

M. D. WELLMAN.

Fireplace.

No. 64,465.

Patented May 7, 1867.

Fig. 1

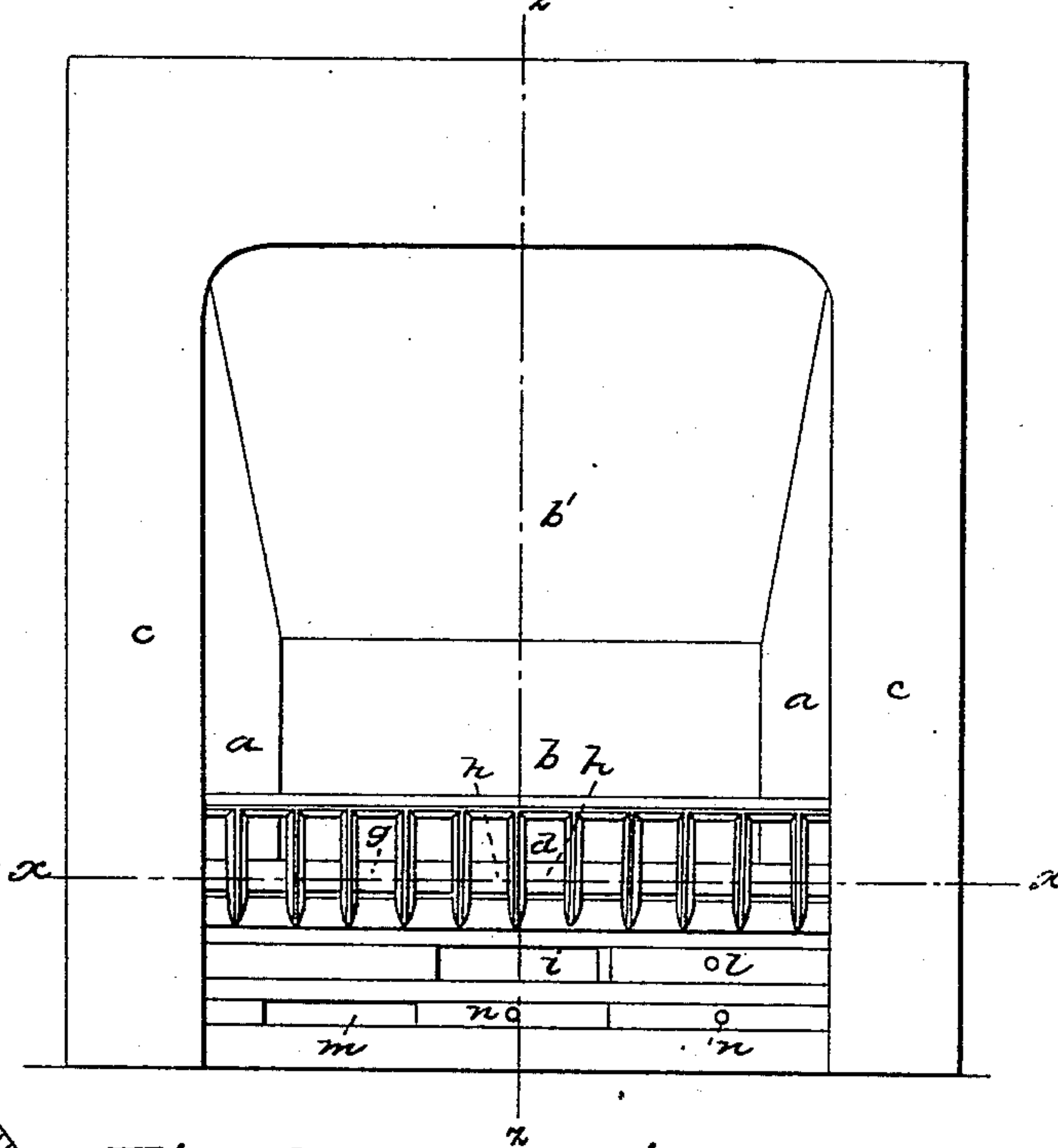


Fig. 2

