Sept. 11, 1956 M. E. JONES 2,762,355

PRIMER AND FUEL CUT-OFF DEVICE

Filed Aug. 25, 1952

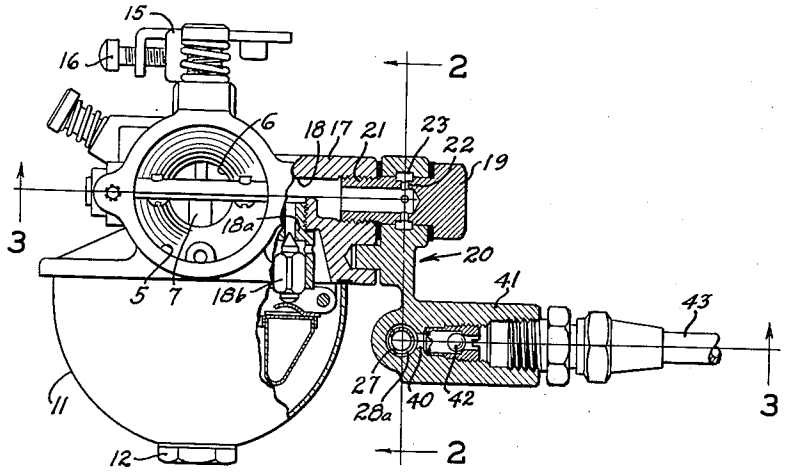


FIG. 1.

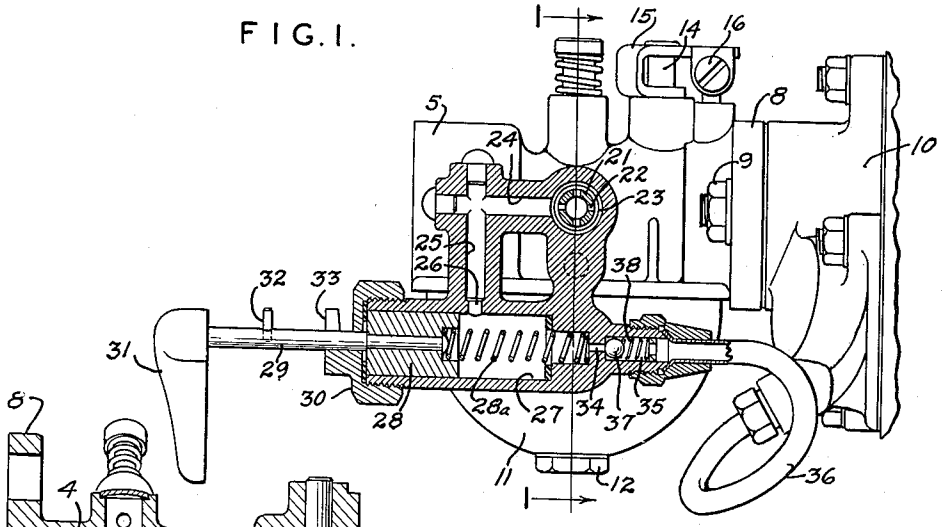


FIG. 2.

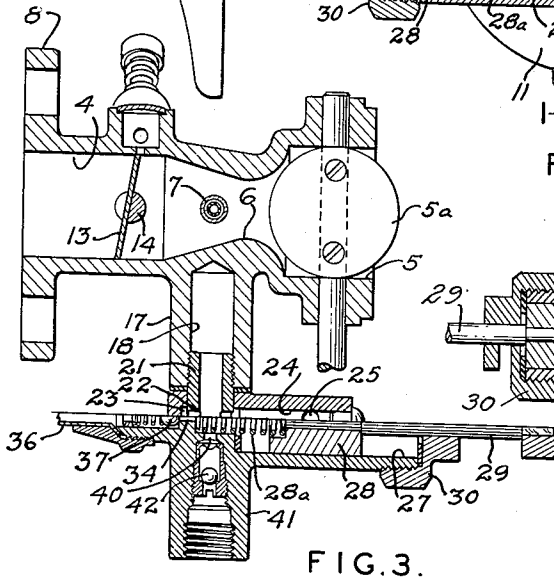


FIG. 3.

