

HANDBOOK OF THE
TWO-TON TRUCK CHASSIS
NASH MODEL
4017-A AND 4017-L

(SEVENTY-FOUR - PLATES)

JULY 3, 1918



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WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ORDNANCE,
WASHINGTON, July 3, 1918.

This manual is published for the information and government of the Regular Army, National Guard, and National Army of the United States.

By order of the Secretary of War:

C. C. WILLIAMS,
Brig. Gen., Ordnance, N. A., Acting Chief of Ordnance.

DEC 13 1918
g. Prof. S. C. Shuy...

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**SPECIFICATIONS, TECHNICAL DATA, DIMENSIONAL INFORMATION,
PARTS NUMBERS AND DESIGNATIONS, CARE
AND REPAIR OF**

TWO-TON CHASSIS NASH MODELS 4017-A AND 4017-L.

These chassis models are alike except as follows:

Model 4017-A has electric generator and storage battery lighting.

Electric searchlight and electric side and tail lamps.

Magneto without impulse starter.

Model 4017-L has acetylene generator and searchlight. Oil side and tail lamps.

Speedometer.

Magneto fitted with an impulse starter.

Other than changes mentioned, the specifications for both models are identical. Where information or data applies only to one model it is so stated in the proper place.

HANDBOOK OF THE TWO-TON TRUCK CHASSIS

NASH MODEL 4017-A AND 4017-L

CHAPTER I.

WEIGHTS AND OUTLINE SPECIFICATIONS.

Rated load capacity.....	pounds..	4,000.00
Body weight allowance.....	do....	1,200.00
Weight of chassis only.....	do....	6,700.00
Maximum gross weight (including chassis, body and pay load)	pounds..	11,900.00
Percentage of chassis weight on front tires (without load).....		66.66
Percentage of chassis on rear tires (without load).....		33.33
Percentage of load weight on front tires.....		30.00
Percentage of load weight on rear tires.....		70.00
Percentage of gross weight on front tires.....		45.00
Percentage of gross weight on rear tires.....		55.00
Overall length of chassis (without body).....	inches..	202.50
Overall width of chassis (at widest part).....	do....	78.50
Chassis wheelbase	do....	124.00
Length of frame back of driver's seat.....	do....	117.13
Width of frame (outside dimensions).....	do....	38.13
Height of rear end of frame from ground loaded.....	do....	35.50
Height of rear end of frame from ground unloaded.....	do....	38.50
Diameter of turning circle.....	feet..	50.00
Tread of front wheels.....	inches..	60.50
Tread of rear wheels.....	do....	60.50
Road clearance under front axle (lowest point).....	do....	14.75
Road clearance under rear axle (lowest point).....	do....	14.75

ENGINE.—Four-cylinder, 4-cycle; L-head type, cylinders cast en bloc, with integral head. Bore 4.25 inches, stroke 5.5 inches. Horsepower 28.9, N. A. C. C. rating.

COOLING.—Water, centrifugal pump circulation.

LUBRICATION.—Force feed, using drilled crankshaft; spray to cylinders.

RADIATOR.—Tubular type with fins, removable cast iron headers.

IGNITION.—Eisemann high-tension variable spark magneto, type G4-II Edition. Model 4017-L fitted with an impulse starter.

CARBURETOR.—Type M-2, 1.25-inch Stromberg, plain-tube type, with hot-air connection.

FUEL FEED.—From main tank of 27 gallons capacity to auxiliary tank, holding two quarts, from latter to carburetor by gravity.

GOVERNOR.—Fly ball type, drives through flexible shaft from camshaft and is mounted between carburetor and short external inlet manifold.

CLUTCH.—Single-plate, dry-disc, fitted with clutch brake.

TRANSMISSION.—Selective, sliding-jaw clutch type, combined with silent chain reduction. Four speeds forward—one reverse.

DRIVE.—Drive from transmission through two propeller shafts fitted with Spicer universal joints, then to bevel ring gear in axles and through axles to internal gearing in four wheels. Torque absorbed through springs. Full Hotchkiss drive.

FRAME.—Channel section pressed steel. Six cross members. Five standard Ordnance transoms. Ordnance pintle at rear, towing hooks in front.

SPRINGS.—Front and rear semi-elliptic with auxiliary coil springs.

AXLES.—Front and rear identical. Bevel pinion and gear with M. & S. locking type differential at propeller shaft and internal gear at wheels.

BRAKES.—Two sets of brakes. Pedal-operated service brake of internal expanding type in wheel brake drums. Hand-lever operated emergency brake of external contracting type on transmission; hand-brake applies foot brakes also.

WHEELS.—Cast-steel disc wheels, all four identical. Wheels have brake drums cast integral. Wheels fitted with taper roller bearings.

TIRES.—36 inches x 6 inches, solid tires, pressed-on type.

STEERING.—All four wheels used for steering. Vertical steering column. Steering gear of screw and split nut type. Hardwood steering wheel.

CONTROLS.—Left hand steer. Change gear and emergency brake levers in front of driver's seat to right of steering column. Spark and throttle lever operated on sector clamped below steering wheel on front of steering column. Ignition ground wire switch on left side dash. Carburetor choke control on steering column. Clutch and service brake pedals left and right respectively. Accelerator pedal to left of change gear lever.

MAIN GASOLINE TANK.—Galvanized steel tank, 27-gallon capacity.

AUXILIARY GASOLINE TANK.—Steel tank, two quarts capacity.

EQUIPMENT.—Pyrene fire extinguisher; non-skid chains, complete in chain box; eyes for non-skid chains; hand-operated horn; odometer; hand flashlight; *Model 4017-A, fitted with speedometer*; electric searchlight, electric side lamps, electric taillamp, Bijur generator, storage battery. *Model 4017-L, acetylene searchlight, acetylene generator, oil side lamps, oil tail lamp and speedometer.*

BRIEF DESCRIPTION NASH MODELS 4017-A AND 4017-L.

With the exception of a few details of equipment these models are identical. The Model 4017-L uses an impulse starting device on the

nut or broken bolt slipped into the transmission may completely ruin a truck or cause loss of life, and these things should be watched carefully.

After the inspection of the shipment, so far as completeness goes, see that the drain cocks under radiator and water pump and the plug in cylinder water jacket are closed, and that all hose connections are tight. The radiator should then be filled with clean water to within two inches of the bottom of filler neck on radiator and all connections and joints tested. Care should be exercised in selecting water, get soft water, if it is procurable. The radiator and cooling system holds about seven gallons of water.

The crankcase of the engine should be examined and the specified grade of heavy oil put in so that the gauge on the left side of the engine indicates the proper level. The grease cups on the water pump glands should be turned down. Note if there is a water leak at that point. The spark plugs should be removed, and with a squirt can, about a tablespoonful of motor oil should be squirted on to the top of each piston, and the engine revolved by hand a number of times after replacing plugs, so that the oil will lubricate the cylinder walls. While turning the engine over notice whether there are any compression leaks around the cylinder head pet cocks, and have them closed.

Dampness and moisture may get to the working parts, and on arrival they may be rusted badly, grease may be lost out of important places, and equipment stolen or lost. In the former case the engine should be handled very carefully, because the pistons might have rusted fast or valves seized in the guides. Kerosene applied with an oil can to the tight parts will loosen them. A little kerosene in the clutch will make it function better, and prevent grabbing in case it has rusted on the plate. After the engine has been cranked freely by hand the gasoline tank lever should be turned to main supply with the long end of the lever down inclined at an angle of about forty-five degrees to the left. Fill gasoline tank with clean gasoline, being sure funnel and receptacle gasoline is carried in is thoroughly grounded on tank or explosion may occur, and after a sufficient quantity has been put in, unscrew the end of the gasoline pipe near carburetor and drain out a quart or so to clear line and tank of dirt before it reaches the carburetor.

Open the plug on the side of the transmission case and note oil level. If oil does not flow, fill to proper height with grade specified in lubricating instructions. Note oil level of differential housings and fill, if necessary, with specified grade.

A careful inspection should be made of the amount of grease in the wheels and on spindle bearings.

The pinion shaft roller bearings should be looked at in case they may have rusted or broken. If one of these bearings fail, serious damage might result.

After all spring bolts are oiled and grease cups have been turned down

TO START TRUCK.

Release hand brake.
 Disengage clutch.
 Engage low speed gear.
 Increase engine speed slightly.
 Slowly engage clutch.

GEAR CHANGES.

As truck gains momentum, disengage clutch, close throttle, shift to intermediate speed, open throttle slightly and engage clutch. When momentum is gained again disengage clutch, close throttle and engage next higher gear. Repeat operation until fourth speed is reached, after which truck speed can be controlled by accelerator (or hand lever).

