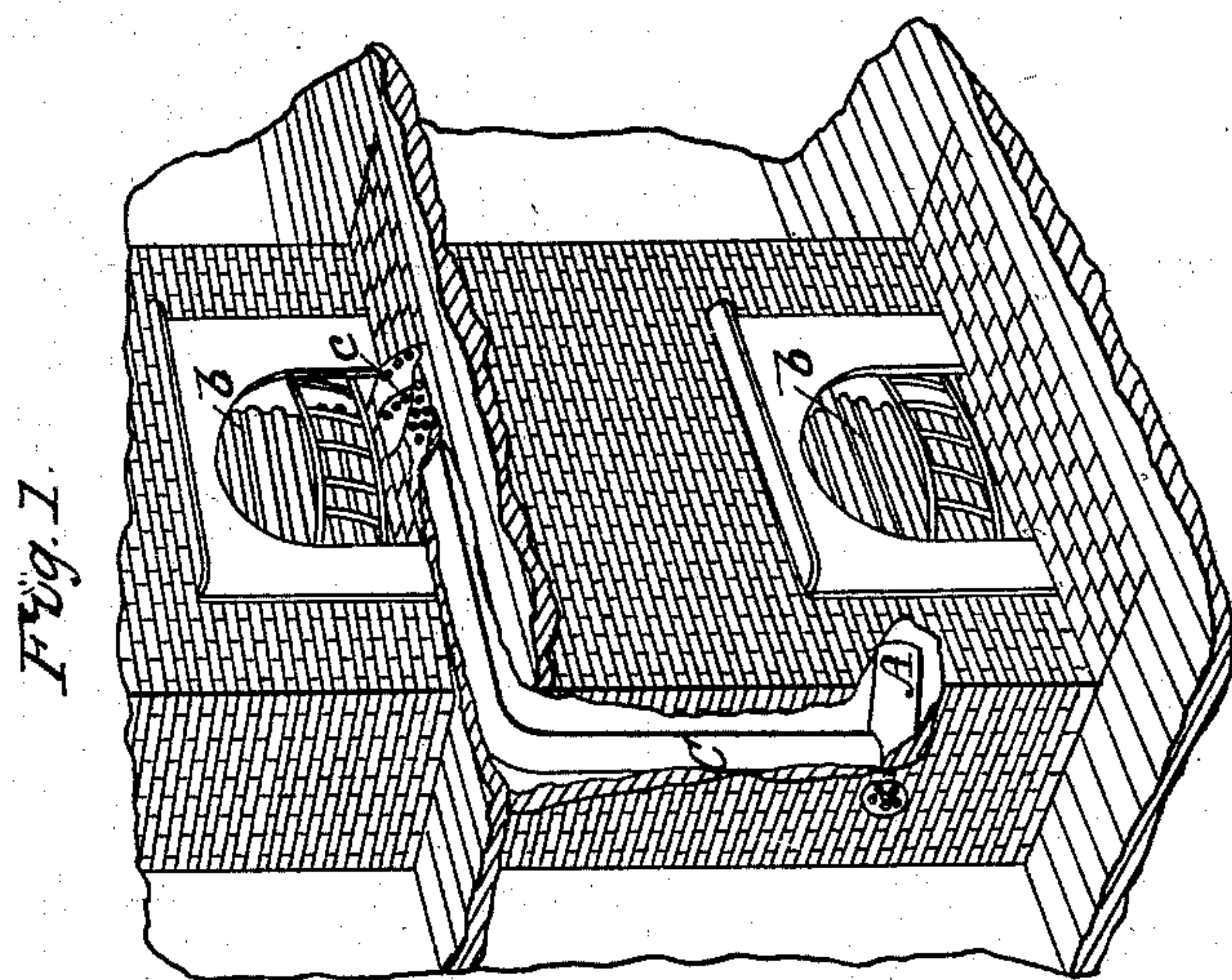
