Book of Information

on the

Operation and Care

of the

ESSEX

ESSEX MOTORS
DETROIT, MICHIGAN

FIFTH EDITION

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M O D E L " A "

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E S S E X M O T O R S

D E T R O I T , M I C H I G A N

F O R E W O R D

You, as an owner of an Essex car, will find this book a means of gaining a quick comprehension of the most essential things necessary in its care and operation.

A careful study of it will be of great help in obtaining maximum service and pleasure from your purchase.

A WORD ON SERVICE

Service begins in the design of the car.

Its value depends upon the manner in which the car is built. Anything that takes place after the car reaches the user is dependent upon the fundamentals of design and construction. If this is wrong, it would be impossible for any Company, regardless of how sincere is their desire to overcome such shortcomings, to make good any guaranty. But with proper design, a correct and careful manner of construction, the question of guaranty rests with the integrity of the Company.

If you will carefully follow all the oiling directions given herein and those covering the various minor adjustments, needing attention at regular intervals, you will find little occasion to call upon the dealer for assistance except in a co-operative way. However, should any circumstances develop in connection with the operation of your Essex car, the nature of which demands action on the part of either the dealer or Essex Motors, you will find both ready to render that service in the right spirit and with the proper inclination to adjust matters fairly.

GENERAL INDEX

INDEX OF ILLUSTRATIONS

How to Start the Motor

It is assumed that the radiator has been filled with water and sufficient oil poured into the motor base through the filler tube on the left-hand side, also that there is gasoline in the tank.

(1) Make sure that the gear shift lever is in neutral.

(See illustration page 9.) When the lever is in the neutral it can be moved freely from side to side.

(2) Place the throttle lever in the idling position and the spark lever about two inches from top of quadrant. (See illustration page 8.)

(3) Pull the gas button on the dash outward about five notches.

(4) Pull the air button out all the way.

(5) Turn the ignition switch (left hand lever on dash) to the left.

(6) Step on starter pedal and move the air button in and out (thereby priming the motor) until it starts.

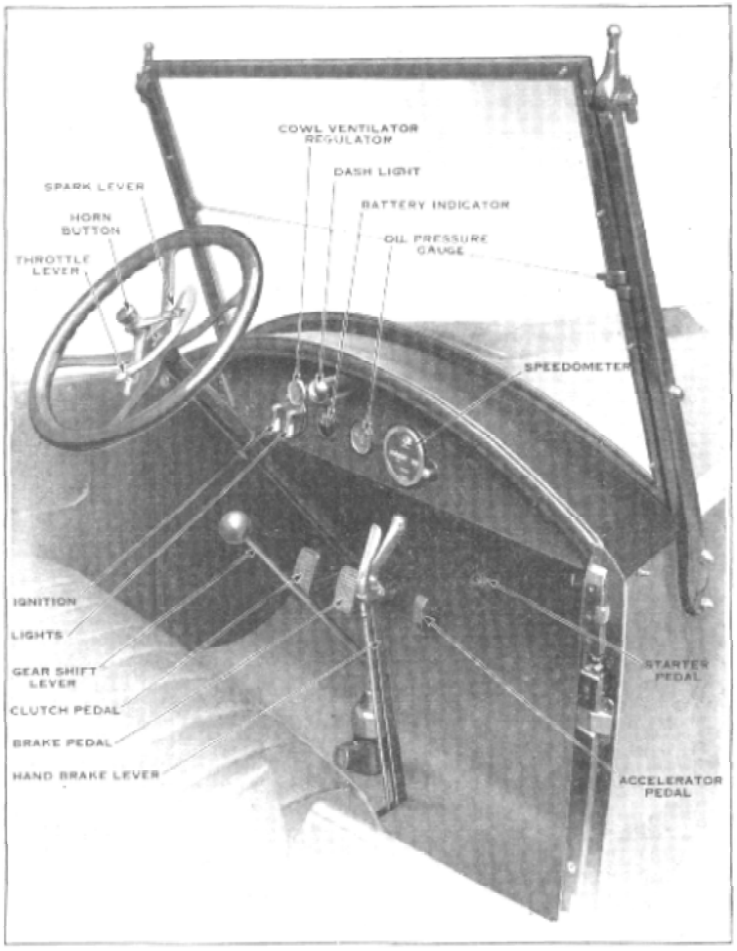
(7) As soon as the motor starts remove your foot from starting pedal and be sure that air button is in or you will flood the motor. If necessary it may be rapidly pulled out and returned to position several times when warming up a cold motor. The car should not be driven with the air button pulled out.

(8) To obtain economy the gas button should be carried as close to the dash as possible, while allowing the motor to idle properly.

(9) Always close the shutter when driving until the motometer indicates that the proper driving temperature has been reached. Then open it just sufficiently to allow this temperature to be maintained. it is rarely necessary to open the shutter wide and it should always be closed when leaving the car in order to conserve the heat.

(10) Do not race the motor needlessly.

The air button controls the "choke" on the carburetor. When it is pulled out all the way, the air is shut off and the carburetor to "strangled" or "choked," as a result of which the cylinders are flooded with raw gasoline. Do not use the air button injudiciously as it will result in flooding, too rich a mixture and excessive gasoline consumption.

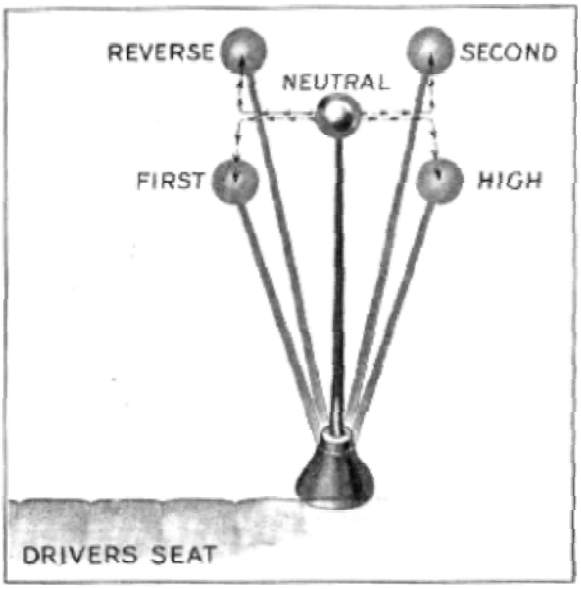


Functions of Fittings in Driver's Compartment

How to Start the Car

Start the motor as instructed on page 7. The throttle lever should be open just enough to permit the engine running without danger of stalling through the improper manipulation of the clutch.

Depress the clutch pedal with the left foot and keep it depressed while putting the gear shift lever into the first gear position. (Study illustration for gear shifting position.) You are now ready to start the car by letting the clutch pedal back gently. If you do this gently the car will start into motion very smoothly. Run the car with the



Positions of Gear Shift Lever When In
Different Speeds

gear in fifth speed for a little while until you have become accustomed to the feel of driving and steering, and are confident you can go a little faster. During this time also get used to the operation of the brakes by depressing both the clutch and the foot brake, or until you have sufficient confidence of being able to stop the car at will. Practice this until you are able to find the hand brake without looking down or taking your eyes off the road.

After you have run along in first gear in the manner described, and you are confident you have mastered the art of steering and stopping, depress the clutch again and shift the gear lever from low gear through the neutral position into the second gear. Under no circumstances should you look at the gear lever when changing speeds. This takes your eyes off the road and destroys your confidence in being able

to control the car. Practice as much as you care to with the car standing still or running slowly at first speed but never take the car in traffic or out on to the country roads until you have learned to change all the speeds without taking your eyes off the road. After the car has gained sufficient momentum in the second gear, it is only necessary to depress the clutch again and bring the lever backwards to place it in high gear. The gear shift lever is right at hand and there to no more reason for looking at it when changing from one speed to another than there is for looking for your pocket when you take out your watch. It is all a matter of getting accustomed to it and it will come to you after just a little practice. If, in changing from first to second, there is a tendency to clash gears, it is because you are trying to make the change too quickly. Wait a second or two after you have depressed the clutch pedal before shifting from first to second. Never force the lever in. If the gears do not mesh easily, it is because you have not yet learned to judge the correct car speed at which to make the change. The same rule applies in changing from second to high.

In changing from high to second or from second to first, in other words, changing down to a lower speed, it is necessary to make the change more quickly. Do not change back from high into second speed with the Idea in mind of quickly lowering the speed of the car. Use your clutch and brake for this. The times you will need to change from high to second or from second to first is when you are climbing and the time to make the change under these conditions is when the car can no longer make the grade in high gear and has lost its momentum to a point demanding a change in ratios. If you change at that moment you will find it easy. The same rule applies in going back from second to first.

Never attempt to change to the Reverse Gear when the car is in motion. By so doing, you will invariably strip the gears.

Perhaps the two most important things to remember and those to which the new driver should pay the most attention when first learning, are the art of engaging the clutch - letting the clutch pedal come back slowly so that the load of starting the car is taken up very gently. Letting the clutch in with a jerk causes excessive friction at the clutch discs and tends to burn them out. It also exerts a great deal of unnecessary strain on the entire driving mechanism.

Making the gear shift from first to second or second to high at the point where the speed of the motor and that of the car are in proper harmony.

Your ability to drive your Essex will be judged by most people on how well you have mastered these two details of operation.

Never slip the clutch in order to reduce the speed of the car or in an effort to make it climb a hill on high gear. The transmission to the device containing the different gear ratios and its sole purpose to to minimize the strain on the driving mechanism by means of increased leverage which may be adjusted in proportion to the work done by the motor. Get into the habit of using the transmission gears at the right moment. Don't wait for the motor to knock and stall under an excessive load before making the shift to a lower speed. A good driver never strains his motor by making it work under an impossible load as a result of failing to shift gears. No matter how bad the roads are or how steep the grade, If the driver changes the gears judiciously, neither the motor nor the car need ever be placed under an excessive strain.

Develop the habit of shifting the gear shift lever into the neutral position immediately upon stopping the car. Do not use the brakes and clutch to control the car when the throttle will do it. Practice using the foot accelerator which you will find will give you perfect control of the car under practically all circumstances.

Turn off the switch when leaving the car.

If you are in doubt as to your ability to operate the car in accordance with these instructions, seek the advice of our dealer rather than that of your friends who are driving other make cars. Every Essex dealer knows best the way to drive an Essex car and we want you to drive It in that manner.

A Few Suggestions on Correct Driving

Changing Gears. More accidents result from unwillingness to change gears than from almost any other cause. Most drivers use their first and second speeds only in starting their car. They allow the car to drift along and thus get into a tight place in traffic or too close to street cars and because of misjudging the speed of the approaching vehicle or their selfish desire to crowd out another car, collisions or other accidents frequently result.

The second speed is incorporated for a purpose. It is seldom that we are in such a hurry that we cannot spare a moment to afford absolute safety.

When the Car Skids. Although the driver feels helpless at first, a little experience will soon give him confidence.

Most skids can be corrected by the manipulation of the steering and brakes. An expert driver can keep his car straight under almost any conditions, but it is impossible to explain just how he does It. Usually the rear end skids first, and in the right hand direction, this being caused by the crown of the road. Under such conditions, the skidding action will be aggravated if the brakes are applied, and the car may be ditched or continue to skid until it hits the curb.

The correct action in an emergency of this kind is let up on the accelerator pedal to shut off the power; but not entirely so, or it will have the same effect as putting on the brake. If the car seems to right itself, the power may be applied gradually and it will be advisable to steer for the center of the road again. However, if the car continues to skid sideways, steer for the center of the road, applying the power gently. This will aggravate the skid for the moment, but will leave you with the front wheels in the center of the road and the car pointing at an angle. By so doing you can mount to the crown of the road again and the momentum of the car will take the rear wheels out of the ditch on the right hand side. It is customary to advise turning the front wheels in the direction that the car is skidding in order to correct the action but this can hardly be said to be true in all cases, as the amount of room on the skidding side is somewhat limited, and for this reason, the explanation given above will better apply to such a condition.

When turning a corner on asphalt pavements which are slippery, it frequently occurs that the front wheels skid. In a case of this kind, immediate action is necessary. It will usually be found that by applying the brakes suddenly for a moment so as to lock the wheels, the rear end will help the action of the front wheels and the releasing of the brakes and the touch of the accelerator will bring

the car around the corner without any over-travel of the front end. By applying the brakes in this way, it is possible to turn the front wheels in the direction opposite to that in which the car is to be turned for a moment while the rear end is skidding. When the brakes are released, it is plain to see that the front wheels will have no tendency to skid farther, as they will be pointing in the direction in which the car is to be turned and the rear end will be In line with it, due to the skid.

Needless to say, this manipulation requires a little more expertness than the correction of an ordinary skid on a straight road.

Use Your Motor as a Brake - it is a natural brake whenever the throttle is closed. Prove this for yourself In the following way. At a speed of twenty miles an hour, release the accelerator and retard the spark, at a certain mark by the roadside a telegraph pole, for example. Don't throw out the clutch, or the motor will have no braking effect. Now note how far you have traveled from the pole by the time your speedometer registers five miles. Then over the same road and at the same speed (20 M. P. H.) pass the pole again, but this time throw out the clutch. You will coast much further this time before you drop down to five miles. Note the difference between this last mark and the first. This distance is proportional to the work done by the motor as a brake. By the same token, the wear on your brakes will be lessened in this proportion if you let the motor help. In short, never throw your clutch out until you have dropped down to the lowest speed at which the car will run, say two to four miles an hour.

If the grade is long and steep, use the foot and emergency brakes alternately. This equalizes the wear on them.

Use Your Spark Control Lever - Few amateur drivers realize the advantages of the spark lever as a smooth driving aid.

But you will note that the expert, who makes such wonderful demonstrations, giving the car the feelings of a thing of life, nearly always has his hand on the spark lever. It is only when a level road stretches ahead of him that he seems to relinquish that little lever and you naturally assume that it is because he needs both hands on the wheel. It is because he uses his spark according to his speed that he obtains that smooth slow down in the traffic, without seeming to need a foot-brake at all; and that easy pick-up on high gear, with no signs of motor labor.

The Law of the Spark is simple. When you have mastered It you can demonstrate to yourself all the time.

The pick-up is much improved if the spark is gradually advanced as the motor gains speed, bringing the lever up to about "half-way" at the first touch of the accelerator and then advancing about half an inch for every five miles per hour as the car gains speed. This, of course, applies to picking up from a low rate of speed, say ten miles per hour, and in a lesser degree at greater speeds, since the car has greater momentum and the motor, therefore, less work to do.

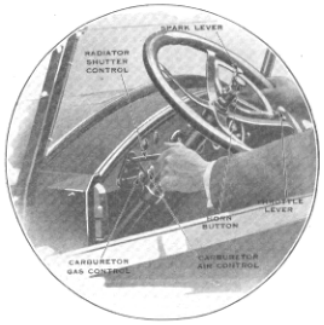
Coasting Mountain Roads---Whenever you approach a long and steep grade, It is best to put your gear speed lever into first speed and allow the car to drift down on the motor. This is better than using the brakes. It gives you absolute control of the car at all times.

The Essex Radiator Shutter

An Explanation of Its Purpose on the Essex.

Poor gasoline mileage, during the winter months, as well as the other inconveniences of winter driving, which owners of all types of cars are subjected to, can in most cases be blamed to the failure on the part of the owner to properly warm up the motor before attempting to drive It away.

This does not mean simply the ability to get the motor to operate so that you are able to drive away, but refers to the temperature of the motor or heat required under the hood so that it will operate without the necessity of using the choke or enriching the gasoline mixture.



Radiator Shutter Control

All gasoline used during the cold weather in excess of what is the standard for the same motor during the summer months is simply that unburned portion which goes through the carburetor but does not vaporize, being drawn up into the combustion chamber in a liquid state where it then seeps past the pistons into the crank case. This distillate or kerosene cuts the lubricating oil in the crank case and renders it useless. It therefore follows that if the motor is persistently run in a choked condition and to not allowed to warm up to a point where all of the gasoline going through the carburetor is properly vaporized, a slow process of condensation is going on in the combustion chamber. This makes it necessary to remove the oil from the crank case every few hundred miles because of its diluted and dangerous condition.

Perhaps a more simple way of explaining the reason why a radiator shutter, such as is installed on the Essex, is so essential in obtaining continued good results from a gasoline motor is to point out the similarity of action between it and the human body. The human body functions properly only through a small range of temperature. This temperature under normal conditions remains constantly at 98.6º Fahr. regardless of surrounding conditions. Any variation from this point results in illness. Exactly the same conditions prevail in the gasoline motor. If it is driven too hot, the carburetor does not function as it should. If driven too cold, carburetion is again but partial. There is only one efficient point. Deviating from that either way decreases the performance of the motor proportionately.

With a shutter equipment, you will be able to conserve most of the heat generated in the motor, regulate and retain it. in fact, it to possible with this equipment to keep the temperature of the motor under all climatic conditions to that ideal point which obtains during the summer months.

Its Operation.

A small operating lever on the dash is constructed in such a manner that the shutter can be set in any position. You need only to look at the motometer to determine the position the blinds of the shutter should be placed. This regulation depends entirely, of course, upon the weather. it will take you but a short while to learn to regulate these. Close the shutter when you leave the car standing and leave it closed when you first start away If the car has been standing in the cold. in fact, leave it closed until the red fluid in the motometer reaches the center of the circle.

Gasoline economy during the winter time will depend very much upon your manipulation of the shutter. It is the most valuable attribute to good gasoline economy of your car. Make use of it.

The Essex Lubricating System

The Essex Oiling System can be most suitably termed a circulating, constant level, splash system. An oil pump is mounted at the front of the motor, well above the frame line and in a position where it may be instantly inspected, removed, or tested without recourse to special tools. It is of such simple and sturdy construction that it can be easily understood by a layman.

