(No Model.)

A. M. JOHNSTON.

SAFETY VALVE.

No. 475,320. Patented May 24, 1892.

Fig. 1.

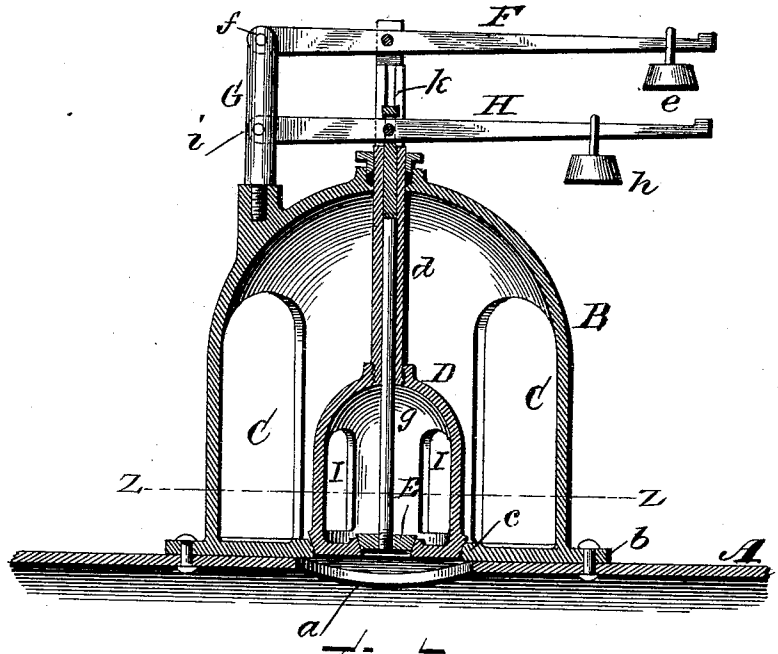
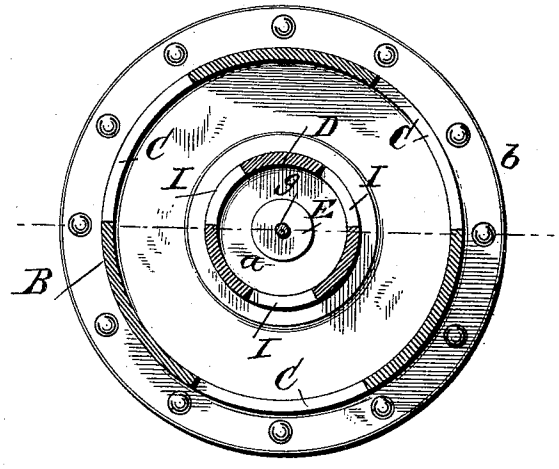


Fig. 2.



Witnesses
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UNITED STATES PATENT OFFICE.

ALEXANDER M. JOHNSTON, OF HOMESTEAD, PENNSYLVANIA.

SAFETY-VALVE.

SPECIFICATION forming part of Letters Patent No. 475,320, dated May 24, 1892.

Application filed February 6, 1892. Serial No. 420,536. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER M. JOHNSTON, a native-born citizen of the United States, residing at Homestead, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements 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 annexed drawings, making a part of this specification, and to the letters of reference marked thereon.

Figure 1 of the drawings represents a vertical section of my improved safety-valve; Fig. 2, a horizontal section taken on line *z z* of Fig. 1.

The present invention has relation to that class of safety-valves in which two valves of different areas are employed, the valve of the smaller area being so adjusted as to relieve the ordinary predetermined pressure, while the valve of the larger area with that of the smaller valve will quickly relieve the boiler of any surplus pressure caused by sudden generation of steam or steam and gases combined.

The invention consists in the several details of construction, substantially as shown in the drawings, and hereinafter described and claimed.

In the accompanying drawings, A represents a section of the boiler provided with the opening *a*, over which is secured the dome B by means of the flanges *b*, bolts or other suitable fastenings being used to secure the dome to the boiler, as shown. The dome is provided with openings C, through which the steam may escape or through which the valves may be inspected. The inner face of the dome forms the seat *c* of the large valve D, and upon this valve is seated the small valve E. The latter-mentioned valve, which is an ordinary disk valve, is seated on the inner base of the large valve, the latter being formed in the shape of a dome. The dome-valve D has a hollow stem *d*, which projects up through the dome B and is secured to the lever F, which lever is provided with the usual weight *e* and secured to the fulcrum-standard G, as shown at *f*. The stem *g* of the valve E passes up loosely through the hollow valve-stem *d* of the larger valve and extends beyond the top of the dome B and beneath the lever F, the stem *g* being also provided with a lever H and weight *h* thereon, and is fulcrumed at *i* to the standard G. In order to permit the stem *g*, which is in the hollow stem *d*, to be secured to the lever H, the hollow stem is slotted, as shown at *k*.

The dome-valve D is provided with openings I, through which the steam from the small valve may escape or through which the small valve may be inspected.

In the operation of the valves, as above described, the small valve, which is loaded by the adjustment of the weight to the pressure desired to be carried by the boiler, will open and relieve any ordinary surplus of pressure; but should there be any sudden increase of pressure the larger valve will also open, presenting an opening of sufficient area to discharge any surplus pressure that may be generated. The large or dome valve is loaded by adjusting the weight on its lever slightly beyond that pressure which is required to open the small valve, so that the small valve will open first under ordinary circumstances.

Having now fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a safety-valve, the combination of a large valve, a small valve seated upon the large valve and each opening in the same direction, and means for independently loading each valve, substantially as and for the purpose set forth.

2. In a safety-valve, the combination of a large valve provided with a hollow stem, a small valve provided with a stem that passes through the hollow stem and each opening in the same direction, and means for loading each valve independently, substantially as and for the purpose described.

3. In a safety-valve, the combination of a large valve provided with a hollow stem, a small valve seated on the large valve and provided with a stem which passes through the hollow stem and each opening in the same direction, and means for loading each valve independently, as and for the purpose described.

4. In a safety-valve, the combination of the dome-shaped large valve provided with openings in its sides and a seat in its lower end with a small valve resting on the large valve,

and means for loading each valve independently, substantially as and for the purpose set forth.

5. In a safety-valve, the combination of a large valve with a small valve seated thereon, the dome forming a seat for the large valve, and a guide for the valve-stem, substantially as and for the purpose specified.

6. In a safety-valve, the combination of a large valve with a small valve seated thereon, the dome forming the seat for the large valve and guide for the valve-stem, and means for loading each valve independently, substantially as and for the purpose set forth.

7. In a safety-valve, the combination of a dome having openings in its side, a fulcrum-standard having levers connected thereto and carrying weights adjustable thereon, a dome-shaped valve having its seat in the dome and provided with a hollow stem and openings in the side of said valve, a smaller valve having its seat in the dome-shaped valve and its stem extending through the hollow stem thereof, and a connection between the stems and the weighted levers, substantially as and for the purpose set forth.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

ALEXANDER M. JOHNSTON.

Witnesses:
W. J. HERTH,
H. A. MCKEE.