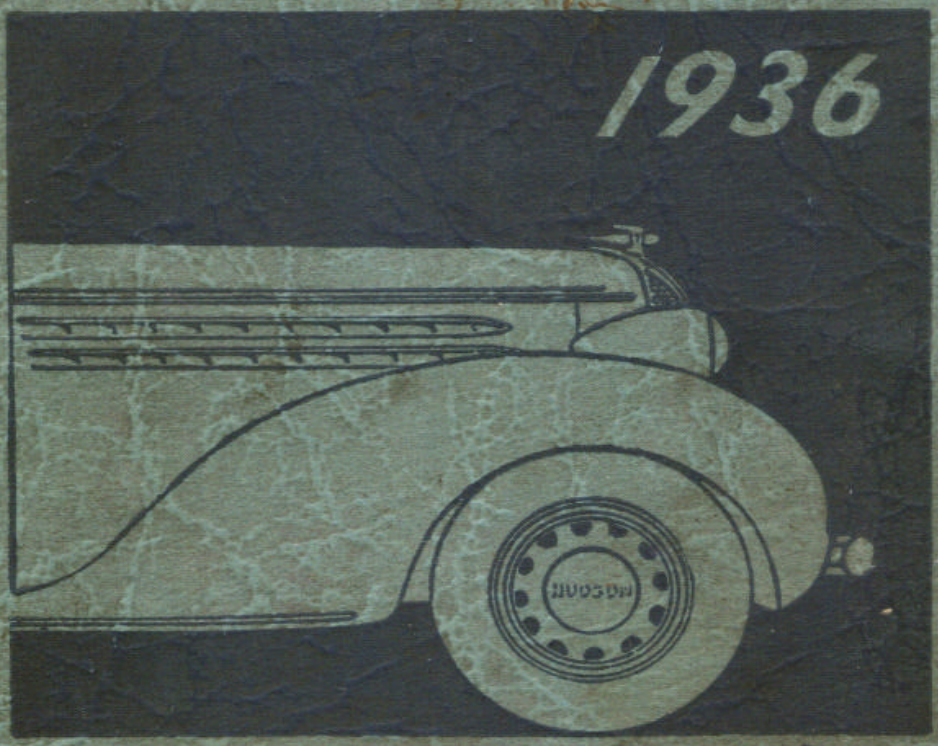
HUDSON

Six

1936



OWNER'S MANUAL

To the Owner of this Hudson Six Motor Car

A great deal of money, time and care has been devoted to the proper designing, manufacturing and preparation of this car for delivery into your hands.

We share your pride in its character and appearance, and our sincere hope is that you derive from its operation the full enjoyment and utility to which you looked forward in purchasing it.

For these reasons, may we take the liberty of suggesting that a fine mechanism such as this new car of yours will always respond with its best to considerate treatment and care?

It will repay you well for the slight outlay in attention and cost required to give it regular and proper lubrication, inspection at stated intervals, and such adjustments as may be indicated from time to time.

Hudson and Essex Distributors and Dealers in your community, and practically everywhere you may drive, are prepared with equipment facilities and experienced personnel to give your car uniform, proper and complete attention in these respects at moderate prices for the materials supplied and services rendered. We commend to you their expert and friendly interest in your car.

As to this manual itself, its chief purpose is to acquaint you with the means of taking the best care of your car, so that you may derive from it. the full measure of operating quality and long economical life built into it at the factory. Will you cooperate to the extent of reading this manual and keeping it in one of the side pockets of your car for ready reference as needed?

HUDSON MOTOR CAR COMPANY
Detroit, Michigan

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Warranty

"We warrant each new passenger automobile manufactured by us to be free from defects in material and workmanship under normal use and service, our obligation under this warranty being limited to making good at our factory any part or parts thereof, including all equipment or trade accessories (except tires) supplied by the Car Manufacturer, which shall, within ninety (90) days after making delivery of such vehicle to the original purchaser or before such vehicle has been driven 4000 miles, whichever event shall first occur, be returned to us with transportation charges prepaid, and which our examination shall disclose to our satisfaction to have been thus defective, this warranty being expressly in lieu of all other warranties expressed or implied and of all other obligations or liabilities on our part, and we neither assume nor authorize any other person to assume for us any liability in connection with the sale of our vehicles.

"This warranty shall not apply to any vehicle which shall have been repaired or altered by other than an authorized Hudson and Essex Distributor or Dealer in any way so as, in the judgment of the Manufacturer, to affect its stability or reliability nor which has been subject to misuse, negligence or accident."

HUDSON MOTOR CAR COMPANY

Detroit, Michigan, U. S. A.

Inspection Service

Upon delivery of the new car the Dealer will furnish the owner with an Owner's Service Policy and Identification Card, which entitles the owner to replacement of any defective parts in accordance with the Standard Warranty.

The car will be inspected and lubricated by the Dealer who sold the car at the expiration of 500 miles and 1,500 miles of driving at no charge other than the list price of engine oil, lubricants or supplies used. If the car is taken to a Hudson and Terraplane Dealer other than the one who sold it, the inspections will he made at a nominal cost.

The inspections to include the following operations

500 Mile Inspection
Lubrication

1. Chassis Fittings
2. Engine (Change Oil)
3. Water Pump
4. Generator
5. Starter
6. Distributor
7. Hood Locks and Hinges
8. Door Strikers and Dovetails
9. Door Locks and Hinges

Mechanical Inspection

1. Remove Governor
2. Tappet Adjustment
3. Check Engine Tune-up (Minimum Vacuum Gauge Reading-18)
4. Fan Belt Adjustment
5. Generator Charging Rate
6. Generator, Starter and Battery Connections
7. Generator Regulator
8. Lamps (Connections and Bulbs)
9. Battery
10. Brake Fluid
11. Clutch Pedal Adjustment
12. Rear Wheels Tight on Taper
13. Tighten all Wheel Bolts
14. Adjust Door Strikers and Dovetails
15. Inflate Tires
16. Fill Radiator (Anti-freeze in cold weather

1500 Mile Inspection
Lubrication

1. Chassis Fittings
2. Engine
3. Throttle Rods
4. Generator
5. Distributor
6. Water Pump Shaft
1. Starting Motor
2. Transmission
3. Rear Axle
4. Steering Gear
5. Hood Locks and Hinges
6. Door Locks, Hinges and Dovetails
13. Oil Bath Air Cleaner

Mechanical Inspection

1. Engine Tune-up
   Spark Plugs, Distributor Points, Tappets, Ignition Timing, Carburetor (Minimum Vacuum Gauge Reading-18)
2. Fan Belt
3. Radiator (Anti-freeze in cold weather)
4. Battery
5. Instruments and Signals
6. Inflate Tires
1. Pitman Arm Tight on Shaft
2. Drag Link
3. Body Bolts Tight
4. Front Wheel Bearing Adjustment
5. Tighten Wheel Bolts
6. Brakes-Fluid and Adjustment
7. Steering Gear Adjustment
8. Front Spring Clips Tight
9. Rear Spring Clips Tight
10. Door Lock Strikers

License Data

Car Serial Number (on plate on dash under hood)	63101 and up
Engine Serial Number (stamped on left side of cylinder block opposite cylinder number 6)	70000 and up

Number of Cylinders		6
Cylinder Bore		3"
Piston Stroke		5"
NACC Horsepower Rating		21.6
Piston Displacement	cu. in	212

Actual Horsepower

Compression Ratio	Horsepower
6.25 to 1	93 @ 3800 R.P.M.
7.0 to 1	100 @ 3800 R.P.M

Body Types and Weights

Brougham	2830	Touring Sedan	2880
Touring Brougham	2830	4-Pass. Coupe	2810
Sedan	2880	2-Pass. Coupe	2730

Convertible Coupe 2870

Technical Information

Engine

Type	6 Cylinders en bloc
Compression Ratio	Standard-6.25 to 1 Optional-7 to 1
Actual Horsepower Developed-	
6.25 to 1 Compression	93 @ 3800
7 to 1 Compression	100 @ 3800
Firing Order	1-5-3-6-2-4
Number Main Bearings	3
Main Bearing Clearance	.001"
Main Bearing End Play	.006-.012"
Valve Material	Silicon Chrome Alloy Steel
Valve Head Diameter .	Intake, 1-3/8"; Exhaust, 1-3/8"
Valve Tappet Clearance (Hot)	Intake, .006'; Exhaust, .008"
Camshaft Drive	Gear
Connecting Rod Lower Bearing Clearance	.001"; End Play .006' to .010"
Piston Material	Lo Ex Aluminum Alloy
Piston Type	.T Slot Cam Ground
Piston Weight	Ounces, 10.75
Skirt Clearance	.002"
Number Piston Rings	Compression, 2; Oil Control, 2
Width of Piston Rings	..Compression, 3/32"; Oil Control, 3/16"
Piston Ring Gap	.009"-.011"
Lubrication System	Hudson Duo-flo Automatic
Oil Pump Type	Oscillating Plunger
Oil Reservoir Capacity	5 Quarts
Capacity of Lubrication System	6 Quarts

Cooling System

Type	Pressure Pump Circulation
Radiator Type	Ribbon Cellular
Cooling System Capacity	3¼ Gallons
Fan Belt	"V" Type

Fuel System

Carburetor .	Make, Carter; Type, Down Draft; Size, 1¼"
Choke Control	Automatic
Heat Control	Automatic
Fuel Delivery	Pump
Air Cleaner	Intake Silencer Type
Gasoline Tank Capacity	16½ Gallons

Starting, Lighting and Ignition

Make	Autolite
Spark Control	Automatic
Timing.	Dead Center
Firing Order	1.5-3-6-2-4
Distributor Gap	020"
Spark Plug Type	Champion J-8—Metric
Spark Plug Size	14 MM.
Spark Plug Gap	025"
Generator Regulation	Third Brush and Voltage Regulator
Generator Charging Rate	Cold, 22 Amps.; Hot, 17 Amps

Fuse—Headlamp Circuit, 20 Amps.
Tail Lamp Circuit, 20 Amps.
Voltage Regulator, 7½ Amps.

Lamp Bulb Specifications

	C. P.	Base	Voltage	Mazda No.
Head	32-32	D. C.	6-8	2331
Parking	1	S. C.	6-8	55
Dash Signals	1	S. C.	6-8	51
Instruments	1	S. C.	6-8	51
Stop and Tail	2-21	D. C.	6-8	1158
Dome	15	S. C.	6-8	87

Clutch

Type	Oil Cushioned, Single Plate
Clutch Pedal Clearance at Floor Board	1½"

Transmission

Type	Selective
Gear Ratio	Low, 2:42; Second, 1.6; High, 1; Reverse 3.30
Lubrication	Summer, S.A.E. 90 EP; Winter, S.A.E. 80 EP; Capacity, 3 Pints

Rear Axle

Type	Semi-Floating
Bearing Type	Taper Roller Throughout
Gear Ratio	4-1/9-1, 4-5/9-1
Lubrication	Summer, S.A.E. 110 EP; Winter, S.A.E. 90 E. P.; Capacity, 3 Lbs.

Front Axle

Toe-in	0 to 1/8"
Caster	2° to 3°
Camber	1°-1¾"

Brakes

Type	4-Wheel Hydraulic
Size	10-1/16 x 1¾"
Clearance Between Lining and Drum	.010"

Steering Gear

Type	Variable Pitch Worm and Sector
Gear Reduction	17 to 1
Lubricant	Summer, S.A.E. 110 EP; Winter, S.A.E. 90 E. P

Tires

Size	16 x 6.00
Minimum Air Pressure	Front, 24 Lbs.; Rear, 32 Lbs.

Chassis Dimensions

Wheelbase	120"
Tread	Front, 56"; Rear, 57½"
Road Clearance (center)	Front Axle, 8-9/16"; Rear Axle, 8-7/16"
Over-all Length, Including Bumpers—	
Sedan and Brougham	199-5/8"
Coupe	204-5/8"

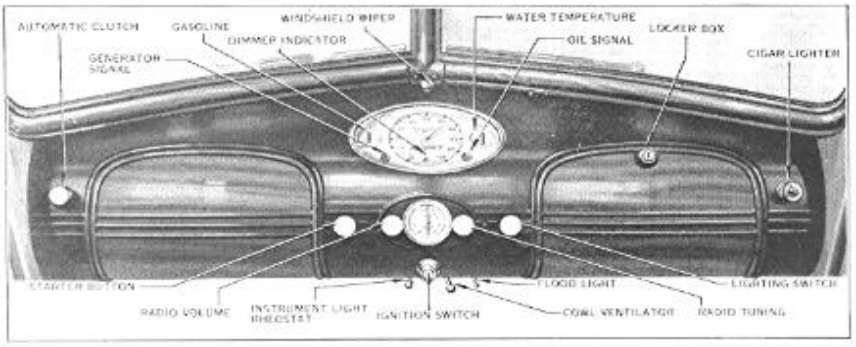


Figure 1

OPERATION

The operation of the Hudson Six follows standard practice in many respects; however, even those accustomed to Hudson products may refresh their memories on some of the details by reading the following paragraphs:

The clutch is disengaged in the conventional manner by depressing the left foot pedal to release the engine drive from the transmission. Automatic clutch control is available and the control button is located as shown in Figure I. When the control button is pushed in, the automatic clutch control becomes operative. The clutch is then disengaged simply by removing the foot from the accelerator pedal.

The transmission operation conforms to the standard shift. The clutch must be disengaged (either by using the pedal or by removing the foot from the accelerator pedal when automatic clutch control is being used) before shifting gears.

The "Electric Hand" transmission control, which is available as a factory-installed option, has a small lever, Figure la, conveniently located just under the rim of the steering wheel. This lever has five positions arranged in the form of the letter 1-3 corresponding to the neutral, three forward and reverse positions of the standard transmission shifting lever. This lever is easily moved to any of the forward gear positions to select the gear desired. As a safety feature, it is necessary to lift up on the lever and at the same time push forward in order to get into the reverse position.

