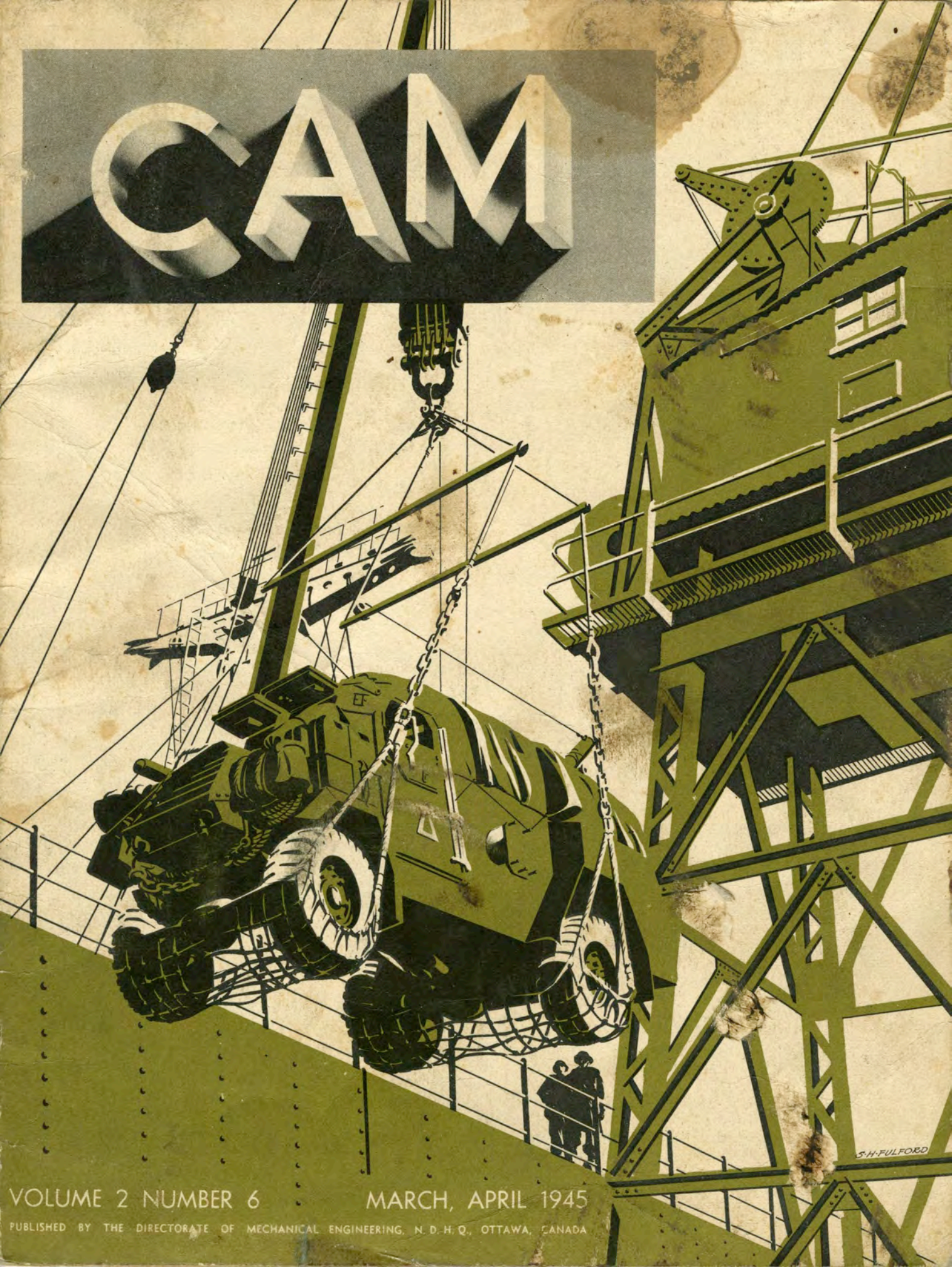


# CAM



S. H. FULFORD

VOLUME 2 NUMBER 6

MARCH, APRIL 1945

PUBLISHED BY THE DIRECTORATE OF MECHANICAL ENGINEERING, N. D. H. Q., OTTAWA, CANADA



# A slight 'tch



**W**E have run into a spot of bother. This in itself is not unusual—even the most highly organized and efficient operations have their problems, but problems are the things which we have to overcome if we are to make progress. Generally speaking no problem is large enough to be insurmountable, but sometimes it becomes necessary to effect a temporary compromise, until conditions can be readjusted to a point of normalcy.

The exigencies of the situation overseas has given rise to a demand for manpower. We, like everybody else in Canada, have made our contribution to this demand which has caused a temporary backlog in the production of our magazine. On top of this, by force of circumstances, we have been compelled to make new printing arrangements. These two conditions have precluded any possibility of our getting out the March and April issues on time. We have, therefore, decided as a temporary expedient to publish this as a single issue covering both March and April. This will be Volume 2 No. 6. Further, since this action was necessary we have under consideration the idea of consolidating four issues into two releases later in the year which will enable us to complete our twelve issues with the termination of the Calendar year rather than September as at present.

We trust you will bear with us in this temporary measure with the assurance that we will continue to pass the ways and means of equipment maintenance in the best way we know how and to the limit of our means.



MARCH, APRIL — 1945  
VOL. 2 No. 6



## Contents

	Page
Repair Schedules .....	101
Spark Plug Cleaners .....	102
Automatic Pistol .....	104
Benny Boob .....	104
Generators .....	106
Sgt. O'Sweat .....	108
King Pin Wear Tool Box Oil Cans Ford Battery Indicator	
Spray Painting .....	110
Parts Left Over .....	114
Pushing Vehicles (For B.F.s) .....	116
Quiz .....	117
Chore Horse .....	119
Special Tools .....	120
Semi-Annual Index .....	Inside Back Cover

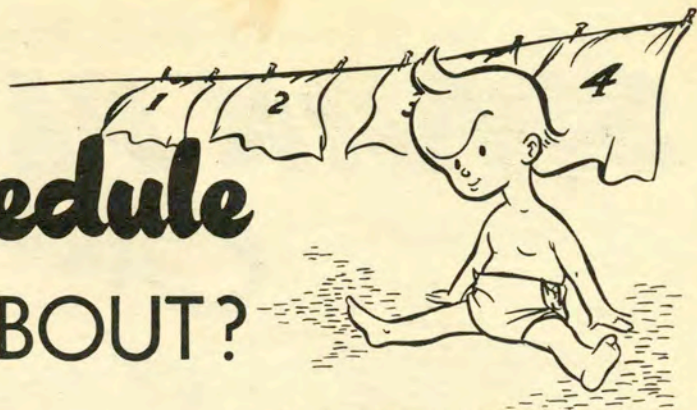


CAM is published monthly in the interests of Mechanical Maintenance, and directed to the non-commissioned officers and men of the Canadian Army.

Your contributions of articles and ideas are welcome. Address all correspondence to the Editor, CAM, Directorate of Mechanical Engineering, Department of National Defence, Ottawa.



# WHAT'S THIS Repair Schedule BUSINESS ALL ABOUT?



**H**AVING suffered unnecessary mental misery over this 'Line' and 'Echelon' business, we finally cornered a gent the other day who can speak without a lisp and with authority on the subject. Murphy gave it to us neat.

According to Murphy—to get the picture straight, some idea of the situation as regards overseas field formations is called for. With this as a basis, the story can be adjusted to show the adaptation of these matters to the Canadian picture, where mobility is not the factor it is over thar.

Let's take it the way Murphy tells it. *Repairs* are divided into four echelons. You might call them grades, types, divisions or layers, but don't. Call them 'echelons'. Every repair job can therefore be classified as a first, second, third or fourth echelon repair.

The *workshops* that do these repairs are also divided into four 'lines'. You might call these grades, types, divisions or layers, but don't. Call these 'lines'. Every repair organization therefore (starting with Units and L.A.D.s) can be called a first, second, third or fourth 'line' workshop.

To help you know a first, second, third or fourth echelon repair when it's staring you in the face, you should know the principles on which they're split up. Thus:

**First echelon** repairs are those adjustments, minor repairs, replacement of accessible components, emergency

replacement of certain assemblies and light welding repairs which can be carried out in units, by unit personnel and/or L.A.D.s with the tools and equipment available.

**Second echelon** repairs are primarily the replacement of defective assemblies by new or reconditioned assemblies. In addition, repairs to certain assemblies and items not dealt with as assemblies insofar as they can be satisfactorily completed in the time and with the personnel and equipment available to the workshop.

**Third echelon** repairs are primarily the repair of assemblies by fitting new or reconditioned parts and secondly the repair of defective parts. The extent of these repairs is limited to work not requiring extensive or elaborate testing apparatus.

**Fourth echelon** repairs cover all repairs not specified as 1st, 2nd or 3rd echelon.

**First 'line'** workshops undertake first echelon repairs.

**Second 'line'** workshops undertake second echelon repairs.

**Third 'line'** workshops undertake the overflow of second echelon repairs in emergencies.

**Fourth 'line'** workshops undertake the bulk of third echelon repairs and all fourth echelon repair. In the active field formations, first and second 'line' workshops are mobile enough to keep up with the moves of the formation whose equipment they maintain. Likewise *third line* workshops, though not fully equipped with transport are sufficiently mobile

to keep up with the formations they service. *Fourth line* workshops are static and normally located in base areas.

In Canada, where the factor of mobility is practically nil we find what would correspond to the unit facilities or L.A.D. overseas becomes a Unit Garage, housed in a permanent building. Canada's R.C.E.M.E. workshops, also static and equipped with a permanent roof over their heads, carry out second, third and fourth echelon repairs and are comparable to a combination of second, third and fourth line workshops in the field.

Right here the brighter characters are going to ask for closer definitions of where one 'line' stops and another takes over. Sure—there's got to be rules in a repair organization of this size—and we've got 'em. In Canada the rule book for 'A' vehicles is the R.E.M.E. Repair Schedules. 'B' vehicles are covered by Permissive Repair Schedules (P.R.S. 1). These schedules lay out the 'echelons' of repair which may be carried out by Units and L.A.D.s or R.C.E.M.E. workshops to ensure these important considerations:— *One—That vehicles and equipment are repaired in the best way by the most suitable 'line' formation available in the circumstances. Two—That vehicles and equipment are not put out of action by attempts at repair beyond the facilities of the line concerned (in Canada—the Unit Garage).*

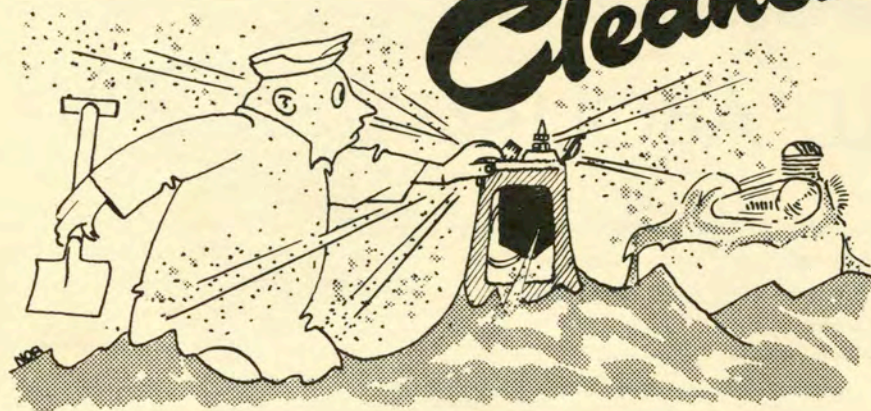
Tied right in with these two considerations, and largely governed by

(Continued on next page)



Cleanliness is next to impossible if you neglect your . . .

