

No. 633,414.

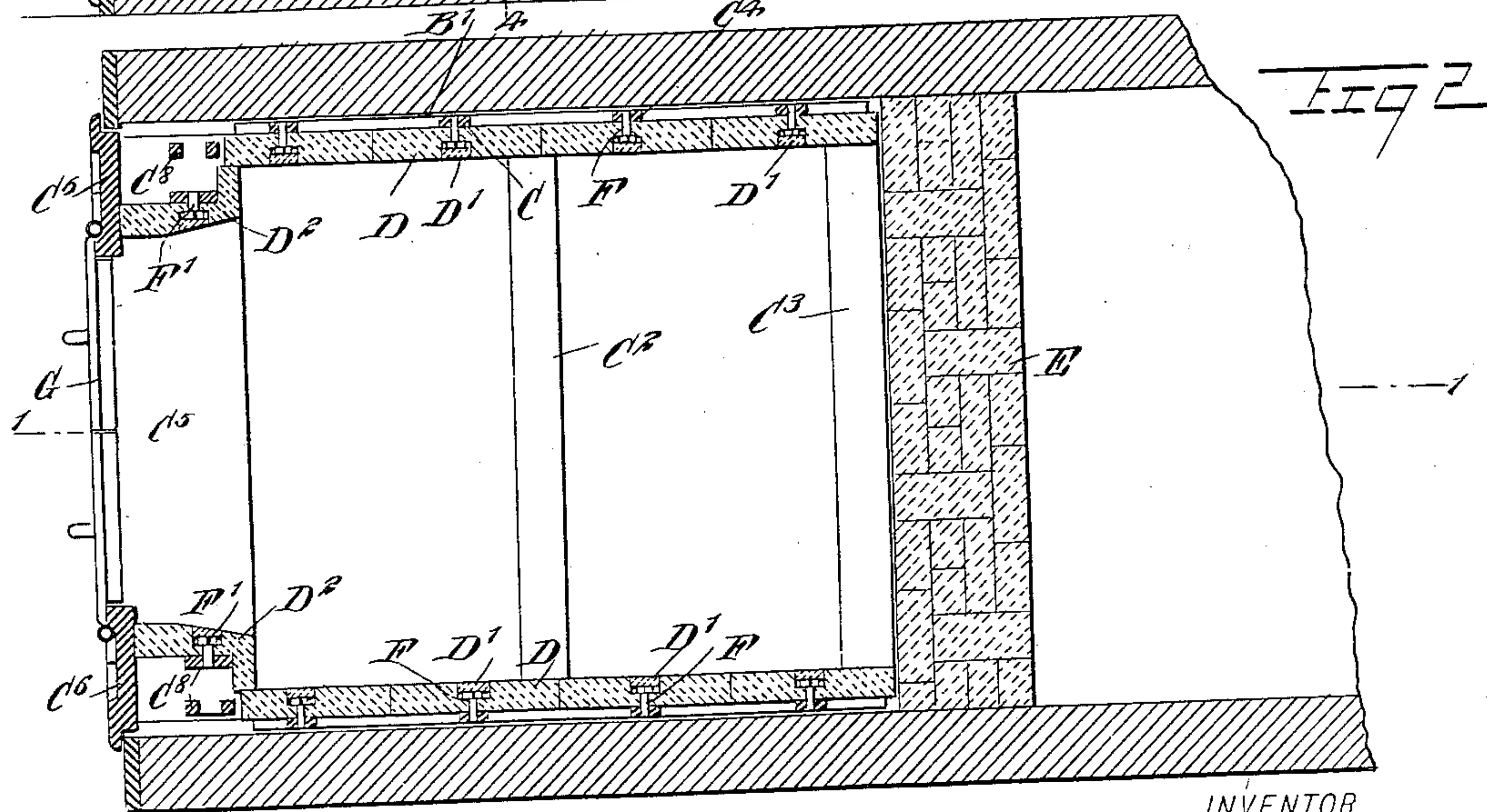
