for Economical Transportation

CHEVROLET

INSTRUCTIONS

FOR THE OPERATION
AND CARE OF

CHEVROLET COMMERCIAL VEHICLES

NATIONAL

SERIES - AB

1928 EDITION

GENERAL MOTORS
LIMITED
EDGWARE ROAD
THE HYDE
HENDON N.W.9.

J. J. KELIHER & CO., LTD., LONDON, S.E.1.

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CHEVROLET CARS.

ORDERING CHEVROLET PARTS.

For the benefit and convenience of owners, stocks of genuine Chevrolet replacements parts are available throughout the country. All requests for parts should be placed with your nearest Chevrolet Dealer, who, if some particular part is not held in his own stock, can obtain it promptly from our Works.

When ordering parts from your Dealer or Agent, it is absolutely necessary that the following information should be given :

(1) The vehicle serial number or chassis number;

(2) Engine number;

(3) Year, model and type of vehicle;

(4) Description of parts required;

(5) Quantity;

(6) Shipping Instructions such as Post, Passenger Train, Goods Train, and where parts are to be sent by Rail, the name of the nearest Station and Railway.

If this information is supplied it will enable the Dealer to attend to your requirements promptly and will greatly facilitate that good service which we are anxious you shall receive.

WARRANTY.

Fine materials, scientific research and design and painstaking workmanship go into every General Motors product to ensure the maximum satisfaction in the user's hands. Conscious of this inherent quality in its products, and confident of the service that they render, and as tangible evidence thereof, each vehicle manufactured by General Motors is accompanied by this Warranty :—

> " Should any defect in material or workmanship develop within one year from the date as mentioned below, a part to replace that which is defective will be delivered at our dealer's establishment without cost to you."

This Warranty does not cover tyres inasmuch as they are guaranteed by their respective makers.

To further ensure the utmost satisfaction from your purchase, we earnestly recommend that wherever possible you utilise the services of our authorised dealers for repairs and adjustments. A list of these authorised dealers will be sent on application to the Company.

GENERAL MOTORS, LTD.,

Edgware Road The Hyde, London, N.W.9.

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FOREWORD.

In preparing this instruction book, effort has been made to present only such information as will be of assistance in keeping the performance of the Chevrolet up to its normal high standard, having in mind as well, simplicity of language and convenience for ready reference. It deals with such adjustments and recommendations as to care which seasonal changes may require and minor operations which the owner might wish to perform himself or which emergencies might make necessary.

Keep this book in your vehicle. It is dedicated to your convenience and satisfaction with your purchase, not so much with the idea of helping you out of trouble as to help you in keeping away from it.

GENERAL MOTORS, LTD.,

Edgware Road, The Hyde, London, N.W.9.

MISCELLANEOUS DATA

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

Serial Number:—

The serial number will be found stamped on a small metal identification plate.

Motor Number:—

The Motor Number is stamped on a boss on right side of the cylinder block just back of the distributor.

Wheel Base:—

The wheel base is 107 inches—10 cwt. and 124 inches—25 cwt. chasses.

Tread:—

The tread is standard, 56 inches.

Engine:—

Number of cylinders, 4; bore, $3\frac{11}{16}''$; stroke, $4''$; horsepower 21.7 R.A.C.

Approximate shipping weight of National 10 cwt. chassis without petrol, water or extra equipment is 1665 lbs.

TO THE CAR OWNER

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

Avoid the use of substitute or inferior replacement parts. Genuine Chevrolet parts are handled through authorized dealers. 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.

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

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 under the direction and supervision of experts. Always patronize Authorized Chevrolet Service stations and avoid the possibility of receiving inferior work or substitute parts.

Get the habit of making careful and periodic inspections. Keep all parts of the car clean and well lubricated and drive with consideration.

If necessary to write your dealer or General Motors Ltd., The Hyde, Hendon, for information on any subject, be sure in every case to give the serial and motor number.

WHAT TO DO UPON RECEIVING THE CAR

Before Chevrolet cars and commercial vehicles leave 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.

The buyer should insist on going over the car personally with the dealer's representative before the car is driven. Even though you have driven other cars you should insist on being instructed thoroughly in the operation of your new Chevrolet.

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 and equipment are with the car.

Make sure that the radiator is filled with clean water.

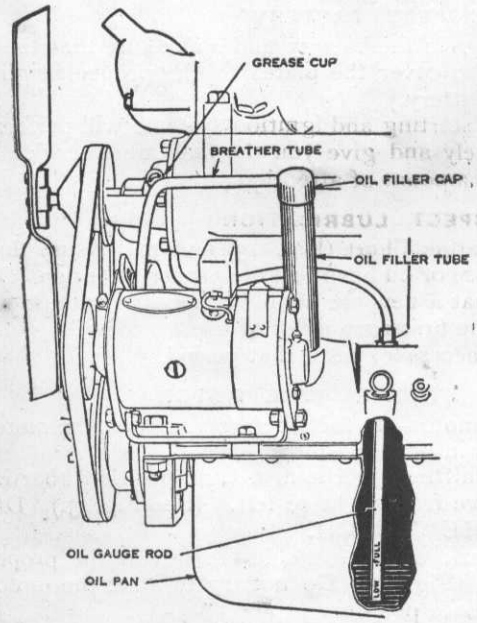

Fig. 1—Oil gauge and filler pipe.

See that the oil reservoir is filled to the proper level with good clean fresh oil. (See Fig. 1) To read the gauge stop the motor, pull up the oil gauge rod located just below the oil filler tube. 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. Replace the oil filler tube cap.

The breather tube pipe in the National motor connects the crankcase to the carburettor, and the oil filler tube cap has a solid (not perforated) top. DO NOT PLACE A PERFORATED CAP ON THE OIL FILLER TUBE OF A NATIONAL MOTOR.

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 overfilling will simply mean increased wasteful consumption, smoking and carbonization.

WHEN TO CHANGE OIL

When necessary, 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.

TYRE PRESSURE

Examine the tyres to see that they are not under inflated.

This is very important for the reason that if the deflection is too great, that is if the tyres flatten out too much under load, due to under inflation, trouble is sure to follow.

INSPECT BATTERY

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 52, 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.

INSPECT LUBRICATION

Next refer to Lubrication Chart (Fig. 13) 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.

BEFORE STARTING THE MOTOR

Before you start the motor—in fact, before you start the motor at any time—make certain of three 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. 3.) DO NOT DISENGAGE THE CLUTCH.

Second, that the spark and throttle levers are in the proper positions for starting. (Fig. 2.) Do not try to start the motor with throttle lever in closed position.

Be absolutely sure that the spark lever is properly retarded, as shown. (Fig. 2.) Failure to observe this may cause serious

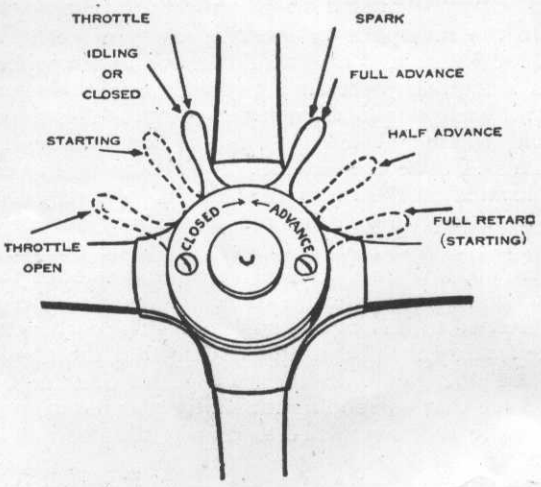

Fig. 2—Positions of spark and throttle levers

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, therefore, observe this point without fail.*

Third, that the ignition switch is turned on.

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

TO START MOTOR

Located on the floor boards within reach of the right foot is the starting switch. With ignition turned on press down the starter switch button as far as it will go and hold it until the motor starts. *Remove your foot the moment the motor starts.* DO NOT DEPRESS THE STARTER SWITCH BUTTON THE SECOND TIME, UNTIL THE MOTOR HAS COME TO A COMPLETE REST. Serious damage can be done to the starting motor or flywheel unless this is watched very carefully.

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.

Do not try to start the motor with the throttle in closed position.

CARBURETTOR CHOKE ADJUSTMENT

Owing to the difference in specific gravity of petrol obtainable in various localities, and also to difference in atmospheric conditions, it is sometimes necessary to feed the motor a fuel mixture rich in petrol 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 carburettor choke rod located on the instrument board. In very cold weather it may be necessary to pull this rod all the way out for a moment only. As the motor starts, the rod may be pushed part way inward again until, when the motor 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 carburettor, before leaving the factory, has been adjusted so that the motor will run at its highest efficiency with the least petrol 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 petrol may heat up the motor or cause it to " gallop " or " miss fire " or cause 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.*

CONTROL OF MOTOR SPEEDS

It is not a good thing to let the motor " race " idle (run at considerable speed without load). Therefore, you should now " retard " the THROTTLE LEVER (Fig. 2) thereby cutting down the 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 to 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. By operating the spark in the retarded position, when the car is travelling along at high speed, the motor runs hot as the late explosion develops considerably more heat.

SPARK KNOCK

When the motor is labouring 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 or spark knock.

ACCELERATOR

The accelerator pedal is located to the left 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.

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 left hand a vertical lever moving in a ball and socket called the GEAR CHANGE LEVER. This lever controls the various speeds of the car.

If you are 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.

Third, move the gear change 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. 3.

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

While you have been moving the gear change lever you should keep 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, sooner or later causing serious damage.

Since you are in first or low speed your motor will run comparatively fast, but your car will travel slowly.

Be in no hurry to change into a higher speed, but let the car gain some momentum. If you are a novice run along slowly 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, then to the right and right-front or second speed position. (Fig. 3.)

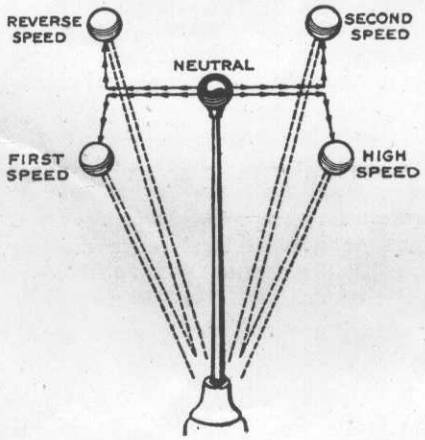

Fig. 3.—Gear Change Lever positions.

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, then prepare for changing to high or third speed.

Release the clutch as before and, while the clutch pedal is depressed, pull the gear-changing lever straight back into the right-rear or high speed position as indicated in Fig. 3. 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 lever from any one position to another, only be careful :

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

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

Under no circumstances should you attempt to shift to the reverse position until the car has come to a dead stop.

To avoid "clashing" when engaging the gears, pause a few seconds between the operations of depressing the clutch pedal and moving the hand gear lever.

When the gears clash press down a little more upon the clutch pedal and wait a moment before trying again. Remember, clashing the gears burns up the edges of the teeth, injuring them and, in time, making gear changes exceedingly 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, 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 foot brake pedal, the one under your right foot, until the car practically stops, then release the clutch, by depressing the clutch pedal.