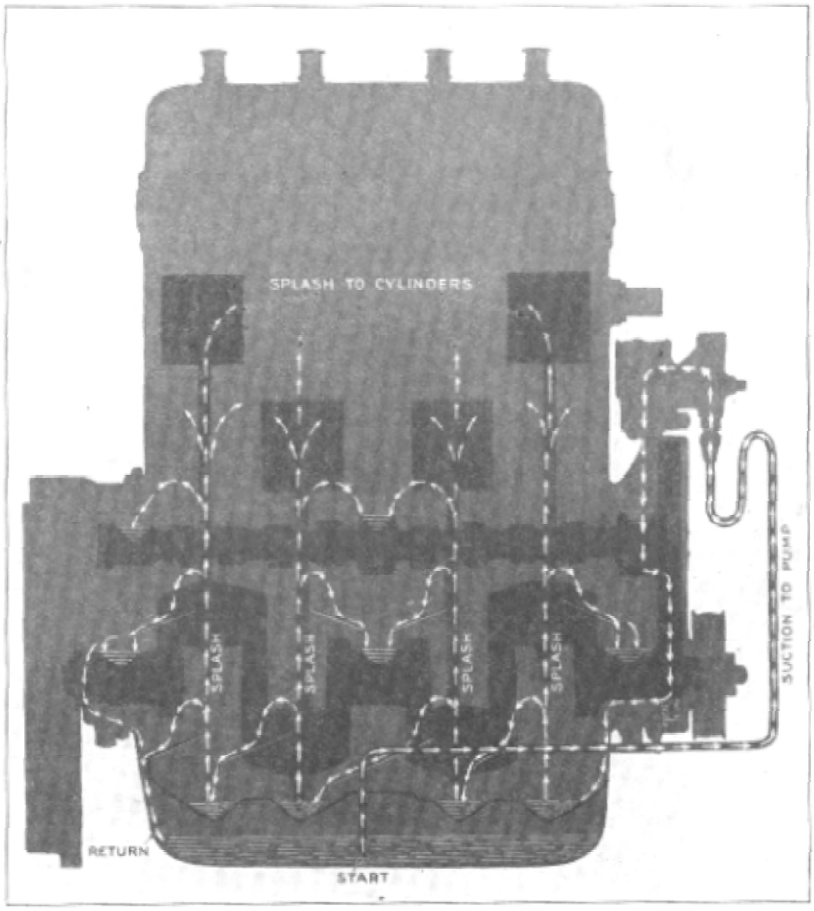


Diagram Showing Travel of Oil Through Motor

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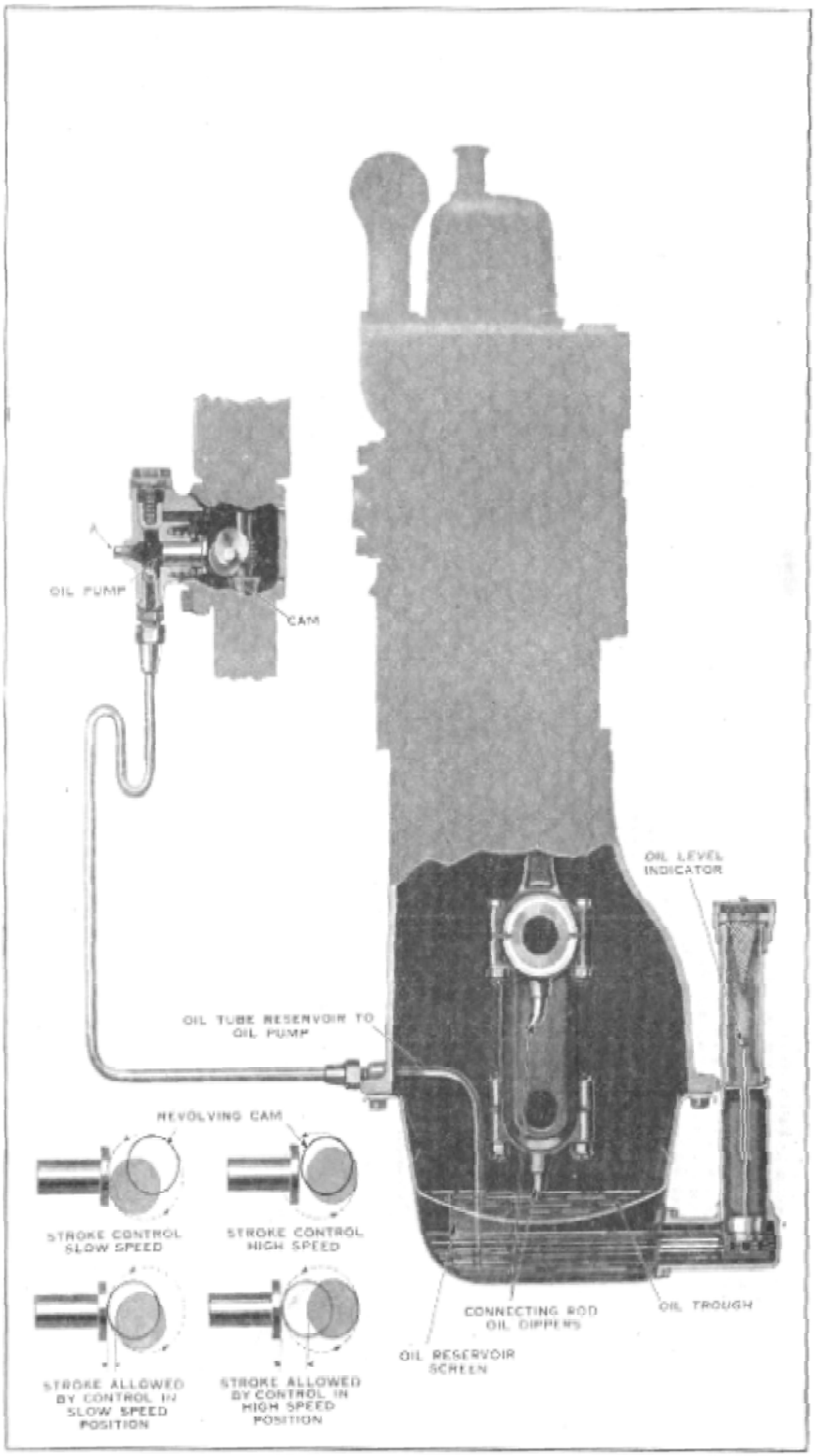


Details of Oiling System

The pump takes oil from the pressed steel reservoir at the bottom of the motor, drawing all of it through a filter or metal screen of fine mesh. The oil is then fed directly into the front compartment containing the timing gears and their bearings and flows from this into the first oil trough immediately under No. 1 cylinder. The large splash on the end of the connecting rod practically empties this oil trough at every revolution, throwing the oil into suitable channels or gutters on the side of the reservoir and crank case. The upper gutters lead to the main bearings and thus a continuous stream of oil feeds to these. The lower gutter feeds the oil directly into No. 2 trough. (Follow the line of travel Indicated by the arrows in the illustration on page 15 for a clearer understanding of this detail). The splash from No. 2 oil trough feeds No. 3, and so on until No. 4 trough or the rear end of the motor is reached, at which time the oil goes back into the lower reservoir through an opening. It is therefore apparent that all the oil which enters at the front end must circulate completely through the various troughs and bearing of the motor before it can find an exit at the rear end of the trough, there to re-enter the reservoir.

The reservoir is fitted with a float indicator, mounted on the left side of the motor, which shows the level of the oil by means of a button working in a glass tube which also acts as a filler tube.

The reservoir contains 5 quarts of oil in the troughs and in the reservoir itself. On account of its being of pressed steel construction and its large capacity, having such an exposed position under the motor affords excellent cooling facilities. The large quantity of oil insures a slow enough circulation to allow proper cooling before the oil is recirculated through the bearings and troughs.

The pump is of a plunger piston type operated by a cam which is driven by a worm gear mounted on the distributor shaft. You will note from the illustration on page 16 that while the oil pump to of conventional type and operated by a plunger bearing on a cam, its driving mechanism is also connected to the carburetor throttle. This is done to regulate the stroke of the oil pump In proportion to the motor speeds.

As the connecting rod dippers splash more oil at the higher speeds than at low speeds, It is necessary to control the stroke of the pump so that the flow is proportionately increased to cope with the more rapid circulation. While this may sound complicated, it to extremely simple, the action being obtained by means of an eccentric and a very large pump plunger. At low speeds this eccentric holds the plunger away from the cam, but as the motor speeds up the eccentric is turned by the movement of the throttle, thereby cutting down the distance the plunger is held away from the cam, increasing the action of the plunger accordingly. In this way the pump has a short stroke when the motor is idling at the curb or running slowly, but the minute the throttle is opened wide the stroke of the pump immediately Increases In proportion.

An oil gauge is mounted on the dash which to connected directly to the top of the oil pump. This gauge acts simply as an indicator to you that the oiling system is operating properly. It to not a true indicator of the pounds pressure or the amount of oil delivered, but merely shows that the pump is operating and delivering oil to the motor. Should you have occasion to re-set the oil plunger In such a manner as to cut down Its travel and find that the gauge does not register sufficiently, slightly increase the tension of the plunger spring

directly over the check valve. Decrease the spring in the event the gauge is showing too much pressure. A reading from 2 to 3 lbs. under fairly high speeds is correct and a pound pressure at low speeds Is sufficient.

How to Set the Stroke of the Oil Pump.

Remove plug "A" shown on page 16 in oiling diagram. Start motor and run at idling point. Now insert end of match or piece of straight wire into plug hole. This will butt up against the top of the oil pump plunger and move in and out with tt for the full length of the stroke. Measure its travel. For normal driving this should be about 1/16". Where excessive or extreme driving conditions prevail, it should have a travel of about 3/32". The setting can be changed by loosening a clamp lever which can be found directly behind the pump housing assembly. When you have loosened the lever, turn outer end of oil control shaft to the right or left until the proper stroke is registered on the wire.

The Essex Thermo-Syphon Cooling System

The Thermo-Syphon system of cooling has been adopted because of its reliability and simplicity. As the name implies circulation is induced by thermal action only, based on the natural law, that when water Is heated It expands and will seek a higher level.

It functions as follows: The water in the jackets surrounding the cylinders absorbs heat caused by the combustion, expands and rises into the water header and upwards to the radiator. This water is replaced by cool water from the bottom of the radiator entering the water jackets by way of the lower connection. As the flow enters the upper radiator connection and leaves by way of the lower one, the flow in the radiator itself Is downwards, and the warm water passing down through the core is cooled by the air passing through, thus maintaining circulation.

The fan is to accelerate the air passing through the radiator core, and assist in the cooling, especially when the car is standing with the motor running.

The positive action of the system does not depend upon the motor or car speed. When starting out with a cold motor, there is little circulation until the water jackets have become thoroughly warmed. As the motor warms up, the action becomes more vigorous, taking care of the motor's needs automatically.

To obtain maximum results with this cooling system, the following precautions must be taken:

1. Have a thorough practical knowledge of the uses of the radiator shutter and motometer which are described elsewhere in this book.

2. The cooling system must always be filled with clear water, preferably rain or soft water.

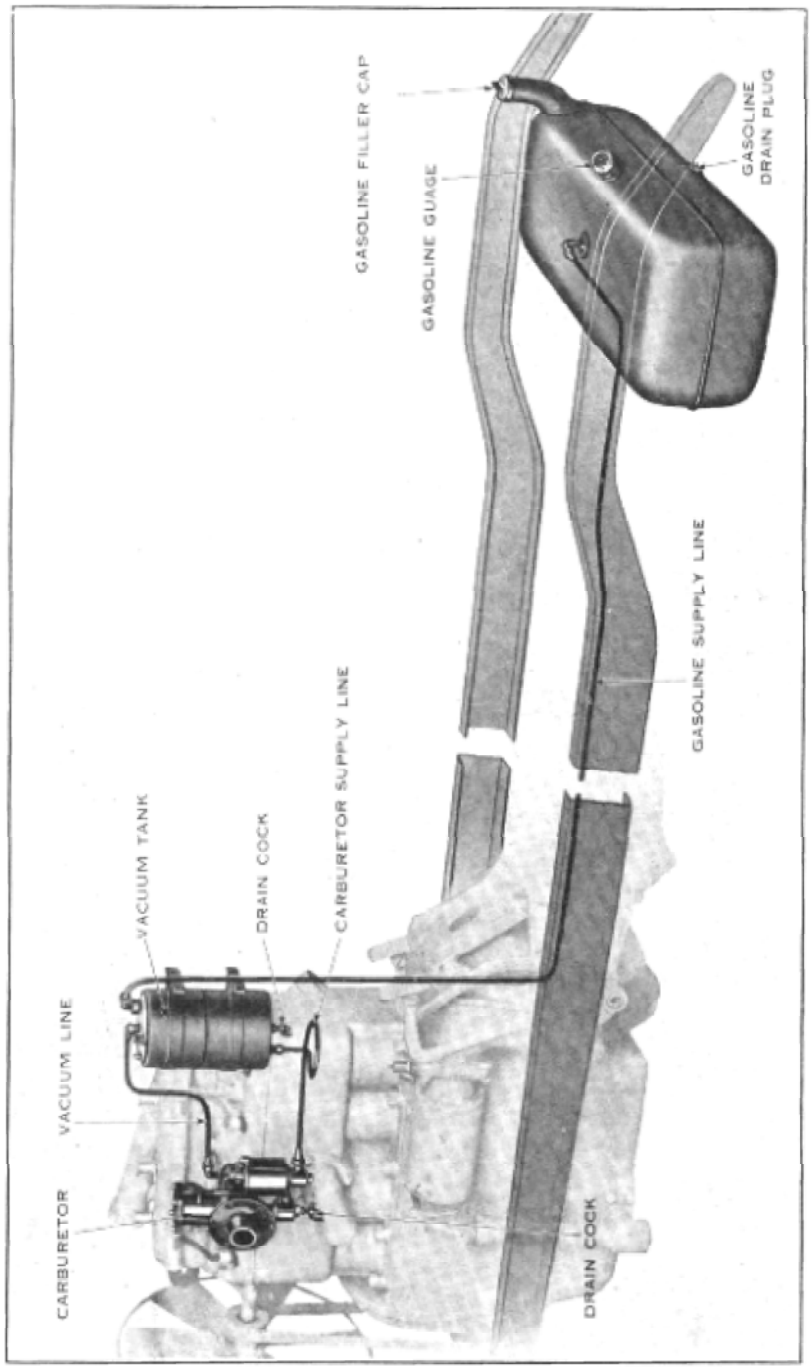
3. Drain, flush out and refill once a month.

4. See that there is sufficient tension on the fan belt to prevent the fan from slipping.

5. The hose connections must not leak and should present a smooth inner surface.

6. Use only the anti-freeze solutions we recommend In cold weather.

7. Should you damage your radiator and use linseed meal or similar compounds to temporarily stop the leak, remember that most of this material will circulate with the water and lodge In the radiator calls and corners of the cylinder jackets, seriously retarding circulation and it should be thoroughly flushed out, and the radiator properly repaired at the earliest opportunity.



The Essex Gasoline System

The Essex Gasoline System

The gasoline system consists of the gasoline tank, vacuum tank, and the necessary connecting pipes. The carburetor is fed from the vacuum tank by gravity and the vacuum tank is replenished from the main gasoline tank.

The Gasoline Tank.

The gasoline tank is supported at the rear of the car and is of ample capacity. It is equipped with a gauge which shows at a glance how much fuel is contained. When filling the tank care should be exercised that no foreign matter enters. Should the filler cap be misplaced it is advisable to tie a piece of cheesecloth or similar material over the filler pipe until the cap is replaced. When filling the tank always inspect the vent holes in the gasoline gauge to see that they are not clogged.

The Vacuum Tank.

The vacuum tank Is a small cylindrical tank located under the bonnet. There are three pipes leading from the tank (see cut). Two from the top or cover of tank (A) and (13) and one from the bottom (C). Pipe (A) is connected to the supply tank at the rear of car. Pipe (B) is the vacuum line and is connected to the intake passage of motor. Pipe (C) is the outlet pipe, and Is the gasoline line to the carburetor. The bottom of the tank is formed up, and so forms a water and sediment trap, which may be drained at (D).

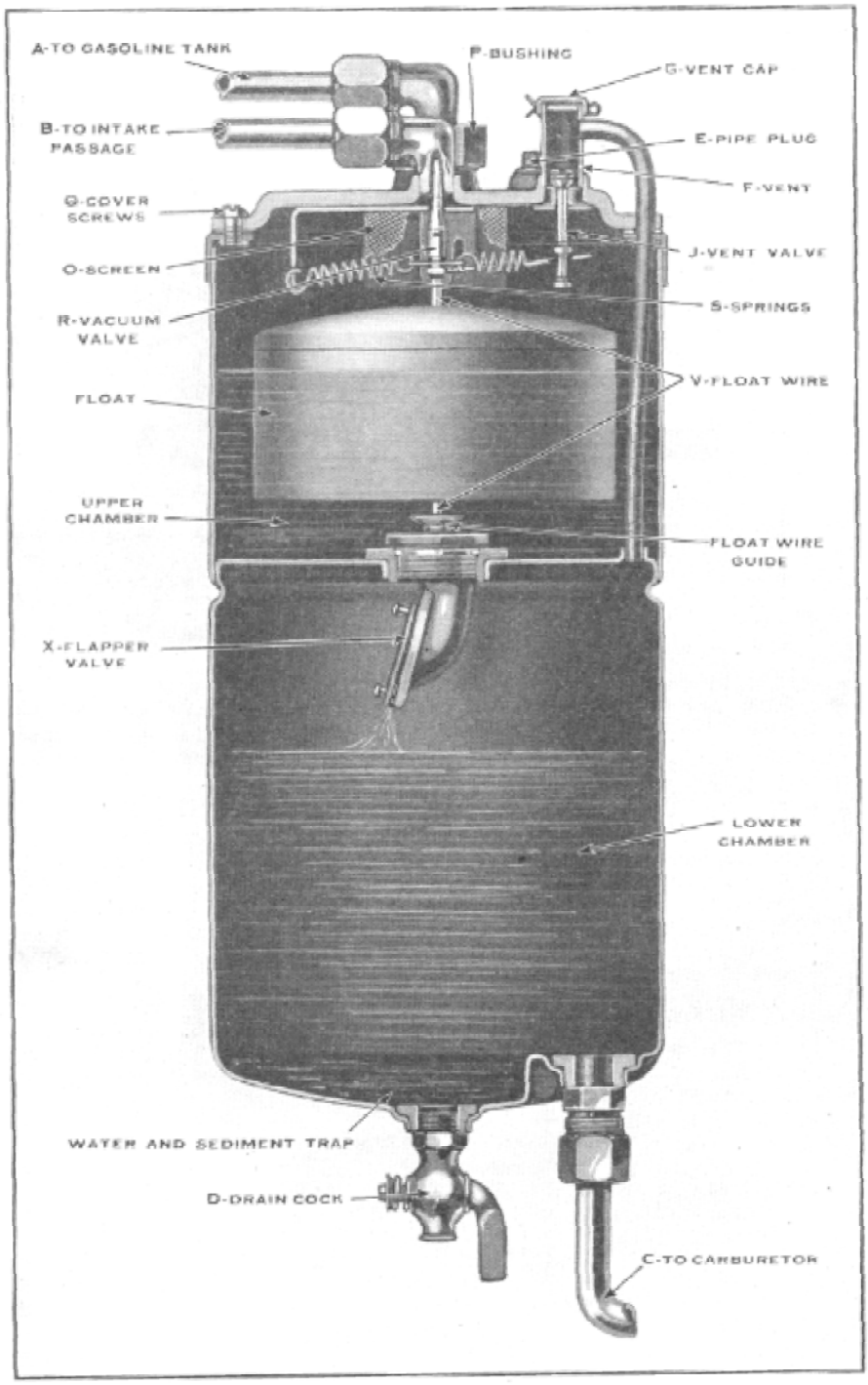
The suction from engine through pipe (13) draws gasoline from rear tank through pipe (A) until the upper, or float chamber is nearly full, then float rises and shuts off vacuum valve (R) and opens vent valve (J) which lets in atmosphere pressure that destroys the vacuum. The weight of gasoline in upper chamber now opens flapper valve (X) and allows it to flow to lower chamber where It Is fed by gravity through pipe (C) to the carburetor.

