No. 882,085. PATENTED MAR. 17, 1908.

M. WARREN.

FLUID PRESSURE GENERATOR.

APPLICATION FILED SEPT. 22, 1906.

3 SHEETS—SHEET 1.

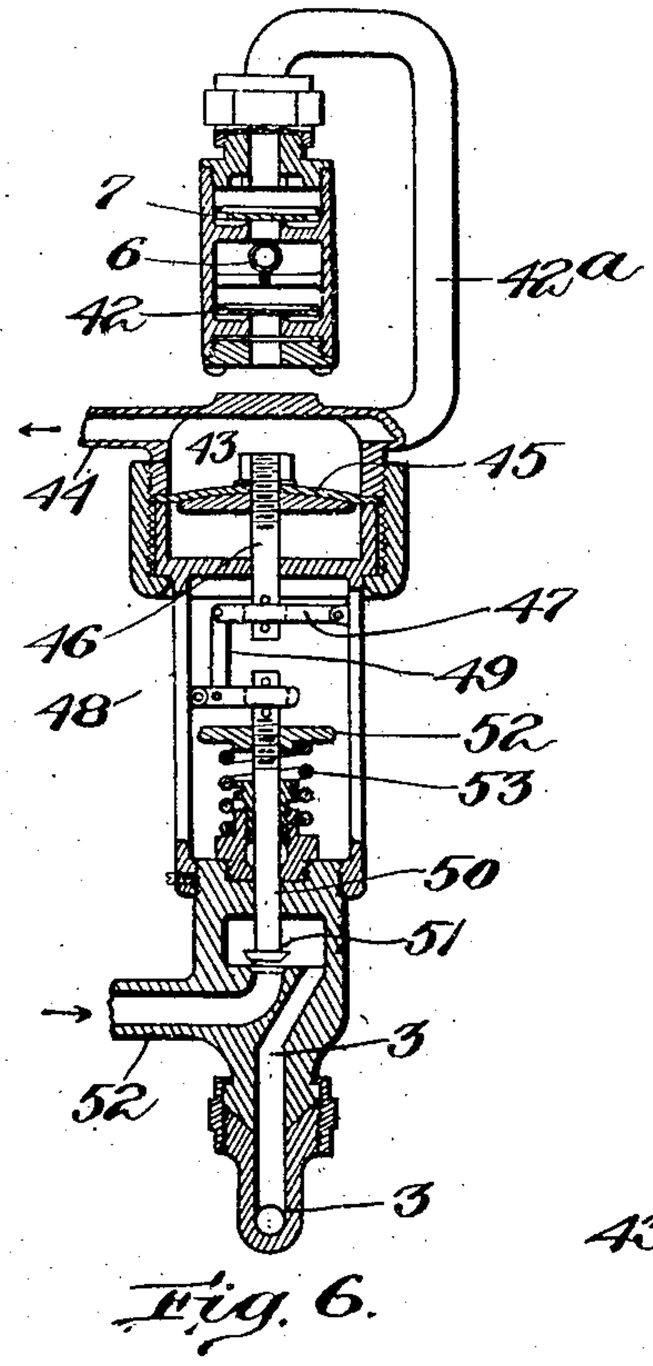

Fig. 6.

