

YOUR NEW

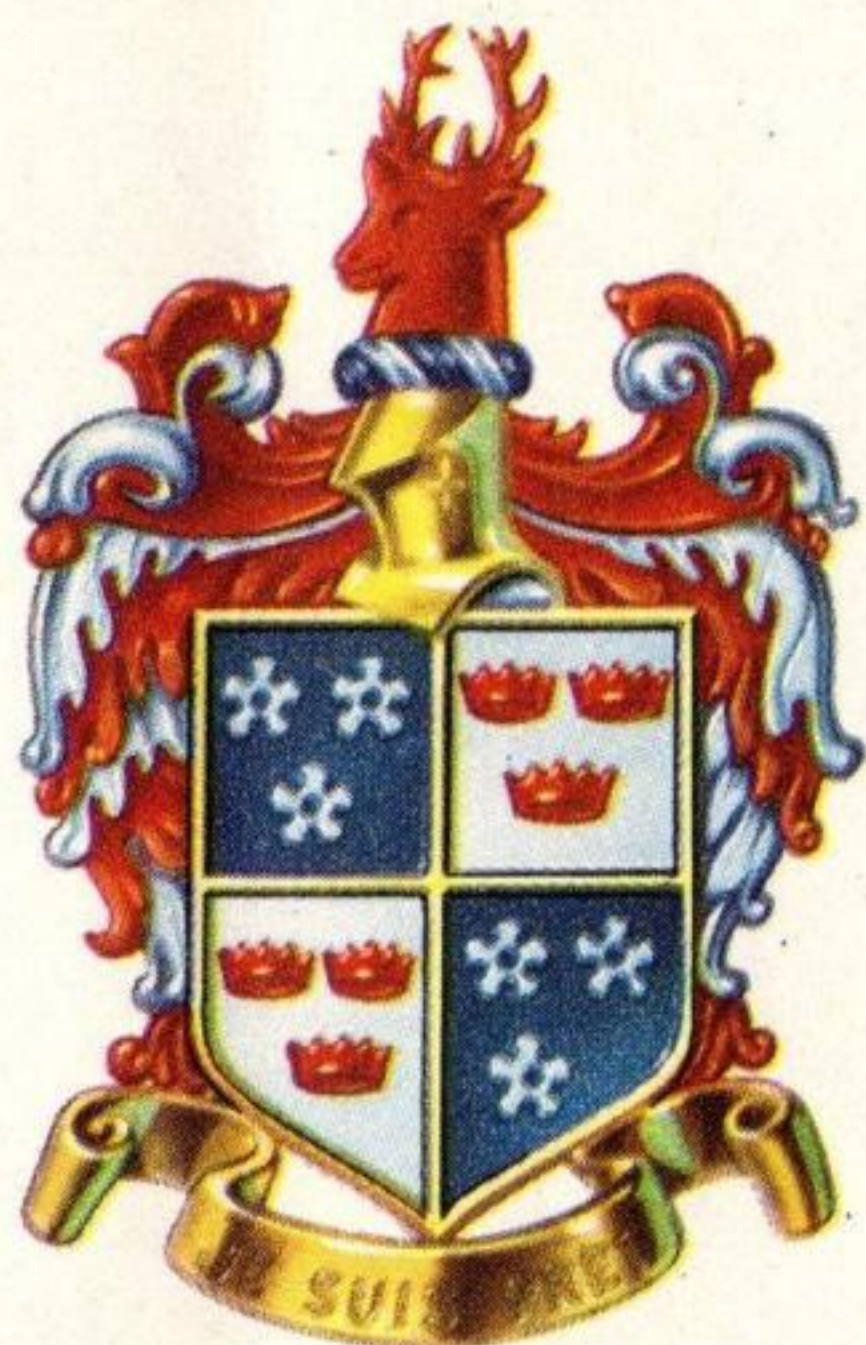
1949



FRAZER

KAISER-FRAZER SALES CORPORATION, WILLOW RUN, MICHIGAN

The



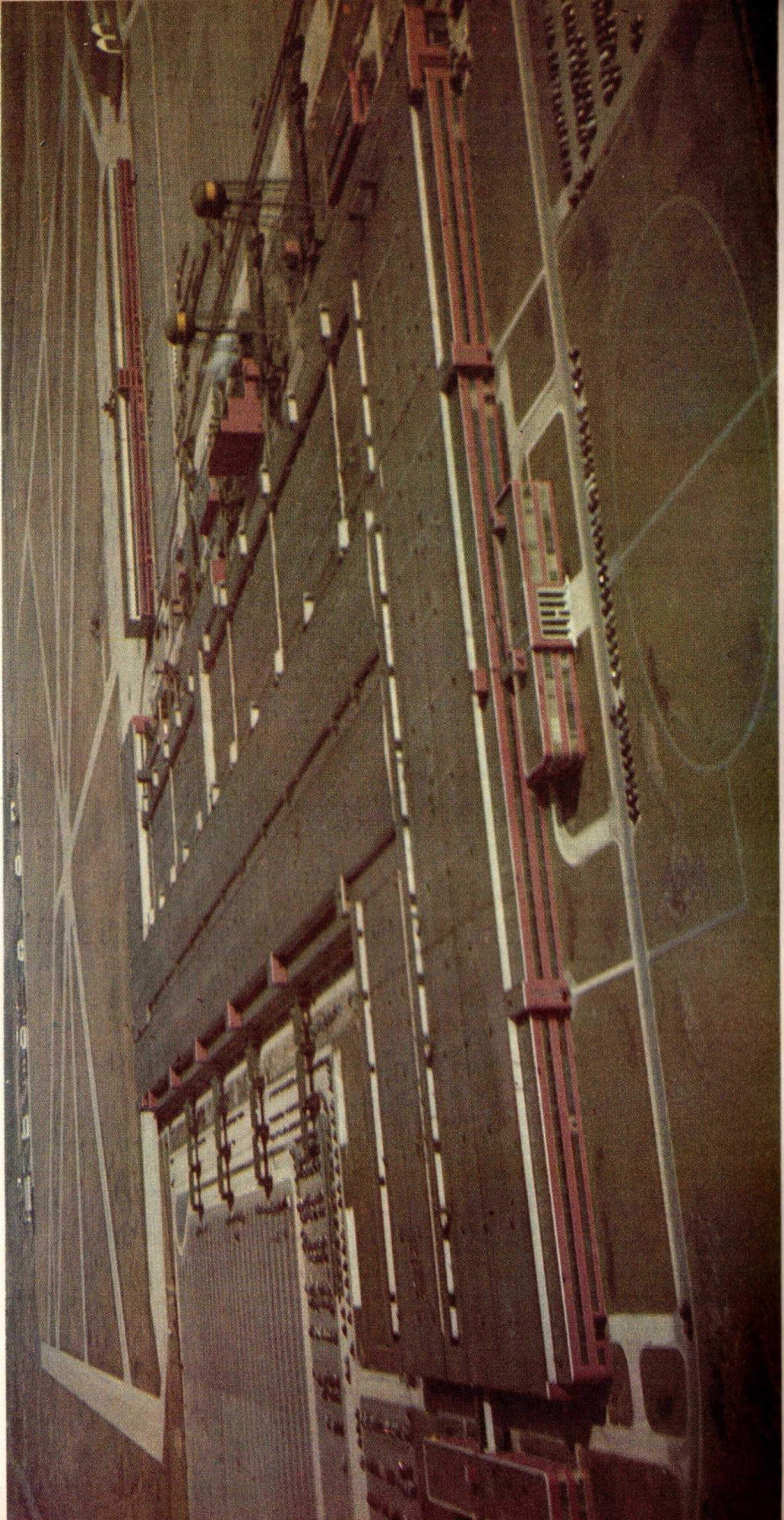
1949

FRAZER

**FACTS
AND
FEATURES**

KAISER-FRAZER SALES CORPORATION, WILLOW RUN, MICHIGAN

WILLOW RUN



This vast plant covering some 80 acres, humming with activity, is producing cars on an ever accelerating schedule to meet the public demand —truly a giant in the industry. Beyond the plant is the Willow Run Airport, one of the largest in the world.



A LETTER FROM MR. FRED R. COOPER

KAISER-FRAZER SALES CORPORATION
Willow Run, Michigan



Dear Frazer Owner:

Your purchase of a new Frazer indicates an appreciation of the finer aspects of motor car performance combining safety, comfort and operating economy. The highest standards of quality and craftsmanship have been built into your car.

All of us at Willow Run are grateful for this opportunity to welcome you to the fast growing ranks of owners of this truly fine car and we are anxious to see that you obtain the continued excellent performance inherent in its design.

Such a fine piece of machinery deserves care and attention. Regular periodic maintenance assures trouble-free motoring and prevents future service expense.

With this in mind we have prepared this manual which tells you how to get maximum motoring satisfaction. It explains the use of the various controls and gauges. It gives information on maintenance procedures. It describes the more important mechanical features—those you should understand when your car needs attention.

Please read this manual. Keep it in your glove compartment for reference. May we also suggest that you avail yourself of your Kaiser-Frazer dealer's service, regularly. You'll find that his special tools, genuine Kaiser-Frazer parts and factory trained personnel will assure you of top performance.

Sincerely,

Fred R. Cooper
Vice President in Charge of Sales

FRC/vmc

STORY OF WILLOW RUN

In September, 1945, a new company entered the automobile business. Joseph W. Frazer and Henry J. Kaiser joined forces to produce the Kaiser and Frazer automobiles. They chose as their manufacturing center the famous war-time bomber plant at Willow Run, about 26 miles from the heart of Detroit on the Willow Run Expressway.

In January of 1946 this plant was a vast 80-acre shell. Now Kaiser-Frazer is operating the largest automobile plant in the world under one roof, and is the world's fourth largest producer of automobiles.

The first K-F cars began to roll from the assembly line in June 1946. Less than 25 months later, on July 1, 1948, the plant produced its 250,000 car, a 1948 Frazer Manhattan.

Willow Run is unique in that it is the only automobile plant in which all operations—from forming body panels on presses to loading completed autos on freight cars—take place on one floor under one roof. The 2,650,000 square feet of floor space in the main manufacturing building, plus 1,040,000 square feet in the balconies, provide space for huge body presses, body building lines, and storage areas, plus inside railway shipping docks which have a capacity for more than 76 freight cars.

The plant is completely conveyor equipped. The body building, paint, trim, chassis and final assembly lines total over 20,000 feet in length. These main lines are served by 54,850 feet of auxiliary conveyors which deliver parts and materials from sub-assembly departments. In all, there are more than 18 miles of floor and overhead conveyor which eliminate a vast amount of expensive, time-consuming handling of materials. Kaiser-Frazer subsidiary plants—The Detroit Engine Division and Dowagiac Foundry—supply Willow Run with engines and gray iron castings.

A progressive industrial relations program which embodies a unique Social Security Fund has resulted in eminently harmonious relations between Kaiser-Frazer and its many employees at Willow Run and at subsidiary plants. Production interruptions due to strikes have been rare and employee productivity has been superior.

The huge weekly payroll which flows into retail and commercial establishments from Willow Run has vitally stimulated population and real estate growth in the Willow Run-Detroit area.

To facilitate the procurement of scarce materials and to accelerate the movement of trouble-shooting executives and expeditors, Kaiser-Frazer makes constant use of its fleet of five airplanes. A staff of 19, including pilots and ground crew, operate the planes on an efficient 24 hour schedule. In 1947, these five planes carried key personnel and "Dangerous Production Shortage" cargo for a total of 1,417,566 air miles. The air fleet is based at Willow Run Airport which is at the mammoth plant's back door.

In March of this year the beautiful new Retail Customer Drive-away Building was dedicated. The frame and flag-stone structure, located on wooded acreage adjoining the huge factory, has been established for the use of customers who wish to take factory delivery on their new cars to save transportation costs.

Visitors to Willow Run tour the plant on an electric "Buffalo Train" which carries 46 passengers plus the guide. The guide explains the plant operations over a public address system connected to speakers located in the center arm rest of each car. There are several tours every day except Saturday and Sunday. Special tours for groups may be arranged. During 1947 a total of 23,311 visitors went through the great plant on the "Buffalo Train".

FRAZER SERVICE

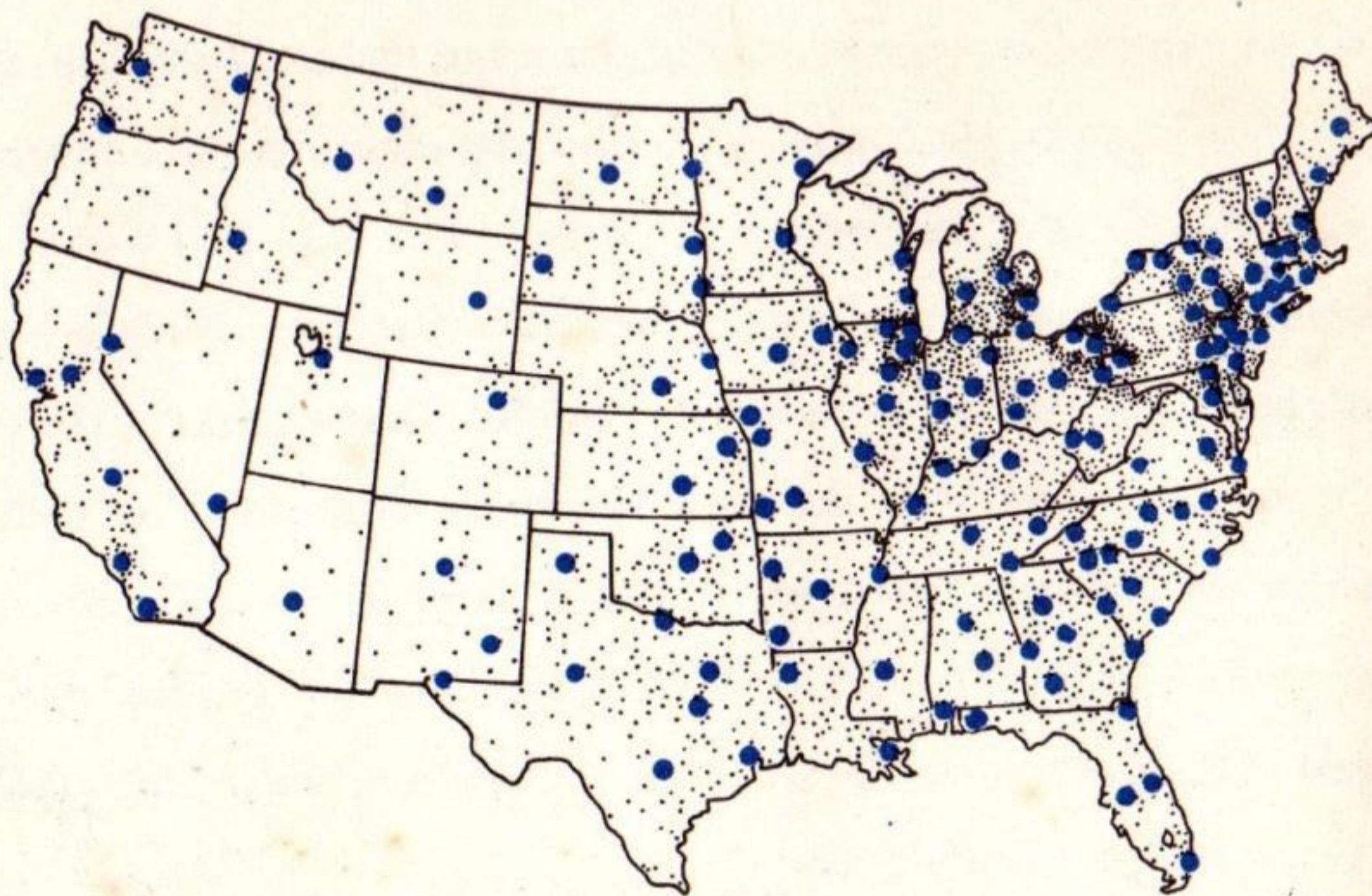


Modern motor car design, with its emphasis on maximum efficiency of component function has revolutionized maintenance and service procedures.

In the not too distant past the motorist was not very critical of car performance beyond its ability to start and run. The mechanic had few factory specifications to guide him. Spark plugs were set with a thin dime, distributor points with a calling card, and valves more or less at the mechanics' discretion.

The discriminating owner of a modern fine car insists on the continued superlative performance inherent in his car and realizes that this performance is assured by the application of modern service methods and the use of modern test equipment.

Frazer Service is as modern and efficient as the car itself. It is firmly based on excellently equipped service shops manned by expert, factory



trained mechanics. Wherever a Frazer owner travels throughout the United States or Canada he will find authorized Frazer Service and Factory Approved Parts at his disposal.

In order to provide the high service standards insisted upon by the Kaiser-Frazer Sales Corporation a Service School has been established at Willow Run at which key service personnel of all distributors and dealers are trained in the servicing of Frazer cars. This school is completely equipped with modern service devices and training aids and is staffed by experienced instructors. In addition to the intensive course given at the factory, Factory Field Representatives and Distributor's Field Service men continue to carry on instruction right on the job in each dealer's shop.

This extensive training program is the Frazer owner's assurance that he will secure the same efficient, high quality service in every city and town he may visit.

A.M.A. UNIFORM WARRANTY

FRAZER
OWNER
SERVICE POLICY

Name _____

Address _____

City _____ State _____

Model _____

Serial No. _____

Engine No. _____

Key No. _____

Delivery Date _____

Policy Issued By _____

PART NO. 755643 LITHO IN U. S. A.

OWNER IDENTIFICATION CARD

This is to certify that _____

Took delivery of a Frazer car _____ 19____

From _____ ON _____

and is entitled to receive PROMPT, EFFICIENT AND COURTEOUS service from any AUTHORIZED FRAZER DISTRIBUTOR OR DEALER in accordance with the terms of the Frazer Owner Service Policy.

Owner's Signature _____

"The Manufacturer warrants each new motor vehicle manufactured by it to be free from defects in material and workmanship under normal use and service, its obligation under this warranty being limited to making good at its factory any part or parts thereof, including all equipment

or trade accessories (except tires) supplied by the Motor Vehicle Manufacturer, which shall, within ninety (90) days after making delivery of such vehicle to the original purchaser or before such vehicle has been driven four thousand (4,000) miles, whichever event shall first occur, be returned to it with transportation charges

prepaid, and which its examination shall disclose to its satisfaction to have been thus defective; this warranty being expressly in lieu of all other warranties expressed or implied and of all other obligations or liabilities on its part, and it neither assumes nor authorizes any other person to assume for it any liability in connection with the sale of its vehicles.

"The Warranty shall not apply to any vehicle which shall have been repaired or altered outside of an authorized Frazer Service Station in any way so as, in the judgment of the Manufacturer, to affect its stability or reliability, nor which has been subject to misuse, negligence or accident."

CONTENTS

	PAGE NO.
INTRODUCTION	
Willow Run (Illustration)	2
Letter From Mr. Cooper	3
The Story of Willow Run	4
FRAZER SERVICE	6
A.M.A. Uniform Warranty	7
KNOW YOUR INSTRUMENTS AND CONTROLS	
Outside Door Handle	10
Inside Door Lock	10
Fuel Gauge	11
Ammeter	11
Speedometer	11
Oil Pressure Gauge	11
Temperature Gauge	12
Instrument Panel Light Switch	12
Overdrive Control	12
Ignition Lock	12
Starter Switch	12
Headlight Switch	13
Headlight Dimmer Switch	13
Cigarette Lighter	13
Horn Ring	13
Windshield Wiper Control	13
Clutch	14
Gearshift Lever	14
Directional Signal Lever	14
Brake	14
Hand Brake	14
Front Seat Adjustment	15
Map Light	15
Dome Lamp	15
Hood Lock	15
Blower Switch	16
Glove Compartment Lock	16
Air Conditioner Controls	16
Ash Receiver	16
Radio Controls	16
STARTING ENGINE	17
Starting Instructions	17
The Right Gasoline	17
BREAK-IN INFORMATION	
LUBRICATION	
Authorized Lubrication	18
Engine Lubrication	18
Oil Filter	19
Air Cleaner	19
Chassis Lubrication	20
Lubrication Chart	Center Spread

ELECTRICAL SYSTEM COMPONENTS	PAGE NO.
Battery.....	21
Generator.....	21
Fan Belt Adjustment.....	21
Distributor.....	22
Spark Plugs.....	22
Lights.....	22
Light Bulb Chart.....	23
Fuse Chart.....	23
Frazer Electrical System.....	24 and 25
F-4951 Wiring Diagram.....	26
COOLING SYSTEM	
Capacity.....	27
Water Pump.....	27
Radiator Cap.....	27
Draining and Cleaning.....	27
Fan Belt Adjustment.....	28
Anti-Freeze Chart.....	28
BRAKES	
Adjustment.....	29
CLUTCH	
Adjustment.....	30
TIRES	
Size and Pressure.....	31
Balancing.....	31
Wheel Alignment.....	31
Switching Tires.....	31
Tire Chains.....	32
Changing Tires and Wheels.....	32
CAR CLEANING HINTS	33
ACCESSORIES	
Radio.....	35
Heater.....	36
INSIDE INFORMATION	
Cooling System.....	37
Engine Lubrication System.....	38
Transmission.....	39
Overdrive.....	40
Truline Steering.....	41
Brakes.....	42
Engine.....	43
Electrical System.....	44
GENERAL SPECIFICATIONS	46
WHEN IN TROUBLE	47
IDENTIFICATION	
Car Identification and License Data.....	48

**STUDY THESE PAGES
CAREFULLY—TO GET
FULL ENJOYMENT
FROM YOUR FRAZER**

KNOW YOUR INSTRUMENTS AND CONTROLS

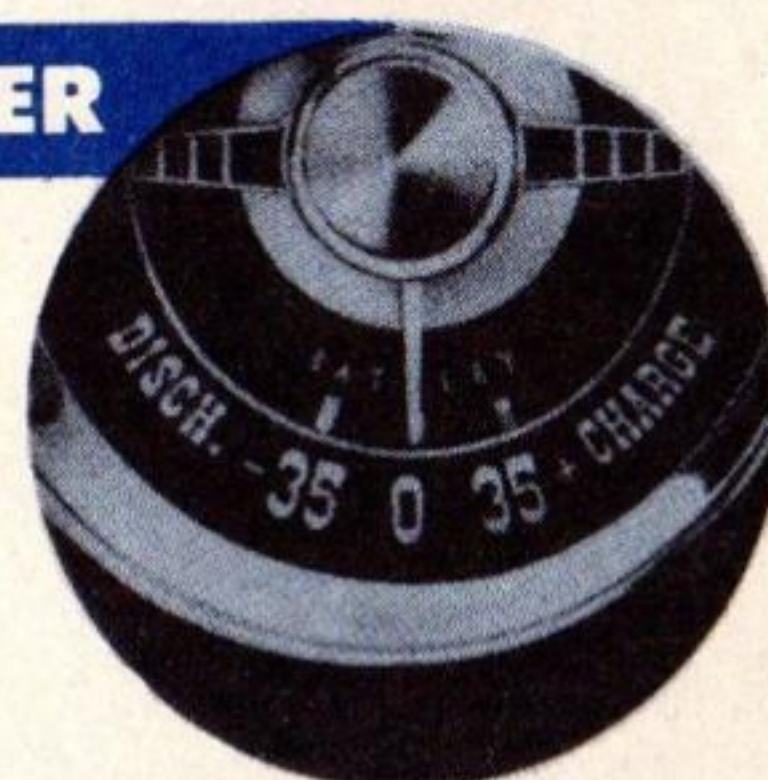
FUEL GAUGE

The fuel gauge is an electrical unit operating from a float in the gasoline tank. It will indicate the amount of fuel in the tank either when the engine is running or when the ignition switch is turned to the "accessory" position. This feature permits you to check your fuel level without energizing the ignition circuit.



