

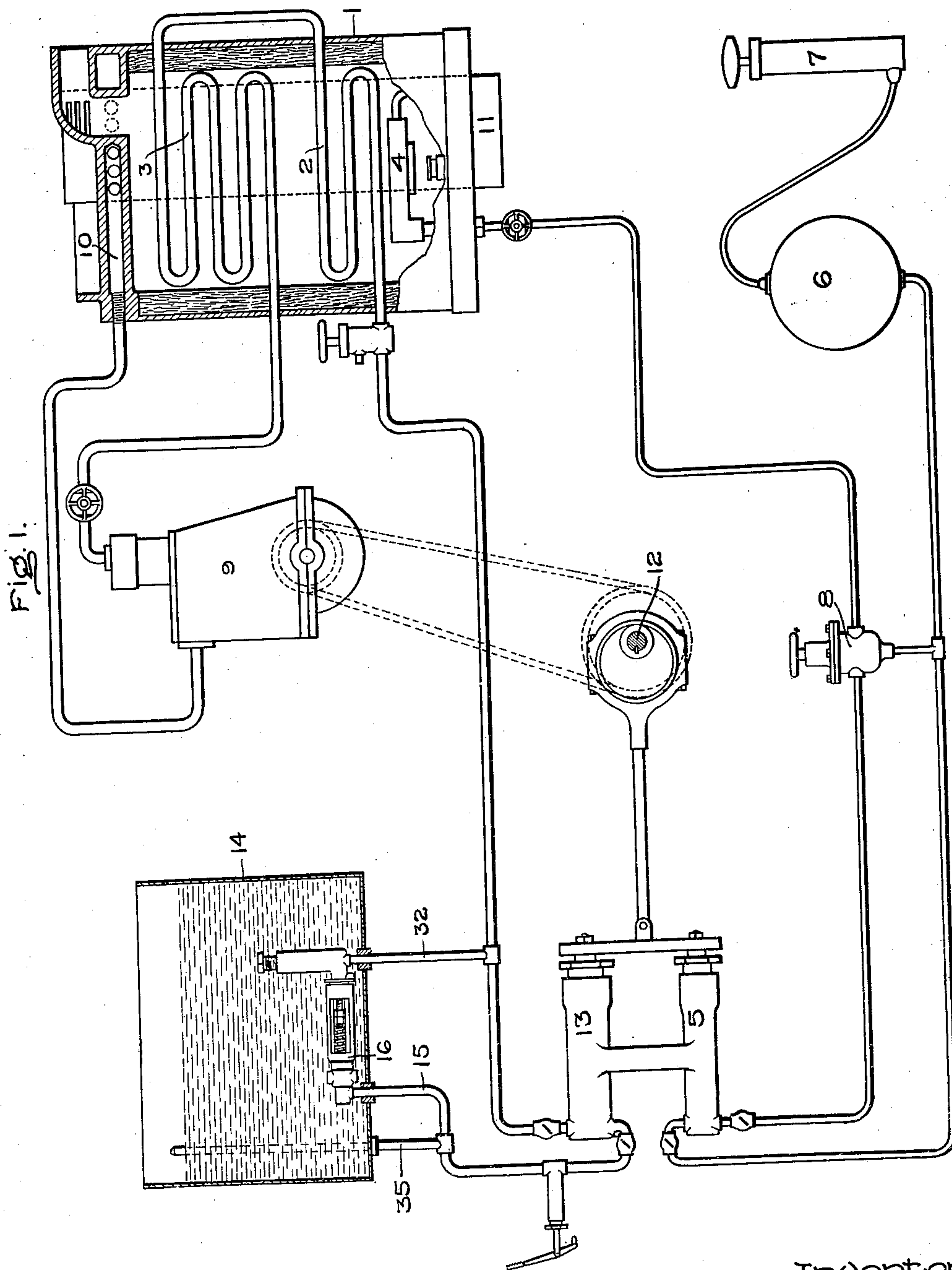
No. 822,276.