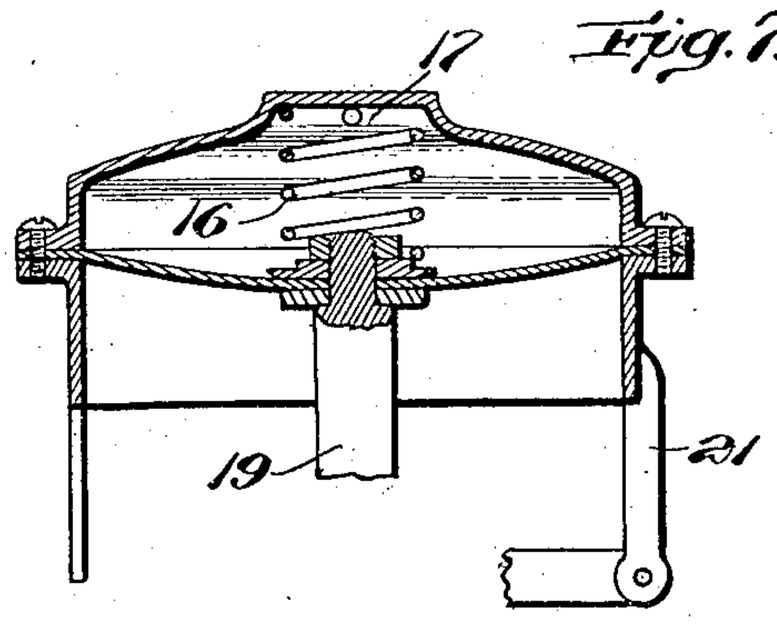

Fig. 7.

