

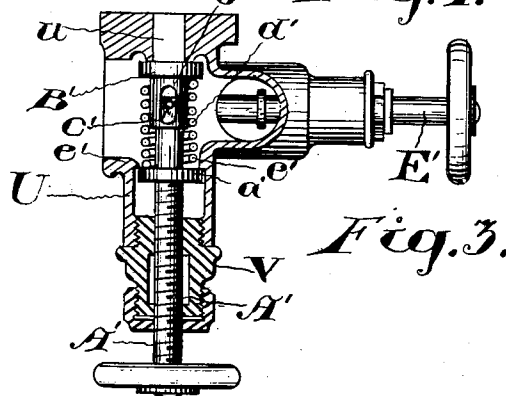
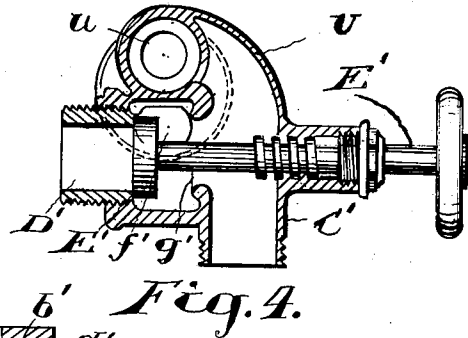
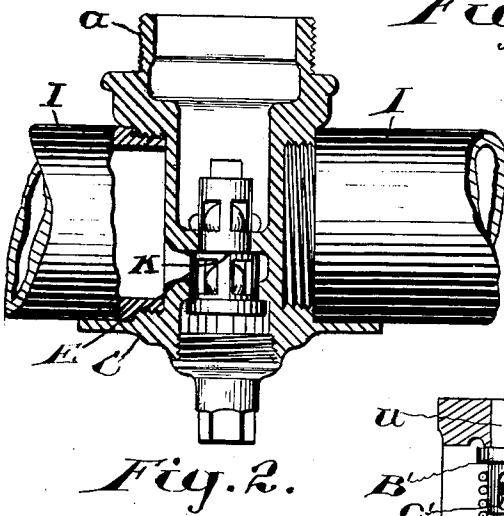
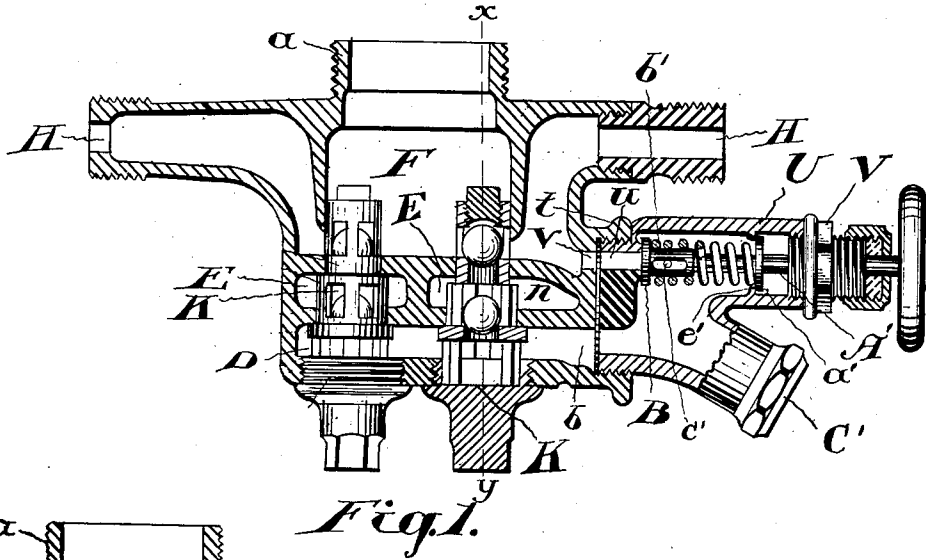
W. H. HEARD.

PUMP.

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948,302.

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WITNESSES:

Edw. D. Shepard
J. W. Kendrick

INVENTOR.

W. H. Heard

BY

Ridout & Mayhew
ATTORNEYS

UNITED STATES PATENT OFFICE.

WILLIAM H. HEARD, OF LONDON, ONTARIO, CANADA.

PUMP.

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To all whom it may concern:

Be it known that I, WILLIAM H. HEARD, of the city of London, in the county of Middlesex and Province of Ontario, Canada, have invented certain new and useful Improvements in Pumps, of which the following is a specification.

My object is to devise a simple and effective combined safety valve, by-pass from the pressure to the suction sides of the pump, and a tank filler, and my invention consists essentially of the constructions hereinafter more specifically described, and then definitely claimed.