As the gasoline flows from the upper chamber to lower, the float drops with it until when nearly empty the float wire (V) opens vacuum valve (R) and closes vent valve (J) putting tank again into operation. The gasoline entering the vacuum tank passes through a filter screen (O) which has ample capacity to take care of car for one season without cleaning.

Care of System.

The gasoline system requires little attention other than that of keeping all connections tight and keeping vent hole in filler cap on rear tank open. About every 1000 miles open drain cock (D) and allow any sediment or water that has accumulated in the trap drain out. (Insert wire in drain cock if there is no flow.) If vacuum tank is empty, it will be necessary to fill it before motor can be started. This can be accomplished by closing throttle, choking carburetor and turning motor over a few times with the starter. If this does not fill the tank it may be that a small piece of sediment has lodged on flapper valve (X) and does not allow it to close. Remove pipe plug (E) in top of tank and pour gasoline into tank; also remove vent cap (G) and squirt a little gasoline in top of vent (F). This will in most cases wash out the dirt and the gasoline poured in at (E) will run the engine until tank starts to operate. If gasoline runs through valve (J), when squirted in at (F) it

(22)



The Vacuum Tank

is certain that this valve leaks and should be worked in with a screw driver (bearing very lightly) until it holds gasoline.

To test the flapper valve (X) for leak, disconnect pipe to carburetor at (C) and with motor turning over with starter hold finger close to but not touching hole in fitting (C), also remove cover (G) and plug up all openings in (F). If even a slight suction is felt or draws the bubble of gasoline off finger into tank, the flapper valve to leaking and if, after repeated attempts to wash it out, as explained above, It still leaks, it will be necessary to take tank apart In order to clean or repair it.

If engine floods or gets too much gasoline when running on usual adjustment, remove pipe plug (E) In top of tank and If this remedies trouble, It is probable that float leaks. Car may be run to where you desire to make repairs by operating the tank with the plug (E) removed. When tank is nearly empty replace plug and allow it to fill up; then remove plug and proceed as before. To repair float the tank will have to be taken apart and the instructions following should be rigidly adhered to.

Instructions for Dismantling Vacuum Tank.

Before attempting to take tank apart, be positive that the trouble is in the tank. Make sure that all pipes are clear and connections tight and that there is no excess sediment in the screen (O). Sediment may be removed by disconnecting pipe at (A) and screwing out bushing (P); lift out the sediment with a hairpin or knife blade, being careful not to injure screen.

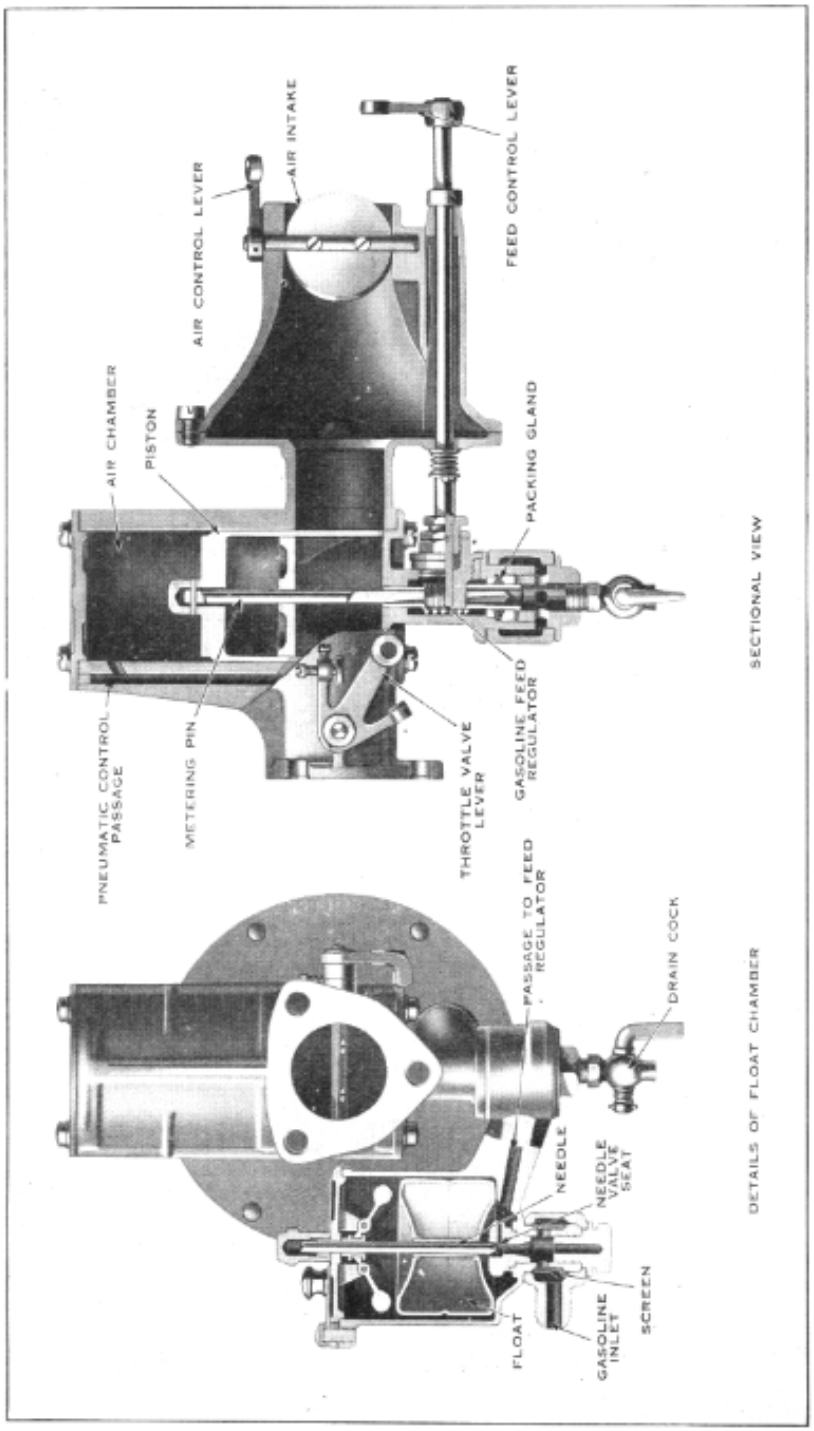
If all preceding instructions have been followed with no results, and it is necessary to dismantle the tank, follow instructions very carefully.

Remove eight screws at (Q) in top; then Insert knife blade between cork gasket and cover (not between tank and gasket) and move blade around cover using great care not to hurt cork gasket, as this will allow an air leak when re-assembled and cause tank to fail to work. After top has been lifted out, care being taken not to stretch springs (8) you are now ready to make the necessary adjustments. If flapper valve (X) is leaky it can easily be screwed out and cleaned. Do not scrape or otherwise mar valve seat. When cleaned and tight, return to place, being sure that copper gasket is back in place and tight.

If float has sprung a leak, it should be repaired as follows:

First unhook springs, being careful not to stretch them, and also to note how they are hooked into yoke, so as to replace in a like manner.

Next dip float in hot water and notice where bubbles raise from an this indicates the leak. After leak has been found, punch a small hole In top of float, also one in the bottom near the outside edge to let the gasoline out. After all gasoline has been let out, solder up the leak first, then the other two holes, Use as little solder as possible so as not to unbalance the float. While the tank is down thoroughly clean the filter screen. Next see that float wire (V) is smooth and has not been bent; hook springs (S) to yoke as found and lower float into tank. See that float wire is started into wire guide on flapper valve (X). Then tighten down eight screws (Q) a little at a time, going around several times so as not to spring tank or flange.



The Essex Carburetor

The Essex Carburetor

The Essex Carburetor operates upon the pneumatic principle. A glance at the sectional view of the carburetor on page 24 will show clearly the operation. When the throttle to opened with the motor running, the auction is communicated to the air chamber by way of the pneumatic control passage. This causes the piston to rise and with it the metering pin. The metering pin has a V shaped slot cut in it, and as the pin rises or falls according to the motor's requirements, it changes the area of the slot at the gasoline feed regulator and consequently controls the amount of fuel passing through. The proportioning of the mixture is automatic at all speeds, the piston giving instant response to the demands made on the motor.

Any adjustments necessary can be made entirely with the dash controls. The air control adjustment is used only for starting the motor in cold weather or after it has been standing for any length of time. Once the motor is running it should be operated with the air adjustment valve open.

The gasoline adjustment enables the driver to have the mixture as rich or lean as desired, by varying the amount of fuel allowed to pass the metering pin. This is done by raising or lowering the gasoline feed regulator which surrounds the metering pin. This regulator is actuated by the "Gas" button on the dash.

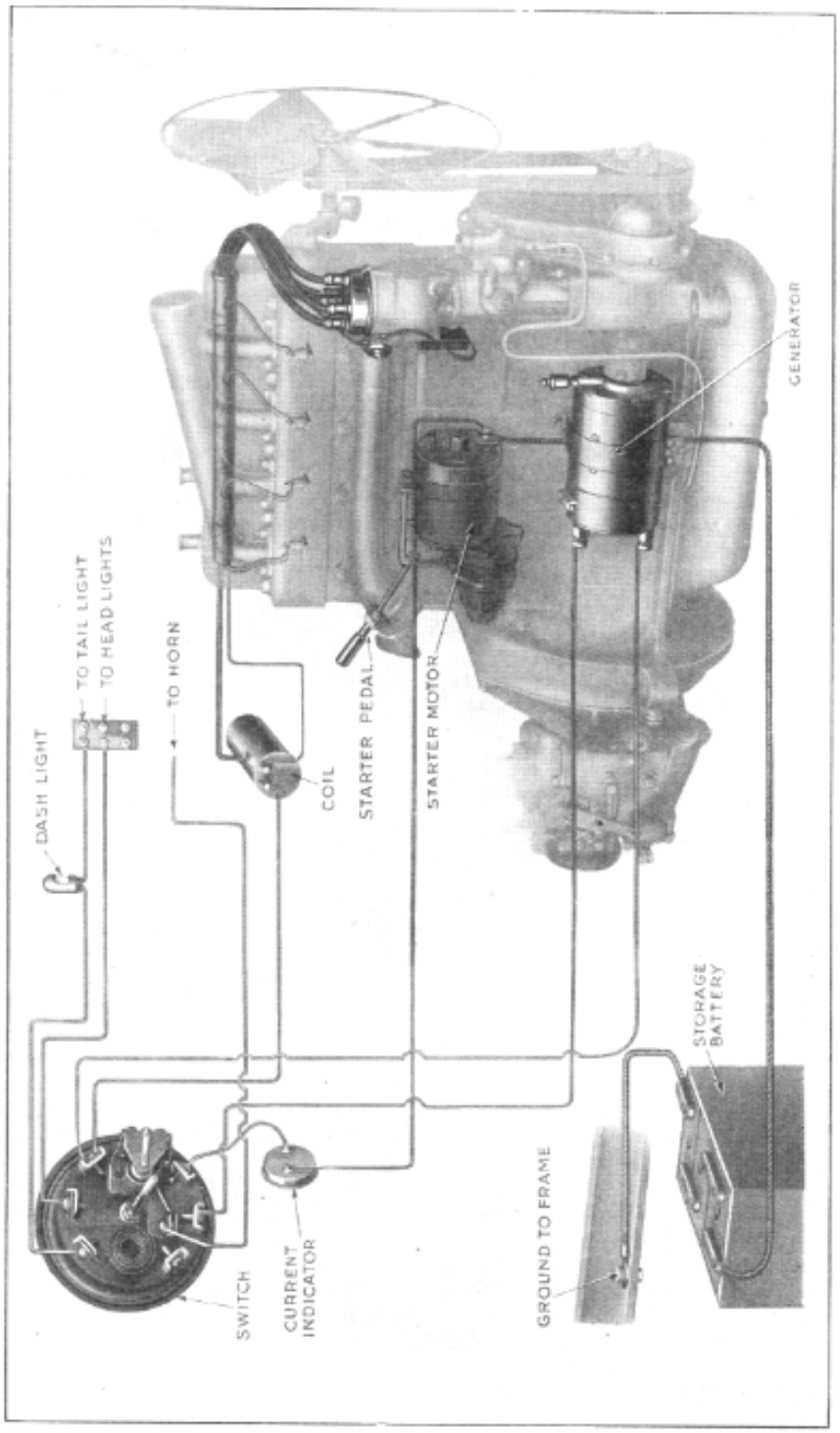
When the radiator shutter has been adjusted, so that the motor temperature maintains the red fluid in the Motometer at the center of the circular opening, the motor will operate very economically on a lean mixture. Of course, heavier duty placed on the motor such as hill climbing, pulling through sand, high speed, etc., places proportionate demands upon the amount of fuel, but in ordinary driving at speeds of 20 miles per hour upwards, the carburetor should be adjusted as lean as possible.

Too rich a mixture results in carbonization and misfiring; too lean a mixture gives less power and acceleration at low speeds. The entire range of adjustments are convenient to the driver.

The carburetor requires no attention other than that of making sure, periodically that the piston is clean and that the packing gland is tight. (See cut.) A sticking position will seriously interfere with the action of the carburetor and a loose packing gland will permit excessive gasoline consumption with Its attendant troubles.

The piston can be taken out by removing the four screws and cover on top. The surface should be highly polished with a good metal polish and the inner surface of the air chamber should be similarly cleaned. When returning piston be sure that the groove in the metering pin points toward the motor. The arrow on top of piston will assist you to return properly. Then carefully replace cover and tighten the four screws.

To repack or tighten the packing gland nut it is best to remove carburetor assembly. Then remove drain cock plug, float chamber and lower half of jet housing. The packing gland nut is slotted and can be removed or tightened with a screw driver or preferably by a special wrench which we can, supply. When repacking use soft candle wicking. When this gland is loose the fuel cannot be accurately gauged by the gas button and the necessity of periodic inspection is, therefore, apparent.



Electric Wiring Diagram

The Essex Electrical System

The Delco electrical equipment on the Essex consists of a three unit single wire system in which the frame of the ear acts as a return circuit. The system consists of the following units:

Starting Unit.
Generator.
Current Indicator.
Distributor.
Ignition Coil.
Combination Ignition and Lighting Switch.

Starting Motor.

The starting motor is mounted on the left hand side of the engine, and is attached to the flywheel housing. The purpose of the starting motor is to perform the cranking operation, but it is in no way responsible for the ignition or mixture which must be in the combustion chamber before the actual running of the engine is accomplished. During the cranking operation the energy is supplied by the storage battery. When the starting button is depressed it performs two distinct operations. The first of these takes place when the button is part way down, at which time the starter gear mounted to the rear of the starting motor is caused to mesh with the flywheel. The second action occurs when the button is all the way down, bringing the motor brushes in contact with the motor commutator, thereby closing the circuit and energizing the motor which results in the revolving of the armature and the consequent cranking of the motor through the overrunning clutch and thence through the flywheel.

Release the starting button as soon as the engine starts.

The brushes on this motor are of a special composition, and must not be replaced with brushes of any other material as this is almost sure to very materially lower its efficiency. Neither the brushes or commutator should be lubricated, as lubrication of the commutator with compound of any kind is almost sure to cause the brushes to fall to make contact at all, or insufficient contact to permit the cranking operation to be performed.

Starting Motor Lubrication.

The matter of lubrication has been very carefully taken care of.

Two oilers are provided, one being located at the commutator end bearing, which should receive four or five drops of 3 in 1 oil every two weeks. The other oiler is located at the opposite end of the starting motor for lubricating the armature bearing. This oiler should receive eight or ten drops of oil every two weeks.

The clutch and gears run In grease and require attention once or twice a season. A grease plug on the side of the starting motor is provided for this purpose.

Starting Button.

The proper operation of the button is to depress it fully and quickly, and to hold it completely depressed during the cranking operation. There is no danger of exerting too much pressure on this button.

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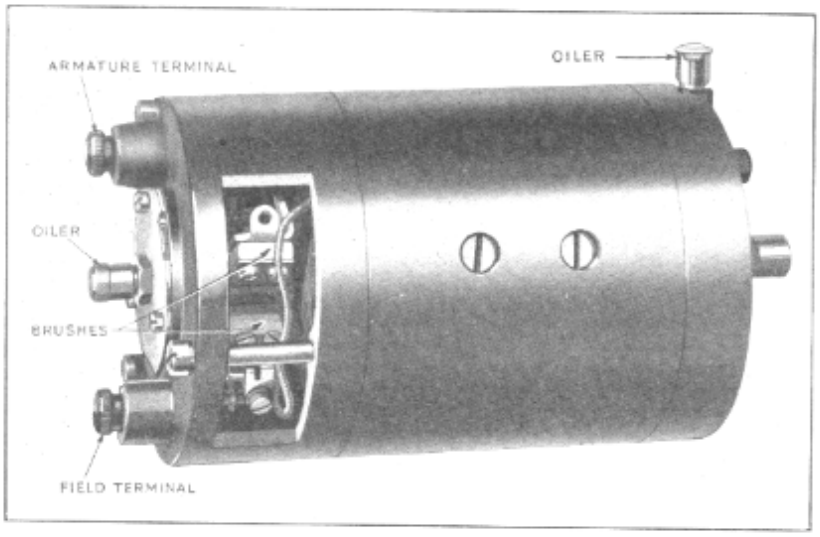
Generator.

