

No. 764,611.

PATENTED JULY 12, 1904.

G. MAFFIT & T. T. PARKER.

BOILER.

APPLICATION FILED JULY 26, 1903.

NO MODEL.

Fig. 1

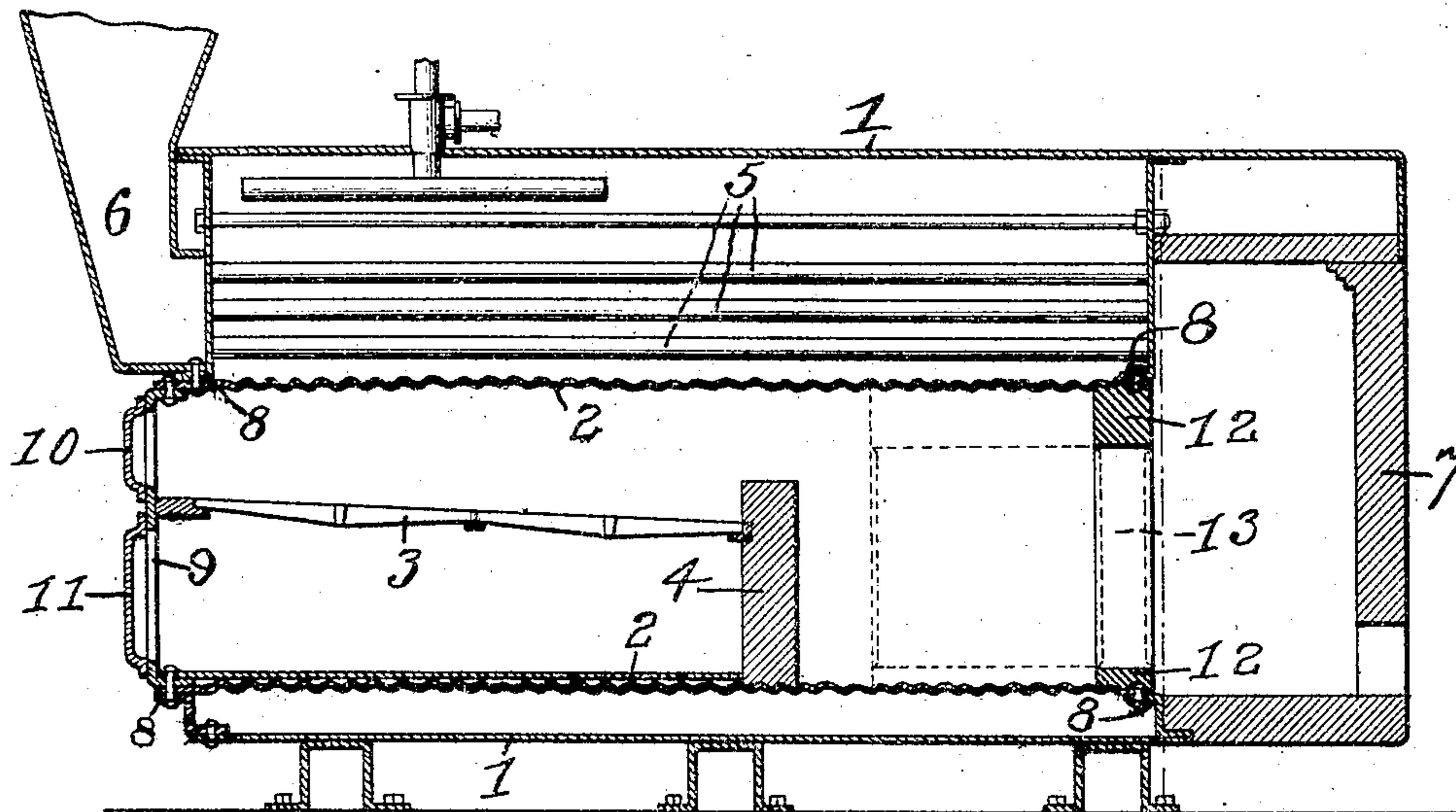
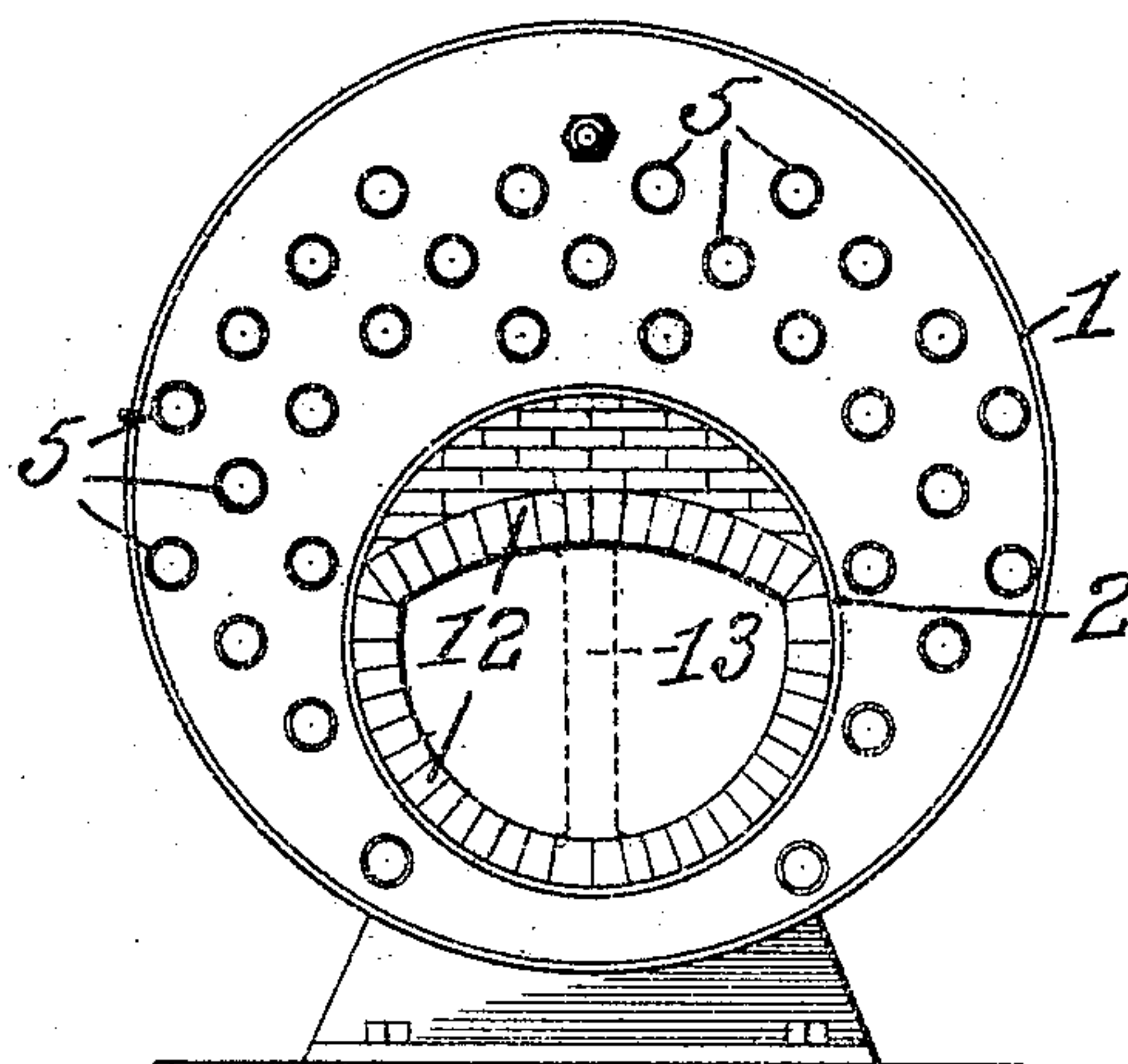


