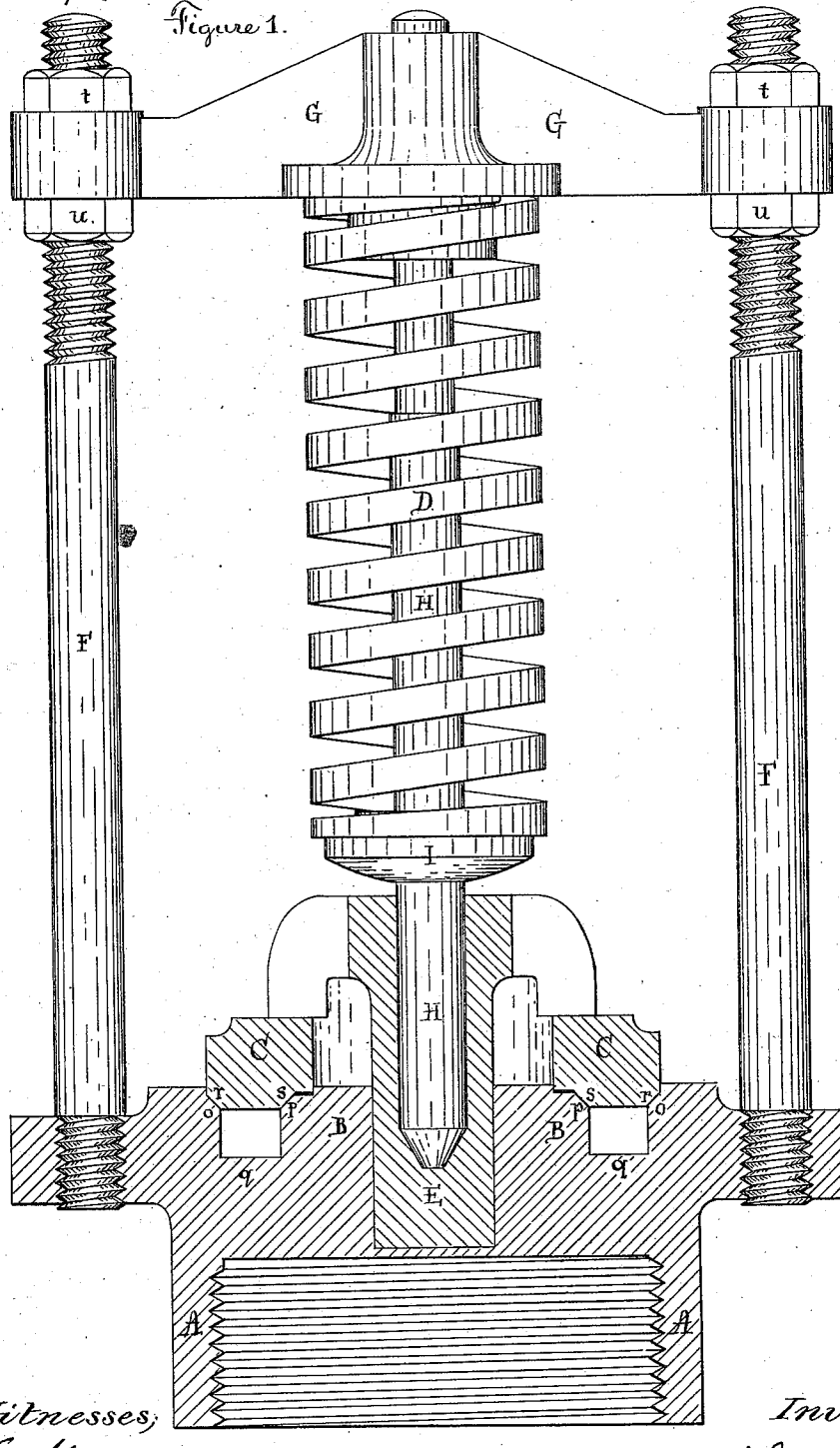
2 Sheets--Sheet 1.

E. H. RIPLEY.

Safety-Valves.

No. 156,312. Patented Oct. 27, 1874.

Figure 1.