GEAR CHANGES TO LOWER SPEEDS.

In changing to lower speed, necessitated by heavy loads or steep grades, disengage clutch, accelerate engine slightly, instantly shift to lower gear, engage clutch and open throttle to gain speed.

TO REVERSE TRUCK.

Reduce engine speed, disengage clutch, apply foot brake. When truck has stopped, engage reverse gear, release brake and engage clutch. Never engage reverse gear when truck is moving forward.

TO STOP TRUCK.

Reduce engine speed, disengage clutch, apply brake, place gear shift lever in neutral, engage clutch, set emergency brake.

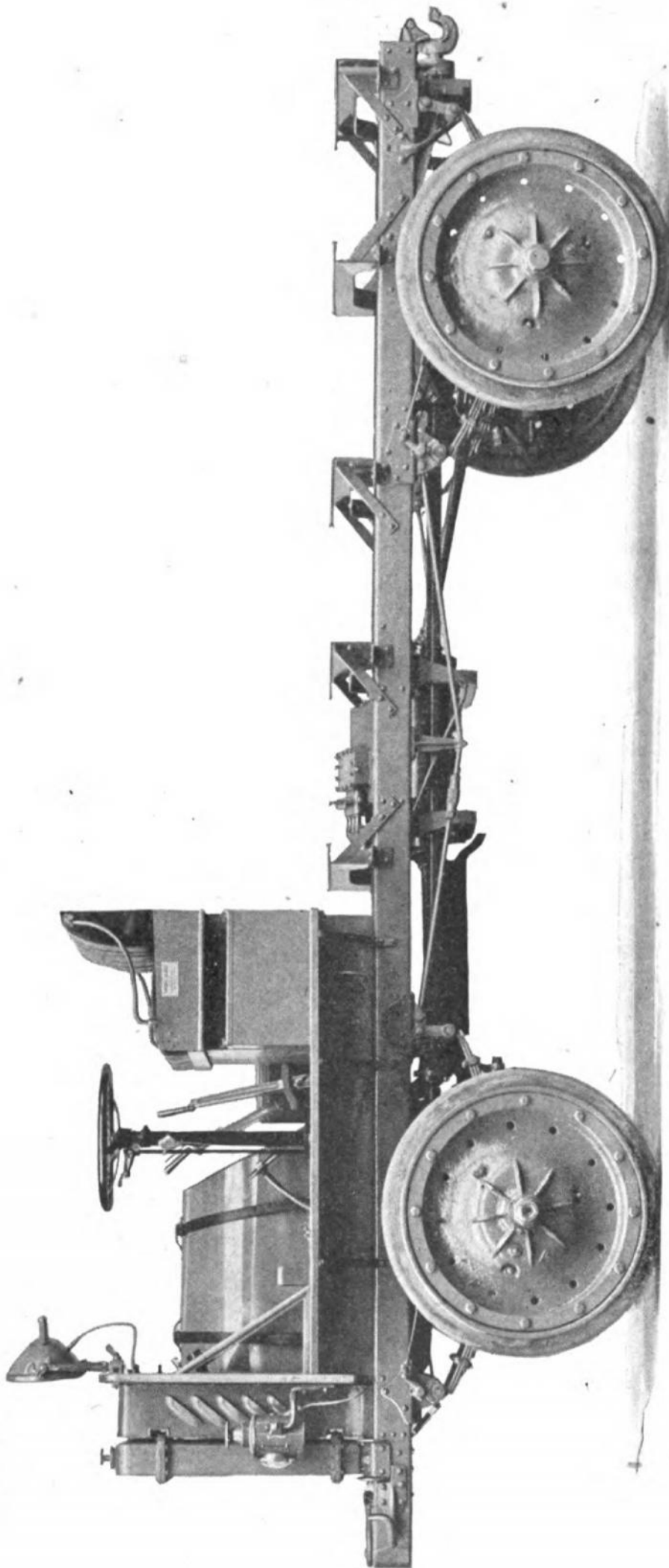
TO STOP ENGINE.

Turn ignition switch to "OFF" position. Advance gas lever slightly to supply initial charge to assist for next start. In winter, pull up air choke when stopping.

DETAIL OPERATING INSTRUCTIONS.**PREPARATION OF TRUCK FOR SERVICE.****UNLOADING FROM SHIP OR CAR.**

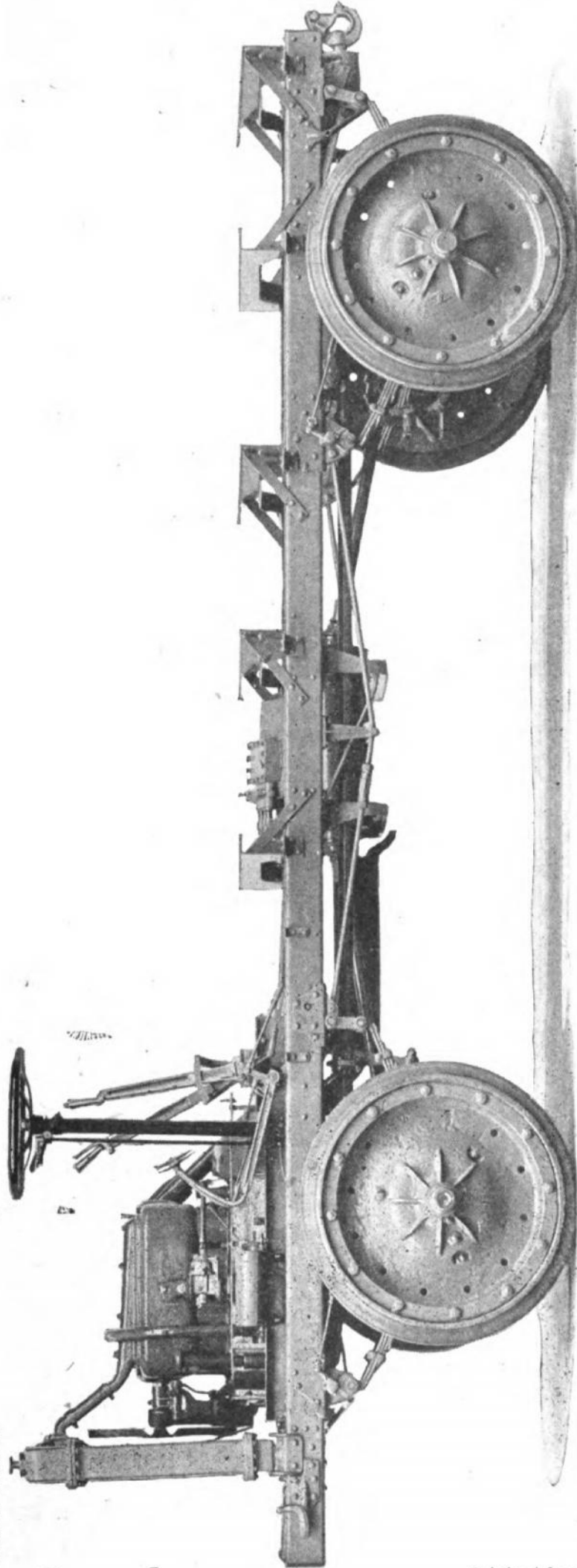
Great care should be exercised in unloading the truck, as carelessness may cause serious loss later. A thorough inspection should be made of the equipment sheet, comparing it with the equipment received. The box of tools and parts should be opened and checked over before being receipted for, and any movable parts that might be stolen or lost from the truck should be checked up. All seals on governor, transmission, differential and other places should be intact and if any have been tampered with make a careful inspection of the place where the seal belonged and note whether any damage might have been done to important parts. A

Plate No. 3



LEFT SIDE OF CHASSIS WITH DRIVER'S SEAT AND ENGINE HOOD IN PLACE

Plate No. 4



LEFT SIDE OF CHASSIS, ENGINE UNCOVERED AND MINUS DRIVER'S SEAT, SHOWING FIVE STANDARD ORDNANCE TRANSOMS MOUNTED ON FRAME.

nut or broken bolt slipped into the transmission may completely ruin a truck or cause loss of life, and these things should be watched carefully.

After the inspection of the shipment, so far as completeness goes, see that the drain cocks under radiator and water pump and the plug in cylinder water jacket are closed, and that all hose connections are tight. The radiator should then be filled with clean water to within two inches of the bottom of filler neck on radiator and all connections and joints tested. Care should be exercised in selecting water, get soft water, if it is procurable. The radiator and cooling system holds about seven gallons of water.