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 lever from the high speed position into the neutral position.

When the gear 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.

PARKING THE CAR

If the stop is to be of some duration, always, before leaving the car, stop the motor, and also set the hand

brake by pulling the hand 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 when the car is moving, otherwise your brakes may partially " set," using up power besides wearing out the brake linings.

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 changing lever in neutral, release the clutch by depressing the clutch pedal and move the gear changing lever forward into the left forward position (Fig. 3.) 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 reversing 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 foot 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 hand brake by pulling the emergency brake lever towards you as far as it will go. By applying both the service and hand brakes you apply the braking effect on both inner and outer surfaces of the brake drum, which will have immediate results.

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

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 four wheels. But the car will not come to an immediate standstill, its momentum will carry it forward and the locked wheels will slide over the ground with most destructive effect on the tyres.

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 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 silencer and there is danger of bursting the silencer 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 wheels 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 reversing as well as when going forward.

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 money. The resulting repair bills, which in time are sure to follow, are never unimportant.

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, tyres and repairs.

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 satisfaction and service out of your car, you must be as considerate and thoughtful about it as you would of a horse that is as 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 parts that cause it and apply the proper remedy.

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.

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.

Petrol 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 the carburettor may be clogged with sediment so petrol cannot enter float chamber.

Petrol line from vacuum tank to petrol supply tank in rear may be broken loose at a joint or clogged with dirt.

The carburettor 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 that it will not ignite. (See instructions, Page 10, 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 mixture. Try cranking the engine by using the starting handle.

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.

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 PETROL SYSTEM

If there is water in the petrol they will not mix, and water being heavier than petrol will find its way to the lowest point in the system, namely, the carburettor.

MOTOR MISSES AT HIGH SPEED ONLY

There is insufficient petrol flowing to carburettor due to obstruction in petrol line or filter screen.

A valve may be sticking slightly and does not come to its seat properly. Remove, regrind and polish stem.

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 centre of the porcelain to the shell of the plug before entering the combustion chamber.

One or more spark plugs may be sooted up. Thoroughly clean the sparking points and porcelain with cloth dipped in petrol.

Compression may be poor due to pitted or warped valves.

A valve spring may be broken.

Push rods may be adjusted too tight.

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

Filter screen in carburettor clogged and petrol not flowing to carburettor properly.

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.

The carburettor may be flooding causing the mixture to be too rich. This is usually caused by the needle valve not seating properly. Consult the Chevrolet Dealer or service station. Repairs to the carburettor should not be attempted by the owner.

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 carburettor 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 petrol and squirt around where the connections are made. If any petrol enters the opening, the speed of the motor will immediately increase thereby indicating a leak.

The carburettor adjusting screw which regulates the flow of petrol 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 21, weak valve springs.)

MOTOR STOPS SUDDENLY

If the motor stops suddenly without any further explosions :

Examine all wires connecting the switch, battery, distributor and ignition for loose connections.

Test the wires at the distributor 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.

Examine petrol supply.

Examine carburettor to see if petrol is running into the float chamber.

Consult the Chevrolet dealer or authorized service station.

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 carburettor 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 petrol supply or a clogged petrol 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.

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—Valves need grinding.

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 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 the proper seating of the valves. This will cause a leakage of gases, resultng in loss of power and uneven running of the motor. When this occurs, grinding the valves is the only remedy.

To determine which valves need attention, turn the motor over slowly by hand with starting crank 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 sometmes difficult to determine in advance, especially if the valves need grinding. 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 and adjust accordingly. (See Page 22, proper valve clearance.)

Fourth—Late or sluggish ignition.

This is not a likely 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. Check up the timing of the ignition.

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—Lack of proper oil or oil circulation stopped.

Second—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 petrol or oil. Make it a rule to regularly inspect and fill the radiator.

Third—Raditor water passages stopped with lime deposit. The radiator should be thoroughly flushed and cleaned.

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

Fifth—Late or retarded spark. This is usually apparent by a marked loss in power.

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

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

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

Ninth—The thermostat valve may be inoperative. (See page 26 cooling system.)

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.

Be sure that the motor has a plentiful supply of good oil (See Page 27) and that the oil is circulating properly.

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 IN 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 labour 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.

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.

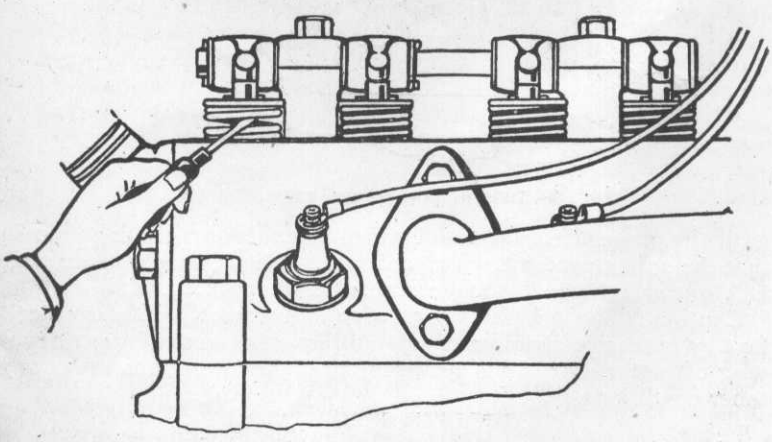

Fig. 4—Testing tension of Valve Springs

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 exhaust valve spring (Fig. 4) 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.

ADJUSTING VALVES (IMPORTANT)

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

The space between the rocker arm and the valve stem (Fig. 5) should be about .006 of an inch on the intake valves and about .008 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 and turn the screw slightly with a screw driver

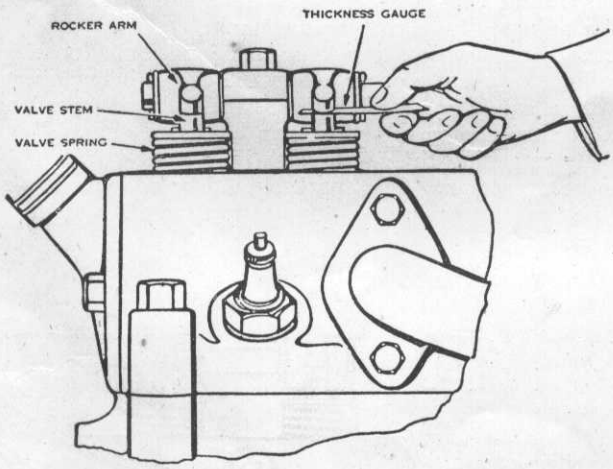

Fig. 5—Determining proper valve clearance.

until the proper clearance is obtained, then tighten the lock nut so that the adjustment will not come loose. Check the clearance after lock nut is tightened to make sure adjustment is correct.

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.

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

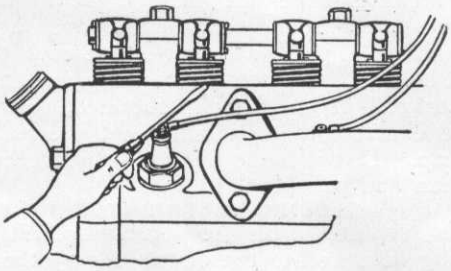

Fig. 6—Short circuiting spark plugs.

mis-fires.

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. 6). 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 petrol.

(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 0.030 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 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 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 centre 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 a Chevrolet 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 conditions of the contact points in the distributor and the wiring.

STARTING MOTOR DOES NOT OPERATE

This is an infrequent source of difficulty but 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 52, Care of Battery.)

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 the negative post of the battery to the frame and see that this is 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 corroded contacts.

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 54, Starting Motor.)

COOLING SYSTEM

The radiator at all times should be kept full of clean water 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 runs, especially when you have been travelling 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 petrol and oil. It is well to examine the water supply every time a stop is made for oil or petrol.

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

Once a month it is a good plan to open the radiator drain cock which is conveniently located on the right side at the bottom of the radiator, 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 OR OVERHEATED.

Leaks in any cooling system 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

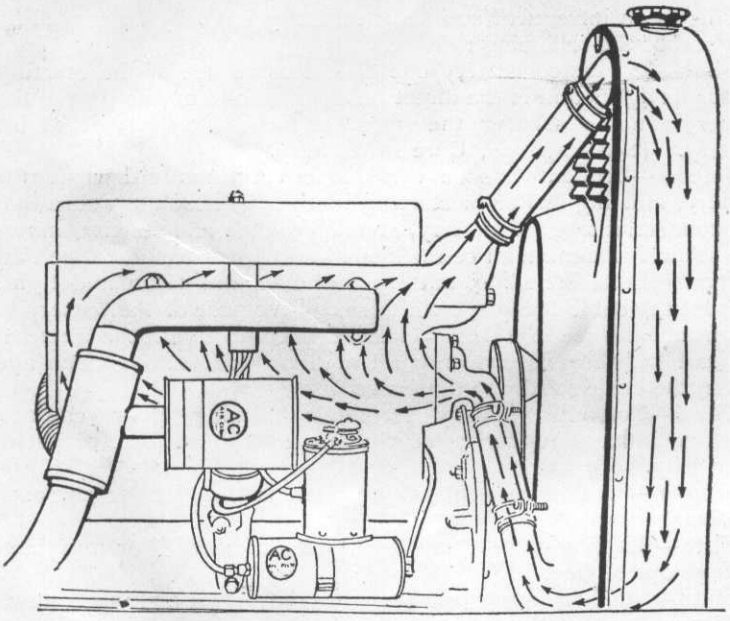

Fig. 7—Cooling system.

seam, once opened up, is likely to get larger, resulting in sudden loss of water with disastrous results.

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.

The National motor is equipped with a thermostat inside the water outlet, which is mounted on the cylinder head. (See Fig. 8.) At low temperatures, the thermostat valve is closed and thus confines the water in the cylinder head until it has reached a higher temperature; then the expansion of the thermostatic unit opens the valve and complete water circulation is obtained.

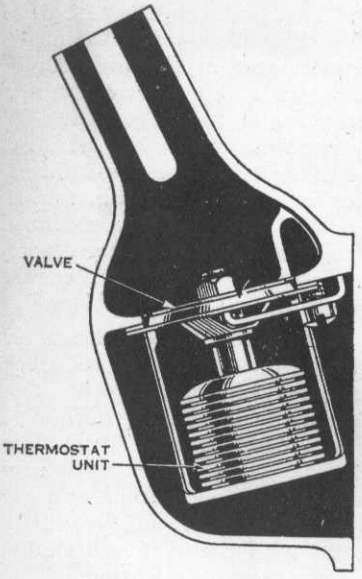

Fig. 8—Thermostat.

The thermostat insures better cold weather motor performance, easier starting and lessens crankcase dilution, since the motor reaches the point of thermal efficiency sooner.

If the thermostat fails to operate the valve, the motor will, of course, get excessively hot and a new thermostatic unit should be installed.

ICE ON WINDSHIELD

If you are troubled with snow and ice sticking to the windshield, this condition may be remedied by rubbing a thin film of glycerine on the windshield glass.

