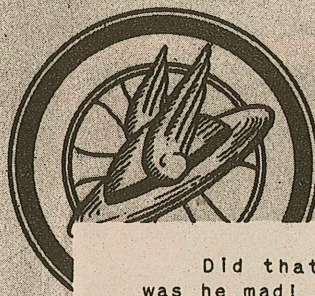


ARMY MOTORS

VOLUME 2 NUMBER 10 • HOLABIRD Q.M. DEPOT MOTOR TRANSPORT SCHOOL • FEBRUARY 1942



OLD AND NEW DEPEND ON *you*



Steering Wheel

CONTENTS

Did that inspector ever get a surprise. And was he mad! The truck had just come in from a ten minute run around the block and he noticed that the lube was oozing out of the vent plug and steering knuckles on the front axle. He took the filler plug out to check the level, and wooosh! the grease spurted out three feet.

Don't believe us? The serial number of that truck was W-322263.

And as though that wasn't enough, he had to go snooping and check another truck. Darn if the same thing didn't happen again, not only from the front axle, but from the rear as well. Oh, yes, he wasn't too mad to see that the serial number was W-322289.

You'd think he'd have learned his lesson by this time, wouldn't you? No sir, not these army inspectors. Covered with grease he tackled the next job and checked the lubricant level in the differential....

Nope, fooled you that time. Grease didn't shoot out of that one. It was filled with engine oil.

As they were carrying the inspector away in a stretcher he just managed to glimpse the serial number: W-318031.

Hope the birds that lubed those trucks don't have a Happy New Year.

Just occurred to us that maybe it wouldn't be a bad idea to send inspectors' reports of this type to the unit commanders in charge of the trucks, requesting reply by "indorsement thereon." Something to think about, anyway.

We're having an awful job keeping up with our subscribers, and we're not going to be able to reach you each month unless we get a forwarding address from you.

And speaking of subscriptions, we'd like to say again that we can only issue personal subscriptions in payment for contributions received. The length doesn't matter, but the quality does. A short shop hint or a snappy field expedient means much more to us than a long winded jaw about converting a Diamond T wrecker into a personnel carrier. One has an immediate use for thousands of people, while the other, excellent as it may be, wouldn't be needed once in a blue moon.

A driver whose brand new Diamond T was towed in with a burnt out engine after only 27 miles of operation, explained, "Yessir, I checked on everything before I started out. I sat in the cab warming 'er up for at least ten minutes. I watched all the gauges, and when the heat indicator stayed at zero I knew everything was O.K. so I started out on the run." (The cooling system was empty.) Can you take a hint?

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Army Motors is published monthly for the Motor Transport Service by the Technical Service Division, Holabird Q.M. Depot, Baltimore, Maryland.

Your contributions of ideas, articles and illustrations are welcomed. Address all correspondence to The Editor, at the above address.

★ ARMY MOTORS

for February 1942

SAMMY CORNELIUS TWITT

The following is an excerpt from a driver's instruction book published abroad by Ford Motor Co. Ltd., and characterizing the average Army driver as one "Sammy Cornelius Twitt."

It were over what's called lubrication
That 'im and the "serge" 'ad a split,
'E waz bungin' some grease in a nipple
' a gun wot were covered wi' grit.

The Sergeant went purple wi' passion
And pretty high speechless wi' rage,
'e managed to call 'im a wotsit
who'd sprung from obscure parentage.

'E says, "If that muck gets in bushin'
It'll tear it to Satan's abode:
I've told yer ter clean them utensils,
Yer parishin' son of a toad."

"Furthermore, while we're on this 'ere
subject,

And before yer begin with yer tool,
Just see as them nipples is spotless
And clear to let grease through, yo'
fool."

"Just keep the lids on t'containers
While they're sweepin' up rubbish an'
all,
'Cos grit sticks to grease like the ivy
Wot clings to the old garden wall."

The booklet is used extensively to supplement lectures and more serious technical books that are a formidable part of the modern soldier's training. Being further proof that important fundamentals are more readily absorbed by the non-technical mind when interspersed with a bit of humor and nostalgia.

You're a soldier, Lad, though you seldom
Fight and never use a gun.
Your tools are weapons of far more might,
The work to you is fun.

Yours is a job that is really tough,
(You're the man underneath the truck.)
And in every case no matter how rough
It's your skill that counts, not luck.

Don't just patch everything you see
Army's supply depends on you.
You're the Third Echelon of the QMC,
You've got to know what to do.

You botch your job they'll never know,
Someone will have to pay.
It may be the life of your buddy, so
Be sure that the job's O.K.

Pfc. Sid Rockmuller
Co. C, 92nd QM Bn.

EXPERIMENTAL

Grease on the Go

The largest commercial fleet operator in the United States, according to a report made in 1940, had about 21,000 vehicles. The Quartermaster Corps has about 300,000. The commercial firm has been building its fleet for 25 years. The Quartermaster Corps has bought about three quarters of its vehicles in the last two years.

Maintaining this mammoth military fleet is about the largest headache in the world - and the biggest pain in the throbbing maintenance headache is lubrication.

The splendid lubrication work now being done by quartermaster units is largely responsible for the mobility of motor transport, but the Army, in its unremitting search for perfection, is determined to keep 'em moving still faster. This constant fight for perfection is typified by the present research and experimentation to make lubrication easier, faster and more foolproof than ever. The Army knows that lubrication keeps 'em rolling by keeping parts moving smoothly. No lube, no roll. Coming, as many of us do, from civilian life, it's difficult to appreciate the problems of military lubrication. There's a vast difference between lubricating trucks in the Army and lubricating trucks in civilian life.

Armies fight anywhere. Civilians can work on ground of their own choosing. Armies must lubricate where they are. Civilians where they want to. This means cold, hard ground instead of a heated garage; frozen, dirty fittings in place of clean equipment; dust and sand fouled lubricants instead of a well kept barrel within the cage of a modern shop; untrained or partly trained soldiers against specialized lubrication technicians; irregular lubrication periods during battles against regular maintenance checks by qualified inspectors.

These are only some of the apparently insurmountable physical barriers faced by Motor Transport in planning any kind of a lubrication schedule - these are only some of the troubles that make it a man sized labour to keep 'em rolling.

Here are some more: You can't lubricate satisfactorily if you have to carry a dozen different kinds of lubes packed in two dozen different containers - the supply problem becomes too great. You can't lubricate satisfactorily if you have to carry a dozen different kinds of equipment - training the men to use them, and keeping them available is a full time job for a small army. You can't lubricate satisfactorily if your men have to take time out to study a different type of lubrication chart for each type of vehicle. Each chart calls for a different routine, and Lord knows, it's hard enough to teach a man one routine, without trying to teach him dozens.

Such are the problems of lubrication: difficult operating conditions, untrained personnel, many types, grades and containers of lubes and different kinds of lubrication guides.

There's not much we can do about the operating conditions, and at the moment let's leave personnel training out of the picture. This leaves standardization of lubes, containers, equipment and lubricating charts to be solved.

Let's see what Motor Transport is doing about them:

In the early part of 1941, there were 7 different grades of motor oil; 2 types of 4 different grades of each gear lubricant; 5 different grades of grease; 3 grades of graphite. Plans are cooking now for the following lubes to be used in the near future:

ENGINE OILS, SAE 10, 30, (for trucks and cars) and 50 (for motorcycles and Ordnance use).

GEAR OILS, Class 1, 80, (for extreme cold) and Class 2, 90 (for all other times).

GREASE, Number 1 (For extreme cold), 2 (universal) and 4 (water pump).

These lubricants cannot be mixed with or added to any other lubricants and the instructions you'll receive for using them

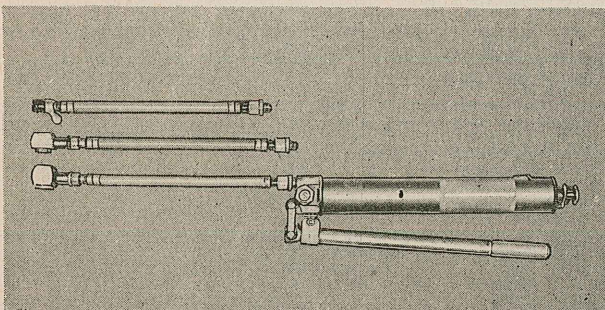


Figure 1. A suggested lever action grease gun.

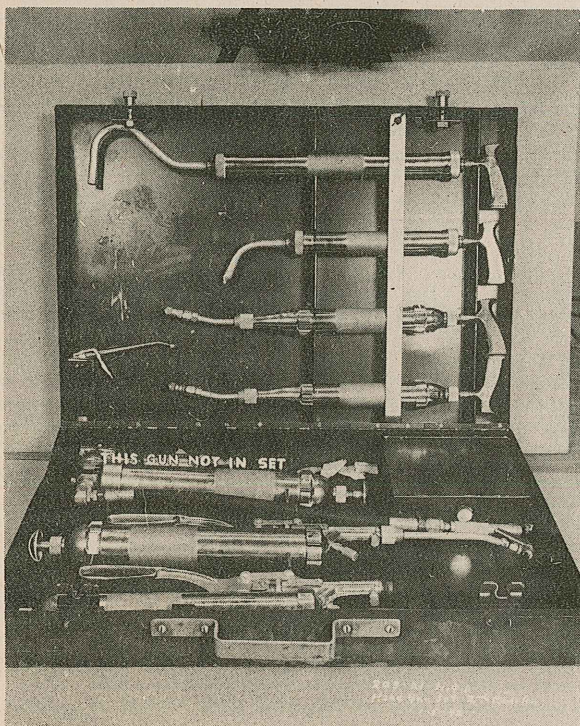


Figure 2. Second echelon handgun equipment.

must be followed to the letter. Here's why:

SAE 10 and SAE 30 oils are of the detergent type, that is, they have a cleansing action, and will help prevent sludge forming. However, they can still become saturated with impurities and as soon as they become saturated, they will begin to separate and clog piston rings, filters, and other small passages. So the engine must be clean before these oils are used, and the oils must be changed before they separate.

These oils may be used in either gasoline or diesel engines.

SAE 50 will be of the aviation type (for gasoline engines only) and won't be detergent. So the 10 and 30 types and the 50 types cannot be mixed because they contain different chemicals that don't get along together. Oils within the same type group can be mixed.

GEAR OILS

The Class 1, 80, and Class 2, 90, gear oils can be used for worm, hypoid and spur gears. These oils have extreme pressure qualities and must be changed at 2000 mile intervals if the vehicle is operated at moderate speeds and if the gear case does not become excessively hot. In sustained high speed operation or if the case overheats, the period will naturally be correspondingly shortened. If the lubricant becomes gritty or "whipped" and looks like mayonnaise, or if it contains water, change it.

The length of time between lubrication jobs cannot be accurately determined in advance. Dust, temperature changes, high speeds, low speeds, continuous service, infrequent service, mud, water and sand all have a say in the matter. Any unit that has obviously taken a beating for any reason should be inspected to see that the lubricant is still O.K.

The majority of the lubrication points to be greased can be grouped by mileage so that a 1000 mile lube job will cover them all. However, in a truck operated through water, the lubricant may be washed away in much less time. A daily examination of exposed fittings will show if mud has accumulated or if there is evidence of rust traces, or lack of lubricant in crevices,

such as around drag link ends.

This lube plan is a remarkably simple one when you think of the various types of lubes you have to play with now, but the powers that be are by no means satisfied. Because of complicated supply problems, the Quartermaster Corps wants to reduce the number of grades in lubes until in addition to the universal gear lube, there is one universal grease for chassis, wheel bearings, universal joints; and one motor oil for year round use, with the exception of extremely cold climates, where additional products will have to be used.

STANDARDIZED CONTAINERS

Standardized containers is the next problem to be tackled. A suggested plan would give you oil, to be added to the engine, packed in one quart cans 4" by 5-1/2", packaged in a carton 16-3/8" x 12-3/4" x 11-3/4" high. But the army uses so much oil, that quart cans used for both original fills and refills, would soon use more critical material than there is available. So complete refills may be handled by introducing a 5 quart can, whose size would be standardized at 6" in diameter by 9-1/2" high; placing 4 to the container 13-3/4" square by 10-1/8" high. This permits a minimum of worry to a unit commander, as he merely requisitions 500 gallons of motor oil and the Depot Supply Officer sends him a proportionate amount of 5 quart and 1 quart containers, based on the ratio of complete fills to refills. There will also be 5 gallon cans for Ordnance use.

Gear lubricants and greases may come in

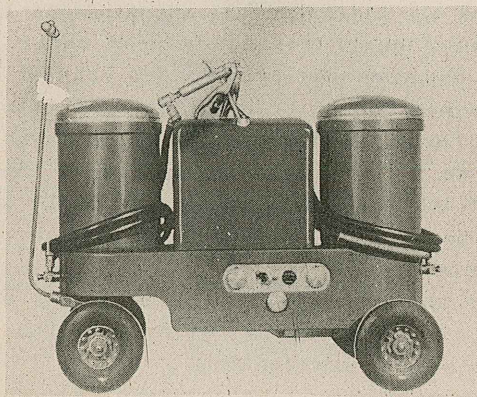


Figure 3. This streamlined electric pump handles two 25 pound drums.

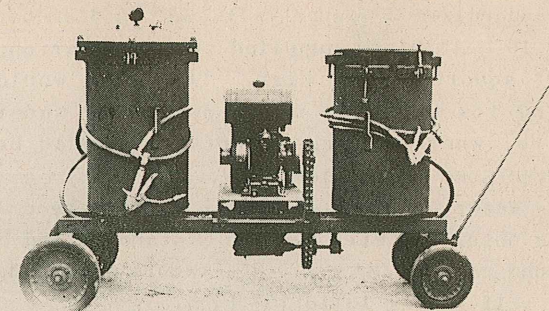


Figure 4. Worm and sector drive type opens the sealed 100 pound cans as they are inserted.

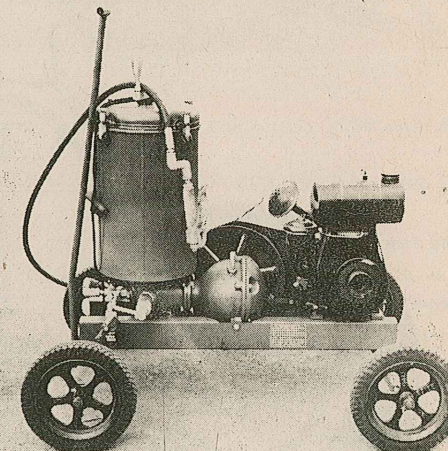


Figure 5. An experimental single drum model.

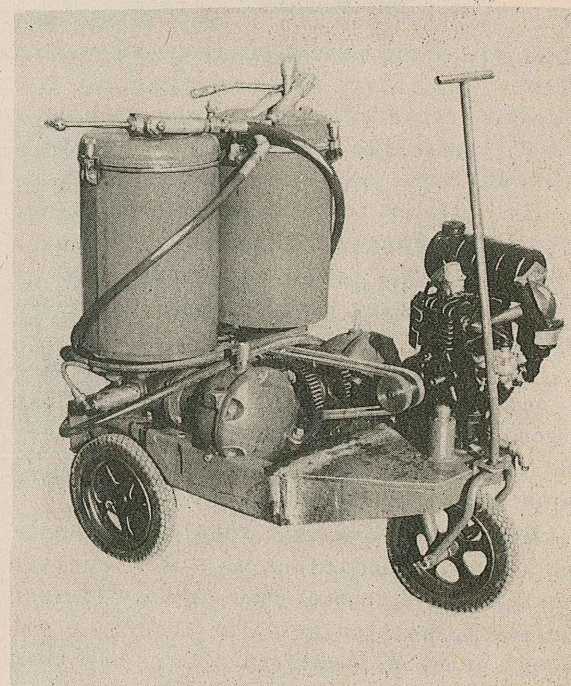


Figure 6. A double barreled test model.

standardized 25 pound pails, 11" in diameter by 10-3/4" high, supplied two to a carton, 12" square by 22" high. This pail would find its use with units operating under fire, where a larger container would be cumbersome and useless.

Water pump grease, which is fast becoming obsolete, will come in a standardized 5 pound can, 5-3/8" x 7-7/8", two to a carton, 3" x 11-3/4" x 18-13/16" high.

