

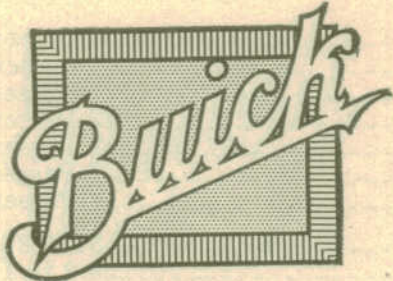
1927 MODELS



SPECIAL FEATURES
and
DETAILED SPECIFICATIONS



BUICK MOTOR COMPANY
DIVISION OF GENERAL MOTORS CORPORATION
FLINT, MICHIGAN



1927 MODELS



*SPECIAL FEATURES
and
DETAILED SPECIFICATIONS*



This book is issued by the sales department of Buick Motor Company
for the information of the sales and service departments
of Buick branches, distributors and dealers.

AUGUST 1, 1926

1927 MODELS

114-1/2" WHEEL BASE

MODELS

27-20	5-Passenger Two Door Sedan
27-24	2-Passenger DeLuxe Roadster
27-25	5-Passenger DeLuxe Touring Car
27-26	2-Passenger Business Coupe
27-26S	2-Passenger DeLuxe Coupe
27-27	5-Passenger Four Door Sedan
27-28	4-Passenger Coupe
Tires	31x5.25 low pressure
Gear Ratio	4.9 to 1
Engine	3 1/8" bore x 4 1/2" stroke
Piston displacement	207.1 cu. in.
Rated horse power	23.44 S. A. E.
Actual horse power	63 h. p. at 2800 r. p. m.
Car speed maximum	65 to 70 miles per hour
Braking area	270 sq. in.
Gas tank capacity	17 gallons

120" WHEEL BASE

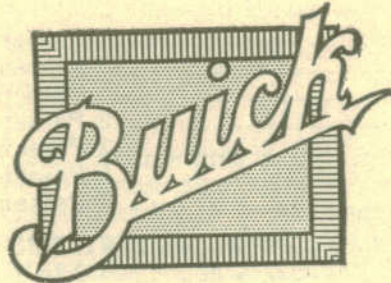
MODELS

27-40	5-Passenger Two Door Sedan
27-47	5-Passenger Four Door Sedan
27-48	4-Passenger Coupe
Tires	33x6 low pressure
Gear Ratio	4.54 to 1
Engine	3 1/2" bore x 4 3/4" stroke
Piston Displacement	274 cu. in.
Rated horse power	29.4 S. A. E.
Actual horse power	77 h. p. at 2800 r. p. m.
Car speed, maximum	70 to 75 miles per hour
Braking area	350 sq. in.
Gas tank capacity	20 gallons

128" WHEEL BASE

MODELS

27-50	7-Passenger Sedan
27-51	5-Passenger Brougham
27-54	2-Passenger DeLuxe Roadster
27-54C	2-Passenger Coupe
27-55	5-Passenger DeLuxe Touring Car
27-58	5-Passenger Coupe
Tires	33x6 low pressure
Gear Ratio	4.72 to 1
Engine	3 1/2" bore x 4 3/4" stroke
Piston displacement	274 cu. in.
Rated horse power	29.4 S. A. E.
Actual horse power	77 h. p. at 2800 r. p. m.
Car speed, maximum	70 to 75 miles per hour
Braking area	350 sq. in.
Gas tank capacity	20 gallons



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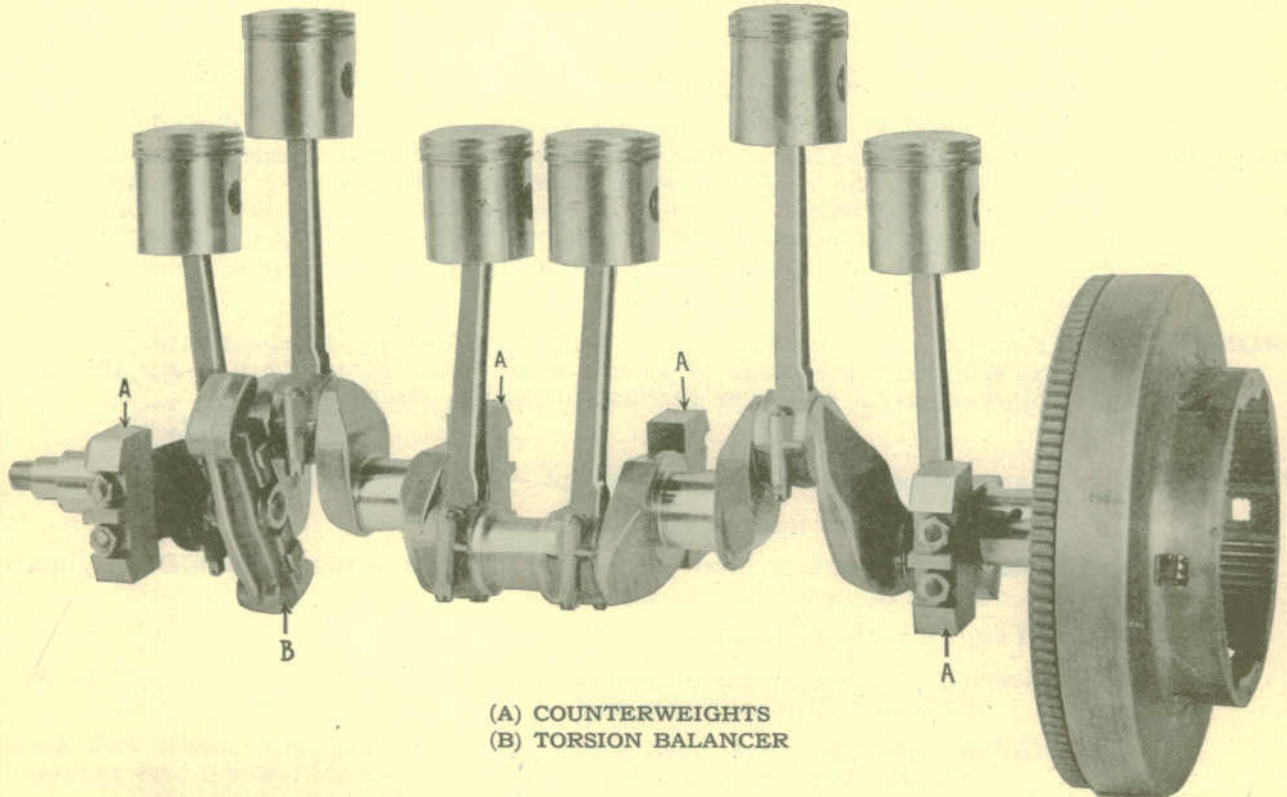
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Special Mechanical Features

- TIRES** Low pressure specially finished black tires.
- RIMS** Specially finished black rims.
- WHEELS** Rear wheels balanced in addition to front wheels (which have had this feature since the adoption of low pressure tires.) The balancing of all four wheels results in a marked improvement in road ability and riding comfort, greatly reducing the bobbing and chattering of rear wheels produced by certain types of roads.
- FRONT AXLE** Same as used on 1926 models with the following improvements:
Steering knuckle made of special alloy steel, increasing strength 50%.
Steering arms of larger section, increasing strength 50%.
- REAR AXLE** Same as used on 1926 models except:—
120" wheel base models—
Gear ratio changed from 4.7 to 1 to 4.54 to 1, using eleven teeth in pinion and fifty teeth in ring gear.
114½" wheel base models—
Bearing on shaft ahead of pinion has been changed from No. 307 to No. 5306 New Departure bearing.
Oilless bushings have been removed from brake cam shafts and Zerk fittings provided, the same as on 120" and 128" wheel base models.
- FRAME** An additional cross member has been placed in the frame directly back of the rear engine arms, greatly increasing rigidity of the already substantial frame.
- SNUBBERS** Models 50, 51, 54, 54C, 55 and 58 are equipped with Gabriel balloon type snubbers at the front.
Frames of all other models are drilled at the front and rear for snubber installation.
Snubbers should be adjusted after 500 to 1,000 miles of driving to take up the stretch of the straps.
- GAS GAUGES** Models 40, 47, 48 and all 114½" W. B. models have gauges on the gasoline tank. These gauges are of gear operated construction. All other models have gauge on the instrument board.
- RADIATOR EMBLEM** A special radiator emblem, integral with filler cap, is used on models 24 and 25 and all 128" W. B. models. Regular filler caps are used on all other models.
- RADIMETERS** Special radimeters are installed on the instrument board on all 128" W. B. models. Attachment is made at rear end of water manifold.

ENGINE

Same bore and stroke and general construction as used on 1926 models, with following improvements: Counter balanced crankshaft; torsion balancer; lighter pistons; new design piston pins; camshaft and valve springs redesigned for quieter valve action; engine suspended in rubber mountings.



(A) COUNTERWEIGHTS
(B) TORSION BALANCER

Crankshaft, Flywheel and Piston Assembly

COUNTER-BALANCED CRANKSHAFT

A counter-balanced crankshaft, together with a Torsion Balancer, a combination entirely new and advanced in crankshaft design, is an exclusive Buick feature, and reduces to a minimum all causes of engine vibration.

The counterweights are attached to the crankshaft to counter-balance the crank pins and lower ends of the connecting rods.

Crankshaft main bearings on the 114½" wheel base models have been increased from 2⅓" to 2¼" diameter.

TORSION BALANCER

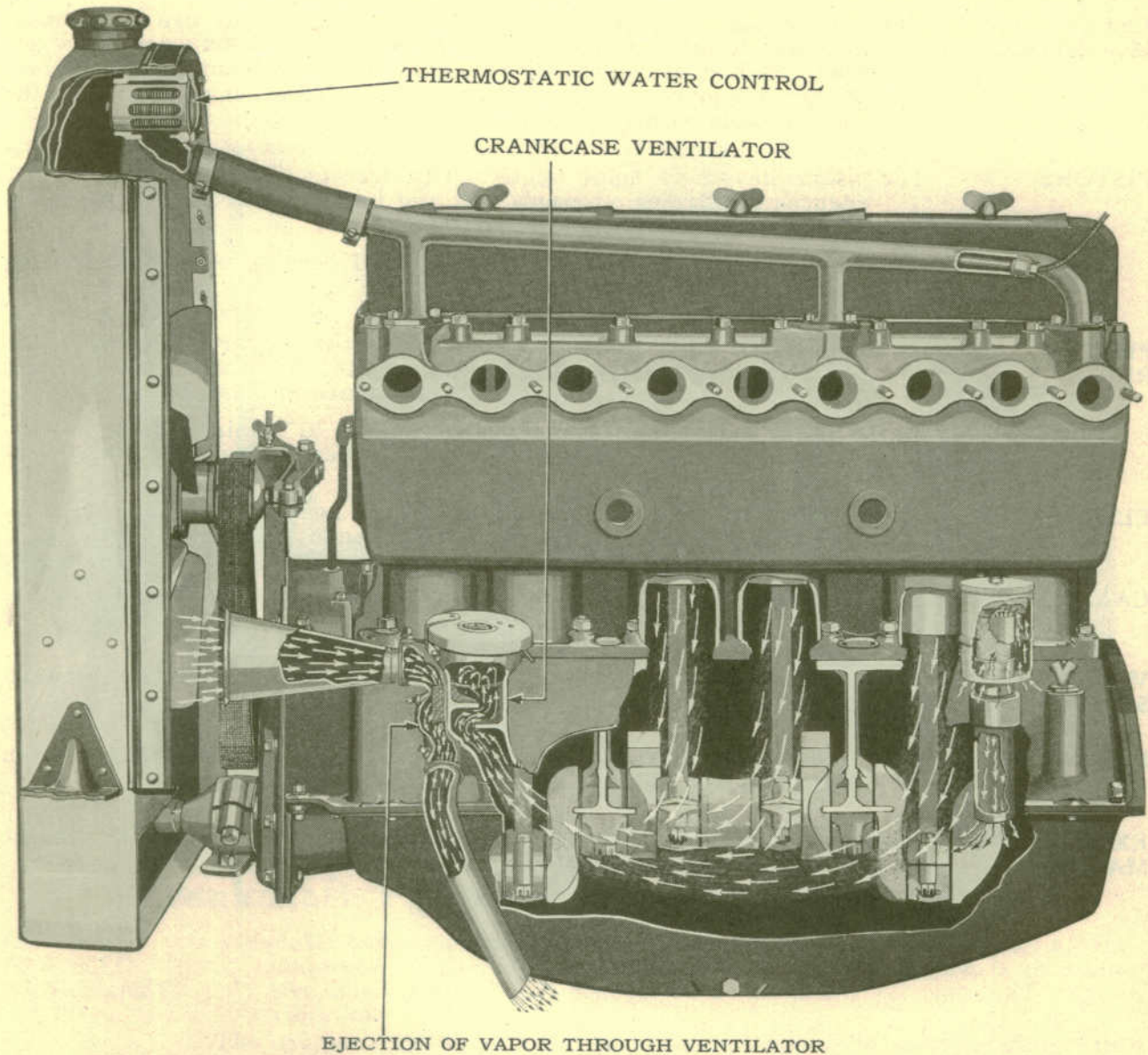
A counter-balanced crankshaft has periods of torsional vibration which can only be eliminated by the use of a torsion balancer.

