

T. JAMES.
Furnace-Grate.

No. 196,905.

Patented Nov. 6, 1877.

Fig. 2.

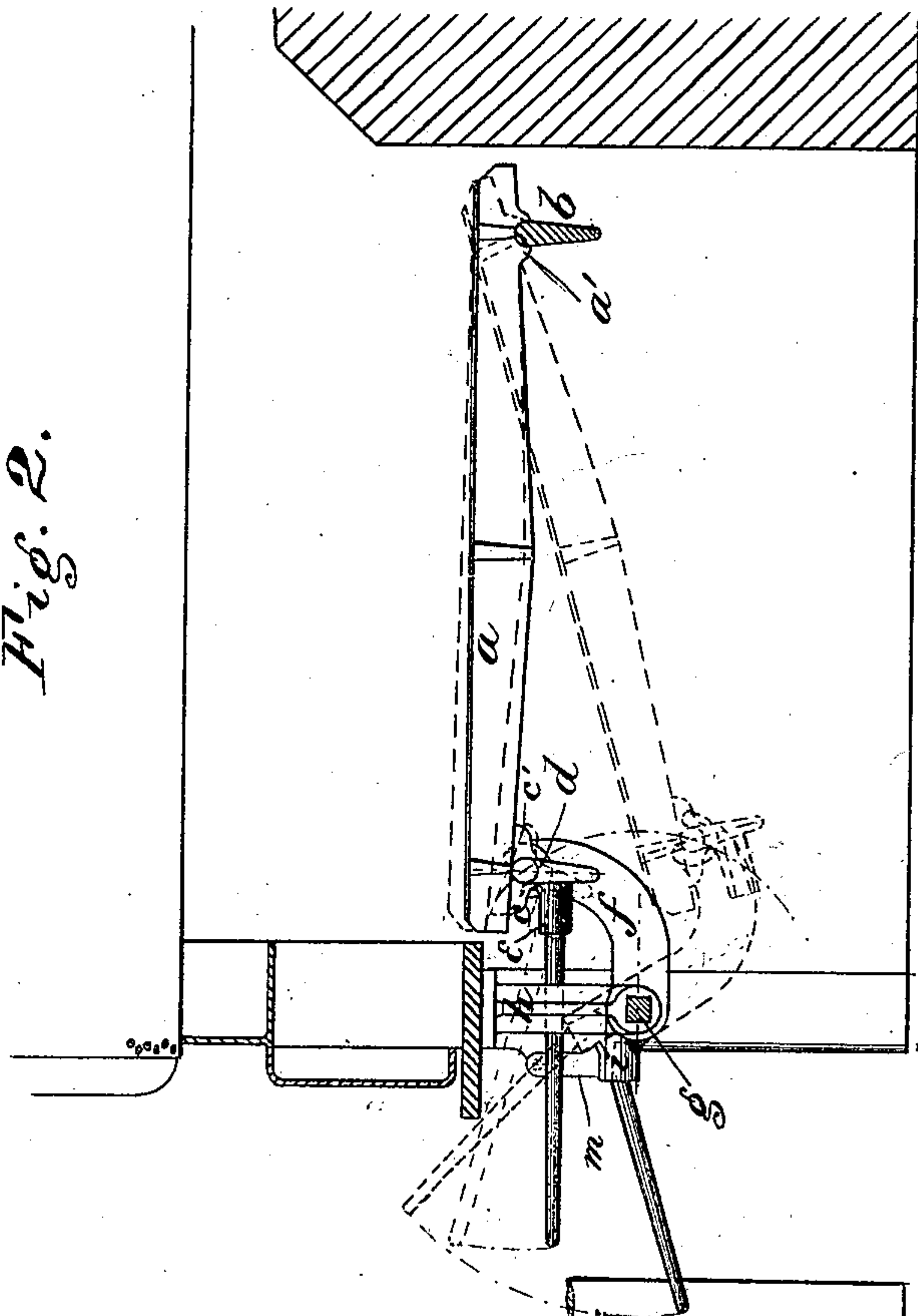


Fig. 3.

