INSTRUCTIONS

FOR THE

CARE AND OPERATION

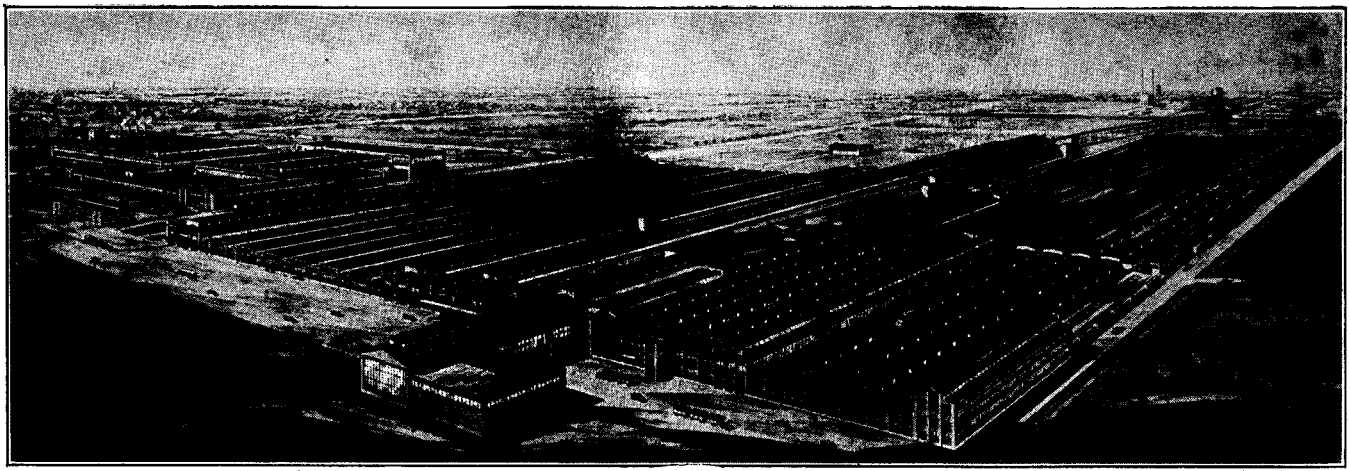
OF

PONTIAC SIX MOTOR CARS

NINTH EDITION

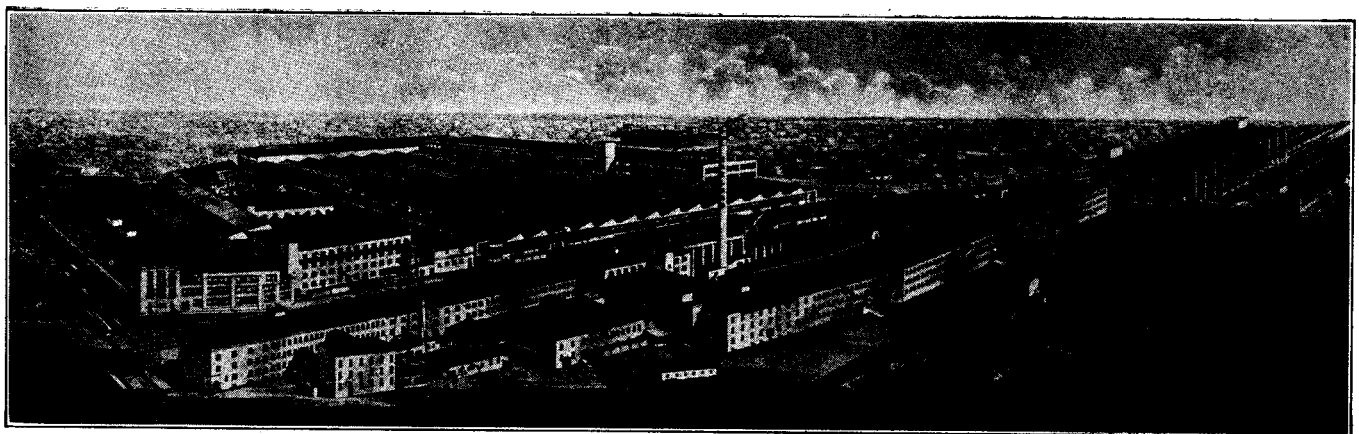
OAKLAND MOTOR CAR COMPANY
Division of General Motors Corporation
PONTIAC, MICHIGAN

Effective Car Number 590,001-P



OAKLAND-PONTIAC ASSEMBLY PLANTS

The total area of the Oakland-Pontiac Assembly Plants and Foundry is 2,525,260 square feet. The Oakland Assembly Plant in the right foreground has a capacity of 750 cars per nine-hour day. The Pontiac Assembly Plant has a capacity of 1,600 new cars in a like space of time. At the extreme left is the newly completed Foundry which has a capacity of 450 tons per day. In the right background is shown the Fisher Body Plant and overhead conveyor which carries the bodies to the assembly lines.



CHASSIS PARTS AND SERVICE PARTS PLANTS

The total area of the Chassis Parts and Service Parts Plants is 828,208 square feet. Here chassis parts such as complete axles, tie rods, brake rods, etc., are manufactured. A separate plant, shown at the right of the railroad tracks, is used exclusively as a replacement service parts warehouse.

It is the duty of every owner to read and thoroughly understand the "Manufacturer's Warranty."

Manufacturer's Warranty

We warrant the automobiles manufactured by us to be free from defects in material and workmanship under normal use and service, our obligation under this warranty being limited to making good at our factory any part or parts thereof which shall, within ninety (90) days after delivery of such automobile to the original purchaser be returned to us with transportation charges prepaid and which our examination shall disclose to our satisfaction to have been thus defective.

This warranty is expressly in lieu of all other warranties expressed or implied, and of all other obligations or liabilities on our part, and we neither assume nor authorize any other person to assume for us any other liability in connection with the sale of our automobiles.

This warranty shall not apply to any Pontiac Six automobile 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, or which has been subject to misuse, negligence, or accident.

We make no warranty whatever in respect to tires, rims, ignition apparatus, tops, upholstery, horns or other signaling devices, batteries, speedometers, or other trade accessories.

FOREWORD

This book has been written with the object of helping the owner of a Pontiac Six to operate and care for his car properly and to obtain from it the unfailing service and satisfaction which the Oakland Motor Car Company aims to build into its products.

Every owner of a Pontiac Six should become familiar with his car. While it is not necessary that he know its mechanical parts and their adjustment, he should know how to operate and care for it. He should acquire the habit of frequently having his car inspected and any necessary adjustments made at an Oakland-Pontiac Service Station.

All matters pertaining to the servicing of the automobile should be referred to the Dealer from whom it was purchased. The Oakland Motor Car Company maintains an extensive organization of skilled mechanics in the field whose object is to assist the Dealer in any problem relating to service which he is not equipped to handle alone.

CHAPTER 1

PUTTING THE CAR INTO SERVICE

Before a Pontiac automobile leaves the factory, it is inspected, checked and rechecked, both for perfect mechanical adjustment and completeness of equipment. The Dealer further inspects the car before it is delivered to assure himself that there is sufficient water in the battery and radiator and that all parts are properly lubricated. However, when putting a new car into service, the driver should satisfy himself that attention has been given to the following points. This will not only insure proper operation of the car from the first, but will help to avoid any misunderstandings with the Dealer.

Lubrication

There should be sufficient oil of the proper grade in the engine oil pan as shown by the level gauge on the left side of the engine.

If the car has been standing without use for some time, the spark plugs in all cylinders should be removed and a tablespoonful of lubricating oil poured in through each spark plug hole. Turn the motor over a number of times with the starter to get the oil on the cylinder walls.

Watch the oil pressure gauge to see that it registers 5 pounds pressure or more as soon as the engine is started.

Cooling System

See that the radiator is filled with clean water above the level of the try-cock. This is located on the left side of the radiator at the engine outlet hose connection. In cold weather a suitable anti-freeze mixture should be used in the cooling system in place of water.

Inspect the fan belt to see that it has sufficient tension to run the fan.

Battery

The battery should be firmly fastened in its carrier and all connections should be tight.

If the level of the electrolyte is less than 3-8 inch above the top of the plates, sufficient distilled water should be added to bring it to this level.

Tires

All tires, including spare, should be inflated to a minimum of 32 pounds pressure, and fitted with valve caps.

Lights

The lights should be inspected to see that they all light and are focused at the proper level. The stop light should operate when the foot brake pedal is pushed in and the ignition is on.

When bringing the car to a stop, the ignition switch should not be turned off till the car is completely stopped, as the stop light is connected in the ignition circuit and does not operate unless the ignition is on.

Fuel System

A supply of good gasoline should be put in the fuel tank and the fuel gauge on the dash checked for proper reading. Inspect the fuel line, pump and carburetor for leaks.

Precautions Necessary During First 500-1000 Miles

The most critical period in the life of the motor is the first 500 miles of operation. Permanent injury may be done through failure to observe the simple but fundamental rules concerning the working in of all new machinery.

When a new Pontiac car is delivered, the bearings in the transmission, axles and universal joints, as well as the pistons in the engine, are "tight," and it is expected that the first 500 to 1,000 miles of operation will result in these bearings assuming a high, glass-like polish. To assure this desirable result, however, it is absolutely essential not to race the engine or to drive at a speed higher than 25 miles per hour during the first 500 mile period,

For the next 500 miles, moderately increasing speeds may be used. From 500 to 600 miles, drive between 25 and 30 miles per hour, frequently attaining 35 miles per hour for a short distance. Between 600 and 700 miles, drive from 25 miles per hour to 35 miles per hour, frequently attaining 40 miles per hour for a short distance. Follow this procedure, gradually working the car into full performance. However, sustained high speeds should not be attempted during the first 2,500 miles.

Continuing to drive a new car at a speed of 25 miles per hour or less after the 500 mile period does not break in the engine for high speed driving. Consequently, nothing is gained by extending the 25 mile driving speed beyond 500 miles. The procedure outlined above should be followed until the car is brought up to the maximum speed at which it is to be driven.

Inspection and Adjustment at 500 Miles

During the first period of driving, the various parts of a car work into their final operating positions. Regardless of how well a car may be built or how thoroughly inspected, it should be given careful attention at this time, for a minor adjustment neglected may make a more serious repair necessary later.

After the car has been driven 500 miles, or at the end of the first month of operation, it should be taken to the Dealer from whom it was purchased for inspection and any minor adjustments which it may need. This should include checking the following items:

Ignition points.
Ignition timing.
Spark plug gap.
Carburetor and manifold heat adjustment.
Oil pressure.
Generator charging rate.
Tappets.
Fan belt.
Oil, gasoline, or water leaks.
Tightening spring clips.
Tightening all body and chassis bolts.
Brake adjustment.

Wheel alignment. This is of the utmost importance, as any misalignment of the front wheels will cause excessive tire wear and erratic steering.

CHAPTER II

CONTROLS, INSTRUMENTS AND EQUIPMENT

One of the first things the driver of a new Pontiac should do is to familiarize himself with the instruments and controls used in the handling of the car. Since a new car may vary in some more or less important detail of operation from any the owner may have driven, it is desirable that the experienced motorist, as well as the new driver, should read this chapter.

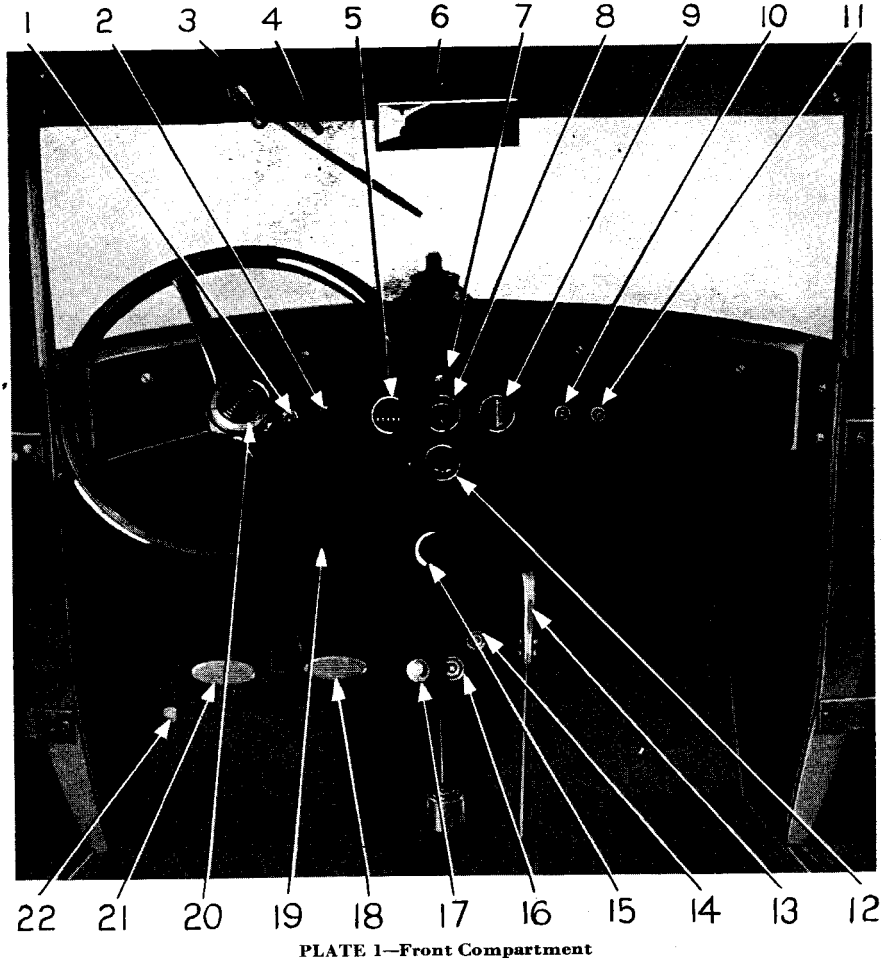


PLATE 1—Front Compartment

1—Light Switch. 2—Lock, Stop Light and Ignition Switch. 3—Windshield Regulator Handle. 4—Windshield Wiper Control. 5—Speedometer. 6—Rear View Mirror. 7—Instrument Lamp. 8—Oil Pressure Gauge. 9—Gasoline Gauge. 10—Choke. 11—Throttle. 12—Ammeter. 13—Hand Brake Lever. 14—Starter Button. 15—Gear Shift Lever. 16—Accelerator Foot Rest. 17—Accelerator. 18—Brake Pedal. 19—Steering Wheel. 20—Horn Button. 21—Clutch Pedal. 22—Headlight Control Button.

CONTROLS

Arrangement of Controls

The driving controls of the Pontiac are located in the conventional position. The steering wheel is on the left side of the driving compartment with the gear shift and hand brake levers in the center. The clutch, brake, and accelerator pedals are placed in a row directly below the steering column and in front of the driver. The starter control is to the right and above the accelerator button. The horn button is in the center of the steering wheel.

On the instrument panel, from left to right, are the head and cowl light switch "L", the ignition lock, the speedometer, and the oil pressure gauge. Directly below the oil pressure gauge at the center of the panel is the ammeter and above the oil pressure gauge, the instrument panel light. To the right of the oil pressure gauge and on a level with it are the gasoline gauge, the choke control button "C", and the hand throttle control button "T".

The headlight beam is lowered or raised by a push switch on the toe-board to the left of the clutch pedal. The stop signal lamp is automatically operated by a switch connected to the service brake pedal. A dome light on closed cars is operated by a small switch on the right hand rear door pillar.

The windshield regulator handle is located in front of the driver and above the windshield. A regulator handle for setting the driver's seat in the most comfortable position is placed on the forward side of the seat below the cushion.

Locks

Locks and keys are provided for the right front door and rear deck. The other doors can be locked from the inside by pushing up on the small toggle located just below the glass on the inside of the door.

