Aug. 6, 1957 B. D. BARTON 2,801,592

PRIMING DEVICE FOR PUMPS

Filed June 4, 1954 2 Sheets-Sheet 1

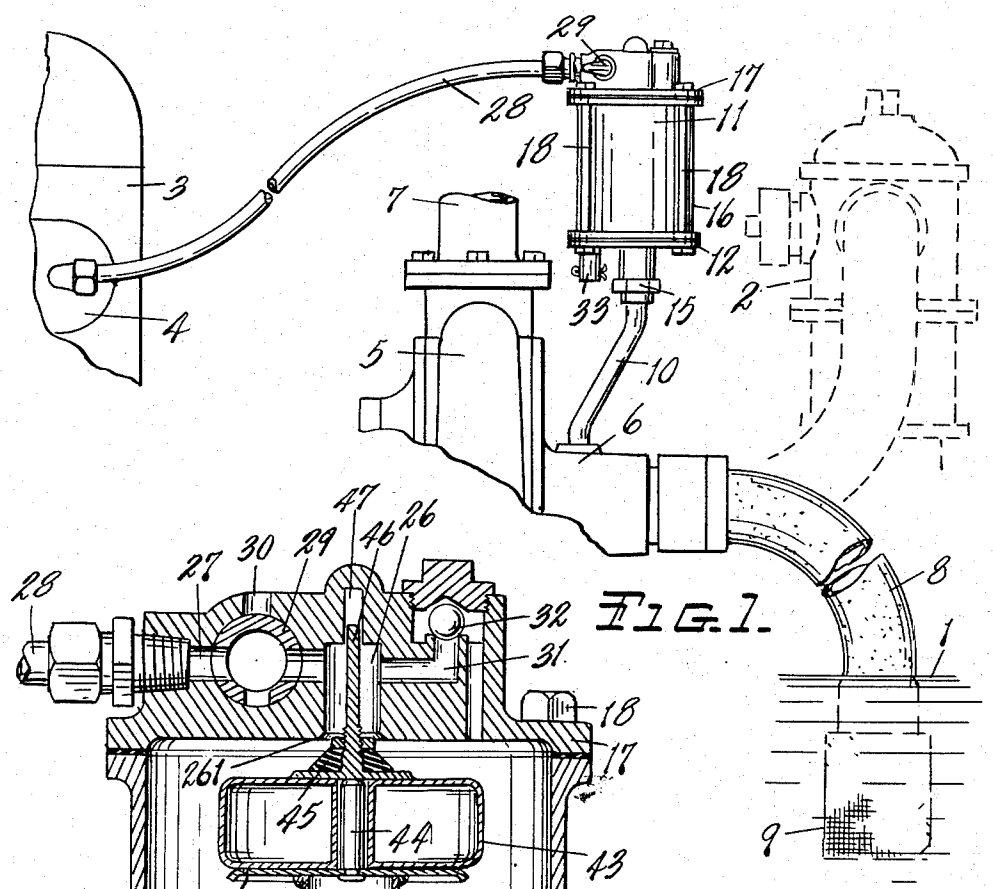

FIG. 1.

