W. P. McDANIEL.

AIR VALVE FOR RADIATORS.

APPLICATION FILED MAY 18, 1908.

920,373.

Patented May 4, 1909.

Fig. 1.

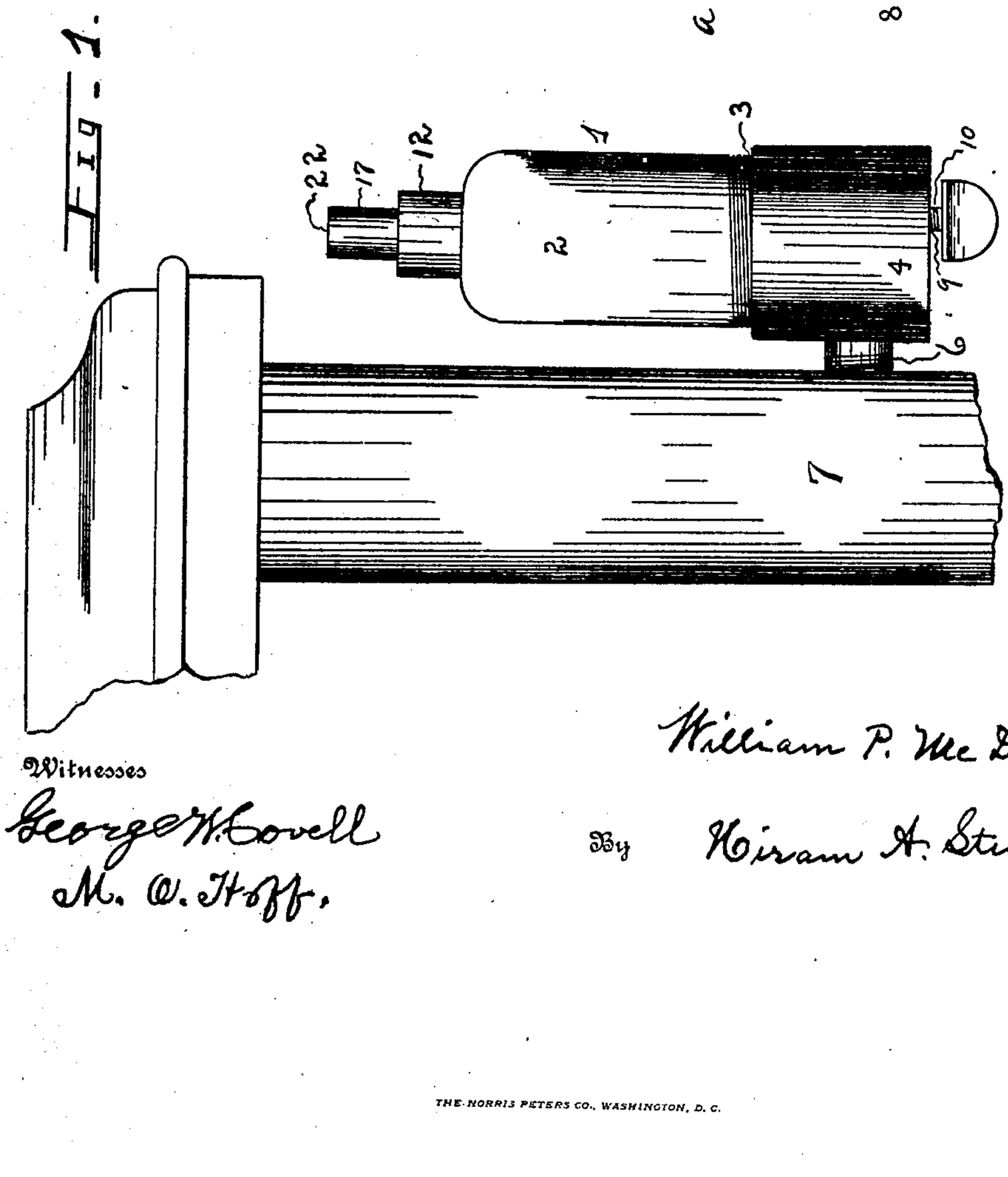


Fig. 2.