The control is electrical while the actual shifting is accomplished by vacuum power from the engine intake manifold. The control is inter-connected with the ignition switch and a circuit breaker on the clutch pedal, making it necessary to have the ignition turned on and the clutch pedal depressed (clutch disengaged) before the system is energized to accomplish a shift of gears. The starter is also inter-connected with a circuit breaker on the clutch pedal, requiring the clutch to be disengaged before the engine can be started. This is a safety feature, preventing the car from being moved should the engine be started while the transmission is in gear.

To operate a car equipped with the "Electric Hand" control: (1) see that switch on selector housing is "on," (2) depress the clutch pedal, (3) turn on the ignition switch, (4) press the starter button. Now, with the engine running and the clutch disengaged (if vacuum clutch control is being used it is not necessary to hold the clutch disengaged with the foot after the engine is started; simply take the foot off the accelerator pedal), move the finger tip control lever to the gear position desired and the shift will be completed immediately. Allow the clutch to engage while depressing the accelerator and the car will move normally for the gear selected. When it is desired to make another shift simply depress the clutch pedal, move the finger tip control lever to the gear desired and allow the clutch to re-engage.

With vacuum clutch the entire operation consists simply of removing the foot from the accelerator pedal, moving the finger tip control lever to the desired gear, then depressing the accelerator pedal to re-engage the clutch and feed the desired amount of gasoline mixture to the carburetor.

A small toggle switch mounted on the selector housing can be used to make the "Electric Hand" inoperative when the car is being serviced or to prevent tampering with the shifting mechanism.

The need of a gear shift lever is eliminated on cars equipped with the "Electric Hand" except should it be desired to shift the transmission when the engine is not running. A hand gear shifting lever is provided with the tool equipment for this purpose. By removing the cover in the floor mat, which exposes the top of the transmission control, the shifting lever can be put in place and any desired shift made after the clutch pedal has been depressed. The toggle switch on the selector switch housing should be turned off while the shifting lever is in place.

The brakes are operated on all four wheels by depressing the right foot pedal while the two rear brakes are operated by pulling backward on the band lever located under the instrument panel to the left of the steering column.

The engine speed is controlled by the foot accelerator. The engine idling speed is automatically increased when the engine is cold to prevent stalling.

The lights on the car are operated by the main lighting switch, which is the knob to the right of the center of the instrument panel, the instrument light switch located under the instrument panel just to the left of the ignition lock, the front compartment flood light switch located under the instrument panel to the right of the ignition lock, the driving light control switch on the toe board to the left of the clutch pedal, the dome lamp switch located on the right hand center pillar and the stop lamp switch.

The main lighting switch has three positions. The central position is "off." Turning the knob clockwise gives the driving lights, while anti-clockwise rotation gives parking lights.

When the main lighting switch is in the driving position the driving light control (foot) switch becomes effective. By pressing this control button and releasing it, the headlamp beams may be deflected to the city driving position, immediately in front of the car, Or to the country driving position, in which the light will be projected a considerable distance ahead of the car. When the lights are in the country driving position the small light at the bottom of the speedometer dial is lighted. (See page 38 for Adjustment of Headlamps.)

The instrument light switch is a gradual control giving any intensity of illumination desired from off to full on by simply turning the knob.

The front compartment and dome lamp switches are of the conventional toggle type.

The stop lamp switch is located on the chassis frame and is connected to the brake system so that the stop light is illuminated when the brakes are applied.

The starter is controlled by the push button to the left of the center of the instrument panel. The ignition switch must he turned on, and on Electric Hand equipped cars the clutch pedal must also be depressed when the starter button is depressed.

The carburetor is equipped with Climatic Control (self-controlled choke), which gives correct fuel mixture for all starting and running conditions without any manual control on the part of the operator.

The oil pressure signal is the red jewel located to the right of the center of the instrument group. When the ignition switch is turned "on" this signal will be lighted. If it remains lighted or flashes while the engine is running above idling speed, the engine should be stopped and the oil level in the reservoir checked. If necessary, check the oil lines. Do not run the engine until the trouble is corrected.

The generator signal is the red jewel located to the left of the center of the instrument group. When the ignition switch is turned "on" this signal will be lighted and should stop glowing when the engine reaches a speed slightly above normal idling. If the signal flashes when the car is being driven above twenty miles per hour, it indicates that the battery is not being charged. Your electrical system should be checked by your Hudson Dealer.

The gasoline gauge, located at the left of the instrument group, indicates the quantity of gasoline in the tank.

The water temperature indicator is located at the right side of the instrument group and, like the gasoline gauge, is operative only when the ignition is turned on.

Starting the Engine

Before attempting to start a cold engine, depress the accelerator pedal slowly approximately 1/4 to half way and then release. This will allow the high idle speed stop to come into position to prevent stalling during the warming-up period. Insert the key in the ignition lock and turn to the right. Press the starter control button to bring the starter into action and start the engine.

If the engine is warm from previous running, the accelerator pedal should be depressed approximately N to half way and held in that position during the starting operation.

If the engine does not start after 15 to 20 seconds of cranking, release the starter button and, after a few seconds, repeat the starting operation.

Do not work the accelerator pedal up and down, except as previously mentioned, either before or during the starting operation, as this will cause the accelerator pump to supply an excessive amount of gasoline and prevent correct starting.

Should a flooded condition of the carburetor develop, either through operation of the accelerator pedal or continuous cranking without the ignition turned on, depress the accelerator pedal fully for further cranking of the engine. With the accelerator pedal in this position, the choke is held open so that the excessive amount of gasoline can he drawn through the engine readily.

Failure of the engine to start when the above procedure is followed can usually be traced to improper engine adjustments or, in cold weather, a combination of this and improper engine lubricant. The car should be taken to an Authorized Hudson and Terraplane Dealer for adjustment or replacement of the oil with the correct grade for the local operating conditions.

Breaking-in Instructions

Your Hudson Six has been designed in accordance with the best practices determined by years of experience and built under the most rigid standards of precision. Before shipment from our factory, each mechanical unit was supplied with the proper quantity of correct lubricant to give maximum protection to the finely finished working parts. In fact, every precaution has been taken to put in your hands an unexcelled mechanism, properly protected against premature wear. Extreme care has been exercised in selecting and testing each lubricant used and there is, therefore, no necessity of replacing any lubricants until the normal change mileage has been reached.

In order to enjoy the maximum in life and trouble-free performance which has been built into your Hudson Six, you should at all times give it the consideration that any fine mechanism deserves.

During the first one thousand miles you should be diligent in following accepted practice, as described in later paragraphs, to permit proper break-in of the finely finished working parts. Failure to follow this practice may result in damage to bearing surfaces, cylinder walls or pistons, or abnormal increases in clearances, which will shorten the life and impair the performance of the units.

Keep the radiator full of water at all times. Maintain the proper oil level in the oil reservoir, using the correct grade of good quality oil as prescribed on page 16.

Do not accelerate fast during the break-in period, as this throws extreme loads on the working parts. When increasing the speed of the car depress the accelerator pedal gradually. Use second gear under adverse driving conditions.

Do not apply the brakes harshly, as braking surfaces require the same care during the break-in period as do engine parts. Hard application of the brakes during

the first few hundred miles may score the brake drums or gall the linings.

The following recommendations should be ,followed as to speed during the first one thousand miles of driving. These recommendations are maximum safe speeds under favorable operating conditions. The speed of the car should be decreased under unfavorable conditions, such as rough or rutted roads, or in climbing steep or continuous grades.

0-250 MILES

Do not exceed 40 miles per hour in high gear or 20 miles per hour in second. Do not accelerate rapidly. Use second gear on steep grades.

250-500 MILES

Do not exceed 50 miles per hour in high gear or 25 miles per hour in second.

500-1,000 MILES

During this period the speed should not exceed 60 miles per hour.

Important

Your car is equipped with a governor installed and sealed at the factory to insure it reaching you in good condition.

While the governor is in place, the top speed and acceleration are restricted and the air intake noise slightly increased.

Your dealer will remove the governor and tune the engine for you when making the 500-mile inspection.

Maintain oil level in crankcase within "oil level range" on oil level gauge at all times. (See Figure 2.)

Do not drive at a high rate of speed until the engine is thoroughly warmed up. Cold oil is not able to flow freely into the small clearances between the working surfaces, so that damage may occur if this is not observed.

Special Lubricants

THERE IS NO NECESSITY OF USING SPECIAL LUBRICANTS CONTAINING GRAPHITE OR OIL CONCENTRATES EITHER IN THE ENGINE OIL RESERVOIR OR BY ADDING TO THE GASOLINE DURING THE BREAK-IN PERIOD. If such practices are followed by the owner, he should be guided as to quantities by the recommendations of the manufacturer of the special lubricant. Only light, finely refined oils should be added to the gasoline and not to exceed one quart to a full tank of gasoline

Even where these special practices are followed, the recommendations of the foregoing paragraphs as to speeds and operation should be adhered to strictly.

ENGINE

The unusual power, efficiency and economy of the Hudson Six engine are due to a combination of such advanced designs as the chrome alloy cylinder block, giving great strength and wearing qualities so as to almost eliminate wear on cylinder walls and valve seats; silicon aluminum alloy pistons, cam ground and fitted with a clearance of .002"; silicon chromium steel valves; down draft carburetion—all built around a fully compensated crankshaft and lubricated by the Hudson Duo-flo Automatic Lubricating System.

Crankshaft, Connecting Rods and Pistons

The crankshaft is a heavy forging with integral compensating weights. Full compensation and a torsional dampener mounted on the front insures free running of the crankshaft under all operating conditions. The main bearings are removable bronze backed, virgin babbitt and are fitted to .001" clearance and provided with shims for adjustment. The working member of the dampener is rubber, fully enclosed, requiring no adjustment.

The connecting rods are steel forgings carrying spun virgin babbitt bearings in the lower end fitted with a clearance of .001" and having shims .provided w for adjustment. The upper end is fitted with a bronze bushing to which the piston pin is fitted with .0003" clearance.

The pistons are of silicon aluminum alloy of new design. This alloy is hard, lighter than aluminum and dissipates heat rapidly. The piston is "T" slotted to compensate for expansion; cam ground to give full bearing on the cylinder wall; and is fitted with two compression rings and one oil control ring above the piston pin and one oil control ring below. With this arrangement all of the rings are located somewhat lower down on the piston, with the result that cooler operating conditions and better oil control are obtained. The piston is attached to the connecting rod by a full floating pin, which is honed to give a perfect bearing in the diamond bored piston bosses. The piston pin is a snug fit in the piston bosses when the piston is heated to 200° F.

This piston design permits fitting to the cylinder with a clearance of .002". The pistons are removable from the top of the cylinder bore.

The camshaft is Electric Furnace Alloy with hardened bearing and cam surfaces. End play is prevented by a spring and plunger pressing against the front end of the shaft.

Valve Tappet Adjustment

The valves, which are silicon chromium steel, are operated by the cams through adjustable tappets. The tappets should be adjusted while the engine is at normal operating temperature. To adjust the tappets, remove the engine side cover plates (right side of engine below intake manifold) and insert a feeler gauge between the top of the tappet screw and bottom of the valve stem while the engine is running. The valve tappets should be adjusted to a feeler gauge clearance of .006" on the intake valves and .008" on the exhaust valves. The tappet screw locking nut should be tightened securely after adjustment. The tappet clearance is important and should be set accurately to the recommended dimensions.

Valve Timing

The valve timing is determined by the meshing of the crankshaft and camshaft gears. The tooth of the crankshaft gear with the punch mark on the front face should mesh between the two punch marked teeth of the camshaft gear.

Lubrication System

The Hudson Duo-flo Automatic Lubrication System gives a positive flow of oil to every working part of the engine from the moment of starting throughout the period of operation. It also, through in-built features, conditions the oil so that all oil supplied by the oscillating plunger pump is cooled and freed of solid matter and diluents.

There are only two moving parts in the entire system—the oscillating plunger and the driveshaft of the pump, which is driven by gears direct from the camshaft. There are no small drilled passages to clog or restrict free flow of oil when cold. The oil pipes (3 in number) are all located outside the engine and can readily be removed should there be any necessity to do so.

Crankcase Ventilation and Oil Conditioning

The crankcase ventilators mounted on the valve chamber covers are unusually effective as diluents consist mainly of unburnt gasoline and water coming from the cylinders and crankcase walls and cannot enter the oil reservoir but are retained in the crankcase. The temperature here is near the boiling point of these diluents and, with the agitation of the moving parts of the engine, they are readily vaporized and removed by the slight suction maintained on the ventilator tubes.

Figure 2

The flow of oil after returning to the crankcase is controlled so that it circulates around passages adjacent to the cool outside walls of the reservoir and is cooled before passing through the filter, which removes all solid matter before the oil is recirculated by the pump.

The filter surfaces are so placed that they are flushed each time the crankcase oil is drained and therefore require no special cleaning nor do they have to be replaced.

Oil Capacity

Under operating conditions one quart of oil is retained in the crankcase in addition to the five quarts of oil in the reservoir. If the oil reservoir is removed, one quart of oil should be put into the upper crankcase tray and five quarts in the reservoir. The quantity of oil in the reservoir can be determined by the bayonet gauge attached to the filler cover. (See Figure 2.)

When the oil level is down to the "low" mark, one inch from the bottom of the gauge, three quarts of oil remain in the reservoir. Two additional quarts are required to bring the level up to the mark at the top of the "oil level range". When the reservoir only is drained by removal of the drain plug at the rear of the reservoir, five quarts of oil should be used, filling through the opening in the left side of the crankcase. (See Figure 2.)

The red jewel mounted to the right of the center of the instrument group should be lighted when the ignition is turned on but go out when the engine is running at slightly more than idling speed. Flashing of the light at idling speed indicates

proper operation. Should the light come on when the engine is running above idling speed it indicates interruption of the oil supply and the engine should be stopped until the cause is corrected.

Lubricants

The viscosity of a lubricant is simply a measure of its body or fluidity. The S.A.E. viscosity numbers constitute a classification of lubricants in terms of viscosity, or fluidity, but without reference to any other characteristics or properties.

THE REFINER OR MARKETER SUPPLYING THE OIL IS RESPONSIBLE FOR THE QUALITY OF ITS PRODUCT. THEIR REPUTATION IS THE CAR OWNER'S BEST INDICATION OF QUALITY.

