

No. 806,380.

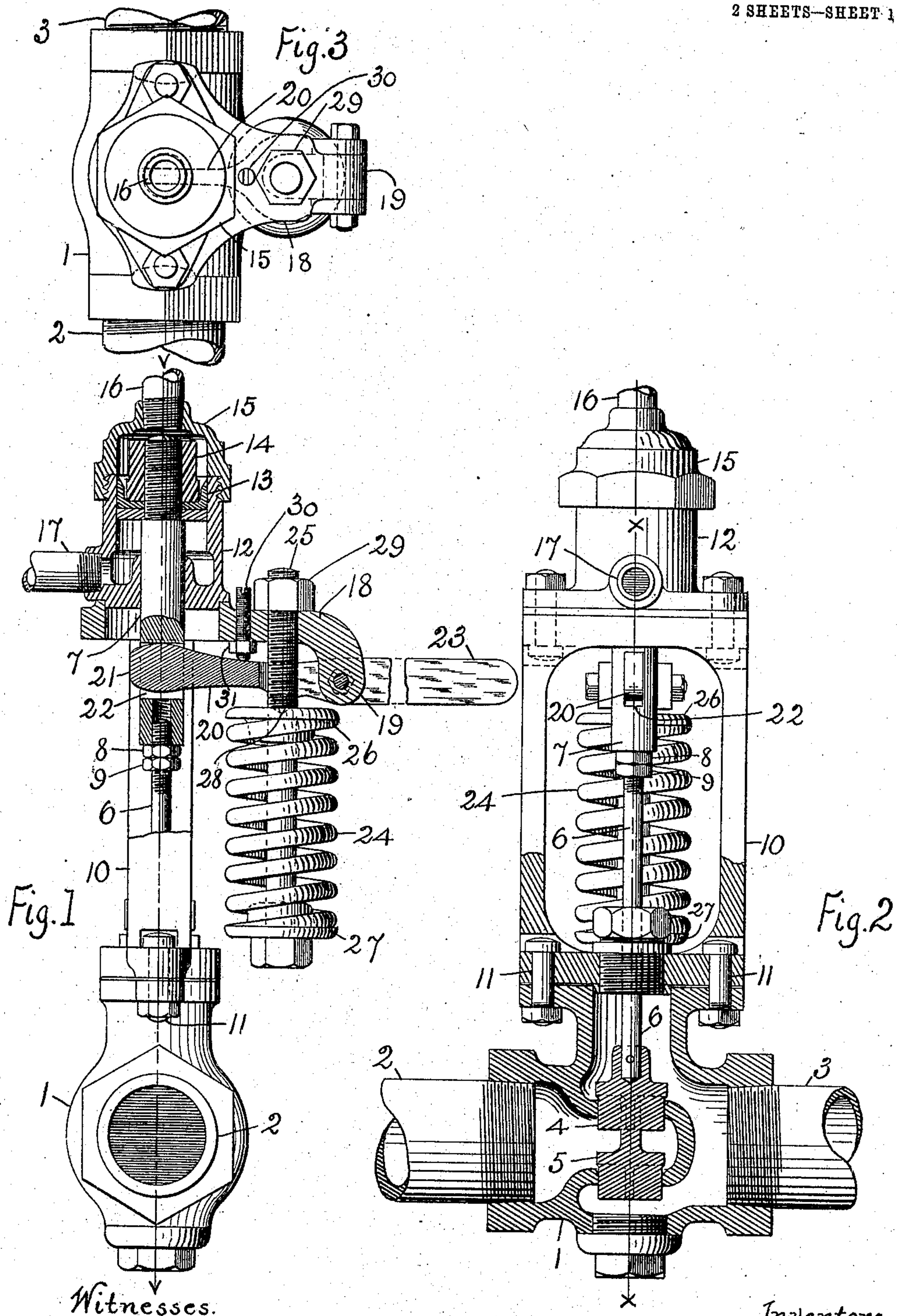
PATENTED DEC. 5, 1905.

J. P. WATSON & F. L. JAHN.

PUMP REGULATOR.

APPLICATION FILED MAR. 24, 1905.

2 SHEETS—SHEET 1.



Witnesses.

