

W. R. CHAMBERLAIN.

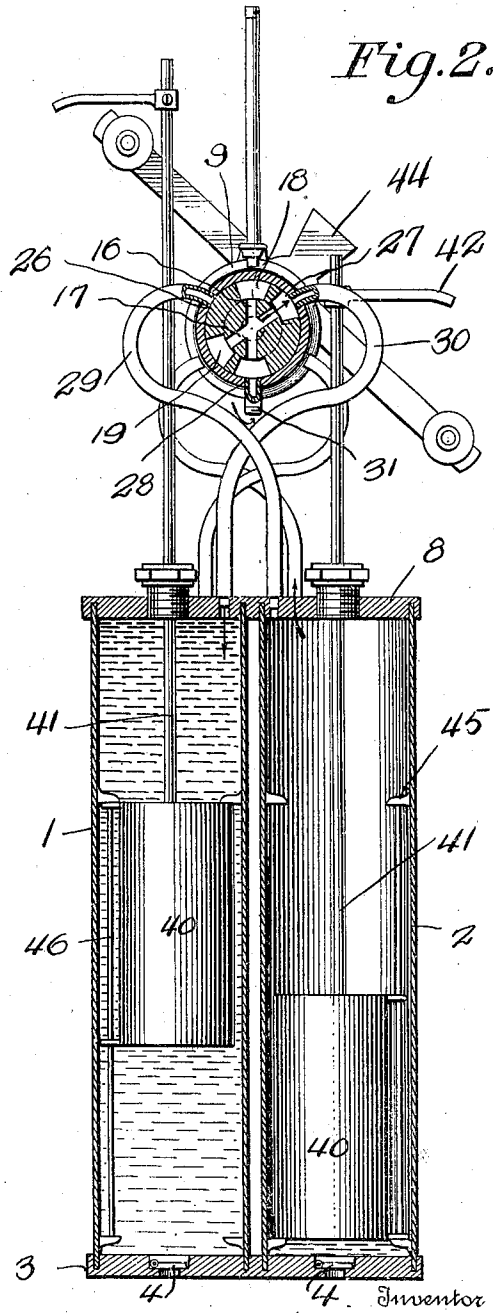
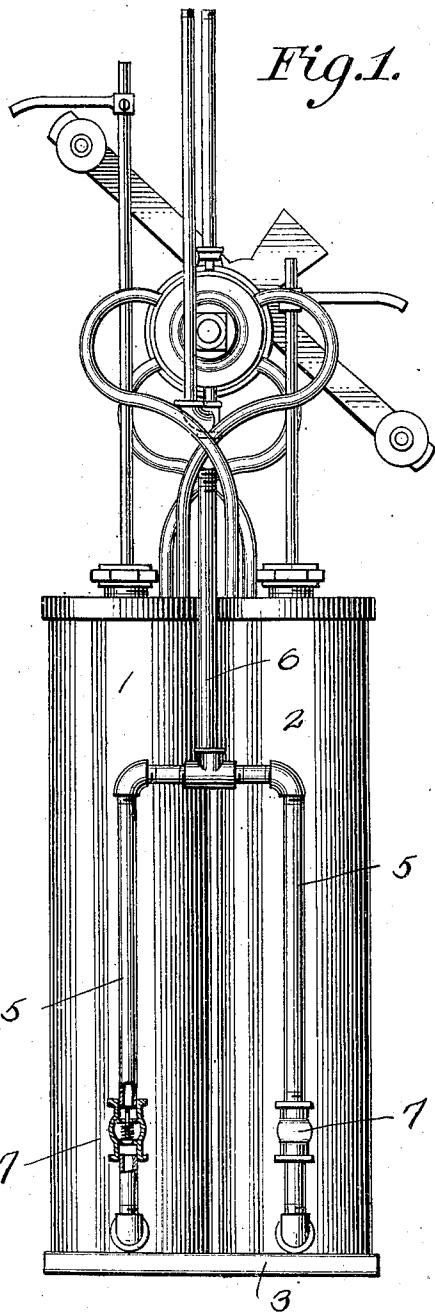
PUMP.

APPLICATION FILED MAR. 4, 1910.

Patented June 20, 1911.

2 SHEETS—SHEET 1.

995,843.



Witnesses

Phil. E. Barnes
D. W. Gould.

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2 SHEETS—SHEET 2.