Figure 1 is a vertical section through the valve chest of a spray pump, the by-pass and safety valve. Fig. 2 is a vertical section on the line $x-y$ in Fig. 1. Fig. 3 is a vertical section showing the by-pass combined with a filler. Fig. 4 is a sectional plan view of the same.

In the drawings like letters of reference indicate corresponding parts in the different figures.

I show my invention in connection with the valve chest of a spray pump, but as this forms no part of the present invention it is unnecessary to describe it in detail. Suffice it to say that D is the suction chamber, F the pressure chamber, H H discharge pipes, a a collar for the connection of an air chamber, and K K the valve casings, provided with ball valves, as shown, controlling the openings between the suction chamber D and the intermediate chambers E, and between the intermediate chambers and the pressure chamber F. The intermediate chambers E, it will be seen on reference to Fig. 2, communicate with the plunger-tubes I.

In power driven machines there is a special danger of the pressure in the pressure side of the pump becoming too great and it is necessary to provide means for its automatic relief. For this purpose I provide the combined safety valve and by-pass, shown more particularly in Fig. 1. A casing U is secured to the valve chest C preferably by being screwed into the collar t formed thereon. The position of this casing is such that it communicates with the suction opening b of the valve chest. The casing is also provided with an opening u adapted to register with the opening v communicating with the pressure chamber F of the valve chest. On the casing U is screwed the bon-

net V, through which is screwed the valve stem A'. On this valve stem is formed or secured a stop disk a' . On the end of the stem is slipped a sleeve b' carrying the valve disk B'. In the side of the sleeve is formed a slot through which passes a pin c' into the stem A'. Between the stop disk and the valve disk is placed a coil spring d' tending normally to hold the valve disk B' against the opening u . The stop disk a' is provided with a seat e' against which it may be screwed by revolving the stem A'. When the stop disk is in contact with its seat, it will be seen that the pin c' is intermediate the ends of the slot in the sleeve b' , so that the valve disk B' is held against the opening u by the pressure of the spring. Thus, if at any time the pressure in the pump becomes excessive, it is relieved, by the lifting of the valve disk B', into the casing, and thence into the suction pipe C' connected with the casing.

When starting the pump it is sometimes desired to blow back from the pressure side of the pump through the suction pipe, to clear the strainer, or for other purposes, and this may be done at any time by turning the stem and withdrawing the stop disk a' and the valve disk B' from their seats. Owing to the slot and pin connection between the valve disk and the stem, the stop disk comes away first from its seat, and subsequently the valve disk, the reverse being the case when the stem is screwed in. The stop disk contacting with its seat effectually prevents the coil spring D' being compressed to give too great a tension on the valve disk.

It will be noted that owing to the slot and pin connection the valve disk rotates with the valve stem. This enables it to grind any small particles off its seat, which might otherwise prevent its fitting tightly.

I prefer to employ with the by-pass and safety valve an arrangement whereby the pump may be caused, when desired, to refill the tank with which it is employed. I show the arrangement for this purpose in Figs. 3 and 4. The by-pass and safety valve remain as before, but in addition to the suction pipe C' I provide a second suction pipe D', and provide a suitable hand valve E' operated through the side of the casing and adapted to close the second suction pipe, as shown in Fig. 4. Between the suction pipe C' and the suction opening f' I form an opening g' , adapted to be closed by the valve

E'. Thus by operating the valve E' either the suction pipe C' or the suction pipe D' may be placed in communication with the opening f', and thus with the suction side of the pump. When the valve E' is in the position shown in Fig. 4 the suction is through the pipe C', thence through the opening f' into the valve casing. If, however, the valve E' be operated to close the opening g', and by opening the by-pass and safety valve the suction is through the pipe D', and through the opening f' into the pump, thence from the pressure side of the pump through the openings v and u into the pipe C'. If the pipe D' be connected with a source of supply, the tank may be readily filled through the suction pipe C'. As soon as the tank is filled the valves are again closed, as shown in Figs. 3 and 4, and the machine is ready for operation in the ordinary manner.

Thus from the construction described it will be seen that I provide a safety valve, by-pass and filler by means of a simple construction employing only two valves, conveniently arranged, adjacent to one another.

What I claim as my invention is:

1. In a valve chest provided with a pressure side and a suction side and having a valve controlled communication between them, and having also a by-pass communication between the two sides, the combination of a spring actuated safety valve normally closing the by-pass communication and means for closing said valve or for positively opening it to permit free communication between the pressure and suction sides of the pump, means for varying the tension of said spring actuated valve, and means for limiting the increase of tension to prevent the valve being forcibly held closed, substantially as described.