The ignition switch is provided with a key lock built into the ignition coil in such a way that it is impossible to short circuit the switch without short circuiting the coil also.

The lock numbers are stamped on each key, but not on the face of the lock. The owner should make a record of the key numbers as soon as he takes delivery of his car, so that in the event of the keys being lost, duplicate keys can easily be obtained from an Oakland-Pontiac Dealer. Space is provided in the front of this book for recording the key numbers.

Throttle Control (Hand and Foot)

The speed and power of the engine are controlled by the opening and closing of a throttle valve in the carburetor. This throttle valve is operated from the driving compartment by either the foot accelerator button, or the pull button on the dash. The pull button on the dash remains in the position to which it is moved, while the foot accelerator always returns to the idling position.

The foot accelerator is used in all ordinary driving. The height of the foot rest to the right of the accelerator can be adjusted to suit the driver.

In its normal position, the hand control is pushed into the panel as far as it will go. For starting, however, it should be pulled out far enough to keep the engine running and left in that position until the engine is warm enough to idle satisfactorily, or without stalling, with the control all the way in. On long, open stretches of road where the speed is constant, this hand control may be used instead of the more flexible foot accelerator.

It is important, in using these controls, not to race the engine. Great harm can be done to an engine in this way, particularly if it is cold or new.

Choke Control

When starting a cold engine, it is necessary to have a fuel mixture richer in gasoline than is ordinarily required. The choke control provides for this.

The choke should be pulled all the way out when cranking a cold engine, and after the engine starts, pushed in promptly to some midway point which gives good performance without "spitting" or backfiring until the engine is warm enough to allow a full return of the choke. The choke should be used only when necessary, as its

prolonged use not only increases the fuel consumption but also dilutes the engine oil with gasoline, causing excessive piston and cylinder wear.

Do not "pump" the choke control, as this not only retards the warming up of the engine but also causes crankcase dilution.

Brakes

There are two separate brake controls on a Pontiac car. Foot brakes, controlled by the right foot pedal, operate on all four wheels and should be used for all ordinary driving. The hand brakes, operated by the lever to the right of the gear shift handle, work on all four wheels independently of the brake pedal. This provides a parking or emergency brake of double the power and safety ordinarily used.

Control the speed of the car with the engine as much as possible, using the brakes when it is necessary to stop suddenly or in a small space. This makes for safer driving and longer brake life. In descending hills, let up on the accelerator and allow the engine to assist the brakes in retarding the speed of the car. On particularly steep or dangerous hills, the car may be better controlled by changing to second or even first gear, thus obtaining very great braking action from the engine. When using the engine to assist the brakes in this manner, always leave the ignition on, as the unburned fuel which would otherwise be pumped into the muffler would explode when the ignition was turned on again, damaging the muffler.

Gear Shift Lever

The transmission has three forward speeds and one reverse, as well as a neutral position at which time the gears are disengaged. The positions of the control lever for the various speeds are as follows:

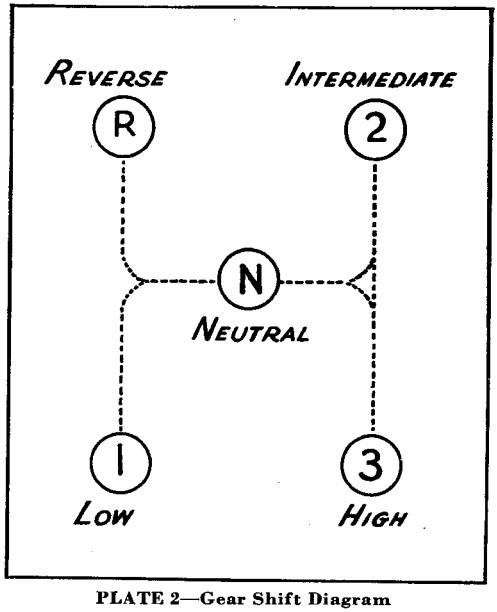


PLATE 2—Gear Shift Diagram

Neutral (center)—Lever can be moved from side to side.

First (low)—To the left and back. This position gives the greatest pulling power for starting, climbing hills or going through mud and sand.

Second (intermediate)—To the right and forward. This position gives good acceleration and power for climbing hills.

Third (high or direct drive)—To the right and back. This position should be used for all ordinary driving once the car is in motion.

Reverse—To the left and forward.

The gears should never be shifted unless the clutch pedal is fully depressed. A change from a forward speed to reverse or from reverse to a forward speed should not be made unless the car is completely stopped. A shift from a higher to a lower gear, as from high to second, should only be made at low speed. It is necessary that the above precautions be observed. Otherwise, damaged gears may result. When starting the car or leaving it, place the control lever in the neutral position.

Clutch

The clutch is controlled by the left pedal. Its normal position is out, at which time the transmission gears are connected to the engine and are turning with it. When the clutch pedal is all the way down, the clutch is released, and the engine can turn independently of the transmission gears.

The clutch should only be used when shifting gears or when stopping. Do not put the clutch pedal in when the brakes are applied until the car is about to stop. This not only allows the engine to assist the brakes in stopping, lengthening their life, but also keeps the car under better control. Holding the clutch out unnecessarily at any other time is also to be avoided. Another bad habit frequently indulged in by drivers is that of "riding" the clutch pedal with the foot. This must be avoided, because the motion of the car often brings pressure on the pedal, thus partially disengaging the clutch and allowing it to slip and wear.

Starter Pedal

Pushing on the starter pedal causes the gear on the starter to mesh with the teeth on the flywheel and crank the engine. As the starter motor remains in operation as long as the pedal is down, it is very important that the starter pedal be released as soon as the engine starts. It is also important never to push the starter pedal down when the engine is running, as serious damage may result to the starter or flywheel teeth.

In cold weather, the clutch pedal should be held down while starting the engine. This relieves the starter of the load caused by the turning of the transmission gears. This load is small in warm weather, but in the winter when the transmission oil is thick, the additional load due to the turning of the transmission gears in the thickened lubricant adds an unnecessary drain on the battery.

INSTRUMENTS

Oil Pressure Gauge

The oil pressure gauge on the dash shows the pressure under which the oil is being forced to the engine bearings. It does not show the quantity of oil in the engine.

When the engine is not running, the gauge will show no pressure, but as soon as the engine is started and as long as it runs, the gauge should show pressure. This should be 5 pounds or more where the engine is idling and 12-15 pounds at a car speed of 25 miles per hour, which is the maximum permissible driving speed during the breaking in period. After the first 500 miles, the oil pressure regulator should be readjusted at an Oakland-Pontiac Service Station.

Should the gauge show no pressure or a very sudden drop when the engine is running, the engine should be stopped immediately and the cause determined. Great damage may be done to an engine in a very short time if it is run without oil pressure.

Ammeter

The ammeter registers the flow of current into or out of the battery, except that taken by the starter. With all lights off, the ammeter should show charge at all car speeds above ten miles per hour. A discharge reading while the engine is stopped and the lights off, indicates a short circuit which should be located and remedied.

If the ammeter shows zero or less with the lights off when the car is traveling at ten miles per hour or more, the engine should be stopped and the generator and wiring inspected, as serious damage may be done to the generator otherwise.

Fuel Gauge

The fuel gauge registers the number of gallons of fuel in the supply tank at the rear of the car. A slight drop may occur in the reading on the gauge after the car has been standing idle for some time, or as a result of a marked change in temperature, but the gauge will again register accurately after the car has been driven a short distance.

Speedometer

The speedometer indicates the speed at which the car is traveling, and registers the total number of miles traveled. This mileage total should be watched, and at the intervals indicated on the accompanying Lubrication Chart, the car should be given the specified lubrication and adjustment.

EQUIPMENT

Lighting Switches

The headlights, parking lights, and tail light are operated by the button "L" on the instrument panel. When this button is pushed all the way into the panel the lights are off. The parking lights are turned on by pulling the button half way out. Pulling the button "L" all the way out turns the head and tail lights on.

The foot switch on the extreme left of the toe board acts as a dimmer switch, throwing the head light beam up or down. Pressing down on the foot button switches the lights up or down, or vice versa. It is not necessary to hold the button down for either position, as the switch snaps from one position to the other alternately each time the button is depressed.

Windshield Wiper Control

The windshield cleaner on the closed cars is controlled by the lever which extends below the windshield header panel directly behind the wiper motor. On the open cars, the windshield cleaner is operated by pulling out on the button located on the wiper motor.

Windshield Regulator

The one-piece windshield on Pontiac closed cars is controlled by a handle above the windshield. To raise the glass, the handle should be turned counter clockwise, and to lower the glass, clockwise.

For ventilation under the cowl, the windshield should be raised not more than one inch, so that the lower edge of the glass is still below the ledge over the instrument panel. With the windshield in this position, air is deflected into the driving compartment through an opening in the cowl just forward of the instrument panel. The windshield can be further raised above the level of the instrument panel, allowing the air to enter directly into the car. In this position, however, less air is forced down under the cowl.

The windshied on the open cars is pivoted at the upper corners and held in place by a wing nut on each side. To open the windshield, the wing nuts should be loosened and the windshield pushed into the desired position. It is necessary to tighten the wing nuts to hold it in position.

Adjustable Seat

The driver's seat on all Pontiac closed cars is adjustable for the convenience and comfort of the driver. The position of the seat is changed by turning the handle located on the front of the seat near the floor.

Top (Open Car)

To lower, unbutton the quarter side curtains and fold them smoothly against the inside of the back curtain.

Release the front end of the top from the windshield standards.

With one hand on the horizontal bow over the front seat, pull down, and with the other hand on the front edge of the top, push up. This will "break" the front part of the top so that the front bows can be folded back over the rear. Lower the top into the rests, being careful to tuck the material between the bows so it lies smoothly and is not pinched.

Draw the dust hood over the folded top and fasten with the corner straps.

CHAPTER III

DRIVING SUGGESTIONS

Experienced drivers have found that courtesy and safety go hand in hand. The observing of a few common sense rules will not only eliminate most of the hazards of driving, but will also contribute greatly to the pleasure of owning an automobile.

1. Respect the rights of others, particularly pedestrians.
2. Familiarize yourself with the traffic regulations in the locality in which you are driving, and then obey them.
3. Signal with the hand when slowing down, turning or stopping, even though the car is equipped with an automatic warning device.
4. When about to make a right hand turn, approach the corner on the extreme right. Do not drive up the middle of the street before making a right turn.
5. When about to make a left hand turn, approach the corner near the center of the street, but not on the left hand side. Do not drive up on the extreme right and do not cut diagonally across the corner.

6. Avoid sharp turns either to the right or left. Make all turns at slow speed—especially on wet pavement.

7. Keep to the extreme right when going around a curve in the road. Never attempt to pass a car going in the same direction on a curve, as this would cause interference with any car coming from the opposite direction.

8. Keep to the extreme right when going over a hill, and do not pass a car going in the same direction when near the top, as this would put you directly in the path of a car coming over the hill from the opposite direction.

9. Be especially careful at crossings where there is more than one track. Do not cross directly behind a train that has just passed. Another train may be coming from the opposite direction on the next track.

10. If driving slower than the general traffic, keep near the right curb.

11. Don't abuse the brakes. Sudden stops not only throw undue strain on the tires, but are often the cause of rear end collisions.

12. Drive with the choke in at all times, except when starting with a cold motor.

13. Disengage the clutch before attempting to shift gears and always stop the car before changing from a forward to a reverse gear or from a reverse to a forward gear.

14. Form the habit of glancing at the instruments occasionally while driving, for it is by them that the proper functioning of the motor lubrication and electrical systems is shown.

Caution

The exhaust fumes from a gasoline engine contain carbon monoxide, a deadly poisonous gas. As this gas is both colorless and odorless, its presence cannot be noticed. Therefore, never run the motor in a closed garage as you may be overcome by the gas. OPEN THE GARAGE DOORS BEFORE STARTING THE MOTOR.

CHAPTER IV

ENGINE LUBRICATION

Proper lubrication is of the utmost importance in securing the greatest satisfaction and service from an automobile. The necessity for adequate lubrication is apparent when the large number of moving parts in the mechanism of a car are considered. Allowing these parts to run without proper lubrication causes friction and results in very rapid wear. An automobile may be ruined in a single season by neglect, or its life may be prolonged indefinitely by proper care.

The Oakland Manufacturing Organization conscientiously builds into the car the best material obtainable and the finest kind of workmanship. By adopting the crankcase ventilator and thermostatic control, they have gone the limit to guard against wear in the engine and to prolong the useful life of the product.

Therefore, if the owner is to secure all the satisfaction which he has a right to expect from his car, it is necessary that he do his part by carrying out the following lubrication instructions.

Engine Oil

For the correct engine lubrication a high grade, well-refined oil of proper body is essential. In order to designate the viscosity or body of oil more definitely than has been possible in the past with the terms "Light," "Medium," or "Heavy," a series of viscosity numbers has been adopted by the Society of Automotive Engineers. These numbers classify the oil according to the body or thickness only. They do not cover any of the other properties.

The oil company supplying the oil is responsible for the quality of the product. Do not use cheap or little known lubricants. It is always safest to buy lubricants from a concern with an established reputation, as their experience and responsibility are the best insurance.

In general, an oil having a body of S. A. E. viscosity No. 30 is recommended for summer use. For winter use when the temperature is below 40 degrees F. an oil having a body of S. A. E. viscosity No. 20 with a zero pour test (that is, will pour from a bottle at zero temperature) should be used. The following table gives the oil recommended for temperature not covered by the above.

ENGINE OIL RECOMMENDATIONS

Air Temperature	*Grade of Oil or Mixture*
"Hot Weather" Above 80 degrees.	S. A. E. 40
"Summer" 40 to 80 degrees.	S. A. E. 30
"Winter-Mild" 15 degrees to 40 degrees.	S. A. E. 20
"Winter-Cold" —15 degrees to +15 degrees.	S. A.E. 10 or 90% S. A. E. 20 10% Kerosene
"Very Cold" Below —15 degrees.	90% S. A. E. 10 10% Kerosene or 80% S. A. E. 20 20% Kerosene.

If an occasion arises where it is necessary to choose between two grades of oil, use the lighter grade of the two oils.

Changing Oil in Crankcase

It is necessary to change the lubricating oil in an engine because, in the normal operation of the engine, the oil is being constantly diluted with unburned fuel, condensed water vapor and acid from the exhaust gases.

The gasoline in the oil is the result of improper use of the choke. Where the choke button is pulled out, as in starting, a comparatively large amount of liquid gasoline is drawn into the engine. If the choke is kept out longer than is necessary the excess fuel will not burn but will find its way past the pistons and down into the lubricating oil. The gasoline thins the oil and greatly reduces its lubricating qualities.

Water vapor, which is one of the products of combustion, condenses on the cylinder and crankcase walls and becomes mixed with the oil in the oil pan. The resulting water is a non-lubricant and is liable to freeze, stopping the oil circulation and breaking the oil pump drive.

Some fuel may contain a small amount of sulphur which, when burned, forms sulphur dioxide. This sulphur dioxide combines with water to form sulphurous acid. Sulphurous acid attacks all polished surfaces in the engine and causes corrosion and excessive wear.

The rapidity with which these non-lubricating elements accumulate increases as the temperature drops. The crankcase ventilator and thermostatic water control greatly reduce their formation and the resulting dilution of the crankcase oil. However, they will always be present to some extent and can only be completely removed by draining the crankcase and refilling with fresh, clean oil.

Taking into consideration the fact that the Pontiac is provided with a crankcase ventilator and thermostatic temperature control, the following recommendations are given:

It is necessary that the engine crankcase be drained after the first 500 miles of driving and refilled with six quarts of fresh oil. Thereafter, it should be drained and refilled when an inspection shows the oil to be thinned to a point where it no longer possesses good lubricating qualities. This point will vary due to the type of driving, the experience of the driver and the climatic conditions to which the car is subjected.

