No. 765,849. PATENTED JULY 26, 1904.

A. L. MERRILL.

FLUID PRESSURE REGULATOR

APPLICATION FILED SEPT. 12, 1903.

NO MODEL.

Fig. 1.

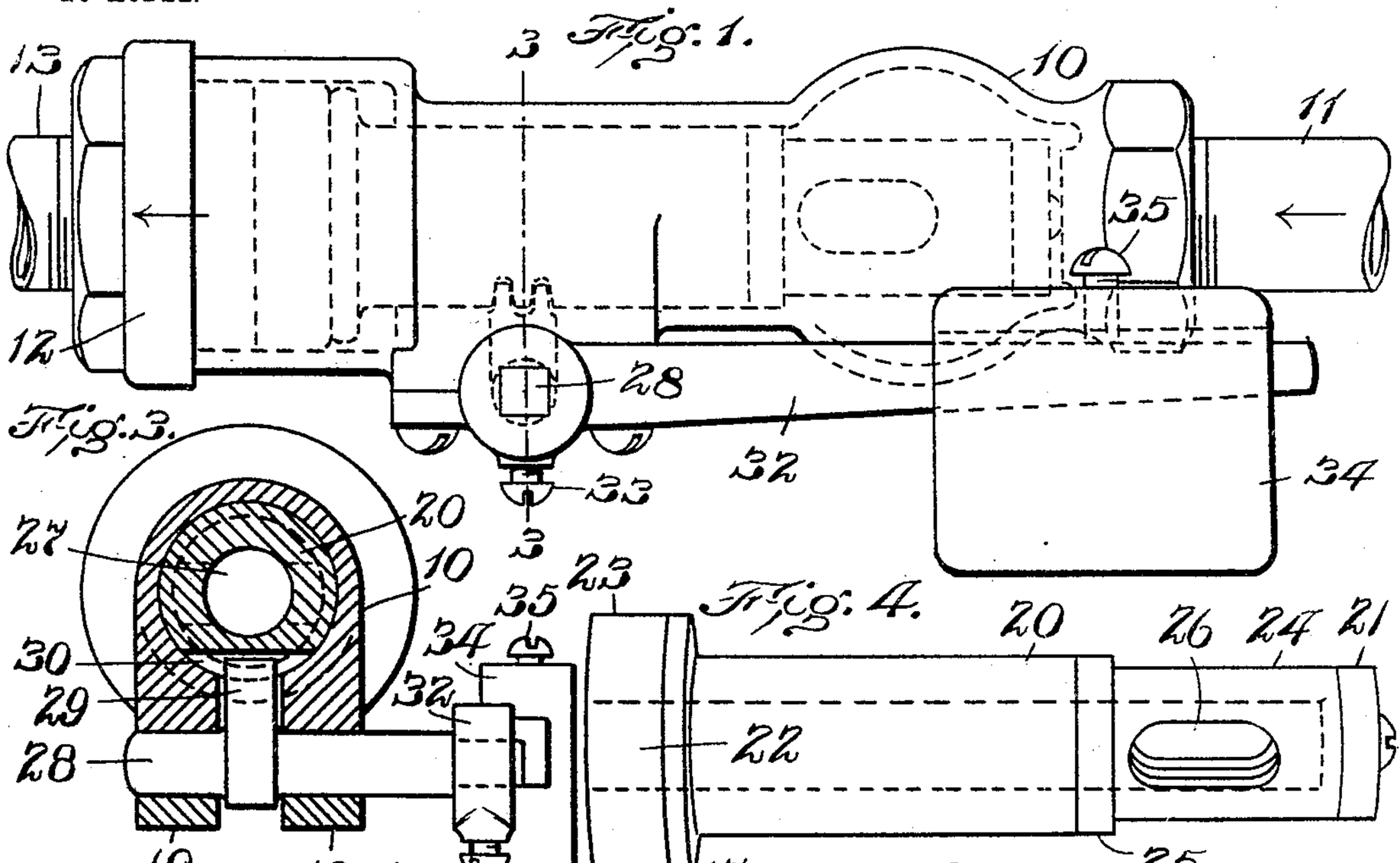


Fig. 3.