AMMETER

The ammeter indicates whether the battery is being "charged" or "discharged". Indications of various degrees of "charge" or "discharge" are normal but the ammeter should return to "zero" with continued operation of the car. Excessive fluctuations or continued indications of "charge" or "discharge" are abnormal and the cause should be immediately investigated.



SPEEDOMETER

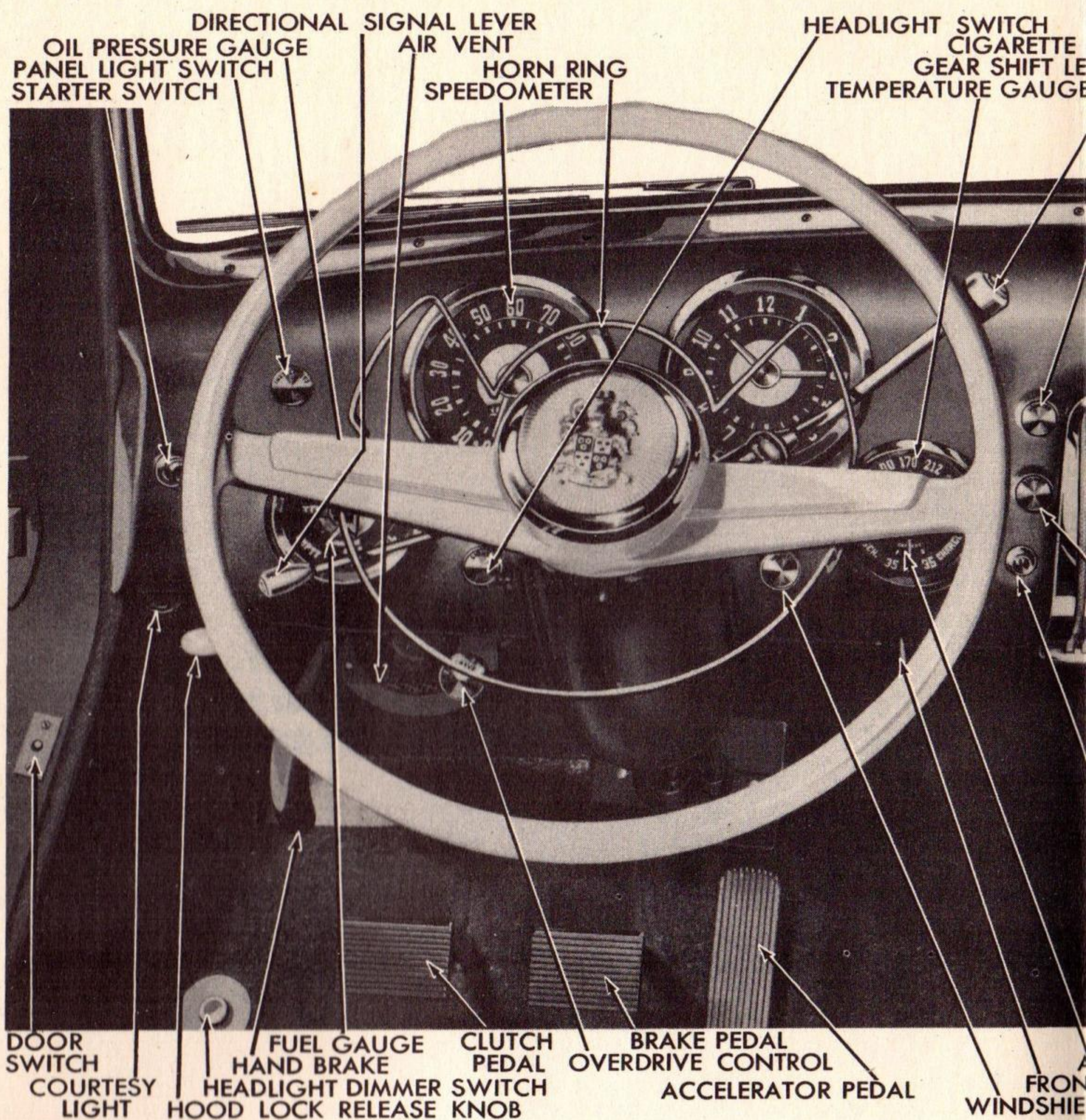
The speedometer is provided with a continuous reading mileage recorder. A headlamp "high beam" indicating lamp (red) is located between the "0" and "120" MPH markings. A right turn indicating lamp (green) is located between the "70" and "80" MPH markings and a left turn indicating lamp (green) is located between the "40" and "50" MPH markings.



OIL PRESSURE GAUGE

The oil pressure gauge indicates the pressure under which oil is being delivered to the engine lubrication system. Normal oil pressure should be approximately 35 pounds at 30 miles per hour when using SAE 10 or 20 engine oil and after the engine has reached normal operating temperature. At speeds below 30 miles per hour the gauge will read proportionately lower, however some oil pressure should be indicated even at engine idle. If engine oil pressure varies greatly from the foregoing an immediate investigation should be made as to the cause.

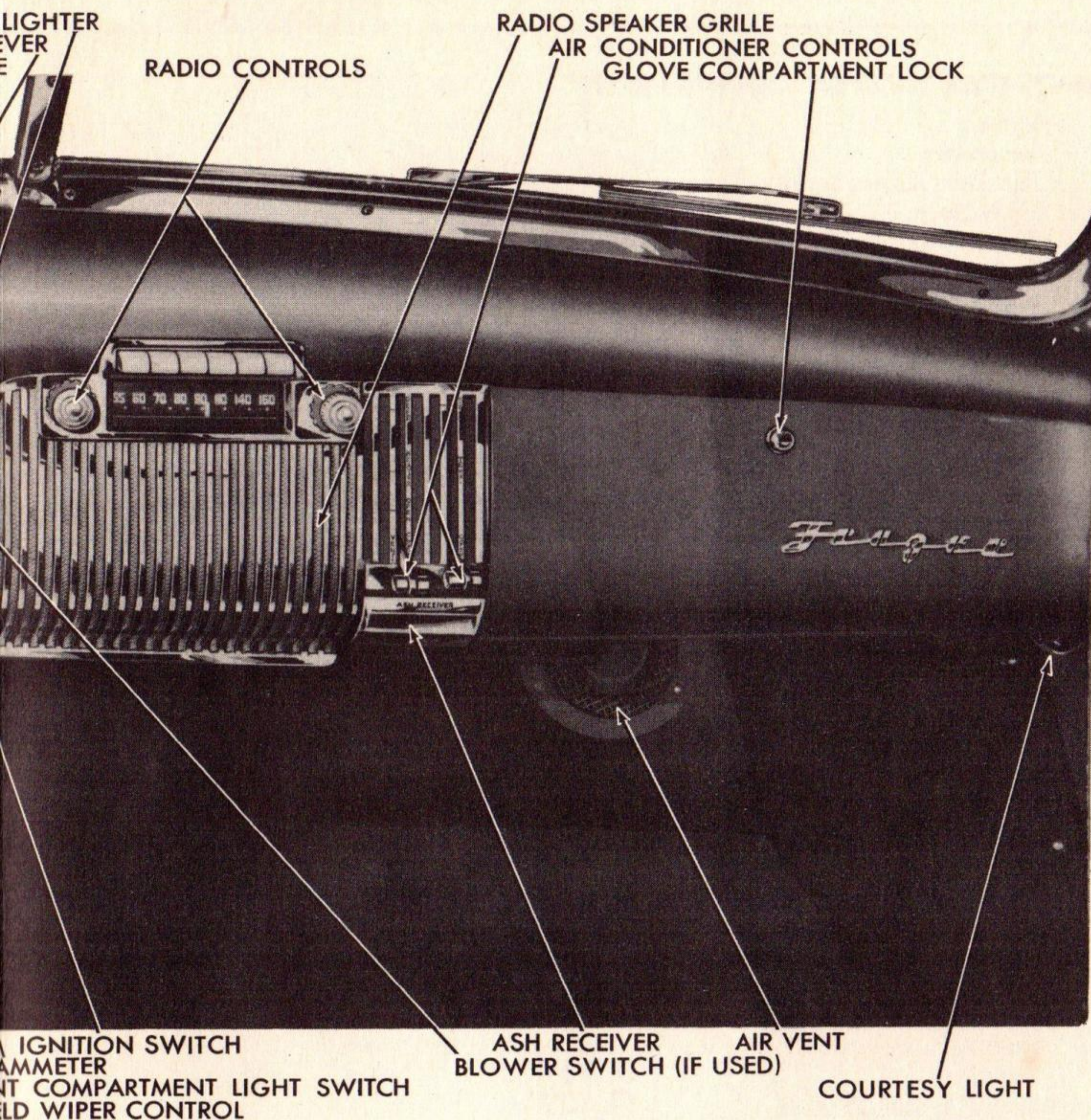




OUTSIDE DOOR HANDLE

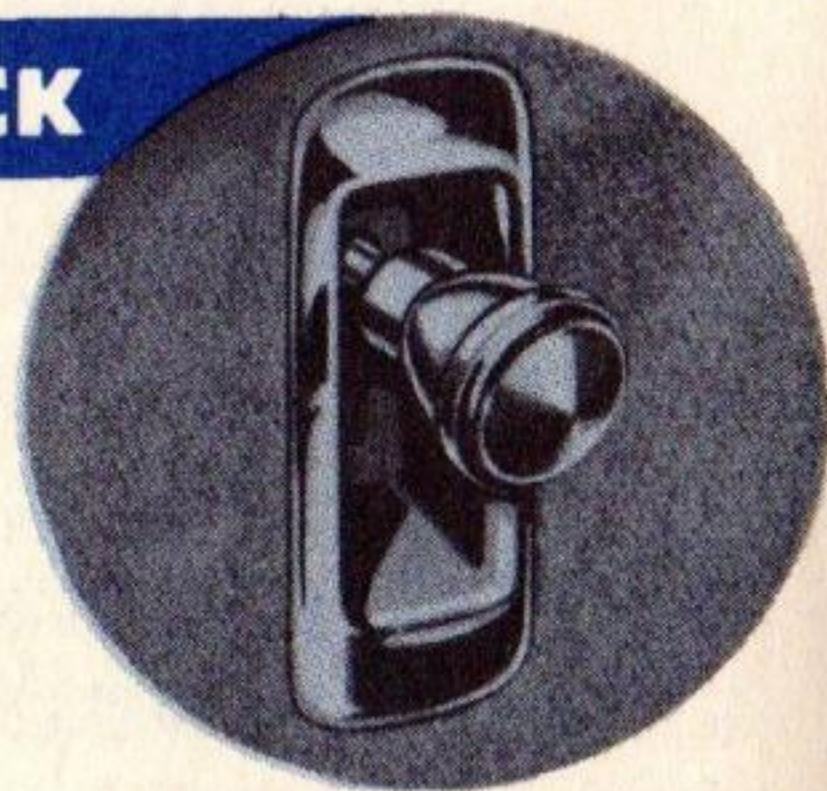
Both front doors are provided with "pin tumbler" type locks located below the outside door handles and operated by the ignition and door key. It is not necessary to "twist" or "squeeze" the door handle to open the door. A slight pull on the door handle will trip the lock and open the door.

NEVER LEAVE YOUR CAR UN

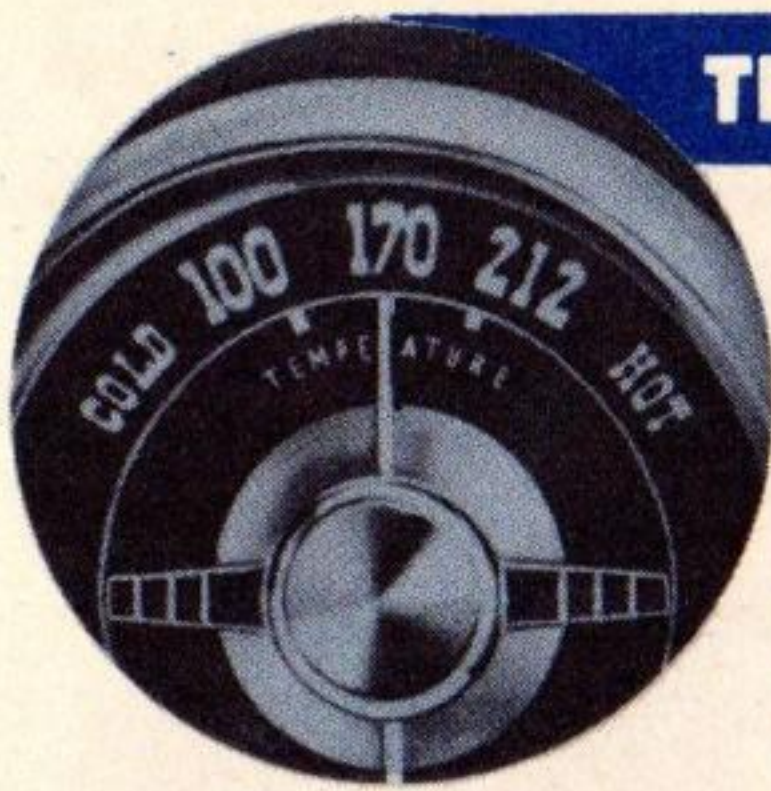


INSIDE DOOR LOCK

All doors may be locked from the inside by simply depressing the locking levers. For your safety and the safety of your passengers, no door can be opened from either the inside or outside when these locking levers are depressed. The doors are opened from the inside by finger-tip pressure on the door opening button.



LOCKED WHEN UNATTENDED!



TEMPERATURE GAUGE

The temperature gauge indicates the temperature of the coolant in the engine. Normal coolant temperature should be approximately 170° F except in extremely hot weather or when the engine is operated at continuous idle. Under these conditions the gauge may register nearer to the "hot" side. This condition need not cause alarm as the "pressurized" cooling system will prevent boiling or coolant losses up to temperatures of 225° F.



INSTRUMENT LIGHT SWITCH

The entire group of instruments and the radio are indirectly lighted and the amount of lighting is controlled by the combination panel light switch and rheostat.



OVERDRIVE CONTROL

To operate the car with overdrive, push the control button all the way "in." To operate the car in "conventional" gear, pull the control button all the way "out." If the car is in motion, reduce the speed below the overdrive cut-in point (approx. 25 MPH) and disengage the clutch before operating the control button.



IGNITION LOCK

The ignition lock is a three position rotary switch with "off" in the center. When turned to the left or "accessory" position it permits you to operate your radio, heater blower or other electrical accessories without energizing the ignition coil. When turned to the right or "ignition" position the same circuits are closed with the addition of the engine ignition. The ignition key cannot be removed until turned to the center or "off" position.



STARTER SWITCH

The starter switch is a "push button" type switch used to operate the "starter relay" which carries the heavy current necessary to operate the cranking motor.

HEADLIGHT SWITCH

The headlight switch is "push-pull" type. Pulling the switch knob out to the first position turns on the parking and tail lights.

Pulling the knob out to the second position turns on the headlights and the tail lights.



HEADLIGHT DIMMER SWITCH

The headlight dimmer switch is a foot-operated switch that transfers the headlights from "high" to "low" beam and vice versa. When the headlights are on "high" beam a red warning lamp is lighted in the speedometer face between the "0" and "120" M.P.H. markings. *Do not subject approaching cars to your "high" beam lights.*



CIGARETTE LIGHTER

The cigarette lighter is the automatic "pop out" type. To use the lighter push it in to its contact making position. It will remain in this position until the heating element is red hot (about 10 seconds) when it will pop out to its normal position with an audible "click". Do not hold the lighter in the "in" position.



HORN RING

To provide maximum accessibility and ease of operation the horn is operated by means of a large ring on the steering wheel. Finger tip pressure any place on the ring tilts the ring and makes electrical contact to blow the horns.



WINDSHIELD WIPER CONTROL

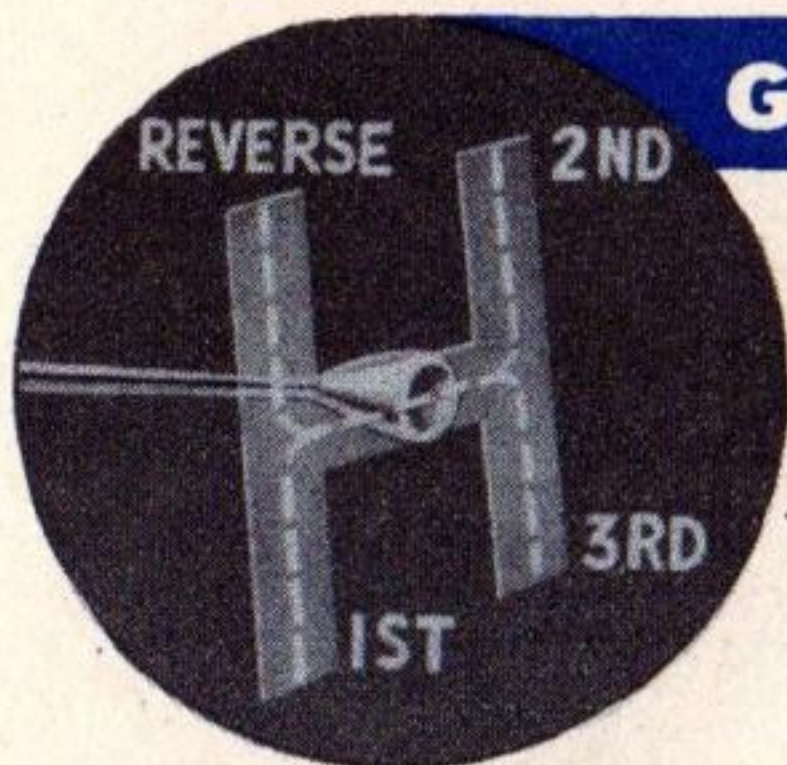
Turning the windshield wiper control knob approximately $\frac{1}{4}$ turn to the right allows maximum speed of the wiper motor. Turning the knob back toward the "off" position reduces the speed of the wiper motor and permits adjustment to suit various weather conditions.





CLUTCH PEDAL

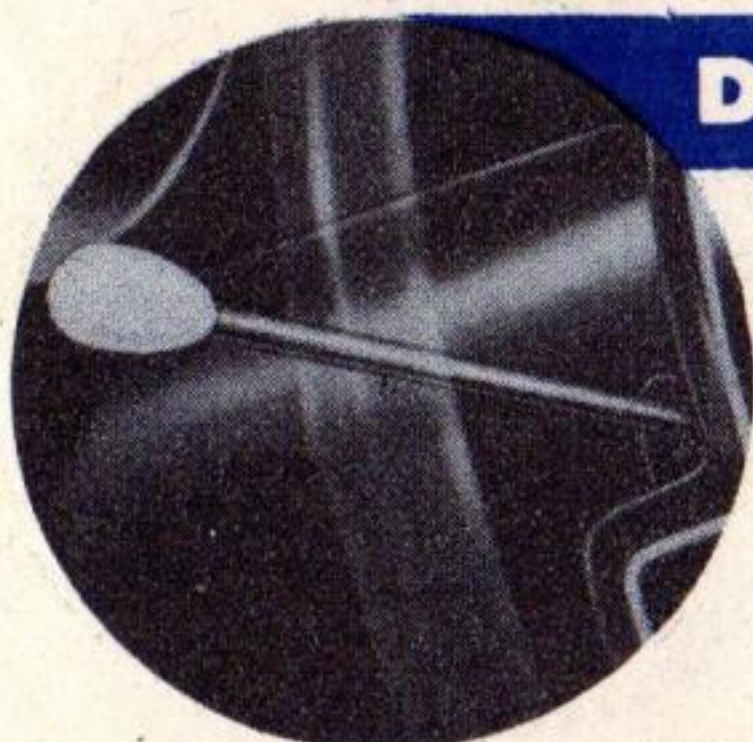
The clutch pedal provides the manual engagement between the engine and the transmission. Release the clutch slowly and evenly to insure smooth acceleration when starting the car and when shifting gears. This will reduce strain on the engine, transmission, and rear axle and will avoid scuffing the tires.



GEAR SHIFT LEVER

The function of the gear shift lever is to mechanically mesh the transmission gears (with the assistance of the clutch) in any of the three forward or one reverse gear ratios.

The movement of the gear shift lever may be described as confined to the form of the letter "H" so positioned that the center bar of the "H" is in line with the steering column.



DIRECTIONAL SIGNAL LEVER

For your convenience in signalling a turn the car is equipped with intermittent (flasher type) directional lamps, at the front and rear of the car, operated by the small lever opposite the gear shift lever.



BRAKE PEDAL

The brake pedal operates the "master cylinder" in the hydraulic braking system, to operate the individual brake cylinders in each wheel and engage the brake shoes with the brake drum. Reserve brake operation to the times when it is really necessary and allow the engine to brake the car in normal deceleration or gradual stopping to obtain maximum wear from the brake linings.



HAND BRAKE

A hand operated brake is provided for your safety and convenience. This brake operates on the rear wheel brake shoes through mechanical linkage and is applied by a slight pull on the brake handle. The brake is released by a slight squeeze on the trigger in the handle.

