

MANUAL No. 7
GENERAL
PROPERTY AND DISBURSING
REGULATIONS
U. S. SIGNAL CORPS
1909

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WAR DEPARTMENT : OFFICE OF THE CHIEF SIGNAL OFFICER

U.S. - Signal Service
MANUAL NO. 7

GENERAL,
PROPERTY, AND DISBURSING
REGULATIONS

SIGNAL CORPS, UNITED STATES ARMY

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WAR DEPARTMENT,
SIGNAL OFFICE,
Washington, D. C., June 1, 1909.

The following general, property, and disbursing regulations have been prepared under authority of act of Congress approved October 12, 1888, which reads as follows:

“Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That from and after the passage of this act every officer of the Signal Corps and all other officers, agents, or persons who now have in possession or may hereafter receive or may be intrusted with any stores or supplies shall quarterly, or more often, if so directed, and in such manner and on such forms as may be prescribed by the Chief Signal Officer, make true and correct returns to the Chief Signal Officer of all Signal Service property and all other supplies and stores of every kind received by or intrusted to them and each of them or which may in any manner come into their and each of their possession or charge. The Chief Signal Officer, subject to the approval of the Secretary of War, is hereby authorized to draw up and enforce in his bureau a system of rules and regulations for the government of the Signal Bureau and of all persons in said bureau and for the safe keeping and preservation of all Signal Service property of every kind, and to direct and prescribe the kind, number, and form of all returns and reports and to enforce compliance therewith.”

These regulations are compiled from orders and circulars of the War Department and Signal Office, and decisions pertaining to property, disbursing and general matters. References to Army Regulations are from the 1908 edition.

JAMES ALLEN,
Brigadier-General, Chief Signal Officer of the Army.

TABLE OF CONTENTS.

	Page.
ARTICLE I.—DUTIES AND PERSONNEL.....	7
Commissioned officers.....	7
Enlisted men.....	9
Furloughs.....	11
Detachments, companies, etc.....	12
Promotion of noncommissioned officers.....	13
Chief signal officers of departments.....	15
Civilian employees.....	17
Traveling expenses.....	19
Electrical engineers and assistants.....	21
ARTICLE II.—ORGANIZATION FOR FIELD SERVICE.....	25
ARTICLE III.—DISBURSING REGULATIONS.....	31
Appropriations.....	31
Unexpended balances.....	32
Annual estimates.....	32
Authorities.....	33
Funds.....	34
Purchases and payments.....	36
Contracts.....	36
Proposals.....	38
Open-market purchases.....	38
Inspection.....	41
Evidence of delivery.....	42
Marking supplies by contractors.....	42
Boxing or packing.....	42
Freight charges.....	42
Vouchers.....	43
Cash payments.....	46
Pay rolls.....	46
Checks.....	47
Cashbooks.....	49
Accounts current.....	49
Cash account.....	50
Administrative officers.....	52
Proceeds of sales.....	52
Settlements for property transferred between Bureaus.....	52
Decisions by Treasury Department.....	53
ARTICLE IV.—PROPERTY ACCOUNTABILITY.....	55
Philippine returns.....	62
American Bell rented telephones.....	63
Typewriters.....	64
Expendable property.....	64

	Page.
ARTICLE V.—REQUISITIONS AND SUPPLY OF PROPERTY.....	67
General depots of supply	68
Storehouses at coast artillery posts.....	72
Packing and shipment of property	76
Decisions concerning issues.....	80
Manuals.....	82
Special vehicles	83
Guidons for signal troops	83
Issues to the organized militia.....	84
War Department telegraph codes.....	86
Equipment issued to line organizations.....	86
Field glasses.....	87
Visual signaling equipment	88
Balloons.....	90
Photography.....	92
ARTICLE VI.—ELECTRICAL INSTALLATIONS	93
Fire-control installations	93
Transfers of fire-control installations.....	96
Post telephone systems at interior posts	97
Telephone systems at coast artillery posts	98
Inspections at interior posts.....	99
Inspections at coast artillery posts	101
Switchboard operators.....	102
Commercial telephone service at military posts.....	103
Telephones	104
Telephone switchboards.....	105
Wireless telegraphy.....	106
Rifle-range equipment.....	107
ARTICLE VII.—CABLES.....	111
Cable repairs.....	112
Inspections.....	112
Official numbers of cables laid	113
Philippine cables.....	113
Alaskan cables	114
United States cables.....	114
Types of cables.....	118
Cable gear and supplies	123
ARTICLE VIII.—STANDARD SUPPLIES.....	127
Line-construction material	127
Wire.....	131
Line-construction tools.....	133
Insulating and splicing materials.....	135
Insulating compounds.....	136
Tool chests.....	137
Electrical instrument case	140
Tool bag	142
Inspector's pocket kit.....	143
Standard specifications.....	143
Blank forms.....	148

GENERAL, PROPERTY, AND DISBURSING REGULATIONS SIGNAL CORPS, UNITED STATES ARMY.

ARTICLE I.

DUTIES AND PERSONNEL.

DUTIES OF THE SIGNAL CORPS.

1. The Chief Signal Officer is charged with the direction of the Signal Corps of the Army; with the control of the officers, enlisted men, and employees attached thereto; with the construction, repair, and operation of military cables, telegraphic and telephonic lines and wireless installations, field telegraph trains, balloon trains, and furnishing and installing instruments and connecting cables used for transmitting information in connection with fire control at seacoast fortifications; with the preparation, distribution, and revision of the War Department telegraphic code; with the supervision of such instruction in military signaling and telegraphy as may be prescribed in orders from the War Department; with the procurement, preservation, and distribution of the necessary supplies for the Signal Corps and for signaling installations of the lake and seacoast defense. He has charge of all military signal duties, and of books, papers, and devices connected therewith, including telegraph and telephone apparatus and the necessary meteorological instruments for target ranges and other military uses; of collecting and transmitting information for the army, by telegraph or otherwise, and all other duties pertaining to military signaling. (A. R. 1574.)

2. The furnishing of time service to posts is not a function of the Signal Corps, but of the Quartermaster's Department. (Dec. C. S. O., Jan. 18, 1905.)

PERSONNEL.

COMMISSIONED OFFICERS.

3. The Signal Corps has an authorized strength of 1 brigadier-general, 1 colonel, 2 lieutenant-colonels, 6 majors, 18 captains, 18 first lieutenants, 36 master signal electricians, 132 sergeants (first class), 144 sergeants, 156 corporals, 552 first-class privates, 168 privates, and 24 cooks; in all, 46 officers and 1,212 enlisted men.

4. An officer of a staff corps or department, or an officer serving therein by detail, will report to The Adjutant-General of the Army

and to the head of his corps or department on the last day of every month, giving his address, a statement of the duties on which he has been employed during the month, the date of his assignment thereto, and the authority by which so assigned. (A. R. 836.)

5. Officers obtaining leaves of absence or permission to delay en route in changing stations from authority other than of the Chief Signal Officer of the Army are directed to promptly notify the signal office, in writing as far as practicable, in advance of such leave or delay and give prospective date of leaving station and of return. Officers while on leave of absence will keep the Chief Signal Officer advised of any change of address in order that they may be communicated with if necessary.

6. Signal officers are enjoined to exercise great care in making recommendations for foreign service. Men of indifferent character or dissipated habits should be kept on duty within the limits of the United States, where they can be disciplined and supervised; nor should men of weak physique be recommended for foreign service. Unsuitable men are a source of weakness and injury either in Alaska or the Philippines, where signal corps men generally serve on detached duty.

7. Commanding officers of signal corps noncommissioned officers, excluding those stationed in the Philippine Islands, who are about to be discharged, will notify the Chief Signal Officer of the Army prior to the discharge of the soldier whether or not he is fully qualified in all respects to perform the duties required of men of his grade and whether or not the continuance of his warrant is recommended. If it is recommended that the warrant be not continued upon reenlistment, the communication should be sent at least three months prior to the date of the soldier's discharge, so as to allow time for a decision to be made and the soldier notified thereof before the date of his discharge.

8. Commanding officers of signal corps companies, excluding those stationed in Alaska and the Philippine Islands, will furnish the Chief Signal Officer of the Army by mail at the end of each month the number of enlisted men in each grade in their companies, both present and absent. This information will be furnished by telegraph by the commanding officers of signal corps companies stationed in Alaska.

9. On the last day of each month, the commanding officer of each signal corps field company will forward to the Chief Signal Officer of the Army, through his commanding officer, a report setting forth the following information:

(a) The enlisted strength of his company, present and absent.

(b) The average number of officers and enlisted men present at drill during the month.

(c) The names of all enlisted men of his company on extra or special duty with the authority for the same.

(d) The duty performed by his company during the month.

(e) Recommendations relative to increasing the efficiency of signal corps field companies or their equipment.

10. On the 1st day of January, April, July, and October, the commanding officer of each signal corps field company will report to the Chief Signal Officer of the Army, through his commanding officer, the following information:

(a) The number of wire reel carts, instrument wagons, and other special vehicles in his company, giving their serial numbers and their condition.

(b) The number of buzzers and telephones, with a statement of their condition.

(c) The number of miles of field and buzzer wire.

(d) The serial number of all wireless sets issued to the company.

(e) The number of public animals.

11. At every permanent station of the Signal Corps the word "Signals" will be the official address of the senior officer, noncommissioned officer, or civilian employee present, and telegraph companies, post-offices, and other proper persons should be duly notified. When telegrams are sent to individual officers, the surname of such individual will precede the word "Signals."

12. An official copy of all serial orders issued by officers in charge of military telegraph lines must be forwarded to the Chief Signal Officer for his information on the date of issue.

ENLISTED MEN.

13. When muster rolls of signal corps men are rendered to The Adjutant-General a copy will also be sent to the Chief Signal Officer of the Army for the information of his office.

14. Whenever an enlisted man of the Signal Corps dies his commanding officer will immediately inform the Chief Signal Officer of the Army by telegraph.

15. Whenever a noncommissioned officer of the Signal Corps is discharged his commanding officer will immediately inform the Chief Signal Officer of the Army by letter and will add the character given on the soldier's discharge. In cases where the soldier expresses an intention to reenlist in the Signal Corps, this report will be delayed until the day following his discharge, when it will state whether or not the soldier reenlisted.

16. All detached enlisted men of the Signal Corps serving at stations in the Departments of the East and Gulf will be attached to and carried on the rolls of the signal corps company stationed at Fort Wood, N. Y.

17. All detached enlisted men of the Signal Corps serving at stations in the Departments of the Lakes, Missouri, Dakota, Colorado, and Texas will be attached to and carried on the rolls of a signal corps company stationed at Fort Omaha, Nebr., the company to be designated by the commanding officer of that post.

18. All detached enlisted men of the Signal Corps serving at stations in the Department of California will be assigned to Company M, Signal Corps, with station at the Presidio of San Francisco, Cal.

19. All detached enlisted men of the Signal Corps serving at stations in the Department of the Columbia other than points in Alaska will be attached to and carried on the rolls of the signal corps company stationed at Valdez, Alaska.

20. Warrants of noncommissioned officers of the Signal Corps may be continued in force only when the soldier reenlists on the day following that of discharge. If a noncommissioned officer or first-class private fails to reenlist on the day following his discharge, but does so within thirty days from the date of discharge, he may upon reenlistment be appointed to the grade formerly held by him, or to a lower grade, as may be determined by the Chief Signal Officer of the Army.

21. Master signal electricians of the Signal Corps should be addressed in writing and referred to in reports under their full titles. They may, however, be verbally addressed "Electrician."

22. In cases where master signal electricians have been assigned to the "post noncommissioned staff," they will be dropped therefrom and transferred to a company of the Signal Corps stationed at the post where the men are serving, or to a signal corps company to which signal corps men, on duty in the territorial department in which the station is located, are attached.

23. Master signal electricians of the Signal Corps will be supplied with the following technical books, for which they will be accountable:

One copy of each manual issued by the Signal Corps.

Electrical Engineers' Pocketbook, "Foster."

Handbook on Engineering, "Tully."

Gas, Gasoline and Oil Engines, "Hiscox."

24. Short-term men will not be recommended for foreign service unless they agree to reenlist upon the expiration of present term of service, and then only when such statement is made in writing. In all such cases the written statement will be forwarded to the Chief Signal Officer of the Army with the recommendation for assignment to foreign service.

25. Enlisted men of the Signal Corps are not entitled to extra-duty pay for services of any kind rendered the Signal Corps except telephone switchboard operators at signal corps posts. For extra-duty pay as a teamster, baker, or similar duty not in the line of signal corps

work, application should be made by the post commander to The Adjutant-General, U. S. Army, requesting authority of the Secretary of War for extra-duty pay. This authority can not be retroactive, and such soldiers are not entitled to extra pay until the date of such authority.

26. When an enlisted man of the Signal Corps is ordered to a station in a territorial department in which the men of that corps are assigned to a company other than that to which the man belongs, his descriptive list required by paragraph 104, Army Regulations, will be made in duplicate, the original to be forwarded to the commanding officer of the station to which the soldier is sent, the duplicate to the commanding officer of the signal corps company to which the soldier's new assignment carries him, for use in the preparation of muster roll of said company.

27. Each enlisted man of the Signal Corps (including all grades) on detached service away from the headquarters of his company will, at the end of each month, prepare a personal report on Form 212. This report will be forwarded by the post signal officer, or other officer in charge, through the post commander, to the commanding officer of his company. The signal corps company commander will note the information given and forward this report to the chief signal officer of the department for file. The chief signal officer of each department, upon receipt of these personal reports of detached enlisted men, will prepare a consolidated statement and include it with his monthly report to the Chief Signal Officer of the Army.

28. Enlisted men of the Signal Corps are expected to perform all duties in connection with the transmission of military information for the use of the army. At military posts it is discretionary with post commanders to require them to assist the post signal officers in the matter of signal instruction, care of the signal corps property, etc., as the former may deem the public interests or special conditions require.

FURLOUGHS.

29. Furloughs granted to enlisted men of the Signal Corps stationed at signal corps posts, will conform to the following periods of time:

To soldiers serving in their first year, not to exceed twenty days, and then only in case of emergency.

To soldiers serving in their second year, not to exceed one month and ten days during first and second years of service.

To soldiers serving in their third year, not to exceed two months during three years of service.

To soldiers immediately reenlisting in the Signal Corps after three years' service, not to exceed three months.

A furlough for more than three months will be granted only to soldiers with foreign service and excellent character, after six years' service without previous furlough, and where urgent need is clearly cited.

Under A. R. 105, it is forbidden to grant a furlough to a soldier about to be discharged.

Commanding officers of signal corps companies will be governed accordingly in forwarding applications for furloughs from members of their companies.

30. Whenever enlisted men of the Signal Corps are returned to the United States, by virtue of a furlough, from the Philippines or Alaska, the Chief Signal Officer of the Army should be notified at once, in writing, and the descriptive list of such soldier forwarded, if from the Philippines, to the chief signal officer, Department of California, and if from Alaska to the chief signal officer, Department of the Columbia. The soldier should also be directed to report his post-office address to the same office and to the Chief Signal Officer of the Army in order that he may be communicated with, if necessary.

31. Hereafter no enlisted man of the Signal Corps will be granted a furlough to visit the United States without being informed that the Chief Signal Officer of the Army will grant no change of station to men on furlough unless such change shall be recommended by the signal officer to whose command the furloughed soldier belongs.

32. No enlisted man of the Signal Corps returning to the United States on furlough will be granted a change of station unless such change shall have been recommended by the signal officer to whose command the furloughed soldier belongs.

DETACHMENTS, COMPANIES, ETC.

33. Detachments of the Signal Corps shall be exempt from detail for any other duty, except when in the judgment of the commanding officer the importance of the duty will not permit exemption. (A. R. 370.)

34. When detachments of the Signal Corps of less than 30 men are on duty at stations garrisoned by other troops, the officers and men of the former will not be required to perform guard duty, and will be required to perform only such police duty as may be necessary around their own barracks, storehouses, and other buildings.

When detachments of the Signal Corps of more than 30 privates form a part of a garrison their officers and men may, in the discretion of the commanding officer, be required to perform the necessary guard duty to protect the storehouses, sheds, stables, parks, and corrals pertaining to the Signal Corps, provided such property can not be properly guarded by including observation thereof in the

duties of sentinel posts or patrols already established. The necessary police duty around such buildings and property will be assigned to enlisted men of the Signal Corps, but they will be exempt from the ordinary police duties of the garrison. (Circ. 48, W. D., 1904.)

35. At ceremonies the position of companies or detachments of the Signal Corps, if dismounted, will be as laid down in paragraph 6, Army Regulations, viz:

On the right of the command to which they are attached.

If mounted, they will form on the other flank. If both engineers and signal corps troops are together, the former, for ceremonies, will form on the right of the latter. (Circ. 36, W. D., 1906.)

PROMOTION OF NONCOMMISSIONED OFFICERS.

36. Promotions and reductions in the Signal Corps are made by the Chief Signal Officer of the Army or by his authority. All enlistments are usually made in the grade of private; but the Chief Signal Officer of the Army is authorized to enlist men in the noncommissioned grades in special cases. Promotions can very rarely be made, except to fill vacancies occurring from time to time, and recommendations for such promotions must be made with unusual caution, the object being to secure the advancement of the most deserving and suitable men.

37. Examinations for the eligible list for promotion to the grades of master signal electrician and first-class sergeant will be held in March of each year. These examinations will be confined to first-class sergeants of not less than one year of excellent and unbroken service in that grade in the case of eligibility for advancement to the grade of master signal electrician, and to sergeants of not less than six months of similar service in the case of eligibility for advancement to the grade of first-class sergeant.

Applications for permission to take these examinations from men serving at points other than in the Philippine Islands must reach the office of the Chief Signal Officer of the Army not later than February 1 of each year, and candidates in the Philippines for these examinations will be designated by the chief signal officer, Philippines Division, and their names must be furnished this office not later than January 1 of each year.

It should be clearly understood that the passing of either of these examinations does not insure promotion, but is only intended to establish in the office of the Chief Signal Officer of the Army a list of men mentally qualified for advancement to the grades mentioned when vacancies occur.

38. Candidates for promotion to the grade of master signal electrician will be examined in the following subjects:

Electricity, theoretical, five questions.
Telegraphy, practical.
Telephony, five questions.
Power and light, five questions.
Primary and secondary batteries, five questions.
Visual signaling, using apparatus, practical.
Visual signaling, five questions.
Algebra, five questions, not including quadratics.
Elementary mechanics, five questions.
Steam engineering, five questions.
Gas and oil engines, five questions.
Army regulations, five questions.

39. Candidates for promotion to the grade of first-class sergeant will be examined in the following subjects:

Electricity, theoretical, five questions.
Telegraphy, practical.
Telephony, five questions.
Primary and secondary batteries, five questions.
Visual signaling, using apparatus, practical.
Visual signaling, five questions.
Arithmetic, five questions.
Army Regulations, five questions.
Wiring diagrams, five questions.
Telegraph administration, five questions.

40. In each of these examinations the candidate's "general adaptability" will be given a weight of 25 in the general average and will be determined from length and character of service, recommendations, and special qualifications. All other subjects combined will be given a weight of 75.

The questions in the subjects of electricity, telephony, and primary and secondary batteries will embrace only subjects treated in Signal Corps Manual No. 3.

The subject of practical telegraphy will consist of a test in sending and receiving American Morse, the results to be reported in words per minute, counting five letters to each word.

The results of the practical test in visual signaling will be reported in the number of letters correctly sent and received per minute.

The questions in visual signaling will embrace only matter covered in Signal Corps Manual No. 6.

The subject of Army Regulations will cover only portions pertaining to the signal corps company administration, military organizations, and matters affecting the pay, rations, and equipment of enlisted men.

The questions in the subject telegraph administration will embrace matter covered in Signal Corps Manual No. 2.

CHIEF SIGNAL OFFICERS OF DEPARTMENTS.

41. At the end of each fiscal year, or as soon thereafter as possible, the chief signal officer of each department in the United States will prepare an annual report, addressed to the Chief Signal Officer of the Army, which will comprise a summary of all the monthly reports during the year, and, in particular, recommendations for the employment of Signal Corps in that department for the following year. It will include a statement of branch commercial telegraph offices at military posts.

42. On the last day of each month, or as soon thereafter as possible, the chief signal officer of each department will render a report, addressed to the Chief Signal Officer of the Army, to include the following:

Progress in construction of post telephone systems, with references to material on outstanding requisitions which appear to be unusually delayed.

Report of line receipts, number of messages handled, and classes of messages at each military telegraph office in that department.

A statement of civilian employees, with their stations and duties, except such as may be employed at general supply depots of the Signal Corps.

A statement of enlisted men of the Signal Corps detached from signal corps posts, with their stations and duties.

A report of interruptions to military telegraph lines of more than one-half day, with duration, cause, etc.

Departments in which fire-control installations are in progress at coast artillery posts, the monthly report should include a statement of the progress at each post, with the percentage of completion.

43. In addition to the above, the chief signal officer, Department of the Columbia, in charge of the Alaskan telegraph and cable system, will include a report of cable operations, transfer of money by telegraph, the amount of press messages handled, stations and duties of officers and enlisted men of line organizations serving with the Signal Corps, telegraph offices opened and closed, and all other matter which should be of record in the office of the Chief Signal Officer of the Army.

In the Department of the Columbia the statement of enlisted men on detached service will include only those at posts in the United States, and not the operators and linemen throughout Alaska.

44. The chief signal officer, Philippines Division, will render monthly and annual reports as prescribed in the preceding paragraphs for chief signal officers of departments, and in addition thereto will report concerning the changes in telegraph offices, lines, and cables, and telegraph line receipts of the bureau of posts as well as Signal Corps.

45. Officers in charge of divisions of military telegraph lines in the United States and Alaska, who, under existing orders, render

accounts current of telegraphic receipts to the Chief Signal Officer of the Army, will furnish to the chief signal officer of the department in which the lines may be located or to those officers specially designated to have charge of these lines a copy of their monthly account current without vouchers. This copy will be forwarded at the same time as the copies sent to the Chief Signal Officer of the Army.

46. The signal officer to whom the copies mentioned in the foregoing paragraph are forwarded will keep in his office a ledger account showing the amount received each month by each officer, the amount transmitted or deposited, the amount remaining on hand, and such details as may be considered necessary.

47. It will be a part of the duties of the department chief signal officer or other designated officer to see that the officers and noncommissioned officers responsible for telegraph receipts deposit or transfer these receipts promptly. In case of delays proper instructions should be issued to correct such delinquencies and prevent their recurrence.

48. Accounts current relating to the Philippine telegraph system will be forwarded to and adjusted in Manila in such a manner as the chief signal officer of the division may direct. He will, however, forward to the Chief Signal Officer of the Army an abstract showing the total amount received, transferred, deposited, etc., for each month, the above abstract to be forwarded as soon as the accounts for all stations have been examined and adjusted.

49. Department chief signal officers will make the necessary arrangements for the inspection of post telephone systems by competent inspectors. Telephone systems at interior posts will be inspected twice annually under the provisions of paragraph 11, General Orders, 97, War Department, 1906, and reports of the inspections rendered on Form No. 209, edition April 9, 1909.

In departments containing seacoast fortifications, General Orders 83, War Department, 1909, require all signal corps equipment at each seacoast fortification to be inspected and tested, if practicable, during the months of April, May, or June of each year by the chief signal officer of the department.

50. Chief signal officers of departments are directed to promptly advise the Chief Signal Officer of the Army of the names of all the officers or enlisted men assigned to duty as storekeepers of signal-corps property, either for general use or for fire-control purposes, so that proper check of property received or issued by them may be made in the examination of property returns.

51. On June 30 and December 31 of each year each chief signal officer of a department will submit a report to the Chief Signal Officer of the Army covering the general efficiency of each civilian employee

of the Signal Corps serving under his supervision, as provided in paragraph 65, this manual.

52. The chief signal officer of each department will recommend to the Chief Signal Officer of the Army on April 30 of each year the number of switchboard operators (to whom extra-duty pay will be paid) required at each post in the department to efficiently operate signal corps switchboards. The assignment of switchboard operators receiving extra-duty pay at switchboards owned by commercial companies is unauthorized.

Chief signal officers of departments will report all violations of paragraph 553, Manual No. 7.

53. It is the duty of the department chief signal officer to carefully scrutinize the reports of post telephone inspections and see that the provisions of paragraphs 539-544 have been complied with. Should inspectors recommend that additional material be supplied, to increase the efficiency of post systems, the department chief signal officer should take the necessary steps to insure that requisitions for the necessary materials are promptly submitted.

54. It is the duty of the department chief signal officer to investigate each requisition for signal equipment and supplies, forwarded through his office, and to indorse thereon his recommendation concerning the material to be furnished. In each case where requisitions contain insufficient information concerning articles required, the requisitions should be returned to the posts for the information necessary to make issue possible. Much of the delay incident to the issue of signal equipment and supplies is due to insufficient data given on requisitions.

55. Chief signal officers of departments, and officers in charge of signal corps general supply depots, will submit to the Chief Signal Officer of the Army, an annual estimate of expenses to be paid from signal service appropriations to reach the Chief Signal Officer of the Army not later than June 1 of each year, and should cover expenses for the fiscal year beginning the 1st of July following. The chief signal officer, Philippines Division, will forward this estimate for the departments in the Philippine Islands.

56. Estimate for funds will be submitted by the chief signal officers of departments and will include all funds required by disbursing officers in the department.

CIVILIAN EMPLOYEES.

GENERAL PROVISIONS.

57. The general regulations concerning appointment, promotion, dismissal, the payment, traveling expenses, etc., of all civilian

employees of the War Department are set forth in article LVII, Army Regulations.

58. Temporary employment of a civilian for not to exceed thirty days to fill a vacancy in an existing permanent position in the service outside of Washington will be authorized when necessary by the Chief Signal Officer of the Army upon telegraphic application. The date of employment and the date of discharge to be immediately reported to the Chief Signal Officer of the Army by letter. In case the services of the temporary employee are required for more than thirty days, special authority must be obtained from the Civil Service Commission, and application therefor should be made to the Chief Signal Officer of the Army.

59. When the services of noneducational employees, such as carpenters, cable splicers, wire men, etc., are required, appointments may be made from the registers of the local civil-service boards of the Engineer Department at large. Upon application to the Chief Signal Officer of the Army the central civil-service board, Office of the Chief of Engineers, will be requested to instruct the secretary of the local board in the vicinity of the work to furnish a copy of his register of eligibles to the officer in charge where the vacancy exists.

60. The rules now governing appointments, changes in status and reports of noneducational employees in the Engineer Department at large, as laid down in Circular 14, Office Chief of Engineers, 1902, are to govern appointments, etc., in the Signal Corps of those selected from the Engineer Department registers of eligibles and the authority delegated therein to the Chief of Engineers shall apply to the Chief Signal Officer in fixing the status of these employees. These rules are set forth in Engineering Circular A-25, office of the Chief Signal Officer of the Army, April 11, 1908.

61. Under date of April 7, 1906, the Civil Service Commission granted authority to make temporary job appointments of mechanics and skilled tradesmen or laborers who are employed on construction and repair work in the Signal Service at large. Such appointments can not be extended beyond a period of three months without the prior approval of the commission. This authority applies only to persons engaged in construction or repair work in the field under such conditions that it would be practically impossible to fill the vacancies through certification by the Civil Service Commission or local boards.

62. Monthly reports showing all employments, discharges, and other changes in status of signal corps employees will be prepared on form 26, and mailed to the Chief Signal Officer of the Army so as to reach his office not later than the 10th of the month following the period covered. When an employee in the service at large is transferred

from one department to another, the date of his departure, last date for which he has been paid, and the amount of annual and sick leave taken by him during the current calendar year will be promptly reported by letter to the Chief Signal Officer of the Army. The date of arrival at new station will be similarly reported.

63. Copies of civil-service rules and civil-service regulations governing the employment of laborers will be furnished by the Chief Signal Officer of the Army upon request.

64. Under no condition should employment be made, except under the authority indicated in the preceding paragraphs, without previously communicating with the Chief Signal Officer of the Army and obtaining special authority therefor.

65. On June 30 and December 31 of each year every signal officer will submit a report to the Chief Signal Officer of the Army covering the general efficiency, habits, attendance, etc., of each civilian employee of the Signal Corps serving under his supervision, stating whether or not he should be continued and giving such other information as will serve to determine his fitness for the position he holds. Officers detailed as property officers at general supply depots of the Signal Corps will render similar reports of the civilian employees at their respective depots direct to the Chief Signal Officer of the Army.

TRAVELING EXPENSES.

66. The attention of the civilian employees of the Signal Corps is called to the propriety and necessity of exercising strict economy in expenses incurred on journeys under orders. No employee should impose on the United States a greater expense than he would incur if traveling on his own business. Extraordinary and unusual expenses will be noted against the records of employees unless such are accompanied by evidence of imperative necessity. Usually his station will be changed when an employee is to be on duty a month or more at any one point.

67. Regulations concerning traveling expenses for civilian employees are covered by paragraphs 735 to 742, Army Regulations.

Paragraph 736, Army Regulations, 1908, was amended by General Orders 72, W. D., 1909, to read as follows:

4. Cost of meals, including tips, not to exceed \$4.50 a day while en route when meals are not included in the transportation fare paid, and not to exceed \$4.50 a day for meals, tips, and lodgings during necessary delay en route, and when meals are included in the transportation fare paid, tips for meals not to exceed 15 cents each.

5. Costs of meals and lodgings including baths, tips, and laundry work, not to exceed \$4.50 a day while on duty at places designated in the orders for the performance of temporary duty.

68. While the allowance of \$4.50 per day for meals and lodging does not specify the proportion allowable for each, and, similarly, the allowance of \$4.50 for meals en route does not limit the rate to be paid for each meal, any charge which appears to be unreasonable or exorbitant under the circumstances, will be disallowed.

69. *Expense accounts.*—The attention of all civilian employees of the Signal Corps is invited to the following important rulings concerning expense accounts:

(a) It is held that under no circumstances is an employee privileged to pay a rate which might be construed to be higher than the rate usually paid for like accommodations.

(b) It is held that expenses incurred under such circumstances as to appear to be of advantage to persons other than the employee signing them are irregular and contrary to the law.

70. Accounts covering expenses of civilian employees, Signal Service at large, will be rendered at the end of each month.

71. The Quartermaster-General has ruled that Form 13½ (Quartermaster's Department), accompanying expense accounts, must be made out in *ink*. They will not be accepted if filled out on the *typewriter*.

72. When ordered to temporary duty, each civilian employee is allowed his *actual* expenses to an amount not exceeding \$4.50 per diem.

In order to insure prompt reimbursement of this money, the following points must be noted:

1. Receipts are required for running expenses in all cases where the length of stay in one place exceeds one day. Receipts are invariably required for lodging.

2. The account must be so made out that it shows clearly the expenses for each day, since the allowance is literally \$4.50 for each day, and any amount in excess for any one day will not be reimbursed, even though the total expenses for the trip do not average \$4.50 per diem.

3. The account must be made on blanks and forms as shown in Signal Corps Memorandum No. 6, with all certifications, etc., appearing thereon.

The expenses are reimbursed by the Quartermaster's Department and should in all cases be requested paid through the signal officer under whom they are incurred.

73. When traveling to change station for any duty which requires the use of tool chests or instrument cases on arrival and there is not sufficient time to ship by freight, apply to the chief signal officer of the department requesting the authority of the chief quartermaster of the department for shipment by express. If the travel order authorizes such shipment by express, no application is necessary. When proper authority has been obtained, the Quartermaster's Department will ship by express on government bill of lading.

ELECTRICAL ENGINEERS AND ASSISTANTS.

74. Classes of work.—Assistant electrical engineers may be detailed as follows:

(a) In the office of the Chief Signal Officer of the Army or chief signal officer of a department in charge of or as assistant in technical matters pertaining to fire-control installations.

(b) In the office of the Chief Signal Officer or chief signal officer of a department on inspection or similar work.

(c) In an artillery district in general charge of fire-control installations.

(d) In an artillery post as overseer.

75. Electrical assistants may be detailed as follows:

(a) In the office of the Chief Signal Officer or chief signal officer of a department assisting the electrical engineers and on inspections of similar work.

(b) In an artillery post as overseer.

(c) In an artillery post as assistant to the overseer.

76. Duties.—When employed in the office of the Chief Signal Officer a civilian employee will receive all orders through the officer designated by the Chief Signal Officer.

When employed on fire-control installations the following instructions will be observed:

(a) All permanent civilian employees may be called upon for duty in technical charge of fire-control installations and when so acting will be designated as “overseers.”

(b) All civilian employees of the Signal Corps on fire-control installations will be under the direct control of the overseer.

(c) In case an engineer of higher rank than the overseer is temporarily assigned to an installation he will confer with the overseer, but will not interfere with the *direct control* of the latter unless written instructions are issued to both to that effect.

(d) When a civilian employee proceeds to an artillery post to install apparatus under a scheme approved by the War Department he should report first to the post commander, stating what his instructions are. The district commander will, usually, have had previous notice of the assistant’s coming and will make provision for his work.

(e) Throughout the installation it shall be the aim of the employee to maintain harmonious relations with all of the other departments, and he should request prompt official attention in case it is indicated to him that any part of the approved installation does not meet with local approval.

77. Whenever a signal officer is charged with such technical duties as require for a definite time the entire services of an electrical engineer or other of the force above named, the employee will be assigned to duty for a definite period with the designated officer. When these employees are acting under the immediate orders of a signal officer they will from time to time file such reports with that officer as may be prescribed by him.

78. Assistant electrical engineers, or electrical assistants, in charge of signal corps work must promptly notify the officer to whom they report of the date any employee of the Signal Service at large reports for duty; also the date of departure from the district or termination of the services of such employee.

79. The senior engineer, or electrical assistant acting as such, in each artillery district will cause *all vouchers for services* to be turned in to him several days before the period at which they must be forwarded to the officer in charge of the installation for certification. On the last day of the period covered by the vouchers the engineer in charge will inclose them with a letter naming the vouchers, and adding that he has examined the same and that the services have been rendered, as stated.

80. Allowance should be made for delays in shipments, as well as the time required for requisitions to go through proper channels, and under no conditions should there be less than one month's supplies in the main storeroom.

81. Property issued to each assistant on regular invoices is usually preceded by a quartermaster's notice of shipment, which requires no action, and should be followed in a reasonable time with duplicate invoices signed by the issuing officer and duplicate receipts, which latter should be signed and returned to the officer whose name they bear.

When property is transferred by an assistant to authorized parties, similar invoices should be used, with accompanying receipts.

82. All matters pertaining to the work of installation or to matters of policy must be transacted through the signal officer to whom the assistant reports.

83. *Miscellaneous.*—Each assistant electrical engineer and electrical assistant should have the following tools and supplies, for which he is personally responsible:

1 electrical engineer's tool chest.	1 copy S. C. memorandum No. 6, in binder.
1 empty service tool bag.	1 binder for engineering circulars.
1 portable voltmeter, 0-5, 0-150.	1 binder for blueprints.
1 volt-ammeter.	Typewriters are issued when needed.
1 copy Kent's Mechanical Engineer's Pocket Book.	Chests, packs, leatheroid, for books and instruments will be issued as required.
1 copy Foster's Electrical Engineer's Pocket Book.	
1 copy each S. C. manual.	

Electrical instruments for cable testing are kept at department headquarters and are issued on memorandum receipt during the time they are actually in use. When the testing is completed these instruments should be shipped back to headquarters.

84. The tools listed under personal equipment are intended to be kept in the possession of the assistant during his service in the Signal Corps, and all special or construction tools needed on work with which he is connected, as well as all tools used by enlisted men or temporary employees, will be furnished by the signal corps storekeeper as required.

85. When acting in the capacity of overseer, either for a post or district, the assistant will be expected to check the condition of all storehouses and tool chests, both as to care taken with the equipment and as to the need for renewal.

86. Civilian employees of the army are authorized to purchase certain articles of clothing and fuel from the Quartermaster's Department (A. R., 1063) and subsistence supplies (A. R., 1263) under a certain condition set forth in these paragraphs.

87. Civilian employees at military posts are entitled to medical attendance under such regulations as the Surgeon-General may establish. (See A. R., 1475-1477.)

88. When it is absolutely necessary that a telegram be sent, a blank form (Quartermaster's Department Form 87) should be procured through the post adjutant, the telegram signed by the assistant, countersigned by an army officer, and then presented to any telegraph office for transmission. Care should be taken to make telegrams clear and brief. The name of the telegraph company must be entered on the blank. The blanks are always to be had at army posts.

89. In case orders are received from any officers at artillery posts which are apparently improper or in conflict with the employee's orders or instructions, the proper procedure is to obey promptly, reporting the matter immediately to the signal officer under whom he is serving, such report to be by telegraph only in extraordinary cases. It is enjoined that all employees use great care to avoid friction in their relations with officers.

90. Electrical engineers and other technical employees of the Signal Corps while serving on transports or other Government vessels used as cable ships are entitled to subsistence in the same manner as employees of the Quartermaster's and Commissary departments serving thereon.

91. *Personal reports.*—(a) Each assistant electrical engineer and electrical assistant shall send to the Chief Signal Officer of the Army, through the chief signal officer of the department in which he is employed, at the end of each month, a personal report on Form 210,

24 GENERAL, PROPERTY, AND DISBURSING REGULATIONS.

(b) Each assistant acting as overseer of construction shall report weekly to the signal officer under whose direction the work is being done.

(c) The following printed signal corps forms are furnished on requisition in connection with the work of civilian employees engaged on fire-control installations:

- No. 22. Pay Roll of Civilian Employees.
- No. 26. Report of Changes, Civilian Employees.
- No. 63. Requisition for Fire-Control Maintenance Material.
- No. 66. Single Sheet Property Return.
- No. 67. Invoice or Receipt Combined.
- No. 210. Report of Civilian Employees.
- No. 243. Cable Card.
- No. 261. Cable Record.
- No. 262. Conductor Record.
- No. 263. Storage-Battery Inspection Report.
- No. 264. Report on Progress of Installation.

Quartermaster Department Form No. 13½ is necessary in rendering expense accounts. This form should be obtained through the officer in charge of the fire-control installation.

ARTICLE II.

ORGANIZATION FOR FIELD SERVICE.

97. The senior signal officer of an army in the field commands the signal parties serving therein. Orders affecting them will be transmitted through him, and he will be responsible that they are fully instructed, adequately supplied, and that they properly perform their duties. He will keep himself informed of the position of the army and of the enemy, and, under the instruction of the general commanding, will establish his stations. He will submit reports of operations to the general commanding and forward copies thereof to the Chief Signal Officer in Washington, to whom he will report monthly his station, the strength and condition of his parties, and all other matters pertaining to their duties and equipment. (A. R. 1576.)

98. Upon the recommendation of the Acting Chief of Staff the Acting Secretary of War, on September 16, 1907, approved the following as a provisional organization for the Signal Corps serving with a division of troops in the field:

3 captains.	30 corporals.
9 lieutenants.	135 privates, first class.
9 master signal electricians.	60 privates.
30 sergeants, first class.	6 cooks.
30 sergeants.	

For the purpose of administration these men may be organized into companies of such strength as to best meet existing conditions.

The following transportation is provisionally approved for the signal corps troops attached to a division:

100 riding horses.	6 construction wagons (escort), 4 mules each.
6 wire reel carts, 2 horses each.	4 escort wagons (general transportation), 4 mules each.
5 wire wagons, 4 mules each.	9 pack mules.
7 lance trucks, 4 mules each.	
6 instrument wagons, 2 mules each.	
3 instrument wagons, 4 mules each.	

99. As authorized above, the Chief Signal Officer announces the organization of companies for purposes of drill, administration, and equipment, as follows:

A COMPANY.

1 captain.	10 corporals.
3 lieutenants.	45 privates, first class.
3 master signal electricians.	20 privates.
10 sergeants, first class.	2 cooks.
10 sergeants.	

A company of 100 men, as enumerated above, will be considered a normal organization. However, in the field the number of enlisted men will be greater or less, as the nature of the service and existing conditions may require.

100. The number of signal corps troops authorized for a division is therefore equivalent to three companies. In order to distribute the duties equitably and provide suitable equipment for each company, the companies will be designated as "Field," "Telegraph," and "Base Line." The scope of duties, equipment, and normal distribution of transportation will be as follows:

101. *Field Company*.—Will provide lines of information for tactical use during combat, maneuvers, rapid marches, etc. Each Field Company will be provided with suitable equipment to furnish communication for a division by visual signaling, wireless telegraphy, and tactical field lines. The amount of equipment will be sufficient for a Field Company to construct, operate, and maintain 40 miles of field wire lines, 30 miles of buzzer wire lines, three portable wireless telegraph stations (normal radius 20 miles), and six visual signaling stations.

TRANSPORTATION.

90 riding horses.	|	2 escort wagons (general transportation), 4 mules each.
6 wire reel carts, 2 draft horses each.		9 pack mules.
3 instrument wagons, 4 mules each.		

102. *Telegraph Company*.—Will provides lines of information for administrative purposes, such as camp telephone systems, serving staff departments, supply depots, hospitals, etc. Each Telegraph Company will be provided with suitable equipment to furnish communication for a division by visual signaling, and lance or semi-permanent lines for telephone and telegraph service. The amount of equipment will be sufficient for the company to construct, operate, and maintain 40 miles of lance lines and six visual signaling stations.

TRANSPORTATION.

10 riding horses.	|	4 construction wagons (escort), 4 mules each.
3 wire wagons, 4 mules each.		1 escort wagon (general transportation), 4 mules.
4 lance trucks, 4 mules each.		
3 instrument wagons, 2 mules each.		

103. *Base Line Company*.—Will provide lines of information from the base of an army along the routes of supply to the distribution points and connections to commercial telegraph and cable systems. Each Base Line Company will be provided with suitable equipment to construct, operate, and maintain telegraph and long-distance

telephone over permanent or semipermanent lines, 50 miles of three wires, and two wireless-telegraph stations, 1 kilowatt, having a normal radius of 100 miles. Details from this company will assist in the administration of signal corps depots of supply at bases and distribution points.

TRANSPORTATION.

- | | |
|--|---|
| <p>2 wire wagons, 4 mules each.
 3 lance trucks, 4 mules each.
 3 instrument wagons, 2 mules each.</p> | <p>2 construction wagons (escort), 4 mules each.
 1 escort wagon (general transportation), 4 mules.</p> |
|--|---|

104. The drivers for the wire reel carts and instrument wagons will be enlisted men of the Signal Corps. These are special vehicles supplied by the Signal Corps.

105. Each cavalry division will have two Field Companies and one Telegraph Company, all mounted.

106. When one company is required to provide all classes of service—viz., Field, Telegraph, and Base Line—suitable equipment will be furnished accordingly.

107. The Base Line Companies will usually be assigned for duty under direction of the chief of telegraph and telephone service of the bases and lines of communication, instead of serving with a division.

108. A balloon company will be assigned to each army corps, army, or expeditionary force as circumstances warrant. The balloon company will serve under the immediate direction of the Chief Signal Officer of the Army in the field.

109. A division in camp, when practicable, will be supplied with the following telephone service by the Signal Corps: One telephone at each brigade headquarters, headquarters of divisional cavalry, headquarters of divisional artillery, engineer battalion, quartermaster supply depot, commissary supply depot, headquarters Signal Corps, division headquarters (two phones), each field hospital, corral of ammunition and supply train, and to each regimental headquarters when the amount of material on hand warrants.

110. The following will be considered the equipment for a Field Company unless the duties required of a particular company necessitate additions. This list is subject to change to conform to improvements in field equipment.

- | | |
|--|---|
| <p>6 axes.
 6 axes, extra helms for.
 6 belts, lineman's tool.
 3 boards, letter.
 100 books, field message.
 15 buzzers, cavalry.
 15 buzzers, field.</p> | <p>100 cartridges, carbide.
 48 cartridges, Very, red.
 48 cartridges, Very, white.
 48 cartridges, Very, green.
 16 cells, dry, No. 6, Reserve.
 16 cells, dry, No. 5, Reserve.
 150 cells, dry, No. 4-0, Reserve.</p> |
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- | | |
|---|--|
| <p>30 cells, dry, for cavalry buzzers.
 1 chest, post tool.
 8 chests, pack.
 2 clamps, splicing, combination wire and sleeve.
 4 pairs climbers with straps.
 6 compasses, box.
 20 connectors, buzzer, model "A."
 4 pounds $\frac{3}{4}$-inch cord, Samson spot.
 6 disks, cipher.
 1,000 envelopes, message.
 12 glasses, field, day and night.
 2 glasses, field, 10 Terlux.
 3 grips, Buffalo, with pulleys.
 12 handles, extra, for hatchets.
 12 hatchets.
 6 heliographs.
 20 kits, inspector's pocket.
 6 kits, flag, 4-foot.
 6 kits, flag, 2-foot.
 30 knives, brush-cutting.
 50 knives, electrician's.
 10 lanterns, coal oil.
 6 lanterns, field, acetylene.
 25 lbs. nails (assorted).
 1 oil can, 5-gallon.
 12 payout handles.</p> | <p>25 ptkes, wire.
 1 gross pencils, copying.
 6 pistols, Very.
 16 pliers, 6-inch.
 8 pliers, 8-inch.
 8 reels, breast.
 3 relays, pocket, 150-ohm.
 3 relays, box sounding, 150-ohm.
 10 rockets, sequence.
 10 rockets, yellow smoke, parachute.
 30 rods, ground.
 2 sets induction field telegraph.
 1 soldering outfit, small.
 12 spectacles, smoked.
 20 pounds tape, insulating.
 4 telephones, field.
 6 telescopes, complete with holder.
 4 voltmeters, pocket, 0-6 volts.
 6 wire reel carts.
 54 miles wire, field, 11-strand.
 30 miles wire, buzzer.
 1,000 feet wire, outside, twisted pair.
 2 wireless-telegraph sets, pack, each consisting of trunk set of instruments, antennae, hand generator or storage battery.
 1 portable charging outfit.</p> |
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FOR EACH WIRE REEL CART.