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.

The Torsion Balancer is mounted on No. 2 crank throw and its bearings are lubricated under pressure from the crankshaft oiling system. The balancer, being a part of the crankshaft, is completely enclosed in the engine crankcase and thoroughly protected from dirt and atmospheric conditions. It should last the life of the engine without requiring adjustment or attention.

Connecting rods and pistons can be removed through lower part of engine, same as formerly, except in the case of Nos. 1 and 2 the torsion balancer must first be removed.

ENGINE MOUNTINGS	Three point suspension is retained, but all three points are completely insulated from the frame by rubber mountings, reducing steering wheel vibration and body rumble. The mountings are made of the highest grade of rubber and are housed in such a manner as to provide the best possible protection and long life.
PISTONS	<p>The pistons have been made lighter. This decrease in reciprocating weight reduces the strains on crankshaft and bearings and contributes materially to the smoothness of the engine.</p> <p>Pistons are of cast iron which material is used because of its fine bearing qualities and long life.</p>
PISTON RINGS	<p>In the 120" and 128" wheel base models, the two upper piston rings are $\frac{1}{8}$" wide, diagonal split, instead of $\frac{3}{16}$" wide as formerly used. The $\frac{3}{16}$" width oil control ring is retained in these models.</p> <p>In the 114$\frac{1}{2}$" wheel base models, pistons carry $\frac{1}{8}$" plain rings in two upper grooves and $\frac{1}{8}$" oil control ring in lower groove as in 1926.</p>
PISTON PINS	Light weight hollow piston pins are used with hole tapered to provide increased wall thickness and strength at center portion.
CAM SHAFT	The cam contour has been changed to lessen velocity and sound as the valves seat.
VALVE SPRINGS	Valve springs have been redesigned to provide slight clearance between lower coils and prevent spring clatter.
PUSH RODS	Push rods in the 114 $\frac{1}{2}$ " wheel base models have been changed from $\frac{5}{16}$ " rod to a $\frac{3}{8}$ " diameter tube with $\frac{1}{32}$ " wall.
EXHAUST MANIFOLD	Exhaust manifolds are securely clamped on each side of ports to prevent distortion, leakage and blowing of gaskets.



Crankcase Ventilating System

CRANKCASE VENTILATOR

A crankcase ventilator is located on the front left side of the engine. This ventilator works on the ejector principle. The fan blows air through a funnel, past an opening in the crankcase, causing a suction which pulls the vapors from the crankcase and ejects them through a pipe below the side pan. This disposition of vapors prevents their reaching the interior of car.

The rear breather, which acts as a vent to the crankcase, is provided with an air cleaner to prevent dust particles from entering the crankcase.

One of the chief products of the explosive mixture in a gasoline engine is water. When starting a cold engine the water and heavy ends of the fuel, which are not combustible below a certain engine temperature, find their way down past the piston in the form of vapor. Unless this vapor is removed it will condense and cause water and kerosene dilution of the lubricating oil.

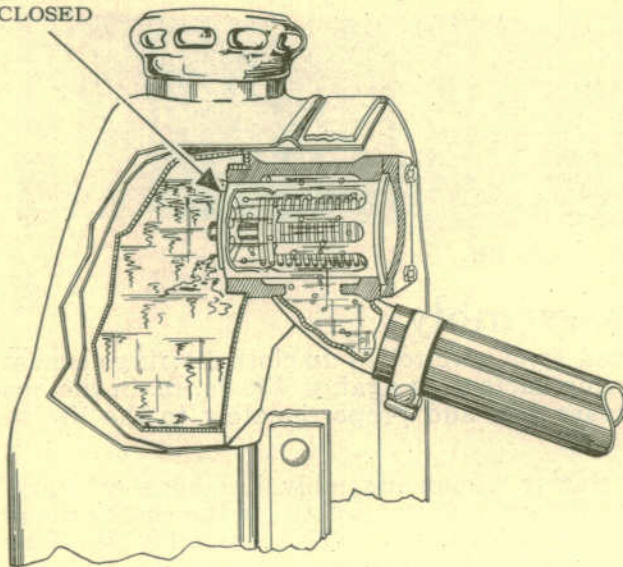
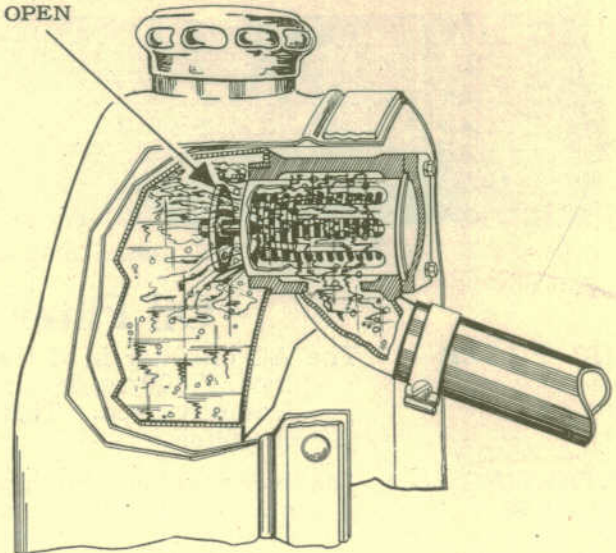
The water mixes with the sulphur which may be in the unburned fuel or the oil, and forms sulphuric acid which attacks working parts of the engine and causes quick corrosion, pitting and rapid wear.

The crankcase ventilator does not prevent kerosene dilution of the oil in extremely cold weather, but positively does remove the water. The kerosene dilution, when held within normal limits, is necessary to keep the oil from congealing and to allow easy starting of the engine and immediate circulation of oil through the system.

The normal limits of kerosene dilution in zero weather are from 20% to 30% and the ventilator automatically keeps the oil within these limits.

The combination of the crankcase ventilator, which removes all harmful dilution, with the oil filter and air cleaner, keeps the oil in the engine in good condition at all times, thereby entirely eliminating the necessity of frequent oil changes.

The crankcase ventilator, in combination with the Thermostatic Water Control, prevents the accumulation of water which is the destructive element of crankcase dilution and holds the other element, unburned fuel, to a minimum.

THERMOSTAT
CLOSEDTHERMOSTAT
OPEN

Thermostatic Water Control

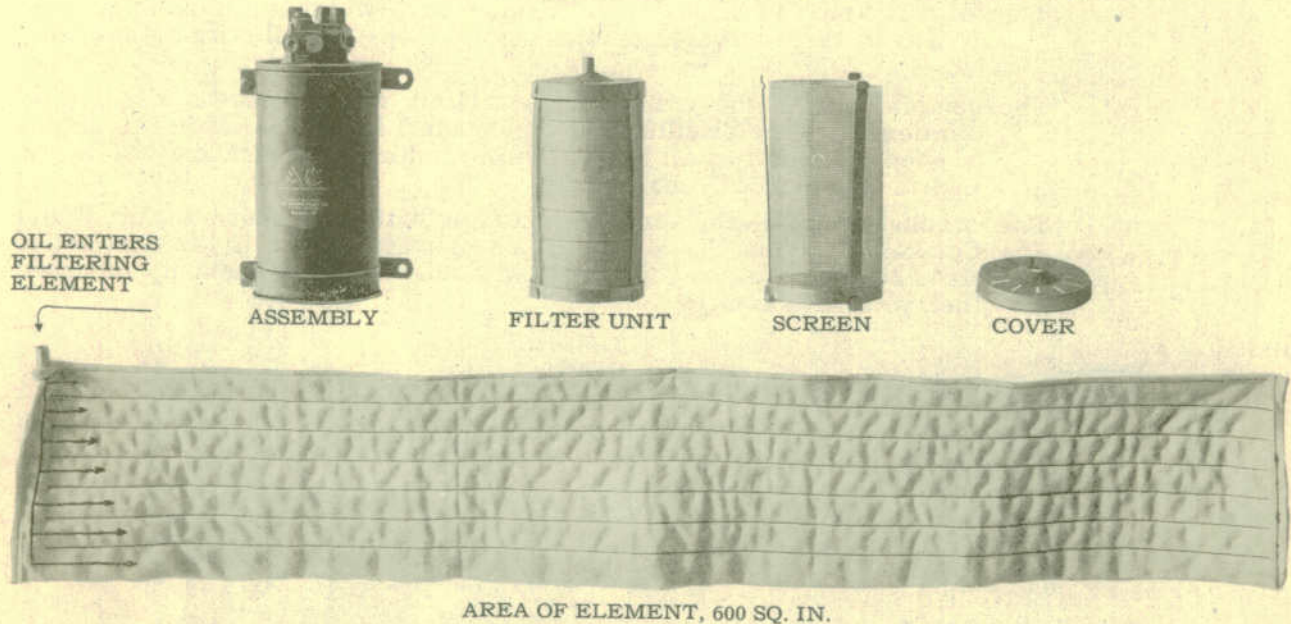
THERMOSTATIC WATER CONTROL

A thermostat is placed in the water line between engine head and radiator. It is held in a housing attached to the upper water tank of radiator, the water from engine passing through this housing and around the thermostat unit. The unit consists of a metallic bellows attached to a poppet valve. This valve remains closed while water in cylinder jacket is below 120° and prevents circulation of water through the system. When water reaches 120° the bellows expands, forcing the valve from its seat and allowing normal circulation of water. The valve is provided with a 7/64" bleeder hole which permits a small quantity of water to pass through the thermostat housing when valve is closed, assuring instant action of the bellows when cylinder water jacket temperature reaches 120°.

Under the most severe weather conditions the engine will warm up from zero to 120° in less than three minutes.

After engine has been warmed, should the car be parked, the thermostat valve will close as soon as water temperature falls to 120°, and prevent thermosyphon circulation. The water in cylinder jacket will, therefore, remain warm for a long time. Subsequent start may then be made without the excessive use of choker which is a large factor in the dilution of lubricating oil with raw gasoline.

The thermostat requires no adjustment. The unit is easily removed from the housing by taking out four cap bolts in rear plate.



Oil Filter Disassembly

- OIL FILTER** The AC oil filter is of the round type with rolled up cloth filtering element having 600 sq. in. of filtering surface as against 450 sq. in. in the one formerly used. This increase will add proportionately to the life of the filter.
- STARTING MOTOR** The overrunning clutch and starter pinion assembly has been strengthened by redesigning so that the gear slides directly on the shaft instead of on a sleeve, to give sturdier construction. This assembly is interchangeable with assembly used on 1926 models.
- GENERATOR** Sixteen slotted generator armature is used instead of twenty-six slots as formerly used. This results in fewer crossovers of wires, reducing the possibilities of short circuits. The armature is interchangeable with one used on 1926 models.
- MUFFLER** Muffler is of entirely new construction, composed of a series of baffles welded directly to the shell, eliminating the horizontal tubes as formerly used. It is much stronger, quieter and reduces tendency to blow-out, loosen and rattle.
- TAIL PIPE** A long muffler tail pipe extending from muffler to rear end of frame carries exhaust gases completely clear of chassis and reduces exhaust noise.
- CLUTCH** Same clutch as used on 1926 models. Thumb nut adjustment at clutch pedal is provided on 120" and 128" wheel base models. (This adjustment is same as used on Standard Six 1926 models and retained on 114½" wheel base models in 1927.)

TRANSMISSION Same type and general construction as used on previous models with following important changes to reduce gear sound:

A longer and more positive pilot between flywheel housing and transmission case, together with heavier sections in these parts, to maintain correct alignment of engine and transmission.

Larger gears reducing unit pressure on teeth.

