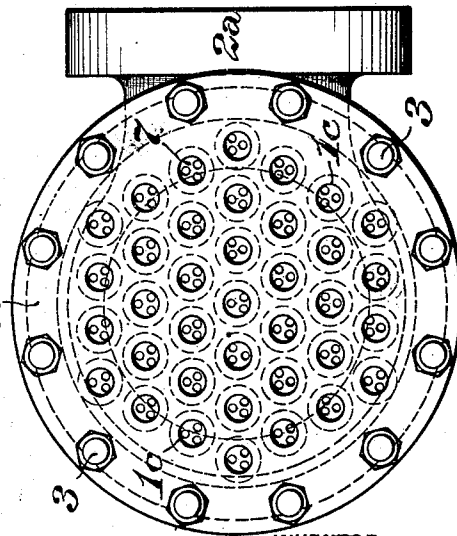
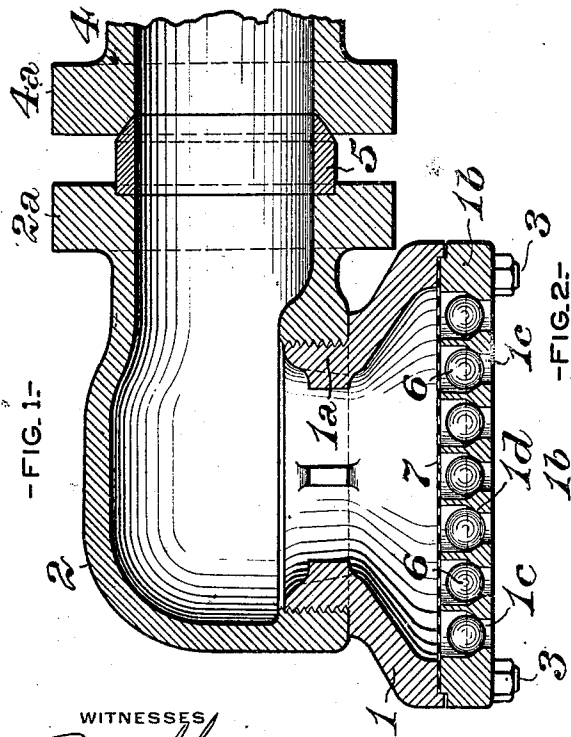
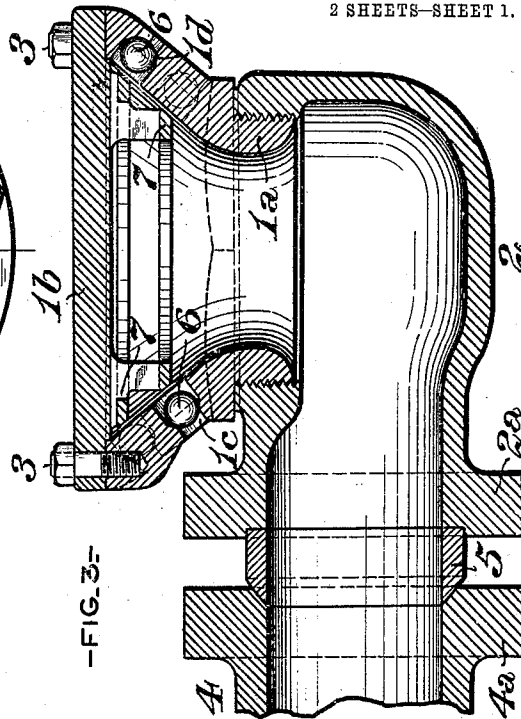
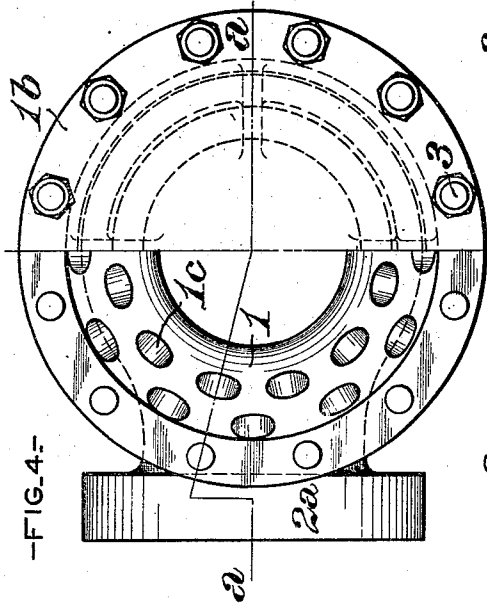


S. S. RIEGEL.
 STEAM CHEST RELIEF VALVE.
 APPLICATION FILED DEC. 12, 1912.

1,054,794.

