

(No Model.)

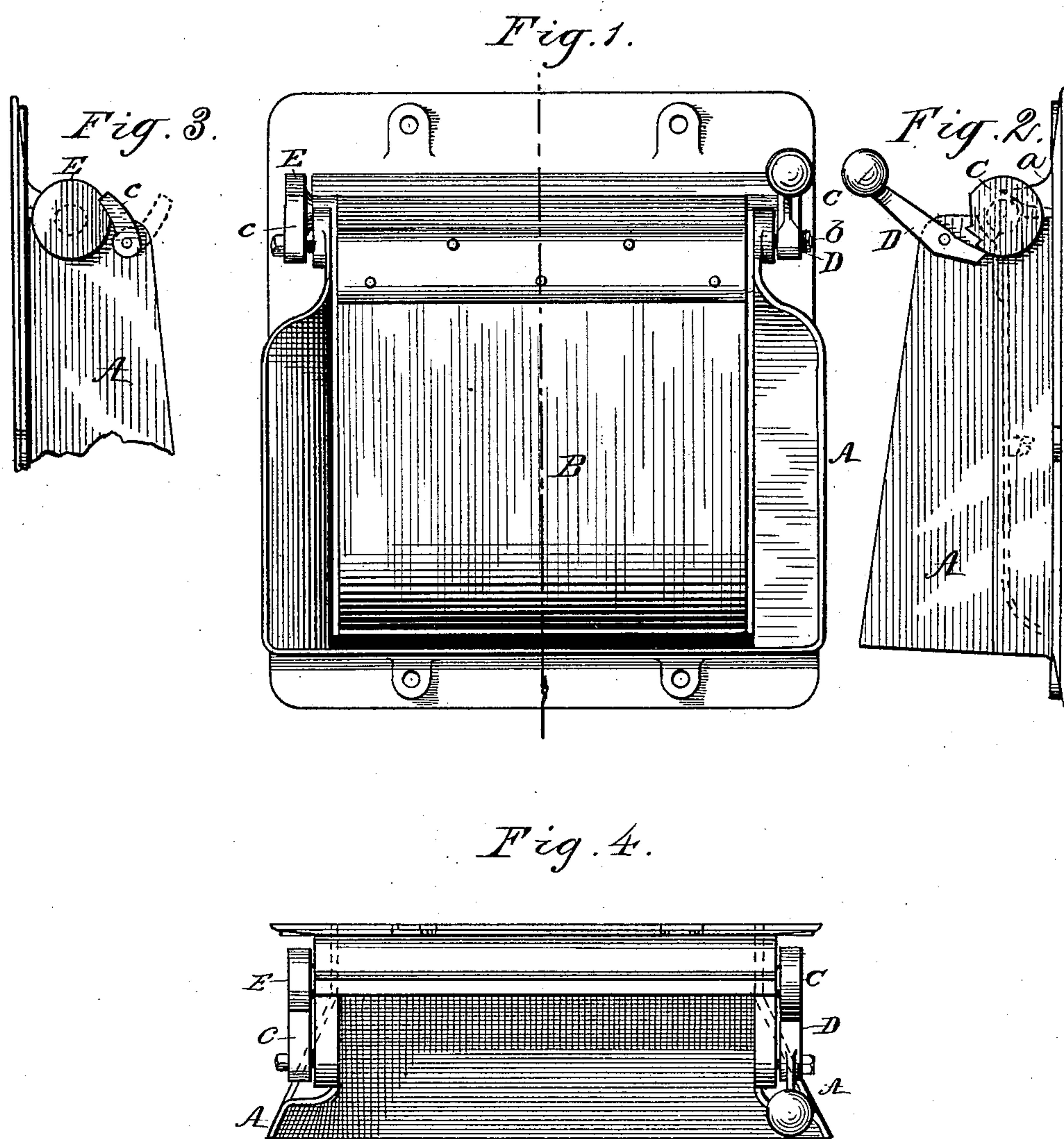
2 Sheets—Sheet 1.

