BUICK

REFERENCE BOOK

1932

THE EIGHT AS BUICK BUILDS IT

Oil changed [illegible]
[illegible] [illegible] - 32
[illegible] [illegible] bath @ [illegible]
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Oil [illegible] 6,050 [illegible] qts

Feb - [illegible] - 33
[illegible] [illegible] @ 70[illegible]
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Fri - Dec - 1 - 33
[illegible] changed @ [illegible] 14.716 [illegible]

Thur - Mar - 1 - 34
Oil changed @ Nimmeys 17.277 [illegible]
Thur - May - 17 - 34
Oil changed @ Nimmeys 19.586 - HyVis 9 qts

PRINTED IN U. S. A.—55

Reference Book

1932 Models

Series 32-50—114″ Wheelbase

Model 32-55	Sport Phaeton	5 Passenger
Model 32-56	Business Coupe	2 Passenger
Model 32-56S	Special Coupe	4 Passenger
Model 32-56C	Convertible Coupe Roadster	4 Passenger
Model 32-57	Sedan	5 Passenger
Model 32-57S	Special Sedan	5 Passenger
Model 32-58	Victoria Coupe	5 Passenger
Model 32-58C	Convertible Phaeton	5 Passenger

Series 32-60—118″ Wheelbase

Model 32-65	Sport Phaeton	5 Passenger
Model 32-66	Business Coupe	2 Passenger
Model 32-66S	Special Coupe	4 Passenger
Model 32-66C	Convertible Coupe Roadster	4 Passenger
Model 32-67	Sedan	5 Passenger
Model 32-68	Victoria Coupe	5 Passenger
Model 32-68C	Convertible Phaeton	5 Passenger

Series 32-80—126″ Wheelbase

Model 32-86	Victoria Traveler Coupe	5 Passenger
Model 32-87	Sedan	5 Passenger

Series 32-90—134″ Wheelbase

Model 32-95	Sport Phaeton	7 Passenger
Model 32-90	Sedan	7 Passenger
Model 32-90L	Limousine	7 Passenger
Model 32-91	Club Sedan	5 Passenger
Model 32-96	Victoria Coupe	5 Passenger
Model 32-96S	Country Club Coupe	4 Passenger
Model 32-96C	Convertible Coupe Roadster	4 Passenger
Model 32-97	Sedan	5 Passenger
Model 32-98	Convertible Phaeton	5 Passenger

Buick Motor Company

Division of General Motors Corporation

Flint, Mich., U. S. A.

SECOND EDITION

February, 1932

WARRANTY

This is to certify that we, THE BUICK MOTOR COMPANY, Flint, Michigan, U. S. A. WARRANT each new passenger automobile manufactured by us, to be free from defects in material and workmanship under normal use and service, our obligation under this Warranty being limited to making good at our factory any part or parts thereof, including all equipment or trade accessories (except tires) supplied by the Car Manufacturer, which shall, within ninety (90) days after making delivery of such vehicle to the original purchaser or before such vehicle has been driven 4,000 miles, whichever event shall first occur, be returned to us with transportation charges prepaid, and which our examination shall disclose to our satisfaction to have been thus defective; this warranty being expressly in lieu of all other warranties expressed or implied and of all other obligations or liabilities on our part, and we neither assume nor authorize any other person to assume for us any liability in connection with the sale of our vehicles.

This warranty shall not apply to any vehicle which shall have been repaired or altered outside of an Authorized Buick 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.

The Manufacturer reserves the right to make changes in design or add any improvements on motor vehicles and chasses at any time without incurring any obligation to install same on motor vehicles and chasses previously purchased.

LOCK YOUR CAR

All Buick models are equipped with an effective anti-theft lock and the owner should take advantage of this protection by making a practice of ***always*** locking the car when parking.

IF YOUR CAR IS STOLEN—

1. It may be wrecked by a joy-rider.

2. You will have to notify the police and your insurance company.

3. Your theft insurance cost may be higher next year, because the rate will be based largely on how much it costs the insurance companies this year.

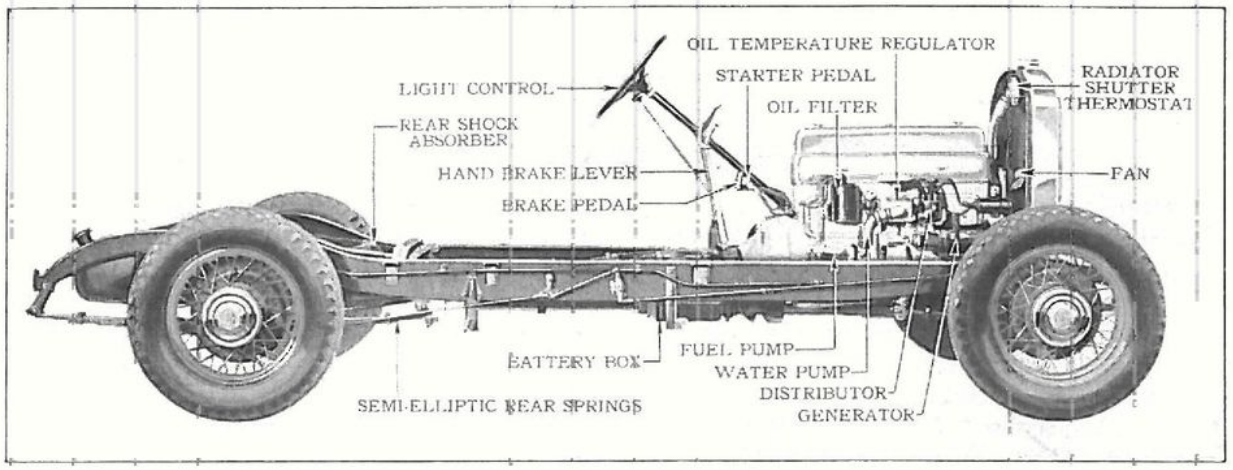
4. You will suffer inconvenience without your car until the insurance company settles.

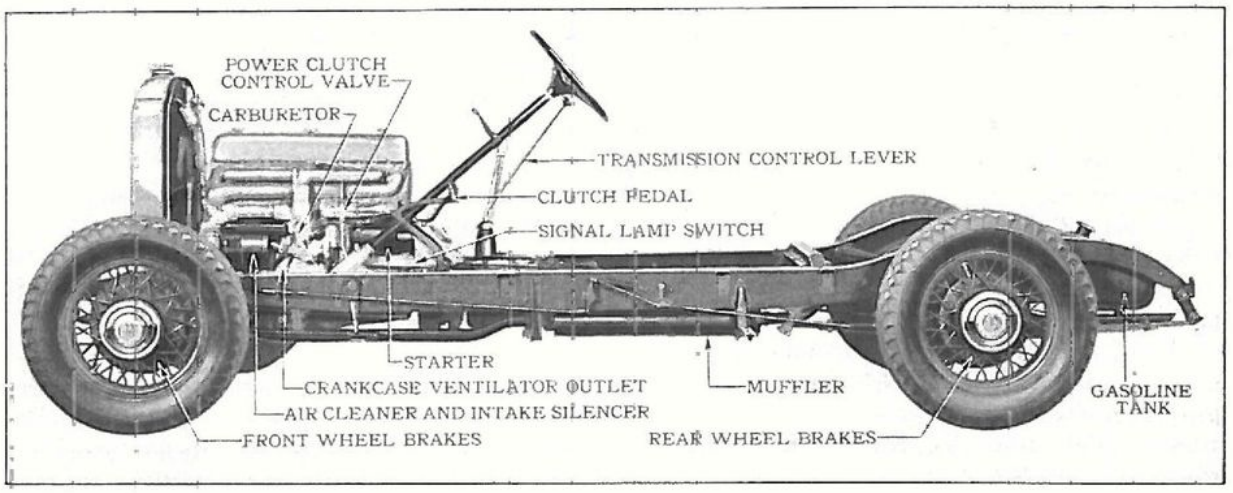
5. You may have to go to court to identify your car if recovered.

6. You may aid the thief to carry out other and perhaps worse crimes by not locking your car.

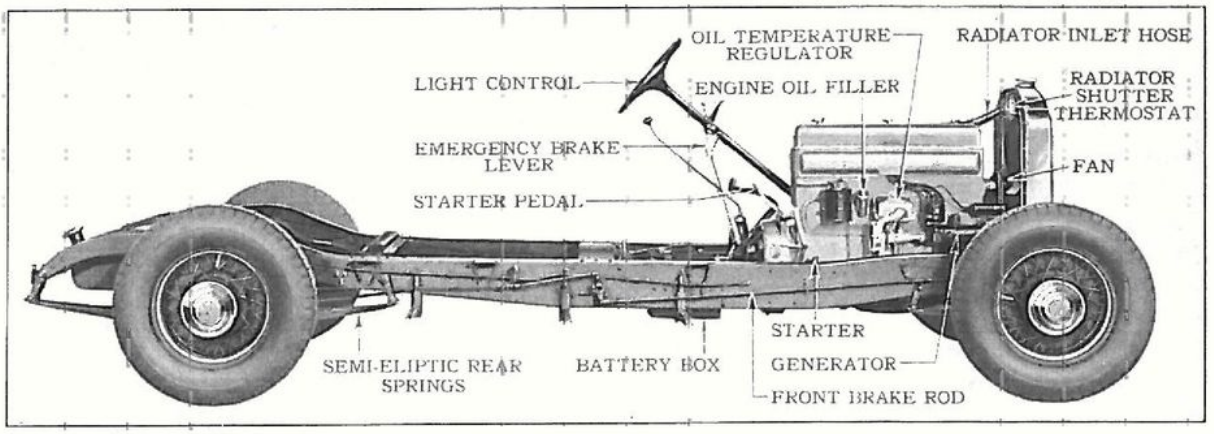
SO—LOCK YOUR CAR

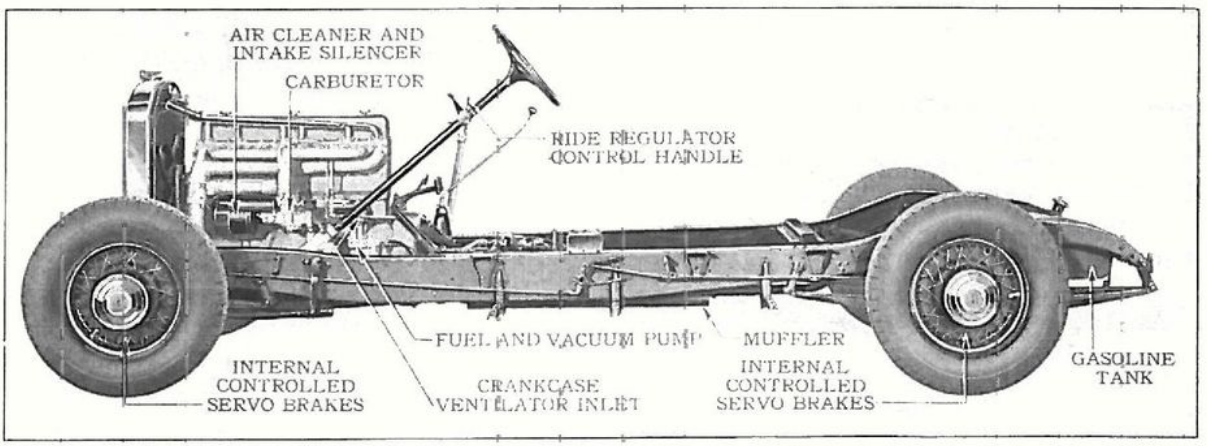
BUICK MOTOR COMPANY
DIVISION OF GENERAL MOTORS CORPORATION





RIGHT AND LEFT SIDE VIEWS—SERIES 32-50 CHASSIS





RIGHT AND LEFT SIDE VIEWS—SERIES 32-90 CHASSIS

SPECIFICATIONS

Weights—

See your dealer for shipping weights and other information necessary for license purposes.

H. P. Rating—

S. A. E. or N. A. C. C., Series 32-50—27.61; Series 32-60—30.02; Series 32-80—32-90—35.12. Brake H. P., H. C. Head, Series 32-50—82.5 at 3200 R. P. M.; Series 32-60—96 at 3200 R. P. M.; Series 32-80—32-90—113 at 3200 R. P. M.

Bore—

Series 32-50—$2\frac{15}{16}$″; Series 32-60—$3\frac{1}{16}$″; Series 32-80—32-90—$3\frac{5}{16}$″.

Stroke—

Series 32-50—$4\frac{1}{4}$″; Series 32-60—$4\frac{5}{8}$″; Series 32-80—32-90—5″.

Cylinders—

Eight (8) cylinders all models.

Firing Order—

1-6-2-5-8-3-7-4.

Displacement—

Series 32-50—230.4 cu. in.; Series 32-60—272.6 cu. in.; Series 32-80—32-90—344.8 cu. in.

Compression—H. C. Head—

Series 32-50—106.5 lbs.; Series 32-60—106 lbs.; Series 32-80—32-90—99 lbs.

Compression Ratio—H. C. Head—

Series 32-50—5.09 to 1; Series 32-60—5.03 to 1; Series 32-80—32-90—4.8 to 1.

Serial No.—

On plate on right side of frame, beneath front fender.

Engine No.—

On right side of upper crankcase above oil filler.

Wheel Base—

Series 32-50—114″; Series 32-60—118″; Series 32-80—126″; Series 32-90—134″.

Tread—

	32-50	32-60	32-80	32-90
Front.....	$57\frac{15}{16}$″	$57\frac{5}{8}$″	$57\frac{7}{8}$″	$57\frac{7}{8}$″
Rear.....	$57\frac{7}{8}$″	$58\frac{3}{4}$″	59″	59″

Chassis Lubrication—

Zerk lubrication system.

Engine—

Eight cylinder, four stroke cycle.

Valve-in-head type.

Unit power plant suspended at four points.

Cylinder block and crankcase cast integral.

Crankshaft supported by five large bearings and equipped with counter weights and torsion balancer.

Connecting rods and pistons properly balanced.

Large valves mounted in detachable head, readily accessible and operated by adjustable push rods.

Camshaft has five bearings in Series 32-50 models and six bearings in Series 32-60, 32-80 and 32-90 models and cams are forged integral with shaft.

Piston pins are case hardened and ground.

Pistons are of cast iron, with three piston rings above pin. The upper two are compression and the lower, oil-seal type.

Cooling—

Water in the cooling system is circulated by a centrifugal pump, driven by spiral gears from the camshaft and its temperature is controlled by a thermostatically operated radiator shutter. The fan is driven by belt from pulley on the crankshaft.

Capacity of the cooling system: Series 32-50—3 gallons; Series 32-60—4 gallons; Series 32-80—32-90—$4\frac{3}{4}$ gallons.

Lubrication—

The engine lubricating system is of the pressure feed type, oil being forced to all main and rod bearings, camshaft bearings, rocker arms, push rods and timing gears. Cams, pistons and piston pins are lubricated by oil mist thrown from connecting rod bearings. The system includes oil pressure gauge on the instrument board, oil filter mounted on right side of engine, oil level gauge and drain plug, and oil temperature regulator. Engine oil capacity, dry engine: Series 32-50—9 quarts; Series 32-60—$11\frac{1}{2}$ quarts; Series 32-80—32-90—$12\frac{1}{2}$ quarts. Refill: Series 32-50—7 quarts; Series 32-60—8 quarts; Series 32-80—32-90—9 quarts.

Carburetor—

The carburetor used on all 1932 models is a Marvel automatic air valve multiple jet type, supplied by a fuel pump. All Series are equipped with dual carburetors, employing a single float bowl with twin mixing chambers, air valves, throttles and heat risers. All models have manual heat control, and are equipped with air cleaner and silencer on carburetor intake and gasoline strainer on fuel pump.

Starting, Lighting and Ignition—

All models are equipped with the Delco-Remy two-unit system, which includes generator, distributor, ignition coil, starting motor, cut-out relay, current limit relay, light control switches and battery. The generator is thermostatically con-

trolled and a current limit relay protects the system from short circuit.

The ignition system is of the high tension jump-spark type, the distributor and cut-out relay being mounted on the generator. The distributor includes the automatic spark advance feature with manual control also in the form of a button on the instrument board.

The system includes also a switch for control of head, side and tail lights from the steering wheel and a combination stop and back-up lamp is automatically controlled by brake operation and transmission in reverse gear, except Series 32-50 models which include only the stop light.

Clutch—

The clutch in all Series 32-50 and 32-60 models is a single dry disc type, self contained and enclosed in a pressed steel cover bolted to the flywheel. In Series 32-80 and 32-90 models, the clutch is a two plate dry disc type, self-contained and mounted in the flywheel. Ball bearing release is provided in both types, with lubrication by means of an oil cup.

Transmission—

All 1932 models are equipped with the Buick Synchro-Mesh transmission, a selective type with three speeds forward and one reverse. The first and reverse speeds are conventional sliding gears while the second speed gears are in constant mesh, and have helical teeth, designed for quiet operation. All gears are chrome nickel steel, heat-treated.

Oil capacity of the transmission is four pints or pounds for all models.

Universal Joint—

All models are driven through a single universal joint entirely enclosed by ball drive housing and automatically lubricated from the transmission. The torque tube connects the rear axle to the rear end of transmission by means of the ball drive housing and a leather boot is provided on all models to protect the exposed surface of the universal joint ball.

Rear Axle—

All models of Series 32-50 are equipped with rear axles of the semi-floating type, in which the load of the rear end of the car is carried on the axle shafts. All models of Series 32-60, 32-80 and 32-90 are equipped with three-quarter floating rear axles, the load in this type being carried on the outer ends of the axle housing. The axles of all Series have the torque tube drive, and the main housing is of one-piece pressed steel construction.

The differential in all models is a one-piece, two-pinion type mounted in the axle on New Departure single-row ball bearings. Pinion shafts are supported by New Departure single and double-row ball bearings and wheel bearings are Hyatt roller type. The driving gears are spiral bevel type, fully adjustable.

Oil capacity of rear axles: Series 32-50—3 pts. or lbs.; Series 32-60—7½ pts. or lbs.; Series 32-80—32-90—8½ pts. or lbs.

Front Axle—

All series are equipped with front axle of reverse Elliott type I-beam section, drop-forged and heat-treated.

Steering knuckles are mounted on ball thrust bearings and wheel bearings are of New Departure cup and cone type.

Brakes—

All 1932 models are equipped with Buick controlled servo, internal expanding shoe type, mechanically operated four wheel brakes. The parking brakes are operated by means of the hand-brake lever in the driving compartment. The hook-up is such that the brakes on all wheels can be operated by either the brake pedal or the hand lever, independently of each other.

Wheels—

Wire and wood wheels, demountable at the hub, are standard equipment on all models, except 32-56 and 32-57, on which artillery wood wheels are used. All demountable wheels are made with drop center rims while artillery wheels use demountable rims. Front and rear demountable wheels are interchangeable on each series.

Tires—

Tires on all models are low pressure, straight side, cord type, the sizes for the several Series being as follows:

Series 32-50—18 x 5.50—4-ply.
Series 32-60—18 x 6.00—4-ply.
Series 32-80—18 x 7.00—4-ply.
Series 32-90—18 x 7.00—6-ply.

Steering Gear—

Series 32-50—Worm and sector type.

Series 32-60, 32-80 and 32-90—Worm and roller type. In both types, adjustment is provided to take up wear.

Frame—

The frame side rails of all models are made of heavy pressed steel channels, heavy cross members being gussetted to the side rails at the points of greatest strain.

In Series 32-50 models, there are five cross members, the front one which supports front end of engine and radiator being exceptionally heavy.

In Series 32-60, 32-80 and 32-90 models, there are six cross members, and the center one is of the box type, completely enclosing the brake cross shaft.

The frame requires no particular attention, other than to see that the body bolts are tightened as may be necessary and that there are the proper shims between the body and the frame. In the event of accident or collision, it is advisable to have the frame thoroughly inspected and straightened if necessary.

Springs—

Semi-elliptic type, front and rear.

Shock Absorbers—

Hydraulic type, single acting shock absorbers are used both front and rear on all Series 32-50 models.

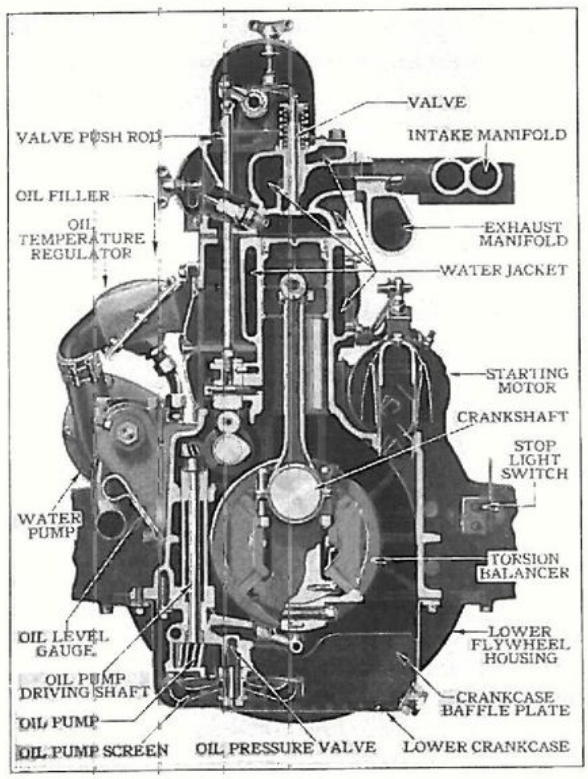
Double acting hydraulic type are used both front and rear on all models of Series 32-60, 32-80 and 32-90.

POWER SYSTEM

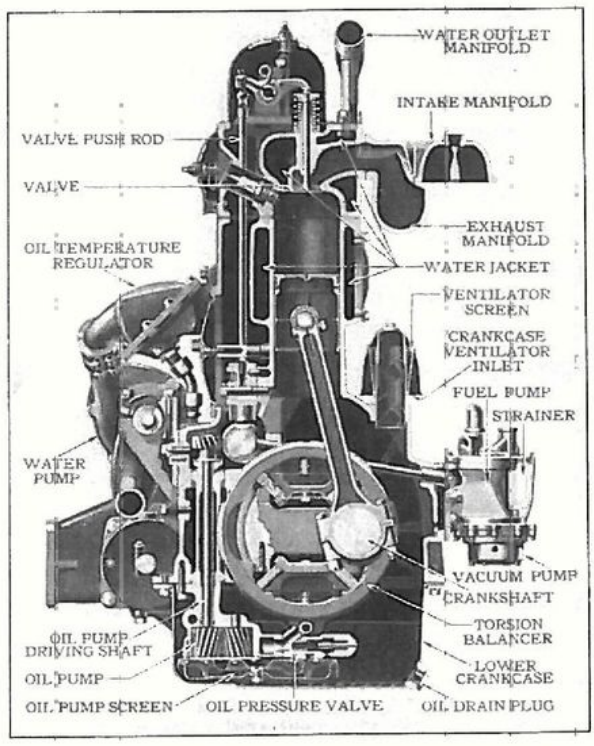
All 1932 Buick models are equipped with an eight cylinder engine, valve-in-head type, there being three sizes, Series 32-50, Series 32-60 and Series 32-80—32-90. It is known as a four-stroke cycle engine and each Series is designed to provide the maximum of power in relation to car weight.

Four strokes of the piston or two revolutions of the crank are required for each explosion or working stroke. The four strokes are as follows:

(a) ***Suction Stroke.*** The intake valve opens and the piston moving down draws a mixture of gas and air into the cylinder from the carburetor.

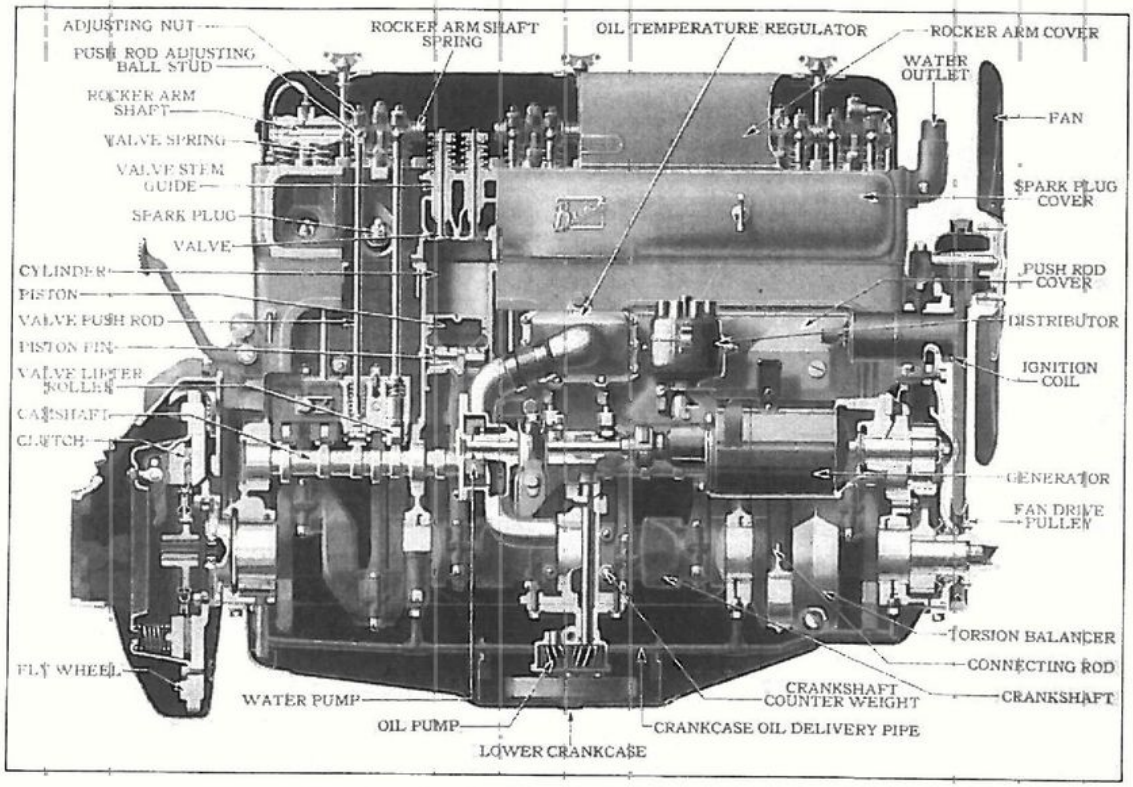


END SECTIONAL VIEW—SERIES 32-50 ENGINE

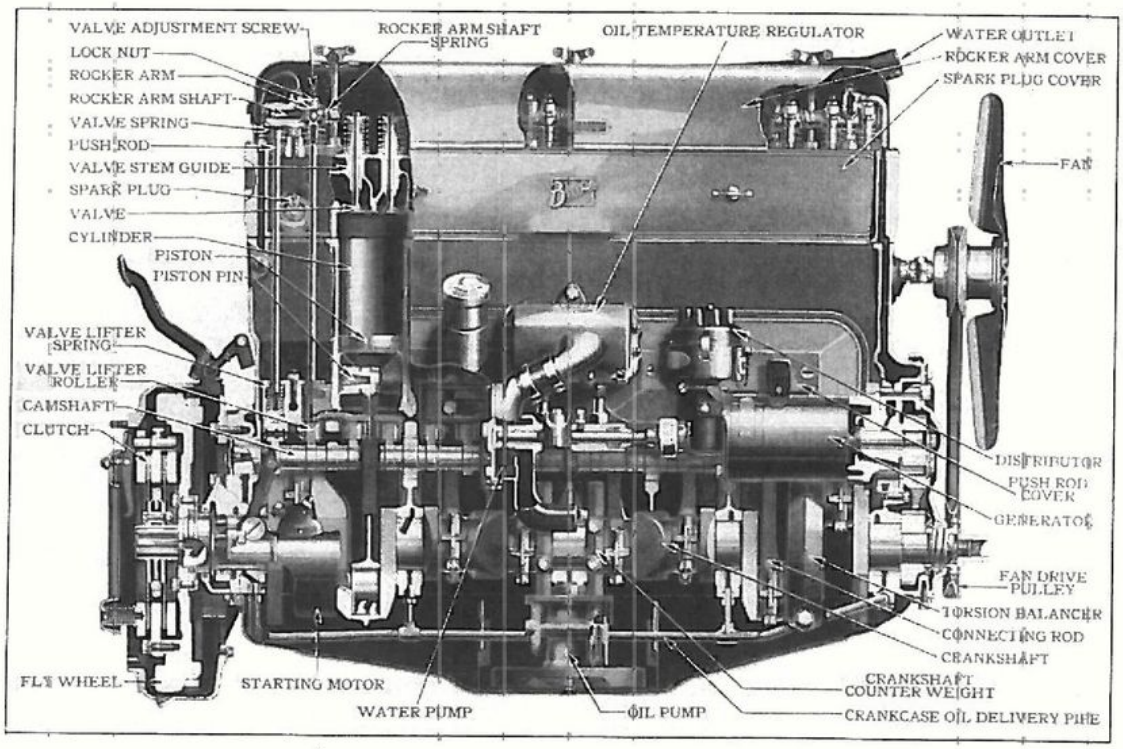


END SECTIONAL VIEW—SERIES 32-90 ENGINE

(b) ***Compression Stroke.*** Intake and exhaust valves closed, the piston moving up compresses the mixture of gas and air into a highly combustible condition.



SIDE SECTIONAL VIEW—SERIES 32-50 ENGINE



SIDE SECTIONAL VIEW—SERIES 32-90 ENGINE

(c) ***Power Stroke.*** When the piston has reached the top of the stroke the spark plug fires and causes an explosion of the compressed gas mixture, forcing the piston down to supply the power.

(d) ***Exhaust Stroke.*** The intake valve remains closed and the exhaust valve now opens, allowing the dead gas to be forced out on the upward stroke of the piston and clearing the cylinder for the next charge.

There is but one power stroke out of four, the other three preparing for the power stroke. The engine has eight cylinders but the crankshaft actually receives only four impulses every revolution.

Piston—

The piston is attached to the upper end of the connecting rod by means of a hardened and ground pin, the driving power being transmitted through the connecting rods to the crankshaft and from this point on through the clutch and transmission to the rear axle and wheels.

Connecting Rods—

Connecting rods are attached to the crank pins of the crankshaft. The natural wear of the crankpin and connecting rod bearings may be taken up by removing, as may be necessary, one or more of the thin shims provided between the rod and its cap. This work should be done by an experienced mechanic, as the rods and pistons must be maintained in proper alignment.

Crankshaft—

The crankshaft is made of high carbon steel, drop-forged and heat-treated, and having five bearings of large diameter. It is also equipped with counterweights and a torsion balancer.

The counterweights are attached to the crankshaft to counter-balance the crankpins and lower ends of the connecting rods. The torsion balancer absorbs the tendency of the crankshaft to twist under the power impulses of the pistons and delivers these impulses back to the shaft after the piston forces are spent. It is mounted on crankshaft between Nos. 1 and 2 crank pins. As part of the crankshaft, it is completely enclosed in the crankcase and protected from dirt and atmospheric conditions.