PATENTED JUNE 5, 1906.

E. D. HODSDON.  
PRESSURE REGULATED SUPPLY VALVE.

APPLICATION FILED NOV. 29, 1902.

2 SHEETS—SHEET 1.



Witnesses:

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Alfred Macdonald.

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Fig. 2.

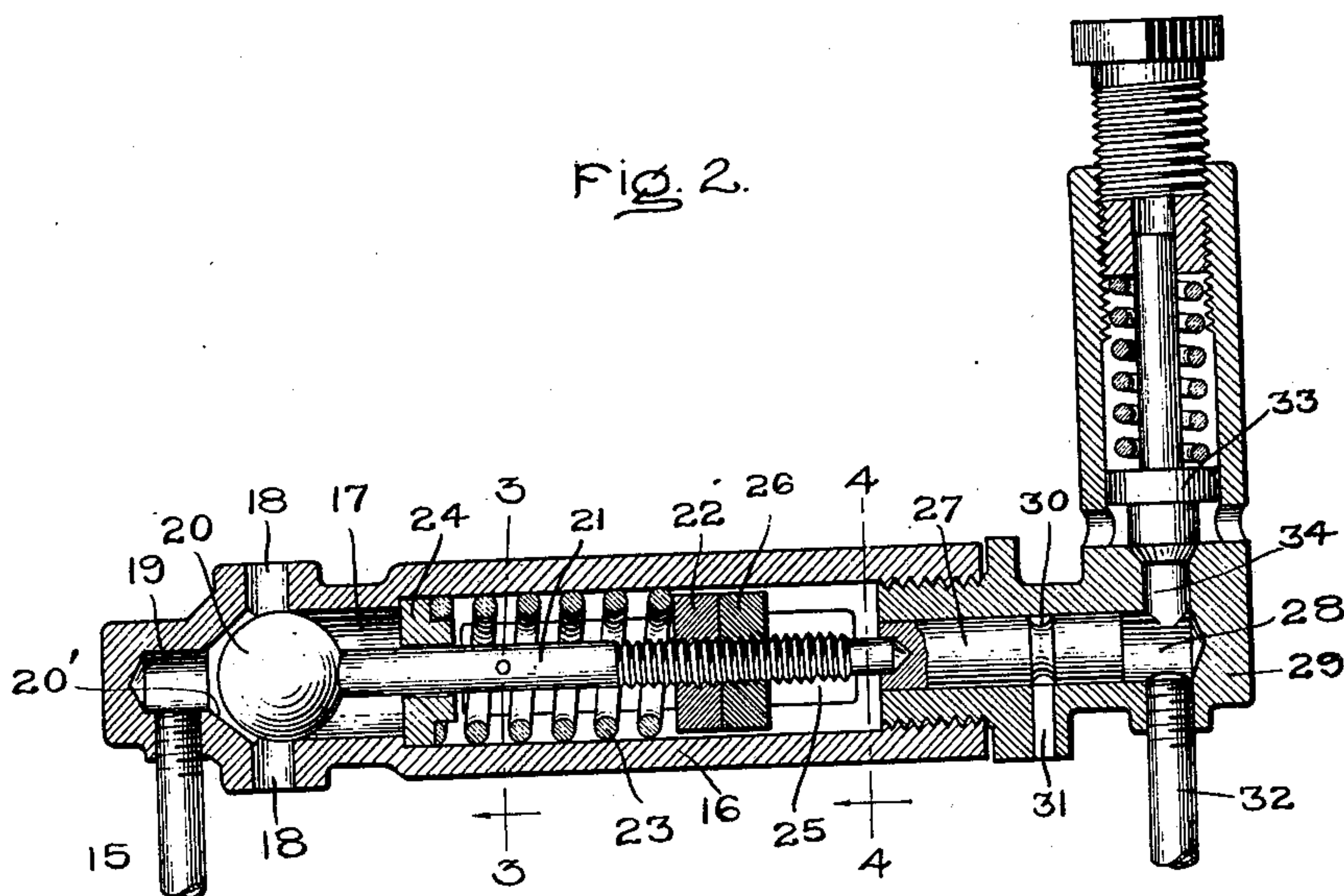


Fig. 3.

