

ARMY MOTORS

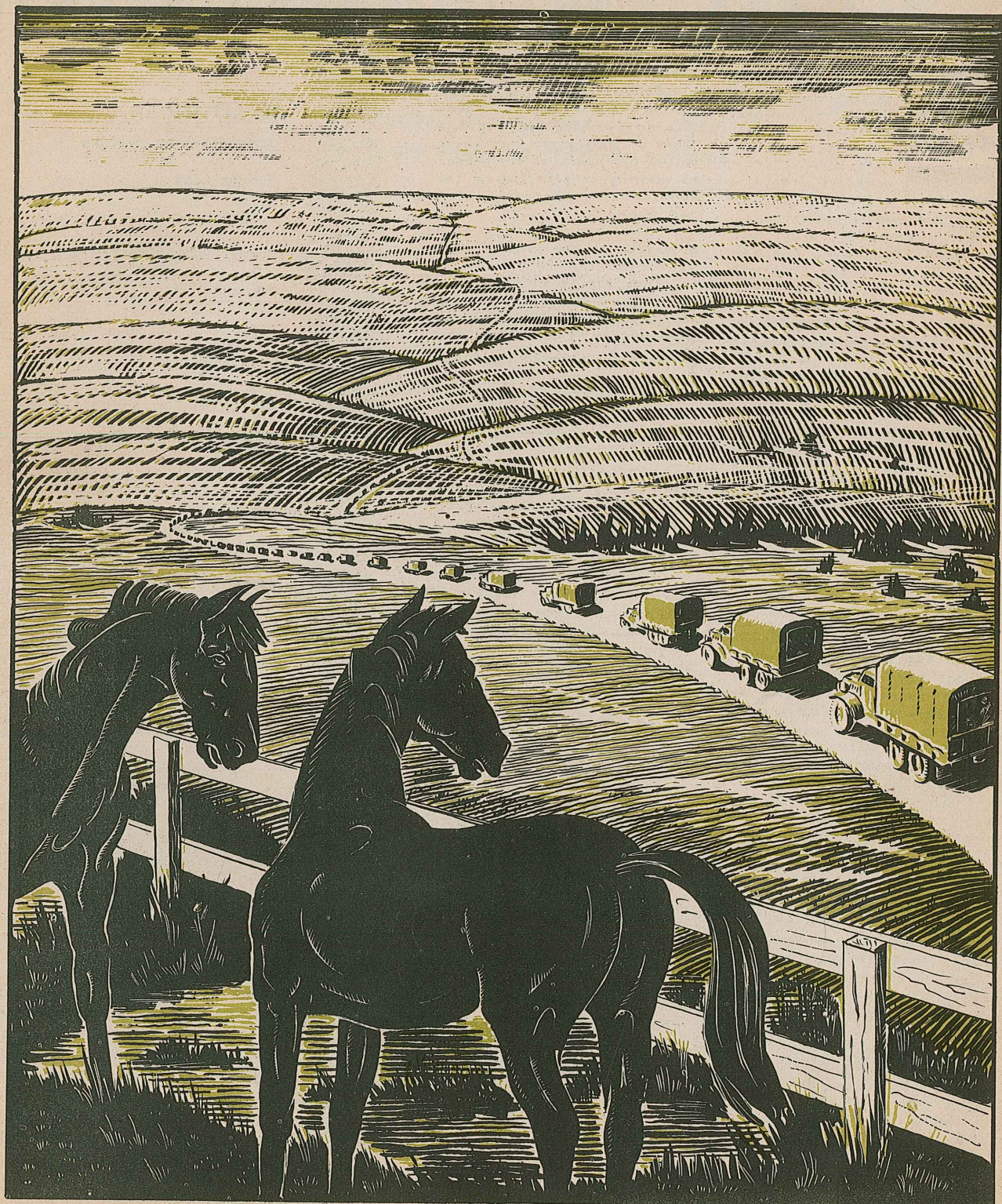
VOLUME-3



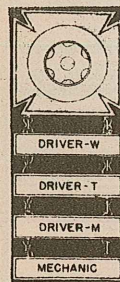
AUGUST * 1942



NUMBER-5



steering wheel



We don't like to brag, but we still like to recall the day somebody in Washington called up and said, "Send over another half-dozen copies of your magazine with the 'driver-prestige' editorial in it."

That was the editorial (March) where we raised all kinds of Cain over the way drivers were being treated.

Well, there were three months of silence after that, and then on July 28th, along came War Department Circular 248, setting up a MOTOR VEHICLE DRIVER AND MECHANIC AWARD. (Top of column).

The award (with appropriate bars), it said, will be given to drivers who pass the tests prescribed by FM 25-10 for wheeled vehicles, and FM 17-5 for track-laying vehicles — who have performed their duties as drivers or assistant drivers for three months without traffic violations, accidents and with a rating of *excellent*.

It will be given to mechanics who have completed their course with a rating of *skilled* or who have enough previous experience to be rated as *skilled* — and who've worked for 3 months as a second-echelon mechanic or higher.

And it brought proud tears to our eyes.

Now it's not the red hat with the striped ostrich feathers which we demanded for our drivers — and we've heard some muttered remarks (not from any driver) about a raise in pay — but we think it's nice. We think it's as nice as any DSC (which also doesn't carry any raise in pay). Furthermore, we think it's only the beginning.

We think that when this war gets a little older and the reports of our truck operators in action under fire start drifting back, something new is gonna be added.

We don't know what — maybe that rating will come through after all (which our guys don't need as an incentive), maybe it'll be a distinctive uniform.

Maybe it'll only be a 'God Bless You, Dogface,' from the boys in the foxholes as the trucks roll up, but it's going to be something.

Because the way this war is throwing itself all over the world and the way the lines of supply are stretching out, a big chunk of the burden of winning is settling on the shoulders of the men behind the wheel.

And this little old medallion is the first recognition of the fact.

They say it's to be made of oxidized silver with bars of the same metal, marked to show the type of qualification: *Driver-W* for wheeled vehicles, *Driver-T* for track-laying vehicles.

Driver-M for motorcycles, *Mechanic* for automotive or allied trade mechanic.

But before this war is won, it'll be made of the purest diamond, sprinkled with stardust and will cast a radiance on the blackest night for a distance of fifty feet.

For the deeds of the men who wear it, is the stuff that will give it meaning, value, and life.

Oh, we suppose there are those who say there's nothing much heroic about shuttling a truck back and forth between the railheads and the edges of battle — or squatting in a ditch to get at a bearing knock — but we think it takes some guts.

We even think it takes something more than guts to set yourself to the workaday task of squirting in grease and tightening a body bolt with the horrifying and unnatural sounds of the holocaust roaring around you.

With the screams and bloody visions that should make a man seek refuge in the arms of his God, what manner of men are these who kneel on the ground and search beneath their vehicle for loose or hanging parts, for leaks of fuel and grease?

Why those are the men of the motor transport service.

You can tell by the little medallion which is worn on the left breast, below the line of medals and service ribbons, as prescribed in AR 600-40.

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ARMY MOTORS is published monthly for the Motor Transport Service by the Technical Service Division, Holabird Quartermaster Motor Base, Baltimore, Maryland. Your contributions of ideas, articles and illustrations are welcomed. Address all correspondence to the Editor, at the above address.

NO MORE KEYS!

In response to many requests from the Auto-Thieves Mutual Benefit Society, there will be no more keys on military vehicles.

No more ignition keys on Motor Transport's vehicles.

You heard us — and if you must have it in official language: "An amendment to vehicle specification under date of June 26, 1942, file SPQME 451.01 (Locks and Keys), has eliminated the key from the ignition switch."

That means that new vehicles coming off production lines won't have keys. They'll have a 'lever-operated ignition switch' — just a little, old handle that flicks on or off.

As for the trucks already in the field, we're going to do the same for them — only in a different way.

No, we're not going to hand out replacement switches; we're just going to do a little rapid brainwork.

We're going to jam the keys in our present trucks — right into the ignition switches so they'll stay in there. In other words, we're going to do a little trick to our keys so that when we stick them into the lock, they'll stay in for the duration.

First of all, you'll have to know how a key works.

When a key is pushed into an ignition switch, the tumblers of the switch ride up and down the smooth hills on the key until the key is in place. When the key is finally all the way in the lock, the tumblers are sitting on the tops of the hills and on the bottoms of the valleys. Just turn the key and the ignition is on.

Now in order to jam our H700 key into the lock, we only have to do a simple thing.

All we have to do is ruin the smooth path that the tumblers take. Specifically, with a small file we will cut a slight notch in the key at the bottom of the first hill that enters the lock (see diagram).

This little trick will prevent the tumbler that sits in the valley just behind the last hill, from sliding up when you try to remove the key from the lock.

In short, your key gets stuck in the lock. From now on you will use it just like the lever that'll be coming out on new vehicles.

If you've got an older truck that uses a key previous to the H700, you'll carry out exactly the same idea by notching one of the last hills on the key right at the slope nearest the key handle.

But in both cases, be careful not to file so that you change the elevation of any of the tumblers seated on

the top or bottom of the hills. File just where it's indicated on our diagram. Otherwise, your key'll be stuck in the lock and you won't be able to turn it. You'll have to take the lock apart. Save yourself the trouble by being careful.

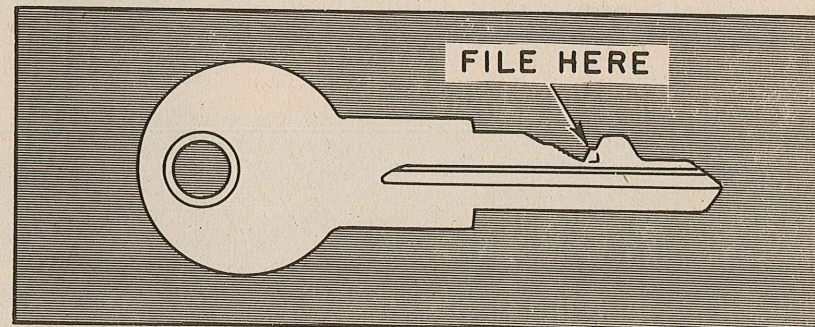
Why are we going in for 'keyless' ignition switches?

Well, just imagine a combat situation. A couple of guys named Mike want to go somewhere in a hurry. They jump in a truck or car — and all of a sudden somebody discovers the key is lost.

They don't go. That's one reason why we're going in for keyless ignition switches.

By the way, if some dreamy day, we ever get orders to take our keys out of the switches again, we'll have to disassemble the lock, and take the key out by working the tumblers by hand.

....some dreamy day.



Jam your key in the ignition lock by filing along the line indicated in the remarkable action drawing above.

modern design



What is it that travels by land, water, and air-- yet is light and maneuverable enough to be 'manhandled' by one or two men?

ANSWER: A new 1/4-ton trailer designed by the Holabird Engineers in cooperation with the Willys and Bantam companies.

Called the smallest, all-purpose trailer in the Motor Transport Service, the new jeep-size tow-wagon will bounce along over-land behind the 1/4 ton and 3/4 ton trucks.

It's got an all-steel, sealed body that lets it float easily through the water behind the smaller of the amphibian trucks now being tested by the engineers.

Light and compact, it will probably see much travel by air especially when large-scale aerial troop and equip-

ment movement comes of age.

And last but not least, it is designed with heavy 'nose-weight', for easy pulling by one or two men — hand-cart fashion. In this manner, it is expected to be used on the battlefield as a 'stretcher-bearer.' Two stretchers fit comfortably across its gunwales.

Filling a long-felt need for a trailer to be towed behind the 1/4 ton jeep, the new wagon was planned with as much interchangeability with the jeep as possible. It's combat wheels and tires are interchangeable with the jeep, as are the brakes (shoes and lining), springs, shock absorbers, spring hangers, and

spring shackles.

The little jeep-trailer preserves the battle-ability of its 1/4-ton mamma. Over rough, level ground, tests show that it offers only a slight pulling resistance to the towing vehicle. Furthermore, having the same low silhouette as the 1/4-ton jeep, it won't betray its mamma to the enemy. Its angles of approach and departure match the jeep's — allowing it to duck in and out of the same shell-holes.

In the water, the little tow-wagon floats with a free-board of slightly more than six inches fully loaded. This is no easy trick considering that the weight of the trailer alone is five hundred sixty (560) lbs., with a payload (rated) of five hundred (500) lbs.

The new 1/4-ton trailer behind the jeep. ↓

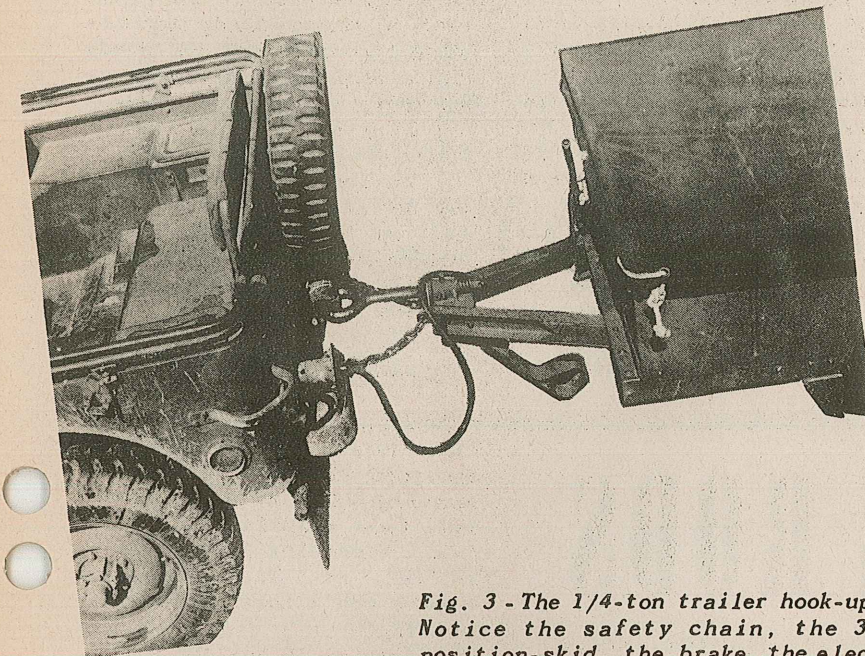
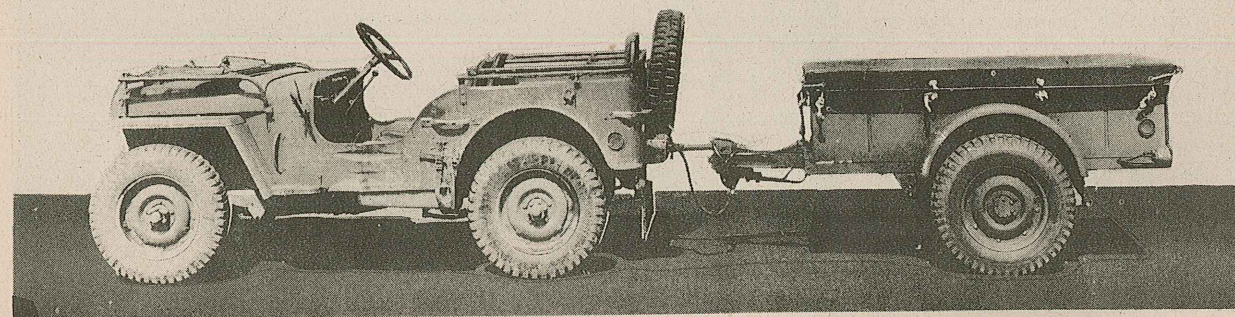


Fig. 3 - The 1/4-ton trailer hook-up. Notice the safety chain, the 3-position-skid, the brake, the electrical connection.

However, buoyancy has been accomplished in a number of ways. In the first place, the engineers figured that the tires being full of air, would theoretically take care of floating the wheels, axle and springs. Then again the body is sealed and displaces a sufficient volume of water to guarantee 'flotation'.

Finally, the whole arrangement is neatly balanced to keep it riding along on an even keel.

A tarpaulin that comes with the new trailer was originally intended merely to keep out water that splashed in on the load. But a funny thing that happened during the tests convinced the engineers that the tarp was meant for better things.

Lieut. E. Molnar of the Engineer's Test Section, riding around the Chesapeake Bay in a small amphibian with the trailer on behind, suddenly got the feeling that he'd better look around. He looked and gulped — the little trailer was riding way down with its nose just barely out of the

large quantity of air, and, like a bottle full of air under water, kept the water out.

As an additional seal to keep the trailer high and dry the tarpaulin is expected to work fine.

To take care of any water that manages to sneak by, there's an ingenious self-draining plug — the kind used in lifeboats — fitted in one corner of the body floor. It lets the water out without letting any in.

The height of the lunette was an important consideration; it had to be on an exact level with the pintle hook of the towing vehicle to allow tow-er and tow-ee to ride along on a level plane without the one or the other being held underwater. And that's the way it is.

Incidentally, the lunette is a swivel-type to allow either towed or towing vehicle to spill over on its side in an accident, without pulling the other over with it.

An additional safety factor, is a 'safety chain', (Fig. 3). This is merely a chain bolted into the 'A' frame supporting the trailer lunette. It stretches across to a couple of eye-bolts in the pintle bracket on the towing vehicle, and provides an additional bond in case of failure in the pintle-lunette assembly.

In place of the hydraulic or electric brakes, you're accustomed to seeing on trail-



And everywhere the amphibian went, the 1/4-ton trailer was sure to go.

ers, this baby has only a mechanical handbrake. This is no cause for alarm— plenty of brakage is furnished by the towing vehicle on a trailer small as this one.

To provide juice for the trailer's tail-light, a socket will be provided on the 1/4-ton jeep. At last reports, this socket was installed down in one of the jeep's bumperettes.

New to army trailers, is the skid arrangement furnished on the little tow-wagon (Fig. 3). It is adjustable

to three positions by a latch and socket arrangement (under the lunette swivel). In the first position it stands flat-footed on the ground, supporting the trailer when it's parked off by itself. In the second position, it is a few inches up and back off the ground and provides additional flotation for the trailer in swampy or soft terrain. In the third position, it is merely up out of the way.

