Aug. 31, 1926.

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F. A. FRIZELL

FUEL CHARGE DILUTING DEVICE

Filed Dec. 16, 1924

Fig. 1.

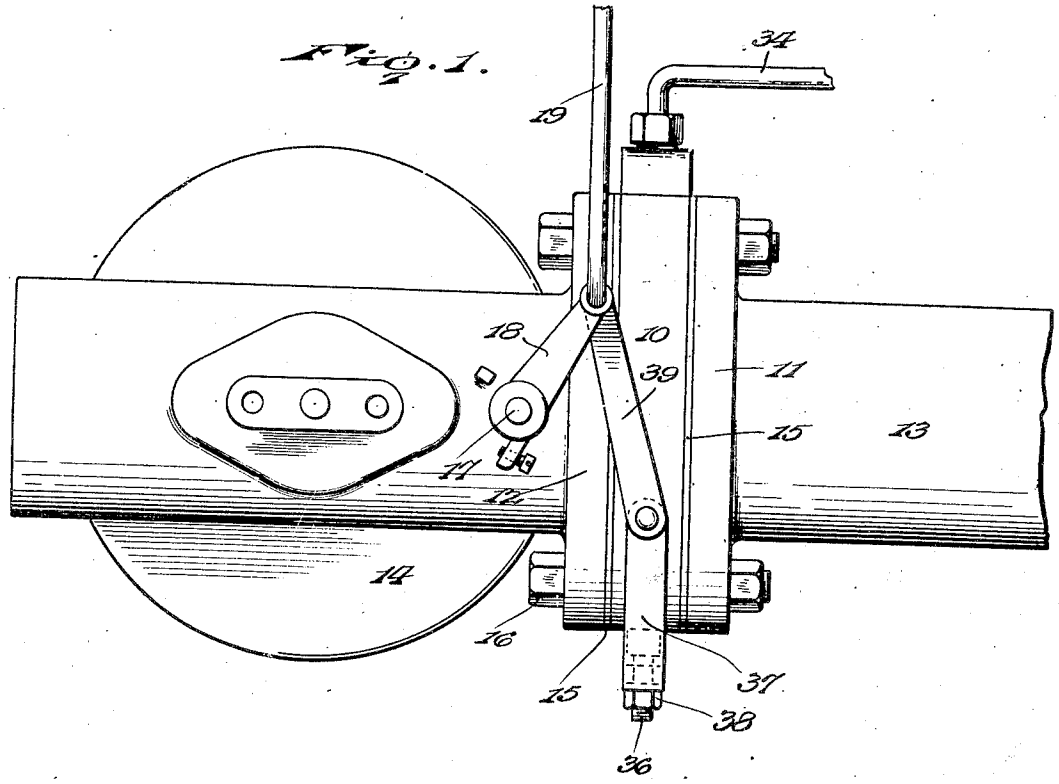


Fig. 2.

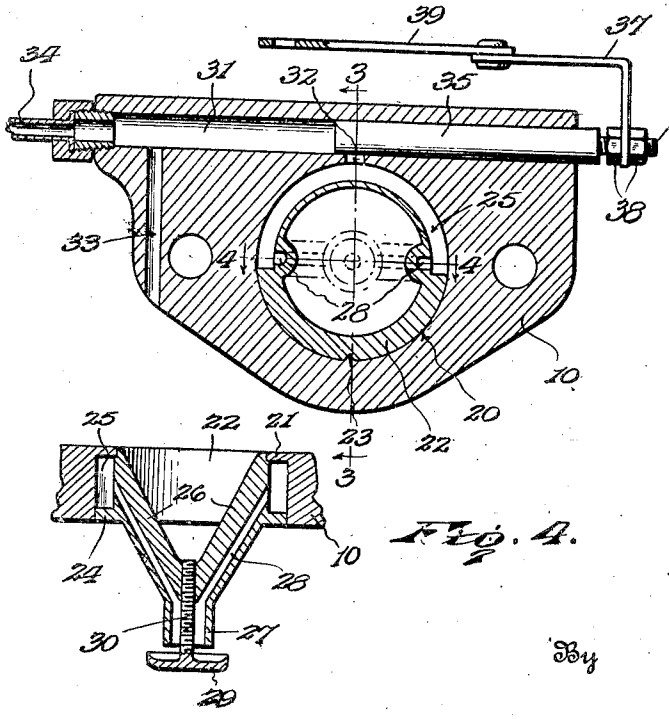


Fig. 3.