The purpose of the generator is to supply electrical energy for charging the storage battery operating the lights, horn, ignition and starting motor. It is located on the right hand side of the engine and is driven by a shaft from the front gear compartment of the motor. The generator consists essentially of the revolving element or armature which is mounted on ball bearings. The main part of the armature consists of a number of thin round discs which are clamped together on the armature shaft. These discs have dots on their outer



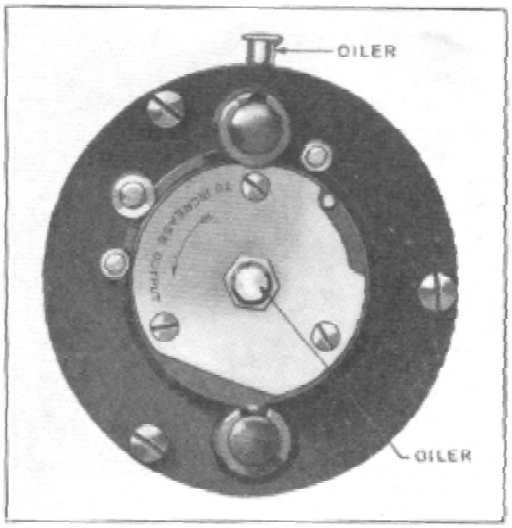
The Generator

surface in which are wound the copper wire coils which are connected to the commutator on the forward end. The brushes make contact with the commutator and collect the current which is induced in these armature coils when the armature rotates.

On each side of the armature are mounted the pole pieces which are secured to the outer frame. These pole pieces are strongly magnetized by the field coils which surround them. As a result the armature is rotated in a strong magnetic field. The operation of any electric generator depends upon the strength of the magnetic field. At very low engine speeds the generator voltage is not equal to that of the storage battery, and a small amount of current may flow from the storage battery through the generator winding, thus a discharge is shown on the indicator on the dash, but at all normal speeds of the engine the voltage of the generator exceeds that of the storage battery. This causes the current to be charged into the storage battery or to be supplied to the other consuming units.

Generator Regulation.

Because of the constantly varying speed at which an. automobile is driven, some method of regulating the output of the generator is necessary. This condition is met by what is known as the third brush method of regulation. The shunt field current is conducted through the third brush. The natural function of the generator is such that a heavy current is sent through the shunt field at the lower speeds, thus obtaining the maximum output of the generator. At the higher speeds the amount of current through the field winding to much less. This weakens the field and decreases the output. Upon

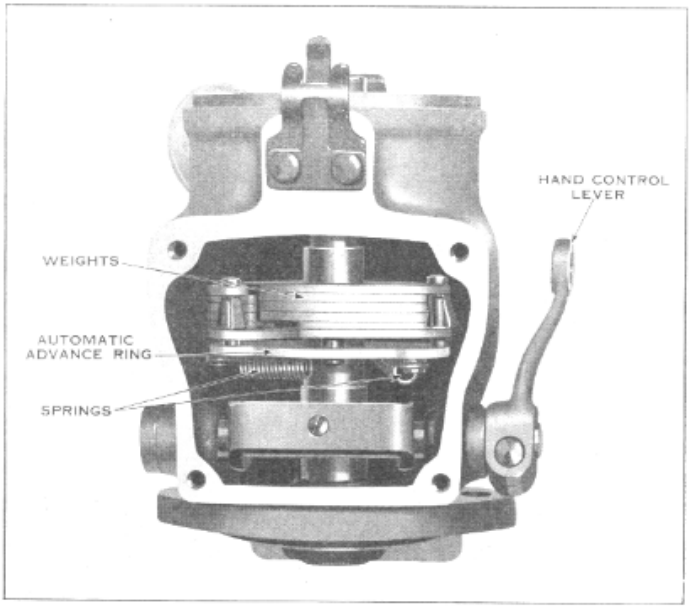


End View of Generator Showing Details of Current Regulation

leaving the factory each generator is adjusted to give an ample charging rate for normal driving conditions. Occasionally, however, cars are operated in such a manner that they require much more current or a great deal less than the average. It is advisable in such cases to change the output of the generator. In order to do this, the third brush is mounted in such a manner that its location on the commutator can be changed so as to either increase or decrease the output. Whenever this is advisable, the following Instructions should be followed:

The three screws which hold the bearing retainer plate in place on the commutator end of the generator should be loosened. Note illustration on this page. When facing the commutator end of the generator, the armature rotates in a counter-lockwise direction. To Increase the output, the third brush holder which is held in position by these three screws, should be shifted the same direction as the armature rotates, while If it is desirable to decrease the charging rate, the brush holder should be rotated against the direction of rotation, or In a clockwise direction. The three screws should then be tightened, and a piece of fine sandpaper should be drawn between the commutator and

the third brush with the rough side of the paper against the brush. This will seat the brush to the commutator. If the third brush is not properly seated, the output will be materially reduced until the proper seating is obtained. After adjusting the charging rate, it should be carefully checked by testing with an ammeter. The charging rate should not be in excess of 16 amperes, as serious trouble is very likely to follow.



Distributor Housing Showing Details of Automatic Advance

Generator Lubrication.

An oiler is provided at each end of the generator for the purpose of lubricating the armature bearings. Each of these oilers should receive from four to five drops of 3 in 1 oil every two weeks.

Dash indicator.

An indicator is provided which is mounted on the dash for the purpose of indicating the charge or discharge of the storage battery.

Distributor.

The distributor is mounted on the right hand side of the engine just in front of the generator and is driven by spiral gears. It is for the purpose of securing the proper timing and distribution of the ignition current. Its general construction is shown on pages 30 and

32. The vertical shaft is driven at one-half crankshaft speed. This shaft is mounted on ball bearings, and carries the automatic advance mechanism, the breaker cam and the rotor.

The timing of ignition current is affected by the interruption of the ignition current through the timing contact. If these contacts are opened by the breaker cam, the high tension current is induced in the secondary winding of the ignition coil. The distributor is equipped with both manual and automatic control. The manual control is linked up with the spark lever on the steering wheel sector. This is for the purpose of securing the proper retard of the ignition for the starting operation and very slow idling speeds, and to secure the proper advance required for maximum power at very low engine speeds, over which the automatic feature has no control.

The automatic feature is for the purpose of securing additional advance that is required to get the best operating conditions of the engine at the higher engine speeds. This feature makes it unnecessary to manipulate the spark lever for varying engine speeds in order to secure the best performance of the engine. The rotor is for the purpose of distributing the high tension current to the different spark plugs in the proper time. The high tension current from the ignition coil is conducted to the center terminal of the distributor head. The relation between the rotor and the breaker cam is always such that when the breaker cam causes the contacts to open, and when high voltage current is induced in the secondary winding of the ignition coil, the rotor will be in the proper position for conducting this current from the center terminal to one of the terminals which leads to the spark plugs. The breaker cam is secured to the vertical shaft by an arrangement which permits it to be located in any angular position. This is for the purpose of securing the proper timing.

Condenser.

The condenser is mounted on the side of the distributor casting.

It consists of two long strips of tin foil insulated from each other by strips of paraffine paper. These strips are laid together In alternate layers of tin foil and paraffine paper, and are folded up into a very compact form, then sealed in a moisture-proof metal case. One of the strips of tin foil is connected to the ground while the other is connected to the plate on which the contact screw is mounted. The breaker arm of the distributor is grounded to the distributor body. This being the case the condenser is connected directly across the breaker contacts. It is for the purpose of decreasing the amount of burning In the contacts, and Increases the voltage Induced In the secondary winding of the ignition coil.

Resistance Unit.

A resistance unit is mounted on the side of the distributor and is connected in series with the primary circuit of the Ignition system. It prevents excessive discharge from the storage battery when the Ignition switch is in the "on" position when the engine is not operating, and also causes the spark to be more nearly uniform at different engine speeds.

Care of the Distributor.

When it leaves the factory, the distributor is packed with grease for lubricating the working parts. No further lubrication should be necessary In the distributor housing for at least one season. A few drops of oil may occasionally be applied to the upper ball bearing of the distributor shaft.

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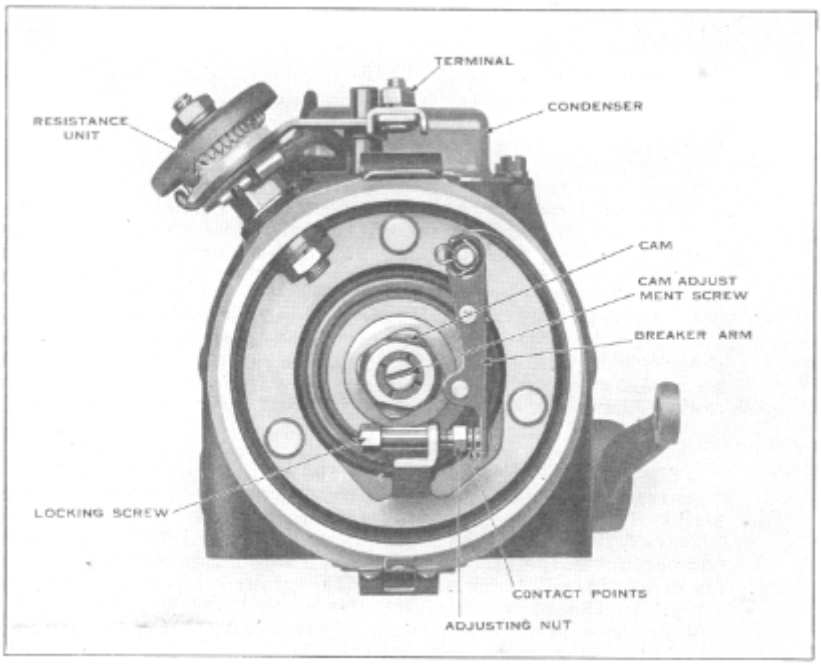
The rubber track inside of the distributor head should be lubricated a few times with a very small amount of vaseline until the rotor button polishes this track. The rotor button should be kept polished, smooth and bright. The center terminal in the distributor head should always make contact with the rotor.

Adjusting Timing Contacts.

The timing contacts should be adjusted so that when they are opened by the breaker cam, they will be apart the thickness of the gauge on the distributor wrench marked "Distributor." This is .018".



Top View of Distributor Showing Contact Points

Due to the wearing to a seat of the fibre rubbing block of the breaker arm against the cam, the contacts will require one or two adjustments during the first season's driving, after which no attention is necessary. The timing contacts are of tungsten metal, and are very hard. They should require no other attention than to maintain the proper adjustment.

Timing the Ignition.

The ignition system is carefully timed when the car leaves the factory and under ordinary conditions, will not require any attention, but should It become necessary to re-time the ignition for any reason. it can be done as follows:

1. Place the spark lever on the steering wheel sector in the fully advanced position.

2. Turn the engine with a hand crank until No. 1 piston starts to come up on the compression stroke. The marking of the flywheel should then be observed through the hole in the flywheel housing on the right hand side of the engine until the marking D. C. 1-4 appears at the pointer on the flywheel housing.

3. Loosen the timing adjustment screw in the center of the distributor shaft and turn the breaker cam so that the rotor button will be in a position under No. 1 high tension terminal or that which leads to No. 1 cylinder, when the distributor head is down in place. Locate the breaker cam carefully in this position so that when the slack in the distributor driving gears is rocked forward the contacts will be opened by the breaker cam, and when the slack in the gears is rocked backwards, the contacts will just close.

4. Tighten the adjustment screw, securing and replacing the rotor and distributor head.

Adjusting Spark Plugs.

The gauge an the distributor wrench marked "Spark Plug" should be used for adjusting the spark plugs. This gauge is approximatel:y thirty-thousandths of an inch thick (.03011). On spark plugs having more than one gap, all but one gap should be made very wide, and the closest gap adjusted to this gauge. An exceptionally wide adjustment may cause missing at the higher speeds. Too close an adjustment will cause the Ignition to be very poor at very low speeds and when idling.

Ignition coil.

The ignition coil is mounted on the engine side of the dash. This is for the purpose of converting the low voltage current from the storage battery or generator, to a current of very high voltage that will jump the gaps in the spark plugs. It consists primarily of an iron core made up of a number of soft iron wires. Wound around and insulated from this core, is the primary winding, which consists of a comparatively few turns of copper wire. This is connected in series with the resistant unit mounted on the side of the distributor. It is through this winding that the current from the storage battery or generator is conducted. The current through this winding magnetizes the iron core, and when the current is interrupted by the timing contacts in the distributor, the magnetism dies out. This dying out of the magnetism in the iron core induces the high voltage current in the secondary winding. The secondary winding is wound over the primary winding and insulated from It. It consists of several thousand turns of very fine copper wire, one end of which connects to the primary winding, and the other to the high tension terminal in the center of the coil. It is from the center terminal that current is conducted to the distributor head, rotor and spark plugs.

Combination Switch.

The combination switch is located in the cowl. It is for the purpose of controlling the lighting and Ignition circuits, and the circuit between the generator and storage battery. The lever on the left controls the Ignition and generator circuit. The lever on the right controls the lights and has three positions, off, dim lights and bright lights. The cowl and tall lights are lit when the head lights are either dim or bright. These lights are connected in series, and should the tail light go out from any cause, the cowl light will also go out, in this manner acting as a signal. By controlling the circuit between

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the generator and storage battery with the ignition switch lever, an automatic cut-out which is commonly used for this purpose, is not required. The ignition button should never be left In the "ON" position when the engine is not operating as the storage battery would run down.

Circuit Breaker.

On the back of the combination switch is located the circuit breaker. This is a protective device which takes the place of fuses which are commonly used for this purpose. The normal current to the lighting circuits does not affect the circuit breaker, but In the event of an abnormally heavy current, such as would be caused by a ground on any of the lighting circuits, it flows through the circuit breaker. This current causes the circuit breaker to operate and intermittently cut off the flow of current, thus causing a clicking sound, This will continue until the ground is removed, or the switch Is operated to cut off the circuit on which the ground exists. In this manner the circuit breaker protects the wiring, switch and storage battery. As soon as the ground is removed, the circuit breaker restores the circuit and there is nothing to replace.

Lamp Bulb Sizes.

Headlight 6-8 volt, 15 c. p., 21/2 amp,, style G, Ediswan B.
Dash and tail 3-4 volt, 2 c. p., .84 amp., style G-6, Ediswan B.

The Storage Battery

The storage battery used with the electrical system Is known as the "Exide" battery and is manufactured by The Electric Storage Battery Co. of Philadelphia, Pa.

The function of the battery is to supply the electrical energy required for cranking the motor, and operating the lights or Ignition when the car is standing or not running at a sufficient speed to cause the generator to "charge."

The battery consists of three cells or jars, each containing positive and negative plates, These cells are enclosed in a wooden case. The plates in each cell are submerged in the acid or electrolyte. It is sufficient for our purpose to call the battery a reservoir of electrical energy. When you crank the motor or operate the lights with the motor not running, the battery discharges., When the car is running and the indicator on the instrument board reads on the charging side, it means that the generator is delivering a surplus of energy over the car's requirements, and that surplus is being delivered to the battery.

In order to obtain maximum service from the battery, it will be seen that the charging and discharging must balance as closely as possible; i. e., when you crank the motor or burn the lights excessively, the motor and generator must be run sufficiently to restore the current used, or the battery will gradually run down and probably have to be recharged from an outside source.

The majority of battery and ignition trouble can be traced to carelessness and lack of attention on the part of the owner. If the following precautions are taken, your battery will render you maximum service:

Add nothing but distilled or clear rain water to the battery and do it often enough to keep the plates covered.

Distilled water may be purchased at any drug store, but If not convenient, rain water caught in any non-metallic vessel, may be safely used. Water which contained salts or iron rust, etc., would cause the battery to deteriorate in a short time. Water is added to each cell by removing the vent cap on top. Inspect the battery once a week in warm weather and twice a month in cold weather. It is advisable to add water before making a run In cold weather so that the water will become thoroughly mixed with the acid.

Keep the filling plugs and connections tight and the battery clean.

A loose connection on the battery or badly corroded terminals will cause the same symptoms as a weak or run down battery. The remedy for this is to keep the battery clean and dry, using waste moistened with weak ammonia to clean any acid spilled on it. The terminals and terminal clamps should be frequently examined for corrosion. If present, It should be carefully scraped off both terminal and clamp and when returned and tightened, the parts should be coated with vaseline. This will prevent the acid creeping on the terminals.

The battery connections should always be drawn up tight to avoid trouble. If you ever experience lack of lights or horn or failure of starting motor, tighten the battery connections before looking for trouble elsewhere.

Take Frequent Hydrometer Readings.

Always test each cell of battery with a hydrometer syringe BEFORE adding the distilled water. The hydrometer syringe consists of a large glass tube, a rubber bulb and a float (this can be bought at any electrical supply store) and is for the purpose of measuring the specific gravity of the acid. The stem on the float is graduated from 1.100 to 1.300.

In a fully charged battery the specific gravity Is from 1.280 to 1.300. In a totally discharged battery, the gravity is 1.100 or lower.

The hydrometer syringe is inserted In each cell (after the cap has been removed) and sufficient acid drawn up in the syringe to have the float free. The float will rise or sink to a certain point and rest. When it is stationary, the reading should be taken on the stem at the surface of the liquid. Then return acid to same cell and proceed to test the others the same way.

1.280 to 1.300 fully charged.
1.200 to 1.250 one-half to three-quarters charged.
1.150 to 1.200 less than half charged.
1.150 or lower-Completely discharged.

A hydrometer syringe may be purchased at any accessory house and is indispensable to the man who is not convenient to regular battery stations who do such testing.

Have the battery recharged whenever the hydrometer readings show it necessary.

Should your battery get below 1.200 according to hydrometer reading it will be necessary to run motor considerably in the day time when you are not burning lights, and advisable to crank by hand until the battery has been brought up to at least 1.270. If this is not convenient, it should be taken to a regular battery station to be recharged. The battery will be ruined if allowed to remain in a rundown condition. This applies whether you are running car or not. When a car is stored, the battery must be frequently inspected and recharged when the reading shows it necessary.

General Instructions.

