TERRAPLANE HUDSON

Service

TECHNICAL INFORMATION
PARTS—ACCESSORIES
MERCHANDISING

Issue 6 MAY, 1935 1935 Series

From the Man Who Builds Them

Here at the factory we are engaged in building automobiles that we think are the greatest performers in the industry.

Contributing to this are thousands of manufacturing operations that produce parts to extremely close limits for long life and quietness. Revolving and reciprocating parts are accurately balanced for utmost smoothness and quietness in operation. Technical knowledge, skilled workmen and special machinery are required to do this work. All these we have. Hundreds of different gauges and measuring devices are used to insure desired quality in power units, chassis and bodies. Parts are inspected through all manufacturing processes, and checked again in assemblies for performance and quietness.

Finally when the completely assembled automobile leaves the assembly line, it is thoroughly checked throughout, and after a normal breaking in period on the part of the owner, the car is ready to go out and duplicate the performance for which our product is favorably known, in hill climbing, speed, acceleration, and fuel economy, as well as challenge any make of car for quick and safe stopping as provided by the rotary equalized braking system.

This marvelously performing and rugged machine, then, is delivered to the dealer, and from then on its future is squarely up to you Service Men. If Service Departments are properly fitted with modern equipment, and the Service Men trained in their constantly more exacting profession, I know the result will be a happy one for the owner of Terraplane and Hudson cars. Later on when the owner is in the market again for a new car, he very likely will choose again a Terraplane or a Hudson, for he knows they will give him many comfortable and carefree miles of modern performance.

That is what "Hudson Built" means—ruggedness and performance, intelligently preserved by Service Men skilled in their chosen work.

Your work is important work, and you should feel proud of your mechanical knowledge and ability, which must constantly keep pace with the technical advance in motor cars.

IRA B. SWEGLES
Factory Manager

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(Issues Nos. 1, 2, 3, 4, 5 and 6—1935 Series)

A Letter for You from California

EARLE C. ANTHONY, INC.

Los Angeles, Calif.,
April 24, 1935

MR. H. J. HUDSON,
Assistant General Service Manager,
Hudson Motor Car Company,
DETROIT, MICHIGAN.

Dear Howard:

For several months we had been dissatisfied with the amount of merchandise and accessory sales and had tried several plans to improve the condition, but had little success.

As you know, every service station has one outstanding service salesman who is just naturally sales minded; the rest are in most cases willing to sell but don't seem to have just the right spark to make them function.

On or about January 1, 1935, Mr. E. J. Sturgeon, our San Francisco Service Manager, submitted a plan, which on the surface looked quite encouraging and we decided to give it a trial. The results obtained were away beyond expectation, so with thirty days experience in San Francisco we adopted the same method both in Los Angeles and Oakland station.

The plan is so simple that you could easily pass by it without giving it second thought but the results have given us an increase of better than 100% average and I believe it is safe to assume before this month is out it will be 150%.

The plan is as follows: In a service meeting, we listed on the blackboard a certain number of items we had not been selling that we had on our shelves for sale. We included in this list another group of items we were desirous of selling. In this group were such items that we knew if properly presented could be sold. After completing this list we called upon each man to establish a quota on each item on the board that he would sell during the month. Inasmuch as he established this himself he naturally was on base and the performance of the other men would not enter into his problem, as he had definitely committed himself to a certain performance. After establishing these quotas in this meeting, we called upon certain men to sell certain items to us, the object being to check his presentation and what he knew about the item he was attempting to sell. We have found that in many cases the service salesman will not sell certain items because he either does not know enough about them, or he is not sold on the items himself. Our experience has shown us that by getting a personal committal on their monthly performance and teaching them how to sell each item, the fear of selling to the customer immediately vanishes.

We, of course, cover all of these items with a selling commission and in many cases a bonus.

The plan has not only increased our volume but has increased the earning power of the individual and we have in many cases, in a few days time, disposed of materials that have not been sold previously and that had been laying on the shelves too long.

We are also applying this plan to the small dealer service station; even where the service manager is doing all the selling, he sets up his personal quota for himself.

Trusting this may be of some value to you, we are,

Yours very truly,

EARLE C. ANTHONY, INC.,

F. E. RANDALL,
General Service Manager.

Radio Display Stands

We know you are interested in profit. That's why you are in business. Any proposition that will increase those profits certainly is interesting to you.

You probably have a radio-equipped car on your display floor, but that doesn't have the eye appeal of the Radio Display Stand pictured above. Car prospects will see the radio in the car, but they are primarily interested in the car itself.

Every person entering your place of business for any purpose will be attracted by the Display Stand, and sales will follow as a natural result.

Dealers who are using this Display report outstanding results. If you have not already done so, tell your distributor you are ready for your Stand—get it in operation and "cash in" on radio as an accessory.

Beat April

The Sales Departments are working to "Beat April" car sales in May. Let's show them that the Service Departments are also on their toes and "Beat April" service sales in May.

During May your performance, safety and appearance items will be in greater demand. Let's go after this business.

Set up a quota for your shop and get every man to work to bring in more customers and sell more per customer. Post your sales against your quota daily and see the interest and business it will develop.

Let's show the Sales Department that we, too, can sell. Let's "Beat April."

May Sales Opportunities

Did you remove the anti-freeze and clean out all cooling systems with Hudson Radiator Cleaner and protect the cooling system from rust and the resultant loss in life of parts and cooling efficiency with Hudson Rust and Corrosion Inhibitor? If not, finish this job in May.

Contact every owner who has not had this service and sell him on the importance of it. Proper cleaning and the use of an inhibitor saves the cooling system, the engine and the owner. Picture the owner on a hot day in a traffic jam, radiator boiling and no water in sight. Save your owners this embarrassment.