T. R. BUTMAN.

FURNACE DOOR.

No. 308,552.

Patented Nov. 25, 1884.



WITNESSES

J. W. Reynolds.
T. J. Holden

INVENTOR

Thos. R. Butman
per O. C. Duffy
ATTORNEY

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2 Sheets—Sheet 2.

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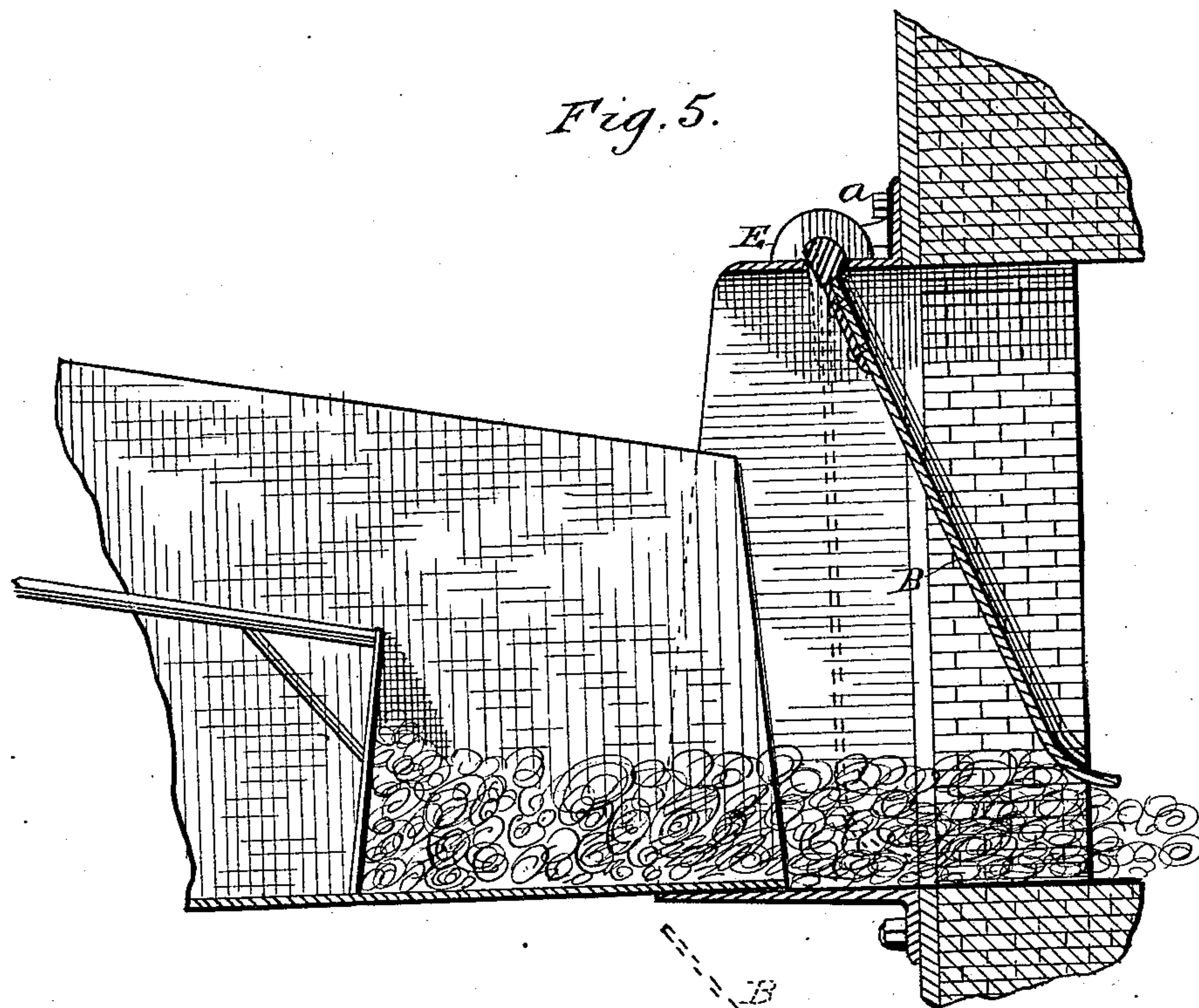


