

(No Model.)

W. F. CUNNINGHAM.
VALVE FOR STEAM BOILERS.

No. 433,618.

Patented Aug. 5, 1890.

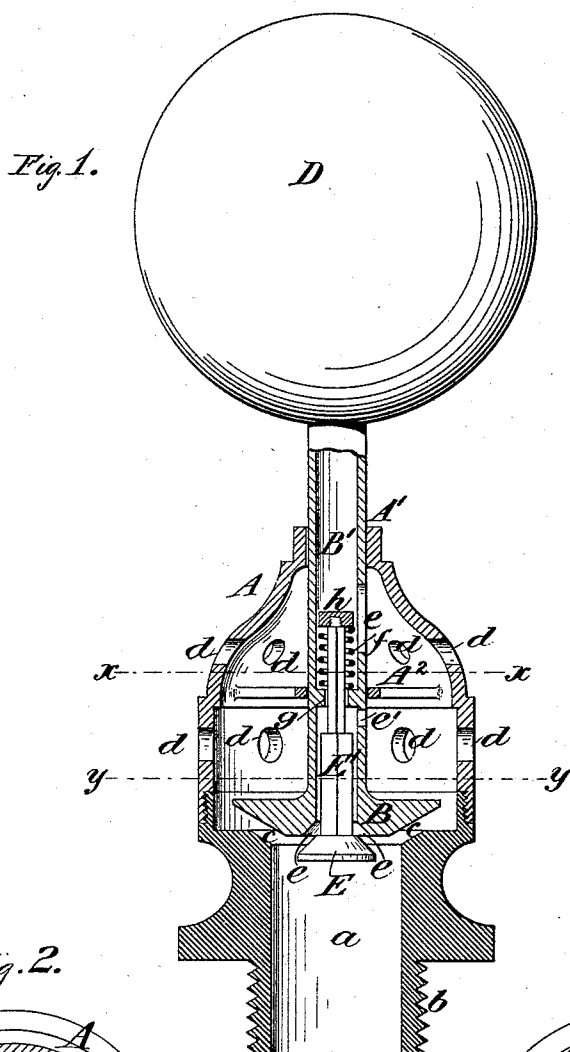


Fig. 2.

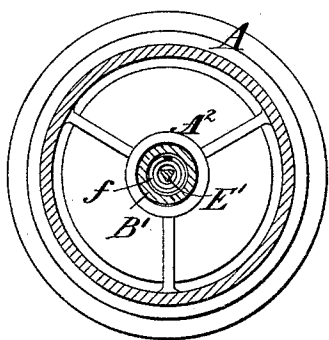
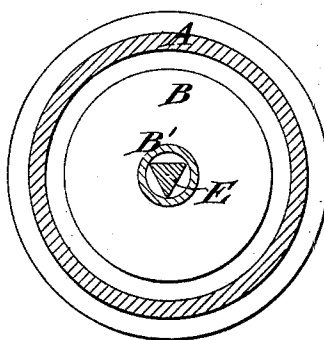


Fig. 3.



Witnesses,
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Inventor,
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By attorneys
Frank Griswold

UNITED STATES PATENT OFFICE.

WILLIAM F. CUNNINGHAM, OF BROOKLYN, NEW YORK, ASSIGNOR OF ONE-HALF TO ENOCH RUTZLER, OF SAME PLACE.

VALVE FOR STEAM-BOILERS.

SPECIFICATION forming part of Letters Patent No. 433,618, dated August 5, 1890.

Application filed November 2, 1889, Serial No. 329,027. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM F. CUNNINGHAM, of the city of Brooklyn, in the county of Kings and State of New York, have invented
5 a new and useful Improvement in Valves for Steam-Boilers, Radiators, and other Purposes, of which the following is a specification, reference being had to the accompanying drawings.

10 This invention relates to combined pressure and vacuum valves, consisting of a safety-valve to prevent explosion by pressure within an apparatus and a vacuum-valve to prevent collapsion by pressure without on the
15 formation of a vacuum within the apparatus.

My invention consists in the novel combination, hereinafter described and claimed, of the two valves and their box, whereby great simplicity is obtained.

