G. J. ORR.

Relief-Valves for Steam Fire-Engines.

No. 156,371, Patented Oct. 27, 1874.

Fig. 1.

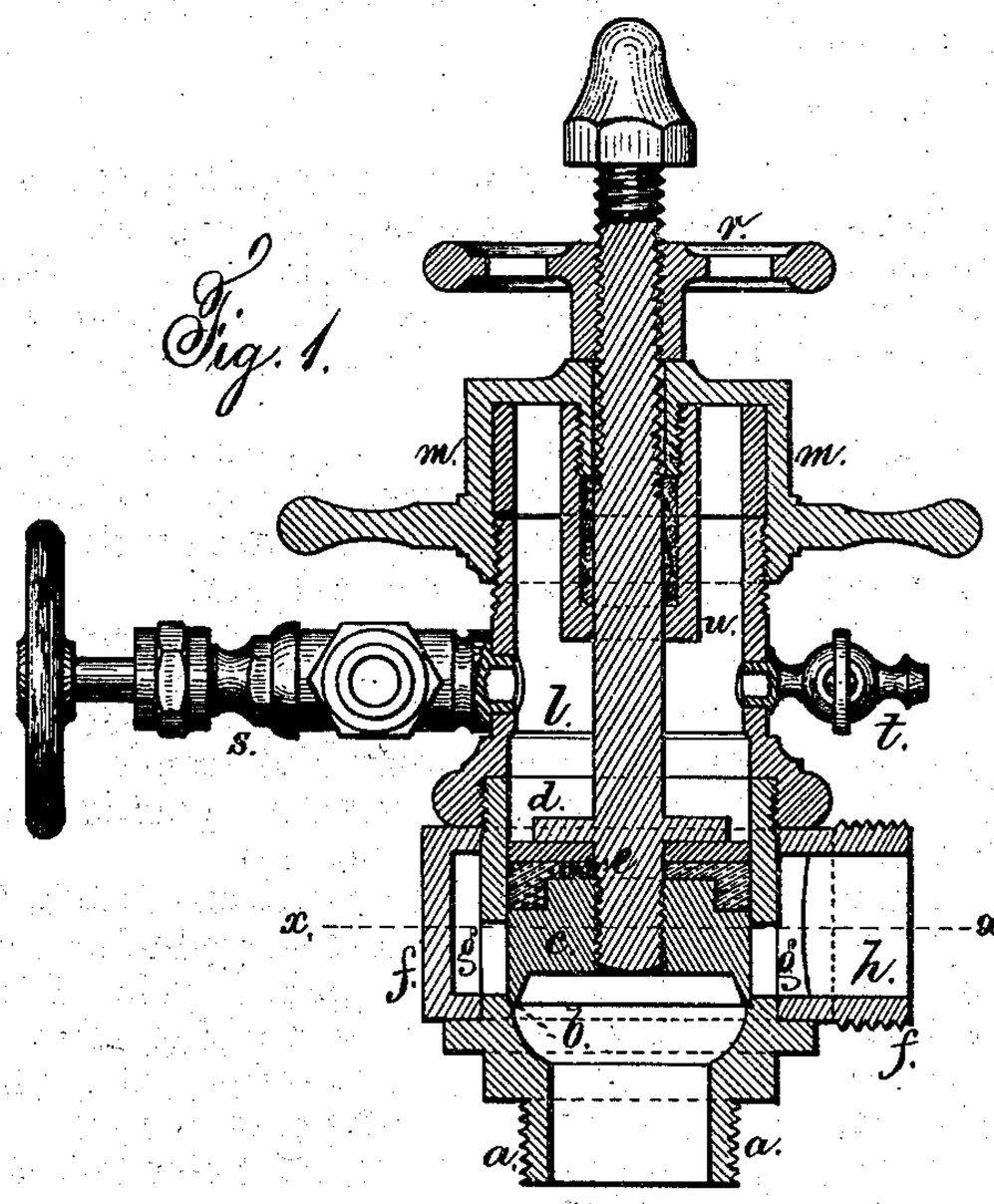


Fig. 3.