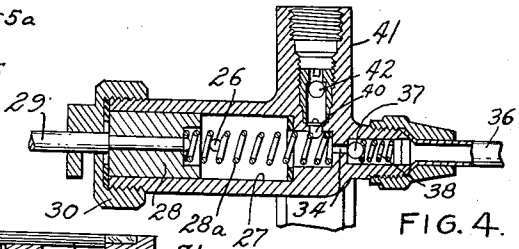


FIG. 4.

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United States Patent Office 2,762,355
Patented Sept. 11, 1956

2,762,355

PRIMER AND FUEL CUT-OFF DEVICE

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Application August 25, 1952, Serial No. 306,257

7 Claims. (Cl. 123—180)

This invention relates to fuel supply systems, particularly, for internal combustion engines and consists in a novel combination primer and fuel cut-off device.

Internal combustion engines of the type used to operate motor boats frequently require and are provided with individual means for positively shutting off the fuel connection between the fuel tank and the carburetor or firing chambers, when the engine is not in operation, and also, for supplying a priming charge to the firing chambers to facilitate starting. Such separate devices may tax the space limitations, especially in case of a small outboard motor. According to the present invention, a manual priming pump is arranged in the fuel supply line in such a manner to serve, in addition, as a positive fuel cut-off when the engine is not operating.

In the accompanying drawing which illustrates the invention,

Fig. 1 is an end view and vertical transverse section taken on line 1—1 of Fig. 2.

Fig. 2 is a side view and vertical longitudinal section taken substantially on line 2—2 of Fig. 1.

Fig. 3 is a horizontal section taken on broken line 3—3 of Fig. 1, but showing the plunger in a different position.

Fig. 4 is a section on the line 4—4 of Fig. 2 looking in the direction of the arrows.

The carburetor shown is of the side draft type having a horizontal mixture conduit 4 with an air inlet 5 at one end, controlled by choke valve 5*a*, an intermediate venturi tube portion 6 into which the main fuel supply nozzle 7 discharges, and an outlet portion, flanged as at 8, for attachment by bolts 9 to the intake manifold portion 10 of an engine, in this case, an outboard engine for motorboats. Mounted beneath the mixture conduit is a constant level fuel bowl 11 secured in position by a center bolt 12. A mixture controlling throttle valve 13 is mounted in the mixture conduit, posterior to venturi tube 6, upon a shaft 14, carrying an arm 15 for attachment by means of a clamping screw 16 to a suitable remote control wire or link (not shown).

A boss 17 projecting sidewardly from the carburetor mixture conduit or body, houses an inwardly extending main fuel passage 18 which leads to the fuel bowl through needle valve seat 18*a* past float operated needle valve 18*b*. The boss is internally threaded at its outer end for receiving a hollowed cap screw element 19 which secures in position the combination primer and shut-off valve structure, generally indicated at 20. The threaded shank 21 of cap screw 19 has annularly arranged ports 22 communicating through an annular recess 23 in structure 20 with a longitudinal passage 24 connecting with a vertical passage 25. Passage 25 opens through a port 26 into a chamber 27 within which works a plunger 28. An actuating stem 29, secured centrally to the plunger, slidably projects through a cap 30 on the end of chamber 27 and has a handle 31 on the end thereof. Actuator 29 also has a lateral pin 32 for cooperating with a recessed off-set 33 on chamber cap 30, to form a bayonet joint

for securing the plunger in its discharged, fuel cut-off position, as described hereafter. The plunger normally is urged toward its normal operating position of Fig. 2 by a coiled compression spring 28*a*.

Opening into the opposite end of chamber 27 is a port 34 which communicates through a valve chamber 35 with a tube 36 leading directly to intake manifold structure 10 for supplying priming fluid directly to the firing chambers. An outlet check ball 37 in chamber 35 is biased towards its seat by a coiled spring 38. A third port 40 in the wall of chamber 27 connects through a threaded, valve chamber-forming boss 41, carrying unbiased inlet check ball 42 with tubing 43 leading to the fuel supply tank.