Fig. 2



Witnesses:

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UNITED STATES PATENT OFFICE.

GEORGE MAFFIT AND THOMAS T. PARKER, OF CHICAGO, ILLINOIS.

BOILER.

SPECIFICATION forming part of Letters Patent No. 764,611, dated July 12, 1904.

Application filed July 25, 1903. Serial No. 167,002. (No model.)

To all whom it may concern:

Be it known that we, GEORGE MAFFIT and THOMAS T. PARKER, both of Chicago, Cook county, Illinois, have invented certain new and useful Improvements in Boilers, of which the following is a specification.

This invention relates to boilers, and relates particularly to what are commonly known as "internally-fired" boilers, comprising an outer shell which contains the water and one or more relatively small shells which extend longitudinally through the outer shell, the ends of which are secured to the edges of openings formed in the end walls of said outer shell and within which the furnace of the boiler is located. As commonly constructed, the ends of the furnace-shell are riveted to flanges formed around the edges of the openings in the ends of the outer or water shell. It is found in practice that the expansion and contraction of the furnace-shell due to sudden variations in the temperature therein from any cause—as by opening the furnace-door in stoking, whereby cold air is admitted to the furnace—produces a severe strain on said furnace-shell at a point where it is riveted to the end walls of the outer or water shell which in time operates to form cracks in said furnace-shell extending from said rivets to the end thereof, commonly known as "fire-cracks." These fire-cracks cause the boiler to leak and also weaken the boiler at this point and are very objectionable. These objectionable effects are apt to occur only at the rear end of the boiler, where the heat is greatest, the front end being heated to a much less degree and the variations in temperature are not as extreme as at the rear end of the boiler.

A primary object of our invention is to overcome the above objectionable features by providing means to prevent sudden and extreme variations of temperature where said furnace-shell is connected to the outer or water shell.