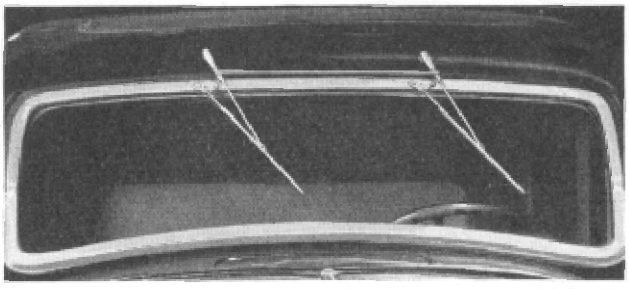
Your April lubrication customers should be May lubrication customers. Do you have a record of them? Are you going to ask them to come back?

The Owner Follow-up System makes it easy to know your customers and keep them coming back.

We all like attention. If you give it to your customers they will like to do business with you. Contact them regularly.

A Fast Mover

A review of April accessory sales indicates that distributors and dealers are really "going to town" on the Windshield Wiper Auxiliary Arm, Part No. 111819, listing at $3.50.



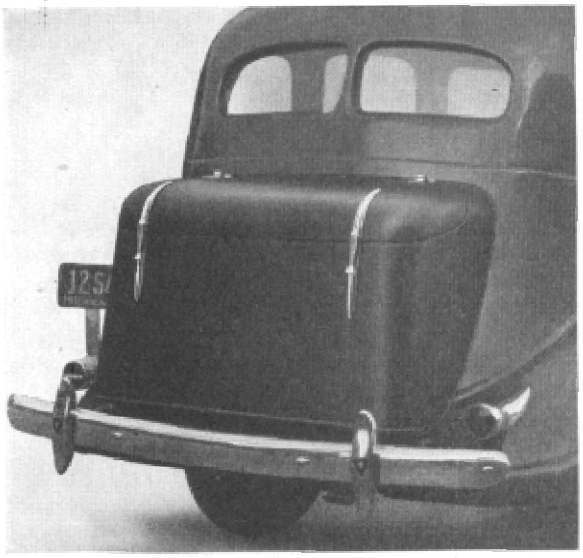
If you are not already "cashing in" on this easy-selling accessory, put it on the list for your next week's special.

Approach every customer entering your place of business and watch those *extra* profits roll in.

Sell Trunks

With the coming of warm weather and the opening of the tourist season, you are going to find an increased demand for trunks.

We are carrying in stock here at the factory Sedan and Coach trunks, both for the 1934 and 1935 cars.

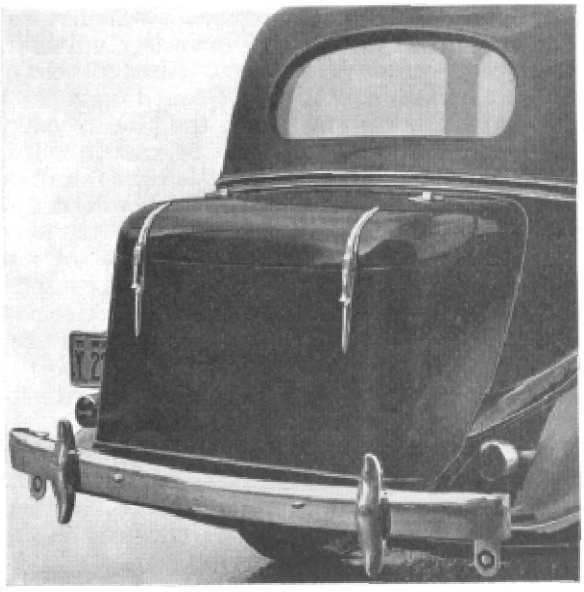


You will find that you can create a considerable market for trunks on 1934 cars, inasmuch as trunks were not available a year ago to purchasers of 1934 cars. You will also find quite a number of your 1935 owners who originally purchased a car without trunk, who will now like to install one for the summer season.

These trunks, as you know from past experience, are very easily installed. They present no difficulty, and the cost of installation is not great.

There isn't any reason why you should not do a splendid business with trunks on both 1934 and 1935 cars, and you will note by the resale schedule that you are going to enjoy a nice profit from each sale.

It would be good merchandising practice to display a service trunk on your showroom floor, especially during the next few weeks when the largest volume of trunk sales can be expected.



Carburetor or Customer?

Which Needs Adjustment?

Customer should be told the limitations on results of Carburetor adjustments. The service man must use his head

Courtesy of AUTOMOBILE DIGEST

A frequent car owner complaint is poor engine performance or economy after the carburetor has been adjusted, and to prevent this complaint is the purpose of this article. Too often, after a careful tune-up and adjustments which include a thorough exhaust gas analysis to determine the completeness of combustion, the customer is not satisfied. Complaint is based on the assumption that the service man has retarded carburetor performance rather than improved it. The specific complaint may be loss of power, much higher fuel consumption, poor starting, no acceleration, irregular running or some similar trouble. Many car owners take the stand that tune-up is a racket in which the mechanic tampers with the carburetor and gets it out of adjustment.

The reason for this appears to be neglect on the part of the service man to properly convey to the owner facts upon which satisfactory carburetor adjustment must depend. An important consideration here is knowledge of the owner, as carburetor performance is closely related to driving habits, what the owner expects, what he considers is important and what it is possible to accomplish, keeping in mind the condition of the engine and all those factors which have a bearing on the problem.

Since the carburetor is only one unit in the process which converts the energy contained in the fuel into power, these factors must be explained to leave no doubt in the owner's mind. If this is successfully accomplished, the problem can be solved.

