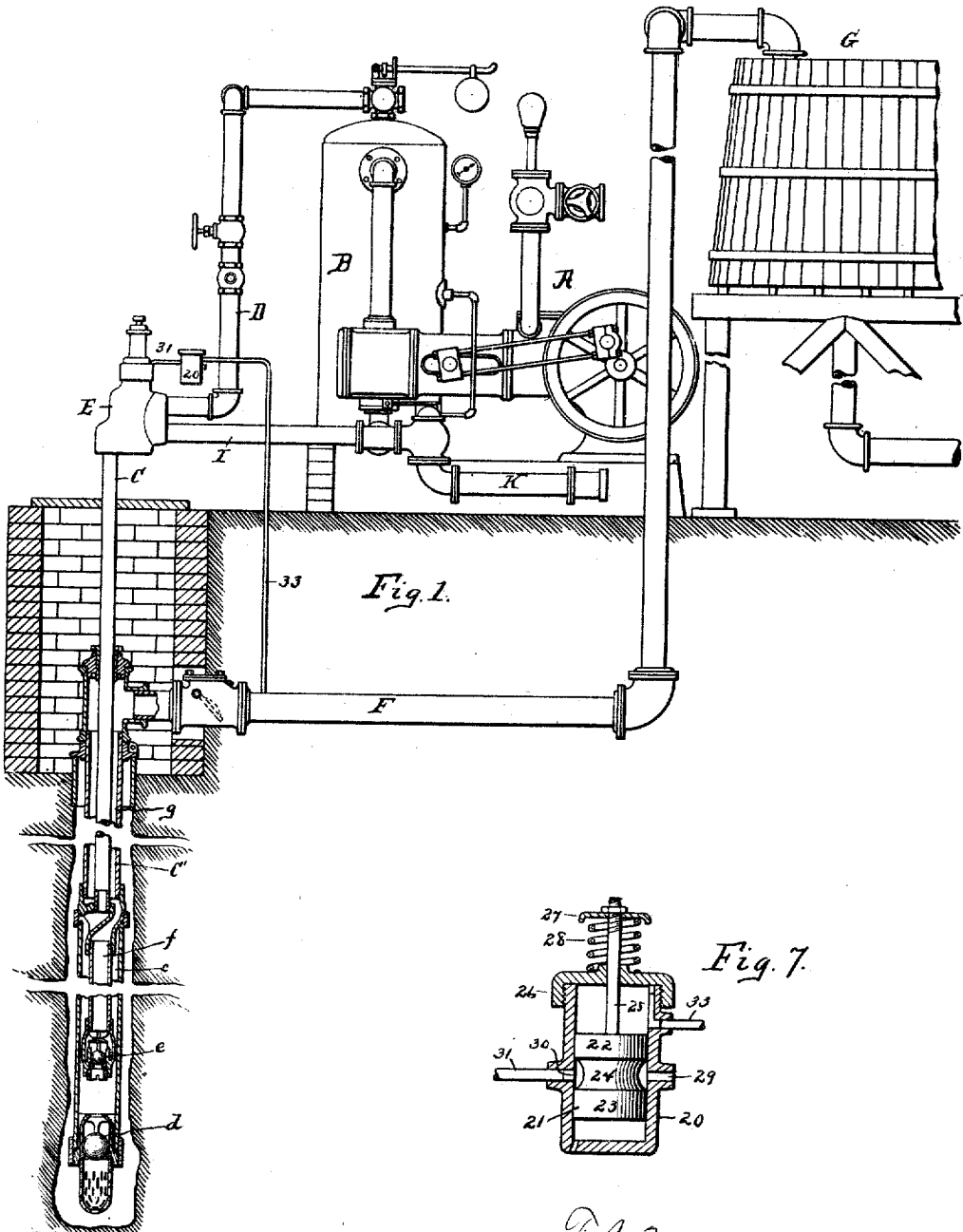


F. C. WEBER.
 PUMPING SYSTEM.
 APPLICATION FILED JUNE 22, 1910.

998,059.

Patented July 18, 1911.