# SPARK PLUG Cleaner



**C**ONFIDENTIALLY, "Pop" was an old plugger. Since the horse and buggy days he'd been fixin' everything from roller skates to big trucks. But for nigh on fifty years he had been in a rut. He took twice as long than was necessary to do a job because he let his tools and equipment go to pot. You'd see him cutting a frame with a broken down hack-saw, working with dull and bent screwdrivers, a dull centre punch or chisel.

We saw him cleaning spark plugs one day with his jack-knife and asked, "why don't you use your plug cleaner Pop?" "Well son," he said, "I just aint had the time to fix that

thar plug cleaner yet—but I'll get to it one of these days."

We heard that Pop kicked the bucket last month and he never did get around to fixing his plug cleaner. But what's that got to do with you? Well, when we got the news about Pop we thought of you—we wondered how often you can slip a plug on your spark plug cleaner, shoot the sand to it for not more than five seconds and have a plug that shines like the light in her eyes on Saturday night.

A new cleaner will give you that kind of a job—at least it will until the sand gets dirty and the nozzle and adapters become worn. When this happens the cleaner may not

work at all, or it may operate in spurts. When the cleaner gets in this sad state you'll maybe find the mechanic shaking the cleaner like a playful pup shakes a slipper. Or he may remove the spark plug from the cleaner while the air is still connected to see if there's any sand coming through the nozzle—thereby catching himself a sudden blast square between the eyes.

Why? That's what we want to know. You wouldn't try to drill a hole with a dull drill. You wouldn't try to shave with a dull razor. You wouldn't eat your meals off dirty dishes—so why try to clean plugs with a dirty or worn out plug cleaner that acts like its last P.M. job was done by Gravel Gertie?

Champion and A.C. cleaners differ slightly in appearance and construction but they both work on the same principle. Fig. 1 shows what's in the bag of the Champion cleaner. You can see that it operates much like a spray gun—or any other kind of atomizer.

The compressed air shooting out jet "A" causes a vacuum inside the nozzle "N" which pulls up the sand from the bottom of the canvas bag. It's as simple as that, but here's what goes wrong with it after it has been in use for awhile.

First of all a very natural thing happens. The sand gets dirty. You, or your Sarge (or even O'Sweat) can't tell how long the sand will take

## REPAIR SCHEDULES—(Continued from page 101)

them, are the tools and repair equipment made available to a unit. The rule books here are the Scales of Issue (C.A.R.O. 3427 and subsequent amendments). The referee is the Sr. E.M.E. of the formation, concerned, for he authorizes the actual issue of these tools, either in whole or in part, according to the size of the unit, number of vehicles on charge and the facilities and personnel available. Even a complete scale of issue in the hands of a well

housed unit garage do not make it a second line workshop, for it is still equipped to handle *only* first echelon repairs.

The extent of issue of tools and equipment to a unit can in fact govern its capacity to even carry out all the first echelon repairs that are laid down in the schedules, in which case the wise unit recognizes its limitations and carries out *only* those repairs which it is capable of handling.

Too many units have gone off the deep end in trying to complete repairs and incorporate design changes which were over their heads—at the expense of much necessary first echelon repair work that was within their capacity, consequently ending up with less efficient equipment than if they had stayed in their own league.

Which sounds like all meat and potatoes to us Murphy.



to get dirty. That depends on how you use it. If you try to clean plugs that are oily and coated with heavy deposits of carbon you can be sure the sand will get dirty in a hurry. That's why you'll knock off the worst of the carbon with a wire brush, dip them in gasoline or varsol and dry them thoroughly with compressed air **before** you sand blast them.

The cleaning compound isn't the same kind of sand you get your shoes full of at the beach. It's special stuff made of crushed stone. It has sharp edges which, when forced under pressure, cut off the deposits on the spark plug insulator. If moisture, oil and carbon is mixed with the sand its like tossing cream-puffs at those hard deposits. To do a good job then—you must use clean dry sand.

When the compound becomes dirty it should be completely *emptied out* and about 1½ pounds of fresh compound installed. If used properly this will do about 200 spark plugs.

Some spark plug cleaners have a water trap—other types of cleaners rely on the condensation being re-

moved from the compressor and air line before the air reaches the cleaner. Everyone knows that sand blasting can't be done with mud—therefore moisture **must** be kept out of the bag one way or another.

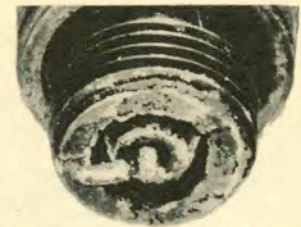
Cleaning oily or wet plugs with the sand blaster is another fast way of spoiling the compound. Oil tends to make the particles of sand stick together and stick in the corners and around the sides of the bag. If you have to pat or shake the bag so the sand will fall down to the bottom—you've got a case of sad-sack sand-sack and it's a sure sign it's time to change the compound.

Then there's the possibility of other things besides compound getting inside the bag. The most common of these are spark plug gaskets and spark plug terminals. If these, or any other small foreign objects, accidentally fall into the bag they are likely to restrict the opening of the intake tube at the bottom of the bag, cutting off the compound and there's no doubt that you can't clean a plug by just blowing air at it.

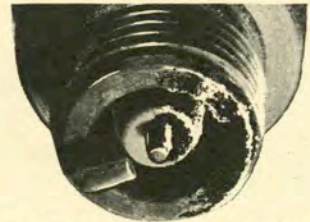
Every type of cleaner has a nozzle that is replaceable. The abrasive qualities of the sand beat the daylight out of the nozzle and before long its hole becomes egg shaped. When this happens—instead of blasting the sand where it will do the most good—the blast is to one side and its effectiveness is partly lost. This means a poor cleaning job.

New cans of compound usually contain new nozzles which should be installed at the same time you put in fresh compound.

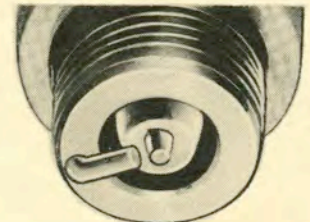
Here's another source of grief. Desert operation has proven the necessity of keeping grit and sand out of engines. Yet in many shops you'll find a small sand storm in the vicinity of the spark plug cleaner when it is in operation. This fine abrasive is just about the worst thing you can feed air compressors, vehicles



1.—This dirty little number is how the plug looked when it came out of the engine.



2.—This is how it looked after blasting it for 30 seconds with an inefficient cleaner.



3.—Another plug—spick and span—Cleaned for 5 seconds after the cleaner had been given a going over.

Fig. 2

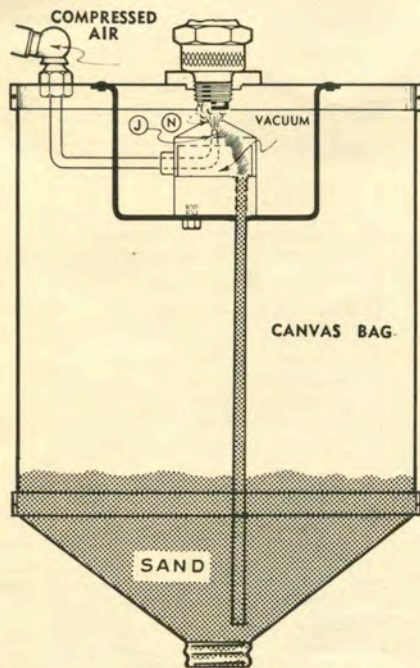


FIG. 1 Now you know what's in the bag.... of a Champion cleaner and how the compound is blasted on the plug.

or any other machinery in the shop. The solution to this problem is to never have the plug cleaner located close to the air compressor or in a part of the shop where engines are overhauled, and especially — never operate it near stored lubricants.

If the plug cleaner is in good condition a minimum amount of compound will leak out. But if the various spark plug adapters are worn—if you're using too much air pressure or if the filter elements are old—then you're really going to spread sand all over the shop.

The way you hold the spark plug in the adapter also has a lot to do with the amount of compound that escapes. If the cleaner is operating properly, the plug will come out clean

(Continued on page 109)



DEMENT T. ROWDY  
SOUNDS OFF ABOUT—

# Self-loading PISTOLS

LAST Thursday, what with Pte Kizel and a touch of rickets between the ears. I am feeling particularly unhappy and wishing to end it all. I firmly press the muzzle of one of the Army's new self-loading pistols to my right temple and press the trigger. Now obviously the pistol does not go off or I would not be sitting here writing this and since the pistol is freshly loaded I am much surprised. I finally discover that pressure on the muzzle of these pistols will move the slide far enough to the rear to disconnect the trigger sear mechanism and am so interested that I postpone my demise indefinitely. My mental processes thus stimulated cause me to think that there may be things about the new self-loading pistol that many people do not fully understand.

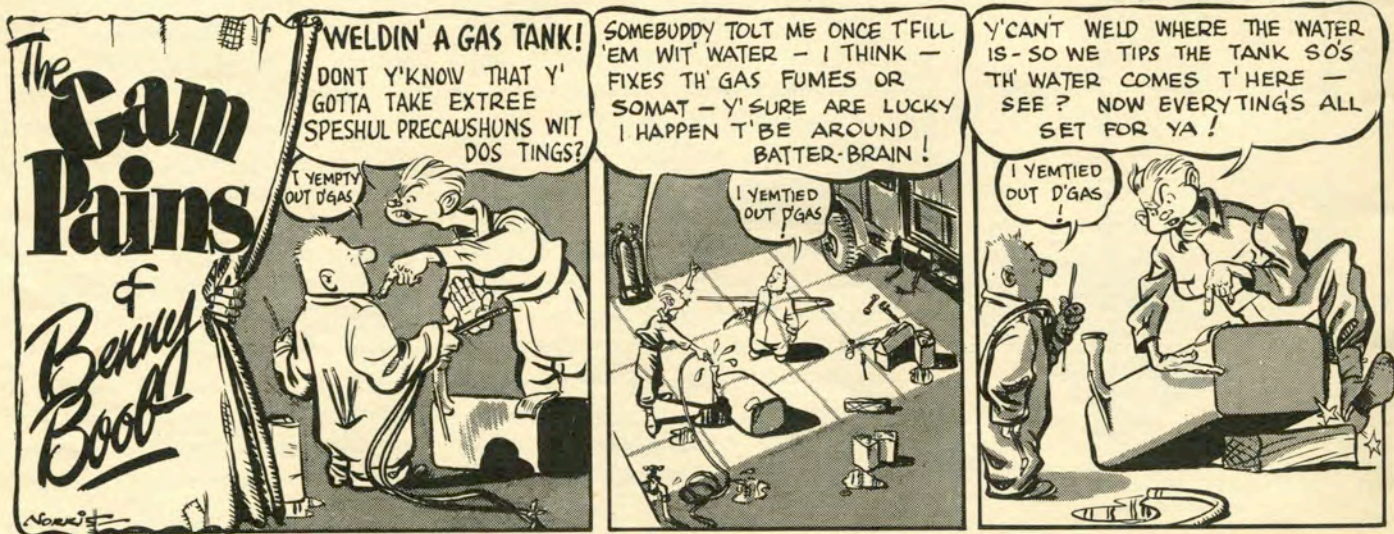
In the first place the pistol has a "floating" firing pin which, a technical man tells me, means that the



firing pin is shorter than its housing and it requires a good hefty blow from the hammer to drive it forward so that its own momentum will cause it to strike the primer of a cartridge hard enough to fire it. This means that the hammer can be safely "eased down" when there is a live cartridge in the chamber and carried that way without any chance of accidentally firing. Now if this is done, the character carrying the pistol might accidentally brush the hammer to the rear but not far enough to engage the sear, thus causing it to fly for-

ward. This condition would be very embarrassing, not to mention painful, to anything immediately in front of the muzzle if it is not for the fact that the designer puts a half-cock notch on the hammer so that unless the trigger is pulled it will not hit the firing pin.