Purpose of Carburetor Overhaul

The real function of carburetor overhaul is to return a worn instrument to standard conditions so that it may supply the engine with the correct amount of air and fuel, and to compensate for slight variation in the quality of the fuel and to some limited degree compensate for the reduction in the mechanical condition of the engine. But it cannot be accepted as a cure-all for all defects which may affect engine performance. Because it is provided with an adjustment is no reason to assume that this adjustment can compensate for a multitude of conditions. This is exactly the attitude that may be taken by the owner unless a detailed explanation is presented as to what may be expected from carburetor adjustment under existing conditions.

Before any attempt is made to adjust a carburetor, it is logical to first find out what the owner has in mind and what he expects. His demands may not be consistent with what is practically attainable. Does he want power, economy, pick-up, high-speed performance or what? Usually the demand is for all of these, which brings up again the question as to whether the customer or carburetor needs adjustment.

Generally when a car has seen as much as a year's service, and many even before they reach that point, depending upon the care they have had and how they have been handled, it is impossible to make adjustments which will re-establish the original performance standard. In this case, the owner must be given to understand that if adjusted for economy, power and pick-up, to some extent he must pay the penalty. The logical conclusion is to first adjust the customer to what is practically attainable and the results carefully explained, so there may be no misunderstanding after the adjustment has been made.

Dieting the carburetor is one way to make a record for fuel economy, but this cannot be done except at the expense of power and performance. On the other hand, maximum power and performance must be at the expense of economy. However, reasonably good economy can be obtained by careful driving and by keeping the engine in proper mechanical condition.

The Source of Power

The source of power is the fuel, and within certain limits maximum power is dependent upon the volume of fuel which can be provided in the combustion chamber of the engine. There is a limit to the ratio of fuel vapor to air that can be efficiently employed, and which provides the maximum power output. Generally, carburetor adjustment for maximum power is slightly on the rich side. If we adjust for economy, we have an adjustment that is slightly on the lean side and, therefore, to obtain maximum economy we must use the leanest mixture possible. The moral is that power requires fuel, and if too great economy is expected, restricted power must also be expected.

The analysis does not end here, because this reasoning is based on factory standards and adjustments, with all units and parts at their maximum efficiency. This is not the case when Mr. Owner wants his carburetor adjusted. He will have one or a combination of troubles in mind and his speedometer will show considerable mileage. It then becomes a case of comparing conditions. Original factory adjustments and performance was based on snug working fits for all parts, no blow-by, no valve guide looseness, proper seating valves, no wear, efficient battery and a host of other conditions.

Here the compromise enters the picture, for the engine may need new piston rings, valve guides, reseating of valves, spark plugs, coil, battery or what not. One cannot adjust a carburetor without knowing what an owner expects and the condition of the engine, and then determining what can be expected from the two factors. The only thing possible is to adjust for best all-round performance, considering all

these things. It is quite essential that both owner and mechanic know what it is all about. The mechanic should impart his knowledge to the owner, as he must be told what can be expected, and without reservations.

In the matter of economy, the mechanic can also help his cause if he will instruct the owner diplomatically in the rudiments of driving which promote economy and performance. Economy and all-round performance is sacrificed by the driver with the heavy foot who intermittently drags along and then makes a dash at full open throttle, who has a heavy foot on the throttle at the traffic light, and who must pump the accelerator before gliding away. All these conditions demand maximum power, and maximum power demands maximum fuel. Fuel economy and performance are also promoted by keeping the engine in good mechanical condition and the ignition system properly adjusted, then with live current to supply the spark, the carburetor may be adjusted to the most economical setting within the limits of the desired performance.

Conclusion

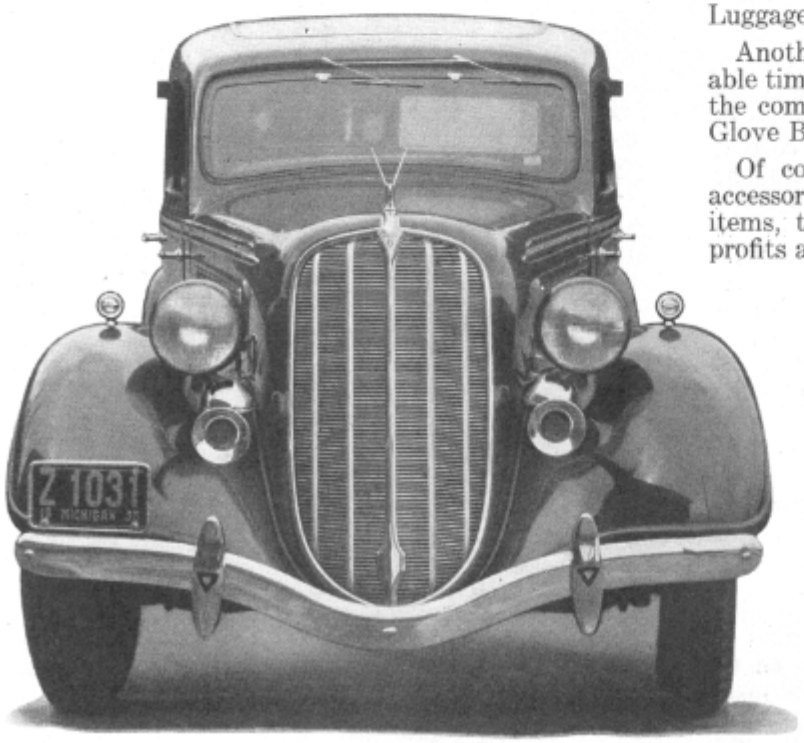
Not only is the service station confronted with carburetor problems, but the carburetor manufacturer also has his problems. He aims to supply a device or instrument that will suitably proportion and vaporize the fuel, provide the maximum possible economy and other features in demand. But he cannot provide a device that will compensate for a wide range of changing conditions foreign to the carburetor. It is up to the service man to understand these conditions and it is necessary that he thoroughly explain these to the owner and make recommendations that will permit approximating original carburetor performance.

