

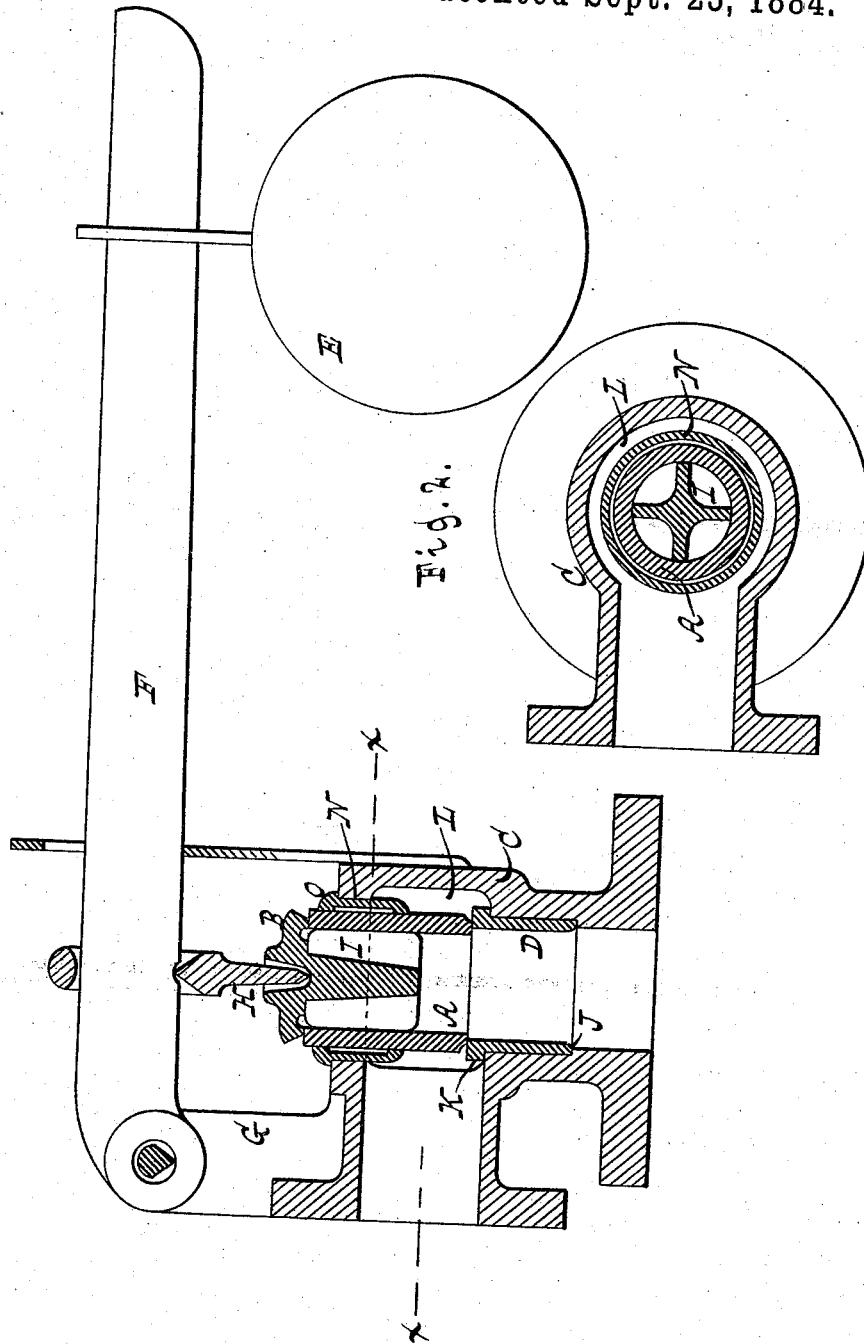
(No Model.)

W. C. BARR.
SAFETY VALVE.

No. 305,416.

Patented Sept. 23, 1884.

Fig. 1.



WITNESSES:
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UNITED STATES PATENT OFFICE.

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SAFETY-VALVE.

SPECIFICATION forming part of Letters Patent No. 305,416, dated September 23, 1884.

Application filed January 31, 1884. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM C. BARR, a citizen of the United States, residing at Jersey City, Hudson county, New Jersey, have invented certain new and useful Improvements in Safety-Valves, of which the following is a specification, reference being had therein to the accompanying drawings.

The object of my invention is to combine, in a safety device for steam-boilers and analogous structures, two valves in such a manner that under normal conditions both valves co-operate, while in case one valve becomes inoperative the other preserves an operative condition. This object I have accomplished by constructing and arranging the valves as hereinafter described, and as illustrated in the accompanying drawings, in which—

Figure 1 is a vertical section showing both valves in a closed position. Fig. 2 is a cross-section on the line *x x*, Fig. 1.

Similar letters indicate similar parts.

