M. F. COX.

FIRE BRICK ARCH FOR BOILER FIRE BOXES.

APPLICATION FILED AUG. 30, 1915.

1,231,854. Patented July 3, 1917.

Fig. 2.

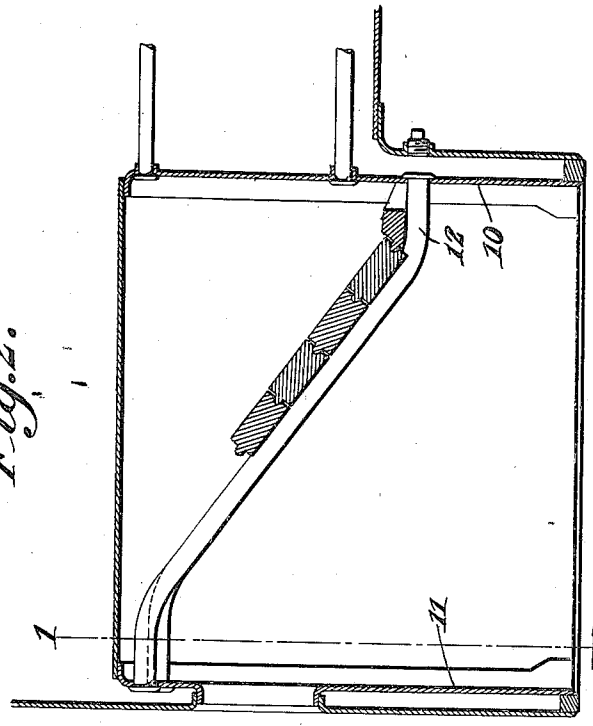


Fig. 4.

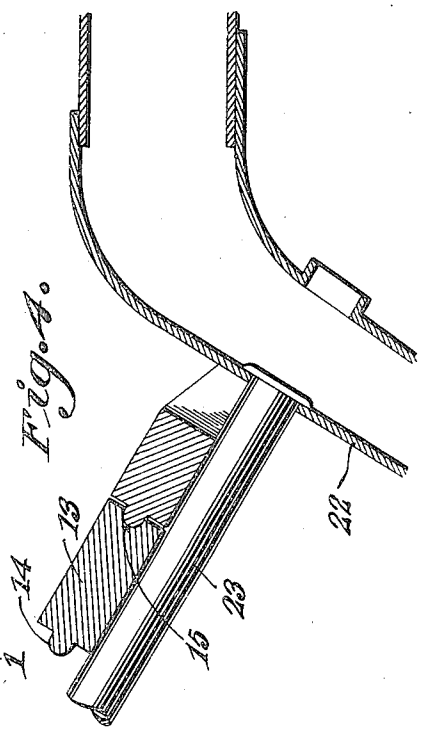


Fig. 1.

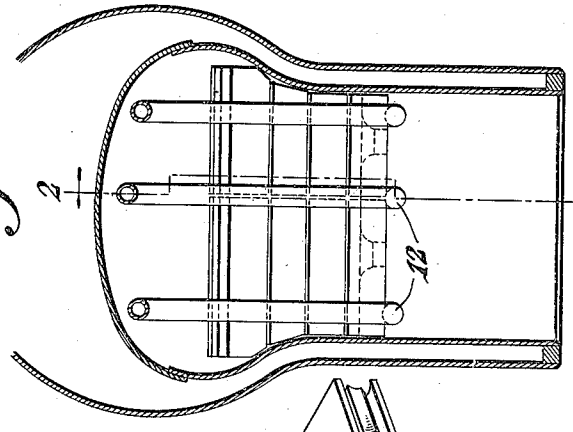


Fig. 3.

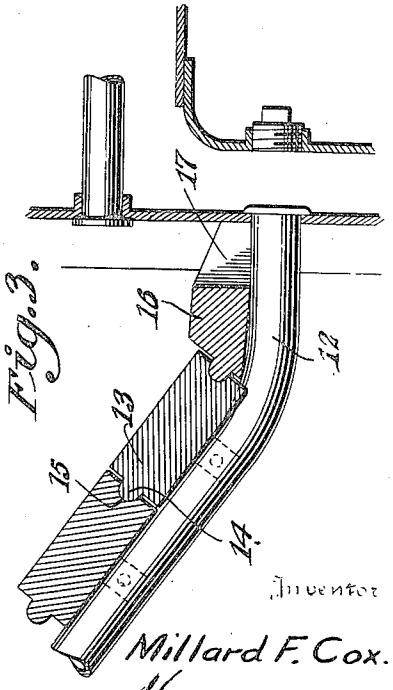
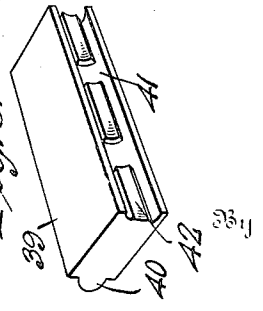


Fig. 5.



Witnesses

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FIRE-BRICK ARCH FOR BOILER FIRE-BOXES.

1,231,854. Specification of Letters Patent. Patented July 3, 1917.

Application filed August 30, 1915. Serial No. 48,093.