Fig 6

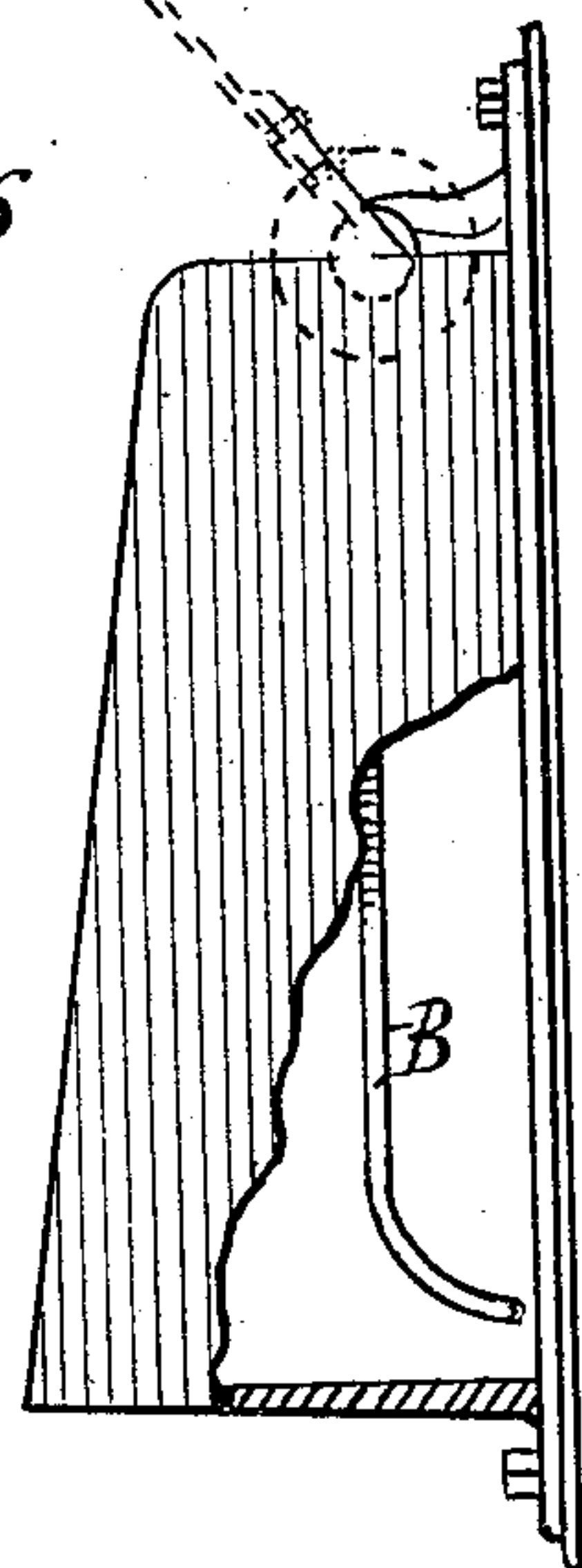
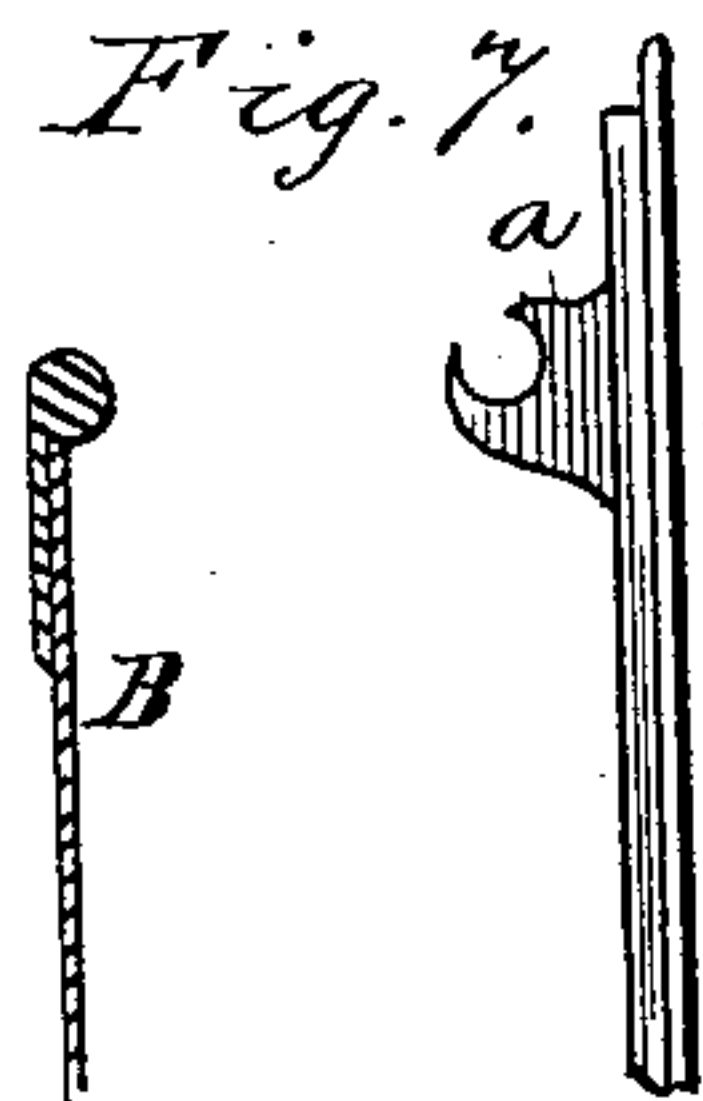