Everyone using this firearm is no doubt very familiar with some form of revolver but very few know how to operate a self-loading pistol. They will learn that to load the thing, a loaded magazine is inserted in the butt but (ouch) the pistol will not





fire until the slide is drawn fully to the rear and released, thereby loading a round from the magazine into the chamber. If the user does not anticipate shooting anyone shortly after doing the foregoing it will be well for him to snap the safety catch into the up position which is "on" or, if the gadget is to be left loaded for some time, the hammer should be **carefully** lowered to relieve the hammer spring from strain. If the hammer is lowered it will have to be manually cocked before the pistol will fire—a good thing to remember.


Unless the magazine (loaded or unloaded) is in the butt the trigger linkage will be disengaged and will not fire. This is to prevent accidents caused by people who think that just removing the magazine unloads the pistol.

When the pistol is loaded with a round in the chamber it is possible to have 13 rounds in the mag. and one in the chamber, (which is better than Hoot Gibson for my money). The hammer is cocked and the safety is down or in the "off" position, all that is required to fire is pressure on the trigger. O.K.—so we press the trigger—bang, the bullet takes a powder and the pistol uses the recoil energy of that fired cartridge to eject the empty cartridge case, cock

the pistol and load a fresh round from the magazine into the chamber (that is why the pistol is called self-loading). Now all we have to do to fire again is release the trigger and press again. If this is done long enough all the ammunition in the magazine becomes fired away and when the magazine is empty and the last round is fired the slide stop on the left side holds the slide open so that to reload, a loaded mag is inserted in the butt and the slide stop released; the slide moves forward and loads the top round from the mag into the chamber. We are ready to make like Edward G. Robinson again.

The men who use it must make themselves thoroughly familiar with it so that they know instinctively whether or not it is ready for action at all times. This of course can only be done by constantly stripping, cleaning, inspecting and asking questions of someone who understands the theory of operation of the pistol. For those fortunate souls who have access to the C.A.L.E.M.E.I.'s, Small Arms and Machine Gun Section E-300 (CA), E-301 (CA) and E-302 (CA) will prove invaluable for the purpose of showing what gives.

Inexperienced people and Kizel, will find it dangerous to handle



**Embarrassing Question?**

How is your manifold heat control valve? Is it stuck solid—or if it's the adjustable type are you trying to take a sleigh ride in July? Too much heat in the manifold will cause engine trouble and may warp the manifold.

until they learn to remember that after firing once the pistol is loaded and cocked and ready to fire again immediately.

The advantages of the self-loading pistol (number of rounds at one loading, ease of loading, general compactness, good grip, fits the hand and points naturally and **ease of cleaning**)—are many, but the self-loader will meet with much disfavour unless you and you and you give it a fair chance to prove itself by caring for it properly and learning its action so that your mistakes won't be blamed on the gat

x y z



When you're down our way again Benny, there are a couple of points we can mention . . . precautions for welding tanks that have held gasoline amount to more than tossing the contents out and putting water in.

Among other things—they've got to be *thoroughly cleaned out*—a steam cleaning at least.

Sure, you were O.K. in putting water in, *but* you didn't vent the area above the water level. Heat any closed container, or sealed hollow part, and you're playing with a bomb. With a poorly cleaned gas tank that isn't vented, you're building up to a sure blow up!

A little knowledge, Benny, is a dangerous thing.



# *You gotta ac-cent-tchu-ate the maintenance* on **GENERATORS**

**T**HERE'S been too much generator trouble reported from the field. Generators in sore need of repair are piling up like potatoes in a bin. The trouble is entirely needless, because it takes only thirty seconds of a driver's time to save repairmen endless hours.

A driver has to double check two things. First, the lubrication of the generator; second, the fan belt adjustment.

First, let's look at the lubrication. In most generators, lubrication is accomplished by means of a wick. The wick in the generator carries oil up to the armature shaft just like a lamp wick. Well, you squirt a bit of oil in there (only as often and as much as recommended in your Lube Guides) and the oil settles to the reservoir in which the wick is bathed. The wick leads up from the oil reservoir and is cut into the bushing upon which the armature shaft is revolving. In the same way that a beer stain spreads over your new tie (a professor friend of ours calls it "capillary attraction") the oil spreads or travels up the felt wick and lubricates the speedy armature shaft.

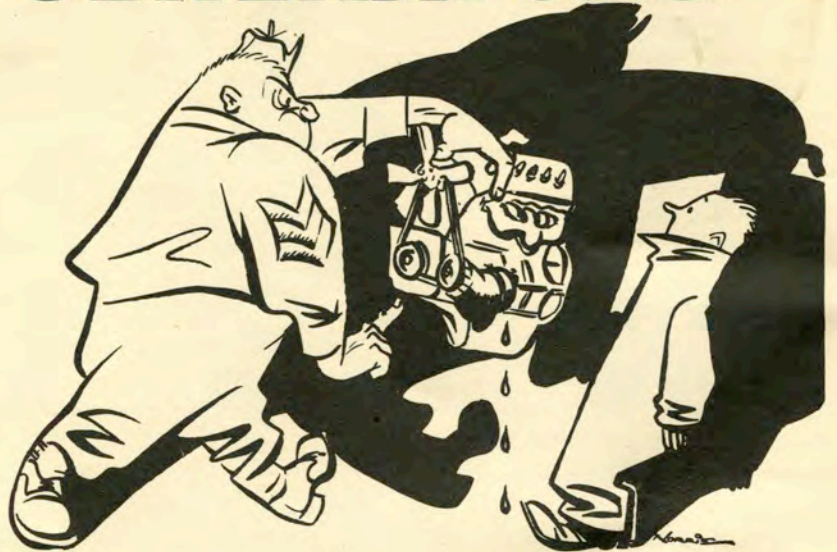
Of course, if you have neglected to squirt oil into the reservoir, there won't be anything to travel up the wick except perhaps a few microbes. These won't oil the armature shaft. Without oil, the wick burns up and must be replaced. Without lubrication, the armature shaft wears the bushing, or else the bushing "freezes" on the shaft. When this happens, the bushing revolves with the shaft until an egg shaped hole is worn in the end plate.

Felt wicks, when they become

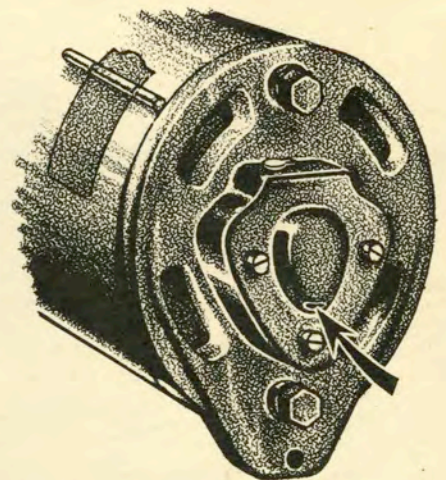
glazed, should be renewed or moved to a position so the glazed part won't contact the armature shaft. But this is done (or should be done) by the workshop or unit garage when the generator is dismantled.

At any rate, whether the bushing wears out, or freezes on the shaft, the hole is made larger and the armature drops down on the field pole shoes. The clearance between the armature and the field pole shoes is only some 30/1000 of an inch anyway, so when the armature drops down even the slightest bit, the jagged face of the armature either tears and wrenches at the field pole shoes or else wears them down to the point of being useless.

When this finally happens you can't just fix it with a piece of old chewing gum and piano wire. The armature, the field pole shoes and the commutator end plate have to be replaced. In a man, this would be comparable to replacing the medulla oblongata and parts of the brain, not to mention the izzard and the gizzard.



Over-oiling — while it isn't as damaging as no oiling at all—is still bad. Using gallons of oil where only drops are required will cause a flood —and if the flood reaches the commutator it's only a matter of time till the generator quits charging and has to be torn asunder to be cleaned. And speaking of cleaning—don't



**Fig. 1—A plugged overflow is apt to cause trouble anywhere—especially the one on the cam end of the generator.**



slop oil around the outside of the commutator end plate—if you do, wipe it off or this is what will happen. Air cooled generators **pull** air through the commutator end of the generator. They don't push air through from the drive end like some people think. If there's oil on the outside of the commutator end plate—the air stream will pick it up and plaster it all over the commutator and brushes.

One more spot that should receive the driver's attention is the **drain hole** in the commutator end plate. Like we mentioned before—the felt wick rests in a small reservoir in the end plate. If by any chance the reservoir gets too large a dose of oil the drain hole is the overflow. The drain hole must not be plugged **or else**—or else the excess oil will run inside the generator instead of outside. Again, the cure is dismantling the unit and cleaning it.

So you see it's a big job—a big job that could be no job at all if you'd only lend an ear to manufacturer's recommendations on oiling the generator.

As to the second cause of generator failure, which is simply that the fan belt is on too tight, all a driver has to do is take his little pinky finger and test it. If the belt doesn't have that 1/2" deflection or "give" it's too tight, and requires adjustment right then and there. The average driver can make this adjustment in less than five minutes. A too-tight-belt will overload and burn out the bearing in the generator drive end-cover—which will wear the armature shaft hole; and again as above, the armature will deliver the kiss of death to the field pole shoes. P.S., in this case, the water pump bearings also burn out and the fan belt falls apart.

Now will you be good and oil the generator and test the fan belt?

You might also look into the extent of wear on the fan belt. These are "V" type belts that ride in the groove of the drive pulley. However,

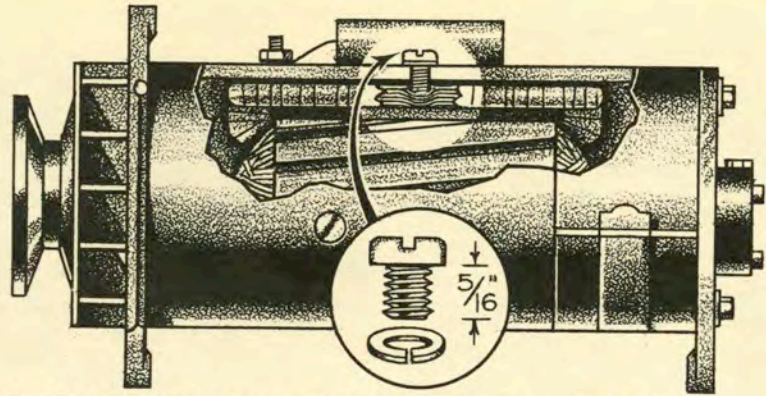


Fig. 2—It's the simple little things that can cause plenty of grief—like installing a radio condenser on a generator.

if they are riding too far down into the groove (below the outer edge of the pulley) it means they are probably "bottoming"—that is, the belt is riding on the bottom of the pulley and slipping. The belt should ride or cling to the sides of the pulley where it has a firmer grip. If it is riding at the base of the "V" it is worn out or is the wrong one and should be replaced.

If, however, you should be tempted to make the belt too loose, just remember that a loose belt will cause a reduced and unsteady output of current from the generator; leading to a low battery condition and excessive wear and tear on the cut-out points.

The quaint custom of driving a spike through a witch's heart may have cured the odd devil in the good old days—but as treatment for 1944 generators it's going to bring on the devil—to pay.

Were talking about another complaint that has been coming in regarding generators—the old story of punctured field coils. If 'you all' don't know what 'we all' are talking about, take a quick look at the picture above. See the ghost view of the generator? And see the length of the radio condenser mounting screw? That isn't as it should be. The mounting screw in this case (and in many cases in the field) is too long. When it's tightened it breaks through the insulation on the field coils. If left in there, the field will be grounded and if you take it out—wishful thinking and time alone will never heal the wound in the coil. The only remedy is to perform a major operation—remove the old field coil and install a new one.

To avoid this trouble here's what you do. The length of the screw used must not measure over 5/16" and the lockwasher must be used. If the lockwasher is left off there is danger of even a 5/16" screw puncturing the field coil. If by any chance you haven't a scale handy, you can always measure the depth of the threaded hole in the generator housing with a match stick—then make sure you use a screw which is shorter than the depth of the hole.