In the winter time or in city driving, frequent inspections should be made and the oil changed when it is found to be necessary, regardless of the mileage. Between oil changes, oil should be kept to the proper level in the engine as shown by the gauge on the left side of the crankcase. Inspect daily and add enough new oil to bring the oil level to the full mark.

Oil Level

The engine lubricating system is designed to operate with a definite quantity of oil. This is six quarts for the Pontiac. As oil is used up in the proper operation of engine, it is necessary to add oil from time to time to maintain the correct quantity in the oil pan. The oil pressure gauge indicates circulation of the oil but does not show when the supply in the crankcase reservoir is running low. Watch and test the oil level in the crankcase by reading oil level gauge.

The quantity of oil in the oil pan is shown by the oil level rod in the left side of the crankcase. To take a reading, pull out the rod, wipe it clean and put it back, being sure to push it all the way down. Pull it out again and the amount of oil in the oil pan will be shown by the height of oil on the rod. Empty and full positions are shown by grooves on the rod. Keep the oil level as near the full position as possible.

CAUTION: Do not attempt to determine oil level while the engine is running. Wipe oil level gauge clean before taking reading.

Insufficient Lubrication

If the engine does not receive sufficient lubrication, showing signs of laboring or heating, or begins to knock, it should be stopped immediately.

Bring the oil in the oil pan up to the proper level, and after the engine has cooled thoroughly, fill the radiator with water. Run the engine slowly and note whether the proper oil pressure is shown by the gauge. If the engine continues to labor or knock, it should be inspected by a competent mechanic before it is driven further.

CHAPTER V

GENERAL LUBRICATION AND INSPECTION

Every effort is made by the Oakland Motor Car Company to build a first-class automobile and deliver it to the customer in the best condition possible. To keep the car in that condition is beyond its control and is plainly the responsibility of the individual owner.

It is the object of this section to help the owner take the best care of the car, so that he may obtain the maximum of service from it with the minimum expense.

In addition to these instructions, the Oakland Motor Car Company has prepared a very complete lubrication chart, which shows explicitly every point which requires lubrication and the period at which it is to be given attention. This chart, tacked up in your garage, will prove invaluable in properly lubricating your car.

Schedule of Lubrication

Systematic lubrication and inspection at regular mileage intervals is the only kind that is effective. The following list and the Lubrication Chart have been prepared for the use of the Pontiac owner and contain in concise and compact form all the routine inspections, care and adjustments which experience has proved to be necessary.

Any unusual noise or behavior or symptom of trouble in the car should be investigated and corrected before serious trouble develops.

Daily or Every 100 Miles

1. Check the level of the oil in the engine oil pan and, if the oil level is below the "Full" mark on the rod, add enough new oil to bring the level up to this mark.
2. Check water in radiator and add more if necessary.
3. See gasoline gauge and add fuel if necessary.

Weekly or Every 250-500 Miles

1. Follow Lubrication Chart for oiling.
2. After the first 500 miles of driving, drain all oil from crankcase and refill with six quarts of fresh oil. Thereafter, the crankcase should be drained each time an inspection proves it necessary.
3. Remove the vent caps from each of the storage battery cells and add distilled water if necessary.
4. Inspect the tires for cuts, bruises and nails, and check pressure with a good balloon tire gauge. If the front tires show uneven or excessive wear, have the alignment of the front wheels checked and corrected if necessary.

5. It is advisable after the first 500 miles of use to perform all the lubrication operations shown on the Lubrication Chart for 500, 1,000 and 3,000 miles. Thereafter, these operations should be performed at the specified intervals. At the same time, the car should be taken to the Dealer from whom it was purchased for a complete inspection and adjustment.

Monthly or Every 1000 Miles

1. Follow Lubrication Chart for oiling.
2. Note if generator charges battery at a rate corresponding to the type of driving to which the car is subjected.
3. With light machine oil, such as "3-in-1," lubricate door hinges, door locks, hood hinges and hood hooks.

Twice Yearly or Every 2500-3000 Miles

1. Follow Lubrication Chart for oiling.

General Inspection and Tightening

In addition to the regular lubrication as shown on the Lubrication Chart, the car should be thoroughly inspected at frequent intervals, at which time it should be tightened all over and any adjustments made which may be necessary. This will help to prevent squeaks, rattles and minor difficulties to which all cars are subject and will greatly increase the life of the car and the satisfaction to be derived from it.

We recommend that at intervals of not more than 2,500 miles, and more frequently when the car is new, the car be taken to an Oakland-Pontiac Service Station where the following items should be checked and any necessary adjustments made.

1. Check clutch pedal for proper clearance.
2. Check front wheel bearings.
3. Check brakes.
4. Take up any play in steering gear or connections.
5. Check front wheel alignment.
6. Check car for easy rolling. (This is of extreme importance in securing good gasoline mileage.)
7. Inspect spring shackles and if necessary, tighten the shackle bolt to give 1-32 to 1-16 inch clearance under the flat spring which maintains the tension in the shackles.
8. Check fan belt tension.
9. Check head light adjustment.
10. Check generator charging rate.
11. Inspect generator and starter brushes.
12. Clean distributor, set contact points and retime.
13. Clean and adjust spark plug gaps.
14. Clean and tighten battery connections.
15. Clean, inspect, and tighten all wiring.
16. Flush out radiator and cooling system.
17. Clean gasoline tank, gasoline line, fuel pump bowl and carburetor screens.
18. Clean crankcase ventilator.
19. Tighten the following nuts and bolts:
    a. Cylinder head bolts.
    b. Oil pan bolts.
    c. Engine support bolts.
    d. Radiator bolts.
    e. Universal joint bolts.
    f. Spring clips.
    g. Differential to rear axle housing bolts.
    h. Body bolts.
    i. Gasoline tank strap bolts.
    j. Fender, running board, running board apron, engine side pan, and splash apron bolts and screws.
    k. Tighten all body hardware screws.
20. Check valve tappets.
21. Remove crankcase ventilator inlet assembly and wash out in gasoline.

Valve Tappet Adjustment

Valve tappets are adjusted with a clearance between valve stem and adjusting screw of .007" to .009" when the engine is hot and idling, preferably the last figure for best performance. The clearance is the same for both intake and exhaust valves and *does not* mean .007" clearance intake and .009" clearance exhaust. (Closer adjustment than that given above will not secure quieter valve action and will surely cause trouble such as hard starting, poor gasoline economy, burning or warping of valves, the necessity for their frequent grinding, and blowing out of mufflers.)

Grinding Valves

Because of the great variation in operators and operating conditions, it is not possible to state definite mileage that a car should attain before having a valve grind.

After several thousand miles operation of the car, we recommend that the owner of the car have the valves inspected at an Oakland-Pontiac Service Station, and, if necessary, have them reground. This operation can be quickly and cheaply done and the benefits derived such as quicker starting, better pickup, and increased power, are well worth the expenditure.

CHAPTER VI
CARE
COOLING SYSTEM

Filling Radiator

The cross flow type radiator, if properly used, will keep the engine cool under severe conditions, i. e., at wide open throttle on long mountain grades at high atmospheric temperatures, and still not over-cool it under normal driving conditions. The proper height of the liquid in the cross-flow type radiator is governed by the operating conditions to which the car is subject. These conditions may be divided into three classes:

1. City driving at average winter temperatures of northern states.
2. High speed driving at average year around temperatures.
3. Mountain driving at high atmospheric temperatures.

The proper liquid level for city driving at average winter temperatures (Case I) is just above the try-cock, which is located on the left side of the radiator at the engine outlet hose connection. This level may be gained by filling the radiator to the try-cock level and then adding a small amount of water.

If the car is to be operated at high speeds in average year around temperatures (Case II) a slightly higher liquid level in the radiator is recommended. When the try-cock level has been reached add from 1 1-2 to 2 pints of water.

Mountain driving at high atmospheric temperatures (Case III) calls for a still higher liquid level approaching the overflow height. Keep radiator as full as possible bearing in mind that if filled too full, water will be lost out the overflow until the proper level is established.

When filling only to the try-cock, the liquid should be allowed a short time to settle, as this type of radiator fills more slowly than conventional types. Never allow the liquid to fall below the try-cock level.

Keeping Radiator Clean

The use of clean pure water only is recommended. If it becomes necessary to use muddy or dirty water for any reason, it should be thoroughly strained through two or three thicknesses of cloth to prevent any dirt entering the cooling system.

The radiator should be flushed out each 4,000 or 5,000 miles of running, or at least twice a year, by disconnecting the lower radiator hose and inserting a water hose in the radiator filler neck. If this does not flush it out thoroughly so that the water runs through freely, the radiator should be drained, the lower outlet plugged, and the radiator filled with five quarts of hot water to which has been added half a cup of sal soda (ordinary washing soda). Allow this to stand in the radiator for a short time and then drain and flush out again with the hose.

In case this treatment does not thoroughly clean the radiator cells, the car should be taken to a branch of the United Motors Service or a Harrison Radiator Service Station where the radiator can be properly cleaned out.

Do not attempt to clean the outside of the radiator by poking dirt out. Raise the hood and wash the dirt out with a strong stream of water from the rear.

Cooling System in Winter

As soon as freezing weather is liable to be experienced, an anti-freeze solution should be used in the cooling system. The available commercial materials for preparing anti-freeze solutions for automobile radiators are distilled glycerine, ethylene-glycol, and denatured alcohol.

Each of the above anti-freeze solutions has certain advantages. Glycerine and ethylene-glycol have higher boiling points than alcohol and are not harmful to the car finish, but there is the disadvantage of higher initial cost. These two solutions are better suited to cooling systems using other than the cross-flow radiator.

Owners contemplating the use of glycerine or ethylene-glycol in their radiators should use these materials in accordance with the instructions and in the proportions recommended by the manufacturers of such material.

The alcohol solution is best adapted to the present Pontiac cooling system using the cross-flow radiator. Denatured alcohol has a low boiling point which in ordinary cooling systems causes a loss of the rather expensive solution. However, with the cross-flow radiator, due to its special design, the vapor from the cooling solution must pass over the coolest portion of the radiator where it is condensed and made available for use again.

In pouring alcohol into the radiator, be sure that none is spilled on the hood, as alcohol will spot Duco. Any alcohol accidentally spilled on the finish should be flushed off immediately with a large quantity of water.

The following table gives the freezing temperatures and specific gravity of solutions of denatured alcohol and water. The approximate percentage of alcohol required for different temperatures is as follows:

Alcohol	*Pints alcohol to make 11 qt. solution*	*Sp. Gr. 60°*	*Freezing Point*
20%	4½	.978	19° F above zero
30%	6½	.968	10° F above zero
40%	9	.957	2° F below zero
50%	11	.943	19° F below zero

In order to test the strength of the anti-freeze solution if the radiator is not full, it is necessary to drain some of the mixture into a container while making the test. In using a hydrometer to determine the temperature at which a solution will freeze, the test must be made at the temperature at which the hydrometer is calibrated. Otherwise a large error may result.

When using an anti-freeze solution in a cooling system equipped with a thermostat, it is especially necessary to make frequent checks on the freezing point of the solution, as the thermostat checks the circulation thru the radiator when the engine is cold. Serious damage to the cylinder block or cylinder head will result if the cooling solution freezes.

Salt solutions, such as calcium or magnesium chloride, sodium silicate, honey, glucose, or sugar solutions, or oil are not satisfactory for use in automobile radiators and should not be used.

Preparing Cooling System for Anti-freeze

Before adding anti-freeze solution, drain the radiator, tighten all leaks, and replace the radiator hose if necessary. Since both alcohol and glycerine tend to loosen up rust and lime deposits caused by all cooling solutions, it is also important to thoroughly flush out the radiator and cylinder block before refilling with anti-freeze. Tight joints are required due to the cost of the anti-freeze. Tighten the pump packing, if necessary, since the entrance of air thru leaks will cause glycerine or ethylene-glycol to foam, the air reacting with the material with the possibility of serious difficulties.

FUEL SYSTEM

Gasoline Tank

A 13 gallon tank is mounted at the rear of the car. Care should be taken in filling the tank that no lint or dirt of any kind gets into it. The tank should be cleaned out every 4,000-5,000 miles or approximately twice a year by removing the plug from the bottom of the tank and allowing a quantity of gasoline to be drained out.

At the same time, it is well to disconnect the gasoline lines from the gasoline tank to the fuel pump and from the fuel pump to the carburetor and have any dirt which may have accumulated in them blown out with an air hose at any gasoline filling station. Never use compressed air on the gasoline tank or lines unless the gauge to gasoline tank line is disconnected, for this would blow the red liquid from the gauge.

Gasoline Strainer

The gasoline strainer screen and settling bowl should be removed occasionally from the gasoline pump and cleaned. When reassembling, make certain that the cork gasket is not broken and lies flat on its seat and that the bowl retaining nut is tight. Otherwise the pump will not work.

Gasoline and Other Fuels

Many states and large cities now have laws or ordinances covering the specifications for gasoline. One of these requirements is that gasoline shall not contain anything which will corrode polished copper. Gasoline which passes this requirement should be harmless so far as affecting an engine is concerned.

It is a fact, however, that some gasoline substitutes, such as benzols and certain blended fuels, may contain sulphur in sufficient quantities to form sulphurous or sulphuric acid when burned in an automobile engine. This acid collects in the crankcase and attacks the bearing surfaces of the timing chain, valve lifters, piston pins, and other metal parts. An engine subjected to this acid will quickly develop chain slack and worn bearings.

Since there is no simple test which will show whether or not any harmful compounds are present in the fuel before it is used, the safest course is to purchase only such fuel as experience has shown to be harmless. The Oakland Motor Car Company cannot hold itself responsible for damage done to engines resulting from the use of harmful fuels.

Our experience with Ethyl Gasoline indicates that it is a satisfactory fuel for Pontiac engines.

ELECTRICAL SYSTEM

Starter Motor

Every 1,000 miles apply a few drops of engine oil to the oiler at the rear end of the starter. At the same time, the moving parts of the starter switch mechanism should be oiled with engine oil.

Generator

The oilers on the generator should be filled with light engine oil every 1,000 miles. Care should be taken not to apply so much oil at the commutator end that it will work into the commutator and brushes. The brushes are self-lubricating.

The generator charging rate is adjusted at the factory to suit average driving conditions and, under ordinary curcumstances, will need no attention. However, if the driving conditions are such that frequent use of the starter is necessary and the generator no longer keeps the battery charged, the charging rate should be increased. On the other hand, if the car is driven on long trips, so that there is danger of overcharging the battery, the charging rate should be reduced. The ideal adjustment is such that the generator just keeps the battery fully charged. This adjustment can best be taken care of at an Oakland-Pontiac Service Station.

Distributor

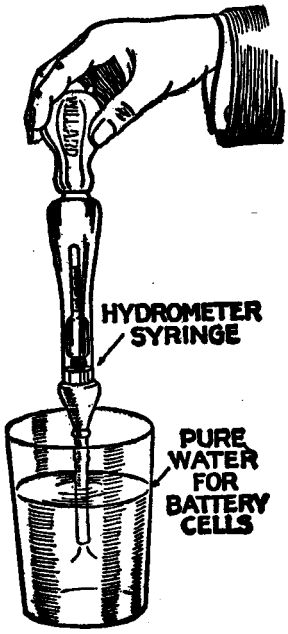
The grease cup on the distributor should be filled with soft grease and given one turn every 500 miles.

