The ARMY MOTORS

VOLUME 2 APRIL 15 1941 NUMBER 1

THE HOLABIRD QUARTERMASTER DEPOT BALTIMORE MARYLAND

TABLE OF CONTENTS

THERE IS NO CHARGE FOR THE 'AM_____

Requests for subscriptions should bear the signature of the Commanding Officer of the organization desiring them.

ORIGINAL ARTICLES ARE WELCOMED.

Address all correspondence to "The Editor, Holabird Quartermaster Depot, Baltimore, Maryland".

THE 'AM

VOLUME II APRIL 15TH NUMBER-1

BENJAMIN FRANKLIN HAS BEEN SO FREQUENTLY HELD UP TO SCHOOL CHILDREN AS A PARAGON OF ALL RIGHTEOUSNESS THAT MANY OF US HAVE GROWN UP WITH THE IDEA THAT HE WAS A STUFFY OLD MAN FULL OF DULL SAYINGS AND POMPOUS PLATITUDES.

ACTUALLY, OF COURSE, IF YOU KNOW ANYTHING ABOUT HIS LIFE, HE WAS FAR FROM STUFFY AND MANY OF HIS SAYINGS, SUCH AS HIS COMMENT ON FISH AND HOUSE GUESTS THAT "THEY BOTH STINK AFTER THREE DAYS", WHILE STRONG, STILL CONTAIN IDEAS THAT ARE AS TRUE TODAY AS THEY WERE IN THE 1800's.

HERE'S ONE THAT WE HAVE ALWAYS THOUGHT GOOD —

"IF A MAN WOULD BECOME A PAINTER, NAVIGATOR OR ARCHITECT, IT IS NOT ENOUGH THAT HE BE ADVISED TO BE ONE, THAT HE IS CONVINCED BY THE ARGUMENTS OF HIS ADVISER THAT IT WOULD BE FOR HIS ADVANTAGE TO BE ONE, AND THAT HE RESOLVES TO BE ONE, BUT HE MUST ALSO BE TAUGHT THE PRINCIPLES OF THE ART, BE SHOWN ALL THE METHODS OF WORKING AND ACQUIRE THE HABIT OF USING PROPERLY ALL THE INSTRUMENTS."

THAT STATEMENT CONTAINS A FIRM FOUNDATION FOR ALL THEORETICAL AND PRACTICAL EDUCATION. NO ONE NOW RESPONSIBLE FOR TRAINING ALL THE THOUSANDS OF NEW MEN COMING INTO THE ARMY CAN POSSIBLY GO WRONG BY TEACHING THEM "THE PRINCIPLES — ALL THE METHODS OF WORKING. — AND THE HABIT OF USING PROPERLY ALL THE INSTRUMENTS".

I see by the new Sears Roebuck catalog that it is still possible to buy an axle for a 1909 Model T Ford, but I am not deceived. The great days have faded, the end is in sight. The last Model T was built in 1927.

It was the miracle God had wrought. Mechanically uncanny, it was like nothing that had ever come to the world before. As a vehicle, it was hard-working, commonplace, heroic and it often seemed to transmit those qualities to those who rode in it.

The Model T was distinguished from all other cars by the fact that its transmission was of a type known as planetary — which was half metaphysics, half sheer friction. Because of the peculiar nature of this planetary element, there was always, in Model T, a certain dull affinity between engine and wheels, and even when the car was in neutral, it trembled with a deep imperative and tended to inch forward.

In its palmy days the Model T could take off faster than anything on the road. The reason was simple. To get under way, you simply hooked the third finger of the right hand around a lever on the steering column, pulled down hard, and shoved your left foot forcibly against the low-speed pedal. These were simple, positive motions; the car responded by lunging forward with a roar. After a few seconds of this turmoil, you took your toe off the pedal, eased up a mite on the throttle, and the car, possessed of only two forward speeds, catapulted directly into high with a series of jerks and was off on its glorious errand.

The driver of the old Model T was a man enthroned. The car, with top up, stood seven feet high. The driver sat on top of the gas tank, and when he wanted gasoline, he alighted, along with everything else in the front seat. The seat was pulled off, the metal cap unscrewed, and a wooden stick thrust down to sound the liquid in the well. Refueling was more of a social function then — the driver had to unbend, whether he wanted to or not. Directly in front of the driver was the windshield — high, uncompromisingly erect. Nobody talked about air resistance, and the four cylinders pushed the car through the atmosphere with a simple disregard of physical law.

There was this about a Model T: the purchaser never regarded his purchase as a complete, finished product. When you bought a Ford, you had a start — a vibrant, spirited framework to which could

be screwed a limitless assortment of decorative and functional hardware. A flourishing industry grew up out of correcting Model T's rare deficiencies and combating its fascinating diseases. You bought a radiator compound to stop leaks, a clamp-on dash light, a sun visor, and a fan-belt guide to keep the belt from slipping off the pulley. Persons of a suspicious turn of mind bought a rear-view mirror; but most Model T owners weren't worried by what was coming from behind because they would soon enough see it out in front. They rode in a state of cheerful catalepsy.

After the car was about a year old, steps were taken to check the alarming disintegration. A set of anti-rattlers was a popular panacea. You hooked them onto the gas and spark rods, the brake pull rod, and the steering rod connections.

During my association with Model T's, self-starters were not a prevalent accessory. Your car came equipped with a crank, and the first thing you learned was how to GET RESULTS. The trick was to leave the

ignition switch off, proceed to the animal's head, pull the choke (a little wire protruding through the radiator), and give the crank two or three nonchalant upward lifts. Then, whistling as though thinking about something else, you would saunter back to the driver's cabin, turn the ignition on, return to the crank, and this time, catching it on the down stroke, give it a quick spin with plenty of THAT. The engine almost always responded — first with a few scattered explosions, then with

MY LOVELY

a tumultuous gunfire, which you checked by racing to the driver's seat and retarding the throttle. Often, if the emergency brake hadn't been pulled all the way back, the car advanced on you the instant the first explosion occurred and you would hold it back by leaning your weight against it. I can still feel my old Ford nuzzling me at the curb as though looking for an apple in my pocket.

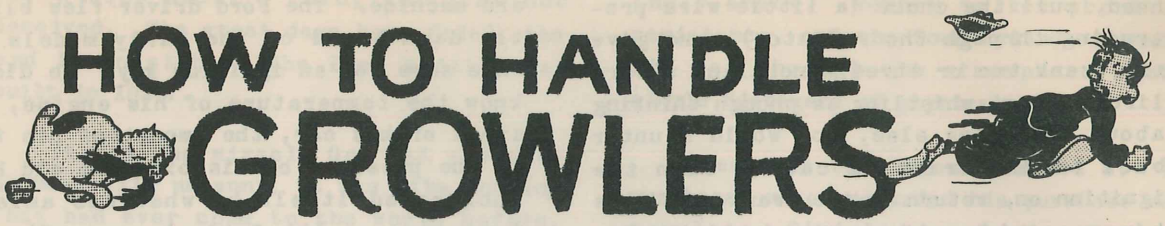
Most everybody used the reverse pedal quite as much as the regular foot brake — it distributed the wear over the bands and wore them all down evenly. That was the big trick, to wear all the bands down evenly, so that the final chattering would be total and the whole unit scream for renewal.

The lore and legend that governed the Ford were boundless. Owners had their own theories about everything; they discussed mutual problems in that wise, infinitely resourceful way old women discuss rheumatism. Exact knowledge was scarce, and often proved less effective than superstition. Dropping a camphor ball into the gas tank was a popular expedient; it seemed to have a tonic effect on both man and machine. The Ford driver flew blind, the dash-board of the early models was bare save for an ignition key. He didn't know the temperature of his engine, the speed of his car, the amount of his fuel or the pressure of his oil (the old Ford lubricated itself by what was amiably described as the "splash system"). He learned not through instruments but through sudden developments. The timer was one of the vital organs about which there was ample doctrine. Some people, when things went wrong, just clinched their teeth and gave the timer a smart crack with a wrench. Others opened it up and blew on it. There was a school that held that the timer needed large amounts of oil; they fixed it by frequent baptism. And there was a school that was positive it was meant to run dry as a bone; they were continually taking it off and wiping it. I have had a timer apart on a sick Ford many times, but I never really knew what I was up to — I was just showing off before God. I remember once spitting into one; not in anger, but in a spirit of research. You see, the Model T driver moved in the realm of metaphysics.

A Ford owner had Number One Bearing constantly in mind. This bearing, being at the front end of the motor, was the one that always burned out, because the oil didn't reach it when the car was climbing hills. (That's what I was always told, anyway.) That bearing was like a weak heart -- you could hear it knocking, and that was when you stopped and let her cool off. Try as you would to keep the oil supply right, in the end Number One always went out.

Springtime in the heydey of the Model T was a delirious season. Owning a car was still a major excitement, roads were wonderful and bad. The days were golden, the nights were dim and strange. I still recall with trembling those loud, nocturnal cries when you drew up to a signpost and raced the engine so that the lights would be bright enough to read destinations by. I have never been really planetary since. I suppose it's time to say good-bye.

HOW TO HANDLE GROWLERS



They resemble neither dog, wolf nor man; in fact nothing that is human or animated, but armature testing devices have come to be known as 'growlers'; so, to save time and space — growlers they shall be.

Many mechanics use growlers principally in testing for short circuits in armature coils. There are many additional tests that can easily be made since actual operating conditions at 3600 r.p.m. are duplicated when an armature is placed on the pole pieces of a growler with field coils connected to 60 cycle current. The magnetic lines of force through the growler poles are changing polarity at a rate of 120 times per second.

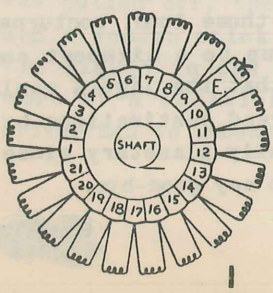
In other words, all that a growler does is supply an alternating magnetic field in which the armature to be tested is placed. Since the magnetic field is moving, current is generated in any closed circuit placed within the field.

If your growlers are not equipped with with an A.C. ammeter, a variable resistance and a pair of test prods, you can supply these units separately. The resistance and the 5 amp. A.C. ammeter should be connected in series. Connect one test prod to the remaining binding post of the ammeter and the other test prod to the remaining post of the resistance. The test meter circuit will now be: test prod to resistance to ammeter to the second test prod. This test circuit is in no way connected electrically with the growler circuit. The purpose of this additional testing equipment is to measure the current generated in the windings of the armature.

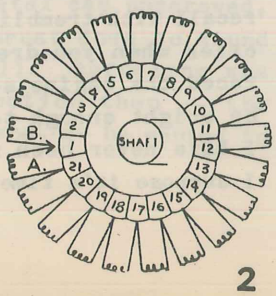
SHORT IN ARMATURE COIL

Place armature on growler poles; place a hack saw blade on the core of the armature. Turn the armature slowly, keeping the saw blade flat on the core. When the slot containing the shorted coil E, Figure 1, is brought under the saw blade, the current which is flowing in the local circuit formed by the short circuit in coil E will set up an alternating magnetic field, which will attract and repel the hack saw blade. As a result the blade will act as an ordinary buzzer and indicate that the coil in the slot is short circuited. Mark this slot with a piece of chalk. When the slot containing the other side of this coil is brought under the saw blade, the blade will again vibrate. If these two slots are the only ones in core to make the saw blade vibrate, you will know that you have only one short circuited armature coil.

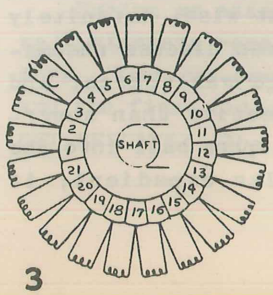
To tell with which commutator bars this coil is connected, place test prods on adjacent commutator bars. Advance the test prods progressively around the commutator, while rotating the armature



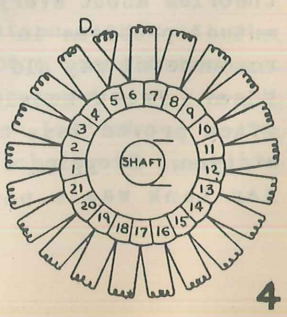
1



2



3



4

until the lowest ammeter reading is found. The lowest reading will be observed with test prods on the shorted bars 9 and 10, Figure 1. The value of the reading will depend on how many of the turns are short circuited.