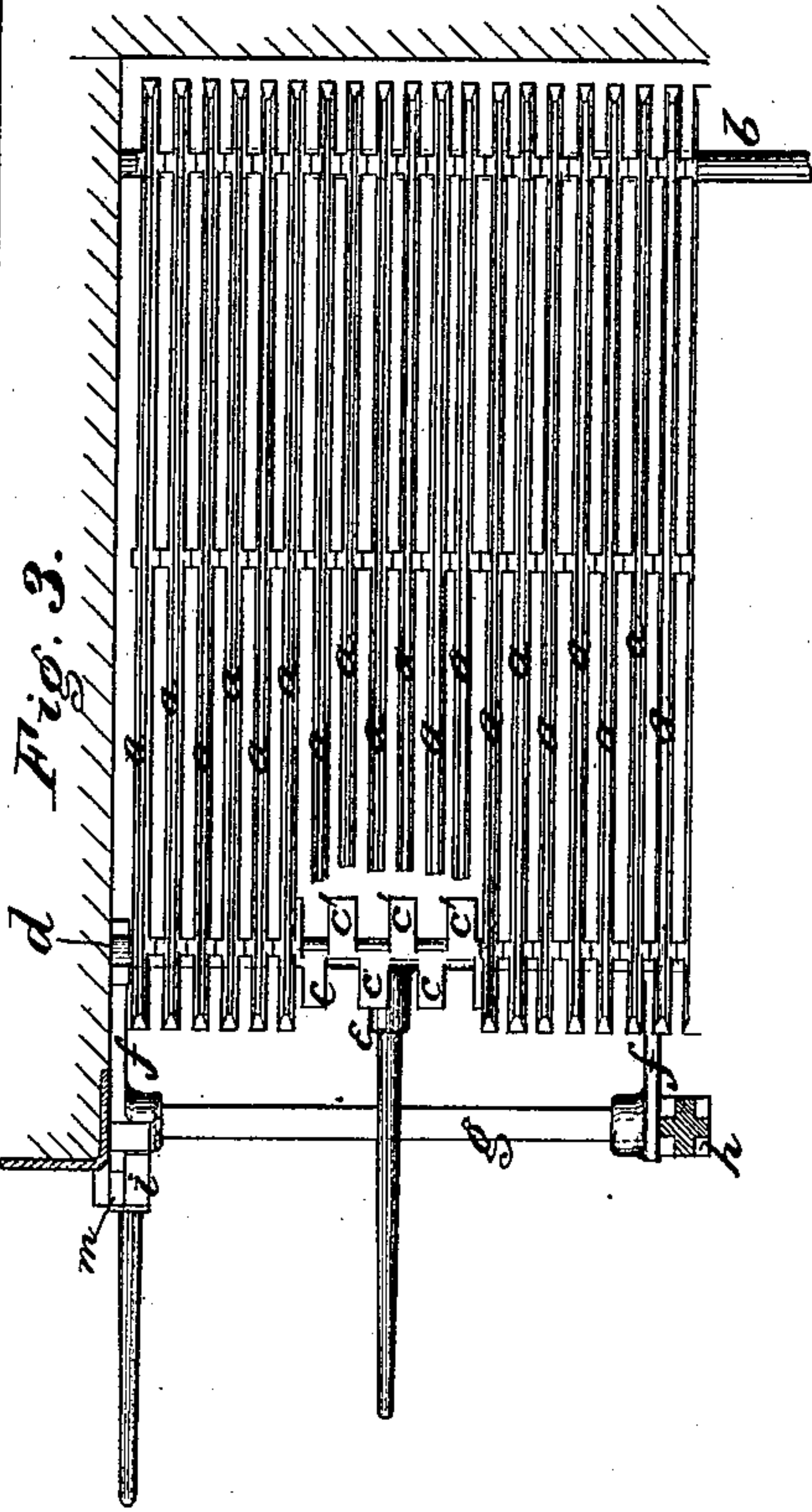