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Fig. 4

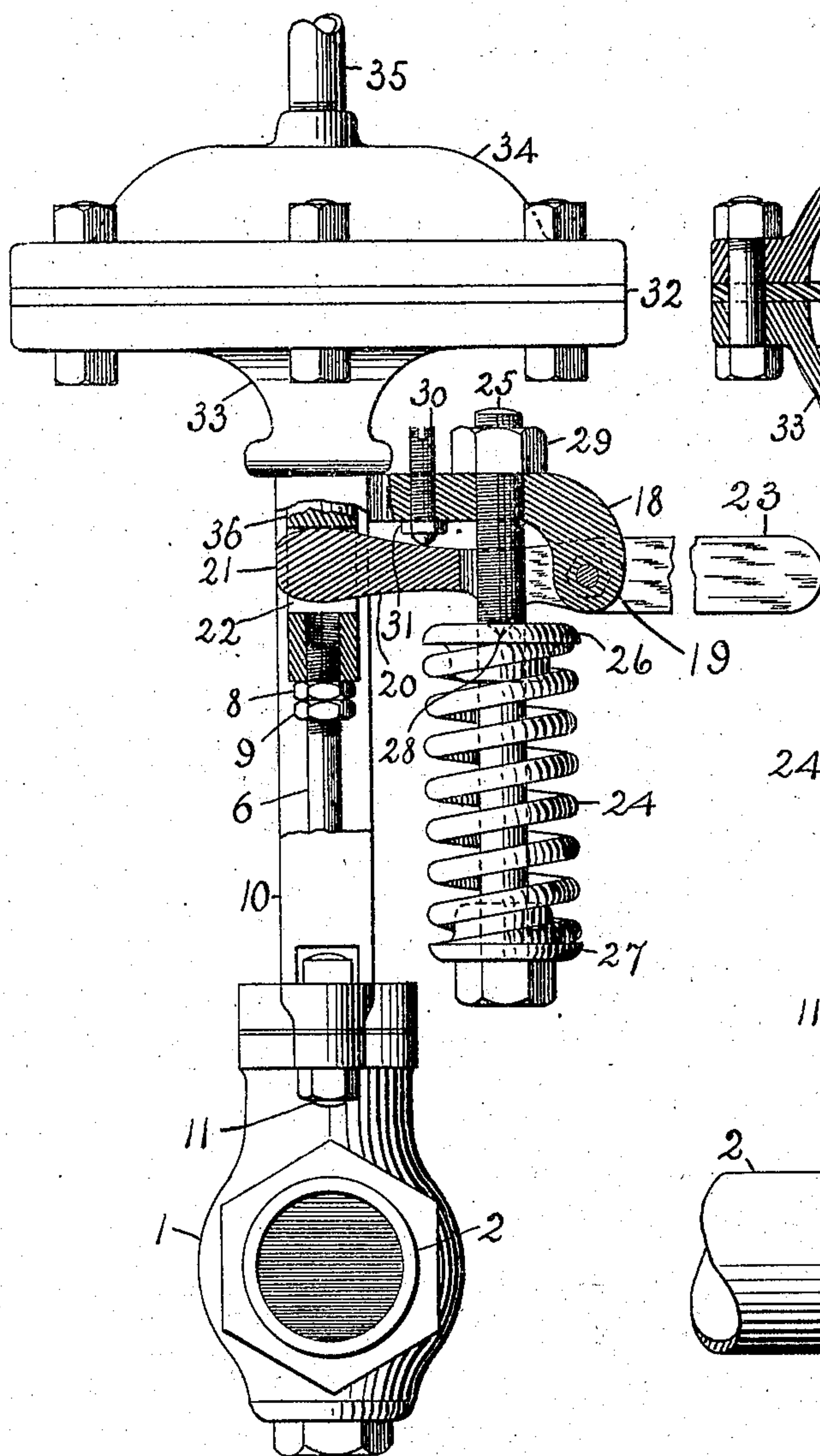
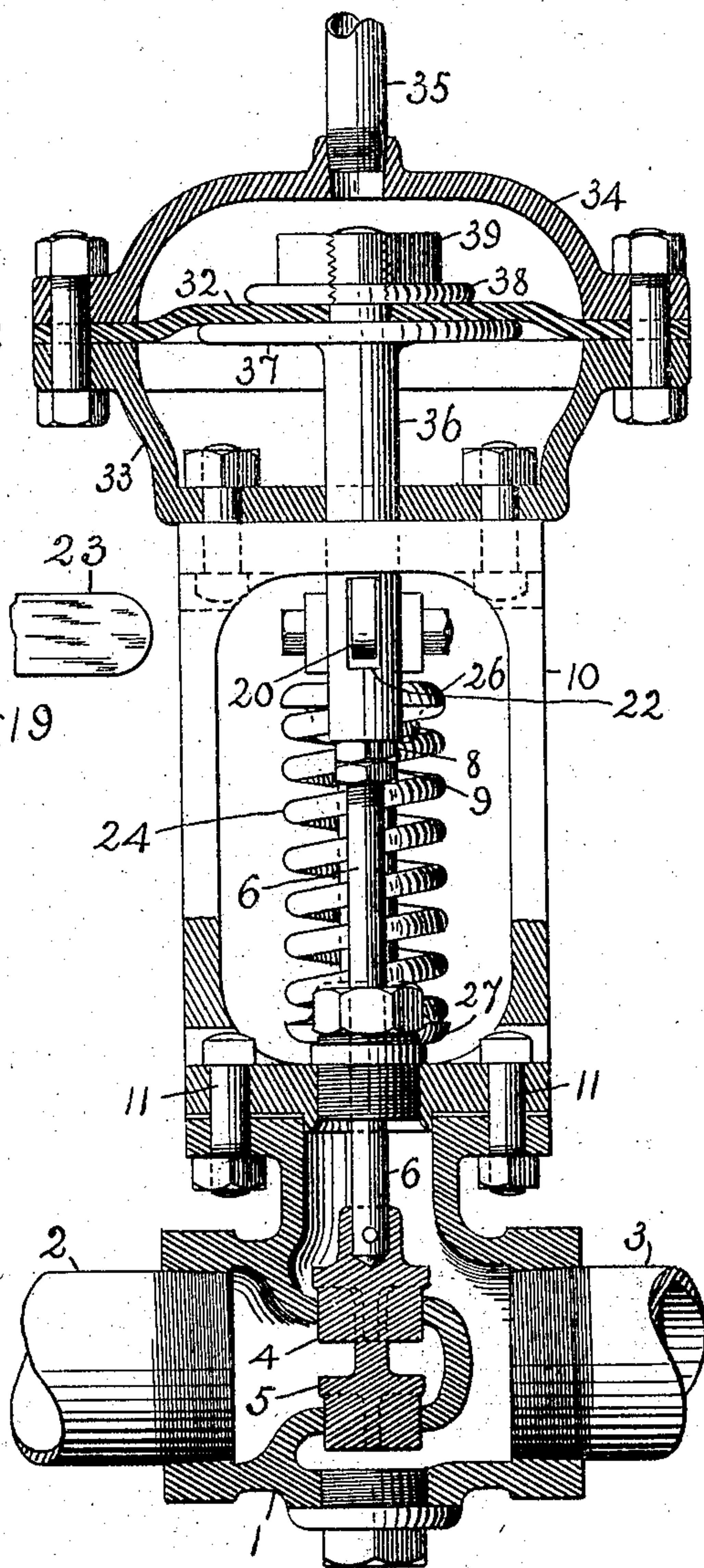