GENERAL LUBRICATION

The chart on lubrication (Fig. 12) shows where and when to lubricate different units of a Chevrolet. 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.

NOTE: This chart may be removed from the book and tacked on the garage wall for ready reference.

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

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.

For correct motor lubrication, a high grade, well refined oil is essential. All reputable oil companies issue lubricating charts, the use of which we recommend as a guide to the proper viscosity for body of oil for summer and winter use which, of course, varies in different localities.

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 approximately every 2,000 miles in summer and approximately every 1,000 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. Under severe conditions the oil should be drained from the crankcase oftener.

OIL FILTER

The function of the oil filter is to remove from the crankcase oil all particles of dirt, carbon and abrasive particles, thus reducing engine wear to a minimum and considerably reducing the frequency with which it is necessary to change lubricating oil.

The filter is connected so that a percentage of the oil flow passes through and returns to reservoir. When the filter is new its capacity is approximately ONE quart of oil per minute at a car speed of 25 miles per hour. This rate of flow will gradually decrease as the filter becomes clogged with the dirt and sludge removed from the oil and will eventually cease to function. This is at approximately 10,000 to 15,000 miles. *When this occurs it is important and necessary to replace the filter cartridge in order to prevent wear caused by dirty oil after the filter has ceased to function.*

When necessary to replace filter cartridge, disconnect inlet and outlet connections, loosen mounting brackets and replace old cartridge with new one.

A new filter cartridge or " refill " may be obtained from your Chevrolet Dealer, or AC Service Stations.

TESTING OIL FILTER

To determine if oil is passing through filter, unscrew test cock on bottom of filter and if oil flows out the filter is operating.

CAUTION : When testing operation of filter, engine must be warmed up and running. Be sure that the test cock is screwed back tightly after making this test and all connections are tight.

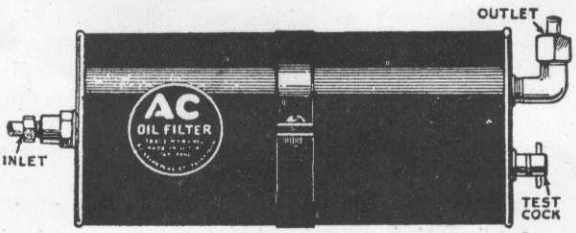

Fig. 9—Oil Filter.

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 petrol 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 in most cases can be traced directly to the character of the fuels in use. Practically all motor fuels to-day contain portions which are slow burning and hard to ignite. The thinning of the motor oil is due to unburned fuel vapour which forces or works its way past the pistons and rings and in coming in contact with the cool walls 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 petrol 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. Use the choke sparingly.

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 increase dilution : Dead or fouled spark plugs, incorrect timing, faulty coil, distributor, weak spark, or leaky gaskets.

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

PRECAUTIONS TO PREVENT DILUTION

1. Avoid excessive use of choke.
2. Avoid idling or excessive slow driving in cold weather.

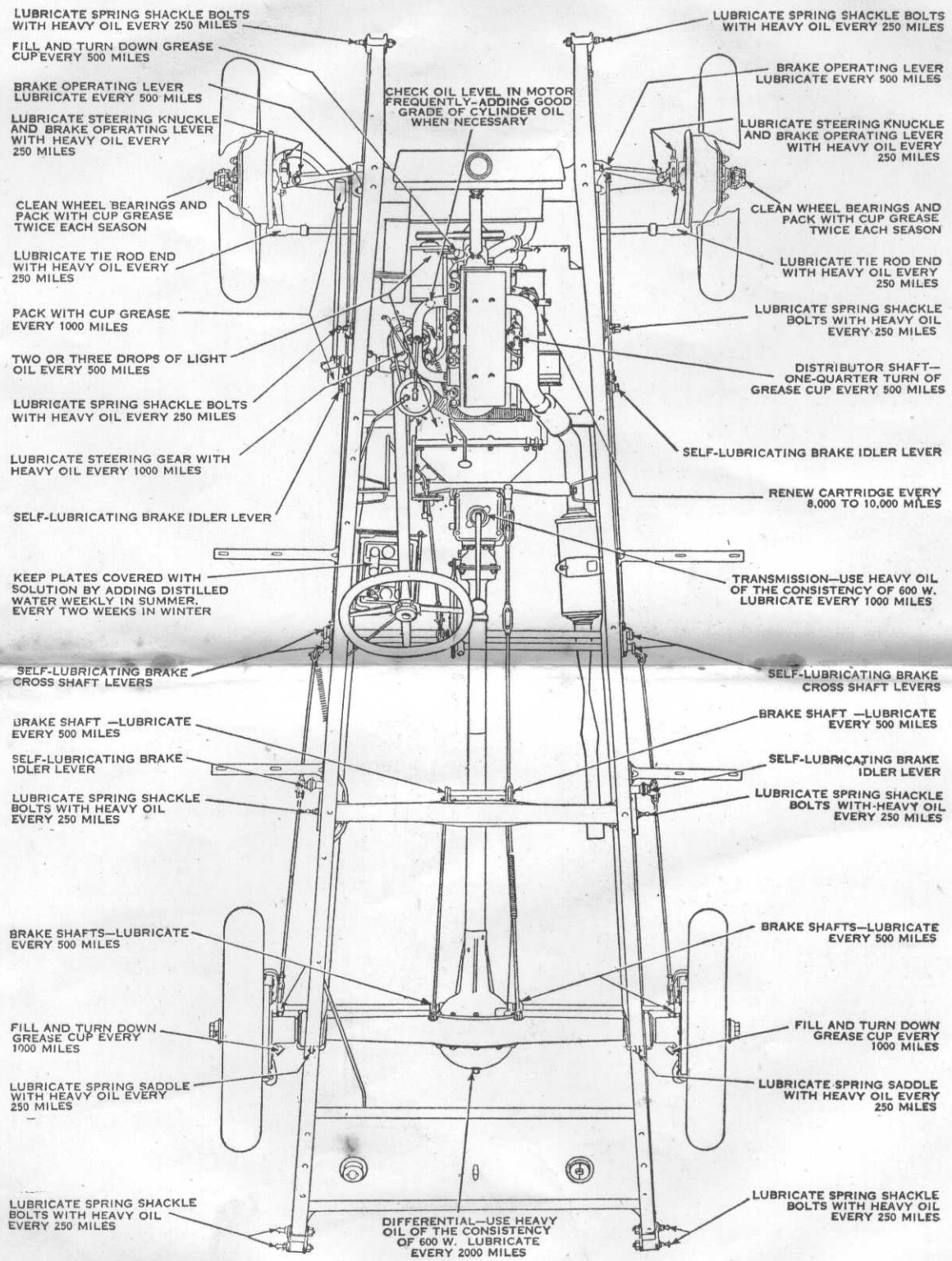

Fig. 12—Lubricating Chart.

This Chart may be removed and tacked on Garage wall for reference.

3. Keep motor in good mechnical condition. Valves properly ground and in perfect adjustment.
4. Drain oil frequently at least every 1,000 miles in winter and more often if you find the oil becomes very thin.
5. Frequently test condition of oil at oil filter test cock.
6. Use 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 vapour 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 piston and rings, even under the most favourable 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. The thermostat helps to prevent condensation in the crankcase.

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.

No motor 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.

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. Good quality petrol generally gives the best results, and the additional satisfaction, ease of starting and freedom from annoyance more than offsets the slight additional cost.

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.

CORROSION

Practically all present-day motor fuel contains small amounts of sulphur which in the state in which it is found is harmless but this sulphur on burning forms certain gases, a small portion of which is likely to leak past the pistons and rings and re-acting with water when present in the crankcase form very corrosive acids. The more sulphur in the fuel the greater the danger from this type of corrosion. This is a condition which we cannot wholly avoid, but it may be reduced to a minimum by proper care of the motor.

As long as the gases and the internal walls of the crankcase are hot enough to keep water vapour from condensing no harm will result, but when an engine is run in low temperatures, moisture will collect and unite with the gases formed by combustion, thus acid will be formed and is likely to cause serious etching or pitting. This etching, pitting or corrosion, when using fuel containing considerable sulphur manifests itself in excessively rapid wear on piston pins, camshaft bearings, and other moving parts of the motor, oftentimes causing the owner to blame the car manufacturer or the lubricating oil, when in reality the trouble may be traced back to the character of present-day fuel or a condition of the motor resulting in excessive blow-bys or faulty carburettor adjustment.

It is possible to find this condition in a gas engine where superficial tests of the fuel and of the lubricating oil indicate no sulphur in either one and this is to be expected, since sulphur in the form in which it occurs in most present-day automobile fuels is not corrosive or acid and does not become so until after being burned and the products of combustion have combined with water.

Certain precautions to reduce the liability of corrosion may be taken by the car owner.

(1) Use good fuel and cover for radiator in winter.
(2) Use none but the very best grades of oil.
(3) Drain the crankcase frequently and flush out with a light washing oil.
(Never use petrol or paraffin to flush out the crankcase) Re-fill with a good grade of oil.
(4) Once each week in winter draw off a half-pint of oil from the crankcase at the drain plug after the motor has been in use, allowing time for the water, if any, in the crankcase to settle to the lowest point. You will likely find a small amount of water each time you drain.
(5) Use the choke sparingly.
(6) Do not idle the motor unnecessarily.
(7) Keep piston and ring fits up to standard, thus preventing blow-bys.
(8) Keep valves ground and properly adjusted.

(9) Be sure cylinder head gaskets and intake manifold gaskets do not leak.
(10) Take your car to the Chevrolet Dealer for regular periodic inspection.
(11) Test condition of oil filter by unscrewing test cock. Renew filter cartridge if necessary (Figure 9).

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.

MOTOR LUBRICATION

The oil is carried in a reservoir located at the bottom of the crankcase and is filled through a filler tube on the left side of the motor just back of the fan. (See Page 7, Figure 1.)

Fill the oil reservoir to the proper level with the best oil obtainable (See Page 27, General Lubrication). Good oil is cheaper than repair bills, therefore, observe this point regularly. Use cylinder oil to lubricate the rocker arms and push rod felts, keeping the felt saturated with oil. The Chevrolet Motor is a combination pump and splash system and none but the best grades of medium or light oil should be used as complete lubrication depends on the oil being thoroughly atomized so that the oil mist or vapour will reach all working parts of the motor.

OILING SYSTEM

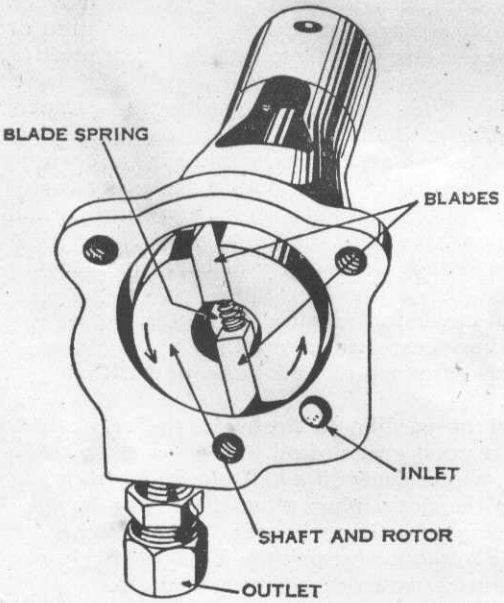

Fig. 10—Oil Pump.