Always set this hand brake when the car is unattended.

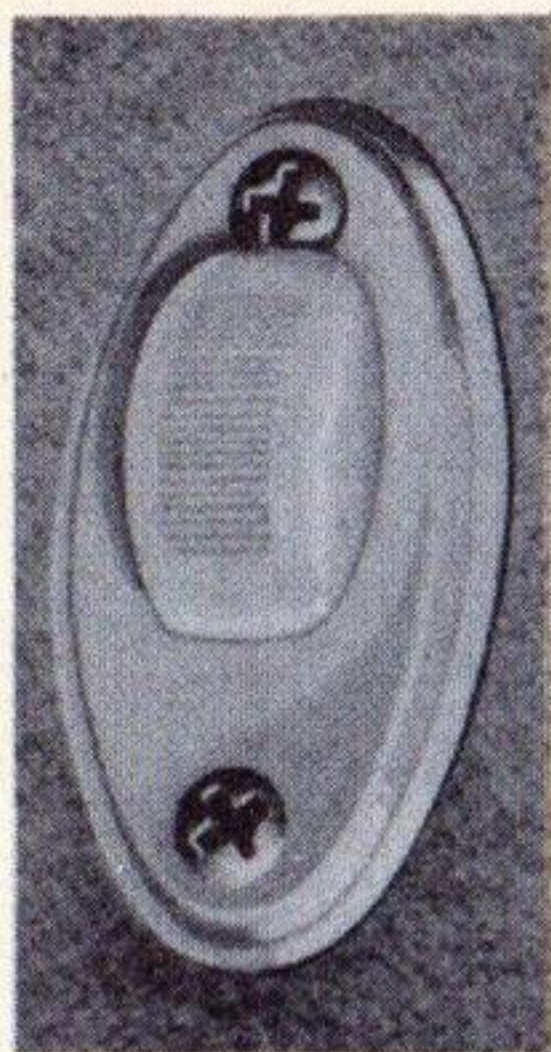
FRONT SEAT ADJUSTMENT

Front seat positioning is accomplished by finger tip pressure on the adjusting lever on the driver's side of the front seat—merely raise the lever and slide the seat to the desired position. Releasing the lever automatically locks the seat at that position.



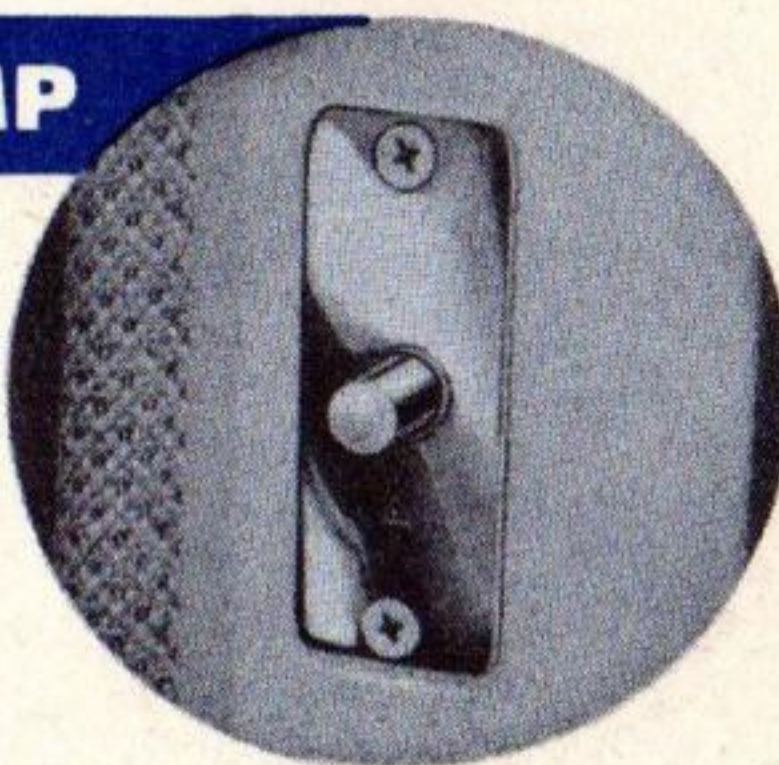
COURTESY LAMP SWITCH

The front compartment is lighted by two lamps located underneath the dash at each side. These lamps are operated by the small toggle switch on the lower edge of the dash. On the Frazer Manhattan, these courtesy lamps also are automatically operated by switches in the body pillars, when either of the front doors is opened.



DOME LAMP

The rear compartment is lighted by a dome lamp in the head lining. This lamp is automatically lighted, by switches in the body pillars, when either of the front doors, or the right rear door is opened. It is also manually operated by a toggle switch in the left hand body pillar. On the Frazer Manhattan, the automatic operation of the dome lamp is from both rear doors.



HOOD LOCK

To protect engine components and accessories from theft, the hood cannot be opened until the hood latch is released from inside the car. As an added precaution for your safety the hood is provided with an auxiliary latch to prevent accidental opening of the hood when the car is in operation.

To open the hood pull out the control beneath the instrument panel, raise the hood slightly and depress the auxiliary latch located under the hood nose.





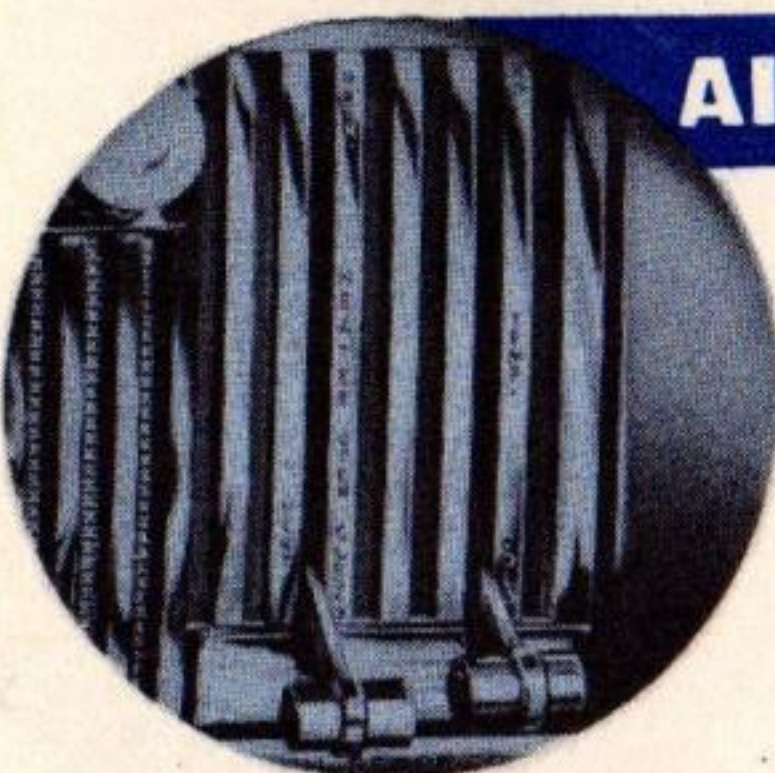
BLOWER SWITCH

The blower switch controls the operation of the blower in the heating system. For a more complete description of blower operation see "Air Conditioner" in the accessory section.



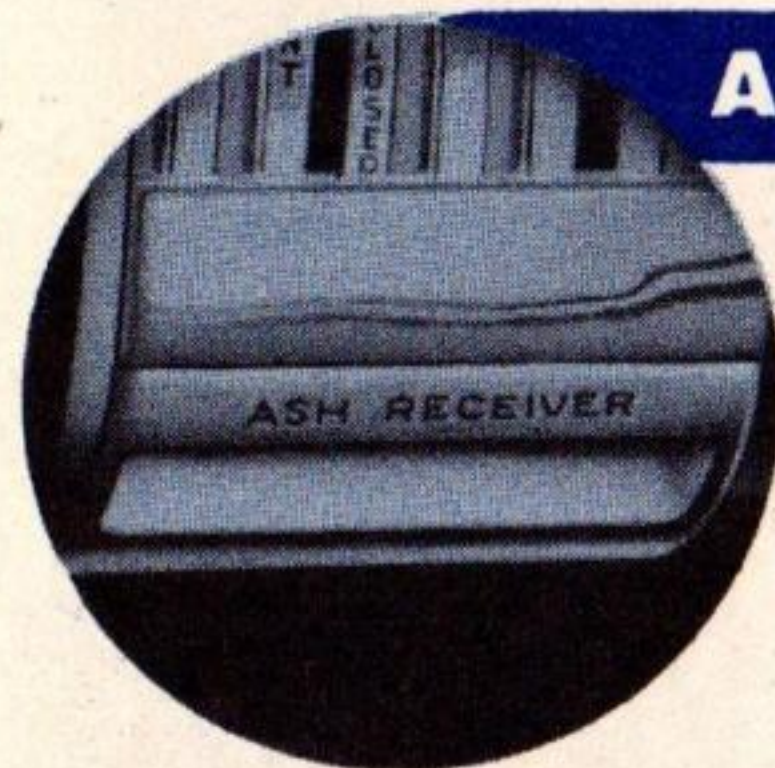
GLOVE COMPARTMENT LOCK

The glove compartment lock is contained in the opening knob and is operated by the rear compartment lid key.



AIR CONDITIONER CONTROLS

The "air vent" control lever operates the dampers in the heater duct system. The "temperature" control lever adjusts the setting of the automatic thermostat in the heater. For a more complete description of these controls see "Air Conditioner" in the accessory section.



ASH RECEIVER

The ash receiver is conveniently located for both the driver and front seat passenger. To use, simply pull out—to empty, push down on ash plate and pull drawer completely out.



RADIO

The radio is provided with versatile controls for volume, tone and station selection. For a more complete description, see "Radio" in the accessory section.

STARTING THE ENGINE

The inherent quality in the design of the Frazer engine and engine auxiliary components assures prompt easy starting in even the coldest weather if the following few simple instructions are observed.

When starting the engine always depress the clutch pedal and hold in this position until the engine has started and has run for a few seconds.

Turn the ignition switch to the "on" position (to the right), depress the accelerator pedal slightly and press the starter switch with the finger. "Choking" of the engine is accomplished automatically by the "climatic control" mechanism. As soon as the engine starts, release the accelerator as much as is practical to avoid "racing" the engine.

Should repeated attempts fail to start the engine, flooding of the engine may result. If this occurs, depress the accelerator pedal slowly and *completely* to the floor board. This will override the automatic function of the "climatic control" and open the choker valve to admit the maximum amount of air to the intake system. With the accelerator pedal held in this position, press the starter button to crank the engine until it starts.

THE RIGHT GASOLINE

The Frazer engine is factory adjusted to give maximum performance and efficiency with the use of all so-called "regular" grades of gasoline. However, the superior performance characteristics of "premium" fuels makes their use desirable and justifies their slightly higher cost.

The gasoline tank filler cap is located under the hinged lid in the left rear fender. Do not fill the gasoline tank to "overflowing" as this is conducive to gasoline loss, especially in hot weather when high temperatures cause considerable expansion of the gasoline.

THE FIRST 2500 MILES

IMPORTANT

The care you give your car during the break-in period will influence its entire life!

The first 2500 miles can be the hardest miles in your car's life, unless care is exercised during this break-in period. Failure to follow the simple, but fundamental rules of proper break-in may result in permanent damage.

DO NOT RACE THE ENGINE AVOID UNNECESSARY SPEED IN LOW AND SECOND GEARS

BREAK-IN SPEEDS

0 to 400 miles DO NOT EXCEED 40 MPH
400 to 600 miles DO NOT EXCEED 50 MPH
600 to 1000 miles DO NOT EXCEED 60 MPH

**DO NOT DRIVE AT SUSTAINED SPEEDS ABOVE 60 MPH
FOR THE FIRST 1000 TO 2500 MILES.**

LUBRICATION

Modern automotive design, emphasizing smooth efficient operation and maximum comfort, has made engine and chassis lubrication a specialized function.

A very definite plan of procedure, to provide your car with the proper lubricant, in the proper amount, in the proper places, at the right time is necessary to assure the excellent performance inherent in your car and to promote its long life and satisfactory operation.



AUTHORIZED LUBRICATION

Your Kaiser-Frazer Dealer is prepared to service your car with the specialized knowledge, equipment and lubricants to give you the maximum efficiency, ease of operation and riding comfort which are built-in to your car.

ENGINE LUBRICATION

Efficient engine performance is dependent to a considerable degree upon the proper type and grade of oil to meet the operating conditions which are imposed on the engine.

When the car is delivered to you the crankcase is filled with the proper oil. At the first and second oil changes (1000 and 2000 miles) use SAE 10 or 10W.

Under normal operating conditions subsequent oil changes should be made every 2000 miles using the type and grade of oil recommended in the lubrication chart.

If the car is operated under extremely dusty conditions or for short periods at low speed in cold weather, the engine oil should be changed more frequently.

Normal by-products of combustion are water and other substances which when combined form corrosive mixtures. Under normal operating conditions these undesirable products of combustion are exhausted from the crankcase in a gaseous or vapor form before they can do any damage to the engine.

In cold weather operation, especially for short distances, which do not allow the engine to reach normal operating temperature, there is a greater tendency for the formation and retention of these by-products of combustion in the crankcase. Therefore it is important that the engine oil be changed more frequently when operating under such conditions.

Inasmuch as operating conditions are so variable it is difficult to establish hard and fast rules for changing engine oil and when operating a car under other than normal conditions the operator should exercise his judgment, supplemented by examination of the condition of the oil to determine when the oil should be changed.

It should always be remembered that engine oil is relatively inexpensive compared to the cost of repairs occasioned by inadequate lubrication.

DIPSTICK

The capacity of the engine lubrication system is five quarts (exclusive of the oil filter). This amount of oil will bring the level to the top mark on the dipstick. The oil level should never be allowed to drop below the lower mark on the dipstick. When the oil level approaches the lower mark on the dipstick one quart of oil is sufficient to bring the oil level up to or near the upper mark. No advantage is gained by overfilling the crankcase. Check the oil level frequently and keep the level between the upper and lower marks on the dipstick.



TEMPERATURE CHART

For the first two oil changes (1000 and 2000 miles) use SAE 10 or 10W
+32° F and above use SAE 20
+32° F to +10° F use SAE 20 or 20W
+10° F to -10° F use SAE 10 or 10W
Below -10° F use SAE 10 or 10W plus 10% colorless refined kerosene.

OIL FILTER

The filter element in the oil filter should be replaced approximately every 10,000 miles—more frequently if examination of the engine oil so indicates. Replacement of the filter cartridge should be made coincident with an oil change. It should be remembered that approximately one quart of oil is contained in the filter element, and when the element is replaced, an extra quart of oil will be necessary (six quarts in all) to bring the oil to the proper level.



CARBURETOR AIR CLEANER

The oil bath type air cleaner should be inspected periodically and quite frequently if operating under dusty conditions. Wash filter element thoroughly in kerosene, empty and clean oil reservoir. Refill to indicated level with engine oil. For temperatures above freezing use SAE 50—below freezing use SAE 20.



CHASSIS LUBRICATION

In order to retain the excellent characteristics built in to your car—safety, stability, economy, riding comfort and ease of operation, it is necessary to insure proper periodic lubrication of the chassis.

Your Kaiser-Frazer Dealer has the specialized knowledge, equipment and lubricants to perform this service for your car.

For your guidance a copy of the complete lubrication chart is contained in this manual.

The following schedule is a condensation of the recommended maintenance procedures for the chassis.

1,000 MILES

Tie Rod Joints	Semi-fluid Chassis Lubricant	2 fittings each side
Upper Suspension	Semi-fluid Chassis Lubricant	4 fittings each side
King Pin	Semi-fluid Chassis Lubricant	2 fittings each side
Drag Link	Semi-fluid Chassis Lubricant	2 fittings
Lower Suspension	Semi-fluid Chassis Lubricant	3 fittings each side
Steering Idler Arm	Semi-fluid Chassis Lubricant	1 fitting
Gear Shift Bell Crank		
Support Shaft	Semi-fluid Chassis Lubricant	1 fitting
Brake Pedal Bearing	Semi-fluid Chassis Lubricant	1 fitting
Clutch Release Shaft	Semi-fluid Chassis Lubricant	1 fitting each side

2,000 MILES

Gear Shift Lever	Semi-fluid Chassis Lubricant	1 fitting
Transmission	Check and maintain level to filler hole	Fluid Gear Lubricant
Overdrive	Check and maintain level to filler hole	Fluid Gear Lubricant
Rear Axle	Check and maintain level to filler hole	Hypoid Gear Oil
Steering Gear	Check and maintain level to filler hole	Fluid Gear Lubricant

10,000 MILES

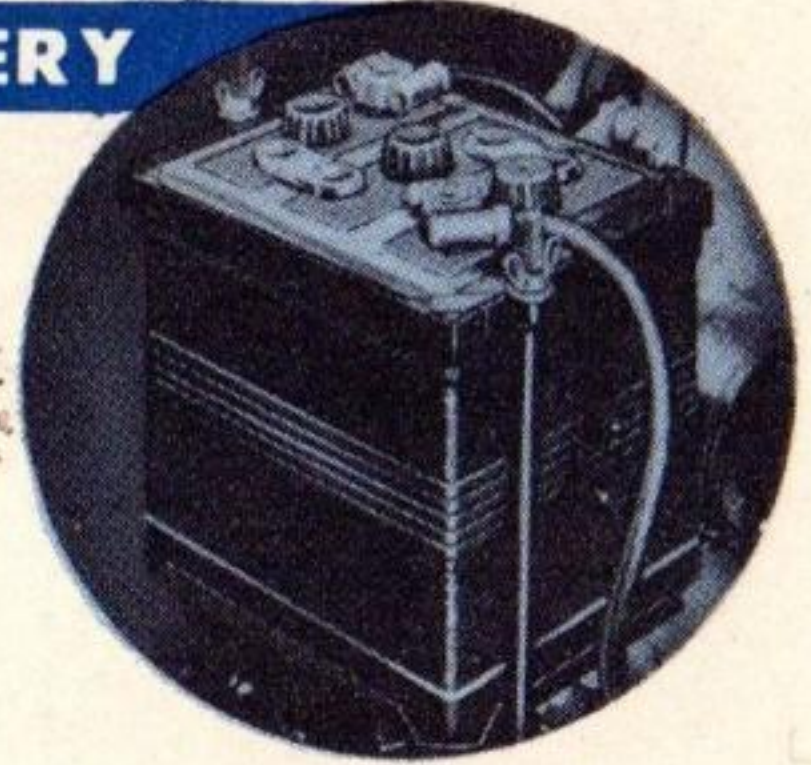
Front Wheel Bearings	Remove, clean and repack with fibre grease
Transmission	Drain, flush and refill with fluid gear lubricant
Overdrive	Drain, flush and refill with fluid gear lubricant
Rear Axle	Drain, flush and refill with hypoid gear lubricant
Rear Wheel Bearings	Remove plugs, insert grease fittings and inject ½ oz. fibre grease

20,000 MILES

Universal Joints	Disassemble, clean and repack with high melting point universal joint lubricant
------------------	---

ELECTRICAL SYSTEM

BATTERY



The battery requires little attention other than to keep the electrolyte at the proper level and the electrical connections clean and tight—however, these precautions are frequently neglected and often result in premature battery failures.

Keep the electrolyte at the desired level by following manufacturers recommendations which are in most instances at least $\frac{1}{4}$ inch above the plates. (Batteries are provided with automatic devices to prevent overfilling or level indicating marks.) Use distilled water if available—if not, good tap water that is clean and fit to drink may be used.

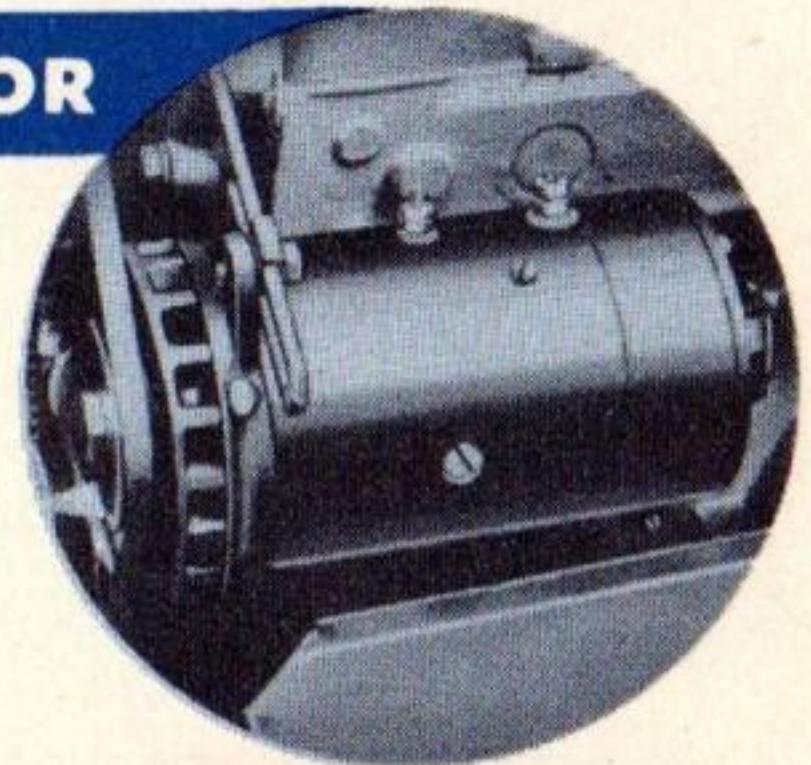
In hot weather, water will need to be added much more frequently to the battery.

Keep the electrical connections clean and tight.

Keep the battery hold-down clamps securely tightened to reduce vibration and resultant wear of internal parts to a minimum.

Keep a close check on the operation of the voltage regulator by observing the action of the ammeter. Indications of "charge" or "discharge" by the ammeter are not abnormal but the ammeter should return to or near "zero" with continued operation of the car. Prolonged, excessive indications of "charge" or "discharge" or excessive fluctuations of the ammeter are indications of misfunction and should be immediately investigated.

GENERATOR



The generator is a high capacity, shunt wound unit working in conjunction with a voltage regulator to control its output. The generator requires very little maintenance—the front and rear bearings should be oiled every 2000 miles with two drops of SAE 20 engine oil.

