Carburetor Instructions

for

HUDSON
SUPER SIX

ESSEX SIX
CYLINDER

Hudson Motor Car Co.
DETROIT, U.S.A.

Carburetor

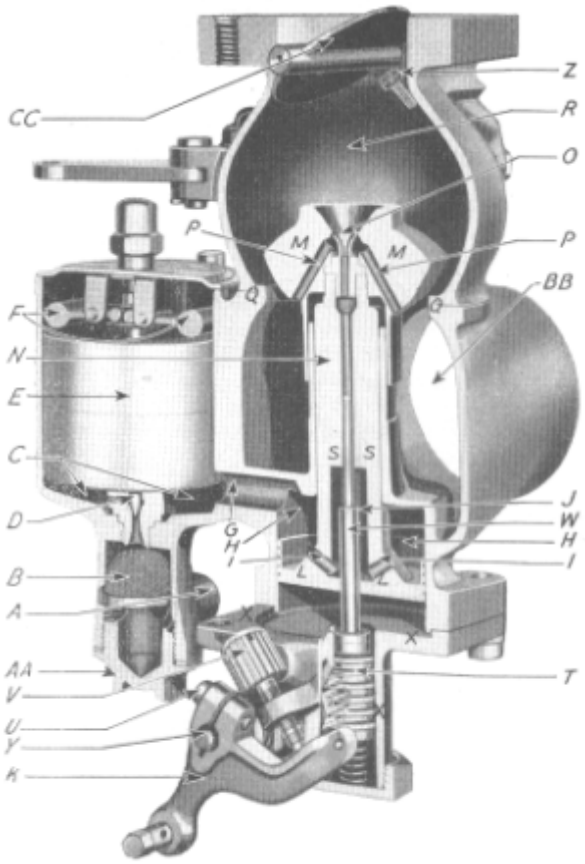
The carburetor is a device for metering correct amounts of fuel and air for the various conditions of engine speed and load. To attain good carburetion it is necessary that the fuel supply be properly atomized and thoroughly mixed with the air.

The Hudson-Essex carburetor has a float chamber of conventional design, which is connected to a vacuum tank. The vacuum tank draws the fuel from the main tank by suction and it is fed to the carburetor by gravity. By means of a float and mechanism the level of fuel in the float chamber is automatically kept at a certain height or head. From this chamber the fuel passes into the main part of the carburetor, where it is metered, thoroughly atomized, and then mixed with the correct amount of air in what is known as the mixing chamber. From this point the mixture passes through a butterfly type of throttle valve, which in turn controls the volume delivered to the cylinders.

Float Chamber

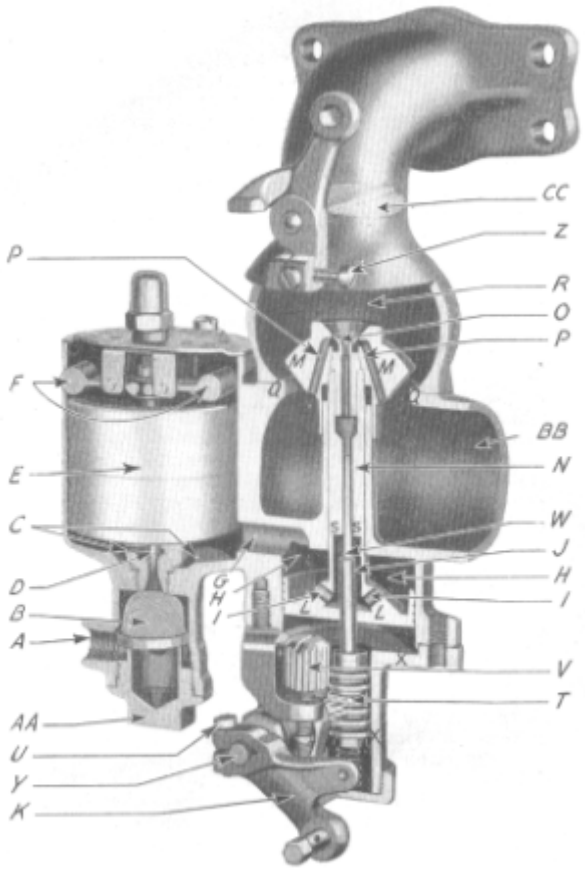
Fuel enters the carburetor at A, passing up through the strainer B, into the float chamber C, through the needle valve D. The valve D is actuated by means of the float E, operating through the counterweight levers F. As the fuel flows into the float chamber the float rises and, acting against the levers F, forces the needle valve down and closes same. As the float rises the valve closes until the float reaches a certain predetermined level at which the valve is entirely closed. If the float falls below this level, because of the diminishing supply of fuel in the float chamber, the valve is automatically opened and more fuel is admitted to bring the level up to correct height. From the above it will be seen that the float chamber constitutes a reservoir of constant supply, in which the height of fuel is always at the same level. This contributes to efficient metering.