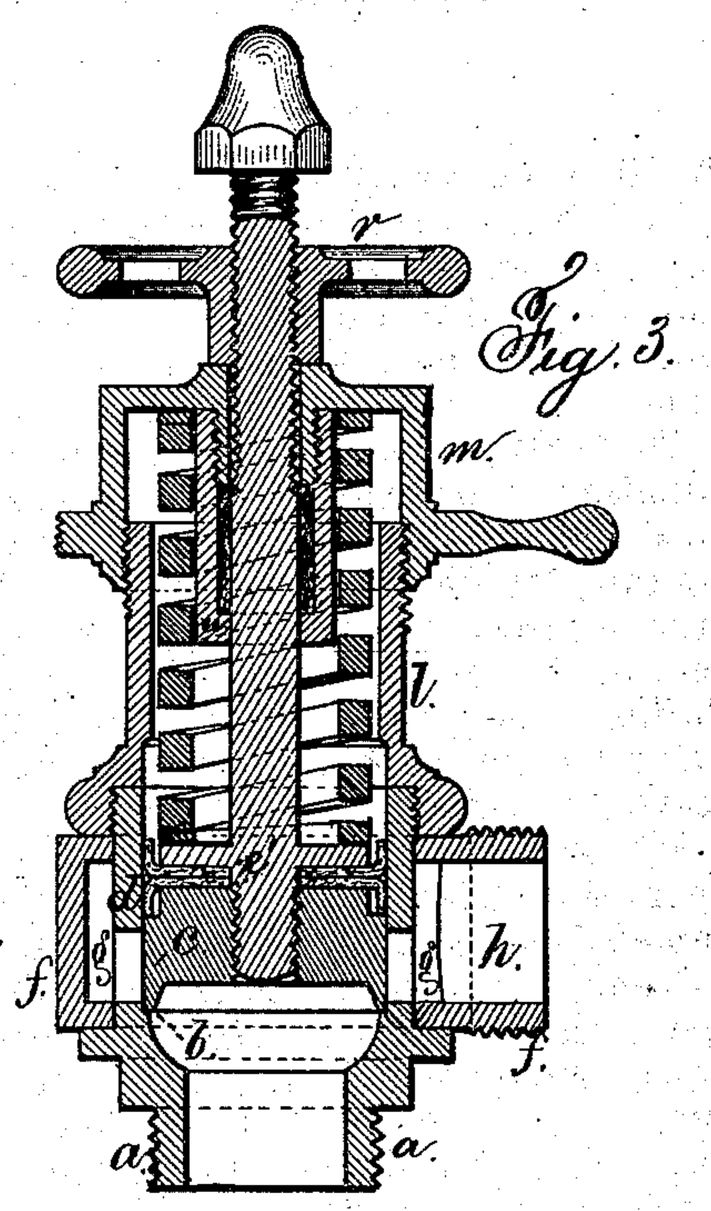
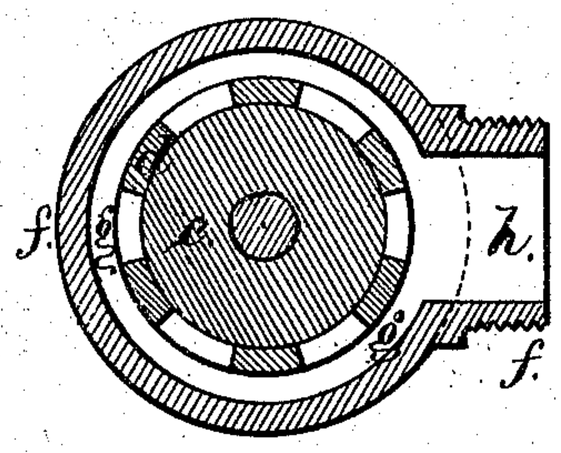


Fig. 2.



Witnesses
Chas. H. Smith
Harold Serrell

Inventor
Gilbert J. Orr.
per Lemuel W. Serrell
atty

UNITED STATES PATENT OFFICE.

GILBERT J. ORR, OF NEW YORK, N. Y.

IMPROVEMENT IN RELIEF-VALVES FOR STEAM FIRE-ENGINES.

Specification forming part of Letters Patent No. **156,371**, dated October 27, 1874; application filed August 8, 1874.

To all whom it may concern:

Be it known that I, GILBERT J. ORR, of the city and State of New York, have invented an Improvement in Relief-Valves for Steam Fire-Engines, of which the following is a specification:

This valve is employed to prevent the accumulation of pressure and the bursting of the hose when the discharge of the water is accidentally or designedly stopped. The water, in such cases, passes from the delivery-passage back to the induction-way, and so on around through the pump. This movement of the water has been accomplished before by relief-valves of various constructions.