The crankcase of the engine should be examined and the specified grade of heavy oil put in so that the gauge on the left side of the engine indicates the proper level. The grease cups on the water pump glands should be turned down. Note if there is a water leak at that point. The spark plugs should be removed, and with a squirt can, about a tablespoonful of motor oil should be squirted on to the top of each piston, and the engine revolved by hand a number of times after replacing plugs, so that the oil will lubricate the cylinder walls. While turning the engine over notice whether there are any compression leaks around the cylinder head pet cocks, and have them closed.

Dampness and moisture may get to the working parts, and on arrival they may be rusted badly, grease may be lost out of important places, and equipment stolen or lost. In the former case the engine should be handled very carefully, because the pistons might have rusted fast or valves seized in the guides. Kerosene applied with an oil can to the tight parts will loosen them. A little kerosene in the clutch will make it function better, and prevent grabbing in case it has rusted on the plate. After the engine has been cranked freely by hand the gasoline tank lever should be turned to main supply with the long end of the lever down inclined at an angle of about forty-five degrees to the left. Fill gasoline tank with clean gasoline, being sure funnel and receptacle gasoline is carried in is thoroughly grounded on tank or explosion may occur, and after a sufficient quantity has been put in, unscrew the end of the gasoline pipe near carburetor and drain out a quart or so to clear line and tank of dirt before it reaches the carburetor.

Open the plug on the side of the transmission case and note oil level. If oil does not flow, fill to proper height with grade specified in lubricating instructions. Note oil level of differential housings and fill, if necessary, with specified grade.

A careful inspection should be made of the amount of grease in the wheels and on spindle bearings.

The pinion shaft roller bearings should be looked at in case they may have rusted or broken. If one of these bearings fail, serious damage might result.

After all spring bolts are oiled and grease cups have been turned down

to the limit and refilled with fresh grease, every universal joint on the truck should be opened and, if necessary, packed with grease. The propeller shaft joints should be given the greatest attention.

PRELIMINARY TO STARTING.

Before attempting to start be certain you have enough fuel, oil and water for the run. See that the crankcase level is correct, and that all lubricating instructions (see under lubrication, page 34) have been carried out. Make a superficial examination to see that nothing about the truck is broken or out of place; look underneath and notice if there is dripping which indicates a leak, except in the case of water coming out through the radiator overflow. You can tell by the feel and odor whether it is water, oil or gasoline. See that any danger is removed from driving, by an excessively loose part of the running gear or controls, such as steering knuckles, tie rod, drag link, wheels, etc.

The engine should then be started and let run idle without any load for from one-half to one hour before starting the truck. After standing on freight cars or on board ship for a long time piston rings may gum fast, valves rust in or the gasoline line clog up, and this preliminary running in will repay for the trouble in the time saved on adjustment later on.

After going into service the truck should be driven very carefully for the first week in order that the various parts may work into place and the rough edges wear off. The first five hundred miles are the most important in the life of the truck, and abuse early will surely result in poor efficiency probably later on, when the best will be required of the truck.

STARTING.

Before cranking the engine always see that the gearshift lever is in neutral position and the hand brake set. If you make a practice of setting the hand brake every time you shift into neutral when stopping you will be on the safe side. When stopping set the spark one-quarter advance and set the hand throttle lever one-quarter open. This sets these for the next start. Get into the habit of doing these things automatically.

Turn ignition switch to "mag" and then crank engine.

After the engine has started firing advance the spark as far as it will go and get a good idling position for the throttle lever. In the winter time it will be necessary to pull up the carbureter air choke before cranking so that a rich mixture is drawn into the cylinders. Do not keep the air choke pulled up longer than necessary. That means as soon as the engine starts firing push the choke down gradually until the engine runs and pulls smoothly. If it starts to backfire and spit keep the choke on full or part way as needed. It will require only a minute in the cold weather to get smooth running with the choke closed, that is, up.

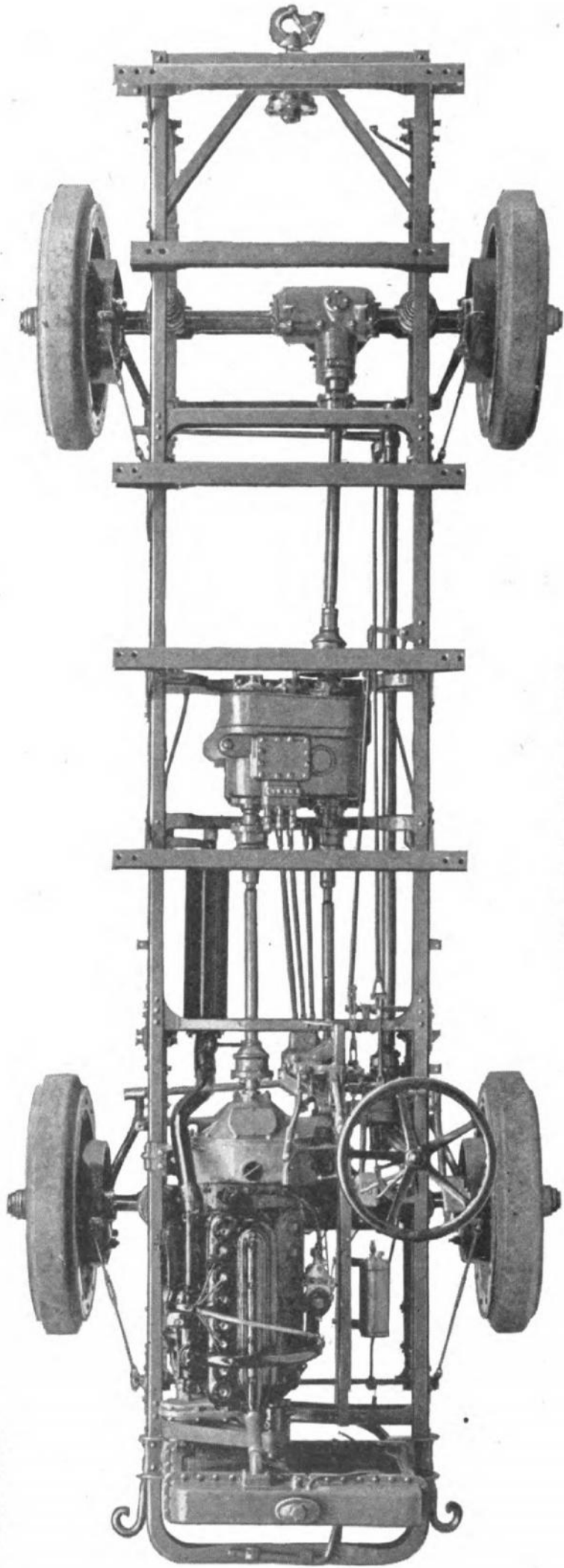
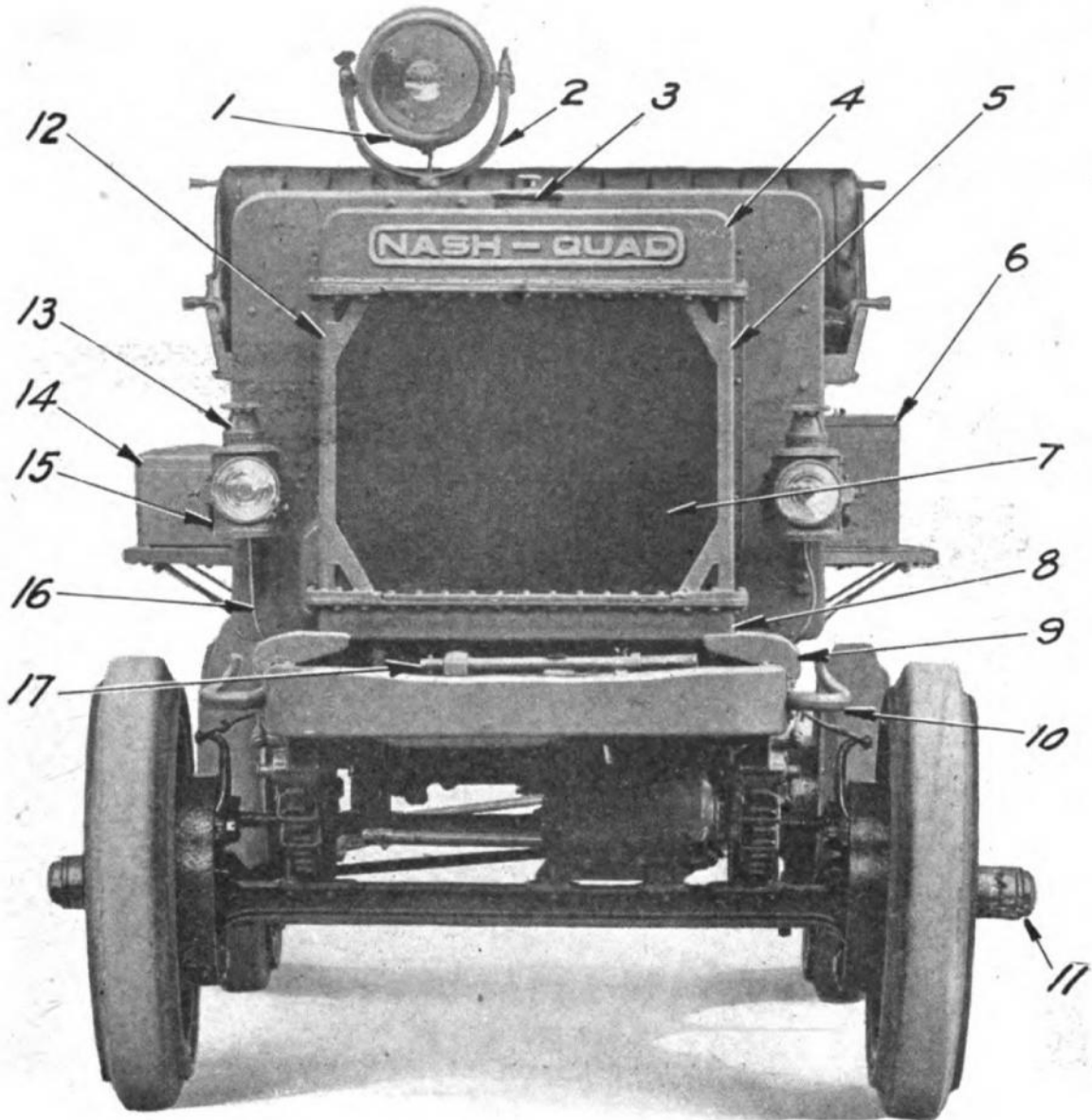


