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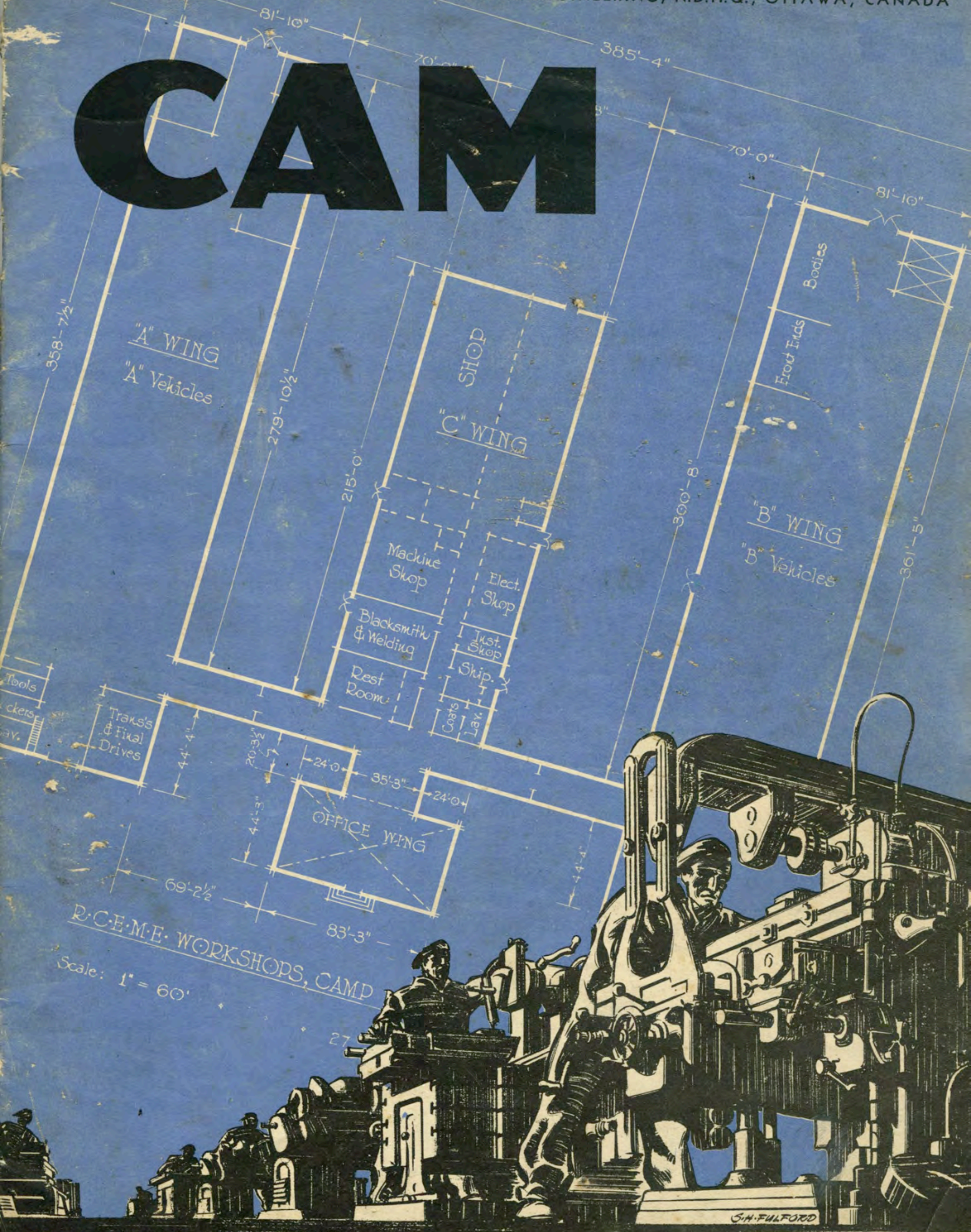
CAM



VOLUME 2 NUMBER 9 JULY, AUGUST 1945

EVERY 1000 MILES.....

IN a workshop we know, there used to hang a crest inscribed with the latinish inscription "Ubendum Wemendum". Maybe once upon a time it truly described the relationship between the mechanic and the driver.

Nowadays we prefer to interpret it differently.

We rather think the driver no longer spends his days bending them. For after six years of wheeling D.N.D. Vehicles from Calgary and Kingston to Cairo and Keil, the driver is coming into his own as a guy with a deep seated realization of the importance of the *preventive* part of maintenance.

So, when he drives up to the stall for a C.P.M.S. 4 or 5, a golden opportunity is born that no up on the ball mechanic is going to miss.

For this is where the mechanic, faced perhaps with a clutch that has been burned down to a frazzle through improper use or lack of P.M., can slip an arm round the drivers' shoulder and with a few tactfully chosen words, tell out the facts of clutch life—the effects of 'riding the clutch'—the importance of pedal 'free play'—and in general, why clutches go wrong.

And the driver, being the guy he is, will appreciate it. He'll understand that the thinning hair on the mechanic's head hides a hundred and one tricks of the trade. He'll realize the mechanic has handled and learned the temperamental peculiarities and traits of the dozens of assemblies and components that go to make up a vehicle. He'll know that nasty words at twenty paces isn't going to improve his driving and preventive maintenance habits, or help the mechanic diagnose his vehicle's ills.

It's going to take a get-together—a mutual exchange of savvy whereby both parties can learn the other sides' story.

The prime time for this is at the meeting of the Great Minds—the Big Two Conferences which are scheduled every 1000 miles.

CAM

JULY, AUGUST - 1945

Vol. 2 No. 9

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. . . their growl is worse than their bite—"But what makes them growl," says Gertie.

GERTIE is a babe wot's sharp as a drill but not nearly so boring. She's a stock keeper gal friend of ours and knows more about tools than most of the mechs. But came the day when someone stumped her by asking for a growler. Finding out what it looked like wasn't enough—she had to find out what it was used for and how.

Now if anyone asked us we would say that everyone in the shop knew how to use a growler. But to satisfy Gertie's manly curiosity we're telling her how it works and how she can use it to locate shorts and open circuits in an armature like a veteran, once she latches on to a few simple habits of electricity and magnetism.

A growler is actually an electromagnet consisting of many turns of wire wrapped around a laminated iron core. When you flop an armature on it and turn on the juice it operates much like an ignition coil or a transformer. Fig. 1 shows the main parts of a simple growler. Insulated copper wire is wound around an iron core—like you would wind thread or fishing line on a spool or reel. If the two loose ends of the wire were connected to a battery you'd have an electro-magnet and magnetic lines of force would travel from one pole to the other. If you want to prove it—connect a growler to a battery for a moment and while it's connected place a screwdriver across the poles. Then you'll believe in magnetic lines of force—even if you can't see them.

Here's another peculiar habit of electro-magnets. Which of the poles is *North* and which is *South* depends on the direction the current is flowing through the wire. If you reverse the direction of the current (by reversing the connections at the battery) the polarity of the magnetism at the poles will reverse.

If a second coil is placed in the magnetic field (as shown in Fig. 2) and the magnetism is increased or decreased rapidly, a voltage will be induced in the second coil, even though there is no electrical connection between the two coils. Connecting the growler to a source of alternating

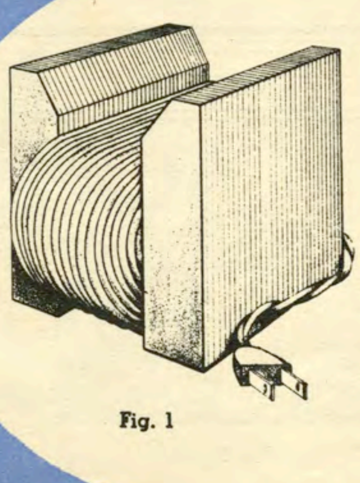


Fig. 1

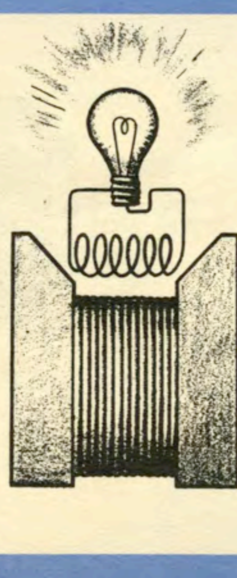


Fig. 2

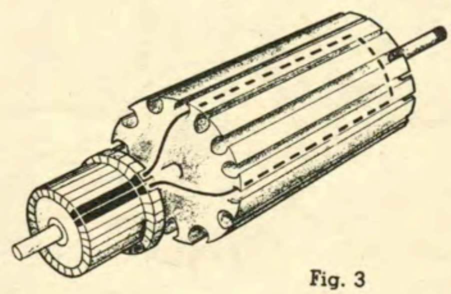


Fig. 3

current gives us a handy means of changing the strength of the magnetism. The usual procedure is to plug the growler into an outlet in the shop which carries 110 volt or 220 volt 60 cycle alternating current. 60 cycle means that the current flows 60 times in one direction and 60 times in the opposite direction every second. This means that the magnetism changes 120 times per second at the poles of the growler. Every time it changes it induces a voltage in the secondary coil—which, in this case, is the armature coil.

Pondering Fig. 3 will give you an idea how the various parts of the armature look by themselves. You can see what one armature coil looks like and how it is connected to the commutator bars.

When several of these coils are imbedded in the armature slots and connected together at the commutator bars, we have quite a handful of coils. Fig. 4 shows how the coils are connected together at the commutator. Even though each commutator bar is insulated from the other bars by mica—all the bars are connected together by the armature coils—all of which is important to remember when testing armatures.

The three common electrical troubles found in an armature; are shorted coils (as at 'S' Fig. 4) open circuited coils (as at 'O' Fig. 4) and grounded coils (as at 'G' Fig. 4).

