

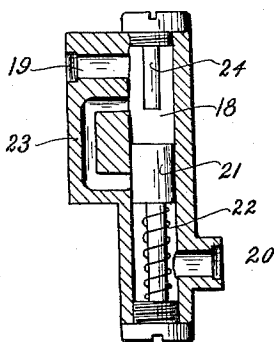
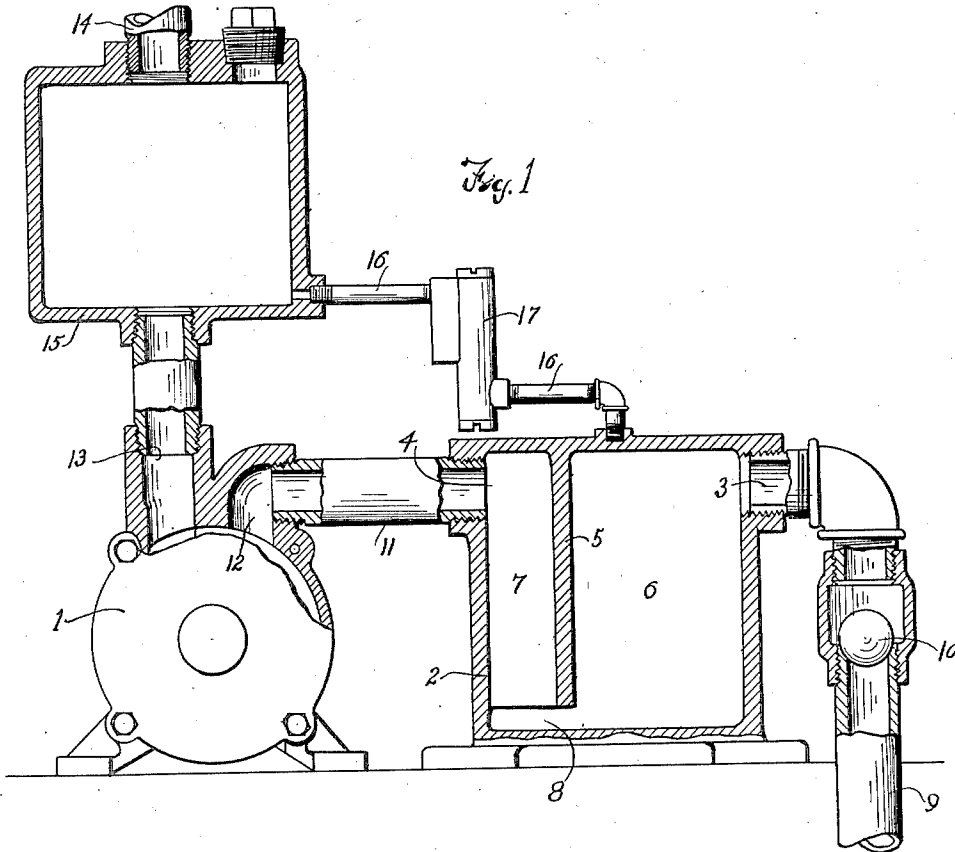
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CENTRIFUGAL PUMP

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## UNITED STATES PATENT OFFICE

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## CENTRIFUGAL PUMP

Application filed July 11, 1927. Serial No. 204,769.

My invention relates to improvements in centrifugal pumps and particularly to means for priming the pump in order that the action of the pump may be initially started.

5 My invention is particularly applicable to centrifugal pumps for moving liquids and one of the objects of the invention is to provide means for priming a centrifugal pump so constructed and arranged that when the  
10 pump has ceased functioning or is stopped for any reason the priming means will be in condition to prime the pump automatically again when it is again started.

It is a further object of my invention to  
15 provide a means for automatically closing the connection between the supplemental chamber and the priming chamber of the priming apparatus during the normal operation of the pump so that liquid once lifted  
20 into the supplemental chamber will not flow back into the priming chamber and thereby decrease the efficiency of the pump, this means however being adapted to open automatically in event it becomes necessary to prime the  
25 pump again.

For the purpose of disclosing my invention I have illustrated one embodiment thereof in the accompanying drawings in which,

30 Fig. 1 is a side elevation partly in section of an apparatus embodying my invention, and

Fig. 2 is a detail section of the shutoff valve interposed between the supplemental chamber and the priming chamber.