All miscellaneous oils, brake fluids and shock absorber fluids would come in a

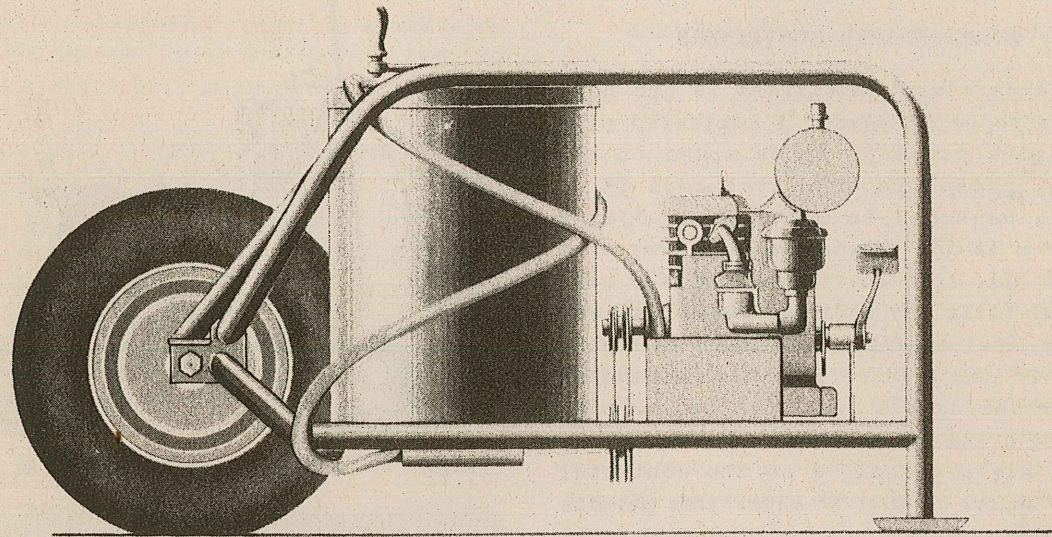


Figure 7. Best features of other dispensers tested were combined in this pilot model.

1 gallon rectangular container 6" x 4" x 9-1/2" high, with four to a carton, 13" x 9" or 10" high.

In addition to the convenience, standardized packages allow you to spot a lubricant by its container. Should markings become effaced or damaged, this may prove very valuable.

Packaging in small, sealed containers is necessary. Field reports indicate that a good portion of trouble is due to dirt and water contaminating lubricants in large open containers.

We said before that lubrication under the best of conditions is the uncertain factor in maintenance. Poor or insufficient equipment, particularly for the first and second echelon, makes it a sure bet that lubrication will be even more haphazard than it is now.

What we give you below is not by any

means the last word in equipment. Most of it is in the experimental stage, and none of it may be authorized. It will, however, show the general trend in lubricating equipment.

Let's take an average period in the life of a truck and see what happens to it in the lubricating line:

It's dawn when the truck pulls up to unload under the camouflage of a tree. It has plowed all night through rain, mud and brush, hauling its precious cargo close to

the front line. The driver knows he's going to be on his way again that evening, so he takes his hand gun and oil can from the tool chest, and wearily shoots the life-giving lube to parts that have been washed by rain and caked with mud. He checks the crankcase oil and finds it low. Taking a quart container from under the seat he pours the oil in, and returns the container to the truck. The empty tin is good for a new full one when it's turned in. He finishes his routine "after operation" lubrication check, and hits the hay. When he gets up, the truck is ready to roll.

Elaborate equipment would be useless under these circumstances, and it's only wise to be realistic and realize that it takes a darn conscientious and well trained driver to do any lubricating at all under such conditions. But, perhaps a different kind of gun, like the one in Figure 1, with

leverage action, might get the job done faster and easier.

SECOND ECHELON EQUIPMENT

The next day the truck runs into trouble and needs some second echelon work. During the routine check, the mechanics find the sadly battered truck needs further and more complete lubrication. Because it must necessarily be a highly mobile unit, the second echelon is limited at present to hand gun equipment, Figure 2.

But let's see what would happen if they were supplied with small power greasing units. A convoy of three or four hundred vehicles has been operating for five days under forced march, without time for lubricating the trucks. A light maintenance squad is informed that some of the trucks need repairs. It heads across country to intercept the convoy, and catches it as the convoy pulls into a truck park. To avoid concentrating, the trucks spread out over a large area, which makes maintenance extremely difficult. But the lubrication experts in the maintenance unit roll out the small power operated lube equipment, Figures 3, 4, 5, and 6 and go to town.

Or they might even have one of the creations, suggested by Figure 7. It em-

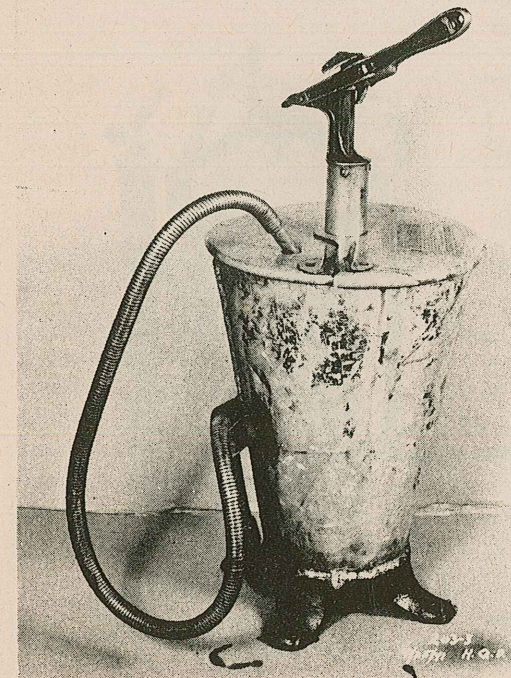


Figure 8. Outmoded type hypoid lube dispenser.

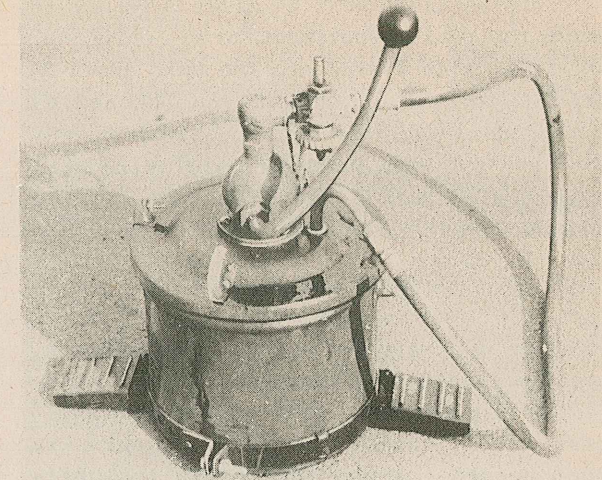


Figure 9. This unit is fitted to a 25 pound pail.

bodies all the advantages of all the other units.

The drivers, of course, are assisting the mechanics, and one of them needs a hand full of gear oil. If he takes it from the old hypoid dispenser, Figure 8, he may also get a hand full of dirt, because the lube has to be taken out of the original container and dumped into the pump unit. However, if one of the experimental units are around, Figures 9, 10, and 11, he's sure of getting uncontaminated lube, and getting it faster and easier than he can now.

With this small mobile power equipment, and new hand-operated dispensers, second echelon lubrication will be practically entirely decentralized, allowing vehicles to disperse over wide areas to discourage aerial and artillery fire.

THIRD AND FOURTH ECHELON

When the third and fourth echelon take over they need semi-mobile powered lube equipment to speed refilling complete replacement units with lubricants. Most of the axles, transmission, transfer cases and U-joints are not prelubricated, and they must be filled after being assembled to the vehicle.

The present 1 ton mobile grease unit, Figures 12 and 13, does the job nicely. It's handy and can dispense any kind of lubricant at a fast rate. The fourth echelon uses it also, because most of their work is done well to the rear of the combat zone and their operations can be centralized.

Consideration must be given to standardizing the mobile equipment for all echelons, and if this is ever done, the unit shown in Figure 7 might be the baby. Instead of having different types of equipment, why not have the same equipment and issue more units to the higher echelons who do more lubrication.

STANDARDIZED CHARTS

The officer, as well as the soldier, needs a lubrication education.

Field surveys indicate that simple charts and concise instruction books are much needed. A man interested in lubrication should not have to wade through a motor vehicle maintenance manual before lubricating each truck. Often he becomes confused because of the different methods of illustrating lubricating points in various manuals. What we need is a single book with charts giving all the lubrication data for standard vehicles. In this book each lubrication chart will be standardized and look something like that illustrated in Figure 14. This should show the location of each lubricant fitting, which will be identified by a constant number. A spring shackle would be No. 1 on a Dodge, G.M.C. or any other vehicle having this part. If the vehicle doesn't have the part, the number will be missing on that particular chart.

The numbers are arranged in frames

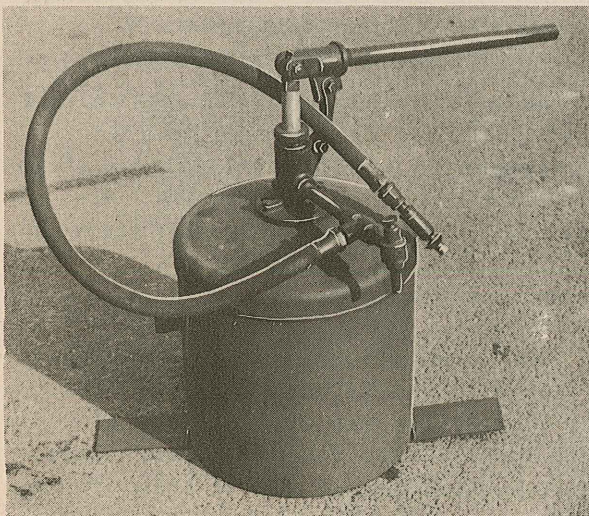


Figure 9a. A 25 pound pail fits neatly inside.

around the chart, so that by lubricating the numbered fittings around the diagram, you can cover all the points to be lubricated in sequence. Say we start at the top left corner of the outer frame on the chart, and continue around the vehicle toward the rear. Then take the remaining frames in the same order. The fittings in the outer frame "A" are lubricated with chassis grease applied from a pressure gun. The vehicle must be on a lift or you must lie or crouch on the ground. You don't have to interrupt the order to change lubricant or dispenser or crawl out from under except to pass the axles. All you need for the first frame is a pressure gun, a screw driver for the level plug in the front axle universals, a wrench for the rear axle center bearing on some 6x6 vehicles and a rag for cleaning.

The fittings in the second frame "B" can be lubricated and the lubricants can be changed without interrupting the order indicated. Gear cases don't have to be drained unless they need it, because they are handled on schedule.

The third frame "C" gives fittings lubricated with engine oil. Since the crankcase oil is changed on a separate schedule, the oil change is considered a separate operation.

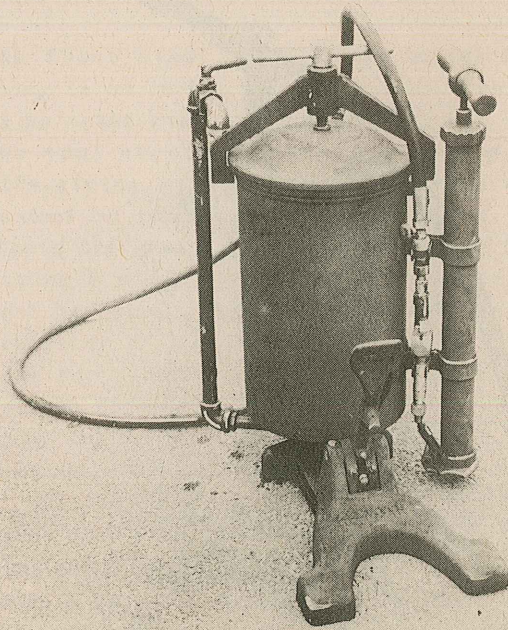


Figure 10. Foot operated with booster hand pump.

The fourth frame "D" indicates fittings lubricated with chassis grease, except 22, which uses gear oil. A wrench is required for the steering gear housing plug. Wheel bearings and spring seat bearings requiring disassembly should be lubricated separately because these jobs cannot conveniently be handled in a motor park.

To save confusion, shock absorbers, hydraulic brakes and batteries are omitted from these charts. Drivers must report any deficiency in shock absorbers, brakes or the battery, so a mechanic can check them.

This routine gives you a chance to examine parts of the vehicle which are relatively inaccessible. Any leaks of water, oil, grease or gasoline, excessive rusting of chassis parts, broken, bent or damaged bolts, rivets, brackets or other members can be seen easily and reported.

Vents are provided on most closed housings to relieve the pressure due to expansion of the lubricant. Vents are indicated on the chart with a "v" next to the number. These are to be cleaned as part of the lubrication.

Whether any of this equipment or these ideas will be approved and put into operation remains to be seen. Even if none of these specific plans are carried through, at least it seems at the moment as though they indicate the coming trend in military lubrication.

Although this article has designated gear lubricants by both their old and new class numbers, the new General Schedule of supply (Class 14, 1-15 to 12-31-1942) and all future publications will refer to gear and universal lubes by their viscosity equivalents. In other words, VV-L-761 classes 1, 2 and 3 do not appear in the new publications; all you'll see is class 80 and class 90.

In order to keep yourself up to date and out of danger on these changes, just remember the following: Wherever you see class 1 specified, order class 80 under the new specs. Where either class 2 or 3 is called for, you now order class 90. Another thing...where the Maintenance Manuals call for mineral oil, delete mineral oil and write class 90 in its place. To make it all inclusive we'll say that all inclosed-type gears, regardless of make, model or previous instructions should be lubricated with the above new classes of lubes. Incidentally only pages 44 and 45 of the new General Schedule apply to your grease needs. Class 80-140 on the next page is for task forces only, if manuals say use it, use class 90 instead.

TURN TO LUBE CHART (FIG.14) PAGE 336



Figure 11. A foot operated unit in action.

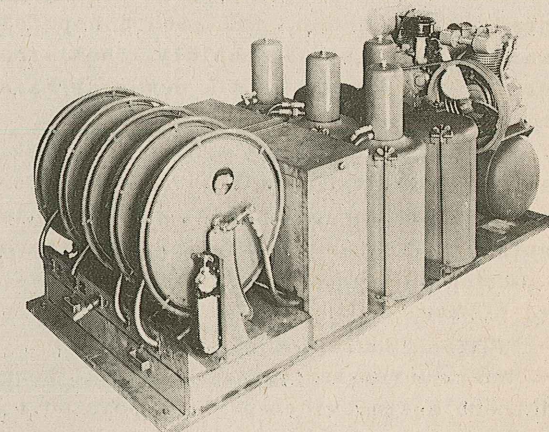


Figure 12. Air operated mobile dispenser.

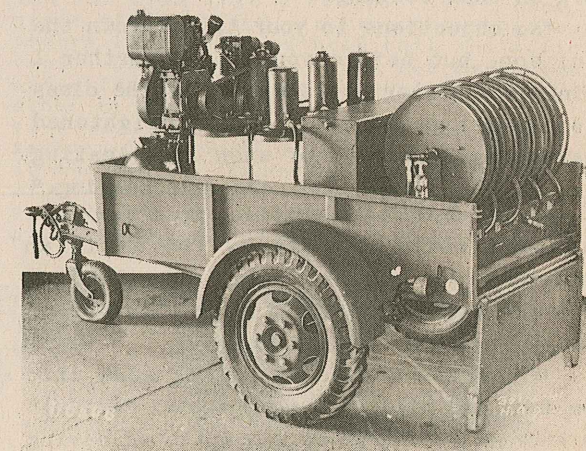


Figure 13. Mobile luber ready to hit the trail.

CRANKSHAFT·CAMSHAFT
WHERE SHALL I SEEK
UP AND DOWN THE CRANKCASE
TO FIND A

Bearing Leak



Suggested by an article in MOTOR AGE, Dec. 41.

Sergeant O'Toole sauntered over to where the rookie was swabbing up a sizable puddle of engine oil. The oil had dripped from the neighborhood of the rear main bearing and was puzzling the rookie no end. He cocked his fatigue cap at a new angle, leaned on his broom, and with a hopeful glance at O'Toole, said boldly, "Wellsir, guess we'll have to slip a new rear main into 'er!"

O'Toole walked slowly around the truck, peeped into the cab, knelt on the floor for a look at the innards, then heaved to his feet and in the way Master Sergeants have of getting an idea across to their students, said:

"WHATMAKESHUTHINKSO?"