Testing for Shorts

If the armature is placed between the poles of the growler and the growler is connected to a source of alternating current—the armature coils will act as the secondary winding. In other words, a voltage will be induced in the armature coils every time the direction of current flow changes in the growler.

To test for a shorted coil, lay a hack-saw blade along the top of the armature core as shown in Fig. 5. Then rotate the armature between the poles. If the armature is good the hack-saw blade will *not* be attracted to the armature. However, if a shorted coil comes under the saw blade, the blade will vibrate like your uppers when you are air drilling.

It's easy to figure out what causes this because current will only flow when there is a complete circuit. As you can see in Fig. 4, each coil is not a complete circuit within itself—its ends are separated by the mica between the bars. But if a short occurs, completing a circuit in any of the armature coils—an induced current will flow round and round in the shorted coil. And when current flows through a coil which is wrapped around a chunk of iron an electro-magnet is formed. This means that when the induced current flows through the shorted coil which is wound around part of the armature core you'll have an electro-magnet that will attract the hack-saw blade 120 times per second, causing it to vibrate over the shorted coil.

Testing For Opens

Testing an armature on the growler for *open circuits* is a little different. The armature is rotated between the poles of the growler as before but in this test you purposely short each coil in turn with the saw blade or a small 6 volt lamp bulb. The lamp bulb is the better of the two to use and can easily be made up by soldering two stiff copper wires to the base of the bulb as shown in Fig. 6. Bend the wires so they will just be wide enough apart to touch two adjacent bars at the same time.

If the circuit in each coil is O.K. (no poor or broken connections) the induced current in the

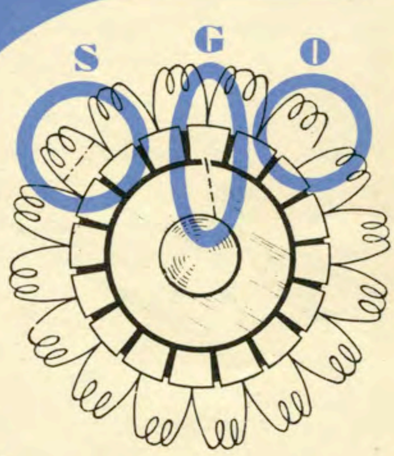


Fig. 4

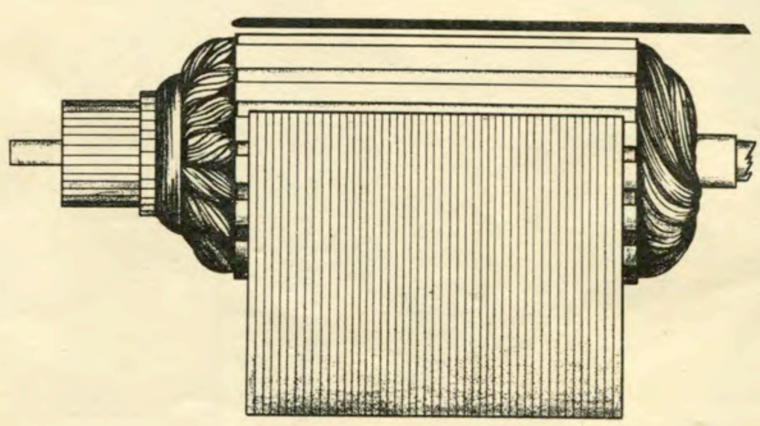
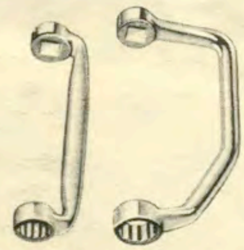


Fig. 5

coil will cause the test lamp to glow—or if a saw-blade is used to short the bars there'll be sparking where the blade contacts the bars. Due to the position of the coil on the armature, the induced current will be greatest at the bars that are about 45 degrees from top centre. (See Fig. 6). So each pair of bars should be in about the same position when they are shorted.

If there's an open circuit—the current won't get through to the bar and naturally the lamp can't light or the saw blade can't cause an arc. A poor connection where the coil is soldered to the bar is the most common cause of open circuits because, when the generator is charging, it gets hot, sometimes hot enough to throw the solder. An armature in this condition is not ready for the scrap heap, all it needs is resoldering, truing the commutator on a lathe and the mica between the bars undercut.

PART No. MT 7380
SHORT SWEEP
AND HANDSOME



PART No. MT 7385
HIGH WIDE SWEEP
AND HANDSOME

BET YOU'LL WANT THESE

IF you've been having trouble cinching down cylinder head nuts on Ford, Chev. and G.M. your troubles are over. Here's just what Doc ordered. Two torque wrench adapters that will snake around those hard to get at nuts. You'll need both of them so you'd better ask for them now. They've been added to the scales of issue for R.C.E.M.E. Workshops (M.F.S. 45) and Unit Garages (C.A.R.O. 3427). In the future nobody will have to tighten some of the cylinder head nuts with the torque wrench and the rest by guess and profanity.

Testing For Grounds

Testing for grounds is not done with the growler but while we are on the subject of testing armatures we might as well finish the job. Both the armature coils and commutator are insulated from the armature shaft and armature core. If the insulation on one of the coils breaks down and allows the bare wire to touch the core, the generator won't generate. Usually the ground occurs in one of the slots and can't be cured without rewinding the armature. Sometimes, however, a ground is caused by a collection of carbon on the end of the commutator. That is one reason why the armature should be kept clean.

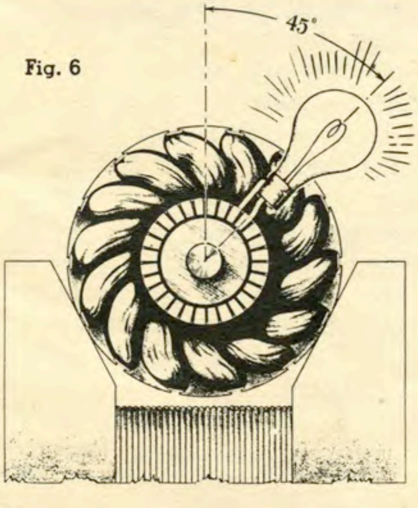
A simple test to locate grounds can be made with a test light connected to the 110 volt lighting circuit. Most shops are equipped with a test light but if yours isn't you can make one very easily. The connections are shown in Fig. 7 and the methods of checking for grounds is also shown. If the test light goes on—that's bad, because if there wasn't a ground there wouldn't be any circuit between the two test prods.

One more important point about growlers. Never operate one unless there's an armature sitting on it. Without an armature to absorb the induced voltage and current, the growler winding will have to take care of it—this will cause it to overheat and break down the insulation on the winding, burning out the growler.

Now, Gertrude, you're on your own. Knowing how to use growlers with the right technique, it's surprising how many armatures you won't have to scrap—and it's astounding how many armatures it takes to win a war.

X Y Z

Fig. 6



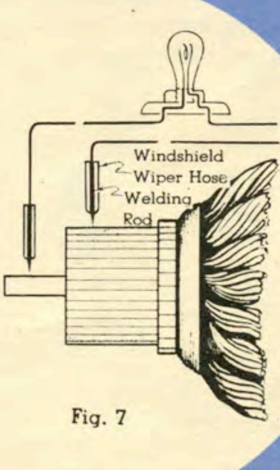


Fig. 7

NORTONS are DIFFERENT

"A M'CYCLE by any other name is still a X?&% m'cycle" was the way Cpl. Ulysees D'Ampears, our erstwhile society editor, greeted the news that the Norton 16H model was out and about in this country. "Just another two wheeled, oil slinging, fanny pounding, neck breaking . . . . "

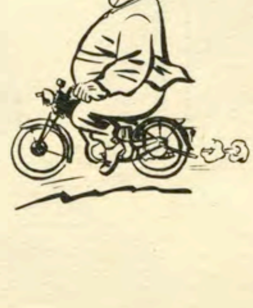
As we were saying before we so rudely interrupted D'Ampears, the "16H." 490 cc. S.V. model is the army version of the side valve, 490 cubic centimetre, (approx 29 cubic inch displacement in English) single cylinder Norton.

Having gotten yourself comfortable on your trusty Harley, we figgered you would be struck—and maybe stuck a bit—by some differences.

As soon as you throw a leg over the Norton, you notice right off that the whole plot is on a smaller, lighter and more compact scale. Don't let this throw you, however—for the Norton has about the same performance as the Harley—maybe a bit quicker on the takeoff—and somewhat the same ability to unsaddle you if you're prone to too fast travel on the gravel—cockiness on the rockiness—or snaking with the braking.

As soon as you're ready to start the motor, there are more differences, some of them perhaps not so obvious. Take the throttle twist-grip on the Norton. From closed to wide open requires less twist than on the Harley. This, plus the fact that the Norton does not need an open throttle to start, can be the cause of much needless leg work on the kick starter.

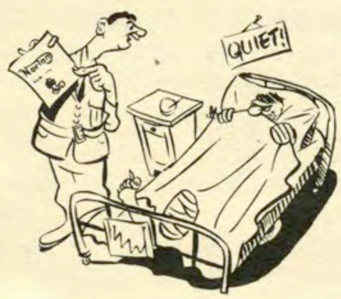
If you've had trouble, try it this way. We'll say the motor's cold. Turn on gas (use the tap on the left side only) and hold down the 'tickler' on the carb float-chamber for a couple of seconds—(no need to dab on it like you was sending a message by wireless). Close the air lever and retard the spark half way. Now crack the throttle just off fully closed. Push down slowly on the kick starter lever until you feel the piston coming up on compression. Raise the exhaust valve lifter (decompressor if you like) and ease the piston past compression. Release the valve lifter and deliver with a smooth swinging push on the kick starter. See how easy it is? Hold it—D'Ampears has a kick coming—in fact plenty of kicking to do if he wants to start his job, for it's apparently flooded. Nortons flood fairly easily, especially when warm. The remedy is just as easy. Open throttle wide, open air lever wide, raise decompressor and kick over smartly several times. Now Ulysees, try like we told you before, but don't tickle the carburetor float this time.