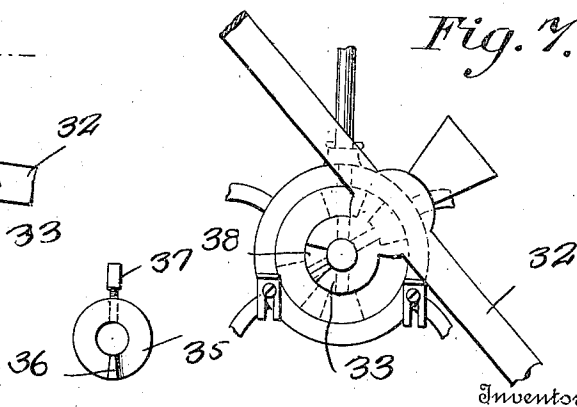
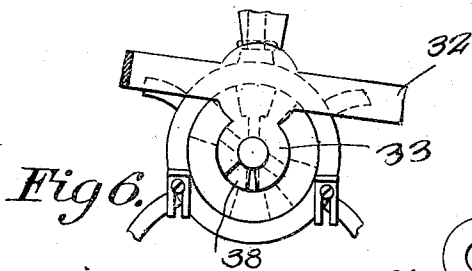
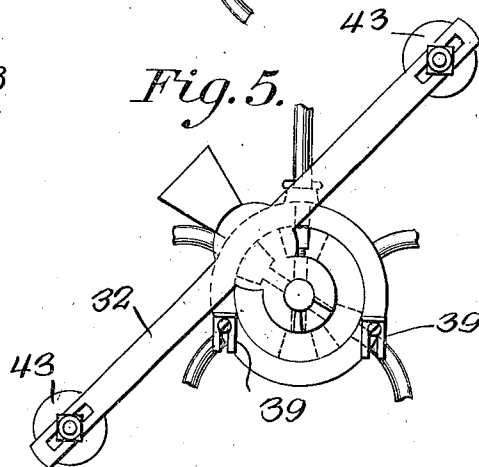
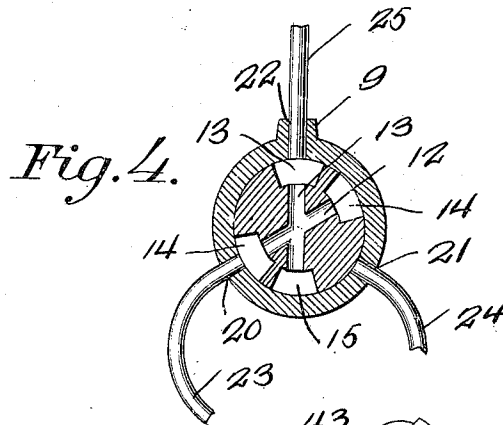
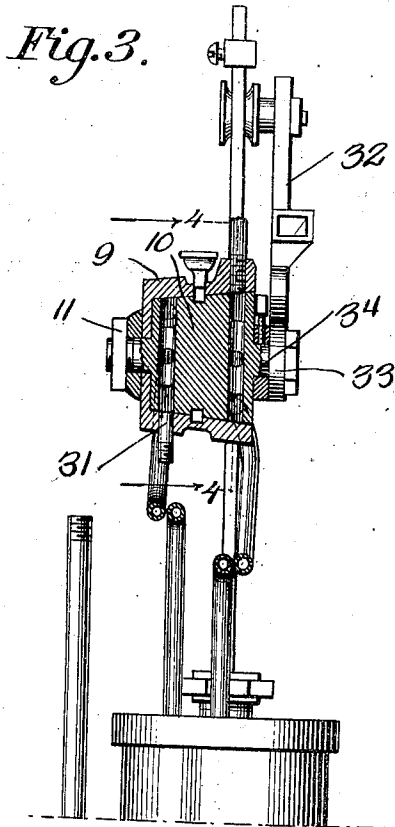


Fig. 8. Wheaton R. Chamberlain

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UNITED STATES PATENT OFFICE.

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PUMP.

995,843.

Specification of Letters Patent. Patented June 20, 1911.

Application filed March 4, 1910. Serial No. 547,340.

To all whom it may concern:

Be it known that I, WHEATON R. CHAMBERLAIN, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented new and useful Improvements in Pumps, of which the following is a specification.

The invention relates to an improvement in pumps, being more particularly directed to a double acting pump in which the driving pressure is supplied from compressed air and in which the admission of the air under pressure to the pump is automatically controlled by the level of the liquid therein.

