

April 3, 1945.

J. H. HURLBUT ET AL

2,372,953

BURNER

Filed Dec. 27, 1940

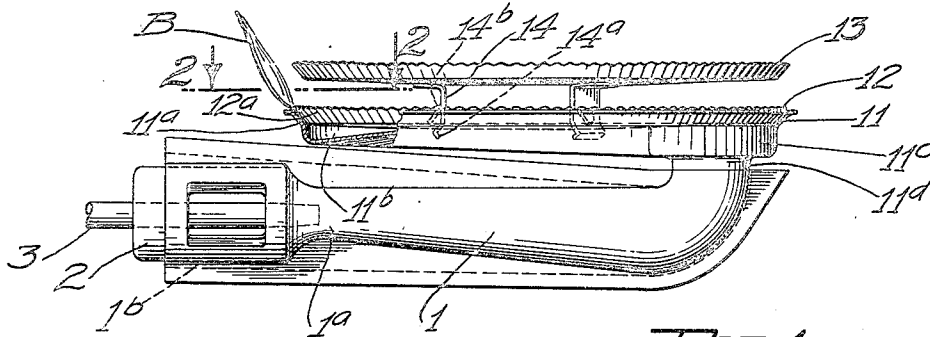


FIG. 1.

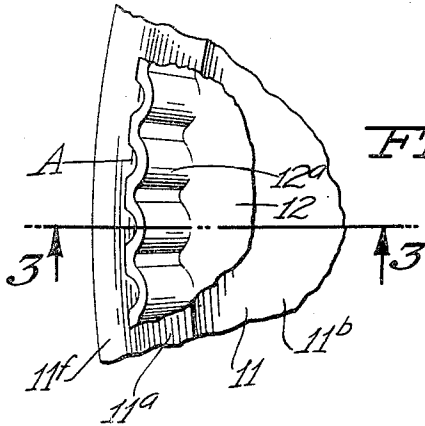


FIG. 2.

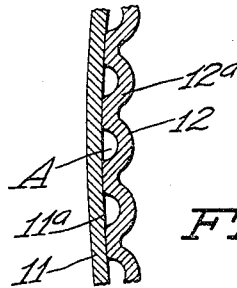
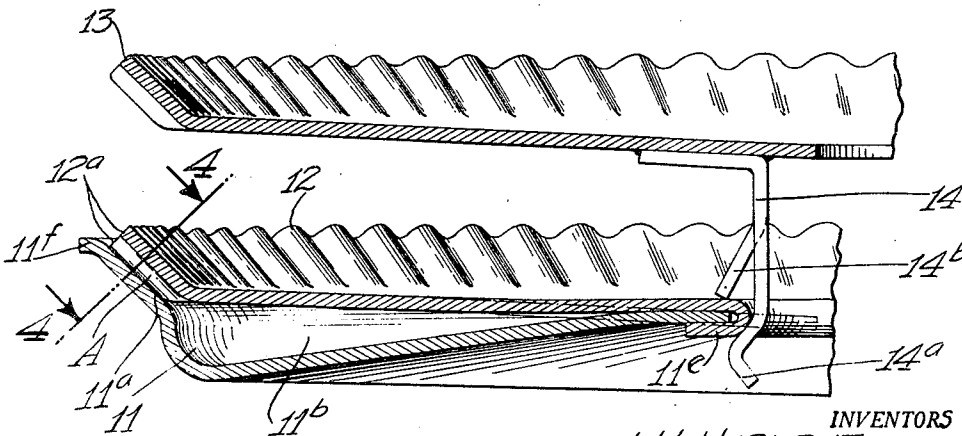


FIG. 4.

FIG. 3.



INVENTORS

J. H. HURLBUT

T. J. DAVIDSON

R. N. BOWMAN

BY *William C. Hall*
ATTORNEY.