In trying to locate shorted armature coils by placing the test prods on adjacent commutator bars, any evidence of broken commutator leads will be apparent from the zero ammeter reading. For example, when test prods are placed on bars 1 and 2, and 1 and 21, as in Figure 2, you get a zero reading. This will indicate that the trouble is in bar No. 1, between coils A and B.

Figure 3. Test for Open Circuit. — Saw blade test clear. When test prods are put on bars 3 and 4, the meter reading will be zero, indicating in this case an open circuit.

Figure 4. Test for Reversed Leads. — Saw blade test is clear and there are no open circuits. In making a commutator bar test with the meter, test prods on bars 5 and 6 would give the same reading as on bars 6 and 7 although coil D is reversed. To discover the reversed leads, place the test points on alternate commutator bars; that is, on 1 and 3, 4 and 6, until a zero reading is obtained. The current induced in the reversed coil D would be opposed to that in the coil connecting bars 4 and 5, and the result of the opposing currents would be a zero reading on the ammeter. Bars 5 and 7 would also give a zero reading. This indicates that bars 5 and 6 contain the reversed coil.

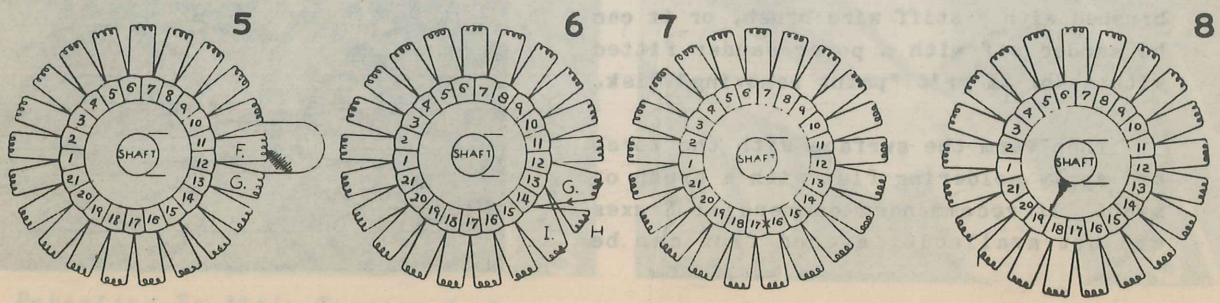
Figure 5. Test for Coil Grounded to Frame. — Saw blade test clear. Bar to bar test indicates winding is O.K. However, when points are placed on commutator bar and one on shaft, an excessive reading would be obtained. If contact were made on bar 8 and ground, for instance, we would then have four coils in series and reading would be almost four times the reading of a single coil. The fault would be located by the fact that the closer you came to bars 11 and 12, the lower the reading would be.

Figure 6. Leads in Wrong Commutator Bars. — Saw blade test clear. Bar to bar test would show a double meter reading on bars 12 to 13, normal on 13 to 14, and double on 14 and 15, indicating that the coils were right in relation one to the other but that the leads were transposed at the commutator. The alternate bar test with test points on 12 and 14 would indicate a current reading for only one coil whereas it should be for two coils. Bars 13 and 15 would give the same indication. Bars 14 and 16 would show one-third above normal, showing three coils were connected instead of two. Bars 11 and 13 would give the same indication.

Figure 7. Test for Shorted Commutator Bars. — Saw blade test would indicate a short circuit. Bar to bar test would give a zero reading between bars 16 and 17 which would indicate a short in the commutator.

Figure 8. Test for Grounded Commutator Bar. -- Saw blade indicates clear. Bar to bar test indicates clear. Commutator bar to shaft test indicates a high reading until bar 19 is approached. When bar 19 and shaft is tested a zero reading would result which indicates a ground on bar 19.

Maintenance men who are frequently required to test for causes of generator failures will find this article helpful and are urged to keep it on top for ready reference.



SHAPE with SOLDER

As long as drivers continue to argue the right-of-way with telephone poles, fences and other vehicles, this business of dinging out dents is going to be important. The fellows who straighten out the damaged parts have to use their heads as well as hammers in order to keep motor transport rolling.

Equipment for fender and body straightening starts with a hammer and a flat block of steel, and ranges on up to the large outfits of electric or air-operated hammers, hydraulic rams and complete paint spray outfits. But regardless of the equipment used, body solder plays an important part in the final job. A complete knowledge of its many uses will save you many hours on badly dented bodies.

When used to fill small dents, particularly in places where it would be necessary to remove trim panels to bump out the dent, solder saves a lot of time and does a good job. For this type of work there are solder spray guns which spray the body solder just like a paint spray gun. However, assuming that you don't all have these sprays, the accompanying illustrations give the steps used in the hand method of flowing the solder on with a torch and spreading it with a paddle.

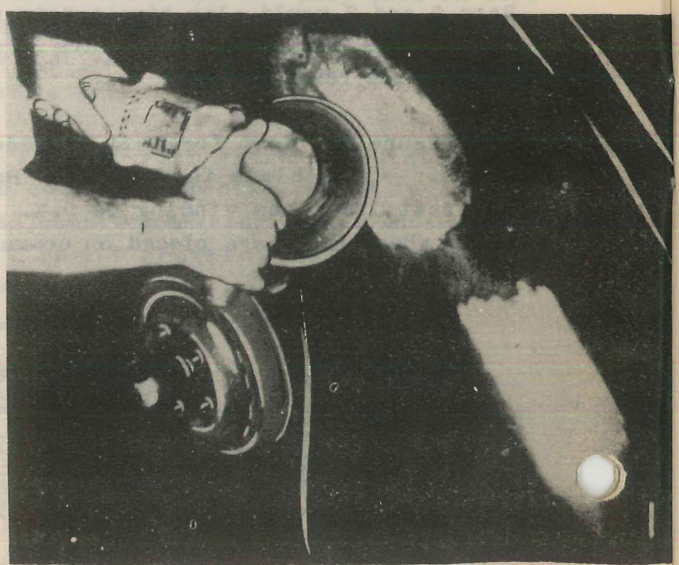
First, clean the dented area to about two inches beyond the actual dents, removing all paint, rust and grease. The paint can be burned off with the torch and then brushed with a stiff wire brush, or it can be sanded off with a power sander fitted with a No. 24 grit "paint removing" disk.

Then warm the surface with the torch and apply soldering flux with a brush or swab. If recommended commercial fluxes are not available, a good flux can be made by dissolving zinc in muriatic acid until no more can be dissolved.

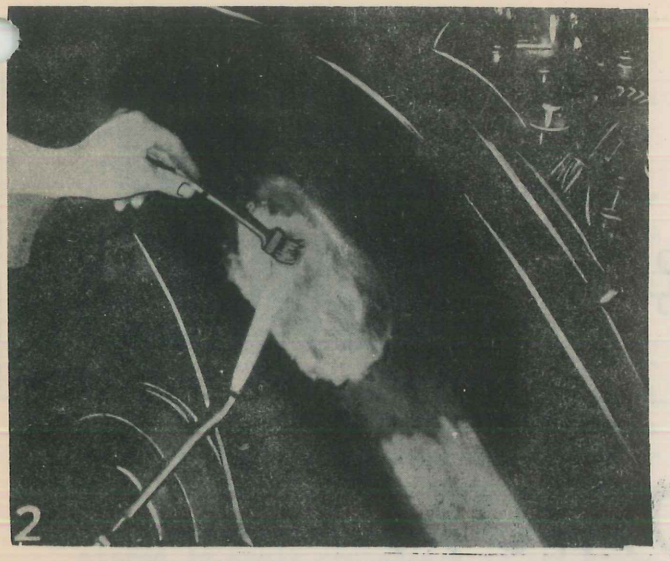
Heat the metal again until it is warm enough to take bar solder when it is rubbed against the heated metal. Apply the torch as often as required to keep the solder molten while it is being wiped over the surface with a rag. This step is known as "tinning".

After having tinned the surface as described, hold the torch in front of the dent with the flame parallel to the surface to keep it warm enough to hold the solder as it is deposited. Hold the end of a bar of body solder in the flame until the solder starts to sag. Then press it against the warm tinned surface. Continue depositing solder in this manner until the dent is filled. While doing this, keep the solder in a *plastic*, but not *molten* condition.

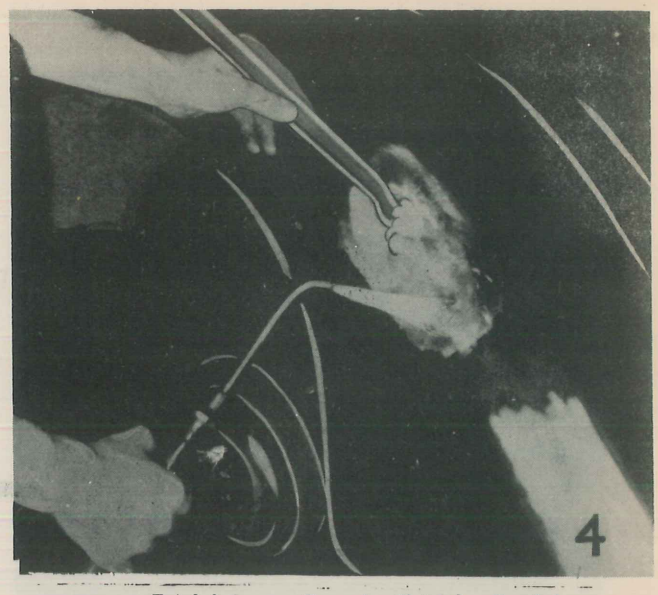
Now shape the plastic solder with a paddle to the contour of the panel. While shaping, apply heat intermittently to keep the solder plastic.



Sanding The Damaged Area.



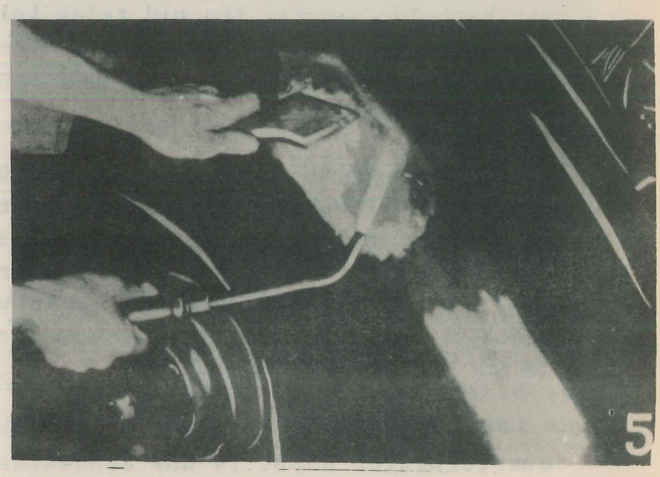
Applying Flux.



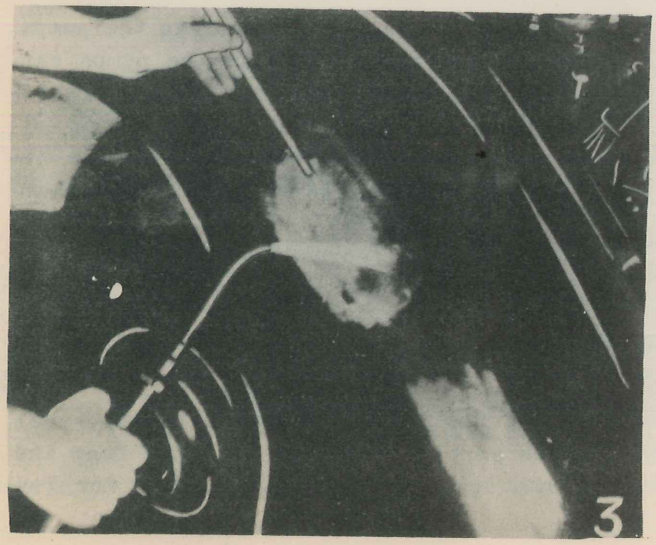
Filling Dent With Solder.

When using the wooden paddles remember to dip them frequently into light oil or tallow so that solder will not stick to them. This will also keep the paddle from burning. When "breaking in" a new paddle be sure to soak it in oil for several days so that every pore of the wood is saturated.