The brushes should be inspected every 10,000 miles. If the brushes are worn out, replace. Check the spring tension when the new brushes are installed. The spring tension should be from 35 to 53 ounces. If it is not, replace the springs.

The generator is driven by the engine fan belt and the correct belt tension should be maintained to assure satisfactory operation.

FAN BELT ADJUSTMENT

Loosen the generator adjusting bracket at the generator.

Loosen the generator mounting bolts. With a spring scale attached to the generator, adjust to a 15 pound pull on the scale *in line with the adjusting bracket* and retighten the mounting bolts and adjusting bracket.



DISTRIBUTOR

The distributor serves two purposes—the breaker points (operated by the cam) interrupt the primary ignition circuit to provide the high voltage spark required to jump the spark plug gap and fire the fuel charge in the cylinder. The distributor rotor distributes this high voltage impulse to the proper spark plug at the proper time to fire the cylinders in their proper sequence.

“Advance” and “retard” of the ignition to meet all operating requirements is automatically accomplished by the “centrifugal” and “vacuumatic” mechanisms that are part of the distributor.

Every 2000 miles the distributor cap should be removed and the cam lightly lubricated with semi-fluid chassis lubricant. At the same time one drop of SAE 20 engine oil should be applied to the breaker arm pivot and about 5 drops to the distributor oil cup.

Inspect the breaker points for evidence of wear or pitting—they may be dressed if necessary with a fine “contact point” file.

To adjust the breaker points, turn the engine by means of the fan until the distributor breaker arm rubbing block is on a high point of the cam and adjust the points to a .020-inch gap. Retime ignition.

SPARK PLUGS

For maximum efficiency spark plugs should be kept clean. Carbon deposits which form on or about the electrodes should be removed and the external porcelain should be wiped clean. Adjust spark plug gaps after cleaning to .032 inch. Make all adjustments on the side electrode. *Do not attempt to bend the center electrode.*

LIGHTS

Ample lighting both internal and external, is provided to assure maximum operational safety, convenience and comfort.

The headlights are powerful “Sealed Beam” units requiring no service other than external lens cleaning and periodic checking for proper aim. No dust or moisture can gain entrance to these units because the entire unit is hermetically sealed similarly to a large incandescent lamp. If the filament burns out the entire unit is easily replaceable. Each sealed beam unit is provided with two filaments so positioned in respect to the reflectors that by selection with the dimmer switch on the floor-board the beam may be raised or lowered as desired.

When the headlights are in the “high beam” position, a red lamp is lighted on the speedometer face between the “0” and “120” M.P.H. markings.

An additional feature for your safety and convenience is the use of a circuit breaker, rather than a conventional fuse, in the headlight circuit. In the event of a “ground” or “short circuit” in the headlight circuit (or other units protected by it) this feature permits intermittent operation until the trouble clears or is corrected at which time the circuit breaker will automatically return and stay in the normally closed position.

LIGHT BULBS

The accompanying chart lists the various light bulbs used on "49" models together with their candle-power ratings and trade numbers.

LAMP CHART

USE	TRADE No.	C. P.	No. USED
Headlamp	4535	45W 35W	2
Parking	63	3	2
Parking and Direction	1158	21-3	2
Rear Direction	1129	21	2
Stop and Tail	1158	21-3	2
License	63	3	1
Trunk	63	3	1
Dome	1129	21	1
Courtesy	81	6	2
Instrument Panel	55	2	4
Hi Beam Ind.	51	1	1
Glove Box	55	2	1
Direction Ind.	51	1	2
Ignition Switch	51	1	1
Fog Lamp	4015A	30W	2
Spotlamp	4535 and 4515	30W	1 or 2
Backup Lamp	1129	21	1 or 2
Radio Dial	55	2	2
Clock	55	2	2
Trouble	88	15	1

FUSES

The electrical circuits are protected against overload by the use of an automatic-reset circuit breaker. Accessories are protected by fuses.

The accompanying chart lists the various fuses used on "49" models together with their ampere ratings and trade numbers.

FUSE CHART

USE	AMPS.	TRADE TYPE
Headlamp (Circuit Breaker)	30	
Overdrive	20	SFE-20
Heater	14	SFE-14
Radio	14	SFE-14
Fog Lamp	20	SFE-20



KAISER

LUBRICATION

● 1,000 MILES

● 2,000 MILES



FRONT WHEEL BEARING

Remove, clean and repack with FIBRE GREASE NLGI No. 2.



TIE-ROD JOINTS

2 Fittings, each side. Use SEMI-FLUID CHASSIS LUBRICANT NLGI No. 1. Below 32° F. Use No. 0.



OIL FILTER

Change Cartridge every 10,000 miles, or oftener, if dip stick shows dirty oil.



UPPER SUSPENSION

4 Fittings, right side. Use SEMI-FLUID CHASSIS LUBRICANT NLGI No. 1. Below 32° F. Use No. 0.



KING PIN

2 Fittings (upper & lower), left side. Use SEMI-FLUID CHASSIS LUBRICANT NLGI No. 1. Below 32° F. Use No. 0.



CARBURETOR AIR CLEANER

Wash element thoroughly in KEROSENE. Empty and Clean Reservoir, then refill to indicated level with ENGINE OIL. S.A.E. 30, above 32° F. S.A.E. 20, below 32° F.



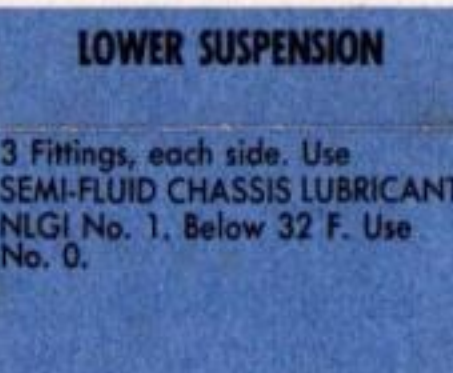
ENGINE OIL

For first two oil changes (1,000 & 2,000 miles) Drain, Flush and Change ENGINE OIL every 1,000 miles. Above +32° F. and above +32° F. to +10° F. Use S.A.E. 30. Below +10° F. to -10° F. Use S.A.E. 20. Below -10° F. Use S.A.E. 10. plus 10% COLOR KEROSENE.



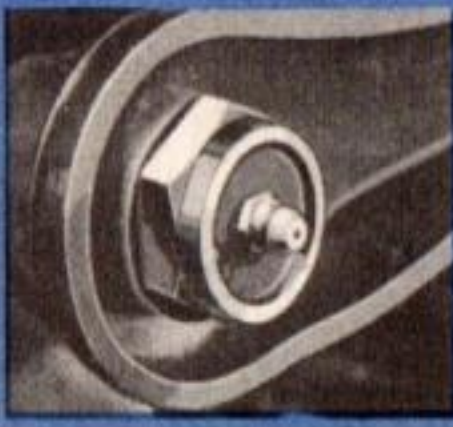
DRAG LINK

2 Fittings Use SEMI-FLUID CHASSIS LUBRICANT NLGI No. 1. Below 32° F. Use No. 0.



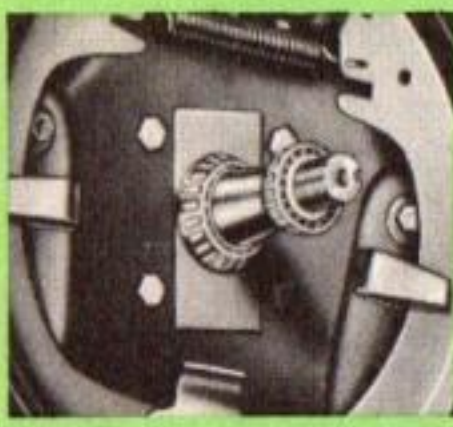
LOWER SUSPENSION

3 Fittings, each side. Use SEMI-FLUID CHASSIS LUBRICANT NLGI No. 1. Below 32° F. Use No. 0.



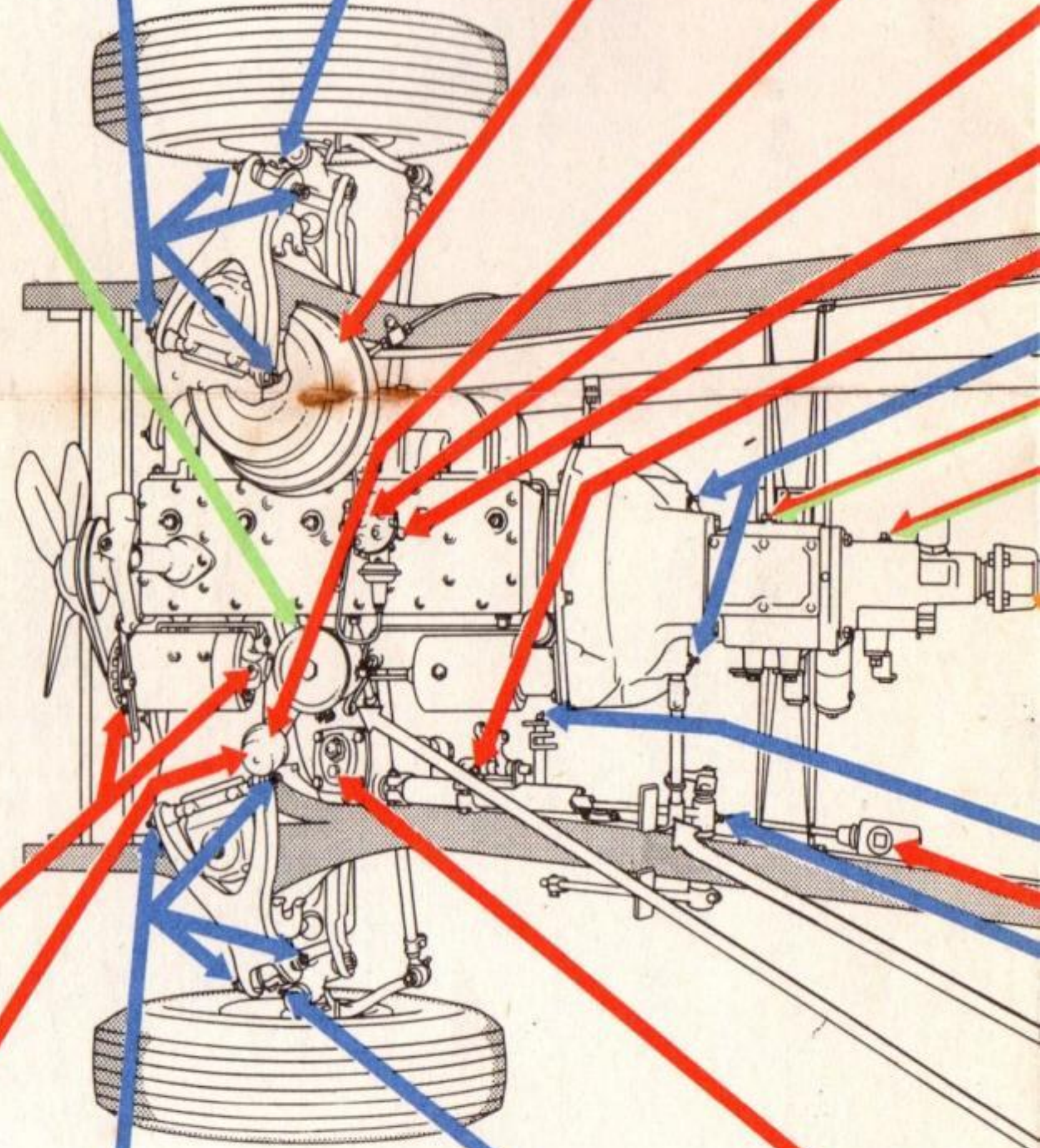
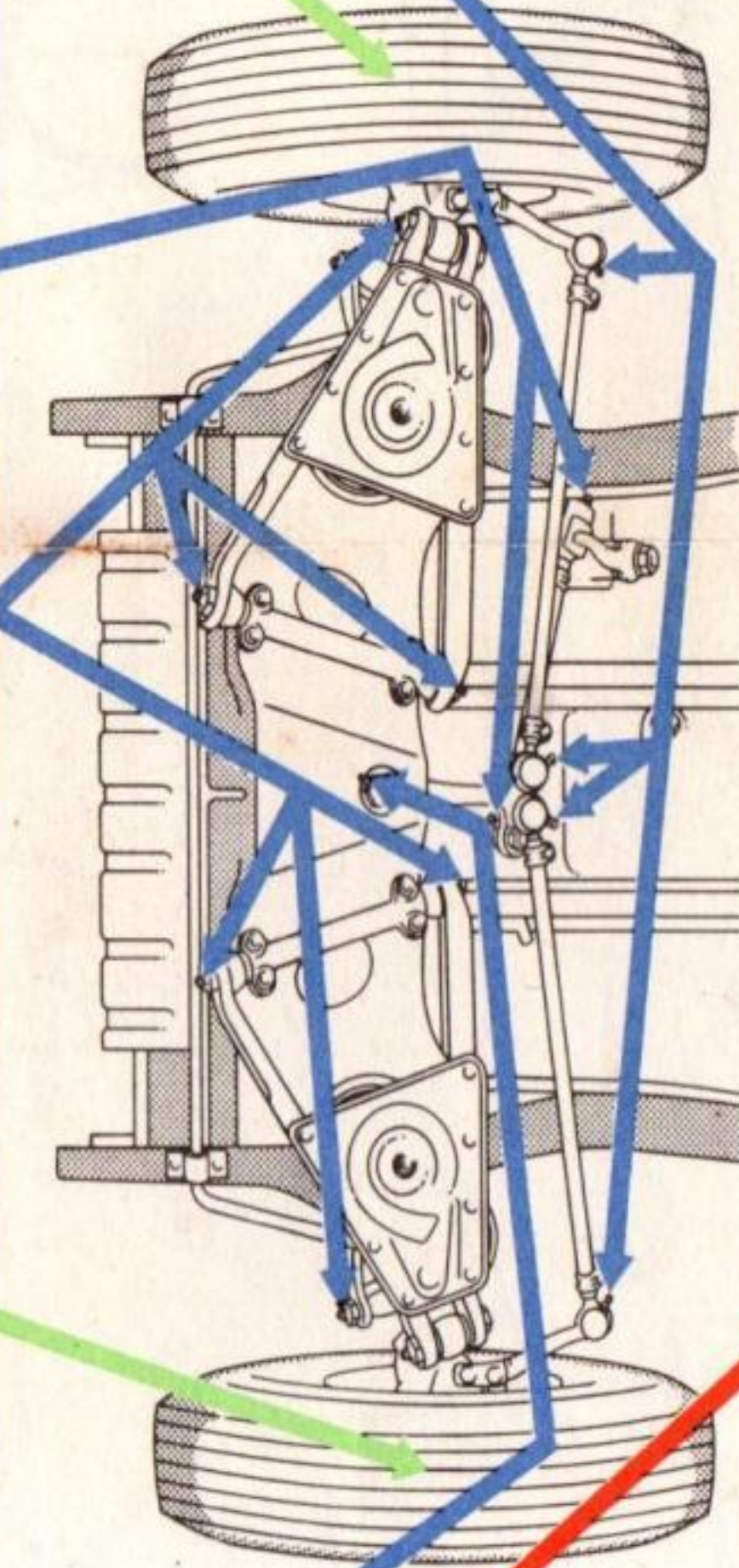
FRONT WHEEL BEARING

Remove, clean and repack with FIBRE GREASE NLGI No. 2.



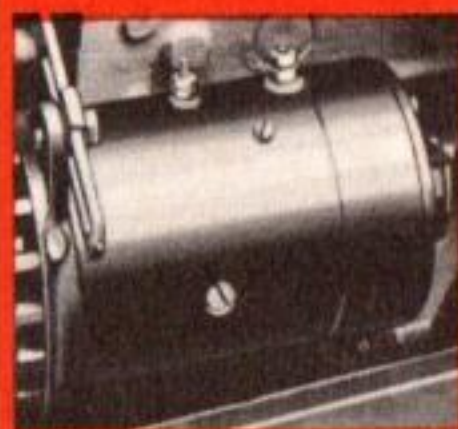
STEERING IDLER ARM

1 Fitting Use SEMI-FLUID CHASSIS LUBRICANT NLGI No. 1. Below 32° F. Use No. 0.



GENERATOR

1 oil Cup, Front. 1 oil Hole, Rear. Apply 2 drops ENGINE OIL S.A.E. 20 in each.



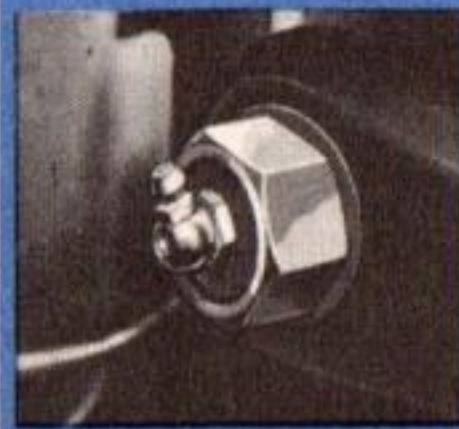
CRANKCASE BREATHER CAP

Wash thoroughly in KEROSENE. Dry and immerse in ENGINE OIL, S.A.E. 20.



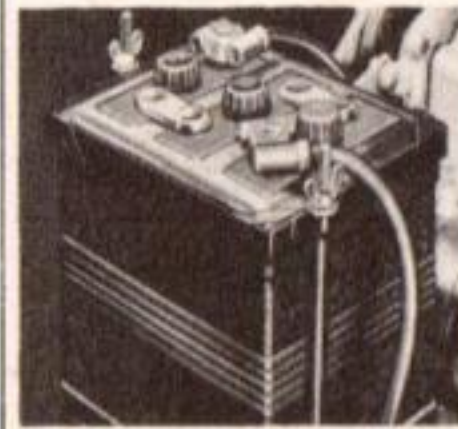
UPPER SUSPENSION

4 Fittings, left side. Use SEMI-FLUID CHASSIS LUBRICANT NLGI No. 1. Below 32° F. Use No. 0.



BATTERY

Add WATER as required to keep level above plates.



KING PIN

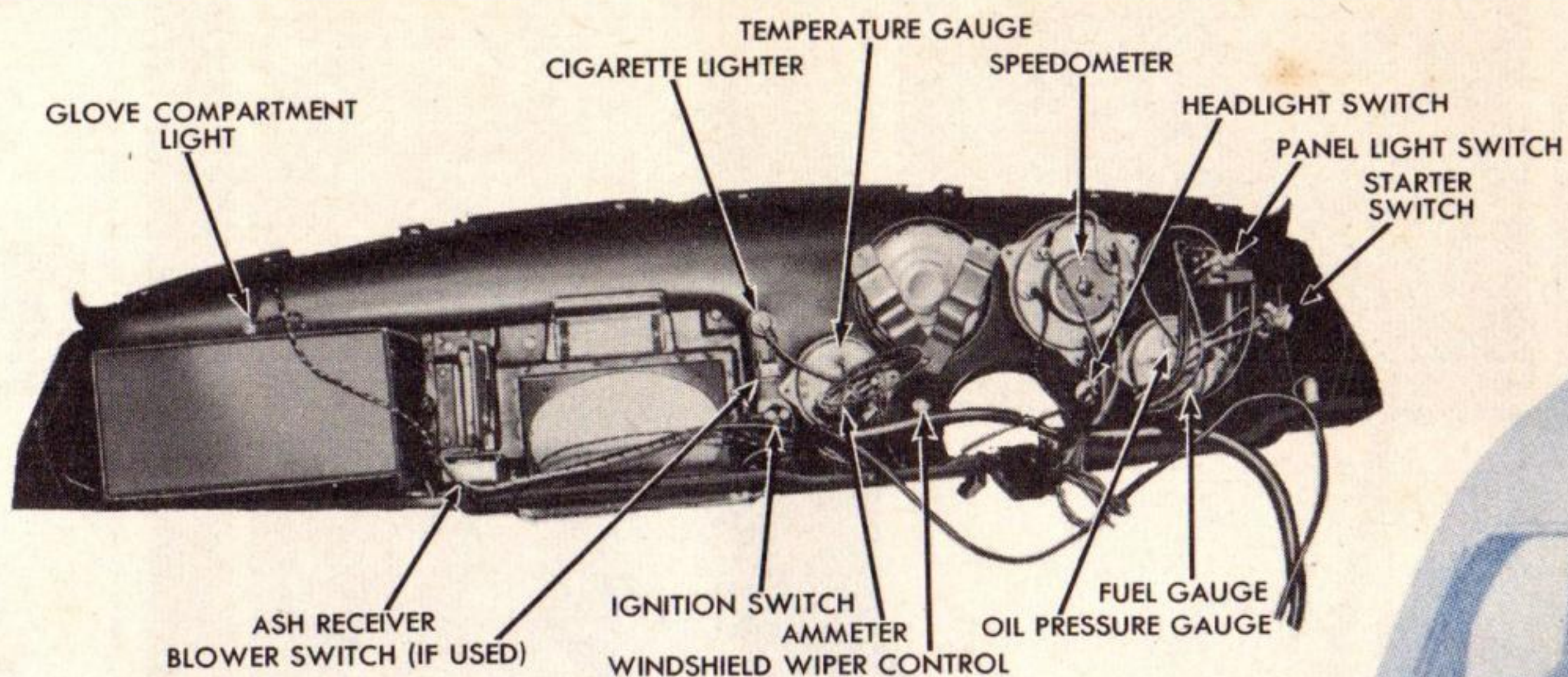
2 Fittings (upper & lower), right side. Use SEMI-FLUID CHASSIS LUBRICANT NLGI No. 1. Below 32° F. Use No. 0.



STEERING

Add, as required, level to filler hole. Use ALL-PURPOSE GREASE S.A.E. 140. Below S.A.E. 90.





