Aug. 16, 1949. J. A. COMPTON 2,479,210

SUBMERGED BOOSTER PUMP SHUTOFF CASING

Filed May 11, 1944

Fig. 1

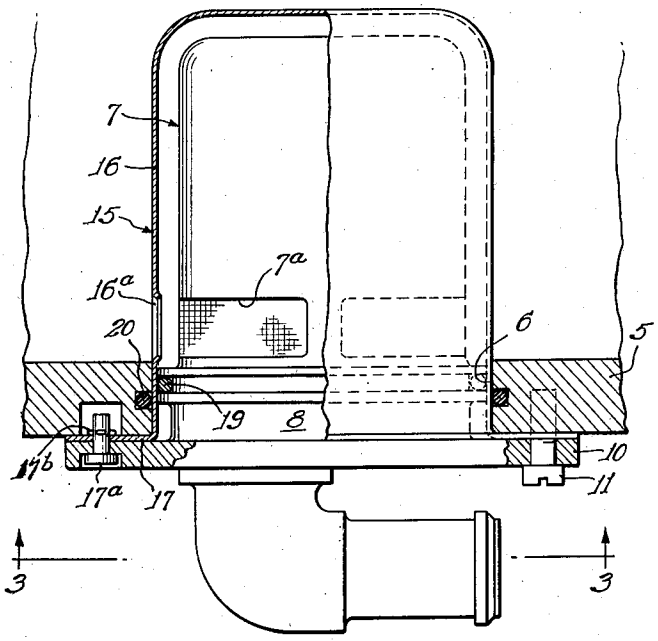


Fig. 2

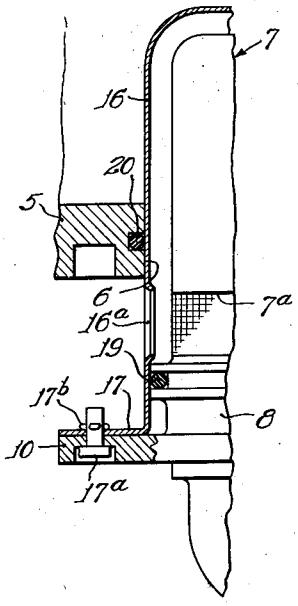
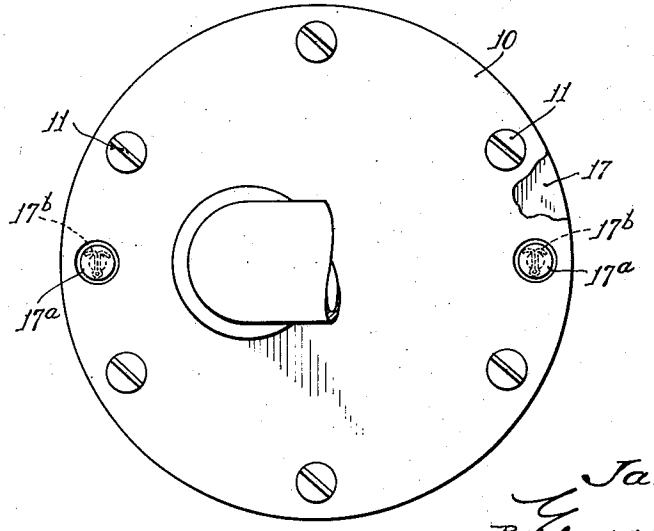


Fig. 3



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SUBMERGED BOOSTER PUMP SHUTOFF CASING

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3 Claims. (Cl. 222—385)

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The present invention relates to pump arrangements adapted for installation in liquid reservoirs or tanks and particularly to an arrangement facilitating the introduction and removal of such pumps without making it necessary to first empty the associated tank.

In arrangements of this type in common use it has been found difficult to effect a removal of the pump for repair and the replacement thereof without either suffering the loss of considerable liquid or else making it necessary to first empty the tank.

It is an object of this invention to provide an improved arrangement of means functioning as an incident to the removal and insertion of the pump unit to automatically effect the requisite shut-off of the liquid communication between the tank and the pump or opening through which the pump is removed as well as automatically effecting reestablishment of such communication in response to the reintroduction of the pump into installed position.

It is a more particular object to provide an improved auxiliary housing for the pump unit having ports therethrough placing the surrounding liquid in the tank in communication with the enclosed pump, this housing being so arranged that when the pump is moved in the outward direction to withdraw the same from installed position for repair, the ports through the auxiliary housing are automatically closed and communication is shut off between the liquid in the tank and the opening through which the pump is being withdrawn.

Another object is the provision of an arrangement of this type which is of simple construction and inexpensive of manufacture, as well as efficient in operation and maintenance.

Other objects, advantages and uses of my invention will become apparent from a reading of the following specification taken in connection with the accompanying drawing which forms a part thereof and wherein:

Fig. 1 is a vertical broken away section view showing a tank installation incorporating a preferred embodiment of my invention;

Fig. 2 is a broken away section view corresponding to Fig. 1 but showing the pump and auxiliary housing assembly in partially withdrawn position; and

Fig. 3 is a plan view taken substantially on the line 3—3 of Fig. 1.

The structure shown in Fig. 1 comprises a reservoir or tank 5 adapted to be supplied with gasoline or similar liquid, gasoline being contemplated in the present instance, the same being fed to the internal combustion engine of an aircraft (not shown). In the bottom of tank 5 there is formed an opening 6 through which access may be had to the interior of the tank providing for the ready installation and removal of a pump unit 7, generally referred to as a booster pump. The base portion 8 of this pump unit is formed generally complementary in shape to opening 6 for reception therein, the pump extending within the tank 5 below the normal liquid level. The base 8 is provided with a radially extending flange 10 for fastening the pump unit in installed position by means of cap screws 11.