The S.A.E. viscosity numbers have been adopted by practically all oil companies and no difficulty should be experienced in obtaining the proper grade of lubricant to meet seasonal requirements.

The grade of oil best suited for each range in temperature is shown by the accompanying table. The car owner should always select an oil having the recommended temperature range agreeing with the lowest atmospheric temperature likely to be encountered before the next oil change.

During the winter months the owner's selection of crankcase oil should be based primarily on easy starting characteristics. The viscosity of 10 W and 20 W oils is such as to permit easy starting down to the minimum temperature for wbich they are recommended.

Oils carrying the S.A.E. specification and not a (winter) specification are selected only on their viscosity at higher temperatures and the starting characteristics of such oils will vary depending upon the type of crude and the refining process.

Although there are oils carrying the S.A.E. specification which also meet the specification for winter starting qualities, the specification on the container is the car owner's only definite assurance as to the starting qualities of the oil.

Minimum Atmospheric Temperature Expected	**Oil Specification**
40° Fahrenheit	S. A. E. 30
0° Fahrenheit	20 W.
-15° Fahrenbeit	10 W.
Below -15° Fahrenheit	10 W. Plus 10% Kerosene

The oil level should be maintained within the "oil level range" on the oil level gauge at all times. Drain oil after first 500 miles of operation and at 2,000 mile intervals thereafter. Refill with five quarts of oil of proper specification.

Ignition System

The distributor is mounted on the right side of the crankcase and driven by gears from the camshaft. A single breaker arm is operated by a six-lobe cam. Automatic advance is incorporated so that the correct timing is given at all speeds

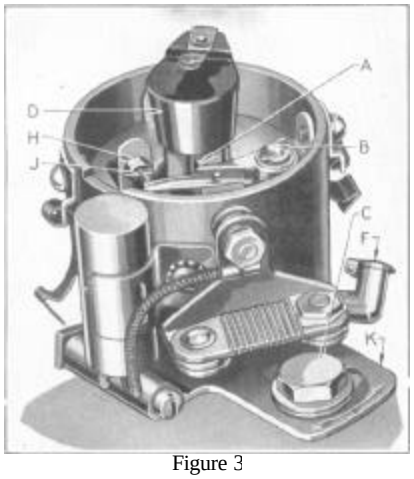


Figure 3

Lubrication

The oil cup (F), Figure 3, should be filled with oil every 2,000 miles. At the same time remove the distributor cap (not shown) and rotor arm (D), placing a few drops of oil on the top of the shaft, one drop of oil on the breaker arm pivot (B), and apply a light coating of vaseline on the cam block (A).

Breaker Points

The breaker points should be adjusted to .020" maximum opening. The points should be clean and set squarely on each other. If the points become pitted it is necessary to remove them and grind smooth or replace with new ones. The grinding should be done in a special machine to insure proper seating. This operation should be done by an Authorized Hudson and Terraplane Service Station.

Filing or honing of the points will remove oxidization from the points but, due to the hardness of the tungsten alloy used, this method is not practical for removing deep pits.

Breaker Point Adjustment

Loosen the distributor clamp screw (C), Figure 3, and turn the distributor until the fiber block (A) of the breaker arm is on the highest point of the cam. Measure the gap between the breaker points with a feeler gauge. This gap should be exactly .020". If adjustment of the gap is required, loosen lock nut (H) and turn adjusting screw (J) until the proper gap is obtained. Tighten lock nut (H) and recheck the gap.

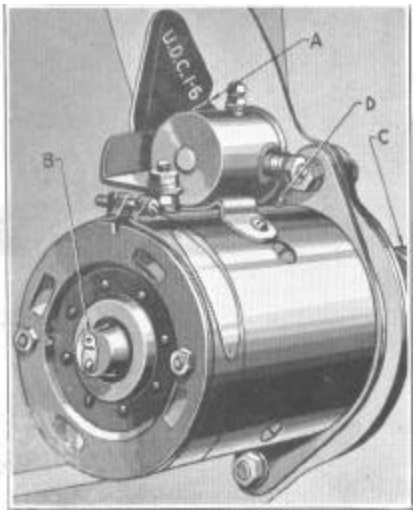


Figure 4

Ignition Timing

The ignition timing is determined by the position of the piston when the distributor breaker points begin to open. In general, the points should begin to open when the piston reaches its highest position in the cylinder. This position of the piston is referred to as upper dead center and is indicated by U. D. C. Marks are placed

on the flywheel to indicate when this position of the piston has been reached.

Since the piston in a four-stroke cycle engine may be completing the exhaust stroke or completing the compression stroke and ready for the power stroke when it reaches U. D. C., it is necessary to determine the stroke as well as the piston position.

To determine this, remove the spark plug from number one (front) cylinder. Place the finger over the spark plug hole and crank the engine slowly, using the hand crank. Air pressure against the finger indicates that the piston is coming up on the compression stroke. After this is felt, continue cranking the engine slowly until the mark "U. D. C. 1 and 6" is directly in line with the pointer on timing inspection hole in the rear support plate of the motor as indicated at (A), Figure 4. the piston is then at U. D. C. and ready to move downward on the power stroke.

Setting Ignition Timing

Turn the distributor housing clockwise to the limit of the slot in the clamping plate (K), Figure 3. Remove the central cable from the distributor cap and place the bare end about IA" from the intake manifold. With the ignition turned on and the U. D. C. 1-6 mark on the flywheel in line with the pointer on the inspection hole (Figure 4), turn the distributor body counterclockwise slowly just until a spark jumps from the high tension wire to the intake manifold. Tighten clamp screw (C), replace central cable in distributor cap and clamp cap on distributor.

When the distributor cap is put in place, the metal strip on the rotor arm should be directly under the terminal to which number one spark plug wire is attached. The other cables should be in the cap terminals in the order 1-5-3-6-2-4, following in a clockwise direction. The cable in the center terminal of the distributor cap should go to the central (high tension) terminal of the ignition coil.

Fuel Compensation

The foregoing operations give dead center timing. This, however, due to variations in fuel characteristics (octane rating) is only approximately correct. To get the correct setting the car should be driven until the engine has reached its normal operating temperature. Allow the car to slow down to 7 miles per hour in high gear on a level, hard-surfaced road, then depress the accelerator rapidly to its limit of travel. As the car accelerates from 10 to 15 miles per hour a slight spark knock should develop. If a knock is not heard, loosen distributor clamp screw (C), Figure 3, and turn the distributor counterclockwise one graduation of the clamping plate (K), Figure 3, and repeat the acceleration test. Repeat this operation until the knock is heard. The higher the octane rating of the gasoline being used, the greater the advance required to get maximum performance and fuel economy. However, the timing should not be set more than 3/4" ahead of the U. D. C. mark on the flywheel.

Carburetor and Fuel System

The carburetor is of the down draft type, incorporating Climatic Control (self-controlled choke), automatic heat control, and an accelerating pump. The only manual control for the operator is the accelerator pedal controlling the throttle opening for regulating the speed of the engine.

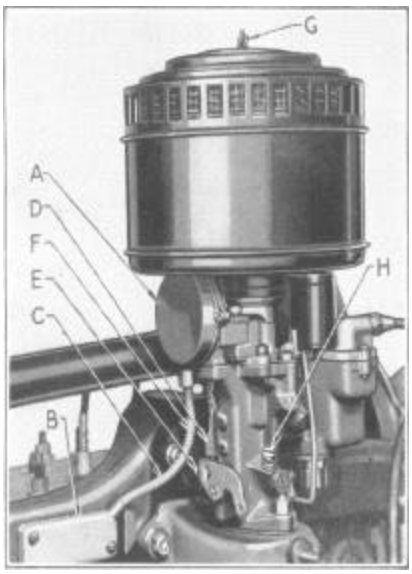


Figure 5

Carburetor Choke

The choke valve, the mechanism for which is contained in the insulated housing (4), Figure 5, is fully closed when the engine is cold at average air temperatures (75° Fahrenheit). Hot air drawn off the exhaust manifold through the stove (B) and tube (C) enters the control housing, giving accurate positioning of the choke for all starting and operating conditions.

When the choke is closed the bar (D) is dropped behind the throttle stop screw (E) to increase the idling speed during the warm-up period. This, however, cannot drop into position until the throttle has been opened. The heat control valve (F) is automatic in operation, supplying the correct amount of heat to the intake manifold under all operating temperatures.

Air Cleaner

The air cleaner should be removed every 2,000 miles, the wing nut (G) unscrewed and the cover and pad removed. Wash filter in gasoline and re-oil by dipping in S. A. E. 50 engine oil. Drain excess oil and replace pad and cover.

On cars equipped with the heavy duty oil bath cleaner (special equipment), remove wing nut and cover and withdraw filter assembly. Remove old oil from body and wash all parts in gasoline. Fill body with S. A. E. 30 engine oil to level of ring pressed in body. Service filter unit as in standard cleaner and reassemble. This should be done at least every 2,000 miles or oftener if extreme dust conditions are encountered.

Fuel Pump

The cap screw holding the cover in place should be removed, permitting the removal of the cover and filter screen for cleaning every 2,000 miles. At the same time the drain plug, located just below the pump inlet, should be removed and the sediment chamber cleaned. This should be done particularly in cold weather to remove any water which may have accumulated.

Engine Tuning

Do not attempt to adjust the carburetor alone. Perform all of the following operations in the order given

1. Clean spark plugs and adjust gaps to .025".
2. Clean distributor breaker points and adjust to .020" maximum opening as described under Breaker Points. (Page 17.)
3. Check battery and ignition wiring, being sure all *distributor wires are pressed down in their sockets and insulation is in good condition and battery terminals clean.*

4. Set ignition timing as described on page 18.
5. Turn carburetor idling screw (H), Figure 5, into its seat and back out exactly one turn.
6. Start engine.
7. When engine has reached normal operating temperature, adjust intake valve tappet clearance to .006" and exhaust tappet clearance to .008".
8. Set carburetor throttle stop screw (E), Figure 5, so that engine idles at a speed equal to a car speed of 7 m. p. h. in high gear.
9. Adjust carburetor idling screw (H) for smooth engine idling. The final adjustment should be from ½ to 1 turn of the screw from its full *in position*.
10. Road test for final ignition timing, as described under Fuel Compensation (page 18).

If the above operations, properly performed, do not give normal engine performance, the car should be taken to an Authorized Hudson and Terraplane Dealer for mechanical inspection.

Starting Motor

The starting motor is controlled by a push button on the instrument panel through a solenoid switch mounted on top of the starting motor.

It is necessary to disengage the clutch on Electric Hand equipped cars in addition to turning on the ignition and pressing the starter button to engage the starter. The switch can be operated manually by unscrewing the cap on the rear of the switch and pushing the plunger in. The drive to the gear on the engine flywheel is through a Bendix drive which is brought into engagement by the rotation of the starting motor.

The front and rear bearings of the starting motor should be lubricated at (B and D), Figure 4, with a few drops of light oil every 1,000 miles.

The threads of the Bendix screw shaft (C), Figure 4, should be cleaned occasionally with a brush and kerosene to remove gum and dirt.

Generator

The generator is of the ventilated type, allowing a greater output than is practical with the non-ventilated type. The maximum output is controlled by a third brush and should be set at 22 amperes. This adjustment requires the use of an accurate ammeter and voltmeter and should be made by an Authorized Hudson and Terraplane Service Station.

A generator output regulator is mounted on the engine side of the body dash and reduces the output from 22 to 10 amperes when the battery is fully charged, reverting to the higher rate should the battery become partially discharged due to frequent starting or continuous use of lights, radio, etc. This regulation is permanently built into the regulator and no adjustment of this unit is necessary.

The generator field circuit fuse is contained in the knurled cup extending from the top of the regulator. If the generator fails to charge, check for a burnt- out fuse. Replacement should be made only with a 7½-ampere, 25-volt fuse.

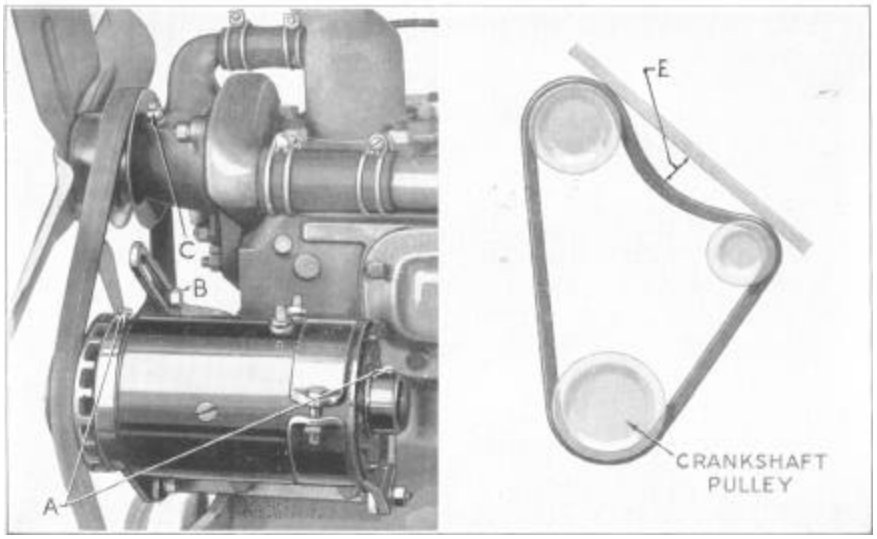


Figure 6

A few drops of light oil should he supplied to cups (A), Figure 6, every 1,000 miles—do not over-lubricate.

Fan Belt

The generator is driven by the "V" type belt, which also drives the fan and water pump. This belt must be kept sufficiently tight to, prevent slippage on the pulleys. When properly adjusted the belt will have from ¾" to 1¼" of slack at a point midway between the fan pulley and generator pulley as shown at (E), Figure 6. This adjustment provides sufficient tightness to prevent slippage without causing undue wear of the fan and generator bearings.

To tighten belt tension loosen nut (B) and swing generator away from the engine until correct position is obtained. Tighten nut (B).

Cooling System

Water Pump

The water pump is of the vane type located on the front of the cylinder block and driven by the "V" belt, which also drives the generator. The adjustment of the belt is covered in the preceding paragraph.

