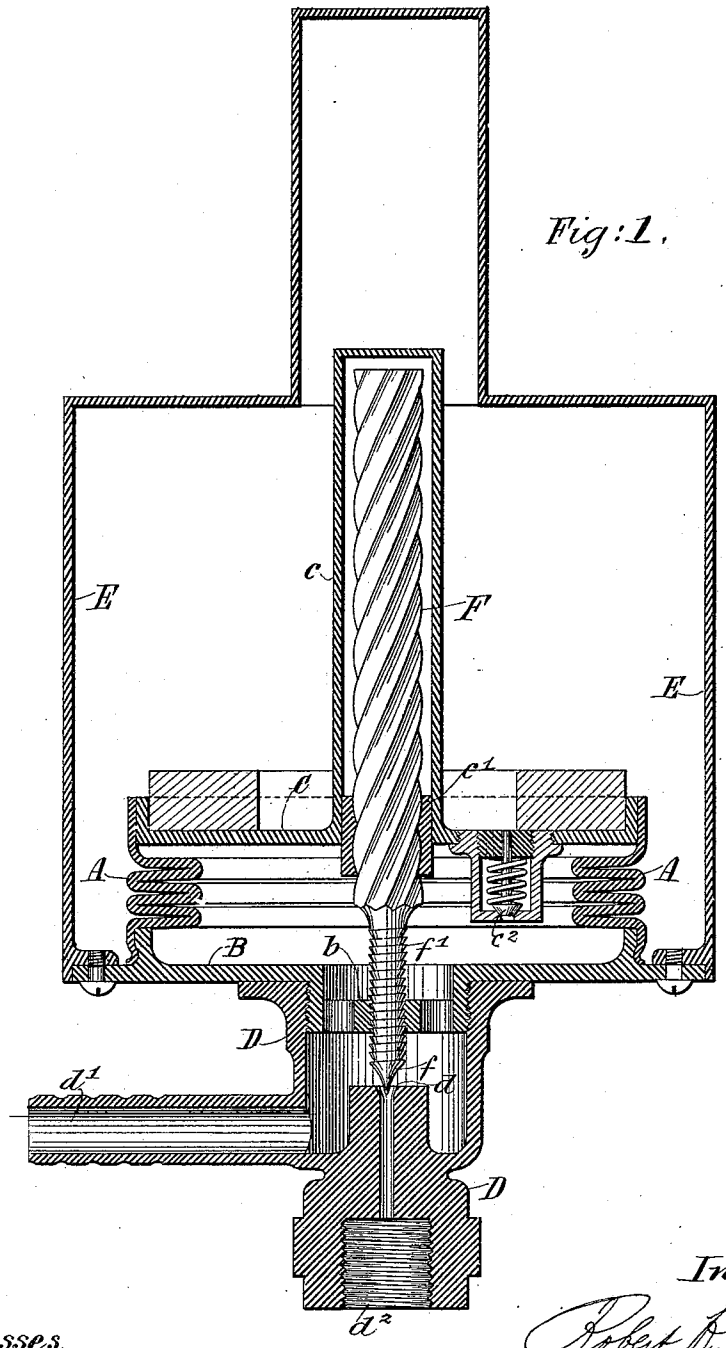
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R. R. BEARD & W. H. OAKLEY.

FLUID PRESSURE REGULATOR.

No. 330,549. Patented Nov. 17, 1885.

Fig: 1.



Witnesses.
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(No Model.) 3 Sheets—Sheet 2.