Witnesses;
J. E. Maycadier
M. A. Knox.

Inventor;
E. H. Ripley

2 Sheets--Sheet 2.

E. H. RIPLEY.

Safety-Valves.

No. 156,312. Patented Oct. 27, 1874.

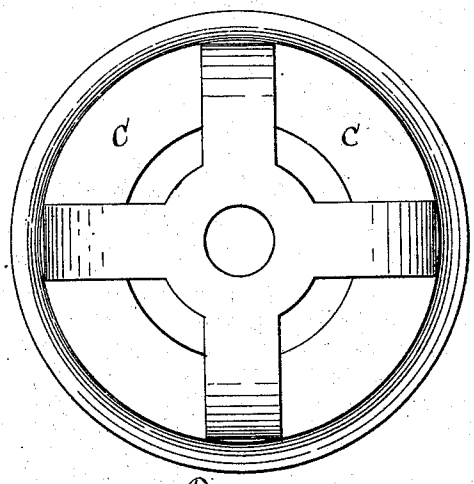


Figure 2.

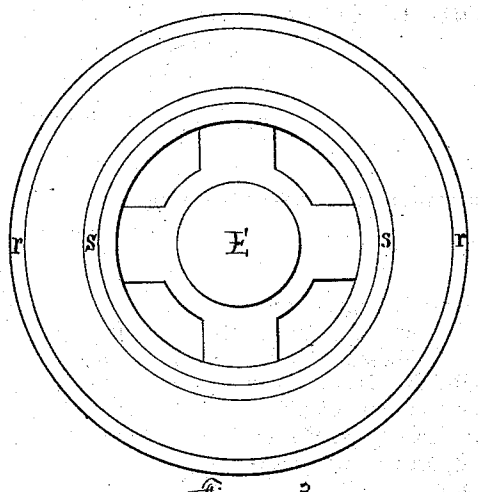


Figure 3.

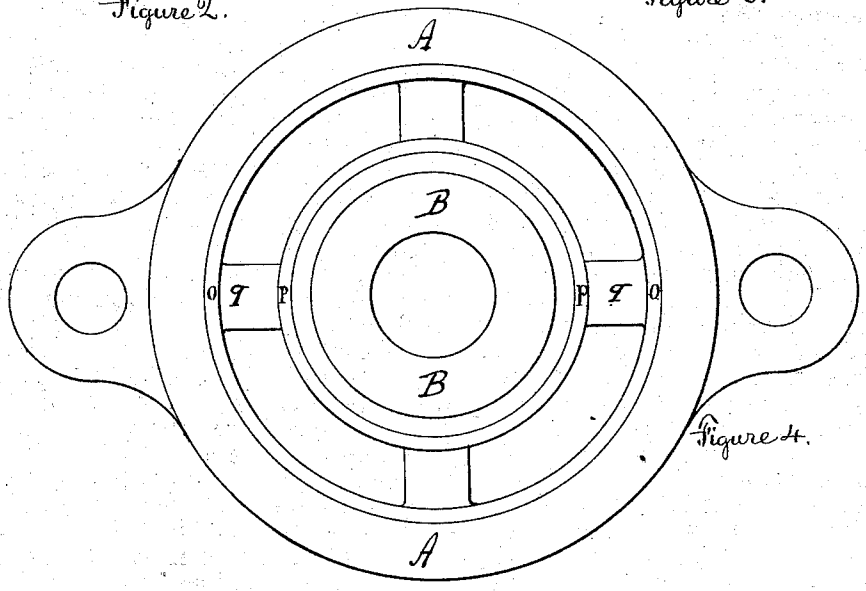


Figure 4.

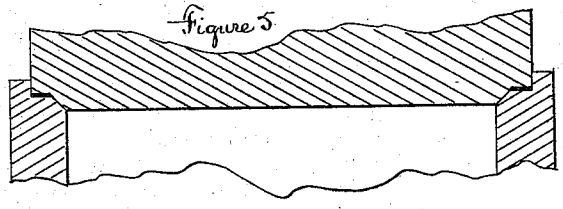


Figure 5.