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| <p>1 can, oil, steel, pint.
 1 chisel, cold, 6-inch.
 1 crank, reel cart.
 1 hammer, carpenter's.
 2 pads, hand, leather.</p> | <p>2 pliers, side-cutting, 8-inch.
 1 screwdriver, 6-inch.
 1 wrench, alligator, 8-inch.
 1 wrench, cart wheel.
 1 wrench, monkey, 8-inch.</p> |
|---|--|

ORDNANCE DEPARTMENT SUPPLIES.

- 1 pick, intrenching, for each reel cart. | 1 spade, intrenching, for each reel cart.

QUARTERMASTER'S DEPARTMENT SUPPLIES.

- | | |
|--|--|
| <p>1 forge, field.
 1 anvil.
 90 riding horses.
 Stationery supplies.
 2 sets wheel harness for each wire reel cart.</p> | <p>2 sets wheel harness for each instrument wagon.
 2 sets lead harness for each instrument wagon.</p> |
|--|--|

111. The following will be considered the equipment for a Telegraph Company unless the duties required of a particular company

necessitate additions. This list is subject to change to conform to improvements in field equipment.

40 arresters, lightning, Mason, fuse type.	10 lanterns, coal oil.
12 axes.	8 lanterns, field, acetylene.
12 axes, extra helves for.	2 mortars.
12 bars, crow.	1 keg nails, 10d.
2 bars, digging.	1 keg nails, 20d.
12 belts, lineman's tool.	1 nailpuller.
100 books, field message.	12 8-inch pliers.
1,000 blanks, message, sending.	2 picks, 7-pound, with handles.
1,200 blanks, message, receiving.	1 gross pencils, lead.
3 boards, letter clip.	1 gross pencils, copying.
500 brackets, oak.	1,200 poles, lance.
4 buzzers, field.	2 reels, payout.
2 cabinets, L. A., for portable field switchboard.	1 reel, pick-up.
200 cartridges, carbide	2 relays, standard, 150-ohm.
40 cells, type "V."	3 relays, box sounding, 150-ohm.
40 cells, dry, No. 5, Reserve.	40 renewals, for type "V" cells.
150 cells, dry, No. 6, Reserve.	10 rockets, sequence.
20 cells, dry, 4-0, Reserve.	10 rockets, yellow smoke, parachute.
1 chest, post tool.	50 rods, ground.
15 chests, pack.	6 10-inch screw-drivers.
1 chest, tool, electrical engineer's.	2 sounders, 4-ohm.
12 clamps, splicing, combination wire and sleeve.	1 switchboard, telegraph, 3 line.
3 clocks, alarm.	2 switchboards, portable, telephone, 10-drop.
6 pairs climbers, with straps.	1 switchboard, 50-drop, telephone.
3 compasses, prismatic.	2 shovels, 6-foot.
6 pounds $\frac{3}{4}$ -inch cord, Samson spot.	4 switchboards, telegraph, 1 line.
6 disks, cipher.	Stationery, office, assorted.
1,500 envelopes, message.	20 shells, red.
200 fuses, for Mason L. A.	20 shells, white.
12 glasses, field, day and night.	20 shells, amber smoke, parachute.
2 glasses, field, 10 Terlux.	4 sets induction field telegraph.
6 pairs grips, Buffalo, with pulleys.	12 spectacles, smoked.
12 hatchets.	2 telephones, cut-in.
12 handles, extra, for hatchets.	4 tables, folding, telegraph.
2 handles, extra, for 6-foot shovels.	10 telephones, desk sets, L. B.
2 handles, extra, for 7-pound picks.	30 telephones, field.
6 heliographs.	6 telescopes, complete, with holder.
3 hooks, message.	2 typewriters.
240 insulators, clamp.	1 voltmeter, pocket, Eldredge.
960 insulators, pigtail.	50 miles wire, G. I., No. 14.
500 insulators, pony, porcelain.	1,500 feet wire, outside twisted, pair.
12 kits, inspector's pocket.	1 wringer and pan, for copying.
10 kits, flag, 4-foot.	1 wireless telegraph set, pack.
20 kits, flag, 2-foot.	1 portable hand generator.
50 knives, brush-cutting.	1 set storage batteries (8 cells).
	1 portable charging outfit.

112. The following will be considered the equipment for a Base Line Company unless the titles required of a particular company necessitate additions. The list is subject to change to conform to improvements in field equipment.

- 50 ammeters, lighting, Mason, five type.
- 38 axes
- 38 axes extra, handles for.
- 12 axes, saw
- 24 axes, felling.
- 20 axes, diamond tool.
- 100 axes, field message, pairs.
- 5000 axes, message, sending.
- 5000 axes, message, receiving.
- 10 boards, letter, 10
- 1000 brackets, box.
- 2 cabinets, L. A., for portable field microphone.
- 200 cartridges, cartridge.
- 200 cans, type 4 1/2
- 40 cans, dry, No. 5. Reserve.
- 100 cans, dry, No. 6. Reserve.
- 2 chains, post tool.
- 15 chains, pack.
- 1 chain, tool, electrical engineer's.
- 20 clamps, splicing, combination wire and splice (connectors).
- 10 clocks, alarm.
- 10 pairs, climbers with straps.
- 2 compasses, box.
- 30 pounds 3/4 inch cord, Samson spot.
- 1,500 crossarms for iron poles, with bolts.
- 6 disks, cipher.
- 3,000 envelopes, message.
- 200 fuses, for Mason L. A.
- 12 glasses, field, day and night.
- 2 glasses, field, 10 Tertux.
- 20 pairs grips, Buffalo, with pulleys.
- 18 handles, extra, for hatchets.
- 48 handles, extra, for 6-foot shovels.
- 2 handles, extra, for 7 pound picks.
- 12 hatchets
- 6 heliographs, field.
- 100 insulators, clamp.
- 400 insulators, pigtail.
- 1,000 insulators, pony, porcelain.
- 12 kits, inspector's pocket.
- 10 kits, flag, 4 foot.
- 20 kits, flag, 2 foot.
- 60 knives, brush cutting.
- 1 letterpress
- 10 lanterns, coal oil
- 1 lamp, Rochester
- 1 lantern, field, acetylene
- 20 message books.
- 2 mortars.
- 1 mess, table, 10x1.
- 1 mess, table, 20x1.
- 1 nail puller.
- 10 3-inch pliers.
- 2 picks, 7-pound, with handles.
- 1 cross pencils, lead.
- 1 cross pencils, copying.
- 1000 poles, iron.
- 50 poles, zinc.
- 3 poles, pipe, 12-foot.
- 3 poles, pipe, 18-foot.
- 1000 plugs, for iron poles.
- 4 reels, payout.
- 2 reels, pick-up.
- 2 relays, standard, 150-ohm.
- 10 relays, box sounding, 150-ohm.
- 200 renewals, for type "V" cells.
- 10 rockets, sequence.
- 10 rockets, yellow smoke, parachute.
- 50 rods, ground.
- 20 10-inch screw-drivers.
- 6 sounders, 4-ohm.
- 10 switchboards, telegraph, 2 line.
- 1 switchboard, telegraph, 6 line.
- 2 switchboards, portable telephone, 10 drop.
- 24 shovels, 6-foot, straight.
- 24 shovels, 6-foot, spoon.
- Stationery, office, small assortment.
- 30 shells, red.
- 30 shells, white.
- 30 shells, amber smoke, parachute.
- 6 sets, induction field telegraph.
- 12 spectacles, smoked.
- 6 telephones, cut-in.
- 10 tables, folding, telegraph.
- 10 telephones, desk sets, L. B.
- 30 telephones, field.
- 6 telescopes, complete, with holder.
- 4 typewriters.
- 1 voltmeter, portable, Weston, standard, model No. 1.
- 170 miles wire, G. I. No. 14.
- 2,000 feet wire, outside twisted, pair.
- 1 wireless telegraph set, 1 kilowatt, wagon (100 miles approximate).
- 12 wrenches, monkey, 10-inch.
- 10 wringers, and pans for copying.

ARTICLE III.

DISBURSING REGULATIONS.

123. Disbursing officers of the Signal Corps and others who may make purchases or engage services on account of the Signal Corps are enjoined to inform themselves of the Army Regulations, as amended by general orders, concerning purchase of supplies and engagement of services, advertisement for proposals, awards, forms of agreement, contracts, etc.

124. Disbursing officers should provide themselves with the following forms:

1. Estimate of Funds Required.
2. Advertisement for Proposals.
5. Abstract of Proposals.
6. Abstract of Expenditures.
8. Abstract of Articles Purchased for Immediate Expenditure.
9. Abstract of Articles Purchased and Paid For.
10. Cash Account.
11. Account Current.
12. Voucher for Personal Services (original and memorandum attached).
13. Contract (articles of agreement).
Report of Open-Market Purchases and Procurements Exceeding \$100.
(Furnished by Supply Division, War Department, Form 18a.)
19. Letter of Transmittal and Receipt for Check.
22. Pay Roll for Personal Services.
27. Shipper's Receipt.
28. Vouchers for Purchases and Services other than Personal (original and memorandum attached).
29. Disbursing Officer's Property Invoice.
57. Estimate for Blank Forms.
68. Invoice or Receipt Combined. (Funds.) (Original and duplicate.)
214. Inventory of Signal Property Sold.
215. Account of Sales of Signal Property.

APPROPRIATIONS.

125. The fiscal year ends on June 30. The quarters of the fiscal year are as follows: First quarter, July 1 to September 30; second, October 1 to December 31; third, January 1 to March 31; fourth, April 1 to June 30. (A. R., 624.)

126. Chiefs of bureaus, in notifying officers of remittances, will inform them of the amount remitted under each head of appropriations, giving the designation by fiscal years when necessary. (A. R., 625.)

127. Limited appropriations are those qualified or modified by the

addition or designation of a stated fiscal year to their titles and thereby restricted or limited to the period indicated; "no limit" appropriations are those not confined within such period, e. g., "Signal Service of the Army, 1908," being restricted to the year 1908, is a limited appropriation, whereas "Fire-control at fortifications," not being so restricted, is a "no limit" appropriation and remains available indefinitely.

UNEXPENDED BALANCES.

128. On or before the 20th day of June in each year every disbursing officer, with the exception of the disbursing officer of the Signal Corps stationed in Washington, D. C., shall inform the Chief Signal Officer of the Army, by mail or telegraph, of the amount of funds there will be to his credit, in respect to limited appropriations, on the 30th day of June in such year in excess of obligations. These balances shall be deposited as soon as all outstanding obligations shall have been settled, but not later than September 30, in a subtreasury or depository to the credit of such appropriation. In the case of the disbursing officer of the Signal Corps in Washington, D. C., such unexpended balances may be retained until December 31 following the close of each fiscal year, in order that such disbursing officer may himself dispose of unpaid claims before depositing his credits, instead of requiring settlement thereof by the Auditor for the War Department after such deposits have been made, as next hereinafter provided.

129. Accounts or claims against the United States, payable from limited appropriations, which remain outstanding three months after the close of the fiscal year in which they accrued, will be adjusted by the Auditor for the War Department and paid by warrant of the Secretary of the Treasury and should be forwarded to the Chief Signal Officer of the Army.

ANNUAL ESTIMATES.

130. Chief signal officers of departments, and officers in charge of signal corps general supply depots, will submit to the Chief Signal Officer of the Army an annual estimate of expenses to be paid from signal service appropriations to reach the Chief Signal Officer of the Army not later than June 1 of each year, and should cover expenses for the fiscal year beginning the 1st of July following. The chief signal officer, Philippines Division, will forward this estimate for the departments in the Philippine Islands.

131. As all authorities for the expenditure of funds expire with the fiscal year in which issued, necessary expenditures under current authorities which will not be closed until after the expiration of

the current fiscal year should be included in the new estimate for funds, citing the number of the expired authority to which they pertain.

AUTHORITIES.

132. At the beginning of the fiscal year the Chief Signal Officer of the Army will issue serially numbered authorities, Form No. 30, covering fixed expenditures to be made during the fiscal year. All authorities expire on June 30 of the fiscal year in which issued.

133. No expense will be incurred which is to be paid from signal corps appropriations unless the officer incurring the expense has in his possession a serially numbered authority issued from the office of the Chief Signal Officer of the Army or has notice that such an authority has been issued. The issuance of such authority does not contemplate the setting aside of any particular funds for expenditure under any specific authority. Any funds of an appropriation that a disbursing officer may have to his credit are available for expenditure under any authority issued to him, which pertains to the same appropriation.

134. In cases of emergency officers may advise the Chief Signal Officer of the Army, by telegraph, of the nature and amount of the expense considered requisite and necessary to be authorized, and if approved they will be so notified. Such notification will be immediately thereafter confirmed by a serially numbered authority or an order authorizing the expenditure. The account should not be paid until the receipt of this authority or order.

135. The original authority, Form No. 30, should be attached to and forwarded with the first voucher paid thereunder to the Chief Signal Officer of the Army.

136. Subsequent vouchers should quote the authority by number and state the number of the voucher and month of the account current to which it is attached.

137. Duplicate copies of Form No. 30 should be retained by the disbursing officers and an accurate account of payments thereunder should be entered on the reverse side.

138. Chief signal officers issuing authority to subordinate disbursing officers under serially numbered authorities issued by the Chief Signal Officer of the Army should furnish them with the number of the authority in order that they may make the proper reference on their vouchers.

139. Officers not disbursing funds when authorized to make expenditures will be furnished with a purchase order and should follow the directions set forth therein. A certificate on the face of the bills should state that the articles have been received, inspected, and accepted or the services satisfactorily performed.

FUNDS.

140. Funds are obtained on quarterly estimates, Form No. 1, based on serially numbered authorities, which should be received before estimates for funds are submitted.

141. Estimates for funds will be submitted by the chief signal officers of departments and will include all funds required by disbursing officers in the department, except general supply depots.

142. Officers in charge of signal corps general supply depots will submit estimates for funds direct to the Chief Signal Officer of the Army.

143. Funds required for purposes for which no authorization has been issued will be made the subject of a separate communication.

144. There should be included in estimates for funds all authorities under which it is expected to make expenditures during the quarter.

145. Under the heading "Deduct available balances," Form No. 1, should be shown all funds on hand in excess of obligations at the beginning of the quarter covered by the estimate.

146. Estimates for funds should be forwarded to reach the office of the Chief Signal Officer of the Army not later than the 25th of March, June, September, and December in each year.

147. The chief signal officer, Philippines Division, will submit estimates semiannually.

148. Public funds will, in general, be transferred as follows: Where the accounts are both in the same office or bank, the officer making the transfer will draw his check directing the depository to place a stated amount to the official credit of the officer named therein. The check will be sent to the depository and not the officer in whose favor it is drawn. If it is necessary that the officer to whom the funds are transferred shall receive them without delay, the transferring officer may draw his check and transmit the same direct to the officer requiring them. In either case an invoice will be sent to the receiving officer, but no receipt will be given him except for cash transfers. The above-mentioned invoice will be forwarded by the receiving officer attached to his account current. Receipts for actual currency should be forwarded with the account current of the transferring officer, but if not received in time notation of this fact should be made and receipts forwarded as soon as received. When the transfer is made by check, notation of the number and date of the check and the depository on which drawn should be made on the account current. Transfers of public funds from one office or bank to another are made by the Secretary of the Treasury on the recommendation of the Secretary of War.

149. In cases where two or more officers disburse under one authority the authority will be filed with the first voucher paid, with the

account current of the officer making first payment, and each officer will subsequently make reference thereto, giving the number of the authority, the name of the officer, and the number and date of the voucher to which it is attached.

150. The Treasurer of the United States, each assistant treasurer of the United States, and each designated depositary will render monthly statements to officers having public funds on deposit to their official credit.

151. Depositaries will also render statements to officers having public funds on deposit to their official credit upon request of said officers to enable them to close their accounts, and to inspecting and administrative officers upon their request when engaged in the duly authorized inspection of accounts.

152. These statements will show a full and true account, including the date, number, and amount of each check paid, and the date and amount of each item placed to the officer's official credit during the period of such statement. The said statements should be rendered to officers in time for them to use the information contained therein in analyzing their balances in the manner provided by the account current, Form No. 11.

153. When funds are deposited the depositor, in addition to furnishing his name, rank, regiment or corps, and the title of the appropriation as required by A. R. 615, will state briefly the source from which the money was derived, as, "Sale of carboys," "Refund lost field glass", "Unexpended balance," etc., and will see that proper notation is made on both original and duplicate copy of certificate of deposit.

154. Public moneys, subject to disbursement, coming into the hands of an officer from any source will be promptly placed by him to his credit with the Treasurer or with an assistant treasurer of the United States, or with a duly designated depositary, or else transferred to a disbursing officer of that branch of the public service to which the money pertains, except in cases where officers have been specially authorized by the Secretary of War to keep in hand, at their own risk, such moneys as may be intrusted to them for disbursement. Moneys in hand may be disbursed at once without being placed in depositaries, if payments are due.

155. Disbursing officers are not authorized to anticipate the receipts of funds on outstanding requisitions by making payments from other funds in hand pertaining to a different appropriation. Funds of one appropriation are not available to pay obligations of another unless so provided by law.

156. Deposits to the credit of the Treasurer of the United States on account of repayment of disbursing funds must be made with the office or bank in which such funds are to the credit of the disbursing officer. Disbursing officers are not authorized to transfer funds

standing to their credit with one depositary to their credit with another depositary; such transfers will be made by the Secretary of the Treasury upon the request of the heads of the departments under which the officers are serving.

157. No allowance will be made to any disbursing officer for expenses charged for collecting money on checks.

158. Whenever any disbursing officer shall cease to act in that capacity he will at once inform the Secretary of the Treasury whether he has any public funds to his credit in any office or bank, and if so, what checks, if any, he has drawn against the same, which are still outstanding and unpaid. Until satisfactory information of this character shall have been furnished, the whole amount of such moneys will be held to meet the payment of his checks properly payable therefrom.

159. In case of the death, resignation, or removal from active service of any disbursing officer, checks previously drawn by him will be paid from the funds to his credit, unless such checks have been drawn for more than four months before their presentation, or reasons exist for suspecting fraud. Any check previously drawn by him and not presented for payment within four months of its date will not be paid until its correctness shall have been attested by the Comptroller of the Treasury or his chief clerk.

160. For every deposit made by a disbursing officer to his official credit a receipt shall be given setting forth its serial number and the place and date of issue.

161. Any disbursing officer of the Signal Corps, who closes his money accountability for any reason should arrange for inspection of his accounts as prescribed in A. R. 910.

PURCHASES AND PAYMENTS.

162. Purchases are made by any of the following methods: Contracts; proposals received in response to advertisements; written proposals and written acceptance; in the open market.

CONTRACTS.

163. Under the provisions of A. R. 557, and signal office order No. 13, July 1, 1907, disbursing officers of the Signal Corps will make contracts for purchases, Form No. 13, on which the time of delivery is over thirty days and the consideration exceeds \$2,000 which will require the approval of the Chief Signal Officer of the Army after being duly signed by the contracting parties. The provisions of A. R. 548 to 563, will be observed in the matter of contracts.

164. Contracts should be made in quintuplicate and forwarded to the office of the Chief Signal Officer of the Army for approval. Only two copies will be returned to the contracting officer, one of

which should be furnished to the contractor. Of the three copies retained in the office of the Chief Signal Officer, one is forwarded to the Auditor for the War Department, and one to the returns office, Department of the Interior.

165. The copy for file with the Auditor for the War Department should be an original copy and there should be attached thereto a copy of the advertisement, a copy of each proposal received, a certificate as to the time and manner of publication, and a certificate that the award was made to the lowest responsible bidder for the best and most suitable article, a copy of the order, a copy of the specifications, if any, and where a bond is required a copy of the bond.

166. The copy to be forwarded to the returns office, Department of the Interior, should be sealed with sealing wax or a press seal, and the affidavit on Form No. 13 executed in the presence of a notary public or other person authorized to administer oaths. This copy should be accompanied by a copy of the order, a copy of the advertisement, a copy of all proposals received, and a copy of the specifications, if any.

167. The copy for the files of the office of the Chief Signal Officer of the Army should have attached a copy of the order and specifications, if any, and an abstract of proposals.

168. Attached to the contracting officer's copy of the contract there should be a copy of the order, a copy of the advertisement, a copy of all proposals received, a copy of the specifications, if any, an abstract of proposals, and, if bond be required, a copy of it.

169. Bonds for the faithful performance of contracts for supplies or services will be required when the consideration is \$5,000 or more and the contract can not be fully performed within sixty days from its date.

170. The penal sum in a contractor's bond will be fixed by the contracting officer and will usually be from 10 to 20 per cent of the total consideration, although the total consideration may be made the total amount of the bond.

171. The rental of all buildings and grounds should in every case be covered by a lease, which should be forwarded to the office of the Chief Signal Officer of the Army in the manner provided for contracts.

172. A disbursing officer who charges in his accounts payment for rent of rooms, unsupported by evidence of a contract fixing the rent to be paid, is not entitled to credit therefor. (Dec. by Comptroller of the Treasury, Apr. 17, 1899.)

173. Careful investigation will be made of the financial status of individual bondsmen offering themselves as sureties on contractors' bonds, and no bonds of individuals will be accepted until it is conclusively shown to the satisfaction of the contracting officer that such bonds afford ample security to the United States for the fulfillment of the contract in question, in accordance with A. R., 577.

174. Contracts once executed will be strictly construed, and no variation from standards or specifications will be permitted or authorized. If it be demonstrated that contract requirements are unreasonable, or that the prescribed tests are not practical, or that for any reason the stipulation can not be rigidly applied or enforced, such contract must not be modified, but may be annulled, with the approval of the Secretary of War, if for the best interests of the Government, and after again inviting competition from bidders who are fully informed of the changed requirements, a new award and contract can be entered into. To sanction variation, or to relax stringency in any particular, of an existing contract is irregular and is likely to give the contractor an advantage which would be unfair to competitors whose proposals were based on the expectation of being held to the strictest observance of the published requirements.

PROPOSALS.

175. Advertisements for proposals will be issued in accordance with A. R., 524 to 551.

176. When articles or services are procured under proposals, and the actual requirements of the United States can not be determined in advance, the right should be reserved to the Government of placing orders at the prices at which awards may be made for additional supplies, provided that the additional orders shall not exceed twice the quantity advertised for.

177. Advertisements for supplies should contain the instruction to bidders who are not manufacturers of the goods called for to submit the name of the manufacturer from whom such goods are to be obtained, unless it is manifestly impracticable to furnish this information.

178. Lack of commercial standing on the part of the bidder or inadequate facilities or plant on the part of the manufacturer will constitute good and sufficient grounds for the rejection of the bids. Abnormally low bids should be subjected to the strictest scrutiny and comparison with prevailing market rates.

179. All proposals received from contractors who have failed unjustifiably to fill former contracts with the Government shall be rejected.

OPEN-MARKET PURCHASES.

180. Open-market purchases of supplies, or procurements of services not personal, within the meaning of Army Regulations, No. 553, constitute those made without advertising, and are authorized:

First. When a public exigency or emergency requires the immediate delivery of supplies or procurement of services and there is not sufficient time to advertise for proposals respecting the same.

Second. Where it is impracticable to secure competition, as when purchase is made of a patented article the selling price of which is fixed, or of a supply where the selling price is fixed by law or a municipal ordinance, etc.

Third. When advertisement has been resorted to and no proposal received.

Fourth. When advertisement has been resorted to and the proposals received are above the prevailing market price, or otherwise unreasonable.

Fifth. When the aggregate of the amount of supplies or services to be procured is less than \$500, as authorized by the act of June 12, 1906.

In the first four cases the law places no limit in regard to the amount of the supplies or services to be procured; in the last case the limit has been fixed at \$500.

181. Supplies or services will not be procured in open market under the act of June 12, 1906, whenever in the judgment of the purchasing officer it will be advantageous to the Government to resort to advertising for proposals.

182. Open-market purchases will not be made under this act in small amounts from time to time when a reasonable degree of foresight would indicate that larger quantities can be procured to advantage by resorting to advertisements for proposals. This applies particularly to procurements made amounting to less than \$500, when larger quantities, exceeding \$500, can be procured to advantage by resorting to advertisement for proposals as required by law.

183. Officers making open-market purchases must not neglect to solicit competition whenever possible.

184. Every open-market procurement of supplies or services, not personal, exceeding \$100 in amount, will be reported on War Department standard Form No. 18, in accordance with instructions thereon to the Chief Signal Officer of the Army, who will submit such reports to the Secretary of War.

185. A procurement will be considered as covering a given quantity of supplies of the same kind procured on the same day; separate purchases of hardware, therefore, from two dealers on the same day, each amounting to \$50 or over, are required to be covered by one report, on this blank. A procurement will also be considered as covering a given quantity of supplies of any kind on the same day from the same dealer. It is forbidden to make purchases arising from the same need of the same kind of supplies from day to day so that the aggregate in each case will be less than \$100.

186. The date of procurement of supplies or services will be considered as the date when all the supplies ordered have been delivered and accepted, or the services have been completely rendered.

187. In making the report on Form No. 18 records will be made in each column as indicated by the headings thereof.

188. In the column for description of supplies or services the description will not be itemized, but the character of the supplies or services will be fully described. Itemizing of the various quantities will be made on the voucher covering the payment.

189. In the column for the total amount of supplies or services furnished the total amount for each procurement reported will be stated.

190. In the column for stating the reasons for making open-market procurements the circumstances which gave rise to the mode of purchase adopted will be fully stated for each procurement reported, viz:

(a) In the case of a procurement made as a result of a public exigency or emergency the circumstances necessitating the immediate procurement of the supplies or services will be stated, and the fact made clear that the delay incident to advertising would have been prejudicial to the public interests.

(b) In the case of a procurement where it was impracticable to secure competition, the reasons showing that it was impracticable will be fully stated, as: "Competition impracticable because the seller has the sole selling agency, and the price paid was the one fixed when the purchase was made," or "Competition was impracticable because the price of the supply is one fixed by law," etc.

(c) In the case of a procurement made when proposals have been invited by advertisement and none received, the method of advertisement will be stated, as: "Advertisement resorted to by * * * day circular advertisement, dated * * * , but no proposals received."

(d) In the case of a procurement made when proposals received were above the prevailing market price or otherwise unreasonable, the lowest price received by proposal will be stated, or the unreasonable character of the proposals received below prevailing market price will be stated, as: "Advertisement resorted to by * * * day newspaper advertisement, dated * * * , but the lowest proposal to \$ * * * ," or "Advertisement resorted to by a * * * day circular advertisement dated * * * , but the proposals received below the prevailing market price called for delivery at other place or places than required by the advertisement," etc.

(e) In the case of purchases made under the act of June 12, 1906, the reason why advertisement could not be had to advantage will be fully stated, as: "The character of these supplies is such, and the amount involved is so small, as not to warrant the cost of advertising."

191. After the report has been completed, the purchasing officer will state at the foot of the blank the total amount of open-market procurements, whether under \$100 or not, made during the month. Directly underneath this he will insert the total amount of all pro-

curements made during the same month. This will be followed by a statement of the percentage of open-market procurements to the total of all procurements made during the month. The insertion of these data will show the Secretary of War the extent to which open-market procurements are being resorted to by the purchasing officer and enable a comparison to be made with other purchasing officers of the same or other bureaus.

INSPECTION.

192. Raw material used by manufacturers in furnishing finished products will be as frequently inspected as the interests of the Government may require by inspectors especially qualified for such work, subject to frequent personal supervision by a commissioned officer.

193. All supplies furnished under contract or otherwise will be subjected, whenever practicable, to the personal inspection of a commissioned officer at the time of delivery; otherwise such inspections will be made by a civilian inspector under his personal supervision, subject to such test and verification at irregular intervals and at unexpected times by such officer.

194. Commissioned officers charged with such inspection and with the supervision of civilian inspectors must qualify themselves by study, observation, and practice for such supervision as shall effectively protect the government interests.

195. Purchasing officers should require that inspectors furnish them a written report of inspection, or have them indorse on face of the vouchers: "Inspected and accepted." In cases where the inspection is made by the receiving officer the indorsement or certificate should read: "Received, inspected, and accepted." These indorsements should be officially signed by the inspector.

196. At the time the purchase is made the purchasing officer should arrange for the inspection, so that the accounts of the contractor can be certified by the inspector immediately upon completion of the inspection and while he is at the factory or place of business of the contractor, if it is intended to have certificate of inspection indorsed on bills.

197. Purchasing officers should so arrange for inspections that bills of contractors will not be delayed in settlement. For instance, if an article is manufactured in the East to be shipped to some point in the West and the proposal of the manufacturer specifies delivery free on board at his factory the articles will be considered delivered, so far as the contractor is concerned, when evidence is produced that they have been turned over to the transportation company to be forwarded on government bill of lading. The bill of the contractor should therefore not be held for payment until the arrival of the shipment at destination.

EVIDENCE OF DELIVERY.

198. Contracts or orders made or issued by purchasing officers will specify how delivery shall be made.

199. Evidence of delivery of material should accompany all bills rendered by creditors. If shipment is delivered to the quartermaster's department for forwarding on government bill of lading, the contractor should procure a receipt from the quartermaster's department and attach it to his bills when rendering them. Form 27 can be used for this purpose.

200. If shipment is to be delivered in the same city in which the contractor is located, he should procure a receipt from the party to whom the articles are delivered. The receipt of such articles may be indicated on the face of the contractor's bills at the time delivery is made, or else a separate receipt should be obtained.

201. Special instructions concerning delivery and taking receipts therefore should be issued by the purchasing officer, if the occasion demands.

MARKING SUPPLIES BY CONTRACTORS.

202. Contractors furnishing supplies will be required to mark and distinguish them with their names and with such other designation as shall be directed by the purchasing officer, or as shall be required by the specifications under which the purchase is made.

BOXING OR PACKING.

203. In making contracts it should be understood that articles are to be boxed or packed and delivered free on board ready for shipment. Exception to this practice should only be made when additional boxing or packing to that stipulated in the contract is requested by the purchasing officer or in the case of shipments boxed for export forwarding.

FREIGHT CHARGES.

204. The Signal Corps is not permitted by law to pay charges for freight, expressage, or postage. When the contract calls for delivery upon the part of the contractor the charges must be prepaid. The contractor must render bills for the goods delivered and not show the transportation charges as a separate item. If the contract does not call for delivery on the part of the contractor, the shipment will be forwarded through the quartermaster's department on government bill of lading.

VOUCHERS.

205. Creditors will be required to render bills against the United States on account of the Signal Corps promptly upon delivery of goods or termination of services. For this purpose Forms 28 and 29 will be furnished the contractor when order is placed.

206. Vouchers for purchase will be rendered in quadruplicate on Forms 28 and 29. When received by disbursing officers they will be checked and examined, briefed, and given a serial number. The two on Form 28 will be held as the original and memorandum voucher for settlement. The other two, on Form 29, will be forwarded to the consignee, one of which he will sign and return as a receipt to the disbursing officer whose name appears in the brief, keeping the other for file with his retained copy of property return rendered for the period in which the property is received. Articles so received will be taken up on the consignee's property return by the serial number given by the disbursing officer to Form 29. Receipted Forms 29 will be retained by disbursing officers until the end of the property accounting period (see par. 307) and within twenty days thereafter forwarded to the Chief Signal Officer of the Army to be checked against the disbursing officer's abstract of articles purchased and the consignee's property return.

207. When a disbursing officer purchases articles which remain in his possession he will enter his own name in the abstract of articles purchased and paid for (Form 9) as the person to whom said articles have been issued, and will account for the same on his property return.

208. Signal corps purchases must always be taken up immediately upon receipt and be accounted for by the consignee on the property return for the period in which received.

209. If the service is performed by the piece or by the job, vouchers should be rendered on Form 28 and worded as follows:

For services (describe the service) e. g.:

For services rendered in setting 10 telegraph poles, for the job.

210. Vouchers for material used in performing service by the job will be disallowed. The price for the job, according to agreement, will include the cost of any material used.

211. Vouchers written with pencil, unless of an indelible character, will not be accepted. Vouchers which show erasures will not be accepted. The vouchers should be dated on or subsequent to the date of delivery.

212. Vouchers for services other than personal will be rendered on Form 28. Vouchers for personal services will be rendered on Form 12 or 22.

213. Order and requisition numbers will be shown on vouchers for purposes of reference. Each purchase should be separately billed. All vouchers for material or services must have a notation in few words stating for what specific purpose the material will be used or services rendered.

214. If the goods are delivered under verbal instructions, the date of such purchase and the name of the party making the purchase should be shown on the vouchers.

215. For the purpose of uniformity and for checking vouchers against orders, the articles should be billed exactly as described in the purchase order.

216. Abbreviations should not be made in the names of articles. When more than one article of the same kind and quality is billed, the unit price must be shown, that is, the price each, per dozen, per 1,000, per foot, etc.

217. As all vouchers must contain a certificate that the services have been rendered or the supplies delivered, payment for an annual subscription to a newspaper or periodical can not be made in advance, but the delivery of such newspaper or periodical for the duration of the time provided for, certified to by the recipient, must be a condition precedent to payment therefor.

218. There should be indorsed on the face of the vouchers the name or title and address of the individual or company to whom the delivery is made and to whom consigned. Example:

Delivered to depot quartermaster, New York, consigned to the Chief Signal Officer, Washington, D. C.

219. Signatures must in all cases literally agree with the name of the creditor in whose favor the account is rendered as shown by the billheads. Examples as to proper manner of signing are given below.

220. Individuals will affix their autograph signatures in ink. The autograph signature of a duly empowered attorney will be accepted when an approved power of attorney has been filed with the disbursing officer paying the account. Example:

JOHN DOE,
By RICHARD ROE, *Attorney.*

221. Copartnership should have the name of the firm stamped or written and be followed by the autograph signature of a member of the firm or other authorized person. Example:

JOHN DOE & Co.,
By RICHARD ROE,
A Member of the Firm.

222. Incorporated companies should have the name of the company stamped or written, followed by the autograph signature of an authorized officer or person showing his official position. Example:

JOHN DOE & Co.,
By RICHARD ROE, *Treasurer.*

223. Companies' or trade names not incorporated should have the name of such company stamped or written, and followed by the autograph signature of the sole owner, sole proprietor, or other authorized person. Example:

THE JOHN DOE IRON WORKS,
By RICHARD ROE, *Sole Owner.*

224. A signature by mark must be witnessed by a disinterested person, with address.

225. Vouchers in payment for supplies or services other than personal made under contract will state, on their face, under the form of agreement, the date of the contract, thus:

Under contract dated ———, ———, 190—.

226. Vouchers for purchases or services other than personal will make reference to the method of advertisement in the place provided therefor on the face of the vouchers (Form 28) by number, as follows:

1. After advertising in newspapers.
2. After advertising by circular letters sent to ——— dealers.
3. Without advertising under an exigency of the service which existed prior to the order and would not admit of the delay incident to advertising.
4. Without advertising, it being impracticable to secure competition because of (state reason).

227. The first voucher rendered in payment for a purchase of supplies or engagement of services other than personal under a proposal will be accompanied by a copy of the advertisement, the original proposal, and a copy of the letter of acceptance of such proposal. Subsequent vouchers under this proposal will make reference to this voucher by number under the form of agreement, thus:

Proposal of (date) attached to voucher No. ———, ———, 190—.
(month)

228. A voucher for the purchase of supplies, or engagement of services other than personal, under a written proposal and written acceptance will be accompanied by the original proposal and copy of the letter accepting proposal. Subsequent vouchers will make reference thereto in accordance with the preceding paragraph.

229. Vouchers for services, Form No. 12, must show the rate of pay per hour, day, or month. The time and rate of pay should be stated, and the total carried out in the proper place. Persons employed by the day or hour will be paid for the actual time.

230. Thirty days will be assumed as the length of the month without regard to the actual number of days in the month. This does not apply to per diem employees.

231. Per diem employees will be paid for legal holidays occurring within a continuous period of employment. (Decis. Judge-Advocate-General, Jan. 16, 1906.)

232. The practice of requiring public creditors to receipt for moneys in advance of actual payment will be discontinued. No payments made shall be evidenced by a receipt, except where receipts are required either by law or contract, unless such payments are made in cash, that is, currency.

233. All vouchers for payment by disbursing officers, except those required by law to be verified by affidavit, and the expense accounts of the civilian officers, employees, and agents of the Government, which shall be verified by affidavit as heretofore, shall be certified by the claimant as correct and just, except that vouchers for personal compensation for services rendered under the personal supervision of some administrative officer and so certified by him need not be certified by the claimant, provided the voucher describes specifically the position, the rate of compensation, and the period covered.

234. Only one copy of a voucher, the original, should contain signed certifications, approvals, and receipts. The memorandum form will be retained by the paying officer as his record of the transaction.

235. Vouchers should be numbered consecutively and so recorded on abstract of expenditure (Form No. 6). Such numbers should not be repeated during any fiscal year.

236. After once forwarding a set of vouchers for settlement, under no circumstances should an officer forward a duplicate set, unless requested to do so. If the original set of vouchers is returned to an officer by the paying office for correction, and it is found necessary to secure a new set in order to make the correction, the incorrect set should be marked "Canceled" and returned to the party rendering them, to be destroyed.

CASH PAYMENTS.

237. Disbursing officers shall make cash payments only in cases authorized, and then only in those cases where the payment is made by the disbursing officer in person, or by his deputy, and the exchange of money and the receipt thereof is simultaneous.

238. When payments are made in cash, that is, currency, on Form 12 or 28, they must be evidenced by a statement of such fact in the receipt and in substantially the following form:

Received from _____ in person, or by his deputy, and in cash, the sum of _____ dollars and _____ cents, in full payment of voucher No. _____ account _____.

PAY ROLLS.

239. Form No. 22 will be used when two or more persons are to be paid for personal services on the same voucher,

240. No vacant lines should be left between names on the pay roll, and the unused space below the last entry should be ruled diagonally across the page, the roll footed up, and the total placed in the space provided at the bottom of the roll.

241. A signature by mark must be attested in the "Remarks" column by one disinterested witness, with address.

242. Pay rolls must not be signed in duplicate. A memorandum should be made and retained as a record in the administrative office or by the disbursing officer.

243. Receipts should be taken on Form 22 only when payment is made by the disbursing officer in person or by his deputy, and in cash—that is, currency—and the delivery of such receipt is simultaneous with the payment.

244. When payment is made by check, no signature to receipt will be required or taken, but the number, date, and amount of the check, and the depository on which drawn, will be shown in the column provided therefor.

CHECKS.

245. Official check books are issued by the Treasurer and assistant treasurers of the United States direct to disbursing officers who have public money on deposit with them. Rules for issue, transfer, etc., accompany each book.

246. Official check books on national-bank depositaries are furnished by chiefs of bureaus, by whom records of blank checks issued will be kept and to whom unused checks will be returned. Rules for issue, transfer, etc., accompany each book. The chief of bureau issuing a check book on a national-bank depository will keep a complete record of its size, its character, the serial numbers of its checks, and when and to whom issued.

247. The officer in whose official possession a check book may come is responsible, while it is in his charge, for any misuse, by anyone, of the blank checks contained therein. The greatest care should be exercised in its custody. It should be kept under lock and key when not in use and the blank checks counted at frequent intervals.

248. The officer receiving such a book or any of its unused checks should receipt for it to the official issuing it, and when he ceases to act in the capacity of disbursing officer, he should turn the book over to his successor if it contains unused checks, retain the stubs with his official records, take a receipt in duplicate for the unused checks transferred, describing them by serial numbers, and transmit one receipt to the official by whom the book was issued; or, if there be no successor, remove the stubs and return the book to the office from which issued with a letter giving the numbers of the unused checks, first counting them to see that none are missing.

249. Mutilated or spoiled official checks upon the United States Treasurer or assistant treasurers will be forwarded promptly to the office to which they pertain, but mutilated or spoiled checks upon a national-bank depository will be forwarded promptly, for preservation and future reference, to the chief of bureau by whom issued, who will acknowledge the receipt of such checks. In either case a record of the dates of both cancellation and transmission will be entered on the stub.

250. Every disbursing officer, when opening his first account, before issuing any checks, will furnish the depository or assistant treasurer on whom checks are drawn with his official signature duly verified by some officer whose signature is known to the depository or assistant treasurer.

251. In making payments by check only official checks will be used.

252. Should any officer make an erasure or alteration of any of his checks, however slight, he will certify to the correctness of such erasure or alteration on the upper margin of such check.

253. Any disbursing officer drawing checks on moneys deposited to his official credit must state on the face or back of each check the object or purpose to which the avails are to be applied. If the object or purpose for which any check of a disbursing officer is drawn is not stated thereon, as required, or if any reason exists for suspecting fraud, the office or bank on which such check is drawn will refuse its payment.

254. Each check of a disbursing officer must state on its face the address of the officer drawing it, the object of the expenditure, and the number of the voucher. In case of payment to an officer, enlisted man, or civilian employee, the period for which the payment is made should also be stated. Payment is refused on all checks where regulations are not complied with, and report of the fact is made to the Treasury. Rubber stamps or the typewriter will not be used to fill in dates, payee's name, or the amounts of checks issued in payment of public creditors.

255. The appropriation and the amount of each voucher should appear on the check stub, but not on the check.

256. The name and official designation of the officer drawing a check should be written or stamped on the stub.

257. A single check may be drawn in payment of more than one voucher payable from different appropriations.

258. Any check drawn by a disbursing officer payable to himself or "order," "to make payment of amounts not exceeding twenty dollars each," must bear indorsed thereon the names of the persons to whom the amount drawn is to be paid, or be accompanied by a list, or schedule, made a part of the check, containing the same information.

259. The object, or purpose, to which the avails are to be applied in

case of any check drawn by a disbursing officer for an amount to be retained in his possession by authority of the Secretary of War, must be clearly indicated by a statement on the check that it is to obtain cash to hold in personal possession and date of authority given so to hold funds.

CASHBOOKS.

260. Every disbursing officer shall keep a cashbook showing the amount disbursed under each appropriation and total. Such cashbook should be balanced monthly and the totals agree with the account current.

The cashbook forms part of the station records and shall not be removed from the station, except on its discontinuance. The disbursing officer will see that it is carefully preserved as part of such records; that the entries therein are properly made; and that the book is transferred to his successor.

ACCOUNTS CURRENT.

261. Accounts current will be made in duplicate; one copy will be retained by the officer, and the other, accompanied by the necessary cash account, abstract of expenditures and vouchers, will be forwarded direct, by indorsement, to the Chief Signal Officer of the Army, for administrative examination and reference to the Auditor for the War Department (in the manner prescribed by Treasury Circular No. 51, dated June 22, 1906), within ten days from the end of the month to which they relate. The officer will then be notified by the Chief Signal Officer of the Army, by letter, of the result of such administrative examination, and will address any correspondence resulting therefrom direct to the Auditor for the War Department, to whom the accounts will then have been forwarded for settlement, accompanied by a copy of the letter above referred to.

Disbursing officers are required to render their accounts monthly, and such accounts shall include all signal corps moneys in their possession on account of the United States. These accounts shall be rendered in one consolidated account current irrespective of the number of appropriations, fiscal years, or other headings of account involved.

262. All transactions coming within the time covered by such account shall be reported therein. No payments or collections not actually made and in the hands of the officer during the period of an account shall be included therein.

263. The balance acknowledged by officers, and their analysis thereof must actually represent the state of their business at the close of the last day for which the account is rendered. They must so order

their business that they may, when called upon so to do, close their accounts and analyze their acknowledged balances without delay.

264. When officers meet a disallowance in the settlement of their accounts they should, if they so desire, use all due diligence in filing an appeal with the Comptroller of the Treasury, as provided by law. Unless it be their intention to file such an appeal, or to secure other and appropriate relief, they should promptly concede the disallowance and credit the United States in their account current. Simultaneously with the concession of disallowances small in amount they should deposit the amount thereof with their actual cash and thereafter at convenient and proper times or, in case of conceded disallowances of greater amount, immediately deposit the same to their official credit, subject thereafter to their legitimate payments. Except upon special instruction from competent authority, amounts of conceded disallowances will not be deposited to personal credit to be covered back into the Treasury. The right of appeal to the Comptroller of the Treasury is limited to one year from date of disallowance.

265. Officers will use diligence in insuring prompt replies to and explanation of any suspensions which may be made in the settlement of their accounts by the Auditor for the War Department.

266. It is believed that in most cases the disbursing officer will be able to obtain from his depository, within the period of ten days above referred to, the necessary information to verify his balance and complete the analysis at the foot of the account current. The account current must nevertheless be forwarded at the proper time, as required by law; and if the information from the depository is not at hand, that fact should be set forth and the net balance only given in the analysis.