New tooth forms having more teeth in contact, giving a smooth rolling action.

Larger transmission case to dampen gear sound.

One-piece drop forged counter gears to eliminate gear distortion and add to quietness of operation.

Transmission case in 120" and 128" wheel base models has been changed to one piece construction, eliminating separate end plate as used in former models.

TRANSMISSION LOCK Transmission lock is the same type as used in 1926 models.

Mechanical Specifications in Detail

114½-in. Wheel Base Models

- TIRES** 31 x 5.25 low pressure, black side walls and tread.
- RIMS** 21" diameter by 4" section. Black finish to match tires, centering bosses pressed into base of rim, and set directly on outer leg of felloe, between rim wedges. The bosses ensure rim being mounted true on wheel, and give additional support for rim between wedges. A rivet is placed in base of rim to ensure correct mounting of rim on wheel. Rims supported by six wedges.
- FRONT AND REAR WHEELS** Artillery type, using steel felloe. Spoke width 1⅜", hub flange 7⅜" diameter, using twelve ⅜" diameter spoke bolts. Wheels provided with balance weight to counter balance weight of rim locking device and tire valve stem.
- FRONT AXLE** Reverse Elliott type, using drop forged, heat treated I beam 2¼" x 1⅞" x 7/32".
Knuckles of drop forged heat treated nickel alloy steel.
Knuckle bearings special hard rolled bronze.
Spindle diameter 1-9/32" at inner bearing and 13/16" at outer bearing.
King bolts are 7/8" diameter, provided with ball thrust bearings containing seventeen ¼" balls to carry load and ensure easy steering.
- FRONT WHEEL BEARINGS** Front wheel bearings are New Departure adjustable cup and cone type. Inner bearing carries ten 5/8" diameter balls. Outer bearing carries nine 15/32" diameter balls.
- TIE ROD** Tie rod 1" diameter tube, 1/8" thickness of wall, adjustable at both ends. Located back of I beam.
- REAR AXLE** Three-quarter floating type, using pressed steel banjo type housing and malleable iron differential carrier.
Housing provided with truss rod for additional strength.
Axle shafts easily removable without removing axle from car.
Differential of two pinion type supported on each side by No. 0210 New Departure adjustable cup and cone bearings.
Differential adjustable and easily removable from rear of axle housing.
Spiral bevel ring gear and pinion. Ratio 4.9 to 1.
- AXLE SHAFTS** Axle shafts heat treated, manganese alloy steel
1⅜" diameter, outer end
1⅞" diameter, necked portion
1¼" diameter, inner end, using six splines.
- REAR WHEEL BEARINGS** Rear wheel bearings are high duty Hyatt roller type, carrying twenty ⅜" diameter rolls 1¾" long.
- PINION SHAFT** Pinion shaft, which is entirely enclosed in torque tube, is heat treated, high carbon steel. Shaft is 1-11/32" diameter at center portion, tapering to 1-3/16" diameter at rear end and 1⅞" diameter at forward end.
Forward end at universal joint is six splined type 1¼" diameter.

**PINION
SHAFT
BEARINGS**

Two bearings support pinion:

Single row No. 1309 New Departure bearing on pinion and double row No. 5306 New Departure bearing on shaft ahead of pinion. Pinion provided with fore and aft adjustment very accessible at outside of carrier.

Pinion, pinion shaft and bearings as a unit, easily removable at rear of axle housing without removing axle from car.

**TORQUE
TUBE**

Torque tube through which both torque and drive are taken, is 2-9/32" diameter, 5/32" thickness of wall. Strut rods tie torque tube and axle housing together, ensuring perfect alignment of these units.

Torque tube is bolted to ball in housing at rear end of transmission. Torque Tube has been shortened because of increased length of transmission case.

**SPRING
SEATS**

Rear axle spring seats provided with drop forged case hardened thrust blocks to prevent end chuck.

Jack rest cast integral with spring seat to accommodate jack and prevent same from slipping.

BRAKES

Four wheel mechanically operated, external contracting service brakes, giving effective braking with light pedal pressure.

Simple and accessible adjustment provided. All exposed joints are covered with leather boots to retain lubricant and keep out dirt and water.

Brake band facings protected from dirt and water by shields fastened to brake discs. These shields add greatly to life of lining and reduce tendency of brakes to squeal.

Rear wheel mechanically operated internal expanding brakes, easily operated by hand lever, are intended for use when car is parked on grades.

**BRAKE
DIMENSIONS**

	Internal Brakes	External Brakes
Drum	12" dia.	12 3/8" dia.
Facings	3/16"x1 3/8"x35-9/16"	3/16"x1 3/4"x38 5/8"
Area of breaking surface	98 sq. in.	270 sq. in.

**CHASSIS
LUBRICATION**

Zerk high pressure lubrication used on chassis.

FRAME

The frame, of pressed steel channel section 5/32" thickness of stock, is provided with five cross members to prevent weaving and distortion.

The maximum depth of side member is 6", with top flange 1 3/4" wide and bottom flange 1 1/2" wide.

Body brackets are provided outside the frames on closed models, providing additional support for body and accessibility of body bolts.

Four brackets—two on each side for model 20.

Six brackets—three on each side for models 26, 26-S, 27, 28.

SPRINGS

Front springs semi-elliptic, overslung.

Length 36 1/4", width 2".

Front spring bolts 9/16" diameter.

Rear springs full floating cantilever.

Length, 48", width 2 1/2".

Rear spring front bolt diameter 9/16"; rear 3/4".

Both springs made of high carbon steel.

Carrying capacity and number of leaves in springs vary with different models in order to ensure proper riding qualities.

Proper riding qualities will be maintained by keeping spring leaves free of lubricant, as proper action is destroyed when spring leaves are lubricated.

- TIRE CARRIER** Tire carrier is of full band type, mounted on rear of frame by pressed steel brackets.
Cross bar located on band to carry tail lamp and license plate.
Band is punched to accommodate brackets for carrying a second spare tire and rim. These brackets are not furnished with cars but may be obtained from any branch or dealer.
- STEERING GEAR** The steering gear is of the worm and split nut, semi-irreversible type with gear ratio of 15.15 to 1.
The worm is $1\frac{3}{4}$ " diameter, $\frac{1}{2}$ " lead, keyed and welded to the steering tube, and supported in two plain bearings. A cup and cone type thrust bearing is provided below the adjustment nut.
The half nuts, made of special bronze, have six threads in contact with worm to reduce unit pressure and wear, and are supported full length in steering gear housing.
Half nuts provided with case hardened steel thrust block, working against case hardened rollers attached to cradle shaft.
Cradle shaft, $1\frac{1}{8}$ " diameter, is supported in steering gear housing by three special plain bronze bearings.
The mast jacket is $1\frac{1}{2}$ " diameter, nickel plated on DeLuxe models and black enameled on all other models.
Gears provided with accessible adjustment to take up lash.
Special ferrules are provided in nest of tubes to prevent rattle.
- STEERING WHEEL** Steering wheel is $17\frac{1}{2}$ " outside diameter, having walnut rim and polished aluminum spider.
Spark and throttle, dimmer control levers and horn button, neatly mounted at top of steering wheel.
- PITMAN ARM** The pitman arm, 8" long, is of drop forged, heat treated steel, splined to cradle shaft. The lower end, to which drag link attaches, is provided with case hardened ball to reduce wear at this part to a minimum.
- DRAG LINK** The drag link is steel tubing $1\frac{1}{8}$ " outside diameter by $\frac{3}{16}$ " wall, adjustable at both ends, and bent to give shortest possible turning radius to cars. Turning circle $37\frac{1}{2}$ ft. right or left.
- ENGINE** The engine is overhead valve type—detachable head—6 cylinder— $3\frac{1}{8}$ " bore by $4\frac{1}{2}$ " stroke—207 cu. in. piston displacement. It develops 63 horse power at 2800 revolutions per minute and 140 pounds feet torque at 1400 revolutions per minute.
The compression chamber is entirely machined to ensure even compression in all cylinders. Compression 77 pounds at 500 revolutions per minute.
Lubrication system is of the pressure feed type.
Engine is suspended in frame at three points, each being insulated from frame by rubber mountings.
- CRANKCASE** The crankcase upper half is made of cast iron, strongly re-enforced by ribbing, providing rigid foundation for engine.
The crankcase lower half is made of pressed steel for lightness and provided with ribs on bottom to prevent drumming. It is also provided with baffles to prevent surging of oil.
Oil drain plug located at lowest point of pan to ensure thorough drainage of oil.
- FLYWHEEL HOUSING** The flywheel housing, composed of two parts, upper and lower half, is made of cast iron.
The upper half, which is integral with engine arms, is doweled and bolted to upper half of crankcase.
The lower half is doweled and bolted to upper half of flywheel housing.

CRANKSHAFT The counter balanced crankshaft, equipped with torsion balancer, is of drop forged, heat treated high carbon steel. The shaft, in addition to counter balancing, is statically and dynamically balanced.

MAIN BEARINGS The crankshaft is supported on four main bearings, the upper half bearing being bronze backed, babbitt lined, doweled in crankcase. The lower half of bearing, or cap, is drop forged steel, babbitt lined, bonded directly to cap.

Bearing sizes are:	Diameter	Length
Front -----	2 $\frac{1}{4}$ "	2-9/32"
Front center -----	2 $\frac{1}{4}$ "	1-11/16"
Rear center or thrust bearing -----	2 $\frac{1}{4}$ "	1-3/4"
Rear -----	2 $\frac{1}{4}$ "	2-19/32"

MAIN BEARING CLEARANCE From April 1st to November 1st, main bearings are fitted .001 to .002 radial clearance on shaft; from November 1st to April 1st, are fitted .0015 to .0025 radial clearance on shaft.

Shims are provided between upper and lower halves of bearings to take up reasonable wear without the necessity of filing faces of cap.

Rear center bearing, which is also thrust bearing, is fitted with .005 to .007 total end clearance on shaft.

Other three bearings are fitted with clearance on shaft of 1/32" to 1/16" at each end.

PISTONS The light weight cast iron pistons are 3 $\frac{3}{4}$ " long, have full skirt, relieved at piston pin bosses, and provided with three piston ring grooves; the lower groove being drilled with ten 3/32" holes for oil ring.

The piston pin bosses, in which piston pins oscillate, are bronze bushed and are offset 3/32" toward camshaft.

The pistons are fitted in cylinder to pass of their own weight on feeler .0015 thick and hold of their own weight on feeler .0025 thick—feelers being $\frac{1}{4}$ " wide.

PISTON RINGS Each piston carries three $\frac{1}{8}$ " cast iron diagonal split piston rings, all located above piston pin. The two top rings are plain type, and the third or lower ring is oil control type.

PISTON PIN The piston pin is hollow, $\frac{3}{4}$ " diameter. The hole through pin is tapered from both ends, with greatest wall thickness at center of pin, giving maximum strength with minimum weight.

The pin is securely clamped in upper end of connecting rod.

CONNECTING ROD The connecting rod is drop forged, heat treated steel, 10" long. The lower end bearing is 1 $\frac{1}{2}$ " wide, 2" diameter, babbitt lined, bonded directly to rod.

Connecting rods are provided with shims to take care of reasonable wear, without filing caps.

Connecting rod fitted to crankshaft with .002 to .0025 radial clearance, and .007 end clearance on shaft.

CAMSHAFT The camshaft is drop forged steel, case hardened, 1-1/16" diameter, supported in four bronze bushings and driven by crankshaft through helical gears.

The cam contour is especially designed for quiet action.

Camshaft bearing sizes are:

	Diameter	Length
Front -----	1-31/32"	1-9/16"
Front Center -----	1-15/16"	1-1/16"
Rear Center -----	1-13/16"	1-1/16"
Rear -----	1-25/32"	1-1/8"

VALVE LIFTERS, ROLLERS AND PINS Valve lifters are 1" diameter, 2-5/16" long and hollow for light weight.

Valve lifter rollers are 1-7/64" diameter, 7/16" wide and case hardened.

Roller pins are $\frac{3}{4}$ " long, $\frac{1}{2}$ " diameter, case hardened and hollow for lightness and ease of lubrication.