The letters A B designate the two valves, one of which may be termed a "main valve," and the other a "supplemental valve," the latter co-operating with, but being capable of operating independently of, the main valve. The main valve A is composed of a hollow cylinder occupying a vertical position in a shell, C, while the supplemental valve B is composed of a disk resting on the upper end of the cylinder. The shell C forms a chamber for the valve-cylinder A, and is provided with a seat, D, therefor, the orifice of which seat is larger than the inner diameter of the cylinder, so that the lower end or face of the cylinder is exposed interiorly of the valve-seat, as shown in Fig. 1. The upper end of the valve-cylinder A is ground to form a seat for the valve-disk B, and the latter is exposed to the action of a weight, E, (or a spring,) which thus is common to both valves, the weight being arranged on the usual lever, F, which is fulcrumed at one end in an arm, G, of the valve-shell, and engages the valve-disk by means of a stem, H, entering a central socket of the disk. For the purpose of guiding the valve-disk D when it lifts off from the cylinder, as hereinafter explained, it is constructed with a spider, I, to enter the cylinder, this spider, by its radial blades, forming an extended bear-

ing for the valve-disk, without obstructing the passage of steam to the disk.

The valve-shell C is made in shape of an elbow, and the valve-seat D is in its vertical limb, which constitutes the inlet of the valve-chamber, the valve-cylinder A passing through the top of the other or horizontal limb thereof, which constitutes the outlet of the valve-chamber. The valve-seat D is composed of a 60 ring or cylinder, which rests on a shoulder, J, of the shell at the lower end, and has an outwardly-projecting flange, K, at the upper end, resting on the shoulder formed at the junction of the two limbs of the shell, so that the seat can be easily removed for its repair or renewal or other purposes. The valve-shell C is constructed with a recess, L, around the valve-cylinder A, at a point opposite the horizontal limb of the shell, so that this recess 70 communicates with the outlet of the valve-chamber, and the valve-seat D is arranged at or near the lower end of the recess. In the top of the valve-shell C, where the valve-cylinder A passes through it, is arranged a bushing, N, which rests on the shell by means of an outwardly-projecting flange, O, at the upper end, and is hollowed on the inner surface intermediate of the ends, so that it bears on the cylinder only at the ends, thus forming an 80 extended bearing for the cylinder, with very little friction.

If desirable, the valve-cylinder A may be grooved longitudinally to further reduce friction.

When the device is applied to use, the weight E is set to properly load the valves A B, and when the pressure of the steam exceeds the capacity of the weight the steam acts on the lower end or face of the cylinder A, due to the 90 relative inner diameter of the cylinder and the orifice of the valve-seat D, to lift the valve-cylinder off from its seat and permit the steam to escape through the outlet of the valve-chamber, the valve-disk B sharing the motion of the cylinder, but remaining stationary on its seat, so as to keep the cylinder closed at its upper end. Both valves A B thus co-operate, while, if from any cause the valve-cylinder A should become inoperative, the disk B lifts off 100 from its seat under the pressure of the steam, and, opening the upper end of the cylinder,

permits the steam to escape, thus insuring safety. An important feature of the valve-disk B is its arrangement exterior of the valve-shell, inasmuch as it is thus entirely relieved from back-pressure.

The effect of the recess L around the valve-cylinder A is to cause the escaping steam to act uniformly on every portion of the valve-cylinder A, so that the latter is balanced.

It should be understood that the operation of the valves A B may be reversed, it being only necessary to increase the diameter of the valve-disk B and of its seat compared to the diameter of the seat of the valve-cylinder to cause the valve-disk to open before the valve-cylinder.

It is not intended to claim herein the broad idea of two independent valves, one seated upon the other, so that one shall maintain an operative condition in case the other becomes inoperative; but my invention consists in attaining this object by a new organization of independently-operating valves, which, under normal conditions, co-operate to open one of two independent ports in the valve-case, while in the event of one valve becoming inoperative the other will open one of said independent ports.

What I claim as my invention is—

1. The combination, in a safety-valve for steam-boilers, of the two valves A and B, arranged as described, with the casing, within which the valve A has a vertical wall-seat and an end seat opening into a side port below its wall-seat, the latter forming a supplemental receiving-surface for the steam-pressure within the diameter of said end seat, and a weight-

ed connection for said valves, whereby the valve B will open the top outlet-port of the valve A, and the latter will open the side case-port, substantially as herein set forth.

2. The combination, in a safety-valve, of the valves A and B, the valve-seat D, and the bushing O, with the casing having a side port and an interior wall-recess communicating therewith between the end and wall seats of the valve A, and the weighted lever, the said casing forming a guide-bearing for the interior valve, A, and the latter forming a guide for the external valve, B, substantially as herein set forth.

3. The combination, with the flanged tubular bushing N and the flanged tubular seat D, of the tubular valve A, packed and seated thereby to expose its lower ring end to the steam-pressure from the boiler, the exterior valve, B, the weighted lever F, and the shell or inclosing-case C, constructed with the interior shoulder, J, and permitting the removal of the tubular seat, the tubular valve, and the tubular bushing, substantially as described, for the purpose specified.

4. The combination, substantially as hereinbefore set forth, with the hollow cylinder composing the main valve and the shell forming the valve-chamber, of the bushing hollowed intermediate of the ends to bear against the valve-cylinder only at those points.

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

WILLIAM C. BARR.

Witnesses:

E. F. EDWINS,
ELLIOT BRIGGS.