In the Chevrolet oiling system the oil pump (Fig. 10) is placed inside the crankcase and lifts the oil from the oil reservoir to the oil distributor where the flow is divided and passes through pipes to the oil troughs located under each connecting rod.

The oil splashers on the ends of the connecting rods strike the oil, a portion of it being forced up into the connecting rod bearing. The rest is broken up into a fine spray or oil mist which penetrates to all moving parts of the motor, lubricates them and in turn drains back to the oil reservoir where it is picked up by the pump and used again.

The oil pump (Fig. 10) and oil distributor (Fig. 11) require practically no attention other than to make sure that the oil at all times does not contain foreign matter of any kind. Be sure to use good oil free from all foreign substances or dope. Do not use a heavy oil for the reason that heavy oil will not atomize properly and is likely to cause parts of the motor to be under lubricated.

The oil pump (Figure 10) rotates counterclockwise and draws the oil from the oil pan, into the oil pump body through the inlet and the blades push it around until it reaches the outlet, thus keeping a constant pressure in the system when the motor is running.

The oil distributor valve is assembled with a separate valve seat, on which it is held by a spring (Fig. 11). Oil coming from the pump

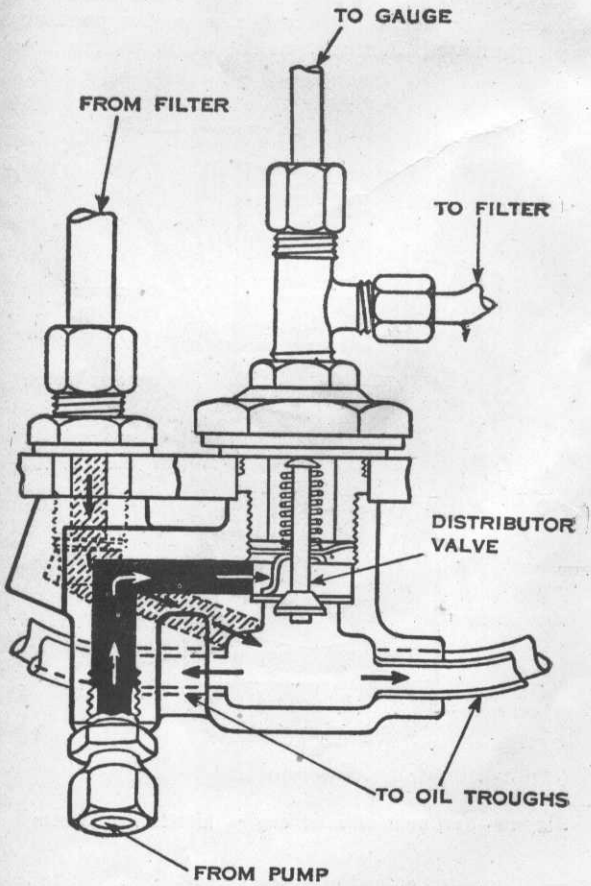

Fig. 11—Oil Distributor.

is free to rise above the valve assembly into the gauge line, but before it enters the distributor pipes it must pass through the holes of the valve seat, and force the valve off its seat against the spring pressure.

Should the oil gauge fail to register at any time, the cause should be investigated at once paying particular attention to all connections and gaskets.

Inspect the oil pump, making sure that the blades are not worn or the spring weak.

Examine the worm on the cam shaft and the oil pump drive shaft gear or pin, they may be damaged or broken.

Should the connecting rod bearings appear to be starved or lack sufficient oil, examine the oil pipes leading from the oil distributor to the oil troughs to see that they are in proper position and not dented or plugged with dirt so that the oil is not reaching the oil trough.

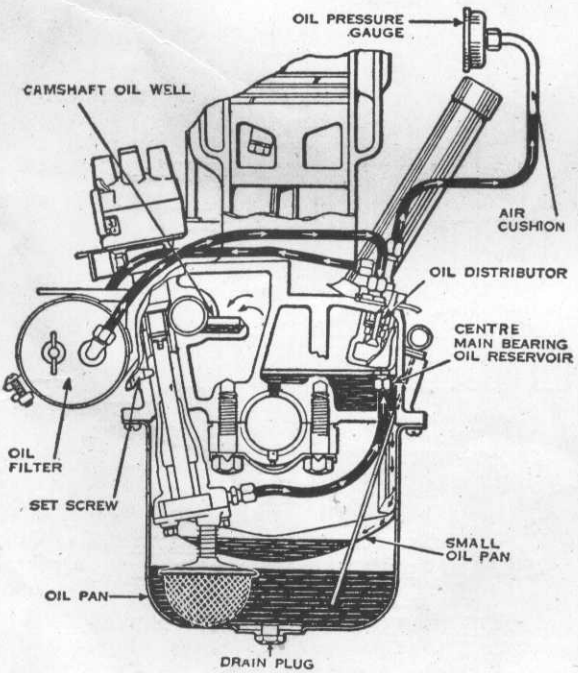

Fig. 13—Sectional view of engine lubricating system.

NOTE.—Oil splasher on end of connecting rod dips 1/16in. in oil in small oil troughs

The main bearings and camshaft bearings collect oil from the splash in depressions or reservoirs located over each bearing and the oil is fed to these bearings through oil holes or channels leading to the bearings themselves.

The pistons and cylinder walls are constantly bathed in the oil spray, thus insuring ample lubrication at all times the motor is in operation. The piston pins or wrist pins are taken care of in a similar manner. In fact, ample provision has been made to care for the proper lubrication of all parts of the motor provided a good supply of oil is maintained.

The oil in the oil reservoir should be drained out at frequent intervals and a supply of fresh, new oil added to insure long life and freedom from expensive repairs.

See Figure 1, Page 7, and be sure to keep the oil level up to the full mark on the oil gauge rod.

Should difficulty develop with the oiling system, the Chevrolet dealer or nearest Chevrolet service station should be consulted immediately.

OIL PRESSURE GAUGE

It should be noted that the oil gauge is an indicator only and merely shows whether the pump is working or not. The amount of pressure (12lbs.) shown on the oil pressure gauge does not necessarily tell anything about the condition of the oil in the crankcase. Inferior or dirty oil may show sufficiently high pressure, therefore it is necessary to follow instructions relative to changing oil (See page 27) in order to insure a supply of fresh clean oil in the crankcase at all times. If the oil pressure gauge fails to operate consult the Chevrolet dealer or service station at once.

CLUTCH

The clutch used on the Chevrolet is a standard plate clutch. The driving disc is made up of steel segments mounted on a clutch hub which is engaged by two clutch friction rings placed on either side of the driving disc.

The clutch pressure is maintained by eight coil springs evenly spaced around the area of the disc. There is only one adjustment necessary on the clutch and that is to keep the clutch pedal in its proper position and so that it does not touch the floor board at any time.

Refer to Fig. 14, and note clutch pedal adjusting bolt and nut.

If at any time the clutch pedal is less than three-fourths of an inch away from the end of the slot in the floor board, when the clutch is fully engaged, the clutch pedal adjusting bolt nut should be turned to the right until the clutch pedal is at least three-fourths of an inch away from the end of the slot in the floor board.

It is well with the first indication of any difficulty with the clutch to consult the nearest Chevrolet Service Station.

Do not disengage the clutch when starting the motor.

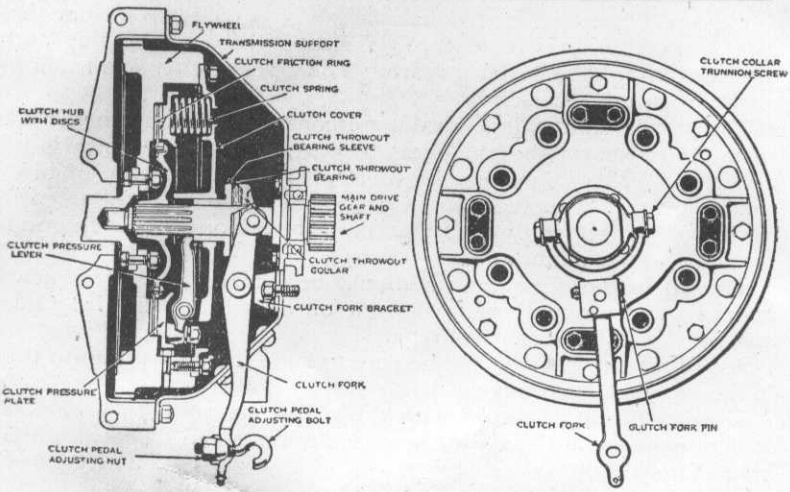

Fig. 14—Clutch and operating mechanism.

CARE OF CLUTCH

Do not lubricate the clutch.

The clutch is designed so that the clutch throwout collar and pilot bearing are both self lubricating and no oil or grease need be applied at these points, and care should be exercised to keep oil and grease away from the clutch disc and clutch friction rings.

TRANSMISSION

The transmission is of the selective type, having three speeds forward and one reverse.

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.

LUBRICATION OF TRANSMISSION

To lubricate the transmission, fill every 1,000 miles with any high grade gear oil, not grease, so that the oil level stands even with the opening in the filler boss on the right side of the case. In cold weather we recommend the addition of a pint of light engine oil to the heavy oil in the transmission which improves the lubricating qualities and makes it easier to shift gears and start the motor.

Once every 2,000 miles it is a good plan to wash out the transmission with a light oil 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 the case thoroughly and refill with a heavy oil such as specified in Fig. 12.

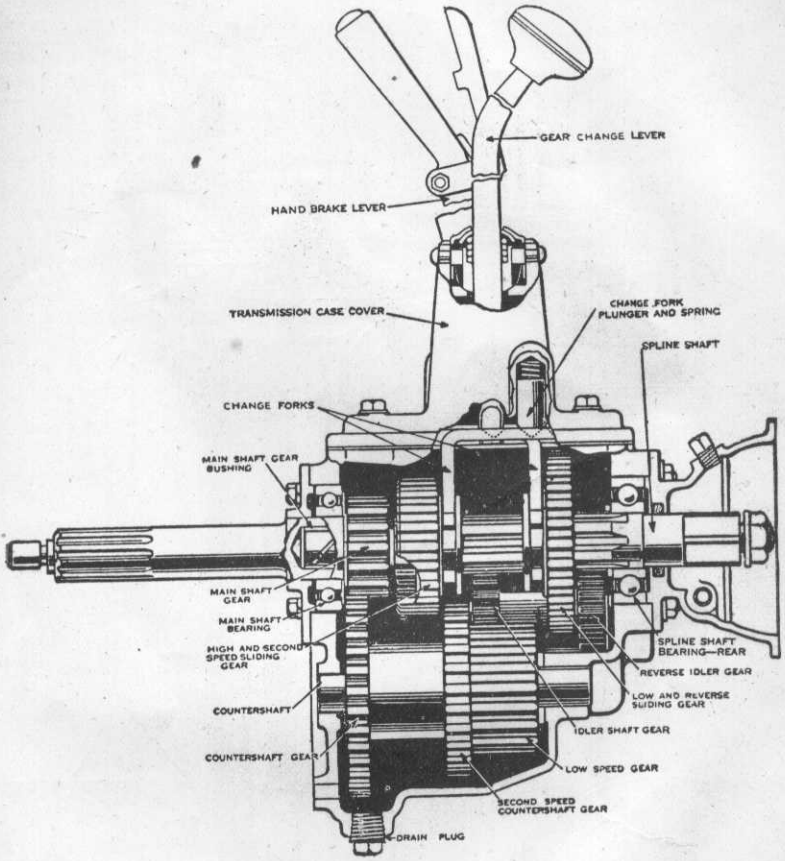

Fig. 15—Sectional View of Transmission.