The question of who is going to get the new trailer is still an open one with us -

although a couple of TO's dated April 1, 1942, give 'em to infantry outfits. It seems such a handy-dandy little thing, though, that everybody with a jeep ought to have one. But we're just guessing now - you'll just have to wait a little to find out.

In the meantime, we can say definitely that a whole raft of Uncle Sammie's new amphibian-trailers are on their way off the production lines. God bless 'em.



TORQUE RODS

Want to gain a lot of respect for the torque rods? (Say yes).

WATCH a truck pull itself over rough terrain. You'll see the forward and rearward rear-wheels swap altitudes like piston rods as the one wheel climbs over a mound and drops into a gully and is followed by the other. You'll see one at the top of the mound, while the other is at the bottom. Yet all the while, the driving power and the support, or flotation, is evenly distributed between the two units. Uncanny ain't it? Sure, but the point we're getting at, is that this heavy-duty job of co-ordination finally results in wear and tear on the torque rods - and

when you replace them, on the 2½-ton, 6x6 GMC, you've got to be sure you get the right rod on the right truck. If you don't, misalignment is right around your corner - and all kinds of tire wear will result.

Another thing to remember: some 6x6's have the split-type differential housing, others have the banjo-type. They use different torque rods.

To check for one or the other type of housing without the extreme aggravation of bending over and looking - glance at the serial number that's stamped on the right-hand-frame side-rail above the

front spring. If the truck is equipped with the split-type housing, the serial number will have a suffix ending in '-1.' Something like '-A1,' or '-B1,' or '-D1.' Some early models won't have any suffix at all.

If the truck has the banjo-type axles, the suffix ending will be '2' - like '-A2,' and '-B2' (not the vitamin).

When replacing torque-rods on the '-1' split-type axle, use the torque rod, part no. 2066894, (it's 19-3/4 inches between stud centers). If the job has the '-2' banjo-type housing, use torque-rod, part no. 2146579, (18-1/4 inches between stud centers). Always check the measurements (Fig. 2) - there's no other way of identifying the rods and, you might get the wrong one from your supply source. (Stranger things have happened).

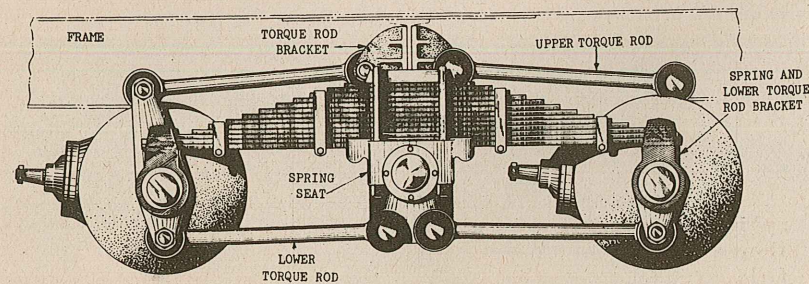


Fig. 1 - The Torque Rods coordinate the action between the axles.

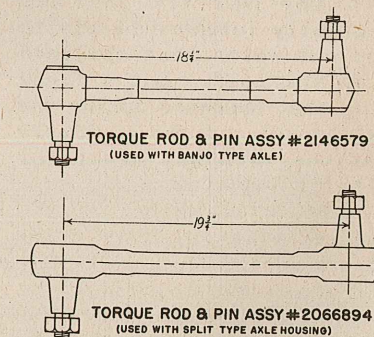


Fig. 2 - Use these measurements to see that you've got the right rods for your truck.

don't let CARBON KNOCK fool you!



Would you be so foolish as to drop a pan to stop a carbon knock? (Come, come, answer the man's question, Rafael).

IT happens that way lots of times. Carbon knocks can sound like loose connecting-rod bearings. And when the mechanic who decides that it's the bearings knocking at his door, snatches off the pan and can't find any missing babbitt, there's a new candidate for the Royal Order of the Burned Butresses.

Carbon can cause more than one kind of knock - and that's what fools you. Everybody has heard the 'carbon-knock,' 'spark-knock,' 'pre-ignition-knock,' 'detonation-knock', as different people are fond of calling it. But in every case, this is merely the rattling or clicking that occurs when the engine is under load. It's caused by fast timing, low-octane fuel, or a reduced area in the firing chamber - the result of carbon deposits - which raises the compression.

The carbon knock we're talking about, is different. It's caused by layers of carbon formed on the piston head, banging up against the top of the firing chamber.

Never thought of that before, did you?

Carbon is a second cousin to the diamond; and when it's thoroughly heat-treated and hardened, it's a first-class hammer. It builds up layer by layer on the piston and the cylinder head from the oil by-

passed into the firing chamber from around the valve guides and piston rings. The heat of the exploding fuel tempers it until it becomes a solid to be reckoned with.

When there's enough of it built up to beat against the top of the firing chamber, the driver, frightened by the ominous knocking from under the hood, cuts his switch and makes a mad dash to check the oil level.

When he finds it okay, he heaves a sigh of relief, says, "Well, they can't pin that one

on me," and has his vehicle towed to the shop.

Back at the shop, the mechanic starts the engine, throttles it up and down a couple of times - calls it a burned out or loose bearing and starts on the wrong side (the underside) of the engine to correct the trouble.

Time and talent wasted. The secret in diagnosing the knock, is in the listening. Like our Uncle Lovelips used to say, "Many a knock sounds powerful-like many another knock...but there's always a difference."

And the way to catch the difference between a bearing and a carbon knock is this:

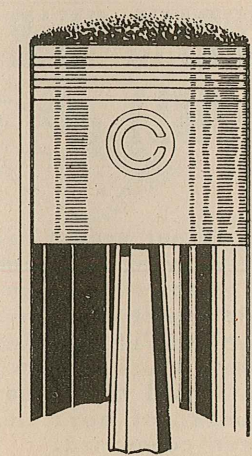
Take the throttle-arm between your fingers and quickly race the engine up to half-speed. Let it drop off - but before it reaches idle speed, race it up again three or four times. If your knock is pretty audible while you're jiggling the throttle upwards, the chances are you have a loose set of bearings.

But if the knock is rather light or inaudible during this test - give it the old, carbon-knock test: Throttle the engine up to half or more speed slowly - then release it suddenly. If the knock appears strongest during the time the engine is losing speed, it's a safe bet you've got carbon deposits.

Bearings knock on the 'up-beat' and carbon knocks on the down-beat!

A carbon-cleaning job is the prescription.

(Continued on page 160)



Corp. Connie RODD'S



BULLETIN BOARD

It is with a deep feeling of elation that we introduce you to Corp. Connie Rodd, a cute chick if we ever saw one. But a cute chick with brains and a wide mechanical background (how's that again?).

It seems her old man was a mechanic from 'way back and Connie was born and raised in the business. At the tender age of three, she amazed the entire neighborhood by throwing a carbon and valve job into an old Moon 6 lying around daddy's garage.

But no kidding, she's a darb and knows and likes the business from the ground up. So now we've got her running the BULLETIN BOARD from which she'll spoon feed you service shots, shop kinks and hints. Don't be afraid to write her letters - she's got nothing to do all day but beat off our advances.

GMC OIL LINE

If you drive one of the earlier GMC's and want to save yourself a hat-full of trouble from all things that can happen when an engine is out of oil, you'd better look into this situation:

The oil line that leads from the engine to the dash pressure-gage has a short, flexible-oil-line located on the exhaust side, at the back of the engine. This flexible line has a way of getting underfoot where the manifold and brake pedal are concerned. Usually, it comes out second-best in the encounter. The manifold burns it in two; the brake pedal cuts it in half. In either case, all the engine oil is lost.

What to do? Lift the hood, and then with somebody in the cab operating the brake pedal, see if the flexible line on your truck is in danger of

being rubbed by the pedal or burned by the manifold. If it is, it can easily be moved to a safe position with the fingers. If it's really sloppy and won't stay put, the metallic line can be anchored to the firewall where it comes through, by drilling a hole and clipping or wiring it in position.

STEERING-GEAR ASSEMBLY



One of our secret agents stopped playing the pinball machine just long enough recently to report that the very helpful OQMG Circular Letter #324 (Dec. 12, 1942) is just so much facial tissue as far as a number of boys in the field are concerned.

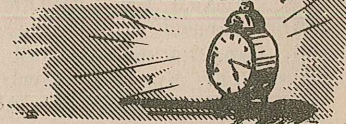
OQMG Circular Letter #324 offers replacement steering-gear assemblies for some that have been discovered to be

defective on certain 2½ ton GMC's.

Our man reported seeing a few outfits repairing these steering-gear assemblies when the proper procedure would have been to ship the defective assemblies to the depot concerned. The assemblies must be tagged and the tag should bear the following information:

- (a) U.S. Registration Number.
- (b) Mileage (speedometer reading).
- (c) Serial number of the vehicle.

FALSE ALARM



One shop we know of, has learned how to save the four to seven hours it takes to tear down and overhaul many ½-ton Dodge transfer cases - simply by tightening a nut. Seems this shop was getting

job orders with 'transfer-case noisy' or 'overhaul transfer-case - grease-leak' written on them. Well, after disassembling a couple of transfer cases and finding them in good shape, they looked around - and in the rear of the transmission, they located the trouble. The propeller-shaft yoke-nut was found to be loose - loose enough, as a matter of fact, to be removed without a wrench.

Not only is this nut responsible for the noise, but it also allows oil to be thrown back over the transfer case, giving the impression of a transfer-case leak.

You fellows with what you think is transfer-case trouble, can save yourself a lot of trouble by checking that nut before shooting it into the shop for an overhaul.



SERVICE RECORDS



For the benefit of the happy-go-lucky brothers in the field who never get to see anything, we hereby publish the full text of the War Dep't Circular, (#223, July 10, 1942) which discontinues the use of Motor Vehicle Service Records.

"Pending revision of AR850-15, September 29, 1939, the use of Motor Vehicle Service Record Book (W.D. QMG Form No. 248) is discontinued. In lieu thereof, such records as are necessary for scheduled maintenance operations will be kept in the form of duty rosters."

GMC TORQUE CHART

FOR 2½-TON, 6x6

Foot pounds of torque with threads clean and dry. If threads are cleaned and oiled, applied torques should be reduced about 10%.

DESCRIPTION	TORQUE SPECIFICATIONS
Axle Flange Nuts	35-40 Ft. Lb.
Differential Carrier (Banjo Type)	60-70
Differential Carrier (Split Type)	25-30
Generator	22-26
Starter	40-50
Connecting-Rod Bearing Bolts	40-50
Cylinder Head	60-70
Engine Mounting (Front)	35-42
Engine Mounting (Rear)	70-80
Flywheel to Crankshaft	35-40
Main-Bearing Caps	70-80
Exhaust Manifold	15-20
Intake Manifold	15-20
Bogie Mountings	140-155
Spring Mounting (Front)	
('U'-Bolts) 3/4	170-185
Spring Mounting (Rear)	
('U'-Bolts) 7/8	200-220
Steering Mounting to Frame	160-170
Transfer-Case Caps	20-25
Universal Joints	20-25

We couldn't find anything like to have it for your dirty, like this nice, handy torque old manual. chart in our dirty, old 2½-ton, 6x6, GMC maintenance manual. And since GMC reports it's only in their late-model manuals, we thought maybe you'd As far as we can see, the specs hold good for all 2½-ton, 6x6 GMC's. Use it in good health.



CARBURETOR DEPOSIT



Do your engines have a punk idle — after you take them out of storage, or after shipment? Do they roll, choke, spit, and load-up, when they should purr like a kitten? Then hearken to this — it comes from one who has had that experience — and found the way out:

Just take off the carburetor and give it a one-hour soaking in a good solvent like Bendix cleaner (Fed. Stock No. 51-5-4385), take it out, and reinstall it. The trouble seems to come from the presence of our old friends GUM AND VARNISH. The small amount of gasoline left in the carburetor evaporates, leaving a residue. The residue clogs the jets and passages, and there goes your performance.

Draining the carburetor before shipment or storage would be the best bet for an ounce of prevention, but if that wasn't done, you'll need our pound of cure.

HARMONIC BALANCER



No, a 'harmonic balancer' is not a musical instrument. A harmonic balancer is a little thing that TSB M-14 promised would be on all 1½-ton Chevies after engine number BV-294987. Speaking simply (you know us) it's a dampener — a crankshaft dampener. It's an overweight, lower fan-pulley, driven on the crankshaft over a key.

Recall how every time an explosion takes place in a cylinder the crankshaft is given another shot of power? Well, with six cylinders pop-

ping off one after the other, the crankshaft revolves in fits and starts — like a hound tearing down the road with a pack of firecrackers tied to his tail. Everytime one explodes, there's a new burst of power.

To help iron out this jerky action, to help make the turning of the crankshaft a smooth flow, we have the harmonic balancer. It absorbs the jolts of the explosions.

The secret of the balancer is a flyweight which moves back and forth on rubber-mounted studs in the opposite direction to the crankshaft — thereby, dampening out and absorbing the crankshaft vibrations.

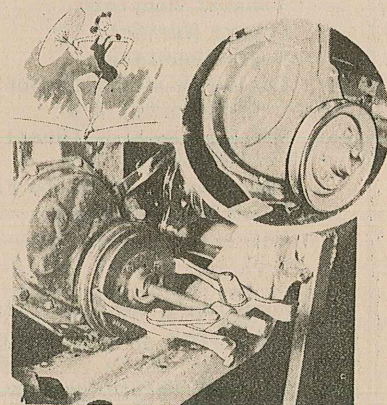


Fig. 1 — The wrong puller being used on the Harmonic Balancer. Don't do it this way! Inset shows fan pulley before Balancer was installed.

Anyway, as we said, it's being put on 1½-ton Chevies after engine number BV-294987.

If you've got a 1½-ton Chevy before this number, have one installed — but only if the engine is in the process of being torn down so that the balancer can be installed without 'additional incidental' assembly.

The balancer, Part No. 839886, is available on regular requisition from your favorite supply depot.

A word to the mechanic: removal and replacement is to be made with the regular

puller-and-driver used for the fan pulley. Don't use any other puller on the balancer! Figure 1 is a candid-camera shot of the wrong kind of puller which we caught one chucklehead using. The regular puller fits into the two holes in the balancer and eases it off without pulling it all apart.

Follow the directions carefully and you won't get messed up. And remember, the balancer comes complete as a unit — you can't get parts for it.

RANGE FILTERS



So many good and worthwhile ideas come from the boys in the field, that it grieves us deeply to pick up our lead-studded club and swat one down to the floor.

This one is a little idea to do with throwing out the asbestos filter-disk in favor of a steel-wool filter disk.

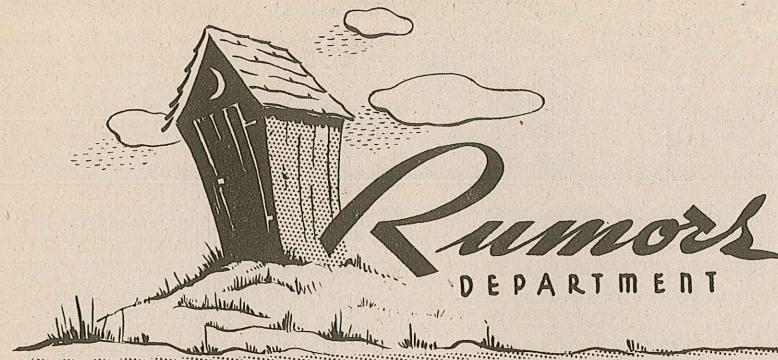
As the boys in the field put it, the asbestos disks clogged up after about two hours' operation, making cookie's life miserable. To remedy this sad situation, the steel-wool filter disk was dreamed up, and installed in the field range in place of the asbestos disk.

From then on, everything looked to be dandy.

But, in reality, cookie had been jumped from the frying pan into the fire.

Let us not drool any longer, let us lay the situation bare by quoting from War Dep't. Circular #234, dated July 16, 1942.

(1) It has come to the attention of the War Department that various organizations have been experimenting with the use of steel-wool filter-disks to replace the present asbestos filter-disks used in
(Continued on page 160)



Do our eyes deceive us — or do we still see vehicles running around wearing those valuable mud and snow tires?

According to War Dep't Circular Letter 226 (July 11, 1942), vehicles operating within the continental limits of the U. S. (except Alaska), Puerto Rico and Panama, must be equipped with the standard highway-type tires.

Well, maybe it's because the supply of highway tires hasn't been received by those certain organizations yet. We'll wait and see.

At least eight people have come up to us with worried faces in the last month, to tell us that the exhaust pipe on the ¼-ton and a couple of other trucks, is aimed so that it throws the hot exhaust gases right on the tire. Their fear is that the hot gases will ruin the rubber.

Ungrounded is the word for their fears. That exhaust pipe was aimed at the tire purposely — it's a 'military characteristic'. The idea is that the poisonous exhaust gases will be dissipated by the rush of air around the tire — and won't be shot back into the lungs of any troops following along behind the truck.

Besides that, the rubber won't be ruined by the lukewarm gases. Forget it.

What do you think of guys who drill holes in gas tank filler-necks?

They go out to a truck on a pretty hot day and start taking off the gas-tank cap. Just as they've about got it off, it shoots up in their faces. Yelling and hollering, they finally blame it on the pressure that's built up in the tank by the heat.

Then they get a drill and bore a nice hole in the filler neck to let the pressure out.

Though they may think they've been right sharp in solving a problem, the truth of the matter is, they've put the skids under a little idea the engineers had for cutting down on vapor-lock, preventing gasoline losses, and avoiding troublesome vacuum in the gas tank.

The little idea is the twin-valve, pressure-type cap for gas tanks which has been on all tactical vehicles the last year or so. We featured this little cap back in November but just to refresh your memory, here's how it works:

It has two valves. One's a check valve that allows approximately three pounds of pressure to get built up in the gas tank (this is the stuff that shoots the cap off at screwballs' unscrewing it in hot weather). This pressure helps to prevent vapor lock and stops evaporation of gasoline. When the pressure goes over three pounds, the valve releases it.