"Well, I ran her for about a half hour and there's the evidence." He pointed to the oil on the floor. "Then I crawled underneath and got myself an eyeful trying to make sure. So if you got no objections I think I'll take the pan down and start to work on that bearing."

"No objections to your takin' down the pan, son, but before you go any farther I think we'd better get the rest of the class over here and all of us get straightened out on this business of when is a leaking rear main bearing a *bad* rear main bearing."

Sergeant O'Toole whistled up a few more students while Mr. Birch, the civilian instructor, hooked a copper tube leading from a pressure tester, to the oil line of the engine. (See drawing.)

O'Toole then hooked an air hose into the tank and explained its purpose. "Girls," he snorted, "We suspect this job of having an oil leak at the rear main bearing. But on these full pressure-lubricated engines

you can't be sure until you've made certain positive tests. Now this here contraption is a pressure tester we made ourselves out of a few odds and ends of pipes and caps. Birchy, here, has filled it about half full of SAE 10 engine oil and hooked the air line onto this tee connection.

"Now we hook this bottom line from the tester onto the engine oil pressure connection, regulate the air pressure so it equals the engine manufacturer's recommended oil pressure, then turn the crankshaft slowly until the oil holes in the main-bearing journal are lined up with the feed lines. Y'see those drops of oil? Well, that's what tells us when we have the holes lined up. Now watch closely, lads, and we'll soon know exactly what's leaking and what isn't leaking."

Seven guys were crushed in the rush to see as O'Toole fumbled in his jeans, drew out his precious 'Big Ben' and started counting the drops of oil which oozed from around the engine bearings.

After about a minute everybody looked expectantly at O'Toole for the decision he appeared ready to make. He smiled a satisfied sort of smile and said, "Gents there's your villain!" Indicating the rear camshaft bearing to which nobody had been paying particular attention.

"What I did was count the number of drops per minute falling from each of the bearings. Where they don't leak at all, the bearing's too tight; when you count fifteen or twenty drops a minute, that's good; between thirty and a hundred-twenty drops, well, that's servicable; but if they come in a steady stream, too fast to count, like

in that rear camshaft bearing, that's the time to fix something.

"But you still don't wanna go off half cocked because there's lots of things that might be the cause of this leak. One might be that the cover plate is bad, or the gasket might be defective or even the cover plate cap-screws might be loose. On some jobs they seal the end of the bearing with a plug and sometimes *that* springs a leak."

Mr. Birch beamed on the rookie, and said with a hint of sarcasm, "Y'see bright-eyes? Before, you were going ahead and put in a new rear main bearing; *now* all you have to do is slap a new gasket on the camshaft bearing cover plate!"

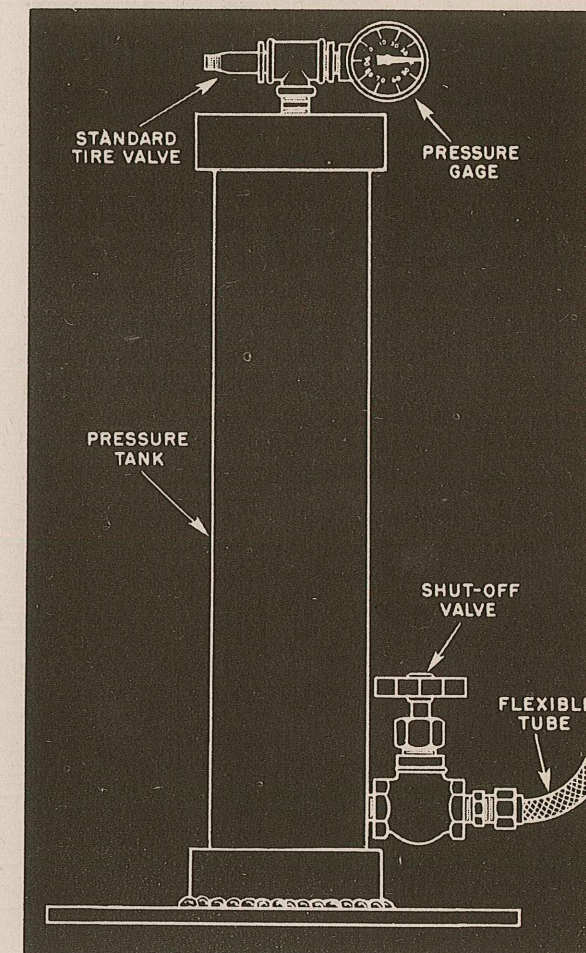
Knowing what he knew, that he had to take down the flywheel to 'slap' in the new gasket, the Pfc. only snorted. "Yeah," he said, "I know."

O'Toole, seeing the boys start to file over to their benches, waved 'em back.

"That ain't all fellows. While we're on the subject I wanna warn you about sump'n you do when you have to change one of these bearings...don't never let me ketch you filin' a bearing cap to make the thing fit. If you use the right tools and put in those bearing shells the way the manufacturer says to, you won't need to do any makeshift filin'. Otherwise you're gonna have oval shaped bearings that'll leak oil as long as the job keeps runnin'."

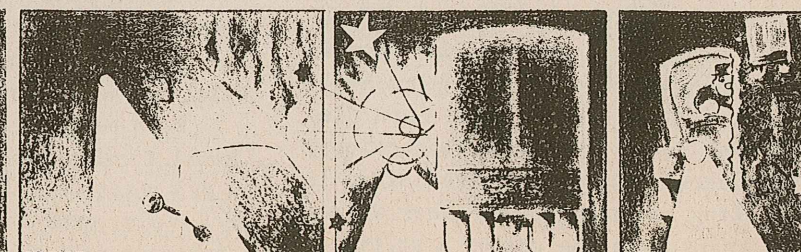
"And another thing, altho I don't wanna tell you fellows more'n you can remember all in one day, I think you oughta know that bearing oil leaks can result from a clogged drain pipe. When that happens, she builds up pressure in the crankcase and natcherly forces oil out the bearings. You don't wanna be movin' them drain pipes around too much either; sometimes y'get 'em too close to the oil pump and it sucks the oil right away from the bearing."

"Also I could tell you a lot more funny things about jobs that seem to have bad main bearings - but ain't...like what to do when the flywheel and clutch think they're a vacuum cleaner and start sucking all the oil outa the rear main, but we'll let that wait 'till a little closer to graduatin' time. O.K. boys, back to work."



You can make this pressure tester from a piece of four inch pipe about twenty-four inches long. Thread both ends and attach caps. Drill one cap for a tee connection and attach a welded or brazed base to the other as a firm stand for the tank. Put a tire valve in one side of the tee and a seventy-five pound capacity pressure gauge in the other. Tap a hole near the bottom of the tank for a line to the engine oiling system intake. Now you're ready for some plain and fancy oil leak sleuthing.

The LIFE AND TIMES OF
One Eyed Pete
OR HALF A TRUCK
IS BETTER THAN NONE



High Resistance

There seems to be little or no reason to fear a food shortage in Occupied Europe - not with Hitler laying eggs all over the Eastern Front.

But that's neither here nor there. What we were trying to bring out was the fact that, like the Poisonous Paperhanger, you too can run into "high resistance" but in your case it won't be Russians, it'll be in your truck.

"High Resistance" will take the pep out of your starter, weaken your ignition spark, dim your lights, lower the recharging rate of your battery, and make the eyes pop out of your head.

"High Resistance" - don't let it frighten you - is merely another name (or rather the result) of loose or dirty connections in your electrical system. Dirt, rust and looseness nestle down in the connections and resist the passage of current. The current has to work harder to get across. To do this, it wastes some of its electrical "push" or *voltage* - voltage that is needed, say, by the headlights.

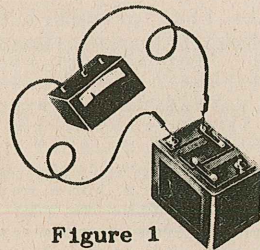


Figure 1

It takes six volts *plus* to make the lights burn their brightest, but with volts used up by the current in getting across the dirty connection, the lights get only 6 volts *minus*. As a result, they burn dim.

Detecting loose and dirty connections, once you understand what you are doing, is as fascinating as anything Sherlock Holmes ever did. It involves the use of a *voltmeter*.

The voltmeter is a magic instrument with two leads and a gage, (Figure 1.) Straddle the leads over any stretch of wire with electricity running through it. If there is any "high resistance" or abnormal voltage (anything over 1 volt) being used between the leads, it will register on the gage.

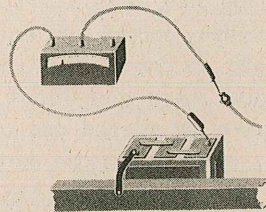


Figure 2

With this trusty instrument in hand, no "high resistance" can evade us. But before we start checking connections, there's one thing we've got to have and that's a good battery. Otherwise we're not going to get the full amount of current that's needed in these tests.

So first let's check the battery which itself may be lousy with high resistances. We use the voltmeter and we don't have to take the battery out of the truck.

Place one lead of the voltmeter on the positive post of the first cell, and the other lead on the "strap" connecting it to the center cell. (Figure 1.) If there's a reasonably intelligent citizen within the sound of your voice, tell him to get into the cab and step on the starter (the truck being out of gear).

Each cell of the battery is supposed to yield 2 volts but the starter will draw only 1 1/2 volts out of each cell. The other 1/2 volt gets lost in the internal resistances present in the best of batteries.

So checking each cell at a time, we find out whether we've got a decent battery or not. In this case, let's say we have.

There's one other thing we might as well check as long as we've got a voltmeter handy: that's *current leakage*.

Current leakage drains a battery like a wife empties a bank account. A hunk of insulation rubbed off here, a wet piece of insulation there, does the dirty work.

To uncover current leakage, we remove the cable running from the battery to the starter switch. By placing the leads of our voltmeter across this circuit (Figure 2), we see if there's any reading. Of course, every electrical unit in the car has to be turned off including the tail-light.

We get no current leakage so finally we're ready to start hunting for high resistance.

The first likely spot for high resistance is where the battery ground strap connects to the frame. Put back the cable you just removed for the current leakage test and turn on the bright lights. The bright lights are necessary to start enough current (amperage) flowing through the wires so that even the tiniest resistance will require an appreciable amount of volts to hurtle the current across them. (Volts being the electrical "push.") Only an appreciable number of volts will register on our voltmeter.

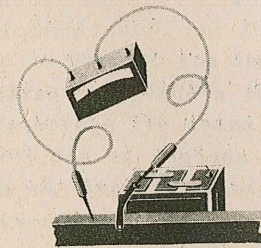


Figure 3

We connect one voltmeter lead to the terminal of the ground cable (on the battery), and ground the other to the frame, (Figure 3.) If we get a reading on the voltmeter, there's a high resistance between the leads. In this case, there's two things we can do: if nobody has seen us fussing around this truck, we can quick stuff our equipment in

a bag and scam. Otherwise we've got to take the cable off, clean it, scrape the point where it joins the frame and clean the cable contact at the battery.

Next we go to the starter switch. Coming into this switch is the main feed wire from the ammeter and other circuits on their way to the battery. The wires at this connection are suckers to jolt loose as the truck jiggles along.

To detect loose or dirty connections at this point, we first turn on the lights then place one lead of the voltmeter on the end of the battery cable at the switch, and the other lead on the terminal of the main feed wire (also at the switch). (Figure 4.) If we get a reading on the voltmeter, we've got a high resistance and a little fixing around the switch is in order.

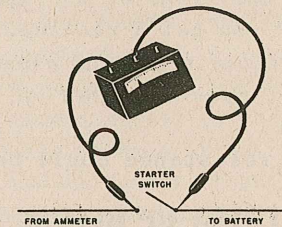


Figure 4

Dim lights are like mumps - at one time or another, we all get them. Nine times out of ten it's a high resistance somewhere in the headlight circuit that's to blame. Just to make sure, we test the whole headlight circuit. The lights are turned on - one lead of the voltmeter is attached to the main terminal of the starter switch, and the other lead to the junction block directly behind the headlights. (Figure 5)

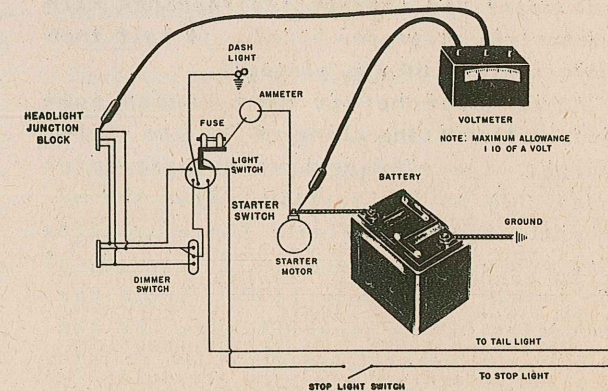


Figure 5

A reading on the voltmeter will tell you that you've got high resistance due to: loose ammeter connections, dirty or loose fuse clips, loose connections at the light switch, tilt ray switch, or the many connections between the tilt ray switch and the lamps themselves. You can localize your loose or dirty connection at any of these places by placing your voltmeter leads across them. Or if there's a very high resistance, you can find it by putting your finger on the different terminals and connections in the circuit. When you smell flesh frying, take your finger off quickly.

In the headlights themselves, if you have a poor ground between the lamp body and the frame of the car, blame it on a high resistance. To make sure, place one voltmeter lead on the headlight shell and the other on the frame of car (get a good contact). If you get a reading, take the whole lamp off the truck and clean the two surfaces that come together of all rust and paint.

The poor resistance could be lurking

CHECK UP BEFORE

Fast Charging

Whatever else fast chargers are, they're not foolproof. You're playing with a lot of current and if you don't follow instructions exactly, you'll ruin the battery.

The recommended procedure must be followed accurately. It includes careful hydrometer and thermometer readings with electrolyte at proper level. (A half inch above the top of the plates.)

Poor hydrometers have caused some trouble in setting chargers for the proper charge. The average battery hydrometer reads only as low as 1140. When the hydrometer fails to float, the only thing that you know is the specific gravity of the battery is below 1140. Since some batteries have a specific gravity considerably below that, and since the charging time is based on specific gravity, it is impossible to determine the setting. Hydrometers for fast chargers must read as

between the reflector and the shell of the lamp itself. In this case, remove the rim or glass from the lamp, connect one lead of the voltmeter to the reflector and the other to the frame of the truck. A reading means the reflector is not contacting the lamp case properly - in other words, high resistance.

Of course if you have sealed beam headlights, forget it.

Talking about lights, if you've got tail light trouble that a new bulb won't cure, place one lead of the voltmeter on the socket of the lamp (glass off) and the other lead on the bumper. If you get a reading, remove the lamp and clean the place where it attaches to the body.

Fascinating, isn't it - this kind of detective work - you and Dick Tracy. And as the dirty connection said to the voltmeter, "You ain't much on looks, but you can have my volt."

Which may be a lousypun (It is! Editor), but in a nutshell, it's the ingenious way the voltmeter tracks down high resistance.

low as 1060 to be any good.

If the time on charge, which is based on specific gravity, is not correctly set, one of two things will happen. If the fast charger is set for too short a time the battery will not get as much of a charge as it should. The result is exactly the same as if it were taken off a slow charger too soon. If the charger is set for too long a time the battery will get the fast charge for too long a period which will result in excessive gassing.

Excessive gassing itself is an indication that much of the current you are putting into the battery is being wasted. Instead of being stored it is being used to separate the electrolyte chemically and turn it into a gas. When this happens, it is possible to waste as much as 90 per cent of the current going into a battery. So you see, accurate hydrometer readings are necessary if the fast chargers are to do their job.

A TISKET A TASKET
BE CAREFUL WITH YOUR



After some of the tough jobs required on an engine, you wouldn't think anybody would have any trouble with gaskets - head gaskets, we mean.

Walking is easy, too, but you and I both know guys who fall over their own feet - so.....

Of course, as Sgt. Frey down in the Dynamometer Bay at Holabird points out, there is a legitimate mistake some guys make. They need a head gasket bad and just as luck would have it, they don't have the specified gasket around. So they root around and the first thing you know, they find one that looks like it might fit. So they take it and fit it onto the block and it looks fine - why it maybe even has some extra holes thrown in free of charge.

But about a week later the truck comes back with the driver complaining that it has about as much pep as Saturday night in the morgue. And when they take the head off, they find the valves burnt to a crisp. So they grab the guy that put the gasket on and hustle him over to show him what happened (beating him rapidly about the ears with a rubber hose as they come.)