A — Fuel Supply Connection
B — Strainer
C — Float Chamber
D — Gasoline Needle Valve
E — Float
F — Counterweight Levers
G — Gasoline Passage
H — Dashpot Chamber
I — Gasoline Passages
J — Gasoline Passage
K — Dash Adjustment Lever
L — Dashpot Piston
M — Metering Valve Head
N — Metering Valve Stem
O — Aspirating Tube or Nozzle
P — Primary Air Passages
Q — Metering Valve Seat
R — Mixing Chamber
S — Fuel Metering Orifice
T — Metering Pin Rack Carrier
U — Adjustment Lever Clamp Screw
V — Adjustment Screw
W — Metering Pin
X — Gear Housing
Y — Pinion Shaft
Z — Low Throttle Stop Screw
AA — Strainer Plug
BB — Air Inlet
CC — Throttle Valve



Model 25
For Hudson Super Six Motor Cars

A — Fuel Supply Connection
B — Strainer
C — Float Chamber
D — Gasoline Needle Valve
E — Float
F — Counterweight Levers
G — Gasoline Passage
H — Dashpot Chamber
I — Gasoline Passages
J — Gasoline Passage
K — Dash Adjustment Lever
L — Dashpot Piston
M — Metering Valve Head
N — Metering Valve Stem
O — Aspirating Tube or Nozzle
P — Primary Air Passages
Q — Metering Valve Seat
R — Mixing Chamber
S — Fuel Metering Orifice
T — Metering I'in Rack Carrier
U — Adjustment Lever Clamp Screw
V — Adjustment Screw
W — Metering Pin
X — Gear Housing
Y — Pinion Shaft
Z — Low Throttle Stop Screw
AA — Strainer Plug
BB — Air Inlet
CC — Throttle Valve



Model 25
For Essex Six Cylinder Motor Cars

Dashpot Chamber

From the float chamber the fuel flows through passage G into the dashpot chamber H. It also passes through the holes I in the valve piston into the central space J which surrounds the tapered metering pin W. The metering valve has a piston L at its lower end and which operates in the dashpot chamber. The object of the dashpot is to improve the performance of the carburetor by steadying the action of the metering valve during acceleration and low speed operation of the engine.

Metering Valve

The metering valve consists of a conical shaped head M, stem N and piston L. This is the only moving part in the carburetor proper. It slides up and down in its guide, formed in the body of the carburetor. The upper part of this valve contains a jet or nozzle 0 and primary air openings P. When the engine is at rest the conical head of the metering valve seats in the carburetor body at Q. When the engine is running, however, the metering valve is always floating in some higher position, thereby forming an annular or ring-shaped air opening between the conical head and its seat Q.

Action of Carburetor

The action of the carburetor is as follows: The suction created by the downward stroke of the engine pistons draws air into the mixing chamber R through the primary air openings P. The same suction draws a fine spray of atomized fuel from the nozzle 0 into the mixing chamber. The air thus mixing with the fuel forms a combustible gas for the engine. As soon as the engine begins to rotate, the metering valve lifts sufficiently to allow the main air supply to pass into the mixing chamber between the conical head M and the seat Q. Fuel is metered in an annular shaped orifice near the center of the valve at S, passing between the valve and the tapered portion of the stationary metering pin W. As the metering valve lifts into the higher positions, it gives increasingly larger fuel openings due to the

lifting of the valve away from the tapered metering pin, also larger air openings due to the lifting of the head of the metering valve M away from its seat Q. The metering valve measures the fuel at its lower end and the air at its upper end, the two being mixed in the chamber R. In other words, the metering valve under all conditions of operation automatically measures and delivers to the mixing chamber the most efficient proportions of fuel and air. The high velocity of primary or initial air passing through the holes P and around the nozzle 0 insures thorough breaking up or atomization of the fuel at all speeds.

Carburetor Adjustments

DO NOT TAMPER WITH THE CARBURETOR. The Hudson-Essex carburetor is exceedingly simple, there being only one point where any change in adjustment is possible. This adjustment is properly made at the factory when the carburetor is installed on the car and no change should be made unless it is positively known that the adjustment is incorrect. Very often, symptoms of carburetor trouble, such as mis-firing, backfiring, lack of power, overheating, etc., are produced by causes foreign to the carburetor. Therefore, before attempting any change in the carburetor adjustment, make sure that the compression is good and equal in all cylinders, that there are no air leaks between the carburetor and engine, that the ignition is timed correctly and delivering a hot spark, and also make sure that the spark plugs are clean and otherwise in good condition with gaps correctly set. It should be known that the fuel supply to the carburetor is sufficient and unrestricted. The only change of adjustment possible in the Hudson-Essex carburetor is that of the relative height of the tapered metering pin W to the opening in the center of the valve at S.

