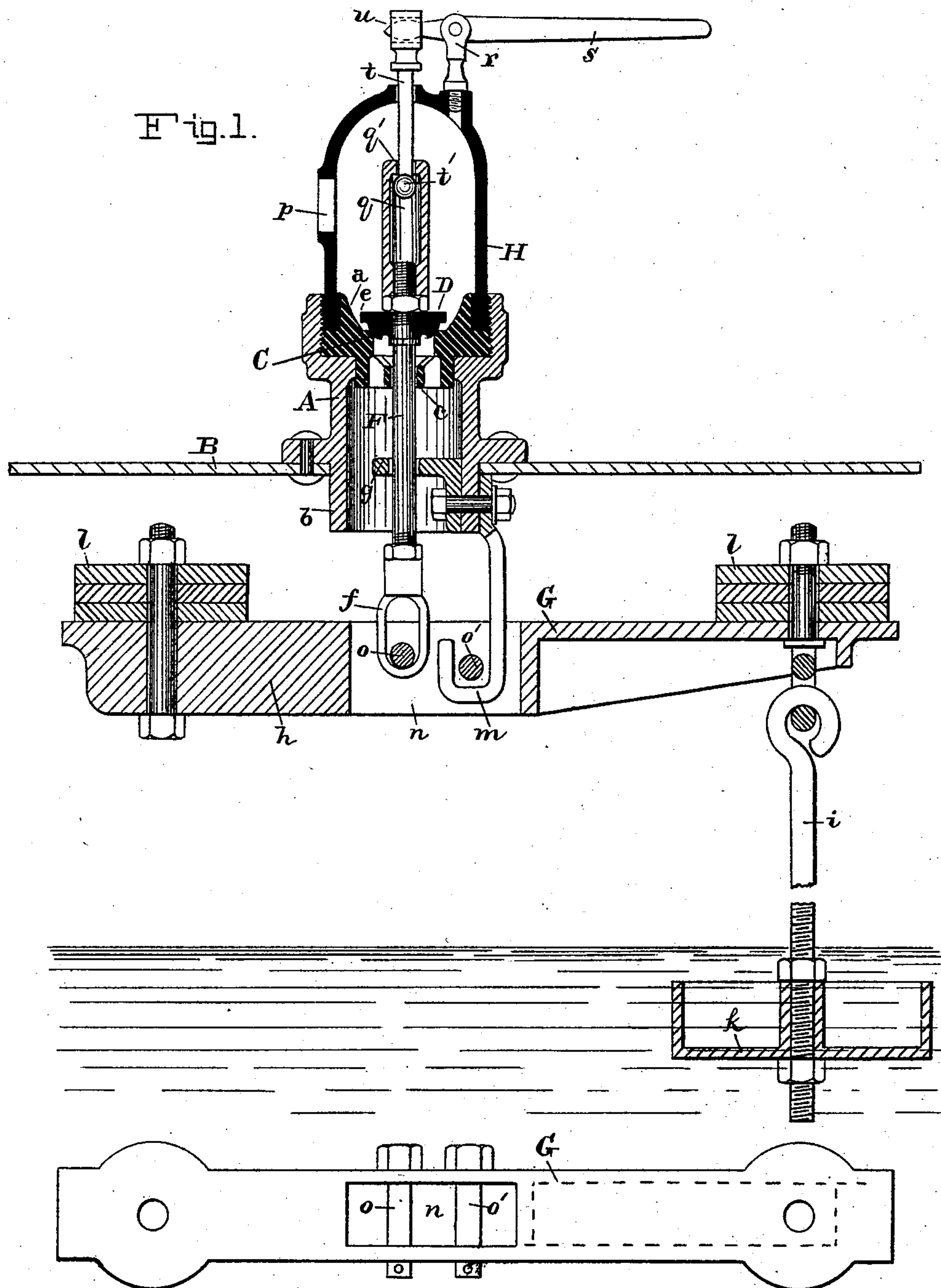


(No Model.)

W. SIMPKIN.
SAFETY VALVE.

No. 364,052.

Patented May 31, 1887.



WITNESSES:

Fig. 2.

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WILLIAM SIMPKIN, OF RICHMOND, VIRGINIA.

SAFETY-VALVE.

SPECIFICATION forming part of Letters Patent No. 364,052, dated May 31, 1887.

Application filed November 4, 1886. Serial No. 217,942. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM SIMPKIN, a citizen of the United States, residing at Richmond, in the county of Henrico and State of Virginia, have invented certain new and useful Improvements in Safety-Valves for Steam-Boilers, of which the following is a specification.

My invention relates to a safety-valve for a steam-boiler, which will blow off at a predetermined pressure or upon the water in the boiler falling to a predetermined level.

One form of construction illustrating the invention is shown in the accompanying drawings, in which--

Figure 1 is a vertical longitudinal section of part of a boiler and of my improved safety-valve. Fig. 2 is a top view of the weighted lever.