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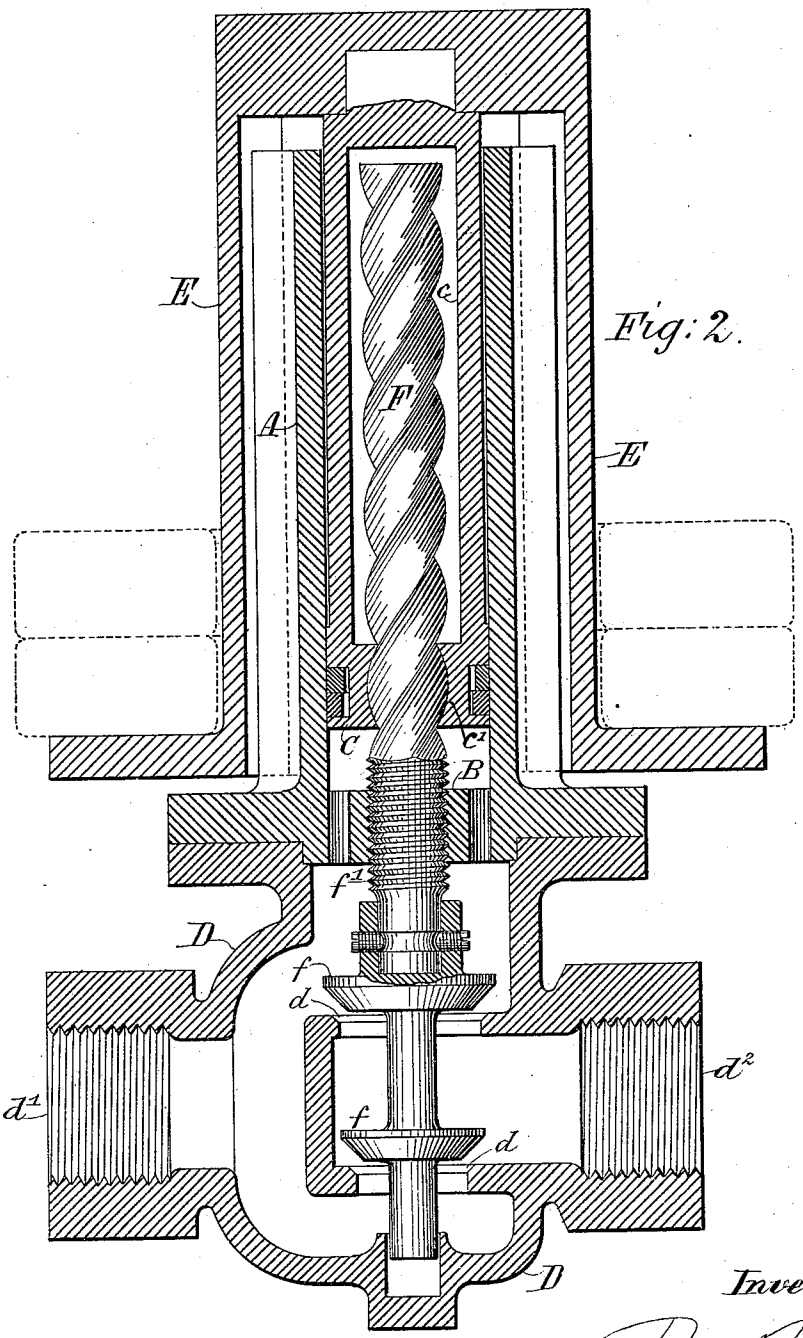


Fig: 2.

Witnesses.
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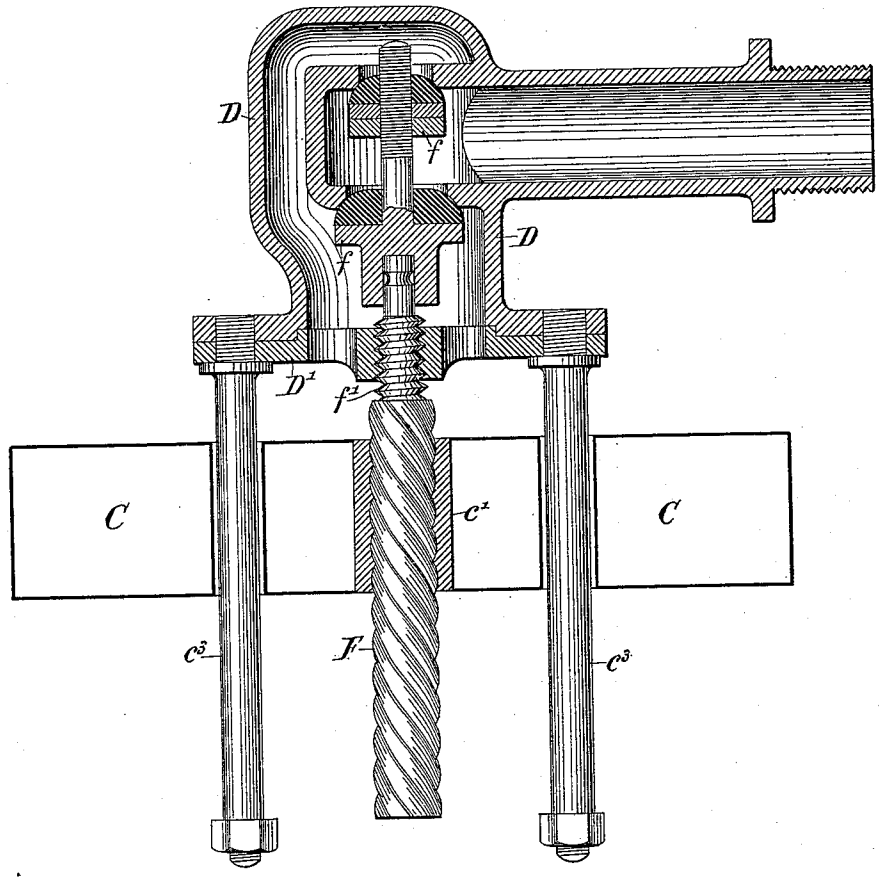
(No Model.) 3 Sheets—Sheet 3.