Fig. 4.

Fig. 2.

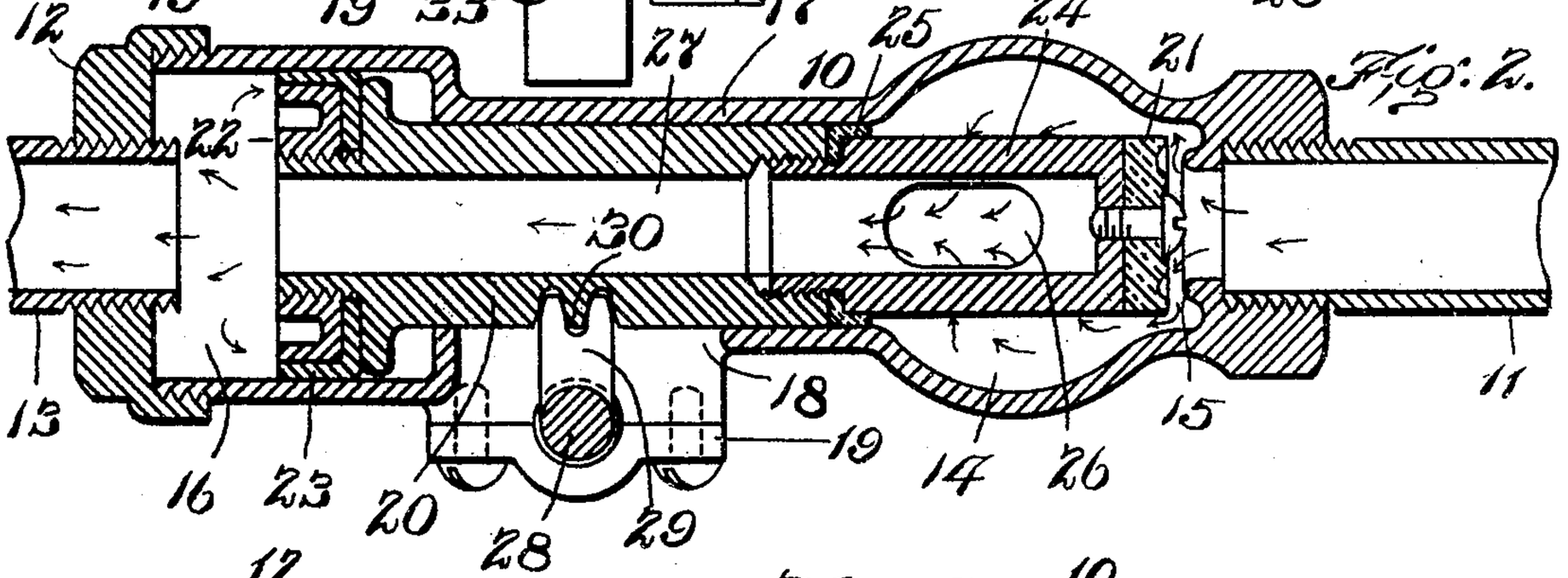
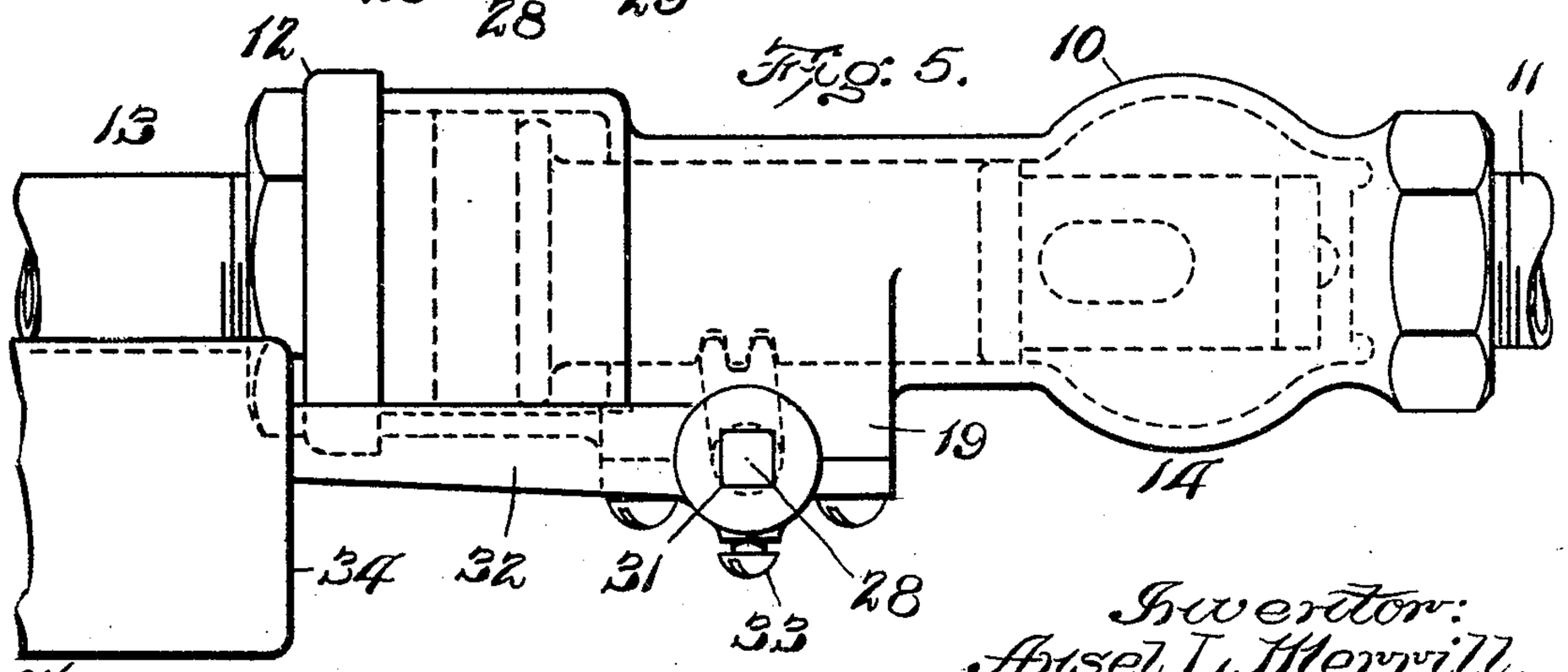