Patented Mar. 4, 1913.

2 SHEETS—SHEET 1.



WITNESSES
 Edward Knight
 S. R. Bell.

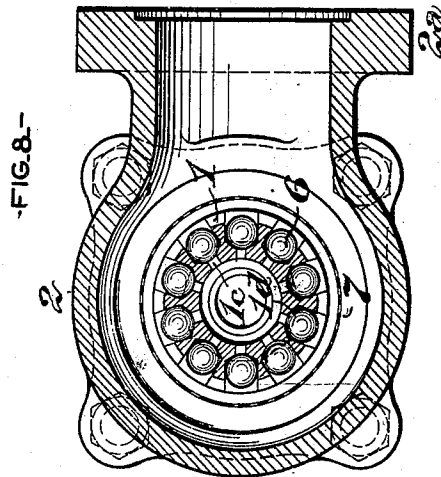
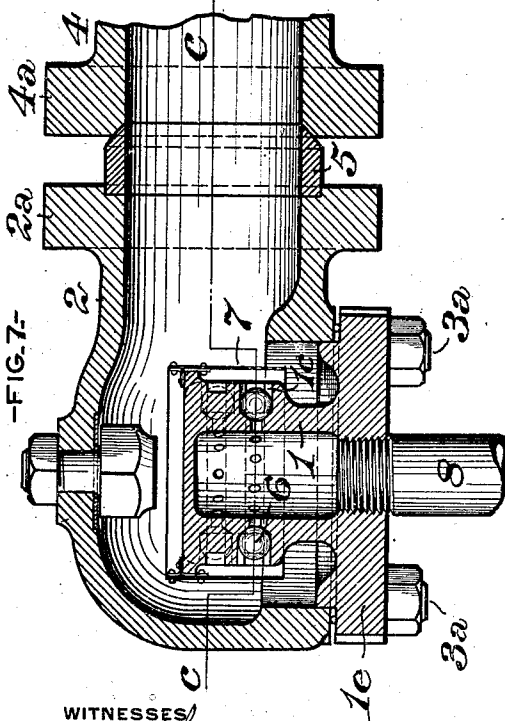
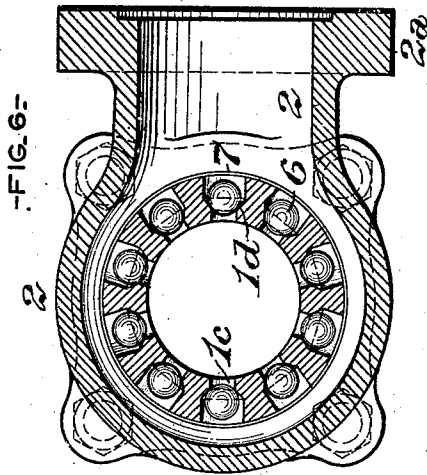
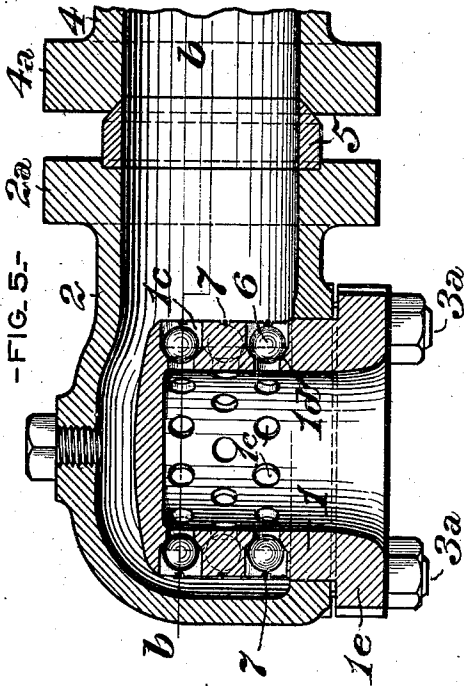
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2 SHEETS—SHEET 2.



WITNESSES
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UNITED STATES PATENT OFFICE.

SAMUEL S. RIEGEL, OF SCRANTON, PENNSYLVANIA.

STEAM-CHEST RELIEF-VALVE.

