

No. 721,482.

PATENTED FEB. 24, 1903.

E. WARD.
STEAM BOILER.

APPLICATION FILED MAY 23, 1902.

NO MODEL.

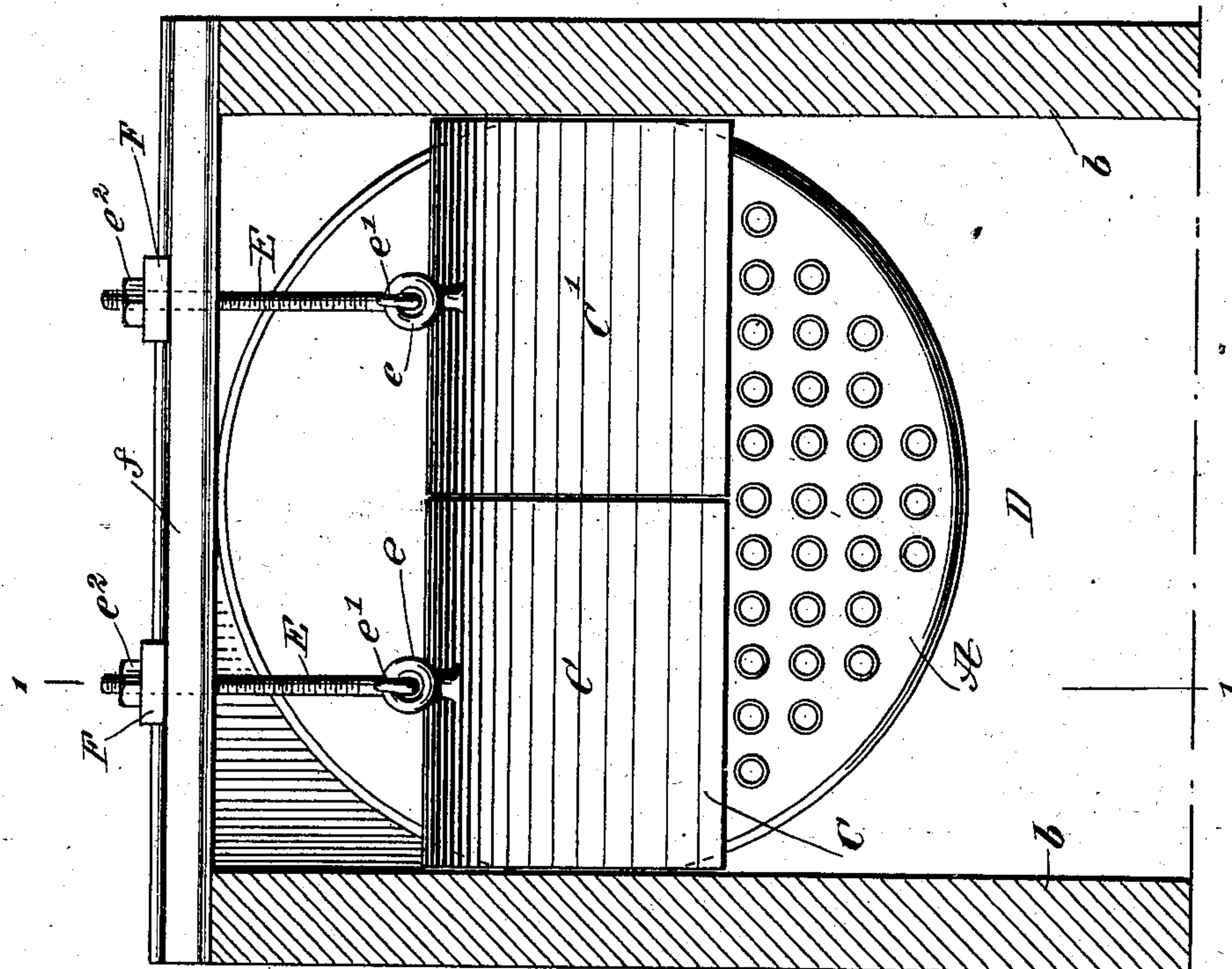


Fig. 2

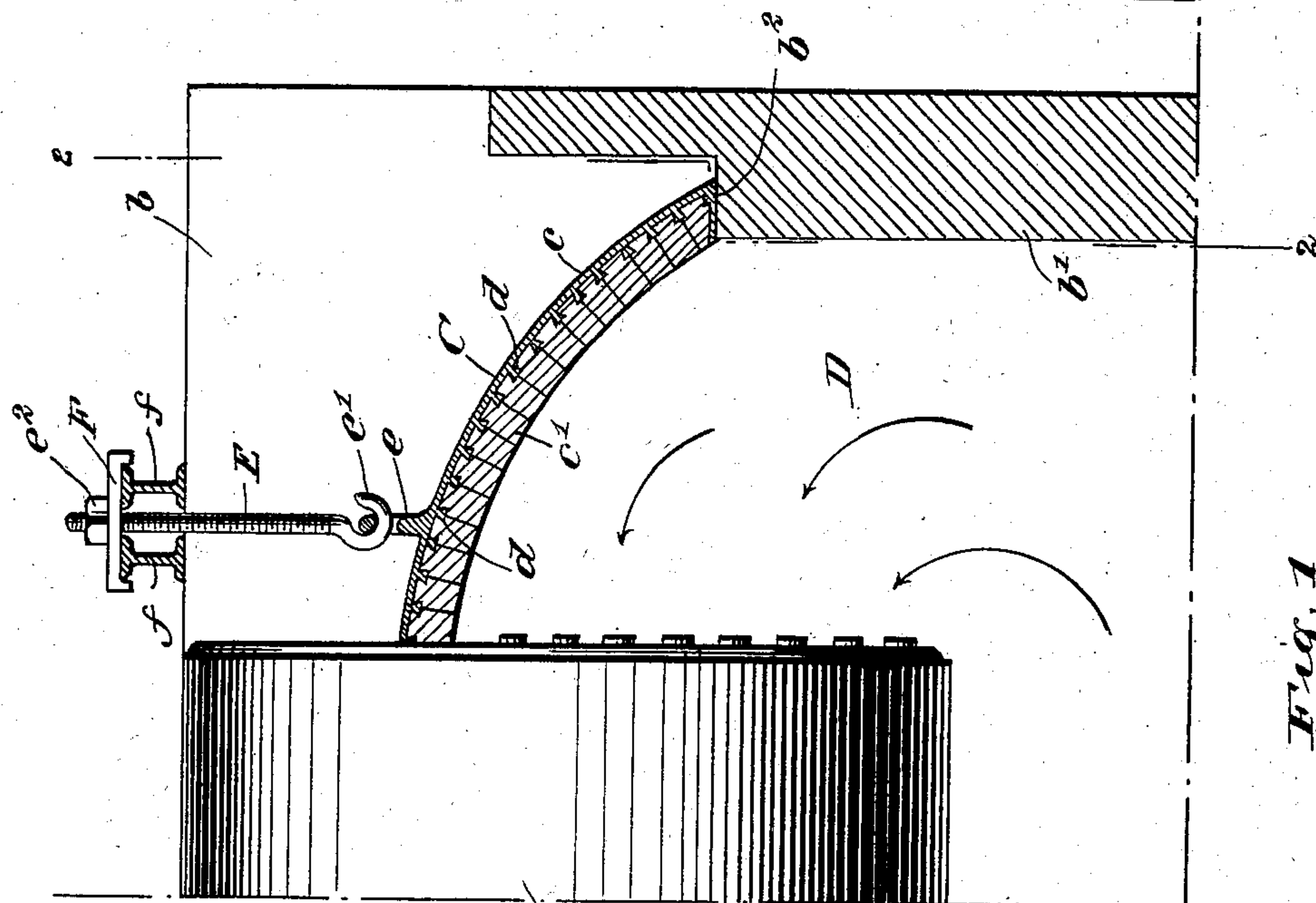


Fig. 1

WITNESSES:

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EDWARD WARD, OF MAYVILLE, WISCONSIN.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 721,482, dated February 24, 1903.

Application filed May 23, 1902. Serial No. 108,663. (No model.)

To all whom it may concern:

Be it known that I, EDWARD WARD, a citizen of the United States, and a resident of Mayville, in the county of Dodge and State of Wisconsin, have invented certain new and useful Improvements in Steam-Boilers, of which the following is a full, clear, and exact description.

My invention relates to improvements in steam-boilers; and it is more particularly directed to that part at the rear known as the "arch," which forms part of the return or combustion chamber.

The object of the present invention is the provision of a simple and durable construction which may be easily removed and replaced, as occasion may require, without disturbing the brick of the boiler-setting at the side or rear walls, whereby the rear end of the boiler can be exposed to enable access to be obtained to the boiler or the flues thereof for the purpose of repairing and cleaning the parts. The improvements also overcome all difficulty of expansion of the parts crowding or displacing the brickwork, and the parts of the improved device are joined together in a novel way and so as to dispense with bolts or other equivalent fasteners.

With these ends in view the invention consists of a steam-boiler embodying the novel features of construction and arrangement, which will be hereinafter fully described and claimed.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in both the figures.

Figure 1 is a sectional elevation on the line 1 1 in Fig. 2 through the rear part of a steam-boiler having my improvement applied thereto, and Fig. 2 is a transverse sectional elevation taken in the plane of the dotted line 2 2 in Fig. 1.

