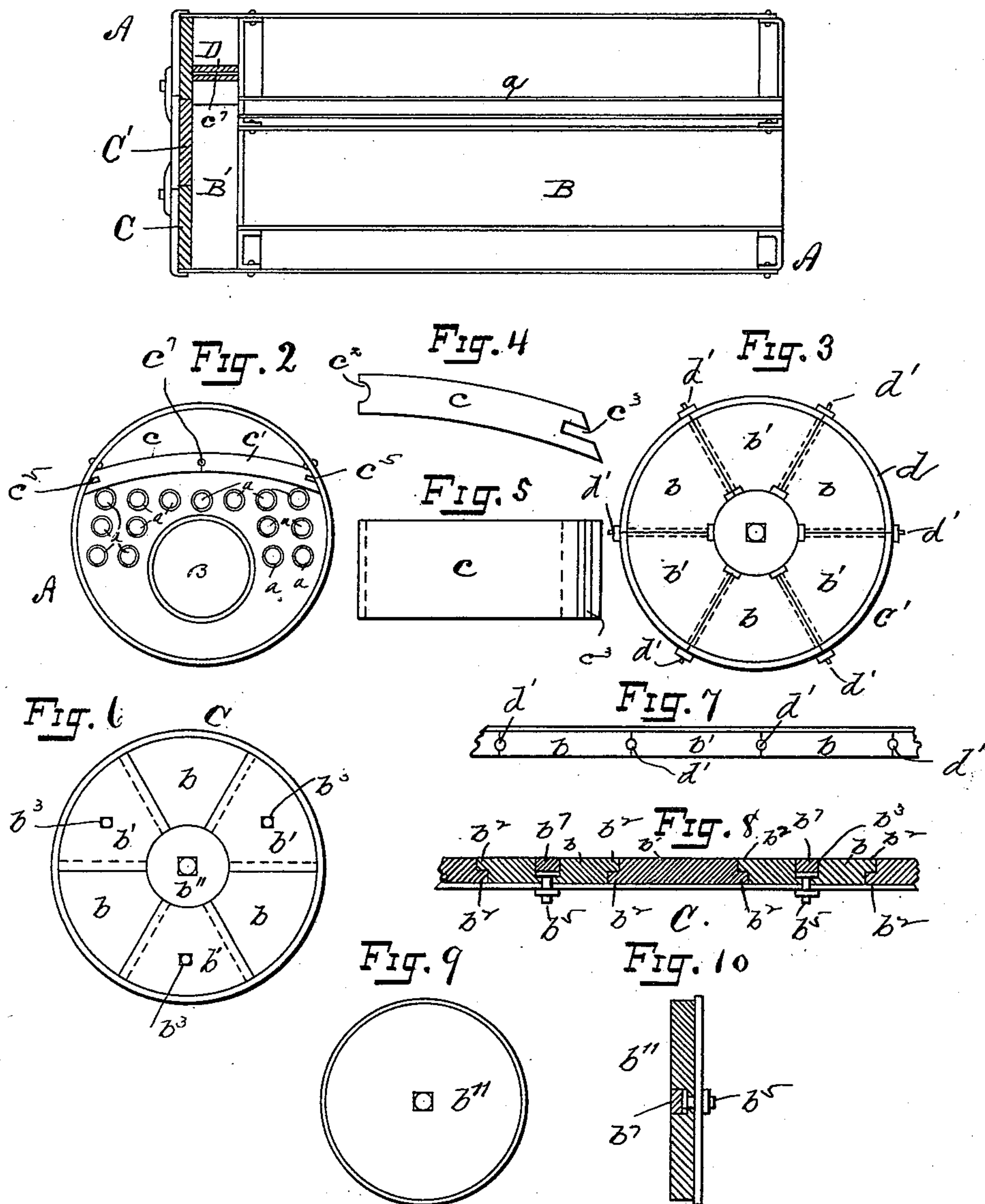


(No Model.)

J. G. DALIE.  
STEAM BOILER.

No. 436,123.

Patented Sept. 9, 1890.  
*Fig. 1*



WITNESSES  
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# UNITED STATES PATENT OFFICE.

JOHN G. DALIE, OF SPRINGFIELD, OHIO.

## STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 436,123, dated September 9, 1890.

Application filed May 16, 1890. Serial No. 352,114. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN G. DALIE, a citizen of the United States, residing at Springfield, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Steam-Boilers, of which the following is a specification.

My invention relates to improvements in steam-boilers, and it especially relates to boilers of the portable-flue type.

My invention consists in the constructions and combinations of parts hereinafter described, and set forth in the claims.