Now you're all set for a run. If you conduct a careful search, you'll find the gear change lever down by your right foot—instead of on the left side of the tank. The clutch is the lever by your left hand, the rear wheel brake by your left foot and the front brake is the lever in front of your right hand—which is also caressing the throttle. Think nothing of this—it all works out fine so long as you remember you're not on your Harley and don't step on the gear change for the brake, depress the foot brake to change gear, and pull in the clutch for the front brake.

Thing to remember about the gear changing business on these

Nortons is the fact that you've got one cylinder doing all the work. You already know that an internal combustion engine depends upon r.p.m. to produce power, and the fewer cylinders, the more sensitive the engine is to its revs. That's what makes the gear box such an important item with a single cylinder. It has four speeds—so use 'em all freely. First gear is not a 'low' low just for foot deep mud or cliff climbing. It's for starting off in too. Slugging along in fourth speed at fifteen miles an hour is not considered good pool either. Use third or second in the camp areas—save high for the highway and over 25. The Happy Nortonist has a keen ear for his motors' revs, a willing foot by the gear pedal and he plays those gears like he had a Muskey on his favourite fishing line.

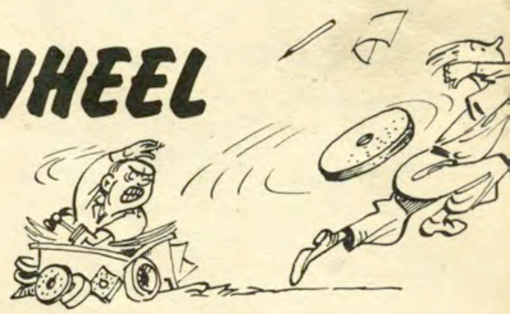


One more difference we can mention is tied in with the magneto ignition system. This means that you don't need a well charged battery (or any battery) to run the motor. This, in turn, means that during the long summer days, when you don't need your lights, the battery is apt to get a maintenance brush off. That can spell finis to the battery and put you in the dark some day when you do want to switch on the headlights.

And that, Ulysees, is a sprinkling of differences in Nortons compared to Harleys. There are lots more we can tell you about—when we come to see you next visiting day.

X Y Z

How to Get a GRINDING WHEEL



"LISTEN," said the DME's tools and equipment Brain, scratching his head with a claw hammer, "it's not me that's wacky, it's the joes who make out these here indents. For example, here's a stack of indents for wheels grinding, the ordinary everyday type that's used on bench grinders. Why do I get these indents? Why do I have to stay up half the night writing letters?"

"Do tell," we said.

"Because, instead of going to the Spare Parts Officer where they can usually get fixed up with a substitute grinding wheel with an adapter, these guys send me indents. So instead of spending my time looking after important demands, I waste it writing letters telling the boys where they can go—to get grinding wheels."

"Oh, not that," we said.

"But that," he moans, "is not all. See this other pile of indents. These are for special grinding wheels. Everyone of them is for a different type, size and shape of wheel, and none of them has enough information on it to tell me what's required. Before I can tell exactly what grinding wheel is wanted I've got to know all its dimensions plus the grit required."

"Natch," we said.

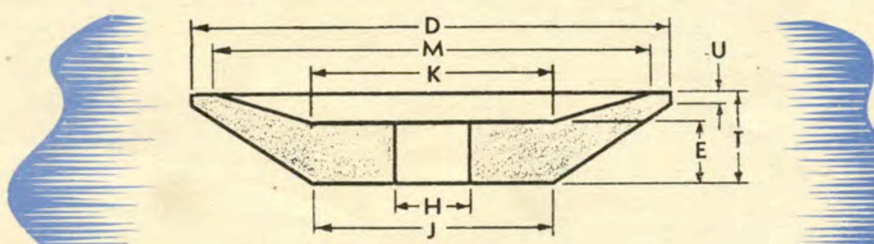
"See that wheel," he said, pointing to a picture that looked like a punctured piece of early Indian pottery, "now if somebody wanted a special wheel like that they'd have to give me all those dimensions. These specifications are universally used among all grinding wheel manufacturers but part numbers are not universal. Getting an indent for a special grinding wheel, part number so-and-so, without any dimensions or grit specified, is enough to drive anybody loco."

"Yak-yak," we said.

"If only I could get the guys who make out indents to put down **all** the information, my job would be a cinch. I could give them really fast service, but the way it is now I'm busy—so get the hell out of here. . . . "

We ducked the first one, but he caught us with a Type 6, D30, T8, H3, W2½, E2½,—right on the fundamental.

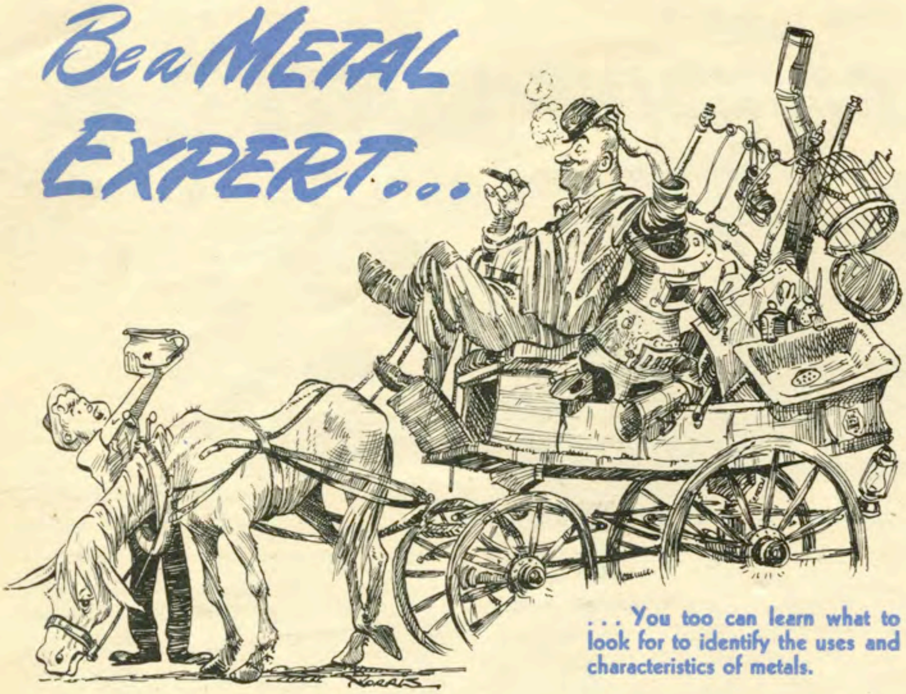
X Y Z



KEY TO LETTER DIMENSIONS

D = Diameter (Over All).
E = Center or Back Thickness.
H = Arbor Hole.
J = Diameter of Flat or Small Diameter.
K = Diameter of Flat Inside.
M = Large Diameter of Bevel.
T = Thickness (Over All).
U = Width of Face.

Be a Metal Expert...



. . . You too can learn what to look for to identify the uses and characteristics of metals.

YOU remember outdoor types who can pick up a chunk of wood and after a glance and a sniff, call it by name. Well, they take a back seat to the fellow who can call off the names of various metals and alloys after a few simple checks. If you can spot the difference between lead and aluminum you're already well on the road to success as a metal identification expert—but why stop there? You can be equally as sharp on other metals.

What say we take a look at some methods for spotting various metals in the field? Maybe the next time you have to make a part from a hunk of a Jap jeep you'll know quickly whereof you weld. Knowing that you don't carry a chemical lab, a high-power microscope and a flock of hand books in your hip pocket we've reduced the tests to the size of a powdered egg.

There are approximately six approaches to the problem of identification that you can use in the field:

★ You can inspect the outer surface of the metal to note its colour and texture. In addition, you can usually tell by looking, whether the metal or component part was cast, forged, rolled, or machined out of a solid piece—or:

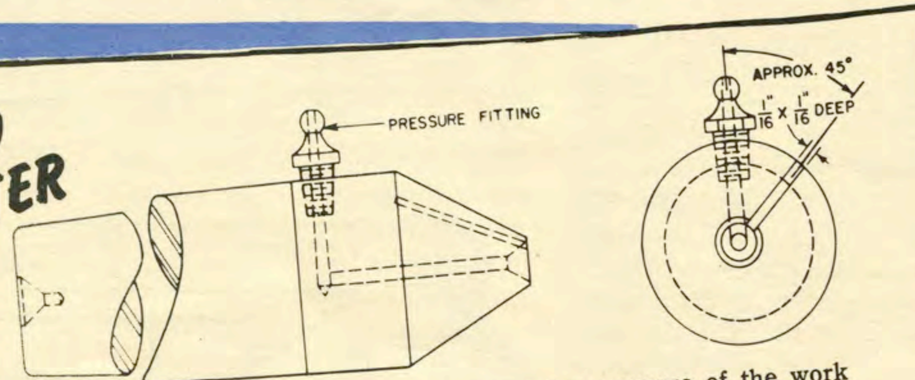
★ Often, you can get a clue by inspecting a fracture. You can also use a hammer and cold chisel to roll a chip which may give you another clue—or:

★ You can use a magnet to tell whether or not the material is magnetic. Strangely enough, many alloys with plenty of iron in them are still not magnetic—or:

★ In many cases you can get an idea by knowing what metals are commonly used to make certain parts. For example, manganese steel is frequently used to make Universal Carrier tracks; low or medium-carbon steel is used to make structural pieces, and so on—or:

★ One of the best tests, is the spark test. As you've probably

LUBRICATED LATHE CENTER



HERE'S a lubricated tailstock center you'll be glad to know about. Fitted with a Zerk, the center can be used whenever an ordinary center shows a tendency to "pick up" bits of metal from a heavy work-piece.