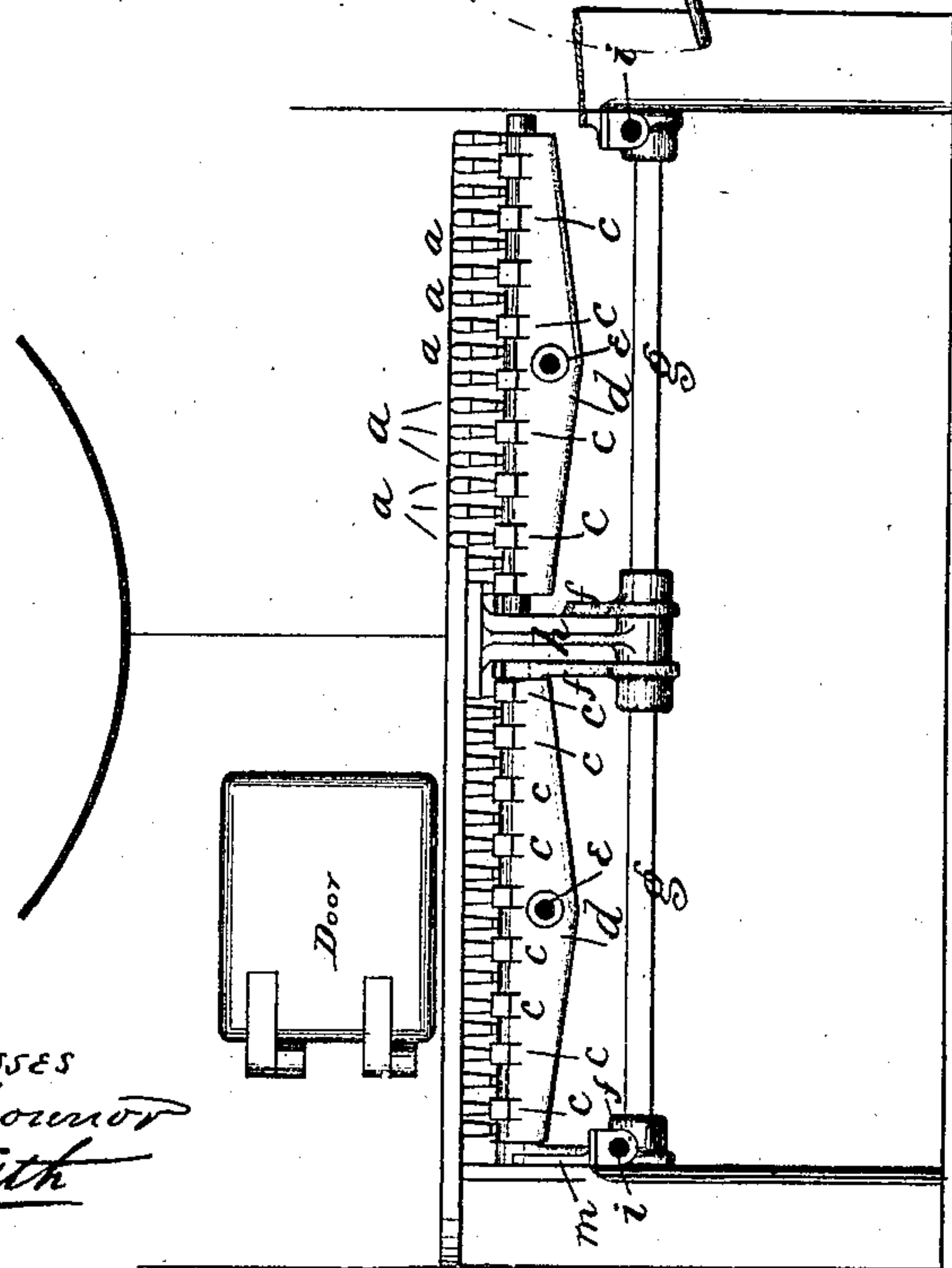
