U. WEDGE.

GAS BURNER.

APPLICATION FILED MAR. 1, 1915.

1,225,381. Patented May 8, 1917.

Fig. 1.

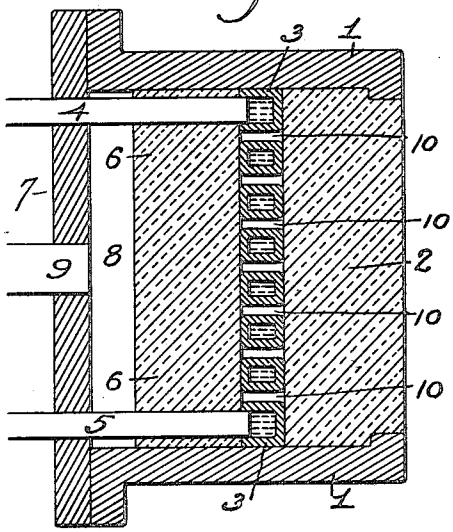


Fig. 2.

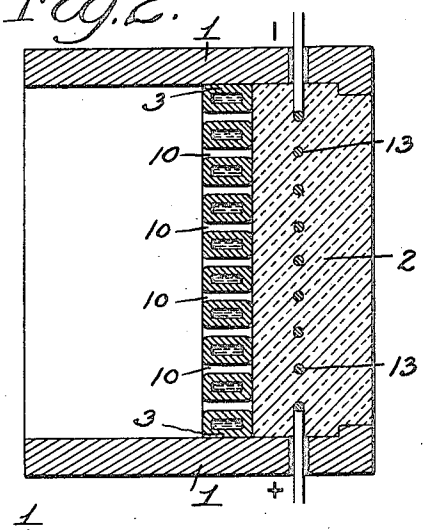
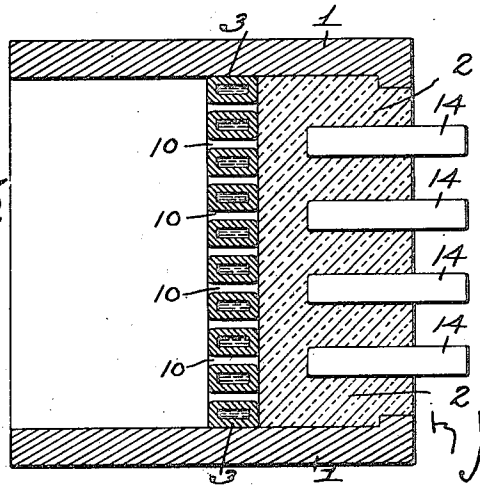


Fig. 3.



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GAS-BURNER.

1,225,381. Specification of Letters Patent. Patented May 8, 1917.

Application filed March 1, 1915. Serial No. 11,363.

To all whom it may concern:

Be it known that I, UTLEY WEDGE, a citizen of the United States, residing in Ardmore, Pennsylvania, have invented certain Improvements in Gas-Burners, of which the following is a specification.

My invention relates to a burner, hereinafter termed a "gas burner" and using gas, oil or other combustible fuel which, when combined with a proper supply of oxygen (usually in the form of air) will have the requisite temperature to produce a flame, one object of my invention being to produce such flame at or immediately adjacent to the face of the burner, and a further object being to prevent backfiring due to ignition of the combustible fuel within the burner.

These objects I attain in the manner hereinafter set forth, reference being had to the accompanying drawing, in which—

Figure 1 is a vertical sectional view of a gas burner constructed in accordance with my invention; and Figs. 2 and 3 are sectional views illustrating means for increasing the heat of that member of the burner upon which the flame is produced.

In Fig. 1 of the drawing, 1 represents the tubular casing of the burner which may be of any desired cross sectional form and dimensions and which is closed at the forward end by a block 2 of porous refractory material, backed by a grid 3, preferably chambered for the circulation of water or other cooling fluid therethrough in order to prevent it from becoming overheated, such cooling fluid being conveyed to and from the grid by means of pipes 4 and 5, and the grid being provided with openings 10 to permit of the passage of the combustible fluid through the same.

Back of the grid 3 within the shell or casing 1 is another block 6, likewise of porous refractory material, and back of the latter and between the same and the rear cap 7 of the burner is a chamber 8 which receives the combustible fluid from a supply pipe 9 and serves to spread the same throughout the area of the rear face of the block 6.

