

W. Duff,
Steam Safety Valve.
N^o 3,202. Patented July 28, 1843.

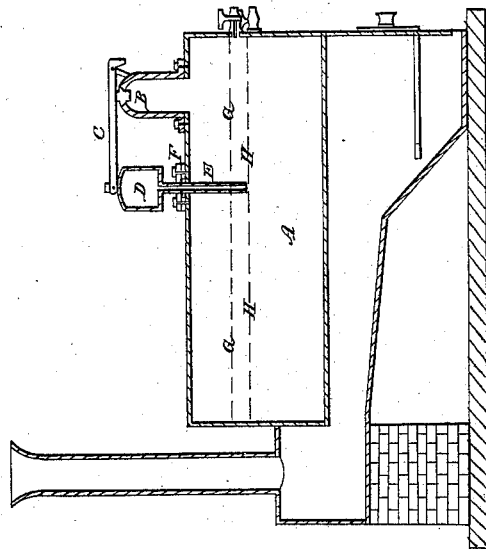


Fig. 1.

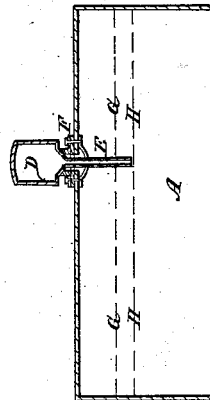


Fig. 2.

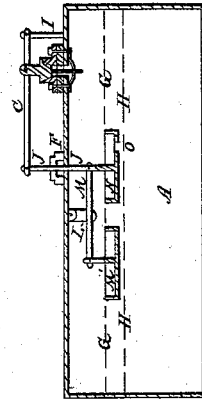


Fig. 3.

UNITED STATES PATENT OFFICE.

WM. DUFF, OF BALTIMORE, MARYLAND.

SAFETY-VALVE FOR STEAM-BOILERS.

Specification of Letters Patent No. 3,202, dated July 28, 1843.

To all whom it may concern:

Be it known that I, WILLIAM DUFF, civil engineer, of the city of Baltimore, in the State of Maryland, have invented a new and useful manner of applying and regulating the weight of the safety-valve of a steam-engine, which improvement I denominate the "hydrostatic weighted steam-valve;" and I do hereby declare that the following is a full and exact description thereof.

My improvement consists in causing a portion of the water from the boiler to constitute a portion of the weight that is to bear upon the safety valve of a steam engine. To effect this I usually make the body of the weight hollow, so as to admit water to pass into it from the boiler, there being a hollow tube, or stem, attached to such weight and forming a channel of communication between the hollow body of said weight, and the boiler. In a weight constructed and arranged according to my plan, the greater portion of the load upon the safety-valve may consist of that due to the weight itself, which may be increased to the desired extent by means of the water. Thus, supposing the hollow weight to weigh fifty pounds, and the capacity of the hollow part thereof to be such as to contain twelve pounds of water, the two weights combined will amount to sixty two pounds. While the water in the boiler remains at such height as to admit of the dipping of the hollow stem into it, the weight will be so situated as to become filled, or partially filled, with water, according to the pressure of the steam. Should this pressure increase beyond the destined amount, the water in the boiler continuing at its proper height, the safety-valve will be raised, as in other boilers; should the pressure continue, and the water become too low in the boiler, so that the stem of the hollow weight will no longer dip into it, the water will be discharged from said weight, and the valve will be raised.

In the accompanying drawing, A, Figure 1, represents a sectional view of a steam boiler; B, a safety-valve, held down by the weight on the lever C, in the ordinary way.

D, is the hollow weight bearing on the lever C; the hollow stem, E, of the weight, D, passes through a stuffing box, F, into the boiler.

G, G, may represent the ordinary water line, and H, H, the lowest point to which it

is intended to descend. It will be seen that at this point, the water in the weight no longer being sustained by the dipping of the stem into that contained in the boiler, it will be discharged by its own gravity, and its pressure upon the valve will consequently be taken off. The pressure of the steam upon the area of the lower end of the stem, and upon the safety-valve, will then be both rendered effective, and will cause the latter to rise.

I propose, sometimes, to dispense with the weighted lever, and to cause the hollow weight and its stem to be so formed as to constitute the safety-valve. This arrangement is shown in Fig. 2. The under side of the body of the weight, D, is so formed as to constitute a conical valve, which is fitted to a seat F. The hollow stem, E, is to be made to work vertically by means of suitable guides, and when thus arranged, and the weight D, and its capacity to contain water, are properly adjusted to the intended pressure, its operation will be the same with that described under the first modification.

In Fig. 3, I have represented a mode of employing the hydrostatic valve by causing the gravity of a portion of the water contained in the boiler to operate entirely within said boiler, so as to open the safety-valve whenever the water descends to its lowest safe level. C, is the valve lever connected to a suitable standard, or fulcrum, I, at one end, and having a rod J, which passes through a stuffing box, F, jointed to it at the other. The rod J, is also jointed to a lever K, within the boiler. The lever K, works on a fulcrum at L, in the manner of a scale beam, and has suspended from its ends two dishes, M, and N. The tops of these dishes may be on a level with, or a little below, the ordinary water line G, G; and their bottoms even with the lowest water line, H, H. The dish N, has an opening in its bottom, as at O; and when the water descends in the boiler, the dish N, will become lighter than M, and will consequently rise and carry with it the rod J, and the safety-valve, B.

Various other modifications of the manner of employing a portion of the water contained in a steam-boiler, so as to constitute a part of the loading of a safety-valve, may be devised, but the foregoing will serve fully to exemplify the principle upon which the action of my valve is dependent, and the manner of carrying such principle into

effect. And having fully explained this in the foregoing description—

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

- 5 The employment of a portion of the water contained in a steam-boiler to constitute the weight, or a part of the weight, by which a safety-valve is to be held down, and which water will cease to constitute such weight

when it has descended to a given level; the said weight of water being rendered effective by means of apparatus constructed and arranged substantially in the manner herein fully made known.

WILLIAM DUFF.

Witnesses:

JOHN F. MEREDITH,

WM. PETERS.