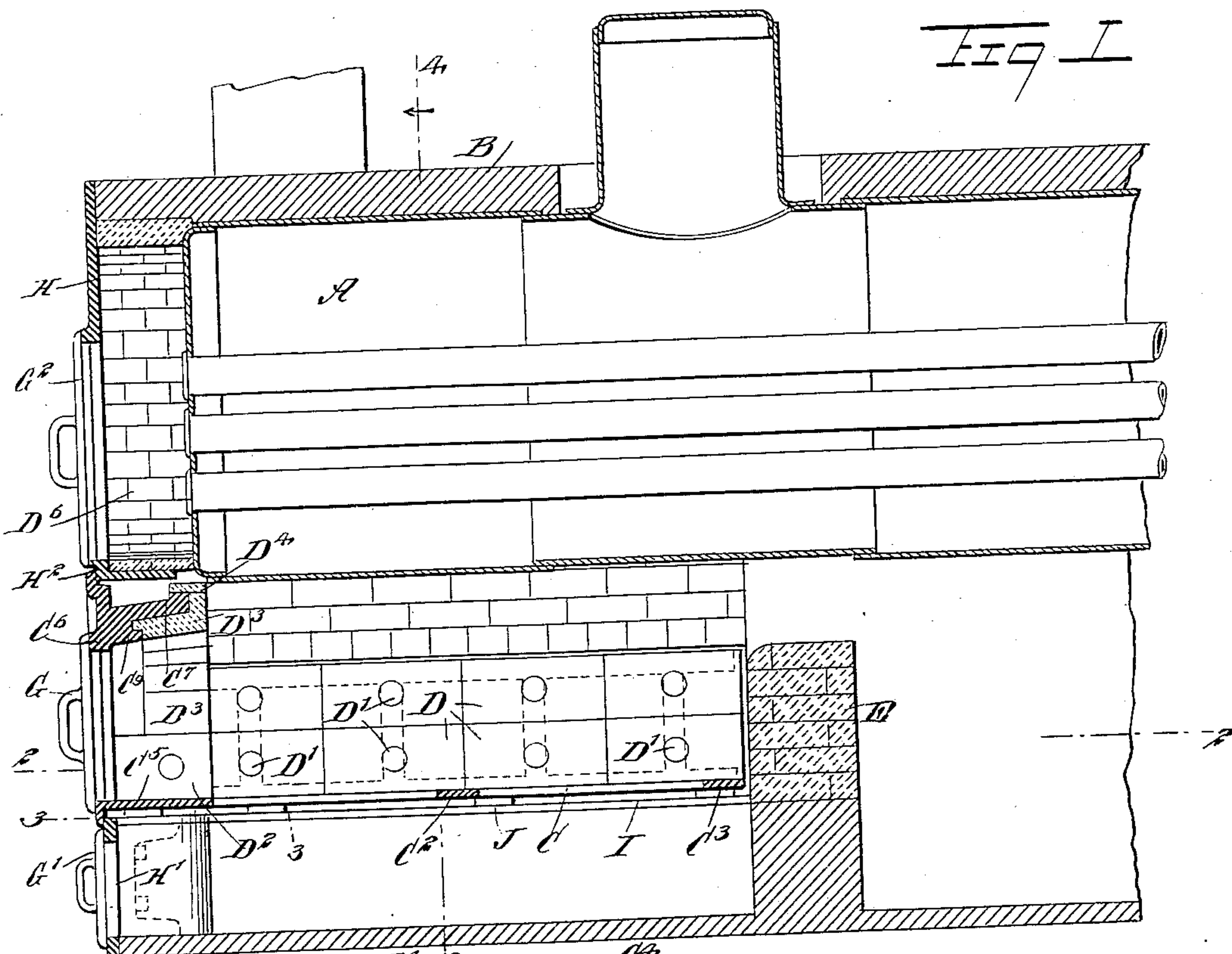
Patented Sept. 19, 1899.

