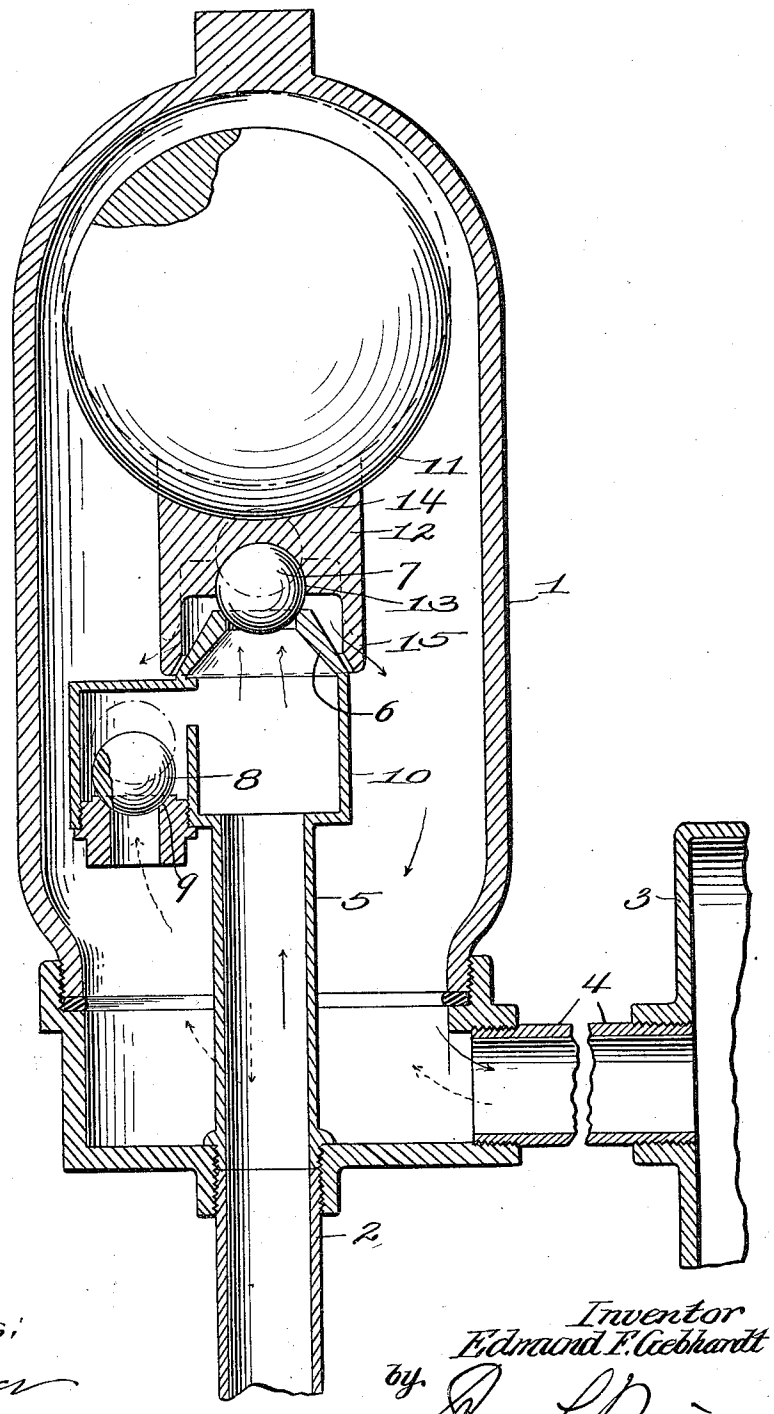
E. F. GEBHARDT.

RELIEF VALVE.

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Witnesses:

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UNITED STATES PATENT OFFICE.

EDMUND F. GEBHARDT, OF EASTON, PENNSYLVANIA.

RELIEF-VALVE.

1,230,289. Specification of Letters Patent. Patented June 19, 1917.

Application filed September 7, 1915. Serial No. 49,332.

To all whom it may concern:

Be it known that I, EDMUND F. GEBHARDT, a citizen of the United States, residing at Easton, in the county of Northampton and State of Pennsylvania, have invented new and useful Improvements in Relief-Valves, of which the following is a specification.

This invention relates to improvements in relief valves, proposing a structure which carries forward the improvement disclosed in my U. S. Patent No. 1,138,551, of May 4, 1915, and which, like the structure shown in said patent, is especially applicable to hot water heating systems, wherein the relief valves are interposed between the expansion tank and a pipe leading from the boiler and serve to regulate the pressure in the system without regard to the elevation of the tank.

