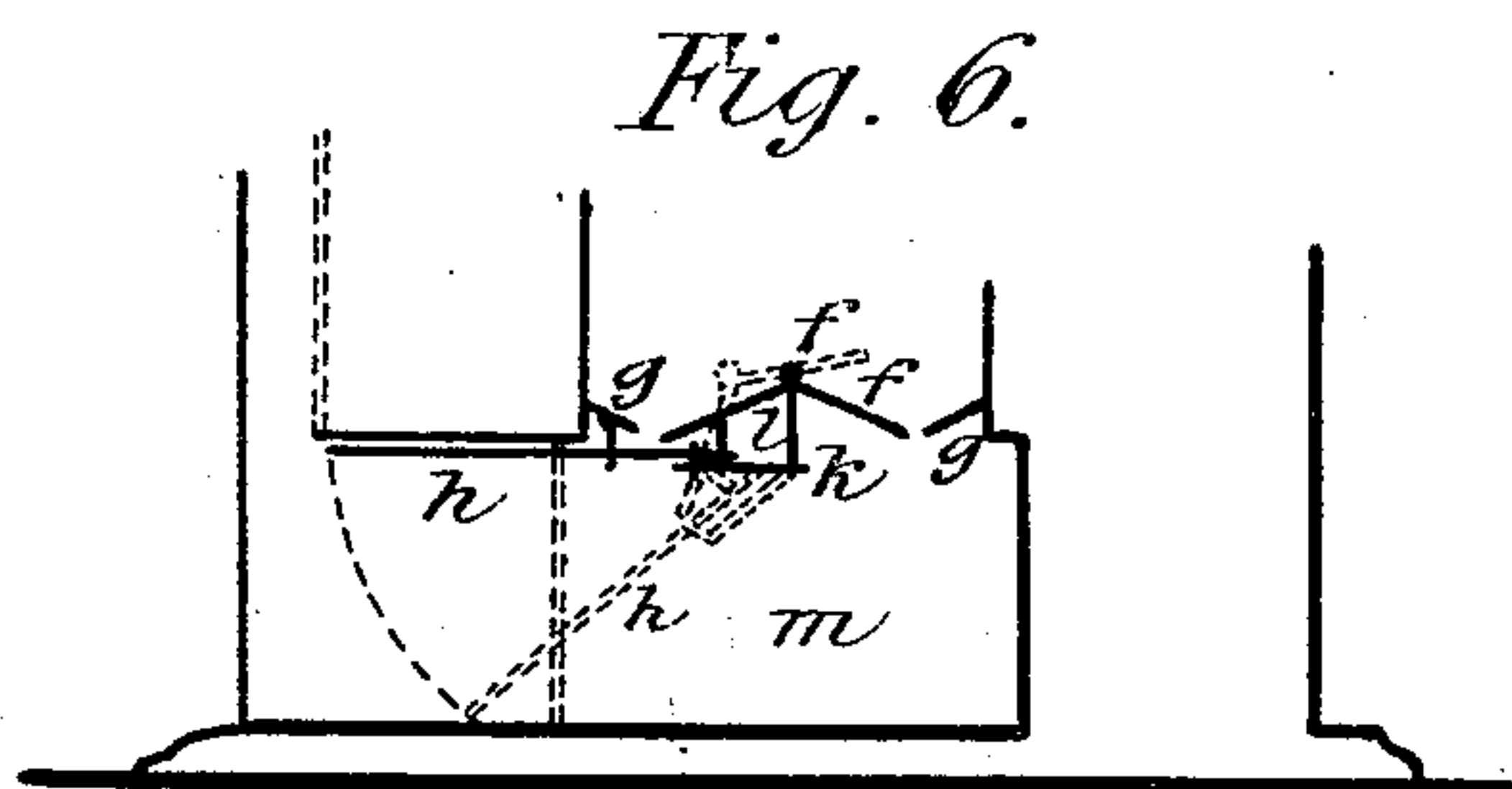


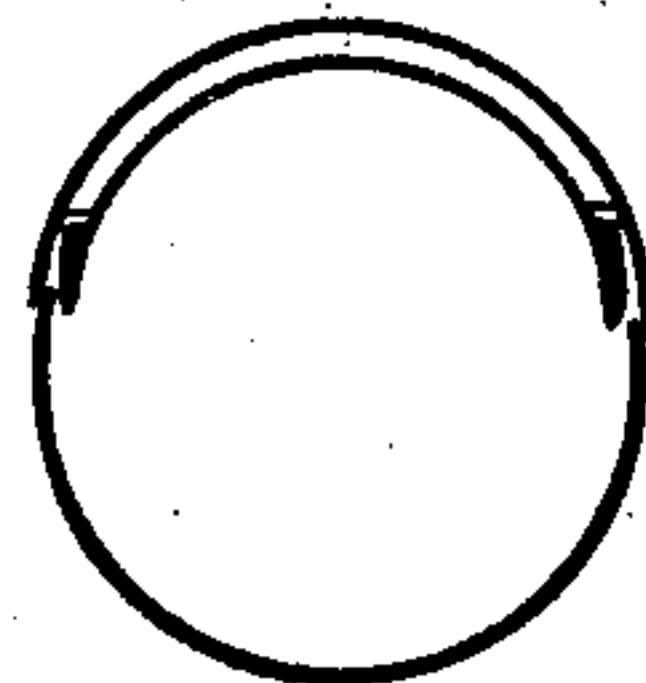
M. A. THAYER.  
Hot-Air Furnace.

No. 103,390.

Patented May 24, 1870.