1,054,794.

Specification of Letters Patent.

Patented Mar. 4, 1913.

Application filed December 12, 1912. Serial No. 736,268.

To all whom it may concern:

Be it known that I, SAMUEL S. RIEGEL, of Scranton, in the county of Lackawanna and State of Pennsylvania, have invented a certain new and useful Improvement in Steam-Chest Relief-Valves, of which improvement the following is a specification.

My invention relates to relief valves used in connection with the valve chests and cylinders of locomotive engines, for the purpose of preventing the formation of a vacuum therein by the reciprocating movements of the pistons when the locomotive is drifting, or running, with throttle closed, down a grade.

The object of my invention is to provide an appliance of this type which may be readily and inexpensively applied, and which, in operation, will afford a free and ample admission of air, or of a limited volume of steam, to the valve chest and cylinder and thereby effectually prevent the formation of a vacuum therein.

The improvement claimed is hereinafter fully set forth.

In the accompanying drawings: Figure 1 is a vertical central section through a steam chest relief valve, illustrating an embodiment of my invention; Fig. 2, a bottom plan view of the same, with the ball valves removed; Fig. 3, a vertical section, on the line *a a* of Fig. 4, illustrating a structural modification; Fig. 4, a plan view of the same, with the left hand half of the cover plate removed; Fig. 5, a vertical central section, illustrating another structural modification; Fig. 6, a horizontal section through the same, on the line *b b* of Fig. 5; Fig. 7, a vertical central section, illustrating another structural modification; and, Fig. 8, a horizontal section through the same, on the line *c c* of Fig. 7.

Referring first to Figs. 1 and 2 of the drawings, in the practice of my invention I provide a valve casing or chest, comprising a hollow or tubular body, 1, which is outwardly and downwardly tapered or inclined, and is adapted for connection to a coupling chamber, 2, as, in the instance shown, by having a short externally threaded delivery nozzle, 1^a, formed on its top; and a cover plate, 1^b, which is secured removably to its opposite side by studs, 3. A flange, 2^a, is formed on the end of the coupling chamber,

2, which is bolted to a similar flange, 4^a, on a nozzle, 4, leading out of the valve chest of the locomotive on which the device is applied; a ball joint ring, 5, being interposed, in the usual manner, to make and maintain a tight joint. It will be obvious that the appliance may, equivalently, be connected with a steam passage leading to the cylinder or with the cylinder itself, through attachment to its head, as in either case, the valve casing would similarly communicate with the space in which a vacuum tends to be formed, and the operation of the appliance would be the same as if directly connected to the valve chest. The cover plate, 1^b, is perforated by a plurality of inlet passages, 1^c, which are enlarged in diameter for the major portion of their length, from their inner toward their outer ends, and a ball valve, 6, of smaller diameter than the larger bore of the inlet passage, is inserted in said larger bore of each of the inlet passages, the ball valves normally fitting valve seats, 1^d, in the larger bores. A valve stop, which is in the form of a sheet of perforated plate, 7, or of wire netting, if preferred, is interposed between the bottom of the casing and the cover plate, and is held in position by the studs, 3, the function of said stop being to limit the inward traverse of the ball valves, 6, and prevent their displacement from the inlet passages.

In the operation of the appliance, the formation of a partial vacuum in the cylinder and valve chest to which it is connected, when the locomotive is drifting or running with throttle closed, necessarily induces a corresponding action in the communicating coupling chamber, 2, and valve casing, 1. Atmospheric pressure acting, through the inlet passages, upon the exposed surfaces of the ball valves, will thereupon unseat said valves, and air will be drawn in through the inlet passages in sufficient quantity to counteract the exhausting action of the piston and prevent the formation of a partial vacuum in the cylinder and valve chest. When steam is readmitted to the engine, the ball valves are returned to, and held against their seats by the action of gravity and of the pressure of steam in the coupling chamber and valve casing.

Figs. 3 and 4 illustrate a modified form of the appliance, embodying the same essen-

tial and characteristic features of structure and operation as in the form first described, and differing therefrom only in such details as enable the valve casing and its accessories to be located above, instead of below, the coupling chamber. To this end, the delivery nozzle, 1^a, through which the valve casing is connected to the coupling chamber, 2, is formed on the lower side of the valve casing, and the cover plate, 1^b, is connected to the top of the casing. The casing is tapered in the opposite direction to that shown in Figs. 1 and 2, and the inlet passages, 1^c, and ball valves, 6, are disposed in two circular sets or rows, one above another. The valve stop, 7, is in the form of two rings, fixed, one above another, to the cover plate, adjacent to the inner ends of the inlet passages, 1^c. The operation of the appliance is the same as that of the form first described.

