

F. E. BALDWIN.
ACETYLENE GAS BURNER.
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994,365.

Patented June 6, 1911.

Fig. 1.

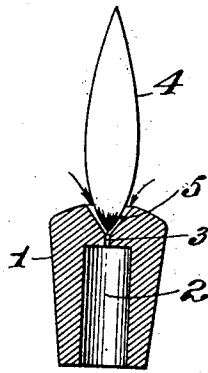
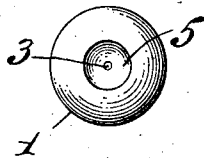


Fig. 2.



Attest:
Edgewood L. Goss
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by *Harry Van Horn Phelps* *Att'y.*

UNITED STATES PATENT OFFICE.

FREDERIC E. BALDWIN, OF NEW YORK, N. Y.

ACETYLENE-GAS BURNER.

994,365.

Specification of Letters Patent.

Patented June 6, 1911.

Application filed December 17, 1908. Serial No. 467,938.

To all whom it may concern:

Be it known that I, FREDERIC E. BALDWIN, a citizen of the United States, residing at New Brighton, in the borough of Richmond, city of New York, and State of New York, have invented certain new and useful Improvements in Acetylene-Gas Burners, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to burners for acetylene gas lamps, that is, for lighting devices using gas produced by dropping water upon calcium carbide, or otherwise placing them in contact with each other. Such burners, as constructed before my invention, while suitable for large-size lamps, as for house use are objectionable in the smaller sizes of lamps, such as bicycle and mine lamps, where the burners are exposed to the mud and dust of the road, or the powdered coal dust of the mines, which soon clogs the small air passages which admit air into the gas passage behind the combustion orifice. On the other hand, attempts to make such burners, or tips, without the entraining air passages, have been failures, because of the deposit of carbon at the orifice which soon clogs it. I have found, however, that, by the use of my invention, I can dispense with the air inlets, and nevertheless can use in acetylene lamps, a tip having the gas passage as small as one one-hundredth of an inch in diameter, without danger of clogging; and this size of passage is of the greatest utility in miners' lamps, which must be as small in size and weight as possible—so small in fact that, as is well known, it is customary to avoid increasing the lamp's weight by furnishing each lamp user with a plurality of removable carbide chambers or containers.

In carrying out my invention, I provide a burner or tip with a restricted trough or cup whereby the outrushing gas surrounds itself with a moving body of air, which forms a cooling medium between the column of gas and the walls of the orifice, which also prevents the flame from impinging directly against the walls of the orifice and thus avoids the possibility of depositing carbon there; while at the same time this outrushing body of gas is prevented from obtaining sufficient oxygen to permit its ignition save at such distance from the orifice as will avoid carbon-deposit there.

My invention will be fully understood by

reference to the accompanying drawings, in which—

Figure 1 is a sectional view of my device showing a flame burning therefrom, and Fig. 2 is a front end-view of the same without the flame.

1 is the body of the burner or tip; 2, a gas recess or passage continued in a duct 3 of small diameter, which duct 3 terminates in a cup shaped nozzle or orifice 5. This cup or nozzle flares somewhat but the walls thereof are at an acute angle to each other.

I have found that the passage 3 may be of as small diameter as one one-hundredth of an inch, and that the angle of flare of the nozzle or orifice 5 may be varied as the diameter of the passage 3 varies—generally speaking, a wider flare for a larger diameter, with the same pressure of gas.

The action I believe to be as follows: The out-rushing gas draws the surrounding air into its vortex and by having the bell-shaped orifice 5 sufficiently restricted, that is, the walls of the orifice are at an acute angle to each other, the out-rushing gas tends to form a vacuum at the bottom of the bell-shaped chamber 5, to counteract which the air must enter passing down (as shown by the arrows) the sides of the bell-shaped orifice. When the gas is ignited this down-rushing air forms a cooling medium between the ignited gas and the walls of the orifice, so that the flame 4 cannot impinge and deposit the carbon. It is well known that these gases cannot burn without large quantities of oxygen, therefore, ignition cannot take place until sufficient oxygen is obtained, which, owing to the restricted shape of the orifice, and the expansive action of the heated gas after ignition (whereby the gas stream tends to fill the bell-shaped orifice) causes the point of ignition to take place, not at the orifice of the gas duct but at such distance above the gas orifice as is necessary for it to obtain the requisite amount of oxygen and thus no injurious carbon can be deposited.

I am aware that it is old to construct acetylene gas burners with air ducts leading into the passage behind the orifice so that the outrushing gas entrains a current of air, which tends partially to avoid deposit of carbon; but in that construction, unless relatively great pressure (causing an elongated and objectionable flame) be employed, the flame will impinge directly upon the tip, and hence tend to deposit carbon at the ori-

5 fice. I am also aware that it has been proposed, in connection with devices for enriching gas with oil, to employ a burner somewhat similar in form to mine with the intention of atomizing any oil that may be delivered at the orifice particularly at or just before the instant of lighting, and, later in the operation, for obtaining a better mixture with air than is obtained in the mixing
10 chamber of the apparatus. This latter device was suggested for use in oil stoves, which, manifestly, are radically different in design and use from lighting devices, and particularly acetylene lamps.

15 What I claim as my invention is:

An acetylene burner tip having a solid body portion provided with a small duct for

the passage of the gas and an external cup shaped nozzle or orifice into which the gas duct extends, the walls of the nozzle or orifice arranged at an acute angle to each other, whereby the flame of the ignited gas expands to nearly fill the nozzle or orifice and the entrained air forms an envelop around the flame to prevent it from contacting with the burner tip to prevent the deposit of carbon. 20 25

In testimony whereof, I have hereunto set my hand, this 11th day of December, nineteen hundred and eight.

FREDERIC E. BALDWIN.

In presence of—

H. V. N. PHILIP,

HENRY E. GAUDY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."
