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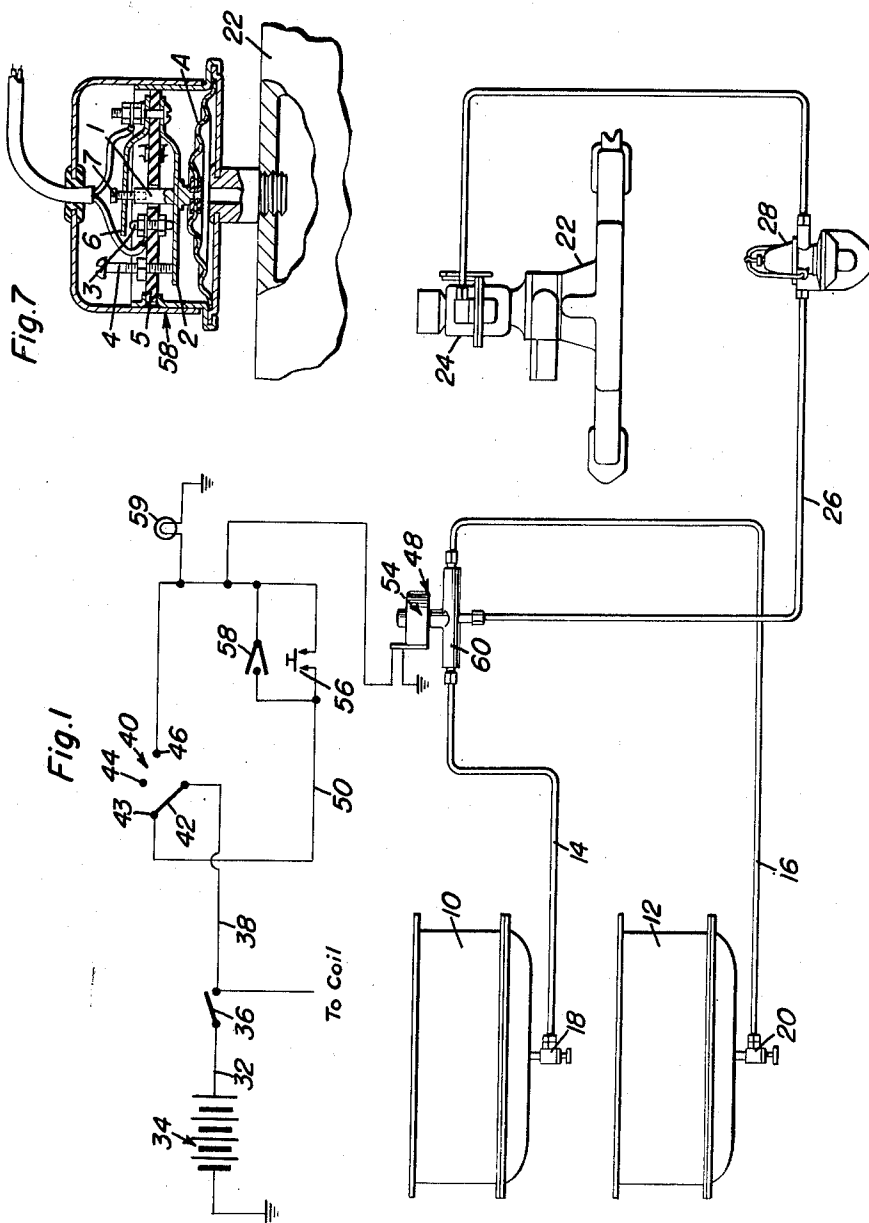
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2,647,566

