

No. 753,059.

PATENTED FEB. 23, 1904.

J. H. FOOTE.
BOILER FURNACE.
APPLICATION FILED MAR. 10, 1903.

NO MODEL.

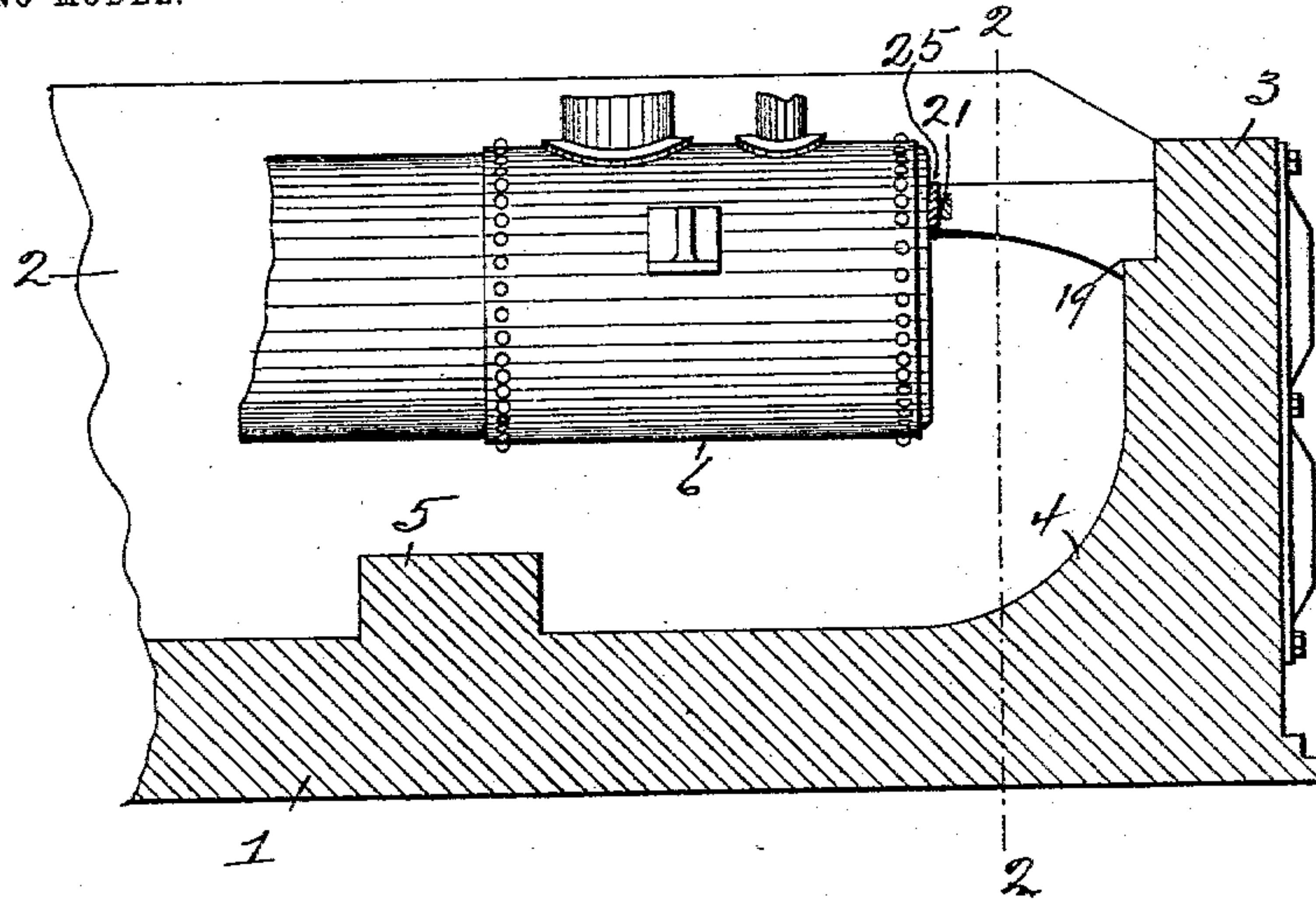


FIG 1

FIG 2

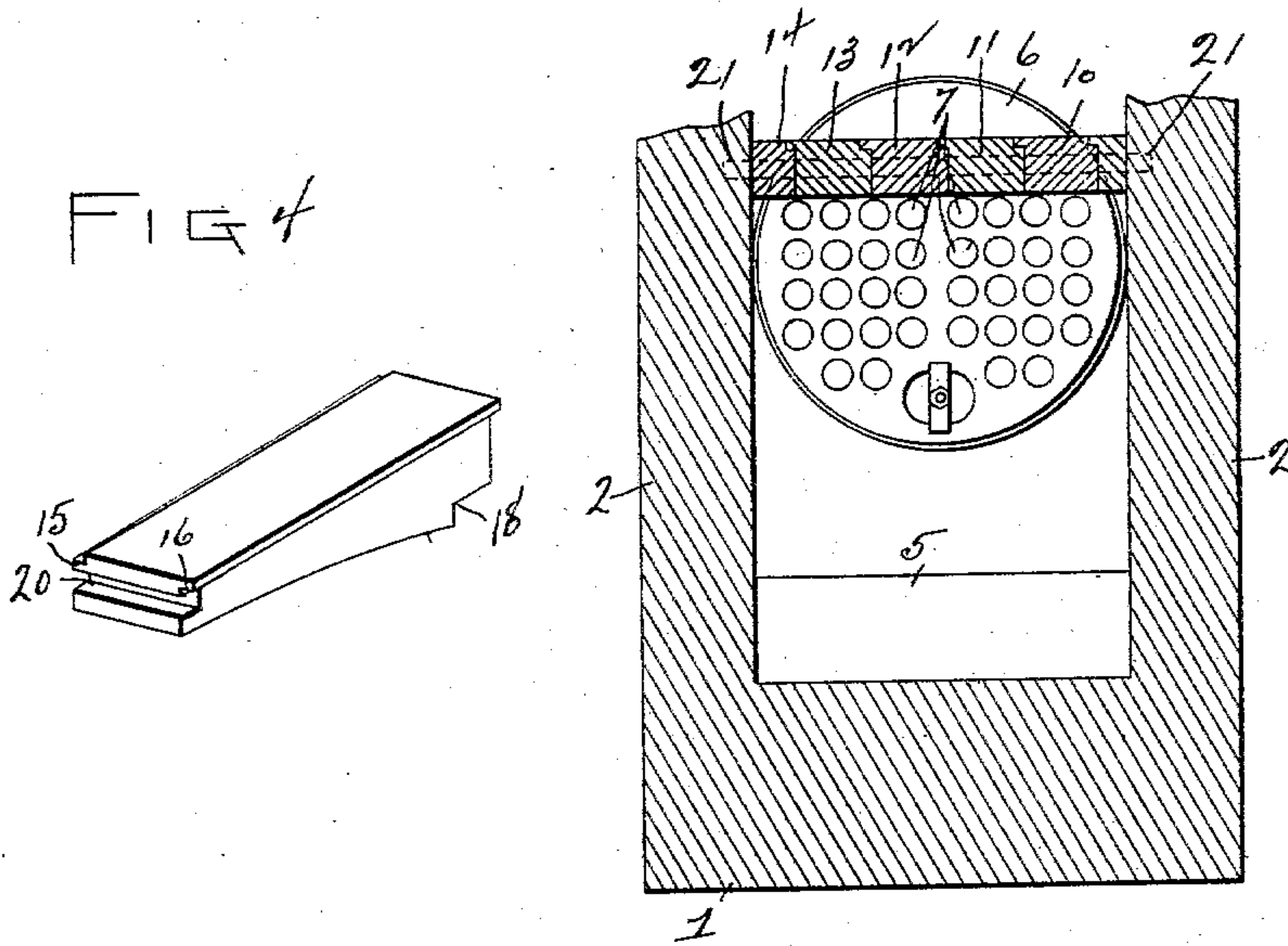