Lubricant forced into the fitting passes through the hole in the center and then along the 1/16 x 1/16-inch groove on the face. Note that the groove is placed where the pressure of the work is lowest.

It's a smart idea, if you have the time and material, to make the center from a piece of hardenable steel or a spare soft center; harden and grind after you've finished machining. If you try to massage a hardened center, you may spend the next day or two regrinding tools.

noticed time and again, different metals throw different spark patterns when they're held against a grinding wheel. You can use this fact to advantage—or:

★ Finally, you can study the action of metal under a torch. Any welder knows that there's a whale of a difference between a puddle of cast iron and a puddle of high carbon steel: one's quiet and the other throws a lot of sparks. Here we've assumed that the welder knows what he's handling. Starting at the other end, you can watch the puddle and then decide, within limits, what family the metal belongs to.

Now for the 1-2-3 of identification. We'll start from scratch. If you have a piece of stock or a part made of a metal you don't recognize, test the metal with a magnet. Either it'll stick or it won't. A magnet salvaged from a conked-out mag or made by holding a piece of high-carbon steel in a d-c field will supply you with the necessary magnet.

If the magnet doesn't stick, the metal's one of several types of stainless steel or it's a non-ferrous metal or alloy (one containing **no** iron). Next, make a spark test. For this you'll need a power grinder. To get the best results, work in subdued daylight and hold the grinder or material so that the sparks are thrown off horizontally. Above all, learn to exert a steady pressure. Don't bear down heavily on one piece and lightly on another.

IF THE METAL ISN'T MAGNETIC . . . and its spark tests show orange-red sparks containing occasional forked bursts, it is most likely a stainless steel, the sort of alloy that's sometimes tough to machine but rather easily welded with an alloy rod.

If the material gives a dull red spark, it's probably some non-ferrous alloy high in nickel. Although Monel, as a rule, falls into this group, it *may* be slightly magnetic. If the material is both non-magnetic and non-sparking, it's some non-ferrous metal such as copper, aluminum, magnesium, zinc, tin, or lead.

IF THE MATERIAL IS MAGNETIC . . . it may be either a plain carbon or alloy steel, a tool steel, plain or low-alloy cast iron, a straight cromium stainless steel, pure nickel (believe or not), a nickel-base alloy containing more than 85 per cent nickel, or a hard-facing cobalt-chromium-tungsten material (Stellite for instance). Try the spark test next.

If magnetic metal throws dull red sparks, it's either nickel, high-nickel alloy, a hard-facing alloy, or a high-tungsten steel.

If the material is magnetic and sparks profusely, it's either a plain carbon or low-alloy steel, cast iron, a high-chromium steel, tool steel, or a stainless steel slightly different than the stainless steel that is non-magnetic.

By the time you've read this far you may be straining yourself trying to remember all we have said. Well stop straining and take a look at the chart on page 168 and 169. You'll find all the dope we've told you about on this chart—keep it handy so you can refer to it every time you test a metal. After a month you won't need any chart—it'll all be in your head. However, the best way to get the dope down pat is to practice with pieces of metal you're sure of. This doesn't give you an excuse to grind or burn holes in parts that are still usable—be sure you get the stuff off the scrap pile.

To sew up the deal, here's a list of metals and alloys that are commonly used for certain parts and components. Stow this in the back of your head and you'll be surprised how handy it will be.

X Y Z

What metals are used where . . . .

GRAY CAST IRON. Used in cylinder blocks, brackets, pump bodies, pedestals, gears, pulleys, journal boxes, clutch housings, axle housings and other applications *where great strength per pound of metal is not required.*

WHITE CAST IRON. Used in making malleable iron castings and in cases where hardness or abrasion resistance is required.

MALLEABLE CAST IRON. Used for castings which must withstand shock (hard-wearing small tools, pipe fittings, brake toggles, shifting forks, clutch release yokes, clutch pedals).

WROUGHT IRON. Used in crane hooks, bolts, water pipe.

LOW-CARBON (MILD) STEELS. Used to make wire, nails, tubes, screws, rivets, plates, some structural members.

MEDIUM-CARBON STEELS. Used for general machining or forging purposes where high strength and surface hardness are required (crankshafts, axles, wheel flanges, connecting rods).

HIGH-CARBON STEELS. Used in making drills, taps, dies, springs, and other parts which are heat-treated to make them hard and wear-resistant.

TOOL STEELS. Used in the manufacture of chisels, shear blades, cutters, large taps, wood-turning tools, razors, and other parts which must retain a sharp cutting edge.

MANGANESE STEELS. Used to make tough castings and parts subjected to severe wear and shock (Canadian Dry Pin Tracks, Universal Carrier Tracks, tractor sprockets, rock crusher parts).

CHROMIUM STEELS. Steels containing some carbon and a low percentage of chromium are used for twist drills, reamers, mandrels, and other tools. Steels containing about 4 per cent chromium are used for gun barrels, ball (and roller) bearings. *Chromium is often used with other alloying metals.*

NICKEL STEELS. Used in connecting rods, bolts, studs, keys, pinions, wrist pins, spline shafts.

VANADIUM STEELS. *Usually used with chromium* to make steels used in forged parts such as ball bearing races, pinions, wrist pins, hand tools.

TUNGSTEN STEELS. Tungsten is often used with chromium and vanadium to make high-speed tool steel and exhaust valves.

MOLYBDENUM STEELS. Used in making steels for high-speed cutting tools. Used also in making parts subjected to high temperatures and pressures (plates, tubes, pipes, valves).

IDENTIFYING METALS BY APPEARANCE

	ALLOY STEEL	HIGH CARBON STEEL	LOW CARBON STEEL AND CAST STEEL	GRAY CAST IRON	WHITE CAST IRON RARELY USED COMMERCIALLY	MALLEABLE IRON
APPEARANCE OF FRACTURED METAL	Very close-grained and velvety; medium gray	Very fine grain structure; whiter than low-carbon steel.	Fine crystalline structure; bright gray, but darker than high-carbon steel	Crystalline structure similar to broken lump of sugar. Carbon in form of graphite (pencil lead) gives dark gray color	Very fine silky crystalline structure the color of a new dime	Dark gray crystalline center with a bright steel-like sand at the edges
APPEARANCE OF UNFINISHED SURFACE	Dark gray; rather rough; rolling or forging lines may be noticeable	Dark gray; rolling or forging lines may be noticeable; often hard to distinguish from alloy steel	Dark gray; forging or casting marks may be noticeable; rolled stock shows surface lines running in one direction	Very dull gray; rough surface caused by sand mold is distinguishing feature	Dull gray; rough surface caused by sand mold	Dull gray; usually lighter than cast iron; generally free from sand
APPEARANCE OF NEWLY MACHINED SURFACE	Very smooth; bright gray; often machined all over	Very smooth; bright gray; often machined all over	Very smooth; bright gray; often not completely machined	Fairly smooth; light gray; rarely machined all over	(Extremely difficult to machine; never machined in practice)	Smooth surface; light gray
APPEARANCE OF CHIP	Smooth, continuous, medium gray chip; many alloy steels are very tough and hard to chip	Smooth, continuous, light gray; steel is very hard, but can be chipped	Smooth, continuous, bright gray; easily cut or chipped	Dark gray, not continuous; easily cut with cold chisel, although surface metal may be tough	(Brittleness prevents chipping path with smooth sides)	Chips do not break short as in cast iron; very tough, harder to chip than cast iron
SPEED OF MELTING (From Cold State)	NOTE: Alloy steels are difficult to identify through use of a torch flame. In fact, the presence of one, two, three or sometimes four alloying elements makes it almost impossible to make an accurate determination without making a chemical analysis. In maintenance work, however, it is not usually important to know exactly what alloying metals are present.	Fast	Fast	Moderate	Moderate	Moderate
COLOR CHANGE WHILE HEATING		Becomes bright red before melting	Becomes bright red before melting	Becomes dull red before melting	Becomes dull red before melting	Becomes red before melting
APPEARANCE OF SLAG		Similar to molten metal	Similar to molten metal	Thick film develops	Medium film develops	Medium film develops
ACTION OF SLAG		Quiet	Quiet	Quiet; tough, but can be broken up	Quiet; tough, but can be broken up	Quiet; tough, but can be broken up
APPEARANCE OF MOLTEN PUDDLE		Lighter than low-carbon steel; has a cellular appearance	Liquid; straw color	Fluid and watery; reddish white	Fluid and watery; reddish white	Fluid and watery; straw color
ACTION OF MOLTEN PUDDLE UNDER BLOWPIPE FLAME		Sparks more freely than low-carbon steel	Molten metal sparks	Quiet; no sparks; depression under flame disappears when flame is removed	Quiet; no sparks; depression under flame disappears when flame is removed	Boils and leaves blow-holes; surface metal sparks—interior does not