Fender Lamps

The photograph below illustrates the appearance of the Fender Lamps mounted on the 1935 cars.

Fender Lamps were standard equipment on certain 1934 models, and their display in showrooms led to many sales of lamps on other models. This year Fender Lamps are not standard on any models, leaving a wide-open field for accessory sales. But they must be displayed to attract the customer's attention.

We suggest you keep at least one car in the showroom equipped with Fender Lamps at all times. The results will be gratifying.



Tourists' Necessities

The tourist season will soon be here, creating a demand for accessories which will contribute to the comfort and safety of the public.

Have you ever tried to light your cigar or cigarette with a match when the car windows were open? A Cigar Lighter is the answer, and you will find your owners receptive to this accessory.

Another popular accessory which will be in demand at this season is the Gas Tank Locking Cap, which prevents the theft of gasoline from the tank and discourages car theft because of inability to refill the tank.

Trunks provide that extra carrying space so essential to the traveler, and should be talked up to every customer entering the service station. If they cannot be interested in the purchase of a Trunk, sell the Luggage Carrier, which is available for all models.

Another essential to summer motoring is a dependable time piece. The preference of all can be met with the complete line of Mirror Clocks or the Electric Glove Box Door Clock.

Of course, it requires constant plugging to sell accessories, but by taking advantage of seasonal items, the job is that much easier and the extra profits amply repay the added effort.

Clutch Load Capacity

The load carrying capacity of the Terraplane and Hudson 6 clutches has been increased by using six Part No. 45154 inner springs instead of three as was former practice.

The nine Part No. 45148 outer engaging springs are continued as heretofore.

The additional inner springs were first used in 1935 production on Terraplane engine No. 134059 and on Hudson 6 engine No. 75247.

Engine Tune-up

Distributor Characteristics

A recent change in the distributor incorporates what is known as a "dog leg" in the automatic spark advance curve. The automatic advance used previously cut in at 800 R.P.M. and advanced uniformly up to 4000 engine R.P.M. With the new arrangement, advance begins at 600 engine R.P.M. and is very rapid up to 800 R.P.M., then advancing more gradually to 3400 R.P.M. and remaining unchanged from then as the engine speed increases.

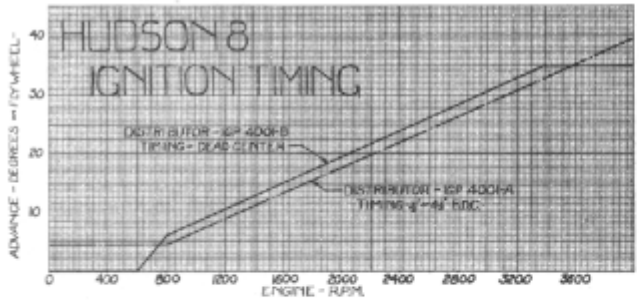


Figure 1

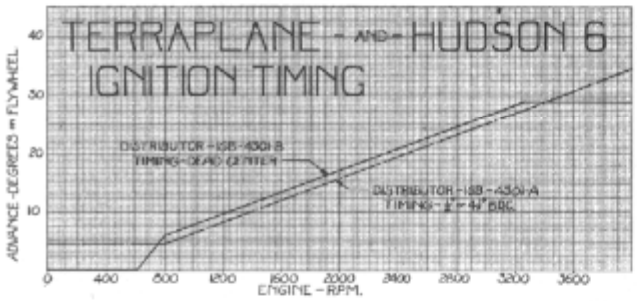


Figure 2

Figure 1 shows the old and new advance of the Hudson 8 with the correct initial setting, while figure 2 shows the Terraplane and Hudson 6. Referring to the figures it is seen that the distributor with the new advance characteristics when set at dead center gives a slightly greater advance from 800 to 3600 R.P.M. on the Hudson 8 (16 to 72 mile per hour) and from 800 to 3400 R.P.M. (16 to 68 mile per hour) on the Terraplane and Hudson 6 than is given by the former distributor set ½" (4½°) ahead of dead center.

This assures the same performance at driving speeds but, due to the dead center timing for cranking, idling, and low speed acceleration, starting is improved. The danger of back-firing while cranking is reduced, idling is smoother and the tendency to spark knock on wide-open throttle at low speeds is reduced.

The curve characteristics of the distributors can be determined by the Auto Lite number on the plate attached to the side of the distributor housing. The following tabulation shows the Auto Lite number of each of the distributors and the 1935 engine serial numbers in which each is used:

	Hudson Eight	Hudson Six	Terraplane
Straight Advance			
Auto Lite Number	IGP-4001A	IGB-4301A	IGB-4301A
Engine Numbers	55000 to 65246	70000 to 73790	103000 to 128076
Ignition Timing	½" BDC	½" BDC	½" BDC
Dog Leg Advance			
Auto Lite Number	IGP-4001B	IGB-4301B	IGB-4301B
Engine Numbers	65247 and up	73791 and up	128077 and up
Ignition Timing	D.C.	D.C.	D.C.

All 1934 Terraplanes and Hudsons use the straight advance distributor and should be set ½" before dead center.

Mechanical Tune-up

The parts of the engine with which we are concerned in a tune-up are the parts which admit fuel to the cylinders, retain it during compression and the power stroke and allow the burnt gas to be exhausted from the cylinder.

The intake valves admit the fuel, the cylinder walls, cylinder head, cylinder head gasket, pistons and rings confine it, while the exhaust valves, manifold, exhaust pipe and muffler permit its escape.

