

(No Model.)

2 Sheets—Sheet 1.

T. E. CADDY.
FURNACE.

No. 464,008.

Patented Dec. 1, 1891.

Fig. 1.

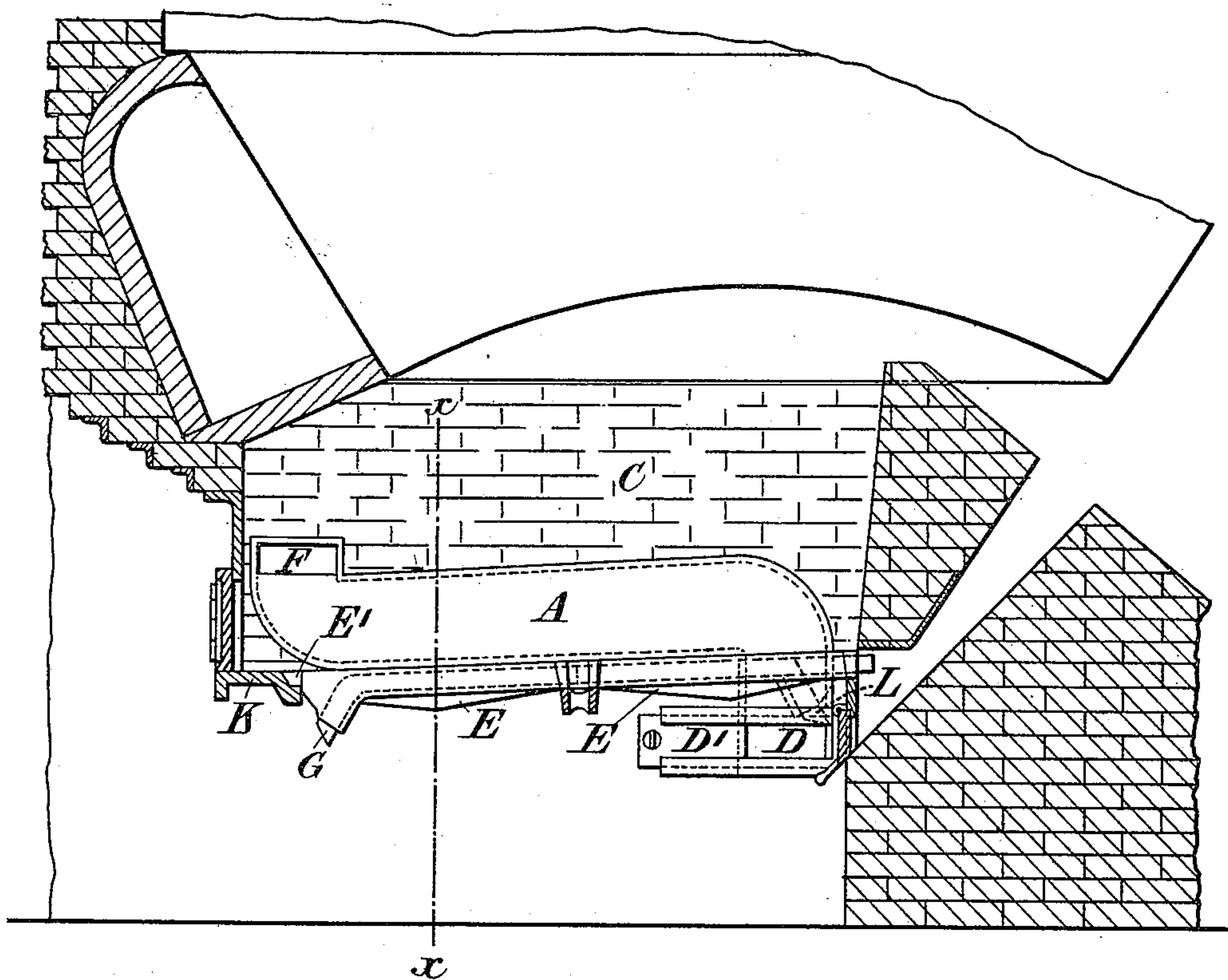
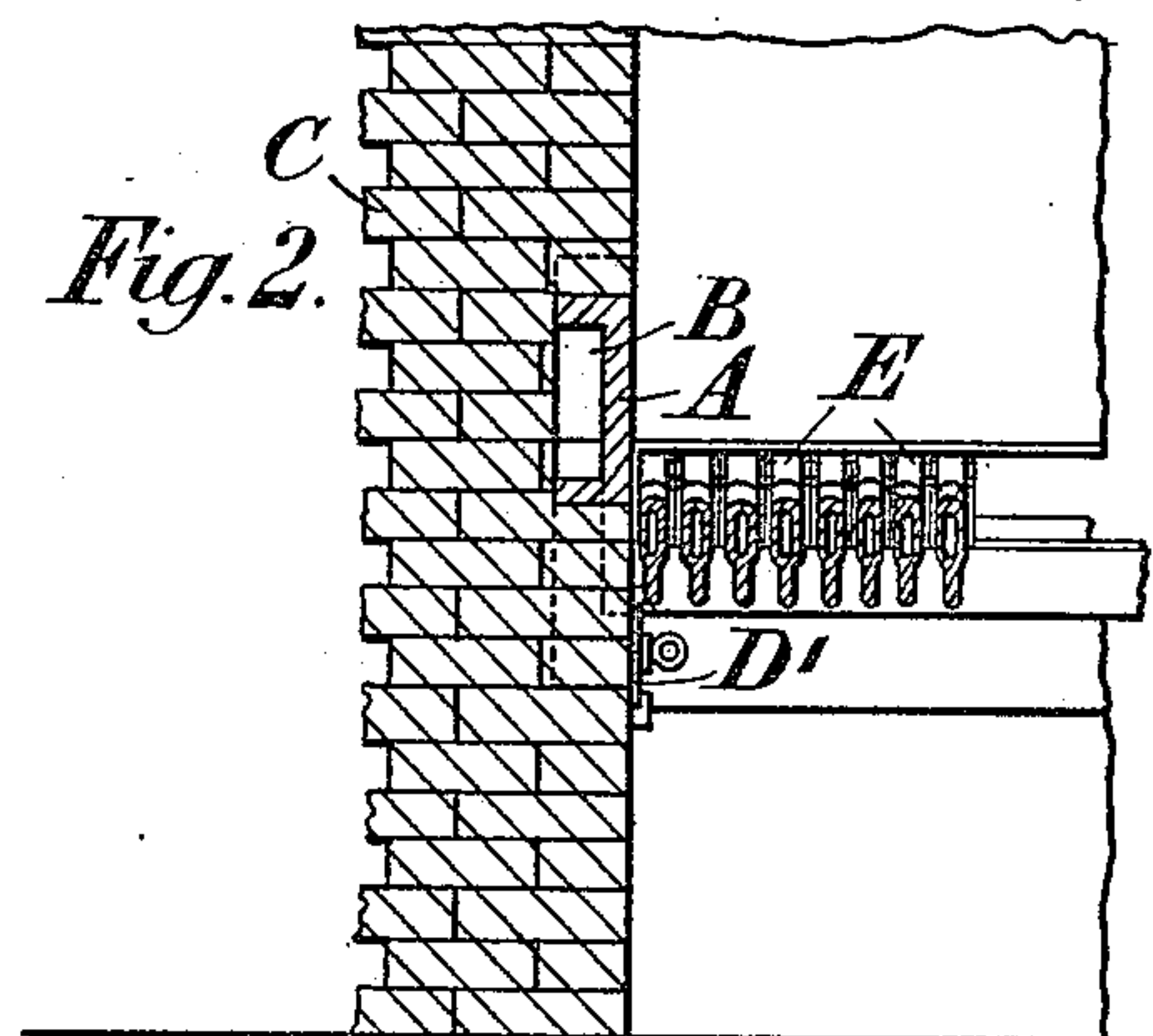