NCE

TYPE OF CHIP

ACTION UNDER TORCH

EABLE ON	WROUGHT IRON	COPPER	BRASS AND BRONZE	MONEL METAL	NICKEL	ALUMINUM AND ALLOYS	LEAD
y crystal- er with a steel - like the edges	Bright gray; fibrous structure caused by slag inclusions	Red; looks like new one-cent piece	Red to yellow; fine grain; rough break	Light gray	Almost white	White	White crystalline
y; usually than cast erally free d	Looks like rolled low - carbon steel; light gray; smooth	Smooth; various shades of brown to green caused by formation of oxides	Various shades of green, brown, or yellow — caused by oxidation	Smooth; dark gray	Smooth; dark gray	Evidence of mold or rolls; very light gray	Smooth; velvety; white to gray
h surface; y	Very smooth light gray surface	Bright copper red; dulls upon prolonged exposure	Red to very light yellow; very smooth	Very smooth; light gray	Very smooth; white	Smooth; very white	Very smooth; white
not break in cast ry tough, chip than	Smooth edges where cut; continuous; soft, easily cut	Smooth chips; saw edges where cut; continuous; soft, very easily cut	Smooth chips; saw edges where cut; can be made continuous; easily cut, but more brittle than copper	Smooth edges; can be made continuous; soft, but tough; chips easily	Smooth edges; can be made continuous; chips easily	Smooth chips; saw edges where cut	Any shape chip can be secured because of softness
	Fast	Slow; melts suddenly	Moderate to fast	Slower than steel	Slower than steel	Faster than steel	Very fast
red before	Becomes bright red before melting	May turn black and then red; copper color may become intense	Becomes noticeably red before melting	Becomes red before melting	Becomes red before melting	No apparent change in color	No apparent change
film devel-	Oily or greasy appearance with white lines	Very little slag; scarcely noticeable	Various quantities of white fumes; bronze may not produce any fumes	Gray scum in considerable quantities	Gray scum; less slag than monel	Stiff black scum	Dull gray coating
ugh, but roken up	Quiet; easily broken up	Quiet	Appears as fumes	Quiet; hard to break	Quiet; hard to break	Quiet	Quiet
d watery; lor	Liquid; straw color	Mirrorlike surface directly under flame	Liquid	Fluid under slag	Fluid under slag film	Same color as unheated metal; very fluid under slag	White and fluid under slag
nd leaves s; surface arks—inter- not	Does not get viscous; generally quiet; may show slight tendency to spark	Tendency to bubble; puddle solidifies slowly and sometimes sinks slightly	Like drops of water; bubbles when subjected to oxidizing flame	Quiet	Quiet	Quiet	Quiet; may boil if too hot

Based on material from THE MAINTENANCE ENGINEER

BEAT the HEAT

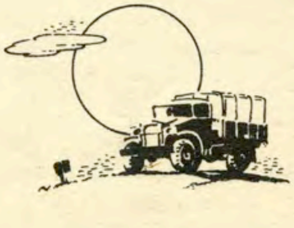
. . . . by cookin' with the right kind of P.M.

WHEN the Fahrenheits' lazin' around and above the 90 mark, there's nothing like a drop of clear cool liquid, lots of cool fresh air and an easy pace.

There's two ways you can take this recipe.

You can apply this to your own little self and let it go at that—or you can include your equipment in on the deal. Grizzled old timers at the game will tell you that the second choice pays off best.

There are plenty of things you can do to keep the cooling system cooling, the crankcase ventilating system ventilating, quenching the battery's thirst for cold water and treating the tires to summer care. It amounts to making hot weather P.M. your business. It's not a different kind of P.M., it's just additional effort and twice as much attention so you won't scorch the pans off your vehicles when the heat's on.

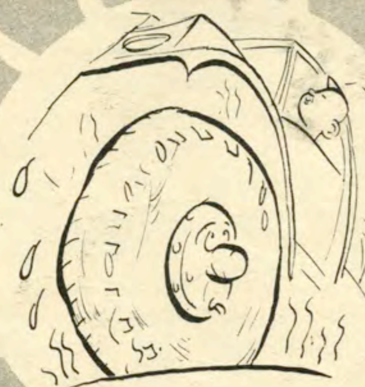


BATTERIES . . .

they usually get more coddling in the winter when it takes more juice to start a vehicle. They get neglected in the summer when nobody loves them, but they shouldn't. Since they operate at higher temperatures, the water in the battery "boils", or evaporates, faster. Check water for proper level (from 3/8 to 1/2-inch above top of plates) at least once a week. Just because it evaporates faster you won't put too much water in the battery because it will bubble out of the vents and speed up corrosion of cables, terminals and clamps. Remember also, to check ignition timing. Late timing, especially when the engine is operated under heavy load, can contribute to overheating.

CRANKCASES . . .

need special attention. Be sure to use D.N.D. 365 engine oil, and maintain the oil at the proper level. Keeping oil level too high or too low may cause an engine to run hot. Also remember that dirty and clogged breathers and crankcase ventilators contribute to engine overheating. See that oil and dirt are scraped off the underside of the crankcase, because it'll insulate the crankcase and thus prevent the oil from dissipating its heat.



TIRES . . .

especially the synthetics that roll you over the baking byways today, are hyper-sensitive to temperature and pressure. They should be inflated to correct pressure in the morning when the dew is on the grass—when they are cool. Tire pressures will normally increase during the day due to the heat of the sun and the heat generated by the flexing action of the tire sidewalls. If pressure is checked again during the day and found to be high, don't bleed the tires because the pressure will usually return to normal as soon as the tires cool off. Bleeding them will only reduce the pressure, increase the flexing and thereby increase the heat generated so that you end up with a hotter tire situation than ever.

COOLING SYSTEMS . . .

require special care. Check the thermostat and see that it opens and closes at the indicated temperatures. Inspect hoses and replace if damaged. Repair or replace the water pump if it leaks or is loose, and check and adjust the fan belt frequently for correct tension. Use clean water in the rad. Bugs are a thing to watch too, not in your seat cushions, but the ones that plug up the radiator core and spoil the rad's cooling ability.

SAND AND DUST

are like flies. They come out in hot weather and will cause all sorts of grief if they get in the wrong places. For this reason, it is important to wash air cleaners, replace oil filter elements, and clean crankcase breathers more frequently. Containers must be better protected against dirt and dust to avoid mucking up fuels and lubricants prior to their use in equipment.

SMART DRIVING

is also an important means of preventing engine overheating. Avoid slow speeds in high gear, especially on long, cross-country or up-hill pulls. When the vehicle is run at reduced speed, the amount of air flowing through the radiator is insufficient to cool the engine. Shift to a lower gear; the fan will speed up, pull more air in and the temperature will become cool and corrected. Also avoid engine "pinging" by changing to a lower gear. A "pinging" engine is a labouring engine that will quickly become an over-heated engine.

Speed of Electricity

Dear O'Sweat:

Some of the boys and myself have been arguing about the feet per second in which electricity travels through the lighting system of a car.

Please give us the correct answer.

I think that CAM is one of the best books ever printed for the workshop.

L/Cpl. M.A.S.

Dear L/Cpl. M.A.S.:

Fourteen bows and a curtsy for them kind words, Corp. Hope you'll like CAM just as much after you've read the next twelve issues we're going to address to you personally. Now to answer your question.

Electricity in any circuit travels at the same rate of speed as light, 186,000 miles per second. That's 982,080,000 feet per second or 66,960,000 miles per hour. Any way you want to figure it, it doesn't take long to get where it's going.

O'Sweat

Tank Voltmeters

Dear Sgt. O'Sweat:

I've run into a procurement problem that you may be able to solve. We've been having trouble getting new voltmeters for the instrument panels of Ram and Grizzly tanks.

Would you say that it is O.K. to take out the old meter and leave it out, at the same time disconnecting the wire from the battery and taping it up until such time as we can get new voltmeters?

Cpl. A.J.R.

Dear Cpl. A.J.R.:

The reason you have had trouble getting new voltmeters is likely due to the fact that it has been decided they aren't necessary. However, I've checked and found that Spare Parts still have a few left.

The tank boys in D.M.E. are getting a CALEMEI ready which you will receive soon. These new instructions will agree pretty well with your idea.

The CALEMEI will tell you that when the voltmeters on your tanks, and S.P. mounts go haywire—don't try to replace them. Disconnect the wire that goes to the battery, *at the rear of the voltmeter* and tape the end of this wire. Leave the old voltmeter in its place on the instrument panel.

It will also be a good idea to write the word **"disconnected"** on a piece of paper and stick it on the voltmeter glass. This will prevent other guys getting their shirt in a knot because the meter won't work.

O'Sweat

AMENdment

REMEMBER what O'Sweat said in our May issue regarding running in engines with DND 365 oil? Well now the amendment he predicted is on the way. Henceforth and from now on it will be official and above board to run in new and reconditioned engines with the lighter oil DND 345. Your present CALEMEI's tell you to use DND 365 but new CALEMEI's covering the subject have been written and will reach the field soon. They will affect:—

CALEMEI
Wheeled Vehicles C024 Inst. 1

CALEMEI
Wheeled Vehicles C604 Inst. 1

CALEMEI
Wheeled Vehicles W024 Inst. 1

CALEMEI
Wheeled Vehicles F064 Inst. 1

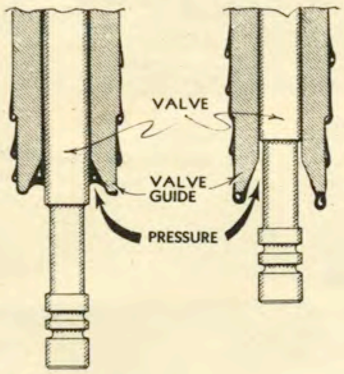
Chrysler Valves

Dear O'Sweat:

Since reading last month's CAM I've been doing a little O'sweating myself trying to find a question that I could send you so I could get my name on your yearly subscription list. Nothing like being frank, is there? But besides the ulterior motive I have of getting a copy of CAM mailed to me every month I really would like an answer to my question.

On the intake valves used in engines manufactured by Chrysler I have noticed that about 11/16" of the valve stem is recessed. There must be a reason for this but so help me—I can't figure out what purpose it can serve. Maybe you can. In the meantime I'll keep my fingers crossed in hopes that my simple question will earn me a subscription to CAM.

Cpl. D.R.S.