Valve Timing

The valve timing is built into the camshaft and can be varied only by changing the meshing of the front end drive gears or chain and varying tappet clearance.

Unless an engine has been assembled incorrectly there is seldom any need to check the meshing of the camshaft drive. On older models using chains, there is a possibility of the chain jumping the accessory drive sprocket if it becomes too loose; however, jumping of teeth on the crankshaft or camshaft gear is very improbable.

In the Terraplanes and 1934 and 1935 Hudsons using gears for the camshaft drive, it is impossible to loose the valve timing except by stripping the gear teeth.

Valve Tappet Clearance

Valve tappet clearance is usually understood to be important to prevent the valves holding open when the stems lengthen by expansion under operating temperatures. Correct valve tappet clearance is also important for correct valve timing and quiet operation.

The cams of Terraplane and Hudson engines are designed to slowly close the tappet clearance so that there is no clearance at the point where the valve is to be opened. With no clearance, the valve is lifted quietly. If too much clearance is allowed, the valve action will be noisy. If too little clearance, the valve will start to open before it should and very slowly. This will cause burning of exhaust valves, while extremely close clearances on the intake valves permit exhaust gases to blow into the intake manifold and cause back-firing through the carburetor.

The take-up is designed for .006" intake tappet clearance and .008" exhaust tappet clearance. These clearances should be measured with extreme care with the engine hot. Remember, feeler gauges wear with use. Worn or battered feeler gauges are inaccurate and make good workmanship impossible.

Valve Springs

All springs tend to lose their strength with use, particularly when subjected to heat. This is taken into consideration in designing Terraplane and Hudson valve springs. New springs before installation in the engine require from 41 to 47 pounds to compress them to a height of two inches. Within a very few miles of use the springs will lose part of their strength but little further loss will be experienced over a period up to 10,000. If the spring, however, requires less than 34 pounds to compress it to two inches it should be replaced.

It is a good precaution to change valve springs when grinding valves if the springs have been in use over 10,000 as weak springs permit the valves to dance when the engine is run at high speeds, causing loss of power, increased gasoline consumption and permitting valves to burn.

Valve Spring Breakage

Valve spring breakage can usually be traced to erratic spring action or rusting. The spring action in Terraplane and Hudson engines is controlled by cages, while the springs are protected from rusting by cadmium plating.

When installing valve spring cages, be sure one of the open sides is toward the engine cylinder to give maximum clearance. Contact of the cage with the cylinder block will interfere with spring action and cause noise and possible spring breakage.

Valve Guides

Valve guides are fitted with a clearance of .002 inches over the valve stems. Closer clearances will cause sticking. If the guides become excessively worn they will not hold the valve to a true seat and frequent valve grinding will be necessary.

Excessive clearance will also permit air to leak around the intake manifold. Although carburetor adjustment can be made to compensate for this excess air at idling speeds, there is no adjustment for the higher speeds and the resultant lean mixture will reduce engine efficiency and in extreme cases cause overheating and burning of valves.

Terraplane Hudson valve guides are readily replaceable. Replace them when they become worn.

Grinding Valves

The necessity for valve grinding can usually be traced to one or more of the following causes:

(1) Insufficient Tappet Clearance
(2) Worn Valve Guides
(3) Valves of Inferior Quality (not genuine parts)
(4) Late Ignition Timing
(5) Continual Misfiring (see April 1935 Issue—page 71—fouled plugs)
(6) Lean Carburetor Mixture
(7) Engine Over Heating (cooling system, lubrication, dragging brakes or (4)-(5)-(6)
(8) Warpage

Valve Warpage

When a car is driven at high speeds the valves become red hot. At no time in a six or eight-cylinder engine are all valves closed. If, therefore, the engine is stopped while the valves are red hot, the valves not on their seats may warp. If the car is stopped quickly after running at high speed, the engine should be allowed to idle for a few minutes so the valve will cool off before the engine is stopped.

Pistons and Rings

The piston must move freely in the cylinder but it must also prevent blow by. The piston rings and the oil film are important factors in preventing blow by. The rings must give uniform pressure around the cylinder walls to hold the pressure of explosion but still maintain a proper oil film to reduce friction and wear.

The rings must be free in the piston grooves. An accumulation of carbon or gum behind the rings will prevent their free action and will also prevent proper control of oil flow to the combustion chamber. This can be guarded against best by the selection of lubricating oil and gasoline of known high quality.

Cylinder Head Gaskets

With increasing compression ratios, the construction of cylinder head gaskets becomes more important as does the method of installation.

Terraplane and Hudson cylinder head gaskets are made of asbestos and sheathed in steel for great strength. The narrow sections, which tend to compress more than the wider sections, are built up with steel shims inside the sheathing to insure uniform clamping action of the head. This also adds to the strength and further protects the gasket against being blown out.

Gasket cement is recommended for use on cylinder head gaskets (available through Hudson Motor Car Company Accessory Division).

When tightening the cylinder head, start by drawing down the middle stud between the middle cylinders just snug and proceed toward both ends, tightening the entire center row. Return to the starting point and draw down fairly snug, then tighten the side studs between the middle cylinders. Continue toward both ends as before but this time tighten studs in all three rows. Go back and repeat, pulling all studs down tight.

Carburetor

The purpose of the carburetor is to supply the correct mixture of gasoline and air to the cylinders under all operating conditions.

Starting

At low temperatures only a small percentage of the gasoline will vaporize sufficiently to form a combustible mixture, the remainder passing through the engine as a liquid and emerging from the exhaust unburnt.

Because of this it is necessary to supply much more gasoline to the air when starting cold to get enough gasoline vapor to burn. The carburetors used on Terraplane and Hudson engines accomplish this by restricting the quantity of air admitted through the use of a choke valve.