(RIGHT) REAR DOOR SWITCH

COURTESY LIGHT SWITCH

COURTESY LIGHT

HEADLIGHT SWITCH

WATER TEMPERATURE SENDING UNIT

DISTRIBUTOR

IGNITION COIL

RIGHT FRONT DOOR SWITCH

BATTERY GROUND CABLE

GENERATOR

HORN RELAY

(LEFT) FRONT JUNCTION BLOCK

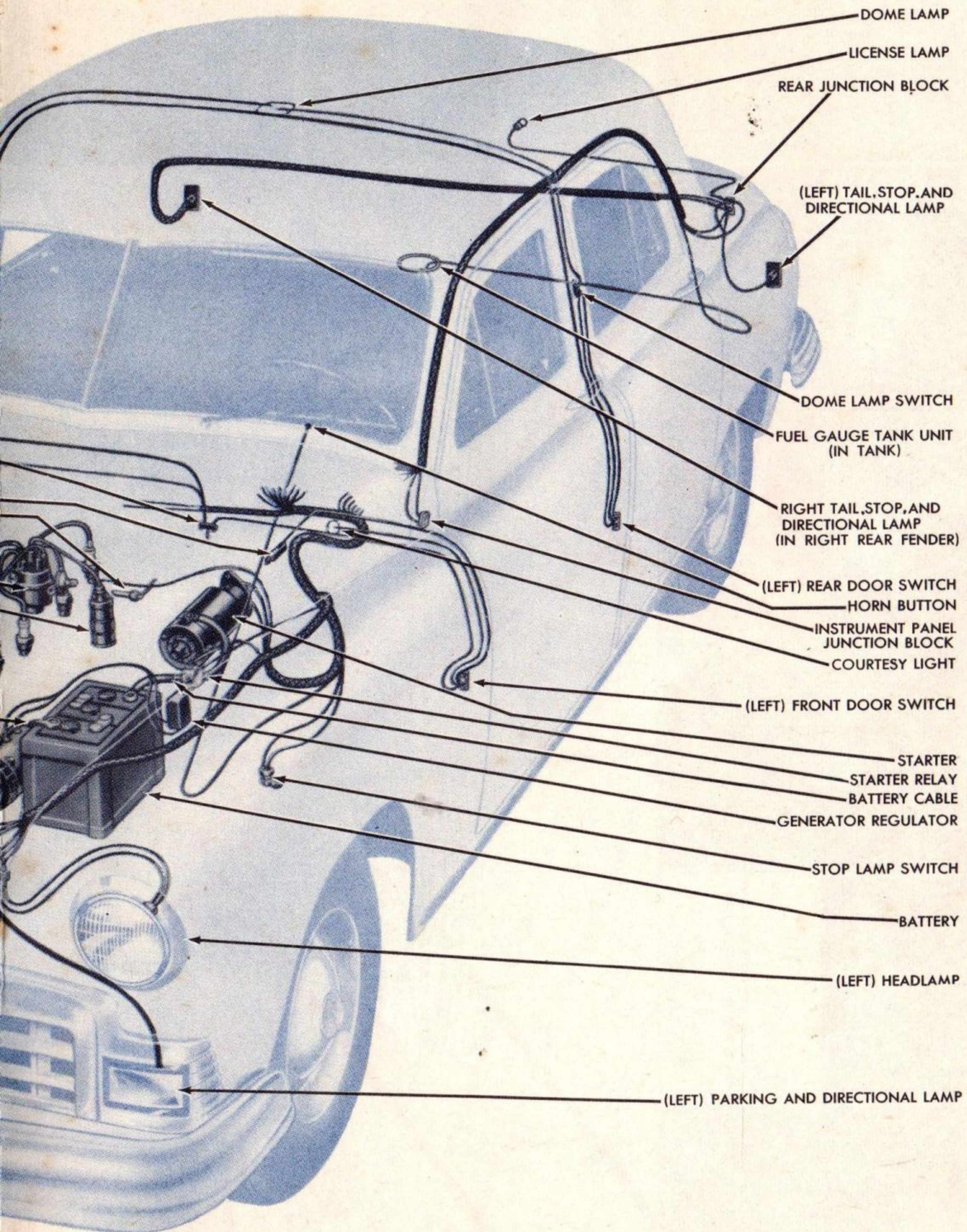
(RIGHT) HEADLAMP

RIGHT FRONT JUNCTION BLOCK

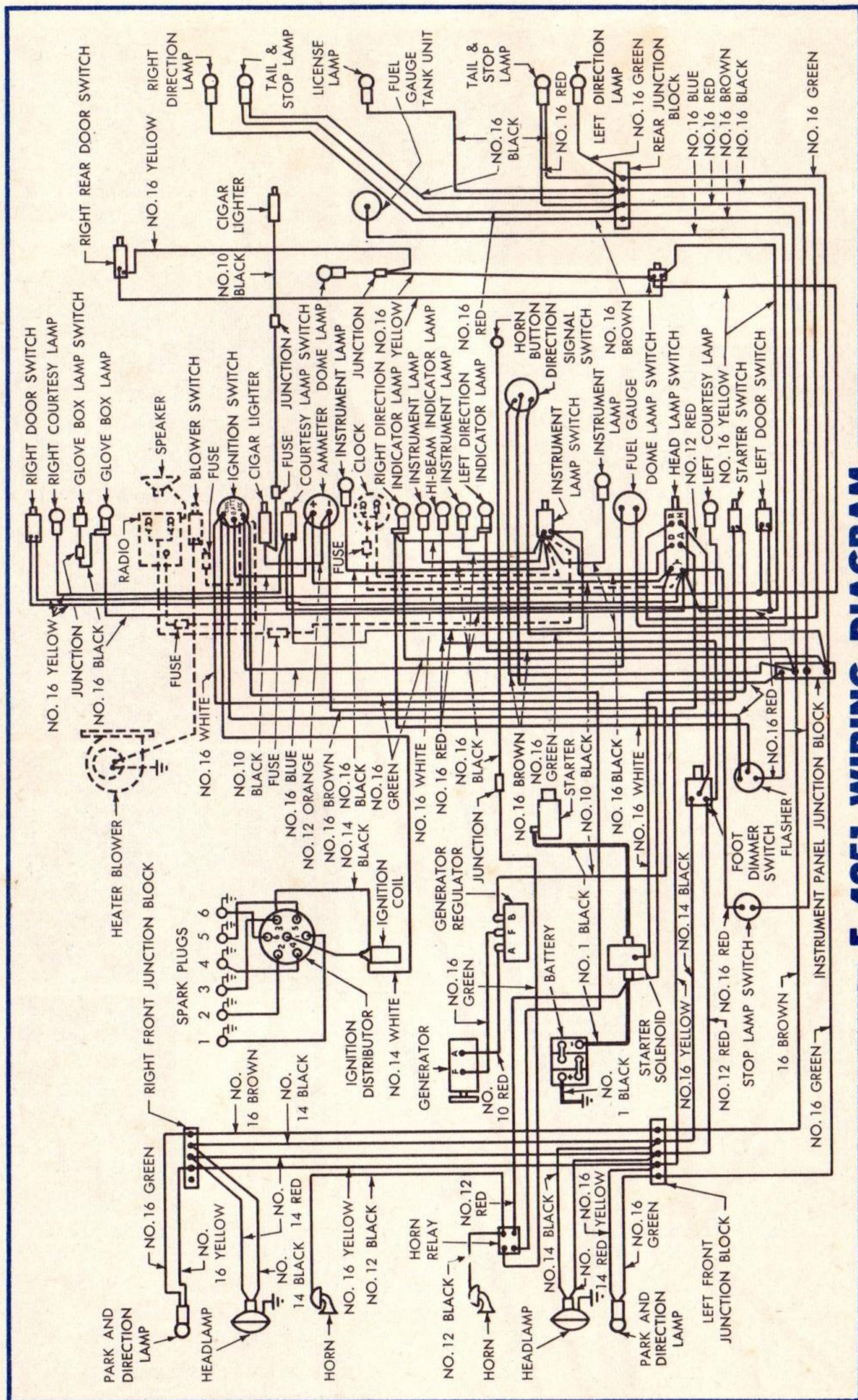
(RIGHT) PARKING AND DIRECTIONAL LAMP

HORNS

FRAZER ELECTRIC



ICAL SYSTEM



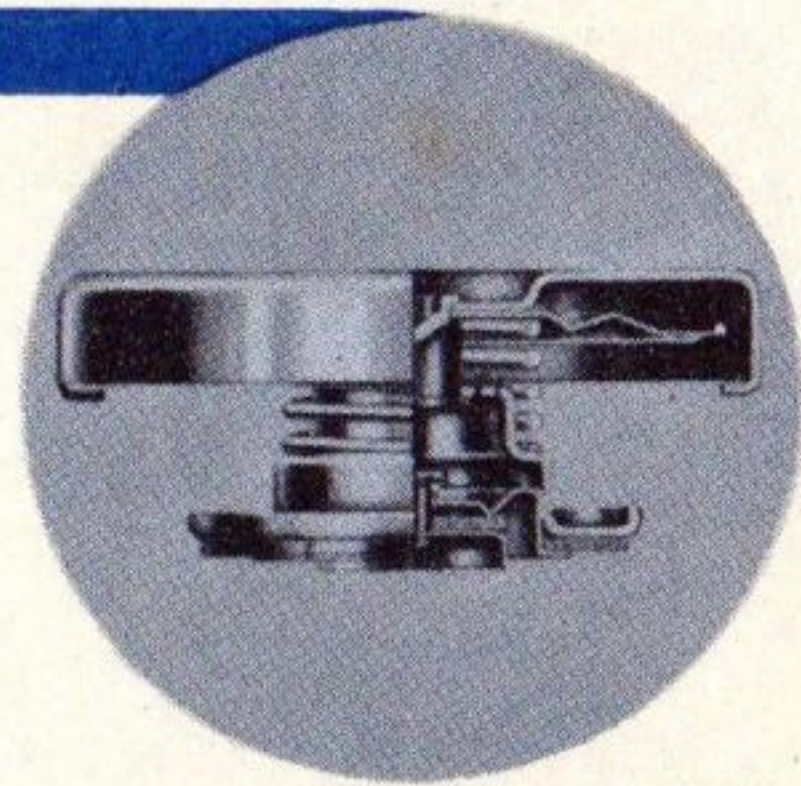
COOLING SYSTEM

The cooling system has a capacity of 13.5 quarts (14.5 quarts when hot water heater is installed). Adequate circulation is provided by means of a high capacity impeller type water pump, belt driven from the engine. The water pump is equipped with sealed lubricant type bearings and requires no servicing. An automatic thermostatically operated valve restricts the circulation of the engine coolant until the engine reaches the desired operating temperature.

When the engine is first started no coolant circulates through the radiator core until the temperature of the coolant in the engine reaches 148° F. at which point the thermostat starts to open. Full flow is obtained through the thermostat when the coolant reaches a temperature of 173° F.

RADIATOR CAP

The radiator filler cap is spring loaded and seals the cooling system to approximately 4 lbs. above atmospheric pressure. This "pressurization" raises the boiling point of the coolant approximately 10° F. and reduces anti-freeze and water losses when operating at slightly higher than normal temperatures.



CAUTION

When removing the filler cap when the coolant is hot, rotate the cap counter-clockwise until a "stop" is reached. At this position pressure will be relieved by means of the overflow pipe. Leave the cap in this position until all pressure has been relieved, then continue turning the cap forcibly past the stop to remove the cap. This feature is for your protection and for the protection of the finish on your car as coolant may be forcibly ejected from the radiator if it is quite hot and the cap is suddenly and completely removed.

All coolants have more or less tendency to expand when heated. If the cooling system is completely filled with coolant, below the normal operating temperature of the system, some losses will occur when the normal temperature is reached.

Maintain the coolant level about 1 inch below the lower edge of the filler neck to avoid these losses upon expansion of the coolant.

Never add cold water to the cooling system if the coolant is low and the engine is hot as it may damage the cylinder block. Allow the engine to cool and then add water slowly with the engine running at slow idle.

Ordinary draining of the cooling system may be accomplished by opening the drain cock located at the right front of the radiator at the base of the core. This drain cock is provided with a length of rubber hose to direct the drainage away from the chassis and facilitate collecting

the coolant in a receptacle. For complete drainage of the cooling system also open the drain cock located on the left side of the engine block. If the car is equipped with a hot water heater the hose connections to the heater should be removed to assure drainage of the heater radiator core. Periodic cleaning of the cooling system is desirable and may be best accomplished before adding anti-freeze in the fall and when removing anti-freeze in the spring.

"KF RADIATOR FLUSH", available at your Kaiser-Frazer dealer, is particularly effective in loosening rust, scale, grease and sludge accumulations from the cooling system. When using "KF Radiator Flush" the cooling system should be thoroughly flushed and "reverse flushed" to remove all loosened accumulations from the cooling system.

Anti-freeze solutions based on alcohol or methanol (synthetic alcohol) or permanent types such as ethylene glycol are recommended and usually contain a suitable corrosion inhibitor.

CAUTION

Do not use preparations such as kerosene, oils, honey, glucose, salt; or any petroleum base or salt base anti-freeze products.

The freezing point of anti-freeze solutions can be determined by the use of a "Universal" hydrometer if the reading is corrected for the solution temperature and as long as various anti-freezes have not been mixed in preparing the solution.

When plain water is used as a coolant it is recommended that "KF Rust Resistor," obtainable at your Kaiser-Frazer dealer, be added to the coolant. This preparation is very effective in preventing the formation of rust and scale in the cooling system.

FAN BELT ADJUSTMENT

The "V" type fan belt drives the cooling fan, water pump and generator from a pulley on the vibration damper attached to the engine crankshaft. Proper tension of this belt is necessary to assure proper driving of these components and to minimize belt wear. Correct belt tension is obtained by attaching a spring scale to the *generator* and with the generator mounting bolts and adjusting bracket loosened to allow freedom of movement, pull the spring scale (in line with the generator adjusting bracket) to a reading of 15 and tighten the generator mounting bolts and adjusting bracket.

ANTI-FREEZE CHART

COOLING SYSTEM CAPACITY QUARTS	FOR PROTECTION DOWN TO	ADD QT. METHYL ALCOHOL	ADD QT. ETHYLENE GLYCOL	ADD QT. ETHYL ALCOHOL
13.5	0°F.	3.5	4.5	5
	-10°F.	4.5	5.5	6
	-20°F.	5.0	6.0	7
14.5 (Hot Water Heater)	0°F.	4.0	5.5	6
	-10°F.	5.0	6.5	7
	-20°F.	6.0	7.0	8

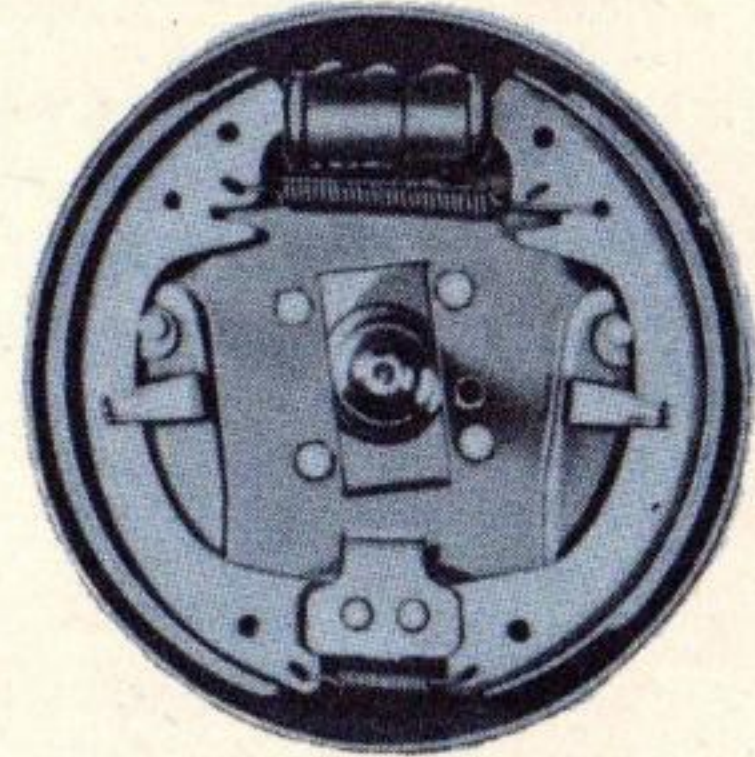
BRAKES

To assure maximum safety and ease of operation the service brakes are direct acting, hydraulically operated on all wheels. To provide smooth powerful braking action and simple positive adjustment the "floating" type brake shoes are provided with molded linings which bear on steel backed, cast alloy-iron brake drums. This combination of braking surfaces reduces scoring and distortion of brake drums to a minimum and assures "trouble free" performance.

By providing the front wheels with slightly larger brake cylinders than the rear wheels, the braking effort is proportioned so that 56% of the braking effort is applied at the front wheels and 44% at the rear wheels.

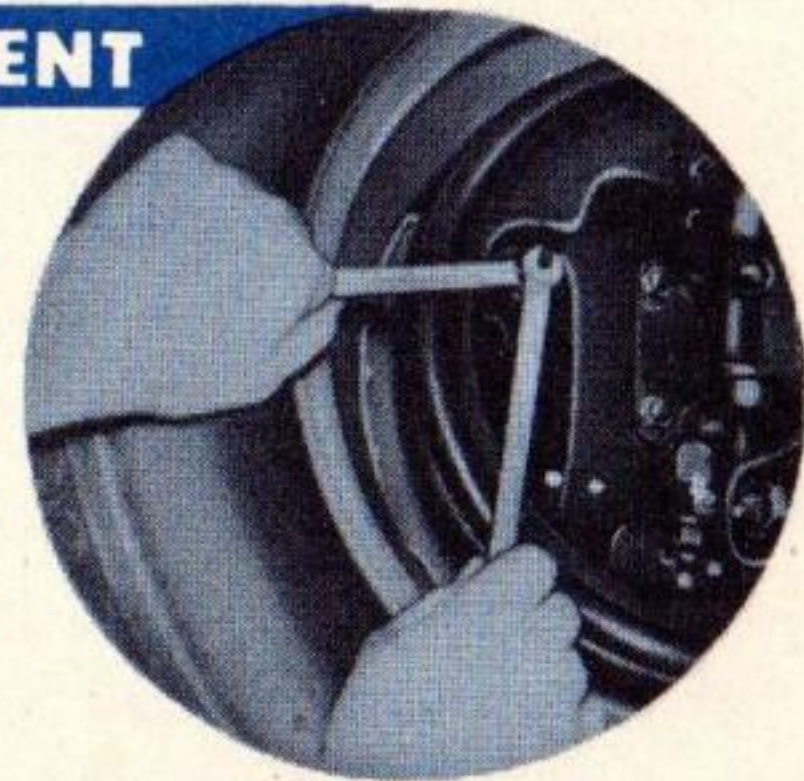
An additional hand-operated brake is provided for use when the car is parked. This brake is independent of the hydraulic system and operates the rear wheel brake shoes through mechanical linkage.

Brake shoe adjustment is controlled by two cams mounted in the brake shoe support plate of each drum.



BRAKE ADJUSTMENT

Lift the wheel or wheels free of the floor, using a jack or hoist. Release the hand brake and operate the brake pedal several times to "equalize" or "center" the brake shoes. Starting with any wheel, loosen the cam lock nut on the rear shoe. With an end wrench, turn the rear shoe cam down and toward the rear of the car until the wheel cannot be turned by hand. Back off the cam until the wheel turns without drag. Repeat these operations on the front shoe cam, turning the front shoe cam in the opposite direction, and retighten the cam lock nuts securely.



BRAKE MASTER CYLINDER

Keep the fluid level in the master cylinder to within $\frac{1}{4}$ " of the filler hole.

BRAKE PEDAL FREE TRAVEL

Correct free pedal travel should be $\frac{1}{4}$ " to $\frac{3}{8}$ " and may be determined by measuring the distance which the pedal travels before starting to move the master cylinder push rod. To adjust free pedal travel loosen the lock nut on the master cylinder push rod and turn the rod in or out. Be sure to tighten the lock nut securely after adjustment.

CLUTCH

The purpose of the clutch is to provide a method of connecting the engine to the transmission in such a manner as to obtain a smooth, even application of engine power to the transmission.

This is accomplished by a frictional drive between the clutch disc (attached to the transmission main drive gear shaft) and the engine flywheel.

ASSEMBLY

The clutch assembly consists of a single dry disc, faced on both sides with molded asbestos linings, and a spring loaded pressure plate which is attached to and rotates with the engine flywheel.

The clutch disc is positioned between the spring loaded pressure plate and the engine flywheel.

ENGAGED

With the clutch engaged (clutch pedal released) the spring loaded pressure plate presses the clutch disc tightly to the engine flywheel, and engine torque is transmitted by the clutch disc to the transmission main drive gear shaft and the idler gear cluster in the transmission. (This is the reason why it is desirable to *depress* the clutch pedal when starting the engine, especially in cold weather, as it relieves the starting motor of the unnecessary load imposed in driving the idler gear cluster.)

DISENGAGED

With the clutch disengaged (clutch pedal depressed to floor) pressure is relieved from the clutch disc, and the engine flywheel and clutch pressure plate revolve without driving the clutch disc.

With the transmission in any gear, as the clutch pedal is released, the clutch pressure plate begins to force the clutch disc against the engine flywheel which may be rotating at a speed of 550 RPM or faster, depending upon the degree of acceleration. The clutch disc begins to drive the transmission but there is a "slipping" action proportionate to the degree of clutch pedal release until the clutch pedal is in the fully released position.

FREE TRAVEL

Inasmuch as the clutch depends upon "friction" to drive the transmission, it is of great importance that there be $\frac{3}{4}$ " to 1" "pedal lash" or "free travel" to insure that the clutch can reach its maximum engagement. This is also the reason that it is not advisable to "ride" the clutch with the foot as either condition will result in excessive heating and wear of the clutch facings.

TIRES

The use of large (7.10 x 15) low pressure tires effectively supplements the excellent riding characteristics built into your car.

Close observance of the following recommendations and preventive measures will be amply repaid in extended tire life.

Your tires are designed to give maximum performance and life when inflated to 24 lbs. per square inch (cold). Tire pressure should be checked frequently to maintain the correct pressure. It should be remembered that tire pressures will vary with temperature and may increase considerably on long drives in hot weather.

Excessive heat is very detrimental to tires. When a tire is run under-inflated the "flexing" action of the tire, as it comes in contact with the road, generates enough heat to materially shorten the expected life of the tire. This is especially true in regard to summer driving on hot pavement.

Over inflation imposes a strain on the tire fabric that, combined with road shocks, contributes to tire breakage and blowouts. Over inflation also reduces the tread contact to the road and results in excessive "crown" wear.

TIRE BALANCE

Tires are factory balanced to compensate for the weight of the valve stem assembly in the tube. Tire casings are marked with a colored dot which should be aligned with the valve stem when mounting the tire and tube on the wheel.

If there is any evidence of vibration, quiver, or wheel tramp at high speeds the tire and wheel should be checked for balance and necessary balancing weights applied.

