

993,742.

Fig. 2.

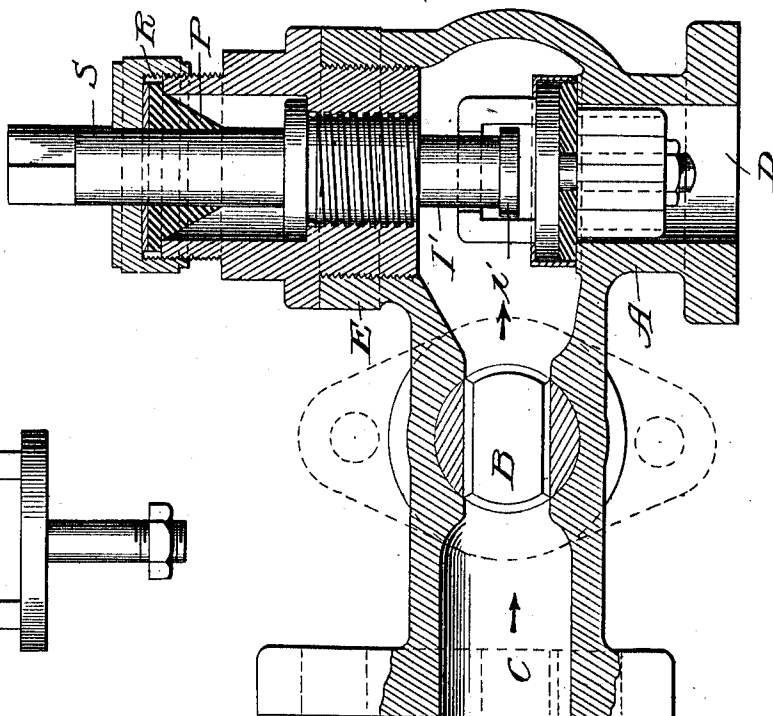


Fig. 3.

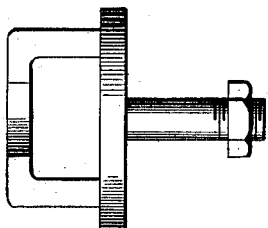


Fig. 1.

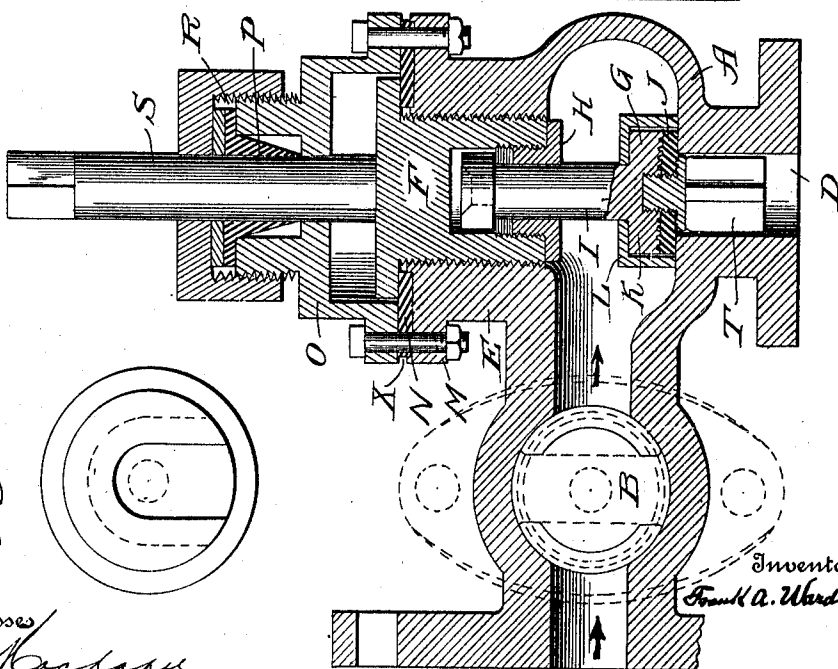
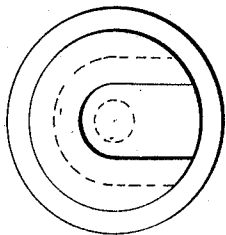


Fig. 4.