In the form of the appliance shown in Figs. 5 and 6, the valve casing, 1, extends into and is surrounded by the coupling chamber, 2, except at its bottom, where it is provided with a flange, 1^a, which is secured to the coupling chamber by studs, 3^a. Three circular rows of inlet passages, 1^c, are formed, in different horizontal planes of the valve casing, each having a valve seat, 1^d, and a ball valve, 6, as in the instances before described. Each row of inlet passages is surrounded by a valve stop, 7, which is, in this instance, in the form of a ring of wire, which, as in the forms of the appliance before described, limits the traverse of the ball valves and prevents their displacement from the inlet passages.

Figs. 7 and 8 show another form of the appliance, in which the ball valves, 6, control the admission of steam to the valve chest and cylinder, instead of air as in the forms before described. The valve casing, 1, projects into the coupling chamber, 2, and is secured thereto by a bottom flange, 1^a, and studs, 3^a, as in Figs. 5 and 6. The interior of the valve casing, however, instead of being open to the atmosphere, as in Figs. 5 and 6, is closed thereto, and a steam supply pipe, 8, leading into the valve casing from a convenient point of connection with the boiler, is connected to the flange 1^a. The inlet passages, 1^c, are disposed in two rows, and their outer ends are surrounded by a perforated plate or wire netting valve stop, 7, performing the same function as in the instances before described. In operation, the valves, 6, are unseated by the pressure in the pipe, 8, and steam is supplied to the steam chest and cylinder through the valve casing and coupling, upon the formation of a partial vacuum in the steam chest and cylinder.

It will be clear to those familiar with the operation of locomotives that my invention

presents the advantages of structural simplicity and inexpensiveness and ready applicability in any of the present standard designs. The embodiment of a plurality of inlet passages, each controlled by a ball valve, enables ample area for the admission of air or steam to be provided, within a comparatively small compass, and with the present perfection in the manufacture of valves of this type, their ready unseating and prompt and accurate seating, as required by operative conditions, may be safely depended upon.

I claim as my invention and desire to secure by Letters Patent:—

1. In a steam chest relief valve, the combination of a valve casing, means for connecting said casing with a locomotive valve chest, a plurality of inlet passages extending through a wall of the casing, each open at one end to the valve chest connection and to a source of exterior pressure at the other, and a plurality of ball valves, each controlling one of said passages.

2. In a steam chest relief valve, the combination of a valve casing, means for connecting said casing with a locomotive valve chest, a plurality of inlet passages extending through a wall of the casing, each open at one end to the valve chest connection and to a source of exterior pressure at the other, a plurality of ball valves, each controlling one of said passages, and a stop, located adjacent to the delivery ends of the inlet passages, and limiting the traverse of the valves toward said ends.

3. In a steam chest relief valve, the combination of a valve casing comprising a hollow or tubular body and an end wall, a coupling chamber connected to, and communicating with, the body of the casing and adapted at its opposite end for connection with a locomotive valve chest, a plurality of inlet passages extending through a wall of the casing, each open at one end to the body of the casing and to a source of exterior pressure at the other, and a plurality of ball valves, each controlling one of said passages.

4. In a steam chest relief valve, the combination of a valve casing comprising a hollow or tubular body and an end wall formed by a cover plate secured detachably to the body, a coupling chamber connected to, and communicating with, the body of the casing and adapted at its opposite end for connection with the locomotive valve chest, a plurality of inlet passages extending through a wall of the casing, each open at one end to the body of the casing and at the other to the atmosphere, and a plurality of ball valves, each controlling one of said passages.

5. In a steam chest relief valve, the combination of a valve casing having a hollow or tubular body and a nozzle at one end

thereof, a cover plate secured to the opposite end of the body and having a plurality of inlet passages, a coupling chamber connected to the nozzle of the body and adapted
5 at its opposite end for connection with a locomotive valve chest, a plurality of ball valves, each seating in and controlling one

of said passages, and a perforated plate valve stop interposed between the body of the casing and the cover plate.

SAMUEL S. RIEGEL.

Witnesses:

JOHN F. MURRAY,
THOMAS C. JAY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."