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It will appear that if the pump unit 7 is to be removed from installed position for repair some special arrangement must be provided for preventing the loss of the liquid contained in the tank or alternatively the tank must be completely emptied of liquid before the pump unit is removed.

I have provided a special arrangement indicated generally at 15 making it possible to remove the pump unit 7 for repair even though the tank be substantially full of liquid and making it unnecessary to first empty the tank. This is accomplished without loss of liquid or the inconvenience of emptying the tank before removal of the pump.

This novel arrangement 15 comprises an auxiliary housing or can 16 enclosing pump unit 7 and having radial ports 16a formed in the side wall thereof for placing inlet ports 7a of pump 7 in communication with the surrounding liquid when the pump is in installed position as shown in Fig. 1. The open end of auxiliary housing 16 extends outside of tank 5 through opening 6 therein and has a radially outwardly extending flange 17 adapted to be removably attached to the radially extending base flange 10 of the pump by means of pins 17a having suitable cotter pins retaining the same in position in the manner shown in Fig. 1. Base portion 8 of the pump unit is formed with an annular channel receiving a sealing ring 19 functioning to provide a liquid seal between base 8 and the embracing auxiliary housing 16. A similar annular channel is formed in the surrounding wall of opening 6 receiving a second sealing ring 20 functioning to provide a liquid seal between the outer surface of auxiliary housing 16 and opening 6.

From the above and particularly by reference to Fig. 2 it will be apparent that pump unit 7 may be readily withdrawn from tank 5 notwithstanding the fact that the same contains liquid above

the level of the pump, merely by releasing cap screws 11 and withdrawing the pump unit and surrounding auxiliary housing 16 axially outwardly to the position shown in Fig. 2. In such position sealing ring 20 sealably engages the wall of auxiliary housing 16 and prevents any flow of liquid from the tank through opening 6. The pump 7 may then be readily removed for repair and reinstallation by withdrawing cotter pins 17b from the fastening pins 17a. When it is desired to reinstall the pump 7 the same is again inserted within the auxiliary housing 16 and fastened thereto by means of pins 17a and associated cotter pins 17b. Following this the complete assembly is moved axially into opening 6 in the tank 5 until flange 17 engages the tank 5 following which flange 10 is fastened to the tank by means of cap screws 11.

While I have disclosed my invention in connection with a preferred specific embodiment thereof, it is to be understood that this is by way of example and not by way of limitation and my invention is to be defined by the appended claims.

I claim:

1. In an arrangement providing for the ready removal and replacement of a pump supported on a lower wall of a tank making it unnecessary to first drain said tank, said arrangement comprising means defining a tank lower wall formed with an access opening therethrough below the lower level of liquid contained in said tank, said access opening providing for the introduction and removal of a pump; a housing mounted in said access opening, said housing having an open lower end and having a portion extending outside said tank lower wall; a pump unit mounted in said access opening and being encompassed by said housing, said pump unit having a portion extending outside said tank lower wall; means detachably securing together said outside extending portions of the housing and pump unit for effecting a separable assembly; means defining a port in the lower region of said housing for establishing communication between said tank and said pump unit; said pump unit and housing assembly being adapted for inward and outward movements with respect to said access opening, sliding seal comprising relatively sliding parts on said housing and said tank wall such that said outward movement is effective to close said port thereby to shut off communication between said tank and pump and said inward movement is effective to open said port to re-establish said communication; and means demountably securing said outside portions of the pump and housing assembly to position said assembly in said access opening with said port open to establish said communication.

2. In an arrangement providing for the ready removal and replacement of a pump supported on a lower wall of a tank making it unnecessary to first drain said tank, said arrangement comprising means defining a tank lower wall formed with an access opening therethrough below the lower level of liquid contained in said tank, said access opening providing for the introduction and removal of a pump; a housing mounted in said access opening, said housing having an open lower end and extending outside said tank lower wall and having a flange adapted for attachment to the outer surface of the tank lower wall in surrounding relation to said access opening; a pump unit mounted in said access opening and being encompassed by said housing, said pump unit having a flange portion extending radially outwardly outside said tank lower wall; means detachably securing together said housing flange and pump unit flange for effecting a separable assembly; means defining a port in the lower region of said housing for establishing communication between said tank and said pump unit; a sliding seal comprising relatively sliding parts on said housing and said tank wall such that said outward movement is effective to close said port thereby to shut off communication between said tank and pump and said inward movement is effective to open said port to re-establish said communication; and means demountably securing the flanges of said pump and housing assembly about said access opening.

3. In an arrangement providing for the ready removal and replacement of a pump supported on a lower wall of a tank making it unnecessary to first drain said tank, said arrangement comprising means defining a tank lower wall formed with an access opening therethrough below the lower level of liquid contained in said tank, said access opening providing for the introduction and removal of a pump; a housing movably mounted in said access opening, said housing having an open lower end and extending outside said tank lower wall and having a flange adapted for attachment to the outer surface of the tank lower wall in surrounding relation to said access opening; a pump unit encompassed by said housing, said pump unit having a flange outside said tank lower wall; said housing flange and said pump unit flange being arranged in superposed relation with respect to each other and in surrounding relation to said access opening; means detachably securing said flanges to each other for effecting a separable assembly; means defining a port in the lower region of said housing for establishing communication between said tank and said pump unit; a sliding seal comprising relatively sliding parts on said housing and said tank wall such that said outward movement is effective to close said port thereby to shut off communication between said tank and pump and said inward movement is effective to open said port to re-establish said communication; and means demountably securing said pump and housing assembly in said access opening.

JAMES A. COMPTON.

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