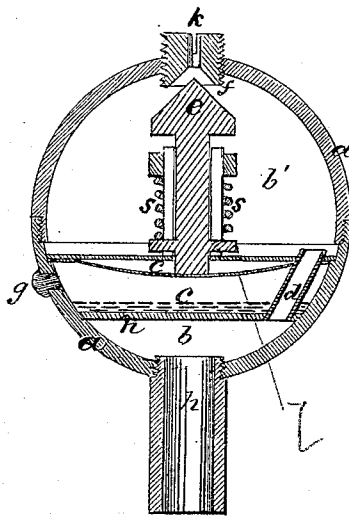
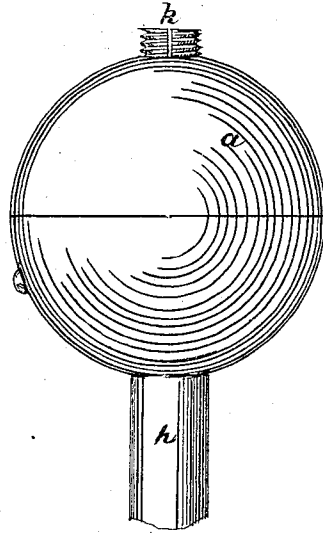


J. R. NICHOLS.

Automatic Air-Cock for Steam-Radiators.

No. 129,291.

Patented July 16, 1872.



Witnesses.

Chas. E. Pillingers
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JAMES R. NICHOLS, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN AUTOMATIC AIR-COCKS FOR STEAM-RADIATORS.

Specification forming part of Letters Patent No. 129,291, dated July 16, 1872; antedated July 6, 1872.

Be it known that I, JAMES R. NICHOLS, of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and improved device for allowing the escape of air from steam-radiators, which I term an Automatic Air-Cock, of which the following is a specification:

The object of my invention is to produce a device, which shall be automatic in its action, for allowing the escape of the air which has entered into a steam-radiator after the steam has gone down and previous to or during the raising of the steam in the radiator. The usual way of allowing the escape of the air in such radiators is by means of an ordinary cock, which requires to be manipulated to prevent the escape of the steam after that of the air. This is objectionable, as each radiator requires the special service of an attendant to operate the cock at the proper moment. My invention consists in causing a cock or valve to be operated by means of the expansion of a liquid which is volatilized at a low temperature and placed in a hermetically-closed chamber, so as to actuate an elastic diaphragm within the said chamber, and upon which the stem of the valve rests, so that when there is no steam in the radiator the volatile liquid, being cool, will allow the valve to remain open for the escape of the air, but as soon as the steam commences to act on the chamber containing the said liquid the latter at once becomes volatilized, and, by its expansion, moves the elastic diaphragm and forces the valve against its seat, and thus prevents the escape of the steam.

Figure 1 in the drawing represents a globular case in elevation, in which the operative parts of my device are inclosed. Fig. 2 is a vertical section of the same, showing the operative parts.

The casing *a* is preferably of globular form, made in two parts, securely attached together and connected to a steam-radiator by means of a pipe, *b*. In the lower portion of this casing is secured a chamber, *c*, in which is placed some liquid which is capable of being volatilized at a sufficiently low temperature—such as ether, chloroform, alcohol, bisulphide of carbon, or other equivalent substance. This liquid may be introduced through an opening,

g, at the side, and when in the chamber *c* the latter is to be hermetically closed, so as to allow of no possible escape of the liquid. Within the chamber *c*, and attached at its edges to the under side of the upper side of the chamber *c*, is an elastic diaphragm, *l*, upon which rests the stem of the valve *e*. The lower portion of the valve-stem is allowed to play through the upper side of the chamber *c*. Around the valve-stem is arranged a spiral spring, which serves to press the said stem upon the diaphragm *l*, so as to maintain it in the position shown in Fig. 2, and allow the valve to remain open for the escape of air. The valve-seat is formed in a plug in the upper portion of the globe, and an opening, *k*, is made through this plug from the valve-seat to admit of the escape of air. *b* and *b'* are steam-chambers communicating with each other by means of a tube, *d*, passing through the chamber *c*.

The operation is as follows: The position of the parts, as shown in Fig. 2, indicates that there is no steam in the radiator, and the liquid in chamber *c* being in a cool state the diaphragm *l* is forced down by the spring *s*, as shown, leaving the valve *e* open. As soon as steam is made in the radiator the air will be forced out through the valve; but as soon as the steam enters the chamber *b* in the globe it acts upon the chamber *c*, and the liquid in said chamber at once volatilizes, and, by expansion, forces up the diaphragm *l*, and, consequently, closes the valve against the escape of steam, and the valve remains thus closed until the liquid in chamber *c* again becomes cool. The chamber *c* being hermetically closed the liquid inclosed therein cannot escape, and the device, therefore, is always ready for operation.

I claim as my invention—

1. The diaphragm *l*, adjusted and arranged within the chamber *c*, when combined with the valve *e* and the spring *s*, in the manner and for the purpose herein described.
2. In combination with the foregoing, I claim the conical valve-seat *k*, in the manner and for the purpose herein described.

JAMES R. NICHOLS.

Witnesses:

CHAS. E. BILLINGS,
S. P. SHARPLES.