Chrysler Imperial "80"

INSTRUCTION BOOK

Second Edition
September 15, 1926

Chrysler Sales Corporation
Detroit, Michigan

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Price 25 Cents

PRINTED IN U. S. A.

License Data

Chrysler Imperial "80"

Car Serial Number.....

Theft protection system, symbol plate built into instrument panel at left side. Chassis shipped without bodies have symbol plate built into frame left side member vertical section just forward of the steering gear.

Engine Serial Number..... (Stamped on boss, top of chain case.)

Cylinder Bore—3½"

Stroke—5"

Number of Cylinders—6

S. A. E. Horse Power Rating—29.4

Piston Displacement—288.6"

Shipping Weights without Spare Tire

Phaeton	3765 lbs.	Sedan (5-Pass.)	4055 lbs.
Roadster	3805 lbs.	Sedan (7-Pass.)	4195 lbs.
Coupe	3975 lbs.	Sedan Limousine	4370 lbs.

KEYS

Keys are serially numbered and number should be jotted down so that in case of loss new keys may be obtained. There is no number apparent on the lock cylinder. Not more than two keys may be ordered and shipment will be made only to Chrysler dealers. These rules are required by the Board of Insurance Underwriters for the protection of Chrysler owners. On closed cars the transmission lock and door lock keys are identical.

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A Personal Message to Chrysler Owners

IT IS our sincere desire that you obtain from your Chrysler Imperial "80" the service, comfort, enjoyment, and innumerable miles of low-cost travel that we have earnestly endeavored to build into it.

It is necessary only that you treat the vehicle with reasonable care and consideration in order that you and your family or friends may realize these qualities.

In the pages that follow we give much valuable information, without going into intricate detail, that you should have in order to give your car the careful attention which it merits.

For extensive repairs or adjustments, we request that you take your car to a Chrysler Service Station, where it will receive the particular attention of an organization devoted to your interests, with mechanics specially trained in the maintenance of Chrysler cars, using genuine Chrysler service materials.

Communications with reference to Chrysler cars should give serial number and mileage.

CHRYSLER SALES CORPORATION

Inspection and Care

Regular inspection, with adjustment or tightening when needed, goes far toward keeping low the maintenance expense and upholding the high standards of quietness, reliability and performance built into the vehicle at the factory.

Engine

The "new car instructions" posted on the windshield should be followed closely. A new car should not be driven faster than 30 miles per hour for the first 100 miles nor faster than 35 miles per hour for the next 400 miles. After 500 miles the maximum speed should not be increased more than 5 miles per hour for each additional 100 miles of driving.

The above speeds are permissible for high or third speed operation only. While driving in intermediate, the maximum speed should be half of that for high gear.

When negotiating hills or heavy roads requiring more than half throttle opening to attain the above specified speeds, the gears should be shifted to a lower speed, the throttle opening and the car speed reduced.

Oiling System

All outside oil line connections and gaskets should be inspected carefully and tightened if necessary. Oil is to be maintained at the high level point in the crankcase, transmission case, and rear axle housing. The plug, in the bottom of the oil filter on the dash, should be removed occasionally to drain off any water or other foreign matter. (Page 14.)

Ignition System

It is a good plan to check over the wiring to see that all connections are tight, that insulation is in good condition, that no wires are chafing or rubbing against metal parts which will wear off insulation and cause a short circuit. Dirt and dust should be wiped off the inside and outside of the distributor cap occasionally. While the distributor cover is off, the rotor contact should be cleaned. Cleaning and adjusting the spark plugs at intervals of about every two months will also aid in keeping the ignition system in good condition. (Page 41.)

When the engine is being used as a brake while coasting, the ignition switch should NOT be turned off. Failure to observe this precaution may cause excessive loading and shocking of the driving mechanism, muffler and exhaust valve damage, fouling of the combustion chambers and spark plugs, excessive reduction of the inlet manifold temperature, and dilution of the engine lubricating oil. While coasting down a long grade with the engine acting as a brake, the manifold heat control knob should be pulled "out" and the ignition switch left "on".

When the engine is not running, the ignition switch should be turned off to prevent discharging the battery and damage to the ignition coil.

Storage Battery

Water should be maintained at the proper level in the storage battery. (See Page 46.) If the nature of service is such that an excessive quantity of water is required by the battery, the generator charging rate should be reduced.

Cooling System

The hose connections and water pump packing nut should be inspected occasionally for leaks and the leaks, if any, stopped by tightening the hose clamp screws or the water pump packing nut, but care must be taken to not tighten the water pump packing nut so much as to bind the shaft, causing undue wear of the packing and possible slippage and wear of the fan belt. The radiator stud nuts and core to shell screws should also be kept tight.

Fuel System

The glass bowl of the fuel filter should be removed and emptied occasionally to remove any water or sediment which may have collected therein. The fuel shut-off valve should be closed before removing this bowl. When the glass bowl and strainer are reassembled, the shut-off valve must be FULLY OPENED (unscrewed until it stops). Cleaning the strainers in the carburetor and vacuum tank about once every five or six months is an added precaution against the flow of fuel becoming obstructed. Carburetor adjustments other than this should not be attempted by any but experienced carburetor mechanics. (Pages 32 and 34.)

Clutch

Abuse of the clutch should be avoided. Starting the car in second gear is permissible only for a gentle start on a hard, level road or down grade. The clutch pedal should have from 1¾″ to 2″ of free movement before resistance can be felt. Less than 1″ free movement of the pedal will cause damage to the clutch. (See "Important", Page 49, under "Adjustments".)

Pressure on the clutch pedal causes a certain amount of wear on the "throw-out" mechanism and rapid wear of clutch disc due to slippage. (Page 51.) A driver should never rest his foot on this pedal except during the operation of shifting gears or stopping the car.

Transmission

The gears must be fully engaged after shifting to different speeds before relieving pressure on the clutch pedal. Lubricant should be maintained at the proper level in the transmission case. (Page 17.) This may be inspected by removing the plug from the filler hole in the side of the transmission. This inspection is necessary only about every six months.

Brakes

The level of the liquid for the hydraulic brakes should never be below the half full point of the supply tank on the dash. The pump plunger in this tank should always be turned down to a tight seat.

The brake bands, at the wheels, should be adjusted so as to just clear the drums at all points. (Page 63.) During the summer, especially in hot climates, the brake pedal, after the car has stood overnight, should have ¾" of free travel before any resistance is felt. This free travel is gradually taken up as the temperature rises. (Page 64.)

Steering Connections

The steering gear connections and front axle tie rod should be inspected frequently as well as the front wheel alignment. (Pages 57 and 59.)

Springs

The nuts on the clips, holding the springs to the axles, should be kept very tight at all times. They should be inspected at least three times during the first month and about once every month for the succeeding six months. (Page 59.)

Tires

Water and road dirt will work into cuts in tires and loosen the rubber from the carcass unless the cuts are properly and promptly sealed. It is also important that the air pressure in the tires be properly maintained at all times. This should be checked about once each week. (Pages 57 and 59.)

Wheels

The front wheel bearings require an occasional inspection for lubricant and adjustment. (Page 57.) The nuts holding the tire rims in place are apt to loosen slightly and should be tightened when necessary, as well as the nuts holding the rear hubs to the axle shafts.

Front Axle

All parts must be well lubricated and the front wheels jacked up and the bearing adjustment checked. (Page 18.)

Rear Axle

The lubricant in the rear axle should be at the proper level and of high quality. (Page 17.)

Windshield

Open car windshield anchor bolts (at bottom of windshield post) should be examined and tightened, if necessary, with a wrench, but the windshield thumb screws should be tightened only by hand.

Body Door Hinges and Locks

These require practically no attention. At times a tendency to bind may develop, but a few drops of oil applied to the movable parts will keep this equipment in good condition.

Washing the Car

It is possible in many instances to clean the Duco finish of the body by wiping with a dry cloth, but it is usually best to wash the finish with water and a sponge, especially if there is grit in the mud or dirt. At times the finish may appear to be turning grey or white, which only indicates that cleaning and polishing is required. If alcohol is spilled on the finish it should be wiped off immediately to avoid spotting.

Varnish should not be used for touching-up scratches in the Duco finish. Duco only should be used for such purposes.

The undersides of the fenders and the running gear should be flooded with water and, after most of the mud is soaked off, a warm soapsuds will take off the remainder. Then it should be thoroughly rinsed with running water. The same sponge should not be used on the body and running gear. After washing, the car should be thoroughly dried with a soft chamois skin.

After car is clean, it should be polished with Duco Polish No. 7 or a comparable product.

The finish should be protected by an application of Simoniz Wax, Johnson's Liquid Wax or Duco Wax. This is an important factor in the life of the finish.

Open Car Top

While the top is damp it should never be folded or laid back. Dust or dirt on the outside of the Phaeton top should be removed with a sponge and a mild soapsuds. A pure, high-grade, linseed oil soap should be used. The Roadster top should be cleaned with clear water and a brush. Soapsuds should not be allowed to drip or spatter onto the finish of the car. If this does happen it should be rinsed off immediately with clear water. All Duco and enamel work should be fairly wet before washing the top.

The top should be well rinsed with clear water and wiped dry with a chamois skin. Gasoline cleaners and most of the so-called top polishes are detrimental to the top material and should never be used. The inside of the top should be cleaned with a stiff brush, as well as upholstered interiors of closed cars.

Side Curtains

The side curtains should be carried in the large compartments provided and laid flat without folding. Curtains should be thoroughly dry before being put away, otherwise they will mold.

Precautions for Summer

The cooling system should be thoroughly flushed and all water leaks stopped (new hose installed, if necessary). Fresh lubricant should be used in the transmission and rear axle after the inside of these cases has been thoroughly cleaned, oil leaks stopped, and necessary gaskets installed. The summer position of the bleeder ("E", Fig. 8, Page 33) should be set in the carburetor, and the choke adjusted, if necessary, for full opening. The battery terminals should be cleaned and coated with vaseline and water

replenished in each cell when necessary. It is possible that th
charging rate will need to be reduced to prevent excessive ev
the battery water. The car should have a general inspection a
cation throughout, including the grinding of valves and relining of
if necessary. The engine oil should be changed every 1500 miles
normal operation in warm weather, but when the car is driven extre
fast or worked hard on heavy pulling in hot weather the oil should be
changed every 500 miles.

Surplus liquid in the hydraulic braking system should be released while the car is hot by opening the valve in the reserve supply tank. This is accomplished by unscrewing the handle of the pump on top of the tank. After the valve has been open but a few minutes it should be closed again tightly by hand before the brake pedal is operated. This will permit surplus liquid to escape into the supply tank and obviate brake drag due to expansion of the liquid.

Precautions for Winter

A non-freezing solution should be used in the cooling system after the first indication of cold weather. (Page 31.) If an alcohol solution is used, the specific gravity should be checked about once a week to make sure of it being the desired strength because the alcohol evaporates rapidly and raises the freezing point of the solution. The lower half of the radiator should be covered.

The carburetor should be drained to remove any water which may have collected there. The winter position of the bleeder ("E", Fig. 8, Page 33) should be set in the carburetor. (Page 34.)

The engine oil pan should be removed and thoroughly cleaned, as well as the oil strainer, the parts then reinstalled and the pan filled with fresh oil. When refilling at temperatures approaching zero, an oil of the body and character of Gargoyle Mobiloil "Arctic" should be used. The engine oil should be changed every 1000 miles during normal operation in cold weather, but if the car stands in the cold and is used principally for short runs the oil should be changed every 500 miles.

The lubricant in the transmission and rear axle should be drained off and each unit filled to proper level with the lubricant specified.

Tire chains should be adjusted loose enough to allow them to creep around the tires.

Storage of Tires

If the car is not to be used for several months it should be jacked up until the tires clear the floor. The tires should be inflated only sufficiently to hold their normal shape. If convenient it is well for the tires to be removed from the rims and placed in a room with subdued light and a temperature of about 60 degrees Fahrenheit. Tires in storage or not being used frequently should be protected from strong sunlight.

he Car

should be thoroughly washed and dried, also the curtains and ied before being stored. The wheels should be jacked up suffi- or the tires to clear the floor. Unpainted metal parts should be with heavy oil to prevent rust and corrosion. The storage place uld be dry and have as even a temperature as possible. Sudden changes of temperature and close proximity of steam pipes or other heating apparatus should be avoided. A subdued light evenly distributed will best preserve the finish. A car should never be stored in the same building with horses or other animals. The water should be drained from the radiator. The spark plugs should be removed and cleaned and a small quantity of engine oil poured into each cylinder through the spark plug holes. Then the spark plugs should be reinstalled and the engine cranked several times by hand. This operation should be repeated every sixty days while the car is in storage.

Partly disengaging the clutch and blocking the pedal in this position will prevent corrosion developing on the faces of the clutch plates. The hand brake should be released and the storage battery stored at a battery service station for proper attention during the storage period. (Page 46.)

Lubrication

Proper lubrication is of vital importance. Lubricating with the best materials and with the utmost care will be repaid many times by long wear and good service.

Engine Lubrication

Oil is put into the engine through the oil filler located on the left hand side of the crankcase. The oil level gauge is just below the filler. When a reading of this gauge is being taken, the engine should be stopped, the indicator removed and the oil wiped off the indicator rod. The indicator should then be inserted again and removed for a true reading. Engine should never be operated when the oil is below the lower mark of the indicator rod.

For correct engine lubrication it is recommended that a high-grade oil of the body and character of Gargoyle Mobiloil "A" be used during the summer and for ordinary winter temperatures. When fresh oil is put in at temperatures approaching zero, an oil of the body and character of Gargoyle Mobiloil "Arctic" should be used.

The gear type oil pump draws the oil through a strainer and forces it through passages drilled in the cylinder block to the main bearings and camshaft front bearing and from the main bearings through passages in the crankshaft to the connecting rod bearings and also through the hollow camshaft to its bearings. The spray off the bearings and the streams of oil from oil holes in the connecting rods lubricate all other reciprocating

and rotating parts of the engine. A tube from the front camshaft bearing delivers oil direct to the timing chain and sprockets. The overflow from the rear main bearing is conducted through a trap back into the oil pan.

An oil filter is mounted on the dash under the hood which passes the oil through a specially treated fabric, removing carbon and dirt too small to be caught by the strainer.

Oil Pressures

The oil pressure gauge, on the dash, at normal driving speeds with warm engine and oil will show approximately 25 to 30 lbs. pressure. Greater pressure compresses a spring in the oil pressure relief valve, allowing excess oil to pass back into the engine oil pump sump.

The oil gauge should be watched at all times, particularly in winter. If at any time it should indicate no pressure, the engine should be stopped immediately. If there is plenty of oil in the pan, the oiling system should be carefully checked by a competent mechanic before starting.

The oil pressure relief valve may be adjusted to increase or decrease pressure on the gauge, but it should not be touched until the oiling system has been carefully checked by an experienced mechanic. If the gauge shows inadequate or too great pressure, it indicates trouble in the oiling system. Changing the position of relief valve to correct gauge reading removes effect of the trouble, but does not remove the cause. If it becomes necessary to adjust the oil pressure relief valve, the cap nut adjacent to the oil filler should be removed and the locking wire withdrawn. The slotted plug should be turned clockwise to increase the pressure or anti-clockwise to decrease the pressure.

There are several conditions which may cause a reduction in the pressure registered on the gauge. They should always be carefully checked before any change is made in the adjustment of the pressure relief valve. Some of them are as follows:

Use of oil too light in body.

Oil excessively thinned out by unvaporized and unburned fuel.

Loose bearings. The looseness may be due to wear and should be investigated.

A leaky or broken oil tube.

Clogged oil screen.

Broken oil gauge.

Oil Filter

The engine oil filter on the dash of the car separates foreign substances from the engine oil, but it is not intended to separate fuel and acids which form in the engine oil due to natural service and improper use of the carburetor choke. Instructions regarding proper use of the choke (Page 35) as well as draining the crankcase (Page 15) should be followed carefully. The foreign matter collected by the filter should be drained by

removing the plug in the bottom of the filter body. When the engine is running fast enough to register about 10 lbs. pressure on the oil pressure gauge, a steady flow of oil should be observed in the sight feed of the filter. If a steady flow of oil cannot be seen at this point, the filter has undoubtedly become clogged with foreign matter. In this case the filtering cartridge should be inspected and replaced if necessary. However, under normal conditions it should not be necessary to replace this filtering unit more frequently than 8000 to 10,000 miles of car travel.

Draining Crankcase Oil

Due to natural conditions, the engine oil, in use, is constantly being impregnated with fuel, water, and acid, depreciating the value of the oil as a lubricant. For this reason the oil should be replaced at regular intervals. (See Lubrication Chart inside back cover.) Running the engine with the choke closed or partially closed increases the amount of fuel drawn into the cylinders. To reduce the amount of fuel which will work into the engine oil, the engine should be run with choke as fully open as possible. The rapidity of accumulation of these damaging elements can be governed to a great extent by the driver of the car.

Fuel accumulates in the engine oil because of a certain excess of fuel in the combustion chambers not burning and working down the cylinder walls into the crankcase. Only certain percentages of vaporized fuel and air when mixed will ignite and explode in the combustion chamber. If the mixture contains too much fuel the excess will not burn, but a certain amount of it will remain on the cylinder walls and work down into the crankcase by the action of the pistons.

Water vapor is a product of combustion. There is approximately as much water vapor formed by weight as fuel consumed. This accounts for the white vapors and water coming from the exhaust which is most noticeable in cold weather. A certain amount of this vapor condenses on the cylinder walls and is carried into the crankcase by action of the pistons. This water accumulates in the crankcase and under certain conditions forms an oil sludge. An excess of sludge or water may interfere with lubrication.

Acid forms in the combustion chamber also due to natural causes. Fuel contains varying percentages of sulphur and when burned changes to sulphur dioxide. The sulphur dioxide unites with water in the combustion chamber, making sulphurous acid.

The accumulation of these non-lubricating elements in the engine oil has very damaging effects on the wearing surfaces. Fuel thins the oil, reducing its lubricating ability. The water is a non-lubricant and is liable to freeze, causing stoppage of the oil circulation. The sulphurous acid attacks bearing surfaces and causes excessive wear. The rapidity of accumulation of the above elements increases as the temperature decreases. These elements can only be removed by draining the crankcase. Instructions (Page 16) should be followed.

To drain the oil, the drain plug in the bottom of the oil pan should removed. The best time to drain is after a run when the engine is heated. The oil is thinner when it is hot and is also thoroughly mixed. It will, therefore, carry off sediment more completely.

Kerosene should never be used for flushing out the oil pan and lubricating system. A certain amount will remain in the system, collecting in pockets from which it cannot readily be drained and will dilute the oil.

Cleaning Oil Pan and Screen

At least once a year, preferably in the fall, the oil pan should be removed from the engine and thoroughly washed. The oil strainer should be removed and washed at this time.

Distributor

The grease cup on the distributor housing should be kept full of No. 2 cup grease and should be given one turn about once each month.

Care should be taken to keep grease off of breaker points and governor weights.

Generator

The oilers at each end of the armature shaft should receive a few drops of light engine oil every 2000 miles. Oil should never be used on commutator.

Starting Motor

The oilers at each end of the armature shaft should receive a few drops of light engine oil every 5000 miles. Care must be exercised when oiling the starting motor to not allow any oil to get on the commutator. The gear housing at the rear of the starting motor body should be filled with Whitmore's Compound No. 0 every 10,000 miles.

Grease Gun

The lubrication system for the chassis consists of an easily operated high-pressure gun and a set of nipples. The gun is filled by unscrewing the end cover and filling the barrel with lubricant as specified for various points.

One pumping action is generally sufficient, but two or more pumping actions should be given if necessary. The return motion of the plunger automatically fills the inner chamber of the gun with a fresh charge of lubricant.

ater Pump

The two bearings of the water pump shaft should be lubricated with Whitmore's Compound No. 0 every 2000 miles. The lubricant hole at the cylinder block end of the pump shaft is provided with a lubricant gun nipple having a cap screwed on to prevent water leakage. This cap should always be in place when lubricant is not being forced into the nipple. The grease hole toward the fan end of the pump shaft is provided with a standard grease gun nipple.

Lubrication of Clutch Transmission, Universal Joints and Rear Axle

Clutch

The clutch is of the single dry plate type, requiring no lubrication, except the release bearing which should be filled with Whitmore's Compound No. 0 every 5000 miles. (Page 49.)

Transmission

The transmission case should be kept full to the level of the filler plug, on the right side, with Whitmore's Compound No. 0. Fresh lubricant should be used each spring and fall after flushing the inside of the housing with kerosene.

Universal Joints

Whitmore's Compound No. 0 should be used for the universal joints, supplying just enough every 5000 miles to feel the lubricant start to enter the leather boot.

Rear Axle

The rear axle housing should be filled to the level of the filler plug in the cover with Whitmore's Compound No. 0.

Note: Grease or non-fluid oil should never be used in the transmission case or rear axle housing.

Running Gear Lubrication

Front Axle

The front axle king pins are lubricated by means of an oiler screwed into each front axle yoke above the steering knuckles. The body of the oiler is so designed as to contain approximately one ounce of engine oil. A wick conducts the oil, by capillary attraction, to the bearing surfaces of the king pins. Oil may be poured into the well of this oil cup after removing the plug in the top of the body; however, it is only necessary to fill the oiler at intervals of every 2000 miles of car travel. The ball and socket joints on the ends of the tie-rods are lubricated by means of the high-pressure lubricant gun and Whitmore's Compound No. 0 every 5000 miles.

The front wheel bearings should be packed with Whitmore's Compound No. 0 every 5000 miles. Before fresh lubricant is packed into the bearings it is advisable to clean the bearings and the inside of the hubs with kerosene.

Springs

The front and rear ends of the chassis springs are provided with rubber supports housed in brackets. The spring brackets are provided with caps on their undersides which by the aid of cap screws hold the rubber supports into their respective housings. Positively no lubrication or attention is required for upkeep of these spring mountings. The springs can be removed by taking the cap screws out of the covers of the spring end housings and dropping the springs. Reassembly can be facilitated by the use of soapy water on the rubber supports.

Fabric covers are fitted over the chassis springs and held in place by coil springs. When the car is built and before the covers are assembled the chassis springs are covered with a generous supply of heavy engine oil as a lubricant for the spring leaves. The covers should be removed once a year or each 10,000 miles and the springs thoroughly cleaned with kerosene and a stiff brush. After cleaning they should be wiped dry with a cloth and coated, on all sides, with lubricant as mentioned above. Then the covers should be installed and properly fastened in place by means of the coil springs.

Brakes

The anchors on the brake bands should be oiled each 2000 miles and their action checked to see that they work freely. There are no other points in the hydraulic brake operating mechanism requiring lubrication. The transmission emergency brake rod connections should be oiled every 2000 miles with a few drops of engine oil.