So that's how it is with generators—everything that cometh to him who neglects 'em is bad.

So P.M. yours—and we don't mean post-mortem. x y z

**Embarrassing Question?**

How long since you checked the amount of "free play" in your clutch pedal? Without at least one inch free travel your clutch won't last very long.

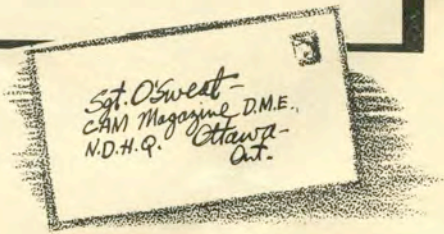


# Sgt. O'Sweat's- HEADACHE & ASPIRIN Dept.



A list of what O'Sweat doesn't know could be written on the head of a needle valve—and before you're finished he'd have the answers, because he's got more inside tracks to information than a bell-hop's convention at a Union Station.

Outside of Saturday nights, he's willing to take *your* troubles on his lap and figure out the angles and the answers. So if you've got a problem that's a technical headache—reach for an answer by addressing your letter like-a-this . . .



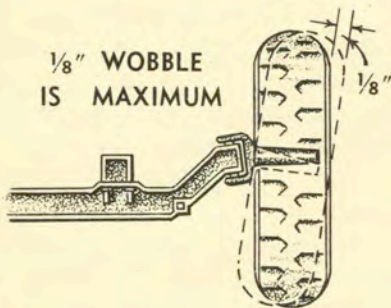
## King Pin Wear

Dear Sgt. O'Sweat:

Every manual I have ever seen says, "replace king pins and bushings when the wear is excessive".

As there seems to be several differences of opinion as to how much is "excessive," we thought we would shoot you a line to see what you have to say about it?

Cpl. R.R.T.



Dear Cpl. R.R.T.:

This is the kind of a question that makes me scratch my noggin Corp. You see it's like this. After a mechanic has repaired vehicles for a number of years he seems to develop a women's intuition about some things and I guess worn king pins is one of them. It's like asking which pant leg you shove your foot through first when you get dressed in the morning. It's something you do automatically.

The Dodge manual explains how to

check king pin wear however, and I think their system of checking could apply to most vehicles. Here's what they have to say about it.

First with the front end jacked up, you remove the hub cap and tighten the wheel bearing adjusting nut enough to take out all the play in the wheel bearing. Then, holding the tire at both top and bottom, move the wheel in and out. If there is more than 1/8" shake (measured at the tire tread) you've got excessive wear at the king pins and bushings.

In addition to taking up the slack in the wheel bearing, before you measure the shake it might be a good idea to make sure the wheel isn't loose on the hub.

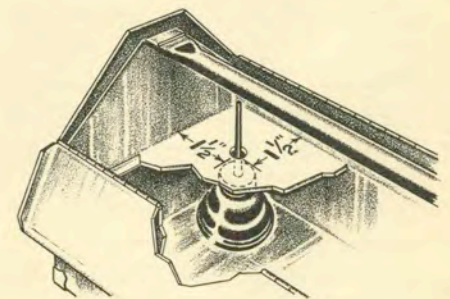
If there are any wrench slingers who have different ideas on the subject I'd like to hear about it so I can pass it along to the Corp.

*O'Sweat*

## Tool Box Oil Cans

Dear Sgt. O'Sweat:

I got a beef and I think you are the person who should hear it. I don't care if you publish this letter or not but I would like an answer to my question.



Dear Cfn:

I know exactly how you feel chum, I toted around one of those M.V. fitters kits Mk. I too. I also had the

The M.V. fitters kit which I have been issued with has an oil can in it, which I like. The oil can comes in handy on a lot of jobs. But here's my beef. When the spout is on the oil can it's too high to stand up in the tool box. Lay it on its side and oil leaks out all over the bottom of the box. Take the spout off and the oil in the can usually spills. In other words the oil can is too large.

Why can't we be issued with a smaller oil can or one that won't leak when it's turned on its side?

Cfn. J.H.C.



same trouble with the oil can.—That is, I did until I solved the problem by drilling a half inch hole in the tray so the spout could stick through. After that I always kept oil in my can and never spilled a drop.

It aint logical to throw out all the present oil cans and issue new ones. So why not drill a half inch hole in your tray? There's no law against it.

*O'Sweat*

### Ford Battery Indicator

Dear Sgt. O'Sweat:

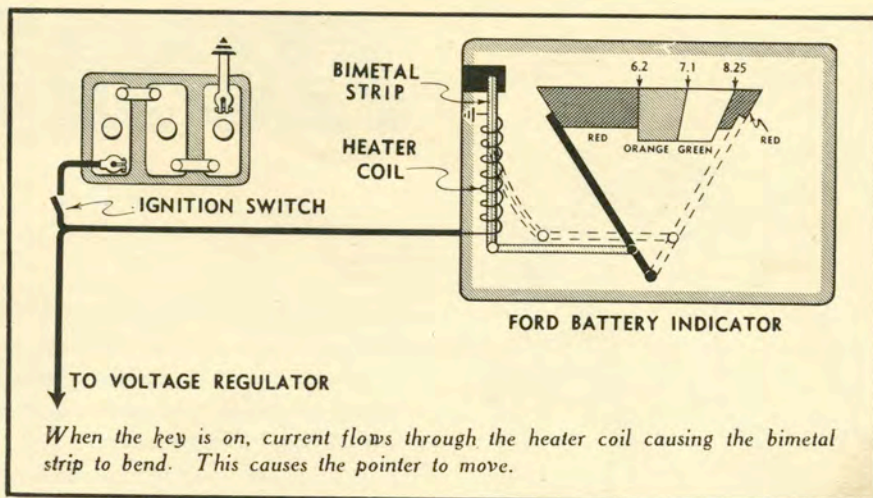
For almost a year now I've been calling the Ford dash ammeter (if that's what it is) all kinds of names. Some say it's a voltmeter, some say it's half voltmeter and half ammeter. Anyhow, (if I may say so) I don't like it as well as the old fashioned dash ammeter. I used to know how much the generator was charging—now I know nothing.

How about clearing this thing up? What does it mean when the pointer is in the orange or the green and why does the needle take so long to get there? I'd also like to know why Ford did away with the regular type of ammeter.

L/Cpl. J.W.

Dear L/Cpl. J.W.:

Hold your hosses Corp. You wouldn't trade your gas gauge for a flowmeter—would you? Of course you wouldn't because you're more interested in how much gasoline you have left in the tank than you are in how much



gasoline is flowing to the carburetor.

That's what Ford thought when he did away with the dash ammeter. The present indicator tells you how much reserve power you have in the battery—which is really more important than knowing how much current is flowing into or out of the battery at any particular time.

But I agree with you—the present type of indicator doesn't make sense unless you know how to read it. In a few words, here is how the indicator works.

Cast your peepers in the direction of the picture and you'll see that current will flow through the **heater coil** when the generator is charging or when the ignition switch is closed. The higher the voltage—the greater the current and hotter the coil. The coil is wound around a bimetal bar which will bend slowly when it is heated. The bimetal bar is connected to the pointer on the gauge in such

a way that any movement of the bimetal bar will move the pointer.

Actually the indicator is a voltmeter. The reading depends on the voltage of the battery. Instead of marking the scale in volts it is marked with colours. If you'll notice, I've marked the picture with the different voltages the colours represent.

When the ignition key is turned on the pointer will slowly move till it indicates the battery voltage. Normally it should be in the orange or green—but if it stays in the red you can expect trouble. Below 6.2 volts means the battery is low. Above 8.2 volts means the battery is over-charged.

So when you see red you better do something about it— but quick. On an ordinary ammeter you wouldn't get this warning

*O'Sweat*

### SPARK PLUGS—

(Continued from page 103)

without rotating the plug or the adapter. That's just one more reason why the cleaning compound, the nozzle and the adapter must be in good condition.

Excessive cleaning does more harm than good to spark plug insulators—it wears them down. If the cleaner

is operating up to snuff, five seconds of sand blasting will do the trick. On the other hand—a cleaner that is not up to snuff will take longer to clean and may only clean one side of the plug making it necessary to rotate the plug or adapter—which, as we said before is bad. Fig 2 shows a triple exposure. One—the plug as it came out of the vehicle. Two—

the same plug after it had been sand blasted for 30 seconds by an inefficient cleaner. Three—a plug after it had been sand blasted for 5 secs by the same cleaner—but after about 15 minutes had been taken to make the cleaner operate properly.

Now you know what to do with **your** next 15 minutes



# HOW TO SP



Painters are made not born . . . says Lil' Dabner. It's just a matter of following the rules.

**W**E'D like you to meet this little squirt named Lil' Dabner. He shoots an awful line of spray but he really knows how to lay it on. He claims he developed his prewar painting technique on crowded, early morning street cars—watching the

feminine sex applying their glamour. This, according to our little friend, is much more difficult than glamourizing a vehicle in a well equipped paint shop. (Could be).

It's just a question of knowing your do's and don'ts.

The elementary rules are the same for gloss finish as they are for matte finish. They both thrive on careful surface preparation. But even the slightest defect on a gloss job shows up like a rip in the middle of a pool table.

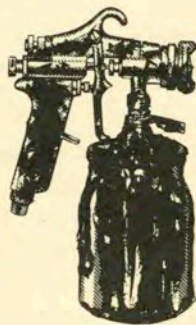
Cleanliness of the paint shop—cleanliness of equipment and cleanliness of the surfaces to be painted are worries one, worries two, and worries three.

## CLEAN SHOP

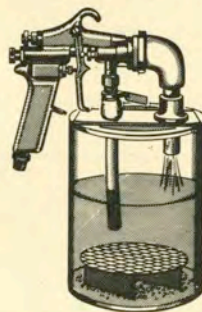
The spray room must be spotless and dust free. Every nook and cranny must be frequently gone over with an oily rag. This includes window sills, ceilings, walls and equipment—

or to be brief—any place where dirt, cobwebs or paint dust can collect. Paint dust is extremely inflammable so before tossing out your sweepings, douse the dust with water.

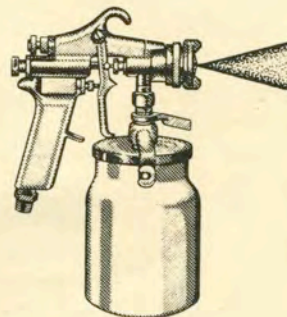
As far as your equipment is concerned—every G.I. knows the importance of cleaning guns. It doesn't matter whether the gun shoots bullets or paint—it must be kept clean—and the moving parts oiled. Last thing before going into battle a good soldier will always inspect his weapon. A good painter will do the same thing before applying paint. Old paint which might have collected in the fluid passages, around the fluid needle, nozzle or air cap, may work loose at the wrong time. It's easier to check these parts **before** you spray than to take a chance on spoiling a good paint job. The air transformer on the gun needs looking after too—dirty filter pads must be replaced with clean ones.



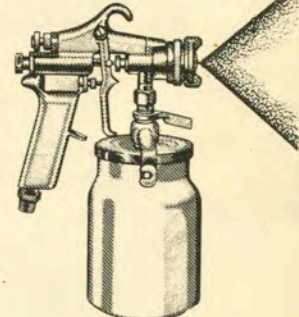
Dirty, mucked up guns are the sign of a careless painter, keep em clean as your rifle Mark IV



Making rainbows in the sky when cleaning the gun with thinner is expensive. Thinner can be used over and over if you fix up a one gallon can like this.



Narrow spray pattern means—poor adjustment, excessive air pressure or paint too cold. Result — waste, orange-peel, sags and runs.



Wide spray pattern means—poor adjustment, paint too thin or too warm. Result—overspray, waste, sags and runs.



