(No Model.)

# G. H. WALKER.

## FLUID PRESSURE REGULATOR.

No. 522,683. Patented July 10, 1894.

FIG. 1.

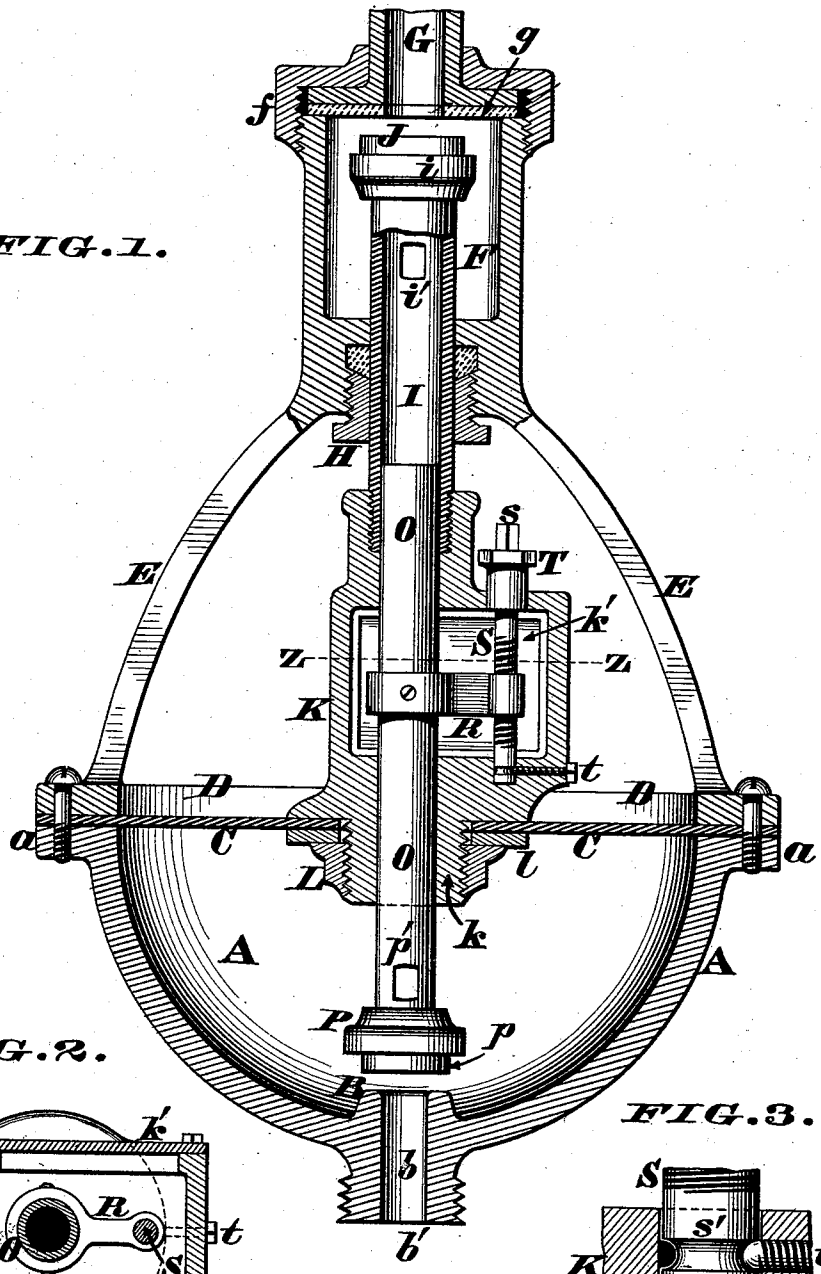


FIG. 2.




FIG. 3.




Attest.
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# UNITED STATES PATENT OFFICE.

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## FLUID-PRESSURE REGULATOR.

SPECIFICATION forming part of Letters Patent No. 522,683, dated July 10, 1894.

Application filed May 12, 1894. Serial No. 511,021. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE H. WALKER, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Fluid-Pressure Regulators; and I do hereby declare the following to be a full, clear, and exact description of the invention, reference being had to the annexed drawings, which form part of this specification.

This invention relates to those devices which employ a flexible disk or diaphragm for controlling the movements of an inlet-valve, so as to maintain a constant pre-determined pressure of fluid or gas in the apparatus to which the regulator is connected, and my improvement comprises a novel combination of appliances wherewith the outlet-valve of the regulator is adjusted with reference to its seat, for the purpose of permitting the operating current to flow faster or slower; as occasion requires, the details of this combination being hereinafter more fully described, and then pointed out in the claims.

In the annexed drawings, Figure 1 is a vertical section of my fluid-pressure regulator, the diaphragm and valves of the device being seen in their normal positions. Fig. 2 is a horizontal section of a portion of the regulator, said section being taken at the line Z—Z of the preceding illustration. Fig. 3 is a detail view.