Steering Gear

Frequent lubrication of the entire steering mechanism provides easy steering. The steering gear housing should be filled every 5000 miles with Whitmore's Compound No. 65.

General Description and Repair Operations

Engine

The power plant of the Chrysler Imperial "80" is of the unit type, having a six-cylinder engine, of the L-head, four-cycle, poppet valve construction. The cylinder head and oil pan are removable.

The rear supports of the engine are mounted in rubber insulators which make secure fastenings between the engine and frame without metallic connections. This eliminates direct transmission of metallic resonance from engine to car.

Lubrication is accomplished by a full force feed system to all crankshaft, connecting rod, and camshaft bearings. The connecting rods have metering apertures drilled in their lower ends to spray the cylinder walls, piston pins, and the entire valve operating mechanism. An oil filter mounted on the dash passes the oil through chemically treated fabric that removes dirt and sediment and returns the oil, cooled and cleansed, to the oil pan.

The water pump, in the front of the cylinder block, draws cool water from the bottom of the radiator and, through a system of graduated outlets and large passages, forces circulation around each cylinder and valve seat. The temperature of the cooling water is quickly raised and maintained at the most efficient point for the operation of the entire engine by the action of the thermostat in the cylinder head outlet passage.

The camshaft and generator are driven by the crankshaft through an adjustable silent chain. The ignition distributor, which has dual breaker points and semi-automatic spark advance, is accessibly mounted on the cylinder head and driven by a spiral gear on the camshaft.

Pistons and Rings

The pistons are light weight, of Chrysler special thermal controlled bridge type, slotted skirt design. The rings are all above the piston pin which floats free in the piston, clamped in the connecting rod. A plain compression ring is assembled in the upper groove of the piston. An oil wiper ring is assembled with undercut down, in the middle groove of each piston. A special oil ring is used in the bottom groove.

Pistons are fitted with .002″ clearance at skirt, .019″ clearance at the head. Piston pins are fitted with .0005″ to .001″ clearance which is a finger push fit or even loose enough to permit the pin to fall through the hole when the piston is shaken by hand, but not jarred. This exact fit is proper for lubrication and to prevent unnecessary thrust of the piston against the cylinder wall.

Upper piston rings have a gap measure of .010″ to .016″, the center and lower rings .005″ to .011″. When assembling new parts the exact clearance must be allowed and the rings should move freely in the grooves when the

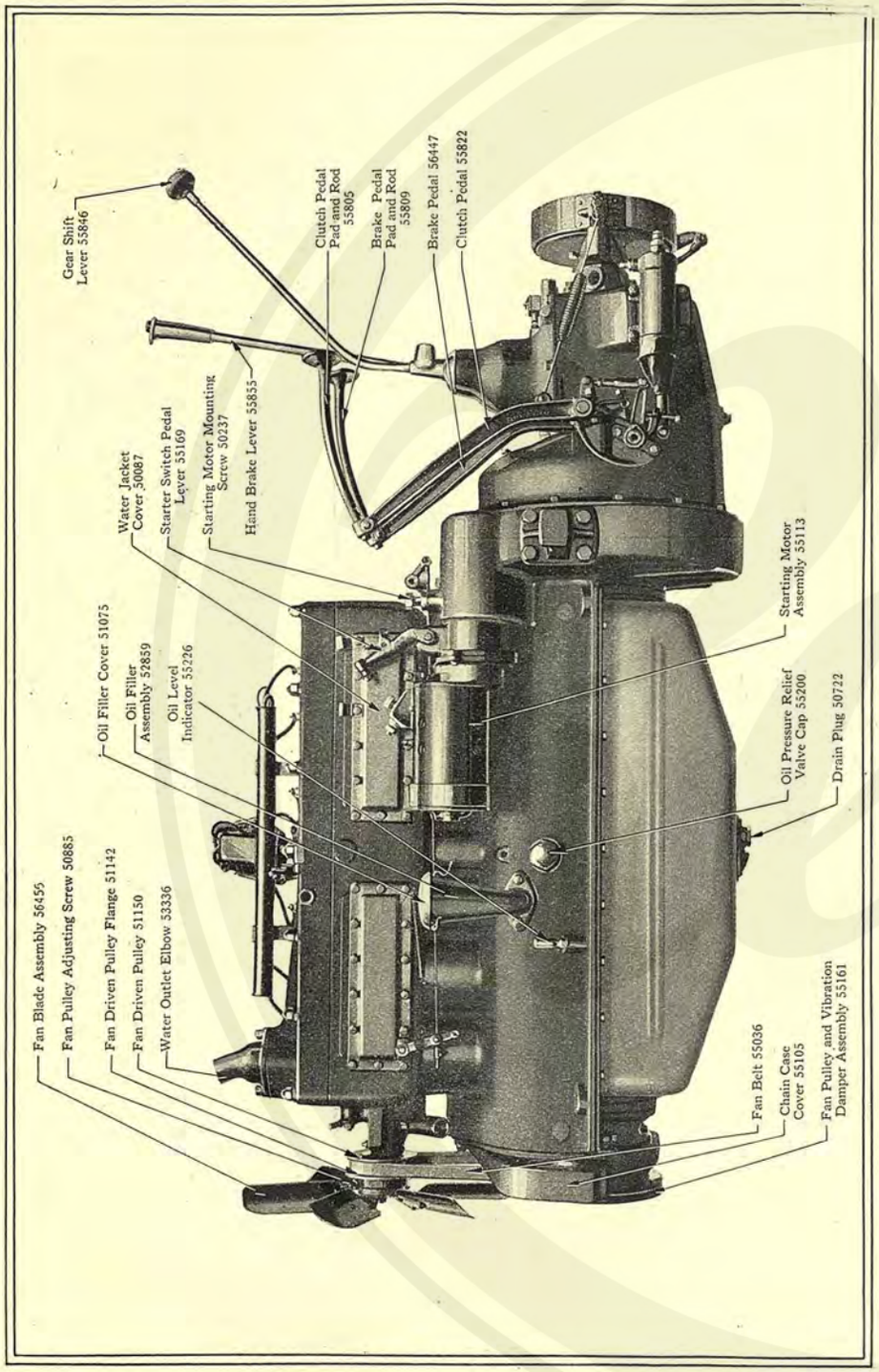

Fig. 1—Left Side View of Power Plant

piston is shaken. Piston and connecting rod assemblies should be removed from the top of the engine.

When connecting rod assemblies are being reassembled to an engine, the oil passages, through the big end bearing, should face toward the valve side of the engine.

Chrysler Imperial "80" pistons and rings were selected only after exhaustive tests proved them most efficient for this engine. Under no consideration should so-called trouble-proof pistons and rings be installed. Chrysler pistons and rings are the results of very elaborate, painstaking and expensive research and under no circumstances should any of these parts be used unless obtained directly through authorized Chrysler Service Stations, as having come from the Chrysler Corporation, as trouble will otherwise inevitably result. Chrysler owners should always insist upon the use of genuine parts.

Bearings

The crankshaft is of the full counterweighted design, positively balanced dynamically and statically, and mounted in seven bronze-backed, babbitt-lined bearings. The crankshaft main bearings are a special interchangeable type, manufactured to such close limits that new bearings may be installed without reaming, scraping, or burnishing. The camshaft, driven by the crankshaft through an adjustable silent chain, is mounted in four large bearings: the front, a bronze, babbitt-lined bearing; the others are machined in the crankcase. The connecting rods are manufactured to exact size and are interchangeable without fitting. Bearings are of babbitt, cast integral by a centrifugal process, thereby providing a perfect bond and a bearing free from flaw or foreign substance.

Due to the full force feed oiling system, all engine bearings are assembled with a clearance of .002", so that there is always a film of oil under pressure as a cushion between the bearings and shaft.

Damaged bearings are positively and quickly repaired at small cost by installing new bearings, which restore the original factory alignment. Bearings are otherwise not adjustable. These bearings should not be tampered with in any way other than to replace them. A bearing cap should never be filed.

Valves and Valve Timing

Extra large valves are mounted along the right side of the cylinder block and are lifted by adjustable tappets of mushroom type. The inlet valves are of chrome nickel steel. The exhaust valves are of silcrome steel, of the semi-tulip design, the ultimate in heat-resisting metals. Valve stems operate in cast iron guides, generously lubricated. The valve tappets are mounted in groups of six in cast iron brackets, easily removed.

To Set Valve Timing

The crankshaft should be turned until Nos. 1 and 6 pistons are at top dead center. The 1/8" pipe plug should be removed from the cylinder

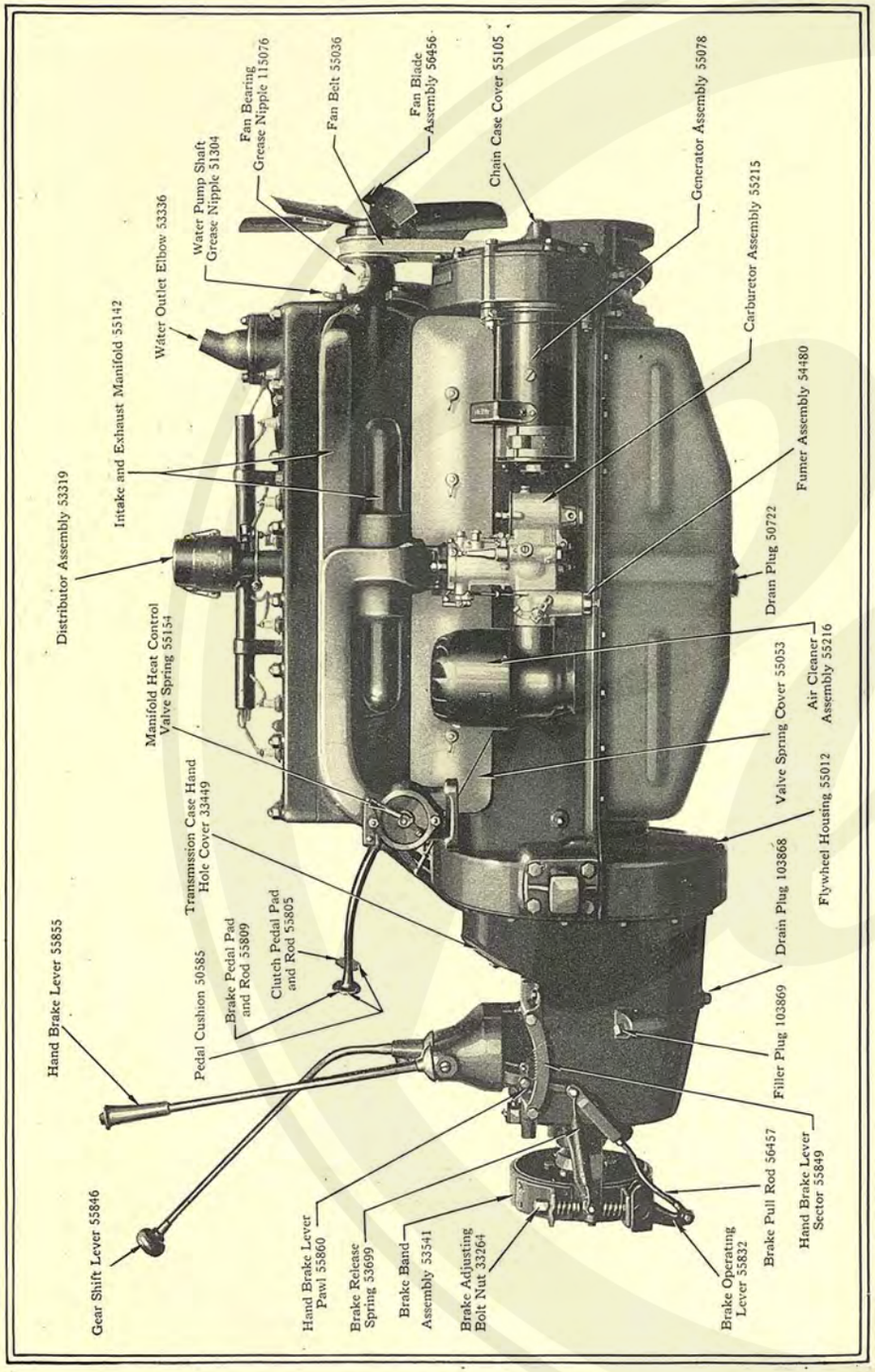

Fig. 2—Right Side View of Power Plant

head above No. 6 piston, and a gauge rod placed through this hole and in contact with the piston head. This provides an easy means of determining the position of Nos. 1 and 6 pistons. When these pistons are at top dead center the timing marks on the crankshaft and camshaft sprockets should be opposite each other (as shown in the illustration on Page 29) and checked with a straightedge to see that these marks are straight in line between the crankshaft and camshaft centers. The timing chain should then be very carefully installed without moving the camshaft or disturbing the setting of the gauge. The tongue of the distributor driveshaft, unless it has been removed, is now parallel to the center line of the crankshaft with offset on the side nearer the carburetor.

To Check Valve Timing

The 1/8" pipe plug should be removed from the cylinder head above No. 6 piston and a gauge rod placed through this hole and in contact with the piston head. The valve tappets should next be adjusted while the engine is warm, with not less than .008" clearance for the exhaust, .006" clearance for the intake. The crankshaft should be rotated until No. 6 piston is coming up on compression stroke and stopped when the piston is at top dead center. The No. 1 intake valve tappet should be up just enough to be tight and the valve just about to open. No. 1 cylinder exhaust valve closes two degrees of crankshaft rotation later. The timing diagram below should be consulted. The exhaust valves are Nos. 1-4-6-7-9-12.

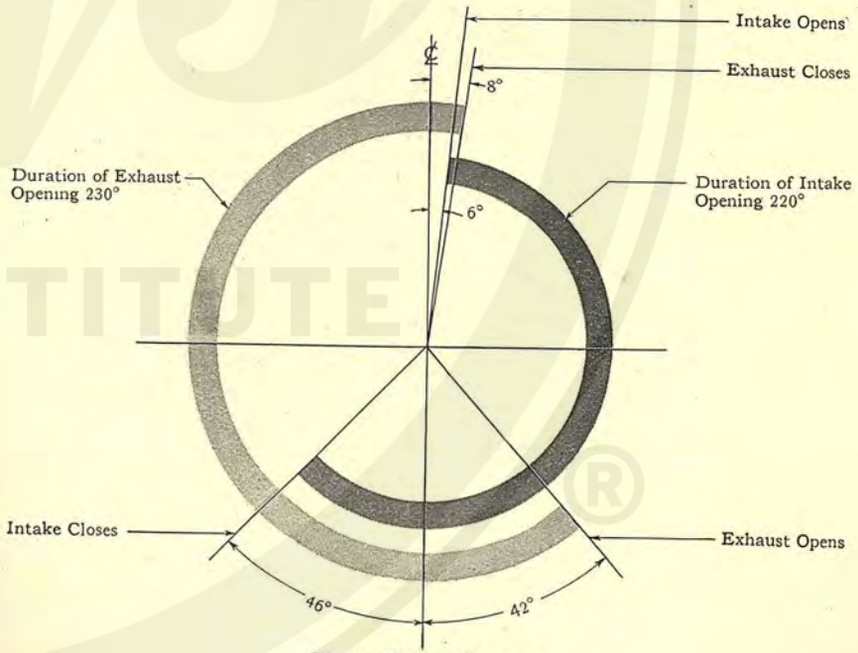

Fig. 3—Timing Diagram

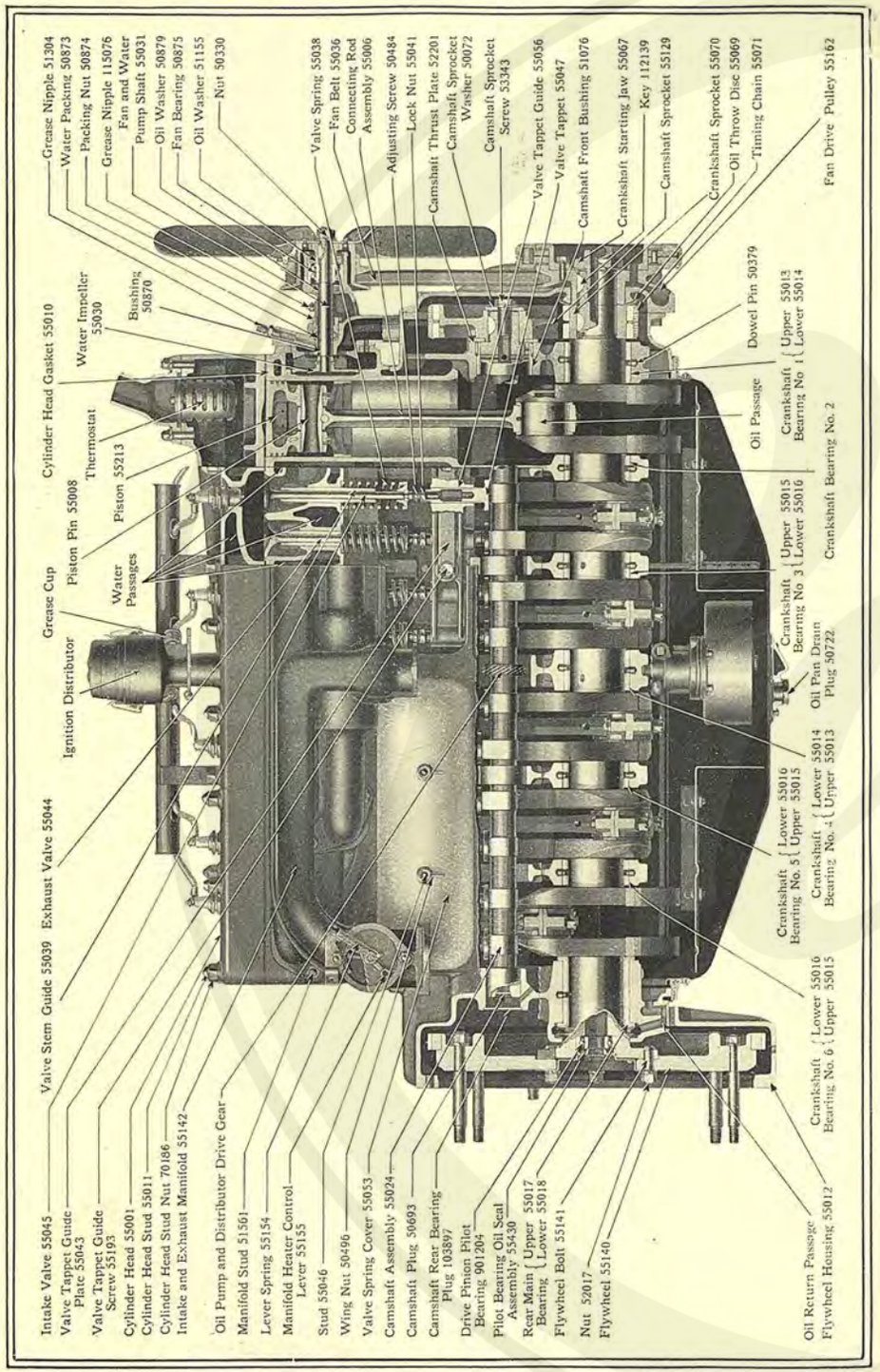

Fig. 4—Side Sectional View of Engine

Valve Grinding

The water should be drained from the cooling system and the upper hose removed from the radiator. The radimeter bulb should be removed from the cylinder head, taking care not to strain or bend the tube. The twenty-two (22) cylinder head stud nuts should next be removed. The distributor clamp screw should be loosened and the distributor and spark plug wire assembly lifted off the cylinder head.

If the cylinder head should stick, a sharp instrument should not be placed between it and the cylinder block as this will cause damage to the gasket and render impossible a tight joint after assembly. If necessary to use force to dislodge the cylinder head, it should be tapped lightly on the sides of the casting, using a wooden mallet or soft metal hammer. Eye bolts screwed into the spark plug holes provide the best method of loosening and lifting the cylinder head. The valve spring cover plates should next be removed. The valve springs should be compressed and the retainers and locks removed. Care should be taken to depress these springs no more than is absolutely necessary as they will be over-stressed, which will result in a permanent set occurring and the valve action will be impaired thereby. The springs may be compressed to 2¼" without harmful effects. The springs should next be removed and the valve tappet adjusting screws turned down.

A soft steel scraper should be used to remove all traces of carbon from the surfaces of the cylinder block, valves and pistons. Care should be exercised not to allow any carbon to fall between the pistons and cylinder walls.

The valves should be removed from the cylinders. The exhaust valves, being made of silcrome steel, are so hard that valve grinding compound will make a very slight impression upon them. Therefore, it is necessary to grind their beveled surfaces in a valve refacing grinder before attempting to grind the seats. It is advisable to grind the inlet valve faces in the same manner to eliminate excessive grinding away of the valve seats.

After the valve faces have been machine-ground, a thin coat of medium grade valve grinding compound should be applied to the valve face. Excessive quantities of grinding compound should be avoided.

The grinding operation can be facilitated by placing a light coil spring of sufficient weight to lift a valve under the head and then the valve returned to the port from which it was taken. With a screwdriver or grinding tool the valve should be oscillated, occasionally relieving pressure to allow the spring to lift the valve from the seat. A valve being ground should not be turned throughout a complete revolution because this has a tendency to cut grooves in the seat. After having oscillated the valve for a few minutes, it should be removed and the valve grinding compound wiped off the valve as well as the valve seat.

A lead pencil mark should be placed across the bevel face of the valve at intervals of about ¼" entirely around the circumference, the valve replaced in its seat and turned about ¼ revolution, exercising light pressure. If all pencil marks are broken, a good seat is indicated.