The metering pin is carried by a circular rack T meshing with a pinion shaft Y to which is attached the dash adjustment lever K. By turning the adjustment screw V, the fixed or running position of the metering pin is changed. Turning the screw to the right (clockwise) lowers the metering pin, thereby increasing the fuel opening, and thus makes the

mixture richer. Turning the screw to the left (anti-clockwise) raises the metering pin and makes the mixture leaner.

To obtain the best adjustment, first run the engine a sufficient length of time to get the jacket water up to normal running temperature. In this connection, the engine should not be too hot, as the adjustment thus obtained will likely be too lean for road conditions. With normal jacket water temperature, make the adjustment with the engine running idle, having the spark fully retarded and the low throttle stop screw Z (located at the top of the carburetor) so adjusted as to give an idling speed of approximately 250 R. P. M. Gradually turn the adjustment screw V to the left, thereby making the mixture leaner, until a point is reached where the engine runs unsteadily or stalls, when the adjustment should be reversed; that is, turned to the right, making the mixture richer a notch at a time until a point is reached where the engine will fire evenly. **It is most important that the adjustment be made at idling speed with fully retarded spark.** This one adjustment, when properly made, automatically insures correct carburetion throughout the entire range of car operating conditions.

Dash Control

For starting and warming up, the Iludson-Essex carburetor enriches the mixture by means of the dash control, which pulls down the tapered metering pin, thereby increasing the size of the fuel orifice. The air supply is in no way restricted. This means that the mixture can be made sufficiently rich for prompt, efficient starting and warming up in cold weather without flooding the engine with excessive quantities of raw fuel as with the use of an air strangle or choke valve.

When starting the engine cold the dash control should be pulled all the way out but should be immediately returned part way as soon as the engine begins to fire. The amount which the control will have to be left out for warming up depends upon the weather conditions. During summer weather a slight amount is sufficient, whereas during extremely cold weather it may be necessary to leave control out as much as half way

the control out as much as half way for part of the warming-up period. A general rule for the amount which the mixture should be enriched by means of the dash control for warming up is to have the control out as little as possible and still obtain satisfaction acceleration. **As soon as the engine comes to normal running temperature, the control should be pushed all the way in. If this is not done, considerable fuel will be wasted**.

Carburetion During Cold Weather

Good starting can be obtained under extreme cold weather conditions as follows: Advance the spark nearly to the running position and set the throttle lever on the steering column so that it opens only slightly. In other words, the throttle should be opened just a little beyond the idling position. The dash control should be pulled all the way out while the engine is being cranked. When the engine commences to fire, the dash control should be left way out and the throttle lever should also be left as for starting, permitting the engine to run for eight or ten seconds. This will allow the combustion chamber walls to become somewhat heated, when the control can be pushed part way in and the engine accelerated as may be required.

The above applies only when starting in extremely cold weather. Under ordinary weather conditions the dash control should be returned part way in immediately or as soon as the engine fires.

Locating Adjustment Arm on Pinion Shaft

As explained before, rotation of the pinion shaft moves the metering pin up or down, thus making the mixture leaner or richer. Motion of the dash control is transferred to the pinion shaft through the adjustment arm K.

Ordinarily, a sufficient range of adjustment can be obtained by means of the screw V. In the event, however, that it should be found, upon adjusting the carburetor, that the mixture cannot be mad sufficiently lean when the screw V is turned all the way to the left, or sufficiently rich

when turned all the way to the right, this can be taken care of by shifting the adjustment arm K relative to the pinion shaft, to which it is clamped. To make this adjustment, first disconnect the adjustment arm spring and then loosen the adjustment arm clamp screw U. In case the mixture cannot be made lean enough by turning the screw V all the way to the left, the adjustment arm should be shifted one notch, or serration, to the right. In case the mixture cannot be made sufficiently rich when the adjustment screw V is turned all the way to the right, the adjustment arm should be shifted one notch to the left. To prevent the pinion shaft from rotating when the arm is removed, and thus losing the adjustment entirely, it is desirable to either remove the cap from the lower part of the gear housing and take out the small spring beneath the metering pin, or tighten the packing gland which surrounds the pinion shaft sufficiently so as to create enough friction to prevent the pinion rack spring from moving the pinion shaft. After shifting the adjustment arm, the clamp screw should be tightened and the spring connected, and the final adjustment made in the regular manner by means of the adjustment screw V. It is well to so locate the adjustment arm relative to the pinion shaft that when the carburetor is finally adjusted for running conditions the adjustment screw V will be approximately in the center of its travel, which will permit making the mixture either leaner or richer to suit seasonal changes.