Fig. 7.



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UNITED STATES PATENT OFFICE.

THOMAS REED BUTMAN, OF CLEVELAND, ASSIGNOR TO JAY A. HIGBEE, OF
FREMONT, OHIO.

FURNACE-DOOR.

SPECIFICATION forming part of Letters Patent No. 308,552, dated November 25, 1884.

Application filed March 9, 1883. Renewed April 16, 1884. (No model.)

To all whom it may concern:

Be it known that I, THOMAS REED BUTMAN, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and
5 useful Improvements in Furnace-Doors; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to
10 which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification.

This invention relates to the class known as "furnace-doors" for steam-boilers. Its object
15 is to feed straw, shavings, sawdust, or other rough or long fuel, preventing at the same time an excess of cold air into the furnace, and also to facilitate the feeding of such fuel by external means.

To these ends my invention consists in the devices for manipulating the door, for retaining it in an open position or in a partially open position by automatic means.

It further consists in the mode of hanging
25 the door, so that when put in position it is held therein by its attached mechanism; and it finally consists, in combination with the door, of external means for feeding the fuel thereto.

Reference being had to the drawings, Fig-
30 ure 1 is a front elevation of the door-frame and door and weighted pawls. Fig. 2 shows a side elevation of the door, the notched disk, and weighted pawl, with the door shown in dotted lines. Fig. 3 is a side elevation
35 showing the device for retaining the door in a closed position when not in use. Fig. 4 is a top plan view showing the incline or flaring mouth, disks, and weighted pawl. Fig. 5 is a vertical section through the door-frame and
40 door, also showing the feeding-pan and pushing-tool. Fig. 6 is a side elevation of the door-frame, showing in dotted lines the position of the door while inserting it in its bearings. Fig. 7 is a detail view of the door-bearing and
45 its shaft.

The same letters of reference designate like parts in all the figures, in which A is the door-frame projecting outwardly and flaring side-
50 wise, for guiding the fuel more readily to the mouth of furnace. This flaring mouth is an

important feature in the feeding of loose light fuel—such as shavings and straw, &c.—for the reason that when the mouth is contracted it is difficult to get the fuel into it.