When grinding is completed, the valves should be removed and washed, as well as the valve seats, with water or kerosene to remove all of the valve

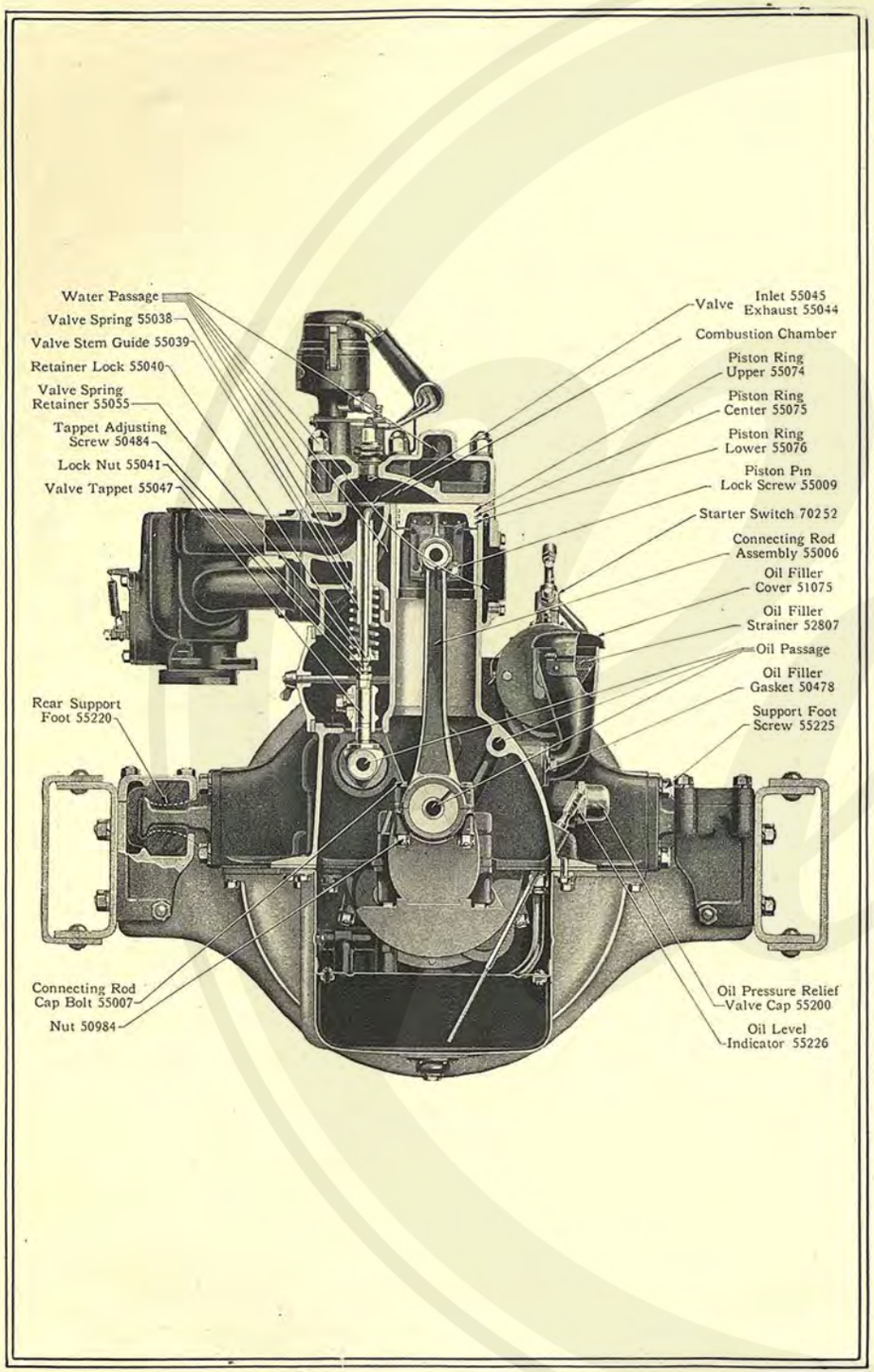

Fig. 5—Front Sectional View of Engine

grinding compound. Positively none of the compound should be allowed to reach the valve guides or cylinders. All valves should be treated in the same manner.

Valves, seats, and guides should be lubricated immediately after grinding in order to prevent rusting, especially if water grinding compound has been used. The valves should next be installed and the timing checked and tappets adjusted as described on Page 23 under "To Check Valve Timing".

Carbon should be removed from the cylinder head with a scraper or wire brush. All traces of carbon should be wiped from the milled surfaces of the cylinder head and cylinder block, as well as both faces of the cylinder head gasket. The spark plug electrodes should be adjusted to a gap of .027". It is important that this gap be adjusted equal on all spark plugs. The cylinder head may next be assembled, exercising care that it is made equally tight all around. All of the cylinder head stud nuts should be turned down just tight enough to touch the cylinder head, then each nut should be given one turn, beginning with the center stud and working towards each end, repeating this operation until the head is tight, further repeating this operation when engine is warmed up.

After filling the cooling system with clean water and installing the distributor, the ignition timing should be checked as described on Page 43. The engine should be allowed to run for about 30 minutes and the valve tappet adjustment checked when the engine is warm. The valve cover plates should next be assembled and the cylinder head stud nuts tightened again.

The thumb nuts holding the valve cover plates in place should be tightened sufficiently to prevent oil leakage.

Timing Chain Adjustment

The camshaft timing chain runs over three sprockets: crankshaft, camshaft, and generator. The latter may be adjusted to compensate for wear or stretch in the chain by loosening the nuts of the support studs that hold the generator to the crankcase, loosening the lock nut on the generator adjusting screw, and turning the screw "clockwise" to tighten the chain. The upper stud holes are elongated to allow for movement of the generator. This adjustment should be made while the engine is running, and the chain tightened until it begins to hum; the adjusting screw should then be turned counter-clockwise slowly until the hum stops. The support stud nuts and adjusting screw lock nut should be securely tightened. If the generator chain is adjusted too tight the sprocket bearing may be damaged.

The first adjustment will be necessary at 800 to 1000 miles, the next at 3000 to 4000 miles, and succeeding ones at 4000 to 5000-mile intervals.

The timing should be carefully checked after performing any operation on the timing chain. (Pages 23 and 43.)

Repairs or adjustments to the timing chain should be entrusted to Chrysler Service Stations, as a variation of only one tooth on the sprocket will make a marked difference in the operation of the car.

The timing chain must be assembled with the arrows pointing in the direction of rotation.

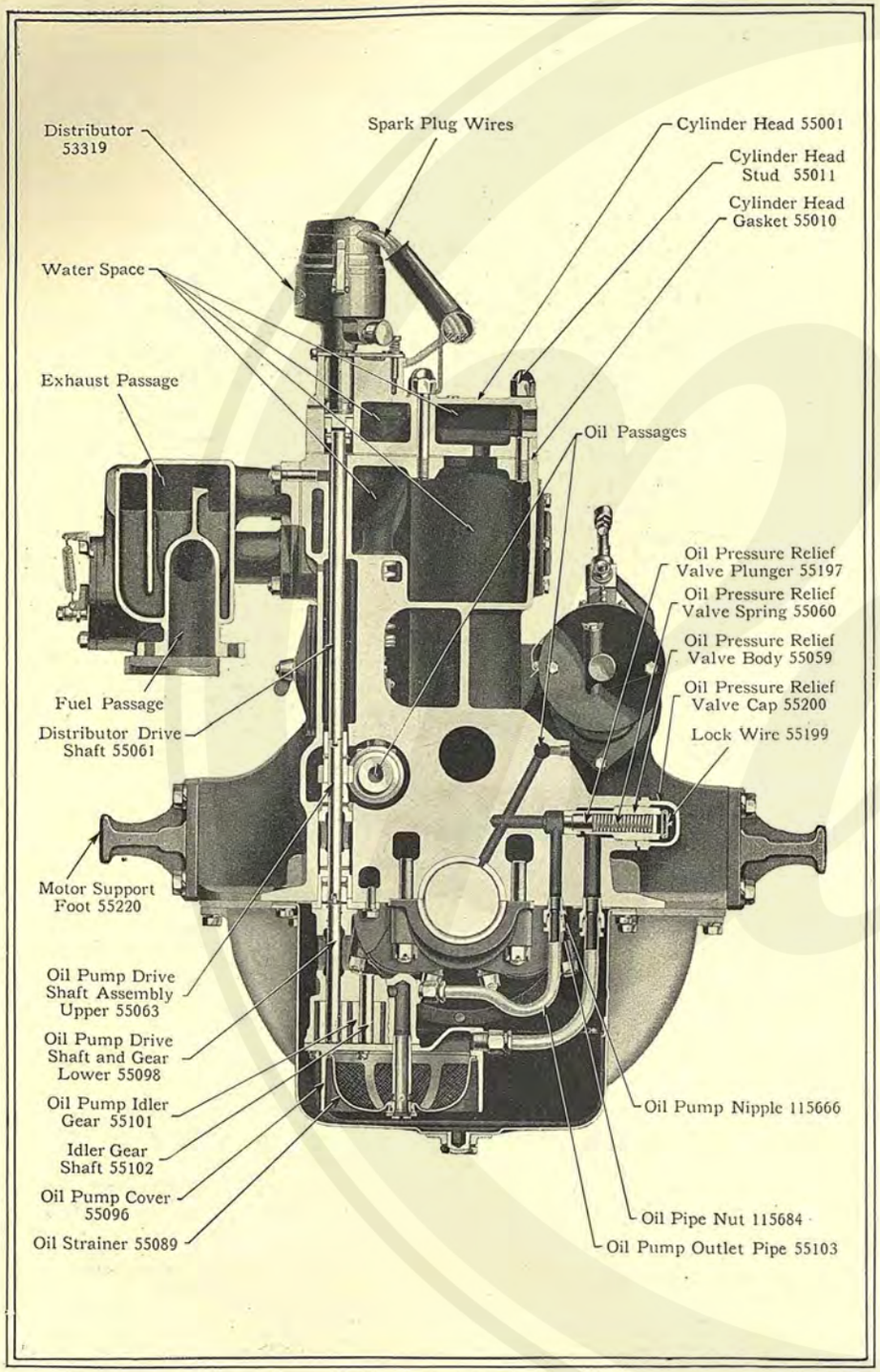

Fig. 6—Center Sectional View of Engine

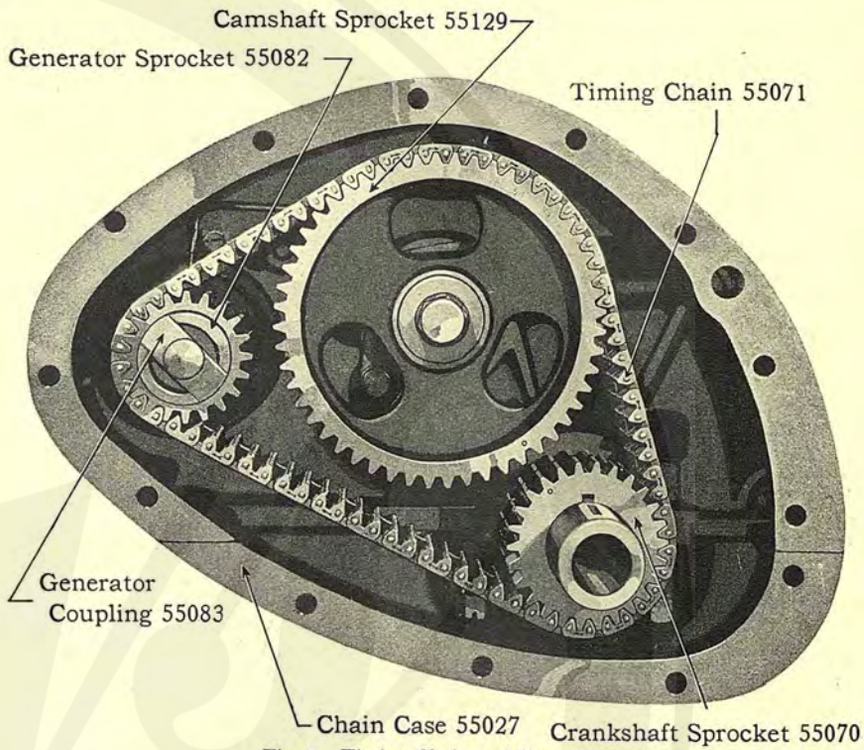

Fig. 7—Timing Chain and Sprockets

Cooling System

The radiator is of approved cellular type, connected by short pieces of hose to the engine. The fan, mounted on an adjustable pulley, is driven by the crankshaft through a V-type rubber cord belt. The water pump impeller in the cylinder block, just behind the fan, is driven by an extension of the fan shaft. The thermostat, in the outlet passage, is a temperature-controlled valve that does not open until the engine has reached a predetermined efficient operating temperature.

Care

The cooling system should be drained (drain cock at bottom left corner of radiator) and flushed occasionally to remove dirt and sediment. If the radiator is removed from the car, the ideal way to flush the radiator is to invert it and force the water through the bottom connection to remove large particles collected in the top tank. Very hard or lime water should not be used in the system.

Lead and oil paint should never be put on the radiator core because it forms an insulation that retards dissipation of heat.

Hose connections should be kept tight. Soft hose should be replaced with new, firm pieces. Mounting studs and the screws holding the core in

the shell must be kept tight. Radiator compounds or other liquids should not be used for stopping small leaks because they generally block the passages in the radiator or plug the thermostat which necessitates an overhauling.

Steaming

When steam comes out of the radiator it is an indication that the water is not circulating properly or that an insufficient supply of water is in the system. Very often if the water in the radiator is frozen, the radiator will emit steam, because ice has obstructed the circulation, and the water around the cylinders is being boiled. A frozen cooling system should be thawed as promptly as possible. There is a great possibility of ice causing much damage to the engine water jackets, pump, and radiator, especially if the overflow pipe in the radiator is clogged.

If an engine is run at a high temperature due to an insufficient supply of water or obstructed water circulation, care must be taken to allow the engine to cool before refilling the radiator. Cold water making contact with an extremely hot cylinder is liable to crack the cylinder casting.

Adjustments

The fan belt is adjusted by removing the lock screw in the front flange of the fan pulley. The flange is to be turned to the right or clockwise to tighten the belt. The lock screw and lock nut must, of course, be replaced and securely tightened. The belt should not be adjusted tight; it should only be brought to a snug tension.

The water pump packing nut is adjusted by means of a special wrench which is part of the equipment of the car. The packing nuts should be turned to the right or clockwise for tightening. Binding the pump shaft should be avoided by not tightening beyond the point of stopping the leak. If, however, the leak is not stopped by turning the adjusting nut, the packing should be replaced.

The thermostat cannot be adjusted and in case of failure to operate, as indicated by the radimeter, should be replaced with a new part. The thermostat can be removed by taking out two cap screws in the flange and lifting out the valve. In case of necessity the engine may temporarily be operated without it, but the same high fuel economy will not be obtained.

Radimeter

The temperature of the water in the cylinder block is indicated by the radimeter in the instrument panel. After 10 or 15 minutes of driving it should register between 150° and 200° Fahrenheit. When driving at high speed for several miles and in very warm weather, the radimeter may register a higher temperature. If the clutch is disengaged and the engine stopped or its speed reduced considerably while traveling at high speed or during a long hard pull at lower speeds, there will be a strong tendency for the radimeter to indicate a higher temperature. This is due to the reduced speed of water circulation through the radiator and does not indicate any necessary attention to the cooling system. If, under such conditions, the car be stopped, the engine should be allowed to run slowly so as to maintain the water circulation. If, for any reason, the water is

boiled, some of it will be expelled from the system through the overflow pipe and should be replenished as soon as possible.

If the radimeter does not register the assembly should be replaced. Repairs or adjustments to this instrument should not be attempted.

While working on the engine, care should be taken to avoid bending or straining the radimeter tube, especially while the cylinder head is being removed. The radimeter bulb is mounted on the cylinder head and must be removed before the cylinder head is removed.

A leak in the radimeter bulb may be detected by bubbles rising from the point of leakage if the bulb and tube are immersed in hot water. Leaks cannot be repaired but can be prevented by an occasional inspection to see that the tube is not chafing or rubbing at any points and has no sharp kinks in it. If no leaks appear, the difficulty, if any, may be due to the indicating hand binding in the gauge.

Non-Freezing Solutions

At the first indication of freezing weather the cooling system should be filled with a good non-freezing solution. Denatured alcohol and water in proper proportions make a very good solution, but care should be taken to prevent its spilling on the Duco finish of the car. If this does happen, the solution should be wiped off the Duco finish as quickly as possible to avoid spotting or bleaching the finish, because alcohol is a solvent of Duco. Alcohol evaporates from water and, when refilling the radiator is necessary, it is generally best to refill with clear denatured alcohol instead of water. Such a solution should be tested about once a week to make certain that it will not freeze in the prevailing temperatures.

Under no circumstances should a calcium chloride solution be used. It has a chemical action on different metal parts of the entire system and in a short time will cause damage.

The following formula is dependable for a good non-freezing solution at the temperatures indicated:

Freezing Point Fahrenheit	Amount of Alcohol (*See Note*)		Specific Gravity
20°	15%	3¼ qts.	.981
10°	25%	5⅓ qts.	.971
0°	35%	7½ qts.	.959
−10°	40%	8⅔ qts.	.951
−20°	45%	9⅔ qts.	.943
−30°	50%	10¾ qts.	.933

Note: The quantity indicated is proper for the Chrysler Imperial "80", which has a capacity of 5⅛ gallons in the cooling system.

Fuel System

Supply Tank

The fuel supply tank has a capacity of 18 gallons, U. S. measure, and is suspended from the rear of the frame. Fuel is drawn from this tank by suction to the vacuum tank on the dash under the hood, whence it flows by gravity through the fuel filter to the carburetor. The plug in the

bottom of the fuel tank should be removed when necessary to allow dirt and sediment to drain out of the tank. The air hole in the fuel tank filler cap should be kept open. At the top of the tank on the right hand side is a lever which operates a "reserve and supply" valve. When the lever is turned to the left, gasoline is drawn from the tank to within about two inches of the bottom, leaving a reserve supply which can be used by turning the lever to the right. The lever should always be turned to the left until the reserve supply is needed.

Fuel Gauge

The fuel gauge is operated electrically. It is important that all connections to this gauge be secured at all times.

A wire is connected to the top of the float unit on the top and center of the main fuel tank. The other end of this wire is connected to the terminal post marked "GA" on the back of the indicating unit in the panel. The other terminal post of the indicating unit marked "IGN" is connected to the "IGN" terminal of the ignition and lighting switch.

On account of being connected to the battery through the ignition switch, the gauge will register only when the ignition switch is on. This is to prevent running down the battery when the car is stored. (Wiring diagram, Page 38.)

The gauge requires no attention other than to see that the connections are tight at the tank unit and indicating unit on the instrument panel.

Vacuum Tank

The driver will seldom experience trouble with the vacuum tank as long as the suction and fuel lines are kept tight and clean. The strainer should occasionally be removed and cleaned.

Should the vacuum tank overflow and flood the engine, it is very likely due to a leaking float which cannot trip the atmospheric valve.

To repair the float, the tank head should be removed and then the rivet removed from the float stem. If the float has a small leak, it may be drained by keeping it submerged in hot water with the leak at the bottom, then repaired by a minute drop of solder; but if extensive, it is best to replace the float, because the additional solder will increase the weight of the float, making it operate improperly. While assembling, care must be taken not to bend or bind the stem. The gasket under the head must be absolutely air-tight.

Should the vacuum tank be emptied, it should be partially refilled (at the filler hole plug in the top of the tank) before attempting to start the engine, which may exhaust the battery.

Fuel Filter

A filter, having a glass sediment bowl, is attached to the underside of the vacuum tank, which very effectively removes water, dirt, and other foreign substances from the fuel. The top of the filter is provided with a valve which should be closed before cleaning the filter or when the pipe leading to the carburetor is disconnected.

The glass sediment bowl of the filter is removed by pressing down on the hinged supporting lever. It is advisable to wash the wire gauze in clean gasoline when the sediment bowl is removed. Cleaning of the filter

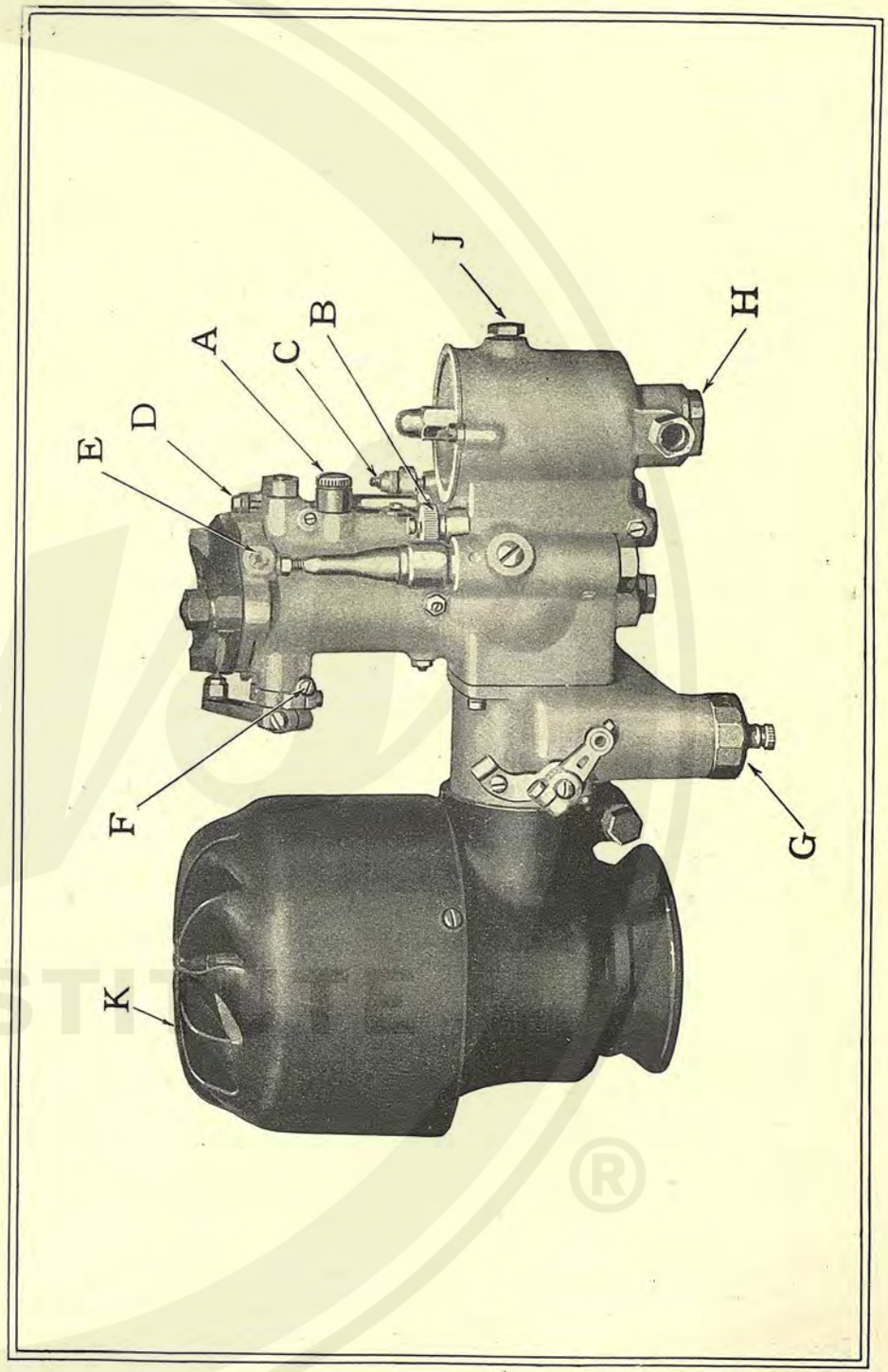

Fig. 8—Carburetor and Air Cleaner

is only necessary when a quantity of water or dirt can be seen through the glass. After assembling, care should be taken to have the valve fully open by turning back to its stop, otherwise fuel flow to the carburetor will be restricted.