# RAY PAINT



These are the correct nomenclatures and D.N.D. numbers for the various materials mentioned in this article.

Metal Prep No. 10	D.N.D. No. 90340
Deoxidine No. 129	D.N.D. No. 90343
Special Brush	D.N.D. No. 90341
Carbide Abrasive No. 180C	D.N.D. No. 90313
Masking Tape	D.N.D. No. 90189
Primer Surfacer	D.N.D. No. 90185
Bituminous Black	D.N.D. No. 92161
Carbide Abrasive No. 320C	D.N.D. No. 90314
Carbide Abrasive No. 400A	D.N.D. No. 90294
Tire Paint	D.N.D. No. 90233
Stripping Compound	D.N.D. No. 90144
	D.T.D. 226 1H-28,000

If the old surface is good—you're lucky—because you won't have to remove the old paint. Steam clean the whole vehicle and then go after any grease or acid spots with a petroleum solvent such as varsol. After that give the body the old soap and water treatment and rinse off with plenty of clean cold water.

Your next step will be to get rid of rust spots. Massage the rust off with a stiff wire brush and sand off any cracked, loose and blistered paint till the bare metal hide of the truck is exposed. If you have an acid cleaner such as Metal Prep or Deoxidine it will save you a heap of time and energy. Mixed with water and applied to the rust spots with a special brush these acid cleaners will eat off the rust in nothing flat. Leave it on for five minutes—then slosh it off with water. If the first application doesn't remove all of the rust—follow it up with a second and

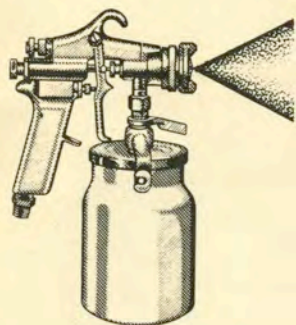
third application if necessary.

Try and not get the cleaner on the painted surface. And don't get it on your hands—wear rubber gloves. If you do get it on your skin, apply baking soda, then douse with water.

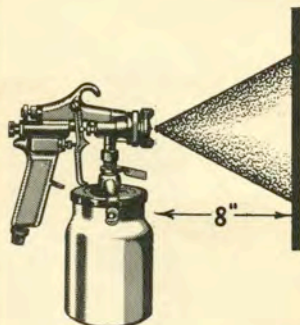
Now wet sand the entire vehicle with carbide abrasive 180C (use plenty of water). Soaking the abrasive in water before using will give you better results. Sanding is not just bull work—you've got to have that certain touch so you can feather edge all corners and rough

## BODY PREPARATION

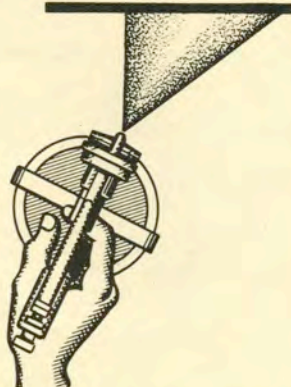
Probably the easiest way to tell a professional painter from an amateur is to watch how he prepares the surface before painting. You'll find the amateur has an itchy trigger finger and can't wait till he starts spraying. A professional, on the other hand, will not even think of shooting the paint till he's absolutely sure the surface is free of dust, grease, rust, acid and moisture.



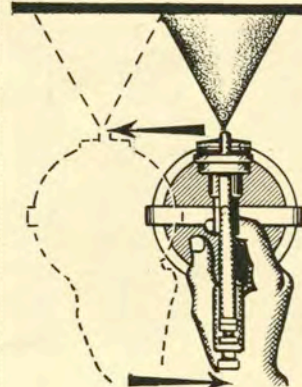
Just right. This is the pattern you'll get if the adjustment and temperature is correct. Result—a good job with no waste.



Holding the gun the proper distance from the work means less waste from overspray and just the right coverage.



Shooting at an angle is bad as it usually results in an uneven finish. Keep wrist steady and swing from the shoulder.



The right angle for the gun is at right angles to the surface throughout the entire stroke.



spots, especially around door jams etc. It takes lots of patience too, so don't stop sanding till you're willing to bet your bottom buck that the job can't be done any better. Then, and only then, will it be ready for masking and priming. But before we go any further, let's see what Dabner has to say about *badly rusted vehicles*.

When a vehicle has had too much western or eastern exposure it may be rusted so badly that **all** of the old paint will have to be stripped off. The reason is simple—rust spreads under paint like mustard gas spreads under your hide. The only way to stop the rust is to remove every trace of it right down to the bare metal.

This can be done with a blow torch and wide putty knife, but to eliminate the danger of warping the metal by excessive heat it is better to use stripping compound (paint remover). Paint remover should be mixed with hot water and applied with an old paint brush. Let the stripper act on the paint for about five minutes, then slosh it off with hot water. Don't get the stripping compound on any woodwork or the wood will swell like a belly full of dried apples. Repeat this performance on spots

where the paint hasn't come off. A rub down with steel wool while the stripper is working on the paint will also help.

When you've got the vehicle as nude as an egg—remove every trace of stripper with clear hot water. Be especially careful to clean it off around door-jams and mouldings etc. Any stripper that's left on the surface will raise all kinds of Cain with your new paint job—like blistering, whitening or removal of paint.

With the paint all removed you can chase away any traces of rust still clinging to the surface with wire brush and sandpaper or if necessary—Metal Prep or Deoxidine, washing off the surface with cold water when you're finished.

Then wet sand the whole body. Smooth it all nice and slick with carbide abrasive 180C, and then wash it off with clear cold water. Dry it off well with compressed air and you'll have it ready for the first coat of primer.

If any new wood has been used in repairing the body it will have to be treated with clear wood sealer. Brush in the wood sealer and allow it to dry. From then on, wood surfaces can be treated just like metal surfaces.

## APPLYING THE PRIMER SURFACER

Primer surfacer does two jobs. First it contains a rust retarding agent. Second, it makes the finish coat of paint stick like flypaper adheres to the seat of your pants. Because bare metal rusts quickly if left exposed, the primer should be applied as soon as possible after the surface has been prepared. Bare metal surfaces will require two coats of primer but when painting over old paint, one primer coat will be enough.

After you've sprayed on the first coat of primer (only covering the bare spots) let it dry for at least four hours. By that time it should be ready for the second primer coat. Some people say it only takes two hours to dry—others say even less—but Lil' Dabner says at least four maybe more, and he's backed up by the National Research Council. (They have the job of testing army paint so we'll take their word against anyone's).

While the first coat of primer is drying—you can go after the undercarriage. No doubt it was well cleaned before you started to work on the vehicle—but make sure all the grease, dirt and tar was completely removed. Any dirty spots still remaining can be cleaned with



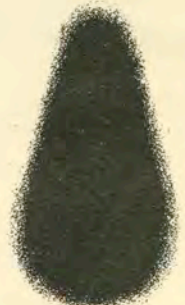
The perfect pattern—proof of properly held gun and correct adjustments.



The milk bottle pattern—heavy in the centre means the pressure is too low.



A dumb-bell pattern, heavy at each end and weak in the centre indicates too much pressure.



The pear shape pattern, wider at top or bottom indicates a dirty fluid nozzle and calls for cleaning.



Varsol or some other petroleum solvent.

The undercarriage should be sprayed with Bituminous Black. Any places—such as grease nipples and vent holes, where you don't want the paint to stick can be smeared with a dab of grease.

Now you can rest your own weary chassis till the primer surfaces are dry and ready for the final finish.

**PREPARING SURFACE FOR FINAL COAT**

This is just about the last lap. So far we've put everything we have into the job—so let's not get careless at this point.

First we'll wet sand the whole surface with very fine sandpaper No. 320C, removing rough spots, scratches and crinkly (orange peel) spots. Remember—this is the last chance to get rid of defects that might spoil the job. Watch you don't rub through the primer because bare spots will show through the final coat. Next you can wash the whole surface with clear cold water and then dry it with compressed air making sure you clean out crevices and under mouldings. While you're doing this—keep your eyes open for any defects you might have missed before.

Dust is something that's always a

bug-a-boo to painters. After the surface has been washed and dried, particles of dust will soon settle again. A tack rag is not only handy but is a "must" if you're going to use a gloss paint. To make a tack rag, all you do is saturate about 1½ yards of clean cheesecloth with varnish, then wring it out and let it dry till it gets tacky. When it dries to this sticky stage fold it into a pad and you'll find it will pick up dust, grit and gremlins that otherwise would ruin a perfectly good paint job.

To further eliminate the dust hazard, lock yourself in the paint shop before you start spraying—this will prevent any characters coming in and raising a cloud of dust. And if you can, put on your final coat just before the shop is locked up for the night, this will also help to prevent dust on the finish. The paint can't be mixed too well, and mix enough in one batch to cover the whole vehicle. If you don't you may find a difference in colour. One gallon is about the right amount to mix for an average truck.

Before you load your gun—don't forget to give the gun a thorough cleaning—then strain the paint through very fine wire mesh or cloth such as organdie or nainsook.

**SPRAYING HINTS**

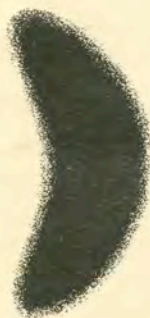
There's several things the painter has to watch when he's spraying. The temperature, the air pressure and the position of the gun are the main items.

For best results and proper drying, the room temperature should be 60°F. or higher. The lower the temp, the greater the air pressure required. At 60°F. you'll need about 55 pounds pressure but on hot days you may have to reduce the pressure to 40 or 45 pounds. You can tell by the spray pattern. When spraying matte or gloss finish hold the gun about 8 inches from the work and always at right angles to the surface you are spraying.

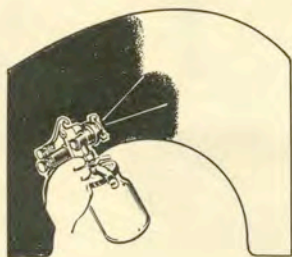
From the distance some boys shoot at their target you'd think they had telescopic sights or they were laying a smoke screen. Then of course there are the ones who creep up on the job as though they are afraid they'll miss altogether. Too much distance means spray dust and wasted paint—too close gives you that crinkly orange-peel effect.

When it comes to traversing, now there is an art. Like we said, the gun should be held at right angles to the work with a sweeping motion from the shoulder. If you can't stop

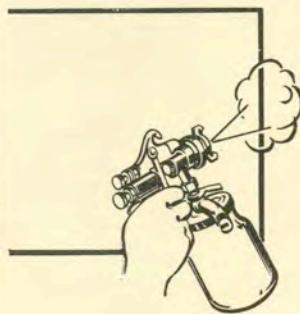
*(Continued on page 115)*



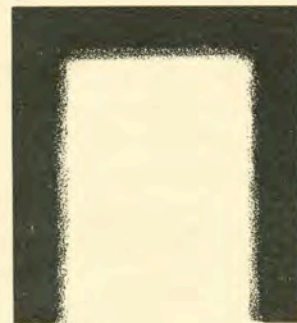
Not a new moon—just a poor pattern that indicates a clogged air passage.



How not to spray a fender. Too many strokes are required plus waste by overspray at the end of each stroke.

