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FUEL FEEDING AND FILTERING

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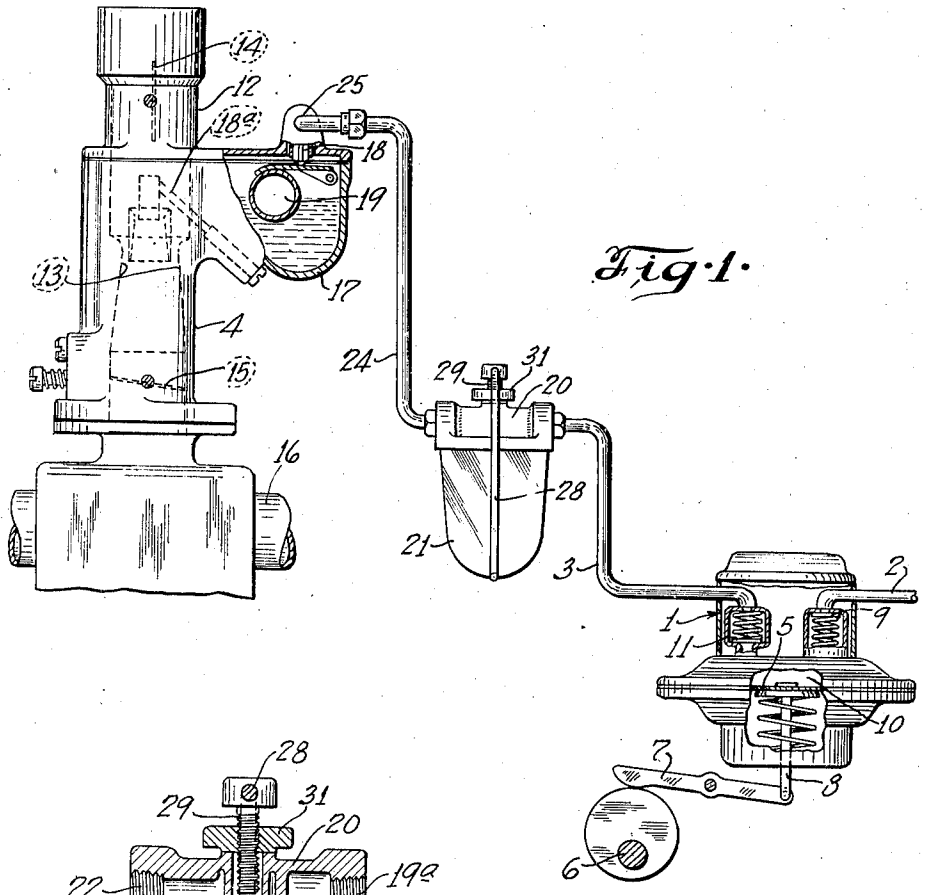


Fig. 1.

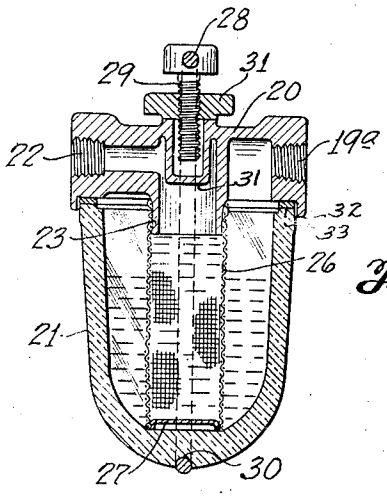


Fig. 2.

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FUEL FEEDING AND FILTERING

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6 Claims. (Cl. 158—36)

This invention relates to liquid supply systems and more particularly to fuel feed means for internal combustion engines.

In modern automotive engines, gasoline is generally forced from a remote fuel tank to the carburetor by means of a fuel pump having a pulsating diaphragm operated from the engine cam shaft. Fuel is admitted to the carburetor bowl and the fuel level maintained substantially constant therein by means of a float operated needle valve. This needle valve is exposed to pulsations in the fuel feed line, which tend to cause the needle to fluctuate during operation, substantially shortening the life of the needle and seat and unsteadying the fuel level.

An object of the present invention is to provide means for dampening the pulsations normally communicated to the carburetor needle valve by the fuel pump.

A more detailed object is to provide a novel combination fuel filter and pulsation dampening device for use with fuel feed systems.

These objects and other more detailed objects hereafter appearing are attained substantially by the structure illustrated in the accompanying drawing in which:

Figure 1 is a diagrammatic representation of an automobile carburetor and fuel pump with the invention applied therebetween, parts being broken away and sectioned for clearer illustration.

Figure 2 is an enlarged section showing the novel fuel filter and pulsation dampening device.

Figure 1 shows a portion of a fuel feed system, such as is generally used with automobile engines, including a fuel pump, generally indicated at 1, connected to a remote fuel tank (not shown) by a tube 2 and having a delivery tube 3 connected therewith and extending towards the carburetor, generally indicated at 4. The fuel pump includes a flexible diaphragm 5 controlled from the engine cam shaft 6 by means of a cam follower crank 7 and operating stem 8. On the downward stroke of the diaphragm, fuel is drawn through tube 2 past inlet check valve 9 into chamber 10, and, on the upward stroke of the diaphragm, check 9 is closed and outlet check 11 is opened to permit the discharge of fuel under pressure through delivery tube 3. Any other type of pulsating pump may be used.