REAR AXLE

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

The axle shafts are supported on the outer ends by heavy duty ball bearings fitted to the axle shaft.

A glance at the illustration Fig. 16 shows the construction and relative positions of the various units.

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.

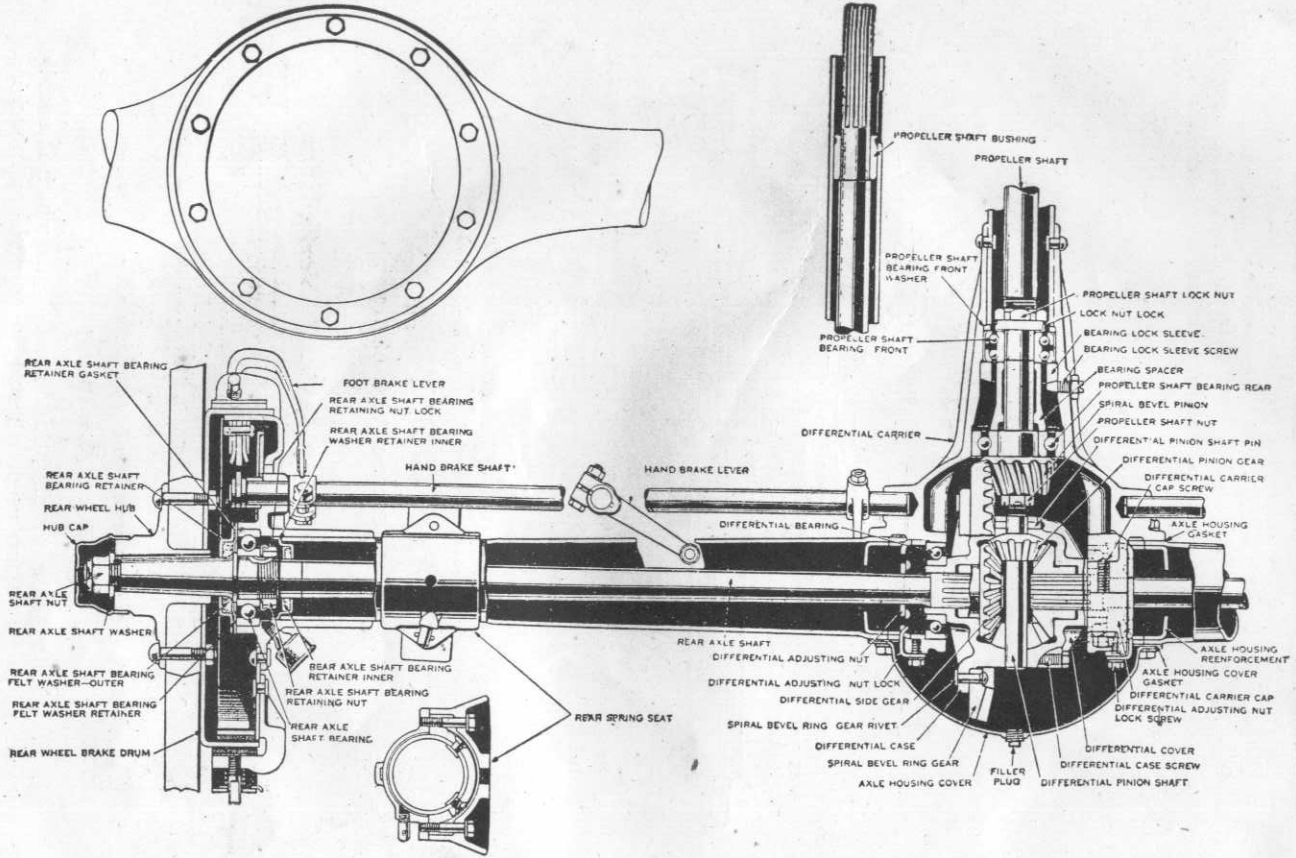

Fig. 16—Sectional View of Rear Axle.

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 dissassembled and an examination made of it by a reliable mechanic.

LUBRICATION

Good quality gear oil should also be used to lubricate the differential, and should be renewed every two thousand miles. By removing the oil plug on the rear of the axle housing cover 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. See Fig. 12.

REAR WHEEL BEARINGS

Heavy duty ball bearings mounted on the axle shaft carry the car load and insure a minimum of power loss and upkeep cost. Outside of seeing that these bearings are properly lubricated they should require no further attention from the owner.

Refer to Fig. 16, Page 38, where these parts are fully illustrated.

BRAKES

10 cwt. Chassis.

The foot brakes are the outside or external bands at the rear wheels and the internal expanding shoes at the front wheel. The foot brakes contract on the outside of the rear brake drums and expand on the inside of the front brake drums. The emergency brakes expand against the inside of the rear brake drums.

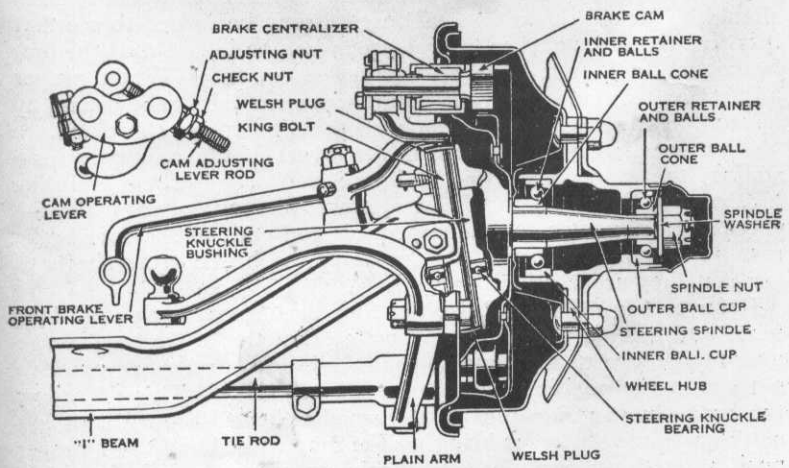

Fig. 17—Adjusting Front Wheel Brakes.

ADJUSTING FRONT WHEEL FOOT BRAKES

Front brakes are designed for minimum shoe clearance at the toe. They should be so adjusted that the toes of the brake shoes just touch the high spots on the drums.

To properly adjust front wheel brakes, proceed as follows :

After raising both wheels from the floor by means of a jack or other lifting device, test the front wheel bearings for play. If it develops that the wheels need tightening on the steering knuckles remove hub caps and tighten the wheel by means of turning the steering spindle nut.

The front brake operating levers should always be in contact with the lever stops (Fig. 17) with the brake pedal released. If the lugs on the operating levers do not touch the stops they can be made to do so by turning the yokes at the front brake rod ends. However, first examine the brake cross shafts to see that they are not binding. (Fig. 20).

Loosen the check nut (Fig. 17) and turn adjusting nut to the left (as you face the radiator) until the brake shoes begin to drag slightly in the brake drum. Then depress the brake pedal two or three times in order to centralize the brake cam. Repeat these operations until the brake drags slightly on all high spots in the drum. Then turn adjusting nut to the right one half turn and securely lock the check nut. GREAT CARE SHOULD BE EXERCISED NOT TO DISTURB THE ADJUSTING NUT WHEN TIGHTENING THE CHECK NUT.

Front wheel brake adjustment should be performed on both brakes simultaneously.

ADJUSTING REAR WHEEL FOOT BRAKES

When adjusting the rear wheel foot brakes both rear wheels should be jacked up so that each wheel may be turned to see that it is free when the brakes are released; i.e., to insure that the foot brake bands do not drag on the brake drums. When proper adjustment is made the brake bands will clear the brake drums by approximately 1/32nd of an inch all the way round the drum.

First see that both external brake levers at the rear axle rests against the stop collars on the brake shafts. (Fig. 20.) If the lugs on the levers do NOT rest against the stop collars make the necessary adjustment at the adjustable rod ends of the foot brake rear pull rods. However, first examine the brake cross shafts to see that they are not binding.

Refer to Figure 18. Raise the foot brake band guide pin lock plate and push it toward the wheel so that the brake band guide pin may be free to turn and so that the brake band guide pin lock plate is in the position indicated in Sketch "B." This will allow the brake band guide pin to be turned either to the right or left as the case may be, thus bringing the foot brake band to its proper position so that it just clears the brake drum by 1/32ind of an inch, after which the brake band guide pin lock plate should be returned to the position shown in Sketch " A," thus locking the brake band

guide pin in position. A piece of ordinary hack saw blade with the teeth ground off makes a good feeler for this purpose.

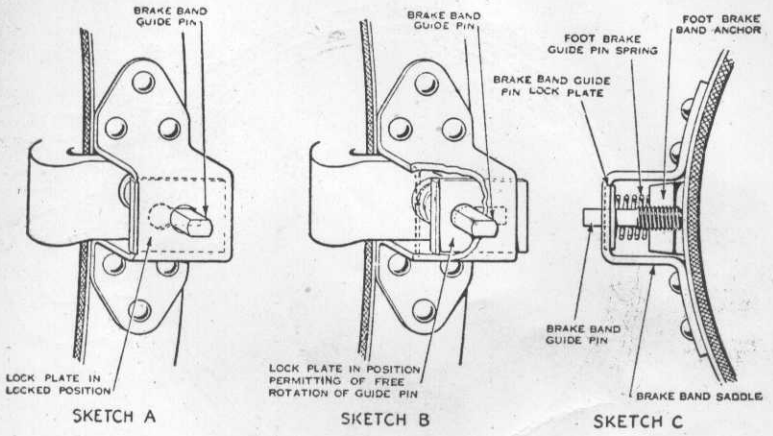

Fig. 18—Brake Guide Pin and Lock Plate.

Refer to Figure 19. And if the upper half of the brake band is too close to the brake drum, loosen the check nut and turn the foot brake adjusting nut to the left until it is at or near the top of the threads on the foot brake adjusting screw. Next, loosen the adjusting screw jam nuts, shown in Fig. 19, and adjust the lower half of the brake band to a position so that it clears the brake drum by 1-32nd of an inch, then tighten the jam nuts. Then turn the foot brake adjusting nut at the top of the foot brake band adjusting screw to a position so that the top half of the brake band clears the brake drum by 1-32nd of an inch.

