

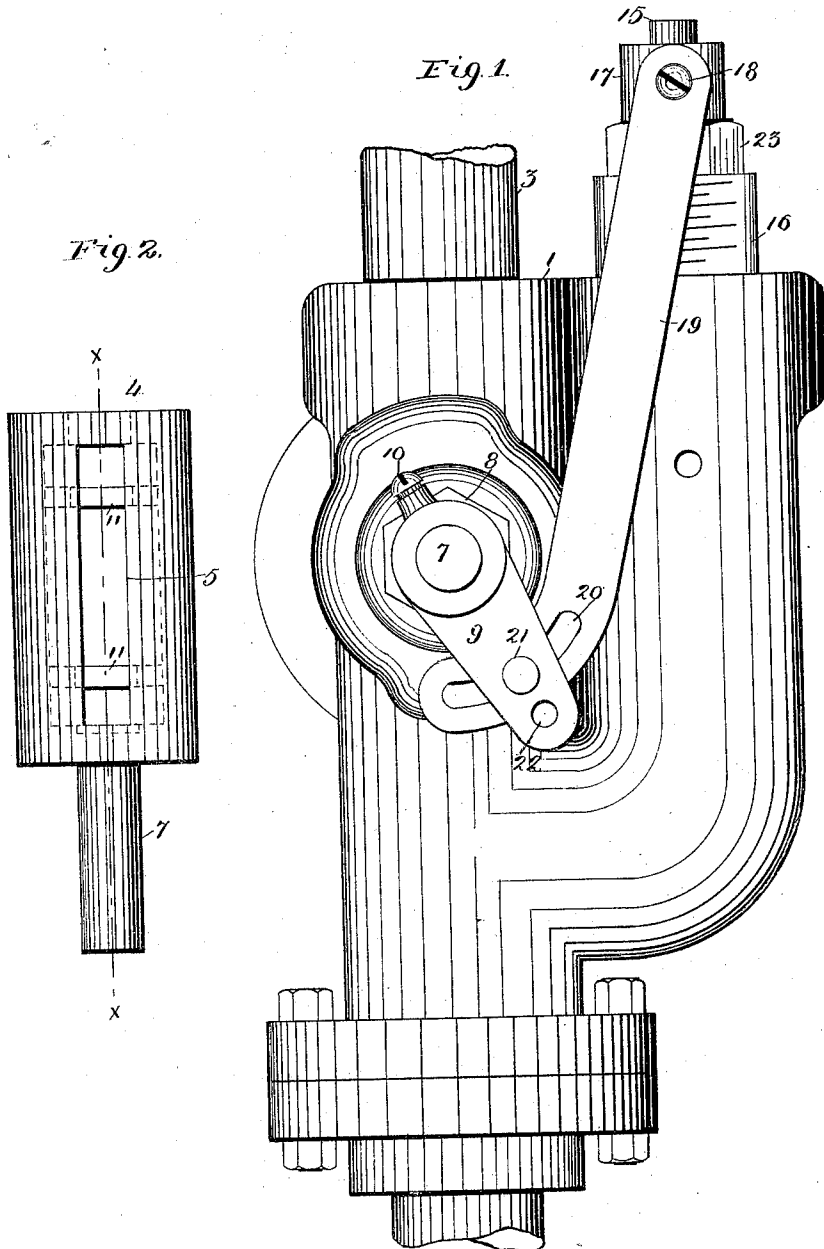
(No Model.)

2 Sheets—Sheet 1.

F. M. GAMACHE.  
FLUID PRESSURE REGULATOR.

No. 542,635.

Patented July 16, 1895.



