Sept. 7, 1926. 1,598,712

W. A. CHRYST ET AL

LIQUID SUPPLY APPARATUS

Filed July 25, 1925

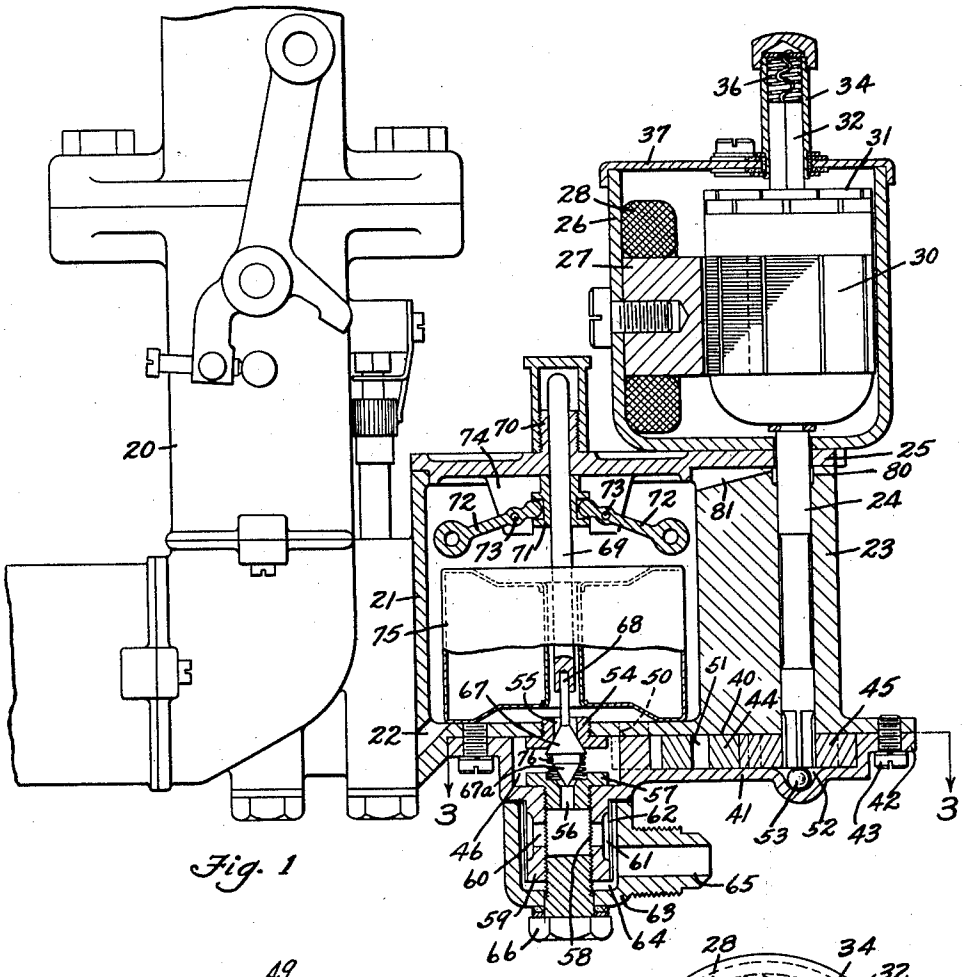


Fig. 1

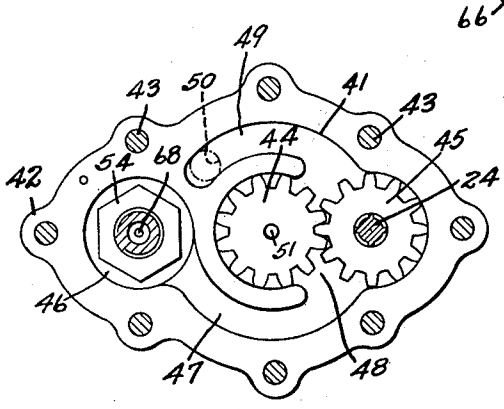


Fig. 3

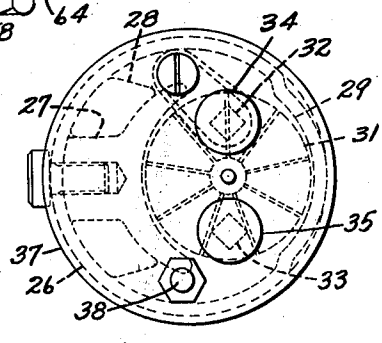


Fig. 2

Inventors

William A. Chryst

and Herbert C. Nattire

By Spencer Sewall & Hardman

their Attorneys

Patented Sept. 7, 1926. 1,598,712

UNITED STATES PATENT OFFICE.