The second valve in the cap takes care of the vacuum that's formed in the tank at certain temperatures. Vacuum

prevents the flow of gas through the lines. The instant a vacuum is set up, this second valve kicks open and allows atmospheric pressure to be drawn in.

Now you can easily see how drilling a hole in the filler-neck upsets the whole idea. You might just as well not have that special cap on there.

Don't drill holes in the filler-neck. Just take the cap off easy to let the pressure out — but don't drill the neck, boys, don't drill the neck.

Some of the boys in the field like to decorate their maintenance manuals, parts lists, operator's permits, etc., with their organizational insignia and various other identifying data.

Now if they will look back into their textbooks on international law, they will see that all they are required to give the enemy, if they are captured, is their name, rank and serial number.

But with all this fancy work on manuals, permits and whatnot, the enemy is in a swell position to find out any and everything — what division, regiment, etc., right on down to what the old man likes for breakfast.

So be a good boy and erase those marks off your manuals.

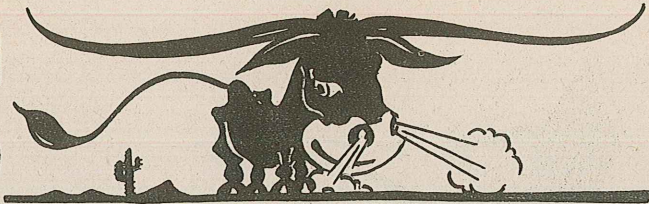
We hear that a lot of GMC engines are being reassembled after overhaul, with the 'spit-hole' on the con rods clogged up. The spit-hole is that oil hole on the upper or 'rod half' of the con rod.

Oil is supposed to spray out of this hole onto the thrust side of the piston when the engine's running. But if the hole is clogged up, it naturally doesn't spray out — and the thrust side where the hardest wear occurs, is well on the road to ruin.

You might look into this, if it concerns you.

(Continued on page 160)

HORNS



We got an angry complaint the other day from one of the boys in an overseas combat area, about the horn on his truck.

The way he tells it, he was driving a truck full of tomato-juice cocktails urgently needed by an infantry battalion in the front lines.

The battle situation was such that the road he was using ran through enemy-infested country. At one point, the road had been so broken up by shell fire that he had to leave it and make his way over a scrubby hillside. Unfortunately, the entire hillside was dotted with enemy infantry hiding behind low hummocks, rocks, and lying in shallow pits.

Keeping the urgency of his mission in mind, this driver took firm hold of the wheel and rushed at breakneck speed through the enemy emplacements.

"For a while," he says, "it wasn't so bad. I went along leapin' and dodgin' them enemy soldiers, and they would scatter as they saw and heard me comin'."

"But then - psssst! all of a sudden my horn went on the blink.

"You know," he says, mopping his brow, "thinkin' back on it now, on account of that damn broken horn, I could of run over and killed some of them enemy soldiers."

To prevent unnecessary bloodshed of this sort, we'd like to take this opportunity to introduce you to a few horny, trouble-shooting tips.

These consist mostly of adjustments - but before going into them, let's look into certain other conditions which affect the performance of the horn.

First of all, if the horn produces a weak signal like, 'ooooooooooh' instead of a strong signal like EEEEEEEEEEE-YYYYYYAAAAAYYYYYY! there's probably not enough voltage being delivered to it. Check by connecting a voltmeter across the horn terminals. The voltage reading shouldn't be less than 5.25 volts. A lower reading indicates either a low battery or high resistance in the horn circuit.

Check the battery - if low, have it recharged.

If loose or dirty connections in the horn circuit are eating up the voltage, fix them up.

Check next for defective wiring anywhere along the line from battery to the horn with your voltmeter. If the wire is bad, *replace with same size wire.*

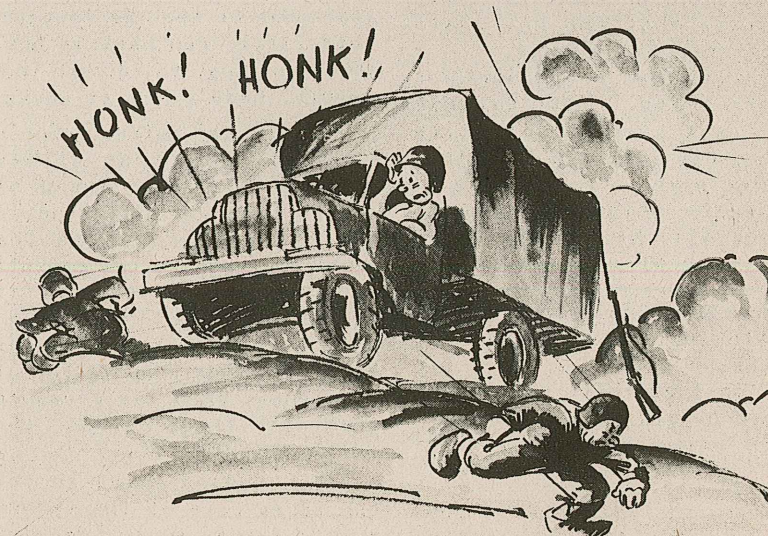
A loose connection or poor contact at the horn push-button causes the horn to operate intermittently or not

at all. To check, shunt around the push button.

Horns will deliver a razz-berry (rasping sound) when vital parts are broken or loose. Or a loose backshell may likewise affect the tone. Tighten all screws, mounting nuts, and studs - replace all damaged parts.

The horn won't work at all if the field windings inside the horn are open-circuited, short-circuited or grounded. To check, connect an ammeter in the horn circuit at the horn terminal. If it reveals that the current is not flowing when the contact points are closed, the windings are open-circuited. Your trusty ammeter will disclose an excessive flow of current if the windings are short-circuited, or grounded.

You can also test the windings for a grounded circuit with test points and a test lamp. Disconnect the horn leads and touch one test



point to one horn terminal, and the other to hot wire. If the lamp lights, the field windings are grounded.

All of the above checks can be made on any horn. If, however, they don't clear up your horn trouble, a couple of adjustments are in order. These adjustments vary from horn to horn - so consult your maintenance manual for proper adjustments.

Looking for some paper to put behind the sweatband of a hat we picked out in a restaurant the other day, we ran across a bulletin carrying the adjustments for horn number 1999801 (unit mfr's number). This particular horn is on most Chevies and GMC's. So in order to complete our story, we'll reveal the adjustments

and show you how to make them. First, take the backshell off the horn.

Second, connect the ammeter in the circuit at the horn and adjust the current consumption to 7-9 amperes by playing with the position of the adjusting nut. Loosen the adjusting locknut and turn the adjusting nut to the left to increase the current, to the right to decrease the current. (Too much current will produce a spluttering sound).

This whole adjustment is very ticklish - so move the nut only about 1/10 of a turn at a time and lock in position each time before trying. How about if you don't have an ammeter? Adjust according to sound.

The proper tone (an ear

splitting bellow) is obtained only if the air gap between the armature and the core is correct. This gap should be uniform across the entire surface of the armature. Adjust the width of the gap to .027" - .033" using a feeler gage. Make the adjustments with the air-gap adjusting nuts.

Remember, these checks and adjustments are made while the engine is not running. So, test it for tone with engine running. (At which time, horn signals change.)

* * * * *
P.S. Before starting to work, you should have checked the tone of the horn. This will give you a basis of comparison when you've finished the job.

Transfer Case OIL SEALS



Have we mentioned lubricant leaks in transfer cases before? Well, hold your hats because here we go again. This time it's leakage shortly after the case has been overhauled.

If you've ever gone to all the trouble of removing the transfer-case assembly, given it the works, and then wrestled it back into position, only to find it staring you in the face again a couple of days later with oil running out its ears - brother, you've got our sympathy.

Here's what - according to the experts - causes the trouble. Grease seals are not getting the respect they deserve! True they aren't as forbidding as a spline-shaft, or a spur-cut gear, but that's where they fool you. They got temperament!

First of all, a grease seal is touchy about how it's prepared for its job. It may look like just a lil' ole hunk

of leather to you, but just fail to cream it thoroughly for 30 minutes with warm, engine oil or neatsfoot oil and you might just as well not install it. They won't work dry. Secondly, seals must be stored in water-proof wrappers away from moisture, extreme heat or cold. Don't let sand or dirt get on the leather before installation - they make it abrasive as sandpaper.

After lavishing this loving care on the seal - don't just jam it home with the first blunt instrument you happen to find. Put a little sealing-compound on its outer edge so the lubricant can't creep around. Then with the proper drift or driver, or with a rawhide hammer, set it, taking

care that it's not cocked in the opening. If it gets bent or twisted in the operation, get another one. When the lip of the leather becomes wrinkled - it just can't seal.

But that ain't all! If you think the seal is particular about the way it's handled, you should see it get up on its hind legs when it's put into a place that's below the standards it deserves.

In other words, a lot of 'come-back' oil-seal trouble is caused simply by mechanics failing to prepare a proper home for the seal. The seal bears on the barrel section of the universal-joint yokes. If this barrel section is in bad shape - etched, nicked, rough, or untrue - nothing short of prayer will keep the lubricant in the case. Give this part of the job your very special attention.

To keep sand and other abrasive materials from being drawn in between the yoke and

(Continued on page 160)

ACCIDENTS

From a report by Major M. H. Fineberg

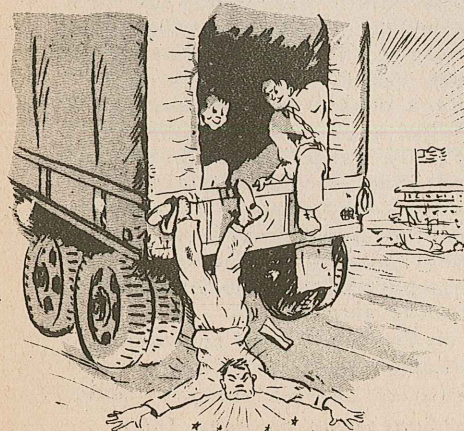
How do you fall down and break your neck?
How do you get killed? Our little chart (fig.1) shows the most popular methods as reported from last year's maneuvers.

As was expected (why?), most of the accidents were due to motor vehicles - 703 or 38.6% of the total, to be exact. The number of deaths, 47, due to motor vehicles, comprised 83.9% of all the deaths emerging from the maneuvers.

The reason lies in the old adage, 'familiarity breeds contempt'. Hanging around trucks so long, soldiers develop the "I-ain't-afraid-of-you" complex, pretty soon they get careless and one day there's another statistic for our chart.

Breaking it down fine, we get four assorted methods of attaining a state of disability. These we have also arranged in handy chart form (Fig. 2). Choose your poison.

The first, 'Accidents due to men getting on or off vehicles' comes as a bit of a surprise. According to the best civilian practice, pedes-



trians are usually struck by trucks and run over. But in the Army, mounting, dismounting or being jolted from moving - and stationary - trucks, yields the heaviest harvest of victims.

Two hundred twenty-one accidents or almost 1/3 of the motor-vehicle accidents come under this heading. Of these, two resulted in deaths. The first death occurred when a soldier was thrown from a car while it was going around a sharp corner; the second, when a soldier fell violently out of a truck.

Of the remainder of the casualties, painful injuries to the foot and ankle, led the field - with sprains in every joint of the body, contusions and lacerations crowding the leader.

The peculiar reason for this peculiar type of accident is that Army vehicles have a higher clearance from the ground than civilian vehicles. Being familiar with the relatively short descent from civilian cars and trucks, the new soldier encounters a pit-fall in the step-down from Army trucks. As the man who fell down the elevator shaft yelled up, "Watch out for that first step - it's a sucker!"

Another reason is that in alighting from a car in civilian life, a man usually encounters a level pavement - as a soldier he may jump to rocky, uneven or deceptively soft ground.

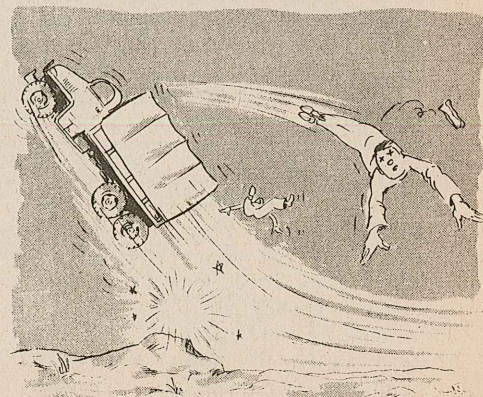


A little more instruction in the art of mounting and dismounting from vehicles - moving or stationary - would undoubtedly cut down the number of casualties.

Perhaps a little closer reading of TM 10-460 (The "Driver's Manual") might not hurt - especially on page 82 where it says, "...it is unsafe for anyone to mount or dismount from your vehicle except when it's stopped." Except, of course, in a bona-fide emergency.

Speaking of the Driver's Manual, we can't see any reason why a copy shouldn't be in the hands of each and every driver - why every driver shouldn't be tested for familiarity with its techniques of vehicle operation and rules of the road.

'Vehicles overturning' is the second largest cause of accidents - with 14 deaths resulting. Ten of these deaths were due to trucks overturning, two to command cars, one to a jeep and one to a tractor.



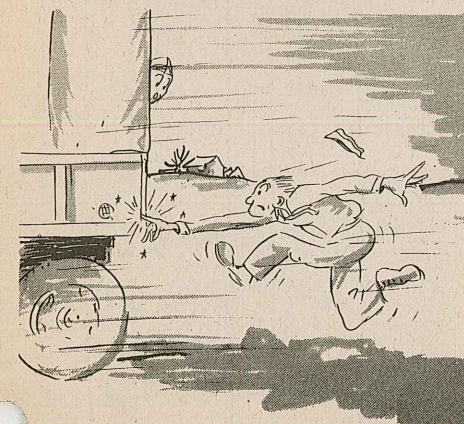
Turns executed too fast, improper handling of a truck over rough terrain, or risky maneuvers in getting out of ditches and ruts, will upset things quicker than two bears in a canoe.

Of the non-fatal accidents in this class, all kinds of vehicles were involved - indicating that no one type of vehicle is safe from the careless driver. Untrained drivers, exhausted drivers, and blackout driving, were usually responsible. For the first and second, the cure is obvious...the new blackout-driving beam ought to cut down on the third.

Eighty-two accidents - with six deaths - were caused when soldiers were struck or run over by vehicles. Ordinary civilian precautions will reduce the number of casualties due to this cause. There is however, one strange reason for soldiers being run over... that is the favorite practice of sleeping under trucks. Maneuvers being a time of fast action, drivers rarely stop to look carefully beneath their trucks for sleeping personnel. The motto seems to be, 'let sleeping dogfaces lie.'

After all, should the driver be expected to cope with recumbent soldiers who have selected the underneath of his truck for a bedroom? (The answer is no - and the moral is, don't sleep under trucks).

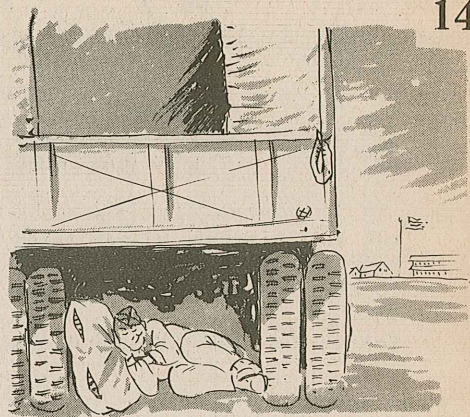
However, the 'Daily - Before Operation' check as



per PMS #3, directs drivers to look under their vehicles for leaks of oil, water, or fuel. While they're at it, they might cast about for soldiers curled up against a tire. The number of casualties would be largely reduced this way.

Into the last, the "miscellaneous" class, fall 260 accidents - of which 25 resulted in deaths. Motorcycle accidents predominated - exactly 25 with 4 deaths.

Simple carelessness or sheer clumsiness was responsible in most miscellaneous cases. Soldiers caught fingers, hands or feet in various parts of vehicles with resulting pain and embarrassment. Proving that there are no conventional accidents on trucks - anything can happen, anytime.



And when it does, another guy named Joe is delegated to the hospital detail for a session of moaning - or maybe lowered slowly into a hole to the measured beat of a drum.

And the green grass grows all around.

FIG. I DISTRIBUTION OF ACCIDENTS AND ACCIDENTAL DEATHS

	Accidents	Deaths
Motor Vehicles	703	47
Soldier Falling or tripping	329	0
Eye Injuries	137	0
Sports	131	0
Fires and Explosions	81	0
Objects Falling	80	0
Fights	76	0
Lifting Objects	54	0
Mules and Horses	52	0
Chopping Wood	21	0
Bites	11	0
Airplanes	9	4
Miscellaneous	136	5
TOTAL	1,820	56

FIG. II DISTRIBUTION OF ACCIDENTS AND DEATHS DUE TO MOTOR VEHICLES

	Accidents	Deaths
GETTING ON AND OFF VEHICLE (while moving)	221	2
VEHICLE OVERTURNED (due to speeding around corners, improper handling of vehicle)	131	14
STRUCK OR RUN-OVER BY VEHICLE (including soldiers sleeping beneath vehicle)	82	6
MISC. VEHICLE ACCIDENTS (Motorcycle accidents due to poor handling; carelessness around vehicle)	269	25
TOTAL	703	47

MORE Technical Manuals

Here's some additions to the list of Technical Manuals and Parts Lists we published in March.

The March list and this one will give you all of these books that are available. Just to clear things up, here's how TMs get to the field: One Maintenance Manual and Parts

List usually shipped out with each vehicle. As new publications become available, extra copies are distributed automatically to Motor Bases, Depots and maintenance organizations. Replacements should be requested from the Adjutant General's Office through channels (see AR 310-200). All

requests should specify the TM number, if it is known. Some of the later vehicles have Publication Plates in the cab, showing the TM number applicable. If you don't know the TM number, send in the Make, Model Number, Nomenclature, and U. S. Registration Number.