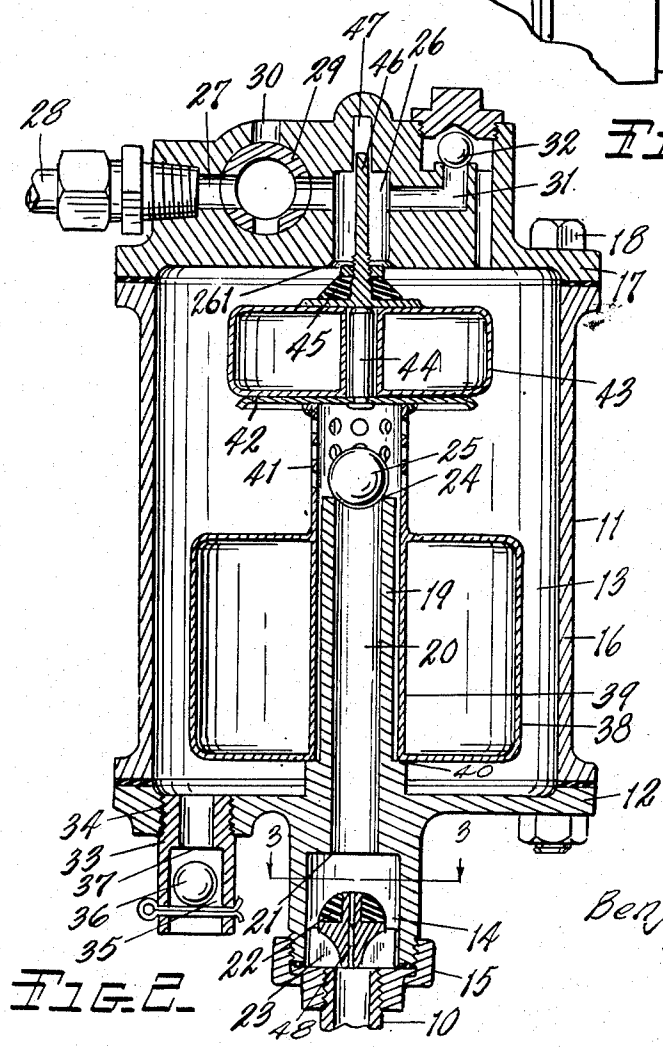

FIG. 2.

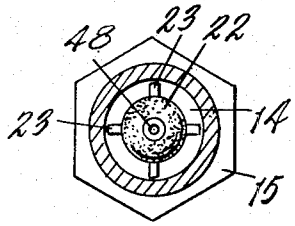

FIG. 3.

INVENTOR.
Benjamin C. Barton
BY Otto Q. Earl
Attorney.

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PRIMING DEVICE FOR PUMPS

Filed June 4, 1954 2 Sheets-Sheet 2

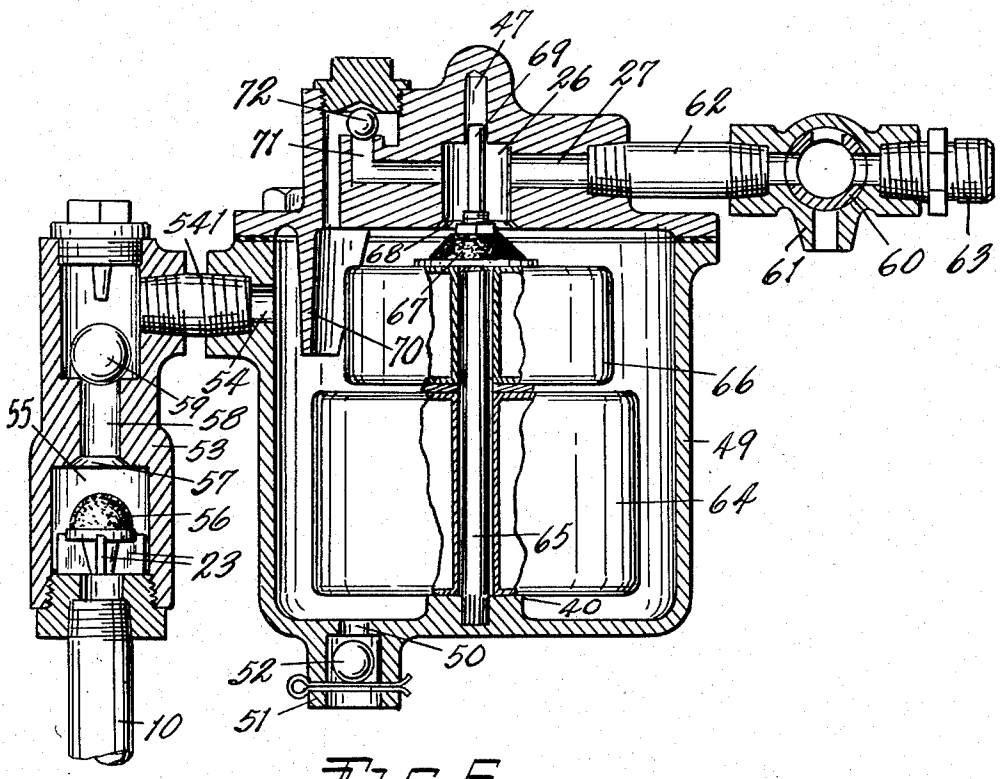

FIG. 6.