- VALVE LIFTER GUIDES** Valve lifters operate in individual cast iron guides which may be removed easily from side of engine.
- VALVE PUSH RODS** Valve push rods are made of $\frac{3}{8}$ " diameter tube, $\frac{1}{32}$ " wall thickness. Tubing used for strength combined with light weight.
- VALVES** Valves, located in detachable cylinder head, are of one piece construction of following dimensions:
- | | Clear Dia. Head | Dia. Stem | Valve Lift |
|---------------|-----------------|-----------------|------------|
| Inlet ----- | 1-7/16" | $\frac{3}{8}$ " | 21/64" |
| Exhaust ----- | 1-7/16" | $\frac{3}{8}$ " | 5/16" |
- Inlet valve material—Nickel steel head, with nickel steel or carbon stem.
 Exhaust valve material—Silchrome steel.
 Valve lash—.006 to .008 when engine is hot.
 Valve Timing:
 Inlet valve opens— $0^{\circ} 50'$ before upper dead center.
 Inlet valve closes— $68^{\circ} 10'$ after lower dead center.
 Exhaust valve opens— $76^{\circ} 50'$ before lower dead center.
 Exhaust valve closes— $32^{\circ} 10'$ after upper dead center.
 Firing order—1-4-2-6-3-5.
- VALVE SPRINGS** Double valve springs are used to ensure quiet operation and proper opening and closing of valves at all engine speeds.
 Valve spring pressure—valve closed—49 to 61 lbs.
 Valve spring pressure—valve open—120 to 136 lbs.
- ROCKER ARM SHAFT** Rocker arm shaft is one piece, $\frac{7}{8}$ " diameter tube, $\frac{3}{16}$ " wall, case hardened and ground.
- ROCKER ARM** Rocker arms are drop forged steel, heat treated, and provided with hard rolled bronze bushing for bearing on rocker arm shaft.
 The end operating against valve stem is case hardened and ground.
 The other end is tapped for adjustable ball stud which operates in push rod.
- ENGINE COVERS** The valve rocker arm mechanism and push rods are provided with pressed steel covers and cork gaskets which prevent dirt and dust from attacking these parts and also prevent oil from escaping.
- TIMING GEARS** Timing gears are composed of steel crankshaft and generator gears running with Textolite cam gear. This construction is same as used on 1926 models. All gears have $1\frac{1}{8}$ " width of face.
- COOLING SYSTEM** The cooling system consists of the radiator, thermostat, cylinder water jacket, water circulating pump and fan.
 The capacity of the entire system is 3 gallons.
- RADIATOR** The radiator core is Harrison cellular type, provided with copper water passages and copper cooling fins. The core is $2\frac{1}{4}$ " thick and has frontal area of 403 sq. in.
 A pressed steel shell encloses the core and supports it on the frame of car.
- FAN** The four blade 17" diameter fan revolves on a plain bearing which is lubricated under pressure by a gear pump which draws oil from a reservoir in the fan shell. A stand pipe inside the shell is provided to control the oil level.
 The fan is mounted on an adjustable bracket attached to cylinder block, and is driven by a flat belt $1\frac{1}{4}$ " wide from fan pulley mounted on end of cam shaft.
- CAUTION: ENGINE OIL ONLY SHOULD BE USED IN FAN**
- WATER PUMP** The water pump is of the centrifugal type and is mounted directly back of generator in a rigid bracket integral with the upper crankcase.
 The impellor, $3\text{-}1/16$ " diameter, $\frac{7}{8}$ " wide, is pinned to a case hardened shaft $9/16$ " diameter.
 The shaft is supported in two bronze bearings located in pump body, which also carries the packing gland.

The pump is driven by the generator shaft through an Oldham coupling. Water pump to crankshaft speed $1\frac{1}{2}$ to 1. The entire cooling system is drained by opening drain cock located in water pump.

ENGINE LUBRICATION

The engine lubricating system is of the pressure feed type and functions in the following manner:

OIL PUMP

An oil pump, driven from the camshaft, is submerged in the oil sump in lower half crank case.

Oil is delivered from the pump through oil manifold to each of the crankshaft main bearings, and by means of drilled holes in crankshaft from main bearings to lower connecting rod bearings.

Lubrication is furnished to camshaft bearings, cylinder walls, pistons and pins by oil thrown from sides of connecting rods and from small holes drilled through connecting rod bearings which meter with drilled holes in crankshaft.

A secondary line leads from oil pump to oil pressure gauge and also to oil filter. After oil is passed through filter it is forced to valve rocker arm shaft. Through drilled holes in shaft, a quantity of the oil is fed to rocker arm bearings and through drilled holes in rocker arm is carried to push rod ball joints, then runs down push rods and lubricates the valve lifters, guides, rollers and pins. The greater portion of oil from the rocker arm shaft is carried down the front end of engine to the timing gear housing, lubricating the timing gears, front camshaft bearing and generator bearing, eventually returning to lower half of crankcase.

In case oil filter is clogged, a valve located in filter automatically opens, by passing oil around filter to rocker arm shaft.

The oil pump consists of two gears, $\frac{7}{8}$ " thick, sixteen teeth, fourteen pitch. The pump is provided with pressure relief valve which opens when oil pressure reaches 25 to 30 pounds.

Oil capacity of crank case: 7 quarts in dry engine, and 5 quarts to refill.

OIL FILTER

The AC oil filter is a round type with rolled up cloth filtering element having 600 sq. in. of filtering surface as against 450 sq. in. in the one formerly used. This increase will add proportionately to the life of the filter.

The filter, located on the front of dash, takes the oil direct from the oil pump in the crankcase, and after filtering passes the oil to the rocker arm shaft and then oil returns to crankcase. The total quantity of oil in crankcase will pass through the filter every five minutes, ensuring clean oil to working parts at all times.

Should the filtering element become clogged, the oil is by-passed around the filter by means of a by-pass valve automatically operated, ensuring oil to rocker arm mechanism under any condition. A pet cock is provided at the filter, and if oil does not flow from cock when opened, either the filter or line to filter has become clogged. If line is clogged it can be opened by blowing through line with air hose. If filter is clogged, new cartridge must be installed.

Pet cock should be opened every 500 miles in order to determine that filter is functioning.

INLET MANIFOLD

The inlet manifold, located on left side of engine, is of the three port type, with straight horizontal runner, each port feeding gas to two cylinders.

The manifold is securely clamped to cylinder head on both sides of each port, assuring air tight joint.

Special attention has been given manifold to ensure even distribution of gas to all cylinders.

Inside diameter of runner and ports, $1\frac{1}{4}$ ".

- CARBURETOR** The carburetor is Marvel model T-3, automatic air valve, heat controlled type, provided with two adjustments only, one for needle valve or low speed nozzle, and one for air valve.
- Carburetor sizes:
 Air intake— $1\frac{7}{8}$ " diameter.
 Air valve— $1\frac{7}{8}$ " diameter opening.
 Air valve spring No. 24-115.
 High speed jet No. 49-225-C-33.
 Metering pin jet No. 84-44.
- CARBURETOR RISER** A double-walled riser, between inlet manifold and carburetor and connected to exhaust manifold, utilizes exhaust gases, by-passing them between riser walls to ensure complete vaporization and minimum consumption of fuel.
- The amount of heat furnished to the riser is controlled by two valves, one located in damper body at end of exhaust manifold, the other located in outlet tube, extending from riser to damper body. These valves are both automatically and manually operated.
- Being connected with throttle, they are automatically opened or closed by the corresponding opening or closing of the throttle, furnishing greatest amount of heat to riser when throttle is closed.
- Being connected to manually operated lever located on instrument board, the automatic action of the heat valves may be varied to suit weather and driving conditions.
- Throttle is located in riser and is $1\frac{7}{16}$ " diameter.
- AIR CLEANER** The AC air cleaner, attached to air inlet of carburetor, separates the dust particles from the air, keeping them from entering the engine where they would cause excessive wear of all moving parts.
- The suction of the engine draws air into cleaner through directing vanes which give the air stream a rapidly rotating motion, spirally.
- Centrifugal force separates the dust particles from the air, throwing them against the wall of the cleaner. The dust is then forced through a small outlet, collecting in a removable container.
- The clean air moves through inner portion of cleaner and enters carburetor free from dirt.
- EXHAUST MANIFOLD** Exhaust manifold, located on left side of engine, is of six port construction and is securely clamped to cylinder head on both sides of each port, preventing warpage of manifold and blowing of gaskets.
- EXHAUST PIPE** The exhaust pipe, extending from damper valve body to muffler, is 2" in diameter.
- An opening, enclosed with pressed steel cover, is provided in exhaust pipe on closed models for attachment of heat valve when installing car heater.
- MUFFLER** Muffler construction is entirely new. It is made up of a shell divided into five compartments by dome-shaped baffle plates. These compartments act as expansion chambers for the exhaust gases, which do not enter rear compartment but pass through into the tail pipe by means of a venturi tube.
- The rear compartment, being in communication with the tail pipe, acts as a vacuum chamber which removes all impulses from out-flowing gases.
- This construction will prevent loosening of muffler parts or bursting because of explosions in muffler and also eliminate exhaust roar so common to other types of mufflers.
- MUFFLER TAIL PIPE** A long muffler tail pipe $1\frac{1}{2}$ " diameter extends from muffler to rear of frame, carries exhaust gases completely clear of chassis, and reduces exhaust noise.

- FUEL SYSTEM** The fuel system consists of gasoline tank, gas lines, vacuum tank, gasoline strainer, carburetor and intake manifold.
- GASOLINE TANK** The gasoline tank of 17 gallons capacity, is located at rear of frame. The tank is provided with a suction pipe to which is attached a wire gauze strainer.
- VACUUM TANK** The gasoline is drawn from rear tank to vacuum tank of 2.66 pints capacity, mounted in front of dash. Vacuum is created by suction from the intake manifold.
- GASOLINE STRAINER** The gasoline strainer mounted at lower end of vacuum tank prevents dirt and water from entering the carburetor.
The strainer is provided with a detachable glass bowl which may be removed easily for cleaning.
A valve is provided for shutting off the gas when cleaning strainer or removing carburetor.
Gasoline flows from strainer by gravity to carburetor float bowl.
- CLUTCH** The clutch is multiple disc, dry plate type, self-contained, carrying five driving plates, five driven plates and ten friction facings. The driving plates to which facings are riveted are driven by the flywheel by means of sixty teeth in the flywheel and driving plates.
The driven plates drive the clutch hub by means of fifty-three teeth in hub and plates.
Clutch driven plates are made of high carbon steel, ensuring long life and resistance to warpage.
Clutch hub is heat treated, drop forged, high carbon steel.
Clutch shaft is supported in two ball bearings, one mounted in front of transmission case, the other in rear end of crankshaft.
Clutch release bearing is ball thrust type containing twelve $\frac{3}{8}$ " diameter balls.
Clutch facings are of woven asbestos re-enforced by copper wires.
The facings are $5\frac{3}{4}$ " inside diameter, $7\frac{3}{4}$ " outside diameter, $\frac{1}{8}$ " thick.
Area of friction surface is 212 sq. in.
Clutch spring pressure is 310 to 330 pounds.
Clutch pedal reduction 17.2 to 1.
- CLUTCH ADJUSTMENT** The only adjustment required in connection with the clutch is at clutch pedal. This adjustment is made with thumb nut located at rear end of clutch release rod outside the clutch housing.
Proper adjustment provides there shall be 1 to $1\frac{1}{2}$ inches free pedal travel.
- TRANSMISSION** The transmission is of the selective sliding gear type, three speeds forward and reverse, with general construction similar to that used on 1926 models.
The transmission case has been made larger and heavier—the pilot forming joint between flywheel housing and transmission case has been reversed, by making the flywheel housing the male member and the transmission case the female member. This increases the length of pilot from $\frac{7}{32}$ " to $\frac{7}{16}$ ", ensuring better alignment between engine and transmission case.
The constant mesh gear set and second speed gear set have been changed from 7-9 pitch gears to full 7 pitch, giving more teeth in contact and smoother rolling action.
The counter gear assembly is of one piece construction instead of built-up type as formerly.
The internal teeth of high speed sliding gear are broached to true tooth form.

Transmission control lever, hand brake lever, and transmission lock are the same as on 1926 models.

Clutch gear bearing No. 1209 New Departure, single row.

Transmission main shaft front bearing, located in clutch gear, is plain bronze 15/16" diameter by 2-1/16" long.

Transmission main shaft bearing, rear, No. 1306 New Departure, single row.

Transmission main shaft of high carbon heat treated steel and has six splines of 1-31/64" outside diameter.

Stationary transmission counter gear shaft is case hardened and ground with diameter of 1".