The packing gland is of the permanent type, built entirely inside of the pump and requires no adjustment.

The pump should be lubricated every 1,000 miles through the pressure fitting (C), Figure 6, with a high-grade aluminum soap grease.

Cooling System Operation

The cooling system is of the pressure pump circulation type, with thermostatic heat control. This provides positive circulation, combined with a short warm-up period, in spite of a total cooling capacity sufficient to give proper cooling under the most unfavorable operating conditions.

When the water in the cooling system is cold, the thermostat which is located in the cylinder head outlet causes the water to flow through a by-pass directly to the pump inlet. During the warming-up period, therefore, the water in the cylinder jacket alone is circulated, while the water in the radiator is completely cut off from the remainder of the cooling system.

When the temperature of the water in the jackets has reached 140° Fahrenheit, the thermostat begins to open the passage into the radiator, and at approximately 160° the by-pass is closed so that all the circulation is through the radiator.

Draining Cooling System

To completely drain the cooling system open the petcock at the bottom of the radiator (left side under hood) and also remove the pipe plug from the cylinder block (left side to rear of side cover plate).

Care of the Cooling System

In order to get the maximum efficiency from the cooling system, it must be kept clean. There is a tendency toward corrosion of parts due to electrolytic action of water containing minerals and also deposits of minerals when the water is heated. Both the corrosive scale and the mineral deposits tend to coat the cooling surfaces, reducing radiation, and in time will clog the radiator passages.

Unless special steps are taken to prevent these deposits, the cooling system should be cleaned twice a year. This cleaning is most effective when reverse flushing is used to remove deposits after they have been loosened by the use of a good cleaning solution. Since reverse flushing requires special equipment operated by compressed air, you should have this done by an Authorized Hudson and Terraplane Dealer.

The cleaning solution recommended is Hudson Radiator Cleaner. Before using this solution, run the engine a few minutes to circulate the water and stir - up loose sediment. Stop the engine and open radiator petcock and drain all water from the system.

Dissolve the contents of a container of Hudson Radiator Cleaner in a bucket of hot water (be sure the material is completely dissolved). Pour solution into radiator, then fill the radiator almost full of water.

With the radiator covered and filler cap tight, run the engine for about twenty minutes but avoid boiling. Stop the engine and completely drain system.

Reverse flushing will remove all of the sediment the solution has loosened.

It is important that all traces of the cleaning solution be removed, as they have a detrimental effect if left in the system.

After thoroughly flushing the cooling system, the addition of Hudson Rust and Corrosion Inhibitor to the water will neutralize the action of any cleaning compound which may not have drained out. It will also prevent corrosion of the cast iron, aluminum and other metals in the cooling system. The practice of using the Inhibitor in the cooling water is particularly advantageous for engines equipped with aluminum cylinder heads.

Hudson Radiator Cleaner and Inhibitor can be obtained from any Authorized Hudson and Terraplane Dealer.

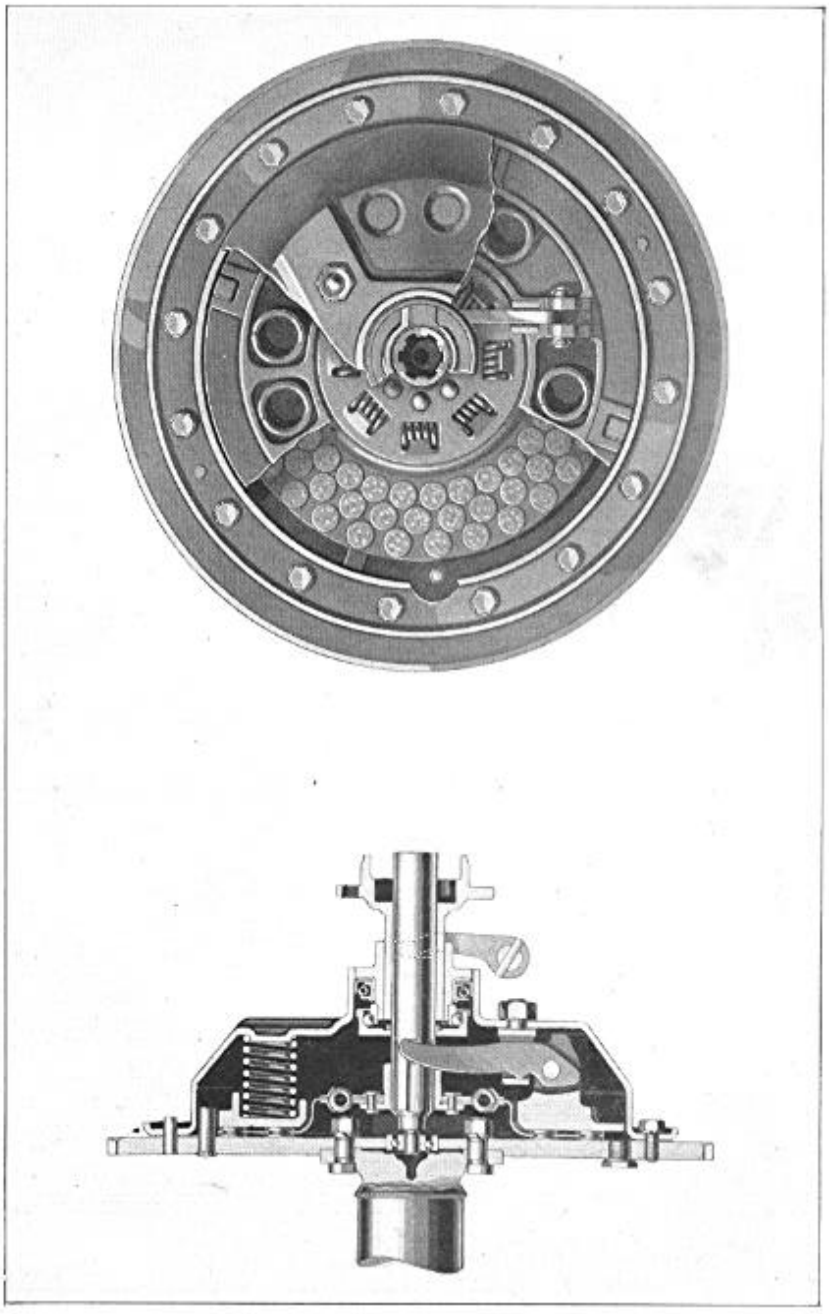
Anti-Freeze

Before putting any anti-freeze in the cooling system, it should be thoroughly cleaned and all hose connections and gaskets checked for leaks.

The types of anti-freeze recommended are: Alcohol, Glycerine and solutions of Ethylene Glycol marketed under various trade names.
Solutions containing calcium salts or other ingredients which promote electrolytic action should be avoided. They will cause serious corrosion of aluminum alloy as well as the solder joints of the radiator. Also avoid the use of solutions containing glucose or honey, as they will tend to clog the system; and of kerosene or fuel oil which, when hot, liberate inflammable vapors.

The following table gives the quantities of the recommended solutions re-, quired for protection against freezing at various temperatures:

Temperture Fahrenheit	Alcohol Quarts	Radiator Glycerine (C.P.A. or Equivalent) Quarts	Ethylene Glycol (Prestone or Equivalent) Quarts
+20°	2½	5¾	2½
+10°	3¾	7¼	3½
0°	5	9	4½
-10°	5¾	10½	5
-20°	6½	12	5¾
-30°	8	13—Full Strength	6½



Clutch

CLUTCH

The clutch is of the single plate type, having a plate with frictional surfaces which is driven by friction from the rear face of the steel flywheel and the forward face of the drop forged steel pressure plate. The frictional facing in Hudson clutches is pliable formed cork and lubricated to give a maximum degree of smoothness in engagement.

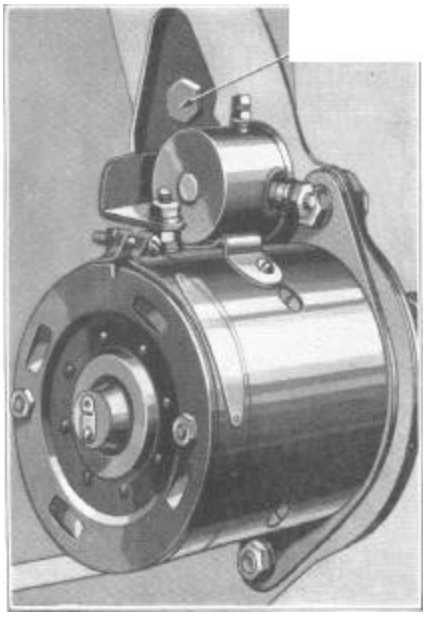


Figure 7

Due to the film of lubricant on the frictional surfaces, burning is prevented and wear is negligible. The frictional surface is always protected and maintained in proper condition by the bath of Hudsonite Clutch Compound, so that even after thousands of miles of usage there will be no material change in the engaging characteristics.

Lubrication

The throwout bearing is a heavy duty ball bearing provided with positive lubrication through a pressure fitting located on the right side of the clutch bell housing. This should be lubricated with one ounce of aluminum soap grease every one thousand miles.

The Hudsonite Clutch Compound is permanently sealed into the clutch housing to prevent loss. It should be drained and replaced every five to fifteen thousand miles.

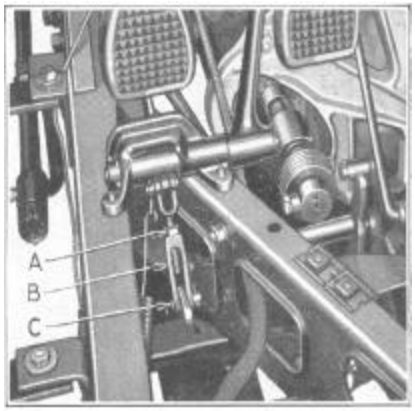


Figure 8

To insert the Hudsonite, turn the engine until the drain plug (A), Figure 7, in the front face of the flywheel is visible through the timing inspection hole in the left side of the rear engine plate. Remove the plug (A) and turn the engine slowly until the star stamped in the front of the flywheel is visible through the inspection hole. Allow a minute in this position to permit the clutch housing to drain, then turn the engine until the filler hole again appears in the timing hole and insert one-third pint of Hudsonite. Replace the plug and tighten securely. Hudsonite is available through all Hudson and Terraplane Distributors and Dealers.

Clutch Pedal Adjustment

The clutch is self-adjusting; however, it is necessary to adjust the clutch pedal rod to prevent the pedal from "riding" the floor board. To adjust, loosen lock nut (A), Figure 8, remove clevis pin (C) and turn yoke (B) to shorten or lengthen the rod, as necessary, so that the pedal shank can be held in a position one and one-half inches from the floor board when the clutch is engaged. Replace the clevis pin (C) and cotter pin. Tighten lock nut (A). The pedal clearance should be checked frequently, as a lack of clearance will cause clutch slippage.

On cars equipped with Automatic Clutch Control, pull backward on the power unit rod—on left side of engine while the accelerator pedal is depressed. When the rod is in its extreme rearward position there should be approximately 7/8" clearance between the back of the slot in the rod yoke and the clevis pin which attaches it to the operating lever.

TRANSMISSION

The transmission is of the quick synchronizing type incorporating helical gears to give a silent second speed. Unusual silence is obtained in all forward speeds by throwing the reverse idlers out of mesh so that they do not revolve except when in actual use. Through the use of steel alloyed with nickel, chrome and molybdenum in gears which are heat treated for strength and case hardened to resist wear, long life is assured. The use of these special alloys also makes extremely heavy parts unnecessary, contributing greatly to ease and rapidity of shifting.

The main drive gear and main shaft are supported by two heavy duty, annular thrust ball bearings, one annular ball bearing and thirty needle bearing rollers. The end thrust between these parts is taken by seven ball bearings running in races machined in the ends of the shafts

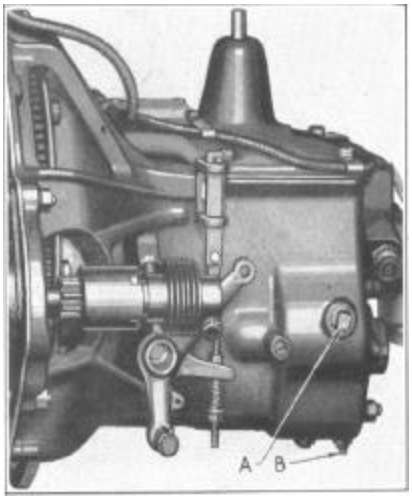


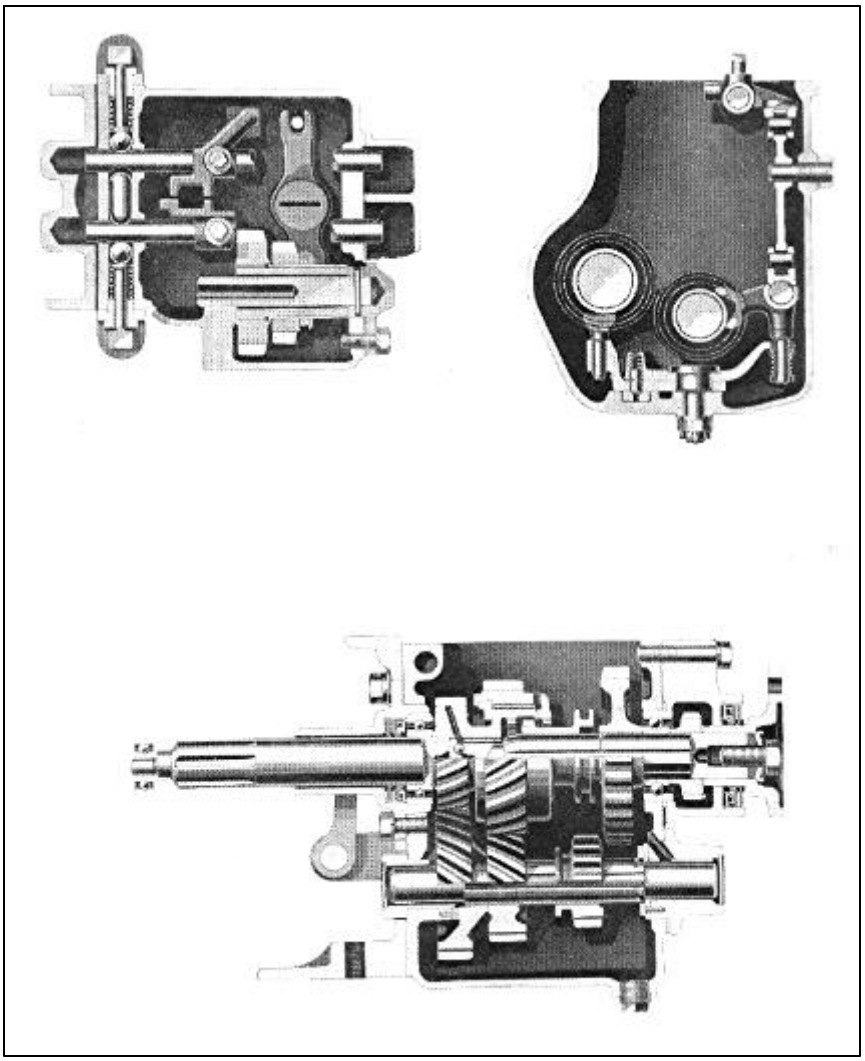
Figure 9

The countershaft is carried on steel-backed babbitt bearings.