This is a Chevrolet engine, they say, and a Chevrolet engine has overhead valves - the valves are in the head, not in the block. There are water passages to cool the valves - these are also in the head, naturally. Now, when you fitted this gasket onto the block without looking to see what holes and passages were in the head, you closed off some of the passages in the head because the gasket didn't provide holes for same.

In other words, the cooling water couldn't flow up from the block to the head, because the gasket (which didn't provide holes) wouldn't let it through.

Dope, they say to the culprit, we ain't complaining because you didn't use the ex-

act gasket specified. We don't mind if you get suddenly thrifty and use a 1934 gasket on a 1936 engine. But if it's an overhead valve engine, match the gasket holes up with the holes in the head. Then if it fits, put it on the block.

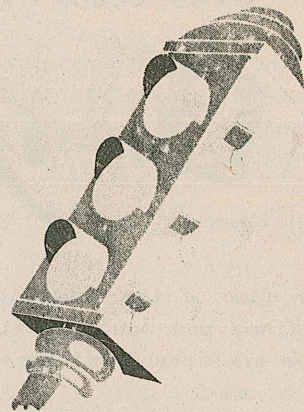
Likewise with the water pump gasket. Match the gasket to the block, not to the pump itself. Many times the pump has a small hole and the block a large one. In this case the gasket laps over, the circulating water tears it off and you have pieces of gasket clogging narrow passages. Gaskets should always be compressed between two surfaces, without any edges lapping over.

But coming back to head gaskets - don't be taken in by the temptation to use an old head gasket a second time. Although you can't see it with the naked eye, the asbestos in a used gasket is packed hard in spots. A gasket has to be soft and flexible enough to fill the uneven spots that occur in even the smoothest surfaces. You can't see them without a microscope, but they're there. An old gasket isn't soft enough to fill in.

Another thing you might not like but which is nonetheless true, is the fact that you're not supposed to use a sealing compound with a head gasket. The gasket is supposed to do the perfect sealing job - in cases where the surfaces are too uneven or warped, a refacing job is in order. Remember that the sealing compound you've been using might be soluble in water - or maybe the anti-freeze will attack it. In which case, you've got a blown gasket.

Spreading a bit of grease over the surfaces will make your gasket slide more evenly, easily and perfectly into place. But under any circumstances, don't forget to clean your surfaces perfectly. A little grain of dirt will cut into the copper or asbestos of your gasket and create a channel for compression leaks. A little leak leads

THE LOW DOWN ON Brakes



from MOTOR AGE, March 1941

Vacuum brakes are quite simple. There's a brake valve, a power cylinder, a check valve, pipe lines and in some cases, a reserve tank. The vacuum from the engine manifold supplies the means of converting normal air pressure into braking effort.

The power cylinder does the actual work of helping the driver apply the brakes. It is controlled by the brake valve which is actuated by the brake pedal. The check valve maintains a maximum vacuum in the unit so that it does not change with the throttle opening. The lines are passages through which the vacuum from the engine manifold acts on the power brake system. The reserve tank is used when the engine vacuum is insufficient to handle repeated brake applications.

There are two types of power cylinders: the piston type and the diaphragm type. Either type may be used in an air suspended system or a vacuum suspended system.

In the air suspended system there is atmospheric pressure on both sides of the piston or diaphragm, and when the brake valve opens, the pressure is reduced to less than atmospheric on one side of the piston. The resulting movement applies the brakes. In the vacuum suspended system there is a vacuum on both sides of the piston and when atmospheric pressure is admitted to one side of the piston by depressing the brake pedal, the piston moves to the end where the vacuum still exists. This movement assists in applying the brake.

Various things can happen to a vacuum power brake system once it has been installed correctly, but the usual fault is a leak. The piston-type power cylinders can

stick from either corrosion or freezing and the rubber in the diaphragm-type can deteriorate rapidly from being mounted too close to the exhaust pipe, but these things seldom happen. There is no excuse for their happening because they can be prevented by a minimum amount of preventive maintenance. In extremely cold climates the addition of 2 oz. of Prestone on each side of the piston will prevent freezing. Rusting and sticking can be prevented by lubricating the piston with SAE 20 engine oil every 3000 miles to 5000 miles or every four to six months. One ounce of oil inserted through the pipe plug provided for that purpose, if there is one, or through the hose connection on the manifold end of the cylinder is sufficient for small cylinders. Two ounces are required for the larger sizes.

The only problem in maintaining vacuum power brakes is locating leaks when they occur. The leaks, of course, destroy the vacuum, and the brake can't work. Leaks can best be located by using a vacuum gage to check through the entire system. For an emergency test it is possible to determine if the unit is working by depressing the brake pedal slightly with the engine shut off. With the pedal slightly depressed, start the engine. The brake pedal should travel downward away from the foot if the vacuum brake is operating. However, this test only shows that the brake is working, not that it will operate satisfactorily for normal use.

AIR SUSPENDED SYSTEMS

To locate the trouble in an air sus-

ended, or single line, unit, try the following:

1. With a vacuum gage, check the amount of vacuum produced by the engine at the manifold. Note reading with idling engine, and replace fitting.

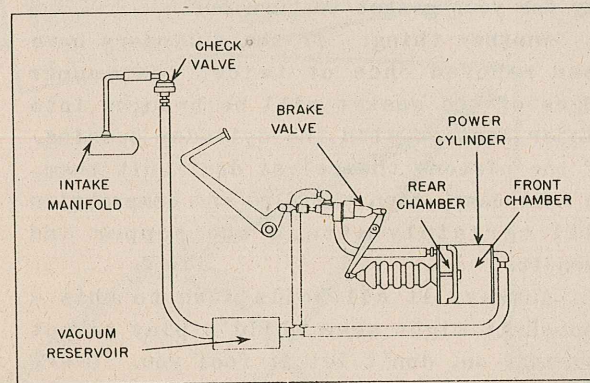
2. Disconnect the hose at the manifold side of the brake valve. Connect the vacuum gage to the hose and take the reading with the engine idling. If the amount of vacuum is within an inch of the reading at the manifold, there is no leak in the line.

3. Reconnect the line to the valve. Disconnect the hose on the cylinder side of the brake valve and connect the vacuum gage to the valve fitting. If the valve does not leak the reading should be zero with the engine idling.

4. With the vacuum gage still connected to the brake valve, depress the brake pedal. If the valve is operating correctly the reading should be within 1 inch of the reading at the manifold.

5. Reconnect the hose to the valve and disconnect the hose at the power cylinder. Connect the vacuum gage to the hose. The reading should be zero. Depress the brake pedal. The reading should be within 1 inch of the reading at the manifold.

6. Connect a Tee into the hose line and power cylinder and connect the vacuum gage to the other end of the Tee. With the engine idling the reading should be zero. Depress the brake pedal and the reading should be within an inch of the reading at the manifold. If the vacuum shows a drop, air is leaking past the piston. A drop of 2 inches of vacuum anywhere along the line will not seriously affect the braking operation, but when a drop of 4



Vacuum suspended system.

inches or more is noted it should be corrected.

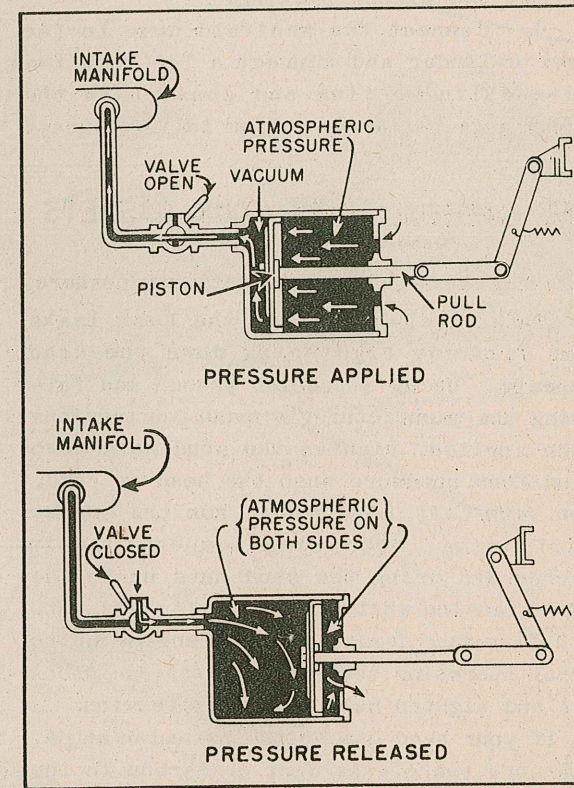
To correct air leaking past the piston, disconnect the hose and clevis so that the piston can be revolved and worked back and forth. Insert lubricant and work piston back and forth to revolve it. Then push piston all the way to the rear and plug the hose opening securely with the finger. If the piston can be pulled to the front without air escaping by the finger, air is still leaking past the piston and the cylinder will have to be disassembled and the piston packing replaced. If it cannot be pulled forward without air leaking by the finger, connect again and test with a vacuum gage. If there is a leak in the diaphragm-type power unit, the diaphragm must be replaced.

VACUUM SUSPENDED

On the vacuum suspended cylinder, or double line unit, the method of locating leaks is as follows:

1. With vacuum gage, check the amount of vacuum produced by the engine at the manifold. Note the reading with idling engine; replace fitting.

2. Disconnect the hose at manifold



Atmospheric suspended system.

side of brake valve. Connect the vacuum gage to the hose and take the reading with the engine idling. If the amount of vacuum is within an inch of the reading at the manifold, there is no leak in the line.

3. Reconnect line to the valve. Disconnect the hose on the power-cylinder side of the valve. Take reading with the engine idling. If the valve does not leak, the reading will be within an inch of the reading at the manifold. Reconnect hose to valve.

4. Disconnect line from both ends of the power cylinder. Connect vacuum gage to hose leading from manifold, and plug the hose leading from the valve with a cork. If there are no leaks in the lines, the reading will be within an inch of the reading at the engine with the engine idling.

Reconnect the manifold to cylinder hose with a Tee and connect the vacuum gage to the other end of the Tee. With the hose line from the operating valve still plugged and the engine idling, note the reading. If the cylinder is okay the reading will be within an inch of the reading at the manifold. If the reading is low, the leak is past the piston packing.

6. Connect the manifold hose to the power cylinder and connect a Tee into the valve-cylinder line and connect in the vacuum gage. With the engine idling, depress

BE CAREFUL WITH YOUR GASKETS

(Continued from page 317)

to a big leak - a big leak gets you nowhere.

Talking about leaks, the best leaks come from not tightening down the head properly. Using a tension wrench and following the manufacturer's manual on tensions to be applied, tighten the stud nuts down to uniform pressure when the head is cold. Then with *Cast Iron Heads*, run the engine until normal operating temperature is reached and bring the stud nuts up to the proper tension while the block is still hot. With *Aluminum Heads*, run the engine up to normal operating temperature, let the block cool and tighten nuts to proper tension.

If your head has bolts instead of studs, make sure there's no dirt or carbon in the bolt holes. Otherwise you won't be able to tighten the bolts properly.

the brake pedal. The vacuum should show a sharp drop when the pedal is depressed and a sharp recovery when it is permitted to return. If the vacuum gage shows a slow recovery, a reserve tank is needed.

If a check valve is used in the system, it is necessary to check the length of hose running to it for leaks with the vacuum gage, and the valve itself can be checked by connecting the gage to the side away from the manifold, and after shutting off the engine, check to see if the valve holds the vacuum for a reasonable length of time. Another check is to apply the brake after the engine has been shut off. If the application requires abnormal effort, the check valve isn't working.

Usually there is an air cleaner provided on the operating valve. This cleaner should be removed and cleaned every six months and if the valve is mounted in an exposed position, it is sometimes necessary to cover the entire valve with a cloth bag to protect it from road dirt.

If the brakes have been operating satisfactorily and suddenly fail, do not try adjusting the linkage or levers until you have checked for a leak in the lines. If the power unit has been bumped, it is possible that there is some misalignment that causes binding; but levers and linkage should never be changed unless you have eliminated all other possibilities.

When you fit the gasket down over studs, do it gently, (especially if oversize studs have at one time or another been inserted), or you'll break the copper or asbestos edges of the gasket holes. This opens the way for your gasket to burn out.

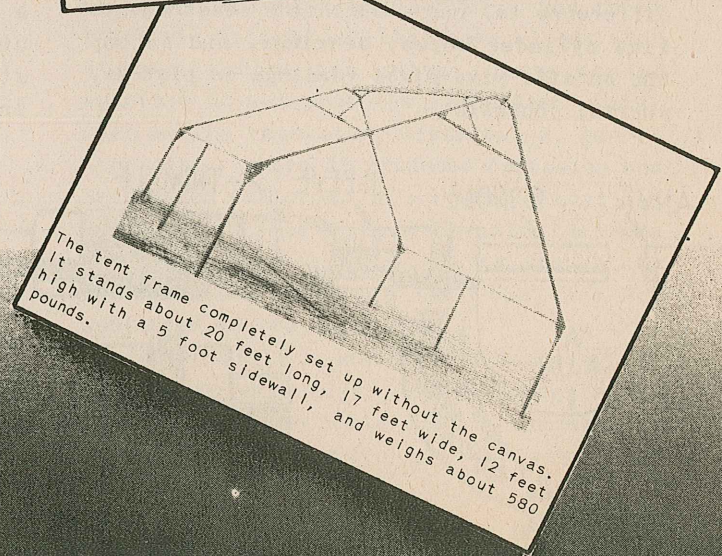
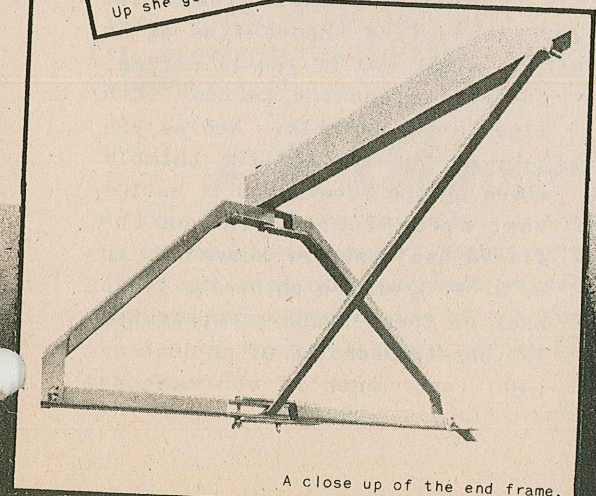
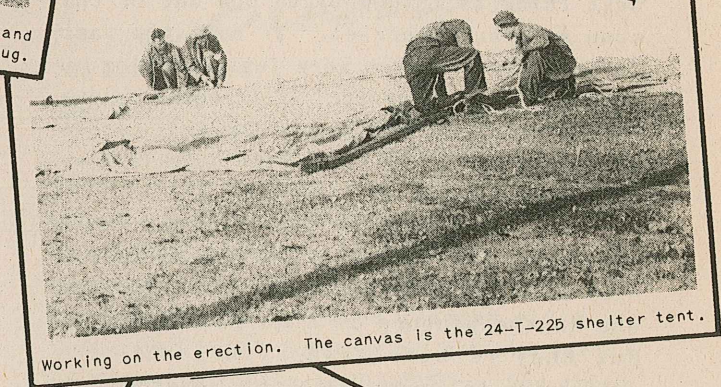
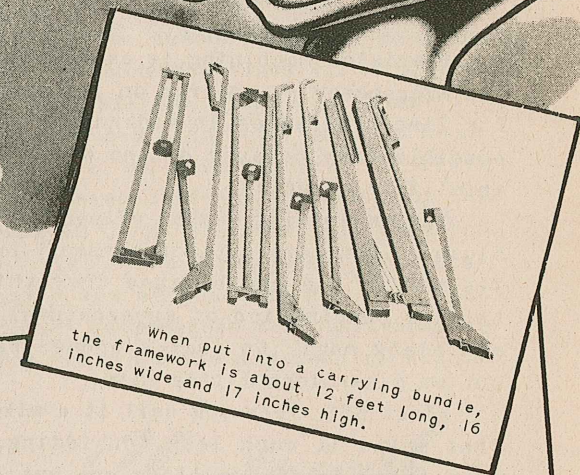
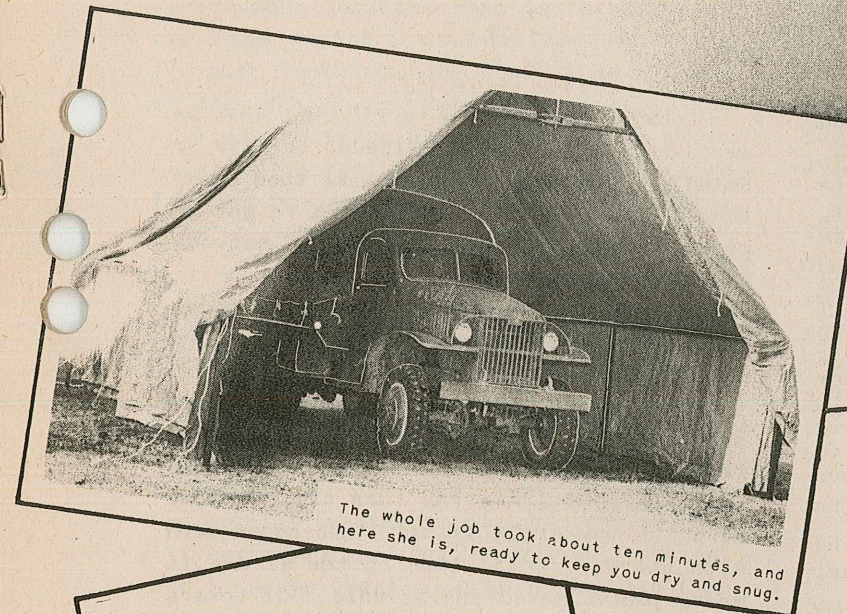
Another thing: if the cylinders have been rebored once or twice, the copper edges of the gasket will be brought into closer contact with the cylinder opening. If the pistons themselves don't hit them, in this case, then the fire and compression will certainly attack the copper and burn it.