MANUFACTURER	NOMENCLATURE	YEAR	MODEL	PARTS LIST NUMBER TM-10	CHANGE NO.	MAINT. MANUAL NUMBER TM-10	CHANGE NO.
Autocar	5-6 ton 4x4	1942	U-8144-T (Supplement)	1118	1		
A. BANTAM	1/4 Ton 4x4	1941	BRC	1204	1		
CHECKER CAB CO.	1-Ton Water Tank Trailer	1942	CC-1	1454		1454	
CHEVROLET	1 1/2 Ton 4x4	1942	G-7105-06-07-13-16-17-27-33			1127	1
"	1 1/2 Ton 4x2	1942	General Coverage (4x2)			1465	
"	1 1/2 Ton 4x4, Telephone Maintenance	1942	G-7163 & G-7173			1203	4
"	1 1/2 Ton 4x4	1942	G-7105-06-16-07-17	1438		1127	1
"	1 1/2 Ton 4x4	1942	4103	1410		1411	
"	Master Parts List		Issued April 1, 1942				
"			Models, 1941 and 1942	1475			
"	1 1/2 Ton 4x4 Panel Del.	1942	G-7105			1461	
CORBITT	6 Ton 6x6	1942	50-SD-6	1108	1	1109	
"	6 Ton 6x6	1942	50-SD-6 (Supplement)	1108	1		
DODGE	1/2 Ton 4x4	1942	WC-43	1444		1445	
"	1/2 Ton 4x4	1942	WC-21, 23, 24, 25, 26, 27 and 41	1442		1443	
FRUEHAUF	14-Ton Semi-Trailer	1942	FFLT-2226-DF	1446		1446	
FORD	Sedans, 6-Cylinder	1942	2-GA-73-C	1374			
"	Sedan Body Parts, 8-Cylinder	1941	11-A-73	1486			
"	1/4 Ton 4x4	1942	GPW	1348		1349	
"	Sedans, 8-Cylinder	1942	2-GA-73-C	1374	1		
"	1/2 Ton 4x2	1942	2-GC & 21 C	1436			
"	1 1/2 Ton 4x2, 8-Cylinder	1942	11 T-80	1138		1139	
"	1 1/2 Ton 4x2, 6-Cylinder	1942	2G-8TS & 2GT	1432		1433	
"	1 1/2 Ton 4x2, 6-Cylinder	1942	2-GT-86	1328		1329	
"	1/4 Ton 4x4, Contract 11424	1942	GPW Interchangeable with Willys TM-10-1512	1348	1		
"	1 1/2 Ton 4x2, 6-Cylinder	1942	2GT-86			1257	
GMC	4 Ton 4x4	1942	AFEX-804	1290			
"	2 1/2 Ton 4x2	1942	CC-453	1514		1515	
"	2 1/2 Ton 6x6, C.O.E.	1942	AFKWX-353	1450		1451	
"	1 1/2 Ton 4x2, C.O.E. K-18	1942	CF-351			1453	
GRAY COMPANY	Portable Gasoline Dispenser	1942	GD-100	1404		1404	
HARLEY-DAVIDSON	Motorcycles, Solo, Shaft Drive	1942	XA	1292			
HIGHWAY INTERNATIONAL	Trailers, Cargo & Animal	1942	S.K.D. 1815	1372		1372	
"	5 Ton 4x2, (Contract 10973 Item #2)	1942	KR-11	1336		1337	
"	2 1/2 Ton 4x2, (Contract 11201)	1942	K-7	1344		1345	
"	5 Ton 4x2, (Contract 11401)	1942	KR-11	1382		1383	
"	5 Ton 6x4 (Contract DA-231)	1942	M-5-6	1462		1463	
NASH-KELVINATOR	Trailers, 1 Ton	1942	A	1468		1468	
ROGERS BROTHERS & WINTER-Weiss	Trailers, Tank Transporter	1942	D-45-L-F-1	1322		1322	
STUDEBAKER	2 1/2 Ton 6x6	1941	US-6	1502	2		
WATSON	Trailers, Animal & Cargo	1941	TD-32-G	1110		1110	
WESTFIELD	Bicycles	1942		1481		1481	
WHITE	4 Ton 6x6	1940	950x6	1366		1367	
"	4 Ton 6x6	1942	666			1221	
WILLYS-OVERLAND	1/4 Ton 4x4, (Contract DA-189)	1942	MB	1206	6	1207	4
"	1/4 Ton 4x4, (Contract 11423)	1942	MB Interchangeable with Ford TM-10-1448 Ch. 1	1512		1513	

Handling the COMBAT WHEEL

They keep shot-flat tires rolling but, they're tricky and dangerous when handled by a dope. Learn how now.

We always like to sit in a soft chair and tell people how easy it is to change a tire. Because for our money — there isn't any easy way to change a tire. But there are ways of changing one that makes it easier, and is easier on the tire and tube.

While strolling through the shop with our concealed camera lens peeping out through a cross in our shoe strings, we picked up the accompanying picture sequence with some comments both educational and profane that may help you save rubber and skinned knuckles.

As we see it, some trusting souls with a limited knowledge of life and split rims, expect things to happen this way:

After removing the valve core to make sure that all the air is out of the tube, and then taking off the rim nuts, they stand back quietly, expecting the split-type rim to crumble away from the tire with no more activity on their part, than a close inspection of their nail polish.

But it does not happen that way.

Any tendency of the wheel to dissolve away from the tire

must be aided and abetted by a few persuasive blows of the hammer and a few sweeps of the spoon iron.

Furthermore, there is a popular misconception that the close affinity between tire and rim, is due to the halves of the split rim having got stuck together. And any amount of prying, pounding and imprecation has been showered on the innocent rim without result.

One little group we know of, attacked a tire and rim unsuccessfully for three hours, inflicting considerable damage to the beads and their tempers, and finally, in sheer desperation, drove a 2½-ton truck over the sidewalls in an attempt to dislodge the tire from the rim — with, we might add, further unsuccess.

The truth of the matter is twofold: First, there's the beadlock supporting the tire from the inside. Second, the bead does stick tenaciously to the rim.

The proper approach is scientific and deliberate.

The spoon iron must be driven between the bead and rim and worked around to completely loosen the bead. The reward at the end of the few short minutes it requires to loosen the bead, is the rim separating as effortlessly as an egg dropping out of a halved shell.

As our pictures prove, there's nothing more to it, than that.

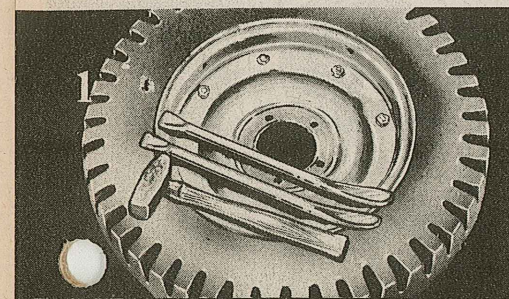
A few words of caution though:

Tubes that have been in service long enough to have become stretched, wrinkle when returned to the tire, and are sure to give trouble in time — replace them.

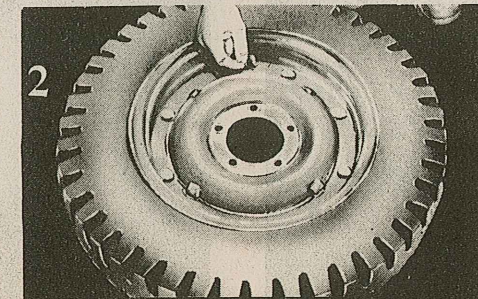
When reassembly of the rim has begun, it's a good idea to round out the tube with a little air — this helps hold the valve in place, and keeps the tube from getting pinched.

Well, it's been easy changing a tire with our big, fat mouth — we're sure you won't find it so easy with your hands. But that's all right — you like hard work.

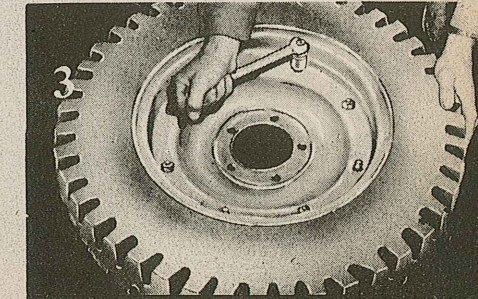
Now follow our photography.



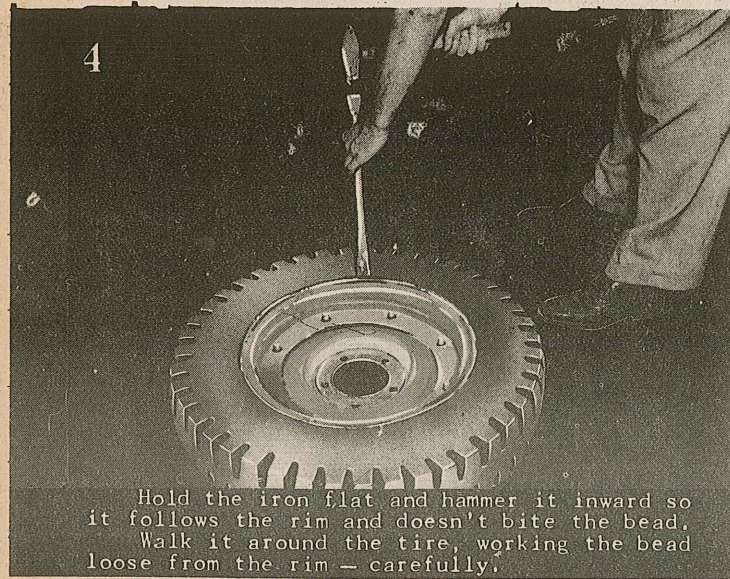
With two spoon irons and a hammer, you can remove combat tires from now 'til Johnny comes marching home. Don't be wild now — use 'em with tact and care — especially the hammer. Ready? Roll up your eyelids and let's go.



There are plates riveted on both sides of the rim, saying, "Warning — deflate tire before removing rim nuts." A couple of dead guys we knew, named "Exhibit-A" and "Exhibit-B," could tell you why.



Remove rim nuts. Remember, all the air pressure in the tire is straining against the half of the rim which is held down only by the nuts. Deflate before removing nuts — or you're a dead dogface.



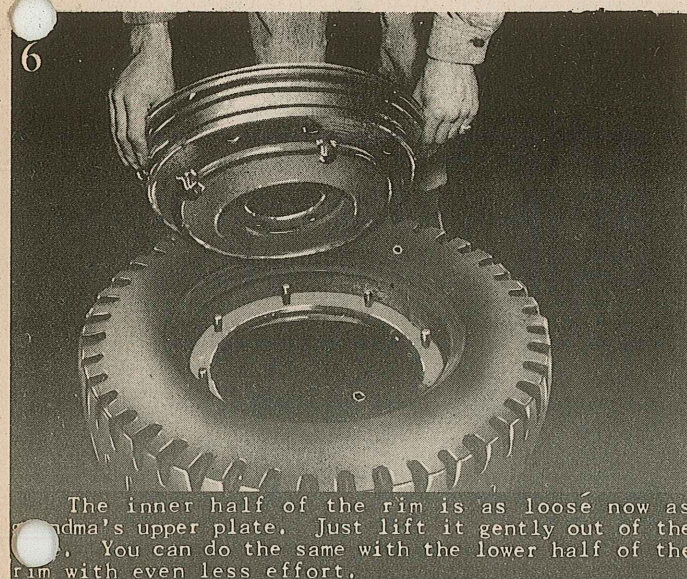
4

Hold the iron flat and hammer it inward so it follows the rim and doesn't bite the bead. Walk it around the tire, working the bead loose from the rim — carefully.



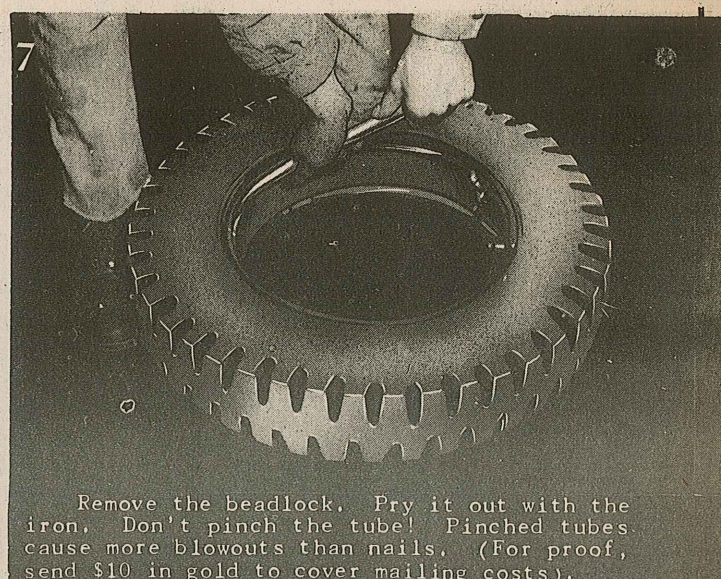
5

Here's a little trick called 'stacking up the irons,' which will give you a bigger bite and more leverage in getting the bead away from the rim. (You can do the same with the lower half of the rim, you've already gone once around the rim).



6

The inner half of the rim is as loose now as grandma's upper plate. Just lift it gently out of the tire. You can do the same with the lower half of the rim with even less effort.



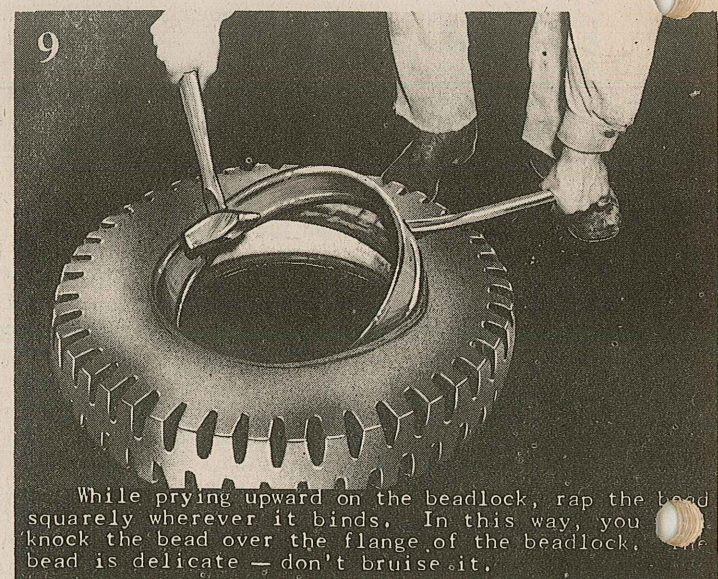
7

Remove the beadlock. Pry it out with the iron. Don't pinch the tube! Pinched tubes cause more blowouts than nails. (For proof, send \$10 in gold to cover mailing costs).



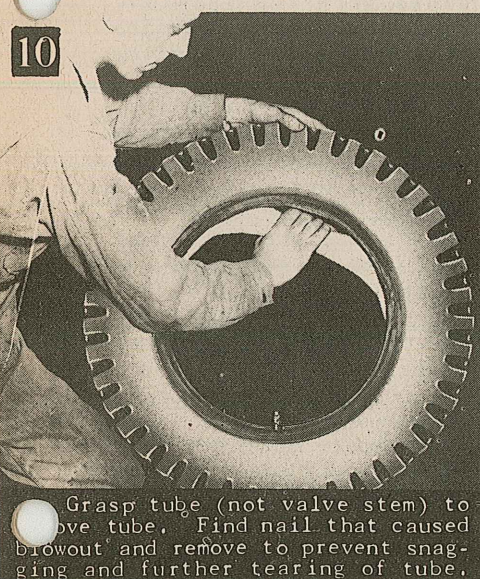
8

Be masterful. Force the beadlock outward on the side opposite the valve. Forcing it out on the valve side will uproot the valve quicker than you can say 'G!Zn*?XA%#A.'



9

While prying upward on the beadlock, rap the bead squarely wherever it binds. In this way, you knock the bead over the flange of the beadlock. The bead is delicate — don't bruise it.

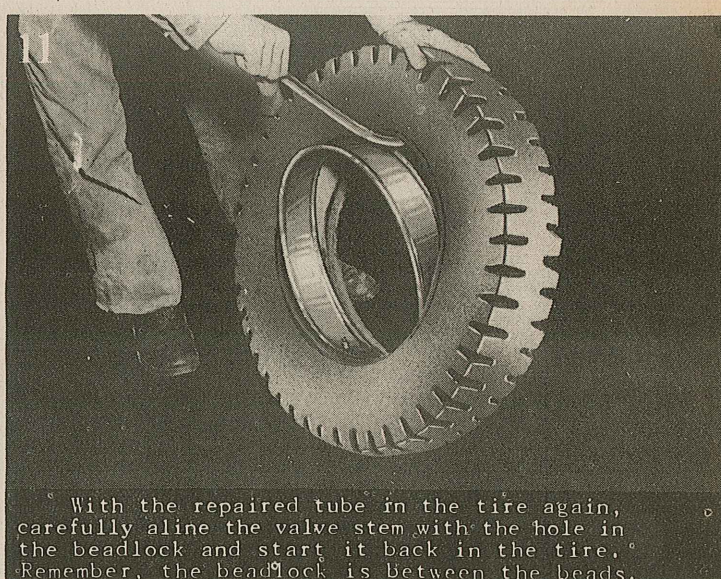


10

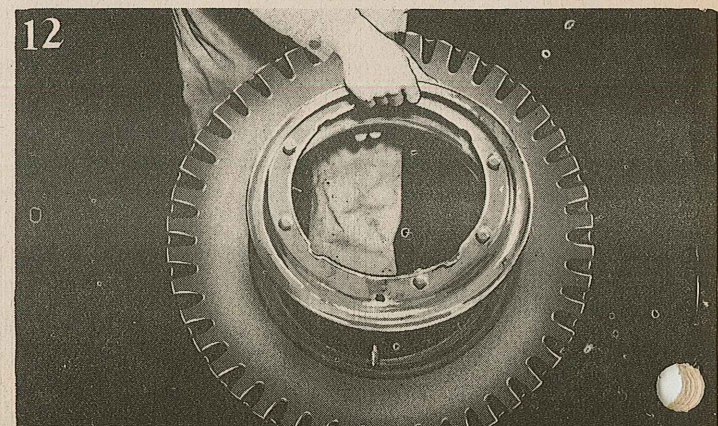
Grasp tube (not valve stem) to locate blowout. Find nail that caused blowout and remove to prevent snagging and further tearing of tube.

