(No Model.)

W. E. PEARSON.

POP SAFETY VALVE.

No. 253,622. Patented Feb. 14, 1882.

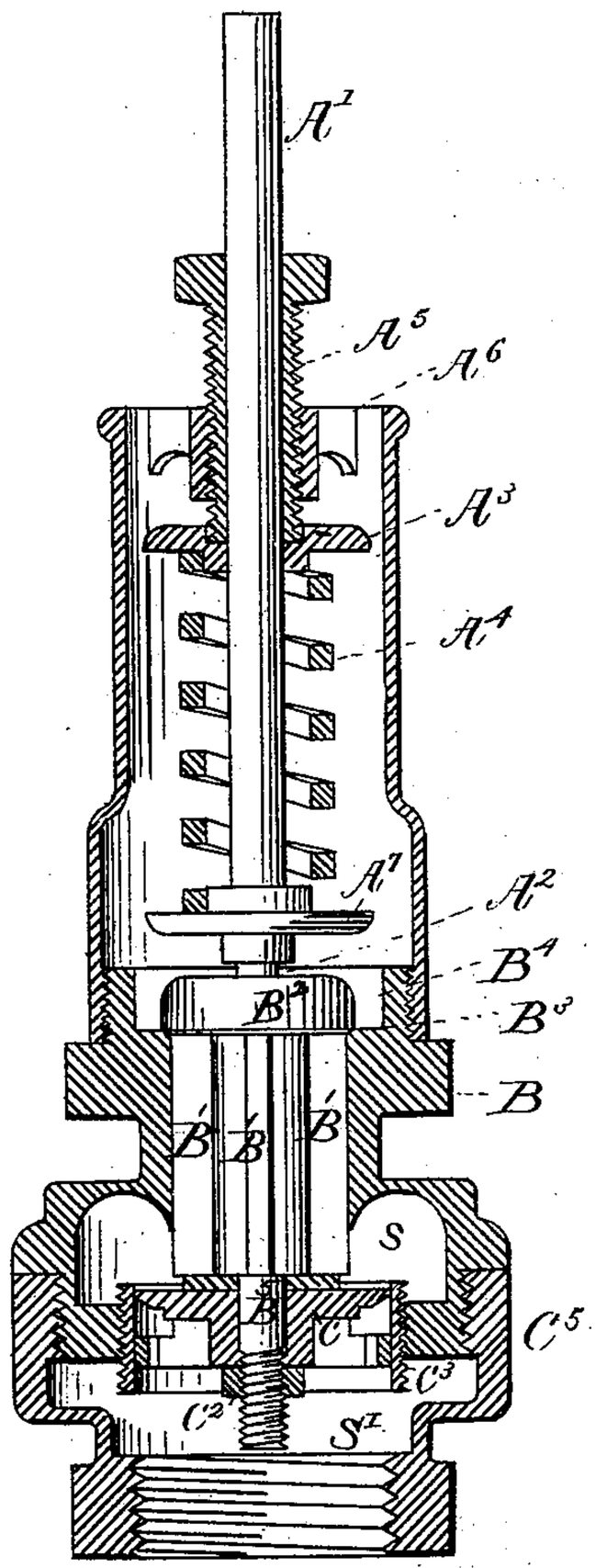

Fig. 1.

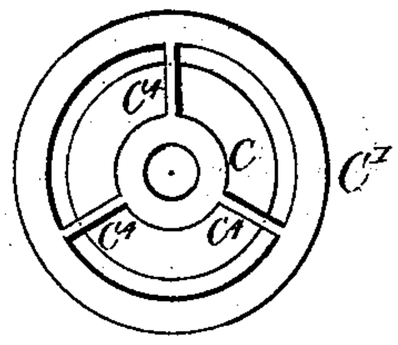

Fig. 3.

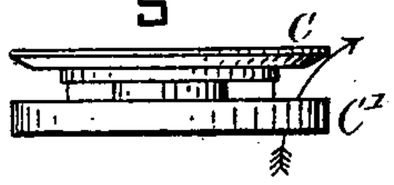

Fig. 4.

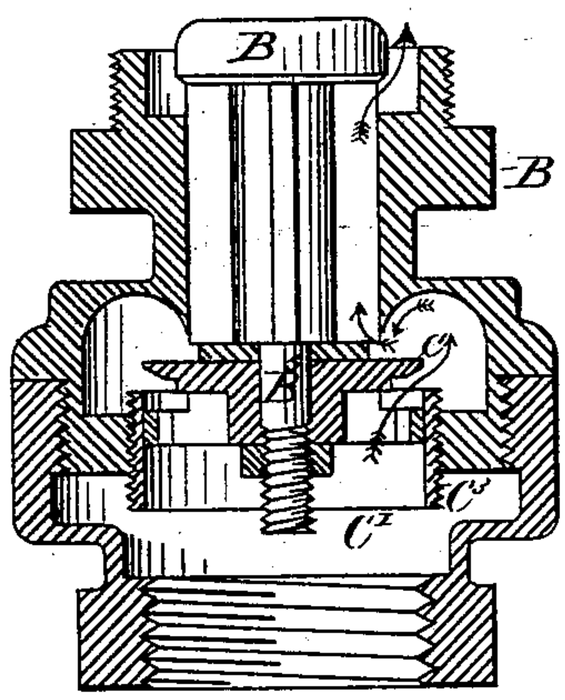

Fig. 2.