The base of my regulator is a concave shell or case A, having at bottom a raised seat B, traversed by the discharge passage *b* of a short neck or coupling *b'*, the latter being screw threaded to enable the ready attachment of said regulator to any apparatus capable of being run with a fluid or gas. The top of this shell has an annular flange *a* that serves as a seat for a flexible disk or diaphragm C, made of rubber or other suitable material, said disk being clamped at its margin by a ring D, bolted to said flange, in the manner shown. Projecting upwardly from this ring, and converging inwardly, are ribs E, three being usually employed, and all of them being integral both with said ring and a valve-chamber F, the latter being surmounted by a screw-threaded cap *f*, that retains a flanged inlet-pipe G in a proper position. *g* is a gasket interposed between the flange of this pipe and the upper end of chamber F.

H is a stuffing box, screwed into chamber F, from its lower end, and traversed by a smooth pipe I, closed at top by a head *i*, which is counterbored to admit the inlet valve J. *i'* is a port in this pipe, below the head *i*.

Pipe I is connected to the upper end of a box *k*, whose lower end takes the shape of a screw-threaded neck *k*, which, after passing through a circular orifice in the center of disk C, has a nut L engaged therewith, a flat washer *l* being interposed between said disk and nut. Box K has a cap *k'* bolted to one side, and is traversed by a smooth pipe O, whose upper portion plays freely within the other pipe I, the lower end of said pipe O being closed by a head P that is counterbored to admit the outlet-valve *p*. *p'* is a port in this pipe, above the head P. Screwed, or otherwise attached to that portion of pipe O included within the box K, is a lateral-lug R, screw-threaded near one end to engage with an adjusting screw S. The upper portion of this screw passes through a stuffing-box T, and has a square arbor *s*, or a thumb nut, that enables the ready turning of said screw either to the right or left, as circumstances may suggest. The lower end of said screw has an annular groove *s'* to admit the point of a screw *t* tapped horizontally in the base of box K, as more clearly seen in Fig. 3.

This device may be used for regulating the pressure in almost all machines or motors operated by a fluid or gas of any kind, although I have designed it more especially for application to the peculiar form of hydraulic air-compressor, seen in Letters Patent No. 491,232, granted to me February 7, 1893. When thus applied, the discharge passage *b*, of the regulator, is connected to the water inlet of the compressor by a hose or tube, and the induction pipe G, is placed in communication with a street main, or other source of water supply. Valve *p* is then adjusted with reference to valve J so as to cause them to occupy the positions seen in Fig. 1, when the diaphragm C is in its normal condition, at which time said diaphragm must be able to resist the water pressure necessary to run the compressor at the desired speed. Now, when all the parts are in their normal positions, it is evident

water enters at the inlet G, flows freely around the valve J and head *i*, and thereby obtains access to the port *i'*. After passing through this port, the water traverses the communicating pipes I, O, escapes at the lower port *p'*, fills up the shell A, and finally descends the passage *b*, and is then led to the inlet of the compressor. As long as the pressure remains constant, this flow of water will be continuous, but as soon as this pre-determined pressure is exceeded, the diaphragm C naturally bends or bows upwardly, and in so doing forces the valve J against the gasket *g*. It is evident this automatic seating of said valve immediately shuts off the flow of water through the regulator, which remains inoperative until the pressure beneath the diaphragm is reduced, and then the latter again resumes its normal position, the result being the free passage of fluid to the compressor, as above described. By properly turning the screw S, the pipe O can be adjusted either up or down within the other pipe I, for the purpose of causing the valve *p* to approach nearer to its seat B, or to recede therefrom. When said valve is set quite near the seat, the water will be "wire drawn" on its way to the compressor, which latter will then run very slowly, while a greater opening of said valve will produce a corresponding increase in the speed of said compressor. It will thus be seen that the degree of pressure is determined solely by the action of the diaphragm C, and not by any shifting of the valve *p*, the duty of the latter being to regulate the velocity of the flowing current. Finally, by turning the screw S until the valve *p* is seated, and then turning said screw still farther, until the disk C bends upwardly, the valve J will close the inlet G, and thereby stop the entire apparatus.

I claim as my invention—

1. The combination, in a fluid-pressure regulator, of a shell having a valve-seat and discharge passage; a flexible diaphragm secured at its margin to said shell; a valve-chamber provided with a seat and inlet; a valve occupying said chamber and carried by a tubular-stem, having a receiving port; another tubular stem fitted within the first one, and provided with an outlet-valve and delivery port; and a device for shifting the inner stem longitudinally of the outer one, whereby said outlet-valve is adjusted with reference to its seat, for the purpose described.

2. The combination, in a fluid-pressure regulator, of the shell A, having a valve-seat B and discharge passage *b;* a flexible diaphragm C secured at its margin to said shell, and having a box K attached to it; a valve chamber F provided with a seat *g*, and inlet G; a valve J occupying said chamber and carried by a tubular stem I, having a receiving port *i';* another tubular stem O fitted within the one I, and provided with an outlet-valve *p*, delivery port *p'*, and lug R; and a screw S journaled in said box and engaged with said lug, for the purpose of shifting the inner stem O, longitudinally of the outer stem I, all as herein described.

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

GEORGE H. WALKER.

Witnesses:
JAMES H. LAYMAN,
FRANCIS M. BIDDLE.