Camshaft—

The camshaft is made of low carbon steel, drop-forged, case-hardened and is supported by five bearings in Series 32-50 and six bearings in Series 32-60, 32-80 and 32-90.

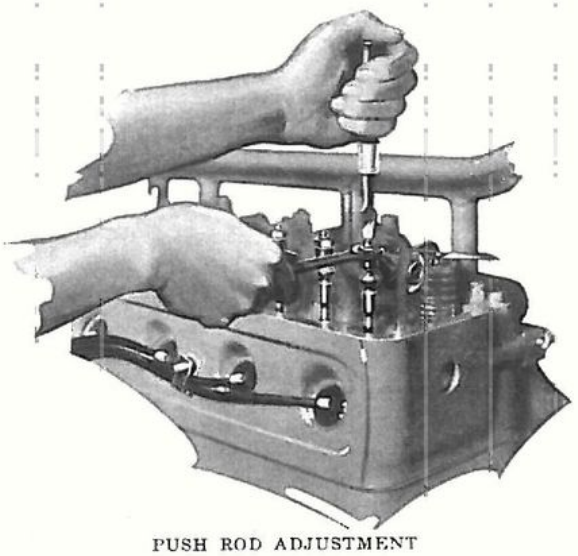
Valves—

The valves (inlet and exhaust) are operated off the cams by means of valve lifters, push rods and rocker arms, opening at the exact point in the cycle determined by the angular relation between the camshaft and crankshaft.

Adjusting Push Rods—

Push rods should be adjusted only when engine is normally hot, the usual method being by means of a feeler as illustrated in sketch, with the engine idling. However, if not practiced in this method, the owner may proceed as follows:—Remove spark plug. Turn engine with hand crank until intake valve closes in cylinder in which adjustment is to be made. Continue to crank until piston reaches top dead center. Both valves in that cylinder may then be adjusted by means of adjusting screw and locknut on end of rocker arm, and clearance between rocker arm and valve stem should be not less than .008″ when engine is hot. Be sure that lock nuts are set up tight.

CAUTION: Closer adjustment than the above will cause trouble, such as loss of power, hard starting, poor gasoline economy, burning and warping of valves, necessity for their frequent grinding, and the blowing out of muffler. For the first 500 miles operation of the new car, the push rods should not be adjusted closer than .010″, in order that the valves may become properly seated.



PUSH ROD ADJUSTMENT

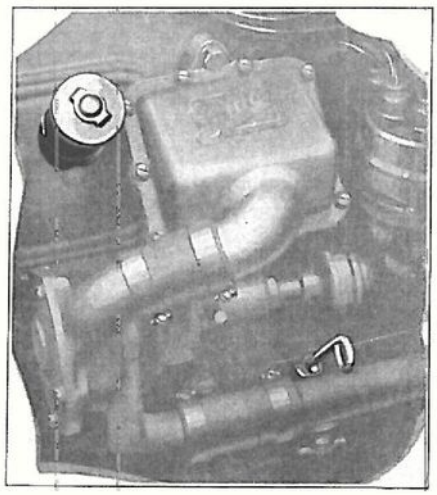
Valve Timing—

The crankshaft gear is one-half the diameter of the camshaft gear, thus driving the camshaft at one-half the speed of the crankshaft. The cam-

shaft gear, therefore, is meshed with the crankshaft gear in such manner that the valves open and close at exact points in the inlet and exhaust strokes. These gears are set in such relation to one another that the position of the pistons and the valves is correctly timed when the punch marks are in line with one another. The tooth and the space, each bearing a single punch mark, are meshed together. ***This setting must be adhered to strictly.***

Engine Lubrication—

The oil is placed in the engine through the oil filler, which is located on the right side of the



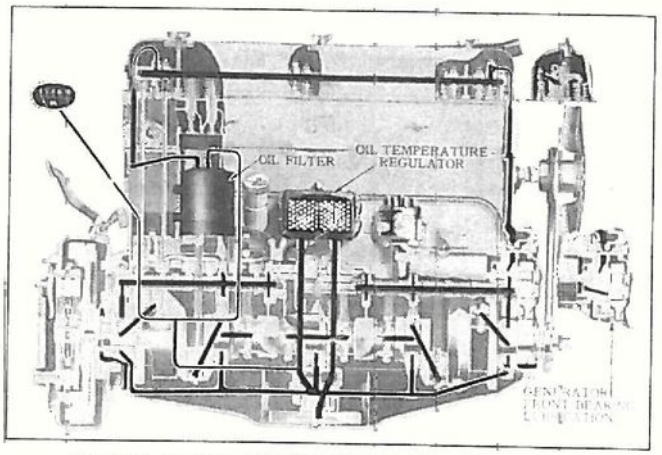
OIL FILLER AND OIL LEVEL GAUGE

engine. The amount of oil in crankcase is accurately measured by an oil level gauge located on the right side of the engine on the upper crankcase and should be maintained to the "full" level as indicated by this gauge. Complete change of oil in crankcase is required only every three months.

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

The engine lubricating system is of the forced feed type. Oil is supplied under pressure from the oil pump to all main, connecting rod and camshaft bearings. A secondary line from the pump delivers oil to the oil filter and thence to the hollow rocker arm shaft. Timing gears and generator shaft front bearings are lubricated by the overflow of oil from the rocker arm shaft.

Cylinder walls, pistons and piston pins, are lubricated by oil forced through a small hole drilled through the lower end of each connecting rod which meters with the hole in crankshaft once each revolution.



ENGINE OILING SYSTEM WITH OIL FILTER AND OIL TEMPERATURE REGULATOR

Oil Temperature Regulator—

The engine lubricating system of all models includes an oil temperature regulator, whose purpose is twofold. First, it acts as a cooler for the oil by preventing a rise in temperature under continued high speed driving, to a point where the lubricating quality of the oil would be reduced. Second, it acts as an oil heater when engine is started cold, since the temperature of the water in the cooling system, under control of the radiator shutter, is raised more quickly than the temperature of the oil in the sump would be raised without the aid of the temperature regulator.

This regulator, in its dual capacity, tends to equalize temperatures of the engine oil and cooling water, thereby providing a more uniform temperature of engine parts with a consequent uniformity of heat expansion throughout the engine.

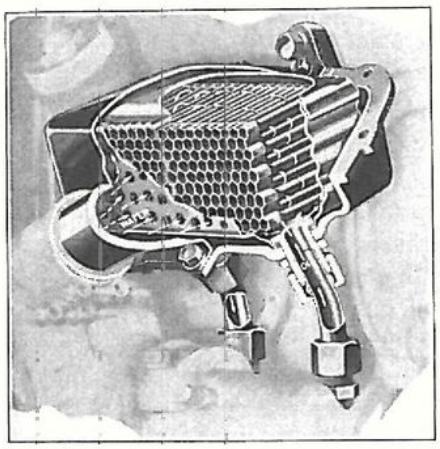
It consists of a radiating core through whose passages the oil is circulated and which is water jacketed by a shell flanged to the cylinder block and connected to the water pump by a hose. All water from the pump is forced through this shell and contacts with the surfaces of the radiating core.

The operation of the oil temperature regulator is as follows: When the engine is started cold, the high viscosity of the oil builds up a resistance in the core passages of the regulator sufficient to cause a by-pass valve in the oil pump to open and permit direct passage of the oil to the bearings without circulation through the regulator. To shorten the period necessary to warm the oil suffi-

ciently to allow circulation through the temperature regulator, the pressure relief valve discharges the excess oil back into the pump body instead of the oil sump.

When the temperature of the engine oil is raised sufficiently to reduce its viscosity to a point where the resistance to flow in the core passages of the regulator is less than that required to hold the by-pass valve open, this valve will close and all the oil supplied by the pump passes through the core of the temperature regulator where it is still further warmed by the water surrounding the core.

If the car is then driven at high speed for any considerable length of time, the temperature regulator assumes its function as an oil cooler.



CUTAWAY—OIL TEMPERATURE REGULATOR

The oil temperature regulator should be cleaned every 20,000 miles, as its efficiency will be lowered in this distance by sediment deposited on the tubes of the core. For proper cleaning, the car should be taken to the nearest authorized Buick service station.

Oil Pump—

The oil pump is located in the lowest point in the lower crankcase and is driven by the camshaft through spiral gears. It consists of two spur gears enclosed in a one-piece housing and is provided with a relief valve to control the oil pressure and a by-pass valve used in the oil temperature regulator system. Both valves are non-adjustable.

Oil is drawn through a fine mesh screen under a dome-shaped cover. This cover ensures a supply of oil to the pump under all driving conditions, providing the proper oil level is maintained in the lower crankcase.

Oil Pressure Gauge—

The oil pressure gauge on the instrument board merely indicates circulation of the oil and does not show when the supply in the crankcase is running low. Check the oil level in the crankcase frequently by means of the oil level gauge. The normal maximum reading on the pressure gauge is 35 lbs. for all models.

CAUTION: If the indicator hand should fall to Zero while engine is running, the engine should be immediately stopped and the reason for the drop in pressure determined.

Oil Filter—

The function of the oil filter is to remove from the crankcase oil, all particles of dirt and carbon not already eliminated from circulation by the oil pump screen. When the filter is entirely free of dirt, its capacity is such that one quart of oil passes through the filter per minute at a car speed of 25 miles per hour. This rate of flow will gradually decrease until such time as filter ceases to function, due to clogging, and while there is no definite limit to the life of the filtering unit, it is advisable to replace this unit after approximately 10,000 miles use.

Owing to improved construction of the filter, the replacement can easily be made and at a reasonable cost.

Crankcase Ventilator—

The crankcase in all models is provided with a ventilating system, to prevent harmful dilution of the engine oil by water and fuel. This system utilizes the crankshaft with its counter weights and torsion balancer, as a blower to force the vapors consisting of fuel and water, from the crankcase into the valve lifter compartment.

A vent at the rear of the rocker arm cover permits air to be forced into the cover and this air is forced also into the valve lifter compartment, carrying with it the vapor from within the rocker arm cover.

An opening from the valve lifter compartment is connected to an outlet pipe between Nos. 4 and 5 cylinders. Vapors forced into this compartment from the crankcase and rocker arm cover are expelled through the outlet pipe below the engine side pan, and are thus prevented from reaching the body of the car.

This ventilating system does not remove all of the fuel dilution, but a small amount is not harmful and is really necessary in cold weather. It does, however, remove all of the water dilution under average driving conditions, and the car owner may assist in preventing harmful dilution by observing the following suggestions.

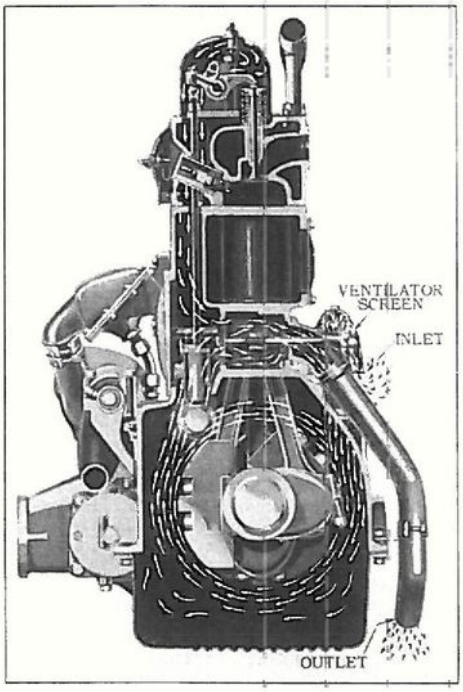
1. Avoid use of the "Choke" longer than necessary.

2. Do not idle engine or drive at extremely slow speeds for long periods of time.

3. Do not flush crankcase with kerosene.

4. Keep the engine in good mechanical condition. See that the compression is good, that the ignition system functions properly and that the carburetor is correctly adjusted.

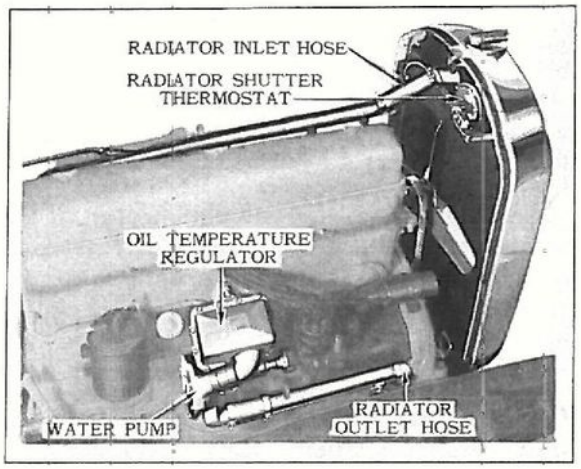
5. An engine in good condition and in proper adjustment should show some appreciable amount of oil consumption. Check the amount of oil in crankcase at regular intervals and maintain level to "full" mark on oil level gauge.



CRANKCASE VENTILATOR

COOLING SYSTEM

The cooling system includes the radiator, cylinder water jackets, water circulating pump, thermostatically controlled radiator shutter, and fan. The water capacity of the cooling system in the various models is as follows: Series 32-50, 3 gallons; Series 32-60, 4 gallons; Series 32-80 and 32-90, 4¾ gallons.



COOLING SYSTEM—SERIES 32-90

Radiator—

The radiator consists of an upper and lower tank connected by many narrow passages in the core. The hot water from the engine enters the upper tank and gradually flows through the passages in the core to the lower tank, while a current of air is circulated through the openings in the core by the fan.

The core is a Harrison Cellular type with copper water passages and copper cooling fins. A pressed steel shell encloses the core and supports it on the frame cross member, to which it is attached by two bolts.

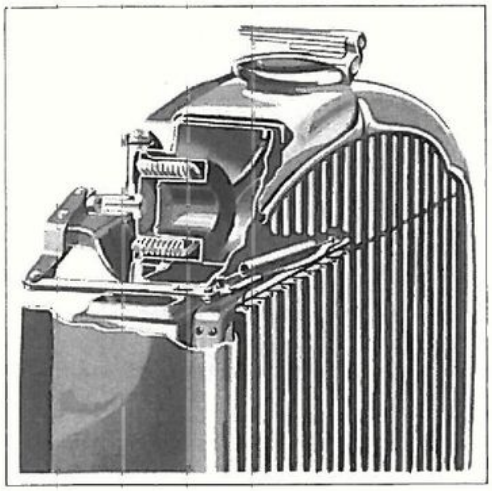
Thermostatic Shutter Control—

All 1932 models are equipped with Thermostatic Radiator Shutter Control. This device prevents circulation of air through the radiator core when the engine is cold, thereby permitting the engine to quickly reach an efficient operating temperature. At such time, the shutters automatically open and permit just enough cooling air to pass through so that this efficient temperature may be maintained.

The thermostat unit in this control is of an improved type, in direct contact with the water in the upper radiator tank. It is attached to the

tank by six screws, and the joint between the two is provided with a gasket which must be kept in good condition that water leaks at this joint may be avoided.

Should there be need at any time for adjustment of the thermostat or any part of the control, a Buick Authorized Service Station should be consulted.



THERMOSTAT AND RADIATOR SHUTTER

Water Temperature Gauge—

A water temperature gauge is mounted on the instrument board of all models, and this indicates the temperature of the water in the cylinder block and head.

Water Pump—

A centrifugal type water pump is mounted at the rear of the generator, on a bracket attached to the upper crankcase. The gravity pressure of the water in the radiator forces it to the pump which in turn forces the water to the cylinder jackets.

The pump is driven at one and one-half times the crankshaft speed, by the generator shaft through an Oldham coupling. The pump shaft is packed to prevent leakage, and should the packing nut show evidence of leakage, it should be tightened with engine running slowly, enough only to stop the leak, however, as excessive tightening will cause binding and cutting of the shaft.

Fan—

The fan has four blades and is mounted on an adjustable bracket attached to the cylinder block. It is driven by a V-type belt from a pulley mounted on end of the crankshaft.

The fan revolves on a plain bearing which is ubricated under pressure by a gear pump drawing oil from a reservoir in the fan hub shell. A stand pipe is provided inside the hub to control the oil level. With the filler hole at the top, and the screw removed, insert a sufficient quantity of oil so that when fan is rotated and filler hole is at bottom, the excess oil will drain off. When oil ceases to run out, the quantity remaining in fan hub is sufficient for lubrication of bearing for approximately 5000 miles. Filler screw should then be replaced, making sure that it is properly tightened.

CAUTION: Use engine oil only, as, if grease is used, the pump will not deliver it to the bearing.

Draining and Cleaning—

To drain the cooling system, open the drain cock which is located on right side of car at lowest point in pipe between water pump and lower tank of radiator. The car should never be stored, especially in cold weather, without draining the system thoroughly.

Once or twice a year, particularly in the spring after the use of alcohol or other anti-freezing mixtures, it is advisable to clean the cooling system. In performing this operation, the following suggestions may be found of assistance.

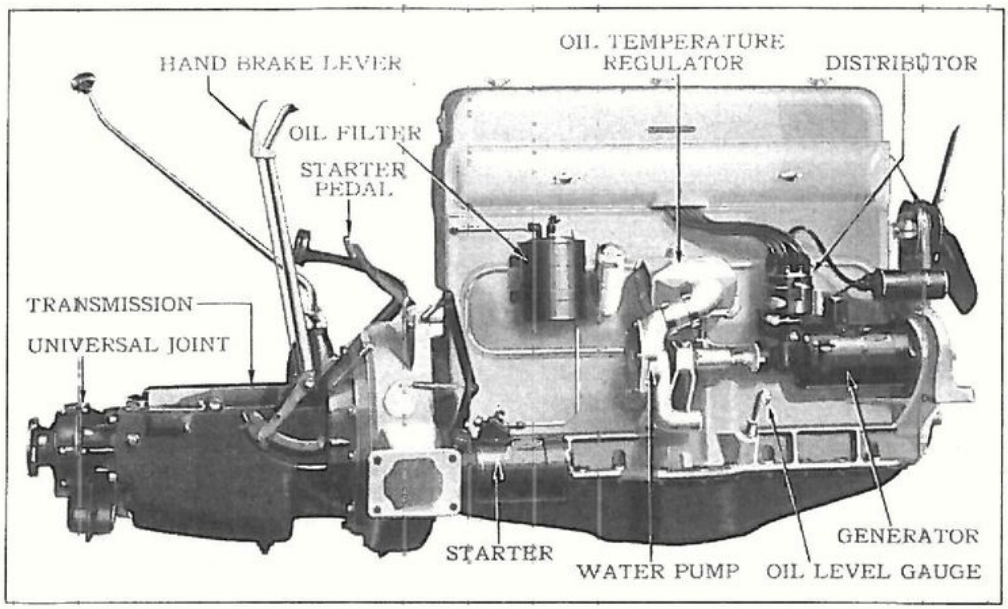
First drain the system thoroughly and after dissolving a pound of sal soda or a half pound of lye in five gallons of water, pour mixture in the radiator after straining through a cloth. Run the engine slowly for five minutes and then drain the cleansing mixture. Again fill the system with clear water, running the engine as before; and after draining this thoroughly, the radiator may be refilled for use. Thorough flushing of the system after using the cleansing mixture is essential in view of the detrimental action of such mixtures on the hose connections.

It is further suggested that contact of the cleansing mixture with the enameled or painted surfaces will injure the finish.

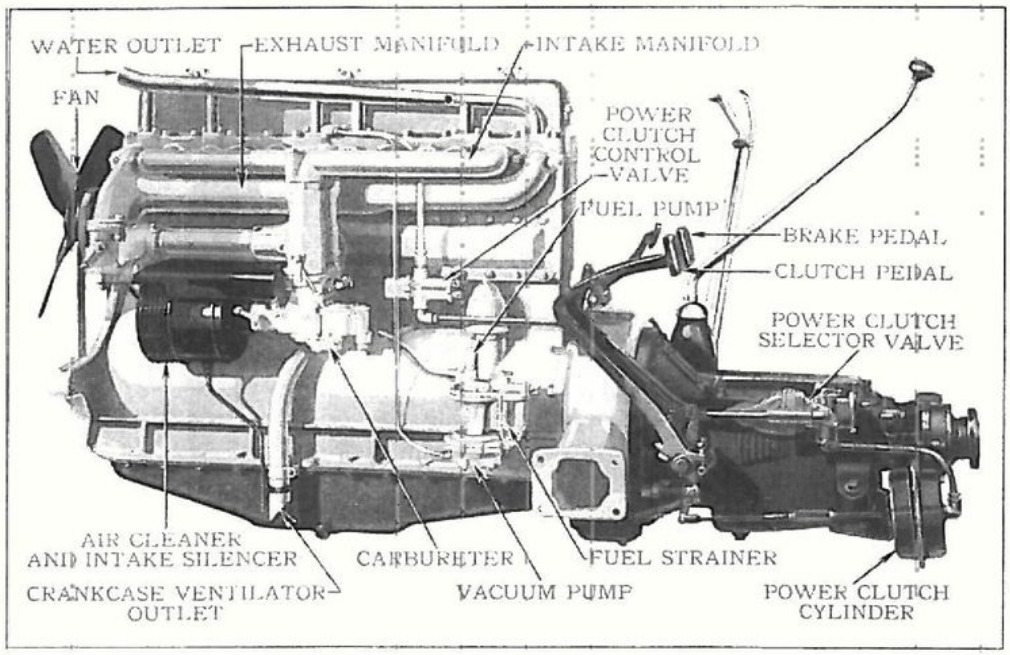
CAUTION: Never pour cold water in the radiator when its water content is extremely low and the engine very hot, as cracking of the water jacket may follow. Give the engine an opportunity to cool off before adding cold water.

Anti-Freezing Mixture—

For recommendations and instructions see pages 59-60.



RIGHT SIDE VIEW—SERIES 32-90 ENGINE



LEFT SIDE VIEW—SERIES 32-90 ENGINE

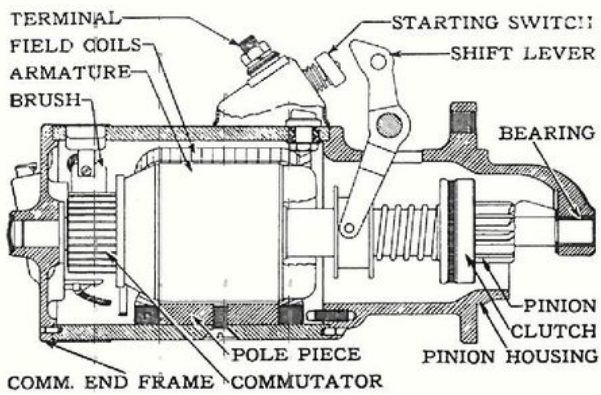
STARTING, LIGHTING AND IGNITION

The Delco-Remy system of starting, lighting and ignition is used on all models. The system consists of starting motor, generator, distributor, ignition coil, cut-out relay, current limit relay, and light control switches and battery. It is of the six-volt, single wire or grounded type, the engine and frame of the car forming the return side of the electrical circuit.

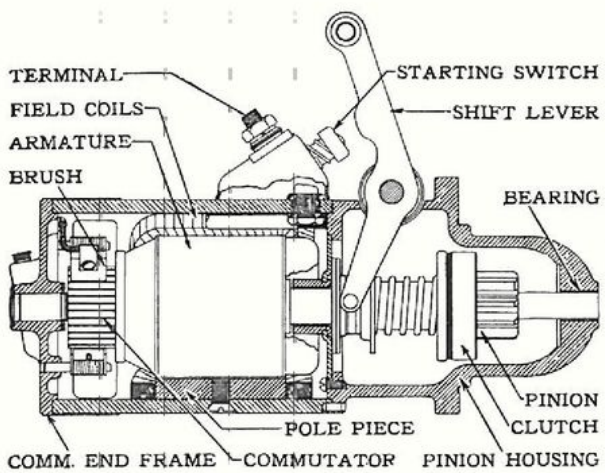
Ignition switch in combination with lock on the steering column is used, but this is not part of the Delco-Remy system.

Starting Motor—

The same starting motor is used on all Series 1932 models, except that used on Series 32-50 has no inner bearing.



SECTIONAL VIEW OF SERIES 32-50 STARTER



SECTIONAL VIEW OF SERIES 32-60, 32-80 AND 32-90 STARTER

This unit serves the purpose of cranking the engine for starting. The initial movement of the starter pedal causes the starting pinion to engage with the teeth on the flywheel and further movement of pedal closes the switch on top of starting motor. This completes the electrical circuit and cranks the engine. The starter pedal should be released as soon as the engine begins to fire.

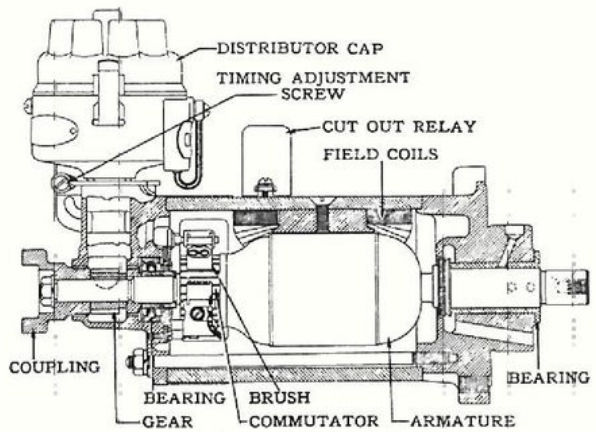
Lubrication—

The commutator end bearing of the starting motor is fitted with an oil cup, which should receive a few drops of engine oil each 1000 miles. The inner and outboard bearings are inlaid with graphite and require no further lubricant.

Generator—

The same generator is used on all Series 1932 models.

The purpose of the generator is to provide current for lighting and ignition and in addition, a sufficient amount to keep the storage battery in a



SECTIONAL VIEW OF GENERATOR

properly charged condition. Current for lighting and ignition is supplied by the storage battery when the engine is stopped and during car speeds under approximately eight miles per hour.

Generator Lubrication—

The ball bearing at the rear of the generator is fitted with an oil cup which should receive a few drops of engine oil each 1000 miles. The front bearing is lubricated by the overflow of oil from the rocker arms.

Charging Rate Regulation—

Different conditions of driving require varying charging rates to obtain the best results from the system as a whole. For example: A physician's

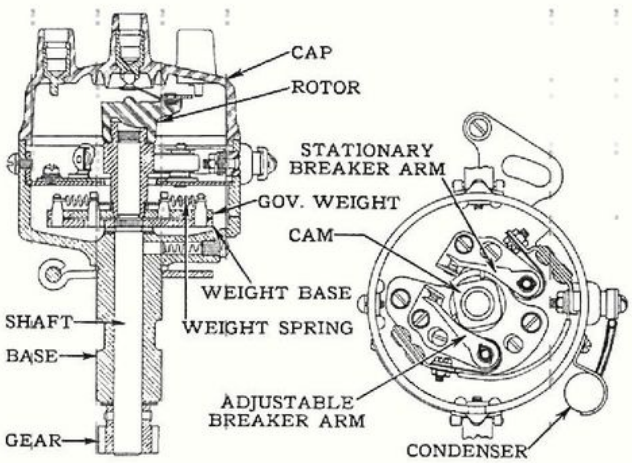
car operated for short distances and requiring frequent starting and considerable use of lights, needs a higher charging rate than a car which is driven long distances, with little use of lights. A thermostat is provided in the generator, for automatic regulation of the charging rate to meet these varying requirements.

The adjustment of the thermostat should never be changed. If unusual driving conditions should make adjustment of the charging rate necessary, this may be done by adjustment of the "third brush," but the operation should be attempted only by some one thoroughly familiar with the proper procedure. When the car leaves the manufacturer, the charging rate is adjusted to meet the requirements of the average driver.

Distributor—

It is mounted on the rear end of the generator and its purpose is to bring about the proper timing and distribution of the ignition current.

At normal engine speeds the spark advance is automatically regulated within the distributor but under certain conditions of driving, the spark control button on the instrument board should be used to retard or advance the spark.



SECTIONAL VIEW OF DISTRIBUTOR

The spark should be retarded when cranking engine by hand or when spark knock occurs under heavy pull. Under all other conditions it should be fully advanced.

The distributor is a double breaker arm type, each breaking alternately, thus sharing the work which would otherwise be done by one.

Lubrication—

Zerk connection is provided on the distributor housing and should receive attention each 1000 miles.

The distributor rotor should be removed every 2000 miles and a few drops of oil placed on the felt wicking in the top of the cam. This lubricates the cam bearing. A small amount of vaseline jelly should also be placed on the cam surface at this time.

Breaker Points—

The breaker points are carried in the distributor housing below the rotor, and their function is to interrupt the low tension (or battery) current at the proper time to produce the spark. The points should be so adjusted that the clearance between them when the contact arm is directly on top of cam, is .020".

Timing the Ignition—

1. Check Breaker Point Gaps:
   (a) Remove distributor cap and rotor. Figs. 1 and 6.
   (b) Loosen distributor headclamp screw (A).
   (c) Rotate distributor head until breaker points on No. 1 breaker arm (stationary) open widest.
   (d) Check the gap with .020" feeler gauge.
   (e) If the gap is incorrect, loosen clamp screw (B-1) see Fig. 6, and turn eccentric screw (C-1) until gap is just .020". Repeat this operation on No. 2 breaker arm (adjustable.)

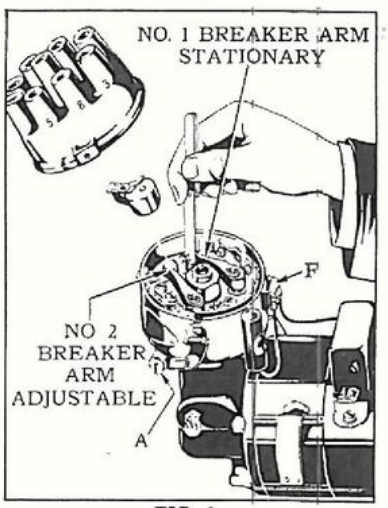


FIG. 1

   (f) Make certain that both clamp screws (B-1) and (B-2) are tight after adjusting the gaps.