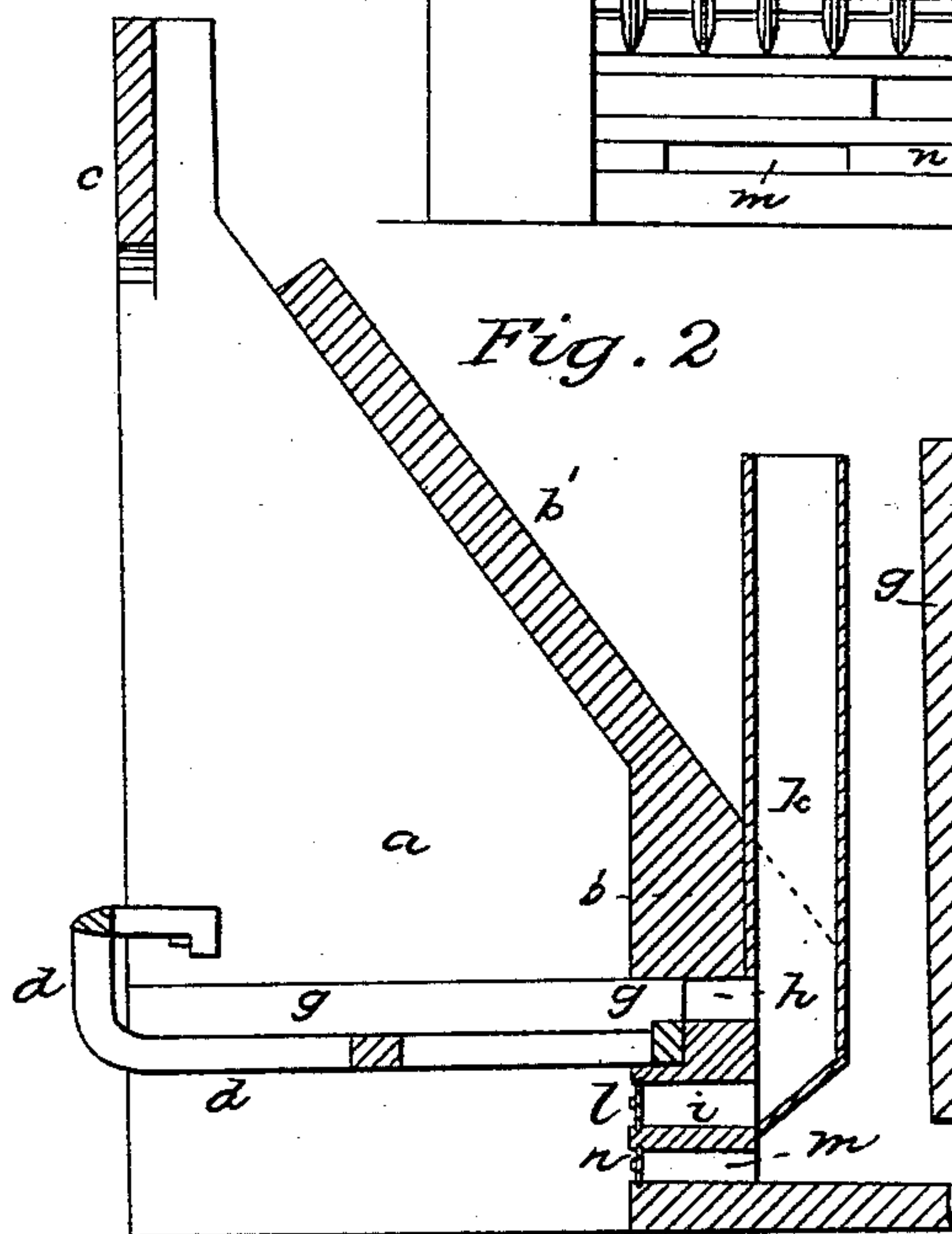
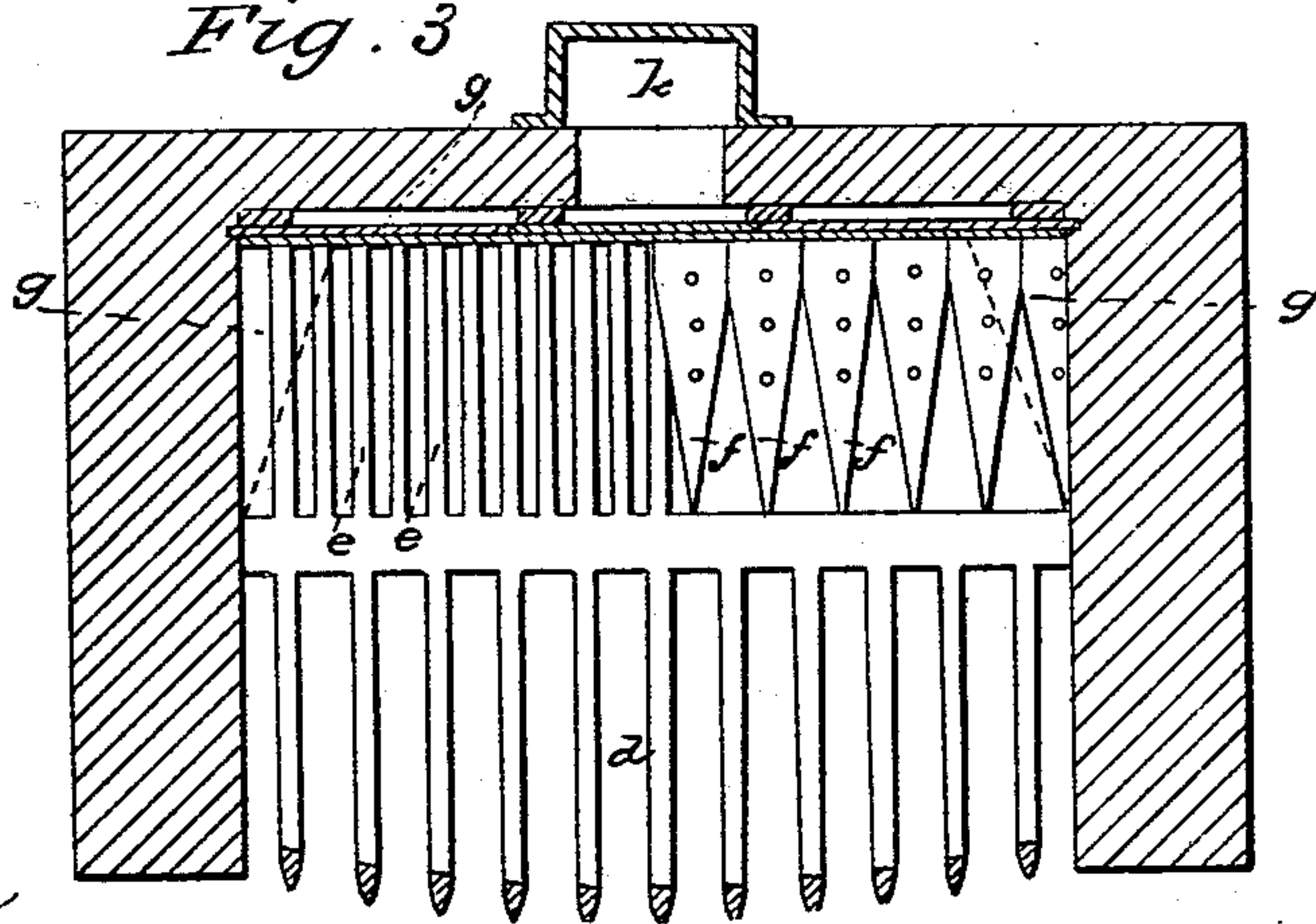