Counter gear bushings plain bronze—two—1" diameter by 2" long.

	Teeth	Pitch
Clutch gear -----	17	7
High and intermediate sliding gear -----	24	7
Low and reverse sliding gear -----	30	7-9
Countershaft constant mesh gears -----	31	7
Countershaft intermediate gear -----	24	7
Countershaft low speed gear -----	18	7-9
Countershaft reverse gear -----	15	7-9
Reverse idler gear -----	17	7-9

Gear material; heat treated chrome nickel steel.

GEAR REDUCTIONS

Transmission	Total at Wheel
High—direct -----	4.9-1
Intermediate—1.824-1 -----	8.93-1
Low—3.039-1 -----	14.89-1
Reverse—3.647-1 -----	17.87-1

Case requires 3½ pints of oil to fill to proper level.

UNIVERSAL JOINT

The universal joint is enclosed in the ball drive housing located at rear of transmission case. The housing protects joint from dirt and water and retains lubricant supplied by the transmission.

The forward yoke is attached to transmission main shaft by means of a spline fitting and held securely by washer and nut.

The rear yoke is supported in a bronze bushing in driving ball. The yoke is broached to receive splined end of pinion shaft.

The universal joint and bushing are automatically oiled from the transmission.

The joint is 3¾" outside diameter and yoke pins 1" diameter.

SPEEDOMETER GEARS

The speedometer drive gears are enclosed in ball drive housing, protected from dirt, and automatically lubricated.

Speedometer drive gear -----	6 teeth
Speedometer driving pinion -----	19 teeth

DRIVING BALL

The driving ball 4¾" in diameter surrounds the universal joint and is enclosed in a ball housing at end of transmission case. It is fastened directly to the torsion tube by four ⅜" diameter cap screws.

STARTING, LIGHTING AND IGNITION

The Delco system of starting, lighting and ignition is used on all models. Complete description of the various units of this system is given on page 30.

Mechanical Specifications in Detail

120 in. and 128 in. Wheel Base Models

TIRES	33x6.00 Low pressure, black side walls and tread.		
RIMS	21" diameter x 4½" section. Black finish to match tires, centering bosses pressed into base of rim, and set directly on outer leg of felloe, between rim wedges. The bosses ensure rim being mounted true on wheel, and give additional support for rim between wedges. A rivet is placed in base of rim to ensure correct mounting of rim on wheel. Rims are supported on felloes by six wedges.		
FRONT AND REAR WHEELS	Artillery type, using steel felloe. Wheels are provided with balance weights to counter balance weight of rim locking devices and tire valve stems.		
	Hub Flange Diameter	Spoke Width	Spoke Bolts
120" WB, Front	7-13/16"	1½"	Twelve ¾" Dia.
120" WB, Rear	8½"	1⅜"	Twelve ½" Dia.
128" WB, Front	7-13/16"	1½"	Twelve ¾" Dia.
128" WB, Rear	9"	1½"	Twelve ½" Dia.
FRONT AXLE	Reverse Elliot type, using drop forged, heat treated I beam 2¼" x 1⅞" x ¼". Knuckles of drop forged, heat treated nickel alloy steel. Knuckle bearings special hard rolled bronze. Spindle diameter 1-7/16" at inner bearing and 15/16" at outer bearing. King bolts are 1" diameter, provided with ball thrust bearings containing fourteen 5/16" balls to carry load and ensure easy steering.		
FRONT WHEEL BEARINGS	Front wheel bearings are New Departure adjustable cup and cone type. Inner bearing carries ten ¾" diameter balls. Outer bearing carries nine ⅝" diameter balls.		
TIE RODS	Tie rod 1⅛" diameter tube, ⅛" thickness of wall, adjustable at both ends. Located back of I beam.		
REAR AXLE	Full floating type, using pressed steel banjo type housing and malleable iron differential carrier. Housing provided with truss rod for additional strength. Axle shafts easily removable without removing wheels from housing. Differential of four pinion type supported on each side by No. 3720 New Departure adjustable cup and cone bearings. Differential adjustable and easily removable from rear of axle housing. Spiral bevel ring gear and pinion.		
			Ratio
120" wheel base	-----		4.54 to 1
128" wheel base	-----		4.72 to 1

AXLE SHAFTS

	Material		Diameter
120" WB	Manganese Steel	Outer end	1-13/16"
		Necked portion	1-1/4"
		Inner end	1-3/8" Six Spline
128" WB	High Carbon Steel	Outer end	1-17/32"
		Necked portion	1- 5/16"
		Inner end	1-1/2" Six Spline

REAR WHEEL BEARINGS

Rear wheels are mounted on New Departure annular type ball bearings.

	Bearing Number
120" WB	N. D. 1310
128" WB	N. D. 1311

PINION SHAFT

Pinion shaft, which is entirely enclosed in torque tube, is heat treated, high carbon steel.

	Forward End	Diameter Center Portion	Rear End
120" WB	1-5/16"	1-5/16"	1-5/16"
128" WB	1-5/16"	1-9/16"	1-3/8"

Forward end on both models is 1 1/4" diameter and six splined to receive the universal joint.

PINION SHAFT BEARINGS

Pinion is supported by one single and one double row New Departure ball bearing.

	On Pinion	On Shaft
120" WB	No. 1310 Single Row	No. 307 Double Row
128" WB	No. 1309 Single Row	No. 307 Double Row

Pinion provided with fore and aft adjustment, very accessible at outside of carrier.

Pinion, pinion shaft and bearings as a unit, easily removable at rear of axle housing without removing axle from car.

TORQUE TUBE

Torque tube through which both torque and drive are taken, tapers from 3 1/4" diameter at rear end to 2-17/32" at front end with 3/16" thickness of wall. Strut rods tie torque tube and axle housing together, ensuring perfect alignment of these units.

Torque tube is bolted to ball housing at rear end of transmission. Torque tube has been shortened because of increased length of transmission case.

SPRING SEATS

Rear axle spring seats provided with drop forged, case hardened thrust blocks to prevent end chuck.

Jack rest cast integral with spring seat to accommodate jack and prevent same from slipping.

BRAKES

Four wheel mechanical type, external contracting service brakes, giving effective braking with light pedal pressure.

Simple and accessible adjustment provided. All exposed joints are covered with leather boots to retain lubricant and keep out dirt and water.

Brake band facings protected from dirt and water by shields fastened to brake discs. These shields add greatly to life of lining and reduce tendency of brakes to squeal.

Rear wheel mechanical type internal expanding brakes, easily operated by hand lever, are provided for use when car is parked on grades.

BRAKE DIMENSIONS

	Internal Brakes	External Brakes
Drum -----	13 ⁵ / ₈ " dia.	14" dia.
Facings -----	5/32x1 ⁵ / ₈ x40-11/16"	3/16x2x43 ³ / ₄ "
Area of braking surface -----	132 ¹ / ₂ sq. in.	350 sq. in.

CHASSIS LUBRICATION

Zerk high pressure lubrication used on chassis.

FRAME

The frame, of pressed steel channel section 3/16" thickness of stock, is provided with seven cross members to prevent weaving and distortion.

Side members are 2" wide with maximum depth of 6-7/16".

Body brackets are provided outside the frame on closed models, providing additional support for body and accessibility of body bolts.

Four brackets—two on each side for models 40 and 51.

Six brackets—three on each side for models 47-48-50-54C-58.

SPRINGS

Front springs semi-elliptic, overslung.

Length 36⁷/₈", width 2".

Front spring bolt diameters:

Front 11/16".

Rear 7/8".

Rear spring full floating cantilever.

Length 47⁵/₈", width 2¹/₂".

Rear spring bolt diameters:

Front 9/16".

Rear 7/8".

Front springs made of high carbon steel with Vanadium steel main plate.

Rear springs made of high carbon steel.

Carrying capacity and number of leaves in springs vary with different models in order to ensure proper riding qualities.

Proper riding qualities will be maintained by keeping spring leaves free of lubricant, as proper action is destroyed when spring leaves are lubricated.

TIRE CARRIER

Tire carrier is of full band type, mounted on rear tubular cross member of frame by pressed steel brackets and braced by drop forged steel arms.

Cross bar located on band to carry tail lamp and license plate.

Band is punched to accommodate brackets for carrying a second spare tire and rim. These brackets are not furnished with cars but may be obtained from any branch or dealer.

STEERING GEAR

The steering gear is of the worm and split nut, semi-irreversible type with gear ratio of 16.2 to 1.

The worm is 2¹/₈" diameter, 1/2" lead, keyed and welded to steering tube, and is supported in three bearings, two plain and one No. 206 New Departure cup and cone type bearing, which also acts as thrust bearing.

The half nuts, made of special bronze, have six threads in contact with worm to reduce unit pressure and wear, and are supported full length in steering gear housing.

Half nuts provided with case hardened steel thrust blocks, working against case hardened rollers attached to cradle shaft.

Cradle shaft, 1¹/₄" diameter, is supported in steering gear housing by three special plain bronze bearings.

The mast jacket, 1³/₄" diameter, is nickel plated.

Gears provided with accessible adjustment to take up lash.

Special ferrules are provided in nest of tubes to prevent rattle.

STEERING WHEEL Steering wheel is 18" outside diameter, having walnut rim and polished aluminum spider.
Spark and throttle, also dimmer control levers and horn button, neatly mounted at top of steering wheel.

PITMAN ARM The pitman arm, 7 $\frac{7}{8}$ " long, of drop forged, heat treated steel, splined to cradle shaft. The lower end, to which drag link attaches, is provided with case hardened ball to reduce wear of this part to a minimum.

DRAG LINK The drag link is steel tubing 1 $\frac{1}{8}$ " outside diameter by 3/16" wall, adjustable at both ends, and bent to give shortest possible turning radius to cars.

	Turning Circle
120" WB models -----	41 $\frac{1}{2}$ feet
128" WB models -----	43 feet

ENGINE The engine is overhead valve type—detachable head—6 cylinder—3 $\frac{1}{2}$ " bore by 4 $\frac{3}{4}$ " stroke—274 cu. in. piston displacement. It develops 76 horsepower at 2800 revolutions per minute and 180 pounds feet torque at 1400 revolutions per minute.
The compression chamber is entirely machined to ensure even compression in all cylinders. Compression 72 pounds at 500 revolutions per minute.
Lubrication system is of the pressure feed type.
Engine is suspended in frame at three points, each being insulated from frame by rubber mountings.

CRANKCASE The crankcase upper half is made of cast iron, strongly re-enforced by ribbing, providing rigid foundation for engine.
The crankcase lower half is made of pressed steel for lightness and provided with ribs on bottom to prevent drumming. It is also provided with baffles to prevent surging of oil.
Oil drain plug is located at lowest point of pan, to ensure thorough drainage of oil.

FLYWHEEL HOUSING The flywheel housing, composed of two parts, upper and lower half, is made of cast iron.
The upper half which is integral with engine arms, is doweled and bolted to upper half of crankcase.
The lower half is doweled and bolted to upper half of flywheel housing.

CRANK-SHAFT The counter balanced crankshaft, equipped with torsion balancer, is of drop forged, heat treated high carbon steel. The shaft, in addition to counter balancing, is statically and dynamically balanced.

MAIN BEARINGS The crankshaft is supported in four main bearings, the upper half bearing being bronze backed, babbitt lined, doweled in crankcase. The lower half of bearing, or cap, being drop forged steel, babbitt lined, bonded directly to cap.

Bearing sizes are:

	Diameter	Length
Front -----	2 $\frac{3}{8}$ "	2-5/8"
Front Center -----	2 $\frac{3}{8}$ "	1-15/16"
Rear Center or Thrust Bearing -----	2 $\frac{3}{8}$ "	2"
Rear -----	2 $\frac{3}{8}$ "	2-25/32"

MAIN BEARING CLEARANCE

From April 1st to November 1st, main bearings are fitted .001 to .002 radial clearance on shaft; from November 1st to April 1st, are fitted .0015 to .0025 radial clearance on shaft.

Shims are provided between upper and lower halves of bearings to take up reasonable wear without the necessity of filing faces of cap.

Rear center bearing, which is also thrust bearing, is fitted from .005 to .007 total end clearance on shaft.

Other three bearings are fitted with clearance on shaft of 1/32" to 1/16" at each end.

PISTONS

The light weight cast iron pistons are 3-15/16" long, have full skirt, relieved at piston pin bosses, and provided with three piston ring grooves; the lower groove being drilled with twelve 5/32" holes for oil ring.