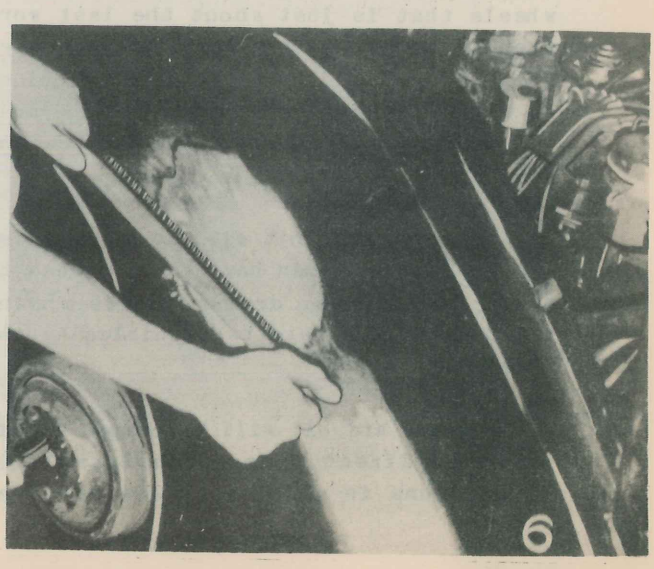
Smooth the soldered surface with a body file and continue to dress the surface as explained by "The Knack Of Ironing" on page 255 in the January 1941 'AM. Be sure to remove all traces of flux before attempting to paint or the enamel used in refinishing will not have a good bond, and will flake off.



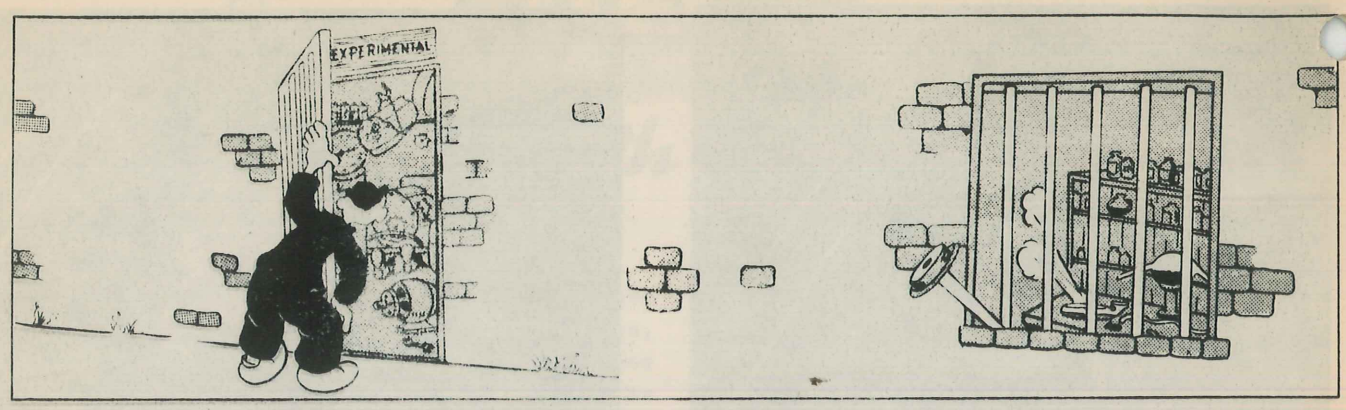
Shaping Solder To Body Contour.



Reheating To Apply Tinning Coat



Dressing Down Before Painting.



"LUBRITORIUM"

As a crystal gazer THE 'AM is maintaining a pretty high percentage of accuracy. Way back in January, the old rajah told you about a service station on wheels which could do everything for a truck but teach it to sew a button.

Only two months have lapsed since the first hint of mobile service was passed on to you. So far you've seen a mobile gas dispenser ("Gas on the Go", February 'AM); a new streamlined and powerful wrecker; and a new mobile water trailer, (March 'AM Experimental Section).

The Engineering Division of Holabird Quartermaster Depot is now conducting experiments on a trailer assembly which will be a complete lubrication station on wheels that is just about the last word when it comes to fast field maintenance. The unit can well be called "Lubritorium" on wheels because with it you will be able to perform any lubricating job in the field that can be done in the shop.

The greasing unit will be arranged so that two or more men have ready access to sufficient hoses, drums and dispensing nozzles to lubricate two vehicles at the same time.

Greases and oil will be pumped by air pressure direct from the original 100 pound drums in which they are received from the refinery, thus avoiding possibility of contamination from outside sources. Even small bearings and grease cups can be supplied direct from the hose nozzles.

Power will be supplied to the air compressor by a six horsepower gasoline engine. The engine is supplied with fuel for 5 hours continuous operation from a tank mounted right on the engine frame. The compressor is designed to deliver 200 pounds of air pressure per square inch but will use only 150 pounds per square inch to operate all three of the pumps which are expected to be in use at any one time. The engine can be started either by a hand crank or if preferred, by the rope and pulley method.

Hoses from the compressor to the pumps will be seven feet long so the pumps can be placed on cans arranged on the ground beside the trailer. This method of operation may be followed at all times in permanent stations to minimize loading and unloading the heavy drums on the trailer. The supply of lubricants in the trailer itself will be used only when the trailer must be operated at places distant from points of supply.

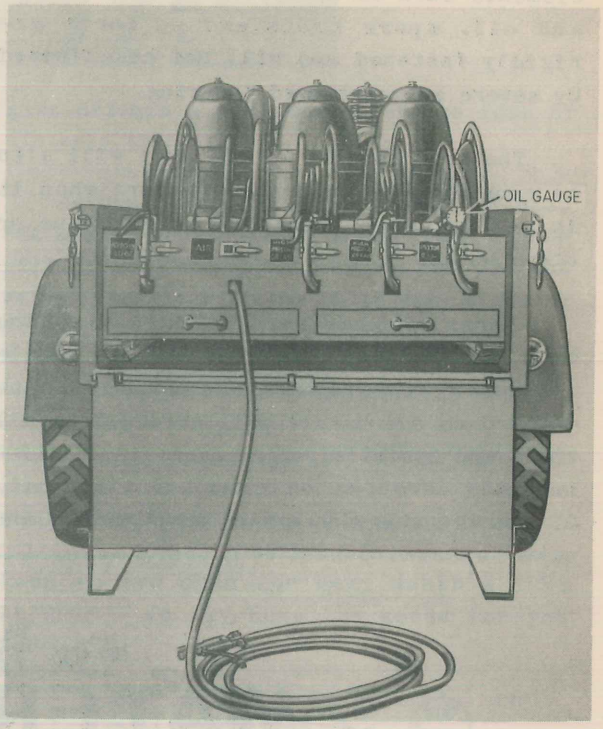
Of the four air pumps (barrel type) which supply the lubes straight from the drums, two are of low pressure for the

light lubes and one is high pressure for the heavy greases. The fourth pump is a spare high pressure pump which is only for use if the high pressure pump goes wrong. All are provided with an injector for anti-freeze to prevent the moisture in discharged air from freezing when operating in low temperature zones.

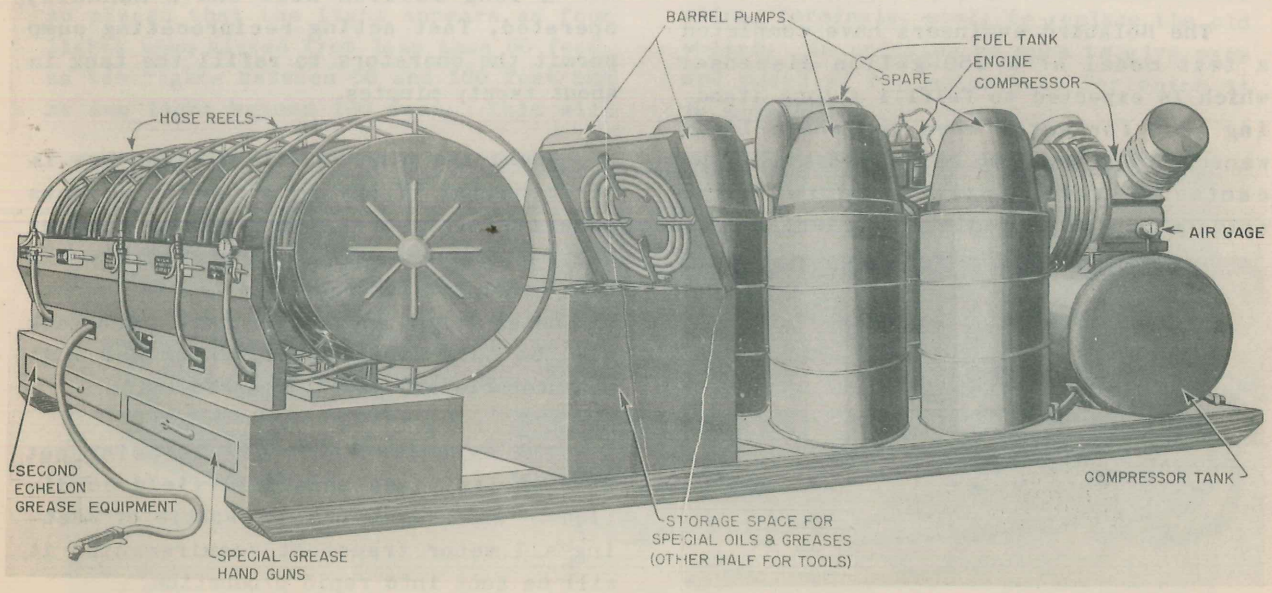
To maintain a normal ratio of lubricants the unit will mount three 100 pound drums of engine oil, two 100 pound drums of gear oil and one 100 pound drum of heavy grease. Special lubricants such as water pump grease, kerosene, etc., will be stored in small containers in the spare parts and tool box.

Each of the five hose reels will carry 30 or more feet of hose which is specified to withstand up to 17,000 pounds of pressure per square inch. The air hose to be used for tire pumping, blowing out stoppages and so forth will be fifty feet long and will be supplied with a pressure regulating chuck for accurate measurement.

The entire assembly will be securely mounted on longitudinal steel channel beams and bolted to sturdy oak skids. This arrangement makes it possible to slide the greasing unit over the ground or to 'manhandle' it if circumstances prevent the use of the trailer. It is entirely independent of the trailer in every phase of its operation.



Ordinary travel up to 50 m.p.h. over hard surfaced roads will be pie to this outfit. In fact, it is so well balanced that if sensibly maneuvered it will follow the convoy over any terrain considered passable for the other trucks without any



fear of tipping over. All demountable elements such as drawers, drums of grease and oil, spare tools and so forth are rigidly fastened and will not be affected by severe and continued jouncing.

The self balance of the unit will also be considered a desirable feature when it is necessary to transport it by crane or other hoist.

Foresight has been used in planning even the smallest detail of the new mobile greaser. A large accessory box to be mounted as a sub-unit will accommodate all tools and essential spare parts in addition to small cans for kerosene and light oil, 25 pound pails for water pump grease and other special lubes, a battery water kit and extra hose for emergency repairs.

Of course there will be an accessible carbon tetrachloride type of fire extinguisher mounted on the trailer.

In the event of a complete failure of the power unit, hand operated grease guns which will be fastened in a drawer can be used. The hand grease pumps and automatic dispensing nozzles are all of the latest approved type.

Every part of the greasing unit will be standardized so that replacements can be ordered by number when necessary, and easily installed. The apparatus weighs less than 2000 pounds and will fit neatly into a standard one ton trailer.

Well, here it is. Once again THE 'AM keeps a promise and comes through with details of the new water trailer which was pictured on page 329 of the last issue.

The Holabird engineers have completed a test model of a 250-gallon dispenser which is expected to fulfill a long standing need for water when and where it is wanted. The new job is fitted with four canteen filling spigots and two large spigots for quick radiator replenishment.

All of the spigots will be enclosed for cleanliness and self-closing for rapid manipulation.

A long suction hose and a manually operated, fast acting reciprocating pump permit the operators to refill the tank in about twenty minutes.

Among its other desirable features is the mounting of the tank and its various accessories on a regular one ton trailer chassis whose parts are interchangeable with other standard one ton trailer parts. The total weight of trailer and loaded tank will be only 3600 pounds, which makes it maneuverable and easily "manhandled".

The experimental model is being put through its paces under all field conditions. When it is proved capable of meeting all motor transport requirements, it will be sent into rapid production.

