A. L. IDE.

STEAM RADIATOR.

No. 180,033. Patented July 18, 1876.

Fig. 1.

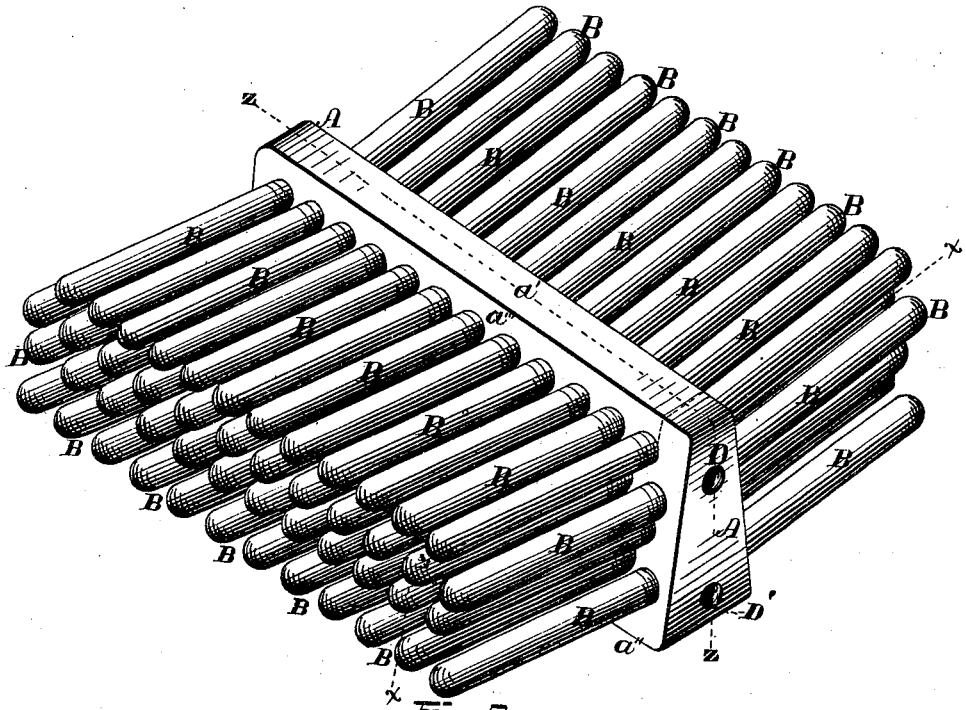


Fig. 2.

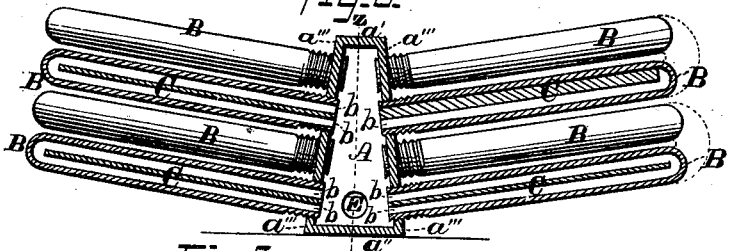
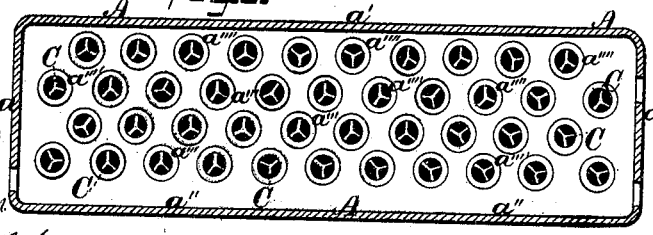


Fig. 3.



WITNESSES:

Jas. L. Hutchinson

John R. Young

INVENTOR.

A. L. Ide, by

Prindle and Lawrence Attys

UNITED STATES PATENT OFFICE.

ALBERT L. IDE, OF SPRINGFIELD, ILLINOIS.