4 SHEETS—SHEET 1.



Witnesses:
C. E. Sanders
Marion R. Sanders

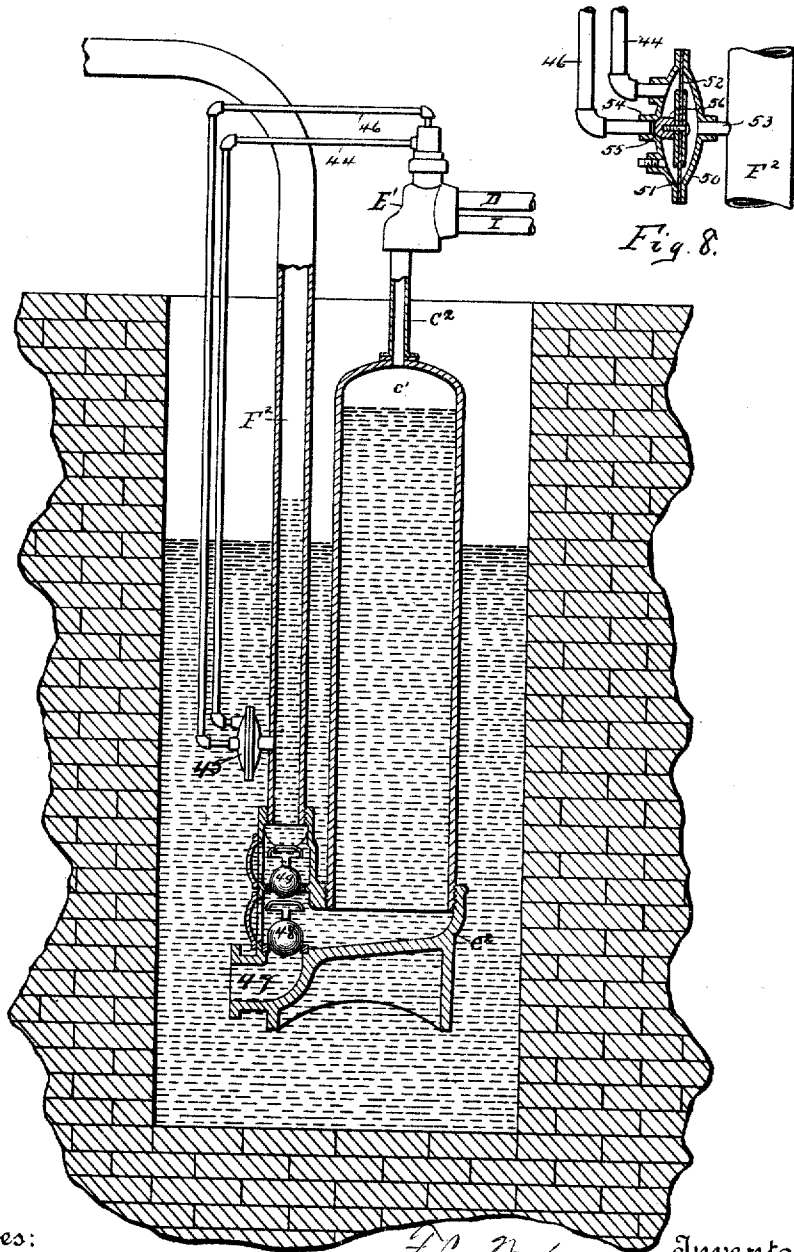
F. C. Weber Inventor
Louis M. Sanders By his Attorney

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4 SHEETS—SHEET 2.



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Fig. 2.

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4 SHEETS-SHEET 3.

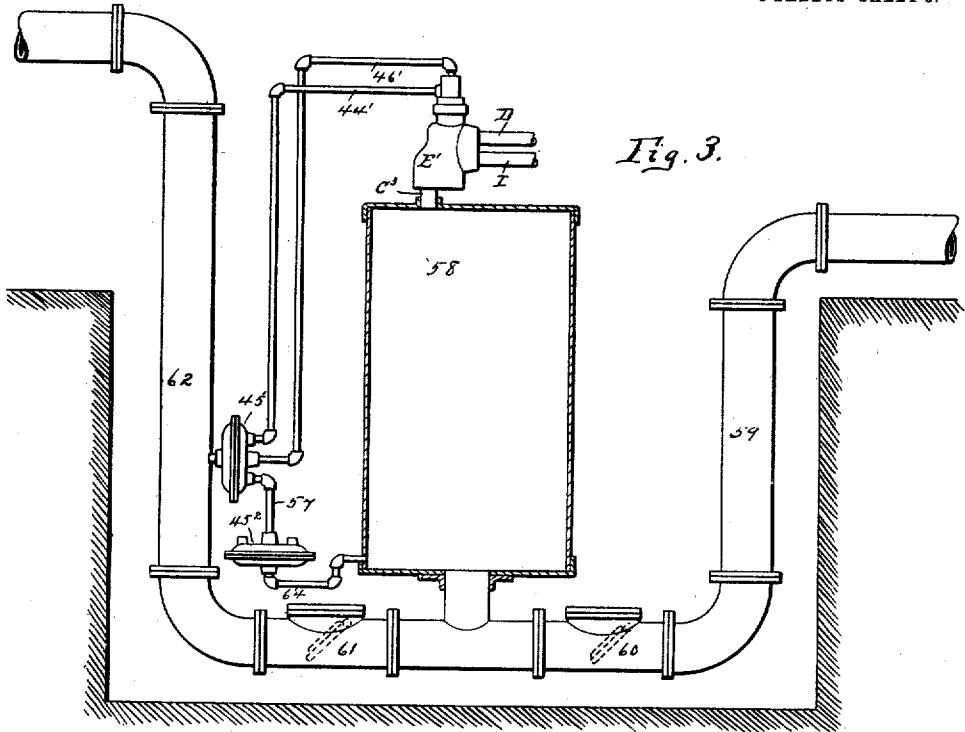


Fig. 3.

