

(No Model.)

2 Sheets—Sheet 1.

J. G. WHITE.
SAFETY VALVE.

No. 549,413.

Patented Nov. 5, 1895.

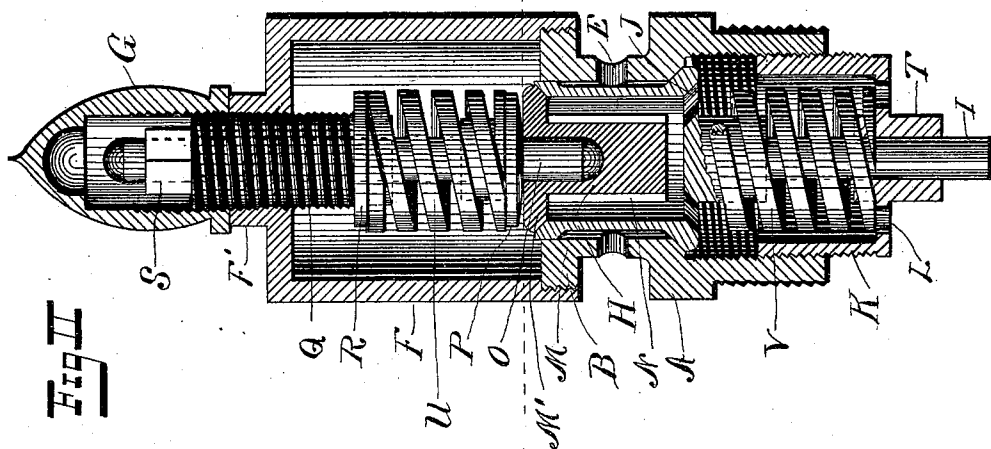


Fig II

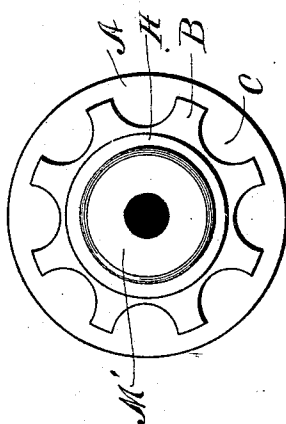


Fig III

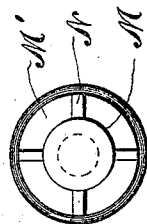


Fig IV

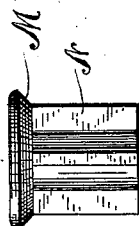


Fig V

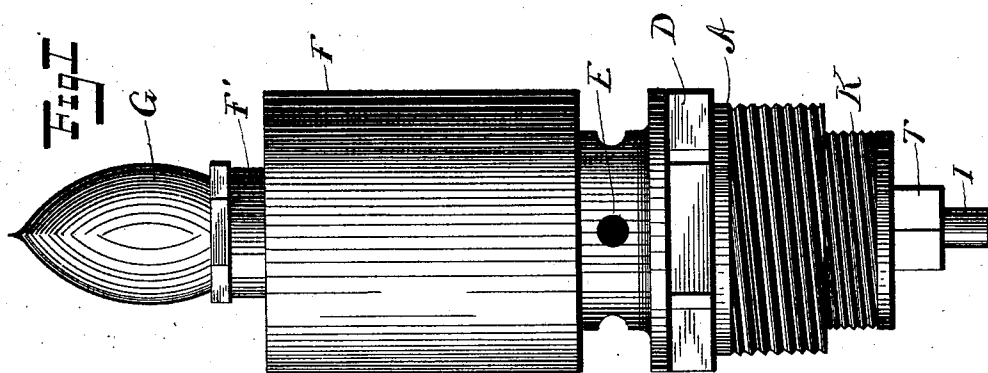


Fig I

Witnesses
Robt. S. Oler
Frank. C. Ward

JAMES G. WHITE. Inventor.

By Warren D. House,

His Attorney.

