June 9, 1931. F. G. SCHWEISTHAL 1,809,394

VAPOR AND PRESSURE TRAPPING DOME FOR FUEL PUMPS

Filed March 10, 1930

Fig. 1.

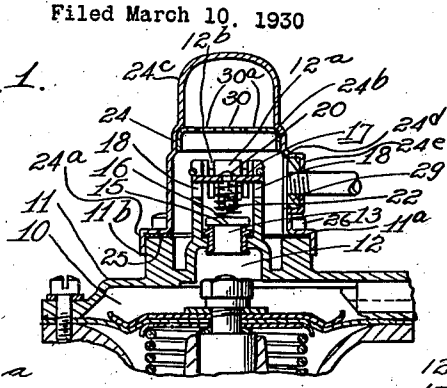


Fig. 8.

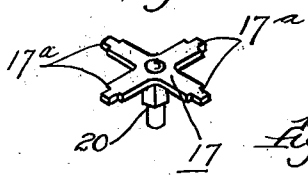


Fig. 7.

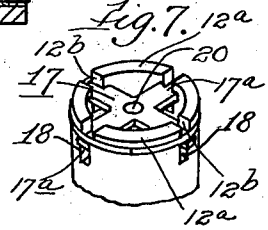


Fig. 6.

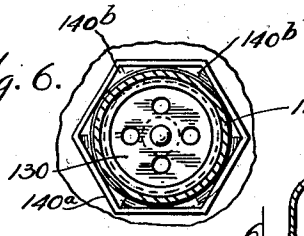


Fig. 2.

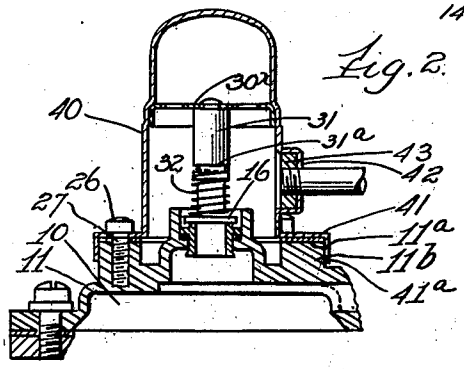


Fig. 3.

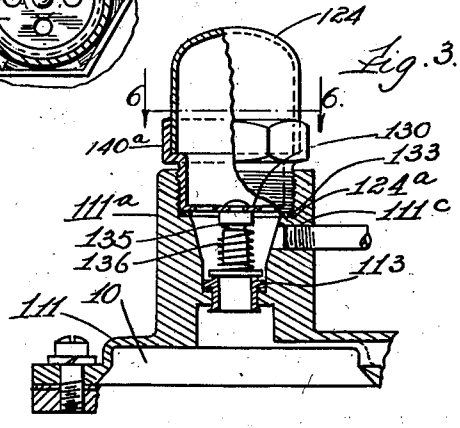


Fig. 4.

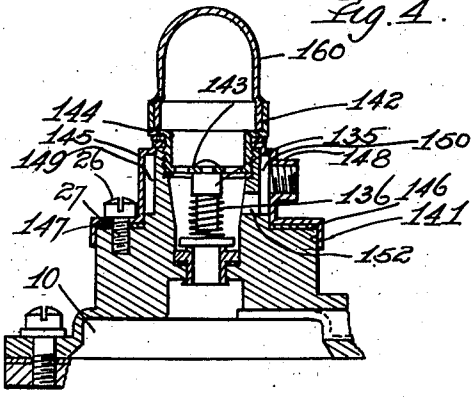
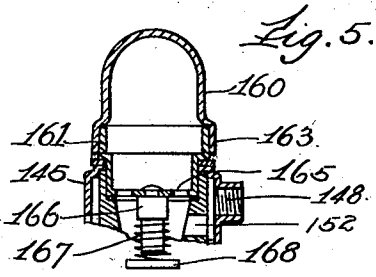


Fig. 5.



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Patented June 9, 1931 1,809,394

UNITED STATES PATENT OFFICE

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VAPOR AND PRESSURE TRAPPING DOME FOR FUEL PUMPS

Application filed March 10, 1930. Serial No. 434,679.

