

No. 705,369.

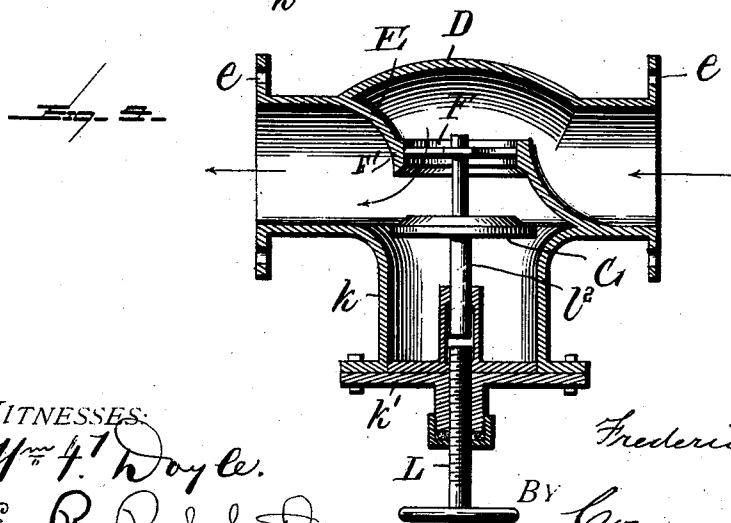
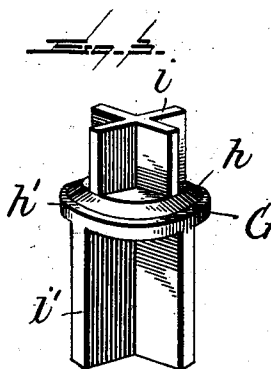
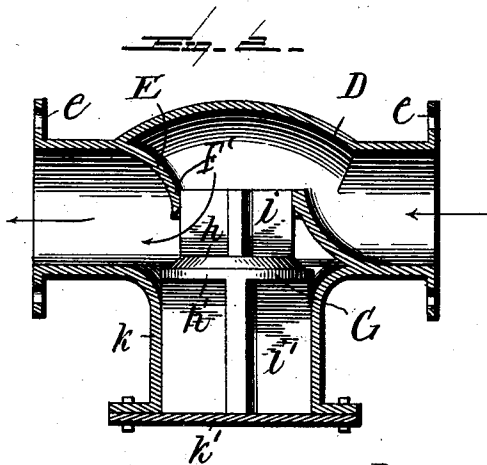
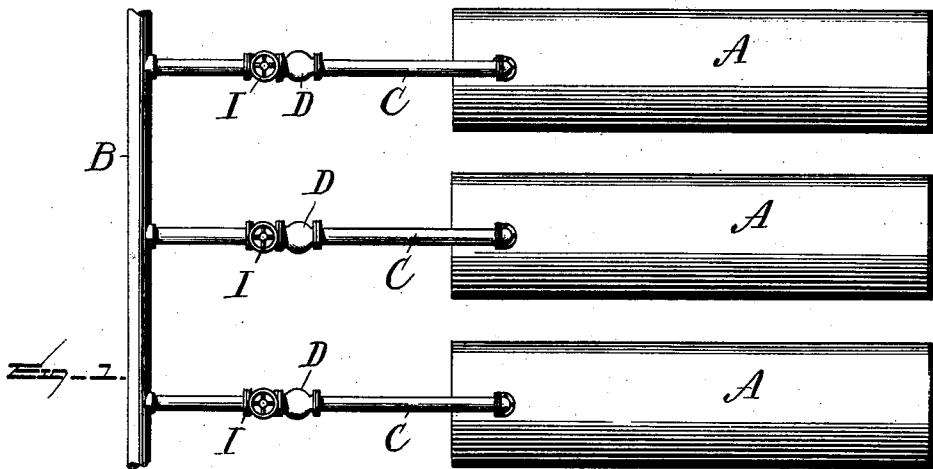
Patented July 22, 1902.

F. J. MANLEY.

SAFETY DEVICE FOR STEAM BOILERS.

(Application filed Nov. 30, 1901.)

(No Model.)



WITNESSES:

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# UNITED STATES PATENT OFFICE.

FREDERICK J. MANLEY, OF ALLEGHENY, PENNSYLVANIA.

## SAFETY DEVICE FOR STEAM-BOILERS.

SPECIFICATION forming part of Letters Patent No. 705,369, dated July 22, 1902.

Application filed November 30, 1901. Serial No. 84,259. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK J. MANLEY, a citizen of the United States, residing at Allegheny, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Safety Devices for Steam-Boilers; and I do hereby 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.

This invention has relation to safety devices for steam-boilers, and is especially designed and adapted for use in connection with batteries of several boilers supplying steam to a common main.