The combustible fluid, under pressure, and preferably mixed with the requisite amount of oxygen to maintain combustion, passes through the pores of the block 6 and through the passages 10 of the cooling member 3 to the inner face of the block 2, the latter being highly heated so that by the time the combustible mixture reaches the outer face of said block it will at once become ignited and burn in, on, at, or immediately adjacent to said face, there being no forcible projection of a volume of flame beyond the latter.

The block 6 serves the same purpose as the wire screen of the usual "Davy" safety lamp in preventing backward passage of flame or spark to the combustible fluid in the chamber 8.

In using the older forms of gas burners of this type experience has shown that although a reducing or neutral condition of flame can be maintained at the surface of the burner the admission of sufficient air to produce an oxidizing condition cools the burner to such an extent as to interfere with the maintenance of a suitable combustion temperature and if, in any of such older types of construction, an effort is made to overcome this condition by using an increased percentage of oxygen, the incandescent zone will slowly creep back until a posterior explosion will ultimately be produced.

In my improved burner, however, it is not necessary to force the combustible mixture through the block 2 at a high velocity in order to prevent the following back of a temperature which will cause an eventual explosion in the chamber at the rear of the burner, because the cooling of the back portion of the block 2 is not dependent upon the admission of a large quantity of cold combustible fluid, but is effected by the cooling member 3, whereby the danger of a posterior explosion is so far removed that it would be admissible, if desired, to insert a heating member between the incandescent surface of the block 2 and the cooling member 3, such for instance, as the electrically heated body 13, shown in Fig. 2, or the bars 14 of high heat conductivity embedded in the block, and projecting into the flame at the surface of the same, as shown in Fig. 3, so as to conduct heat into the block, whereby, even if a considerable excess of air was admitted to the burner, the necessary temperature for combustion would still be maintained.

I have not considered it necessary to illustrate in Figs. 2 and 3 the members 4, 5, 6, 7 and 9 shown in Fig. 1.

Even if pure oxygen is employed and the cooling function of the inert gas with which oxygen is combined in atmospheric air is, therefore, not available, the heat would not

extend back of the cooling member 3, and in such event it would not be necessary to use the heating member to maintain the necessary temperature of combustion, a strong oxidizing flame or oxidizing condition being maintained without causing either a posterior explosion or excessive cooling.

If oil or other liquid fuel is employed it will, in its passage through the block 2, have been subjected to such a degree of heat as to convert the same to gas which will be burned upon the face of the block, but in this case it might be necessary to primarily heat the combustible fluid in order to offset the loss of heat units represented by the gasification of the liquid. In either case, the relatively low temperature of the grid 3 will prevent the heating of the fuel to such an extent in the rear of the block 2 as to cause combustion at that point, and this result will also be attained even if the fuel has not, previous to its contact with the block 2, been passed through the pores of a supplementary block such as shown at 6.

In case a combustible liquid mixed with oxygen is used in this burner the cooling member would prevent a posterior explosion the same as if a mixture of gas and oxygen is employed. If a combustible liquid is used without admixture of oxygen the cooling member will prevent vaporization by heat until the combustible fluid has reached the combustion zone. Such vaporization or decomposition of liquid fuel, if occurring prematurely, would tend to interfere with the operation of the burner, hence the use of the cooling member is advantageous whether or not oxygen is combined with the combustible liquid.

Economies possible by reason of the complete combustion secured with my improved burner are so great as to justify the small amount of heat extracted, or the small amount of power consumed, in maintaining the required maximum or minimum temperatures.

I claim:

1. A gas burner having a block of porous refractory material on the surface of which combustion is effected, another block of porous refractory material inwardly beyond the same and through which the fuel is compelled to pass on its way to the first block, and a cooling device interposed between said blocks.

2. A gas burner having a block of porous refractory material on the surface of which combustion is effected, and means embedded in the block for increasing the heat of the same.

3. A gas burner having a block of porous refractory material on the surface of which combustion is effected, and heat conducting bars embedded in the block and projecting from that face of the same on which combustion is maintained.

4. A gas burner having a block of porous refractory material on the surface of which combustion is effected, means embedded in the block for increasing the heat of the same, and cooling means at the rear of the block.

5. A gas burner having a block of porous refractory material on the surface of which combustion is effected, means for increasing the heat of said block, and water cooled means at the rear of the block for reducing the temperature of the combustion fluid at that point.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

UTLEY WEDGE.

Witnesses:

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