Fig. 2.



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Inventor:
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by J. Walter Douglass.
att'y.

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Fig. 3.

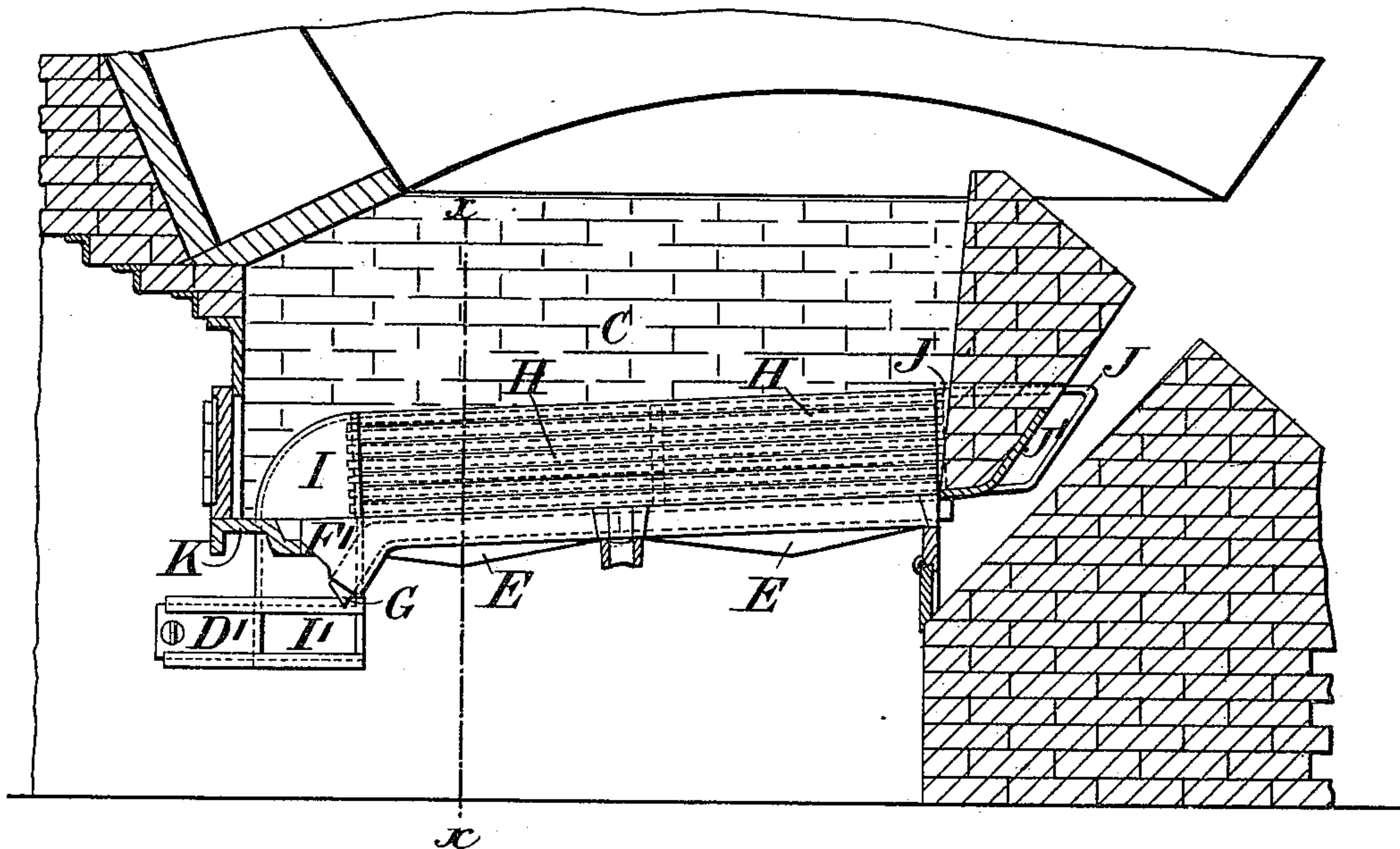
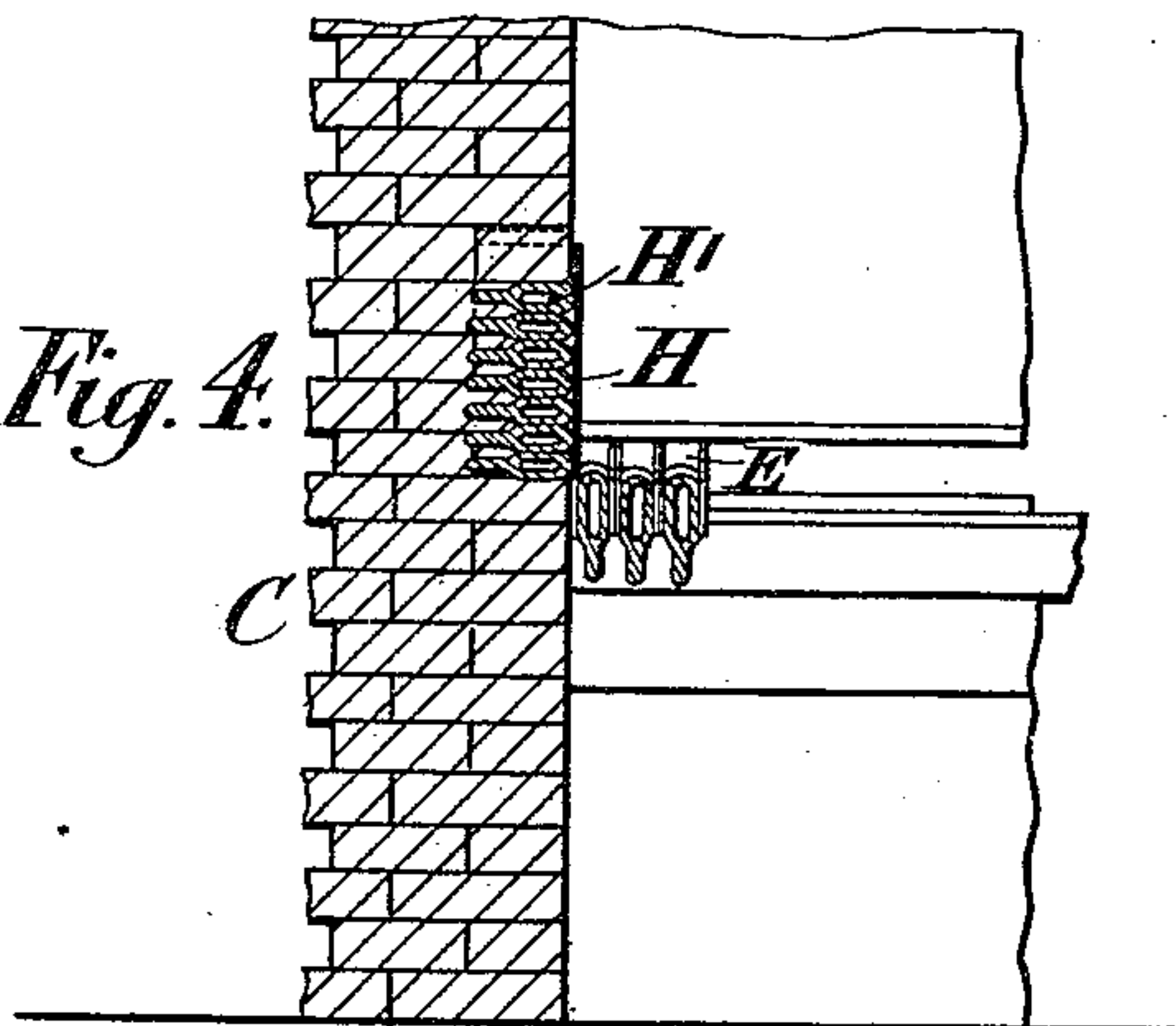