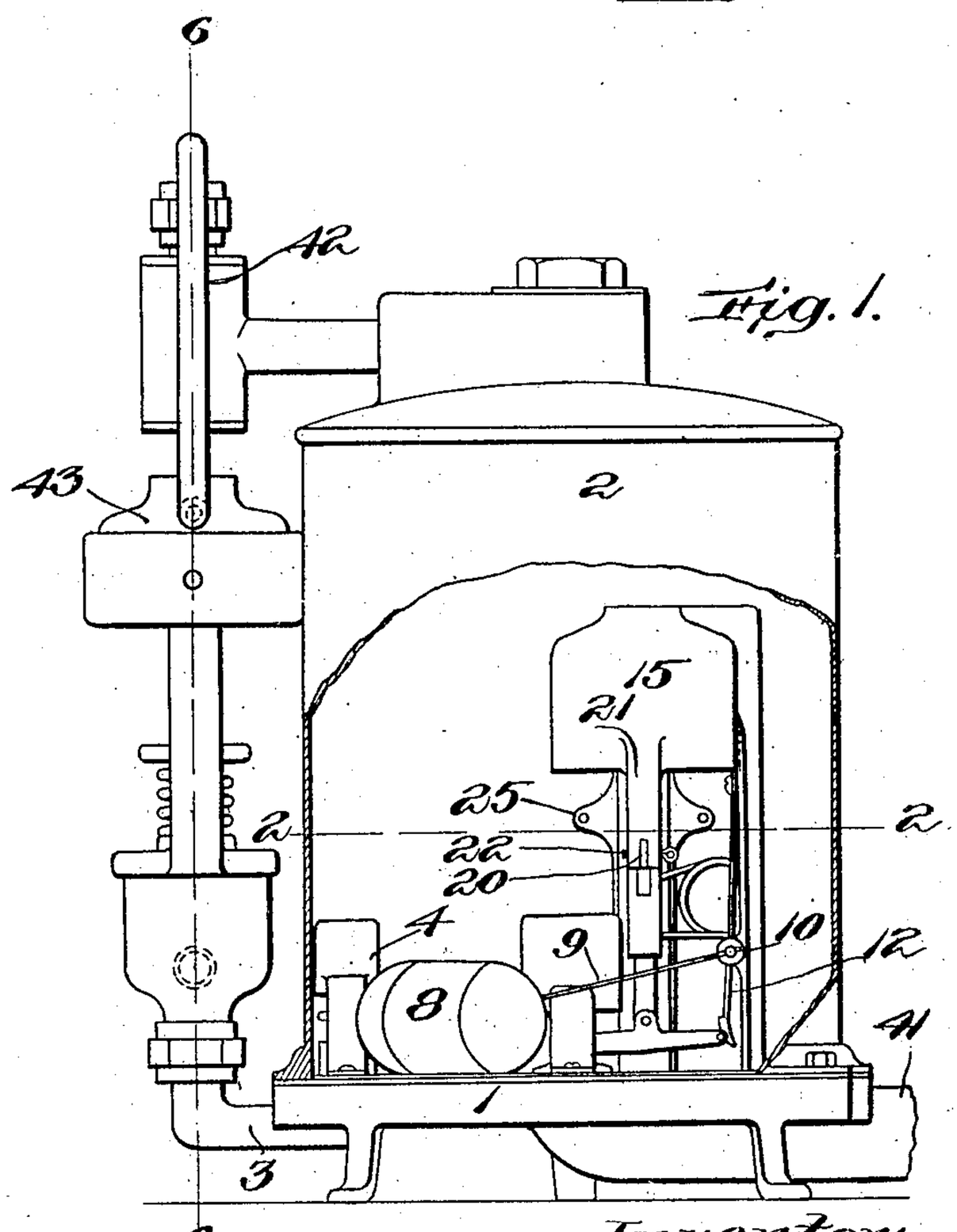

Fig. 1.

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3 SHEETS—SHEET 2.

Fig. 2.