WITNESSES

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POP SAFETY-VALVE.

SPECIFICATION forming part of Letters Patent No. 253,622, dated February 14, 1882.

Application filed September 12, 1881. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM E. PEARSON, of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improved Pop Safety-Valve, of which the following is a specification.

My invention relates to that class of valves that are adjusted to open for the escape of steam at a certain fixed pressure and to remain open until the pressure in the boiler is considerably reduced, the object being to improve the construction, so as to insure certainty of action and improved adjustability. I attain these objects by the mechanism shown in the accompanying drawings, in which—

Figure 1 is a vertical section, showing all of the parts. Fig. 2 is a vertical section, showing the valve and its attached piston open. Fig. 3 is a plan showing the under side of the piston. Fig. 4 is an elevation of the attached piston.

In the drawings, A B C represent the several parts, that being screwed together, constitute the valve-chamber, the upper end of the part A having segmental openings to allow of the free escape of steam when the valve is open.

A′ A^2 is a stem, guided at its upper end by the hollow screw A^5, which is connected to the upper end of the cylinder A by radial arms A^6. The lower end, A^2, of the stem A′ rests in a socket made in the top of the valve B.

A^3 is a disk attached to the adjusting-screw A^5, and serves to form a buttress for the spring A^4.

A^7 is a disk attached to the stem A′ A^2, and serves to transmit the pressure of the spring A^4 to the valve B. This pressure of the spring A^4 may be varied by turning the screw A^5 up or down, so that the valves B may be held down against its seat, and to open at any desired number of pounds pressure.

The valve B^2 has a seat slightly beveled, as shown. The valve-seat proper has an annular flat extension, B^3, around it, which is bounded by the vertical cylinder B^4.

B′ B′ B′ are three of the four vertical guiding-wings, which extend downward from the under side of the valve B, and serve as guides for keeping it in a vertical position.

B^5 is a stem extending from the center of the wings B′ B′, and serves to connect the valve B with the piston C. This piston C separates the lower chamber, S′, from the upper chamber, S; but the piston C, not being steam-tight, allows steam enough to pass from the lower chamber, S′, to the upper chamber, S, to balance the pressure in both—that is, the pressure in the chamber S immediately under the valve B is the same as the pressure in the boiler. The piston C consists of a flat disk, forming its upper part, and of a ring, C′, connected to the parts C by means of the radial arm C^4, (see Fig. 3,) the piston being so made that steam may enter its lower part inside of the ring C′ and escape laterally between the parts C and C′, as indicated by the arrow in Fig. 4.

C^3, Figs. 1 and 2, is an adjustable cylinder, into which the piston C fits, not steam-tight, but quite accurately. This cylinder C^3 being provided with a screw-thread on its outer side, which fits into a corresponding thread formed at B^6, admits of being adjusted vertically in relation to the piston C with the greatest accuracy.

C^2 is a nut which serves to confine the piston C to the stem B^5 of the valve B.

My device operates as follows: When the valve B is closed the pressure of the boiler is communicated to the chamber S immediately under the valve B by the leakage of the piston C. When this pressure exceeds the limit admissible, then the valve B is forced upward, taking with it the piston C. When the upper disk of the piston C arises above the edge of the cylinder C^3 the steam can freely escape into the chamber S, and from there through the opening between the valve B and its seat.

From the above it can plainly be seen that the first effect of opening the valve B is to allow the steam of the boiler to act on the enlarged area of the piston C, and that unless this action was counteracted the valve B would remain open until the pressure was largely reduced; but this action is counteracted by the impact of the steam that passes into the chamber S, the top of which is recurved, as shown, so that a large portion of the steam comes back onto the top of the piston C, and by impact causes it to settle back to its place. This re-

action takes place so promptly that the valve will be closed before the steam has lost a pound of pressure.

The cylinder C and the spring-adjusting screw A^5 in adjustment have a mutual relation one to another, both dependent upon the pounds of pressure it is desirable to maintain. The greater the pressure the less the top of the cylinder C^3 should extend above the top of the piston C, and vice versa.

Having thus described my invention, what I desire to secure by Letters Patent is—

1. In a safety-valve device, the combination of the valve B with the piston C, having an annular lateral opening, and an adjustable cylinder, C^3, all operating together substantially as described, and for the purpose set forth.

2. In a safety-valve device, the combination of the piston C and adjustable cylinder C^3 with the recurved walls of the chamber S, all operating together substantially as described, and for the purpose set forth.

WILLIAM E. PEARSON.

Witnesses:
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