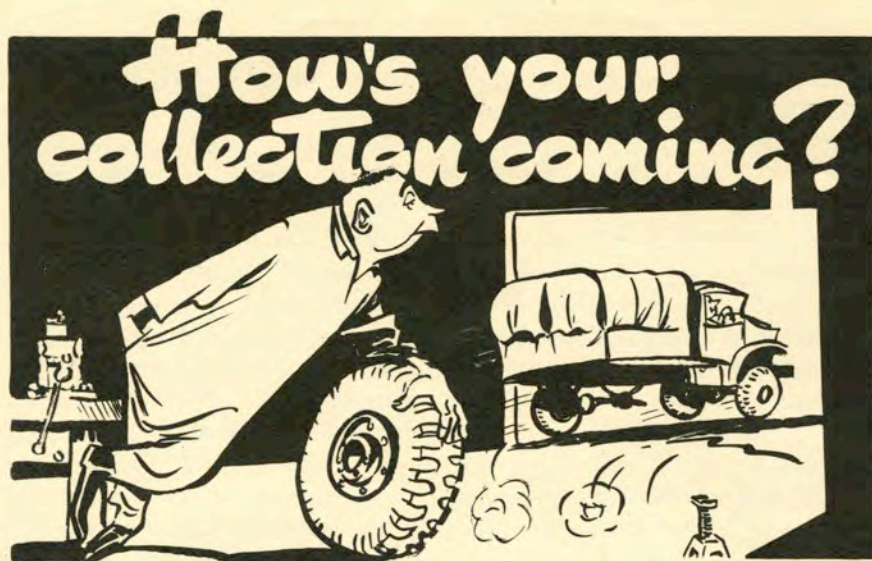


This is overspray—waste—waste—waste—at the end of each stroke.



Here's how wasteful overspray can be prevented. Just make a vertical band on each side of the panel and fill in between with horizontal strokes.





Not your collections of pin-ups — we mean the bits and pieces left over after you complete a repair job.

A good mechanic never has any pieces left over when he finishes a job. Only guys who don't know what it's all about end up with lock-washers and nuts and bolts to spare.

If you're a good mechanic, you know the little pieces count as much as the big pieces and that every piece is necessary in vehicle assembly. If you're a good mechanic, you're going to put everything back where it belongs; because that's how you can make trouble if you don't.

Suppose, for instance, you reassemble the jeep transmission and transfer case and forget to install the interlock plunger (Fig. 1). You'll jump in your jeep after the job is finished and try to shift her, but she won't stay in gear—any gear.

The interlock plunger you left out of the assembly is the thing that acts as a "stabilizer" on the transmission shift-rails. It keeps two different gears from engaging at the same time. With the interlock in place the driver can control the transmission—without the interlock the transmission shifts itself when

it feels like it—regardless of the drivers likes or dislikes.

As you can see—the interlock fits between the transmission and transfer case. To make it stay put during assembly, slap a dab of grease in the slot or use any other system you choose—but it's gotta be there when you finish the job. If you find it lying on the floor after you've buttoned her up—you know what you'll have to do.

Then there's the feather brained boys who go to no end of trouble to make a good job of cleaning and adjusting spark plugs. After they're finished and have the plugs installed they find one or two plug gaskets lying on the fender. The usual pro-

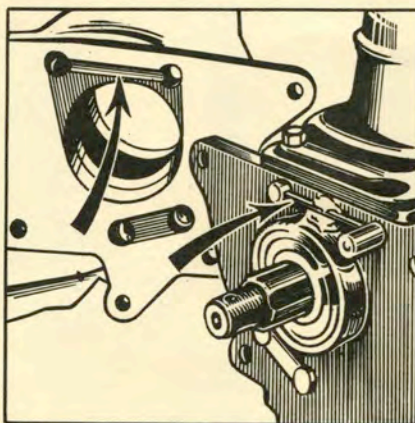


Fig. 1—Without this interlock plunger the gears in your Jeep transmission are likely to get confused—and so are you.

cedure is to swivel-head in all directions, quickly kick the extra gaskets under the bench and walk away whistling. This is probably the reason for more spark trouble than you can shake a spanner at. Of course you know that it is most important to have the plugs operate at normal temperatures. Two gaskets under a spark plug may make it operate "too hot" while no gasket at all may allow compression leakage and also may result in a hot spot in the combustion chamber. (Fig. 2). If you found gaskets lying around after you'd installed a set of plugs

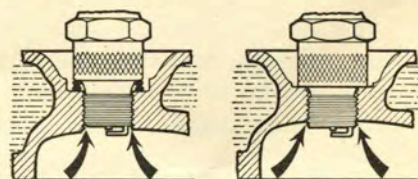


Fig. 2. With two gaskets or no gasket there's liable to be sharp threads exposed to combustion which may become incandescent and cause pre-ignition.

and you were not sure where they came from you'd pull the plugs and find which one is minus its gasket, wouldn't you? But some guys wouldn't.

Starting motors are another unit that call for all the pieces. Thrust washers weren't put on the armature shaft because the manufacturer made the armature too short for the housing. They do more than just taking up the end play. Without a steel thrust washer on the drive end, the cast iron housing would wear. Leaving the thrust washer out also allows excessive end play which in turn may allow the ends of the armature windings to rub and short on the housing. (Fig. 3). On some G.M. starters you'll see a leather washer on the commutator end of the armature. Assembling and installing the starter without this bit of leather means three things. First the washer acts like a brake to slow the armature down after it has been in use. The more rest the starter gets the longer it will last—so why let it spin



like a top when it doesn't have to? Second, the leather washer is an oil slinger and helps prevent the commutator getting oiled up. Third—(and this is the pay off) you'll get paid off by the sarge if he catches you leaving the leather washer out.

Other wallflowers often left on the bench after the last screw is tightened are carburetor parts. There are scads of parts in every carburetor and most of them are little bits of things that are easy to misplace. But regardless of how small the part is—we can't think of one of them that can be left out without resulting in something that isn't good. Leave out one tiny jet or one small fibre

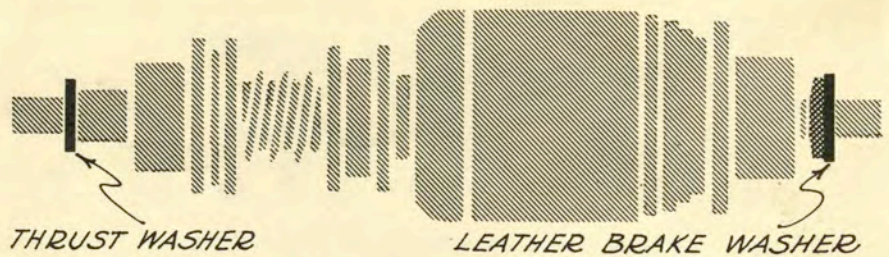


Fig. 3—Washers may be small and cheap—but you're gonna have trouble a-plenty if you make the mistake of leaving them out.

washer and right away you've got troubles. A clean bench before you start and a clean bench after you finish are pretty good symptoms of a carb job done well.

We could go on and on but by this time you should have seen

the pernt.

It's the little things that make or break the job. Having small pieces left over, (and we do mean lock-washers, cotter pins and other types of locking devices) mean trouble sooner or later.

x y z

**PAINT (Continued from page 113)**

flexing your wrist like a universal joint get someone to drop an eight pound sledge on it to stiffen it up. It's the steady, even, full arm strokes, back and forth straight across the panel, holding the proper distance all the way, that cut down waste and lays on a smooth finish.

Speaking of waste—did you know that one man can shoot more than fifteen bucks worth of paint through the spray gun in one squirting hour? Multiply that by the number of army painters across Canada and you'll have quite a figure. That's why you have to take careful aim before you squeeze the trigger. The idea is to get all the paint on the job and not squirt it into thin air. That's also why the temperature must be right and the gun adjusted properly.

If you don't believe us, notice the increased pressure required to atomize cold paint. See how narrow the spray pattern becomes due to the heavy viscosity. See the amount that bounces off in spray dust and fog. Yes sir—one can blow off in spray dust almost one third as much as goes on the job.

Even if the paint is of the proper

temperature, much can be wasted by a poorly adjusted gun. If the pattern is narrow or irregular it means extra strokes — extra time and more material.

To prevent waste by overspray at the end of each horizontal stroke—try spraying a vertical band on each side of the panel to be painted. Then fill in between the vertical bands with horizontal strokes.

**DRESSING-UP THE FINAL COAT**

Your reward for all the sweat and blood you've put into the job comes the next morning when you open up the shop. A nice clean job without marks or blemishes is all the reward a good painter asks for.

If the temperature has been correct through the night the final coat will be dry—(it usually takes about eight hours). Then you can look it over carefully and if you do see any orange-peel, sags or fine scratches, take them out with Silicon Carbide Abrasive Grit 400A. Then the lustre can be brought back with rubbing compound.

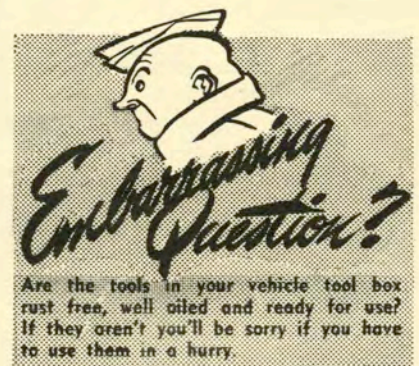
Any marks that cannot be removed by light sanding will have to be sanded with 180C carbide abrasive and repainted. Before repainting—mark off the section such as a door

or hood, then tack off grit and respray the whole section.

The last part of the job is painting the tires with tire paint, stenciling the vehicle D.N.D. numbers and washing and polishing. Stenciling is nothing new but if you are stenciling on enamel—don't apply the paint too thick or it will cause the enamel to check.

In most paint shops there's some old timer who has his own ideas about painting vehicles—some good—some not so good. But there's one thing sure—army paints must be used the army way to get best results—and the army way is what Lil' Dabner has just given you the low down on.

x y z





# For B.F.s

## The old push around . . . . .

HERE'S only one good feature about B.F.'s. As long as they keep pulling damn fool stunts with their vehicles we'll have something to write about. (And if the day ever comes when there are no B.F.'s left in the world—there are those who suggest that we wouldn't be here either).

But that time hasn't arrived yet. Oh no. Not when on certain occasions you can still see one D.N.D. vehicle being pushed by another D.N.D. vehicle.

Are you the worrying type?—Or don't you give a plugged Reich Mark when you see one army truck pushing another? We don't worry—we just feel plain sorry. Sorry for the driver of the pushing vehicle (B.F. fits him to tee) because he's the one who's

liable to foot the bill if he caves in the front of his truck. We also get a salty tear in our eye when we think of the poor B\* who's got to make the repairs.

When the average driver sees another driver in trouble, usually the thought occurs to him to lend a hand. If it's not possible to get the stalled vehicle rolling, it's always a nice gesture to help get the vehicle to the shop. In other words, the trap is set—ready for the first B.F. that comes along, to fall into it. If he has a large heart and a small brain, he pushes the stalled vehicle all the way home.

But let's give the B.F. a little credit. Suppose he does take a peek from the front of his vehicle to see

\*Bodyman

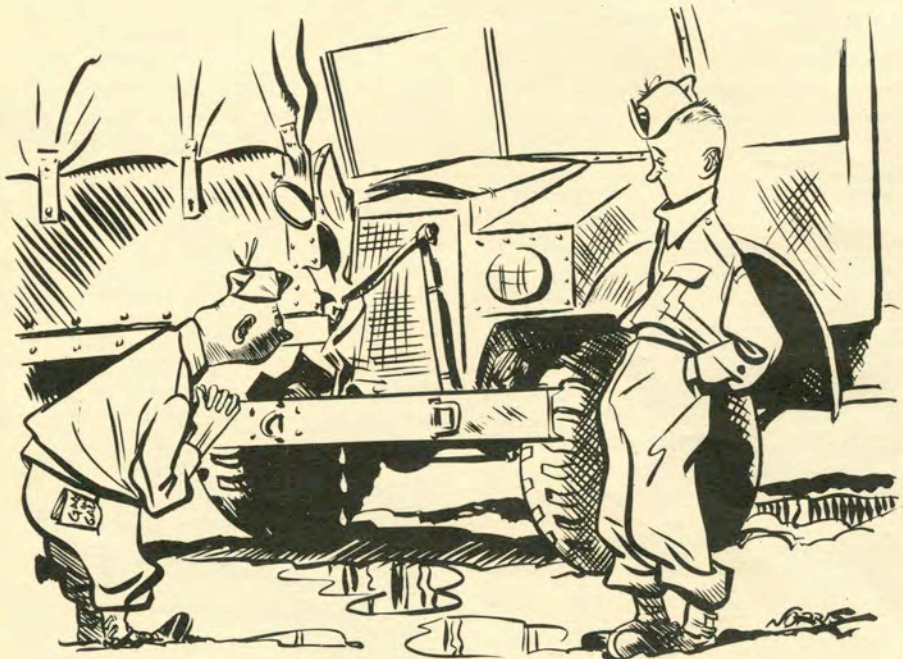


“ . . . the thought occurs to him to lend a hand.”

what's going to do the pushing. He sees a nice hefty bumper just below the radiator—that's good. Then there's a light weight bar across the front of the rad and about half way up. That's also good. But does he notice how short this bar is? Hell no! He just climbs into the cab and starts pushing, because his foresight is about as long as the hair on a knats eyebrow. He doesn't figure on what's going to happen if he pushes real hard, or the two vehicles round a corner—not until he hears that sickening krr-unch—then it's too late.