In case the location of the adjustment arm is completely lost, this can be restored, so that no difficulty will be encountered in starting the engine, by the following means: Detach the carburetor from the engine and then remove the throttle body, or upper part, by unscrewing the two cap screws. This will expose the metering valve head. Then, with the adjustment arm spring disconnected, also the clamp screw U loosened, the pinion shaft should be turned to the left (using the adjustment arm K as a wrench) so that the metering pin will be forced up into the metering valve, lifting same from its seat. Next, turn the pinion shaft in the opposite direction very slowly until the metering valve just touches its seat. Measurement should then

be taken of the distance between the end of the gear housing X (with the cap removed) and the rack T which carries the metering pin and slides within the gear housing. This can be done with a narrow scale or depth gauge. Next turn the pinion shaft to the right which will force the metering pin rack down 1/16 of an inch. This distance can be measured with the scale or depth gauge. Then carefully remove the adjust¬ment arm from the shaft, without turning same, and replace (again being careful not to turn the shaft) in such a position that the adjustment arm will come opposite the point of the adjustment screw when same is turned down approximately one-half of its total travel. Next the clamp screw should be tightened and the adjustment arm spring connected. This will give an approximate adjustment so that the engine can be easily started, and after bringing up to normal temperature, the final setting should be made by means of the screw V.

Flooding of Carburetor

Flooding or overflowing of the carburetor may result from one of several causes, such as leaky float or failure of the needle valve to seat because of dirt or other foreign matter. A leaky float is easily determined by shaking it near the ear. It should, of course, contain no fuel. In case the fuel supply contains foreign matter, this may become lodged between the point of the needle and its seat, causing the carburetor to flood. In this connection it is well to remove, from time to time, the strainer AA located at the lower part of the carburetor, and thoroughly clean it of any dirt or sediment. Should flooding be due to improper seating of the needle valve, this can sometimes be corrected by removing the cap from the center of the float chamber, which will expose the needle valve stem, and which can then be tapped lightly with the wooden handle of a small screw-driver, turning the needle in several different positions while tapping.

Carburetor Fouled With Dirt or Foreign Matter

No amount of dirt contained in the air supply can possibly interfere with the action of the Hudson-Es sex carburetor. As in any other type of carburetor, however, if dirt, scale, or other foreign mat ter works through the strainer, it may cause trouble. To correct this the instrument can be easily disassembled by any competent mechanic and thoroughly cleaned. In order to accomplish this, the carburetor should first be removed from the engine and the outside thoroughly cleaned with gasoline or kerosene, so that the dirt will not work into the inside when the instrument is disassembled. Next remove the float chamber cover and float; unscrew the strainer plug at the bottom of the float chamber; remove the throttle body or upper part, by means of two cap screws which attach it to the main carburetor body, and also remove the gear housing assembly (that is, the lowest part of the carburetor) by means of the four screws which attach it to the main body. This will expose the principal working parts of the carburetor. If desired, the metering valve (M N L) can be disassembled by catching the head M in a vise or holding same with a wrench and turning the piston L to the left by means of a special dowel wrench, which fits into two holes drilled in the lower face of the piston. The head is attached to the stem by means of a right-hand thread. The carburetor body and disassembled parts should next be thoroughly washed with gasoline and blown out with compressed air, if this is available. **The metering pin, also component parts of the metering valve, are very accurately machined and, when cleaning, no abrasives, such as files, emery cloth or sand paper, should be used. It is only necessary to clean these parts to have them function properly.** In reassembling, take particular pains to note that the metering valve is entirely free to slide up and down in the body of the carburetor in any position to which it may be rotated.

In the case of a carburetor which has been in service for some little time and is being disassembled for cleaning, it may be advisable to install new gaskets at the strainer connection, the

throttle body connection, and the gear housing. It is also desirable to tighten slightly the packing gland which surrounds the pinion shaft. This is accomplished by first loosening the lock nut and then tightening the packing nut, which has a right-hand thread. This, however, should never be so tight as to prevent the adjustment arm spring from re-turning the arm to the point of the screw. It is not necessary to remove the adjustment arm from the pinion shaft, thereby changing the adjustment of the carburetor, when the instrument is being disassembled for cleaning.

Do Not Alter the Specifications of Carburetor

The weight of the metering valve, size of jet, taper of metering pin and various clearances of the metering valve in the body, etc., have been very carefully worked out to suit the requirements of Hudson and Essex engines. None of these details should be in any way altered, as satisfactory results cannot be obtained if this is done.