The letter A designates a tubular base, which may be attached directly to the boiler-shell B, as shown, or to the top of an ordinary dome. The lower end, b, of the tubular base projects through or within the shell. The valve-seat C is supported on the tubular base and has a cup shape, a. It is provided in its neck below the seat with a vertical guide or bearing, c. The valve D has at its top or crown a disk or circular projecting flange, e, which increases its area. A rod, F, is attached to the valve D and passes down through the vertical guide or bearing c, and at its lower end is provided with a hanger-loop, f, which supports the weight G. In order to direct the rod F true in its vertical movement a small bracket, g, is secured to the interior side of the tubular base, and has a hole in the vertical direction for the passage of the said rod F.

The weight suspended from the valve-rod F is in the form of a lever, G, one end, h, of which is thick and solid to give the desired weight, and the other end has a hanger-rod, i, attached to an open box-float, k, which also serves as a weight. It will be seen the combined weight of the rod F, lever G, hanger-rod i, and float-weight k, less the weight of the water displaced by the said float, comprises the load on the valve. By the addition of special weights l, seated upon the lever, as shown, the load on the valve can be increased as much as desired.

A stirrup, m, is bolted to the tubular base and hangs down into the boiler. The lever G has a central opening, n, and is provided with two metal pins or bolts, o o', which pass cross-wise of this opening. The hanger-loop f has one pin, o, passed through it, and the stirrup m has the other pin, o'. The lever G is so hung from the rod F as to be balanced on the pin o when the float k is submerged in the water, and at this time, which is the normal condition, the pin o' and stirrup m are not engaged, as shown in Fig. 1.

A casing, H, surrounds the valve and has an opening, p, whereat either a whistle or a blow-off nozzle may be attached. When using the apparatus for detecting excessive pressure only, the whistle may be employed; but if using it as a low-water detector a blow-off nozzle should be employed.

An upright tubular socket, q, is attached to the top side of the valve D. This socket has a contracted opening, q', in its top. A fulcrum, r, is on the outer side of the casing H, and a lever, s, is pivoted on the said fulcrum. A rod, t, passes through the top of the casing H and is movable up and down therein, and also passes through the contracted opening q' in the tubular socket, and has at its lower end a round head, t', which occupies the said socket. The upper end of this rod is loosely connected with the lever s by a jaw-joint, u. It will be seen that raising the free end s' of the lever has no effect on the valve D; but depressing said lever raises the valve from its seat. The lever s, rod t, and socket q have no part or function in the working of the valve, if the valve be set properly and all the parts properly adjusted; but the lever s may be used for reducing the weight on the valve D, whereby a less degree of steam-pressure in the boiler will raise it. The lever s and connected parts also serve for the purpose of testing the valve from time to time, in order to determine whether it is in condition to work freely.

It will be obvious the valve cannot be either loaded or wedged exteriorly.

As a detector of excessive pressure the device will operate as follows: When the steam-pressure in the boiler, acting on the under side of the valve D, exceeds the load on the valve, the latter will be raised, and the steam

then acts on the disk *e*, and being partially confined by the cup shape *a*, the valve will continue to rise until a discharge of steam takes place equal to the area of the valve-seating.

5 As a low-water detector the action is as follows: The float *k* is submerged in water, and is therefore full of water. Now, when the water in the boiler lowers and is partly drawn from around the box-float, the latter, by reason of the water it contains, becomes an increased weight, pulling down on the lever *G*, which was previously balanced. When this pulling down on the lever *G* occurs, the pin *o'* on the lever will be brought to rest on the stirrup *m*, which then becomes a fulcrum, and the pin *o* in the hanger-loop *f* will, by the tilting of the lever, be raised therefrom, whereby the load previously hanging on the valve becomes transferred to the stirrup. As the valve is now unloaded, it will at once rise from its seat and steam will be discharged until the water in the boiler is raised or brought back to its normal level, and meantime no steam can be raised until this is done.

25 Having described my invention, I claim and desire to secure by Letters Patent of the United States—

1. The combination of a valve-seat, a valve provided with a depending rod, *F*, a weighted lever, *G*, having two cross-pins, *o o'*, and a box-float, *k*, and hung and balanced by one of said cross-pins from the said depending rod, and a stirrup hanging down in position to engage with the other cross-pin, but normally not

so engaged, whereby the load of the weighted lever normally hanging on the valve may become transferred to the stirrup, as set forth. 35

2. The combination of a cup-shaped valve-seat, *C*, a valve, *D*, having a top disk or projecting flange, *e*, and provided with a depending rod, *F*, a casing, *H*, around the valve, having an opening, a weighted lever, *G*, having two cross-pins, *o o'*, and a box-float, *k*, and hung and balanced by one of said cross-pins from the said depending rod, and a stirrup hanging down in position to engage with the other cross-pin, but normally not so engaged, for the purpose set forth. 40 45

3. The combination of a valve-seat, a valve provided with a depending rod, *F*, a weighted lever, *G*, having two cross-pins, *o o'*, and a box-float, *k*, and hung and balanced by one of said cross-pins from the said depending rod, and a stirrup hanging down in position to engage with the other cross-pin, but normally not so engaged, a casing around the valve, having an opening, an upright tubular socket attached to the top of the valve, an outside lever, *s*, and a rod, *t*, loosely connected with the outside lever, passing through the casing and into the said tubular socket, for the purpose set forth. 50 55 60

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

WILLIAM SIMPKIN.

Witnesses:

C. Y. LOOMIS,

H. C. JOHNSTON.