If one cell persists in remaining at a lower gravity than the others have the battery thoroughly tested at a battery station.

See that indicator always shows charge when running above 10 miles an hour with the lights out.

Keep all electrical connections clean and tight.

If battery or one cell leaks, it is probable that the battery has not been securely fastened or clamped on car and one of the jars has cracked. This will necessitate having a new jar installed.

General Motor Adjustments

Adjusting Tappets.

Adjustments to tappets are made at the pushrods, which are provided with adjusting screws and lock nuts. It is necessary to remove tappet coverplate on right side of motor and Intake valve rocker cover on top of the motor. The proper clearances for the tappets are .006 on the intake and .008 on the exhaust. The exhaust tappet clearance can be checked by inserting an .008 feeler between the pushrod adjusting screw and the valve stem, but the intake tappets must be adjusted with the .006 feeler inserted between the upper pushrod and rocker arm. When adjusting tappets the motor should be turned over until No. 1 cylinder is on the compression stroke and the piston has assumed its highest point, or dead center, when Nos. I and 2 tappets should be adjusted (numbering from the front of the motor). As the motor fires in the order 1, 3, 4, 2, it follows that 1/2 revolution of the motor will now bring number 3 piston to the top on the firing stroke, when numbers 5 and 6 tappets may be adjusted. Then one-half revolution will bring number 4 piston up, and when numbers 7 and 8 tappets are checked, one more half turn puts number 2 cylinder on dead center, when numbers 3 and 4 tappets may be set, thus completing the series. The importance of adjusting the tappets according to piston position, is that it gives absolute assurance that the pushrods are assuming their lowest position on the cam.

Valve Grinding.

Valves require re-grinding when the following conditions manifest themselves. Loss of compression and power-excessive gasoline consumption and motor missing at low speeds. However, weak ignition, a poorly adjusted carburetor, or tappets adjusted too closely give similar symptoms, therefore before attempting to grind valves, make the following tests to assure yourself that the trouble is in the valves.

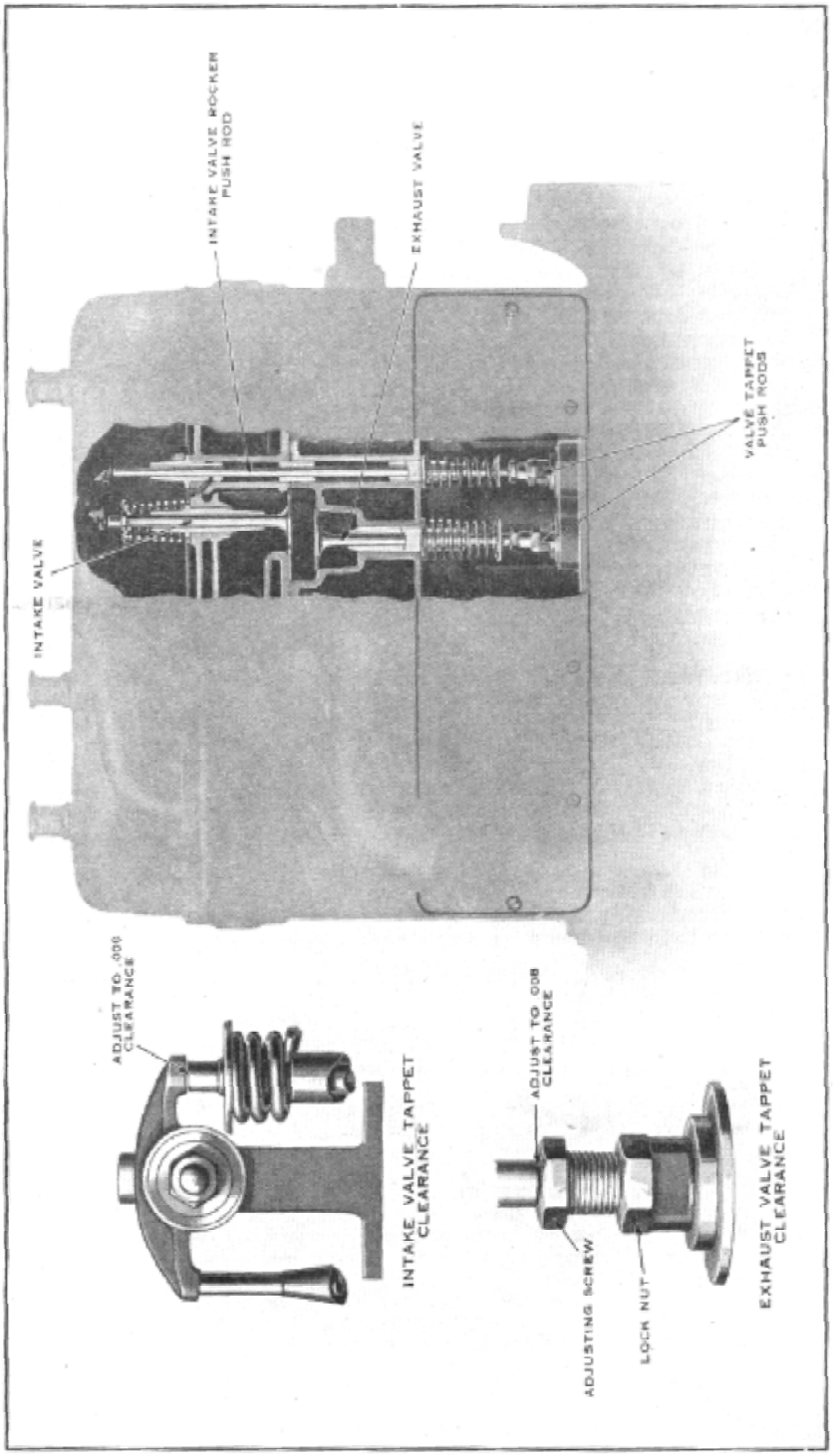
See that a strong spark is being fed to each plug. Ascertain this by disconnecting the plug wires one at a time and holding it close to but not touching the plug while the motor is running.

The spark plug should be clean and set at the proper clearance. Too small a clearance will cause missing at low speeds and when idling. If one cylinder is missing try changing plugs with one that is firing. If this transfers the trouble to the other cylinder the plug may be defective and should be replaced with a new one.

See that the tappets are adjusted according to paragraph on tappet adjustment.

Should the above fail to remedy the trouble test the compression in each cylinder by means of the hand crank while the motor is warm. If the compression is unequal or weak, it is possible that carbon is preventing the valve from seating properly. When this condition exists it is necessary to regrind the valves and the method of procedure to as follows:

Drain water from cooling system. Remove cover and oilers from intake valve rockers on top of motor. Take off valve tappet cover plate on right side of motor and remove valve spring retainers and springs. Disconnect valve rockers on top of motor



Valve and Tappet Adjustments

and draw out intake valve push rods. Remove all cylinder head bolts and lift cylinder head off, being careful not to injure the gasket.

When grinding valves it is advisable to place a spring under them of sufficient tension to hold valve away from seat, when not under pressure from the valve tool. Valve grinding compound may be purchased at any accessory store and it is usually sold in combination tine containing coarse and fine grades. A little of the coarse grade should be placed on the valve and it should be worked into the seat with a to and fro motion, bearing very lightly, being careful not to make more than 1/3 to 1/2 a revolution of the valve before reversing directions, otherwise grooves in the valve will result. When all pits and black spots have disappeared and the valve presents a frosty appearance, finish the grinding with the fine compound. The valve should have a uniform surface, free from grooves and pits but should not necessarily have a polish. The valves acquire the glassy polish while in use. Each valve should be ground and returned to the seat it was removed from. Be very careful of this. Now replace valves, valve springs and retainers and return cylinder head and gasket to place. in tightening head, a little should be drawn on each bolt at a time until all are secure, or leakage will result. Replace intake valve pushrods, lower springs and rocker arms. Check over tappet clearances and replace rocker arm cover and oilers.

Carbon Deposit.

After considerable service the cylinder head pistons and valves accumulate a deposit of what is termed carbon. This deposit may be minimized by avoiding running, on a very rich mixture, use of high grade oil, properly adjusted ignition, and maintaining the correct motor temperature by the aid of the radiator shutter equipment. When the motor knocks on a pull or under sudden acceleration, even though the spark has been retarded, the deposit has assumed such proportions that it has raised the compression much above the average and is causing pre-ignition because the carbon becomes incandescent under compression. The motor will overheat and loss of power will result. The most thorough method of removing the carbon is by removing the cylinder head and carefully scraping the accumulation off the combustion chamber and adjacent parts. To remove the cylinder head follow the instructions under Valve Grinding.

How to inspect and Tune Motor and Car Periodically.

Remove spark plugs, clean them, and set the points at .030.

Check tappet clearances (See page 38).

Clean distributor points with fine sand paper and set the points at .018 when at their widest opening.

Adjust fan belt tension if necessary.

Change oil in motor (See page 62).

Clean storage battery terminals, tighten clamps and cover terminals with vaseline to prevent corrosion.

See that all electrical connections are tight and clean.

Add distilled water to battery.

Clean motor and carburetor thoroughly with a rag moistened with kerosene.

See that carburetor, radiator shutter, and spark controls work freely..

See that motor bolts are tight.

Drain sediment from vacuum tank.

Drain sediment from carburetor bowl.

Drain cooling system (when water is used) flush out, and refill.

Tighten spring clips.

See that Spring shackles are tight.

Inspect brakes (See page 49).

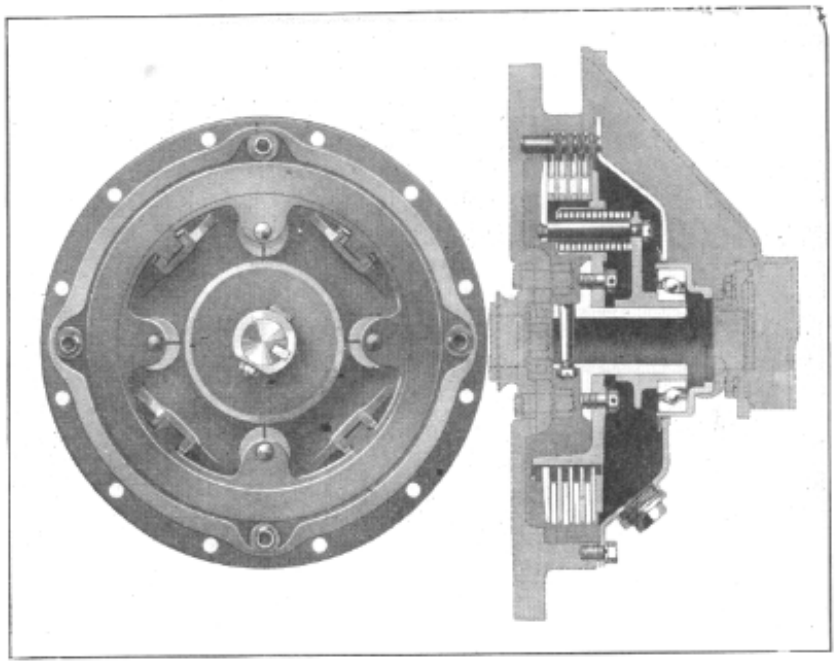
Lubricate spring leaves.

Lubricate generally (See page 60).

The Essex Clutch

The clutch is of the multiple disc type with cork inserts. The corks being soft supply the smooth action so desirable, but the friction between cork and steel to so great that once engaged the clutch will not slip.

The only care necessary Is to renew the clutch oil regularly. The fact that the cork inserts become saturated with oil makes It comparatively difficult to abuse this clutch, If our lubricating instructions are strictly adhered to. Always drain the old oil

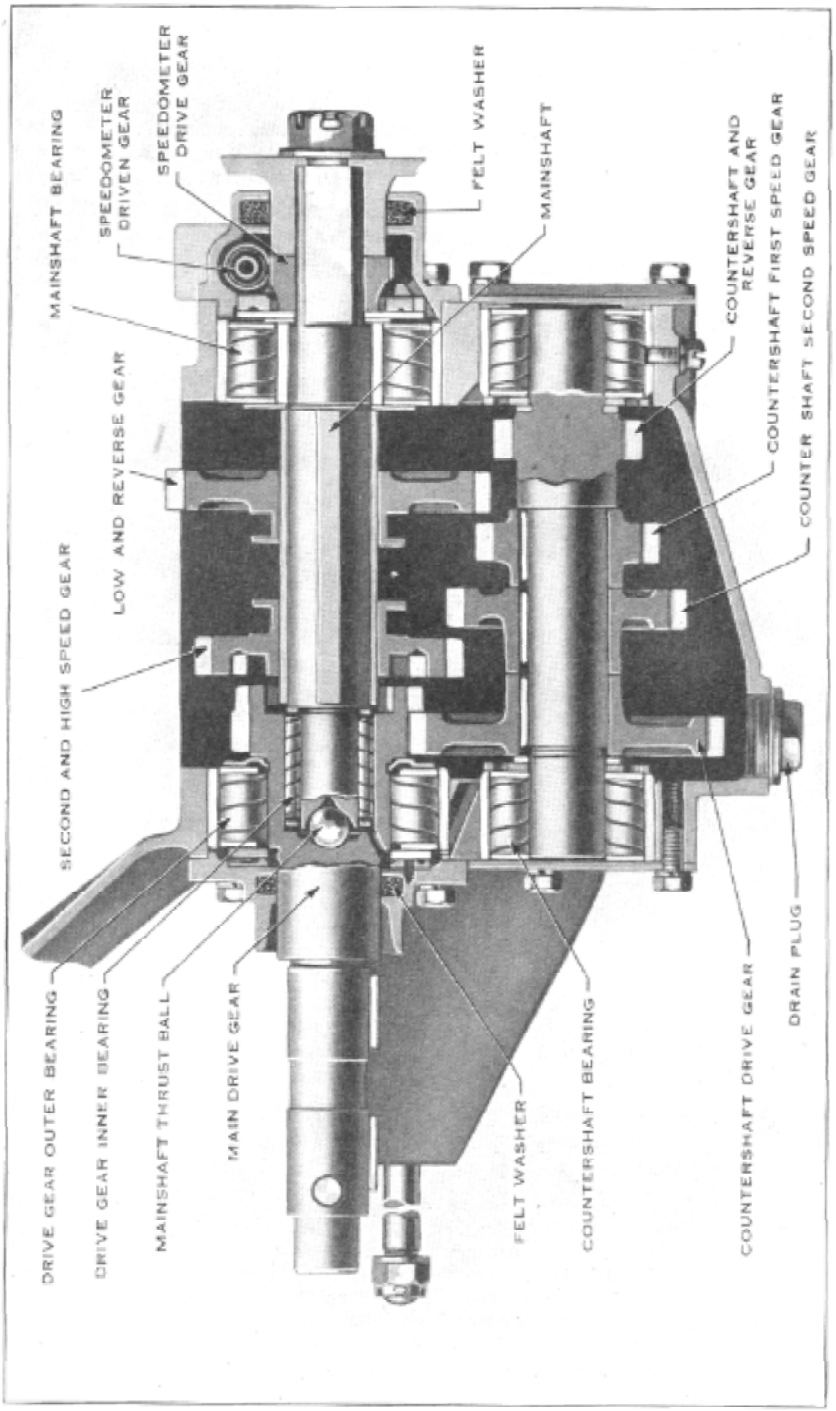


The Essex Clutch

out before filling with fresh oil. Refill with one pint only of a mixture of half kerosene and halt high grade motor oil. Do not experiment with the mixture.

Do not slip the clutch except when absolutely necessary and then only when you are sure it has sufficient lubrication.

The clutch throw-out bearing Is lubricated from the transmission and requires no attention. Due to normal wear on the fingers which operate the clutch and throw-out bearing, the clutch pedal will, in time, fail to return all the way when the foot is released. There is a small set screw and lock nut located on a stop In front of the clutch pedal under the floor board. By means of this adjustment the wear In the clutch control can be compensated by turning up this set screw, until the pedal resumes its former position.



The Essex Transmission

The Essex Transmission

The following description will assist the owner in understanding what takes place in the transmission at the different "speeds" or gear changes.

The transmission used on the Essex comprises four speeds, three forward and one reverse, which are actuated by the transmission control hand lever.

The transmission consists of the case, containing two shafts, a transmission main shaft drive gear and a series of gears together with the bearings and adjustments.

The transmission main shaft is in a direct line with the Main shaft drive gear, the end of the main shaft turning in the end of the main drive gear. The third shaft operates parallel with the main shaft and is called the transmission countershaft.

The main transmission shaft carries two gears of unequal sizes, which can be caused to slide into mesh with gears of unequal sizes on the countershaft. One of the sliding gears may also be moved into mesh with the reverse idler gear supported by the transmission case, thus obtaining the change "reverse." (The reverse idler gear is not shown in illustration.)

The countershaft carries the following: stationary or non-sliding gears, countershaft drive gear, intermediate gear, low speed gear and reverse gear. The countershaft drive gear is always in mesh with the main shaft drive gear; consequently the countershaft always turns, although you will note that when in third speed or "high" the countershaft does not transmit power. However, it keeps the lubricant agitated and in circulation, which is essential.