BLACKOUT BRIEFS

Here's the dope we promised last month on the new rear black-out light. We were mistaken in calling it a sealed *beam* unit because the source of light is an ordinary bulb, not a true sealed beam. The rear light consists of two sealed units, each containing a bulb, filter, baffle and lens, which can be replaced independently when necessary. In optical principle the lamp is the same as the old one described on page 227 of the December 'AM. The new rear sealed units can be used in the old rear lamps by replacing the lamp door.

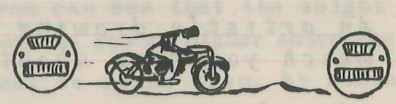
The front lamps remain the same except for a new type door.

Instead of a louvre which the old lamps had, the new rear ones cut off the angle of vision by baffles within the units. These baffles are set within the sealed units at a predetermined distance from the light source to give the angle desired.

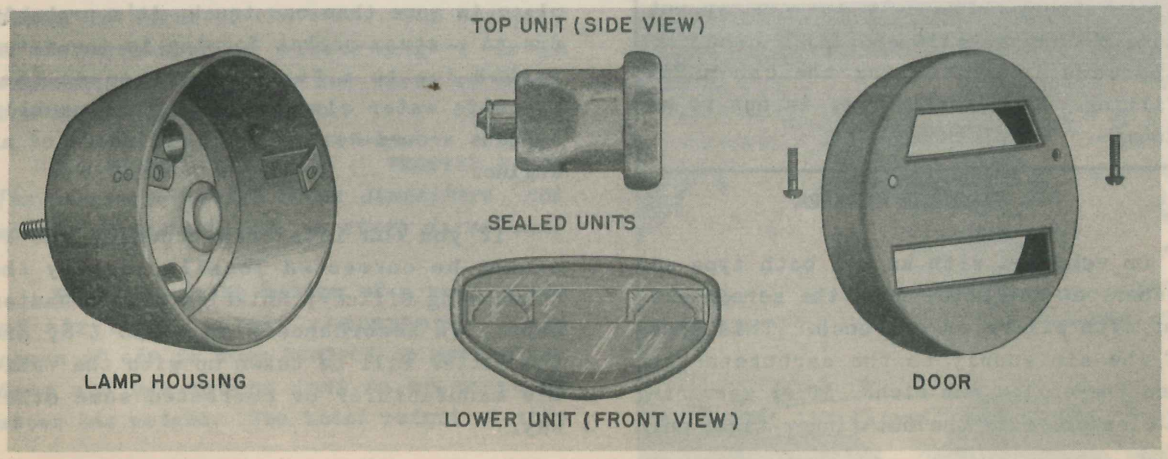
The new units still have a stereoptic effect, but the distances at which the effect becomes noticeable have changed slightly. The field of the front light is divided into two parts, which appear to an observer as two lights under 60 feet, and one light over 60 feet. The field of the rear tail light is divided into four parts, so placed that the light appears as four lights when viewed from less than 60 feet, as two lights between 60 and 180 feet and as one light beyond 180 feet. This will give drivers a much more accurate idea of distance than the old lights.

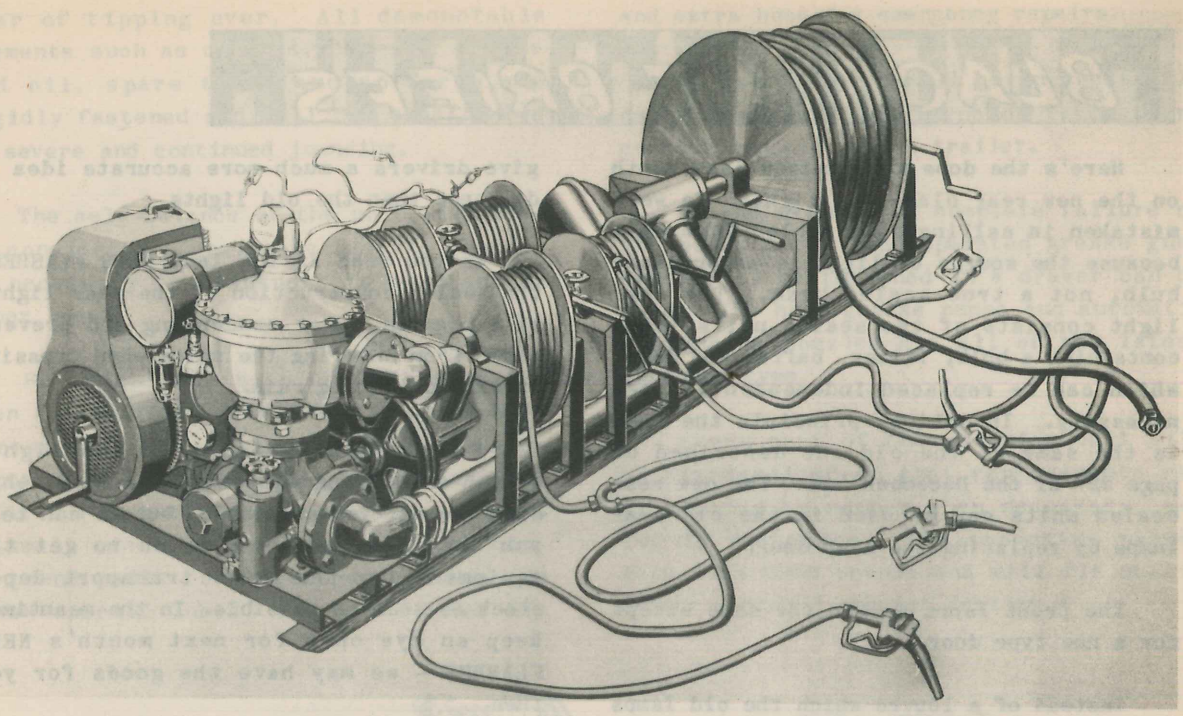
As you read in the last NEWS FLASHES, the sealed construction of the rear lights will prevent water condensing and prevent water from entering the units when crossing streams or during rain.

Procurement details on the light, switch and wiring equipment for 1940 vehicles are not yet available, but we can tell you that the pressure is on to get the equipment for the motor transport depot stock as soon as possible. In the meantime, keep an eye open for next month's NEWS FLASHES - we may have the goods for you then.



Old blackout light switches on motorcycles, which were unsatisfactory, are being replaced with a new switch. This new switch is being produced by the Delco-Remy Division of the General Motors Corporation and supplied to the motorcycle manufacturers. All defective switches should be replaced with this new type. It is available from the motorcycle manufacturer in kit form and includes all necessary screws, clips, terminals, etc., to replace the old switch. In ordering be sure to give make and model of the motorcycle for which it is intended.





An artist's drawing of the new mobile gas dispenser which you read about on page 283 of the February 'AM.

There has been some confusion about the amount of gasoline that the new rectangular gas cans will hold. The cans contain exactly five gallons when filled to the bottom threads of the filler opening.

A regulation of the Interstate Commerce Commission (I.C.C.), requires that the total capacity be stamped on the cans. This number may vary from 5-1/5 to 5-3/4-gallons but should not be referred to in keeping a gasoline record or inventory. The only way you can put more than five gallons of fuel in any of the cans is by tilting the can while filling. This, of course, is not to be done.

OIL BATH AIR CLEANER

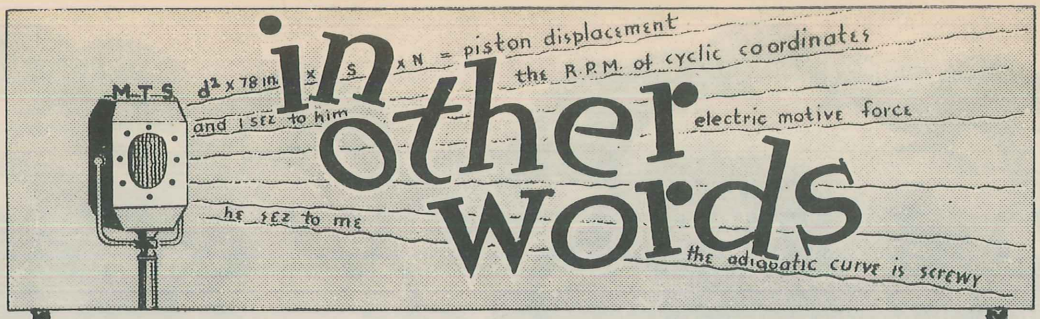
On vehicles with an oil bath type air cleaner, do not screw down the screen element with pliers or a wrench. This shuts off the air supply to the carburetor and makes the engine run rich. After servicing the cleaner, make the nut finger-tight only.

WE'VE HEARD

that quite a number of one type of new vehicles are showing up in repair shops with cracked cylinder heads and blocks. Outside of freezing and some operating fault, this damage may be caused by: A sticking thermostat, or one that slipped off its shoulders and out of position, creating enough steam pressure to do the damage. Check the operation and location of the thermostat and correct defect noted.

If the crack is appearing in the same place in more than one truck, it's probably due to a steam pocket forming in the water jacket due to a "trap" in a recess that prevents water circulation. This usually happens around Nos. 5 and 6 cylinders of an engine.

If you run into this trouble, and it cannot be corrected locally, notify the Commanding Officer, Holabird Quartermaster Depot, in accordance with MTTSB Z-5, and the matter will be taken up with the vehicle manufacturer or corrected some other way.



EACH MONTH WE WILL PRESENT AN UNDERSTANDABLE DEFINITION OF WORDS FREQUENTLY USED IN VARIOUS TECHNICAL PUBLICATIONS.

AMPERE.- WEBSTER SAYS: *An ampere is the practical unit of intensity of electric current, being that produced by one volt acting through a resistance of one ohm.*

In other words, an ampere is a standard international unit for measuring the flow of electric currents, just as the inch is a standard unit for measuring lengths. We hope you are all familiar with the inch.

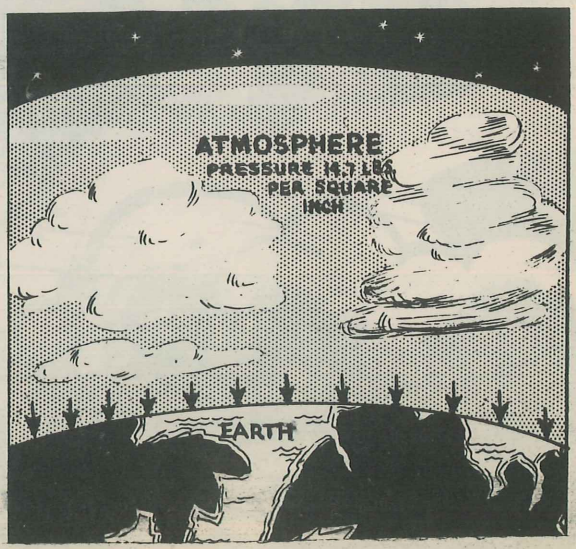
AMPERE-TURNS.- WEBSTER SAYS: *A unit of magnetomotive force. It is the magnetomotive force around a path that links with with one turn of wire of a helical coil carrying an electric current one ampere strength.*

In other words, an ampere-turn is a unit of measure of magnetic force. The inch is a familiar unit for comparing lengths, and the ampere, the unit for measuring electric currents. In a like manner, the ampere-turn is a unit of measure for comparing the magnetic force developed by passing electric current through a wire wound around a bar. To find the ampere-turns of any electric magnet, you multiply the number of amperes of current flowing through the wire by the number of turns of the wire. For example, if the current of an electromagnet is 10 amperes, and there are 300 turns of wire, the ampere-turns are 3000.

ATMOSPHERIC PRESSURE.- WEBSTER SAYS *The pressure exerted by the atmosphere, not merely downwards, but in every direction.*

We live at the bottom of a vast ocean of air known as the atmosphere. This ocean of air is some hundred or more miles deep and has weight just as an ocean of water has weight. The total weight of this ocean of air is enormous, almost unbelievable. The weight of this air presses on the ground, on the leaves of the trees, on the roofs of buildings, on you. But you do not feel this tremendous pressure, and it does not crush our buildings, because it is acting in every direction at once. The upper air presses down on the air beneath it and this weight forces the lower air to spread out in all directions, thus exerting a pressure not only towards the earth but in every direction. From this you can see that the weight of air decreases as you go higher above the earth.