Plate No. 5

PLAN VIEW OF CHASSIS.

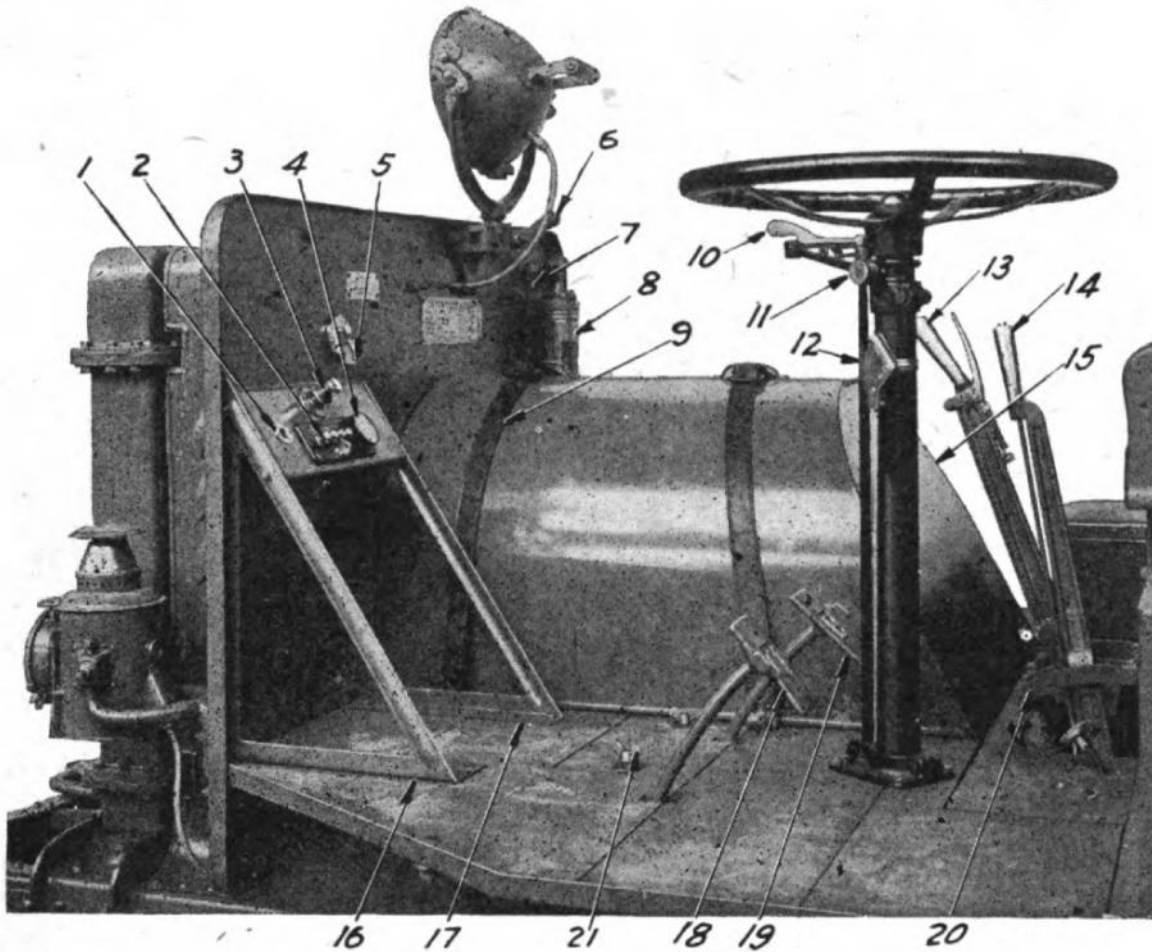


FRONT VIEW OF CHASSIS. MODEL 4017-A ONLY.

Ref. No.	Part No.	Name of Part.
1	37057-A	Searchlight.
2	35259-A	Searchlight bracket, complete.
3	32183-A	Radiator filler cap.
4	32186-A	Radiator top tank.
5	32178	Radiator side member.
6	35836-A	Battery cover.
7	32171	Radiator core, complete.
8	32185	Radiator bottom tank.
9	31087	Radiator bracket.
10	32530	Tow hook (left).
11	32713	Wheel odometer and hub cap.
12	32178	Radiator side member.
13	35327-A	Head lamp complete (Adlake).
14	32620-A	Tool box.
15	35339	Head lamp bracket.
16	35723	Side lamp wire.
17	32674	Starting crank.

Note.—Special instructions for Model 4017-L. This engine should be easier to start than in the 4017-A, because of the use of an impulse starting device fitted to the magneto. This impulse starter gives a very quick turn

Plate No. 7



DRIVER'S COMPARTMENT. MODEL 4017-A ONLY.

Ref. No.	Part No.	Name of Part.
1	35871	Trouble lamp socket.
2	35287-A	Lighting switch, complete.
3	35284-A	Instrument board lamp, complete.
4	36839	Ammeter (Weston).
5	35902	Magneto switch (Kick type).
6	36636	Searchlight bracket lever.
7	35281	Fire extinguisher bracket.
8	35249	Fire extinguisher.
9	35305-A	Hood strap (left).
10	33778	Spark lever.
11	CU-113	Steering column grease cup.
12	33662	Carburetor control.
13	32206-A	Hand brake lever.
14	35404-A	Change gear lever assembly.
15	32880-A	Hood, complete.
16	33042	Dash brace (upper left).
17	33043	Dash brace (upper center).
18	32651	Clutch pedal pad.
19	32650	Brake pedal pad.
20	32317	Gear shifted lever quadrant (outer).
21	NU-1006	Floor board clamp nut.

to the magneto armature, causing a good, hot spark to occur with only a single turn of the crank. It is not necessary to spin the engine to get the needed good spark, but it may be to get a good mixture.

If in cranking the engine it does not respond in a reasonable time, investigate instead of wasting energy cranking further. Go at the work systematically, keeping in mind all the time that there are three important systems, the failure of which will cause engine failure. These systems are: The fuel system, the ignition system and the valve system. If there is fuel and spark and the valves are working properly the engine should start, other things being equal. See page 104 for further information about failure to start.

If on cranking, the engine turns over only part way, stopping suddenly at one point and not going beyond, make an investigation to find an obstruction. In the winter a frozen water pump might cause this. Breakage of a timing gear or interference with free movement of any moving part of the engine will cause stoppage of this kind. Use your judgment, based on the previous run of the truck, recalling whether it was run with proper amount of oil, or if any unusual noises were heard.

In the winter time cranking may be more difficult than in warm weather, because of the thickening of the oil around the interior moving parts. Once the engine is started in cold weather let the engine idle for a while, until the oil has become sufficiently thin to circulate properly. Cold oil is like cold molasses, it will not flow readily.

RUNNING.

PRELIMINARY ADVICE.

Remember that in the first few hundred yards of running you should keep your eyes, ears and sensory system at work. Test the brakes to make sure they are working, instead of finding out in an emergency. Be satisfied that everything is running right.