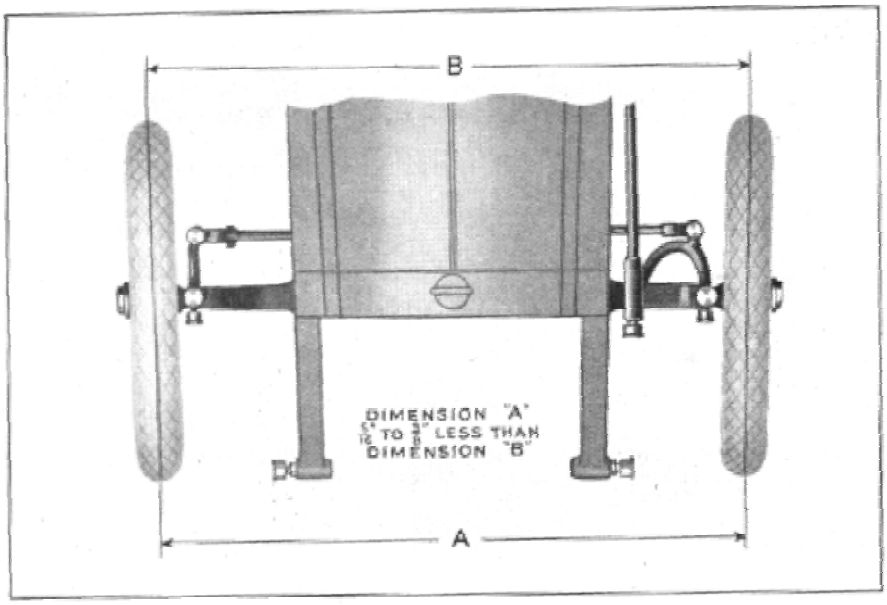
The Four Speeds:

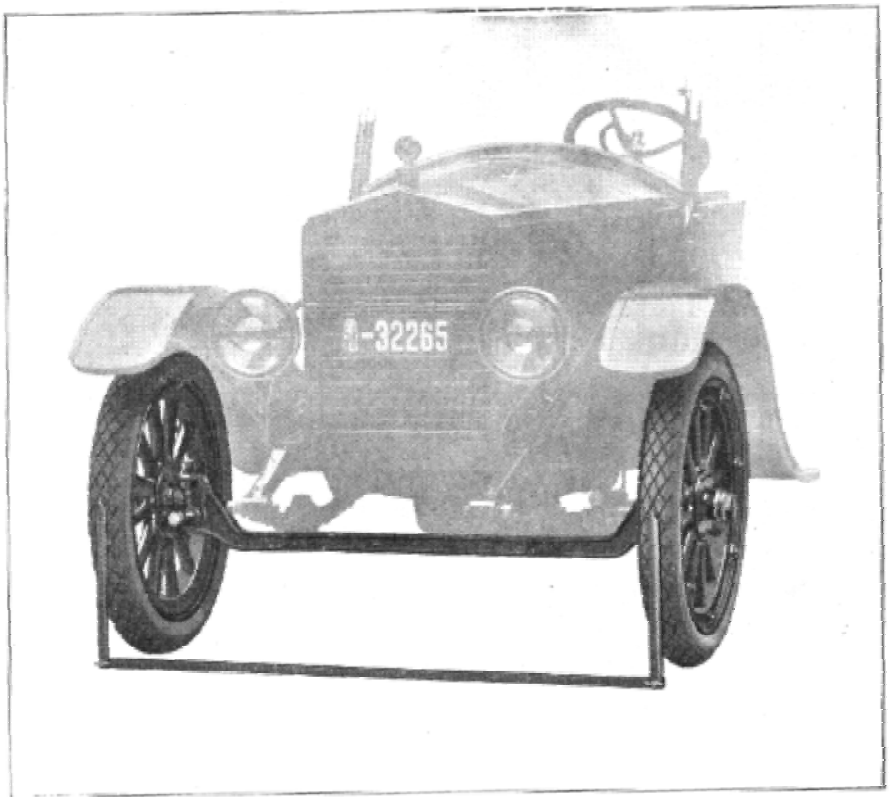
First Speed. - When the operator puts the lever in first speed, the low and reverse sliding gear is pulled into mesh with the countershaft low speed gear. This results in the main shaft being revolved, though at much lower speed than that of the engine. The motion of the main shaft is transmitted to the propeller shaft and thus the rear wheels are caused to turn.

Second Speed. - When the lever is placed in second speed, the high and intermediate sliding gear is thrown back into mesh with the countershaft intermediate gear. The propeller shaft is caused to turn as in the preceding paragraph at a higher rate of speed.

Third Speed. - When the lever is placed in high speed, the high and intermediate sliding gear is thrown forward and meshes with the main shaft drive gear. it will now be seen that the main shaft is traveling at the same speed as the motor, and thus the propeller shaft is turned at the same rate. This is known as direct drive.

Fourth Speed. - When the lever is placed in reverse, the low and reverse sliding gear is thrown back into mesh with the reverse idler gear which is always in mesh with the countershaft reverse gear. As we now have a train of three gears in mesh, instead of two (as in first and second speed) it will be seen that the main shaft will revolve in the opposite direction to that of the main shaft drive gear, therefore the propeller shaft will revolve in the opposite direction to what it did in first, second and third speed, and the rear wheels will reverse.





Front Wheel Alignment

Wheel Alignment

Because the alignment of the wheels is an important factor in the life of the front tires, the distance rod is provided with adjustments. The front of the tires should be about 5/16” closer together than the rear, measured at the same height from the ground.

The easiest way to check this adjustment is as follows:

Jack up the front of the car from the center of the axle so that the distance rod is not interfered with. With both wheels free to revolve, a center line may be marked on each tire by holding a soft lead pencil against it when spinning. The pencil must be held steady or the result will not be a straight line.

Next, measure with a tape or stick the distance between these lines at a point opposite the hub; turn the wheels half a revolution and measure again. The distance between the two results is the average, allowing for a slight wobble, and should be 5/16" to 3/8” less than the distance measured in the same way at the rear.

The handiest way to check this alignment is with the distance stick shown in the illustration.

To adjust the distance rod, it is necessary to remove one of the bolts so that the clamp screw can be loosened and the clevis adjusted by turning on the threads of the distance rod. Any backlash in the axle knuckles and clevises should be taken up by straining the wheels outward in front before setting the distance by the rod.

The job should always be checked after the wheels have been let down on the ground with the weight of f he car on them.

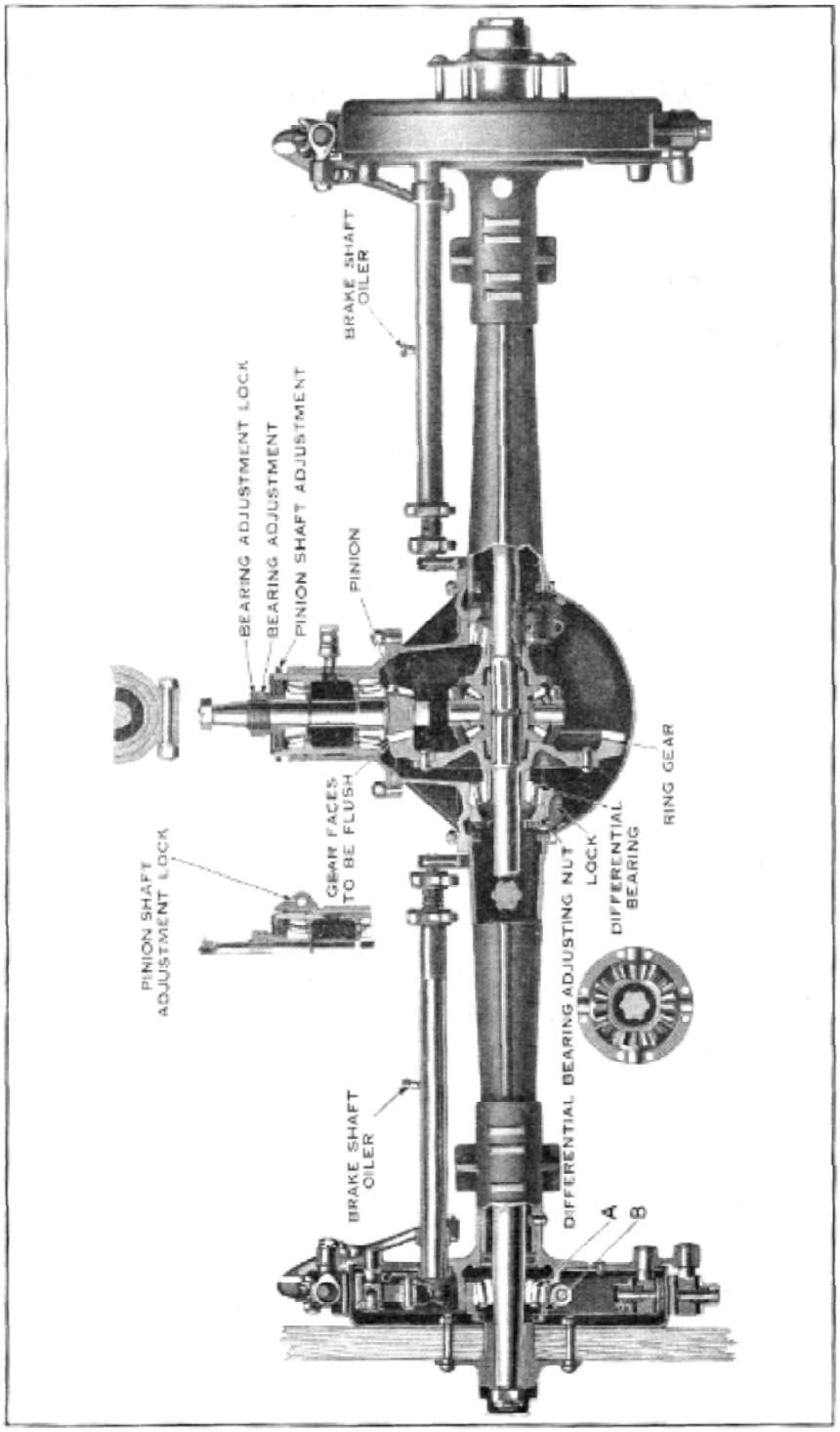
The Essex Steering Gear

The design of the Essex steering gear is such that it may be kept in good condition by periodical adjustments and lubrication with very little difficulty.

Remove the screw on top of steering gear housing and lift the locking plate clear of the adjusting nut. Adjust the gear for end play by screwing the nut downwards until the play is eliminated. Replace the locking plate in such a position to bring one of the two holes as nearly as possible in line with the hole in the housing. if necessary back off the adjustment until the screw can be entered through one of the two holes in the plate and through the tapped hole in the housing.

The worm wheel shaft has an eccentric bushing in order to bring the worm wheel deeper into mesh with the worm, remove the steering arm and cover. The worm wheel and shaft may then be removed.

Examination of the eccentric bushing will show a series of notches at the end nearest the steering arm. The bushing is prevented from turning by means of a pin which fits into one of the slots. This may be removed and the bushing turned enough to bring about the desired adjustment. The pin should then be replaced and the steering gear reassembled.



The Essex Rear Axle

The Essex Rear Axle

The rear axle assembly is of the semi-floating type, rugged in construction and very accessible. The only care necessary to to see that it is thoroughly lubricated at all times. After extensive service it is well to check over the adjustments outlined to see that the gears bear the proper relation to each other.

Lubrication.

The differential should carry 2-1/4 lbs. of Whitmore's Compound No. 45, at all times. The pinion bearing housing should be lubricated with 1/4 lb. of the same compound. The differential housing cover has a plug in it where the grease may be inserted. The pinion bearing housing has a grease cup located on one side.

If an excessive amount of lubricant is put in the differential it will tend to work out at the rear wheels, spoiling the effectiveness of the brakes. Should this occur it will be necessary to drain differential, clean shafts, replace felt washers and refill with the proper quantity. Unless the shafts are cleaned, the grease will tend to creep even after the level has been lowered, due to capillary attraction.

Examine lubricant in rear axle every 2,000 miles, clean housing out and refill. Whitmore's Compound may be strained and, returned to the housing together with sufficient new compound, to bring it up to the proper level.

The wheel bearings A (rear axle diagram on opposite page) should be lubricated with Whitmore's Roller and Ball Bearing Composition.

The brake shafts are provided with oilers. They should receive frequent attention, in order to retain free brake action.

Adjustment of Gears.

When the pinion and ring gears are properly adjusted the following conditions prevail:

The back face of the teeth on both ring gear and pinion will be flush.

There will be from .006 to .008 backlash between the teeth.

Referring to the rear axle diagram it will be seen that there in incorporated in the rear axle, adjustments for bringing about and maintaining these conditions.

In making the adjustments the correct procedure would be

1st - Removing end play from pinion shaft.

2nd - Adjusting pinion so that the back face of the teeth on pinion and ring gear will be flush.

3rd - Adjusting ring gear to left or right to obtain the proper backlash.

Please note that any one of these adjustments may be made independently of the others when it is necessary, but it is advisable to check over all three.

To Remove End Play in Pinion Shaft.

Loosen pinion bearing adjustment lock (see Rear Axle diagram) and turn adjustment in to take up the play. The bearings should be adjusted until there is no end motion, but

they should not bind or cause the shaft to turn hard. When this has been done, hold the adjustment against movement and turn up the lock tight. Try shaft again to see that it is not binding when the lock is tight. if so, it will be necessary to back adjustment off slightly and re-lock until the desired result has been obtained.

Adjusting Pinion so That the Back Face of the Teeth on Both Ring Gear and Pinion Will be Flush.

Remove pinion shaft adjustment lock and screw pinion shaft adjustment in or out until the back face of the teeth are flush. Then lock this adjustment by returning lock to slot and replacing clamp bolt. The gears may be inspected while making this adjustment by removing inspection plug on the left side of the rear axle housing on top.

Adjusting Ring Gear to Obtain the Proper Backlash.

Remove differential cover plate on the rear of the axle housing. Take off the differential bearing adjustment locks and loosen cap bolts sufficiently to allow the differential bearing adjusting nuts to turn. if there is any side play in bearings, turn nuts up until this is removed but do not bind. To move Ring Gear to left, loosen left side nut two notches and turn up right side nut the same, Repeat this operation until the required backlash is obtained, To move ring gear to right, reverse this operation. When completed return lock and tighten bolts holding bearing nuts in place.

Adjustment of Wheel Bearings.

Through usage, the wheel or axle shaft bearings shown at A in the rear axle diagram develop a certain amount of play, due to natural wear.

The wheels are rigidly fastened to the shafts by being drawn up on the taper, therefore the bearing wear will cause side play in the wheels. These bearings may be adjusted as follows:

Remove the wheels. This should always be done with a wheel puller, never by striking the end of the shaft with a hammer, as this may injure the bearing.

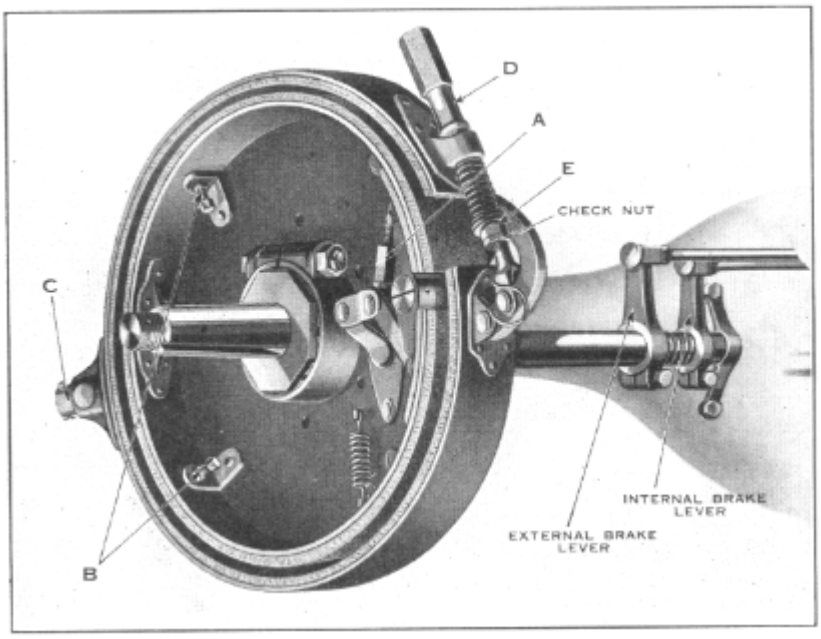
Remove adjusting nut lock and loosen locking bolt. Take up the adjusting nut B until the drive shafts show about .005 to .010 end play, but are perfectly free and the bearings do not bind. In making adjustment do not take up all the play from one side. Equalize it by taking up the same amount on each side until the proper result has been obtained.

When returning lock, if the notches do not correspond, back the nuts off until the lock will engage. Do not tighten the nut any more to make lock engage or too much pressure will be placed on the bearings.

Adjustment of Brakes

The hand or emergency brakes are of the internal expanding type, the brake band bearing against the inside of the drum on the rear wheels.

The foot or service brakes are of the external contracting type and bear on the outer surface of the brake drums. The service brake receives the greatest use and therefore should be accurately adjusted at all times. Long service or excessive use of the brakes wears the linings down until they gradually become ineffective. When this stage is reached, the brakes should be relined at once.



Brake Adjustments

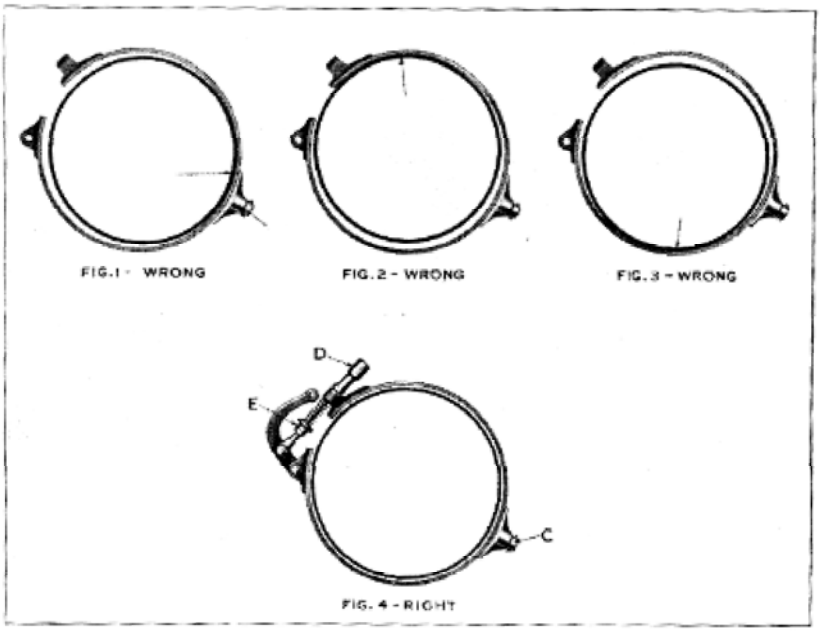
Adjusting the External or Foot Brake.

Providing the brake lining is not excessively worn, the method of procedure is as follows:

The adjusting nut D should be loosened up two full turns. The check nut below H should be loosened and the nut E turned up until the clearance between the drum and the lower half of the band to approximately the thickness of a thick visiting card; then lock check nut. The adjusting nut D may now be screwed down until the band just clears the drum. The construction of D is such that it must be tightened or loosened 1/2 turn at a time in order to lock at the proper point. Now test your adjustment by seeing that the wheel revolves freely. if it shows the slightest tendency to bind, the adjustment

must be loosened until it is perfectly free. It is advisable after taking up brakes, to run for a mile or so, and then stop and feel the drums and bands on both rear wheels with the hand. if cool, the bands are not binding. if warm there is a drag, and adjustment D or E must be loosened sufficiently to eliminate it.