FIG 4

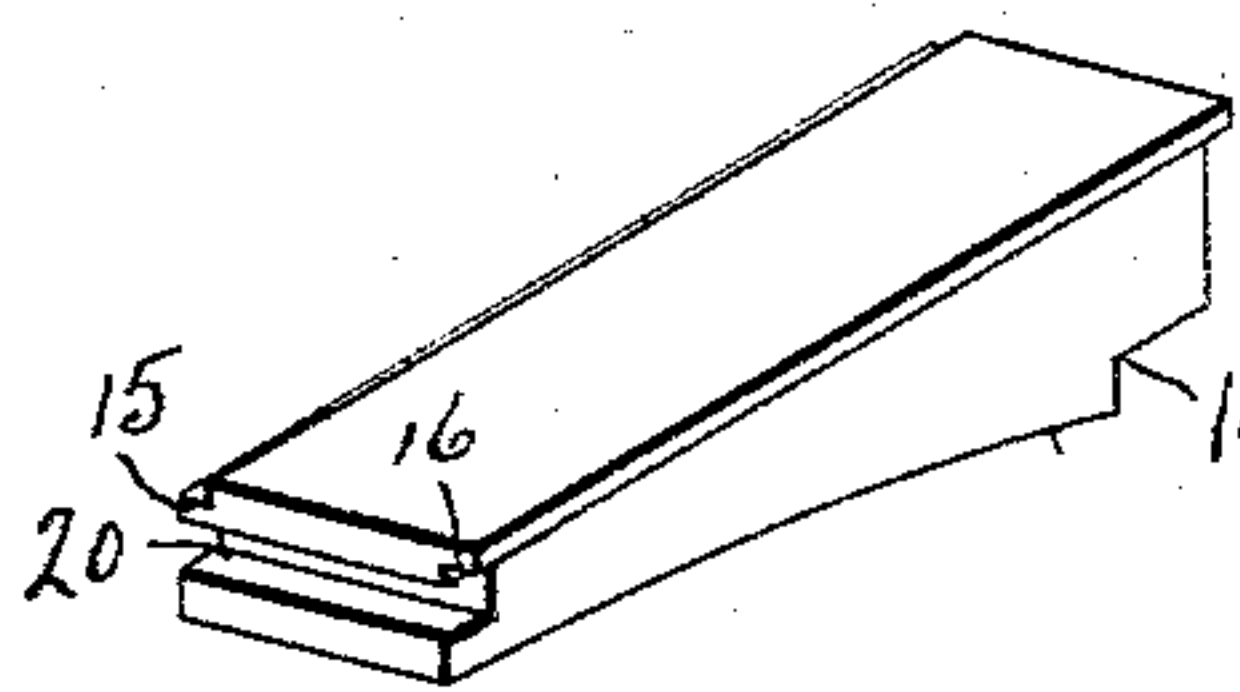
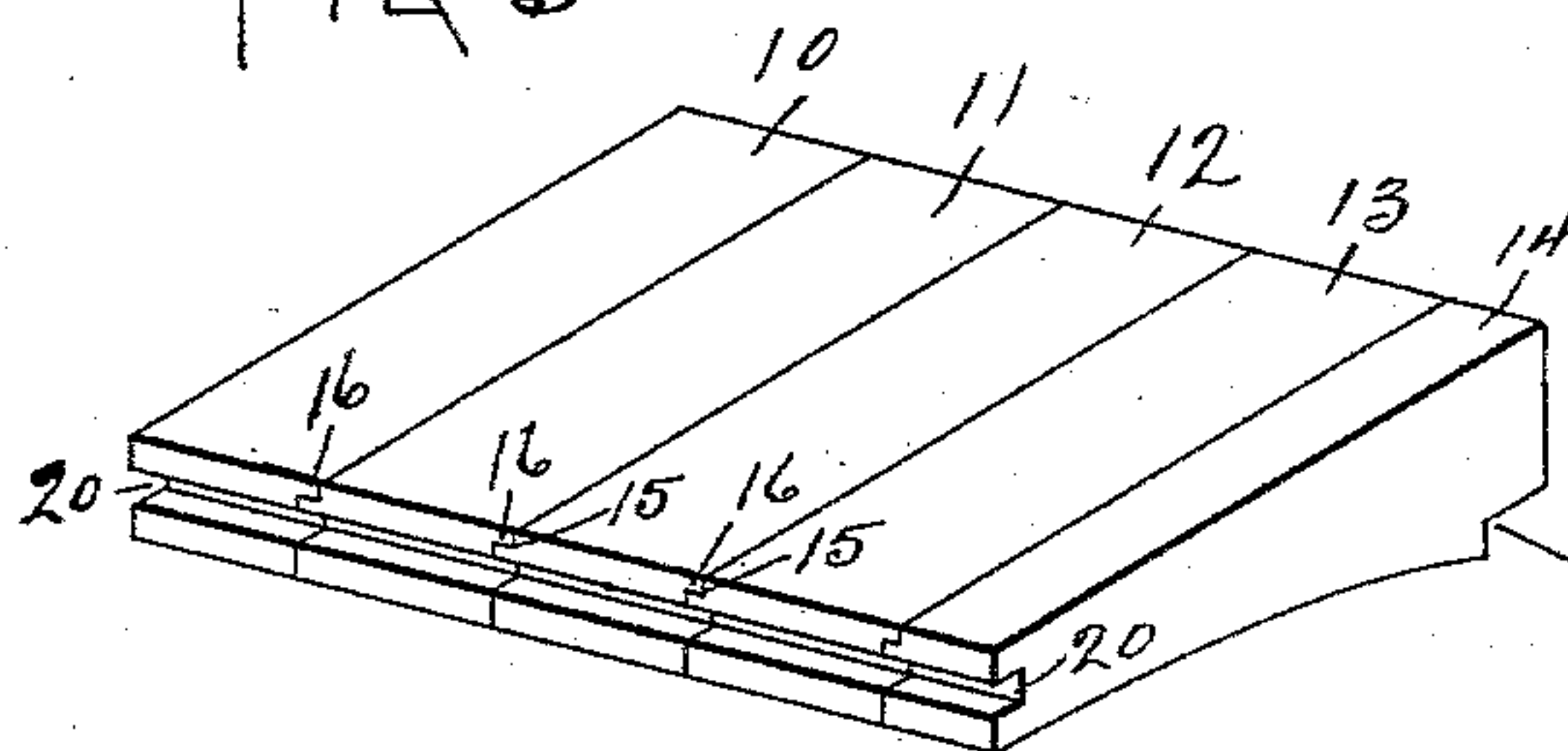