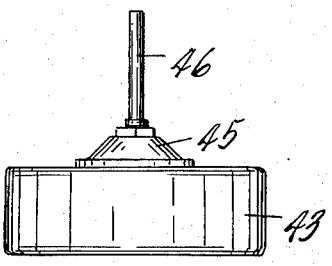

FIG. 5.

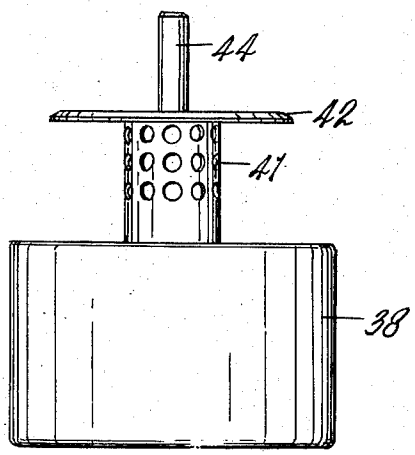

FIG. 4.

INVENTOR.
Benjamin D. Barton
BY
Otto A. Earl
Attorney.

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Patented Aug. 6, 1957

2,801,592

PRIMING DEVICE FOR PUMPS

Benjamin D. Barton, Battle Creek, Mich., assignor to American Fire Apparatus Company, Battle Creek, Mich.

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9 Claims. (Cl. 103—113)

This invention relates to a priming device for pumps.

The main objects of this invention are:

First, to provide an improved primer for a suction or centrifugal pump which is highly efficient and primes a pump quickly and at the same time fully protects the source of suction or vacuum and drains automatically.

Second, to provide a priming device of this character which permits the apparatus to be connected to a hydrant or source of water supply under pressure.

Third, to provide a priming device having these advantages which is very compact and relatively simple in structure and not likely to become clogged or inoperative under varying operating conditions.

Objects relating to details and economies of the invention will appear from the description to follow. The invention is defined and pointed out in the claims.

A preferred embodiment of the invention is illustrated in the accompanying drawings, in which:

Fig. 1 is a fragmentary elevational view of a primer embodying my invention shown in operative relation to a centrifugal pump and to an engine, a hydrant and connection being illustrated in dotted lines.

Fig. 2 is an enlarged vertical section of a preferred embodiment of my invention, the valves and other parts being illustrated by full lines and the control valve being illustrated in position to connect the device to a suction or vacuum source.

Fig. 3 is a horizontal section on a line corresponding to line 3—3 of Fig. 2.

Fig. 4 is an enlarged side elevational view of the main float.

Fig. 5 is a side elevational view of the auxiliary float.

Fig. 6 is a view mainly in vertical section of a modified form or embodiment of my invention.

In the accompanying drawing I illustrate my invention as a priming device for a centrifugal pump forming a part of a portable fire apparatus commonly powered by an internal combustion engine. The present priming device, however, permits connection of the apparatus to a fire hydrant or other source of water under pressure and in Fig. 1, 1 represents water to be pumped and 2 a fire hydrant. 3 represents an internal combustion engine and 4 its intake manifold.

The centrifugal pump 5 is shown conventionally and is provided with an intake 6 and a discharge 7. The suction pipe 8 of the pump is adapted to be inserted in the water supply as conventionally illustrated in Fig. 1. When inserted in a water supply the intake is desirably provided with a screen 9. The intake 8 may, however, be attached to a hydrant 2 conventionally illustrated in Fig. 1, the couplings not being illustrated. The intake 10 of the priming device designated generally by the numeral 11 is connected to the intake 6 of the pump.