C. W. BAIRD.
BOILER FURNACE.

(Application filed Jan. 7, 1899.)

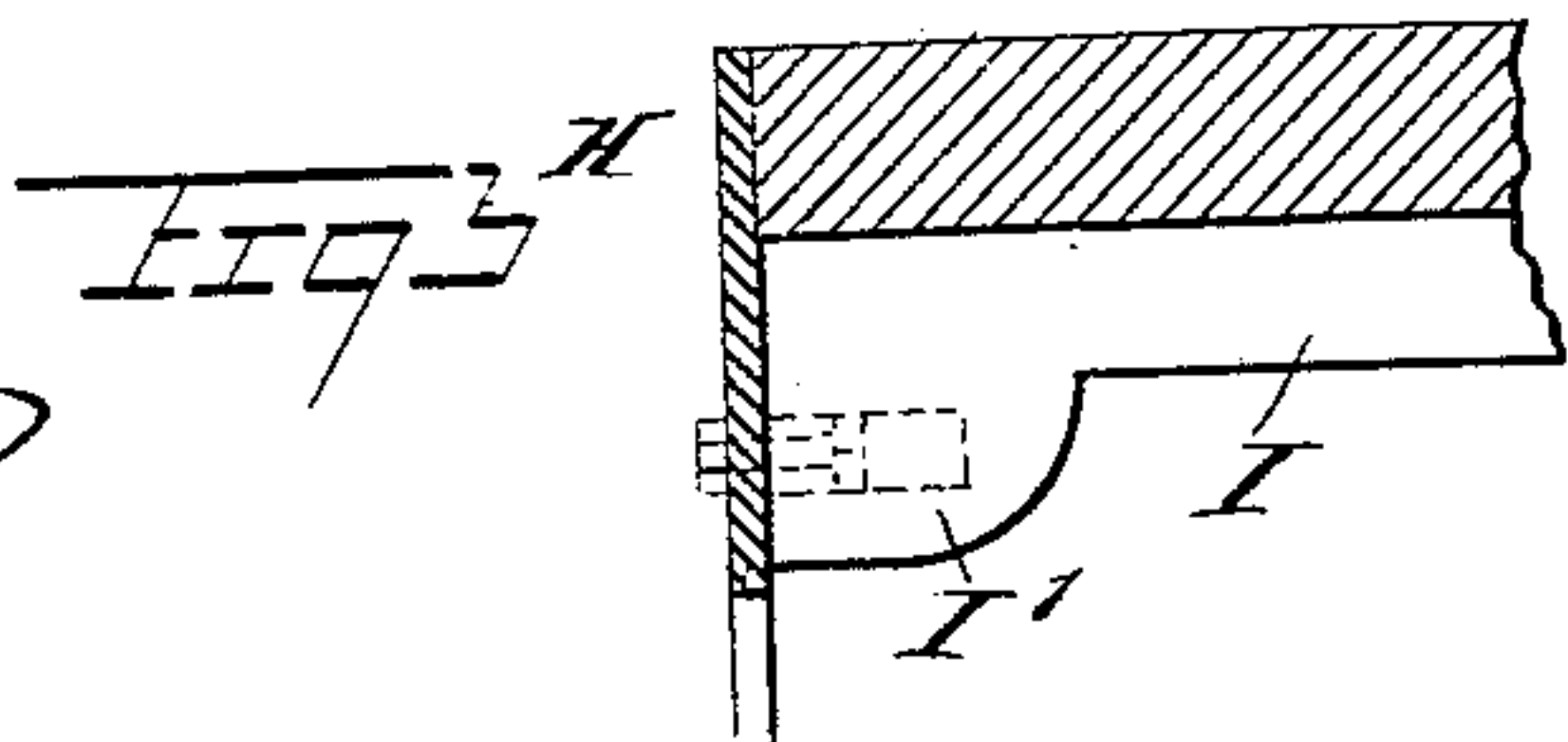
2 Sheets—Sheet 1.

(No Model.)



WITNESSES:

W. Walker
Rev. J. Foster



INVENTOR
Charles W. Baird
BY
Munn
ATTORNEYS.

No. 633,414.