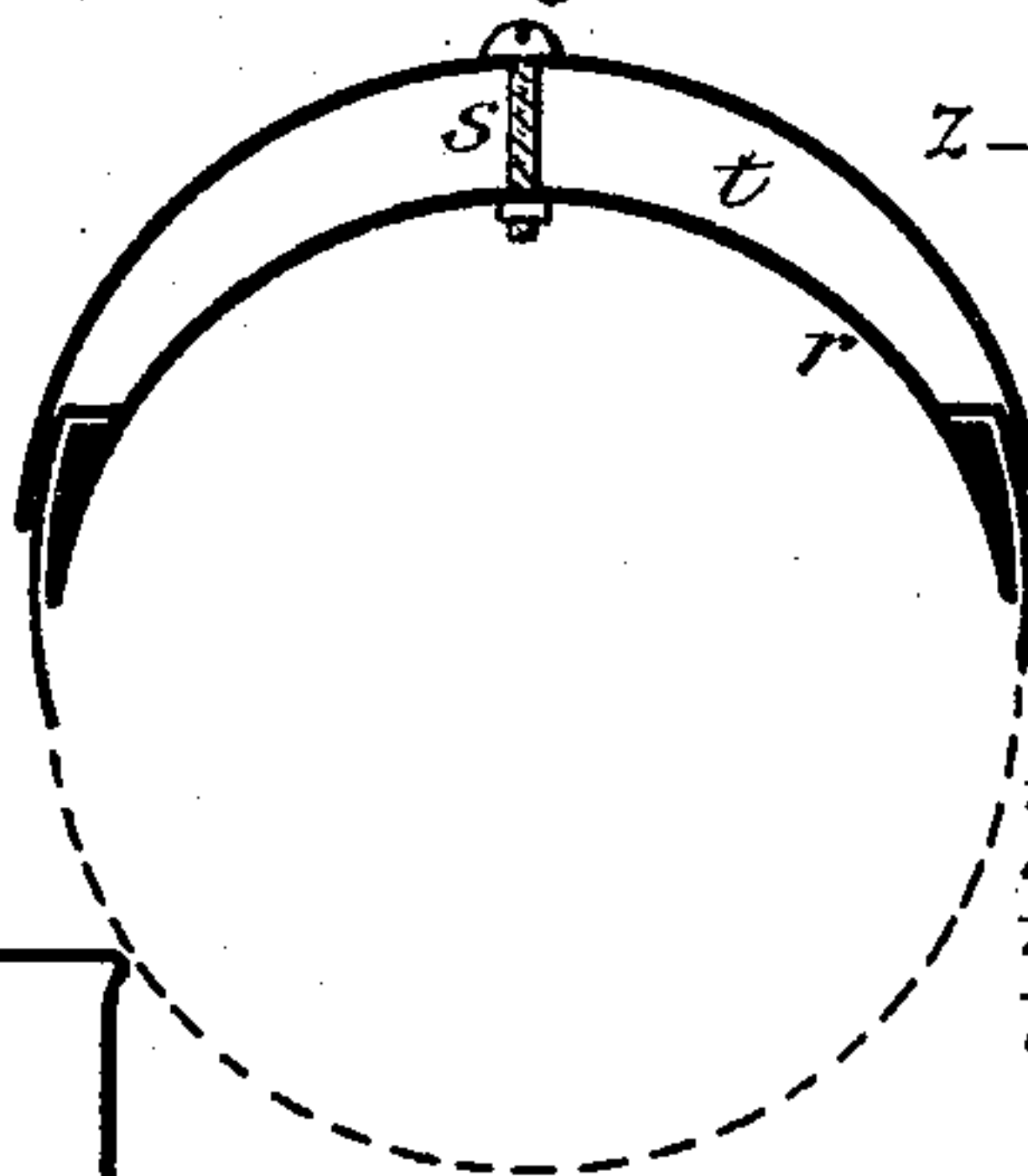
*Fig. 5.*



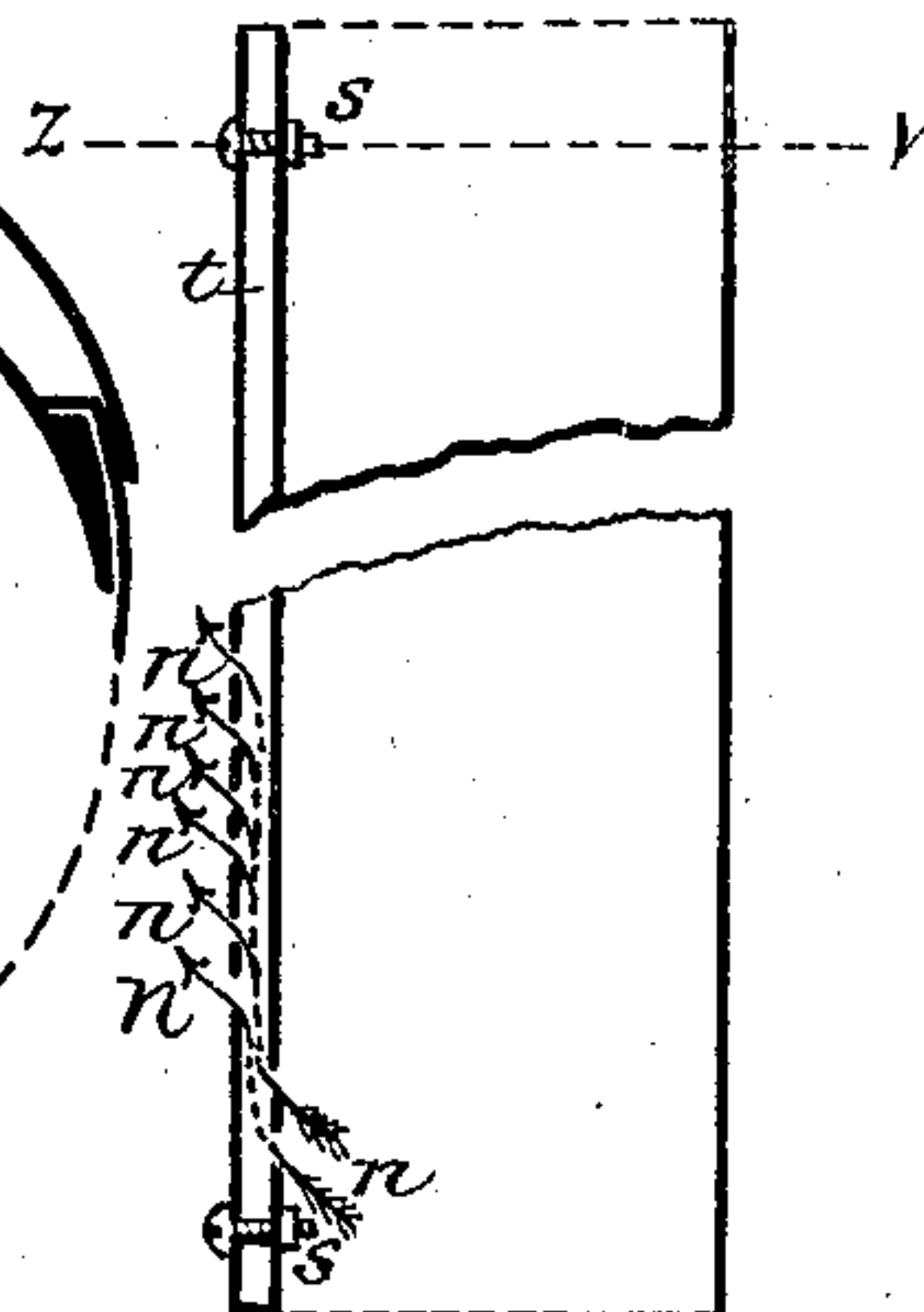
*Fig. 4.*



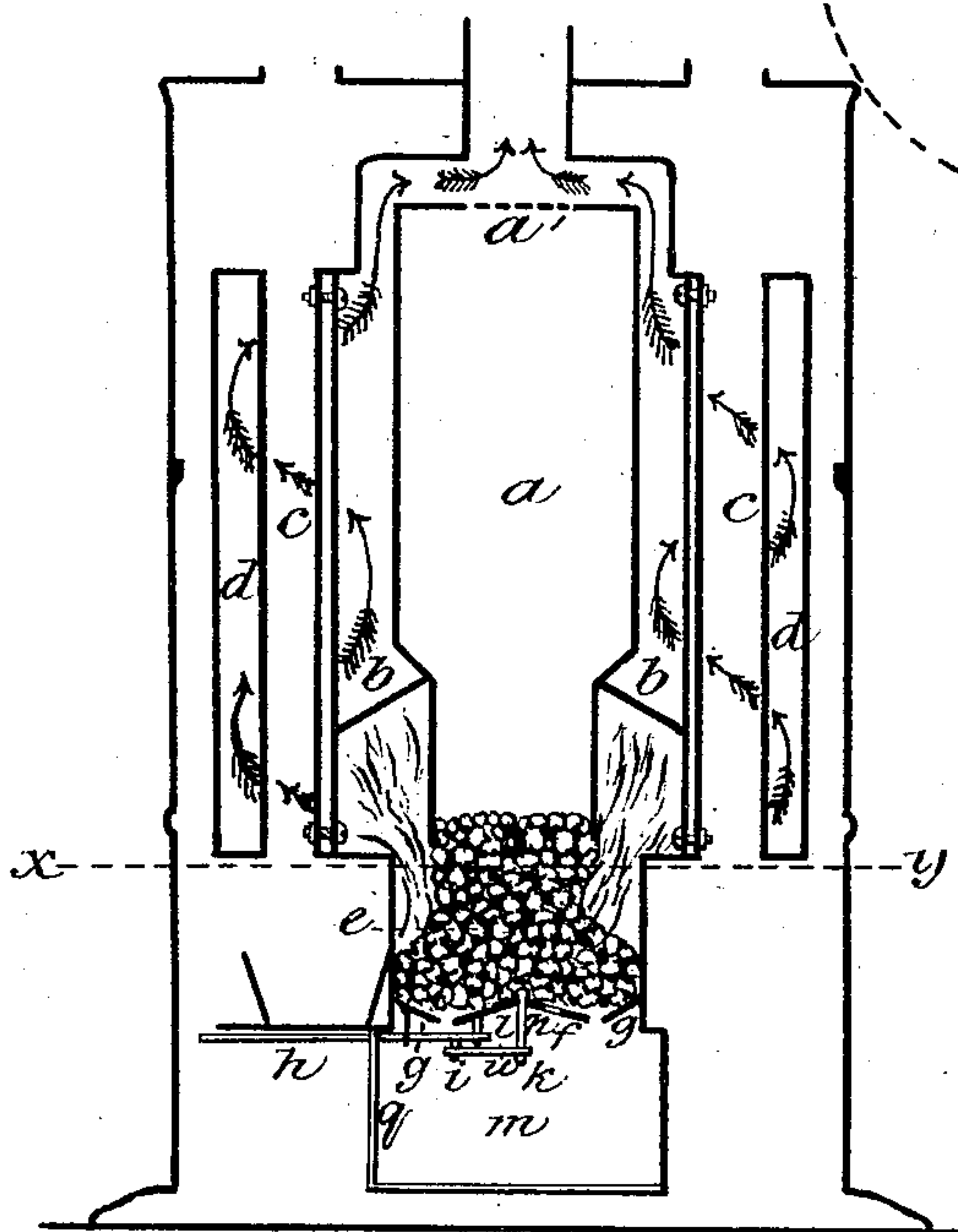
*Fig. 7.*



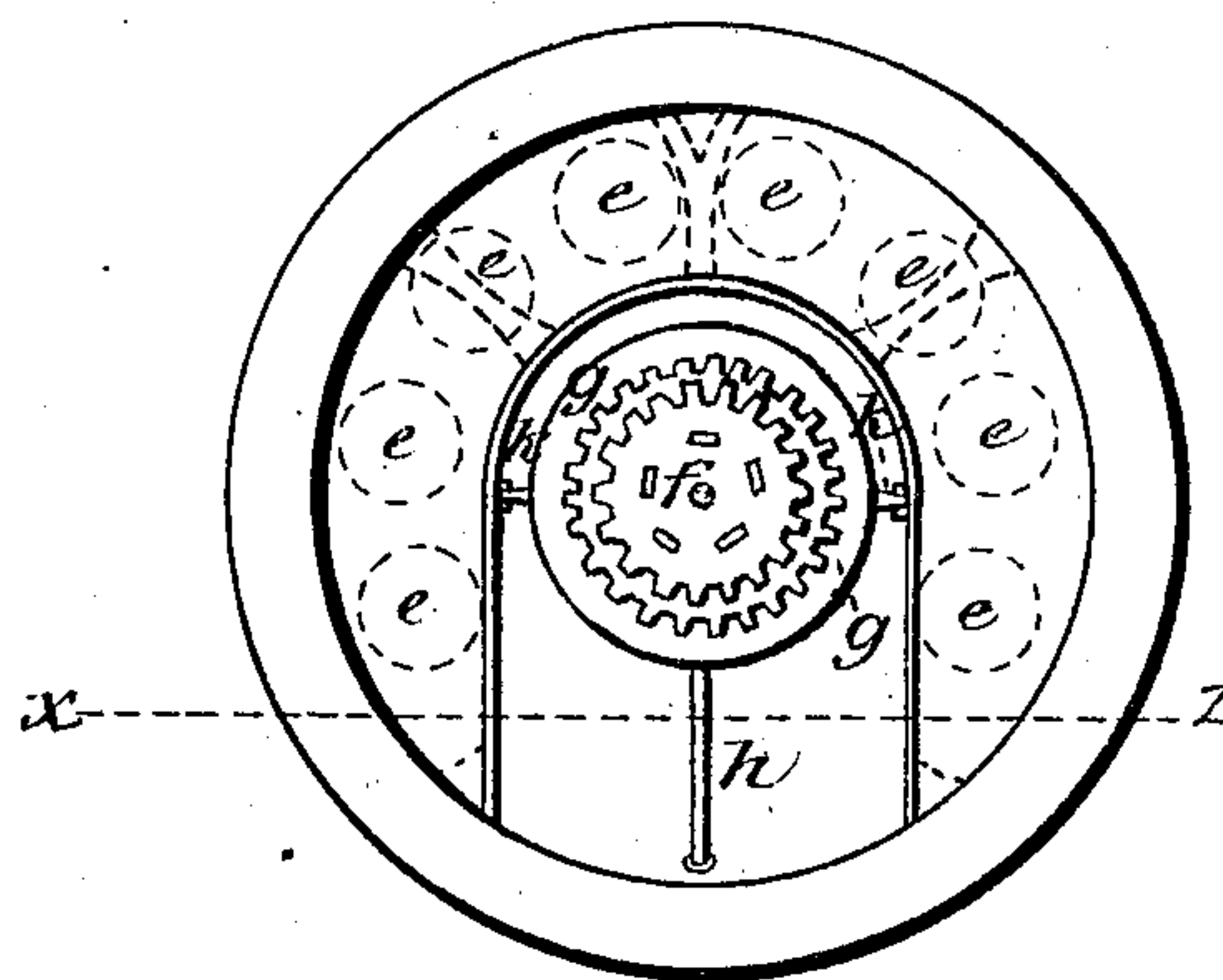
*Fig. 3.*



*Fig. 1.*



*Fig. 2.*



Witnesses:

James Howles  
Archibald Storey

Inventor:

Moses A. Thayer



# United States Patent Office.

MOSES A. THAYER, OF CHICAGO, ILLINOIS.

Letters Patent No. 103,390, dated May 24, 1870.

## HOT-AIR FURNACE.

The Schedule referred to in these Letters Patent and making part of the same