The purpose of this invention is to provide an improved fluid pressure trap adapted to be attached to the discharge of a fuel pumping apparatus for trapping under pressure the vapor which may be developed from and carried in the liquid fuel pumped at a point proximately beyond the discharge valve of the pumping apparatus. It consists in the elements and features of construction shown and described as indicated in the claims.

In the drawings:—

Figure 1 is a vertical section of a portion of a fuel pumping apparatus including the discharge passage and valve, and having mounted at the discharge a device embodying this invention in one of its forms.

Figure 2 is a similar view showing a second form of the invention.

Figure 3 is a view similar to Figure 1 showing a third form of the invention.

Figure 4 is a similar view showing a fourth form of the invention.

Figure 5 is a similar view showing a slight modification of the form shown in Figure 4.

Figure 6 is a section at the line 6—6 on Figure 3.

Figure 7 is a perspective view of a terminal part of the pump body member having the pump discharge passage valve seat and valve.

Figure 8 is a perspective view of a spider employed as a bridging member in the outflow passage for limiting the valve lift and stopping the spring which holds the discharge valve normally seated.

In the form shown in Figure 1, the pumping chamber of the pumping apparatus to be served by the device embodying the invention is indicated at 10, bounded by the cap plate, 11, of the pumping apparatus, which has the discharge passage, 12, leading to the discharge port, 13, in which there is mounted a valve seat, 15, with the valve, 16, above said seat in an upwardly extending continuation of the discharge passage. Said continuation is bridged at a short distance above the valve seat by a bridge member in spider form, 17, and provided below the bridge member with lateral delivery apertures, 18, 18, the bridge member carrying a downwardly projecting center pin, 20, terminating at a short distance above the valve for limiting the opening movement of the valve, affording means for positioning and guiding a coil spring, 22, which reacts on the valve for holding it normally seated.

The detail construction for mounting and securing the bridge member, 17, which carries the valve-stopping pin and spring, may be understood from Figures 1 and 7. The continuation of the discharge passage is formed by an upwardly protruding cylindrical flange, 12^a, notched at the upper end as seen at 12^b, the bridge member, 17, being peripherally notched to form radial projections, 17^a, distributed circumferentially for engaging the notches, 12^b; and the cylindrical flange has an encompassing groove, 12^d, forming notches in the projections resulting from the notches, 12^b, and a spring, 17^b, snapped over the notched end of the cylindrical flange engaging said groove, serves to retain the bridge member, 17, in position for holding the valve stop pin and spring in proper position relative to the valve.

At or near the plane of the port in which the valve seat, 15, is mounted, the boss, 11^b, of the pump cap member, 11, through which the discharge passage, 12, is formed, terminates in a horizontal shoulder, 11^a. On this shoulder there is mounted a shell, 24, shown as a metal stamping, containing a vapor trapping chamber, said shell being closed at the top and fully open at the bottom, where it is formed with an outwardly projecting flange, 24^a, for stepping the shell on the shoulder, 11^a. Said flange is shown downturned at its periphery for clasping the circumferential edge of the boss, 11^b, for stiffening the shell and to position the shell concentrically and securely on the boss.

The shell is secured to the boss by bolts, 26, through a plurality of bolt holes, 27, angularly spaced at equal intervals in the circumference of the flange to adapt the shell to be turned about its axis to as many different positions for securement as the number of said equally spaced bolt holes, in order to locate the discharge connection hereinafter mentioned, as may be most convenient for leading to the carbureter.

The shell, 24, is made slightly reduced in diameter at the upper part to form a stop shoulder, 24[b], for positioning a perforated diaphragm partition or baffle, 30, which, as shown, is a peripherally flanged metal stamping perforated, as seen at 30[a], to adapt it for screening the vapor-and-air-impregnated liquid which enters the chamber, and causing the vapor and air, which is by this means separated from the liquid, to be trapped in the space above said baffle. This baffle is dimensioned for drive fit in the shell, 24, being introduced through the wide open lower end and forced into position against the stop shoulder, 24[b].