Dear Cpl. D.R.S.:

Okay, Corp.—all you gotta do now is let us know every time you change your address and CAM will follow you like your shadow.

That recess you're curious about does serve a purpose. It helps prevent excessive oil consumption. Look at the two pictures I doodled and you'll see how it works. When an intake valve opens, atmospheric pressure tends to push air past the valve stem and guide into the cylinder where there's a lower pressure. The inside of the valve chamber is dripping with oil so natchaly a certain amount of oil is pushed past the guide with the air. Chrysler control this by a recess on the stem. The recess is positioned very carefully so just enough oil will slide by for proper stem lubrication. Then, as you can see in the right hand doodle—when the recess enters the valve guide, the air can get by, without pushing the oil ahead of it into the combustion chamber.

Good thing about this simple idea is, it works.

O'Sweat

Blowing Grease Seals

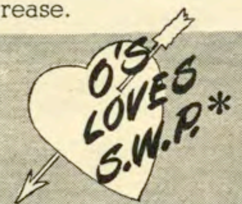
Dear Sgt. O'Sweat:

Why is it that we are having so much trouble with the rear wheel grease retainers in some of our Ford 30 cwts.? For some unknown reason the grease gets by them even after new retainers are installed. This sure makes a mess of the brake lining.

Pte. F.J.B.

Dear Pte. F.J.B.:

I'll bet you have to duck when you remove the diff case filler plug after a run too. If you don't you're liable to get an eyeful of grease.



*Soldiers With Problems

. . . . specially maintenance problems! Has a manual got you muddled? Is a bulletin buffaloing you? Are you irked by a quirk in your work? If where you are, the answers ain't—pass your poser to O'Sweat. If there's an answer, he'll get it for you. Better still, if we can print the question and answer, you get a PERSONAL SUBSCRIPTION to CAM—you lucky dog. Write 'Dear O'Sweat' CAM magazine, D.M.E. Department of National Defence, Ottawa.

When the gears start churning and the temperature rises, you get a pressure build-up inside the differential. This pressure can, and will, blow the grease seals in no time if the diff case vent plug isn't working. That's most likely where your trouble lurks. Make sure these vent plugs are working properly and not plugged with dirt—so they'll pop off and lower the pressure before the grease seals blow.

Another thing that causes leaks past the leather grease seals, is not soaking them in oil before they are installed. If the leather isn't soft and pliable they'll wear and in some cases a groove will be worn on the axle where the hard leather contacts. The grease will sneak past and into the brake—and as you say, the linings get to be a non-functioning mess.

This doesn't only apply to Fords—it can happen on all military pattern vehicles.

O'Sweat

Contact Point Pitting

Dear Sgt. O'Sweat:

This question has come up for discussion more than once at this training centre.

According to manuals etc., condenser capacity affects contact point pitting. They tell us that an overcapacity condenser causes a build up of metal on the negative contact and a hole in the positive contact. An undercapacity condenser will cause the opposite. The build up or tit will be on the positive contact and the hole will be in the negative contact.

No manuals or books explain how this happens and that is what we would like to know.

Sgt. C.G.

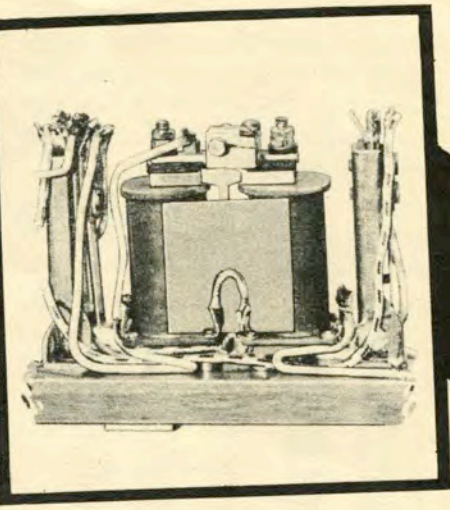
Dear Sgt. C.G.:

I got a feelin' you had a gleam in your eye when you asked this question, Sarjint.

As you know, a condenser acts something like a shock absorber. When the contacts open, the current tries to keep flowing. Instead of jumping between the contact points in the form of an arc it flows into the condenser. However, if the condenser capacity isn't large enough to handle all the current, some of the current is going to arc across the points. The ordinary guy might think that this arc carries metal with it from the positive to the negative contact, but if that happened we'd get the hole on the wrong side. What actually happens is

SHORTY SIRKIT GETS A LINE ON A COUPLE OF

SWITCHBOARD SQUAWKS



EVER been plagued by the automatic switch on the generator used in U.C. switch boards and type F Telephones? Like it won't operate smoothly—or worse, it won't activate at all?

Shorty Sirkit comes along with his finger on the likeliest suspect—the screw which guides the crescent shaped slotted sleeve on the switch operating arm. The trouble being that this guide screw has got itself burred or otherwise worn through use, and hence is not sliding in the aperture as it should.

The remedy for this is straight forward—simply remove the magnet and keeper bar, whip out the guilty little screw and smooth out the burrs with emery cloth or a very fine file. If it's shot beyond recall, replace it—making sure the replacement is identical and the livin' image of the original screw.

Speaking of the weather, women, and U.C. switch boards, Shorty also mentioned their relays. Seems that relays are a perpetual hang-over to tels tribesmen. These particular ones, on U.C. switch boards, have long contact arms which makes them hang over even more. In most cases this arm gets itself bent by fumble-thumb handling when removing or replacing a line unit in its receptacle on the panel. And once this arm gets bent, it's next to impossible to straighten it out true enough to ensure proper relay action from then on.

Being able to do nothing about the thummy handling, Shorty guards the arm with a simple shield per the pix shown here.

It's made with a small piece of thin fibre or bakelite measuring 1½" x 1⅜", placed against the coils on the arm side and slid into place so that the protector is held where you want it by the lugs in the base. The delicate relay arm is now reasonably safe from catching the bends during a line unit replacement.

X Y Z

O'SWEAT *(Continued from page 173)*

—positively charged ions passing from the positive to negative contact beat a tatoo on the negative contact surface. This bombardment causes the hole. The negative particles of metal which get dislodged in the process are attracted to the positive contact and there they stick—which accounts for you getting a build up on the positive contact when you use an undercapacity condenser.

An overcapacity condenser causes pitting too, but the build up and hole turn up on the opposite contacts. Strange as it seems this happens when the contacts are *closing*. When the points are open, the condenser is charged at battery voltage. When they close they short the condenser plates and the current that was stored in the overcapacity condenser passes from one contact to the other. This surge of current, maybe 100 amps or higher, occurs when the contacts are only millionths of an inch apart. The current flow is from positive to negative but the electrons flow in the opposite direction, from negative to positive. This accounts for the metal on the positive contact being knocked off and piled on the negative contact. Which, (as the six Doctors of Electricity at National Research Council said to us) is all very simple.

O'Sweat

COUGH

OKAY, BROTHERS—cough up those bright Maintenance ideas you've been harbourin' to y'self. Those ways and means that have helped your equipment—or helped you. If we can print them for the benefit of the rest of the maintaineers—you'll fall heir to their everlasting blessings and a one year PERSONNAL SUBSCRIPTION to CAM.

Write the Editor, CAM Magazine, Directorate of Mechanical Engineering, Department of National Defence, OTTAWA.


The
CAM PAINS
of
BENNY BOOB
NORRIS
POP!
CLICK!
WRRRRRRRRRR
CENSOR!
UH-UH!
CENSOR!!
DELETE
TSK!
OOTSY
ISSUE
2 hours and 10 breakdowns LATER
MOVIE TONIGHT
We'll mention, Benny, if you should care,
Preventive Maintainance before you're there
Will prevent Maintenance being the bill of fare.

For B.F.s

The Red Nuts .....

. . . . *a spare pot of red paint.*

THE words at the top of this page sound like the title to a murder story. Perhaps they're prophetic. However, let's get on with what we wanted to say.

If you happen to drive a D.N.D. vehicle that's one jump, or better, larger than a jeep—you will have noticed *two* rings of nuts spaced around the wheel hubs. There *are* two anyway, and one of them, the outer ring of nuts, is painted red.

One of these days it may occur to you to wonder why. You can take our word for it that it isn't done to make the wheels look pretty when they go round, or because the army happened to have a spare pot of red paint. It's done, like most things on a service vehicle, for a good and sufficient reason.

An Army tire is usually a massive affair. You'll find that out as soon as you try to change one. It is so hefty, in fact, that it cannot be pulled off an ordinary rim because it just wont 'give'. So the wheel has to be made in two parts, the inner half and the outer half. These two parts are bolted together, and they are designed in such a way that you can take the wheel out of the tire when they are separated, instead of busting your pantie buttons trying to take the tire off the wheel.

The second ring of nuts—the *inner* ring—is the one you find on all other kinds of wheel. That is to say it is the ring of nuts provided to hold the wheel to the vehicle.

Now all that is fairly straightforward. It means that you have to undo the inner ring of nuts to remove the wheel, and the outer ring of *red* nuts to remove the tire.

But it isn't enough just to acknowledge this fact and then to forget all about it. That way lies danger, as they say in the Y.W.C.A., and it is because of this danger that they colour the nuts red.

If you make a mistake and undo the red nuts when you are meaning to remove a wheel, you may get the surprise of your life—especially if the tire is fully inflated. The pressure of air will probably blow the two halves of the wheel apart. You will wake up (about time, did we hear someone say?) in hospital, wondering what on earth hit you. And we don't want the army to go back to mules.

Learn the golden rules of wheel and tire changing by heart. The inner ring of uncoloured nuts when you want to change a wheel. The outer ring of coloured nuts when you want to change a tire. And never monkey with the red nuts unless and until the tire is completely deflated.

