

A. Pollock,
Steam Safety Valve,
Nº 54,768, Patented May 15, 1866.

Fig. 1.

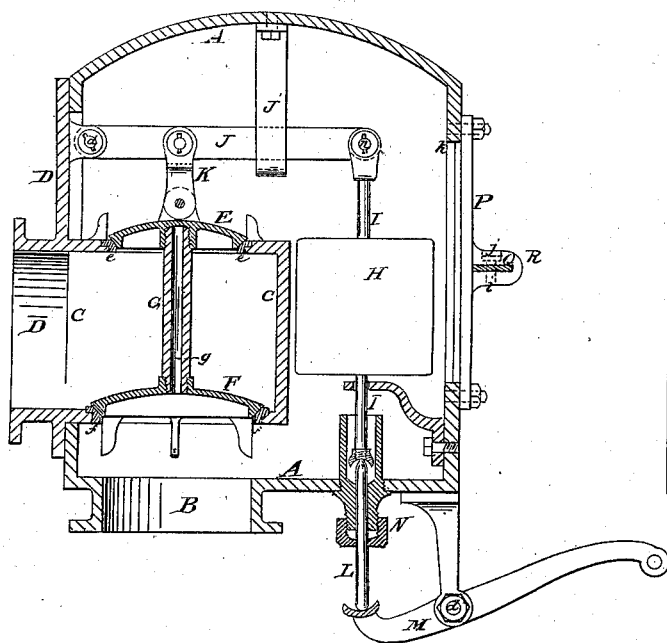


Fig. 2.

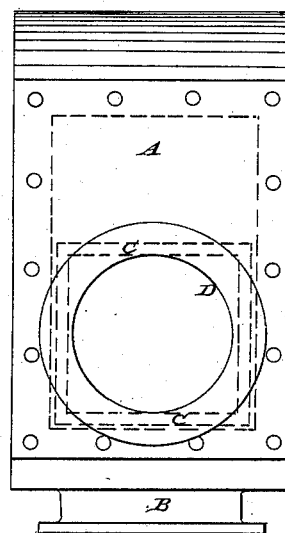
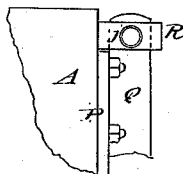


Fig. 3.



Witnesses

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UNITED STATES PATENT OFFICE.

ALEXANDER POLLOCK, OF NEW YORK, N. Y.

IMPROVEMENT IN SAFETY-VALVES.

Specification forming part of Letters Patent No. 54,768, dated May 15, 1866.

To all whom it may concern:

Be it known that I, ALEXANDER POLLOCK, of the city, county, and State of New York, have invented a new and useful Improvement in Safety-Valves for Steam-Boilers; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a vertical sectional view, illustrating the invention. Fig. 2 is an elevation, at right angles to Fig. 1, of the steam-box which contains the safety-valve. Fig. 3 is a plan view of a portion of the steam-box and its sealed door.

Similar letters of reference indicate corresponding parts in the several figures.

This invention consists in a certain novel construction and arrangement of and mode of inclosing and protecting a safety-valve, whereby it is made to serve most efficiently the ordinary purpose of a safety-valve in relieving the boiler of excessive pressure, and while it may be opened by the engineer for blowing off the steam from the boiler, it is so far beyond his control that it cannot be overloaded or secured to confine the steam within the boiler at a higher pressure than the maximum permitted by the government inspector or other person whose business or duty it is to determine the maximum of pressure to be carried.

A is a steam-box, to be arranged above any convenient part of the steam-space of the boiler, and connected therewith with an open flanged throat, B, at the bottom, in such manner as to permit a free communication therewith. Within this steam-box there is arranged a valve-chest, C, the interior of which has free communication with the blow-off-pipe connection D, but has no communication with the steam-box A, except through the openings of the double puppet-valve E F, the heads of which are fitted to seats *e* and *f*, one in the top and the other in the bottom of the valve-chest.

The lower head, F, of the valve is of larger area than the upper one, and as, when the valve is closed, only the lower surface of the lower head and the upper surface of the upper head are exposed to the pressure of steam, the tendency of such pressure to raise the

valve is only what is due to the pressure on an area equal to the difference between that of the lower valve-opening and that of the upper one, and hence the valve requires for keeping it closed a small load as compared with the area of opening which it gives for the escape of steam when open.

The upper and lower valve-heads are connected by a hollow stem, G, of such large diameter that by making it open at the bottom, as shown in Fig. 1, a chamber, *g*, is formed between the valve-heads, into which the steam enters from the steam-box, for the purpose of heating the said stem to the same temperature of the valve-chest, so that the said stem, being made of the same metal as the valve-chest, will expand equally therewith, and both heads of the valve will be kept tight in their seats when the valve is closed.