Because the bar in front of the rad is short—there is no protection for the headlights and fenders. As long as the push is head on and the weight is not too heavy everything's reasonably rosy. But he can't drive very far without turning one way or another—and when he does, one of the headlights is bound to chin itself on the vehicle in front. The driver of the pushing vehicle then becomes fully aware of the folly of his ways—and the cost of various front end components on a D.N.D. vehicle.

In conclusion, may we make a suggestion. If ever you feel the urge to push things around start with your Sarge. If nothing else it will save workshop repairs.

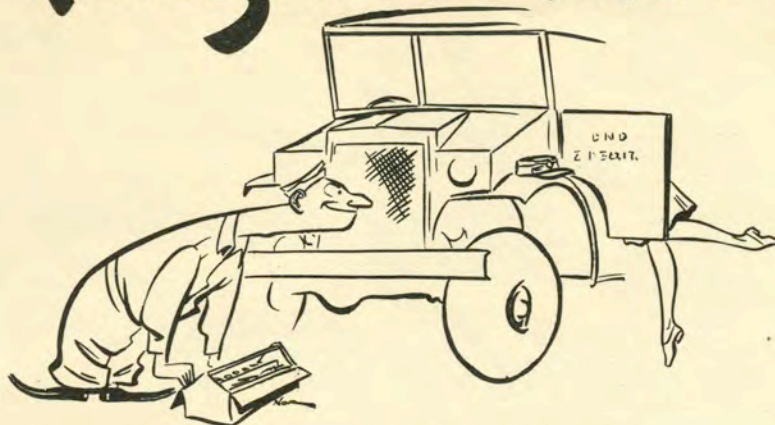


“ . . . the driver . . . becomes fully aware of the folly of his ways . . . ”

x y z



# In Quizitative Mood?



## TRY THESE FIRST AIDERS FOR VEHICLE SPRING FEVER

1. After a long hard winter, engine cooling systems are usually choked up and require servicing to keep their temps normal during the spring and summer. Can you think of eight parts of the cooling system that will need treatment?

6. When new radiator hose is being installed, often it's a pretty snug fit and needs a little something to make the job easier. What are your ideas?—then we'll tell you ours.

2. During cold weather army vehicle engines are lubricated with D.N.D. 345 oil. In the spring the oil is changed to D.N.D. 365. What other units on the engine must have their oil changed to D.N.D. 365?

7. Cooling systems have to be flushed in the spring with D.N.D. 90147 flushing compound to clear out all of the rust, scale and grease. They also need another treatment. Know what it is?

3. Using the fingers on your left hand—let's hear you count off and name four places on the vehicle where the lubricant should be changed from D.N.D. 360 to D.N.D. 390.

8. Oil doesn't look like grease and grease doesn't look like oil—yet they are both used to lubricate. Do you know what the main difference is between grease and oil?

4. When changing from winter to summer lube, should the engine crankcase be flushed out before the new oil is added? If so—what would you use for flushing oil?

9. The dangers of overheating are much greater in the summer than in the cold season. Therefore, it is important that the thermostat is operating properly. What kind of service does the thermostat require in the spring? (tra - la.).

5. Faulty radiator hose can cause more grief than a plugged W.C. and the springtime is when it needs inspection most. How would you examine it? By taking it off, by feeling it or by looking at it?

10. What is the last job to be done when a vehicle is summerized? (We'll give you a hint on this one). The Captain of a ship does the same thing every day in the week.



SEE PAGE 117  
BEFORE TAKING THIS CURE

# Rx

*For vehicle Spring Fever  
to be taken regularly as  
specified by Army Directives*

1. The eight places in the cooling system requiring first aid in the spring are: Radiator, block, cylinder head, drain cocks, radiator hose, thermostat, overflow pipe and heater (if the vehicle has one).
2. The oil bath air cleaners need an oil change in the spring. And that goes for the one on the carburetor and the one on your crankcase ventilator as well.
3. The transmission, transfer case, differential and steering assembly. During operation the lubricant in these units (with exception of steering) is about 100 degrees higher than outside temperature—so drain when the lube is warm.
4. Not in this man's army. H.D. oil contains a detergent which cleans much better than any flushing oil. In other words—there won't be anything left in that thar engine to flush out.
5. Radiator hose can easily fool you if you try to judge its condition by looks and feel alone. It must be disconnected at one end so you can examine it inside for cracks, rot and muck.
6. Gasket cement is the best thing to use to make rad hose slip on easily. At the same time, it helps make a leak proof joint. Never use grease or shellac because it has a tendency to rot the hose.
7. Flushing compound leaves the cooling system clean as the table cloths in the sergeant's mess on Monday morning. To prevent further rusting the system needs a rust retarder. Use inhibitor, D.N.D. No. 90198.
8. Grease is a mixture of soap and oil. The soap makes the oil "stay put" wherever the grease is applied. Heat developed due to friction softens the soap and allows the grease to spread over the bearing surface.
9. Thermostats need more than a visual inspection. They must be thoroughly cleaned and tested in hot water before you can be sure they are going to open correctly when the warm weather comes.
10. The last job when summerizing a vehicle (but by no means the least important) is making an entry in the vehicle's log book. If you don't—someone else may do the whole job over again by mistake.



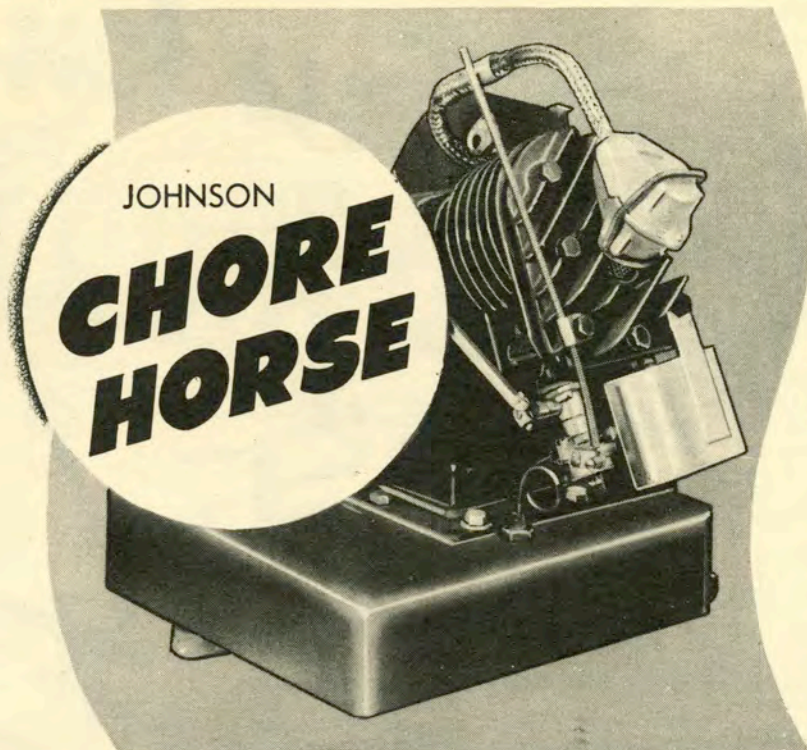
**Y**OU'LL find these little 395 series Chore Horse engines sweating their heads off most anywhere. That is—wherever a fraction of horse power is required to operate air compressors, teletype equipment, wire throwers etc. and an A.C. power line isn't handy. They don't require much servicing, mainly a bit of oil and gas once in a while. With no radiator to leak or run dry, no fuel pump to go haywire, no fan belt to break or adjust, nor any float to stick, there's precious little to get out of line, and for these very reasons they're often abused and neglected. They'll take it for so long and then one of these days you'll walk up and find them done to death. Here are two things that shouldn't, but do, happen to a Chore Horse that will cook its goose—both literally and figuratively.

Take the Joe who wouldn't think of driving his vehicle without water, but tries to operate his Johnson without air. Did he ever stop to think that air is to the Johnson as water is to his truck? The book didn't tell him to add air, so he places the motor in a nice little out of the way corner and starts it up. It isn't long before he can smell something hot—and dashes over to the Chore Horse just in time to see it turning blue in the fins, trying to gasp fresh cool air over its hot cylinder.

With its flywheel side bang up against a wall, this is like trying to take a nice cooling bath in a saucer of lukewarm tea.

Now the piston rings have lost their tension, the piston and cylinder is scored, the valves and seats warped and Joe has learned that the engine must have air—lots of it—and it doesn't get it if it is operated close to a wall, with a large pulley on the flywheel side, or without the shroud. Air is free, so let the Johnson have plenty.

Then there's an adjustment on the carburetor. Joe is sure that he has



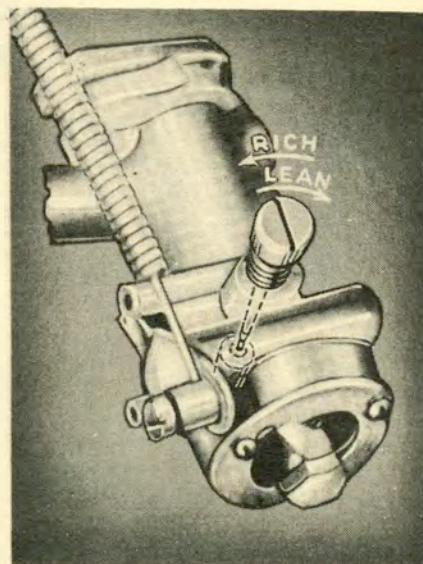
... like its name implies, it's a willing little plugger. As a lover of good horse flesh you'll want to feed it the very best in P.M.—and that aint hay.

the carburetor adjusted correctly as he turned the needle down tightly onto its seat and then unscrewed it approximately 1½ turns, just like the book says. The Chore Horse runs fine for a minute or so and then it seems to need another carburetor adjustment. Finally it gets so bad that Joe has to stand by and twist the needle valve in and out continuously to coax the motor to run.

He has now cooked the number 2 goose.

Why? Because when he turned the needle valve down onto its seat, he forgot that the E.M.E.R. Power FZ 113 (or had he seen it?) stated "gently" and he had used almost as much force as Hitler would. The needle had enlarged the hole in the valve seat making an accurate adjustment virtually impossible. When this needle valve jet gets into this state there's nothing you can do about it—except replace the whole carburetor with a new one.

So there you have them. Two things about a Johnson Chore Horse. Don't let either of them cook your goose.

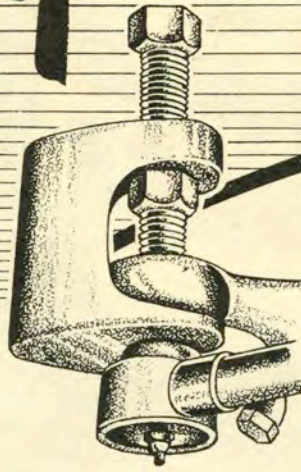


Carburetion in its simplest form—only one adjustment but that adjustment is v-e-r-y touchy.