MOTOR FUEL SELECTOR ASSEMBLY

Filed Nov. 21, 1950

2 Sheets-Sheet 1



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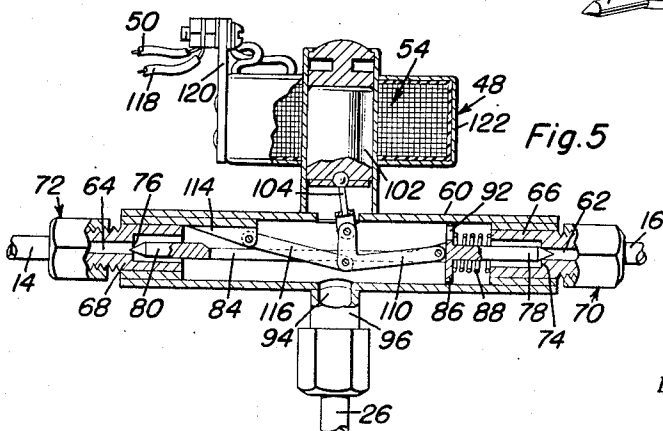
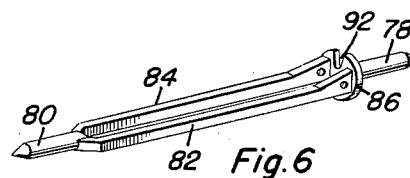
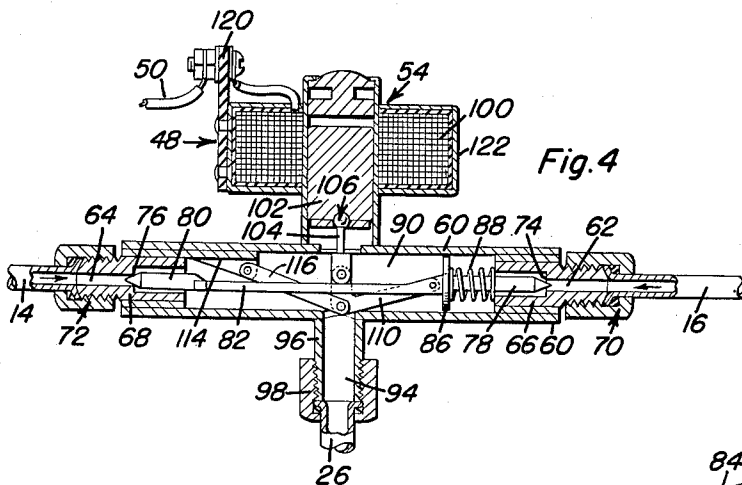
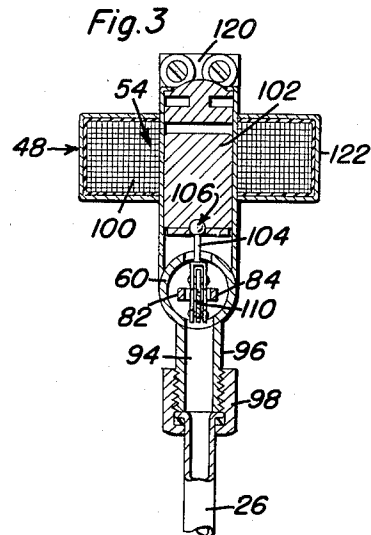
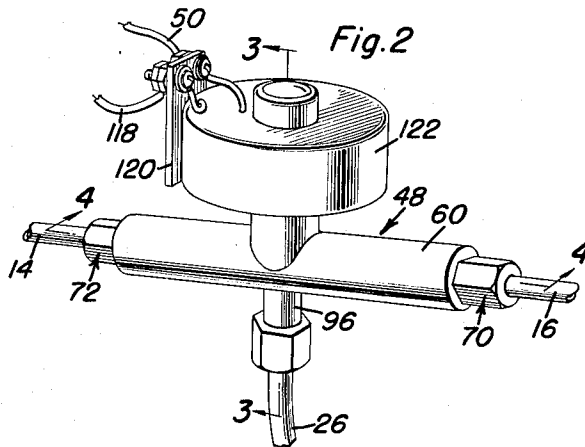
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MOTOR FUEL SELECTOR ASSEMBLY

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UNITED STATES PATENT OFFICE

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MOTOR FUEL SELECTOR ASSEMBLY

Earl L. Haynie, Berwyn, Ill.

Application November 21, 1950, Serial No. 196,830

2 Claims. (Cl. 158—36.3)

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This invention relates to improvements in internal combustion engine attachments.

An object of this invention is to provide an improved valve assembly in a multi-fuel system for an engine, the improved valve assembly serving the purpose of selecting the proper type or grade of fuel by electrical means.

Ancillary objects and features of importance will become apparent in the following description of the illustrated form of the invention.

