

No. 715,707.

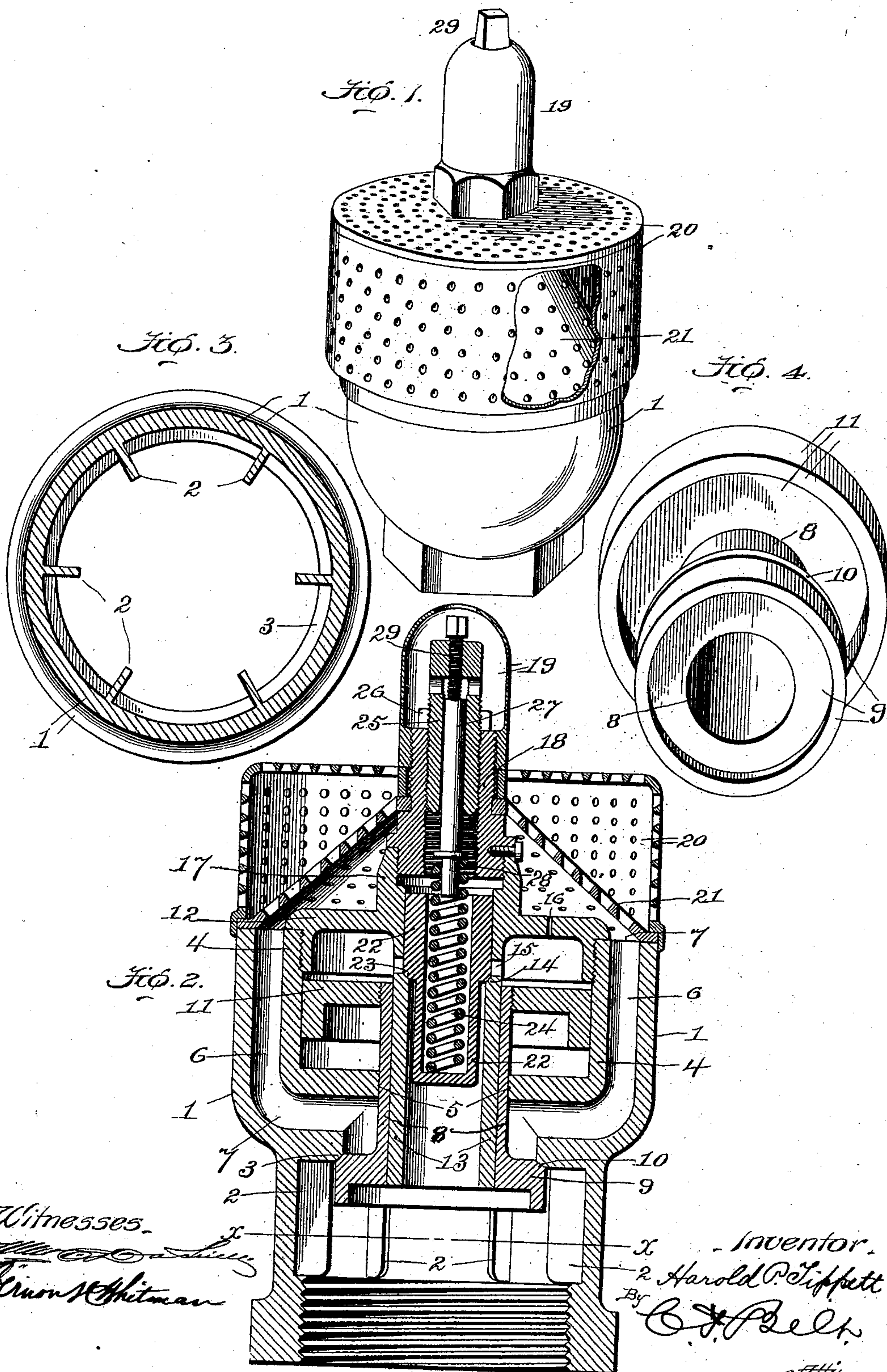
Patented Dec. 9, 1902.