What we mean, then, by atmospheric pressure is the weight of a column of air one inch square in cross section, extending from the ground up through the atmosphere. At sea level, such a column of air weighs about 14.7 pounds. Then, this page, which contains approximately 84 square inches of surface, supports 1234.8 pounds of atmosphere when held horizontally. Sounds unbelievable, doesn't it? The reason you can hold the page with all of this weight on it is because there is the same pressure on the bottom pressing upwards as there is on the top pressing down, and there is the same pressure per unit of surface pressing on the thin edges from all sides.




YESTERDAY

IF YOU GOT EXCITED ABOUT "GOODBYE TO SPIT AND POLISH", PAGE 330, MARCH 'AM, HERE'S SOME MORE DEFINITE INFORMATION FOR YOU ON OBTAINING THE LUSTRELESS PAINT. THE PURCHASING AND CONTRACTING OFFICER, HOLABIRD QUARTERMASTER DEPOT, BALTIMORE, MARYLAND, HAS ENTERED INTO AN INDEFINITE QUANTITY CONTRACT #W-398-QM-8694 (#1135) WITH THE PITTSBURGH PLATE GLASS COMPANY (PAINT DIVISION), 2 CHESTER AVENUE, NEWARK, NEW JERSEY, FOR THE SUPPLY OF SYNTHETIC, OLIVE DRAB, LUSTRELESS ENAMEL, IN ACCORDANCE WITH SPECIFICATION ES-NO. 474, DATED JUNE 28, 1940. THIS CONTRACT IS IN FORCE UNTIL JUNE 30, 1941. ANY STATIONS REQUIRING THIS PAINT AND DESIRING INFORMATION CONCERNING PRICES AND DELIVERY MAY COMMUNICATE WITH THE PURCHASING AND CONTRACTING OFFICER, HOLABIRD QUARTERMASTER DEPOT, BALTIMORE, MARYLAND, OR THE OFFICE OF THE QUARTERMASTER GENERAL, PENDING PUBLICATION OF THE CONTRACT BULLETIN.

CIRCULAR 1-10, PARAGRAPH 6, HAS BEEN REVISED TO CHANGE THE DEFINITION OF EXPENDABLE AND NON-EXPENDABLE ITEMS OF MOTOR TRANSPORT EQUIPMENT — WHICH SHOULD KILL ONE OF THE MOTOR TRANSPORT HEADACHES. MOTOR VEHICLES, BICYCLES AND AUTOMOTIVE MACHINERY ARE NON-EXPENDABLE. THE REVISION INCLUDES A LIST OF "RECOVERABLE" EXPENDABLE ITEMS, AND TELLS WHAT TO DO WITH UNSERVICEABLE "RECOVERABLE" ITEMS. GET YOUR COPY OF THE CHANGE AND READ ALL ABOUT IT!

TECHNICAL MANUALS 10-510 "THE MOTOR VEHICLE", 10-540 "AUTOMOTIVE LUBRICATION", 10-545 "MOTOR TRANSPORT INSPECTIONS", AND 10-570 "THE INTERNAL COMBUSTION ENGINE", PREPARED UNDER DIRECTION OF THE QUARTERMASTER GENERAL, ARE NOW BEING DISTRIBUTED. TM 3-250 "STORAGE AND SHIPMENT OF DANGEROUS CHEMICALS" IS ALSO BEING DISTRIBUTED. THESE MANUALS CONTAIN THE LATEST WORD ON THEIR SUBJECTS — SO READ 'EM AND KEEP UP-TO-THE-MINUTE.

TECHNICAL SERVICE BULLETINS WILL SOON BE ADDED TO AND REVISED BY CHANGE 14, WHICH WILL CONTAIN DOPE ON BENDIX-WEISS UNIVERSAL JOINTS; REPORTING DEFECTS AND DEFICIENCIES IN NEW VEHICLES, AND BREAKING IN VEHICLES AND UNLOADING THEM FROM CARS; AND ADJUSTING THE END PLAY IN FRONT AXLE SHAFTS.

THIRD ECHELON UNITS WILL FIND PLENTY OF INFO IN A NEW TENTATIVE GUIDE AND REFERENCE FOR QUARTERMASTER LIGHT MAINTENANCE UNITS JUST OFF THE PRESS. IT'LL SOLVE MANY OF YOUR PROBLEMS, AND MAKE MAINTENANCE WORK A LOT EASIER.

A MOTOR REPAIR SHOP MANUAL, SUPERCEDING "REGULATIONS GOVERNING THE INDUSTRIAL ACTIVITIES AT MOTOR REPAIR SHOPS OF THE QUARTERMASTER CORPS" HAS AN EASIER TITLE, PRAISE BE!, AND WE THINK YOU'LL FIND IT HANDIER TO USE. AS FAR AS WE CAN SEE IT TELLS MOST EVERYTHING ABOUT A MOTOR REPAIR SHOP.

IF YOU WANT ANY OF THESE PUBLICATIONS, YOU'LL HAVE TO REQUISITION THEM THROUGH OFFICIAL CHANNELS. SORRY, BUT **THE 'AM** CANNOT ACT AS A DISTRIBUTING AGENCY.

APRIL

motor transport courses

It might prove of interest to officers sending enlisted men to the Quartermaster Motor Transport School to read the following excerpts from a bulletin recently issued by the School:

There are two main enlisted men's courses given by the school - the basic automotive mechanics' course (two months) and the specialist mechanics' courses.

BASIC AUTOMOTIVE MECHANICS COURSE

This course is intended to train a man as an apprentice mechanic. The course consists of laboratory and classroom work. Lectures and practical work are given in disassembling and reassembling such major units as the engine, clutch, transmission, transfer case, front and rear driving axles, etc., and thorough lubrication and servicing of the vehicle. When a student completes this course, he should be able to perform unit replacement, such as replacing the engine, clutch, universals, carburetor, generator, radiator, etc. He should be able to locate and correct common difficulties in fuel feed and ignition systems, install cylinder heads and cylinder head gaskets, grind and adjust valves. A student taking this course will not become competent in the more exacting jobs but he should always be able to render *intelligent* assistance in practically any motor maintenance and overhaul operation.

SPECIALIST MECHANICS' COURSES

Students detailed to take these courses should have previously completed the basic course at this school, or a similar school, or have had at least one year's experience as an assistant to a general automotive mechanic in a shop where all the usual vehicle repairs are made. The subjects included in this course are too numerous to break down under their headings, but we will give you the title of the course. Each of these courses usually lasts for three months.

Engine Specialist.
Chassis Unit Specialist.
Carburetion and Electrical Units.
Motorcycle.
Welding and Blacksmithing.
Sheet Metal and Radiator Repair.
Machinist.
Inspection and Foremanship.

We recently received a letter from a motor officer containing the following:

"In the February 15, 1941 issue of THE 'AM, I read with interest the suggestions for improvement of present cabs and truck bodies. I'm very much in favor of a modification in the tail gates.

"Why can't we also have a guard for windshields of winch trucks? I suggest a grill something like the one in front of radiators only with cross grills as well. The grill should be of such width that it completely covered the windshield and could be put in place by setting it on the hood against the hood hinges and hooking it over the windshield wiper brackets at the top. A man sitting in a cab letting out the clutch to pull a load close to 10,000 pounds on his winch is taking his life in his hands. If the

cable should be defective or if it should slip, I don't want to be sitting behind a windshield when that heavy chain and hook starts flying through the air. We have had one case of a chain breaking on a gradual pull already. The links started spitting fire and snapped, the cable moved like a blacksnake whip, but fortunately no one was in its path."

Two ways of minimizing possible dangers of this kind are contained in Motor Transport Technical Service Bulletin Z-10. The first is that the soft iron shear pin should never be replaced by cold steel rivets, bolts, etc. The shear pin has a definite purpose: to prevent overloading the winch. Shear pins have a tensile strength less than that of wire rope originally on the winch, so if the rope is in good condition the shear pin should give first if the winch is overloaded.

This brings us to the second precaution: keep the wire rope free of kinks, bends and chafing. If you don't, its tensile strength will be less than that of the shear pin, and a heavy load may snap it.

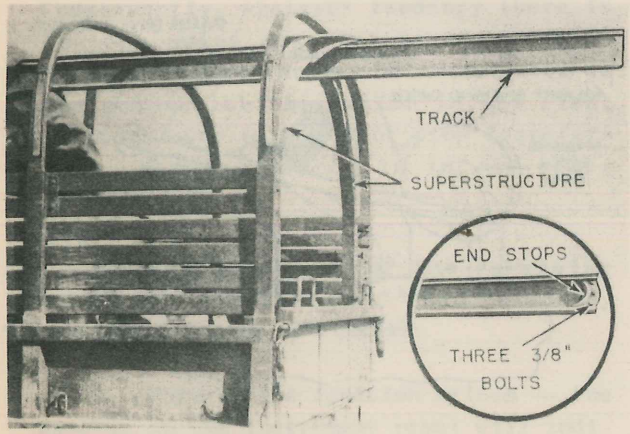
MTTSB-Z-10 contains good dope on truck mounted winches — why not read it for a "refresher"?

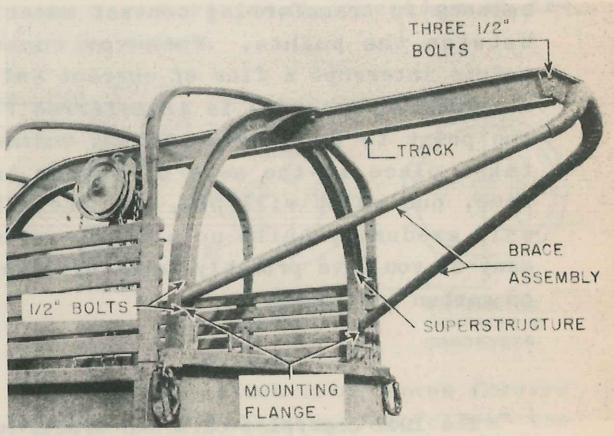
Major Alfred B. Denniston writes in to direct attention to a slightly confused paragraph in "A Guide Through the Maintenance Maze", in the January 'AM.

Headed "Engine Overhaul", the paragraph reads, in part, "...,so the Division Motor Officer makes out WD QMC Form No. 504 (Job Order Requisition)".

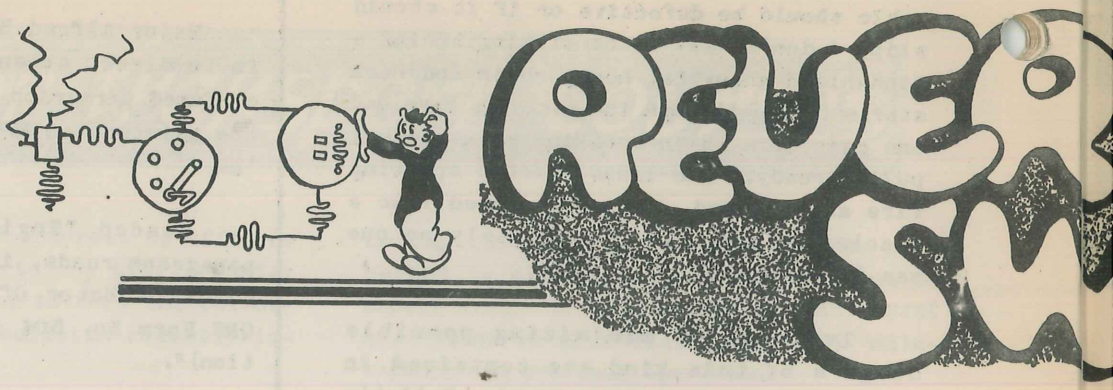
Actually, the form used for the purpose stated is WD QMC Form No. 500 (Request for Job Order). Please make this change in your copy of THE 'AM and also change number in the corresponding block on the chart.

A NEW SUPERSTRUCTURE





Two views of the superstructure showing the general appearance of the assembly before and after the new brace has been added. It takes only a glance at these pictures to realize how much added strength the brace supplies.