267. Every disbursing officer will, upon receipt of the statement of his disbursing account for the month of June of each year, from the office or bank in which his funds are kept, immediately make a return to the Secretary of the Treasury of all checks drawn by him which have been outstanding and unpaid for three full fiscal years on the 30th of June of that year, stating the number of each check, its date, amount, in whose favor, on what office or bank, and for what purpose drawn; the number of the voucher in payment of which it was drawn, and, if known, the residence of the payee, and inclose in said return all checks described therein which may be in his possession.

Credit entries for funds received in correction of overpayments should show by whom and to whom the overpayments were made and on what vouchers.

CASH ACCOUNT.

268. Every disbursing officer will forward with his monthly account current a cash account on Form 10, exhibiting fully all items of

cash belonging to the United States in his personal possession during the month. Cash, within the meaning of this requirement, will be understood to include not only specie and legal tender Treasury notes, but also national-bank notes and commercial drafts or checks coming into the disbursing officer's hands in any way.

269. He will debit therein the amount of cash on hand from the preceding month, and separately each item of cash received during the month, indicating fully its date, amount and source, as e. g., proceeds of check drawn to procure cash, designating its number and depositary; cash collected from sales of property; cash refunded by himself or another to correct an erroneous payment, designating the voucher whereon the error was made, etc.

270. He will credit therein severally each cash deposit made by him during the month, designating the depositary, and indicating whether the deposit was to his official credit or to the credit of the Treasurer of the United States. If the latter, he will give also the number of the certificate of deposit. He will credit in a single lump sum the entire amount of cash disbursements made during the month, as shown by receipts filed with the vouchers to his account current. He will credit at the end of the month the amount of cash remaining in his personal possession, which should in every case be verified by actual count, and agree with the cash as shown by the analysis of balance in his account current.

271. If the officer had no cash of the United States in his possession during the month, he should nevertheless sign and forward the cash account with his account current, indicating its negative character by appropriate entry on its face.

(a) The cash account is merely subsidiary to the account current and in no way takes the place of the latter or of any of the entries which should properly appear therein.

(b) Thus a cash deposit to the credit of the Treasurer of the United States must not only be credited in the cash account as pertinent to the record of the officer's cash transactions, but must also be debited in his account current, in order to show and claim a proper reduction in his accountable balance as distinguished from his cash balance. On the other hand, cash deposits to his official credit, as shown by credit entries on his cash account, do not affect his accountable balance, and should not be noted in his account current.

(c) Again, cash debited in the cash account from collections or refundments to correct disbursing errors must be credited in the account current, since it augments the officer's accountable balance; but cash debited from checks drawn on his depositary to procure the same does not affect his accountable balance, and no entry thereof should be made in the account current.

(d) Cash disbursements on vouchers which are credited in a lump sum in the cash account are included in the total disbursements debited in the account current and should not be again separately debited in the latter.

ADMINISTRATIVE OFFICERS.

272. Whenever feasible, administrative officers will require disbursing officers under them, at the close of business on the last day of periods for which they are required to render accounts, to count and schedule, in the presence of a duly authorized and disinterested witness or witnesses, all items of cash, i. e., currency, memorandum payments and other items, to appear in their analysis of balances for which vouchers are not to be submitted to the auditors of the Treasury Department with the current account.

PROCEEDS OF SALES.

273. The proceeds of the sale of condemned stores should be inventoried on Form 214, account of sales rendered on Form 215, and accounted for on the account current Form 11.

274. The proceeds of the sale of condemned stores or other public property of any kind should be deposited to the credit of the United States as "miscellaneous receipts on account of proceeds of government property."

275. The act of June 8, 1896, authorizing the payment of expenses "as approved by the accounting officers of the Treasury" incurred in the sale of old material, etc., from the gross proceeds thereof, and the payment into the Treasury of the net proceeds only, does not require that such expenses shall be so approved before payment, but simply that an itemized account thereof shall be rendered to the accounting officers for settlement as any other item of expenditure of government funds. (Davis, par. 616, of 1901.)

276. When necessary to employ a civilian auctioneer for the sale of public property, the officer, when practicable, will determine before employment the amount he shall be paid for the service. This should be reasonable. In case of fees, the percentage should be that usually obtained in that locality, and under this form of payment the auctioneer should bear all the expenses of advertisement.

277. For ordinary sales the services of a clerk or employee should be utilized as auctioneer without expense to the Government.

SETTLEMENTS FOR PROPERTY TRANSFERRED BETWEEN BUREAUS.

278. The transfer of public property from one bureau or department to another is not regarded as a sale. If money is received therefor

it may be used to replace such stores and will be reported accordingly. (A. R. 623.)

279. Vouchers for services rendered or invoices of supplies furnished by any other department, bureau, or office to the Signal Corps, or by the Signal Corps to any other department, bureau, or office should be sent in duplicate to the Chief Signal Officer of the Army for settlement.

280. Under A. R. 675, supplies will not be furnished to another department or bureau, except in the Philippine Islands, prior to the approval of the Secretary of War, and the papers in the case will be forwarded to the Chief Signal Officer of the Army for such approval. Invoices covering supplies so furnished will bear notation as follows:

These supplies should be considered as property of the —— department, as reimbursement therefor will be obtained by the Signal Corps.

DECISIONS BY TREASURY DEPARTMENT.

281. Disbursing officers, under section 8 of the act of July 31, 1894 (28 Stat. 208), can appeal to the Comptroller of the Treasury for decision as to the legality of payment of any account. This section reads as follows:

Disbursing officers, or the head of any Executive Department, or other establishment not under any of the Executive Departments, may apply for and the Comptroller of the Treasury shall render his decision upon any question involving a payment to be made by them or under them, which decision, when rendered, shall govern the Auditor and the Comptroller of the Treasury in passing upon the account containing said disbursement.

The Comptroller in interpreting this statute decides that he is not authorized to render a decision in advance of payment except when the account which is to be paid is submitted with request for decision.

ARTICLE IV.

PROPERTY ACCOUNTABILITY AND RESPONSIBILITY.

GENERAL PROVISIONS.

300. The general regulations prescribing property responsibility and accountability in the army and the proper procedure when articles are lost or damages is set forth in A. R. 661 to 707.

301. The various manuals of the Signal Corps need not be accounted for on property returns.

302. Blank forms of the Signal Corps when sent out by property depots should not be invoiced or accounted for.

303. All reference to signal corps property should conform to the designation and title of standard articles as used in this manual. All articles not enumerated herein should be referred to and accounted for as invoiced.

304. Under repeated decisions connected with various paragraphs of the Army Regulations, enlisted men in charge of telegraph offices or of isolated signal stations are considered to be acting as sergeants of the Signal Corps and will be held accountable for public property under A. R. 699. It is explicitly stated, however, that neither officers of the Signal Corps nor post signal officers are permitted, except under competent local authority, to devolve their property accountability on enlisted men serving immediately under them.

305. When a station is discontinued, the disposition of the property will be ordered from the office of the Chief Signal Officer of the Army or department chief signal officer. The officer or other person in charge will be held responsible that each article is properly disposed of as ordered.

306. Articles of public property issued to a company for its exclusive use will, when practicable, be marked with the letter or number of the company and number and arm of the regiment. Articles issued to enlisted men will not be marked with the number of the man in the Signal Corps. (Extract from par. 290, A. R.)

307. Until otherwise directed by the Secretary of War, signal corps property returns are to be made on the 31st day of December and on the 30th of June of each year, and all returns for signal corps property begin and end at those times, except where, in the cases of officers, enlisted men, or others responsible for property by reason of transfer, change of station, or leaving the service, it

becomes necessary to close their accountability at an earlier date. A return, with all its accompanying papers, must be forwarded direct to the office of the Chief Signal Officer, Washington, D. C., within twenty days after the termination of the accounting period. State militia returns are rendered December 31 only.

308. All persons accountable for property are held personally responsible and should render only one return to include all property received and transferred at any station during the period. The rendering of a separate return for articles in personal possession is not desired.

309. The property officers in charge of signal corps general supply depots will arrange property returns in three alphabetical lists, using Forms 31b white and 31b blue, as follows:

- (a) Showing all signal corps property in stock available for issue.
- (b) Showing all fire-control property in stock available for issue.
- (c) Showing signal corps and fire-control property in use or to be used at depot and post and not available for issue.

All articles in the third class to have the notation "S. C." or "F. C." to indicate to which division of stock they pertain.

Reserve field equipment to be included in the third class and each item marked "Reserve" opposite entry on face of slip.

310. Property received at a depot from a post will be taken up as "Fire control" or "Signal service," as follows:

Everything received from coast artillery posts pertaining to fire-control or post-telephone systems will be considered "Fire control." All visual signaling and rifle-range equipment received from coast artillery posts and all property received from interior posts will be considered "Signal service."

All property received from purchase will be taken up as indicated on the disbursing officer's purchasing order, which will show whether purchased from fire-control or signal-service appropriation.

Transfers between property depots will show whether property is "S. C." or "F. C."

311. Signal corps property returns, where the number of items does not exceed 25, may be rendered on Form 66. All larger returns will be rendered on the new system Forms 31a, 31b (original and duplicate), and 31c, according to the detailed instructions on the back of Form 31a. Requisitions for these blank forms should be forwarded to the property officer, Fort Wood, New York Harbor, in quantities as follows:

- 31a and 31c, one copy for each return.
- 31b, original (white), one copy for each item.
- 31b, duplicate (blue), one copy for each item.

312. Should an officer or agent of the Government charged with public property fail to render the prescribed returns thereof within

a reasonable time, a settlement of his account will be made by the proper bureau of the War Department, and the money value of the property with which he is charged will be reported against him for stoppage.

313. Officers of the army detailed for duty at military colleges who are accountable for signal corps property that has become unserviceable are authorized to submit the same for the action of an inspector.

314. When an inspector recommends that certain articles of signal corps property be turned into a depot for repairs, the accountable officer will report such fact to the department chief signal officer and await instructions as to the disposition of the same.

315. Whenever instructions are given for sending unserviceable property to the depots of the Signal Corps for repairs, it must be transferred by invoice and receipt in the regular way.

316. Transfer of any article of government property will not be made from one office to another without specific authority from the proper officer; nor will articles of government property be sold or otherwise disposed of, except as provided by regulations of the service and specific instructions from proper authority.

317. Public property and labor hired for public use will not be perverted to any use whatsoever not authorized by the regulations of the service.

318. Articles of like name but of different pattern will not be combined. Thus, 20-ohm, 4-ohm, and main-line sounders must not be carried as so many "sounders," but the total of each will be carried under its appropriate heading.

319. The official numbers of field glasses, telescopes, rented telephones, and other instruments bearing official serial numbers, must in all cases be shown on returns, invoices, and receipts. This will not include Signal Corps telephones. Bicycles, typewriters, etc., should be carried on returns and invoiced and receipted for by reference to manufacturer's serial numbers.

320. When invoicing signal corps property the invoicing officer will enter a serial voucher number on both of the invoices and receipts sent to the receiving officer. The invoicing officer will use this number in dropping the property from his return. The receiving officer will indicate on the receipts returned to the invoicing officer the voucher number by which the property will be accounted for on his return.

321. Property received on a disbursing officer's Form No. 29 will be accounted for on the property return under the disbursing officer's voucher number, the consignee's voucher number also being shown in the following manner $\frac{29}{100}$ (the smaller number represents consignee's voucher and the larger number the disbursing officer's voucher).

322. All articles on signal corps property returns must be arranged in alphabetical order. Photographic supplies, bicycles and parts

for same, typewriters and parts for same, telephones and parts for same, etc., should be included in alphabetical order and not under subheadings.

323. In cases where a complete transfer of property occurs, instead of exchanging separate invoices and receipts, the receiving officer may make direct entry on the final return (both original and duplicate) of his predecessor that all the property thereon enumerated as on hand and transferred to successor was received by him. The transferring officer may make similar entry on the return of his successor, stating that all the stores there taken up as received from such predecessor were actually turned over by him.

324. The retained return, showing accountability for property, pertains to the person making it, and will not be considered a part of the records at the station where the officer or man is serving.

325. When it is not possible to render a return within the limits of time prescribed, owing to the nonreceipt of certain vouchers, the return itself must not be held, but will be mailed to the Chief Signal Officer, with a letter stating what vouchers are missing, with reason therefor, said missing vouchers to be forwarded later when received.

326. Officers and others accountable should verify by an actual count of all the articles on hand at the time the property return is made.

327. All property received must be taken up on the returns, whether invoiced or not, except forms, manuals, and stationery. Should any article of property be received, either by purchase or otherwise, and not included in invoices, special attention should be called to the fact by letter.

328. When an officer to whom stores have been forwarded believes them to have miscarried he will promptly inform the issuing and forwarding officers.

329. If an officer to whom public property has been transferred fails to receipt for it within a reasonable time, the invoicing officer will report the facts to the commanding officer of the former for action. Copies of all papers relating to the transaction will be filed with his returns. (A. R. 671.)

330. Upon the receipt of public property by an officer he will make careful examination to ascertain its quality and condition, but will not break original packages until issues are to be made, unless he has reason to believe the contents defective. Should he discover defect or shortage, he will apply for a survey to determine it and fix the responsibility. Should he consider the property unfit for use, he will submit inventories in triplicate and request the action of an inspector. The same rule will be observed in regard to packages when first opened for issue and for property damaged or missing while in store. (A. R. 672.)

331. When packages of supplies are opened for the first time, whether because of apparent defect or for issue, the officer responsible, or some other commissioned officer, will be present and verify the contents by actual weight, count, or measurement, as circumstances may require, and in the case of deficiency or damage will make written report of the facts to the post commander. If only the officer responsible be present and make the report, he will secure the sworn statements in writing of one or more civilians or enlisted men regarding the condition of the property when examined. Should a survey be ordered, the post commander will refer to the surveying officer the report made by the examining officer, together with the sworn statements. At arsenals and depots, where there are persons whose special duty it is to receive and issue public stores, the reports herein required may be made by them instead of officers of the army. (A. R. 673.)

332. All public property, whether paid for or not, must be accounted for on the proper returns. All public property unaccounted for, when discovered by an accountable officer, will be taken up and the usual returns rendered therefor. When discovered by officers not accountable for that class of property, or by enlisted men or civilian employees, they shall report the same as soon as practicable to an officer so accountable, who will take it up and account for it. In the absence of such an accountable officer the senior officer, enlisted man, or civilian employee present will take charge of such property and report it to the commander of the department wherein it may be located, with a view to its proper disposition. (A. R., 697.)

333. To save time and space, a few articles of signal corps property are invoiced as "complete." Officers, enlisted men of the Signal Corps, and other persons receiving such articles should satisfy themselves that all the parts which go to make up the whole are present before signing receipt therefor. When any parts are missing, a memorandum should be made on the receipt specifying such parts as are missing.

334. Officers in charge of military telegraph lines will account for all property at their stations and for all sections of line (in miles) radiating therefrom. They will designate the several repair sections on the lines under their charge, and the enlisted men or civilian operators in charge of such repair sections will account for all property at their stations.

335. When an officer, enlisted man, or other employee having signal corps property in his possession or being accountable therefor leaves the service of the United States, final payment will not be made to such officer, enlisted man, or other employee until full and satisfactory evidence is furnished that the property with which he may have been intrusted has been duly accounted for.

336. In order to reduce to a minimum the clerical work at the office of the Chief Signal Officer of the Army incident to the examination of property returns, the post signal officer shall be accountable for all signal corps property at a military post or station. Should another officer desire to retain certain articles of signal corps property for official use, he may be authorized to obtain them from the signal officer on memorandum receipt. The district artillery engineer will be accountable for all signal corps property in the district (except as provided in par. 367), and the post artillery engineers in the district will be responsible to him for the property at their respective posts. These instructions, however, do not apply to chief signal officers of departments, to enlisted men of the Signal Corps on duty at stations where there is a military telegraph office, nor to the property issued under the provisions of paragraph 11, General Orders, War Department, 1909, or paragraph 11, General Orders, 87, War Department, 1909.

337. Letters of transmittal are not required in forwarding property returns unless there is some particular fact relative to the papers to which it is desired to specially invite attention.

338. Where errors are found during the examination of property returns at the office of the Chief Signal Officer of the Army, the accountable officer will be immediately notified thereof, and, where practicable, subsequent correspondence will be by indorsement on the original communication. In connection with discrepancies, a new return will not be rendered unless specially called for, as it necessitates the reexamination and checking of each item on the new return.

339. All persons accountable for signal corps property will refrain from shipping to any signal corps supply depot any property which is unquestionably beyond repair, or can no longer be used for the purpose originally intended. Such material should be submitted to the action of a surveying officer or an inspector, in accordance with existing regulations.

340. When invoicing standard packages of equipment which are incomplete through loss of parts or damage thereto, a statement in detail will be made upon the invoice of the articles short from each chest, bag, kit, or other piece of equipment.

341. Signal corps property received by district artillery engineers for use at encampments and maneuvers of the organized militia will be accounted for separately on property returns.

342. In adjusting accounts pertaining to signal corps property no notice will be taken of omissions or errors where the money value thereof does not exceed 25 cents. This ruling is to save expense attending correspondence, etc.

343. Property worn out by fair wear and tear in the service which has no salable value may be submitted to a surveying officer and destroyed as provided for in A. R. 720, or placed before an inspector

without prior action of a surveying officer. Property worn out by fair wear and tear which presumably has some salable value will be submitted to an inspector without prior action of a surveying officer. Property damaged other than by fair wear and tear in the service will not be placed before an inspector without prior action of a surveying officer. The proper procedure to obtain a survey or to place articles before an inspector is set forth in A. R. 713 to 729 and A. R. 911 to 922.

344. In case of articles lost and damaged in transportation, proceed as prescribed in A. R. 1149.

345. When any article of public property not of an expendable nature, for which any officer or other person is responsible, becomes unfit for service from any cause whatever and is not worth expense of repair, he will report the facts in the case and submit the articles for action to the inspector first visiting the station, excepting telescopes, field glasses, heliographs, and telephones. (See A. R. 1584.) An approved copy of the inventory and inspection report must accompany the return rendered to the Chief Signal Officer of the Army on which the property is dropped.

346. Telescopes, field glasses, telephones, and expensive electrical apparatus of the Signal Corps when unserviceable will not be submitted to an inspector for condemnation without previous authority of the Chief Signal Officer of the Army. (A. R. 1584.) Whenever such instruments are unserviceable a report should be made to the chief signal officer of the department, stating the nature of the unserviceability and whether the article can be repaired in the vicinity of the post, and the probable cost of repairing. The chief signal officer of the department will then act in the matter or forward the communication to the Chief Signal Officer of the Army with recommendation as the case may warrant.

347. When an enlisted man has, by a court-martial, been convicted of losing or damaging public property, the officer accountable for the property will send with his property return a certified copy of so much of the court-martial order as refers to the case, giving number, date, and place of issue of the order, and stating on the face of said copy the rolls on which the charges are made.

348. Enlisted men of the Signal Corps at military posts becoming responsible for public property when stores or supplies shipped to them are received in unserviceable condition, or when deficient in number and quality, shall examine them in the presence of witnesses, as per A. R. 673. In case of damage or deficiency appearing, they will then apply in writing to their immediate commanding officer for survey to determine the responsibility for injury or loss occurring. Enlisted men of the Signal Corps serving at isolated stations will, under similar circumstances, make immediate report in detail of the

facts to their immediate commanding officers and ask that appropriate action may be taken.

349. Articles (expendable or unexpendable) lost, stolen, or destroyed, when the aggregate value does not exceed \$5, should not be entered on certificate of expenditure, but should be covered by a special certificate (Form 56) setting forth the facts in the case. This certificate when approved by the commanding officer under whom the accountable officer is serving will be a proper voucher for file with property return. A survey must be had when stores lost, stolen, or destroyed exceed \$5 in value.

350. Property returns and vouchers thereto must be properly briefed before forwarding to the Chief Signal Officer of the Army.

351. An officer or other person whom a survey officer or other competent authority has adjudged responsible for the loss, destruction, or shortage of any article or parts of articles of signal corps property will be required to cover the money value thereof into the United States Treasury before a clearance will be furnished. This may be done either by forwarding the money to the disbursing officer of the Signal Corps, Washington, D. C., who will deposit the money on account of the responsible officer, or the money may be deposited in some government depository to the credit of "Miscellaneous receipts, refundment for _____ (lost) _____ property, Signal Service of the Army, 190—" (giving the current fiscal year). In the latter case an account current must be rendered to this office for examination and transmission to the accounting officers of the Treasury Department.

352. The following-mentioned property will not be presented for the action of an inspector without the authority of the Secretary of War:

Electrical and mechanical installations and appliances furnished to the Coast Artillery Corps by the engineer department or the signal department and forming part of the permanent seacoast defenses, but not including supplies such as wiring, tools, clamps and battery fluid, fragile articles like battery cells or jars and carboys, or spare parts and accessories not essential to the operation of the installation, such as battery syringes and hydrometers.

All of the copies of the inspection report on such property will be forwarded by the department commander directly to the chief of the bureau concerned for the final action of the Secretary of War. (A. R. 921.)

PHILIPPINE RETURNS.

353. All signal property shipped from the United States to the Philippine Islands will be invoiced to the "Property officer, Signal Corps, U. S. Army," Manila, P. I., the shipping instructions being shown on the face of invoice.

Property returns rendered in the Philippine Islands by civilian employees and enlisted men of the Signal Corps will receive final examination in the office of the chief signal officer, Philippines Division, and after settlement will be filed in that office. The property returns of all officers, except the property officer at Manila, will be checked against the others in the division and forwarded to the office of the Chief Signal Officer of the Army. The return of the property officer at Manila may be held until all property issued to civilian employees or enlisted men throughout the division is checked; but in order that the examination of property returns at the office of the Chief Signal Officer of the Army is not delayed a memorandum abstract, showing the property transferred to and from officers in the United States, will be forwarded to the Chief Signal Officer of the Army.

354. The accounting for signal corps property, as examined in the office of the chief signal officer, Philippines Division, will be regarded as a clearance of accountability only for such items as have been taken up and properly accounted for. (Approved by Secretary of War Jan. 6, 1906.)

AMERICAN BELL RENTED TELEPHONES.

355. Telephones and transmitters on life rental from the American Bell Telephone Company will, when unserviceable, be sent in from signal corps depots in numbers of not less than six through the Quartermaster's Department to the American Bell Telephone Company, care of the Western Electric Company, No. 463 West street, New York City, notification of the shipment and list of serial numbers of instruments being furnished to the Chief Signal Officer of the Army.

356. Unserviceable rented American Bell telephones at posts should be shipped to the nearest signal corps general supply depot. Officers in charge of the supply depots should return these unserviceable telephones to the owners without applying to the Chief Signal Officer of the Army for authority.

357. Under date of March 30, 1906, the president of the American Telephone and Telegraph Company informed the Chief Signal Officer of the Army that in returning unserviceable rented Bell telephones it is only necessary to return transmitters and receivers. (File No. 16302-2.) Backboards and magnetos may be broken up. The return of unserviceable American Bell transmitters and receivers does not require the action of an inspector-general.

358. All transmitters and receivers furnished by the American Bell Telephone Company to this service are their property, and are

held by the Signal Corps under life rental upon the following conditions:

For use of the United States Signal Service only, and not to be used in connection with lines, instruments, or service of other parties.

359. Serviceable transmitters and receivers from American Bell telephones may be changed to other American Bell telephones, thereby making the latter serviceable, but these parts must not be mounted on any telephones of independent manufacture.

360. The manufacturer's serial numbers of transmitters and receivers of American Bell rented telephones must be entered on property returns in red ink, or in case of a considerable number of these telephones a statement should accompany the property return, giving the serial numbers.

TYPEWRITERS.

361. When a typewriter becomes unserviceable to such an extent that it can not be repaired locally for \$15, the responsible officer should report the fact to the Chief Signal Officer of the Army, giving the name of the maker and the serial number of the typewriter, together with a statement of the necessary repairs.

EXPENDABLE PROPERTY.

362. All articles of signal corps property enumerated in the classifications below, when received, must be accounted for on property returns, but *when consumed* may be dropped upon proper certificate of expenditure. (Form No. 55.)

363. These certificates of expenditure will be accepted as proper vouchers *only when the articles have actually been consumed* and the voucher approved, as provided in paragraph 371.

Classifications as follows:

Insulating and splicing materials.

Outside line material when used in repairs.

Inside wiring material.

Photographic chemicals, papers, plates, and films.

Articles of stationery, except steel erasers, ink wells, mucilage cups, and rulers.

Dry batteries and renewals for batteries of any type when installed.

Spare parts for any instrument or machine when installed or used in repairs.

Fuses below 65 ampere capacity. (See par. 368.)

Articles such as oils, soap, acids, paint, etc., which it is evident are supplied to be consumed.

Cable when used for inside wiring.

Molding, hinges, hasps, locks, etc., when installed as part of permanent fixtures.

D. S. sounding shots and glass tubes for Thompson machine.

Hack-saw blades, nails, screws, etc.

364. Battery cells and jars, connectors, push buttons, etc., when taken from stock and placed in a circuit are not considered as expended, as they are then merely performing the purpose for which they were furnished, and they will not be dropped from returns unless broken or absolutely unservicable.

365. Poles, wire, insulators, and other telegraph-line material when used in the construction of a line may be dropped; but such line must in all cases appear on the return in miles and fractions or in feet. When the line is shortened or taken down, the material recovered must be again taken up and accounted for. Open wires on poles will be accounted for as the total of all wires in miles. Subterranean and submarine cable will be carried on returns as cable.

366. Parts of machinery, etc., which have been replaced by new parts must be continued on property returns until inspected and condemned.

367. It has been decided that short lengths of cable extending from the cut-out cabinet and forming part of the battery wiring, or similar short lengths of cable installed within the switchboard room, will be considered "inside wiring" and will be expended as such by the signal corps storekeepers. This inside wiring will not be invoiced to the artillery engineer.

368. All fuses of the inclosed cartridge type of all makes and of capacities above 65 amperes should not be destroyed when burned out in service, but should be collected and shipped to the property officer, Fort Wood, N. Y., at the expiration of every six months. It is designed to have these fuses refilled with fuse wire and indicating charges. Overseers of construction and signal corps storekeepers shall exercise care in seeing that these fuses are properly collected and that shipment is made as directed above.

369. *Cable ends.*—All pieces of lead pipe cut off from lead-covered cable ends in construction work will be saved. These pieces will be turned in to the signal corps storekeeper in the district. Upon completion of the fire control installation this junk lead will be taken up on the papers of the storekeeper and invoiced by weight to the district artillery engineer with other signal corps property. The report of the civilian engineer or assistant in charge of the work should show the amount of junk lead thus turned in.

370. Station record letter books, such as letters sent, copying, check ledgers, etc., as soon as they are opened and put to use can be dropped

from property returns on certificate of expenditure as "used in service." Check ledgers when filled should be kept for reference.

371. Enlisted men of the Signal Corps who are accountable for signal corps property, serving at coast artillery posts where standard fire control installations are in progress, before forwarding their property returns will have the certificate of expenditure (Form 55) and certificate of property lost and destroyed (Form 56) approved by the signal officer immediately in charge of the construction work; in all other cases the property returns will have the certificate of expenditure approved by the post commander. Those not on duty at military posts and accountable for property will forward the certificate to the department chief signal officer for approval in season, so that it can be returned in time to be included with the return when rendered. In Alaska both copies of certificate of expenditure and property lost and destroyed should be sent by operators in charge to the officer in charge of the section for approval; one copy of each certificate to be returned to the accountable person and the other copy forwarded direct to the Chief Signal Officer of the Army.

ARTICLE V.

REQUISITIONS AND SUPPLY OF PROPERTY.

REQUISITIONS.

390. Requisitions for all signal corps equipments and supplies, or fire control material for maintenance, will be forwarded to the Chief Signal Officer of the Army through the chief signal officer of the department, who will indorse a recommendation concerning the issue. In the Philippines Division the supply of property will be controlled by the chief signal officer, Philippines Division, and requisitions not forwarded to the Chief Signal Officer of the Army. In the Department of the Columbia, requisitions for Alaskan telegraph and cable supplies will be filled by the chief signal officer, Department of the Columbia, from the stores in that department without reference to the Chief Signal Officer of the Army; requisitions for post telephone or fire control material, however, in that department will be forwarded to the Chief Signal Officer of the Army. Only one copy of a requisition is required.

391. When requisitions are received at the office of the Chief Signal Officer of the Army, the officer submitting the requisition will be notified by letter of the action taken.

392. All correspondence relating to a requisition should bear the serial number of the requisition.

393. Requisitions for maintenance supplies from posts should be prepared semiannually, after the completion of the prescribed inspections of post telephone systems and include all articles recommended by signal corps inspector. *Only one copy of requisitions required.*

394. Requisitions submitted for supply parts for motors, generators, motor generators, boosters, or telautographs, must indicate the signal corps serial number, and, if possible, the manufacturer's name and factory number. In the case of brushes, it is essential that the size be given.

Requisitions submitted for supply parts for bicycles must indicate the manufacturer's name; model number; serial number; height of frame (from top of seat post frame fitting to center of crank axle); axle (front or rear); balls (diameter); chain (width of block); cranks (right or left and length from center to center of holes for pedals); sprockets (front or rear and number of teeth); rims (diameter and cross-diameter of tires which are to be fitted).

Requisitions that do not embody this information will be returned to have the data supplied.

Requisition for each separate typewriter will be forwarded to the Chief Signal Officer of the Army for action, and should state fully and explicitly the necessity therefor. This does not apply to such typewriters as are absolutely necessary for the proper performance of necessary work at signal corps posts and at important telegraph offices in the Philippine Islands and Alaska.

395. In cases where requisitions have been made but no reply has been received concerning the action taken on the supply of the articles requested, a second or special requisition should not be forwarded, but a letter written to the chief signal officer of the department, inviting attention to the nonreceipt of the supplies.

396. Requisitions for articles to be used in fire-control installations (Form No. 63) must not include any supplies for general service, as the purchases are made from separate appropriations.

397. Electrical assistants or assistant electrical engineers acting as overseers will, when necessary, provide storekeepers for their posts or districts, with a list of supplies for which requisitions should be made. Under ordinary circumstances it will be unnecessary for civilians to make requisitions for construction supplies.

398. When it is necessary for engineering employees to make requisitions for either construction supplies or personal equipment, Form 63 should be used and duplicate copies should be forwarded to the officer under whom the employee is engaged.

399. Where requisitions must be made out for work at several posts in an artillery district, care should be taken to separate the requisitions by posts, unless the shipments are to be made to a district storekeeper for general distribution.

GENERAL DEPOTS OF SUPPLY.

400. "The general depots of supply" mentioned in A. R. 187, as amended by Paragraph I, General Orders, No. 130, War Department, July 16, 1906, include the general property depots of the Signal Corps at present established, or that may hereafter be established. Whenever such depots of the Signal Corps are situated at a signal corps post, matters of post administration remain in the hands of the department commanders. (Extract Cir. 46, W. D., 1906.)

401. The signal corps general depots of supply are established as follows:

- Fort Wood, New York Harbor.
- Fort Omaha, Nebr.
- Fort Mason, Cal.
- Seattle, Wash.
- Manila, P. I.

402. Property officers of supply depots are prohibited from issuing signal corps property without specific authority of the Chief Signal Officer of the Army. The anticipation of favorable action on requisitions to be submitted is prohibited. When the urgency is such as to require special action the telegraph may be employed for such authority.

403. The general depots of supply at Fort Wood, Fort Omaha, Fort Mason, and Seattle will maintain a card record of all property at the depot available for issue; separate records will be kept of signal-service and fire-control property. A separate card will be provided for each item, on which will be credited the issue or receipt of property. Depots will report to the Chief Signal Officer of the Army daily, on a special form provided for that purpose, all property received and issued, stating the balance remaining on hand, which will be a check to correspond with the property records at the signal office; the daily report card will also indicate where the property came from (usually disbursing officer's order number) or the requisition number in case of issues.

404. The shipping directions to property depots for the issuance of supplies will be sent direct to depots. Such orders for issue after shipments are made will be returned to the Chief Signal Officer of the Army direct, with notation showing date and manner of shipment and serial numbers of instruments. Articles which can not be supplied for any reason are then ordered from other property depots or purchased. Shipping directions must be returned from supply depots within one week after being received.

405. At general supply depots of the Signal Corps where war reserve equipments are maintained, a complete alphabetical list of all property contained therein shall be kept for ready reference, said list to show box, etc., wherein each article is packed. No article will be added to or taken from this reserve equipment without specific instructions from the Chief Signal Officer of the Army.

406. Requisitions for depot stock signal service property from Fort Wood, Fort Omaha, and Fort Mason will be made quarterly and mailed about the 1st day of January, April, July, and October each year, to reach the office of the Chief Signal Officer of the Army by the 10th of the months stated. In the interest of economy, requisitions should be *reduced to as few items as possible, but the items that are entered should be in quantity to fill probable issues for one year.* It is desired to purchase about one-fourth of the annual stock each quarter in different items—that is, a certain item will appear only in one of the quarterly requisitions during the year.

407. The requisition for the Philippines Division will be made annually and mailed in time to reach the office of the Chief Signal Officer of the Army by July 10 each year.

408. The requisition for the Alaskan telegraph and cable system will be made annually, and mailed in time to reach the signal office by January 10 each year; it will be abstracted and consolidated in the telegraph division with the depots' quarterly stock requisitions of that date.

409. Quarterly stock requisitions from general supply depots, and the annual requisitions from the Philippines Division and Alaska will be rendered *in duplicate* and all items divided into the following classifications, viz:

Hardware.—This classification to include everything which is usually carried in stock by the wholesale hardware dealers. It includes all line-construction tools, rope, bolts, paints, painting supplies, etc.

Electrical machinery.—To include motors, dynamos, transformers, switchboards, and all parts and appurtenances usually pertaining to electric-power equipment.

Miscellaneous electric supplies.—To include insulating and splicing material, testing instruments, telegraph instruments, and inside wiring fittings.

Wire and cable.—To include every kind of wire and cable.

Telephones.—To include all kinds of telephones, cavalry and field buzzers, telephone switchboards, switchboard lightning protectors, and all parts for these.

Line material.—To include poles, insulators, brackets, cross arms, messenger strand, and all appurtenances for these.

Special field equipment.—To include all field equipment which the Signal Corps has manufactured under its specifications and can not be purchased in open market, such as breast reels, payout handles, fireworks, "Very" pistols, and all visual signaling equipment.

Typewriters.—To include all typewriter parts and supplies.

Bicycles.—To include all bicycle repair parts and supplies.

Stationery.—To include all items of stationery and office furniture, excepting signal corps blank forms.

Wireless equipment.—To include supplies and repair parts for all classes of wireless. It is very necessary that complete information and description be furnished concerning every article.

Engine parts.—It is very important that the manufacturer's name, type, and serial number of the engine for which the parts are required, be given.

Optical.—To include field glasses, telescopes, clocks, meteorological instruments, etc.

Miscellaneous.—To include all items which can not be properly included in any of the above classifications.

All items in each classification above should be arranged in alphabetical order.

410. Shipping directions for the issue of property from the general depots of supply must be returned to the Chief Signal Officer of the Army within one week after they are received at the depot, reporting action taken.

411. The officer in charge of a general depot of supply may issue material and supplies from depot stock as may be required in the repair shop, cable splicing, etc., without submitting a requisition to the Chief Signal Officer of the Army. Material so issued from stock will be reported on the daily reports of property under a requisition number which will be assigned for that purpose by the office of the Chief Signal Officer of the Army.

412. On the 1st day of January and July the officer in charge of each property depot will report to the Chief Signal Officer of the Army the serial number, type, make, and condition of each unserviceable field glass in stock, with his recommendation as to whether the glass is worth repairing. In general all unserviceable field glasses will be turned in to the supply depot at Fort Wood, N. Y.

413. In issuing equipment and supplies to organizations of the state militia and to colleges on requisitions approved by the Chief Signal Officer of the Army, only new and unused supplies will be issued.

414. All persons accountable for signal corps property will refrain from shipping to any signal corps supply depot any property which is unquestionably beyond repair, or can no longer be used for the purpose originally intended. Such material should be submitted to the action of a surveying officer or an inspector, in accordance with existing regulations.

415. The officers in charge of the general depots of supply of the Signal Corps in the United States will ordinarily be so detailed by a War Department order. The relation between the property officer and post commander will be governed by the following instructions:

(a) In matters of inspection, discipline, police, fire protection, transportation, guard, and detail of enlisted men the post commander will have general supervision of the property depot and the repair shop in connection therewith.

(b) Directions for the issue of property and correspondence pertaining thereto will be addressed to and reply will be made direct between the signal office, Washington, and the property officer.

(c) The repair of unserviceable instruments and property will be under the immediate direction of the property officer.

(d) The post commander should not detail the property officer for other duty without permission from the Chief Signal Officer of the Army, except in case of emergency. In the absence of the post commander he would, if senior officer present, assume the duties of post

commander by reason of such seniority, in addition to his duties as property officer.

(e) When practicable, the post commander will detail the necessary enlisted men to carry on the work of the property depot and repair shop, and do everything that is possible to expedite the work at the depot and shop. The services of clerks, packers, and other civilian employees at general supply depots will not be utilized for post duties in any manner.

416. The Fort Wood property depot is designated to supply signal corps blank forms, and the property officer should keep on hand an ample supply by timely requisitions for printing to the signal office, Washington. Applications for blank forms sent direct to the Fort Wood depot will be filled by the property officer when the quantities appear to be reasonable.

417. Officers in charge of general supply depots will arrange for an expert inspection of all delicate apparatus received by them immediately upon its arrival and before opening and unpacking. The purpose of this inspection is to determine whether or not the apparatus received has been injured in shipment, and so far as possible to determine whether or not the instrument is operative. It is not intended that any attempt should be made to compare the articles with the specification; but it is necessary that any defects arising from carelessness in handling be reported to the Chief Signal Officer of the Army without delay.

STOREHOUSES AT COAST ARTILLERY POSTS.

418. During the period in which the Signal Corps is installing fire-control systems at coast artillery posts a storehouse will be established for the preservation and issue of the construction material and instruments required. These storehouses will usually be in charge of an experienced noncommissioned officer of the Signal Corps, who will be accountable and responsible for the property sent there.

419. *General instructions for storekeepers.*—(a) All signal corps material sent to the artillery district for original installation will be invoiced to the storekeeper.

(b) The only exception to this rule is for tools (carried on the papers of civilians) and post supplies on requisitions from artillery engineers.

(c) No property is to be issued by the storekeeper except on the authority of the chief signal officer of the department, through local representatives.

(d) The storekeeper will be advised concerning all apparatus which it is proposed to ship to his post, and a weekly report will be required showing what shipments are lacking.

(e) Small supplies will be purchased locally by conferences with the senior civilian assistant or officer of the Signal Corps, if one be present.

(f) All property leaving the storeroom will be issued on memorandum receipt. When the installation is completed it will be invoiced as indicated in Manual No. 8 and paragraph 527, Manual No. 7.

(g) The storekeeper will report promptly to the chief signal officer of the department all delays and shortage in shipments, as well as supplies which are needed and can not be secured locally.

(h) All signal corps supplies intended for the storeroom will be marked as follows:

THE NONCOMMISSIONED OFFICER,
In Charge of S. C. Storeroom,
Fire-Control Installation,
Fort ———.

(i) The storekeeper shall keep his storeroom in a neat and orderly fashion.

(j) The records will conform to paragraph 426 of these regulations, and will be so arranged that the civilian overseer may determine, at any time, from the card records, the exact status of each item in the list of standard supplies.

(k) The storekeeper will allow no unauthorized persons in the storeroom and will see to it that the construction men do not have access to the supplies except under the supervision of himself or his assistant.

(l) Either the storekeeper or his assistant will be present at the storeroom at all reasonable hours, and, if practicable, one of them should bunk in an adjoining room. The storekeeper will be held responsible for any delays that may result in installation work due to the storeroom being closed when it is necessary that apparatus be issued.

(m) All storekeepers will keep a complete record of all material received by them, this record indicating the nature of the shipment, the name of the shipper, and the name of the party who delivered the goods. The purpose of this record is to assist in tracing missing shipments, and storekeepers will be expected to be able to furnish exact information on short notice concerning any material received by them. Particular care will be taken, in case the storekeeper is relieved from duty, that his successor be fully informed concerning all the shipments that have been received, so that the record may be complete and continuous from the time of organization of the storeroom until it is abandoned.

420. Requisitions.—Where requisitions must be made out for work for several posts in a district, care should be taken to separate the requisitions by posts unless the shipments are to be made to a district storekeeper for general distribution.

Allowance should be made for delays in shipments as well as the time required for requisitions to go through proper channels, and under no conditions should there be less than one month's supplies in the main storeroom.

421. It is intended that hardware, lumber, etc., will be purchased locally, all purchases being approved by the signal corps officer in charge or his representative. Material which can not be purchased locally will be made the subject of a special requisition.

422. *Inspections of stock received.*—(a) Civilian employees of the Signal Corps, acting as overseers of construction, shall inspect delicate apparatus upon its receipt by the storekeeper, in order to ascertain whether or not any damage has come to it in transit.

(b) This inspection is for the purpose of assisting in fixing the responsibility for any damage which has occurred to the instruments from careless handling in shipment or improper care in packing. A complete report should be made by the storekeeper to the officer in charge of any deficiencies or damages which may be found to exist.

When property is shipped to artillery districts in which no signal corps overseer is stationed, the storekeeper will make the inspection called for.

A copy of the inspection report will be furnished the storekeeper, the original being forwarded to the officer in charge of the fire-control installation.

423. Storekeepers, after receiving and inspecting instruments and other materials of delicate construction or character, should return them to their original packages in order to prevent deterioration on the storeroom shelves.

This applies to all apparatus which will not be used very shortly after its receipt, except the rougher class of construction material.

424. *Inspection of stock on hand.*—When acting in the capacity of overseer, either for a post or district, the assistant will be expected to check the condition of all storehouses and tool chests, both as to care taken with the equipment and as to the need for renewal.

425. *Office equipment.*—In connection with the storeroom a small office will usually be provided, which may be used jointly by the senior civilian assistant and the storekeeper.

This office should be provided with a flat-top table for maps, a double table desk, a typewriter stand, a letterpress stand, and a set of pigeonholes, all of which shall be made by the carpenter employed on the installation.

426. *Storekeeper's record.*—(a) In order to facilitate the keeping of storekeeper's records, a storekeeper's file cabinet will be furnished to each storeroom, with 500 record cards and 26 alphabetical index cards.

(b) Additional record cards will be furnished on requisition, and should be indicated as "Storekeeper's record cards."

(c) The storekeeper shall maintain such records as will show at any time the quantity of each article in stock.

(d) The record followed shall be a card catalogue.

(e) The storekeeper will number his invoices serially and enter the numbers on the cards. If the material is expendable it should be entered on a card, giving the date, the amount, and the initials of the person to whom issued. Unexpendable material will be issued to constructing parties on memorandum receipts. These receipts will be numbered serially and the number noted on the card. When supplies on any invoice have been issued and duly transferred the card covering this property will be turned in to the officer or engineer in charge of the installation. This card furnishes valuable data for estimating purposes and should under no circumstances be destroyed.

427. The following-mentioned supplies constitute the equipment of storekeeper's office. Such of these articles as are not furnished by other supply departments will be supplied by the Signal Corps upon requisition being rendered for the same, and if special supplies other than those indicated herein are required, they should be asked for promptly. No unusual or unnecessary equipment will be furnished.

1 Army Regulations.	1 dozen erasers, pencil.
2 gross bands, rubber.	2 erasers, steel.
2 basins, cast-iron.	6 hooks, messenger.
2 waste baskets.	1 quart ink, copying.
50 blanks, articles lost and destroyed, No. 56.	1 bottle ink, red.
100 blanks, certificate of expenditures, No. 55.	2 ink wells.
5 blanks, estimates for blank forms, No. 57.	1 lamp, student's.
100 blanks, invoices and receipts, No. 67.	2 bottles mucilage.
100 blanks, memorandum receipts, No. 59.	25 pads, pencil, 6 by 10 inches.
200 blanks, property returns, No. 31b.	50 pads, pencil, 4 by 6 inches.
50 blanks, requisition, No. 63.	24 sheets paper, carbon.
25 blotters, 4 by 10 inches.	2½ reams paper, typewriter, letter heads.
6 blotters, 24 by 30 inches.	2½ reams paper, typewriter, plain.
6 boards, letter clip.	2 bottles paste, ¼-pint.
2 books, copy, letter, 500 pages.	6 dozen pencils, lead.
1 bucket, galvanized-iron.	1 gross pens, assorted.
2,000 cards, storekeeper's ledger-lined, standard.	6 penholders.
2 chairs, office, revolving, small.	6 cones pins.
12 chimneys, for student's lamp.	2 pitchers, galvanized-iron.
1 clock, office.	1 letter press.
2 cups, galvanized-iron.	1 pen rack.
200 envelopes, message.	2 rulers, 18-inch.
500 envelopes, penalty.	2 ribbons, typewriter, copying.
1 dozen erasers, ink.	12 shades for student's lamp.
	6 cakes soap, toilet.
	6 towels.
	1 typewriter, standard make.
	6 wicks for student's lamp.