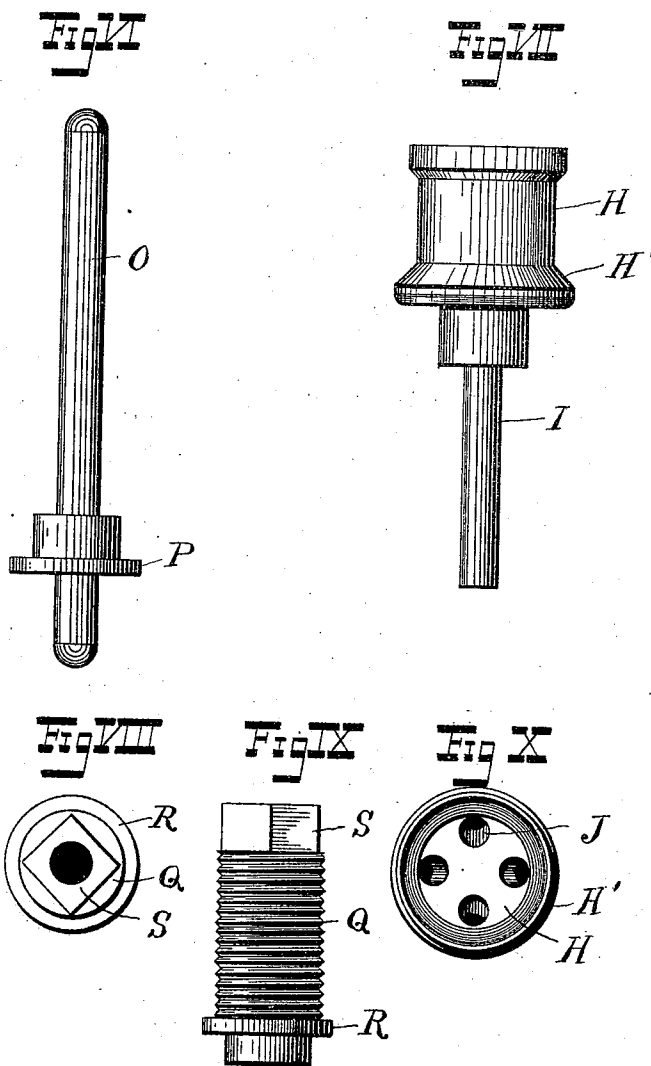
(No Model.)

2 Sheets—Sheet 2.

J. G. WHITE.
SAFETY VALVE.

No. 549,413.

Patented Nov. 5, 1895.



Witnesses
Frank C. Ward
Robt. S. Oden

James G. White. Inventor.
By Warren D. House,
his Attorney.

UNITED STATES PATENT OFFICE.

JAMES G. WHITE, OF WESTPORT, MISSOURI.

SAFETY-VALVE.

SPECIFICATION forming part of Letters Patent No. 549,413, dated November 5, 1895.

Application filed May 29, 1894. Serial No. 512,890. (No model.)

To all whom it may concern:

Be it known that I, JAMES G. WHITE, a citizen of the United States, residing at Westport, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Safety-Valves, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to improvements in safety-valves, and is an improvement upon the invention for which Letters Patent were granted to me bearing the date of December 13, 1892, for an improvement in safety-valves.

My invention pertains to that class of safety-valves in which the escape-valve is located within the inspiring-valve.

The object of my invention is to provide a valve compact in construction, cheap to manufacture, easily taken apart and put together, and readily adjusted to suit the required pressure of the fluid within the vessel to which the valve is connected.

In the accompanying drawings, illustrative of my invention, Figure I represents an elevational view. Fig. II represents a vertical sectional view of the valve-casing and valves and shows the springs, valve-stems, and upper tension-plug in elevation. In this view a portion of the upper part of the lower spring is broken away. Fig. III represents a top view of the lower half of the casing and the top of the valves. Fig. IV represents a bottom view of the escape-valve. Fig. V represents a view of the escape-valve shown in elevation. Fig. VI represents an elevational view of the separable stem of the escape-valve. Fig. VII represents an elevational view of the combined lower valve and valve-seat. Fig. VIII represents a plan view of the upper tension-plug. Fig. IX represents an elevational view of the upper tension-plug. Fig. X represents a plan view of the combined lower valve and valve-seat shown in Fig. VII in elevation.

