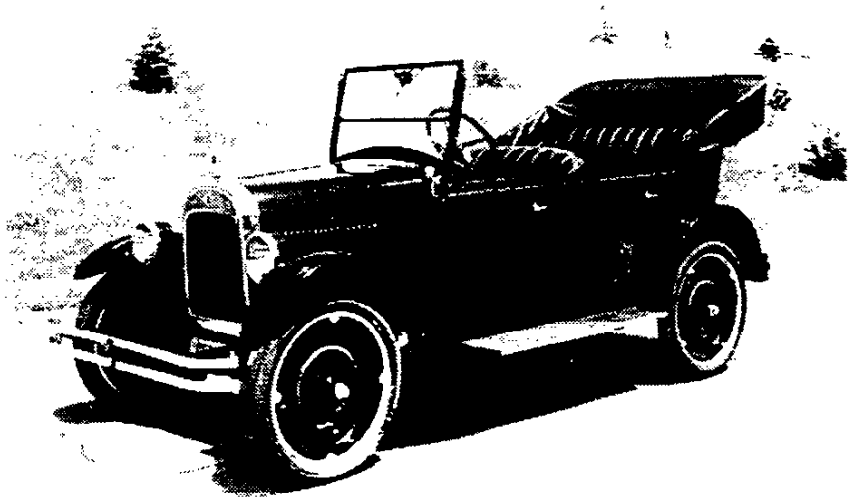
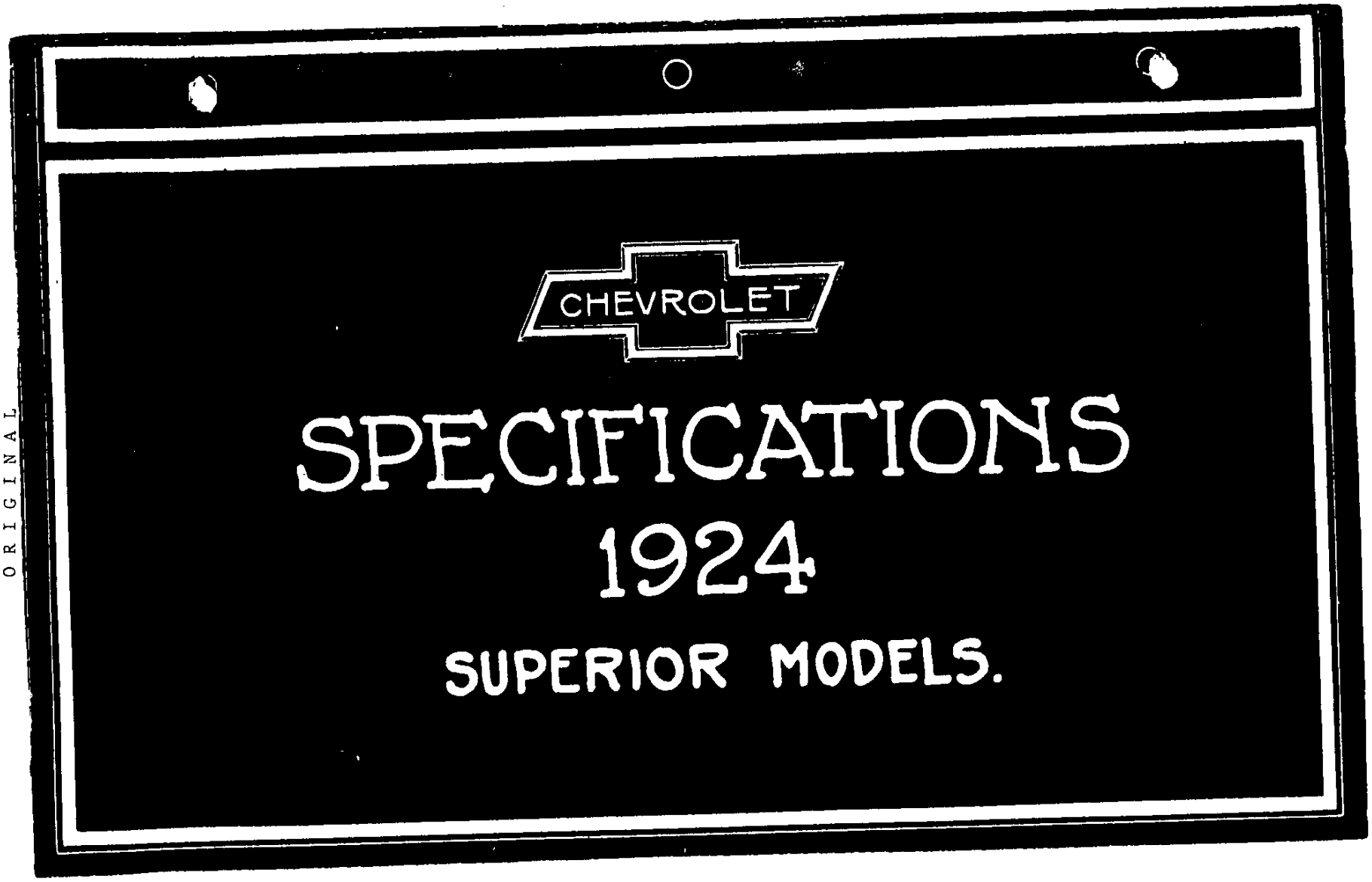
CHEVROLET



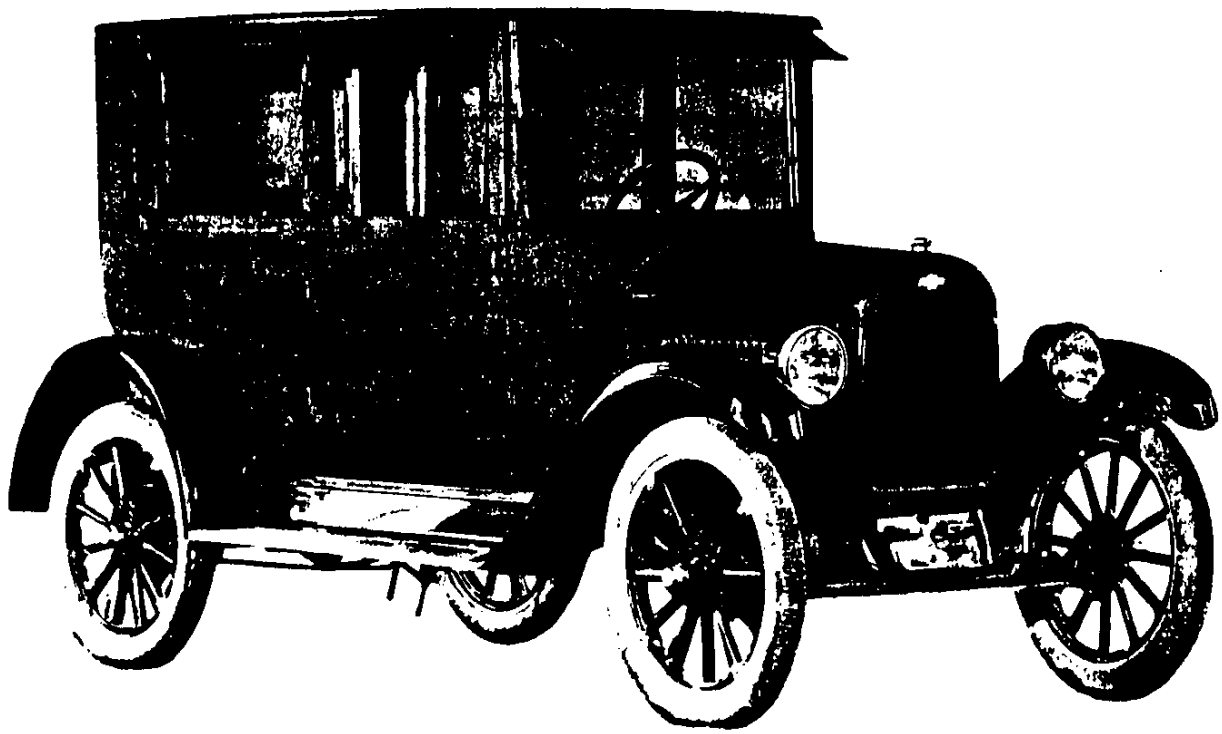
1924 Chevrolet, Superior, touring, OCW

1924



1924 MOTOR SPECIFICATIONS

MODEL	HORSEPOWER		FAN				IGNITION	SELF-STARTER COMBINED STARTING, LIGHTING, IGNITION				
	MAX	MAX	DIA	NO OF BLADES	BEARING	V BELT		OPERATED BY	TYPE	SYSTEM	BATTERY	GEAR REDUCTION
SUP TOURING	27	26	4	4	BRONZE	VULCANIZED FABRIC	BATTERY AND COIL	PEDAL	ELECTRIC	REMY	WILLARD-XVW-13 OR EXIDE-XC-3-1 WILLARD-STRR-5 EXPORT ONLY	10-1
SUP ROADSTER	27	26	4	4	BRONZE							10-1
SUP SEDAN	27	26	4	4	BRONZE							10-1
SUP COUPE-4	27	26	4	4	BRONZE							10-1
SUP COUPE-2	27	26	4	4	BRONZE							10-1
SUP COM CHASSIS	27	26	4	4	BRONZE							10-1
SUP TOUR CHASSIS	27	26	4	4	BRONZE							10-1
SUP UTILITY EXP	27	26	4	4	BRONZE							10-1



1924

1924

The Business Man's Time-Saver

for Economical Transportation

CHEVROLET

Utility Coupé $640 *f. o. b. Flint, Mich.*

The heavy and increasing demand for this model has compelled us largely to increase our production schedules and facilities.

This car was designed and built particularly for business uses, providing most economical transportation for salesmen on the road or for business men in daily trips to and from office or factory. It is also very popular with physicians, teachers and young couples.

It combines enduring quality, comfort and great economy.

Chevrolet Motor Co., Detroit, Mich.

Division of General Motors Corporation

Five United States manufacturing plants, seven assembly plants and two Canadian plants give us the largest production capacity in the world for high-grade cars and make possible our low prices.

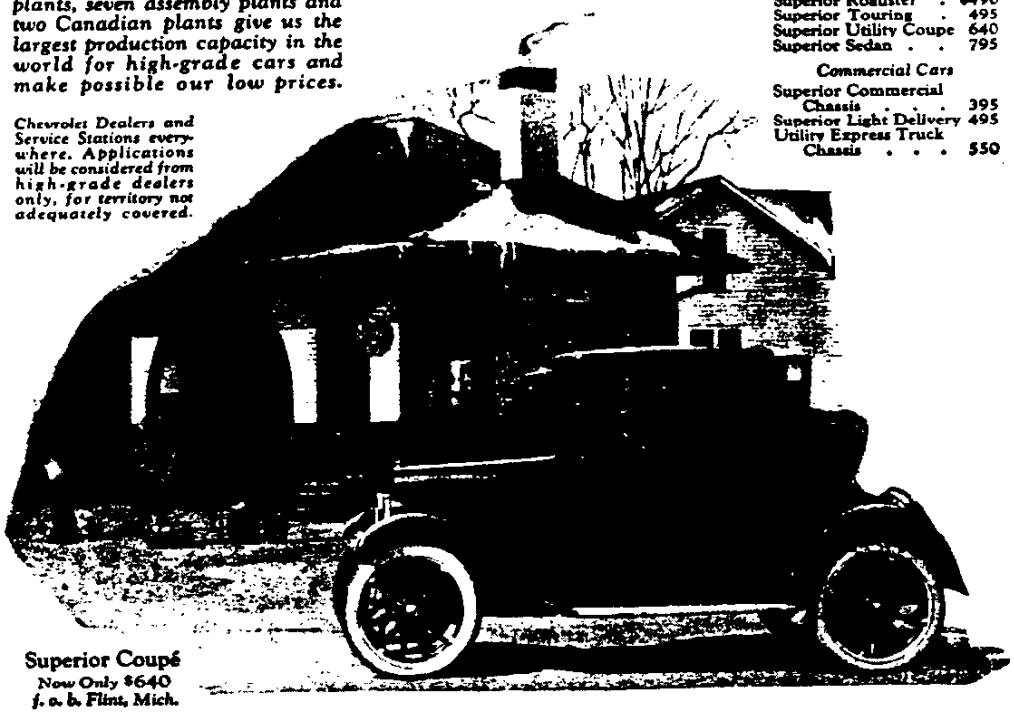
Chevrolet Dealers and Service Stations everywhere. Applications will be considered from high-grade dealers only, for territory not adequately covered.

Prices f. o. b. Flint, Mich.

Superior Roadster	$490
Superior Touring	495
Superior Utility Coupe	640
Superior Sedan	795

Commercial Cars

Superior Commercial Chassis	395
Superior Light Delivery	495
Utility Express Truck Chassis	550



Superior Coupé
Now Only $640
f. o. b. Flint, Mich.

It is desirable to remove the tires and place them in storage where they are not subjected to extreme temperature changes. The casings should be thoroughly cleaned to remove all oil which may have adhered to them. After removing the tires, thoroughly clean the inside of the wheel rims and apply a coat of shellac or enamel to prevent rust, which is very injurious to the fabric of the tire.

If the tires are not removed, jack up the car so that the wheels clear the floor at least two inches, and let the air out of the tubes.

UNDER NO CIRCUMSTANCES should the car be stored in a barn or other building in which horses or cattle are kept at the same time. The ammonia fumes given off will quickly discolor the paint and enamel. Select a building having a good roof, and preferably a wooden floor raised several inches from the ground.

All bright metal parts should be thoroughly coated with slab oil, vaseline, cosmic or gun grease to prevent rusting.

CARE OF TOPS

The top of the car should be thoroughly cleaned and all dust brushed out. Never attempt to clean the top or curtains with gasoline or kerosene—use a good brush or broom.

If, after exposure to the weather and after considerable use, the top material becomes checked or slightly porous allowing water to soak through, procure a good top dressing and apply it to all exposed surfaces of the top. This will not only eliminate any tendency to become damp on the under side but acts as a preservative as well.

CARE OF CLOTH UPHOLSTERY

To clean the cloth upholstery on Sedan Bodies, use warm water and Ivory Soap only. Gasoline has a tendency to spread the grease and leave a discolored spot.

After cleaning, wipe dry with a clean cloth.

HEADLIGHTS

The Chevrolet Superior car is equipped with Special Headlamp Reflectors.

The stripes or cylindrical zones must be vertical.

The principle behind all automotive headlighting is to concentrate the light from each lamp into a shallow beam, spread it sideways to cover the road surface, and direct it straight ahead with the top of the beam just below the horizontal. This eliminates objectionable glare, since under normal driving conditions the high intensity light is kept below the level of the approaching driver's eyes and on the road surface where it will do the most good.

A great deal of the criticism as to headlighting conditions may be traced directly to improper adjustment of the headlighting equipment. All lighting devices used in head lamps at the present time require adjustments of some sort before satisfactory results can be obtained.

For best results with the Special Reflectors used on Chevrolet Superior cars, use only 21 candle power tipless precision type bulbs. We do not recommend any other type for replacement purposes.

Consult your dealer or police department as to what the requirements are in your particular locality and have your headlamps adjusted accordingly.

There are two adjustments provided. The body of the lamp may be tilted up or down or to the right or left by loosening the headlamp bolt nut.

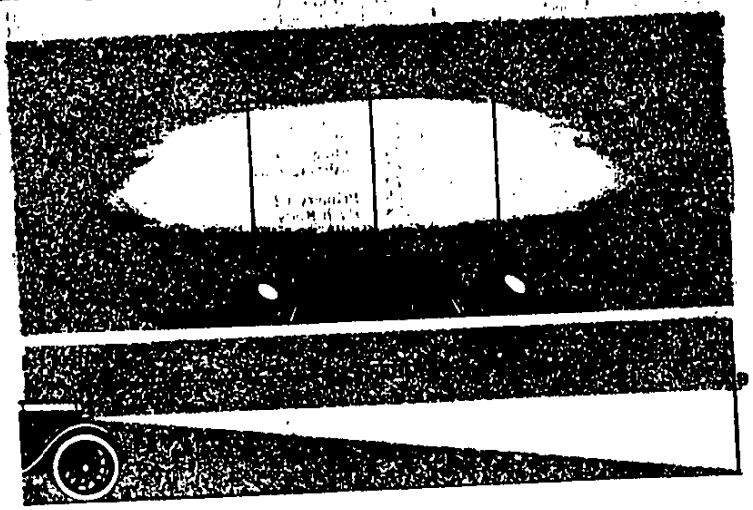


Fig. 43—Headlights

The bulb itself may be pushed forward from the reflector or backward toward the reflector by loosening the focusing screw which is on the outside of the headlight body. All focal adjustments should be made after the lens and headlamp rim have been installed.

Fig. 43 gives a very good idea of the method to be used in adjusting the head lamps.

Place the car on a level floor or piece of ground twenty-five feet from a wall or side of a building and proceed to adjust each lamp separately keeping the lamp not being adjusted covered.

The top of the beam of light should fall on the wall at a point indicated by the horizontal line A—B in Fig. 43 at a point equal to the height from the floor or ground of the center of the headlamps with the car loaded.

The Reflector used on all Chevrolet Superior cars will comply with all state laws if properly adjusted.

1924 TRANSMISSION SPECIFICATIONS

MODEL	COUNTERSHAFT BEARINGS			IDLER GEAR BEARINGS	CLUTCH GEAR BEARINGS	MAIN BEARINGS			HAND CONTROL	UNIVERSAL JOINT	
	DIA.	LENGTH OF EACH	LENGTH OVER ALL			FRONT	REAR	CENTER TO CENTER		DIA OF PINS	LUBRICATION
SUP TOURING	7/8	1 1/2	3	3/4 x 2 3/8	N.D.# 1207	3/4 x 1 15/16	N.D.# 1306	6 11/16	CENTER	1	GREASE
SUP ROADSTER	7/8	1 1/2	3	3/4 x 2 3/8	N.D.# 1207	3/4 x 1 15/16	N.D.# 1306	6 11/16		1	
SUP SEDAN	7/8	1 1/2	3	3/4 x 2 3/8	N.D.# 1207	3/4 x 1 15/16	N.D.# 1306	6 11/16		1	
SUP COUPE-4	7/8	1 1/2	3	3/4 x 2 3/8	N.D.# 1207	3/4 x 1 15/16	N.D.# 1306	6 11/16		1	
SUP COUPE-2	7/8	1 1/2	3	3/4 x 2 3/8	N.D.# 1207	3/4 x 1 15/16	N.D.# 1306	6 11/16		1	
SUP COM. CHASSIS	7/8	1 1/2	3	3/4 x 2 3/8	N.D.# 1207	3/4 x 1 15/16	N.D.# 1306	6 11/16		1	
SUP TOUR. CHASSIS	7/8	1 1/2	3	3/4 x 2 3/8	N.D.# 1207	3/4 x 1 15/16	N.D.# 1306	6 11/16		1	
SUP UTILITY EXP	7/8	1 1/2	3	3/4 x 2 3/8	N.D.# 1207	3/4 x 1 15/16	N.D.# 1306	6 11/16		1	

1924 MOTOR SPECIFICATIONS

MODEL	VALVES		PISTON DISPLACEMENT CU. INCHES	CONNECTING ROD & PINS				CRANKSHAFT BEARINGS				FLYWHEELS		
	BORE OF THROAT	LIFT		PISTON PIN	CRANK PIN	LENGTH OF ROD	BOLT DIA.	NO.	FRONT	CENTER	REAR	DIA	WIDTH	AT
SUP TOURING	1 5/16	7/32	170.9	27/32 × 3 5/16	1 3/8 × 1 7/8	7 3/8	3/8	3	1 3/8 × 2 5/16	1 21/32 × 1 1/2	1 3/4 × 2 1/16	14 5/16	2 1/2	48 1/4
SUP ROADSTER	1 5/16	7/32	170.9	27/32 × 3 5/16	1 3/8 × 1 7/8	7 3/8	3/8	3	1 3/8 × 2 5/16	1 21/32 × 1 1/2	1 3/4 × 2 1/16	14 5/16	2 1/2	48 1/4
SUP SEDAN	1 5/16	7/32	170.9	27/32 × 3 5/16	1 3/8 × 1 7/8	7 3/8	3/8	3	1 3/8 × 2 5/16	1 21/32 × 1 1/2	1 3/4 × 2 1/16	14 5/16	2 1/2	48 1/4
SUP COUPE-4	1 5/16	7/32	170.9	27/32 × 3 5/16	1 3/8 × 1 7/8	7 3/8	3/8	3	1 3/8 × 2 5/16	1 21/32 × 1 1/2	1 3/4 × 2 1/16	14 5/16	2 1/2	48 1/4
SUP COUPE-2	1 5/16	7/32	170.9	27/32 × 3 5/16	1 3/8 × 1 7/8	7 3/8	3/8	3	1 3/8 × 2 5/16	1 21/32 × 1 1/2	1 3/4 × 2 11/16	14 5/16	2 1/2	48 1/4
SUP COM. CHASSIS	1 5/16	7/32	170.9	27/32 × 3 5/16	1 3/8 × 1 7/8	7 3/8	3/8	3	1 3/8 × 2 5/16	1 21/32 × 1 1/2	1 3/4 × 2 11/16	14 5/16	2 1/2	48 1/4
SUP TOUR. CHASSIS	1 5/16	7/32	170.9	27/32 × 3 5/16	1 3/8 × 1 7/8	7 3/8	3/8	3	1 3/8 × 2 5/16	1 21/32 × 1 1/2	1 3/4 × 2 1/16	14 5/16	2 1/2	48 1/4
SUP UTILITY EXP.	1 5/16	7/32	170.9	27/32 × 3 5/16	1 3/8 × 1 7/8	7 3/8	3/8	3	1 3/8 × 2 5/16	1 21/32 × 1 1/2	1 3/4 × 2 11/16	14 5/16	2 1/2	48 1/4

1924 CHASSIS SPECIFICATIONS

MODEL	WHEEL BASE	TREAD	TIRES	TYPE OF WHEELS	FRAME				STEERING GEAR			
					OVERALL WIDTH	OVER ALL LENGTH	SECTION]	DROP	TYPE	ANGLE OF POST	CA OF POST	CA OF WHEEL
SUP TOURING	103	56	30×3½*	ARTILLERY DEMOUNTABLE RIM	28 FRONT 38 9/32 REAR	106 1/8	4½×1½×5/32	NO	WORM & GEAR	37° 2'	1½	6
SUP ROADSTER	103	56	30×3½*		28 FRONT 38 9/32 REAR	106 1/8	4½×1½×5/32	NO	WORM & GEAR	37° 2'	1½	6
SUP SEDAN	103	56	30×3½+		28 FRONT 38 9/32 REAR	106 1/8	4½×1½×5/32	NO	WORM & GEAR	37° 2'	1½	6
SUP COUPE-4	103	56	30×3½+		28 FRONT 38 9/32 REAR	106 1/8	4½×1½×5/32	NO	WORM & GEAR	37° 2'	1½	6
SUP COUPE-2	103	56	30×3½+		28 FRONT 38 9/32 REAR	106 1/8	4½×1½×5/32	NO	WORM & GEAR	37° 2'	1½	6
SUP COM CHASSIS	103	56	30×3½*		28 FRONT 38 9/32 REAR	106 1/8	4½×1½×5/32	NO	WORM & GEAR	41°20'	1½	6
SUP TOUR CHASSIS	103	56	30×3½*		28 FRONT 38 9/32 REAR	106 1/8	4½×1½×5/32	NO	WORM & GEAR	37° 2'	1½	6
SUP UTILITY EXP	120	56	FR 31×4* RR 34×4½+		28 6/16 FRONT 37 REAR	130 11/16	5 1/16×1¾×3/16	NO	WORM & GEAR	41°20'	1½	6

*FABRIC CLINCHER-NON SKID + CORD STRAIGHT SIDE-NON SKID

1924 MOTOR SPECIFICATIONS

MODEL	CAM SHAFT BEARINGS			MANIFOLDS		CENTER OF SHAFT TO TOP OF CYLINDER	OILING	OIL CIRCULATED BY	OIL CAPACITY QUARTS	TYPE OF WATER PUMP	WATER CAPACITY GALLONS
	FRONT	CENTER	REAR	INTAKE I.D.	EXHAUST I.D.						
SUP TOURING	1 5/16 × 2 3/8	1 9/32 × 2	1 1/4 × 1 7/16	1 1/32	1 1/16	12 3/8	SPLASH SYSTEM	GEAR PUMP	4	CENTRIFUGAL	2
SUP ROADSTER	1 5/16 × 2 3/8	1 9/32 × 2	1 1/4 × 1 7/16	1 1/32	1 1/16	12 3/8			4		2
SUP SEDAN	1 5/16 × 2 3/8	1 9/32 × 2	1 1/4 × 1 7/16	1 1/32	1 1/16	12 3/8			4		2
SUP COUPE-4	1 5/16 × 2 3/8	1 9/32 × 2	1 1/4 × 1 7/16	1 1/32	1 1/16	12 3/8			4		2
SUP COUPE-2	1 5/16 × 2 3/8	1 9/32 × 2	1 1/4 × 1 7/16	1 1/32	1 1/16	12 3/8			4		2
SUP COV. CHASSIS	1 5/16 × 2 3/8	1 9/32 × 2	1 1/4 × 1 7/16	1 1/32	1 1/16	12 3/8			4		2
SUP TOUR CHASSIS	1 5/16 × 2 3/8	1 9/32 × 2	1 1/4 × 1 7/16	1 1/32	1 1/16	12 3/8			4		2
SUP UTILITY EXP	1 5/16 × 2 3/8	1 9/32 × 2	1 1/4 × 1 7/16	1 1/32	1 1/16	12 3/8			4		2

1924 CHASSIS SPECIFICATIONS

MODEL	DIFFERENTIAL BEARINGS		REAR AXLE				
	RADIAL BEARING	THRUST BEARING	WHEEL BEARINGS	PROPELLOR SHAFT			TYPE OF DRIVE
				DIA. OF SHAFT	FRONT BEARING	REAR BEARING	
SUP TOURING	HYATT #6221	24 BALLS 3/8 DIA.	N.D. #4307	1"	N.D. #305	N.D. #307	SPIRAL BEVEL
SUP ROADSTER	HYATT #6221	24 BALLS 3/8 DIA.	N.D. #4307	1"	N.D. #305	N.D. #307	SPIRAL BEVEL
SUP SEDAN	HYATT #6221	24 BALLS 3/8 DIA.	N.D. #4307	1"	N.D. #305	N.D. #307	SPIRAL BEVEL
SUP COUPE-4	HYATT #6221	24 BALLS 3/8 DIA.	N.D. #4307	1"	N.D. #305	N.D. #307	SPIRAL BEVEL
SUP COUPE-2	HYATT #6221	24 BALLS 3/8 DIA.	N.D. #4307	1"	N.D. #305	N.D. #307	SPIRAL BEVEL
SUP COM. CHASSIS	HYATT #6221	24 BALLS 3/8 DIA.	N.D. #4307	1"	N.D. #305	N.D. #307	SPIRAL BEVEL
SUP TOUR. CHASSIS	HYATT #6221	24 BALLS 3/8 DIA.	N.D. #4307	1"	N.D. #305	N.D. #307	SPIRAL BEVEL
SUP UTILITY EXP.	N.D. #0212	N.D. #0212	HYATT #6221	1 3/16	N.D. #307	N.D. #1408	SPIRAL BEVEL

1924 TRANSMISSION SPECIFICATIONS

MODEL	TYPE OF TRANSMISSION	TYPE OF CLUTCH	AREA OF CLUTCH SURFACE	RATIO OF TRANS GEAR SPEED				GEAR TEETH		DRIVE SHAFT		
				FIRST	SECOND	THIRD	REVERSE	PITCH	WIDTH OF FACE	ACROSS CORNERS	TYPE	ACROSS FLATS
SUP TOURING	SELECTIVE SLIDING GEAR	CONE	5734	3.32-1	1.77-1	DIRECT DRIVE 1-1 RATIO	4.2-1	7-9	5/8	1 1/16	SQUARE	7/8
SUP ROADSTER			5734	3.32-1	1.77-1		4.2-1	7-9	5/8	1 1/16		7/8
SUP SEDAN			5734	3.32-1	1.77-1		4.2-1	7-9	5/8	1 1/16		7/8
SUP COUPE-4			5734	3.32-1	1.77-1		4.2-1	7-9	5/8	1 1/16		7/8
SUP COUPE-2			5734	3.32-1	1.77-1		4.2-1	7-9	5/8	1 1/16		7/8
SUP COV CHASSIS			5734	3.32-1	1.77-1		4.2-1	7-9	5/8	1 1/16		7/8
SUP TOUR CHASSIS			5734	3.32-1	1.77-1		4.2-1	7-9	5/8	1 1/16		7/8
SUP UTILITY EXP			5734	3.32-1	1.77-1		4.2-1	7-9	5/8	1 1/16		7/8

1924 CHASSIS SPECIFICATIONS

MODEL	CAPACITY OF GASOLINE TANK	GASOLINE FEED	CROSS SECTION OF TANK	FRONT SPRING				REAR SPRING			
				TYPE	LENGTH EYE TO EYE	WIDTH	NUMBER OF LEAVES	TYPE	LENGTH EYE TO EYE	WIDTH	NUMBER OF LEAVES
SUP TOURING	10 2 GALS	VACUUM TANK	⬭	QUARTER ELLIPTIC	——	1 3/4	9	QUARTER ELLIPTIC	——	2	9
SUP ROADSTER	10 2 GALS	VACUUM TANK	⬭	QUARTER ELLIPTIC	——	1 3/4	9	QUARTER ELLIPTIC	——	2	9
SUP SEDAN	10 2 GALS	VACUUM TANK	⬭	QUARTER ELLIPTIC	——	1 3/4	9	QUARTER ELLIPTIC	——	2	
SUP COUPE-4	10 2 GALS	VACUUM TANK	⬭	QUARTER ELLIPTIC	——	1 3/4	9	QUARTER ELLIPTIC	——	2	10
SUP COUPE-2	10 2 GALS	VACUUM TANK	⬭	QUARTER ELLIPTIC	——	1 3/4	9	QUARTER ELLIPTIC	——	2	10
SUP COM. CHASSIS	10 4 GALS	GRAVITY	⬭	QUARTER ELLIPTIC	——	1 3/4	9	QUARTER ELLIPTIC	——	2	9
SUP TOUR. CHASSIS	10 1/2 GALS	VACUUM TANK	⬭	QUARTER ELLIPTIC	——	1 3/4	9	QUARTER ELLIPTIC	——	2	10
SUP UTILITY EXP	10 2 GALS	GRAVITY	⬭	QUARTER ELLIPTIC	——	1 3/4	9	SEMI-ELLIPTIC	44	2 1/2	2

1924 CHASSIS SPECIFICATIONS

MODEL	FRONT AXLE						REAR AXLE						
	SECTION	STEERING	NOM DIA OF SPINDLE	DIA OF KING BOLT	WHEEL BEARINGS		TYPE	DRIVE GEARS					DIA OF AXLE INNER END
					INNER	OUTER		RATIO	TEETH RING	TEETH PINION	PITCH	FACE	
SUP TOURING	IBEAM	CROSS	1 3/16	9/16	N.D.909002	N.D.909001	SEMI-FLOATING	3.777-1	34	9	425	1"	1 5/16
SUP ROADSTER	IBEAM	CROSS	1 3/16	9/16	N.D.909002	N.D.909001		3.777-1	34	9	425	1"	1 5/16
SUP SEDAN	IBEAM	CROSS	1 3/16	9/16	N.D.909002	N.D.909001		3.777-1	34	9	425	1"	1 5/16
SUP COUPE-4	IBEAM	CROSS	1 3/16	9/16	N.D.909002	N.D.909001		3.777-1	34	9	425	1"	1 5/16
SUP COUPE-2	IBEAM	CROSS	1 3/16	9/16	N.D.909002	N.D 909001		3.777-1	34	9	425	1"	1 5/16
SUP COM. CHASSIS	IBEAM	CROSS	1 3/16	9/16	N.D.909002	N.D.909001		3.777-1	34	9	425	1"	1 5/16
SUP TOUR CHASSIS	IBEAM	CROSS	1 3/16	9/16	N.D 909002	N.D.909001		3.777-1	34	9	425	1"	1 5/16
SUP UTILITY EXP	IBEAM	CROSS	1 3/16	9/16	N.D.909002	N.D.909001		3.428-1	38	7	3458	1 1/4	1 5/8

STARTING MOTOR

The starting motor is mounted on the rear motor supporting arm, having a pinion, which automatically engages the toothed edge of the fly wheel when the motor armature is rotated rapidly, as in starting. The armature shaft of the starting motor has an extension or sleeve provided with square threads. The pinion is also threaded and, in addition, carries an eccentric weight, which holds the pinion in the position shown in Fig. 41, with the weight underneath. Because of the weight, the pinion is too heavy to turn

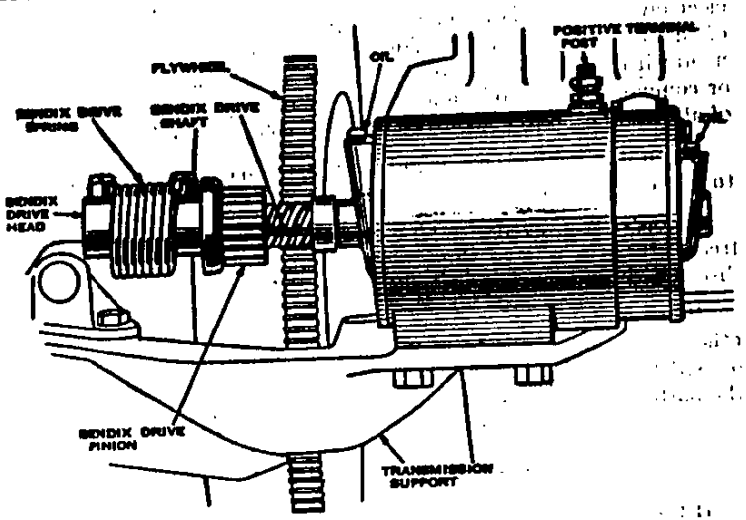


Fig. 41—Starting Motor

on the threaded extension, and because the pinion does not turn, it must move along the screw sleeve. After the pinion has moved along the threaded sleeve, it engages the teeth on the fly wheel and keeps on moving along until it reaches a stop at the end of the threaded sleeve. The pinion and the fly wheel gear are then fully meshed. Fitted over the end of the armature shaft is a second sleeve held securely to the shaft by a clamping bolt. A heavy coiled spring connects the outer sleeve with the threaded sleeve. After the pinion has reached the stop, it now must turn with the threaded sleeve, but since it is engaged with the fly wheel gear the shock of starting the engine would be very great were it not that the armature shaft is connected to the threaded sleeve through the coiled spring. Instead of picking up the load immediately, this spring keeps coiling until the torque of the starting motor overcomes the resistance of the spring and starts to revolve the fly wheel.