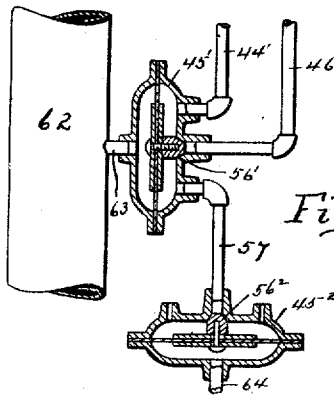


Fig. 6.

Witnesses:
C. E. Sanders
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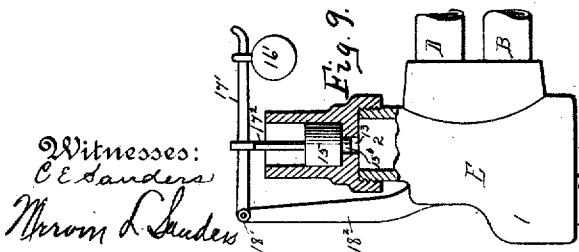
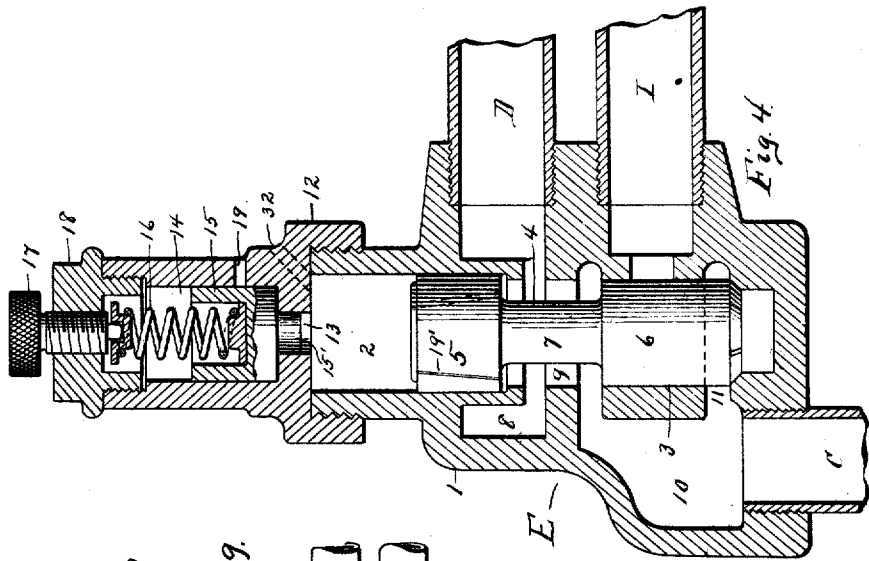
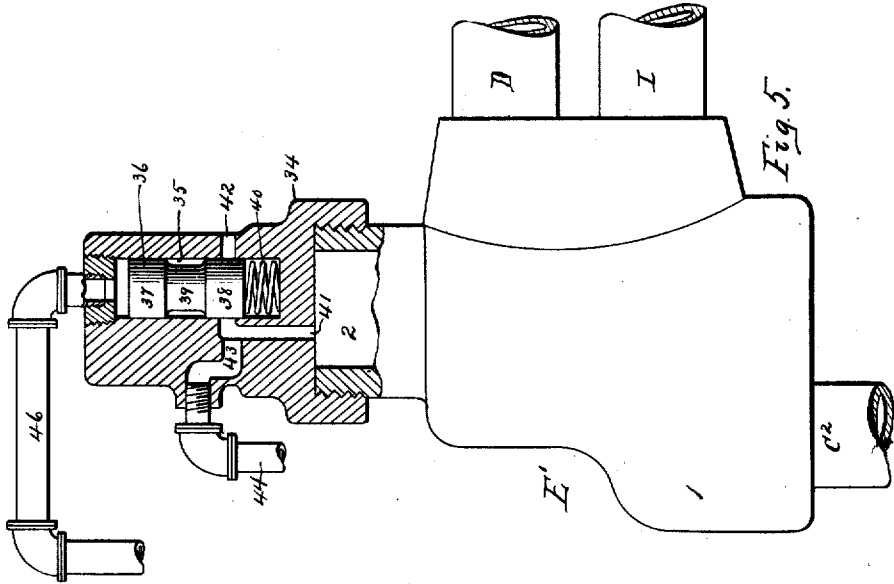
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Patented July 18, 1911.

4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

FREDERICK C. WEBER, OF NEW YORK, N. Y.

PUMPING SYSTEM.

998,059.

Specification of Letters Patent. Patented July 18, 1911.

Application filed June 22, 1910. Serial No. 568,256.