If the brake lining is worn, the rear of the band may stand away from the drum. If this is the case the band may be moved forward by removing cotter pin at C and turning the plug in. Then replace cotter pin and proceed with the other adjustments as stated above.



Adjusting the Hand or Emergency Brake.

Each internal brake is provided with set screws and locks, as shown at B. These are for the purpose of making the band conform to the inside surface of the drum. The wheel may be removed with a wheel puller and the band adjusted by means of these set screws until the drum will slide over the band snugly and the wheel revolve freely.

After extensive use, the lining becomes worn and it will require greater effort and a longer pull to set the brake. Provision has been made for this with the adjustment A. The clevis pins should be withdrawn and the arm A lengthened by turning out the clevis. it should not be lengthened enough to necessitate the drum and wheel being forced over it as the wheel must be free when the hand brake lever is in "off position." When the proper position has been reached, return clevis pins and secure work with a cotter pin.

Springs and Spring Shackles

The springs on an automobile are being constantly exposed to mud and dust which gradually absorbs the oil and grease oozing out between the leaves and destroys the effectiveness of the lubricant. When this occurs the springs stiffen up, and if the application of a suitable lubricant is deferred long enough, the springs will rust between the leaves.

A spring leaf spreader may be purchased at almost any automobile supply house and is a very simple tool to manipulate. its operation to self evident, the tool being used to separate one leaf at a time in order that the lubricant may be thoroughly inserted. The Whitmore Mfg. Co., of Cleveland, Ohio, manufacture a special lubricant known as Whitmore's Spring Composition for this purpose, but if not procurable a mixture of graphite and high grade lubricating oil will give excellent results.

To retain flexible spring action and corresponding easy riding qualities, the springs should be lubricated every 600 to 800 miles, depending, of course, upon the nature of the road conditions encountered.

Spring breakage can nearly always be attributed to lack of lubrication and loose spring clips - those clips which secure the springs to the axles. Despite the precautions taken in providing heavy nuts to tighten these clips, the enormous strain under which they are subjected tends to loosen them up. it is therefore essential that the clips be inspected once a month for tightness.

The spring eyes and shackles are subject to a certain amount of wear which in time will cause a rattle or knock on the road. This side play can be eliminated by loosening up the shackle bolt nut and turning bolt until the threaded shackle is turned in sufficiently. When adjusted, lock with-nut and cotter pin.

Universal Joints and Propeller Shaft

The propeller shaft which transmits the power from the transmission to the rear axle is of the hollow, tubular type, and has enclosed dust tight joints at either end. The light weight of the tubular shaft minimizes the wear on the propeller shaft joints and axle housing by decreasing the strains resulting from centrifugal action. In this way, it differs from the solid type of shaft as there is no tendency to whip.

The universal joints depend upon their dust covers to retain the necessary amount of lubricant. As these covers are of necessity, removable for assembling purposes, it is possible they may have become loose in service. it is therefore necessary to inspect them with a view to tightening them up or re-filling with grease as occasion requires.

If the covers are allowed to remain loose, not only will the grease be lost but a certain amount of dirt will work into the universal joint. All dirt causes abrasive action when mixed with grease. The resulting wear will be out of all proportion to the wear in ordinary service.

Every thousand miles, refill the universal joints with a good quality soft grease. By removing the pipe plug, a grease gun may be used conveniently. Be sure to replace the plug after filling the universal joint.

Tires

Tires represent one of the principal items of your later upkeep expense. The service they give depends very largely on the attention and care they receive. Yet many motorists are content to let the tires take care of themselves, and their mileage is shortened accordingly.

It is estimated that the loss in tires prematurely ruined last year would pay the cost of three transcontinental highways. By exercising a little care and observing the simple precautions listed here, your share in this loss may be eliminated, and your service and satisfaction increased accordingly.

First and foremost, keep the tires properly inflated. Remember the car rides on air-not on the side-walls of the tires. To insure long life and protection against bruises, snags and blowouts, tires must contain enough air to support the car's weight.

The best average pressure for Essex cars is 60 pounds front for fabric, and 64 pounds Front Cord, 70 pounds Rear fabric and 68 pounds Rear Cord. These pressures are recommended where the car carries ordinary 5 passenger load. if extra weight, in form of passengers or equipment is added, tire pressure should be raised accordingly.

(To find actual load on each tire, weigh front and rear of fully loaded car separately, and divide each by two.)

Provide yourself with a reliable gauge and test tires at least once a week, or every morning when touring. if the pressure has fallen 10 pounds, or more, reinflate at once. This, more than any other thing, will help prolong your tire's life and prevent trouble.

Heat Does NOT Affect Air Pressure.

Do not let out the air on account of hot weather. Heat has comparatively little effect on air pressure, and will never cause trouble from undue expansion. By diminishing the air pressure because of hot weather, you encourage tire troubles.

Cuts that reach through the tread rubber are dangerous. Dirt works in and gathers under the tread, loosening it from the tire body and frequently leads to blowouts.

Fill Cuts in Tread.

In a few minutes at night you can clean out the tread cuts with gasoline, apply some of the cement in the repair kit and squeeze in a little tire putty. This putty hardens overnight and effectually closes the cuts.

Vulcanize.

Long cuts or tears or mud blisters that start before you notice them, should be vulcanized at once by a competent repair man.

A common trouble especially hard to account for, to sudden wearing down of the tread, either unevenly or around the entire circumference. This may be caused on the rear tires by quick starting or stopping, or on the front by improper alignment of the wheels.

Wheels Out of Line.

Sometimes dropping a wheel into a deep rut, or driving against a curb stone, will bend the axle or steering knuckle slightly enough to grind off the tire-tread rapidly. To determine whether wheels are in proper alignment, set wheels straight ahead and measure distance between tires at point about same height as axle. if a difference of not more than 3/8 inch exists, the alignment is all right.

Tight Brakes.

Brake bands should be tested occasionally to make sure they are equally tight on each wheel. Otherwise, when suddenly applied one brake will grip before the other, lock the wheel and cause it to skid.

Spinning Wheels.

Spinning the wheels in mud or on slippery hills, grinds off the tire treads rapidly. This isn't always avoidable, but must be considered as a cause of undue wear.

Chains.

If you find it necessary to use chains, apply them loosely enough so they can slip around the tire. Chains that are too tight quickly cut and tear the rubber. If too loose they will fold under and produce the same result.

Oil.

Keep tires out of grease and oil. Oil rots rubber quickly, and causes it to peel off. if necessary to drive over oiled roads, it to a good plan, on returning, to wipe the tires with a piece of waists soaked in gasoline. This cuts the oil and leaves the tires clean.

Heat and Light.

Tires should be protected from extreme temperatures, dampness and bright light.

In applying tubes, always be sure to dust the inside of the casing thoroughly with French Talc furnished in tire repair kit. This acts as a lubricant and prevents the tube from heating in the case, and sticking to the sides.

Keep Rims Free From Rust.

Before applying a new tire or tube, examine the rim carefully, and if rusty, have it sand-papered smooth and treated with a coat of rim paint or graphite.

Take Care to Avoid Pinching Tubes When Applying.

In applying, always keep the tube sufficiently inflated to hold it out round. This will prevent the possibility of its folding under or being pinched between the bead and rim.

Leaky Valves.

When you inflate your tires, test the valves occasionally by wetting, to make sure they don't leak. Leaky valves are a frequent cause of under-inflation and are bound to lead to trouble.

If the valve is leaky, try tightening the valve inside, with the reverse end of the valve

cap. if this isn't sufficient, insert new core. Extra cores are supplied in envelope included in tire repair kit.

Spare tubes should be carried in the box in which they come, or be carefully wrapped to prevent chafing or coming in contact with grease or oil.

The following tire supplies should be kept at hand

Extra tube for emergencies. Pressure gauge. Heavy rim-cut or emergency blow-out patch, in case of a bad cut or blow-out.

Here are a few DONT'S it will pay to observe:

Don't drive fast around corners. Aside from danger of skidding, this throws terrific strain on the tread and carcass of the tire.

Don't let the clutch in with a jerk, or jam on the brakes when stopping. Spinning or sliding the wheels will quickly wear thousands of miles of service off the tires.

Don't scrape the tires against curb stones. This wears off the rubber and exposes the cords to dirt and moisture, which soon starts to rot them.

Don't drive fast across car tracks or other irregularities in the road surface. A sharp blow that hits the tire squarely, may break the inner plies and later pinch a tube or cause a blow-out.

Don't leave the car standing on the tires for a long period of time. Tires should be jacked up and partly deflated.

Don't store the car where tires are exposed to bright light, or allow it to rest on an oily, greasy floor.

Don't carry spare tires or tubes unprotected.

Don't drive in car tracks.

Don't overlook either the car or the tires.

Don't drive on a flat tire for even a hundred yards. it will not only injure the casing, but will also tear the tube.

Wire Wheels

Owners whose cars are equipped with wire wheels, will not find it necessary to change rims when tire trouble is experienced. It, however, results that the wire wheel upon which the tire is mounted will have to be completely changed.

Connected with this operation there is one very important point upon which we feel a word of advice is not wasted.

Whenever it becomes necessary to change a Houk wire wheel, care must be exercised in the removal or replacing of the hub cap. The hub cap wrench must be so applied that it completely grips the entire hexagon surface of the cap, at the same time being firmly placed against the shoulder as far as it will go, so that the pawl which locks the hub cap, becomes completely depressed beneath the weight of the wrench and allows the hub cap to be turned freely.

Unless the pawl is forced downward by the proper application of the wrench, the hub cap remains locked and must necessarily become damaged, as a result of trying to force it off while it is held in the hub of the wire wheel by means of an unreleased locking spring.

When tightening up the hub cap always be sure that the pawl springs upward as soon as the wrench is removed. Otherwise, the cap is not locked and the wheel is likely to come off. it is possible that the pawl may stick tight sometimes if a little dirt gets onto the spring. Be sure to see that the pawl functions properly.

The following instructions must be closely observed when installing wire wheels:

The inner hubs, being the part which is attached to the axle, are marked very distinctly "Right side" and Left side." This marking indicates the proper side upon which these hubs are to be used. The right side of any car is on the person's right when he is sitting in the seat facing forward.

When the proper inner hubs have been selected for the right and left sides, bearings properly adjusted in the front hubs and keys properly fitted in the rear hubs, the locking nuts on the end of the front axle spindles and on the ends of the rear axle shafts should be securely locked by inserting cotter key through the nut and end of spindle or shaft.

The outer caps used for holding the wire wheel upon inner hubs are also marked "Left side" and "Right side." in addition to this the Rudge-Whitworth nut is marked showing direction in which nut should be turned in order to remove it. In case of the Houk wheel, the outer nut to marked showing direction in which same should be turned to screw it on. It is impossible to place a nut intended for the right side on the left side if the inner hubs are properly installed. This for the reason that the large nuts are cut with right-hand threads on the left side, and left-hand threads on the right side.

Always use wrenches furnished with wire wheels for removing outer caps, and before attempting to remove caps, make sure that you are turning the wrench in the proper direction as indicated on the end of the cap

.

Washing of the Car

When received a car is new, clean and neat-a thing of beauty. Why not keep it in this condition?

The car should be regularly and systematically cleaned and renovated. The varnish on a new car is always benefited by an occasional washing with clear, pure water. The car, even when not in active use, should be cleaned at stated intervals. in summer, preferably the water should be cool. On a new car, occasional washing with cold water serves to harden the varnish and increase its brilliancy. During the winter, if the washing is performed in a warm place, the use of cold water for an occasional washing may be continued, but cold water applied in a cold place at a frigid season of the year is injurious to the varnish.

When the car is in daily use or following each period of road service, the varnish should be washed, top cleaned and the interior furnishings of the car renovated.

Things to remember: Never wash the car in bright sunlight. The sun dries the water up too rapidly, and causes streaks in the finish. Always use absolutely clean water and change it often to keep it clean. Never turn the hose on the body unless the stream to so broke up that it does no more than spray the body, but we advise the use of the pail and the sponge in preference to the hose.

Clean Top First.

Before starting the washing of the car the top should receive attention. The top can be sponged off with clean tepid water, and when coated with road dust or mud, this water should contain enough Castile soap to provide sufficient alkali to cleanse. Follow this cleaning by drying with a chamois skin.

Washing the Body.

Begin washing the body by dipping the sponge well into the water, in order to pick up as much water as it will hold, then begin at the top of the panels and gently dash the water obliquely against the panels. Another way is to squeeze the water out of the sponge at the top of the panels to loosen the dirty accumulations, and cause them to drop off. These instructions are for cars that are washed immediately after road service.

When Washing is Delayed.

Provided the car has been put away for the night unwashed, and the mud and other road refuse allowed to dry onto the finish, it will harm the varnish to apply water and attempt to remove these dry, crusty accumulations at once. All such surfaces should have plenty of fresh, clean water run down in an easy volume over the finish. Continue this practice until the dirt-encrusted surface is thoroughly soaked up. Then let the work stand for 15 or 20 minutes for the water to so act on the body of dirt and mud that under a fresh flow of water it will readily run away without injury to the finish.

In all cases the mud and dirt should be floated off by a natural flow of water rather than wiped off. This latter practice usually results in the finish being scratched and disfigured by the grit and dirt. It must be understood that a water-loaded sponge drawn

or rubbed over a dirty or mud-bespattered panel develops a scouring effect. This diminishes the brilliancy of the varnish and reduces its capacity for protecting the undercoats.

The Second Washing.

After concluding the first or preliminary washing of the surface, a new sponge and a new pail should be taken in hand and the surface again washed with a fresh supply of clean water. A soft wash brush, oval in form, and chisel pointed, should be used to tool around the surface ornaments, mouldings and other attached body fixtures. Such places cannot be effectively reached with a sponge.

Use the same care and precautions in washing the chassis and under no circumstances employ the same tools for the body and the chassis and vice versa. In this way avoid transferring grease and oily stains from one part of the car to the other.

Drying the Body and Chassis.

For drying off the water from the body of the car or chassis use a chamois skin free from lint and absolutely clean. Wring the chamois out after rinsing in clear water, or if dirty after washing out in a solution of soft water and Castile soap. Begin at the first part of the car washed, proceed to pass the chamois over the surface with just sufficient pressure to take up the water with the exception of a mist, which will quickly evaporate.

To attempt to wipe the car perfectly dry in all parts will result in injury to the luster of the finish. An erosive effect on the surface can be produced under the pressure of the chamois and this effect must be avoided at all time,,,

No car should be left unwashed for more than 24 hours.

Finish Cracked and Spotted by Mud.

Mud in its various forms, in drying on a body of varnish, takes up the oil from the varnish, and in so doing destroys the luster. Road dirt or dust picked up on highways largely given to horse travel is often saturated with ammonia, and all such accumulations are destructive to the finish. Such road refuse, if allowed to dry upon the finish, not only spots the varnish, but fractures the film and causes it to decay and crumble away.

Mud and dirt from the roads traversing lime districts are likewise destructive to both the luster and the fabric of varnish, the latter disintegrating under the effects of lime. Some varnishes, or, in fact, a great many of them, will spot under the effects of soapy or dirty water, the alkali and capillary mediums contained in these waters going at once at the luster of the varnish.

The car not systematically and regularly washed will have its finish often spotted from the effects of various gases and garage impurities. Many manufacturing cities are so poisoned with deleterious fumes that the finish on the irregularly and too infrequently washed car to spotted and deprived of its luster in a comparatively short time. Moreover, lose of luster is a direct result of improper and infrequent washing.

Care of Enamel on Hood and Fenders.

Notwithstanding the extreme care and pains taken in enameling, and careful washing, the finish on theme parts will show a tendency to dull from service. This is

attributed to the fact that enamel has a peculiar affinity to dirt. The hood and fenders are subjected to exposure, to dust and dirt, oil, grease and heat from the motor. These conditions in time cause a sort of filmy covering to form, which deadens the original gloss. The longer this condition is allowed to exist, the harder it will be to restore the luster. This is brought about by the simple expedient of taking off the greasy substance which is adhering to the surface of the enamel.

There are a number of preparations for removing the dirt and cleaning the enamel, which can be secured from any accessory house. Careful washing with ivory soap and water, afterwards removing the suds before they are allowed to dry, and polishing with a chamois, will restore the finish. Fuller's Earth and water can also be used to rub off the dirt if it is very obstinate, and will not harm the finish.

Cleaning of Nickel-Plated Parts.

All nickel plated parts may be cleaned with lamp black or with regular silver cleaner paste. Use only the softest flannel rag or chamois to rub with.

Do not clean lamp reflectors except when absolutely necessary and then use Putz Pomade, applied with a very soft clean chamois skin. These reflectors are silver plated and are very easily spoiled by frequent polishing.

Miscellaneous information

Anti-Freezing Mixtures:

For 5 D below zero:		
Alcohol		15%
Gylcerine		15%
Water		70%
For 100 below zero:		
Alcohol		18%
Glycerine		18%
Water		64%
	or	
Alcohol		35%
Water		65%
	or	
Glycerine		50%
Water		50%

To Keep Water From Clinging to Windshield.

If you are in a climate where snow and sleet are a common feature of the weather for any lengthy period, you can keep the windshield clean by wiping it over with a solution of water, glycerine and salt. The proportions are:

1 oz. water.
2 ozs. glycerine.
1 dram salt.

Pour this on a piece of gauze and wipe the glass with all strokes downward. This will prevent rain drops or water in any form from clinging to the glass.

To Those Who Will Store Their Car Through the Winter Months

A few helpful hints on how it should be done. First: Store car in a dry place. Any dampness coming up from the floor will reach the exposed metal parts of the chassis and rust will start making inroads that are decidedly detrimental to the life of your car.

Second: You can avoid any tendency to rust by rubbing a small quantity of vaseline (not cheap grease) over such parts as dash equipment, hub caps, transmission levers, hood clamp, carburetor control rods, exhaust manifold, grease cups and all Delco connections and spark plugs. These, being of brass or nickel plate, tarnish easily. Also rub this into the various corners and crevices of the splash guards, particularly where they join the fenders.

Third: Jack up all four wheels and let out the air from tires.

Fourth: Drain water from radiator plug at lower water connection (left hand corner to person sitting in driver's seat).