As soon as the engine starts under its own power, the fly wheel revolves at a much higher speed than it did when the starting motor was cranking the engine. This increases the speed of the pinion, and because it is running faster than the threaded sleeve, it will be screwed on the threads of the sleeve like a nut on a bolt until it has been screwed out of mesh with the fly wheel gear. Should the operator of the car, through error, not immediately remove his foot from the starting button, the unbalanced weight of the pinion causes it to twist on the threaded sleeve, preventing it from again meshing with the fly wheel gear. This demeshing movement is entirely automatic.

The coiled spring should be examined occasionally to see that it is clamped tightly and that no distortion has taken place. Should this occur, replace the spring, as this must be in good working order to prevent damage to the teeth on the fly wheel gear.

While the coiled spring absorbs much of the starting torque, the vibration of the car, coupled with the shock of starting, may cause the clamping bolts, holding the starting motor to the motor support, to loosen and possibly shift the starting motor slightly, throwing the pinion out of proper alignment with the fly wheel gear.

Whenever, when starting the engine, the pinion goes into mesh with a "bang," accompanied with considerable noise while cranking, take your car to a garage and have the bolts examined and the starting motor lined up properly. By turning the threaded sleeve with the fingers, the pinion can be moved into mesh with the fly wheel gear, and any disalignment observed and corrected.

In general the instructions given for the care of the generator will apply as well to the starting motor. The brushes and commutator are easily accessible for examination by removing the sheet metal cover on the commutator end of the machine (See Page 78).

LOCATING TROUBLES

When the electric system gives trouble, do not jump at conclusions. Only when you have made sure that the wiring is in perfect condition, all terminals tight and connected up according to the wiring diagram (Fig. 42), should trouble be looked for in the electrical instruments themselves.

SHORT CIRCUITS

A short circuit occurs when any two wires of opposite polarity come in contact at exposed places or with any metallic conductor. This will discharge the storage battery in a very short time, therefore, THE GREATEST CARE SHOULD BE TAKEN TO SEE THAT ALL CONNECTIONS REMAIN TIGHT AND THAT THE INSULATION OF ALL WIRES IS NOT BROKEN OR CUT.

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MEMORANDA

However, the battery will soon be discharged because no current is being sent back through the battery to keep it in working condition.

Minor repairs, such as removing the burrs and pits from the contact points, which have become burned through constant use, may be done by securing a very fine jeweler's file. This file, being perfectly flat, may, without any injurious effect, be placed between the contact points, and, with the movable points held lightly against the file, pull the file out. It may be necessary to repeat this operation several times in order to secure a perfectly flat and clean contact surface.

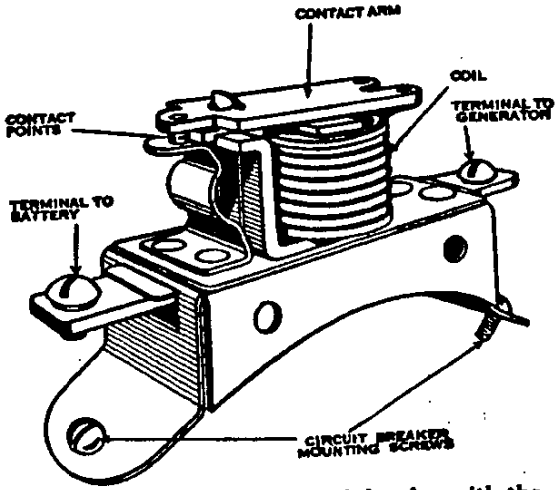


Fig. 39—Illustrates the circuit breaker with the metal cover removed.

Do not move the file back and forth between the points as this motion has a tendency to round off the edges, causing them to have a convex surface rather than a flat surface. If the points burn off entirely or if the contact spring breaks, reinstalling new parts is the only remedy. If the coil burns out on account of the excessive flow of current through it, the only remedy is to install a new circuit breaker or return the old one to the nearest Remy or United Motors Service Station for repairs.

CAUTION: It is a good plan to disconnect the battery wire before attempting to file the contact points on the circuit breaker to do away with danger of a short circuit.

BATTERY

The battery, popularly referred to as "storage battery," which gives rise to a false conception of the true nature of the battery, is in reality an electro-chemical apparatus or machine.

[illegible] stored [illegible]
is caused to flow into the battery and out of it by [illegible]
attached to it, but none of the electricity stays there [illegible]
merely take place within the battery itself [illegible]

Charging a battery by causing electric current [illegible]
it, sets up a certain electro-chemical action between its [illegible]
and negative plates in the presence of the battery fluid or electrolyte, composed of pure distilled water and chemically pure sulphuric acid in certain proportions. Charging entirely alters the characteristics of the plates and electrolyte.

When this change has been accomplished properly, known as "charging," it is only necessary to make a continuous uninterrupted circuit between the positive and negative terminals of the battery, in order to produce electricity. When this circuit is made through the wiring on the car we are able to operate the various electrical units from the power generated in the battery.

When a battery is thus used to produce electricity, the charging process is reversed and in doing so the battery generates electricity, and when used for a sufficient length of time it is gradually restored or changed to its original or uncharged condition. Electric current is generated in the battery in as full a sense as it is in a generator.

From the foregoing it will be seen that the efficiency of the battery is in direct proportion to its state of charge; also that to obtain the fullest efficiency, whatever amount of current is generated by the battery must be compensated for by running the generator long enough to restore the battery plates to the condition known as "charged." On account of certain losses this current sent back through the battery in charging must be of a slightly greater amount than the current which was generated and put out by the battery.

If a comparative few rules are followed out carefully in the care of the battery, the battery will continue to perform its part faithfully and have a long life. In other words, the length of time your battery will last depends entirely on the care which it receives and the character of the service you demand from it.

The purpose of a generator (Fig. 88) on a motor car is to constantly keep the battery charged and in working order so that it will produce electricity at all times when required for starting, lighting and ignition.

PROPER BATTERY CARE

Practically all cause for failure of the battery may be elminated by observing four things: cleanliness of the battery, keeping all connections tight and clean, and by adding pure distilled water at the proper intervals, and by keeping the battery fully charged.

When a new car is purchased, the owner should determine the make of the battery and go to the nearest battery service sta-

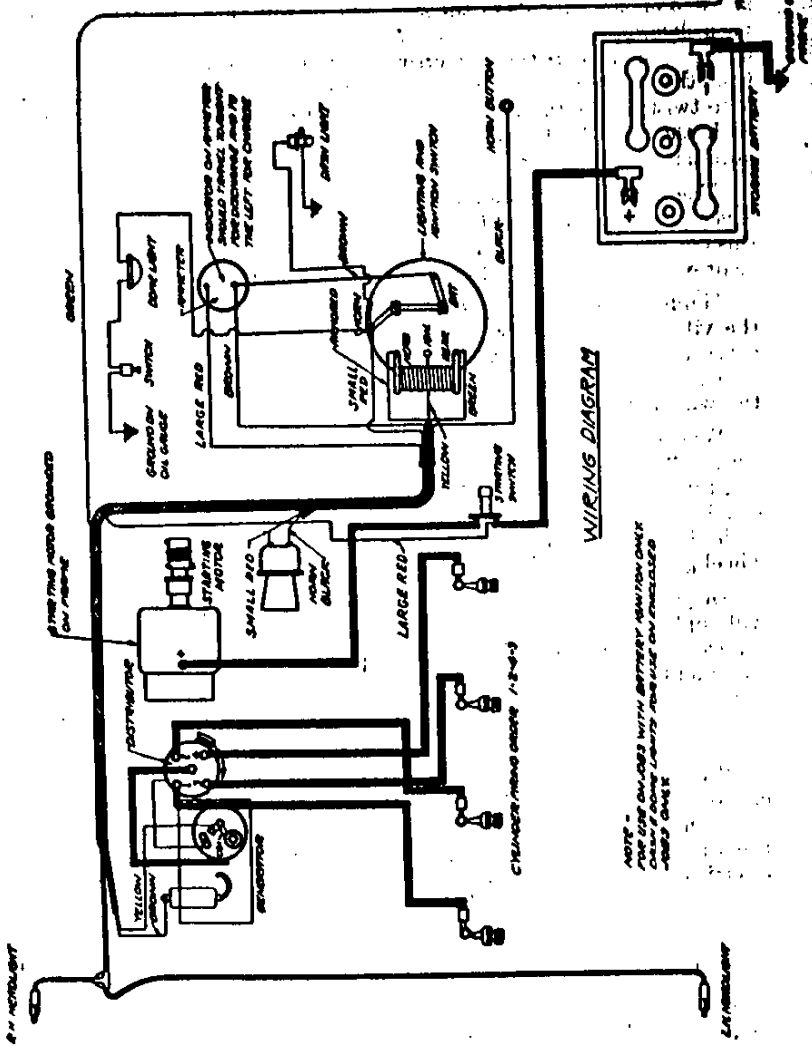


Fig. 42—Wiring diagram.

To prevent a short circuit and damaging the wiring, a fuse is inserted on the rear of the lighting switch. When this "blows" it can be easily replaced; however, before doing so be sure everything else in the wiring system is in good order.

If the ammeter hand shows a discharge when the lights are turned off and engine idle, disconnect the positive (+) wire from battery, and if the hand goes back to zero it shows that there is a leak or a short circuit, which should be remedied at once. If the hand does not go back to zero, the needle is bent. (See care of ammeter.)

After satisfying yourself that the wiring is in good working order test each of the electrical instruments.

Examine the generator brushes; see that they work freely and that the commutator is clean. (See Page 78.)

Examine the circuit breaker; see that the points make contact. If not, close them with your fingers. If the ammeter registers "charge" with the engine running at fair speed, remove the circuit breaker and send to the makers for repairs as instructed. (See Page 79.)

Examine the ammeter; With the lights turned on and engine idle the ammeter hand should register "discharge." If it stands at zero, remove the ammeter and return to the manufacturers as instructed.

You may operate your car while the ammeter is being repaired by connecting the two ends of the wires removed from the ammeter. Be sure to thoroughly cover the connection with electrician's tape.

Examine the battery; SEE THAT THE SOLUTION IN EACH CELL COVERS THE PLATES, AND ADD DISTILLED WATER IF IT DOES NOT. See that the top of the battery is CLEAN AND TERMINALS TIGHT. In case of leakage of the electrolyte in one or more cells take your battery to the nearest service station maintained by the battery manufacturers for examination and repairs.

It should be remembered that the efficiency of any storage battery decreases with a drop in temperature, and for that reason THE STARTING MOTOR AND LIGHTS SHOULD BE USED SPARINGLY IN COLD WEATHER and the engine run for several minutes at good speed after each start. (See Care of Generator Page 78.)

WINTER STORAGE OF CARS

When it is found necessary to store the car during the winter months, all water should be drained from the radiator and motor, after which the engine should be run under its own power until it becomes thoroughly heated. Do not run the motor too fast, but keep it going long enough to evaporate every particle of water that may be "pocketed" to prevent the water freezing and possibly bursting the water jackets.

body. The rotation of the distributor is called "clock wise," that is, it turns in the same direction as the hands of a clock, therefore in the same direction will come the No. 2 wire, then No. 4, and lastly No. 3.

Remember that for every revolution of the motor the distributor shaft is revolving at half the speed, therefore it is necessary to turn down the grease cup one-quarter turn every 500 miles to insure proper lubrication at this important point.

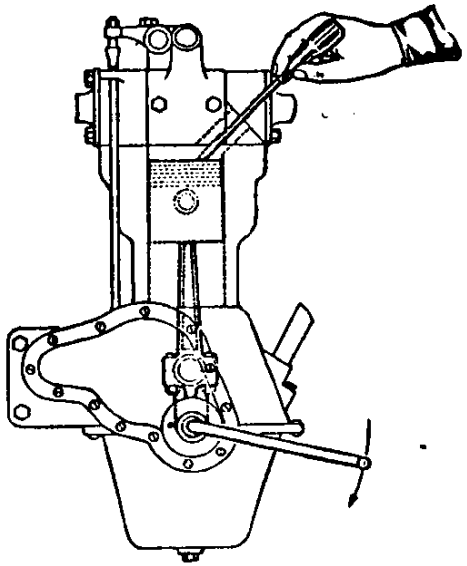


Fig. 37—Locating "Top Center" position of piston.

Keep the top of the distributor clean—examine the wires occasionally to see that they are in good condition and that no oil or grease is allowed to remain on them; in short, make it your business to see that the entire distributor assembly is kept in a clean and healthy condition and you will have no cause to fear exasperating break-downs or delays on the road.

ELECTRIC STARTING AND LIGHTING SYSTEM

The system used on Chevrolet Superior cars is the one wire common return two unit system.

An insulated copper wire forms one side of the electric circuit to each of the several units and the metal portions of the car form the common return side of the circuit.

The system is composed of three principal units:

The Generator for the purpose of producing sufficient electric current to keep the battery charged and to supply current for lights and ignition when the car is in operation.

The Battery which delivers current to the starting motor when the engine is to be set in motion and furnishes current for lighting and ignition when the speed of the generator drops below the point where it will produce sufficient current for lighting and ignition.

The starting motor which cranks the engine when it is to be set in motion.

In addition there are four auxiliary units for the regulation and control of the different units as follows:

A Circuit Breaker, (Fig. 39) whose function is to "break" the charging circuit when the engine is not running or when the speed drops below the point where the generator will produce a voltage in excess of that generated by the battery.

An Ammeter, which registers on a dial the charging or discharging rate of current flowing through the system. When the car is at rest, and no lights burning, the indicating needle or pointer should stand at "zero." When the lights are turned "on," the pointer will move toward the side marked "discharge" and indicate the amount of current drawn from the battery. With the engine running at a fair speed, and no lights burning, the pointer will move to the side marked "charge" and will indicate the amount of current flowing from the generator to the battery. Should the pointer indicate "discharge" when the car is at rest and no lights burning, the system is not working properly and you should consult a competent electrician as quickly as possible.

An Ignition and Lighting Switch, by which the ignition and lighting systems are controlled.

THE GENERATOR

The construction of the generator is of the utmost simplicity, and beyond a few drops of oil every 500 miles requires no attention. The machine is inclosed in a dust and moisture proof shell which effectually protects it from oil and dirt. The generator is driven by a gear meshing with the camshaft gear housed in the gear case at the forward end of the motor.

The current output is controlled by a third brush, which increases or decreases the field strength in proportion to the motor speed, thus doing away with mechanical governors and clutches, which are liable to get out of adjustment.

The generator begins to charge at a car speed of about ten miles per hour. At twenty-five miles per hour the generator is producing nearly its maximum output, or about fifteen to eighteen amperes.

tion maintained by that battery manufacturer, immediately and have the battery registered and inspected in order to take advantage of the manufacturer's warranty and service plan.

If you buy a battery to replace the one you now have, it will be registered when sold to you.

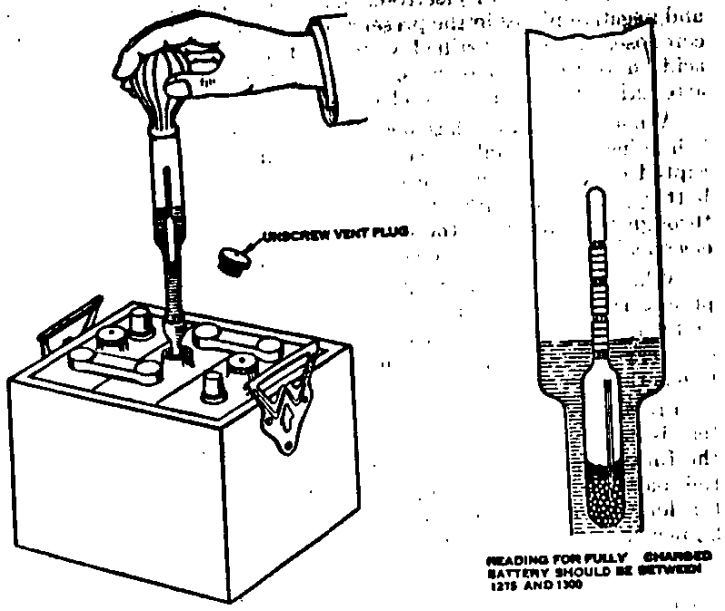


Fig. 40—Testing battery

Test all cells with a hydrometer on the first and fifteenth of every month. The specific gravity of a fully charged battery is between 1.275 and 1.300. If successive readings show lower values (for example 1.275 then 1.265 and on the third reading 1.250) this indicates that the battery is gradually becoming discharged. In other words, the battery is required to generate more current than the generator is sending back through the battery to keep it in proper charged condition. The generator in this case should be readjusted to deliver more current. (See Page 79 Generator Adjustments.) Serious injury will result to the battery if the battery is not kept charged. In taking the readings, care should be exercised to return the electrolyte from the hydrometer syringe to the same battery cell from which it was taken.

Keep all cells filled with distilled water to a level ½" above the top of the plates. In warm weather, it makes no difference when water is added. In freezing weather it should be added just

using the car. The [illegible] will remain on top of the solution until it is mixed with it by action of the battery. If mixed with the solution, it would freeze almost as quickly as outside of the battery. Water will be required more frequently in summer than in winter. It is a good plan to add water at least once a week in summer and every other week in winter. When long daylight runs are made, water must be added still more frequently.

Keep the battery and the battery compartment clean and dry. If electrolyte or acid is accidentally spilled or splashed over the top of the battery, wash all outside surfaces and the battery compartment with a solution of water and ammonia or Gold Dust and water, or common baking soda and water. Wipe dry—do not allow any of above solution to get into the battery cells.

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

In order to prevent freezing in cold weather, test your battery frequently and see that the gravity is kept up to at least 1.250. A discharged battery will freeze at a little below the freezing point.

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

TREATMENT OF BATTERIES IN STORAGE

If the car is to be placed in storage for any length of time without the battery being removed, it should be thoroughly charged. The hydrometer should show that the gravity of the electrolyte in each cell is between 1.275 and 1.300.

Tests should be made at intervals of two weeks, and if necessary the engine should be run until the hydrometer shows the reading given above. This is especially essential in freezing weather, as a battery in a discharged condition will freeze and considerable damage might result.

The proper method of handling a battery, if the car is to be place in storage either in winter or summer, is to remove the battery from the car and take it to a Service Station where for a nominal sum it can be either placed in dry storage or kept on a tickler charge which will insure it against any damage resulting from standing in a discharged condition and the owner will derive the best results when the car is again placed in operation.

FUEL SYSTEM (G. G.)

The principle on which the "G. G." Fuel System operates is as follows: The rotation of the motor creates, by means of a small pipe connected to the intake manifold, a partial vacuum within the inner chamber, which is communicated through the vacuum feed to the gasoline tank in the rear of car. This causes the fuel to be forced by suction into the inner chamber of the vacuum system.

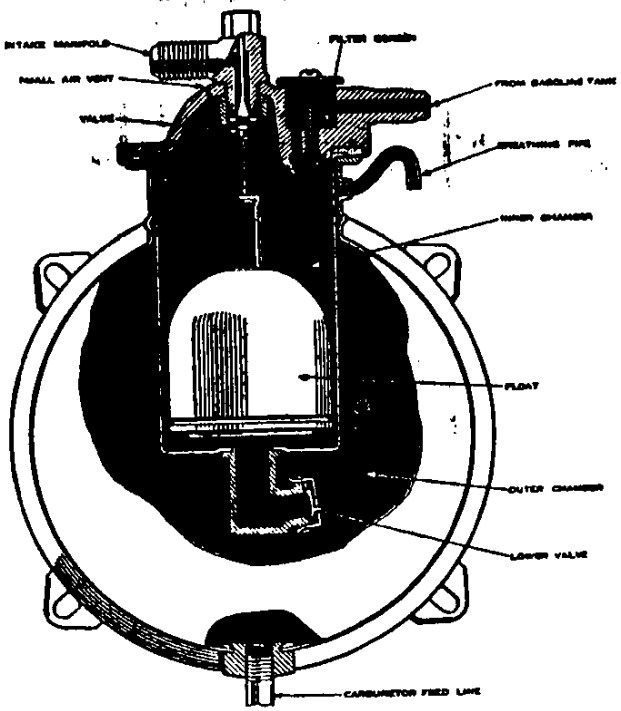


Fig. 34—Fuel System.(G. G.)

When the gas reaches the level, the valve is automatically closed by action of the float, thus the "Suction" of the motor, having been temporarily eliminated, normal or atmospheric pressure is established within the inner chamber, by means of air entering through the small permanent vent, which is located between the screen, and the outlet to the manifold.

The weight of the gasoline now opens the lower valve, whereby the gasoline flows rapidly from the inner into the outer chamber of storage reservoir, which is independent of any suction of the motor, and functions simply as a storage tank supplying gasoline by gravity to the carburetor.

IGNITION

The engine derives its power from the explosion and expansion of compressed gas in the engine cylinders, the expansion driving down the pistons, which produces power.

These charges of gas are ignited by an electric spark made in the cylinder.

When the primary current, which ranges from six to eight volts and is distributed at regular intervals by the breaker arm contacts in the distributor to the coil, through the primary wire, where it is transformed to a high tension or secondary current which flows to the distributor through the high tension wire and from the distributor to the spark plugs.

The ignition equipment used on Chevrolet Cars is designed to give an even hot spark at all times regardless of engine speed. It is therefore possible to run your car at slow speeds with an even flow of power, also to accelerate the power without stalling.

Care should be taken to see that all terminals are tight and that the instrument is kept clean. **You cannot be too careful on this point. Keep all wire terminals tight.**

CONTACT POINTS

The contact points will require little attention or refiling, even though they may be very rough and irregular. When they become so badly burned as to cause missing they should be "trued" so that their contact surfaces are exactly parallel. The best way to do this is to secure a thin Swiss or jeweler's file, insert the blade between the contact points, then press them together firmly with the fingers (Fig. 36), at the same time withdrawing the file. Repeat this operation two or three times, then adjust the contact points so that when the cam holds them fully open the space between is approximately .030 of an inch or about $\frac{1}{32}$ inch.

CAUTION—The contact points are made from thin discs of tungsten, so care must be taken to remove only enough metal (when truing points) to get parallel surfaces. When the tungsten has been removed by reason of frequent refiling, a new adjustable point and contact arm can be secured from your Chevrolet dealer or service station.

RETIMING DISTRIBUTOR

Should it become necessary to remove the distributor assembly, loosen the clamp bolt through the split collar on the generator housing and lift the entire assembly. In replacing care should be

CARE OF THE GENERATOR

The generator should be examined occasionally to see that all connections are tight and that there is no undue wear on the moving parts. The commutator end of the generator can be reached by removing the steel band around the *commutator head.* (Fig. 38).

If the commutator should be found blackened or rough it may be smoothed down with No. 00 sandpaper, while the generator is running. NEVER USE EMERY CLOTH FOR THIS PURPOSE. After smoothing down the commutator examine it carefully and remove all particles of metal which may bridge across from one copper segment to another. Blow out every particle of carbon dust which may have accumulated in the generator case.

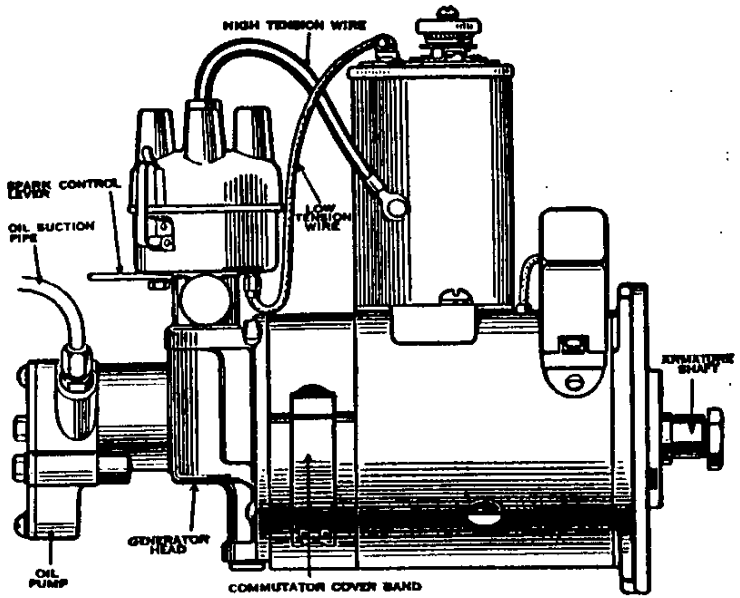


Fig. 38—Generator and Ignition Set

See that there is just enough spring tension on the carbon brushes to insure good contact on the commutator. Too much tension will cause heating and unnecessary wear to brushes and commutator segments.

See that the brushes are making even contact with the commutator. When they become worn to such an extent as to need replacement order new ones from your dealer or direct from the branch nearest to you. See Pages 3 and 5. **Do not use cheap carbon brushes or substitutes.**

The brush holders must be entirely insulated from the generator case. Should any of the insulating plates or bushings become worn or broken they must be replaced with new ones.

GENERATOR ADJUSTMENTS

When cold weather arrives, we suggest you call at your Chevrolet dealer's service station or any branch of United Motor Service, Inc., and have the third brush on your generator advanced so as to increase the charge going through the battery and thus offset the extra burden the battery must assume in cold weather driving. Again on the approach of warm weather the third brush should be set back to its original position.

When the third brush is rotated in the direction in which the generator armature turns, the current output of the generator will be increased and when the third brush is rotated in the opposite direction, the current output will be reduced.

Never allow the third brush to be advanced so far that the maximum output of the generator is in excess of 18 amperes when the generator is warm. A burned out armature is likely to result.

Should the wire that runs to the circuit breaker be disconnected for any reason, **Do not operate the motor until it is again connected.** (See care of circuit breaker on Page 79.

In case of any trouble with the generator winding or serious damage to an important part, the machine should be returned to the manufacturer for adjustment and repairs.

Once every 500 miles lubricate the bearings with a few drops of good machine oil through the oilers provided. Do not use too much oil, as only enough to soften the grease in the bearings is necessary. **Do not, under any circumstances, get oil or grease on the commutator or brushes.**

CIRCUIT BREAKER.

The circuit breaker is entirely automatic and requires no lubrication. If for any reason the instrument should fail to operate properly, it should be returned to the manufacturer for adjustment. If the circuit breaker is removed, the car must not be operated until the lead wire from the generator to the circuit breaker is "grounded" to the frame of generator by attaching it to the circuit breaker mounting screw (See Fig. 39), so as to protect the windings in the generator from possible damage. The end of the battery wire must be taped or thoroughly insulated so that no part of the bare end of the wire can come in contact with any metal parts of the car.

If these precautions are taken you can operate your car for a limited time without the circuit breaker while it is being repaired.

This screw is clearly shown in the cut and is located on the engine side of the carburetor. If this throttle adjusting screw turns too tightly, first loosen the lock screw, making sure to tighten the lock screw after the proper adjustment is secured. Turning the adjusting screw counter-clockwise reduces the idling speed of the engine and turning the screw clockwise will increase the idling speed of the engine.

Main or Running Adjustment

All the fuel passing to the main nozzle and also to the idling nozzle is metered by the limiting jet, which is a fixed adjustment. If dirt collects over this jet the float must be removed in order to take this jet out for cleaning.

CARBURETOR (CARTER)

The Carter Carburetor has been carefully tested and adjusted to the motor before leaving the factory. No adjustments should be made by the owner as it has been found by experience that those made at the factory are proper for all changes in gravity and atmospheric conditions when the motor has been heated to the proper temperature. If in trouble consult the Chevrolet dealer or service station.

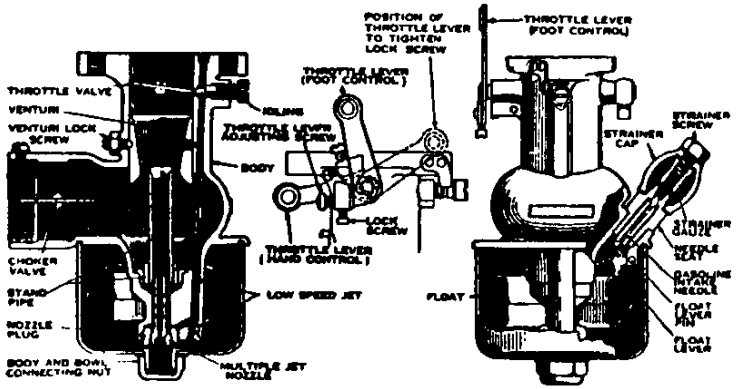


Fig. 32—Sectional view of carburetor.

Too often adjustments to the carburetor are made when in reality something else is causing uneven running or the motor has not thoroughly warmed up. It is well to remember that any changes in the carburetor's action will come gradually and not suddenly. Therefore, if your car was operating properly when run last, you may depend upon it that some other part of the motor is at fault and the trouble should be located and corrected before attempting alterations to the carburetor.

The gasoline from the tank passes through the strainer cap filter screen and needle valve into the carburetor bowl, raising the float as the volume increases. When the float raises to a certain point the needle valve closes the gasoline inlet, shutting off the gasoline flow.

Once every 2,000 miles, or more often if the gasoline does not enter the bowl properly, the filter screen in the strainer cap should be removed and thoroughly cleaned. This screen may be easily removed by unscrewing the strainer cap screw. Replace the screen carefully so it will not be damaged, as it must be in perfect condition or small particles of dirt may enter the carburetor bowl and obstruct the jets.

If the carburetor float chamber overflows, the trouble will usually be traced to the needle valve seat, and is sometimes caused by either dirt collecting on the seat or some imperfection which permits the gasoline to flow past the point of the valve. If this occurs, the needle valve seat (Fig. 32) can be removed and if it is found that there is an imperfection in the seat, it can usually be corrected by rotating the needle valve, at the same time tapping the top of the valve with a light hammer. This causes the valve to form a new seat or push aside any obstructions which may be under it.