Fig. 5



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UNITED STATES PATENT OFFICE.

JAMES P. WATSON AND FREDERICK L. JAHN, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNORS TO THE WATSON AND McDANIEL COMPANY, A CORPORATION OF PENNSYLVANIA.

PUMP-REGULATOR.

No. 806,380.

Specification of Letters Patent.

Patented Dec. 5, 1905.

Application filed March 24, 1905. Serial No. 251,784.

To all whom it may concern:

Be it known that we, JAMES P. WATSON and FREDERICK L. JAHN, citizens of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Pump-Regulators, of which the following is a specification.

This invention relates to regulators especially for steam-pumps, and whereby the admission of steam to the pump's cylinder and the speed of the pump are regulated by the hydraulic pressure in the pump, so that as this pressure decreases more steam will be admitted, and vice versa. Balanced steam-valves for the pump's steam-cylinder are adjustably connected and in alinement with a piston actuated by the hydraulic pressure of the pump. Exterior to the line of the steam-valves and the piston there is an adjusting-spring placed to bear upon a lever which engages the valves and piston through their connecting mechanism. This arrangement of the valves and piston in one line, and the spring in a separate and distinct line permits the inspection of the steam-valves, the piston, and the spring separately and without disturbing the adjustment of the spring set to open the steam-valves to run the pump at a desired pressure; but if the pump runs too fast it will produce an excess of hydraulic pressure which will force the piston, overcome the interposed spring, and close the steam-valves. As the hydraulic pressure decreases the piston will yield and the spring will restore the steam-valves to their normal position. There are means to adjust the connection between the piston and valves by shortening or lengthening their distance apart and separate and independent means to adjust the spring to open the valves to drive the pump at a desired speed to produce a desired pressure. There is also provided a special construction as a speed limit, which can readily be adjusted to control the maximum opening of the steam-valves to prevent a dangerous speed of the pump in case of a sudden decrease of hydraulic pressure in the pump and on the piston. As the regulator may be placed where infrequently used, as in the case of fire purposes, a means is provided by which the spring, the valves, and the piston may be tested by a hand movement to learn if they are