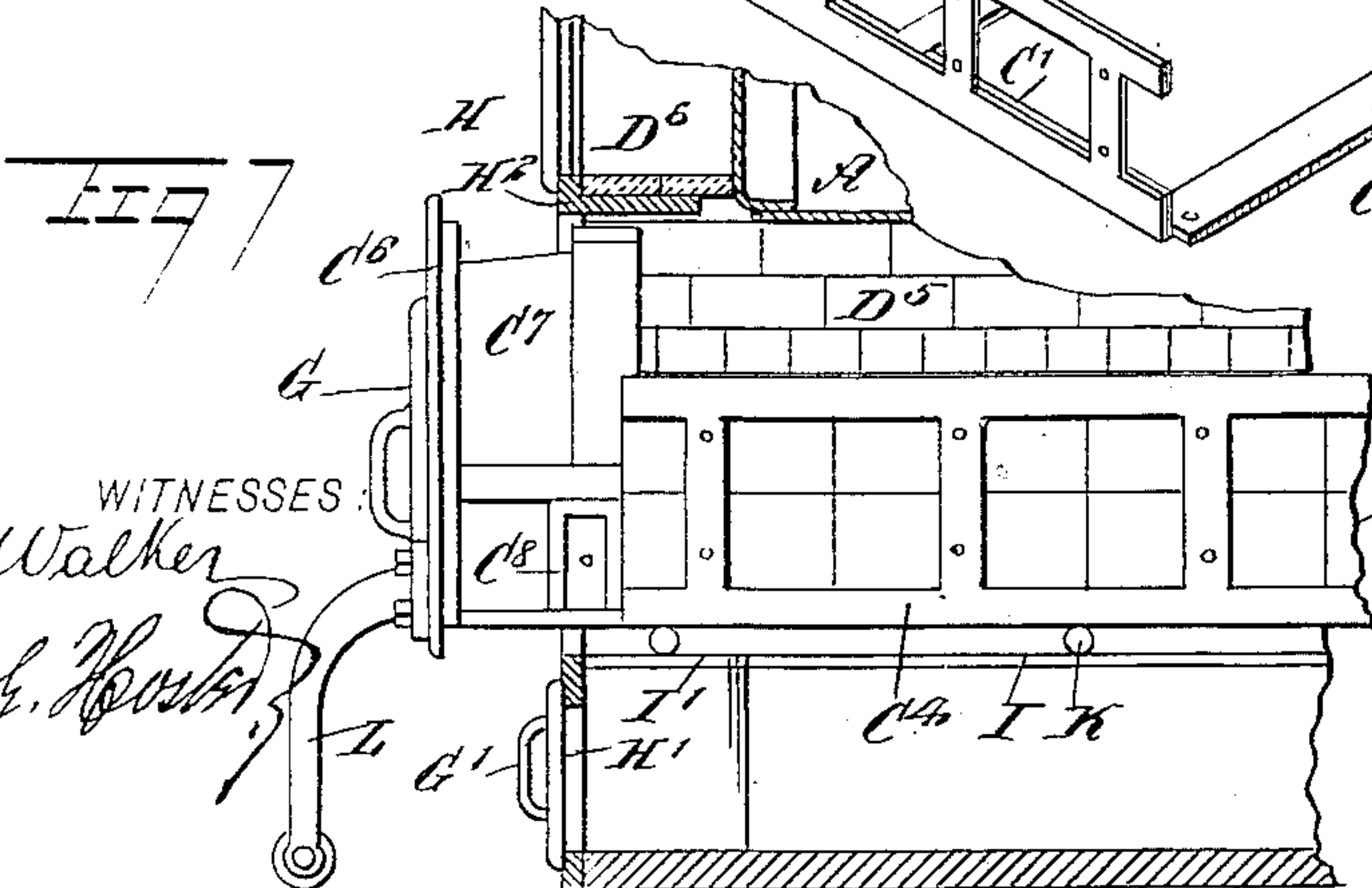
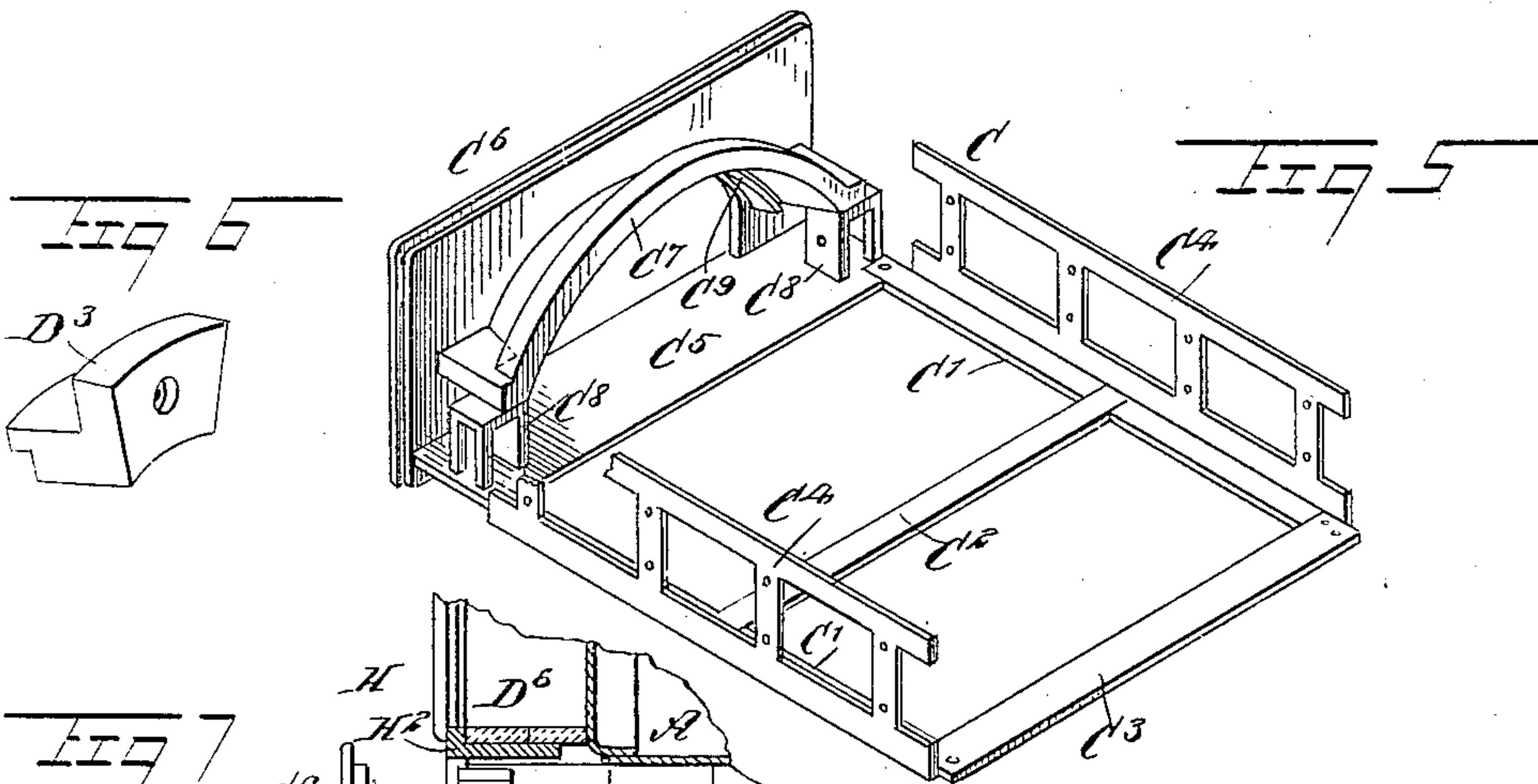