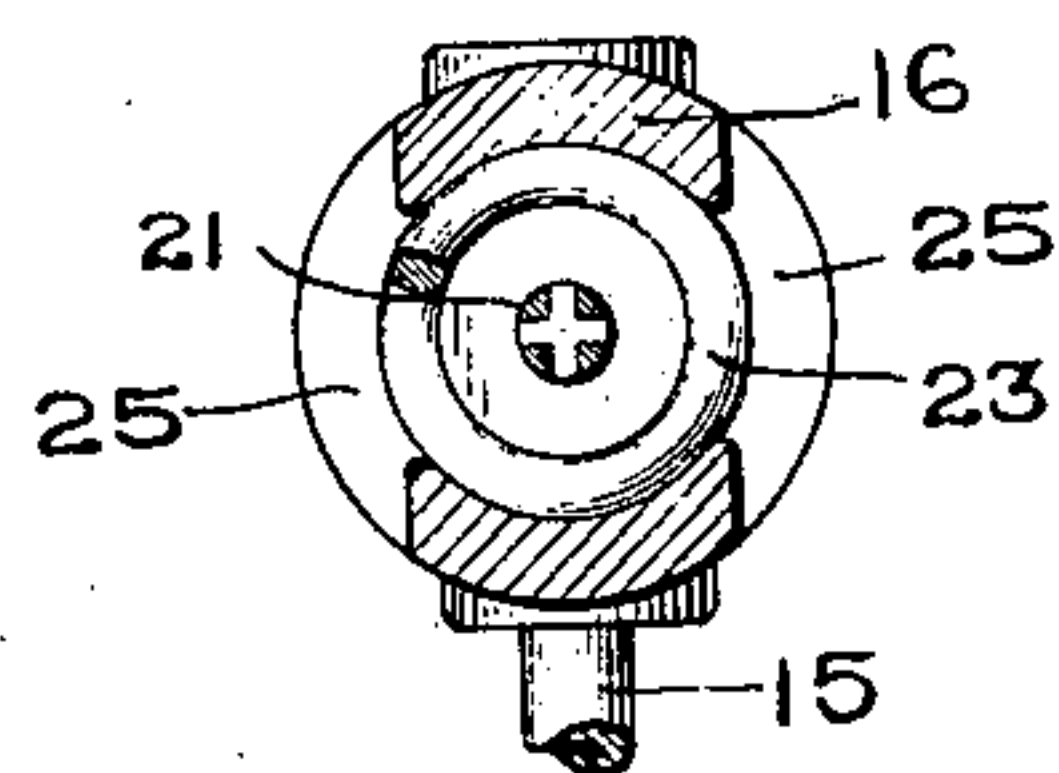
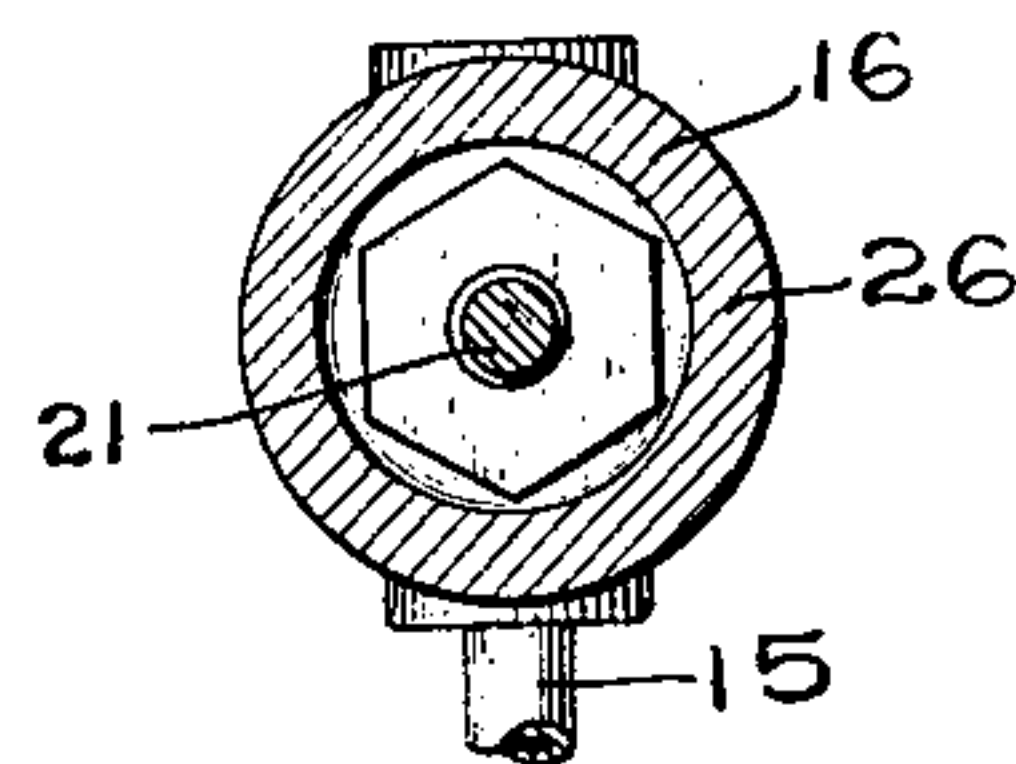