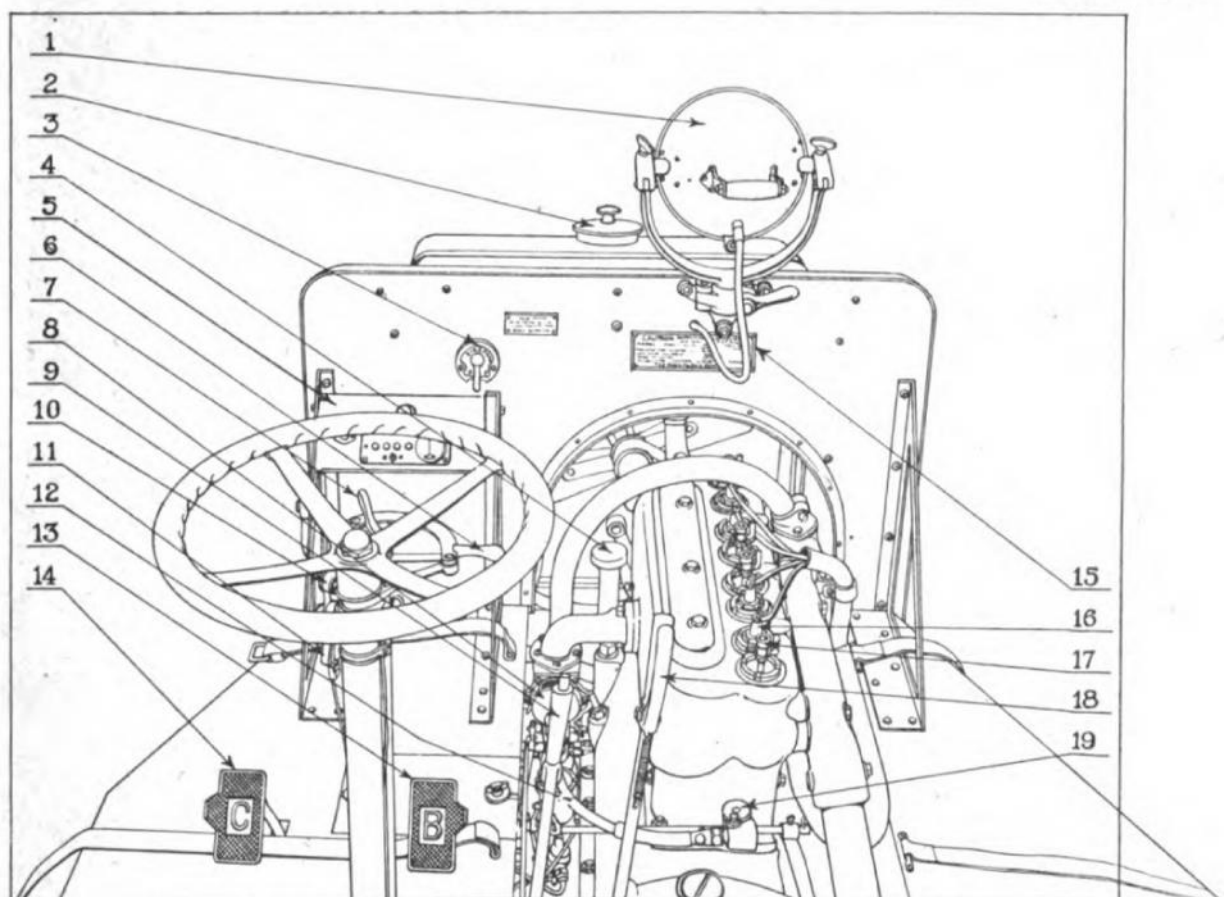
THE CONTROL SYSTEM.

The control system consists of those parts necessary to start the engine, shift the gears, accelerate and keep the truck moving forward, and those needed to stop the truck. Thus the complete system consists of clutch and brake pedals, hand or emergency brake lever, spark and throttle levers, accelerator pedal, ignition switch, and carburetor air control.

THE CONTROLS AND THEIR USE.

STEERING WHEEL.

The steering wheel controls the direction of the truck. Turning the wheel to the right turns the truck to right and vice versa. Do not at-



DRIVER'S COMPARTMENT. MODEL 4017-A ONLY.

Ref. No.	Part No.	Name of Part.
1	35270-A	Search lamp and bracket assembly.
2	32183-A	Radiator filler cap.
3	35902	Ignition switch.
4	34395	Motor oil filler cap.
5	35764-A	Instrument board.
6	33784	Throttle lever.
7	33778	Spark lever.
8	31801-A	Governor.
9	35404-A	Change-gear lever.
10	CU113	Steering column grease cup.
11	33662	Carburetor control.
12	32991	Governor drive casing.
13	32650	Brake pedal pad.
14	32651	Clutch pedal pad.
15	37105	Caution plate.
16	31946	Spark plug.
17	34359	Relief cock.
18	32206-A	Hand-brake lever assembly.
19	35705-A	Governor drive gear housing.

open the throttle wide suddenly, but gradually. Get accustomed to using the accelerator pedal, using the hand lever only for an idling point and also for traveling at a fixed speed.

SHIFTING GEARS.

Remember that the clutch should be engaged gradually, that is, allow the pedal to return to normal position slowly instead of quickly. Gradual engagement means less shock to the whole power transmitting mechanism.

on high gear. When the engine labors, change to a lower speed. This will save the moving parts and prolong the life of the engine.

DRIVING UP AND DOWN GRADES.

In driving down grade there are three forms of resistance that can be used to control the speed of the truck. Its momentum can be arrested by means of the brakes, the gears may be shifted into a lower speed, or the engine may be used as a brake by shutting off the ignition. The lower the gear used the greater resistance, so that the greatest possible resistance in the transmission is had with the gears in the first speed. Added resistance may be had by shutting off the ignition, and, of course, still more by using the brakes. All three forms (the gears in first, the ignition off and brakes applied) hardly need be used. The object is to refrain from using the brakes because keeping them applied wears the linings.

In ascending a grade use judgment about the ability of the truck. If it is very steep, shift to a lower gear before you get on the grade. If you think it can be done in high without the engine knocking do not shift. Make as quick a shift as possible, if it is necessary to do shifting on an up-grade. If you happen to stall the engine on the grade, shift immediately into neutral and apply the hand brake, at the same time cramping the wheels.

“RIDING” THE CLUTCH.

In driving along do not “ride” the clutch, that is, do not keep your foot on the clutch pedal. Even slight pressure on the clutch pedal causes excessive wear of the clutch bearings and may cause slight slippage.

STOPPING.

In slowing the truck down always slow down the engine first and anticipate your stop, so as to avoid excessive use of the brakes.

After the truck has been brought to a standstill, the gears shifted into neutral and the hand brake applied, turn the ignition switch to “Off” position, retard the spark lever to one-quarter position and the throttle lever to one-quarter open, placing these controls ready for the next start.

LUBRICATING INSTRUCTIONS.

PRELIMINARY ADVICE.

Study the lubricating chart inserted after page 32 for parts that require attention. Perfect and continuous lubrication means less wear of parts, less trouble and a better running truck. Lubricant is of little value mixed with dirt, so before you oil or grease a part make sure there is no dirt on the surfaces, that not even the smallest speck of dirt gets to a moving part. Cleanliness of moving surfaces is absolutely essential. Use clean cloths to wipe these surfaces after they have been cleaned by means

SPRINGS.

Once every two months jack up the frame, and by removing the spring clips the spring leaves may be pried apart. Lubricate between the leaves with graphite. Should leaves be excessively rusted, it is well to dismantle the spring, remove the rust, and paint the leaves with graphite paint.

MAINTENANCE ROUTINE.**DAILY MAINTENANCE ROUTINE.****ENGINE.**

Tighten all wiring terminals.
 Tighten any loose nuts.
 Clean exterior of spark plug porcelains.
 Clean magneto externally.
 Note tension of fan belt.
 Inspect oil pump for performing its function.
 Fill radiator (twice).
 Fill gasoline tank.
 Inspect all gasoline, oil and water lines and connections for leaks.

BRAKES.

Examine, and adjust brakes (if necessary).

GENERAL.

Clean, trim and fill all lamps and generator.
 Inspect springs for breakage.
 Report any breakage.
 Check tool equipment.
 Inspect wheel alignment and all steering connections.

LUBRICATION.

See chart after page 32.
 Fill oil squirt can.

WEEKLY MAINTENANCE ROUTINE.**ENGINE.**

Inspect all wires for proper support and freedom from damage.
 Thoroughly clean engine externally.
 Inspect for oil leaks.
 Inspect control connections.
 Inspect all water connections for leaks.
 Remove, clean and adjust all spark plugs.

