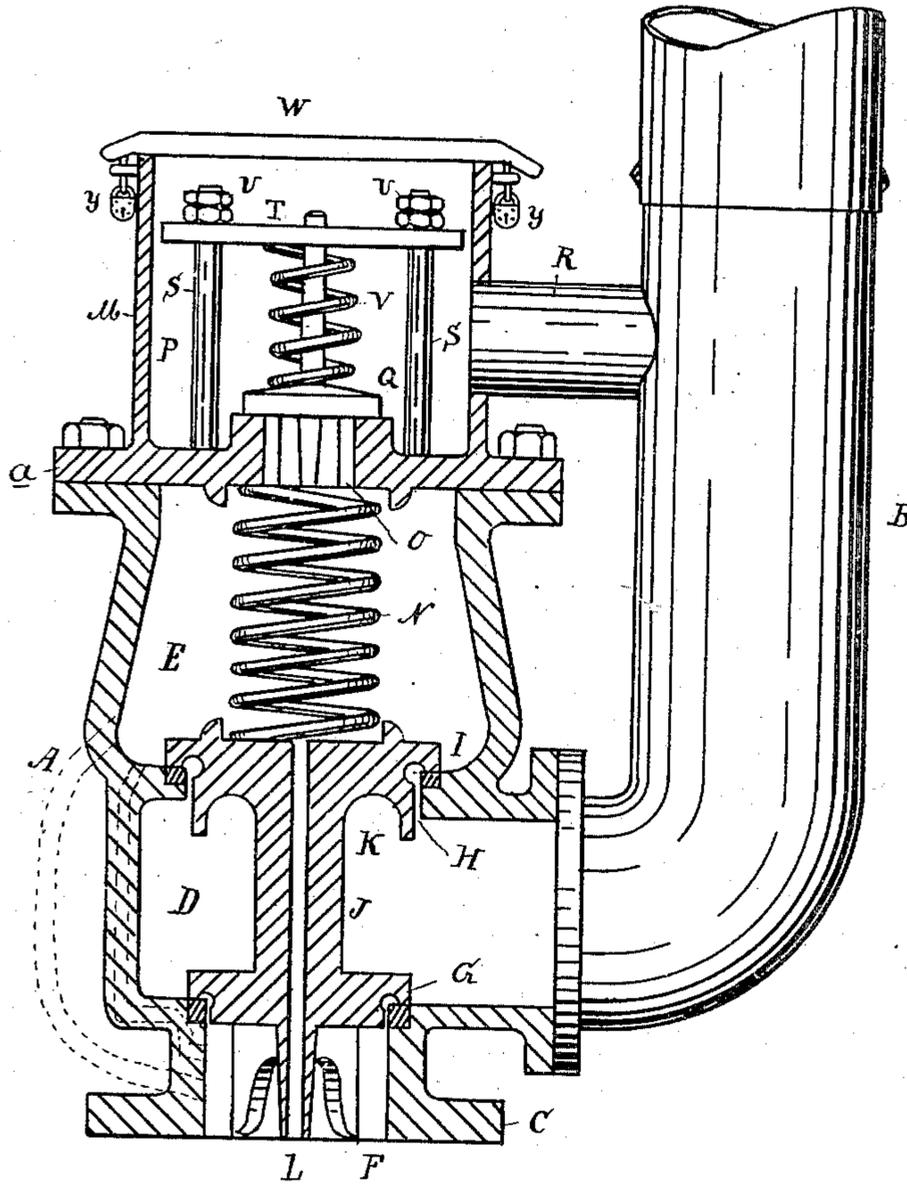


(No Model.)

W. A. CAMPBELL.
SAFETY VALVE.

No. 314,649.

Patented Mar. 31, 1885.



Attest:
John Schumann.
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Inventor:
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UNITED STATES PATENT OFFICE.

WILLIAM A. CAMPBELL, OF EAST SAGINAW, MICHIGAN, ASSIGNOR OF
ONE-HALF TO A. F. BARTLETT & CO., OF SAME PLACE.

SAFETY-VALVE.

SPECIFICATION forming part of Letters Patent No. 314,649, dated March 31, 1885.

Application filed September 24, 1884. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM A. CAMPBELL, of East Saginaw, in the county of Saginaw and State of Michigan, have invented new and useful Improvements in Safety-Valves; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing, which forms a part of this specification.

This invention relates to certain new and useful improvements in safety-valves; and the invention consists in the novel construction and combination of parts, as more fully hereinafter described.

