

(No Model.)

D. S. RICHARDSON.
RADIATOR FOR FURNACES.

No. 279,666.

Patented June 19, 1883.

Fig 1.

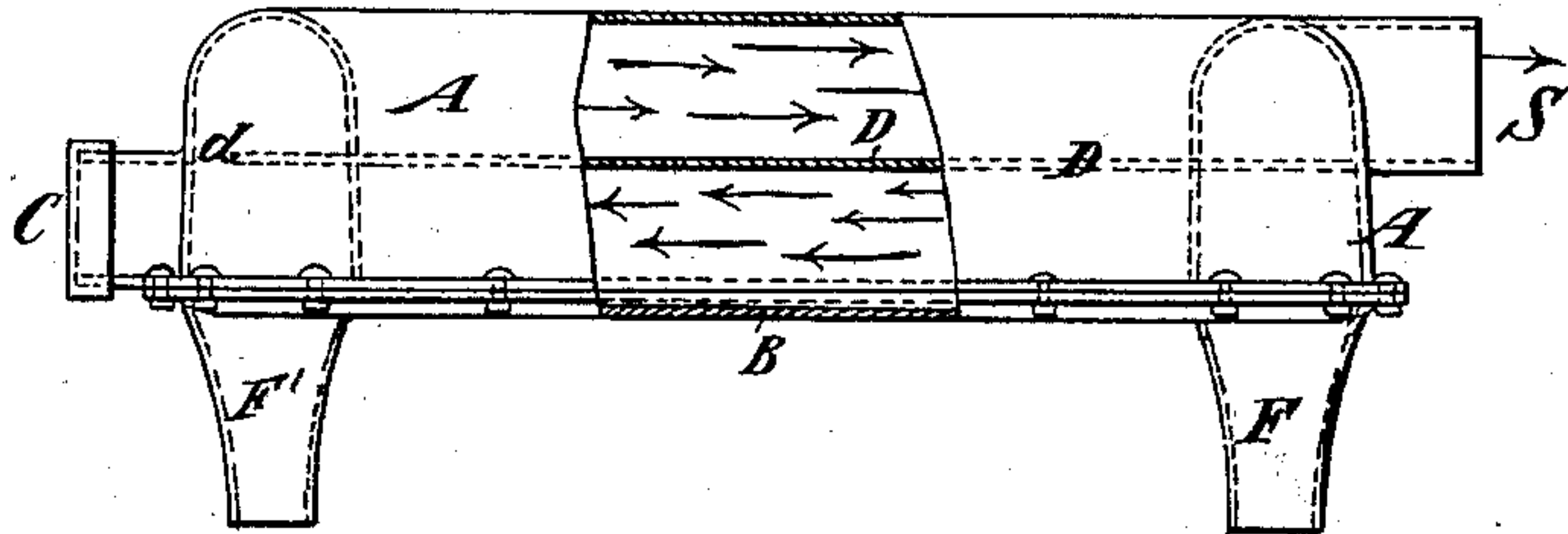


Fig 3.

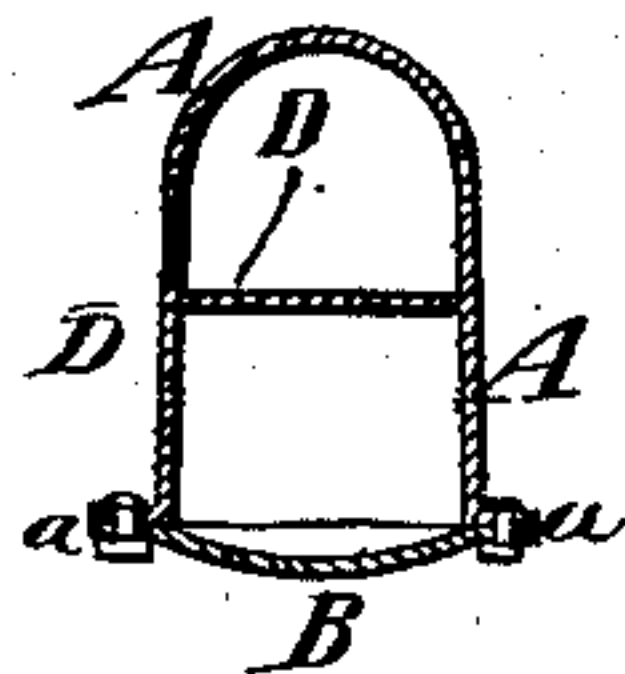


Fig 4.