To all whom it may concern:

Be it known that I, MILLARD F. COX, a citizen of the United States, residing at Louisville, in the county of Jefferson and State of Kentucky, have invented certain new and useful Improvements in Fire-Brick Arches for Boiler Fire-Boxes, of which the following is a specification.

This invention relates to a fire brick arch for boiler fire boxes for a stationary or a locomotive boiler. Such arches are used for the purpose of baffling temporarily the direct flow of the gases generated from the grate on their way to the boiler tubes, and cause the gases to flow first back and then forward through the entire length of the fire box. This baffling is sufficient to accomplish the more perfect combustion of the fuel and to cause the gases to be entirely consumed before they have an opportunity to escape through the flues. This arch or baffle also tends to more evenly distribute the gases generated by the combustion to the entire inside surface of the fire box, resulting in a more free water circulation and increased evaporation, and consequently provides a better and more economical steam producing boiler.

The advantage in building such an arch in sections is that it can be more easily renewed and many pieces may be saved and used over again. Since the advent of the wide fire box boilers, it has shown itself a very important factor in fuel economy and indispensable to the modern type of high pressure boiler provided with superheaters. The intense heat in the fire box does, however, soon destroy the arch and it has been found that the life of the arch is generally about 90 days when it has to be entirely renewed or thoroughly repaired.

It has been found from a number of actual tests, that my arch gives longer service as compared with other similar baffles or arches, the bricks being entirely or almost entirely uniform, depending on the particular shape of the fire box, and very easy to manufacture and the cost of maintaining is very small. These bricks have therefore shown themselves to be superior to others with which they have been compared.

The following are a few of the advantages and objects of the present invention. This form of arch offers the least obstruction to the flues and provides the greatest amount of space for repairing the flues. The pressure upon the water tubes on which the fire arch rests is in a vertical direction so that it amounts only to the actual weight of the fire brick arch, and there is therefore no tendency to spread the water tubes as in other designs. The bricks are moreover made as light as is consistent with strength and durability, and each brick is of the same cross section throughout the fire box, if the fire box is of uniform width from end to end with the exception of the bricks which bear against the back of the tube sheet, which are of slightly different construction. The bricks are reversible and interchangeable, or in other words, a brick can be placed either forward or rearward in the fire box, and after having been used in a very exposed place, it may be shifted to a less exposed place or turned upside down. Should the fire box not be of the same width throughout, the bricks at each side will have to be of slightly different size and only the inner ones are uniform, as in the case of a parallel fire box.

In the accompanying drawings:—

Figure 1 is a view of a narrow fire box with one pipe off the center, the section being taken along the line 1—1 of Fig. 2;

Fig. 2 is a longitudinal sectional view on the line 2—2 of Fig. 1;

Fig. 3 is a part section in larger scale similar to Fig. 2 and taken near the back tube sheet of the fire box;

Fig. 4 is a section similar to Fig. 3 of a slightly modified construction, and

Fig. 5 is a perspective view of the slightly modified form of brick.

10 designates the back tube sheet of a boiler fire box and 11 the front tube sheet thereof, to which are terminally connected the brick supporting tubes 12. The bricks are shown in Figs. 1, 2, 3 and 4 as consisting of symmetrically rectangular body portions 13, provided with smooth sides, and each having a tongue 14 at one edge and a groove 15 at the other edge. The tongue and groove in each brick extend the entire length of the brick and the tongue is of such construction that the distance from the body portion of the brick to the free edge of the tongue is greater than the depth of the groove, so that the edges of adjacent bricks will be spaced apart when the bricks are assembled in the arch. It will also be observed that the bricks are generally uniform in size,

so that they are not only interchangeable, but also reversible, except the rearmost ones 16 which are provided with lugs 17 so as to leave an opening between the rear edge of the arch and the back tube sheet. By maintaining a space between adjacent bricks when they are in the arch, a tool may be inserted, whereby the bricks may be pried apart preparatory to repairing the same, or when it is necessary to shift some of the bricks.

In Fig. 5, I have shown a slightly modified form of brick, in which 39 is the body portion, provided with an edge groove 41 and tongue 40. An abutment 42 is formed in the groove 41 so that the tongue may engage only in certain places in the groove, but for the most part leaves a space between adjacent bricks as shown.

In Fig. 4 the rear tube plate 22 is slightly inclined, so that instead of having a bend in the tubes 23, straight tubes may be employed.

The advantage of building the arches in sections and of bricks of comparatively small size will be obvious when it is considered that it is frequently necessary to repair the arch, due to local burning, and when it is considered that only the bricks which have to be replaced need be taken out.

I claim:—

1. A fire brick for fire box arches having a tongue at one edge and a groove at the opposite edge, with a spacing projection carried by the wall of the groove, the width of the tongue being such that only a portion thereof may enter the groove of an adjacent brick when the bricks are assembled in an arch, whereby the body portions of adjacent bricks will be spaced apart.

2. A fire brick for fire box arches comprising a symmetrical rectangular body portion having smooth sides and provided at one edge with a groove extending the entire length of the brick, and at the opposite edge with a tongue coextensive with the length of the groove, the distance from the body portion of the brick to the free edge of the tongue being such that the edges of adjacent bricks will be spaced apart thereby when the bricks are assembled in an arch.

The foregoing specification signed at Louisville, Kentucky, this 19th day of July, 1915.

MILLARD F. COX.