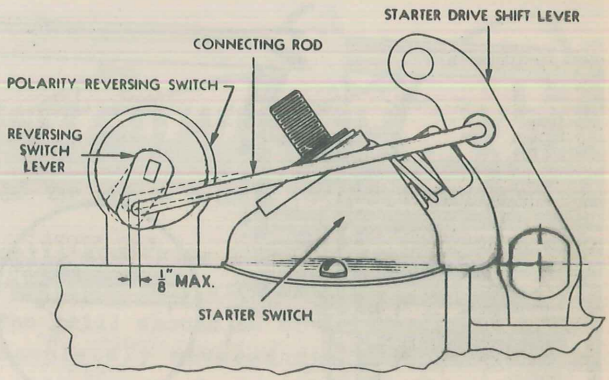


Probably the distributor contact points get more attention than any other part of the ignition system. This is reasonable because they see plenty of action, operating 12,000 times every mile on an eight cylinder vehicle. At 60 miles an hour, they are opening and closing 200 times every second. If the points are not making good contact every time they close, if they are closing early or late, or are remaining closed too briefly, the ignition system is not functioning properly, the energy of the spark will be cut down, timing will not be right, and the engine will not have the pep and power it should have.

Point pitting is produced by a lack of balance in transferring contact material between the points. Whenever contact points interrupt a flow of current and an arc occurs, material is transferred from one point to the other. If the transfer takes place in the same direction each time, one point will pit, and the other will gradually build up a little mound. Many of you have probably seen this happen on carbon arc lamps.

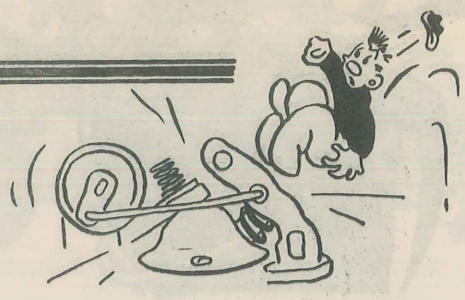
HOOK-UP

The 1941 Chevrolet cars and trucks have a polarity reversing switch that reverses the flow of current through the points each time the cranking motor is used. The reversing switch is connected into the ignition circuit as shown in the wiring diagrams. The distributor breaker plate to which the stationary contact point is assembled is completely insulated from the housing and is electrically connected through an insulated terminal to one of the switch terminals. The breaker lever contact point is connected through the breaker lever spring and through the usual insulated terminal of the distributor to a second terminal on the reversing switch. The third terminal on the switch is connected to the ignition coil. The stationary point is connected to the coil primary terminal and the breaker lever point is connected to the ground — both through the reversing switch. The wiring diagrams show the two directions of current flow.

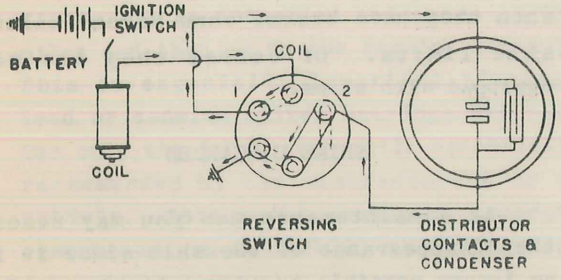


Schematic Diagram Showing How Reversing Switch Is Operated.

SING WITCH



The reversing switch is linked to the cranking motor shift lever. When the cranking motor is operated, the reversing switch is also operated and the contactors in the reversing switch are all shifted around 60 degrees. In this position the stationary point becomes grounded and the breaker lever point becomes connected to the coil primary terminal — again both through the reversing switch. This reverses the direction of current flow through the contact points as shown by the arrows. Consequently, whatever tendency there is for the point material to transfer is equalized; whatever may be transferred to one point with the switch in the first position over a period of time transfers back when the switch is in the other position.



Proper operation of the reversing switch is important, and when necessary should be checked as follows:

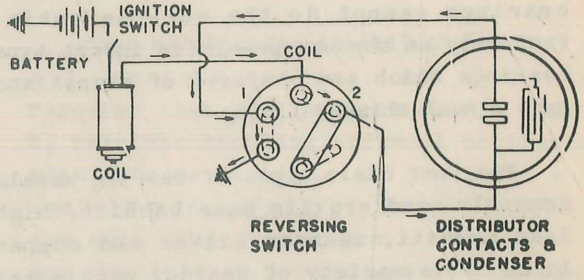
1. Turn on the ignition switch — the ammeter on the instrument panel will indicate the ignition load.

2. Slowly push down on the starter pedal while watching the ammeter. As the pedal is partially depressed and the reversing switch begins to operate, the ammeter indicator will return to zero.

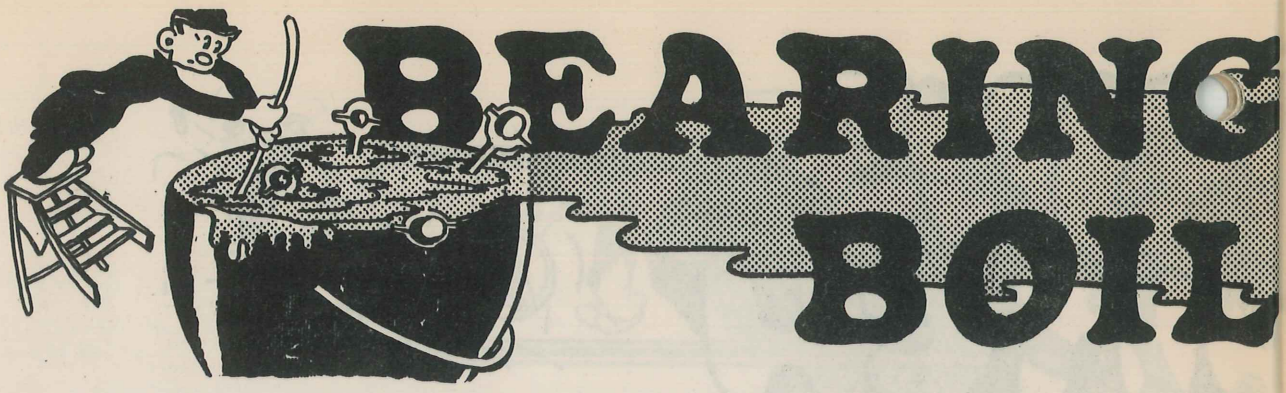
3. Continuing to depress the starter pedal completes the primary ignition circuit through the reversing switch — this will cause the ammeter indicator to register as in paragraph 1.

4. Additional movement downward on the starter pedal will cause the reversing switch to "click", and the ratchet locks into the closed circuit position.

5. Note the exact position of the switch lever when this "click" is heard. This lever must not move forward more than 1/8" after the "click" is heard until the starter switch is contacted and the engine cranking begins. The 1/8" measurement is taken in a horizontal direction at the reversing switch.



6. If the switch lever moves forward more than 1/8" following the "click" the connecting rod should be shortened by bending it slightly at the center. Check operation and measurement after bending to be sure adjustment is correct.



In recent years engine bearings have undergone radical changes that have puzzled mechanics principally because the changes have been explained in highly technical language which is difficult for the average mechanic to follow.

You are probably familiar with the old type of engine bearing that was loosely described as babbitt. Some of these old type bearings were made of a bronze shell with a babbitt lining about an eighth of an inch thick which was spun or poured into a connecting rod forging, while in others the lining was poured directly into the tinned connecting rod. Fitting these bearings and the necessary shims so that they operated quietly and efficiently was considered the peak of the mechanic's art.

BEARING PRESSURES TREMENDOUS

In modern engines the bearing loads have increased from 800 to as much as 2500 pounds per square inch. The speeds at which the crankshaft operates have increased tremendously and the old type bearings cannot do the work as satisfactorily as the new precision insert type bearings which are composed of alloys and have a much thinner lining.

The four basic types of bearing metals commonly used are tin base babbitt, high lead babbitt, cadmium silver and copper lead. This variety of bearing metals was used because, so far, there is no universal bearing material — that is, one material which is best for all engines. There may be as many as eleven different types of bearings used in one engine.

Most modern engine bearings are of the removable type and consist of from .0015 inches to .030 inches of bearing material facing a bronze or steel casting. The really thin bearing (.0015) is so new that it might still be called experimental. They are precision bearings — that is, they fit when installed. There is no adjustment, and the bearings are discarded when they have become worn beyond allowable limits. Of course they are not equipped with shims.

SHIMS DISCARDED

As a maintenance man you may resent the disappearance of the shim since it is no longer possible to adjust bearings. You may not realize it, but shims were only a means by which manufacturers could get by with crankshafts that were not nearly so accurate as they have to be today. He simply used shims to take up the inaccuracies.

Modern engines designed for high speeds and heavy loads require bearings with tolerances of .00025 inches, which in turn require extremely accurate lubrication, so naturally shims have to be abandoned.

Bearings must now be fitted with a specified clearance which is right from the start and must remain so; if not, the bearings may suddenly fail.

Although it is possible to adjust bearings to a specified clearance by the use of shims under certain conditions, it is a long and tedious process and more often than not results in eventual bearing failure. To obtain this clearance it is

FACTS ED DOWN

more satisfactory in the long run to install new precision-made bearings than to attempt bearing adjustment. This is especially true because shims also have been found to distort the bearings which they were intended to adjust.

In either a new truck or one in which bearings have been replaced, change lubricating oil at 500 miles and again at 1000 miles and then go to the regular schedule. This is especially important if copper lead or cadmium silver bearings are used. Use only the lubricating oils specifically recommended by the manufacturers of the vehicle. This point should be carefully remembered and faithfully checked on each job.

KEEP THE OIL CLEAN

The oil filter and air cleaner must be kept at top efficiency. Clean oil is more important than ever because modern bearings, having thinner linings, cannot withstand foreign material imbedded in the bearing liner.

Keep the oil pressure up to the recommended pounds per square inch. If the engine is permitted to operate with the oil pressure low, it may suddenly fail. In any event it will shorten the life of the bearings.

A slight drop in oil pressure may not seem so important, but when you consider that the back pressure in the oiling system does not decrease when the oil pressure does, you can see the correct oil pressure is vital if the bearings are not to be starved through lack of oil.

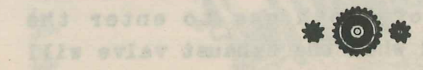
CORRECT CLEARANCE IMPORTANT

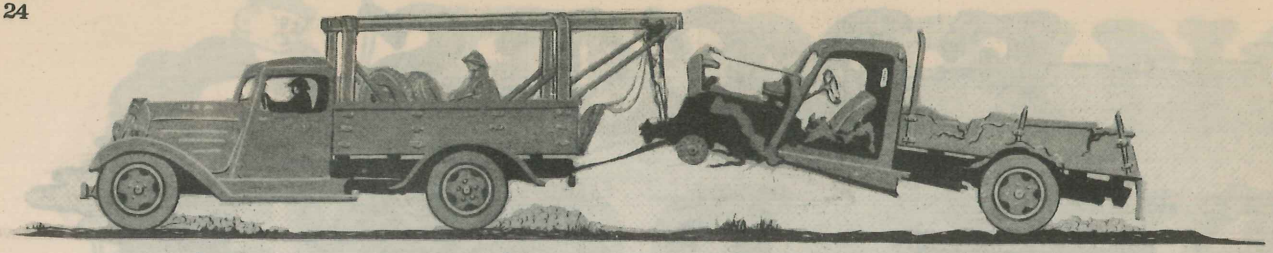
When replacing bearings, make sure that the proper bearing is used. Always re-install the same kind and size of bearing as the one removed. Make sure the work and immediate surroundings are clean. Many bearings are ruined by abrasives from valve grinding and cylinder reconditioning. The lives of others are shortened by various other grits encountered in a dirty shop.

Make sure that the bores are round, they may have been distorted by some form of abuse. If they are not round, it becomes necessary to fit an undersize or semifinished bearing and bore it to size.

Make sure that there is no misalignment of the parting surfaces of the connecting rod and cap. Use the proper tension wrenches on every bearing tightening operation. You may cause misalignment if you use an ordinary socket on the connecting rod nut that bears against the cap.

Test all bearing installations with an oil pressure tester. And above all remember that bearings are easily ruined by careless handling and must be treated with extreme caution. If you check each operation carefully, your replacement job will stay in service. Otherwise it may come back at you because of some minor slip up which could have been avoided with a little extr attention.





HELP!

The following charts and text are based on material recommended by the General Motors Corporation. They contain very useful information, and if you study the charts, you'll get dope that will help you plenty in your maintenance work.