My present invention is an improvement upon the relief-valve, for the object before named; and consists in a plunger-valve, the movement of which endwise in a cylinder opens the discharge water-way into the suction of the pump. This plunger-valve is acted upon by a yielding pressure and resistance that is proportioned to the pressure at which the water is to be discharged from the engine, so that when that pressure is exceeded the valve-plunger opens and allows the water to escape.

In the drawing, Figure 1 is a vertical section of my improved valve. Fig. 2 is a sectional plan of the same, at the line *x x;* and Fig. 3 is a vertical section, representing some modifications in the yielding resistance to the valve-piston.

The screw-coupling *a* is adapted to the opening made in the discharge water-way of the pump, or to a pipe leading thereto; and at *b* is a seat for the valve-piston *c*, that fits within the cylinder *d*, and is made to move steam or water tight therein by the elastic packing *e*, Fig. 1, or the double cup-leather packings *e'*, Fig. 3. In the portion of this cylinder *d* above the seat *b* are slots or openings, through which the water can freely discharge into the water-way *g*, that is annular, and made as a case, *f*, around the cylinder *d*. This case *f* is provided with a discharge-pipe, *h*, and it can be turned around so as to allow the pipe to pass away in the most convenient direction; and this case *f* is clamped in place by the cylinder 2, screwed upon the cylinder *d*.

The piston-valve *c* is to be pressed to its seat by a power sufficient to resist the designated pressure of the water, and when that pressure is exceeded the valve opens, and allows the water to flow back into the induction-ways through the way *g* and the pipe or connection *h*.

The pressure that tends to hold the valve *c* to its seat is, preferably, the steam-pressure from the boiler; and for this purpose the steam is allowed to fill the cylinder *l*, and act upon the side of the valve-piston opposite to that against which the water-pressure acts; and this cylinder *l* has a cap, *m*, and packing-gland *u* around the piston-valve stem or rod, and a screw-wheel, *r*, serves for opening the valve by hand, whenever desired.

The steam or steam-pressure is admitted by the cock or valve *s* into the cylinder *l*, and the area of the piston against which it acts, in comparison with the area of the valve, is such that, with a given pressure in the cylinder *l*, the valve will be lifted against that steam-pressure by any excess of water-pressure over the fixed standard.

The blow-off cock *t* serves the purpose of allowing water of condensation to be discharged, when desired, and also for lessening the pressure of the steam acting upon the valve; and hence, by the proper adjustment of the valves *c* and *t*, the pressure acting upon the piston *c* can be regulated, as desired.

A gage is usually applied to indicate the pressure in the discharge water-way, and a gage should be applied to indicate the pressure in the cylinder *l*.

It will be apparent that the relative areas of the piston-valve surfaces, against which the water and steam pressure act, respectively, may be varied by making the valve-seat, and the valve resting thereon, smaller than the other end, against which the steam-pressure acts.

In Fig. 3 I have shown a spring and an adjusting screw-cap, *m*, applied to act as a resistance to the plunger, the annular case *f*, slotted cylinder *d*, and valve and seat being made as before described.

The spring and steam pressure might be employed together, one in aid of the other, if desired.

I claim as my invention—

1. The annular case *f* around the slotted cylinder *d*, provided with the pipe or connection *h*, and secured in place by the cylinder *l*, in combination with the plunger-valve *c* and seat *b*, substantially as set forth.

2. The screw-cap *m* and packing-gland *u* at the end of the cylinder *l*, in combination with the plunger-valve *c*, slotted cylinder *d*, and annular case *f*, substantially as and for the purposes set forth.

3. The valve-stem passing through a packing-gland, *u*, and having the screw and hand wheel *r*, in combination with the plunger-valve *c*, slotted cylinder *d*, valve-seat *b*, inlet and discharge pipes *a h*, and cocks *s t*, substantially as set forth, for operating the plunger-valve by hand or the pressure of a fluid, as specified.

4. The relief-valve for steam fire-engines, made with a plunger-valve moving in a cylinder, in combination with a pipe and cock, *s*, connected with the steam-boiler and blow-off cock *t*, for regulating the pressure acting in said cylinder to press the plunger-valve toward its seat, as and for the purposes specified.

Signed by me this 5th day of August, A. D. 1874.

GILBERT J. ORR.

Witnesses:
GEO. T. PINCKNEY,
CHAS. H. SMITH.