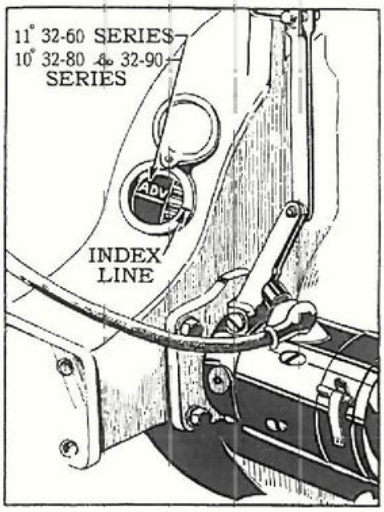


FIG. 2

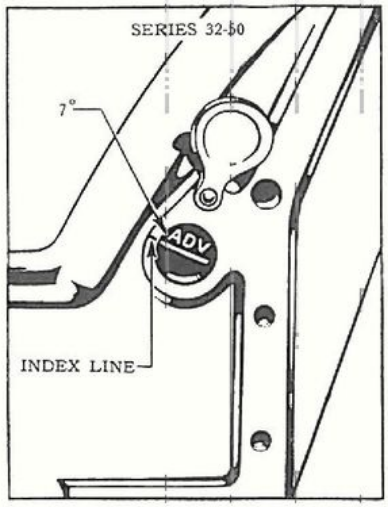


FIG. 3

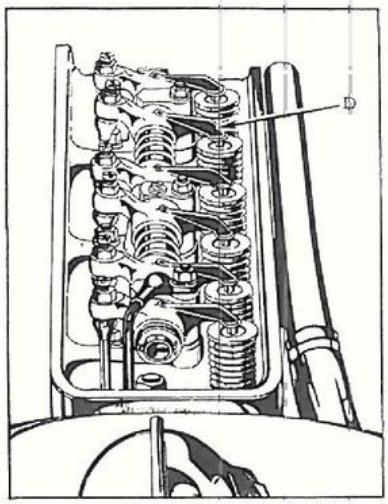


FIG. 4

2. Remove valve rocker arm cover. Fig. 4.
3. Uncover timing hole at right of flywheel housing. Figs. 2 and 3.
4. Set spark control button (J) to advanced position. Fig. 5. Note that screw (E) is at extreme rear end of slot.
5. With ignition off, crank engine by hand until No. 3 cylinder exhaust valve (D), Fig. 4, starts to open. Then crank over slowly and watch timing hole, Figs. 2 and 3, until the 11° mark on Series 32-60 flywheel, the 7° mark on Series 32-50 flywheel or the 10° mark on Series 32-80 and 32-90 flywheel coincides with the index line. This is the position to fire No. 1 cylinder.
6. With screw (A) loose, Fig. 8, turn distributor head so that terminal (F) is toward the front of car. The eight high tension terminals will then be in the position shown in Fig. 8.
7. ***Important***—Rotor point (G), Fig. 8, must be directly under No. 1 high tension terminal. If it is not, remove cap screw (E) at back of distributor, loosen screw (H), Figs. 5 and 6, and pull spark control wire back free from trunnion (K). Lift up the distributor assembly and turn the rotor so that point (G) is directly under No. 1 high tension terminal. Let the assembly down and replace screw (E), set spark control button and distributor arm in advanced positions and reconnect wire to trunnion. The distributor head and rotor should now be in positions as shown in Fig. 7.
8. No. 1 breaker arm (stationary) should now be timed in the following manner: Turn the distributor head carefully in a ***clockwise*** direction until the breaker points just barely open. This can be determined by turning on the ignition and holding the center high

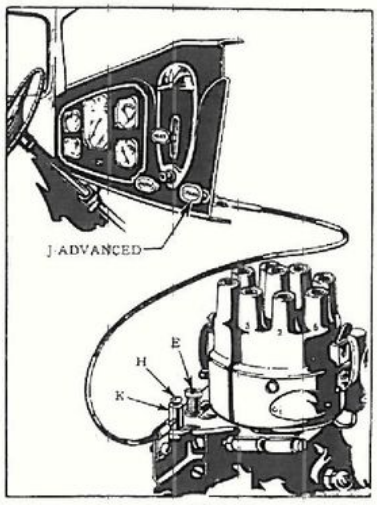


FIG. 5

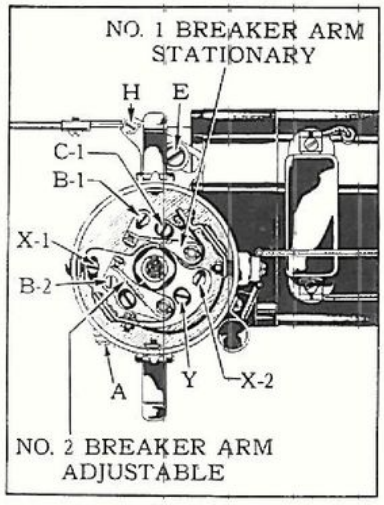


FIG. 6

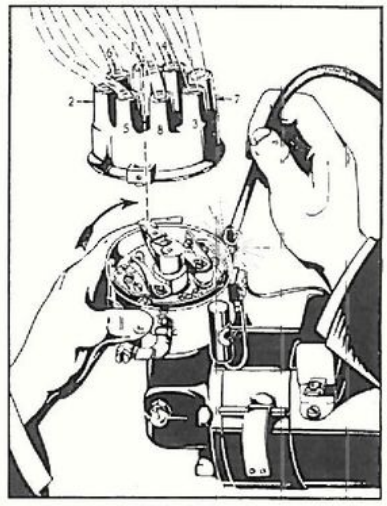


FIG. 7

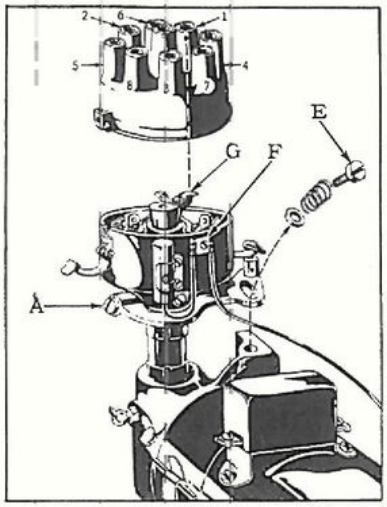


FIG. 8

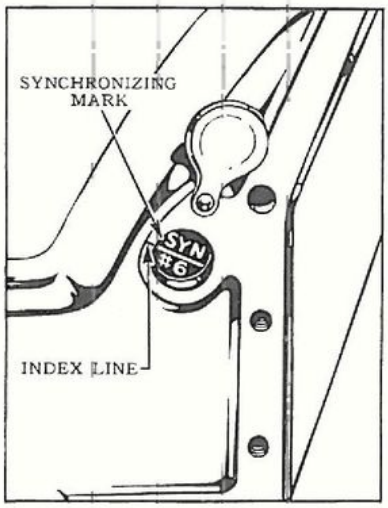


FIG. 9

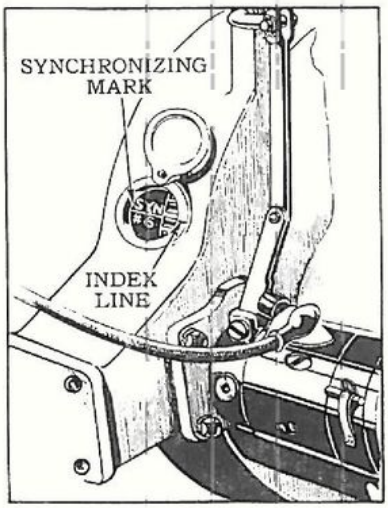


FIG. 10

tension wire to form a gap with the distributor housing. See Fig. 7. When the points open, there will be a spark across the gap. Lock the distributor in this position by tightening screw (A).

9. No. 2 breaker arm (adjustable) should now be timed as follows: Turn flywheel over ***one-quarter revolution*** until synchronizing mark on flywheel coincides with index line, Figs. 9 and 10. This is the position to fire No. 6 cylinder.
10. Loosen the two breaker arm plate locking screws (X-1) and (X-2), Fig. 6. Turn the eccentric screw (Y) so that breaker arm advances in clockwise direction, until points just separate which can be determined by watching the spark as described under No. 8.
11. Tighten screws (X-1) and (X-2) so as to lock breaker arm in this position. Breaker arms should now be properly synchronized.
12. To check timing of No. 1 breaker arm (stationary), proceed as follows: Replace rotor and cap, but disconnect all high tension wires from spark plugs. Hold No. 1 spark plug wire in such a way as to form a gap with metal part of engine. Turn flywheel over slowly until spark occurs. This should require ***one and three-quarters revolutions.*** Next observe position of timing mark on flywheel relative to index line on flywheel housing. Marks should line up as in Figs. 2 and 3.
13. To check timing of No. 2 breaker arm (adjustable):
    Hold No. 6 spark plug high tension wire in such a way as to form a gap with metal part of engine. Turn engine over with crank until spark occurs. This should require ***one-quarter revolution.*** If No. 2 breaker arm (adjustable) has been properly timed, the synchronizing mark on the fly-wheel will line up with the index line on the housing. This timing operation must be accurate in order to synchronize the breaker arms.
14. Re-assemble all removed or disconnected parts.

Spark Plugs—

AC Spark Plugs are used on all 1932 models. No. J-12 is used with low compression and H-9 with high compression head. Gap for J-12 is .025″ to .030″ and for H-9 is .020″ to .025″.

Cut-Out Relay—

A cut-out relay is mounted on top of the generator and serves to automatically connect and disconnect the generator from the battery. If the car is running at such reduced speed that the generator is not charging the battery, the relay automatically disconnects the generator, thereby preventing discharge of the battery through the generator.

The relay is designed to cut in at from 6.7 to 7.5 volts and should cut out when the discharge current does not exceed 2½ amperes. If adjustment is required, the owner should call on a Buick Authorized Service Station for proper adjustment.

Condenser—

The condenser is contained in a water-proof metal case and is mounted on the side of the distributor. Its function is to minimize or prevent

sparking at the breaker points and utilize this energy in maintaining as high a voltage as possible in the high tension circuit.

Current Limit Relay—

A device known as the current limit relay is mounted on the inside of the dash. The normal lighting current does not affect the relay, but in the event of a ground or short in any of the lighting circuits, or the use of too many electrical accessories, the current limit relay begins to function by setting up a buzzing or clicking sound and intermittently cuts off the flow of current. This will continue until the ground or short is removed or the circuit cut off in which the ground exists. This device, therefore, protects the wiring circuits, switch and storage battery, but the horn and ignition circuits are not protected by the relay.

Ignition Coil—

The coil is mounted on the timing gear housing and its function is to convert the low voltage primary current from the battery or generator to high voltage capable of jumping the gap in the spark plugs.

Ignition Switch—

The ignition switch operates in conjunction with the steering gear lock, and is automatically locked, when the steering gear is locked. The ignition switch must be turned to the "off" position before steering gear can be locked.

Lighting Switches—

The switch, controlling head, side and tail lamps, is mounted at the base of the steering gear and is operated by a lever on top of the steering wheel. This switch has four positions, which from left to right are: Parking, Off, Dim and Bright.

Dome, pillar and tonneau lights are operated by separate switches.

Direct lighting of the front compartment and indirect lighting of the instruments are provided by a switch located on the instrument board.

These lights are "off" when the switch lever is in the center position.

Signal Lights—

Signal lights are provided for the several models as follows:

Series 32-50—Combination stop and tail lamp.

Series 32-60, 32-80 and 32-90—Combination stop, tail and back-up lamp.

The tail light is controlled by the lighting switch lever on steering wheel and is "On" when either head or parking lamps are lighted.

The switch for operating the stop light, in Series 32-50, is mounted on the rear engine arm. On Series 32-60, 32-80 and 32-90 the stop light switch is mounted on a bracket attached to the center cross member and the switch for the back-up light is mounted on the rear of the transmission cover.

These signals provide warning when the brakes are applied and light for backing up when transmission control lever is in reverse position.

Proper adjustment of the stop light switch is such that the light should be on when the brake pedal is depressed from one to one and one-half inches. If adjustment is needed, a Buick Authorized Service Station should be consulted.

Horn

Two Klaxon horns of vibrator type, Model K-26, are used on all models. They are bolted directly to the head lamp supports and while requiring little attention normally, it is advisable to consult a competent mechanic or Buick Authorized Service Station in the event of any need for adjustments.

Ammeter—

The ammeter, mounted on the instrument board, indicates the net amount of current that the generator is supplying to the storage battery when the engine is running or that the battery is furnishing for lights when the engine is not running. The generator starts charging at a car speed of 8 to 10 miles per hour and the current out-put reaches its maximum at a speed of approximately 25 miles per hour.

Should the ammeter indicate "discharge" when car speed is in excess of 10 miles per hour and with no lights on, the electrical equipment and wiring should be checked by a mechanic familiar with the system.

CAUTION: Do not attempt to operate the electrical system with the battery disconnected as serious damage to the apparatus may result.

Do not remove the generator or attempt to change any connections on switches, current-limit relay or ammeter without first disconnecting the lead from one of the storage battery terminals.

LAMPS

The lamp bulbs used in the lighting system have a voltage rating of 6 to 8, with candle power as follows:

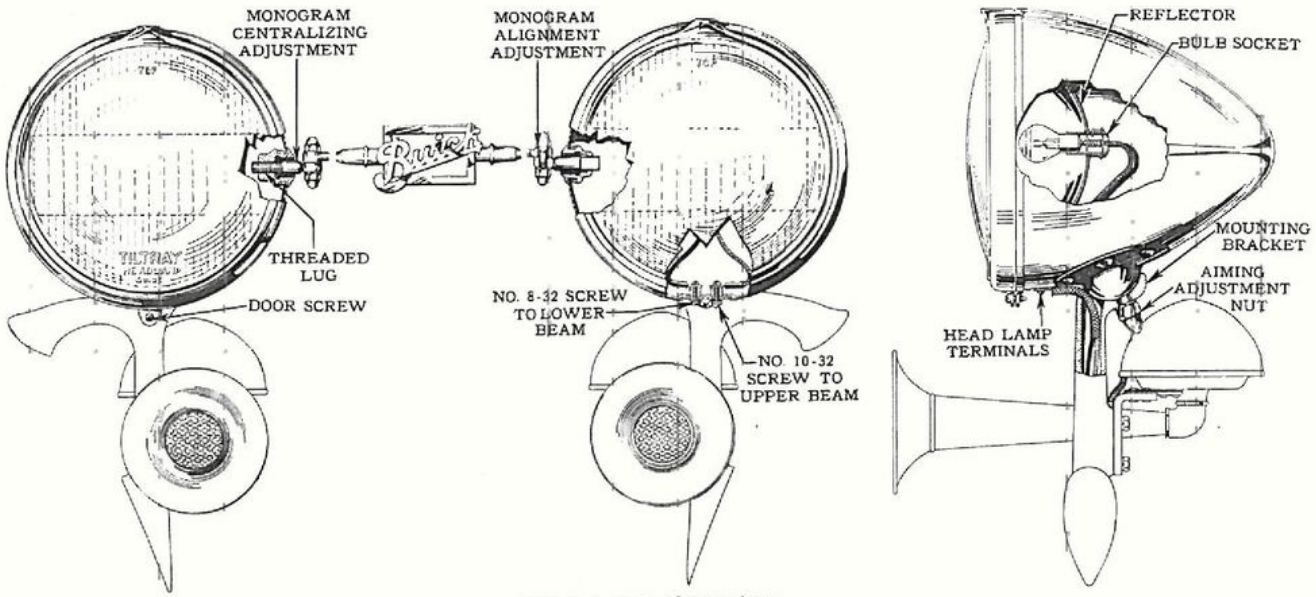
Head lamps: 21 c.p., two filaments, double contact base.

Stop and Back-up lamp: 15 c.p., single contact.

Parking lamps Tail lamp Tonneau lamp Instrument lamp Direct and Indirect Pillar lamps	3 c.p., single contact.
Dome lamp:	6 c.p., single contact.

Head Lamp Adjustment—

Safe night driving depends largely upon the proper adjustment and courteous use of head lamps. Tilt-Ray head lamps are of the fixed focus type and require no adjustment other than aiming.



HEAD LAMP MOUNTING

Satisfactory results will be secured when lamps are adjusted as follows, except where state or local regulations are enforced, the procedure should be modified to meet legal requirements.

The aiming operation should be performed with the car placed on a level garage floor or driveway and the lamp beams projected against a light colored vertical surface such as a garage door or wall. The surrounding light should be subdued as much as possible in order to properly outline the upper edge of the beam.

Place the car so that the front faces of the lamps are twenty-five feet from the vertical surface upon which the beams are to be projected. Draw a horizontal line six feet long on this surface. This should be located at a height exactly equal to the center of the head lamps. Sight through the center of the rear window, over the radiator cap ornament, and establish a point on the above horizontal line. Locate vertical lines to the right and left of this center point equal to one-half the distance between the lamp centers.

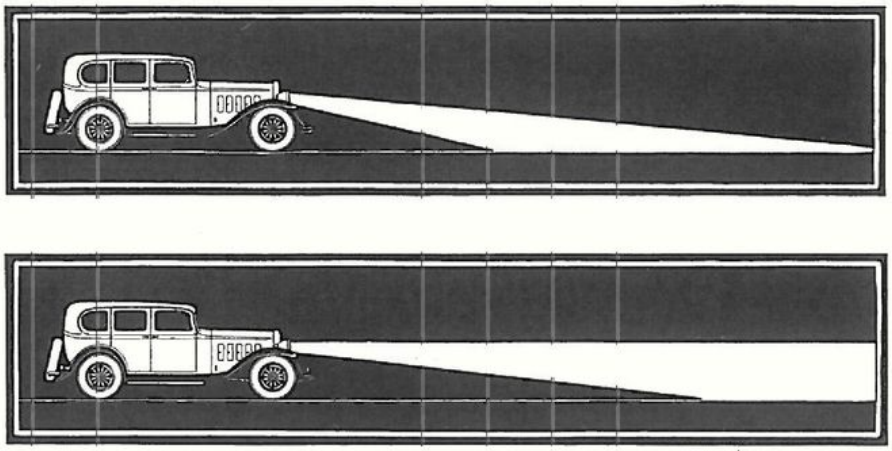
Before making the aiming adjustment the beam from one lamp should be obscured by a suitable covering while the other is being adjusted. Make certain that the lighting switch is turned to the upper beam position.

Loosen the aiming adjustment nuts on the back of the lamp brackets. Also loosen the monogram alignment adjustment nuts. Adjust each head lamp up or down until the top edge of the beam touches and is parallel with the horizontal line, and equally divided by the vertical line.

With the lamps in this position, tighten the adjustment nuts securely making certain that the top edge of the beam is still in contact with the horizontal line.

The monogram bar is adjustable and can be centered with the radiator cap by turning the

centralizing adjustment lug on the left hand lamp to the proper position. The final position of the lug should be with the rounded surface upward. The lug on the right hand lamp is keyed and does not turn but can be moved in or out as required. The monogram should be held in a vertical position while the adjustment nuts are tightened.

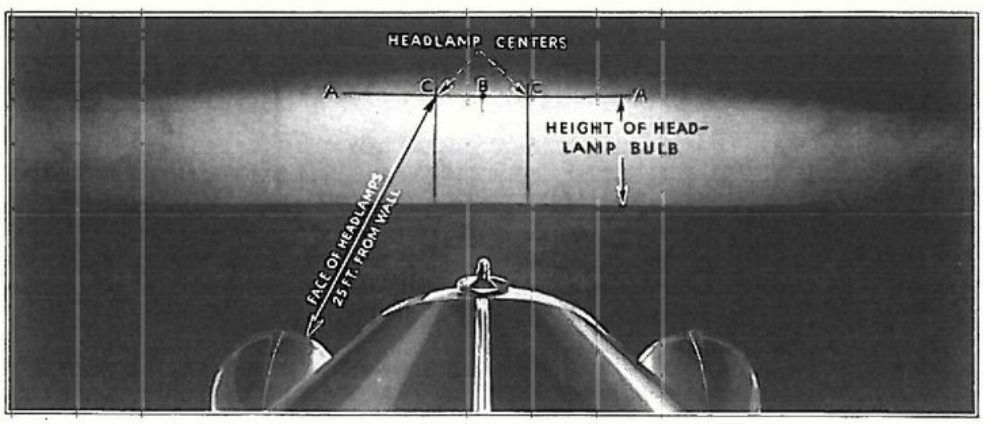


UPPER AND LOWER HEAD LAMP BEAMS, PROPERLY ADJUSTED

Service Suggestions—

It is occasionally necessary to replace head lamp lenses which become broken. Replacement should be made at the first opportunity to avoid damaging the reflector surface. If a lens is not immediately available the reflector can be protected by fastening a cloth over the head lamp face. It is essential to use only the genuine Tilt-Ray lens in making the replacement.

The quality of headlighting can be maintained by occasionally cleaning the reflector. This can be done by applying a mixture of lamp black and alcohol, rubbing the surface gently with a soft clean cloth.



HEAD LAMP ADJUSTMENT

BATTERY

Series 32-50 models are equipped with a 6-volt, 13-plate battery, Delco-Remy type 13-EW, of 100 ampere hour capacity.

Series 32-60 models are equipped with a 6-volt, 15-plate battery, Delco-Remy type 15-CW, of 120 ampere hour capacity.

Series 32-80 and 32-90 models are equipped with a 6-volt, 17-plate battery, Delco-Remy type 17-BW, of 135 ampere hour capacity.

Warranty—

Batteries are manufactured by the Delco-Remy Corporation and are subject to the provisions of the general car warranty. The guarantee does not cover free charging of batteries or repairs due to damages resulting from continued lack of charge or from failure to keep the plates covered with solution by filling the cells from time to time with pure water.

Registration—

When taking delivery of the new car, the purchaser should see that its battery has been properly registered with the nearest authorized battery service station and its condition and installation checked.

Care—

The battery requires very little attention, but that little is absolutely necessary. Negligence in this respect is the principal cause of battery failure or short life.

Distilled water should be added to the battery at such intervals as will ensure the plates being covered at all times. Usually, water should be added once a week in summer and twice monthly in winter, and in freezing weather it should be added just before using the car.

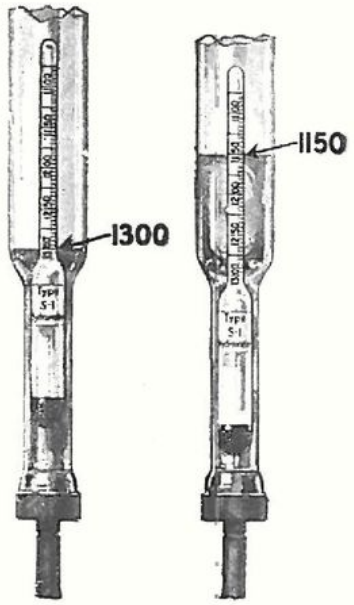
To prevent corrosion of battery terminals and connections apply a coating of vaseline jelly over the battery posts and strap terminals, making sure that connections are properly tightened. If corrosion occurs, clean posts and terminals with a strong soda solution before applying vaseline jelly.

See that the filler plugs are tight and the top of the battery kept dry.

An occasional inspection should be made of the ground strap connection between the battery and the transmission as looseness in this connection is a frequent cause of burning out of head lamp bulbs.

Periodical hydrometer readings are advisable and this inspection should be made by Buick or Delco-Remy authorized battery service station.

A battery in good condition should register an hydrometer reading of not less than 1.250 in climates where freezing of water occurs, or 1.180 in climates where this does not occur. If the reading falls below 1.150 and 1.080 in such climates, it indicates complete discharge and the battery should be taken to a battery station for charge.



HYDROMETER READINGS

If the car is to be laid up for the winter, take the battery to a Delco-Remy authorized battery station for proper storage.

It is not necessary to add acid to the battery. Except in cases of broken jar or deterioration of the sealing compound, loss of acid does not occur. It is inadvisable for car owners to experiment with so-called quick electrolytes for the purpose of keeping the battery fully charged.

Circuit Diagram—

The wiring circuits of the electrical equipment are shown in the circuit diagrams on page 23. With the aid of these diagrams, each circuit through the several units can be traced.

ELECTRICAL ADJUSTMENTS

The electrical system provides practically continuous service and satisfactory operation, because of the excellence of design and manufacture of its component units. However, minor difficulties may arise and the following suggestions may be found of practical benefit to the owner in the care and operation of the car.

Starting motor fails to crank engine when starter pedal is fully depressed.

(a) Switch on head lamps and note that they are lighted normally.

(b) Depress starter pedal as usual, and note the intensity of the light in the head lamps. If dimmed considerably or lights go out, the trouble may be located as follows:

(c) Battery low or completely discharged. Check specific gravity with hydrometer—see instructions for care of battery as above.

(d) Crank engine by hand with ignition off, and determine if there is any mechanical condition which would prevent engine being cranked by starter.

(e) Terminals of wire connections to battery posts may be loose or corroded. Remove terminal from post by loosening clamp bolt, and scrape the inside of the terminal and outside of the post with a knife blade so that it is clean. Place a small amount of vaseline jelly on the battery post and tighten terminal securely in place.

(f) See that ground wire connecting battery to transmission is securely fastened at both ends.

Lights—

Lights will not burn when light switch is turned on.

The lights are controlled by a switch operating from the center of steering post. The parking position of lever, to left of center, lights the parking lamps and tail lamp. Center position indicates all lights off, and dim and bright positions are to right of center. If lights do not burn in any of the switch positions, but the starter cranks, check as follows:

(a) All connections between the battery and the current limit relay should be checked to see that they are tight. The current limit relay is located on the dash, and if the trouble is due to dirty contact points on the relay, a slight pressure of the finger, producing a sliding movement of the contact, will usually correct the trouble.

(b) Examine bulbs and if all are burned out, trouble may be due to loose connection in generator circuit, causing high voltage. This will usually be indicated by lamps flaring up when engine speed is increased and should be taken care of only by a Buick Authorized Service Station.

Current limit relay vibrates.

This indicates a short in one of the lighting circuits and may be traced as follows:

(a) Turn switch successively to each lighting position, and if the relay vibrates in all positions except "Off," the trouble should be found in the tail light circuit.

(b) If the current limit relay vibrates when the lighting switch is in all positions including the "Off" position, the ground will be found in one of the following circuits—dome light circuit, lighting switch to stop light switch, current limit relay to lighting switch, or current limit relay to instrument light switch. The trouble can then be traced to the particular defective circuit by disconnecting the black wires with red tracer from the lighting switch. If the relay continues to vibrate, the ground is in a circuit between the current limit relay and the light switch. If the relay stops vibrating, the ground is in the light switch to stop switch circuit or stop switch to dome light circuit. If the trouble is in the dome light circuit, the relay will not vibrate when the dome light wire is disconnected from the current limit relay.

(c) If the current limit relay vibrates only when the service brakes are applied or when the gear shifting lever is placed in the reverse position, the ground will be found in the stop and back-up light circuit.

(d) When electrical accessories are added, it is possible to increase the capacity of the current limit relay by increasing the contact spring tension by bending. However, it is advisable to have part of the accessories removed instead of re-adjusting the relay as the current consumption will be too great, and difficulty may be experienced in keeping the battery charged.

Lights flare up as engine is speeded up.

This indicates a loose connection in the circuit from generator to battery and the following connections should be checked:

(a) Current limit relay.
(b) Ammeter.
(c) Starting motor and battery terminals.
(d) Battery ground connection to transmission.
(e) Generator relay connections.

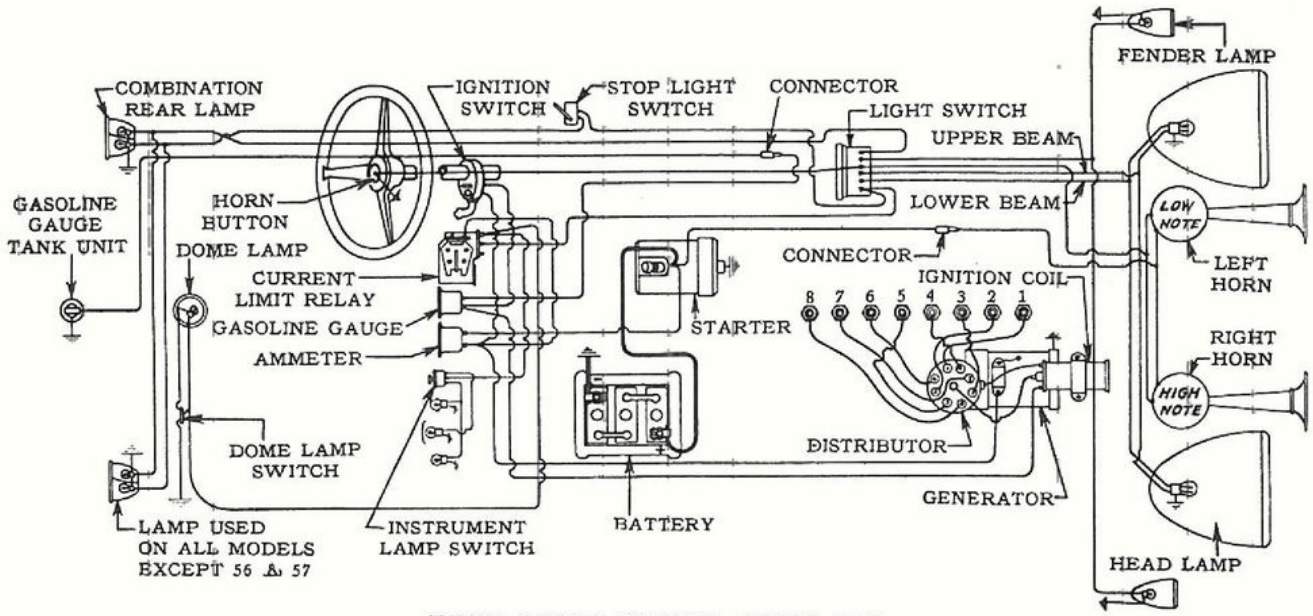
Lamps have short life and must be replaced frequently.

Examine lamp bulbs for proper voltage (6-8 volts) and make sure that only good quality bulbs are used. Check wires for loose connections as outlined under previous paragraph.

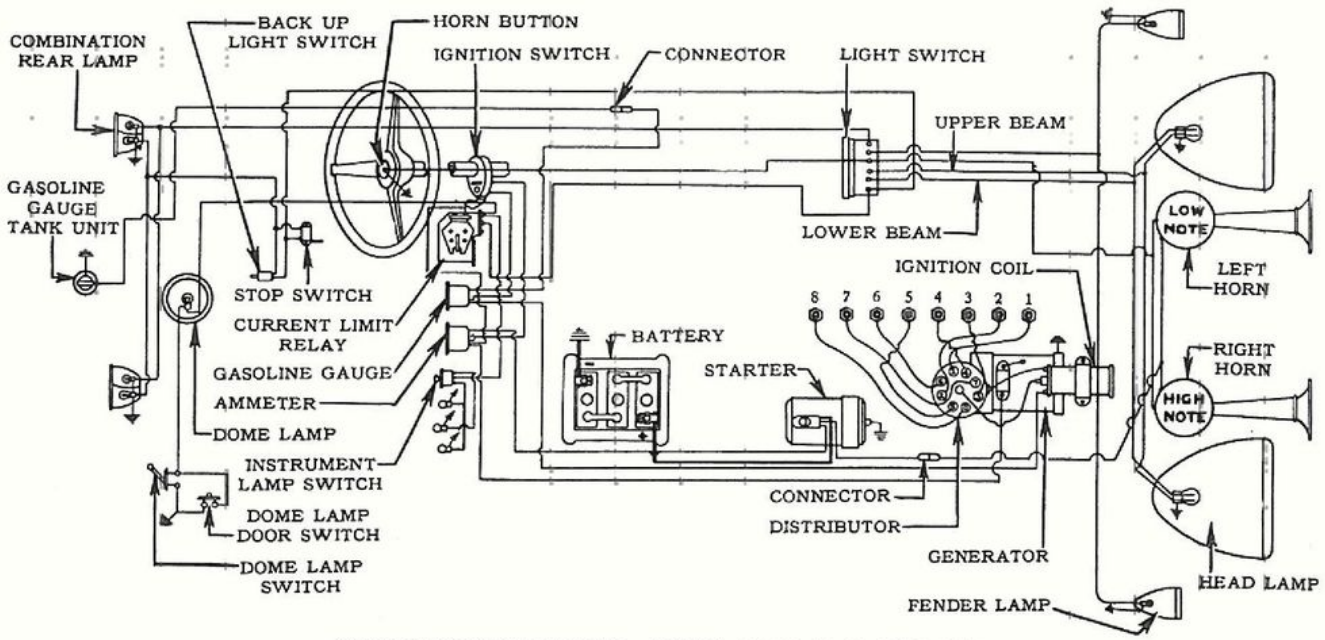
Engine fails to fire when switch is on and when cranked by starting motor.