Horn

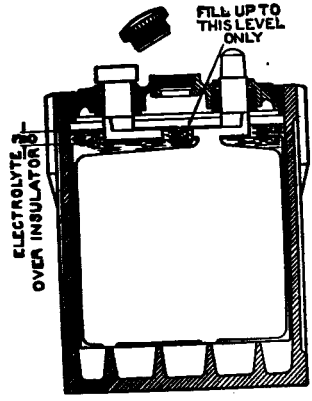
Twice a year the cover should be removed from the horn and a few drops of light, fine oil applied to the felt oil retainers at each end of the armature. Do not get any oil on the commutator or brushes.

Storage Battery

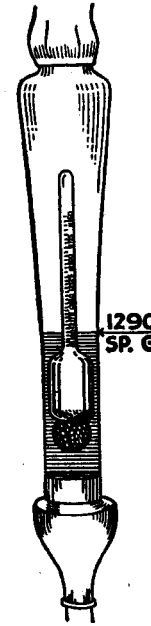
A storage battery is an electrochemical apparatus entirely different from the mechanical parts of the car. Its life depends on the care which it receives and the kind of service demanded from it. If the following suggestions for the care of the battery are followed, it will give long and trouble-free service.



Using hydrometer to fill battery with water



Sectional view of battery



Correct reading to hydrometer when battery is full

PLATE 3—Storage Battery

Proper Battery Care

1. When the car is purchased, the owner should go to the nearest battery manufacturer's service station immediately and have the battery registered in order to take advantage of guarantee, consulting, testing, and filling service. At this time a registration service card is usually given to the owner, covering the above.

2. Test all cells with a hydrometer on the 1st and 15th of every month. Fully charged cells should read between 1.280 and 1.300. In taking these readings care should be exercised to return the electrolyte from the hydrometer syringe to the same battery cell from which it was taken.

3. The electrolyte in each cell should be at least ⅜ inch above the separators. When the electrolyte is less than ¼ inch above the separators, pure, distilled water should be added. Never use hydrant water or water which has been in a metal receptacle.

4. Keep the terminals clean and tight and well covered with vaseline to prevent corrosion.

5. On long drives in hot weather, the headlights should be turned on.

6. In order to prevent freezing in cold weather, test your battery frequently and see that the gravity is kept up to at least 1.275. A discharged battery will freeze at a little below the freezing-point.

7. When filling, if one cell takes considerably more water than the others, this indicates a leaky jar, and the battery should be taken or sent to the battery manufacturer's service station. Unless repaired immediately, the battery may be ruined.

Every new battery is guaranteed by the battery manufacturer. Any repairs, adjustments or claims for unsatisfactory service should be taken up with their service station in your locality. We recommend that you take advantage of the facilities of these service stations whenever your battery requires attention.

Spark Plugs

Due to the deterioration of the plugs, they should be replaced with new plugs of the same type after 10,000 miles of service. New plugs, properly adjusted, will have a marked effect on the performance of the engine and will prove well worth their cost.

Wiring and Switches

The wiring system of the car should be inspected occasionally to make sure all connections are tight and free from corrosion.

CHASSIS PARTS

Clutch

The only part of the clutch which requires lubrication is the clutch release bearing. This part should be lubricated with cylinder oil thru the oil cup on the toe board every 250-500 miles.

Transmission

The gears run in a bath of oil which should be inspected at frequent intervals and kept filled to the level of the filler plug on the side of the transmission. At the end of every 3,000 miles of driving, flush out the old oil and refill with new transmission oil.

Universal Joints and Propeller Shaft

Each 3,000 miles, remove both oil plugs from the universal joints and force lubricant with an oil gun thru the bottom hole until it runs out of the top hole. Replace the plugs securely.

The slip joint in the front end of the propeller shaft requires oiling every 1,000 miles. This may be done with a pressure oil gun.

The lubrication chart shows where and when these parts should be lubricated.

Rear Axle

After the first 500 miles of driving the cover plate should be removed from the rear axle and the lubricant allowed to drain out. The axle housing should be carefully wiped out to remove any dirt or grit which may have accumulated in the bottom of the housing. After replacing the cover securely, refill with one and one-half quarts of transmission oil.

The rear axle housing should be kept filled to the level of the oil filler hole with heavy oil, grade A-150. In extremely cold weather, this heavy oil should be thinned slightly with "zero cold test" engine oil. As this mixture is too thin for ordinary weather conditions, it should be drained out and replaced with regular transmission oil as soon as warm weather is liable to be encountered.

When the winter oil is drained out, or once a year, the axle housing should be cleaned out carefully.

Oil for Transmission and Rear Axle

For lubricating the transmission, steering gear and rear axle, any transmission oil which meets the General Motors viscosity test A-150 is recommended.

If difficult steering or gear shifting is encountered in extreme cold weather, the A-150 oil in the steering gear and transmission may be thinned with "zero cold test" engine oil.

Springs

At intervals of every 5,000 miles, or once a year, the covers should be removed from the springs and lubricated by one of the following methods:

1. Paint springs with a heavy oil such as is used in the transmission and then pack spring covers with petrolatum.
2. Pack spring covers with a good graphite grease.

The spring clips which hold the springs to the axles should be examined and tightened if necessary every 400 to 500 miles for the first few thousand miles. Loose spring clips cause spring breakage and improper functioning or chattering of the brakes.

Wheels

The front wheel hubs should be filled with No. 3 cup grease every 1,000 miles. The rear wheel bearings are lubricated with a pressure oil gun as shown in the lubrication chart.

Brakes

At the end of the first 500 miles and thereafter whenever it is necessary, the brakes should be adjusted at an Oakland-Pontiac Service Station. Due to the vital importance of proper brake operation and the necessity for experience in making brake adjustments, it is most strongly recommended that these be attempted only by competent Oakland-Pontiac mechanics.

Replacing Brake Linings

The lining used in the Pontiac internal expanding brakes is a low friction lining constructed of asbestos, molded to fit the brake bands, and containing special protective ingredients. Because of the very powerful self-energizing feature of the brake construction, very severe action of the brakes would result were a high friction lining, such as common woven lining, used.

When it becomes necessary to install new linings, new bands with the lining attached must be used. These bands, with the linings attached, can be obtained from any Oakland-Pontiac Service Station at a special price which will be found to be as low as the cost of installing new linings on the old bands. Therefore, do not be persuaded to use any other than the genuine Pontiac brake band and lining. IT IS IMPERATIVE THAT NO OTHER BRAKE BAND ASSEMBLY BE USED.

Chassis Lubrication

A high-pressure oil gun should be used for lubricating the chassis parts. In the operation of lubricating the various parts, it is only necessary to place the nozzle of the gun onto the conical lubrication fitting and push the handle. When the oil gun is pressed against the fitting, the plunger moves forward, forcing the lubricant in the nozzle directly thru the fitting into the bearing under an extremely high pressure. Usually, enough lubricant is delivered to the bearing by one full stroke of the plunger, but in some instances more than one stroke may be necessary.

Before using the gun, each connection should be wiped off with a rag, so that no dirt will be forced into the bearing surfaces. It is also well to wipe off excess oil which is forced out around the edges of the bearing to prevent the accumulation of road dust.

The oil gun may be refilled by unscrewing the cap at the plunger end and pouring in 600 W or transmission oil. DO NOT USE HARD GREASE.

Checking for Easy Rolling

The car should be checked occasionally to see whether it is rolling freely or not. Improperly adjusted brakes or tight wheel bearings will cause a drag which not only increases the fuel consumption of the car, but also wears the dragging parts very rapidly. A pull of 25-30 pounds should keep the car moving on a smooth, level pavement. A second way to check the car is to accelerate to about 30 miles per hour on a smooth level pavement and then allow the car to coast to a stop with the gear set in neutral. The car should take approximately one minute to slow down from 25 miles per hour to 5 miles per hour. If the car does not roll freely, the air pressure in the tires should be checked and the wheel bearings and brakes inspected and adjusted if necessary.

Front Wheel Alignment

The front wheels of a car taper in at the bottom to provide easier steering. To offset this, it is necessary that the wheels toe-in at the front. The wheels are correctly aligned when the distance between the front tires at a point on a level with the hub measures 3/32 to 5/32 inch less at the front than at the rear. This "gather", or toe-in, can be adjusted without removing the tie rod ends by loosening the tie rod clamp bolts and turning the tie rod with a pipe wrench in the necessary direction to give 3/32 to 5/32 inch toe-in. This dimension should be checked occasionally, as the proper alignment of the front wheels is necessary for easy steering and long tire life. The wheels are aligned at the factory, but natural wear of the axle parts or, more frequently, striking a curb or other obstruction will change the alignment and cause very rapid tire wear.

The Owner should inspect the front tires frequently as tire wear due to mis-alignment of the wheels is so noticeable that the Owner can hold only himself responsible if the front tires wear out from this cause.

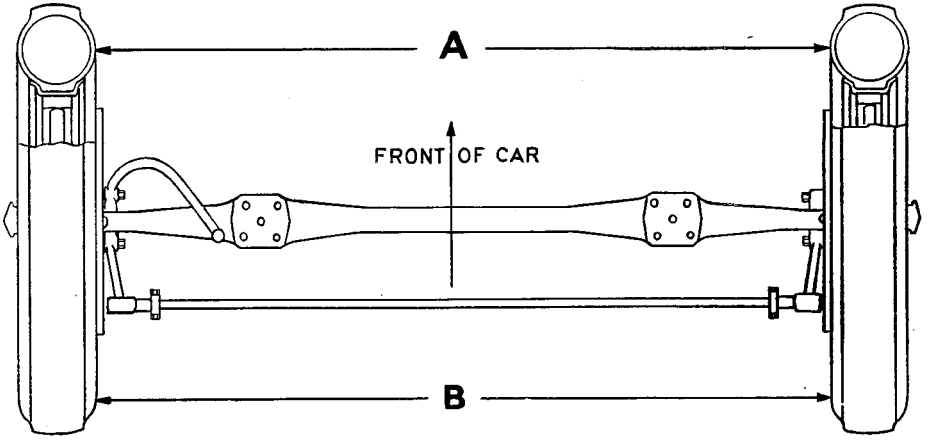


PLATE 4—Front Wheel Toe-In

For correct adjustment, the distance "A" should be $\frac{3}{32}$" to $\frac{5}{32}$" less than "B."

Steering Gear Adjustment

The steering gear is of the semi-irreversible worm and sector type. It is so designed as to prevent road shocks being transmitted to the steering wheel while still allowing the front wheels to follow small irregularities in the road surface and partially straighten themselves out on turns.

Three adjustments are provided to compensate for the natural wear in the mechanism. Should excessive backlash develop the following adjustments should be made with the front wheels off the ground and in the order given:

1. Adjust the steering arm (Sector) shaft for end play. Back off the lock nut (1) Plate 5 on the side of the steering gear housing toward the engine. With a screw driver, turn the adjusting screw (2) in as far as it will go, back it off slightly to relieve the tension, and tighten the lock nut.

2. Adjust the worm thrust bearings for end play. Loosen the bolt (3) in the steering column bracket in the driving compartment and loosen the clamp bolt (4) in the steering gear case where the steering column enters the steering gear

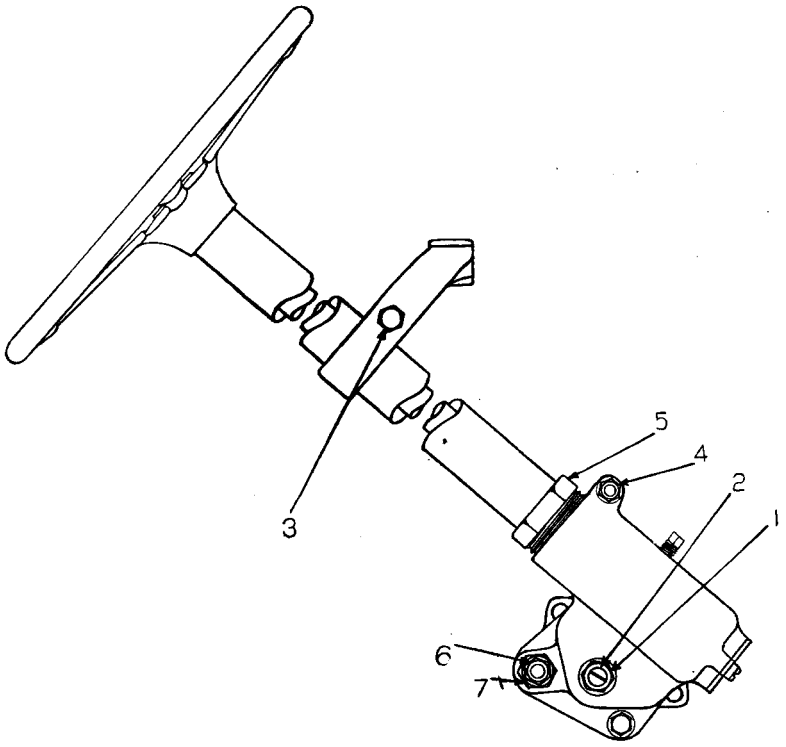


PLATE 5—Steering Gear

1—Lock Nut. 2—Sector Shaft End Play Adjusting Screw. 3—Steering Column Bracket Bolt 4—Housing Clamp Nut. 5—Worm End Play Adjusting Nut. 6—Eccentric Sleeve Lock Nut. 7—Eccentric Sleeve.

case. Turn the large hex nut (5) on the steering column clockwise till the end play in the worm is removed. *Do not tighten too much,* as binding of the bearings will result with rapid wear and hard steering. If the adjusting nut is turned too far, it should be backed off one-third turn and the steering wheel turned from one extreme to the other two or three times. The adjusting nut should then be turned clockwise again to secure the proper adjustment. Tighten the clamp bolt and the bolt in the steering column bracket.

3. Adjust for backlash between worm and sector. With the wheels *straight ahead,* disconnect the drag link from the pitman arm and move the arm fore and aft to determine amount of back lash. Loosen the cover stud nuts on the outside of the case ¼ turn only. Loosen the eccentric adjusting sleeve lock nut (6) ½ turn only. With one wrench on the eccentric bolt and one on the eccentric sleeve (7) turn the eccentric bolt clockwise and the eccentric sleeve (7) in the opposite direction in GRADUAL STAGES, noting the result by moving the pitman arm at each step and using care at the last stage to turn just sufficiently to remove back lash and no farther, as damage to the gear will result if they are turned too far. In most cases ⅛ turn of the eccentric bolt and sleeve should be sufficient. After making this adjustment, and after each of the two preceding adjustments, turn the steering wheel both ways to the extreme positions to make certain it does not bind. When properly adjusted, the gear will be without backlash in straight ahead position only. Securely tighten the lock nut on the adjusting sleeve and the nuts on the housing and connect the drag link to the pitman arm.

NOTE: In connection with ease and stability of steering, too much emphasis cannot be placed on the necessity for maintaining proper tire pressure at all times.

Heavy oil should be poured into the steering gear housing thru the pipe plug hole in the top of the housing each 1,000 miles of running. DO NOT USE GREASE.

Windshield Cleaner

If at any time the motor of the windshield cleaner should fail to operate in the regular way, or stop completely thru fouling action at some point, the movement of the wiper arm back and forth a few times by hand will have a tendency to free the instrument without harming it in the least. Under these conditions, it may be that a drop of oil is necessary, but this should seldom, if ever, happen.

When Trico Automatic Cleaners require oil, the quantity needed is really very small. The right kind of oil puts new life into the piston packing and has a generally beneficial effect.

To Oil

Remove the hose connector from the cleaner.

Place in any small receptacle (use oil can top) 1 or 2 teaspoonfuls of automatic windshield cleaner oil (Trico Maro-Oil or any light oil, if Maro-Oil is not available).

Use a 4 or 5-inch length of rubber hose. (Don't use the hose used on cleaner—oil softens rubber.)

