(No Model.)

J. ADAIR.

FIRE PLACE LINING.

No. 272,013. Patented Feb. 13, 1883.

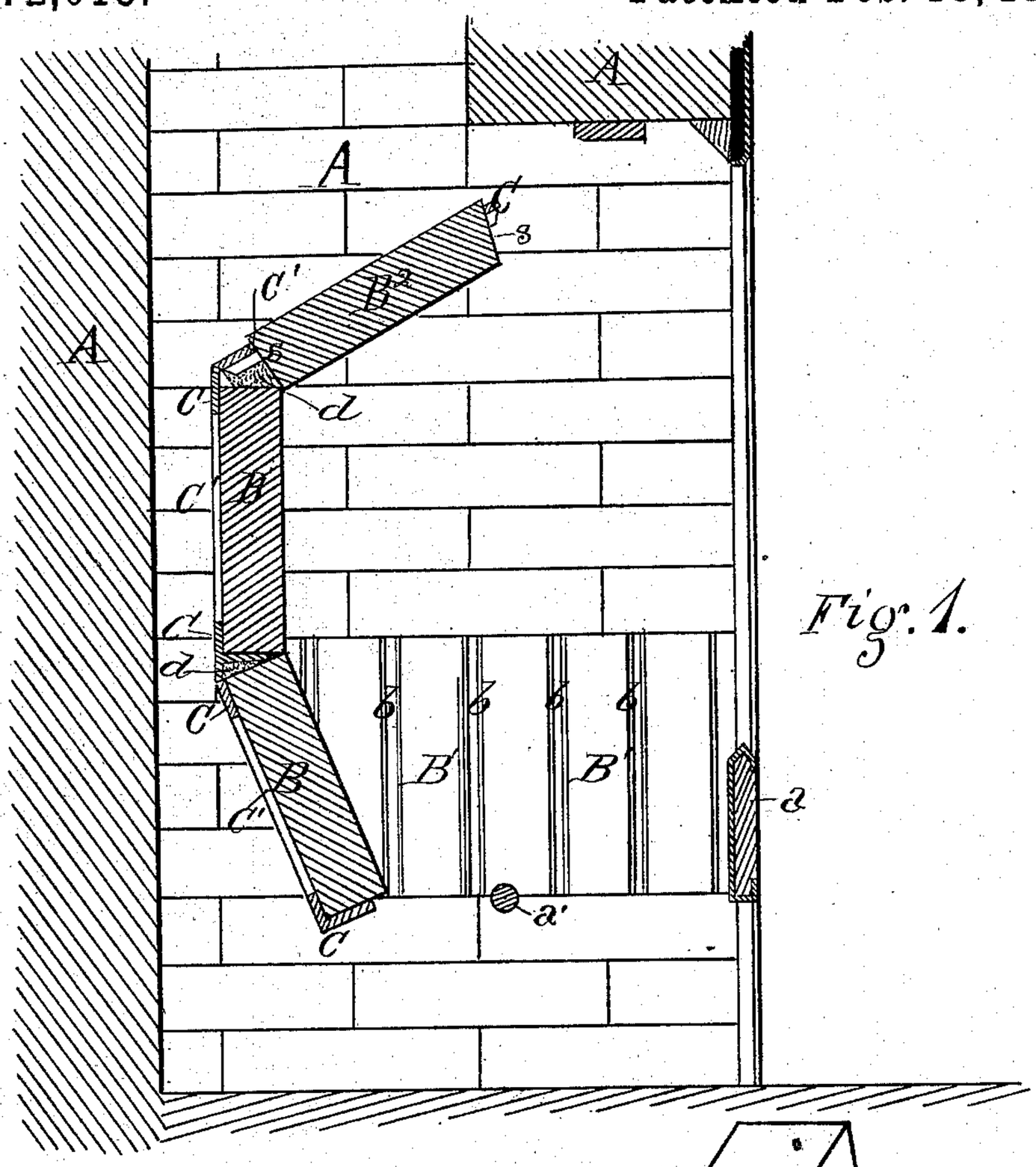

Fig. 1.