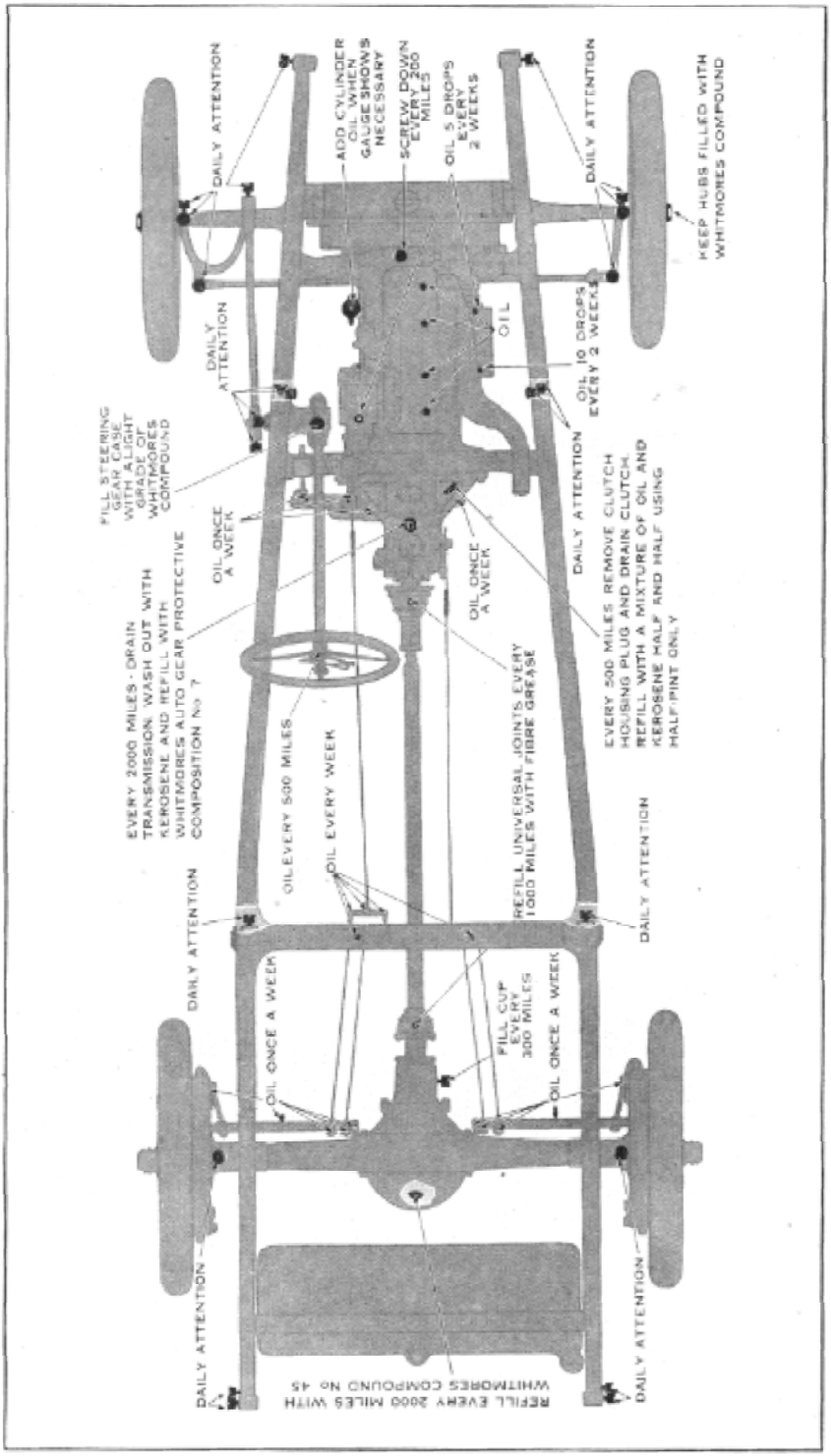
Fifth: Take out the spark plugs and put in each cylinder one-half cupful of castor oil. Then replace the plugs. Drain all oil from the reservoir and put in a gallon of castor oil. then run the motor for a short peiod until you know this oil has had an opportunity to cover all the connecting rod bearings and other moving parts on the inside of the motor.

Sixth: The battery should show a specific gravity of either 1.275 or 1.300 at the time you are storing away the car. In this condition there will be no danger of freezing at any temperature above forty degrees below zero (Fahrenheit). During this "out of service" period, the battery should be charged every two months if possible from an outside source.

Should either of the above methods be impractical, and if there is no charging station to which the battery can be conveniently sent, it can be left standing all winter, providing the specific gravity registers between 1.275 and 1.300 at the time the car is laid up. The life of the battery, however, will be decreased in this case. Much better results are obtained if it is charged periodically every two months.

Disconnect the wires from the battery to avoid any leakage through a short circuit. if you can conveniently do so, store the battery in a warm and dry place rather than in the car. in any event it the battery is removed from the car, it is a good plan to keep it wrapped up in burlap and covered with a quantity of newspapers to preclude the admittance of dust or moisture.

Seventh: Cover car with some sort of tarpaulin.



Essex Lubricating Chart

Oils and Greases Beat Suited for the Essex Car

MOTOR LUBRICATING OILS:

Use a high grade, medium bodied oil	Initial filling, 5 qts.

Always Insist upon receiving your motor oil in the original cartons, or when purchasing in bulk be sure as to the responsibility of the concern with whom you are dealing.

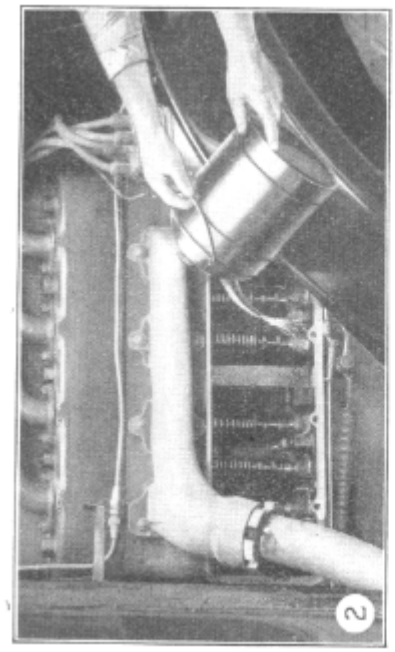
	Quantity to Purchase for Convenience.
CLUTCH Regular lubricating oil mixed with kerosene. (1/2 pint each.)	
TRANSMISSION Whitmore Compound No. 7. hole in Transmission Case. For tained in	21/2 lbs. of No. 7 Whitmore's Auto Gear Protective Composition, or fill until composition reaches overflow convenience, this can be ob- 5 lb. cans from the Whitmore Manufacturing Company, Cleveland, 0.
UNIVERSAL JOINT: Moore's Universal Joint Grease, or Whitmore's Special universal joint composition.	Moore's grease can be obtained from the Moore Oil Co., Cincinnati, 0., in 1 lb. cans. Whitmore special compound can be procured from the Whitmore Mfg. Co.
REAR AXLE: Whitmore's Compound No. 45. lbs. to be put in Differential and 1/4 the overflow plug.	2-1/2 lbs. of this Compound. 2-1/4 lb. in Pinion Bearing Housing or to
FMONT AND REAR WHEEL BEARING: Whitmore's Roller and Ball Bearing Composition.	Pack. Buy 5 lb. can.
ALL GREASE CUPS: No. 5 Whitmore's Anti Friction Composition.	Buy a 5 lb. can from the Whitmore Mfg. Co.
GENERATOR STARTER AND HORN: 3 in I oil in bearings. Soft grease in starter gears.	A few drops occasionally. (Buy 3 in 1 oil at any drug store.)

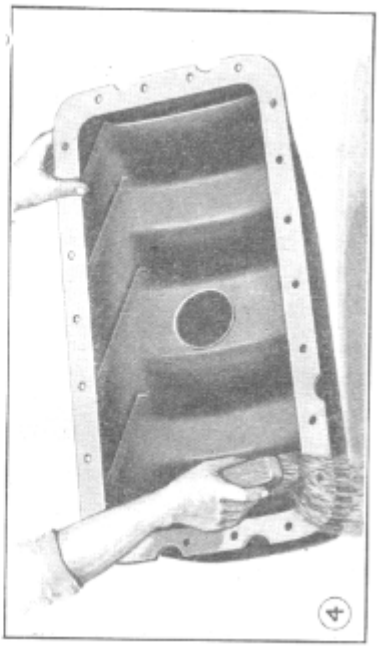
STEERING GEAR: 1/4 lb. of No. 5 Whitmore's Anti Friction Compound.

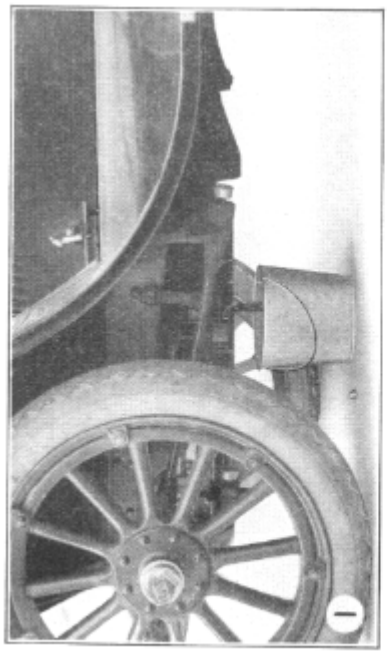
GASOLINE TANK HOLDS: Approximately 121/2 gals. (49.3 litres).

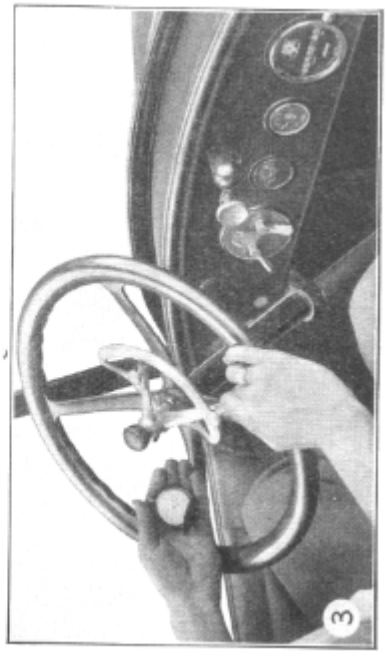
RADIATOR HOLDS: Approximately 6 gals. Obtain Whitmore's Compound at any of their branches or distributors, or by writing to the Whitmore Manufacturing Company, Cleveland, 0.

Whitmore's Compounds No. 7 and 45 when drawn off from the transmission or differential, can be strained and used again. Use a strainer made of No. 60 mesh wire cicth, which can be obtained from the Whitmore Mfg. Co. if desired









To Maintain Motor Efficiency

It is essential that the oil in the motor be changed frequently, preferably every five hundred miles of use.

The best grades of motor oil obtainable will, after prolonged use in an internal combustion motor, precipitate a black sediment. This sediment has no lubricating value and in fact, as more and ignore oil is added to the motor, this voluminous deposit remains until it seriously impairs the lubricating qualities of the new oil. Operating the motor under these conditions can have but one result-rapid deterioration and decline in performance.

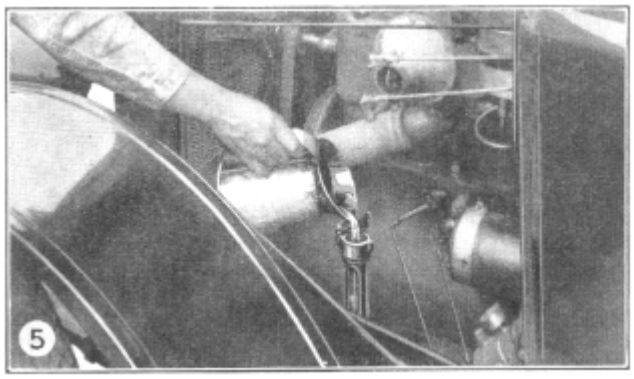
Tests show that this deposit assumes such proportions at from five hundred to one thousand miles (depending upon the quality of the oil) that it is imperative to drain out all the old oil in the crank case and refill with new, preferably flushing and draining out the crank case with a little clean cylinder oil (not kerosene) before refilling in order that most of this deposit will be removed.

This procedure will keep the floating deposit at a minimum but an accumulation will gradually adhere to the interior of the crank case, oil screen and oil pan which must be removed by thoroughly cleansing the parts affected.

KEROSENE SHOULD NEVER BE USED IN THE MOTOR UNLESS THE OIL PAN IS GOING TO BE REMOVED.

After from two thousand to two thousand five hundred miles use, proceed as follows:

1. Remove drain plug from oil reservoir and drain off all oil. Replace drain plug.
2. Remove the valve cover plate and pour about two quarts of kerosene into the tappet compartment allowing it to run thru into the motor.
3. Crank motor with starter for about thirty seconds, but do not let motor run on its own power. This will work down the sediment from the inside walls.
4. Take down oil pan and thoroughly cleanse same, using a stiff paint brush, moistened in kerosene. Flush out oil screen and drain, making sure that no kerosene remains in pan. Return pan to position and tighten uniformly so as not to



spring the pan and cause oil leaks. Replace drain plug.
5. Pour two quarts of new high grade oil into motor thru tappet compartment. Replace tappet cover plate. Refill crank case with 3 quarts of new oil. (Making 5 quarts in all.)

Detecting Trouble

Electric Cranking Falls.

1. Loose Battery Connections. Battery terminals are subject to corrosion which usually takes place between the battery post and terminal and sometimes cannot be seen. Therefore, when testing for a loose terminal, remove it entirely from post and thoroughly wipe off both the post and inside of terminal. Replace by again clamping it tightly to post. A sudden dimming of the lights when the starter button is pushed in, usually indicates a broken or loose battery terminal.
2. Depleted Battery. Dim lights with a failure to crank usually are a sure sign of a run down battery.
3. Motor Contact Brushes on Commutator making faulty contact (in starting motor on left hand side).
4. Seized motor bearings or transmission gears engaged.

Failure of Motor to Start.

1. Switch not turned on,
2. Out of Gasoline.
3. Water in gasoline, or poor grade of gasoline in extremely cold weather.
4. Weak ignition.
5. Contact points in distributor head out of adjustment. (See illustration on page 32.)
6. Open circuit in the ignition resistance unit (mounted on side of distributor). Resistance coil may be disconnected or broken.
7. Water on coil, distributor or spark plug terminals.
8. Spark plugs improperly adjusted. Clean and set to gap mounted on distributor wrench.
9. Over rich mixture, or what is commonly called "Carburetor Flooding," caused by continued use of choke.

   If there is good, clean gasoline in the carburetor and a good spark at the plugs, your motor will start if properly handled.

If Motor Stops.

1. Lack of gasoline. A popping or choking usually precedes the final stopping of the motor when the gasoline ceases to flow into the carburetor. To determine whether or not this is the case, first try the pet cock on bottom of vacuum tank. There should be a free flow of gasoline from this pet cock at all times. (See page 22 for

complete explanation of the functioning of the Vacuum tank.)

2. Vents in gasoline tank at rear may be clogged. (Vents are in upper end of gauge tube.)
3. Disconnected spark plug terminals or other loose electrical connections between distributor head to coil or spark plugs.
4. Contact arm adjustment loosened up.
6. Motor out of oil, indicated usually by a knocking in the motor followed by an abrupt stop. if this occurs, do not attempt to use either the electric starter or hand crank. Let the motor cool off. This usually is a serious matter, and the motor should have the attention of a good mechanic before attempting to put the car into service again. This same condition may be the result of a sudden loss of water from the circulating system. Should this be the case DO NOT pour a fresh supply of water into the radiator until the motor has had ample time to thoroughly cool off.

Reasons for Motor Missing:

1. Short circuited or dirty spark plug or plug out of adjustment.
2. Partially short circuited or broken secondary terminals. These are the wires running from the distributor head on right hand side of motor to spark plugs.
3. Poor contact between the various ends and clips of wires.
4. Loss of compression in one or more cylinders. Valves may be stuck in their guides. Valves may need re-grinding or re-seating. A valve spring may be broken or the adjustment of a valve tappet may have become loosened to a point where the tappet is either holding the valve open continually, or not raising the valve off the seat at all. An inspection of all the tappet clearances will show this at once.
5. Air leaks around inlet manifold, or piston stuck in carburetor cylinder.
6. improper functioning of Vacuum Tank. (See page 22.)

If Motor Knocks:

1. Connecting rod bearings loose. Loose bearings give a light knock at high speed, or when under a heavy pull.
   If you are convinced that this is the trouble, go to your dealer for assistance. Do not attempt to make major adjustments of this kind unless you are skilled in motor mechanics.
2. Loose Main Bearing. This can be distinguished from a connecting rod bearing by a heavy pounding under low motor speed, or a heavy pull.
3. Carrying the spark too far advanced.
4. Too rich a mixture. See that dash carburetor adjustments are in lean position.
5. Carbon in Cylinders, due to the use of improper oil. Have carbon cleaned. Wash out present motor oil in reservoir and begin using an oil of better quality.

6. Worn Valve Tappet (Light Tapping sound). Tappet adjustments loosened up.

If Motor Overheats:

The motor is starting to overheat when the red in motometer reaches the top. Stop motor immediately and investigate when this condition prevails. Some of the causes are as follows:

1. Low supply of water.
2. Dash adjustments improperly adjusted, or the shutter has not been opened.
3. Lack of motor oil.
4. Improper ignition timing or running with retarded spark.
5. Loose or broken fan belt.
6. Carbonized cylinders.

If Motor Lacks Power:

If motor will run but will not pull on grade, or heavy loads.

1. Loss of compression, due to leaky valves. This Is usually caused by running with too rich a mixture, or too much oil causing valve seats to become gummed up.
2. Too rich a mixture through some trouble in the carburetor-in all probability flooding, due to some grit or foreign matter getting under the float valve seat.
3. Piston in carburetor sticking.
4. Late Ignition. (See page 32 for instruction covering ignition setting.)
5. Cold Motor. Improper vaporization is the result of a combination of a poor grade of gasoline and a cold motor. This applies only to extremely cold weather and should prevail only for a few minutes when first starting out when the motor Is still thoroughly chilled.
6. Lack of water in the radiator, or the proper amount of oil in the motor.
7. Improper flow of gasoline to the carborator, usually caused by some foreign matter getting into the gasoline line. This makes itself known by spitting back through the carburetor, especially when you are about to open the throttle.