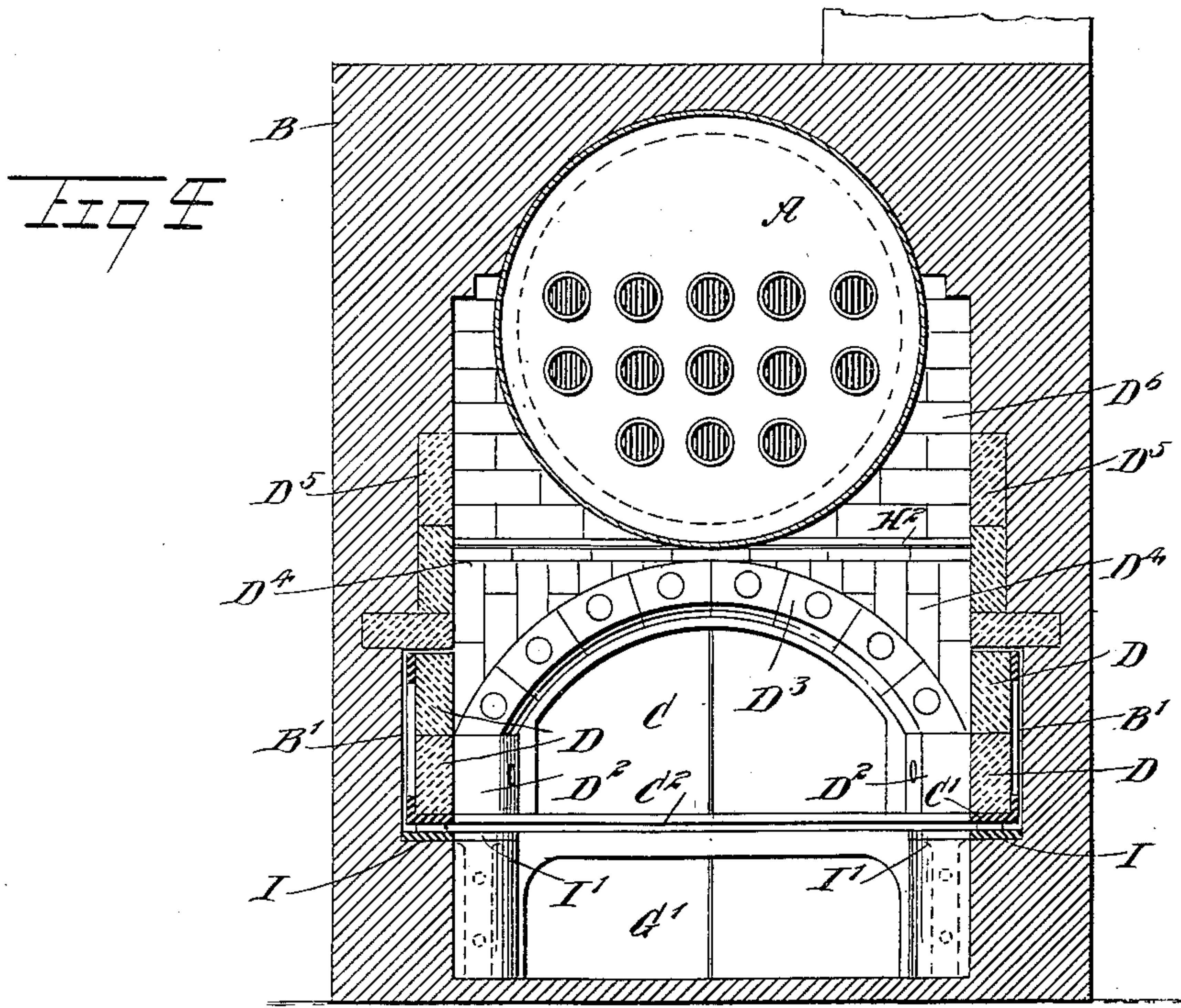
Patented Sept. 19, 1899.