### To whom it may concern :

Be it known that I, MOSES A. THAYER, of the city of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Hot-Air Furnaces; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings and to the figures and letters of reference marked thereon, forming a part of this specification, in which—

Figure 1 is a vertical section.

Figure 2 is a view through the line *x y* of fig. 1.

Figure 3 is a vertical section of one of the hot-air tubes *c c c*, &c.

Figure 4 is a view through the line *x z* of fig. 2.

Figure 5 is an end view of one of the hot-air tubes *c c c*, &c.

Figure 6 is a vertical sectional view showing the fire-grate and the method of dumping it.

Figure 7 is an enlarged view of one of the hot-air tubes through *z v* of fig. 3.

The nature and object of my invention is to construct a hot-air furnace in as cheap and practical a way as possible, and one that will turn to a practical account as much of the heat as possible generated from the fuel.

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

Similar letters of reference in the different drawings refer to similar parts.

In fig. 1 will be seen the internal arrangement of my furnace, in which it will be observed that my invention is of that class called "base-burners."

*a* is the coal-chamber, wherein is placed the coal for consumption.

*c c c* are the hot-air tubes.

*b* is a deflector extending from the coal-chamber *a* to the tubes *c c*.

*d* is the space around the air-tubes or pipes *c c c*.

*m* is the ash-pit.

*f* is an inner circular grate, provided with an edged or toothed surface, as seen in fig. 2.

*g* is an outer grate surrounding the inner grate *f*, as seen in fig. 2, with its inner edge toothed or notched similar to the outer edge of the inner circular grate.

*w* is a pivot supporting the inner plate *f* and resting upon the revolving bar *k k*, fig. 2.

*h* is a lever, resting and working upon the fulcrum *i*, which fulcrum rests upon an arm, *u*, extending from the revolving bar *k k*.

*l* is a pin extending down from the inner circular grate *f* and through a slot in the lever *h*.

*q* are two pins extending down from the outer grate *g* and on each side of the lever *h*.

*a'* are perforations through the top of the coal-chamber *a*.

The tubes *c c c* are made in three pieces. That part next to the fire is made of two walls, with a space, *t*, between them. These walls are made of cast-iron, and the rest of the tube is made of sheet-iron.