Carburetor

The idle mixture and closed throttle running are controlled by the idle adjustment screw ("A", Fig. 8). This operates on the air, so that turning it clockwise gives a rich mixture and counterclockwise a leaner one. If after adjusting the idle adjustment screw "A" as above described the motor idles too fast, the throttle stop screw "F" should be turned to the left or counterclockwise. If the motor idles too slow and stops, screw "F" should be turned to the right or clockwise.

The high-speed and main driving adjustments are regulated by a dial "B", which limits the amount of adjustment to one complete turn of the needle: one-half turn rich and one-half turn lean from a predetermined correct mixture. Four letters spelling the word "RICH" are placed on one side with an arrow indicating the direction in which (anti-clockwise) this needle should be turned in order to enrich the mixture. On the other side the four letters spell "LEAN" with an arrow indicating the direction in which (clockwise) the needle should be turned to lean the mixture. This dial is so arranged that it has eight evenly spaced letters. Each one of these letters differs from one another. Should it be desirable to get a finer adjustment it is so designed and constructed that the needle can be turned and stopped between any two of the letters. A stop bracket pointer attached to the carburetor body indicates the mixture setting.

To set the carburetor at the predetermined normal mixture the high-speed screw "B" should be adjusted so that the indicator points midway between letters "N" and "R". The adjustment can be referred to by letter. For example, if the pointer indicates letter "N", that means that the adjustment is set one notch lean; if set at "R", one notch rich, etc.

Caution—High-speed adjusting screws are not interchangeable.

Another feature incorporated in this carburetor is an auxiliary needle ("C", Fig. 8) operated by a lever and cam from the choke shaft which by-passes fuel around the high-speed adjustment, giving a richer mixture only for starting and during the warming-up period when the choke is in use. This auxiliary needle should always remain closed when the choke is in the full open position. This may be checked by opening the choke wide and holding the lever which operates or raises the auxiliary needle to see if there is a slight amount of backlash or clearance between the nut on the top of this needle and the fork which lifts it off the seat. This clearance should be between .004″ and .010″.

Caution—With choke lever on the dash set in "RUN" or vertical position, carefully check to see that the choke butterfly valve is wide open, also that the valve closes tightly for starting purposes.

The acceleration well in the carburetor is what is known as a manometer type of well. The function is that a column of fuel is suspended above the float chamber level by a vacuum when the throttle is closed or partially closed. On sudden opening of the throttle this vacuum decreases,

allowing this column of fuel to fall, feeding in through what is known as an acceleration well discharge jet. The carburetor is provided with a double end well bleeder ("E", Fig. 8), having a small orifice on one end and a larger orifice on the other. The bleeder is threaded on each end and when assembled to the carburetor the threads on the exposed end are protected by a sleeve, which is easily removed. The end screwed into the carburetor regulates the height of fuel column in the accelerating well; the outer hole has no effect. With the small hole end screwed into the carburetor, the accelerating charge is greatest in amount and is the correct setting for COLD WEATHER driving. With the large hole end screwed into the carburetor, the accelerating charge is least in amount and is the correct setting for WARM WEATHER driving.

A lever mounted on the throttle shaft operates an economizer needle valve ("D", Fig. 8), which automatically furnishes the most economical operating mixture under average driving conditions. The adjustment should not be disturbed.

A small plug ("J", Fig. 8) is located in the side of the float chamber to permit inspection of the fuel level in the bowl. The level should coincide with bottom of the opening. The fuel level as set should not be altered.

To clean strainer, drain plug ("H", Fig. 8) should be removed.

Fumer

When the engine stops running a certain amount of fuel, which has condensed in the intake manifold, drains down into a well at the bottom of the carburetor. An electrical heating element called the fumer ("G", Fig. 8) is screwed into this well. A switch on the instrument board (Fig. 23), when pressed, closes an electrical circuit, causing heat to be generated in the fumer. This heat vaporizes the fuel which has drained into the fumer, and when the engine is cranked the vapor is drawn into the cylinders to be ignited.

When a cold engine is to be started, the standard procedure (Page 68) should be followed. If the engine does not start after it has been turned about three seconds by the starter and with the choke fully closed, the fumer switch button should be pressed "in" for about 20 or 30 seconds after releasing the starting motor button, thereby generating rich fuel fumes in the carburetor and intake manifold. The choke should be fully closed and the manifold heat control button pulled out. Then, with the ignition switch turned "on" and the throttle opened about one-third, the starting motor button should be pressed. If, after the starting motor has turned the engine for about 3 or 4 seconds, the engine does not start on its own power, the starting motor button should be released and the above operation repeated. *Note*—The fumer switch is to be held "in" continuously until the engine starts. In extremely cold weather the fumer switch should be held "in" a few seconds while the engine is warming up. (Page 68, "To Start Engine".) THE FUMER SHOULD NOT BE USED TO START A WARM ENGINE. The nuts securing the wire terminals to the fumer and fumer switch should always be kept tight.

Air Cleaner

The air drawn into the carburetor contains a certain amount of dust which is an abrasive, and if allowed to enter the cylinders will cause more rapid wear of the pistons, rings, cylinders and bearing surfaces. The dust sticks to the oil in the cylinders and gradually works into the oil pan and is circulated through the engine. It is true that the oil filter on the dash will remove this foreign substance from the oil, but the air cleaner ("K", Fig. 8) removes the dust from the air before it enters the carburetor by centrifugal force of the self-contained fan and throws it down into the open space beside the engine. The draft from the radiator cooling fan drives the dust past the engine.

The air cleaner requires no attention and does not operate at idling engine speeds. It should always be mounted in a vertical position. If inclined to either side, it will not function except at high engine speed.

Manifold Heat Control

Manifold heat control provides a quick means of heating the inlet manifold, thereby reducing the length of time that the choke must be used after starting a cold engine. It also makes the engine more flexible during the warming-up period, as well as reducing the fuel consumption, carbon accumulation, and crankcase dilution.

The valve for this heater is operated by a knob at the right side of the instrument panel. Pulling this knob out closes the main exhaust passage and opens a manifold by-pass, thereby causing all of the exhaust gas to circulate through the inlet manifold heat jacket before going to the muffler. Pushing the knob "in" closes the by-pass and opens the exhaust passage direct to the muffler, under which condition the inlet manifold is heated by the exhaust gas principally from the two center cylinders.

When starting and warming up a cold or cool engine, the manifold heat control knob should be pulled "out" to its stop. After the engine is sufficiently warm to provide standard performance with the carburetor choke lever in the vertical or "run" position, the heat control knob should be pushed "in" to its stop.

Primarily, the manifold heat control is designed for cold weather usage. In freezing weather, full heat can be used to good advantage for city driving below 30 miles per hour. For cross-country driving at speeds of 35 miles per hour or higher, even in freezing weather, the manifold heat control knob should be pushed in all the way; manifold heat "on" under these conditions would cause a loss of power and efficiency.

IMPORTANT—THE ENGINE SHOULD NOT BE RACED NOR WORKED HARD UNTIL IT IS WARMED UP AND RUNNING SMOOTHLY, AND WITH THE CARBURETOR CHOKE LEVER IN "RUN" POSITION.

Electrical System

The six-volt, one-wire system is used. The several units composing the system are: The starting motor, generator, relay, ignition timer, distributor and coil, storage battery, battery water indicator, lights, clock, fumer, cigar lighter, gasoline gauge, horn and closed car telephone. (See Page 38.)

Several of the above units are grounded; that is, the car frame serves as one conductor for the current. When disconnecting any unit from the rest of the system, the exposed terminals should be taped to prevent them from grounding (touching) on any metallic part of the car. Should this occur it would short-circuit either the generator or the storage battery, and would probably damage either or both of these units beyond repair. The cables and wires should occasionally be inspected to make sure that none is rubbing against a sharp edge, as such rubbing or chafing wears away the cable insulation and short-circuits the cable, with the attendant danger of fire or damage to the storage battery.

All terminals and terminal binding nuts should be kept tight and free from dirt and oil. An occasional inspection of the electrical equipment by an experienced electrician is advisable as it reduces the chances of trouble on the road.

Starting Motor

The starting motor of reduction gear type is mounted on the left side of the flywheel housing and held in place by a heavy set screw and lock nut. The starting motor pinion is shifted into mesh with the gear teeth on the flywheel by a foot-operated mechanism. In connection with this gear-shifting mechanism is a switch which closes the electric circuit for the starting motor just after the gears have been meshed.

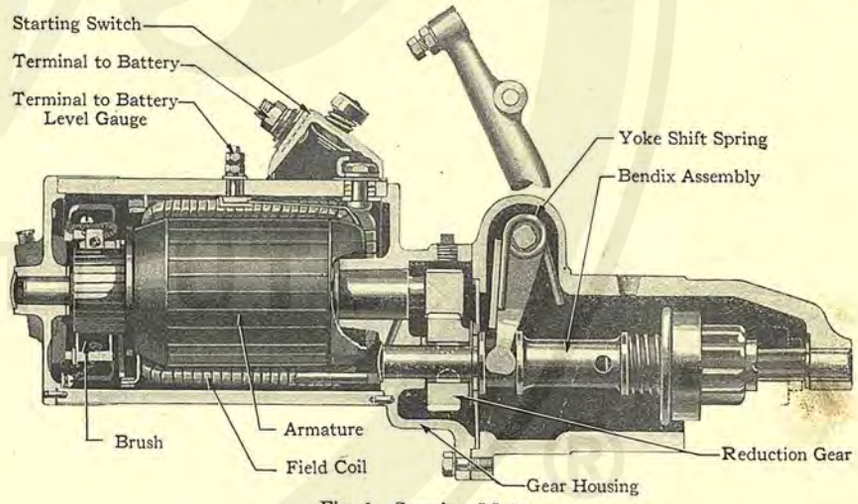

Fig. 9—Starting Motor

The commutator should be kept clean and free from oil and grease; if it appears dirty or rough, it should be cleaned with number 00 sandpaper. Emery paper should never be used for this purpose. If this treatment does not smooth the commutator, the armature should be removed and

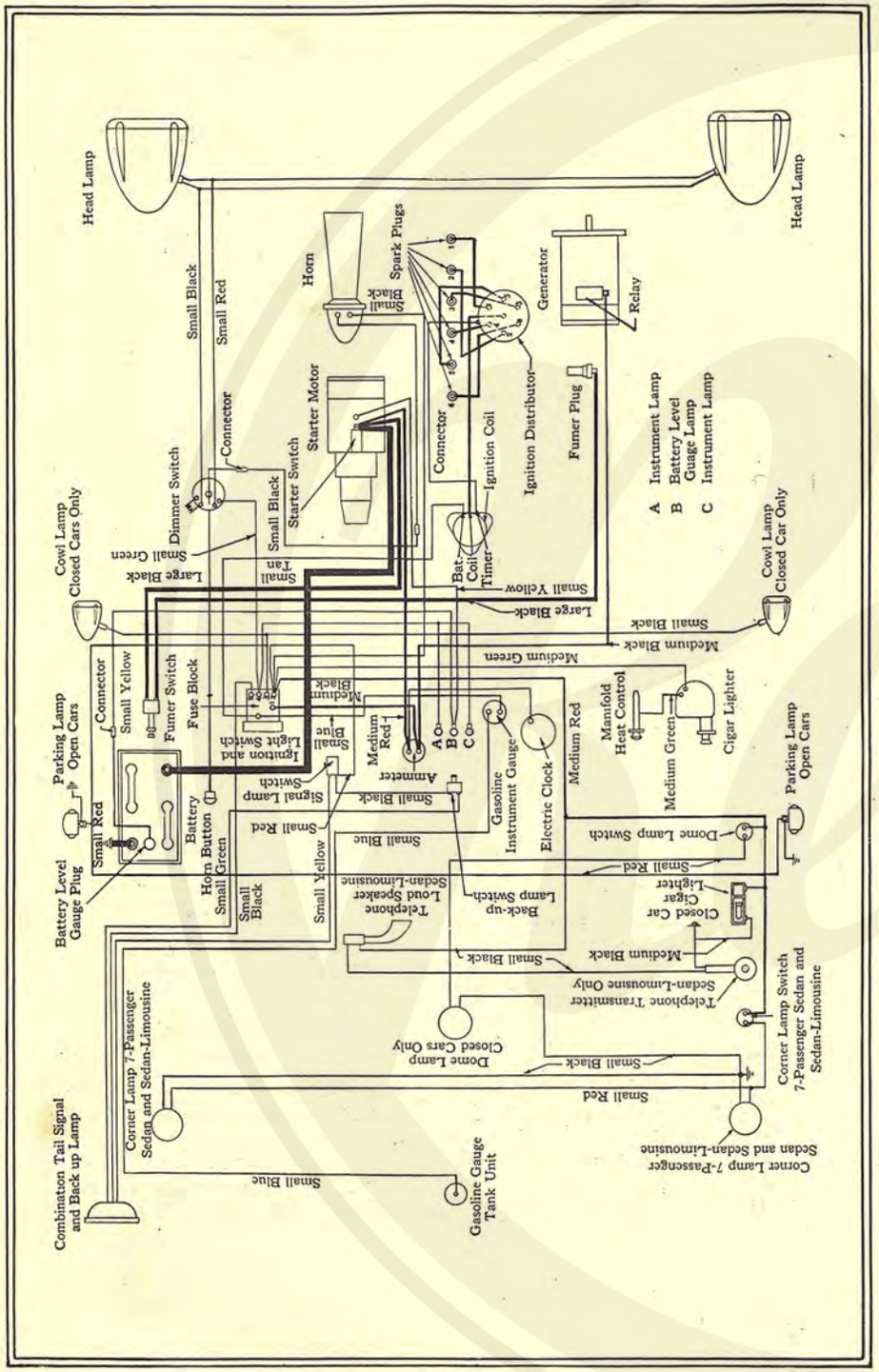

Fig. 10—Wiring Diagram

the commutator turned in a lathe. The mica should not be undercut on motor commutator. The brushes should move freely in the brush holders and the full contact area should bear on the commutator. The locations of the brushes should never be changed as they are properly set when the instrument is built.

The oilers in each end of the starting motor housing should receive a few drops of light engine oil every 5000 miles. Whitmore's Compound No. 0 should be forced into the gear case at the lubricant plug hole at rear end of starting motor body. Lubricant should be inserted here about every 10,000 miles. The commutator should never be oiled. The connections of the gear-shifting mechanism should receive a few drops of oil each 2000 miles to maintain free action.

The starting motor is removed by first disconnecting the cables. Then the cotter pin and clevis pin, connecting the gear-shifting lever with the foot rod, should be removed. The lock nut should be loosened and the set screw, entering the flywheel housing above the starting motor, removed. The starting motor may then be pulled straight out of the flywheel housing toward the front of the car.

Generator

The generator is mounted on the right side of the engine at the rear of the timing chain case and driven by the timing chain. It generates current for the entire electrical system and feeds it to the storage battery. The generator may be easily and quickly removed without disturbing the timing chain adjustment by removing the flange stud nuts.

The generator should be removed without disturbing the interposed flange which carries the generator drive sprocket.

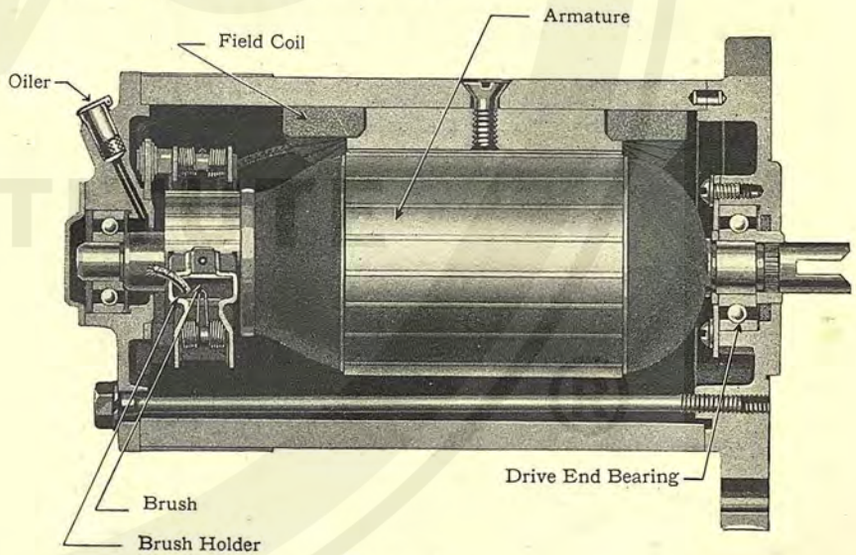

Fig. 11—Generator

The bearings at each end of the armature shaft should receive a few drops of light engine oil about every 2000 miles.

The generator begins charging at 8 to 10 miles per hour and reaches its maximum output of 18 amperes (with cold generator) at 20 to 22 miles per hour. For ordinary driving the rate should never exceed 20 amperes. The charging rate may be regulated by rotating the "third" brush holder. This is made accessible by removal of the commutator end cover band. The "third" brush rocker ring clamp screw may then be loosened and the "third" brush holder rotated in the direction of armature rotation to increase the rate or against armature rotation to decrease.

Thermal Control

The thermal control in the field circuit compensates for various driving conditions by reducing the charging rate when the generator becomes hot. When the engine is first started, the generator will charge at 16-20 amperes, but after the car has been driven a few miles the rate will decrease abruptly to between 10 to 14 amperes. (With lights off.)

If the generator charges normally when cold, but stops charging after a few minutes and then starts charging when the generator cools, the resistance in the thermostat is probably burned out. This indicates a loose or poor connection at the relay, ammeter, starting switch, battery, or battery ground on frame. This connection should be repaired and the resistance replaced as soon as possible.

Relay

This device automatically breaks the circuit between the generator and the battery when the engine speed is too low for the generator to charge the battery. It automatically closes the circuit at the proper engine speed so the generator can charge the battery.

The relay requires no lubrication or other attention. The adjustment of the movable arm should not be disturbed.

Distributor

The distributor, which is of the double breaker arm type with condenser on the outside of the base, is accessibly mounted on the cylinder head and driven through a vertical shaft from the camshaft. The opening of the breaker points by the cam on the distributor shaft interrupts the flow of primary current, which induces a high-tension current in the secondary winding of the coil, mounted on the dash. The high-tension current is delivered to the center terminal of the distributor cap, and thence through the rotor to the spark plugs. The cylinders are fired in the order 1-5-3-6-2-4.

Adjustment and Synchronization

The two sets of breaker points must be set to open simultaneously, i. e., in synchronism, and the gaps must be equal, exactly .022″ with breaker arm on the highest point of the cam.

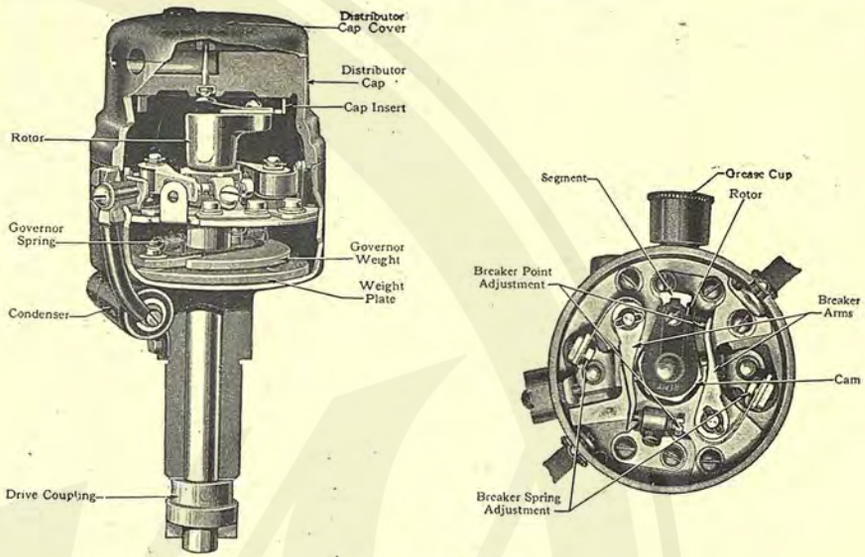

Fig. 12—Distributor

To Adjust Point Opening

The rotor should be removed and the engine turned until each breaker arm rests on high points of the cam. The gaps should be .022″ and may be measured by standard feeler gauges. If necessary to correct the adjustment of the gaps the lock screws on the contact clamps should be loosened and the contact screws turned in or out as required. The breaker arms should move freely on their pivots and it is advisable to check the tension of the breaker arm springs.

To Synchronize

A piece of tissue paper should be placed between each set of points. Each paper should be held in the fingers (one in right hand and other in left hand). As the engine is turned over very slowly by tapping on the crank, the papers should be tugged lightly. Both pieces of paper should be freed at the same moment. If not, the three screws holding the movable plate which carries one set of breaker points should be loosened and the plate moved forward or backward until the desired result is obtained.

Ignition Coil

The ignition coil needs little attention other than to be kept clean, dry, and well grounded. All terminals on the coil must be tight.

Spark Plugs

The gap between the spark plug points must be .027″ to .030″. Too wide a gap will cause misfire, especially at high speeds and when laboring with open throttle, while a small gap causes poor idling. Dirty or fouled

plugs should be washed in gasoline. Uniform gap setting insures evenness of engine firing.

The engine performs best with the spark plugs furnished with the car. These are obtainable from Chrysler Service Stations and should be used to the exclusion of all others. The use of so-called carbon-proof spark plugs and others having smaller diameter electrodes should be avoided. Such spark plugs will cause the engine to miss at high speed.

Suggestions

Ignition trouble will make itself known by the engine misfiring or refusing to start.

If the engine "misses" regularly on one cylinder, the trouble is usually due to the spark plug in that cylinder being dirty, broken or improperly adjusted. If misfiring is not limited to one cylinder, the cap should be removed from the distributor and the contact points examined to make certain that they make good contact with each other and are clean. The correct point opening is .022".

If the contacts show a tendency to burn, the distributor may not be well grounded to its mounting bracket. Paint and dirt should be scraped off the bracket to insure a good ground. The condenser, which is on the distributor, should be tested and its connections from the coil should be tight.

When the engine will not start, the ignition should be checked as follows: The ignition switch should be turned "on" and the cover removed from the distributor to see that the contact points are touching each other. Then the secondary wire should be disconnected from the coil on the dash and a piece of wire or metal held against the engine or dash and about 1/8" from the terminal of the coil from which the secondary wire was removed. The contact points should next be separated by moving the breaker arms with the fingers. A spark should jump between the coil terminal and the piece of wire or metal touching the engine or dash if the coil and its connections are in good condition.

If no spark is obtained at the coil under the above conditions, it should be determined whether current passes through the coil.