In the drawings:

Figure 1 is a diagrammatic view showing one multi-fuel system for an internal combustion engine wherein the improved valve assembly is disposed;

Figure 2 is a perspective view of the improved valve assembly;

Figure 3 is a sectional view taken substantially on the line 3—3 of Figure 2;

Figure 4 is a sectional view taken substantially on the line 4—4 of Figure 2 and in the direction of the arrow;

Figure 5 is a sectional view similar to that of Figure 4 the elements being in a second position of adjustment;

Figure 6 is a perspective view of the valve members connected together and held in spaced relationship by means of a rigid connection; and

Figure 7 is a sectional view of a suction operated valve used in the invention.

The present invention includes subject matter similar to that disclosed in my copending application, Serial No. 196,829, filed on November 21, 1950.

Attention is invited first to Figure 1. There is a fuel tank 10 which is adapted to contain one type or grade of fuel. The fuel tank 12 is adapted to contain a second grade or type of fuel. Conduits 14 and 16 extend from outlets of the tanks 10 and 12 and standard valves 18 and 20 are interposed in the conduits 14 and 16 for manual control of the fuel flowing from the tanks.

A standard intake manifold 22 is illustrated in this figure and has a carburetor 24 located thereon. A pipe 26 having the fuel pump 28 interposed therein is connected to the inlet of the carburetor.

The wiring appurtenant to the assembly includes an electrical conductor 32 extending from the source 34 and having the standard ignition switch 36 therein. A wire 38 extends from the standard ignition switch and connects to the selector switch 40. This selector switch has a switch arm 42 arranged to engage the contacts 43, 44 and 46, respectively. When the switch arm engages the contact 43 selectivity of operation of the selector valve assembly 48 is obtained inasmuch as the wire 50 extends from the contact 43 and is attached to a contact of the electric motor 54, forming a part of the selector valve assembly. The preferable type of motor

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is a solenoid (Figures 3-5). Interposed in the wire 50 is a switch 56 which is adapted to be actuated by the choke and idle linkage of the carburetor, this switch being appropriately located. A suction responsive switch 58 is operatively connected to the intake manifold 22 so that suction beyond a predetermined value causes the switch to operate. Therefore, the switch 56 may be so arranged that at idling speeds or while choking, the switch is closed, thereby causing operation of the selective valve 48 and permitting only the better grade of fuel to flow to the carburetor. The same is true at idling speeds when the suction in the intake manifold is high. The switch 58 will remain closed causing only the better grade fuel to flow into the carburetor. At this time the signal lamp 59, appropriately wired in the circuit is illuminated.

As disclosed in Figure 7 there is a switch 58 operatively connected with the intake manifold 22 of the engine whereby suction of the manifold is caused to actuate the diaphragm A of the switch. The construction is such that the switch 58 will remain closed, causing only the better grade of fuel to flow into the carburetor, at idling speeds when the suction in the intake manifold is high and will open when the suction decreases to allow a lower grade of fuel to be used, but will close again at such time that the suction is even lower.

At low vacuum the diaphragm A will expand allowing the center stem 1 to force the lower contact finger 2 to engage the bottom end of the terminal 3. The adjustment screw 4, carried by the insulating partition 5 is used to set the lower contact finger to make contact at the desired point of low vacuum. A spring may be used in conjunction with the diaphragm if found necessary in order to insure that the diaphragm will expand properly.

The diaphragm contracts as the vacuum increases in the intake manifold 22 due to the fitting connecting the intake manifold with the switch casing. This draws the center stem 1 down thereby pulling the upper contact finger 6 down to engage the upper end of the terminal 3 when the vacuum increases to a desired point. The adjustment screw 7 connecting the center post and the upper contact 6 is used to adjust the upper contact finger to make contact at the desired point of high vacuum.

The electrical circuit illustrated in Figure 1 is thereby controlled.

The contact fingers 2 and 6 normally will not touch the terminal 3 due to the tension of the fingers unless actuated by the diaphragm A through the center stem 1. Thus, through the range between high and low vacuum the switch would be open. The switch would be closed at high and low vacuum.

When the switch arm 42 is moved to the contact 44, the circuit is open. When the switch arm 42 is moved to engage the contact 46, due to the wiring the switches 56 and 58 are by-passed. Hence, the selective valve motor 54 will be energized holding the selective valve assembly 48 in such condition that the better grade of fuel only will flow to the carburetor.

In operational summation, when the arm 42 is in engagement with the contact 43, there is "automatic" selective valve 48 control. When the switch arm 42 is moved off the contact 43 but prior to engagement with the contact 46, the selector valve assembly 48 is inoperative. When the switch arm 42 engages the contact 46 premium fuel flows through the valve assembly 48.