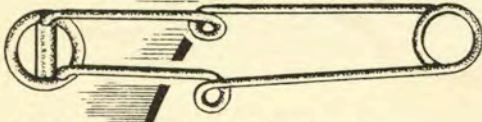
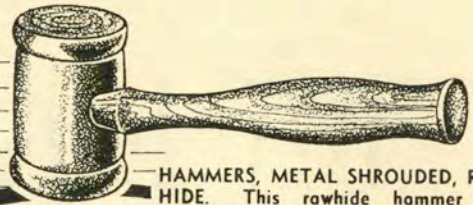


# Time you knew...

**REMOVERS, STEERING BALL JOINT AND SHOCK ABSORBER LINK.** Or to put it more plainly—a tie rod end pusher outer. This is another one of those places where it pays to use the proper tool rather than smacking the assembly with a hammer.

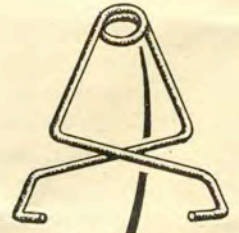


**HAMMERS, METAL SHROUDED, RAW-HIDE.** This rawhide hammer isn't exactly a stranger but you would think so if you saw the way some fellows beat hell out of tire casings with sharp edged crow bars or sledge hammers. Like your girl friend, tires bruise easily—so use raw hide on 'em.

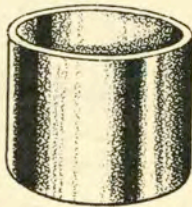


**LIGHTERS, FRICTION**—not for cigarette lighting but for kindling the flame on the tip of your welding torch. You know about people who get their fingers burned while playing with fire—well that's why you shouldn't use matches—unless your matches are at least 12" long.

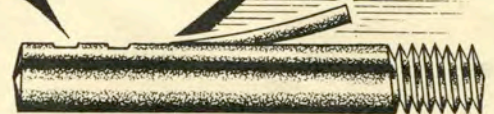
# about TOOLS



**CLAMPS, BRAKE WHEEL CYLINDER.** Did you ever sit cross legged, putting the finishing touches to a brake wheel cylinder. Then wham! Some so and so steps on the brake pedal and you spend the rest of the day looking for the guts of the cylinder. After that happens you always use these clamps.



**CARBURETOR, SLEEVE, CYLINDER LOADING.** When you boil it right down it's only a bushing. But it's exactly the right inside and outside diameter to allow the accelerating pump piston to slide into the pump cylinder. Using any other gimmick such as screwdrivers indicates a B.F. of the first water.



**SCREWS, OIL PAN HOLDING.** The three guys we know of who don't need these oil pan holder uppers when installing an engine oil pan are; Superman, Lil' Abner and Tarzan. If you're not one of these characters and can't turn the vehicle upside down—use these screws.

**T**HERE are certain tools in every workshop and unit that have been gathering dust ever since they were first issued. Possibly there are several reasons why these tools haven't been used, but the two most likely reasons are—first, maybe you and the tools have never been properly introduced. Second, maybe you've seen the tools but don't know exactly how they should be used.

We've picked these six out of the list of tools on scale of issue to workshops and units—there's no reason why they shouldn't be in your tool crib if you need 'em. Using incorrect tools makes your work more difficult—usually causes damage to parts and is apt to result in minor or serious accidents.

As you scan this page you're apt to say to yourself, "hell I don't need that rawhide hammer," or, "Pistons on that torch lighter, I've got along fine up to now without it". Maybe so, but who can tell when you're going to use the wrong tool once too often?





# CAM'S SEMI-ANNUAL INDEX

VOL. 2 - NUMBERS 1 TO 6 OCTOBER 1944 TO APRIL 1945

All the subjects large and small that have appeared in CAM from Oct. 1944 to April 1945 are listed alphabetically.

Covers are listed like this:

- IF—Inside Front Cover
- IB—Inside Back Cover
- OB—Outside Back Cover

The number following "B" or "F" indicates the issue—for example OB6 means Outside Back Cover, sixth issue.

## 'B' VEHICLES

### AXLE

King Pin Wear ..... 108

### BATTERY

(See Electrical System)

### BEARINGS

Jeep Bell Crank Failure..... 59

### BODIES

Breakage ..... 72  
Spray Painting ..... 110

### BRAKES

Brake Fluid Containers ..... 94  
Solid Ford Brakes ..... 58, 98  
Vacuum Power Boosters ..... 22

### CARBURETOR

Carter Identification ..... 87

### COOLING SYSTEM

Fan Belt ..... 15  
Thermostats, Reclamation ..... 17

### DRIVING

(See Operation)

### ELECTRICAL SYSTEM

Battery Indicator (Ford) ..... 109  
Battery Installation ..... 54  
Battery Tools ..... 184  
Distributor Contact Maint. .... 95  
Distributor, Overhaul ..... 41  
Distributors, Operation of ..... 26  
Distributor Point Burning (Ford) 77  
Ford Battery Indicator ..... 109  
Ford Resistance Units ..... 55  
Gauges, Tank Unit Salvage ..... 20  
Gauges, Gasoline ..... 18  
Generator, Maintenance ..... 106  
Generator, Model No. (G.M.C.) 79  
Generator, Repolarizing ..... 55  
Meters, Construction of ..... 82  
Quick Soldering ..... 65  
Regulator, Trouble Shooting..... 5, 73  
Spark Plug Cleaners ..... 103  
Voltage Drop Tests, (correction) 14  
6 Little Spark Plugs (Poem)..... 85

### ENGINES

Breaking in Engine ..... 84  
Detonation (Ping) ..... 46  
Horsepower Definition of ..... 78  
Sludge ..... 12  
Tightening Components ..... 92  
Tune-up Procedure ..... 70  
Valve Spring Breakage ..... 54

### FAN BELTS

V-Belts, Wear and Tear ..... 15

### FORD

Battery Indicator ..... 109  
Carb. and Fuel Pump  
Installation ..... 77  
Distributor Point Burning ..... 77  
Front Springs Installation ..... 98  
Modifications 15 cwt. .... 183  
Resistance Units ..... 55  
Solid Brakes ..... 58, 98

### FUEL SYSTEM

Carter Carb. Identification ..... 87  
Fuel and Lubricant Numbers ..... 96  
Gauge Tank Units, Salvaging..... 20  
Gum Deposits ..... 16

### G.M.C.

Caster and Camber Adjustment 77  
Generator Model Number ..... 79

### JEEPS

Bell Crank Bearing ..... 59  
Grease Pit width ..... 25  
Spare Tire Bracket,  
Reinforcement ..... 94  
Tool Box, How to Construct..... 57  
Tracta Joint ..... 61  
Valve Spring Breakage ..... 54  
Windshield Brace ..... 38

### LUBRICATION

Fuel and Lubricant Numbers ..... 96  
Generator Maintenance ..... 106  
Quiz ..... 117  
'U' Joint Gun Adapter ..... 57

### OIL

(See Lubrication)

### OPERATION

Driving in Wooded Areas ..... 40  
Jacking a Truck ..... 86  
Pushing Vehicle ..... 116

### SHOCK ABSORBERS

Servicing ..... 68

### SPARK PLUGS

Spark Plug Cleaner Maintenance 102  
6 Little Spark Plugs (Poem) .... 85

### STEERING

Camber and Caster Adjustment 77

### TIRES

Servicing, Lack of ..... 085  
Synthetic Tubes, Repair ..... 1, 52  
Tire Markings, Definition of... 97  
Valve Caps ..... 67  
Valve Leakage ..... 98

### TROUBLE SHOOTING

Detonation (Ping) ..... 46  
Tune-Up Procedure ..... 70

### UNIVERSAL JOINT

Lube Gun Adapter ..... 57  
Tracta Joint ..... 61

### WINTER OPERATION

Sludge ..... 12  
Vehicle Servicing ..... 0B4

## 'A' VEHICLES

### ENGINE

Exhaust Elbows on Radials..... 60  
Oil Pipe Plug ..... 60

### RAM TANK

Modifications ..... 1B2

### TANKS

Transmission Troubles ..... 45  
Turret Locks ..... 80

### TOOLS

Tank Track Installation ..... 49

## MOTORCYCLES

### ELECTRICAL SYSTEM

Battery Maintenance ..... 98  
Coil Salvage ..... 35

### ENGINE

Transmission Filler Plug ..... 38

### MODIFICATIONS

Harley Model W.L.C. .... 1B1

### OPERATION

Jiffy Stand ..... 33  
Know Your Enemy ..... 50  
Speed Wobble ..... 34

### TIRES

Wear ..... 66

## ARMAMENT

Automatic Pistol ..... 104  
Bicycle, Maintenance ..... 76  
Shotguns, care of ..... 29  
Signal Pistols, care of ..... 9  
The Armourer (Poem) ..... 4  
22" Long Branch Rifle, abuse ..... 58

## TELECOM'S

Batteries, glass jar type ..... 34  
Chore Horse Engine ..... 119  
Meters, construction ..... 82

## GENERAL

CAM  
Filing Back Numbers ..... 0B2  
Staff Greetings ..... 0B3

### CONSERVATION

Gasoline Gauge Tank Units..... 20  
Reclaiming Thermostats ..... 17

### EDITORIALS

CAMS First Anniversary ..... 1F1  
Christmas Message ..... 1F3  
Danger of Complacency ..... 1F5  
New Years Resolution ..... 1F4  
R.E.M.E. and "D" Day ..... 1F2

### EQUIPMENT AND TOOLS

Battery Tools ..... 1B4  
Brass Tubing, How to bend..... 17  
Engine Assembly Racks ..... 80  
Grease Pits ..... 25  
Meters, Construction ..... 82  
Motorcycle Jiffy Stand ..... 33  
Painters Respirator ..... 65  
Spark Plug Cleaner,  
Maintenance ..... 102  
Special Tools ..... 1B5, 120  
Tool Box, Oil Cans ..... 108  
Welding Goggles ..... 16

### FORMS

Accident Forms, where to carry 39  
Accident Reports ..... 30  
Control Racks, types ..... 39

### MISCELLANEOUS

Assembly of Components ..... 114  
Bicycle, Maintenance ..... 76  
Cdn. Legion Educ. Services ..... 81  
Horse Power, Explanation of... 78  
Quiz, General ..... 99, 117  
Repair Schedules ..... 101  
R.E.M.E. and the Invasion ..... 21  
Tightening Components ..... 92  
Tube Bending ..... 17  
V-Belts, care of ..... 15

### PAINTING

Painters Respirator ..... 65  
Spray Painting ..... 110

### PROCUREMENT

Requisitioning ..... 0B1

### PUBLICATIONS

Cdn. Legion Educational  
Services ..... 81

### SAFETY

Accidents, general ..... 10  
Accident Reports ..... 30  
Checking Batteries ..... 78  
Climbing into Vehicles ..... 72  
Compressed Air, danger of... 56  
Jacking a Vehicle ..... 86  
Lead Poisoning ..... 36  
Pushing Vehicle ..... 116  
Road Signs ..... 0B6

### SOLDERING

Quick Method ..... 65

### TWO CYCLE ENGINE

Lubrication ..... 69

### WELDING

Cleaning Goggles ..... 16  
Sealed Containers, danger of... 104

### WINDSHIELD WIPER

Trouble Shooting ..... 90



*Believe in Signs!*

**S**OME one didn't believe in this one. This jeep tells only half the sad story. You should see the driver that got away—on a stretcher.

He didn't get within three thousand miles of our enemy—no German ever set his sights on this jeep. Yet here they are in Canada—casualties. And casualties are a score for the enemy.

The sign isn't kidding—it's there to warn you of your worst enemy over here . . . accidents. Believe in signs.