The choke valve used on Terraplane Special models is manually controlled by the driver. Pulling out the choke control button on the dash closes the valve for starting.

The choke valve used on Terraplane De Luxe models and all Hudson 6's and 8's is automatically controlled by the Climatic Control. Complete in-

structions for disassembling, cleaning and adjusting will be found on pages 48 and 49 of the April-July 1934 issue of Terraplane Hudson Service.

Gasoline consumption is greatly increased by the use of the choke. After the engine is started the choke should be opened as much as possible without stalling the engine.

When the Climatic Control is used it is necessary to see that the air passages from the manifold heater through the device are clean, that the small bakelite piston is clean and the adjustment made so the valve is just closed at a temperature of 74° Fahrenheit. Free air passage is necessary to develop correct temperatures to control the choke valve after proper adjustment has been made.

Idling Speed

When the engine is idling, the throttle is virtually closed, so that the small volume of air drawn through does not have sufficient velocity at the main jet to pick up much gasoline. The gasoline is fed mainly through an auxiliary passage in which it is mixed with air. The air is taken through a small drilled hole in the side of the carburetor throat, carried down past the mouth of the idling jet and discharged back into the main carburetor passage through a vertical slot located directly opposite the edge of the throttle valve.

When the throttle valve is closed, only a small portion of the slot is exposed to supply the mixture, but as it is opened the slot is uncovered so that speeds up to nearly 20 m.p.h. can be obtained.

The mixture from the idling by-pass is very rich and is diluted by the air stream in the main carburetor passage to give the correct mixture for efficient burning. The richness of this mixture is controlled by the idle adjusting screw.

As the throttle is opened for higher speeds the vacuum at the air intake for the idling by-pass becomes more nearly the same as the vacuum below the throttle at the by-pass outlet, stopping the flow of air through the idle by-pass, so that the idle screw position has little to do with gasoline consumption or performance except when the car is driven below 20 m.p.h.

Driving Range

All the gasoline for normal driving speeds flows from the float chamber through the main orifice located in the bottom of the float chamber and is delivered into the air stream from the main jet.

Float Level

The level of the gasoline in the float chamber is important in determining the correct flow of gasoline from the jet for proper performance and economy. If the float level is too high too much gasoline will be delivered from the jet. If the float level is low, insufficient gasoline will be delivered.

The correct level for each Carter Carburetor used on Terraplane and Hudson cars is given in the accompanying charts. The proper method of measuring the float position is also shown. This necessitates the removal of the float chamber cover from the carburetor.

Metering Rod

The metering rod passes through the main orifice in the bottom of the float chamber and determines the maximum quantity of fuel that can pass through the orifice to the main jet. This is necessary since the air stream in the venturi is capable of picking up more gasoline than is required and the flow must therefore be restricted.

The metering rod has either two or three steps (three step rods used on 1934 and 35 Terraplanes and Hudson 6) at the lower end. When the throttle is closed, the largest step is in the orifice and a minimum amount of gasoline is allowed to pass to the main jet. As the throttle is opened, the metering rod is raised so that the second or smaller step is in the orifice and more gasoline can flow through to take care of requirements at the higher speeds. It is readily seen that the engine speed at which the change is made from one step to the other is important. This is obtained by operating the metering pin through linkage from the throttle so that for a given throttle opening the metering pin has a definite position.

Metering Pin Adjustment

The metering pin position is checked or corrected by the following procedure:

(1) Back off throttle stop screw until throttle valve is closed.

(2) Disconnect upper end of link connecting throttle shaft to metering pin operating lever.

(3) Remove metering pin from carburetor and insert gauge in its place, being sure the tapered end of the gauge is seated in the main orifice. (Use Carter Gauge No. T109-20, marked 2.795.)

(4) With throttle *closed* and metering rod lever pin resting on top of gauge, bend link, if necessary, to permit it to enter the hole in the metering rod lever *freely*.

(5) Install metering rod, connect link and reset throttle stop screw.

Accelerator Pump

The accelerator pump adds extra fuel to the air stream for rapid acceleration as a slightly richer mixture is required for maximum power. The quantity of gasoline supplied from the pump by completely depressing the accelerator is determined by the stroke of the pump. The stroke is determined by hole selected in the operating lever for the link. The link should be set in the end hole for winter use to give maximum stroke, while the intermediate or short stroke obtained by connecting the link at the other holes is more satisfactory for warm weather operation.

Performance and Fuel Economy

Summarizing the foregoing paragraphs, following are the functions of the various parts of the carburetor and their effect on performance and economy:

Choke—Functions only during warm-up; however, increases gasoline consumption very greatly if used excessively or if engine is started frequently in cold weather. Has no effect after engine has warmed up and choke valve is wide open.

Idling Adjustment—Gives correct mixture for smooth idling and speeds below 20 m.p.h. *This adjustment has no effect whatever on performance or economy at speeds over 20 m.p.h.*

Float Level—The float level is important at idling speeds in that an excessively high float level will allow gasoline to run out of the main jet and supply gasoline to the air stream in addition to that supplied by the idle by-pass.

The float level is very important for both performance and economy at all speeds above idle as it determines the quantity of gasoline that the air stream can pick up.

Metering Pin—The position of the metering pin position is important at all speeds as it is depended upon to prevent the air stream from picking up too much gasoline from the main jet.

Accelerator Pump—The stroke of the pump is important as it regulates the amount of fuel pumped into the air stream in addition to that supplied by the main jet when the accelerator is depressed rapidly for quick acceleration. After the stroke has been set to give maximum acceleration, the actual quantity of gasoline the pump supplies is determined entirely by how frequently the accelerator is depressed rapidly. The handling of the accelerator, therefore, has a marked effect on the fuel consumption.

