S. HARRISON.

SAFETY-VALVE.

No. 169,805. Patented Nov. 9, 1875.

FIG. I

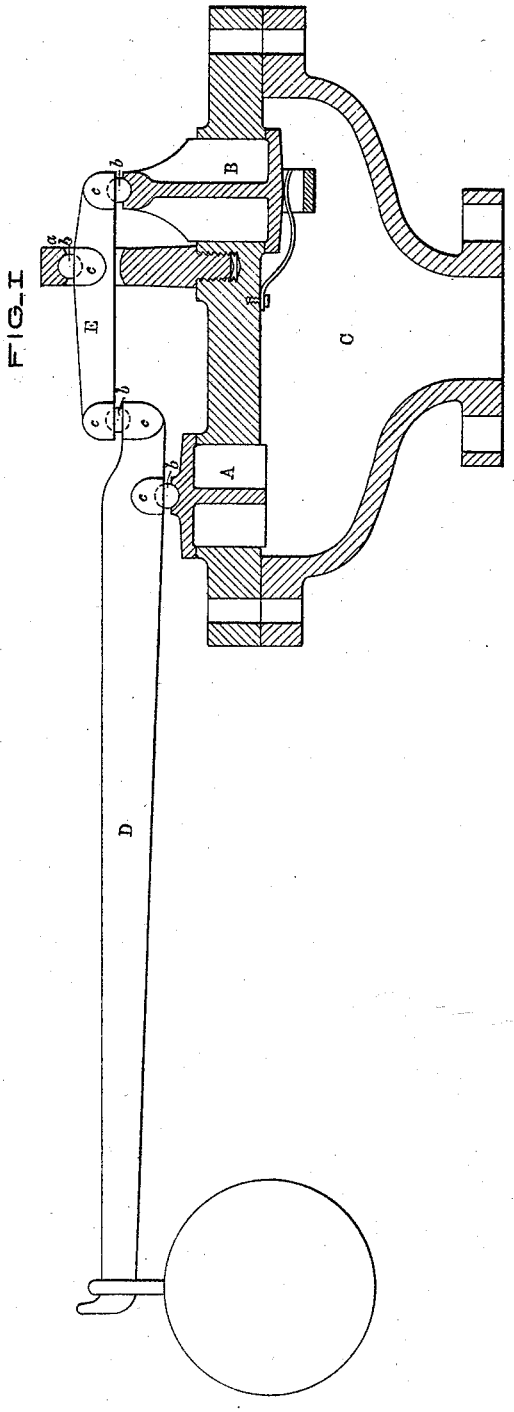
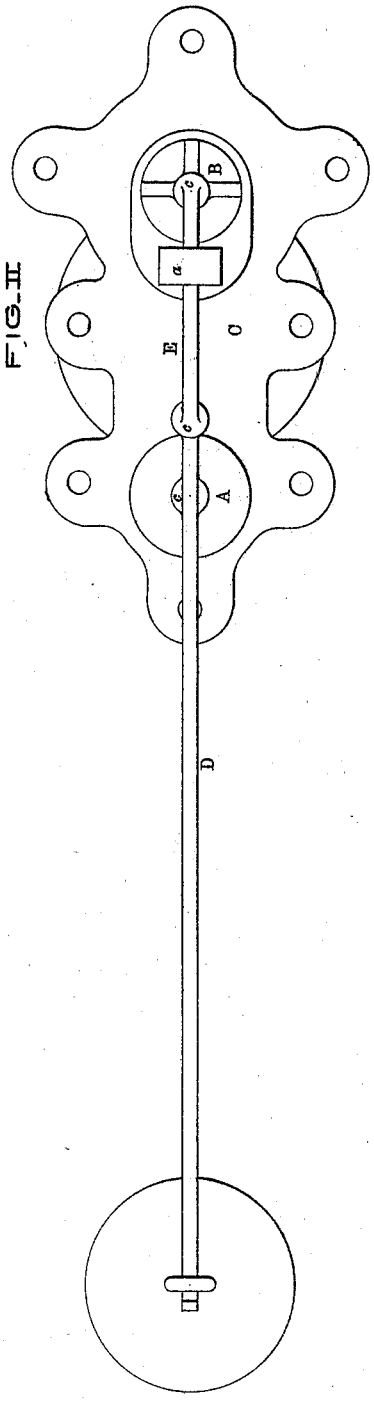


FIG. II



WITNESSES.

