

No. 659,549.

Patented Oct. 9, 1900.

D. U. RICHARDS.  
ARCH PLATE FOR STEAM BOILER FURNACES.

(Application filed May 14, 1900.)

(No Model.)

Fig. 1.

Fig. 2.

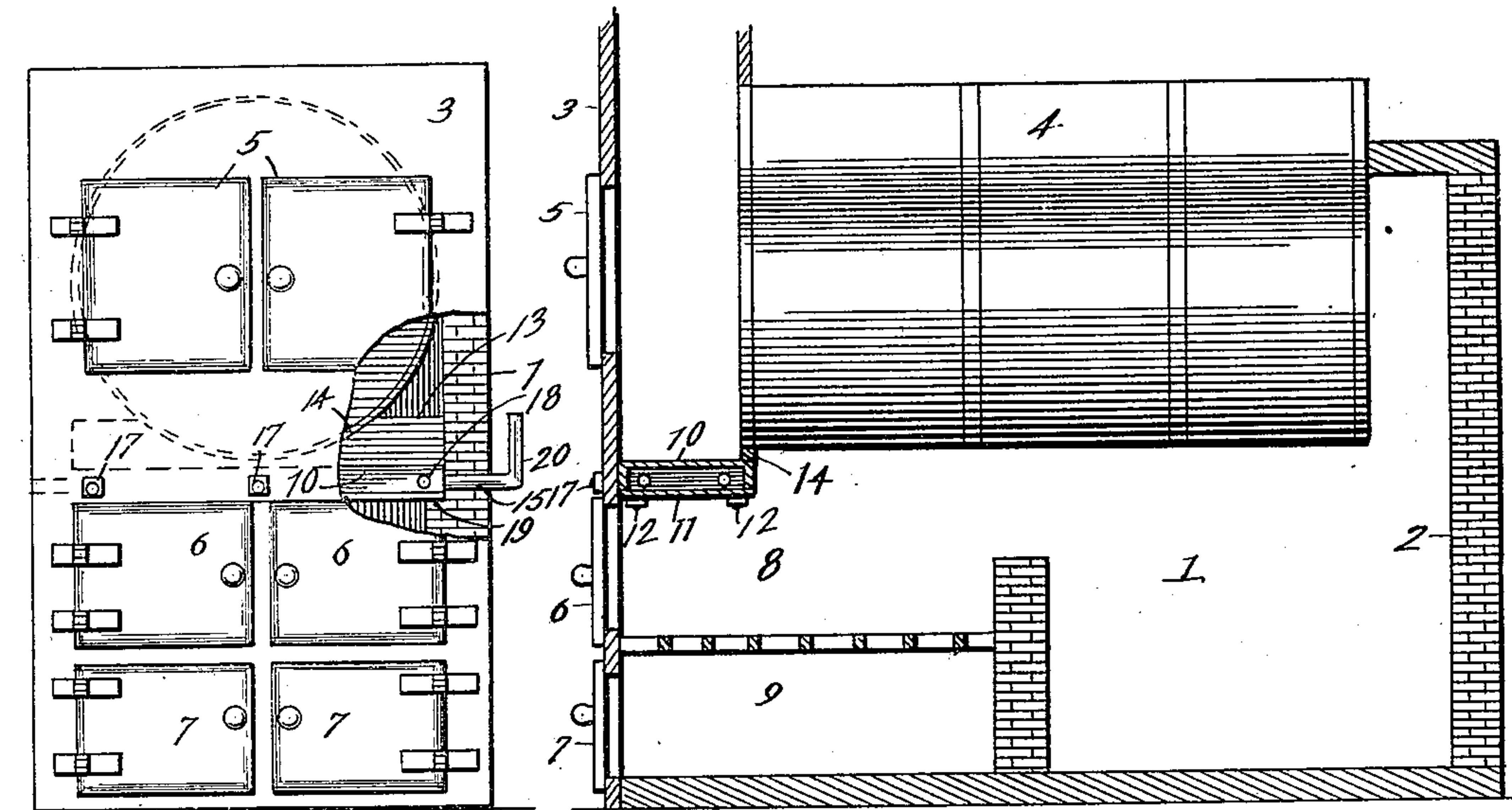


Fig. 3

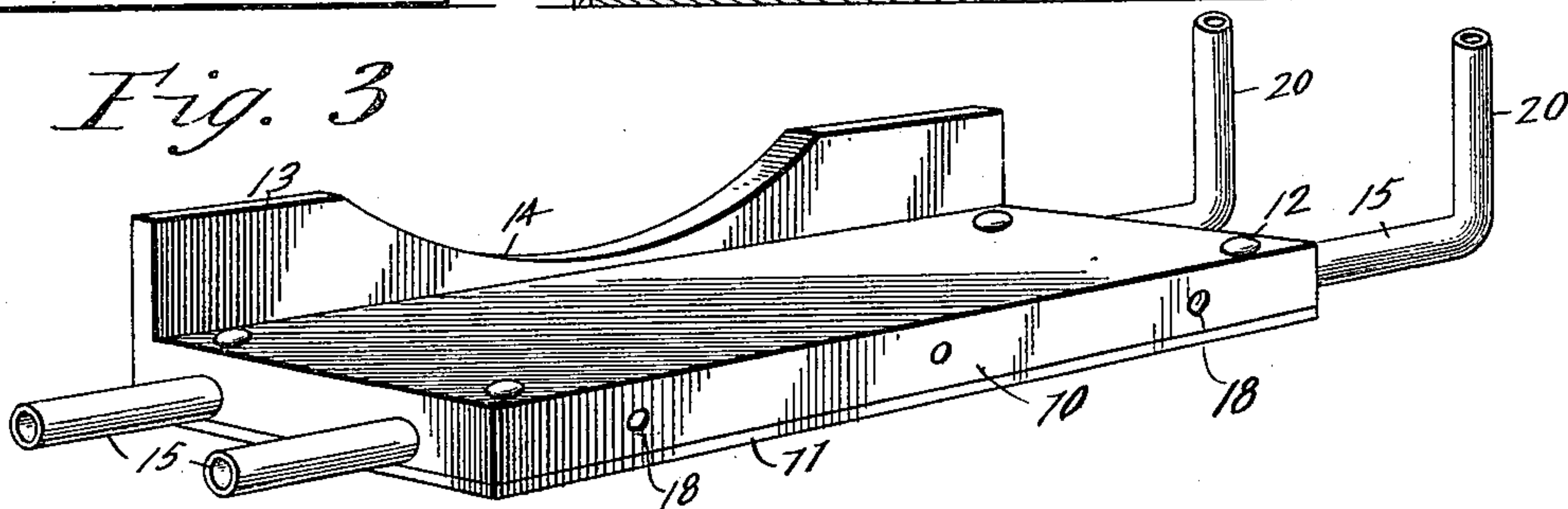
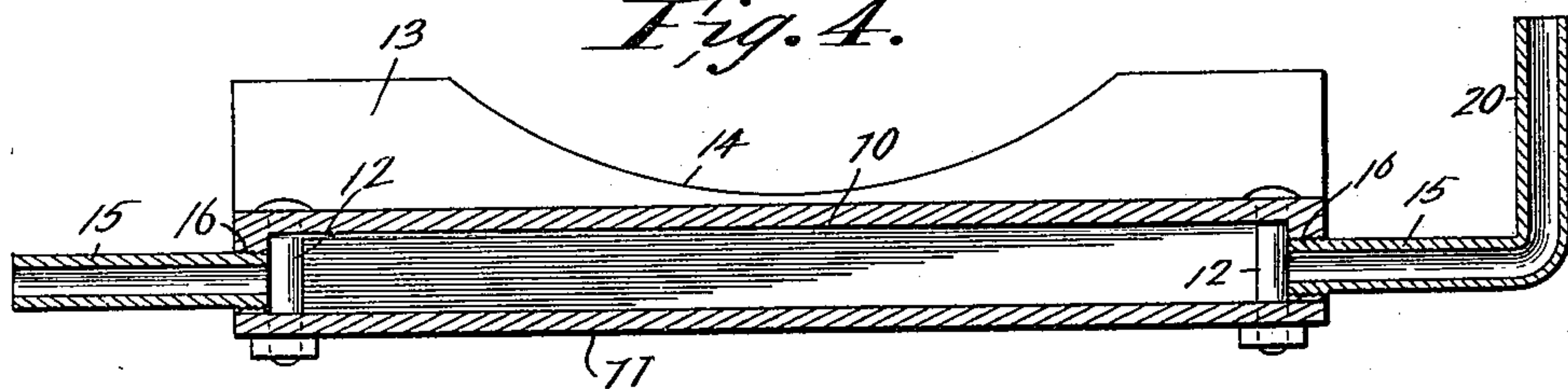


Fig. 4.



Witnesses

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# UNITED STATES PATENT OFFICE.

DANIEL U. RICHARDS, OF DANVERS, MINNESOTA.

## ARCH-PLATE FOR STEAM-BOILER FURNACES.

SPECIFICATION forming part of Letters Patent No. 659,549, dated October 9, 1900.

Application filed May 14, 1900. Serial No. 16,674. (No model.)

*To all whom it may concern:*

Be it known that I, DANIEL U. RICHARDS, a citizen of the United States, residing at Danvers, in the county of Swift and State of Minnesota, have invented a new and useful Arch-Plate for Steam-Boiler Furnaces, of which the following is a specification.

This invention relates to steam-boiler furnaces; and it has for one object to provide an improved arch-plate for supporting the front end of the boiler and for closing the space above the fire-box and between the front of the boiler and the front of the furnace. It is also designed to dispense with the usual brick arch, although the latter may be employed without affecting the present device, and to close the space between the upper side of the present arch and the front end of the boiler and the respective side walls of the furnace; and, finally, the most important object is to provide an improved hollow arch having means for circulating cold air therethrough, so as to prevent the latter from becoming burned out or cracked by the intense heat to which such arches are exposed.