FIG 3



WITNESSES
Wm. S. Green
E. M. O'Reilly

INVENTOR

John H. Foote

724
Prosser & Curtis
attys.

UNITED STATES PATENT OFFICE.

JOHN H. FOOTE, OF TROY, NEW YORK, ASSIGNOR OF ONE-HALF TO
HARVEY S. McLEOD, OF TROY, NEW YORK.

BOILER-FURNACE.

SPECIFICATION forming part of Letters Patent No. 753,059, dated February 23, 1904.

Application filed March 10, 1903. Serial No. 147,134. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. FOOTE, a citizen of the United States, residing at Troy, county of Rensselaer, and State of New York, have invented certain new and useful Improvements in Boiler-Furnaces, of which the following is a specification.

The invention relates to such improvements; and it consists of the novel construction and combination of parts hereinafter described and subsequently claimed.

Reference may be had to the accompanying drawings, and the reference characters marked thereon, which form a part of this specification.

Similar characters refer to similar parts in the several figures.

My invention relates more particularly to what is known as the "back" arch of a combustion-chamber.

The principal objects of the invention are to provide a more durable arch and to impart to the lower surface of the arch and the surface of the bed of the combustion-chamber a shape which will tend to facilitate the passage of the products of combustion through the combustion-chamber.

Figure 1 of the drawings is a central vertical longitudinal section of the improved furnace with the front portion, which may be of any known construction, broken away. Fig. 2 is a vertical cross-section taken on the broken line 2 2 in Fig. 1. Fig. 3 is a view in symmetrical perspective of the fire-brick portion of the back arch detached. Fig. 4 is a similar view of one of the elongated bricks forming a part of the arch detached from its fellows.

The bed 1 and side walls 2 of the furnace are preferably made of fire-brick in the usual well-known manner except that at the junction of the bed-wall and the back wall 3 a curved surface 4 is provided instead of the usual right-angled corner.

The usual bridge-wall is represented at 5, and 6 represents the boiler, which may be of any well-known form provided with the combustion-flues 7, as seen in Fig. 2.

The preferred form of improved arch

(shown in Fig. 3) is made up of a plurality of elongated fire-bricks 10, 11, 12, 13, and 14. Each of the intermediate bricks of the arch is provided with a rabbet or groove 15 along one edge and a fillet or molding 16 along its opposite edge adapted to fit into the rabbet in the neighboring bricks, whereby the bricks when assembled together, as shown in Fig. 3, have interlapping portions to make a tight joint between the individual bricks. The outer or end bricks would have these lapping portions only on one side, as shown, and these outer or end bricks may be of different widths to make the complete arch of the proper width to fill the space between the side walls of the furnace. In Fig. 3 only one of the end bricks is shown narrower than the others, while in Fig. 2 both end bricks are shown narrower than the intermediate bricks. One end of the bricks is adapted to rest upon and be supported by the back wall of the furnace and may be provided with a rabbet 18, adapted to receive the corner 19 of the back wall. The other or forward ends of the bricks are severally provided with the channel or groove 20, adapted to receive a bar 21, shown in section by solid lines in Fig. 1 and by dotted lines in Fig. 2. This bar is made of sufficient length to project beyond the bricks of the arch and enter or bear upon the side walls of the furnace, as indicated by dotted lines in Fig. 2. The arch is thus supported at one end by the back wall and at the other end by the bar. The bar being thus covered by the fire-bricks forming the arch is protected from the heat, and thus made more durable than the usual forms of construction where angle-bars are inserted in the walls, and the space between these bars filled in with fire-brick of the ordinary dimensions. The lower portion of these angle-bars being exposed to the extreme heat of the furnace soon deteriorate and break down. The space between the front end of the arch and the boiler is preferably packed with a yielding cement 25, such as asbestos-cement, to allow for expansion and contraction of the boiler and other parts. It is obvious that the bar 21 may be passed through openings formed in the individual bricks of the arch at some distance from its