(a) See that battery connections are tight and that battery is in properly charged condition.

(b) Remove high tension wire from one of the spark plugs, and hold terminal approximately ¼" from metal base of plug while engine is being turned over with starting motor. The spark should jump the gap readily. If it does not and ammeter flickers to discharge while engine is being cranked, the trouble should be traced as follows:



WIRING CIRCUIT DIAGRAM—SERIES 32-50



WIRING CIRCUIT DIAGRAM—SERIES, 32-60, 32-80 AND 32-90

1. Breaker points pitted or out of adjustment (fail to open properly).
2. Defective condenser.
3. Broken down ignition coil.
4. Ignition out of time.

Engine Fires Irregularly—

(a) Examine spark plugs and see that they are not short circuited by oil or carbon, and that gaps are proper.

(b) Inspect breaker points for proper clearance and cleanliness. If necessary to adjust breaker points, also check ignition timing as the timing is also changed when points are adjusted.

(c) Check high tension wires to spark plugs for poor insulation.

Ammeter shows discharge when ignition and light switches are "OFF."

Disconnect the red wire from ammeter terminal. If ammeter hand does not return to zero, ammeter is incorrect, and there is no fault in other parts of the electrical system. If ammeter hand returns to zero, it indicates fault is in switch or wiring.

Generator does not charge battery.

The generator is provided with a thermostat for automatically regulating the charging rate. Should the generator charge when the car is first started but fail to charge after running a short time, the trouble may be due to burned out thermostat resistance unit. This trouble is caused by loose or dirty connections in the generator charging circuit, and electrical system should be inspected as follows:

(a) Test all wires and connections from battery through starting motor terminal, ammeter, switch, and generator for open circuits, and check operation of cut-out relay.

(b) Examine all generator brushes for good seats and spring tension.

FUEL SYSTEM

The fuel system consists of gasoline tank, gasoline gauge on the instrument board, gas lines, fuel pump, gasoline cleaner, air cleaner, intake manifold and carburetor. The capacities of the gas tanks on the several series models are as follows:

Series 32-50—16 gallons.

Series 32-60—19 gallons.

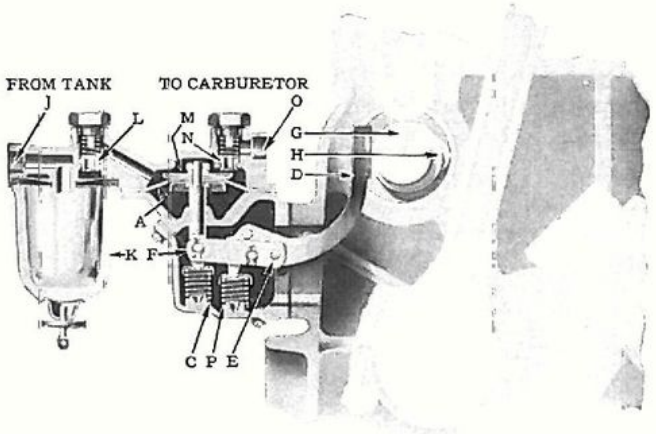
Series 32-80—32-90—22 gallons.

Fuel Pump—

The AC variable stroke diaphragm type fuel pump is used on all models. In Series 32-50 models, Type B pump is mounted on the right side of the crankcase and is driven directly by an eccentric on the camshaft.

In Series 32-60, 32-80 and 32-90 models, Type F combination fuel and vacuum pump is mounted on the left side of the crankcase and is driven by an eccentric on the camshaft through a push rod supported in bosses in the crankcase. In this combination, the fuel pumping unit is of extra large capacity to insure an adequate supply of fuel at all speeds and under extreme temperature conditions. The vacuum pump unit acts as a booster to augment the intake manifold suction in the operation of the windshield wiper.

The operation of the fuel pump unit in Type F pump used on Series 32-60, 32-80 and 32-90 models, is the same as in Type B and those pumps used on earlier models. The valves of the pump may sometimes be impaired in their action, due to collection of dirt or other foreign matter or deposit of a gum-like substance which is present in some of the present day gasolines. When the pump valves are in such condition the car should be taken to a Buick Authorized Service Station for thorough cleaning of the valves and any necessary adjustment of the pump mechanism.



FUEL PUMP OPERATION—SERIES 32-50

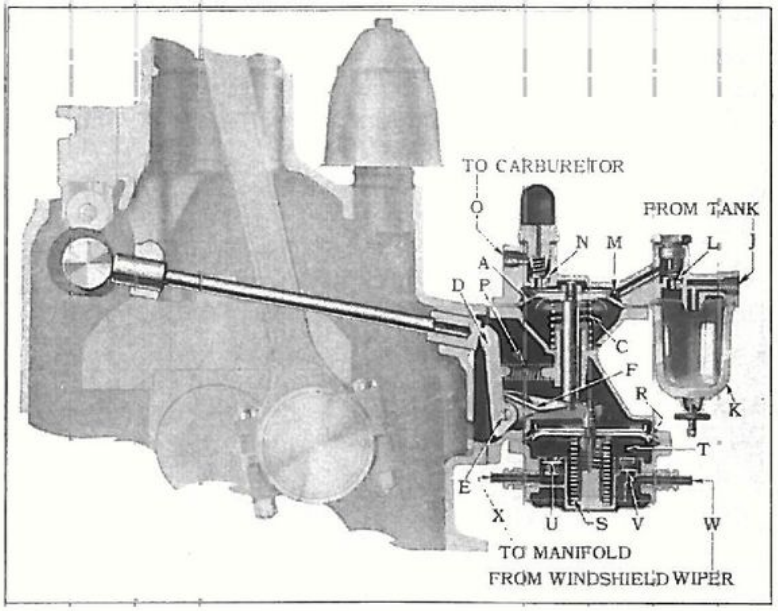
Gasoline Cleaner—

This is an integral part of the fuel pump and consists of a glass bowl with a screen of fine mesh, through which the fuel must pass upward. Dirt and water settle in the bowl which may easily be removed for cleaning.

It is important that the screen be inspected and the bowl cleaned frequently to avoid as far as possible, the chance of dirt reaching the fuel pump valves and carburetor jets.

Carburetor—

The carburetor is the instrument which measures the fuel charges to the engine and automatically mixes them with the proper amount of air to form a highly combustible gas.



VACUUM AND FUEL PUMP OPERATION—SERIES 32-60, 32-80 AND 32-90

All 1932 models are equipped with Marvel dual carburetors of the automatic air valve multiple jet type, embodying a single float bowl and twin mixing chambers, air valves, throttles and heat risers. Following are the carburetor models used on the several Series:

Series 32-50—Model TD-1-S.
Series 32-60—Model TD-2-S.
Series 32-80—32-90—Model TD-3.

Construction—

The carburetor consists of a main body or twin mixing chamber to which is attached a float chamber bowl and a double walled heat riser through which exhaust gases pass under automatic control of a damper valve located at the exhaust manifold outlet. The throttles are carried in the heat risers.

Within each of the twin chambers are three non-adjustable type jets which proportion the gasoline for a proper mixture. One of these jets, called the "low speed nozzle" is located in the center of the venturi which is a fixed air opening. The other two jets, called "high speed" and "intermediate high speed," are located just under the air valve and controlled by it. An air adjustment screw is provided for regulating the pressure of the air valve spring enclosed therein. This is the only mixture adjustment required.

Within this air adjustment screw is also enclosed a plunger connected by a link to the air valve. This plunger provides a resistance in addition to that of the air valve spring to richen the mixture for acceleration. This arrangement of plunger spring and hollow screw is termed the dash pot.

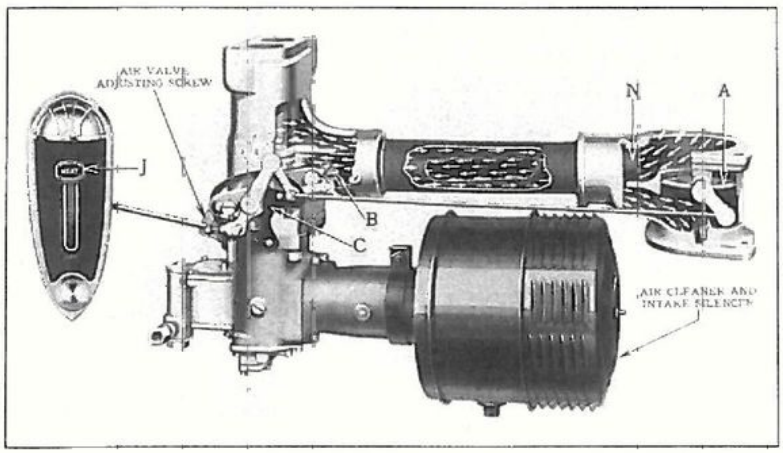
A further control of the "high speed" and "intermediate high speed" jets is provided by a non-adjustable fuel metering valve automatically operated by the carburetor throttle. At part throttle driving range this valve controls the amount of fuel being used, thus providing maximum economy and when the throttle is fully opened for high speeds, hard pulling or quick "pick up" this valve allows maximum fuel feed to the jets.

Heat Control—

The carburetor and manifolds have been designed to utilize the exhaust gases of the engine to ensure complete vaporization and a consequent minimum consumption of fuel. A double walled twin riser is placed between the carburetor and the intake manifold connected to the exhaust line by two tubes, one within the other. The gases passing to the riser jacket through the inner and returning to the exhaust line through the outer tube are controlled automatically by two damper valves; one in the main exhaust line above the outlet tube from the riser, and one in the exhaust inlet to the riser.

The damper valve in the main exhaust line is connected to the throttle lever in such a manner that the greatest amount of heat is supplied when the throttle is only partly opened, as at slow car speeds, and a decreasing amount as the throttle is opened further for higher speeds.

A control lever on the instrument board provides a means of changing the automatic action of the damper valves to suit driving conditions. When lever is at the top of the slot, the greatest amount of heat is had in the riser jacket and by moving the lever downward, adjustment may be made to the point where no exhaust gases pass through the riser.



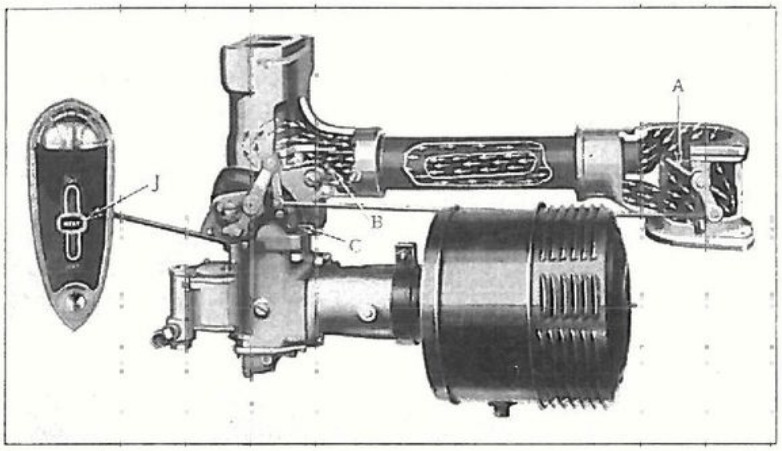
"HEAT-ON" POSITION

Heat control lever "J" on instrument board at top or "heat on" position.

Valve "A" in main exhaust pipe closed and valve "B" in outlet of carburetor body wide open.

Gases from exhaus' manifold enter at opening "N" and pass through riser jacket, returning to exhaust pipe below valve "A."

As throttle is opened, valve "A" remains closed up to approximately 40 miles per hour then opens with wide open position of throttle.

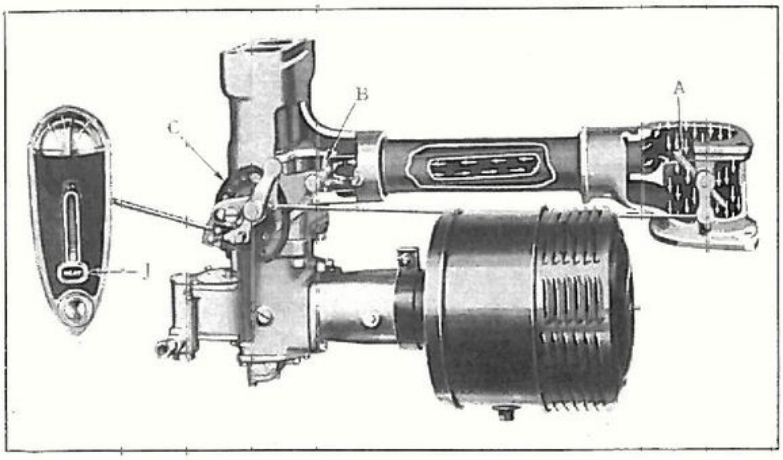


"MEDIUM" POSITION

Control lever "J" on instrument board in center of slot at "medium" or normal driving position.

Valve "A" nearly closed and valve "B" partly closed, restricting flow of hot gases through riser jacket. As throttle is opened, valve "A" will also open quickly.

This setting of control lever may be used when engine is thoroughly warmed up and lower position should not be used except in extremely hot weather.



"HEAT-OFF" POSITION

Heat control lever "J" on instrument board at bottom of slot or "heat off" position.

Valve "A" half open and valve "B" fully closed.

In this setting no exhaust gases pass through riser jacket. As throttle is opened, valve "A" will also open further.

This is the setting used during extremely hot weather or under certain heavy road conditions when engine appears to lose power because of too much heat.

IMPORTANT: The damper valve shaft should be lubricated every 1000 miles with a few drops of a light graphite oil, in order that the valve may work freely at all times.

Starting—

The choke has been made more effective in providing better cold weather starting, and consequently, discretion must be exercised in its use at all times in order to avoid flooding of the engine.

Cold Weather—

The clutch should be disengaged before depressing the starter pedal, in order that the drag caused by the clutch due to cold oil in the transmission may be removed and thereby insure a higher cranking speed.

When starting the engine, there is no excess vacuum in the intake manifold beyond what is required to lift the fuel, therefore the vacuum clutch control should not be used in attempting to disengage the clutch at this time.

1. Place heat control lever in "On" position.
2. Advance throttle lever on steering wheel about 1".
3. Pull choke out all the way.
4. Turn on ignition switch.
5. Depress clutch pedal.
6. Depress starter pedal.
7. As soon as engine fires push choke button in part way and move button in and out slightly as may be needed to get engine running smoothly. When engine first fires, keep foot on starter pedal long enough to manipulate choke and make sure the engine will keep running, **but under no circumstances should engine be raced when foot is on starter pedal.**

Use of Choke—

After engine has been started it is necessary to keep choke button out part way until engine is well warmed up. This should not be very long, and as soon as engine will fire regularly when driving, choke should be pushed in all the way in order to avoid excessive gasoline consumption and dilution of engine oil.

Operation of Heat Control—

In cold weather starting, the heat control lever should always be in the "On" position and kept there until engine is thoroughly warmed up. For city driving and on short runs the lever should be kept in the "On" position at all times, but on long drives, it may be lowered to the "Medium" position.

Should the carburetor pop or engine hesitate, more heat is required and the heat control lever should be regulated between the "On" and "Medium" positions to provide the best driving conditions.

Engine Oil Viscosity for Cold Weather Driving—

Summer oil should be drained from the crankcase and the proper grade substituted for winter use. In cold weather, new engine oil in the crankcase after standing for any time becomes congealed and increases the difficulty in cranking the engine. Where it is necessary to make a complete change of oil in the crankcase during cold weather it is, therefore, advisable to dilute the oil with kerosene or a very light grade of engine oil to the extent of approximately 15%. In sub-zero temperatures the amount of this dilution may be increased to meet the requirements. This dilution should apply however, **only** when making a complete change of oil in the crankcase.

Generator Charging Rate—

For cold weather operation, the generator charging rate should be adjusted for such operation and, generally speaking, this adjustment may be such that the ammeter will show approximately 20 amperes at a speed of 25 miles per hour when the engine is comparatively cold.

As further assistance in cold weather starting, it may be desirable to use a good grade of high test gasoline. The following suggestion will also be found of assistance where the car stands outside for any length of time or is stored in a cold garage:

When parking the car and when ready to leave it, first speed up the engine by means of the foot accelerator, turn off switch, pull out choke button and step on accelerator and with the choke out keep accelerator depressed until engine stops.

Warm Weather—

To start the engine in warm weather, the same operations should be followed as for cold weather except that it is not necessary to set the heat control lever above the "Medium" position and the choke will not have to be used to such extent as in cold weather.

If the choke is used for too long a period, the

engine may be flooded with raw gasoline and cannot be started. Should this occur, it will be necessary to delay starting operations until the cylinders have been cleared by cranking with the throttle wide open and choke button all the way in.

The heat control lever need never be set below the "Medium" position for long distance driving except in case of extremely hot weather when it may be set at the bottom or "Heat Off" position.

Adjustment—

No change should be made in the carburetor adjustment until an inspection has been made to determine if the trouble is not in some other unit. It should be made sure that the gasoline lines are clear; that the fuel pump is supplying fuel to the carburetor; that there are no leaks at connections between carburetor, engine and fuel pump; that the ignition system is in proper condition and that there is even compression in all cylinders.

If it should be necessary to test the adjustment, or to make a readjustment, proceed as follows:

1. Set the air screw so that its end is flush with the end of ratchet spring bearing against it.

2. Set the heat control lever on instrument board in the "Heat On" position and leave it in this position while making the adjustment. Start the engine in the usual manner, using the choke as instructed above.

3. When the engine has warmed up slightly, set the air screw for a good idle by turning to the right for a richer mixture or to the left for a leaner mixture, as the needs of the engine may require.

If the air screw adjustment is too tight, the engine will roll or appear sluggish. If not tight enough, the engine will hesitate and perhaps stop entirely. To test the idling adjustment, turn the air screw to the right a quarter of a turn at a time until the engine does roll; then turn back to the left until engine hesitates, indicating that the mixture is lean or has too much air. Next, turn the air screw to the right three or four notches at a time until the engine runs smoothly. This accomplished, proper adjustment for the best performance throughout the entire range of engine speeds and loads will have been obtained.

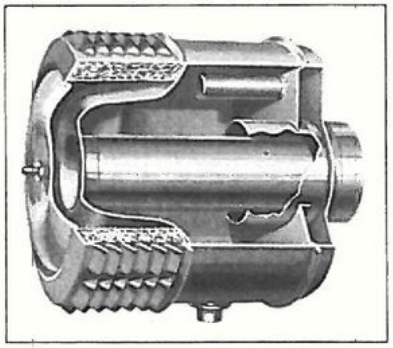
If the engine idles too fast with throttle closed, the latter may be adjusted by means of the throttle lever adjusting screw.

Adjustment for Driving in High Altitudes—

Should the car be operated continuously in mountainous country, where high altitudes obtain, it is recommended that a Buick Authorized Service Station be consulted for a change in the carburetor high and intermediate speed jets, necessary to obtain the best possible performance in such altitudes. Such changes are not necessary when only touring in high altitudes or when the elevations do not exceed four thousand feet.

Air Cleaner and Intake Silencer—

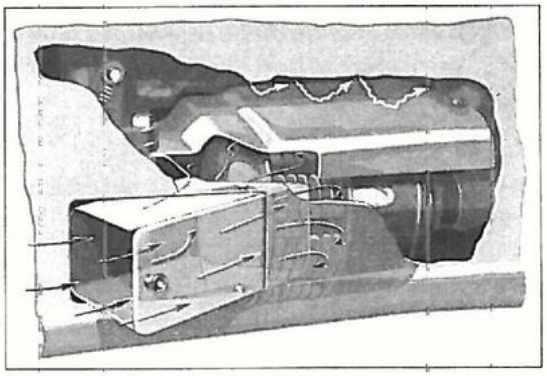
All 1932 Buick models are equipped with a combined air cleaner and air intake silencer. This combination serves a dual purpose of cleaning the



AIR CLEANER AND INTAKE SILENCER

air drawn into the carburetor and silencing the air intake noises, usually present where some provision is not made for muffling these noises.

The air cleaner is provided with a drain pipe and contains a gauze filter for cleaning the air before entering the carburetor. As indicated on a label attached to the cleaner, it should be removed for a thorough cleaning approximately every 2500 miles. For this operation, the car should be taken to the nearest Buick Authorized Service Station.



AIR INLET TO CARBURETOR

Air Inlet to Carburetor—

All 1932 models are provided with a door on the left side of the hood, opening outward and to the

front which, when open, directs a flow of outside air to the carburetor silencer intake. The purpose of this door is to supply the carburetor with air of lower temperature than that available within the hood during hot weather operation. This door should be open when the outside air temperature exceeds 70° and a shield is placed above the silencer to assist in directing the cool air to the silencer and keep the radiated heat from the manifolds.

The cooler air furnished to the carburetor in this way has effect in lowering carburetor body temperatures, thereby preventing to a considerable extent, the formation of vapor bubbles in the carburetor passages, these bubbles tending to interfere with proper functioning of the carburetor.

Gasoline Gauge—

The amount of gasoline in the main tank is registered on the instrument board by an electric gasoline gauge, manufactured by the AC Spark Plug Co. Briefly, the construction of this gauge is as follows:

The dash unit embodies two coils whose axes are at 90°, with an armature and pointer assembly mounted at the intersection of the axes. A dampener is provided on the armature assembly to prevent vibration of the pointer on rough roads.

The tank unit is essentially a rheostat, the movable contact of which is actuated by a float that rests on the surface of the gasoline in the tank. Movement of the float is transferred to the rheostat contact arm by a set of gears. A cork washer, held by a calibrated spring between a collar on the vertical shaft and a stationary lug, acts as a brake. This prevents the slight float movement caused by ripples on the surface of the gasoline from appearing on the dash unit indicator.

When the gasoline tank is empty the float assembly is at its lowest position where the rheostat in the tank unit is completely grounded. All the current through the coil at the empty side

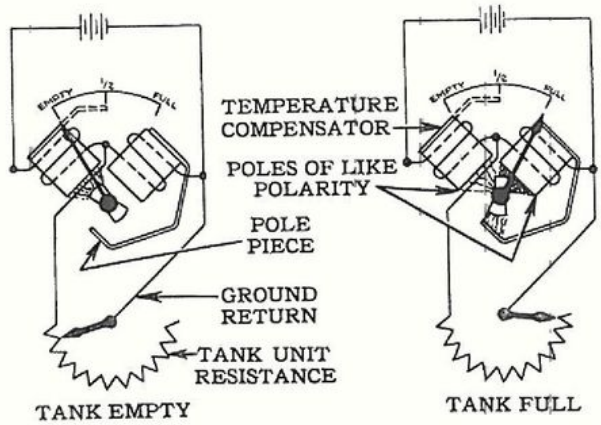
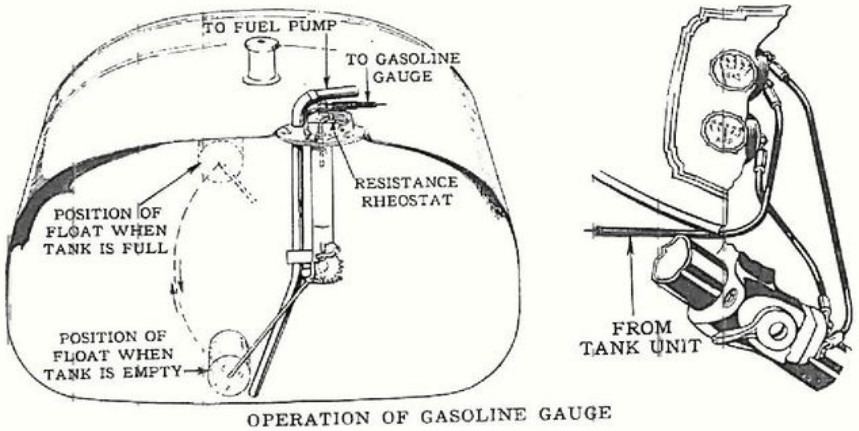


DIAGRAM OF GASOLINE GAUGE—TANK UNIT

of the indicator and the pointer is pulled to the empty mark. As fuel is added in the tank the float assembly rises. This moves the contact brush in the rheostat, setting up resistance in the circuit that grounds the full coil in the dash unit so that part of the current flows through this coil and the pointer is attracted away from "empty" to a position of balance between the two coils. Its point of rest depends upon the amount of resistance which in turn is governed by the quantity of gasoline that has been added in the tank.

The gauge is compensated for temperature variation and is not affected by variation in voltage of the battery. When it is in need of adjustment or attention of any kind, the car should be taken to the nearest Authorized Buick Service Station.

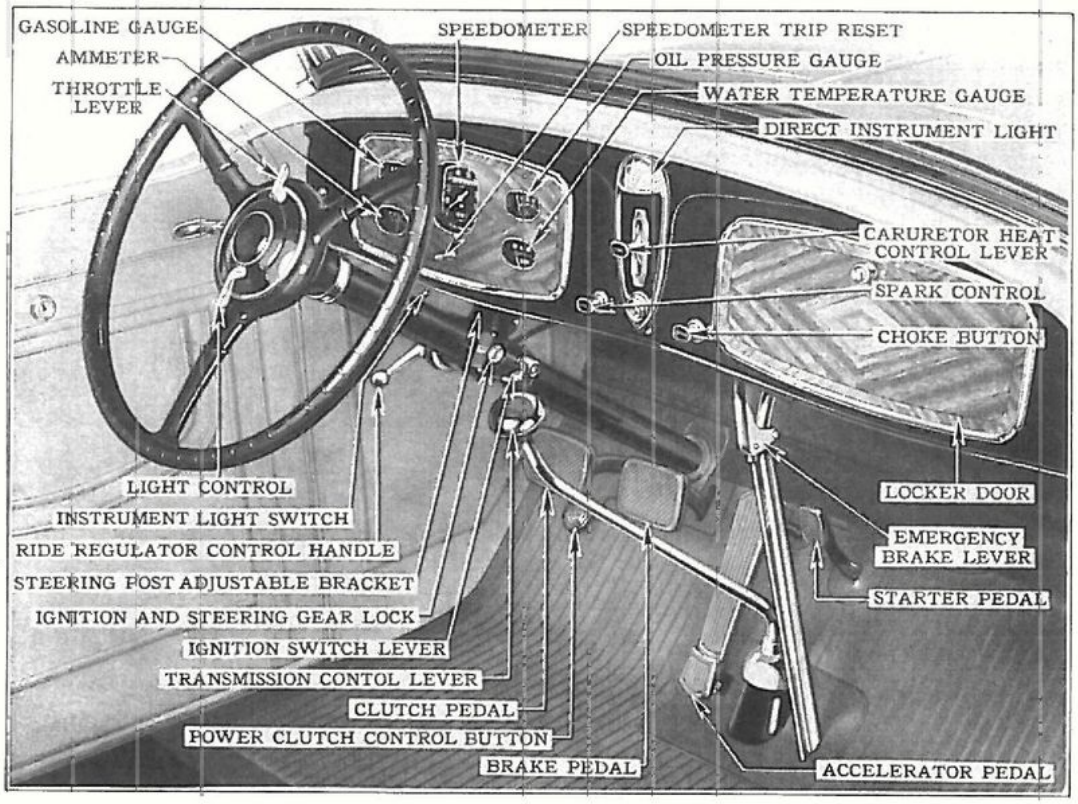


OPERATION OF GASOLINE GAUGE

CAUTION: Do not lubricate either the dash or tank units. No lubrication is necessary in the dash unit and the bearings in the tank unit are automatically lubricated by splash of the gasoline.

Gasoline Reserve—

The gasoline gauge is designed to provide approximately one and one-half gallons reserve when pointer is at the empty position.

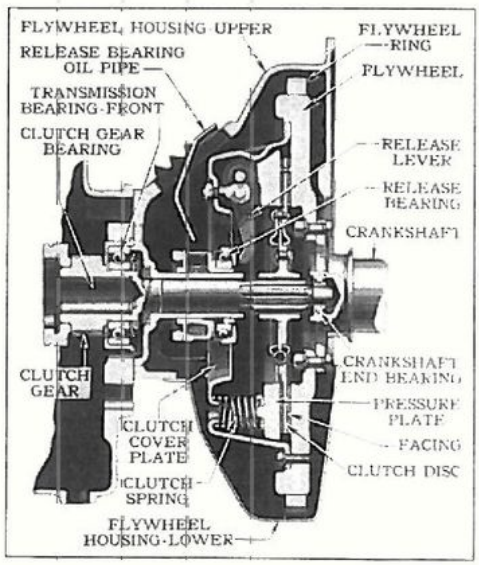


DRIVING COMPARTMENT

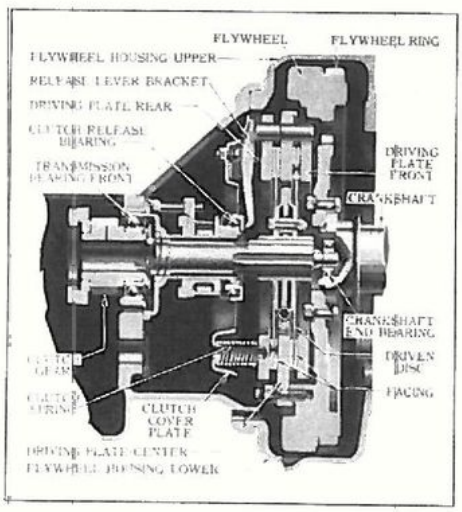
THE DRIVING SYSTEM

Clutch—

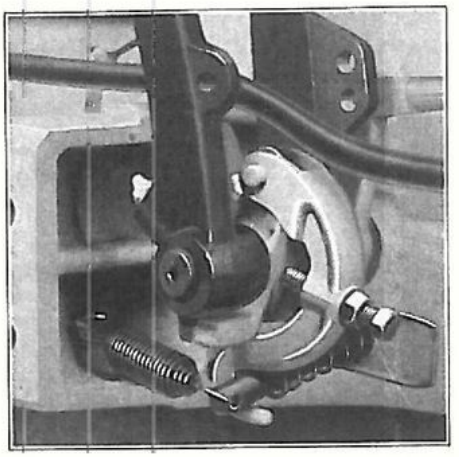
The clutch in Series 32-50 and 32-60 models is a single dry disc type, and in Series 32-80 and 32-90, a two-plate dry disc type is used. Both of these clutches are simple in construction, non-adjustable as to spring tension and of ample capacity. Correct functioning of the clutch, however, depends upon the proper adjustment of the clutch pedal movement and compensation for



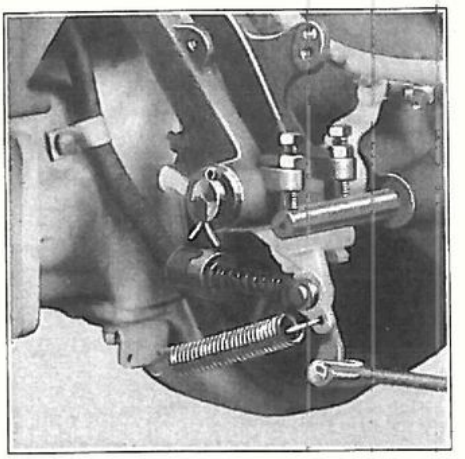
SECTIONAL VIEW—SERIES 32-50 AND 32-60 CLUTCH



SECTIONAL VIEW—SERIES 32-80 AND 32-90 CLUTCH



CLUTCH PEDAL ADJUSTMENT—SERIES 32-50



CLUTCH PEDAL ADJUSTMENT—SERIES 32-60, 32-80, 32-90

natural wear of the clutch facings. Correct adjustment of the clutch pedal and clearance between the pedal and underside of the floor board, are described in the following paragraph.