Below the location of this perforated baffle the shell is formed with an exteriorly protruding interiorly hollow boss, 24[d], apertured as seen at 24[e], said boss being, as shown, rectangular in form and dimensioned for accommodating a nut, 29, wholly within the cavity of the boss, so that the nut does not protrude into the main cavity of the shell, the nut being soldered in position in the boss with its threaded aperture registered with the aperture, 24[e], of the boss; whereby the boss and nut constitute a pipe connection for a discharge pipe leading to the carbureter.

The equal spacing of the bolt holes, 27, in the circumference of the flange 25, makes it possible to mount the shell in as many different positions as the number of said bolt holes for positioning the pipe connection most conveniently for leading to the carbureter as above mentioned.

The form shown in Figure 2 consists of a shell, 40, forming a chamber, closed at the upper end and open at the lower end, at which the shell is provided with an outwardly protruding flange, 41, with a downturned marginal portion, 41[a], for stepping, centering and securing the shell on the flat face, 11[a], of the boss, 11[b]. In this form, a perforated diaphragm, 30[x], carries rigid with it a downwardly protruding stem, 31, for limiting the opening movement of the valve, 16, and for carrying a coil spring, 32, engaged at its upper end in a groove, 31[a], of the stem, and at its lower end reacting on the valve for holding it normally seated. In this form, the shell has the outwardly protruding, inwardly centrally apertured hollow boss, 42, with the nut, 43, lodged and soldered therein for pipe connection, as seen in the form shown in Figure 1.

In the form shown in Figure 3, the cap member, 111, of the pumping apparatus forming the upper wall of the pumping chamber has a boss, 111[a], in which the valve seat member, 113, is mounted extending upward a substantial distance above the valve seat and the valve thereon, and counterbored and threaded at the upper end for having screwed into it a hollow fitting, 140, furnished with a hexagonal terminal for screwing it into the boss, 111[a], and into the upper end of said fitting, 140, there is fitted a cylindrical stamping, 124, closed at the top and with a hexagonal flange, 140[a], at the bottom and constituting a pressure dome, said stamping being secured air-tight into the fitting by soldering.

In this form, the fitting, 140, comprises at the bottom a perforated diaphragm, 130, and a gasket, 133, is interposed between the same and the shoulder, 124[a], formed by the threaded counterbore, for effecting fluid-tight junction, avoiding leakage through the screw threads. In this form also the diaphragm carries a rigid downwardly protruding stem, 135, for limiting the opening movement of the valve, and carrying a spring, 136, for holding the valve normally seated. In this form, the discharge pipe connection is provided for by a laterally opening threaded aperture, 111[c], in the boss, 111[a].

In the form shown in Figure 4, the boss corresponding to the boss, 11[b], of Figure 1, indicated at 141, is counterbored and threaded at the upper end for receiving screwed into it a fitting, 142, which may be a sheet metal stamping, comprising at its lower end the perforated diaphragm, 143, corresponding to the diaphragm, 130, of the form shown in Figure 3, and the diaphragm, 30, of the form shown in Figure 1, said diaphragm, 143, having rigidly secured to it, and protruding downwardly from it at the center, a stop pin, 135, carrying the spring, 136, for holding the valve normally seated, as in the form shown in Figure 3.

In this form, the part, 142, is enlarged in diameter at its upper part forming a shoulder, 144, overhanging the upper end of the boss, 141, and serving to clamp between said shoulder and the upper end of said boss, a fitting, 145, which is shown as a sheet metal stamping, annular in form, encompassing the upper end of the boss, 141, lodged at its lower side on a shoulder, 146, formed by exteriorly reducing the diameter of the boss, 141, suitable gaskets, 147, being interposed for causing said annular fitting to seat liquid-tight on the boss. This annular fitting has an outwardly protruding inwardly hollow boss, 148, which is shown interiorly threaded for pipe connection. The upper end of the boss, 141, is further reduced in exterior diameter, as seen at 149, at a short distance above the shoulder on which the annular fitting is seated, said reduction in diameter forming an annular inter-space, 150, between the reduced upper end portion of the boss and the encompassing annular fitting, 145; and the boss, 141, has at any convenient point in its circumference a discharge port, 152, communicating with said annular space and thereby with the hollow boss, 148, of said annular fitting at which the discharge pipe is connected for leading to the carbureter. In this form,

the vapor trapping chamber is provided by a shell shown as a sheet metal stamping, 160, which is fitted liquid-tight, preferably by soldering or welding, in the upper enlarged end of the fitting, 142, which at its lower end comprises the perforated diaphragm carrying the valve-stopping pin and spring.