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UNITED STATES PATENT OFFICE.

SAMUEL HARRISON, OF BALTIMORE, MARYLAND.

IMPROVEMENT IN SAFETY-VALVES.

Specification forming part of Letters Patent No. **169,805**, dated November 9, 1875; application filed October 15, 1875.

To all whom it may concern:

Be it known that I, SAMUEL HARRISON, of the city of Baltimore and State of Maryland, have invented certain new and useful Improvements in Safety-Valves, of which the following is a specification; and I do hereby declare that in the same is contained a full, clear, and exact description of my said invention, reference being had to the accompanying drawing, and to the letters of reference marked thereon.

My invention relates, first, to a safety-valve to which is connected, by means of a lever, or series of levers, one or more auxiliary valves adapted to open in a direction opposite to that of the safety-valve aforesaid, and thereby admit of the escape of steam from the boiler upon the weight or load on the safety-valve being increased, as hereinafter described.

My invention relates, secondly, to means whereby the friction of the connecting parts of the levers and other mechanical contrivances employed to couple the safety and auxiliary valves is reduced, and the invention adapted for use on locomotive and marine boilers where lateral and other movements of the levers would interfere with their proper functions.

In the further description of my invention which follows due reference must be had to the accompanying drawing forming a part of this specification, and in which—

Figure 1 is a sectional view of the invention, and Fig. 2 a plan of the same.

Similar letters of reference indicate similar parts in both figures.

A represents the main safety-valve, and B an auxiliary valve adapted to be held to its seat by the pressure of steam from the boiler acting upon the under side thereof. C is the safety-valve chamber, which is secured by bolts to the boiler. D represents the safety-valve lever, weighted in the usual way, and arranged to rest either directly or indirectly on the valve A. E is an auxiliary lever, one end of which serves as a fulcrum for the lever D, and the other adapted to bear upon the valve B, or some extension thereof.

The fulcrum of the lever E, which is represented by *a*, may be of any suitable description, its position, together with the relative lengths of the long and short arms of the levers, being governed by the sizes of the valves and the maximum steam-pressure to be allowed.

In order to provide for the various motions to which safety-valve levers are subjected when used upon locomotive, marine, and other movable boilers, the connections between the various operating parts are formed of balls *b*, resting within cups *c*. This arrangement of joints produces a uniformity of friction which is not disturbed by any irregular movement of the levers or connections.

The auxiliary valve B is fitted with a guard and spring, to prevent its falling within the valve-chamber when there is no pressure within the boiler.

Supposing the several parts of the invention to be regulated to admit of the escape of steam by means of the safety-valve A, upon its reaching a certain tension, and additional weight is placed upon the lever D, the resistance to movement of the lever E, which forms the fulcrum of the one, D, is overcome, and the valve B depressed, thus giving a vent for the steam, which cannot be closed until the additional weight is removed.

The above operation of the valves does not interfere in any manner with the opening of the safety-valve by an increased pressure of steam in the boiler.

I do not confine myself to any particular location or arrangement of the levers, as one or all may be placed within the boiler, and attached to the valves by rods; or they may be inclosed within a box on the outside of the boiler without affecting the character of the invention.

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

1. An ordinary safety-valve, combined with a downward-moving auxiliary valve and intermediate mechanism, whereby the lever of the safety-valve, on being overloaded, tends to depress the said auxiliary valve, and thus relieve the pressure in the generator, substantially as herein specified.

2. The safety-valve chamber C, valve A, and

weighted lever D, combined with the fulcrate or auxiliary lever E and valve B, substantially as and for the purpose specified.

3. In a combination of safety-valves with their respective levers, the balls *b*, resting in or entering semispherical concavities formed in the opposing surfaces or points of contact in said valves and levers, substantially as and for the purpose herein specified.

In testimony whereof I have hereunto subscribed my name this 11th day of October, in the year of our Lord 1875.

SAMUEL HARRISON.

Witnesses:
WM. T. HOWARD,
WM. W. TOWSON.