Fig. 4.



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UNITED STATES PATENT OFFICE.

THOMAS EDWARD CADDY, OF NOTTINGHAM, ENGLAND.

FURNACE.

SPECIFICATION forming part of Letters Patent No. 464,008, dated December 1, 1891.

Application filed September 1, 1891. Serial No. 404,481. (No model.)

To all whom it may concern:

Be it known that I, THOMAS EDWARD CADDY, a subject of the Queen of England, residing at Nottingham, in England, have invented certain new and useful Improvements in or Relating to Furnaces, of which the following is a specification.

This invention relates to improvements in furnaces which are built up of brick or the like, such as externally-fired boilers, and is also partly applicable to furnaces generally. It will be best understood by reference to the accompanying drawings, in which—

Figure 1 is a longitudinal section of a furnace constructed according to my invention, shown in connection with a brewer's copper. Fig. 2 is a transverse section taken on line *x x* of Fig. 1. Fig. 3 is a longitudinal section of a furnace, showing a modification; and Fig. 4 is a transverse section taken on line *x x* of Fig. 3.

In carrying out this invention to utilize the heat which is so destructive with present arrangements to the sides of the furnace, I employ metal cheeks A, of a suitable height and extending preferably the whole length of the furnace. These cheeks A may be formed hollow or built in, as shown, with an air-space B between the cheeks and the brick-work C. To render them more durable, they may be cast with chilled faces, and may also be formed in segments, so that worn or damaged parts may be removed and new parts substituted therefor. Through each of the passages formed in the hollow cheeks A or through each space B a current of air may be conveyed from the front to the back or into a hollow bridge, or, as shown in the drawings; the air may be taken up at the opening D at the back of the furnace and below the bars E, and delivered at the opening F at the front of the furnace above the bars. In this case the heated air is delivered in front of the fire over which it passes. In both cases the air assists in the consumption of the smoke and also helps to preserve the cheeks by keeping them from becoming overheated. The opening D may be provided with a door D', sliding, as shown, or of any other convenient form, so that the air-current may be regulated. In some cases one or more air-passages may be formed through the cheeks by casting one or more

tubes in them, those in each segment being in direct connection with or delivering the air to the corresponding tubes in the segment next to it, or the cheeks may be built up of tubular bars H, as in Figs. 3 and 4, adapted so as to be built in with their faces forming the vertical sides of the furnace, the air being taken up and conveyed by the tubular passages H', either from the front of the furnace and delivered at the back of or near the bridge, or from the back to the front, discharging the air at a suitable height above the bars, in the same manner as hereinbefore described and shown, suitable arrangement being made at the front or back to permit of access of air to the tubular passages and at the front or back for its delivery.

As shown in Figs. 3 and 4, the tubular passages H' are connected at the front to an air-passage I, provided with an opening at I' below the fire-bars F, and fitted with an adjustable door D', and at the back to an air-passage J, passing through the bridge and provided with an opening at J'.

I preferably employ bars E, in each of which a tube is cast to form an air-passage through it to the back of or into a hollow bridge, for the same purpose as hereinbefore described. The receiving end G of the tube is bent downward at a suitable angle, so as to pass out of the bar below and at a suitable distance from the end instead of passing straight through, as heretofore. With this arrangement the ends E' of the bars E may be formed so as to engage with an ordinary dead-plate K, and the necessity for an additional bearer-bar is thus done away, and the under side of the bar may be left cleared, so as to afford an increased draft. The ends of the tubes may also be cut at an angle, as shown, and are in a better position for taking up the air and are less likely to get choked with ashes or dust. The bars may also be arranged to take up the air at the back, as shown in dotted lines at L, Fig. 1, in which case the air would be delivered at the front into preferably a hollow dead-plate and would pass over the fire. This I find to be more effective in some cases for consuming the smoke than delivering the air at the back, as heretofore.

In the process of casting the bars I preferably employ a metal plate provided with an

opening for receiving and supporting the bent ends of the tubes in the mold. The plate is rammed in and supported or partially supported by the sand. The pattern is preferably provided with a core-print corresponding to the position of the bent end of the tube and is preferably molded in an inverted position on a plate. When the pattern has been partially rammed, the supporting-plate is placed on the print, the box is then filled, and the process of ramming completed, after which the box is turned and the pattern drawn, leaving the plate in the mold, which receives the end of and thus affords support to the tube. The supporting-plate may be provided with a stop to limit the length of tube passing through the plate, and may also be secured more firmly in position by pins passing through the molding-box engaging with the plate, or in any other well-known manner. For example, in some cases the plate may be hinged to the molding-box. The straight end of the tube may also be carried and supported in the mold by a plate fitting in the end of the molding-box adjusted by a suitable stop or stops and provided with an opening to receive the end of the tube.

I claim—

1. A furnace having the respective side walls thereof provided with air-channels for conveying air lengthwise of the furnace and above

and below the grate, and said channels inclosed by metal cheeks disposed flush with the side walls and extending upward from the grate, substantially as and for the purposes set forth.

2. A furnace having the respective side walls thereof provided with air-channels for conveying air lengthwise of the furnace and above and below the grate, and composed of tubes disposed flush with said walls, so as to form metallic cheeks, which extend upward from the grate, substantially as and for the purposes set forth.

3. A furnace having the respective side walls thereof provided with air-channels for conveying air lengthwise of the furnace and above and below a grate provided with fire-bars, having central air-tubes passing out of the bars and having their front open ends disposed beneath the front of the grate, and said channels inclosed by metal cheeks disposed flush with the side walls, which extend upward from said grate, substantially as and for the purposes set forth.

In testimony whereof I have hereto set my hand in the presence of the two subscribing witnesses.

THOMAS EDWARD CADDY.

Witnesses:

H. C. SHELDON,
A. A. DICKINSON.