H. P. TIPPETT.
SAFETY VALVE.

(Application filed Apr. 5, 1902.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses.

Kimball Whitman

Inventor.

Harold P. Tippet

By *C. J. Bell*

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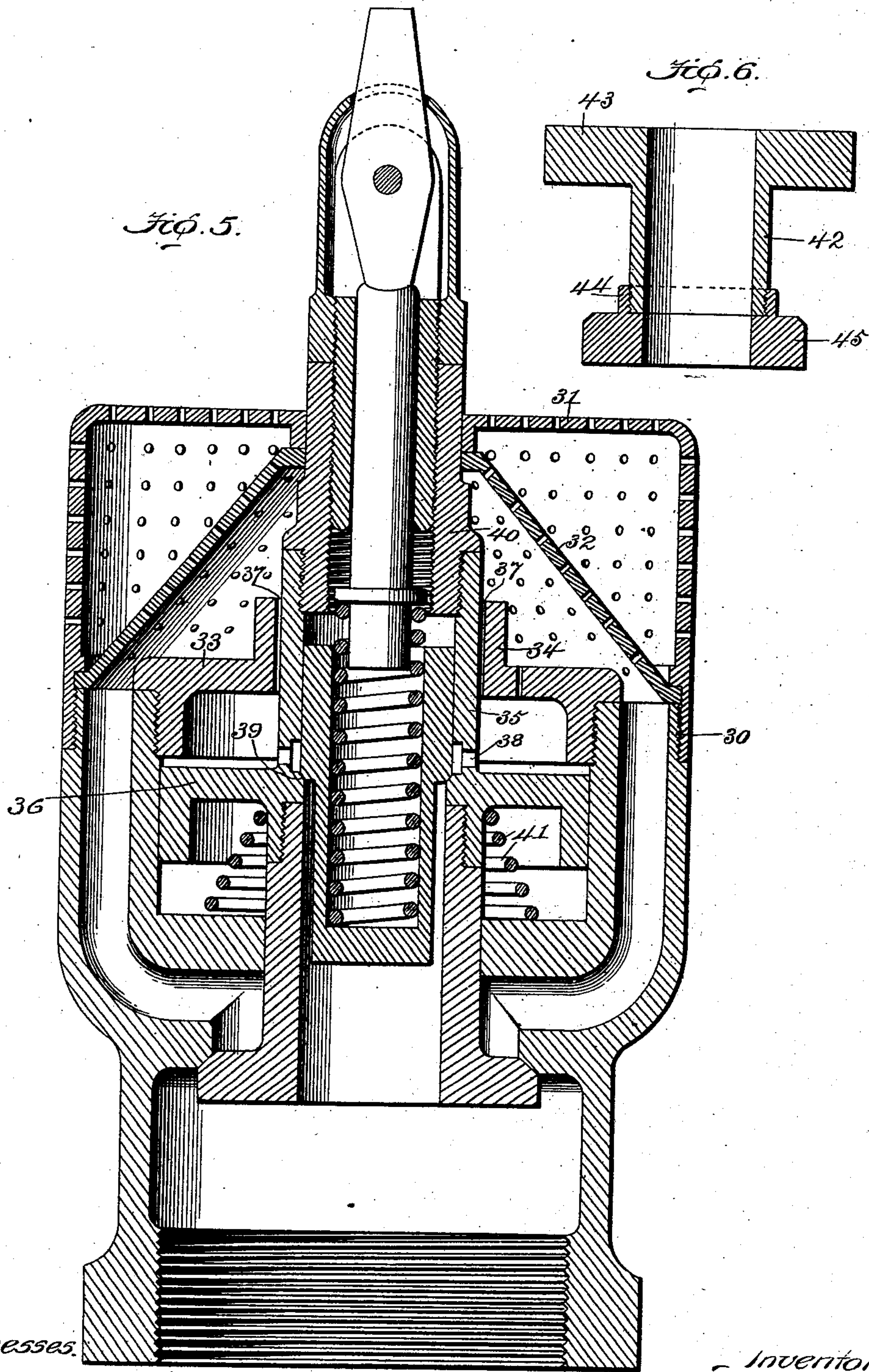
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Witnesses.

