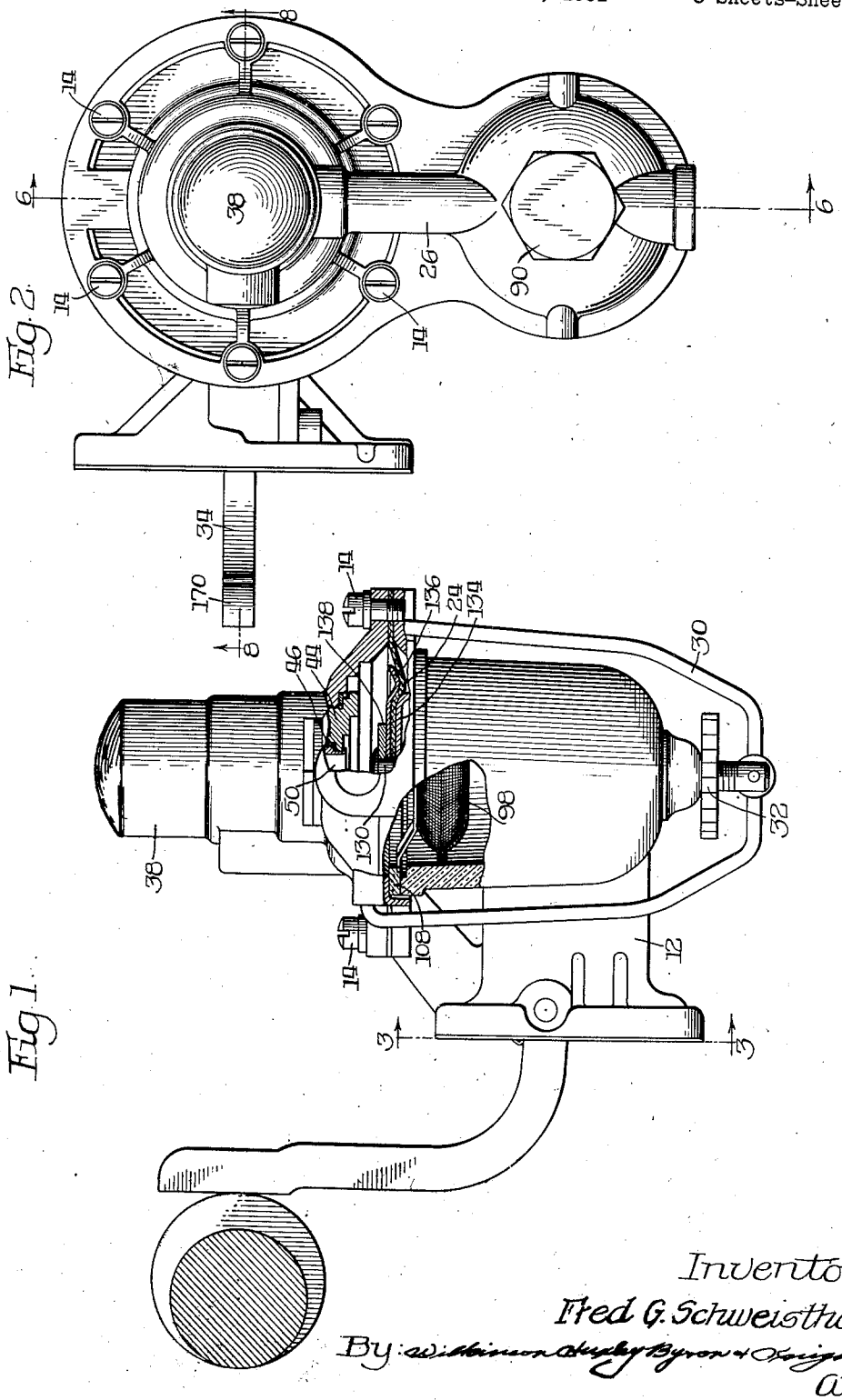
April 25, 1933. F. G. SCHWEISTHAL 1,905,246

MECHANICAL FUEL PUMP

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MECHANICAL FUEL PUMP

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Fig. 3.

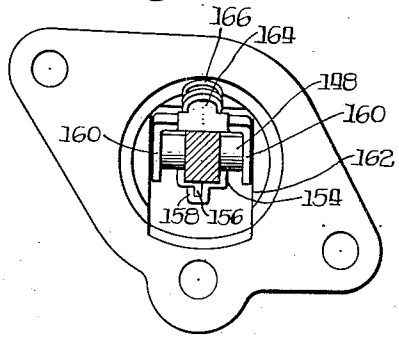


Fig. 5.