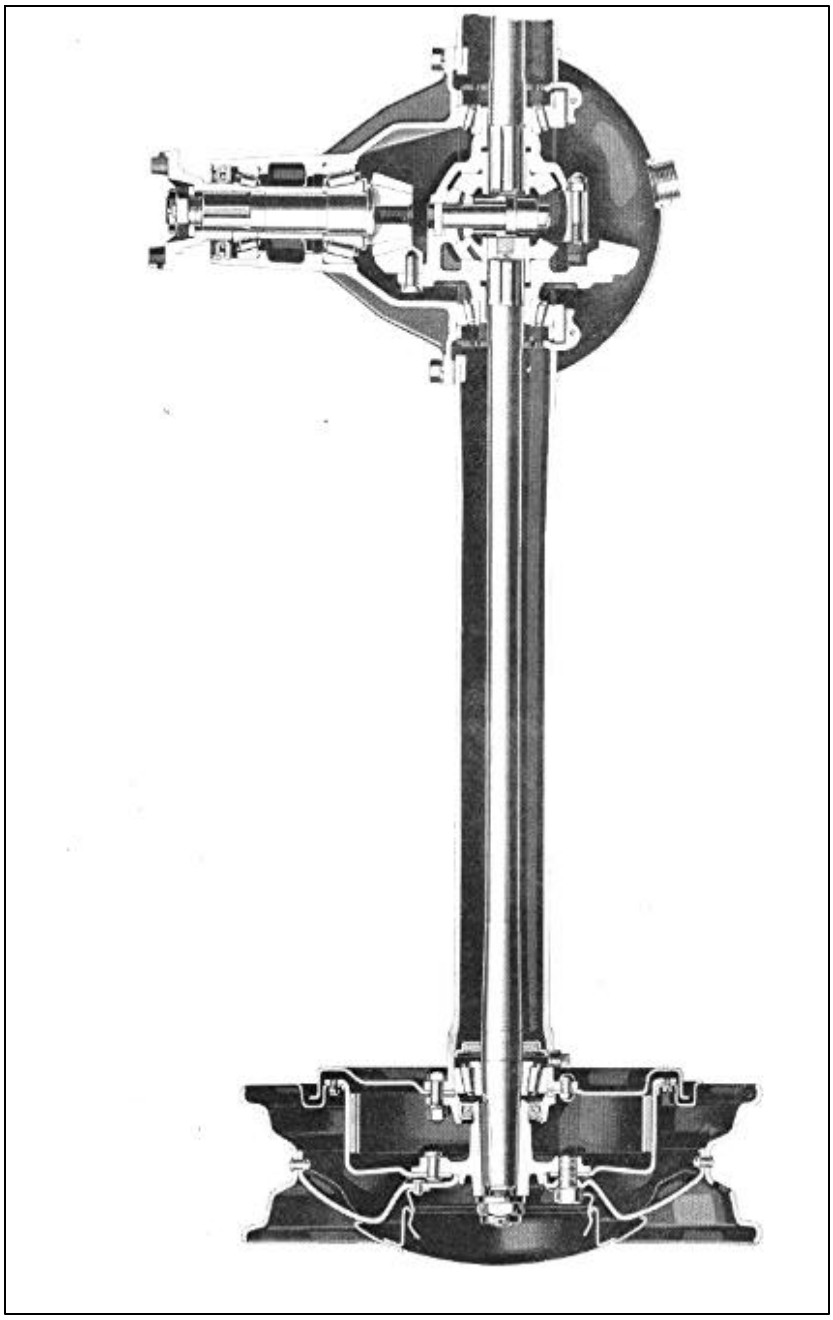
Lubrication

The lubricant used must be able to withstand the pressure developed between the gear teeth and also flow freely into the small clearances of the hearings. These qualities can be obtained in S. A. E 90 E.P. transmission gear oil for summer and S. A. E 80 E.P. (zero pour test) transmission gear oil in winter. When hard shifting is encountered during cold weather, three ounces of kerosene should be added to the lubricant.

The transmission should be filled with lubricant to the level of the filler plug (A), Figure 9, at all times. Drain the lubricant with change of season



Transmission



Rear Axle

by removing plug (B) and replacing with three pounds (or pints) of fresh oil of the proper specifications.

UNIVERSAL JOINTS

The front and rear universal joints are fitted with needle roller bearings at the trunnions for the purpose of minimizing friction and maintenance attention. Oil reservoirs provided at each bearing are filled with lubricant at the time of assembly and supply the necessary lubrication for long periods of operation.

At 20,000-mile intervals both universal joints should be disassembled, cleaned, repacked with good viscous chassis lubricant and reassembled.

Every 2,000 miles, the splined hub of the front universal joint should be lubricated by removing the pipe plug and introducing viscous chassis lubricant.

REAR AXLE

The rear axle is of the semi-floating type carried in a one-piece, welded, banjo type housing. This gives a rugged assembly, with all parts readily accessible, as the axle shafts and wheel bearings can be removed without disturbing the differential assembly; also the differential and gear set assembly can be removed as a unit, after the axle shafts have been removed, by simply disconnecting the rear universal joint flange and removing the ten carrier bolt nuts.

The helical bevel drive gear and pinion are made of nickel molybdenum electric furnace steel, heat treated for strength and case hardened to resist wear. The drive pinion, differential and axle shafts are carried by six heavy duty, taper roller bearings.

Exceptional lubrication has been provided to the driving pinion bearings by arranging a large passage to carry oil thrown from the ring gear to a point in the housing between the front and rear pinion bearings. This oil flows through the bearings and returns to the axle housing. Oil leakage at the front of the pinion is guarded against by the use of a hydraulic leather oil seal. Similar seals are located in the wheel bearing caps.

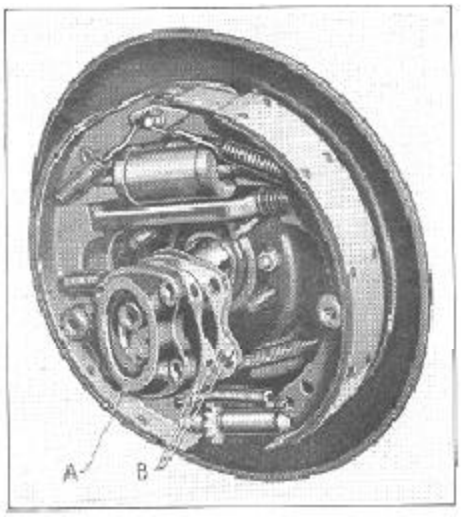


Figure 10

Adjustment

To adjust rear wheel bearings, jack up rear axle and remove both rear wheels and hubs. Remove the four nuts from bearing cap (A), Figure 10, and push the bolts out of the backing plate to permit removal of the bearing cap wlthout disturbing the handbrake operating link. By removing shims (B) under the cap the end play of the axle shaft is decreased. Total play between axle shafts should be from .005" to .010", which is perceptible by pulling shaft in and out with the hand.

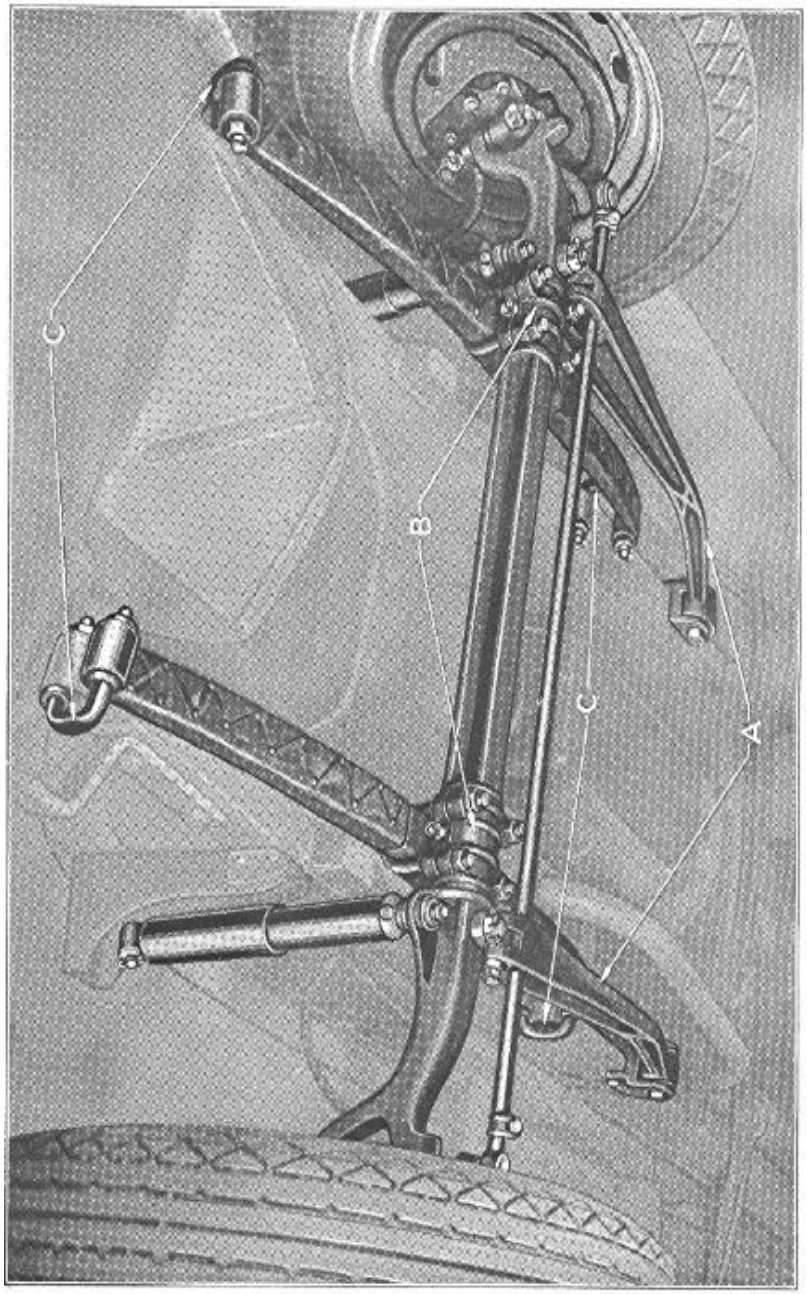


Figure 12—Front Axle and Spring Suspension

It is necessary that the thickness of shims at each rear wheel be approximately the same, so when adjusting remove a thin shim from each side and repeat, if necessary, until only a slight amount of play is evident. Be sure the axle shafts turn freely before building up.

Caution

Under no condition should a knockout type puller be used to remove a wheel hub or the end of the axle shaft struck a heavy blow.

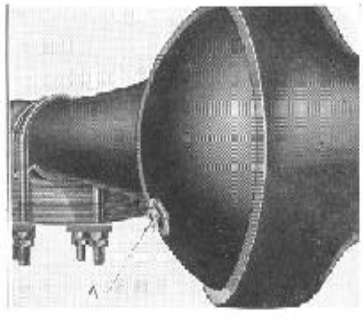


Figure 11

Lubrication

An oil must be used that will withstand the pressures developed between the gear teeth and also flow freely to enter the smaller clearances and circulate through the passages to the pinion bearings. These qualities can be obtained in a heavy-bodied gear oil of S. A. E. 110 E. P. viscosity for summer and S. A. E. 90 E. P. for winter.

The oil should always be kept to the level of the filler plug (A), Figure 11. Drain the oil and replace with three pounds (or pints) of fresh oil with change of season.

The wheel bearings are lubricated with wheel bearing grease. The bearings should each be packed with one and one-half ounces of grease every 5,000 miles. In order to insert this grease the wheels and wheel bearing caps must be removed, as described under wheel bearing adjustment.

FRONT AXLE AND SPRING SUSPENSION

The front axle is of the Elliott type, see Figure 12, the center section being a heavy drop forging of high quality carbon steel. The steering spindles, which are drop-forged molybdenum alloy steel, are attached to the axle center with alloy steel spindle pins mounted in hardened steel bushings with ball bearings to carry the thrust on the end of the pin.

Each wheel is mounted on two taper roller bearings. The tie rod ends are of the ball bearing type for frictionless control.

The axle is attached to the chassis frame by two torque arms (A) which insure accurate positioning of the axle, and relieves the front springs of all loads other than that of supporting the weight of the car. The torque arms are attached to the frame through large rubber bushings to absorb road shock.

The springs are mounted on bearings (B) which permit free turning on the axle center and each end of the spring is attached to the frame through shackles (C). This permits unrestricted spring action for a smoother ride under all road conditions.

All points requiring lubrication are equipped with pressure fittings except the wheel bearings.

Bearing Adjustment

After jacking up the front axle and removing the hub cap, withdraw cotter key holding nut (A), Figure 13. Turn nut (A) to the right until a slight drag is felt when turning the wheel slightly by hand. Then loosen the nut just sufficiently to permit the wheel to turn freely. Insert cotter key.