Turn the shaft in the cleaner—by the handle if it is an interior type or by the wiper bar if an exterior type—to the extreme right—position 1, Plate 6.

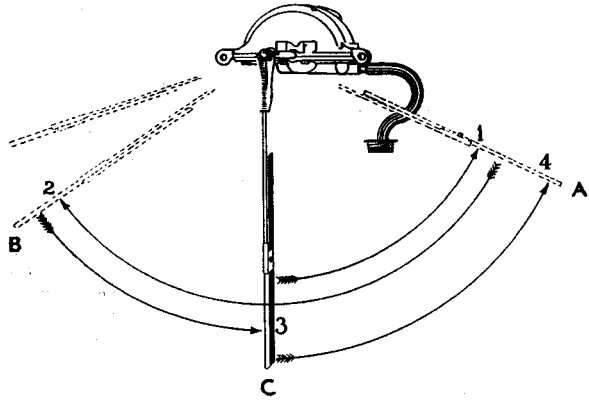


PLATE 6—Automatic Windshield Cleaner

Move back about ¾ of the normal travel to the left (position 2), being careful not to move it all the way. (If you miss the stop at the ¾ position, go back to the start again.)

Submerge the end of the 5-inch piece of hose in the oil, making a quick movement half way to the right (position 3).

Withdraw the hose from the oil.

Complete the stroke of the balance of the distance to the right (position 4). (This operation will result in oil being drawn into one side.)

Repeat the foregoing, starting off in the opposite direction, with complete motion to the left; return stroke ¾ of the way to the right; submerge the hose in the oil; now make a quick half-stroke to the left; withdraw the hose from the oil; complete the movement to the left, as before.

CARE OF TIRES

Tire cost is a considerable item in car operation and maintenance. It may be kept at a minimum or greatly and needlessly inflated according to the thought and attention given to a few fundamentals of tire conservation.

Weekly Inspection

Every week the tires should be inspected for proper pressure, cuts and nails, and proper wheel alignment.

Keep a reliable low pressure tire gauge and test the air pressure at least once a week. Before the pressure has dropped below the minimum figure, 32 pounds, bring it back to normal by adding more air. A tire does not have to be flat to be underinflated. A very small drop in pressure below the proper inflation will result in the weakening of the carcass and uneven and excessive tread wear.

When the air pressure is checked, inspect the treads for cuts and small glass or metal particles imbedded in the rubber. Remove anything imbedded in the rubber, and plug the cuts with tire putty. This is a sure way to save money, as dirt, oil, and water will work into the inside if the cuts are left open and cause the fabric and cord of the body of the tire to rot and in time blow out.

If a tire shows excessive wear when it is run at the proper pressure, it may indicate that the wheel is running out of true. A wheel sometimes runs out of true after receiving a severe jolt or strain, such as striking a curb. In this case, the car should be taken to an Oakland-Pontiac Service Station where the alignment of the wheels can be checked and corrected if necessary.

Changing Tires

In case of tire trouble on the road, do not run the tire flat even for a hundred feet, for the carcass will be mashed between the steel rim and the road, not only injuring the casing, perhaps beyond repair, but also tearing the tube.

Before putting a tire on a rim, be sure the tire flap, if one is used, the rim, and the inside of the casing are clean and smooth. Sprinkle just enough mica or talc in the casing to prevent the tube sticking to the casing. If too much is used, it cakes and chafes the tube. Make certain that the tire valve stem rubber grommet is in place to prevent water and dirt from getting inside the casing. Assemble the casing on the rim with the valve stem located at the mark "VALVE" on the casing, as the wheel is balanced with the valve in this position. Otherwise "shimmying" and increased wear may occur. Tighten rim bolts up alternately and a little at a time to insure getting the rim properly centered on the wheel.

NOTE—When changing tires see that the tire valve stem rubber grommet is inserted in the wheel from the outside so that the flanged end will rest between the wheel and the demountable rim. In this position it cannot be forced out of place by the tire valve stem when the spare tire is fitted on the wheel.

Correct Tire Pressure

The lowest pressure which can be safely carried in the tires on a Pontiac without damage to casings is 32 pounds. This applies to both front and rear tires of all models. The pressure should be 3 or 4 pounds more than this, particularly if the car is being driven at high speed, *but should never be allowed to drop below 32 pounds.* Air pressure is affected comparatively little by heat and should not be diminished because of hot weather. MAINTENANCE OF THE PROPER INFLATION PRESSURE IS BY FAR THE MOST IMPORTANT ELEMENT OF TIRE CARE.

STORING THE CAR

When it is necessary to store the car for any length of time, the following operations should be performed:

1. Clean the car carefully.
2. Cover all unpainted metal parts with heavy oil to prevent rust and corrosion.
3. Lubricate the car thoroughly.
4. Drain the gasoline system and run the engine till it stops, thus running all gasoline out of carburetor.
5. Drain all water from engine and radiator.
6. Remove spark plugs and insert a small amount of good cylinder oil in each cylinder. Replace the spark plugs, and crank the engine with the electric starter (with the ignition switch off) for about one-half minute, thus coating all interior parts with oil.
7. Remove the battery and store at a battery service station for proper attention during the storage period.
8. The tires may or may not be removed. If they are removed, they should be thoroughly cleaned and placed in a dark, comparatively cool room to prevent deterioration. If they are not removed from the wheels, all four wheels should be jacked up to relieve the car weight from the tires. The air may then be released from the tubes.
9. Partially disengage the clutch and block the pedal to hold it in this position. This will prevent the facings from sticking after the car has been in storage for some time.

CHAPTER VII

SUGGESTIONS FOR THE MAINTENANCE OF BODIES

Bodies are too frequently considered as requiring no attention other than that connected with the appearance of the car. Although there are not a great many points requiring attention, bodies, no less than the strictly mechanical parts, need periodic inspection and care.

Care of the Finish

All bodies on Pontiac cars are lacquered with Duco and their lustrous finish improves with age if properly cared for.

The body should be wiped every day with a soft cloth and washed only when mud and sand have accumulated on it. When washing is necessary, only clear, cold water should be used. Never use soap.

An occasional polishing with No. 7 Duco Polish or some other recognized lacquer polish will restore the luster of the finish. Never use wax or furniture polish.

No. 7 Duco Polish is a cleaner, as well as a polish. If softens and removes the dirt film or "scum" which soap and water cannot clean off. It also revives weathered Duco, restoring its original beauty and luster. Do not become alarmed if the polishing cloths become stained with the color of the car. This only represents a weathering of the finish. Use a dry, clean cloth for rubbing off the polish and working up the luster. A good, brisk rubbing will work up a beautiful finish.

If alcohol, or anti-freeze compounds containing alcohol, are spilled on Duco, they should be immediately wiped off, or flushed off with water. If this is not done at once, it is sometimes possible to remove stains by using No. 7 Duco Polish.

Care of the Top

Closed Cars: Fisher uses for its top coverings the best grade of material obtainable and you may be sure that the top on your Fisher Body will retain its original beauty and water proofing qualities over a long period of time if given the proper care.

The top of the car should be washed only with clear luke-warm water with a sponge or brush. A brush will give the best results as it will remove the dirt and dust from the depressions or graining in the material. Do not use soap, oil, kerosene, gasoline or fabric cleaner for this purpose. Such preparations are likely to dull the luster and damage the fabric causing leaks.

Roof coverings should be inspected periodically for cracks or separations, punctures or damaged spots that would allow water to seep through. Also crown mouldings and

drip mouldings should be inspected to detect any loose or unsealed places, which would allow water to enter and saturate the wood parts beneath, as dampness penetrating through the roof covering may do considerable damage in a short time.

Top dressing is not recommended as a preventative of deterioration or for reviving or restoring a deteriorated roof covering, because most dressings have some sort of a solvent that causes the roof covering to deteriorate.

Open Cars: Road grime or mud spatters may be cleaned off open car tops and side curtains by washing with clear luke-warm water with a sponge or brush. Soap of almost any kind will cause the color to fade. The remedy for a badly discolored khaki roof covering is to replace with a new one. Alcohol, ether, carbon tetra chloride, gasoline or any other cleaning solvent that may be used on ordinary fabric should not be used for cleaning top material.

In extremely cold weather the top should be kept up as the composition of the material which makes it waterproof becomes hard when subjected to low temperatures. Lowering the top while it is in this condition may cause the top covering to crack.

Care of the Upholstery

The upholstery in the car should be cleaned at least once a month with a vacuum cleaner, using the nozzle with which most vacuum cleaners are equipped. If a vacuum cleaner is not available, the upholstery should be brushed briskly with a whisk broom. It will take only a few minutes to do this, including the cleaning of the trimming on the sides and roof, and will keep the interior of the car looking fresh and attractive.

Should the upholstery become spotted with grease or other substances, the stains can be removed with any good cleaning fluid, such as is used in removing stains from woolen or silk garments.

After the cleaning fluid has thoroughly evaporated, wet a cloth, wring and apply to the surface. Press lightly with a hot flatiron in much the same way as a tailor presses a garment. Then brush the cleaned surface in all directions with a whisk broom to raise the nap and restore the texture to its original state.

To Prevent Squeaks and Rattles

The body is attached to the chassis frame by means of hold-down bolts, shims of anti-squeak material being placed between the body sill and the frame to take care of slight irregularities between these parts. These bolts should be gone over once a month and tightened whenever necessary.

If these bolts become loose, the body immediately starts to shift on the frame, throwing an abnormal strain on all joints. The majority of squeaks and rattles that develop in a body can be traced directly to this cause. Therefore, a few minutes devoted once a month to tightening these bolts is time well spent. This is an essential bit of service that is frequently neglected and yet has an important bearing on comfort and motoring satisfaction.

The Windshield

Closed Cars: The windshield and ventilator need a small amount of hard grease placed on the brackets where the locking fingers operate about once every six months. As it is necessary to remove the windshield header board to gain access to the operating mechanism, it is recommended that this work be taken care of by your Dealer.

Open Cars: The only attention the windshield on an open car requires is an occasional oiling of the windshield pivots and thumb locking screws. A light oil, such as "3 in 1", should be used for this.

Always see that the windshield glass and the rubber blade of the wiper are clean and free from grit before turning on the windshield wiper. This will prevent the windshield glass from getting scratched.

Window Regulators

The only attention the window regulators need is occasional lubrication to keep them running freely. To do this, raise the glass to the closed position. Using a squirt can, apply light machine oil along the upper edge of the metal channel attached to the lower edge of the glass. This oil will flow down on the channel and lubricate both the channel iron bracket and the regulator arm knob.

If the regulator is forced after the window has gone as high or as low as it is allowed to go by the body constructon, tremendous strain is thrown on the working

parts. While this unit is as strong as it is possible to make it in the limited space allowed for its operation, it is not indestructible. With proper usage, however, permanent satisfaction is assured.

Should anything go wrong with the regulator, it is necessary to remove all the trimming on the door to make repairs. Broken glass, however, can be replaced by removing the garnish moldings, putting the metal channel on the new glass and installing the glass, replacing the garnish moldings.

Glass Run Channels

Windshield and window glass travel up and down in felt covered glass run channels. These channels may become worn and permit the glass to vibrate or develop excessive end play, causing the glass to bind.

To correct the first condition, lower the glass, remove the screws from the side garnish moldings, and with a cloth covered wooden block and a hammer, drive these moldings in towards the glass. This will reduce the openings in the glass run channels and cause the glass to be held tightly.

To remove excessive end play, lower the glass, remove the side garnish moldings, and insert a thin waterproof shim behind the glass run channel. This shim should be $\frac{3}{8}$" wide and long enough to extend from the top of the glass run channel down three inches below the window sill. Tack the shim and channel in place and replace the garnish molding.

Door Locks

The only care that the door locks need is a little oil put on the lock bolt once a month. After applying the oil, work the lock bolt back and forth so that the oil will work itself into the lock. Excess oil should be wiped off the outside so there will be no danger of staining clothes.

Door Checks

Door checks on Fisher Bodies are placed at the top of the door. The check pin sliding in the slot should have a small amount of hard grease applied about once a month. By doing this the binding and squeaks, which are likely to develop if lubrication is neglected, are prevented.

Door Hinges

The door hinge pins should be lubricated at least once a month, and the hinge screws tightened.

The hinge pins used in the door hinges of Fisher Bodies are made of a softer material than the hinges. This is done so that any wear which may occur will be on the pin, which is easily replaced, rather than on the hinge. If these pins become worn your dealer can easily replace them in a short time.

Door Dovetail Bumper Assembly

The wedge plate on the dovetail should have a very small amount of grease applied about once a month. This keeps the door working freely inasmuch as this wedge plate fits between two bumper shoes and pressure is very high at this point. Should the door begin to stick, a very slight amount of grease will remedy the condition.

Door and Window Drains

In the bottom of every Fisher Body door and under the rear quarter windows are openings which permit water, which may run down past the glass, to drain out. It is very important to see that these drains are kept open. Otherwise, water may accumulate, stain the trim pads and cause the wood parts to become water soaked.

Safety Locks

Every closed body by Fisher is equipped with safety locks which operate on the same principle as the nightlock on the door of a house. These locks, which are on the left-hand door of the two-door cars and on all excepting the right front door on the four-door cars, have an inside pawl lever. This pawl lever may be tripped so that the door will lock or remain unlocked. This feature makes it possible for the driver to automatically lock all doors from the inside, except the right front door which is locked from the outside with a key.

These locks, with the positive locking windshield, make the car with a Fisher Body as nearly theft proof as an automobile body can be made. Always remember, therefore, to have your door key on your key ring.

DON'TS

Observance of the following cautions will materially add to the life or resale value of the car.

1. Do not wash your car too often. Washing is necessary only when mud or an excessive amount of dust has accumulated.
2. Do not use furniture polish or any lacquer polish containing abrasives or alkalis.
3. Do not permit alcohol, if used as an anti-freeze solution in your radiator, to come in contact with any lacquered surface.
4. Do not use anything but clean water on the roof of your car.
5. Do not neglect to oil occasionally the hinge pins, door check links, lock bolts and dovetail bumpers and to tighten the hinge screws.
6. Do not exert additional pressure on window or windshield regulators when windows are completely opened or closed.
7. Do not neglect to clean upholstery once a month.
8. Do not neglect to keep body hold-down bolts tightened.

CHAPTER VIII

HEADLIGHT ADJUSTMENT

The adjustment of the headlights should be checked occasionally to assure safety and comfort in night driving, as well as to comply with all local driving regulations and laws.

The Tilt Ray headlights used on the Pontiac Six consist primarily of a special lens operating in conjunction with a special reflector and a bulb having two 21-candle power filaments separated about one-eighth of an inch apart above and below the central axis of the bulb and reflector. Lighting the lower filament gives the upper or "driving" beam (Plate 7). The upper filament produces the lower or "passing" beam (Plate 8). Change from one to the other is made by depressing the foot switch.

To Focus—Place the car on a level floor squarely facing a wall or other vertical surface 25 feet from the face of the headlamps. Draw a horizontal line "A" (Plate 9) on this vertical surface at the level of the lamp center. Sight through the center of the rear window over the radiator cap and so determine a line "B" perpendicular to line "A" and midway between the headlamps. Next, mark two vertical lines "C-C" to the right and left of line "B" and spaced the same distance apart as the lamp centers. Turn the headlights on and, with the foot control, switch the headlight beam to the upper or "driving position." Cover one lamp to hide its light. Turn the focus adjustment screw in the back of the uncovered lamp until the beam has a high intensity at the top and a sharp upper outline and is as narrow as possible from top to bottom. Then with the car loaded loosen the bracket adjusting bolt at the bottom of the headlamp and aim the lamp so that the top of the beam coincides with the horizontal line "A" and is equally divided by the vertical line "C" directly ahead of the headlamp center. Tighten the bracket bolt securely. The correct adjustment for the right headlamp will look like Plate 10. Repeat the operations with the other lamp and the headlamps will be properly adjusted. No further adjustment for the lower beams are needed. The lower beam for the right hand lamp will look like Plate 11.