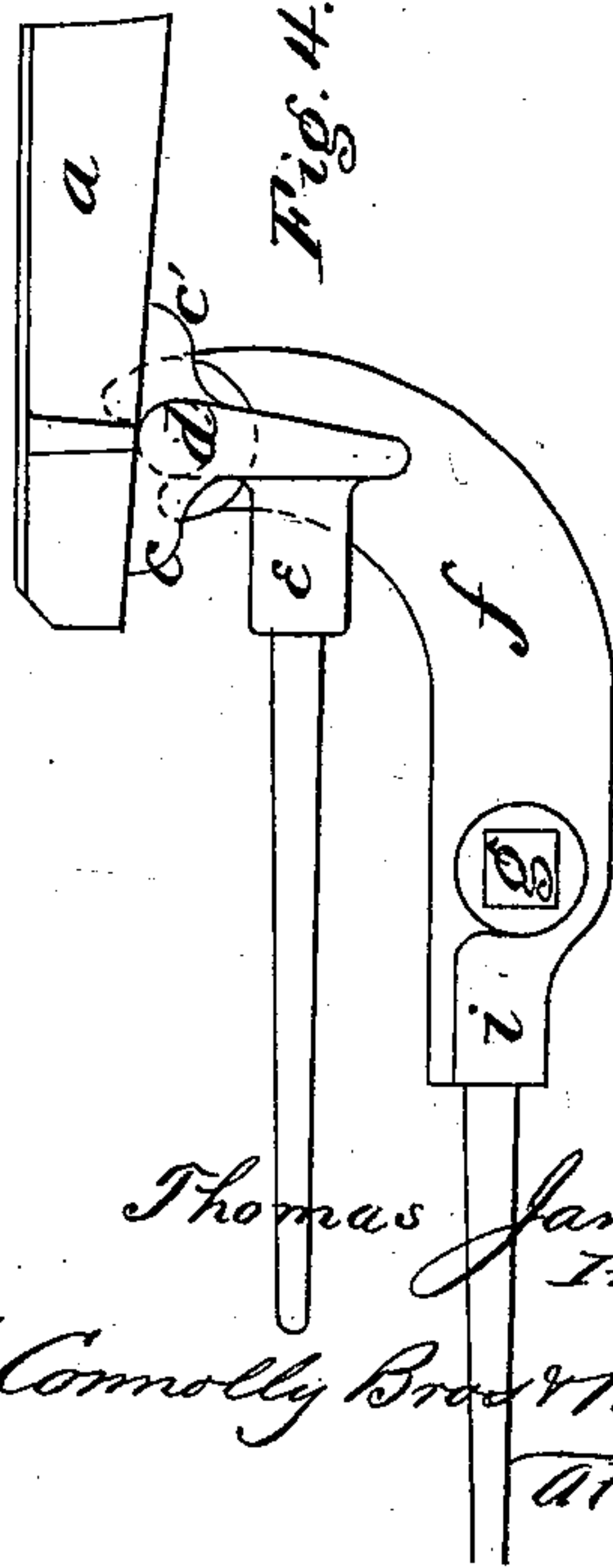