R. R. BEARD & W. H. OAKLEY.

FLUID PRESSURE REGULATOR.

No. 330,549. Patented Nov. 17, 1885.

Fig. 3.



Witnesses.
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UNITED STATES PATENT OFFICE.

ROBERT R. BEARD AND WALTER H. OAKLEY, OF BERMONDSEY, COUNTY OF SURREY, ENGLAND.

FLUID-PRESSURE REGULATOR.

SPECIFICATION forming part of Letters Patent No. 330,549, dated November 17, 1885.

Application filed September 8, 1885. Serial No. 176,463. (No model.)

To all whom it may concern:

Be it known that we, ROBERT ROYOU BEARD, of 90 Fort Road, Bermondsey, in the county of Surrey, England, and WALTER HENRY OAKLEY, of 202 Grange Road, Bermondsey aforesaid, have invented certain new and useful Improvements in Fluid-Pressure Regulators, of which the following is a specification.

The pressure-regulator which forms the subject of this invention is designed to regulate the flow of gaseous and other fluids; but the primary object we have in view is to obtain a sensitive regulator for use with the compressed gases employed for the production of the oxy-hydrogen or oxycalcium light.

Our invention consists in a novel application of a quick and slow threaded screw for working automatically the delivery-valve for the fluid.

In the accompanying drawings we have shown our invention as adapted for a compressed-gas regulator and for a steam-regulator; also for controlling the flow of water.

Figure 1 shows in vertical section the form our invention takes for automatically regulating the delivery at a uniform pressure of compressed gas.

A is a circular bellows, formed of india-rubber or other flexible material, having a base-plate, B, to which it is attached, and a movable head, C, which is weighted as desired, to maintain the requisite pressure upon the gas. The plate B of the bellows is screwed to a casting, D, which carries at its center a valve-seat, *d*, and has projecting from it laterally a delivery-pipe, *d'*. d^2 is a screwed socket formed in the bottom of the casting, and intended to fit upon the screwed neck with which the gas-reservoir is provided. Mounted on the base-plate B is a cylindrical case, E, which is made fast by bayonet-joints or their equivalent to the plate, and is intended to serve as a protection to the bellows. The movable head C is fitted with a central tube, *c*, closed at its upper end, and contracted at its lower end into a neck, *c'*, which is threaded internally to receive a quick-screw, F. This screw forms the spindle of the regulating-valve *f*, which fits the valve-seat *d*, made in the casting D. Immediately above the valve a slow-thread, *f'*, is cut on the valve-spindle, and in a neck of the base-plate B a thread, *b*, is cut corresponding with the thread *f'* on the valve-spindle. Openings are made in this neck for the passage upward of the gas into the bellows, and as the pressures of the gas vary the bellows will be caused to expand or contract, the tendency of the weighted head C being to force the bellows into the compressed state. As the weighted head descends, it will impart an axial motion to the valve-spindle, and thereby cause the valve, under the action of the screwed neck *b*, to recede from its valve-seat, and thereby enlarge the opening for the delivery of the gas. When the pressure of the gas is in excess, it will be necessary to contract the delivery-opening. This is done by the rise of the bellows-head under the excessive pressure, which rise, by giving an axial motion to the valve-spindle in the opposite direction, forces down the valve toward its seat. By this means an automatic regulation of the delivery is effected, the weight of the head being adjusted to suit the requirements of the case. The head of the bellows is fitted with a safety-valve, c^2, which will prevent the rupture of the bellows should the compressed gas in full force be admitted thereto.

