J. B. CARROLL.

ACETYLENE BURNER.

APPLICATION FILED DEC. 21, 1911.

1,050,338. Patented Jan. 14, 1913.

Fig. 1.

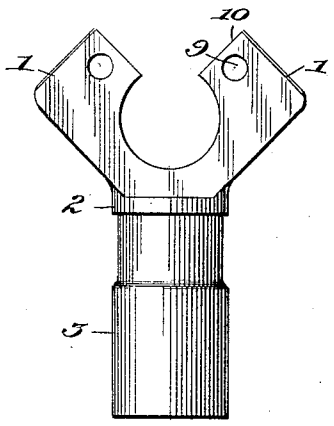


Fig. 2.

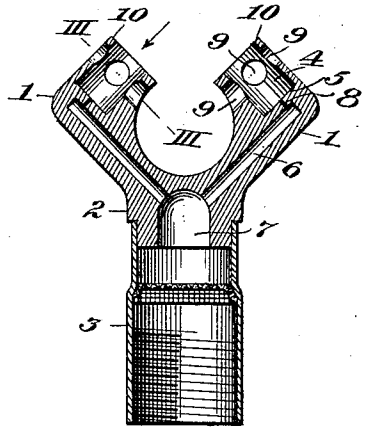
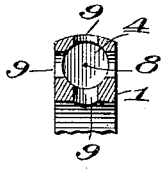


Fig. 3.



Witnesses:

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UNITED STATES PATENT OFFICE.

JOHN B. CARROLL, OF CHICAGO, ILLINOIS.

ACETYLENE-BURNER.

1,050,338. Specification of Letters Patent. Patented Jan. 14, 1913.

Application filed December 21, 1911. Serial No. 667,138.

To all whom it may concern:

Be it known that I, JOHN B. CARROLL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Acetylene-Burners, of which the following is a specification.

In U. S. Letters Patent No. 817,750, granted to me April 17, 1906, I have shown an acetylene burner having opposed cylindrical flame-chambers of considerable width, in which the gas is burned as a central jet of flame at some distance from the surrounding imperforate wall, the air required to effect the combustion moving inward toward the gas-orifice, between the flame and the heated wall. When a burner of this type and of the proportions shown and described is supplied with gas under the normal pressure, a temperature is maintained at the orifice above that which permits the accumulation of carbon or solid hydrocarbons. When the supply of gas to such a burner is restricted to give a low flame, however, carbon accumulates at the orifice and the burner soon chokes.

The present invention is a burner fundamentally of the type shown in my specified patent, but having an improved construction which permits it to be operated not only with the normal gas-pressure and full flame, but with a pressure and flame which may be decreased to any desired extent, that is a "turn-down" burner.

The preferred construction is illustrated in the accompanying drawing, in which—

Figure 1 is a side elevation of the complete burner; Fig. 2 is a vertical section in a plane passing through the axes of the flame-chambers; and Fig. 3 is a transverse section of one of the branches, on the line III—III of Fig. 2.

The burner illustrated is one of the duplex type, having two branches 1, 1, leading from a trunk 2, which is supported in the upper end of a metal tube 3. The branches and trunk preferably consist of a single piece of lava, steatite, or other heat-insulating material, although the branches may consist of separate pieces. In the inner face of each branch is a recessed flame-chamber 4, which is preferably cylindrical and has a flat bottom 5. Within each branch is a gas-supply conduit 6, leading from a central passage 7. A minute cylindrical duct 8 extends from the conduit to the flame-chamber, the duct and chamber being in axial alinement.

In the burner of my previous patent, the cylindrical recess constituting the flame-chamber has a normal width, in fractions of an inch, of 0.18, and a depth of 0.12, the walls being imperforate. In the present burner, this cylindrical recess 4 still has a preferred width of 0.18, but the depth is greatly increased, preferably to about 0.23. The walls of this recess are also provided with a number of radially-extending circular holes, here shown as four in number, spaced at an angular distance of 90°. In the present burner these holes are 0.10 in diameter and the base of the flame chamber is 0.10 below these holes, giving a flame-chamber having an imperforate wall of a net depth of 0.10, or nearly the same as that of my previous patent.