UNITED STATES PATENT OFFICE

2,372,953

BURNER

James H. Hurlbut, Huntington Park, Thomas J. Davidson, Montebello, and Roy N. Bowman, Southgate, Calif., assignors to Rheem Manufacturing Co., Richmond, Calif., a corporation of California

Application December 27, 1940, Serial No. 371,900

3 Claims. (Cl. 158—116)

Our invention relates to hydro-carbon burners, particularly adapted for water heaters, although not limited to such use.

One of the principal objects of this invention is to provide a burner of this class comprising separate burner rings which, when placed together, form ports at their outer portions for conducting the fuel gas, and in which the rings are forced together at their outer port-forming portions by clamping means at the radially inner portions.

Another important object of this invention is to provide a burner of this class in which a duplicate of one of the members is spaced above the burner to provide a baffle for directing secondary air against the flame issuing from the ports of the burner.

An important object also of this invention is to provide a burner of this class having baffle means at opposite sides of the flame issuing from the ports of the burner for directing secondary air to the flame above the base thereof to facilitate combustion, and also to determine the direction of the flame in order to deflect the flame from portions of the burner.

It is also an object of this invention to provide a lower or outer baffle which is directed outwardly away from the flame for deflecting the secondary air away from the base of the flame but so constructed as to allow such air to rise toward the outer or upper portion thereof.

A further important object of this invention is to provide a burner of this class which is particularly simple and economical of construction, durable, and efficient.

With these and other objects in view, as will appear hereinafter, we have devised a hydro-carbon burner having certain novel features of construction, combination, and arrangement of parts and portions, as will be hereinafter described in detail and particularly set forth in the appended claims, reference being had to the accompanying drawing and to the characters of reference thereon, which form a part of this application, in which:

Fig. 1 is a side elevation of our burner in a preferred form of construction, portions being broken away and in section to facilitate the illustration;

Fig. 2 is an enlarged fragmentary plan view thereof, taken at 2—2 of Fig. 1;

Fig. 3 is an enlarged sectional elevation thereof, taken through 3—3 of Fig. 2; and,

Fig. 4 is an enlarged, fragmentary section taken on line 4—4 of Fig. 3.

At the lower portion of our burner is a mixing tube 1, intermediate the ends of which is a venturi 1^a. At the inlet end of the mixing tube and ahead of the venturi is a recess 1^b in which is rotatably mounted a shutter or shutter assembly 2. The gas or feed pipe 3 extends through the shutter assembly with its open end directed towards the venturi.

On the opposite or outer end of the mixing tube is carried the burner proper which consists essentially of the burner elements 11 and 12. The opposite or outer end of the opening of the mixing tube is directed upwardly for directing the fuel mixture into these burner elements 11 and 12.

The burner element 11, which will be referred to as a burner ring, is provided at its periphery with a ledge 11^a which is inwardly bevelled. From this ledge the ring is pressed downwardly to form an annular channel 11^b. At one side of the channel is an enlarged opening 11^c provided with a downwardly extending flange 11^d which is preferably welded to the outer end of the mixing tube over the outer end of the opening therein. The central portion of the burner ring is open, as indicated by 11^e, to permit the passage of secondary air for the flame.

The burner element 12 is a port-forming disc. The peripheral portion of this disc is inclined upwardly, to conform to the inclination of the ledge 11^a, and is provided with a multiplicity of corrugations 12^a which are directed upwardly and outwardly. The outer portions of the corrugations rest upon the ledge 11^a and this corrugated portion forms with the ledge a series of outwardly and upwardly directed ports A for the escape of fuel gas. The central portion of the disc 12 is also open, and the portion adjacent the opening is bent downwardly and around the corresponding inner edge of the burner ring 11. These rings are thus rigidly secured together. When securing the two rings together, both of the rings are sprung or distorted axially, resiliently forcing the peripheral portions of the rings together.

