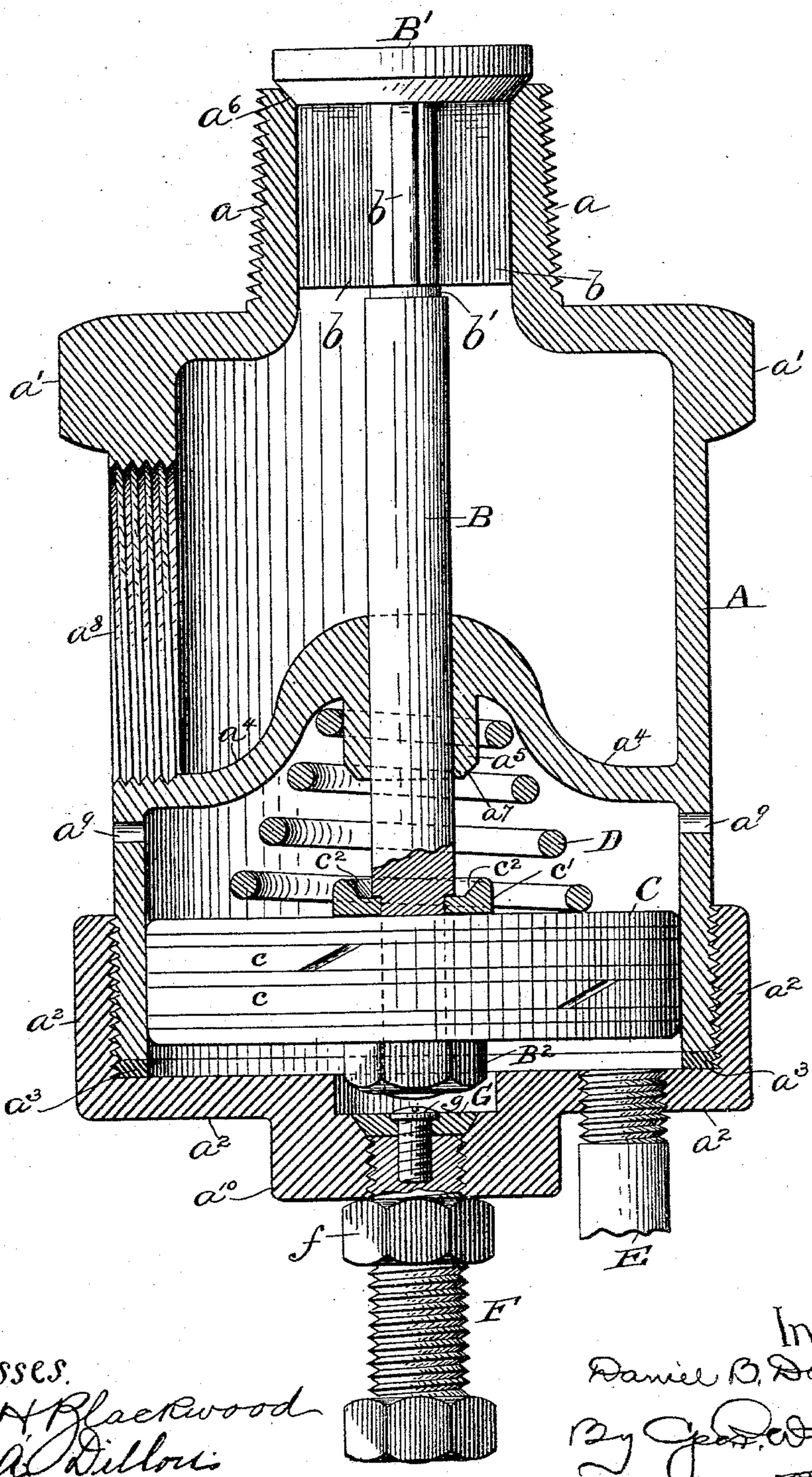
(No Model.)

# D. B. DONNELLY.

## BLOW-OFF COCK.

No. 551,370. Patented Dec. 17, 1895.

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# UNITED STATES PATENT OFFICE.

DANIEL B. DONNELLY, OF DERRY STATION, PENNSYLVANIA.

## BLOW-OFF COCK.

SPECIFICATION forming part of Letters Patent No. 551,370, dated December 17, 1895.

Application filed June 21, 1895. Serial No. 553,508. (No model.)

*To all whom it may concern:*

Be it known that I, DANIEL B. DONNELLY, a citizen of the United States, residing at Derry Station, in the county of Westmoreland and State of Pennsylvania, have invented certain new and useful Improvements in Blow-Off Cocks; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawing, and to the letters of reference marked thereon, which forms a part of this specification.

My invention relates to blow-off cocks for steam-boilers, the object being to improve the construction and enable the cock to be operated either by fluid-pressure or by hand.

It has been proposed to provide a blow-off cock or valve with a cylinder and a piston, the latter connected with the valve-stem, whereby the valve could be operated by admitting steam or compressed air to the cylinder. My invention pertains to this kind of blow-off cock, and my improvements consist in means for preventing the water and sediment and steam escaping from the boiler from leaking into the cylinder in which the piston works, and thereby interfering with the prompt and efficient operation of the device. A further improvement is the providing of a plunger by means of which the valve may be positively opened by hand when there is no fluid-pressure available.

The drawing is a vertical longitudinal section of my improved blow-off cock.