in good condition and not inoperative from disuse.

The invention is illustrated in the accompanying drawings, in which similar parts are designated by similar figures of reference, in which—

Figure 1 is an end elevation view, with some of the parts in section, on line *x x*, Fig. 2. Fig. 2 is a side elevation, with some parts in section, on line *v v*, Fig. 1. Fig. 3 is a top view. Fig. 4 is a view in the same position as Fig. 1 of a modification having a diaphragm to be used in place of the hydraulic piston shown in the other views for low pressures. Fig. 5 is a view in the same position as Fig. 2 with the diaphragm modification.

A steam-valve case 1 has attached thereto an inlet-pipe 2 and an outlet-pipe 3 and contains the balanced steam-valves 4 5. Connected to the valves is a stem 6, adjustably secured to a hydraulic piston-rod 7 and locked by nuts 8 9. A yoke-frame 10 is secured above and to case 1 by bolts 11, and at the upper end of the frame there is a hydraulic cylinder 12, inclosing a hydraulic piston comprising a cup-packing 13 of yielding material, preferably leather, secured by a part 14, screwed on rod 7. The cylinder has a head 15, in which is secured a pipe 16, leading from the discharge of a pump's hydraulic cylinder. Cylinder-head 15 limits the upward movement of the piston, and by removing the head the piston may be inspected or cleaned without disturbing any other part of the regulator. A bleeder-pipe 17 is provided for cylinder 12. The upper end of frame 10 not only forms a seat for cylinder 12, but it also has an extension from one side forming a lug 18, which is turned down at 19 for the pivotal suspension of a lever 20, which at its opposite end 21 is rounded top and bottom and enters a slot 22, formed through piston-rod 7, and in some cases this lever is provided with a handle 23, extending beyond its point of suspension for the hand-testing of the valves, piston, and spring when the regulator is used in connection with fire apparatus, where by much disuse the parts may become gummed or stuck.

A regulating-spring 24 is suspended from lug 18 by a bolt 25 and carries seats 26 27, between which the spring is held, while its seat 26 bears against a knife-edged projection 28

of lever 20. Bolt 25 is tapped through lug 18, by which the tension of spring 24 may be varied, and a nut 29 locks the bolt. By setting spring 24 at one side, out of line of valves 4 5 and piston 13 14 permits the inspection of those parts without displacing the spring or in any way changing its tension, while the spring may be removed and replaced without in any manner disturbing the valves or piston, and the spring 24, bearing on lever 20 between its point of suspension and its operative contact with rod 7 and the line of movement of the valves and piston, is more sensitive than if placed in line with the valves and piston and having the same amount of movement as the valves and piston. By removing bolts 11 and pipe 16 all parts above case 1 may be removed, valves 4 5 lifted out and inspected, and their seats in case 1 inspected without breaking the steam-joints of case 1 and pipes 2 3, and the tension of spring 24 will be undisturbed.

Tapped through lug 18 is a speed-limit adjustment 30, which limits the upward movement of lever 20 and valves 4 5, and it can be adjusted so that no matter how great the steam-supply to the valves or how sudden a decrease of hydraulic pressure there may be in the pump and on piston 13 14 the pump cannot be run at a dangerous or breakable speed. It is locked by a nut 31, and being inconspicuous and owing to its obscure location is not liable to be tampered with and is a sure safeguard against breakages.

In Figs. 4, 5 a modification is shown for use with low pressures, in which a diaphragm 32 is used in place of piston 13 14. In Figs. 1, 2, 3, the diaphragm being inclosed in a case formed of a lower part 33, attached to frame 10, and an upper part 34, to which is attached pressure-pipe 35, a stem 36 is provided for attachment to the valve-stem 6, and it has a collar 37 below the diaphragm and a washer 38 and a nut 39 to secure the diaphragm.