Fig. 5.



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No. 765,849. Patented July 26, 1904.

UNITED STATES PATENT OFFICE.

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FLUID-PRESSURE REGULATOR.

SPECIFICATION forming part of Letters Patent No. 765,849, dated July 26, 1904.

Application filed September 12, 1903. Serial No. 172,988. (No model.)

To all whom it may concern:

Be it known that I, ANSEL L. MERRILL, of Hydepark, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Fluid-Pressure Regulators, of which the following is a specification.

This invention relates to fluid-pressure regulators; and its object is to simplify such a structure and reduce the number of parts, thereby reducing the cost of manufacture and securing increased reliability of working and many kindred advantages.

Of the accompanying drawings, Figure 1 represents a side elevation of a pressure-regulating valve constructed according to the present invention. Fig. 2 represents a longitudinal section. Fig. 3 represents a section on line 3 3 of Fig. 1. Fig. 4 represents a detail perspective view of the piston and valve structure. Fig. 5 represents a view similar to Fig. 1, showing the weight reversed.

The same reference characters indicate the same parts in all the figures.

In the drawings, 10 indicates a casing into one end of which is screwed an inlet-pipe 11, while the other end is provided with a cap 12, in which is screwed an outlet-pipe 13. At 14 the casing is enlarged to form a valve-chamber at the outer end of which and surrounding the inlet thereto is a valve-seat 15. The opposite end of the casing is enlarged at 16 to form a piston-chamber and guide, and between the two chambers the casing is contracted into a guide 17, having an opening 18, flanked by bearings 19.