end instead of an open channel, as shown. In either case the iron bar is embedded in the fire-bricks and protected from the heat.

By having the under surface of the forward
 5 portion of the arch plane and smooth I am able to place the arch in such a position that its lower surface will be only a fraction of an inch above the upper edge of the combustion-flues of the boiler, as will be seen in Fig.
 10 2, and by having this bottom surface of the arch adjacent to the boiler approximately horizontal and plane ample room is afforded for inserting an expanding-tool to expand the combustion-flues into the head of the boiler
 15 whenever a new flue is inserted by way of repairs without removing the arch or the back wall. This is not permissible when the arch is supported by angle-bars, as above described, which project down below the surface of the
 20 arch, it being important to have the lower surface of the arch close to the combustion-flues in order that the boiler-head above the flues may be protected from the heat and that the fusible safety-plug may be placed as
 25 low as possible to increase the safety capacity of the boiler. By giving the portion of the arch neighboring the back wall a downwardly-inclined under surface, as shown in the drawings, and at the same time keeping the trans-
 30 verse surface straight and approximately horizontal the passage of the products of combustion through the combustion-chamber is facilitated. The passage of these products of combustion is further facilitated by filling in the
 35 usual right-angle corner between the bed and the back wall with a curved or upwardly-inclined surface 4, as shown in the drawings. This surface 4 may be curved in the arc of a circle, or it may be inclined with a plane sur-
 40 face. The same is true of the inclined bottom surface of the arch. It may be either a plane surface or a curved surface, as shown. By having the curved surfaces at the junction of the back wall and the bed of the chamber, as
 45 well as the arch, the draft through the combustion-chamber will be greatly increased.

The lower surface of the front end of the arch is plane and horizontal to the very end, where the cement is inserted between such
 50 end and the boiler. Such form permits of

protecting the boiler from heat down to the upper tier of boiler-flues without interfering with the removal of such flues for repairs, while the arch remains in place and undisturbed. The steam-space in the boiler is thus
 55 increased, since the water-line may safely be maintained at a level two or three inches lower than would be possible if the forward end of the arch was rounded off, as sometimes practiced. 60

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

1. In a boiler-furnace, a combustion-chamber arch, consisting of a series of elongated interlapping fire-bricks, adapted to rest upon
 65 and be supported at one end by the back wall of the furnace, and provided, at the other end, with a supporting-bar embedded in the arch with its ends projecting at the sides of the
 70 arch and adapted to bear upon the side walls of the furnace and support the arch in close proximity to, but wholly independently of, the boiler, substantially as described.

2. In a boiler-furnace, a combustion-chamber arch, consisting of a series of elongated
 75 interlapping fire-bricks, adapted to rest upon and be supported at one end by the back wall of the furnace, and provided at the other end, with a supporting-bar embedded in the arch
 80 with its ends projecting at the sides of the arch and adapted to bear upon the side walls of the furnace and support the arch in close proximity to, but wholly independently of, the boiler, and a yielding packing between
 85 the arch and boiler, substantially as described.

3. A combustion-chamber arch adapted at one end to rest upon the back furnace-wall and at its other end provided with a plane approximately horizontal under surface extending
 90 to the extreme front end of the arch and means for supporting such end in close proximity to the boiler with its horizontal under surface just above the upper edge of the upper tier of boiler-flues, substantially as described.

In testimony whereof I have hereunto set
 my hand this 27th day of February, 1903. 95

JOHN H. FOOTE.

Witnesses:

GEO. A. MOSHER,
 E. M. O'REILLY.