Tune-up Procedure

Since it is usually necessary to *sell* the customer on the need of a tune-up, the procedure will be followed with this in mind.

When tuning an engine the last test to be made is the vacuum test, as it is a general check of all conditions affecting the operation. It, therefore, can be used to advantage before the customer to determine the need of a tune-up. Regardless of the customer's request, so long as it pertains to engine performance, attach the vacuum gauge to the windshield wiper connection. If it shows a steady reading of 18″ to 20″ on a Terraplane 6 or Hudson 6 or from 19″ to 21″ on a Terraplane 8 or Hudson 8 when idling at 7 miles per hour, attach a synchroscope to number 1 spark plug and check the ignition timing. This is necessary as correct vacuum may be obtained by setting the timing ahead to offset a rich carburetor mixture or vice versa.

If the vacuum gauge hand drops back at regular intervals, it indicates a valve stuck open or leaky valves. If the hand drops back at irregular intervals, it indicates the carburetor too rich or too lean, valve stems intermittently sticking or an intermittent spark plug miss. If the vacuum gauge shows a low reading with proper ignition timing and carburetor idle adjustment, it indicates an intake manifold leak or leakage around intake valve stems.

If the hand drops back from 5″ to 20″ at regular intervals it indicates a valve held open or a cylinder head gasket blown. More vibration of the gauge hand at high engine speed than at low engine speed indicates weak valve springs.

The above applies to tests made at altitudes not over 2000 feet above sea level. Above 2000′ altitude the vacuum gauge reading will decrease approximately one inch for each 1000′ increase in altitude.

The above tests are mainly for idling speed operation and do not show any conditions which are prevalent at high speed only. It, therefore, is essential that the ignition system, including the battery and starter circuit, be tested thoroughly and that the carburetor float level and metering pin position be carefully set.

Locating Weak Cylinders

A test harness consisting of five pieces of high tension cable should be used in this test. One end of each of the wires should be attached to a large snap on clip and a small clip suitable for attaching to the spark plug terminal attached to the other end of each wire. Attach the large clip to the engine as a ground. Open the throttle so that the engine is running at a speed equal to about 25 m.p.h. Now ground spark plugs Nos. 1-2-3 and 6 by attaching the small clips to them. Note the vacuum gauge reading. Now remove the clip from No. 6 and attach to No. 5, then to No. 4. If the same reading is obtained in all cases, the three rear cylinders have equal compression and uniform power impulses. If one reading is higher than the other two, the cylinder to which the clip is attached is the weak cylinder.

The test is repeated on the three front cylinders by grounding spark plugs No. 4, No. 5 and No. 6 and then grounding No. 1, No. 2 and No. 3, one at a time and noting the readings as before.

When testing an eight-cylinder engine, attach the clips to spark plugs No. 1, No. 2 and No. 7 and No. 8, then test No. 3, No. 4, No. 5 and No. 6 cylinders in order, then attach clips to spark plugs Nos. 3-4-5 and 6 and test Nos. 1-2-7-8 as before. In this test the engine will be running on three cylinders instead of two as in the six-cylinder engine. A variation of ½″ vacuum is permissible between cylinders.

Compression Test

If a weak cylinder is located by the balance test, remove the spark plug from that cylinder and attach a compression gauge. Turn the engine with the starter—ignition off—and note the gauge reading.

Remove the gauge and inject a good quantity of engine oil into the cylinder and turn the engine over a few times to distribute the oil and insure a good piston seal. Insert the compression gauge and take another reading.

If the second reading is considerably higher than the first, it indicates that the major loss of compression is by the piston rings. No appreciable increase indicates a blown cylinder head gasket or leaking valves.

Conclusion

The information given on the various phases of Engine Tune-up is valuable only as it is used. It can be made use of only after careful study and through accurate application. Reliable equipment is essential.

Air Cleaners

In addition to Oil Bath Air Cleaners being available as an accessory, they are now included as a factory option. They can be obtained at a slight extra cost as factory equipment on all Terraplane and Hudson models.

The silencer type air cleaner which has been used as standard equipment on Terraplane De Luxe cars is now standard equipment on the Terraplane Special models.

These additions make available to Terraplane and Hudson purchasers the maximum protection against engine damage from dust and also gives the Terraplane Special the quietness of operation that has been characteristic of the higher priced Terraplane and Hudson models.

TERRAPLANE Motor Tune-Up and Carbureter Data

CAUTION. Change worn or leaky flange gaskets. Tighten manifold bolts and test compression before adjusting carbureter.