Witnesses
T. K. Macdonald
E. Williams

Inventor
Frank A. Wardlaw

Robt. P. Haines
Attorney

UNITED STATES PATENT OFFICE.

FRANK A. WARDLAW, OF BROOKLYN, NEW YORK.

BLOW-OFF VALVE.

993,742.

Specification of Letters Patent.

Patented May 30, 1911.

Application filed December 21, 1909. Serial No. 534,289.

To all whom it may concern:

Be it known that I, FRANK A. WARDLAW, a citizen of the United States, and a resident of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Blow-Off Valves, of which the following is a full, clear, and exact specification.

My invention relates to improvements in blow-off valves, and is designed to overcome the constant troubles and continuous expense necessary for the maintenance of what is technically known as the blow-off or blow-down cock of a locomotive or other steam boiler.

My improved blow-off valve is designed to prevent the emptying of the boiler in the event of serious damage to the blow-off cock, or its seat, or the presence of any hard foreign substance under the valve that would prevent its being forced to its seat. The improvement also avoids the possibility of the destruction of the valve and its seat, due to the rough manner in which the average blow-off valve is forced against its seat by locomotive drivers and firemen.

The first defect above mentioned is overcome in my valve by the interposition of a shut-off cock between the blow-off valve proper and the boiler, that forms part of the same casting as that containing the blow-off valve. The last mentioned, *i. e.* the avoidance of damage due to a careless or rough handling, is overcome by completely reversing the direction of flow through the valve, whereby it is closed by the pressure from the boiler itself, and is so constructed as to preclude any possibility of its being forced to its seat by exterior means.

In the accompanying drawings wherein similar letters of reference are used to indicate corresponding parts in each of the several views: Figure 1 is a vertical sectional view of one form of the invention; Fig. 2 is a similar view of a modification; Fig. 3 is a side view of the form of the top of the valve illustrated in Fig. 2; and Fig. 4 is a top plan view of said valve.

Referring particularly to Fig. 1, A indicates the body of the valve that may be pro-

vided with either flanged or screwed fittings as desired, having in its neck, and between the valve chamber proper and the connection to the boiler, a tapered ground plug-cock B, such as that provided on ordinary locomotive check valves. The inlet to this valve is at C, and the outlet is at D. The upper part of the valve chamber E has a screwed opening through which passes the flanged plug F, that raises or lowers the blow-off valve G, connected loosely to it by means of the lock-nut H. A space exists between the bottom of the lock-nut H and the head of the blow-off valve spindle I, which slightly exceeds the thickness of the semiplastic seating J of the valve, that permits of the metallic portion of the valve K descending and forming the seal in the event of the destruction of the semiplastic portion J. A cup-shaped metallic circular disk L that slides freely on valve spindle I is provided, to cover the edges of the semiplastic seating J when raised, so as to prevent its being worn away by the action of the out-rushing water. An annular ring is made in the top of the valve chamber casting as shown at M, in which is laid, so as to form a snug fit, the packing ring N, which may be of wood-ite, klingerit, or any other suitable packing, its object being to prevent any leakage when the plug F is screwed to the closed position; it also serves to form a steam and watertight joint between the body A of the blow-off valve, and the cap O that carries the stuffing-box P, when the plug is screwed to the open position. Cap O and body A are fastened together as shown by bolts and nuts extending through their flanges, or by means of stud-bolts let into the casting A, the cap O being placed over these stud-bolts and tightened down by nuts. Cap O serves three purposes viz: it maintains a tight joint at X when plug F is in the open position; it carries the stuffing-box P that prevents any leakage around the operating spindle S, and it serves as a stop for the plug F, limiting the distance to which it can be raised. As will be seen by the drawings, there is a clear space between the top of the recess in the plug F, and the head of the valve spindle I,

when plug F is screwed to closed position, thus making it impossible for the operative to force the valve against its seat by means of long spanners, or other devices, its proper closing being entirely automatic and beyond his control. The operating spindle may be provided with a hand-wheel, or simply a square head, to be operated by means of a proper spanner from the ground or the engine as desired.