IDLING ADJUSTMENTS

The idling adjustment is controlled by the idling adjustment screw (Fig. 32). Turning the screw counter clockwise gives more fuel, turning the screw clockwise gives less fuel when the motor is running idle or at low speed.

THROTTLE ADJUSTING SCREW

The throttle adjusting screw prevents the complete closing of the throttle valve. When idling, if the throttle valve is allowed to shut off too far, the motor speed will be too slow and similarly, if the valve is opened too far, the speed will be much too fast. The size of the opening of the valve is controlled by the adjusting screw. This screw is clearly shown in the cut and is located so that it can be conveniently reached with a screw driver. If the throttle adjusting screw turns too tightly, first loosen the lock screw (See Fig. 32). To readily reach the lock screw press throttle lever to position indicated in Fig. 32 by the dotted lines. Be sure to tighten the lock screw after the proper adjustment is secured. Turning the adjusting screw clockwise, the idling speed of the motor will be increased and by turning the screw counter-clockwise, the idling speed will be decreased.

GASOLINE TANK

Gasoline should be carefully strained before being placed in the tank to remove the sediment which will eventually clog the filter screen in the carburetor.

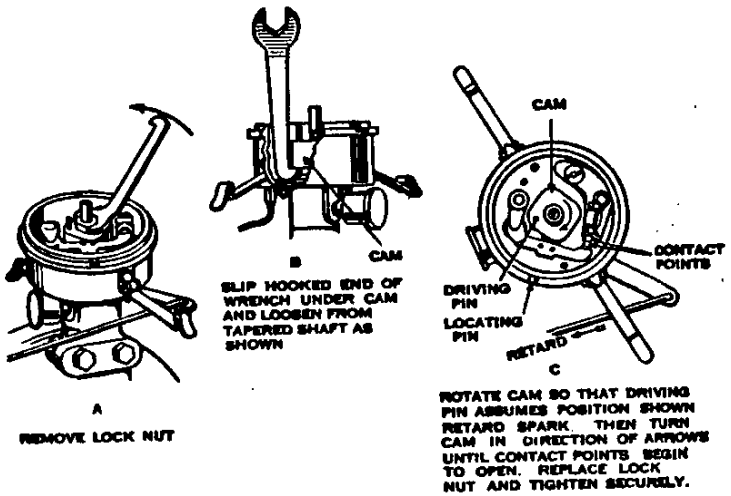


Fig. 35—Disassembling Distributor to clean points.

taken to see that the shoulder on the machined end of the distributor housing comes in contact with the generator housing, otherwise the gears will not be in proper engagement.

The clamp bolt can then be tightened securely and the advance rod connected. Remove the distributor cover and distributor arm, as in Fig. 40, then remove the lock nut holding the igniter cam to the shaft and pry upward to loosen it from the shaft (the distributor shaft is tapered and the cam is held to this taper by friction so that it should not require a great effort to loosen it).

Insert the starting crank and turn until the intake valve on No. 1 cylinder begins to open—remove the spark plug on that cylinder and insert a screw driver or rod (Fig. 37)—continue to turn the motor until the piston has traveled downward and again returned to its uppermost position. By holding the screw driver or rod firmly the position of the piston at which no further upward movement takes place can be readily determined. The piston is then on "top dead center" of the compression stroke and the gases have been compressed ready for firing.

Next turn the cam on the distributor shaft so that the driving pin asumes the position shown in Sketch C, Fig. 36. Retard spark, then turn the cam in the direction of the arrow until the two contact points begin to open—by the term "begin to open" we mean that point at which the two contact surfaces no longer touch each other.

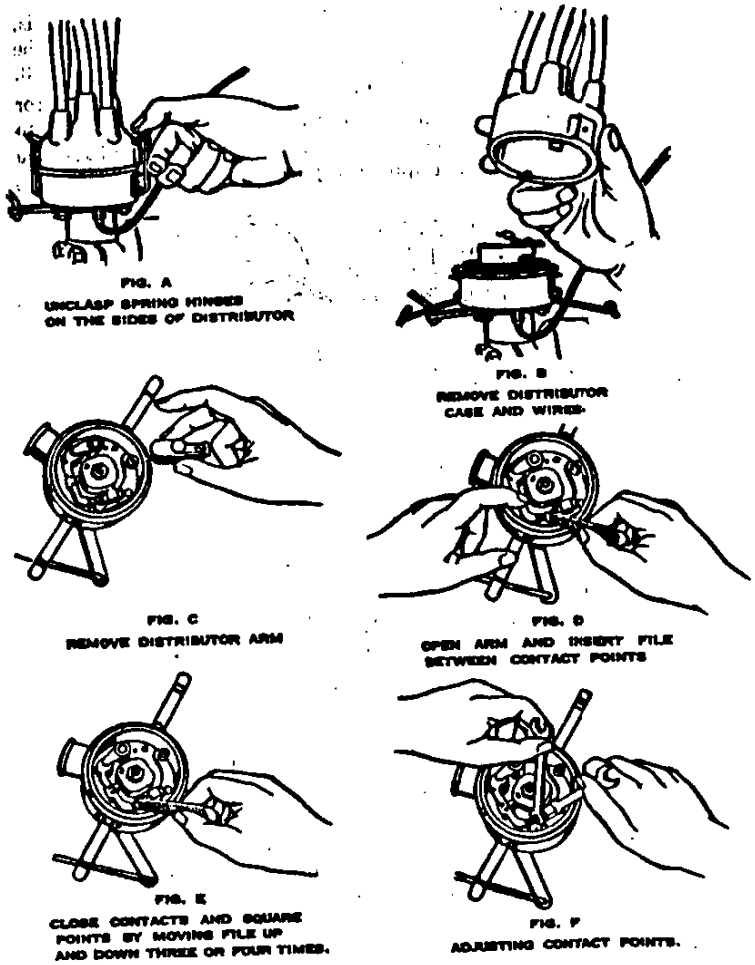


Fig. 36—Disassembling Distributor to clean points.

The lock nut can then be slipped on the shaft and securely tightened against the cam; however, in doing this use care not to disturb the position of the cam. The distributor arm and cap can now be put in place and the car operated.

The sequence of firing is 1-2-4-3, the No. 1 wire being the one immediately above the small slot on the edge of the distributor case. This slot fits over the locating pin on the rim of the distributor

none of the steering connections have changed adjustment, otherwise there is the possibility that the front tires may become unduly worn, necessitating early renewal.

By referring to Fig. 28, the distance indicated by line B; i. e., between the inner sides of the wheel felloe at the rear of the front wheels should be $\frac{1}{8}$ inches greater than the distance indicated by line A.

The best method of checking these measurements is by use of a front wheel tramming device such as is shown in Fig. 28. Almost any good repair shop or tire station is equipped with one of these devices and will be glad to check the alignment of the wheels for you.

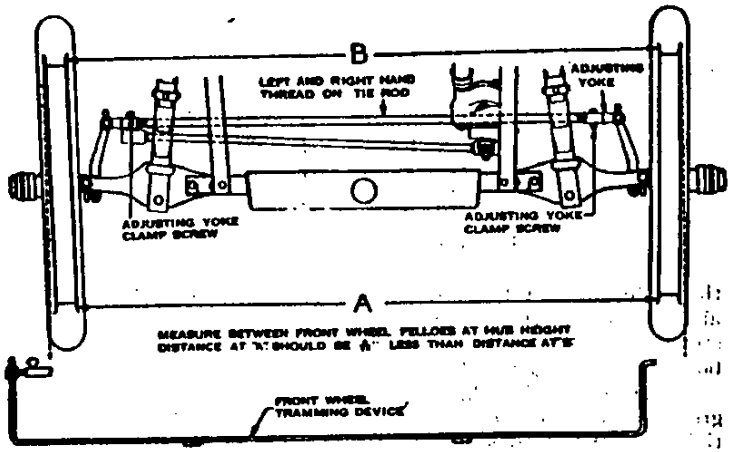


Fig. 28—Front wheel alignment.

If it is found that the front wheels do not have the proper "toe in," that is $\frac{1}{16}$ inches, loosen the adjusting yoke clamp screw at both ends of tie rod as shown in Fig. 28 and with a small pipe wrench or pair of pliers, turn the tie rod to the right to shorten the tie rod and reduce the distance shown in Fig. 28 as "B." To increase the distance indicated in Fig. 28 by line "B," turn the tie rod to the left.

Turning the tie rod to the right will increase the distance shown as line "A" in Fig. 28 and turning the tie rod to the left will decrease the distance indicated by line "A" in Fig. 28.

After proper adjustment has been secured, be absolutely certain to fasten both adjusting yoke clamp screws firmly as failure to do so may result in a serious accident to the car or occupants.

The lubrication of the tie rod bolts is very important, therefore be sure to follow the instructions on the Oiling Chart, Page 48 carefully.

SPRINGS

It is of the utmost importance that regular attention be given to the springs on your car if you are to realize their fullest riding qualities. Even the best designed spring will become squeaky as soon as moisture enters between the leaves and causes rust. The fullest action and resiliency of the springs obtain only when the different leaves are free to slide on each other. A spring which is "rusted up" cannot do this, causing unequal strains to be placed on each leaf, especially the larger or main one. It follows, therefore, that to lubricate the springs as soon as they begin to squeak is the surest way to secure easy riding and prevent spring breakage.

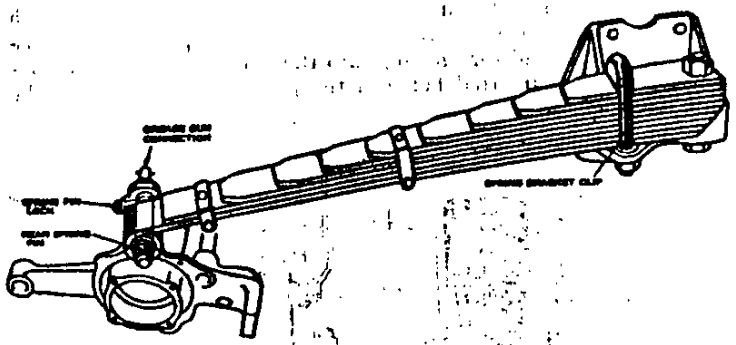


Fig. 29—Spring and Spring Clips.

The best way to lubricate the springs is to place a jack under the frame or body and raise the car (not the wheels) until the spring leaves separate far enough so that graphite grease can be spread between them.

Once a week examine the clamping bolts and spring clips holding both front and rear springs to the axles and SEE THAT THEY ARE ABSOLUTELY TIGHT. No matter how "tight" they were drawn up at last examination, the action of the spring may cause them to "stretch" or loosen up. Nearly all spring breakage can be traced to loose spring clips and bolts, so observe this rule carefully.

CARBURETOR

The Zenith, Holly and Carter Carburetors are used on Chevrolet Superior cars.

They have been carefully tested and adjusted to the motor before leaving the factory. No adjustments should be made by the owner as it has been found by experience that those made at the factory are proper for all changes in gravity and atmospheric conditions when the motor has been heated to a proper temperature. If the carburetor on your car appears to be giving trouble con-

Vibration will in time cause a loosening of the gasoline pipe connections, causing leaks. Remedy these as soon as they appear, as they are dangerous and also wasteful of fuel.

In order that the gasoline will flow properly to the carburetor, there is a small hole in the top of the filler cap on the tank so that air can enter as the quantity of gasoline in the tank is decreased. It is essential that this hole be kept open.

VACUUM TANK (STEWART)

As the gasoline tank is mounted on the rear of the car, some distance from the carburetor, it is necessary to provide a means of drawing the fuel from the tank into the carburetor.

This is accomplished by the use of a vacuum tank mounted under the hood, the construction of which is illustrated in Fig. 33.

Every motor draws its supply of gasoline through the carburetor by reason of the pumping action of the pistons, which on their downward or suction stroke create a partial vacuum in the intake pipe. It is this same pumping action which draws gasoline from the main supply tank into the vacuum tank.

The vacuum tank is composed of two chambers. The upper or smaller one is the filling chamber, and the lower one the emptying chamber. To the upper chamber is connected a copper pipe C, which is attached to the intake pipe at the center of the two branches.

Gasoline enters this chamber from the main supply tank through the connection D, at the base of which a small wire strainer E is placed to catch any dirt or lint which may have gotten into the main tank. At the base of this chamber is placed a flapper valve F, which when closed, prevents the gasoline from running into the lower chamber.

The suction of the pistons on the intake stroke exhausts the air in the upper chamber, creating a vacuum, and this vacuum closes the valve F. As the main supply tank is open to atmospheric pressure (through the vent hole in the filler cap), the vacuum created in the upper chamber will cause the gasoline to flow from the main tank through the supply line and into the chamber through the connection D. Mounted inside of this chamber is a metal float G, and as the gasoline rises in the chamber the lever H moves upward until when the proper quantity has been obtained the direction of pull on the springs K is reversed, which causes the lever M to move upward. This action closes the valve A, thus shutting off the suction from the motor, and opens the valve B, which allows air to flow into the chamber through the vent pipe P.

The admission of outside air destroys the vacuum in the chamber, which automatically releases the suction on the valve F and at the same time stops the flow of gasoline through the pipe D. The

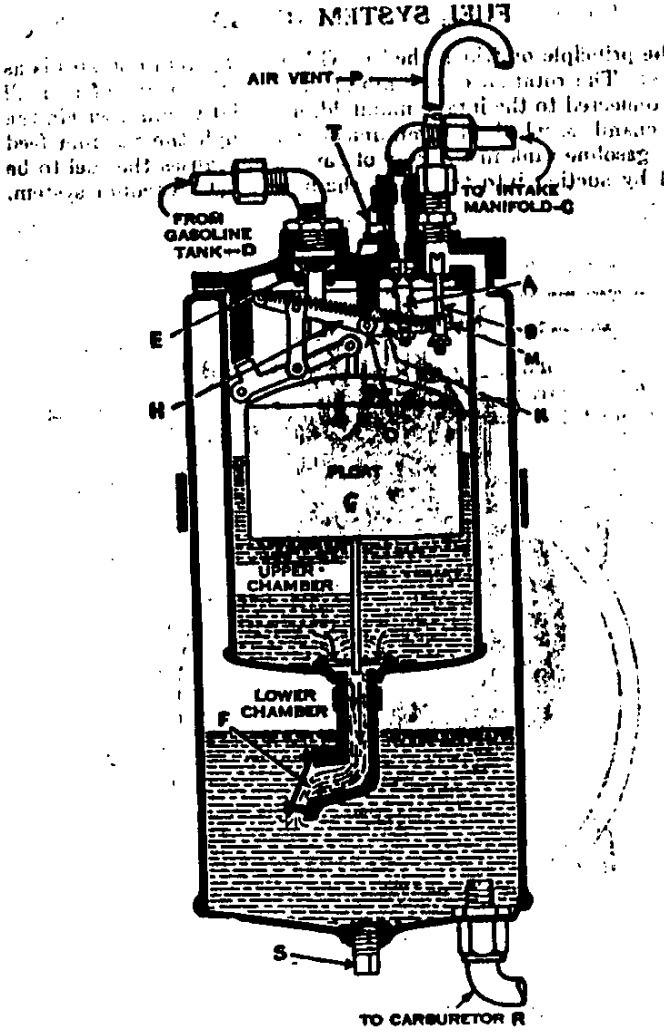


Fig. 33—Vacuum tank. (Stewart).

weight of the gasoline in the upper chamber then causes the valve F to open, allowing the gasoline to flow into the lower chamber, from whence it flows by gravity to the carburetor through the connection R.

the lock nuts on each side of the "Service Brake Rod Adjustment" and turn the turn-buckle to the right or clockwise.

This adjustment controls the braking action of the service brake on both rear wheels and in the event that one brake should grab or take hold too quickly, they can be equalized by loosening the bolt on the Service Brake Shaft lever mounted on the brake cross shaft at rear of the propeller shaft and change the relative positions of the right and left adjusting levers (See Fig. 25, by moving the adjusting levers forward or back as the case may require.

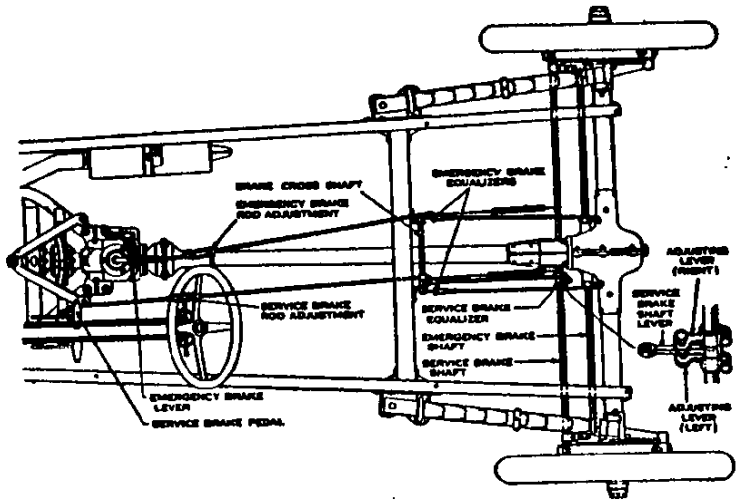


Fig. 25—Adjusting Brakes.

When the hand brake lever is pulled back as far as it will go without stopping the forward movement of the car, shorten the rod between the hand brake lever and the brake shaft by loosening the lock nuts on each side of the "Emergency Brake Rod Adjustment" and turn the turn buckle to the right or clockwise. This adjustment controls the braking action of the emergency brake on both rear wheels and in the event that one brake should grab or take hold too quickly, they can be equalized by loosening the lock nuts just back of each emergency brake equalizer (See Fig. 25) and turn the brake rod yoke to the right to tighten on the emergency brake and to the left to loosen on the emergency brake.

Examine the brakes frequently and if after considerable use you find that practically all of the available space for adjusting has been used, new brake linings should be installed. Do not neglect your brakes.

STEERING GEAR

The steering mechanism used on Chevrolet cars has been designed to give the greatest ease of handling with the least amount of wear and consequent adjustment. No part of the car is so vital, there-

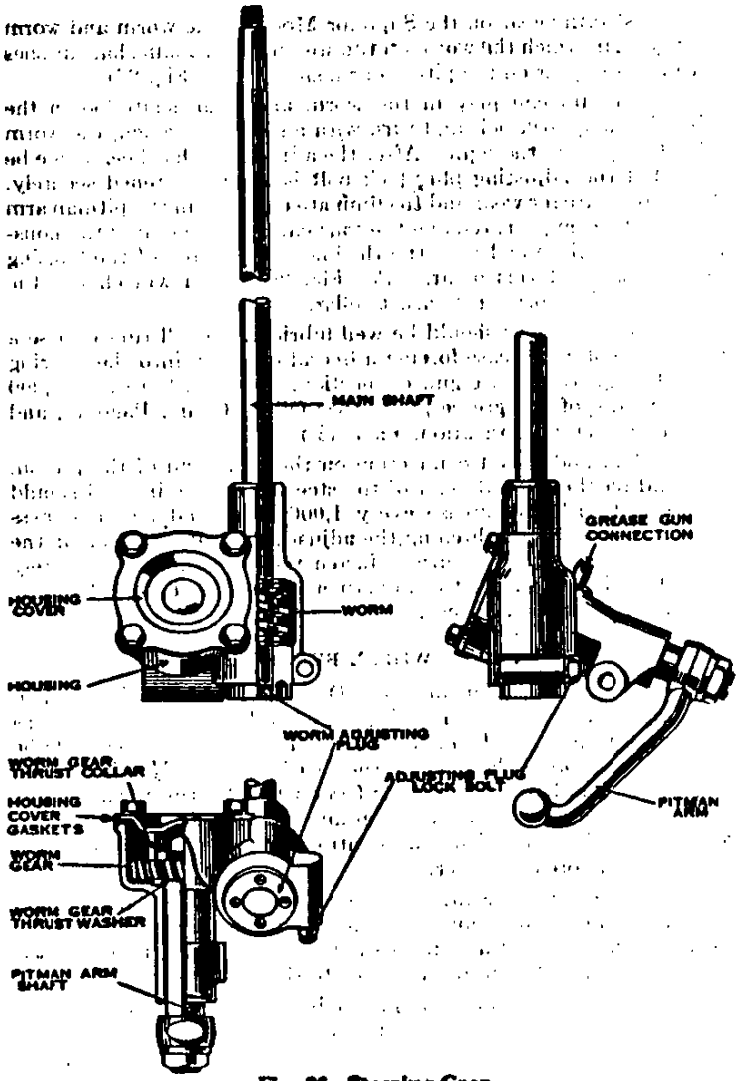


Fig. 26—Steering Gear.

sult the Chevrolet dealer. Too often adjustments of the carburetor are made when in reality something else is causing uneven running or the motor has not thoroughly warmed up. It is well to remember that any changes in carburetor's action will come gradually and not suddenly. Therefore if your car was operating properly when run last, you may depend upon it that some other part of the motor is at fault and the trouble should be located and corrected before attempting alterations to the carburetor.

CARBURETOR (ZENITH)

All gasoline, before being placed in the tank, should be strained to remove water and dirt; however, in spite of care a certain amount of dirt or lint will get into the system and interfere with the best working of the carburetor. To remove as much as possible the liability of dirt getting into the instrument itself, a wire-gauze strainer is inserted between the gasoline inlet pipe and the float chamber.

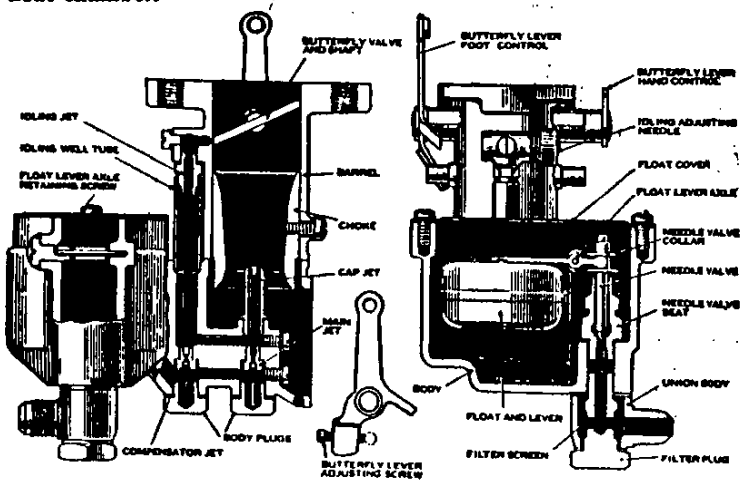


Fig. 30—Carburetor. (Zenith)

Once every 2000 miles the filter plug should be removed. This allows the gasoline inlet connection to slide off the boss on the end of the carburetor. Surrounding this boss is the filter screen or strainer. Remove and clean thoroughly. In replacing, care should be taken not to damage it, as this must be in perfect condition or trouble will result.

If carburetor float chamber overflows, the trouble will usually be traced to the needle valve seat, and is sometimes caused by either dirt collecting on the seat or some imperfection which permits the gasoline to flow past the point of the valve. Trouble of this sort

can usually be eliminated by removing the needle valve cap, rotating the needle valve, at the same time tapping the top of the valve with a light hammer. This causes the valve to form a new seat or push aside any obstructions which may be under it.

IDLING ADJUSTMENT

The idling adjustment is controlled by the regulating screw with a knurled head—turning clockwise gives less fuel, turning counter-clockwise gives more fuel for idle.

CARBURETOR (HOLLY)

The adjustments on the Holly carburetor are so locked that they cannot change of themselves; faulty operation is usually caused by dirt or water interfering with the proper flow of fuel through the carburetor. To the extreme left of the float chamber bowl is the fuel entrance and the strainer body which is connected to the vacuum tank. Before the gasoline enters the float chamber, it must pass

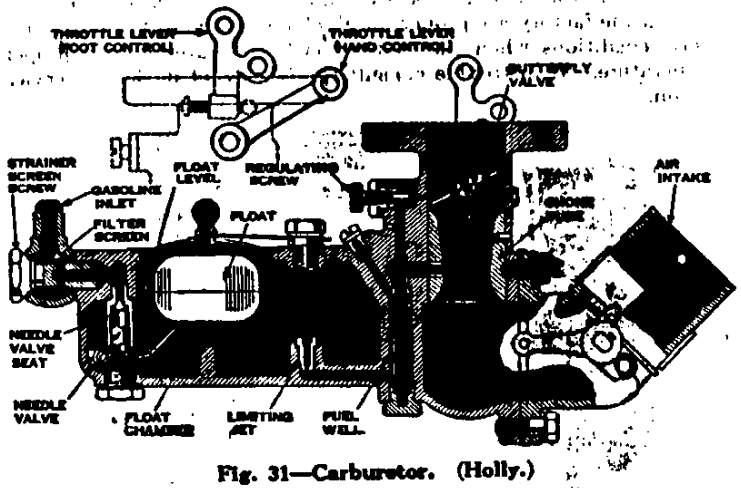


Fig. 31—Carburetor. (Holly.)

through a filter screen. This screen may be easily removed by unscrewing the strainer screen screw. (See Fig. 31).

To properly clean the screen, it should be washed in a bowl of gasoline. This should be done at least every 2,000 miles.

Throttle Adjusting Screw

The throttle adjusting screw prevents the complete closing of the throttle valve. When idling, if the throttle valve is allowed to shut off too far, the motor speed will be too slow and similarly, if the valve is opened too far, the speed will be much too fast. The size of the opening of the valve is controlled by the adjusting screw.

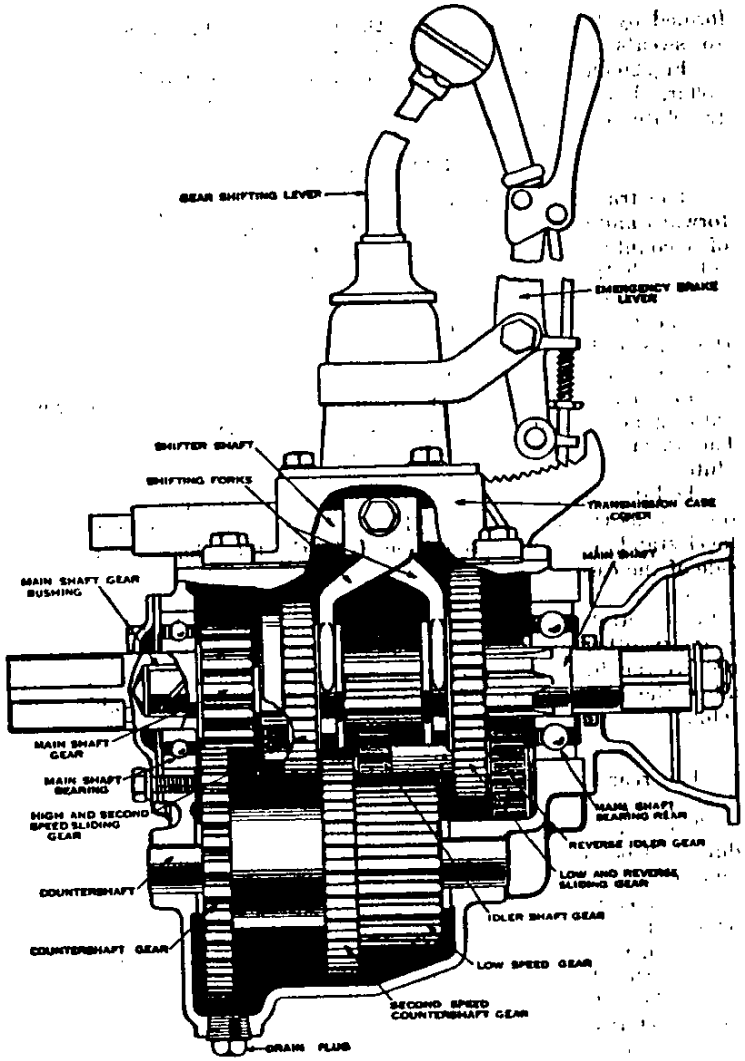


Fig. 22—Sectional View of Transmission.

The function of a Differential is to permit one rear wheel of the car to travel faster than the other, or independent of the other when required. If such a device were not used, turning corners

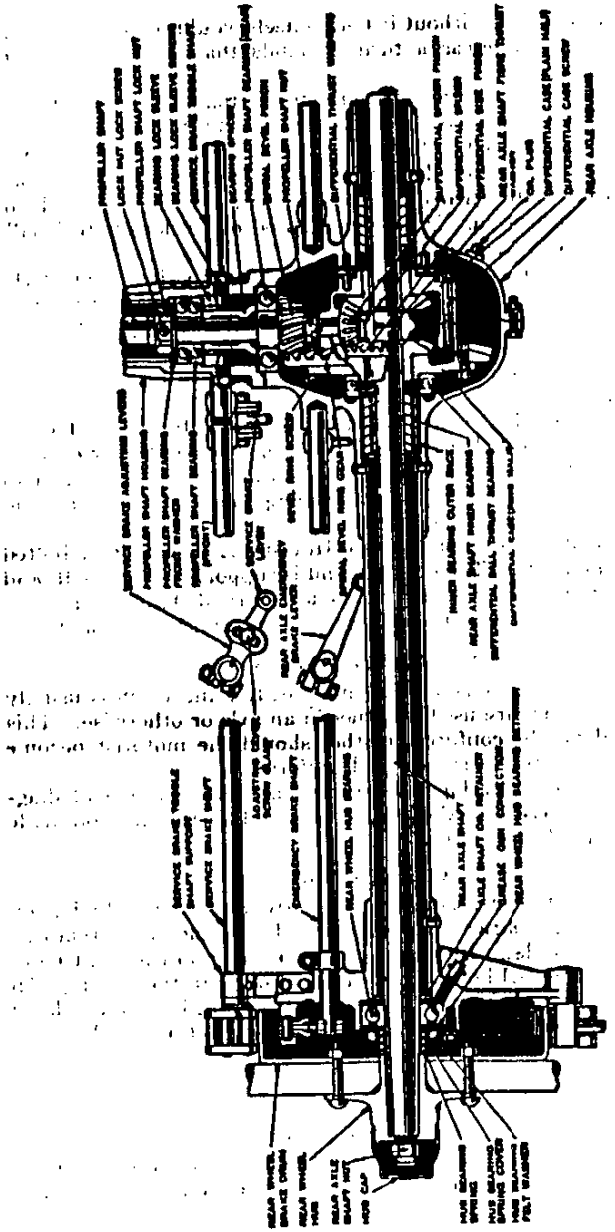


Fig. 23—Sectional View of Rear Axle.

fore it is absolutely essential that it be well lubricated and any looseness immediately corrected. Go over all the connections regularly and tighten any bolts or nuts which are loose, supplying grease and oil where needed, as this is the only safe insurance against a costly accident.

The steering gear on the Superior Model is the worm and worm gear type, in which the worm on the steering gear main shaft meshes with a worm gear on the pitman arm shaft. (See Fig. 26).

To take up end play in the worm and main shaft loosen the adjusting plug lock bolt and turn with a spanner wrench, the worm adjusting plug to the right. After the adjustment has been made be sure that the adjusting plug lock bolt is again tightened securely. To compensate for wear and to eliminate end play in the pitman arm shaft and worm gear, remove the four cap screws holding the housing cover in place and vary the thickness or number of the housing cover gaskets at this point. (See Fig. 26) which will change the position of the worm gear thrust collar.

The steering gear should be well lubricated at all times. Use a high grade of cup grease forcing a liberal quantity into the steering gear through the grease gun connection, (See Fig. 26) every 2,000 miles by use of the grease gun. (See Oiling Chart, Page 48, and refer to General Lubrication, Page 43.)

The ball and socket connection on the outer end of the pitman arm and on the opposite end of the steering connecting rod should be greased with cup grease every 1,000 miles and any looseness or play removed by tightening the adjusting nut in the end of the rod. (See Fig. 28.) Be sure to fasten the adjusting nuts securely with the cotter pin after the adjustment is made. Failure to do so may cause a serious accident.

FRONT WHEEL BEARINGS

The front wheels run on New Departure ball bearings which are lubricated (See Fig. 18, Lubrication Chart) by filling the hub caps with soft cup grease. In mounting the front wheels, care should be exercised to thoroughly saturate the bearing assembly with grease (Fig. 27). The best lubricant for front wheel bearings is a straight mineral grease which does not contain any free acidor acid forming compounds and which is also entirely free of graphite, asbestos fibre or other foreign matter.