Clutch Pedal Adjustment—

In Series 32-50, only one adjustment is provided, this at the pedal, for regulating the clearance between clutch release bearing and clutch release levers. Satisfactory functioning of the clutch requires that the pedal should have a free movement or lash of 1″, measured at the pad. To make this adjustment, loosen lock nut, as shown in the accompanying illustration for Series 32-50, turn adjusting screw to the left or counter-clockwise, until the pedal pad has a free movement of 1″; then tighten lock nut. When free movement is ¾″ or less, it should be readjusted. A rubber pad on the toe-board acts as a stop for the pedal in the upper position.

For Series 32-60, 32-80 and 32-90 models, two adjustments are provided at the pedal, one for the clearance between toe-board and pedal, and the other for necessary clearance between the release bearing and the release levers. Toe-board clearance is adjusted by means of a set screw and lock nut on the lower end of the pedal and should be ¼″ with set screw against the stop pin.

Clearance between release bearing and release levers is adjusted by means of a nut on the front end of clutch release rod, and should give a free pedal movement of 1″ on Series 32-60 and 1¼″ on Series 32-80 and 32-90. When this movement is ¾″ or less on Series 32-60 and 1″ or less on Series 32-80 and 32-90, it should be readjusted.

Power Clutch—

In addition to the conventional clutch pedal operation, all 1932 models are equipped with a power clutch mechanism which provides automatic clutch operation for both gear shifting and free wheeling under a single button control, without the use of special over-running clutches or other mechanisms in the transmission.

The clutch pedal or conventional operation should be used if it is desired to operate the clutch

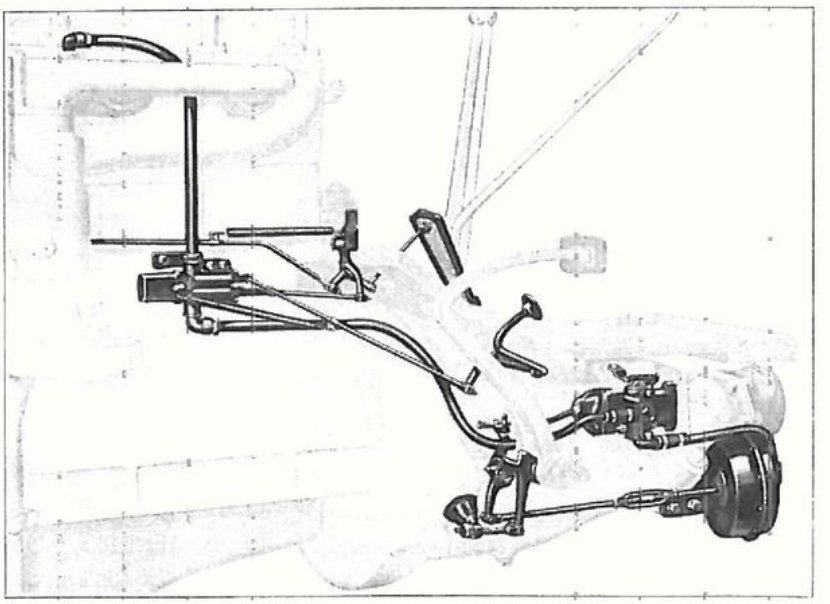


DIAGRAM OF POWER CLUTCH SYSTEM

when the engine is not running, since at such times, the power mechanism is not operative. The pedal should also be used when shifting after a cold start if it is necessary to hold the engine speed above the idling range. It is also advisable to use the clutch pedal when parking in close quarters. When it is desired to use the power clutch mechanism, the hand throttle lever above the steering wheel should always be set at the fully closed position, since the power clutch is only operative when the carburetor throttle is closed to the predetermined idling speed.

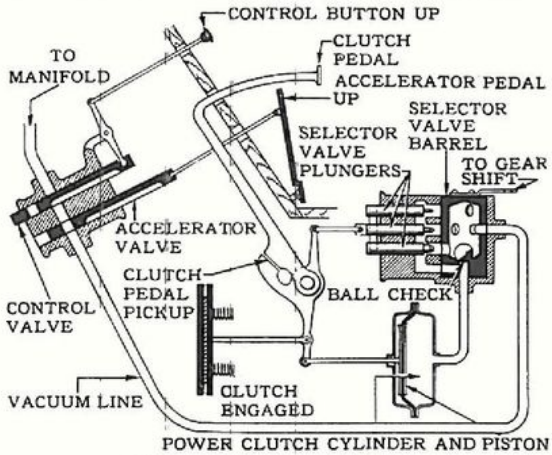
Construction and Operation—

The Buick power clutch mechanism utilizes the vacuum in the intake manifold as the power and the clutch is held in disengaged position for gear shifting or free wheeling so long as the control button is depressed, the accelerator pedal released, and the hand throttle lever above the steering wheel set in closed position. Depressing the accelerator pedal or releasing the control button, allows instant engagement of the clutch and use of the engine as braking power. The system employs the following units:

(a) Power clutch cylinder and piston, to disengage the clutch. The cylinder is connected by tubing to the intake manifold.

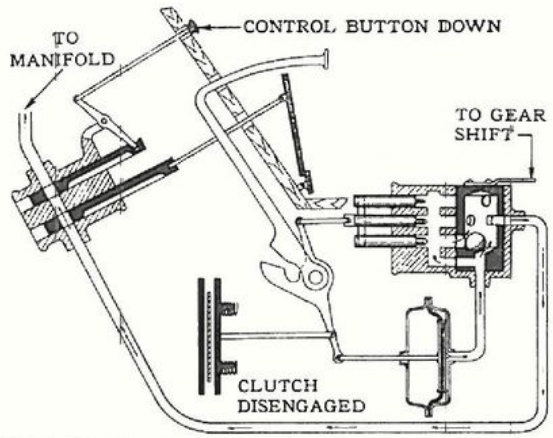
(b) Dual valve, for cutting vacuum in or out of power clutch cylinder, operated by control button and accelerator pedal.

(c) Selector valve, to time the rate of clutch engagement in gear shifting, operated by shifter shaft in transmission and clutch release yoke.



POWER CLUTCH CYLINDER AND PISTON
CURB OR IDLING POSITION

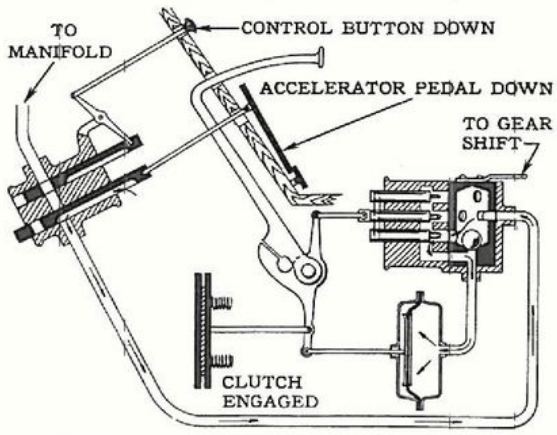
To disengage the clutch, the control button must be pushed down, the accelerator pedal completely released and the hand throttle lever set in closed position. This sets both control and accelerator valves in position to open the vacuum line from manifold to power clutch cylinder. Subsequent engagement of the clutch is brought about by either releasing the control button or depressing the accelerator pedal, since such action on either valve cuts off the vacuum and bleeds air into the line, releasing the suction on the piston.



DISENGAGEMENT FOR GEAR SHIFT OR FREE WHEELING

Clutch engagement during gear shifting operations is controlled by the selector valve which allows a slow engagement for low and reverse, a quicker one for intermediate and a still quicker one for high.

Assume the clutch to have been disengaged by pressing down the control button. The three plungers will then have been drawn forward, opening to the maximum their respective ports to the barrel valve. Movement of the gear shift lever to any one of the shifting positions aligns one of the three openings in the barrel valve with

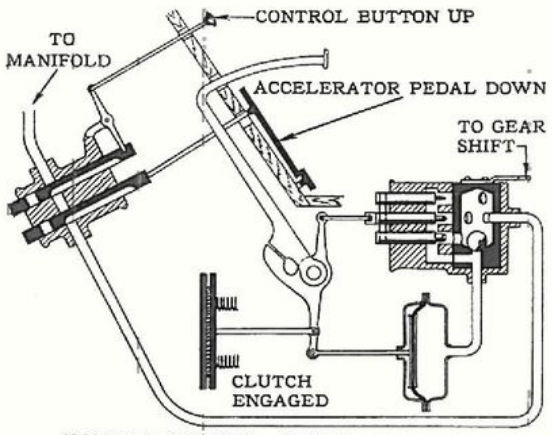


CLUTCH ENGAGEMENT FOR GEAR SHIFT

the respective plunger port for that particular gear position. Depressing the accelerator pedal moves the accelerator valve to a position which cuts off the vacuum and bleeds air into the vacuum line

through the selector valve and into the operating cylinder. Release of vacuum in the cylinder starts the clutch into engagement and moves the selector valve plungers inward. As their restricted portions enter the ports, the air flow is metered to control the speed of piston travel and thereby allow clutch engagement at the proper rate to fit the particular gear change desired.

A ball check in the selector barrel valve allows quick clutch dis-engagement by permitting the air being drawn from the cylinder by suction in the intake manifold, to by-pass the restricted selector valve plunger.



NORMAL DRIVING—CLUTCH ENGAGED

Power Clutch Adjustment—

As with the conventional clutch pedal operation, adjustment may sometimes be necessary, so with the power clutch, the need of certain adjustments of the several units may sometimes be apparent in the severity of clutch operation or clutch slippage. For such adjustments, the car should be taken to the nearest Buick Authorized Service Station.

Lubrication—

Proper operation of the power clutch mechanism depends upon ability of all valves, levers, pins and shafts to operate freely and without binding, but excessive play will cause erratic action. Lubrication is supplied in the valves at the time of assembly and they should not require further attention for a considerable period of operation.

However, if for any reason these valves are disassembled, they should be lubricated with a light oil, with viscosity conforming preferably with S. A. E. specifications No. 10, having maximum pour test at 15° below zero Fahrenheit. A leather boot protects the exposed ends of the selector valve plungers from road dirt and should be kept in good condition.

All fittings, pipe connections and hose clamps, must be kept tight, to eliminate air leaks, as such leaks would interfere with proper operation.

CAUTION: It is important that the carburetor be properly adjusted both at throttle lever screw and air valve screw, for smooth engine idling, since a rich idle or extremely slow idle will tend to hinder action of the power clutch, due to decrease in the available vacuum.

Idling speeds should not be less than the equivalent of six (6) miles per hour.

Lubrication of Clutch Release Bearing—

Lubrication of the clutch release bearing is provided by means of an oil cup,conveniently located, and which should receive attention every 1,000 miles. Do not oil or grease the clutch plates or force an excessive amount of oil to the clutch release bearing as some of the excess will find its way to the clutch plates.

Riding the Clutch—

Driving with the foot continuously on the clutch pedal is commonly described as "riding the clutch."

This practice will result in excessive wear of the clutch plate facings and a slipping clutch, as well as a noisy release bearing.

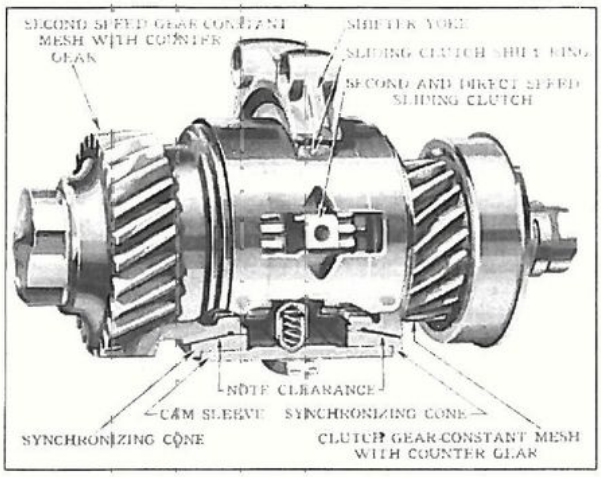
Transmission—

The transmission proper includes all those parts which transmit power from the engine to the rear wheels, but generally the transmission gearset is understood when referring to the transmission.

The gearset or change speed gears are necessary because a gasoline engine develops power in proportion to its speed, the higher the speed, the greater the power output. On the other hand, the car may sometimes require more power at low speeds, and in such an event, the gearset is used to change the ratio between the speed of the engine and that of the rear wheels.

All 1932 models are equipped with the Buick synchro-mesh transmission, selective type, with three speeds forward and one reverse. The first and reverse speeds are conventional sliding gears, while the second speed gears are in constant mesh and have helical cut teeth designed for quiet operation. Shifting of second and direct speeds is controlled by a synchronizing mechanism which consists of a sliding gear clutch and engaging friction cones. When making the shift the cones are engaged, bringing the speed of the gears and clutch in step, and permitting the shift to be made

without clash. All gears are made of heat-treated, nickel chrome steel, and the teeth of the constant

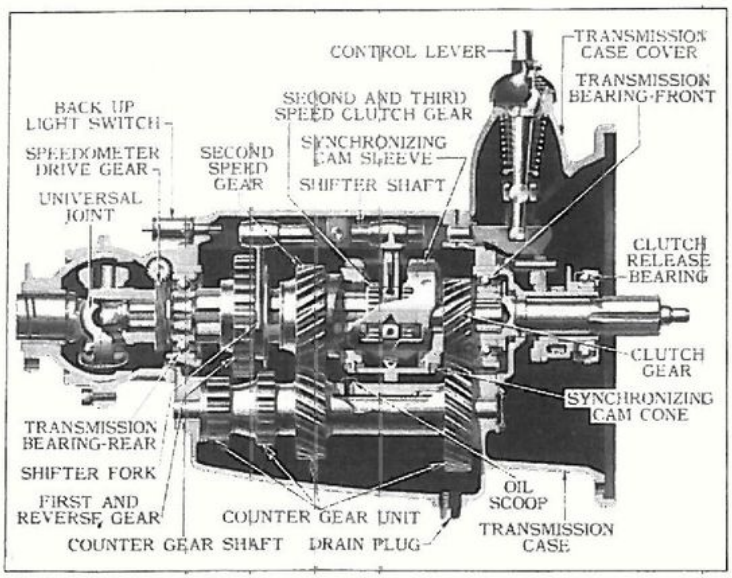


DETAIL OF SYNCHRONIZING MECHANISM

mesh gears are accurately ground to ensure quiet operation.

Control—

The transmission gear set is operated by a control lever in the driving compartment. The positions of the control lever for the various speed changes are the same as in the conventional transmission, but owing to the synchronization of engaging parts for both second and direct speeds, shifting may be accomplished with ease and without clash. It should be clearly understood, however, that this transmission is in no sense a "trick" one and shifts from direct to second speed should not be made when the car speed is in excess of 35 miles per hour.



SECTIONAL VIEW OF TRANSMISSION

Lubrication—

The transmission gears run in a constant bath of oil which also lubricates the bearings of the main shaft and the clutch gear. A filler hole is provided on the side of the transmission case for introduction of new oil, and a drain plug at the bottom permits draining and cleaning. A change of oil is recommended after the first 2000 miles operation of the new car and thereafter twice a year.

To fill the case to the proper level, 4 pints or pounds are required for all models.

Universal Joint—

The transmission or gearset is fastened solidly to the engine which in turn is fastened to the car frame, but the rear axle being hung on springs must be free to follow the uneven surface of the road. To permit the continuous transmission of power from the gearset to the rear wheels, the universal joint is interposed between them.

A single universal joint is used, this being entirely enclosed by the ball drive housing. It consists of two yokes held at right angles to each other by means of two universal joint rings and four cap screws. The front yoke is attached to the transmission main shaft by six splines and locked by nut and washer. The rear yoke is attached to the pinion shaft by means of ten splines on Series 32-80 and 32-90 and six on Series 32-50 and 32-60 and supported in a bronze bushing in the driving ball.

The driving ball is connected to the torque tube by means of a flange and is supported in a two-piece housing at the rear of the transmission. It is lubricated from within by oil from the transmission case.

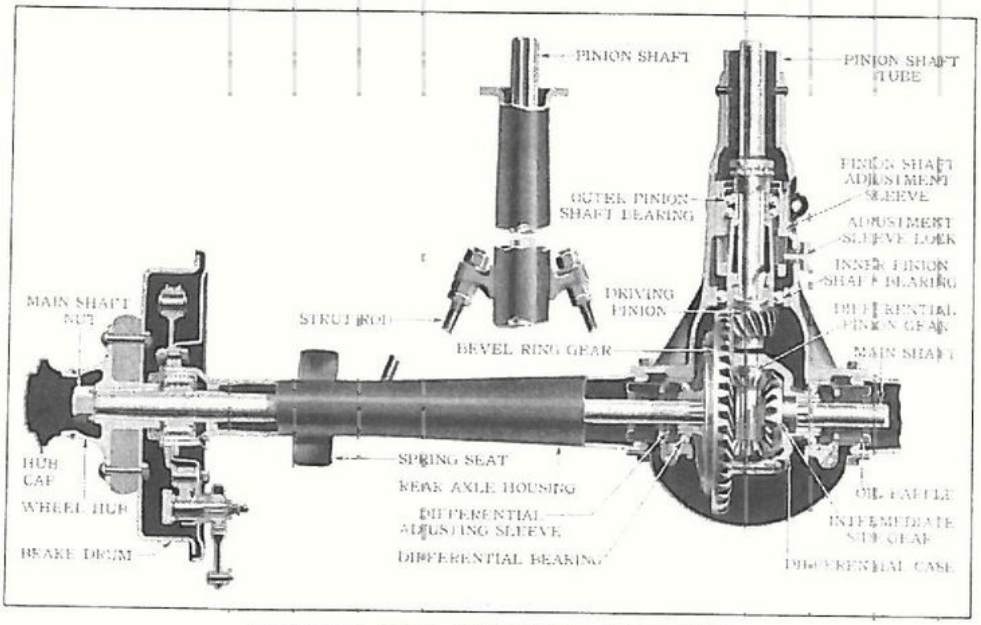
Rear Axle—

The rear axle assembly constitutes the final unit in the driving mechanism of the automobile and includes the pinion shaft, differential, axle shafts, brakes and wheels, together with the housing for carrying these parts.

All models of Series 32-50 are equipped with rear axles of the semi-floating type, in which the load of the rear end of the car is carried on the axle shafts. All models of Series 32-60, 32-80 and 32-90 are equipped with three-quarter floating rear axles, the load in this type being carried on the outer ends of the axle housing. The axles of all Series have the torque tube drive, and the main housing is of one-piece pressed steel construction.

Pinion Shaft—

Power is transmitted from the universal joint to the driving gears of the differential by means of a pinion shaft, this shaft being mounted in ball bearings and is enclosed for its entire length in a torque tube which carries the driving flange attached to the universal joint housing on the rear of the transmission. To the pinion shaft is attached the driving pinion which meshes with the large ring gear on the differential.



SECTIONAL VIEW—SERIES 32-50 REAR AXLE

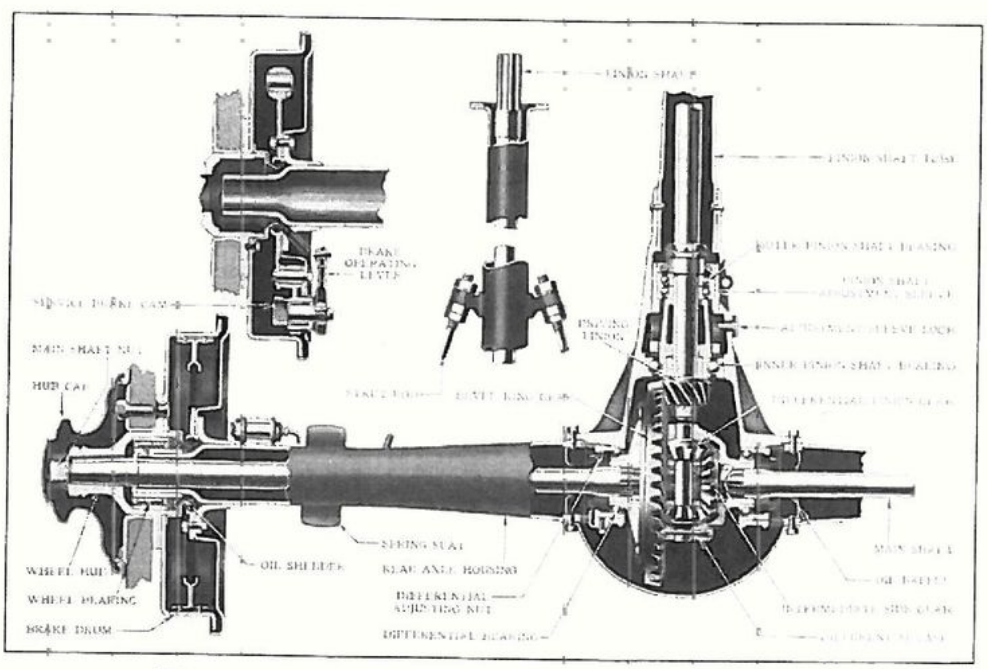
Differential—

Briefly, the differential enables the rear wheels to turn simultaneously at different rates of speed, whenever this may be necessary. In the Buick rear axle design, it is a two pinion type, enclosed in a one-piece malleable iron case, mounted in ball bearings in the differential carrier. Bevel ring and pinion are spiral bevel cut. If necessary, differential and ring gear assembly may be removed from the axle housing while still under the car.

Adjustment of Gears—

In any drive system where gears are employed for the transmission of power, quietness of operation depends in large measure upon the proper meshing of the gears or the contact between teeth. The depth to which the pinion meshes with the teeth of the ring gear is adjustable as is also the position of the differential and driving gear with respect to the driving pinion.

These adjustments should be attempted only by an experienced mechanic, and where there is need for correction of a noisy condition, the car should be taken to the nearest Buick Dealer or Authorized Service Station.



SECTIONAL VIEW—SERIES 32-60, 32-80 AND 32-90 REAR AXLE

Lubrication—

The differential and its bearings operate in a continual bath of oil, a deflector being attached to the housing cover to direct a stream of oil to the differential gears. Baffles are provided in axle housing outside of the differential bearings and also oil retainers at the outer ends, to prevent oil from reaching the brakes.

A filler plug is provided for adding oil to the housing and a plug at the bottom for draining. The oil should be drained off, differential and housing cleaned out with gasoline or kerosene and new oil introduced twice each year or when conditioning the car for winter and summer driving.

The capacity of the housing for a refill is as follows:

Series 32-50—3 pints or pounds.
Series 32-60—7½ pints or pounds.
Series 32-80 and 32-90—8½ pints or pounds.

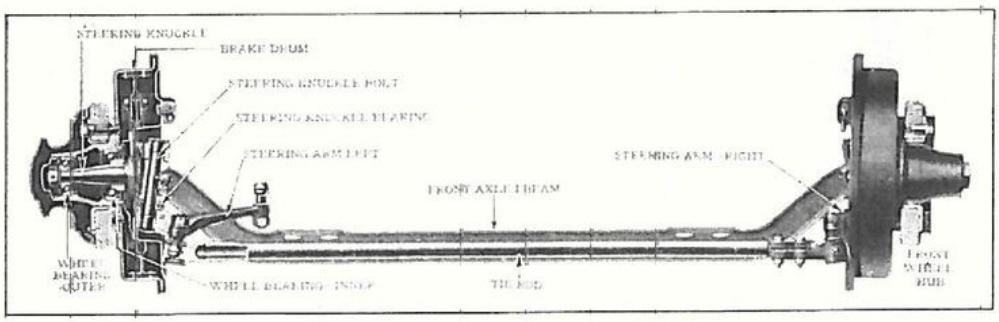
Rear Wheels—

The rear wheels rotate on Hyatt roller bearings, these requiring no adjustment. The bearings are packed in grease when assembled and while further lubrication is provided automatically by oil from the differential housing, it is recommended that both rear wheels be removed once a year and bearings lubricated with soft cup grease, after cleaning bearings and inside of hubs with kerosene. Do not fill hub caps with grease.

FRONT AXLE

The front axle used on all 1932 models is of reverse Elliott type, I-beam construction, the I-beam, knuckles, steering arms and king bolts being heat-treated to provide maximum strength. If any of these parts should become bent through accident, under no consideration should they be straightened, if necessary to apply heat in doing so. Such heat application would destroy the effects of the original heat-treatment, thereby softening the steel and making it liable to bend and fatigue easily.

In the event of breakage, no parts of the front axle should be welded as they are subjected to severe strain and safety requires their replacement by new parts.



SECTIONAL VIEW OF FRONT AXLE

Front Wheels—

The front wheels rotate on ball bearings, cup and cone type, mounted on the steering knuckles, and when assembling, care should be taken to properly lubricate the bearings.

Lubrication of these bearings should be given attention every 5000 miles. For this purpose, it is necessary to remove the wheels and before applying fresh grease, it is advisable to clean the bearings and inside of the hubs with kerosene.

Fresh lubricant should then be applied directly to the bearing cups and ball assemblies, but the hub cap and center of hub should not be filled with grease.

Bearing Adjustment—

In addition to periodical lubrication, the front wheel bearings will require adjustment from time to time, and when this appears necessary, the following procedure is recommended:

Remove the hub cap, jack up the wheel and extract the cotter pin from the bearing nut. Then tighten this nut to the point where no perceptible shake can be felt in the wheel; do not mistake shake due to wear in king bolt bushings which can be determined by inserting a chisel or other small tool between steering knuckle and I-beam.

Next back off the bearing nut until a very slight shake can be felt, then tighten to the nearest cotter pin hole.

With the cotter pin replaced, this adjustment is then completed and checking of the adjustment is recommended after the first 1500 miles and every 5000 miles thereafter.

Front Wheel Alignment—

The front wheels of the automobile are set so that they do not stand exactly parallel, the purpose of such design being to provide easy handling of the car. The wheels have "toe-in" or are closer at the front than at the rear, and also "camber" or are closer at the bottom than at the top. The king bolts are also set at an angle, inclined to the rear from a perpendicular and this is called the "castor angle."

The wheels are set correctly at the factory but the alignment should be checked occasionally and in the event of collision or accident, the car should be taken to an Authorized Buick Service Station for proper alignment and adjustment of the wheels.

SPEEDOMETER

The speedometer registers the speed at which the car is traveling, the total number of miles traveled, and the trip mileage. The total cannot be reset, but the trip mileage can be reset to zero by pulling out and turning the knurled finger nut which protrudes below the face for that purpose.

If the speedometer head is removed for any reason, it should be handled with great care as it is made up of delicate parts which may be easily damaged.

Under no circumstances oil the instrument head.

The drive is taken from a worm gear which is attached to the main shaft of the transmission through the transmission end plate, being supported with suitable bearings and held in place by a set screw.

STEERING GEAR

The steering gear used on Series 32-50 models is of the worm and sector type, while that used on Series 32-60, 32-80 and 32-90 models is of the worm and roller type. In the former type, the worm on the steering tubes engages with the three teeth of the sector shaft, while in the latter type, the worm engages with a single roller mounted on the roller shaft.

In both types, the worm is mounted between two tapered roller bearings adjustable for end play by means of a nut at the top of the housing. The roller shaft is carried in two bronze bushings in the housing cover, and in the worm and roller type, the roller is mounted on a hardened sleeve which is carried on a pin in the forked end of the roller shaft and is provided with roller thrust bearings.

Adjustment—

An adjusting screw is provided in the housing to regulate end play of the sector shaft and roller shaft of the two types. Backlash between the worm and roller and between the worm and sector is adjusted by shifting the housing cover. End play of the worm and shaft is adjusted by means of a nut at the top of the steering gear housing.

When properly adjusted, the steering gear will have no backlash or lost motion, with the front wheels in straight ahead position.

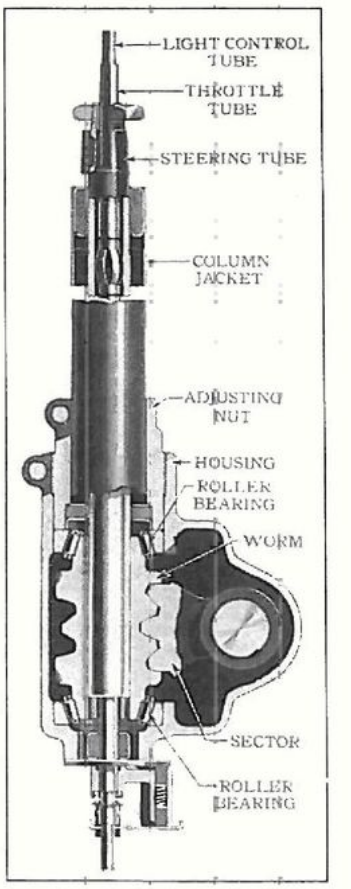
NOTE: When adjustment is necessary the work should be done only by an Authorized Buick Service Station.