A quick check may be made on the primary circuit of the coil by closing the ignition switch and cranking the engine. If the ammeter needle moves back and forth between 0 and 3 or 4 amperes discharge, it indicates the primary circuit is all right. If ammeter needle does not move, proceed as follows:

With the ignition switch turned on and the distributor contact points separated, rest a screwdriver over the edge of the distributor housing with the end of the screwdriver touching against the stationary contact point. There should be a flash or spark to indicate the flow of current. If current flows, the secondary winding of the coil is apparently damaged and a new coil should be installed.

If no current can be detected on this test, the small wire from the coil to the distributor should be examined for breaks, loose connections, or damaged insulation.

If the wiring is in good condition it should be determined whether the current reaches the coil. A screwdriver should be rested over the "Bat" terminal of the coil and at the same time touching some metal part of car with the end of screwdriver. If a flash or spark is obtained, the coil is faulty and a new one should be installed. If no current reaches the coil, the trouble is due to a loose connection, broken wire, defective switch, dead battery, or poor ground connection.

To Set Ignition Timing

The breaker points should be adjusted to .022" opening and the manual spark control lever set in the fully advanced position. If both sets of breaker points are not perfectly synchronized, the points should be properly adjusted. (Page 41.) The 1/8" pipe plug should be removed from the cylinder head above No. 6 piston and a gauge rod placed through the hole and in contact with the piston head. The crankshaft should be rotated until No. 6 piston is coming up on exhaust stroke and stopped when the piston is .046" before top dead center. The screw which clamps the distributor timing lever to the distributor should be loosened and the distributor cap removed to see that the rotor brush is at No. 1 spark plug cable terminal. The distributor clamp screw should next be loosened and the distributor rotated in an anti-clockwise direction, as viewed from above, until No. 1 cam begins to open the breaker points. When doing this the distributor rotor should be pressed against the direction of rotation to be certain that all backlash is removed. The clamp screw should then be tightened and the distributor cap reinstalled as well as the spark plug cables connected to the proper spark plugs and terminals on the distributor cap. The hand spark control lever should be checked for full advance and retard.

Firing Order

The firing order of the cylinders is 1-5-3-6-2-4. The wires from the spark plugs should be connected to the terminals numbered on the distributor corresponding with the number of the cylinder in which the spark plugs are placed. Number 1 cylinder is nearest the radiator.

Spark Advance

For all ordinary road driving the spark control hand lever should be in the advanced position which is toward the top of the steering wheel. When pulling hard with a wide open throttle, but not at high vehicle speed, the spark should be retarded by moving the control lever about half way down. When cranking the engine by hand, the spark lever should be all of the way down. The automatic advance will take care of all other conditions.

Lights

The head, parking, tail and instrument panel lights are all controlled by the same lever as the ignition. When the lever is in the vertical or central position, no connection is made. When the lever is turned to the right, the parking and tail lights are illuminated. When the lever is turned to the first notch to the left, only the ignition is connected. The next notch to the left connects the head, instrument panel and tail lights, as well as the ignition. When the lever is turned to the third notch to the left, the parking and tail lights are connected, as well as the ignition.

Headlamps

A knob, having a corrugated rim, located just under the horn button, on the top of the steering wheel, controls the double filament bulbs in the headlights and the resistance for dimming. With the switch lever in the headlamp position and the knob (on the steering wheel) turned to the right (clockwise), the lower filaments in the headlamp bulbs are connected, giving strong beams of light a long distance ahead of the car. Turning the filament control knob one notch to the left (counter-clockwise) disconnects the lower filaments and connects the upper filaments, giving strong beams of light on the ground in front of the car for a distance of about fifty feet. By further turning the filament control knob to the left (counter-clockwise), a resistance is connected to the same circuit, causing the headlamps to be dimmed.

The lens and reflectors used in these headlamps are so designed as to spread and deflect the rays of light on the road at the proper angle according to the filament being used in the bulb.

The design of these headlamps is based upon very scientific principles and neither the bulbs, reflectors, nor lenses should be replaced with parts of other design. The bulbs used are two-filament type. None other than Tungsol bifocal or Mazda No. 1110 should be used. These bulbs are 21-21 C. P., 6-8 V.

Headlamp Adjustment

The car should be placed with normal passenger load on a level surface with the headlamps located twenty-five feet from a garage door or light-colored vertical wall.

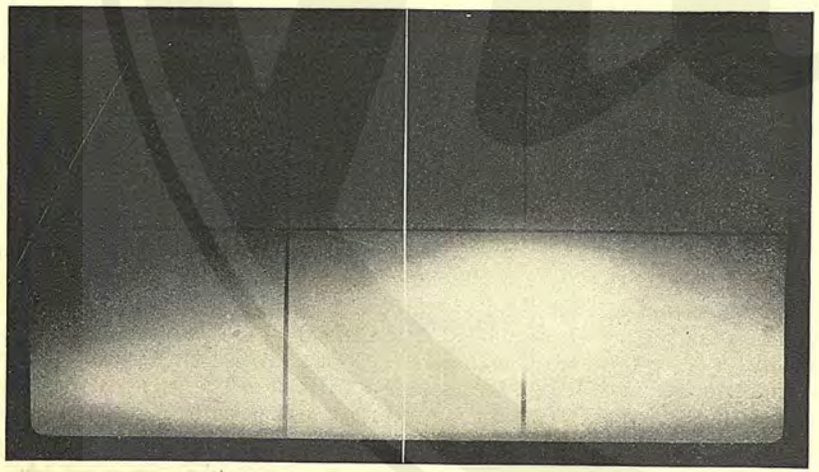

Fig. 13—Upper beam of right-hand Headlamp correctly focused and aimed

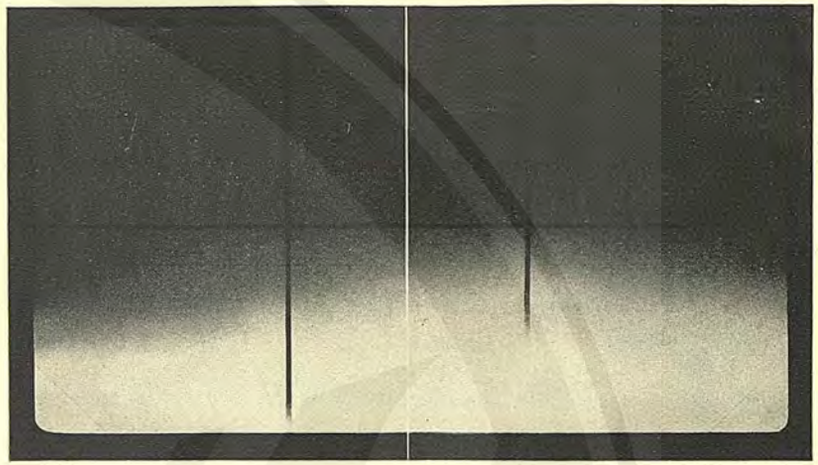

Fig. 14—Lower beam of Headlamp shown in Fig. 13

A horizontal line should be drawn on this surface at a height of the lamp centers. A center point should be located on this line by sighting through the center of the rear window of the car and in line with the radiator cap. Equidistant from this center point two vertical lines should be drawn at a distance from each other equal to the distance between the centers of the headlamps. If this is done correctly, these two lines will be immediately ahead of and in line with the respective headlamps.

Lighting switch lever should be in the position marked "BRIGHT". In this position the lower filaments which produce the distant upper light beams should be illuminated. If upper filament is illuminated, the condition can be corrected by reversing connections 2 and 3 at the steering column dimmer switch.

One headlamp should be adjusted (with the lens in place) while the other is covered. The best driving light beam is obtained when there is a high intensity near the top of the beam. This is accomplished by turning the adjusting screw accessibly located at the rear of the lamp. When properly adjusted, the light will be intense at the top and shallow in height as well as quite widespread. In case the upper light beam does not cut off sharp, turning the light bulb over in its socket may result in improvement.

By loosening a single nut, which fastens the lamp to its bracket, the light beam may be adjusted in both vertical and horizontal directions. Fig. 13 shows how the light should appear from the right-hand headlamp when properly set. The left-hand lamp should be adjusted in a similar manner. No further adjustments for the lower beams are needed. When lighting the upper filaments the resultant lower light beams will appear as shown in Fig. 14.

Adjustments should be made with lenses in place, but if lenses are ever removed and replaced they should be installed so that the anchors engage the lens notch to prevent turning.

Signal Light

A switch connected to the brake pedal completes the circuit for the rear signal lamp whenever the brake pedal is depressed.

Reverse Light

A switch connected to the gear-shifting lever mounted on the transmission completes the circuit for the reverse light whenever the transmission gears are set in the reverse position. This light illuminates the road back of the car while reversing.

Battery Indicator Light

The small light behind the medallion in the center of the instrument panel is illuminated when the starting motor button is depressed, providing the electrolyte or fluid in the battery is up to the proper level. If the electrolyte falls below the proper level, the lamp will not light during the time the starter switch is closed and this indicates that distilled water should be added to the battery. (See "Care of Battery".)

Battery

The battery is of a six-volt, three-cell type and is carried under the front floor board. When installing a battery, care must be taken to make certain that the positive terminal is grounded and that the negative terminal is connected to the starting and lighting cable before attempting to use any part of the electrical system. Damage may be done to the entire system if the wrong connections are made.

The starting motor foot button should never be held "in" for a period to exceed 10 or 15 seconds. Continual cranking of the engine will discharge the battery until it is no longer able to supply sufficient current to turn the starting motor. If the engine fails to start, the procedure on Page 66 should be followed. The clutch should be disengaged when cranking the engine to reduce the load on the battery, especially during cold weather.

When storing the car for an extended period, the battery should be removed and delivered to a battery service station for attention during the period of car storage.

Care of Battery

The battery must be kept securely fastened in its rack. It should be cleaned and dried frequently. The terminals and connections should be coated with vaseline or grease. If the solution has been slopped or spilled, the surface of the battery should be wiped with a piece of waste, wet with ammonia.

If a sufficiently charged battery will not turn the starting motor it is probable that there is corrosion at the battery clamps and posts. In this case the clamps should be removed and all corrosion scraped from them, as well as the posts, to insure proper contact. The ground terminal and frame at the point of contact should also be scraped. Liquid in each cell of the battery should be maintained at a level of about ½" above the top of the plates.

To signal the driver when the battery liquid is at the proper level, a device is connected to the battery which, through its electrical connection, illuminates an electric light in the center of the instrument panel when the starting motor switch is engaged. If the liquid is too low the light will not illuminate. (Page 46.) A small door is located over the battery in the floor board which provides access to the battery. As soon as possible, when the driver sees that this lamp does not illuminate, pure distilled water should be added to each cell of the battery until the solution is about ½" above the top of the plates. If distilled water is not available, clean rain water will be satisfactory. Acid or electrolyte should only be added to a battery by an experienced battery repairman. The filling hole plugs should be screwed in by hand.

The specific gravity of the solution in each cell should be tested occasionally with a hydrometer before adding water. If the reading is above 1.200 the battery is more than half charged. If it is below 1.200, but above 1.150, the battery is less than half charged, and is a warning to use the lights sparingly until the specific gravity is restored to at least 1.250. If one cell regularly requires more water than the others, it is probably due to a leak and should be repaired at once. If there is no leak and one cell shows a specific gravity markedly lower than the others, there is a short-circuit or some other trouble in that cell and it should have the prompt attention of a good battery repairman.

A fully charged battery will not freeze in temperatures ordinarily encountered. The electrolyte will freeze in a one-half discharged battery at about 20° below zero (specific gravity 1.210).

Clock

The clock furnished on the Chrysler Imperial "80", except tonneau clock in Sedan-Limousine, is electrically wound every minute and for this reason the wire connections must be kept tight. The current consumed, however, is so slight that it can hardly be measured. It is important that the case be held tight to the instrument panel so as to make a good ground connection.

Regulation of Electric Clock

Regulation of the electric clock should not be attempted until the amount of variation per day is known. On the back of the clock is a small lever, the movement of which governs the regulation. Movement of this lever can be seen on the face of the clock near the figure "9". Extreme variation in temperature affects the operation of all clocks. It may be necessary to make a slight regulation in the spring and fall to compensate for the temperature variations.

Setting the Clock

A knob, on the back of the clock, when pulled out and turned (similar to a stem-set watch) will move the hands as desired. When properly set the knob must be pushed back to its normal position so it will turn without changing the setting of the hands.

Maintenance of Clock

The clock should be removed from the car once a year for cleaning and oiling by a good jeweler. It should not be taken apart by any except the manufacturer of the clock or an authorized service station. (Page 72.)

Horn

The car is equipped with a high frequency vibrator type 6-volt horn, adjustable for tone, and requires no lubrication. Should the horn require adjustment, the cover should be pulled directly off, giving a sharp rap downward with the hand. Adjustment is made by shifting screw S-38. (Fig. 15.) The screw is held in place with a screwdriver in the slot while moving nut S-37.

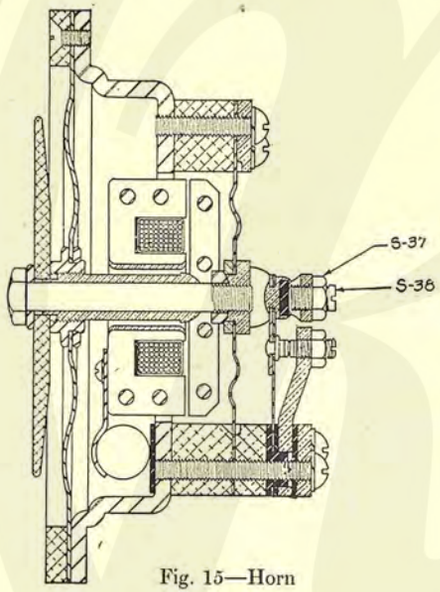

Fig. 15—Horn

Note—None other than the standard horn supporting bracket should be used, and horn must be mounted with wire terminals pointing downward.

Cigar Lighter

The cigar lighter, on the right-hand side of the instrument panel, is operated by simply withdrawing the hand-piece from its socket. A spring contained in the body of the instrument winds the wires when released. A switch automatically closes the circuit for operation as soon as the heating unit is withdrawn.

Power Transmission System

Clutch

The clutch is of the single dry plate type, comprising a pressure plate assembly having six pressure springs, three release levers that are provided with knurled nut adjustments spring-locked, and a drop-forged hardened steel splined hub. A driving disc, having woven asbestos cord facing, drives the splined steel hub and shaft by means of fabric composition discs interposed between the driving disc and hub. These composition discs are clamped tight against the driving disc by bolts through the splined hub and provide a cushion effect on the driving mechanism when the clutch is engaged.

A stationary sleeve carries the clutch release bearing. This bearing should be filled with Whitmore's Compound No. 0 every 5000 miles. To do this the clutch housing cover should be removed and lubricant forced with the high-pressure gun through the nipple in the release bearing sleeve. The clutch should be released for a few seconds with the engine running and the operation repeated in order to pack the bearing thoroughly.

The clutch must be operated dry. A hole is drilled in the bottom of the housing to permit any small leakage of oil from rear crankshaft bearing, clutch release bearing, or transmission, to drain off.

Adjustments

Figure 16 illustrates the parts of the clutch assembly and should be referred to in connection with these instructions. The release bearing and pedal must be in their proper positions. This is accomplished by setting the release shaft lever stop screw, No. 55820, so that the rear face of the release bearing sleeve, No. 55415, is exactly $\frac{5}{16}''$ forward of the front face of the adjacent shoulder on the release sleeve support, that is, the release bearing sleeve should be $\frac{5}{16}''$ forward from its rear stop. Then the release fork, No. 55862, should be adjusted to locate the pedal as high as possible without interference with the floor board after the release bearing and pedal are in proper relation and engaged position. Next, the three release levers, No. 55414, should be adjusted to $\frac{3}{16}''$ clearance at the release bearing and all fingers to make simultaneous contact with the release bearing. The clutch pedal should have from $1\frac{3}{4}''$ to $2''$ of free movement before any resistance can be felt.

Important—Owing to the compound leverage arrangement employed in the Chrysler Imperial "80" clutch pedal hook-up to reduce the effort required for operation, the slight amount of play prevailing in the two pins, connecting the release link, No. 50595, to the levers, results in as much as one inch free movement of the clutch pedal and is *often mistaken for proper pedal adjustment* when the release fork, No. 55862, inside the housing is actually riding the release bearing, resulting in slight slippage, which soon becomes excessive, causing failure of the woven facing.

THE ADJUSTMENT AT LINKAGE POSITIVELY HAS NO CONNECTION WITH THE FREE MOVEMENT OF THE CLUTCH PEDAL, BUT IS ONLY PROVIDED TO ADJUST FOR CLEARANCE AT TOE BOARD AND TO CHANGE THE ANGLE OF THE PEDAL.

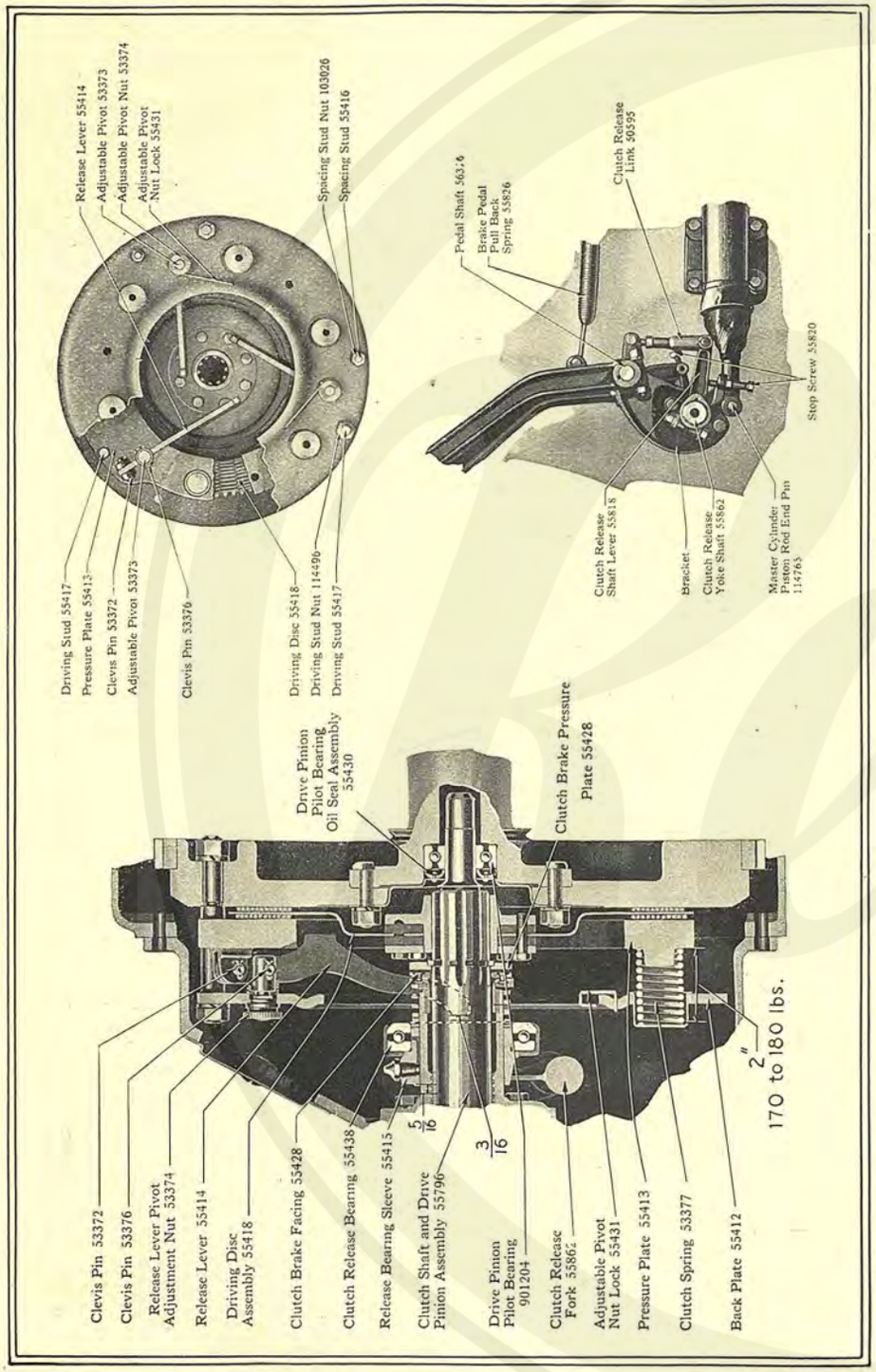

Fig. 16—Clutch and Pedal Connections

The clutch release shaft lever stop screw, No. 55820, controls the free movement between release bearing and fork. It is imperative, therefore, *to distinguish the difference between these two adjustments.*

The release levers are individually adjustable by turning the adjacent pivot adjusting nut, No. 53374. Anti-clockwise turning of the adjusting nuts increases the clearance between release bearing and release levers and compensates for wear of frictional members.

In this connection, it is well to warn drivers against the practice of resting the foot on the clutch pedal while driving. The weight of the foot holds the clutch throwout yoke against the release bearing with consequent rapid wear and noise; reduces tension of the clutch springs, causing slippage and loss of power; causes rapid wear of the facings, producing sluggish clutch action, rattles and knocks. The practice of resting the foot on the clutch pedal will necessitate more frequent lubrication. (Page 9.)

The clutch shaft bearing in the crankshaft is of the annular ball type and requires no attention except that it is good practice to pack it with a good fibre grease whenever the clutch is removed from the car. The roller bearing at the rear of the clutch shaft receives its lubrication from the transmission.

Transmission

The transmission driving gear is an integral part of the clutch shaft. The high-speed gear is of internal tooth type, and the countershaft assembly is in constant mesh. The main shaft operates on a ball bearing in the rear and a roller bearing in the front, and the countershaft gears revolve on roller bearings. There are three forward speeds, one reverse. The gear shift is standard.

The lock, of approved design, built into the gear-shifting lever, requires no attention. If keys to the lock are lost, new ones may be obtained from a Chrysler Service Station after the serial number of the keys is given. The keys will then be ordered from the Chrysler Sales Corporation, who in turn will make up the keys and forward them to the Chrysler Service Station which ordered them. No more than three keys may be ordered and they will only be shipped to authorized Chrysler Service Stations. These rules are necessary for the protection of Chrysler owners.

The transmission should be filled to the level of the filler plug on the right side with Whitmore's Compound No. 0. Once a season, the case should be drained, washed with kerosene, and refilled with fresh lubricant. (Page 17.)

If it should be necessary to remove the transmission assembly, care should be taken to keep it in perfect alignment with the engine while removing and installing in order to avoid springing of the driving disc, which is manufactured with great precision, also to avoid injury to the clutch shaft pilot bearing. This can be accomplished by supporting the transmission on blocks exactly in alignment with the engine. The transmission is removable without disturbing the clutch.