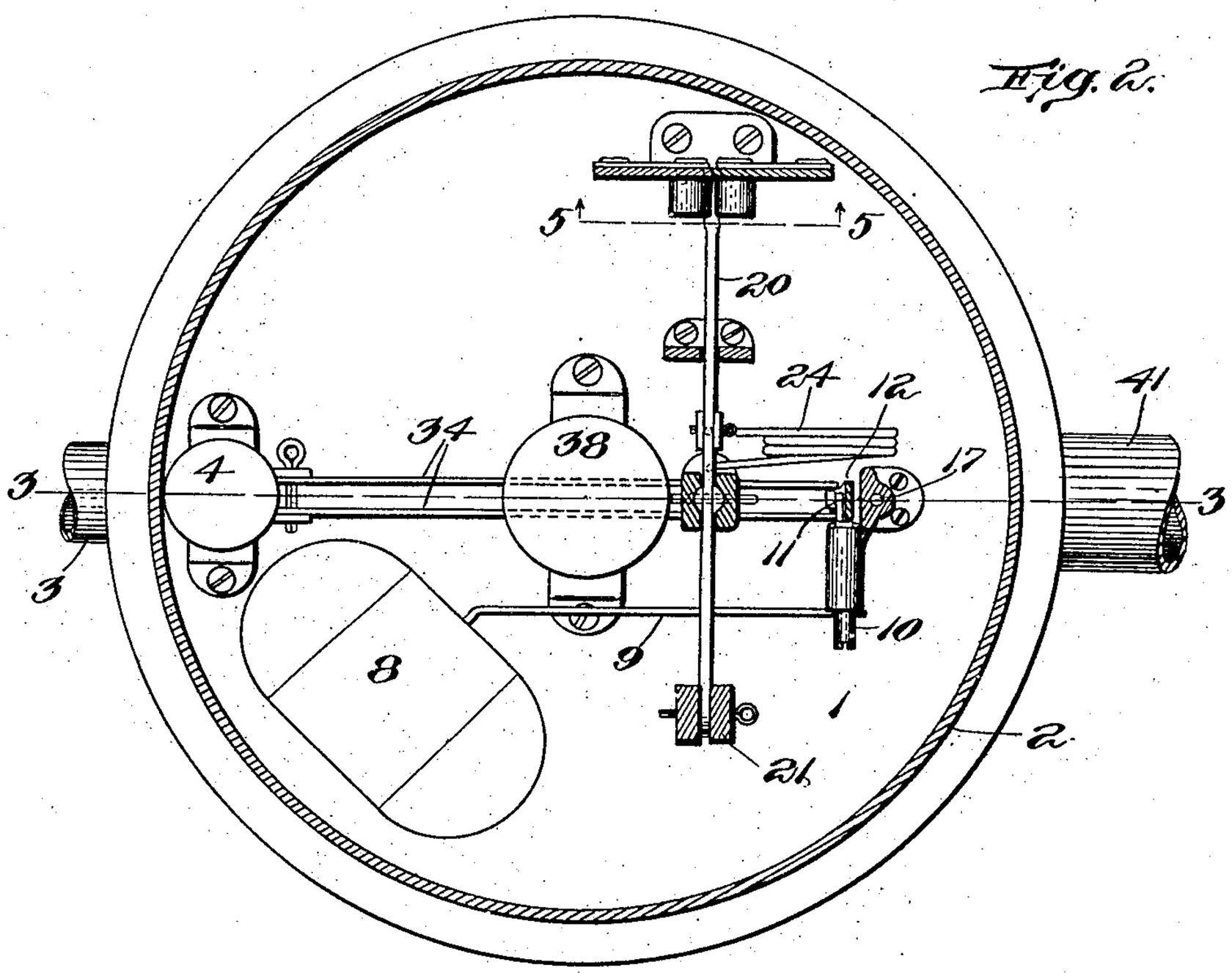


Fig. 4.

