N. Thomas,

Safety Valve.

No. 107,308. Patented Sept. 13. 1870.

Fig. 1.

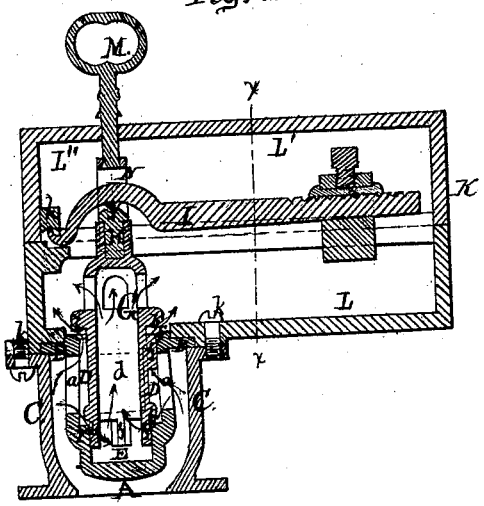


Fig. 2.

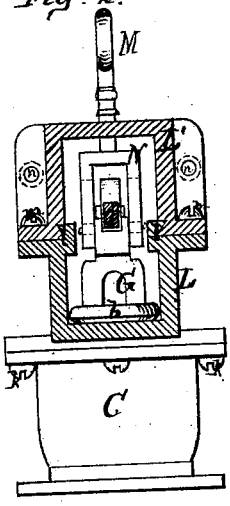


Fig. 3.

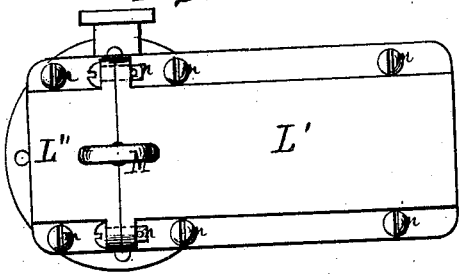
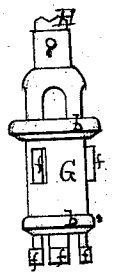


Fig. 4



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NICHOLAS THOMAS, OF CHICAGO, ILLINOIS.

Letters Patent No. 107,308, *dated September* 13, 1870.

IMPROVEMENT IN SAFETY-VALVE.

The Schedule referred to in these Letters Patent and making part of the same

To all whom it may concern:

Be it known that I, NICHOLAS THOMAS, of Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Safety-Valves; and I do hereby declare the following to be a full, clear, and exact description thereof, which will enable others skilled in the art to which my invention appertains to make and use the same, reference being had to the accompanying drawings forming part of this specification, in which—

Figure 1 is a longitudinal vertical section of my improved safety-valve, showing the same raised.

Figure 2 is a transverse vertical section of the same in the line *x x*, fig. 1;

Figure 3 is a top plan view of the case inclosing the valve; and

Figure 4 is an elevation of the valve removed from the case.

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

It consists, first, in the construction of two hollow cylinders, one within the other, and so placed within the dome or steam-space of a boiler as to project downward therein, or in such a manner as to be in direct communication with the steam, the outer cylinder being provided with perforations which admit steam into the space between the cylinders, and having, also, two seats for the reception of the inner cylinder, which slides within the outer cylinder, constituting a double-seat valve, whereby, as the valve is raised from its seats, additional surface is exposed to the action of the steam, which then has a free and clear exit from the boiler, thereby preventing accident from explosion.

It consists, secondly, in suspending the outer cylinder or shell within the boiler, or within a drum or case attached to the boiler in such a manner that its lower end shall be free from contact with the boiler, whereby it is permitted to expand in proportion to the expansion of the valve, so that the latter shall fit both its seats equally under all circumstances.

In double-seated safety-valves, as ordinarily constructed, the lower seat is supported from some part of the boiler in such a manner that it cannot expand equally with the valve, and, as a consequence, the latter does not seat itself evenly, but permits the escape of steam.

It consists, lastly, in a lifting-device or handle, combined with the valve, the valve-case, and weighted lever, whereby the valve may be lifted but cannot be held down, and whereby, also, movements of the weighted lever are unobstructed.

In the accompanying drawings—

A is the outer cylinder, having a flange, B, at or near its upper end, by which it is suspended from the case C, affixed to a boiler in such a manner as to be surrounded by steam.

If desired, the case C may be dispensed with, and the cylinder suspended by its flange directly within the boiler.

The sides of the outer cylinder are perforated, as shown at *a a*, for the purpose of admitting steam to the annular chamber or space D surrounding the valve.

E is an auxiliary chamber, and

F F are the valve-seats in the outer cylinder.

G is the double-seated valve or hollow inner cylinder, provided with the flanges *b b*, which are adapted to fit the seats F F of the outer cylinder.

d is the large open space in the valve G, through which the steam entering at the lower valve-seat makes its exit.

f f are guides or projections formed upon the middle and lower end of the valve, by which the latter is retained in position during its movements within the outer cylinder.

In the upper end of the valve is fitted a loose pin, H, having its head notched to receive the fulcrum *g* of the weighted lever I, which holds the valve to its seats.

The shorter arm of the lever bears against a notched stud, *h*, of the case K. This case, by which the valve is made a lock safety-valve, is composed of a rectangular box divided longitudinally into two parts, L and L′. The lower part, L, is secured firmly, by means of screws or bolts *k*, to the case C, and both parts are fitted together by a dovetail connection, *l*, being held to each other by screws or bolts, *m*.

The end L″ of the part or top L′ over the valve is adapted for removal to permit access to the valve without removing the entire top.

These two parts are secured together by the screws or bolts *n*, through which may be fitted a suitable lock, to prevent their being separated improperly after the valve has been set to the required pressure of steam.

M is a handle or lifting-rod passing through the top of the case K, and attached at its lower end to a yoke, N, whose slotted sides fit over lateral pins, *o*, upon the upper end of the valve, as shown in fig. 2.

By lifting upon the handle, the valve can, from time to time, be raised from its seats, to prevent its becoming fixed to the latter or clogged by sediment.

By reason of the slots in the side of the yoke, it will be seen that the valve cannot be held down by applying weights or other force to the handle, but will rise independently of the same under sufficient pressure of steam from the boiler.

The operation of my invention is as follows:

The cylinders A G being attached to the boiler as previously mentioned, the steam enters through the

perforations *a a*, filling the annular chamber D and pressing against the upper shoulder *b* of the valve. Now, as the force exerted by the steam on the valve exceeds the working pressure, the valve G will be raised from its seats, and the surplus steam permitted to escape from the boiler through the circular space between the cylinders, as well as through the large open interior of the valve, by means of which the pressure of the steam is regulated, and accident from explosion prevented, as nearly double the quantity of steam is permitted to escape as compared with the ordinary valve.

The course of the escaping steam is shown by the arrows, fig. 1.

By suspending the cylinder A within the boiler, as shown, its lower end is free, so that it can expand in proportion to the expansion of the valve G, so that the latter shall at all times fit both seats equally.

My improved valve is not only effective as a safety-valve, but can with equal efficiency be employed as a throttle, poppet, or pump-valve, or, in fact, to any position where a lift-valve is required.

Having thus described my invention,

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

1. The valve-chamber or shell A, and the double-seat valve G, constructed and combined substantially as described, for the purpose specified.

2. The valve-chamber A, constructed as described, and suspended within a boiler, substantially as and for the purpose specified.

3. The case K of the safety-valve, consisting of the parts L, L′, and L″, constructed substantially as described, for the purpose specified.

4. The combination of the handle M and yoke N with the double-seat valve G, weighted lever I, and case K, substantially as described, for the purpose specified.

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