Positioned axially above the burner portion, comprising the rings 11 and 12, is a baffle 13. This baffle, for economy of construction, is made identical with the disc 12 prior to the downward bending of the inner portion.

The baffle 13 is supported in spaced relation to the port-forming disc 12 by means of brackets 14 secured to the lower side of the baffle. Preferably three of such brackets are provided. The brackets 14 are made of metal straps extending

downwardly from the baffle 13 and are bent outwardly at their lower ends to form latch or retaining portions, as indicated by 14^a. From intermediate the ends of the straps 14 are struck ears 14^b which engage the upper sides of the disc 12 adjacent the center opening, and limit the downward position of the baffle 13. The outwardly bent portions 14^a resiliently engage the lower portion of the disc 12 for resiliently securing the baffle in position.

The peripheral portion of the burner ring 11 has a flange 11^f which extends beyond the peripheral portion of the port-forming disc, that is, beyond the base of the flame issuing from the ports. This flange 11^f is bent radially outwardly from the ports.

Air for the initial combustion of the gas in the burner is supplied through the mixing tube, but secondary air is supplied to the outer and inner sides of the flame, issuing from the ports A, around the edge of the baffle 11f and between the disc 12 and the baffle 13. Air passes upwardly along the outer side of the burner ring 11 and is then deflected outwardly. As this air rises it impinges against the flame upwardly or outwardly from the base, tending to bend the flame upwardly. Both sources of secondary air determine the position of the flame, as indicated in Fig. 1, so that the upper or hot portion of the flame is deflected from metallic portions of the burner.

Though we have shown and described a particular construction, combination, and arrangement of parts and portions of our burner, we do not wish to be limited to the same, but desire to include in the scope of our invention the construction, combination, and arrangement substantially as set forth in the appended claims.

We claim:

1. In a burner of the class described, a pair of burner rings in the form of discs, the radially inner portions of the discs being positioned together flatwise, means for clamping the radially inner edge portions of said rings together, the peripheral portion of one of the rings, at the side adjacent the other ring, having an outwardly and upwardly inclined conical ledge, and the peripheral portion of the adjacent side of said other ring having circumferentially spaced radial port-forming portions, the port-forming portions being resiliently clamped against said ledge by the

inherent spring of the metal caused by clamping of the radially inner edge portions of said rings together said rings being spaced apart between their inner edge portions and the port forming portions whereby a fuel distributing means is provided for ports formed by the port forming portions and ledge.

2. In a burner of the class described, a pair of burner rings in the form of discs, the radially inner portions of the discs being positioned together flatwise, the radially inner edge portion of one of the discs being bent over the corresponding inner edge of the other, the peripheral portion of one of the rings, at the side adjacent to the other ring, having an outwardly and upwardly inclined conical ledge, and the peripheral portion of the adjacent side of said other ring having circumferentially spaced radial port-forming portions, the port-forming portions being resiliently clamped against said ledge by the inherent spring of the metal caused by clamping of the radially inner edge portions of said rings together said rings being spaced apart between their inner edge portions and the port forming portions whereby a fuel distributing means is provided for ports formed by the port forming portions and ledge.

3. In a burner of the class described, a pair of burner rings in the form of discs, the radially inner portions of the disks being positioned together flatwise, means for clamping the radially inner edge portion of said rings together, the peripheral portion of one of the rings, at the side adjacent to the other ring, having an outwardly and upwardly inclined conical ledge, and the peripheral portion of the adjacent side of said other ring having circumferentially spaced radial port-forming portions, the port-forming portions being resiliently clamped against said ledge by the inherent spring of the metal caused by clamping of the radially inner edge portion of said rings together, there being formed radiating ports by the adjacent peripheral portions of the rings, said discs diverging gradually from their radially inner secured edge portions, the radially outer portions between the discs having a deep channel with which the inner ends of the ports communicate.

JAMES H. HURLBUT.
THOMAS J. DAVIDSON.
ROY N. BOWMAN.