The piston pin bosses, in which piston pins oscillate, are bronze bushed, and are offset 3/32" toward the camshaft.

The pistons are fitted in cylinder to pass of their own weight on feeler .002 thick and hold of their own weight on feeler .003 thick—feelers being 1/4" wide.

PISTON RINGS

Three concentric type, diagonally cut, cast iron rings are provided above the piston pin.

The two top rings are plain type 1/8" wide and the lower ring is an oil control type 3/16" wide.

PISTON PIN

The piston pin is hollow, 7/8" diameter. The hole through pin is tapered from both ends, with greatest wall thickness at center of pin, giving maximum strength with minimum weight.

The pin is securely clamped in upper end of connecting rod.

CONNECTING ROD

The connecting rod is drop forged, heat treated steel, 10-61/64" long. The lower end bearing is 1 3/4" wide, 2 1/4" diameter, babbitt lined, bonded directly to rod.

The connecting rods are provided with shims to take care of reasonable wear, without filing caps.

Connecting rod fitted to crankshaft with .002 to .0025 radial clearance, and .007 end clearance on shaft.

CAMSHAFT

The camshaft is drop forged steel case hardened, 1-1/16" diameter, supported in four bronze bushings and driven by crankshaft through helical gears.

The cam contour is especially designed for quiet action.

Camshaft bearing sizes are:

	Diameter	Length
Front -----	2"	2-1/8"
Front Center -----	1-31/32"	1-5/8"
Rear Center -----	1-15/16"	1-5/8"
Rear -----	1-25/32"	1-1/32"

VALVE LIFTERS, ROLLERS AND PINS

Valve lifters are 1" diameter, 2-5/16" long and hollow for light weight.

Valve lifter rollers are 1-7/64" diameter, 7/16" wide and case hardened.

Roller pins are 3/4" long, 1/2" diameter, case hardened and hollow for lightness and ease of lubrication.

VALVE LIFTER GUIDES

Valve lifters operate in individual cast iron guides which may be removed easily from side of engine.

VALVE PUSH RODS

Valve push rods are made of 3/8" diameter tube, 1/32" wall thickness. Tubing used for strength combined with light weight.

VALVES

Valves located in detachable cylinder head, are of one piece construction of following dimensions.

	Clear Dia.		
	Head	Dia. Stem	Valve Lift
Inlet -----	1 $\frac{7}{8}$ "	$\frac{3}{8}$ "	2 $\frac{1}{64}$ "
Exhaust -----	1 $\frac{5}{8}$ "	$\frac{3}{8}$ "	5 $\frac{1}{16}$ "

Inlet valve material—Nickel steel head, with nickel steel or carbon steel stem.

Exhaust valve material—Silchrome steel.

Valve lash—.006 to .008 when engine is hot.

Valve Timing:

Inlet valve opens—0° 50' Before Upper Dead Center.

Inlet valve closes—68° 10' After Lower Dead Center.

Exhaust valve opens—76° 50' Before Lower Dead Center.

Exhaust valve closes—32° 10' After Upper Dead Center.

Firing order—1-4-2-6-3-5.

VALVE SPRINGS

Double valve springs used to close the valves and designed for quiet operation, are of sufficient tension to ensure proper opening and closing of valves at greatest engine speed.

Valve spring pressure—valve closed—41-55 lbs.

Valve spring pressure—valve open—118-134 lbs.

ROCKER ARM SHAFT

Rocker arm shaft is one piece, $\frac{7}{8}$ " diameter tube, $\frac{3}{16}$ " wall, case hardened and ground.

ROCKER ARM

Rocker arms are drop forged steel, heat treated, and provided with hard rolled bronze bushing for bearing on rocker arm shaft.

The end operating against valve stem is case hardened and ground.

The other end is tapped for adjustable ball stud which operates in push rod.

ENGINE COVERS

The valve rocker arm mechanism and push rods are provided with pressed steel covers and cork gaskets which prevent dirt and dust from attacking these parts and also prevent oil from escaping.

TIMING GEARS

Timing gears are composed of steel crankshaft and generator gears running with Textolite cam gear. This construction is same as used in 1926 models. All gears have $1\frac{1}{4}$ " width of face.

COOLING SYSTEM

The cooling system consists of the radiator, thermostat, cylinder water jacket, water circulating pump and fan. The water capacity of the entire system is $4\frac{1}{2}$ gallons.

RADIATOR

The radiator core is Harrison cellular type, provided with copper water passages and copper cooling fins. The core is $2\frac{1}{4}$ " thick and has frontal area of 423 sq. in.

A pressed steel shell encloses the core and supports it on the frame of car.

FAN

The four blade, $17\frac{3}{4}$ " diameter fan revolves on a plain bearing which is lubricated under pressure by a gear pump which draws oil from a reservoir in the fan shell. A stand pipe inside the shell is provided to control the oil level.

The fan is mounted on a bracket attached to the timing gear cover, provided with automatic adjustment and driven by a flat belt $1\frac{1}{4}$ " wide from fan pulley mounted on end of camshaft.

Caution: Engine Oil Only Should Be Used in Fan.

WATER PUMP The water pump is of the centrifugal type and is mounted directly back of generator in a rigid bracket integral with the upper crank case.

The impellor, 3-1/16" diameter, 7/8" wide, is pinned to a case hardened shaft 9/16" diameter.

The shaft is supported in two bronze bearings located in pump body, which also carries the packing gland.

The pump is driven by the generator shaft through an Oldham coupling.

Water pump to crankshaft speed—1½ to 1.

The entire cooling system is drained by opening drain cock located in radiator.

ENGINE LUBRICATION The engine lubricating system is of the pressure feed type and functions in the following manner.

OIL PUMP An oil pump, driven from the camshaft, is submerged in the oil sump in lower half crankcase.

Oil is delivered from the pump, through oil manifold to each of the crankshaft main bearings, and by means of drilled holes in crankshaft from main bearings to lower connecting rod bearings.

Lubrication is furnished to camshaft bearings, cylinder walls, pistons and pins by oil thrown from sides of connecting rods and from small holes drilled through connecting rod bearings which meter with drilled holes in crankshaft.

A secondary line leads from oil pump to oil pressure gauge and also to oil filter. After oil is passed through filter it is forced to valve rocker arm shaft. Through drilled holes in shaft, a quantity of the oil is fed to rocker arm bearings and through drilled holes in rocker arm, is carried to push rod ball joints, then runs down push rods and lubricates the valve lifters, guides, rollers and pins. The greater portion of oil from the rocker arm shaft is carried down the front end of engine to the timing gear housing, lubricating the timing gears, front camshaft bearing and generator bearing, eventually returning to lower half of crankcase.

In case oil filter is clogged, a valve located in filter automatically opens, by-passing oil around filter to rocker arm shaft.

The oil pump consists of two gears, 7/8" thick, sixteen teeth, fourteen pitch. The pump is provided with pressure relief valve which opens when oil pressure reaches 25 to 30 pounds.

Oil capacity of crankcase: 8 quarts in dry engine, and 6 quarts to refill.

OIL FILTER The AC oil filter is a round type with rolled up cloth filtering element having 600 sq. in. of filtering surface as against 450 sq. in. in the one formerly used. This increase will add proportionately to the life of the filter.

The filter located on the front of dash, takes the oil direct from the oil pump in the crankcase, and after filtering passes the oil to the rocker arm shaft and then oil returns to crankcase. The total quantity of oil in crankcase will pass through the filter every five minutes, ensuring clean oil to working parts at all times.

Should the filtering element become clogged, the oil is by-passed around the filter by means of a by-pass valve automatically operated, ensuring oil to rocker arm mechanism under any condition. A pet cock is provided at the filter, and if oil does not flow from cock when opened, either the filter or line to filter has become clogged. If line is clogged it can be opened by blowing through line with air hose. If filter is clogged, new cartridge must be installed. Pet cock should be opened every 500 miles in order to determine that filter is functioning.

- INLET MANIFOLD** The inlet manifold, located on left side of engine, is of the three port type with straight horizontal runner, each port feeding gas to two cylinders. The manifold is securely clamped to cylinder head on both sides of each port, assuring air tight joint. Special attention has been given manifold to ensure even distribution of gas to all cylinders. Inside diameter of runner and ports, 1-7/16".
- CARBURETOR** The carburetor is Marvel model T-4, automatic air valve, heat controlled type, provided with two adjustments only, one for needle valve or low speed nozzle, and one for air valve. Carburetor sizes:
 Air intake—2 1/8" diameter.
 Air valve—2" diameter opening.
 Air valve spring No. 24-115.
 High speed jet No. 49-300-D-28.
 Metering pin jet No. 84-43.
- CARBURETOR RISER** A double walled riser, between inlet manifold and carburetor, and connected to exhaust manifold, utilizes exhaust gases, by passing them between riser walls, to ensure complete vaporization and minimum consumption of fuel. The amount of heat furnished to the riser is controlled by two valves, one located in damper body at end of exhaust manifold, the other located in outlet tube, extending from riser to damper body. These valves are both automatically and manually operated. Being connected with throttle, they are automatically opened or closed by the corresponding opening or closing of the throttle, furnishing greatest amount of heat to riser when throttle is closed. Being connected to manually operated lever located on instrument board, the automatic action of the heat valves may be varied to suit weather and driving conditions. Throttle is located in riser and is 1-11/16" diameter.
- AIR CLEANER** The AC air cleaner, attached to air inlet of carburetor, separates the dust particles from the air, keeping them from entering the engine where they would cause excessive wear of all moving parts. The suction of the engine draws air into cleaner through directing vanes which give the air stream a rapidly rotating motion, spirally. Centrifugal force separates the dust particles from the air, throwing them against the wall of the cleaner. The dust is then forced through a small outlet, collecting in a removable container. The clean air moves through inner portion of cleaner and enters carburetor free from dirt.
- EXHAUST MANIFOLD** Exhaust manifold, located on left side of engine, is of six port construction and is securely clamped to cylinder head on both sides of each port, preventing warpage of manifold and blowing of gaskets.
- EXHAUST PIPE** The exhaust pipe, extending from damper valve body to muffler, is 2 1/4" diameter.

- MUFFLER** Muffler construction is entirely new. It is made up of a shell divided into six compartments by dome shaped baffle plates. These compartments act as expansion chambers for the exhaust gases which do not enter rear compartment but pass through into the tail pipe by means of a venturi tube.
- The rear compartment being in communication with the tail pipe, acts as a vacuum chamber which removes all impulses from out-flowing gases. This construction will prevent loosening of muffler parts or bursting because of explosion in muffler and also eliminate exhaust roar so common to other types of mufflers.
- A casting at forward end of muffler is provided to receive the car heater valve. On models 40, 47, 48, 54 and 55 this casting has a pressed steel cover which is removable for attachment of heater valve.
- MUFFLER TAIL PIPE** A long muffler tail pipe 1½" diameter extends from muffler to rear of frame, carries exhaust gases completely clear of chassis, and reduces exhaust noise.
- FUEL SYSTEM** The fuel system consists of gasoline tank, gas lines, vacuum tank, gasoline strainer, carburetor and intake manifold.
- GASOLINE TANK** The gasoline tank of 20 gallons capacity, is located at rear of frame. The tank is provided with a suction pipe to which is attached a wire gauze strainer.
- GASOLINE GAUGE** Gasoline gauges are the same as used on 1926 models.
120" wheel base models have gauges mounted on gasoline tanks.
128" wheel base models have gauges mounted on the instrument boards.
- VACUUM TANK** The gasoline is drawn from rear tank to vacuum tank of 3.76 pints capacity, mounted in front of dash. Vacuum is created by suction from the intake manifold.
- GASOLINE STRAINER** The gasoline strainer mounted at lower end of vacuum tank prevents dirt and water from entering the carburetor.
- The strainer is provided with a detachable glass bowl which may be removed easily for cleaning.
- A valve is provided for shutting off the gas when cleaning strainer or removing carburetor.
- Gasoline flows from strainer by gravity to carburetor float bowl.
- CLUTCH** The clutch is multiple disc, dry plate type, self contained, carrying five driving plates, five driven plates and ten friction facings. The driving plates to which facings are riveted are driven by the flywheel, by means of sixty teeth in the flywheel and driving plates.
- The driven plates drive the clutch hub by means of fifty-three teeth in hub and plates.
- Clutch driven plates are made of high carbon steel, ensuring long life and resistance to warpage.
- Clutch hub is heat treated, drop forged, high carbon steel.
- Clutch shaft is supported in two ball bearings, one mounted in front of transmission case, the other in rear end of crankshaft.
- Clutch release bearing is ball thrust type containing twelve ⅜" diameter balls.
- Clutch facings are of woven asbestos reenforced by copper wires.
- The facings are 5¾" inside diameter, 7¾" outside diameter and 5/32" thick; area of friction surface is 212 sq. in.
- Clutch spring pressure is 360 to 380 pounds.
- Clutch pedal reduction 18.7 to 1.