Communication may be established between the chamber *g* and steam-box A at any other point in the said chamber instead of at the bottom.

The valve is loaded by means of a weight H, attached to a rod, I, suspended by a pin, *n*, from the free end of a lever, J, which works within a guide, J', and the other end of which is attached to a fixed fulcrum, *a*, above the valve, and which is connected with the valve by a link, K, the said lever and weight, as well as the valve, being within the steam-box A and out of reach of the engineer. A spring may be substituted for the weight H as an equivalent therefor.

The rod I works in a guide, *b*, and has its lower end cup-shaped or fitted within an inverted cup, *c*, to receive the upper end of a rod, L, which works through a stuffing-box, N, in the bottom of the steam-box, and the lower end of which rests upon or is connected with a lever, M, working upon a fulcrum, *d*, outside of the steam-box. This lever, though it does not permit the weight to be increased or fastened down, enables the engineer to press the rod L upward against the rod I for the purpose of tripping or lifting the weight, lever, and valve when it is desirable to blow off steam.

The valve-chest C and blow-off-pipe connection D, instead of being permanently attached to the steam-box A, are cast with or permanently attached to a removable plate, D, which

is bolted around an opening in one end of the steam-box. The fulcrum-pin *a* of the lever *J* is also attached to this plate *D*, so that by unbolting the said plate after having removed the pin *n*, which connects the weighted rod *I* with the said lever, the valve-chest, valves, and lever can all be taken out together. To provide for the removal of this pin *n*, and also to permit the examination of the valve and its appurtenances, the steam-box has at the end next which the weight is situated an opening, *h*, large enough to examine or adjust the valve and weight and their connections; and this opening is fitted with a steam-tight door or bonnet plate, *P*, which is only to be opened by or under the direction of the government inspector or other person whose business or duty it is to do so, and in order to detect its being opened by any other person. After having been closed, a bar, *Q*, Figs. 1 and 3, is placed across the said door through a staple or staples, *R*, permanently attached to the exterior of the steam-box on one or both sides of the opening *h*, and a pin or pins, *i*, inserted through a hole or holes in the said staple, or each of the said staples, and through a corresponding hole or holes in the said bar to secure the latter, the head or heads of the said pin or pins being countersunk into the pin-hole or pin-holes in the said staple or staples to such a depth as to leave room above for a seal, *j*, above, thus preventing the removal of the bar to open or take off the door or bonnet plate without breaking the seal. As neither the valve nor weight or their connections can be reached by any other means but through the opening *h*, and this cannot be uncovered without breaking the seal, there can be no tampering with the valve without detection; and even if the risk of detection by breaking the seal should be taken, the door *P* cannot be removed to reach the valve, lever *J*, or weight while steam is up. When it is desired to remove the valve-chest, valve, and lever and connections, the plate or door *P* must be first removed to permit the withdrawal of the pin *n*.

While the valve is protected against being overloaded or fastened down by the construction and arrangement above described, it is enabled to serve most efficiently the ordinary purpose of a safety-valve by affording a large opening for the escape of steam for the relief

of the boiler from excessive steam-pressure, and also to serve as a blow-off valve, to be opened by the engineer when desired to blow off steam from the boiler, thus obviating the necessity of any other safety or blow-off valve.

I do not claim the employment of a double puppet-valve as a safety-valve, nor the inclosing of a safety-valve in such manner as to be beyond the reach of the engineer; but

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

1. The valve-chest *C* and its two valve-seats, *e f*, the double puppet-valve *E F*, and the outlet *D*, arranged in relation with each other and with the steam-box *A*, communicating with the steam-space of the boiler, substantially as and for the purpose herein specified.

2. The arrangement of the safety-valve, the weight *H*, or its equivalent, and the lever *J*, through which the weight or spring acts upon the valve, all within a steam-box, *A*, which is always in communication with the boiler, substantially as herein described.

3. The tripping-lever *M*, outside of the steam-box *A*, and the rod *L*, applied in combination with loaded rod *I*, connected with the valve-lever *J* within the steam-box *A*, substantially as herein described, whereby the lifting or tripping of the inclosed valve for blowing off steam is provided for without permitting the load on the said valve to be increased or the said valve to be secured in a closed condition.

4. The arrangement of the valve-chest *C*, attached to steam-box *A* by the removable plate *D'*, whereby, by the removal of the pin *n*, the valves and valve-chest lever *J* may all be removed from the steam-box with the said plate *D*.

5. The bar *Q*, staple or staples *R*, pin or pins *i*, and seal or seals *j*, applied and arranged in relation with each other and with the steam-box *A* and door *P*, substantially as and for the purpose herein set forth.

6. The double puppet-valve provided between its heads with a chamber, *g*, which is open to the steam-space in which the valve-chest is situated, substantially as and for the purpose herein specified.

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Witnesses:

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