A designates the rear portion of an ordinary return-flue steam-boiler, which is disposed in the usual way within a boiler-setting, the side walls of which are indicated at *b* and the rear wall at *b'*. The space between the upper rear part of the boiler A and the rear wall *b'* of the boiler-setting is closed by one or a series of arches, (indicated at C C',) the number of arches depending upon the di-

ameter of the boiler. It will be understood that the invention may employ a single arch when a boiler of small diameter is used; but the number of arches may be increased to two, three, or more, as may be required, although I have only shown two of the arches C C' in Fig. 2. Each arch consists of a metallic backing *c* and a facing *c'*, which is made of fire-brick or other heat-resisting material. In the manufacture of each arch I prefer to arrange the fire-brick facing *c'* in a proper curved position and to cast the backing *c* against the rear surface of said fire-brick facing, whereby the metallic backing and said brick facing are united intimately and solidly together without the employment of bolts or other suitable fastenings. It is my practice, however, to provide the convex rear surface of the brick facing with recesses or grooves into which flows the molten metal of the metallic backing during the operation of casting said backing, thus uniting the facing and the backing by the keys, (indicated at *d* in Fig. 1.) The recesses or grooves in the brick facing may be of dovetailed shape in cross-section in order that the keys may take a similar shape, and this construction not only binds the fire-brick and the metal backing substantially together, but it enables me to produce a superior arch at a low cost of manufacture. The metallic backing of the brick-lined arch is provided with a loop or eye *e*, which is adapted to receive the hook *e'* on the lower extremity of a threaded suspension-bolt E, the latter passing in an upward direction above the boiler-setting and between suitable cross-rails *f*, which are adapted to rest upon the boiler-setting at the rear part thereof. The space between the rails is spanned by one or more bridges F, and on each bridge is adapted to rest a nut *e''*, which is screwed on the threaded shank of the suspension-bolt, whereby the bolt is adjustably connected to a supporting device located on the top part of the boiler-setting.

By employing the arch or arches contemplated by this invention the rear wall *b'* of the boiler-setting need not extend to the top edges of the side walls *b*, and in Fig. 1 I have shown this rear wall as terminating a suitable distance below the top edges of the side walls,

thereby opening the rear end of the boiler-setting. I prefer to employ a seat on the rear wall b' for the reception of the lower edge of the arch or arches, and this seat is provided
 5 by cutting away or reducing the width of the top part of said wall b' , thus forming a ledge b^2 , which constitutes the seat just referred to.

In applying my improvements to a boiler it is only necessary to erect the rear wall b'
 10 to a height sufficient to extend above the return-flues of the boiler A, and the arch or arches C C' are then placed in position, so as to span the space between the upper rear end of the boiler and this rear wall b' , whereby
 15 the arches and the setting coöperate to produce the return or combustion chamber D. The upper front end of each arch rests against the solid or unbroken part of the rear flue-sheet, said front end engaging with the boiler
 20 on a line above the return-tubes thereof. The lower rear end of the arch or arches is seated firmly upon the ledge or shoulder of the rear wall, and said arches are engaged by the suspension-bolts E, the latter relieving the boiler
 25 and the setting of some of the weight of the arches.

It is evident that the suspension-bolts may be manipulated in order to raise the arches and permit their removal from the furnace,
 30 thus opening the rear portion of said setting and allowing workmen to obtain easy access to the rear part of the boiler, whereby the flues or tubes can be easily cleaned, or any one of the tubes can be taken out of the
 35 boiler should occasion demand. The employment of the arches overcomes expansion of the rear part of the boiler, which in ordinary structures is sometimes sufficient to displace or crowd out the bricks from the rear
 40 wall b' . My improvements enable the rear part of the boiler to be opened with facility and despatch for the performance of neces-

sary work or for inspection of the parts. These improvements may easily be removed and applied, and they may be manufactured
 45 at a low cost. The employment of the fire-brick as a facing for the metallic back preserves the latter from the deteriorating action of the heat and products of combustion, and the arches are very durable and efficient in
 50 service.

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

1. The combination with a boiler, and a
 55 rear wall, of an arch spanning the space between the boiler and said wall and provided on its upper convex face with a loop or eye, a bridge on the boiler-setting, a suspension-bolt hooked into said loop or eye of the arch,
 60 and a nut screwed on the bolt and supported by the bridge to adjustably suspend said arch.

2. The combination with a steam-boiler, and a rear wall, of a series of arches spanning
 65 the space between the wall and the boiler and removable individually therefrom, and means for separately suspending and adjusting the arches of the series.

3. The combination with a steam-boiler, 70 and a rear wall, of bridge-bars in rear of the boiler, a suspension-plate on said bars, an arch resting on the wall and against the boiler, a bolt connected to said arch, and means for
 75 adjustably connecting said bolt to the suspension-plate.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EDWARD WARD.

Witnesses:

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 E. G. BENNETT.