IMPROVEMENT IN STEAM-RADIATORS.

Specification forming part of Letters Patent No. **180,033**, dated July 18, 1876; application filed February 26, 1876.

To all whom it may concern:

Be it known that I, ALBERT L. IDE, of Springfield, in the county of Sangamon and in the State of Illinois, have invented certain new and useful Improvements in Indirect Steam-Radiators; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a perspective view of my improved radiator. Fig. 2 is a transverse section of the same, and Fig. 3 is a longitudinal section of the central steam-chamber.

Letters of like name and kind refer to like parts in each of the figures.

The object of this invention is to increase the heating capacity of an indirect steam-radiator; to render more rapid and perfect the expulsion of air and the circulation of steam within the same; to decrease the original cost; and to lessen the liability of such radiator to become injured by frost or by the expansion and contraction of its parts, to which end—

It consists principally in a steam-chamber, provided at one or both sides with free-end tubes, which extend laterally outward and have an upward inclination from their inner to their outer ends, substantially as and for the purpose hereinafter shown.

It consists further in a steam chamber, provided at one or both sides with laterally-extending free-end tubes, which are each provided with longitudinal circulating diaphragms, substantially as and for the purpose hereinafter set forth.

In the annexed drawings, A represents a steam-chamber, constructed with vertical ends *a* and *a*, and horizontal top and bottom *a'* and *a''*, respectively, and having each of its sides, *a'''* and *a'''*, inclined upward and inward, at an angle of about ten degrees from a vertical line. Each side *a'''* is provided with two or more horizontal series of openings, *a''''* and *a''''*, which openings are preferably arranged so that those of one series are directly above the spaces between those of the next lower series. Within each opening *a''''*, which is threaded, is secured one end of a pipe, B, the opposite end of which is closed, as seen in Fig. 2, and within each pipe is placed a three-arm diaphragm, C, that extends from the inner end to a point near the outer end of the same and divides its interior into three substantially equal passages, *b*, *b*, and *b*, which unite at their outer ends. The device thus constructed being provided with an inlet-opening, D, for steam, an outlet-opening, D', for the same, and an opening, E, for the escape of condensed steam, operates in the following-described manner: Upon admitting steam to the chamber A, its buoyancy will cause it to enter into and pass outward and upward through the upper compartments *b* and *b* of each pipe B, while the air contained within the same will pass inward and downward through the lower passages, and, by reason of its relative gravity, will pass to the lower portion of said chamber and escape through the outlet-opening D, the inclination of said pipes, as well as the division of their interiors into longitudinal compartments operating to effect the result named.

After the interior of the radiator has been completely filled with steam, the circulation described will still continue, as the temperature and bouyancy of the inward-flowing current of steam will exceed that of the outward-flowing current, and cause the result named to be constantly produced.

The inward and downward inclination of the pipes insures their entire freedom from water, while their nearly horizontal positions enables a larger proportion of air to be naturally brought into contact with their exteriors than would otherwise be practicable.

If desired, the pipes B and B may extend horizontally outward from the chamber A, but in such event the circulation will be less rapid and more water will collect in said pipes.

For a less expensive radiator the diaphragms C and C may be omitted from the pipes B and B, and the two upper and two lower rows of each side may be connected at their outer ends, as shown by the dotted lines of Fig. 2, in which event the steam would pass outward through the upper pipes of each connected series and inward through the lower pipes of the same.

Having thus fully set forth the nature and merits of my invention, what I claim as new is—

1. A steam-radiator composed of a chamber, A, provided at one or both sides with free-end tubes B and B, which extend laterally outward and upward, substantially as and for the purpose shown.

2. In a steam-radiator, the combination of a chamber, A, provided at one or both sides with laterally-extending free-end tubes B and B, which are each provided with a longitudinal circulating diaphragm, C, substantially as and for the purpose set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 14th day of February, 1876.

ALBERT L. IDE.

Witnesses:
SAM'L BENNETT,
HERMAN PRENK.