If it becomes necessary to remove the clutch, the transmission should first be removed. A mark should be placed on the back plate and a driving stud to assure reassembling in the same relative position. Bolts having No. 16 thread $\frac{3}{8}$" in diameter by $1\frac{1}{4}$" long should be installed in the three

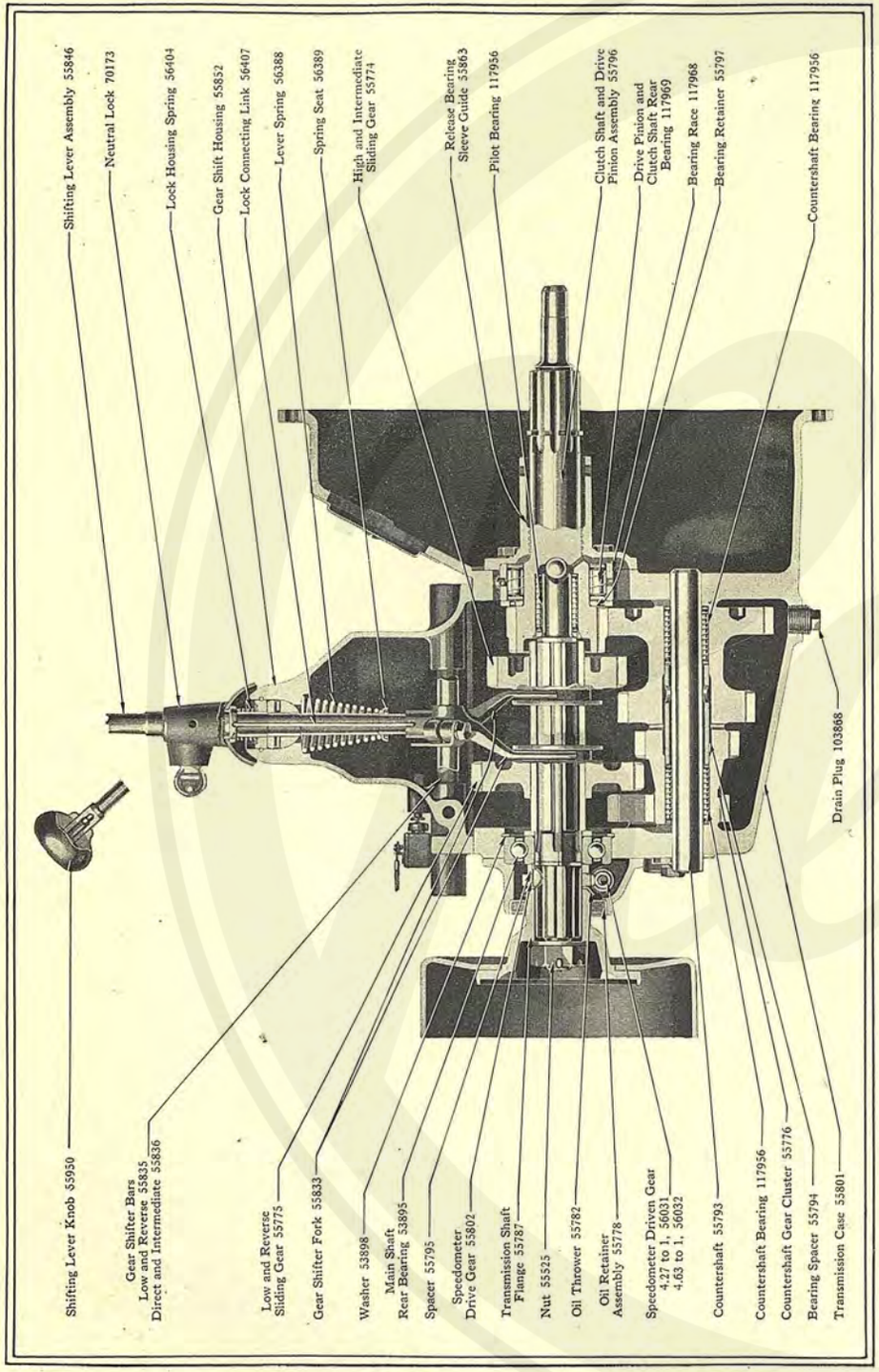

Fig. 17—Transmission

open holes in the back plate, No. 55412, and these three bolts tightened just enough to cause slight forward movement of the release levers, No. 55414, and then the six nuts, No. 103026 and No. 114496, should be removed and the clutch slipped back from the flywheel. The clutch should be removed and installed independently of the transmission; that is, removed after the transmission and installed before the transmission.

To Install Clutch

A teaspoonful of good fibre grease should be packed into the drive pinion pilot bearing, No. 901204, and the clutch assembly mounted on the six studs, No. 55416 and No. 55417. The drive pinion (clutch shaft), No. 55796, should be placed through the hub of the driving disc, No. 55418, and into the drive pinion pilot bearing, No. 901204, and the six flywheel stud nuts tightened. The three bolts which hold the back plate, No. 55412, and the pressure plate, No. 55413, should be removed. The main drive pinion is used as a guide for the clutch parts so as to obtain perfect alignment. This part may either be removed from the transmission of the car or a new one used.

The main drive pinion may next be removed from the driving disc and the nuts, No. 53374, adjusted so that the inner ends of the release levers, No. 55414, are in line with the front face (toward front of car) of back plate, No. 55412.

After the clutch is installed as outlined, installation of the transmission may be made and care must be taken while mounting in order to avoid springing of the driving disc and injury to the clutch shaft pilot bearing. (Page 51.) The detailed instructions (Page 49) for clutch adjustment should be followed carefully after assembling a clutch and transmission.

Universal Joints

The two trunnion type universal joints at each end of the propeller shaft should be packed with Whitmore's Compound No. 5 every 5000 miles through the filler hole plug. No other attention will be required.

Rear Axle

The rear axle is semi-floating, with spiral bevel gears mounted on tapered roller bearings, with the exception of the rear pinion bearing which has straight rollers. The housing is a single unit of pressed steel with a large cap on the rear side which may be easily removed for inspection. The differential is mounted at the rear of the carrier, which, as a unit, is bolted to the front of the axle housing. The pinion, integral with its shaft, is assembled as a unit, with its three bearings to the front side of the differential carrier.

The proper adjustment of the ring gear and pinion gear is determined when the axle is built and this adjustment should never be changed under any circumstances. Shims are placed between the rear face of the pinion carrier and the front face of the differential carrier. If, for any reason, the pinion carrier is removed, the same shims should be reinstalled when the carrier is reassembled so as to retain the original adjustment.

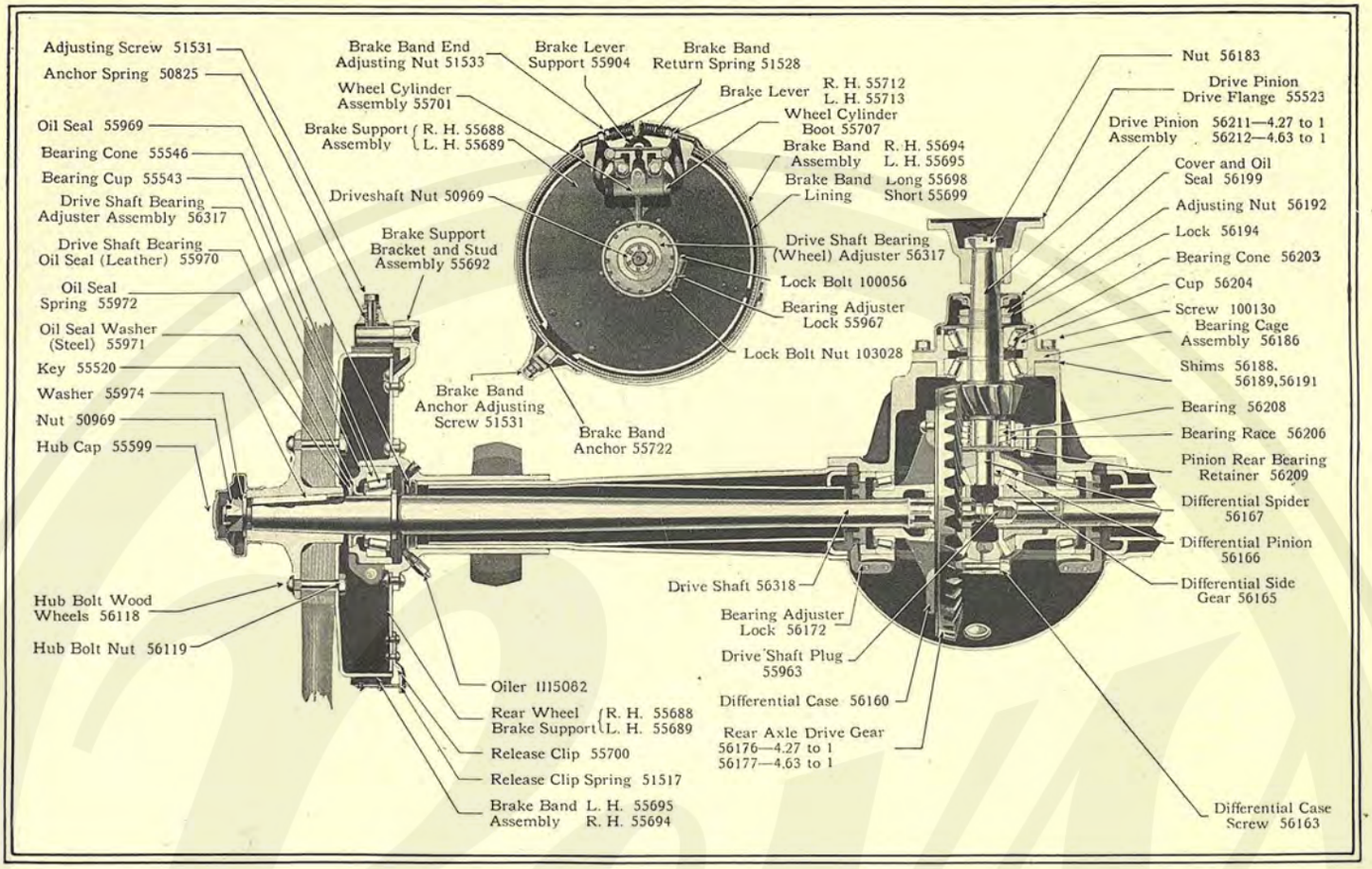

Fig. 18—Rear Axle

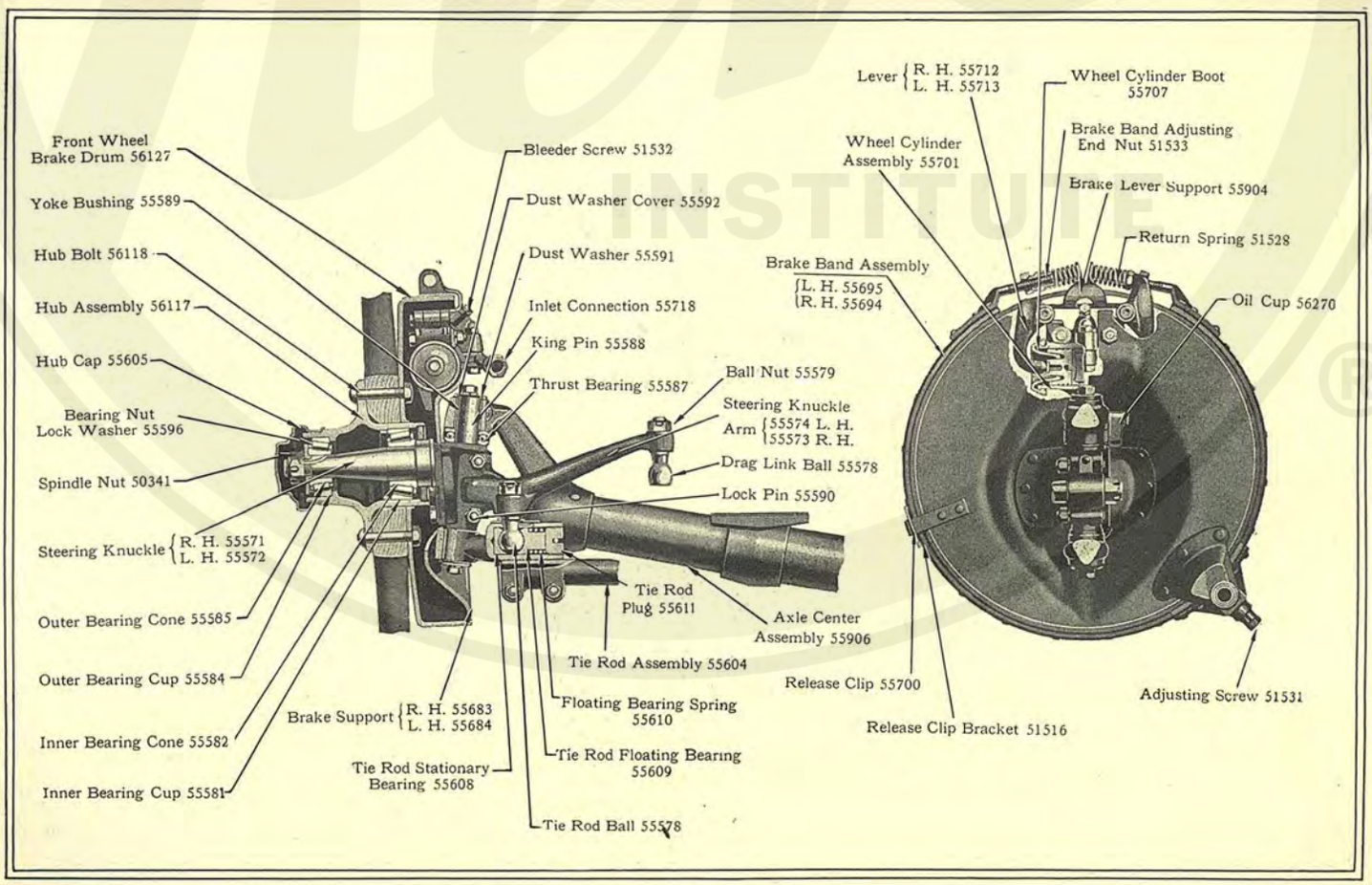

Fig. 19—Front Axle

Pinion Bearing Adjustment

The two forward bearings on the pinion shaft are simultaneously adjusted by means of the adjusting nuts on the pinion shaft. These nuts are covered by a steel cap held in place by the same screws which hold the pinion carrier to the differential carrier. These screws, of course, should be removed and the cap slipped forward so as to make the adjusting nuts accessible.

The rear bearing of the pinion is made with straight rollers (non-adjustable) and serves as a pilot and support for the rear end of the pinion shaft.

Differential Bearing Adjustment

The differential bearings are adjusted by turning the adjusting nuts to the right or left as required. The locking fingers and their cotter pins must be in place after the adjustment is completed.

Axle Shaft Bearing Adjustment

The rear axle shaft (wheel) bearings are adjusted by turning the adjusting nut, No. 56317 (Fig. 18), to the right or left as required after releasing the clamp screw and lock. The inner ends of the two axle shafts should clear each other by about .004″ and care should be taken to see that this clearance is allowed when the bearings are being adjusted. If, after adjusting one bearing, it is found that the proper clearance is not allowed between the ends of the two shafts, the bearing on the opposite side of the car should be readjusted. Care should be taken not to have one shaft extending further from the end of the axle housing than the other shaft. They should be equalized by moving one bearing "in" and the other bearing "out".

Lubrication

The differential and pinion bearings, as well as all axle gears, should be lubricated with Whitmore's Compound No. 0, which should be poured into the differential case through the filler hole in the rear of the cover. This hole is located so as to serve as a guide in determining the proper amount of lubricant to be put into the housing. Lubricant should be level with the bottom of this hole. (Page 17.)

The axle shaft bearings are to be lubricated with Whitmore's Compound No. 0 every 5000 miles by means of the high-pressure lubricant gun.

Front Axle

The front axle center is a strong tube of chrome-molybdenum steel, with spring saddles and yokes are pressed on under enormous hydraulic pressure; the steering arms and steering knuckles are heavy drop forgings.

It is of vital importance in the safe operation of a motor car that the front axle tie rod and wheels be kept well lubricated and properly adjusted. They should be inspected regularly as designated on Pages 18 and 57.

Front Wheel Alignment and Tie Rod Adjustment

Correct alignment of front wheels must be maintained to assure continuous, easy steering and long tire mileage. The wheel bearings should be properly adjusted and tire pressures equal before taking measurements. (Page 59.) The distance between the wheels when measured in front at the felloe, approximately 14 inches above the floor, and in rear from the same points should be equal or not greater at the rear than ⅛-inch. Measurements should be taken in front, the felloe marked, and the car moved forward just far enough to measure from exactly the same points on the felloe bands in the rear, and at the same height from the floor. It is important to follow these instructions to get an accurate setting.

To change or adjust wheel alignment, loosen the clamp bolts which lock the cross tube to the end forgings. Adjust length of cross tie rod by revolving the cross tube similar to adjusting a turnbuckle, then securely lock clamp bolts.

The lubricant nipples in the tie rod ends face toward the rear of the car and should receive Whitmore's Compound No. 0 from the high-pressure gun every 5000 miles. The king pins are lubricated by means of oilers screwed into the front axle yokes above the steering knuckles. The oilers should be filled with engine oil every 2000 miles.

Wheels

Each front wheel is supported by two tapered roller bearings, and adjustable. The adjustment is made by first jacking up the axle until one wheel just clears the floor. The hub cap should then be removed as well as the spindle nut cotter pin. The wheel should then be spun slowly and the spindle nut turned tighter only until the bearing begins to bind slightly; then the nut should be backed off one notch. The cotter pin and hub cap should then be reinstalled. A two-ounce weight, at any one of the rim clamp nuts, should bring that part to a stop at the bottom of the wheel. The front wheel bearings must be free and have very slight end shake. The wheel bearings should be cleaned and packed with No. 2 cup grease every 5000 miles.

Important—Because of the high speed attained by this car it is of vital importance that the front wheels (complete with tires) be as near perfectly balanced at all times as is possible in order to avoid so-called "tramping" of front wheels at high speeds. The rapid revolutions of the wheels develop gyroscopic forces, which, combined with unbalanced wheel forces, will cause severe wobble and bounding motion of the front wheels. These forces reverse their direction very rapidly and, because of this fact, heavy strains are developed in the steering mechanism. For similar reasons it is equally important to maintain uniform tire pressures. Unequal and low pressure in the two front tires will cause much annoyance when driving at high speeds. (Page 59.)

The same condition is true with the rear wheels, but the strains are transmitted to the axle shafts and their bearings, but are not so apparent. Excessive tire wear also results from poorly balanced wheels when driven at high speeds.

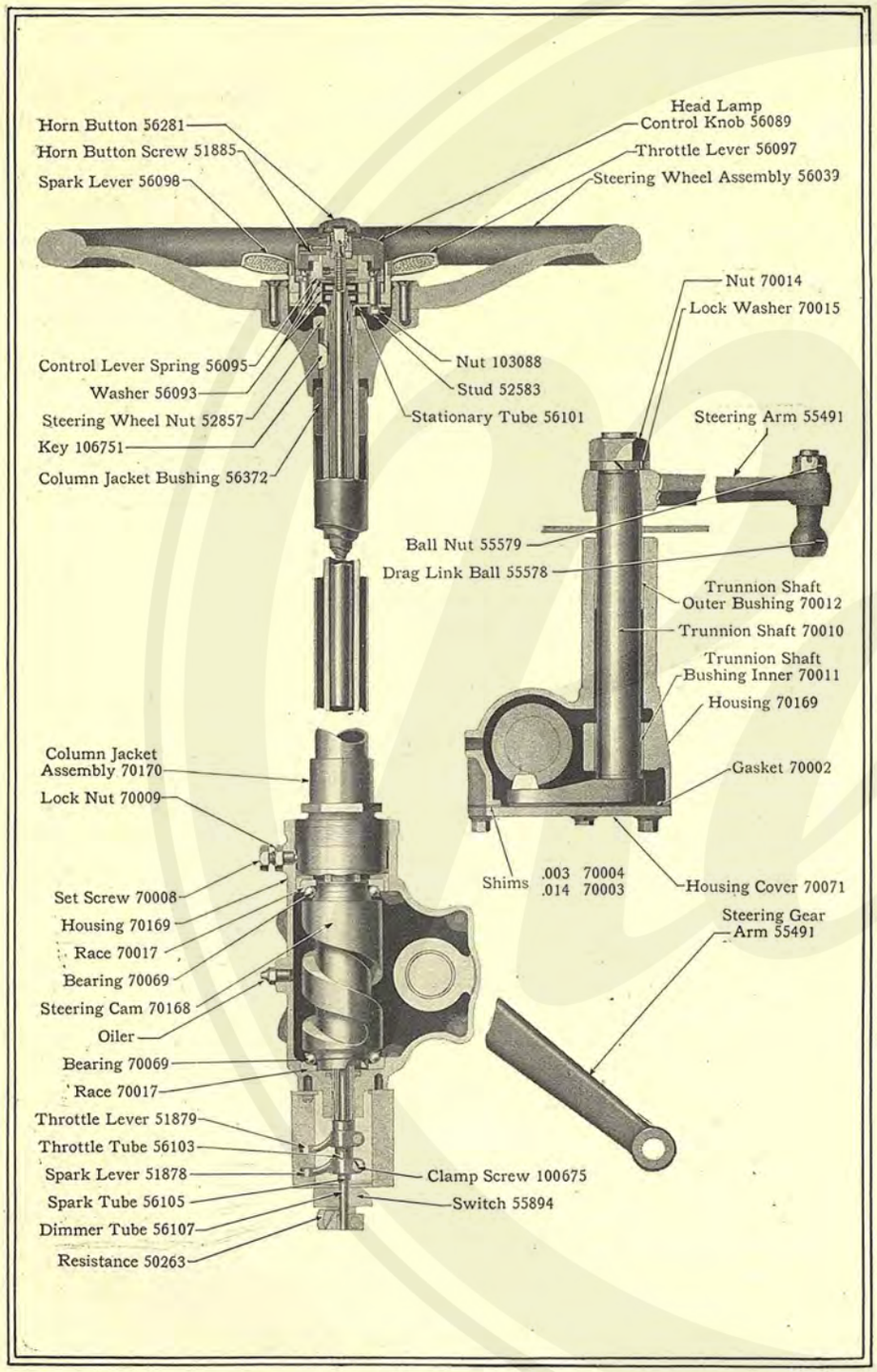

Fig. 20—Steering Gear

Tire Pressures

For normal driving, tire pressures as low as 35 lbs. may be used.

For higher speeds, 40 lbs. or more is recommended.

Note—It is especially important to maintain *equal* and higher pressures in the two front tires.

Drag Link

The drag link connects the steering gear with the front axle. In each end of the drag link tube are two heavy springs for cushioning the road shocks of the front wheels which otherwise would be transmitted to the steering gear. The springs are adjusted by means of round slotted plugs threaded into each end of the drag link tube. Cotter pins are inserted through the ends of the tube, and slots in the outer ends of the round plugs, to prevent the plugs changing their adjustment.