There now, wasn't that easy? (No). Now put the tire on a spreader or run your hand around the inside and take out dirt, pebbles, etc. and examine the tire for tears and roughness. Report tire damage to the Tire Detail of your outfit.

No damage? Okay, let's put it back together again.

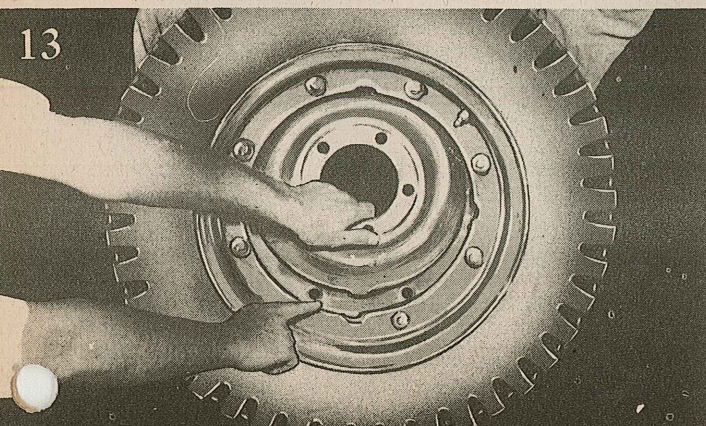


With the repaired tube in the tire again, carefully align the valve stem with the hole in the beadlock and start it back in the tire. Remember, the beadlock is between the beads.



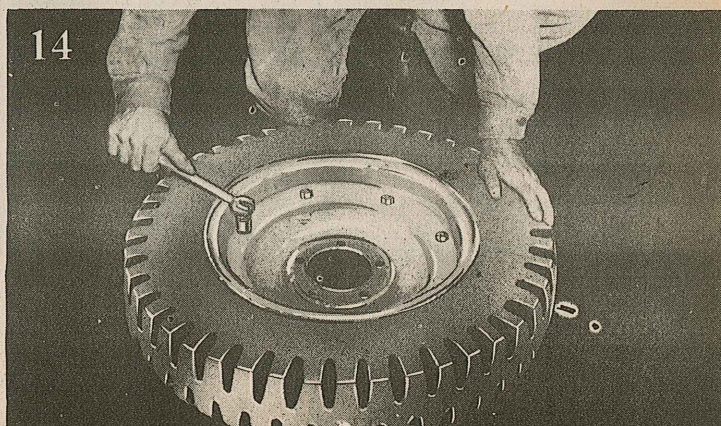
12

When inserting the rim, make sure the beadlock and the rim line up exactly at the valve stem (it's a little off-center). You don't want the stem disappearing when you're finally finished.



13

Match the lug in the back rim with the slot in the front half of the rim. This'll save you from the bug-house trying to line things up when you go to put on the nuts. (That's the lug on the back rim).



14

Last step: Finger-fit all nuts, then tighten in turn 'til the rim bottoms. Pull up all the way. You're done! You're a master! Do the same with the other type of combat wheel—the 'side flange'.

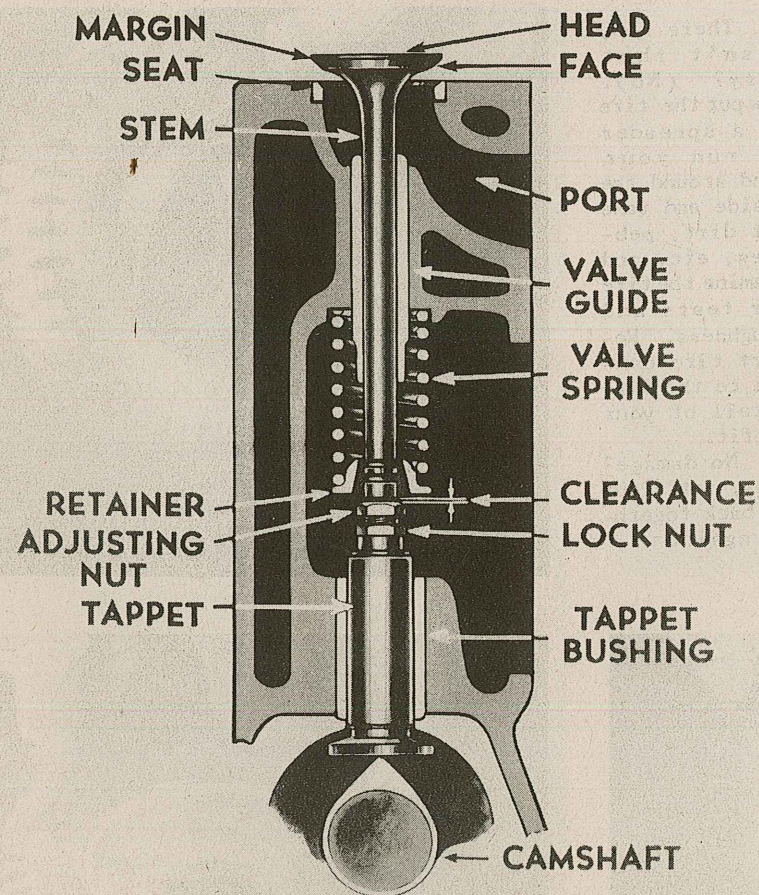
VALVES Hot, Fast and Ticklish!



Back in the good old days, a little old lady used to drive into our shop about every sixty days, point to her car, and pipe, "Wash it, grease it, and grind the valves."

THAT was to show us she knew what was going on under the hood — but the little old lady wouldn't of known a valve if one had walked up to her and called her grandma.

Like the little old lady, there are plenty of knuckle-busters who know there's a double-handful of valves under the hood, but who've slept through the latest developments.



Valve Assembly

The valve assembly. A weak link in the chain turns engine efficiency to engine deficiency.

And from the number of valve jobs coming in to army shops, there might even be a couple of oldtimers who surely don't know that the old, grey valve, she ain't what she used to be.

Around 1913 and sometime thereafter, the life of the valve was an easy one. Low-compression and low-speed engines were the fashion.

Four-to-one compression ratios were common, and the piston only compressed the fuel-air mixture to 50 lbs. per square-inch. The resulting explosion after ignition, developed a pressure of only about 200 lbs. per square inch — that's all the valve was called upon to seal into the combustion chamber. What's more, it could take its own sweet time about opening and closing, since engines were low-speed as well as low-compression.

But compare these pressures with the pressures of modern engines. Compression ratios of 6 to 1; fuel-air pressures of 100 lbs. per sq. in.; and explosion pressures of 400 lbs. per sq. in. The valve is the sucker that holds it in.

To hold the lid on these pressures, and to allow the inhale and exhale of the combustion chamber at high speed, the valve has to be perfectly timed. The opening of the valve is timed mechanically by the camshaft — but the return of the valve to its seat is the job of the valve spring.

Any weakness of the spring spells curtains for the valve; time wasted in reaching the seat or bouncing after it gets there, is a kick in the bustle

for the valve.

Why?

Well, did you know an exhaust valve at work is cherry-red? The only chance it gets to cool off, is on the seat — which, as you know, is water cooled. The terrific heat the valve picks up from the firing chamber, must be dissipated through the seat and guide — otherwise, it will curl up and die like a dry leaf on a hot stove.

A factory representative named Beanie once showed us how cooling of the valve works. He took a hunk of cigarette paper and held a match to it. It went up in smoke. Then he took another hunk of cigarette paper and wrapped it tightly around a penny. When he held a match to it this time, the paper held out for a long while before finally burning.

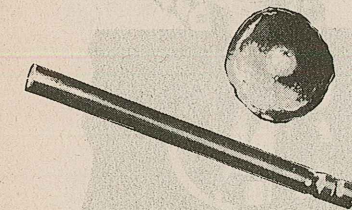
The secret was that the copper penny picked up the heat quickly, saving the paper from burning.

That's the way valves get cooled — the water-cooled seat picks up the heat they collect from the combustion chamber.

(Beanie sure sold us a lot of valves. He later drank himself to death).

Since the valve opens and closes about 1200 times a minute at moderate road speeds, and because of its high temperature, it can't afford to miss that cool seat even once. Furthermore, it dasset allow the engine to lose power because of lost compression.

For these and a couple of other reasons that escape us for the moment, the valve



A broken valve — blame it on bounce caused by weak springs: or too-strong springs which seat the valve with a wallop.

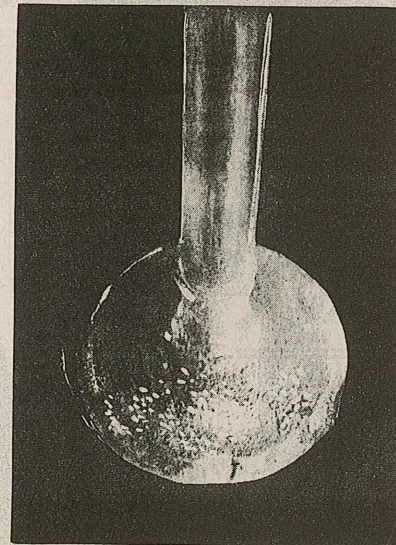
deserves a lot of care — the parts of the valve train must be kept free acting.

Take tappet adjustments. A loose tappet adjustment delays the valve-lift timing and reduces the valve lift. A tight adjustment holds the valve off the seat. Both raise hell with the works.

Worn valve-guides promote vacuum leaks, sponsor poor heat dissipation — louse up the alinement. Poor alinement will indubitably cause the valve to hit the seat cockeyed or create a thrust action which may break the valve stem.

The valve seat deserves attention. Examine it for cracks, if it's the insert type 'sound' it for looseness in the block or head. When you grind it, grind it to the proper angle, and be sure the width of the seat is the width the manufacturer wants it. You're supposed to use a valve-seat, dial-indicating gage to check concentricity.

Refacing is important to a woman and to a valve. The job on the valve is begun with a true stone, which is dressed as often as needed. Check the grinding angle while setting the machine — a split-hair error screws up the job. If



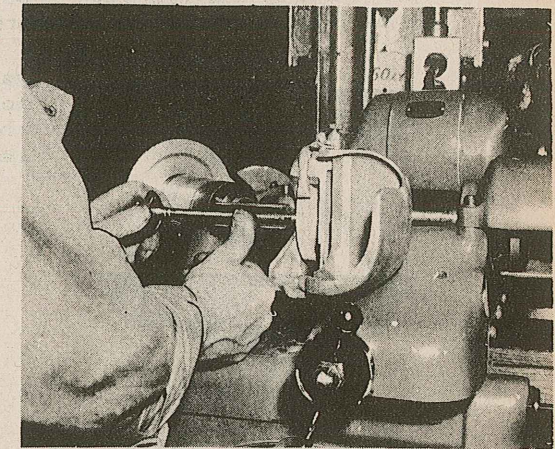
This little valve got burned. That's what comes of missing the nice, cool seat. Blame misalinement, bad adjustment, etc.

you don't have at least a 3/64 inch margin above the ground surface on the head of the valve, replace it. Be sure the retainer grooves on the stem aren't worn.

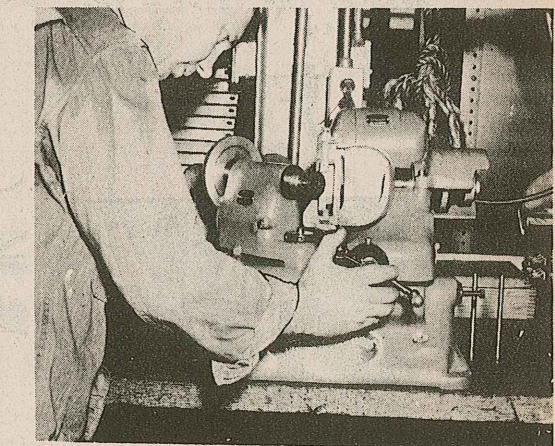
While refacing, take small cuts — but don't remove any more material than you have to, to get a true face at the correct angle.

For an accurate and quiet adjustment, hold the tip of the valve in a V-block and true it up on the wheel.

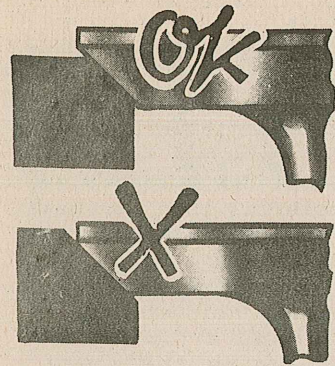
Maybe you've wondered why manufacturers make different recommendations on lapping or grinding valves after the refacing and reseating oper-



Truing up the bottom of the valve irons out the tappet wear so that feeler-gage readings will be accurate.

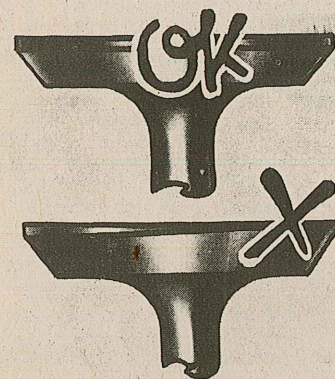


When refacing, take small cuts and don't take any more material than you have to, to get a true face at the correct angle.



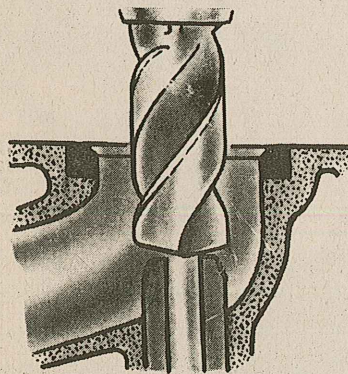
Width of seat

Follow the manufacturer's recommendation - it's his seat, give it the width he wants it to have.



Valve head margin

If you don't have at least a 3/64-inch margin above the ground surface on the head of the valve - replace it.



Shortening valve guides

Shortening the valve guides is one cure for valve-stem deposits. Use a snub-nose drill slightly larger than the outside diameter of the guide.

ation. GMC and Ford say lap 'em in lightly, Chevvy doesn't advise lapping, just says reface and reseal 'em good and then says test the seat this way: 'Mark lines with a lead pencil about 1/4 inch apart on the beveled edge of the valve-head, and replace the valve. Give the valve a half-turn to the right and a half-turn to the left using a little extra pressure. If all the pencil marks are removed, the grinding is perfect. If one line or part of a line remains, there's an uneven spot - the valve must be reground until it seats properly.

Dodge uses special hard valve seats on the exhaust ports only - and recommends that only intake valves be lapped.

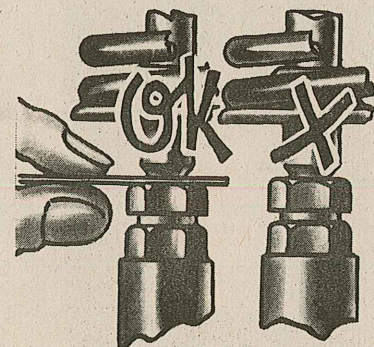
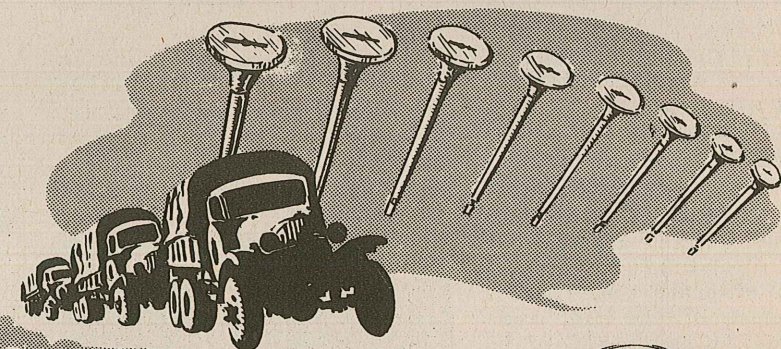
In all cases, follow the

manufacturer's recommendations - and everything'll be jake.

Valves really reached their highest point of perfection in the last year or so - but some of the metals that went to make them so good are on the critical list...chances are they'll be yanked out. This means that valves containing 5% nickel and 25% chromium, will get a no-nickel-and-9%-chromium substitute.

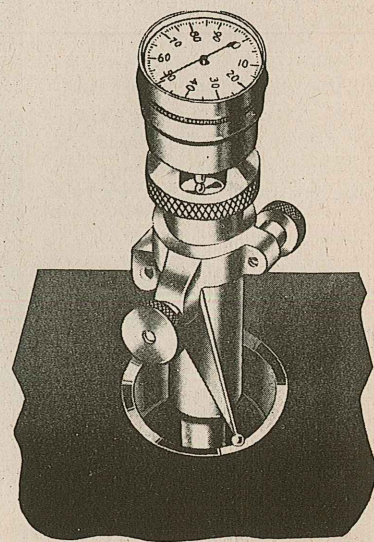
To you, this means that the new valves must be given all the breaks. Of course, if you'd rather, you can stick around and learn the hard way. A broken valve can smash up the guts of an engine as thoroughly as a burned-out rod bearing; poorly adjusted or sticky valves can sap power like another truck tied on behind.

Understand?



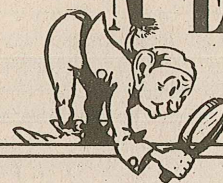
Tappet clearance check

Check the tappet clearance periodically. Between 500 and 1000 miles after grinding valves.



The valve seat indicator checks concentricity. And a good thing too.