WHEEL ALIGNMENT

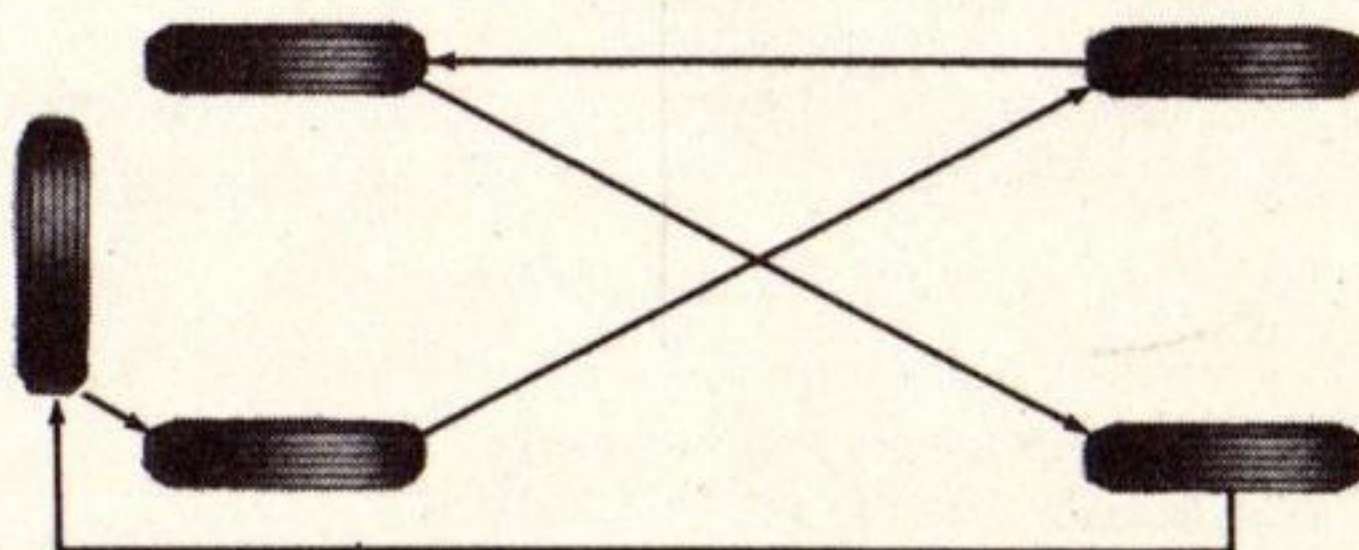
Periodic check should be made for proper wheel alignment.

The front wheels are provided with several adjustments to secure proper steering and easy handling of the car. If these adjustments are disturbed, unevenness and peculiarities of tire wear will result.

SWITCHING TIRES

Inasmuch as each tire is subjected to different conditions, certain normal irregularities of tire wear will occur. This wear will be reduced to a minimum by periodic switching of wheels (5000 miles) as indicated by the accompanying diagram.

The spare tire and wheel should be included in this program in order to gain additional tire mileage and distribute the wear evenly over all tires.



CAR SPEED

Tests of effect of car speeds on tire wear have indicated that tire wear is directly proportional to car speed.

At average speeds of approximately 40 miles per hour, expected tire life will reach 100%. At speeds in excess of 40 miles per hour expected tire life decreases until, at approximately 80 miles per hour, average tire life will be reduced to 20% of normal.

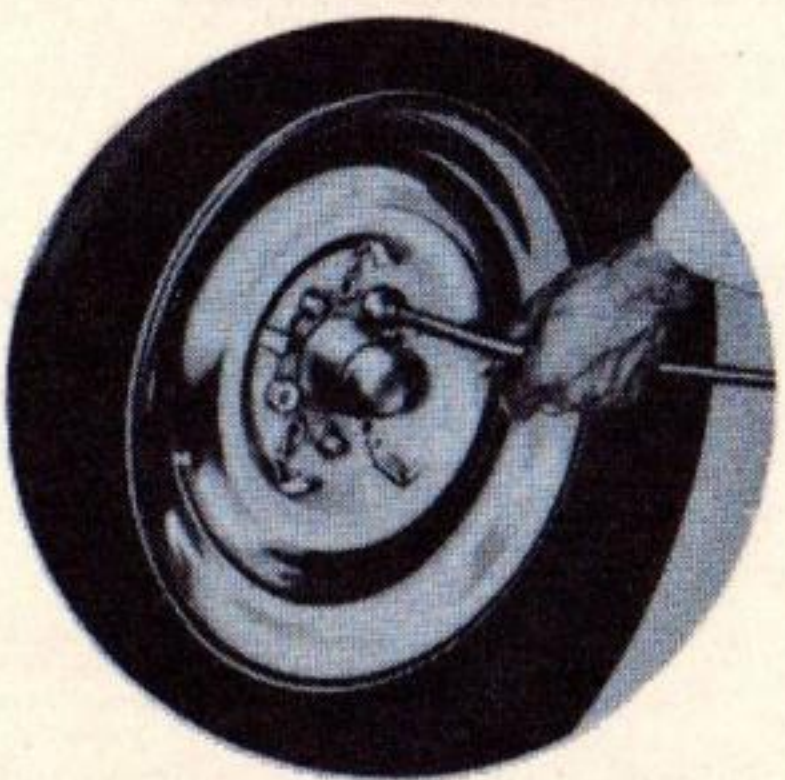
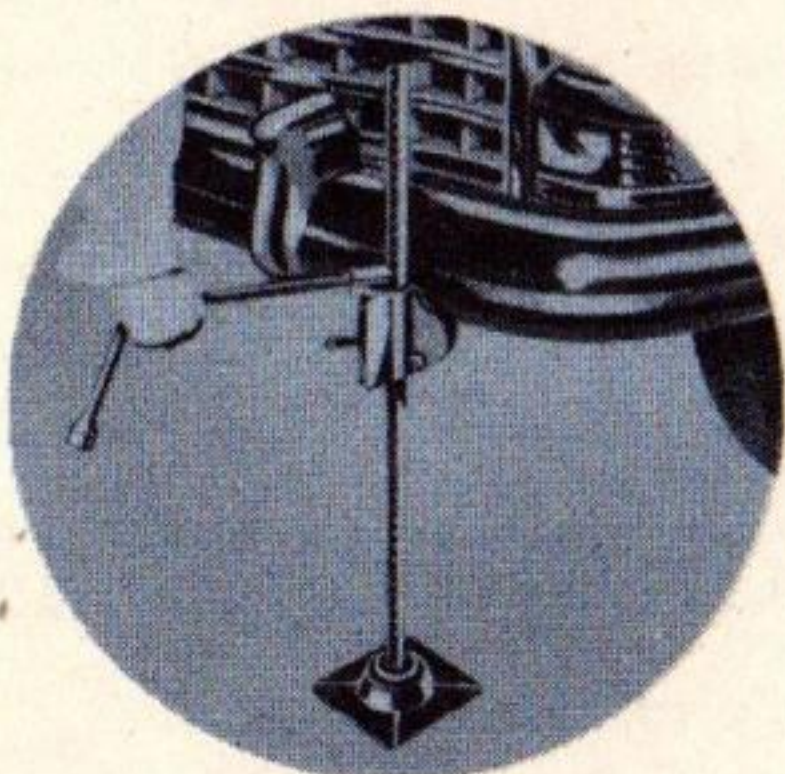
Excessive speeds on curves, unnecessary braking, and fast "get aways" accelerate tire wear.

TIRE CHAINS

If tire chains are used, be sure they are properly fitted. They should be just loose enough to allow the chains to "creep" around the tire and distribute effects of their wear uniformly. Tension springs should be used to keep the chains tight.

CHANGING TIRES AND WHEELS

Tire and wheel changing is simplified with the aid of the bumper jack included in the car tools.



1. Set the hand brake or block the wheels.
2. Place the jack base on a firm level surface directly in line with the wheel to be changed and engage the lift on the jack with the car bumper as shown in the illustration.
3. Remove the hub cap and slightly loosen the wheel nuts before lifting the car with the jack.
4. Jack the car up (using the wheel nut wrench as a jack handle) until the tire is slightly free of the ground.
5. Remove the wheel nuts and the tire and wheel.
6. Place the spare tire and wheel on the hub and replace the wheel nuts.
7. Lower the bumper jack until the tire touches the ground and then *securely* tighten the wheel nuts.
8. Remove the bumper jack completely and replace the hub cap.

TIRE WARRANTY

Tires are warranted by the manufacturer. His agents are authorized to make adjustments under the manufacturers' warranty.

CAR CLEANING HINTS

OUTSIDE

Calcium chloride or sodium chloride used to melt ice on the streets and roads is very injurious to car finishes, especially chrome, if allowed to remain on the car.

The car should be washed frequently with cold water and dried with a clean chamois to preserve the finish.

Never wash your car in hot sunlight or when the metal is hot—allow the car to cool before washing and wash it in a shady place.

Occasional polishing with K-F Auto Polish and Cleaner or Auto Cleaner and Wax will help to maintain the factory finish and lustre indefinitely.

Assurance of lasting beauty and "sparkle" is best obtained by careful inspection of the finish and prompt attention to damage and rusting to arrest their progress.

INSIDE

Dust and dirt particles that fall on the surface of the upholstery can be readily removed with a whisk broom or vacuum cleaner. If the upholstery is unusually dusty, the seats should be removed before cleaning.

Before attempting to remove spots and stains from the upholstery fabric, it is necessary to determine as accurately as possible the type of fabric, the type of fibers used in the construction of the fabric, the nature of the stain, how long the stain has been on the upholstery, and the effect the removal agent will have upon the color, structure, and general appearance of the fabric.

Cloth upholstery is designated as "flat" cloth or "pile" fabric. Flat cloth upholstery has a flat surface made up of lengthwise and crosswise yarns woven at right angles to each other. Pile fabrics are made up of many upright fibres densely woven at right angles to the base of the fabric. These upright fibers are known as "the pile."

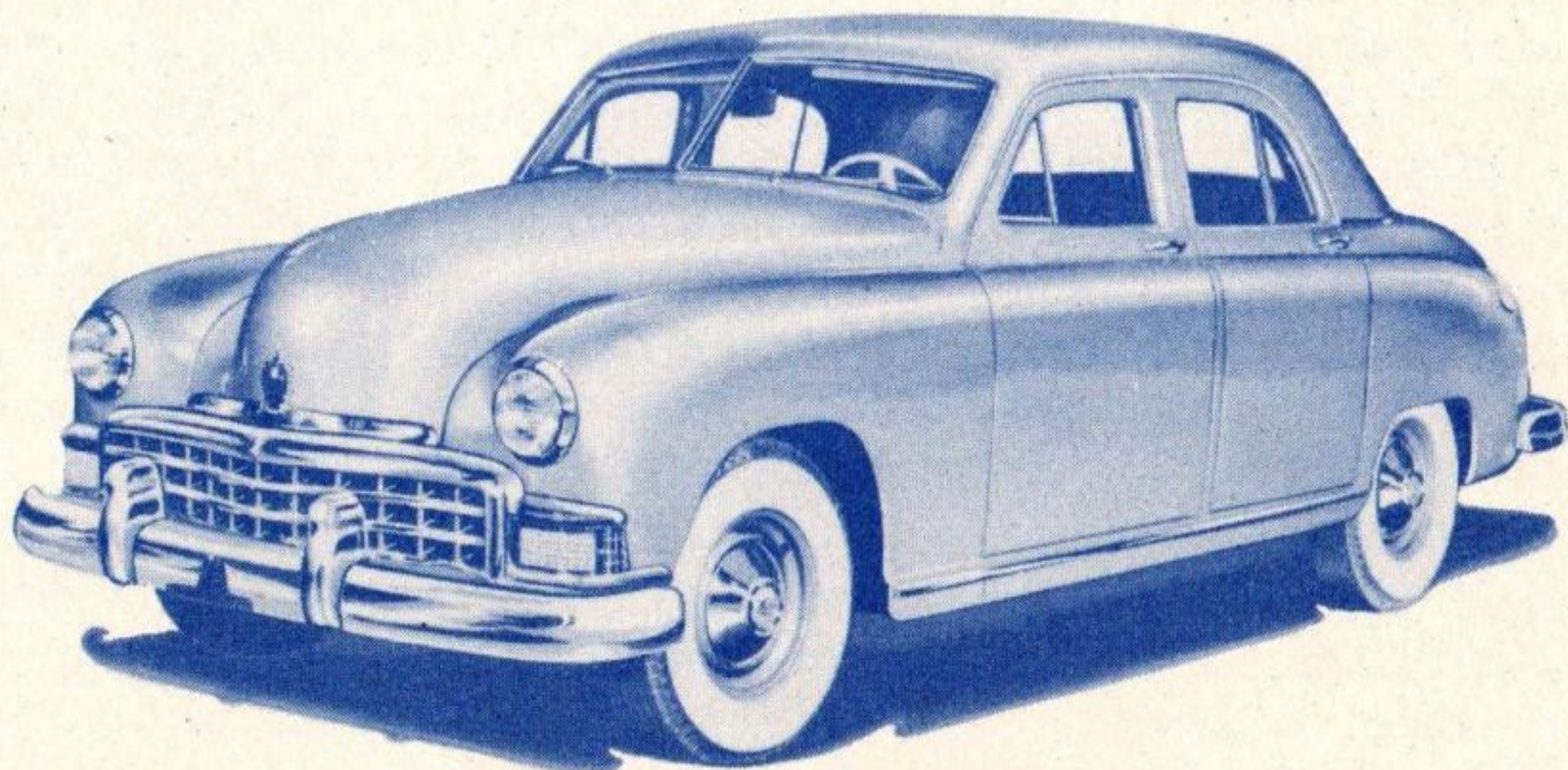
Volatile cleaners are cleaning fluids usually having a carbon tetrachloride or naphtha base and are recommended for removing grease, oil, road grime, and certain stains. Alkaline cleaners are not recommended for use because of the possible risk to the fabric. Soap and water may be used provided that the soap is a neutral and nonalkaline agent. Soap should be used with luke warm water and should be formed into a frothy suds. The suds should be applied with a damp cloth, sponge, or soft brush. When applying soap suds to pile fabrics, rub with the pile, not against it. Soap suds should be removed with clean, damp cloth, or damp sponge. After removal, wipe the surface thoroughly with a dry cloth. While the pile is still damp, brush it lightly with a whisk broom or a medium stiff brush. After the upholstery has dried brush again, this time against the pile.

Soap and water is not recommended for cleaning flat cloth upholstery. Water is destructive to this type of finish and causes the nap to curl and roughen.

When using volatile cleaners, care should be taken to always use clean cloths and to carefully gauge the quantity of solvent used in the cleaning operation. Permit the solvent to do the cleaning work by using only a minimum of friction or pressure. To give the best results, dip a small cloth pad into the cleaning solution, wring it out thoroughly, and allow part of the solution to evaporate. Place the cloth on the stain for a few seconds, then use a tapping pressure several times. This will pick up articles embedded in the cloth. After all loose particles have been removed, dip a new cloth into the cleaner, wring it out thoroughly, and allow the solution to evaporate until the cloth is barely damp. Rub the soiled area in a backward and forward motion, applying increased pressure. With a third cloth, slightly dampened with the cleaning solution, rub the stain and the surrounding area with a light brisk motion. Repeat the brushing operation. If a cleaning ring should form, the entire area which has been cleaned should be thoroughly brushed and gone over lightly with a solvent.

SAFETY PRECAUTIONS FOR CLEANING FABRICS

1. Do not use any colored gasoline or any fluid containing tetraethyl lead as a cleaning solvent.
2. Do not use bleaches or reducing agents such as Chloride of Lime, Hydrogen peroxide, Sodium Hydrosulphite, Potassium permanganate, Chlorine Solutions, Sulphurous acid, and sodium thiosulphate. These solutions may weaken the fabric and change the color.
3. Exercise every precaution and care when using cleaning solvents (Carbon tetrachloride is not inflammable).
4. Do not permit cleaning solvents to come in contact with the skin.
5. Do not breathe the fumes of cleaning solvents.
6. When using oxalic acid, keep it out of reach of children and away from your mouth. It is a deadly poison.
7. Always select a cleaning solvent of proved quality.
8. Do not use too much cleaning fluid, because some interior trim assemblies are padded with rubber, and volatile cleaners are usually solvents for rubber.



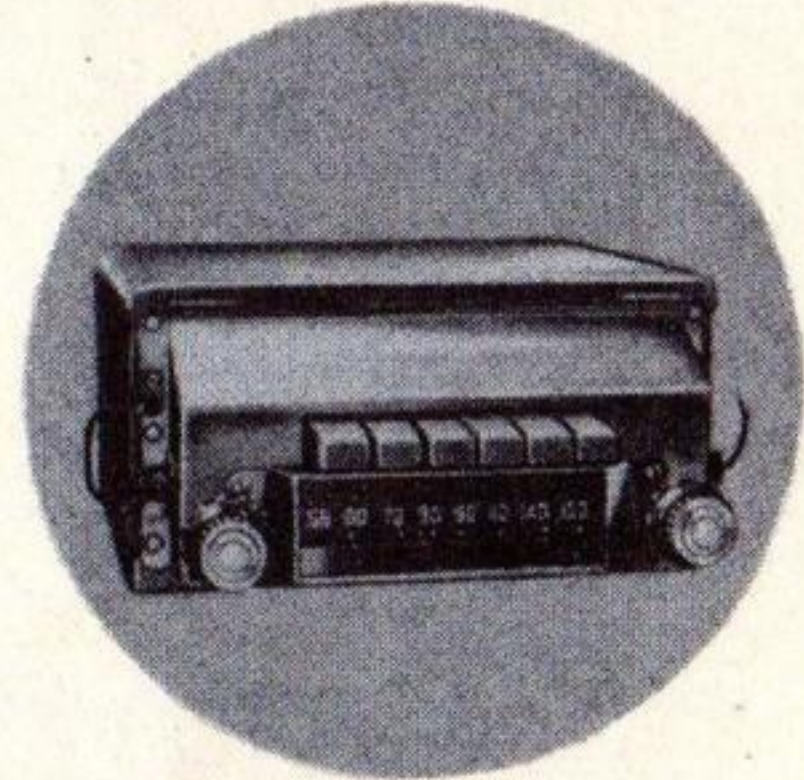
ACCESSORIES

A complete selection of K-F engineered accessories is available to the discriminating owner. These accessories are designed to supplement the natural beauty, style and performance of your car and are available at moderate cost.

RADIO OPERATING INSTRUCTIONS

1. "On-Off" Switch and Volume Control.

The power supply lead for the radio is connected to the ignition switch in such a manner that the radio may be operated while the engine is running or while the car is parked, but is automatically turned off when the key is removed from the switch. The radio is turned on by rotating the volume control knob to the right. The set will require from ten to twenty seconds for the radio tubes to warm-up to the operating temperature. To increase the volume, merely continue knob rotation to the right. To turn the receiver off, rotate the knob to the left to the point where a click is heard.



2. Manual and Automatic Tuning.

The *manual* tuning control is located at the right of the dial and offers positive tuning along any part of the dial. The pointer, of course, travels in the same direction as the knob is being rotated. To operate the *automatic* tuning, it is necessary only to depress the desired push button all the way in and the receiver is automatically tuned to a predetermined station. Thus, with six push buttons, it is possible to pre-select six individual stations. These stations may be altered when desired by first removing the plastic button by a side-wise movement of the spring lever located beneath the plastic button and pulling the plastic button off. Loosen the thumb screw, then, by means of the manual tuning control, tune in the desired station. Push in on the thumb screw and tighten down at the same time. Replace the plastic button to complete the station set-up operation.

3. Tone Control.

The tone control knob is located directly behind the volume control knob. Turning the chrome knob to the right will emphasize the treble or brilliant high notes, while turning to the left will emphasize bass notes. The treble position is generally used when the car is in motion to overcome wind noise and is almost always used for voice. The bass position is an aid in bringing out full, mellow tones of musical programs. An intermediate position gives equal emphasis of the full tonal range.

For dial lights and fuse replacements, see chart in section on electrical system components. The dial lights may be replaced by merely removing the sockets located on each end of the dial.

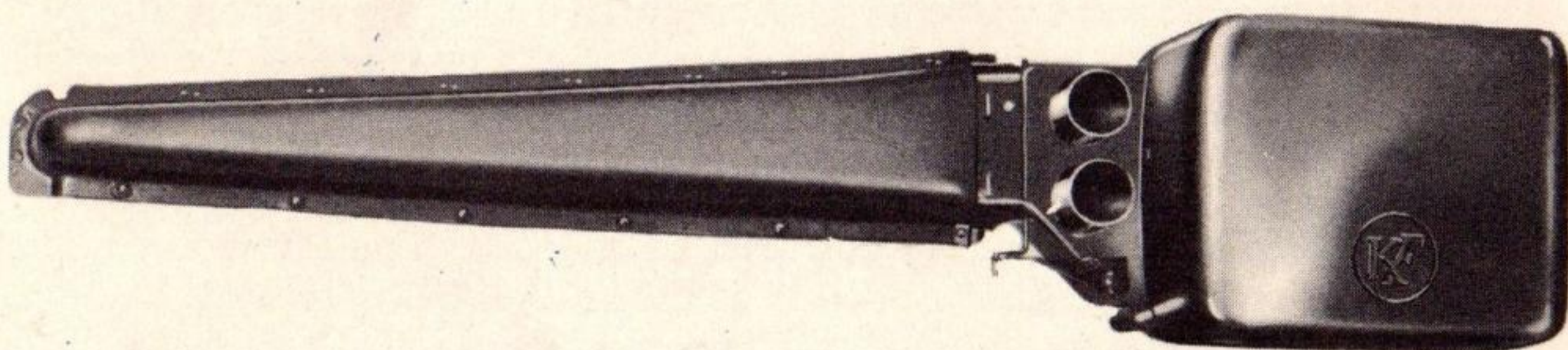
AIR CONDITIONER

The system consists of a large heating element, high capacity blower, adequate duct system, and controls.

The heating element, or radiator, is connected to the engine cooling system and the hot engine coolant is circulated through the heater by the engine water pump. The amount of coolant circulating through the heater core is regulated by the airplane type "temperature" control lever in the instrument panel. Setting this lever at any point from "off" to "warm" to "hot" presets the thermostat in the coolant line to the heater and the amount of coolant through the heater is then automatically regulated to keep the car interior at the constant temperature as selected with the "temperature" control lever.