In the accompanying drawing, which forms a part of this specification, my invention is shown in central vertical section as connected with the escape-pipe and disconnected from the boiler; and in the drawing, A represents the valve-case connected directly with the escape-pipe B and provided with the usual flange, C, by means of which and suitable bolts and packing the case is designed to be connected with the steam-generator. This valve-case is divided into two compartments, D and E, as hereinafter mentioned.

F is the orifice in the lower part of the case, communicating with a similar orifice in the boiler, the two orifices being coincident when the boiler and safety-valve are connected together. In the upper end of this opening, and in the bottom of the chamber D, there is fitted the swing or poppet valve G, in a seat suitably arranged to receive the same.

H is another opening in the wall which separates the two chambers D and E, and this opening is of a much larger area than the opening F, and in the bottom of the chamber E is seated the valve I, adapted to close and disclose such opening H. The two valves G and I are connected by means of a stem, J, and a guide-disk, K, a little smaller than the diameter of the opening H, guides the valve I in its reciprocation.

Vertically through the center of the valves G I, the stem J, and guide K is an opening or passage, L, which affords the only means of communication between the boiler to which the device is attached and the chamber E.

M is a supplemental valve-case, the bottom

a of which, when bolted to place, forms the top of the chamber E, and a spring, N, is inserted between the bottom of the case M and the top of the valve I, as shown. An opening, O, affords communication between the chamber E and chamber P, and at the top of this opening there is seated the wing-valve Q, and this chamber P communicates with the escape-pipe B by means of the connecting-pipe R. A yoke consisting of the two stud-bolts S and cross-bar T is formed in the chamber P, such cross-bar being vertically adjustable upon the stud-bolts and secured in any desired position by means of the nuts U. A spring, V, is interposed between said cross-bar T and the valve Q.

The device being constructed and attached to the steam-generator as described, it will readily be seen that the steam passing through the passage L into the chamber E, the area of the valve I being so much larger than that of the valve G, would convert the two valves, taken as a whole, into an unbalanced valve so long as valve Q remains closed, and balanced when valve Q is open, the pressure being alike upon the under face of the valve G and the upper face of the valve I; hence the object or office of the spring N is simply by its pressure to overcome or destroy the balance after valve Q has closed again. The continued pressure through the passage L into the chamber E acts upon the valve Q, and the spring V is loaded or set to the pressure the boiler is allowed to carry. As soon as this pressure reaches that point, it opens the valve Q, allowing the steam from the chamber E to pass through the pipe R to the escape, and as soon as this is done the pressure in the chamber E is relieved to that extent that the boiler-pressure upon the valve G will cause it and its attachments to overcome the pressure of the spring N, and the steam will escape through the pipe B.

When it is designed to use this valve upon steamboat-engines, or such engines as are brought within the exercise of law regulating the amount of pressure allowed to be carried, and as the load upon the valve is created by the spring V, I provide a cap or cover, W, to the supplemental case P, which cover I pro-

vide with suitable devices, as shown at Y, or their equivalents, for locking such cover in place, so that no change can be made in the load upon the valve without the knowledge of the inspector, who carries the only means in existence for unlocking such cover.

A passage may be formed in the case of the valve which will connect the steam-space of the boiler with the chamber E; or any outside connection may be made between the boiler and such chamber whereby the same pressure is constantly maintained in such chamber as in the generator when the valve Q is closed; and this modification or addition, both of which are shown in dotted lines in the drawings, might be made without departing from the spirit of my invention; and in this case the passage leading through the lower valve might be omitted, as the same result would be produced.

What I claim as my invention is—

1. The combination, with the chambers D, E, and P, and outlets from the chambers P and D, of the valve G, closing the opening from F to chamber D, the valve I, closing the opening between chambers E and D, a stem connecting and a spring closing both of said valves, a passage from below the valve G to the chamber E when valves G I are closed,

and the valve Q, closing the passage between chamber E and the chamber P, substantially as described.

2. The combination, with the case A, having the orifice F, and the chambers D E P, of the pipes B and R, connecting the chambers D and P, and the valves G I and stem J, having passage L, extending vertically through said valves and stem, the spring N, in chamber E, and the spring-pressed valve Q, in the chamber P, substantially as described.

3. The combination, with the case A, having the connected chambers D E P, and the pipes B and R, of the connected valves G I, having the steam-passage L, the spring N, the spring-pressed valve Q, and the adjustable yoke T, substantially as specified.

4. The combination, with the case A, having chambers D, E, and P, with inlet F and outlet-pipes B R, and a communication between said inlet and chamber E when the valves G I are closed, of the said valves G I, having stem J and guide-disk K, the spring N, and the spring-pressed valve Q, in chamber P, substantially as specified.

WILLIAM A. CAMPBELL.

Witnesses:

HERBERT A. FORREST,
WILLIAM A. DONALDSON.