In operation, the combination primer and fuel cut-off plunger 28, in its normal operating position, is positioned at the left end of chamber 27, as in Fig. 2. In this position, a path is provided through chamber 27, between fuel inlet port 40 and port 26, which may be termed the normal outlet port, which leads through passages 25, 24, and 18 to the fuel bowl 11. In starting the engine, in case a priming charge is needed, it is only necessary to manually force plunger 28 inwardly or to the right with respect to Fig. 2, whereupon normal outlet port 26 is occluded or cut off early in this priming movement of the plunger and, thereafter, the fuel in chamber 27 is forced under pressure past outlet ball check 37 and through tube 36 into the engine firing chambers. Actuator stem 29 is then promptly returned, by means of handle 31, to the normal operating position to permit continued flow of fuel from inlet tube 43 to the normal fuel supply passages.

When the engine is stopped, plunger 28 is forced inwardly until pin 32 is abreast of recessed cap member 33 and then rotated to cause the pin to enter this recess structure so as to lock the plunger in its inward position. In this position, the flow of fuel through inlet tube 43 and the normal outlet passages is completely cut off. Outlet check spring 38 is strong enough to resist any leakage of fuel therepast, except upon priming movement of plunger 27.

Accordingly, the primer plunger and its actuators are constructed and arranged to perform the additional function of a fuel cut-off safety valve so that the structure is considerably simplified and cheapened over previous arrangements having independent parts for accomplishing these functions. The particular type of carburetor and its application, as shown, are not essential.

The invention may be modified in these and other respects as will occur to those skilled in the art and the exclusive use of all modifications as come within the scope of the appended claims is contemplated.

I claim:

1. A combination primer and fuel cut-off for internal combustion engines comprising a body having a chamber, fuel inlet and outlet ports in the wall of said chamber and a plunger working in said chamber and capable when moved in one direction of forcing fluid in said chamber through said outlet port, said plunger having at least two operative positions in said chamber, in one of which the plunger is so positioned as to permit a normal flow of fluid from the inlet to the outlet port and in the other the plunger closes one of said ports to prevent said flow of fluid between said ports.

2. A combination primer and fuel cut-off as described in claim 1, further including check valves for controlling the flow of fluid through said ports.

3. A combination primer and fuel cut-off for internal combustion engines comprising a body having a chamber, a fuel inlet port and a pair of outlet ports in the wall of said chamber, a plunger in said chamber capable of movement to at least two positions, one in which a free path for fuel is provided between said inlet port

and one of said outlet ports and the other in which said path is cut off, and an outlet check valve in the other outlet port for resisting flow of fluid from said chamber therethrough except when said plunger is moved to compress the fluid in said chamber.

4. A combination primer and fuel cut-off for internal combustion engines comprising a body having a chamber, fuel inlet and normal outlet and priming passages having ports in the wall of said chamber, a plunger working in said chamber, and inlet and outlet check valves, respectively, in said inlet and priming passages, said plunger being movable to at least two positions in said chamber, one in which a free path is maintained between said inlet and normal outlet ports for feed of fuel under normal fuel pressure to said chamber and said outlet ports, and another in which one of said last mentioned ports is occluded to cut-off the fuel supply therethrough, said plunger, in movement between said positions, serving to force a priming charge of fuel through said priming passage.

5. A primer and fuel cut-off as described in claim 4 in which said normal outlet port is positioned to be occluded early in the priming movement of said plunger whereby the pressured fuel is concentrated upon said priming passage.

6. The combination with an internal combustion engine

having a fuel tank, a carburetor, and an intake manifold of a combination primer and fuel cut-off valve device comprising a chamber, a plunger working therein, an inlet fuel passage for connecting the tank and said chamber, an outlet fuel pasage for connecting said chamber and the carburetor, a priming fuel passage for directly connecting said chamber and the manifold, an unbiased, inlet check valve in said inlet passage, and a biased outlet check in said priming passage, said plunger in its normal operative position, providing a free passage through said chamber between said inlet and outlet passages and said outlet passage being positioned to be occluded by said plunger during priming movement thereof.

7. The combination specified in claim 6 further including means for securing said plunger in its normal operative and outlet occluding positions.

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