428. Of the above-mentioned articles the post quartermaster will, upon requisition approved by the post commander, furnish the following:

Rubber bands.	Carbon paper.
Blotters.	Typewriter paper.
Penalty envelopes.	Paste.
Ink erasers.	Lead pencils.
Pencil erasers.	Pens.
Steel erasers.	Penholders.
Copying ink.	Pins, cone.
Red ink.	Penracks.
Mucilage.	Rulers.
Pencil pads.	Revolving office chairs.
Letter presses.	

PACKING AND SHIPMENT OF PROPERTY.

429. All instruments and other articles of the Signal Corps must be carefully packed for shipment to avoid damage in transit, especially when intended for distant transportation, as to the Philippines or Alaska.

430. On opening any packages of signal corps supplies received from the depot the packer's ticket inside should be secured, and in case of any discrepancy in the number of articles this packer's ticket must be returned to the shipper with report of the deficiency.

431. The following extract from the proceedings of the equipment board, Quartermaster-General's Office, on the subject of packing boxes is furnished for information and guidance when practicable:

(Extract.)

That the uniform size of packing boxes which would meet nearly all the requirements as to shipping in escort wagons or by pack animals, as well as cause the most advantageous handling for transportation beyond the sea, should be of dimensions as follows:

For escort-wagon transportation, 38 by 19 by 15 inches (outside measurements).

For escort wagon and pack transportation, 30 inches by 19 inches by 15 inches (outside measurements).

That these boxes should be constructed of 1-inch pine lumber dressed on one side and to be bound properly with hoop iron.

* * * * *

That sacking or baling should be substituted whenever practicable.

That all supplies intended for field service when practicable should be packed in boxes of the dimensions given above, weight not to exceed 150 pounds gross.

It is an exceptional case when stores and equipments for field service can not be so packed.

(a) In some (exceptional) cases to avoid destroying unity of equipment and separation into component parts, the loss of any one of which would render the others useless, the gross weight packed may exceed 150 pounds.

(b) In other (exceptional) cases where the stores are now packed in boxes or bales the gross weight of which is under the limit of 150 pounds and the

dimensions of which, determined by the nature of the stores and the number of units necessarily carried, are within the above-prescribed dimensions, they may be packed as heretofore.

In all other cases when the dimensions of the stores or equipments will allow the length and breadth of the standard box should be rigidly adhered to, but the height may be slightly varied.

* * * * *
 The majority of supplies of the Quartermaster's Department * * * can be readily packed in the standard-sized boxes by reducing the number of articles and keeping within the limit of 150 pounds gross weight.

* * * * *
 Name of the consignee should be on top of box. Sides: Contents and name of packer on one side, and name of consignor, also initials of purchasing officer, initials of department, with month and year of purchase.

The ends should show contents: — gross, — tare, — net, pounds, and shipping member. Also in diamond figure should be marked the number of invoice on which the stores are shipped.

The department insignia should be stamped or stenciled on both sides and ends of all boxes.

* * * * *
 For such smaller sizes as may be necessary the boxes will be exact subdivisions of the boxes above mentioned.

432. The act of Congress approved June 8, 1896, limits the weight of all mail packages to 4 pounds. When articles are ordered transferred from one station to another, or to this office, by mail, care must be exercised to see that the packages do not exceed this weight. Where this weight would be exceeded in one package and it is possible to divide the articles, two or more packages must be made.

433. Voltmeters of all types, ammeters, electrical-instrument cases, time-interval clocks, mercurial barometers, and all other electrical apparatus of delicate construction which are susceptible to injury by rough handling in shipment will in every instance be shipped by express. (G. O., 86, W. D., 1907.)

[Second indorsement.]

434.

WAR DEPARTMENT,
 OFFICE OF THE QUARTERMASTER-GENERAL,
Washington, June 10, 1907.

Respectfully returned to the Chief Signal Officer, U. S. Army, with remark that the chief quartermaster, Omaha, Nebr., and the depot quartermaster, New York City, have been authorized to ship by express upon request of the post authorities at Forts Omaha and Wood signal corps property in packages not exceeding 50 pounds in weight, when there is urgent necessity therefor, without reference of such request to this office for authority for express shipment; also that the quartermaster at Benicia Barracks, Cal., has been authorized to take similar action in the case of express shipments of signal corps property from that post.

The post authorities at Fort Omaha and Fort Wood can communicate with the chief quartermaster at Omaha and depot quartermaster at New York City, respectively, by telephone, which will avoid any delay in such shipments.

(Signed)

C. F. HUMPHREY,
Quartermaster-General, U. S. Army.

435. Buzzers, telephones, switchboards, and all such instruments operated by dry cells will have all battery cells removed before shipment. Dry cells for these instruments will always be furnished, but must be packed separately and not installed in the instrument.

436. Dry cells will be issued with instruments in all cases except the composite artillery type telephone, and the number and size according to the table below.

Allowance of dry cells to be provided.

Instrument.	Type of cell.	Number of cells.
L. B. post-telephone switchboards.....	No. 8 "Reserve".....	(a) 2
Portable field-telephone switchboard.....	No. 6 "Reserve".....	2
L. B. telephones, for post use.....	No. 4-0 "Reserve".....	2
Field telephones, models of 1905 and 1906.....	No. 6 "Reserve".....	2
Field telephones, old types.....	do.....	2
Field buzzers.....	No. 5 "Reserve".....	2
Cut-in telephones.....	No. 4-0 "Reserve".....	5
Service telephones (folding-box pattern).....	do.....	4
Induction field telegraph set.....	No. 6 "Reserve".....	2
Cavalry buzzer.....	No. 5 "Reserve".....	4
Field artillery type telephone.....	Special.....	b1
	No. 4-0 "Reserve".....	2

^a Supply only when directed.

^b One unit consisting of two special cells.

437.

WAR DEPARTMENT,
OFFICE OF THE QUARTERMASTER-GENERAL,
Washington, June 9, 1906.

The CHIEF SIGNAL OFFICER, *U. S. Army.*

SIR: In order to comply with the requirements of the Department of Commerce and Labor relative to furnishing collectors of customs at various ports from which shipments of government property are made, copies of the manifests for such government property, together with the actual valuation thereof, it is requested that in invoicing property to the Quartermaster's Department for shipment to noncontiguous territories of the United States (Guam, the Philippines, Hawaii, Porto Rico, and Alaska) the actual valuation be in all cases furnished to the shipping quartermasters, in order that same may be shown on the government bill of lading, for the information and guidance of the officer of the port from which the supplies are to be forwarded, to enable him to comply with the requirements of the Department of Commerce and Labor.

Respectfully;

C. F. HUMPHREY,
Quartermaster-General, *U. S. Army.*

438. Instruments and all articles of value sent through the mails must be registered. Postage stamps for this purpose will be furnished by the Quartermaster's Department.

439. The regulations concerning penalty envelopes for free postage are set forth in A. R. 843 and 848, and it should be noted that the use of freight or express for transmitting official letters or packages that can be sent by mail is forbidden, that the weight of packages is limited to 4 pounds, and that penalty envelopes will not be fur-

ARD DRY CELLS

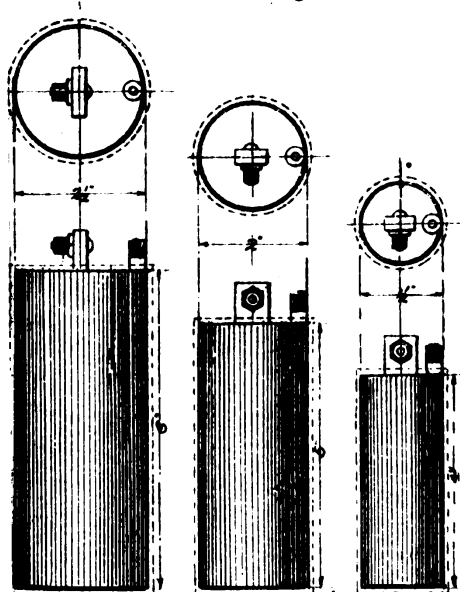
No.99.

U. S. SIGNAL CORPS
SEPT. 10, '08

Date	
Drawn	J. Y. Barnes
Check	W. W.
O.K.	

Revisions
Takes place No. 99
dated Dec. 1908

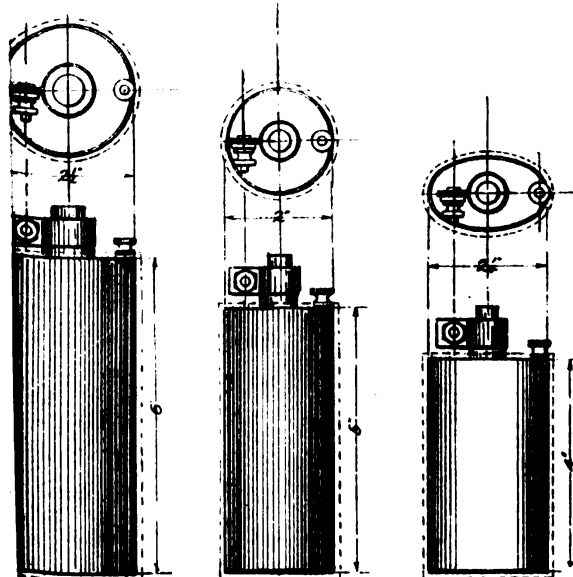
Note: With the exception of the Hallsen cell, dimensions are for cells with paper coverings removed.



No. 6
"COLUMBIA"

No. 5
"COLUMBIA"

No. 4
"COLUMBIA"



No. 6
"RESERVE"

No. 5
"RESERVE"

No. 4-0
"RESERVE"

THE NORRIS PETERS CO. WASHINGTON, D. C.

nished to merchants or other dealers to cover the transmission of public property.

440. When short pieces of cable are shipped and invoiced, care must be taken to indicate on the invoice the number of the reel from which the cable was removed. Cable will invariably be identified by the number of the reel from which it was taken, and in all reports of installation of cable the original reel number should appear.

441. In the shipment of battery commanders' telephones in iron cases, the generator handle should be removed from its socket and secured within the case. Soft packing should be inserted around the telephone on top of the tray and in front inside the case cover. In this way, if the iron pins that hold the telephone in the case should work loose, the telephones will not be damaged.

442. Whenever it is necessary to ship station-ammeters, either for repairs or for installation, special care should be taken to see that the separate shunt, when one is provided for the meter, with the leads used with it, accompanies the shipment. The shunt should always bear the same serial number as the meter, the shunts of different numbers and their leads not being interchangeable. This precaution is necessary in order that, if repairs are to be made, the meter can be properly recalibrated, and when installed will give correct indications.

443. The attention of signal corps property officers, signal corps storekeepers, and artillery engineers at posts where signal corps storekeepers are not stationed is invited to the following important requirements with regard to packing signal corps apparatus for shipment or storage:

In preparing telephone switchboards for shipment, special attention should be given to see that the keyboards are held down by a cross cleat, as the key-board locks are not strong enough to hold the board in place during shipment. This cleat should be padded to prevent injury to the finish of the woodwork. Cord weights should be securely tied to prevent damage to the apparatus in the switchboard or they may be removed entirely and packed in separate boxes for shipment.

All telautograph receivers should have the buckets secured with thread or fine cord to prevent being thrown out of the well in transit. Wire should not be used for this purpose.

The armor of all armored cords should be removed and made into neat coils for shipment. The cord after the removal of the armor should be withdrawn into the instrument and tied into place.

All iron case instruments should be held in place in the packing case by strong blocks in addition to the excelsior packing.

All tool chests should be crated for shipment. The finished surfaces of all tools should be given a very thin coat of oil or vaseline

before the chests are placed in storage or prepared for shipment in order to prevent rust.

Terminal boxes should be covered with heavy manila paper and crated before shipment.

DECISIONS CONCERNING ISSUES.

444. Push buttons, doorbells, and call buzzers are furnished by the Quartermaster's Department, and not by the Signal Corps. The Signal Corps supplies call bells and buzzers only for night signals on telephone switchboards.

445. Telegraph instruments for practice purposes will not be issued except to such posts as, in the opinion of the department commander, are of sufficient importance and strength to justify the belief that practical results or benefit would be derived therefrom.

446. Bicycles are not issued by the Signal Corps for transportation purposes, but only for repair work on telegraph lines and kindred work connected therewith. (See Circular 71, War Department, Oct. 24, 1907.)

447. The chief signal officers of the several military departments should not make requisition upon the Signal Corps for the necessary articles of office, toilet, and desk furniture, binding, and police utensils, as the purchase of these articles is provided for in the appropriation of the army "for contingent expenses at the headquarters of the several military divisions and departments, including the staff corps serving thereat." Allotments are made from this appropriation by the Secretary of War for the headquarters for each military department and division.

448. Requisitions for gravity battery material will be approved, based on the following:

One copper per year.

One zinc for two months.

Two pounds bluestone, per month, for 6 by 8 size.

One and one-half pounds bluestone, per month, for 5 by 7 size.

Two renewals, type "V" cells, per year.

449. Requests for signal corps blank forms may be sent direct to the property officer, Fort Wood, New York Harbor, and will be supplied direct when the quantities appear to be reasonable. Chief signal officers of departments receiving requests for forms should send them direct to the Fort Wood depot.

450. Manuals of the several staff departments and blank forms are subject to issue or sale to state militia the same as other supplies. (Decis. Military Secretary, Jan. 29, 1907.)

451. All testing cells and sets for use in testing electrical installations in seacoast fortifications, except those needed as a part of the mine equipment, will hereafter be issued by the Signal Corps, and

requisitions for the cells and sets should be made to the Chief Signal Officer of the Army. (Ext. G. O., 72, W. D., 1907.)

452. Signal corps material will be issued to military schools and colleges of "Class A" only as defined in General Orders, 155, War Dept., July 24, 1907, and published in the Monthly Army List. (M. S. O., 1140355.)

453. The transportation of signal corps stores from property depots to institutions of learning, and from institutions of learning back to depots, is always without expense to the United States.

454. Stationery and office supplies are furnished by the Quartermaster's Department, as set forth in A. R. 1068 and 1069, and the Signal Corps supplies stationery for telegraph offices doing commercial business. A letter from the Quartermaster-General of the Army defining the policy in this matter is as follows:

WAR DEPARTMENT,
OFFICE OF THE QUARTERMASTER-GENERAL,
Washington, October 12, 1905.

CHIEF SIGNAL OFFICER, U. S. ARMY, *Washington, D. C.*

SIR: In reply to your letter of the 28th ultimo, you are respectfully informed that stationery and expendable desk supplies have been and are now issued quarterly on approved requisitions by the Quartermaster's Department, under paragraph 1069, Army Regulations, to the Signal Corps at points where they are performing only military duty and for performing military duty only at other points, and that this practice will be continued, the Signal Corps in this respect being regarded as on the same footing as other corps of the army to which the Quartermaster's Department issues stationery, etc., for purely military purposes.

Respectfully,

C. F. HUMPHREY,
Quartermaster-General, U. S. Army.

455. Enlisted men of the Signal Corps in charge of telegraph and telephone offices at military posts should make requisition, approved by the post commander, to the post quartermaster for stationery for their offices. The issue of stationery by the Signal Corps will hereafter be made only to offices on United States military telegraph lines where its use is not exclusively for military purposes. Telegraph blanks, message envelopes, and printed forms of the Signal Corps will be issued as heretofore.

456. It has come to the attention of the Signal Corps that some difficulty has arisen in the use of breast reels, spools, and payout handles for buzzer wire, due to variations between apparatus made up under original specifications and the present approved types. This difficulty is due to differences in length of the spools and diameter of central openings, which prevent the breast reels and payout handles as made at the present time from closing properly when used with spools of old pattern. To remedy this it will be

4443—09—6

necessary to remove the wire from the spool, using an empty spool and breast reel for the purpose, remove the metal head of the spool and cut the wood core back for three-sixteenths ($\frac{3}{16}$) inch. This should be done preferably in a miter box to insure a true cut. The slot and holes for screws should be extended back into the wood for the same distance. If the screw holes are not bored deeper, there is danger of splitting the core when the head is screwed in place. To cut the slot deeper a handsaw may be used, cutting the slot the full width of the core. The spool may now be rewound with wire, using a breast reel for this purpose.

457. All of the old type signal corps mortars, originally designed to withstand a pressure of 1,000 pounds per square inch, and made of ordinary iron pipe, are considered unsafe and should be immediately destroyed. The new type mortars, recently made for the Signal Corps by the Ordnance Department, are of cold drawn steel, having a tensile strength of 6,000 pounds per square inch, which is more than the maximum pressure for firing any of the signal corps bombs. They are stamped "Signal Corps, U. S. A., Model 1907," or "Rocket gun, Watertown Arsenal, 1907."

458. Official telegraph blanks (blue color, Form 87 S, Q. M. D.) for use in filing telegrams for transmission over commercial lines are provided by the Quartermaster's Department. Blank forms for messages transmitted over military lines are contained in the United States Army Field Message Book (Form 217-A) and are provided by the Signal Corps.

MANUALS.

459. The manuals concerning the several staff departments will contain, besides extracts from general regulations, such rules as have special application, but no regulations, orders, or instructions will be embodied therein which are in conflict with the Regulations of the Army. (Decis. Sec. War, Oct. 31, 1895.)

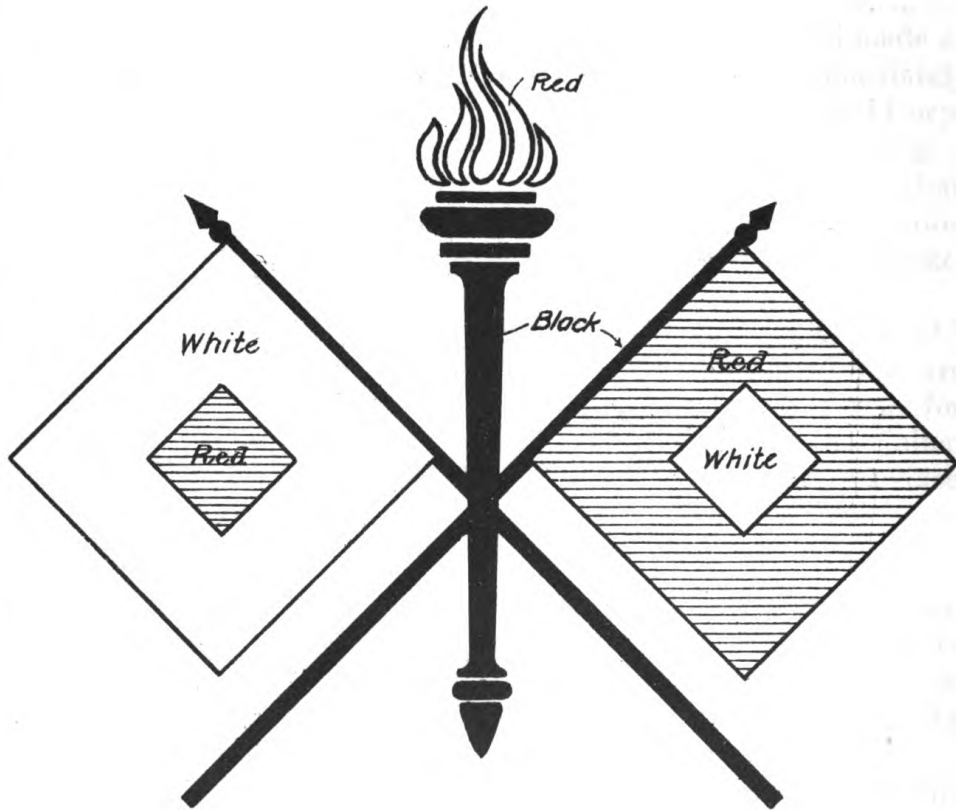
460. Manuals issued by the staff departments and approved by the Secretary of War, when not in conflict with any of the provisions of these regulations, will have equal force therewith. (A. R. 1588.)

461. The following manuals pertain to the duties and equipment of the Signal Corps:

- No. 1. Telephones. (Obsolete.)
- No. 2. Regulations for Military Telegraph Lines.
- No. 3. Electrical Instruments and Equipments. (1905 edition embraces both old Nos. 1 and 3.)
- No. 4. Submarine Cable Handbook.
- No. 5. Photography. (Obsolete.)
- No. 6. Visual Signaling.
- No. 7. General Regulations, Disbursing and Property Manual.
- No. 8. Fire-Control Equipment.

U.S. SIGNAL CORPS INSIGNIA

Scale of inches



Revised Aug. 1907

R.F. Barnes, Jan 07

THE MORRIS PETERS CO., WASHINGTON, D. C.

Rev.

Manual No. 8 is a confidential publication issued only by the second section of the General Staff. Copies are issued to officers of the Signal Corps and to officers, master electricians, and electrician sergeants of the Coast Artillery Corps. Enlisted men of the Signal Corps engaged in fire-control work at coast artillery posts may obtain a copy of this manual by having it sent to the officer in charge of the detachment, who will issue it to the enlisted man on memorandum receipt and also charge it on his descriptive list.

Each copy of the manual bears a serial number and must be receipted for by the person to whom issued.

462. Applications for signal corps manuals from officers, enlisted men, and civilian employees of the Signal Corps should be addressed to the Chief Signal Officer of the Army.

The issue of manuals to officers and enlisted men not members of the Signal Corps and to civilians not employed by the Signal Corps is made by the second section, General Staff. (Circular 12, War Department, 1904.)

SPECIAL VEHICLES.

463. (a) All signal corps special vehicles will be painted an olive-drab color.

The following is the formula for mixing the olive-drab paint to be used:

6 pounds white lead ground in raw linseed oil.	1 pint turpentine.
1 pound raw umber.	$\frac{1}{2}$ quart japan drier. 1 quart raw linseed oil.

(b) The insignia of the Signal Corps, according to the design herewith, will be painted in a suitable place on all special vehicles, pack chests, etc., belonging to the Signal Corps.

464. Each reel cart, wire cart, or wire wagon will have a serial number plate. Any officer accountable for one of the vehicles enumerated above which does not have a serial number plate will report the fact together with a description of the vehicle, by which it can be identified.

GUIDONS FOR SIGNAL CORPS.

465. Each mounted company of the Signal Corps will have a guidon of orange silk, dimensions and shape same as described for cavalry guidons; in the center on both sides of the guidon two crossed flags 6 inches square of white silk, with centers 2 inches square of scarlet silk, having staffs 15 inches in length of yellow silk; the letter of the company, of white silk, block shaped, $4\frac{1}{2}$ inches high, to be placed above the crossed flags; lance same as for cavalry guidon. This silken guidon will be used only in battle, campaign, or on occasions of ceremony. Each mounted company of the Signal Corps will also have a service guidon, made of bunting or other suitable material, in shape and design the same as the silken guidon. (Par. I, G. O., No. 67, War Dept., 1909.)

ISSUES TO THE ORGANIZED MILITIA.

466. "The annual appropriations * * * shall be available for the purpose of providing for issue to the organized militia any stores and supplies or publications which are supplied to the army by any department. Any State, Territory, or the District of Columbia may, with the approval of the Secretary of War, purchase for cash, from the War Department, for the use of its militia, stores, supplies, material of war, or military publications, such as are furnished to the army, in addition to those issued under the provisions of this act, at the price at which they are listed for issue to the army, with the cost of transportation added, and funds received from such sales shall be credited to the appropriations to which they belong and shall not be covered into the Treasury, but shall be available until expended to replace therewith the supplies sold to the States and Territories and to the District of Columbia in the manner herein provided." (Extract sec. 17, act of Jan. 21, 1903 (32 Stats., 778).)

467. All the public property issued to the organized militia will be accounted for under the same regulations that now govern accountability for public property in the army, and the chiefs of the several supply departments will furnish the governors of the several States and Territories and the commanding general of the District of Columbia Militia the necessary blank forms for making the required returns of the public property so issued, and returns will be made annually on the 31st of December of each year and will be sent to the War Department for examination and settlement. (Circ. 9, W. D., 1903.)

468. "SEC. 4. Whenever any property furnished to any State or Territory, or the District of Columbia, as hereinbefore provided, has been lost or destroyed, or has become unserviceable or unsuitable from use in the service, or from any other cause, it shall be examined by a disinterested surveying officer of the organized militia, to be appointed by the governor of the State or Territory or the commanding general of the District of Columbia Militia to whom the property has been issued, and his report shall be forwarded by said governor or commanding general direct to the Secretary of War; and if it shall appear to the Secretary of War from the record of survey that the property has been lost or destroyed through unavoidable causes, he is hereby authorized to relieve the State from further accountability therefor; if it shall appear that the loss or destruction of property was due to carelessness or neglect or that its loss could have been avoided by the exercise of reasonable care, the money value thereof shall be charged against the allotment to the State under section sixteen hundred and sixty-one of the Revised Statutes as amended. If the articles so surveyed are found to be unserviceable or unsuit-

able, the Secretary of War shall direct what disposition, by sale or otherwise, shall be made of them, except unserviceable clothing, which shall be destroyed, and if sold the proceeds of such sale shall be covered into the Treasury of the United States." (Act of June 22, 1906 (34 Stat. L., 450).)

469. The act of March 1, 1899, requires chiefs of supply bureaus to issue such public property as is ordinarily issued by them, upon requisitions from the commanding general, District of Columbia Militia, as may be approved by the Secretary of War. In his interpretation of this act the Judge-Advocate-General of the Army decides that in this act Congress bears the same relation to the organized militia of the District of Columbia as do the State legislatures to the organized militia of their respective States, and that the quantity of issues is limited only to the approval of the Secretary of War. He also decides that the act of March 1, 1899, is not superseded or annulled by the acts of January 21, 1903, and March 2, 1903, and that the District of Columbia can draw property to the full value of its allotment under these acts, and in addition draws such property under the act of March 1, 1899, as the Secretary of War may approve. The supply bureaus are not reimbursed for the value of such issues under act of March 1, 1899.

470. Requisitions (Form No. 60), signed by governors of States and Territories and by the commanding general, District of Columbia Militia, are forwarded direct to the Secretary of War. The Secretary of War forwards requisition to the chief of the supply bureau for an estimate of cost, who returns it with the information. If approved, the Secretary of War returns it to the chief of the bureau for issue. The supplies are issued and shipped on Government bill of lading. They are invoiced, receipts accomplished, and accounted for on annual return by the party to whom issued. An itemized statement showing the value of property is forwarded to the governor or commanding general, District of Columbia Militia, and the Secretary of War informed that all action has been taken and request made for reimbursement to credit of the supply bureau.

471. The Signal Corps does not carry on hand a large stock of the various special electrical instruments and other equipment, and upon receipt of requisitions orders are placed with manufacturers. To insure receipt of signal corps supplies, requisitions should be forwarded so as to reach the Secretary of War at least five months prior to the time when the equipment is required.

472. Issues to the militia under the act of January 21, 1903, are confined to such articles as are procured under direct provisions of law for issue to the regular forces of the United States Signal Corps.

473. Experimental equipments will not be issued, but only such stores as are necessary to equip the militia in the same manner as prescribed for the Regular Army.

WAR DEPARTMENT TELEGRAPH CODES.

474. The regulations concerning care and accountability for War Department telegraph codes at posts are set forth in paragraph 1194, Army Regulations, 1908.

475. The War Department telegraphic code, 1906, will replace the telegraphic code to insure secrecy (Gregory), the War Department telegraphic code of 1900, and the cipher of the War Department for official telegraphic code messages sent on and after November 1, 1906, except that the cipher of the War Department may be used after that date for correspondence in such cases only as may be authorized by the Secretary of War. (G. O., 177, W. D., 1906.)

476. All copies of the telegraphic code to insure secrecy and of the War Department telegraphic code of 1900 with appendices, together with such copies of the cipher of the War Department as are no longer needed, will be returned to Adjutant-General of the Army. (G. O., 177, W. D., 1906.)

477. The duplicate memorandum receipt for the War Department telegraphic code, 1906, and the semiannual report accounting for copies of that code shall be forwarded directly to the Chief Signal Officer of the Army. The semiannual report will hereafter be rendered on June 30 and December 31 of each year. (Extract Par. II, G. O., 93, W. D., 1907.)

EQUIPMENT ISSUED TO LINE ORGANIZATIONS.

478. It is not contemplated that signal officers at interior posts shall have on hand any visual signaling equipment. (Ext. G. O., No. 87, War Dept., 1909.)

479. In order to carry out the provisions of A. R. 1580, the Signal Corps will issue to each company of infantry and Philippine Scouts, and to each troop of cavalry, machine-gun platoon, and company of coast artillery on permanent duty in artillery districts a visual signaling outfit, consisting of two flag kits (2-foot) and two field glasses. This outfit will be retained as part of the company, troop, or machine-gun platoon equipment, and will be accounted for by the company, troop, or machine-gun platoon commander, except that in the case of coast artillery troops the issues will be made to district artillery engineers, who will account for the same. The signaling outfit will not be transferred to a post signal officer. A field glass is not issued for the personal use of an officer, and will not be used in lieu of the officer's personal field glass prescribed by paragraph 97, General Orders, No. 169, War Department, August 14, 1907. (Par. 2, G. O., 41, War Dept., 1909.)

480. The Signal Corps will furnish fire-control equipment for field artillery, as follows:

BATTERY EQUIPMENT.

3 telephones, field artillery type.	2 flag kits, 2-foot.
2 hand reels.	2 megaphones, aluminum, 18-inch.
2 spools buzzer wire.	6 field glasses, field artillery type.
3 ground rods.	3 buzzer connectors, model A.
3 inspector's pocket kits.	

BATTALION EQUIPMENT.

2 telephones, field artillery type.	1 field acetylene lantern.
2 ground rods.	1 heliograph and tripod, complete.
2 pay out handles.	1 flag kit, 4-foot.
2 breast reels.	1 field glass, field artillery type.
6 spools buzzer wire.	3 miles twin conductor cable, field artillery type.
2 inspector's pocket kits.	2 buzzer connectors, model B.
2 rolls insulating tape.	
1 pliers, 8-inch.	

Until a suitable pack reel is adopted and issued no twin conductor cable, field artillery type, will be issued as a part of the battalion equipment of mountain artillery regiments.

REGIMENTAL EQUIPMENT.

2 telephones, field artillery type.	1 field glass, field artillery type.
2 ground rods.	3 miles twin conductor cable, field artillery type.
2 inspector's pocket kits.	2 buzzer connectors, model B.
1 field acetylene lantern.	1 pliers, 8-inch.
1 heliograph and tripod, complete.	2 rolls insulating tape.
1 flag kit, 4-foot.	

Until a suitable pack reel is adopted and issued, six spools buzzer wire, two buzzer connectors, model A, two pay out handles, two breast reels, will be issued in lieu of three miles twin conductor cable, field artillery type, and two buzzer connectors, model B, as a part of the regimental equipment of mountain artillery regiments.

One high-power field glass will be furnished to the commanding officer of each battery and to each regimental and battalion reconnaissance officer.

All signal equipment in excess of the allowance mentioned herein will be reported to the Chief Signal Officer of the Army for directions as to disposition. Requisitions will be submitted for deficiencies.

No devices other than buzzer connectors will be used in connecting field telephones or buzzers to twin conductor cables, field artillery type. (G. O. 150, W. D., 1909.)

FIELD GLASSES.

481. The following standard types of field glasses are issued by the Signal Corps: (a) "Day and night" ($3\frac{1}{2}$ - $5\frac{1}{2}$), for use in instruction

in visual signaling. (b) "Day and night," field artillery type ($4\frac{1}{2}$ - $6\frac{1}{2}$), for issue to field artillery. (c) "Terlux" (10), for issue to field artillery and machine gun platoons.

In special cases, other types will be provided only on approval of the Chief Signal Officer of the Army.

Descriptions of the standard types of signal corps field glasses are contained in the manual of visual signaling.

The inspection of signal corps field glasses is prescribed in general specification 263.

482. For the information of officers of the army who may desire to obtain field glasses for their individual use, the following is published concerning the various types supplied by the Signal Corps:

GALILEAN TYPE.

Signal Corps day and night glass, model 1906.—Powers $3\frac{1}{2}$ and $5\frac{1}{2}$, object lens $1\frac{1}{2}$ inches; tan leather finish; tan leather carrying case, with compass; weight of glass, with case, cord, and straps, 21 ounces.

Artillery type day and night glass.—Powers $4\frac{1}{2}$ and $6\frac{1}{2}$, object lens $1\frac{3}{4}$ inches, interpupillary adjustment; tan leather finish; tan leather carrying case, with compass; weight of glass, with case, cord, and straps, 30 ounces.

PRISMATIC TYPE.

Terlux binocular.—Ten-power, with sunshade, object lens $1\frac{3}{4}$ inches, interpupillary adjustment; tan leather finish; tan leather carrying case; weight of glass, with case, cord, and straps, 46 ounces. A superior high-power glass.

Officers desiring to purchase any of the above glasses for their personal use can do so at government contract price. Information in regard to same will be furnished upon application to the disbursing officer, Signal Corps, Washington, D. C.

VISUAL SIGNAL EQUIPMENT.

483. Ardois electric night signaling outfit, complete: All parts of standard outfit enumerated in Manual No. 6. Requisitions must specify voltage of electric-lighting current available; for spare parts, give name of maker of outfit.

Calcium carbide, cartridges; for field acetylene lanterns.

Cartridges for Very pistols, supplied in red, white, or green.

Code cards.

Cipher disks.

Compass, magnetic.

Flags. (See Kits.)

Glasses, field, day and night, $3\frac{1}{2}$: $5\frac{1}{2}$ powers.

Glasses, field, day and night, $4\frac{1}{2}$: $6\frac{1}{2}$ powers (for issue only to field artillery).

Glasses, field, 10-terlux. (10 power prismatic, issued only for special purposes.)

Glasses, eye, smoked, with case.

Heliograph, field, complete with tripod and cases. (Parts composing complete outfit; see Manual No. 6.)

Kits, 2-foot, flag, complete, consists of—

Canvas case, with strap.

3 sections staff.

1 white flag, 2-foot.

1 red flag, 2-foot.

Kits, 4-foot, flag, complete, consists of—

Canvas case, with strap.

3 sections staff.

1 white flag, 4-foot.

1 red flag, 4-foot.

Lantern, field, acetylene, complete. (Description and parts, see Manual No. 6.)

Lantern, field, oil. Issue discontinued.

Lanterns, signal, R. R., brass.

Mortars, for signal bombs. (1907 model, steel.)

Message pads, field.

Pistols, Very, for night signals.

Staffs, flag, 12-foot, in 3 sections. Issue discontinued.

Shutter, heliograph, F. and G. 1905 model, 6-blade.

Telescope, Spencer Lense Co., 12 to 27 power.

Telescopes, Warner & Swasey, 18 and 24 power, with tripod complete. In rectangular leather carrying case.

Telescope holders; for attachment to trees; specify size of telescope.

Telescope holders; adapted for heliograph tripod.

Tripod, cavalry, folding; with canvas case; for heliograph and field lantern.

484. All of the old type signal corps mortars, originally designed to withstand a pressure of 1,000 pounds per square inch, and made of ordinary iron pipe, are considered unsafe and should be immediately destroyed. The new type mortars, recently made for the Signal Corps by the Ordnance Department, are of cold-drawn steel having a tensile strength of 6,000 pounds per square inch, which is more than the maximum pressure for firing any of the Signal Corps bombs. They are stamped "Signal Corps, U. S. A., Model 1907," or "Rocket gun, Watertown Arsenal, 1907."

485. The following signal rocket and shell equipment is authorized:

For night use.—Shells, red; shells, white; rockets, sequence; Very pistol, with red, white, and green cartridges.

The shells are all single shot. They are fired from a 5-inch portable mortar, and will go to a height of about 550 feet. The explosion can be heard about 10 miles, under favorable conditions, and the shower of red or white fire persists for some time, until the sparks fall almost to the ground.

The sequence rockets are provided with paper parachutes. The red and white colors are in the form of threaded sections, which can

be screwed on in any combination to make letters of the Myer code. There are also blank sections which can be inserted. Letters containing two whites or two reds together are very uncertain. It is almost impossible to determine when the same color follows. Alternate colors, however, are distinct. The blanks should be inserted between two units of the same color. The rockets will hold but four units, therefore several letters of the code can not be made. The rockets reach a height of about 700 feet.

The Very pistol fires a cartridge which is similar to the shotgun shell, 12-gauge brass. The signals reach a height of about 200 feet. The color is quite brilliant and can easily be seen 15 miles.

For day use.—Shells, amber smoke, parachute; rockets, yellow smoke, parachute.

The shells are fired from a standard 5-inch mortar, and reach a height of about 550 feet. After the explosion, the parachute suspends a small, light, wood tube, which emits smoke for about one minute. Reports of explosion can be heard about 2 miles.

The rockets reach a height of about 700 feet, and after the explosion the parachute suspends a small tube which emits yellow smoke for about one minute.

Each rocket and shell for both day and night use is supplied in a cylindrical sealed tin can, which also contains portfire, wind matches, and for the rockets, a stick in four sections. On the outside of the can is a label designating the kind of shell or rocket. These cans are easily opened by pulling a ring, and require no special opening tool.

The fuse for all shells is very rapid and practically instantaneous. The shells should therefore be fired only by attaching portfire to a long stick.

The portfire will burn almost two minutes, and can not be extinguished by wind or rain.

In general, rocket and shell signals should be used as preconcerted signals only, it being impracticable to spell out messages on account of the great amount of ammunition required.

In firing shells the mortar should be surrounded by earth or sand, preferably placed in sacks, and the fuse ignited by attaching the portfire to a long stick. The firing fuse is practically instantaneous.

486. Signal rockets and shells furnished in sealed cans are to be used only in necessary signaling, observing strict economy, and under no consideration should these fireworks be used for purposes of display.

BALLOONS.

487. All matters pertaining to Signal Corps ballooning and equipment are confidential, and therefore no details will be published.

488. Hydrogen compressed in tubes will be shipped from Fort Omaha when required. The tubes for hydrogen gas bear serial numbers and all shipments of these tubes should contain a statement of the serial numbers of the tubes, and indicating whether they are charged or empty. They should be stored in a dry place to prevent rusting and corrosion of valves.

489. When hydrogen is generated by the reaction of sulphuric acid on iron in the presence of water, commercial sulphuric acid testing 66 degrees Baumé and iron or steel turnings free from oil, rust, and dust will be used in the proportion of 1 pound of iron to $1\frac{3}{4}$ pounds of acid and 6 pounds of water. About 5 cubic feet of hydrogen should be produced from each pound of iron. Great care should be used in handling the acid, and those men working at the generating plant should not be permitted to approach balloons or to walk on the ground where balloons or balloon cloths are laid out.

490. Balloons should be shipped by express on account of the danger of damage from spontaneous heating when confined by being wrapped tight for some time.

491. Signal corps spherical balloons will be serially numbered. The lettering will be placed well down near the appendix of the balloon (about 2 templets from the bottom), as follows:

Signal Corps, U. S. Army,
No. 1.
21,800 cubic feet.

For all spherical balloons of a capacity less than 1,000 cubic feet the letters will be 3 inches high and the serial number 6 inches.

For all spherical balloons having 1,000 to 50,000 cubic feet capacity, the letters will be 4 inches in height and the serial number 8 inches.

For all spherical balloons having a capacity of 50,000 cubic feet and larger, the letters will be 6 inches high and the serial number 12 inches.

Dirigible balloons will be serially numbered separate from spherical balloons.

The lettering will be placed under the gas bag near the forward end, as follows:

Signal Corps, U. S. Army,
Dirigible No. 1.
20,000 cubic feet.

For all dirigible balloons having a capacity of 50,000 cubic feet or less, the letters and figures of the first and third lines will be 4 inches high, those of the second line 8 inches high.

For all dirigible balloons having a capacity greater than 50,000 cubic feet, the size of the letters and figures will be increased proportionally to the size of the balloons.

Light-colored balloons will be lettered in black, and dark-colored balloons in white.

Great care must be taken that the paint used does not injure the balloon fabric. Cotton balloons may be painted with mineral paint mixed with linseed oil after the balloon has been well varnished to fill all pores of the cloth.

Balloon envelopes of silk and rubber fabric must not be painted with any prepared paints containing oil. For this fabric the paint should be the coloring matter mixed with pure shellac dissolved in alcohol.

PHOTOGRAPHY.

492. For service in the field, where a photographic outfit is required, the Signal Corps will supply a high-grade camera and holders, of a type intended for the use of film packs or film rolls, and taking a picture $3\frac{1}{4}$ by $4\frac{1}{4}$ inches. Film packs or rolls will also be supplied, but no developing or printing equipment will be furnished with them except under special circumstances. When all the films in the pack or roll have been exposed they should be put in strong opaque wrapper and mailed immediately to the Chief Signal Officer of the Army, stating that they are exposed films to be developed and inclosing a statement of the subjects. These will be developed in the signal office, Washington, by an expert photographer, and the person sending them will be furnished one unmounted print of each, enlarged or of size of negative. Pictures which are of special interest and value will be enlarged from the negatives to 8 by 10 size and placed in the official album.

493. All photographic negatives of instruments, equipment, etc., known as "technical negatives," will be filed in the office of the Chief Signal Officer of the Army.

494. When forwarding photographic prints to the office of the Chief Signal Officer of the Army for file, they should be sent, as far as practicable, unmounted.

495. It is not intended that photograph plates, films, chemicals, or other materials liable to deterioration be kept in stock at general supply depots of the Signal Corps.

ARTICLE VI.

ELECTRICAL INSTALLATIONS.

FIRE-CONTROL INSTALLATIONS.

520. The Signal Corps will supply all instruments for communication. This will include all kinds of telephones, telegraphs, telautographs, and megaphones which may from time to time be prescribed, with their primary and storage batteries, storage-battery switchboards, motor generators, boosters, and the necessary cables of all kinds required for operating and interconnecting them. It will also supply electrical clocks, time-interval bells, firing signals, zone signals, aeroscopes, field glasses, telescopes (other than battle, fire, and mine commander's telescopes), and meteorological instruments. It will furnish and install all submarine cables for communication, including the construction of cable terminals, but excluding cover for the terminals or the cable approaches. It will also furnish all cable for communication by overhead or underground lines and the necessary terminal boxes. In case of underground lines the cables will be placed in trenches or ducts by the Engineer Department. In case of overhead lines they will be installed by the Signal Corps. When practicable any pole lines which have been installed by the Engineer Department for light and power wires may, with the consent of that department, be utilized by the Signal Corps for any of these wires. It will supply each garrisoned coast artillery post having a standard fire-control installation with the following equipment: One electrical engineer's tool chest, one inspector's pocket kit, and one tool bag. To each coast artillery post equipped with a provisional fire-control installation it will supply a post tool chest.

The Signal Corps will supply all the necessary lines and means of electrical communication, including telephones, dial and other telegraphs, wiring, all necessary electrical instruments not permanently attached to the switchboard, including portable ammeters and portable voltmeters, and such special instruments as may be directed to be supplied by the Secretary of War.

521. The Engineer Department will erect all stations (including battle and battery commander stations; primary, secondary, and supplementary stations for fire commands, mine commands, and batteries; searchlight, tide-gauge and meteorological stations, etc.),

switchboard rooms, and telephone and telautograph niches and booths for emplacements and stations, all protected in the best manner practicable; it will furnish circular benches around observing instruments and plotting boards, and to reduce the noise will furnish corrugated rubber floor cloth for the floors of stations and telephone booths; it will also furnish searchlights and the electric power current required for all fire-control purposes (except that derived from signal corps storage batteries installed to operate telautographs), together with electric lamps and other material for lighting all stations, etc.; it will also furnish and install all wiring, underground or overhead, for lighting and power. (Ext. G. O., No. 5, W. D., 1909.)

522. The engineering circulars issued by the electrical division, Signal Office, are of a confidential nature, and all civilian employees and others receiving them are enjoined to consider them as such. These circulars are issued to all electrical engineers and assistants, so that they may be informed of new pieces of apparatus, diagrams, or alterations and improvements in old types; also instructions as to procedure in administrative matters.

523. The engineering circulars are issued in a separate series for each subject according to the following schedule:

- A. Personal Equipment; Property Papers; Reports; Expense Accounts; Forms.
- B. Arrangement of Stations.
- C. Mining Equipment.
- D. Supplies for Permanent Construction.
- E. Telephones.
- F. Memoranda; Manuals.
- G. Installation of Apparatus; Circuits.
- H. Tools.
- I. Terminals.
- J. Line Construction.
- K. Orders.
- L. Temporary Installations.
- M. Cables.
- N. Supply Cabinets.
- O. Approved Equipment by Stations.
- P. Aeroscope and Telautographs.
- Q. Method of Procedure in Turning over Installations of Fire Control.
- R. Interpretation of Standard Diagrams and Charts.
- S. Telegraph Apparatus.
- T. Insulating Compounds.
- U. Testing.
- V. Modifications in Circuits or Instruments.
- W. Switchboard rooms.
- X. Switchboards.
- Y. Miscellaneous.
- Z. Obsolete Circulars.

524. Telephones, telautographs, time-interval clocks, or other delicate apparatus issued by the Signal Corps for installation in seacoast fortifications will not be taken apart for purposes of instruction. (G. O., 117, W. D., 1906.)