To all whom it may concern:

Be it known that I, FREDERICK C. WEBER, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Pumping Systems; and I declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make, construct, and use the same.

My invention relates to that class of pumping systems wherein pneumatic pressure is utilized to elevate the liquid to be pumped to a predetermined height, while the "head" or back pressure of the liquid so elevated is made to actuate a valve mechanism; and thus render the system automatic, so long as the pneumatic pressure is maintained. By the construction hereinafter described, I am enabled to very materially simplify the mechanism of such systems, and at the same time preserve all of the valuable features and functions of my former systems as exemplified both in my prior patents as well as in my pending application for Letters Patent.

Many other features of improvement will be disclosed in the course of the following detailed description, to which particular attention will be directed.

In the drawings accompanying this specification and forming a part thereof Figure 1 is a general view of my improved pumping system. Fig. 2 is a similar view of a modified form, designed for a specific purpose hereinafter to be fully set forth. Fig. 3 is a view of a still further modified form. Fig. 4 is a detailed sectional view of the automatic valve used in connection with the form shown in Fig. 1. Fig. 5 is a similar view of the valve as used in connection with the forms illustrated in Figs. 2 and 3. Fig. 6 is a detail sectional view of the diaphragm valves used in connection with the form illustrated in Fig. 3. Fig. 7 is a sectional view of a retaining valve, which may or may not be used in connection with the form shown in Fig. 1. Fig. 8 is a sectional view of the diaphragm valve, used with the form shown in Fig. 2. Fig. 9 is a sectional view of the retaining valve used with the form shown in Fig. 1.

Similar reference letters and numerals are applied to like parts throughout the specification and drawings.

In Fig. 1, I have shown my improvements in connection with the well tubing structure of my prior application—Serial No. 473,516, filed January 21, 1909—to which specific reference is made for a complete description of the parts and their mode of operation. For the present case it is enough to say that the air pressure is alternately admitted to and exhausted from the liquid chamber, thereby causing a simultaneous but alternate discharge and refill of the chamber. The air compressor and vacuum pump is shown at A; this may be of any desired or preferred type, operated by steam as shown or by electricity if desired. Pressure is stored in the reservoir B, whence it is lead by the pipe D to a valve E. The suction or vacuum side of the pump may be connected to the valve by pipe I, provision being also made for replenishing the system through the intake pipe K, should it be found that the air therein was becoming too greatly reduced. The pipe C leads from the valve E to the well tube C', or more properly speaking, to the liquid chamber *c*, which communicates with the well through the valve *d*, and with the main discharge pipe F, through the valve *e*, pipe *f* and tube *g*.

The purpose of the valve E is to so determine the admission of pressure to and exhaust the same from the liquid chamber *c* as to at once render the system complete, efficient and economical. Referring now to Fig. 4 for the details of the valve E, 1 represents the valve case which is provided with the upper piston chamber 2 and the lower valve chamber 3 in concentric alignment with each other, but of differential cross-sectional area; the upper chamber 2 being slightly larger than the lower chamber 3. Within these chambers is located the spool valve 4, the upper portion—or head—5 of which is fitted to the chamber 2, the lower portion—or head—6 fitted to the chamber 3, these parts being connected by the integral reduced connection 7. Surrounding the lower portion of the chamber 2 is the annular chamber 8 which is connected laterally with the pressure pipe D. The chamber 8 communicates through a passage 9 with the lower chamber 10, which in turn communicates directly with the pipe C, heretofore referred to, through the passage 11. The chamber 3 also communicates with the exhaust or vacuum tube I as clearly shown in the drawings. The upper chamber 2 is cov-

ered with the cap 12, which has a passage 13 communicating with the chamber 2. Within this cap 12 is a chamber 14, within which is the cylindrical plug valve 15, which is provided with the plug 15' extending into and fitting closely the passage 13 and is held upon its seat by means of the spring 16, the latter being adjustable by means of the thumbscrew 17, which passes through the screw threaded aperture in the cap 18. The exhaust passage 19 is provided in the cap 12, this passage being normally covered by the valve 15. In the upper head 5 of the valve 4, I locate a capillary by-pass 19' so as to afford communication from the chamber 8 to the chamber 2; the purpose of which will be hereinafter described.