Fig. 4.



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# UNITED STATES PATENT OFFICE.

ERNEST D. HODSDON, OF LYNN, MASSACHUSETTS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

## PRESSURE-REGULATED SUPPLY-VALVE.

No. 822,276.

Specification of Letters Patent.

Patented June 5, 1906.

Application filed November 29, 1902. Serial No. 133,199.

*To all whom it may concern:*

Be it known that I, ERNEST D. HODSDON, a citizen of the United States, residing at Lynn, county of Essex, State of Massachusetts, have invented certain new and useful Improvements in Pressure-Regulated Supply-Valves, of which the following is a specification.

This invention relates to steam-generating apparatus, and especially to flash-boilers wherein the supply of water must be regulated in accordance with the demand upon the boiler. Various devices for accomplishing this automatically have been devised, such, for instance, as causing the boiler-pressure to open a by-pass in the feed-pipe when the pressure reaches a predetermined maximum.

My invention aims to effect a regulation of the water-supply by causing the boiler-pressure to automatically close a stop-valve in the suction-pipe of the water-pump. As the pump is usually arranged to operate continuously, this requires it to work against a vacuum when the valve is closed; but in practical operation I find that this is not objectionable.

In the accompanying drawings, Figure 1 is a diagrammatic view of a flash-boiler, engine, pumps, and tanks with my invention applied thereto. Fig. 2 is a section of the regulator on a larger scale. Fig. 3 is a cross-section of the same on the line 3 3, Fig. 2; and Fig. 4 is a cross-section on the line 4 4, Fig. 2.

The flash-boiler is of any suitable construction, the one shown being of a well-known type, having an asbestos-lined shell 1 inclosing the steam-generating coil 2 and the superheating-coil 3, located above a vaporizing-burner 4 for liquid fuel, which is supplied by a pump 5 from a reservoir 6, in which an initial air-pressure is maintained by a hand-pump 7. A valve 8 permits the fuel to be fed to the burner by the air-pressure only, if desired, cutting out the pump 5. The valve may also be used as a by-pass to regulate the effective delivery of the fuel-pump.