525. *Reports on the progress of installations.*—(a) In the last weekly report of each month each assistant in charge of construction shall incorporate in his report an estimate of the per cent of completion of the fire-control installation at each post over which he has supervision.

(b) The following general outline should be used as a guide in preparing these reports:

	Per cent.
Complete installation	100
Cable system.....	35
Includes installation of subterranean cables and terminal boxes, emplacement cabling and mounting outlet boxes, submarine cable and terminal huts, and testing of cable system for capacity, insulation, and resistance, and reports on same.	
Wiring of stations.....	10
Includes wiring of all stations and terminal boxes.	
Installation of equipment.....	45
Includes setting and testing of telephones, telautographs, aeroscopes, time-interval bells, motor generators, storage batteries, distributing and power switchboards, cut-out cabinets, cut-off jack sets, interrupters, etc.	
Engineering	10
Preparation of plans and scheme, general supervision of men and material, records, maps, diagrams, reports, etc.	

(c) Each post in the district should be enumerated in these reports. If no work has been done at any post a statement to that effect should be made.

(d) A detailed report of the *completed* installation at each post shall be made by the overseer, describing all special features. This report forms a part of the consolidated report for the district which is forwarded to the chief signal officer of the department.

526. *Cable records.*—Upon the completion of any installation of subterranean or submarine cables a complete record showing the use of each conductor of each cable and clearly indicating the spare conductors should be made out on the standard form. A copy of this record will be left in the hands of the artillery engineer for each post. It is intended that this record shall serve the same purpose as the wire chief's record in telephone work and shall indicate to the artillery engineer the exact location and number of spare conductors in his fire-control system, as well as aiding in the routing of conductors when faults arise. But one copy of this record will be prepared for the use of the artillery engineer. Additional cards will be supplied him on requisition in case he desires to have duplicate copies

made. Each copy supplied by the representative of the Signal Corps shall bear the initials of the officer or engineer under whose direction they were prepared. A second copy of this card will be forwarded to the office of the Chief Signal Officer of the Army.

METHOD OF PROCEDURE IN TRANSFERRING FIRE-CONTROL INSTALLATIONS
TO THE COAST ARTILLERY CORPS.

527. (1) Upon the completion of any signal corps fire-control installation, the officer in charge shall report such completion to the Chief Signal Officer of the Army with a statement of the batteries, observing stations, switchboard rooms, etc., which are recommended for transfer. The Chief Signal Officer of the Army will then indicate the parts of the system to be transferred.

(2) After inspection by the engineer in charge, accompanied by the district artillery engineer, the signal corps storekeeper will accomplish the usual receipts and invoices conveying the apparatus to the district artillery engineer. The Signal Corps will retain possession and control of the equipment until these invoices and receipts have been accomplished.

(3) Cables will be transferred as follows:

(a) The engineer in charge will prepare a set of maps showing the exact routing of each cable at the post, giving these cables the letter and numeral designation of the approved scheme. All branch cables shall be included. These maps are to be traced in the district if facilities are available. Otherwise they should be forwarded to the chief signal officer of the department for completion and the requisite number of blueprints. The tracings will afterwards be forwarded to the Chief Signal Officer of the Army for file.

(b) The engineer in charge will prepare a triplicate set of sheets showing accurately the condition of all trunking cables, submarine and subterranean, as indicated by the standard tests. These tests will not be required on branch cables extending from the cut-out cabinets to the various emplacements, etc., but the engineer in charge will certify that these latter are operative. These tests shall be recorded on forms Nos. 243 and 261.

(c) One copy each of the above maps will be furnished the non-commissioned officer in charge of the storeroom, who in turn will invoice these cables, referring in his invoices to the above records, which must accompany them. The engineer will transfer the duplicate set of maps and records to the signal corps officer in charge of the installation.

528. The invoices must indicate that the cable is "laid," must show the type and length of each cable with its designation, and must bear the certificate of the engineer in charge, as noted below.

The following example is given:

AT FORT PREBLE.

ARTILLERY ENGINEER,

District of Portland, Fort Williams:

Cable C. Laid from terminal box, primary station, to booth No. 1 (type No. 214), 350 feet.

Cable No. 1. Laid from manhole, foot of tower, to House Island (type No. 24), 350 feet.

(See blueprint map of Fort Preble, No. 69; see blueprint map of Portland Harbor, No. 15.)

* * * * *

JOHN BROWN,

Corp. Sig. Corps, in Charge Signal Corps Storeroom.

Cables O. K. as per record submitted.

J. W. SMITH,

Asst. Electrical Engineer, Signal Corps.

529. When deemed expedient and satisfactory to the signal officer and engineer officer concerned, arrangements may be made whereby nonextensive concrete work, such as bases for motor generators, etc., may be done by the regular engineer corps construction parties, the men employed being reimbursed from signal corps funds.

This arrangement should be made by local agreement between construction officers of the two corps, it being understood that the request will not be made by the Signal Corps in case the work of the Engineer Corps will be retarded thereby.

POST TELEPHONE SYSTEMS AT INTERIOR POSTS.

530. For administrative purposes the following telephonic communications are authorized at military posts and will be established by the Signal Corps as rapidly as funds become available for that purpose. Each year, as soon as practicable after the passage of the army appropriation bill, the War Department will designate the posts at which the extended telephone system herein authorized will be established during the following fiscal year, and pending such establishment existing post telephone systems will remain intact, and the number of telephones at posts not designated to receive the extended system will remain the same as those authorized prior to September 30, 1908.

The telephones will be located as follows:

- | | |
|--|--|
| <ul style="list-style-type: none"> Office of the commanding officer. Office of the quartermaster. Office of the commissary. Office of the artillery engineer. Office of the ordnance officer. Office of the local assistant to district engineer officer (when located at the post). Each officer's quarters. The hospital. The guardhouse. | <ul style="list-style-type: none"> The post exchange. The pumping station. The corral. Each subpost. The quartermaster dock. Each picket guardhouse. Each barrack. Quarters of the senior master electrician or electrician sergeant. Quarters of the local assistant to the district engineer officer. |
|--|--|

4443—09—7

The central post exchange will usually be located at the adjutant's office. (G. O., 170, W. D., 1908.)

531. The post telephone systems specified in the preceding paragraph are only authorized for such posts as are specially designated by the Secretary of War. The systems contemplated in the preceding paragraph are usually underground common battery systems.

532. For military posts other than those designated to receive the systems prescribed in General Orders, 170, War Department, 1908, the following telephones are authorized for administrative purposes by General Orders, 97, War Department, 1906:

Office of the commanding officer---	1	Residence of the quartermaster---	1
Office of the quartermaster-----	1	Residence of the adjutant-----	1
Office of the commissary-----	1	Residence of the surgeon-----	1
At the hospital-----	1	At the pump house-----	1
At the guardhouse-----	1	At the corral-----	1
At the post exchange-----	1	At each subpost-----	3
Residence of the commanding officer -----	1		

In addition to the foregoing allowance, not to exceed one additional telephone for each organization serving at the post may be installed at points selected by the post commander when certified to be necessary for the public service. These telephones are intended to expedite general administrative affairs at large posts where a number of companies are stationed, and are not primarily intended to be placed at the company offices or barracks.

The central post exchange will usually be located in the post administration building.

533. Telephonic installations for rifle ranges, fire-control purposes, War College, and service schools are not included in the above. They are provided for separately, according to the necessities of the occasion.

534. In the matter of installation and maintenance of post telephone systems the Chief Signal Officer of the Army has decided that Alcatraz Island, Fort Mason, and Fort Slocum will be equipped from signal service appropriation, and the Presidio of San Francisco and Fort McDowell from fire-control appropriation.

TELEPHONE SYSTEMS AT COAST ARTILLERY POSTS.

535. The telephone system of an artillery district constitutes a portion of its defenses and will hereafter be installed on the recommendation of the Chief Signal Officer of the Army and the Chief of Artillery. It will be established and maintained from funds appropriated for fire-control installation.

536. The post telephone systems at coast artillery posts are divided into three classes, according to the connections authorized in each case, as follows:

(1) Posts equipped with provisional fire-control installations are equipped with the system authorized in paragraph 532.

(2) Posts equipped with standard fire-control installations undertaken prior to issue of General Order 170, War Department, 1908, are equipped with the system prescribed in paragraph 532, with the following additions:

(a) Two to the battle commander's station; one line to each of the following: F' station, M' station, mining casemate, loading room, meteorological station, tide station, district signal station.

(b) Each storage magazine, ordnance machine shop, ordnance storehouse, engineer storehouse, signal corps storehouse, torpedo storehouse, each central power plant.

(3) Posts equipped with standard fire-control installations undertaken since the issue of General Order 170, War Department, 1908, will be provided with the system prescribed in paragraph 530, with the following additions:

(a) Two to the battle commander's station; one line to each of the following: F' station, M' station, mining casemate, loading room, meteorological station, tide station, district signal station.

(b) Each storage magazine, ordnance machine shop, ordnance storehouse, engineer storehouse, signal corps storehouse, torpedo storehouse, each central power plant.

537. At each post the telephones for administrative purposes, those mentioned in the preceding paragraph, and such other fire-control telephones as may be designated on the recommendation of the Chief of Artillery, will be centered in one switchboard, located at post headquarters or at such other point as may be recommended by the Chief of Artillery.

538. From each post switchboard in an artillery district there will be one trunk line, and from each battle commander's station two trunk lines to the post switchboard at artillery district headquarters. Detached posts and battle commands, attached to artillery districts for administrative purposes, will not be included in the district telephone system.

INSPECTION AT INTERIOR POSTS.

539. Post telephone systems are to be maintained and operated by the members of the garrison, as a rule. Post systems at interior posts will be inspected twice annually by a competent inspector under the provisions of paragraph 11, General Orders, 97, War Department, 1906. The inspection of the systems at posts provided with the extended underground systems contemplated in General Orders, 170, War Department, 1908, should be made, if possible, by an officer having a technical knowledge of common battery systems.

540. The reports of inspections prescribed in paragraph 11, General Orders, No. 97, War Department, 1906, will be prepared on signal corps Form No. 209 (edition Apr. 9, 1909) and forwarded through military channels from the post where the inspection is made.

541. Inspectors will note on their reports of the inspection of post telephone systems whether signal corps wire, poles, conduits, or telephones are used in providing private unofficial telephone service between offices or officers' quarters and switchboards provided by commercial companies. There is no objection to commercial companies connecting their trunk lines to signal corps switchboards and thereby providing private unofficial service to offices and officers' quarters on the post administrative system, but the use of signal corps telephones, wires, conduits, or poles in furnishing private unofficial service between offices or quarters in a post and the switchboard of a commercial company is an unauthorized use of public property.

542. The inspector will carefully note all of the following points, correct everything which he is able to do with tools and material on hand, and furnish the post signal officer with a statement of all material which is necessary to correct or complete the system accordingly. Requisitions from post signal officers for such material should state that the articles are recommended by the signal corps inspector.

The points to be especially observed are the following:

Switchboard.—It should have a few drops in excess of the number of lines; every drop, jack, plug, cord, night-bell circuit, etc., should be tested; also the generator and switchboard telephones; requisitions for parts must specify the name, size, and serial numbers of the switchboard.

Switchboard protectors.—Must be enough for all lines; all protectors clean and free from dust; a supply of extra fuses on hand; fifteen-drop switchboards will usually be provided with lightning arrester cabinets, the larger boards with distributing frames.

Construction.—The construction of the system, types of equipment, and material should conform to the standard construction as described in paragraphs 456 to 462 inclusive, this manual.

Each telephone instrument must be provided with an efficient lightning arrester and it should be especially noted whether the arrester is properly grounded. A supply of extra fuses and fuse wire should be on hand. The inside wiring should be inside twisted pair wire, secured by small porcelain cleats. Inspectors should test the voltage and condition of the battery at each instrument (local battery). Wet-cell types of local battery are no longer issued, but where now in use may be continued. The No. 6 size dry cell is the present standard, and two cells for each instrument should last at least one year.

Tools.—Each post should be provided with the following tools for maintenance and repair of the telephone system, viz :

- | | |
|---|--|
| <ul style="list-style-type: none"> 1 post tool chest. 1 tree trimmer. 1 blow torch. 1 battery gage (pocket voltmeter). 1 magneto testing set. 1 spoon shovel. 1 digging and tamping bar. 1 lineman's tool belt. | <ul style="list-style-type: none"> 1 lineman's body belt. 1 pair 8-inch side-cutting pliers. 1 inspector's pocket tool kit. 2 Buffalo grips, with pulleys and rope. 1 pair climbers, with straps. 1 splicing clamp, combination wire and sleeve. |
|---|--|

543. Inspectors will inquire concerning surplus instruments, tools, or line material on hand, and note same in the report. Each post should have one extra wall phone in storeroom to replace any which become unserviceable.

In addition to the inspection of the post telephone system, inspectors will examine the telephone equipment for rifle range, reporting condition of instruments, cable, outlet boxes, etc.

544. In general, the inspector will note whether the post telephone system conforms to General Orders, No. 97, War Department, 1906, or General Orders, No. 170, War Department, 1908, and report instruments which are not installed in places prescribed by the two orders mentioned herein. He will also note all cases where the total number of telephones in use is in excess of the authorized allowance. In computing the allowance, a band is counted as one organization.

It is desired that all telephones of the post system should be of the same make. Recommendations and requisitions should conform to this policy.

545. Recommendations for the supply of additional material appearing in the reports of signal corps inspectors concerning post telephone systems will in no case be considered a requisition. The inspector should furnish the post signal officer with a statement of the material which he recommends for maintenance and betterment of the system. The post signal officer should then submit a requisition.

INSPECTIONS AT COAST ARTILLERY POSTS.

546. The following instructions for the inspection, test, and repair, by officers of the Signal Corps or of the Coast Artillery Corps, as the department commander may select, of such of the elements of coast fortifications as have been finished or installed by the Signal Corps, are published for the information and guidance of all concerned :

General Orders, No. 157, War Department, September 13, 1906, as amended by paragraph IV, General Orders, No. 219, October 29, 1907, and so much of paragraph 11, General Orders, No. 97, War Department, May 25, 1906, as amended by paragraph IV, General

Orders, No. 219, War Department, October 29, 1907, as relates to the inspection of coast artillery post telephone systems, are rescinded, and the following instructions relative to the inspection, test, and repair of such of the elements of seacoast fortifications as have been finished or installed by the Signal Corps are substituted therefor:

(1) The department commander will cause an annual inspection and test to be made of the entire signal corps equipment of each sea-coast fortification within his department. Such inspection and test will take place, if practicable, during the three months preceding June 30 of each year, and will be made by the chief signal officer of the department. If that is impracticable, the inspection and test will be made by some other officer of the Signal Corps, or by the district artillery engineer; and if none of these officers is available, then by such other officer of the Coast Artillery Corps as the department commander may designate. Officers designated to make these inspections and tests will give notice thereof, through the artillery district commander, to the post commander, who will furnish such officers with any assistance that may be required. The inspector will be accompanied during his inspection by the district artillery engineer and by the officer immediately responsible for the equipment to be inspected.

(2) A report covering the inspection and test, on blank forms provided by the Signal Corps, will be prepared in triplicate and forwarded through the post commander to the department commander. One copy will be withdrawn for file in the office of the chief signal officer of the department and the remaining two copies will be forwarded to The Adjutant General of the Army for file in the offices of the Chief Signal Officer of the Army and the Chief of Coast Artillery, respectively.

(3) Should the post commander learn, at any time other than at the regular inspections, that a serious defect has developed in the signal corps equipment at his post, it is his duty to inform the department commander, through the artillery district commander, giving a detailed report in order that, if practicable, the necessary corrections may be made before the next regular inspection. (Par. II, G. O., 83, W. D., 1909.)

547. The annual report of the inspection of signal corps equipment at seacoast artillery posts, prescribed in the foregoing paragraph, will be rendered on form 204 (approved May 19, 1909).

SWITCHBOARD OPERATORS.

548. In order to localize responsibility for the proper care of the switchboard and to secure experienced services the commanding officer of the posts will, whenever possible, have the switchboard operated

by men permanently detailed for that purpose. (Par. 10, G. O., 97, W. D., 1906.)

549. The muster roll and pay roll in the case of an enlisted man entitled to extra-duty pay while performing the duties of a switchboard operator at an interior post will contain the following data under the head of remarks: Dates of the beginning and ending of the time for which the soldier was employed during the period covered by the roll and the actual number of days to which he is entitled to the extra-duty pay; for example, "Switchboard operator, entitled to extra-duty pay July 1 to 31, 1907, twenty-two days." (Circ. 32, W. D., 1907.)

550. The number of switchboard operators for whom extra-duty pay is authorized at each post is announced annually in a War Department general order. Extra-duty pay is only authorized for operators on duty at switchboards provided by the Signal Corps in connection with the post administrative system. The detail of such operators at switchboards provided by commercial telephone companies that are providing unofficial service to their subscribers in military posts is unauthorized.

COMMERCIAL TELEPHONE SERVICE AT MILITARY POSTS.

551. The following extract from paragraph 1, General Orders, 116, War Department, 1908, refers to trunk line service with commercial telephone companies, provided by the Quartermaster's Department:

When the Quartermaster's Department finds it necessary to contract for telephonic communication from a near-by town to the offices of the commanding officer, the quartermaster, and the commissary, or such of them as may be necessary, through a commercial telephone company, that department is authorized to contract for the rental of a commercial wire, together with a sufficient number of telephones and switchboard, if necessary, for the official business of the post; or it may contract for trunk lines to the post telephone switchboard in case such trunk line service can be obtained without material increase in expense to the United States.

552. Although the Signal Corps is only charged with the duty of providing telephone service within military posts, for administrative purposes, there is no objection to trunk lines of commercial companies being connected to the signal corps switchboards of post administrative systems, provided no charge for the same is made against the signal corps appropriation.

553. In post administrative systems the wires of commercial telephone companies that are furnishing unofficial telephone service to their subscribers in military posts can not be placed on signal corps poles or in signal corps conduits. Spare wires in signal corps conduits can not be used for this purpose.

Should it become necessary in contracting for trunk line service with commercial companies to provide wires between certain offices at military posts for official business, application for the erection of new wires or for the use of existing signal corps wires will be made to the Chief Signal Officer of the Army in each case.

554. At large posts where complete private telephone service is desired in addition to that provided by the Signal Corps, a revocable license will be prepared by department commanders and forwarded to The Adjutant-General of the Army for the approval of the Secretary of War, covering completely the conditions under which the poles may be erected, the wires strung, and the exchange service regulated, or the whole plant removed when required. This service will be permitted in no case without the approval of the Secretary of War and will be made an entirely separate installation from the government lines. The use of signal corps equipment in the construction or maintenance of such commercial systems within a military post is unauthorized.

TELEPHONES.

555. At present for local battery service the Signal Corps is issuing "Dean" and "Sumter" wall telephones and desk sets. These are ordinary commercial patterns adapted to pass rigid electrical tests.

The Signal Corps no longer rents American Bell telephones and those now in use are being replaced (entire post system at one time) by telephones owned by the Government.

Service telephones (folding-box type) are being withdrawn from post systems and issued only for use at pits of rifle ranges.

All odd and miscellaneous types of telephones are being withdrawn from post systems as fast as funds will permit and replaced by new commercial types. It will be required that all telephones of a post system shall be of the same type.

Only the No. 6 "Reserve" type dry cells are issued as the local battery of telephones.

556. *Allowance of dry cells to be provided.*

Instrument.	Type of cell.	Number of cells.
L. B. post-telephone switchboards.....	No. 8 "Reserve".....	(a)
Portable field-telephone switchboard.....	No. 6 "Reserve".....	2
L. B. telephones for post use.....	No. 4-0 "Reserve".....	2
Field telephones, models 1905 and 1906.....	No. 6 "Reserve".....	2
Field telephones, old types.....	do.....	2
Field buzzers.....	No. 5 "Reserve".....	2
Cut-in telephones.....	No. 4-0 "Reserve".....	5
Service telephones (folding-box pattern).....	No. 4-0 "Reserve".....	4
Induction field telegraph set.....	No. 6 "Reserve".....	2
Cavalry buzzer.....	No. 5 "Reserve".....	4
Field artillery type telephone.....	Special.....	61
	No. 4-0 "Reserve".....	2

^a Supply only when directed.

^b One unit consisting of two special cells.

557. Repairs to telephones which require dismounting of parts will not be made at posts. When unserviceable they will be sent to the nearest general supply depot of the Signal Corps for repair. This, however, does not apply to competent telephone men of the Signal Corps who are sent to posts for the purpose of placing a telephone system in condition.

558. The regulations relative to American Bell telephones, rented by the Signal Corps, are contained in paragraphs 355-360, Manual No. 7.

TELEPHONE SWITCHBOARDS.

559. For small post systems requiring fifteen lines or less, the "Sterling" local battery board is provided. This is supplied with fifteen drops installed, but may be increased to twenty. For systems of twenty lines and over, the "North Electric" local battery switchboard is provided. This board may be increased to fifty drops.

The primary telephone circuit for the switchboard operator in the "Sterling" and "North Electric" switchboards is a closed circuit, and the battery used should be four cells of gravity battery 6 by 8 size.

Telephone switchboards of various other types will be continued in use where installed as long as they remain serviceable.

The lightning protectors for "Sterling" switchboards will consist of a cabinet having Mason lightning arresters mounted. "North Electric" switchboards will be provided with a "Cook" type L 3 distributing frame, size fifty line, on which will be mounted "Cook" No. 8 switchboard protectors (in blocks of ten).

SIZES OF THE VARIOUS TYPES OF TELEPHONE RECEIVER DIAPHRAGMS.

560. In the supply of telephone receivers of various makes there are several sizes of ferrotype diaphragms, and in order to avoid confusion in the selection of these diaphragms in making requisitions for repair parts, the following tables have been prepared:

STANDARD FIRE-CONTROL INSTRUMENTS.

	Inches.
Single head receiver, leather cover, made by the Western Electric Company-----	2 ³ / ₄
Hand receiver, Western Electric Company-----	} ----- 2 ³ / ₈
Hand receiver, North Electric Company-----	
Hand receiver, Dean Electric Company-----	
Watch-case receiver, head set-----	} ----- 2 ⁷ / ₈
Watch-case receiver, hand set-----	
Watch-case receiver, double head-----	

SPECIAL FIRE-CONTROL INSTRUMENTS.

Cable-testing telephone-----	2 ¹ / ₈
All Lambert Schmidt head receivers, watch-case type, made for artillery use in 1904-5-----	2 ¹ / ₈
Special flat hand set of Western Electric Company, made in 1904-----	2 ¹ / ₂

GENERAL SERVICE INSTRUMENTS.

Head receiver used with field buzzer, Western Electric Company.....	2 $\frac{3}{4}$
Hand receiver of American Bell, rented phone.....	2 $\frac{7}{8}$
Hand receiver, Sumter.....	}
All microtelephones, Lambert Schmidt.....	
Cavalry buzzer.....	
Hand receiver with Lambert Schmidt service phone.....	
Head receiver with Sterling field buzzer.....	
Head receiver with lineman's testing set.....	}
Microtelephone, Western Electric Company, with field phone.....	
Hand set, Dean Company, with field phone.....	
Hand receiver, Dean Company, with wall and desk sets.....	2 $\frac{3}{8}$

WIRELESS TELEGRAPHY.

PORTABLE SETS.

561. At the present time, the following types of portable wireless sets are issued by the Signal Corps:

- (a) Field wireless set, pack.
- (b) Field wireless set, 1 kilowatt.

562. The field wireless set, pack, is designed to be transported by three pack mules. The arrangement of the instruments varies in the different sets which have been produced, and improvements in design, circuits, etc., are constantly being made. In general, this outfit may be described as one or two chests containing all sending and receiving instruments and carried on one mule. A second mule carries two units of portable, nonspillable storage battery, or a portable hand generator. A third mule carries a portable field pole, length 60 feet, in ten sections of 6 feet each, complete with antennæ, counterpoise and guys. The entire outfit, including portable mast and batteries, weighs about 450 pounds. The radius of operation is about 20 miles under normal conditions.

563. The field wireless set, 1 kilowatt, consists of a 2-cycle gasoline engine, belt drive, and alternating-current generator, 133 cycles, 2,660 revolutions per minute. The engine, generator, gasoline tank, etc., are mounted together on one base and frame, which is transportable, and may be carried in the army escort wagon. The alternating current generator supplies the primary of a dry core transformer which steps the voltage up to 20,000 volts. All measuring, sending, and receiving instruments are contained in one transportable chest. A sectional mast, total length of 100 feet, is provided for supporting the antennæ. The entire outfit weighs about 1,000 pounds. Its radius of operation under normal conditions is from 50 to 60 miles.

STATION SETS.

564. The following list shows the wireless stations installed by the Signal Corps:

Name of station.	Call letter.	Power.	System.	Whether open to public service.
		<i>Kilo-watts.</i>		
Fort Andrews, Mass.	FC	1	Signal Corps..	Not open to public service.
Fort H. G. Wright, N. Y.	FW	1	do.....	Do.
Fort Hancock, N. J.	FN	1	do.....	Do.
Fort Leavenworth, Kans.	FL	3	do.....	Under construction.
Fort Levett, Me.	FV	1	do.....	Not open to public service.
Fort Monroe, Va.	FY	1	do.....	Do.
Fort Omaha, Nebr.	FS	3	do.....	Do.
Presidio, San Francisco.	PS	1	do.....	Under construction.
Fort Riley, Kans.	FZ	3	do.....	Do.
Fort Totten, N. Y.	FT	3	do.....	Not open to public service.
Fort Wood, N. Y.	FD	3	do.....	Do.
Fort Worden, Wash.	FX	1	do.....	Do.
S. C. Laboratory, Washington, D. C.	SC	3	do.....	Under construction.
Alaska:				
Circle City.	FK	3	do.....	Open to public service.
Fort Egbert.	FQ	3	do.....	Do.
Fairbanks.	FB	3	do.....	Do.
Gibbon.	FG	10	do.....	Do.
Kotlik.	FE	1	do.....	Under construction.
Nome.	FD	10	do.....	Open to public service.
Petersburg.	FP	1	do.....	Do.
*Safety Harbor, Nome.	SA	10	De Forest..	Do.
Fort St. Michael.	FM	3	do.....	Do.
Wrangell.	FW	1	Signal Corps..	Do.
Philippine Islands:				
Corregidor Island.	FH	10	do.....	Under construction.
Jolo.	FS	3	do.....	Open to public service.
Malabang.	FA	3	do.....	Under construction.
Zamboanga.	FM	3	do.....	
United States Army transport service:				
Kilpatrick.	ATK	3	do.....	Open to public service.
Logan.	ATL	3	do.....	Do.
Sherman.	ATR	3	do.....	Do.
Sheridan.	ATS	3	do.....	Do.
Thomas.	ATU	3	do.....	Do.
Cable ship Burnside.	BS	3	do.....	Not open to public service.
Cable ship Joseph Henry.	FR	2	do.....	Under construction.
Artillery harbor tugs:				
Captain Chas. W. Rowell.	RW	1	do.....	Not open to public service.
Reno.	X	1	do.....	Do.
General Randol.	OR	1	do.....	Do.
General R. B. Ayers.	FY	1	do.....	Do.
Harvey Brown.	HB	1	do.....	Do.

* Discontinued August 26, 1909.

565. All officers and enlisted men of the Signal Corps accountable for wireless property or engaged in operating wireless sets are directed to exercise great care in the use of silicon, Perikon or other dry detectors. These detectors are very expensive and must be handled with great care. In case a dry detector becomes unserviceable from any cause it will be forwarded at once by registered mail to the Signal Corps Laboratory, Washington, D. C., for repair.

RIFLE-RANGE EQUIPMENT.

566. Signal corps supplies for target ranges differing from the standard herewith set forth will not be furnished except on the special approval of the Chief Signal Officer of the Army for reasons which must be satisfactory to the Chief of Staff.

It is assumed that ranges will be equipped with targets varying in number from two to twenty-four and that the purpose of the telephone communication is to enable men firing to communicate with the markers on such occasions as may be necessary to note a failure to mark, a miss, an improper position of the target, or other incidental events not requiring any extended or considerable amount of conversation over telephones on the range.

Ranges are divided into two classes—the first having a width of more than 100 yards, and the second class a width of 100 yards or less. First-class ranges will have the range office connected with the target pits by two single-pair lead-covered cables, one at the right side and the other at the left side of the range. The cables are to be buried in a trench not less than 15 inches deep and covered first with a board at least 1 inch thick and 6 inches wide, and then with earth.

Each firing point (at 200 yards, 300 yards, etc.) will be provided with an outlet box for the purpose of furnishing telephonic communication with any desired point on the range. Local connections are to be made by a flexible cord, one twisted pair, of sufficient length to permit a field telephone to be carried to any desired position on the firing point.

Telephones with plug will enable the range officer to establish communication between the range office, the target pits, and any firing point on the range where practice may be taking place.

Ranges of the second class, 100 yards or less in width, will be equipped in the same manner, except that one cable only will be furnished.

There will also be suitable stationary boxes to protect telephones placed in the rear of the targets and portable boxes for protecting the field telephones while they are being used on the firing line, the latter boxes to hold the portable cord when not in use.

Under these conditions it will be practicable to bridge on an additional telephone or two at the outlet box on the firing point, and also at the terminus of the cable in the target pits should it be necessary or desirable to simultaneously maintain communication from the firing point with the range office and the target pits.

567. The accountable officer will be held responsible that signal corps telephones are not permitted to remain in target pits after the conclusion of the practice season. This would result in the telephones becoming entirely unserviceable.

568. The following standard signal corps telephone equipment for target ranges is usually furnished:

FIRST-CLASS RANGE.

Cable, lead covered, one pair (a line of subterranean cable to extend down each side of the range, the length on each side to be the length of the range plus two-thirds its width.)

Twelve outlet boxes (one at each firing point on both sides of the range).
 Two portable telephone boxes.
 Two portable telephone cords (each cord to be in length about one-third the width of the range).
 Two service telephones for target pits.
 Two field telephones (portable) for use at firing points.
 Two rolls friction tape.

SECOND-CLASS RANGE.

Cable, lead covered, one pair (a line of subterranean cable to extend down one side of the range. The length will be the length of the range plus two-thirds its width).

Six outlet boxes (one at each firing point).
 One portable telephone box.
 One service telephone for target pit.
 One field telephone (portable) for firing point.
 One roll friction tape.

569. In addition to the telephone communication authorized for target ranges according to the preceding paragraphs, the Signal Corps will equip such of the large and important rifle ranges as may be determined by the War Department with the "annunciator buzzer system." This special signal system is to provide a buzzer, or other suitable signal, at each target, operated by a push button at the firing point. The general scheme is illustrated in drawings Nos. 624a and 624b, printed in this manual.

570. The following standard signal corps equipment is usually furnished in the installation of annunciator buzzer systems on ranges:

Cable, lead covered, one pair (type 213), to connect buzzers with distributing box.

Cable, lead covered, 10 pair (type 411), a length to extend down the middle of the range.

Buzzers (the same number as targets).

Six outlet boxes with 20 contacts.

One distributing box.

Two telephones, service.

Two telephones, field.

Buzzer outlet boxes.

Push buttons with flexible conductors and plugs, same number as targets plus two extra.

One annunciator.

One buzzer switch.

Strap keys, three point—same number as targets.

Twenty cells, dry, No. 6, reserve.

Together with necessary construction materials.

571. For some of the large rifle ranges the Signal Corps has supplied a portable, direct-reading anemometer. The use of these instruments is confined to preliminary drills for instruction in wind reading. They will not be allowed on the range during the regular practice season or during competitions. (M. S. O., 1201729.)

ARTICLE VII.

CABLES.

590. (a) Each reel of standard signal corps cable bears a brass tag marked with the letters "S. C." and a serial number, this tag being attached to the reel when the cable thereon is accepted by the signal corps inspector. This tag is primarily for the purpose of identifying the reel. When inspection is made, the inspector shall see that the manufacturer's name and reel number appear in permanent form (stenciled, cut, or burned) on the reel, and cable will not be accepted without such marking.

(b) All reels which become the property of the Signal Corps at the time of the purchase of the cable shall be branded "Property of the Signal Corps, U. S. Army." Other reels subsequently purchased shall at that time be likewise marked.

(c) When the cable is removed from a reel apparently not the property of the Signal Corps, the Chief Signal Officer of the Army should be at once notified, in order that steps may be taken to return the empty reel to the manufacturer, reel to be held until definite advice is received from the Chief Signal Officer of the Army that it is not signal corps property.

Reels should be returned to the manufacturer on government bill of lading and notification of shipment forwarded to the Chief Signal Officer of the Army.

Should the cost of transportation exceed \$10 each reel, that fact will be reported to the Chief Signal Officer of the Army and shipment held awaiting approval. Only serviceable reels should be returned.

(d) If cable is transferred from one reel to another, a new tag should be affixed to the reel to which the cable is transferred, the chief signal officer of the department furnishing tags for this purpose. The reel to which the cable is transferred should bear no other signal corps number than the new one so assigned. Cable should never be transferred to a reel known to be not the property of the Signal Corps, if it is possible to avoid it.

Effort should be made to release, as soon as possible, any reels that can be returned for credit.

(e) In ordinary cases, it is desirable to group together while in storage reels which have borne numbers in a series, so that, in case it is necessary to return them to the manufacturer, there may be no confusion.

(f) The property officers at the various depots are hereby directed to brand all reels on hand that can not be returned for credit, "Property of Signal Corps, U. S. Army."

(g) A careful record will be kept in each department of the issue of these tags in fulfilling the requirements of paragraph (d) of this circular, indicating in each case the signal corps number of the reel from which the cable transferred to the new reel was taken.

The monthly report from each department shall show the numbers of the tags issued, the signal corps number of the reel from which the cable was taken, the signal corps number formerly borne by the reel to which the cable is transferred, and any other information that will enable the cable on the reel to be identified.

CABLE REPAIRS.

591. When repairs are made on signal corps cables in which there are faults the party repairing the fault will send direct to the office of the Chief Signal Officer of the Army a piece of the core containing this fault—about 6 inches in length—with a brief statement of the circumstances under which the fault was discovered and repaired. Whenever in the location of the fault it is necessarily burned out to such an extent as to render the original trouble unrecognizable, it should be so stated in the report accompanying the piece of core. Whenever a cable is broken by an anchor or other means, the piece of the core at the broken ends will be sent in.

592. Whenever a cable or other material forming part of the sea-coast defenses of the United States is fouled by a passing vessel, the commanding officer of the post or station to whose knowledge the fact is brought will make prompt report by telegraph direct to The Adjutant-General of the Army of the name and nationality of the vessel concerned and the nature and extent of the damage done by it, in order that the matter may be placed in the hands of the Department of Justice. The commanding officer will send a copy of his report to the department commander.

593. In view of the fact that the submarine cables are laid for a definite purpose along routes determined and approved by competent authority, no signal officer will either establish an additional office on a cable system or, beyond the necessities of occasions for seeking better bottom, change the route of any Signal Corps cable without such change having been submitted to and approved by the Chief Signal Officer of the Army or other competent superior authority. Similar principles will govern the maintenance and repair of military land lines.

INSPECTIONS.

594. In the inspection of wire or cable under specifications from the office of the Chief Signal Officer of the Army the inspector will, in all

cases, secure samples of each separate lot of wire (bare or insulated), armor wire, cable core, and cable. One sample of wire or core about 20 feet long and cable about 1 foot long should be taken from each lot and the same transmitted to the office of the Chief Signal Officer, labeled with the date of manufacture, the manufacturer's name, the cable for which the wire is intended, and the order under which the purchase is being made. Inspectors will also submit with their report a suitable number of short samples tested under their own supervision, so that there may be on file representative specimens of each lot.

OFFICIAL NUMBERS OF CABLES LAID.

595. Every section of signal corps cable is assigned an official number by the Chief Signal Officer of the Army when the cable is laid. When two or more sections of cables are later joined through permanently, a new number is assigned; also when any section is divided to cut in an intermediate office.

Numbers from 1 to 100 are assigned to cables outside of the United States, and from 101 upward to cables in the United States.

In correspondence the official number of the cable here given will be sufficient for its identification.

596. The following list of submarine cables laid by the Signal Corps of the Army is published for the information of the Signal Corps:

PHILIPPINE CABLES.

Official No.	Name.	Number of conductor.	Date laid.	Remarks.
1	Malate-Cavite.....	1	Nov. —, 1898	Recovered Apr. 13, 1905.
2	Liloan-Ormoc.....	1	Apr. 19, 1900	Now part of the Ormoc-Cebu cable, No. 5.
3	Tacloban-Samar.....	1	Apr. 21, 1900	
4	Liloan-Cebu.....	1	Apr. 24, 1900	Now part of the Ormoc-Cebu cable, No. 5.
5	Ormoc-Cebu.....		.....do.....	Formed by joining Liloan-Cebu, No. 4, and Liloan-Ormoc, No. 2, cables.
6	Guinayangan-Pasacao.....	1	May 28, 1900	
7	Corregidor-Nale.....	1	June 4, 1900	Practically relaid on Apr. 1, 1904.
8	Calamba-Santa Cruz.....	1	Sept. 30, 1900	
9	Santa Cruz-Siniloan.....	1	Oct. 1, 1900	Recovered July, 1903.
10	Calamba-Los Banos.....	1	Oct. 2, 1900	
11	Misamis-Lintogoup.....	1	Jan. 7, 1901	Recovered Aug. 2, 1905.
12	Dumaguete-Misamis.....	1	Jan. 13, 1901	
13	Misamis-Iligan.....	1	Jan. 18, 1901	
14	Iligan-Cagayan.....	1	Jan. 25, 1901	
15	Zamboanga-Tucuran.....	1	Feb. 21, 1901	Now part of the Malabang-Zamboanga cable, No. 42.
16	Zamboanga-Jolo.....	1	Feb. 28, 1901	To be recovered and relaid between Surigao and Cagayan.
17	Dumaguete-Oslob.....	1	Mar. 18, 1901	
18	Catbalogan-Carigan.....	1	July 13, 1901	
19	Catbalogan-Calbayog.....	1	July 15, 1901	
20	Argao-Loon.....	1	July 18, 1901	
21	Malabang-Parang.....	1	July 24, 1901	
22	Malabang-Tucuran.....	1	July 27, 1901	Now part of the Malabang-Zamboanga cable, No. 42.
23	Calapan-Batangas.....	1	Aug. 8, 1901	
24	Calapan-Boac.....	1	Aug. 16, 1901	
25	Palanog-Calbayog.....	1	Sept. 6, 1901	
26	Palanog-Sorsogon.....	1	Sept. 12, 1901	
27	Legaspi-Bacon.....	1	Sept. 17, 1901	

PHILIPPINE CABLES—Continued.

Official No.	Name.	Number of conductor.	Date laid.	Remarks.
28	Maasin-Surigao	1	Sept. 29, 1901	Purchased by Philippines civil government.
29	Zamboanga-Isabela	1	Oct. 5, 1901	Recovered Dec. 15, 1904.
30	Jolo-Siassi	1	Oct. 9, 1901	
31	Milagros-Capiz	1	Nov. 5, 1901	
32	Cavite Transport Buoy	1	Mar. —, 1902	Recovered June 30, 1905.
33	Cavite-Naval Flagship Buoy	1	Mar. —, 1902	Do.
34	Los Banos-Malahi	1	May —, 1902	
35	Palanog-Romblon	1	Nov. 20, 1902	
36	Romblon-Boac	1	Nov. 22, 1902	
37	Panay-Guimaras	1	Nov. 24, 1902	
38	Corregidor-Mariveles	1	Nov. 30, 1902	
39	Cuyo-San Jose	1	June 7, 1903	Civil government.
40	Malinao-Cololbong	1	Mar. 28, 1904	Do.
41	Lake Lanao	1	June 16, 1905	
42	Malabang-Zamboanga	1	July 19, 1905	Formed by connecting the Tucuran-Zamboanga, No. 15, and the Tucuran Malabang, No. 22, off Point Flechas. Formerly No. 12, Dumaguete-Misamis. Relaid Dec. 17, 1906.
55	Dumaguete-Camp Overton	1	Dec. 8-13, 1906	
56	Tacloban-San Antonio	1	Dec. 1, 1906	
	The Philippine cables mentioned above have been transferred to the insular government of the Philippine Islands.			
57	Olongapo-Grande Island	1	July 25, 1907	
62	Grande Island-Macmanys Point	1	Sept. 28, 1907	

ALASKAN CABLES.

43	Safety-St. Michael	1	Oct. 17, 1901	Abandoned; partly recovered Aug. 15, 1905.
44	Juneau-Skagway	1	Aug. 23, 1901	
45	Juneau-Haines	1	July 7, 1903	Formed by dividing the Juneau-Skagway cable, No. 44, at Fort William H. Seward, and replacing portions near Skagway.
46	Haines-Skagway			
47	Juneau-Sitka	1	Oct. 2, 1903	
48	Sitka-Seattle	1	Aug. 29, 1904	
49	Sitka-Valdez	1	Oct. 7, 1904	
50	Valdez-Liscum	1	May 15, 1905	
51	Valdez-Seward	1	Aug. 5, 1905	
52	Fanshaw-Wrangell	1	Dec. 20, 1906	
53	Wrangell-Hadley	1	Dec. 29, 1906	
54	Hadley-Ketchikan	1	Dec. 31, 1906	
58	Sitka-Japonski Island	1	Aug. 31, 1907	
59	Seward-Montague Island	1	Aug. 12, 1908	
60	Valdez-Montague Island	1	.....do.....	Formed by dividing the Valdez-Seward cable, No. 51, at Montague Island.
61	Cordova-Montague Island	1	.....do.....	

CABLES IN THE UNITED STATES.

No.	Location.	Conductors.	Date laid.	Remarks.
MAINE.				
101	Cushings Island-Jewells Island	1	1898	
102	*Fort Williams-Pond Cove (1)	1	1903	Recovered.
103	*Fort Williams-Pond Cove (2)	1	1903	Do.
104	*Fort Williams-Two Lights (1)	7	1903	Do.
105	*Fort Williams-Two Lights (2)	7	1903	Recovered partially.
106	*Fort Williams-Cushings Island (1)	1	1903	Recovered.
116	*Fort Williams-Cushings Island (2)	8	1903	
107	*Fort Williams-Batcheldors Cottage (1)	1	1903	Do.
108	*Fort Williams-Batcheldors Cottage (2)	1	1903	Do.
117	*Fort Williams-Batcheldors Cottage (3)	1	1903	Do.
109	*House Island-Cushings Island (1)	7	1903	Do.
119	House Island-Cushings Island (2)	12	1903	
200	House Island-Cushings Island (3)	1	1905	

* Artillery Corps torpedo cable.

Serial numbers of cables in the United States—Continued.

No.	Location.	Con- ductors.	Date laid.	Remarks.
MAINE—continued.				
257	House Island-Cushings Island (4).....	54	1908	
110	*Fort Gorges-Fort Preble.....	1	1903	Recovered.
111	*Cushings Island-Great Diamond Island (1).....	1	1903	Do.
112	*Cushings Island-Great Diamond Island (2).....	1	1903	Do.
114	*Long Island-Great Diamond Island (1).....	1	1903	Do.
115	*Long Island-Great Diamond Island (2).....	1	1903	Do.
118	*Fort Preble-Cushings Island.....	1	1903	Do.
120	*House Island-Fort Preble (1).....	7	1903	
121	*House Island-Fort Preble (2).....	1	1903	
122	House Island-Fort Preble (3).....	8	1903	
255	House Island-Fort Preble (4).....	6	1908	
256	House Island-Fort Preble (5).....	44	1908	
113	*Cushings Island-Long Island (1).....	7	1903	Do.
123	Cushings Island-Long Island (2).....	1	1903	Do.
124	Cushings Island-Long Island (3).....	9	1903	Do.
125	Cushings Island-Long Island (4).....	12	1903	Do.
126	*Long Island-Great Diamond Island (1).....	7	1903	Do.
127	Long Island-Great Diamond Island (2).....	12	1903	Do.
262	Fort McKinley-Peaks Island (1).....	12	1908	
263	Fort McKinley-Peaks Island (2).....	7	1908	
264	Fort McKinley-Peaks Island (3).....	24	1908	
258	Fort Levett-Peaks Island (1).....	9	1908	
259	Fort Levett-Peaks Island (2).....	1	1908	
260	Fort Levett-Peaks Island (3).....	12	1908	
261	Fort Levett-Peaks Island (4).....	24	1908	
128	Fort McKinley-Fort Lyon (1).....	4	1903	
265	Fort McKinley-Fort Lyon (2).....	24	1908	
266	Fort McKinley-Long Island.....	6	1908	
267	Fort Williams-Fort Levett (1).....	44	1908	
268	Fort Williams-Fort Levett (2).....	32	1908	
NEW HAMPSHIRE.				
129	*Fort Constitution-Fort Foster.....	7	1903	Abandoned.
130	Fort Constitution-Fort Stark.....	10	1905	
131	Fort Stark-Fort Foster.....	8	1905	
MASSACHUSETTS.				
132	Fort Heath-Deer Island (1).....	1	1902	Do.
227	Fort Heath-Deer Island (2).....	10	1907	
133	Fort Strong-Deer Island (1).....	3	1899	Recovered.
134	*Fort Strong-Deer Island (2).....	7	1902	Do.
228	Fort Strong-Deer Island (3).....	6	1907	
135	Long Island-Moon Head (1).....	2	1904	
252	Long Island-Moon Head (north cable) (2).....	2	1908	
136	Fort Strong-Fort Warren (1).....	6	1898	
233	Fort Strong-Fort Warren (2).....	40	1907	Recovered, laid as 253
240	Fort Strong-Fort Warren (3).....	6	.....	Abandoned.
137	Fort Warren-Fort Revere.....	2	1898	Do.
138	Fort Andrews-Fort Revere (1).....	2	1904	
236	Fort Andrews-Fort Revere (2).....	50	1907	
237	Fort Andrews-Fort Revere (3).....	50	1907	
144	Marthas Vineyard-Woods Hole.....	1	1902	Abandoned after ma- neuvers.
226	Fort Heath-Nahant.....	40	1907	
229	Deer Island-Fort Standish (1).....	30	1907	
230	Deer Island-Fort Standish (2).....	40	1907	
231	Fort Standish-Fort Warren (1).....	30	1907	
232	Fort Standish-Fort Warren (2).....	40	1907	
234	Fort Warren-Fort Andrews (1).....	40	1907	Recovered.
235	Fort Warren-Fort Andrews (2).....	40	1907	Do.
274	Fort Warren-Fort Andrews (3).....	66	1909	
275	Fort Warren-Fort Andrews (4).....	44	1909	
238	Fort Revere-Point Allerton.....	40	1907	
239	Point Allerton-Strawberry Hill.....	20	1907	
253	Fort Strong-Fort Standish (1).....	44	1908	
254	Fort Strong-Fort Standish (2).....	22	1908	
RHODE ISLAND.				
139	Fort Adams-Fort Wetherill (1).....	2	1902	
140	Fort Adams-Fort Wetherill (2).....	7	1902	
141	Fort Wetherill-Head of Mackerel Cove.....	1	1902	
201	Fort Getty-Fort Greble (1).....	1	1903	

* Artillery Corps torpedo cable.