NEW TIRE DATA



You can stop sherlocking around for the correct tire-pressure for your particular truck or passenger car. With the

appearance of TM 31-200, a long-needed set of compromise tire-pressures, based on tire size alone, has been authorized.

Tire and Rim Data Chart

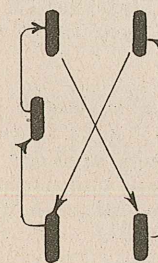
TIRE SIZES	AIR PRESSURE	VALVE STEM	RIM SIZE	RIM TYPE	RIM WIDTH	DUAL SPACING*
4.00-12/4	30	TR13	12x2.50	DC	2-1/2"	---
4.00-19/4	30	TR11	19x2.50	DC	2-1/2"	---
4.00-18/4	30	TR11	18x2.50	DC	2-1/2"	---
4.50-18/4	30	TR11	18x2.75	DC	2-3/4"	---
5.50-16/4	30	TR15	16x3.50	DC	3-1/2"	---
6.00-16/4**	30	TR15	16x4.00	DC	4"	---
6.00-16/6**	30	TR15	16x4.00	DC	4"	---
6.50-16/4**	30	TR15	16x4.50	DC-SDC	4-1/2"	---
6.50-16/6**	30	TR15	16x4.50	DC-SDC	4-1/2"	---
7.00-16/4	30	TR15	16x5.00	DC-SDC	5"	---
7.00-16/6	30	TR15	16x5.00	DC-SDC	5"	---
7.50-15/4	30	TR15	15x5.00	DC-SDC	5"	---
7.00-15/6	30	TR15	15x5.00	DC-SDC	5"	---
7.50-16/4	40	TR15	16x5.50	DC-SDC	5-1/2"	---
7.50-16/6	40	TR15	16x5.50	DC-SDC	5-1/2"	---
Light Truck-15/6	40	TR177A	15x5.50	DC-SDC	5-1/2"	---
9.00-16/8	40	TR177A	16x6.50	CS	6-1/2"	(11-1/2)***
6.00-20/6	50	TR75	20x3.75	FB	3-3/4"	7-3/4
6.50-20/6	50	TR75	20x3.75	FB	3-3/4"	8-1/4
7.00-20/8	55	TR76	20x4.33	FB	4-21/64"	9
7.50-20/8	55	TR177A	20x5.00	FB	5"	10
8.25-20/10	60	TR177A	20x5.00	FB	5"	10-1/2
9.00-20/10	65	TR175A	20x6.00	FB	6"	11-1/2
10.00-20/12	70	TR175A	20x7.33	FB	7-21/64"	12-3/4
10.00-22/12	70	TR175A	20x7.33	FB	7-21/64"	12-3/4
11.00-20/12	70	TR78A	20x7.33	FB	7-21/64"	12-3/4
11.00-22-12	70	TR78A	22x7.33	FB	7-21/64"	12-3/4
12.00-20/14	80	TR78A	20x8.37	FB	8-3/8"	13-1/4
12.00-24/14	80	TR78A	24x8.37	FB	8-3/8"	13-1/4
14.00-20/16	90	TR175A	20x10.00	FB	10"	(16-1/2)***

*Minimum dual spacing except for Quartermaster vehicles which use chains and other traction devices.

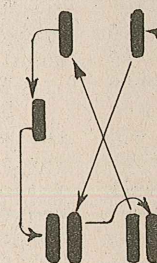
**Use 16x4.50 CS rims with combat tires.

***Generally not used as duals.

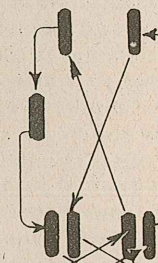
4X2 OR 4X4



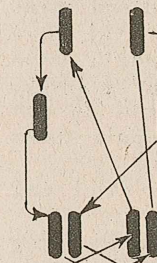
4X2 OR 4X4 DUAL



6X4 OR 6X6 ONE SPARE



6X4 OR 6X6 TWO SPARES



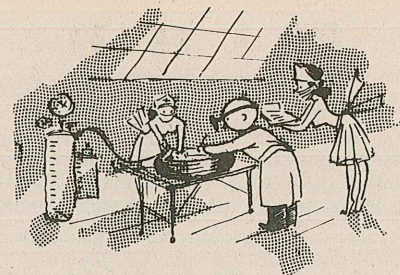
LEGEND

- DC-drop center
- SDC-semidrop center.
- CS-combat ('S' flange).
- FB-flat base.
- TR-tire & rim assoc.

NOTE: Rotation charts are fine things if they're used sensibly. Before you start moving tires around, make sure you've got the worst ones where they'll get the least wear and have matched pairs on the duals. Never put a new tire on an inside dual unless you match it with another new one. Put the most-worn of a pair on the inside dual, and the least-worn on the outside, so the four tires on the axle will tend to conform with the crown of the road. There is no rule for starting the rotation

plan, but it's a good idea to put the best tires in the toughest spots, and vice-versa. Generally, wear is greatest at the right front, less at the left front, still less at the right rear, and least at the left rear.

TIRES



On April 15, 1940, we started feeding you words on how to take care of your tires. It was strictly a matter of economy then, only a case of saving money which even the Army likes to do.

Every month since then we've been throwing words at you, until now they're surely coming out of your ears. And we're a little sorry - because beating the same old drum so long, we're a little afraid that maybe you don't listen.

So there's only one last thing we can think of, to get you to realize, to feel deep down in the core of your brain how desperately fixed we are about rubber:

Go out to your little, old truck, kneel down by a tire - look that tire square in the face. Punch it with your fist, feel of it between your fingers, smell it, look hard at it.

Now say to yourself, "There ain't no more where you came from, baby."

On the practical side, they're setting up TIRE DETAILS to take care of our wounded and worn-out rubber. There'll be a detail at every post, camp and station. If you're lucky, you'll be appointed to one and learn how to repair tubes with 20-inch splits.

If not, we'll tell you what you can do.

Probably the biggest thing you can do about wounded or worn-out tires is to get them off the wheel at the right time - before they get real sick and die.

Call even the lousiest little cut to the attention of the Motor Sergeant or the TIRE DETAIL. It's not a matter of your safety this time -

it's a question of aggravating that little tire injury by leaving the tire in service.

Did you know a tire weighing about 20 pounds, carries a load of nearly 50 times its own weight? When this tire travels about 50 miles per hour, a force of about a ton builds up trying to tear it apart? That this tire at only 40 miles per hour makes about 465 turns per minute? That a tire under certain conditions gets so hot, it goes way beyond the boiling-point of water?

An injured tire won't stand this kind of stuff without going to pieces before very long. Turn it in!

You don't need any excuse to get a new tire, don't think you've got to make that little

cut bigger before it's respectable to turn it in. Don't try to get 'one more mile' out of a smooth tire. Soon's the tread design disappears in the center, or at most, about 3/4 of the way across the tread, swap that shoe for a new one.

There's a couple of good reasons: First, a tire picks up more things (like nails) when it's smooth. Second, there isn't as much rubber left to absorb the shock of ruts and stones - so you'll bruise it easily. Lastly, the right guys can do a better capping job when they have to use less rubber, and when there's a smooth, clean, unbroken surface to work on.

Sometimes you'll find uneven spots wearing on your tire. That's a sure sign of mechanical trouble - maybe misalignment or unbalance of the wheel. Continued running won't help it and it sure won't help the tire. Get the trouble fixed.

Keep your eyes peeled for tread cuts. If you spot a cut don't try to guess how deep it is - find out. Get a screwdriver or a tire probe and force it into the cut. Don't try to make the cut larger or deeper, just check its depth. If the cut penetrates into the cord of the tire, turn the tire in for a new one. Don't keep it on the truck as a spare - exchange it for another tire at your 2nd echelon light-maintenance shop.

No matter how small the cut - it's how deep it is that counts.

Why?

Dirt and water works into the cord body, gets between the plies. This weakens the tire, enlarges the injury. Constant flexing also enlarges a cut or break.

Once in a while a tire is bruised, cut or scuffed so you can see the cord. The cords might not be cut or injured, still the tire should come off at once - before water starts to get the best of the cord.

If you ever pick up a nail, spike, piece of glass, or an object of any kind, check to

see how deep it's gone, and if it has punctured through to the inside of the tire, *trade it in!* Look at the cords on the inside, make sure they're not chafed or loose.

Anytime you've got to remove a shoe - to patch a tube or for any other reason - look over the inside closely. If you find any of the reasons for removal listed above, don't hesitate to exchange the tire.

A word to the engineers and ordnance. Trucks that go over the crushed rock, etc., of roads under construction, and field pieces that bounce around from here to hell-and-gone as they follow vehicles, hit all sorts of holes, and rocks, and often gouge chunks of rubber out of tires. Sometimes these 'chunks' are torn away, other times, they're just ripped from the tread, and hang on by a hair. Turn these tires in!

When you use chains, they sometimes chafe the sidewall. If you see cord, it's back to the same story - swap the tire. When a bum rim cuts into the bead area, remove the tire immediately.

About reprocessed tires - tires repaired or capped. If you ever notice tread-separation, bulges, or any evidence of defective workmanship or

material, check the condition with your Motor Sergeant or TIRE DETAIL for possible exchange. If the condition prevents normal service from the tire, the boys might take it off, who knows? But at any rate tell your story to the detail to help them follow through.

The most important thing is to use your head. We've tried to give you a basis to work on. If you don't remember anything else, remember this: *Never use a tire that looks like it might not give sound performance.* Don't use any tire that is damaged or injured. Not from the safety angle - but for the sake of saving that tire before it's too far gone.

Go out and kneel down again and promise your tires, "I'm gonna take good care of you, baby - like you was my own skin. I'm gonna ride you easy over bumps and stones and I'm gonna keep you full of air. When wheel misalignment or unbalance starts to scrape your tender hide, I'm gonna park you outside the 2nd echelon's door until they fix you up.

"I'm gonna ride you slow, baby, and I'm gonna keep your valve cap on. You and me, we got a long war to fight - you're all I got, I'm all you've got - and when it's all

over, I'm gonna take you for a ride, baby - *all over Tokyo and Berlin.*"

How TIRES ARE TURNED IN FOR RETREAD

If you've puzzled about turning in tires for retread or repair, about who to turn them in to, where, how and when, stop worrying:

1. Questionable tires will be removed by the 1st or 2nd Echelon. Drivers can help by reporting damage or suspicious wear on tires.

2. Tires removed will be turned in on an exchange basis to the regular supply organization of the unit.

3. Tires will be forwarded by the supply organization to the designated Motor Transport District or other designated tire collection center. There they will be inspected, classified and reconditioned, in accordance with the procedure outlined in QM Circular letter 153, April 11, 1942.

GMC BEARINGS

Another little maintenance manual slip has passed in the night.

This one concerns the No. 270 engine in the 2½ ton GMC. Seems that some of the latest manuals talk about babbitt bearing for this engine and give clearances for same.

But don't use babbitt, con-rod bearings in the #270 engine.

For military purposes,

this engine uses copper-lead bearings.

So when you get to replace the bearings in this engine, don't use the babbitt-bearing clearances in the manual. Use those we're about to give you.

(Don't get confused though, the smaller GMC engines, #228 and #248 use babbitt - the bearing loads are less).

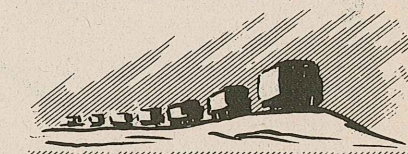
Connecting-rod clearance is .0015 to .0036 -- test with shims of .0025 and .0035 thickness. Cut the shims from the two sizes of brass stock, about ¼ inch wide by 1 inch long. Oil the .0015 shim, lay it in the bottom half of the bearing, put it on the crankshaft and draw the nuts down to the proper tension with a

torque wrench.

For ideal fit, the rod should be snug enough against the shaft so it can be moved with some resistance by the hand. If it's loose, make the same test with the thicker shim. A snug fit with the thicker shim is okay.

What if it's loose with this .0035 shim? You'll need an undersize bearing.

P.S. Don't forget to remove the shims when you get through testing (stranger things have happened, stranger).





CONTRIBUTIONS

Got a good idea? Have you invented something lately? Got a gripe? Jot it down and shoot it along to the Army Motors. Maybe you've solved a problem everybody else is worrying about. Pass it along to us and we'll buck the news to the rest of the boys in the field. You'll get a personal subscription to the Army Motors if we like your idea - you lucky stiff.

Dear Editor,

Here is disclosed a little clamp which is something. We give a money-back guarantee that it will put an end to mufflers breaking out on Diamond-T Model-967 muffler ends. (Fig. 1).

Once you get it made, it only takes about 5 minutes to install. You just tie the clamp support to one of the parking-brake-rod-support bolts, screw up the clamp, and your broken mufflers are a thing of the past. And the drivers will have to find another excuse for that drowsy feeling.

To make it — first get the strap iron. (Don't ask us how — get it like we did).

Utilities has a bender, 3rd Echelon will weld it if you whisper what nice eyes they got.

This should be of interest to all 155 MM outfits who gas up their personnel with leaky mufflers.

Sgt. John F. Oster, B-9-3, Fort Bragg, North Carolina

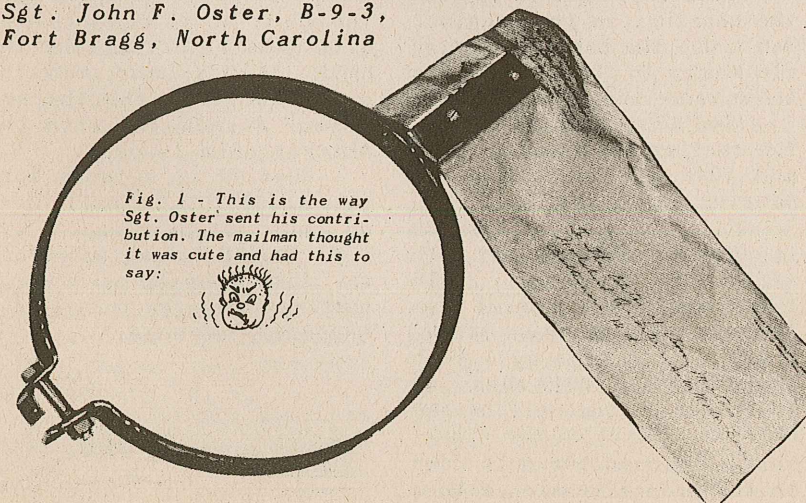


Fig. 1 - This is the way Sgt. Oster sent his contribution. The mailman thought it was cute and had this to say:



It's no easy trick to conceal vehicles from enemy air observation. Sometimes the best job of camouflage possible. is spoiled when a beam of sunlight is mirrored upwards from the exposed glass of a windshield, headlights, etc., betraying the position of troops, trucks, and bivouac.

First Lieutenant Harry R. Buckley from down California way, says that sometimes these parts are covered with burlap or canvas. However, he believes the cheapest and most effective method of blacking-out glass, is to mix one part water to two parts asphalt emulsion, and apply it to the surfaces in question. Glare is eliminated entirely.

The coating is waterproof but can be removed with any solvent.

Step up to the head of the class, lieutenant.

1st Lieut. Harry R. Buckley, Asst. Automotive Officer Emeryville, Calif.

Hold everything, here's Mr. Schott, our Ohio correspondent, up to his old tricks again. A great man in an emergency, Mr. Schott.

Here's a very likely situation he dreamed up: You bust a flexible line, and you haven't got anything but some copper tubing to make the fix. Remembering that the manufacturer installed a flexible line at this point in the first place, because the motion would break a regular metal line, what would you do about it?

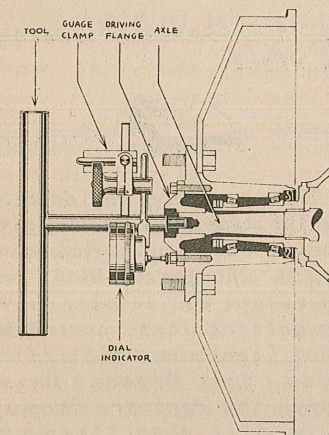
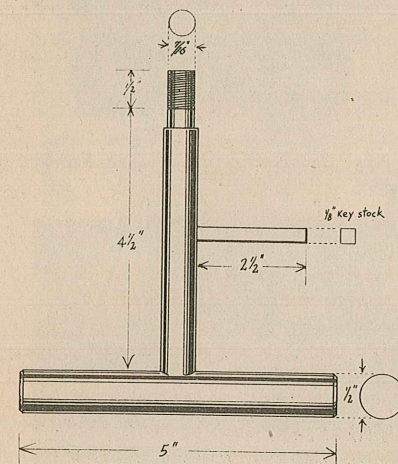
Mr. Schott would take about four or five turns (of about four inches in diameter) in the tubing, solder the fittings from the broken flexible-line at each end, and then install the result, which looks a miniature still-coil, in the breach. And as usual Mr. Schott would be right. As he says, it won't last forever, but it will bring you in.

Dear Ed,

Everybody knows that hard steering and rapid wear on constant-velocity universal joints can result from improper adjustment of axle-shaft end-play on GMC's with split-type housings. And mechanics who've made the adjustments know that it's a good way to get musclebound, because it takes two complete disassembly and reassembly jobs to get the proper clearances.

But now, I think I've got a little tool that'll save a

lot of backwork in checking the axles for play. Furthermore, the operations for making the adjustment will only have to be done when such adjustments are actually necessary.



- 4 - Mount the dial indicator on the key stock.
- 5 - Place the indicator button on the flange stud.
- 6 - Push on the end of the tool to remove all end-play in both shafts.
- 7 - Set the indicator on zero. Pull the tool back until axle contacts flange.
- 8 - The indicator will register the amount of end-play in the shaft in .001's of an inch.

If the reading is around .031, no adjustment is necessary. Any great variation from this figure is a sure sign that shims have to be added or subtracted from the thrust button at the other end of the shaft.

In field operations where maybe you won't have a dial indicator, a satisfactory measurement of the end-play can be made with a scale placed between the key stock on the tool, and the flange. Mr. W. H. Weekly, Instructor, Motor Transport School, Normoyle QM Motor Base, San Antonio, Texas.