There are two bearings to each front wheel (Fig. 27) and these are held in adjustment by the spindle nut which is fastened with a cotter pin and also by a safety washer which is interposed between the spindle nut and the cone to the outer bearing.

The bearings should be adjusted by drawing the spindle nut up tightly, revolve the wheel a few times to insure that all parts are operating satisfactorily, at the same time tapping the safety washer lightly to insure a proper contact with the outer bearing.

The wheel will now revolve somewhat stiffly. Turn the wheel until the valve stem is at the top, unscrew the spindle nut until the weight of the valve stem causes the wheel to rotate, then insert and spread

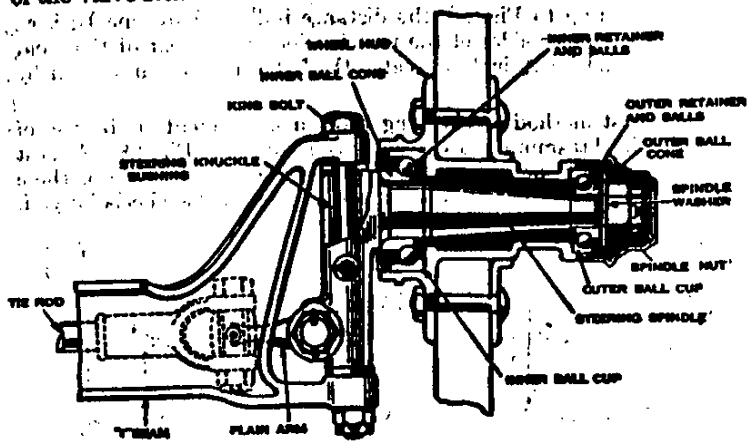


Fig. 27—Front wheel bearings.

the cotter key. When adjusting wheel bearings, it is sometimes advisable to insert a chisel or a small bar between the axle and the steering knuckle to insure that any play in the steering spindle bolt is not confused with play in the bearings.

Be sure that the wheel turns perfectly free on the bearings as a great many bearings are damaged because of being adjusted so tight that they heat and cause the bearings to deteriorate.

The lubrication of the steering spindle bolts should not be overlooked. (Refer to Oiling Chart on Page 48.) The steering spindle bolts should be lubricated every 250 miles. Use a high grade cup grease entirely free from acids or other adulterations and of a soft nature having a sufficiently high melting point to prevent flowing in hot weather. Do not use a grease having graphite or other substances of this nature in it.

FRONT WHEEL ALIGNMENT

To make steering easy it is required that the front wheels should "toe" in; that is, the distance between the inside faces of the wheel felloes, measured at the height of the wheel hubs, should be $\frac{1}{16}$ in. more at the rear than at the front. This causes the wheels to grip the road better, and allows the car to hold its course without undue action on the steering mechanism.

As the car passes over uneven road surfaces the front wheels are subjected to considerable strain; therefore, about once every 2,500 miles their alignment should be checked to make sure that

to give a constant, even supply of oil with a minimum of parts and a consequent lessening of pump troubles. Under normal conditions you will not experience the slightest trouble, and will need to give no thought to this important part; however, as a safeguard, and to avoid accidents, an Oil Pressure Gauge is mounted upon the instrument board (Fig. 3) so that the motorist may observe the action of the pump.

Should this gauge for any reason show that the pump has stopped working the car should be stopped at once and the source of the trouble located and remedied. Usually this will be found to be due to air leaks in the suction pipe (Fig. 19), and can, in most cases, be corrected by tightening the connections at the upper and lower ends. Occasionally dirt and unburned carbon will form as a sediment and be drawn into the suction and feed pipes, obstructing them, in which case they should be taken off and cleaned.

Get into the habit of noting the action of the oil pressure guage regularly—not in the expectation of trouble, but to avoid its possibility and resulting large repair bill. Frequently, as you drive along, look at the gauge—it only takes a second, and requires no special effort. Failure to make proper observations may cost you in time and money several times this amount.

OIL GAUGE

The needle or hand of the oil gauge is actuated by the pressure of oil against a column of air in the tube from the oil pump to the gauge. This instrument is self-contained and will require no attention in itself. Should the dial indicate that the pump has stopped working, disconnect the SUPPLY PIPE (Fig. 19) at the pump. If the pump is working, oil will be discharged, and the trouble is in the air line or guage. Examine the air line, especially the connections, and see that they are tight. If tightening the connections does not remedy the trouble, take an oil can full of oil and, with motor running slowly, squirt oil along the entire length of the air line. If the tubing has split, bubbles will appear at the leak. If the air line is in good condition then it is evident that the gauge is at fault and it should be returned to the makers for repair.

The compact construction of a Chevrolet makes necessary the placing of oil holes and grease cups under the floor boards of the car. Don't, because it might cause you a little extra trouble, forget to remove the floor boards and lubricate as directed. (See Oiling Chart, Page 48.)

We guarantee that, when adjusted and lubricated, following the instructions contained in this booklet, your car will give you a maximum of service at a minimum of upkeep cost.

An enlarged cut of the oiling chart which can be tacked on the garage wall for handy reference is sent out with each car. Be sure you get one.

CLUTCH

The clutch used is the conventional cone engaging with a bevel rim on the fly wheel. The "face" of the cone is covered with a leather band firmly riveted to it. To prevent "grabbing" expanders are placed under the clutch leather so as to present slightly raised points of contact. If the clutch takes hold too quickly and

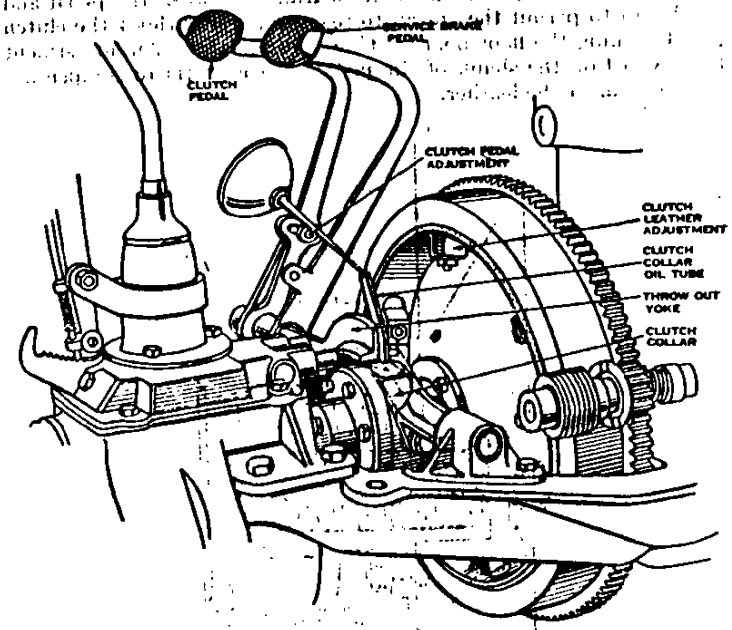


Fig. 20—Clutch and operating mechanism.

causes the car to start with a jerk, it is an indication that the clutch leather expanders need adjusting. To do this, with the clutch engaged, turn each of the expander nuts to the right, until they lightly touch the clips, and then give them a half turn to the left. This unscrewing a half turn allows the expander to act properly under the clutch leather.

The clutch leather will in time "dry" out, resulting in "grabbing," or slipping. Once a month apply a little neat's-foot oil on the leather to soften it. Should the clutch leather become greasy, apply a little Fuller's earth to it. DO NOT USE SAND OR OTHER GRITTY SUBSTANCES to make a slipping clutch hold. If you do you simply are inviting a large repair bill.

would be difficult, as without it both wheels would have to move at the same speed, whereas a turn demands that one wheel travel faster than the other.

When the car is traveling over uneven road surfaces, turning corners, or on the side of the roadway, considerable end play or "thrust" is transmitted to the differential. To prevent injury, and to reduce the power loss due to friction, a suitable bearing called a **Differential Ball Thrust Bearing** located on the left side of the differential gear case is used, composed of hardened steel balls mounted between steel washers.

To compensate for wear and to allow proper adjustment of the Differential Drive Gear and Drive Pinion, differential thrust washers are inserted on the right side of the differential case.

The weight of the differential and the driving torque is carried by two roller bearings on either side and bearing on the main axle shafts.

The propeller shaft is housed inside the **Propeller Shaft Housing** and is supported at its lower end by the **Propeller Shaft Bearing Rear** which is mounted on the hub of the spiral bevel pinion. A ball bearing called the **Propeller Shaft Bearing Front** absorbs the end play of the shaft and driving thrust.

One end of the Propeller Shaft Housing is flanged and bolted to the axle housings. The opposite end is supported by a **Ball and Socket Joint**, inside of which works a **Universal Joint** connecting the propeller shaft with the main or splined transmission shaft.

REAR AXLE NOISES

In some axles there is a slight and steady hum which is usually present when gears are used, whether in an axle or otherwise. This noise should not be confused, neither should the motorist become alarmed if it continues steady and uniform.

If a loud noise develops, there is no absolute method of diagnosis except to have the axle disassembled and an examination made of it by a reliable mechanic.

LUBRICATION

An oil of the consistency of 600W or steam cylinder oil should be used to lubricate the differential, and should be renewed every thousand miles. By removing the oil plug on the right hand side of the differential housing, the amount of oil in the housing can be determined. The housing should be filled until the oil is level with the lower edge of the opening from which the oil plug was removed.

REAR WHEEL BEARINGS

Heavy duty ball bearings mounted on the axle shafts carry the car load and insure a minimum of power loss and upkeep cost. Outside of seeing that these bearings are properly lubricated by forcing grease through the grease gun connection (See Fig. 23) they should require no attention from the owner.

BRAKES

As will be shown by reference to Illustration (Fig. 24), the service brake is the outside or external band, and the emergency the inside, or internal band. One, the service, contracts on the outside of the brake drum, and the other, the emergency, expands against the inside of the drum.

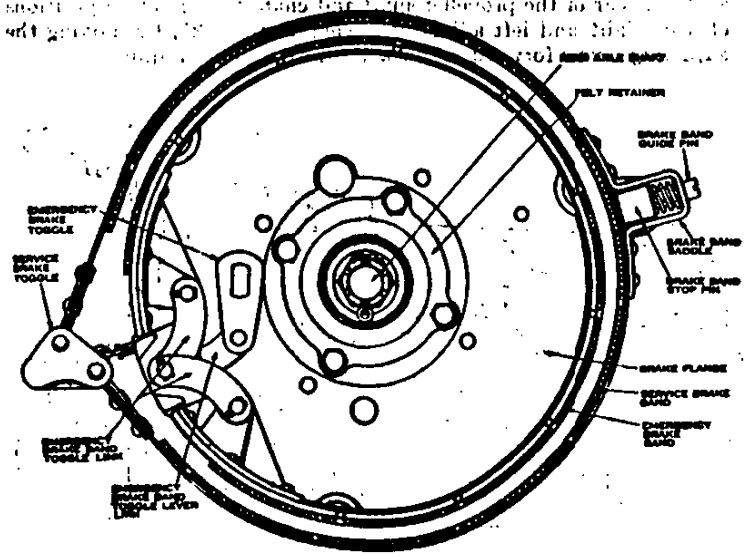


Fig. 24— Brake mechanism

ADJUSTING BRAKES

No part of an automobile is more neglected by the average user than the brakes. They are of the utmost importance and no effort should be spared to insure their dependable condition at all times. The brakes on the Superior Chevrolet are simple and at the same time very effective and require a minimum of attention. However, the owner should safeguard the car and its occupants by making a rigid inspection at frequent intervals to make sure that all is as it should be with the brake operating parts.

When adjusting the brakes, both rear wheels should be jacked up so that each wheel can be turned to see that it is free when the brakes are released. When the brakes are properly adjusted, the brake bands will not bind or drag on the brake drum and yet be close enough so that when either the service or emergency brake is set the forward motion of the car will be stopped.

When the brake pedal is pressed down as far as it will go without stopping the forward movement of the car, shorten the rod between the service brake pedal and brake shaft (See Fig. 25) by loosening

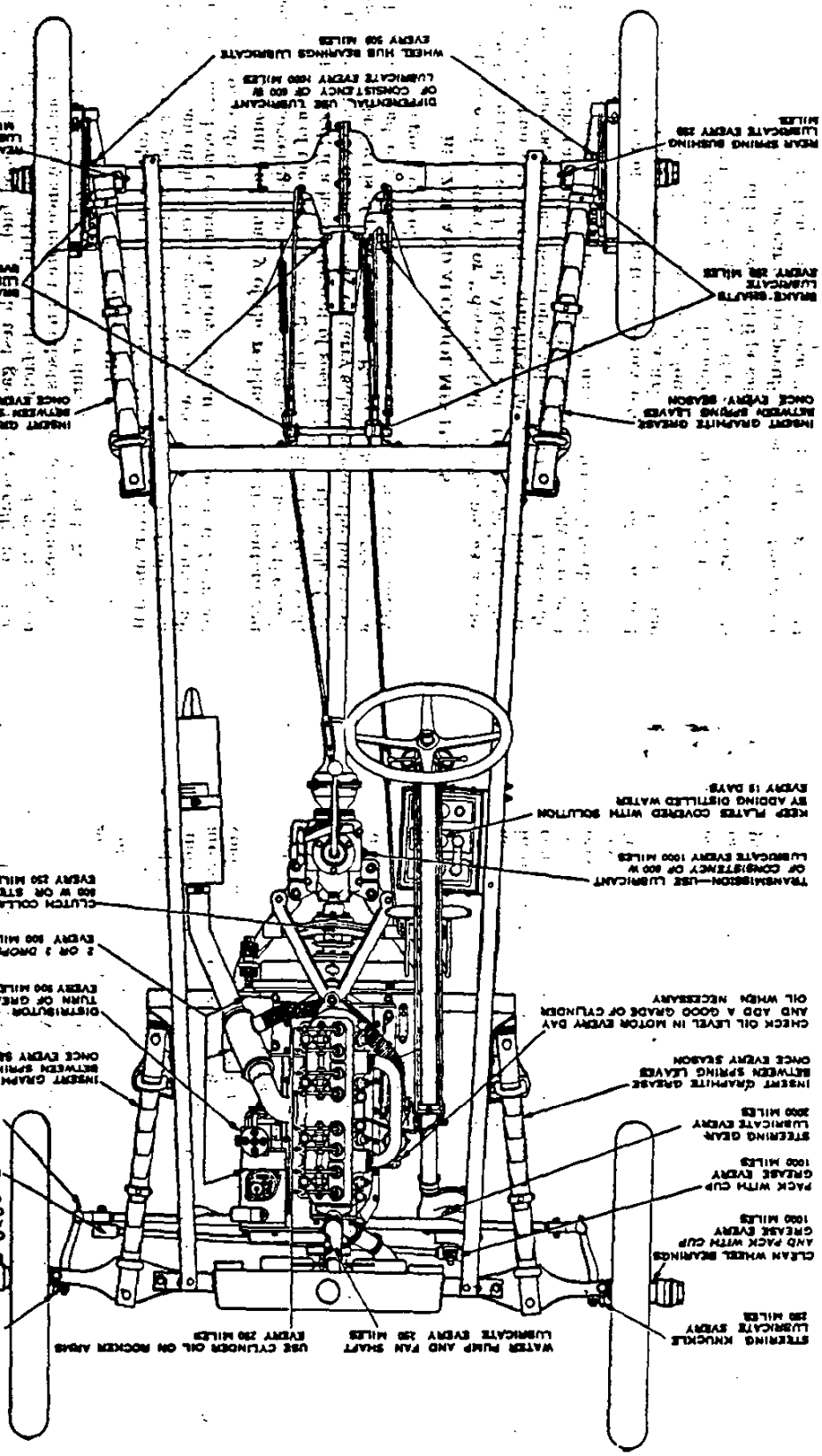


Fig. 18—Lubrication Chart.

Should the clutch leather become worn because of continued slipping, it should be replaced. We carry in stock clutch bands ready for installation and recommend ordering from our nearest branch or your nearest dealer when this becomes necessary. (See map Page 5, also Page 3, How to Order Parts.)

As the clutch leather wears, the clutch will set deeper in the fly wheel, bringing the clutch pedal more closely to the floor board. There should always be sufficient clearance between the pedal and the board to permit the clutch to seat properly without the clutch pedal striking the floor board. If not, it will slip. An adjustment is provided on the shank of the pedal (See Fig. 21) to compensate for the wear of the leather.

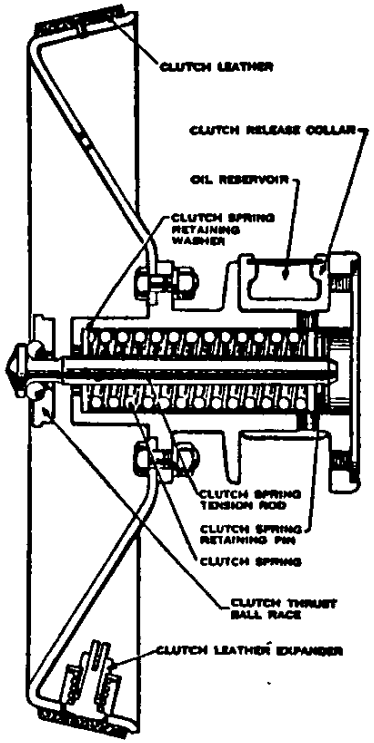


Fig. 21—Sectional view of clutch and release collar.

LUBRICATION CLUTCH COLLAR

The clutch collar consists of a hollow casting. In its friction surfaces wood plugs are inserted extending into an oil receptacle formed by the hollow casting; through these plugs the oil exudes (or sweats) and lubricates the friction surfaces.

Fig. 20 illustrates the proper method to pursue in oiling the clutch collar. Use a heavy oil such as 600W steam cylinder oil to lubricate the clutch collar every 250 miles.

TRANSMISSION

The transmission is of the selective type, having three speeds forward and one reverse. Stripped of technicalities, it is composed of a countershaft on which are keyed three gears and a main or splined shaft on which slide two gears, which by a lengthwise movement can be made to engage the gears on the countershaft. (Fig 22).

The fundamental requirement is in every case to first engage the gears so that the entire tooth "face" of the sliding gears mesh with those on the countershaft and second, to properly lubricate all working parts. Proper engagement can be had by being sure when shifting gears that the gear-shift lever travels as far forward or backward as it will go without straining before re-engaging the clutch.

To lubricate the transmission, fill every 1,000 miles with a heavy oil such as 600W or steam cylinder oil, not grease, so that the oil level stands even with the opening in the filler boss on the left side of the case.

Once every 2,000 miles it is a good plan to flush out the transmission with kerosene to remove any chips of metal knocked off the gears, or other foreign substances such as grit or dirt. To do this, remove the drain plug at the bottom of the transmission case and allow the oil to drain off, after which flush out thoroughly and refill.

REAR AXLE

The rear axle on the Chevrolet Superior cars is of the semi-floating type.

The axle shafts are supported on the outer ends by heavy duty ball bearings fitted to the taper on the axle shaft and at the inner ends by heavy duty roller bearings.

A glance at the illustration Fig. 28 shows the construction and relative positions of the various units.

The driving torque is transmitted from the motor crankshaft through the clutch and transmission to the propeller shaft.

On the end of the propeller shaft is mounted a bevel pinion called the **Spiral Bevel Pinion**, with spiral cut teeth, which mesh with a large ring gear called the **Spiral Bevel Ring Gear**. This in turn is securely bolted to a housing called the **Differential Case**.

Inside the differential case are mounted five gears. Two of these, called the **Differential Side Pinions**, are fastened to the ends of the axle shafts. The other three gears, called **Differential Spider Pinions**, are mounted on the **Differential Spider** and mesh with the two **Differential Side Pinions**.

The following are some of the oils which are within our specifications but space will not permit us to name many others which might properly be added:

SUMMER OILS

BRAND NAME OF OIL	REFINER
Havoline "A"—Medium Heavy	Indian Refining Company
Kenco "C"	Kendall Refining Company
Pennzoil—Extra Medium	The Pennzoil Company
Polarine—Medium	Standard Oil Company of Ohio
Polarine—Medium	Standard Oil Company of Ind
Polarine Oil	Standard Oil Company of New Jersey
Sunoco—Medium	Sun Oil Company
Amalie—Medium	L. Sonneborn Sons, Inc.
Socony—Light Medium	Standard Oil Company of New York
Veedol—Medium	Tide Water Oil Company
Marathon Motor Oil "L"	Transcontinental Oil Co.
Gargoyle Mobiloil Arctic	Vacuum Oil Co.
Valvoline—Medium	Valvoline Oil Co.
Oilzum	The White & Bagley Co.
Supreme Auto Oil—Medium	Gulg Refining Co.

The following specifications are those of a motor oil suitable for winter use in Chevrolet Cars:

1. GENERAL. Oil purchased under this specification must be properly refined petroleum oil. It shall not contain water, sediment, acid, soap, rosin or any substance not derived from petroleum.
2. FLASH POINT. The flashing point, Cleveland Open Cup, shall not be below 340° F.
3. FIRE POINT. The firing point, Cleveland Open Cup, shall not be below 385° F.
4. VISCOSITY. The viscosity, Saybolt Universal, at 100° shall be between 270 and 350 seconds.
5. CARBON RESIDUE. The carbon residue (Conradson) shall not exceed .3%.
6. POUR TEST. The pouring point shall not be above zero Fahrenheit.
7. COLOR. The oil shall not be darker than No. 5 N. P. A.
8. CORROSION. The oil shall not corrode any metal used for machine construction.

The following are some of the oils which are within our specifications but space will not permit us to name many others which might properly be added:

WINTER OILS

BRAND NAME OF OIL	REFINER
Kenco "C"	Kendall Refining Company
Polarine—Medium	Standard Oil Company of Ohio
Polarine—Medium	Standard Oil Company of Ind.
Polarine Oil	Standard Oil Company of New Jersey
Sunco—Medium	Sun Oil Company
Socony—Light Medium	Standard Oil Company of New York
Marathon Motor Oil "L"	Transcontinental Oil Co.
Gargoyle Mobiloil Arctic	Vacuum Oil Company
Valvoline—Medium	Valvoline Oil Company
Flocold Oilzum—Medium	The White & Bagley Company
Supreme Auto Oil—Medium	Gulf Refining Company

Cup grease of high grade entirely free from acids or other adulterants and of a soft nature, having a sufficiently high melting point to prevent flowing in hot weather.

It should be remembered that low first cost of oil or grease invariably means high final cost.

The best is actually the most economical—Use Good Oil.

CHANGE THE OIL IN CRANK CASE

Any two metal surfaces moving in contact, one with the other, no matter how well lubricated, will eventually wear. Minute metal fragments tear or break away and accumulate in the oil, thus adding minute abrasive particles to the oil. In the case of a motor car this is made still worse by the addition of road dust, small particles of carbon and foreign matter in the air finding their way into the cylinders and crank case. For this reason the oil in the crank case eventually becomes unfit for further use and must be drained off and replaced by fresh clean oil.

This should be done every 1,000 miles in summer and every 500 miles in winter, but this too is largely governed by the mechanical condition of your car and how carefully you as the driver handle and care for it.

The following precautions will have a tendency to greatly reduce motor and lubrication troubles:

(1) After the motor has been standing idle for a time and while still warm, drain off a small quantity of oil from the bottom of the oil reservoir and note whether or not it contains a few drops of water. If so, repeat this operation every few days and you will keep the oil reservoir practically free from water and remove the cause of much trouble and consequent repair bills.

(2) Select good fuel. High test gasoline generally gives the best results, and the additional satisfaction, ease of starting and freedom from annoyance more than offsets the slight additional cost.

(3) Use hood and radiator cover during cold weather.

TESTING FUEL

A very simple yet practical way of testing fuel to determine if it is suitable for your car is to put a tablespoon full of the fuel into a clean porcelain dish or cup; ignite it and allow it to burn until all the fuel has been consumed, being careful to protect it from air currents or drafts.

The amount and quality of the residue left on the bottom and sides of the porcelain dish are an indication of the quality of the fuel. If the bottom of the cup is practically clean, the sides free from soot, the fuel is good; if a heavy deposit of soot is left on the walls of the cup or a quantity of heavy oily or tarry substance on the bottom of the vessel, the fuel is of poor quality. Between these two results—a clean fuel and one that leaves a heavy residue—lies the quality ranging from good to bad.

BENZOL AND ALCOHOL MIXTURES

The use of "patent" or "doped" fuels should be, as a rule, avoided as mixtures of Benzol, Alcohol and "Fuel Dope" quite frequently contain very corrosive qualities which will have bad results on the cylinders, pistons, piston pins, valves and rings. This condition is usually caused by the impurities not being wholly extracted from one or more of the component elements entering into the fuel mixture.

A rough test of freedom from corrosive tendencies of such a fuel mixture can be made by immersing a strip of polished steel in the fuel mixture for a period of say twenty-four hours.

If the bright surface of the steel is unimpaired after this test, the fuel may be considered safe for use. If corrosion or discoloration is present, the fuel should be avoided if possible.

Learn to know your car and its peculiarities—give it the proper care, use good oil and fuel, and the car will respond by giving you long and continuous service at a very low cost in repairs.

We guarantee that when adjusted and lubricated properly, your car will give you a maximum of service at a minimum of cost.

MOTOR LUBRICATION

The oiling system used on Chevrolet cars is known as the constant-level splash system. The oil is carried in a reservoir located at the bottom of the crank case and is filled through a filler tube on the left side of the motor, just back of the fan. (See Page 11 and Fig. 1).

Oil is drawn from the oil reservoir by a geared pump located on the rear generator head and is then "fed" into a basin having four troughs or depressions over which the spoons or splashers on the ends of the connecting rods pass.

The rapid "splashing" of these spoons and rotation of the crank shaft keeps the main bearings, connecting rods, piston pins and cylinder walls bathed in oil, from whence it drains back into the reservoir to be used over again.

Once every 1,000 miles in summer and every 500 miles in winter the oil reservoir should be drained by removing the drain plug. This removes all "old" or "burned" oil and prevents clogging of oil holes and pockets. Fill to the proper level with the best medium heavy oil obtainable. (See Page 43, General Lubrication.)

Fresh oil is cheaper than repair bills, so observe this point regularly.

Use cylinder oil to lubricate the rocker arms and push rod felts. Keep the felts saturated with oil. Grease the fan bearing every 250 miles with a good grade of cup grease

OIL PUMP

Upon the oil pump depends the successful lubrication of the motor. The pump used on Chevrolet cars has been simply designed

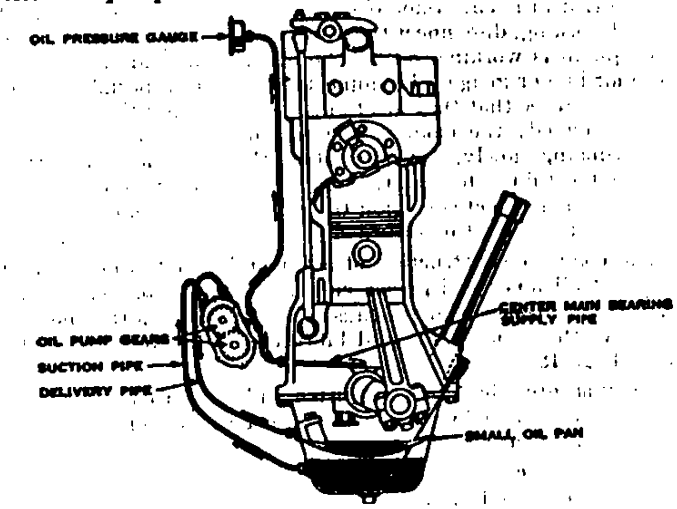


Fig. 19—Sectional view of engine lubricating system.

GRINDING VALVES

To determine which valve needs attention, turn the motor over slowly by hand until the number one intake valve closes (the second valve from the radiator). The piston in number one cylinder is then traveling upward on the compression stroke. Then note the amount of compression or resistance offered.

Keep turning motor. The next cylinder to compress will be number two, then number four, then number three.

The ones offering the least resistance, or compression, are those valves which leak and need grinding (Note: Except piston rings leaking—see page 28).

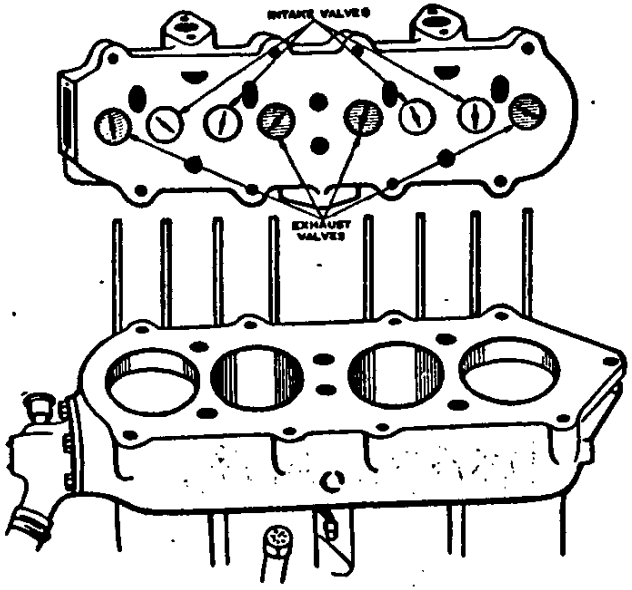


Fig. 14—Cylinder head removed.

The grinding of a valve is not a difficult operation when undertaken with patience. First, it is necessary to remove the cylinder head as follows:

Disconnect intake manifold and exhaust fitting from cylinder head. Disconnect the upper radiator hose connections and remove rocker arms and shafts (Fig. 13) then each of the bolts holding the cylinder head to the cylinder casting and lift the head off. (Fig. 14.)

To remove the valves, proceed as follows: With a screwdriver or specially designed tool and your fingers, press down upon

the valve spring cap until the spring has been compressed enough to admit pulling out the valve spring cap pin (Fig. 15).

Remove each valve separately, using care not to mix them in any way, as they must go back in the order in which they were removed.

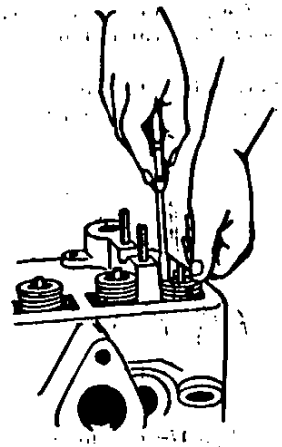


Fig. 15—Removing valve springs.

Scrape off all carbon deposits from the combustion chamber and valve ports. Do not leave any projections of carbon, as they will heat up and cause pre-ignition.

At the same time remove the carbon deposits from each piston head. Scrape clean, but use care not to scratch the surfaces, as this will provide a "pocket" to catch carbon more easily. Brush out all the particles of carbon, and finally wash with clean kerosene.

Secure a light coil spring and place it around the valve stem before replacing it for grinding. Use a good grade of grinding material, the best being none too good if a satisfactory job is to be done. Smear the compound thinly on the beveled edge of the valve head. With a brace and a screwdriver of good size rotate the valve back and forth, using only a light pressure on the seat (Fig. 16). DO NOT TURN THE VALVE THROUGH A COMPLETE CIRCLE, as this will cause the compound to cut ridges on the surfaces. After rotating the valve a few moments release the pressure on the brace. This will cause the coil spring to act, lifting the valve off its seat. Turn valve slightly before again reseating for further grinding. Continue this method until the entire contact surfaces on both valve head and valve seat show no dark spots. After the surfaces have become apparently properly ground, test the seats for unevenness, as follows: First wash both valve and valve seat thoroughly to remove all valve grinding compound. Next with a pencil mark lines

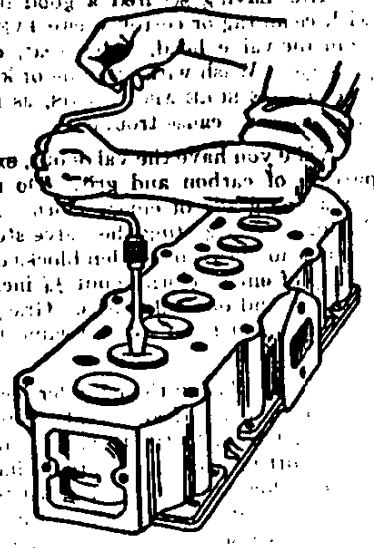


Fig. 16—Grinding valves.