Anyway, it all boils down to this - though it might seem child's play to put a gasket on, don't let it fool you. Overconfidence is a bad thing.

Remember Pearl Harbor.

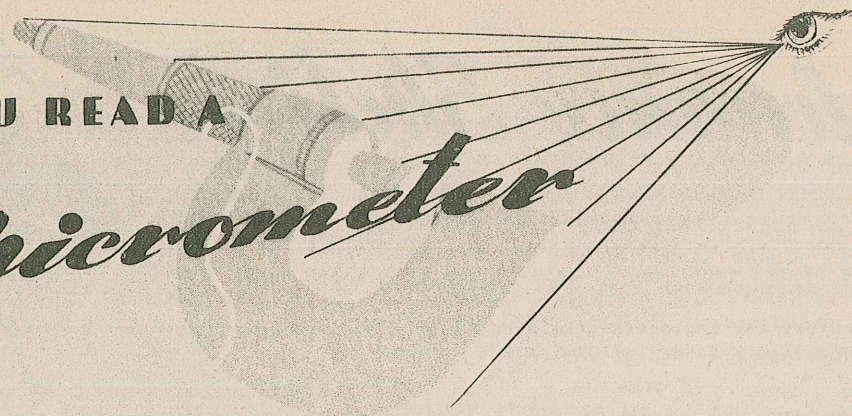
Maintenance Shelter

Almost a year ago we tipped you off that the Engineers were working on a new field maintenance shelter. Last May we got a picture of one of the experimental models, and this month comes another one. It hasn't been officially adopted yet, and it may be some time before the Engineers make a decision. But at least these shots show they are hard at work.



CAN YOU READ A

Micrometer

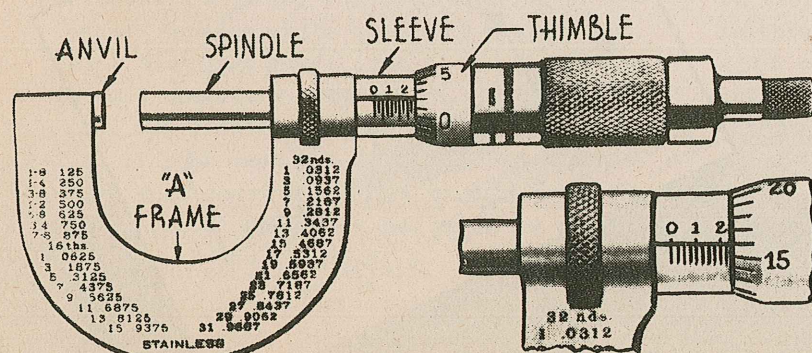


Precision machining is as dependent on the micrometer as an arch on its keystone. The fine clearances in modern engines are possible only because of the micrometer's infallible accuracy.

Yet an amazing number of people (don't blush...you have lots of company) haven't learned to use one because they think it takes a combination of supernatural power and black magic to coax a proper reading out of a harmless little mike.

First off, lets you call it a mike too. That makes it much less forbidding. The next thing is to negotiate one out of the shop sergeant's pocket. If he's too fast for you, pretend you were just checking up to see if he'd miss it. If it comes to the worst, let him chain you to the drill press while you learn how to use the mike following these directions.

O.K. Now hold it firmly (they don't bite) and look it over. Is it an inside mike or an outside mike? If it's like the one in the picture it's an outside mike. But they're both read alike, the only difference is, one makes inside measurements like cylinder bores, bearings, and so on; the outside mike gives readings on pistons, shafts, journals.



Look at the picture to find out what we mean when we say Anvil, Sleeve, Thimble or Spindle. You don't have to name them every time you take a reading, but you've got to put the thing you want to measure between the right parts.

Now let's investigate the hodge podge of little numbers and lines that are jumping all around in front of you.

Look at the lines on the thimble. Each one, starting with the first one above the zero, stands for one-thousandth of an inch (written .001). As you turn the thimble, each time one of the little lines comes even with the horizontal line on the sleeve it means you've moved the spindle .001 toward or away from the anvil. Got it? All right, let's send the spindle all the way down to the anvil and start reading as we open 'er up.

The first line you reach on the thimble, as you already know, is .001, the second is .002, the third .003, and so on 'til you get all the way round the thimble to zero again. Now look down at the sleeve and you'll see a little vertical line peeping out from under the thimble. The vertical line stands for twenty-five thousandths of an inch (written .025) and if you'll notice, you've reached the twenty-fifth line on the thimble. Now as you keep on turning and the thimble moves up the sleeve you'll notice that every fourth line on the sleeve has a number above it: 1, 2, 3, 4, 5, and so on up the line. Each of these numbers represents 100 one-thousandths of an inch or .100 (one tenth if you want to

say it that way), which makes sense because you can see it takes four complete turns of the thimble to reach each of the numbered lines.

Now let's set our mike like the one in the picture #2, and take our first reading. The edge of the thimble is a little to the right of the first line on the sleeve past the line marked with Figure 2. Knowing that this stands for .200 let's jot it on a scrap of paper just that way; then because we remember that the line to the right of the line marked 2 stands for .025 let's jot that down under the first figure. Next we note the graduations on the thimble and sure enough we're on the first line above 15 which we note on our pad as .016. The figures on your pad should look exactly like this:

.200
.025
.016

and added properly make a total of .241

Why of course it's easy, what makes us think there was anything tough about it in the first place? Oh, that rumor-monger over there did, did he? Well, you just give him the special treatment the Army reserves for all rumor-mongers. And let that be a lesson. Don't assume there's anything you can't do until you've tried.

Of course you'll want to get this thing down pat before you forget all you've learned, so pick up a few odds and ends of metal and mike away at them; but bear in mind that the mike is a delicately adjusted precision instrument and shouldn't be bounced around on the floor. So you'll want to avoid forcing the spindle too tightly against the work being measured. Some mikes have a safety ratchet which starts clicking when you have the proper fit, others don't, so treat it as if you had paid for it.

Z-5 Change

One of the most important bulletins in the whole Motor Transport Technical Service Bulletin series has just been revised: Z-5 "Defects and Deficiencies of New Motor Vehicles and New Replacement Parts and Unit Assemblies."

The manufacturers guarantee their

vehicles against all but accidents and poor operation, and when something goes wrong with a new one it must be reported on a Z-5. Why? Well, if the fault is one that's been built into the vehicle, other vehicles of the same model all over the country will probably go wrong. If the first unit having trouble reports it, immediate action can be taken to correct the defect before a stack of trucks go on the dead line.

Repairing the trouble yourself and keeping mum about it helps no one in the long run. The same defect, if uncorrected, may be carried through into the next contract and the second batch of vehicles rolls off the assembly lines with the same mistake. See all the trouble it makes?

Get those Z-5's in soon and keep sending them in. If you haven't received Change 27, which contains the new Z-5, get in touch with Corps Area and tell them you want it. All 3rd and 4th echelon maintenance units are supposed to get them, and all officers responsible for quartermaster purchased vehicles are supposed to submit Z-5's.

Electrical

The Editor,
The Army Motors,

Dear Sir:

We have made some studies of the United States Army maneuvers in North and South Carolina in the interest of finding out how Delco-Remy electrical equipment has stood up and the troubles which occurred.

Several things were learned which we felt would be of interest to you and worthy of some mention in ARMY MOTORS. One thing which was noticed was that some places were steam cleaning the units. This caused moisture to get into the electrical units, such as the regulator, distributor, generator, etc., where it produced corrosion and insulation failures. In a number of civilian bus garages where steam cleaning methods are used, the electrical units are either removed or covered so that they are not subjected to the steam.

There still seems to be a tendency for drivers to make adjustments to regulators just because they notice that no appreciable charge is going into the battery. You

covered this matter very well in a recent issue of the ARMY MOTORS ("Regulators," page 228, November).

A few cases were noticed where the wrong regulator was installed on a vehicle. Regulators look much alike from the outside. It is necessary to check the model number on the name plate to detect differences. Apparently where the wrong regulator was installed, the mechanic failed to compare model numbers or check the application data. This mis-application could cause complete destruction of the generator and regulator.

Very truly yours,

William H. Crouse,
Service Department,
DELCO-REMY

Decals

Decalomanias-known to the vulgarians among us as "cock-a-main-yiz" or simply "decals" - will not be used to apply markings on ambulances as of January 1st. They peel off like banana skins, they fall off in pieces - and generally behave like something worth zero pesos.

From now on we'll be using lustreless enamels to mark ambulances. Lustreless insignia colors may be bought on the Q.M.C. Indefinite Quantities Contract if you like. Several manufacturers are right now on the verge of supplying small kits to the field with paper mask stencils and a small can of "stickum." The "stickum" is sprayed or brushed on the back of the stencil to make it hold while the markings are applied. **WARNING** - allow the stickum to dry on the back of the paper stencil for twenty to thirty minutes before placing it against the side of the ambulance. Otherwise the solvents in the stickum will soak into the ambulance paint and stain it.

In applying the marking, use only the lustreless enamel of the proper shade. And when two or more colors are to be used, allow the first color to dry thoroughly before applying the mask for the second color.

Incidentally, you fellows hate to get things for nothing. We told you in the September AM that new paper stencils and mucilage for numbering army vehicles were available for the asking from all Depots

after October 22. Nobody seems to want them. Here's the dope:-

For 2 inch letters and numerals: USA, stock #53-S-5241. W, stock #53-S-5242. Numerals 0 to 9, stock #53-S-5240. For 4 inch letters and numerals: USA, stock #53-S-5246. W, stock #53-S-5247. Numerals 0 to 9, 53-S-5245.

Chevy Changes

We heard from the Chevrolet people the other day that they're busy making some changes in their new 1-1/2 ton trucks. Among other things:

1. The "Pal" Lock nuts for the radiator support have been replaced with a regular hex nut. Two hex nuts are used on each bolt, one acting as the locking nut.
2. An additional washer has been added to the attaching screws for the voltage regulator to eliminate any possibility of the connector plates shorting on the attaching screws when the terminal nuts are tightened.
3. An additional hole has been added to the upper end of the throttle control rod for the installation of a cotter key to prevent the throttle rod disengaging from the carburetor throttle shaft lever if the throttle control wire breaks.
4. Both the front and rear bearings for the generator will be the permanently lubricated, sealed type.
5. A transfer case mounting bolt lock plate supersedes the present wire used to lock the transfer case mounting bolts. Four plates per job are required.

Hand Brake

Reports indicate that a great many transmission hand brake linings are worn out quickly due to lack of lubrication of the conduit and cable, resulting in the cable tying up.

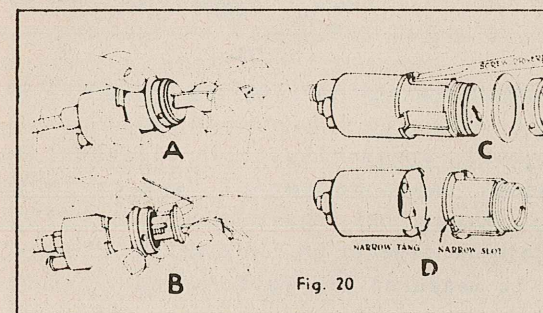
On Page 106 in the Maintenance Manual, covering both the "MA" and "MB" Willys 1/4 ton 4x4 Trucks, attention is called to the importance of lubricating the conduit by putting a few drops of oil at the end of the conduit tube every 1,000 miles, so that the cable will slide freely in the conduit.

Locks & Keys

(CONTINUED FROM JANUARY)

Ignition Lock Cylinder Removal

1. Insert key and turn clockwise until the stop is reached.
2. Insert a stiff wire through the hole in the face of the lock cylinder, depress plunger "A", Fig. 20.
3. Continue to turn the key clockwise until the lock cylinder can be removed, "B", Fig. 20.

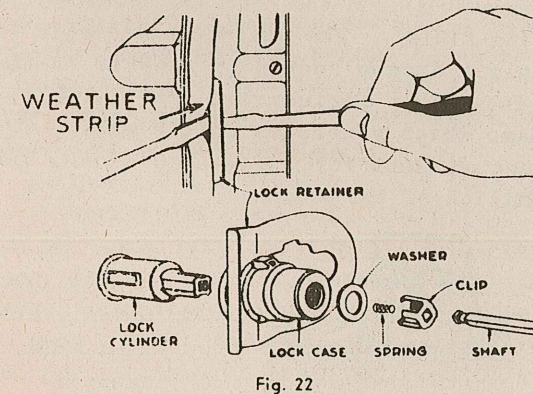


Ignition Lock Case Removal

1. Detach ignition cable from instrument panel.
2. Bend the three lock tangs to remove the lock case, "C", Fig. 20.
3. A new lock case can be slipped into place with the narrow tang engaging the narrow slot, "D", Fig. 20.
4. Bend the lock tangs back securely into place.

Passenger and Truck Door Safety Lock

1. To remove the door safety lock, locate the lock retainer spring under the door pillar weatherstrip (weatherstrip on passenger cars only).
2. Loosen weatherstrip and hold it back to provide access to the retainer, Fig. 22. Then pry the lock retainer spring loose with a screwdriver.



3. After the retainer spring has been loosened, pull it out about 1/2" and remove the lock.

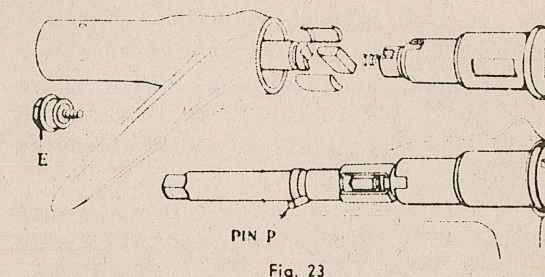
CAUTION: Remove the lock retainer spring from the slot after the lock is out of the door. This will prevent it dropping down between the door and trim pad.

4. To install the lock, place remote control button on inside of door in locked position, slide the lock retainer spring in the door slot just far enough to permit installation of safety lock.
5. Using the key in the lock as a handle, insert the lock as far as possible in door panel without forcing.
6. Manipulate the key between the locked and unlocked positions until the lock shaft slips into place and allows the lock to be forced all the way in.
7. Slide the retainer spring into place in the slot, making sure it engages the recesses immediately under the head of the lock, and re-cement the weatherstrip in place on passenger cars.

Door Handle Lock

Panel truck rear doors and the station wagon right front door and top tail gate have the lock cylinder in the door handle.

The handle is held in the door by the hexagon screw "E", Fig. 23. The retaining pin "P" holds lock cylinder in the handle.