Witnesses  
*Lee Lyle*  
*H. B. Wells*

Inventor  
*F. M. Gamache.*  
By *7.15* Attorneys  
*Keller & Storer*

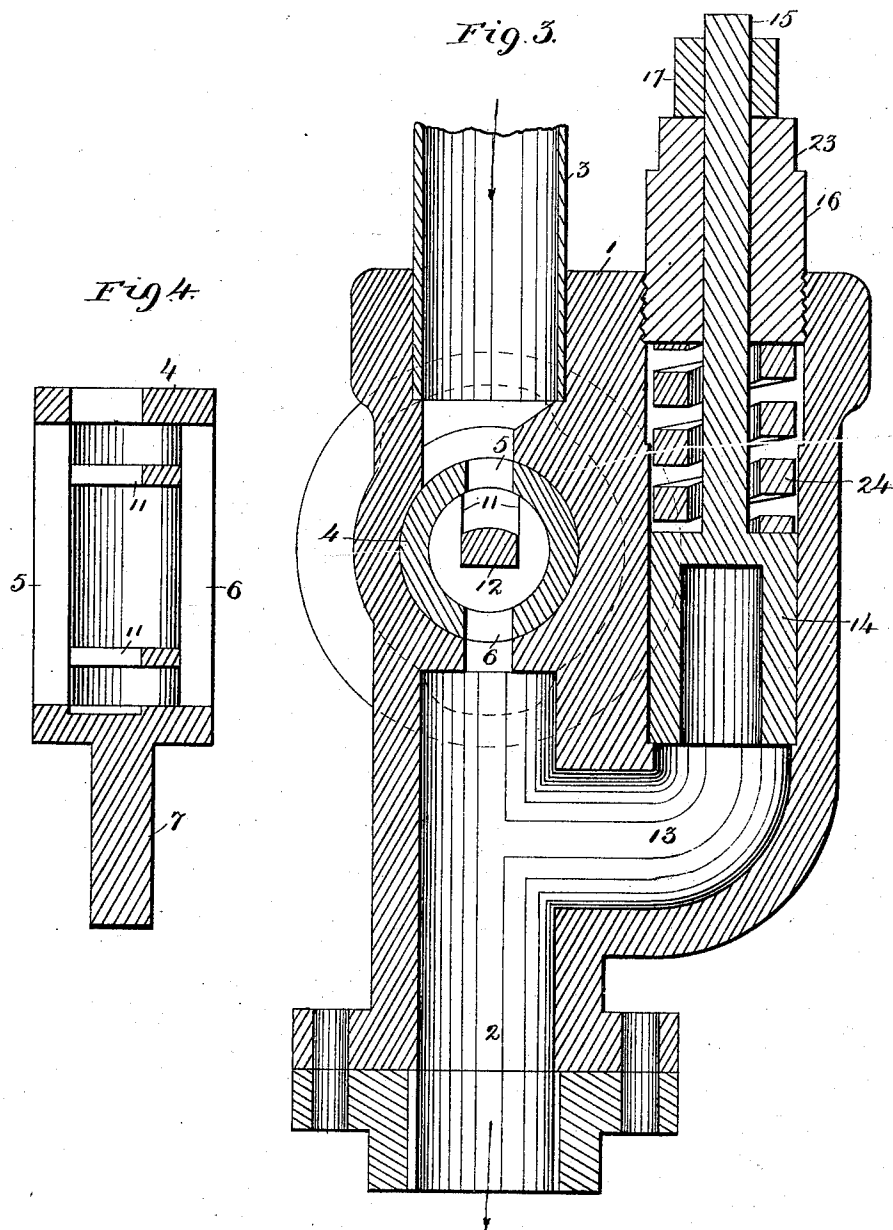
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*H. B. Wells*

Inventor  
*F. M. Gamache*  
By *his Attorneys*  
*Keeler & Storer*

# UNITED STATES PATENT OFFICE.

FRANK M. GAMACHE, OF ST. LOUIS, MISSOURI.

## FLUID-PRESSURE REGULATOR.

SPECIFICATION forming part of Letters Patent No. 542,635, dated July 16, 1895.

Application filed October 29, 1894. Serial No. 527,104. (No model.)

*To all whom it may concern:*

Be it known that I, FRANK M. GAMACHE, of St. Louis, Missouri, have invented certain new and useful Improvements in Fluid-Pressure Regulators, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention has relation to improvements in fluid-pressure regulators; and it consists in the novel arrangement and combination of parts more fully set forth in the specification and pointed out in the claims.

In the drawings, Figure 1 is a side elevation of my complete invention. Fig. 2 is a detail plan view of the controlling-valve of the device. Fig. 3 is a middle vertical section taken through the device; and Fig. 4 is a section of the valve, taken on the line *xx* of Fig. 2.