Remove magneto distributor cover and clean with gasoline and clean cloth.

Drain water and dirt from water trap in gasoline line.

Inspect carburetor control connections and connections with governor.

Do not attempt to alter adjustment of carburetor or governor unless this is shown to be necessary when truck is in service.

Inspect engine oil drain cocks and drain plugs for loss of oil.

BRAKES.

Inspect and thoroughly clean all brake connections.

SPRINGS.

Inspect center bolt of spring and spring clips for apparent tightness.

WHEELS.

Inspect tires for undue damage.

TRANSMISSION.

Clean and inspect all control connections.

WHEEL UNIVERSALS AND DRIVING PINION BEARINGS.

Inspect wheel universal joints and drive pinion bearings for excessive looseness, by inserting a screwdriver between the spring clip bolts and the axle shafts. If considerable vertical movement is possible universal joints should be examined and the proper adjustment of pinion bearings made by removal of shims from between the bearings cage and the knuckle body.

BODY AND EQUIPMENT.

Inspect body bolts, hood fasteners and all similar bolts for apparent tightness.

Inspect tool equipment for completeness.

LUBRICATION.

(See chart after page 32 for parts needing weekly attention.)

MONTHLY MAINTENANCE ROUTINE.

ENGINE.

See page 103, under Carbon Removal, for method of doing the work, and how to determine if carbon is present in quantity in the engine.

Examine and inspect engine for loose parts, leaks, noises.

Clean oil strainer.

Grind valves if necessary. See page 55 for instructions on doing the work.

IGNITION.

Clean magneto collector ring, file and adjust breaker points.

CLUTCH.

Thoroughly clean and inspect all pedal connections.

TRANSMISSION.

Clean externally and inspect for leaks, particularly in bearing covers at the front and rear ends around shafts.

STEERING.

Put two jacks under front and rear axles, near wheels, and lift wheels slightly off from the ground, then inspect all connections for wear or undue looseness.

SPRINGS.

Thoroughly clean and inspect spring shackle connections. Inspect springs, replacing any defective parts.

DIFFERENTIALS.

Clean and inspect all differential housing for oil leaks. Inspect all bolts for tightness.

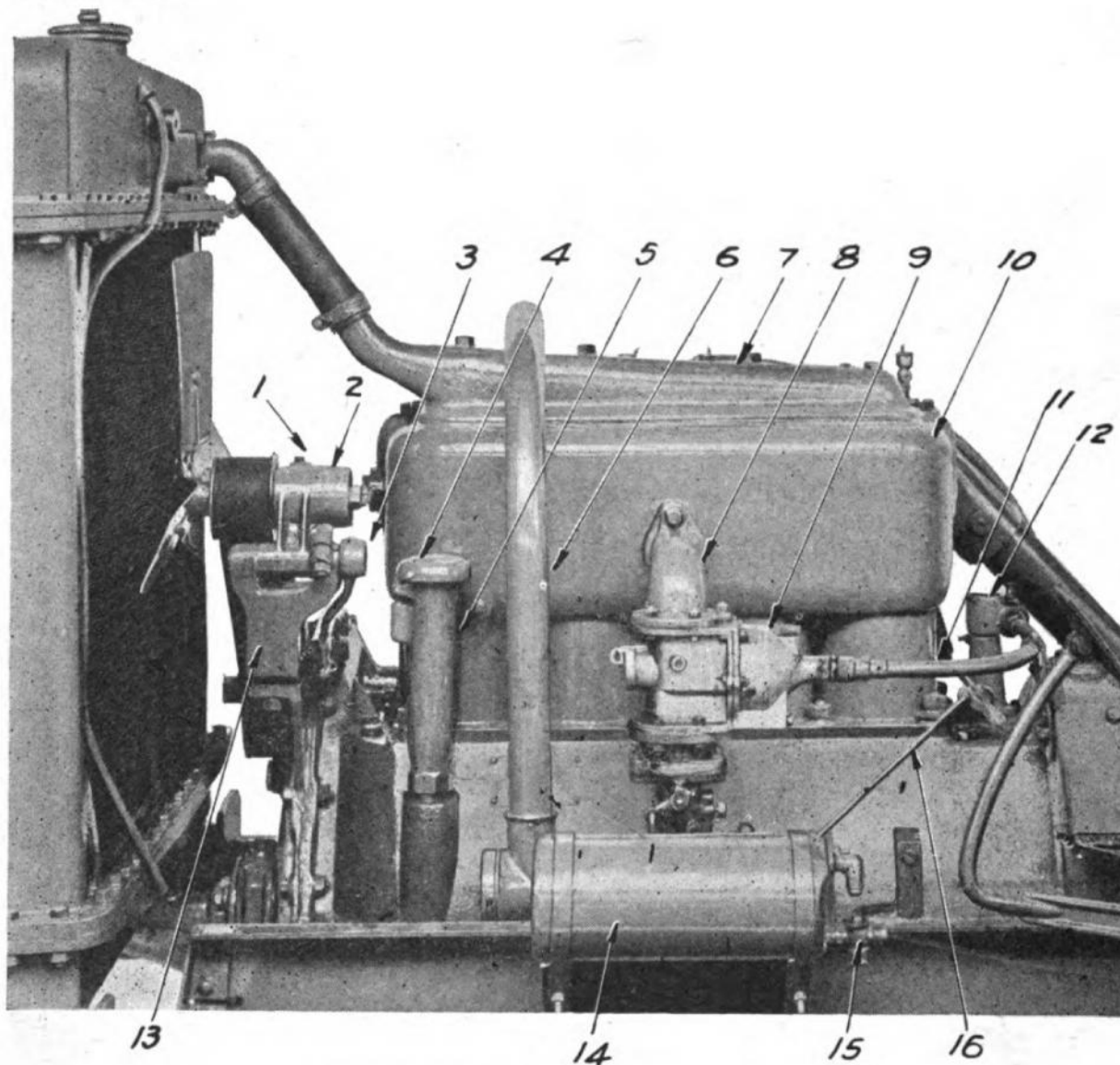
WHEELS.

Remove hub cap and inspect for supply of lubricant. Inspect all wheels for proper relative alignment.

GENERAL.

Inspect drip pan for security.
Inspect speedometer drive for reliability.

Plate No. 13



LEFT SIDE OF ENGINE.

Ref. No.	Part No.	Name of Part.
1	PL-102	Fan shaft bearing grease plug.
2	32721	Fan shaft bearing.
3	32724	Fan belt tightening spring lever.
4	34395	Breather body cap.
5	34394	Breather body.
6	33051	Carburetor hot air tube.
7	32456	Water jacket top cover.
8	33297	Intake pipe.
9	31801-A	Governor (duplex).
10	34555-A	Cylinder.
11	32291	Governor drive cable casing.
12	35705-A	Governor spiral drive gear housing.
13	32720	Fan shaft bearing bracket.
14	33500-A	Auxiliary gasoline tank.
15	35839	Auxiliary gasoline tank shut-off cock,
16	32830	Spark rod.

CHAPTER II

ENGINE AND ENGINE ATTACHMENTS.

DESIGN, CONSTRUCTION AND OPERATION IN BRIEF.

The engine is a standard design of Buda make, having four block-cast, L-head cylinders with heads integral. The block is mounted on a cast-iron crankcase, which is in two halves, horizontally split. The cylinders are 4.25 inches dia. bore by 5.25 inches stroke, cooled by centrifugal pump circulation; lubrication is by force-feed and splash; ignition is by Eisemann magneto, and carburetion by a vertical outlet Stromberg carburetor fed by gravity. The engine is equipped with a governor. The valves and valve operating mechanism are on the right, together with the water pump, driven from the timing gears; the magneto driven by an extension of the pump shaft, and the lighting generator with a drive taken between the pump and magneto. On the Model 4017-L there is no electric lighting generator.

ENGINE OPERATION.

The engine operates on the four-stroke cycle which is the same as that of all truck and passenger car engines made in the United States. There are four distinct strokes of the pistons necessary for the completion of a cycle, these four strokes being called: Intake, compression, power and exhaust.

Upon being cranked by hand, a piston descends while its intake valve is open, and draws into the cylinder through the carburetor and the intake pipe, a charge of gas. When piston is just past the bottom of its stroke, and again returning upwards the intake valve closes, and as the exhaust valve is at this time also closed, the gas is trapped within the cylinder and compressed by the piston's upward motion.

When piston reaches top of its stroke, the spark occurs and explodes the mixture which, due to its increase in pressure, drives down the piston with considerable force, thus storing up energy in the flywheel for the succeeding strokes.

