(No Model.)

J. L. JUDGE.

AIR VALVE.

No. 477,597. Patented June 21, 1892.

Fig. 1.

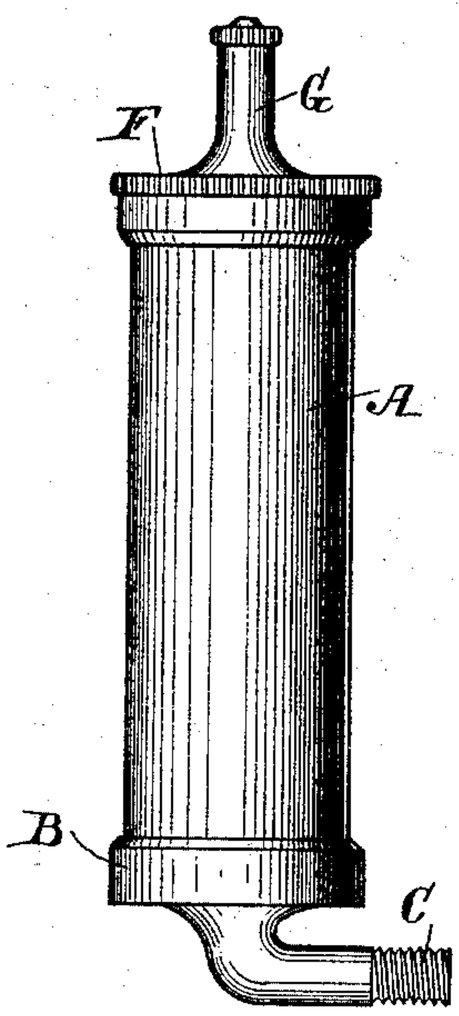


Fig. 2.

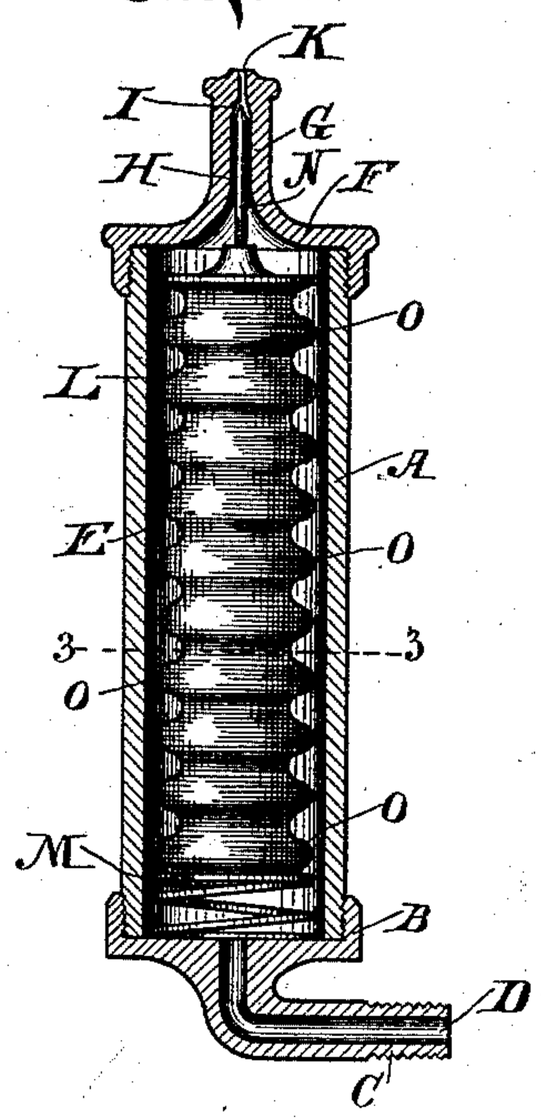
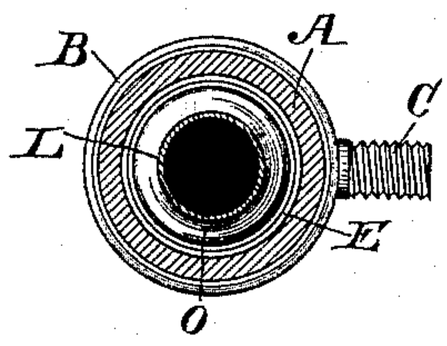


Fig. 3.



Witnesses.

C. A. Keeney.

Anna V. Faust.

Inventor.

James L. Judge

By C. A. Benedict

Attorney.