C. W. BAIRD.
BOILER FURNACE.

(Application filed Jan. 7, 1899.)

(No Model.)

2 Sheets—Sheet 2.



WITNESSES:

H. Walker

Rev. J. H. H. H.

INVENTOR

Charles W. Baird.

BY

M. M. M.

ATTORNEYS.

UNITED STATES PATENT OFFICE.

CHARLES WILLIAM BAIRD, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF
TO WILLIAM I. KIDNEY, OF SAME PLACE.

BOILER-FURNACE.

SPECIFICATION forming part of Letters Patent No. 633,414, dated September 19, 1899.

Application filed January 7, 1899. Serial No. 701,482. (No model.)

To all whom it may concern:

Be it known that I, CHARLES WILLIAM BAIRD, of the city of New York, borough of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Boiler-Furnaces, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved boiler-furnace arranged to permit of conveniently and quickly lining and relining the whole or a part of the fire-box and adjacent parts at a comparatively small expense, to keep the furnace at all times in good condition, and to insure its perfect working without the loss or waste of any heat.

The invention consists of novel features and parts and combinations of the same, as will be fully described hereinafter and then pointed out in the claims.

A practical embodiment of my invention is represented in the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a longitudinal sectional elevation of the improvement on the line 1 1 of Fig. 2. Fig. 2 is a sectional plan view of the same on the line 2 2 of Fig. 1. Fig. 3 is a sectional plan view of part of the improvement on the line 3 3 of Fig. 1, showing the guide-plate for the skeleton frame. Fig. 4 is a transverse section of the improvement on the line 4 4 of Fig. 1. Fig. 5 is a perspective view of the skeleton frame with part broken out. Fig. 6 is a perspective view of one of the bricks for the arch over the fire-door, and Fig. 7 is a sectional side elevation of the improvement with the fire-box skeleton frame partly withdrawn.

The boiler A, of the usual construction, is suspended in the ordinary manner in the brickwork B, the fire-box portion of which is provided in its sides with longitudinally-extending recesses which form guideways B' for the skeleton frame C, carrying the lining D in the shape of fire-clay bricks, as indicated in the drawings, the guideways B' terminating at their rear ends at or near the bridge-wall E, built in the usual manner, with the upper portion of fire-brick, as indicated in

Figs. 1 and 2. The bricks for the lining D are formed with transversely-extending holes for engagement by bolts F, which permit of fastening the bricks in place on the skeleton frame, the front portions of the holes in the bricks that are countersunk being closed after the insertion of the bolts by suitable fire-clay material D' to protect the bolts from being burned by the heat in the fire-box.