The inner wall, *r*, fig. 7, is made of cast-iron, and with a shoulder on each edge. The sheet-iron side is made to lap over these shoulders, and the outer wall is then placed over these two, thus joined, and the whole is fastened by means of the screw and nut *s s*.

At the base of the inner wall, fig. 3, are one or more holes, *p*, leading into the space between these two walls. In the outer wall, and above the last-mentioned holes *p*, is a series of holes, *n n*, which lead from this space between the walls into the space occupied by the ascending fire and heat.

*o*, fig. 4, is a support for the lever *h*.

The operation of my invention is as follows:

Coal is fed into the coal-chamber *a* through a side-door, which falls down upon the grate.

The grate is made of two pieces, both of which are circular, one of which works within the other. The inner part, *f*, is made with a declining surface from the central point upon which it revolves. The outer part, *g*, is made with a declining surface from its outer to its inner side. The edges of the two parts of the grate coming near together are provided with teeth or notches.

On moving the handle *h* from right to left, or *vice versa*, the two parts of the grate will be made to revolve in opposite directions. As the lever *h* revolves upon the fixed point *i*, and the points of contact with the two parts of the grate, through the pins *q* and *l*, are on either side of the fulcrum *i*.

When moving this grate in the manner described, the ashes and cinders are thrown down onto the lowest part of the grate, where they are submitted to the action of the two toothed edges of the grate, and a thorough sifting takes place.

To dump the grate, the lever *m* is slipped off the support *o*, fig. 4, when the inner part *f* of the grate is turned partially over, as shown by the dotted lines in fig. 6, the bar *k*, which supports the inner part *f* of the grate turns upon its supports, and thus allows the inner part to be dumped, the outer part *g* remaining in a horizontal position.

Air passes into the space between the two walls of the pipe *c c* through the holes *p*, and is distributed into the flame and heat through the holes *n n*, as indicated by the arrows in fig. 3.

The flame and heat from the fuel pass up and around the tubes *c c c*, thus heating them, and thus keeping a current of hot air constantly passing up through the distributing pipes.

The deflector *b*, surrounding the coal-chamber *a* and extending to the air-tubes *c c c*, forces the flame and heat out to and around the air-tubes *c c*, thus utilizing



much of the heat that otherwise would pass directly up the chimney.

The perforations *a* in the top of the coal-chamber allow all gas generated within the coal-chamber, and that does not pass down and out at the side, to escape directly into the smoke-flue, and thus does not come into the room when the door is opened for feeding the furnace.

The space *t* between the two walls of the tube *c c* is closed at the upper and lower ends.

I do not confine myself to the above-described form of a furnace in the use of my grate herein described, but reserve the right to use it in any kind of a stove that it is adapted to.

The deflector *b*, made as it is to surround the coal-chamber *a*, and to extend to the air-tube *c*, serves also to support and sustain the coal-chamber, thus serving the double purpose of causing the heat and flame from the fuel to pass around the air-tubes *c* and of supporting the coal-chamber *a*.

The perforations in the top of the coal-chamber admit of the gas unconsumed to continuously pass into the smoke-flue, where it is consumed, but the flame

does not pass down through the perforations, and thus any explosion from the confined gas in the coal-chamber is obviated.

Having thus described my invention,

What I claim as new, and desire to secure by Letters Patent, is—

1. Constructing and arranging a grate for a stove or furnace in two parts, so that, by the action of a single lever, the two parts of the grate will move in opposite directions.

2. Combining and arranging the two parts of the grate, *f* and *g*, with the lever *h*, substantially as and for the purpose described.

3. Constructing and arranging the two parts *f* and *g* of the grate with an inclined surface, substantially as shown, and for the purpose described.

4. Combining the coal-chamber *a*, deflector *b*, and tubes *c c*, substantially as and for the purpose described.

MOSES A. THAYER.

Witnesses:

JAS. A. COWLES,  
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