Car and Carbureter Models	Spark Plug Gap	Set Breaker Points	Use Timing Light	Valve Clearance With Motor Operating at Normal Temperature — Set Valves	Correct Float Level (Remove Cork Gasket)	Idle Adjustment Screw Setting	Metering Rods (Use gauge, part No. T109-20—marked 2.795—before installing new rod.)
Essex "K" Six Terraplane 1932 Carbureter No. 2435★	.025"	.020"	Distributor to be set so breaker points separate at top dead center. Mark on flywheel to be opposite pointer on flywheel housing.	Intake .006" Exhaust .008"	3/8 in. to 13/32 in.	5/8 to 1 1/8 Turns Open	Standard 75-53 60-48; 1 Size Lean 75-90 75-90; 2 Sizes Lean 75-91 75-91
Essex "KP" Six Export Terraplane 1933 Carbureter No. 2535★	.025"	.020"	Breaker points to separate at top dead center of piston travel. Mark on flywheel D. C. 1-6 to be opposite pointer on flywheel housing (3/4" (19.0 mm) B. T. D. C. with hightest fuel).	Intake .006" Exhaust .008"	1/2 Inch	1/2 to 1 Turn Open	Standard 75-70 67-56; 1 Size Lean 75-92 75-92
Essex "K" Six Terraplane 1933 Carbureter No. 2675★	.025"	.020"	Breaker points to separate at top dead center of piston travel. Mark on flywheel D. C. 1-6 to be opposite pointer on flywheel housing.	Intake .006" Exhaust .008"	3/8 in. to 13/32 in.	3/4 to 1 1/4 Turns Open	Standard 75-67 62-45; 1 Size Lean 75-96 75-96; 2 Sizes Lean 75-97 75-97
Essex "KT" Eight Terraplane 1933 Carbureter No. 2615★	.025"	.020"	Synchronize breaker points. Stationary points open when flywheel mark D. C. 1-8 registers with pointer on inspection hole. Movable points open when mark D. C. 3-6 register.	Intake .006" Exhaust .008"	1/2 Inch	3/8 to 1 Turn Open	Standard 75-76 75-76; 1 Size Lean 75-94 75-94; 2 Sizes Lean 75-95 75-95
*Terraplane "K & KU" Sixes, 1934 Carbureter No. 2815★	.025"	.020"	Breaker points to open 1/2" before D. C. mark on flywheel.	Intake .006" Exhaust .008"	3/8 Inch	3/8 to 1 Turn Open	Standard 75-106 75-106; Lean 75-100 75-100
*Terraplane Export "KP" Six, 1934 Carbureter No. 2875★	.025"	.020"	Breaker points to open 1/2" before D. C. mark on flywheel.	Intake .006" Exhaust .008"	3/8 Inch	3/8 to 1 Turn Open	Standard 75-108 58-54; 1 Size Lean 75-122 75-122; 2 Sizes Lean 75-123 75-123
Terraplane "KS" Six, 1934 Carbureter No. 2955★	.025"	.020"	Breaker points to open 1/2" before D. C. mark on flywheel.	Intake .006" Exhaust .008"	3/8 Inch	3/8 to 1 Turn Open	Standard 75-119 75-119; Lean 75-100 75-100
Terraplane "G" & Commercial, 1935 Carbureter No. 3115★	.022"	.020"	†Breaker points to open at top dead center.	Intake .006" Exhaust .008"	3/8 Inch	3/8 to 1 Turn Open	Standard 75-119 75-119; Lean 75-100 75-100
*Terraplane "GU" 1935 Carbureter No. 3095★	.022"	.020"	†Breaker points to open at top dead center.	Intake .006" Exhaust .008"	3/8 Inch	3/8 to 1 Turn Open	Standard 75-106 75-106; Lean 75-100 75-100

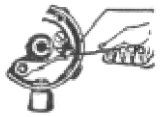
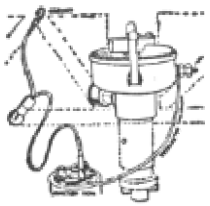
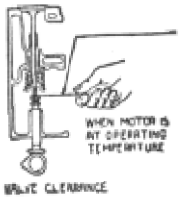
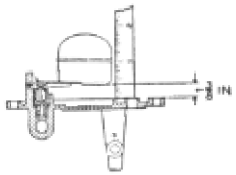
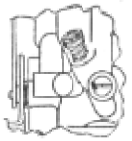
★Units so marked have pump stroke adjustable for high or low temperatures. Set to longest stroke for cold weather, to shorter stroke for hot weather driving.
*Units so marked are equipped with Carter Climatic Control.
†Early cars equipped with Autolite IGB—4301A distributor—breaker points should open 1/2" before D. C.

Courtesy Carter Carburetor Corporation

HUDSON Motor Tune-Up and Carbureter Data

Be Accurate! Always Use Feeler Gauges!

CAUTION. Change worn or leaky flange gaskets. Tighten manifold bolts and test compression before adjusting carbureter.

Car and Carbureter Models	 Spark Plug Gap	 Set Breaker Points	 Use Timing Light		 Correct Float Level (Remove Cork Gasket)	 Idle Adjustment Screw Setting	Metering Rods (Use gauge, Part No. T109-20, marked 2.795, before installing new rod.) 
Models "LL" and "LT"—1934 Carbureter *No. 282S★	.025″	.015″	Breaker Points to Open 1/2″ Before D. C. Mark on Flywheel.	Intake .006″ Exhaust .008″	3/8 Inch	3/8 to 1 Turn Open	Part No. Standard 75-107 Lean 75-127
Model "LTS" 1934 Carb. No. 299S★	.025″	.016″	Breaker Points to Open 1/2″ Before D. C. Mark on Flywheel.	Intake .006″ Exhaust .008″	3/8 Inch	3/8 to 1 Turn Open	Part No. Standard 75-120 Lean 75-127
*Model "GH" 1935 Carb. No. 309S★	.022″	.020″	†Breaker Points to Open at Top Dead Center.	Intake .006″ Exhaust .008″	3/8 Inch	3/8 to 1 Turn Open	Part No. Standard 75-106 Lean 75-100
*Models "HT," "HU" and "HHU" 1935 Carb. No. 310S★	.022″	.020″	†Breaker Points to Open at Top Dead Center.	Intake .006″ Exhaust .008″	3/8 Inch	3/8 to 1 Turn Open	Part No. Standard 75-107 Lean 75-127

★Units so marked have pump stroke adjustable for high or low temperatures. Set to longest stroke for cold weather, to shorter stroke for hot weather driving.
*Units so marked are equipped with Carter Climatic Control.
†Early cars equipped with Autolite IGP—4001A distributor—breaker points should open 1/2″ before D. C.

Courtesy Carter Carburetor Corporation