20 is a hollow moving structure provided at one end with a valve 21, which coöperates with the seat 15, and at the opposite end with a piston or moving partition 22, having a cup-packing 23 facing the outlet-pipe. The valve 21 is attached to an end piece 24, screwed into the body of the moving structure 20 and securing in place a smaller cup-packing 25, which fits the guide 17. This end piece is formed with openings 26, affording a communication between the chamber 14 and the hollow interior conduit 27 of the moving structure 20. It will be seen that there is a continuous opening through the interior of the moving structure 20 between the chamber 14 and the chamber 16, occupied by piston 22.

Supported in the bearings 19 is a short shaft 28, having a toothed pinion-segment 29 meshing with a complementally-toothed short rack 30, formed on the stem portion of the structure 20 within the guide 17, said pinion-segment projecting through the opening 18 in the casing. One end 31 of the shaft 28 is squared to receive the complementally-squared hub of a weight-arm 32, secured by a set-screw 33. On this arm is a weight 34, adjustable therealong and secured by a set-screw 35. This permits the weight to be moved toward and away from the axis of arm 32 to give a greater or less torque on shaft 28. It is also possible with the arrangement of parts described to reverse the position of arm 32, allowing it to project over on one side or the other of the shaft 28. In one position, as shown in Fig. 1, the weight 34 assists the pressure in chamber 16 acting on piston 22, and in the opposite position (shown in Fig. 5) it opposes this pressure.

The operation is as follows: Fluid in the inlet-pipe 11 will act on valve 21 so as to move the structure 20 to the left as viewed in the drawings and open said valve, permitting the fluid to enter the chamber 14. Through the interior of the structure 20 the fluid passes to the piston-chamber 16 and reacts on the large area of piston 22. The difference in the areas of piston 22 and valve 21 will cause said valve to assume a certain position, giving a predetermined difference in pressure between the pipes 11 and 13, which difference is influenced by the amount and direction of the torque of weight 34 upon the shaft 28. It is obvious that if the weight is on the right of said shaft, as seen in Fig. 1, a relatively great reduction in pressure will take place because the effort of the fluid in chamber 16 to close the valve is seconded by the action of the weight. If the weight is placed on the opposite side of the shaft 28, as shown in Fig. 5, a greater pres-

sure in 16 is required to close the valve, and there is accordingly a smaller reduction. It will be observed that the described device is very simple and compact and possessed of few moving parts.

The described regulator may be used for water, steam, or other fluid. When used for water, the packing material may be made of leather, and when used for steam any suitable steam-packing, such as the well-known Jenkins packing, may be employed.

I claim—

1. In a pressure-regulating valve, a casing having a valve-chamber provided with a fluid-inlet, a closed pressure-chamber provided with a fluid-outlet, and a moving structure provided with a valve in said valve-chamber and a sliding piston in said pressure-chamber and whose interior constitutes the main fluid-passage between said inlet and outlet.

2. In a fluid-pressure regulator, a casing provided with inlet and outlet chambers and an opening between them, a moving structure provided with a valve and a piston in the respective chambers, a fluid-passage connecting said chambers, packings for said structure on opposite sides of said opening, and yielding means external to the casing engaging the moving structure through said opening for imparting valve-operating movement thereto.

3. In a fluid-pressure regulator, a casing having a valve-chamber provided with a fluid-inlet, a piston-chamber provided with a fluid-outlet, and an opening between said chambers, a moving structure provided with a valve in the valve-chamber and a piston in the piston-chamber, the interior of said structure constituting the main fluid-passage between said inlet and outlet, means for packing said structure on both sides of said opening, and yielding means external to the casing engaging the moving structure through said opening for imparting valve-operating movement thereto.

4. In a fluid-pressure regulator, a casing formed with inlet and outlet chambers, a moving structure for controlling the relative pressures therein, and a yielding device having a reversible connection with said structure for assisting or opposing the pressure in the outlet-chamber.

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

ANSEL L. MERRILL.

Witnesses:

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