The object of my invention is to construct a fluid-pressure regulator which will be compact, simple, and durable and at the same time sensitive and susceptible of accurate adjustment. To this end I have devised an apparatus which in detail can be described as follows:

Referring to the drawings, 1 represents the casing within which the operative parts are located. The passage 2 thereof leads to any suitable heating or similar system, the opposite end of said passage having a pipe connection 3 leading from a suitable boiler or steam or similar generator. (Not shown.) In the path of the passage 2 in the casing and within suitable bearings is mounted and operates a rotatable cylindrical controlling-valve 4, having longitudinal diametrically-opposite inlet and exit openings 5 and 6 respectively. From one of the cylindrical ends of the valve projects a stem 7, the stuffing-box or bearing thereof being closed externally by a washer 8 passed over the stem and on the outside of the casing. To the outer end of the stem 7 is secured an arm 9, the manner of connecting it being accomplished preferably by a fastening-screw 10. Inside of the cylindrical valve 4, supported on and guided within suitable guide-bearings 11, which latter are located at a suitable distance from the inner walls of the circular ends of the valve, operates an emergency block-valve

12, the motion thereof being a rectilinear one within the guides of the said bearings 11. Communicating with the passage 2 is a passage 13, within which operates a hollow piston 14, the stem 15 thereof extending outwardly through a perforated cap 16, said cap being screwed into the open end of the passage 13. To the outer projecting end of the stem 15 and beyond the cap 16 is a sliding nut 17 adjustably secured to said stem by a screw 18, from the outer smooth portion of which is free to oscillate an arm 19 having its lower inwardly-curved end provided with a slot 20, along which the free end of the arm 9 may be variably adjusted and secured by the securing screw or bolt 21. The free end of the arm 9 is provided with an extra opening 22 exterior to the one through which passes the bolt 21 for the purpose of varying the adjustment between the arm 9 and the slotted end of the pivoted arm 19. The cap 16 is provided with a polygonal head 23 for operating the same, and between the inner surface of the cap and the upper surface of the piston 14 and encircling the stem 15 is confined an adjusting-spring 24, said spring being employed to set the approximate pressure at which the regulator is to be used.

The operation of the device is as follows: Suppose the spring 24 is set to operate or respond to a pressure of forty pounds and that the boiler-pressure is forty-five pounds. As the steam from the boiler passes through the device by way of the pipe 3, then when forty pounds and a little over have been reached the piston 14 will be driven upwardly, compressing the spring 24 against the cap 16, raising the stem 15, to which the upper end of the arm 19 is pivoted, and by the upward movement of the stem the arm 19 is pulled after it, rotating the arm 9, to which it is secured, and thus in turn rotating the stem 7 of the valve, and consequently the valve 4, thus closing its ports 5 and 6 to the admission to and escape of steam from the same into the heating system through the passage 2. In this manner the pressure within the system is always kept constant. The amount and rapidity of rotation given to the stem 7 and arm 9 secured thereto depends on the relative connection of the latter with the slotted end of the arm 19, on the relative po-

sition of the upper end of the arm 19 on the stem 15, on the distance to which the cap 16 has been screwed into the casing, and on the consequent degree to which the spring 24 is compressed. For fine adjustment the free end of the arm 9 is shifted at will along the slot 20 by the bolt 21 passing either through the opening, as shown in Fig. 1, or the opening 22 exterior to the same, and when once adjusted the two arms are firmly secured. When the pressure between the boiler and heating system is balanced, or when the parts are in their normal position, they occupy the relative position shown in Fig. 3. If for any reason the pressure in the boiler should suddenly drop by reason of explosion or other cause, then the excess of pressure in the system will force the emergency-valve 12 from its seat against the opening 5, closing the latter to any escape of the fluid from the heating system. My present device is adapted not only to steam systems but to fluid systems generally.

Having described my invention, what I claim is—

1. A fluid-pressure regulator comprising a casing, a passage leading therefrom to a suitable generator and system, a regulator valve in the casing normally in open communica-

tion with said passage, suitable means for operating said valve upon variation of pressure within the generator, and an emergency valve loosely mounted within the regulator valve in the casing and controlling the inlet passage from the generator into the casing, substantially as set forth.

2. A fluid-pressure regulator comprising a casing, a passage leading therefrom to a suitable generator and system, a regulator valve in the casing normally in open communication with said passage, an arm secured to said valve, a fluid-operated piston in said casing, a stem on said piston, a pivoted arm secured to the stem, an inwardly curved slot at the opposite end of said arm, means for securing the end of the arm secured to the valve in an adjusted position along the slot of the pivoted arm, and an emergency valve loosely mounted within the regulator valve and controlling the inlet passage from the generator into the casing, substantially as set forth.

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

FRANK M. GAMACHE.

Witnesses:

LEE SALE,  
EMIL STAREK.