As disclosed one fuel pump 28 is required. The multi-fuel pump system as disclosed in Patent No. 2,163,241 may be used as an alternative. In that patent there is a single fuel pump for one tank and the other tank has an individual fuel pump.

Attention is now invited to the specific valve assembly 48. There is a case 60, preferably of tubular stock, said case having open ends. There is a pair of inlets at the opposite open ends of said case. The inlet 62 has the conduit 16 arranged therein, while the inlet 64 has the conduit 14 arranged in communication therewith. The conduits 14 and 16 are connected to lengths of pipes 66 and 68 by means of standard couplings 70 and 72. Valve seats 74 and 76 are formed in the lengths 66 and 68 of pipe, each seat accommodating a valve member 78 and 80, respectively.

As disclosed in Figure 6, the valve members 78 and 80 are held in fixed spaced relationship by means of the rods 82 and 84, one end of each being fixed directly to the valve member 80 and the other end of each being fixed to a disk or plate 86 which is, in turn, fixed to the valve member 78. The function of the disk 86 is to constitute a seat for the spring 88. This spring bears against the inner end of the length of pipe 66 and serves the purpose of yieldingly opposing the operation of the valve members and of retaining the valve members 78 unseated when the solenoid is inoperative.

The space between the valve members constitutes a valve chamber and a mixing chamber 90. The disk 86 may be made of a size sufficiently small to allow free flow of fuel thereby or may be apertured or notched as at 92 in order to permit the passage of fuel which enters the inlet 62, to pass into the outlet 94. This outlet is in communication with the chamber 90 and has the pipe 26 communicating with it, being held in place on the outlet member 96 by means of a standard coupling 98.

The solenoid is provided with a coil 100 mechanically held in place around the soft iron core 102, this core having a link 104 connected to it. The link is secured to the core by means of a ball swivel connection 106 and has its lower end secured to one end of the crank 110. The opposite end of the crank is held by means of a pivot pin, fixed to the rods 82 and 84 near one pair of ends thereof. The crank is pivoted intermediate its ends to a bracket 114, which is fixed in the chamber 90, through the medium of a link 116.

In order to hold the ground wire 118 of the system fixed properly and in order to hold the wire 50 in proper relationship to the solenoid, a contact block 120 of insulating material is riveted to the solenoid casing 122.

In operation of the valve assembly the following takes place: The fuel pump applies a suction to the outlet member 96. When the solenoid is actuated, the core 102 is lifted thereby drawing the crank 110 upwardly in a constrained motion due to the presence of the link 116. This causes the valve member 78 to seat firmly in the valve seat 74, closing the inlet 62 and permitting no flow through the conduit 16. However, since the valve member 78 is rigidly fixed to the valve member 80 and the valve members have been moved in this manner, the inlet 64 is opened, permitting fuel to flow through the chamber 90 and outlet 94.

The above movement of the valve members is opposed by the spring 88. Therefore, when the solenoid is no longer energized the spring 88 returns the valve members to such position that the inlet 62 is opened and the inlet 64 closed by their respective valve members.

Having described the invention, what is claimed as new is:

1. In an engine fuel supply assembly which includes a carburetor, a fuel pump connected thereto by means of a pipe, a first and a second fuel supply tank, and conduits extending from each tank, together with a selective valve connecting said conduits and a pipe leading from the selective valve to the fuel pump, means for operating said selective valve comprising a selector switch having a wire adapted to connect the switch to an ignition system for an engine, a suction responsive switch, an electrical conductor extending from said selector switch to said suction responsive switch, said suction responsive switch being adapted to operatively connect with the intake manifold of an engine for actuation in response to vacuums above and below a predetermined range, said suction responsive switch having an electrical conductor extending therefrom, an electric motor arranged to actuate said selective valve and mechanically connected therewith, and said motor connected for operation with the last-mentioned electrical conductor, and means responsive to operation of said selector switch and connected with said selector switch and said motor for by-passing said suction responsive switch.

2. The combination of claim 1, and a switch adapted to be operated by a standard choke and idle linkage electrically connected with the first-mentioned electrical conductor extending from said selector switch in parallel with said suction responsive switch to control the electrical operation of said motor.

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