Serial numbers of cables in the United States—Continued.

No.	Location.	Con- ductors.	Date laid.	Remarks.
RHODE ISLAND—continued.				
219	*Fort Getty-Fort Greble (2).....	7	1907	
223	Fort Getty-Fort Greble (3) (East cable).....	1	.....	Abandoned.
224	Fort Getty-Fort Greble (4) (West cable).....	1	.....	Do.
142	Fort Getty-Fort Philip Kearny.....	2	1904	
143	Block Island-Narragansett Pier.....	2	1898	Turned over to U. S. Weather Bureau.
NEW YORK.				
145	Fort Tyler-Fort Terry.....	1	1902	Recovered.
146	Fort Terry-Fort Michie.....	2	1902	
147	Fort Michie-New London Light (Conn.).....	4	1902	Do.
148	Fort Michie-Fort H. G. Wright.....	4	1903	
149	Fort H. G. Wright-New London Light (Conn.) (1).....	1	1902	West cable.
216	Fort H. G. Wright-New London Light (Conn.) (2).....	1	1902	East cable.
150	Fort H. G. Wright-Fort Mansfield (R. I.).....	1	1902	
215	Fort H. G. Wright-Averys Point (Conn.) (1).....	3	1906	Recovered.
273	Fort H. G. Wright-Averys Point (2).....	2	1909	
151	Fort Slocum-New Rochelle (1).....	3	1898	
244	Fort Slocum-New Rochelle (2).....	7	1907	
272	Fort Slocum-New Rochelle (3).....	24	1909	Q. M. D. ca- ble.
152	Fort Totten-Fort Schuyler (1).....	40	1904	Recovered.
153	Fort Totten-Fort Schuyler (2).....	40	1904	Do.
222	Fort Totten-Fort Schuyler (3).....	34	1907	
250	Fort Totten-Fort Schuyler (4).....	34	1908	
154	Governors Island-Barge Office (1).....	8	1901	Do.
155	Governors Island-Barge Office (2).....	15	1897	Do.
156	Governors Island-Barge Office (3).....	9	1905	Do.
210	Governors Island-Barge Office (4).....	40	1906	Do.
211	Governors Island-Barge Office (5).....	8	1906	
217	Governors Island-Barge Office (6).....	9	1906	
220	Governors Island-Barge Office (7).....	44	1907	Q. M. D. ca- ble.
157	Governors Island-Ellis Island.....	12	1897	Recovered.
158	Bedloes Island-Black Tom Wharf (N. J.) (1).....	12	1904	
202	Bedloes Island-Black Tom Wharf (N. J.) (2).....	12	1905	North cable buried in water pipe trench, 5 feet deep.
159	Fort Hamilton-Fort Wadsworth (1).....	7	1905	Recovered.
160	Fort Hamilton-Fort Wadsworth (2).....	54	1904	Do.
212	Fort Hamilton-Fort Wadsworth (3).....	54	1906	
214	Fort Hamilton-Fort Wadsworth (4).....	54	1906	
251	Fort Hamilton-Fort Wadsworth (5).....	54	1908	
161	Fort Wadsworth-Fort Hancock (1).....	3	1898	Do.
218	Fort Wadsworth-Fort Hancock (2).....	14	1906	
NEW JERSEY.				
197	Across Shrewsbury River.....	3	1898	Abandoned.
DELAWARE.				
162	Fort Du Pont-Fort Delaware (1).....	12	1904	Recovered.
271	Fort Du Pont-Fort Delaware (2).....	24	1908	
163	Fort Delaware-Fort Mott (N. J.) (1).....	4	1904	
203	Fort Delaware-Fort Mott (N. J.) (2).....	9	1905	
MARYLAND.				
164	Fort Howard-Fort Smallwood (1).....	7	1903	Recovered.
198	Fort Howard-Fort Smallwood (2).....	8	1905	
199	Fort Howard-Fort Smallwood (3).....	8	1905	
243	Fort Howard-Fort Smallwood (4).....	6	1907	
270	Fort Howard-Fort Smallwood (5).....	6	1908	
165	Fort Carroll-Fort Armistead (1).....	2	1902	Do.
167	Fort Carroll-Fort Armistead (2).....	40	1905	Do.
221	Fort Carroll-Fort Armistead (3).....	7	1907	Do.
269	Fort Carroll-Fort Armistead (4).....	42	1908	
166	Fort McHenry-Fort Armistead.....	2	1905	Do.
168	Fort Armistead-Fort Howard.....	4	1905	
206	Fort Washington-Fort Hunt (Va.) (1).....	3	1906	Do.
175	Fort Washington-Fort Hunt (Va.) (2).....	50	1905	
176	Fort Washington-Mockley Point.....	2	1905	Do.

* Artillery Corps torpedo cable.

Serial numbers of cables in the United States—Continued.

No.	Location.	Con- ductors.	Date laid.	Remarks.
VIRGINIA.				
169	Fort Monroe-Fort Wool (1).....	7	1905	Recovered. Do.
170	Fort Monroe-Fort Wool (2).....	8	1905	
171	Fort Monroe-Fort Wool (3).....	8	1905	
172	Fort Wool-Willoughby Spit (1).....	2	1905	
173	Fort Wool-Willoughby Spit (2).....	2	1905	
174	Around McGinnis Land (Fort Monroe).....	8	1905	
NORTH CAROLINA.				
179	*Fort Caswell-Southport (1).....	1	1898	Abandoned.
209	Fort Caswell-Southport (2).....	7	1906	
SOUTH CAROLINA.				
177	Fort Moultrie-Fort Sumter.....	1	1903	Abandoned. Do.
178	Charleston-Hog Island.....	3	1898	
180	*Fort Fremont-Paris Island (1).....	1	1903	
204	*Fort Fremont-Paris Island (2).....	7	1905	
207	Fort Fremont-Paris Island (3).....	4	1906	
FLORIDA.				
181	*Fort Dade-Fort De Soto (1).....	1	1905	Recovered. Do.
208	Fort Dade-Fort De Soto (2).....	9	1906	
213	Fort Dade-Shaws Point.....	1	1906	
205	Fort De Soto, main base line.....	6	1905	
182	*Fort Barrancas-Fort Pickens (1).....	1	1900	
187	Fort Barrancas-Fort Pickens (2).....	1	.....
246	Fort Barrancas-Fort Pickens (3) (East cable).....	1	1907	
247	Fort Barrancas-Fort Pickens (4) (West cable).....	1	1907	
248	Fort Barrancas-Fort Pickens (5).....	2	1907	
183	*Fort McRee-Fort Pickens (1).....	1	1902	
249	Fort McRee-Fort Pickens (2).....	2	1907	
184	*Fort McRee-Fort Barrancas (1).....	1	1902	
245	Fort McRee-Fort Barrancas (2).....	2	1907	
225	Fort Dade-Shaws Point.....	2	1898	
ALABAMA.				
185	Fort Morgan-Fort Gaines (1).....	2	1904	Lost.
281	Fort Morgan-Fort Gaines (2).....	6	1908	
LOUISIANA.				
186	Fort St. Philip-Fort Jackson (1).....	3	1901	Abandoned.
288	Fort St. Philip-Fort Jackson (2).....	1	1908	
289	Fort St. Philip-Fort Jackson (3).....	1	1908	
CALIFORNIA.				
188	Presidio-Fort Baker.....	3	1904	Projected. Do. Do.
189	Fort Baker-Fort McDowell (1).....	3	1898	
282	Fort Baker-Fort McDowell (2).....	30	.....
190	Fort McDowell-Alcatraz Island.....	3	1898	
283	Fort Baker-Fort Winfield Scott.....	50	.....
284	Fort Barry-Fort Miley.....	50	.....
WASHINGTON.				
191	Fort Columbia-Fort Stevens (Oreg.) (1).....	3	1899	Projected. Do.
285	Fort Columbia-Fort Stevens (Oreg.) (2).....	20	.....
286	Fort Stevens-Fort Canby.....	20	.....
192	Fort Flagler-Fort Worden (1).....	10	1904	Recovered. Do. Do. Do. Do. Do.
193	Fort Casey-Fort Worden (1).....	10	1904	
241	Fort Casey-Fort Worden (2).....	6	1906	
194	Fort Casey-Fort Flagler (1).....	10	1904	
242	Fort Casey-Fort Flagler (2).....	10	1906	
195	Fort Lawton-Fort Ward.....	1	1905	
196	Fort Lawton-Fort Worden.....	1	1904	
287	Fort Lawton-Fort Flagler.....	1	1906	
290	Fort Flagler-Fort Worden (2).....	6	1909	
291	Fort Casey-Fort Worden (3).....	12	1909	

*Artillery Corps torpedo cable.

The last number assigned is No. 291.

597. Commanding officers of seacoast fortifications will instruct sentries on duty at docks to report promptly any vessel that is about to anchor in the vicinity of military cables and to warn the master of such vessel that he is endangering the cables and is liable to prosecution if any damage is done. Additional sentries will not be posted for this purpose except when absolutely necessary. (G. O. 165, W. D., 1905.)

TYPES.

598. The signal corps cables manufactured to date are divided into six classes, viz:

- Rubber insulated submarine, serial type Nos. 1 to 200.
- Rubber insulated subterranean, serial type Nos. 201 to 300.
- Paper insulated armored, serial type Nos. 301 to 400.
- Paper insulated, aerial, unarmored, serial type Nos. 401 to 500.
- Special types, serial type Nos. 501 to 600.
- Power cables, serial type Nos. 601 to 700.

599. Description of types of rubber-insulated submarine cables.

Type No.	Specification No.	Designation.	Date.	Conductor.			Diameter over insulation.	Armor No. B. W. G.
				Number.	Strand.	B. & S. gauge.		
1	.....	1-conductor, deep-sea, Philippines.....	1899	.....	7	21	In. 3/32	a 12
			1900	.....	7	24		a 12
2	.....	1-conductor, shore end, Philippines.....	1889	.....	7	24	3/32	a 6
			1900	.....	7	24		a 6
3	1	1-conductor, deep-sea, Philippines.....	1899	.....	7	21	3/32	a 10
			1900	.....	7	21		a 11
4	9	1-conductor, experimental, light.....	1901	.....	7	24	3/32	18
5	10	2-conductor.....	1901	.....	7	21	3/32	7
6	7	5-conductor, 1-pair, 3-straight.....	1901	2	7	21	3/32	9
				3	7	24		
7	7	7-conductor, 2-pair, 3-straight.....	1901	4	7	21	3/32	7
				3	7	24		
8	7	9-conductor, 3-pair, 3-straight.....	1901	3	7	21	3/32	6
				6	7	24		
9	7	11-conductor, 4-pair, 3-straight.....	1901	3	7	21	3/32	5
				8	7	24		
10	7	13-conductor, 3-straight, 5-pair.....	1901	3	7	21	3/32	5
				10	7	24		
11	7	17-conductor, 7-pair, 3-straight.....	1901	3	7	21	3/32	5
				14	7	24		
12	15	1-conductor.....	1902	.....	7	21	3/32	10
13	16	3-conductor, San Francisco.....	1902	.....	7	21	3/32	12, 5
14	17	4-conductor, New London.....	1902	.....	7	21	3/32	9
15	17	2-conductor.....	1902	.....	7	21	3/32	9
16	17	1-conductor.....	1902	.....	7	21	3/32	a 10
17	2	1-conductor, Int., Alaskan.....	1903	1	16	23	3/32	8
				9	16	23		
18	3	2-conductor, Int., Alaskan.....	1903	1	16	23	3/32	8
				9	16	23		
19	4	1-conductor, rock, Alaskan.....	1903	1	16	23	3/32	8, 0
				9	16	23		
20	5	1-conductor, shore end, Alaskan.....	1903	1	16	23	3/32	8, 3
				9	16	23		
21	6	1-conductor, deep-sea, Alaskan.....	1903	.....	1	16	3/32	13
22	14	F. C., Portland, 4-pair.....	1903	7	24	3/32	8
				7	21		
23	14	F. C., Portland, 4-pair, and 4-straight.....	1903	4	7	21	3/32	6
				8	7	24		

a B. & S. gauge.

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Description of types of rubber-insulated submarine cables—Continued.

Type No.	Specification No.	Designation.	Date.	Conductor.			Diameter over insulation.	Armor No. B. W. G.
				Number.	Strand.	B. & S. gauge.		
24	14	F. C., Portland, 2-pair, and 4-straight.....	1903	4	7	21	In. $\frac{6}{32}$	9
				4	7	24		
25	14	F. C., Portland, 3-pair, and 3-straight.....	1903	2	7	21	In. $\frac{6}{32}$	8
				2	7	24		
26	14	4-pair, 3-straight.....	1903	3	7	21	In. $\frac{6}{32}$	6
				3	7	24		
27	14	4-pair, 4-straight.....	1903	3	7	21	In. $\frac{6}{32}$	6
				3	7	24		
28	14	2-pair.....	1903		7	24	In. $\frac{6}{32}$	11
29	338	1-conductor, F. C.....	1905		7	21		
30	338	2-pair, F. C.....	1905		7	24	In. $\frac{6}{32}$	11
31	338	3-pair, F. C.....	1905		7	24		
32	338	4-pair, F. C.....	1905		7	24	In. $\frac{6}{32}$	8
33	338	5-pair, F. C.....	1905		7	24		
34	338	6-pair, F. C.....	1905		7	24	In. $\frac{6}{32}$	6
35	330	1-conductor, deep-sea, Alaskan.....	1905		7	24		
				1	9	16	In. $\frac{9}{32}$	13
				1	9	23		
36	331	1-conductor, Int., Alaskan.....	1905		9	16	In. $\frac{9}{32}$	8
				1	9	23		
37	332	1-conductor, shore end, Alaskan.....	1905		9	16	In. $\frac{9}{32}$	8, 3
				1	9	23		
38	333	1-conductor, deep-sea, Philippines.....	1905		7	21	In. $\frac{9}{32}$	10
39	333	1-conductor, shore end, Philippines.....	1905		7	21		
40	334	1-conductor, special, light.....	1905		7	24	In. $\frac{9}{32}$	10, 6
41	338	2-conductor, F. C.....	1905		7	24		
42	374	3-pair, special.....	1905		7	21	In. $\frac{9}{32}$	18
43	375	3-pair, special.....	1905		7	21		
44	419	1-conductor, intermediate.....	1906		7	20	In. $\frac{8}{32}$	9, 5
45	420	1-conductor, deep-sea.....	1906		7	20		
46	421	1-conductor.....	1906		7	20	In. $\frac{8}{32}$	8
47	424	1-conductor, Philippines.....	1906		7	20		
50	431	1-conductor.....	1906		7	21	In. $\frac{9}{32}$	13, 8
51	431	2-conductor.....	1906		7	21		
52	431	4-conductor.....	1906		7	21	In. $\frac{9}{32}$	10
53	431	6-conductor.....	1906		7	21		
54	431	8-conductor.....	1906		7	21	In. $\frac{9}{32}$	9
55	431	10-conductor.....	1906		7	21		
56	431	12-conductor.....	1906		7	21	In. $\frac{9}{32}$	4
57	431	1-conductor, double armor.....	1906		7	21		
58	431	2-conductor, double armor.....	1906		7	21	In. $\frac{9}{32}$	9, 4
59	431	4-conductor, double armor.....	1906		7	21		
60	431	6-conductor, double armor.....	1906		7	21	In. $\frac{9}{32}$	8, 4
61	431	8-conductor, double armor.....	1906		7	21		
62	431	10-conductor, double armor.....	1906		7	21	In. $\frac{9}{32}$	6, 4
63	431	12-conductor, double armor.....	1906		7	21		
64	478	1-conductor, small.....	1907		7	21	In. $\frac{7}{32}$	4, 2

Submarine cables for deep sea are usually delivered in lengths of not less than 15 miles.

Fire-control cables are usually furnished on reels in the following lengths:

- Types 29, 30, 41, 50, 51, and 52 in lengths of 2 miles.
- Types 31, 32, 53, and 54 in lengths of 1 mile.
- Types 33, 34, 55, 56, and 64 in lengths of one-half mile.
- Types 57 to 63, inclusive, in special lengths.

The standard deep-sea single-conductor cable as indicated in types 3, 16, and 38 will weigh approximately 3,000 pounds to the mile.

The weight of the standard fire-control cables per statute mile is approximately as follows:

- Type 29, 2,800 pounds.
- Type 30, 10,000 pounds.
- Type 31, 12,500 pounds.
- Type 32, 15,000 pounds.
- Type 33, 21,000 pounds.
- Type 34, 25,000 pounds.
- Type 41, 6,000 pounds.

The Alaskan cables weigh approximately per statute mile as follows:

- Type 35, 3,425 pounds.
- Type 36, 5,450 pounds.
- Type 37, 20,000 pounds.

600. *Description of types of rubber-insulated subterranean cables.*

Type No.	Specification No.	Designation.	Date.	Conductor.		Diameter over insulation.	Armor No., B. W. G.	Thickness of lead sheath.																																																
				Strand.	B. & S. gauge.																																																			
201	.....	1-pair.....	1902	.....	18	Inch.	Inch.	Lead.																																														
202	3-pair.....	1902	18				Lead.	Lead.	Lead.																																													
203	5-pair.....	1902	18							Lead.	Lead.	Lead.																																										
204	6-pair, and 8-straight.....	1902	18										Lead.	Lead.	Lead.																																							
205	5-pair.....	1902	18													Lead.	Lead.	Lead.																																				
206	6-pair, and 8-straight.....	1902	18																Lead.	Lead.	Lead.																																	
207	12	1-pair.....	1902	3	23																			Lead.	Lead.	Lead.																														
208	12	3-pair.....	1902	3	23																						Lead.	Lead.	Lead.																											
209	12	6-pair.....	1902	3	23																									Lead.	Lead.	Lead.																								
210	12	8-pair, and 8-straight.....	1902	3	23																												Lead.	Lead.	Lead.																					
211	13	6-pair.....	1902	3	23																															Lead.	Lead.	Lead.																		
212	13	8-pair, and 8-straight.....	1902	3	23																																		Lead.	Lead.	Lead.															
213	429	1-pair.....	1906	7	21																																					Lead.	Lead.	Lead.												
214	429	3-pair.....	1906	7	21																																								Lead.	Lead.	Lead.									
215	429	6-pair.....	1906	7	21																																											Lead.	Lead.	Lead.						
216	429	12-pair.....	1906	7	21																																														Lead.	Lead.	Lead.			
217	429	6-pair.....	1906	7	21																																																	Lead.	Lead.	Lead.
218	429	12-pair.....	1906	7	21																																																			

These rubber-insulated subterranean cables are furnished on reels, as follows:

- Types 213 and 214 in one-half mile lengths.
- Types 215, 216, 217, and 218 in lengths of 1,000 feet.

The weight of the standard cables per statute mile is as follows:

- Type 213, 3,000 pounds.
- Type 214, 9,200 pounds.
- Type 215, 11,100 pounds.
- Type 216, 14,785 pounds.
- Type 217, 18,800 pounds.
- Type 218, 26,900 pounds.

The usual reel for the shipment of these types of cable weighs 400 pounds, has a length of 30 inches, a drum diameter of 34 inches, and sides 5 feet 6 inches high.

601. *Types of paper-insulated armored cables.*

Type No.	Specification No.	Designation.	Date.	Conductor No., B. & S.	Insulation.	Armor No., B. W. G.	Thickness of lead sheath.
							<i>Inch.</i>
301	8	10-pair.....	1901	19	Double, paper...	9	$\frac{1}{8}$
302	129	25-pair.....	1904	19	do.....	9	$\frac{1}{8}$
303	174	20-pair, combination...	1904	8-pair-19 12-pair-3-21	do.....	11	$\frac{1}{8}$
304	174	25-pair, combination...	1904	10-pair-19 15-pair-3-21	do.....	11	$\frac{1}{8}$
305	339 427	5-pair.....	1905 1908	19	do.....	11	$\frac{1}{8}$
306	339 427	10-pair.....	1905 1908	19	do.....	11	$\frac{1}{8}$
307	339 427	15-pair.....	1905 1908	19	do.....	11	$\frac{1}{8}$
308	339 427	20-pair.....	1905 1908	19	do.....	9	$\frac{1}{8}$
309	339 427	25-pair.....	1905 1908	19	do.....	9	$\frac{1}{8}$
310	339 427	30-pair.....	1905 1908	19	do.....	9	$\frac{5}{32}$
311	339 427	50-pair.....	1905 1908	19	do.....	6	$\frac{5}{32}$
312	237 427	5-pair.....	1905 1908	19	Double, paper.....		$\frac{1}{8}$ and $\frac{5}{32}$
313	237 427	10-pair.....	1905 1908	19	do.....		$\frac{1}{8}$ and $\frac{5}{32}$
314	237 427	15-pair.....	1905 1908	19	do.....		$\frac{1}{8}$ and $\frac{5}{32}$
315	237 427	25-pair.....	1905 1908	19	do.....		$\frac{1}{8}$ and $\frac{5}{32}$
316	237 427	30-pair.....	1905 1908	19	do.....		$\frac{1}{8}$ and $\frac{5}{32}$
317	237 427	50-pair.....	1905 1908	19	do.....		$\frac{1}{8}$ and $\frac{5}{32}$
318	372	5-pair, special.....	1905	19	do.....	9	$\frac{1}{8}$
319	373	do.....	1905	19	do.....	9, 6	$\frac{1}{8}$
320	427	5-pair.....	1906	19	do.....	6	$\frac{1}{8}$
321	427	10-pair.....	1906	19	do.....	6	$\frac{1}{8}$
322	427	15-pair.....	1906	19	do.....	6	$\frac{1}{8}$
324	427	20-pair.....	1906	19	do.....	4	$\frac{1}{8}$
325	427	25-pair.....	1906	19	do.....	4	$\frac{1}{8}$
326	427	30-pair.....	1906	19	do.....	4	$\frac{1}{8}$
327	427	50-pair.....	1906	19	do.....	4	$\frac{1}{8}$

602. The armored paper-insulated cables are supplied under certain conditions for submarine work. They may also be used for subterranean work.

Type 303 weighs 22,600 pounds per statute mile.

Type 304 weighs 25,000 pounds per statute mile.

Types 303 and 304 when shipped in mile lengths are provided with reels weighing 5,000 pounds, having a length of 7 feet, a diameter of side of 8 feet, and a shaft 5 inches in diameter and 10 feet long.

These cables are usually ordered in lengths to suit the installation for which they are designed, so as to be installed without splices.

603. *Types of double paper-insulated, lead-covered, unarmored cable.*

Type No.	Designation.	Conductor, B. & S. gauge.	Thick-ness of lead sheath.	Approximate outside diameter.		Weight per statute mile.	Weight per 1,000 feet of cable and reel.
				Inches.	Pounds.		
401	10-pair, aerial.....	19	3/32	0.722	5,370	1,186	
402	15-pair, aerial.....	19	3/32	.797	6,193	1,368	
403	20-pair, aerial.....	19	3/32	.872	7,054	1,558	
404	25-pair, aerial.....	19	3/32	.922	7,693	1,700	
405	30-pair, aerial.....	19	3/32	.982	8,416	1,860	
406	40-pair, aerial.....	19	3/32	1.113	11,083	2,448	
407	50-pair, aerial.....	19	3/32	1.208	12,445	2,750	
408	75-pair, aerial.....	19	3/32	1.443	15,829	3,497	
409	100-pair, aerial.....	19	3/32	1.638	18,860	3,967	
411	10-pair, aerial.....	22	3/32	.607	4,229	935	
412	15-pair, aerial.....	22	3/32	.682	4,937	1,093	
413	20-pair, aerial.....	22	3/32	.737	5,549	1,226	
414	25-pair, aerial.....	22	3/32	.787	6,088	1,345	
415	30-pair, aerial.....	22	3/32	.827	6,520	1,441	
416	40-pair, aerial.....	22	3/32	.943	8,664	1,914	
417	50-pair, aerial.....	22	3/32	1.023	9,646	2,131	
418	75-pair, aerial.....	22	3/32	1.193	11,890	2,627	
419	100-pair, aerial.....	22	3/32	1.353	14,050	3,106	

Specification No. 197 for types 401 to 409, inclusive, prepared 1904; for types 411 to 419, inclusive, prepared 1907.

Cable is usually furnished on reels in lengths of 1,000 feet; length is stated in purchase order. Cable reels are usually 33 inches in length, and diameter from 56 to 72 inches.

604. *Types of power cables (Specification 432).*

Type Nos.				Area circular mills.	B. & S. gauge.	Number of wires in strand.	Diameter of single wires—mills.	Resistance of conductor per 1,000 feet, 68° F.	Thickness of wall of rubber insulation.	Length on reel.		Thickness of lead.	Armor No., B. W. G.
Single braided.	Single L. C.	Duplex L. C.	Duplex L. C. and armored.							Single braided and Single L. C.	Duplex L. C. and Duplex L. C. and armored.		
601	621	641	661	4,107	14	1	64.08	2.521	Inch. 3/32	Feet. 2,000	Feet. 1,000	Inch. 11	11
602	622	642	662	6,530	12	1	80.81	1.586	3/32	2,000	1,000	11	11
603	623	643	663	10,380	10	1	101.9	.9972	3/32	1,500	1,000	11	11
604	624	644	664	16,510	8	7	48.6	.6271	3/32	1,500	1,000	11	11
605	625	645	665	26,250	6	7	61.2	.3944	3/32	1,500	1,000	9	9
606	626	646	666	33,100	5	7	68.8	.3128	3/32	1,500	1,000	8	8
607	627	647	667	41,740	4	7	77.2	.2480	3/32	1,500	1,000	8	8
608	628	648	668	52,630	3	19	52.6	.1967	3/32	1,500	1,000	8	8
609	629	649	669	66,370	2	19	59.1	.1560	3/32	1,000	1,000	8	8
610	630	650	670	83,690	1	19	66.4	.1237	3/32	1,000	1,000	8	8
611	631	651	671	105,500	0	19	74.5	.09811	3/32	1,000	1,000	8	8
612	632	652	672	133,100	00	19	83.7	.07780	3/32	1,000	1,000	8	8
613	633	653	673	167,800	000	19	94.0	.06170	3/32	1,000	1,000	8	8
614	634	654	674	211,600	0000	19	105.5	.04893	3/32	1,000	1,000	8	8

Type No. 629a conforms to type No. 629, with the exception that one No. 10 wire of each conductor is replaced by a conductor made up as follows: Conductor to consist of sixteen strands of No. 30 B. & S. gauge copper wire, equivalent in cross section to No. 18

B. & S., with a serving of cotton and covered with an even layer of rubber compound to a uniform diameter of one-tenth ($\frac{1}{10}$) inch, the conductor being well centered in the insulation.

Type 643*a* conforms to type 643, except that four No. 10 conductors are supplied.

Type 663*a* conforms to type 663, except that four No. 10 conductors are supplied.

Chief signal officers of departments should keep the cable records of their offices so that they can readily determine therefrom the location and condition of the various types of cables installed or stored within the geographical limits of the military department wherein they are serving.

Attention is invited to the instructions contained in Signal Office Circular No. 8, June 1, 1908, issued as Engineering Circular M-18, with regard to assigning cable reel numbers, and the procedure to be followed in handling cable reels from which all cable has been taken.

605. SUBMARINE CABLE GEAR AND SUPPLIES.

Anchors, mushroom, ordinary. Supplied in sizes of 1, 2, 2½, 3, 4, and 5 hundredweight.

Anchors, mushroom, patent (Johnson's patent removable shank). Supplied in sizes of 1, 2, 2½, 3, 4, and 5 hundredweight.

Blocks, wood or iron. Specify whether plain or snatch type, number of sheaves, and length of block in inches.

Buoys, automatic whistling. Weight, 18 hundredweight; safe load, 25 hundredweight.

Buoys, cable. Specify length and diameter or carrying capacity desired, or both. These can be obtained in capacities from 3 hundredweight to 6 tons. Specify bridle chains for same when desired.

Boats, cable (also called cable cutters).

Blades for hacksaws; dozen. Specify length.

Bell-mouths, hinged.

Chain, bridle. Usually made up in lengths as desired and fitted with egg links at each end. Necessary to specify size of links or state breaking strain. The type is usually crane chain and size is the thickness of the link. To obtain exact duplication, also specify the outside width of the link and the pitch, which is the distance between similar points of successive links.

Charts. Give serial number and specify whether Coast and Geodetic Survey or Hydrographic Office edition.

Chronometers, marine.

Clamps, buoy lamp.

Coats, oilskin.

Counters, revolution.

Core, cable, feet. For test room connections and leads.

Couplings, for chains. Specify size and kind of coupling, whether with swivel and egg links or simply shackles.

Crinolines, cable tank. Manufactured only according to specifications for each particular case.

Cut-Meter. This is a direct reading speed indicator which can be applied to any moving surface.

Cutters, cable. A portable bolt cutter that may be mounted on a block with handles. It is supplied for use about the decks of cable ships.

Dividers, proportional.

Dividers, steel, navigator's.

Dynamometers, large size 25 tons strain, small size strains to 10 tons.

Frames, hacksaw. Adjustable furnished unless length is stated.

Guages, wire.

Globes, telephoto or Ardois. Specify whether red or white and name of manufacturer of outfit.

Grappels, ordinary 5-prong can be obtained in sizes of 1, 1½, 2, 2½, 2¾ long prong, 3, and 3½ hundredweight.

Grappels, boat, weight about 23 pounds.

Grappels, Jamieson's rock, 2 types, one having flat prongs and the other with prongs forked at shank. Type with flat prongs preferred.

Grappels, Johnson's renewable section.

Spare prongs for same, short

Spare prongs for same, long.

Grappels, Lucas patent cutting and holding, complete, with knives.

Grappels, centipede, can be obtained in sizes of ½, 1, 1½, 2, 2½, 3, and 3½ hundredweight.

Grappels, centipede, boat, weight 30 pounds.

Grappels, Murphy's patent centipedes, in sets of six each, consisting of 4 grappels and 2 spare, and including 4 shackles. Can be obtained in 4 sizes, weights per section as follows: 20, 45, 55, 85 pounds each.

Hats, oilskin.

Hose, steam, flexible copper, 1½ and 2 inch sizes.

Hose, steam, 5-ply rubber, 1½ and 2 inch sizes.

Hose, steam, 8-ply rubber, wire-wound, 1½ and 2 inch sizes.

Hose couplings. Requisitions for steam hose specify length of sections.

Hauling-off gear, steam or electric. For electric specify voltage.

Irons, calking, 3 per set.

Irons, soldering, electric. Specify voltage.

Knives, cable sheath.

Lamps, alcohol.

Lamps, buoy; can be obtained in various sizes. Ship's anchor-lights usually supplied. Specify size.

Lamp frames for attachment to flagstuffs and buoy tripods.

Lamps, blow. (*See "Torches, blow."*)

Lamps, incandescent. Specify voltage and candlepower. Edison sockets will be furnished unless otherwise indicated. Straight filament lamps are supplied for testing room galvanometers. Special lamps for telephoto and Ardois must have voltage and maker's name specified.

Lanterns, tin.

Lead, red, pounds. Supplied for the preservation of cable gear. Unmixed will be supplied unless otherwise specified.

Leads, deck, several sizes and kinds of 1, 2, and 3 roller leads.

Leads, heaving, 12 and 28 pound weights.

Leather, rigging, sides. Specify thickness and quality.

Lead, sounding, for Thompson machine.

Logs, taffrail, with propeller and line.

Liuks. Specify length, width, and size.

Machines, cable, usually classed as "pick-up," "pay-out," or combined "picking-up and paying-out." To be accounted for by name of maker.

Machines, D. S., sounding, Sigsbee.

Machines, electric, vulcanizing. Specify voltage.

Mallets, calking.

Mallets, serving, wood.

Mallets, serving, iron.

Mushrooms. (See "Anchor, mushroom.")

Marline spikes.

Needles, sail, dozen.

Oil, boiled linseed, gallons.

Oil, engine, barrels.

Oil, cylinder, barrels.

Padlocks. Specify make desired and size. Usually unsatisfactory when furnished assorted.

Paint. Specify whether mixed or unmixed.

Palms, sailor's sewing.

Rope, grapnel, 6 by 3; combined wire and manila, breaking strain 15 tons; weight per thousand fathoms exclusive of fittings 55½ hundredweights.

Rope, grapnel and buoy, 4 by 4; combined wire and manila, breaking strain 13½ tons; weight per thousand fathoms exclusive of fittings 49½ hundredweights.

Rope, buoy, 3 by 3; combined wire and manila, breaking strain 7½ tons; weight per thousand fathoms exclusive of fittings 24 hundredweights. Specify the length of sections of grapnel and buoy ropes; also that each length be equipped with proper fittings.

Rope, manila, coils. Specify size inches (circumference). Rope supplied only in units of coils. Number of feet in a coil not fixed. Three-strand will be supplied unless 4-strand is specified.

Rotometers, Elliot (revolution counters).

Scales for T.-B. sounding tubes.

Sextant.

Shackles, Specify size, whether screw or pin, give size and also length and width, as some types are unsuitable for use with grapnel rope.

Sheaves. There is such a great variety of sizes and kinds that requisitions should clearly specify type and dimensions.

Spun yarn, 3 yarn.

Shots, sounding. Can be obtained in weights from 40 to 90 pounds. Should be purchased by cable ship, as required.

Splicing tool. A disk with handles for laying on armor wire.

Swivels. Can be obtained in various sizes and with various shaped links attached.

Slip-hooks (detaching hooks). Has trigger for releasing buoys. Three sizes—small, medium, and large.

Tubes, glass, sounding, for Thompson machine, 10 tubes per case.

Tubes, sounding, Tanner-Blish, for Thompson machine, frosted glass.

Tube, brass, sounding. To attach to sounding wire and contains the glass tube.

Tube boxes for T.-B. sounding tubes.

Tags, cable, linen.

Telegraphs, special. Refers to pedestal dials complete; also known as "ship's telegraph." Requisitions for chain or pulleys specify exact size, and for the telegraphs furnish a sketch showing the lettering desired for the dial.

Telephoto outfits (Ardois). To be accounted for by number.

Thermometers, deep-sea sounding. These thermometers on being reversed when heaving in indicate the bottom temperature. Negretti & Zambra type will be supplied unless otherwise indicated.

Thermometer cases. For reversing thermometer to obtain bottom temperature.

Thimbles. Can be supplied in great variety of sizes and shapes. Galvanized iron will be supplied unless otherwise specified.

Torches, blow. Gasoline type will be furnished unless otherwise specified.

Trays, vulcanizing. These are for melting paraffin for vulcanizing joints. Can not be purchased in open market. When new one is required, old one should be furnished as a sample to manufacturer.

Waste, cotton, bales, about 100 pounds per bale.

Wire, seizing. This is a soft G. I. No. 18 for serving armor of D. S. cable.

Wire, sounding, 7-strand, for Thompson machine. Supplied in lengths of 300 fathoms.

Wire, deep-sea, sounding, fathoms. This is "No. 11 music," approximately No. 21 B. & S. gauge, breaking strain about 207 pounds. Supplied in sealed tin cans containing 1,000 fathoms of wire.

Books supplied for cable testing and engineering: Signal Corps Manual No. 4, Deep-Sea Explorations (Fish Commission edition), Electrical Engineer's Pocket Book (Foster), Electrical Testing for Telegraph Engineers (Young), Submarine Cable Laying and Repairing (Wilkinson), Submarine Telegraphs (Bright), Submarine Cable Testing (Fisher & Darby), Electrical Testing (Kent).

606. Instruments for operating and testing submarine cables are furnished in special types for each particular station. Signal Corps Manual No. 4, 1905 edition, gives a complete description of this class of instruments and should be referred to for any information on the subject.

ARTICLE VIII.

STANDARD SUPPLIES AND SPECIFICATIONS.

607. Supplies which may be considered standard and usually carried in stock for issue on requisitions are enumerated herewith and some articles illustrated. Sizes and types of articles appearing on requisitions should conform to those shown herewith as standard.

608. *Marking hammers.*—Whenever inspections of considerable quantities of poles, wooden conduits, cross arms, or other rough wood-work are required, the inspector will be supplied with a marking hammer showing the crossed flags of the Signal Corps, and a letter indicating the office from which the inspection was made.

These marking hammers will be supplied by department chief signal officer or signal office, Washington, when needed.

609. LINE CONSTRUCTION MATERIALS.

[This list includes both fire-control and general-service supplies.]

- Anchors, guy, D. & T., 8-inch.
- Anchors, star, $1\frac{1}{2}$ -inch, No. 10.
- Anchors, star, $\frac{3}{4}$ -inch, composition.
- Anchors, expansion, $\frac{1}{2}$ -inch, composition.
- Anchors, guy, Matthews, 6-inch with rods. or 8-inch.
- Arresters, "Cook:"
 - Type H strips.
 - No. 8 telephone switchboard.
 - B-4 telephone sneak current.
 - T-5 pencil fuses for pole terminals.
- Arresters, Mason's Standard, with or without fuses.
- Arresters, "Sterling."
- Brackets, oak.
- Bracket, pot head, Bissell, $1\frac{1}{2}$ -inch.
- Bolts, carriage (diameter, $\frac{3}{8}$ -inch; length, 4 inches).
- Bolts, cross arm, diameter, $\frac{3}{8}$ -inch; supplied in six lengths: 10, 12, 14, 16, 18, and 20 inches.
- Bolts for cross-arm braces.
- Bolts, double arm (diameter, $\frac{1}{2}$ -inch; length, 12, 14, 16, or 18 inches).
- Boxes, junction, 3-way.
- Box, cable, pole, with "Sterling" tubular fuses and carbon arresters.
- Boxes, telephone, outlet, for rifle ranges.
- Boxes, telephone, portable, for rifle ranges.
- Braces, cross arm.
- Brackets, iron, for lance-pole insulators.
- Cable, distributing, switchboard, f. c., 12-pair.
- Cable, aerial, lead covered. (*See table of cables.*)
- Cable, telephone, switchboard, 20-pair.

- Cable, tree.
- Clamps, strand, 2-bolt, for $\frac{1}{4}$ -inch strand.
- Clamps, strand, 3-bolt, for $\frac{3}{8}$ -inch strand.
- Clamps, Simpson, ground.
- Clips, cable, marline.
- Clips, Crosby.
- Cleats, cross-arm (wood).
- Cleats, porcelain :
 - 2-wire for sizes No. 16 to No. 8.
 - 2-wire for sizes No. 6 to No. 00.
 - 3-wire for sizes No. 6 to No. 08.
 - 3-wire for sizes No. 4 to No. 00.
 - 1-wire cleat No. 4 to No. 9.
- New England telephone cleat with ear.
- Conduit, loricated or electroduct, $\frac{1}{2}$ to 2 inches, with couplings and elbows.
- Conduit, iron pipe, $\frac{1}{2}$ to 2 inch. Length, 10 feet.
- Conduit, bituminized fiber, 2 $\frac{1}{2}$ -inch.
- Conduit, creosoted wood, 2 $\frac{1}{2}$ -inch.
- Conduit elbows. State kind and size.
- Conduit couplings. State kind and size.
- Cross arms, iron pole.
- Cross arms, wood — pin.
- Regular telephone size, 2 $\frac{3}{4}$ x 3 $\frac{1}{2}$ inches.
- Heavy telephone size, 3 $\frac{1}{4}$ x 4 $\frac{1}{4}$ inches.

Dimensions of standard cross arms, heavy telephone size.

Length.	Number of pins.	Pin spacing.		
		Ends.	Sides.	Centers.
<i>Feet.</i> 3	2	4	-----	28
4	4	4	12	16
6	6	4	12	16
8	8	4	12	16
10	10	4	12	16

- Forming strips.
- Fuses, D. & W., 3-ampere, midget.
- Fuses, D. & W., 6-ampere, midget.
- Fuses, D. & W., 15-ampere, midget.
- Fuses, D. & W., 20-ampere, cartridge, 250 volts.
- Fuses, mica, 1 ampere.
- Hangers, cable, marline.
- House line, hemp.
- Inclosed fuses :
 - Nonindicating (250 volts, 3 amperes), 1 $\frac{1}{2}$ inches in length over all.
 - Nonindicating (250 volts, 5 amperes), 1 $\frac{1}{2}$ inches in length over all.
 - Nonindicating (250 volts, 15 amperes), 1 $\frac{1}{2}$ inches in length over all.
 - Indicating (250 volts, 30 amperes), 2 $\frac{3}{8}$ inches in length over all.
 - Indicating (250 volts, 50 amperes), 3 $\frac{5}{8}$ inches in length over all.
 - Indicating (250 volts, 120 amperes), 3 $\frac{5}{8}$ inches in length over all.
 - Indicating (250 volts, 120 amperes), 3 $\frac{5}{8}$ inches in length over all.
- Insulators, glass.
- Insulators, pigtail, galvanized.

IN

(size e; No. 11, double groove.)

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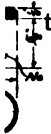
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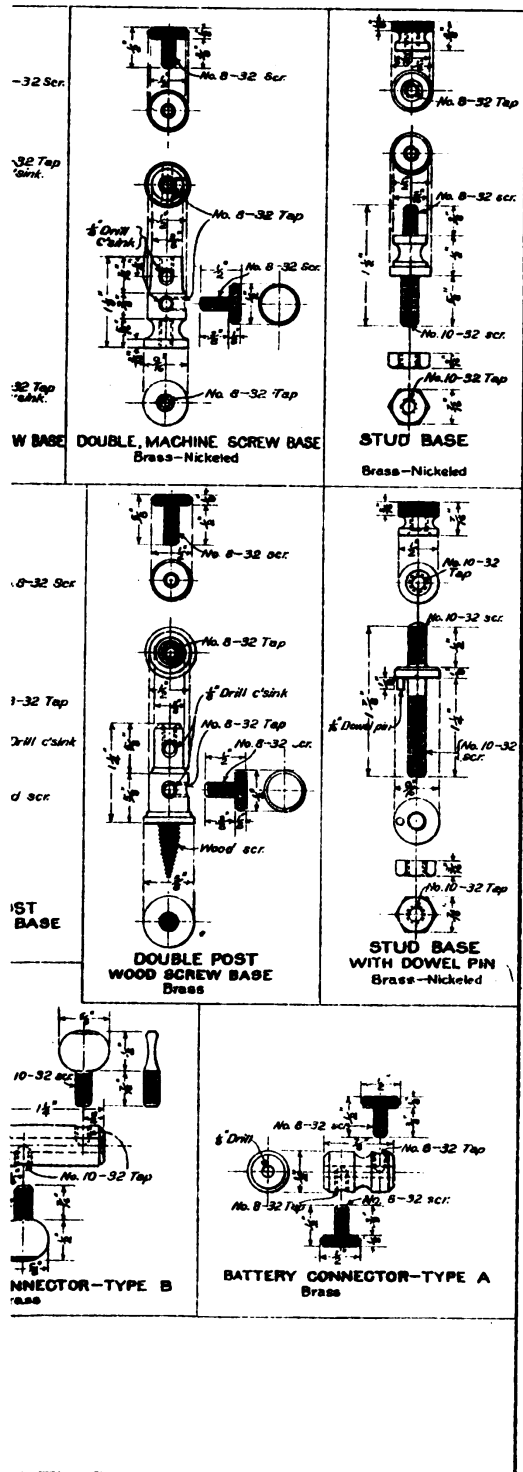
inches—	
for heavy line.	
PC REW top.	At 6 feet from butt.
16	25
22	32
22	36
22	40
22	43
22	47
22	50
22	53
22	56



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IG POSTS



F.C. Bowen, May 6, 1907

THE NORRIS PETERS CO., WASHINGTON, D. C.