The blow-off valve proper G, is composed of metallic and non-metallic substances, the latter being of a semiplastic nature capable of resisting the high pressures and temperatures of the vapors, gases or liquids passing through the valve without altering its shape, or altering it to so slight a degree as to be negligible, such as woodite, ebonite, vulcanized rubber, lenolite, etc. This semiplastic material is firmly gripped between the two metallic parts of the valve G and T by screwing them together as shown, the under surface of G and the upper surface of T having grooves, annular rings, or teeth cut in them, to prevent the dislocation of the semiplastic material. It is still further secured to its place by re-heating after being assembled and tightened cold, and again tightened by screwing the metallic parts together a trifle more. This same re-heating and re-tightening also tends to prevent any further expansion or enlargement of the semiplastic material when subjected to the high pressures and temperatures of the vapors, gases or liquids for which it is to be used.

The operation of the invention will be readily understood from the foregoing description.

The valve is connected to the boiler by flanged or screwed connections according to previous practice. The flow from the boiler to the atmosphere is in the direction indicated by the arrows. The valve is shown as completely closed, both by means of the valve G and the plug-cock B. In normal working the plug-cock B remains continually open, or moved to a quarter turn from the position shown. This throws the full boiler pressure on to the upper surface of the valve G, forcing it tightly against its seat and preventing the escape of the water. When it is desired to blow down the boiler, a suitable spanner is applied to the square head of the spindle S, or the hand-wheel turned as the case may be, and the plug F unscrewed until its flanged head meets the under surface of the cap O. This raises the valve proper G to the required distance, allowing the water to discharge. When it is desired to close the valve, the spindle S is turned in the contrary direction, lowering the plug F and valve G until the flanged head of F is firmly compressed against the packing ring N. Long before the flanged

head of F has been seated on the packing, however, it will have lost any control over the valve G which will have been already seated by the boiler pressure, not with a blow or any forcing, but gradually and easily until the seal is complete. The engine-drivers or firemen can not force it as they do the valves at present in service. Should any accident occur to valve or valve seat, or to packings N or R, these can be at once repaired by turning the plug-cock B one-quarter turn, thus shutting off all pressure from the boiler, a feature not existing in any other blow-off valve at present in use. The valve G is guided both top and bottom insuring perfect seating.

The operation of the form shown in Fig. 2 is substantially like that shown in Fig. 1, there being a slight difference in the construction of certain details which might simplify the manufacture of the device. In this modification the spindle I' and head J' are made in one piece, and slip into the valve proper, instead of being fastened to it as in Fig. 1 by lock-nut H.

Having thus fully described my invention what I claim as new and desire to secure by Letters Patent of the United States is:—

1. In a blow-off valve device, the combination with a turning plug, of a valve loosely connected thereto, said valve consisting of a metallic member and a semi-plastic member, and a cup-shaped cover for said valve loosely mounted on said valve.

2. A blow-off valve device comprising a casing provided with a threaded plug seat, a plug fitting said seat, and formed at its inner end with a recess, a valve spindle extending into said recess, a nut for securing and guiding said spindle, a valve on said spindle consisting partly of metal and partly of semiplastic material, and a cup shaped protector for said valve inclosing the latter and loosely mounted on said spindle.

3. In a blow-off valve device, the combination with a turning plug of a valve spindle loosely connected thereto, a valve secured to said spindle and consisting of a metallic member, and a semiplastic member, and a cup-shaped cover for said valve loosely mounted on said spindle.

4. A blow-off valve device, comprising a casing provided with a threaded plug seat, a plug fitting said seat, a valve spindle loosely connected to said plug, a composite valve carried by said spindle, means for turning said plug and a cup-shaped cover for said valve, said cover being loosely mounted on said spindle.

5. A blow-off device comprising a casing provided with a threaded plug-seat, a plug fitting said seat, and formed at its inner end with a recess, a valve spindle extending into said recess, a nut for securing and guiding

said spindle, a valve on said spindle consisting partly of metal and partly of semiplastic material, a cup shaped protector for said valve inclosing the latter, and a shut off
5 cock or valve interposed between the blow-off valve and the boiler end of the casing.

In testimony whereof I have signed my

name to this specification in the presence of two subscribing witnesses.

FRANK A. WARDLAW.

Witnesses:

LOUIS E. YOUNG,
CHARLES M. CHANDLER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."