Rear Compartment Lock Cylinder

1. Unlock and open lid.
2. Remove handle retaining nut on underside of lid. Pull handle out.
3. To remove the lock cylinder, drive out the small retaining pin at lower end of shank and draw out the cylinder and case.
4. To reassemble, insert anti-rattle spring in handle, place bolt in slot of handle shank and then install lock cylinder.
5. With the cylinder engaging the lock bolt, install the pin and peen in place.
6. Round off peening burrs with file.

Well, there you have it. Thanks to the Chevrolet Service News we've given you the most comprehensive sequence on lock repair ever seen around these parts. The question is, what good is it? We know you've got plenty of locks and probably keys to fit 'em, too. But what the AM is anxious to find is one good reason for locks of any kind for Army truck doors, ignitions, etc. Isn't it highly probable that in a theatre of operations a perfectly good truck might be left on the deadline because the man with the key has gone with the wind, or a blonde, or even just maybe lost the key?



A NEW PORTABLE

Dynamometer

"Warfare doesn't flow like a stream. Warfare is broken up into small savage bits called battles in which groups of armed men rear back and hurl themselves upon each other. Eventually, both groups spend themselves and fall back to lick their wounds - but the group that *pulls itself together first*, grasps the advantage, kicks off a hot and explosive football, as it were, to its still unready rival, sprawled bloody on the field."

This is the way George Lafacavish Grovney, professor of Clavicaes and Phrognology at Dunderhead University describes the importance of *recuperation* in warfare. Professor Grovney said a few other things such as, "Is it time to eat yet?" which does not concern us at this time.

But his thought on recuperation bears study. In our case, it's the recuperation or quick recovery of motor vehicles after battle with the enemy or the drivers. (We'll take the enemy.)

Think of a vast battle theater with long lines of motor vehicles streaming in every direction. Second, third and fourth echelon mechanics dot the landscape, working frantically to maintain and repair disabled trucks. Now think of the importance of any instrument or machine that aids the work of these mechanics.

Such a machine is the dynamometer - specifically, a *portable* dynamometer which

QM Engineers are now testing for possible distribution to 4th echelon outfits. It sees all, knows all, tells all about an engine. As a matter of fact, a young dynamometer of our acquaintance, was invited to join the experts on "Information Please."

It measures the performance - speed, power, etc. - of engines under different loads. It has clever attachments that check the vacuum and the exhaust. Thusly, it finds the trouble and puts the finger on it.

Though the field portability of this new dynamometer is a "first" for the QM Engineers, dynamometers themselves are nothing new. The "strength-testing" machine in the penny arcade is a dynamometer. As a matter of fact, any "power absorption" unit with gages to measure the power absorbed is a dynamometer.

To test truck engines, two types of dynamometer predominate; the "engine" dynamometer (using electricity to check the power output), and the "chassis" dynamometer (using fluid). The engine dynamometer is simply a dynamo hooked by a shaft to the engine. The engine runs and spins the dynamo which generates electricity. The amount of electricity generated reveals the condition of the engine.

Then there's the chassis dynamometer. Our new portable dynamometer is a *hydraulic* "chassis" dynamometer. It's called "chassis" because the whole truck is placed on the machine for the test instead of just the engine. It's *hydraulic* because water is the "power absorption" medium instead of electricity.

It works this way: you drive the hind wheels of your truck up onto the rollers, start your engine and throw it into gear. The truck wheels spin, the rollers transmit the power to the power absorption unit and the horsepower and speed gages on the instrument panel tell the story.

Possibly the best thing about it is, that you go nowhere fast. That's a strange thing to say, but just imagine sprinting beside a speeding truck to listen for engine noises or decorating said truck with sensitive equipment and gages to discover its horsepower and whatnot.

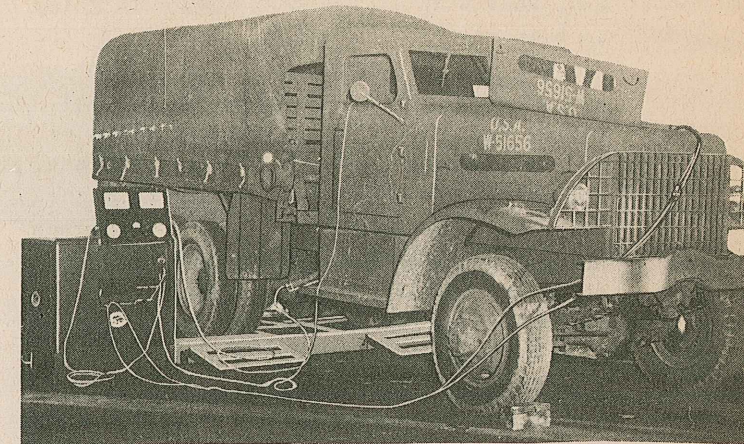
What we mean to say is that the first great advantage in the dynamometer, is that it allows you to run the vehicle through the whole range of speeds, under all kinds of loads, at your convenience in the shop or laboratory. You don't have to guess how much power is being developed.

And the new portable dynamometer the Engineers are testing has more special advantages than you've got hair on your head. In the first place, it's completely portable - besides folding up to the size of a cream cheese sandwich and weighing only 3200 lbs. net, it has its own 6 volt storage battery, generator, voltage regulator and water tank system. This means you won't have to find a good sized city to plug it into - (stationary dynamometers have to cut into the city water system and power lines to make them go).

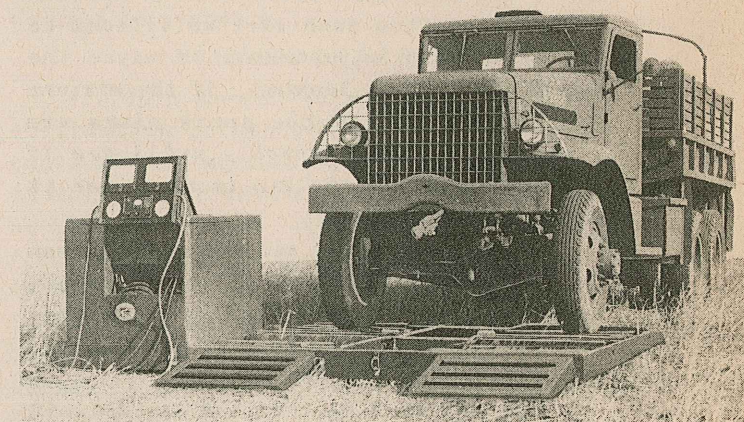
Besides that, a section of its radiator has a circulating pump and a thermostat to provide auxiliary cooling for the truck being tested. A heavily-loaded truck being tested indoors gets hotter than a hottentot.

Some other things we know you'll like: all the rotating parts and bearings are sealed against dust, mud, water; and large plates under the frame allow you to set it up on soft ground.

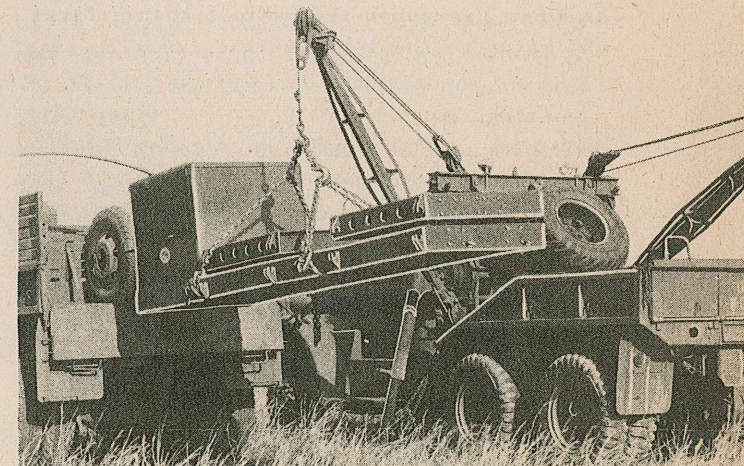
All this, you are no doubt saying, is very interesting, fine and dandy - but



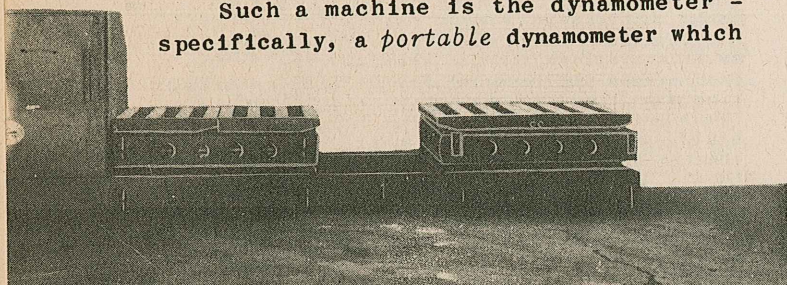
Works as well in the field as in the shop.



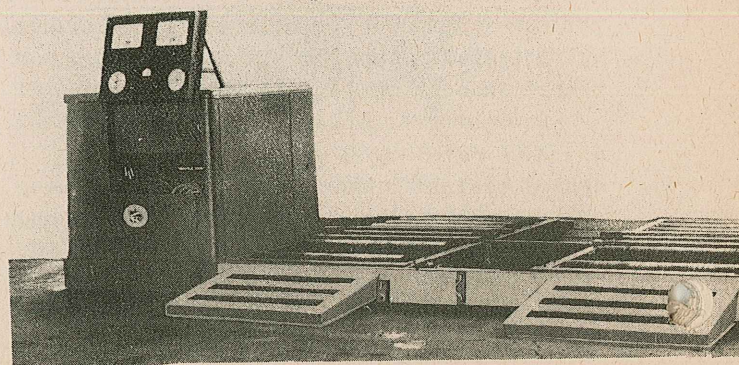
A truck gets the third degree.



Upsa daisy and away we go!



The new dynamometer folded and ready to move.



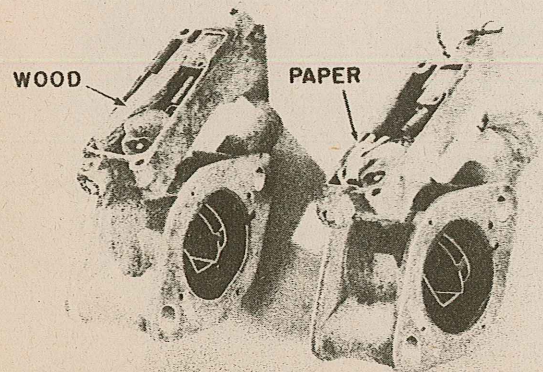
Unfolded and ready for work.

what's the new dynamometer got that I ain't got, what's in it for me? How is it going to help me fix up vehicles faster?

We were coming to that. And the nub of our story is that the dynamometer will detect troubles hidden from the naked ear or eye. Here's how: In the first place, you remember we've been harping on horsepower and speed. Well, drive a loaded truck up on the rollers and give it a run. Now check the horsepower gage on the instrument panel, - ah, you notice the truck is not delivering the h.p. it's supposed to. Something's wrong - without the dynamometer you probably wouldn't know. Let's track the trouble down starting with the "exhaust analyzer" that comes with the dynamometer. This is a long line that attaches to the tail pipe of the truck - it takes a sample of the exhaust gases, analyzes them - and shows the air-fuel ratio. If the mixture is too lean (too much air) we'll look to the carburetor adjustment, or maybe the intake manifold is leaking. If the mixture is too rich, maybe the spark plugs are giving us a "cold" spark - we'll see if they're dirty, if the gap is right, or if they're just no good.

At any rate, we'll search out the reason for the suspicious composition of the exhaust gases, investigating the easiest things to get at first and, by elimination, going on to the tougher jobs.

Same way when we test the vacuum - if there's not enough of it in the lines we'll look for leaky or burnt valves, poor timing, or perhaps the carburetor needs adjusting. As above, we check the easiest things first and go on to the tough.



FROM TRUCK
W-311872

FROM TRUCK
W-311938

Of course, all these things can be done without an expensive dynamometer - but listen to what the test project says, "Improper carburetor settings, ignition timing, faulty spark plugs, etc., which did not show up when the motors were operated without load, became very apparent when the vehicles were placed on the dynamometers and loaded down to their maximum horsepower output."

In other words, you can take the truck and set up certain conditions of load, etc. right in the shop and discover for sure what's wrong, if anything - whereas otherwise, you'd have to depend on observation - which too often is undependable.

The new dynamometer can handle anything in the army that rolls on rubber. "A White 6 ton 6x6 prime mover with a pay load of 12,000 lbs. making a total rear bogie load on the dynamometer of about 26,000 lbs. (the dynamometer accommodates two bogies) was operated continuously at full throttle with the power absorption unit loaded so that it held the speed down to 20 mph. for a period of thirty minutes without any indication that bearings or any other parts were overloaded or overheating."

So you see the new dynamometer is not a toy.

"Like a stethoscope in the hands of a doctor, it's an invaluable aid to diagnosis of engine ills and troubles. In this gypsy war of far-flung battle lines, this completely portable machine follows the fight - an ally to the echelons maintaining the vehicles of battle."

Unquote Professor Grovney.

Exhibit No. 1 in the biggest crime of the month - the jimmying of two inoffensive governors that never did nobody no harm. What's that? They strangled two poor perfectly good engines by cutting down their horsepower so they couldn't pull? You don't blame the driver for slaughtering the governors - you'd do it yourself? Gentlemen, gentlemen, quiet, please. Didn't you read the governor story in the January issue: "Damn Clever These Chinese?" You still don't believe it? OK, OK, you asked for it. Next month we're going to give you a horsepower curve on an engine, with and without governors, proving that the engine isn't strangled by a governor. Watch the March issue for Exhibit No. 2 in the Great Governor Crime story.

RANDOM SHOTS FROM THE

Field Artillery



We are all familiar with stories of phenomenal dual discoveries. Uranium... aluminum... photography... steam power for boats, were all announced from far corners of the globe at strikingly short intervals. So it was eye opening but not amazing, that the 48th Field Artillery produced a distance gauge for vehicle spacing at the same time the AM presented a similar solution to an obviously serious problem. (November, p.232)

People who like to dig into these things, say conditions always demonstrate a decided need. It is entirely logical for more than one person to recognize the need and act to fill it.

The device adopted by the 48th FA Bn.* is a circular disc about eight inches in diameter. They painted the disc scarlet and drew two vertical lines 13/16 of an inch wide and 15/16 of an inch apart bisecting the circle. A few trials proved brilliant orange to be the best color for the lines which they wanted to appear as one line at a distance of one hundred yards.

When they finally arrived at the right color and size combination, they mounted the disc on the tailgate of a cargo truck and parked it a hundred yards from another vehicle. Then they had numerous drivers climb in the rear truck for a practical test. They found that over 90% of the men saw the two lines as one line at the calculated distance of one hundred yards.

Then as a final test of the distance gauge, they put one of the discs on the tail-gate of each truck in a large convoy and set out for San Francisco.

The result, in Colonel Dunkel's own words, attests the value of the orange and scarlet disc: "The resulting preservation of distances on our trip to San Francisco

* According to Lieut. Col. W.C. Dunkel in an article in the Field Artillery Journal.

and return was remarkable although the entire route involved highways packed with ...motorists."

For distances of more or less than the hundred yards adopted as standard by the 48th, you'll have to calculate proper sizes and colors to make the two vertical lines appear as one line to the driver of the vehicle in a convoy.

BLACKOUT DRIVING

"...When secrecy of movement from air observation is desired and speed is essential, such movement can be accomplished at twilight or dawn with slight chance of being discovered. The driver does not require headlights, and observers in planes in the bright sky cannot see his movements in the dusk below. The planes will fly high because they present an excellent target to guns below which are invisible to them.

"In northern latitudes this will often permit a march to be made in an hour and a half that would otherwise require all night to be completed under blackout conditions and then only with difficulty and hazard...

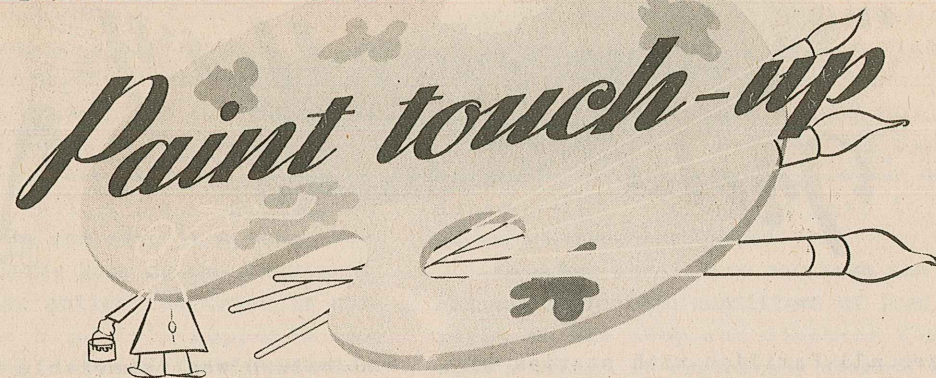
"In the Balkans the Germans often drive with lights at night. Of course, they had control of the air, but they never knew when the British might raid their columns. They figured that they would get more casualties from accidents (mountain roads) if they drove without lights."