35 In the embodiment of the invention illustrated I provide a centrifugal pump 1 which may be of any desired construction, although it is preferably of the construction illustrated in my application filed June 24, 1926, Serial  
40 No. 118,149. Associated with this pump is an automatic primer comprising a casing 2 closed with the exception of the intake port 3, the outlet port 4, and a trickle opening in its top, later to be described. This casing  
45 is divided by a web 5 which extends to a short distance from the bottom of the casing and divides the casing into two chambers 6 and 7 communicating at the point 8 beneath the web 5. The chamber 6 is provided with the  
50 intake opening 3 which is connected with a

supply line 9, provided with a ball check valve 10. The chamber 7 is connected by a conduit 11 with the intake 12 of the pump 1 and it will be noted that this intake is well above the center line of the rotary centrifugal  
55 pump 1. Interposed between the delivery port 13 of the pump 1 and the delivery line 14 is a supplemental tank 15 through which the liquid passes in its passage to the delivery line 14 and which is adapted to supply  
60 priming liquid to the priming tank or casing 2. This supplemental tank 15 is connected at its bottom with the trickle opening in the top of the priming tank or casing 2 by means of a suitable conduit line 16 in which is inter-  
65 posed a check valve 17.

This check valve as illustrated in Fig. 2 comprises a casing having a vertically extending bore 18 provided at its upper end with an intake port 19 connected with the supplemental  
70 tank 15 and a delivery port 20 at its lower end connected with the priming tank 2. Operating within this casing is a cylindrical valve 21 vertically movable in the cylinder and adapted to be maintained in its raised  
75 position by a coiled spring 22. The casing of the valve is provided with a bypass 23 which, when the cylinder 21 is in its raised position and abutting against the stop 24, is opened so that communication may be established between  
80 the tank 15 and the tank 2 and which, when the cylinder is in its lowered position as illustrated in Fig. 2, is closed to prevent passage of liquid from the tank 15 to the tank 2. During normal operation of the pump, when  
85 liquid is being raised, there is created in the tank 15 sufficient back pressure on the piston 21 to move the same downwardly against the action of the spring 22 to a position to close the bypass 23 and thus shut off  
90 communication between the tank 15 and the tank 2 whereby there will be no liquid draining back into tank 2 from tank 15. In event the pump loses its prime or when the pump ceases operating the back pressure in tank 15  
95 will be reduced to such an extent that the spring 22 may function to raise the piston 21 opening the bypass 23 and establishing communication between the tank 15 and the tank  
100 2. Under these circumstances, assuming that

the pump is not primed, when the pump is started the operation of the impeller of the pump will exhaust the fluid from tank 6 delivering the same to the tank 15 and as the capacity of the delivery between tank 15 and the tank 2 is considerably less than the capacity of the pump the fluid will be withdrawn from the tank 2 at a greater rate than it is supplied thereto from the tank 15 thereby creating a vacuum or partial vacuum in the chamber 6 which will exhaust a certain proportion of the air in the intake line 9. As soon as the water level in the chamber 6 reaches a point lower than the bottom of the web 5 the air will pass into the impeller chamber of the pump and the pump will cease to function. However, the chamber 6 will gradually fill from the tank 15 and another charge of water will be drawn through the pump, again partially exhausting the air from the intake line 9. This process continues until the fluid in the supply line 9 is raised and flowing, after which the pump operates in the normal manner and sufficient back pressure is generated in the tank 15 to close the valve 17. Due to the fact that the intake to the pump 1 is at the top of the pump and below the delivery mouth of the pipe 11 and the entry to the priming chamber 7 is at the bottom of the chamber 6 a syphoning effect will be created insuring a full flow of fluid from chamber 6 to the pump.

I claim as my invention:

1. A priming chamber for use with pumps comprising a casing, and means dividing said casing into two communicating chambers having a common imperforate floor, each of said chambers being provided with a port adjacent its upper end, and said ports being substantially aligned, but separated by said means.

2. A priming chamber for use with pumps comprising a casing, and a wall extending from the top of said casing to a point adjacent the bottom thereof, and dividing said casing into two communicating chambers having a common imperforate floor, each of said chambers being provided with a port adjacent its upper end, and said ports being substantially aligned, but separated by said wall.

3. A priming chamber for use with pumps comprising a casing, and means dividing said casing into two communicating chambers having their upper portions in the same plane each of said chambers being provided with a port adjacent its upper end, and one of said chambers being further provided with a second port in its upper portion.

4. A priming chamber for use with pumps comprising a casing, and means dividing said casing into two communicating chambers of unequal size having their upper portions in the same plane, the smaller of said chambers being provided with a port adjacent its

upper end, and the larger of said chambers being formed with a port in its one wall and with a second port in its upper portion.

5. A priming chamber for use with pumps comprising a casing, and means dividing said casing into two communicating chambers of unequal size, the smaller of said chambers being provided with an outlet port adjacent its upper end, and the larger of said chambers being formed with an inlet port adjacent its upper end, said larger chamber further being formed with a supplemental inlet port in its top wall.

Signed by me, this 2nd day of July, 1927.

CLARENCE G. WOOD.