PREVENTIVE MAINTENANCE WORK SHEET
GASOLINE TRUCK AND TRACTOR HEAVY DUTY "A" SERVICE
To be Performed at Each 1,000 Miles or 30 Day Interval

OWNER _____ MODEL AND CHASSIS No. _____ DATE _____

ADDRESS _____ MILEAGE _____ TRUCK No. _____ R. A. No. _____

(✓) O. K. (X) ADJUSTMENTS MADE (O) REPAIRS NEEDED

ITEMS OF ADJUSTMENT AND LUBRICATION

1. Clean and adjust spark plugs. (See Instruction Manual for Gap Spacing).
2. Clean and adjust distributor points. (See Instruction Manual for Point Spacing).
3. Check ignition timing, oil distributor wick and fill distributor grease cup.
4. Tighten starter switch, ammeter, distributor and coil connections.
5. Adjust fan and compressor belts (not too tight).
6. Tighten water pump gland nut and hose connections.
7. Clean fuel pump strainer, bowl and carburetor strainer.
8. Tighten cylinder head, (use torque wrench), manifold, governor and carburetor flange bolts.
9. Adjust valves (see Instruction Manual for clearance). (Is overhead getting oil)
10. Adjust carburetor (set with vacuum gauge when possible).
11. Lubricate chassis according to lubrication chart.
    (a) Oil and inspect pedal controls, choke, carburetor linkage, door hinges and locks.
12. Check front wheel bearings, adjust if necessary and inspect steering knuckle pins for looseness.
13. Adjust clutch pedal for clearance.
14. Tighten transmission case and bell housing bolts.
15. Tighten front spring U-bolts.
16. Tighten all wheel nuts.
17. Tighten axle shaft nuts or flange bolts.
18. Inflate tires and adjust front wheel toe-in. R.F. _____ lbs.; L.F. _____ lbs.; L.R. _____ lbs. Spare R.F. _____ lbs.
19. Take hydrometer reading—all battery cells: 1 2 3 and fill with distilled water.

ITEMS OF INSPECTION

20. AIR HYDRAULIC AND BOOSTER BRAKES. Lubricate all fluid or air line connections—check line pressure (air) check master cylinder fluid level (hydraulic), check booster cylinder alignment and fluid level.
21. Inspect universal joints for looseness.
22. Drain air tanks (air brake equipment).
23. Check differential lubricant level; add lubricant if necessary. Examine for oil leak at pinion or worm.
24. Check transmission lubricant level; add lubricant if necessary. Examine for oil leak—front and rear of transmission.
25. Check body or cab hold down bolts for looseness.
26. Inspect radius rods.
27. Inspect rear spring U-bolts and alignment clips.
28. Check play in steering wheel.
29. Check parking brake—adjustment not included.
30. Inspect drag link and steering arms for looseness and out-of-alignment.
31. Check generator mounting and pulleys for looseness.
32. Check crankcase oil level.
33. Inspect radius rod hold-down bolts.
35. Check and record:
    Oil pressure _____
    Charging rate _____
36. Check gas gauge, air gauge, heat indicator, horn.
37. Test all lights.
38. Fill radiator with water or check anti-freeze as necessary.
39. Check all doors, door locks, and window regulators.
40. Check condition of fenders, running boards, splash aprons, etc.
41. Road test vehicle—check brakes—application valve—speedometer—and note general condition.

Why tune an engine?

Why align front wheels?

Neglect of the following will frequently cause road failures; therefore operators not using the Extended Preventive Maintenance Plan should be guided by the following:

Add 2 oz. oil each end of booster piston at least 30° below zero.	at approx. each 3000 miles	Clean and repack wheel bearings	each 12-15000 miles
Check wheel grease retainers—adjust wheel bearings	at approx. each 5000 miles	Replace distributor points, condenser and high tension wires	each 15000 miles
Clean or replace oil filter element	at approx. each 5000 miles	Replace or condition fuel pump	each 15000 miles
Clean crankcase ventilator	each 5000 miles	Replace carburetor jets	at approx. each 15000 miles
Grease speedometer cable	at approx. each 10000 miles	Replace distributor rotor and cap	each 30000 miles
Replace spark plugs	at approx. each 10000 miles	Clean air cleaner	as necessary

WHY TUNE AN ENGINE?

Let's first consider valve clearance and how it affects the economy of engine performance. Instruction books on all engines talk valve clearance in thousandths of an inch. This measurement determines when an intake valve will open to permit the charge of fresh gas to enter the cylinder, and when the exhaust valve will open to permit the discharge of hot, burned gases from the cylinder.

If the valves are closed when the gases are supposed to be entering the cylinder and open when the gases are supposed to stay in the cylinders, there will be a loss of power and excessive fuel consumption. In many instances, burned exhaust valves can be traced to improper adjustment — early opening of the valve subjects the valve seat to higher temperatures and burns the valve seat. If greatest fuel economy, together with lowest maintenance costs are to be realized, it is of vital importance that valve lash be kept in correct adjustment at all times.

The electrical phase of engine tuning is important. The most elementary operation, of course, is cleaning spark plugs and spacing the electrodes properly. This operation alone has been found to improve fuel economy as much as 10%. During the vehicle life, there is a certain amount of wear in the distributor shaft, timing gears, etc., which causes a minor change in the engine timing. If correct timing is to be maintained, it is necessary to check them frequently.

EARLY TIMING is the spark occurring too soon and is usually "heard" because of the ping or spark knock which it causes. This condition results in a lazy engine, poor acceleration, loss of power, overheating and additional wear on connecting rod and crank shaft bearings.

LATE TIMING also has a decided effect on power acceleration and fuel consumption.

All of the gas in an engine cylinder is compressed into a small space and then burned, giving the energy that drives the

wheels. Late timing decreases this energy because the spark igniting the fuel occurs after the piston has traveled too far down the cylinder, reducing compression and thereby reducing the efficiency of the combustion.

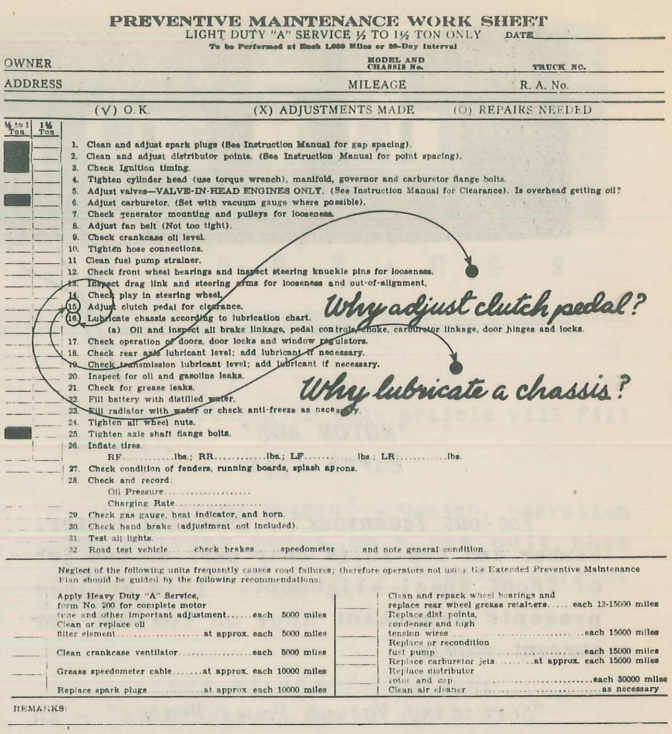
WHY ALIGN FRONT WHEELS?

If you pay no attention to front wheel alignment, your tire mileage will be far below normal. Front wheels are given camber — that is, the top of the wheel is tipped out so that the center of the load on the spindle is directly over the center of the tire at the ground. Hence the dish construction of the wheel makes the wheels tend to run out. To counteract this tendency, the front wheels are toed in, pointing the wheels towards each other at the front, so that in effect they actually run parallel on the road surface with a minimum amount of slippage or drag. In other words, the combination of camber and toe-in results in the front wheels traveling in a straight line. Toe-in adjustment is subjected to constant change because of the irregular condition of the road surface, excessive strain on the mechanism as a result of turning the wheels when the truck is stationary, running over curbs, etc. Therefore, frequent adjustment is necessary if maximum tire mileage is to be obtained. Excessive toe-in or toe-out results in an unbalance between camber and wheel alignment, which in turn results in excessive wear or dragging of the front tires on the road surface.

FRONT WHEEL BEARING ADJUSTMENT, like front wheel alignment should be corrected at regular intervals, because bearings simply will not give maximum service if allowed to run out of adjustment, and because wheel alignment and tire mileage are dependent upon correct bearing adjustment. Check these conditions each 1,000 miles.

WHY ADJUST THE CLUTCH PEDAL?

Clutch pedal adjustment has a serious bearing on clutch life as well as the operating efficiency of the vehicle. When too much clearance exists, it prohibits complete disengagement of the clutch. As a result, gears clash, making the shifting operation very difficult. On the other hand, insufficient pedal clearance has the same effect as partially disengaging the clutch or riding the clutch. The result is a semi-slipping action which materially reduces the life of the clutch facings, and is also harmful to the clutch throw-out bearing.



PREVENTIVE MAINTENANCE WORK SHEET
LIGHT DUTY "A" SERVICE ½ TO 1½ TON ONLY DATE
To be Performed at Each 1,000 Miles or 30-Day Interval

OWNER — MODEL AND CHASSIS No. — TRUCK NO.
ADDRESS — MILEAGE — R. A. No.

(V) O. K. (X) ADJUSTMENTS MADE (O) REPAIRS NEEDED

½ to 1 Ton	1½ Ton	
		1. Clean and adjust spark plugs (See Instruction Manual for gap spacing).
		2. Clean and adjust distributor points. (See Instruction Manual for point spacing).
		3. Check ignition timing.
		4. Tighten cylinder head (use torque wrench), manifold, governor and carburetor flange bolts.
		5. Adjust valves—VALVE-IN-HEAD ENGINES ONLY. (See Instruction Manual for Clearance). Is overhead getting oil?
		6. Adjust carburetor. (Set with vacuum gauge where possible).
		7. Check generator mounting and pulleys for looseness.
		8. Adjust fan belt (Not too tight).
		9. Check crankcase oil level.
		10. Tighten hose connections.
		11 Clean fuel pump strainer.
		12. Check front wheel bearings and inspect steering knuckle pins for looseness.
		13. Inspect drag link and steering arms for looseness and out-of-alignment.
		14. Check play in steering wheel.
		15. Adjust clutch pedal for clearance.
		16. Lubricate chassis according to lubrication chart.
		(a) Oil and inspect all brake linkage, pedal controls, choke, carburetor linkage, door hinges and locks.
		17. Check operation of doors, door locks and window regulators.
		18. Check rear axle lubricant level; add lubricant if necessary.
		19. Check transmission lubricant level; add lubricant if necessary.
		20. Inspect for oil and gasoline leaks.
		21. Check for grease leaks.
		22. Fill battery with distilled water.
		23. Fill radiator with water or check anti-freeze as necessary.
		24. Tighten all wheel nuts.
		25. Tighten axle shaft flange bolts.
		26. Inflate tires.
		RF.....lbs.; RR.....lbs.; LF.....lbs.; LR.....lbs.
		27. Check condition of fenders, running boards, splash aprons.
		28. Check and record:
		Oil Pressure.....
		Charging Rate.....
		29. Check gas gauge, heat indicator, and horn.
		30. Check hand brake (adjustment not included).
		31. Test all lights.
		32. Road test vehicle.....check brakes.....speedometer.....and note general condition.

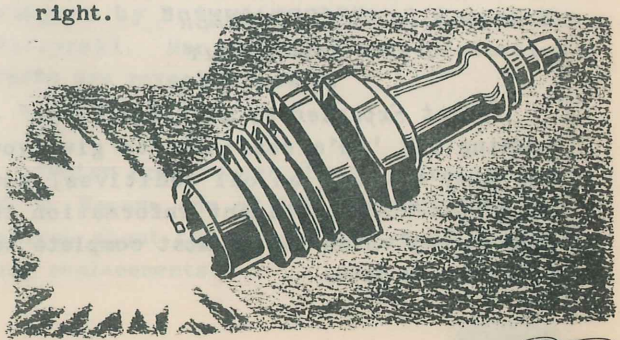
Why adjust clutch pedal?

Why lubricate a chassis?