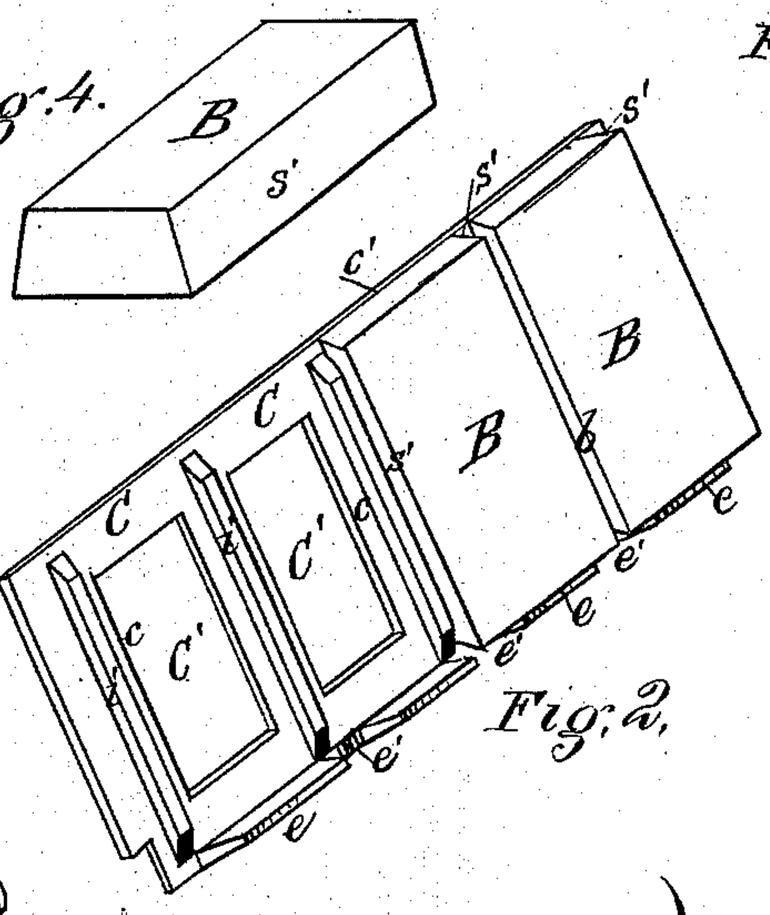

Fig. 4.

Fig. 2.

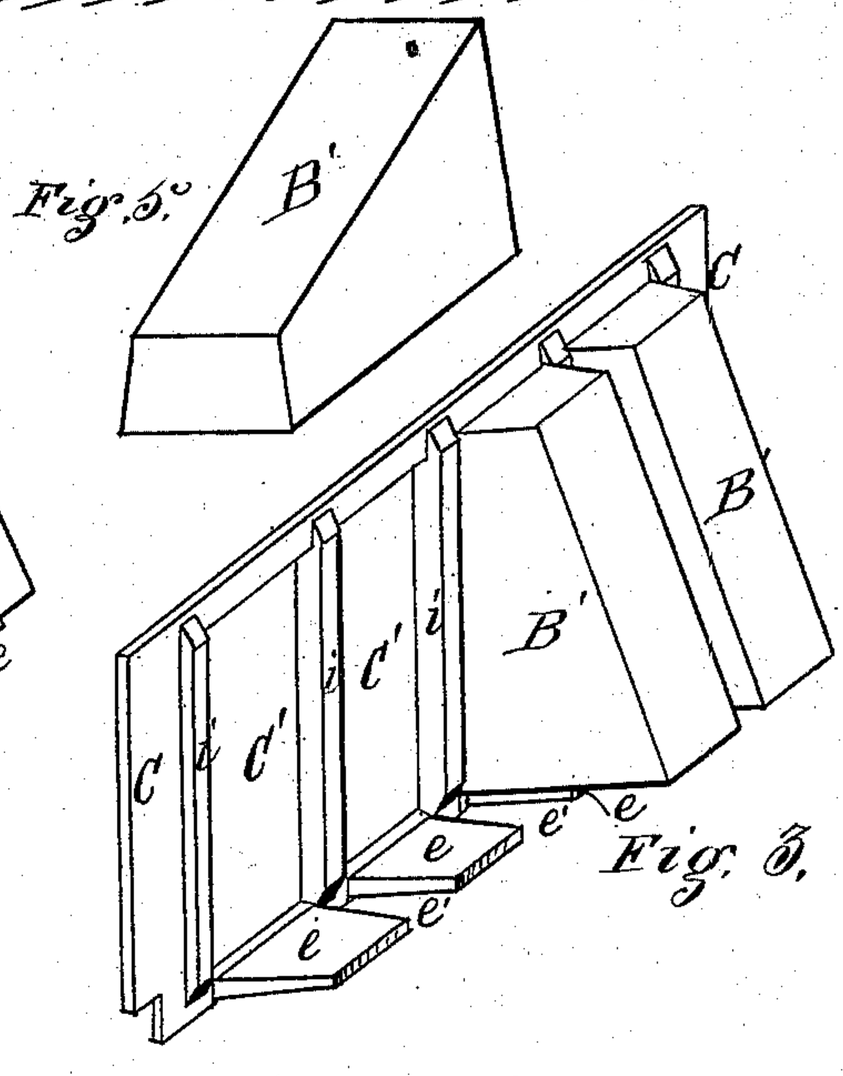

Fig. 5.

Fig. 3.

Witnesses.
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UNITED STATES PATENT OFFICE.

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FIRE-PLACE LINING.