Fig. 3



Witnesses:

Allan C. Bakewell.
W. D. Lewis

Inventor:

M. D. Wellman
by his attorney
W. D. Bakewell.

United States Patent Office.

MARSHALL D. WELLMAN, OF PITTSBURG, PENNSYLVANIA.

Letters Patent No. 64,465, dated May 7, 1867.

FIRE-PLACE.

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

TO ALL WHOM IT MAY CONCERN:

Be it known that I, MARSHALL D. WELLMAN, of the city of Pittsburg, in the county of Alleghany, and State of Pennsylvania, have invented a new and useful Improvement in Fire-Places; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawing, in which—

Figure 1 is a front view of a fire-place constructed with my improvements.

Figure 2 is a vertical cross-section through the line *z z*, fig. 1.

Figure 3 is a horizontal section through the line *x x*, fig. 1.

In the several figures like letters of reference denote similar parts.

My improved fire-place is designed especially for the burning of bituminous coal, which, when first heated and ignited gives out a very large amount of hydrogen gas and smoke, the greater portion of which, in fire-places and grates of ordinary construction, is utterly wasted, passing up the chimney without ignition. Some of the improvements which I have introduced into my improved fire-place and grate are applicable also to other descriptions of fires, such as cooking stoves and boiler furnaces; but I shall first describe the fire-place and grate shown in the drawing, and explain my invention as illustrated thereby. As before stated, a great source of loss in the consumption of bituminous coal, especially in open fire-places, arises from the large amount of fuel which escapes in a volatile form without undergoing combustion. The carbon and hydrogen thus wasted would ignite and give out a greater amount of heat than the live coals in the grate, if they were supplied with the requisite amount of oxygen at a point where the heat is sufficient to cause combustion. If a perfect combustion could be obtained, there would, of course, be no smoke allowed to escape up the chimney, and all that fuel would be utilized and saved. Another important matter in the use of bituminous coal as fuel in open fire-places is to regulate the burning of the fire so as to give out a greater or less degree of heat as may be required, and at the same time not to effect this object by allowing the heat to escape without warming the apartment, but to prevent the creation of heat by retarding the combustion of the fuel. In fire-places where there is a strong draught up the chimney, the hot-air from the apartment is too rapidly carried off in that direction, and with it the heat generated by the fire; if this draught is checked, a great deal of fine dust from the ashes of the coal passes into the room and lights on the mantel-piece, carpet, and furniture, which is a great source of annoyance and discomfort.

My invention is designed to cure these defects in open fire-places and grates, and to secure a ready and speedy control of the fire without the great waste of fuel which usually takes place.

To enable others skilled in the art to make use of my invention, I will proceed to describe my improvements.

In the accompanying drawings, *a a* are the side walls; *b b'* the back wall of my fire-place; *c* is the fire-front. The side walls *a a* are not at right angles to the fire-front, but converge as they recede from the front so as to reflect the heat from their surfaces into the room. The back wall *b* is perpendicular to about the height at which the coal is designed to lie in the fire-basket or grate *d*, and thence slopes upwards, (as *b'*,) at an angle of about forty-five degrees to the horizon, sufficiently for the flame to play against it, which will keep it so hot as to prevent the deposit and accumulation of soot in its surface, and cause it the better to reflect the heat outwards and downwards into the room. The grate or fire-basket *d* is low in front, lower than is usual in fire-grates for bituminous coal. In front, and for about one-half of the depth of the fire-chamber, the grate-bars are as wide apart as is usual, to allow the ashes to fall out between them and permit the insertion of a poker between them; this usual space is about an inch between the bars. The rear portion of the bottom bars *e* are very close together so as to prevent the ashes and cinders from readily passing through them; this part of the grate extends from the back wall about half way to the front of the fire-basket, as seen in fig. 3. Instead of the close-barred grating *e*, I sometimes use tapering or wedge-shaped bars for the rear portion of the grate, such as are shown in a part of the grate marked *f*, in fig. 2. These wedge-shaped bars *f* are so arranged that at their front the space between them is as wide as that between the front-bars *d*, which space gradually lessens until at the back they are close together. In some fire-places and furnaces the position is reversed, the wide part of the bars being in front and the narrow part in the rear of the fire; this, however, depends upon what part of the fire requires the greatest amount of air to be given to it. In the back wall *b* and side walls *a a* of