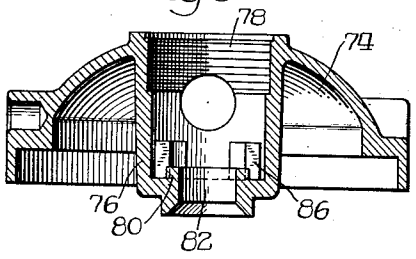


Fig. 4

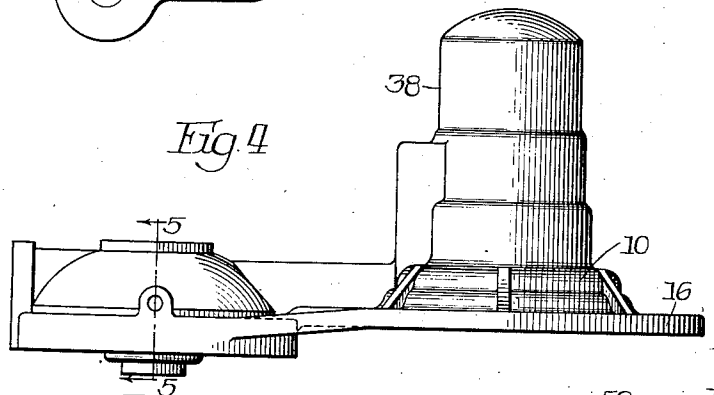


Fig. 6

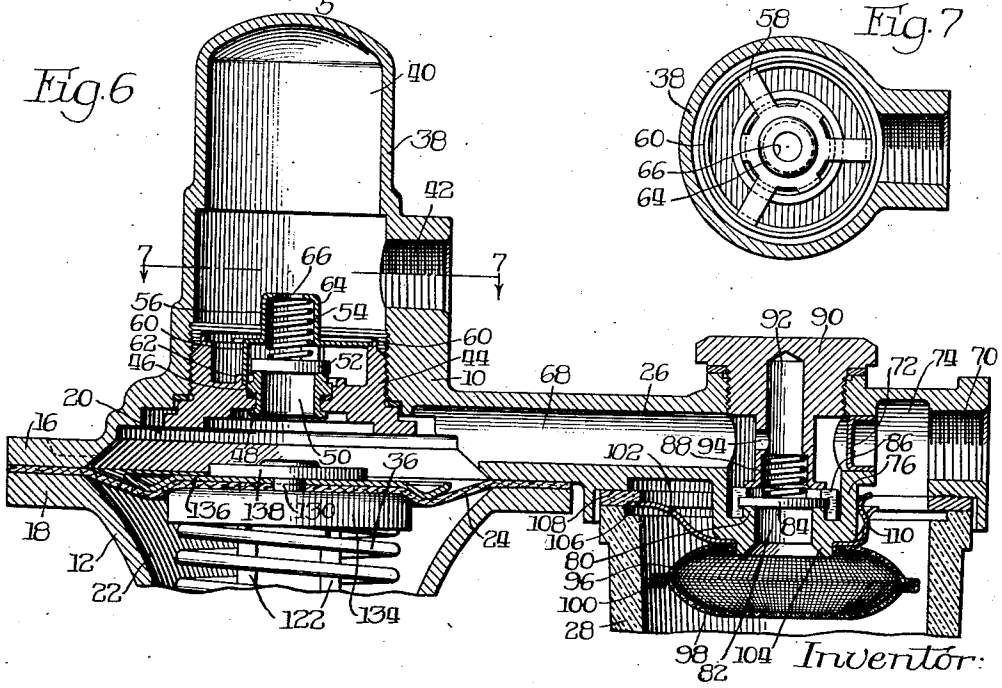


Fig. 7

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MECHANICAL FUEL PUMP

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Fig. 8

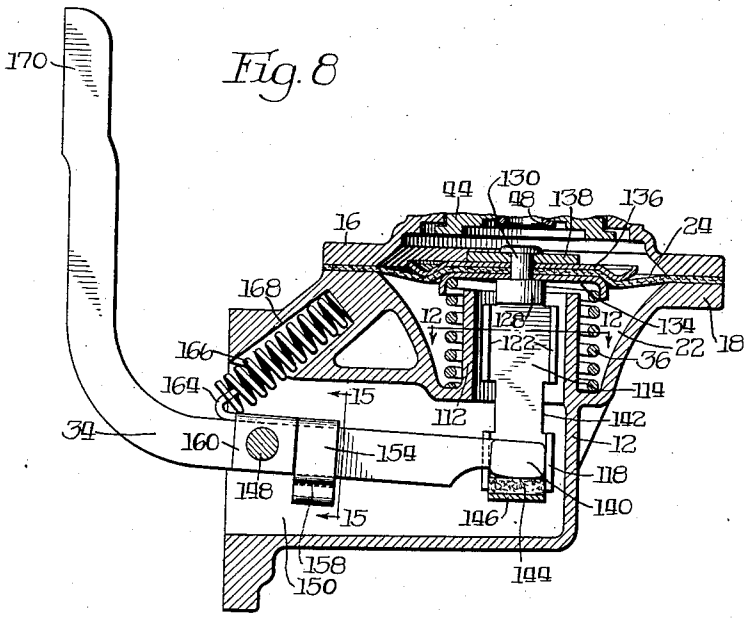


Fig. 10

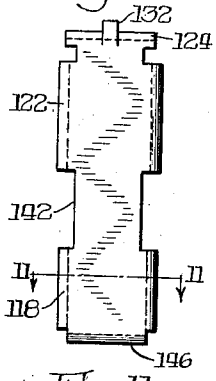


Fig. 11

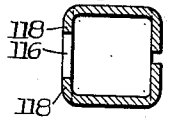


Fig. 9

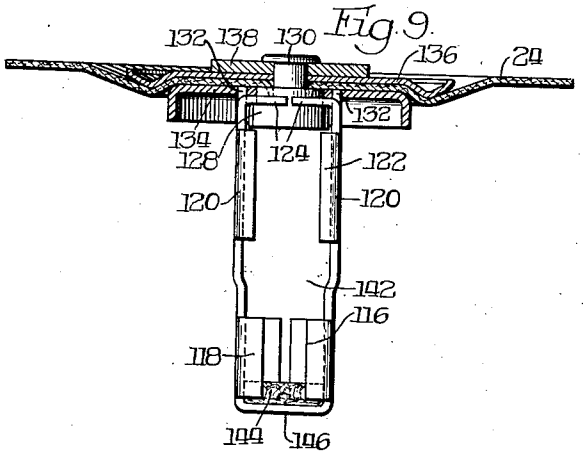


Fig. 12

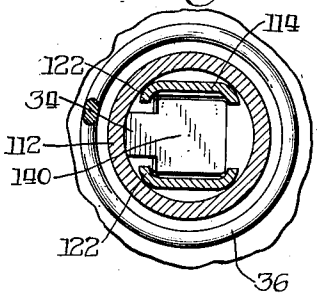


Fig. 13

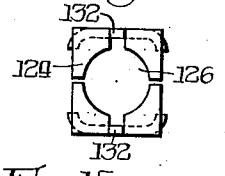


Fig. 14

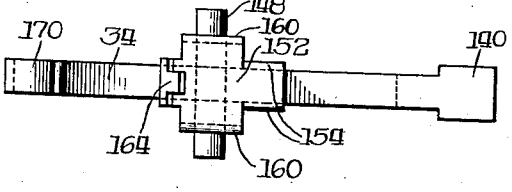
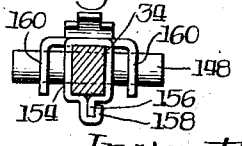


Fig. 15



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1,905,246

UNITED STATES PATENT OFFICE

FRED G. SCHWEISTHAL, OF CHICAGO, ILLINOIS, ASSIGNOR TO STEWART-WARNER CORPORATION, OF CHICAGO, ILLINOIS, A CORPORATION OF VIRGINIA

MECHANICAL FUEL PUMP

Application filed December 21, 1931. Serial No. 582,226.

This invention relates to improvements in fuel pumps of the mechanical type in which the pumping diaphragm may have a variable discharge stroke in accordance with the delivery pressure, that is, as the delivery pressure in the pumping chamber becomes sufficiently high to resist the discharge stroke under the influence of the discharge spring beneath the pumping diaphragm, the full delivery or discharge stroke of the diaphragm will be prevented. Pumps of this general type are well known and the present improvements relate to certain details of the construction.

The improvements disclosed in the present application relating to the actuating means for the fuel pump are covered by claims in a divisional application, Serial No. 627,937, filed Aug. 8, 1932.

A further object of the present invention is the provision of a discharge or vapor dome cast integral with the pump casing. With this construction the outlet valve assembly is screw-threadedly secured in the lower end of the cavity forming the vapor dome.

An additional object of the present invention resides in the improved construction of the filter screen and the support therefor.

