(No Model.)

J. WATERS.

FURNACE DOOR.

No. 441,083. Patented Nov. 18, 1890.

Fig. 1.

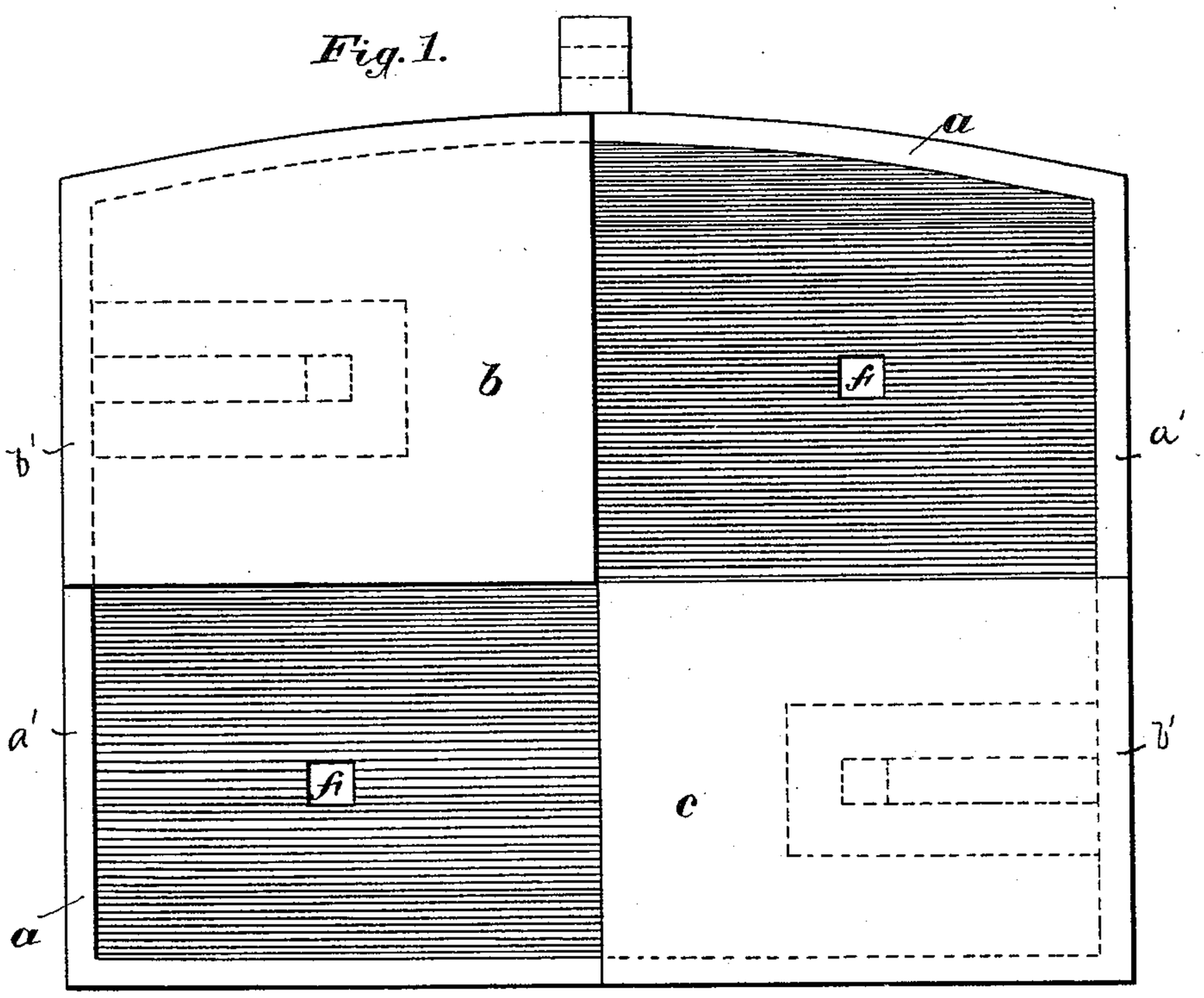


Fig. 2.