The position of the valve 4 with its cylindrical heads 5 and 6 will be normally as shown in Fig. 4. When pressure is admitted through the pipe D, it will find its way through the passage 9, through the chamber 10, and thence by way of the pipe C to the liquid chamber *c*. This pressure will also pass through the capillary by-pass 19' to the chamber 2 where it will equalize both above and below the valve head 5. Inasmuch as this pressure is now exerted upon the valve head 5, the valve will be maintained in the position as illustrated. However, as the pressure accumulates in the chamber 2 it will be exerted upon the lower end 15' of the valve 15 gradually raising it against the tension of the compression spring 16 until the part 15' is free from the passage 13 thereby permitting pressure to act upon the entire area of the valve 15 when the said valve 15 will suddenly rise and open the port 19, (the latter being of very much larger diameter in cross-section than the by-pass 19'), thereby exhausting the chamber 2. Now, as the valve head 5 is slightly larger than the valve head 6, the differential of pressure will result in suddenly causing the valve 4 to rise to the upper limit of the chamber 2 thereby closing off the passage 9 and opening the chamber 10 to the exhaust or vacuum pipe I, through the annular passage 11 and chamber 3. In this manner the liquid chamber *c* is vented or exhausted. When the pressure is exerted upon the liquid in the liquid chamber *c* it will result in forcing the liquid therein past the valve *e* through the pipe *f* and out through the discharge pipe F into the tank G. The withdrawal of this pressure by the operation of the valve 4, as above described, will cause the liquid to again fill the chamber *c* until such time as the valve 4 shall fall by gravity to the position indicated in Fig. 4. It being understood that it takes but an instant to exhaust the chamber 2 when the valve 15 will again find its seat and cover the exhaust passage 19; the pressure from the pipe D will then find its way through the pas-

sage 19' into the upper end of the chamber 2, causing pressure to be exerted upon the upper end of the valve head 5, thereby assisting the restoring of the valve 4 to its normal position as shown. This operation of introducing pressure into the liquid chamber *c* from the pressure pipe D, the actuation of the valve 4 by this accumulated pressure in the chamber 2, and the consequent operation of the valve 4 to exhaust such pressure from the liquid chamber *c*, continues so long as the pressure in the reservoir B and the pipe D is maintained.

As a slight modification of this structure, I may provide what I term a retaining or unloading valve, as illustrated in Fig. 7, coupling the same to the cap 12 through means hereinafter described. In construction, this retaining or unloading valve is as follows:—It consists of a plain cylinder 20, within which is located the spool valve 21, the said spool valve being provided with the heads 22, 23, and the reduced connecting portion 24, as shown. The valve stem 25 projects through the cap 26 and is provided upon its upper end with a spring cap 27 between which and the cap 26 is located the compression spring 28, the normal tendency of which spring is to hold the valve 21 in its uppermost position so as to close the exhaust passage 29 from the port 30, directly opposite. I connect the port 30 by the pipe 31 with a passage 32 in the cap 12 so as to lead from the upper end of the chamber 2. The exhaust passage 29 is open to the atmosphere. The upper end of the cylinder 20 is connected by a pipe 33 to the discharge pipe F, so that as the "head" to which the liquid in the pipe F accumulates, back pressure is exerted through this pipe 33 to the upper valve head 22 and there acts in opposition with the spring 28. When this "head" has accumulated to a point where it overcomes the tension of the spring 28, the valve 21 is forced downwardly so as to bring the reduced portion 24 adjacent to the pipe 31 and thereby exhaust the chamber 2.

In Figs. 2 and 5, I have shown a slight modification of the form of the pump and valve. In this case the liquid chamber *c*¹ is partially submerged in the well, as shown, with the pipe C² connected to the valve E', as shown. The pressure pipe D and the exhaust pipe I are connected in the usual manner and as illustrated in Figs. 1 and 4. The casing 1 and the valve E' are identical with that illustrated in Fig. 4 as is also the valve 4 and the ports and passages within the casing. For the cap 12, however, I substitute a cap of a different form, as for example, that shown in Fig. 5 and designated by the reference numeral 34. This cap is provided with a cylindrical chamber 35, within which is located the spool valve 36, having the upper head 37 and lower head 38 and the re-

duced portion 39. Beneath this valve and in the lower part of the chamber 35, I locate the compression spring 40, the tendency of which is normally to hold the valve 36 in the upper portion of the chamber. Tapping the chamber 2 and the upper portion of the valve casing 1, is a passage 41 which leads laterally into the chamber 35 at a point normally covered by the valve head 38. Directly opposite this passage 41 is an exhaust passage 42. It will be seen by this construction, that when the valve 36 is forced downwardly against the spring 40 to a point where the reduced portion 39 will open the passage 41, the chamber 2 will be exhausted, thereby causing a sudden rise of the valve 4 within such chamber and the consequent opening of the pipe C² to the exhaust pipe I.

Leading laterally from the port 41 is a passage 43 to the outside of the cap 34, and from that point connected by the pipe 44 to an unloading valve 45, the details of which will be hereinafter fully described. Leading also from the upper end of the chamber 35 is a pipe 46 which also leads to the unloading valve 45. The details of the unloading valve 45 will be found in Fig. 8, which will hereinafter be fully set forth.