The casing A has at its upper end a screw-threaded neck $a$ adapted to be screwed into a tapped hole in the shell of the boiler at or near the place where the ordinary blow-off cock is usually attached. The casing is provided with a polygonal flange $a'$ for the application of a wrench to screw it into place. The lower end of the casing is closed by a screw-cap $a^2$, a suitable gasket $a^3$ being interposed between the casing and the cap. The casing is divided into two chambers, upper and lower, by a septum $a^4$, which is preferably dome-shaped in order to make the whole device as compact as possible. The septum has a depending neck $a^5$, or is otherwise thickened at the center to afford a long bearing for the rod B, which passes centrally through it. The upper end of the rod is provided with a valve B′, which fits a suitable seat $a^6$ on the upper end of the neck $a$ inside the boiler. Wings $b$ project radially from the rod B below the valve and guide its movements in opening and closing, said wings fitting the cylindrical bore of the neck $a$. A slight groove $b'$ is turned in the rod just below the wings to weaken the rod at this point, so that if the casing should be broken off the rod will break at the groove and leave the valve on its seat to prevent the escape of water or steam.

The lower chamber in the casing is bored out cylindrical to receive the piston C, which is secured to the lower end of the rod B by a nut $B^2$. The piston is provided with the usual packing-rings $c$, and has on its upper side a central boss $c'$, in which is turned a recess, preferably with a beveled face or edge $c^2$. The lower end of the neck $a^5$ is formed with a beveled face $a^7$, adapted to fit tightly into the recess and prevents water, sediment or steam from leaking into the lower chamber around the rod B.

A spring D surrounds the rod B between the piston and the septum $a^4$ to hold the valve B′ to its seat when there is no pressure in the boiler, and also to assist in closing it. The spring is preferably a conical helix, with its base resting on the piston, and its upper end received in the top of the dome-shaped septum around the neck $a^5$. This construction permits the spring to be contracted to a considerable extent in spite of its short length, since the successive coils close one into the other, allowing the piston to come up nearly to the septum.

In the cap $a^2$ is screwed a pipe E, which conveys to the cylinder a supply of steam or compressed air, preferably the latter in the case of a locomotive. The supply is governed by a cock under the control of the engineer. When he wishes to blow out the sediment in the boiler, he admits fluid-pressure underneath the piston, which rises and opens the valve B′. The matter escaping through the neck $a$ into the upper chamber of the casing passes out through a large opening $a^8$ in the

side thereof, whence it is conveyed away by a pipe or otherwise. In case any steam or air leaks into the chamber above the piston it escapes through the ports $a^9$ in the wall of the casing.

Inasmuch as the rod B is likely to be eroded by the rush of sediment through the upper chamber, I make the rod bearing in the septum $a^4$ longer than the lift of the piston, so that the lower portion of the rod may not emerge from the bearing, and will thus remain smooth and cylindrical and maintain a tight joint.

In order to enable the valve to be opened when the boiler is not under steam, or when there is no air-pressure in the main reservoir, I provide a plunger in the cap $a^2$, adapted to operate against the lower end of the piston-rod. I prefer to use a screw-plunger, the cap being formed with a central boss $a^{10}$, in which is formed a screw-threaded hole to receive the screw-plug F, provided with a lock-nut *f*. A disk G is secured by a screw *g* to the upper and inner end of the screw-plug F. The disk has a beveled edge to fit a corresponding seat in the inside of the cap $a^2$, so that by backing out the screw-plug until the disk is tightly seated, it can then be locked by the jam-nut *f* and thus prevent any escape of air-pressure around the screw-plug. In order to open the valve B′ by this device it is simply necessary to loosen the lock-nut *f* and turn in the plug F until it strikes against the end of the rod B, and forces it upward, compressing the spring D and lifting the valve from its seat.

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

1. In a blow-off cock, the combination with the valve, its rod and piston, of a casing having a septum containing a bearing for the rod, said bearing being longer than the lift of the valve, substantially as described.

2. In a blow off cock, the combination with the valve, its rod and piston, of a casing having a septum through which the rod passes, a helical spring surrounding the rod between the piston and the septum, said piston and septum being provided with coacting faces to form a tight joint around the rod when the piston is raised, substantially as described.

3. In a blow off cock, the combination with the valve and its rod, of a piston having a central boss containing a recess, and a casing having a septum provided with a face to fit into said recess, substantially as described.

4. In a blow off cock, the combination with the valve and its rod, of a piston having a central boss containing a recess having a beveled edge, and a casing provided with a septum having a central neck terminating in a beveled face adapted to fit said recess, substantially as described.

5. A blow off cock having a cylinder and piston for opening its valve by fluid pressure, and a screw plug F engaging with a threaded opening in the head of the valve casing, but independent of the valve rod, and adapted when screwed in to abut against the piston and thereby open the valve, substantially as described.

6. In a blow off cock, the combination with the casing A, of a valve rod B and valve B′, the piston C, the spring B bearing thereon, and the screw plug F engaging with a threaded hole in the head of the casing and in line with but independent of the piston and the valve rod, substantially as described.

7. A blow off cock, having a cylinder and piston for operating its valve by fluid pressure, and a screw plug in the head of its casing independent of the valve rod, said plug having means for tightly closing the opening through which said plug passes, substantially as described.

8. In a blow off cock, the combination with the casing of the valve, the rod and the piston for operating the valve, and the screw plug independent of the valve rod and having a disk secured to its inner end and adapted to close the hole in the casing through which said plug passes, substantially as described.

9. In a blow off cock, the combination with the casing, of the valve, the rod and the piston for operating the valve, the screw plug passing through the end of the casing and provided with a lock nut, and a beveled disk secured to the inner end of the plug and adapted to close against a beveled seat on the inside of the casing, substantially as described.

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

DANIEL B. DONNELLY.

Witnesses:
A. D. HARMAN,
W. UTTS.