WILLIAM A. CHRYST AND HERBERT C. WALTERS, OF DAYTON, OHIO, ASSIGNORS TO THE DAYTON ENGINEERING LABORATORIES COMPANY, OF DAYTON, OHIO, A CORPORATION OF OHIO.

LIQUID-SUPPLY APPARATUS.

Application filed July 25, 1925. Serial No. 46,025.

This invention relates to liquid supply devices, especially for supplying fuel to the carburetor of an internal-combustion engine.

One of the objects of the invention is to provide a simple and compact liquid supply device which can be manufactured at relatively low cost. In order to accomplish this object, the disclosed embodiment of the present invention provides an electric motor and a gear pump driven thereby, combined in a unitary structure with the float bowl of the carburetor.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred form of the present invention is clearly shown.

In the drawings:

Fig. 1 is a side view, partly in section, of a carburetor provided with a form of the present invention;

Fig. 2 is a plan view of the electric motor for operating the fuel pump; and

Fig. 3 is a sectional view on the line 3—3 of Fig. 1.

Referring to the drawings, 20 designates a carburetor of any type, including a fuel bowl 21 for receiving fuel which is delivered through a passage 22 to the air-carbureting chamber (not shown). A portion of the side wall of the fuel bowl 21 is enlarged to provide a bearing 23 for the armature shaft 24 of an electric motor. The bowl 21 is provided with a cover 25, which supports the field frame 26 of the motor. Frame 26 carries a pole piece 27 surrounded by a field winding 28, and the frame 26 is shaped to provide a pole shoe 29. An armature 30 carried by the shaft 24, revolves between the pole shoe 29 and the pole 27. The conductors of the armature are connected with commutator segments 31, engaged by brushes 32 and 33 which are slidable in brush holders 34 and 35, respectively, and are urged by springs 36 into contact with the commutator 31. The motor frame end cover 37 supports the brush holders 34 and 35, and a terminal 38, which is adapted to be connected with a source of current and is connected by means (not shown) with one end of the field winding 28. The other end of the field winding 28 is connected with the brush holder 34 which is insulated from the cover 37. The other brush holder 35 is grounded upon the cover, and hence an electric circuit to the source of current is completed through the carburetor and engine which, in an automobile, is mounted directly upon a metallic frame which serves as a ground for the electrical circuits of the automobile.

The bottom wall 40 of the float bowl 21 is provided with a machined undersurface for receiving a pump housing member 41 provided with a flange 42 which is attached by screws 43 to the bottom wall of the bowl 21. The housing 41 supports pump gears 44 and 45, and is provided with a cylindrical recess 46 which is connected by an arcuate groove 47 with a recess 48 which receives the gears 44 and 45. The recess 48 is connected with an arcuate groove 49. When the pump housing 41 is attached to the float bowl 21, the recess 46 provides a valve chamber, the groove 47 a pump inlet, and the groove 49 a pump outlet. The outlet 49 is connected with the fuel bowl 21 through a hole 50 in the bottom wall of the bowl. Hole 50 is indicated by the dot-and-dash line circle in Fig. 3. Housing 41 supports a pin 51 providing a bearing for the gear 44 and housing 41 is provided with a recess 52 for receiving a ball 53 which provides a thrust bearing for the shaft 24, which has a splined connection with the gear 45.