20 Figure 1 is a central vertical sectional view of the combined safety and vacuum valve embodying my invention. Fig. 2 represents a horizontal section in the line xx of Fig. 1. Fig. 3 represents a horizontal section in the
25 line yy of Fig. 1.

Similar letters of reference designate corresponding parts in all the figures.

A is the valve-box, having in its bottom an opening a , through which communication is to
30 be made with the boiler, radiator, or other apparatus, to which the combined safety and vacuum valve is to be applied. The connection of this box with the boiler may be made by a screw-thread b around the said opening
35 a or in any other convenient manner. At the top of the opening a is a safety-valve seat c , to which an outwardly-opening safety-valve B is fitted. The stem B' of this valve passes through a guide A' in the top of the valve-
40 box A and a guide A^2 within the said box, and is represented as being loaded by a ball or weight D, directly applied to its upper end, but may be loaded externally in any well-known way. The said guide A' is formed by
45 simply making the said box with a contracted neck and boring out the said neck for the stem to pass through. Openings d are provided in the sides of the box A for the escape of steam when the safety-valve B is lifted by
50 excessive pressure at the opening a .

I will now proceed to describe my improvement. The valve-stem B' is made hollow, and an opening is made through the valve B in line with the stem, so that there is a passage
55 directly through the said valve and stem, and around the lower end of this passage is formed a seat e for the vacuum-valve E, the said seat facing in the opposite direction to the safety-valve seat c and the two valves also facing in
60 opposite directions. The vacuum-valve E is closed upward against the seat e by pressure through the opening a . In the sides of the hollow safety-valve stem E' there are open-
65 ings e' , so that air entering the valve-box A through the opening d may pass through the said openings e' through the passage formed in the stem B' and valve B and through the
70 valve-seat e when the valve B is opened, as it will be when the pressure at the opening a is considerably less than the pressure of the atmosphere.

The stem E' of the vacuum-valve B passes into the passage provided in the safety-valve and its hollow stem B' , and in order that the
75 said stem E' may not interfere with the free ingress of air through the said passage the said stem must be so constructed that while it is guided within said passage there may
80 be room for the circulation of air outside of it within the said passage, and for this purpose I have represented it of polygonal form in its transverse section, (see Figs. 2 and 3,) the said passage having a circular transverse
section.

In order that the vacuum-valve may always
85 remain closed until the pressure in the opening a is somewhat lower than that of the atmosphere, a light spring f is applied to it for the purpose of closing it. The strength of this spring, which is represented as coiled
90 around the stem, needs only to be slightly in excess of what is necessary to sustain the weight of the valve E. This spring is supported upon an internal shoulder g , provided in the interior of the safety-valve stem B' ,
95 and its upper end presses against a head or collar h , secured on the top of the valve-stem E' . In order that the air may pass by the shoulder g in the safety-valve stem, the opening provided in the said shoulder for the stem
100

E is made circular and the portion of the said stem which passes through it is made polygonal.

5 In order to enable the valve-stem E' to be guided in the lower part of the passage in the safety-valve and its stem and yet to pass the shoulder *g*, provided for the spring, the upper part of the said stem E' is made smaller than the lower part.

10 According to my invention, a vacuum-valve is provided in the same box with a safety-valve without any unnecessary enlargement of the safety-valve box or of the safety-valve, and without any stuffing-box, and neither
15 valve interferes in any way with the operation of the other, the safety-valve being permitted to open in the usual way by excessive pressure within the apparatus to which it is

applied and the vacuum-valve being free to open when the pressure within the apparatus 20 is sensibly less than that of the atmosphere.

What I claim as my invention, and desire to secure by Letters Patent, is—

The combination, with the pressure-valve B, having a hollow slotted stem B', and a 25 vacuum-valve E, arranged within said pressure-valve, of the valve-box A, having lateral openings *d*, an inner guide A² for said stem B, and an outer guide consisting of the contracted neck A', through which the said stem 30 projects to be loaded externally, substantially as herein set forth.

WILLIAM F. CUNNINGHAM.

Witnesses:

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