When adjustment is being made of the drag link bearings and springs, all of the parts should be cleaned and oiled as well as the adjusting plugs and threads inside of the drag link tube. Standard springs should be used to replace any that do not measure from $\frac{31}{32}$" to $1\frac{1}{32}$" free length. Any other worn parts should be replaced. When the parts are being assembled the adjusting plugs should be screwed "in" until the springs are compressed solid, then the plugs should be unscrewed two or two and one-half turns. A large screwdriver should be used for adjusting the plugs so as to overcome any binding in the threads. When the plugs are adjusted properly the position of their outside faces should be flush with the ends of the tube or slightly "in" *but must not protrude.*

The steering arm balls of the front axle and the steering gear arm in the drag link ends should be lubricated with Whitmore's Lubricant No. 0, through the lubricant nipples, at intervals of each 5000 miles.

Springs

The chassis springs of alloy steel are semi-elliptic and mounted on rubber supports at each end, requiring no attention.

Spring breakage at or near the center is caused, in practically every instance, by loose spring clips (holding the springs to the axles), which throw the entire stress on the center tie bolts. They should be tightened at least three times during the first month and about once every month for the succeeding six months.

Springs are provided with fabric covers. (Page 18.)

Steering Gear

The steering gear is of the cam and lever type (Fig. 20), having a varying reduction ratio and provided with two adjustments for wear.

It is important that the drag link be disconnected from the steering gear arm or the arm removed from the gear before making any adjustments

to the steering gear. By oscillating the steering wheel while making adjustments, the proper setting can be easily determined by noting the resistance at the steering wheel.

The thrust bearings, above and below the cam, at the lower end of the steering tube are adjusted by turning the adjusting nut, No. 70170, Fig. 20. clockwise to tighten the bearings. This regulates vertical movement of the steering tube. Before making this adjustment, the steering column bracket pinch bolt, at the instrument panel, should first be loosened, because the column tube is tight in the adjusting nut and both will turn together. Next, the adjusting nut set screw, No. 70008, and its lock nut should be loosened. Then the adjusting nut may be turned with a wrench. The adjusting nut must be turned only enough to remove vertical play in the bearings. If the bearings are bound too tight, unnecessary wear and stiff steering will result.

If backlash develops between the cam and the cam lever stud, it may be removed by taking out one or more shims, No. 70003-4, from between the steering gear housing and the cover. The inner end (toward engine) of the trunnion shaft integral with the cam lever bears against the housing cover which prevents end motion of the shaft toward the engine. The stud on the cam lever is tapered and fits into the spiral groove of the steering cam, No. 70168, which prevents end motion of the transmission shaft toward the outside of the chassis frame. Rotation of the steering wheel rotates the steering cam, and the cam lever stud, fitting in the spiral groove of the steering cam, follows the groove, causing the cam lever and integral shaft to oscillate. The shims between the housing and housing cover are of varying thicknesses, permitting very close adjustment between the cam lever stud and the groove of the steering cam. Care must be taken not to remove enough shimming to cause binding of the tapered cam lever stud and the steering cam. The maximum end play of the cam lever shaft is .003". The nuts holding the housing cover in place must be securely tightened after removing shims and before testing an adjustment. This adjustment should be made with the steering wheel in the mid-position.

If it should ever be necessary to remove the steering arm, No. 55491, from the trunnion shaft, this should be done with a puller and not by driving a wedge between the frame and steering arm. The latter will cause damage to the cam lever stud and cam. When the arm is being reinstalled, the steering wheel should be rotated until it reaches a point midway between the extreme right and left positions. The steering arm should then be placed in a vertical position on the cam lever or trunnion shaft and forced into place by the nut and lock washer, on the end of the shaft, by means of a large wrench. A hammer blow on the hub of the arm will cause damage to the studs and nuts holding the housing cover in place. Such procedure must be avoided. If the steering arm has not been removed from the drag link, the chassis wheels should be placed in the straight-ahead position before placing the steering arm on the cam lever shaft.

A nipple is provided in the housing of the steering gear, through which lubricant can be forced by means of the high-pressure gun. The housing should be filled with Whitmore's Compound No. 0 every 5000 miles.

Chrysler Hydraulic Four-Wheel Brakes

The Chrysler Lockheed hydraulic four-wheel brakes are self-equalizing and their adjustment is easy. There are no operating rods or cross shafts, and, consequently, nothing to rattle and no joints to lubricate. Simple in construction, the brakes depend only upon the fundamental displacement principle of hydraulics for their operation and equalization, and when treated with a reasonable amount of consideration will need but little attention.

Operation

Connected to the brake foot pedal is a piston working in a master cylinder, which is bolted to the left-hand side of the transmission case. Leading from this master cylinder to cylinders in each of the four brake drums are copper tubes and armored hose connections. In each brake drum cylinder are two pistons, each of which is connected through a lever with an end of the brake band. The whole system (that is, all cylinders and lines) is full of liquid, all the air having been expelled in the process of filling. There is no pressure in the system when the brakes are not in operation and the brake band linings are held clear of the drums by the brake return springs.

When the foot pedal is depressed, the piston in the master cylinder moves back, expelling into the lines sufficient liquid to force out the pistons in each of the brake drum cylinders until the brake bands come in contact with the drums.

There can be no braking pressure applied to any one drum until all bands are in contact with their drums. The greater force required to give braking pressure cannot be supplied until the resistance in all wheel cylinders is built up to that force. This is governed by the physical law that force or pressure exerted upon a column of liquid is expended equally in all directions. With the four brake bands at the point of braking, the additional pressure of the foot pedal is naturally transmitted equally to all brakes, giving a positive braking action, absolutely self-equalizing in its application.

When the brake pedal is released, the pistons in the brake drum cylinders are returned to their stops by the brake return springs, forcing the liquid, used in displacing the pistons, through the lines back into the master cylinder.

General

The level of the liquid in the supply tank on the dash should not be below the one-half full position. The supply of liquid should be checked once a month and replenished if necessary. Unless there are leaks in the system it will require replenishing only about once every six months. The correct liquid is a mixture of 50% medicinal castor oil and 50% No. 5 denatured alcohol free from acid (wood alcohol should never be used).

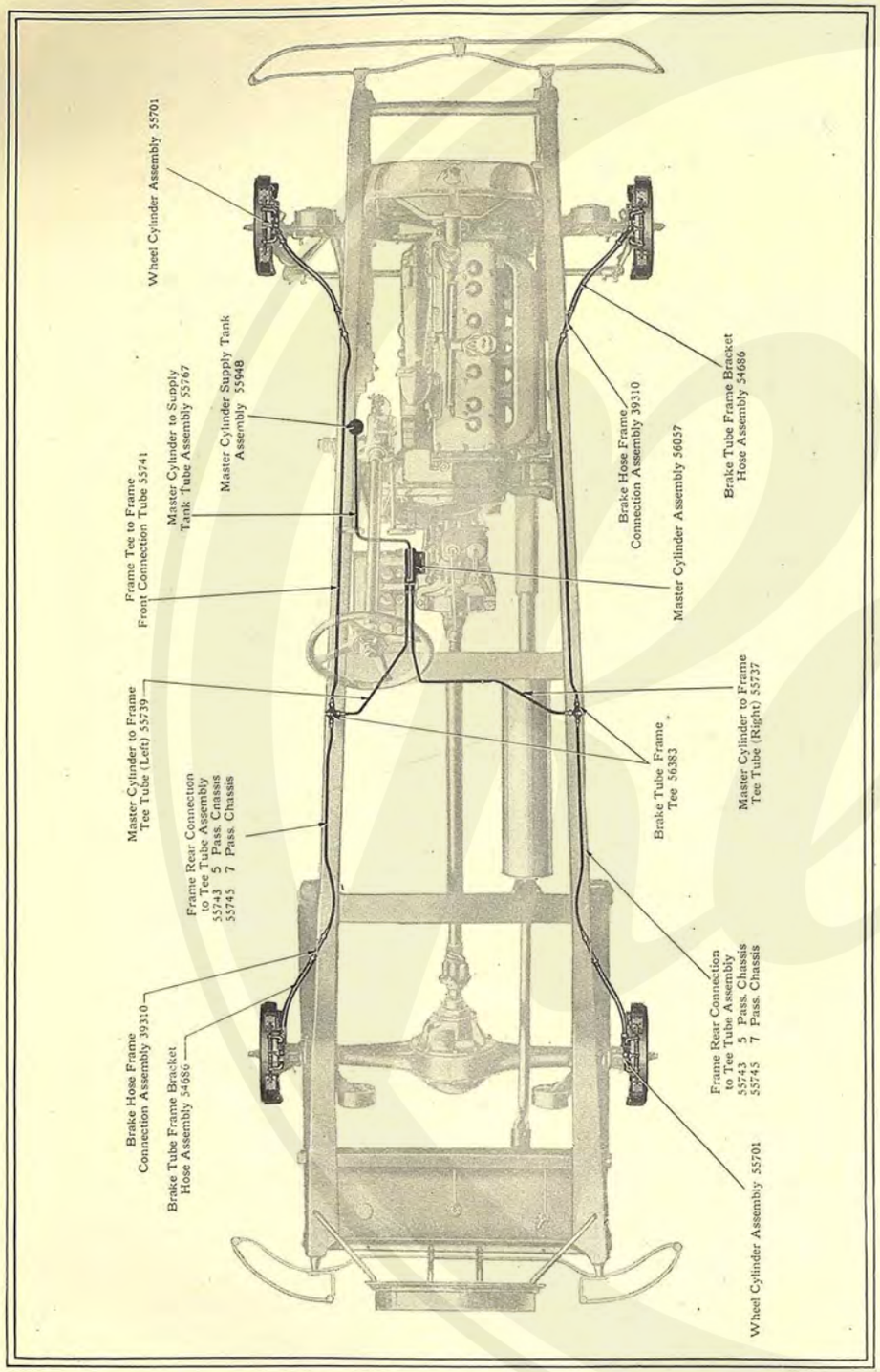

Fig. 21—Hydraulic Four-Wheel Brake System

Chrysler Hydraulic Brake Liquid is available at all Chrysler Service Stations. This should be used to the exclusion of all other liquids in the braking system. It contains no ingredients harmful to the mechanism. The total capacity of the system is 1½ pints. The pump handle on the supply tank should be in the locked position, which is accomplished by pushing the handle down to the limit of its travel and turning to the right until positively seated.

The anchors on the brake bands should be oiled each 2000 miles and their action checked to see that they work freely. There are no other points in the hydraulic brake operating mechanism requiring lubrication.

The foot pedal is set for clearance between the pedal and the floor board, on each individual car, at the factory. Readjustment in the field will not be necessary and improper adjustment will result in decreasing the effective travel of the master cylinder piston.

To Adjust Brakes

The brake bands should conform to the brake drum; that is, they should form a circle. With the foot pedal in the release position, the bands should be adjusted with .010″ to .015″ clearance between brake band and drum at all points. This adjustment is made through the hexagon nuts on the threaded ends of the brake bands and a screw at the anchor plate. The clearance can best be established by use of a .010″ feeler, which should slip between band and drum at any point without binding. To avoid excessive

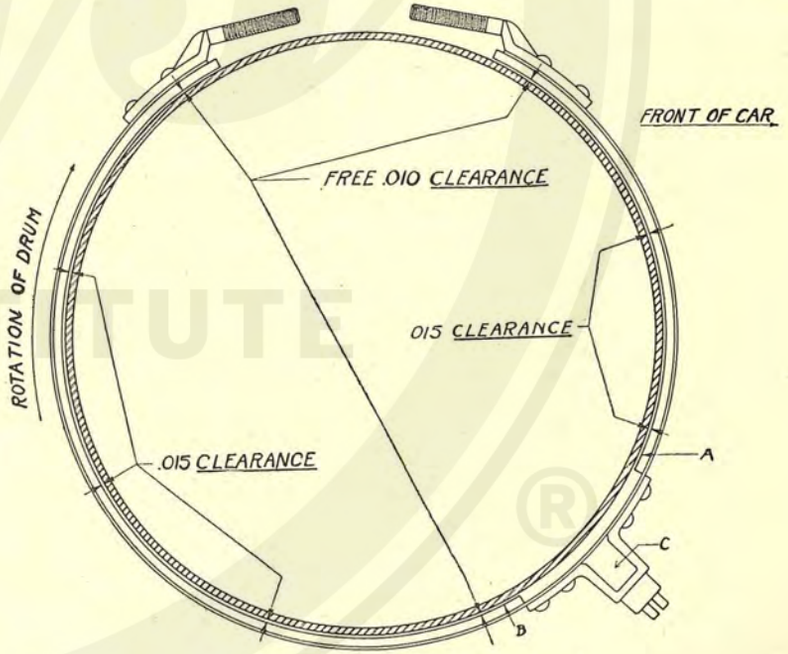

Fig. 22—Wheel Brake Band Adjustment

take-up at the brake band ends, clearance should not be greater than .015". The brake band brackets at the anchor pins should move in and out freely.

Loss of liquid, air in the lines due to broken connections or a leaking or unlocked supply tank valve are the only causes for any change in the effective movement of the brake pedal, which can easily be detected by a free movement of the brake pedal before feeling resistance in the master cylinder.

When this looseness becomes appreciable, that is, ¾" of pedal movement, it should be corrected as follows: With the brake bands releasing fully and foot pressure released from the foot pedal, the pump handle on the supply tank should be released by turning to the left until it is free to move up and down. The pump handle should then be given a few strokes up and down until the foot pedal no longer has the free movement. After this has been done, a pause of several seconds should be made to permit excess liquid in the lines to back up into the supply tank, and then the valve closed at the bottom of the pump by depressing the pump handle and turning to the right until firmly seated. It is important that the pump handle be locked tight so that no liquid can be returned to the tank under pedal pressure.

If the above does not eliminate excessive pedal travel, the condition can only be due to air in the lines and it will be necessary to "bleed" the lines as indicated on Page 65.

Caution—The brake pedal stop screw adjustment and the brake piston rod lock nuts are properly adjusted when the car is built and should not be disturbed, as improper adjustment will result in decreasing the effective travel of the piston in the master cylinder.

Relining Brakes

When brakes are being relined, it is imperative that the same kind of material be used on all brakes, because if different materials are used the brakes on the individual wheels will not be equally effective in their action.

In case of relining one brake only, the same material should be used as is on the other three bands. There may be a slightly less effective action when first installed, but this will be self-corrected as the face of the lining comes to a bearing with use.

The brake lining on Chrysler brakes was developed as a result of very intensive research, and, for most satisfactory brake operation, relining should only be done with genuine Chrysler brake lining purchased from a Chrysler Service Station.

After relining, the bands should be very carefully shaped to the drum. The brake bands may be adjusted by means of the nuts on their ends at the upper side of the drum. The diagram on Page 63 indicates the proper clearance between the band and the drum at the different points.

After the brake bands have been adjusted properly, the car should be driven about one mile for "wearing in" the uneven surface. During this mile of driving the brakes should be applied about ten times with sufficient pressure to stop the car normally from a speed of about twenty miles per hour. Then the adjustment should be checked to make certain that it is according to the illustration (Fig. 22). Under no circumstances should

the lining be "burned in". This not only blisters the finish on the drums and bands, but it reduces the frictional qualities of the lining.

Bleeding the Lines

The cap screw, No. 51532 (Fig. 19), should be removed and the bleeder nipple and hose attached (part of car tool equipment) to the bleeder valve in the wheel cylinder with a small open end wrench. The bleeder valve should be opened from ½ to ¾ of a turn, but not completely removed. One end of the rubber tubing should be slipped over the exposed end of the bleeder valve and the other end of the tubing laid into a clean and dry container, preferably a pint bottle. The latter should be resting on the floor.

With foot pressure removed from the brake pedal, the valve in the supply tank should be opened by turning the handle to the left until it is free to move up and down. By means of this handle, liquid should then be pumped into the system, which will force the liquid out of the brake drum cylinder into the container. When the lines are being filled by pumping, the cap at the top of the tank should be released at least one turn to insure proper venting. The cap should then be tightened with fingers only and NOT WITH A TOOL. After about ½ pint of liquid has been drained from the system and it is observed that air bubbles still remain in the liquid, coming out of the rubber tubing, the bleeder valve should be closed and the cap removed from the supply tank. The liquid drawn from the system should then be poured back into the supply tank. This operation should be repeated until no more bubbles appear. It may be necessary to apply this operation to all four brake drum cylinders to insure air being removed from all lines.

It will be necessary to bleed the lines to remove air from the system after disconnecting one of the brake drum cylinders for removal of axle parts, or if a connection or pipe should break.

Leaks

An excessive consumption of liquid denotes a leak in the system. This can easily be detected by applying very heavy pressure to the brake pedal while the car is standing still and then checking over the various connections to see the point of leakage.

Liquid Expansion

In exceptionally hot weather, a slight brake drag may be noticed. This is due to either too much liquid having been pumped into the system or expansion of the liquid under heat. The correction is to open the supply tank valve for a few seconds. Care must be taken not to press on the foot pedal while this valve is open. After the valve has stood open for a few seconds, it should again be closed.

Caution—Pistons or any other parts of the master cylinder or brake drum cylinders should never be removed. Special tools are required to correctly assemble these parts. There is nothing in these cylinders to give trouble, but, if it should be necessary to make a service repair, a complete cylinder assembly should be used.

Emergency Brake

The emergency brake, exter... on a drum mounted on the trans...

Adjustment is made by first jacking up the rear wheels and setting the brake lever in the extreme forward position. Then the brake anchor adjusting screw should be turned so as to give $\frac{1}{16}$" clearance between the drum and the lining, and it should be observed that the anchor bracket moves freely on the anchor stud while operating the brake. Next, the adjusting nut, No. 33264 (Fig. 2), should be turned to give $\frac{1}{16}$" clearance throughout the remainder of the band and drum. The adjusting sleeve should be turned to equalize the clearance between the band and the drum at the top and bottom. The band should conform to the drum at all points.

Your brakes are vital to your safety. Chrysler brakes are extremely efficient. When adjustment or service is necessary have this done ***only in a Chrysler Service Station*** by Chrysler methods and with genuine Chrysler materials.—*Be Sure of Your Safety*

Corrective Measures

No adjustments should be made nor any parts tampered with until the cause of the trouble is known. Otherwise adjustments which are properly made may be destroyed. The problem should be analyzed.

Engine Fails to Start

1. Lack of fuel.
   The tank should be full and fuel filter shut-off cock fully open. Fuel line should be free of obstructions.
2. Lack of ignition current.
   May be due to failure to turn the switch or to a broken or disconnected wire. Ammeter needle will move when ignition current flows through breaker points.
3. Fouled spark plugs.
   Due to an excessive amount of oil in the engine and too long use, whereby the points become coated with carbon. Fouled spark plugs should be removed and cleaned or replaced with new.
4. Points improperly set. (No. 3 under "Engine Misses".)
5. The carburetor choke valve must be closed tight.
6. The fumer and connections should be checked.

Engine Stops

1. Lack of fuel.
2. Disconnected wires.
3. Lack of oil.
4. Carburetor flooding.

Engine Misses

...dis...3.

...spa... ...s should be short-circuited one after another by touching a ...ammer or screwdriver from the metal of the cylinders to the terminals of the spark plugs. When one is reached which makes no difference in the running of the engine, this is probably the plug at fault.
Remove and clean. Porcelain insulation may be cracked.

3. Points of spark plugs improperly set.
   Points too close together or too far apart may cause missing. Spark plug points should be set .027" apart.
4. Loss of compression in any cylinder.
   Valve may be stuck or there may be dirt under it. Examine the valve tappet to see whether the valve seats properly. To locate cylinder that is weak on compression, turn over the engine by hand, testing each cylinder in turn. If engine misses when hot, tappet clearances should be checked. (Page 23.)
5. Water in fuel. Check filter for an excess of water.
6. Overheating.
7. Carburetor adjustment should be checked.

Loss of Power

The engine will run, but will not pull the car under a heavy load. May be due to:

Too rich mixture.
Valves not seating.
Less than normal tappet clearance.
Ignition improperly timed.
Lack of oil or water.
Lack of fuel, due to obstruction in gasoline pipe or carburetor.
Screen or filter filled with dirt or water.
Dragging brakes.
Engine overheating.
Loss of compression.

Lack of Compression

Faulty cylinder head gasket.
Insufficient tappet clearance.
Valves or rings not seating.

Popping Back Through Carburetor

This usually indicates too lean a mixture, but may be caused by:

Dirt in carburetor.
Inlet valves holding open.
Water in the gasoline.
Air leak at intake manifold connections.
Incorrect ignition timing or limited spark advance.
Secondary wires connected to the incorrect plugs.
Improper kind or defective spark plugs.

Eng[illegible]ats

Lack [illegible]rication.
Stoppage [illegible]ulation or lack of water
Slipping fa[illegible]
Imperfect ga[illegible]
Ignition time[illegible] or driving with
Thermostat out of order.
Limited spark advance.

Engine Knocks

Connecting rod bearing loose
Crankshaft bearing loose.
Faulty engine lubrication or diluted oil.
Loose piston.
Broken piston ring.
Carbon in cylinders.
Overheating.
Incorrect ignition timing.

Operation

Preparation for Use

When a new car or a car which has been in storage for some time is being prepared for use the fuel tank, radiator, crankcase, and hydraulic brake supply tank should be filled with the proper liquids. (Pages 31, 29, 13 and 61.) All parts of the car should be lubricated as indicated on Chart on the inside back cover of this book. The air pressure in the tires should be checked to make certain that it is correct. (Page 59.) The specific gravity of the liquid in the storage battery should be tested to see that it is properly charged and at the proper level. (Page 46.)

To Start Engine

The ignition and lighting switch lever should be turned one notch to the left from the central or vertical position and the spark control lever (the left, above the steering wheel) set in the top or full advanced position. Except when cranking by hand the spark lever should be set full advance. The throttle lever (the right, above the steering wheel) should be moved down just far enough to cause the accelerator pedal to go down approximately quarter way. The clutch should be disengaged by pressing the left foot pedal down to the floor board and then the starting motor pedal pushed down. (Illustration, Page 69.) If the engine is being started by use of the hand crank the spark lever should be moved to the full retard position (down as far as possible).

As soon as the engine starts to run under its own power, pressure should be released on starting motor button and clutch pedal. The throttle should be closed immediately and the spark lever fully advanced if engine has been cranked by hand. (Both levers toward the top of the steering wheel.)

During cold or cool weather the fumer, as well as the manifold heat control, may be used when starting a cold engine. Instructions for operating these devices are on Pages 35 and 36 respectively and should be consulted.