The main object of the present invention is the provision of a twin cylinder pump of which the cylinders are free from communication with each other and each open under suitable control to the admission of air under pressure, whereby the fluid contained within the respective cylinders may be forced into a service pipe, the control for the admission of air under pressure to the cylinders and the exhaust therefrom being automatically operated by means controlled through floats actuated by the rise and fall of the water within the cylinders.

The invention in its preferred details of construction will be described in the following specification, reference being had particularly to the accompanying drawings, in which:—

Figure 1 is an elevation of the improved pump. Fig. 2 is a vertical section, partly in elevation, of the same. Fig. 3 is a broken vertical section, partly in elevation, illustrating particularly the control valve, the line of section being at right angles to that of Fig. 2. Fig. 4 is a section on line 4—4 of Fig. 3. Figs. 5, 6 and 7 are partly diagrammatic views of the control valve and cooperating parts, said figures illustrating successively the movement of the operating lever from the position to control the admission to one cylinder to a position for the control of the other cylinder. Fig. 8 is an elevation of one of the clutch members forming the connection between the control lever and the valve.

Referring particularly to the accompanying drawings, wherein is shown the preferred embodiment of details of the invention, the improved pump comprises duplicate cylinders 1 and 2, preferably mounted on the same base 3 and in communication

with a source of water or other liquid supply through valved openings 4. The valves may be of any preferred type opening freely by pressure from beyond the cylinders but closed against pressure from within the cylinders. Each cylinder has connection with an exteriorly arranged pipe section 5 which, beyond the cylinders, communicates with a service or supply pipe 6 which may be directed to any point of use. In the pipes 5 are arranged valves 7 of any preferred or usual type which open under pressure from within the cylinders but close against pressure from the opposite direction.

The cylinders are closed by heads 8, and supported thereby and arranged above the cylinders is an air pressure controlling means comprising in effect a valve including a casing 9 having a conical bore in which is seated a conical valve body 10 held in place by the usual connection 11. The valve body is of peculiar type being formed near one end with exhaust passages and near the opposite end with pressure passages. Near what will be termed the exhaust end of the valve, the body 10 is provided with diametrically opposing bores 12 and 13 having the angular relation shown more particularly in Fig. 4, and centrally intersecting; the terminal of each bore, or that portion opening from the surface of the valve body is somewhat enlarged forming what may be termed a pocket at the end of the bore, as for example, a diametrically enlarged pocket 14 at the end of each bore 12 and a similar pocket 15 at the end of each bore 13. At the opposite or pressure end of the valve body the construction is similar, having bores 16 and 17 terminally provided with pockets 18 and 19. In the casing 9 in alinement with the exhaust bores there are formed openings 20, 21 and 22. The openings 20 and 21 are in communication with pipes 23 and 24 which form the exhaust pipes and lead to the respective cylinders 1 and 2, being at all times in open communication therewith. The opening 22 in the casing is in communication with a pipe 25 opening to the atmosphere or to a suitable suction apparatus, as preferred.

As will presently appear, the valve is limited to two positions, one of which is illustrated in Fig. 4. In one position the pipe 23 will, by the arrangement of the bores, be in open communication with the pipe 25, at

which time the pipe 24 will be closed against the pipe 25, while in the other position the pipes 24 and 25 will be in communication while the pipe 23 will be closed against the exhaust.

In alinement with the pressure ports in the valve body the casing 9 is formed with openings 26, 27 and 28 from which respectively extend pipes 29, 30 and 31. The pipes 29 and 30 lead to the respective cylinders 1 and 2 while the pipe 31 leads to a suitable air pressure apparatus of any preferred or desired type. In this construction, as in that described in connection with the exhaust, the valve in one position, shown in Fig. 2, will establish communication between the pipe 31 and the pipe 30, cutting out the pipe 29, while in the other position pipes 29 and 30 are in communication with the pipe 30 cut out.

From this construction it will be obvious that in one position of the valve a pressure pipe and an exhaust pipe are in communication with the pressure supply and with the exhaust, and the respective pressure and exhaust pipes are so connected with the cylinders 1 and 2 that in either position of the valve the pressure pipe leading to one cylinder will be in communication with the pressure pipe from the pressure apparatus while the exhaust pipe from the other cylinder will be in communication with the exhaust pipe 25. In other words, in the operation of the valve the respective cylinders are alternately subjected to pressure and open to the exhaust, the admission of pressure to one cylinder and the opening of the other to the exhaust being assumed.

