

W. G. SHOALS.

STOVE.

APPLICATION FILED JUNE 12, 1909.

944,154.

Patented Dec. 21, 1909.

2 SHEETS—SHEET 1.

Fig. 1.

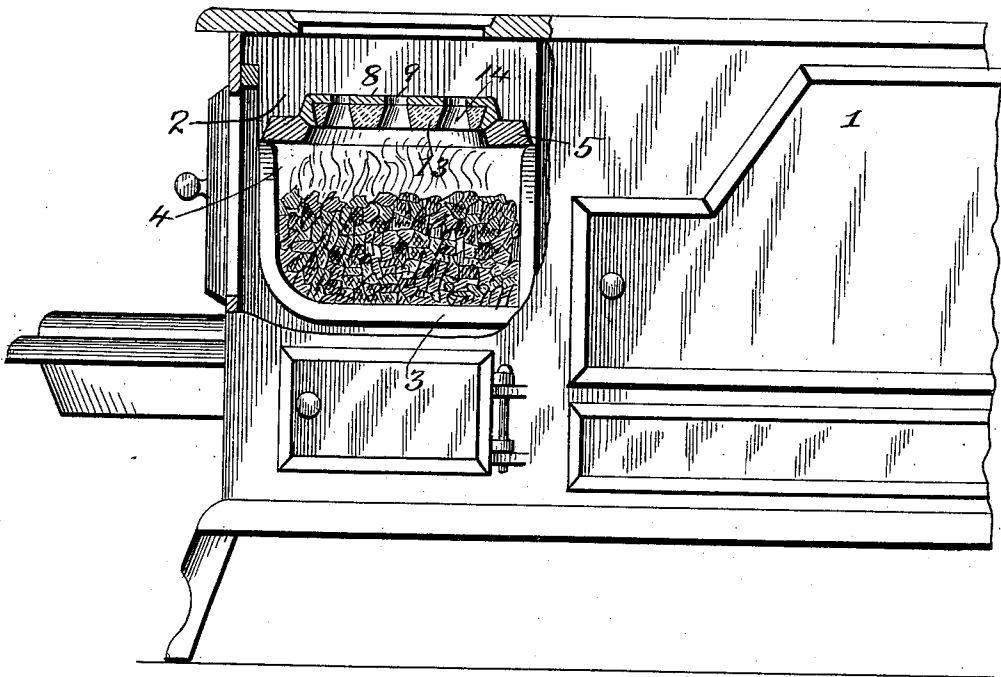
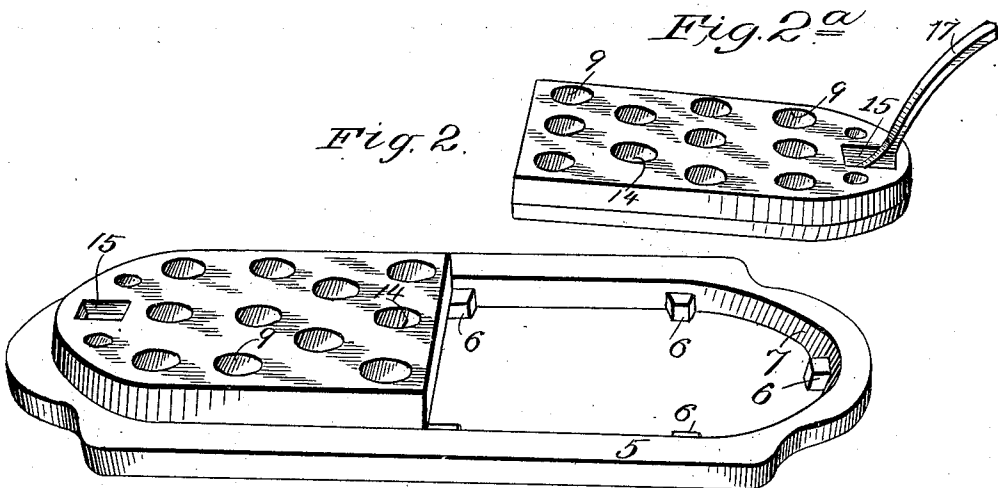


Fig. 2.

Fig. 2a



Witnesses

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2 SHEETS—SHEET 2.

Fig. 3.