Further and additional features and advantages of the present improvements will be more readily apparent from the following description taken in connection with the attached drawings in which

Figure 1 is a side elevation partially in broken section of the fuel pump;

Figure 2 is a plan view of the fuel pump;

Figure 3 is a vertical section taken on the plane indicated 3—3 in Figure 1;

Figure 4 is a side view of the top part of the pump casing;

Figure 5 is a transverse section taken on the plane indicated 5—5 in Figure 4;

Figure 6 is a longitudinal vertical section taken on the plane indicated 6—6 in Figure 2;

Figure 7 is a detail horizontal section taken on the plane indicated 7—7 in Figure 6;

Figure 8 is a partial vertical section on the plane indicated 8—8 in Figure 2;

Figure 9 is a detail view showing the pick-up stem in side elevation and the diaphragm in section;

Figure 10 is another side elevation of the pick-up stem;

Figure 11 is a detail section taken on the plane indicated 11—11 in Figure 10;

Figure 12 is a detail horizontal section showing the manner in which the pick-up stem is guided by the pump casing;

Figure 13 is a top view of the pick-up stem;

Figure 14 is a detail plan view of the lever assembly, and

Figure 15 is a detail vertical section of the lever supporting means.

In general the pump construction corresponds to present commercial designs and includes a pump casing made up of a top casing part 10 and a bottom casing part 12. The pair of casing parts are clamped together by a series of bolts 14 and the marginal flanges 16 of the upper casing part and 18 of the lower casing part surround recessed portions 20 in the upper casing part and 22 in the lower casing part, there being a flexible pumping diaphragm 24 clamped at its marginal edge between the pair of pump casing parts. The top casing part 10 has a lateral extension 26 in the usual manner adapted to have removably secured thereto, on its bottom side, a transparent bowl 28 held in place by the swinging yoke 30 and clamping nut 32. The diaphragm is operated in the usual manner by a lever 34 which is adapted to extend into the engine casing for cam actuation. The pump is of a type in which the discharge stroke is variable and produced by the force of a compression spring 36, positioned in the recessed portion 22 of the lower casing part 12 and reacting upwardly upon the pumping diaphragm. The lever imparts a positive suction stroke to the diaphragm.

The design of the upper casing part 10 is an improvement over prior constructions in that it includes an integrally cast vapor dome chamber 38, the axis of which is concentric with the pumping diaphragm. The threaded outlet connection from the chamber 40 of the dome is shown at 42. In this construction

it is necessary to assemble the outlet check valve from the lower side of the pump casing part 10, and I have shown a plug 44 which supports the outlet valve assembly and which is threaded into the casing part 10 from the lower side. The plug 44 carries a valve seat member 46, assembled from the upper side of the plug 44 and having a beaded lower edge 48 for securing the valve seat member in place. The valve seat member has a central passage 50 in communication with the recessed portion 20 which constitutes the pumping chamber. An outlet check valve 52 seats downwardly upon the valve seat member 46 and is normally pressed to seated position by a spring 54 positioned and held in place by a stamped supporting member 56. The stamped member 56 is in the form of a spider, as shown in Figure 7, and has a plurality of arms 58 held in place by the rim 60 of the plug 44. The spider includes additional arms 60 bent downwards to engage an upwardly directed shoulder 62 of the plug 44. The stamped spider also includes a cylindrical portion 64 for receiving and positioning the spring, having an opening 66 at its upper side to permit escape of the fuel therefrom. It will therefore be understood that upon the discharge stroke of the pumping member, the fuel will be forced upwardly past the check valve 52 and through the stamped spider 56 and into the vapor dome chamber 40 from which liquid fuel will flow through the outlet connection and fuel vapor will be trapped in the dome to maintain a constant pressure on the fuel delivered.

The casing part 10 has a horizontal fuel passage 68 through which the fuel flows into the pumping chamber 20. The passage 68 is in line with the threaded inner connection 70 and the straight bore through the casing part 10 is closed by the plug 72, whereby the fuel is caused to flow downwardly and upwardly around the plug 72. The threaded inlet connection 70 communicates with a recessed chamber 74 on the lower side of the casing extension 26, as clearly shown in Figures 5 and 6.

The casing extension 26 has an integrally cast valve housing portion 76, as shown in Figure 5, which has an internally threaded portion 78 and a valve seat portion 80. The valve seat portion 80 has a vertical flow passage 82. The inlet check valve 84 is assembled through the upper open end of the housing portion 76 and is centrally positioned by integral lugs 86 which permit and guide the vertical movement of the valve 84. The valve 84 is pressed to its normal seated position by a spring 88, held in place and positioned by a plug 90 which is threaded into the housing 76. The plug 90 has a vertical bore 92 in communication with the passage 68 through an opening 94, whereby the fuel may flow into the passage 68 around the plug 90 or through the spring 88. It will be noted that the axis of the valve assembly is concentric with the fuel bowl 28 which constitutes a fuel receiving and trapping chamber.