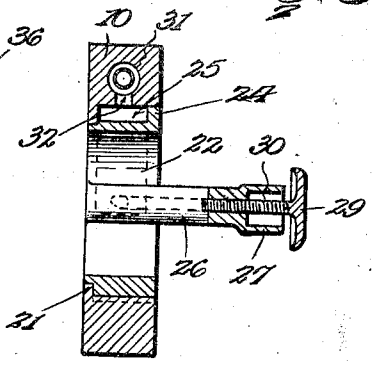


Fig. 4.

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UNITED STATES PATENT OFFICE.

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FUEL-CHARGE-DILUTING DEVICE.

Application filed December 16, 1924. Serial No. 756,319.

This invention relates to an improved fuel charge diluting device for internal combustion engines and seeks, among other objects, to provide a simple and efficient device of this character for diluting the carburetted fuel with a mixture of fresh air and water vapor to thus not only effect an economy in liquid fuel as well as an increase in the efficiency of the engine, but also to reduce the formation of carbon in the engine cylinders.

The invention seeks, as a further object, to provide a device which may be readily installed and which will be controlled in unison with the throttle valve of the engine carbureter.

And the invention seeks, as a still further object, to provide a device constructed in such manner as to facilitate the manufacture of the device.

Other and incidental objects will appear hereinafter.

In the accompanying drawings:

Figure 1 is a plan view showing my improved device installed between a conventional carbureter and engine intake manifold.

Figure 2 is a vertical sectional view taken medially through the device.

Figure 3 is a transverse sectional view on the line 3—3 of Figure 2, looking in the direction indicated by the arrows.

Figure 4 is a fragmentary horizontal sectional view on the line 4—4 of Figure 2, looking in the direction indicated by the arrows.

In carrying the invention into effect, I employ a body block 10 which, as shown in Figure 1 of the drawings, is shaped to fit between the confronting flanges 11 and 12 of an engine intake manifold 13 and carbureter 14. Suitable gaskets 15 are disposed between the parts and extending through said flanges and through the block are bolts 16 clamping the block in position. The manifold 13 and carbureter 14 are, of course, conventionally illustrated. However, it is desired to note that the carbureter includes the usual throttle valve having a stem 17, to which is fixed a lever 18, and engaged with the free end of said lever is the customary control rod 19, the adjacent end of which is bent downwardly, in the usual manner to form a terminal extending through the lever.

Formed in the block 10 is a central opening 20, stepped adjacent the rear side of the block to define an inwardly directed annular flange 21, and snugly but removably fitting in said opening is a core or ring 22 reduced near its rear edge to snugly fit through said flange terminating flush with the rear face of the block. At the lower side of the opening 20 is, as particularly shown in Figure 2, a transverse locking rib 23 while the core is formed with a groove accommodating said rib so that the core is thus locked against rotation. At is upper side, the core is cut away throughout substantially half the circumference thereof to produce a radial flange 24 snugly fitting in the opening 20 of the block 10 so that when the core is in position, a semi-circular passage 25 is defined between said flange and the flange 21 of the block. Integrally formed on the core is a spider comprising a pair of forwardly converging arms 26 which, at their rear ends, are united with the core at its inner circumference while, at their forward ends, said arms are merged and continued to form a forwardly directed cylindrical nozzle 27. Formed through the arms to communicate with the ends of the passage 25 are passages 28 opening into said nozzle. Mounted upon the spider is a disc-shaped spreader 29 having a stem 30 extending through the nozzle and screwed through the crotch between the arms 26. The spreader is provided with a cupped rear face for deflecting radially in a thin sheet, the vapors emerging from the nozzle and, as will be perceived, the spreader may be rotatably adjusted for positioning the spreader with respect to the forward end of the nozzle.