CRANK CASE DILUTION

Another phase of motor oil deterioration, probably the most serious of all is that of crank case dilution.

By crank case dilution we mean a thinning of the oil on account of certain portions of the gasoline or fuel leaking by the piston and rings and mixing with the oil. This condition will be encountered in all classes of cars and motors regardless of make or model. It is always present in a greater or less degree and must be combatted continually.

Careful attention to a few comparatively simple precautions will minimize it and avert real damage.

The cause of crank case dilution is traced directly to the character of the fuels in use. Practically all motor fuels today contain ingredients which are slow burning and hard to ignite. The thinning of the motor oil is due to unburned fuel vapor which forces or works its way past the pistons and rings and in coming in contact with the cool walls and oil in the crank case, condenses and is mixed with the oil, thus reducing the body of the oil and impairing its lubricating qualities.

All motor oils are subject to this dilution.

With a given percentage of fuel, heavy oils are reduced in body more rapidly than are lighter grades. Therefore, in a motor designed to handle a light or medium oil, the use of a heavy oil will not retard the tendency to become thin, but may lead to other and more serious trouble.

USE OF CHOKE OR PRIMER

There are other causes such as the careless use of the choke. It is a well known fact that to start a cold motor a rich mixture is required until the motor is "warmed up." In order to hasten this "warming up," the tendency is to use an excessively rich mixture.

By the careless use of the choke it is possible to force several ounces of raw gasoline into the lubricating system in the first few minutes of running. This practice, if persisted in, is sure to spell, if not disaster, serious trouble in a short time.

MECHANICAL CAUSES OF DILUTION

Dilution may be caused by such faults mechanically as, scored cylinders, poor ring fit, "sloppy" or loose pistons, and faulty valves. The remedy is obvious.

Poor ignition due to any of the following conditions will also increased dilution: dead or fouled spark plugs, incorrect timing, faulty coil, distributor, or weak spark.

Common causes of incomplete combustion of the fuel are over-rich mixture caused by faulty carburetor adjustment, restricted air intake to carburetor, wrong jet or nozzle in carburetor or defective carburetor.

PRECAUTIONS TO PREVENT DILUTION

1. Avoid excessive use of choke.
2. Avoid idling or excessive slow driving in cold weather.
3. Keep motor in good mechanical condition. Valves properly ground and in perfect adjustment.
4. Drain oil frequently at least every 500 miles in winter and more often if you find the oil becomes very thin.
5. Use hood and radiator cover in cold weather.

WATER IN CRANK CASE

Serious lubrication troubles may result in cold weather by an accumulation of water in the oil reservoir. This condition is as a rule little understood by the car owner. To demonstrate the chief cause of water in the oil reservoir, hold a piece of cold metal near the end of the exhaust pipe of the motor and note the rapid condensation and collection of drops of water on the cold metal. The exhaust gases are charged with water vapor and the moment these gases strike a cold surface will condense, forming drops of water.

On account of a certain amount of these gases passing the pistons and rings, even under the most favorable conditions, we will have the formation of water in the oil reservoir in a greater or less degree until the motor becomes warm. When the motor becomes thoroughly warm, the crank case will no longer act as a condenser and nearly all of these gases will pass out through the breather.

Short runs in cold weather, such as city-driving, will aggravate this condition but even under the best of conditions a small amount of water may always be expected in the oil reservoir.

Provided the oil you use is free from water content and all gaskets and joints are water tight, the only other cause of water in the oil reservoir is from what may be termed "sweating." This condition will come about in case your motor has been standing for some time in a very low temperature and for some reason or other the air is subjected to a rather sudden increase in temperature, the warm air on striking the cold metal will form drops of moisture. However, this condition is rather rare and can be practically ignored.

Water in the oil reservoir together with other impurities will form a mixture in the nature of an emulsion, which under extreme conditions will become so thick and "jelly like" that it will clog the oil lines and oil circulating system, causing burned out bearings, premature wear on piston, piston pins, piston rings and cylinder walls.

No motor oil is entirely free from this tendency under certain severe conditions. It is not possible to entirely eliminate "sweating" or "condensation" in the oil reservoir. However, certain precautions can be taken to reduce the bad effects to a minimum.

It is not a good plan to put Anti-Leak Compounds, corn meal, bran, or other similar substances in a radiator to stop a leak. It fouls the tubes and decreases the efficiency of the radiator. Better by far make a permanent repair as soon as a leak is discovered.

WINTER DRIVING

As soon as the temperature begins to approach the freezing point, an anti-freezing solution should be placed in the radiator. Wood alcohol or denatured alcohol is best for that purpose.

It requires 8 quarts of water to fill the cooling system of the Chevrolet Superior car.

The following table may be used in estimating the quantity of alcohol required for different temperatures:

(Wood Alcohol)		(Denatured Alcohol)	
10 Per Cent	23° F. Above	10 Per Cent	27° F. Above
20 " "	10° F. "	20 " "	19° F. "
30 " "	2° F. Below	30 " "	10° F. "
40 " "	20° F. "	40 " "	2° F. Below
50 " "	40° F. "	50 " "	18° F. "

Since alcohol evaporates more quickly than the water, it is well when filling the radiator to make up the loss by adding a solution of equal parts of alcohol and water.

The use of powerful chemicals, while sometimes cheaper in first cost, is very likely to cause damage later, costing more in repair bills than the amount saved, as they attack the metal of the cooling system and rubber hose connections.

If the radiator should freeze, do not try to thaw it out by starting the motor, but thaw it by placing in a warm place.

It is a good plan, when making a stop in cold weather, to cover the radiator and hood with a blanket or other covering. This helps hold the heat, and in that way gives considerable protection from the liability of freezing, besides making the motor start easier.

NOTE: Be sure to read the instructions on care of the battery Page 81 and General lubrication instructions Page 43 with reference to Winter Driving.

We recommend the use of a good radiator and hood cover for winter driving.

VALVES AND VALVE SETTING

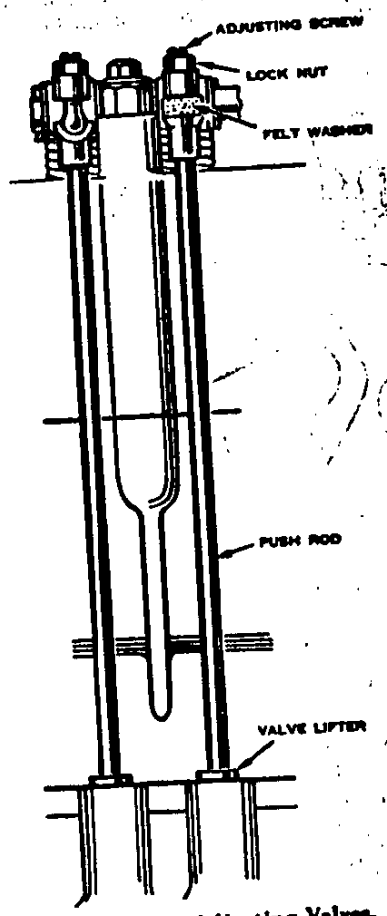


Fig. 10—Adjusting Valves.

The valve mechanism used on Chevrolet cars is recognized as the highest type of engineering practice, not only from the standpoint of greatest efficiency, but of simplicity as well, allowing, as it does, absolute freedom in making adjustments and renewals. (See Fig. 10)

To keep the valves in a state of continued efficiency, it is only necessary to give attention to a few simple rules.

Keep all rocker arms, push rods and valve lifters clean and free from dirt.

Adjust when needed, the clearance between ends of valve stems and rocker arms. (Fig. 11.)

Remove all pits and carbon deposits from valve seats when loss of compression or poor running indicates the necessity.

Too much stress cannot be laid upon the necessity of keeping the motor clean. The dust drawn through the radiator openings as the car travels ahead contains grit which, when wet with oil, forms a cutting compound that wears and scratches, leaving an irregular surface. This in time is sure to give trouble, so make it a rule to regularly clean all working parts. The slight inconvenience to yourself will be more than offset by the saving in repair bills later on. (See Page 23).

HOW TO ADJUST VALVE CLEARANCE

The continual action of the push rod, opening and closing the valves, will in time produce wear which must be taken up.

on the beveled edge of the valve head about ¼ inch apart, and reseat the valve. Give it a one-half turn to the right and then to the left, using a little extra pressure on the brace. If the valve has been ground accurately, each one of the pencil marks will be wiped away; but on the other hand, if one line, or a part of one, remains untouched, there is an uneven spot, and the valve must be reground until it seats accurately.

The secret of good valve grinding comes only with experience; however, if care is taken to properly rotate the valve back and forth with a reciprocating motion, and at the same time turning the valve so that at the end of several such movements the valve has been turned through a complete circle, a good job will result.

Never grind a valve more than is required to secure a good accurate seat.

Excessive grinding will lower the valve seat so that in time the valve head will fall below the top edge of the seat and cause trouble. When this occurs the only remedy is to have an expert reseat the valves with proper tools and replace the worn valve heads with new ones.

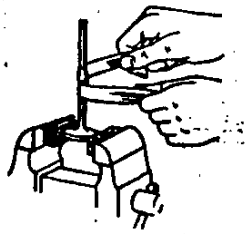


Fig. 17—Polishing Valve Stems

After having secured a good finish and accurate seat, remove with clean rag or cotton waste EVERY ATOM of grinding compound from the valve head, valve seat, combustion chamber and intake passages. Wash with gasoline or kerosene and then flush the valve guides. BE SURE ABOUT THIS, as it requires only a small particle of abrasive to cause trouble.

While you have the valve out, examine the stem, removing every particle of carbon and grit. Do not use a file for this purpose, but a fine grade of emery cloth. A good way to do this without the liability of getting the valve stem out of round is to clamp the valve head between wooden blocks or copper jaws (Fig. 17), then use a strip of emery cloth about ¼ inch wide and wrap it around the stem one and one-half turns. Grasp the free ends of the cloth and pull back and forth, at the same time causing it to slide up and down the stem. (See Fig. 17)

Before replacing the cylinder head examine carefully the copper asbestos gasket. If any weak spots appear, it is better to replace the gasket than to try to use the old one, as much depends upon a good fitting gasket. In replacing the cylinder head bolts, run each one down until the head just touches the boss on the cylinder head, then—and be sure about this—TIGHTEN EACH ONE EVENLY A LITTLE AT A TIME UNTIL FINALLY ALL ARE TIGHT. No one bolt should be drawn down tight until all are set snug.

GENERAL LUBRICATION

The chart on lubrication (Fig. 18) shows where and when to lubricate different units of a Chevrolet Car. The thing to bear uppermost in mind is that oil and grease are much cheaper than repair bills, and should be applied regularly if you are to secure a maximum of useful service from your car.

Don't wait until you hear a "squeak" before oiling. This means a rusted or dry bearing, and when once in that condition trouble soon follows.

The purpose of lubrication is to prevent any two pieces of metal that are working one against the other from touching. This is accomplished by having a film of oil between these two metals. Upon this film of oil depends entirely the life of the bearings, cylinder walls, pistons, and, in fact, all working parts of the car. Proper care of the lubricating system will eliminate the vast majority of repair bills and more than double the life of your car.

Lubrication is the most important and at the same time the most serious problem you as the owner of a motor car have to face. Correct lubrication is not insured by merely placing the proper quantity of oil or grease in your car. Find out from the dealer or manufacturer from whom you purchased the car the proper oil for your car and then always use it.

To assist in meeting this problem on lubrication, the Chevrolet Motor Company has the following recommendations to make with respect to oils:

The following specifications are those of a motor oil suitable for summer use in Chevrolet Cars.

1. GENERAL. Oil purchased under this specification must be properly refined petroleum oil. It shall not contain water, sediment, acid, soap, rosin or any substance not derived from petroleum.
2. FLASH POINT. The flashing point, Cleveland Open Cup, shall not be below 385° F.
3. FIRE POINT. The firing point, Cleveland Open Cup, shall not be below 425° F.
4. VISCOSITY. The viscosity, Saybolt Universal at 100°, shall be between 270 and 330 seconds.
5. CARBON RESIDUE. The carbon residue (Conradson) shall not exceed .5%.
6. POUR TEST. The pouring point shall not be below 35° F.
7. COLOR. The oil shall not be darker than No. 5 N. P. A.
8. CORROSION. The oil shall not corrode any metal used for machine construction.

points direct from the coil when the contact points are closed. To determine whether there is any trouble at this point, disconnect at the coil the primary wire which leads from the distributor to the coil, and with the contact points closed and with the ignition switch turned on, strike the terminal end of the wire against the terminal on the coil.

If there is a spark, the current is flowing properly. If no spark is obtained, make the following examination:

Examine the spring on the distributor arm. See that this is not broken and that it is making a good contact with the high tension terminal in the center of the distributor cap.

Examine the primary wire. See that the insulation is good and that it is properly fastened to the distributor.

Occasionally oil or grease will get into the distributor and form a connection between the case and the insulated contact point. Wipe out thoroughly.

There may be a "ground" in the distributor due to defective insulation between the supports of the contact points and the distributor housing.

Examine the contact points to see that they are clean, not burned or corroded and are opening and closing properly.

TESTING COIL

In order to determine if the coil is operating properly, secure a piece of wire, attach one end to the frame of car or motor casting or other metallic "ground," bring the other end to within three sixteenths inch from the point where the high tension wire (running from coil to the central terminal on the distributor) leads from the coil and crank the motor by hand with the switch on. If a spark occurs at this point the coil is operating properly.

If no spark occurs and the primary circuit from the battery to the coil is intact, it is evident that the coil should be replaced or repaired.

There are times, however, when it is possible to obtain a spark in a test of this kind when the coil will not operate properly at higher speeds. If ignition trouble occurs and it is impossible to locate the trouble at other points, the coil should be taken to some repair station where a test can be made of the coil when it is operating under practically the same conditions as it is in the car when the trouble occurs.

TEST OF PRIMARY CIRCUIT

When testing the primary circuit there are practically only two things to be taken into consideration, namely: the condition of the contact points in the distributor and the wiring.

TESTING IGNITION SWITCH

In order to test switch and determine if current flows through it, remove the wire from the terminal marked "Bat" on coil. Turn on Ignition Switch.

Touch the end of wire removed from coil to the frame of the car, or to metal portions of motor. If no spark occurs make sure that the negative terminal of the battery is properly grounded to the frame of the car by trying the starting motor. If the starting motor operates properly the ground connection is alright.

Next test for current at screw on back of switch marked "IGN" by taking a piece of wire long enough to touch one end to screw and the other end to metal portions of the car. If there is a spark at point marked "IGN" and no spark at end of wire removed from coil, the wire from switch to coil is defective.

If no spark occurs at point marked "IGN" on switch, search for loose connections in the wiring system or an open circuit in the interior of the switch.

STARTING MOTOR DOES NOT OPERATE

This is not an infrequent source of difficulty and may be caused by any one of the following:

First—Exhausted battery due to excessive use of the starting motor or lights and is the direct result of failure on the part of the owner in not observing the rules set forth for the care of his battery. (See Page 81).

Second—Broken or loose wires or connections either at the battery, starting switch or starting motor. Be absolutely sure that the connections at the battery, starting switch and starting motor are secure. Examine all connections and wires carefully. See that all connections including battery terminals are clean and tight. Inspect the cable leading from negative post of the battery to the frame and see that this is a clean, firm contact with the frame of the car. If there is dirt or paint at this point, scrape clean and fasten the cable solidly to the frame.

Third—Corroded battery terminals causing poor contact. Remove and thoroughly clean, then cover with vaseline or petroleum jelly.

Fourth—Starting switch making poor contact, having broken blades or sticking. Remove the switch and make necessary repairs.

Fifth—Starting motor may be "short circuited" or may have shifted out of line.

Sixth—Starting motor brushes worn out or not making contact, or dirty or corroded commutator. (See Page 84 Care of Starting Motor).

To determine proper valve clearance, crank the motor by hand, turning the motor until the valve lifter has reached its lowest position.

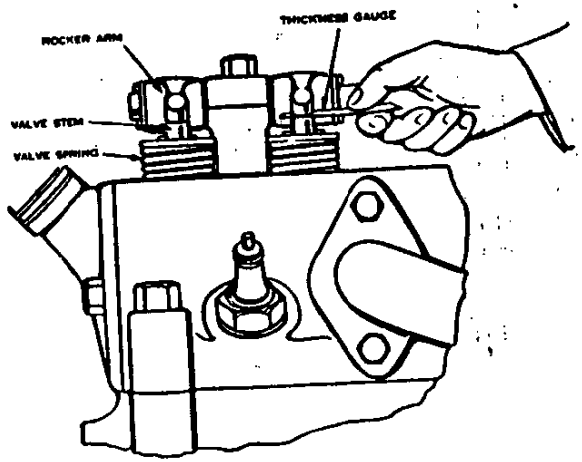


Fig. 11—Determining proper valve clearance

The space between the rocker arm and the valve stem (Fig. 11) should be about .008 of an inch on the intake valves and about .010 of an inch on the exhaust valves when the valves are seated. The adjustment should be made when the motor is hot so that the valve stems and push rods will be expanded to the limit. If the space is greater than this, loosen the lock nut on the rocker arm adjusting screw (Fig. 10) and turn the screw slightly with a screw driver until the proper clearance is obtained, then tighten the lock nut so that the adjustment will not come loose.

Fig. 12 shows one of the valve lifters removed for inspection or replacement.

Caution: The necessity for valve adjustment will show itself first by excessive clicking of valve lifters, and second by poor running of motor. It is not necessary to make alterations under any other conditions.

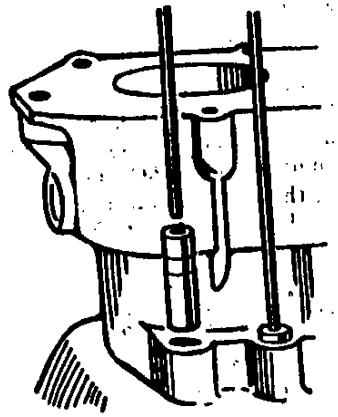


Fig. 12—Push rod and valve lifter removed.

In time the ends of the valve lifters where they come in contact with the cams will become worn to such an extent as to require replacement.

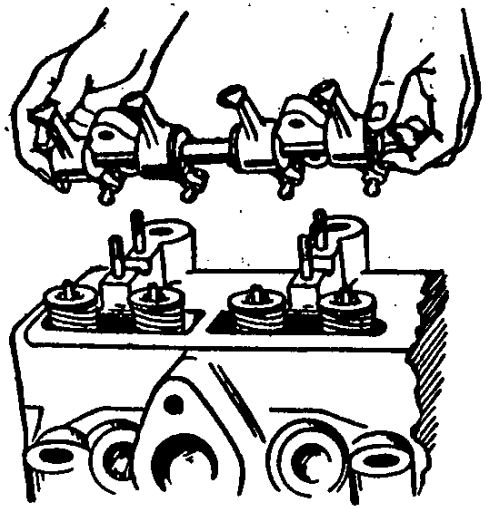


Fig. 13—Rocker arms and shaft removed.

the proper seating of the valves. This will cause a leakage of gases, resulting in loss of power and uneven running of the motor. When this occurs, grinding the valves is the only remedy. (See Page 40.)

To determine which valves need attention, turn the motor over slowly by hand and note whether the same degree of resistance is met with in each cylinder. The ones offering the least resistance are those whose valves leak. Grinding the valves is the only remedy.

Second—Worn or broken piston rings.

This is sometimes difficult to determine in advance, especially if the valves are badly carbonized and need grinding. By removing the cap from the breather tube (Fig. 1) and holding the ear near the opening you can sometimes hear the gas "blowing" by the rings. Inasmuch as the cylinder head must be removed to make replacement of rings or pistons, it is advisable to examine carefully the valves before going further. Should the rings or pistons be worn, they should be replaced.

Third—Valve push rods set up too tight, causing the valves to hold open. With the motor hot, test the valve clearance (Page 38) and adjust accordingly.

Fourth—Late or sluggish ignition.

This is not a common occurrence and is best detected by an almost entire lack of power; also, the motor will heat readily causing the water in the radiator to boil. Where it is very late, the motor will pound and knock on the slightest pull. Check up the timing of the ignition. (Page 73).

Fifth—Badly burned spark plug electrodes, which increases the resistance of the plugs, resulting in a weak spark. Replacing the plug is the only remedy.

MOTOR GETS HOT

The following causes will usually lead to a hot motor:

First—Low water supply in the radiator. It is just as necessary to have a full tank of water as it is to have plenty of gasoline or oil. Make it a rule to regularly inspect and fill the radiator.

Second—Radiator tubes stopped with lime deposit. The radiator should be thoroughly flushed and cleaned. (See Page 34).

Third—Fan belt too loose, or broken, causing fan to stop rotating.

Fourth—Late or retarded spark. This is usually apparent by a marked loss in power, and can best be detected in that manner.

Fifth—Carburetor choke rod may be partially pulled out causing the mixture from the carburetor to be too rich. This point should be watched very closely and as soon as the motor gets warm after starting, the carburetor choke rod should be pushed forward as far as it will go.

Sixth—Examine brakes and see that they are not dragging. Sometimes the emergency brake lever is left partially set.

Seventh—The distributor may have become loosened, resulting in a retarded spark.

MOTOR POUNDS OR KNOCKS

When a peculiar pound or knock, is heard, it should be investigated to determine as nearly as possible its location and seriousness.

Go about the task of locating the source of trouble carefully—don't jump at conclusions, and, above all, do not operate your car until you are satisfied that no harm will result pending later repairs.

Nearly all motor noises can be definitely located. Some, however, can only be approximated. These noises are usually the result of:

FIRST—AN ACCUMULATION OF CARBON DEPOSITS ON PISTON HEADS, VALVES AND COMBUSTION CHAMBER.

A motor which is badly carbonized will pound when the power is applied suddenly or when ascending a slight grade. Retarding the spark will reduce the noise; however, the motor will be sluggish, heat readily, and labor on the slightest pull.

Carbon will deposit in the combustion chamber of any internal combustion engine, so do not be alarmed. However, at the first opportunity the cylinder head should be taken off, the carbon removed, and the valves reground (Page 40).

SECOND—LOOSE OR WORN BEARINGS.

A bearing knock or thump can be detected by accelerating the motor quickly, at which time a rattling and clashing sound will be produced, or, by starting the car with the brakes set, which will cause the motor to pull against resistance.

If it is found that the bearings have become loosened, they should be adjusted by a reliable mechanic.

Sometimes an ignition knock is mistaken for a loose bearing. Ignition knocks usually occur when the car is being operated on grades or in sandy roads with the spark fully advanced or when accelerating the motor after the car has been running at a low speed. By retarding the spark slightly, a knock or pound of this kind can be overcome. The spark should be advanced as soon as the car begins to reach its normal speed again and the going becomes easier.

Do not confuse body or chassis noises with motor knocks.

WEAK VALVE SPRINGS

As the valve springs are subjected to considerable heat, it follows that in time their "temper" will be affected.

By inserting a screw driver or other suitable tool between the coils of the spring (Fig. 7) and turning it (while the motor is running) the tension of the spring can be increased. If the motor picks up and runs properly, replace the spring. If you have no new

COOLING SYSTEM

The cooling system consists of a large cellular type radiator and a belt driven centrifugal pump. As the circulating pump is connected to the lower radiator outlet the water is drawn through the radiator before being delivered to the water jackets surrounding the cylinder walls, which insures a proper circulation of cool water at all times, regardless of engine speed. (Fig. 9).

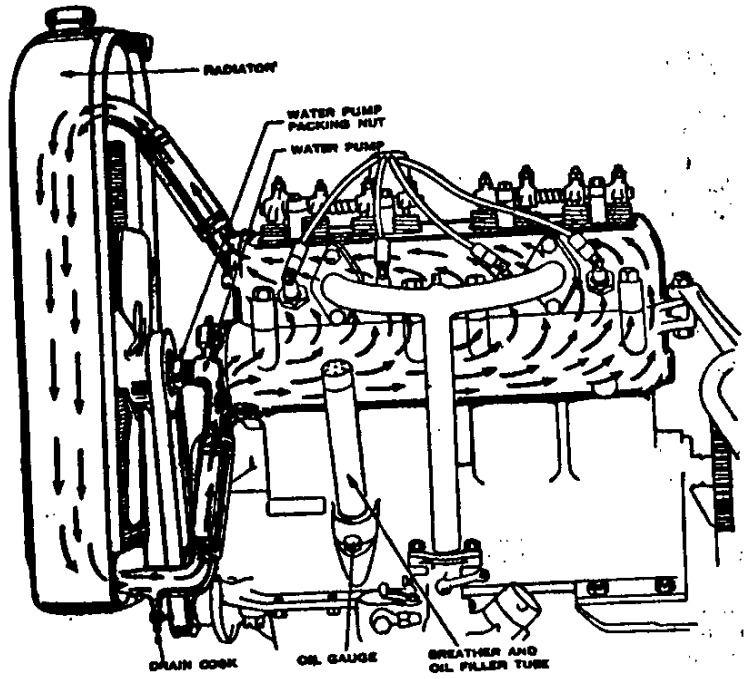


Fig. 9—Sketch showing cooling system.

The circulating pump is readily accessible by removing the bolts holding it to the cylinder jacket. Should water leak through the stuffing box on the end of the pump shaft, tighten the nut. If this does not stop the leak, unscrew the stuffing box nut and wrap around the shaft ordinary candle wicking that has been saturated with tallow or graphite grease and tighten the nut again.

The radiator at all times should be kept full, or trouble is sure to follow. It is a good plan to form the habit of inspecting and filling the radiator before the car is taken from the garage. On long tours, especially when you have been traveling over hilly roads or those

with a loose top surface, examine the water supply quite frequently. Consider, always, that the proper amount of water is as important as your supply of gasoline and oil. It is well to examine the water supply every time a stop is made for oil or gasoline.

Always use clear water. If rain water can be had, use it, as less scale or deposit will result.

Keep the cellular openings clean. Never allow mud to remain in them, as it cuts down the radiation and prevents proper cooling. The entire circulating system should be thoroughly flushed out occasionally. This can be done in ordinary cases by disconnecting both the upper and lower hose connections and allowing fresh water to enter the filler neck and flow down through the radiator and out the lower hose. The motor water jackets can be flushed out the same way.

When hard water has been used, a scale or deposit will be formed which, unless removed, will obstruct the circulation, causing unnecessary heating and frequent refilling. In this case a good way to clean out the scale is to dissolve a half pound of lye in about five gallons of water. Strain the liquid through a cloth and put in the radiator. Run the motor for about five minutes, then draw off the solution through the radiator drain cock. Fill the radiator with fresh water and run the motor again for several minutes, then drain off the solution and refill with fresh water. NEVER USE A MORE POWERFUL CHEMICAL.

Once a week it is a good plan to open the radiator drain cock and let all the water and accumulated dirt run out. If the water is very dirty, flush the radiator with fresh water.

NEVER—and be sure about this—put cold water into the radiator while the motor is HOT. By "hot" we mean any temperature which is uncomfortable to the hand when held against the cylinder head.

When a motor gets "hot" the danger of cracking the cylinder walls and especially the cylinder head around the exhaust ports, cannot be over-estimated; therefore, make it a point that should you stop for water after the motor has been running for some time, to test the temperature of the motor by raising the hood and placing your hand on the cylinder head. If you can hold it there with comfort, water can be placed in the radiator; if not, wait until you can. It will only take a few minutes for the motor to cool off, and the repair bill saved will more than offset the slight loss of time and inconvenience.

Leaks in any system subjected to vibration are likely to occur, so don't be alarmed if you find your radiator has "sprung" a leak. As soon as possible it should be soldered, as a leaky radiator is not only a source of some annoyance by reason of frequent refilling, but a seam, once opened up, is likely to get larger, resulting in sudden loss of water with disastrous results.

clutch engages and transmits the power to the rear wheels through the transmission or gear set.

In the four cycle motor, of which the Chevrolet is an example, it takes four strokes of the piston or two complete revolutions of the crank shaft for each explosion or working stroke in any one cylinder.

As the piston starts downward on the first stroke of the cycle, the intake valve is opened. The motion of the piston creates a vacuum in the cylinder and draws in a charge of gas from the carburetor through the valve opening.

When the piston has reached the bottom of its stroke and starts upward on the second stroke of the cycle, the intake valve closes and the piston compresses the gas that is drawn into the space in the top of the cylinder.

As the piston reaches the end of its upward stroke the compressed gas is ignited by an electric spark which occurs at the points of the spark plug and the resulting explosion or expansion pushes the piston downward turning the crank shaft on the third or working stroke.

On the upward stroke of the piston, the exhaust valve is opened and the piston forces the remaining burned gas out through the exhaust pipe, leaving the cylinder empty and ready for the beginning of a new cycle.

DETECTING TROUBLE

Motor Will Not Start

If for any reason the motor does not start immediately under its own power, remove your foot from the starting button at once. One of the following things may be causing the trouble:

The ignition switch has not been turned on.

Gasoline supply exhausted.

Vacuum tank may be empty due to connections on top of tank or suction line to intake manifold becoming loosened or the shut-off cock under the vacuum tank may be closed.

Filter or screen in bottom of carburetor may be clogged with sediment so gasoline cannot enter float chamber (See instructions, Page 66 on carburetors, regarding the cleaning of this screen).

Gasoline line from vacuum tank to gasoline supply tank in rear may be broken loose at a joint or clogged with dirt, or if it is in cold weather an accumulation of water in the line from carburetor to vacuum tank may have frozen.

The carburetor choke rod may not be pulled out far enough, providing the motor is cold, to make the mixture rich enough to ignite, or the choke valve may have been closed too tight, causing the mixture to be so rich with gasoline that it will not ignite. (See instructions, Page 46 covering the operation of the choke rod).

The battery may be partially discharged and when the starting motor is in operation, not enough electric current is flowing

to the coil to produce a spark sufficient to ignite the gas. Try cranking the engine by using the hand starting crank.

The coil may be burned out.

The contact points in the distributor may not be opening or the points may be burned so badly as to remain open. (See Page 73 adjustment of contact points).

The primary wire from coil to distributor, coil to switch or to battery, may be loose or broken, making poor contact.

Spark plugs may be fouled with oil or carbon.

Secondary wire from coil to distributor cover disconnected at coil.

WATER IN GASOLINE SYSTEM

If there is water in the gasoline it will not mix, and being heavier than gasoline will find its way to the bottom of lowest point in the system, which is at the carburetor. In cold weather it may freeze. By pouring hot water or applying hot cloths to the supply pipe of the carburetor, this can be loosened up. If poured on, be careful that none enters the carburetor, as water in the gasoline will cause motor to miss.

MOTOR MISSES AT HIGH SPEED ONLY

There is insufficient gasoline flowing to carburetor due to obstruction in gasoline line or filter screen.

A valve may be sticking slightly and does not come to its seat properly.

There may be a loose electrical connection.

The spark plug points may not be spaced properly. About $\frac{1}{32}$ of an inch is the proper gap.

The springs on the contact arm in the distributor may be weak.

MOTOR MISSES AT ALL SPEEDS

Porcelain in the spark plug may be broken, allowing the spark to jump from the electrode in the center of the porcelain to the shell of the plug before entering the combustion chamber.

One or more spark plugs may be fouled. Thoroughly clean the sparking points and porcelain with cloth dipped in gasoline.

A valve may be sticking. Remove and thoroughly polish the stems. (See Page 42.)

Compression may be poor due to pitted or warped valves. (See Page 40.)

A valve spring may be broken.

Push rods may be adjusted too tight. (See Page 37.)

Valves may not be seating. (See Page 37.)

Adjustment for the push rods may have become loosened and valve is not opening.

Filter screen in carburetor clogged and gasoline not flowing to carburetor properly. (See Page 66.)

spring at hand, remove the old one and stretch it about an inch. As soon as possible, however, a new spring should be secured and installed to insure a permanent repair.