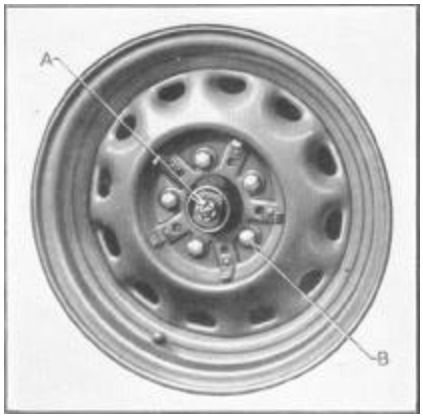


Figure 13

Front Wheel Alignment

The front wheels should be adjusted with zero to 1/8" toe-in measured 10" from the ground. This adjustment is made by loosening the clamp bolts in the tie rod ends, Figure 12, and turning the tie rod in a clockwise direction, as viewed from the right, to increase toe-in and in the reverse direction to reduce toe-in.

A special tool is required to make this measurement accurately. This adjustment is important for correct steering and to prevent excessive tire wear. Have your Authorized Hudson and Terraplane Dealer check this alignment frequently.

Caster

The caster (backward tilt of the axle) should be from 2° to 3° and should he equal within ½° at both front wheels.

By loosening nut (D), Figure 14, removing capscrew (E) and replacing shim (F) with a thicker shim caster is decreased. Replacing shim (F) with a thinner shim increases caster.

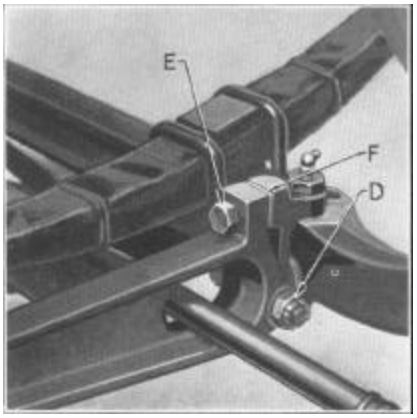


Figure 14

Camber

The camber (outward tilt of front wheels) should he from 1° to 1½°.

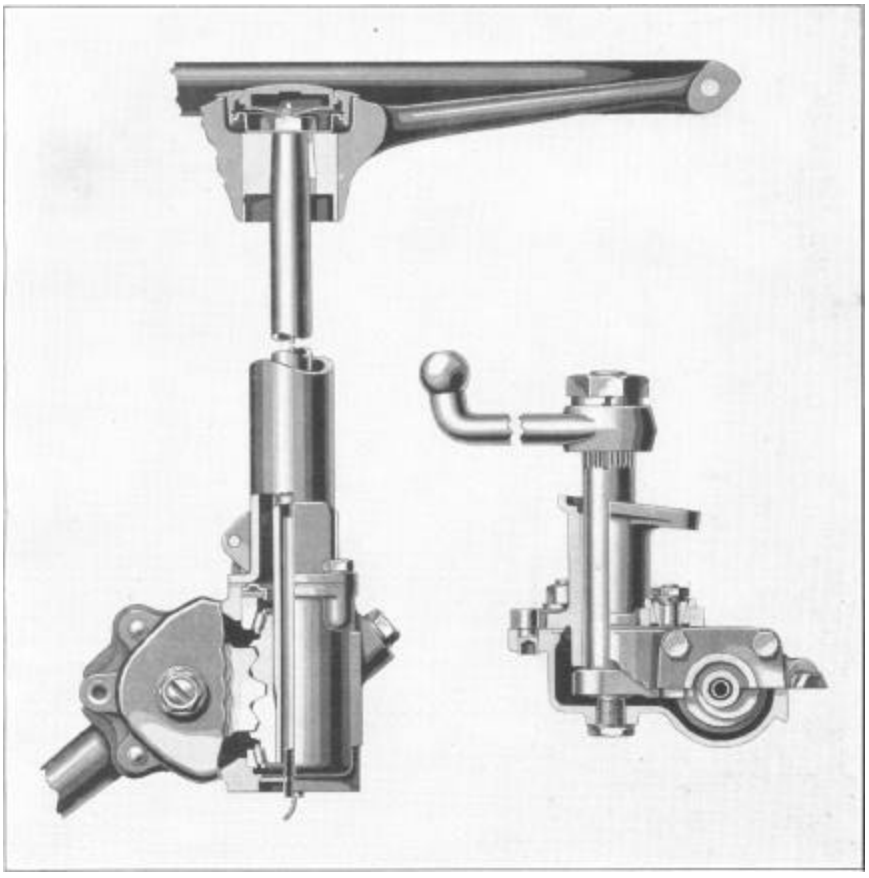
Should any front axle parts become bent, through accident, to such extent that they cannot be straightened without heating, they should be replaced with new ones. Heating will destroy the original heat treatment of the parts and may result in sagging or even breakage.

Lubrication

The front wheel bearings should be lubricated every 5,000 miles with a good grade of wheel bearing grease. Remove hub and wash bearings and inside of hub with kerosene and pack each bearing and hub with 3 ounces of wheel bearing grease (see page 32 for adjusting wheel bearings).

The tie rod ends are lubricated and sealed when assembled and require no further lubrication.

Lubrication of parts equipped with pressure fittings is covered on the lubrication chart (inside back cover).



STEERING GEAR

The steering gear on the Hudson Six is of the variable pitch worm and sector type.

The maximum ratio of 17 to 1 is obtained in the straight ahead position to give maximum ease of steering. The ratio is reduced as the gear is turned either to the right or left to give quick action for sharp turns.

The worms are cut in a manner which gives a minimum clearance, with the sector in the straight ahead position and increased clearance on turns. This gives maximum control and assures freedom from binding, even after extensive use, which on conventional gears makes it impossible to get proper clearance without binding on extreme turns due to maximum wear coming in the straight ahead position.

Adjustment

The main or worm shaft is carried on two taper roller bearings, which are maintained in proper adjustment by a shim pack which is properly selected when the gear is built.

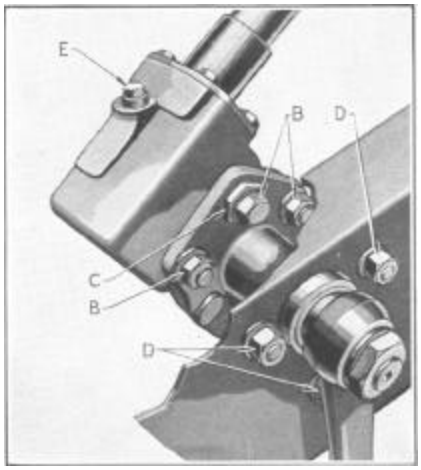


Figure 15

The end play in the cross shaft is adjusted by a screw extending through the right side of the steering gear housing. By turning this screw into the housing the end play is reduced. The screw should be tightened, then backed off just enough to prevent binding, and the lock nut tightened.

The mesh between the worm and sector of the gear is adjusted by moving the housing cover. To adjust, loosen the four (one not shown) housing cover stud nuts (B), Figure 15, one-quarter turn. With front wheels jacked up and in the straight ahead position, turn the eccentric (C) in a clockwise direction in gradual stages, noting the effect by working the steering gear arm. When play has been reduced suffIciently, tighten nuts (B), drawing up the one on eccentric (C) first. Before lowering front wheels, turn steering gear from extreme right to extreme left to be sure no binding occurs.

To raise or lower steering wheel to suit the requirements of the driver, loosen frame bracket stud nuts (D), as well as steering column bracket nuts under the instrument panel. Set the wheel in the desired position and tighten column bracket nuts. Turn steering wheel to align gear on frame and tighten frame bracket nuts.

Lubrication

The housing should be filled at all times with a good grade of S. A. E. 110 E.P. gear oil in summer and S.A.E. 90 E.P. gear oil in winter. The lubricant can be

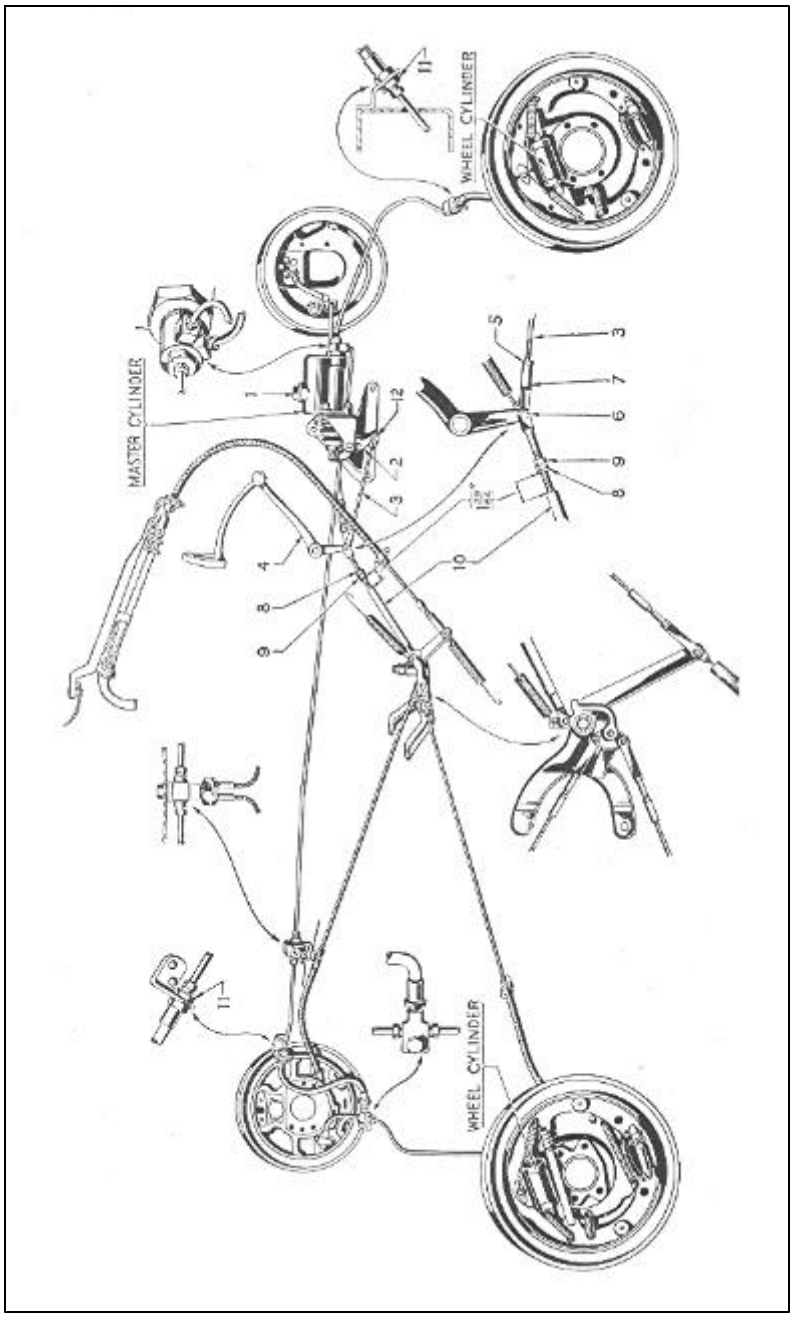


Figure 16

injected after removing filler plug (E), Figure 15, and should he done with change of season.

BRAKES

The Hudson brakes are hydraulically operated with supplementary mechanical actuation of the rear brake shoes both from the foot pedal and the hand brake control. (Figure 16.)

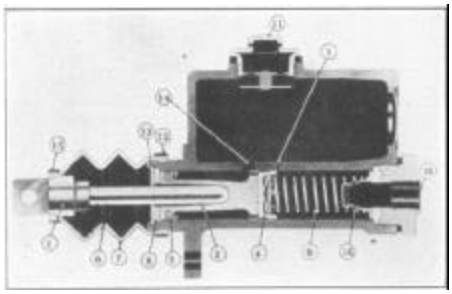


Figure 17

The heart of the hydraulic system is the master cylinder, Figure 17, which has an integral reservoir from which additional fluid is supplied to the system as necessary.

The master cylinder is mounted on the chassis frame side member and is accessible by lifting the left side of the hood.

The reservoir should be kept at least half full at all times. Before removing the filler plug (1), Figure 16, wipe all parts free of dirt and take extreme care to prevent dirt getting into the cylinder.

The reservoir should be filled with Hudson fluid. The use of other than genuine Hudson fluid or the introduction of oil with a mineral base into the system will cause the rubber parts to swell and become inoperative.

The piston in the master cylinder is operated through the lever (2) and rod (3) from the brake pedal (4). (Figure 16.) In order to insure full return of the piston when the brake is released there must be 1/4" to 3/8" free pedal pad movement before the piston starts to move as the pedal is depressed. This free movement is adjusted by loosening lock nut (5), removing clevis pin (6) and turning the yoke (7). After proper free pedal movement is obtained, replace the clevis pin (6) and tighten lock nut (5). This adjustment is important as failure of the piston to return to the end of the cylinder will cause the brakes to drag.

An occasional filling of the reservoir should he the only attention required to the hydraulic system unless the reservoir is permitted to run dry, a main line is disconnected or a wheel cylinder is disconnected for service operations. If the reservoir runs dry or a main pipe line is disconnected it is necessary to bleed the air out of the lines at all wheel cylinders. If a wheel cylinder is disconnected it is necessary to bleed only at that particular cylinder.

The bleeding operation is performed as follows:

Figure 18

(1) Remove the screw (D), Figure 19, and screw the end of the bleeder tube (A), Figure 18, in its place and allow end of tube to hang in a jar partially filled with liquid.

(2) Slip the bleeder wrench (B), Figure 18, over the tube until it engages on the hexagonal section of the bleeder valve (E), Figure 19.

(3) Open the bleeder valve ¾ turn.

(4) Push the brake pedal down and allow it to return slowly. This will force liquid and air out the bleeder tube. Continue this operation until air bubbles cease to be emitted from the bleeder tube.

(5) Close the bleeder valve (E), remove the bleeder hose and wrench, replace the screw (D), Figure 19.

(6) Refill reservoir.

CAUTION—Do not use a substitute for Genuine Hudson Hydraulic brake fluid. Substitutes are not suitable for this system.