In the accompanying drawings, Figure 1 is a longitudinal sectional elevation of a steam-boiler embodying my invention. Fig. 2 is a transverse sectional view of the same on the line  $x x$  in Fig. 1. Fig. 3 is a similar view showing a modification. Figs. 4 to 10, inclusive, are detailed views of the various parts hereinafter referred to.

Like parts are indicated by similar letters of reference throughout the several views.

In the said drawings, A A represents the outer shell or casing of the boiler.

B is a large flue in which the fire-box is located.

B' is a smoke-box connecting with the large flue B and with small return flues or tubes  $a$ , which connect the smoke-box B' with the chimney or smoke-stack B<sup>2</sup>. In boilers of this type the head or rear end C of the outer casing is formed of iron and riveted or otherwise secured to the shell proper. A man-hole is provided therein having a suitable man-head C' to close the same.

The intense heat coming from the fire-box in the flue B in the passage of the flames and products of combustion to the tubes  $a$  makes it necessary that the back or end C be protected by a substance or material capable of standing great heat, such as fire-brick, fire-clay, &c. It is also desirable that means be employed for protecting the top of that portion of the casing over the smoke-box B'. To accomplish this in a simple, effective, and inexpensive manner has been the object of my invention. In Figs. 6 and 8 I have shown the preferable method of accomplishing this result. In this case I construct the head with a sectional lining made of fire-clay or similar substance and formed in sections  $b b'$ , each of

said sections being provided on its edge with small flanges  $b^2 b^2$  so placed that the flanges of one section shall overlap the flanges of the next section, as shown in Fig. 8. Each alternate section  $b'$  is provided with a recessed opening  $b^3$ , into which is inserted a small bolt  $b^5$ . These bolts  $b^5$  engage in the recessed openings  $b^3$ , as shown in Fig. 8, and project through the head C, and are provided with suitable nuts, by means of which these sections  $b'$  are bolted firmly to said head. These sections being provided with overlapping edges, also hold the sections  $b b b$  in place. After the bolts  $b^5$  have been inserted in place the recessed openings over said head are also filled with fire-clay, as shown at  $b^7$  in Fig. 8, thus completely protecting all the exposed parts from the flames.

It should be noted that the sections  $b$  and  $b'$  are formed on radial lines and the sections so constructed that they fill all the space between the outer periphery of the head C and the man-head C'. The man-head C' is also covered by a circular plate  $b^{11}$ , of similar material to the sections  $b$ , fastened in a similar way, as shown in Fig. 10.

For protecting the top of the box B', I construct an arch D of fire-clay or similar material. This arch is formed in two sections  $c$  and  $c'$ , each formed at one edge with a groove  $c^2$ , preferably semicircular in form, and at the other with a groove  $c^3$ , preferably rectangular in form at its inner end, one end of each section being beveled, as shown in Fig. 4. The smoke-box B' is provided on the outer shell or casing with small flanges  $c^5$ , over which the grooves  $c^3$  are adapted to slide longitudinally, with the grooves or openings  $c^2$  in the opposite edges of the sections arranged together and adapted to receive a key bolt or rod  $c^7$ . In assembling the parts the sections  $c$  and  $c'$  are slipped into position over the flanges  $c^5$ , after which the bolt or rod  $c^7$  is forced into the opening formed by the groove  $c^2$ , thus holding the parts firmly in position. By this construction it will be seen that the shell, flanges, and key or rod are all fully protected from the flames, while at the same time all the parts are held securely in their positions.

It is evident that the construction of the arch with the circular grooves  $c^2$  between



the respective sections may be employed for holding the sections  $b$  and  $b'$  in the head  $C$ , as shown in Fig. 3, each of the sections being provided with grooves similar to those described, and keys or rods  $b^{12}$  inserted through the said sections and through the flange  $d$  of the head  $C'$ . By the constructions thus described it will be seen that a simple and effective means is provided for fully protecting all the exposed parts at the point where the greatest heat occurs.

Having thus described my invention, I claim—

1. The combination, in a return-flue boiler having a smoke-box, as described, of the sectional plate and sectional arch, substantially as and for the purpose described.

2. The combination, with a cylindrical casing, of a head formed therein, said head being protected on its inner surface by sectional blocks of fire-clay or similar substance having overlapping edges, each alternate block being provided with a recessed opening, and a countersunk bolt, substantially as specified.

3. In a portable boiler such as described, the combination, with the main and return flues, of a smoke-box adapted to form a communication between said flues, an arch over said flues, said arch being formed in sections having grooved edges, flanges in said smoke-box adapted to receive said grooves, and a key or rod to join said sections, substantially as specified.

In testimony whereof I have hereunto set my hand this 5th day of May, A. D. 1890.

JOHN G. DALIE.

Witnesses:

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CHAS. I. WELCH.