If there are any irregularities or bends in the brake band, it will be necessary to remove them with a hammer or mallet so that the band will set at an equal distance all around the brake drum.

When these settings have been made on both brake bands the brakes will operate properly. After the brakes have been adjusted in this manner, FURTHER ADJUSTMENTS TO COMPENSATE FOR WEAR SHOULD BE MADE AT THE BRAKE DRUMS AND NOT AT THE ENDS OF THE RODS.

ADJUSTING REAR WHEEL EMERGENCY OR HAND 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 cross shaft by loosening the lock nuts on each side of the " Hand Brake Rod Adjustment " and turn the turn-buckle to the right or clockwise. This adjustment controls the braking action of the hand brake on both rear wheels and in the event that one brake should grab or take hold too quickly, they can be equalised by loosening the lock nuts

just back of each hand brake equalizer (See Fig. 20) and turn the brake rod yoke to the right to tighten and to the left to loosen.

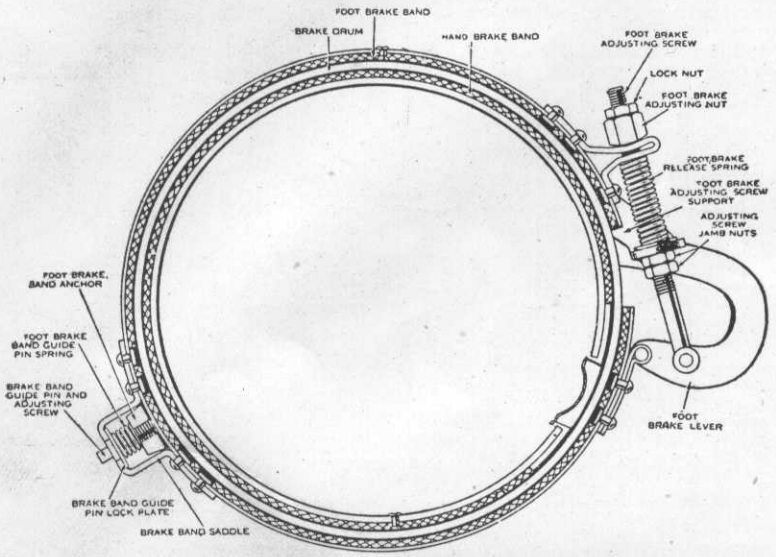

Fig. 19—Brake Band Adjustments.

After several adjustments have been made, the brake levers on the cross shaft at the hand brake equalizer may stand too far forward. This may be remedied by loosening up on the turnbuckle and then shorten the rear hand brake pull rods by means of the adjustable rod ends. These levers should point down and toward the rear axle; that is, back of the vertical with the hand brake released.

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.

ADJUSTING CHASSIS LINKAGE FOR FOUR-WHEEL BRAKES

The double cross shaft assembly illustrated in Fig. 20 serves to regulate the proportion of brake pressure exerted on the front and rear foot brakes. To properly adjust the foot brake chassis linkage, proceed as follows:

Adjust the brake pedal pull rod (Fig. 20) so that the brake pedai rests against the stop on the clutch housing. Then the distance between the eyes of the outside levers of the brake cross shafts is 3 5-8th inches. Then adjust the front and rear adjustable foot brake pull rods, so that the front and rear brake levers rest against their respective stops.

When the brake cross shaft lever adjusting template is used, the outside brake cross shaft levers automatically assume their proper relative position.

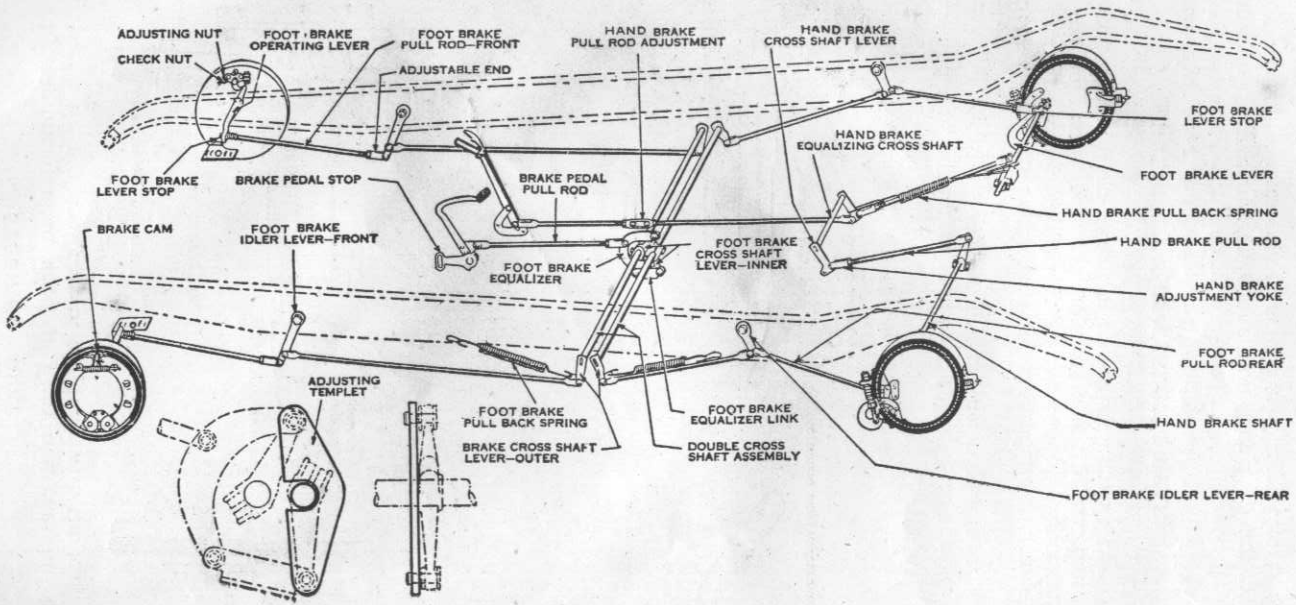

Fig. 20—Brake Rods and Levers—10 cwt. Chassis.

STEERING GEAR

The steering mechanism used on Chevrolet cars has been designed to give the greatest ease of handling with the least amount

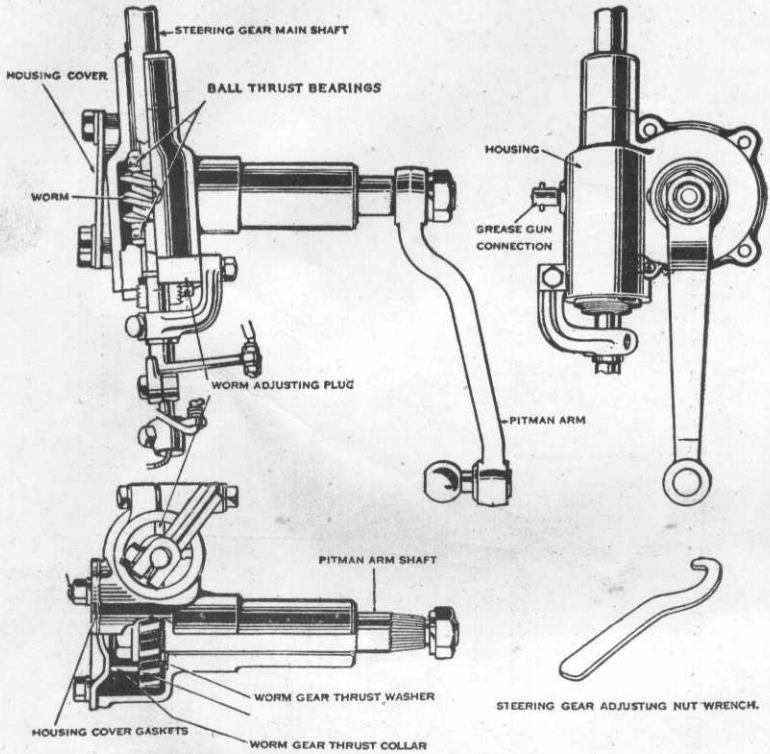

Fig. 21—Steering Gear.

of wear and consequent adjustment. The ball thrust bearings above and below the steering worm insure quietness and easy steering.

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. At the first sign of excessive wear or looseness consult the Chevrolet dealer.

LUBRICATION OF STEERING GEAR

The steering gear should be well lubricated at all times. Use a high grade of heavy oil forcing a liberal quantity into the steering gear through the grease gun connection (See Fig. 20) every 1000 miles by use of the grease gun. (See Oiling Chart, Fig. 12.)

FRONT WHEEL LUBRICATION

The front wheels run on New Departure ball bearings which are lubricated (See Fig. 12, Lubrication Chart) by packing the bearings with soft cup grease. In mounting the front wheels, be careful to thoroughly saturate the bearing assembly with grease (Fig. 17). The best lubricant for front wheel bearings is a straight mineral grease entirely free of asbestos fibre or other foreign matter.

By turning the front wheels as indicated in Fig. 22, the three Alemite fittings are accessible for easy lubrication with an Alemite Gun from the front of the car. After lubrication the steering knuckle on one side of the car, turn wheels in the opposite direction and repeat the oiling operation at the three Alemite fittings on the opposite side.

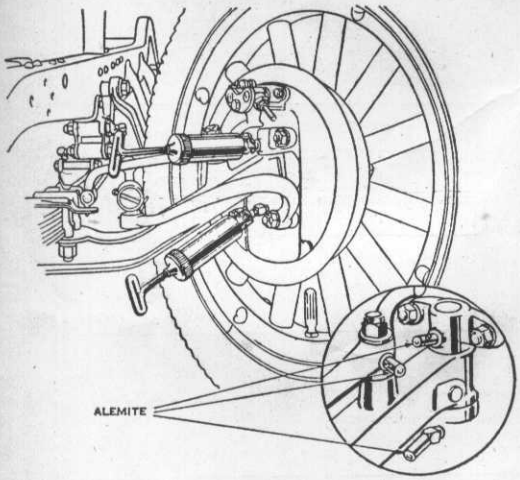

Fig. 22—Front Wheel Lubrication.

The lubrication of the king bolts should not be overlooked. (Refer to Oiling Chart Fig. 12.) The king bolts should be lubricated every 250 miles. Use a high grade gear oil. Do not use oil having graphite or other substances of this nature in it.

FRONT WHEEL ALIGNMENT

To make the 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 from 3-16th to 5-16th 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.

By referring to Fig. 23, 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 from 3-16ths to 5-16ths 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. 23. Almost any good repair shop is equipped with one of these devices and will be glad to check the alignment of the wheels for you.

If it is found that the front wheels do not have the proper " toe in," that is from 3-16ths to 5-16ths ins., loosen the adjusting clamp screw at both end of tie rod as shown in Fig. 22 and with a small pipe wrench or pair of pliers, turn the tie rod to the right to shorten screw at both ends of tie rod as shown in Fig. 23, as "B." To increase the distance in Fig. 23, by the line "B," turn the tie rod to the left.