Lubrication—

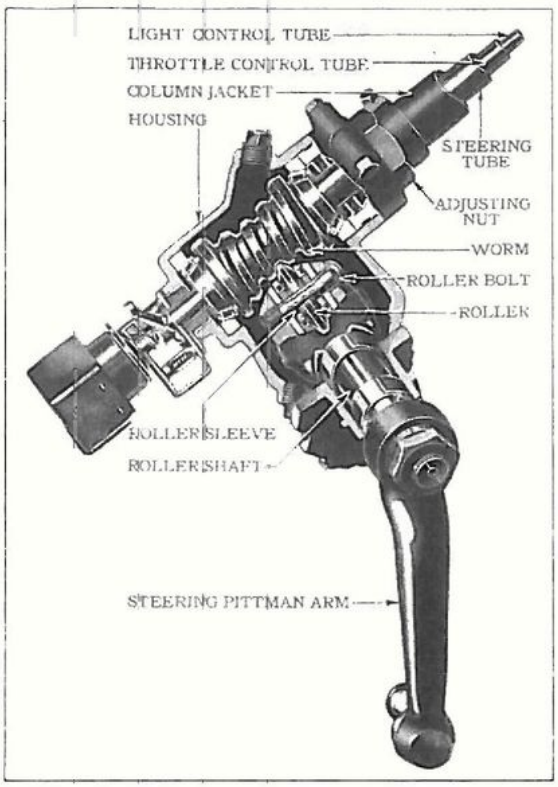
Periodical lubrication of the steering gear and its connections is essential for in addition to minimizing wear, such attention will make for easy steering.

An oil plug is provided in the steering gear housing for keeping the housing filled with gear lubricant, using the proper grade for summer and winter driving.

Zerk connections are provided at both ends of the steering connecting rod and on each of the tie rod ends and king bolts, and these points should have attention every 1000 miles, using transmission oil.



SECTIONAL VIEW—SERIES 32-50 STEERING GEAR

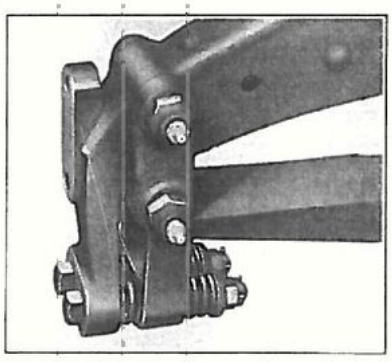


SECTIONAL VIEW—SERIES 32-60, 32-80 AND 32-90 STEERING GEAR

The throttle bevel gears at the bottom of the steering gear should receive a little engine oil from time to time.

Road Shock Eliminator—

On all models of Series 32-60, 32-80 and 32-90, a special shackle is provided at the front end of the



ROAD SHOCK ELIMINATOR

left front spring, and this acts as a shock eliminator. The device includes four coil springs, against which the shackle acts, and these springs absorb the road shocks so that they do not reach the steering gear.

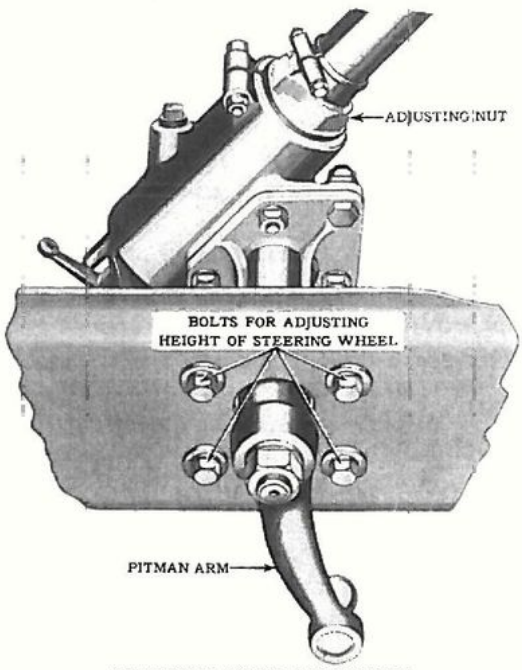
Proper functioning of the eliminator depends upon the correct tension in these springs, and when adjustment of the spring tension may be necessary, a Buick Authorized Service Station should be consulted.

Steering Gear Lock—

A lock is provided for locking the steering gear in conjunction with the ignition. It is mounted in a housing integral with the steering column bracket and the gear may be locked only after the ignition lever is turned to the "Off" position. In one operation, it locks both steering and ignition, and provides a most effective theft protection for the car.

To lock the car, first turn the ignition lever to "Off" position. Then turn the lock key to the left counter-clockwise, until it can be removed and both steering and ignition are then locked.

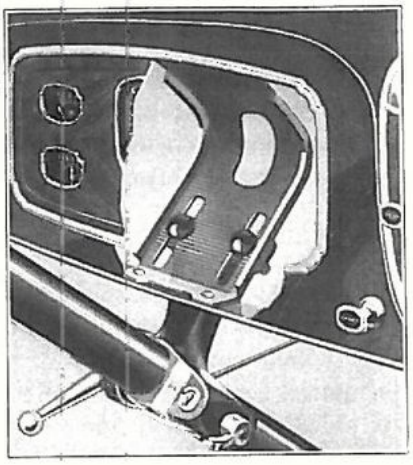
To unlock the car, insert key and turn to the right, clockwise, until it can be withdrawn from the lock. This unlocks the steering post and the ignition lever can then be turned to the "On" position for starting the engine in the usual way.



STEERING GEAR MOUNTING

If key turns hard, move steering wheel slightly to remove strain on locking pin.

CAUTION: Immediately upon receipt of the car, the owner should make a record of the key numbers for future reference, as without these numbers it will be impossible to duplicate lost or broken keys.



ADJUSTMENT OF STEERING WHEEL POSITION

Steering Wheel—

A three spoke steering wheel is used on all models, this in proper position being set with one spoke straight down, so that the driver has an unobstructed view of the instrument panel when driving straight ahead. Should the wheel become rotated and the spoke out of position in relation to the instruments, as when adjusting the steering wheel height, the condition may be corrected by means of an adjustment provided at the rear end of the steering connecting rod. When this adjustment may be necessary, a Buick Authorized Service Station should be consulted.

Steering Wheel Position—

The steering column bracket on all models is provided with an adjustment for placing the steering wheel in the most convenient position for the individual driver. This adjustment consists of loosening two nuts on the steering column bracket back of the instrument board, also four screws which clamp the steering gear housing in the bracket, raising or lowering the steering wheel to the position desired and then tightening the screws and nuts.

SPRINGS

Front and rear springs on all models are semi-elliptic type, made unusually long and flexible. The carrying capacities and number of leaves vary with the different models, in order that the best riding qualities may be had in each model.

The leaves of all rear springs are made of Silico Manganese steel, while those of all front springs are made of carbon steel, except the main leaf which is of Silico Manganese steel. Front springs are overslung while the rears are underslung, thus making possible a lower body level.

Spring Shackles and Bolts—

All 1932 models are equipped with a new Screw Type Shackle, designed to present large surfaces for resisting side thrust as well as vertical loads. The threads not only increase the bearing surface, but serve to retain the lubricant. No adjustment is provided for these shackles, but with proper lubrication, the wearing parts will operate silently and need not be replaced except in case of breakage or after extremely long service.

The spring bolts at the front ends of the front springs and in the shock eliminator on Series 32-60, 32-80 and 32-90, are of the conventional type used in the past. When necessary, these may be adjusted by drawing up tight and backing off one-half turn.

Spring Clips—

Spring clips should be tightened after the first 500 miles and again at 1000 miles. Thereafter the clips should be inspected every 2000 miles and tightened if necessary. This practice, if followed, will serve to prevent breakage of spring plates through center bolt holes.

Lubrication of Springs and Shackles—

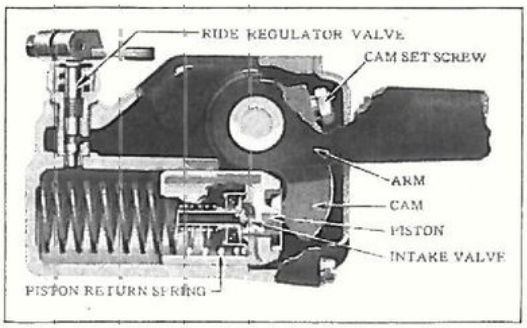
All models of Series 32-90 are equipped with metal spring covers, and the lubrication thus provided in these springs should make further lubrication unnecessary.

With all other models, excessive lubrication should be avoided, as it will result in too much spring action. The springs of these models may be lubricated at the ends of the plates for the prevention of squeaks and a mixture of engine oil and graphite, applied sparingly with a brush, is recommended.

Spring shackle bolts and spring pins should be lubricated with transmission oil and zerk fittings are provided for this purpose.

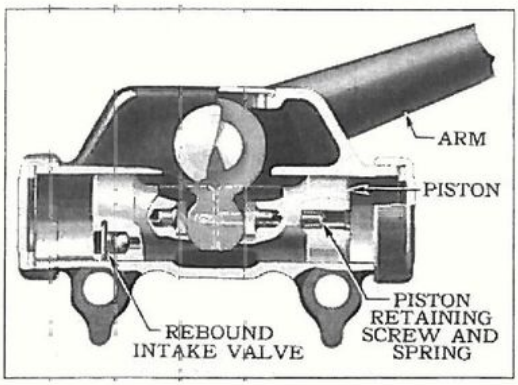
See Lubrication Chart for recommended intervals.

SHOCK ABSORBERS AND RIDE REGULATOR



SECTIONAL VIEW—SERIES 32-50 SHOCK ABSORBER

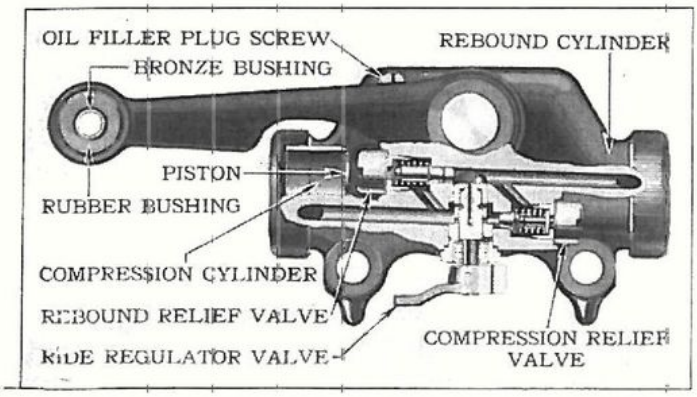
All models of Series 32-50 are equipped with improved Single Acting Type Hydraulic Shock Absorbers, this type having a single acting piston,



SECTIONAL VIEW—SERIES 32-60, 32-80 AND 32-90 SHOCK ABSORBER

actuated by a cam attached to the shock absorber arm.

Those models of Series 32-60, 32-80 and 32-90 are equipped with opposed type Two-Way Hydraulic Shock Absorbers. This type has a single cylinder and a double acting piston, which controls rebound when moving in one direction and compression in the other direction.



SECTIONAL VIEW—SERIES 32-60, 32-80 AND 32-90 SHOCK ABSORBER

Ride Regulator—

All models except 32-56 and 32-57 are supplied with an operating lever, attached to the steering column, by which the flexibility of the car ride can be regulated by the driver while the car is in motion, to suit any road or driving conditions. The shock absorbers of these models include a regulating valve having variable positions which graduate the control as desired by the driver. This valve regulates or meters the flow of oil between the rebound and compression cylinders and is controlled by the operating lever on the steering column. The calibration of the rebound and compression valves has been worked out for each series, to provide the maximum range of ride regulation, between permissible limits, for smooth and rough roads.

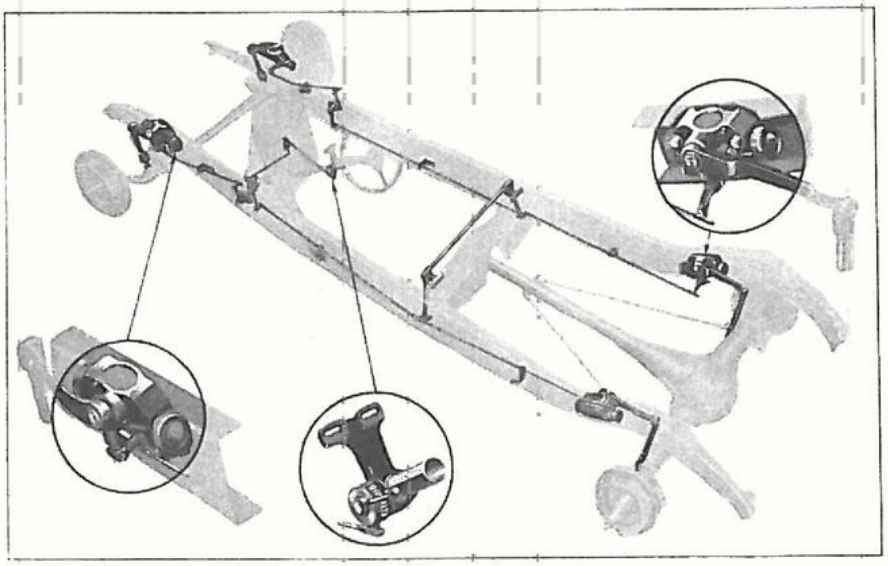
The control mechanism of the Ride Regulator consists of the operating lever mounted on the steering column, and the movement of this lever is graduated as follows:

"Smooth Road—1-2-3-4-5-6-7—Rough Road."

The operating lever is connected through an adjustable rod with an idler lever on the dash and this in turn connects with a ratchet idler lever on the left side of frame.

The ratchet idler lever engages with a spring poppet or ratchet and has seven possible positions corresponding to the various positions of the ride regulator lever. The ratchet idler levers connect by means of adjustable rods with the left hand front shock absorber regulator lever and the regulator cross shaft which is mounted on the center cross member. The regulator cross shaft connects with both rear shock absorbers and the right front shock absorber idler lever, by means of adjustable rods. The idler lever is also connected with the shock absorber by an adjustable rod.

Proper adjustment of the ride regulator hook-up requires that each of the four shock absorbers be in exact step or agreement with the others and the procedure necessary to accomplish this should be attempted only by the Buick Dealer or Authorized Service Station.



LAYOUT OF RIDE REGULATOR OPERATION

Lubrication of Shock Absorbers—

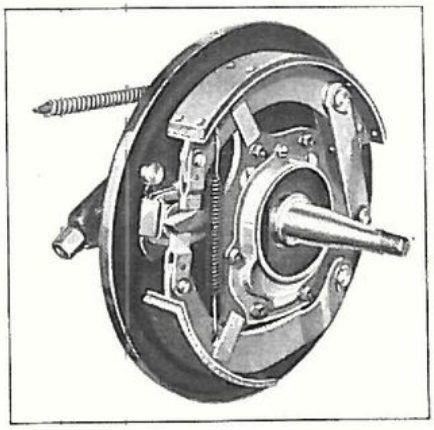
Proper functioning of the shock absorbers on all models requires that they be kept filled with oil. Oil used for this purpose should be a special non-freezing brand which may be obtained from any Authorized United Motors Service Station. The shock absorbers should be inspected at least twice yearly or every 5000 miles and oil added if necessary, to properly fill them.

The bolts attaching shock absorbers to the frame, should be kept securely tightened, as looseness will cause noise and possible breakage.

CAUTION: Do not use any type or brand of oil in the shock absorbers, other than that specified above.

BRAKES

All 1932 models are equipped with Buick controlled servo, internal expanding shoe type, mechanically operated four wheel brakes. The parking brakes are operated by means of the hand-brake lever in the driving compartment. The hook-up is such that the brakes on all wheels can be operated by either the brake pedal or the hand lever, independently of each other.



FRONT WHEEL BRAKE ASSEMBLY

Series 32-50 models use 12″ brake drums, Series 32-60, 14″ and Series 32-80 and 32-90, 15″ brake drums.

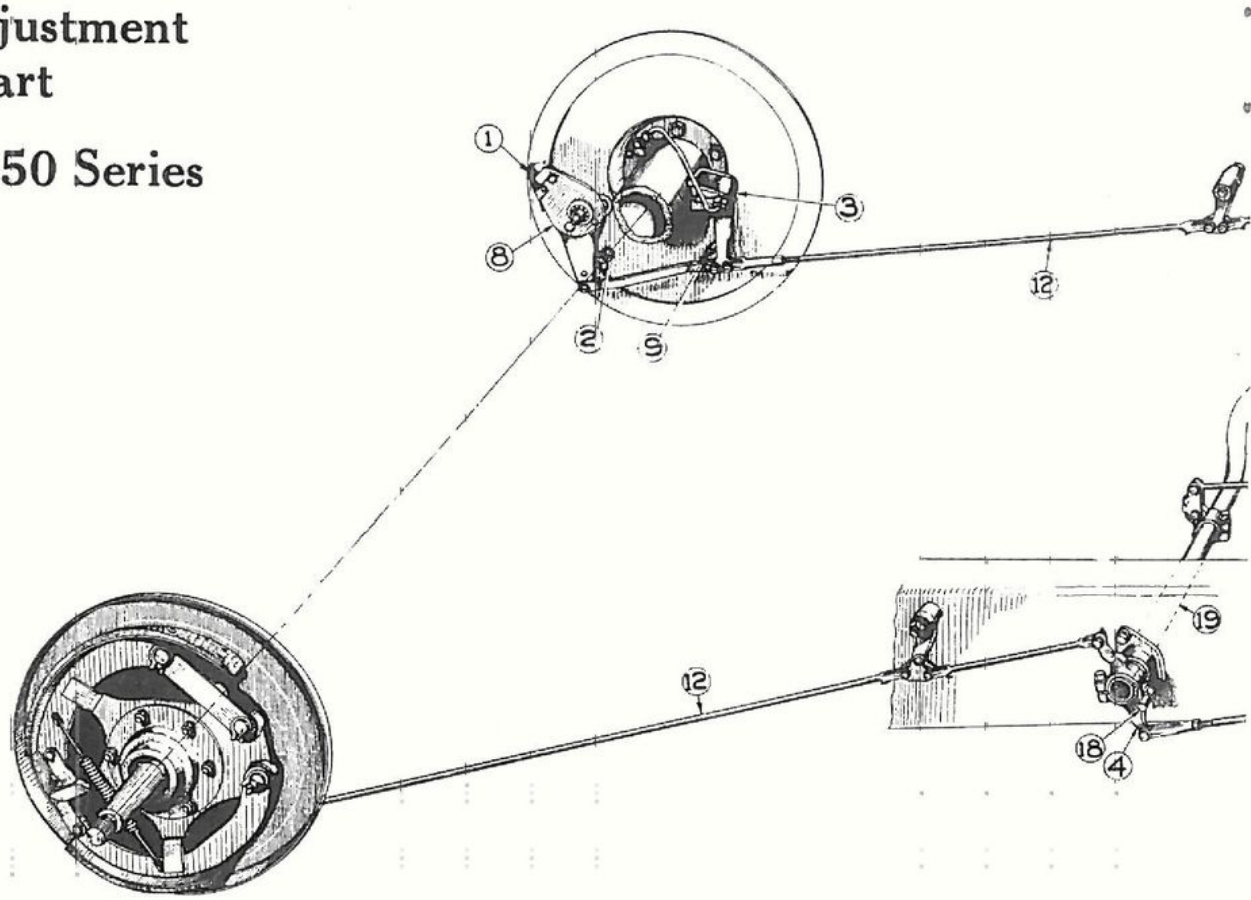
The Buick controlled servo type of brake is designed with a positive single brake cross-shaft over-running hook-up, which allows the application of front and rear brakes by either the pedal or hand lever. The same set of shoes is used for service and emergency braking. With full pedal travel, or when pedal pad hits the toe board, there is sufficient reserve left in hand lever to operate brakes.

Service brakes are applied by the brake pedal, acting upon all four wheels simultaneously and the pedal pad is equipped with a replaceable rubber pad which affords a feeling of security when making brake application.

The parking brakes are applied by the hand brake lever, both front and rear brakes being operated for parking as well as service.

Brake Adjustment Chart

32-50 Series



FOR MAXIMUM EFFICIENCY AND SMOOTHNESS IN OPERATION, FOLLOW IN ORDER INSTRUCTIONS LISTED BELOW:

NOTE: Do not adjust when brakes are warm, brake drums must be at room temperature, readjust brakes when pedal travels to within 2" of toe board with brakes applied. For high speed driving brakes should be adjusted when pedal travels to within 3" of toe board with brakes applied.

1. (a) LUBRICATE ALL BRAKE CONNECTIONS WITH TRANSMISSION OIL S. A. E. VISCOSITY SPECIFICATION NO. 160. THIS SHOULD BE DONE ONCE A MONTH TO INSURE FREELY OPERATING BRAKES.

   (b) Pedal must have live feel.

   (c) Grease cables 11 twice a year with Transmission Oil S. A. E. Viscosity Specification No. 160. (Using special tool for this purpose.)

   (d) Tighten all chassis spring clip nuts if loose.

   (e) Front wheel bearings must be properly adjusted.

   (f) Check rear wheels for looseness. They must be drawn up tight on tapers of rear axle shafts.

   (g) Do not over-grease wheel bearings. A teaspoonful of grease on each bearing is sufficient. Do not fill hubs or hub caps with grease.

2. IN RELEASED POSITION, CROSS SHAFT 19 MUST RETURN FREELY TO STOP PIN 18.

3. REMOVE ALL SLACK IN PEDAL MOVEMENT.

   (a) Pedal should be set so that it rests up against rubber pad by adjusting screw 23.

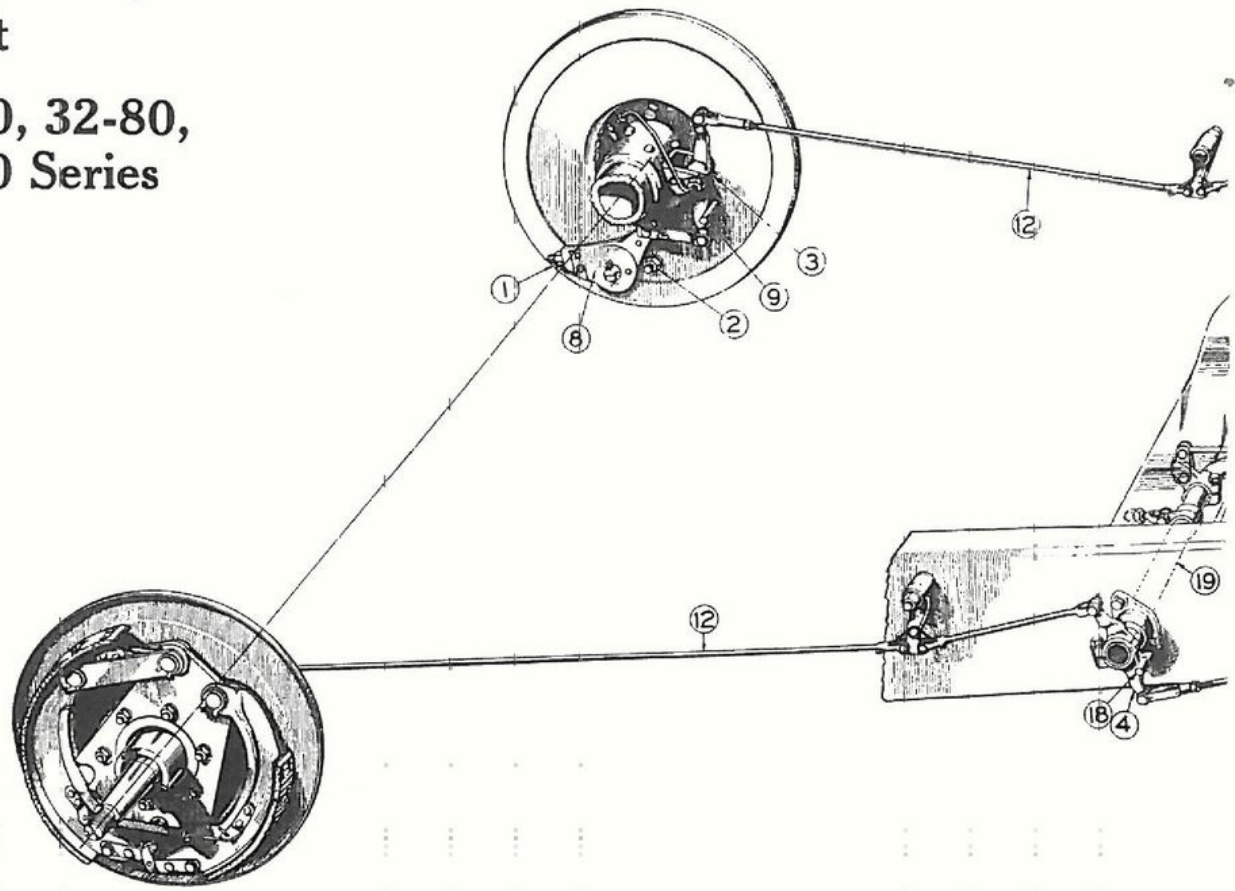
   (b) Remove all slack from pedal rod 7, rod 7 should be in lower hole in pedal. If a slightly harder pedal pressure is desired, rod 7 can be assembled in upper hole.

   (c) Remove all slack from hand brake lever rod 13 with lever in full release position.

   (d) When all slack is removed cross shaft lever 4 must be against stop 18.

Brake Adjustment Chart

32-60, 32-80, 32-90 Series



FOR MAXIMUM EFFICIENCY AND SMOOTHNESS IN OPERATION, FOLLOW IN ORDER INSTRUCTIONS LISTED BELOW

NOTE: Do not adjust when brakes are warm, brake drums must be at room temperature, readjust brakes when pedal travels to within 2″ of toe board with brakes applied. For high speed driving brakes should be adjusted when pedal travels to within 3″ of toe board with brakes applied.

1. (A) LUBRICATE ALL BRAKE CONNECTIONS WITH TRANSMISSION OIL S.A.E. VISCOSITY SPECIFICATION NO. 160. THIS SHOULD BE DONE ONCE A MONTH TO INSURE FREELY OPERATING BRAKES.

   (B) Pedal must have live feel.

   (C) Grease cables 11 twice a year with Transmission Oil S. A. E. Viscosity Specification No. 160. (Using special tool for this purpose).

   (D) Tighten all chassis spring clip nuts if loose.

   (E) Front wheel bearings must be properly adjusted.

   (F) Check rear wheels for looseness. They must be drawn up tight on tapers of rear axle shafts.

   (G) Do not over-grease wheel bearings. A teaspoonful of grease on each bearing is sufficient. Do not fill hubs or hub caps with grease.

2. IN RELEASED POSITION, CROSS SHAFT 19 MUST RETURN FREELY TO STOP PIN 18.

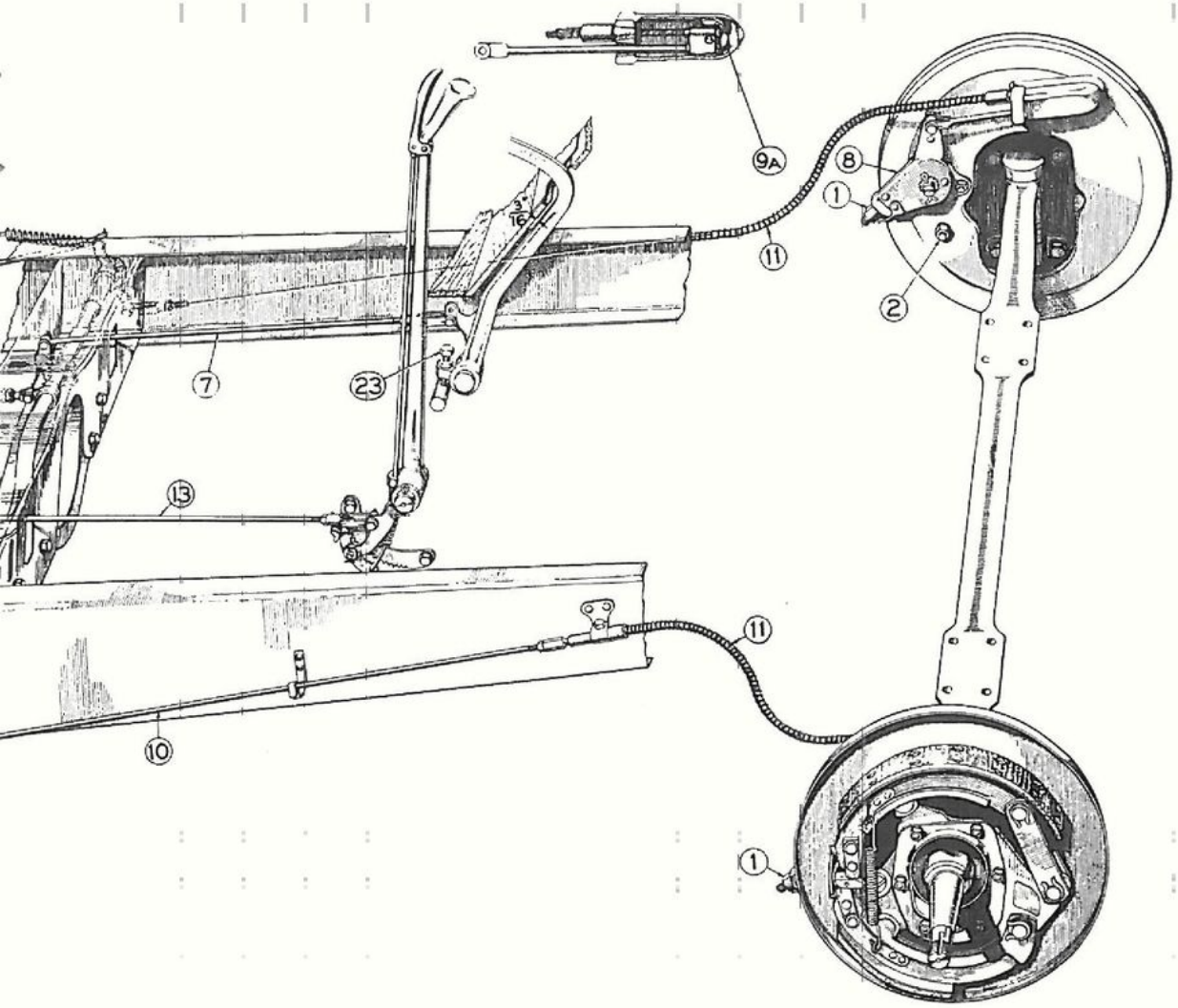
3. REMOVE ALL SLACK IN PEDAL MOVEMENT.

   (A) Pedal should be set approximately $\frac{5}{16}$″ from toe board by adjusting screw 23.

   (B) Remove all slack from pedal rod 7, rod 7 should be in lower hole in pedal. If a slightly harder pedal pressure is desired, rod 7 can be assembled in upper hole.

   (C) Remove all slack from hand brake lever rod 13 with lever in full release position.

   (D) When all slack is removed cross shaft lever 4 must be against stop 18.



(E) Disconnect rods 10 at lever 4 and rods 12 at levers 3. With wheels set straight ahead, operate each brake separately by hand, pulling levers 3 and rods 10 to see that brakes release freely to stops 9 on rear and 9A on front. When connecting rods 10 and 12 adjust the lengths at adjustable yokes so that all slack is removed.