Do not use fluid that has been drained out of the system. Always replace with new. Use Genuine Hudson Hydraulic brake fluid Number 5 except when continuous sub-zero temperatures are encountered. Hudson Number 1 fluid is recommended for use at extreme low temperatures.

Adjustment of Pedal Push Rod

With equalizer bar against stop loosen lock nut (8) and turn adjusting nut (9) until rear face is 1-29/64" from front end of push rod (10) as shown in Figure 16. Tighten lock nut. This adjustment is important to obtain proper mechanical follow-up to the hydraulic operation of the rear brakes.

Brake Shoe Adjustment

There are only two points of adjustment in the braking system to compensate for brake lining wear. The Eccentric Adjustment (B), Figure 19, centralizes the brake shoes in the drum. The Adjusting Screw, accessible by removing cover (C), Figure 19, takes up the clearances between the lining surfaces and the brake drums.

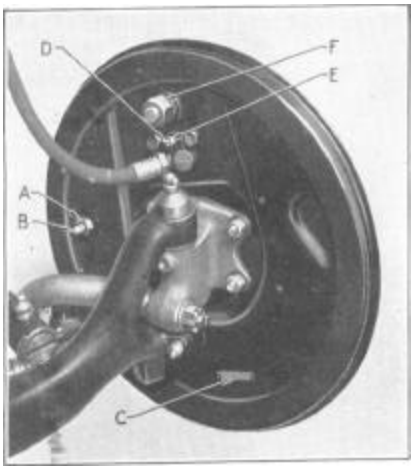


Figure 19

Adjustment for Wear Only

(1) Jack up all wheels clear of the floor.

(2) Disconnect rear wheel cables from equalizer bar.

(3) After removing adjusting hole covers (C), Figure 19, and gauge hole covers in brake drums, AT EACH WHEEL: Loosen eccentric lock nut (A), Figure 19, and insert .010" feeler gauge between the lining of secondary (eccentric controlled) shoe and brake drum. Turn the eccentric adjustment in he direction of forward wheel revolution until .010" feeler is just snug at anchor and adjusting ends of secondary shoe. Tighten eccentric lock nut.

The clearance at both ends of the secondary shoe should not vary more than .003". Should the variation be greater than this it will be necessary to relocate the anchor pin. This work should be done by an authorized Hudson and Terraplane Service Station. (In case of clearance variation it is desirable that clearance at the anchor end he less than at the adjusting end.)

(4) Spread the brake shoes by means of a screw driver inserted through the hole (C) engaging the notched adjusting screw wheel until the shoes are expanded against the brake drum so drum can just be turned by hand.

(5) Pull hand brake lever until equalizer bar plate is A" from stop, Figure 16.

(6) Pull rear brake cables tight and adjust ends so clevis pins just enter holes in plate. The rear face of the equalizer plate must be parallel to the face of the stop after this adjustment is made.

(7) Release hand brake.

(8) Release adjusting screw at each wheel until the brakes are just free of drag and replace feeler gauge hole covers and wheels.

(9) Lower car and test for balance on brake testing machine or road. Always loosen adjusting screw on tight brakes rather than tighten adjusting screw on loose brakes to get balance. This is to safeguard against one or more dragging brakes.

SHOCK ABSORBERS AND SPRINGS

The spring leaves are lubricated with a thin coating of graphite grease and covered to prevent entrance of road dirt or water and preserve the lubricant.

Spring control is obtained through the use of four direct-acting, self-compensating shock absorbers. By using a large quantity of fluid working under low pressure, accurate control is obtained and there is no variation due to changes in operating temperatures.

The large reserve of fluid, the low operating pressure and the double seal practically eliminate the loss of fluid. The fluid should, however, be maintained at the proper level and it is recommended that this be checked by an Authorized Hudson and Terraplane Service Station at least twice a year.

HEADLAMPS

The headlamps are designed to give maximum safe illumination under all driving conditions. The only adjustment necessary to obtain the results which should he expected is the proper aiming of the headlamps. The right and left lenses are interchangeable and can he used satisfactorily on either side. The lamps are fitted with standard 1-candle power bulbs for the parking position and pre-focused bulbs having a flanged mounting and employing a 32-candle power filament for city driving and passing, and a 32-candle power filament for country driving. When the main lighting switch is in the driving (right) position, the light beams can be changed to the high or country driving position or to the low or city driving position by depressing and releasing the toe board control switch.

Adjustment

In order to get the proper lighting effect, the headlamps must he aimed accurately, as follows:

Place the car on a level floor or driveway squarely in front of a white wall or screen at a distance of twenty-five feet. Draw a horizontal line (AA), Figure 20,

on the wall six feet long and at a height equal to the height of the center of the headlamps from the floor. Sight through the center of rear window and over the radiator ornament and determine the exact center line of the car projected on the wall, as indicated at point (B) in the illustration. Measure one-half the distance between the centers of the headlamps to each side of point (B) and draw the vertical lines (C) and (D) through these points. These lines represent the vertical center lines of the lamps.

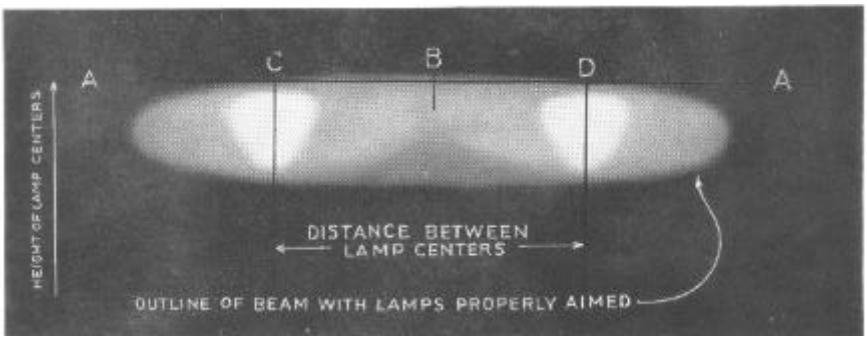


Figure 20

With the car carrying a full passenger load, cover the left headlamp to obscure its beam and place lighting switch in the high or country driving position. Loosen the mounting nut of the right lamp and aim the lamp so that the top of the light beam is just even with the horizontal line and equally divided on each side of the center line of the right lamp.

Tighten mounting nut on right lamp and follow same procedure in aiming left lamp. When this has been properly done, the lamps will be correctly aligned for both the city and country driving positions.

Removal of Headlamp Lens

Loosen the screw at the bottom of the lamp body. Push the bottom of the lens backward and downward until the top of the lens is clear of the top of the lamp body and lift out. Replace by reversing this operation.

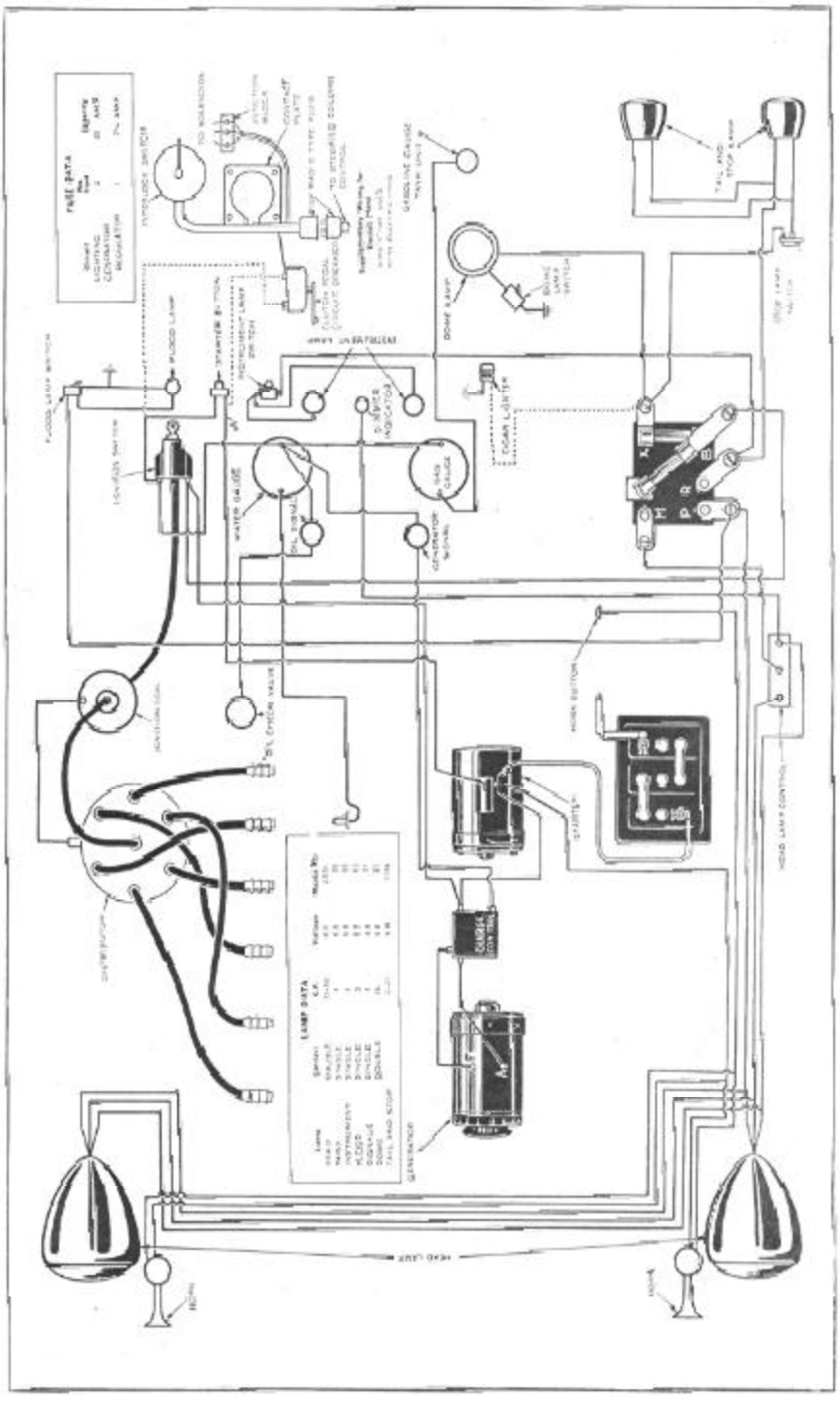
Do not touch the reflector, as any marks will reduce the illumination. Should it be necessary to clean the reflectors, use ordinary lamp black on a soft cloth and wipe gently in a circular motion.

If the reflectors require frequent cleaning, it is an indication that the gaskets are not giving a proper seal and they should he replaced.

BATTERY

Registration

A 17-plate, 120 ampere hour National battery is used. This battery is covered by a Guarantee and Adjustment Policy by its manufacturer. To be entitled to the benefits of this Policy the battery must be registered with a National Dealer within



Wiring Diagram

National Dealer within thirty (30) days after delivery of the car. Do not neglect to make this registration.

Care

The battery requires little attention; however, this attention is absolutely essential. Negligence will shorten the battery life and cause premature failure.

Distilled water should be added to the battery at such intervals as will insure the plates being covered at all times. Usually water should be added twice a month in warm weather and monthly in winter. During freezing weather water should be added just before the car is to be used.

To prevent corrosion of battery terminals and connections apply a coating of vaseline over the battery posts and strap terminals, making sure the terminals are properly tightened. If corrosion occurs, clean posts and terminals with a soda solution before applying the vaseline. When using the soda solution be sure the cell caps are in place and be careful to prevent the soda from entering the cells. Flush off well with water and dry top of battery.

Inspect the battery ground strap occasionally, as looseness at the battery or frame or breakage will reduce the output for starting and a complete break will cause the lamp bulbs to burn out.

Periodic hydrometer readings should be made by your Dealer. **If** the battery gravity is low and the battery in good condition, the generator charging rate should be checked. This requires accurate voltmeters and ammeters and should be handled by your Hudson and Terraplane Dealer.

It is not necessary to add acid to a battery except where leakage has occurred. This must be done in conjunction with charging and should not be attempted except by an experienced battery service man.

TIRES AND WHEELS

Steel artillery type wheels are standard equipment.

All wheels are demountable at the hub by prying off the outside hub cap and removing the cap screws (B), Figure 13, in the wheel mounting plate. When replacing the cap screws, the final tightening locks them to prevent loosening in operation. Be sure the cap screws are drawn down tight.

Removal and Installation

The wheels are of the drop base type, permitting installation and removal of the tires without separate locking rings or the use of any special tools. Four- ply 16 x 6.00 tires are used.

To remove a tire, deflate the tube. Starting directly opposite the valve stem and working in both directions toward the valve, press both beads of the tire off the rim ledge down into the rim well. Start removal of one bead at the valve stem, working around the wheel in both directions from this point. Pull the valve back inside of the rim, remove inner tube and remove the second bead by the same procedure used to remove the first.

To install a tire, inflate the tube until just rounded out and insert into the casing. Place one bead over the rim and into the rim well at one point, so that the remainder of the bead can be worked over the rim. Press this bead onto its rim seat and insert valve stem through the hole in the rim. After **the** valve is aligned in the hole, start application of the second bead directly opposite the

opposite the valve, pressing it into the rim well and working in both directions so that the section of the bead at the valve is the last to be worked onto the rim.

Readjust, if necessary, so that the valve protrudes straight through the rim, and pull the valve through from outside until seated snugly against the inside of the rim.

Partially inflate and work both beads onto the rim seats, then complete inflation.

Inflation Pressures

In order to get maximum life from the tires, they should always be inflated to a minimum pressure of 24 pounds front, while 32 pounds should be carried in the rear tires. Lower pressure will cause excessive tread wear and make the tire more susceptible to bruises and breaks from impact with sharp irregularities in the road surface. Higher pressures reduce the shock absorbing qualities of the tires but increase stability at high speeds.

Tire Wear

Due to increased thickness in tire treads, together with higher driving speeds, faster acceleration and more effective braking, the tread blocks flex when in contact with the road so that the forward edges of the tread design blocks wear more rapidly than the rear, giving a sawtooth appearance. This is known as heel and toe wear and is particularly noticeable on the front tires which are subjected to braking action only, while in the case of the rear tires the tread wear is equalized, due to both driving and braking action.