TWO GOOD IDEAS DEPARTMENT

"The distribution of parts by airplane should be contemplated and planned for." January FIELD ARTILLERY JOURNAL

"It'll take two days to get them parts. We supposed to get out and carry the cargo?"
"No, sir, the two way radio gets goin' - before you know it the jeep airplane swoops down and lets loose spare parts in a parachute."
O'Flaherty on Supply - October ARMY MOTORS

FOR THAT OLIVE DRAB COMPLEXION!



What is there about a truck that attracts birds like a fire plug attracts dogs? With all the green grass and growing things that *need* it, they go and select your truck. Just the other day we saw a 2-1/2 ton 6x6 fleeing down the road with a sparrow ripping after it as though his life depended on it. What makes them do it?

We'll leave that question for another time. Right now, we'll remind you to get after it - for their acid in their bird droppings, acid to eat into your paint.

Likewise, a scratched fender, a bunged-up door panel, a scuffed hood all mean that the protective coating - the *paint* - on the surface of the truck, has been damaged. Besides looking as unmilitary as Charlie Chaplin's pants, the bare metal, exposed to the ravages of the weather, soon rusts. More than that, it threatens the entire painted surface, for corrosion spreads like a disease - the next thing you know, the truck needs a new paint job.

A little touch-up shortcuts the trouble.

Touch-up is the art of repairing localized damage done to an otherwise perfect paint job. Damage, for our purposes, falls into two classes: 1. grease spots and stains; 2. rust, corrosion, cracks and blistered spots.

Some touch-up fiends view class 1 (grease spots and stains) with cold horror, whip out the old spray gun and throw a coat of paint over it. This is like sweeping dirt under a rug - sooner or later, it'll come to light.

The first thing to do is make every effort to *clean* the spot out. Why repaint when all you have to do is clean? Besides too thick a coat of paint on a vehicle adds

nothing to the durability. As a matter of fact, too thick a coat will fail as quick or quicker than a thin coat of paint.

For ordinary stains (not grease spots) try washing with a sponge using soap and cold water. Rinse the soap off the surface immediately to prevent soap stains. If you've got a steam gun, you'll do an even better job of cleaning.

Grease spots require treatment with solvents. "Stoddard" solvent, naphtha or kerosene followed by soap and water ought to do the job. Since greasy spots gloss up easily, degreasing solvent will remove that unwanted shine from the surface. (An even stronger grease remover for lustreless enamel is in the first stages of development at Holabird right now). But if this doesn't work, then and only then, is paint touch-up the prescription.

Class 2 damage: corroded, rusted, cracked or blistered spots, require a wire "husking." With a stiff wire brush, scratch out all the corrosion on and around the spot, even down to the bare metal. If the bare metal area is more than a foot square, apply, with an old brush or rag, a little metal conditioner (QM Spec. ES 431) in the solution of two parts water to one of conditioner. Leave it on for about two minutes then wash off thoroughly with water. Keep the conditioner off your skin. If some does get on your skin, apply baking soda and wash off with water.

In touching-up, your best bet is to paint the entire panel on which the spot occurs rather than just the spot itself. This reduces the danger of off-color, dry spray edges, and sags (thick overlapping). For some funny reason, you never get the

same color out of the same can of paint twice - so it's practically impossible to blend a repainted area perfectly with the rest of the body.

However, the difference between the old and new paint will be a lot less noticeable if you do the whole panel, and let it be slightly off-color from the rest of the body rather than if you do just a spot - which will stand out like a red patch on the seat of your jeans. (Automobile men call this "body-fender" match).

If, however, you find yourself in the midst of shot, shell and enemy tanks in the middle of no-man's-land, you probably won't have time to paint the entire panel. Do a quick job on the small area alone.

Using #240 wet or dry sandpaper with water or naphtha, sand down an area somewhat larger than the "ding" or spot. Go right through to the bare metal if the spot is of any size or penetrates deeply into the paint coat. Ease up the pressure on the sandpaper as you approach the outer edges. This gradual tapering off gives you better blending. Clean the area well with naphtha and let it dry thoroughly (keep the enemy back with medium-sized rocks).

Apply a coat of rust-inhibiting primer, Spec. 680, Class 1, to the spot, tapering off at the edges so as not to cover the entire sanded area. This keeps the new color coat from standing out from the rest of the surface because of excessive thickness.

Let the primer dry thoroughly, prefer-

Interchangeability gets another boost with an announcement from GMC that drive and pinion gears on front and rear axles of models ACKW and CCKW will now be identical.

THE CHANGES: The gear tooth contact angle is now 20° instead of 14½°. (You can't see the difference, but if you find the number 34861 stamped on the drive yoke of the pinion shaft you know it's a new one). The front axle pinion shaft has been enlarged to equal the size of the rear axle pinion shaft.

THE SPECIFICATIONS: The following are available only in matched sets and are not to be replaced individually.

ably overnight (more rocks). Then inspect to be sure no overspray has gotten on any surface not to be repainted. Use #240 sandpaper very lightly if overspray is present.

At this point, run your finger over the edges of the sanded area. The surface should be slightly concave. If it isn't, sand down the primed area so that there is a slope away from the edges toward the center.

You're now ready to touch up the area with enamel, Spec. 680, Class 4. You can't touch up lustreless enamel with a brush - a spray gun is necessary.

The air-pressure should be very low - about twenty pounds. The paint should be thinned considerably more than for normal paint. A 30% thinning gives the best results: 2-1/2 pints of thinner to enough paint to make 1 gallon.

Apply about three light coats of the thinned enamel, increasing the area of each successive coat 'til the entire sanded surface is covered. Just enough should be applied so that the surface is level and without too much build-up on the retouched area. But here's a secret about paint: *confidentially*, it shrinks. If you want a level surface, the paint has to be piled up slightly when wet in order to be level with the rest of the surface when dry. A little practice makes you perfect.

That's all there is to it.

Heal up the sore spots and no paint job will die young.

INTERCHANGEABILITY

Front Axle Only

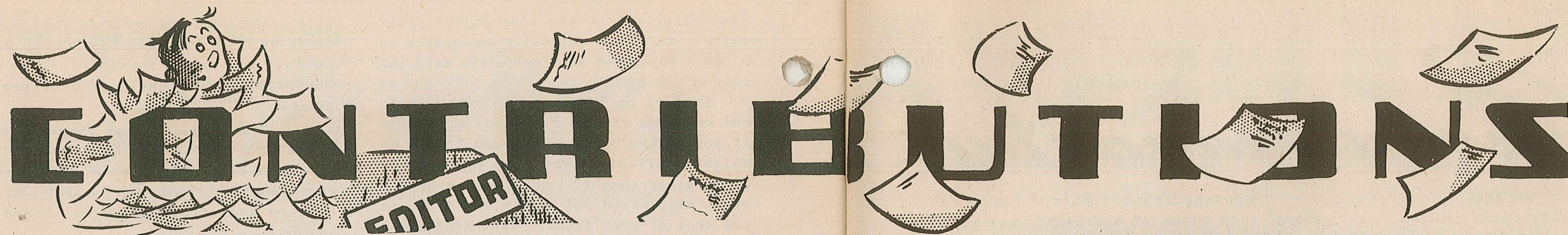
Part No. Old	Part No. New	Description	Quantity
			per Vehicle
2056622	2162389	Drive and Pinion Gear Set	1
142299	120644	Pinion Outer Bearing Cone	2
2056629	678421	" Outer Brg. Cone, Adj. Nut	2
085985	678422	" Outer Brg. Cone Adj. Lock	1
085986	678794	" Outer Brg. Cone Adj. Washer	1

Following Part is for Rear Axle Only

2046778	2162389	Drive & Pinion Gear Set	2
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THE INSTRUCTIONS: Follow present maintenance manual installation instructions when replacing old drive and pinion gear

Continued on inside back cover.



CONTRIBUTIONS

The Editor
Army Motors
Holabird Quartermaster Depot
Baltimore, Maryland

Dear Sir:

I try to "steal" a copy of "Army Motors" each month just to see what the other fellow has to complain about, and incidentally read the rest of it through rank interest.

I have only three squawks to annoy you with this time - Air, Fan Belts and Transfer Case Studs.

Air

Air is free, even at a filling station, but if we ran one hundred and fifty-seven 2½ ton GMC's thru any one or three filling stations for free air, the proprietor would be justified in calling for a defense loan. Air is the only thing about the truck "Uncle" gets free, but howinell d'you get it caged up? I know - we have some tinker toy gadgets called air compressors, and the driver can pump in his spare time, but when he's out for eighteen to thirty hours at a clip on a tactical run, he isn't interested in anything but a self-inflating tire.

Belts

All our trucks are GMC - 110 1940 models and 47 1941 models. After we graduated from the 'oil seal' headache, we ran into the bearing trouble, and through the unit replacement of engines, we became "fan belt funny." The humor is - you can feel funny without feeling fanny, but you can't feel fanny without feeling funny. Seems two engines, identical in all other respects, will have pulleys with two different widths of groove. We don't buy parts, we use the

ones furnished by 3rd echelon, and the belts are all the same size. Part number 596196 the parts manual says, and that is what we get, but they don't always fit. The maintenance manual says they must have about one half inch slack, but by the time we loosen the generator and push it against the block, then pry 'Fanny' on with a screw driver, the pressure is as high in the belt as it is low in the tires. The belt mortality record is three in eleven miles, but most of them last a little longer. The agonizing part is that next the generator bearings go, and after that, the water pump bearing, or worse yet, the tension crystalizes the fan shaft and the only thing that keeps the fan blades from going ahead as advance scouts is the radiator. You guessed it, that doesn't do the radiator any good whatever. One day's operation cost us four generators and one water pump, the next day's operations cost us three generators, two water pumps and one radiator. Have had the GMC service representative down twice, showed him the trouble, gave him some of the "casualties," wrote a long letter about it, and we're still getting 'fanned' until we don't have to feel 'Fanny' to feel funny or even feel downright ugly. I can give you working formula: three fan belts equal one generator, five fan belts equal three generators and one water pump, six fan belts equal four generators, one water pump and one fan shaft plus a radiator.

(Good news for you, Major. Take a look at the fan belt article under HELP, this month. There's a new belt out, half an inch longer, which should solve your problem. Incidentally, the widths of pulley grooves can vary without affecting the operation as long as the slopes of the pulley grooves are identical. EDITOR)

Studs

Late this summer, a driver pulled into bivouac, at Longview and said his truck acted funny - something trying to chew it's way through the bottom of the cab. We crawled under and found nothing more serious than the transfer case hanging by the drive shafts - all studs broke off. Within one month we had seventeen transfer cases down with the 3rd echelon prying the ends out with a hammer and their false teeth. We ran the cause to earth - faulty driving. The driver gallops up to a stopping place, throws the shift into a lower gear, and lets the engine stop the truck. This places a reverse strain on the upper case studs and they soon work loose, then snap. After the upper studs let fly, the lower ones don't last long. The cure wasn't so easy either, - stopping the practice didn't tighten up the studs we knew were loose on a lot of others. But to get a wrench on the upper studs is something to write home about. It's easy with a special double jointed wrench made for that purpose we located in a certain shop, but the owners thereof almost kept it locked in the safe, consequently we don't have one yet, and like torsion wrenches, they 'ain't' authorized. Those upper studs have to be kept tight. The easy way is to let 'em go and the 3rd echelon will tighten 'em up after they drill out the broken ends and turn new studs, but we're trying to remain on friendly terms with them. If you will look under the seat, you'll find a little trap door held down by a couple of screws. Take these out and lift up the door. You'll see parts of the 'underwards' from a new angle, but not the studs which are supposed to be right under that 'bait.'

Find a nice big tree with a substantial limb parallel with the ground about ten or twelve feet above the ground, run the truck under it so the limb is right over the cab, then loosen the bolts holding the cab on the chassis, and by hooking a block and tackle to the cab, you can lift it up in the air and there's your trouble right out in plain sight. It only takes two minutes to tighten those pesky studs and you can put the cab down again for another month. I simply was lacking in 'intestinal capacity' and gall to make the mechanics lift all those blooming cabs, so I thought hard. Why not cut a new 'trap door?' Sure, that's the answer, but by that time I remembered a regulation which says you can't cut holes in Army vehicles, so I had to hide that one from the mechanics. I didn't cut any holes and I didn't tell them to, but some day I'll have to give somebody hell for violating Army Regulations, - and maybe I better quit thinking out loud.

Until September, I did not have a single officer who had ever been to or through a motor school, a few of the mechanics had been through some kind of school years ago, but most of us had to learn by the hardest school of all - actual operation. We of the operating end have learned motor transport the hard way, and pass tips and bugs to one another for what they are worth.

Every vehicle of this battalion goes through our own school-shop each month for a complete service check and "lube" job, the chief mechanic and his assistants work directly under my own supervision, so if you have any problems we can help you on, we'll be glad to do so, we've ran into most of them already.

(Signed) Austin E. Corpe,
Major, 2nd Bn. 47th QM Reg.,
Commanding.

READING

Current magazines

"INFANTRY JOURNAL"

January 1942

"SOP For Motor Marches" - A schedule of "Standing Operating Procedures" is the one way to simplify control of a motor march. This well-rounded article suggests a basic plan easily adaptable to individual circumstances. The wide awake officer will read this one.

"Rifle Regiments" - Included in this story of troop movement is an excellent and detailed section on motor movements. Read it for a realistic picture of troop movement by truck through a combat zone.

"FLEET OWNER"

January 1942

"Preventive Maintenance" - Any friend of the Army's is a friend of the commercial trucker. Here's the story of how PM is used and appreciated by the commercial fleet owner.

"How To Prevent Tube Failures" - Everybody talks about tire care but how about tubes? This well-illustrated article lists the various types of neglect and abuse that tubes suffer. A good thing to clip and hang in your shop.

"MOTOR AGE"

January 1942

"Carburetor Cleaning" - A review of the process of cleaning carburetors by immersing them in a solvent. A practical method of parts cleaning without the necessity of tearing them down.

"Aim The Headlights" - Oldtimers who have forgotten and newtimers who don't know how, might like this brush-up on adjusting headlights. Although blackout driving is the coming thing, you'll still have plenty of occasion to use your lights.

"Shooting Trouble With A Pressure Gage" - "A piece of equipment that will tell you as much about a car's innards as anything in the shop" - if you know how to use it. This article introduces you to the pressure gage, and tells you something of its use.

"How To Repair Damaged Tires" - A well illustrated article on the "how" of repairing casing breaks. You can't read too much on tire repair - what with the Army's new retread program.

"AUTOMOBILE DIGEST"

January 1942

"Tire Repair" - If you've got your eye on the Army's proposed Tire Rebuilding course, you might like to read this approach to tire repair. Especially good on methods of tire inspection.

"COMMERCIAL CAR JOURNAL"

January 1942

"More Miles From Replacement Bearings" - A really complete discussion on why replacement bearings give only half the mileage of the original bearings - and ways to cut down this ratio.

"THE AMERICAN AUTOMOBILE"

January 1942

"The Army Really Tests Them" - A civilian's-eye-view of how Holabird's rigid testing program has and is affecting commercial truck design. Better written than most.

"MOTOR"

January 1942

"Preventive Service Will Help Preserve Parts" - Don't miss the rogues' gallery of parts ruined through abuse and neglect in this article - a photographic purgatory for careless motor transport personnel.

REVIEW

Latest books



DYKE'S AUTOMOBILE AND GASOLINE ENGINE ENCYCLOPEDIA, The Goodheart-Wilcox Company, Inc., Chicago, Illinois, Nineteenth Edition, 1941, 1,483 pages, \$6.00.

Dyke's is big - the biggest book on the motor vehicle that we've seen. It's complete - more dope in it than you could digest in a year. It's all embracing - it tells you how to drive, repair, wash, polish, maintain and start a vehicle, and for good measure throws in sections about aeroplanes, diesels, tractors, tools, sources of automotive information and how to build and equip a garage. It's up-to-date - giving information on hydraulic transmissions and current and voltage regulators.