In the preferred embodiment illustrated the base member 12 of the float chamber 13 is provided with a cylindrical intake valve chamber 14 connected to the intake 10 by the coupling 15. The side wall portion 16 of the float chamber is cylindrical and is closed at its upper end

by the head 17, the parts being detachably secured together by lag screws nidicated at 18.

A stand pipe or intake tube 19 is formed integrally with the base member 12 and projects centrally within the float chamber. This stand pipe defines a passage 20 opening to the valve chamber 14 and into the float chamber. At its lower end this passage is provided with a valve seat 21 for the intake valve 22 which is reciprocatingly mounted in the valve chamber 14 and provided with radial guides 23 which maintain the valve in upright position and centered to coact with the valve seat 21. At its upper end the pipe 20 is provided with a valve seat 24 for the return check valve 25 which is preferably a ball valve.

The head member is provided with an air suction or vacuum passage 26 having a downwardly facing valve seat 261 at its entrance end vertically aligned with the stand pipe 19. This vacuum passage 26 has a branch 27 connected to the source of suction or vacuum by the conduit 28. This branch passage 27 is provided with a two-way control valve 29 adapted in one position to connect the suction passage to the source of vacuum as is illustrated in Fig. 2 or to the atmosphere through the port 30. The head member is provided with a bypass 31 opening to the passage 26 and to the top of the float chamber and provided with a return check valve 32. With this arrangement of passages when the control valve is adjusted to connect the suction passage to the port 30, air enters the float chamber through the bypass 31 thus permitting the float chamber to drain and the restoring of the parts to initial position.

The float chamber is provided with a drain valve comprising the valve body 33 threaded into an opening 34 provided therefor in the base 12 and having a cage or passage 35 for the suction actuated valve 36 which coacts with the seat 37 when sufficient vacuum is created in the float chamber to lift and hold the valve 36 to its seat.

The stand pipe 19 constitutes a guide for the main float 38 having a central tube 39 slidably embracing the stand pipe. This float seats on the shoulder 40 provided therefor at the base of the stand pipe. A tubular foraminated valve cage 41 is carried by the float 38 and retains the valve 25. A baffle 42 is mounted on the upper end of this valve cage. The auxiliary float 43 is adapted to seat on the baffle 42 to be actuated with or independently of the main float.

The main float is provided with a guide stem 44 for the auxiliary float. A valve 45 is carried by the auxiliary float and adapted to coact with the valve seat 261 of the suction passage. The valve 45 is provided with a guide stem 46 coacting with the guide 47 in the head member.

With the parts thus arranged, when it is desired to prime the pump the control valve 29 is adjusted to connect the suction passage 27 with the source of suction, which in the embodiment illustrated is the intake of an internal combustion engine but it may be any other source of suction or vacuum. With the valve 29 open, a partial vacuum is created in the float chamber which acts to close the drain valve and create a vacuum or suction in the connection 10 to the pump. An accumulation of water within the float chamber actuates the floats and closes the float chamber vacuum connection valve 45. The control valve 29 is then closed to cut off the suction or vacuum and connect the suction passage with the atmosphere through the port 30. The atmospheric pressure opens the valve 32 in the bypass, thus breaking the vacuum within the float chamber and allowing the drain valve 36 to open. Should there be a surge of water in the conduit 10 the valve 22 will close, but usually when the pump 5 is in operation the valve 22 remains open. It is closed however by the surge

or velocity of water such as results from a connection to a hydrant.

The valve **22** is desirably provided with a restricted passage **48**, the primary purpose of which is to prevent the valve **22** and the valve **25** closing simultaneously. While that is unlikely to occur, the restricted passage serves as a safety factor. As stated when the intake **8** is connected to a hydrant or other source of water under pressure, the valve **22** is closed.

The main and auxiliary floats commonly move to valve closing position as a unit but the auxiliary float may move independently of the main float should the main float fail to operate for any reason. Also this arrangement provides for a relatively loose mounting of the floats and at the same time centering and effective seating of the valve **45**.