Valve constructions of the type stated usually include two valve bodies, one of which (for convenience herein designated as the "main" valve) controls the passage through which the water flows from the system to the expansion tank, and the other of which (for convenience herein designated as the "return" valve) controls the passage through which the water returns from the expansion tank into the system. The present invention is essentially directed to the organization of the main or relief valve proper, and its principal object is to provide a relief valve, as described, wherein, while the parts are so organized that the main valve can not become "stuck" upon its seat and, hence, cannot fail to open when the pressure in the system reaches that determined upon as the maximum, the said valve cannot become open, however slightly, by causes other than the pressure in the system such, for example, as the vibration of the building in which the system is installed. In this way, while the main valve opens freely when the pressure exceeds the maximum degree determined upon, it is at all other times effectively closed against any leakage of fluid thereby.

In connection with the attainment of this object, the invention preserves all of the advantages of the structure disclosed in my patent above referred to.

An embodiment of the invention is illustrated in the accompanying drawing, wherein the figure is a vertical central sectional view of the improved valve.

The valve comprises a casing 1 which is connected, on the one hand, to the system by a pipe 2 and, on the other hand, to the expansion tank 3 by a pipe 4. Within the casing, a pipe 5 is provided which directly communicates with the pipe 2, forming, in effect, an extension thereof, and has, at its upper end, an annular valve seat 6 which functions as an outlet into the interior of the casing 1 and is normally closed by a main valve 7. According to the present invention, the main valve 7 is in the form of a ball, and the valve-engaging surface of the seat 6 conforms to the sphericity of the ball 7 which latter projects to some extent into the opening which the annular valve seat 6 defines.

When the pressure in the system exceeds the maximum degree determined upon, the water forces the valve 7 from its seat and then passes into the interior of the casing 1 and through the pipe 4 into the expansion tank 3. When the pressure in the system falls below the maximum degree determined upon, the water flows from the expansion tank into the interior of the casing and through the return valve 8 into the pipe 5, and through this back into the system. The flow of water from the system into the expansion tank is indicated by the arrows in full lines, and the return of water from the expansion tank into the system is indicated by the arrows drawn in dotted lines. The valve 8 works with relation to a seat 9, and the valve seats 6 and 9 are conveniently formed as parts of a casing or enlargement 10 provided at the upper end of the pipe 5. For the closure of the valve 7, a weight 11 in the form of a ball is provided, the ball 11 being relatively large in comparison to the ball 7. According to the present invention, the ball 11 has its seating upon a block 12 which latter has a rolling fit or seating upon the valve 7. The block 12 has, on its under face, a hemispherical recess 13 which conforms to the ball 7 and fits thereover, and, on its upper face, a concave recess 14 which conforms to the curvature of the weight 11 and provides a seat for said weight. Below the recess 13, the block 12 is provided with an annular apron 15 which terminates slightly short of the conical flange wherein the valve seat 6 is formed. The apron 15 serves to center the block 12 adequately for all practical purposes with relation to the weight 11 and the valve 7, but, on the other

hand, having a certain measure of play with relation to the flange wherein the valve seat 6 is formed, permits the block 12 to take up any vibration, such as the vibration of the building, which might otherwise cause the valve 7 to rattle or vibrate on its seat and hence permit the escape of fluid.

As in my patent referred to, the relation between the weight 11 and the valve and the casing is such that no special guide means for said weight, during the opening and closing movements of the valve 7, is required. It will be observed that there is a substantial space intervening between the weight and the surrounding wall of the casing, yet the weight is always accurately centered and cannot possibly become displaced or disengaged from its seat.

Having fully described my invention, I claim:—

1. A relief valve organization comprising a casing having separate inlet and outlet connections, a pipe within said casing forming a continuation of the inlet connection and having at its upper end a valve seat which functions as an outlet into said casing, a spherical valve normally closing said outlet and engaging upon said seat, a block having in its under face a recess conforming to and fitting over said valve and having a depending annular apron, the latter centering said block and permitting a limited measure of play thereof about said valve as a fulcrum, the block having a concave recess in its upper face, and a spherical weight resting upon the block and engaging the concave recess thereof, the width of the casing being so selected that the weight has normally no contact with the casing and the displacement of said weight in any lateral direction as far as the center of said valve is prevented by the wall of the casing which surrounds said weight.

2. A relief valve organization comprising a casing having separate inlet and outlet connections, a pipe within said casing forming a continuation of the inlet connection and having at its upper end a valve seat which functions as an outlet into said casing, a ball valve engaging said seat, a block having a rolling fit on said ball valve, and a spherical weight centered on said block.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

EDMUND F. GEBHARDT.

Witnesses:
M. J. REIMER,
JAMES P. TRUNNFELDER.

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