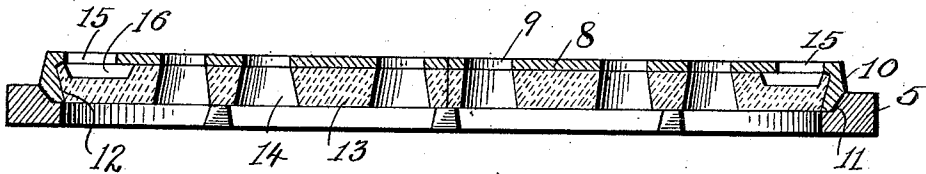


Fig. 4.

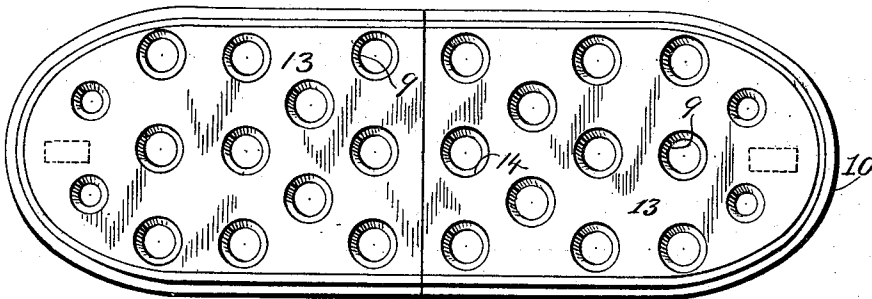


Fig. 5.

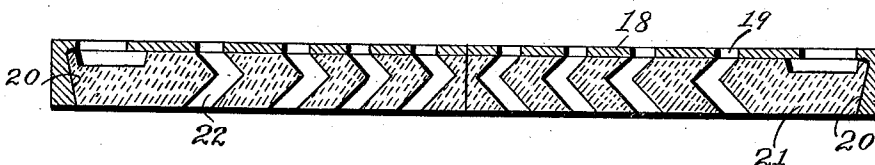
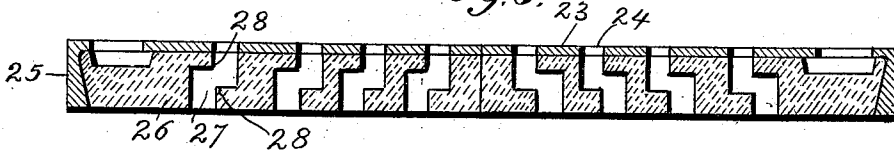


Fig. 6.



Witnesses

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# UNITED STATES PATENT OFFICE.

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## STOVE.

944,154.

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*To all whom it may concern:*

Be it known that I, WILLIAM G. SHOALS, a citizen of the United States, residing at Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Stoves; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in stoves, and the object of my invention is to provide means whereby perfect combustion may be obtained in all sorts of stoves and heaters, for example, in an ordinary cooking stove or range.

With this object in view my invention consists in the construction and combination of parts as hereinafter described and claimed.

In the accompanying drawings—Figure 1 is a side view, partly in section, showing an ordinary stove with my invention applied thereto. Fig. 2 is a perspective view of the sectional plate, one half being removed. Fig. 2<sup>a</sup> is a perspective view of the removed half of the cover and showing the lifter. Fig. 3, is a longitudinal section of the plate shown in Fig. 2. Fig. 4 is a bottom plan view of the same, and Figs. 5 and 6 are longitudinal sections of modified forms.

1 represents a stove, 2 the fire-brick or refractory lining, 3 the grate, and 4 the firepot. Resting upon the top of the grate and on any suitable support, such as the grate, is the construction embodying my invention, in which 5 is an open ring or frame, said ring being provided with a series of lugs 6, arranged at intervals on its interior. It is also beveled inwardly, as shown, in order that the perforated plate may be closely fitted thereon. This perforated plate constitutes the main feature of my invention. This plate is composed of a metal top 8, perforated at intervals, as shown at 9, and having downwardly extending sides and ends 10 beveled off, as shown at 11, to fit against the part 7 of the ring 5 and resting upon the lugs 6. The inner part of the sides and ends of this plate, which is preferably made of iron, is inclined inwardly, as shown at 12, in order to better support the lining 13. This lining is made of fire brick or other suitable refractory material, the lower part

of which is partly exposed to the flame and hot products of combustion, and is preferably provided with conical shaped holes 14, the upper end of each of which registers with one of the holes 9. This plate is made in two sections, as shown in Fig. 2, for the convenience of removing the same.