In the modified form or embodiment of my invention shown in Fig. 6, the float chamber member **49** is of generally cup shape and is provided with a drain opening **50** in the bottom thereof, the valve cage **51** being formed integrally with the body member **49**. The valve **52** functions as has been described for the drain valve **36**. In this embodiment a separate intake member **53** is provided and connected to the intake port **54** adjacent to the top of the float body member by the coupling **541**. The member **53** is provided with a valve chamber **55** to which the intake pipe is connected.

The valve **56** is the same in structure as the valve **22** described and adapted to seat against the valve seat **57** at the lower end of the passage **58** which is provided with the return check valve **59** at its upper end. In this embodiment the control valve **60** is provided with a separate casing **61** connected to the passage **27** by the coupling **62**. **63** represents the connection to the source of vacuum. In this embodiment the main float **64** is guided by the guide rod **65** as is also the auxiliary float **66** which normally seats upon the main float.

The valve **67** is carried by the auxiliary float and coacts with the valve seat **68**. The valve **67** is provided with a guide stem **69**. A baffle or guard **70** is disposed in spaced relation to the inlet port **53** so as to prevent the discharge from this port striking the auxiliary float and thus displacing it or interfering with its proper valve seating action. This modified structure has a bypass passage **71** provided with a check valve **72** for breaking the vacuum in the float chamber when the control valve **61** is adjusted to connect the suction passage to the atmosphere and thus allowing the float chamber to drain.

I have illustrated and described my invention in two highly practical embodiments thereof. I have not attempted to illustrate or describe other embodiments or adaptations which I contemplate as it is believed that this disclosure will enable those skilled in the art to embody or adapt my invention as may be desired.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a priming device of the class described, the combination of a body defining a float chamber provided with an inlet adapted for attachment to the inlet of a pump, the inlet having an inlet check valve chamber therein, a stand pipe disposed within said float chamber and defining an inlet passage opening to said float chamber and to said inlet check valve chamber and having an inlet check valve seat at its lower end and a return check valve seat at its upper end, said body also forming a suction passage opening to said float chamber and provided with a downwardly facing suction check valve seat aligned with said stand pipe, said suction passage having an air port, said body also having a drain opening to the bottom of the float chamber, a main float slidably guided by said stand pipe and having thereon an upwardly projecting valve cage provided with a discharge opening, and a baffle disposed above said discharge opening, said main float having an auxiliary float guide projecting upwardly from said baffle, an auxiliary float disposed in said float chamber and slidable on said guide and adapted to seat on said

baffle on said main float and movable with or independently of said main float, a suction check valve mounted on said auxiliary float to coact with said suction passage valve seat, an inlet check valve disposed in said inlet check valve chamber to coact with said inlet check valve seat, a return check valve disposed in said cage on said main float to coact with said return check valve seat on said stand pipe, a suction seated valve for said drain opening, a manually actuated control valve for said suction passage adjustable to connect the suction passage with a source of suction or to connect the suction passage to said air port, and a bypass in said body connecting said suction passage to said float chamber and provided with a check valve seating outwardly of said float chamber under the influence of suction in said bypass connection and opening to admit air to said float chamber when said manually actuated valve is adjusted to disconnect the suction passage from a source of suction and connect it with said air port.

2. In a priming device of the class described, the combination of a body defining a float chamber provided with an inlet adapted for attachment to the inlet of a pump, the inlet having an inlet check valve chamber therein, a standpipe disposed within said float chamber and defining an inlet pasage opening to said float chamber and to said inlet check valve chamber and having an inlet check valve seat at its lower end and a return check valve seat at its upper end, said body also forming a suction passage opening to said float chamber and provided with a downwardly facing suction check valve seat aligned with said stand pipe, said suction passage having an air port, said body also having a drain opening to the bottom of the float chamber, a main float slidably guided by said stand pipe, an auxiliary float disposed in said float chamber and movable with or independently of said main float, a suction check valve mounted on said auxiliary floats to coact with said suction passage valve seat, an inlet check valve disposed in said inlet check valve chamber to coact with said inlet check valve seat, a return check valve disposed to coact with said return check valve seat on said stand pipe, a suction seated valve for said drain opening, a manually actuated control valve for said suction passage adjustable to connect the suction passage with a source of suction or to connect the suction passage to said air port, and a bypass in said body connecting said suction passage to said float chamber and provided with a check valve seating outwardly of said float chamber under the influence of suction in said bypass connection and opening to admit air to said float chamber when said manually actuated valve is adjusted to disconnect the suction pasage from a source of suction and connect it with said air port.