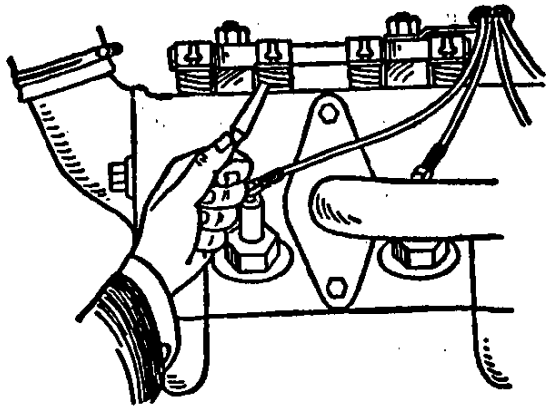


Fig. 7—Testing tension of valve springs.

DEFECTIVE IGNITION

First of all, ascertain whether the trouble is in the distributor the wiring, or the spark plugs. In most cases it will be found in the external wiring or plugs when one cylinder continually mis-fires. (See Page 73 Electrical System.)

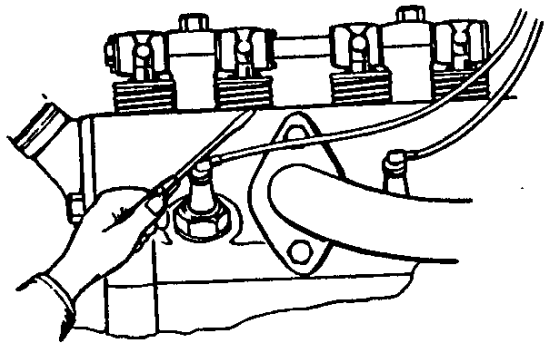


Fig. 8—Short circuiting spark plugs.

To determine the location of the trouble, go about the task systematically—do not jump from one thing to another but satisfy yourself that each part examined is working in its proper position.

When the engine misfires, locate the particular cylinder at fault as follows: With a screw driver (having a wooden handle) touch the top of the terminal end of the spark plug and at the same time allowing the screw driver to come in contact with the cylinder head (Fig. 8). If a change in the motor running is noticed, that cylinder is working properly. Try each spark plug until one is found where "short-circuiting" the plug causes no change in the motor running. You have then located the particular cylinder that is missing.

SPARK PLUGS

The faults generally occurring in the spark plugs are as follows:

(1). Fouled or sooted plugs. These may be very easily cleaned with a brush dipped in gasoline.

(2). Broken insulation or porcelain. A close examination of the plug will determine if this is the cause of the trouble. Replacing the plug is the only remedy.

(3). Gaps too wide between the sparking points. The best width of spark gap is 0.020 inch, or slightly less than 1/32 inch. Larger or smaller gaps are detrimental to the ignition.

(4). The sparking points or electrodes have become burned to such an extent as to increase their resistance. Replacement of the plug is the best remedy.

If, after satisfying yourself that none of the things listed above is the cause of the trouble, find a cylinder that you know is working and put the assumed bad plug in that one and the good plug in the bad cylinder. If the trouble goes with the plug you are sure it is the plug; if not, look elsewhere.

SPARK PLUG WIRES

To determine if the spark-plug wire is at fault disconnect it from the spark plug and hold the end about one-quarter inch from the plug. If no spark jumps across the gap with the motor running, examine the terminals and insulation. Sometimes the copper wires break but do not damage the insulation. If no exterior damage can be found replace the wire on the plug, and with motor running, slip the wire out of the socket on the distributor cap and hold it about one-quarter inch away from the brass ring on the socket. If a spark is given off, you are sure the wire is at fault, and should replace it with a new one. If no spark is obtained, remove the distributor cap and examine the terminal point protruding from the inside of the cap. If it is found burned or blackened on the point thoroughly clean and polish.

TESTING DISTRIBUTOR

If trouble is suspected with the distributor, first see if electric current is being delivered to the distributor by the primary wire from the switch and battery. If the distributor is functioning properly, the primary current will pass through the breaker arm and contact

lower gear, while a little slower, is in the end an insurance for longer life and more efficiency.

BRAKING EFFECTS

When the brakes are applied suddenly and with full force to the wheels of a car going at a considerable speed, the braking action will be so powerful as to immediately stop the rotation of the driving wheels. But the car will not come to an immediate standstill, its momentum will carry it forward, and the locked rear wheels will slide over the ground with most destructive effect on the tires.

The best method of using the brakes is that which applies pressure on them so gradually that the forward movement of the car and the rotation of the wheels come to a stop TOGETHER.

Avoid spectacular stops; they are not only unnecessary, but there may also come a time when the brakes will fail. The inevitable result will be a bad smash up with its consequent danger to others.

The careful driver shuts his power off before he reaches the stopping point, and permits the car to carry him along on its momentum, bringing it, with a gradual application of the brakes, to a halt at the exact spot.

Never apply the service brake without first closing the throttle or disengaging the clutch if the car is moving at considerable speed as the braking effect would be destroyed, besides it is injurious to the mechanism. The motor can be used, however, in assisting to hold back the car when going down steep grades by leaving the clutch engaged and the transmission gears in first or second speed, as the resistance offered by the compression in the motor makes it unnecessary to apply brakes so hard that they might become overheated.

When operating the car in this manner, keep the throttle closed but do not turn off the ignition switch as a certain amount of unburned gas would accumulate in the exhaust pipe and muffler and there is danger of bursting the muffler when the ignition switch is again turned on.

STEERING

Steering is not a difficult task. Perfection comes from confidence, as well as from knowledge. Within a short time the novice will have learned just how much of a movement on the steering wheel is required to turn a corner, pass other vehicles or obstructions.

Turning the steering wheel to the left will cause the front wheels to turn in the same direction and the car will travel to the left. Turning the steering wheel to the right causes the car to travel to the right. This applies when backing up as well as when going forward.

Proceed cautiously, preferably on a road that is little frequented and wide enough to give plenty of room for your first attempt at automobile driving.

Don't forget that after turning a corner the front wheels should be "straightened" up, otherwise you will run off the road.

A FEW HINTS ON DRIVING

Never drive your car at high speed over any road, much less a rough or slippery one. The slight gain in time saved will not offset the liability of an accident nor the pounding and racking to which the car is subjected. Usually the time saved is unimportant when figured in dollars and cents. The resulting repair bills, which in time are sure to follow, are never unimportant.

It has been demonstrated that the motorist who drives his car at average speeds of from twenty-five to thirty-five miles per hour over all sorts of roads pays much more per mile for gasoline, oil and tires than the one who is more conservative and averages from twenty to twenty five miles per hour.

In addition, a car which is driven at high speeds all the time is in the repair shop at frequent intervals, which adds to the cost per mile of operation.

Economical transportation is not a question of how many miles are covered in a given time but the number of miles of useful travel that can be obtained at the least cost per mile for fuel, oil, tires and repairs.

In times of emergency when to stop suddenly is absolutely necessary, remember the speed at which you are traveling combined with the road surface may spell safety or disaster for you, the occupants and your car. One cannot always observe closely road surfaces when traveling at high speed; the necessity of watching the road far ahead prevents. So, avoid excessive speed is a good rule to be observed.

RULES OF THE ROAD

Road and traffic laws vary in different localities. It is, therefore, impossible to set down a complete list of rules which may be followed in all parts of the country. The following are some of the rules which are practically universal in all parts of the United States.

In meeting a vehicle going in an opposite direction PASS to THE RIGHT.

In passing a vehicle going in the same direction PASS TO THE LEFT.

Always stop with the right side of the car next to the curb. If it is necessary to turn around to do this, it should be done.

Never turn around or turn off onto another road without making absolutely sure that there are no other vehicles close behind you.

Never enter upon street car tracks without making sure that no car is directly behind you—no matter how sure you feel, look and see.

One of the ignition wires may be loose and due to vibration makes and breaks the contact.

Contact points in distributor are not opening and closing properly.

Contact points may need cleaning or filing. (See Page 74.)

The carburetor may be flooding causing the mixture to be too rich. This is usually caused by the needle valve not seating properly. To correct, remove needle valve cap, rotate valve slowly with fingers and tap lightly on top of the valve with a light hammer. This will cause a new seat to be formed and will also remove any obstruction or roughness that there may be on the needle valve seat.

MOTOR MISSES AT LOW SPEED ONLY

Compression is weak due to leaky piston rings or valves not seating.

There may be a leaky gasket where the carburetor is attached to the intake manifold or where the manifold attaches to the cylinder head, permitting air to enter, weakening the mixture. To detect the leak, take an oil can filled with gasoline and squirt around where the connections are made. If any gasoline enters the opening, the speed of the motor will immediately increase thereby indicating a leak.

The regulator screw which regulates the flow of gasoline at low speed only, may not be adjusted properly. Set the throttle for low speed running and turn the screw in or out to obtain the best low speed running adjustment.

The spark lever may be advanced too far. When running at low motor speeds the spark lever should be retarded.

When running at low motor speed the generator does not deliver electric current to the battery as the circuit breaker makes an "open" circuit in the line and ignition current is then supplied from the battery. If the battery is in a badly discharged condition it oftimes happens that insufficient current is being supplied for ignition purposes.

There may be one or more weak exhaust springs and with the throttle practically closed the vacuum created in the cylinders by the piston on the suction stroke will open the exhaust valve, drawing in burned gases and weakening the mixture so it will not burn. (See Page 30)

MOTOR STOPS SUDDENLY

If the motor stops suddenly without any further explosions:

Examine the switch, and at any point on the reverse side of the instrument board where wires are attached, the battery, distributor and on the coil for loose connections, as a wire might have become detached.

The switch may be burned out, or the key does not produce a contact.

Test the coil (See Page 32) to determine whether it is burned out, and, in fact, make a thorough examination of the entire ignition system.

Test the wires at the distributor (See Page 31) to determine whether electricity is getting through the ignition switch.

If it is found that the electrical connections are all tight and that there is electricity in the wires, examine the distributor, as the cam which operates the distributor may have become loosened and the contact points are not opening. If this is found to be the case see Page 73 for retiming distributor.

Examine gasoline supply.

Examine carburetor to see if gasoline is running into the float chamber.

MOTOR SPITS AND BACKFIRES

This is usually an indication of carburetion faults although the backfiring through the exhaust pipe or muffler may be due to defective ignition. If for any reason the ignition apparatus fails to operate for a few revolutions of the motor, there is a considerable amount of unburned gas forced from the cylinders into the exhaust pipe and muffler, then when the gas is ignited in the cylinders the flame which is emitted through the exhaust valve ignites the gas in the muffler, causing an explosion.

Backfiring and spitting through the carburetor is often due to a weakened mixture, which is slow-burning, and as there is still a certain amount of flame in the cylinder when the intake valve opens to receive the new charge of gas, the result is that the gas in the intake pipe is ignited. The cause is usually a low gasoline supply or a clogged gasoline system, or there may be small air leaks in the intake manifold or at the connections which allow air to enter, making the mixture too lean.

Carbon which collects on top of the pistons and in the combustion chamber will sometimes become heated until it is incandescent and will ignite the incoming gas prematurely.

One of the intake valves may be sticking and not getting to its seat in time. It should be removed and the stem polished. (See Fig. 17).

MOTOR LACKS POWER AND IS SLUGGISH

This is very apparent when ascending a slight grade or in attempting to accelerate the motor suddenly, and may be caused by the following:

First—Carbonized valves.

As the motive power is obtained by burning or exploding a highly compressed gas mixture, it follows that a certain amount of carbon will be deposited on the VALVE SEATS, PISTON HEAD and COMBUSTION CHAMBER. Small particles of burnt carbon will lodge under a valve, especially the exhaust, holding it open. As this exposes the valve seat to the heat generated by the explosion, small pits or burnt spots will in time cause the surface to be so roughened as to prevent

ACCELERATOR

The accelerator pedal is located to the right of the service brake pedal. Pressing down upon this pedal causes the motor to be speeded up or "accelerated." When pressure is released a spring returns it to its normal position. The hand throttle lever and the accelerator pedal are interconnected. Advancing or retarding the hand throttle lever will move the accelerator pedal down or up, but pressing the accelerator pedal down will not actuate the hand throttle lever. It is possible, therefore, to set the hand throttle lever for any desired minimum speed so that when pressure is removed from the accelerator pedal the motor will not stop, but will drop to the minimum speed which you have selected. This arrangement gives greater freedom to the operator's hands, especially when it is necessary to shut off power when going around bad spots in the road, approaching turns or in passing other vehicles.

The hand throttle is used in starting the motor and in touring as an occasional relief to rest the foot at times when the car is run considerable distances without material changes in its speed.

PUTTING THE CAR IN MOTION

When you are seated behind the steering wheel in the car, you have at your right hand a vertical lever moving in a ball and socket called the GEAR SHIFTING LEVER (Fig. 4). This lever controls the various speeds of the car.

The motor is still running slowly and the gear shifting lever is still in the neutral position (vertical and free to move to right or left).

You are now going to set the car in motion on the first or low speed.

First, ADVANCE THE SPARK AND THROTTLE LEVERS to the position indicated in Fig. 2. The motor speed will be increased.

Second, PUSH DOWN ON THE CLUTCH PEDAL, the one under your left foot (Fig. 4).

Third, move the gear shifting lever from the neutral position into first or low-speed position by moving it first to the left as far as it will go, and then backwards as shown in Fig. 5.

In moving the gear-shifting lever be sure to avoid the left-hand front or reverse position.

While you have been moving the gear-shifting lever you have kept the clutch pedal pressed down with the left foot.

Now let it come up, not suddenly, but gradually and smoothly, little by little, until the car moves slowly ahead. A little practice will soon show the proper clutch manipulation.

Remember, letting the clutch in suddenly is not only unpleasant to the occupants of the car, but VERY INJURIOUS to the entire mechanism.

Since you are in first or low speed your motor will run comparatively fast, but your car will travel slowly. Do not permit your motor to "race" at this stage.

Be in no hurry to change into a higher speed, but let the car gain some momentum. If you are a novice run along for some distance on the first speed to get the "feel" and to gain the confidence of handling.

After the car has gained sufficient momentum, prepare for changing to second speed.

Speed the car up just a little by opening the throttle.

Release the clutch by depressing the clutch pedal, the one under your LEFT foot, and while the car retains its slightly increased speed, and while you KEEP THE CLUTCH RELEASED, move the gear-shifting lever forward to neutral, thence to the right and right-front position. (Fig. 5).

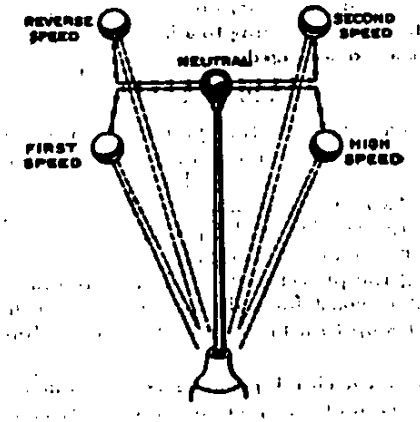


Fig. 5—Gear shifting Lever positions.

Now, let the clutch pedal come back easily as before, and at the same time advance the spark and throttle levers slightly.

Allow the car to gain some speed (do not permit the motor to race), then prepare for changing to high or third speed.

Release the clutch as before and, while the clutch pedal is depressed, pull the gear-shifting lever straight back into the right-rear position as indicated in Fig. 5. At the same time advance both the spark and throttle levers a little.

When you have become accustomed to changing gears, try using the accelerator pedal to "accelerate" the motor after making shifts from second to high or high to second, instead of the throttle lever. You will find it less awkward, besides giving greater freedom of the hands.

It is possible to move the gear shifting lever from any one position to another, only be careful:

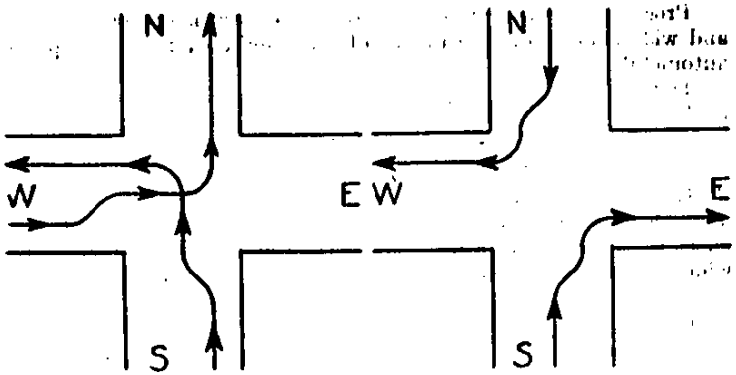


Fig. 6—Traffic diagram.

Do not cross street car or steam railroad tracks without making sure that it is absolutely safe to do so.

In crowded traffic do not apply the brakes too suddenly. It It may be that the vehicle following cannot stop as quickly as you can. If this is the case, a collision is sure to result.

On wet asphalt streets or slippery roads do not apply the brakes too suddenly. If the brakes are applied suddenly under these conditions a bad skid is sure to result.

When you have reached a point where you intend to turn or stop, always make your intention known in advance to the DRIVER following by an appropriate signal.

If you are driving north and wish to turn west, or if going east and intend turning north (Fig. 6): First, pull over so that you are traveling in the center of the road SOME DISTANCE FROM THE CROSSING, and, second, before you begin to turn HOLD YOUR ARM OUT IN A HORIZONTAL POSITION so that the driver in your rear may be aware of your intention to turn. He can then pass to your right with plenty of room, and without danger of collision.

If you are driving north and wish to turn east, or if going south and intend turning west (Fig. 6): First, pull over near the curb or side of the road SOME DISTANCE FROM THE CROSSING, and, second, indicate your intention to the driver in your rear BEFORE YOU BEGIN TO MAKE THE TURN.

When you intend stopping, or, in crowded traffic, slow up, ALWAYS make your intention known to the driver in your rear by HOLDING YOUR ARM out from the side of the car in a horizontal position.

More rear-end collisions occur by neglecting to notify the driver following, that you intend stopping, or turning, than there are through carelessness on the part of the rear driver. Remember, the driver following cannot read your mind—all he can see is the rear of your car and the roadway between—he cannot see the road ahead of you, and is therefore dependent on you to prevent a collision and damage to both cars.

KEEP THE MOTOR CLEAN

Too much stress cannot be laid upon the necessity of keeping the motor clean. The dust drawn through the radiator openings as the car travels ahead contains grit, which, when wet with oil, forms a cutting compound that wears and scratches, leaving an irregular surface. This in time is sure to give trouble, so make it a rule to regularly clean all working parts. The slight inconvenience to yourself will be more than offset by the saving in repair bills later on.

SUMMARY

In order that you may get the maximum enjoyment and comfort out of your car, you must be as considerate and thoughtful about it as you would of a fine horse that is as fine and costly as your car.

Therefore:

Do not race the motor unnecessarily.

Be warned by every abnormal noise; if a squeak, locate it and lubricate the part. If it is some other noise, locate the loose parts that cause it and tighten the bolts.

Don't tinker. Half the ability to make an adjustment or repair is the ability to discover its necessity.

Some motorists are said to have "luck" with their cars. There never seems to be any trouble, everything is trim and neat, the motor always starts when wanted and runs as long as is needed without any of the exasperating breakdowns on the road with which the unfortunate one thinks himself cursed through the carelessness of the manufacturer. With all adjustments carefully made when needed, every bearing and working part well lubricated, the whole car will work very satisfactorily and will continue to do so with only a very small fraction of the attention that would be absolutely necessary for the care of a horse.

By neglecting details you will save yourself some time and inconvenience in getting on your way; but the day of reckoning is sure to come. What you have saved may be spent in expensive roadside repairs.

HOW THE MOTOR OPERATES

The power of the motor is produced by burning or exploding charges of gas in the cylinders above the pistons, the resulting pressure forcing the pistons down.

The pistons are connected with the crank shaft by means of connecting rods and as they move up and down, turn the crank shaft around in a clockwise direction, viewed from front of the car. At the rear end of the crank shaft is a heavy fly wheel in which the

see that the terminals are tight and not corroded or covered with dirt or oil at the following places:

1. All connections to spark plugs.
2. All connections to the coil.
3. All connections to the generator and cut out.
4. That the starting motor cable is securely fastened at the starting motor terminal post and also at the starter switch.

Next examine all connections on the dash and remove the floor board making sure that the positive cable from the battery to starting switch is fastened securely at both the switch and battery terminal ends. Be sure the negative or short cable is securely clamped to the battery terminal and has a good solid contact where fastened to the frame of the car.

Remove the vent plugs in the battery and make sure that there is sufficient electrolyte to cover the plates to the proper height. (See Page 80 Care of Battery).

The electric lighting, starting and ignition systems will perform their functions indefinitely and give you the maximum service if given even a reasonable amount of attention. (See Page 73).

Next refer to Lubrication Chart, Page 48 and make sure that all places requiring grease or oil have had the proper attention. Do not overlook the fact that a new car should have closer attention, and especially during the first 1000 miles of use, to the oiling and greasing than is really necessary after that period.

STARTING THE MOTOR

These few details attended to, you are ready to start the motor.

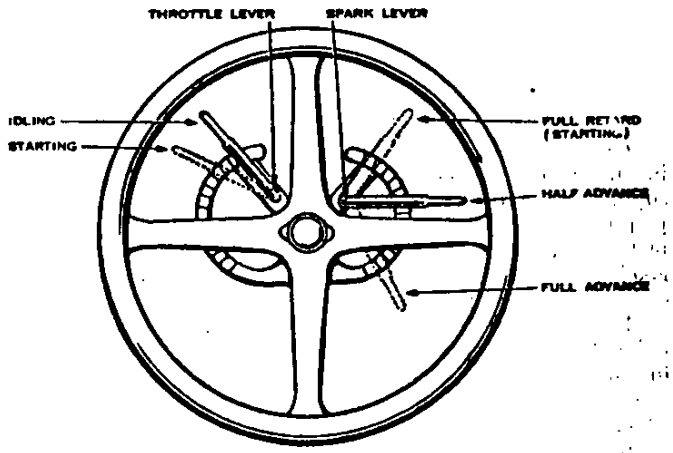


Fig. 2—Positions of spark and throttle levers.

Before you should do so, however—in fact, before you should start the motor at any time—make certain of these things.

First, that the gear shifting lever is in neutral position, that is, it should be free to move from right to left. (See Fig. 5).

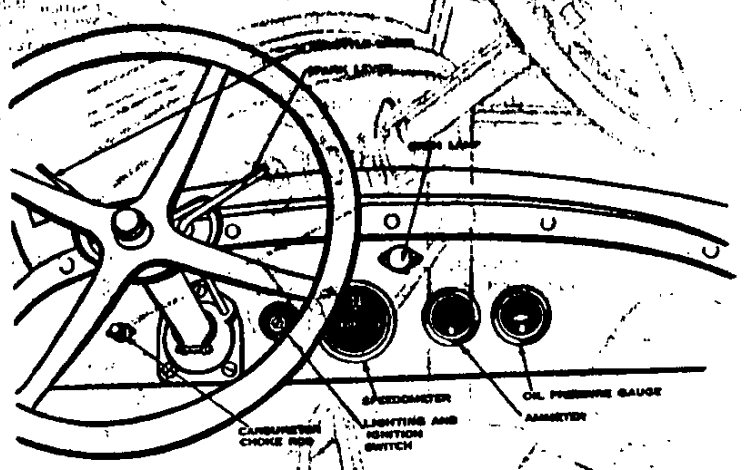


Fig. 3—Instrument Board

Second, that the spark and throttle levers are in the proper positions for starting. (Fig. 2)

Third, that the ignition switch is turned on. (Fig. 3.) To do so, insert key, press it forward slightly until it will turn, then give it one-quarter turn to right.

Be absolutely sure that the spark lever is properly retarted, as shown. (Fig. 2) Failure to observe this may cause serious damage to the starting equipment or break the teeth from the fly wheel and subject you to unnecessary trouble and expense.

We will not be responsible for such damage, so observe this point without fail.

After being absolutely sure that all THREE RULES given above have been carefully observed, start the motor.

Located on the floor boards (Fig. 4) within reach of the right foot is the starting switch. Press this down as far as it will go and hold it until the motor starts under its own power. Remove your foot the moment the motor starts. Serious damage can be done to the starting motor or flywheel unless this is watched very carefully.

To keep the clutch released while moving the gear shifting lever.

To avoid the left front or reverse position while the car is moving.

To avoid "clashing" when engaging the gears.

When the gears clash press down a little more upon the clutch pedal and wait a moment before trying again. Remember, clashing the gears burrs up the edges of the teeth, injuring them and, in time, making gear changes exceeding hard, besides necessitating an early renewal of the gears.

Be deliberate: It is well to pause a moment after disengaging the gears before moving into the next speed. The fundamental requirements in every case are that the gears to be meshed shall be revolving at as nearly the same speed as possible. By waiting a moment, time is given for this to take place.

In changing to a higher gear, slow down the motor while the gears are disengaged. When changing to a lower speed, speed up the motor while the gears are disengaged.

STOPPING THE CAR

When you have decided that you want to make a stop, release the clutch and at the same time retard the throttle lever, or remove your foot from the accelerator pedal. Allow the car to coast for a moment or two on its own momentum, then gradually press downward on the service brake pedal, the one under your right foot, until the car comes to a stop.

By applying the pressure on the brakes gradually, and by permitting the car to coast for a distance on its own momentum, you can gauge your stop to a nicety and come to a stop exactly at the desired spot.

You must keep the clutch pedal depressed while the car is coming to rest, and never under any circumstances, take pressure off the clutch pedal until after you have moved the gear shifting lever from the high speed position into the neutral position.

When the gear shifting lever is in neutral the transmission gears remain out of engagement, and although the pressure on the clutch pedal be now removed, the car will remain motionless although the motor continues to run.

If the stop is to be of some duration, always, before leaving the car, set the emergency brake (Figure 4) by pulling the emergency brake lever straight back towards you as far as it will go. Be sure that the pawl attached to the lever engages the tooth segment, otherwise the brake will not hold. To release the brake pull the lever towards you slightly. This causes the pawl to disengage more easily from the toothed segment then the lever can be pushed forward into its original position. Be sure the lever has been pushed forward as far as it will go, otherwise your brake may partially "set," using up power besides wearing out the brake linings.

To stop the motor turn the ignition key to the left one-quarter turn and remove it from the switch.

It is also good practice to turn the steering gear so that the wheels "turn in" toward or against the curb or side of the road. Should the brake, for any reason, be released, this will prevent the car from starting on a "wild plunge," should your stop be on a grade.

REVERSING OR BACKING THE CAR

Always bring your car to a "dead" stop before attempting to back up. Failure to observe this may result in serious damage to the transmission or rear axle and cause unnecessary expense. With the car at rest and the gear shifting lever in neutral release the clutch by depressing the clutch pedal and move the gear shifting lever forward into the left forward position (Fig. 5). Now let the clutch pedal come back easily and at the same time accelerate the motor speed by opening the throttle slightly.

Remember that in moving backward the same movement of the steering wheel will cause you to turn to the right or left as it would were you going forward.

Proceed cautiously—more accidents occur when backing up than when going forward, as you cannot see clearly, so take your time, look around and make sure that you have your car under such control that a stop can be made instantly.

MAKING AN EMERGENCY STOP

There are times when the ability to bring the car quickly to a stop is of the greatest importance. When this occurs, release the clutch by pressing the pedal under your left foot and at the same time PRESS DOWN HARD on the service brake pedal, the one under your RIGHT foot. If this braking action is not sufficient to bring the car to a stop in the required time, "set" the emergency brake by pulling the emergency brake lever (Fig. 4) towards you as far as it will go. By applying both the service and emergency brakes you apply braking effect in opposite directions, which will have immediate results.

As soon as possible retard the throttle to prevent the motor "racing."

If a full stop is not desired, merely a temporary slackening of the speed, RELEASE THE BRAKE SFIRST, THEN LET THE CLUTCH PEDAL COME UP.

If the speed of the car has been decreased to any great extent, it is advisable to shift into a lower gear. Never allow the motor to pick up a slowly moving car on high gear. The strain placed upon it is very great, and the likelihood of "stalling" the motor easily offsets the small effort necessary to change speeds.

Be considerate: the manufacturers have placed three forward speeds at your disposal, each ratio of which is designed for certain loads and conditions. Don't overload the motor; the next

for Economical Transportation

CHEVROLET

TO THE CAR OWNER

The degree of success encountered in the use of any automobile, regardless of price or kind, is a direct result of and in direct proportion to, the thought and effort expended in caring for that automobile. It, therefore, rests with the car owner to do the things recommended, or to see that they are done.

The automobile is not simply a machine but is a very fine piece of machinery, and is often subjected to services for which it was not designed.

It is only on account of the generous factors of safety incorporated in the car design by the makers that may save it from utter destruction.

Like any piece of machinery, the automobile requires certain care along certain well defined lines at certain intervals. Given this care a maximum return on your investment in transportation may be expected at the minimum cost per mile.

Thanks to the efficiency and foresight of the automotive engineers and designers, the amount of labor and time necessary to care for an automobile as designed and built today is not great. Even so small a period as one or two hours a week of conscientious intelligent effort by the owner-driver or someone employed by him, will secure the results the owner has a right to expect and which the automobile manufacturer desires. We may well draw a comparison between the care and consideration lavished on a locomotive, which runs over hard smooth road bed, at the end of every two or three hundred miles and the attention given and maintenance necessary on the average automobile driven under the worst possible road conditions.

The manufacturer has done his part, the dealer has shared this responsibility by seeing to it that the car is delivered to the owner in first class condition and has established an efficient maintenance department. The balance rests with the automobile owner.

This book is compiled for the benefit of the owners of Chevrolet cars. By means of descriptions, illustrations and diagrams, we have endeavored to show the mechanical construction of the Superior Chevrolet car, describing in detail the care, operation and adjustments which, if carefully observed, will insure a long term of service with the minimum of maintenance expense.

This book is not published to instruct the car owner how to disassemble a car, but in order that he may know how to take the best care of it and handle it in such a way that it will give him the maximum of service and pleasure. Whether or not the car will give the satisfaction that is built into it lies principally with the car owner.

We advise every owner of a Chevrolet car to become familiar with the car, its mechanical parts and their care and adjustment as soon as possible.

Get the habit of making careful and periodic inspections as directed in this Book of Instructions. Keep the parts of the car

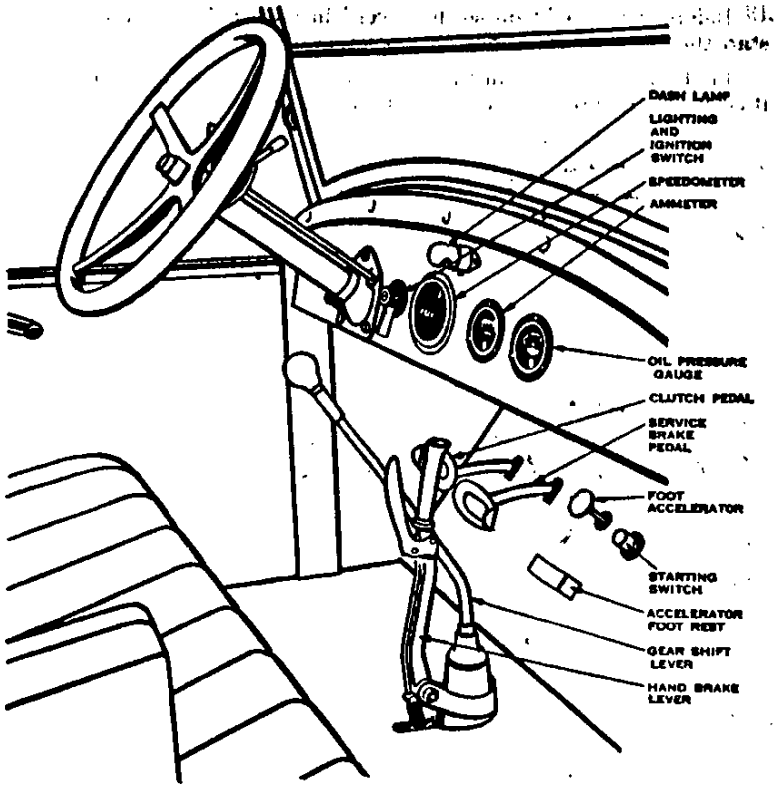


Fig. 4. Controlling Devices

If the engine fails to start never hold the starter switch button down for any length of time without stopping to examine the position of the levers, switch, etc., as failure to start is generally an indication that something is wrong and a prompt investigation should be made.