SPECIFICATION forming part of Letters Patent No. 272,013, dated February 13, 1883.

Application filed July 24, 1880. (No model.)

To all whom it may concern:

Be it known that I, JAMES ADAIR, of Sewickley borough, Pittsburg postoffice, county of Allegheny, State of Pennsylvania, have invented or discovered a new and useful Improvement in Fire-Place Linings; and I do hereby declare the following to be a full, clear, concise, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—like letters indicating like parts—

Figure 1 is a transverse sectional elevation of a part of a fire-place illustrative of my present invention. Figs. 2 and 3 are detached perspective views of the tile-supporting frame, and showing tile or brick of different forms arranged thereon; and Figs. 4 and 5 are enlarged views in outline of the brick or tile shown in Figs. 2 and 3, respectively.

My present invention relates to the construction and arrangement of the tile walls or lining of fire-places; and it consists, in general terms, in certain combinations of separate tiles or bricks with supporting-frames in the walls of the fire-basket, and in the form and construction of such tiles and walls, as hereinafter more fully described and claimed.

In the drawings, Fig. 1, A represents the chimney-walls, inclosing the fire-place. Within this space the fire-basket with its walls or linings are arranged, and (in the case of open grates) usually consist of a fire-grate, two end tiles, one or two back tiles, and a roof-tile. I have not shown a grate, as my invention is equally applicable to grates of different construction; but the front bar, *a*, and central pivot-rod, *a'*, are intended and adapted for receiving the agitating-grate shown and described in patent granted to me July 27, 1880.

Heretofore the tile walls or linings of the fire-basket have usually been built of slabs of fire-clay tile, which reach in one piece from end to end or from front to back of the fire-basket. Such large tiles are not only expensive, but they are liable to crack or be broken, especially when hot, and in order to replace them with sound ones a large part or nearly all of the tile-work must be torn out and rebuilt.

In my invention I make use of a metallic frame or plate, C, which is arranged in the plane of the desired wall, with its ends resting in recesses in the chimney-walls or on independent brick supports. Any desired number of fire-clay or other refractory tiles or bricks are arranged and supported on such frame, so as to give the desired wall or lining, the manner of support and the arrangement depending somewhat upon the position which the frame occupies in the fire-place. When designed for the back wall of the fire-basket I make on the lower edge of the frame ledges or flanges *e*, Figs. 1, 2, and 3, on or against which the separate bricks rest at their lower ends, while their rear faces rest against the cross and side bars, *c c'*, of the frame. Ribs *i* are also raised or formed on the cross-bars *c*, which ribs space the separate bricks and prevent sidewise displacement.

If desired, fire-clay or other mortar may be placed between the bricks, covering the ribs *i*, so as to protect the metal frame from the destructive action of the heat. I prefer, however, to leave considerable of this space open, so as to form thereby ducts or channels *b* between the separate bricks on their front or face side, and by making notches or openings *e'* in or between the ledges *e* in line with these channels passages will be formed across the face of the lining-wall, through which air may pass to the fire from below, or ashes be discharged from the fire, and thereby prevent the rear part of the fire-basket from becoming choked or clogged. By using brick having beveled side edges, *s'*, Fig. 4, these channels or ducts *b* may be varied in form. If the smaller face of the brick be placed against the frame C, the channels will have a dovetail form, wider toward the back than at the front face of the wall. The advantage of this form (see Fig. 2) is that any coals or clinkers which may enter the channels from the front face will readily fall, and the channels can easily be kept clear. I consider this feature of considerable importance, and it is an advantage which cannot be secured in the ordinary fire-place tile, owing to the difficulty of molding such channels in solid tile. If, however, for any reason it is desired to make the channels *b* widest on the face of the wall, it may be done by placing the larger face or edge of the brick against the frame, as in Fig. 3.

The separate bricks may be laid flat on the

frame, as at B, Fig. 2, in which case four bricks of ordinary size will cover the usual width of fire-basket, leaving three ducts or passages between the bricks and two at the ends or outside edges. This manner of arranging the bricks on the supporting-frame is designed more particularly for the back of the fire-basket, and in arranging the frame in such place I prefer to slope it upward and backward, as in Fig. 1, so that a like slope may be given to the face of the wall. Several well-known advantages result from this arrangement or slope, though, if for any special reason a vertical wall be desired, it may be so arranged as in the case of the upper part of the back wall, Fig. 1. Any spaces made by inclining either of these parts of the wall, or made in other ways, may be filled with suitable refractory mortar or cement, as at *d*. For the end walls of the fire-basket the brick may be laid flat on the frames, as just described, though I prefer to use brick shaped as at B′, Fig. 5, and set them edgewise on the frame, as in Fig. 3. In this case the frames are set in the desired position in the fire-place in a vertical or nearly vertical position. The inclined or sloping edges of the brick will give an upward and backward slope to the face of the wall; or, when preferred, rectangular brick may be arranged in the same way, giving a vertical wall; or the desired slope may be secured by inclining the frames, as before described.