The lower end of the chamber c¹ is provided with a valve casting c², such valve casting having the intake 47 leading to the ball valve 48 and finding passage past said valve into chamber c¹. Located above the ball valve 48 is a similar ball valve 49, opening into the discharge F². This construction will be fully understood upon reference to Fig. 2. It will be understood, however, that when pressure is exhausted from the liquid chamber c¹, the liquid from the well will fill said chamber, passing therein through the intake 47, past the ball valve 48. When, however, pressure is admitted to said chamber or upon the surface of the liquid, said liquid will at once be driven therefrom past the valve 49 and be discharged through the discharge pipe F². If now some means is not provided for tripping the valve E¹ so as to prevent the complete discharge of all the liquid in the chamber c¹, a "blow-over" will occur, that is, all of the liquid will be driven out from the chamber c¹ through the discharge pipe F², and the compressed air will follow and be wasted. The unloading valve 45 is provided to prevent this difficulty. This valve 45 is located on the discharge pipe F², at a point at or about equal to the height to which it is desired to retain the liquid in the chamber c¹, so that a liquid seal will be constantly maintained for the two valves 48 and 49.

The unloading valve 45 consists of the two castings 50 and 51 so formed as to provide an interior chamber, this chamber being divided by means of the diaphragm 52. The casting 50 is connected directly with the

pipe F² by means of the pipe 53. The casting 51 is provided with an apertured boss 54 at the inner end of which is a valve seat 55. Mounted upon the diaphragm 52 and in a position to register with the valve seat 55 is the plain plug valve 56. The operation of this valve is such that when pressure is exerted through the pipe 53, it will cause a seating of the valve 56, so as to close the passage through the boss 54. As above indicated the pipe 44 leads to the unloading valve 45 as shown, and is connected through the casting 51 to the left-hand side of the chamber so that the pressure through the pipe 44 acts in opposition to that through the pipe 53. The pipe 46 leading from the valve E¹ is connected to the apertured boss 54, as shown.

The operation of the device is as follows: Pressure is admitted through the pipe D in the manner heretofore described and finds its way through the valve E¹ into the liquid chamber c¹, thereby driving the liquid therefrom out through the discharge pipe F². The pressure from the pipe D also finds its way into the chamber 2 in the upper end of the valve casing E¹. This pressure can pass through the passages 41 and 43 to the pipe 44 whence it is exerted upon the left hand side of the diaphragm 52. As the liquid from the chamber c¹ rises in the pipe F², its "head" will exert a back pressure through the connecting pipe 53 upon the right-hand side of the diaphragm 52, in opposition to that through the pipe 44 but the pressure in the pipe D is a continually increasing pressure so that there comes a time when the pressure in the pipe 44 will overbalance the pressure due to the "head" of the liquid in the pipe F². When this point occurs, the valve will be unseated, thereby permitting the pressure from the pipe 44 to pass into the pipe 46 and thence to the upper end of the chamber 35 and cause a sudden depression of the valve 36 and a consequent venting of the chamber 2. This sudden venting of the chamber 2, as heretofore described, causes the shifting of the valve 4 so as to close off the passage of pressure from the pipe D into the liquid chamber c¹ and simultaneously venting said chamber through the exhaust pipe I. When this occurs, the chamber c¹ will again fill with liquid, either due to gravity or due to the vacuum formed in the chamber if the pipe I is connected to the vacuum side of the air compressor. The venting of the chamber 2 and the pipe 44 and its connected parts will cause an immediate restoration of the valve 56 to its seat and a consequent restoration of the valve 36 to the position where the exhaust 42 is closed. The accumulation of pressure from the pipe D in the chamber 2, will again take place and the cycle of operation will be repeated.

In Fig. 3, I have shown a modification of the system designed for surface pumping where it is intended to elevate water from a surface pipe or a source of liquid supply which is not so deep in the ground as those for which the forms illustrated in Figs. 1 and 2 are designed. In this form I use the same valve E^1 as illustrated in Fig. 5, having the pressure pipe D and the exhaust or vacuum pipe I, together with the connecting pipe C^3 , the pipes 44' and 46' leading to diaphragm valves 45' and 45² structurally similar in all respects with the valve 45 shown in Fig. 8, with the exception that from the pressure side of valve 45' I lead the pipe 57 to the valve 45². The pressure side of this latter valve, however, is operated in a manner hereinafter to be described. The liquid chamber 58 of this system has its supply from a supply pipe 59 through an ordinary check valve 60 and its discharge through an ordinary check valve 61 and discharge pipe 62.

In order to preserve the liquid seal for the check valve 60 and 61, it is necessary that the liquid in the liquid chamber 58 be never completely discharged, and to accomplish this I connect the valve 45' with the discharge pipe 62 at a height substantially the same as the lowest level of the liquid in the liquid chamber 58, and the valve 45² with some part of the discharge pipe or chamber 58 and between the check valves 60 and 61. It should be stated at this point that the upper side of the diaphragm valve 45² is open to the atmosphere through the exhaust as shown.