The cover 8 is provided with a hole 15. Underneath that hole the fire brick lining is provided with the larger hole 16, in which a lifter 17 may be inserted for the purpose of removing one of the halves of the plate, the two halves being similarly constructed. This construction is a great convenience as it provides for the removal of these plates for the feeding of the coal in through the top of the stove in a convenient manner.

The operation is as follows: The fire being started in the stove in the usual manner, the hot products of combustion are caused to flow upwardly through holes 14 and 9. They cannot escape around the edges of the plate and are forced to flow through it. The consequence is that the plate and lining thereof become intensely heated and heat the products of combustion, causing any un-consumed products, which would otherwise escape through the chimney, to be burned. I have found that if this plate is maintained at the heat of about 1800 degrees F., perfect combustion results. In any ordinary stove of the type in which the draft is at the front and beneath the fire, some of the air passes through the fire, but other portions pass up and around and above the fire, creating counter currents and cooling the fire, at the edges especially, the result being that perfect combustion takes place only in the center of the fire, while considerable quantities of unburned or half burned gases escape upwardly into the flue, not being heated sufficiently to cause them to burn. It is of the highest importance, therefore, that all the products of combustion should be compelled to pass through the holes 14 and that none of the draft should be allowed to escape into the flue by passing around the fire. By the construction shown I have accomplished this result in a most efficient manner.

In Fig. 5, a modified form of the plate is shown consisting of the top 18, having perforations 19, and inclining inwardly on the inside, as shown at 20, for the purpose of efficiently supporting the fire brick lining 21. This lining is provided with holes 22, which

register with the holes 19, and these holes 22 are arranged so as to form a zigzag passage through the plate, as shown, the upper ends registering with the holes 19.

5 In Fig. 6 is shown another form of the plate. It consists of the top 23 provided with holes 24 at intervals therethrough, and sides 25 inclined inwardly to support the fire brick lining 26. This lining is per-  
10 forated with holes 27, the upper ends of which register with the holes 24, but these holes or passages 27 are made in three parts, viz: A lower vertical portion, a horizontal  
15 central portion and an upper vertical portion, the end of which registers with one of the holes 24. This arrangement I have found in practice to be of great importance, because corners 28 are formed, which heat  
20 very quickly when the fire is started, and which correspondingly give out heat very rapidly to the products of combustion passing therethrough.

The plates shown in Figs. 5 and 6 are each made in two similar halves, and each half is  
25 provided with means whereby it may be readily lifted out of the stove, as already described in connection with the form shown in Figs. 2, 3 and 4.

I have described this invention as applied  
30 to an ordinary cooking stove, but obviously it could be applied to any form of a stove or a furnace.

I claim:—

1. The combination with the casing and  
35 fire-pot of a fuel burning apparatus, of a perforated plate adapted to be placed over the fire-pot, and means for causing all the products of combustion to pass through said plate, including a ring supported by said  
40 fire-pot, the inner part of said ring being

beveled toward the center and provided with a series of supporting lugs, said perforated plate resting upon said lugs and composed of two similarly shaped but oppositely lo-  
45 cated halves, each half being provided with a metal top, formed with sides and ends, said sides and one end being beveled off to fit the contour of the supporting ring, and each half being provided with means  
50 whereby it may be readily removed from the stove, said plates having perforated refractory material secured beneath the metal top, substantially as described.

2. The combination with the casing and fire-pot of a fuel burning apparatus, of a  
55 perforated plate supported above the fire-box, and means for causing all the products of combustion to pass through said plate, including a ring having its internal parts  
60 beveled and provided with lugs on the interior thereof, said perforated plate resting upon said lugs and composed of two similarly shaped but oppositely disposed halves  
65 adapted to fit against said ring and provided with means whereby said halves may be removed from the stove, each half being provided with a metal top, formed with sides and ends, said sides and one end being  
70 beveled off to fit the contour of the supporting ring, and refractory material supported thereby, the top of each of said halves and the refractory material being provided with a series of registering perforations, substan-  
tially as described.

In testimony whereof, I affix my signature, 75  
in presence of two witnesses.

WILLIAM G. SHOALS.

Witnesses:

CHARLES VAN VOORHIS,  
CHARLES W. PRIEM.