Witnesses;
J. E. Mayrodeer
M. A. Knox

Inventor.
E. H. Ripley

UNITED STATES PATENT OFFICE.

EDWARD H. RIPLEY, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO H. G. ASHTON, OF SAME PLACE.

IMPROVEMENT IN SAFETY-VALVES.

Specification forming part of Letters Patent No. **156,312**, dated October 27, 1874; application filed September 5, 1874.

To all whom it may concern:

Be it known that I, EDWARD H. RIPLEY, of Boston, Massachusetts, have invented a Double-Relief Safety-Valve, of which the following is a specification:

In the drawings, Figure 1 is an elevation. Figs. 2, 3, and 4 are plans, and Fig. 5 is for illustration.

The tube A, upon the upper end of which the seat *o* is formed, is constructed so as to be readily attached to the boiler in any usual way. It has firmly secured within it a plug, B, upon the upper end of which the seat *p* is formed. In practice this plug, its bridges *q q*, and the tube A, are cast in one piece. The valve C has also two seats, one, *r*, to fit the seat *o* of the tube A, the other, *s*, to fit the seat *p* of the plug B; and also has an orifice in it through which the steam which escapes between the seats *p* and *s* finds an outlet, thereby affording two openings for the escape of the steam instead of one, as in Fig. 5. This feature is not new with me. The plug B is bored out to receive the stem E, which serves to guide the valve. The rods F F connect the cross-head G with the tube A. This cross-head has a boss upon it which surrounds the rod H and enters the spring D. This rod H has a bossed collar, I, upon it, the boss of which also enters the spring D, and these two bosses act to keep the spring from buckling. The nuts *t t u u* serve to secure the cross-head G at any desired height upon the rods F F, and thus regulate the pressure of the spring D and determine the blowing-off point, in the usual way.

The plug B may be bored clear through, and a third seat be formed to receive a seat formed upon the stem E, and thereby a third aperture be provided, making a treble relief-valve; but the principle is the same.

It will be observed that the annular face of the valve fits closely into an annular space formed by sinking the seats *o* and *p* below the upper surface of the tube A and plug B. This is for the purpose of causing the steam which enters between the seats *o* and *r* and *p* and *s*, when the valve has barely moved upward, to exert its force in aid of the force of the steam which presses upward against that part of the valve which is exposed to the steam when the valve is closed. The action is, in fact, presenting a larger area of the valve to the pressure of the steam—that is to say, as soon as the steam gets between the seats *o* and *r* and *p* and *s* the area of the valve exposed to pressure is increased, as the valve fits closely, though not, of course, steam-tight, into the tube above the seat *o*, and the reduced end of the plug also fits closely into the orifice in the valves.

This increase of the area exposed to pressure increases, of course, the power acting against the spring, which is the object intended to be effected.

The purpose and effect of this increase of power are too well known to require description.

This manner of obtaining this increase of power, namely, by sinking the seat below the upper surface of the tube, and fitting the valve closely in the space thus formed, is an important feature of my invention, and is applicable, of course, to the common valve, as will be plain if the plug B be supposed to be omitted, and the valve C be supposed to be without the orifice in it, as illustrated in Fig. 5. But when used in a double relief-valve, it is clear that the area exposed to pressure is increased not only externally, (as it would be if used in a common valve,) but also internally; that is, my valve is a double relief-valve, because the area increases both externally and internally after the valve is started from its seat. Moreover, it is a double relief-valve, in that it combines the two modes of relief above described. First, by increasing the opening for the escape of the steam due to a given motion of the valve, and, second, by increasing the area exposed to pressure.

What I claim as my invention is—

1. The tube A, having the seat *o* sunk below the surface, as set forth, in combination with a valve fitted so closely in the space thus formed that the steam cannot

escape freely until it has raised the valve out of this space, as and for the purpose specified.

2. The combination of the tube A, having the seat *o*, the plug B, having the seat *p* sunk below its surface, as set forth, and the valve C, having an orifice through it, into which the end of plug B fits closely, all as and for the purpose specified.

E. H. RIPLEY.

Witnesses:
M. A. KNOX,
J. E. MAYNADIER.