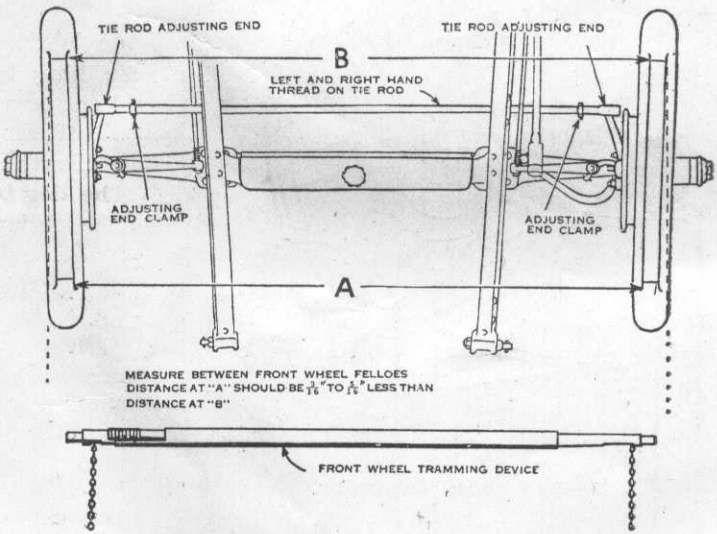

Fig 23—Front Wheel Alignment.

Turning the tie rod to the right will increase the distance shown as line "A" in Fig. 23 and turning the tie rod to the left will decrease the distance indicated by line "A" in Fig 23.

After proper adjustment has been secured, be absolutely certain to fasten both adjusting 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 ends is very important, therefore be sure to follow the instructions on the Oiling Chart (Fig. 12) carefully.

CARBURETTOR.

The Carburettors used on Chevrolet cars 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 carburettor on your car appears to be giving trouble consult the Chevrolet dealer.* Too often adjustments of the carburettor 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 a carburettor's action will usually 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 carburettor.

PETROL TANK

Petrol served at most filling stations is filtered but all other petrol should be carefully strained before being placed in the tank to remove the sediment which will eventually clog the filter screen in the carburettor.

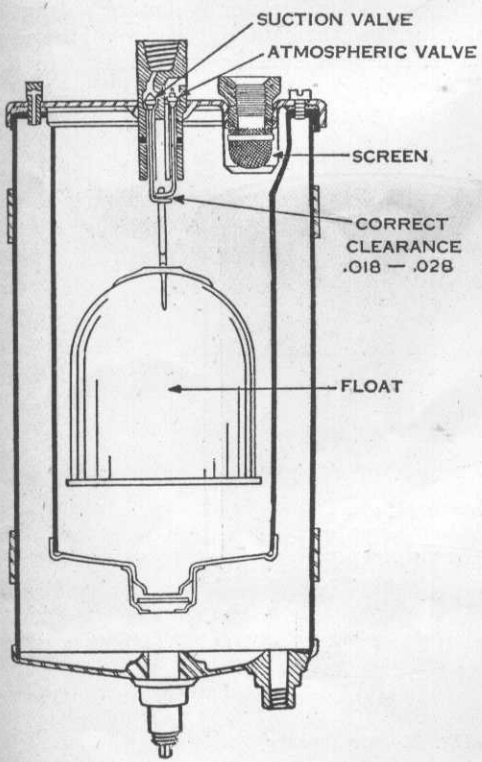

Fig. 24—Vacuum Tank.

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

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

VACUUM TANK

The Stewart Warner vacuum tank (Fig. 24) is used on all cars and trucks.

When the float is in its lower position, it

closes the atmospheric valve, thus drawing petrol into the inner tank. During this period, the atmospheric pressure in the outer tank closes the flapper valve at the lower end of the inner tank. For correct valve action clearance should be .018 to .028 inches as shown.

When the float is raised to the point where it closes the suction valve, stopping the flow of petrol to the inner tank, and opens the atmospheric valve, the petrol then flows to the reserve or outer tank through the flapper valve in the lower end of the inner tank.

Please note that in the case of improperly operating mechanisms there are two assemblies which cannot be taken apart and must be replaced complete. They are the tank cover assembly and the inner tank with the flapper valve.

When it becomes necessary for any reason to dis-assemble this vacuum tank and remove the top cover assembly, a *New* Cork gasket should *Always* be used to eliminate the possibility of leakage.

AIR CLEANER

The principle of the Chevrolet Air Cleaner is similar to that of the ordinary cream separator, in that centrifugal force is used to separate two substances of different specific gravities. In this case it is air and dust. According to accurate measurements, ten thousand gallons of air are consumed for every gallon of fuel used

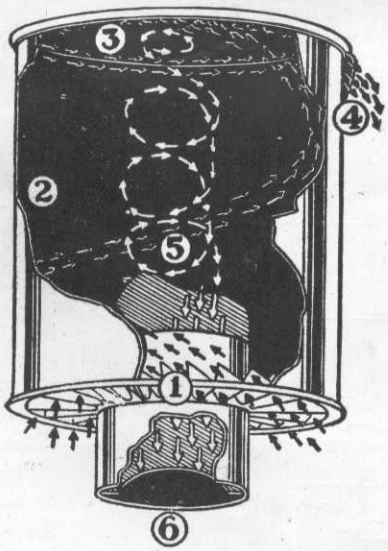

Fig. 25—Air Cleaner.

by the engine. Road dust pollutes this air and very severely wears the moving parts, because it is composed largely of minute particles of sharp-edged sand or quartz. Dust, when drawn in with the carburettor air, mixes with the oil film on the cylinder walls, where it grinds away the efficiency of the engine with each piston stroke.

Dust is eliminated as follows:

1. Suction stroke of engine draws dust-laden air through stationary directing vanes, which gives it a rapid, spirally-rotating motion.

2. Centrifugal force separates the dust particles from the air, throwing them against the inside walls of the cleaner.

3. The spiral movement of the dust along the inside surface of the cleaner wall brings it to rear circular end.

4. The momentum of the dust particles, together with the suction produced by the air flow across the specially shaped dust exit, causes them to be thrown out of the cleaner.

5. Clean air, indicated by white arrows, rotating spirally in centre portion, strikes directing plate and twists itself out of the cleaner.

6. Straightened current of clean air leaves cleaner to enter carburettor.

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.

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.

DISTRIBUTOR

The Distributor (Fig. 26) is the Semi-Automatic Type, which means that the spark is operated both manually and automatically.

Fig. 26 shows the Distributor with breaker plate removed. In this mechanism, there are two weights "AA" hinged at point marked "BB." They are held in position, shown by springs "CC."

At car speeds below 22 miles per hour, the automatic feature does not function, and the only variation in firing is obtained by the spark control lever on the steering wheel. At car speeds of 22

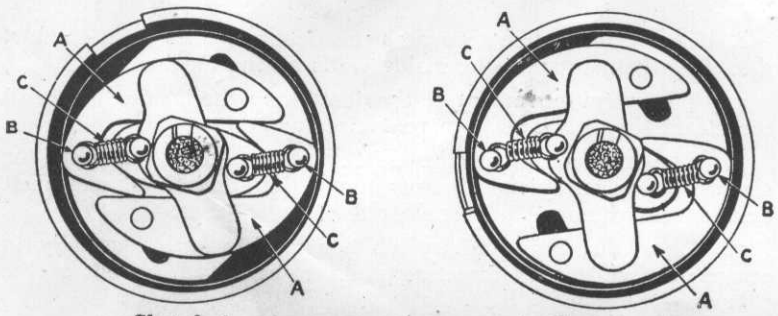

Fig. 26—Distributor.

miles per hour or more, centrifugal force begins to throw both weights out until, at a maximum speed, they reach the point as shown in Sketch No. 2. In their outward movement, because of the manner in which they are connected with the cam, they advance the position of the cam beyond the point shown in Sketch No. 1, and therefore advance the firing of the motor.

The Distributor requires no special attention, except turning down the grease cup one-quarter turn every five hundred miles and occasionally examining the spring contact point on the top of the distributor arm. This spring makes contact with the centre point in the distributor head.

ADJUSTING BREAKER POINTS ON SEMI-AUTOMATIC DISTRIBUTOR

The contact points on the Semi-Automatic Distributor are fixed in their mountings; and are controlled by an eccentric screw moving the mounting plate (Fig 27.)

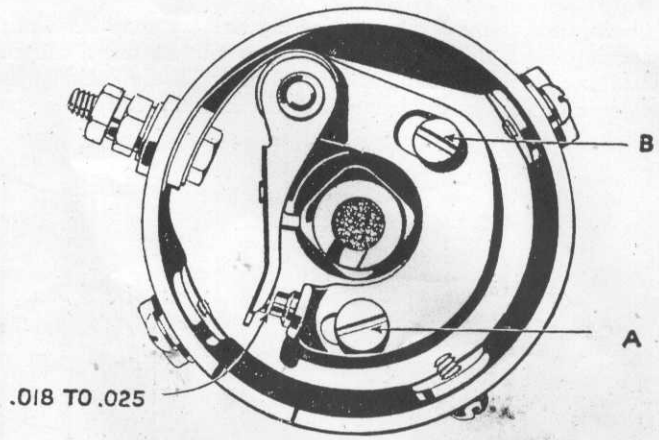

Fig. 27—Adjusting Distributor Breaker Points.

To adjust gap, proceed as follows:

1st—Turn the motor over until the cam is in the position shown in Fig. 27. The contact points are then open the maximum distance.

2nd—Loosen set screw "A."

3rd—Turn eccentric adjusting screw "B" to the right or left. increasing or decreasing the gap to the desired distance. Correct breaker point gap is .018 inch to .025.

4th—When properly set, lock in position by tightening set screw "A."

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 jeweller's file, insert the blade between the contact points, then press them together firmly with the fingers at the same time withdrawing the file.

ELECTRIC STARTING AND LIGHTING SYSTEM

The system used on Chevrolet cars is the one wire common return two unit system. See wiring diagram on page 56 for details of this system.

CARE OF BATTERY

Practically all cause for failure of the battery may be eliminated 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.

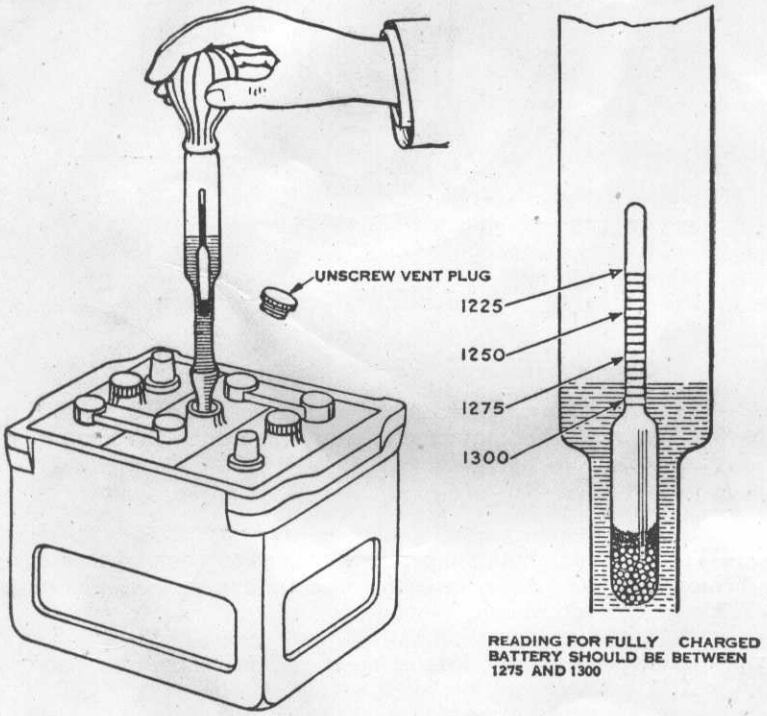

Fig. 28—Testing battery.