**CLUTCH
ADJUSTMENT**

The only adjustment required in connection with the clutch is at clutch pedal. This adjustment is made with thumb nut located at rear end of clutch release rod outside the clutch housing.

Proper adjustment provides there shall be 1 to 1½ inches free pedal travel.

TRANSMISSION

The transmission is of the selective sliding gear type, three speeds forward and reverse, with general construction similar to that used on 1926 models.

The transmission case has been made larger and heavier—the pilot forming joint between flywheel housing and transmission case has been reversed, by making the flywheel housing the male member and the transmission case the female member. This increases the length of pilot from 7/32" to 7/16", ensuring better alignment between engine and transmission case.

The constant mesh gear set and second speed gear set have been changed from 7-9 pitch gears to full 7 pitch, giving more teeth in contact and smoother rolling action.

The counter gear assembly is of one piece construction instead of built-up type as formerly.

The internal teeth of high speed sliding gear are broached to true tooth form.

Transmission control lever, hand brake lever, and transmission lock are the same as used on 1926 models.

Clutch gear bearing No. 1210 New Departure, single row.

Transmission main shaft front bearing, located in clutch gear, is plain bronze 15/16" diameter by 2-9/32" long.

Transmission main shaft bearing, rear, No. 1307 New Departure, single row.

Transmission main shaft is of high carbon, heat treated steel and has six splines of 1-11/16" outside diameter.

Stationary transmission counter gear shaft is case hardened and ground to 1" diameter.

Counter gear bushings plain bronze—two—1" diameter by 2¾" long.

	Teeth	Pitch
Clutch gear -----	19	7
High and Intermediate sliding gear-----	27	7
Low and Reverse sliding gear -----	34	7-9
Countershaft constant mesh gear -----	34	7
Countershaft intermediate gear -----	26	7
Countershaft low speed gear -----	19	7-9
Countershaft reverse gear -----	15	7-9
Reverse idler gear -----	19	7-9

Gear material; heat treated, chrome nickel steel.

Gear Reductions

Transmission	Total at Wheel	
	120" WB	128" WB
High - direct -----	4.54-1	4.72-1
Intermediate—1.723-1 -----	7.82-1	8.149-1
Low—3.202-1 -----	14.537-1	15.14-1
Reverse—4.056-1 -----	18.41-1	19.18-1

Case requires 4 pints of oil to fill to proper level.

UNIVERSAL JOINT

The universal joint is enclosed in the ball drive housing located at rear of transmission case. The housing protects joint from dirt and water and retains lubricant supplied by the transmission.

The forward yoke is attached to transmission main shaft by means of a spline fitting and held securely by washer and nut.

The rear yoke is supported in a bronze bushing in driving ball. The yoke is broached to receive splined end of pinion shaft.

The universal joint and bushing are automatically oiled from the transmission.

The joint is 4" outside diameter and yoke pins 1" diameter.

SPEEDOMETER GEARS

The speedometer drive gears are enclosed in ball drive housing, protected from dirt, and automatically lubricated.

Speedometer drive gear	120" WB 8 teeth	128" WB 8 teeth
Speedometer driving pinion	22 teeth	23 teeth

DRIVING BALL

The driving ball surrounds the universal joint and is enclosed in ball housing at end of transmission case. It is $5\frac{1}{8}$ " dia. and fastened directly to the torsion tube by four $\frac{7}{16}$ " diameter cap screws.

Starting, Lighting and Ignition

The Delco system of starting, lighting and ignition is used on all models.

It is of the six-volt single wire, or grounded type, the engine and frame of car forming the return side of the electrical system.

The equipment consists of the following units:

	114½" W.B.	120" W.B.	128" W.B.
Starting Motor -----	No. 316	No. 316	No. 316
Generator -----	No. 317	No. 317	No. 317
Combination Switch -----	No. 1288	No. 1289	No. 1305
Dimmer Switch -----	No. 1290	No. 1290	No. 1290
Ignition Coil -----	No. 2188	No. 2188	No. 2188
Cut-out Relay -----	No. 5766	No. 5766	No. 5766
Distributor Assembly -----	No. 16605	No. 16605	No. 16605
Battery-Exide -----	3-XC-13-1	3-XC-15-1	3-XC-15-1

STARTING MOTOR

The starting motor, mounted on flywheel housing on right side of engine, is of the direct drive mechanical shift type. It is a four-pole unit with the field coils in parallel and connected in series with the armature. The armature shaft is supported in two bronze bushings, inlaid with graphite which require no further lubricant.

Engagement with the flywheel is made through the drive unit, which consists of a pinion, spring, shifting collar and overrunning clutch. This drive unit is mounted on the splined armature shaft. It is moved endwise by means of a shifting yoke which fits in the shifting collar. The upper end of the shifting yoke is connected through a lever and cross shaft to the starter pedal.

When the starter pedal is depressed, the drive unit is shifted toward the flywheel and the pinion engages with the flywheel gear. After the pinion is well meshed with the flywheel gear, the upper arm of the shifting yoke comes in contact with a switch on top of the motor housing, completing the electrical circuit between the starting motor and storage battery. The armature then revolves and cranks the engine.

The teeth of both the flywheel gear and starting pinion are chamfered, providing easy engagement. In shifting the drive unit, if the teeth of pinion do not slide into mesh with the flywheel gear, the spring behind the pinion is compressed until circuit is closed, and when the armature begins to rotate the pinion slides into complete engagement.

The overrunning clutch is provided to automatically disconnect the drive unit from the armature shaft and prevent the flywheel driving the armature at high speed after engine starts running on its own power and before the starter pedal is released.

The flywheel teeth are cut in a heat treated steel ring, shrunk on flywheel and welded to it.

	114½" W. B.	120" & 128" W. B.
No. Flywheel Teeth -----	118	122
No. Pinion Teeth -----	11	11
Ratio -----	10.7 to 1	11 to 1

GENERATOR

The generator is mounted on right hand side at front of engine. It is a two pole shunt wound unit, having third brush regulation.

The generator furnishes current for the lights and ignition and keeps the storage battery charged so that a supply of current is available for starting and lighting when engine is not running.

The armature shaft is driven at one and one-half engine speed in a clockwise direction (looking at front end) by the engine timing gears, and is supported at the front end by two special bronze bearings and at rear end by an annular ball bearing. Lubrication for the front bearing is supplied by overflow of oil from rocker arm shaft to oil well below bronze bearings. An oil ring on armature shaft dips into this well and carries oil up to the bearings.

The generator starts charging at a car speed of 8 to 10 miles per hour. Below this speed no current is generated and all current required is taken from the storage battery. In order to prevent battery from discharging through generator below charging speed, a cut-out relay is used.

Control of the charging rate as mentioned above is accomplished by a third brush regulator. The ordinary type of shunt generator furnishes a current that increases with speed. The third brush applied to the shunt wound generator produces a current output that reaches its maximum at a car speed of approximately 25 miles per hour and automatically decreases above that speed. The position of the third brush determines the charging rate and is mounted on an adjustable plate. By means of this plate the brush position may be changed.

CUT-OUT RELAY

The cut-out relay, mounted on top of the generator, and magnetically operated completes the current between the battery and generator when generator voltage exceeds that of battery, and opens the circuit when the generator voltage drops below that of battery.

DISTRIBUTOR

The distributor is an integral part of the generator, being mounted on the commutator end housing. It is of the combined automatic and manual spark advance, and is driven by generator armature shaft through spiral gears at one-half engine speed.

The purpose of the distributor is to interrupt the primary circuit and distribute the high tension current to the spark plugs.

AUTOMATIC AND MANUAL SPARK ADVANCE

The automatic advance mechanism, located in distributor cup automatically advances or retards the spark for different driving speeds, eliminating the necessity of frequently shifting the spark lever located on steering wheel.

The distributor is set to fire 17° before upper dead center (measured on flywheel) in the advanced position which brings it 7° after upper dead center in retard position.

The automatic advance cuts in at approximately eleven miles per hour, car speed, and gradually advancing spark 15° to 19° at car speed of forty miles per hour. With this setting the total maximum advance, both manual and automatic, is from 32° to 36° .

IGNITION COIL

The ignition coil, mounted on top of the generator converts the low voltage primary current from the battery or generator into a secondary current of very high voltage, capable of jumping the gap in the spark plugs.

The resistance unit, which is mounted on the front end of the ignition coil, prevents excessive discharge of the battery in case the ignition switch is left on when engine is stopped and timing contacts are closed.

COMBINATION LIGHTING AND IGNITION SWITCH

The combination switches, Nos. 1288, 1289 and 1305, differ in external appearance but the operation and internal electrical circuits are identical.

The right switch handle controls the lighting circuit and the left handle controls the ignition circuit.

**CIRCUIT
BREAKER**

A protective device known as the circuit breaker is mounted on the back of the switch.

The normal current to the lighting circuits does not affect the circuit breaker, but in the event of an abnormally heavy flow of current, such as would be caused by a ground in any of the lighting circuits, the circuit breaker operates and intermittently cuts off the flow of current causing an audible clicking sound which gives a distinctive warning that abnormal conditions exist. This will continue until the ground is removed, or switch is operated to cut off the circuit in which the ground exists. In this manner the circuit breaker protects the wiring, switch and storage battery. As soon as ground is removed the circuit breaker restores the circuit.

**DIMMER
SWITCH**

The dimmer switch is mounted at base of steering gear and is operated by lever at top of steering wheel. The switch has two positions, one furnishing current to the upper filament, the other to the lower filament of bulbs in head lamps.

**STORAGE
BATTERY**

114½" wheel base models: Exide No. 3-XC-13-1, 13 plates, 6-8 volts, 90 ampere hour capacity.

120" and 128" wheel base models: Exide No. 3-XC-15-1, 15 plates, 6-8 volts, 105 ampere hour capacity.

LIGHTING

The head lamps, of controllable beam type, are provided with universal brackets and mounted on fender brackets as in 1926. Two filament bulbs and special reflectors are used, both filaments having the same candle power. The beams are controlled by lever at top of steering wheel.

The lever, when moved to dim position, lights the upper filament of bulb, throwing light beams directly in front of car.

When moved to bright position, lights the lower filament and raising light beams, throwing them at a greater distance ahead of car.

Lamps are focused by means of screw at back of lamp body.

Head Lamp	-----	21 candle power
Cowl Lamp	-----	3 candle power
Tail Lamp	-----	3 candle power
Dash Lamp	-----	3 candle power
Dome Lamp	-----	6 candle power

HORN

Klaxon motor driven horn, model 12C, is mounted on bracket attached to inlet manifold.

Detailed Description

Open Models

There are four open models in the line, as follows:

Wheel Base	Models
114½"	24 Roadster and 25 Touring
128"	54 Roadster and 55 Touring

These models are completely equipped DeLuxe type cars. The roadsters are equipped with dickey seats in decks, so designed that when open they have a low appearance. Interiors of decks are finished and trimmed throughout and dickey seats provided with neat arms having aluminum brackets. A luggage compartment is built into the roadster bodies with easy access through door in right side.

Tops on both roadster and touring models are folding type covered with a gray and white double texture material over natural wood bows with nickeled sockets. Side curtains are of special construction with extra large and heavy pyralin lights. A compartment for curtains is built into back of driver's seat in roadsters and back of rear seat in touring cars. Top holders and boots are furnished with each model and nickeled deck bars are provided on roadsters, to protect rear decks when tops are down. Tops when folded have a very neat appearance and do not interfere with passengers in dickey seat of roadsters. The trimming of these models is special finish Spanish type leather, without piping, over conventional spring construction with heavy hair pads.

MODEL 24 is an entirely new two passenger sport roadster of the DeLuxe type with dickey seat. The finish is two tone Duco. Patrol Green above and Patrol Cream below the moulding. Moulding is dark Patrol Green with a heavy Patrol Red stripe below. Wheels have dark natural wood spokes with felloes, brake drums and flanges of Patrol Green, matching the body.