Similar letters of reference indicate similar parts.

Referring to the drawings, A indicates the lower half of the valve-casing, which is substantially the shape of a hollow cylinder, the lower end being provided with screw-threads, so that it may be screwed into the boiler,

cylinder, steam-chest, or other place where it may be used. The portion immediately above the screw-threaded lower end is hexagonal or octagonal in shape, so that a wrench may be applied to it in screwing it into the boiler. The upper end of the part A is provided with a horizontally-projecting flange B, which is externally screw-threaded and fitted into the internally screw-threaded lower end of the upper half of the valve-casing F, which is cylindrical in form, the lower end being open and the upper end closed.

The top of the shell F is provided with a central boss F', through which is a vertical screw-threaded opening. An externally-screw-threaded tension-plug Q, cylindrical in form and provided with an outwardly-extending flange R at its lower end, is fitted within the opening through the boss F'. The upper end of the tension-plug is squared, so as to present a holding-surface for a wrench, as indicated by S.

The inner side of the lower end of the casing A is screw-threaded, and fitted therein is the lower tension-plug K, which is in the form of a hollow cylinder, the upper end of which is open and the lower end closed. The central bottom portion of the lower tension-plug K is provided with a square or hexagonal projection or boss T, through which is a central vertical opening, into which is fitted the vertical valve-stem I of the combined valve and valve-seat H.

The combined valve-seat and valve H is best shown in Figs. 7 and 10. The valve H in its body portion is cylindrical and hollow, the upper end being beveled inwardly, so as to form a seat for the valve M. The lower body portion is closed, excepting the openings J, which extend through the bottom and permit the steam to pass from the lower side into the interior of the valve H. The valve H is provided with a valve-stem I, centrally located and integral with the bottom of the valve H. The lower end of the body portion of the valve H is provided with an outwardly-beveled projection, which is fitted to an inwardly-projecting shoulder on the inner surface of the casing A, thus providing a seat for the valve H. The bottom of the lower tension-plug K is provided with vertical openings L extending therethrough.

The sides of the casing A above the valve-seat and below the flange B are provided with horizontal openings therethrough, as indicated by E. The valve H is hollowed out
 5 around its circumference from immediately above the outer beveled portion to within a short distance of the top, so as to afford an inlet for air when the valve is depressed from contact with its seat. The flange B is
 10 vertically fluted around its periphery, as indicated by C, thus providing openings through which steam may escape from the interior of the casing F when the valve M is raised from its seat. The valve M is a cy-
 15 lindrical body provided with vertical flanges or wings N around its periphery, which are movably fitted within the hollow cylinder or valve H. The upper portion of the said body is provided with a horizontally-projecting
 20 flange N', the outer lower side of which is downwardly and inwardly beveled and fitted to the valve-seat in the valve H. The upper end of the valve M is provided with a central vertical opening into which is loosely
 25 fitted the valve-stem O, which is a vertical rod, the upper end of which is guided by and movable within an opening vertically located within the center of the upper tension-plug Q.

Near the lower end of the rod or valve-stem
 30 O is an outwardly-extending horizontal flange P, which serves as a bearing for the lower end of a coil-spring U, which encircles the stem O, the upper end of the spring U having a bearing upon the lower side of the
 35 flange R of the tension-plug Q previously referred to. Encircling the valve-stem I is a similar coil-spring V, the lower end of which has a bearing upon the upper side of the bottom of the lower tension-plug K, the
 40 upper end of the spring V bearing against the under side of the valve H. The upper end of the upper tension-plug Q is provided with a lock-nut G of any suitable form, but preferably closed at the top, so as to give a
 45 finished appearance to the valve.