The operation of the system is as follows:—
The ordinary liquid level in the chamber 58 is designed to be maintained by gravity, the same being supplied through the intake pipe 59, and standing at the same height in the discharge pipe 62. Upon air pressure being introduced into the liquid chamber through the pipe D, valve E^1 and connecting pipe C^3 , this liquid is driven out past the check valve 61 and through the discharge pipe 62. The liquid pressure in the chamber 58 passes through the tube 64 to the lower side of the diaphragm valve 45² so as to raise the valve plug 56² toward its seat, and it is so adjusted that when chamber 58 is filled to its maximum capacity with water the back pressure is just sufficient to force the valve 56² upon its seat while with less back pressure it will stand open and thus vent the pipe 44. As the air pressure accumulates in the liquid chamber 58 due to the liquid head in the discharge pipe 62 there is a simultaneous passage of pressure from the chamber 2 in the valve E^1 which pressure passes through the passages 41, 43, and pipe 44' to the right hand side of the diaphragm valve 45'. This pressure is balanced on the opposite side of the diaphragm from the discharge pipe 62,

but since this latter pressure can never rise to a point higher than that due to the liquid head or height of the discharge opening in said pipe there comes a time when the pressure on the right-hand side of the diaphragm will overbalance the liquid pressure on the left-hand side and thereby unseat the valve plug 56' and permit the escape of the pressure through the pipe 46' to the upper end of the chamber 35 in the valve cap 34 of the valve E^1 . This will result in the sudden depression of the valve 36 against the spring 40 and a consequent venting of the chamber 2 and the pipe 44, resulting in the sudden elevation of the valve 4 and the seating of the valve plug 56'. This will be followed by the exhaustion of the chamber 58 and an unseating of the valve 56² (provided the supply head in 59 is less than the maximum height of the liquid in 58, for which the valve 56² is adjusted), either by suction through the pipe I from the air compressor or to the open atmosphere in case the pipe I is not connected to the suction side of the air compressor. Liquid will now begin to rise in the liquid chamber 58, and will continue to so rise until said chamber is filled, by which time, the valve 4 will have again been restored to its seat as indicated in Fig. 4, while the back pressure of the liquid will again seat the plug 56², when the cycle of operation will be completed. The location of the valve 45' at a point on the discharge pipe 62 equal to the lowest level to which the liquid is intended to fall, is an important feature of my invention, for the reason that as the pressure accumulates in the chamber 58 such pressure must overbalance the back pressure due to the liquid in the discharge pipe 62, and inasmuch as this is simultaneously exerted upon the right hand side of the diaphragm valve 45' the lowering of the liquid level in the chamber 58 cannot continue for more than two or three inches below the location of the valve 45' before tripping.

In Fig. 9, I have shown a slight modification of the structure shown in Fig. 4. In this case the valve 15 is held upon its seat by the weight 16', carried by the lever 17' which is fulcrumed at 18' upon an arm 18², the latter being fixed to some part of the valve case 1. The stem 17² rests upon the valve 15 and supports the weighted lever 17' as shown. The operation will be readily understood without further description.

I claim:

1. In a pumping system, the combination of a source of fluid pressure supply, a liquid chamber having inlet and discharge valves, means for admitting fluid pressure from said supply to said chamber, and for exhausting said pressure therefrom, said means including a differential pressure and gravity actuated valve.

2. In a pumping system, the combination of a source of fluid pressure, a liquid chamber, liquid inlet and discharge valves for said chamber, a differential pressure and gravity actuated valve for admitting pressure from said supply to, and exhausting the same from said liquid chamber.

3. In a pumping system, the combination of a source of fluid pressure supply, and a source of liquid supply, a liquid chamber, a valved inlet connection between said chamber and said liquid supply, a valved discharge pipe leading from said chamber, and a differential pressure and gravity actuated valve for admitting fluid pressure from said supply to said chamber and for exhausting the same therefrom.

4. In a pumping system, the combination of a source of fluid pressure supply, a source of liquid supply, a liquid chamber, a valved inlet connection from said liquid supply to said chamber, a valved discharge pipe leading from said chamber to a level higher than that of said liquid supply and a valve actuated by gravity for admitting fluid pressure from said fluid pressure supply to said chamber, and actuated by differential pressure from said fluid pressure supply to exhaust said fluid pressure to said liquid chamber, whereby liquid is successively drawn into and discharged from said liquid chamber.

5. In a pumping system, the combination of a liquid chamber having a valved inlet, and a valved discharge pipe, means for introducing air pressure to and exhausting the same from said chamber, to cause influx of liquid thereto and discharge therefrom, said means including a differential pressure and gravity actuated piston valve.

6. In a pumping system, the combination of a liquid chamber, a valved liquid inlet and a valved discharge pipe for said chamber, a valve for exhausting the pressure from said chamber to cause an influx of liquid thereto through said valved liquid inlet and for admitting fluid pressure to said chamber to cause a discharge of the liquid therefrom, means governed by the height at which said liquid is discharged for actuating said valve.