The sides of the deck have been carried down 1¼" below the frame, making the body and frame appear lower.

Polished aluminum step brackets with rubber pads are provided for easy access to dickey seat.

The center portion of back curtain may be removed for ventilation and to allow conversation between dickey seat passengers and those in drivers seat.

Windshield is one-piece with gracefully sloping nickeled posts.

Radiator cap carries a new distinctive emblem.

The instrument board is indirectly lighted and the speedometer is directly in front of driver.

The steering column jacket and bracket are nickeled. Hand brake lever and control lever are nickeled. The control lever ball and horn button are of colored Bakelite.

An automatic windshield wiper and a large rear vision mirror are furnished.

Running board and door sill scuff plates are of aluminum.

MODEL 25 is a five passenger touring of the DeLuxe type, and a companion car for the model 24 roadster.

The folding top is of new design with neat appearance when up or down. Top boot and holders, when not in use, are stored with side curtains in a compartment back of rear seat. The seat back is hinged for easy access to this compartment.

Colors and equipment are the same as Model 24.

MODEL 54 is a two passenger, sport roadster of the DeLuxe type with dickey seat. The finish is two tone Duco. Courier Brown above and Courier Cream below the moulding. Striping is Patrol Red ¼" below the moulding which is dark Courier Brown.

Wheels have dark natural wood spokes with felloes, brake drums and flanges painted Courier Brown to match the body.

The rear sides of the deck are carried down 1¼" below the frame, giving the body a low appearance from the rear.

The dickey seat compartment is finished with a foot rest and rubber mat. Arm rests with nicked brackets add to the comfort and appearance of the dickey seat. Polished aluminum step plates with rubber mats are furnished for easy access to the dickey seat compartment.

The center portion of the rear curtain may be removed for ventilation and to allow conversation between front and dickey seat passengers.

The windshield is one-piece, ventilating type, with nicked posts. Beveled plate glass side shields are attached to the windshield posts.

Radiator cap carries the new emblem in place of the conventional filler cap.

Inside door handles are placed at the front of the door, out of the way, but still in a very accessible position.

A large tool compartment provided with lock is built into the left door.

All instruments have a walnut inlay finish on the face and the instrument board is indirectly lighted to prevent glare.

MODEL 55 is a five passenger touring of the DeLuxe type. It is a companion model for the Model 54, carries the same equipment and is finished in the same colors.

Closed Models

All closed models have been greatly improved in exterior appearance and embody many interior refinements.

New roof lines, together with redesigned front door posts, sun visors, rear corner panels and the color schemes add greatly to exterior appearance of the cars.

Deck lines of coupes have been changed to give the appearance of lowered frames and bodies.

Window mouldings in all models are walnut finish.

Smoking sets provided in all models.

New type cushion and back springs are provided for greater comfort.

Mohair plush trimming and special design hardware are used.

Models 50, 51, 54C and 58 are equipped with heaters. The heating system is so arranged that exhaust gases from the heater are discharged through the muffler, preventing objectionable exhaust noise when heater is being used.

MODEL 20 is a five passenger, two door sedan on the 114½" wheel base chassis. The finish is Duco, using Washington Blue below the belt and on window insets, with black upper. Striping is gold; one stripe above, one below the belt and one below lower moulding. Wheels are painted and striped to match the body.

The trimming material is Mohair Plush which harmonizes with the body colors. Curtains are silk finish fabric. Interior hardware is of special design and of the same general construction as used in longer wheel base models.

Rear compartments are furnished with a good grade of tapestry carpet and foot rests of new design with nicked brackets.

Instrument board is indirectly lighted and the speedometer is located directly in front of driver.

Front compartment floor is covered with a rubber mat of special design.

A smoking set of new design is furnished.

MODEL 27 is a five passenger, four door sedan on the 114½" wheel base chassis.

The color scheme, interior trim and hardware are the same as Model 20. In addition to the equipment used in Model 20, a new design of robe rail and an elastic pocket in right rear door are furnished.

MODEL 26 is an entirely new two passenger business coupe on the 114½" wheel base chassis. The long, high deck in combination with the lines of the upper parts of the body, give the car an appearance of length and balance.

No rear side windows are used, but large, well shaped Landau hinges are attached giving the rear quarter a finished appearance.

This model has in common with models 20 and 27, all other improvements such as door posts, sun visors, trimming, hardware, rubber mats and indirect lighting. Color scheme is the same as models 20 and 27.

MODEL 26-S is a new two passenger coupe of the De Luxe type with dickey seat. This model is on the 114½" wheel base. It has all the exterior and interior refinements of the Model 54-C with a body of the same proportions as the Model 26. The rear window may be lowered for ventilation and to allow conversation between dickey seat passengers and those in front.

The finish is two tone Duco. Delaware Green is used on the upper portion with the entire body below the belt Yorktown Green. A double gold stripe is carried on the lower moulding which accentuates the length of the body.

The Landau hinges have the same color as the upper portion of body with ends and center nickeled.

Wheels are a dark, natural wood finish with hubs, drums and felloes painted and striped to match the body.

The radiator carries the new emblem in place of the regular filler cap.

Interior trimming is mohair plush to harmonize with the body colors.

MODEL 28 is a four passenger coupe on the 114½" wheel base chassis. The deck is higher and longer than on the 1926 model and the sides have been carried down 1¼". The belt line moulding has been lowered and the rear corner panel has a lower radius to blend with the roof line. These changes give the car a low and well balanced appearance from any angle.

Seating arrangement and interior body proportions have not been changed except to provide a larger and more convenient package compartment similar to the one used in the Model 48.

The color scheme, equipment and general finish are the same as models 20 and 27.

MODEL 40 is a five passenger, two door sedan on the 120" wheel base chassis. The general body dimensions are the same as the 1926 model, but refinements have been made to both interiors and exteriors.

The body below the belt and the window insets are Delaware Green. Mouldings and upper portion are black. Three gold stripes are used; one above the upper moulding and one above and below the lower moulding.

Wheels, brake drums and flanges are painted to match the lower part of body.

The exterior appearance has been improved by more graceful roof lines, and lowered back corner panels, together with a new design of front door posts and sun visors.

A fine grade of Mohair plush is used which harmonizes with the body color. The floor is covered with a tapestry carpet and the toe boards with a heavy rubber mat.

Side curtains are of a silk finish fabric.

A smoking case is furnished in the rear compartment.

Interior hardware is of distinctive design with satin finish. The inside door lock handles are new long lever type.

Foot rest has a black center with nickeled brackets.

Indirect lighting is used on instrument board and speedometer is directly ahead of driver as in other models.

MODEL 47 is a five passenger, four door sedan on the 120" wheel base chassis. The color scheme, body lines, interior trim and hardware are the same as Model 40.

A folding robe rail and a vanity case are provided in the rear compartment and an elastic pocket is fitted to the right rear door.

MODEL 48 is a new four passenger coupe on the 120" wheel base chassis. The interior is exactly of the same dimensions as the 1926-48 but the deck has been redesigned to accommodate the shorter frame. The new high deck, together with the side moulding, gives the car a low and well balanced appearance. The sides of deck are carried down 1¼" over the frame as in other coupes and roadsters.

The deck lines, roof lines, new formed door posts and back corner panel give this model the same long appearance as the 1926-48.

The same color scheme and interior and exterior refinements of the Models 40 and 47 are used in this model.

A smoking set is furnished and an elastic pocket is provided in the right door.

MODEL 50 is a DeLuxe seven passenger model on the 128" wheel base chassis. The rear corner panel has been lowered, giving more graceful roof lines. Front door posts are shaped to blend into the roof rail and a new type sun visor with concealed fastening is used.

The color scheme and striping is entirely new. The lower part of body, window insets, upper and vertical mouldings are Colonial Blue with Black above the belt.

Wheels have natural wood spokes and the hubs, felloes and brake drums are painted to harmonize with bodies.

Finest quality mohair plush is used for interior trimming as regular equipment but a fine quality neat stripe broadcloth may be had on special order. Trimming is plaited type with tufting buttons carefully arranged to give a custom built appearance.

Seats are exceptionally comfortable, having double springs with heavy coil conventional type on the bottom and soft Marshall springs on top. Cushion retainers are used to hold the cushions in place. Seats are low to provide ample head room, both in front and rear compartments.

Arm rests are of new design, plaited to harmonize with the other trimming. Assist cords are provided in rear compartment.

A high grade velvet carpet covers the floor in rear compartment and a heavy rubber mat is used on the floor in front compartment with a mat to match on the inside of dash.

The instruments have walnut wood dials with inlaid nickel silver in an artistic design. The speedometer is directly in front of the driver. The center instrument group includes the following:

Oil gauge
Gasoline gauge
Ammeter
Radimeter

The instrument board is finished on the upper part with an inlaid walnut strip to match window mouldings and door panels. Indirect lighting is used on instrument board.

All interior fittings are of new design. The door locking handles are a flush type. The exposed surfaces of the door locks and dove tails on doors are nickel plated.

A new designed robe rail is used having grab handle brackets harmonizing with other fittings.

A dome light with six candle power bulb is provided instead of the customary pillar lights.

A combination vanity case and smoking set, with art metal finish, enclosed in a hand tooled leather case is provided in rear compartment.

Rear vision mirror bracket is covered with an ornamented plate.

The radiator carries the new emblem instead of the regular filler cap.

Windshield wiper is a more powerful type with a valve arrangement to ensure the wiper arm being held up against the frame when not in use.

Running boards are fitted with large polished aluminum scuff plates.

A new type car heating system has been designed which is more efficient and quiet than any system used in the past. The heater valve is easily opened by pushing down on lever and closed by kicking lever to release spring.

MODEL 51 is a five passenger, four door DeLuxe type Brougham on the 128" wheel base chassis.

The back upper corner of body has been dropped 1¼".

Front door posts are shaped to blend with roof rails and the new type sun visor is attached with concealed screws.

The rear side windows have been designed to open.

Large Landau hinges are provided. These have nickeled joints and ends with other parts colored to match body.

Top rear quarter covering material is of a color to harmonize with body colors.

This model is two tone Duco. Light Paul Revere Green is used on the lower part of body with dark Paul Revere Green above. The lower moulding is black with a heavy Burnt Orange stripe in the center. This accentuates the moulding and adds a final touch in making the color scheme unusually attractive.

The interior design of trimming material, hardware, instruments, carpets and heater are the same as the Model 50, with the exception that a smoking set is assembled in the center of the front seat back. There is no combination vanity case and smoking set provided.

MODEL 54-C is a two passenger coupe of the DeLuxe type, with dickey seat, on the 128" wheel base chassis.

The rear deck has been raised and lengthened and the rear sides carried down 1 $\frac{1}{4}$ " below the frame. The upper belt line is straight and the top is lowered at rear. These changes give the car a longer and better balanced appearance.

The dickey seat is constructed so that the back extends slightly above the deck, making a low and comfortable seat. Neatly finished arm rests are attached. The interior of deck compartment is finished throughout and fitted with a folding foot rest and rubber mat. A large side door provides easy access to the deck luggage compartment. Polished aluminum step brackets with rubber pads are attached for entrance to dicky seat compartment.

The rear window may be lowered for ventilation and to allow conversation between dickey seat passengers and those in front.

The color scheme is the same as Model 51.

The interior design of trimming, hardware, instruments, carpet and heater are the same as in Model 50.

MODEL 58 is an entirely new design five passenger coupe of the DeLuxe type on the 128" wheel base chassis.

It is a companion car for the Model 50 and carries the same equipment, detailed refinements, interior finish and color scheme. The interior is arranged to give ample leg room for five passengers and provides large comfortable seats for the front passengers.

The body lines, together with the high deck, low roof line and the color scheme accentuate the length and general appearance.

Tool Equipment

All cars are equipped with:

- Oil can
- Tire pump
- Starting crank
- Hub cap wrench
- Spark plug wrench
- Combination rim wrench and tire tool
- Jack with long folding handle

Tool kit containing the following tools:

- 5 Case hardened end wrenches
- 1 Adjustable wrench
- 1 Punch
- 1 Chisel
- 1 Hammer
- 1 Pliers
- 1 Screwdriver. Note: Two screwdrivers furnished in 120" and 128" models only.

This equipment is carried under the seats in all models except the 54 and 55 in which cars a compartment is provided, in the door at driver's side, for the small tools. The oil can is carried in a bracket on front side of dash.

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