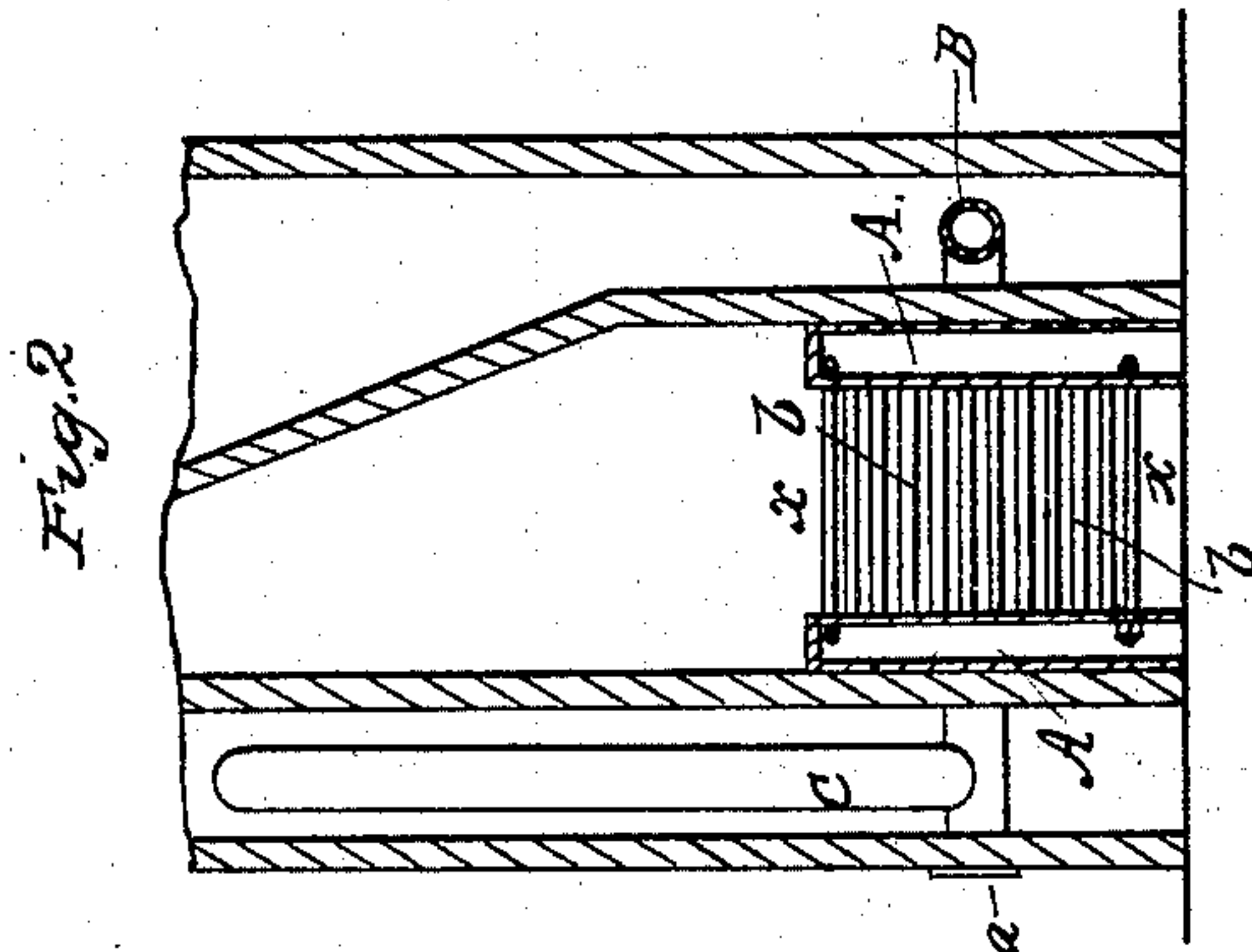