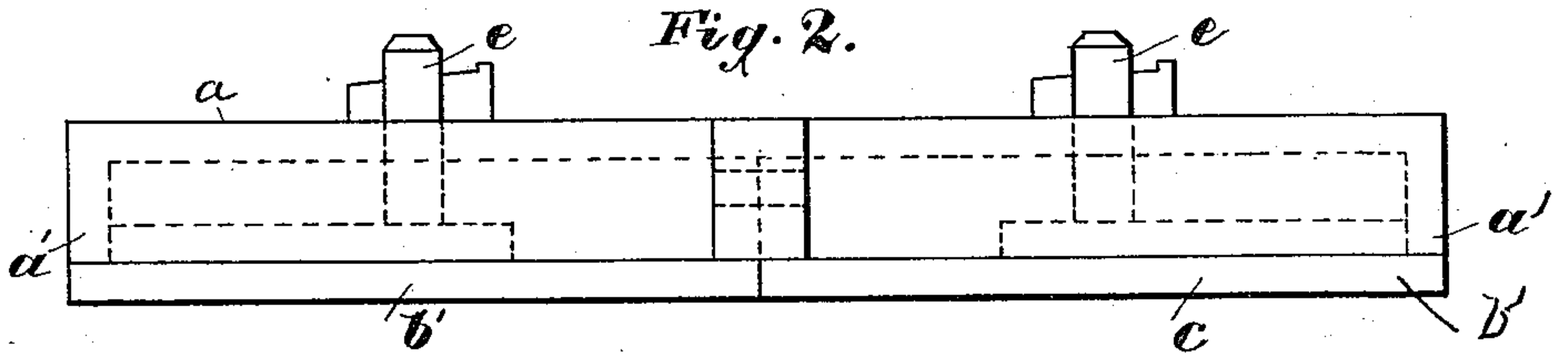


Fig. 3.

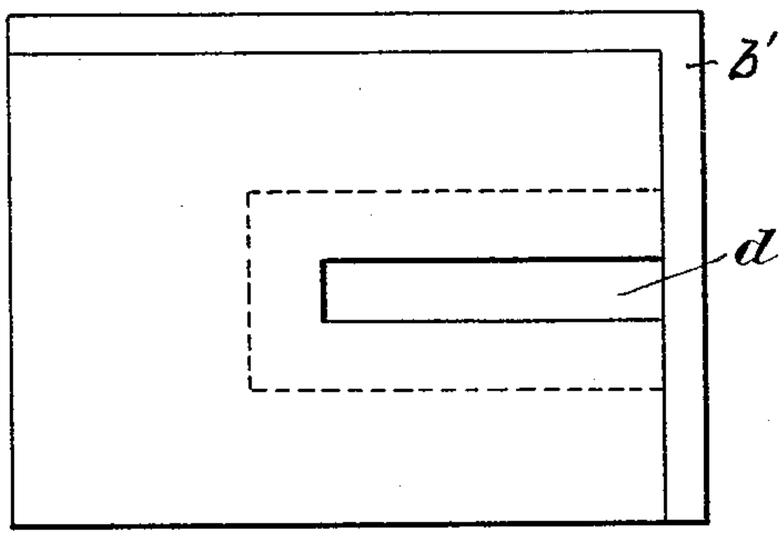


Fig. 4.

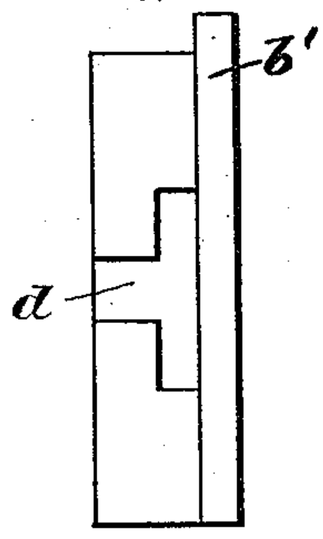
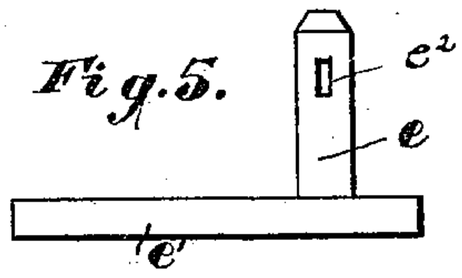


Fig. 5.



Witnesses:
H. deVos.
Howard L. White.

Inventor:
John Waters
By Richards & G
Attorneys.

UNITED STATES PATENT OFFICE.

JOHN WATERS, OF GLASGOW, SCOTLAND.

FURNACE-DOOR.