In order to secure the brick separately, yet safely, when arranged edgewise, as in Fig. 3, I set their rear edges into the openings C′ of the frame between the raised bars *i;* also, the flanges or ledges *e* may be made deeper, projecting forward nearly as far as the front edges of the brick, but by preference stopping a little short of such front edges, so as to be protected thereby from the fire. By this edgewise arrangement I secure a greater number of ducts or passages, *b*, and also a greater body or thickness of wall or lining, which adds very materially to the heating capacity of the fire-place, since these passages increase materially the extent of surface exposed on the brick or tile to the fire by permitting flame, hot gases, and coals to come in direct contact with their edges or side as well as front faces, whereby they become very hot and radiate their heat for a long time. This combination of devices in forming the back and end walls of the fire-basket, as illustrated in Fig. 1, I consider an important improvement, economizing space and cost of construction, and securing comparatively heavy walls with means for readily heating the same, as described. For these reasons I prefer the construction and arrangement which I have here shown. Where there is sufficient room in a fire-place this arrangement, Fig. 3, may be used for the lower back wall of the fire-basket, as well as for the end walls.

When applying my improvement to the top or roof tile I set the frame C in the desired position and support the bricks B^2 thereon by passing them into the openings C′ of the frame from the upper side. The sloping edges *s′* of the brick, bearing against the bars of the frame, will hold them in place, yet permit of their separate removal; also, ducts or passages will thus be formed between the separate bricks on their lower or face side, which serve as channels for the passage of smoke and gaseous products of combustion. This not only keeps the face of the wall or lining cleaner, and therefore in better condition to radiate heat, but the channels are also calculated to arrest a tendency to puffing smoke into a room.

I am aware that furrows or channels have been made in the face of solid fire-place tiles, and that such tiles have been arranged in the top or roof as well as in the ends and back of a fire-basket; but I am not aware that lining-walls with channels have been made as I have herein shown and described.

By my improvement I am enabled to make use of ordinary fire-brick, the forms shown being such as are commonly used in furnace construction. They can therefore be obtained from dealers generally at a comparatively low price, while the tile usually employed in fire-place linings are special articles of manufacture, difficult to obtain when manufacturers of fire-clay products are busy, and at any time can be had only on special and increased prices.

By my improvement I can make a fire-place cheaper with less trouble in obtaining the materials, and the wall or lining made in this way is in many respects better than when made with the usual large solid, plain, or fluted tile, because the wall is less liable to crack and break, and especially because the bricks can be removed separately or singly when broken, and, being separated by passages *b*, they are exposed both on their front and side or edge faces to the fire in the basket, and are thereby more highly heated, as above described. The metal frames, being covered and protected from the fire, will be durable and practically permanent.

I do not limit my invention to the particular form of frame or of bricks shown and described, as these features can be varied by mechanical skill to adapt them to grates of different constructions and to fire-places of different forms without departing from my invention.

I am aware that the side walls or linings of fire-pots in stoves, furnaces, &c., have been made of separate bricks or tiles supported on iron frames with open passages between the edges of the bricks, and I do not claim broadly, or alone considered, such construction and combination.

I claim herein as my invention—

1. In combination with the fire-basket of an open fire-place, a metal supporting-frame, C, extending from the back wall forward, partially over the fire-basket and separate bricks B^2, supported on and projecting from the under face of such frame, with ducts or passages between the bricks in the line of draft, substantially as set forth, whereby smoke and gas

2. The combination of sloping frame C, two or more rectangular bricks, B, of uniform thickness arranged on such sloping frame, with open-sided passages *b* between the adjacent uncovered edges of the bricks, the same constituting the back wall of a fire-basket, and frames C and bricks B′, arranged thereon at the ends of the fire-basket, such bricks decreasing in thickness upward and having open-sided passages between the adjacent side faces of the bricks, the same forming the end walls of the basket, substantially as described.

3. In the fire-basket of an open fire-place, and in combination therewith, a tile wall for such basket, having increased thickness on the face side toward its lower edge, with open-sided ducts or passages extending through the thickened part of the wall along its face and opening at their lower ends into the space below the fire-basket, substantially as and for the purposes set forth.

4. A wall or lining for the fire-basket of a fire-place, consisting of two or more separate bricks or tiles, B′, arranged side by side with open passages between their adjacent uncovered sides, such bricks decreasing in thickness toward the top and having their front faces sloping, as described, in combination with a frame or support for holding the separate bricks in place, substantially as set forth.

In testimony whereof I have hereunto set my hand.

JAMES ADAIR.

Witnesses:

JAMES A. MCKEAN,

C. L. PARKER.