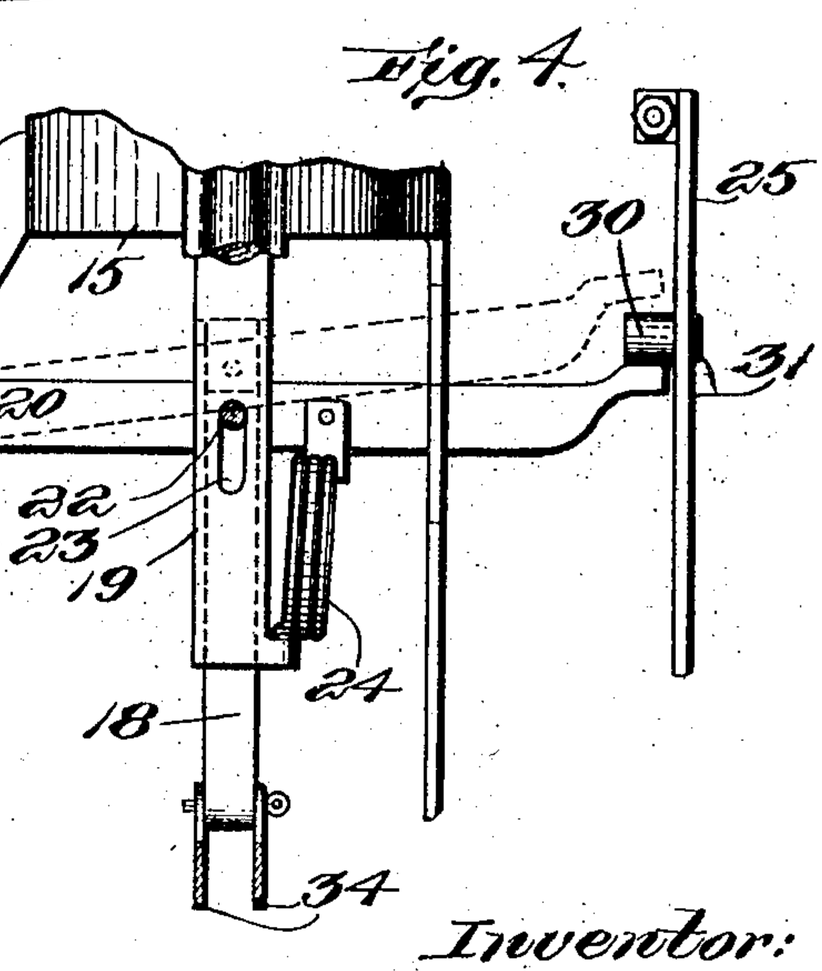
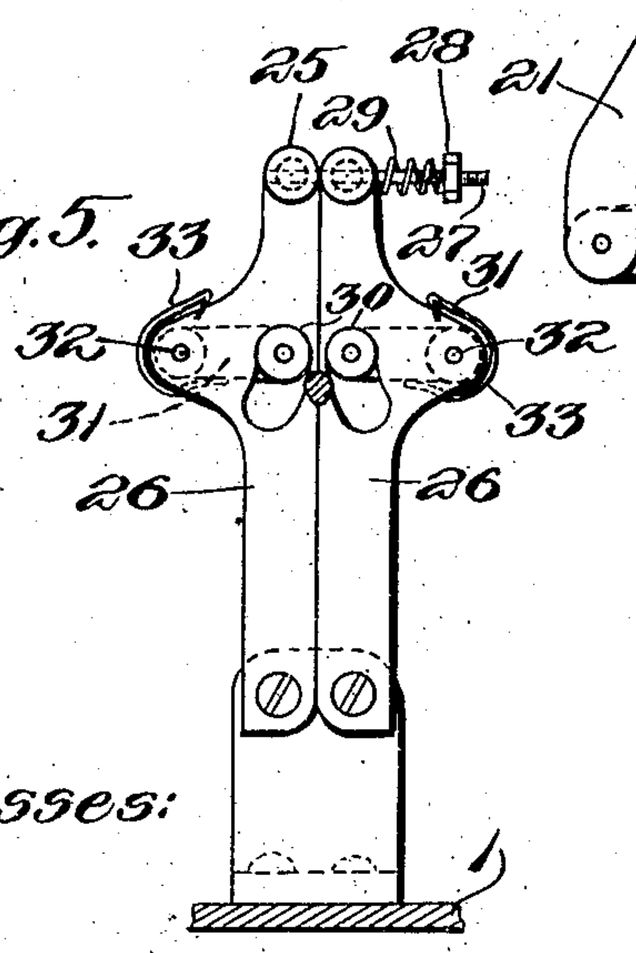