3. In a priming device of the class described, the combination of a body defining a float chamber provided with an inlet adapted for attachment to the inlet of a pump, the inlet having an inlet check valve chamber therein, a stand pipe disposed within said float chamber and defining an inlet passage opening to said float chamber and to said inlet check valve chamber and having an inlet check valve seat at its lower end and a return check valve seat at its upper end, said body also forming a suction passage opening to said float chamber and provided with a downwardly facing suction check valve seat aligned with said stand pipe, said suction passage having an air port, said body also having a drain opening to the bottom of the float chamber, a main float slidably guided by said stand pipe, an auxiliary float disposed in said float chamber and movable with or independently of said main float, a suction check valve mounted on said auxiliary float to coact with said suction passage valve seat, an inlet check valve disposed in said inlet check valve chamber to coact with said inlet check valve seat and having a restricted passage therein permitting restricted passage of air and water to said float chamber when the valve is in seated position, a return

check valve disposed to coact with said return check valve seat on said stand pipe, a suction seated valve for said drain opening, a manually actuated control valve for said suction passage adjustable to connect the suction passage with a source of suction or to connect the suction passage to said air port, and a bypass in said body connecting said suction passage to said float chamber and provided with a check valve seating outwardly of said float chamber under the influence of suction in said bypass connection and opening to admit air to said float chamber when said manually actuated valve is adjusted to disconnect the suction passage from a source of suction and connect it with said air port.

4. In a priming device of the class described, the combination of a body forming a float chamber provided with an inlet connection adapted for attachment to the inlet of a pump and having an inlet check valve chamber therein, said body also having a drain opening to the float chamber, a stand pipe disposed within said float chamber opening to said float chamber and to said inlet check valve chamber, and having an inlet check valve seat at its lower end and a return check valve seat at its upper end, a suction passage opening to said float chamber and provided with a downwardly facing suction check valve seat aligned with said stand pipe, said suction passage having an air port, a main float slidably guided by said stand pipe having an auxiliary float guide, an auxiliary float disposed in said float chamber and slidable on said guide and movable with or independently of said main float, a suction check valve mounted on said auxiliary float to coact with said suction passage valve seat, an inlet check valve disposed in said inlet check valve chamber to coact with said inlet check valve seat, and having a restricted bleed passage therein permitting restricted passage of air and water to said float chamber when the valve is in seated position, a suction seated valve for said drain opening, a control valve for said suction passage adjustable to connect the suction passage with a source of suction or to connect the suction passage to said air port, a return check valve for said stand pipe, and a suction check valve bypass connecting said suction passage to said float chamber and provided with a check valve which is urged to its seat by suction in said suction passage and opening to admit air to said float chamber when said control valve is adjusted to disconnect the suction passage from a source of suction and connect it to said air port.

5. In a priming device of the class described, the combination of a body forming a float chamber provided with an inlet connection adapted for attachment to the inlet of a pump and having an inlet check valve chamber therein, said body also having a drain opening to the float chamber, a stand pipe disposed within said float chamber opening to said float chamber and to said inlet check valve chamber, and having an inlet check valve seat at its lower end and a return check valve seat at its upper end, a suction passage opening to said float chamber and provided with a downwardly facing suction check valve seat aligned with said stand pipe, said suction passage having an air port, a main float slidably guided by said stand pipe having an auxiliary float guide, an auxiliary float disposed in said float chamber and slidable on said guide and movable with or independently of said main float, a suction check valve mounted on said auxiliary float to coact with said suction passage valve seat, an inlet check valve disposed in said inlet check valve chamber to coact with said inlet check valve seat, a suction seated valve for said drain opening, a control valve for said suction passage adjustable to connect the suction passage with a source of suction or to connect the suction passage to said air port, a return check valve for said stand pipe, and a suction check valve bypass connecting said suction passage to said float chamber and provided with a check valve which is urged to its seat by suction in said suction passage and opening to admit air to said float chamber when said control valve is adjusted to disconnect the suction passage from a source of suction and connect it to said air port.