4. JACK UP ALL FOUR WHEELS.

5. LOOSEN NUTS 2 UNTIL LOCK WASHERS ARE FREE TO ALLOW CENTRALIZERS TO CENTER CAMS.

6. TAKE UP NUTS 1 UNTIL WHEELS DRAG HARD, OR UNTIL IT IS JUST POSSIBLE TO ROTATE WHEELS A COMPLETE REVOLUTION BY HAND.

7. TIGHTEN NUTS 2 TO LOCK CENTRALIZERS IN CORRECT POSITION.

8. BACK OFF NUTS 1 FOURTEEN FLATS FOR NEW LINING, AND AFTER LINING IS BURNISHED IN, TWELVE FLATS IS SUFFICIENT. THIS IS EQUIVALENT TO APPROXIMATELY 1¾" PEDAL TRAVEL. A SLIGHT DRAG IS PERMISSIBLE WITH NEW LINING. AFTER BACKING OFF NUTS 1, IT WILL BE NECESSARY TO APPLY BRAKES FIRMLY TO PROPERLY SEAT NUTS 1 AGAINST LEVERS 8.

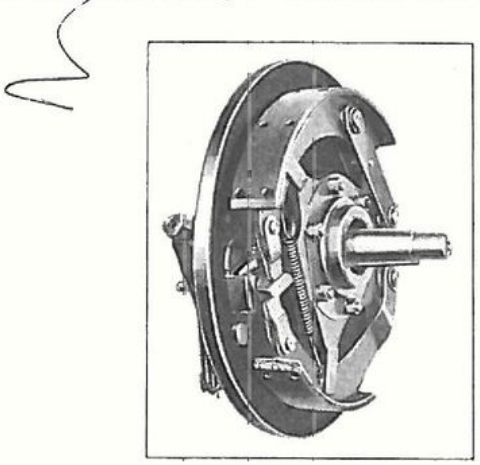
NOTE: Check spring locks to make sure they will hold nuts 1 from rattling off.

9. BEFORE REMOVING JACKS, APPLY BRAKES LIGHTLY WITH PEDAL JACK TO DETERMINE WHETHER ALL WHEELS HAVE SAME DRAG. IF NOT, SLACK OFF ADJUSTING NUT 1 ON TIGHT WHEEL TO BALANCE.

10. REMOVE JACKS AND TEST CAR ON ROAD.

Adjustment—

The type of brake used on all 1932 models should require very little adjustment, only such as may be needed to compensate for natural wear of the brake linings. Whenever such adjustment may be necessary, a Buick Authorized Service Station should be consulted and the procedure as outlined in the instructions included with the brake charts on pages 42 to 45, should ensure maximum efficiency of the brake system.



REAR WHEEL BRAKE ASSEMBLY

Lubrication—

The brake mechanism is lubricated by means of zerk fittings and should have attention in accordance with the lubrication chart. In addition all brake clevis pins, rod end yokes and bearings should be lubricated once each month with transmission oil, to ensure free operation of the brake mechanism at all times.

Front brake cables should be lubricated twice a year with transmission oil, by removing the brake rod from conduit and applying a special attachment to the end through which oil may be forced with a zerk gun. Consult Authorized Service Stations.

FRAME

In Series 32-50 models, the frame side rails are made of heavy pressed steel channels. Five heavy cross members are rigidly gussetted to the side rails.

The front cross member, which also supports the front end of the engine and the radiator, is exceptionally heavy.

The rear end of frame has a "Kick Up" over the rear axle to allow sufficient "ride" of the rear springs and to provide low car appearance. The side rails are spaced 28" apart at the front and 44⅜" at the rear, to provide short turning radius of the front wheels and a wide mounting for the body. Bumper brackets are built into the frame.

In Series 32-60, 32-80 and 32-90 models, the frame is of a double-drop type, of very rigid construction with deep side rails. Six cross members with integral gussets are used and placed at points of greatest strain.

The center cross member of the box type, completely encloses the brake cross shaft. Bumper brackets are integral with the frame.

WHEELS

Wire and wood wheels, demountable at the hub and with drop center rims, are standard equipment on all models except 32-56 and 32-57 which are equipped with artillery wood wheels and demountable rims. Front and rear demountable wheels are interchangeable on each series.

All demountable wheels are held on by five tapered nuts which fit into tapered seats in the wheel flanges. These attaching nuts are inclosed inside of the hub on wire wheels and covered by the hub cap on wood wheels.

All wire wheels are of the riveted spoke type with large hub shells, and the outer end of the hub is enclosed by a cover or cap which snaps into place and is held by three double ended springs. The cap can be removed by prying between cap and hub shell with a screw driver.

Demountable wood wheels have twelve large spokes, painted to conform with the color scheme of the car. A large cap encloses the wheel nuts and this cap snaps over a retaining ring which is fastened to the wheel flange and can be removed by prying with a screw driver between the cap and the retaining ring. There are three depressions in the retaining ring to receive the end of the screw driver and so facilitate removal of the cap.

To remove demountable wheels, both wire and wood, proceed as follows:

1. Jack up the wheel.
2. Pry off the cap with screw driver.
3. Remove the attaching nuts with the demountable wheel wrench.
4. The wheel can then be removed from the hub.

To replace the wheel, the foregoing operations should be reversed, making certain that the nuts are drawn up tight. When tightening these nuts, it may be noticed that when nearly tight, a jerky motion will be felt. This is due to the cam shaped faces of the nut on its seat in the wheel flange. Continue to tighten until the wheel is drawn up snug against the hub flange.

Balancing of Wheels—

Proper balance of all types of wheels is essential to satisfactory performance of the car, especially at high speeds, and when wheels are changed or tires replaced for any reason, the wheel and tire assembly should be checked for proper balance by a Buick Authorized Service Station.

TIRES

All 1932 models are equipped with low pressure, straight side cord tires, the sizes for the several Series being as follows:

Series 32-50—18 x 5.50 (29 x 5.50)
Series 32-60—18 x 6.00 (30 x 6.00)
Series 32-80 and 32-90—18 x 7.00 (32 x 7.00)

The purpose of the tire is to protect the tube that holds the air, thus providing an air cushion to absorb shocks of the road. With normal load and correct inflation, the tire should deliver satisfactory service but if it is run at a lower air pressure than is recommended, rapid tread wear will certainly occur and very often fabric breaks.

Maintenance of the proper pressure is therefore the most important element of tire care and the tires should be tested with a reliable gauge every week, making sure that they are inflated to the minimum pressure recommended.

The following illustrations will indicate the more common forms of tire damage resulting from under inflation.

Figure No. 1 shows an under-inflated tire striking a hole in the pavement. The gauge showed this tire under-inflated to the extent of more than ten pounds, so that the tire was too soft to absorb the force of the blow and was crushed flat.

Figure No. 2 shows a cross sectional view of the tire at the moment of impact. This will illustrate the manner in which tire is damaged by being crushed between the rim and the pavement.

Figure No. 3 shows the effect of the blow. The fabric has been ruptured, although the tough rubber tread showed no marks of the blow. The tube, of tough elastic rubber, probably was not damaged at the time, but constant flexing or bending of the tire enlarged the break and the

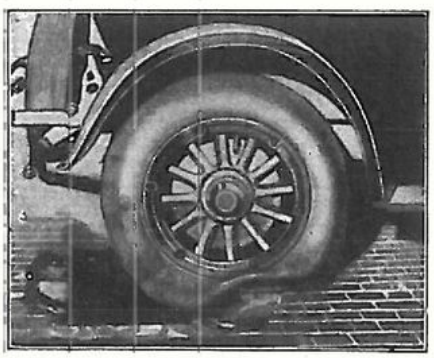


FIG. NO. 1
TIRE HITTING HOLE IN PAVEMENT

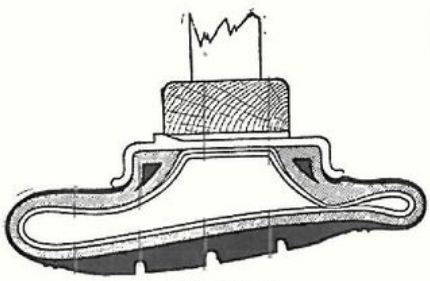


FIG. NO. 2
CROSS-SECTION VIEW OF BALLOON TIRE CRUSHED BY IMPACT

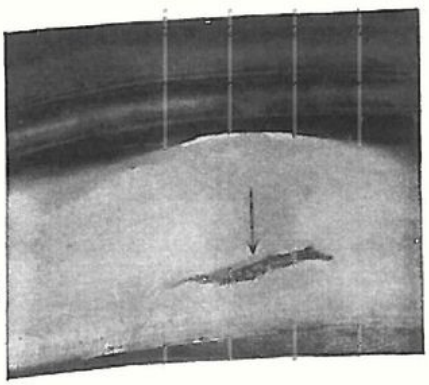


FIG. NO. 3—SINGLE BREAK

Careful use and proper attention to air pressures should provide maximum service. Application of brakes too quickly and turning of corners at high speeds should be avoided, as well as skidding and running of tires in car tracks. Front wheel alignment and adjustment of brakes should be checked occasionally.

tube, forced into the crack by the air pressure within, was pinched and cut. A leak thus developed and eventually the tire became flat although perhaps not for several days after the injury.

Figure No. 4 shows the manner in which an under-inflated tire may be bruised against the

curb while parking or turning around. Bruises or breaks caused in this manner are very common.

Figure No. 5 shows the appearance (on outside of casing) of a bruise made by the rim on an under inflated tire. Rim bruises are not always evident on the outside of casing, however, even though several of the inside plies of fabric may be broken.

Figure No. 6 shows a similar injury except that the break is worse, being of a compound nature. The outside of the casing may show no evidence of this damage and blow-out may not occur for some time after the tire was injured.

tion is responsible for unnatural, spotty or rapid tread wear. This is particularly true of low pressure casings because of the greater area of contact and the constant wiping action against the road surface.

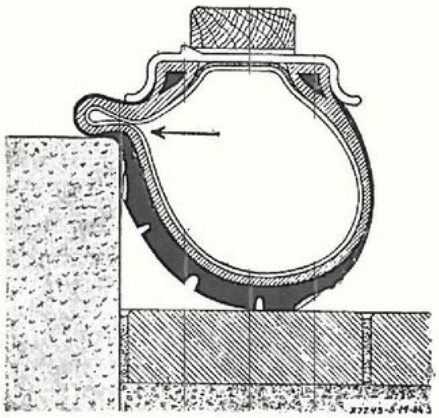


FIG. NO. 4
MANNER IN WHICH RIM BRUISE OCCURS

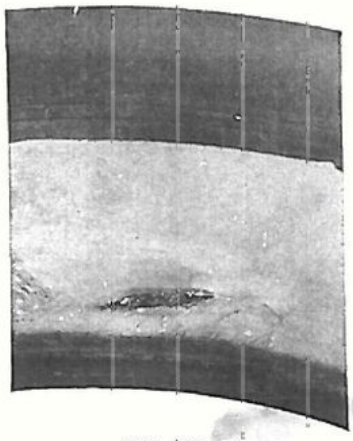


FIG. NO. 5
BRUISE PARALLEL TO BEAD

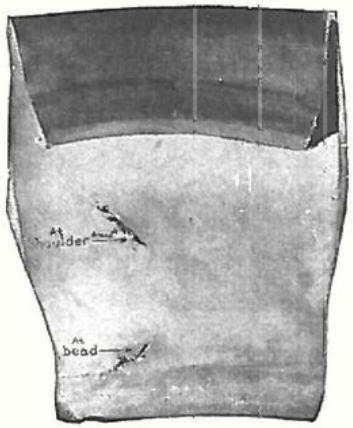


FIG. NO. 6—COMPOUND BREAK

Figure No. 9 shows a casing which was run flat on the rim for a short distance and so badly injured that it cannot be repaired. The same condition will result if a casing is run for a considerable distance at an extremely low pressure. This will show the need of changing the tire or repairing the leak immediately, so that the fabric may not become torn and separated.

A tire pressure of 35 pounds is recommended for all models, both front and rear. For high speed driving however, the front tire pressure for all models should be increased 5 pounds.

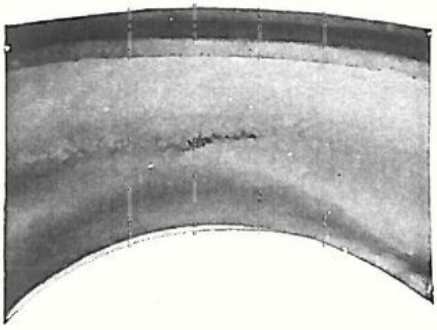
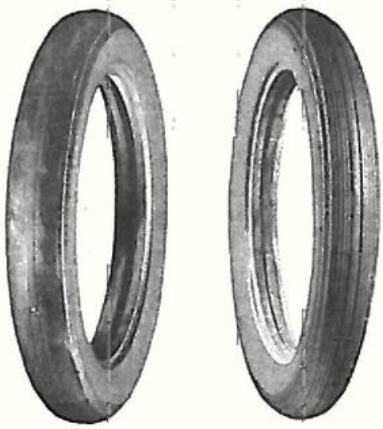


FIG. NO. 7—SHOULDER BREAK



Tire Run 4 lbs. Under-inflated — Tire Run at Correct Pressure

FIG. NO. 8

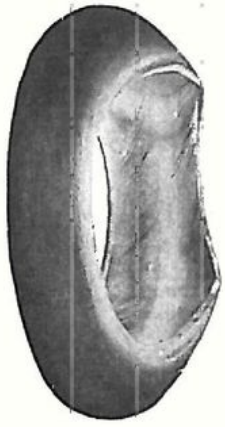


FIG. NO. 9—CASING RUN FLAT

Figure No. 7 shows a crack or break in the fabric on the inside of a casing, caused by excessive flexing of the sidewall as a result of under inflation.

Figure No. 8 shows the effect of under inflation in relation to tread wear on low pressure casings. Tests have proven conclusively that under infla-

Removing and Applying Tires—

The drop center rims used on all demountable wheels are of one continuous piece and do not have the ordinary detachable ring for applying or removing tires. If the instructions for removing and applying tires as given below are carefully followed, there should be no difficult experienced in these operations.

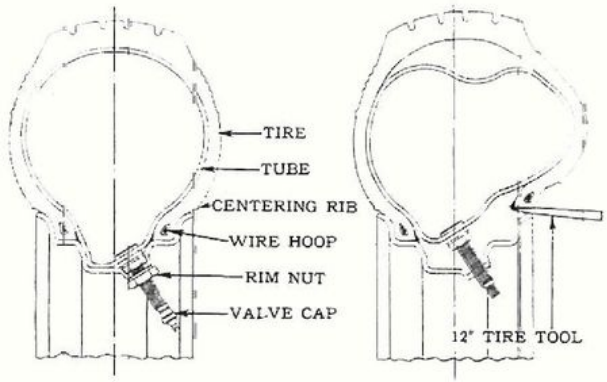


FIG NO. 1

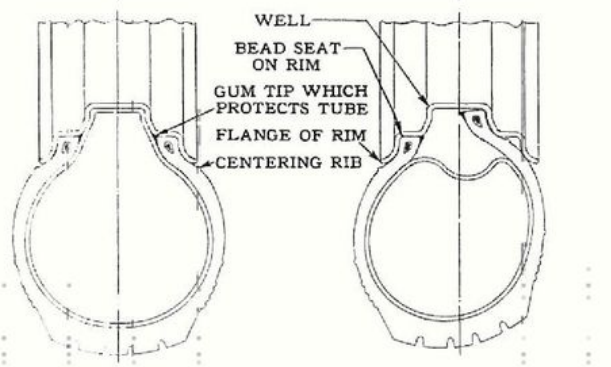


FIG. NO. 2

1. The toe of each tire bead has a soft rubber tip, see Fig. No. 1, which must not be damaged when removing or applying the tire. This soft rubber tip protects the tube from chafing.
2. Do not pinch the tube with the tire tools.
3. If too much force seems necessary when prying the bead over the flange, this is indication that the bead is not down in the well on the opposite side of the rim, see Fig. No. 2. Inside of each tire bead, there is a hoop of wire which must not be broken or unnecessarily strained.
4. Do not under any circumstances attempt to remove or apply both beads at the same time.
5. After the tire has been assembled, it is imperative that it be centered on the rim before inflating. The beads must be up on the bead seats. With tires having centering ribs, the ribs must show uniformly above the rim flange, see Fig. No. 1.
6. The rim nut must always be applied before inflating, and the valve dust cap after the tire is inflated.
7. The operation of tire changing will be facilitated if the inside and outside of bead is coated, as required, with a vegetable oil soft soap, this also protecting the soft rubber tips of the tire bead. The use of soft soap is recommended, but oil or grease should not be used.

Wheel on Axle or Rack To Remove Outside Bead—

Remove valve stem dust cap and rim nut. Deflate tube completely and loosen both beads from flanges, using tire tool if necessary. Force outside bead off bead seat of rim with knee at

FIG. NO. 3

bottom. Place two tire tools about 8 inches apart between tire and rim near valve stem. Pry bead over rim flange, see Fig. No. 3.

FIG. NO. 4

Follow around the flange, as shown in Fig. No. 4, with one tool until outside bead is completely free of the rim.

To Remove Inside Bead—

Force inside bead down into well at top of rim, see Fig. No. 2.

Grip the tire at bottom and pull straight out until tire swings free, see Fig. No. 5.

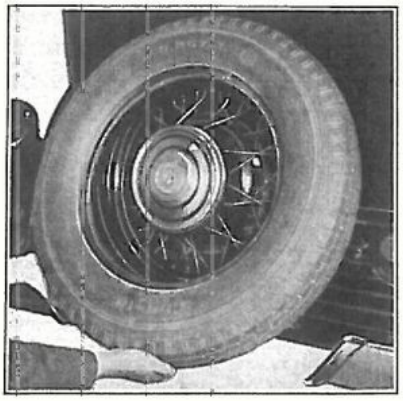


FIG. NO. 5

If the tire does not pull off easily, use the tire tool, taking short bites to pry it over the rim.

Applying Inside Bead—

Before mounting, read "General Information" on the use of soft soap on the beads.

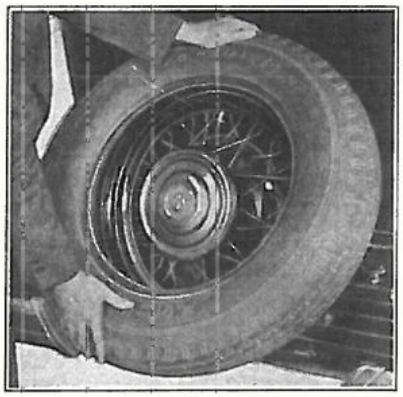


FIG. NO. 6

Mount wheel so valve hole is at the top. Inflate inner tube until barely rounded out, and insert it in the tire. Hang the tire over the rim, at the top, guiding valve through valve hole. Apply rim nut one or two turns to keep stem from slipping out of valve hole.

Push inside bead only into bottom of well at top of rim, see Fig. 6, then force remaining portion of inside bead over outside flange of rim as far as possible, and if tire tool is necessary, follow through with small bites, see Fig. 7.

Applying Outside Bead—

Lift up on tire by hand and force outside bead

FIG. NO. 7

over flange at top side of rim, see Fig. 8, starting bead into the well.

Then with one tire tool, starting at either side of valve, pry short lengths of bead over rim flange,

FIG. NO. 8

see Fig. 9. Continue around rim until entire bead is in place, always keeping as much of the bead in the well as possible.

FIG. NO. 9

Remove rim nut and push valve stem back into

casing to make certain that tube is not pinched under the bead. Do not let go of the valve stem while doing this.

Re-apply rim nut, inflate slowly and see that tire beads are centered on rim on both sides, as in Fig. 1, before inflating fully.

Wheel on Floor To Remove Top Bead—

Deflate tube completely and remove rim nut.

Loosen both beads from the rim ledges, using tool if necessary.

Stand on tire with feet about 15 inches apart opposite valve stem, to force bead off the bead seat into the well. Insert two tire tools about 8

FIG. NO. 10

inches apart between bead and rim flange near valve stem and pry short lengths of bead over flange, as shown in Fig. No. 10.

Then leaving one tool in position, follow around

FIG. NO. 11

rim with the other tool, taking small bites, to remove remainder of bead.

To Remove Bottom Bead—

Remove inner tube.

Stand wheel in upright position with bead in well of rim at bottom, see Fig. No. 2, and apply soft soap around both sides of the soft rubber tip.

Insert tool between bead and rim flange at top side of wheel and pry wheel out of tire, as shown in Fig. No. 11.

Applying Bottom Bead—

Before mounting read "General Information" on use of soft soap on beads.

Inflate tube until barely rounded out and insert in tire.

FIG. NO. 12

Place tire on rim, guiding valve through valve hole. Apply rim nut two or three turns, just enough to prevent valve stem being pulled through.

Push bottom bead down into well at valve stem and force remaining portion of bead over rim flange, using a tire tool if necessary, see Fig. 12.

When following around, use small bites.

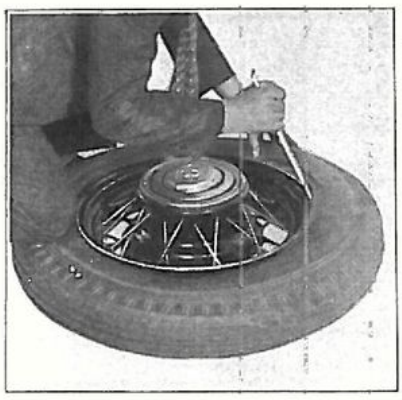


FIG. NO. 13

Applying Top Bead—

At point opposite valve stem, insert tool between top bead and rim flange, prying bead over rim flange and into the well. Holding this tool in

position, continue prying with other tool, taking small bites, working around rim until bead is in place, see Fig. 13.

Always keep as much of the top bead as possible in the well while applying.

Remove rim nut and push valve stem back into casing to make certain that tube is not pinched under the bead. Do not let go of the valve stem while doing this.

Re-apply rim nut, inflate slowly and see that tire beads are centered on rim on both sides, see Fig. 1, before inflating fully.

GENERAL LUBRICATION

Systematic lubrication is essential to economical and satisfactory motor car operation and too much emphasis cannot be placed upon its importance. Buick owners are provided with a product of mechanical excellence, but it must be realized that like any other piece of good machinery, it performs at its best only when it is properly lubricated. Every effort has been made to make Buick lubrication as simple and as automatic as possible as well as to make the lubrication points unusually accessible and convenient.

For convenience, the capacities of the several units of the car are listed below, for taking care of lubrication, cooling and fueling:

Engine Crankcase—

Series 32-50—Dry, 9 qts.—Refill, 7 qts.
Series 32-60—Dry, 11½ qts.—Refill, 8 qts.
Series 32-80 and 32-90—Dry, 12½ qts.—Refill, 9 qts.

Transmission—

Series 32-50—4 pts. or lbs.
Series 32-60—4 pts. or lbs.
Series 32-80 and 32-90—4 pts. or lbs.

Rear Axle—

Series 32-50—3 pts. or lbs.
Series 32-60—7½ pts. or lbs.
Series 32-80 and 32-90—8½ pts. or lbs.

Steering Gear—

Series 32-50—½ pt. or lb.
Series 32-60—1 pt. or lb.
Series 32-80 and 32-90—1 pt. or lb.

Cooling System—

Series 32-50—3 gallons.
Series 32-60—4 gallons.
Series 32-80 and 32-90—4¾ gallons.

Gasoline Tank—

Series 32-50—16 gallons.
Series 32-60—19 gallons.
Series 32-80 and 32-90—22 gallons.

ENGINE

To ensure the proper lubrication of the engine, it is advisable to check daily the amount of oil in the crankcase, using for this purpose the oil level gauge in upper crankcase on right side of engine. The level should be maintained at the "full" mark on this gauge, and should it be necessary to add any oil, fill through the oil filler tube on right side of engine. For detailed information on "Engine Lubrication," see page 9.

Engine Oil Viscosity Specifications—

For proper engine lubrication a high grade well refined oil is essential. As a guide to the selection of a proper body or viscosity for summer and winter conditions, an oil having a body or viscosity conforming with S. A. E. No. 30 is recommended for summer use, except in the case of prolonged high speed driving where a heavier oil such as those conforming in viscosity with No. 40 or No. 50 should be used.

For winter use an oil having a body or viscosity of S. A. E. No. 20 and with zero pour test is recommended. Such an oil should be satisfactory for temperatures down to zero, below which temperature an oil of viscosity conforming with S. A. E. No. 10 and with a zero or sub-zero pour test should be used.

The S. A. E. numbers have been adopted by a large number of the oil companies and no difficulty should be experienced in obtaining the proper grade when adding to or making a complete change of oil in the crankcase.

Lubricating Points—

The charts shown on pages 54 to 57 will indicate the points requiring lubrication, the recommended intervals and the kind of lubricant to be used. It should be realized that oily surfaces quickly collect dirt which if reaching the various working parts, will cause premature wear. It is advisable, therefore, to keep all points of lubrication as free from dirt as possible.

For your convenience and ready reference, the following table will call attention to the various lubricating points, the frequency of attention and the proper lubricant.

EVERY 1000 MILES

Engine Oil—

Generator bearing, rear, a few drops, 1.
Starter bearing, front, a few drops, 1.
Throttle control linkage and shaft, a few drops.
Clutch release bearing, a teaspoonful, 1.
Ride regulator ball joints, a few drops.

Transmission Oil—

Front end of front spring—
2—Series 32-50.
3—Series 32-60, 32-80 and 32-90.
Front spring shackle bolt, upper, 2.
Front spring shackle bolt, lower, 2.
King bolt, upper, 2.
King bolt, lower, 2.
Front axle tie rod, 2.
Steering connecting rod, front end, 1.
Steering connecting rod, rear end, 1.
Distributor, 1.
Brake pedal, 1.
Clutch pedal, 1.
Brake cross shaft, outer bearing, 2.
Rear brake idler lever, 2.
Rear spring shackle, front—
4—Series 32-50.
2—Series 32-60, 32-80 and 32-90.
Rear spring shackle, rear, 4.
Rear axle brake spider, 2.
Brake pull rod clevis pins, a few drops.
Brake cross-shaft supports.
Ride regulator idler levers, 2.

Soft Cup Grease—

Water pump, 1.

Light Graphite Oil—

Carburetor heat control valve shaft and linkage, a few drops.

EVERY 2000 MILES

Transmission Oil—

Steering Gear—Remove plug in housing and fill if necessary, with transmission oil, conforming with S. A. E. specifications No. 160 for summer and No. 90 for winter use.

FIRST 2000 MILES AND TWICE A YEAR THEREAFTER

Transmission and Rear Axle—

Remove the filler cap in transmission case and plug in rear axle housing, filling both to the level of the opening with an oil conforming in viscosity with S. A. E. specifications No. 160 for summer and No. 90 for winter use. Check the amount of oil in both frequently.

FOUR TIMES A YEAR

The engine crankcase should be completely drained and refilled four times a year. The level of the oil, however, must be maintained to the full mark on the measuring gauge at all times. Use a good grade of oil conforming in viscosity with S. A. E. specifications No. 30 for summer and No. 20 for winter.

EVERY 5000 MILES

Remove screw plug in fan hub and refill with engine oil as directed on page 12.

Remove both front wheels, clean bearings and inside of hubs with kerosene. Apply soft cup grease to ball races and bearing cups, using not more than one teaspoonful to each bearing.

Do not fill hub cap or center portion of hub with grease.

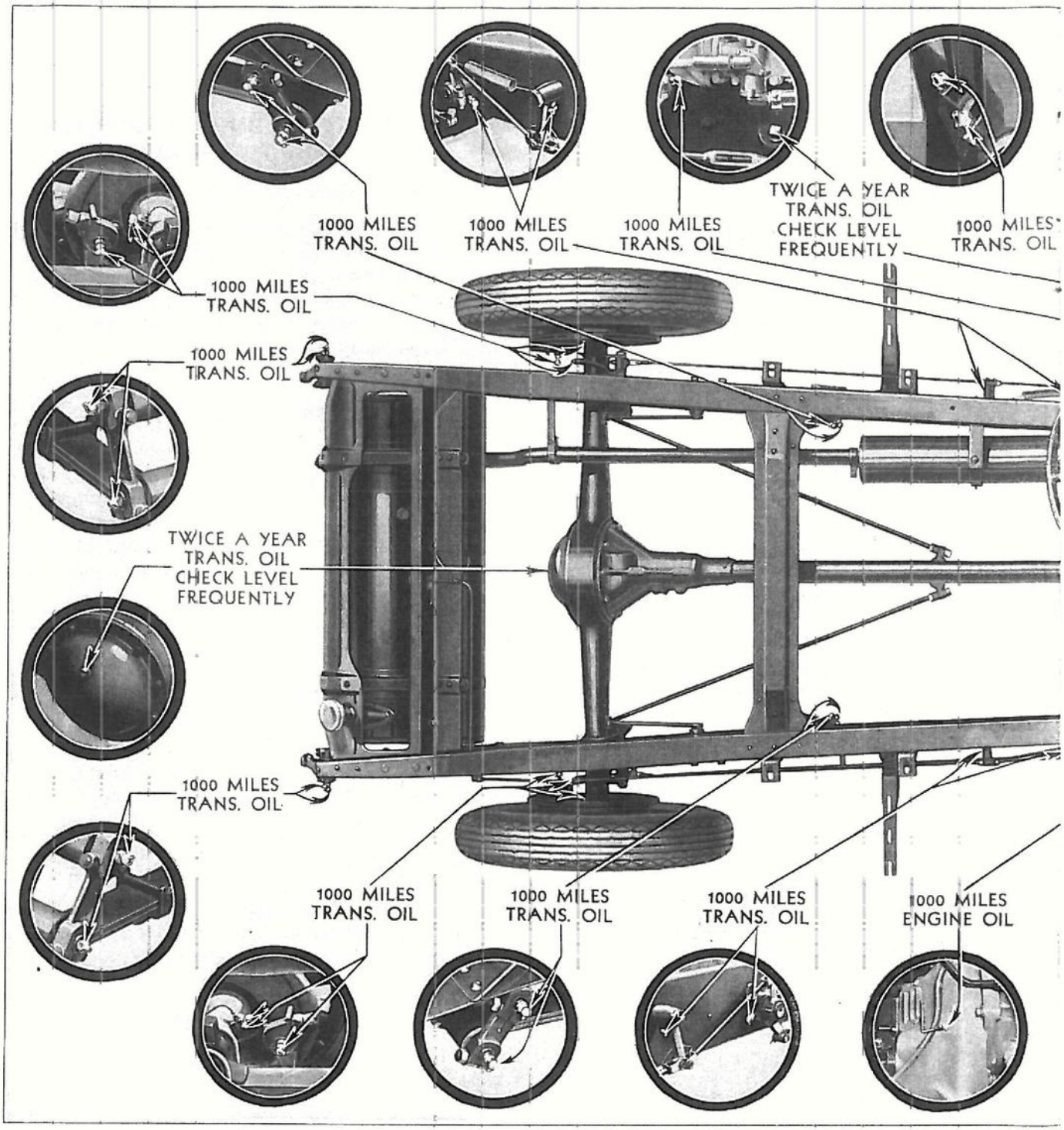
Inspect shock absorbers and add oil, if necessary, to fill them. Use only the special oil supplied by United Motors Service Stations.