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. 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 $\frac{1}{2}''$ above the top of the plates. In warm weather, it makes no difference when the water is added. In freezing weather it should be added just before using the car. The reason is that water will remain on top of the solution until it is mixed with it by action of the battery. If not 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 two weeks 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 a little below freezing point.

A battery showing a reading of 1.250 or more on the hyrometer will not freeze even at temperatures as much as 30 deg. below zero Fahrenheit. *Keep the battery fully charged in winter.*

When filling, if one cell takes considerably more water than the others, this indicates a leaky jar and the battery should be taken or sent to 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 placed 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 will receive proper attention, 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.

STARTING MOTOR

The starting motor is mounted on the clutch housing, having a pinion which automatically engages the flywheel when the starter button is depressed.

As soon as the engine starts under its own power the foot should be removed from the starter switch and the starter pinion will automatically be disengaged from the flywheel.

If when starting the engine the starter pinion goes into mesh with a bang or is accompanied by considerable noise while cranking, take your car to the Chevrolet dealer or service station and have it examined carefully. Repairs to the starting motor should not be attempted by the owner.

THE GENERATOR

The construction of the generator is as simple as such a piece of electrical equipment can be made and beyond a few drops of oil every 500 miles, requires no special attention.

The generator and connections should be examined occasionally to see that all are tight. If trouble in the generator is suspected or if the ammeter does not show a proper charging rate at ten to twelve miles an hour, the car should be taken to the Chevrolet dealer or Chevrolet service station for examination and possible repair. Repairs to the generator should not be attempted by the owner.

When cold weather arrives we suggest that you call at your Chevrolet dealer's service station and have the third brush on your generator advanced slightly, thus increasing the charging rate.

This suggestion is made because of the fact that more current is required in cold weather driving than in summer driving. This adjustment is not necessary except in cases where the battery does not retain its charge in cold weather. This adjustment should not be attempted by the owner unless he is sure that he is entirely familiar with what he is doing or has been instructed by one competent to do so.

FAN AND GENERATOR BELT ADJUSTMENT

The fan and generator belt is so designed that very little adjustment is required.

The belt should not be tight but should have a small amount of ' slack '' in it, only having sufficient tension to keep it from being thrown off the pulleys when the motor is run at a high speed.

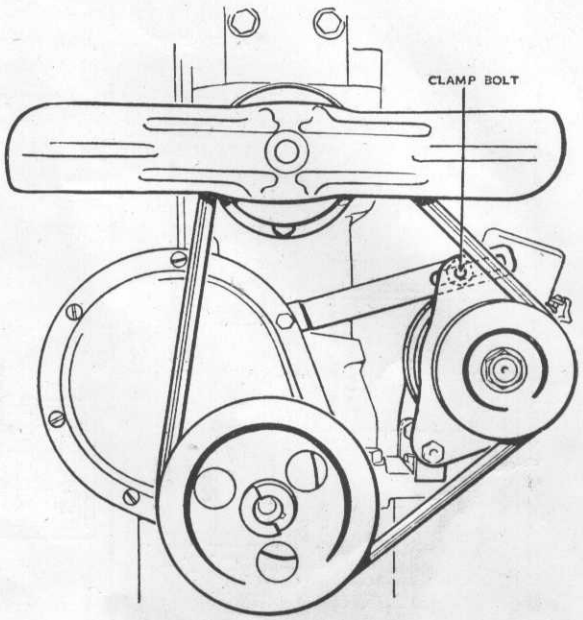

Fig. 29—Adjusting Fan and Generator Belt.

By referring to Fig. 29, the method of adjusting the belt will be made clear. All that it is necessary to do when the belt needs adjustment is to loosen the clamp screw and pull the generator outward and away from the engine slightly. Do not run with the belt too tight.

TO REPLACE FAN AND GENERATOR BELT

Loosen generator clamp bolt, see Fig. 29, and move generator toward the engine as far as it will go. Then place the belt over the pulleys, then pull the generator outward and away from the engine and tighten the clamp bolt. Do not run the engine with the fan and generator belt too tight. See that it has a small amount of " slack."

LOCATING ELECTRICAL TROUBLE

When the electrical 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. 30), should trouble be looked for in the electrical instruments themselves.

SHORT CIRCUITS

A short circuit occurs wnen any two wires of opposite polarity come in contact at exposed places or with any metallic conductor.

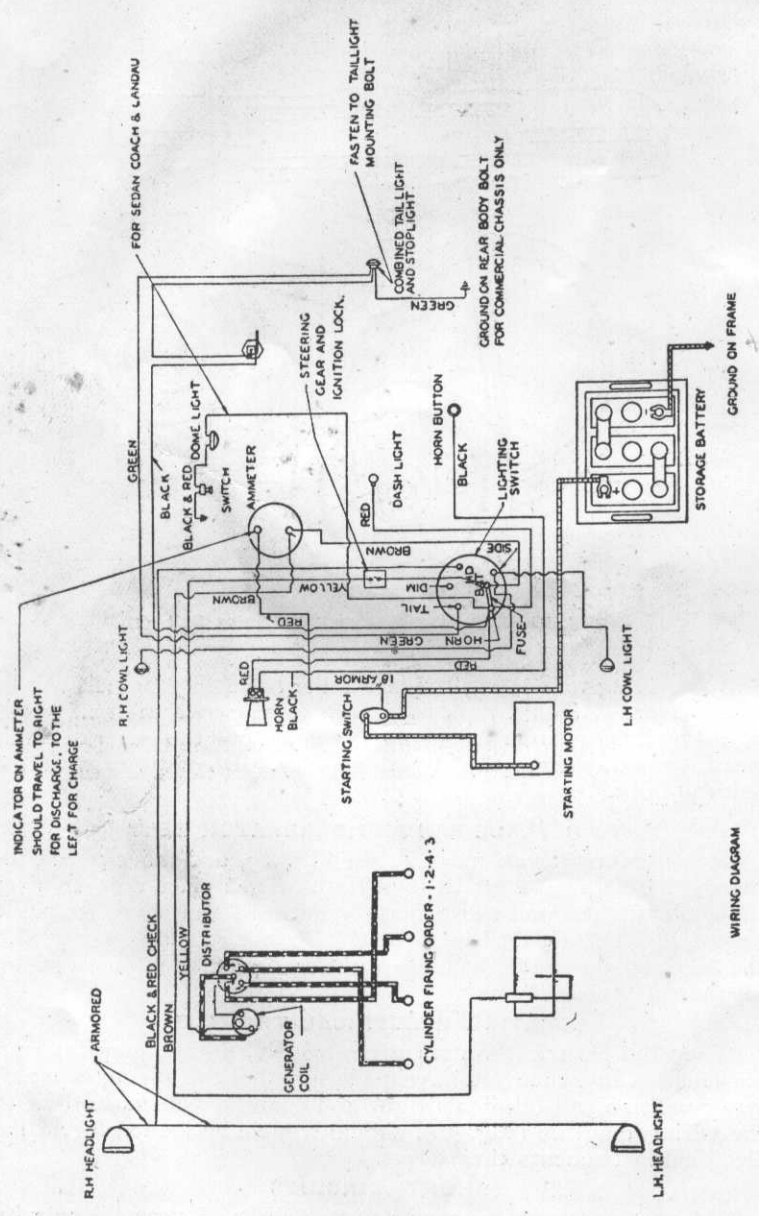

Fig. 30—Wiring Diagram.

This will discharge the 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.

To prevent a short circuit from 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.

Examine the ammeter; With the lights turned on and engine idle the ammeter hand should register " discharge." If it stands at zero, consult your Chevrolet dealer at once.

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.

STOP AND TAIL LIGHT

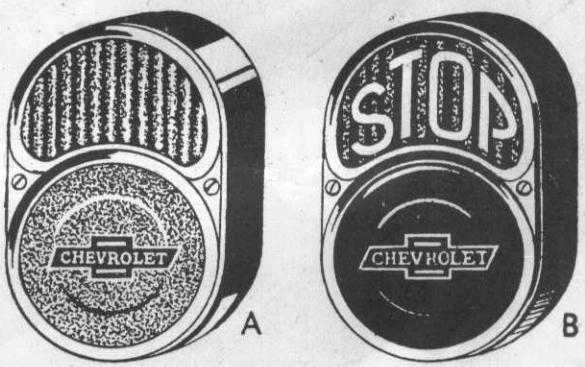

Fig. 31—Stop Light.

All Chevrolet cars are equipped with a combination stop and tail lamp, Fig. 31. The stop and tail lamp is built in a unit containing two bulbs. The stop light is a single contact six-volt, fifteen candle power bulb, while the tail light is a single contact six-volt, three candle power bulb.

Drawing " A " indicates approximately the appearance of the combination stop and tail light when neither bulb is lighted, while drawing " B " indicates the approximate appearance of the combination stop and tail light when both bulbs are lighted. When the tail light is on and the stop light is off; that is, while the car is

in motion, the word " stop " will not appear on the glass but as soon as the brake pedal is pressed forward slightly, the word " stop " will flash and stay lighted until the pressure is released on the brake.

Refer to Fig. 32 for detail wiring diagram. Adjust switch operating lever on foot brake rod so that switch will make contact just as the brake begins to engage.

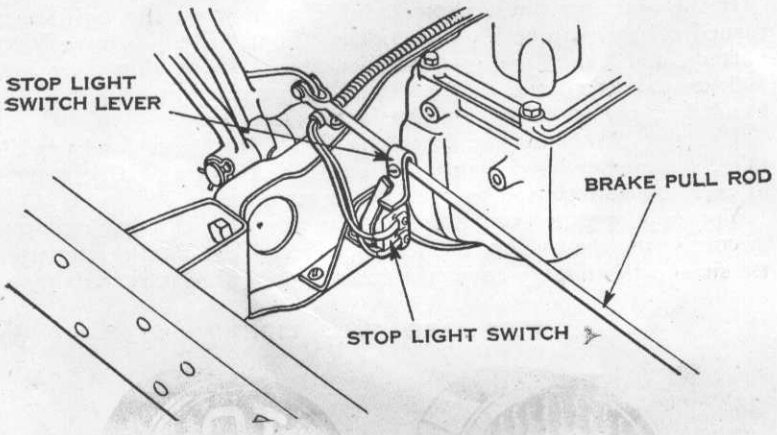

Fig. 32—Stop Light Switch.

The stop light switch, Fig. 32, is entirely self contained and will be serviced as a unit only. The switch operating lever which attaches to the brake rod is sold separately.