The steam is led from the superheating-coil to the engine 9, from which the exhaust passes to a superheater 10 and thence to a downdraft-flue 11. The engine is governed by a throttle-valve and is belted or otherwise mechanically connected with a shaft or axle 12, on which is an eccentric or the like for

driving the water-pump 13 and the oil-pump 5. The water is carried in a tank 14, in which is located my improved feed-regulating valve, which will now be described.

Connected with the intake end of the suction-pipe 15 is a casing 16, having adjacent to the end of said pipe a cylindrical chamber 17. Inlet-ports 18 open into said chamber, and a port 19 connects it with the end of the suction-pipe. A ball-valve 20 fits in said chamber and controls the port 19 by closing upon a conical seat 20', surrounding said port. Attached to said valve is a stem 21, which is provided with a head, preferably in the shape of a nut 22, screwing on a screw-threaded portion of said stem. A helical spring 23 surrounds the stem, abutting against the nut at one end and at the other against a shoulder in the casing or a washer 24, resting thereon. The nut enables the tension of the spring to be adjusted at will, the sides of the casing having longitudinal openings or slots 25 to permit access to the nut. A lock-nut 26 may be provided, if desired. The end of the stem is connected with a movable abutment which is exposed to the boiler-pressure. This is preferably a piston 27, fitting in a cylinder 28, formed in a casting 29, attached to the end of the casing 16. The piston is preferably packed by water from the tank entering a groove 30 in said piston through a small port 31 in the casting 29. A pipe 32, connected with the delivery-pipe of the water-pump, enters the end of the cylinder beyond the abutment, and, if desired, a spring safety-valve 33 is arranged to close a port 34, opening out of said cylinder into the tank.

The water-pump is provided with the usual automatic suction and discharge valves, the suction-valve being located intermediate the feed-regulating device and the pump, while the discharge-valve is located intermediate the pipe 32 and the pump. By this arrangement the passage of water through the suction-pipe is controlled by the automatic suction-valve and the feed-regulating device. The latter when acting throttles the quantity of water fed to the pump. In other words, two suction-valves are provided, one of which is operated by the suction of the pump and the other by the pressure of the water on the delivery side of the latter.



The operation of the device is as follows: The helical spring 24 holds the ball-valve normally open, allowing the pump 13 to draw water freely from the tank and force it into the boiler; but as soon as the demand upon the boiler is lessened to such an extent that the pressure rises to some predetermined point (say five hundred and fifty pounds per square inch) such pressure acts upon the piston 27 and overcomes the tension of the spring, which has been adjusted to yield at this pressure. The ball-valve is thus closed upon its seat 20' and shuts off the supply of water to the pump until the boiler-pressure falls sufficiently to allow the spring 24 to reopen the valve. Should the boiler-pressure become excessive, the safety-valve 33 will open and relieve it.

In case there should be a hammer-blow in the operation of the pump it can be stopped by running a small pipe 35 from the suction-pipe of the water-pump up to a point above the water-level in the tank and providing its upper end with a minute opening to the atmosphere.

My invention is described in connection with a feed-pump for water-service, as it has great utility in that connection; but it can be used for other purposes, if desired.

One important feature of my invention resides in the fact that the power consumed in operating the pump varies in proportion to the demand for water, it being at a maximum when the demand for water is greatest and decreasing as the demand lessens. When the demand for water ceases altogether, the load is practically removed from the pump. I attain the advantage referred to above by reason of the novel arrangement and coöperation of parts previously described. The saving of power is a most important consideration, particularly where the storage capacity is limited, as in an automobile.

In accordance with the patent statutes, I have described the principle of operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof; but I desire to have it understood that the apparatus shown is only illustrative and that the invention can be carried out by other means.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. The combination with a feed-water pump having a suction-valve through which the water passes, of means responsive to the abnormal pressure of the water for closing the suction-valve and holding it closed so long as said pressure exists.