Fig. 5.



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3 SHEETS—SHEET 3.

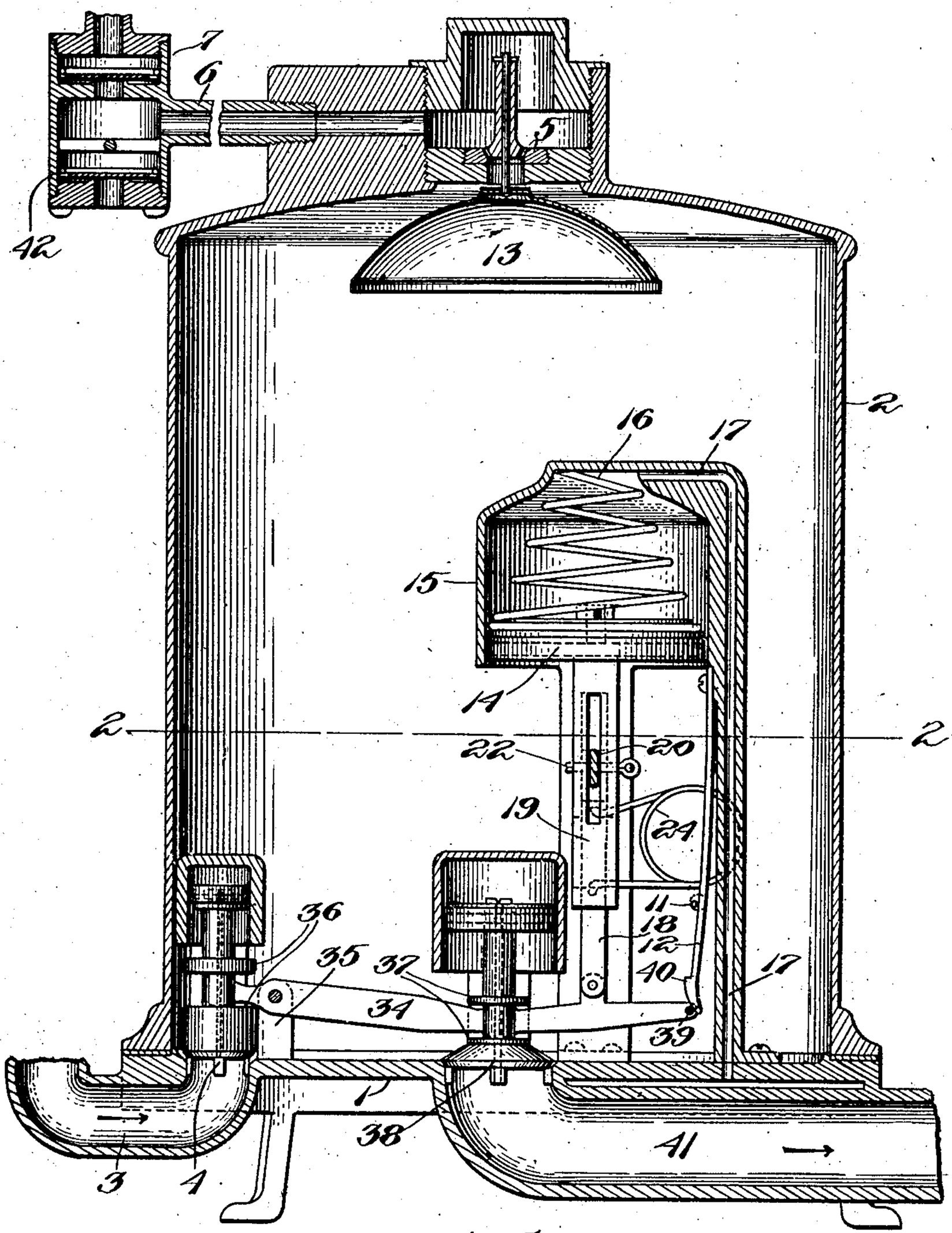

Fig. 3.

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UNITED STATES PATENT OFFICE.

MARION WARREN, OF ROCHESTER, NEW YORK.

FLUID-PRESSURE GENERATOR.

No. 882,085. Specification of Letters Patent. Patented March 17, 1908.

Application filed September 22, 1906. Serial No. 335,680.

To all whom it may concern:

Be it known that I, MARION WARREN, a citizen of the United States, and resident of Rochester, in the county of Monroe and State of New York, have invented new and useful Improvements in Fluid-Pressure Generators, of which the following is a specification.

In the accompanying drawings,—Figure 1 is a side elevation of my improved fluid pressure generator, partly broken away; Fig. 2 is a section on line 2—2 of Fig. 1; Fig. 3 is a vertical section on line 3—3 of Fig. 2; Fig. 4 is a detail view of the valve actuating mechanism hereinafter described; Fig. 5 is a section on line 5—5 of Fig. 2; Fig. 6 is a section on line 6—6 of Fig. 1; Fig. 7 is an alternative construction of the cylinder, hereinafter described.

As will be seen by reference to the drawings, my improved fluid pressure generator consists of a base 1 to which is secured a dome 2. Water under pressure, ordinarily from the city supply, is admitted through a pipe 3 (Fig. 3) controlled by a valve 4 which is shown in its open position and gradually fills the dome 2. As the water rises the air above it is forced out through passage way 5, and 6 and through the check valve 7 to a reservoir. When the water level reaches a sufficient height a float 8 is lifted.

The float 8 is connected by an arm 9 to one end of a shaft 10. At the opposite end of the shaft 10 is the eccentrically mounted pin 11. The location of the pin 11 is such that as the shaft 10 is turned by the rising of the float 8 the pin 11 is moved away from a latch arm 12, allowing said latch arm to spring inward for the purposes hereinafter set forth.

After the water level rises slightly higher than the lower edge of a bell 13 the air confined in the bell lifts the latter and closes the passage way 5 against further escape of the air confined in the dome. It is evident that this will not take place until practically all of the air has been expelled from the dome which will avoid any waste of energy in compressing air which will not pass to the reservoir. As there is no means of escape for the water, the whole pressure of the main supply is exerted on the inside of the dome. This pressure is enough to cause the piston 14 to rise in the cylinder 15 against a spring 16 as the upper side of the piston is open to the atmosphere through a passage-way 17. I prefer to use a cylinder and piston as shown in Figs. 1 and 3 but a diaphragm may be employed if desired. A vertical section of a cylinder using a diaphragm is illustrated in Fig. 7.