Fig. 1



Witnesses
K. C. Brown
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Fig. 4.



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UNITED STATES PATENT OFFICE.

THOMAS JAMES, OF BRADDOCK, PENNSYLVANIA.

IMPROVEMENT IN FURNACE-GRATES.

Specification forming part of Letters Patent No. **196,905**, dated November 6, 1877; application filed September 8, 1877.

To all whom it may concern:

Be it known that I, THOMAS JAMES, of Braddock, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Furnace-Grates; 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, in which—

Figure 1 is a front-end view with part of furnace-front removed. Fig. 2 is a side view with side wall of furnace removed. Fig. 3 is a plan view of one-half the grate. Fig. 4 is an enlarged elevation of the working parts.

This invention has relation to furnace-grates; and it consists in the novel construction, combination, and arrangement of parts whereby the grate-bars extending from front to rear of furnace may be alternately raised and lowered or tilted to agitate the fuel, and altogether or a portion of them lowered below the level of the bed-plate to discharge the contents of the grate into the ash-pit, as hereinafter more fully described and claimed.

I divide the grate-bars *a* into two portions, for a purpose hereinafter to be described. All the bars have a retaining-lug, *a'*, near their back ends, and rest by that means upon a cross-bar, *b*, as shown. The front ends of the bars *a* rest upon the alternating studs *c c'*, projecting horizontally from the rock-shafts *d*, one under each half of the grate, and the shafts *d* are at their ends journaled in bearings, as hereinafter shown. They are provided with sockets *e* for the insertion of a lever or poker, by an up-and-down motion of which the grate-bars *a* are alternately oscillated at their front ends by the action of the alternating studs *c c'*. This agitates the fire, and shakes out the fine ash and consumed fuel, but does it only at the forward or front end of the grate. This distinction is important, because it is essential to the proper combustion of the fuel that the rear portion of the fire be not materially disturbed; for if it be, the packed character of the fuel there would be changed, air admitted just where it is not wanted, and the result would be insufficient combustion and loss

of heating power. Thus the fire may be raked without opening the doors of the furnace, and so a uniform temperature may be preserved inside. All this is accomplished, too, without special construction of the grate-bars, as the rock-shaft works on a plain-surfaced bar, and the retaining-lugs at the rear are generally found on grate-bars, so that the rock-shaft may be adapted to almost any style of bar.

The ends of the rock-shafts *d* are journaled or loosely set in the upper ends of the upwardly-curved arms *f*, each pair of which is rigidly connected by the rod *g*, whose ends journal in suitable bearings—in this case at their inner ends in a bracket, *h*, depending from the furnace bed-plate, and at their outer ends in side plates fixed to the ash-pit walls.

One of each pair of arms *f* is furnished with a socket, *i*, for the insertion of a lever or poker. To support the whole in position, I use a gravitating-latch, *m*, which normally falls on the sockets *i*, and prevents all movement.

When the grate needs cleaning out, the lever is inserted in the socket *i*, the latch *m* pushed out of position, and the arms *f* allowed to drop a short distance, say fifty degrees, until the lever meets the bed-plate of the furnace. Then, the rock-shaft having lowered, also, and with it the bars, an opening is left between the forward portion of the grate and the bed-plate, and through this opening, aided by the forward inclination of the grate, a few moments suffice for thorough cleaning. The doors not being opened, and the coals being thrown down into the ash-pit, the fireman is not exposed to such intense heat as he would otherwise be. By dividing the grate-bars into sections, each capable of operation by itself, the whole furnace may be cleaned in portions without putting out the whole fire and allowing the boilers to get almost cold. This is of great importance in large establishments, where economy of time, labor, and fuel is to be effected at every possible point.

I claim as my invention—

1. A furnace-grate composed of independent and removable bars *a*, sustained at their front ends upon a vertically-movable support, and resting upon a rock bar or bars having alternating studs on opposite sides, in combination with the bed-plates of a furnace, sub-

stantially as described, whereby the grate may be lowered at its front end below the level of the bed-plate, so as to deliver into the ash-pit.

2. In combination with the rock-shaft *d*, supporting the front ends of the grate-bars, and constituting bearings for said shaft, the arms *f*, rigidly connected by rod *g*, and journaled, as shown, whereby the forward end of the grate, or a section thereof, may be lowered.

3. The combination of the grate-bars *a* with a forward support, comprising a pivoted or hinged frame, by which the grate or a portion

thereof may be lowered below the level of the bed-plate, and a rock bar or bars having alternating studs on opposite sides, by which said bars may be alternately raised and lowered to agitate the fire, substantially as described.

In testimony that I claim the foregoing I have hereunto set my hand this 24th day of August, 1877.

THOMAS JAMES.

Witnesses:

W. DICKSON WEBB,
THOS. J. MCTIGHE.