The airplane type "air vent" control in the instrument panel regulates the distribution of air through the heater duct system.

With the "air vent" control in the "closed" position the dampers are closed in the air ducts and no outside air is admitted to the system, however, with the control in this position the heater blower may be operated to re-circulate the air in the car.



With the "air vent" control in the "open" position, fresh, outside air is admitted directly into the car. If desired, the "temperature" control may be set at the "off" position and the blower used to boost the air delivery on hot days.

With the "air vent" control at the "heater" position all fresh, outside, incoming air is directed through the heater core and will be warmed to the degree selected with the "temperature" control.

Moving the "air vent" control from the "heater" to the "defroster" position proportions the air volume between the passenger compartment and the windshield.

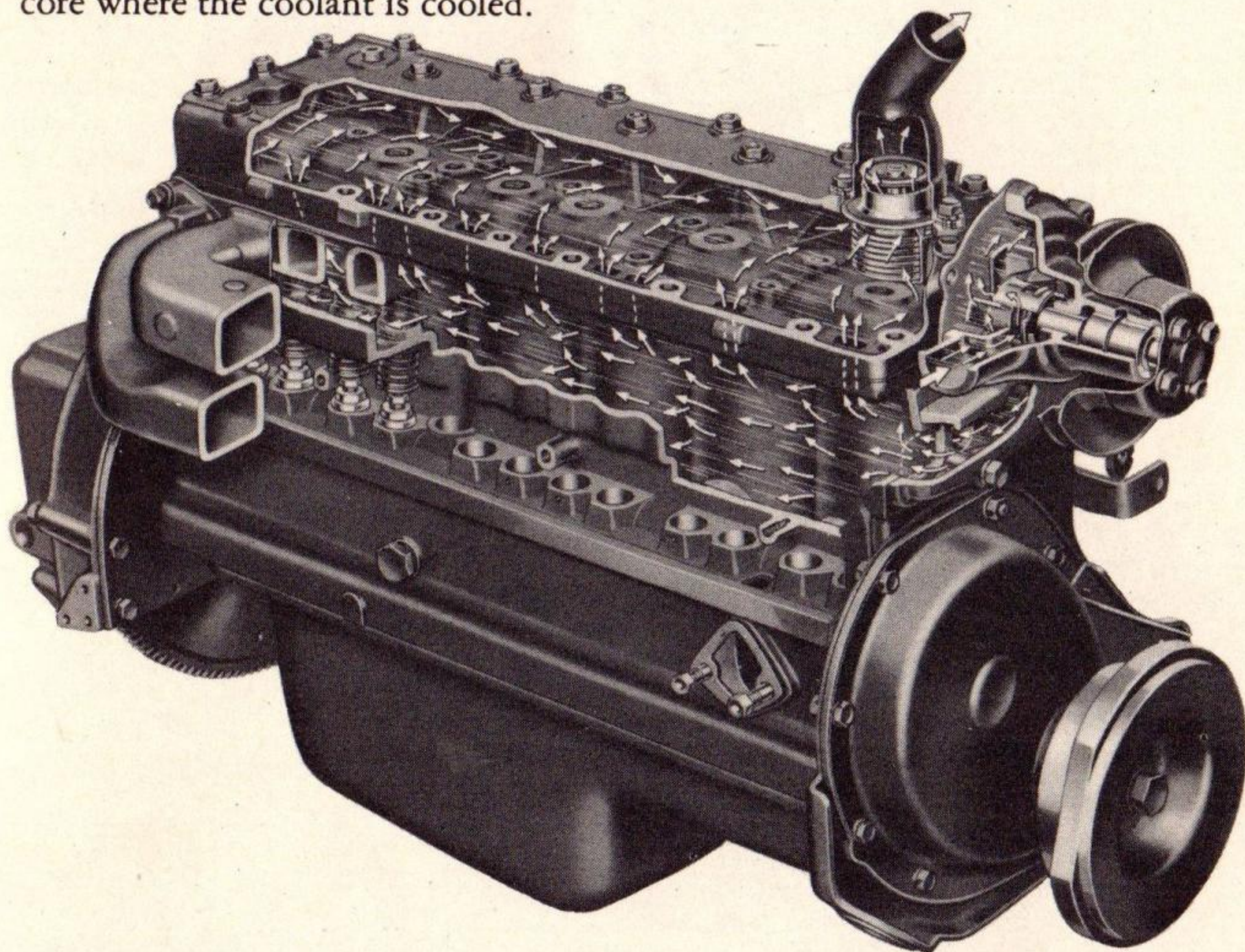
With the "air vent" control at the "heater" position *all* incoming air is directed through the heater and discharged into the duct, or chamber, that extends across the car beneath the instrument panel. This chamber is provided with louvres or openings that distribute the warm air evenly across the floor of the front compartment from where it is directed under the front seat to warm the rear compartment. To obtain adequate heating of the rear compartment *do not obstruct the opening between the toe rail and the floor at the bottom rear of the front seat.*

With the "air vent" control at the "defroster" position, most of the air from the heater is directed to the windshield.

COOLING SYSTEM

In the average automotive engine about 35% of the total heat in the fuel is absorbed by the engine and must be dissipated by the cooling system, through which the coolant is pumped sometimes at the rate of 2000 gallons per hour.

The areas around the valves, cylinders, and pistons and throughout the cylinder head are provided with passages, through which the coolant is circulated by the belt driven pump, and thence through the radiator core where the coolant is cooled.

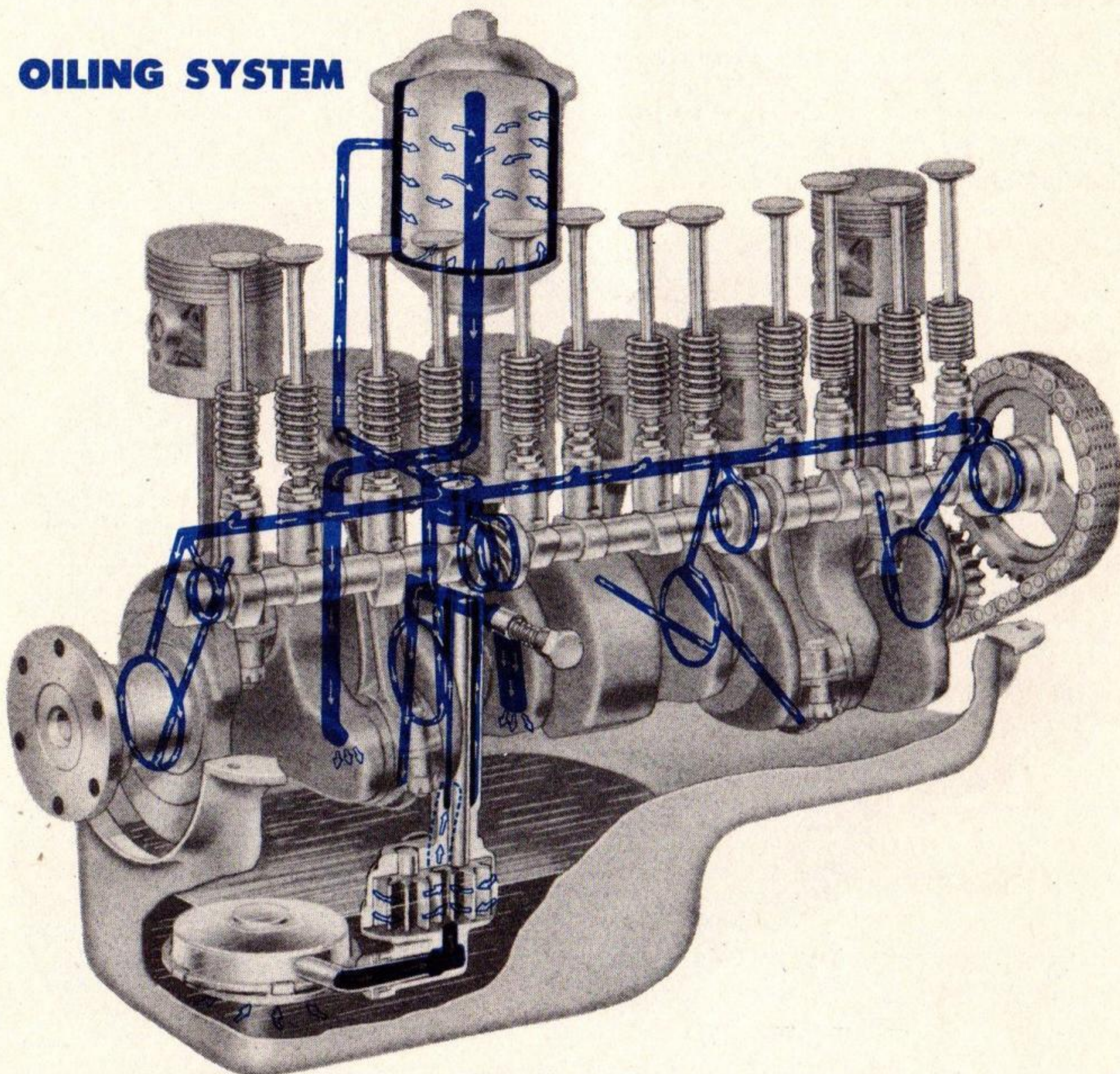


A heat operated valve (thermostat) is placed in the coolant line to the radiator. When the coolant is cold, this valve is closed and prevents circulation of the coolant through the radiator. When the temperature of the coolant in the engine reaches a temperature of about 148° F. the valve begins to open and the pump begins to circulate coolant through the radiator. The valve is fully open when the coolant temperature reaches about 173° F. and the pump is then permitted to deliver its maximum capacity.

The cooling system must be kept clean and free of rust, scale and sludge. Most commercial anti-freeze solutions contain a suitable rust inhibitor. If ordinary tap water is used as a coolant in warm weather, "K-F Rust Resistor" should be added in accordance with instructions on the container.

As an added precaution the cooling system should be treated twice yearly with "K-F Radiator Flush" according to the directions on the container, after which the cooling system should be thoroughly flushed and reverse flushed to remove any loosened accumulation of rust, scale or sludge. This may be conveniently accomplished before adding anti-freeze in the fall and after removing it in the spring.

OILING SYSTEM



All the vital parts of the engine are pressure lubricated by a gear type oil pump driven from the engine camshaft. The pump is provided with a floating, screened, intake that prevents the recirculation of any sediment that might accumulate in the oil pan.

By means of this pump the engine oil is driven, at a pressure of 35 lbs. per sq. inch, through the drilled passages in the crankshaft, to efficiently lubricate the main and connecting rod bearings. Oil is also force fed to the camshaft bearings, timing gear chain and sprockets. Cylinder walls and piston pins are supplied with oil from spurt holes in the connecting rods. At the same time engine oil is continually by-passed through the oil filter which effectively removes all harmful bodies which may be suspended in the oil.

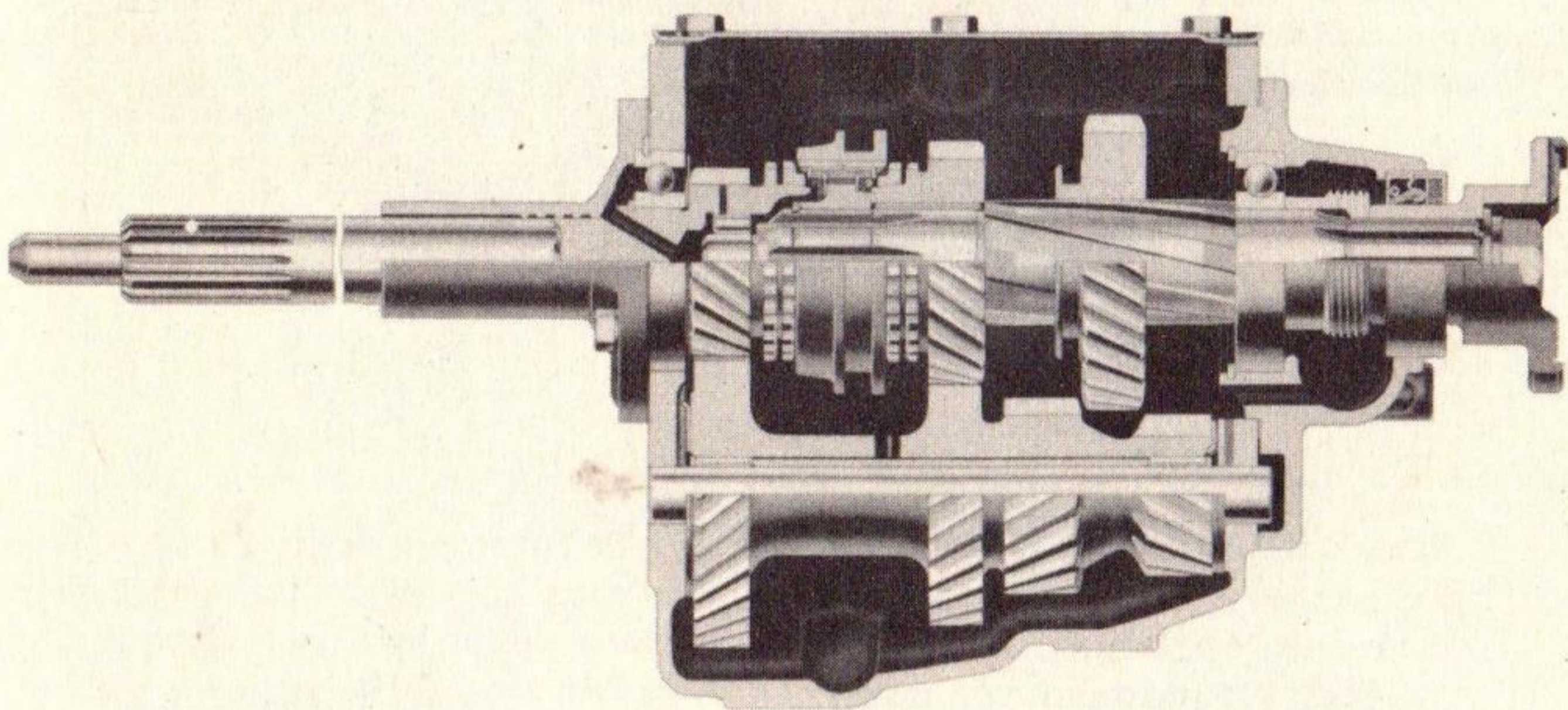
The oil pan capacity is five quarts (exclusive of the oil filter). The filter element holds about one quart of oil and whenever it is changed, it is necessary to add an additional quart of oil (six quarts in all).

The air intake (on the carburetor) is provided with a large capacity, oil bath type air cleaner. In addition to the filter element there is an oil reservoir in the oil cleaner. Be sure to keep the air cleaner clean and the reservoir filled to the indicated level with fresh oil, as recommended in the lubrication chart.

TRANSMISSION

The development of power of an engine is proportionate to engine speed or revolutions per minute—the higher the engine speed the greater the power developed, up to a certain point (3600 R.P.M.). When the car is standing still a larger amount of power is required to overcome inertia and start the car rolling than is necessary to sustain the car speed. This means that the engine must be allowed to “turn up” to develop this power, yet at the same time the rear wheels are turning slowly relative to the engine speed.

The function of the transmission is to provide the different ratios between engine speed and car speed to allow the car to operate smoothly and efficiently.



The transmission has three forward and one reverse gear ratios.

In first or low gear the engine crankshaft makes approximately two and one-half revolutions to each revolution of the propeller shaft—this allows the engine to “turn up” and develop the power necessary to set the car smoothly in motion.

In second or intermediate gear the engine crankshaft makes approximately one and one-half revolutions for each revolution of the propeller shaft—this accelerates the car speed or allows the engine speed to decrease.

In third or high gear the engine crankshaft makes one revolution to each revolution of the propeller shaft and car speed is directly proportionate to engine speed.

OVERDRIVE

The overdrive is a supplement to the regular transmission and is essentially an automatic "fourth" forward gear ratio.

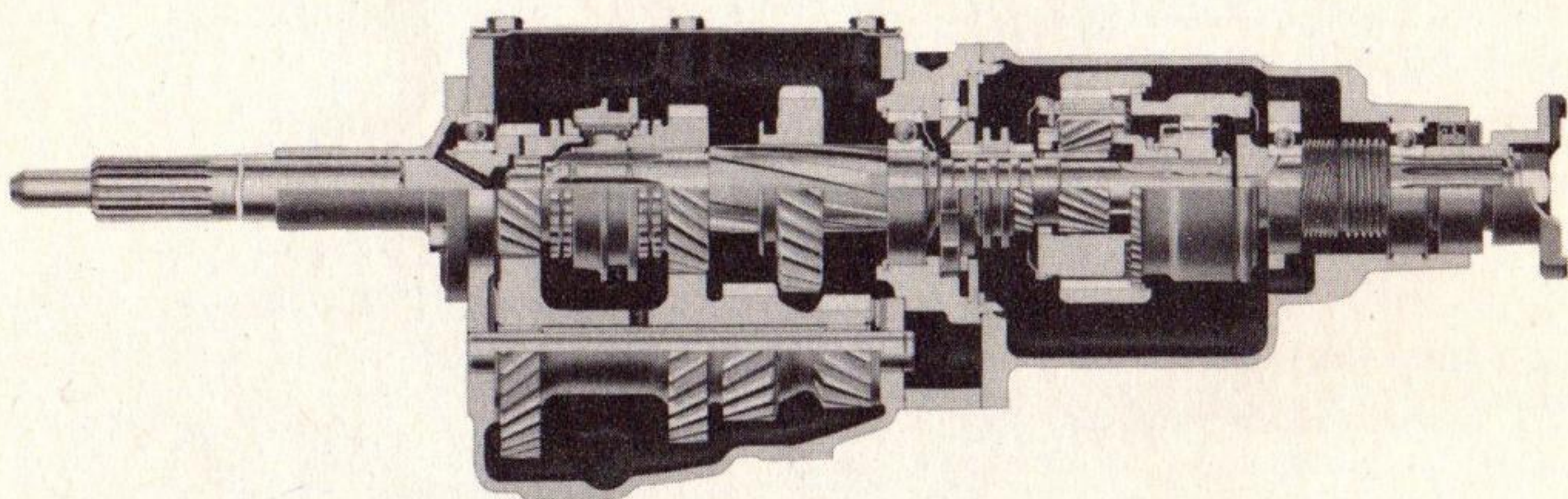
Operation in overdrive gives approximately a 30% reduction in engine speed relative to the normal engine speed for any given car speed.

The engagement and disengagement of the overdrive is automatic but is only effective at the discretion of the driver.

If it is desired to operate the car in *conventional* gear pull the overdrive control knob all the way out.

If it is desired to operate the car with *overdrive* the knob should be pushed all the way in.

With the overdrive knob all the way in the overdrive mechanism is prepared to function automatically at the further discretion of the driver.



When the car reaches a forward speed of approximately 25 M.P.H. the overdrive controls automatically function to *prepare* the overdrive to go into operation. However the car does *not* go into overdrive until the operator momentarily raises his or her foot slightly on the accelerator pedal. This very slight engine deceleration permits the overdrive to complete its engagement.

Overdrive is essentially a "cruising" speed and when overtaking and passing another car in traffic it may be desirable to have the greater acceleration afforded by conventional "third" or high gear.

To obtain this increased acceleration press the accelerator pedal smoothly and *completely to the floor* which will close the "kick down" switch and the transmission will revert to conventional "high gear".

As soon as the accelerator pedal is released slightly the transmission will again go back into overdrive automatically.

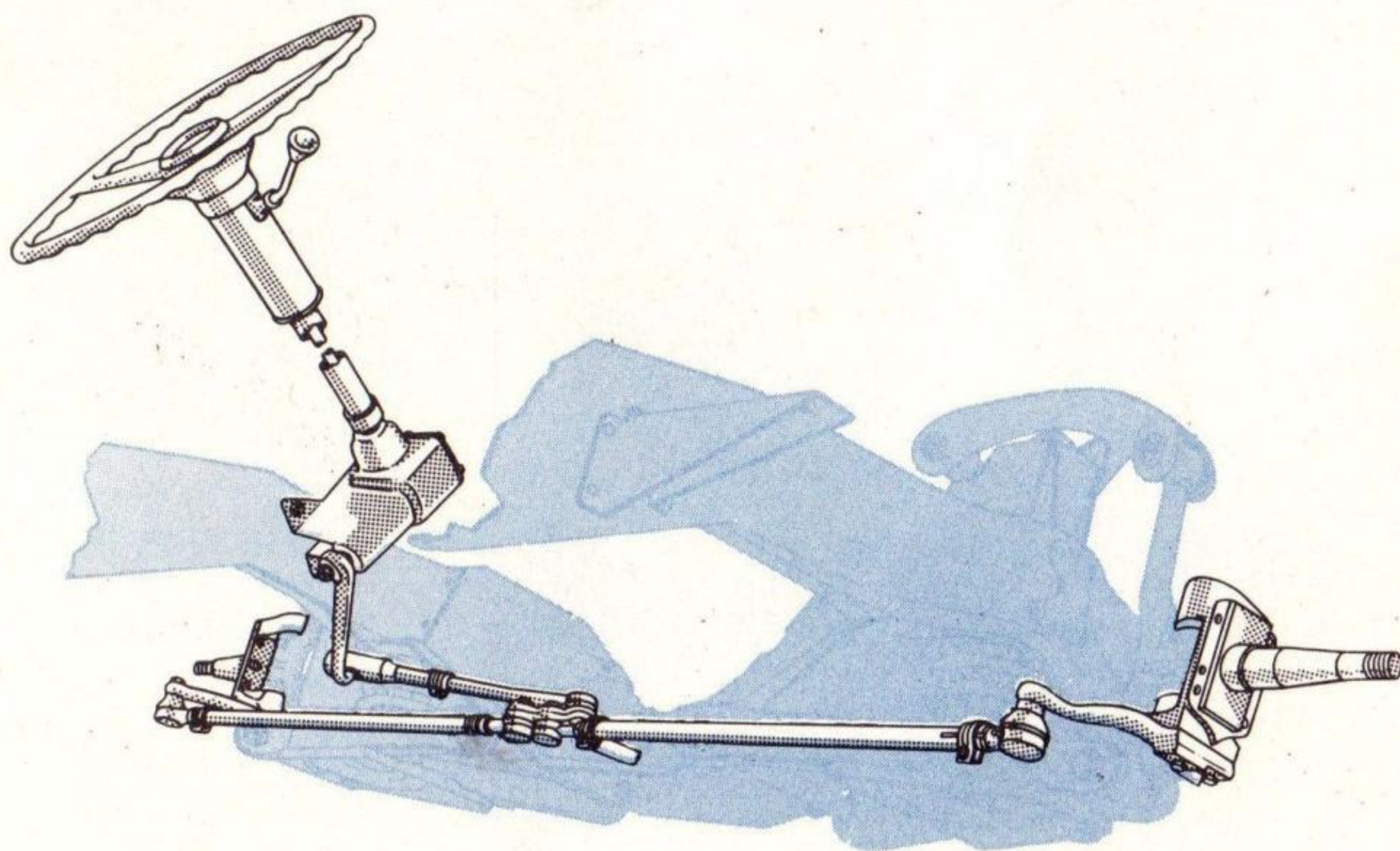
Upon normal deceleration, when the car speed has decreased to approximately 20 M.P.H. the overdrive will automatically disengage and the car will go into conventional "high" gear.