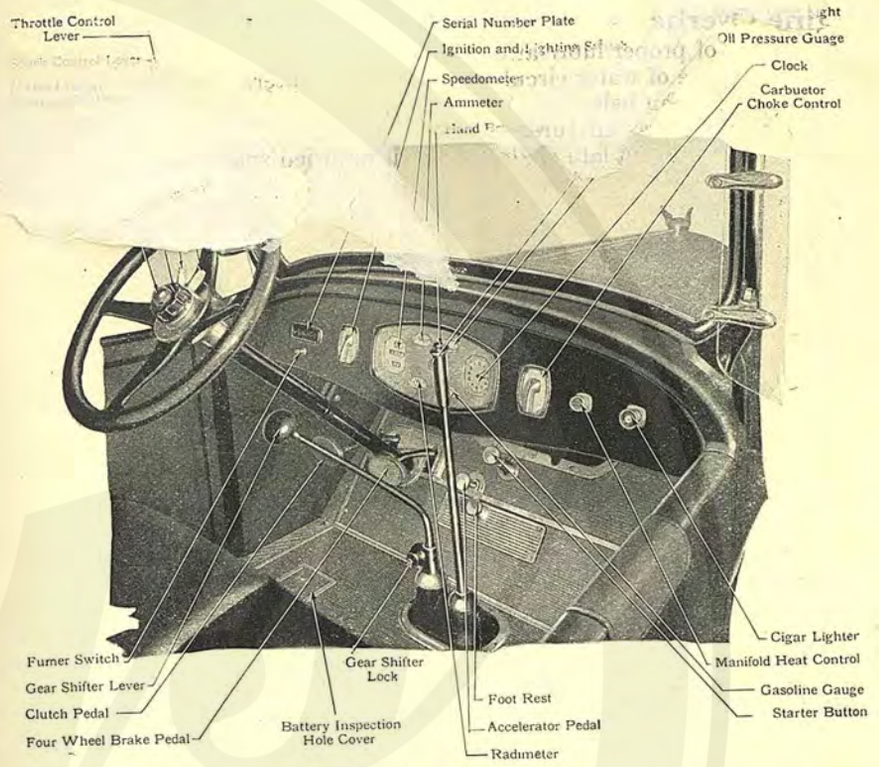

Fig. 23—Front Compartment

Caution—Always open the garage doors before starting the engine. The exhaust gases from a gasoline engine contain carbon monoxide, which is a deadly poison.

If the starting motor cranks the engine 5 or 10 seconds without the engine starting under its own power, the starting motor button should be released and the cause of the engine not starting determined. (Page 66.) Prolonged use of the starting motor will soon discharge the storage battery. The starter button should be released the moment the engine starts.

Driving the Car

The hand brake lever should be in the released position (forward as far as possible) and the clutch disengaged (pedal pressed down to the floor). Then the transmission gears should be shifted to the low speed position by tilting the gear-shifting lever to the left and rearward or reverse position by tilting the gear-shifting lever to the left and forward, as is required, and the speed of the engine increased slightly by pressure on the accelerator pedal. Simultaneously with the increase of the engine speed, the clutch should be gradually engaged. If the car is being moved forward and when it has attained a speed of about ten miles per hour, the clutch should be disengaged, the accelerator released, and the gears shifted

to ...d speed position by moving the gear-shifting lever forward to n...ral and tilting to th... right, then forward again ... soon as th... second speed gears are enga..., the clutch should be engaged again and the accelerator pressed ... the car reaches a s... to twenty miles per hour. ... the tra... the high or third speed positi... mo... back past the neutral position and ope... pedals as before.

The transmission gears should never ...tch is engaged. The reverse gears should never ... is moving forward nor the forward speed gears engaged w... ...oving backward.

If it is necessary to shift the gears from a lower speed while the car is moving, the clutch should be disengaged, the desired gears meshed, and the engine speed increased before engaging the clutch. This shift when necessary, due to conditions of traffic or load, should be done quickly so as to retain as much as possible of the momentum of the car. If the driver wishes to drive at a constant speed for any length of time, the throttle may be controlled by the hand lever at the top of the steering wheel (on the right side) and the foot removed from the accelerator pedal.

Stopping the Car

When it is desired to stop the car, the throttle should be closed and the clutch disengaged. Then the gears should be shifted to the neutral position (central position of gear-shifting lever) and the hand brake applied. The clutch may then be engaged and the engine stopped, if desired, by moving the ignition switch to the vertical or right position. (Fig. 23.)

When leaving the car it is a good precaution for drivers to make a habit of always locking the gear-shifting lever and removing the key.

Caution

At the insistent demand of the public for a greater measure of safety, four-wheel brakes are being placed on motor cars. In order to prove the efficiency of these brakes, demonstrators perform many hazardous feats far beyond the demands of ordinary driving. However, these stunts are for the professional. The average driver is urged to test and judge the brakes by the remarkable ease with which they quickly, safely and continuously perform the regular demands of every day's driving.

Chrysler cars are equipped with Lockheed four-wheel hydraulic brakes and if sharply applied will bring the car to a stop almost instantly. For this reason, except in case of emergency, the brakes should be applied gently.

Your brakes are vital to your safety. Chrysler brakes are extremely efficient. When adjustment or service is necessary have this done ***only in a Chrysler Service Station*** by Chrysler methods and with genuine Chrysler materials.—*Be Sure of Your Safety*

Tools

... of t... quipment furnished with the ...is are o... rst quality and carefully de... ...rk which an owner may wish to perform on t...

In ope... ... kept in a panel in the left front door, while the pu... are kept under the front seat or in the rear deck. In closed cars all t... ...ot under the front seat or in the rear deck.

1 Wheel rim wrench
1 Wheel hub cap wrench
1 Stabilator wrench
1 Floor board lock key
1 Brake cylinder bleeder hose assembly
1 Brake cylinder bleeder hose connection gasket
1 High-pressure lubricant gun
1 Tire pump
1 Auto jack
1 Auto jack handle
1 Rim tool assembly
1 Starting crank assembly
1 Water pump packing nut wrench
1 Wheel brake wrench
1 No. 1 wrench
1 No. 2 wrench
1 No. 3 wrench
1 No. 4 wrench
1 Auto wrench
1 Pliers
1 Screwdriver—small
1 Screwdriver—large
1 Hammer

Crankshaft
Statically and dynamically balanced and equi
Supported on 7 bronze-ba
Maximur

...rs

All questio... or replacing or ac...
the Chrysler In... taken up with their ...at
manufacturers, a... ...ator

...n is en-
...ns moving
...moving back-

...r lower speed while

Carburetor

Stromberg Motor Devices Co., Chicago, Ill.

Ignition Coil, Distributor, Starting Motor, Generator and Speedometer

United Motors Service, Detroit, Mich.

Horn

Sparks-Withington Co., Jackson, Mich.

Electric Clock

Sterling Electric Clock Corp., 30 Irving Place, New York, N. Y.

Stabilators

John Warren Watson Co., 24th and Locust Sts., Philadelphia, Pa.

Vacuum Tank

Stewart-Warner Speedometer Corp., Chicago, Ill.

Fuel Filter

Bassick Mfg. Co., 2650 N. Crawford, Chicago, Ill.

Oil Filter

Motor Improvements, Inc., Newark, N. J.

De...

...haust gas heat from engine.

Axle—Rear
...the engine
... Banjo type hous... ...nick, removab...
...rive gear and pinion spi... ...ium steel. Drive
... eleven inches in diameter a... ...: Roadster 4.09 to
Ch... ...thers 4.63 to 1. Axle shaft: ...me-nickel steel with
signe... ...ears, keyed to wheel
on the car... ...gs.

In open... ...ubular, 2½ inches diameter, 3/16 inch walls,
while the pu... chro... ...l steel yokes pressed into place under
In closed cars all t... ...tapere... roller wheel bearings. Yoke bushings:
... inches long. Ball thrust bearings at steering
... chrome-nickel steel. Steering arms are chrome-
...or lubricating chrome-nickel steering spindle pins.

Bodies
Pressed steel panels over rigid hardwood frame.

Brakes (Service)
Chrysler Lockheed hydraulic, external contracting. Drums 14 3/8 inches in diameter, brake band 2 inches wide.

Camshaft
Mounted on 4 bearings. Front bushing 2¼ inches in diameter, 1½ inches long, bronze-backed, babbitt-lined. Front center bearing 2⅛ inches in diameter, ⅞ of an inch long. Rear center bearing 2 3/32 inches in diameter, ⅞ of an inch long. Rear bearing 1⅝ inches in diameter, 1 11/32 inches long. Front center, rear center and rear bearings machined in crankcase. Oil pump and distributor drive gear integral with camshaft. Camshaft is drilled through the center and oil under pressure is forced through this passage, giving positive lubrication to all its bearings.

Carburetor
Plain-tube type, provided with limited, self-apparent, high-speed adjustment covering all necessary ranges to compensate for variations of altitude, peak summer and winter conditions, also auxiliary needle valve automatically operated with choke to facilitate starting and warming up. Equipped with centrifugal air cleaner. Fumer for easy starting.

Clearance
Road clearance 9½ inches at front axle, 9 inches at rear.

Clutch
The clutch is of the single dry plate type. Driven disc is of the flexible type and is 12 inches in diameter and has asbestos cord facing woven into it. Compound leverage arranged for light load on release bearing which is carried by a stationary support.

Connecting Rods
I-beam section. Drop-forged alloy steel. 10⅞ inches between centers. Crankshaft bearing is babbitt cast in rod 2 3/16 inches in diameter x 1½ inches wide.

Control
Conventional left-hand drive, center control. Spark and throttle levers, dimmer switch control, and horn button at top of steering column. Backing light operates when shifting gear lever into reverse. Stop light operates with brake pedal.

Cooling System
Water (capacity 5⅛ gallons), circulated by centrifugal pump driven by extension of fan shaft. Extra large water passages completely surround each cylinder and each valve. Thermostat in water outlet passage. Cellular radiator with detachable shell. Six-blade, 16-inch fan, driven by V-belt. Quickly adjustable flanged pulley to take up wear of belt. Radimeter on instrument panel registers temperature of water.

Crankshaft

Statically and dynamically balanced and accu
Supported on 7 bronze be
Ma

rts

or replacing or ac
taken up with their
at
ator

Curtains

h is en-

Six on Phaeton.
open with doors. Sa
Phaeton curtains carried in compa

Cylinders

Six, cast en bloc, integral with crankcas
seven main bearing supports. Detachable cy
Stroke
5 inches. Finish, reamed and honed.
Oil passages are drilled through bosses integral with cra case casting.
Cover plates on left-hand side provide easy access to water passages.

Drive

Hotchkiss type horizontal drive.

Engine

L-type, water-cooled, six-cylinder, four-cycle. Bore 3½ inches, stroke 5 inches. S. A. E. H. P. 29.4. Developed H. P. 92. Piston displacement 288.6 cubic inches.
Suspension: rear, rubber shock insulators in brackets bolted to stamped steel cross member; front, bolted to frame cross member.
Unit type. Firing order 1-5-3-6-2-4. Full force feed lubrication to all crankshaft, camshaft, and connecting rod bearings. Spray from $\frac{3}{32}$" hole in connecting rod bearings lubricates cylinders. Seven-bearing crankshaft. Four-bearing camshaft.

Electrical System

Generator—Two-unit, single-wire third brush regulation, thermal control, six-volt type.
Starting Motor—Back gear, manual shift.
Battery—Six-volt, seventeen heavy plate type, one hundred sixty ampere hour capacity.

Equipment

Bumpers, cigar lighter, spring covers, stop light, backing light, clock, battery water-level indicator, mirror, wind deflectors on open cars, fuel filter, oil filter, telephone on Sedan-Limousine, fuel gauge on instrument panel, heater on closed cars. Torque impulse reaction neutralizer on cylinder block and dash.

Fenders and Running Board

Fenders—Heavy sheet steel, one-piece fender and skirt without seam. Wide crown type, baked enamel finish, assembled to car with glazed fabric packing strips.
Steel running board—Corrugated rubber-covered, aluminum-bound, concealed screws.

Flywheel

Gray iron, dynamically and statically balanced. Starter gear teeth cut in steel ring shrunk on flywheel.

Frame

Pressed steel, wide flange. Channel 7 inches deep. Length—Five-Passenger Sedan, Roadster and Five-Passenger Phaeton 169$\frac{5}{32}$ inches, Four-Passenger Coupe and Seven-Passenger Sedan 176$\frac{5}{32}$ inches, Sedan-Limousine 182$\frac{5}{32}$ inches. Thickness $\frac{5}{32}$ inch. Flanges 2½ inches to 4½ inches wide. Seven cross members.

Fuel System

Vacuum tank supply system triple capacity. Visible sediment trap with shut-off valve. Eighteen-gallon fuel tank mounted at rear of frame. Three-gallon reserve capacity controlled by valve at rear on tank. Rustproof, terne plate. Electric fuel gauge on dash of all models.

De

haust gas heat from engine.

Axle—Rear

ld by the engine

Banjo type hous
rive gear and pinion spi
eleven inches in diameter a
hers 4.63 to 1. Axle shaft:
Ch
signe
on the car.

In one

forged spi
Duco finished bodies to match
hydraulic pressure.
s, also two filament bulbs to give depressible
Bronze, on
lower beam. Depression of beam and dimming
knuckle h
t. Cowl lamps to match headlamps on closed
e design on open cars. Combination tail, signal and
back-up
esign on all models. Concealed instrument and battery
water-level lamp i
strument panel. Dome lamps on all closed cars controlled by pillar switch on Five-Passenger Sedan and Coupe and by automatic door and pillar switches on Sedan-Limousine and Seven-Passenger Sedan. Corner lamps in Sedan-Limousine and Seven-Passenger Sedan. Headlight bulbs 21-21 c. p., 6 to 8 volt, 2-filament. Signal and back-up bulb 21 c. p., 6 to 8 volt, single contact. Tail, cowl, parking, dome, corner and instrument lamp bulbs 3 c. p., 6 to 8 volt, single contact. Battery water-level gauge bulb 2 c. p., 3 to 4 volt, double contact.
Headlamps adjustable for direction and focus.

Lubrication—Engine

High-pressure to all crankshaft, connecting rod and camshaft bearings. Gear pump located in oil pan, driven by timing shaft from spiral gear on camshaft. All other working parts lubricated by positive spray under pressure from hole in connecting rod, also from crankshaft and camshaft. Timing chain and generator sprocket lubricated by direct oil leads. Large area fine mesh suction strainer with relief valve returning oil to interior of screen. Oil—filtered, cleansed and cooled by circulation through oil filter mounted on dash.

Oil capacity 2 gallons.

Pressure gauge on dash. Level indicator on left side of crankcase under filler.

Overall Length

Five-Passenger Sedan, Roadster, Five-Passenger Phaeton, 185½ inches overall length, including bumpers.

Seven-Passenger Sedan and Four-Passenger Coupe, 192½ inches overall length, including bumpers.

Sedan-Limousine, 198½ inches overall length, including bumpers.

Pistons

Light alloy. Constant clearance type controlled by thermal expansion bridges of Invar steel. Length 4 inches. Fitting clearance .002 inch. Lower ring groove drilled with twelve $\frac{3}{32}$ inch oil return holes.

Piston Rings

Gray iron, 3 per piston, concentric. Width ⅛ of an inch.

Center ring undercut.

Special oil-control ring in lower groove.

Piston Pins

Alloy steel, case-hardened and lapped. 1 inch in diameter x 3⅛ inches long. Clamped in rod.

Propeller Shaft

Seamless steel tubing. Forged ends electrically welded.

Diameter 2¾ inches.

Spark Plugs

⅞ of an inch, 18 S. A. E. thread, heavy electrodes.

Springs

Chrome-vanadium alloy steel. Semi-elliptic. Front: Length 41½ inches; width 2¼ inches; 10 leaves.
Rear: Length 58 inches; width 2¼ inches; 10 to 13 leaves, according to model. Mounted in rubber shock insulators at all spring brackets which require no lubrication. Fabric spring leaf covers.

Stabilators

Stabi are used fr ll models.

Steering Ge.

Semi-irrev sible, cam lev able for wear. drop-forging, heat-treated.

Timing Chain

Silent chain. Three sprockets. E stable by m erator bracket. Generator may be removed without dis bing chain.

Tires

Cord, non-skid tread on all wheels. 32 x 6.20 special balloon cor on all models.

Top

One-man folding cape type. Waterproof material. Large glass in rear.

Transmission

Three-speed, selective sliding gear type. Unit with engine. Main shaft mounted on ball and roller bearings with roller pilot bearing. Countershaft roller bearings. All gears are chrome steel. Countershaft drive gears are $\frac{13}{16}$ of an inch wide. Second speed gears are $\frac{15}{16}$ of an inch wide. First speed and reverse gears are $\frac{13}{16}$ of an inch wide.

Gear Ratio:	Propeller Shaft	Final Drive	Final Drive
	All Models	Roadster	Five-Pass.Sedan,Seven-Pass. Sedan, Sedan-Limousine, Phaeton, Coupe
High	1 to 1	4.09 to 1	4.63 to 1
Intermediate	1.85 to 1	7.56 to 1	8.56 to 1
Low	3.2 to 1	13.08 to 1	14.8 to 1
Reverse	4.06 to 1	16.6 to 1	18.8 to 1

Tread

57¾ inches.

Turning Radius

Roadster, Phaeton and Five-Passenger Sedan 23 feet. Four-Passenger Coupe and Seven-Passenger Sedan 23 feet 6 inches. Sedan-Limousine 24 feet.

Universal Joints

Two used. Ball trunnion type.

Valve Tappets

Mushroom type. Chilled cast iron head welded to hollow steel stem. Mounted in groups of six in detachable brackets. Tappet clearance: Exhaust .008. Intake .006.

Valves

Inlet, flat head chrome-nickel steel. Exhaust, silcrome steel, semi-tulip head. Location: right side, enclosed. Clear diameter of opening $1\frac{21}{32}$ inches, stem ⅜ inch, 45-degree seat. Lift $\frac{5}{16}$ of an inch. Valve stem guides removable.

Wheels

Wood, artillery type. Demountable rims. Wire wheels standard on Roadster, wood wheels optional.

Windshield Wiper

Automatic, operated by engine suction. Operating valve on instrument board on closed cars, on windshield wiper on open cars.

PARTS PRICES

The Chrysler policy on t e of pa wners is tha y a ere in t States buy parts when t uniform ed t prices without sts for tation, handling or tax.

The Company believes that published price lists establishing the delivered prices on service parts, which Chrysler owners are expected to pay the country over and open to their inspection when buying parts, must create a feeling of confidence as to fair dealing which can be expressed in no other way.

When in the course of future time it is necessary to buy parts, Chrysler owners are privileged to examine the parts price lists at any Chrysler Service Station with which they may be dealing, with the understanding that the published price for service parts is the Chrysler owners' price and that there is no additional charge for transportation, handling or government tax.

Any part sent to the Company with a request for free replacement is to be returned through a Chrysler Distributor or Chrysler Service Station for factory credit consideration. No charge is permissible to the owner by the Distributor or any Chrysler Service Station for handling the claim or the material.

CHRYSLER SALES CORPORATION

Spring
Ch...
2¼ in

ORDERING PARTS

Chrysler owners are kindly requested to purchase parts from Chrysler Service Stations where adequate stocks of "Genuine Chrysler Parts" are carried. Should a dealer not have a desired part on hand, it can be quickly obtained from the Chrysler Parts Department.

The car serial number, which is stamped on a plate built into instrument panel, should be given in all orders or correspondence regarding the car to the parts department to promptly and intelligently fill the order or answer the correspondence. (Chassis number on frame left side member vertical section adjacent steering gear.)

Parts of accessories to the car not manufactured by the Chrysler Sales Corporation should be ordered from the respective manufacturers or service stations. (See list, Page 72.) Chrysler Service Stations will assist in this service. See "Parts Prices", Page 77.

RETURNING PARTS

Chrysler Service Stations have been supplied with special forms and tags that greatly expedite the handling of parts returned to the factory for inspection and credit consideration. Owners are kindly requested to make all parts returns through Chrysler Service Stations.

Parts of accessories to the car not manufactured by the Chrysler Sales Corporation should be sent to the respective manufacturers or service stations. (See list, Page 72.) Chrysler Service Stations will gladly perform this service for Chrysler owners.

Any part sent to the Company with a request for free replacement is to be returned through a Chrysler Distributor or Chrysler Service Station for factory credit consideration. No charge is permissible to the owner by the Distributor or any Chrysler Service Station for handling the claim or the material.

GENUINE PARTS

If, for any reason, Chrysler parts are required, Chrysler owners should be sure to insist on *genuine* parts from the Chrysler Sales Corporation. It is a matter of importance to do this. If it is ever necessary to buy Chrysler parts and Chrysler accessories, owners should insist upon the following notation being placed on the invoice rendered for the repair work:

"Genuine Chrysler Parts Used in Making These Repairs"

Parts from the Chrysler Sales Corporation are of standard production quality, engineered, manufactured and *inspected* to afford in every respect the same high standard of quality as required in the building of Chrysler cars.

Chrysler *genuine* parts are priced in reasonable ratio to their costs, considering the quality and care exercised in their manufacture, as contrasted with non-genuine parts which are made and sold solely for profit.

Only the Chrysler Sales Corporation could have the unfailing insistence that its parts should invariably be of the best quality.

Genuine Chrysler parts carry the same warranty as Chrysler cars. If a new part proves defective within ninety days, another will be furnished gratis.

INSIST ON
GENUINE CHRYSLER PARTS

Warranty

(Standard Warranty of the National Automobile Chamber of Commerce)

"We warrant each new motor vehicle manufactured by us, whether passenger car or commercial vehicle, to be free from defects in material or workmanship under normal use and service, our obligation under this warranty being limited to making good at our factory any parts or part thereof which shall within ninety (90) days after delivery of such vehicle to the original purchaser be returned to us with transportation charges prepaid, and which our examination shall disclose to our satisfaction to have be[illegible] thus defective; this warranty being expressly in [illegible] all other warranties, expressed or implied [illegible] all other [illegible] liabilities [illegible] neither [illegible] authorize any other person t[illegible] us any other liability in connection with the sale of our vehicles.

"This warranty will not apply to any vehicle which shall have been repaired or altered outside of our factory in any way so as, in our judgment, to affect its stability or reliability, nor which has been subject to misuse, negligence or accident, nor to any commercial vehicle made by us which shall have been operated at a speed exceeding the factory rated speed, or loaded beyond the factory rated load capacity.

"We make no warranty whatsoever in regard to tires, rims, ignition apparatus, horns or other signaling devices, starting devices, generators, batteries, speedometers or other trade accessories, inasmuch as they are usually warranted separately by their respective manufacturers."

CHRYSLER SALES CORPORATION
Detroit, Michigan

The Chrysler Sales Corporation reserves the right to make changes in design or to make additions to or improvements in its product without imposing any obligation upon itself to install them on its product previously manufactured.

Speaker-Hines Printing Co.
Detroit