UNITED STATES PATENT OFFICE.

JAMES L. JUDGE, OF MILWAUKEE, WISCONSIN, ASSIGNOR OF ONE-HALF TO WILLIAM K. DOWNEY, OF SAME PLACE.

AIR-VALVE.

SPECIFICATION forming part of Letters Patent No. 477,597, dated June 21, 1892.

Application filed April 27, 1891. Serial No. 390,559. (No model.)

To all whom it may concern:

Be it known that I, JAMES L. JUDGE, of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a new and useful Improvement in Air-Valves, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

My invention relates to improvements in the air-valve for which Letters Patent No. 394,860 were issued to me December 18, 1888.

In the drawings, Figure 1 is an elevation of the complete air-valve. Fig. 2 is a longitudinal central section of the complete valve. Fig. 3 is a transverse section on line 3 3 of Fig. 2.

My improved device is adapted for use with the radiators that are used in heating buildings, in connection with a system of pipes for steam, and serves to permit the escape of air therefrom, but prevents the escape of steam or water therethrough.

The case A is a small hollow cylinder provided with a bottom B, to which it is secured conveniently by turning into an annular flange by screw-thread. The bottom B is provided with a screw-threaded nipple C, through which there is a duct D, leading into the chamber E of the valve. A cover F is secured removably to the cylinder by turning it thereon by a screw-thread, as shown in Fig. 2. The cover F is provided with a central upwardly-extending neck G, having therein a passage H, leading from the chamber E, a tapering valve-seat I, and a small discharge-orifice K therefrom. It will also be noticed that the under side of the cover F is convex in form, as indicated at *f*. This convexity extends up to the central neck G, so that the two surfaces upon each side of said neck gradually converge until they respectively meet the sides bordering passage H. A hollow water-tight float L in the case A rests normally on a spring M and is provided with a needle-valve N, supported and adjustable by a screw-thread in the top of the float. The needle-valve N is tapered at its upper extremity, so as when raised thereto to fit the valve-seat I and close it against the passage of steam or water. The needle-valve N is adjusted in the top of the float, so that when the float rests normally in the ordinary temperature on the spring M the top of the valve will be a little way from its seat I, so as to permit the escape of air coming from the radiator through the duct D into the chamber E through the orifice K. The float L is constructed of thin sheet metal, and upon the admission of steam into the chamber E the metal of the float will quickly expand and force the needle-valve N against its seat I, closing the orifice K and preventing the escape of steam. The spring M yields under the continued expansion of the walls of the float L after the needle-valve N has been raised to its seat by the slight expansion of the walls of the float, and thus provides for the unusual or extraordinary expansion of the walls of the float. On turning off the steam in the radiator, if water of condensation accumulates and runs into the chamber E the float will be raised by its buoyancy in the water, carrying the needle-valve N to its seat I and closing the orifice K against the escape of water therethrough.

To provide as large a surface as possible in the float for expansion, the side walls of the float are preferably corrugated by annular enlargements alternating with annular contracted parts, as shown at O, thus providing for the closing of the orifice K quickly under the action of a small amount of steam admitted to the chamber E, causing the walls of the float L to expand quickly and greatly in excess of the case A. The needle-valve N can be adjusted at a proper distance from the valve-seat I by removing the cover F from the case A and turning the needle by its screw-thread in the top of the float. This may be required under any change in the condition of the spring M.

An important advantage gained by providing the removable stop or cover with a convex under side is that an effective guideway is formed for the needle-valve, the converging of the metal toward the passage H insuring the entrance of the valve and its accurate guidance to its seat.

What I claim as new, and desire to secure by Letters Patent, is—

An air-valve comprising an upright cylinder-case forming a valve-chamber, a duct

leading into the bottom of the case from a steam-radiator, a cover detachably secured to the top of the case, which cover is provided with a central upwardly-extending neck having a passage leading from the air-chamber to the valve-seat near its upper extremity, and a discharging-orifice above the valve-seat, a hollow water-tight float in and nearly filling the chamber of the case, which float has corrugated sheet-metal sides, whereby it is adapted to expand and contract longitudinally quickly under change of temperature, a needle-valve secured adjustably in the cover of the float and projecting therefrom into and guided by the neck movably to normally near the valve-seat, and an independent spring interposed between the bottom of the float and the bottom of the case, on which spring the float rests yieldingly, constructed and arranged substantially as described.

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

JAMES L. JUDGE.

Witnesses:
C. T. BENEDICT,
ANNA V. FAUST.