Further objects of the invention are to deflect the products of combustion downwardly against the bottom of the furnace-shell, thereby subjecting the water surrounding the under side of the said furnace-shell to a high degree of heat and materially increasing the effi-

ciency of the boiler, and to effect a more perfect combustion of the gases generated in the furnace, thereby generating a greater quantity of steam with a given amount of coal and also materially reducing the volume of smoke produced by the furnace.

Our invention consists of the various features, combinations of features, and details of construction hereinafter described and claimed.

In the accompanying drawings our invention is fully illustrated.

Figure 1 is a vertical longitudinal sectional view of a boiler embodying our invention, and Fig. 2 is a transverse section on the line 2-2 of Fig. 1.

Referring now to the drawings, 1 designates the outer or wall shell of an internally-fired boiler; 2, the furnace-shell; 3, the grate-bars; 4, the bridge-wall; 5, the boiler-tubes; 6, the breeching, and 7 is a housing, of masonry or the like, inclosing the rear end of the boiler and forming an inclosed space through which the products of combustion pass from the furnace-shell 2 into the tubes 5. As shown, the ends of the furnace-shell 2 are secured to flanges 8, formed around the edges of openings formed in the walls of the outer or water shell 1 by means of rivets in the usual manner. The front end of the furnace-shell is closed by means of suitable heads or castings 9, provided with firing-doors 10 and with doors 11 which open into the ash-pit.

All of the foregoing features may be of any usual or approved construction and will be readily understood by a person familiar with the art without a detailed description thereof.

The products of combustion pass from the furnace-shell into the space inclosed by the wall or housing 7, through the tubes 5 into the breeching 6, and thence into the smoke-stack.

It is obvious that the rear end of the furnace-shell 2 will be heated to a very high degree and also that when the doors 10 are open cold air will be admitted thereto which will operate to suddenly reduce the temperature therein, causing said shell to contract, and that this cooling and contraction will subject the seam or joint connecting the furnace-shell to the outer or water shell to a severe strain, and

experience has shown that in time this will cause said shells to crack between said rivets and the ends thereof, forming what are known as "fire-cracks." Said fire-cracks weaken the boiler and also cause the same to leak and are very objectionable.

We have found that the formation of fire-cracks in the seam or joint connecting the furnace-shell 2 to the flange 8 can be prevented by covering said seam or joint with a shield of suitable material, as fire-brick or the like, which will protect the same from sudden variations of temperature within the furnace-shell due to opening and closing the fire-doors or from other cause and will prevent the consequent strain on said seam or joint due thereto. In the drawings, 12 designates a shield of this character. In practice we have realized very good results by the use of a shield approximately four and one-half inches thick by nine inches long. It is obvious, however, that the thickness of said shield may be increased to any extent that may be desired, so that it does not choke the opening at the rear end of the furnace-shell and prevent the free passage of the products of combustion therethrough. The length of the shield admits of even greater range than the thickness thereof, and, in fact, it may be extended to within a short distance of the bridge-wall, if desired. In practice we prefer to make the shield 12 of a considerable thickness—say twelve to fifteen inches—at the top of the furnace-shell, thus forming a ledge or shoulder of considerable depth at the side thereof toward the fire-box which will operate to deflect the products of combustion passing through said shell downwardly against the bottom of the shell, which will operate to heat the water which surrounds the under side of the said furnace-shell to a much higher degree than it would be otherwise heated. When the top of the shell 12 is made in the form of an arch, it will ordinarily be strong enough to require no additional

support. When, however, the furnace-flue is large in diameter, and particularly when said shield is made very heavy on top or the inner surface thereof is but slightly arched, it is desirable to provide a support therefor. A desirable form of support consists of a pier, (shown in dotted lines at 13;) but any other desired or suitable form of support may be used in place thereof. A further advantage due to the use of a shield of this character when of considerable body is that the heat therefrom will operate to maintain the gases from the furnace at a high temperature when the furnace-door is open, whereby more perfect combustion will be effected and a less volume of smoke produced.

We claim as our invention—

1. In a boiler of the character described, the combination with the outer water-shell and the furnace-shell arranged within and above the bottom of the water-shell, of a refractory shield within the furnace-shell covering the seam or joint connecting the rear end of said furnace-shell with the end of the water-shell, substantially as described.

2. In a boiler of the character described, the combination with the outer water-shell and the furnace-shell arranged within and above the bottom of the water-shell, of a ring-like refractory shield within the furnace-shell covering the seam or joint connecting the rear end of said furnace-shell with the end wall of the water-shell, said shield forming a deflecting-shoulder at top, substantially as described.

In testimony that we claim the foregoing as our invention we affix our signatures, in presence of two subscribing witnesses, this 21st day of July, A. D. 1903.

GEORGE MAFFIT.
THOMAS T. PARKER.

Witnesses:

E. M. KLATCHER,
K. A. COSTELLO.