For the automatic control of the valve I have arranged what I term an operating lever 32 to which there is centrally connected an offset disk 33 movably mounted upon a stem 34 projecting from the valve body. Secured upon the stem 34 between the valve body and the disk 33 is what may be termed a clutch member 35 comprising a ring-like member formed with an offset lug 36 and provided with a set screw 37 whereby it may be secured upon the stem. The disk 33 of the lever, which may be called a co-acting clutch member, is formed with a recess 38 to receive the lug 36, the space between the respective edge walls of the recess being materially greater than the transverse dimension of the lug, whereby the disk 33, and therefore the lever, is permitted a certain amount of free movement prior to the engagement of either side wall of the recess 38 with the lug, the subsequent movement of the lever serving to operate the clutch member 35 and thereby turn the valve body. By reason of the free movement thus given the lever in each direction, the latter will contact with the lug 36 and, by a blow, thereby more effectively operate the valve

body. The movement of the lever in each direction is limited by stops 39 secured upon the valve casing, which stops are adjustable to control the extent of movement of the lever, said stops being of course arranged so that at either limit of movement the lever will have moved the valve body to arrange the ports therein in proper position to the cylinder connected pipes.

To impart movement to the lever, I mount within each cylinder a float 40, from which is extended a rod 41 projecting through a suitably packed opening in the top plate of the cylinders and adjustably carrying at the upper end a trip arm 42. The respective ends of the lever 32 are provided with grooved rollers 43 adjustably connected to the lever and disposed in the path of the trip arms 42, so that the arm carried on the rod of the elevated float will, on the descent of that float, engage a roller on the end of the lever immediately beneath the arm, and carry it downward until the limit of the movement of the float is reached where the descent of the lever will continue by reason of the force imparted thereto by such movement and by the action of gravitation. For the latter purpose the lever is preferably provided with a weighted projection 44 which, when carried beyond the center serves to induce a relatively rapid movement of the lever and thereby impart the blow-like effect to the valve body. The floats are limited in their respective movements by stops 45 arranged within the cylinders and are guided on rods 46, as will be seen in Fig. 2.

In operation assuming the parts arranged as shown in Fig. 2, it will be noted that the cylinder 1 is filled with water while cylinder 2 is empty, the float in cylinder 1 is elevated, the float in cylinder 2 is lowered, and the operating lever arranged with its upper end above cylinder 1. Air pressure from the pressure apparatus will now pass through the pipe 31, the ports within the pressure end of the valve body, the pipe 30 and the cylinder 1, forcing the water therefrom into a supply pipe, while at the same time the cylinder 2 is open to the exhaust through pipe 23, the exhaust ports in the valve body and pipe 25. The cylinder 2 is thus being exhausted drawing in water from the exterior supply while the water in the cylinder 1 is being forced out into the pipe 6. As the water leaves the cylinder 1 the float gradually descends, carrying with it the elevated end of the lever until said end has been lowered to a point slightly below the horizontal, then the weight 44 operates to continue the movement of the lever downward in an accelerated manner, causing one of the walls of the recess 38 to engage the projection 36 on the clutch member 35 and move the valve to the opposite position, admitting

pressure to the cylinder 2 and opening the cylinder 1 to the exhaust. This movement will continue alternately and automatically, maintaining a continuous pressure of water in the supply pipe. It will be noted that the upward movement of the float is limited and that therefore a suitable quantity of water will be forced from the cylinder before the float begins to move downward. Furthermore, the proportions of the parts are such that the float will have to move practically to its lowermost limit, or in other words all of the water will have to be forced from the cylinder before said float will have fallen a sufficient distance to move the end of the lever to that point where the weight 44 will continue to move to change the position of the valve.

Having thus described the invention what I claim as new, is:—

A pump including twin cylinders, a float arranged within each cylinder, means for limiting the movement of the float within the cylinder, a rod carried by each float, an arm adjustably mounted on each rod, a rotary valve mounted above the cylinders, a lever carried by said valve, a roller adjustably mounted on the opposite ends of said lever whereby to coact with the arms carried by said rods.

In testimony whereof I affix my signature in presence of two witnesses.

WHEATON R. CHAMBERLAIN.

Witnesses:

W. H. LITTLE,
CHRISTOPHER C. LAKIN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."