6. In a priming device of the class described, the combination of a body forming a float chamber provided with an inlet connection having an inlet check valve and a return check valve and provided with a suction seated drain valve, a suction passage opening to said float chamber and provided with a suction check valve seat, said suction passage having an air port, a slidably supported main float having an auxiliary float guide, an auxiliary float disposed in said float chamber and slidable on said guide and movable with or independently of said main float, a suction passage check valve mounted on said auxiliary float to coact with said suction passage valve seat, said inlet check valve having a restricted passage permitting restricted passage of air and water to said float chamber when the valve is in seated position, a control valve for said suction passage adjustable to connect the suction passage with a source of suction or to connect the suction passage to said air port, and a suction passage bypass connecting said suction passage to said float chamber and provided with a check valve which is urged to its seat by suction in said suction passage and opened by air pressure when said control is adjusted to disconnect the suction passage from a source of suction and connect it to said air port.

7. In a priming device of the class described, the combination of a body forming a float chamber provided with an inlet connection having an inlet check valve and a return check valve and provided with a suction seated drain valve, a suction passage opening to said float chamber and provided with a suction check valve seat, said suction passage having an air port, a slidably supporting main float having an auxiliary float guide, an auxiliary float disposed in said float chamber and slidable on said guide and movable with or independently of said main float, a suction passage check valve mounted on said auxiliary float to coact with said suction passage valve seat, a control valve for said suction passage adjustable to connect the suction passage with a source of suction or to connect the suction passage to said air port, and a suction passage bypass connecting said suction passage to said float chamber and provided with a check valve which is urged to its seat by suction in said suction passage and opened by air pressure when said control is adjusted to disconnect the suction passage from a source of suction and connect it to said air port.

8. In a priming device of the class described, the combination of a body forming a float chamber, an inlet conduit means connected to said float chamber, an inlet check valve in one end of said inlet conduit means adapted to be seated by a surge of water under pressure while permitting the passage of air and water as a result of a vacuum within the float chamber, said inlet check valve having a restricted passage permitting a restricted passage of air and water to the float chamber when the inlet check valve is in seated position, a return check valve in said inlet conduit means and located inwardly from said inlet check valve, a suction passage having an inlet connection to said float chamber and provided with an air port, a control valve for said suction passage adjustable to selectively connect it with a source of suction or to said air port, a main float in said float chamber, an auxiliary float operatively associated with said main float to be operated thereby or to operate independently thereof in the event of the failure of the main float to operate, a suction check valve on said auxiliary float for closing said suction passage inlet to the float chamber, a suction actuated drain valve for said float chamber, and a bypass connection for said suction passage to said float chamber provided with a check valve which is urged to its seat by suction in said suction passage while admitting air to said float chamber when said control valve is adjusted to connect the suction passage to said air port.

9. In a priming device of the class described, the combination of a body forming a float chamber, an inlet conduit means connected to said float chamber, an inlet check valve in one end of said inlet conduit means adapted to be seated by a surge of water under pressure while permitting the passage of air and water as a result of a vacuum within the float chamber, a return check valve in said inlet conduit means and located inwardly from said inlet check valve, a suction passage having an inlet connection to said float chamber and provided with an air port, a control valve for said suction passage adjustable to selectively connect it with a source of suction or to said air port, a main float in said float chamber, an auxiliary float operatively associated with said main float to be operated thereby or to operate independently thereof in the event of the failure of the main float to operate, a suction check valve on said auxiliary float for closing said suction passage inlet to the float chamber, a suction actuated drain valve for said float chamber, and a bypass connection for said suction passage to said float chamber provided with a check valve which is urged to its seat by suction in said suction passage while admitting air to said float chamber when said control valve is adjusted to connect the suction passage to said air port.

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