A telescopic piston rod is secured to the piston 14, (see Fig. 3 and 4) the upper end, 19, of the piston rod sliding over the lower end 18. Passing through a slot in both portions of said piston rod is the lever 20 which is fulcrumed to a support 21 attached to the cylinder 15. This lever 20 is connected to the rod 19 by the pin 22. The pin 22 passes through a slot 23 (Fig. 4) in the upper portion of the piston rod 19. A spring 24 one end of which is fixed to a lug on the lower end of rod 19 and the other end to the lever 20, tends to hold the pin 22 at the upper end of the slot 23.

At the free end of lever 20 is a yielding abutment 25 shown in Fig. 5. This abutment is composed of two arms 26 pivoted at their ends and held together at the upper ends by the stud 27 the nut 28 and a spring 29. Two rolls 30 are mounted on the arms 26 at a point just above the free end of the lever 20 when it is in its lower position as shown in full lines in Fig. 4. The distance between the rolls 30 is slightly less than the width of the lever 20 so that lever 20 will have to force the two arms 26 apart against the pressure of the spring 29 in passing between said rolls.

The rolls 30 are mounted on the ends of two arms 31 pivoted at 32 and normally held horizontal by two springs 33. It will be necessary for the lever 20 to spread the two arms 26 in order to rise as has been described but in returning to its normal position the pressure of the lever 20 on the top of the rolls 30 will cause the arms 31 to drop and allow the said lever to pass downward opposed only by the springs 33. After the lever 20 has passed the said rolls the spring 33 will return the rolls to a horizontal position.

I will now explain the purpose of the above described yielding abutment.

The piston 14 is forced upward by the full pressure from the water mains as has been described. When this pressure becomes effective by the stoppage of the outlet as hereinbefore described, the first result will be the lifting of the rod 19 with the piston 14 until the lower end of the slot 23 strikes the pin 22. When the water pressure on the piston 14

has raised it to a sufficient extent, the pressure of the lever 20 will overcome the force of the spring 29 and said lever will be elevated to its uppermost position by the spring 24 shown in dotted lines in Fig. 4. It will be understood that this operation will take place with great rapidity. The movement of the lower portion of the piston rod 18 which is pivotally attached to lever 20 is instantaneous, so to speak. By adjusting the nut 28 which forms one abutment of the spring 29 various pressures may be exerted to oppose the rising of the lever 20. This adjustment will be necessary on account of the different pressures on the water supplies in different localities.

Pivoted to the lower end of the rod 18 (Fig. 3) is the lever 34. This lever is fulcrumed on a fixed standard 35. The outer end of the lever 34 engages two collars 36 of the valve 4 and on the opposite side of the fulcrum 35 the said lever engages two collars 37 of the valve 38. Both of the said valves are of the well known balanced type. The lever 34 may be made of two pieces of sheet metal as shown in Fig. 2. At the opposite end from the valve 4, on the lever 34 is a pin 39 adapted to engage the latch 40.