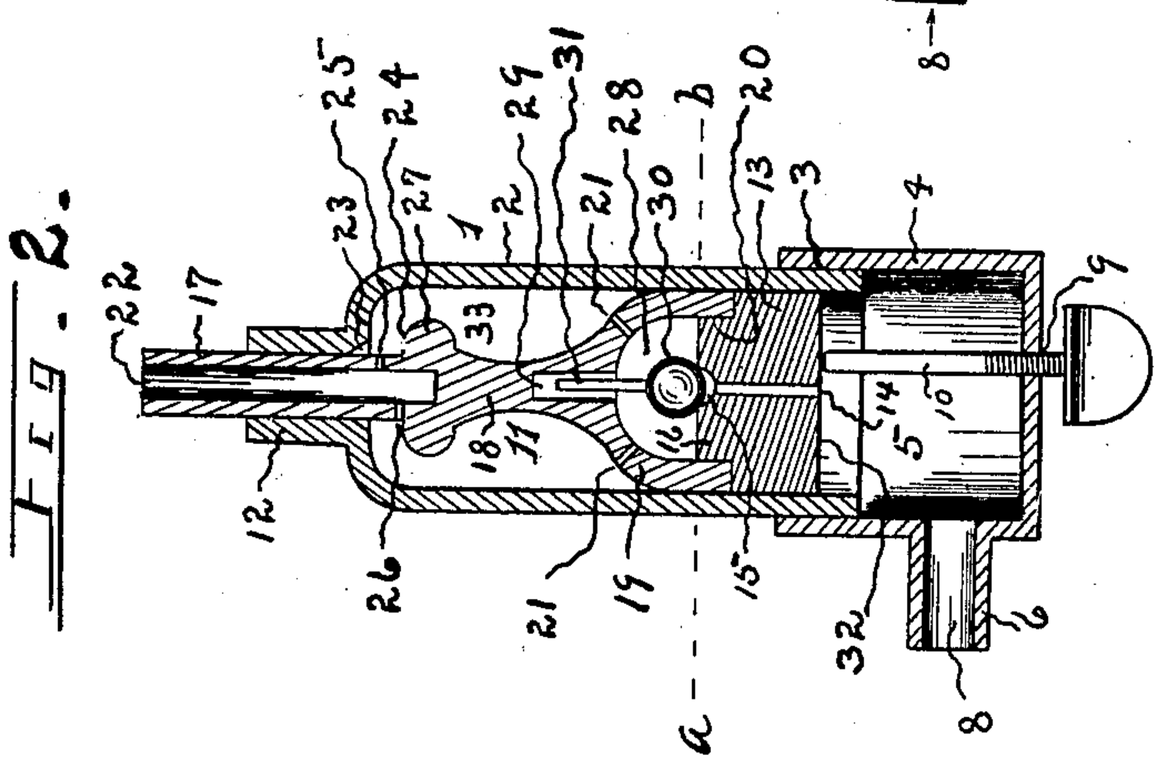
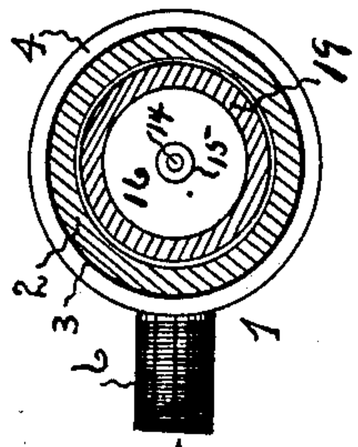


Fig. 3.



Witnesses

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WILLIAM P. McDANIEL, OF OMAHA, NEBRASKA.

AIR-VALVE FOR RADIATORS.

No. 920,373. Specification of Letters Patent. Patented May 4, 1909.

Application filed May 18, 1908. Serial No. 433,374.

To all whom it may concern:

Be it known that I, WILLIAM P. McDANIEL, a citizen of the United States, residing at Omaha, in the county of Douglas and State of Nebraska, have invented certain new and useful Improvements in Air-Valves for Radiators, of which the following is a specification.

This invention relates to improvements in air valves for radiators, and is designed more particularly for use in connection with radiators where steam is employed for heating purposes.

The principal object of the invention is the provision of a valve of this class having two parts, which may be economically manufactured, will be reliable in operation to permit the escape of air which accumulates in the steam pipes with the cooling of the radiator and pipes, and which will operate reliably to prevent escape of steam from the radiator after the air has been expelled by steam force.

The invention includes certain structural features relating to adjustability, and to facility for assembling the parts, as will be explained.

With these and other objects in view, the invention presents a new combination and arrangement of parts as described herein, pointed out by the claims, and as illustrated by the drawing, wherein,—

Figure 1 is a vertical side view of the valve mounted upon a radiator, the latter being broken away. Fig. 2 is a sectional elevation of the complete valve. Fig. 3 is a sectional view taken on line *a b* of Fig. 2.

Referring now to the drawing for a more particular description, numeral 1 indicates an air valve, comprising a vertical casing 2, having at its upper end the elongated nozzle or guide 12 and having at its lower end a threaded connection at 3 with a base 4, and providing within the base a chamber 5. Base 4 is formed with a neck 6 having threads for operatively mounting the casing upon one of the pipes or compartments 7 of a radiator, and providing the inlet or duct 8 communicating with chamber 5. The lower wall of the base is also provided with the aperture 9 making threaded engagement with the adjusting thumb-screw 10.