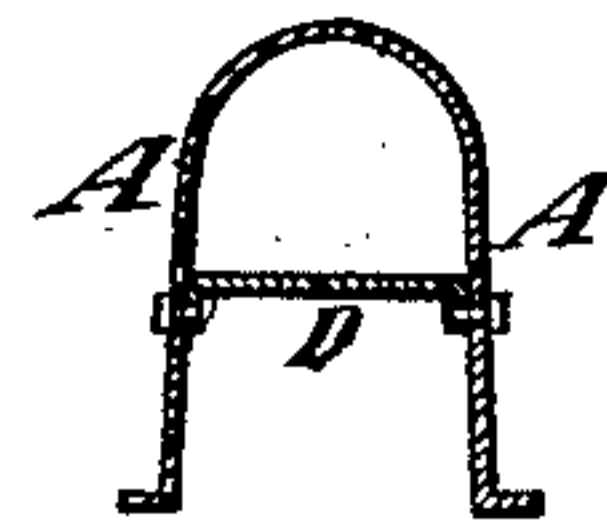
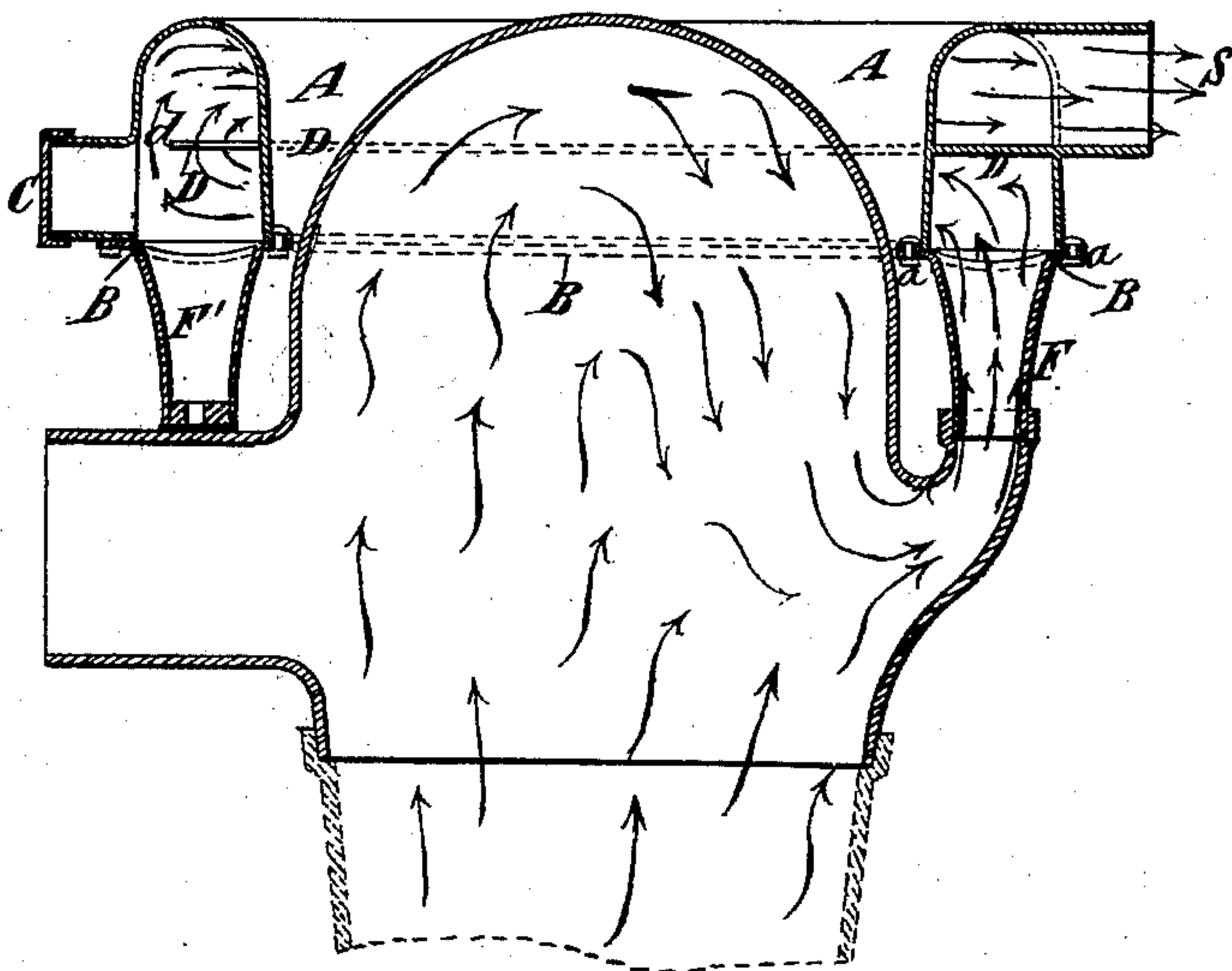