When the lower portion of the piston rod 18 is elevated as has been described it is evident that the valve 4 will be closed and the valve 38 will be opened. The valve 38 will allow the water to escape through the exhaust pipe 41. When lever 34 is operated as above the pin 39 will be engaged by the latch 40 and held in that position until released as follows. As the water level is lowered by the water escaping through the valve 38, the pressure on the piston 14 is released. The piston will descend until the upper end of the slot 23 rests on the pin 22. At this point it will be held from further movement by the latch 40 through the connections described. When the water level has reached a certain point the float 8 will descend with the water. At this time the reverse movement to that described of the float 8 and shaft 10 will take place; that is, the pin 11 will rotate and return the latch arm 12 to its original position thereby disengaging the pin 29 from the latch 40. On the instant that the pin 39 is released the spring 24 will force the rod 18 downward and practically instantaneously close the exhaust valve 38 and open the inlet valve 4. By the proper adjustment of the float 8 and connecting members this operation will not take place until all the water has escaped. As the water level has been lowering, a fresh supply of air has been drawn in through the check valve 42 and the passage ways 6 and 5. The generator is now in the position to repeat its cycle as has been described. I will now consider the air pressure regulating mechanism which is best shown in Fig. 6. After the compressed air passes the check valve 7, as has been described, it passes through a pipe 42ª into the chamber 43, on the upper side of a diaphragm 45, and then through a pipe 44 to the reservoir. By this construction the air pressure in the reservoir is constantly exerted on the diaphragm 45 but is prevented from flowing back into the dome 2 by the check valve 7.

Attached to the under side of the diaphragm 45 which is open to the atmosphere, is the diaphragm rod 46. Any vertical movement of the rod 46 is transmitted to the rod 50 by means of two levers 47 and 48 connected by the link 49. At the lower end of rod 50 is a valve 51 which is adapted to close upon being thrust downward. This valve 51 controls the water supply which enters through a pipe 52, passes the valve 51 and then flows through the pipe 3 which is shown broken off in Figs. 2 and 3. Near the upper end of the rod 50 is a thumb nut 52 by means of which the pressure of a spring 53 may be regulated. If the air pressure in the chamber 43 goes above the desired point, the downward pressure on the diaphragm 45 will overcome the upward pressure of the spring 53 and the rod 50 will be depressed thereby closing the valve 51. This will shut off the water supply and the pump will remain idle until the valve 51 is released by the fall of pressure above the diaphragm 45.

By this construction I have means to set my generator to any water pressure which may be used, by the nut 28, and means to maintain any desired pressure of air in the reservoir by adjusting the thumb nut 52.

I claim as my invention:

1. In a fluid pressure device, the combination of a cylinder 2; water inlet and outlet valves controlled by a lever; an auxiliary motor operated by water pressure and connected by a telescoping piston rod to the valve operating lever; a spring, one end of which is connected to one member of the telescoping piston rod and the other end of which is connected to the other member of the telescoping piston rod; detents to retain the valve lever in one position until a predetermined time and means to control the operation of the detents.

2. In a fluid pressure device, the combination of a cylinder 2; water inlet and outlet valves; an auxiliary motor; means connecting the inlet and outlet valves to actuate them in opposition; a telescoping connection between the valve connecting means and the auxiliary motor; a spring 24 interposed between the two parts 18, 19, of the telescoping connection; a detent obstructing the upward movement of the telescoping member 18 attached to the valve connecting means; all organized substantially as described, to cause the auxiliary motor to compress the spring by the upward move-

ment of member 19, until the resistance of the detent is overcome and the valves suddenly reversed by the elevation of member 18.

3. In a fluid pressure device, the combination of a cylinder 2; water inlet and outlet valves; means connecting the inlet and outlet valves to actuate them in opposition; a telescoping connection between the valve connecting means and the auxiliary motor; a spring 24 interposed between the two parts 18, 19 of the telescoping connection; a detent preventing the downward movement of the member 18, attached to the valve connecting means; means to actuate this detent at a predetermined point, as the water escapes, all organized, substantially as described, to cause the auxiliary motor to compress the spring 24, by the downward movement of member 19 to suddenly reverse the valves through member 18 when the detent is tripped.

4. In a fluid pressure generator a float 13 suspended at the top of the dome 2, a cylinder, and a piston within that cylinder open upon one side to the atmosphere and upon the other to the water in the dome; means to give resistance to the movement of the piston; all organized to cause the closing of the air outlet by the float 13 to make effective the water main pressure upon the piston to operate the valves.

Signed by me at Rochester, New York, this nineteenth day of September, 1906.

MARION WARREN.

Witnesses:
ROY C. WEBSTER,
HENRY V. WOODWARD.