2. A by-pass connection between the pressure and suction sides of a pump, comprising a casing having an opening therein for communication with the pressure side of the pump and an opening for communication with the suction side of the pump; a suction pipe communicating with the casing; a valve disk adapted to close the first mentioned opening; a stem on which the said disk is slidable; a stop disk on the stem; a seat in the casing for the stop disk; a spring adapted to hold the valve disk against the aforesaid opening when the stop disk is on its seat; and means for operating the stem to press the stop disk against its seat or to retract both the stop disk and valve disk, substantially as described.

3. A by-pass connection between the pressure and suction sides of a pump, comprising a casing having an opening therein for communication with the pressure side of the pump, and an opening for communication with the suction side of the pump; a suction pipe communicating with the casing; a valve

disk adapted to close the first mentioned opening; a stem on which the said disk is slidable; a stop disk on the stem; a seat in the casing for the stop disk; a spring adapted to hold the valve disk against the aforesaid opening when the stop disk is on its seat; means for operating the stem to press the stop disk against its seat or to retract both disk and valve disk, the parts being so proportioned that as the disks are forced home the valve disk contacts before the other, substantially as described.

4. A by-pass connection between the pressure and suction sides of a pump, comprising a casing having an opening therein for communication with the pressure side of the pump, and an opening for communication with the suction side of the pump; a suction pipe communicating with the casing; a valve disk adapted to close the first mentioned opening; a sleeve to which the disk is connected; a valve stem on the end of which the sleeve is slidable; a stop disk on the stem; a seat in the casing for the stop disk; a spring on the stem tending to force forward the valve disk; and means for operating the valve stem, substantially as described.

5. A by-pass connection between the pressure and suction sides of a pump, comprising a casing having an opening therein for communication with the pressure side of the pump, and an opening for communication with the suction side of the pump; a suction pipe communicating with the casing; a valve disk adapted to close the first mentioned opening; a sleeve to which the disk is connected; a valve stem on the end of which the sleeve is slidable; a stop disk on the stem; a seat in the casing for the stop disk; a spring on the stem tending to force forward the valve disk; a stop on the stem limiting the forward movement of the valve disk; and means for operating the valve stem, substantially as described.

6. A by-pass connection between the pressure and suction sides of a pump, comprising a casing having an opening therein for communication with the pressure side of the pump, and an opening for communication with the suction side of the pump; a suction pipe communicating with the casing; a valve disk adapted to close the first mentioned opening; a sleeve to which the disk is connected; a valve stem on the end of which the sleeve is slidable; a stop disk on the stem; a seat in the casing for the stop disk; a spring on the stem tending to force forward the valve disk; a stop on the stem limiting the forward movement of the valve disk and adapted to prevent its rotation; and means for operating the valve stem, substantially as described.

7. A by-pass connection between the pressure and suction sides of a pump, comprising a casing having an opening therein for

communication with the pressure side of the pump, and an opening for communication with the suction side of the pump; a suction pipe communicating with the casing; a valve disk adapted to close the first mentioned opening; a sleeve to which the disk is connected; a valve stem on the end of which the sleeve is slidable; a stop disk on the stem; a seat in the casing for the stop disk; a spring on the stem tending to force forward the valve disk; a stop on the stem limiting the forward movement of the valve disk; means for operating the valve stem, the parts being so proportioned that as the disks are forced home the valve disk contacts before the other, substantially as described.

8. A by-pass connection between the pressure and suction sides of a pump, comprising a casing having an opening therein for communication with the pressure side of the pump, and an opening for communication with the suction side of the pump; a suction pipe communicating with the casing; a valve disk adapted to close the first mentioned opening; a stem on which the said disk is slidable but non-rotatable; a stop disk on the stem; a seat in the casing for the stop disk; a spring adapted to hold the valve disk against the aforesaid opening when the stop disk is on its seat; and means for operating the stem to press the stop disk against its seat or to retract both the stop disk and valve disk, substantially as described.

9. A by-pass connection between the pressure and suction sides of a pump, comprising a casing having an opening therein for communication with the pressure side of a pump, and an opening for connection with the suction side of the pump; two suction pipes communicating with the casing; a valve whereby either may be cut off from communication with the suction opening; a communication between one of the suction pipes and the pressure opening; and a valve controlling said opening, substantially as described.

10. A by-pass connection between the pressure and suction sides of a pump, comprising a casing having an opening therein for communication with the pressure side of a pump, and an opening for connection with the suction side of the pump; two suction pipes communicating with the casing; a valve whereby either may be cut off from communication with the suction opening; a communication between one of the suction pipes and the pressure opening; a spring actuated safety valve normally closing the communication; and means for closing said valve or for opening it to permit free communication between the pressure opening and the suction pipe, substantially as described.

London, Ont., 30th January, 1908.

WILLIAM H. HEARD.

Signed in the presence of—

MABEL I. HENDERSON,
WINAFRED D. REILLY.