When the piston nears the bottom of its stroke the exhaust valve opens, allowing the expanded, and now useless gases to escape, and stays open during the following upward movement of the piston, allowing the ejection of the remaining burned gases.

DESIGN, CONSTRUCTION AND OPERATION IN DETAIL.

CYLINDERS.

MATERIAL AND CONSTRUCTION.

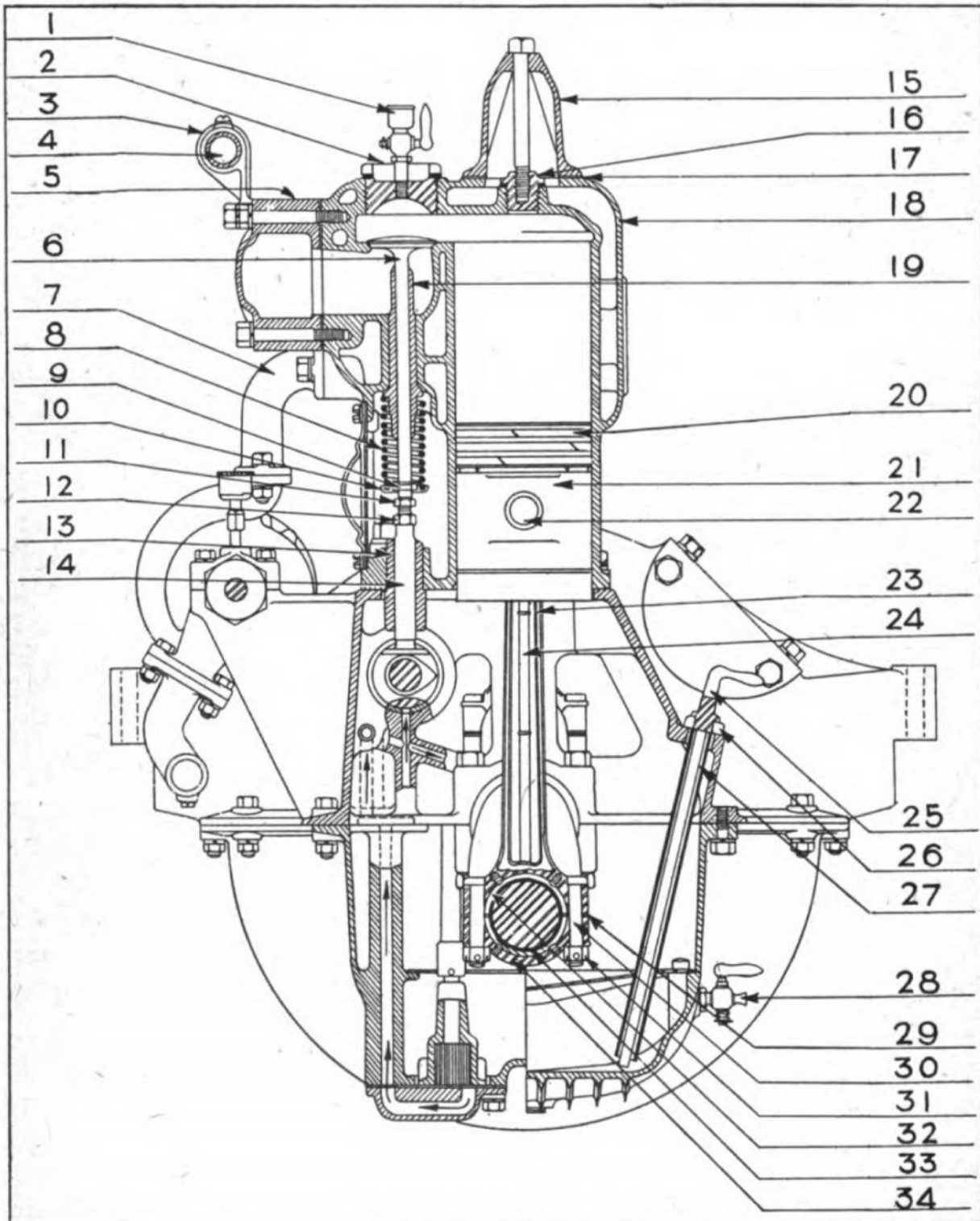
The cylinders are of gray iron, cast in block, and bolted to a cast-iron crankcase. The cylinder casting has the inlet passages cored out so that

the carburetor attached to a short external elbow, or manifold, on the left, feeds across the block through the cored passages. The block has an integral head, but uses valve plugs, so that removal of the valves is possible when the plugs are removed. The water jacket top cover with a portion of the water outlet pipe is a unit bolted to the top of the casting.

PRIMING CUPS.

There are four priming cups screwed into the valve plugs. These cups may be used for priming in winter or for testing the firing and compression.

Plate No. 14



END SECTION OF ENGINE.

IF JACKET IS CRACKED.

If a cylinder water jacket is cracked, emergency repair can be made by calking or by shellac saturated cloth strips pasted over crack, and permitted to dry before filling cooling system with water.

CYLINDER SCORED.

Cylinders may become scored because of engine operation for long periods when overheated, lack of lubrication, tight pistons, loose or broken wrist pin, piston out of round, connecting rod out of alignment, broken piston rings, connecting rod bearing tight (frozen), water or dirt in lubricating oil, burr on piston.

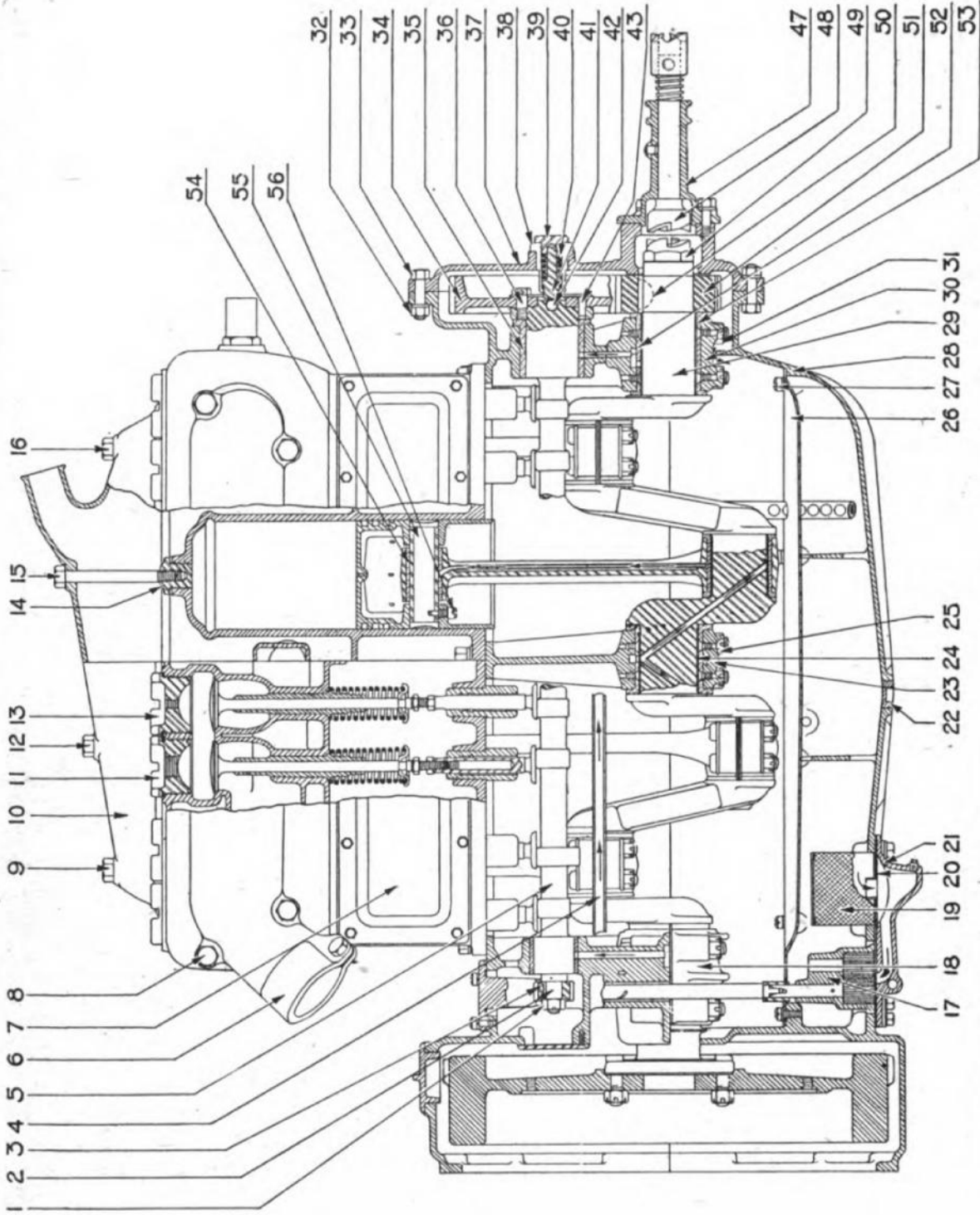
PISTONS.