Filtering means are provided to filter the fuel as it flows upward towards the inlet check valve 84 and comprise a pair of biscuit-shaped filter screen members 96 and 98 clamped together at their marginal portions as at 100 and supported by a stamped spider member 102, which is positioned centrally by a depending shoulder 104 of the housing 76. The spider has arms 106 extending for clamping by the shoulder of bowl against the gasket 108 which seals the fuel bowl 28 to the extension 26 and the spider 102 includes spring arms 110 which engage the outer walls of the housing portion 76. It will be understood that the recessed chamber 74 or dome tends to maintain a partial vacuum therein during operation which assists in maintaining an even flow of fuel from the source of supply to the pump casing.

The lower casing part has an upstanding cylindrical portion 112 which is surrounded by the discharge spring 36. The cylindrical portion 112 forms a guide bearing for a substantially square-shaped in section pick-up member or diaphragm stem 114, as clearly shown in Figure 12. The pick-up member 114 is of novel construction and is shown in the detail views of Figures 9, 10, 11, 12 and 13 and comprises a metal stamping provided at its lower end with a box-like formation having a slot 116 between the inwardly directed flanges 118. The stamping 114 may be initially formed flat and bent to the shape shown and includes side members 120 and curved flanges 122 for guiding the reciprocable movement of the pick-up member. The upper ends of the side member 120 have inwardly directed flanges 124, defining a central circular opening 126 whereby the flanges or fingers 124 engage the shoulder portion 128 of a rivet member 130 which serves to clamp the pick-up member to the diaphragm 24. For additionally securing the pick-up member, vertically directed fingers 132 are provided which engage openings of the cup-shaped disk member 134 which is clamped to the bottom side of the diaphragm. A metal disk 136 formed to take up the slack of the diaphragm is clamped to the upper side thereof and a washer 138 serves to further strengthen the central portion of the pumping member. The box-like formation at the bottom of the pick-up member is intended to receive the enlarged head 140 of the operating lever which may be introduced through the enlarged opening 142 at the mid-portion of the pick-up member. The enlarged head 140 is adapted to engage a cushion abutment 144 seating in the bottom of the box-like chamber upon the bottom wall 146.

The lever is supported on the pivot pin 148 which is carried by the lower casing part 12 in a cavity 150 thereof in a novel manner by a stamping member 152. This metal stamping includes arms 154—156 bent around the rectangular portion of the lever 34 and interlocked as at 158. Another pair of arms 160 are bent to extend the entire width of the flanged opening 162, as shown in Figure 3, and serve to centrally position the lever. The arms 160 have openings to receive the pivot pin 148. The stamping 152 also includes an upwardly bent clip 164 which, as shown in Figure 8, engages one end of the follower spring 166 seated in an obliquely disposed spring chamber 168 formed in the lower body casing 12. The compression spring 166 tends to maintain the thrust receiving end 170 of the lever in engagement with the driving cam.

I claim:

1. In a fuel pump of the diaphragm type, a pump casing member adapted to be secured to the upper side of the pumping diaphragm, said casing member having a recessed chamber on its lower side adapted to form a pumping chamber, an integral vapor dome chamber extending upwardly from said pumping chamber, and an outlet check valve assembly removably secured to the under side of said casing member to separate the pumping chamber from the vapor dome chamber.

2. In a fuel pump, a reciprocable pumping diaphragm, a pump casing member adapted to be secured to the upper side of the pumping diaphragm, said pump casing member having an upwardly directed integral vapor dome and a recessed pumping chamber on its lower side and an outlet check valve assembly adapted to be removably secured to the underside of said pump casing member before securing the pumping diaphragm thereto.

3. In a fuel pump, a reciprocable pumping diaphragm, a pump casing member having an integral vapor dome adapted to be secured to the upper side of said pumping diaphragm, said pump casing member having a recessed chamber on the lower side forming a pumping chamber, a discharge connection from said integral vapor dome and an outlet check valve assembly comprising a screw-threaded support adapted to be removably secured to the lower side of the pump casing member before securement of said pumping diaphragm, an outlet check valve adapted to seat downwardly upon said supporting member, a spring reacting upon said check valve to normally seat the same and a spider for holding said spring in place secured to the upper side of said supporting member.

Signed at Chicago, Illinois, this 14th day of December, 1931.

FRED G. SCHWEISTHAL.