The object of this invention is to provide means whereby in the event of a disruption of or accident to a boiler requiring the immediate cutting out of such boiler from the main its communication with the latter will be automatically closed, thus preventing the flow of the steam from the other boilers to the disabled one and the consequent and frequently disastrous, as well as wasteful, escape of steam.

This invention consists in the novel construction and combination, with the steam-supply branch leading from the boiler to the main, of an automatic valve which when the boiler is in working order allows of the unimpeded flow of steam to the main, but which in the event of such an accident as will deprive the boiler of its steam-pressure will be automatically closed by the back pressure from the main, thus completely cutting out the disabled boiler without affecting the other boilers.

In the accompanying drawings, Figure 1 is a plan view showing a battery or set of boilers and their connections to the steam-main. Fig. 2 is a central longitudinal sectional view of the valve constituting the safety device. Fig. 3 is a perspective view of the valve proper. Fig. 4 is a sectional view of a modification.

A A A designate the boilers of any suitable type, B the steam-main leading to the engine, and C C C the branches from the boilers through which the main is supplied. On each of these branches is located a suitable valve casing or chamber D, flanged at *e e* and formed

with the partition E, having the opening F, the edge of which forms the seat for the valve G. The partition E is of the usual shape and arrangement common to check-valves, being connected on one side of the valve-seat with the upper part of the casing and on the other side with the lower part of the casing, so that the steam coming from the boiler will flow downward in the direction of the arrows through the valve-opening on its way to the main.

The valve G is formed of the beveled disk *h*, with an enlarged flange *h'* below it and with the winged guiding-stems *i i'*. The stem *i* extends through the valve-opening above the valve-disk *h*, while the stem *i'* extends downward and is socketed in the lower part of the casing, which is formed with a neck *k*, having a removable cap *k'*, upon which the stem *i'* normally rests. The area of the flange *h'* is greater on its under surface than the area of the upper surface of the valve-disk *h*, and the wings of stem *i'* extend out slightly farther than those of stem *i*. While the steam is coming from the boiler the valve remains open, the pressure of steam being above the valve and upon the valve-disk *h*. If, however, an accident occurs to the boiler, causing the pressure and flow of steam to cease, a backflow and pressure from the main immediately ensues, and the steam striking the under side of the flange *h'* causes the valve to suddenly rise and close, thus cutting out the disabled boiler and preventing return of steam thereto.

An ordinary hand-operated globe-valve I may be arranged on the boiler-pipe between the valve-casing D and the main, by which the communication between the main and boiler can be definitely closed after the check-valve has performed its work.

In Fig. 4 I have shown a modification of my invention by which the necessity of using a separate globe-valve is obviated when it is desired to definitely or positively shut off the steam from the boiler or the back pressure from the steam-main. In this modification I dispense with the wings on the stem *i'* and provide a cylindrical stem *i<sup>2</sup>*, which plays in a suitable socket or sockets in the bottom of the valve-casing. A threaded spindle or adjusting-rod L, with a hand-wheel on its outer

end, is fitted to a boss on the cap *k'*, and the stem *i*<sup>2</sup> of the valve rests thereon. By adjusting the rod L the valve may be closed at any time or when closed by back pressure from the steam-main maintained in a closed position.

I have referred to the stems on the upper and lower side of the valve-disk as being "winged." The stems, however, one or both, may be simply central stems without wings and the casing formed with spiders through which the stems play.

I wish it to be noted that with the valve as shown in Fig. 4, should the valve be closed by screwing up the adjusting or closing screw no danger can follow the unscrewing of such screws, even though the pressure in the boiler should be lower than the pressure in the main, as the valve cannot open against the back pressure from the main until the boiler-pressure slightly exceeds it. When the adjusting-screw is lowered away from the valve-stem, the valve may be let alone, as the pressure in the boiler gradually increasing will very gradually open the valve until in a short time it completely opens the valve and allows the full flow to pass to the main.

It is obvious that by substituting the cap *k'* shown in Fig. 4 of the drawings, with its projecting threaded neck and gland, for the flat cap *k'* shown in Fig. 2 the screw L may be used for adjusting or closing the valve shown in Fig. 2 in the same manner as it is

used for adjusting or closing the valve shown in Fig. 4.

Having described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination with a battery or series of steam-boilers, of separate pipes communicating with a main steam-line and automatically-operating check-valves on the boiler-pipes constructed and adapted to allow the passage of steam to the main under ordinary conditions and to automatically close under back pressure from the main when the pressure from the boiler ceases, said check-valves being provided with means for manually closing them against their seats, substantially as described.

2. The herein-described combined automatic, and hand-operable, shut-off steam-valve comprising the valve-casing D, having partition E, formed with the opening F, and valve-seat F' of the check-valve, having upwardly and downwardly extending guided stems, and an adjusting-screw, whereby the valve may be positively closed, regardless of the direction of the steam-pressure, substantially as described.

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

FREDERICK J. MANLEY.

Witnesses:

THOS. A. CONNOLLY,  
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