If the car is empty when the adjustment is made, the beams will have to fall slightly lower in order not to rise too high when the car is loaded. In this case, aim the headlamp so the top of the beam is at a lower line "D," five inches below line "A" for a 5-passenger car and 4 inches below line "A" for a 2-passenger car, instead of at "A." *No portion of the beam should rise higher at twenty-five feet, when the car is loaded, than the center of the lamps.*

One point that should be kept in mind is that the top of the beam should be cut off as sharply as possible. Results frequently can be improved by turning the bulb over in the socket when the beam is not satisfactory with the bulb as first installed.

Care should be taken when replacing a lens to engage the lug, which anchors the lens, in the lens notch to prevent rotation and also to insure the flutes being vertical. Both the reflector and lens are notched and also marked "TOP," so that they may be mounted only in the correct position.

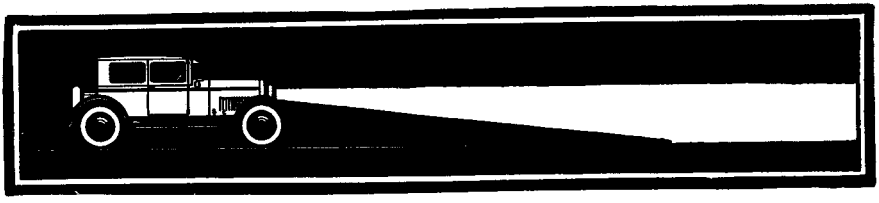


PLATE 7—Upper beam from Tilt Ray Headlamps

PLATE 8—Lower beam from Tilt Ray Headlamps

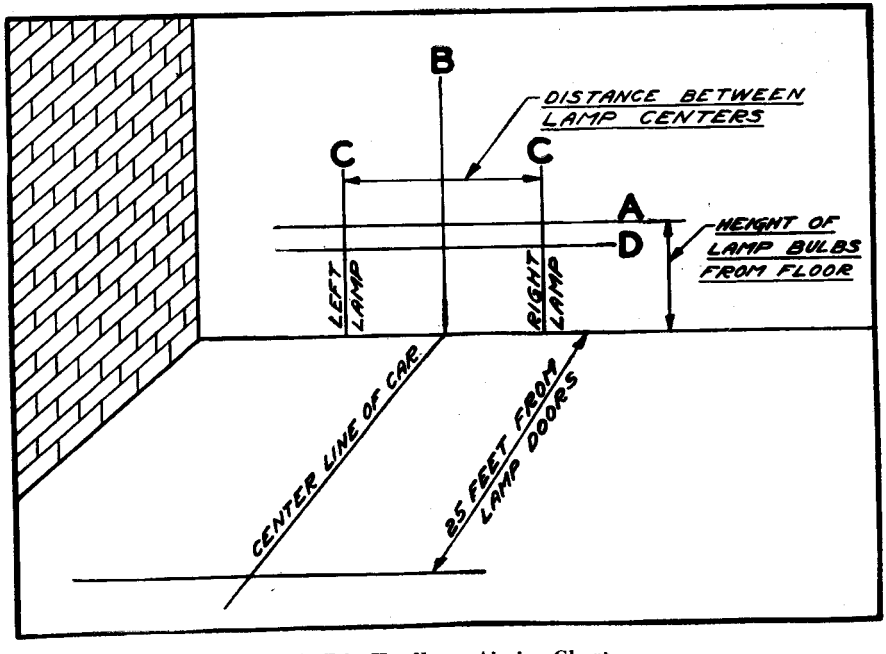


PLATE 9—Headlamp Aiming Chart

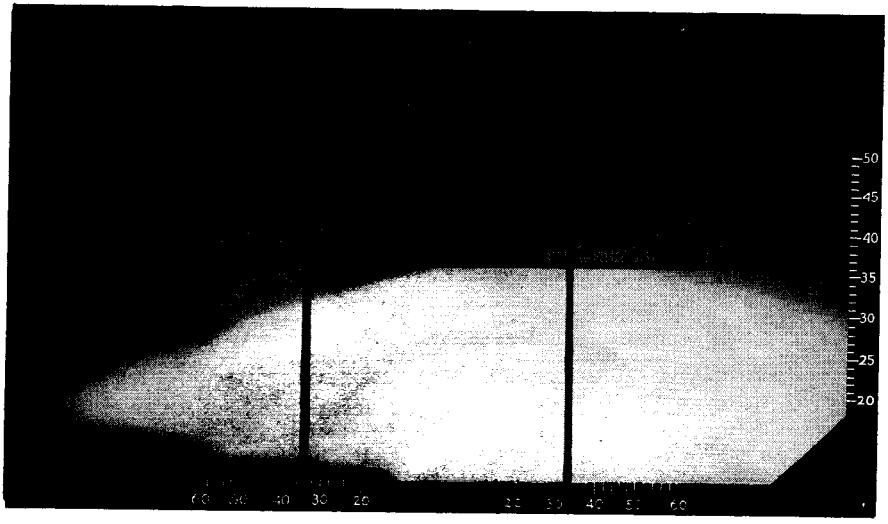


PLATE 10—Upper beam of right hand Tilt Ray Headlamp correctly focused and aimed

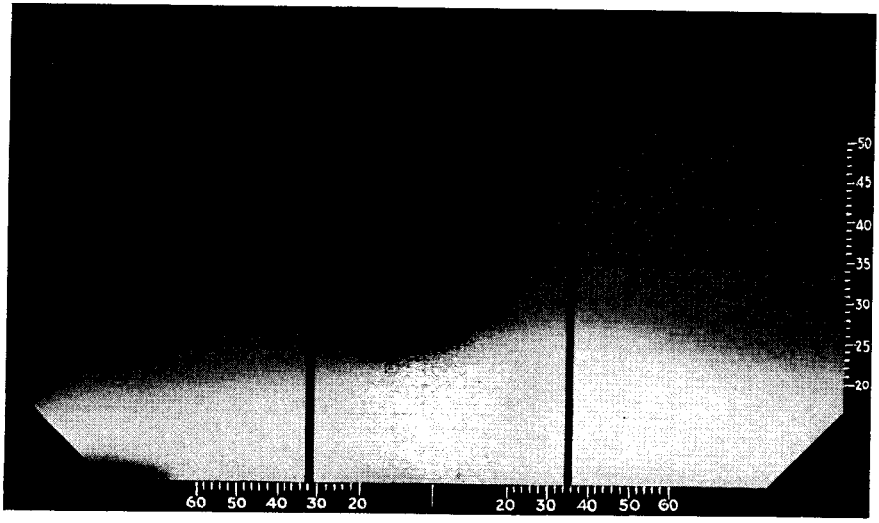


PLATE 11—Lower beam of Tilt Ray Headlamp

The following table gives the number, size, and candle-power of bulbs in lamps on Pontiac cars.

	Candle Power	Volts	Mazda No.
Headlight	21	6—8	1110
Cowl Light	3	6—8	63
Tail Light	3	6—8	63
Instrument Light	3	6—8	63
Dome Light*	3	6—8	63
Signal Light	15	6—8	87

*Used only on closed cars.

CHAPTER IX

GENERAL DESCRIPTION

Axle—Front

Own make, drop-forged "I"-beam section, reverse Elliott type. Inclined king-pin, bronze bushings in steering knuckles, weight carried on ball thrust bearings. New Departure ball bearings on wheel spindles. Spring cushioned ball and socket tie-rod. Toe-in 3-32—5-32 inch. Caster 1° 30′—2° 15′. Camber 1° 30′ or 5/8″ at outside of tire. Spindle bolt inclination 7° 10′.

Axle—Rear

Own make, semi-floating, banjo type housing. Spiral-bevel gear drive, gear ratio all models 4.42 to 1. Third member and differential carrier removable as a unit. Chrome-nickel steel drive shafts, 1 1/6 inch diameter. Differential bearings, New Departure combination radial and thrust, No. 2208. Outer pinion bearing, New Departure double-row, No. 306. Inner pinion bearing, New Departure single-row, No. 1307. Wheel bearings, Hyatt roller. Hotchkiss drive. Capacity 1½ quarts of oil.

Battery

Six volt, three cell, 13-plate, 80 ampere hour capacity.

Bearings—Main

Bronze-back, babbitt-faced type. Shimless, interchangeable without fitting.

Brakes

Foot brakes 4-wheel, internal expanding, mechanically operated. Inside diameter of drum 10¾ inches, width of band 1½ inches, 177 square inches braking surface. Brakes adjusted at brake shoe. Brakes independently operated by hand lever for parking.

Body

Closed bodies, Fisher Body Corporation. Open bodies, own make.

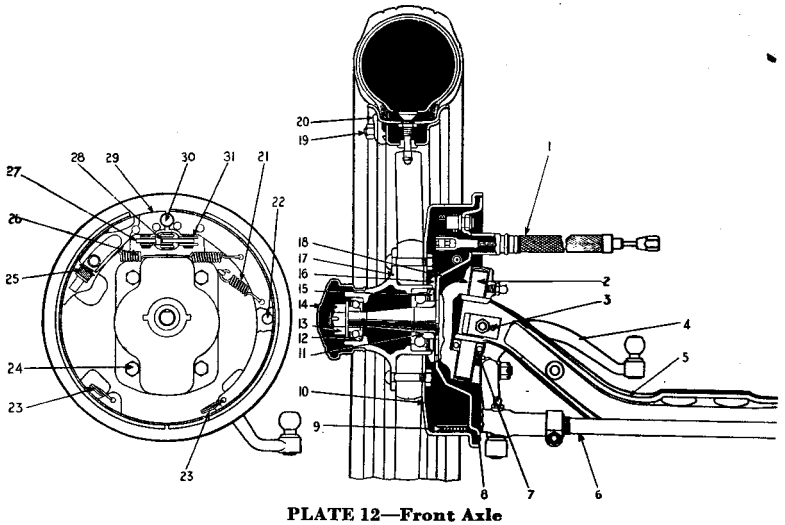


PLATE 12—Front Axle

1—Brake Cable Assembly. 2—King Pin. 3—Steering Knuckle Stop. 4—Steering and Third Arm 5—I-Beam. 6—Tie Rod. 7—King Pin Thrust Bearing. 8—Brake Support Plate. 9—Brake Shoe Facing. 10—Brake Drum. 11—Front Wheel Inner Bearing. 12—Front Wheel Outer Bearing. 13—Steering Knuckle Spindle Nut. 14—Hub Cap. 15—Front Wheel Inner Bearing Felt. 16—Front Brake Oil Guard. 17—Front Wheel Hub. 18—Steering Knuckle. 19—Demountable Rim Bolt Nut. 20—Demountable Rim Bolt Lug. 21—Short Brake Shoe Spring. 22—Brake Shoe Centralizing Cam. 23—Anti-Rattle Spring. 24—Steering Knuckle to Brake Disc Bolt. 25—Adjuster Screw Nut. 26—Long Brake Shoe Spring. 27—Toggle Arm Roller. 28—Toggle. 29—Brake Shoe Adjuster. 30—Anchor Pin. 31—Toggle Arm Roller.

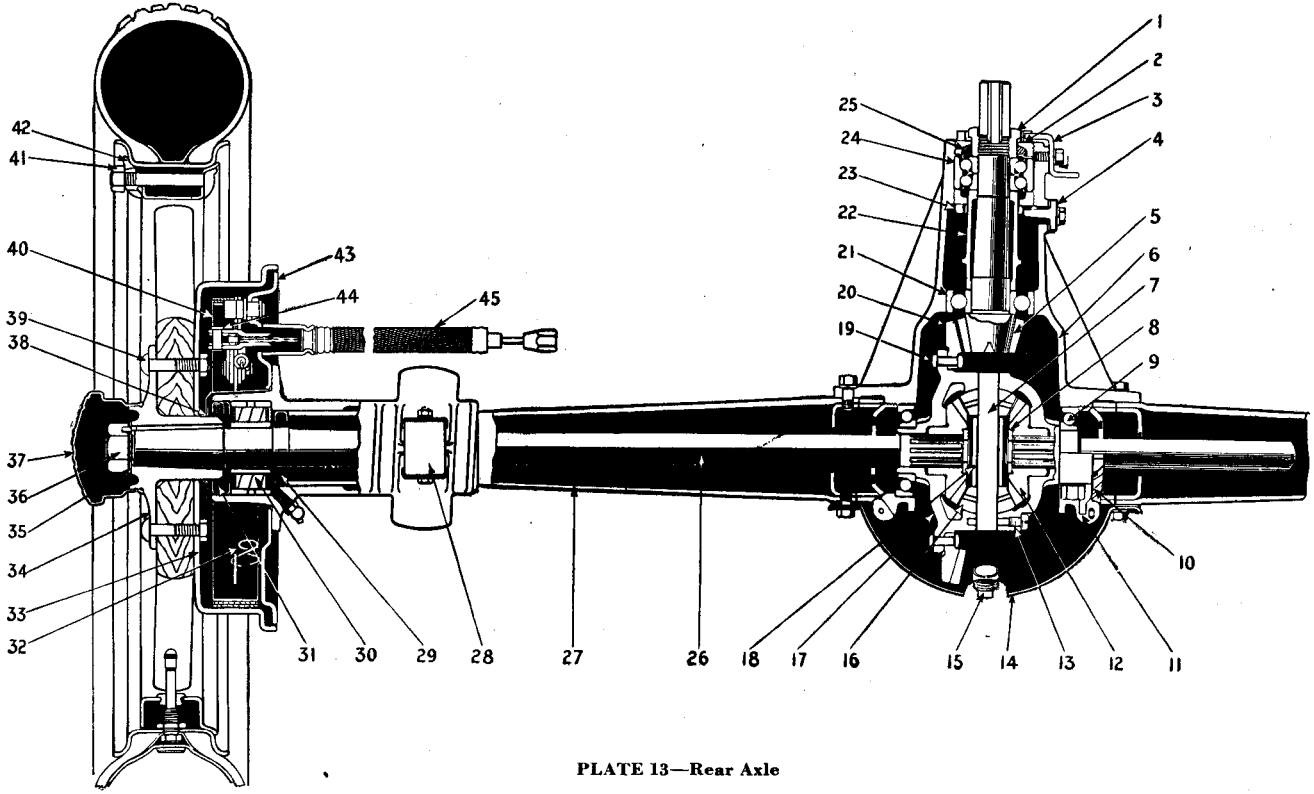


PLATE 13—Rear Axle

1—Spiral Bevel Drive Pinion Nut. 2—Differential Bevel Drive Pinion Packing Nut. 3—Differential Packing Nut Lock. 4—Differential Adjusting Nut Locking Plate. 5—Pinion Gear and Shaft. 6—Differential Housing. 7—Differential Cross Pin. 8—Main Shaft Split Washer. 9—Differential Bearing. 10—Differential Bearing Adjusting Nut. 11—Differential Bearing Adjusting Nut Lock. 12—Differential Side Gear. 13—Differential Cross Pin Lock Screw. 14—R-A Housing Cover. 15—Oil Filler Plug. 16—Differential Cross Pin Pinion. 17—Differential Case. 18—Differential Bearing Spacer. 19—Differential Ring Gear Rivet. 20—Differential Ring Gear. 21—Rear Pinion Bearing. 22—Pinion Bearing Spacer. 23—Pinion Adjusting Nut. 24—Front Pinion Bearing. 25—Bevel Drive Pinion Packing. 26—Axle Shaft. 27—Axle Housing. 28—Rear Spring Bumper. 29—Wheel Inner Bearing Felt. 30—Rear Wheel Bearing. 31—Wheel Outer Bearing Felt. 32—Brake Shoe Anti-Rattle Spring. 33—Rear Wheel Brake Drum. 34—Rear Wheel Hub. 35—Axle Shaft Nut Star Washer. 36—Axle Shaft Nut. 37—Wheel Hub Cap. 38—Rear Wheel Oil Slinger. 39—Rear Wheel Hub Bolt. 40—Brake Shoe. 41—Demountable Rim Bolt Nut. 42—Demountable Rim Bolt Lug. 43—Brake Support Plate. 44—Brake Cable to Toggle Pin. 45—Brake Cable Assembly.