Marion K. Whitman

Inventor.
Harold P. Tippet
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UNITED STATES PATENT OFFICE.

HAROLD P. TIPPETT, OF COLUMBUS, OHIO.

SAFETY-VALVE.

SPECIFICATION forming part of Letters Patent No. 715,707, dated December 9, 1902.

Application filed April 5, 1902. Serial No. 101,518. (No model.)

To all whom it may concern:

Be it known that I, HAROLD P. TIPPETT, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Safety-Valves, of which the following is a specification.

This invention relates to steam-engine valves, and particularly to a safety-valve for locomotive and other boilers.

The invention embodies various improvements in safety-valves, and especially in the safety-valve covered by Letters Patent issued to me May 11, 1897, numbered 582,445, and in the valve covered by my application filed March 18, 1902, Serial No. 97,320.

The first or principal object of this invention is to provide in a safety-valve a construction and arrangement of parts to effect the closing or seating of a vertically-slidable main valve in the direction of the flow of steam from a boiler instead of against such steam flow, as covered by the above-mentioned patent.

A further purpose of the invention is to provide in a safety-valve a vertically-slidable main valve having a central opening around which is formed a valve-seat, the bottom of the main valve being solid or closed, except for said opening, and without a port or ports, as shown in my patent hereinbefore referred to. In said patent the main valve has an open top and is cup-shaped, so that the bottom is of smaller area than the top; but in this application I provide the main valve with a sleeve having a piston of larger area than the said valve.

In the accompanying drawings, forming part of this application, Figure 1 is a perspective view, partly broken away, of a valve constructed under this application. Fig. 2 is a central vertical section without mufflers. Fig. 3 is a cross-section on the plane indicated by the line *x x*, Fig. 2. Fig. 4 is a perspective view of the main valve. Fig. 5 is a central vertical section of a modification. Fig. 6 is a section of modified form of main valve.

The same numeral references denote the same parts throughout the several views of the drawings.

The valve-body consists of an outer casing 1, adapted to be attached to a locomotive or

other steam boiler, and having valve-guides 2, and a valve-seat 3; an inner shell 4, having a central valve-sleeve, bearing 5, and joined to the casing by a series of ribs 6, which form with the casing and shell, a series of exhaust-ports 7.

The main valve comprises a hollow sleeve 8, working steam-tight in the bearing 5 and opening through an otherwise closed or solid bottom 9, which works between the guides 2 and has a valve-seat 10 formed upon its upper surface to coöperate with the seat 3 and a piston 11, secured to the top of the stem 8 and making a steam-tight bearing against the shell 4. The shell 4 is provided with a cover 12, having a hollow depending stem 13, over which the sleeve is fitted steam-tight. The stem 13 is provided with a valve-seat 14, and adjacent to the latter are ports 15 through the stem. The cover 12 has one or more ports 16 and a head 17 to receive a nut 18, having inside and outside screw-threads. A hood 19 is screwed to the top of the nut 18 and holds the outer muffler 20 and the inner conical muffler 21 to the nut and in position on the valve-casing.

The controlling-valve 22 has an open top and a closed bottom and is provided with a valve-seat 23 to engage the valve-seat 14. From the seat 23 to the top of the valve 22 the latter makes a steam-tight joint with the cover 12 and the stem 13, and from the said seat 23 the controlling-valve 22 is reduced to the bottom thereof to leave a live-steam passage between the controlling-valve and the stem 13.

The means for regulating the spring 24 and adjusting the valve 22 is disclosed in my application hereinbefore referred to, but not therein claimed specifically. It consists of a hollow bolt 25, held to the nut 18 by a nut 26, a rod 27, having a shoulder 28 to engage the spring, and a set-bolt 29 to work the rod 27 in the hollow bolt 25. The hood 19 covers this mechanism and protects it from accidental movement.