- Insulators, pony, porcelain.
- Insulators, pony, glass. (No. 9, single groove; No. 11, double groove.)
- Insulators, lance pole, pigtail, hard rubber or molded mica.
- Insulators, lance pole, clamp, hard rubber or molded mica.
- Insulators, strain, P. and S.
- Insulators, porcelain, standard knobs, as follows:
 - No. 4 (diameter, $1\frac{1}{2}$ inches; length, $1\frac{1}{8}$ inches).
 - No. 5 (diameter, 1 inch; length, $1\frac{1}{4}$ inches).
 - No. 6 (diameter, $\frac{1}{8}$ inch; length, $\frac{1}{4}$ inch).
 - No. 11 (diameter, $1\frac{1}{2}$ inches; length, $\frac{1}{8}$ inch).
- Insulators, tree, Gem.
- Insulators, tree, Victor.
- Molding signs.
- Molding, type A (two $\frac{1}{2}$ by $\frac{1}{4}$ inch grooves).
- Molding, type B (three $\frac{1}{2}$ by $\frac{1}{4}$ inch grooves).
- Molding, type C (two $\frac{1}{2}$ by $\frac{1}{4}$ inch grooves).
- Nails, 8d, buttonhead.
- Ozite.
- Paint, Mogul, preservative, gallons.
- Paraffin.
- Pipe, iron, 2-inch, 3-inch, galvanized, per foot.
- Pins, insulator, $1\frac{1}{2}$ -inch cross arm.
- Plugs, insulator for iron poles.
- Poles, iron.
- Poles, lance.
- Poles, wooden.

Dimensions of poles.

Length.	Circumference in inches—			
	For light line.		For heavy line.	
	At top.	At 6 feet from butt.	At top.	At 6 feet from butt.
<i>Feet.</i>				
20.	16	24	16	25
25	20	30	22	32
30	20	33	22	36
35	20	36	22	40
40	20	40	22	43
45	20	43	22	47
50	20	46	22	50
55	20	49	22	53
60	20	52	22	56

- Pole steps.
- Rings, bridle, $\frac{1}{8}$ -inch; $1\frac{1}{4}$ -inch; $1\frac{1}{2}$ -inch, or 3-inch.
- Rods, guy, $\frac{1}{2}$ by 60 inches.
- Rods, ground.
- Sandpaper, standard.
- Screws, state whether—
 - Brass or iron.
 - Machine or wood.
 - Length.
 - Flathead or roundhead.
 - Commercial type number.

4443—09—9

Screws, lag.

Screws, fetter drive.

Seats, pole.

Summary of parts:

One angle-iron framework.

Two braces.

Two three-eighths ($\frac{3}{8}$) inch bolts.

Three one-quarter ($\frac{1}{4}$) inch stove bolts.

Four one-half ($\frac{1}{2}$) inch lag screws.

One wooden seat.

Sleeves, lead, sizes as follows: Lead sleeving—Order by inside diameter.

Sleeves, paper, $\frac{1}{8}$ inch by 3 or 2 $\frac{1}{2}$ inches.

Sleeves, McIntyre, per B. & S. gauge.

Solder, half-and-half, in bars.

Solder, plumber's wiping, in 5-pound ingots, 40 per cent tin.

Staples, d. p., "Blake," No. 3, insulated, $\frac{3}{8}$ -inch.

Strand messenger.

Properties of strand.

Diameter.	Size of wires, B. W. G.	Tensile strength.
<i>Inches.</i>		<i>Pounds.</i>
$\frac{1}{8}$	8	8,320
$\frac{1}{4}$	11	4,700
$\frac{3}{8}$	12	3,300
$\frac{1}{2}$	15	1,750
$\frac{3}{4}$	17	1,000

Strand, guy, $\frac{1}{4}$ -inch.

Supports, cross-arm (for attaching wood arms to iron poles).

Supports, messenger.

Tacks, "Milonite."

Tapes. (See Insulating material.)

Thimbles, guy, for $\frac{1}{4}$ -inch and $\frac{3}{8}$ -inch strand.

Tags, cable.

Terminal, cable pole "Cook" type T-5. Number of pairs as required.

Tubes, porcelain:

Diameter of bore, $\frac{1}{8}$ inch; length, 1 $\frac{1}{2}$ inches.

Diameter of bore, $\frac{1}{4}$ inch; length, 3 inches and 8 inches.

Wood poles shall not have a sweep greater than as indicated in the following table, the sweep to be measured between the 5-foot mark and the top of the pole:

20-foot pole, sweep not more than 2 inches.

25-foot pole, sweep not more than 3 inches.

30-foot pole, sweep not more than 5 inches.

35-foot pole, sweep not more than 6 inches.

40-foot pole, sweep not more than 6 inches.

45-foot pole, sweep not more than 7 inches.

50-foot pole, sweep not more than 7 inches.

Guy stubs and anchor logs.—The timber used for guy stubs and anchor logs shall correspond in all respects with that specified for poles. Anchor logs shall not be less than 24 inches in circumference nor less than 4 feet in length.

Guy stubs shall not be less than 22 inches in circumference.

The timbers to be used for pole braces shall be of the same quality as that specified for poles. No braces shall be less than 18 inches in circumference at smaller end.

Cedar poles.

Size of pole.		Estimated weight of each.	Number of poles per-carload.
Top.	Length.		
<i>Inches.</i>	<i>Feet.</i>	<i>Pounds.</i>	
4	20	100	240 to 420
5	20	130	185 to 325
6	20	175	130 to 250
7	20	210	115 to 200
4	25	150	160 to 280
5	25	200	120 to 210
5½	25	225	110 to 190
6	25	250	100 to 170
7	25	350	70 to 130
8	25	400	60 to 105
5	30	275	80 to 155
6	30	350	70 to 120
7	30	450	55 to 95
8	30	550	45 to 80
6	35	450	70 to 90
7	35	600	50 to 70
8	35	750	40 to 60
6	40	625	50 to 65
7	40	800	40 to 55
8	40	975	30 to 45

Double cars.

Size of pole.		Estimated weight of each.	Number of poles per load (2 cars).
Top.	Length.		
<i>Inches.</i>	<i>Feet.</i>	<i>Pounds.</i>	
7	45	1,000	60 to 70
8	45	1,150	52 to 58
7	50	1,250	48 to 55
8	50	1,350	44 to 48
7	55	1,550	39 to 42
8	55	1,750	34 to 37
7	60	2,000	30 to 33
7	65	2,700	23 to 25

610.

WIRE.

Wire, buzzer. (Consists of a strand of 2 steel and 1 copper wires, saturated cotton insulation; resistance, 290 to 322 ohms per mile; weight 17 pounds per mile, on 2 spools; supplied on spools of one-half mile each.)

Wire, bridle. (This is similar to pothead wire except conductor is No. 16 copper; supplied in coils of 500 feet.)

Wire, copper, hard-drawn, bare. See table of sizes below.

Wire, copper, H. D., No. 14, weatherproof. Coils 32 to 50 pounds.

Wire, copper, H. D., No. 12, weatherproof. Coils 53 to 72 pounds.

Wire, No. 12, copper, soft-drawn, rubber-covered; supplied in 500-foot coils.

Wire, No. 14, copper, soft-drawn, rubber-covered; supplied in 500-foot coils.

Wire, fuse; state amperage.

Wire, field, 11 strand. (Consists of 1 copper conductor, No. 20 gauge, surrounded by 10 steel wires each, diameter .012 inch, rubber insulation; supplied

in half-mile coils; resistance, 54.6 ohms per mile; weight, 70 pounds per mile; breaking strength, 250 pounds.)

Wire, No. 14, G. I., miles. (This is the standard for post telephone-lines and lance-lines. It is supplied in half-mile coils, each weighing about 48 pounds.)

Wire, No. 9, G. I., miles. (This is the standard for telegraph-lines. It is supplied in half-mile coils, each weighing about 152 pounds.)

Wire, inside, twisted pair, feet. (This is the standard for inside telephone-wire. It is No. 18 copper; supplied in coils of 500 feet.)

Wire, magnet; specify gauge; supplied in single or double cotton or silk insulation.

Wire, outside, twisted pair, feet. (This is the standard used for connecting pole-lines to buildings. No. 12 or No. 14, copper, rubber-covered and braided: supplied in coils of 500 feet.)

Wire, pothead, feet. (This is a twisted pair, rubber insulation; conductor No. 19, copper; supplied in coils of 500 feet.)

Wire, resistance, finished as follows:

- Single cotton covered.
- Double cotton covered.
- Single silk covered.
- Double silk covered.
- Bare.

Wire, silicon, bronze, bare, No. 21 gauge; supplied in 1/2-mile spools.

Wire, zone, signal, No. 16, copper, rubber and braid insulation coils 500 feet.

Wire, German-silver, 30 per cent alloy, see table below.

Wire, Climax, see table below.

Wire, S. B., bare, No. 28 (Driver-Harris).

Wire, German-silver, 18 per cent alloy.

Table of lengths and resistances of standard spools "18 per cent," German-silver alloy resistance wire.

B. & S. gauge.	Net weight, ounces per spool.		Feet per ounce, approximate.					Ohms per ounce, approximate.					Ohms per 100 feet, approximate.
			Double cot-ton.	Single cot-ton.	Double silk.	Single silk.	Bare.	Double cot-ton.	Single cot-ton.	Double silk.	Single silk.	Bare.	
20	4	19	19	20	20	20	3.5	3.5	3.5	3.6	4.0	18.4	
22	4	29	30	30	31	32	8.7	9.0	9.0	9.1	10.2	30.0	
24	4	45	48	49	50	51	21.0	22.0	22.0	23.0	26.0	47.0	
28	2	100	115	120	125	130	120.0	135.0	139.0	145.0	165.0	119.0	
30	2	150	175	185	195	200	286.0	332.0	345.0	362.0	416.0	189.0	
31	1	180	220	230	245	260	432.0	519.0	537.0	524.0	662.0	239.0	
32	1	220	270	285	300	325	658.0	807.0	840.0	904.0	1,050.0	295.0	
33	1	270	340	350	383	410	992.0	1,250.0	1,310.0	1,420.0	1,680.0	374.0	
34	1	320	410	440	480	520	1,490.0	1,930.0	2,030.0	3,530.0	4,230.0	476.0	
35	1	370	500	540	600	650	2,200.0	2,970.0	3,180.0	3,532.0	4,230.0	602.0	
36	1	440	610	650	740	825	3,260.0	4,580.0	4,880.0	5,500.0	6,730.0	756.0	
37	1	500	740	800	920	1,040	4,770.0	6,950.0	8,080.0	8,410.0	10,700.0	955.0	
38	1	970	1,150	1,310	12,500.0	14,100.0	16,900.0	1,200.0
39	1	1,150	1,400	1,650	21,600.0	22,000.0	26,800.0	1,530.0
40	1	1,400	1,730	2,090	29,700.0	34,700.0	42,700.0	1,930.0

These values are approximate.

When "Climax" resistance wire is ordered it should have a resistance approximately 2.777 + times that of table. The other values for Climax wire are the same as above.

When 30 per cent German-silver wire is ordered it should be estimated that its resistance is approximately 1.55 times that of 18 per cent wire.

Bare wire will be supplied in packages as above. Its resistance, etc., may readily be determined from data above.

Bare S. B. wire No. 28 supplied in ounce spools (about 150 feet). Resistance, 2.1 ohms per foot.

Copper line wire (bare).

B. & S. gauge.	Diameter.	Weight per 1,000 feet.	Weight per mile.	Resistance per 1,000 feet at 68°.	Resistance per mile at 68°.	Tensile strength.	Coil lengths.
	<i>Inches.</i>	<i>Pounds.</i>	<i>Pounds.</i>	<i>Ohms.</i>	<i>Ohms.</i>	<i>Pounds.</i>	<i>Feet.</i>
5	0.182	100	529	0.323	1.71	1,550	1,000
6	.162	79	419	.407	2.15	1,235	1,000
7	.144	63	331	.513	2.71	980	2,640
8	.128	50	262	.646	3.41	778	2,640
9	.114	39	208	.815	4.30	617	2,640
10	.102	32	166	1.028	5.43	489	2,640
11	.091	25	132	1.296	6.84	388	5,280
12	.081	20	105	1.635	8.63	307	5,280
13	.072	15.7	83	2.061	10.88	244	5,280
14	.064	12.4	65	2.599	13.72	193	5,280

611. To secure uniformity in units of wire as reported on property returns and stock at depots, the following will be observed:

All galvanized iron wire to be in miles. (Fractions less than a half may be disregarded.)

All bare copper wire in feet.

All insulated copper wire in feet. (This includes outside and inside twisted pair, bridle, pothead, and office wire.)

Buzzer wire, in spools. (Each standard spool holds ½ mile.)

Buzzer wire, bare, in spools. (Each standard spool holds ½ mile. Under this title should be included all phosphor bronze and silicon bronze wire of about No. 21 and No. 22 gauge, which was purchased for use as buzzer wire.)

Fuse wire, in pounds.

Field wire, in miles.

Magnet wire, in pounds.

Messenger strand wire, in feet.

Resistance wire, in pounds.

Deep sea sounding wire, in fathoms.

Seizing wire, in pounds. (This is a soft G. I. No. 18 wire, for serving armor wires of D. S. cable.)

Annunciator wire, in pounds. (This is copper wire of about No. 18 or No. 19, cotton and paraffin insulation).

612. LINE CONSTRUCTION TOOLS.

[Standard construction tools are described in specification No. 360.]

Adze, 4-inch blade, house carpenter's full head.

Ax, hand (broad hatchet), 5-inch blade.

Axes, handles for.

Ax, lineman's 5-pound, long handle.

Bags, lineman's, canvas with leather bottom, 20-inch.

Bars, crow, wedge-point, 17 pounds, steel.

Bars, digging, 1-inch round, 8 feet long, weight 17 pounds, steel.

Bars, digging, 1½ inches round, 8 feet long, weight 28 pounds, steel.

Bars, digging and tamping, 1-inch round, tool steel, 7 feet long, weight 19 pounds.

Bars, digging and tamping, 1-inch octagonal tool steel, 8 feet long, weight 25 pounds.

Bars, digging (electric spud), steel tubing with cast blade and tamper.

134 GENERAL, PROPERTY, AND DISBURSING REGULATIONS.

Belts, lineman's, for tools, 38 inches, 40 inches, 44 inches, with loops and rings for safety strap.

Belts, lineman's, safety.

Bits, auger, sizes $\frac{1}{8}$ -inch, $\frac{1}{4}$ -inch, $\frac{3}{8}$ -inch, $\frac{1}{2}$ -inch, $\frac{5}{8}$ -inch, $\frac{3}{4}$ -inch, all 8 inches long.

Bits, expansion, $\frac{1}{2}$ -inch to $1\frac{1}{2}$ inches.

Bits, pole, 12 inches by $\frac{5}{8}$ -inch and 16 inches by $\frac{5}{8}$ -inch.

Blades, hack saw, 12 inches.

Block, pulley, iron; single or double 3-inch; double or triple 6-inch; double or triple 10-inch.

Block, roller, for cable.

Braces, ratchet, 8-inch sweep.

Buffalo grip with pulleys, No. 1 size, for wires up to No. 6; No. 2 for wires up to No. 0.

Chain, cow, 4 feet, with rings.

Chisels, cold, $\frac{3}{4}$ -inch to 1-inch, tool steel.

Chisels, socket-framing, handles for, ring-topped.

Chisels, socket-framing, $1\frac{1}{2}$ inches to 2 inches.

Clamps, combination splicing, for wires No. 6 to No. 14, iron; for No. 8 to No. 14, copper.

Climbers, with straps, two sizes, 16 inches and 18 inches.

Climbers, straps for.

Cord, sampson, spot $\frac{3}{8}$ -inch, coils of 100 feet.

Connectors (splicing clamps) combination wire and sleeve (wires No. 6 to 14 iron and No. 8 to 14 copper sleeves).

Coppers, soldering, with handles, 1 pound, 2 pounds, and 4 pounds.

Coppers, soldering, handles for, with ring ferrules.

Drill, rock, large and small sizes.

Files, dentist.

Files, 5-inch triangular.

Files, 8-inch round.

Files, flat.

Files, bastard.

Files, half-round, 8-inch.

Files, handles for, wood.

Frames, hack saw, 9-inch to 12-inch.

Furnace, gasoline, with 5-inch pot and ladle.

Globes, lantern, plain or ruby.

Hammers, claw, 18-ounce.

Hammers, machinist, 2-pound.

Handles for hammers and hatchets.

Handles with tools.

Hooks, cant, 4-foot, with handle.

Hooks, carrying, 4-foot handle.

Jack strap, complete, with hook and No. 1 buffalo grip.

Jenny, cable spinning, $2\frac{1}{2}$ -inch bore by 18 inches long.

Kit, inspector's pocket tool.

Knives, draw, 12-inch blade.

Knives, draw, 14-inch blades, telegraph pattern.

Knives, electricians'.

Lanterns, excavation, ruby globe.

Pick handles.

Pike poles, 12-foot, 16-foot, and 18-foot, 2 inches in diameter.

Picks, 7 pounds to 8 pounds.

Post-hole augers, 12-inch, 5 feet long.

Post-hole diggers, 6-foot or 7-foot handle.
 Pike, guarded or raising, 14-feet.
 Pliers, lineman's, 6-inch, side cutting.
 Pliers, 8-inch, side cutting.
 Pliers, 6-inch, diagonal.
 Pole support, jenny.
 Pole support, mule.
 Reels, pay-out, with handles and shoulder straps.
 Reels, take-up.
 Reel jacks, for 2½-inch shaft, capacity 10 tons per pair.
 Reel jacks, axles for, steel, 1-inch, 1½-inch, 2-inch, and 2½-inch per foot.
 Rope, pure manila hemp, ¾-inch in coils of about 1,000 feet.
 Rope, pure manila hemp, ½-inch, in coils of about 1,000 feet.
 Rope, pure manila hemp, ¾-inch, in coils of about 500 feet.
 Rope, pure manila hemp, ¾-inch, in coils of about 500 feet.
 Rope, pure manila hemp, 1-inch, in coils of about 500 feet.
 Rules, carpenter's, 2-foot.
 Rules, zigzag, 4-foot.
 Saws, crosscut, 5-foot, with handles.
 Saws, hack, blades, 12-inch.
 Saws, hack, adjustable frame, 9-inch to 12-inch.
 Saws, hand, 26-inch, 8-point.
 Saws, rip, 26-inch, 5½-point.
 Screw-drivers, 3 inches, 4 inches, 6 inches, and 12 inches.
 Shovels, 6-foot and 8-foot handles, with 18-inch straps.
 Shovels, handles for.
 Spades, handles for.
 Spades, grading, round and square pointed, D handles.
 Spoons, 6-foot and 8-foot handles, 18-inch strap.
 Sheaves, double and single, wood or iron, with one or two becketts, or with becket and hook, give length desired in inches.
 Straps, safety, for lineman's belts.
 Tapeline, cloth, 100 feet and 50 feet, in feet and inches, leather case.
 Tool bag, service, complete (leather).
 Torches, blow, hot blast.
 Tree trimmers, large size, without saw.
 Tree trimmers, large size, with saws.
 Tree trimmers, handles for, 18 feet, with ferrule joint.
 Wrench, combination lag and nut screw.
 Wrench, steel tie wrench for No. 8, 10, and 12 wire.
 Wrenches, monkey, 10-inch and 12-inch.

613. INSULATING AND SPLICING MATERIALS.

[This list includes both fire-control and general-service supplies. General specification No. 210 covers insulating and splicing material.]

Alcohol, grain, gallons.
 Armalac, gallons.
 Asbestos, as ordered.
 Asphaltum varnish, gallons.
 Beeswax, yellow, pounds.
 Chatterton's compound, domestic, pounds.
 Cloth, emery, quires (specify size).
 Cloth, crocus, quires.
 Cotton wicking, balls.

Flax, sewing, 12 strands, 1-pound balls.
 Instrument lacquer, blue, colorless, or yellow, bottles.
 Insulatine, in 1-pound sticks.
 Ozite, gallons, in tin cans of 1 gallon, No. 2 grade.
 Paraffin, pounds, in 10-pound flat cakes.
 Paraffin oil, quarts.
 Paint, P. & B., No. 2, supplied in $\frac{1}{2}$, 1, and 5 gallon cans and barrels.
 Paint, Mogul, insulating, gallons.
 Pastors, gummed paper for wiped joints, rolls, 2 inches wide.
 Rubber, pure, $\frac{3}{4}$ -inch strip on cambric; thickness of rubber about 0.0235 inch;
 $\frac{1}{2}$ -pound rolls wrapped in tin foil and sealed in flat tin boxes.
 Rubber, pink, 60 per cent pure Para, $\frac{3}{4}$ -inch strip on cambric; thickness of
 rubber about 0.012 inch; $\frac{1}{2}$ -pound rolls wrapped in tin foil and sealed in flat
 tin boxes.
 Rubber cement in pint and $\frac{1}{2}$ -pint cans.
 Shellac varnish, orange or white, quarts and gallons.
 Shellac gum, pounds.
 Sandpaper, quire or dozen sheets, Nos. 0, 1, and 2.
 Sleeving, paper, $\frac{1}{8}$ -inch by 3-inch, per 1,000 or 100.
 Sleeving, paper, $\frac{1}{8}$ -inch by 2 $\frac{1}{2}$ -inch, per 1,000 or 100.
 Sleeving, cotton, per 100 yards. (Give size of wire.)
 Sleeving, McIntyre, state B. & S. gauge.
 Sleeving, lead, length as ordered.
 Soft-rubber tubing, $\frac{1}{8}$ -inch, $\frac{1}{4}$ -inch, and $\frac{1}{2}$ -inch bore, feet.
 Solder, resin core, $\frac{1}{2}$ -pound spools, pounds.
 Solder, half-and-half, in wire, 10-gage, pounds.
 Solder, half-and-half, in bars, pounds.
 Solder, plumber's wiping, in ingots, pounds.
 Splicing tool. A disk with handles for laying on armor-wires of D. S. cables.
 Tape, friction, $\frac{3}{4}$ -inch wide, $\frac{1}{2}$ -pound and 1-pound rolls, in pasteboard boxes,
 pounds.
 Tape, Grimshaw, $\frac{1}{2}$ -pound rolls, in pasteboard boxes.
 Tape, Manson, 1-pound rolls, in pasteboard boxes.
 Tape, Okonite, 1-pound rolls, in pasteboard boxes.
 Tape, splicer's, 1-pound rolls, in pasteboard boxes, pounds.
 Wire, seizing, No. 18 G. I. soft, pounds.

INSULATING COMPOUNDS.

614. In order that no confusion may exist concerning the use of the various insulating compounds which are ordered, the following instructions should be noted:

The compounds supplied are: Chatterton's compound (first quality), insulatine, gyite, ozite, paraffin.

Chatterton's compound.—Chatterton's compound is a high-class insulator costing \$1 per pound and should be used only in sealing ends of cable where they are exposed to storage-battery fumes or in similar work where a high-quality insulator is required.

Insulatine.—Insulatine is not a high-quality insulator, and it is intended for use in sealing outlet boxes where a wall of rubber exists between the insulatine and the conductor. It should never be used for insulating purposes only, and is depended on more for its sealing qualities than for insulation. This material is comparatively cheap, costing about 12 cents per pound.

Gyite.—Is a better grade than insulatine, but not as good as ozite.

Ozite.—Ozite is used for sealing potheads in paper cable work. It may also be used for sealing the ends of rubber cable. Ozite is used for pothead work exclusively.

Paraffin.—Paraffin is intended for use in boiling out splices in paper cable and in drying the ends. It should never be used in pothead work or for sealing purposes.

615. ELECTRICAL ENGINEER'S TOOL CHEST.

[This chest is manufactured under specification No. 192.]

Name plate.

ELECTRICAL ENGINEER'S TOOL CHEST.

U. S. SIGNAL CORPS.

No. —.

The tools are distributed as follows:

COVER.

1. 1 backsaw, 10 inches.
2. 1 rule, 4 feet, 8 fold.
3. 1 crosscut saw, 20 inches.
4. 1 rip saw, 22 inches.
5. 1 hacksaw frame, adjustable, No. 6.
6. 1 metallic tape, 50 feet.

FIRST TRAY.

7. 1 spirit level, pocket, 3-inch.
8. 1 polarity indicator.
9. 1 wrench.
10. 1 riveting hammer, 15 ounces.
11. 1 claw hammer, 1 pound.
12. 1 jackknife.
13. 1 screw-driver, 5 inches.
14. 1 screw-driver, 10 inches.
15. 1 socket chisel, 1-inch.
16. 1 socket chisel, $\frac{1}{2}$ -inch.
17. 3 files; 2 8-inch flat bastard. 1 8-inch clear edge hand.
18. 1 cold chisel, $\frac{1}{2}$ inch.
19. 1 screw-driver, 2 inches.
20. 1 screw-driver, 2 $\frac{1}{2}$ inches.
21. 1 tool holder with tools.

SECOND TRAY.

22. 1 pair 6-inch dividers.
23. 1 ratchet brace, 8-inch throw.
24. 2 Buffalo grips, Nos. 1 and 2.
25. 1 12-inch scale, combination square.
26. 1 center head, combination square.
27. 1 square and bevel, combination square.
28. 1 hand vise.
29. 1 block plane.
31. 1 soldering copper, jeweler's, No. 2.
32. 1 soldering copper, 1 pound.
33. 1 soldering iron, electric, No. 10.

138 GENERAL, PROPERTY, AND DISBURSING REGULATIONS.

30. 1 pair metal shears.

THIRD TRAY.

- 34. 1 oilstone, soft, Arkansas, 5-inch, mounted.
- 35. 1 pair pliers, 8-inch, side cutting.
- 36. 1 ladle, 3-inch, wrought iron handle.
- 37. 1 pair pliers, 5½-inch, long nose, side cutting.
- 38. 1 monkey wrench, 12-inch.
- 39. 1 nail puller.
- 40. 1 Stillson wrench, 14-inch.
- 41. 1 pair pliers, 6-inch, side cutting.
- 42. 1 pair pliers, diagonal cutting, 6-inch.
- 43. 2 combination splicing clamps.

FOURTH TRAY.

- 44. 1 wood countersink.
- 45. 9 steel twist drills, ½-inch, ⅞-inch, ⅝-inch, ⅜-inch, ¼-inch, and Nos. 2, 12, 22, and 30, and 1 center punch.
- 46. 1 set alphabet punches, ½-inch.
- 47. 1 plumber's kettle, 5 inches.
- 48. 1 breast drill.
- 49. 2 shields for fire pot.
- 50. 1 set steel figures, ½-inch.
- 51. 1 expansion bit, ¼-inch by 1½ inch.
- 52. 1 rabbit plane, ½-inch.
- 53. 1 cable sheath knife, 4½-inch blade.
- 54. 1 set of auger bits with one 4-inch triangular file, ⅞-inch to 1 inch by 16ths.

END OF CHEST.

- 55. 1 furnace, plumber's, galvanized reservoir.
- 56. 1 magneto (furnished by United States Signal Corps).
- 57. 1 dozen hacksaw blades, all hard, 12-inch.

616. CONSTRUCTION TOOL CHEST.

[This chest is manufactured under specification No. 400.]

Name plate.

CONSTRUCTION TOOL CHEST.

U. S. SIGNAL CORPS.

No. —.

The chest shall be provided with a lock and duplicate set of keys.

- 2 axes, hand, 4½-inch.
- 1 bag, tool, service, empty.
- 1 bit, bell hanger's, 24 by ⅝ inches.
- 1 box, miter.
- 3 blades, hack saw, 10-inch, dozen.
- 2 brace and bits, "home," sets.
- 2 chisels, wood, 1-inch.
- 2 coppers, soldering, with handles, No. 2½.
- 1 dies, marking, steel, figures, ¼-inch set, hand cut.
- 1 dies, marking, steel, letters, ¼-inch set, hand cut.
- 1 drill, breast, size No. 18.
- 12 drills, rock, ⅞-inch.

- 12 drills, rock, $\frac{1}{8}$ -inch.
- 1 drill, twist, straight shank, $\frac{1}{4}$ to $\frac{1}{2}$ inch in sixteenths, standard.
- 8 files, assorted, with handles; 2 bastard, half round, 10-inch; 2 hand, safe edge, 6-inch; 2 slim taper saw files, $5\frac{1}{2}$ -inch; 1 round file, 6-inch; 1 rasp, cabinet, 10-inch.
- 2 frames, hack saw, Star, No. 10.
- 2 gouges, $\frac{3}{4}$ -inch.
- 2 grips, buffalo Nos. 1 and 2, with pulleys.
- 6 hammers, claw, carpenter's, 15-ounce.
- 6 handles with tools.
- 1 indicator, polarity.
- 1 iron, soldering, with handle, jeweler's No. 1.
- 2 kits, tool, inspector's pocket.
- 1 knife, cable sheath, $4\frac{1}{2}$ -inch blade.
- 6 knives, Empire, No. 1013.
- 1 mallet, serving, metal.
- 1 mallet, serving, wooden.
- 1 plane, block, $1\frac{1}{2}$ -inch blade.
- 1 plane, fore, $2\frac{1}{2}$ -inch blade.
- 1 plane, jack, 2-inch blade.
- 1 plane, rabbet, $\frac{1}{2}$ -inch blade.
- 2 pliers, diagonal cutting, 6-inch, pairs.
- 1 pliers, gas, 8-inch, pair.
- 2 pliers, side-cutting, 6-inch, pairs.
- 2 pliers, side-cutting, 8-inch, pairs.
- 2 pliers, snipe-nose, $5\frac{1}{2}$ -inch, pairs.
- 1 punch center.
- 2 saws, back, 10-inch.
- 1 saw, compass, 12-inch.
- 1 saw, crosscut, carpenter's, 20-inch.
- 1 saw, rip, carpenter's, 22-inch.
- 2 screw-drivers, 12-inch.
- 1 shears, 8-inch, pair.
- 1 snips, pair, Compton, No. 10.
- 1 tape, 50-foot, metallic.
- 2 torches, gasoline.
- 1 try-square, steel, 6-inch.
- 1 wrench, screw, 12-inch.
- 1 wrench, Stillson, 14-inch.

617. CABLE SPLICER'S CHEST.

[This chest is manufactured under specification No. 318.]

Name plate.

CABLE SPLICER'S CHEST,
U. S. SIGNAL CORPS.
No. —.

EQUIPMENT.

- 1 plumber's furnace, with two chimneys.
- 1 ladle, 3-inch.
- 1 inspector's pocket kit.
- 1 hook, shave.
- 1 plumber's kettle, 5 inches.

140 GENERAL, PROPERTY, AND DISBURSING REGULATIONS.

- 2 soldering coppers, 2½ and 4 pounds, with handles.
- 1 cable sheath knife, 4½-inch blade.
- 1 hack saw frame, adjustable, Star, No. 10.
- 2 hack saw blades, 10 inches, dozen.
- 1 dogwood cable mallet.
- 1 stearin, ¼ pound.
- 1 gummed paper, 1½ inches wide, pounds (pasters).
- 1 hammer, claw, 16 ounces, with handle.
- 1 hammer, plumber's, 18 ounces, with handle.
- 1 canvas tool bag, leather bottom, 20 inches.
- 250 paper sleeves, ½ inch by 3 inches.
- 2 cotton strips, ¼ inch, in rolls, 5 inches diameter.
- 6 wiping cloths, moleskin.
- 1 file, hand, smooth, 6 inches, with handle.
- 1 file, half-round, bastard, 6 inches, with handle.
- 1 rule, 2-foot, folding, boxwood, brass bound.
- 1 rasp, smooth, 12 inches, with handle.
- 1 saw, plumber's, Disston's, 14 inches.
- 1 pliers, pair, 8 inches.
- 1 snips, No. 10.
- 3 drift pins, 1½ inches, 1½ inches, 2 inches.

618. PIPE FITTER'S CHEST.

[This chest is manufactured under specification No. 276.]

Name plate.

PIPE FITTER'S CHEST,
U. S. SIGNAL CORPS.
No. —.

EQUIPMENT.

- 2 pipe wrenches, 18 inches.
- 1 pipe vise, combination, swivel base, 3½-inch jaws, reversible jaws.
- 1 pipe cutter, No. 2 (½ inch to 2 inches).
- 1 stock for dies (½ inch to 2 inches), adjustable, with quick-opening and self-centering dies and guides.
- 1 set of dies for above stock (½ inch to 2 inches).
- 1 oil can, malleable iron, 5 ounces.
- 1 butt reamer, for brace, 1½ inches.
- 1 pipe former, ½ inch by 1½ inches.
- 1 file, half-round, bastard, 6 inches.
- 1 rasp, smooth, 10 inches.
- 1 file, hand, smooth, 10 inches.

619. ELECTRICAL INSTRUMENT CASE.

[This instrument case is manufactured under specification No. 145.]

CONTENTS.

- 1 insulation and capacity test set consisting of the following in case:
 - 1 portable galvanometer of the D'Arsoval type.
 - 1 telescope and scale for above galvanometer.
 - 1 100,000-ohm box.
 - 1 combined shunt and switch.
 - 1 condenser set.

- 1 ohmmeter.
- 1 tripod, external to case.
- 1 service testing battery.
- 1 micrometer caliper, B. and S., No. 8, without ratchet stop, with morocco carrying case.
- 1 inspector's pocket tool kit.
- 1 testing telephone (furnished by U. S. Signal Corps).
- 1 space for forms and reports.
- 1 space for books.

MISCELLANEOUS PARTS AND SUPPLIES.

- 1 galvanometer coil and mirror.
- 4 round-head plugs.
- 6 lower suspensions.
- 6 upper suspensions.
- 2 milled-head screws.
- 1 piece felt.
- 4 screws for glass.
- 1 ohmmeter card.
- 1 piece chamois.
- 1 bottle vaseline.
- 1 bottle typewriter oil.
- 85 gr. No. 22 bare copper wire.
- 19 gr. advance wire.
- 18 gr. No. 22 manganin wire.
- 9 gr. No. 34 manganin wire.
- 5 gr. No. 40 manganin wire.
- 14 gr. No. 28 manganin wire.
- 1 glass window.
- 4 paper scales.
- 6 feet battery cord.
- 10 feet okonite wire.
- 8 ounces solder.

REPAIR KIT.

The repair kit contains the following instruments:

- 1 nickel-plated screw-driver.
- 2 pairs tweezers, nickeled.
- 3 lower suspensions for galvanometer.
- 4 upper suspensions for galvanometer.

620. POST TOOL CHEST.

[The post tool chest is manufactured under specification No. 350.]

Name plate.

POST TOOL CHEST,
SIGNAL CORPS, U. S. ARMY.
No. —.

- 3 bits, $\frac{1}{8}$ -inch, $\frac{1}{16}$ -inch, and $\frac{1}{32}$ -inch.
- 1 brace, ratchet, ball-bearing, 8-inch throw.
- 1 chisel, socket, $\frac{3}{4}$ -inch, beveled edge.
- 1 chisel, cold, $\frac{3}{4}$ -inch.
- 1 file, round, 6-inch, bastard, with handle.

142 **GENERAL, PROPERTY, AND DISBURSING REGULATIONS.**

- 1 file, saw, with handle, 8-inch.
- 1 file, 8-inch, clear edge, with handle, hand, bastard.
- 1 hammer, claw.
- 1 holder, tool, Millers Falls Co., No. 5, containing the following:
 - 1 4-inch saw.
 - 1 8-inch saw.
 - 2 screw-drivers.
 - 1 chisel.
 - 1 gouge.
 - 2 awls.
 - 1 gimlet.
 - 1 three-cornered file.
 - 1 reamer.
- 1 hatchet, claw, 4½-inch blade.
- 1 knife, draw, 14-inch blade.
- 1 plane, iron, "Keen Kutter," No. 4c.
- 1 pair pliers, 6-inch.
- 1 rule, 2-foot, folding, brass-bound.
- 1 saw, crosscut, 20-inch.
- 1 saw, 24-inch, crosscut.
- 1 screw-driver, 6-inch.
- 1 square, graduated, 9-inch.
- 1 tape, metallic, 50-foot.
- 1 wrench, screw, 10-inch (opening in jaws 1½ inches).

621.

SERVICE TOOL BAG.

[The service tool bag is manufactured under specification No. 312.]

EQUIPMENT.

- 1 try-square, steel, 4-inch blade.
- 1 chisel, cold, ½-inch.
- 1 chisel, wood, ½-inch socket blade, iron, ring-topped handle.
- 1 hammer, claw, 16-ounce.
- 1 holder, tool, Millers Falls Co., No. 5, complete as described in par. 620.
- 1 knife, Empire, No. 1013.
- 1 level, pocket spirit, 2½-inch.
- 1 plane, block, 6-inch.
- 1 pair pliers, 6-inch, side cutting.
- 1 pair pliers, 8-inch, side cutting.
- 1 4-foot rule, folding, boxwood, 8 parts.
- 1 saw, back, 8-inch.
- 1 screw-driver, 6-inch.
- 1 screw-driver, 10-inch.
- 1 pound solder, resin core.
- 1 wrench, screw, forged 6-inch monkey wrench.
- 1 wrench, socket, for telephone apparatus, 4-inch.
- 1 small brace, ratchet brace, 8-inch throw.
- 1 Irwin auger bit, ¼-inch.
- 1 Irwin auger bit, ⅜-inch.
- 1 Irwin auger bit, ½-inch.
- 1 Irwin auger bit, ⅝-inch.
- 1 Irwin auger bit, 1-inch.
- 1 polarity indicator.

622. INSPECTOR'S POCKET KIT.

[The inspector's pocket kit is manufactured under specification No. 186.]

Marking.

The carrying case has stamped into the leather the following:

INSPECTOR'S POCKET KIT,
U. S. SIGNAL CORPS.
No. —.

EQUIPMENT.

- 1 combined screw-driver and skinning knife with safety spring.
- 1 electrician's scissors, 5-inch, nickeled.
- 1 pair pliers, 5-inch, side cutting, nickeled.
- 1 bastard file, 3-inch, half round, with handle.
- 1 pair tweezers, 4 $\frac{3}{4}$ -inch, nickeled.
- 1 screw-driver, 2-inch.
- 1 rule, 2-foot, narrow, 4-fold, boxwood, brass bound.

STANDARD SPECIFICATIONS.

623. The following index to standard specifications is correct to May 15, 1909. New specifications are added and old ones corrected from time to time. Those marked (*) are not intended for general distribution and are not in printed form.

Title.	Specifica- tion No.	Title.	Specifica- tion No.
A.		*Battery, signal storage	362
Aeroscope, service.....	319	Battery supplies, primary.....	341
Aeroscope terminals.....	348	Battery switch.....	156
Ambulance, improved army, 1900 pat- tern (Quartermaster's Department specification).....	446	Battery, telephone storage.....	280
Ammeter, millimeter, millivoltmeter, voltammeter, voltmeter.....	191	Battery, testing, post.....	404
Anchor logs, poles, guy stubs, and wooden pole braces.....	180	Battery, testing, service.....	185
Anchor, cable, and ring bolt.....	389	Batteries, wet, closed circuit.....	202
Anemometer.....	159	Batteries, wet, open circuit.....	201
Apparatus, zone signal.....	302	Bell, box for large T. I.....	155
Apron panel, special.....	395	Bells and buzzers, vibratory.....	274
Arms, cross, wooden.....	177	Bells, time interval.....	313
Arresters, lightning.....	229	Binding posts and connectors.....	231
*Arrester cabinet for portable telephone switchboard.....	422	Block, telephone terminal.....	438
*Arrester cable for portable telephone switchboard.....	423	*Bodies for S. C. automobile wagons on Winton and Cadillac chassis.....	327
*Atmosphere scale, 1909 type.....	513	Bolt, ring, and cable anchor.....	389
*Automobile wagons, S. C. bodies for, on Winton and Cadillac chassis.....	327	Boosters.....	500
B.		*Booster charging set for telautograph storage battery.....	492
Bag, inspector's instrument.....	342	Boosters and motor generators, concrete bases for.....	402
Bag, service tool.....	312	Box, base line switch.....	455
Balloons, dirigible.....	483	Box, cable terminal, weatherproof.....	245
Barometers.....	133	Box, firing signal.....	295
Base, concrete, for boosters and motor generators.....	402	Box, gun outlet.....	448
Batteries, dry, special.....	200	Boxes, junction.....	92
Batteries, dry, standard.....	221	Box, junction, 3-way.....	343
Batteries, telautograph storage.....	447	Box for large T. I. bell.....	155
*Battery, discharge resistance for tele- phone storage.....	473	Box, mortar switch.....	252
*Battery, booster charging set for telau- tograph storage.....	492	Box, outlet, for target ranges.....	471
		Box, portable, for field telephone.....	188
		Box, searchlight outlet.....	297
		Boxes, terminal.....	269
		Box, terminal, for submarine cables.....	501
		Box, terminal, type D.....	441
		Braces, wooden pole, anchor logs, guy stubs, and poles.....	180
		*Bracket, hand set.....	209
		Brackets for interrupters.....	325
		Bracket for lance-line insulator.....	388

Title.	Specifica- tion No.	Title.	Specifica- tion No.
Bracket, telautograph transmitter.....	168	Cable, single conductor, intermediate, Alaskan type.....	331
Brackets, wooden, pins and plugs.....	178	Cable, single conductor, light, double armor.....	421
Breast reel.....	412	Cable, single conductor, shore end, Alas- kan type.....	332
Bunting, Burgees wool.....	199	Cable, single conductor (special light)....	334
Burgees, wool bunting.....	199	Cable, single conductor, submarine (Philippine).....	424
Button, push.....	216	*Cable, single conductor, submarine....	478
Buzzers and bells, vibratory.....	274	Cable, single and multiple conductor, rubber insulated, submarine, F. C. (single and double armor).....	431
*Buzzers, cavalry.....	503	Cable splicer's chest.....	318
Buzzer, field, model 1908.....	495	Cable terminal, submarine, standard....	386
*Buzzer system equipment, target range..	496	Cable, submarine, paper insulated, single armor, special.....	372
Buzzer wire and spool for buzzer wire....	387	Cable, submarine, single conductor, Philippine.....	424
C.			
*Cabinet, arrester, for portable telephone switchboard.....	422	Cable, submarine, paper insulated.....	427
Cabinet cut-out.....	406	Cable, submarine, rubber insulated, F. C., single and multiple conductors (single and double armor).....	431
Cabinet, supply.....	193	Cable, switchboard, distributing.....	349
Cabinet, storage battery.....	271	Cable, switchboard, twenty pair.....	290
Cabinet, storekeeper's file.....	363	Cable terminal box, weatherproof.....	245
Cabinet, telegraph storage battery.....	437	Cable, testing.....	253
Cabinet, terminal.....	435	*Cable testing on cable ship Joseph Henry, motor generator for.....	515
Cable, aerial, paper insulated.....	197	Cable, tree, multiple conductor.....	236
Cable, Alaskan type, deep sea, single conductor.....	330	Cable, twenty pair, switchboard.....	290
Cable, Alaskan type, single conductor, intermediate.....	331	Cable and wire to be used in wireless telegraph work.....	416
Cable, Alaskan type, single conductor, shore end.....	332	*Cart, reel, 1908 pattern.....	443
*Cable, arrester, for portable telephone switchboard.....	423	*Cart, signal corps wire, wheel, model 1909.....	507
Cable clamp, standard.....	154	*Cart, signal corps wire, 1909.....	504
Cable, deep sea, single conductor.....	420	Case, electrical instrument.....	145
Cable, deep sea, single conductor, Alas- kan type.....	330	*Case, filing, metal map.....	502
Cable, distributing switchboard.....	349	Case, reagent, for testing electrolyte....	315
Cable, double armor, single conductor, light.....	421	*Cavalry, buzzer.....	503
Cable-forming strips.....	118	*Cells, Gordon.....	470
*Cable, gun, rubber insulated.....	417	Cement, insulating.....	347
Cable, intermediate, single conductor....	419	Cement, Portland.....	391
Cable, intermediate, single conductor, Alaskan type.....	331	Cement, rubber.....	458
Cable, lead covered, rubber insulated, multiple conductor.....	429	Changer, pole.....	218
Cable, multiple conductor, rubber insu- lated, lead covered.....	429	Chest, cable splicer's.....	318
Cable, multiple and single conductor, rubber insulated, submarine, F. C. (single and double armor).....	431	Chest, construction tool.....	400
Cable, paper insulated, aerial.....	197	Chest, electrical engineer's tool.....	192
*Cable, paper insulated, power (Brook- lyn to Governors Island).....	344	*Chests, field artillery signal.....	490
Cable, paper insulated, submarine.....	427	Chest, pipe fitter's.....	276
*Cable, paper insulated, submarine, double armor, special.....	373	Chests, post tool.....	350
*Cable, paper insulated, submarine, single armor, special.....	372	Clamp, cable, standard.....	154
Cable, Philippine, single conductor, sub- marine.....	424	Clock, time-interval.....	305
*Cable, power, paper insulated (Brook- lyn to Governors Island).....	344	Coil, choke, for telephone and telegraph circuits.....	23
Cable, power, rubber insulated.....	432	Compound, 30 per cent rubber insulating.	430
*Cable, power, rubber insulated (for use between Brooklyn, N. Y., and Govern- ors Island).....	310	Condensers.....	224
*Cables, rubber insulated, gun.....	417	*Condenser, glass plate, oil insulated, 3 kw., for station wireless set.....	480
Cable, rubber insulated, lead covered, multiple conductor.....	429	Condenser, panel and bus bar.....	436
Cable, rubber insulated, power and wire..	432	Conduit.....	238
Cable, rubber insulated, submarine, F. C., single and multiple conductor (single and double armor).....	431	*Conduit work, electric lighting and wireless telegraph station, Fort Wood, N. Y.....	439
Cable, shore end, single conductor, Alas- kan type.....	332	Connecting cords with flexible armor....	316
*Cable, single armor, paper insulated, submarine, special.....	372	Connectors, binding posts and.....	331
Cable, single conductor, deep sea.....	420	Construction material, line, standard....	272
Cable, single conductor, deep sea, Alas- kan type.....	330	Construction tools, line.....	3 0
Cable, single conductor, intermediate....	419	Cords, connecting with flexible armor....	316
		Cords, portable field telephone.....	184
		*Cords, telephone for composite artillery type, single and double head receivers..	399
		Couplings, grapnel ropes, and buoy ropes.	405
		Cover, manhole.....	390
		Covers for motor generators and boosters.	442
		Cross arms, iron poles, and fittings.....	226
		Cross arms, wooden.....	177
		Cut-off jack set, key type.....	491
		Cut-out cabinet.....	406
		Cylinders, gas.....	494

Title.	Specifi- cation No.	Title.	Specifica- tion No.
D.			
Designation labels.....	379	*Instrument wagon (1907 pattern).....	452
Drills rock.....	132	Insulative cement.....	347
E.			
*Engine, gasoline, for 1 kw. generating set.....	468	Insulating and splicing materials.....	210
*Equipment, high frequency power, for Forts Leavenworth and Riley.....	514	Insulating compound, rubber, 30 per cent.....	430
*Equipment, station power, 3 kw.....	481	Insulator, bracket, for lance line.....	388
*Equipment, wireless telegraph, for U. S. cable ship Joseph Henry.....	516	Insulators for lance lines.....	356
Equipments, telephone switchboard.....	189	Insulators, glass.....	212
F.			
*Field artillery signal chests.....	490	Interrupter for time-interval bells.....	298
Field buzzer, model 1908.....	495	J.	
Field heliograph.....	246	Jack set, cut-off, key type.....	491
Field induction telegraph set.....	370	Junction boxes.....	92
Field telephone.....	309	Junction box, 3-way.....	343
*Field telephone, artillery type.....	453	K.	
Field telephone, portable box for.....	188	Keys, strap.....	317
Field wire, spools for.....	472	Keys, telegraph.....	214
*Filing case, metal map.....	502	*Kites, folding Malay.....	371
Firing signals.....	409	Kit, inspector's pocket.....	186
Fittings, pole line.....	469	Knife switches.....	368
Fixtures, lighting, for switchboard rooms.....	393	Knives, cable sheath.....	275
Flag kits, 2-foot and 4-foot.....	283	Kits, flag, 2-foot and 4-foot.....	283
Forming strips, cable.....	118	L.	
Fuses and mountings, and fuse wire.....	397	Labels, designation.....	379
G.			
Galvanizing.....	96	Lance line insulator, bracket for.....	388
Galvanometers.....	278	Lance lines, insulators for.....	356
Gas cylinder.....	494	Lance poles for field telegraph lines.....	376
*Gas cylinder wagon.....	467	*Lance truck (1907 pattern).....	451
*Gas holder.....	487	*Lance truck, Signal Corps, parts for, model of 1909.....	508
*Generating sets, wireless telegraph, 1 and 3 kw.....	463	*Lanterns, acetylene, field.....	265
*Generating set, direct-coupled, for field wireless set, 1 kw., wagon.....	484	*Leatheroid.....	381
*Generator, alternating current.....	465	Lighting fixtures for switchboard rooms.....	393
Generator, motor for cable testing.....	196	Line construction material, standard.....	272
*Generator, motor, for cable testing on U. S. cable ship Joseph Henry.....	515	Line construction tools.....	360
Generator, motor, for charging telephone storage battery.....	285	Lineman's magneto testing set.....	306
*Generator, motor, ½ kw., for wireless telegraphy.....	488	M.	
*Generator set, motor, 3 kw., for signal corps testing laboratory.....	475	Machine, heavier-than-air flying.....	486
*Generator set, motor, special wireless telegraph, for Fort Levett, Me.....	460	Magneto testing set, lineman's.....	306
*Generator set, motor, 10 kw., for Fort Mills, P. I.....	511	Manhole cover.....	390
*Generator set, motor, for Fort Winfield Scott, Cal.....	512	*Map filing case, metal.....	502
Glass insulators.....	212	Materials, insulating and splicing.....	210
Guy stubs, anchor logs, poles, and wooden pole braces.....	180	Material, standard line construction.....	272
H.			
Handle, pay-out.....	413	*Mechanism, time interval.....	457
*Hand set bracket.....	209	Megaphones.....	136
Hand wire reel.....	323	Metal strip resistance.....	383
Heliograph, field.....	246	Milammeter, ammeter, millivoltmeter, voltammeter, voltmeter.....	191
Hook retaining spring for composite artillery type telephone.....	394	Mortar switch box.....	252
Hooks for time-interval clocks.....	326	Mortar switching panel.....	345
*Hydrogen plant.....	449	Motor generator and boosters, concrete bases for.....	402
I.			
*Indicator, wind velocity.....	355	Motor generator for cable testing.....	196
Instrument bag, inspector's.....	342	*Motor generator for cable testing on U. S. cable ship Joseph Henry.....	515
Instrument case, electrical.....	145	Motor generator for charging telephone storage battery.....	285
Instrument shelter.....	175	*Motor generator, ½ kw., for wireless telegraphy.....	488
*Instrument shop, Signal Corps, motor installation for operating machinery in.....	505	*Motor generator set, 3 kw., for signal corps testing laboratory.....	475
J.			
K.			
L.			
M.			
N.			
O.			
P.			
Q.			
R.			
S.			
T.			
U.			
V.			
W.			
X.			
Y.			
Z.			