Camshaft

Drop-forged steel, cams integral, casehardened and ground. Three bearings: front 1-31/32 inch diameter by 1½ inch long, center 1-29/32 inch diameter by 1-1/32 inch long, rear 1-5/8 inch diameter by 1¼ inch long. Splash lubrication. Silent chain drive. Bearings machined in crankcase. Oil pump and distributor drive gear integral with camshaft.

Carburetor

The 1¼ " Marvel carburetor used on this engine is of the automatic air valve two-jet type with an economizer and accelerating device. Adjustment of the air screw constitutes the only mixture adjustment on the carburetor.

The economizer remains in action on level roads up to approximately 50 M. P. Hr. and is entirely automatic and requires no adjustment.

Connected with the throttle and built in with the economizer is the accelerating device. On quick opening of the throttle a definite increased charge of fuel is forced from the "highspeed" jets to provide for quick "pick-up."

Adjustment: The adjustment as shipped from the factory will usually be found to be best for operating and economy. Even the most severe climatic or seasonal changes should not require more than a very slight change from this position. LEAVE THE CARBURETOR ALONE. If it becomes absolutely necessary to have an adjustment on the carburetor made, have a competent mechanic do it.

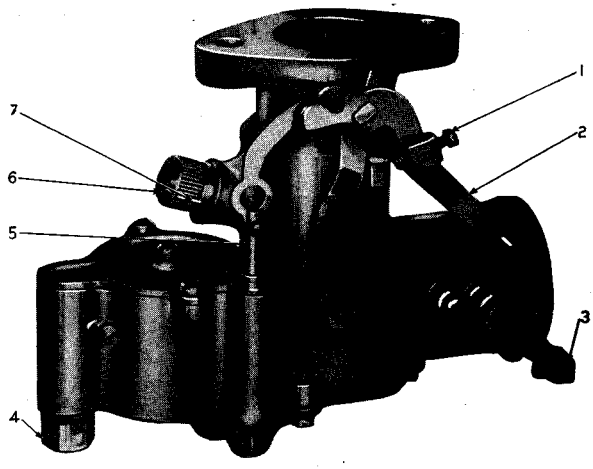


PLATE 14—Carburetor

1—Throttle Lever Adjusting Screw. 2—Throttle Lever. 3—Choke Lever. 4—Gasoline Connection. 5—Economizer and Accelerator Device. 6—Air Adjusting Screw. 7—Adjusting Screw Ratchet Spring.

Clutch

Single dry disc clutch, self-adjusting for wear, one driven and two driving members. Driven disc faced with friction material on both sides. Spring cushioned driving hub.

Connecting Rods

Drop-forged, heat treated, I-beam section, 7-5/16 inches between centers. Bearing 2 inches in diameter by 1-9/16 inches long, high grade babbitt, tin bonded to rod, shimless. Piston pin bushing 1-1/16 inch diameter, 1-7/16 inch long; diamond bored. Selected in matched sets with total weight variation of 1/8 ounce.

Cooling System

Cross-flow radiator, balanced impeller type water pump with single packing nut. Thermostatically controlled water circulation. Two blade fan, 17 inches diameter, mounted on pump shaft. Water capacity 13 quarts.

Crankshaft

Three bearings, counterweighted, statically and dynamically balanced to within 1½ inch ounce and fitted with harmonic balancer on front end. Weight with counterweights, 53 pounds. Drilled entire length for oil feed. Bearing sizes: front 1-15/16 inches diameter by 1-5/8 inches long, center 2 inches diameter by 2 inches long, rear 2-1/16 inches diameter by 2 inches long. End thrust taken on center bearing.

Cylinder Block

Cast en bloc, integral with crankcase. Removable cylinder head cast in two sections. Water jacket all the way around cylinders and valve seats.

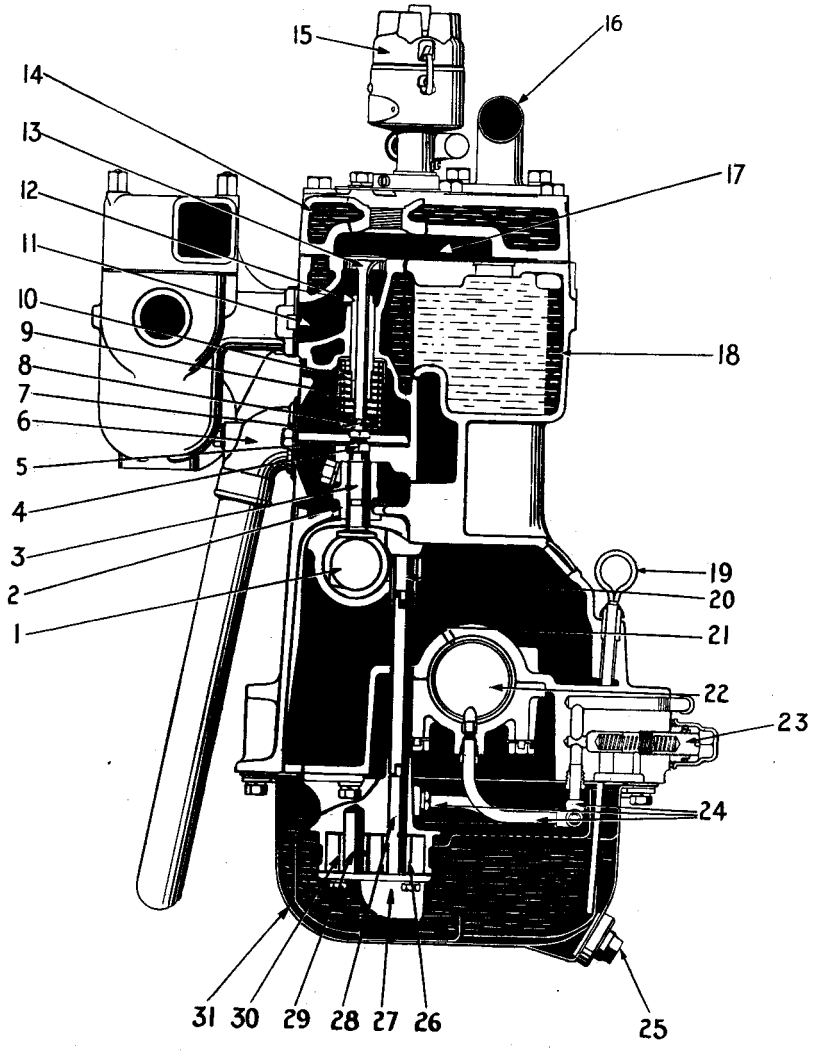


PLATE 15—Section of Engine—End View

1—Camshaft. 2—Valve Lifter Bracket. 3—Valve Lifter. 4—Adjusting Screw Lock Nut. 5—Valve Lifter Adjusting Screw. 6—Ventilator Outlet. 7—Engine Side Cover. 8—Valve Spring U-Washer. 9—Valve Spring Cage. 10—Valve Spring. 11—Valve Port. 12—Valve Stem Guide 13—Valve. 14—Cylinder Head. 15—Distributor. 16—Water Outlet Manifold. 17—Combustion Chamber. 18—Water Jacket. 19—Oil Level Gauge. 20—Oil Pump and Distributor Shaft. 21—Oil Pump Intermediate Drive Shaft. 22—Crankshaft. 23—Oil Pressure Regulator Assembly. 24—Oil Pipes. 25—Oil Drain Plug. 26—Oil Pump Drive Gear. 27—Oil Pump Cover. 28—Oil Pump Drive Shaft. 29—Oil Pump Driven Gear Shaft. 30—Oil Pump Driven Gear. 31—Oil Pan.

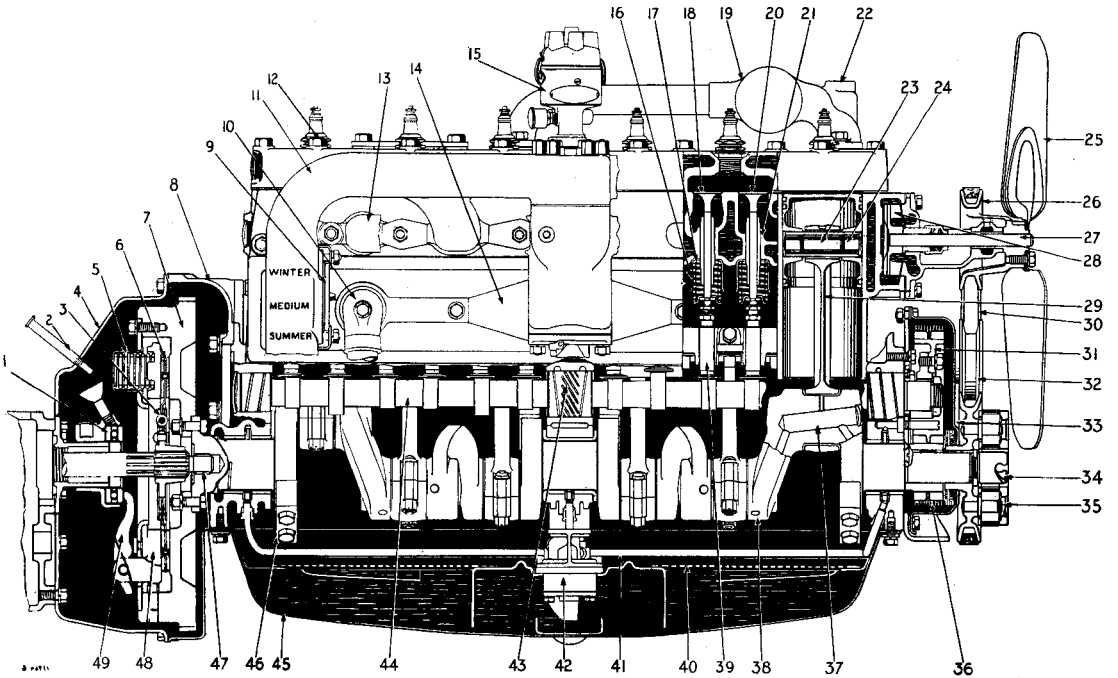


PLATE 16—Sectional Side View of Engine and Clutch

1—Clutch Release Bearing. 2—Clutch Release Bearing Oiler. 3—Clutch Drive Plate Spring. 4—Bell Housing. 5—Clutch Spring. 6—Clutch Drive Plate. 7—Flywheel. 8—Flywheel Housing. 9—Exhaust Manifold Valve. 10—Ventilator Outlet. 11—Exhaust Manifold. 12—Spark Plug. 13—Intake Manifold. 14—Rear Engine Side Cover. 15—Distributor. 16—Valve Spring Cage. 17—Valve Spring. 18—Exhaust Valve. 19—Water Outlet Manifold. 20—Intake Valve. 21—Valve Stem Guide. 22—Thermogage Hole. 23—Piston Pin. 24—Piston Pin Plug. 25—Fan Blade. 26—Fan Pulley. 27—Water Pump and Fan Shaft. 28—Water Pump Impeller. 29—Connecting Rod. 30—Fan and Generator Belt. 31—Camshaft Sprocket. 32—Generator Pulley. 33—Timing Cover. 34—Starting Crank Nut. 35—Harmonic Balancer Assembly. 36—Timing Chain. 37—Oil Passage in Crankshaft. 38—Crankshaft. 39—Valve Lifter. 40—Oil Pan Screen. 41—Oil Pipe. 42—Oil Pump. 43—Distributor Drive Gear. 44—Camshaft. 45—Oil Pan. 46—Crankshaft Counter Weight. 47—Clutch Pilot Bearing. 48—Clutch Pressure Plate. 49—Clutch Lever.

Distributor

Delco-Remy, six lobe cam, single contact type, driven from camshaft. Full automatic spark advance. Contact opening .022 inch.

Electrical System

Single wire system. Six-volt, 3-cell battery. Third brush regulated Delco-Remy generator. Delco-Remy starter, mechanical engagement. Fuse, 20 amperes.

Engine

Own make, six cylinders, L-head, water-cooled with pump circulation. Bore 3-5/16 inches, stroke 3-7/8 inches, displacement 200 cubic inches. Brake horse power 60 at 3,000 R.P.M. N.A.A.C. H.P. 26.33. Compression ratio 4.9. Weight complete with clutch, bell housing, and transmission approximately 576 pounds. Firing order 1-5-3-6-2-4. Pressure oiling to all main and connecting rod bearings.

Flywheel

Grey iron casting, balanced to 1 inch ounce tolerance, starter gear teeth cut in flywheel. Fully enclosed.

Frame

Pressed steel, side members straight, channel section 5 inches by 1¾ inches by 5/32 inch thick. Five cross members including rear engine support. Bumper brackets integral with frame.

Fuel System

Gasoline tank mounted at rear of frame, 13 gallon capacity. Fuel supplied to engine by pump operated from camshaft. Gasoline filter mounted on pump. Fuel gauge mounted on dash.

Generator

Delco-Remy, third brush regulation, belt driven from the crankshaft. Maximum charging rate 14 amperes. Reverse current relay mounted on top of generator.

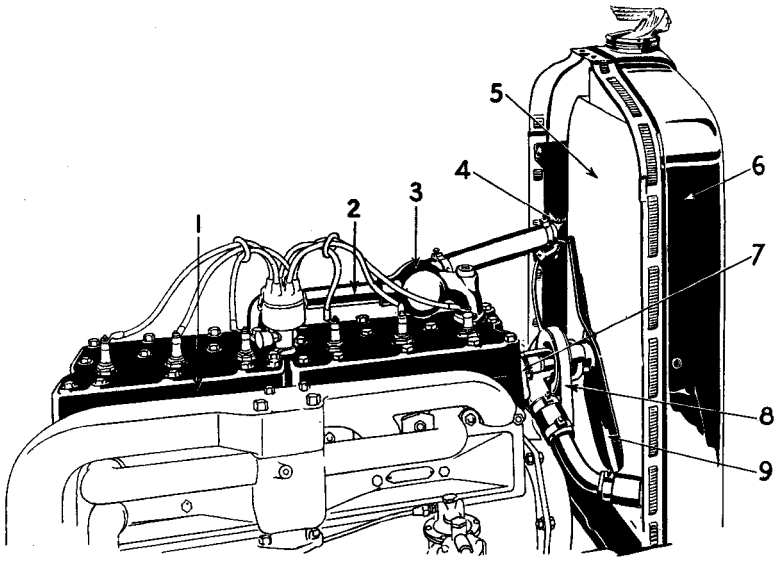


PLATE 17—Cooling System

1—Engine Water Jacket. 2—Water Outlet Manifold. 3—Theromstat Housing. 4—Try-cock 5—Radiator Core. 6—Radiator Shell. 7—Water Pump. 8—Fan Belt. 9—Fan.

Manifold Heater

The intake manifold is connected with the exhaust manifold in such a way that circulation of the hot exhaust gases around the hot-spot and riser portion of the intake manifold is controlled at the manifold. This control, which is shown in Plate 18, forces these hot gases around the intake manifold when the lever is in the "Winter" position.

