

UNITED STATES PATENT OFFICE

D. G. COPPIN AND G. H. CLEMENS, OF CINCINNATI, OHIO.

IMPROVEMENT IN SAFETY-VALVES.

Specification forming part of Letters Patent No. 58,987, dated October 23, 1866.

To all whom it may concern:

Be it known that we, D. G. COPPIN and G. H. CLEMENS, of Cincinnati, Hamilton county, and State of Ohio, have invented a new and useful Improvement in Non-Tampering Safety-Valves, of which the following is a full and clear description, reference being had to the accompanying drawings, making part of this specification.

Our improvement in safety-valves relates to the shrouding a series of weights which rest upon levers that bear down upon the valve, effectually preventing tampering with the valve.

Figure 1 is an elevation of the shrouding or casing of the valve secured to the top of a boiler. Fig. 2 represents a plan of the casing of the valve. Fig. 3 is a plan of the lower section of the casing of the valve, the valve, valve-seat ring, and levers resting upon the valve. Fig. 4 is a vertical section through the boiler, valve, valve-seat ring, levers, weights, and casing of the valve.

A is a boiler having perforation *a*. To boiler A is bolted the casing B of our non-tampering safety-valve. Casing B is in two sections. The lower section, *b*, is made fast to the boiler by bolts *b'*; the upper section, *c*, is bolted to lower section, *b*, by bolts *b''*. An opening in the top of upper section, *c*, passes through hub *d*. The annular flange *e*, on the inside of lower section, *b*, near the bottom, is provided for the annular ring *f*, which contains the valve-seat. Annular ring *f* is bolted to flange *e*. Valve C is provided with a number of guides, *g*, projecting from its lower face. A tubular continuation of the upper part of the valve C has perforations *h*, whose area is equal to that of the valve-opening. The tubular continuation of valve C terminates in the disk *k*, upon the edges *k'* of which rest the levers *l*. These levers *l* are pivoted to lugs *l'*, which project from the inner surface of lower section, *b*. A tube, *m*, is tapped into the tubular continuation of valve C, and terminates in sleeve *n*. Sleeve *n* is a short tube fitting steam-tight the hub *d* from its inner surface, and at its lower end projects inward the annular flange *n'*. A corresponding flange, *m'*, projects from the upper end of tube *m*, fitting steam-tight the sleeve *n*. A perforated cap, *o*, covers and is made fast to sleeve *n*.

A series of weights, D, perforated in their centers, rest upon levers *l*. The tube *m* passes

through these weights. The upper weight, D', is provided with an annular ring, *p*, of rubber, having a diameter less than the largest diameter of hub *d*. Weight D' has its upper surface dish-shaped.

Operation: The desired weight being placed upon the valve, and the valve at rest upon the valve-seat, as shown in Fig. 4, will so remain until an excess of pressure forces the valve from its seat. The edge *k'* of the upper portion of the valve C presses the levers *l*, upon the free ends of which rest the series of weights D. The weights rise until the annular ring *p*, which acts as a cushion, comes in contact with the hub *d*. In the meantime the steam escapes through perforations *h* into tube *m*, and finally through the perforated cap *o*. The excess of pressure having been thrown off, the valve C reseats itself. By increasing the length of levers *l* or the diameter of disk *k*, which terminates the tubular continuation of valve C, a greater pressure may be brought to bear upon the valve, which may be still further increased by filling the dish-shaped upper surface of weight D' with lead or other heavy material.

The perforation in cap *o* serves two purposes—for the escape of steam and the insertion of a hook to raise the valve from its seat at intervals, and thus ascertain whether or not the valve is held in its seat by an accumulation of sediment around it.

From the above description it will be seen that the valve cannot be loaded by designing persons.

Having fully described our improved safety-valve, its operation, and advantage over those in general use, we make the following claims, which we desire to secure by Letters Patent:

1. The valve C and tube *m*, constructed as above described, and for the purpose set forth.
2. The valve C, levers *l*, and weights D and D', arranged as above described, and for the purpose set forth.
3. The valve C, levers *l*, weights D and D', and tube *m*, in combination with annular ring *f*, casing B, sleeve *n*, and cap *o*, for the purpose above described and set forth.

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Attest:

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