the fire-place, immediately above the grate-bars, is a recess, *g*, about four inches more or less in height and depth, the height of the recess being such that the coal will not readily enter it and fill it up; for ordinary coal the height should be somewhat less than that named. The depth of the recess in the side walls *a a* lessens towards the front of the fire-place, at which point the recess ceases, as shown by dotted lines in fig. 3. An aperture, *h*, is made through the back wall in the recess *g*, which opens into a flue or pipe, *k*, extending up a short distance back of the back wall and leading to the chimney; below the aperture *h* is a similar aperture, *i*, placed underneath the grate, which aperture *i* also opens into the flue or pipe *k*. The lower aperture *i* is furnished with a slide, *l*, by which it may be opened or closed as may be desired. At the bottom of the back wall *a*, underneath the grate, are two openings, *m*, into the space back of the fire-place, for the purpose of drawing the soot and dust which collects in the rear of the back wall out into an ash-pan. These openings are also furnished with slides, *n*, which are usually kept closed. The upper part of the back wall *b'* is made sloping and smooth in the rear side as well as in front, so that soot and dust deposited on it may slide down back of the back wall *b*, and thus be accessible from the dust-holes *m m*.

The operation of my improved fire-place is as follows: When a fire has been made in the grate, the rear grate-bars *e e*, being very close together, soon get closed up with cinders and ashes. The recess *g* is closed in front on both sides where the side walls *a a* are flush with the back wall of the recess, and the slide *l* being closed no air enters the recess from outside, and the back portion of the fire being only slightly supplied with air burns very slowly. The fire in front will burn freely, and will gradually waste away, while the fuel in the back part of the fire-place parts with its gas, and gives out smoke without being consumed, but forms with a mass of coke. The gas and smoke from the rear portion of the fire pass forward over the front fire, which is bright and hot, and play against the heated back wall and are thus consumed. If the fire is desired to continue in this condition and burn slowly, it is replenished, when the front part of the fire is burned away, by drawing the coke from behind forward to the front of the fire-basket, and putting the fresh fuel in its place against the back wall, so as to cover the recess *g*. Thus managed, the fire gives out a moderate degree of heat and consumes the fuel very slowly. The front fire may be allowed to burn away without replenishing, and the fuel in the back part will remain alight for a long time. If it be desired to make a hot fire it is only necessary to open the slide *l* so as to allow fresh air to pass up the flue *k*, whence it will find its way into and around the recess *g*, causing the whole body of fuel in the grate to burn with great freedom, giving out a large amount of heat, while the gas and smoke will be almost entirely consumed, emitting a great amount of flame. The degree of air allowed to enter the recess *g* may be regulated by the size of the opening made by the slide *l*. When the fire is stirred the slide *l* should be opened, which will cause such a draught up the flue *k* as to carry with it the dust from the fire; this dust will rise out of the top of the flue *k*, (which is short,) and fall down into the space back of the back wall of the fire-place, whence it may be removed occasionally through the openings *m m*, as before stated. The tapering grate-bars *f* may be perforated with small holes, which tend to keep them from burning. The object of using bars for the grate of this shape is to lessen the air-space towards the back of the fire gradually. If desired these bars may extend along the back wall the entire length of the fire-basket, and be continued tapering from the back wall to the front of the fire-basket, so as to constitute the whole of the bottom of the grate.

These tapering or wedge-shaped grate-bars may be used to advantage in cooking stoves and in furnaces, in which cases it may be desirable to place the broad portion of the bar in front, where the fire naturally receives the greatest amount of air, and thus give a larger space for the entrance of air to the fire in the rear of the fire-chamber.

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

1. The combination of the shallow recess *g*, in the back wall, or back wall and side walls, of a fire-place, with the opening *i*, and flue *k*, substantially as and for the purposes hereinbefore set forth.
2. Making the rear part of a fire-basket with grate-bars *e e* parallel to each other, and closer together than the bars *d*, that compose the front part of such fire-basket, substantially as and for the purpose hereinbefore described.
3. The combination of the dust-holes *m m*, furnished with slides *n n*, the air-passage *i*, and flue *k*, for the purpose hereinbefore described.
4. The use of the tapering grate-bars, for the purpose of diminishing gradually the amount of air admitted to the fire as the space between the bars decreases.
5. Perforating the tapering-grate bars with air-holes, for the purposes hereinbefore described.

In testimony whereof I, the said MARSHALL D. WELLMAN, have hereunto set my hand in presence of—

MARSHALL D. WELLMAN.

Witnesses:

ALLAN C. BAKEWELL,
A. S. NICHOLSON.