CARBURETOR CHOKE ADJUSTMENT

Owing to the difference in specific gravity of gasoline obtainable in various localities, and also to difference in atmospheric conditions, it is sometimes necessary to feed the motor a fuel mixture rich in gasoline and poor in air when starting. This is particularly true in cold weather when the motor has become thoroughly chilled. This is done conveniently by means of the carburetor choke rod located on the instrument board (Fig. 3). In very cold weather it may be necessary to pull this rod all the way out. As the motor starts and begins to warm up, the rod may be pushed part way inward again until, when the engine is running smoothly and begins to warm up to the temperature of best efficiency, the rod should again be returned to its original position. The carburetor, before leaving the factory, has been adjusted so that the motor will run at its highest efficiency with the least gasoline consumption, therefore always see that as soon as the motor warms up to the proper temperature the rod is returned to its original position as quickly as possible.

A mixture which is "rich" in gasoline heats up the motor, causing lubrication troubles, with the consequent danger of "scoring," and rapid wear on all moving parts, besides being wasteful of fuel. Avoid excessive use of the choke.

MOTOR STARTED

It is not a good thing to let the motor "race" idle (run at considerable speed). Therefore, you should now "retard" the THROTTLE LEVER, (Fig. 2) thereby cutting down the gas supply. AT THE SAME TIME ADVANCE THE SPARK LEVER until both have the position indicated in Fig. 2.

It is best to retard the throttle lever until the motor turns very slowly and just fast enough to maintain its operation.

For the novice it is well to try the motor-controlling devices with the car standing still—advancing and retarding the spark, opening and closing the throttle. In this way a fair idea may be gained of the effect of these controlling devices on the action of the motor.

When the car is being operated at a speed greater than fifteen (15) miles an hour, the spark lever should be advanced to the fullest extent. This brings the spark in the cylinder at the proper time to ignite the charge when it will be most effective. (Fig. 2) This places the spark in the cylinders a trifle in advance of the time when the piston reaches the top of the compression stroke, but it is necessary, as there is a certain lapse of time after the spark crosses the point of the plug before the gas is fully ignited. The full amount of the pressure is then brought to bear on the piston as it is ready to start on the downward or power stroke. By operating the spark in the retarded position, when the car is traveling along at high speed, the motor runs hot as the late explosion develops considerably more heat.

When the motor is laboring in sandy roads or on a hill at low speed, the spark lever should be retarded just enough to prevent the motor from having an ignition knock. This knock is brought about by the explosion or expansion taking place in the top of the cylinder before the piston has reached the top of the compression stroke. The motor will develop its maximum power when the spark lever is operated in such a manner so as to ignite the gas at the moment the piston is ready to go downward on the power stroke.

STANDARD WARRANTY

Approved as to Form by National Automobile Chamber of Commerce, Inc.

We warrant each new motor vehicle manufactured by us to be free from defects in material and workmanship under normal use and service, our obligation under this warranty being limited to making good at our factory any part or parts thereof which shall within ninety (90) days after delivery of such vehicle to the original purchaser be returned to us with transportation charges prepaid, and which our examination shall disclose to our satisfaction to have been thus defective; this warranty being expressly in lieu of all other warranties expressed or implied and of all other obligations or liabilities on our part, and we neither assume nor authorize any other person to assume for us any other liability in connection with the sale of our vehicles.

We do not make any guarantee against, and we assume no responsibility for, any defect in metal or other material that cannot be discovered by ordinary factory inspection, or in any part, device or trade accessory.

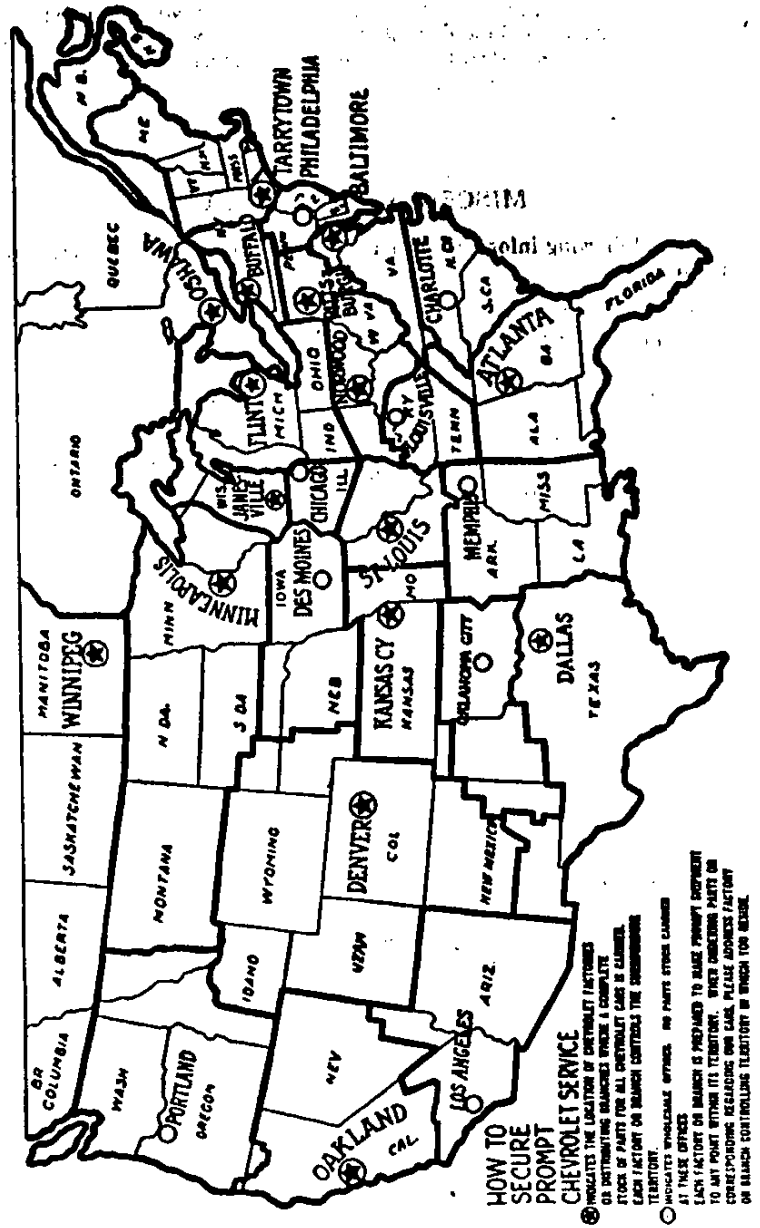
This warranty shall not apply to any vehicle which shall have been repaired or altered outside of our factory in any way so as, in our judgment, to affect its stability, nor which has been subjected to misuse, negligence or accident.

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

CHEVROLET MOTOR COMPANY.

IMPORTANT NOTICE

It is understood and agreed that our Standard Warranty is null and void on any Chevrolet Model where parts not made or sold by us are used in any replacements or otherwise.



clean and well lubricated and drive with consideration for the car as well as for its occupants.

If necessary to write your dealer or the Chevrolet Motor Company for information on any subject, please be sure in every case to give the serial and motor number.

Genuine Chevrolet parts are handled only through authorized dealers and service stations. Owners, therefore, who patronize other than authorized service stations will be liable to have counterfeit parts used for replacement. We have found that almost without exception counterfeit parts are of inferior quality and if installed, will not give the service that the genuine Chevrolet parts will give and in the long run will cost the owner more than if genuine Chevrolet parts were used.

WHAT TO DO UPON RECEIVING THE CAR

Before Chevrolet cars are shipped from the factory they are given a final examination during which every precaution is taken to have each and every item in accordance with specifications.

In spite of these efforts, however, many things may happen to a car or its equipment in transporting it to destination. It is necessary, therefore, that the buyer safeguard his own interests on receiving the car by observing certain precautions.

Even though the car is delivered to the buyer by a dealer ready for use, it is still well for him for his own protection to thoroughly inspect the car and equipment before putting it into service. The buyer should insist on going over the car personally with the dealer's representative before the car is driven.

The treatment the car receives the first 1000 miles of use often determines the difference between a satisfactory car and one that is not.

First see that all tools, curtains and equipment are with the car including oiling chart and instruction book. See that the serial number and motor number correspond to the numbers on your bill of sale.

Make sure that the radiator is filled with clean water.

See that there is a supply of good clean fuel in the fuel tank.

See that the oil reservoir is filled to the proper level with good clean fresh oil. (See Fig. 1) To read the gauge pull up the oil gauge rod located just below the oil filler and breather pipe. Wipe the oil off the rod. Insert the rod and remove it again. In this manner a true reading may be obtained. If the oil gauge rod shows the oil level to be below the full mark, remove the filler pipe cap and pour in a good grade of oil until the full mark is reached. Consult your dealer as to the proper oil for your car. (See Page 43)

Do not put more oil into the oil reservoir than is required to bring the level up to the full mark on the oil gauge rod as the proper level is predetermined to give the best results and over-filling will simply mean increased consumption, smoking and carbonization.

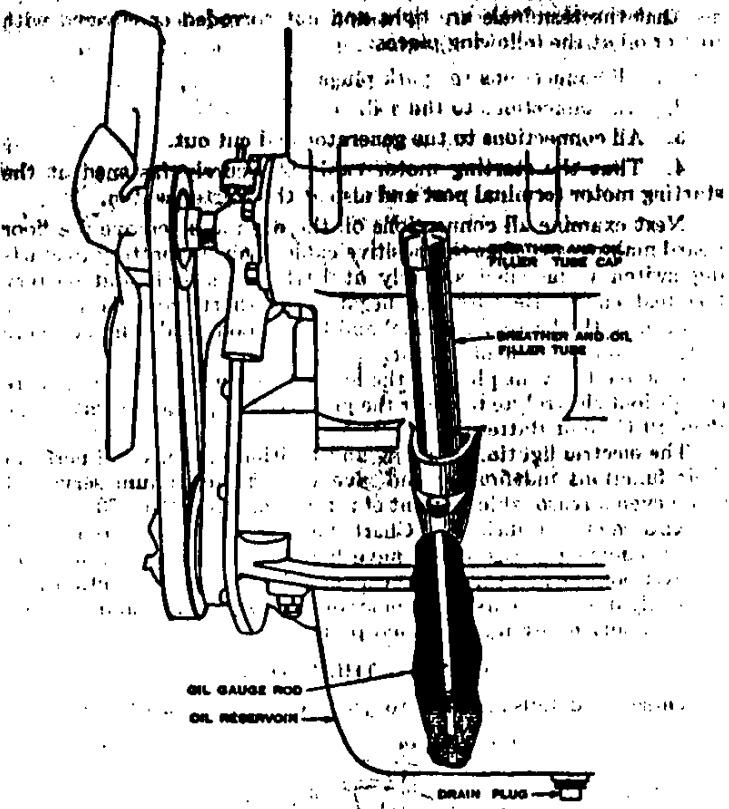
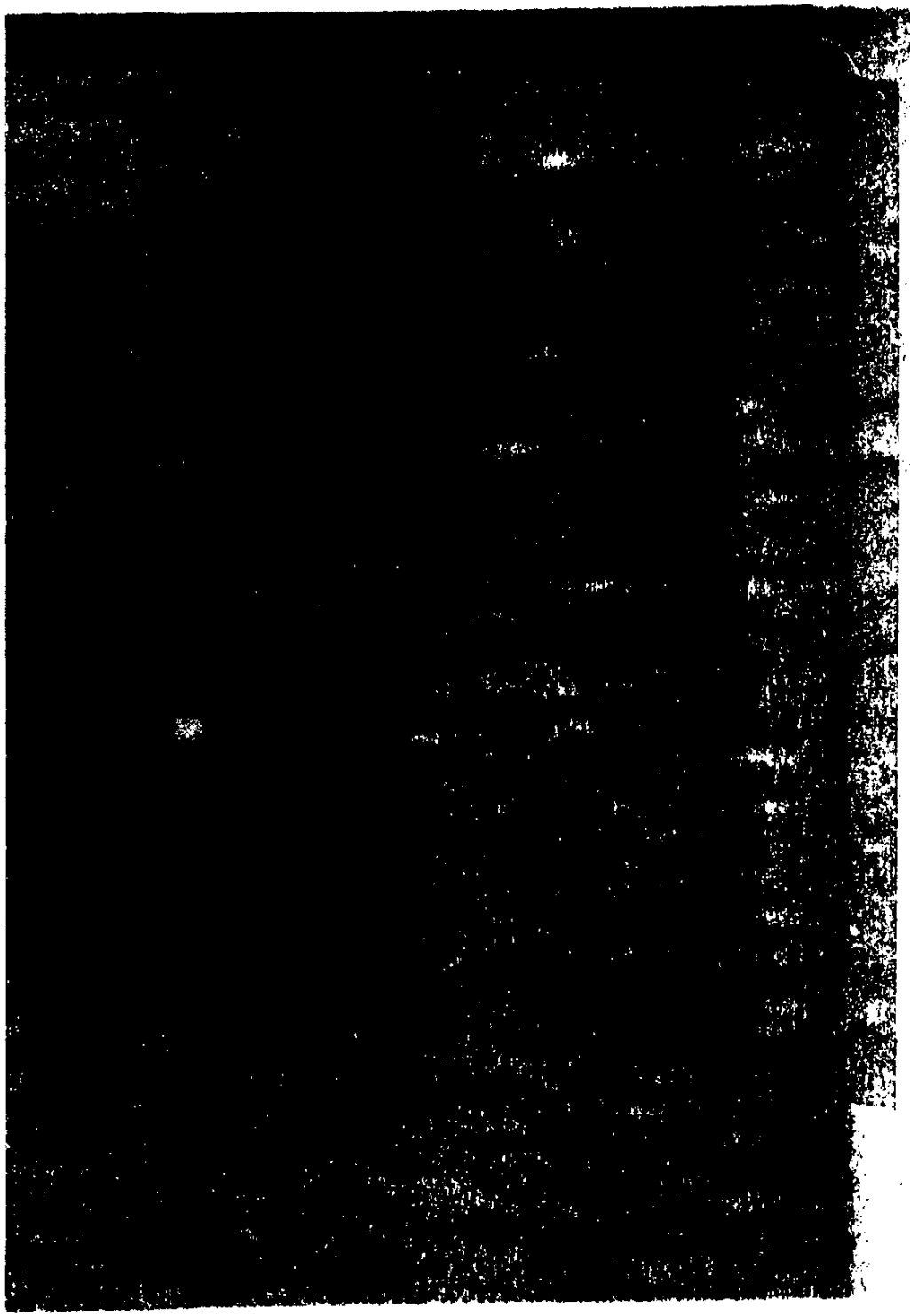


Fig. 1—Oil gauge and filler pipe.

Once a month or every 1000 miles in summer and every 500 miles in winter, all oil in the oil reservoir should be drained off and a fresh supply poured in. The old oil may be drained by removing the drain plug in the bottom of the oil reservoir. After the reservoir is completely drained, replace the plug and fill to the proper level with good oil. (See Fig. 1). Always use the best oil as it is the most economical in the long run. See Page 43 General Lubrication.

Examine the tires to see that they are not damaged or under inflated. The air pressure in the tires should be about 50 pounds for the front tires and 60 pounds for the rear tires; however, you should always be guided by the tire manufacturers recommendation which is usually stamped or moulded on the side of the tire.

Raise the hood and examine all wiring, making sure there are no loose terminals. (See Page 76). Especial care should be taken to



INSTRUCTIONS

FOR THE OPERATION
AND CARE OF

CHEVROLET MOTOR CARS

SUPERIOR
MODEL

—

JANUARY 1924 EDITION

—

CHEVROLET MOTOR CO.
Division of General Motors Corporation
DETROIT, MICHIGAN

MISCELLANEOUS DATA

The following information may be useful in securing license and insurance.

Serial Number:—

The Serial Number on Superior Models will be found stamped on a small metal plate located on the right side of the front seat frame visible when the right front door is open.

Motor Number:—

The Motor Number is stamped on the smooth rim of flywheel back of the starter teeth.

Wheel Base:—

The wheel base is 108 inches.

Tread:—

The tread is standard, 56 inches.

Wheels and Tires:—

All cars are equipped with 30 x 3½" wheels and tires. The closed cars use a straight side cord and the open cars a clincher fabric tire.

Engine:—

Number of cylinders, 4; bore, 3 11/16"; stroke, 4"; horsepower (N. A. C. C. formula), 21.7. (170.00 IN.)

Weight of Superior Cars without Gas, Oil or Water:—

Touring, 1790 lbs.; Roadster, 1693 lbs.; Sedan, 2068 lbs.; Utility Coupe, 1878 lbs.; Light Delivery, 1790 lbs.; Commercial Chassis, 1431 lbs.; Utility Express Truck Chassis, 1790 lbs.

The following is a list of manufacturers supplying accessories for Chevrolet Cars, and as under the terms of our warranty these are guaranteed separately by the manufacturers, any questions as to the repair or replacement of the units may be taken up with them or their nearest service station.

Battery:—

Willard Storage Battery Co., Cleveland, Ohio, or authorized service stations.

Electric Storage Battery Co., Philadelphia, Pa., or authorized Exide Service Stations.

Carburetor:—

Zenith Carburetor Co., Detroit, Mich., or authorized service stations.

Holley Carburetor Co., Detroit, Mich., or authorized service stations.

Carter Carburetor Co., St. Louis, Mo., or authorized service stations

Circuit Breaker:—

Remy Electric Co., Anderson, Ind., or any branch of United Motors Service, Inc.

Coil:—

Remy Electric Co., Anderson, Ind., or any branch of United Motors Service, Inc.

Generator:—

Remy Electric Co., Anderson, Ind., or any branch of United Motors Service, Inc.

Starting Motor and Starting Switch:—

Remy Electric Co., Anderson, Ind., or any branch of United Motors Service, Inc.

Distributor:—

Remy Electric Co., Anderson, Ind., or any branch of United Motors Service, Inc.

Rims:—

Jaxon Steel Products Co., Jackson, Mich., or any branch of United Motors Service, Inc.

Speedometer:—

Stewart-Warner Corporation, Chicago, Ill., or authorized service stations.

A. C. Spark Plug Co., Flint, Mich., or any branch of United Motors Service, Inc.

Tires:—

Goodyear Tire & Rubber Co., Akron, Ohio.

Goodrich Rubber Co., Akron, Ohio.

DATA SHEET CHEVROLET MOTOR CARS

Model	Year Built	Trade Name	Type of Car	No. of Cyl	Bore and Stroke	S. A. E. Horse Power	Tire Size	Wheel base	Ave Shipping Weight	Road Wt. Less Pass	No. of Pass		List Price
C-40	1912	Classic	Touring	6	[illegible]	30.5	34x4	120	[illegible]	[illegible]	5		$2150.00
C-40	1913	Classic	Touring	6	[illegible]	30.5	34x4	120	[illegible]	[illegible]	5		2500.00
L-36	1913	Light Six	Touring	6	[illegible]	[illegible]	34x4	[illegible]	[illegible]	[illegible]	5		1475.00
L-30	1914	Light Six	Touring	6	[illegible]	26.3	34x4	[illegible]	[illegible]	[illegible]	5		1475.00
H-4	1914	Baby Grand	Touring	4	3 11/16x4	21.7	32x3½	106	[illegible]	[illegible]	5		875.00
H-2	1914	Royal Mail [illegible]	Roadster	4	3 11/16x4	21.7	32x3½	102	2225	[illegible]	2		750.00
H-4	1915	Baby Grand	Touring	4	3 11/16x4	21.7	32x3½	106	[illegible]	2500	5		750.00
H-2	1915	Roy. Mail [illegible]	Roadster	4	3 11/16x4	21.7	32x3½	102	2230	[illegible]	2		720.00
H-3	1915	Amesbury Special	Roadster	4	3 11/16x4	21.7	32x3½	102	2300	[illegible]	2		985.00
H-4	1916	Baby Grand	Touring	4	3 11/16x4	21.7	32x3½	106	[illegible]	[illegible]	5		750.00
H-2	1916	Roy. Mail [illegible]	Roadster	4	3 11/16x4	21.7	32x3½	102	2275	[illegible]	2		720.00
dH-2	1916	Roy. Mail [illegible]	Roadster	4	3 11/16x4	21.7	32x3½	102	2425	2450	2		7[illegible]5.00
490	1916	"490"	Touring	4	3 11/16x4	21.7	30x3½	102	1850	1910	5		490.00
490	1916	"490"	Roadster	4	3 11/16x4	21.7	30x3½	102	1660	1740	2		490.00
490	1917	"490"	Touring	4	3 11/16x4	21.7	30x3½	102	1850	1800	5		570.00
490	1917	"490"	Roadster	4	3 11/16x4	21.7	30x3½	102	1660	1740	2		545.00
D	1917	D-5	Touring	8	[illegible]	36.4	34x4	120	2880	3100	5		1160.00
D	1917	D-4 Chummy	Roadster	8	[illegible]	36.4	34x4	120	2900	3140	4		1160.00
F	1917	F-5	Touring	4	3 11/16x4	21.7	33x4	108	2460		5		800.00
F	1917	F-2	Roadster	4	3 11/16x4	21.7	33x4	108	2275		2		800.00
490	1918	"490"	Touring	4	3 11/16x4	21.7	30x3½	102	1850	1800	5		685.00
490	1918	"490"	Roadster	4	3 11/16x4	21.7	30x3½	102	1660	1740	2		660.00
490	1918	"490"	Sedan	4	3 11/16x4	21.7	31x4	102	2165	2250	5		1060.00
490	1918	"490"	Coupe	4	3 11/16x4	21.7	30x3½	102	1910	1990	2		1060.00
490	1918	"490"	Chassis	4	3 11/16x4	21.7	30x3½	102	1460	1540	No Body		625.00
490	1918	"490"	Light Del	4	3 11/16x4	21.7	30x3½	102	1780	1860		1000 lb	595.00
FA	1918	FA-5	Touring	4	3 11/16x5¼	21.7	33x4	108	2410	2580	5		995.00
FA	1918	FA-2	Roadster	4	3 11/16x5¼	21.7	33x4	108	2310	2500	2		995.00
FA	1918	FA-4	Sedan	4	3 11/16x5¼	21.7	33x4½	108	2700	2850	5		1475.00
D	1918	D-5	Touring	8	3⅜x4	36.4	34x4	120	2880	3100	5		1550.00
D	1918	D-4 Chummy	Roadster	8	3⅜x4	36.4	34x4	120	2960	3140	4		1550.00
T	1918	Ton-Truck	Truck	4	3 11/16x5¼	21.7	34x4 Front 32x4 Rear	125	3300	3420		2000 lb	1245.00
490	1919	"490"	Touring	4	3 11/16x4	21.7	30x3½	102	1900	1980	5		735.00
490	1919	"490"	Roadster	4	3 11/16x4	21.7	30x3½	102	1820	1900	2		715.00
490	1919	"490"	Sedan	4	3 11/16x4	21.7	31x4	102	2100	2270	5		1165.00
490	1919	"490"	Coupe	4	3 11/16x4	21.7	30x3½	102	21[illegible]	2215	2		1110.00
490	1919	"490"	Chassis	4	3 11/16x4	21.7	30x3½	102	1460	1540	No Body		985.00
490	1919	"490"	Light Del	4	3 11/16x4	21.7	30x3½	102	1865	1945		1000 lb	735.00
FB	1919	"FB-50"	Touring	4	3 11/16x5¼	21.7	33x4	110	2745	2880	5		1135.00
FB	1919	"FB-20"	Roadster	4	3 11/16x5¼	21.7	33x4	110	2640	2790	2		1110.00
FB	1919	"FB-40"	Sedan	4	3 11/16x5¼	21.7	33x4	110	2945	3095	5		1685.00
FB	1919	"FB-30"	Coupe	4	3 11/16x5¼	21.7	33x4	110	2825	2965	4		1685.00
D	1919	D-5	Touring	8	3⅜x4	36.4	34x4	120	2880	3060	5		1585.00
D	1919	D-4 Chummy	Roadster	8	3⅜x4	36.4	34x4	120	2905	3110	4		1585.00
T	1919	Ton Truck	Truck	4	3 11/16x5¼	21.7	31x4 Front 32x4 Rear	125	3300	3420		2000 lb	1460.00
490	1920	"490"	Touring	4	3 11/16x4	21.7	30x3½	102	1900	1995	5		795.00
490	1920	"490"	Roadster	4	3 11/16x4	21.7	30x3½	102	1820	1915	2		775.00
490	1920	"490"	Sedan	4	3 11/16x4	21.7	31x4	102	2166	2255	5		1245.00
490	1920	"490"	Coupe	4	3 11/16x4	21.7	31x4	102	2040	2155	2		1170.00
490	1920	"490"	Chassis	4	3 11/16x4	21.7	30x3½	102	1460	1540	No Body		745.00
490	1920	"490"	Light Del	4	3 11/16x4	21.7	30x3½	102	1865	1945		1000 lb	795.00
FB	1920	"FB-50"	Touring	4	3 11/16x5¼	21.7	33x4	110	2745	2880	5		1295.00
FB	1920	"FB-20"	Roadster	4	3 11/16x5¼	21.7	33x4	110	2640	2790	2		1270.00
FB	1920	"FB-40"	Sedan	4	3 11/16x5¼	21.7	33x4	110	2945	3095	5		1855.00
FB	1920	"FB-30"	Coupe	4	3 11/16x5¼	21.7	33x4	110	2820	2965	4		1855.00
T	1920	Ton-Truck	Truck	4	3 11/16x5¼	21.7	33x4 Front 35x5 Rear	125	3300	3140		2000 lb	1460.00
490	1921	"490"	Touring	4	3 11/16x4	21.7	30x3½	102	1900	1995	5		625.00
490	1921	"490"	Roadster	4	3 11/16x4	21.7	30x3½	102	1820	1915	2		625.00
490	1921	"490"	Sedan	4	3 11/16x4	21.7	31x4	102	2160	2255	5		975.00
490	1921	"490"	Coupe	4	3 11/16x4	21.7	31x4	102	2040	2155	2		975.00
490	1921	"490"	Chassis	4	3 11/16x4	21.7	30x3½	102	1460	1540	No Body		560.00
490	1921	"490"	Light Del	4	3 11/16x4	21.7	30x3½	102	1865	1945		1000 lb	625.00
FB	1921	"FB-50"	Touring	4	3 11/16x5¼	21.7	33x4	110	2745	2880	5		975.00
FB	1921	"FB-20"	Roadster	4	3 11/16x5¼	21.7	33x4	110	2640	2790	2		975.00
FB	1921	"FB-40"	Sedan	4	3 11/16x5¼	21.7	33x4	110	2945	3095	5		1575.00
FB	1921	"FB-30"	Coupe	4	3 11/16x5¼	21.7	33x4	110	2820	2965	4		1575.00
T	1921	Ton Truck	Truck	4	3 11/16x5¼	21.7	3[illegible]x5 Front 35x5 Rear	125	3300	3440		2000 lb	1345.00
G	1921	¾-Ton Truck	Truck	4	3 11/16x[illegible]	21.7	31x4 Front 34x4½ Rear	120	2450	2530		1500 lb	930.00
490	1922	"490"	Touring	4	3 11/16x4	21.7	30x3½	102	1770	18[illegible]	5		525.00
490	1922	"490"	Roadster	4	3 11/16x4	21.7	30x3½	102	17[illegible]	18[illegible]	2		510.00
490	1922	"490"	Sedan	4	3 11/16x4	21.7	30x3½	102	21[illegible]	22[illegible]	5		860.00
490	1922	"490"	Coupe-4	4	3 11/16x4	21.7	30x3½	102	201[illegible]	2100	4		840.00
490	1922	"490"	Coupe-2	4	3 11/16x4	21.7	30x3½	102	194[illegible]	20[illegible]	2		680.00
490	1922	"490"	Chassis	4	3 11/16x4	21.7	30x3½	102	14[illegible]	1510	No Body		425.00
490	1922	"490"	Light Del	4	3 11/16x4	21.7	30x3½	102	18[illegible]	19[illegible]		1000 lb	510.00
FB	1922	"FB-50"	Touring	4	3 11/16x5¼	21.7	33x4	110	25[illegible]	27[illegible]	5		885.00
FB	1922	"FB-20"	Roadster	4	3 11/16x5¼	21.7	33x4	110	24[illegible]	[illegible]	2		865.00
FB	1922	"FB-40"	Sedan	4	3 11/16x5¼	21.7	33x4	110	[illegible]	3015	5		1395.00
FB	1922	"FB-30"	Coupe	4	3 11/16x5¼	21.7	33x4	110	273[illegible]	28[illegible]	4		1325.00
T	1922	Ton-Truck	Truck Ch.	4	3 11/16x5¼	21.7	34x4 Front 35x5 Rear	125	3300	3440		2000 lb	1095.00
G	1922	¾-Ton Truck	Truck	4	3 11/16x4	21.7	31x4 Front 34x4½ Rear	120	2450	2530		1500	650.00
Sup	1923	"Superior"	Touring	4	3 11/16x4	21.7	30x3½	103	17[illegible]	18[illegible]	5		525.00
Sup	1923	"Superior"	Roadster	4	3 11/16x4	21.7	30x3½	103	171[illegible]	18[illegible]	2		510.00
Sup	1923	"Superior"	Sedan	4	3 11/16x4	21.7	30x3½	103	20[illegible]	21[illegible]	5		860.00
Sup	1923	"Superior"	Sedanette	4	3 11/16x4	21.7	30x3½	103	20[illegible]	2140	4		850.00
Sup	1923	"Superior"	Coupe	4	3 11/16x4	21.7	30x3½	103	194[illegible]	2000	2		680.00
Sup	1923	"Superior"	Com'l Ch.	4	3 11/16x4	21.7	30x3½	103	1[illegible]	1475	No Body		425.00
Sup	1923	"Superior"	Light Del	4	3 11/16x4	21.7	30x3½	103	18[illegible]	1[illegible]60		1000 lb	510.00
Sup	1923	"Superior"	Util. Chas	4	3 11/16x4	21.7	30x3½	10[illegible]	1380	14[illegible]	Chas Only		
Sup	1923	"Sup. Util. Exp."	Truck	4	3 11/16x4	21.7	31x4 Front 34x4½ Rear	120	1870	1[illegible]	No Body	2000 lb	575.00
The following data covers both Series B and Series F Cars for 1924 selling season													
Sup	1924	"Superior"	Touring	4	3 11/16x4	21.7	30x3½	103	17[illegible]	187[illegible]	5		[illegible].00
Sup	1924	"Superior" De Luxe	Touring	4	3 11/16x4	21.7	30x3½	103	19[illegible]	20[illegible]	5		640.00
Sup	1924	"Superior"	Roadster	4	3 11/16x4	21.7	30x3½	103	16[illegible]	17[illegible]	2		495.00
Sup	1924	"Superior"	Sedan	4	3 11/16x4	21.7	30x3½	103	2070	21[illegible]	5		795.00
Sup	1924	"Superior"	Coupe 2	4	3 11/16x4	21.7	30x3½	103	188[illegible]	19[illegible]	2		640.00
Sup	1924	"Superior"	Coupe 4	4	3 11/16x4	21.7	30x3½	103	20[illegible]	20[illegible]	4		725.00
Sup	1924	"Superior"	Com'l Chas	4	3 11/16x4	21.7	30x3½	1[illegible]	1[illegible]	14[illegible]	No Body		410.00
Sup	1924	"Superior"	Light Del	4	3 11/16x4	21.7	30x3½	11[illegible]	1790	187[illegible]		1000 lb	495.00
Sup	1924	"Superior"	Util. Chas	4	3 11/16x4	21.7	30x3½	1[illegible]	158[illegible]	11[illegible]	Chas Only		[illegible].00
Sup	1924	"Sup. Util. Exp." (Series D)	Truck	4	3 11/16x4	21.7	31x4 Front 34x4½ Rear	12[illegible]	18[illegible]	1[illegible]	No Body	2000 lb	

for Economical Transportation

CHEVROLET

DIRECTIONS FOR ORDERING PARTS

When ordering parts be sure to give the model, year produced and car number for which parts are desired.

The model and car number on Superior models will be found on the name plate attached to the front seat frame visible when the right front door is open.

If in doubt as to the name of the part needed, send the broken part to your dealer or the factory or nearest Distributing branch, attention of Parts and Service Department by PREPAID EXPRESS. Write your name and address plainly on the package so that it can be identified upon arrival. Write a letter the same day shipment goes forward, stating the purpose for which it is returned, REGARDLESS OF ANY PREVIOUS CORRESPONDENCE.