The float bowl 21 is provided with a valve seat member 54 having a port 55 in alignment with the port 56 of a valve seat member 57 which is screwed into the threaded hole 58 providing a housing inlet passage in the extension 59 of the housing 41. Hole 58 is connected by passages 60 leading into a groove 61 surrounded by a strainer 62. A coupling member 63 having a cup-shaped chamber 64 connected with a tube 65 adapted to be connected with a fuel tank, is secured in position by a screw 66 threaded into the opening 58. The valve seats 54 and 57 cooperate, respectively, with valves 67 and 67ª integral with a stem 68 which is received by a recess in the lower end of a rod 69, which is slidable through a guide 70 provided by the cover 25. A collar 71 is attached to the rod 69 and is provided with a groove for receiving the ends of levers 72 which are mounted on pins 73 supported by brackets 74, which are integral with the cover 25. The levers 72 are engaged by a float 75

which surrounds the rod 69. A spring 76 maintains the valve 67 normally in engagement with the valve seat 54. A switch, preferably one coordinated with the ignition switch of the automobile, is closed to connect the motor with a cource of current. The operation of the motor will cause fuel to flow from the source of supply through the passages 65, 64, 60, 58, 56, 46, 47, 48, 49 and 50, to the fuel bowl 21. As the level of the liquid in the bowl 21 rises, the float 75 will engage the levers 72, thereby causing the rod 69 to move downwardly so that the valve 67 moves away from the seat 54 and the valve 67[a] engages the seat 57. Although the motor continues to operate, no more fuel will be drawn in from the fuel tank but the fuel in the bowl 21 will be circulated through the passages 55, 46, 47, 48, 49 and 50. In this way, the amount of liquid in the bowl 21 is regulated according to the needs of the engine, although the motor may operate at constant speed.

The bearing 23 is provided with a recess 80 in which liquid may collect and pass into the bowl down the inclined groove 81 provided by the side of the bowl.

It will be observed that the present invention provides an exceedingly compact and simple fuel supply device, which is particularly adapted for carburetors of internal-combustion engines. The electric motor may be removed for repairs or replacement, without disturbing the pump, and the pump may be removed without disturbing the motor.

While the form of embodiment of the invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. Liquid supply apparatus comprising, in combination, a liquid vessel having its side wall shaped to provide a bearing, a shaft extending through said bearing, an electric motor having an armature mounted upon said shaft adjacent one end of the bearing, a gear pump mounted upon said vessel and connected with the shaft adjacent the other end of the bearing, and means connecting the gear pump with the interior of the vessel.

2. Liquid supply apparatus comprising, in combination, a liquid vessel, a vessel cover, an electric motor having a frame supported by the cover, and a pump supported by the vessel and connected with the motor and having an outlet connected with the interior of the vessel.

3. Liquid supply apparatus comprising, in combination, a liquid vessel, a pump supported by the vessel, and an electric motor for driving the pump supported by the vessel, the pump and motor each being separately removable from the vessel while the other remains attached to the vessel.

4. Liquid supply apparatus comprising, in combination, a liquid vessel, a pump including gears and a housing for the gears provided by the lower wall of the vessel and a housing member attached to the lower wall of the vessel, an electric motor supported by the vessel and having a shaft extending into the pump housing and having a connection with one of the pump gears, the shaft being separable from the gear by withdrawing the shaft from the housing.

5. Liquid supply apparatus comprising, in combination, a liquid vessel having its side wall shaped to provide a vertically-extending bearing, an electric motor supported by the vessel and having a shaft extending through said bearing and terminating below the bottom surface of the vessel, and a pump including gears and a housing for the gears provided by the lower wall of the vessel and a housing member attached to the lower wall of the vessel, one of said gears having a splined connection with said shaft.

6. Liquid supply apparatus comprising, in combination, a liquid vessel, a power-operated pump including a housing attached to the vessel, said housing having an inlet passage connected with the pump inlet, and the vessel having passages connected respectively with the pump inlet and pump outlet, valves normally biased to open the housing inlet and to close the passage from the vessel to the pump inlet, and means responsive to liquid level in the vessel for moving the valves to close the housing inlet and to open the passage from the pump inlet to the vessel.

7. Liquid supply apparatus comprising, in combination, a liquid vessel, a power-operated gear pump having a housing provided by the bottom wall of the vessel and a housing member attached thereto, said housing member having an inlet passage, and said vessel having a passage connected with the pump outlet and a passage connected with the pump inlet and in alignment with the housing inlet, a member having integral valves normally biased to open the housing inlet and to close the passage from the vessel to the pump inlet, and means responsive to liquid level in said vessel for moving said valve member to close the housing inlet and for opening the passage from the vessel to the pump inlet.

In testimony whereof we hereto affix our signatures.

WILLIAM A. CHRYST.
HERBERT C. WALTERS.