Fig. 2 shows in vertical section our invention as adapted for the automatic regulation of the pressure of steam. In this example we have shown a double puppet-valve, *f*, connected by its stem to its spindle F in such a way as to allow of the rotation of the spindle to lift or depress the valve without imparting an axial motion to the valve itself. The valve-spindle is formed, like that before described, as a quick-threaded screw for a piston, C, to slide up and down, and is furnished also with a slow screw-thread, *f'*, which works in a central tapped hole in the bottom B of a steam-cylinder, A. The double valve *f* has its seats *d d* in the upper and lower sides of a central chamber formed in a casting, D, which is provided with a screwed neck, d^2, for fitting onto the steam-supply pipe, and has also a screwed neck, *d'*, for connecting with the steam-delivery pipe. The steam is admitted to the central valve-chamber, and passes out therefrom by the double valve *f* into a steam-space surrounding the valve-chamber, whence it is free to pass out at

the nozzle *d'*. Openings are made in the bottom B of the cylinder A for admitting steam from the steam-space below to the under side of the piston C. The piston C is formed, like the bellows-head, with a tubular chamber, *c*, and screwed neck *c'*, for receiving the screwed valve-spindle. This chamber *c* is made sufficiently long to allow for the free play of the piston in the cylinder. The connection of the spindle with its valve is made by screws, which pass laterally through the valve-stem and enter an annular groove in the lower end of the screwed spindle F. Inclosing the steam-cylinder and its piston is a cylindrical cover, E, which is grooved vertically to slide over fixed guides attached to the steam-cylinder. This cover is formed at its top or closed end with a squared socket to receive the squared end of the tube *c*, for the purpose of arresting any tendency of the piston to move axially. The lower edge of this cylindrical cover E is made with a flange for receiving annular weights, by which the pressure of the steam is balanced.

The action of this pressure-regulator is as follows: As the steam enters this properly-weighted pressure-regulator, it will pass the valve *f* and fill the cylinder A, and eventually pass out at the neck *d'*. When the pressure of the steam is in excess of that required, it will force up the piston against the action of the counter-weights carried by the cover E, and thereby cause the piston to impart an axial motion to the spindle F and force the double valve toward its seats, thereby contracting the openings for the passage of the steam. Should, however, the pressure of the steam diminish, the piston will fall and cause the valve to present an increased area to the passage of the steam.

From the foregoing description it will be obvious our pressure-regulator may be applied to regulate the flow of water, say, into a tank or reservoir. We have shown in sectional elevation at Fig. 3 a modification of the last-described pressure-regulator suitable for this purpose. In this example the rising of the valve *f* serves to contract or close the openings for the flow of the liquid; but the action of the regulator is precisely the same as that just described. The water passes into the space surrounding the valve-chamber, and flows thence through openings made in a plate, D', forming the bottom of the casting D, to the tank or reservoir, over which the regulator is fixed. Pendent from the double valve-stem is the screwed spindle F, which works in a threaded hole in the bottom plate, D', and for imparting the axial motion to this spindle a float, C, is employed, which, like the piston of Fig. 2, is formed with a threaded center, *c'*, corresponding with the quick-thread of the spindle. This float is formed to receive two fixed guides, c^3, pendent from the bottom plate, D', and threaded on their inner ends to attach the plate to the casting D. By means of these rods the float is prevented from turning while making its vertical movements. As the float rises and falls with the variations in the level of the water, it will automatically regulate the position of the valve *f* with regard to its seats, and thereby control the admission of the supply.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is—

In combination with a bellows-head, piston, or float so fitted as to rise and fall through the variations in pressure of the fluid to be controlled, a valve carried by a screwed spindle, which spindle is free to turn in a fixed screwed neck, and which also takes into a threaded neck carried by the bellows-head, piston, or float, for the purpose of receiving therefrom an axial motion, and thereby causing the valve to approach to or recede from its seat and control or regulate the flow of fluid past the said valve, substantially as above described.

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