I provide the plunger 11 slidably seated within casing 2, and comprising a base 13 apertured at its middle longitudinally, as shown at 14, the upper end of the aperture being enlarged to form the annular cavity 15; and base 13 has its upper end annularly reduced to form the annular platform or collar 16. The remaining part of the plunger is an integral structure comprising a stem 17, having a diameter substantially equal to the opening of the nozzle or guide 12, an intermediate body portion 18 and a hood 19, said hood having a diameter substantially equal to base-portion 13. The interior surface of the wall of the hood makes contact with the vertical wall 20 of platform 16, and its wall is apertured to provide air ducts 21.

Nozzle 12 has a bore with a gage substantially equal throughout its length, and stem 17 throughout its length has an equal diameter, and while it contacts with the bore of the nozzle, it may be readily moved longitudinally therein; and the plunger, in operation, may have a limited, longitudinal movement within casing 2.

Stem 17 has an aperture 22 passing from its outer terminal the entire length of the stem and is extended lengthwise within the body portion 18 of the plunger. Upon the inner wall of and near the upper end of casing 2, at its junction with nozzle 12, is provided an annular depression 23 to operate as a valve seat. The upper end of body-portion 18 is formed with a head 27 having a convexed surface to provide the valve 24, and I provide exit ways 25 and 26 which traverse the wall of stem 17. Exit way 26 is closely adjacent head 27, and exit way 25 is disposed near head 27 but somewhat farther therefrom than way 26. As thus described, a chamber 28 is formed between hood 19 and platform 16, and body-portion 18 is provided with the longitudinal aperture 29. I provide the ball-valve 30, which may be seated in cavity 15 and having its guide-arm 31 seated in aperture 29. When steam passes duct 8 from pipe 7 to chamber 5, cold air may be expelled from these parts; the steam will drive this air to the atmosphere, and it will first pass aperture 14, at that time forcing ball or valve 30 upward, to pass this aperture; and it will pass apertures 21 of the hood and will pass exit ways 25 and 26.

After air has been expelled, base 13 is moved upwardly from force of the steam, this movement closing valve 24, and this prevents escape of steam from the radiator; and this valve will remain closed while the force of steam is active for heating purposes.

When the pipes have become cooled and steam pressure removed, the plunger, by reason of its weight, will be lowered until the lower surface 32 of base 13 contacts with screw 10; at this time air may enter the respective chambers 33 and 28 of the casing and hood, but valve 30, at this time, prevents the passage of air within chamber 5 or the steam pipes of the radiator. The device, therefore, requires no attention, and its operation is automatic to allow cold air to be expelled from the pipes, and to prevent passage of steam therefrom.

It will be seen that the parts are few and may be readily assembled. Valve 30 is reliable in operation and is held by its arm 31 in an operative position; its normal position is to remain closed, and is so held by gravity, but may be opened by the force of steam, as already described. By use of the thumb-screw 10, the lengthwise movement of the plunger may be regulated. Pipes of radiators located at a considerable distance from the steam boiler will contain more air than those located less remotely, and a greater degree of movement is therefore desired for the plunger where the radiator is remotely located, and, on this account the adjusting screw 10 is employed. This screw is mounted in aperture 9 upon the lower wall of base 4, adjacent the center of said base 4, and traverses chamber 5 to a seating adjacent the aperture 14 of base 13 of the plunger, and therefore is not obtrusive to prevent the movement of steam.

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

1. In an air valve for radiators, the combination with a casing provided with a nipple upon its lower portion adapted to be connected to a radiator and provided with an opening at its upper portion, of a piston mounted in said casing having a radiator connection located at the lower portion thereof, and said piston having a vertical channel formed therethrough, a ball check valve resting upon said piston at the upper face of said channel, a member spanning said ball check valve and rigidly connected to the piston to move vertically therewith, there being an extension carried by said member and projecting through the upper portion of the casing to the atmosphere, said extension being hollow and there being ports formed through the wall of said extension to establish communication between the interior of the casing and the interior of said hollow extension, there being a valve formed upon said member, and there being a valve seat formed within said casing with which said valve is adapted to engage.

2. In an air valve for radiators, the combination with a casing provided with a nipple upon its lower portion adapted to be connected to a radiator and provided with an opening at its upper portion, of a piston mounted in said casing having a radiator connection located at the lower portion thereof, and said piston having a vertical channel formed therethrough, a ball check valve resting upon said piston at the upper face of said channel, a member spanning said ball check valve and rigidly connected to the piston to move vertically therewith, there being an extension carried by said member and projecting through the upper portion of the casing to the atmosphere, said extension being hollow and there being ports formed through the wall of said extension to establish communication between the interior of the casing and the interior of said hollow extension, there being a valve formed upon said member, a valve seat formed within said casing with which said valve is adapted to engage, and a vertically adjustable member controllable from the exterior of the casing for limiting the downward movement of the piston.

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

WILLIAM P. McDANIEL.

Witnesses:
HIRAM A. STURGES,
ARRON MEYER.