ONCE A YEAR

Remove both rear wheels, clean bearings and inside of hubs with kerosene. Apply soft cup grease to roller assembly and sleeves, using not more than one tablespoonful to each bearing. Do not fill hub caps with grease.

GENERAL BODY LUBRICATION

1. Door lock bolts—Use light machine oil.
2. Door hinge pins—Use light machine oil.
3. Door safety lock—Apply a few drops of light machine oil or penetrating oil to key and operate the lock.



LUBRICATION CHART—

Engine—Oil level in the crankcase should be maintained at the full mark on oil level gauge at all times. It should be checked daily or whenever gasoline is added to the tank. The crankcase should be drained and refilled every 3 months, using an oil having a body or viscosity conforming with:—

S. A. E. No. 30 for summer.
S. A. E. No. 40 or 50 for prolonged high speed driving.
S. A. E. No. 20 for winter temperatures as low as zero.
S. A. E. No. 10 for temperatures below zero.

Crankcase capacity, refill—7 qts.

Oil filter cartridge should be replaced every 10,000 miles.

EVERY 1000 MILES

Heat Control Valve Shaft—At front end of exhaust pipe, apply a few drops of light graphite oil.

Brake Rod Clevis Pins—A few drops of transmission oil.

Ride Regulator Ball Joints—A few drops of engine oil.

Throttle Control Linkage and Shaft—A few drops of engine oil.

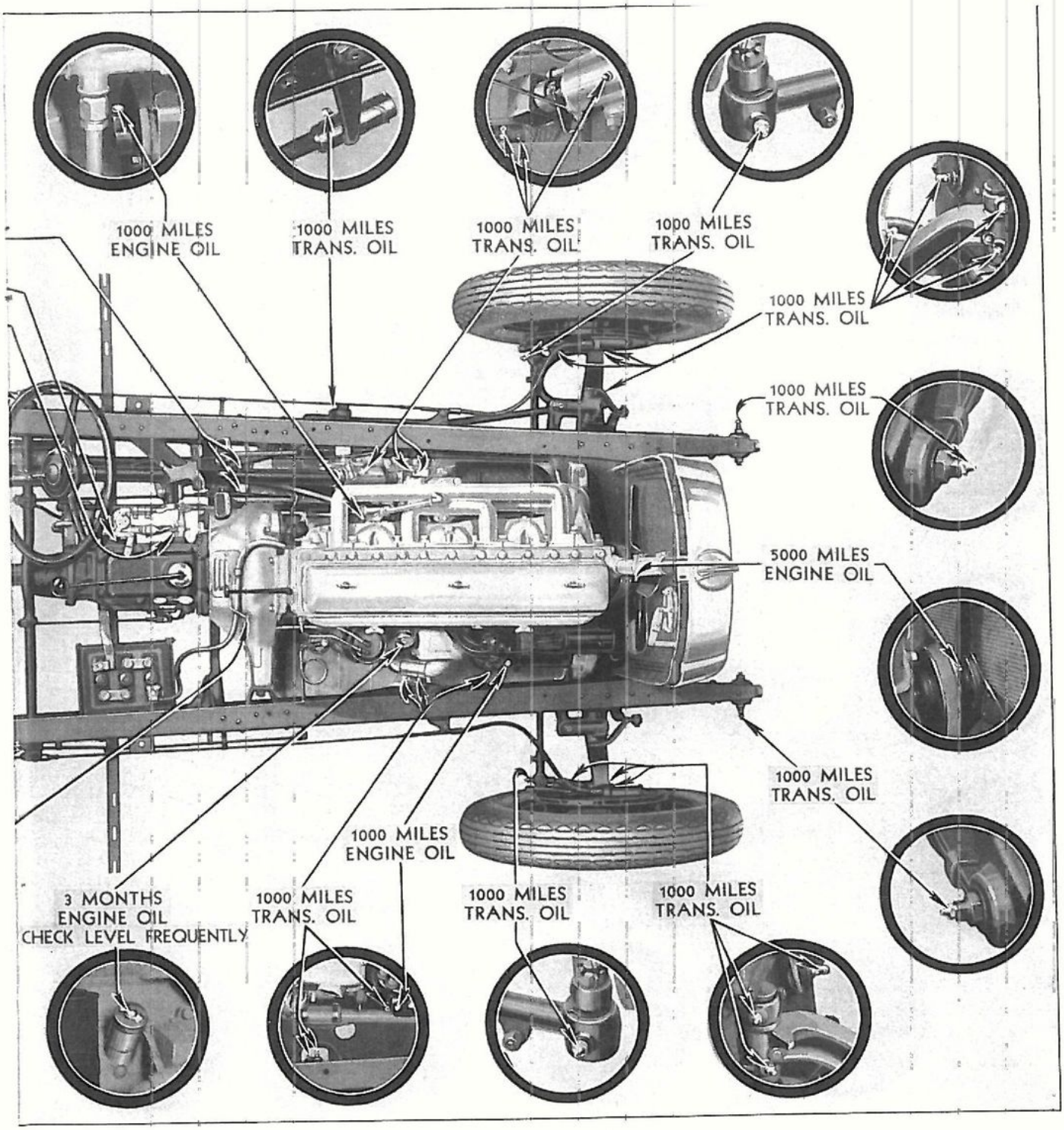
Distributor—Remove distributor rotor and place a few drops of engine oil on felt wicking in top of cam.

Steering Gear Housing—Remove plug and fill with transmission oil, S. A. E. Specification No. 160 for summer and No. 90 for winter. (Check level frequently.) Capacity, ½ pt. or lb.

Water Pump—Zerk connection, soft cup grease.

EVERY 2000 MILES

Rear Axle—Check oil level frequently, at least every 2000 miles—level should be maintained at filler plug opening. **Twice a year** housing should be completely drained, flushed out and refilled with transmission oil.



S. A. E. Specification No. 160 for summer and No. 90 for winter. Capacity, 3 pts. or lbs.

Transmission — Check oil level frequently, at least every 2000 miles—level should be maintained at filler plug opening. **Twice a year** housing should be completely drained, flushed out and refilled with transmission oil, S. A. E. Specification No. 160 for summer and No. 90 for winter. Capacity, 4 pts. or lbs.

EVERY 5000 MILES

Fan—Remove screw plug, insert a sufficient quantity of engine oil so that it will overflow the standpipe when opening is rotated to the bottom. Allow excess oil to drain off. Replace plug.

Front Wheels—Remove wheels, clean bearings and inside of hubs with kerosene. Apply one tablespoonful of soft cup grease to each bearing. Do not fill hub cap or center portion of hub with grease.

Shock Absorbers—Inspect and fill shock absorbers; these **must** be kept full. Use only special oil supplied by any United Motors Service Station.

TWICE A YEAR

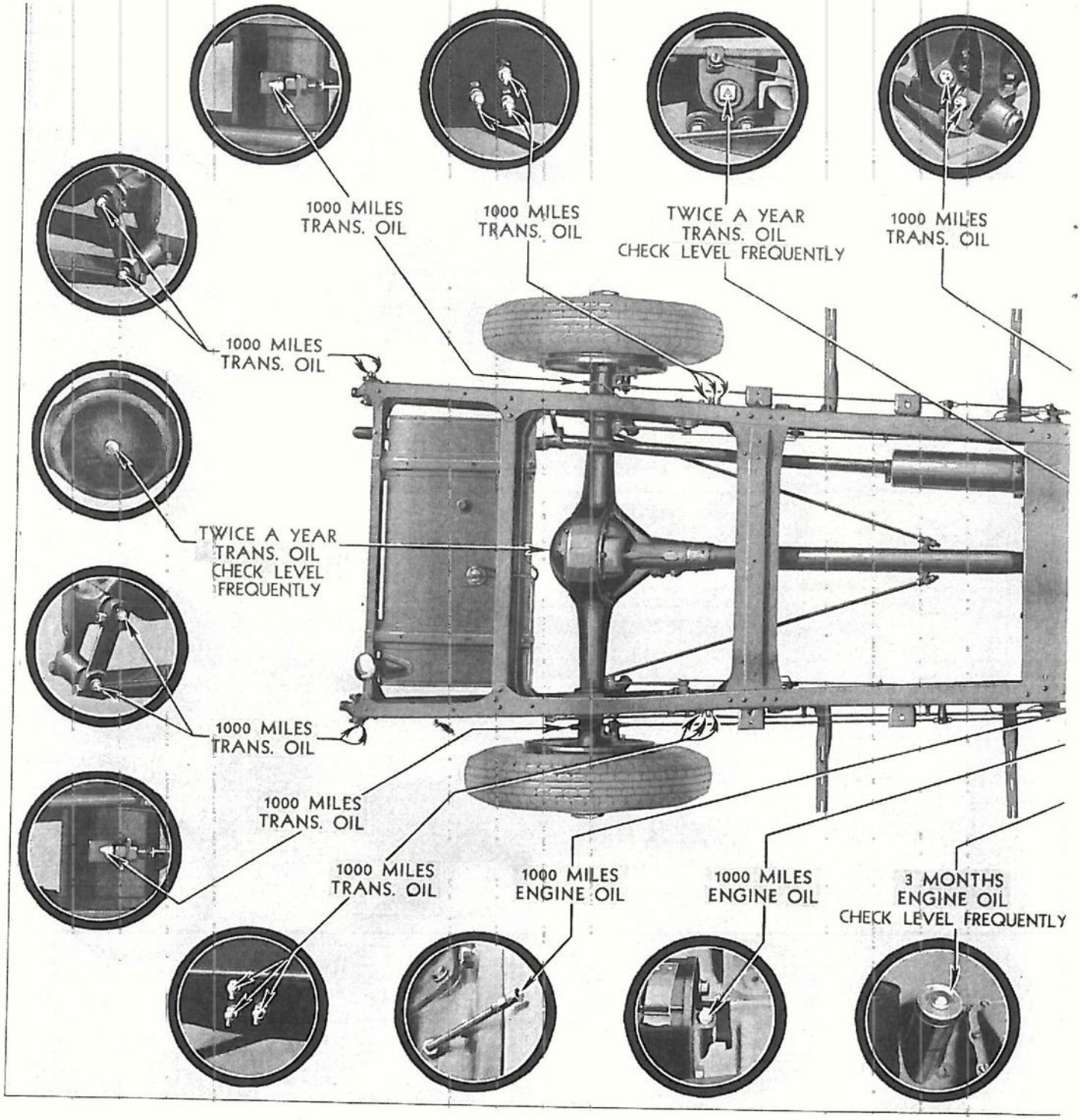
Front Brake Cables—Lubricate with transmission oil, S. A. E. Specification No. 160, using special attachment. Consult Authorized Buick Service Station.

Rear Axle and Transmission—See complete instructions under **"Every 2000 Miles."**

ONCE A YEAR

Rear Wheels—Remove wheels, clean bearings and inside of hubs with kerosene. Apply one tablespoonful of soft cup grease to bearing.

NOTE:—The chassis should be lubricated every 1000 miles at points so specified on chart if car is operated on paved highways. For the car operated largely on dirt or gravel roads, more frequent lubrication is necessary and attention at these points every 500 miles is recommended.



Engine—Oil level in the crankcase should be maintained at the full mark on oil level gauge at all times. It should be checked daily or whenever gasoline is added to the tank. The crankcase should be drained and refilled every 3 months, using an oil having a body or viscosity conforming with:—

S. A. E. No. 30 for summer.
S. A. E. No. 40 or 50 for prolonged high speed driving.
S. A. E. No. 20 for winter temperatures as low as zero.
S. A. E. No. 10 for temperatures below zero.

Crankcase capacity, refill—32-60, 8 qts., 32-80 and 32-90, 9 qts.

Oil filter cartridge should be replaced every 10,000 miles.

EVERY 1000 MILES

Heat Control Valve Shaft—At front end of exhaust pipe, apply a few drops of light graphite oil.

Brake Rod Clevis Pins–A few drops of transmission oil.

Ride Regulator Ball Joints—A few drops of engine oil.

Throttle Control Linkage and Shaft—A few drops of engine oil.

Distributor—Remove distributor rotor and place a few drops of engine oil on felt wicking in top of cam.

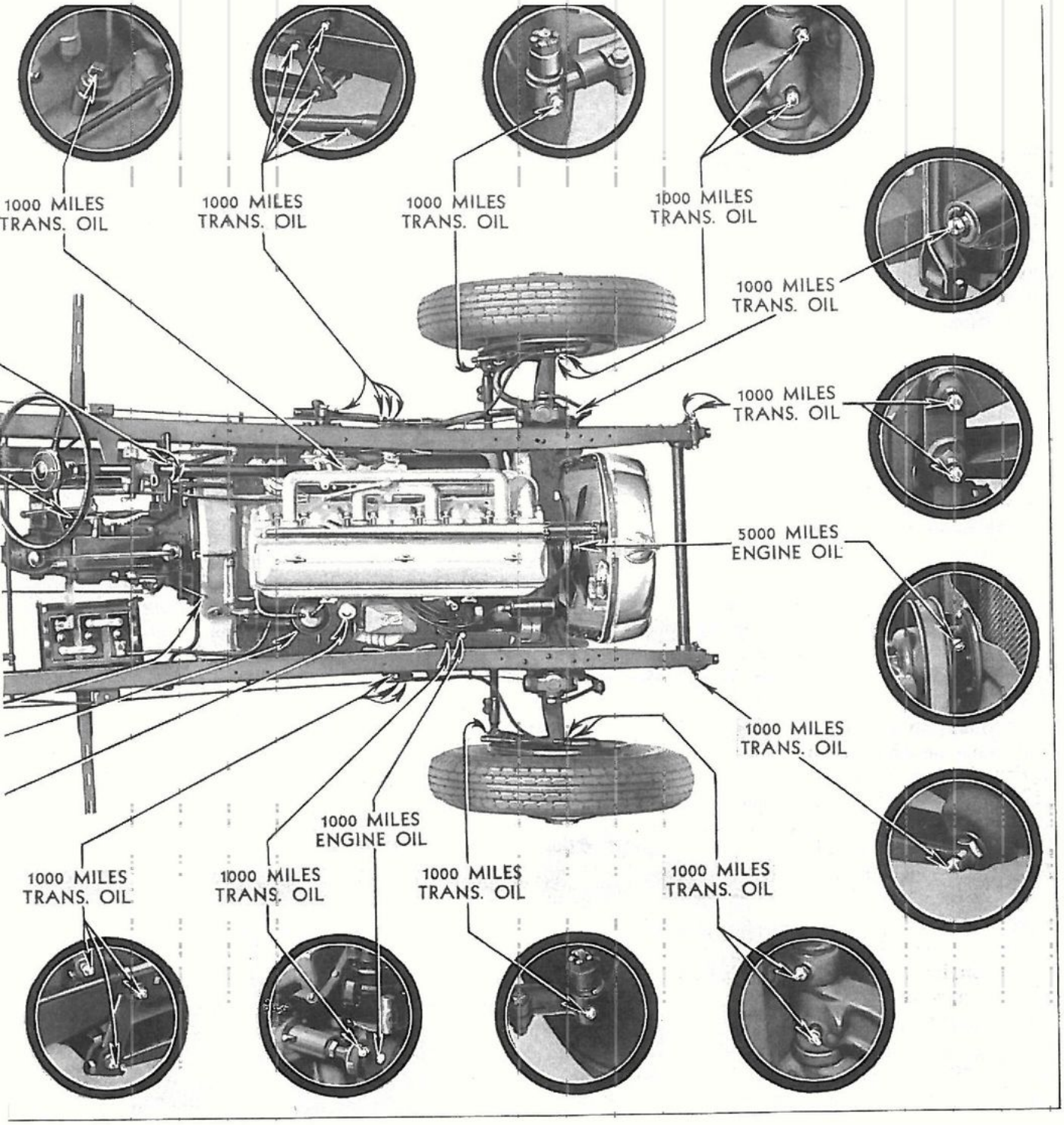
Steering Gear Housing—Remove plug and fill with transmission oil, S. A. E. Specification No. 160 for summer and No. 90 for winter. (Check level frequently.) Capacity, 1 pt. or lb.

Water Pump—Zerk connection, soft cup grease.

EVERY 2000 MILES

Rear Axle—Check oil level frequently, at least every 2000 miles—level should be maintained at filler plug opening. **Twice a year** housing should be completely drained. flushed out and refilled with transmission oil, S. A. E. Specification No. 160 for summer and No. 90 for winter. Capacity, 32-60, 7½ pts. or lbs., 32-80 and 32-90, 8½ pts. or lbs.

Transmission — Check oil level frequently, at least



every 2000 miles—level should be maintained at filler plug opening. **Twice a year** housing should be completely drained, flushed out and refilled with transmission oil, S. A. E. Specification No. 160 for summer and No. 90 for winter. Capacity, 4 pts. or lbs.

EVERY 5000 MILES

Fan—Remove screw plug, insert a sufficient quantity of engine oil so that it will overflow the standpipe when opening is rotated to the bottom. Allow excess oil to drain off. Replace plug.

Front Wheels—Remove wheels, clean bearings and inside of hubs with kerosene. Apply one tablespoonful of soft cup grease to each bearing. Do not fill hub cap or center portion of hub with grease.

Shock Absorbers—Inspect and fill shock absorbers; these **must** be kept full. Use only special oil supplied by any United Motors Service Station.

TWICE A YEAR

Front Brake Cables—Lubricate with transmission oil, S. A. E. Specification No. 160, using special attachment. Consult Authorized Buick Service Station.

Rear Axle and Transmission—See complete instructions under **"Every 2000 Miles."**

ONCE A YEAR

Rear Wheels—Remove wheels, clean bearings and inside of hubs with kerosene. Apply one tablespoonful of soft cup grease to bearing.

NOTE:—The chassis should be lubricated every 1000 miles at points so specified on chart if car is operated on paved highways. For the car operated largely on dirt or gravel roads, more frequent lubrication is necessary and attention at these points every 500 miles is recommended.

4. Door check—Should a squeak develop at this point, give the rod a light application of soft cup grease, then open and close the door three or four times. This will carry the grease to the rubber guide on which the rod slides.

5. Door dovetail bumpers—Apply light machine oil very sparingly to the sides and tops of the metal shoes.

6. Window regulator arm—Raise the window glass to the closed position. Using a squirt can, apply light machine oil along the upper edge of the sash channel on the inside for its entire length, this oil will flow down on the channel and lubricate both channel iron bracket and the regulator arm knob.

7. Lubricate hood lacing on radiator shell and shroud with penetrating oil. Use sparingly. Do not use grease.

GENERAL CARE OF THE CAR

Care of the Finish—

The bodies of all models are finished in Duco, and the outstanding advantage of this finish to the car owner is the ease with which it may be kept clean and new looking. Duco is the hardest, toughest and most durable automobile finish ever developed, but if the owner desires to keep his car looking as it did when delivered to him, the finish must not be abused, and the following cautions should be observed by the purchaser of a Duco-finished car:

The car should be cleaned at reasonable intervals, and while possible in some cases to clean with a dry cloth, it is usually best to wash the finish if the car is very dirty, particularly if grit or small sand particles may be present in the dirt. Should the finish, after washing, appear gray or white, thorough polishing is required and Duco Polish No. 7 is recommended for this purpose.

Care should be taken that no alcohol or anti-freezing mixture containing alcohol is spilled on the Duco finish, but if this does occur, it should be immediately wiped off.

The Duco finish will usually resist the action of dilute acids such as are present in battery solutions, but it is advisable to exercise care in keeping any acid, dilute or full strength, from the finish.

Duco Polish No. 7 may be used both as cleaner and polisher. If the car is only dusty, the dust may be removed with a dry cloth, and the polish then applied. If the car is dirty, it should be washed and dried, before applying the polish. Use a dry, clean cloth in rubbing off the polish and with thorough rubbing a fine lustre will be obtained. If in cleaning and rubbing the finish traces of the color remain on the cloth, the owner need not be alarmed, as this represents a weathering or wearing action and does not appreciably affect the life of the finish.

All chromium and nickel plated parts of the car should be kept clean and free from dirt or foreign matter, and for cleaning the chromium plated parts at least, nothing but clear water and a clean rag should be used. Dirt containing black soot, clay, iron oxide, or calcium chloride, if allowed to remain on the plated surfaces, may cause tarnishing and even corrosion.

For repairing scratches and worn spots on the fenders, duPont No. 7 touch-up black is recommended. This may also be used to prevent rusting of bolts and nuts, such as those used for mounting bumpers, license plates, etc.

Closed Car Upholstery—

The upholstery material in closed cars is exposed to dirt and weather conditions which will cause wear and deterioration unless the proper care is given the upholstery. It is desirable at least once a month or more frequently if necessary, to clean the upholstery with a vacuum cleaner and a whisk broom.

If the material becomes spotted, a cleaning fluid should be used for removing the spots, and when this has thoroughly evaporated, apply a hot flat iron wrapped in a wet cloth. Steaming the fabric and rubbing lightly against the nap will raise the nap to its normal position.

Floor carpets may be cleaned by rubbing with a sponge soaked in gasoline.

Open Car Upholstery—

Leather upholstery may be washed with pure soap and water, rinsing off the soap and drying with a moist chamois. Never use gasoline on leather upholstery.

Squeaks and Rattles—

The body is attached to the chassis by hold-down or "body" bolts and between the body sill and chassis frame is placed an "anti-squeak" material. As the car is driven and the body weight compresses the anti-squeak and the body bolts seat themselves in the wood sills, these bolts may become loose. When this condition exists, the body will move on the chassis and squeaks and rattles will result. It is advisable to inspect the body bolts once a month, at least for the first few thousand miles of driving, and tighten them when necessary.

Door hinges should be examined occasionally and hinge screws tightened if necessary.

A small amount of grease or oil applied once a month to door locks, striker plates, hinges, door check pins and dove tail bumpers will be found helpful in preventing squeaks and rattles.

Tops and Curtains—

Dust or dirt on the outside of the top should be removed with a sponge and soap suds, rinsing with clear water and then drying with a chamois. Do not use gasoline or oil of any kind as these will injure the fabric and dull its lustre.

Exposure to all kinds of weather may in time dull the lustre of the top material used on closed cars, and small cracks may even develop. Various types of top dressing have in the past been used to restore the lustre of the material and prevent cracking, but as these preparations very often contain ingredients which may deteriorate the top covering and allow leakage, the use of top dressings of any kind is not recommended. Should leakage develop and replacement of top material be necessary, such replacement is not subject to the usual warranty terms, if the top has been treated with any kind of dressing.

The inside of closed model tops may be cleaned by brushing briskly with the nap, using a vacuum cleaner if available. Do not brush the windows in the storm curtains of open models; they should be wiped with soft cloth or sponge dampened in alcohol. The curtains should not be folded and laid away when wet.

Storing the Car—

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

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

Crank the engine for about 20 seconds with the ignition switch off and the throttle closed. This insures a distribution of the oil over cylinder walls and valve mechanism.

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

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

Jack up the front and rear axles and remove the tires.

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

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

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

Anti-Freezing Solutions—

In selecting anti-freezing solutions for winter operation the local conditions and the type of service must be considered. The following information is given to enable the individual owner to more intelligently select the anti-freezing solution best suited to meet his own conditions.

The available commercial materials for preparing anti-freezing solutions for automobile radiators

are denatured alcohol, methanol (synthetic wood alcohol), distilled glycerine, and ethylene glycol (Prestone).

Denatured Alcohol and Methanol—

Denatured alcohol and methanol solutions are, at present, the most generally used anti-freezing solutions. Denatured alcohol and methanol are widely distributed, afford protection against freezing, and are not injurious to the materials used in the cooling system.

There are two principal objections to denatured alcohol and methanol. These materials are lost by evaporation, especially on heavy runs, and unless the solution in the radiator is tested periodically and sufficient anti-freeze added to replace the loss by evaporation, the motor or radiator, or both, are likely to be damaged by freezing. The car finish is damaged by contact with denatured alcohol or methanol solutions or vapors, and any material accidentally spilled on the finish should be flushed off immediately with a large quantity of water.

Methanol, for anti-freeze purposes, is sold in the United States in the correct concentration to give the same protection against freezing as denatured alcohol. The following table may be used for both denatured alcohol and methanol:

Directions for preparing Anti-Freezing solutions from Denatured Alcohol 94% (188° proof) and Methanol (Anti-Freeze Grade):

Alcohol or Methanol	Specific Gravity	Series 32-50	Series 32-60	Series 32-80 32-90	Freezing Point
20%	.978	2.4 qts.	3.2 qts.	3.8 qts.	19°F. above zero
30%	.968	3.6 qts.	4.8 qts.	5.7 qts.	10°F. above zero
40%	.957	4.8 qts.	6.4 qts.	7.6 qts.	2°F. below zero
50%	.943	6.0 qts.	8.0 qts.	9.5 qts.	18°F. below zero
60%	.927	7.2 qts.	9.6 qts.	11.4 qts.	35°F. below zero

Glycerine and Ethylene Glycol—

Distilled glycerine and ethylene glycol (Prestone) solutions are, in first cost, more expensive than alcohol, but as they are not lost by evaporation, only water need be added to replace evaporation losses. Any solution lost mechanically, such as leakage, foaming, etc., must be replaced by additional new anti-freezing solution. These solutions, under ordinary conditions, are not injurious to the car finish.

The principal objections to glycerine and ethylene glycol are the tendency of these solutions to loosen the scale and iron rust which forms in the water passages of the cylinder block and head, and the difficulty of securing and maintaining tight leak-proof connections. It is absolutely necessary to thoroughly clean and flush the entire cooling system before glycerine or ethylene glycol is used. It is also necessary to tighten or replace the cylinder head gaskets, hose connections and packing. The cylinder head gaskets must be kept tight to prevent the solution from leaking into the crankcase where it might cause gumming and sticking of the moving parts. The pump packing must be kept tight to prevent air from being drawn into the cooling system, in order to avoid foaming and other difficulties which may result when air is present.

Ethylene glycol, sold in the U. S. for anti-freezing purposes, is chemically treated to overcome the principal difficulties mentioned in the above paragraph, and under normal operating conditions with tight hose connections and cylinder head gaskets, should be satisfactory for use in the cooling systems. Glycerine or ethylene glycol should be used in accordance with the instructions and in the proportions recommended by the anti-freeze manufacturer.

Testing Solutions—

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. If the solution is warmer or colder, it must be brought to this temperature or large errors may result. In some cases these errors may be as large as 30 degrees Fahrenheit. Freezing point hydrometers are not interchangeable, a different float is required for denatured alcohol, methanol, glycerine and ethylene glycol.

Other Anti-Freezing Solutions—

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

FIRST AID SUGGESTIONS

In the operation of an automobile it is recognized that there may arise certain conditions causing poor performance or failure of the engine or power system to function properly and frequently the owner is not able to locate the cause from the symptoms in evidence. When this occurs and an Authorized Service Station cannot be consulted conveniently, it is also realized that the owner should have at hand some simple suggestions which will enable him to drive the car to the service station for advice, should this be needed.

It has, therefore, been thought advisable to list in this book a limited number of suggestions which may be found of benefit to the owner in locating and correcting the minor difficulties encountered in the operation of the car. No attempt has been made, however, to include any instructions relative to the method of performing repair operations. Authorized Service Stations should be consulted whenever such repairs may be found necessary.

If the Engine Fails to Start When Cranked—

(a) Cylinders flooded with fuel by keeping choke button out too long. To correct, push choke button in completely and continue cranking with throttle wide open until excess gasoline has been expelled from cylinders when ignition should occur. Not more than 20 seconds cranking should be required to clear the cylinders.

(b) No fuel in gas tank.

(c) Weak or no spark at spark plugs. The probable causes are discharged battery, loose or corroded battery terminals, burned or improperly adjusted breaker points in the distributor, loose or broken wires or connections, or spark plug points set incorrectly or fouled. The strength of the spark may be determined by disconnecting one of the spark plug connections and holding it about ¼-inch from the plug base while the engine is being cranked.

In case of a discharged battery it may still be possible to hand crank the engine and obtain sufficient spark to start. If loose or corroded terminals are found they should be tightened and cleaned. In case of burned breaker points, the metal adhering to the face of the point may be scraped off to provide temporary relief, and points adjusted to .020″. If the spark plugs are fouled, they should be cleaned and adjusted to proper gap .025″ to .030″ for standard compression and .020″ to .025″ for high compression.

If the Engine Stops or Misses at High Speeds or Under Heavy Load—

(a) Make sure that there is gas in the main tank and if this is established, it is then necessary to determine if fuel is reaching the carburetor.

Examine all connections, particularly into and out of the fuel pump to make sure that these connections are tight. It is necessary that these connections be kept tight as any looseness will interfere with the proper functioning of the pump. If all connections are tight and the condition is still not corrected, disconnect the pump connection of pipe leading from pump to carburetor. Then crank engine and if gasoline flows from the pump connection it may be assumed that fuel is reaching the carburetor and the cause of the trouble will have to be sought elsewhere.

If, in cranking the engine with pump connection loose or disconnected, fuel does not flow from the pump, then it may be assumed that there is an air leakage or stoppage in the main fuel line from the tank to the pump and it would be advisable to take the car to an Authorized Service Station for a determination of the trouble.

(b) Test for spark at spark plugs. The method for making this test is described in a preceding paragraph under the heading "Weak or No Spark at Spark Plugs." If a good spark is obtained regularly, the trouble does not lie in the ignition system. If no spark occurs or the spark is weak, it indicates a discharged battery or loose connections. An examination should be made of wire connections at switch, ammeter, coil and distributor. If these are found tight and in good condition, it is well to examine the battery terminals and ground wire.

If the Engine Misses Regularly on One or More Cylinders—

(a) The most probable cause is dirty spark plug or plugs. To locate, first idle engine slowly with retarded spark, then hold screwdriver against plug terminal and top of engine, thus short-circuiting the plug. Be careful to hold screwdriver by wooden handle, else a shock will result.

Short-circuiting a plug which is not working will not change the engine speed. On the other hand it will cause the engine to slow down or stop if the short-circuit is established with a working plug. After the dead plugs have been thus located, they should be cleaned and adjusted, or replaced by new ones.

If the Engine Misses Irregularly—

(a) Sticky valves or improper adjustment of push rods.

Engine oil, or kerosene if available, introduced around the valve stems, will help to free sticky valves. If push rods require adjustment see under "Adjusting Push Rods," page 8.

(b) Burned or improperly adjusted breaker points.

(c) Loose connections in low tension (or battery) circuit. Examine connections at ammeter and switch, and at side of distributor housing.

(d) Short-circuit in high tension wires due to broken down insulation. Inspect spark plug wires and heavy wire from coil to distributor head.

(e) Defective spark plug, or spark plug terminal gaps are incorrect.

(f) Incorrect carburetor adjustment.

BUICK BRANCHES AND DISTRIBUTORS

Atlanta	Buick Motor Company, 512-516 Spring St., N. W.
Boston	The Noyes-Buick Company, 857 Commonwealth Ave.
Buffalo	Buick Motor Company, 1094-1100 Main Street
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