I have illustrated an acorn-shaped lock-nut, hollow and internally screw-threaded, the lower end of which is polygonal in shape. The central hollow portion of the nut is long
 50 enough to permit the vertical movement of the valve-stem O.

The operation of my invention is as follows: The parts having been assembled, as previously described, the base portion A is
 55 screwed into the screw-threaded opening in the boiler or other vessel in connection with which the valve is to be used. It will be noted that the springs U and V act in opposition to one another, the spring U tending to keep the
 60 valve M in its seat on the valve H, which in turn is kept up against its seat in the casing A by means of the spring V. The proper tension of the springs may be obtained by screwing the tension-plugs Q and K up or down.
 65 For different uses the tension of the springs may vary relatively. For instance, in applying the valve to a cylinder or steam-chest

of a locomotive the relative tension of the valves may be such that the spring U predominates and forces the lower valve from
 70 its seat. In this case, when the steam enters the steam chest or cylinder it forces the lower valve V against its seat; but when the steam is shut off the valve opens, permitting air to pass into the steam chest or cylinder through
 75 the openings E and L, thus avoiding wear on the valve-seat of the steam-chest, due to the forming of a vacuum occasioned by the action of the piston-head in the cylinder. In the use just referred to the lower spring V
 80 in some instances may be dispensed with, the pressure of the steam upon entering the steam chest or cylinder forcing the valve to its seat. To avoid unnecessary waste of
 85 steam, however, it may be found desirable to use the spring V, having its tension set at a little less degree than the spring U, so that when the steam enters the cylinder or steam-chest, the spring V assists in closing the
 90 valve H. Where the valve is used on a boiler or similar vessel in which steam is generated or in which the pressure increases gradually, it will be found advisable to set the tension of the lower spring V a little more
 95 than the tension of the upper spring U, so that the valve H is normally closed, thus preventing any escape of steam during generation. In this case, when a vacuum would ordinarily form in the boiler from causes well known the
 100 pressure of the air, assisted by the pressure of the spring U, forces the valve H from its seat, permitting the entrance of air, as heretofore described, and breaking the vacuum. In any case, where both springs are used it will be
 105 found desirable to very nearly balance their respective pressures, varying it to suit the use. When the pressure within the vessel reaches the limit to which the spring U has been set, the valve M rises, permitting the
 110 steam or other fluid to escape from the vessel through the openings L and J into the upper casing F, from which it escapes through the flutings or semicircular openings C in the flange B. In setting the springs to their required
 115 tension, before the valve is applied to the vessel with which it is to be used, the nut G is removed and the tension-plug Q is turned, so as to get the proper tension on the spring U. The lock-nut G is then screwed onto the
 120 plug Q until it bears against the boss F'. The lower plug K is then screwed to give the proper tension suitable for the use intended. The valve is then ready to be applied to the place where it is to be used.

The valves may be put together and ad-
 125 justed in the factory where they are made and shipped to the place where they are to be used without danger of disarrangement in any manner.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In safety valves, the combination with an inclosing casing consisting in an upper

and a lower shell, of a valve seated in one of the shells, means for retaining the said valve in its seat, a valve seated within the first valve, means for retaining the second valve in its seat, and a screw thread connection between the upper and lower shells, substantially as described.

2. In safety valves, the combination with an inclosing shell or casing, of a valve seated therein, a valve seated within the said valve, a spring for holding each valve in its seat, a guide having a screw thread connection with the shell through which the stem of the outer valve is movable, and a similar guide for the stem of the inner valve, substantially as described.

3. In safety valves, the combination with an upper shell, of a lower shell connected

therewith, a valve seated in the lower shell, a spring holding the said valve in its seat, a guide for the stem of the said valve upon which one end of the spring bears and which is provided with a screw thread connection with the lower shell, an inner valve seated upon the first valve, a spring holding the said inner valve to its seat, a guide for the stem of the inner valve upon which the latter named spring rests and a screw thread connection between the latter named guide and the upper shell, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES G. WHITE.

Witnesses:

ROBT. S. ODÍR,
FRANK. C. WARD.