Fig 2.



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RADIATOR FOR FURNACES.

SPECIFICATION forming part of Letters Patent No. 279,666, dated June 19, 1883.

Application filed January 31, 1883. (No model.)

To all whom it may concern:

Be it known that I, DWIGHT S. RICHARDSON, a citizen of the United States, residing in the city of Brooklyn, State of New York, have invented a certain new and useful Improvement in Radiators for Furnaces; and I do hereby declare, that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification.

The object of my invention is the production of a radiator for furnaces which will be effectively heated by the gases and products of combustion passing through it, and which will prevent the escape of such gases into the air-chamber of the furnace, and which may be easily and cheaply constructed.

In the drawings like letters indicate like parts.

Figure 1 is a perspective view of the radiator and its connections with the dome, a portion being broken away to show the diaphragm within, in which A A are the top and sides, shown as made in one piece. B is the bottom plate bolted thereto. D is the diaphragm, extending nearly across the interior of the radiator, and provided with the opening *d*. S is the opening into the smoke-pipe. C is an opening, closed by means of a plate, for removing the ashes, &c., which may collect in the radiator; and F F' are flues, through one of which, F, the gases and products of combustion enter the radiator from the dome of the furnace. The other flue, F', being closed by a plate, serves as a support for the front of the radiator.

Fig. 2 is a sectional view of the radiator and the dome of the furnace, showing the position the former occupies in respect to the latter and the circulation of the products of combustion from the dome into the radiator.

Fig. 3 is a vertical sectional view through the radiator, showing the construction of the latter.

Fig. 4 is a vertical sectional view through the radiator, showing the top and sides of the same and the diaphragm as bolted thereto.

My improved radiator is divided into chambers by a diaphragm or partition extending through it, and provided with an opening

through which the gas may pass from the lower to the upper chamber. The radiator is connected with the body of the furnace by one or more flues opening near the base or bottom of the dome, through which the gases and products of combustion deflected by the top and sides of the dome pass into the radiator.

The drawings show the radiator with one diaphragm D, dividing it into two chambers. The products of combustion collecting in the body of the furnace pass, by means of the flue F, into the lower chamber of the radiator, and, circulating through the same, pass through the opening *d* of the partition into the upper chamber of the radiator, and then escape into the smoke-pipe S. The radiator may be connected with the furnace by several flues opening from the dome into the lower chamber of the radiator. The opening *d* is placed in that part of the diaphragm as far as possible from the flue by which the products of combustion pass into the radiator, and opposite the exit into the chimney. The gases, &c., thus circulate through the lower chamber of the radiator before they pass into the upper chamber, and through the whole extent of the latter before they escape into the chimney.