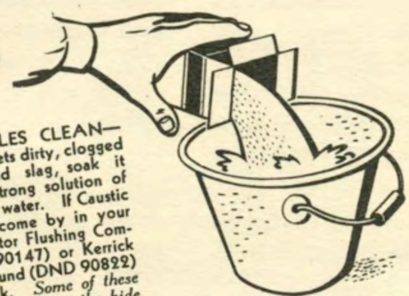
X Y Z

. . . . *you may get the surprise of your life* . . . .

RECONDITIONING OXYACETYLENE CUTTING NOZZLES

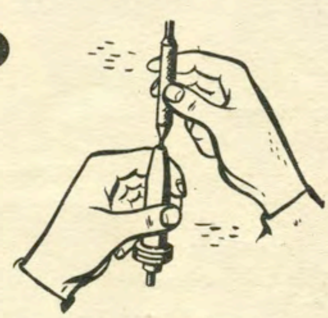
Fussy welders are pernickerty about their nozzles. They keep them clean and new looking just as a good barber keeps his razors stropped. It all boils down to the old familiar—PM, and here's what Preventive Maintainance means where cutting nozzles are concerned.

1



KEEP NOZZLES CLEAN—When a nozzle gets dirty, clogged with carbon and slag, soak it overnight in a strong solution of caustic soda and water. If Caustic Soda's hard to come by in your territory—Radiator Flushing Compound (DND 90147) or Kerrick Cleaner Compound (DND 90822) will do the trick. *Some of these compounds are hard on the hide so handle them carefully.* After the nozzle has been soaked in the solution rinse it well in clean water before you handle it with your bare hands.

2

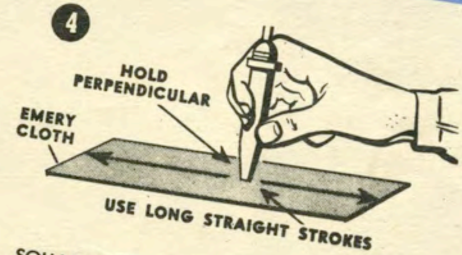


CLEAN GAS PASSAGE—After the nozzle has been soaked for several hours in the solution, the carbon deposit will be loosened. Then the gas passage can be cleaned by carefully working a drill of the correct size through the passage *without forcing or twisting the drill.* If the passage is badly clogged, use a smaller size drill to start with. The last inch of the gas passage has to be clean as a rifle bore, not bell mouthed or oversize and must be perfectly round.

3

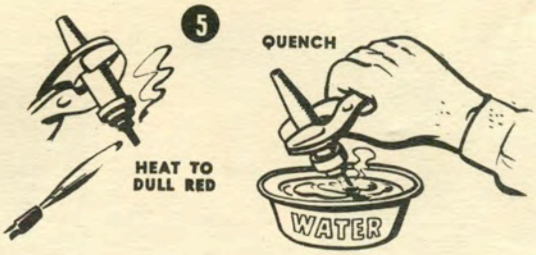
STRAIGHTEN BENT NOZZLES—When a nozzle gets bent it can usually be straightened by placing it on a block of wood and tapping it very lightly in the right spots with a rawhide hammer. It's a ticklish job and one heavy blow can spoil it—so don't beat it to death.

4



SQUARING UP END—The flame end of the nozzle can be made ship shape by dressing it on a piece of emery cloth on a flat surface. Nozzles can be dressed over and over again—as much as ¼" can be removed from the tip before it is ready to be tossed out. To dress the nozzle, hold it at right angles to the emery cloth and rub till the edges are sharp without burrs.

5

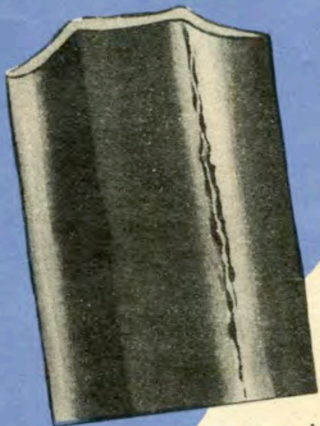


CLEAN NOZZLE SEATS—Good welders check the nozzle seat for dirt regularly and often. The seat can be cleaned by heating the seat below the nut ring till it's a dull red; then quench in water. This loosens the scale so that it can be wiped off with a damp cloth. The heating softens the seat so that when it is connected to the blowpipe it is burnished and dressed by the harder surface in the blowpipe head.

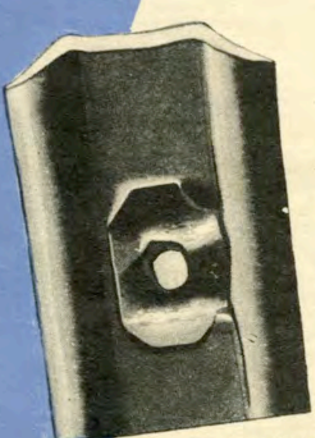
If, when you've gone through this routine, the dents, nicks and burrs have not all been removed--it's time for a new nozzle.

Based on material from Dominion Oxygen Co. Ltd.

FLAP-HAPPY



. . . . it cooks till it's brittle and that isn't good. Cracks form on the tube side of the flap.



. . . . heat bakes the bridge plate into the flap—someone is unhappy.

WHEN it's new, an endless rubber tire flap looks like an overgrown rubber band, and, usually, it can be used with any one of several rim widths. But after a flap's seen service, you can't use it with another tire and rim combination and expect it to work. The pressure and extreme heat within the tire moulds it to a shape it'll never lose.

If you go ahead and interchange flaps just because they seem to fit, you're heading for trouble, which may mean nothing more than a chawed-up flap, although too often you'll wind up with a pinched and leaky tube. Next step — another flat.

To get the most service out of a flap with the least tire trouble there's a few things you should resolve to do.

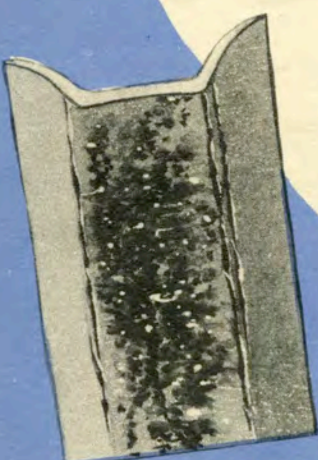
Keeping the tire cool is one thing. Heat caused from poor ventilation or dragging brakes can zoom the rim temperature so high it will cook the flap till it's brittle. Then it cracks because it won't flex. Improper mounting of duals often causes overheating. The ventilating holes in the wheels of each pair of duals must line up opposite each other so the cool breeze can whistle through them. Overheated brake drums (they often hit the 400°-500° F. mark) speed up bridge plate cutting on the tube side of the flap, so check for warped drums and faulty brakes.

Incorrect mounting of the flap on the rim always leads to a tube full of trouble. If the flap is mounted on a rusty rim, deep pits will form and these will develop into deep cracks. This also means tube and tire trouble.

Cracks on the rim side of the flap often come from mounting it on the rim off centre, so there's another point to watch. And you know what a wrinkle in your sock can do to you on a route march, well a wrinkle in your tire flap is just as uncomfortable to the tube. It rubs an' chafes and invariably leads to a phffffffflat. Keep your flaps flat and treat them with the approved lubricant (pure soap and water to you) when you're working on them. Mark all used flaps that are still usable so the next Joe will know what size rim they can be used with.

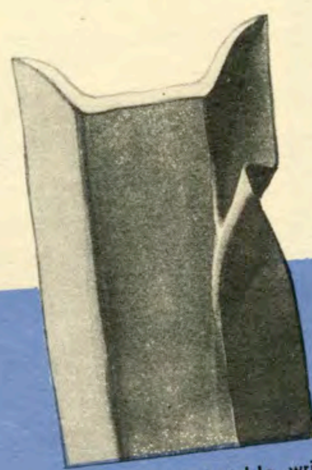
Flaps, like tires are still scarce—keep 'em happy.

X Y Z



. . . . like rust and dirt in a flesh wound—it gets worse and worse.

. . . . mounting the flap off centre did this. Two deep cracks on the rim side of the flap.

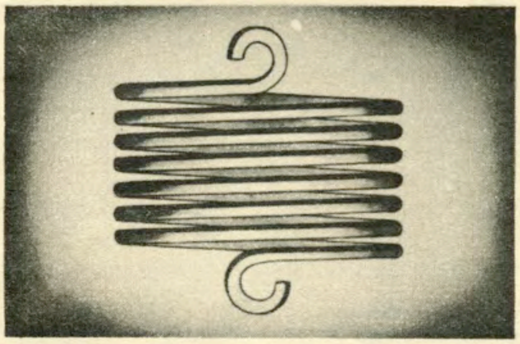


. . . . an uncomfortable wrinkle. The tube will complain with a loud report.

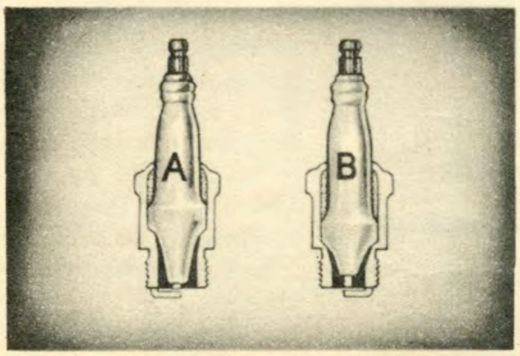
When it's TOO HOT for words

. . . . it's easier to take stock of the facts you've got stored in your noggin with pictures.