When acetylene is supplied to this burner at the normal pressure of about two and one-half inches of water, the gas escaping from the duct 8 burns as a small central jet in each flame-chamber, and the flames from the two branches impinge at right angles and spread out into a broad thin flat flame. A stream of air continuously passes inward between the imperforate heated sides of each chamber and the central jet of flame, being thereby raised to a higher temperature before it reaches the central duct. The gas escaping from the duct meets the hot air and springs into flame, the base of the flame being at or in such proximity to the orifice that its walls are maintained at a temperature above that which will permit the deposit of carbon, or will cause it to be at once oxidized by the heated air if deposited. Thus the normal operation of this burner is identical with that of the burner of my previous patent, except that air flowing rearwardly around the central flame-jets enters through the lateral holes 9, instead of being supplied entirely through the open end of the flame-recess. When the supply of gas is largely cut off, the flame entirely loses its normal characteristics, and no longer springs in the form of narrow luminous central jets from the orifices 8. Two short flames, having substantially the width of the flame-chambers 4, then rise from the outer ends 10 of the branches, the bases of these flames practically seating on these ends. The ends of the flame-chamber walls are thereby maintained at such temperature

that no carbon deposits upon them, and the flames may be turned as low as desired, even to a point where they become non-luminous and almost invisible, without causing any deposit.

In my previous patent, I have stated, referring to the burner shown therein, that "If the surrounding wall of the recess is removed or pierced with holes which will permit an inrush of cold air, the flame remains unchanged in shape and appearance, but the orifice soon chokes." This statement is equally true of the present burner, referring to that portion of the wall, beneath the openings 9, which incloses the normal flame-chamber. This imperforate wall is necessary to retain the heat and thereby heat the air, moving inward between its hot surface and the central jet of flame, to a temperature which will prevent the deposition of carbon at the orifice; it also shields the flame and protects it from drafts. The width and depth of this flame-chamber, proper, should, as heretofore, bear a certain relation to each other and to the normal gas-pressure. The position of the air-inlet holes is also important, holes which are too far from the base of the flame-chamber admitting insufficient air to the base of the flame, and holes which are too near the base of the flame-chamber admitting too much cold air.

While the commercial burner usually comprises two branches with opposed flame-chambers, it will be understood that a burner having a single gas-outlet and flame-chamber, giving a candle-like flame, may be employed.

I claim:

1. An acetylene burner, having a supply-conduit, a recessed flame-chamber of sufficient width to admit air to the base of the flame, and a duct extending from said conduit to said chamber, the walls of said chamber having an air-inlet or inlets at such distance from the base of said chamber that sufficient preheated air is supplied to the normal flame to maintain at the burner-orifice a temperature above that which permits the accumulation of carbon or solid hydrocarbons.

2. An acetylene burner, having a supply-conduit, a cylindrical flame-chamber of sufficient width to admit air to the base of the flame, and a short central duct extending from said conduit to said chamber, the walls of said chamber having an air-inlet or inlets at such distance from the base of said chamber that sufficient preheated air is supplied to the normal flame to maintain at the burner-orifice a temperature above that which permits the accumulation of carbon or solid hydrocarbons.

3. An acetylene burner, having two supply-conduits, two opposed recessed flame-chambers of sufficient width to admit air to the base of the flame, and ducts extending from said conduits to said chambers, the walls of each chamber having an air-inlet or inlets at such distance from the base of said chamber that sufficient preheated air is supplied to the normal flame to maintain at the burner-orifice a temperature above that which permits the accumulation of carbon or solid hydrocarbons.

4. An acetylene burner, having two supply-conduits, two opposed cylindrical flame-chambers of sufficient width to admit air to the base of the flame, and short central ducts extending from said conduits to said chambers, the walls of each chamber having an air-inlet or inlets at such distance from the base of said chamber that sufficient preheated air is supplied to the normal flame to maintain at the burner-orifice a temperature above that which permits the accumulation of carbon or solid hydrocarbons.

5. An acetylene burner, having two supply-conduits, two opposed cylindrical flame-chambers of sufficient width to admit air to the base of the flame, and short central ducts extending from said conduits to said chambers, the walls of each chamber having a series of radial air-inlets at such distance from the base of said chamber that sufficient preheated air is supplied to the normal flame to maintain at the burner-orifice a temperature above that which permits the accumulation of carbon or solid hydrocarbons.

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

JOHN B. CARROLL.

Witnesses:
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