SPECIFICATION forming part of Letters Patent No. 441,083, dated November 18, 1890.

Application filed August 14, 1889. Serial No. 320,689. (No model.)

To all whom it may concern:

Be it known that I, JOHN WATERS, a subject of the Queen of Great Britain, and a resident of the city of Glasgow, Scotland, have invented certain new and useful Improvements in Furnace-Doors, of which the following is a specification.

This invention relates to an improved construction of furnace-door.

Furnace-doors as at present constructed consist, generally, of a hollow metallic frame filled in with fire-bricks bound or cemented together. With this construction, as will be readily understood, individual bricks or portions of bricks are liable to become loosened from constant use of the door, or to become burned or fractured with the intense heat of the furnace, the result being in either case that the bricks eventually fall out and the door is then in many instances cast aside as useless and replaced by a new one.

Under my invention the possibility of individual bricks falling out is entirely obviated, as instead of using a large number of small bricks cemented together, as heretofore, to fill up the cast-iron or other frame, I use either a single homogeneous brick, which is so molded when plastic as to fit into and fill up the frame, or four or other number of large-sized bricks. For the purpose of holding the brick or bricks, as the case may be, in position, I removably fit into each brick one, two, or other number of studs or staples, which may be made of metal, fire-clay, or other suitable material or substance. The studs or staples are made with a broad flange or its equivalent at their base for the purpose of holding tightly and firmly in the brick, the brick being made with a groove for the reception of the flange of the stud or staple when these are to be fitted removably in the bricks. Instead, however, of having a flange, the studs or staples may be made tapered or be dovetailed into position for this purpose. The studs or staples, when the brick is fitted into position, project through holes made in the frame, the brick being held securely in position by passing cotter or other pins through slots or holes made in the projecting ends of the studs or staples.

In order that my said invention may be properly understood, I have hereunto appended an explanatory sheet of drawings, wherein—

Figure 1 is a front view of a furnace-door fitted to hold four large bricks, two of them being shown in position. Fig. 2 is a plan or top edge view of the door. Fig. 3 is a plan, and Fig. 4 an end elevation, of one of the bricks. Fig. 5 is a side elevation.

The door, as shown in these figures, consists of a hollow metallic frame *a*, into which is fitted four bricks, two of them *b c* being shown in position at Fig. 1. Instead of using four bricks, as shown, one or other number of bricks may be used. These bricks, when plastic, are molded in one solid or homeogeneous piece, and they have a groove of a dovetailed or undercut form formed in them, as shown at *d*, Figs. 3 and 4. The bricks are formed with a solid main portion which fits within the flange *a'* of the door, and with a laterally-projecting flange *b'*, which fits over said flange *a'*, thus enabling the brick to be securely held in place to be protected as to its main portion and at the same time to entirely cover and protect the inner face of the door. To enable the brick to be held securely in position in the frame, a stud *e*, having a broad flange or base *e'* on it, is embedded in the brick or fitted into the groove *d*. The flange *e'* catches firmly in the groove, while the part *e* projects out through the hole *f* made in the frame *a*. (See Figs. 1 and 2.) As shown at Fig. 5, the part *e* of the stud has a slot e^2 in it, through which a cotter or other pin is passed, as shown at Fig. 2, when it is desired to hold the brick in place.

When two or other number of bricks are secured in place in the manner hereinbefore described, should one of them be burned it can easily be replaced by a new brick without interfering with the other bricks or injuring the door in any way.

With a furnace-door made as hereinbefore described, although the bricks may by constant use become burned or broken, the frame and the studs or equivalent are still perfectly good and capable of being used with new bricks.

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

1. The herein-described furnace-door, consisting of the combination, with a frame, of the brick having an undercut groove *d*, and a removable fastening device comprising the flange *e'*, adapted to fit said groove and the stud *e*, and means for securing the latter to said frame, substantially as set forth.

2. The herein-described furnace-door, consisting of the combination, with the frame *a*, having the flange *a'*, of the brick having the flange *b'*, an undercut groove *d*, and a removable fastening device comprising the flange *e'*, adapted to fit said groove and the stud *e*, and means for securing the latter to said frame, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 25th day of July, 1889.

JOHN WATERS.

Witnesses:
HUGH FITZPATRICK,
Patent Agent, Glasgow.
ROBERT BARBOUR,
Clerk, Glasgow.