TRULINE STEERING

Many factors other than the steering gear and linkage contribute to give the driver of the new Frazer ease and a sense of security in driving both at high speed on the highway and in congested city traffic.

The whole car, as well as the chassis, is engineered for perfect weight distribution and balance. This, in conjunction with correct steering geometry, a modern easy operating steering gear, and properly balanced front suspension, reduces to a minimum the amount of physical effort required of the driver.

The steering mechanism is of the worm and roller tooth type. precision machined for smooth operation and durability. Needle bearings extend the full length of the roller tooth and tapered roller bearings are provided for the worm. Anti-friction bearings in these vital locations assure ease of operation and long life of all moving parts.



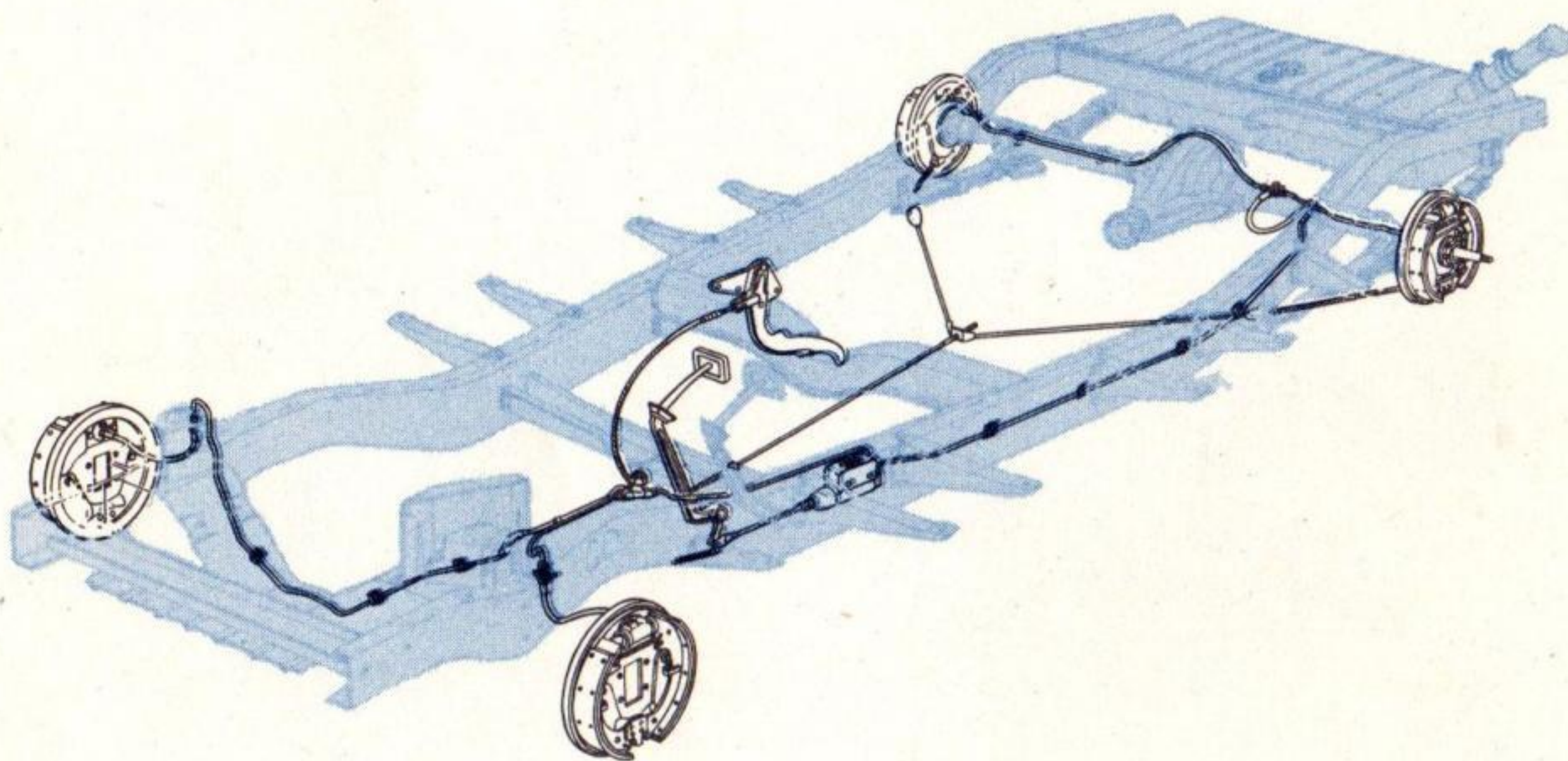
The linkage between the steering gear and knuckles is designed so that each wheel is free to follow road contour without affecting the other, without altering the balance of the linkage, and therefore, without transmitting shocks to the steering wheel.

The "Micro-Finish Bearingized Bores" of the steering knuckles are provided with "floating" split type steel backed bushings which are easily replaceable.

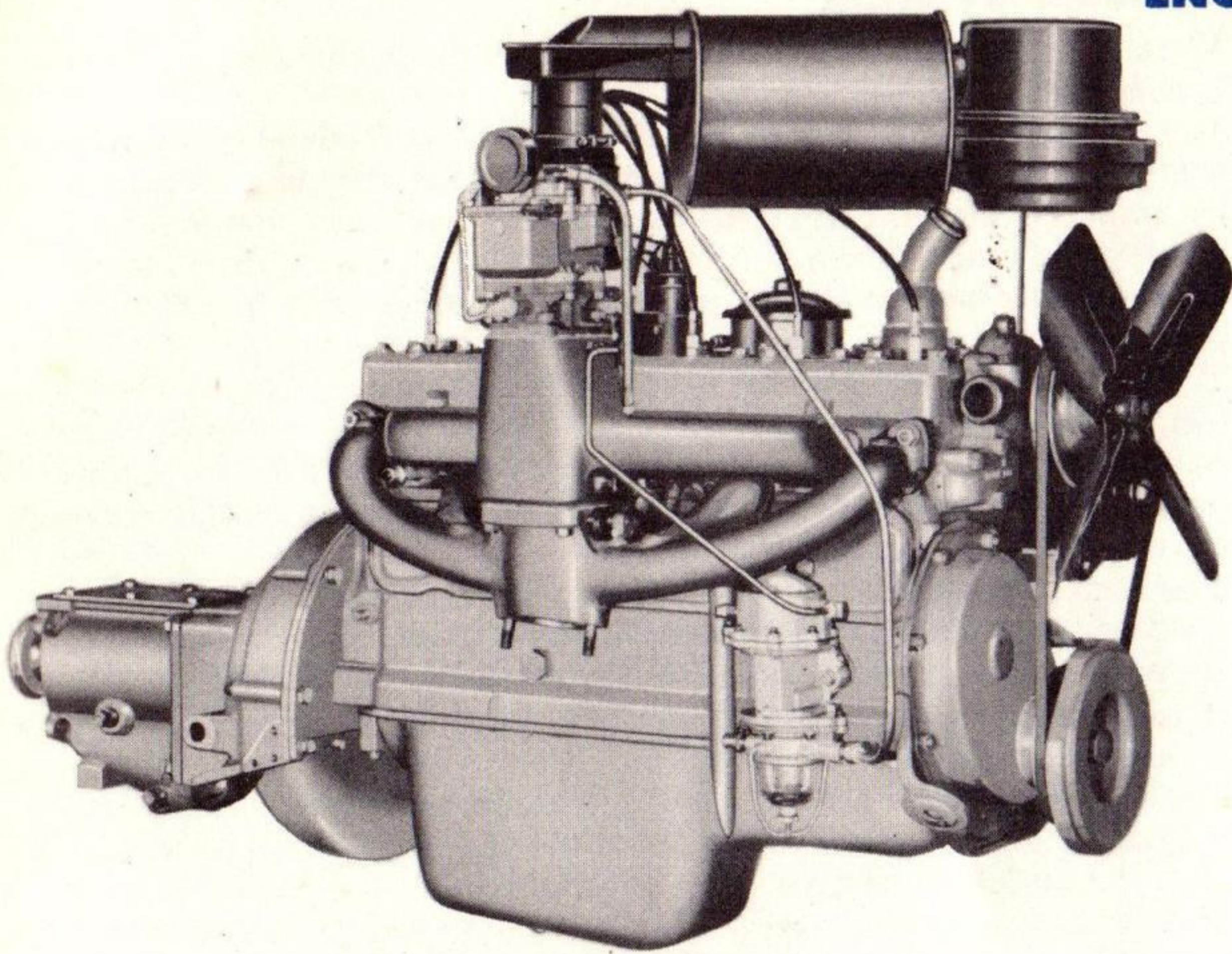
This sound, well balanced steering system insures perfect "Truline" steering that is not noticeably affected by cross winds or rough roads. After a turn, the wheels automatically return to a straight-a-way driving position when the steering wheel is released. Parking is simplified with the short turning radius—20 feet in either direction.

HYDRAULIC BRAKES

Safe driving under modern driving conditions demands ample and dependable braking action. This is obtained by the use of powerful fast acting hydraulic service brakes actuated by light, positive pedal pressure. Operation of the brake pedal develops pressure in the master brake cylinder. By hydraulic principles, this pressure is increased and applied to each of the wheel cylinders through a system of tubing. The wheel cylinders are equipped with pistons that convert the hydraulic pressure into the mechanical power which expands the brake shoes. The "floating" type brake shoes are provided with molded linings which bear on steel backed, cast alloy-iron brake drums. This combination of hydraulic action and braking surfaces gives the safest most positive braking action and reduces scoring and distortion of brake drums to a minimum.



Another feature of Frazer brake action is the balance of braking effort between the front and rear wheels. Because of the shifting of car weight from the rear to the front wheels in making a stop, a greater proportion of the braking effort should be applied to the front wheels. However, such distribution of braking effort must be very carefully engineered in order to prevent "pitching" of the car in sudden stopping. To accomplish this approximately 56% of the braking effort is applied at the front and 44% at the rear wheels. This braking effort distribution when applied to the self-centering type of brake, with which the Frazer is equipped, produces safe, smooth, even stops from all speeds.



DUAL MANIFOLD ENGINE

An engine is a machine that uses power to do work, particularly one that converts some form of energy, especially heat, into mechanical power.

An internal combustion engine—the type used in your car, is one that obtains its power by the combustion, or burning of fuel in a confined space—its cylinders. The pistons, acting as pumps draw the fuel from the carburetor into the intake manifold where it is highly vaporized by mixing with air in the proportion of about one part of gasoline to fifteen parts of air (by weight). This air-fuel mixture is then drawn into each cylinder (intake stroke) where it is highly compressed (compression stroke) and ignited by the spark plug. The mixture burns, the hot gases of combustion, attempting to expand, exert extremely high pressures on the pistons (power stroke) forcing the pistons down the cylinders. By means of the connecting rods and crankshaft, this straight piston motion is converted to the rotary motion necessary to drive the car. The gases of combustion, expanded and their power spent, are then driven out of the cylinder by the returning piston (exhaust stroke).

This is the fundamental principle of the four stroke engine—intake, compression, power and exhaust.

The sequence, or firing order of the cylinders, the ignition timing or firing of the cylinders, the carburetion, or mixing of fuel and air are all peculiar to the particular engine design. In the Frazer engine these factors and many others are engineered to give the superlative performance that you will appreciate in driving your car.

ELECTRICAL SYSTEM

The electrical system of your car consists of the following components:

1. Generator

The generator is belt driven from the engine and converts mechanical energy to electrical energy. It has an output capacity of approximately 35 amperes (ample current to supply the combined requirements of all electrical units) and requires very little servicing or attention other than periodic lubrication and assurance of proper drive belt tension.

2. Battery

The function of the battery is to store electrical energy in chemical form, during normal operation of the car, in order to supply current to operate the starting motor or to supply current for the operation of other electrical units when the engine is not running or is running below generator "cut in" speed.

The battery supplied with your car is a high capacity 15-plate battery with an output capacity of 100 ampere-hours. This is based on a 20-hour discharge rate and means that the fully charged battery is capable of delivering 5 amperes for a total of 20 hours and still have a terminal voltage of 5.7 volts.

The battery requires no attention other than to keep the electrolyte at the proper level (approximately $\frac{1}{4}$ " above the top of the plates) and to keep the cable connections clean and tight.

The condition or "charge" of the battery can be determined by measuring the specific gravity of the electrolyte with a hydrometer. The electrolyte from a fully charged battery should give a reading of approximately 1.250 to 1.280 on the hydrometer.

The state of charge of a battery also determines the battery's resistance to freezing. A fully charged battery will withstand very low temperatures while a "discharged" battery freezes very easily. *Never leave your car stand inoperative in cold weather with a discharged battery as it may freeze and ruin the battery.* A difference of as much as $\frac{3}{16}$ " in the level of the electrolyte may occur, due to contraction in cold weather. For this reason, the electrolyte level should be checked or water added when the battery is at or near normal operating temperature and when it is intended to operate the car for some time. This will avoid over-filling and give the added water time to mix thoroughly with the electrolyte.

3. Voltage Regulator

Inasmuch as the generator does not run at a constant speed, but at speeds proportionate to engine speeds, some method must be used to control the output of the generator in order to maintain the system voltage at the desired level and prevent overcharging of the battery, overloading of the generator or attempted "motorizing" of the generator.

This is the function of the voltage regulator and is accomplished automatically. Various degrees of "charge" and "discharge" as indicated by the ammeter are normal conditions in the normal operation of the car. However, with extended operation of the car the ammeter should return to "zero". Continued indications of "charge" or "discharge" or excessive fluctuations of the ammeter are abnormal, and an immediate investigation should be made as to the cause.

4. Ignition system

The function of the ignition system is to amplify and distribute the electrical energy to "fire" the cylinders. This is accomplished by means of the ignition coil, distributor and spark plugs.

The ignition coil consists of co-axially wound "primary" and "secondary" coils. The "primary" coil, of relatively few turns, is energized when you turn on the ignition switch. This circuit is periodically interrupted, by the opening of the "breaker points" in the distributor. When this circuit is interrupted, the collapsing of the magnetic field around the "primary" and "secondary" coils induces a high voltage in the closely wound "secondary" coil. The "secondary" coil is connected to the distributor rotor which alternately distributes this high voltage "impulse" to each of the cylinder spark plugs in firing order sequence.

The distributor is gear driven from the engine camshaft and is so adjusted that the operation of the breaker points, and the position of the rotor, with regard to the terminals of the leads to the spark plugs, concurs with the operation of each piston on the compression stroke, to fire the gasoline charge in each cylinder at the proper time and in the proper firing sequence. Automatic compensation for various engine loads and speeds is provided for by centrifugal and vacuum advance and retard of the ignition.

5. Lighting system

The headlights are hermetically sealed units consisting of filaments, reflectors and lenses combined into a single easily replaceable unit having long life and requiring no other maintenance than to assure proper aiming of the unit. The two filaments in each unit are so located, in respect to the reflectors, that operation of the foot switch selects either the "high" or "low" beam.

6. Wiring system

The wiring system of your car provides the "arterial" connections between the various electrical units. In order to provide long life, resistance to weather, compactness and ease of replacement the wiring system is composed of durable Vinylite covered wiring "harnesses" which will afford trouble-free service throughout the life of the car.

7. Protective devices

In order to protect the electrical units and wiring of your car and to isolate electrical failures, should they occur, the electrical system is provided at all necessary points with fuses or automatic reset circuit breakers.

It is good practice to carry a spare set of fuses for replacement. If a fuse "blows" replace it, for the cause may be transient and the trouble may not reoccur. However, if the fuse "blows" again there is probably a definite fault which should be discovered and corrected before the circuit is re-fused. *Never* wrap a fuse with tinfoil or a similar conductor as this may result in serious damage to the wiring or may even cause fire.

8. Instruments, switches, etc.

(See Section "KNOW YOUR INSTRUMENTS AND CONTROLS")

SPECIFICATIONS

GENERAL:

Wheel Base.....	123½ inches
Overall Length (with bumpers and guards).....	207½ inches
Overall width.....	72⅞ inches

TIRES:

Size.....	7.10 x 15
Recommended Pressure.....	24 P.S.I.

TIRE TREAD:

Front.....	58 inches
Rear.....	60 inches

CAR WEIGHT (Approx. Curb Weight).....3600 lbs.

TURNING RADIUS.....20 feet

CLUTCH PEDAL FREE PLAY.....¾ inch to 1 inch

BRAKE PEDAL FREE PLAY.....¼ inch to ⅜ inch

**COOLING SYSTEM CAPACITY13½ quarts
(With Heater)....14½ quarts**

ENGINE:

Type.....	L-head vertical
No. of cylinders.....	6
Bore.....	3⅝ inches
Stroke.....	4⅜ inches
Piston Displacement.....	226.2 cubic inches
Brake Horsepower.....	112 at 3600 RPM
Compression Ratio.....	7.3 to 1
Ignition Timing.....	4° BTDC
Firing Order.....	1-5-3-6-2-4

VALVE CLEARANCE (Cold):

Intake.....	014 inch
Exhaust.....	014 inch

LUBRICATION SYSTEM:

Type.....	Pressure
Normal Oil Pressure.....	35 P.S.I.
Crankcase Capacity.....	5 quarts
Oil Pump Type.....	Gear
Oil Intake Type.....	Floating screen
Oil Filter Type.....	Cartridge

FUEL SYSTEM:

Tank Capacity.....	21 gallons
--------------------	------------

AIR CLEANER:

Type.....	Oil bath
Capacity.....	Fill to indicated level

ELECTRICAL SYSTEM:

Distributor Breaker Gap.....	.020-.024 inch
Distributor Breaker Arm Tension.....	17-20 ounces
Firing Order.....	1-5-3-6-2-4

SPARK PLUG:

Size.....	14 MM
Gap.....	.032 inch

BATTERY:

Capacity (Amp.Hr.).....	100 Ampere/hours
Number of Plates.....	15

GENERATOR:

Type.....	Shunt wound—35 amperes
Brush Spring Tension.....	35-53 ounces (new brushes)

WHEN IN TROUBLE

ENGINE WILL NOT CRANK WHEN STARTER BUTTON IS PRESSED

In most cases the cause is a discharged battery and the most simple method of starting the car is to push it (with overdrive control in the "out" position and transmission in "high gear").

When the engine is started, a high charging rate, as indicated by the ammeter, will confirm the discharged battery diagnosis.

If the car is to be driven for some time the normal operation of the generator will restore the battery charge.

In any event a check should be made as soon as possible to determine the cause of the discharged battery to prevent a recurrence of the difficulty.

ENGINE CRANKS BUT WILL NOT START

Be sure that the ignition switch is turned to the right (on) position and that there is fuel in the fuel tank. Now follow the procedure below for whichever of the conditions that apply.

- (a) If the engine is wet, wipe all moisture from the distributor cap, coil, spark plugs and spark plug wires.
- (b) If the engine is hot, press the accelerator slowly and *completely* to the floor and crank the engine. This will relieve any vapor lock that may have occurred.
- (c) If the engine is flooded (due to repeated failures to start, or to over operation of the accelerator) press the accelerator slowly and *completely* to the floor and crank the engine. This will exhaust the excess fuel mixture.
- (d) If the engine is extremely cold check to make sure that the "climatic control" choking mechanism is operating properly. Remove the carburetor air cleaner and observe the position of the choker valve. With a cold engine the choker valve should be closed. If the choker valve is open (indicating malfunction of the "climatic control") the engine may be choked by placing the hand over the air intake and cranking the engine.
- (e) If the engine cranks slowly the indication is that the battery is partially discharged or that the engine oil viscosity is too great for the prevailing temperature. Start car by pushing (with overdrive control in the "out" position and transmission in "high gear").
- (f) Determine if fuel is being delivered to the carburetor by disconnecting the fuel line at the carburetor and, cranking the engine, observe if fuel is discharged from the line.
- (g) Determine if current is being delivered to the spark plugs by detaching the wire from any plug and, holding the wire terminal about $\frac{3}{16}$ inch from the cylinder head, crank the engine. If a spark does not jump this gap, the ignition system is at fault.

DO—When any difficulty has been experienced in starting or operating the car—if the cause is not obvious and easily remedied—take your car to your authorized Kaiser-Frazer Dealer and have the difficulty thoroughly diagnosed and properly corrected.

DON'T lightly dismiss any trouble as transient as this may allow other functions to become involved and lead to greater difficulties.

CAR IDENTIFICATION AND LICENSE DATA

Owner's Name _____

Owner's Address _____

Dealer's Name _____

Dealer's Address _____

Model (Year) _____

Body Type _____

Serial Number _____

Engine Number _____

Number of Cylinders—6

Bore— $3\frac{5}{16}$ " Stroke— $4\frac{3}{8}$ "

A.M.A. Horsepower—26.3 HP.

Maximum Brake

Horsepower Rating—112 @ 3600 RPM (Dual Manifold)

Piston Displacement—226.2 Cubic Inches

KEYS

Four keys come with your car; two for the ignition lock, and doors, and two for the trunk and glove box (De Luxe). The key or lock number is stamped only on the tag attached to the keys. For protection against theft, record the number and destroy the tag.

Ignition Key Number _____

Trunk Key Number _____

ADDITIONS AND IMPROVEMENTS

The Kaiser-Frazer Corporation reserves the right to make changes in design or to make additions to, or improvements in, its product without imposing any obligation upon itself to install them on its products previously manufactured.