The skeleton frame C is constructed as follows: Two longitudinally-extending rails C' are connected with each other by cross-bars C² and C³, arranged to support the grate-bars, and on the longitudinal rails C' are erected the skeleton sides C⁴, to which the fire-clay bricks D are secured by the bolts F. The bottom rows of bricks D rest on the rail C', and the forward ends of the latter are riveted or otherwise secured to the dead-plate C⁵, forming part of the door front C⁶, carrying the doors G. The door front C⁶ fits onto the boiler front H, having the usual openings H' for the ash-pit and doors G' for closing the said openings H'. The forward ends of the first set of grate-bars rest on the dead-plate C⁵, while the inner ends of the said grate-bars rest on the cross-bar C², which also supports the front ends of the second or rear set of grate-bars, resting with their rear ends on the cross-bar C³. The side rails C' of the skeleton frame are adapted to slide on metal guide-plates I, set on bricks of the brickwork B, with the forward ends of the said guide-plates somewhat enlarged, as at I', (see Fig. 3,) to permit of conveniently holding the guide-plates to the boiler front H, as indicated in the said figure. The enlarged portion I' preferably rests on the bricks built up from the bottom of the furnace to correspond to the shape of the enlarged end. The arch-plate C⁷ fits against the door front C⁶ and is supported on skeleton blocks C⁸, resting on the dead-plate C⁵, and on the under side of the arch-plate, near the front edge thereof, is arranged a shoulder C⁹ for receiving the reduced end of a fire-clay brick D³, covering the under side of the arch-plate, as well as the inner face thereof, as will be readily understood by reference to Figs. 1 and 6. The skeleton blocks C⁸ are lined on the inside by fire-clay bricks D², which also support the end bricks C³ on

the arch-plate, and the said bricks D^2 are fastened by bolts F' to the skeleton blocks C^8 in the same manner as the bricks D are fastened to the skeleton sides C^4 . (See Fig. 2.)

5 The guideways B' are somewhat higher than the sides of the skeleton frame C , so as to give ample room for conveniently sliding the skeleton frame, with its lining, in position, there being also sufficient space length-
 10 wise to allow of proper extension of the skeleton frame without straining the bridge-walls E . When the skeleton frame, with the lining attached thereto, is pushed into position in the guideways B' , the entire frame is
 15 jacked so as to bring the top of the sides C^4 and the top edges of the lining in firm contact with the fixed lining D^5 , built into the brickwork D , as is plainly indicated in Fig. 4. Wedges J , of iron or other suitable mate-
 20 rial, are then placed on top of the guide-plates I and under the rails C' , so as to hold the skeleton frame in an uppermost position, as is plainly indicated in Figs. 1 and 4. When it is desired to remove the skeleton frame for
 25 repairing the lining, the jacks are again employed to permit of holding the skeleton frame up to facilitate the removal of the wedges J and enable the location of the rollers K on the guide-plates I under the rails C' , as indi-
 30 cated in Fig. 7. The jacks are then removed, and the skeleton frame can be readily slid outward on the rollers K to allow the engineer to conveniently repair the lining at the out-
 side of the furnace.

35 On the door front C^6 is secured a wheeled arm L , (see Fig. 7,) adapted to travel on the floor to properly support the outer end of the skeleton frame when the latter is withdrawn from the furnace for repairing the lining, as
 40 above explained.

Bricks D^4 , of fire-clay, are set over the arch-bricks D^3 up to a supporting-plate H^2 , resting at its ends in the brickwork B and lined on the top by bricks D^6 , which also form the front
 45 smoke-box for the boiler, in conjunction with the boiler front and the head of the boiler-shell, as indicated in Fig. 1. If desired, the supporting-plate H^2 may be carried by angle-irons on the boiler front to give access to the
 50 smoke-box, as indicated in Fig. 1.

It is understood that the several bricks for the lining of the fire-box are flush with each other when the several parts are in position, as will be readily understood by reference to
 55 the drawings, so that the heat from the burning fuel does not come in contact with the metal forming the skeleton frame, and consequently such metal is perfectly protected and is not liable to be burned and therefore
 60 will last a very long time. It will further be seen that when the skeleton frame is supported in an uppermost position a very firm joint is made between the bricks D of the skeleton frame and the bricks D^5 , forming
 65 part of the fixed lining, so that no ashes or the like can pass into the joint.