With these and other objects in view the present invention consists in the combination and arrangement of parts, as will be hereinafter more fully described, shown in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that changes in the form, proportion, size, and minor details may be made within the scope of the claims without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings, Figure 1 is a front elevation of a steam-boiler furnace, parts being broken away to expose one end of the improved arch. Fig. 2 is a central longitudinal sectional view thereof. Fig. 3 is a detail perspective view of the present arch. Fig. 4 is a longitudinal sectional view thereof.

Corresponding parts in the several figures of the drawings are designated by like characters of reference.

Referring to the accompanying drawings, 1 and 2 designate the respective side and rear end walls, and 3 the front, of a furnace, which is also provided with the usual steam-boiler 4, terminating short of the front of the furnace. In the front plate 3 there are provided

the upper doors 5, for access to the flues of the boiler, and the lower sets of doors 6 and 7, for access to the fire-box 8 and the ash-pit 9, respectively. These parts are common and well known and may have any preferred form, the same being shown in the drawings to more adequately illustrate the application and arrangement of the present improvements.

In carrying out the present invention there is provided a substantially-rectangular hollow box-like arch-plate 10, which is formed of cast metal and is best shown in Figs. 3 and 4 of the drawings. The lower open side of this box is normally closed by means of a removable bottom plate 11, which is held in place by means of suitable fastenings, such as bolts 12, which are preferably arranged at the corners of the device. At the rear longitudinal edge of the box there is provided an upstanding longitudinal flange 13, which is provided centrally with a concaved recess or seat 14 for the reception of the boiler, as will be hereinafter explained. This flange may be cast integrally with the box or secured thereto in any manner, as may be preferred. In the opposite ends of the box there are fitted the respective pipe-sections or tubes 15, which have their inner ends screw-threaded, so as to be removably fitted within corresponding screw-threaded openings 16, formed in the ends of the box and communicating with the interior thereof to conduct cold air thereto and to provide for the escape of the heated air.

By reference to Figs. 1 and 2 it will be seen that the box or arch is located above the fire-box of the furnace and is secured to the front 3 by means of bolts or other suitable fastenings 17, that pass through the front and are received through the respective openings 18 in the front edge of the box, the bottom plate 11 being removable to facilitate the securing of the box to the front of the furnace. The arch-box is located immediately above the fire-box doors, and the convexed seat 14 in the upstanding flange 13 is designed to receive the front end of the boiler, so as to form a support therefor and also to close the space between the upper face of the box and the outer sides of the boiler. The opposite ends of the box are received within recesses or supported upon suitable shoulders 19, formed



upon the inner sides of the opposite side walls of the furnace, as shown in Fig. 1, and the opposite pipes or tubes 15 pass through the walls and communicate with the external  
 5 air. It will now be apparent that as the air within the box-like arch-plate becomes heated it will begin to circulate and pass out through some of the pipes or tubes and the cold exterior air will rush in through some of the  
 10 other pipes to take the place of the escaped air, thereby maintaining a continuous circulation of comparatively cool air through the arch-plate to protect and preserve the latter against the excessive heat of the fire, which  
 15 is directly beneath the arch. It may be found convenient to provide some of the pipes or tubes with upwardly-directed branches or elbows 20 to increase the outward draft for the escape of the heated air, and some of the  
 20 other pipes may have downwardly-directed branches, as may be desired.

From the foregoing description it will be apparent that the present invention provides an improved arch-plate which is effectually  
 25 protected against cracking and being burned out and also dispenses with the usual brick arch, although the latter may be constructed over the top of the box, and in the latter event there is no liability of the brick arch sagging,  
 30 as the box is effectually protected against being warped by the action of the fire. It will of course be understood that the box may be rounded or arched instead of flat, as herein illustrated, and the bottom may be made in-

tegral therewith, as may be desired or found 35 convenient.

What is claimed is—

1. An arch-plate for steam-boiler furnaces, comprising a shallow hollow box, having means for connecting its front edge to the 40 front of a furnace, a longitudinal upstanding flange at the rear edge of the box, said flange having an intermediate concaved recess forming a seat for the front end of a boiler, and its opposite end portions forming closures for 45 the space between the boiler and the respective side walls of the furnace, and the opposite ends of the box having openings for the circulation of air through the box.

2. An arch-plate for steam-boiler furnaces, 50 comprising a hollow box, having an open bottom, openings in its opposite ends, and bolt-openings in its front side or edge, pipes fitted to the respective end openings and extending outwardly therefrom, fastenings projecting 55 outwardly through the bolt-openings, a removable bottom plate normally closing the open bottom of the box, and fastenings securing the bottom plate to the lower edges of the box. 60

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

DANIEL U. RICHARDS.

Witnesses:

ANDREW WILSON,  
 ERNEST R. ALDRICH.