This is a natural wear and can be controlled by reversing the direction of rotation of the tire. It is recommended that the right and left wheel and tire assemblies be interchanged when this wear becomes noticeable. Since the height of the tread block has been reduced by wear, the flexing will be lessened and this change of position of tires will not only even up the wear but will in most cases prevent reappearance.

Wheel and tire balance is carefully checked during the process of assembling; however, this balance may be changed by removal and reinstallation of tires or by tire tread wear. In order to maintain original stability at high driving speeds, have wheels and tires rebalanced whenever it is necessary to remove and reinstall a tire on a wheel, or, if tire changes are not necessary, balance at intervals of 5,000 miles. This operation can be readily and accurately done by attaching sliding type balancing weights to the inside rim flange. The proper position of these weights can, however, be determined only by the use of a wheel balancing machine.

Removal of Spare Tire from Vestibule

To remove the spare wheel and tire from the rear vestibule of the body, open the door and remove the mounting screw clamp from the wheel. The wheel and tire can be pulled out of its compartment.

The jack supplied in the tool kit is of the high lift type and is designed to lift either the front or the rear of the car by supporting it under the bumper brackets. This

makes it unnecessary to reach under the car to put the jack in place in order to lift the car to change a tire.

BODIES

Because of the all-steel construction, the welding of outside panels to the structural framework, as well as the welding and riveting of all structural members, the body structure should remain rigid and quiet throughout the life of the car.

Seat Adjustments

All front seats are adjustable for driver's comfort. By moving handle sidewise at left front corner of seat, the mechanism is unlocked so the seat can be moved forward or backward. Releasing the handle locks the seat.

The Brougham front passenger seat adjustment lock is controlled by the seat back. By pulling the seat back forward, the mechanism is unlocked and the seat can be slid forward to permit easy entrance to the rear of the car, either by further tipping of the back or by pulling forward on the seat itself. When the seat back is pushed into position, the seat resumes its normal position and is locked in place.

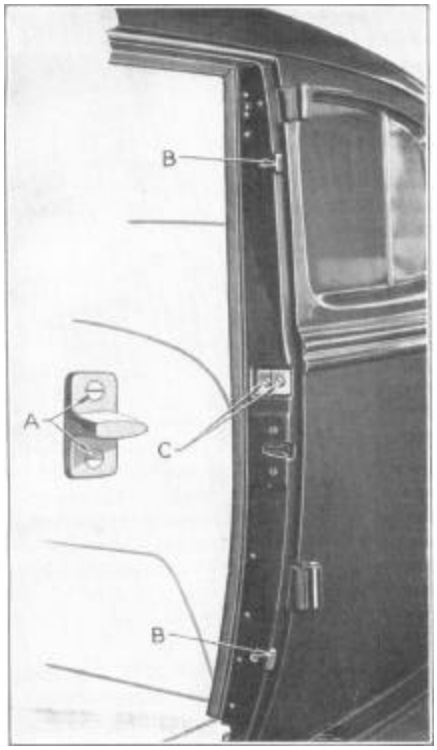


Figure 21

Trim Panels

All side wall and door upholstery panels are attached with screws which are visible along the edges of the doors and pillar posts when the doors are open. By removing these screws and the regulator and lock handles on the panel in question, it can be readily withdrawn.

The door striker plates are adjustable to permit proper in and out regulations of the door position. The dovetail (male) is adjustable to center the door up and down. The hinge pins are cadmium plated to prevent rusting and squeaking of the hinges.

To adjust doors, first loosen the screws (A), Figure 21, holding the male portion of the dovetail to the door and move up or down as necessary so that it lifts the door 1/16" as it enters the female member when the door is being closed.

The front door striker plates should be moved in until the door is held firmly against both the upper and lower rubber bumpers and the rubber door seal.

The front edge of the rear doors should be set slightly inside of the rear edge of front doors to prevent wind noise at high speeds. If an adjustment is necessary, loosen the bumper fastening screws (B) in the pillar post and move the bumpers in or out as necessary to permit the door to close to the desired position. Tighten the screws securely.

If, after this adjustment, the door must be slammed to latch it or the latch does not hold the door snugly against the bumpers and weatherseal, loosen the latch striker plate screws (C) in the pillar post and move the striker in or out as necessary and tighten the screws securely.

Caution: Do not remove the striker plate screws, as the tapping plates will fall out of position.

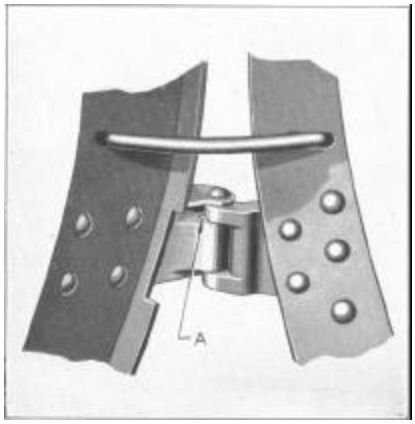


Figure 22

Lubrication

The door striker plates and door dovetails are fitted with lubricating wicks. These should be saturated with light oil. The door hinge pins should be lubricated with light oil. An oil pocket (A), Figure 22, is provided in the top surface of the body half of the hinge adjacent to the hinge pin and is accessible when the door is open.

Ventilation

The glasses of the front door are divided into two sections, each section being controlled by a separate regulator handle. The rear section of the glass moves up and down in the conventional manner as the regulator handle is turned.

By turning the regulator handle which controls the movement of the forward section, the glass can be raised and lowered or swung to act as a wind deflector when in the uppermost position. When this section of the glass is up, it can be lowered in the left door by turning the control handle counterclockwise, while clockwise turning of the handle swings the wing outward. This action is reversed for a given movement of the control handle of the right door.

The raising and lowering of the rear door glasses in Sedans, the rear quarter glasses in Broughams, is conventional by means of crank handles.

The rear quarter windows in the Sedans slide backward when the regulator hand is turned. By moving the glass backward to give an opening of approxi-

mately ½", a suction is created and draws air out of the car, while further opening permits air to enter.

The cowl ventilator is controlled by the handle projecting below the instrument panel slightly to the right of the center. The ventilator is opened to the desired position by pushing forward on this handle.

A translucent rear curtain is used on all closed body types. This curtain prevents vision into the car; however, the lights of an overtaking car can be seen but will give no glare.

The floor mats and carpets are all secured under the sill scuff plates so that dirt can readily be swept out. The front mats can be withdrawn; however, it is necessary to loosen the scuff plate screws to remove the rear carpets.

EQUIPMENT

With the exception of the Electric Hand transmission control, which is available only as a factory installed option, all of the following items of equipment can be installed on any models. This equipment is designed for Hudson cars and is in harmony with interior appointments or exterior finish. In many cases mountings are provided and no drilling or cutting is required to install the equipment; however, any of these items can be readily installed by an Authorized Hudson and Terraplane Dealer.

High Compression Cylinder Head

The aluminum alloy cylinder head, giving 7 to 1 compression ratio, is available for use on the 1936 Hudson engine. Although this requires the use of high octane fuel, it increases the engine output to 100 horsepower and, under comparative driving, increases gasoline mileage, partially offsetting the extra fuel cost. Acceleration and hill climbing are greatly increased by the added power obtained.

Automatic Clutch Control

The clutch mechanism has been designed so that automatic clutch control can be installed without any replacement of standard parts or any drilling. The automatic control is designed especially for Hudson cars and is of the latest design, incorporating pendulum control. This, together with the natural smooth action of the Hudson lubricated clutch and the controlled throttle return, gives a smoothness of operation, both on engagement and disengagement, that has never before been attained.

Electric Hand

The Electric Hand or automatic transmission control may be had on all models as a factory installed option. This device, which is electrically controlled, permits finger tip gear shifting by means of a small lever located immediately under the steering wheel and utilizes the engine intake manifold vacuum to perform the actual work of engaging and disengaging the transmission gears. The Electric Hand also permits pre-selecting of the gears while the car is in motion, the shift being made automatically when the foot is removed from the accelerator pedal or the clutch pedal depressed. When

Automatic Clutch Control is not used the shift is completed by depressing the clutch pedal.

Fender Lamps

All models have a small parking bulb in the headlamp. Fender lamps can be installed on any model and connected in place of the headlamp parking bulb. These fender lamps are of the same design as the headlamps and are chromium finished.

Inside Visor

A visor identical with the left hand visor can be readily installed, as proper mountings have been provided in the right side of the windshield header.

Cigar Lighter

The standard lighter supplied as equipment on some models can be installed on any body type.

HUDSON APPROVED ACCESSORIES

Your Hudson-Terraplane dealer offers a complete line of Factory-Approved Accessories for your car. Each accessory has been chosen for its superiority over competitive items. Each has been inspected and tested and carries the approval of Hudson engineers.

There are certain extra items of a strictly accessory nature which tend to enhance appearance, increase comfort and add satisfaction to the ownership of either a Hudson or Terraplane car.

An ELECTRIC CLOCK is available for mounting in the locker box door, and is the finest automobile clock on the market. Its illuminated dial is visible day or night. Enjoy the freedom from winding, only possible with an electric movement.

The HUDSON RADIO utilizes to the fullest extent the many advances which have taken place in radio engineering. It is a real musical instrument of exceptional quality, bringing you the same enjoyment in automobile radio that you enjoy in your radio at home. The Hudson radio is really a built-in part of the car, the dial in the instrument panel harmonizing beautifully with the other instruments. The separate speaker faithfully reproduces all reception, and the tone is controlled to your individual wish by the tone control dial on the set itself. Wherever you go, you are in touch with the happenings of the world. Sports, music, news bulletins, entertainment of all kinds are brought to you with clear, powerful volume faithfully, accurately reproduced.

The STANDARD HOT WATER HEATER delivers an ample supply of healthful warmth for normal weather conditions. Equipped with variable speed motor and illuminated switch, the De Luxe Heater provides that extra margin of heat output desirable for extremely cold territories. Quiet in operation. The horizontal mounting provides ample foot room. The Twin De Luxe provides the maximum heat with a minimum of space. Has double fan, forcing an abundance of heat throughout the car. All heaters have adjustable deflectors, directing the heat to any desired angle. All models are finished in lacquered colors designed

to harmonize with the car interior. Enjoy the cozy fireside comfort of hot water heat during the cold winter weather and the damp periods of other seasons.

HUDSON SEAT COVERS are tailored to fit Hudson-built cars. They are smart in appearance, the material harmonizing with the upholstery in all models. San-Toy covers somewhat resemble fibre matting, but are far superior in wearing qualities and eye appeal. These covers are not damaged by moisture and are easily cleaned by sponging with Hudson Upholstery Cleaner, foam solution. The smooth finish of this type of material has less tendency to wrinkle clothing and, especially in hot weather, adds greatly to the comfort of riding. Seat covers of this type are usually considered a summer need, but you will be delighted with their all-year comfort and convenience. Quickly and easily installed, they preserve the original upholstery in the car.

A VANITY MIRROR mounted on the sun visor has a decided appeal to feminine motorists. No need of moving the rear view mirror out of driving position when this beauty aid is installed.

The stylish OVAL REAR VIEW MIRROR is not only attractive in design, but its special shape enables the driver to command a full view of the road behind.

The TELL-TURN SIGNAL LIGHT is a practical necessity on a motor car with today's high speed and rapid deceleration. Indicates to those following or approaching the driver's intention to turn. Operates with a touch of the hand from inside the car, obviating the need of lowering window in cold or stormy weather to signal with the arm. The signal is given by a brilliant amber arrow, which arrests attention by its rapid intermittent flashing.

The SAFETY SWINGING STOP LIGHT flashes a stop warning to cars behind, which cannot be overlooked. At a pressure on the brake pedal, the lantern is lighted and starts to swing, calling attention to the driver's intention to stop. The safety stop light is installed singly or in pairs on the rear bumper to frame brackets.

LICENSE PLATE FRAMES transform the ordinary appearing license plates into a really attractive accessory. Protect the license plates from bending and prevent rattles.

FENDER GUIDES are helpful in driving through narrow traffic lanes and in parking. They save your fenders and, being exact duplicates of the radiator ornaments, add an extra touch of distinction.

The above items are only a partial list of Hudson-Approved Accessories obtainable from your dealer. Upholstery Cleaner, Car Polish and Wax are also available.

Make your accessory selection from an authorized Hudson dealer, with full assurance that such accessories will harmonize with the car design and provide, to the fullest extent, the service for which they are intended.

YOUR HUDSON-TERRAPLANE DEALER
WILL GLADLY SHOW YOU THE FULL LINE OF
HUDSON-APPROVED ACCESSORIES

PREPARING CAR FOR STORAGE

If the car is to be laid up for any length of time, and especially in the winter, the following suggestions should be observed: Drain the water from the cooling system, then run the motor not over one minute to dry out the cylinder water jackets.

Drain the crankcase. Flush out the old oil, then refill with fresh oil. It is also well to pour a little oil into each cylinder through the spark plug holes to prevent the interior from rusting. Clean the spark plugs and dip the ends into oil to prevent rusting, and replace them.

Crank the engine for about twenty seconds with the ignition switch off and the throttle closed. This insures a distribution of the oil over cylinder walls and valve mechanism.

Disconnect the wires from the storage battery and remove battery to some dry place. It is best to take the battery to a battery service station, where it may receive a freshening charge at least once a month. It is well worth while to take care of the battery.

Go over the chrome or nickel plated parts with a light coating of vaseline jelly or grease to prevent tarnishing. This should be removed with gasoline before putting the car back into service.

Jack up the car and remove the tires.

If the tires are to be out of service for any length of time, they should be removed from the wheels. The inner tubes should be put in the casing with a small amount of air pressure and the tires stored in some cool, dark place, preferably where there is a slight amount of moisture, since if they become too dry the rubber will harden and lose its elasticity. It is a good idea to wrap tires with cloth to protect them from heat.

Remove all dust from upholstery, wash body clean, put the windows or the top up and cover the car with heavy sheeting or a paper cover especially made for the purpose.

When putting the engine back into service again, remove the spark plugs, inject a small quantity of oil into each cylinder, crank the engine by hand for a few seconds, replace the plugs, turn the ignition "on" and, after the engine has been started on its own power, run slowly for a few minutes.

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