As shown and described in Letters Patent No. 272,326, heretofore granted to me, the radiator is made of solid cast-iron, with a diaphragm extending through the same.

In order to construct the radiator more easily and cheaply, I propose to make it in two parts, which are constructed and put together in such a manner as will not permit the passage of the gaseous products of combustion in those parts of the radiator the sides and top of which are subject to the pressure of the gases.

The radiator may be made either of cast or of wrought iron. When made of cast-iron, the top and sides (indicated by the letters A A' in the drawings) are cast in one piece. To this part the bottom plate, B, which may be of either cast or wrought iron, is firmly attached by bolts or other suitable fastenings, the joints between the two parts being tightly cemented. The diaphragm D may be cast solid in one piece with the top and sides A A', or may be made separate and firmly attached thereto by flanges or bolts, or their equivalent. As thus

constructed, there are no joints in the top or sides of the radiator, where the pressure of the gas is greatest, the only joints being those at *a a*, where the bottom plate is joined to the sides, and at these points there is very little, if any, tendency of the gas to escape, the pressure being very slight. The radiator is thus practically as gas-tight as one cast in a single piece. When the radiator is made of wrought-iron, for facility of construction, the top and sides may be made in sections firmly fastened together; and to the top and sides thus constructed the bottom plate, either of cast or wrought iron, may be attached, as in the other construction. One object of my invention—the construction of a radiator that will prevent the escape of gas—is accomplished as effectually in this mode of construction as when the top and sides of the radiator are formed of a single piece of cast-iron, as, owing to the nature of the material—wrought-iron—and to the fact that but one kind of iron is used to form these parts, the sections may be fastened together so tightly as to prevent the passage of gas through the joints. When the upper part of the radiator is made of wrought-iron and of several pieces, as above described, the entire upper portion of the structure—that is, the sides and top—should be made of the same kind of metal, so that there will be no unequal or different expansion and contraction of the parts to loosen or open the joints. This unequal expansion and contraction, and consequent opening of the joints, has always rendered imperfect radiators when constructed, as they often have been, of different kinds of metal, as part of cast-iron and part of wrought-iron. When, however, the parts subject to pressure are made of metal of the same character, expansion and contraction being the same, or practically so, the joints can be made so as to be and remain close and tight.

It will thus be seen that my improved radi-

ator is more effective than the radiator now in use, as all the products of combustion are forced to pass through it twice, and thus a greater quantity of effective heat is obtained from the same amount of gaseous product or from the combustion of the same amount of coal, and all joints through which the gaseous products of combustion will pass into the air-chamber are also avoided in those parts of the radiator in which there will be any tendency, by pressure, to the escape of such products.

I am aware that in magazine-stoves drums having a diaphragm dividing the same into chambers have been used, and I do not claim these. I am also aware that in a hot-air furnace it has been proposed to construct a radiator of a curved upper section and a V-shaped bottom plate attached thereto. I am further aware that a radiator in which the top and sides were composed of a single piece of cast metal, and to which the flat bottom plate was attached by bolts passing through the whole, is old, for I have myself made it. Of course I claim none of these, broadly; but

What is claimed is—

1. In a radiator for furnaces having the top and sides cast in one piece and the bottom plate fastened thereto, a diaphragm extending through the same, whether cast solid with the top and sides or separate therefrom, and provided with an opening therein, substantially as and for the purposes set forth.

2. In a radiator for furnaces having the top and sides made of one and the same kind of metal, and having a bottom plate attached thereto, a diaphragm extending horizontally through the same, and provided with an opening therein, substantially as and for the purposes set forth.

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