Referring to the modification shown in Fig. 5 of the drawings, the valve-casing is the same as that before described herein, except it is without valve-guides and has an external thread 30 for attaching the mufflers 31 and 32 instead of attaching them as already de-

scribed. The cover 33 has no depending stem; but a central flange 34 is formed on the top of the cover, through which a stem 35 of the main-valve piston 36 works, so as to leave an exhaust-passage 37. The said stem has ports 38 adjacent to a valve-seat 39 formed on the cap 36, and the stem 35 has an internal thread by which the nut 40 is attached and is free to be moved under the action of the main valve vertically through the mufflers. A spring 41 may be employed to hold the main valve seated when there is no pressure on a boiler. In the construction shown in Fig. 5 the main valve and all of its connections are slidable vertically through the shell and shell-cover, so that when the main valve lifts all of its parts are lifted with it, and the controlling-valve is also lifted within and by the main valve.

Fig. 6 shows a stem 42 integral with the top 43 of the main valve and screwed into a flange 44 of the bottom 45 of said valve.

The operation of the preferred form of valve is as follows: Steam from the boiler inducts against the bottom of the main valve and holds it to its seat, while the same steam-pressure raises the controlling-valve and permits such steam to pass from around the controlling-valve through the stem-ports and exerts itself upon the top of the main piston, and the latter being of greater area than the bottom of the main valve the latter is forced open or downwardly unseated, which permits the exhaust to be made through the ports of the valve-casing. When the boiler-pressure is reduced sufficient to seat the controlling-valve, the steam above the main valve discharges through the port or ports in the casing-cover, and the main valve is again seated by the boiler-pressure.

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

1. In a safety-valve, the main valve having a sleeve making a steam-tight bearing on the body of the safety-valve and open at each end, a piston on the sleeve of greater area than the main valve, and means for admitting steam-pressure above the piston.

2. In a safety-valve, a projecting stem provided with a valve seat and ports, a controlling-valve operated by steam in the stem to open and close the said ports, and a main valve having a piston of larger area than the valve.

3. In a safety-valve, a stem depending from the valve-cover and having a seat and ports,

a controlling-valve slidable in the stem to open and close the said ports, and a main valve having a sleeve slidable on the stem and connecting the piston and valve of the main valve.

4. In a safety-valve, a valve-cover having steam-exits, a stem depending from the cover and provided with a valve-seat, and ports, a controlling-valve slidable in the stem to open and close the ports, a main valve having a piston of greater area than the valve, and a sleeve connecting the piston to the valve, and slidable on said stem.

5. In a safety-valve, a stem having ports projecting from the cover thereof, a safety-valve proper having a sleeve open at each end and working on the stem, a piston on the sleeve of larger area than the valve, and means for admitting steam-pressure above the piston.

6. In a safety-valve, a stem having ports and projecting through and from the cover thereof, a safety-valve proper having a sleeve open at each end, and a piston on the sleeve of larger area than the valve, combined with a controlling-valve working in the stem.

7. In a safety-valve, the combination of the casing having a valve-seat, a piston, valve-guides depending from the seat, a shell supported in the casing so as to form ports between the casing and the shell, and means for admitting steam-pressure above the piston.

8. In a safety-valve, the combination, with the casing having a valve-seat, the shell having a central bearing, and the casing-cover having a depending stem provided with a seat and ports, of a spring-controlled valve slidable in the stem so as to leave a steam-passage around the valve to said ports, and a main valve working in said bearing and having a removable piston of larger area than the main valve, and a sleeve forming the only opening in the main valve and connecting the piston therewith.

9. The combination, with the shell and casing, of a main valve having a piston of larger area than the valve, a stem provided with ports and a valve-seat and projecting from the piston slidably through the top of the shell, and a controlling-valve operated in the stem to open and close said ports.

In witness whereof I hereunto set my hand in the presence of two witnesses.

HAROLD P. TIPPETT.

Witnesses:

CHARLES S. M. TRUMAN,
NORMAN L. HAYDEN.