By the construction described the arch-

plate only supports its own bricks and not those of the smoke-box above, and the said arch-plate is completely protected by its fire-
 70 brick lining, so that it is not liable to burn out, as is so frequently the case in the boiler-furnaces heretofore constructed. Should, however, the arch-plate be injured, it can be
 75 readily removed and replaced by a new one without disturbing the construction of the fixed part of the furnace or the remaining parts of the skeleton frame. Furthermore, as the arch-plate is supported by metallic
 80 blocks C^8 from the dead-plate C^5 and not from the brickwork of the furnace it is evident that the said arch-plate cannot fall down when the supporting fire-bricks are burned away, as is so frequently the case in furnaces as
 85 heretofore constructed.

If any of the fire-bricks on the skeleton frame are burned out, they can be easily re-
 placed by breaking the old fire-brick out and then putting new brick in position and bolt-
 90 ing the same securely to the frame and then plugging up the hole at the ends of the bolts with cement, as before described, and indicated in the drawings.

It will be understood that the lining for the skeleton frame may be asbestos or other ma-
 95 terial besides the fire-clay bricks, and I also may form the sides C^4 of the skeleton frame directly with a lining by making the same hollow and circulating water through the
 100 same.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. A furnace having a skeleton frame removably mounted in the fire-box and adapted
 105 to carry the fire-brick, the frame comprising longitudinally-extending side rails connected with each other by cross-ties, a dead-plate extending between the side rails at the front thereof, the dead plate and cross-bars carry-
 110 ing the grate-bars, skeleton sides respectively carried by the side bars, blocks rested on the end portions of the dead-plate, an arch-plate supported on the blocks, the blocks and arch-plate being capable of carrying fire-brick,
 115 and a door front carried on the dead-plate and arch-plate.

2. A furnace, having longitudinally-extending guideways in the sides of its fire-box and a skeleton frame mounted to slide in said
 120 guideways and carrying fire-brick, the skeleton frame being removable from the furnace and comprising longitudinally-extending side rails, skeleton sides mounted on the respec-
 125 tive side rails, cross-bars extending between the side rails, a dead-plate extending between the side rails at the front of the skeleton frame, the dead-plate and cross-bars serving to support the grate-bars, blocks mounted on the
 130 end portions of the dead-plate, an arch-plate carried by the blocks, the blocks and arch-plate being capable of carrying fire-brick, and a door front carried by the arch-plate and dead-plate.

3. A furnace, having a skeleton frame slid-
ably mounted in the fire-box and carrying
fire-brick, the frame being movable out of
the furnace, and a wheeled arm attached to
5 the outer end of the frame and having its
wheel bearing on the ground to support the
outer end of the frame when the frame is
moved out of the fire-box.

4. A furnace, having a skeleton frame
10 adapted to carry fire-brick, the frame being
slidably mounted in the fire-box, and com-
prising a dead-plate, blocks mounted on the
dead-plate, an arch-plate, the ends of which
are supported on the respective blocks, and
15 a door front carried by the dead-plate and
arch-plate.

5. A furnace, having a sliding skeleton
frame adapted to carry fire-brick, the frame
being movable out of the furnace and the
20 frame comprising blocks supported at the
front of the frame, an arch-plate, the ends of
which are sustained on the blocks, the arch-
plate being provided with a shoulder for re-
ceiving fire-brick, whereby the fire-brick is
25 held on the arch-plate, and a door front car-
ried at the front of the skeleton frame and
joined to the arch-plate.

6. A furnace, having guideways formed in

the sides of its fire-box, a skeleton frame slid-
ing in the guideways and comprising longi- 30
tudinally-extending side rails, skeleton sides
mounted respectively on the side rails and
carrying the fire-brick, cross-bars extending
between the side rails, and a dead-plate ex-
tending between the side rails at the front of 35
the frame, the dead-plate and cross-bars serv-
ing to carry the grate-bars.

7. A furnace, having a sliding frame for
carrying fire-brick, the frame being movable
out of the furnace, and the frame comprising 40
longitudinally-extending side rails skeleton
sides mounted respectively on the side rails,
and cross-bars extending between and join-
ing the side rails, the cross-bars serving to
carry the grate-bars.

8. A furnace, having guideways in the 45
walls of the fire-box thereof, and a sliding
frame mounted in said guideways and hav-
ing portions extending across the fire-box,
such portions serving to carry the grate-bars 50
and the sliding frame serving to carry fire-
brick.

CHARLES WILLIAM BAIRD.

Witnesses:

VICTOR LEVI,
RICHARD F. HEARD.