Title.	Specifica- tion No.	Title.	Specifica- tion No.
P.			
*Pack set, field wireless.....	410	Splicing and insulating materials.....	210
Panel and bus bar condenser.....	436	Spool for field wire.....	472
Panel, charging, for telegraph storage battery.....	382	Spool for buzzer wire and buzzer wire.....	387
Panel, motor switching.....	345	Spring, hook retaining, for composite ar- tillery type telephone.....	394
*Panel, power, 1/2 kw., for tug wireless telegraph set.....	499	Stand, telautograph transmitter.....	167
Panel, special apron.....	395	Stand, thermometer.....	380
Panel, station switch.....	415	*Stations, visual signal, and combined wireless, for coast artillery posts.....	450
Pay-out handle.....	413	*Station power equipment, 3 kw.....	481
Pay-out reel.....	91	*Station power equipment, 1 kw. wire- less set.....	506
Pins, wooden, plugs, and brackets.....	178	*Station wireless equipment, 10 kw.....	479
Pipe fitter's chest.....	276	*Station wireless telegraph set, 5 kw.....	518
*Plant, hydrogen.....	449	*Storage battery, signal.....	362
Plugs, substitution.....	157	Storage battery, telegraph, charging panel for.....	382
Plugs, telautograph.....	106	Storage battery, telephone.....	280
Plugs, telephone.....	195	Storehouse, brick.....	369
Plugs, wooden, pins, and brackets.....	178	Storehouse, frame, standard, signal corps.....	260
Pocket kit, inspector's.....	186	Storekeeper's file cabinet.....	363
Pole changers.....	218	Strap keys.....	317
Pole line fittings.....	469	Strips, cable-forming.....	118
Poles, iron, iron cross-arms and fittings.....	226	Strip resistance, metal.....	383
Poles, guy stubs, anchor logs, and wooden pole braces.....	180	Strip, terminal.....	190
Poles, lance, for field telegraph lines.....	376	Substitution plug.....	157
Pole seat.....	377	Supplies, primary-battery.....	341
*Portable signal tower.....	426	*Supplies, standard, for fire-control con- struction.....	279
*Portable wireless receiving set, model 1909.....	517	Supplies, wiring.....	211
Portland cement.....	391	Supply cabinet.....	193
Posts, binding, and connectors.....	231	Switch, battery.....	156
Post testing voltmeter.....	444	Switch box, mortar.....	252
Post tool chest.....	350	Switches, knife.....	368
*Power equipment, high frequency, for Forts Leavenworth and Riley.....	514	Switches, telegraph.....	223
Primary batteries, methods of tests.....	94	*Switchboard, buzzer.....	364
Primary battery supplies.....	341	Switchboard, distributing.....	311
Psychrometer.....	137	Switchboard equipments, telephone.....	189
Push button.....	216	Switchboard, post telephone.....	277
R.		Switchboard, power.....	299
Reagent case for testing electrolyte.....	315	*Switchboard, power, for signal corps laboratory.....	477
*Receiving set, portable wireless, model 1909.....	517	Switchboard rooms, lighting fixtures for.....	393
Reel, breast.....	412	*Switchboard, special supply for Fort Wood, N. Y.....	434
*Reel cart (1908 pattern).....	443	Switchboard, telegraph.....	146
Reel, hand wire.....	323	Switchboard, telephone, common-bat- tery type.....	321
Reel, pay-out.....	91	Switchboard, telephone, fire command- er's, for Fort Monroe, Va.....	244
Reel, take-up.....	95	Switchboard, telephone, fire - control type.....	257
Relays, telegraph.....	217	Switchboard, telephone, portable.....	398
*Repeater set, telegraph.....	411	*Switchboard, telephone power, for Fort Monroe, Va.....	462
Resistance, metal strip.....	383	Switchboard for testing motor generator.....	158
Resistance wire.....	240	T.	
Resonator.....	230	Target ranges, outlet box for.....	471
Rheostats, telegraph.....	225	*Target range buzzer system equipment.....	496
Ring bolt and cable anchor.....	389	Telautograph plugs.....	106
Ring, insulating.....	242	Telautographs, remodeled.....	284
Rock drills.....	132	Telautograph, service.....	300
Ropes, grapnel, buoy ropes and couplings.....	405	Telautograph socket.....	111
Rubber insulating compound (30 per cent).....	430	Telautograph storage batteries.....	447
S.		*Telautograph storage batteries, booster charging set for.....	492
*Scale, atmosphere, 1909 type.....	513	Telautograph transmitter bracket.....	168
Seat, pole.....	377	Telautograph transmitter stand.....	167
Set, induction field telegraph.....	370	Telegraph keys.....	214
Sets, lineman's magneto testing.....	306	*Telegraph repeater set.....	411
*Set, telegraph repeater.....	411	Telegraph rheostats.....	225
Shelter, instrument.....	175	Telegraph set, induction field.....	370
*Shunts.....	378	Telegraph storage-battery cabinet.....	437
Signal apparatus, zone.....	302	Telegraph switches.....	223
*Signal chest, field artillery.....	490	Telegraph switchboard.....	146
Signals, firing.....	409	Telephone, artillery type, composite.....	401
*Signal stations, visual, and combined wireless, for coast artillery posts.....	450	Telephone, cable testing.....	171
Sleeving, lead.....	461	Telephone, common battery.....	320
Socket, telautograph.....	111	Telephone, cut-in.....	289
Sounders.....	222	Telephone, field.....	309
Specifications, standard.....	365		
Splicer's chest, cable.....	318		

Title.	Specifica- tion No.	Title.	Specifica- tion No.
Telephone, field, portable box for.....	188	*Watch, stop.....	308
*Telephone, field artillery type.....	453	Watch, stop, electrical device for operat- ing.....	78
Telephone, local battery.....	361	Wet batteries, open circuit.....	201
Telephone plug.....	195	*Wheel, signal corps wire cart, model 1909.....	507
Telephone storage battery.....	280	*Winch, captive balloon power.....	493
Telephoneswitchboard,commonbattery.....	321	Wind vane.....	256
Telephone switchboard equipments.....	189	Wind velocity indicator.....	355
Telephone switchboard, fire-control type.....	257	Wire, buzzer, and spool for buzzer wire.....	387
Telephone switchboard, portable.....	398	Wires and cable to be used in wireless telegraph work.....	416
Telephone switchboard, post.....	277	*Wire cart, signal corps, 1909.....	504
Telephone system, the composite, com- mon, and local battery.....	220	*Wire cart, signal corps, model 1909, wheel.....	507
*Tent for housing a dirigible balloon.....	497	Wire, copper line.....	79
Terminals, aerospace.....	348	Wire, deep-sea sounding.....	366
Terminal block, telephone.....	438	Wire, field, 19 strand.....	357
Terminal box, type D.....	441	Wire, field, 11 strand.....	408
Terminal boxes.....	269	Wire, fuse, fuses, and mountings.....	397
Terminal box for submarine cables.....	501	Wire, galvanized-iron.....	82
Terminal boxes, cable, weatherproof.....	245	Wire, hard drawn, weatherproof, copper.....	307
Terminal cabinet.....	435	Wire, inside twisted pair, pothead, and bridle.....	340
Terminals, cable, standard, submarine.....	386	Wireless work, wire and cable to be used in.....	416
Terminal strip.....	190	Wire, magnet.....	241
Testing battery, post.....	404	Wire (office), single inside.....	418
Testing battery, service.....	185	Wire, outside twisted pair, distributing.....	396
Testing set, lineman's magneto.....	306	Wire, pothead, inside twisted pair, and bridle.....	340
Test, tinning, for copper wire.....	403	Wire, resistance.....	240
Test, tinning, for iron or steel wire.....	414	Wire, silicon bronze.....	359
Thermometers, stand for.....	380	Wire, single inside (office).....	418
Thermometers, mercurial.....	144	Wire, single rubber-covered and braided.....	474
Time-interval bells.....	313	*Wire wagon, signal corps, model of 1909, limber.....	509
Time-interval bells, interrupter for.....	298	Wire, weatherproof, hard drawn, copper.....	307
Time-interval clock.....	305	Wire, zone signal.....	351
Time-interval clocks, hooks for.....	326	*Wireless generating sets, alternating current, 1 and 3 k. w.....	463
*Time-interval mechanism.....	457	*Wireless generating sets, 1 k. w., gaso- line engine for.....	468
Tinning test for copper wire.....	403	*Wireless, motor generator for, ½ k. w.....	488
Tinning test for iron or steel wire.....	414	*Wireless receiving set, portable, model of 1909.....	517
Tool bag, service.....	312	*Wireless set, pack, field.....	410
Tool chest, electrical engineer's.....	192	*Wireless set, station, 1 k. w.....	485
Tool chest, post.....	350	*Wireless set, station, 5 k. w.....	518
Tool chest, construction.....	400	*Wireless set, station, 10 k. w.....	479
Tool equipment, standard, for fire-con- trol construction.....	291	*Wireless set, station power equipment, 1 k. w.....	506
Tools, line construction.....	360	*Wireless set, tug, ½ k. w., power panel for.....	499
*Tower, signal, portable.....	426	*Wireless, special motor generator set for, at Fort Levett, Me.....	460
*Tower, steel, for wireless-telegraph sta- tion.....	510	*Wireless stations, and visual signal, combined, at coast artillery posts.....	450
*Transformer, testing.....	476	*Wireless telegraph equipment, 10 k. w., for Alaska.....	456
*Transformer, ½ kw., for wireless tele- graph.....	489	*Wireless telegraph equipment, marine, standard.....	454
*Transformer, 3 kw., for wireless work.....	482	*Wireless telegraph equipment for the U. S. cable ship Joseph Henry.....	516
*Transformer, 4 kw., for wireless work.....	385	*Wireless telegraph station, steel tower for.....	510
Transmitter bracket, telautograph.....	168	*Wireless transformer, ½ k. w.....	489
Transmitter stand, telautograph.....	167	*Wireless transformer, 3 k. w.....	482
Transmitter, telephone, test of.....	80	*Wireless transformer, 4 k. w.....	385
*Truck, lance (1907 pattern).....	451	Wiring supplies.....	211
*Truck, lance, signal corps, parts for, model of 1909.....	508	Wooden pole braces, anchor logs, poles, guy stubs.....	180
V.		Wooden cross-arms.....	177
Vane, wind.....	256	Wooden pins, plugs, and brackets.....	178
Vibratory bells and buzzers.....	274	Wood molding.....	294
*Visual signal stations, and combined wireless, for coast artillery posts.....	450	Z.	
Voltammeter, ammeter, millimeter, millivoltmeter, voltmeter.....	191	Zone signal apparatus.....	302
Voltmeter, ammeter, millimeter, mil- livoltmeter, voltmeter.....	191	Zone signal wire.....	351
Voltmeter, post testing.....	444		
W.			
*Wagon, balloon.....	498		
*Wagon, gas cylinder.....	467		
*Wagon, instrument (1907 pattern).....	452		
*Wagon, signal corps wire, model of 1909, limber.....	509		
Wagon, two-horse and four-horse or mule (Quartermaster Department specifica- tion).....	445		

148 GENERAL, PROPERTY, AND DISBURSING REGULATIONS.

624. BLANK FORMS.

Form No.		Form No.	
	DISBURSING.		TELEGRAPH—continued.
1	Estimate of Funds Required.	113	Statement of Guaranteed Messages Transferred, "Other lines," operator.
2	Advertisement for Proposals.	114	Check Report, Philippines.
3	Abstract of Requisitions (see Note 1).	115	Alaskan Tariff Sheet (see Note 1).
4	Request for Purchases (see Note 1).	116	Bill U. S. Military Telegraph Line against "Other lines," operator.
5	Abstract of Proposals.	117	Bill "Other lines," against U. S. Military Telegraph Lines, operator.
6	Abstract of Expenditures.	118	Monthly Statement of Amount Paid and Received for by Other Lines.
8	Abstract of Articles Purchased for Immediate Expenditure.	119	Monthly Statement of O. B. & W. D. Telegrams Transferred to Commercial Lines, operator.
9	Abstract of Articles Purchased and Paid for.	120	Statement of Postage and Special Delivery Charges Paid on Commercial Telegrams, operator.
10	Cash Account.	121	Invoices of "_____ line" Tolls Transferred, operator.
11	Account Current.	122	Receipt for "_____ line" Tolls (Original and Duplicate).
12	Voucher for Personal Services.	123a	Telegrams sent (small, ruled).
13	Contract (Articles of Agreement).	123b	Telegrams sent (small, unruled).
14	Request for Bills (card) (see Note 1).	123c	Telegrams sent (large, ruled).
15	"Follow up" for Bills (card) (see Note 1).	123d	Telegrams sent (large, unruled).
16	Reply to "Follow up" (card) (see Note 1).	123e	Telegrams sent (Transport Wireless).
19	Letter of Transmittal and Receipt for Check.	124	Check Ledger.
20	Notice of Award and Order Blank, Original Copy (see Note 1).	125a	Telegrams received (small, ruled).
21	Notice of Award and Order Blank, Duplicate Copy (see Note 1).	125b	Telegrams received (small, unruled).
22	Pay Roll for Personal Services.	125c	Telegrams received (large, ruled).
27	Shipper's Receipt.	125d	Telegrams received (large, unruled).
28	Voucher for Purchases and Services Other than Personal.	125e	Telegrams received (Transport Wireless).
29	Disbursing Officer's Property Invoice.	126	Check Error Sheet.
30	Authority for Expenditures (in four sheets) (see Note 1).	127	Error Card.
239	Abstract of Signal Corps Equipment.	128	Message Delivery Sheet.
240	Statement of Public Property Purchased.	129	Abstract of "This line" Receipts.
	PROPERTY.	130	Monthly Line Report.
31a	Return of Signal Corps Property (cover) (see Note 2).	132a	Statement of Remittances, "This line."
31b	Return of Signal Corps Property (Original) (white) (see Note 2).	132b	Statement of Remittances, "Other lines."
31b	Return of Signal Corps Property (Duplicate) (blue) (see Note 2).	133	Wrapper, Daily Record of Messages.
31c	Return of Signal Corps Property (back) (see Note 2).	134	Monthly Message Report.
55	Certificate of Expenditure.	135	Receiver's Record (large offices only).
56	Certificate of Property Lost or Destroyed.	136	Delivery Record (large offices only).
57	Estimate for Blank Forms.	137	Notice of Nondelivery (sending office).
59	Memorandum Receipt.	137a	Notice of Nondelivery (receiving office).
60	Militia Requisition Blanks.	137b	Notice of Nondelivery (messenger).
63	Requisition for Fire Control Material and Supplies.	138	Operator's Number Sheet.
64	Requisition for Signal Corps Supplies.	139	Insulation and Resistance Test Report.
66	Single Sheet Return of Property (see Note 2).	144	Message Envelopes.
67	Invoice or Receipt Combined (Property).	145	Application for Telegraph Money Order (Alaska only).
68	Invoice or Receipt Combined (Funds) (Original and Duplicate).	146	Applicant's Receipt (Alaska only).
	TELEGRAPH.	147	Notice to Payee (Alaska only).
102	Account Current, "Other line receipts," officer.	148	Telegraphic Transfer Certificate (Alaska only).
103	Account Current, "This line receipts," station.	149	Payee's Receipt for Transfer Certificate (Alaska only).
104	Account Current, "Other line receipts," station.	26	Report of Changes Civilian Employees.
105	Check Report (U. S. and Alaska).		MISCELLANEOUS.
106	Statement of Uncollected Messages, "This line," operator.	202	Charge Card (see Note 1).
107	Statement of Uncollected Messages, "Other lines," operator.	203	Leave Slips (see Note 1).
108	Transfer Statement of Uncollected Messages, "This line," operator.	204	Report of Inspection of Signal Corps Equipment.
109	Transfer Statement of Uncollected Messages, "Other lines," operator.	205	Clearance to Officers, Property (see Note 1).
110	Statement of Guaranteed Messages, "This line," operator.	206	Request for Personal Reports (see Note 1).
111	Statement of Guaranteed Messages, "Other lines," operator.	207	Enlistment Letter (Authority) (see Note 1).
112	Statement of Guaranteed Messages Transferred, "This line," operator.	208	Monthly Cable Test Sheet.
		209	Semiannual Report of Telephones, etc.
		210	Monthly Report of Employees at Large.
		211	Request for Transportation (printed letters to Q. M. G.) (see Note 1).
		212	Personal Reports, enlisted men detached service.
		213	Personal Reports, Officer's.
		214	Inventory of Signal Property Sold.

Blank forms—Continued.

Form No.		Form No.	
	MISCELLANEOUS—continued.		MISCELLANEOUS—continued.
215	Account of Sales of Signal Property.	233	Request for Receipts (see Note 1).
216	Certificate of Personal Illness (see Note 1).	242	Acknowledgment Receipt, Signal Corps Publications (see Note 1).
217	Field Message Blank (visual signaling) (in pads of 100).	243	Cable Card (Fire Control).
218	Request for Receipt W. D. Code (see Note 1).	261	Cable Record (Fire Control) in 4 sheets.
224	Record Slips, enlisted men (see Note 1).	262	Conductor Record (Fire Control) in 3 sheets.
225	Requisition Wrappers (see Note 1).	263	Storage Battery Inspection Report (Fire Control).
226	Requisition Slips, "File copy" (see Note 1).	264	Report of Progress of Fire Control Installation.
229	Clearance to Officers, Money (see Note 1).	273	Special Requisition for Fire Control Construction Material.
230	Statement of Differences (see Note 1).		
231	Request for Property Return (see Note 1).		
232	Credit Slip, Property (see Note 1).		

NOTE 1.—Used in the Office of the Chief Signal Officer of the Army only.

NOTE 2.—Commencing with the period ending June 30, 1907, signal corps property will be accounted for on Form No. 31, except when the return does not exceed twenty-five items, when Form No. 66 will be used. The use of all other forms of property returns and abstracts will be discontinued. Requisitions should be forwarded to the property officer, Fort Wood, New York Harbor, for Form No. 31 in quantities as follows:

31^a and 31^c, one copy for each return.

31^b (original) white, one copy for each item.

31^b (duplicate) blue, one copy for each item.

INDEX.

	Paragraph.
Abstract of articles purchased.....	124
Accounts:	
Adjusting of.....	342
Inspection of.....	151
Omissions or errors.....	342
Accounts covering traveling expenses, civilian employees.....	70, 71
Accounts current:	
Cash account forwarded.....	268
Checks drawn by disbursing officers.....	267
Disallowance of accounts.....	264, 265
When rendered.....	261
Administrative officers.....	272
Address of officers on leave of absence.....	5
Alaskan telegraph system requisitions.....	408
Allotments of funds.....	132-134
Allowance of dry cells.....	436, 556
American Bell rented telephones.....	355-360, 558
Animals, public.....	10
Annual authorities for expenditures.....	132-134
Annunciator buzzer systems for target ranges.....	569-571
Appropriations:	
Annual estimate of expenses.....	130
Authority for expenditure from.....	132-139
Disposition of balances.....	128
Payments after close of fiscal year.....	129
Restrictions and limitations defined.....	127
Army Regulations:	
Appropriations.....	126
Closing money accountability.....	161
Contracts.....	163
Defects or shortages in property.....	330-332
Failure to receipt for property.....	329
Marking of property.....	306
Open-market purchases.....	180-191
Proposals.....	175
Quarters of fiscal year designated.....	125
Supplies transferred to another bureau or department.....	280
Telegraph offices.....	304
Transfer of property from one bureau to another.....	278
Unserviceable property.....	343-346
Articles sent by mail.....	438
Auditor for War Department.....	129, 165
Authorities for expenditures.....	132-139

	Paragraph.
Balloon company.....	108
Balloons.....	487-491
Base line company.....	100, 103, 106, 112
Bicycles, requisitions for.....	394, 446
Bidders, commercial standing of.....	178
Bills for purchases.....	205
Bills for services.....	205, 209
Blank forms.....	91, 124, 309, 416, 449, 624
Blanks, official telegraph.....	458
Bombs, signal.....	485
Bonds.....	169, 170, 173
Bondsmen.....	173
Boxing and packing.....	203
Breast reels and payout handles.....	456
Buzzer systems for target ranges.....	569-571
Buzzers, field and cavalry.....	10
Cables:	
Cable gear and machinery.....	605
Ends.....	369
Establishment of additional offices.....	593
Faults.....	591
Inspection.....	594
Instruments.....	606
List of cables laid.....	596
Official numbers.....	595
Reels.....	590
Repairs.....	591
Report of cable tags.....	590
Report of injury to cables.....	592
Transferring cable from one reel to another.....	590
Types.....	599-604
Warning to vessels concerning cable locations.....	597
Cable splicers, tool chests.....	617
Cameras.....	492
Cash account.....	268-271
Cash books.....	260
Cash payments.....	237, 238
Ceremonies.....	35
Certificate of deposit.....	153
Certificate of expenditure of property.....	349, 362
Changes of station of soldiers on furlough.....	31, 32
Charges, freight, express, postage.....	204
Check books:	
Record of.....	246
Responsibility for.....	247
Checks.....	148, 152, 157, 158, 159, 245-259
Chief signal officers of departments:	
Accounts current pertaining to telegraph receipts.....	45, 46, 48
Annual estimates.....	55, 56, 130
Annual reports.....	41
Appointment of storekeepers.....	50
Estimates for funds.....	56, 140-147
Charge of military telegraph lines.....	45-47

Chief signal officers of departments—Continued.	Paragraph.
Inspections of telephone systems.....	52, 53
Monthly reports.....	42-44
Recommendations on requisitions.....	54
Report of efficiency of civilian employees.....	51, 65
Report on switchboard operators.....	52
Reports on telephone systems.....	53
Requisitions for office and desk furniture.....	447
Responsibility for telegraph receipts.....	47
Transfer of funds.....	148
Unserviceable property.....	345, 346
Civilian employees:	
Appointments of noneducational employees.....	60
Civil-service rules.....	63
Electrical engineers and assistants.....	74-91, 397, 398
Employments, authority for.....	64
General provisions.....	57
Inspection of stock at coast artillery storehouses.....	422-424
Medical attendance.....	87
Monthly reports of changes.....	62
Purchase of clothing, fuel, and subsistence supplies.....	86
Report of change of station.....	62
Semiannual reports of efficiency.....	65
Temporary employments.....	58, 59, 61
Transportation of instrument cases, etc.....	73
Traveling expenses.....	66-73
Commercial telephone service at posts.....	551-554
Commissioned officers. <i>See Officers.</i>	
Company equipment.....	106, 110-112
Company organization, provisional.....	99-112
Construction materials.....	609
Construction tool chest.....	616
Construction tools.....	612
Contracts.....	162-170, 174, 202, 203
Copper wire.....	610
Copies of all orders issued by signal officers.....	12
Correspondence concerning requisitions.....	392-395
Crossarms.....	609
Delivery of material.....	197
Depots, supply.....	130, 142
Descriptive lists.....	26, 461
Detachments, companies, etc.....	33-35
Dimensions of poles.....	609
Disbursing officers.....	123, 124
Accounts current.....	261-267
Advertisements for proposals.....	175-179
Annual estimates.....	130
Anticipating receipt of funds.....	155
Appropriations defined.....	127
Articles in possession of.....	207
Authorities for expenditure.....	132-139
Balances to be reported.....	150-152
Bills for purchase.....	205

Disbursing officers—Continued.	Paragraph.
Bills for services.....	205, 209
Bonds.....	169, 170, 173
Cancellation of vouchers.....	236
Cash account.....	268-271
Cash books.....	260
Cash payments.....	237, 238
Ceasing to act.....	158
Certificate of deposit.....	153
Change of depositaries.....	156
Checks.....	148, 152, 157-159, 245-259
Contracts.....	162-170, 173-175
Death, resignation, or removal.....	159
Deposits of funds.....	153, 154, 160
Disbursements by two or more officers.....	149
Disposition of balances.....	128
Emergency purchases.....	134
Estimates for funds.....	140-147
Evidence of delivery.....	198-201
Inspection of accounts.....	151, 161
Inspection of material.....	192-197
List of forms required.....	124
Open-market purchases.....	180-191
Payments after close of fiscal year.....	129
Payments for rents.....	171
Pay rolls.....	239-244
Preparation of vouchers.....	209-238
Proceeds of sales.....	273-277
Property purchases.....	208
Purchases and payments.....	162
Rent for rooms.....	172
Source of funds.....	153
To be advised of remittances.....	126
Transfer of funds.....	148
Unexpended balances.....	128, 129
District artillery engineers.....	336, 341
Duties of the Signal Corps.....	1, 28, 34
Electrical engineers and assistants.....	74-83
Classes of work.....	74-76, 85
Clothing, fuel, and medical attendance.....	86, 87
Duties.....	74-76, 85
Improper orders.....	89
Personal reports.....	77-79, 91
Property issued to.....	81, 83
Requisitions.....	397, 398
Subsistence on government vessels.....	90
Telegrams.....	88
Tool chest.....	615
Tools and supplies issued to.....	83, 84
When acting as overseer.....	85
Electrical engineer's tool chest.....	615
Electrical installations:	
Cable records.....	526
Commercial telephone service at posts.....	551-554

Electrical installations—Continued.	Paragraph.
Fire control	520, 521
Inspection of telephone systems	539-547
Post telephone systems	530-560
Report of progress	525
Switchboard operators	548-550
Transfer of fire-control installations to Coast Artillery	527, 528
Electrical-instrument case	619
Electrical instruments	524
Engineering circulars	522, 523
Enlisted men :	
At line posts	33, 34
Change of station when on furlough	31, 32
Descriptive lists	26, 30
Duties of	28
Examinations for promotion	37-40
Extra-duty pay	25
Furloughs	29-32
Master signal electricians	21-23
Muster rolls	13
On detached service, Departments of the East or Gulf	16
On detached service, Departments of the Lakes, Missouri, Dakota, Colorado, and Texas	17
On detached service, Department of California	18
On detached service, Department of the Columbia	19
Personal reports	27
Promotion	36-40
Property accountability	336, 347, 348, 371
Report in case of death	14
Report on discharge of noncommissioned officers	15
Short-term men for foreign service	24
To assist post signal officers	28
Warrants of noncommissioned officers	7, 20
Equipment for companies	106, 110-112
Equipment issued to line organizations	478-480
Establishment of new cable offices	593
Estimates for funds from department chief signal officers	55, 56
Estimates for appropriations	130, 131
Estimates for funds	140-148
Evidence of delivery	198-201
Examinations for promotion of enlisted men	36-40
Expendable property	362-371
Expenditures of funds	132-139
Extra-duty pay, enlisted men	25
Extra-duty pay for switchboard operators	52
Field artillery fire-control equipment	480
Field company	100, 101, 110
Field glasses	345, 346, 479-482
Fire control :	
Cable record	526
Concrete work	529
Engineering circulars	522, 523
For field artillery	480
Inspection of coast artillery installations	546, 547

	Paragraph.
Fire control—Continued.	
Installations.....	520, 521
Report of progress.....	525
Requisitions.....	396
Telephone systems at coast artillery posts.....	535-538
Transfer of installations to coast artillery.....	527, 528
Foreign service, enlisted men.....	6, 24
Freight charges.....	204
Fuel for civilian employees.....	86
Funds:	
Allotments of.....	132-134
Authorities for expenditure of.....	144
Date of forwarding estimate of.....	146, 147
Estimates for.....	140-147
On outstanding requisitions.....	155
Source of.....	153
Transfer of.....	148
Furloughs.....	29-32
General depots of supply:	
Authority for.....	400
Card record of property in stock.....	403
Inspection of delicate apparatus.....	417
Issue of stock from.....	402, 411, 413
Issue of blank forms.....	416
Issues to militia.....	413
Packing and shipping property.....	429-443
Prohibition of certain issues.....	402
Relation to post commanders.....	415
Report of unserviceable field glasses.....	412
Requisitions for Alaskan telegraph system.....	408
Requisitions from the Philippines Division.....	407
Requisitions for depot stock.....	406, 409
Shipping directions to depots.....	404, 410, 414
"War Reserve" stock at depots.....	405
Glasses, field.....	345, 346, 479-482
Guidons for signal troops.....	465
Holidays, payments for.....	231
Insignia of Signal Corps.....	465
Inspections:	
Accounts of contractor certified.....	196
Delicate apparatus.....	417
Of cables.....	594
Of stock at coast artillery storehouses.....	422-424
Post telephone systems.....	49, 53
Raw material.....	192
Unserviceable property at colleges.....	313
Inspectors, articles not submitted to.....	345, 352
Instruments, cable.....	606
Insulating and splicing material.....	613
Insulating compounds.....	614
Invoices.....	320, 340, 353
Leases.....	171
Leave of absence.....	5

	Paragraph.
Line construction materials.....	609
Line construction tools.....	612
Machinery, cable.....	605
Manuals.....	23, 459-462
Manuals for military organizations.....	450
Marking hammers.....	608
Marking supplies.....	202
Master signal electricians:	
Books provided.....	23
Examination for promotion to master signal electrician.....	36-40
Not members post noncommissioned staff.....	22
Title in reports and conversation.....	21
Medical attendance, civilian employees.....	87
Military schools, issue of signal supplies.....	452, 453
Money:	
Deposited on account of articles lost.....	351
Value of articles lost.....	349
Mortars.....	457
Muster rolls.....	13
Noncommissioned officers, promotion of.....	36-40
Numbers, serial.....	319
Office furniture.....	447
Officers:	
Address while on leave.....	5
College details.....	313
Copies of orders issued by signal officers.....	12
Expenditures in emergency.....	134
In charge of telegraph lines.....	334
In charge of property depots.....	412, 413, 415, 417
Incurring expenses.....	133
Inspections.....	192-197
Leave, report of, to Chief Signal Officer of the Army.....	5
Number of.....	3
Personal reports.....	4
Purchase orders.....	139
Recommendations for foreign service of enlisted men.....	6
Report of equipment of field companies.....	10
Reports by commanders of field companies.....	9
Reports by company commanders on strength of companies.....	8
Reports concerning noncommissioned officers to be discharged.....	7
Serving within limits of the United States.....	350
Telegraphic address of senior officer at each station.....	11
Open-market purchases.....	180-191
Amount less than \$500.....	180
Exceeding \$100.....	184
Reasons for making.....	190
Organizations for field service:	
Balloon company.....	108
Base line company.....	103, 107
Company equipment.....	106, 110
Designations of provisional companies.....	100
Equipment of companies.....	110-112
Field company.....	101, 105

Organizations for field service—Continued.	Paragraph.
Provisional company organization	99
Senior signal officer in the field.....	97
Signal troops serving with a division.....	98
Telegraph company	102
Organized militia, issues to	413, 466-473
Packing and shipping property.....	429-443
Packing boxes	431
Payout handles.....	456
Pay rolls:	
Blank forms used.....	239
Payment by check	244
Receipts taken.....	243
Signatures.....	241, 242
Penalty envelopes.....	439
Personal reports:	
Civilian employees.....	91
Enlisted men	27
Officers.....	4
Philippine Islands:	
Chief signal officer	44
Requisitions.....	390-399, 407, 409
Returns.....	353, 354
Philippine returns:	
Accountability for	354
Property shipped from the United States.....	353
Property transferred.....	353
Rendered by civilian employees and enlisted men.....	353
Photography	492-495
Pipe fitter's chest.....	618
Poles	609
Post artillery engineers	336
Post telephone systems:	
Commercial telephone service.....	551-554
For target ranges.....	566-569
Inspection of	539-545
Switchboard operators	548-550
Systems at coast artillery posts.....	535-538
Systems at interior posts.....	530-534, 539-545
Post tool chest.....	620
Proceeds of sales	273-277
Promotion of noncommissioned officers	36-40
Property:	
Accountability by enlisted men.....	336, 347, 348, 353, 371
At stations discontinued.....	305
At telegraph offices	304
Blank forms.....	302, 311
Certificate of expenditure.....	349, 362-371
Damaged in transit	344
Designation on accounts.....	303, 318, 333, 334
District artillery engineers	336
Dropped from returns.....	320
Examination of return	338, 342
Expendable	362-371

Property—Continued.	Paragraph.
Failure to account for.....	312
Failure to receipt for.....	329
Final returns on leaving service.....	335
Found at post or depot.....	332
General regulations.....	300
Invoices.....	319, 320, 323, 327, 333, 340, 353
Letters of transmittal.....	337
Lost or stolen.....	347, 349, 351
Manuals.....	301
Marking of.....	306
Military schools.....	313
Missing vouchers.....	325
Money value of articles lost.....	349
Perversion for private use.....	317
Philippine returns.....	353
Post artillery engineers.....	336
Post signal officers.....	335, 336
Receipts for.....	320, 321
Received at depot.....	310
Received by purchase.....	208, 310
Received by district artillery engineers.....	341
Received from interior posts.....	310
Received without invoices.....	327, 332
Repair of unserviceable.....	314, 315
Retained return.....	324
Returns.....	307-312, 320-332, 341, 353, 354
Rifle range equipment from coast artillery posts.....	310
Sale of unserviceable.....	273-277
Serial numbers.....	319
Submitted to inspector.....	352
Submitted to surveying officer.....	343, 348, 351
Transfer between bureaus.....	278
Transfer of.....	316, 323
Typewriters.....	361
Unserviceable.....	273-277, 313-315, 339, 345, 346, 348
Verification of.....	326, 330, 331, 332, 333, 348
Visual signaling outfits.....	310, 346
Voucher numbers.....	320, 321
Property depots; report of civilian employees.....	65
Proposals.....	162, 175-179, 181, 190
Purchases:	
Accounted for.....	208
Methods of making.....	162
Purchases and payments.....	162, 163, 175-177, 207, 208
Push buttons, door bells, etc.....	444
Raw material.....	192
Recommendations of enlisted men for foreign service.....	6
Reel carts. (<i>See Vehicles.</i>).....	
Renewals for type V cells.....	448
Rents, payments for.....	171
Repairs to telephones.....	557
Report of injury to cable.....	592

Reports :	Paragraph.
Annual reports of department chief signal officers.....	41
By officers in charge of property depots.....	412, 413
Concerning noncommissioned officers about to be discharged.....	7
Monthly reports, chief signal officer, Department Columbia.....	43
Monthly reports, chief signal officer, Philippines Division.....	44
Monthly reports of department chief signal officers.....	42-44
Monthly report of strength of companies.....	8
Of cable tags issued.....	590
Of equipment of field company.....	10, 97
Of officers in charge of military telegraph lines.....	45-48
Of strength and operations of field companies.....	9
Of progress on electrical installations.....	525
Semiannual report on efficiency, civilian employees.....	51, 65
Requisitions :	
Action on.....	391
Correspondence relative to.....	392-395
Electrical engineers and assistants.....	397, 398
For Alaskan telegraph system.....	408
For artillery districts.....	399
For bicycles.....	394
For fire-control materials.....	396
For generators, motors, boosters, etc.....	394
For gravity battery supplies.....	448
For supplies from posts.....	393
For telegraph offices.....	455
For typewriters.....	394
From property depots.....	406-409
From storekeepers.....	397, 420
Philippine requisitions.....	390, 394, 407, 409
Renewals for type V cells.....	448
Stationery.....	454
To be scrutinized by department chief signal officers.....	54
Returns :	
Examination of.....	353
Failure to render.....	312
Rifle-range equipment.....	566-571
Rockets and bombs.....	485, 486
Sale of property.....	273-277
Serial numbers.....	319
Service tool bag.....	622
Settlements for property transferred between bureaus.....	278, 280
Shipment of electrical instruments.....	434, 435, 442
Shipment of property.....	429-443
Shipment of short pieces of cable.....	440
Shipment of telephones.....	441
"Short-term" enlisted men.....	24
Special vehicles. (See Vehicles.)	
Specifications.....	623
Standard supplies :	
Cable splicer's tool chest.....	617
Construction tool chest.....	616
Copper line wire.....	610
Dimensions of poles.....	609

	Paragraph.
Standard supplies—Continued.	
Electrical engineer's tool chest.....	615
Electrical-instrument case.....	619
Inspector's pocket kit.....	622
Insulating and splicing materials.....	613
Insulating compounds.....	614
Line-construction supplies.....	609
Line-construction tools.....	612
Pipe fitter's chest.....	618
Post tool chest.....	620
Service tool bag.....	621
Wire.....	610, 611
Stationery.....	454
Storehouses at coast artillery posts.....	418
Storekeepers.....	50, 419-428
Storekeepers' requisitions.....	397
Strength of Signal Corps.....	3
Subsistence of civilian employees.....	86, 90
Supplies, marking of.....	202
Surveying officer.....	339, 343
Survey of damaged property.....	343, 349, 351
Switchboard operators.....	52, 548-550
Switchboards.....	559
Target-range equipment.....	566-571
Telegraph blanks, official.....	458
Telegraph code, War Department.....	474-477
Telegraph company.....	100, 102, 106, 111
Telegraph instruments for line troops.....	445
Telegraph lines.....	334, 336
Telegraph office supplies.....	455
Telephones:	
Allowance of dry cells.....	436, 556
American Bell.....	355-360, 558
Commercial telephone service at posts.....	551-554
Concrete work.....	529
Packing of.....	441
Receiver diaphragms.....	560
Repairs to.....	557
Switchboards.....	559
Systems. (<i>See</i> Post telephone systems.)	
Systems for target ranges.....	566-571
To be removed from target ranges.....	567
Types of.....	555
Unserviceable.....	345, 346
Telephone service for a division in the field.....	109
Telephone systems. (<i>See</i> Post telephone systems.)	
Telescopes, unserviceable.....	346
Testing sets and cells.....	451
Time service, by whom provided.....	2
Tool chests:	
Cable splicers.....	617
Construction.....	616
Electrical engineers.....	615

	Paragraph.
Tool chests—Continued.	
Electrical instrument	619
Pipe fitters.....	618
Post	620
Service tool bag.....	621
Transfer of fire-control installations to coast artillery.....	527, 528
Transfer of property.....	316, 323
Transportation, Signal Corps.....	101-104
Traveling expenses	66-73
Trunk line service (telephone).....	551-554
Types of cables.....	597-604
Typewriters, requisitions for.....	394
Typewriters, unserviceable.....	361
Unserviceable property.....	414
Vehicles:	
Drivers for.....	104
How painted.....	463
Insignia on	463
Serial numbers of.....	464
Very pistols.....	485
Visual signal equipment.....	479, 483, 484-486
Visual signaling outfits.....	479
Vouchers	205-236
Accounts with other departments.....	278-280
Bills for purchases and services.....	205
Blank forms.....	205
Cancellation of.....	236
Certificate of services rendered.....	217
Delivery under verbal instructions.....	214
For services other than personal.....	212, 225-228
Order and requisition numbers.....	213
Preparation of.....	207
Purchases and payments.....	208
War Department telegraph codes.....	474-477
Warning to vessels concerning cable locations.....	597
Wire	610
Wireless telegraphy	561-565
Wireless detectors.....	565
Wireless pack sets.....	562
Wireless stations.....	564
Wireless wagon sets.....	563
Serial numbers.....	10

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