Neglect of the following units frequently causes road failures; therefore operators not using the Extended Preventive Maintenance Plan should be guided by the following recommendations:

	Apply Heavy Duty "A" Service, form No. 200 for complete motor tune and other important adjustment.....each 5000 miles		Clean and repack wheel bearings and replace rear wheel grease retainers.....each 12-15000 miles
	Clean or replace oil filter element.....at approx. each 5000 miles		Replace dist. points, condenser and high tension wires.....each 15000 miles
	Clean crankcase ventilator.....each 5000 miles		Replace or recondition fuel pump.....each 15000 miles
	Grease speedometer cable.....at approx. each 10000 miles		Replace carburetor jets.....at approx. each 15000 miles
	Replace spark plugs.....at approx. each 10000 miles		Replace distributor rotor and cap.....each 30000 miles
			Clean air cleaner.....as necessary

REMARKS:



WHY LUBRICATE A CHASSIS?

Manufacturers' lubrication recommendations were published for a specific purpose. Engineers who have compiled the requirements have specified when and where to lubricate, and what lubricants to use. They know — follow them and you'll be right.

digests of CURRENT

"MOTOR AGE"
March 1941

"Toe-out Technique" - Checking caster, camber and toe-in is only part of the job of front wheel alignment. This article presents important dope on toe-out for current models.

"Servicing Vacuum Power Brakes" - An orderly procedure for vacuum-gauge, brake analysis.

"Solder's Part in Body Service" - Not new to most of you but very helpful if you've never learned this short cut.

"How to Handle Growlers" - A step by step explanation of eight tests for various armature faults. You'll use this information frequently.

"Engine Bearing Service" - An illuminating resume of present day precision insert-type bearings as opposed to the old hit-or-miss 'shim' technique.

"Valve Spring Pressures" - Poor seating and valve 'bouncing' at high engine speeds may be due entirely to weak valve springs. Read this for corrective measures.

"FLEET OWNER"
March 1941

"Fleet Experiences with Additives" - Pending THE 'AM's readiness to give you the Army's views on oil additives, you will find much pertinent information in this survey which is the most complete we have seen to date.

"Diesel Fuel Problems" - A New York surface-transportation expert gives some inside facts as a result of his experience in overcoming Diesel fleet problems.

"MOTOR SERVICE"
March 15, 1941

"This Valve Can Explode" - A valuable precaution for the disposal of a new sodium filled valve becoming extensively used in some of the new engines.

"Servicing the Chrysler Fluid Drive" - Graphically presented procedure for fluid drive overhaul.

"Truing Brake Shoes and Lining" - Read this article if you want some good information on truing and relining by up-to-date precise methods.

"AUTOMOBILE DIGEST"
March 1941

"Developments in Rapid Battery Charging" - As its title implies, this feature charts most of the facts which pertain to fast charging and the new units which do the work.

"How to Check 1941 Spark Timing" - In this article you'll find a detailed set of valuable specifications and tune-up tips to help decrease your tune-up problems.

"How to Make Headlight Adjustments" - Some additional tests and short cuts on sealed beam headlight systems.

"Modern Practice in Bearing Service" -

comments

TECHNICAL MAGAZINES

The March motor publications seem to be concentrating on new bearing procedures. Assuming that you read everybody's ideas and then make your own decisions, this article is a good addition to your collateral reading list.

"Exit Rivets, Enter Cemented Lining"? - We heartily approve of the question mark they put after this title. While this new brake lining technique looks as if it may be added to a long list of important automotive inventions, it is too new and untested to warrant any extravagant claims at this stage of experimentation.

"MOTOR"
March 1941

"Wheel Alignment" - Caster, camber, toe-in, toe-out and kingpin inclination are just a few of the mightmarish terms which can haunt the maintenance man. Here are some helps in the form of exact specifications and detailed instructions on late model front end adjustment. See also, "Ins and Outs of Caster, Camber and Toe-in", in this same issue.

"Factories Tell How; and Fix it This Way" - As usual these features give some important ins and outs on usually ticklish upkeep problems. Read 'em and you'll find use for 'em.

"COMMERCIAL CAR JOURNAL"
March 1941

"The Body of the Month" - If you want a peek into the future, the advanced truck styling pictured in this article will fill the bill.

"Reversing Switch" - Design, operation and service notes on a new unit that lengthens point life by changing current polarity.

"THE MILITARY ENGINEER"
March-April 1941

"Lighting the Pennsylvania Turnpike" - You will surely want to digest this illuminating article by a lighting expert, which also contains some interesting views of a super highway.

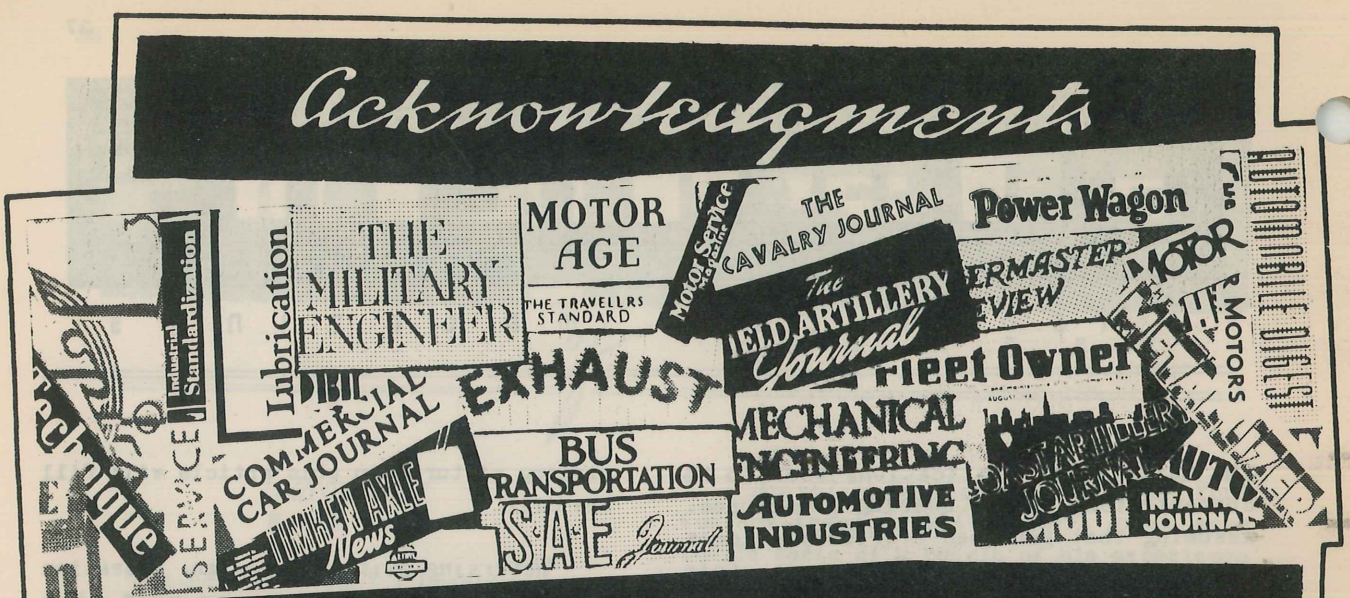
"Field Training in Engineer Operations" - It sounds easy enough to blow up a bridge. Knowing in advance exactly what to do and when and how to do it right the first time makes interesting reading as explained by a Captain of engineers.

"THE QUARTERMASTER REVIEW"
March-April 1941

"Motor Transport and the National Defense" - An interesting address on the subject by Brigadier General Joseph E. Barzynski. Many little known production facts are revealed herein.

"Motor Replacement Parts" - Lieutenant E. P. Hogan, one of THE 'AM contributors, writes about the Army's system of supplying replacements.

Acknowledgments



The editors wish to thank the following publishers for their courtesy in allowing The 'AM to make use of articles and illustrations from their publications. There were many articles that could not be used, but it is hoped that those published here will stimulate interest in the source material.

"Farewell My Lovely", page 2, was condensed from an original article by Lee Strout White in the NEW YORKER. The F-R Publishing Corporation, 25 West 43rd Street, New York.
Subscription $5.00 per year.

"How to Handle Growlers", page 4, was revised from "How to Handle Growlers" in MOTOR AGE, March 1941. Chilton Company, Inc., Philadelphia, Pa.
Subscription $2.00 per year.

"Shape With Solder", page 6, was adapted from "Solder's Part in Body Service", MOTOR AGE, March 1941 and illustrated with pictures lent THE 'AM by the Chilton Company, Inc., Philadelphia, Pa.
Subscription $2.00 per year.

"Reversing Switch", page 20, was suggested by a release in the Chevrolet Service News and by "Reversing Switch", COMMERCIAL CAR JOURNAL, March 1941. Commercial Car Journal, 100 E. 42nd Street, New York.
Subscription $3.00 per year.

"Bearing Facts Boiled Down", page 22, was based on "Engine Bearings Laid Bare", in COMMERCIAL CAR JOURNAL for March 1941. Commercial Car Journal, 100 E. 42nd Street, New York.
Subscription $3.00 per year.

The material in the "Help" section was produced from data provided by the research department of General Motors Corporation.

ONE SET OF THE FOLLOWING TEXTS WILL BE SUPPLIED UPON OFFICIAL REQUEST TO THE EDITOR, THE 'AM, MOTOR TRANSPORT SCHOOL, HOLABIRD QUARTERMASTER DEPOT, BALTIMORE, MARYLAND. REQUESTS FOR ADDITIONAL TEXTS OR SETS OF TEXTS MUST BE APPROVED BY THE QUARTERMASTER GENERAL.

TEXT NO.	BASIC TEXTS	REMARKS
1	THE MOTOR VEHICLE - (Automotive Nomenclature - Terminology Military Motor Vehicles - Vehicle Units and Assemblies).	Revised 1-1-41
2	THE INTERNAL COMBUSTION ENGINE - (Principles of Operation - Types - Parts and their Functions, including Engine Lubrication and Cooling).	Revised 1-1-41
3	FUELS AND CARBURETION - (Fuels - Fuel Systems - Physics of Carburetion - Principles - Types of Carburetion - Intake and Exhaust Systems - Superchargers and Governors).	Published 8-31-40
4	AUTOMOTIVE ELECTRICITY - (Principles of Electricity and Magnetism - Storage Battery - Battery Ignition - Magneto Ignition - Starter and Generator - Lighting System - Horn - Electrical Accessories).	Revised 1-1-41
5	AUTOMOTIVE POWER TRANSMISSION UNITS - (Power Transmission - Clutches - Transmissions - Propeller Shafts and Universal Joints - Rear Axles).	Published 1-1-41
6	CHASSIS, BODY AND TRAILER UNITS - (Frames - Springs - Front Axles - Steering Gear - Wheel Alignment - Wheels, Rims and Tires).	Published 2-1-41
7	AUTOMOTIVE BRAKES - (Principles - Mechanical - Hydraulic - Air - Vacuum - Electric).	Revised 1-1-41
9	THE MOTORCYCLE - (Nomenclature - Operations - Inspection - Maintenance - Driver Training).	Published 9-30-40
10	LUBRICATION - (Principles and Practices).	Published 9-30-40
11	INSPECTION - (Command, Preventive and Technical).	Published 9-30-40
12	HAND, MEASURING AND POWER TOOLS	Published 2-1-41
15	ECHELON SYSTEM OF MAINTENANCE	Published 2-1-41
	ADVANCED TEXTS	
8	DIESEL ENGINES AND FUELS - (Principles of Operation - Types, including Semi-Diesel - Parts and their Functions, including Lubrication and Cooling - Fuels and Fuel Systems).	Being Prepared
16	MILITARY MOTOR TRANSPORTATION - (Organization - Principles - Supply and Maintenance).	Being Prepared
	(Principles of Operation).	Published 9-30-40
17	THE BLACKSMITH AND THE WELDER	Being Revised
18	THE RADIATOR REPAIRER AND THE SHEET METAL WORKER	Being Revised
19	THE MACHINIST	Being Revised
20	THE BODY FINISHER - (Carpenter - Upholsterer - Painter).	Being Revised
21	SHOP SCIENCE - (Arithmetic - Algebra - Geometry - Physics - Mechanics - Blue Print Reading - Metallurgy).	Being Revised
	UNASSIGNED TEXTS To Be Published About May 31, 1941.	
13	TUNE-UP AND ADJUSTMENT - (Trouble Shooting).	Being Revised
14	MAINTENANCE AND REPAIR - (All Units and Assemblies of the Motor Vehicle).	Being Prepared
22	FIRE PREVENTION, SAFETY PRECAUTIONS, ACCIDENTS	Being Prepared


DEATH
begins at
40