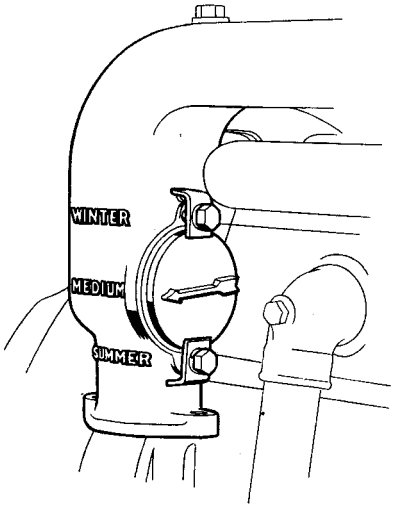


PLATE 18—Heat Adjustment

For city driving both summer and winter, the lever should be left in Winter position. In extremely hot climates and on very heavy pulls as in mountain climbing, or long touring trips, the Summer position is best.

For all ordinary driving the lever should be adjusted to some intermediate position which experience proves to be most advantageous. To err toward excess heat is better than to err toward too little heat, for excessive heat does not injure the engine but merely tends to a slight loss in power.

Horn

Delco-Remy, motor driven, tone adjustable. Button at center of steering wheel.

Lights

Headlights double filament, 21 candle power. Headlight beam controlled by foot switch on toe-board. Tail lamp, instrument lamp, and cowl lamps 3 candle power. Stop light 15 candle power, operated by automatic switch on brake pedal.

Lubrication—Chassis

Wearing parts on chassis lubricated by Zerk fittings and pressure gun.

Lubrication—Engine

Positive force feed to main bearings and through drilled crankshaft to connecting rod bearings. Special lead to timing chain. Pistons, piston pins, valve mechanism oiled by spray from connecting rods. Spray filled pockets over each camshaft bearing. Pressure regulated by spring loaded release valve. Submerged gear type oil pump, spiral gear driven from camshaft. Oil screen full length of oil pan, 134 square inches area. Oil gauge on dash. Oil pressure 10-12 pounds at 25 miles per hour, maximum pressure 25 pounds. Oil capacity 6 quarts.

Pistons

Semi-steel, conventional type with pin pressed into piston. Three 3/16 inch piston rings, two compression rings above pin and one oil control ring below. Pistons matched in sets with total weight variation of ⅛ ounce. Piston fitted in cylinders with .003 inch clearance.

Piston Pins

Hollow steel pins, 1-1/16 inch diameter, ground and lapped to size. Aluminum expansion plugs pressed in ends. Maximum out of round allowable .0002 inch. Piston pins are selective fit in piston and connecting rod.

Propeller Shaft

Welded steel tubing of uniform section, 2 inches diameter. Propeller shaft and universal joint assembly balanced.

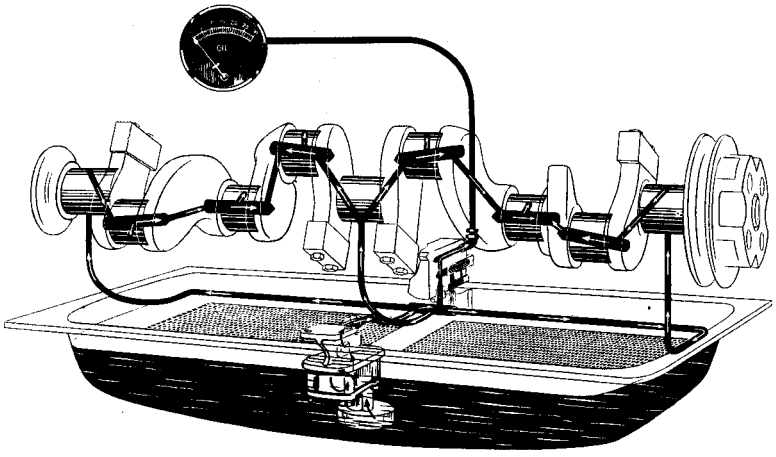


PLATE 19—Engine Oiling System

Radiator

Cross-flow type, tanks on three sides making rigid assembly. Frontal area 398 square inches.

Shock Absorbers

Delco-Remy Lovejoy, single acting hydraulic shock absorbers check the spring rebound.

Spark Plugs

AC Metric, G14 Gap .025 inch.

Speedometer

Driven from rear of transmission. Total miles and miles per hour shown. Limit 80 miles per hour.

Springs

Semi-elliptic front and rear, length rear 54 inches, front 36 inches, width 2 inches. Springs covered with fabric boot and packed in grease. Metal spring shackles of self-adjusting type.

Starter

Delco-Remy, 6-volt, manual engagement.

Steering Gear

Semi-irreversible worm and sector type, fully adjustable for wear.

Thermostat

Mounted in water outlet manifold. Set for full closed at 135° F and full open at 175° F.

Timing Chain

Silent chain mounted on two sprockets, crankshaft sprocket 17 teeth, camshaft sprocket 34 teeth. Number of links, 44, pitch ½ inch, width 1¼ inch. Non-adjustable.

Tires

Straight side, 29x5.00 inch section, 19x4 inch demountable rims. Tire pressure 32 pounds minimum.

Transmission

Three-speed, selective type, conventional shift. Engine, clutch, and transmission mounted as a unit. Clutch drive shaft and rear end transmission main drive shaft mounted on New Departure ball bearings. Pilot bearing in crankshaft self-lubricating bronze. Countershaft bearing, bronze. Gear ratios: high, direct; second, 1.77; first, 3.32; reverse, 4.21. Capacity, 1 quart oil.

1—Main Shaft Bearing—Rear. 2—Reverse Idler Gear. 3—Low and Reverse Sliding Gear. 4—Idler Shaft Gear. 5—Low. Speed Countershaft Gear 6—Second Speed Countershaft Gear. 7—Drain Plug. 8—Countershaft Gear. 9—Countershaft. 10—High and Intermediate Sliding Gear. 11—Main Drive Shaft Bearing. 12—Main Drive Gear. 13—Main Drive Gear Bushing. 14—Transmission Case Cover. 15—Gear Shifter Forks. 16—Splined Shaft. 17—Speedometer Drive Gear.

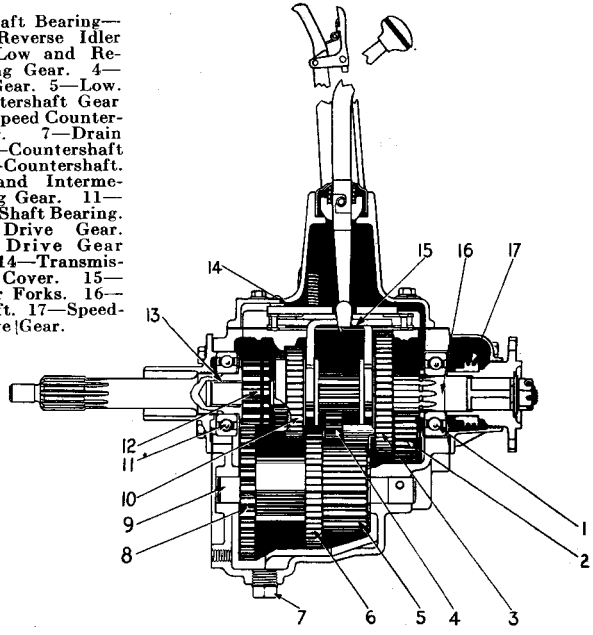


PLATE 20—Transmission

Tread

Front and rear, 56 inches.

Turning Radius

Left 19 feet. Right 19 feet 7 inches.

Universal Joints

Oil tight metal joints of the split ring type. Propeller shaft slip joint in front joint.

Valves

Inlet, chrome-nickel steel, 1¼ inch clear diameter, lift 5/16 inch. Exhaust, No. 1 silicon-chrome steel, 1-3/16 inch clear diameter, lift 5/16 inch. Removable valve stem guides 2⅞ inches long. Valve stem diameter .310 inch. Valve springs 55 pounds open, 34 pounds closed, dampeners fitted to springs to eliminate "surging."

Valve Lifters

Mushroom type, chilled iron head welded to hardened steel stem. Mounted in groups of six in removable grey iron brackets. Hardened steel adjusting screws and lock nuts. Clearance, .007-.009 inch for both intake and exhaust.

Valve Timing

Inlet opens 7° after top center, closes 39° after bottom center. Exhaust opens 42° before bottom center and closes at top center.

Water Pump

Impeller type, mounted in front of block, driven by V-belt from crankshaft. Single packing nut on shaft.

Wheels

Wood spoke, artillery type. Demountable rims. Wire wheels, special equipment.

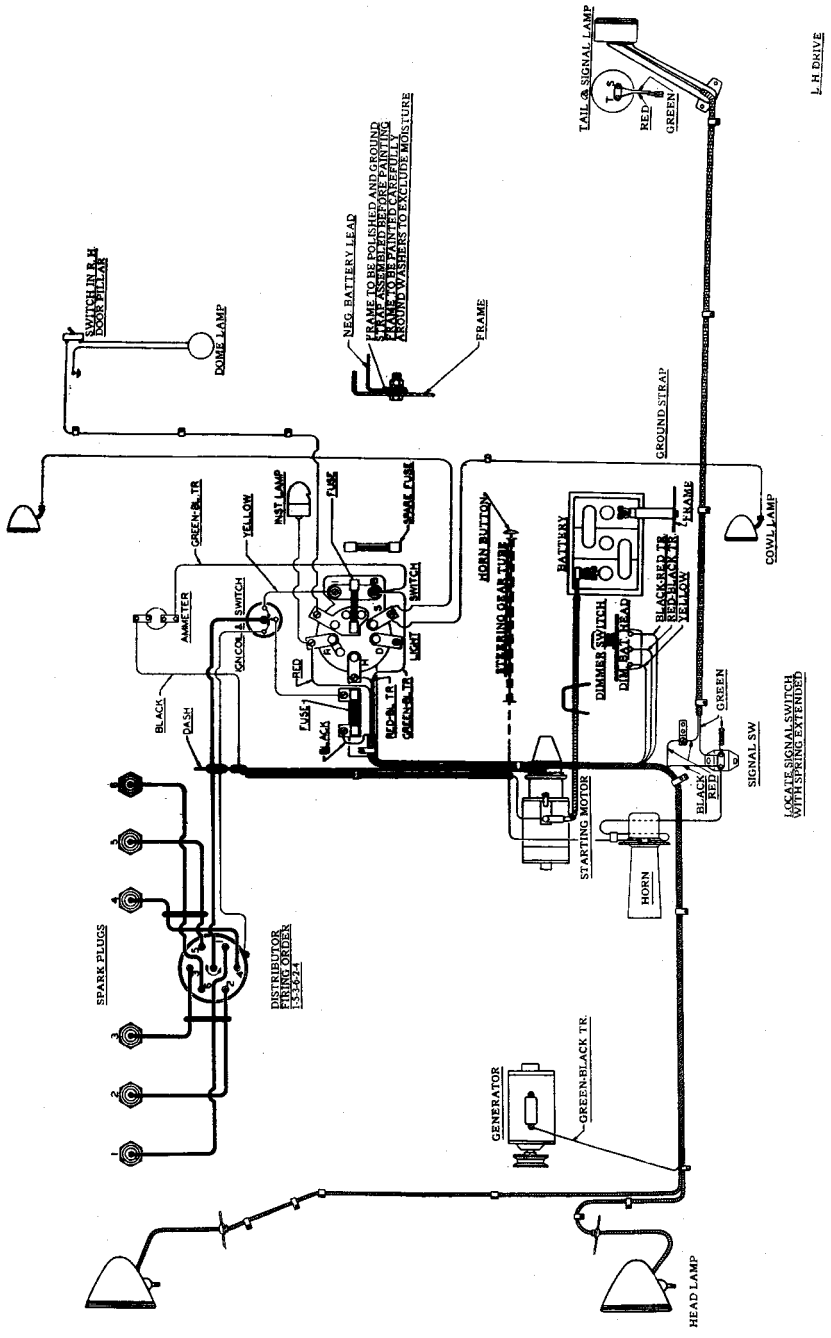


PLATE 21—Wiring Diagram

SUPPLEMENTARY INSTRUCTIONS

The Use, Care and Repair of Equipment Guaranteed and Serviced by the Equipment Makers

SERVICE POLICY ON EQUIPMENT

The equipment listed below is that which by common agreement among car manufacturers is guaranteed by the equipment makers and for which they are individually responsible. For this reason, we advise car owners to take up any questions of repairs or replacements on these parts direct with the company which makes them, or their local representatives.

In the table given below is a list of the equipment covered by these instructions, showing the name and address of the manufacturer, together with the name and address of the organization handling repairs and service on the respective parts. All of these companies have representatives in most cities, where prompt attention will be given Pontiac Six owners.

Equipment	Name and Address of Mfg.	Name and Address Service Representative
Starting, Lighting, Horn and Ignition Coil Lock	Delco-Remy Co., Anderson, Indiana	United Motors Service, (See List Below)
Speedometer and Fuel Pump	AC Spark Plug Co., Flint, Michigan	United Motors Service (See List Below)
Carburetor	Marvel Carbureter Co., Flint, Michigan	Marvel Carbureter Co., Flint, Mich., or Branch Service Station
Gas Gauge	King-Seeley Corp., Ann Arbor, Michigan	King-Seeley Corp., Ann Arbor, Michigan, or Branch Service Stations
Storage Batteries Tires	Serviced by Respective Manufacturers.	

UNITED MOTORS SERVICE

BRANCHES

Atlanta____467 W. Peachtree St., N. W.
Boston_____39 Brighton Ave.
Buffalo_____1127 Main St.
Chicago_____2521-27 S. Wabash Ave.
Cincinnati_____807 Broadway
Cleveland____4019-4109 Prospect Ave.
Dallas_____2820-28 Commerce St.
Denver_____9th Ave. at Acoma St.
Des Moines_____Mulberry at 12th St.
Detroit___495-99 Milwaukee Ave., W.
Indianapolis____961-63 N. Meridian St.
Kansas City_2501-07 McGee Trafficway
Los Angeles_1225-29 South Grand Ave.
Memphis_____731-7 Union Ave.
Milwaukee_____517-21 Jefferson St.
Minneapolis__Tenth St. at Harmon Place
New Orleans___1009-11 St. Charles St.
New York_____239 W. Fifty-Sixth St.
Oakland, Calif.
E. 8th St. and E. 12th St. at 14th Ave.
Omaha_____2813-17 Harney St.
Philadelphia_____342 N. Broad St.
Pittsburgh_____418-420 Roup Ave.
Richmond_____1319-23 W. Broad St.
St. Louis_____Locust St., at Jefferson
San Francisco_____Van Ness at Clay St.
Seattle_____10th Ave. at East Union
Toronto, Canada
5 St. Albans St. (Bay and Yonge)

Instructions for Ordering Parts

It has been found impracticable to provide owners with repair parts lists which will be complete and up-to-date at all times. Owners desiring parts information or repair parts are requested to ask for such information, or order the needed parts, from the dealer from whom their car was purchased.

When ordering new parts from your dealer, be sure to give the model, car number and description of the part required, or deliver to your dealer the old part for duplication; also specify the method of shipment.

TERMS: We do not open accounts with other than Oakland-Pontiac dealers. Dealers are generally in a position to supply any needed repair parts, or will order as required. Where conditions are such as in our judgment to warrant it, we will fill orders for parts direct to owners, providing remittance accompanies the order, or will ship C. O. D. on orders not exceeding $25.00 in value.

Always use genuine Pontiac Six repair parts. They give longer life and greater satisfaction. When in need of repairs, adjustments or replacements, consult mechanics or dealers who are thoroughly familiar with the Pontiac Six car. More prompt and efficient service will be obtained by following these instructions.

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FORM 185-A

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