Minor changes might be made from the construction, arrangement, and attachment of the various parts as herein set forth without departing from the spirit of our invention.

We claim—

1. In a pump-regulator, the combination of balanced steam-valves and a stem therefor, a hydraulic piston and a rod therefor, the rod and stem being in alinement and adjustably connected; with a spring adjustably supported out of alinement with the valves, the piston and their connections, and a lever pivotally supported at one end, engaging the connection between the valves and piston at its opposite end having an extension forming a testing-handle and fashioned to engage the spring at a point between its pivotal support and its engagement with the valve and piston connection, and whereby the movement of the spring is less than the movement of the valves and piston and their connecting mechanism.

2. In a pump-regulator, a case, a steam-inlet and an outlet therefor, balanced steam-valves within the case and a stem for the valves; a framework from the case, a hydraulic cylinder supported on the framework, in alinement with the case, a piston in the cylinder, a rod for the piston, and means to adjustably connect the piston-rod and valve-stem; a passage from the pump to the hydraulic cylinder; a spring supported upon the framework out of alinement with the valves and piston, with means to adjust its tension, and a lever pivotally supported at one end, engaging the valve and piston connection for vertical movement therewith having an extension for hand-testing, and bearing upon the spring in manner for its less movement than that of the valves and piston.

3. In a pump-regulator, a case, a steam-inlet and an outlet therefor, balanced steam-valves within the case and a stem for the valves; a framework secured to the case, a hydraulic cylinder thereon and in alinement with the case, a piston in the cylinder, a rod for the piston and means to adjustably secure it to the valve-stem; a passage from the pump to the hydraulic cylinder; a spring supported upon the framework out of alinement with the valves and piston, with means to adjust its tension, and a lever pivotally supported, oppositely thereto engaging the valve and piston connection, bearing upon the spring at a point whereby its movement will be less than that of the valves and piston, and a continuation of the lever beyond its pivotal support as a means to test the valves, the piston and the spring.

4. In a pump-regulator, a case, a steam-inlet and an outlet therefor, balanced steam-valves within the case and a stem for the valves; a framework secured to the case, a hydraulic cylinder thereon and in alinement with the case, a piston in the cylinder, a rod for the piston and means to adjustably secure it to the valve-stem; a passage from the pump to the hydraulic cylinder; a spring supported upon the framework out of alinement with the valves and piston, with means to adjust its tension, a lever pivotally supported and oppositely thereto engaging the valve and piston connection, bearing upon the spring at a point whereby its movement will be less than that of the valves and piston, and a speed-limit means adapted to control the maximum opening of the steam-valves by limiting the movement of the spring and its lever.

5. In a pump-regulator, a case, a steam-inlet and an outlet therefor, balanced steam-valves within the case and a stem for the valves; a framework secured to the case, a hydraulic cylinder thereon and in alinement with the case, a piston within the cylinder, a rod for the piston and means to adjustably secure it to the valve-stem; a passage from the pump to the hydraulic cylinder; a spring supported

upon the framework out of alinement with the valves and piston, with means to adjust its tension, a lever pivotally supported and oppositely thereto engaging the valve and piston
5 connection, bearing upon the spring at a point where its movement will be less than the movement of the valves and piston, with a continuation of the lever beyond its pivotal support as a means to test the valves, the piston and
10 the spring, and a speed-limit means adapted to control the maximum opening of the steam-valves by limiting the movement of the spring and its lever.

6. In a pump-regulator, a case, a steam-inlet
15 and an outlet therefor, balanced steam-valves within the case and a stem for the valves; a framework secured to the case; a diaphragm-case thereon and in alinement with the steam-valve case, a diaphragm within the case, a rod
20 for the diaphragm and means to adjustably secure it to the valve-stem; a passage from the

pump to the diaphragm-case; a spring supported upon the framework out of alinement with the valves and diaphragm, with means
25 to adjust its tension, a lever pivotally supported and oppositely thereto engaging the valve and diaphragm connection, bearing upon the spring at a point where its movement will be less than the movement of the valves and diaphragm, with a continuation of the lever be-
30 yond its pivotal support as a means to test the valves, the diaphragm and the spring, and a speed-limit means adapted to control the maximum opening of the steam-valves by limiting the movement of the spring and its lever.
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In testimony whereof we affix our signatures in presence of two witnesses.

JAMES P. WATSON.
FREDERICK L. JAHN.

Witnesses:

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