Dear Editor,

When we got an order to mark all our tools, we could think of only one thing. We whipped out a couple sets of lettering dies and went to work — but soon had them so beat up on hardened wrenches you couldn't letter butter

As you can see from the drawings, the device is merely a 'T' handle made of 1/2-inch stock, threaded to fit into the end of the axle after the flange center-bolt is removed. The 2 1/2-inch length of key stock is welded to the shaft so a dial gage can be attached.

The tool is used as follows:

- 1 - Jack up the front axle and turn wheels to straight-ahead position.
- 2 - Remove driving-flange center-bolt.
- 3 - Screw the tool into the axle shaft until the thread bottoms.

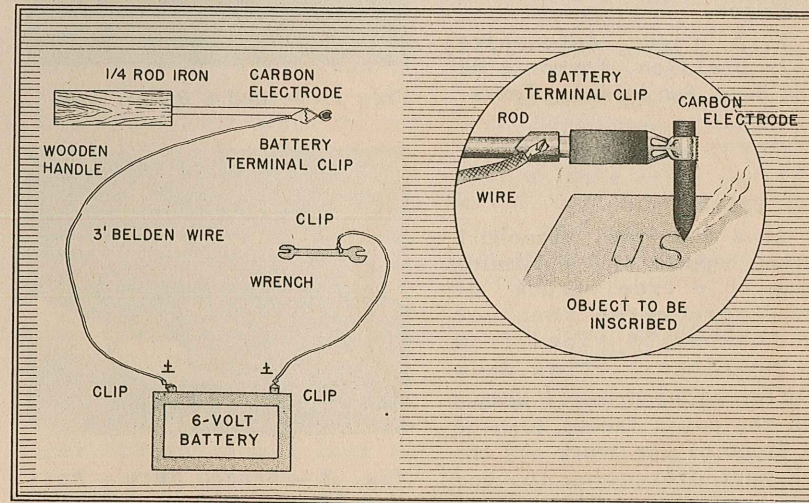
with them. When we tried to draw an electric etcher from the tool room, we discovered we were next, after 400 other guys in line, to use the only one they had.

However, after a fast look at their GI etcher, I personally decided there wasn't anything to it that couldn't be picked up from the scrap pile. Acting on that theory, I soon had one ready and willing to go in a very short time.

A couple 3-ft. lengths of 14-gage insulated wire, four spring clips, a 6-inch length of 1/4-inch welding rod, a wooden handle, a flashlight battery carbon, and a storage battery, and an etcher was born (See illustration below).

The handle is attached to one end of the welding rod, and a clip to the other. The clip holds the end of one wire and the carbon. The other end of the wire is clipped to a battery terminal. A clip is placed on each end of the other wire, so that one end may be clipped to the battery, and the other end to the tool to be etched. The voltage can be varied by using either one, two, or three cells of the battery.

In no time at all we were writing U. S. PROPERTY on tools all over the place. Technician 4th Grade, Marvin R. Wilson, 813th Tank Destroyer Battalion, Fort Bragg, North Carolina.



Taking us up on our plea for parts-salvaging methods, Steve Pogue, from deep in the heart of San Antonio, lets us in on one of the tricks they've been using down there.

Many otherwise perfectly serviceable Universal joint yokes, lower fan pulleys, and pinion shafts with oil-seal grooves are discarded daily, he says, simply because the oil seal has scored the ground surface of the part until the lubricant can no longer be held. They can be easily reclaimed, he insists, by re-grinding them on a #3 Re-Li-O Van Norman Wet Grinder, using an expander-type mandrel for the yokes and pulleys, and by putting the pinion shafts on centers. It has been their experience that as much as .020 of the stock can be removed without impairing the efficiency of the oil seal in the least.

When the scores are beyond this depth, they've been grinding down the shaft to receive a sleeve. The sleeve is shrunk on and then ground down to size. (They've been getting their seamless, stainless-steel sleeve material from a near-by air depot which has lots of short lengths in their scrap pile).

Every scheme for saving critical materials is a good scheme. Keep 'em coming, Mr. Pogue.

Mr. S. H. Pogue, Automotive Repair Division, Normoyle QM Motor Base, San Antonio, Texas.

from a piece of strap iron 6"x3", and welded it to the body directly in front of the bar (Fig. 1). It works.

The original crane-hook holders under the tail-gate were so weak they'd snap off when the cables were tautened. We reinforced them so they wouldn't break so easily (Fig. 2). (Ed. note: They are made weak with a purpose. If a driver tries to save his tires by lifting the back of his wrecker with his crane, the holders will snap before the body is twisted. So don't make 'em too strong)

Wrestling V-bars around in the dark is like eating peas with chop-sticks. We keep ours handy by hooking its lunette to the wrecker pintle, and chain the arms of the bar to the mud guards on either side (Fig. 3).

Spare tires take up a good bit of space in the wrecker body. We mounted one on top of the other, and got ourselves some more room. Easier on the tires, too (Fig. 4).

Peter P. Hale, 1st Lieut., Bn. Motor Officer, 813th Tank Battalion.

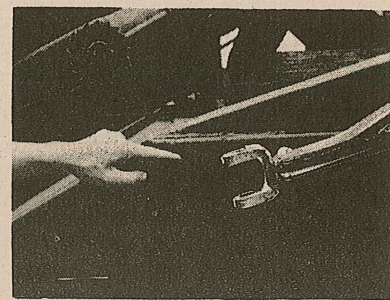


Fig. 1 - Welded a Buffer Here.

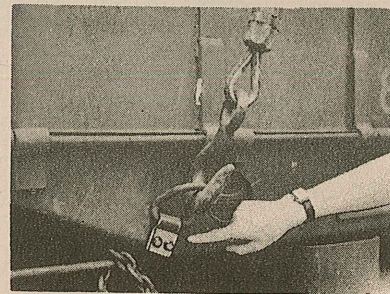


Fig. 2 - Braced Here - Not too Strong.

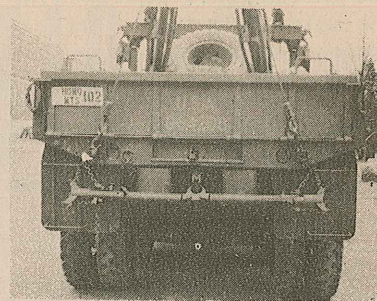


Fig. 3 - Hung our V-Bar Handy.

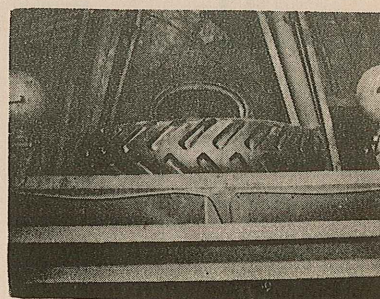


Fig. 4 - Scattered Spares Hog Space.

The chameleon has nothing on valve caps when it comes to blending into the surrounding terrain. At least that's one good reason for so many valve caps getting lost, according to 2nd Lieutenant William G. Bliden, Fort Devens, Mass. He says the caps are dropped in the dirt when tires are checked and are so hard to find, they just aren't found.

So his outfit paints valve caps a brilliant red, and they can be easily found in any surroundings outside of a brickyard.

You should try his scheme, unless your tire-checking department is located near a brick kiln, in which case, try green.



Sgt. "HALF-MAST" McCANICK'S Question Dept.



Dear Half-Mast,

Now that we have the new detergent engine oils and the universal gear lubricants, we wonder if it will affect one of our practices in changing gear lubricants. It has been our practice to flush out the gear box with #10 engine oil before adding the fresh lubricant, but since we do not know the composition of the new oils, we aren't sure that they will mix. What will happen if the detergent engine oil and the universal gear lubricant are mixed? Will they, for instance, form a harmful compound?

And now that we have you on the carpet, how about threading the grease fittings on our 1/4-ton vehicle shackles so they won't pop out when pressure is applied with the gun?

Captain T.A.M.

Dear Captain,

So far as I can find (by prying into the secret files of 'Smokehouse' O'Toole, our chemist) the additives in the engine oils and the gear lubricants are more or less compatible. Therefore, the use of the #10 engine oil as a flushing-oil in gear boxes should not result in any kind of deadly potion. However, now that the gear lubricants are so light, and are changed at such frequent intervals, I really don't believe it's necessary to flush out the boxes after draining, if the

drain is made when the vehicle has come in off the road and is warm. They seem to drain out pretty clean without flushing.

If the grease fitting you refer to is on the U-type shackle with the threaded bushing, you probably wouldn't have much luck either threading it with the threaded-type fitting. The fitting drives into an expansion plug, and if your gun blows out the pressed-in fitting, it'll also blow out of anchoring-the-fitting-by-threading come to pass. However, threaded fittings are sometimes used on domestic vehicles, but with a threaded-type-plug.

On several occasions when grease fittings were popping out with disgusting frequency, it was found that the threaded bushing had been screwed up so tightly that it butted up against the shackle end, so the grease could not leave the cup -- but popped it out instead. You might investigate that angle and make an adjustment, if necessary.

Half Mast

Dear Half-Mast,

I've read enough about other people's troubles in your column, now I want to read about some of my own. We've got a herd of '41 GMC 2 1/2-tonners (CCKW-353) in my

outfit, and the G.I. fan belts are like a belt in the fanny. Outa bounds, so to speak.

In order to use these belts we have to cut 'em down - they're much too wide and far too short. We have to take the generator off to get 'em on - and the fit would be better if we left the generator off, which is against regulations.

We've not been able to get any other belts to replace them and wonder what you would do if you were in our place.

Sgt. E.A.R.

Dear Sergeant,

Something tells me you've got a cross-up in your supply. When you send for the next belt, get the registration number off the truck, and then compare it to the vehicle numbers on the outside cover of the vehicle parts-book.

Not all 353's use the same belt. Check also against your interchangeability charts, to see if you got the right one.

I guess I don't have to tell you that a lot of things can happen if you set a belt up too tight, but there's no harm if the belt rides a bit high in the pulley at first. But it shouldn't be so tight that you have to pull the generator to get it on.

Yep, I'd personally examine the parts book, the parts number, and interchangeability chart, and see if I hadn't been getting the wrong belt.

Around the first of the year (News Flash, January Army Motors), we announced that the belt on some other models of G.M.C. had been lengthened 1/2", and it's possible you got some of the short ones from the old batch.

Half Mast

Dear Sergeant,

There's been a lot of talk among the soldiers in my outfit on the pro's and con's of using stop-leak compounds

in Army vehicle radiators. We were wondering if any stop-leak is recommended for this purpose, and if so, how is it to be used.

Most of us are of the opinion that soldering is the best process in the case of radiator leaks, but we'd like to have your opinion on the subject.

W.O. (J.G.) O.M.S.

Dear Mr. O.M.S.,

I hate to see you bring this subject up. For the past few years I haven't had to worry about trucks overheating from the many kinds of goo that used to be poured into their un-offending cooling systems. Back when the self-starter was still a baby, and water pumps hadn't displaced the thermo-syphon cooling systems, people with nothing better to do would dump everything in a radiator from eggs and bran and pepper to condensed milk -- and don't laugh -- they stopped the leaks. But engines didn't operate at today's high temperatures, and radiator cores were nothing more than mazes of sewer pipe, so it took quite a large amount of garbage to put these outfits out of commission.

In today's high-compression engines with their fine-tube and honeycomb radiators, the grocery store is not the place to look for a stop-leak compound.

However, chemical stop-leak compounds may soon return for use in combat maintenance.

The Holabird Chemical-Engineers have just completed extensive tests and have decided what they want in the way of a sealing compound. Now they're looking around for a commercial product to fit their specifications.

We all agree with you that soldering the leaks is the only right way to do the job. But in view of the fact that a tiny leak might knock a truck out of an important action, a can of radiator seal will be a mighty handy thing to have in the tool kit.

When we get the compound we're looking for, I'll write you a little article on where to get it and how to use it.

Half Mast

Dear Half-Mast,

When I've written to you before, you have always been able to give me the right answers and tell me when my ideas were good and when they were bad. Here's a few more things I have had on my mind for some time; what do you think?

The life of tires on cargo trailers is indefinite because the tires are free rolling, meaning that they are used neither for driving nor for braking. Why wouldn't it be possible to dismount all the good tires on these trailers and mount bald tires? I understand there are 16,000 trailers of this type. My scheme would release 32,000 good tires for other uses. And in these rubber-poor United States, 32,000 tires is quite an item. I think that if you check with the tire companies, they'll agree to the merit of this suggestion.

Secondly, I've noticed that trucks having winches mounted behind the cabs use valuable space inside the body for storage of the two spares. Besides being a waste of space, it's pretty tough to reach the spares without unloading the cargo. My opinion is that it would be very easy to mount the spare or spares directly behind the cab in the empty space above the winch.

I think I've got something this time, don't you, Sarge?

Pvt. L. S.

Dear Private,

I'll split with you this time...give you one right, one wrong.

Mounting bald tires would be a swell way to save thousands of good ones for technical use, except for a couple 'ifs'. If we run these bald tires threadbare on trailers,

they'd be no good for retreading, for which purpose they are of much greater value. Another if: trailer tires are usually interchangeable with the tires on the prime mover, so that by keeping good tires on the trailer, we've got two extra spares in a pinch. While the bald tires might easily support any load the trailer could carry, this would not be true if they were put on the truck.

Then, too, treadless tires run much hotter because they have no air channels to dissipate heat generated by friction, and are much more likely to break up during operation.

Your idea for conserving space in center-mounted-winch cargo trucks has plenty of merit. The spares on these trucks can and will be mounted in the space behind the cab as soon as the engineers complete the design for a mount.

Well, .500 is good batting in anybody's league, so as fast as you knock 'em out we'll print 'em.

Half Mast

Dear Half-Mast,

We get frequent complaints of grease-seal leaks in axle and transmission units after changing to the new gear-lubricants. Is it possible that new oil-seals should be installed before changing over, if the vehicles have been in service for a long time?

Rusting of front-axle-universal-joint ball-housings at the wiping point is also a problem here at the seashore. Would it be possible to plate this portion of the housing with copper or cadmium to prevent rusting? If we could do this, we could keep the joint clean, rust-free, and dry, instead of smearing it with grease, which in itself helps collect a lot of abrasive grit.

M/Sgt. C. E. W.

Dear Sergeant,

It's hard to set down an inflexible rule for installing

new grease retainers when changing to the lighter lubricant. There are too many exceptions.

We know that grease retainers in good condition will hold the grease if it's at the right level, and my suggestion would be to inspect the retainers before changing the grease. If they show signs of leakage with the heavier lubricant -- it's just good common sense and good preventive maintenance to change them before squirting in new lube. But for me to say change them all, would be too much of a good thing...many of the old ones would still be serviceable.

There's a lot more about this lubrication business on pages 139 and 158.

Plating the universal ball with a rust-resisting material is a good idea, but it would have to be done at the factory during manufacture -- it's too big a job in the field.

Maybe some big-shot out slumming in this column, will pick up your idea and pull some strings to get it done. Meantime, it's just a case of clean 'em and lubricate 'em as often as necessary to hold back the rust.

Half Mast

Dear Half-Mast,

We have two blacksheep among our Dodge Recons. Let me tell you how they act and see if you can suggest a cure or a punishment for their misbehavior.

The drivers report that when brakes are applied at high speed, they get a terrific chatter and a pumping action of the pedal.

After a lot of experimenting we made the following discoveries:

1. The trouble was in the right-rear wheel in both cases.

2. With the wheels jacked up, we applied the brake to stall the engine. The brake pedal pumped up and down almost three inches.

3. We found the brake shoes and drum concentric.

4. The pumping action is relative to the speed of the wheel. If the wheel turns rapidly, the pedal pumps rapidly.

5. We changed the wheels to other trucks and they worked O.K. We also put the wheels from the other trucks on the right rear of our blacksheep with the same result. No chatter, no pumping.

Since changing the wheel stops the action, it seems obvious that the wheel must be the cause of the trouble. Will an unbalanced wheel cause such a reaction in the brake system?

Sgt. H. V.

Dear Sergeant,

Since you didn't mention whether both the drum and the wheel were changed during the experiment and since changing parts to be tested from one vehicle to another often leads to wrong conclusions, I'll have to start at the beginning and try to think of everything.

The action of the brake pedal points strongly to an eccentric drum. I wonder if you actually had it checked on a lathe?

It isn't unusual to have an eccentric drum act differently on another vehicle. For instance, if the adjusting cams were closer on one brake than on the other, the motion transmitted to the shoe by the eccentric drum would be reduced. Here's a few suggestions:

1. Check the drum on a lathe, true it up and if necessary, examine for cracks, or to see if the drum was previously undercut too deeply.

2. Be sure the backing plate is bolted on tightly, and that it has not been bent or twisted.

3. Remove the wheel-cylinder pistons and make sure they are free-acting for their full stroke.

4. Make sure the brake lining is clean and has no high spots. Then make a complete major adjustment of

the brakes, (as per manual) making sure the arrows on the anchors are pointing toward each other before moving them to start the adjustment.

The above adjustments are calculated to stop the chatter and brake pedal reaction -- presuming that you moved the drum in your wheel changes.

If an unbalanced wheel has any bearing on the symptoms you listed, it's a new one on me. But you can inspect it for bends, and have it checked for balance (if possible) just to satisfy yourself on its condition.

Half Mast

TC 32

I've had a raft of letters in the past few weeks, asking for a solution to the apparent confusion caused by the many directives, circulars, rumors, and unofficial instructions on the subject of lubricants. Actually the lube situation is well under control. All that's needed is a bit of explaining.

I believe the first step in this direction is the letter from and the reply to Major B.W.G. on page 89 of the June issue. It answers many of the questions that bothered you when you first saw TC 32. This training circular is undergoing a few minor alterations and we'll let you know all about the finished product as soon as I get on the inside track.

Meantime, to get your feet on the ground, why not read up on "Oil Seals," page 139 and "Sore as a Boil About Oil" on page 158 -- the first of a series to be run on the new lube program. There will be more articles in the next several issues of Army Motors expanding on the training circular and detailing many of the operations it outlines.