The pistons are of cast iron of the usual design, with flat top, and using three diagonally-split rings. The ring grooves are 0.250 inch wide. The piston diameter at the top is 4.23 and 4.246 inches at the bottom with a top clearance of 0.020 and at the bottom 0.004 inch. The piston is 5.375 inches long. The difference in clearance between the top and bottom of the piston is due to the difference in expansion at top and bottom, the top

END SECTION OF ENGINE.

Ref. No.	Part No.	Name of Part.
1	34359	Priming cup.
2	34368	Valve chamber plug (exhaust).
3	32982	Wiring manifold bracket.
4	32981	Wiring manifold.
5	34370	Exhaust manifold.
6	35564	Valve.
7	34407	Water pipe from pump to cylinder.
8	34387	Valve spring.
9	34389	Valve spring retainer lock
10	34388	Valve spring retainer.
11	34381	Valve tappet adjusting screw.
12	34382	Valve tappet adjusting screw nut.
13	34391	Valve tappet guide.
14	34380	Valve tappet.
15	32456	Water jacket top cover.
16	34377	Water jacket plug.
17	34366	Water jacket top cover gasket.
18	34555-A	Cylinder.
19	34390	Valve stem guide.
20	34476	Piston ring.
21	34474	Piston.
22	34485	Piston pin.
23	34490-A	Connecting rod.
24	34481	Oil duct.
25	34402	Oil level gauge handle.
26	34401	Oil level gauge tube and nut.
27	34402	Oil level gauge blade.
28	CO-116	Oil level pet cock.
29	34482	Connecting rod bearing shims.
30	34484	Connecting rod bolt.
31	NU-352	Connecting rod bolt nut.
32	34479	Connecting rod bearing (upper).
33	34480	Connecting rod bearing (lower).
34		Connecting rod bearing cap.

Plate No. 15

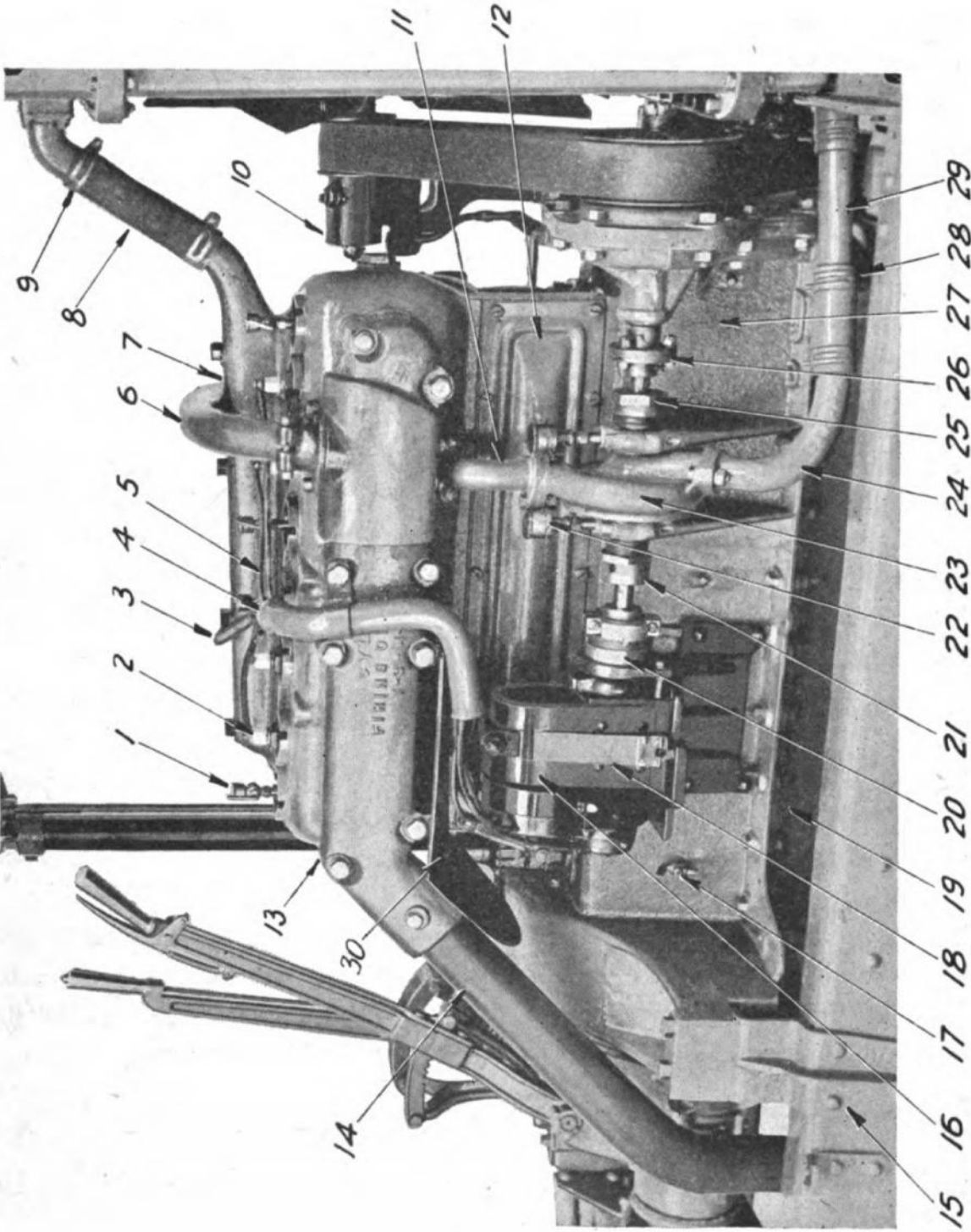


SECTIONAL VIEW RIGHT SIDE OF ENGINE.

SECTIONAL VIEW RIGHT SIDE OF ENGINE.

Ref. No.	Part No.	Name of Part.	Ref. No.	Part No.	Name of Part.
1	NU-354	Oil pump drive gear lock nut.	27	SC-603	Oil pan trough screw.
2		Shoulder for oil pump drive gear.	28	34542	Oil pan.
3	34457	Oil pump drive gear.	29	34492	Crankshaft.
4		Oil distributing tube.	30	34495	Crankshaft front bearing cap.
5	34560-A	Camshaft.	31	NU-354	Crankshaft front bearing cap lock nut.
6	34370	Exhaust manifold.	32	NU-124	Gear case cover bolt nut.
7	34383	Cylinder side plate.	33	SC-3404	Gear case cover bolt.
8	34362	Exhaust manifold screw.	34	34463	Camshaft gear.
9	34360	Water jacket top cover screw (rear).	35	34521	Camshaft front bearing.
10	32456	Water jacket top cover.	36	SC-245	Camshaft gear screw.
11	34367	Valve chamber plug (intake).	37	34557-A	Gear case cover.
12	34362	Water jacket top cover screw (center rear).	38	34451	Camshaft thrust spring housing.
13	34368	Valve chamber plug (exhaust).	39	34453	Camshaft thrust spring nut.
14	34377	Cylinder water jacket plug.	40	34452	Camshaft thrust spring.
15	34363	Water jacket top cover screw (front center).	41	34454	Camshaft thrust spring plunger.
16	34361	Water jacket top cover screw (front).	42	BA-105	Camshaft thrust ball.
17	34529	Oil pump body.	47	34550	Starting crankshaft bracket.
18	34493	Crankshaft rear bearing cap.	48	34551	Starting crank clutch.
19	34539	Oil pump screen.	49	34507	Crankshaft jaw.
20	34540	Oil pump screen cover gasket.	50	KE-114	Crankshaft pinion key.
21	34528	Oil pan sediment filter.	51	34505	Crankshaft pinion.
22	PL-125	Oil pan drain plug.	52	34509	Crankshaft front bearing (upper).
23	34497	Crankshaft center bearing cap.	53	34496	Crankshaft front bearing (lower).
24	34498	Crankshaft center bearing (lower).	54	34478	Connecting rod bushing.
25	NU-354	Crankshaft center bearing cap lock nut.	55	34485	Piston pin.
26	34527	Oil pan trough.	56	34486	Piston pin set screw.

Plate No. 17



RIGHT SIDE OF ENGINE, EXTERIOR VIEW, MODEL 4017-L ONLY.