2. The combination with a feed-pump, of a valve on the suction side thereof through which all the water passes, and means for automatically closing said valve when the pressure of the water in the delivery-pipe passes a predetermined maximum.

3. The combination with a feed-pump, of a valve controlling the suction-pipe thereof, a spring holding said valve normally open, and a movable abutment exposed to the pressure on the delivery side of the pump and connected with said valve.

4. The combination with a feed-pump, of a casing connected with the suction-pipe thereof, said casing containing a chamber and ports opening thereinto, a ball-valve in said chamber, a spring acting to hold said ball-valve off its seat, and a piston connected with said valve and exposed to the pressure in the delivery-pipe of said pump.

5. In combination, a flash-boiler, a pump for supplying water thereto, a suction-valve for the pump, a regulator for holding the suction-valve closed when the boiler-pressure exceeds normal, a relief-valve, and a conduit which supplies fluid under pressure to the regulator and relief-valve.

6. The combination with a pump, of separate suction-valves through which water is drawn by the pump, one of said valves being controlled by the suction of the pump and the other by the pressure of the water delivered thereby.

7. The combination with a pump, of separate suction-valves therefor, one of which is normally held open and the other operates automatically under the action of the pump, and means for closing the normally open valve when the pressure of the water delivered by the pump reaches a certain point.

8. The combination with a pump and its suction and delivery valves, of a feed-regulating valve through which water passes to the pump, and means responsive to the pressure of the water on the delivery side of the pump which operates the regulating-valve to throttle the water supplied to the pump.

9. In a water-supply system, the combination of a supply-pipe, a pump therein, and a normally open suction-valve through which the supply of water passes to the pump and adapted to be controlled by the pump according to the pressure of the water delivered thereby.

10. In a water-supply system, the combination of a supply-pipe, a normally open suction-valve therein, and a continuously-operated pump receiving its supply through the suction-valve and adapted to close said valve at a predetermined pressure of the water which it delivers.

11. In a water-supply system, the combination of a supply-pipe, a normally open suction-valve therein, a continuously-operated pump adapted to receive water through the suction-valve, and means acted upon by the water delivered by the pump which is sensitive to pressure variation of the water for controlling the suction-valve.

12. In combination, a flash-boiler, a source of water-supply, a supply-pipe connecting



both, a pump therein, a suction-valve between the pump and source of water-supply, and a pressure device acted upon by the pump at a predetermined pressure, said device comprising means acting initially relatively to the influence of the water-pressure for closing the suction-valve and means acting finally for relieving water from the supply-pipe.

10 13. In combination, a water-tank, a pump, a suction-pipe connecting the two, a feed-regulator in the tank at the inlet end of the pipe for regulating the water fed there-through, and means connecting the regulator with the delivery side of the pump which  
15 permits the water-pressure to control the former.

14. In combination, a water-tank, a pump, a suction-pipe connecting the two, a feed-regulator which is located in the tank at the inlet  
20 end of the pipe, and which normally permits water to pass to the pump, and a connection which subjects the regulator to the water-pressure on the delivery side of the pump for  
25 operating the regulator.

15. In combination, a water-tank, a recep-

tacle, means for supplying water from the tank to the receptacle, a regulator which regulates the supply of water to said means, and a connection extending from a point between 30 the said receptacle and said means to the regulator for subjecting the latter to the water-pressure of the receptacle.

16. In combination, a water-tank, a receptacle, means for supplying water from the 35 tank to the receptacle, a regulator for regulating the supply of water to said means, a connection extending from a point between the receptacle and the tank to the regulator for subjecting the latter to the pressure of the 40 receptacle, and a relief device in said connection, which is located in the tank and permits water to pass through said connection when the regulator reaches the limit of its operation.

In witness whereof I have hereunto set  
my hand this 25th day of November, 1902. 45

ERNEST D. HODSDON.

Witnesses:

DUGALD McK. McKILLOP,  
JOHN J. WALKER.