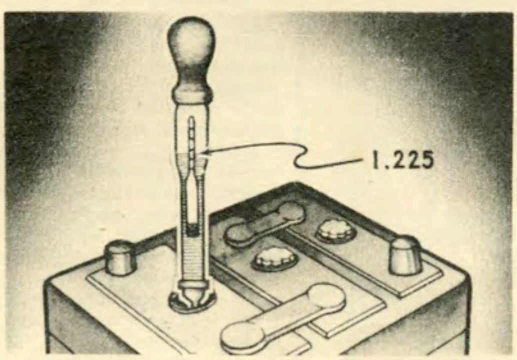
For a quizter like you, the eyes should have it in no time on these pin-up posers. (More than six looks at page 180 would disqualify you for the prize if there was one.)



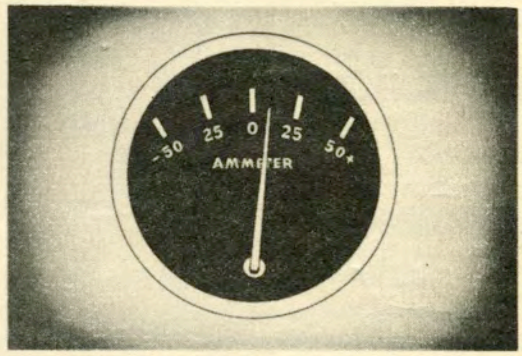
1. This bendix spring can be used on:—(a) a right hand drive; (b) a left hand drive; (c) either one.



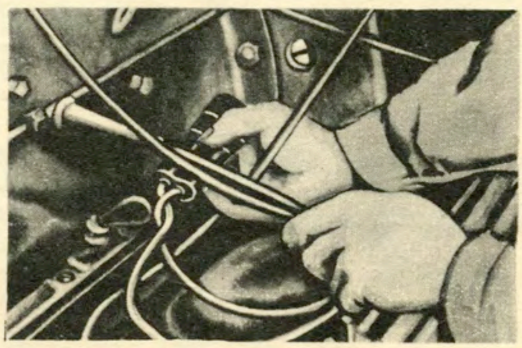
2. For hot, hard working engines:—(a) is the better plug; (b) is the better plug; (c) either one will work as well as the other.



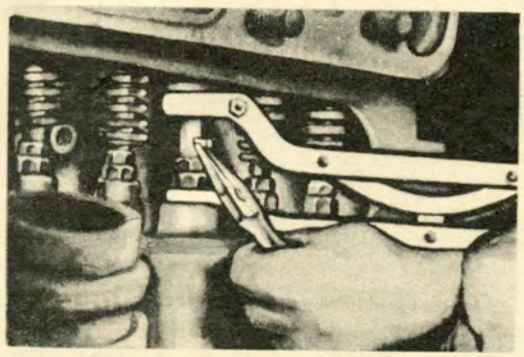
3. This reading is O.K. in:—(a) very cold climate; (b) very hot climate; (c) it's never O.K.



4. This reading indicates:—(a) the voltage regulator needs adjusting; (b) the generator is faulty; (c) everything is hunk'y.



5. To check the timing the timing light should be connected to:—(a) number 1 spark plug; (b) plug nearest flywheel; (c) it doesn't matter.



6. This guy might save himself some trouble if:—(a) he used gloves; (b) he plugged crankcase openings with rags; (c) he used battery pliers.

How about it Dept...

Thread Chaser

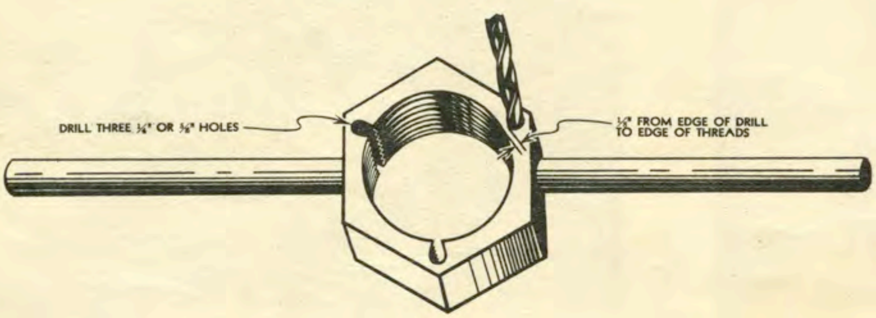
HERE'S an old chestnut that's still good medicine when you're bothered with bunged up threads and haven't got a proper die to straighten them out.

In some cases, when the right size die isn't among your assortment, time can be saved by making yourself a chaser out of a nut of the right diameter and thread size, like the one in the picture.

First drill three 1/4" or 5/16" diameter holes (depending on the size of the nut) so that the inner edge of holes come to about 1/8" from the threads. Then with a fine three-cornered file, file through the threads to the holes. The idea of this is to make sharp cutting edges on the ends of the threads where the three holes are drilled.

Weld two lengths of cold rolled rod on opposite sides of the nut to serve as handles. Finish up with a hardening job so the threads will stay sharp. This is easily done by heating the nut till it's cherry red and rubbing potassium cyanide on the threads while it's at this temperature.

When you've got it finished you'll have a handy thread chaser that will last quite a long time—but remember—it's a chaser, not a die. You can't go cutting new threads with it.



Answers to Picture Quiz on Page 179

1. This Bendix spring can only be used on a right hand drive.
2. 'B' is the better plug because due to its shorter insulator it will dissipate the heat faster.
3. In very hot climates it is advisable to reduce the specific gravity of a fully charged battery to 1.225. It will last longer that way.
4. After a few minutes of driving and the regulator starts to operate, a low reading on the dash ammeter indicates a normal condition.
5. Number one spark plug is the one that corresponds to the mark on the flywheel.
6. Stuffing rags in crankcase openings is a smart idea to prevent valve keepers from getting in the base.

New Life for Old Files

NO longer will you have to spend dull hours with your files.

Now all you gotta do is turn your old file in to Ordnance before it gets worn too badly and they'll hand you a good one. Old files are now being resharpened by a special process. We tried out one of the resharpened raspers on Wolfred's pointed teeth. You can take it from us—they're not half bad.

The only catch to the whole thing is—you'll have to treat your files more like they were precision instruments. Old files can be resharpened if they are dull. But if they are broken or banged around with other tools and lose some teeth—they're no good. So don't wear 'em down to a frazzle. Hand in your old one before it gets too bad and a new one is yours for the asking.

Bearing Creeps

WE'VE been hearing much about front wheel roller bearings giving trouble lately.

Fact is, some bearings—like the outer front wheel bearing cone on 2 ton Dodge trucks—have to be a creep fit. They've got to rotate slowly on the spindle during operation. When these vehicles stand in storage for awhile the grease cakes and hardens. Before the vehicle is put into operation the wheel bearings must be cleaned and repacked with fresh grease. If they aren't, and are run with the old hardened grease, the bearing won't creep. This results in wear taking place in one spot only—and the bearing will give out prematurely. Another thing that helps the situation along is the fact that the old hardened grease won't flow freely enough to lubricate the vital spots.

So keep grease'n and keep 'em creepin'.

X Y Z

P.S. TO FLYING LOCKING RINGS

LAST month we said we had a pretty good hunch that tire locking rings weren't interchangeable. Looks like we made a good guess. Since then, we've asked a lot of questions in the right places, and turned up the right answer.

Locking rings are not interchangeable **—even though they may look like they'll do, don't let them fool you. Use Firestone rings on Firestone rims and Goodyear rings on Goodyear rims. Incorrect seating of the tire bead because of a mismated ring may result in tire bead failure and tube pinching—that is if the locking ring stays on. And if it doesn't stay on????**

Like we said last month, tire locking rings are treacherous — accept no substitutes.

Torquing of Nuts

. . . REMINDED us of those specs on the spots where the manufacturers like to be very pertickler on how you make with the muscle.

So here, straight from the Gee-em's mouth, are the latest figs.

So you'll have the data where and when you want it, have your private secretary type a copy of these specs for you, and pin them up on the wall with rest of your streamlined gallery. In cases of dire necessity (like if you ain't got no P.S.) you might even paste up this cover.

Torque Ft. Lbs.

ENGINE	Chev. 216 cu. in.	G.M.C. 270 cu. in.
Fan Hub Bolts	4-6	8-10
Engine Front Mounting Bolts inner	35-42	35-42
Engine Front Mounting Bolts outer	15-20	15-20
Cylinder Head Bolts	70-80	70-80
Valve Rocker Shaft Support Bolts and Nuts	25-30	25-30
Main Bearing Bolts	*100-110	*70-80
Connecting Rod Bolt Nuts	*40-50	*40-50
Spark Plugs	12-15	12-15
Piston Pin Clamp Bolts	25-30	
Manifold Bolts and Nuts	25-30	25-30
Flywheel Bolts	55-65	55-65

CLUTCH	
Clutch Fork Ball	40-50

TRANSMISSION	
Front Bearing Retainer Bolts	10-12
Transmission Attaching Bolts	50-55
Rear Bearing Retainer Bolts (Upper 4)	15-18
Rear Bearing Retainer Bolts (Lower 3)	20-25

STEERING GEAR	
Steering Wheel Nut	50-60
Pitman Arm Nut	90-100

TRANSFER CASE	
Mounting Bolts (With Rubber Shims)	30-35
Mounting Bolts (With Steel Shims)	100-110
Bearing Cap Bolts	20-25
Universal Joint Flange Nut	125

UNIVERSAL JOINTS	
U Bolt	25-35
Companion Flange Bolt	50-55

SPRINGS	
Spring U Bolts 9/16"	60-65
Spring U Bolts 5/8"	90-100

AXLES	
Axle Shaft Stud Nuts or Capscrews	40-45
Pinion Shaft Nut	160-280
Differential Side Bearing Cap Bolts	130-160
Ring Gear Bolts	85-95

* *With oiled threads.*

Summer HEAT + High SPEED + Worn TIRES =