Half Mast



sore as a boil ABOUT OIL

So the boys on the other side have a fight on their hands? Here's one in our own back yard.

Up to the time War Dep't Training Circular 32 came out (May 22, 1942) establishing a new and simplified lubricants program for Motor Transport, a hot battle raged back and forth on what lubricant to use in the transfer case.

The hottest part of the struggle raged between those who liked the heavier SAE 80-140 or 140-250 Universal gear oils and the lighter SAE 90 oil.

And although the issue has been settled by TC 32 — right now winging throughout the field — there are still a lot of 'aginsters' sniping from behind the trees. For the life of them, they can't understand why 80-140 etc. was dumped overboard in favor of 90 (and 80 for below zero operation).

Especially in the hot, deep South — where many an aginster tried 90 and found that it ran through the oil seals and poured forth from the transfer case like water from the rock that Moses struck.

In order to promote peace on earth, and stop the fight forever, an inspection tour was made recently. Championing the cause of the War Dep't's Fuel and Lubricants Committee, a lone officer rode forth to hear the charges and smite them to the ground forever.

The weapon he was armed with, was this: That the 140 oil promotes great heat in the transfer case, that this great

heat thins out the heavier oil to the same viscosity as the lighter.

For this reason, the one doesn't leak out of the transfer case any faster than the other. Not only this, but the higher temperatures developed by the 140 oil, produce a couple of disadvantages. For one thing, the excess heat hardens the oil seals — hard seals don't seal. For another thing, excess heat breaks down the oil.

Getting down to brass tacks, tests show that 140 oil causes an operating temperature of 235° to 260° in the transfer case with a resultant viscosity of 90 Saybolt seconds.

Similar tests show that the 90 oil causes a temperature of only 190° to 210° with the same viscosity of 90 seconds.

Having the same viscosity, should one leak out of the transfer case any faster than the other?

It shouldn't. It doesn't.

Who would ever think that unevenly inflated tires could cause transfer-case failure?

We would.

Tires inflated unevenly around the vehicle cause a differential action to start up in the transfer case. This in turn causes a rapid rise in temperature around the idler shaft and top-shaft bearings.

Why should either one leak out of the transfer case at all?

It shouldn't. But it does, Undeniably, 90 oil has been leaking out of the transfer cases. Why?

That was the argument. Why should 90 oil — selected as the best thing for the Army to use — leak from the transfer case?

The gent representing the Fuels and Lubricants Committee had a deep-seated hunch that poor maintenance was the answer — and one of the first outfits he encountered in the field, confirmed his hunch.

Sprinkled freely among the trucks of this outfit, were loose transfer cases, scored shafts, poorly installed oil seals, improper oil levels, uneven tire-pressures — all major contributors to transfer case failure.

When the officer in charge indicated that Training Circular 32 advocated the use of

A rapid rise in temperature — excess heat — causes a breakdown of the lubricant. This, together with the fact that uneven inflation causes the transfer-case mounting bolts to loosen up — leads straight to transfer-case failure.

See, what did we tell you? The wages of uneven tire inflation is transfer-case failure.

80-140 oil for summer temperatures over 90° "where leakage is experienced due to defective seals," he was reminded that TC 32 advised this as a temporary expedient — and, then, as a very special favor, he was let in on a little secret. Namely, that a new War Dept. Circular (you'll see it soon) on lubricants, eliminates the use of 80-140 for this purpose altogether.

In no case is 80-140 or heavier lube to be used in the transfer case.

The reason, of course, is as stated before: the higher temperatures which the 140 oil develops, thins it out to the same viscosity as the 90 oil. In addition, the higher temperatures break down the 140 oil.

(90 oil, being made of refined motor oil with a fixed additive, remains stable up to a temperature of 265°. 140 oil is often made of a poor base stock and separation at 230° is not uncommon — the result is a tarry mass at the bottom and a light, spindle oil at the top. Bearing failure is just around the corner.)

Another officer encountered in the field, said his transfer-case leakage was due 50% to bad seals and 50% to the 90 oil.

Our hero took one of the officer's 2½-ton GMC's and stuck a couple of thermometers in the oil reservoir of the transfer case and in the oil vapor space. The transfer case was filled with 140 oil.

After 40 minutes of driving over the highway, the temperature in the transfer case was up to 254°. (On the average, temperatures between 230 and 260 are attained with 140 oil.) And when the truck was brought back to the garage and allowed to stand, a wide pool of the oil flowed forth from a low bearing at the rear.

When the transfer case was torn down, it fairly shouted 'poor maintenance' — the mounting bolts were loose, dirt and grit had worn them-

selves into the oil seals.

The officer didn't bother to argue further on the reasons for his transfer-case leakage.

At another post, a major flung his hat in the air and declared himself all for 90 oil. He reported receiving a bunch of trucks that had been driven the long haul up from Texas. Each truck had about 6000 miles on it. Shortly after arrival, transfer case failure set in. Solid masses of lube were discovered in the housings resulting in burned-out bearings.

Quick as a flash, the major put the vehicles on the deadline, had the cases drained flushed, and filled with 90 oil.

He hasn't had a moment's trouble since — and the trucks are running some 220 miles daily with full loads of spare parts.

His trucks were then checked for transfer-case temperature and for leakage. The temperature built up in one hour and five minutes, to 200° and stayed there. Of leakage, there was none. When the front wheels were engaged, the temperature rose only one or two degrees — and again no leakage.

All this took place on a hot day — the temperature hovered around 100°.

At the last post visited, an officer wondered whether 90 oil would hold up in the Army's 'heavy duty' units. He pointed out that commercial outfits design heavy lubes for small trucks with heavy pay loads.

The answer was simple. In the commercial field, the Army's old contemptible — the good, old 2½ ton — would stagger around under a load anywhere from seven to ten tons.

In the Army, life is much simpler. The 2½ ton carries only 2½ tons. We don't speak of heavy duty in the Army —

the word is rugged duty.

On his return to home base, the Fuel Committee's champion declared himself to be in fine fettle. He had a deep tan and was in fighting trim. Dazzling a few startled on-lookers with some fancy footwork, he challenged all comers on the use of 90 and 80 oil in the transfer case — in hot climates, in cold climates. Especially in cold climates where for the first dozen or so minutes, 140 oil is so thick that it won't penetrate through the small oil holes to the bearings that need it. (This also holds for moderate climates — a sudden cold snap and your 140 oil is thick enough to cut with a knife.)

That's his challenge: anybody with a better oil than 90 for all circumstances — see him.

At any rate, SAE 90 (to be purchased under Federal Specification VV-L-761) is the new order in transfer cases in temperatures above 0° F — (below 0°, use SAE 80).

To change over from 140, simply run the truck 'til the case gets warm (about 30 minutes), drain and refill with 90.

But first, check the breather location. If it's on the idler shaft, change it to the top shaft, according to the instructions in TSB I-8. Be sure the breather is clean of dirt or heavy oil.

If the high operating temperatures of the 140 oil have ruined the oil seals, get them changed. As is to be expected, 90 oil won't stay in the case with bad oil seals. (If the case needs an overhauling, give it that, too.)

Check the mounting bolts — keep 'em tight.

And, above all, remember the theme of our story: poor maintenance is the root of transfer case trouble — the SAE 90 oil you're to use, has nothing to do with it.



OIL SEALS*(From page 139)*

the seal as the truck goes about its business, a 'sand slinger' has been installed in the later model trucks. (You'll probably have to put it on older jobs yourself. Order by part number GP7776.

Don't be afraid to give the oil seals your very kind attention - its easier than tearing into the case again, and doesn't take nearly as long.

CARBON KNOCKS*(From page 133)*

Usually an engine that builds up so much carbon that a knock results, is ready for rings, and a close inspection of the intake valves guides. But sometimes carbon builds up in an otherwise serviceable engine - so when compression is good, and oil consumption is normal, a carbon-cleaning job is all that's necessary.

That's all there is to it. However, as we mentioned before, many a mechanic learns even such a little thing by hard experience. Hearing a knock that resembles a bearing knock, he goes right to work wasting time.

The best part of a good mechanic, is not a horny hand or a bloodshot eye - it's a sharp and wax-free ear.

RUMORS*(From page 137)*

We've always suspected the Cavalry knew their oats - now we're sure of it.

In response to our paragraph in last month's column on loose pioneer-tool sets, the Cavalry Board wrote and let us in on a recommendation they're making to Washington.

They want to see web-straps and slide-grip buckles substituted for the leather straps and tongue-type buckles now used on the tarps of some of our vehicles.

They suggest also that

maybe web-straps and slide-grip buckles are the answer to our loose pioneer-tools.

The slide-grip type of buckle can be adjusted to any degree of tightness. Furthermore, webbing besides being cheaper, will not deteriorate as fast as leather.

Sounds like a pretty good idea - what do you think?

* * *

Last month we started talking about something and somehow never did get into the heart of the argument.

It concerned shifting into lower gear when it's not absolutely necessary in order to 'use the engine as a brake'.

We merely complained that this wore the clutch excessively. What we should have fussed about, is that going from a higher to a lower gear puts a terrific strain on the power train. Everything along the line gets jolted, from the transmission to the differential-gear teeth.

In one camp where this is a general practice, the clanging of gears resounds all day like the ringing of church bells. Needless to say, its repair shops are always busy.

Sure, it's all right to go into low gear before descending steep hills or when the road is slippery - but it's a crime to go around busting up vehicle innards by throwing it from high to low merely to turn a corner or stop at an intersection.

Let's break the habit.

* * *

Maybe you've had a lot of trouble with broken valve springs - and maybe you've heard that 'acid-etching' is the root of a lot of this trouble.

That trouble is on the way out. We hear that the new valve springs will be cadmium-plated to resist etching.

* * *

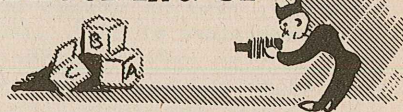
CONNIE RODD'S DEPT.*(From page 136)*

the fire unit of the field range.

(2) The function of the filter disk is to prevent accumulation of lead in the generator tubes and flame valves and to absorb lead which would otherwise remain in the products of combustion. Numerous tests conducted with filter disks made of steel wool in lieu of asbestos, have definitely shown that steel wool does not fill either of these functions.

(3) In view of the serious health hazard involved, the use of these improvised steel wool filter disks will be discontinued immediately.

What more can we say?

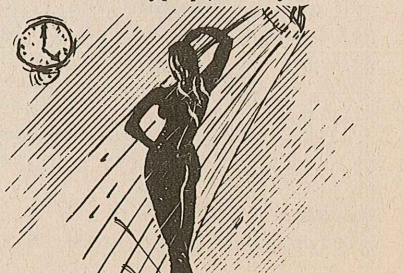
BLOCKING-UP

We suppose you know that authorities advise blocking-up for trucks or trailers stationed in one place for any length of time. This goes for repair and supply trucks - it takes the load off the springs and does a world of good for the tires.

Now we could go out and pose a lot of pictures showing just how this could be done, but we'd prefer to get some ideas and pictures from the field on the subject.

So if you've got any ideas, if your outfit has worked out a system of blocking-up, how about taking a lot of nice pictures and sending them in to us.

We'll let you have a lick of our lollypop, if you do.



News Flashes

HOLABIRD MOTOR BASE, AUGUST 13. A report that several field organizations are using water trailers for gasoline is causing great concern among all who know that these are bitumastic-lined tankers and can't handle fuel safely. Once having held fuel, they cannot safely be used for water.

TECHNICAL SERVICE DIVISION, HOLABIRD MOTOR BASE, AUGUST 17. The new General Automotive Mechanic's Course, more simply known as the 'F' course, is available to all schools, and units operating schools. The 'F' course should prove extremely valuable to field schools since it was prepared within the scope of the tools available and with an eye to field limitations and conditions. Your requests for bound copies of this course should specify the number needed (based on an authorized quota of one per instructor) and should be addressed to the Technical Service Division, Holabird Motor Base, Baltimore, Maryland.

TOLEDO, OHIO, AUGUST 12 - There have been a few complaints of grease being pumped from the transfer case into the transmission on the Willys Jeep. A change has gone into production starting with Serial No. 169756 that will stop the trouble. A suggested repair for cases where grease pumping is excessive is as follows: (Third and fourth echelon shops should make the change on all units dismantled for other repairs).

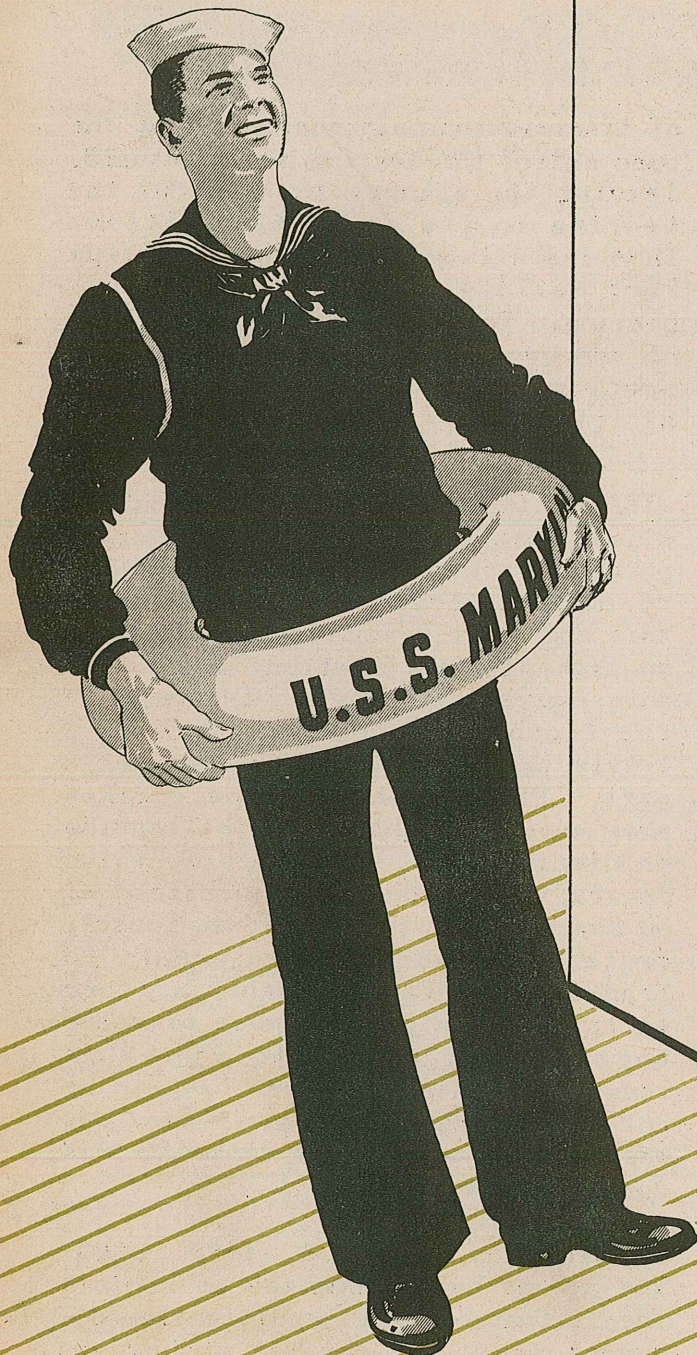
Turn the bearing on the rear

of transmission main shaft so that the open side of the bearing faces forward, leaving the slinger in front of the bearing in its original position. Then install another slinger, Willys Part No. A-410 at the rear of the bearing. These slingers on each side of the bearing will give added protection against leakage in either direction.

ATLANTA, GEORGIA, AUGUST 21. (SPECIAL) Reports show an alarming number of parts and assemblies being damaged due to improper crating for shipment to this and other bases checked. Although no packing specifications are available, investigation shows that most of the trouble could be averted by a little common sense on the shipper's part. Photographs of some engines show entire weight of engine resting on distributors, carburetors, valve covers, fuel pumps, etc., instead of on heavy units; others are so loosely crated that more damage occurs in transit than if they'd hit a stone wall; and in a great number of cases they are not tagged to show what repairs are needed. Some have to be put in running condition to find out whether they need a new camshaft or a complete overhaul.

WASHINGTON, AUGUST 4, 1942, OQMG. The use of engine numbers as vehicle identification will be discontinued - except where the chassis number and engine number are alike. (For engines found without serial numbers, request numbers from OQMG).

Get outta that front wheel drive!



What about a sailor walking down Broadway wearing his life-preserver? What about a couple of joes from the Air Corps pulling the ripcord on their parachute as they step off a high curb?

That's how silly you look taking a small hill or driving cross-country over a smooth meadow in front-wheel-drive.

Like the life-preserver, like the parachute, the front-wheel-drive is strictly an emergency measure to get you out of a jam, when you're in a jam.

You look silly as hell driving in front-wheel-drive when the going is easy.

Not only that, but you're busting the life out of the truck you're driving.

How come? Well, when you go into front-wheel-drive, power is being fed evenly to both the front and rear wheels. BUT — riding over uneven terrain, the wheels don't travel the same distance. The front wheels might be riding over a little hill or a log while the rear wheels are still on comparatively level ground. The difference in travel may run about 1/4 of a turn in every 2. While the rear wheels make two revolutions, the front wheels make two and 1/4.

But with no differential between the front and rear wheels to take up the difference...where can the difference go?

The front wheels have to skid a 1/4 of a turn in every two to get rid of it — off burns the rubber. If the tread of the tire gets caught on a rock or a log and can't skid, SNAP! goes the axle.

And all the while, the transfer case and differentials struggle along at fever heat.

Is this a fact?

Yes, it's a fact.

What can we do about it?

We can wise up, we can forget about going into front-wheel-drive everytime we go off the road. Rear-wheel-drive is tough enough to take us through half of hell and high water. Let's save front-wheel-drive for the other half — for the mud and the slippery ditches, for the steep and broken hills.

Let's get outta that front-wheel-drive!