The carburetor shown includes a downdraft mixture conduit 12, enclosing venturis 13, choke valve 14, and throttle 15. The mixture conduit is flanged at the bottom for attachment to the engine intake manifold, a part of which is shown at 16. If desired, the manifold 16 may be provided with a hot spot for heating the combustible gases supplied by the carburetor. Adjacent the mixture conduit is a chamber 17 within which fuel is maintained at a substantially constant level by needle valve 18 controlled by float 19. Fuel is delivered from float bowl 17 through main nozzle 18a terminating in the interior of the primary venturi.

Tube 3 leading from the fuel pump connects at its upper end with the threaded inlet 19a formed in the head or body portion 20 of the novel filter and pulsation dampening device. Inlet 19a communicates directly with the interior of a glass bowl 21 secured to head 20. Also formed in head 20 is a threaded outlet passage 22 which communicates at its inner end with a short neck or tube 23 extending partially into bowl 21. A tube 24 connects threaded outlet 22 with inlet 25 on the carburetor float bowl cover. Secured to neck 23 is a cylindrical screen 26 closed at its lower end by disc 27. Screen 26 is of a relatively fine mesh, conveniently of copper or brass, screening of approximately 120 mesh to the square inch being conveniently obtainable and satisfactory for the purpose, although screens having from 100 to 200 mesh per square inch have been successfully used. A screen of this type has the characteristic of preventing the passage of air therethrough when wet with gasoline.

Body portion 20 may be conveniently, though not necessarily formed as a die casting and further includes a cup element 31 depending partly into neck 23 and spaced from the walls thereof so as to permit the free passage of fuel therearound. Element 31 receives bail-carrying screw 29 and facilitates compact and unitary construction of the body portion. A depending lip 32 extends around the periphery of the body portion outside its circular bowl engaging seat and protects the engaging surfaces of the bowl, body portion and gasket 33 from dirt and grit.

In operation, fuel from the pump is supplied through tube 3 to inlet 19a in head 20 and flows over screen 26 into bowl 21. Screen 26 is sufficiently small and properly located relative to inlet 19a to be substantially fully wet by the stream of gasoline spurting into the bowl from the inlet. As the bowl fills, a body of air under pressure is trapped in the upper portion thereof above the surface of the gasoline, the liquid fuel passing through the lower portion of the cylindrical screen and upwardly through the same to tube 24 and the carburetor float bowl. The body of air trapped in bowl 21 functions as cushioning

means for dampening pulsations in the fuel feed line 3 so that a substantially steady flow of fuel is supplied to the tube 24 and the carburetor float bowl 17 as long as the pump is operating.

Screen 26 also functions as a filter for straining out foreign particles in the gasoline which particles settle in the bottom of bowl 21. The glass bowl is secured to cover 20 by means of a bail 28 which is secured to the head portion of screw 29 and normally seats at its lower portion in a notch 30 formed in the bottom of the bowl. Screw 29 may be raised or lowered relatively to cover 20 by means of a knurled or clover-leaf nut 31 so as to tighten or loosen the bail. A fuel filter device, as shown, is more fully described as to details in a co-pending application, S. N. 34,488 filed August 3, 1935 in the name of the present inventor.

Due to the shape, size and disposition of the cylindrical screen element, this part is maintained in its wet, air tight condition during operation so as to maintain a cushioning body of air in the top of the bowl. This air, however, does not interfere with the entry of gasoline into the pulsation dampening and filter device through inlet 19a. The device functions well for its intended purpose, resulting in increased stability and longer life of the carburetor needle valve and needle seat and insures a steady supply of clean gasoline so long as the fuel pump is functioning.

The invention is not limited to the structure shown but may be modified in various respects as will occur to those skilled in the art and the exclusive use of all such modifications as come within the scope of the appended claims is contemplated.

I claim:

1. In combination, a pulsating fuel pump, a carburetor, and a pulsation dampening device inserted between said pump and carburetor comprising a chamber having an inlet connection at the top thereof and an outlet connection, and a screen separating said connections and disposed to be substantially fully wet by fuel flowing through said inlet connection, said screen being of a character to prevent the passage of air therethrough when wet whereby air on the inlet side of said screen is trapped during operation of the device and functions as a cushion to dampen pulsations transmitted from said pump.

2. Structure as specified in claim 1 in which said screen is in the form of a cylinder and is disposed relative to said inlet so that fuel spurting through said inlet connection surrounds the same and flows downwardly therealong into said chamber, thence through the lower part thereof, and upwardly through the interior thereof to said outlet connections.

3. A filter and pulsation dampening device for liquid feed means comprising a chamber, a liquid inlet and a liquid outlet above the level of said chamber, and a screen separating said outlet from said air chamber and said inlet, said screen being of a character when wet to resist the passage of air therethrough but to permit the passage of liquid therethrough and being in a position to be substantially fully wet by a stream of liquid spurting into said space from said inlet whereby a cushioning body of air is trapped in said space during operation.

4. A pulsation dampening device for fuel feed lines comprising a chamber part, a member on top thereof including a fuel inlet communicating with said chamber part, a screen located adjacent said inlet and separating a space from said chamber and said inlet, and a fuel outlet communicating with said space, said screen being of a character when wet to resist passage of air therethrough and being shaped and located so as to be fully wet by fuel entering said inlet before said chamber part is filled with fuel so as to trap a substantial quantity of cushioning air in said part adjacent and flush with the upper part of said screen.

5. Structure as specified in claim 4 in which said screen is of a fineness of approximately 120 mesh to the square inch.

6. Structure as specified in claim 4 in which said screen forms a cylinder of sufficiently small cross section relative to said inlet whereby a substantial portion thereof is enveloped by the stream of liquid entering through said inlet.

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