Formed through the block 10 above the opening 20 therein and at a right angle to the axis of said opening, is a passage 31 connected medially with the passage 25 by a port 32 and opening into the passage 31 near one end thereof is a downwardly extending passage 33, the lower end of which is open to the atmosphere. Detachably connected with the adjacent end of the passage 31 is a moisture supply pipe 34 leading from the radia-

tor of the vehicle upon which the device is installed. The pipe 34 may be connected with the radiator in any approved manner but preferably communicates with the filler neck of the radiator so that steam will be supplied through said pipe to the passage 31. Slidable in the outer end of said passage is a piston valve 35 having a stem 36 and adjustably fixed to said stem is an angle plate 37 secured by nuts 38 screwed on the stem. The plate 37 is disposed to overhang the block 10, and pivotally connected to the free end of said plate is a link 39, the free end of which is apertured to receive the terminal at the adjacent end of the control rod 18.

As will now be seen in view of the foregoing description, when the lever 18 is swung to the position shown in Figure 1, for closing the throttle valve of the carbureter 14, the valve 35 will be shifted across the port 32 for closing said port. On the contrary, when the lever is swung for opening the throttle valve, the valve 35 will, as the opening movement of the throttle valve proceeds, be gradually shifted outwardly to uncover the port 32, so that air and steam will be drawn in through the passage 33 and pipe 34 into the passage 31 to become mingled in the latter passage. The mingled air and steam will then be drawn through the port 32 and through the passages 25 and 28 as well as through the nozzle 27 to strike the spreader 29 and be spread out in a thin sheet thereby. Coincidently, the carburetted fuel from the carbureter will be drawn through the central opening of the core 22 about the nozzle and spreader so that the mingled fresh air and steam will be injected into the carburetted fuel to form a diluted fuel mixture for delivery through the manifold 13 to the engine.

Having thus described the invention, what I claim is:

1. A diluting device including a body block having an inlet passage communicating with the atmosphere, and a core carried by the block and provided with an opening for the flow of carburetted fuel as well as with a nozzle disposed opposite said opening and connected with said inlet passage.

2. A diluting device including a body block having an inlet passage communicating with the atmosphere, a core carried by the block and provided with an opening for the flow of carburetted fuel as well as with a nozzle disposed opposite said opening and connected with said inlet passage, and a spreader disposed at the discharge end of the nozzle.

3. A diluting device including a body block having an inlet passage communicating with the atmosphere, and a separate core carried by the body and provided with an opening for the flow of carburetted fuel, the core having a discharge nozzle and cooperating with the block to define a passage connecting the nozzle with said inlet passage.

4. A diluting device including a body block having an inlet passage communicating with the atmosphere, a separate ring-shaped core carried by the body and provided with a spider terminating in a discharge nozzle, the spider being formed with a passage leading to said nozzle, and a core cooperating with the block to define a passage connecting said passage of the spider with said inlet passage.

5. A diluting device including a body block having an inlet passage communicating with the atmosphere, a core carried by the body and provided with a spider terminating in a discharge nozzle, the spider being formed with a passage leading to said nozzle and the core cooperating with the block to define a passage connecting said passage of the spider with said inlet passage, and a spreader disposed opposite the nozzle and having a stem extending through the nozzle and adjustable upon the spider.

6. A diluting device including a body block having an inlet passage communicating with the atmosphere and provided with an opening as well as with a flange projecting into said opening, and a core having integral forwardly converging spider arms merging at their forward ends and provided with a discharge nozzle, one of said arms being formed with a passage leading to the nozzle and the core being cut away to fit through said flange as well as to produce a flange cooperating with the block and with said first mentioned flange to define a passage connecting the passage of said arm with said inlet passage.

7. A diluting device including a body block having a core provided with an opening for the passage of carbureted fuel, the core being provided with a portion extending forwardly from the core and formed with a passage communicating with the atmosphere through the block and terminating in a nozzle disposed opposite said opening at the forward end of said portion.

In testimony whereof I affix my signature.

FRANK A. FRIZELL. [L. S.]