7. In a pumping system, the combination of a liquid chamber, a valved liquid inlet and a valved discharge pipe connected to the lower end of said chamber, a valve for exhausting pressure from said chamber to cause a rise of liquid therein and for admitting pressure thereto to cause a discharge of liquid therefrom through said valved discharge pipe, means for actuating said valve, said means governed by the differential of fluid pressure in said chamber and liquid pressure in said discharge pipe.

8. In a pumping system, a valve, gravity means for actuating said valve to admit

fluid pressure to the pumping mechanism, differential pressure actuated mechanism for operating said valve to exhaust said pressure from said pumping system.

9. In a pumping system, a valve actuated by gravity to admit fluid pressure to said system, and means for permitting a differential pressure to actuate said valve against gravity to exhaust the fluid pressure from said system.

10. In a pumping system, a valve, gravity means for actuating said valve to admit fluid pressure to the pumping mechanism, a differential pressure piston connected to said valve for releasing accumulated pressure upon the upper side of said piston to cause the same to actuate the said first named valve to exhaust pressure from said system.

11. In a pumping system, a main valve, gravity means for actuating said valve to admit fluid pressure to said system, a supplemental valve, means for permitting a predetermined accumulated pressure in said system to actuate said supplemental valve to permit a differential fluid pressure to operate said main valve against the gravity means to exhaust the fluid pressure from said system.

12. In a pumping system, a differential pressure and gravity actuated valve comprising a valve case, having a pressure inlet port and an exhaust outlet port, a service pipe and a valve chamber therein, a valve in said chamber in a position to close the same from said inlet port, a capillary bypass connecting said inlet port and said chamber around said valve whereby pressure may gradually fill said chamber above said valve and thereby equalize the pressure therein with that below said valve, means for exhausting said chamber above said valve to cause a sudden movement of said valve to close said inlet port and simultaneously open said service pipe to said exhaust port.

13. In a pumping system, a differential pressure and gravity actuated valve comprising a valve case having a pressure inlet port, an exhaust port, and a chamber therein, a piston in said chamber, a valve connected to said piston to alternately connect said service port with said inlet and exhaust ports respectively, a by-pass in said piston for equalizing pressure above and below the same, and differential pressure actuated mechanism for exhausting the pressure above said piston to cause the same to shift said valve.

14. In a pumping system, the combination of a liquid chamber provided with valved inlet and discharge passages at its lower end, a discharge pipe connected to said discharge passage, a differential pressure and gravity actuated valve connected

with said chamber for admitting pressure thereto and exhausting the same therefrom, a pipe connection between said discharge pipe and said valve, a diaphragm valve in said pipe connection, said valve being held closed by liquid pressure from said discharge pipe and intermittently opened by fluid pressure from said first named valve whereby said fluid pressure is permitted to escape back to and actuate said first named valve to exhaust said liquid chamber.

15. In a pumping system, the combination of a combined air compressor and a vacuum pump, valve mechanism comprising a valve casing, pressure and vacuum ports, and pipes connecting said casing with said pump, a service port and pipe, a valve member in said casing, means actuated by gravity for shifting said valve member to connect said pressure port and pipe with said service pipe and means actuated by a difference of pressure in said pressure and service pipes for shifting said valve member to connect said service pipe with said vacuum port and pipe.

16. Valve mechanism for pumping systems comprising a valve casing, pressure and exhaust or vacuum pipes leading to said casing, a discharge pipe connected to said casing through a liquid chamber and service pipe, a valve member within said casing, gravity means for actuating said valve member to connect said pressure pipe with said service pipe and liquid chamber, and means actuated by a difference of pressure in said pressure pipe and said discharge pipe for actuating said valve to connect said liquid chamber and service pipe with said exhaust or vacuum pipe.

17. In a pumping system, the combination of a liquid chamber having a valved inlet and a valved discharge pipe at its lower end, a combined vacuum and compressor pump for producing alternate conditions of vacuum and pressure in said chamber, to cause liquid to fill said chamber and to discharge the same therefrom through said discharge pipe, and valve mechanism for reversing said conditions in said chamber, said valve mechanism being actuated by gravity to admit pressure to and by differential pressure between said liquid chamber and said discharge pipe to withdraw pressure from said liquid chamber.

18. In a pumping system, the combination of a liquid chamber, a valved discharge pipe and a valved inlet connected to the lower end of said chamber, an air compressor, a pipe connection between said compressor and said chamber, a differential pressure and a gravity actuated valve located in said pipe connection, a differential pressure actuated valve connected to said discharge pipe adjacent to its lower end, a pipe connecting said valve to the first named valve to admit pressure therethrough to said second named valve to act in opposition to liquid pressure from said discharge pipe whereby a liquid seal for said valved inlet and discharge pipes is maintained.

This specification signed and witnessed this 21st day of June 1910.

FREDERICK C. WEBER.

Witnesses

BENJ. C. SLOAT,
LOUIS M. SANDERS.