R. J. MALCOLM.

AIR-VENTS AND COLLAPSE VALVES.

No. 181,791. Patented Sept. 5, 1876.

Fig. 1.

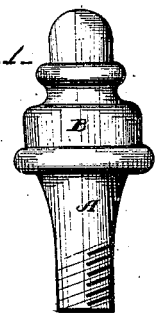
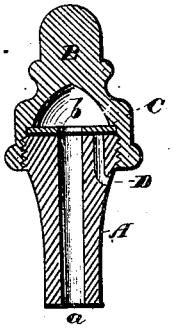


Fig. 2.



WITNESSES
Edw. F. Nottingham.
Albert H. Bright.

INVENTOR
Robert J. Malcolm.
By H. A. Seymour,
Attorney

UNITED STATES PATENT OFFICE.

ROBERT J. MALCOLM, OF CINCINNATI, OHIO, ASSIGNOR TO HIMSELF AND GEORGE E. MASON.

IMPROVEMENT IN AIR-VENTS AND COLLAPSE-VALVES.

Specification forming part of Letters Patent No. **181,791**, dated September 5, 1876; application filed June 1, 1876.

To all whom it may concern:

Be it known that I, R. J. MALCOLM, of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Air-Vents and Collapse-Valves; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to air vents or valves, and is designed to remedy the difficulty frequently incident upon the connection of water-pipes with the range or stove-boiler, sometimes known as the "circulating boiler."

It is well current that upon a withdrawal of water in large quantities from the street-mains of our cities, as it is desirable to repair same, or as the head of water is drawn off from any reason, then there is a strong tendency toward a sudden collapse or sinking in of the boiler from all sides—that is, the incased and weighty subject-matter, upon departure, leaves and necessitates, in a close boiler, a vacuum, and, the tremendous compressing force of the outer air bearing in against same, the resistance of the material is liable to be overcome, thus impairing and endangering the article. Further, upon the return or back-action of the water in from the main, accident and damage are liable from the immediate and unrestricted concussion or flowing-in force of the water; it being entirely unguarded, a result is produced well known as "pounding."

With such premises in view, my invention consists, first, in an air-vent or collapse-valve constructed with an air port or passage extending from the valve-seat downward through the valve-casing; second, in the combination, with a disk-valve, provided with a central perforation, of a valve-seat formed with air inlet and outlet passages.

In the drawings, Figure 1 is a view of my improvement in side elevation, while Fig. 2 is a vertical section of same.

A is the valve-stem, of screw-threaded extremity, so as to readily form a tight and secure adjustment to the pipe or boiler, and having the central passage *a*, for connecting the latter with the valve-chamber *b*. The upper extremity of the stem is also threaded, corresponding to the thread upon the cap B, which thus fits closely over the valve and upper portion of the stem. The disk-valve C is suitably seated over the outer air-port D, so as to fairly connect latter under the proper conditions with the inner air-passage. A circular aperture, agreeable to this latter in dimension, gives free communication between same and the valve-chamber. This latter is of appropriate size, and adapted to the purpose of the parts, as appears hereafter. The outer and immediately-connecting air-port D is located so as to extend downward from the valve, and, passing thus through the valve-casing, finds exit at the base of same.

Such a construction prevents débris of any and all character falling into same, and in any wise clogging and impairing the operation of the parts. It is thus out of the way of much otherwise interfering matter, and is novel with myself as far as my knowledge extends.

The operation of the foregoing is as follows: The device may be appropriately secured to a boiler, pipe, or water-main in such a manner as to enjoy communication with the outer atmosphere. As the water is exhausted from the supply for any cause, determinally or accidentally, a vacuum is of course at once formed, and as the pressure from the valve-chamber is reduced and lessened, a corresponding raising of the valve and resulting inrush of the air follows. The outer atmosphere, exerting its natural force, instantly follows up its inpursuing course as advantage may be given the same. This necessitates and establishes an equilibrium of inner and outer forces, and the boiler is kept intact. So, on the other hand, upon the return flow of the waters through the main, a heavy or sudden shock and impact of the water is prevented as against the boiler or other terminating medium, the air reserved in the chamber and passage affording a strong but elastic break-water, and a cushion is thus formed which it is impossible to overcome or endanger.

The valve is of light rubber, preferably, for insuring the easy and unrestricted opening and closing of same, as it may be conditionally influenced.

It is apparent that this mechanism may be located at the terminus of each pipe, or may be secured to the boiler, or in any suitable manner connected with whatever part agreeable.

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

An air-vent valve, consisting of the screw-threaded stem, provided with a central passage, A, side port D, and a flat valve-seat, in combination with a flexible valve, C, having aperture *b* and a screw-threaded cap, B, formed with an offset to hold the valve C against its seat, all constructed substantially as and for the purpose specified.

In testimony that I claim the foregoing I have hereunto set my hand this 29th day of May, 1876.

ROBERT J. MALCOLM.

Witnesses:
J. C. FAY,
GEORGE E. MASON.