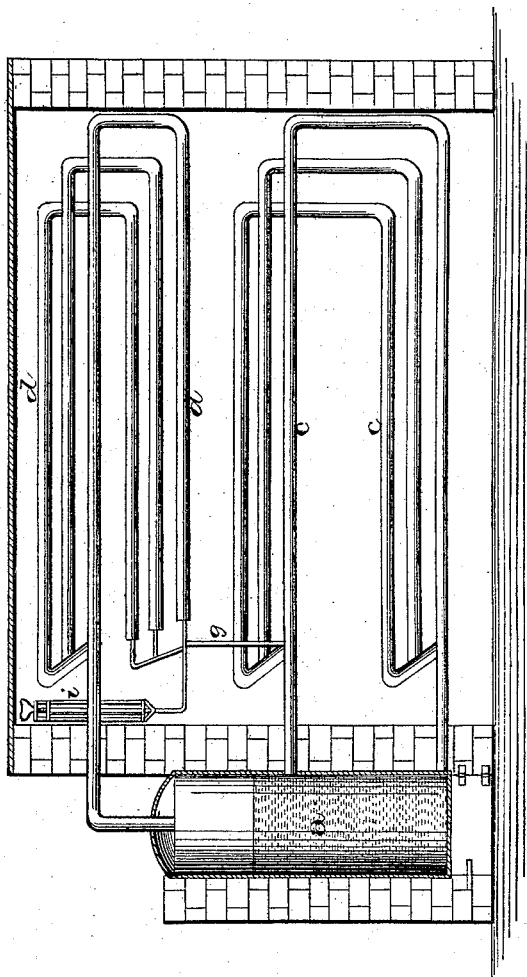


W. H. BUSH.

HEATER.

No. 184,226.

Patented Nov. 14, 1876.



WITNESSES.

*J. W. Garner*  
*F. M. Burnham*

INVENTOR.

*Wm. H. Bush*  
per  
*F. A. Lehmann*  
att'y.

# UNITED STATES PATENT OFFICE.

WILLIAM H. BUSH, OF NEW HAVEN, CONNECTICUT.

## IMPROVEMENT IN HEATERS.

Specification forming part of Letters Patent No. 184,226, dated November 14, 1876; application filed January 27, 1876.

*To all whom it may concern:*

Be it known that I, WILLIAM H. BUSH, of New Haven, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Heaters; 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 an improved system of heating buildings; and consists in combining, in a single apparatus, both a hot-water and a steam system of pipes, both of which are fed from the same boiler, whereby, with a small fire, a gentle heat may be generated, suited to the mild weather of fall and spring, and, also, by simply increasing the fire, a very great heat may be obtained to meet the requirements of the severest weather.

The accompanying drawings represent my invention.

*a* represents a boiler of any desired size, shape, or construction, to which are attached the two separate and distinct systems of pipes, *c* *d*, which are placed in a hot-air chamber, from which flues lead to the rooms to be warmed. The lower system *c* is placed slightly below the lowest level of the water in the boiler, and is connected to the boiler near the level of the water, and at the bottom of the boiler, as shown. As soon as a fire, however small, is started under the boiler, the warm water rises to the top, and at once begins to flow out into the pipes, and starts a circulation through them, and at last returns to the boiler. The external air, entering the hot-air chamber through a suitable flue placed below the lower system, is warmed, and rises upward, passing through the upper system to the flues for distribution. With an increased fire, the steam is generated, and fills the upper system, and imparts its heat to the upward current of air as it rises from the lower system.

While there is no steam, the automatic air-

valve *i* at the end of the steam system remains open, and said system performs the office of an expansion-pot to the hot-water system, thus securing in that a positive circulation. After steam rises and fills the upper system, the air-valve closes, and both systems will operate continuously and harmoniously. The water of condensation in the upper system is carried along in the direction of the steam, and falls into the lower system through pipe *g*. These two series of pipes are or may be separated from each other by a partition, so that the air is made to traverse the whole length of the hot-water pipes, when it rises to come in contact with the steam-pipes above, and is still further heated, and then conveyed away to any desired portion of the building. By this arrangement of pipes a double heating-surface is obtained where but a single one was obtained before. If desired, the hot-water pipes may be made to heat the lower part of the house, and the steam-pipes the upper part; but the arrangement of both systems in the cellar is preferable. In connection with the two systems of pipes here shown, an additional series of steam-pipes may be added for heating distant portions of the building, where the warm air cannot well be carried.

Having thus described my invention, I claim—

1. The boiler *a*, a series of hot-water pipes, *c*, placed below the level of the water in the boiler, and which pipes are connected at two places with the boiler, in combination with the steam-pipes *d*, substantially as shown.

2. The combination of the boiler *a*, water-pipes *c*, connected to the boiler as shown, steam-pipes *d*, and air-valve *i*, substantially as specified.

In testimony that I claim the foregoing I have hereunto set my hand this 21st day of January, 1876.

WM. H. BUSH.

Witnesses:

ROBT. M. BARR,  
F. A. LEHMANN.