In ordering from factory or nearest Distributing branch, attention of Parts and Service Department, if possible always send cash with order because we cannot open accounts except with our regularly appointed dealers, who maintain a deposit sufficient to cover their accounts. ORDERS NOT ACCOMPANIED BY CASH WILL BE SENT C. O. D.

In ordering parts by telegram, be sure the message is PREPAID. COLLECT MESSAGES WILL NOT BE ACCEPTED by this company. Always confirm the telegram by a regular order, marked "confirmation of telegram," through the mail.

All Chevrolet dealers carry a stock of such parts as are needed most frequently; therefore, delays can be avoided by ordering from your nearest dealer or from the Factory or Branch listed below which is nearest to you.

FACTORIES AND BRANCHES

FACTORIES

Flint, Mich.
St. Louis, Mo.
Norwood, Ohio
Janesville, Wis.
Tarrytown, N. Y.
Oakland, Cal.
Buffalo, N. Y.

BRANCHES

Minneapolis, Minn.
Kansas City, Mo.
Fort Worth, Texas
Denver, Colo.
Atlanta, Ga.
Pittsburgh, Pa.
Baltimore, Md.

Important Notice. SEND PARTS ORDERS to Factory or Branch. Wholesale Offices do not carry a Parts Stock. **See Map on Page 5.**

WHOLESALE OFFICES

Chicago, Ill.
Philadelphia, Pa.
Des Moines, Ia.
Los Angeles, Cal.
Charlotte, N. C.
Memphis, Tenn.
Portland, Ore.
Louisville, Ky.
Oklahoma City, Okla.

SUMMARY OF COST

1924 Chevrolet Superior Sedan.

Car 9E-2579
Motor 817156

OPERATING COST

			Cost per mile
Gasoline	306 gal.	$35.75	$.0098
Oil	10.5 "	5.57	.0006
Grease	11#	3.18	.0005
Alcohol	2.5 Gal.	1.70	.0002
Tires	Spare	14.40	.0015
Tire Repair		3.40	.0003
Battery repair-fuses-bulbs		3.50	.0003
*Repair Parts		2.85	.0003
Garage Labor		24.00	.0025
Total		$154.45	$.0159

FIXED YEARLY CHARGES

6% interest on investment (car) compounded
$963.65 — $62.60 — $.0064

6% interest on investment (garage) compounded
$460.15 — $28.02
minus 15.00 rent

	13.02	.0013
Insurance	40.91	.0042
License	8.50	.0009
Personal Tax	10.37	.0011
Depreciation	263.65	.0269
Total	$389.05	$.0398

TOTAL COST TO OWNER

Operating cost	$154.45	$.0158
Fixed yearly charges	389.05	.0398
**Miscellaneous expenses	27.76	.0028
Grand Total	$571.26	$.0584

* Main bearing liners
**Tire chains, driver's cushion, oil gun, rocker arm head, rear vision mirror, spare tire lock, electric horn, bumpers, horn wire, steering wheel, oil funnel, oil measure, wrenches, duster and maps.

April 26, 1924 —— 0
April 26, 1925 —— 9784 Miles

Gasoline —— 19.33 Miles per Gallon.
Oil —— 932 Miles per Gallon.

MAY 16th, 1924 to AUGUST 1st, 1924

Price List No. K-4

Model	"Superior"	Commercial Chassis	$410.00
"	"	Light Delivery	495.00
"	"	Roadster	495.00
"	"	Touring	510.00
"	De Luxe	Touring	640.00
"	"Superior"	Utility Coupe	640.00
"	"	4-Passenger Coupe	725.00
"	"	Sedan	795.00
"	"	Utility Express Truck (Chassis)..	550.00

Total glass area in a 1924 2 door sedan

Following information obtained for and given to Len Restrate 1-27-59:

According to Dave Snyder (Fisher Body - Engrg. Stds.), Fisher Body records of glass specs. prior to the 1925 model year have been destroyed. Snyder did provide us with the following data taken from the 1925 Parts List. It must be noted that these are GLASS BLOCK SIZES: (60-50 style)

W/S	16"x 40"	640 sq.	in.
doors	20"x 26"	1040 "	"
Fr.quart.	20"x 30"	1200 "	"
Rear	12"x 28"	336 "	"
	Total	3216 sq.	in.

Leonard Price (GM Proving Ground - Tech. Data) obtained the following data from the Librarian, GM Proving Ground Library, on a 1926 2 door sedan:

W/S	height at center	8 1/2"	approx. 400 sq. in.
	height at ends	10 1/8"	
doors	height	13 3/4"	approx. 900 sq. in.
	width	31"	
Fr. quart.	height at front	13 3/4"	approx. 900 sq. in.
	height at rear	unknown, but slightly less than 13/ 3/4	
	width	31"	
Rear	height	9 1/4"	approx. 250 sq. in.
	width	26 7/8"	
	Total approx.	2400 sq. in.	

SEPTEMBER 8th, 1924 to JANUARY 1st, 1925

Price List No. L-2

Model	"Superior" Commercial Chassis	$410.00
"	" Roadster	495.00
"	" Touring	510.00
"	DeLuxe Touring	640.00
"	"Superior" Utility Coupe	640.00
"	Utility Express Truck (Chassis)	550.00
"	"Superior" DeLuxe Coupe	775.00
"	" 4-Passenger Coupe	725.00
"	" Sedan	795.00
"	" DeLuxe Sedan	940.00
"	" 5-Passenger Coach	695.00

JANUARY 1, 1924 to MAY 16, 1924

Price List No. K-3

Model	"Superior"	Commercial Chassis	$395.00
"	"	Light Delivery	495.00
"	"	Roadster	490.00
"	"	Touring	495.00
"	"	Utility Coupe	640.00
"	"	4-Passenger Coupe	725.00
"	"	Sedan	795.00
"	"	Utility Express Truck (Chassis)	550.00

SUPERIOR MODELS - 1924.

TYPE	FLINT	BUFFALO	JANESVILLE	NORWOOD	OAKLAND	N. TARRYTOWN	ST. LOUIS
Roadster	1690	1690	1695	1690	1675	1710	1690
Touring	1780	1809	1789	1790	1785	1805	1770
Utility Coupe	1870	1890	1890	1870	1870	1887	1870
Sedan	2052	2075	2075	2058	2075	2075	2060
Commercial Chassis	1450	1460	1427	1430	1420	1433	1400
Light Delivery	1805	1815	1781	1782	1780	1802	1785
Utility Express Truck Chassis	1825	-	1850	-	1855	1868	1850

R.F.S. 12/26/23.

(Issued August 1, 1924)

AUGUST 1st, 1924 to SEPTEMBER 8th, 1924.

Price List No. L-1

Model	"Superior" Commercial Chassis	$410.00
"	" Roadster	495.00
"	" Touring	510.00
"	DeLuxe Touring	640.00
"	"Superior" Utility Coupe	640.00
"	" 4-Passenger Coupe	725.00
"	" Sedan	795.00
"	Utility Express Truck Chassis	550.00

S.A.E. ENGINE TESTING FORMS — CURVE SHEET—D1

LOW AND MEDIUM SPEED, LOW POWER ENGINES

TEST NO. 1280

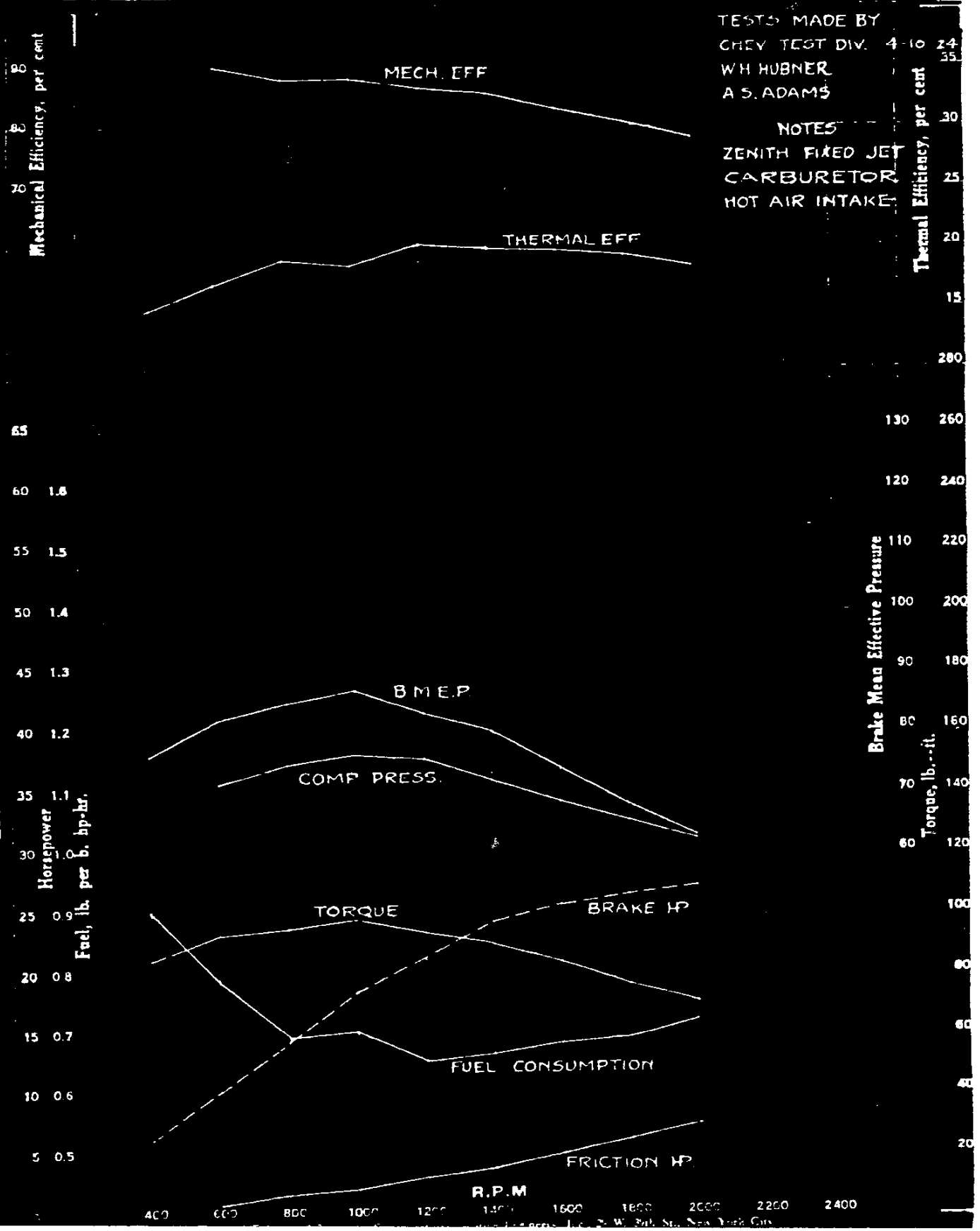
FIRM CHEVROLET MODEL 1924 SUPER SERIAL NO. ____ DATE 4-10-24

NO. CYL. 4 BORE 3 1/16 STROKE 4 1/2 DISPLACEMENT 76.87 COMPRESSION RATIO ____

FUEL GASOLINE *For Detail see Specification Sheet* ____ *and Log Sheet* 1280

TESTS MADE BY
CHEV TEST DIV. 4-10 24
W H HUBNER
A S. ADAMS

NOTES
ZENITH FIXED JET
CARBURETOR
HOT AIR INTAKE



S.A.E. ENGINE TESTING FORMS—SPECIFICATION SHEET—B

Name and Model "Superior 1924" Date of Test November 11, 1924

Manufacturer Chevrolet Motor Company

(1) General Type Valve-in Head - Water Cooled Four

(2) No. of Cyls. 4 Bore 3 11/16 in. Stroke 4 in. Piston Displ. per Cyl. 42.72 cu. in. Total 170.9 cu. in.

(3) Compression Vol., V_c 12.83 cu. in. Total Vol. of Cyl., V 55.55 cu. in. Compression Ratio = Comp. Vol. / Total Vol. = V_c / V = 4.33

Compression Pressure 84 lb. gage at 800-1000 r. p. m.

(4) Type of Cyl. Casting En bloc Matl. Gray Iron

(5) Type of Valves Poppet Location Over Head

(6) Cooling System Water Pump - 15" dia 2 blade fan, 1.23 times Crankshaft speed

Fan Diam. in. No. of Blades Projected Width in. Ratio of Fan to Engine Speed

(7) Piston, Type One piece casting, pin turns in unbushed bosses Matl. Cast Iron

Weight with Rings and Pin 2.55 lb. Length 3 5/8 in. Distance Center of Pin to Top of Piston 1 7/8 in.

(8) Piston-Rings, No. per Piston 3 Type Convention Step Cut, Concentric Width 3/16 in.

(9) Connecting-Rod, Type Drop forged "I" section, pin clamped in upper end

Length, c. to c. 7 3/8 in. Weight, Upper End .505 lb. Lower End 1.167 lb. Total 1.672 lb.

(10) Piston-Rod Bearings, Diam. .850 in. Total Length 2-3/16 in. Matl. Cast Iron & Steel Location In Piston

(11) Connecting-Rod Bearings, Diam. 1 3/8 in. Length 1 7/8 in. Matl. Babbitt Type Cast in place

(12) Crankshaft Bearings, No. 3 Diams. 1 3/8 - 1 21/32 - 1 3/4

Material Babbitt Lengths 2 5/16 - 1 1/2 - 2 11/16

(13) Camshaft Bearings, No. 3 Diams. 1 5/16 - 1 9/32 - 1 1/4

Material Cast Iron Lengths 2 3/8 - 2 - 1 7/16

(14) Type of Cams Round Nose, Straight Side Type of Valve-Lifters Spherical End 2" radius

(15) Inlet Valves, No. per Cyl. 1 o.d. 1 1/2 in. Port Diam. 1 5/16 in. Lift 7/32 in. Seat Angle 45° deg.

(16) Exhaust Valves, No. per Cyl. 1 o.d. 1 1/2 in. Port Diam. 1 5/16 in. Lift 7/32 in. Seat Angle 45° deg.

(17) Weight of Valve Reciprocating Parts, Inlet .822 lb. Exhaust .822 lb. Incl. reduced weight of Rocker Arm Ratio 1:1

(18) Valve-Spring Tension, Inlet Open 47½-52½ lb. Closed 35½-39½ lb. Exhaust Open See Inlet lb. Closed See Inlet lb.

(19) Valve-Timing, Inlet Valve Opens 16 deg. past Top Center, Closes 52 deg. after Lower Center

Exhaust Valve Opens 48 deg. before Lower Center, Closes 16 deg. past Top Center

(20) Flywheel, o.d. 14 5/16 in. Weight 48 lb. Moment of Inertia .378

(21) Weight of Engine 345.6 lb. Including Generator, starter, timer, carbureter without oil and water

CARBURETION

(22) Carburetor, Name and Model Carter - Zenith Nom. Size 1" in.

(23) Specifications (Size of Nozzles, etc.)

(24) How Heated Hot Air drawn from stove around Exhaust Pipe

(25) General Principles of Operation Fixed venturi, single nozzle, adjustable idling speed bleeder at butterfly, no auxiliary air valve

(26) Description of Intake Pipe 1.03 I.D. tubing, T type; length of vertical riser 11 3/4" length of horizontal part about 6" each way

IGNITION

(27) Name and Type of System Remy - Battery

(28) Type of Distributor Remy 366-C Firing Order 1-2-4-3

(29) Type of Breaker Concentric Cam Maximum Spark Advance 30° deg. Retard None deg.

(30) Spark-Plugs, Name and Type A.C. porcelain insulation single electrode Size 7/8 in.

(31) Location 45° angle in head Gap Std. in.

LUBRICATION SYSTEM

(32) Type and Description Force and Splash, Gear Pump forces oil to center main and oil troughs for C.R.

ACCESSORIES

(33) Accessories Attached During Test

See Notes Corresponding to Numbers Under "Rules and Directions" on Sheet A

1924

The Business Man's Time-Saver

for Economical Transportation

CHEVROLET

Utility Coupé $640 f. o. b. Flint, Mich.

The heavy and increasing demand for this model has compelled us largely to increase our production schedules and facilities.

This car was designed and built particularly for business uses, providing most economical transportation for salesmen on the road or for business men in daily trips to and from office or factory. It is also very popular with physicians, teachers and young couples.

It combines enduring quality, comfort and great economy.

Chevrolet Motor Co., Detroit, Mich.

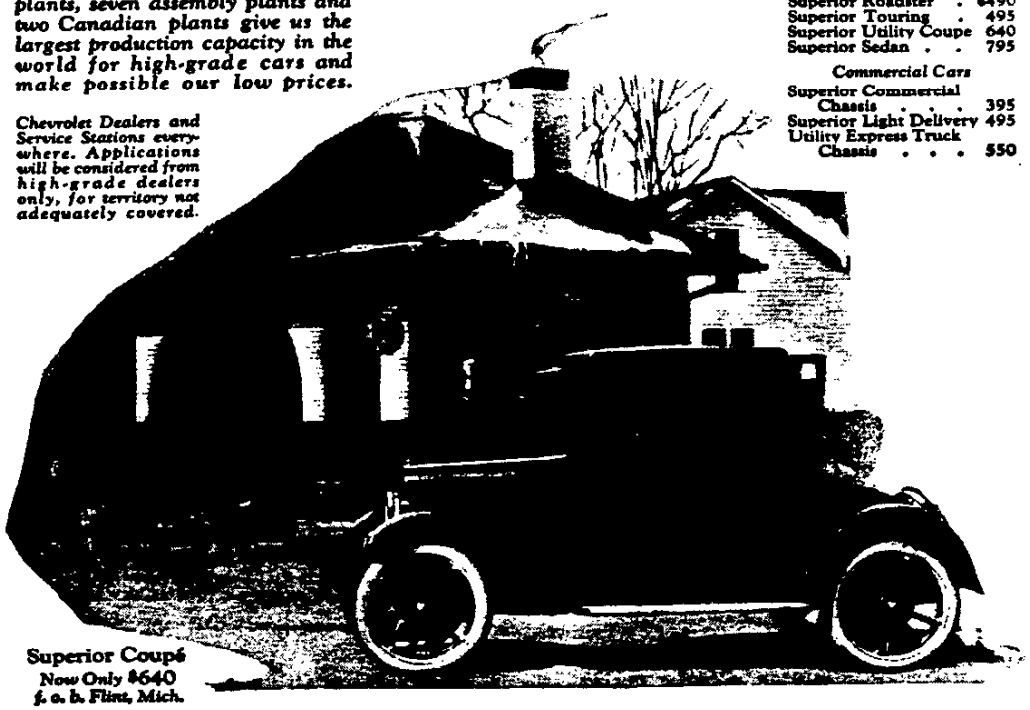
Division of General Motors Corporation

Five United States manufacturing plants, seven assembly plants and two Canadian plants give us the largest production capacity in the world for high-grade cars and make possible our low prices.

Chevrolet Dealers and Service Stations everywhere. Applications will be considered from high-grade dealers only, for territory not adequately covered.

Prices f. o. b. Flint, Mich.

Superior Roadster	$490
Superior Touring	495
Superior Utility Coupe	640
Superior Sedan	795
Commercial Cars	
Superior Commercial Chassis	395
Superior Light Delivery	495
Utility Express Truck Chassis	550



Superior Coupé
Now Only $640
f. o. b. Flint, Mich.

Valve Lash .004 INTAKE & EXHAUST

Valve Lash .006 Intake tight

" " .006 Exhaust Loose

Drop Forg[illegible] I section, [illegible]

8-1/1[illegible] .45 [illegible] 1.7[illegible]

.850 1-5/8 Mat Bronze 1.25 [illegible] Rod

1-3/4 1-5/8 Mat Babbitt, Cast In [illegible] Main

3 1-3/4 Front - 1-7/8 Center - [illegible]

Babbitt, Cast In .006 1-3/4 Front - 2-1/8 Center - [illegible]

3 1-5/8 Front - 1-9/16 Center - 1-[illegible]

Cast Iron 1-7/8 Front - 2-1/8 Center - 1-[illegible]

Round Nose, Curved Flank [illegible] Flat Tuchron[illegible] 1-[illegible] Diameter

1 1-1[illegible]/32 1-5/16 .31[illegible] [illegible]

1 1-1[illegible]/32 1-5/16 .31[illegible] [illegible]

.4[illegible] .466 [illegible] Spring Design

27-1/2 51 [illegible] 51

12° [illegible] [illegible]

44° [illegible] [illegible]

1[illegible]-1/8 Exclu.Teeth 46-3/8 [illegible] .3[illegible] Chain x P[illegible]

5[illegible].25 [illegible] Trans. Support 22.0[illegible], Clutch [illegible] L.[illegible]

Trans. & Levers 52.01

CARBURETION

IGNITION

LUBRICATION SYSTEM

[illegible] Cr[illegible] 6 in .11 Rod, Splash [illegible]

3090 TIMING.

Exhaust closes 2° past upper dead C
Intake closes. 52° past Lower dead C
Exhaust opens 40° Before Lower dead C
Intake opens. 16° past Upper dead C.

SUPERIOR K MOTOR COMPRESSION
RATIO 4.09 TO 1

PRESSURE IN LBS - COMPRESSION

80 LBS @ 800 R.P.M.

Engine Torque - 1924 1200 "lbs @ 1000 R.P.M.

Engine Torque - 1925 - 1200 "lbs @ 1000 R.P.M.

End of hub steer Gear to end of spline = $1\frac{9}{16}$.

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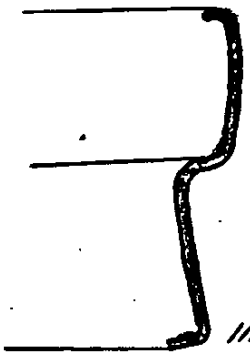
copper cooled engine $3\frac{1}{2} \times 4\frac{3}{5}$ stroke

Ratio of Pump to crankshaft = 2 to 1. (1923 Model T)

Pontiac

Rear Axle ratio 46/11

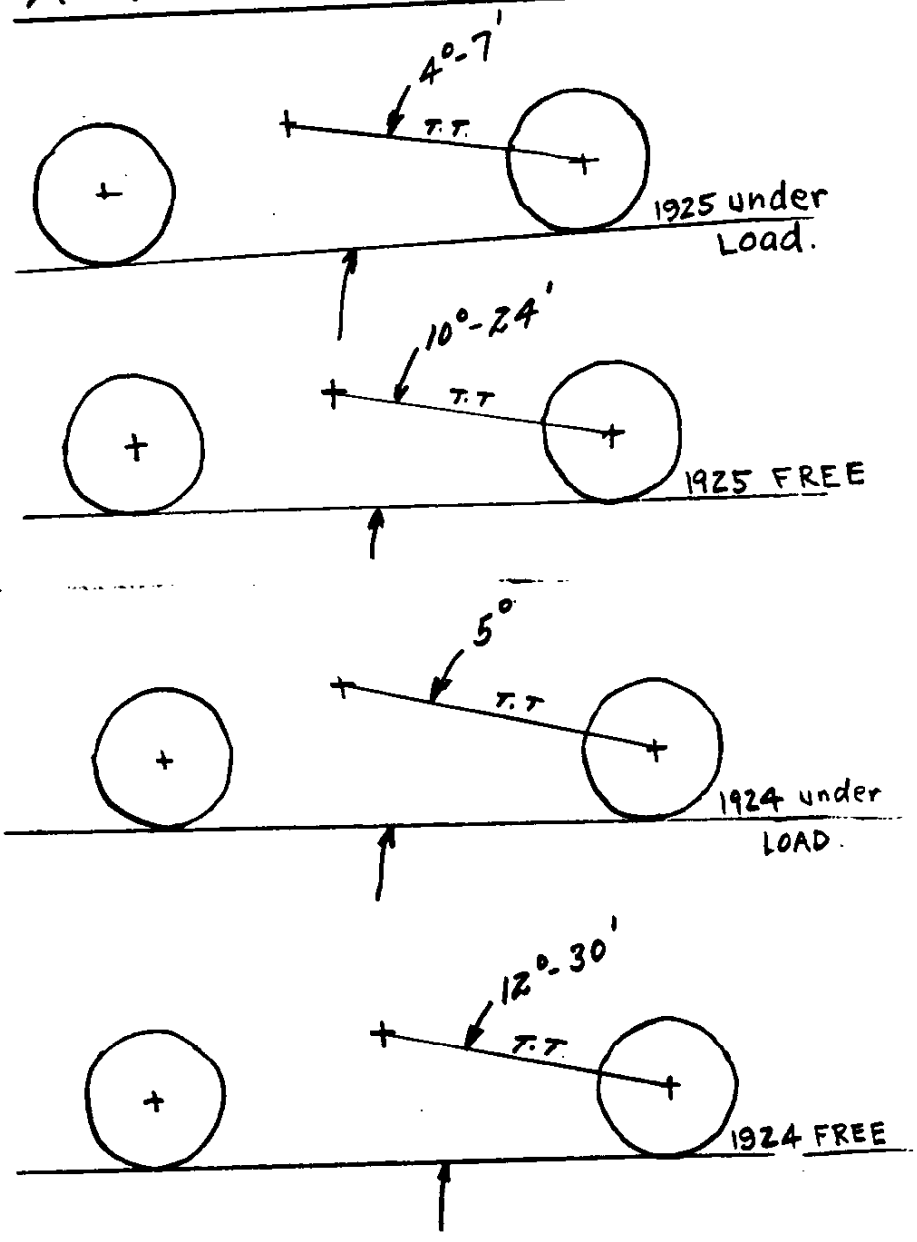
Speedometer Gear ratio 4/11



INSTRUMENT PANEL
SECTION - CLOSED JOBS.

INSTRUMENT PANEL
SECTION - OPEN JOBS.

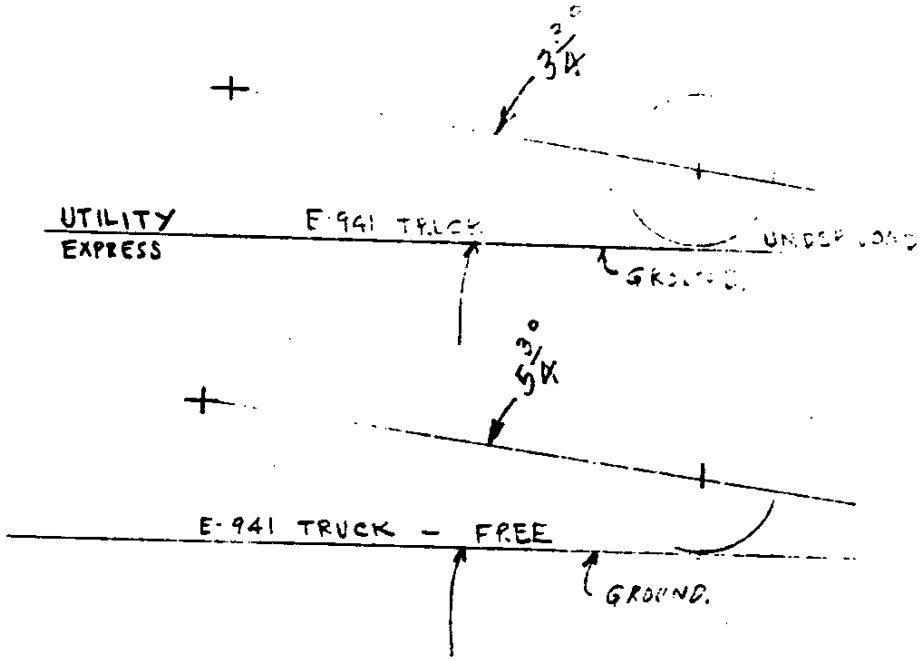
1924-25 TORQUE TUBE ANGLES WITH GROUND.



FULL FLOATING: The axle shaft is relieved of all loads except driving and is connected to hub by universal slip joint.

SEMI FLOATING: In which either inner or outer bearing is mounted directly or indirectly on shaft and hub connected rigidly.

THREE QUARTER FLOATING: In which both inner and outer bearings are mounted independent of shaft, but hub is directly connected to shaft.



1924 - 25

CHEVROLET

DATA

(From George Proctor's 1922-29 Notebook)

Foot Pedal Leverage $\frac{11.375}{2.281} = 4.98$

Pedal Pressure $\frac{135}{4.98} = 27.1$ *

Pedal Pressure with 904* Total Spring Pressure = $\frac{904}{37.47} = 24.12$.

REAR AXLE BEARINGS

1924 COMPLETE CAR SPECIFICATIONS

MODEL	CAPACITY	DRIVE	WEIGHT FULLY EQUIPPED-POUNDS			SHIPPING WEIGHT	ROAD CLEARANCE	MIN. TURNING RADIUS	TOP MATERIAL	OVERALL DIMENSIONS		
			ON FRONT WHEELS	ON REAR WHEELS	CAR WITH GASOLINE					LENGTH TOP DOWN	WIDTH	HEIGHT TOP UP
SUP TOURING	5 PASSENGERS	RIGHT OR LEFT	920	955	1875	1785	9¾	20 FT	RUBBER FABRIC	48	66	73
SUP ROADSTER	2 PASSENGERS		920	870	1790	1693	9¾	20 FT	RUBBER FABRIC	40	66	73
SUP SEDAN	5 PASSENGERS		1000	1155	2155	2068	9¾	20 FT	—	42	66	74½
SUP COUPE-4	4 PASSENGERS		980	1090	2070	1994	9¾	20 FT	—			
SUP COUPE-2	2 PASSENGERS		1000	965	1965	1878	9¾	20 FT	—	4	66	74
SUP COM. CHASSIS	1550+		—	—	—	1431	9¾	20 FT	—	39	66	—
SUP TOUR. CHASSIS	—		—	—	—	1380	9¾	20 FT	—	139	66	—
SUP UTILITY EXP	3550+		—	—	—	1851	10	21 FT	—	70¾	66	—

+INCLUDES BODY

1925 Rear Axle BUICK TYPE

RING GEAR - 42 teeth
PINION — 11 teeth

Ratio. — 3.81 to 1

Ring Gears and Pinions are the same in all axles.

1925 - TRANSMISSION RATIOS

First — 3.32 — 1
Second — 1.77 — 1
Third — Direct.
Reverse — 4.2 — 1

Pitch — 7-9
Face — 5/8

1925 CLUTCH L-11613.

127* @ 1½ Length - 8 springs
Total Spring pressure — 1016*
Lever Reduction - pressure plate to outer end of plate = 7.526
Pull at hook Bolt to Release clutch - 135*

Throwout Bearing area. 3.673 □"
Pressure per sq. in. = 94*

1924 CHASSIS SPECIFICATIONS

MODEL	SERVICE BRAKE				EMERGENCY BRAKE			
	TYPE OF REAR WHEEL BRAKE	DIA. OF DRUM	WIDTH OF BAND	AREA SQ. INCHES	TYPE OF REAR WHEEL BRAKE	DIA. OF DRUM	WIDTH OF BRAKE	AREA SQ. INCHES
SUP TOURING	EXTERNAL CONTRACTING	11	1 1/2	89	INTERNAL EXPANDING	10 11/16	1 1/4	72
SUP ROADSTER	EXTERNAL CONTRACTING	11	1 1/2	89	INTERNAL EXPANDING	10 11/16	1 1/4	72
SUP SEDAN	EXTERNAL CONTRACTING	11	1 1/2	89	INTERNAL EXPANDING	10 11/16	1 1/4	72
SUP COUPE-4	EXTERNAL CONTRACTING	11	1 1/2	89	INTERNAL EXPANDING	10 11/16	1 1/4	72
SUP COUPE-2	EXTERNAL CONTRACTING	11	1 1/2	89	INTERNAL EXPANDING	10 11/16	1 1/4	72
SUP COM. CHASSIS	EXTERNAL CONTRACTING	11	1 1/2	89	INTERNAL EXPANDING	10 11/16	1 1/4	72
SUP TOUR CHASSIS	EXTERNAL CONTRACTING	11	1 1/2	89	INTERNAL EXPANDING	10 11/16	1 1/4	72
SUP UTILITY EXP	EXTERNAL CONTRACTING	12.32	2	148	INTERNAL EXPANDING	12	1 3/4	114