B is the door, which is horizontally hung in
55 journal-bearings formed in lugs *a*, cast onto the door-frame. One end of the pintle *b*, by which these doors are suspended, is provided with a notched disk or segments, C, into which
60 a weighted pawl, D, works when the door is to be retained in an open position or partially open. Upon the other end of the pintle *b*, I
65 locate another disk, E, which is also provided with a notch for a pawl, *c*, to rest in, in such manner as to retain the door in a closed posi-
70 tion when at rest, whereby large volumes of cold air are prevented from entering the furnace, which would chill the furnace-walls, boilers, &c., and thereby lose a vast amount
of heat, which would be otherwise utilized in
getting up steam when operation is again re-
sumed.

Referring again to the bearing-lugs, I make the bearing-journals segmental in cross-section, and the bearings a corresponding shape, so that
75 when the door is inserted in the manner shown by Fig. 6 it is turned down and so retained in position that it cannot be removed until the door
is raised up again to the same position, so that
80 there is no danger of its flying out when opened in either direction. The weighted pawl D is pivoted on the door-frame in such manner as to fall automatically into the niches which hold the door in the required position. The objects
85 of the weight are of course obvious.

To better facilitate the feeding of the fuel, I
locate in the flaring mouth of the door-open-
ing a feed trough or pan, which loosely fits
therein, and into this trough the fuel is thrown,
and then pushed into the furnace by means of
90 a pushing-tool, the door always yielding inwardly when the fuel is pushed into the mouth of the furnace.

When the door is held in the position shown
by Fig. 5 by means of the notched disk and
95 weighted pawl D, the air is made to pass over the surface of the loose fuel which burns better on the surface than below it, which is very well known, and which principle I carry into
effect by my invention.

It will be observed that the door-frame may be cast in one piece with its various parts.

The door may be made of two sections secured together by rivets or other means, as shown by Figs. 1 and 6.

In doors made of sheet-iron, and principally used for light fuel, the lower portion frequently burns out, when the whole door is thrown away, in which case a new one is required. With my door I simply detach the lower portion from the upper and substitute a lower new portion at a small cost. The upper portion of the door being much more expensive to make, I thus produce a great saving to the user, and as any person of ordinary mechanical intelligence may remove the burned portion and substitute a new piece without the loss of time of going to the manufacturing-shops for repairs.

I am aware that swinging furnace-doors are not new, and that they have been made to hang automatically by counterpoise-weights, and that patents have been granted to me for combined doors and deflectors, none of which I claim; but I am not aware that a horizontally-suspended door having segmental bearings and journals, and provided with notched disks and independent weighted pawls for retaining the door in any desired open position, and means for preventing the door from swinging open when at rest, has ever been used. Therefore,

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

1. The combination, in a furnace-door for

feeding light fuel, of the door-frame A, flaring, as shown, the swinging door B, having notched disk C and independently-weighted pawl D, all operating together, as set forth.

2. The combination, in a furnace-door for feeding light fuel, of the door-frame having flaring sides, segmental bearing-lugs and fastening cast in one piece, the horizontally-swinging door, secured to the hinged upper portion, and notched disks and weighted pawl, all operating together, as set forth.

3. The combination, in a furnace-door for feeding light fuel, of the door-frame, the swinging door horizontally suspended from segmental trunnions, the notched disk C and weighted pawl for retaining the door in open position at one side of the door, and the notch-disk with unweighted pawl at the other side of the door for retaining the door in a closed position when the furnace is at rest, as set forth.

4. The combination, in a furnace-door for feeding light fuel, of the horizontally-swinging door adapted to be retained in position when pushed inward, the frame having flaring side, and the feeding trough and tool, the latter operating to raise the door to a partially open position when feeding fuel for the supply of air to the surface thereof automatically, as set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

THOMAS REED BUTMAN.

Witnesses:

B. F. MORSELL,
EDWARD E. ELLIS.