There's no use trying to tell you specifically what's in it because everything that a motor man needs is in it, and there's no use trying to point to any one section as being better than the rest because the whole job has been done to one standard. All in all it's so valuable a book that no mechanic or motor sergeant should be without it because there's no other book like it on the market.

And that's the only complaint we have with Dyke's. There isn't enough competition to persuade the publishers to overhaul the Encyclopedia from stem to stern. It needs severe editing throughout - not to bring it up to date, because it is up to date - but to make it easy to use, to simplify the descriptions, to modernize the illustrations and to weed out a lot of antique equipment and methods that clutter the book. It's a big job, no one knows that better than your reviewer, but if Dyke's is to lead the field by merit,

and not by lack of competition, the job should be done.

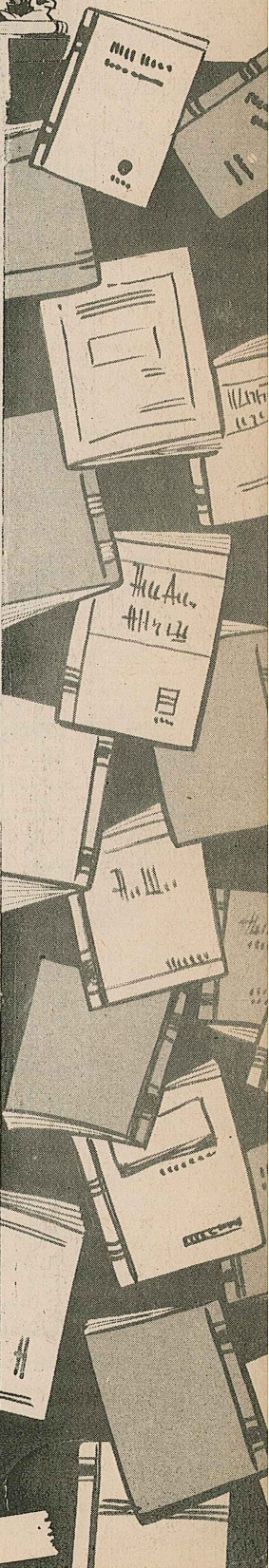
Let's see if we're right about this: The first page of the book says that in trucks "the electric starting motor is seldom used. Instead, the engine is cranked by hand..." and that "a high-tension magneto is usually used" instead of battery ignition system. Quite a few years ago, this was true, but not now. Personally, even if I knew very little about trucks, I'd probably know this was wrong. I'd immediately assume that if there's a mistake on the first page, how can I depend on the information on the rest of the pages?

Under the operating instructions it says "The spark and throttle levers are, in most instances, placed on the steering wheel." This was true in the early '20's, but not now, and once again doubt is cast on the reliability of the book - which is a shame, because Dyke's is eminently reliable. The only trouble is that there is too much old mixed in with the new.

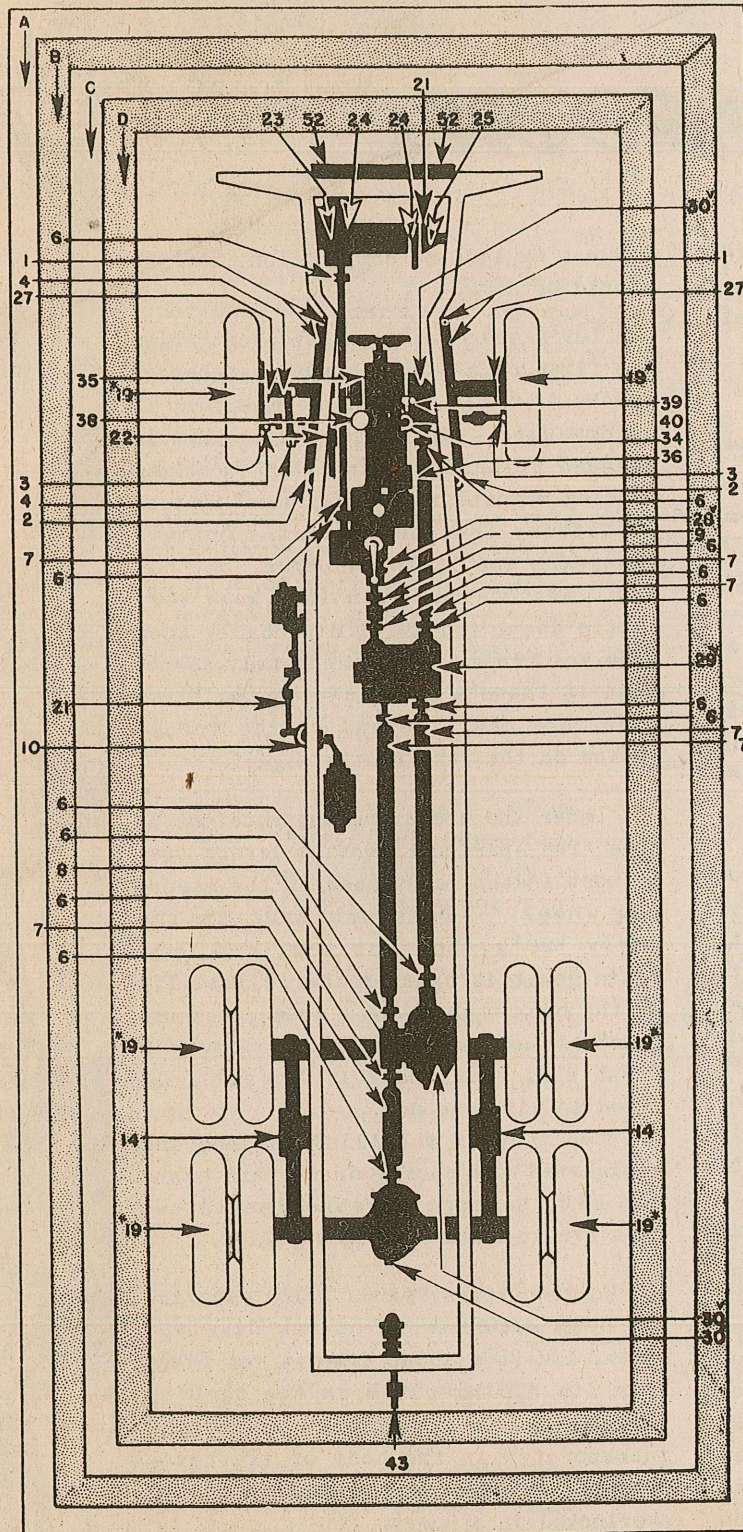
Too many of the illustrations are antiquated and poorly drawn, and stand out all the more because the latest ones are so unmistakably superior.

For ten years, since 1932, material has been accumulated on new developments, and it's about time it was taken from its hiding place in the back of the book with a separate index and incorporated in the body of the text. Valuable information can be too easily overlooked in a hurry.

In other words, Dyke's is the best encyclopedia on the market. Despite its editorial imperfections, we recommend it heartily as the motor man's bible.



Typical Lubrication Chart Layout



1. Spring Shackle
 2. Spring Bolt
 3. Tie Rod End
 4. Drag Link
 5. Universal Joint
 7. Slip Joint
 8. Propeller Shaft
Center Bearing
 9. Speedometer
Adapter
 10. Lever Shaft
 14. Spring Bearing
 19. Wheel Bearing
 21. Linkage
 22. Steering Gear
 23. Winch Worm
Housing
 24. Winch Drum
 25. Winch Shaft
 27. Axle Universal
 28. Transmission
 29. Transfer Case
 30. Axle Housing
 34. Distributor
 35. Generator
 36. Starter
 38. Air Cleaner
 39. Crankcase
 40. Crankcase Breather
Cap
 43. Pintle Hook
 52. Winch Cable Roller
- * Requires disassembly
v Vent

TOOLS

Cleaning Rag
Screw Driver
Open end Wrench
Adjustable Wrench

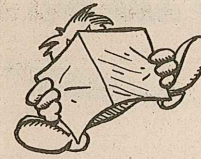
INSTRUCTIONS

Clean and lubricate all points in the order indicated, except those which require disassembly. Clean all vents. Check and adjust level in housings. Disassemble as separately instructed. Drain as separately instructed.

Frame A	Chassis grease
Frame B	Item 21-Engine oil Others-Gear oil
Frame C	Engine oil
Frame D	Item 22-Gear oil Others-Chassis grease

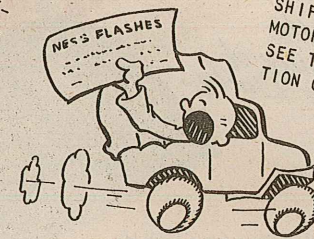
	Above 0° F	Below 0° F
Chassis grease	#2	#1
Engine oil	SAE 30	SAE 10
Gear oil	SAE 90	SAE 80

O.M. SUPPLY DEPOTS STOCK STEERING GEAR ASSEMBLIES TO REPLACE WITHOUT CHARGE DEFECTIVE ONES ON 2½-TON 8x8 G.M.C. TRUCKS. ATTACH A TAG TO EACH ASSEMBLY GIVING SPEEDOMETER MILEAGE OF TRUCK IN ADDITION TO SERIAL AND U.S. REGISTRATION NUMBER. REQUISITION ALSO MUST BEAR THIS INFORMATION.



TECHNICAL SERVICE BULLETIN FF-1 OQMG FEBRUARY 1, GIVES PROCEDURE-REPAIRING 250 GALLON WATER TANK INTERIORS. IF YOU HAVE ANY THAT ARE RUSTY, CHIPPED OR BLISTERED DON'T FAIL TO READ THIS BULLETIN.

SPECIFICATIONS ON LUBRICANTS OF ALL KINDS ARE UNDERGOING RADICAL CHANGES TO SIMPLIFY PURCHASE AND STOCKAGE, TRANSPORT AND USE IN ARMY VEHICLES. DON'T STOCK EXCESSIVE RESERVES UNTIL NEW SPECIFICATIONS ARE ISSUED.



TO AVOID RUN DOWN BATTERIES, CUT FEET DUE TO BROKEN GLASS, AND ICY WINDSHIELDS TO IMPROPER HOOK-UPS, READ TECHNICAL SERVICE BULLETIN X-16 ON ELECTRIC DEFROSTER INSTALLATION ISSUED BY THE OQMG FEBRUARY 1, 1942.

ALL REQUESTS FOR PARTS COMMON MANUALS AND INTERCHANGEABILITY CHARTS SHOULD BE ADDRESSED TO THE OQMG IN WASHINGTON. HOLABIRD DOES NOT STOCK THESE PUBLICATIONS.

INTERCHANGEABILITY NOTE: CORBITT 6 TON 8x8 PRIME MOVER FRONT SPRING CLIPS HAVE BEEN LENGTHENED ONE HALF INCH AND THREADED SO THAT WHITE AND CORBITT FRONT SPRINGS ARE INTERCHANGEABLE.

INTERCHANGEABILITY

Continued from page 331.

sets in rear axles with new part #2162389; no additional parts are needed.

Proceed as follows when replacing front axle drive and pinion sets:

1. Follow Maintenance Manual disassembly instructions.
2. Install new bearing #120644 and pinion shaft to pinion cage, using new adjusting nut #678241 and washer #678794. Adjust according to manual.
3. Install nut lock #678422 and nut #678421.

THE DODGE INSPECTORS WANT US TO REMIND YOU TO LUBRICATE BOTH THE SPLINE AND THE CROSS ON BOTH THE MECHANIC'S AND THE UNIVERSAL PRODUCTS TYPE UNIVERSAL JOINTS.

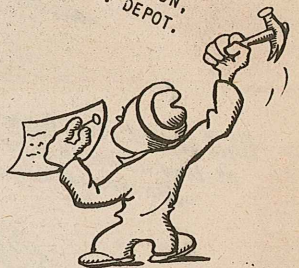
FLASHES

TOO HOT TO HOLD
THESE STOPPED THE PRESSES

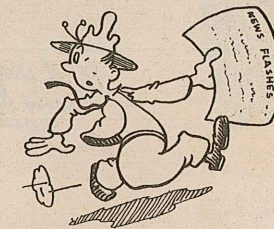


TO OVERCOME FORMATION OF CONDENSATION BEING REPORTED IN FILTER-TYPE VALVE COVERS OF SOME MODEL CCKW 353 GMC'S, ALL VALVE COVERS ON ENGINES FROM 270-43082 TO 270-71802 WILL BE REPLACED. REQUISITION THEM DIRECT FROM THE FORT WAYNE MOTOR SUPPLY DEPOT SPECIFYING REGISTRATION AND ENGINE NUMBERS OF ALL YOUR VEHICLES WITHIN THE ABOVE SERIES. AFTER MAKING REPLACEMENTS STAMP REGISTRATION AND ENGINE NUMBERS ON EACH FILTER-TYPE COVER, PACK THEM ALL IN ONE CRATE AND SEND THEM COMMERCIAL SHIPMENT COLLECT TO MR. L. T. FLYNN c/o GENERAL MOTORS TRUCK AND COACH COMPANY AT PONTIAC, MICHIGAN. SEE TECHNICAL SERVICE BULLETIN M-11 FOR ILLUSTRATION OF BOTH TYPES OF COVERS.

A LIMITED QUANTITY OF THE DECALCOMANIAS MENTIONED IN MTTSB M-9 ARE AVAILABLE AT THE FIELD SERVICE BRANCH, TECHNICAL SERVICE DIVISION, HOLABIRD O.M. DEPOT.



WHY AREN'T YOU CHANGING OVER TO THE NEW MOTORCYCLE BLACKOUT SWITCH ANNOUNCED IN JULY AND ON WHICH WE PUBLISHED PROCUREMENT DATA IN AUGUST? DON'T YOU REALIZE YOU ARE GOING TO NEED THEM? DON'T YOU KNOW THEY ARE FREE?



IF YOU'VE BEEN PRACTICING WHAT ARMY MOTORS PREACHES ON CONSERVATION AND MAINTENANCE, OQMG CIRCULAR LETTER NUMBER 48 WON'T BOTHER YOU. IF YOU HAVEN'T, READ THE CIRCULAR AND PREPARE TO START LIVING A NEW AND MORE USEFUL LIFE.

THE SAFETY CHAINS AND LUNETTES FOR ONE TON TWO WHEEL TRAILERS MENTIONED IN MTTSB X-11 ARE STOCKED AT THE FORT WAYNE MOTOR SUPPLY DEPOT.



Says Hitler.

AMERICA, ALREADY CUT OFF FROM HER RUBBER SUPPLY, CANNOT POSSIBLY WIN THIS WAR. THE AMERICAN MILITARY DRIVER, NATURALLY CARELESS AND WASTEFUL, CANNOT AND WILL NOT LEARN TO CONSERVE RUBBER ...

ALL IN FAVOR OF PROVING ADOLF *WRONG* ...

Say I

... Will check the air pressure of my tires Daily.



UNDERINFLATION - wears outside of tread and shoulders. Tire flexes violently and overheats. **OVERINFLATION** - wears center of tread, wastes mileage. Tires skid, ride hard and bruise easily.

Will report misaligned or unbalanced wheels immediately.



WHEELS OUT-OF-BALANCE - twisting and pounding action wipes off tread in wavy spots. **WHEELS-OUT-OF-LINE** - Too much "toe-in" or "toe-out" of front wheels and bad camber (outward tilt of wheels) scuffs away rubber. A wheel 1/2 inch out of line drags tire sideways 87 ft. per mile.

Will inspect my tires daily for broken casings, nails and tread cuts.



BRUISES - hitting curbs or ruts breaks cord fabric inside tire, starts blowouts. **TREAD CUTS** - separate tread from body, ruin tire. Easily repaired if caught in time.

... WILL USE MY BRAKES CAREFULLY - SHIFT INTO SECOND ON STEEP HILLS!

... WILL REGULARLY ROTATE MY TIRES FROM WHEEL TO WHEEL TO EQUALIZE WEAR!

... WILL DRIVE AT A SENSIBLE SPEED, START AND STOP SLOWLY SO THE RUBBER WON'T GRIND OFF MY TIRES!

Will report Brakes out of adjustment or Brake Drums out of line.



BRAKES - out of adjustment or brake drums "out-of-round" cause one tire to scuff and slide more than others, wears tread in one spot.



A TIRE ON MY TRUCK ... IS WORTH A BOATLOAD IN BORNEO