A slight modification of this form is shown in Figure 5, consisting in making the shell which contains the vapor trapping chamber, for mounting outside instead of inside the upper end of the part, 142.

I claim:—

1. A device for the purpose indicated comprising a metal shell construction containing a vertically extending chamber closed at the upper end and open at the lower end and arranged at the lower end for mounting on the apparatus served, said shell encompassing at its lower open end a valve port of discharge from the apparatus served, a member containing said port and valve seat, and a valve controlling said port; a perforated member separably mounted in fixed position in the shell at the discharge side of said port and valve seat, said member forming at its perforated area a transverse partition in the shell separating a lower from an upper part of the shell cavity, a stop fixedly positioned with respect to said partition below the latter for limiting the opening movement of the valve, the structure having a discharge connection positioned laterally with respect to said chamber intermediate the valve seat and the partition; whereby the air and vapor carried by the liquid entering the shell is separated from the liquid by the perforated partition and trapped in the shell above said partition.

2. In combination with a fuel pumping apparatus, a device adapted to be mounted encompasing and hooding the liquid discharge port and valve seat of said apparatus, said device consisting of a metal shell forming a chamber closed at one end and outwardly flanged for mounting at the opposite open end encompassing and hooding the valve, liquid discharge port and valve seat; said shell having for pipe connection an outwardly protruding inwardly hollow centrally apertured boss dimensioned interiorly as to depth and diameter to accommodate a nut therein without protrusion of the nut in the shell cavity, and a diaphragm dimensioned for entrance through the open end of the shell and for forced fit therein at a point inwardly beyond said nut-accommodating boss, said diaphragm being perforated for liquid communication through it to constitute above the diaphragm a vapor trapping chamber.

3. In the construction defined in claim 1, the member having the port and valve seat being counterbored from the upper end to admit the valve seat, and laterally apertured above said seat; a bridge member for said counterbore, and means carried by said bridge member for limiting the opening movement of the valve.

4. In the construction defined in claim 1, the member having the port and valve seat being counterbored from the upper end to admit the valve seat, and laterally apertured above said seat, a bridge member for the counterbore, and a spring reacting between said bridge member and the valve for holding it normally seated.

5. In the construction defined in claim 1, the member having the port and valve seat being counterbored from the upper end to admit the valve seat, and laterally apertured above said seat, a bridge member for the counterbore, a downwardly projecting pin carried by said bridge member for limiting the opening movement of the valve, and a spring positioned and guided by said pin reacting on the valve for holding it normally seated.

6. In the construction defined in claim 1, the port and valve-seat-containing member having a cylindrical upwardly projecting flange encompassing the port and valve seat, laterally apertured for flow of liquid to reach the discharge connections, said flange being notched at its upper end and provided with an exteriorly encompassing groove, a spider having its spider arms terminating for engaging the notches of the flange, and a spring ring arranged to be sprung into said encompassing groove to lock the spider at said upper end of the valve-seat-containing member, said spider having a pin projecting from its lower side for limiting the opening movement of the valve.

7. In the construction defined in claim 1, the port and valve-seat-containing member having a cylindrical upwardly projecting flange encompassing the port and valve seat laterally apertured for flow of liquid to reach the discharge connections, said flange being notched at the upper end and provided with an exteriorly encompassing groove, a spider peripherally notched to form projections for engaging notches of the flange, and a spring ring arranged to be sprung into said encompassing groove to lock the spider at said upper end of the valve-seat-containing member, said spider having a pin projecting from its lower side for limiting the opening movement of the valve, and a coil spring carried by the pin, reacting on the valve for holding it normally seated.

In testimony whereof, I have hereunto set my hand at Chicago, Illinois, this 26th day of February, 1930.

FRED G. SCHWEISTHAL.