J. MILLER.

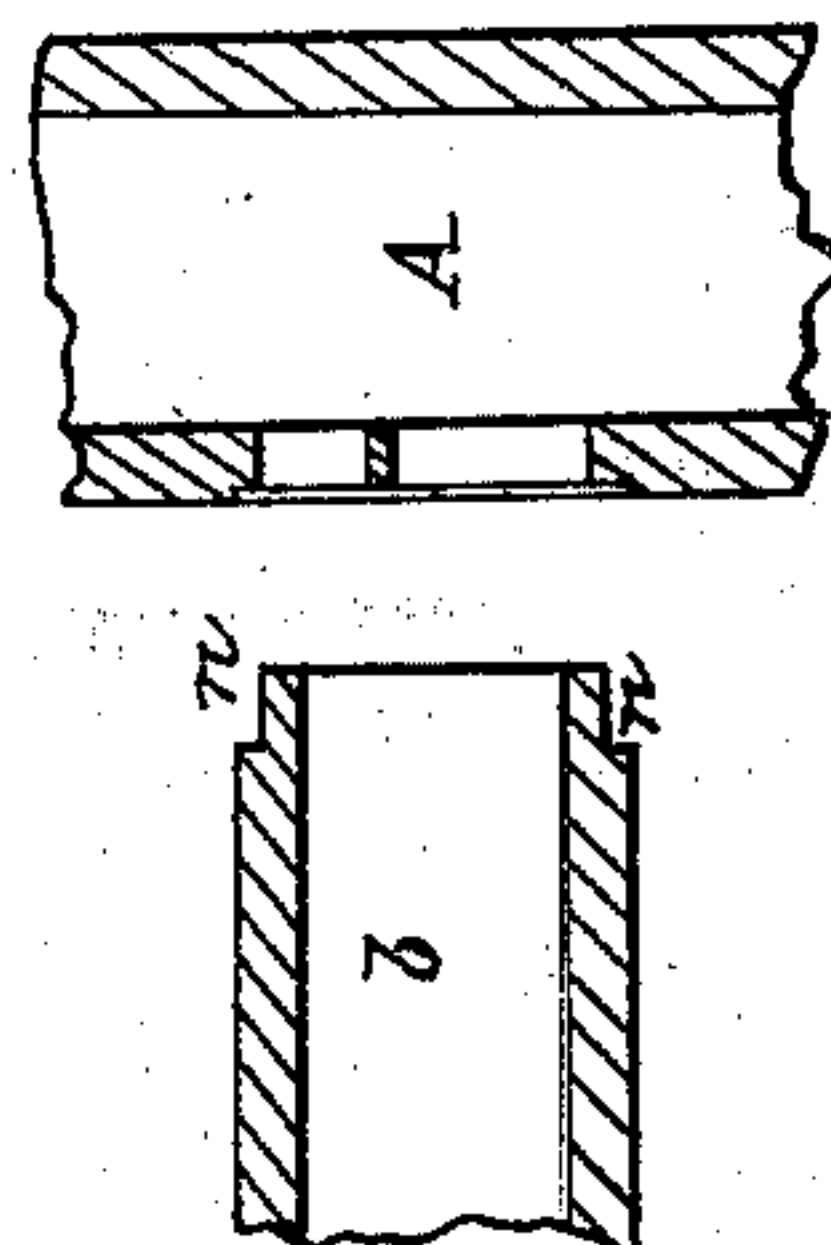
Grate.

No. 48,425.

Patented June 27, 1865.



*Fig. 3*



Witnesses  
Geo. H. M. Luff  
W. Randolph.

# UNITED STATES PATENT OFFICE.

JAMES MILLER, OF ST. LOUIS, MISSOURI.

## IMPROVEMENT IN GRATES.

Specification forming part of Letters Patent No. 48,425, dated June 27, 1865.

*To all whom it may concern:*

Be it known that I, JAMES MILLER, of St. Louis, in the county of St. Louis and State of Missouri, have invented a new and useful Improvement in Grates for Warming Buildings; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

Figure 1 is a sectional elevation in perspective, showing the grate in the lower story, with the hot-air pipe connecting it with the register in the second story. Fig. 2 is a sectional elevation, showing the cold-air pipe, the two air-chambers, which are connected with iron tubes which form the grate-bars, and the hot-air pipe. Fig. 3 is a sectional view, showing the manner of securing the grate-bars to the air chambers.

To enable those skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

I form the two side walls of the fire-place of two cast-iron air-chambers, A, a section of which is shown in Fig. 2. These two air-chambers are connected together by cylindrical cast-iron tubes *b*, which tubes form the back of the fire-place.

Leading from one of the air-chambers A is a cold-air pipe, B, the outer end of which should be outside of the building.

On the opposite side of the grate from the cold-air pipe B is a hot-air pipe, C, which connects the chamber A with any desired room in the building.

The hot-air pipe may lead to a register, *a*, in the same room in which the grate is located, in case it is a large room and one fire is insufficient to warm it, or it may conduct to a register, *c*, in a room in a distant portion of the building, but I prefer to conduct it to a regis-

ter, *c*, in the hearth of a fire-place immediately over that in which the grate which generates the heat is located.

The register *c* may be supplied with a radiator, *c'*, by adjusting which the heat may be localized or diffused at pleasure.

The cast-iron tubes *b*, which form the back of the grate, will have a square shoulder, *n*, turned on each end, as shown in Fig. 3. An orifice, *m*, is made in the side of the chamber A, which is so adjusted as to fit tightly up to the shoulder *n*. The two chambers A are fastened tight up to the shoulders *n* on the tubes *b* by means of the screw-bolts *x*.

The grate being put up in any ordinary fire-place, as described above, the cold air will pass through the pipe B into the chambers A and the tubes *b*, where it will become heated without any extra consumption of fuel for that purpose, and then it, in its heated state, may be distributed to any place where it is needed.

The pipes B and C may be located entirely within the brick walls of an ordinary chimney, where they will not disfigure any apartment.

The tubes *b* having the shoulders *n* fitted nicely up to the chambers A, it will be impossible for any gas to escape from the fire into the room warmed by the heated air.

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

The combination and arrangement of the horizontal tubular or hollow grate-bars *b b* with the lateral chambers A A, substantially in the manner and for the purpose herein set forth.

JAMES MILLER.

Witnesses:

GEORGE P. HERTHEL, Jr.,  
M. RANDOLPH.