C. M. HUNTER.

ATMOSPHERIC BURNER.

APPLICATION FILED NOV. 6, 1915.

1,194,740.

Patented Aug. 15, 1916.

Fig. 1.

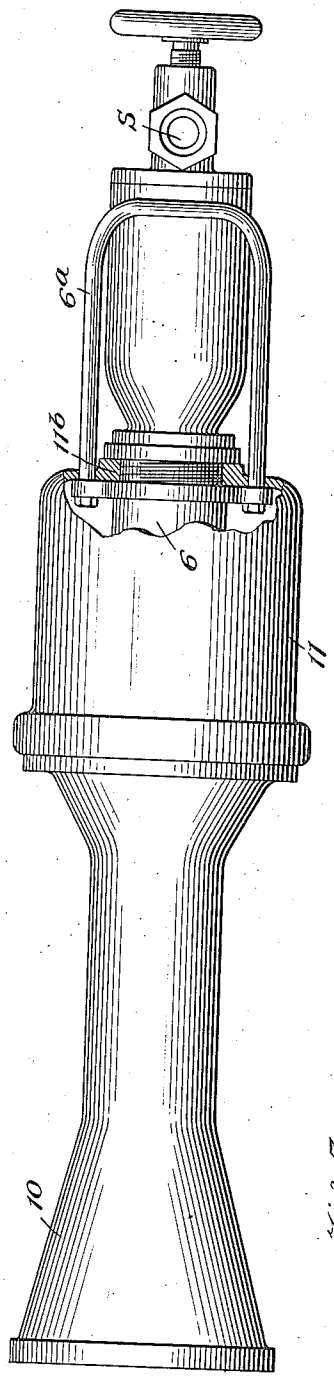


Fig. 2.

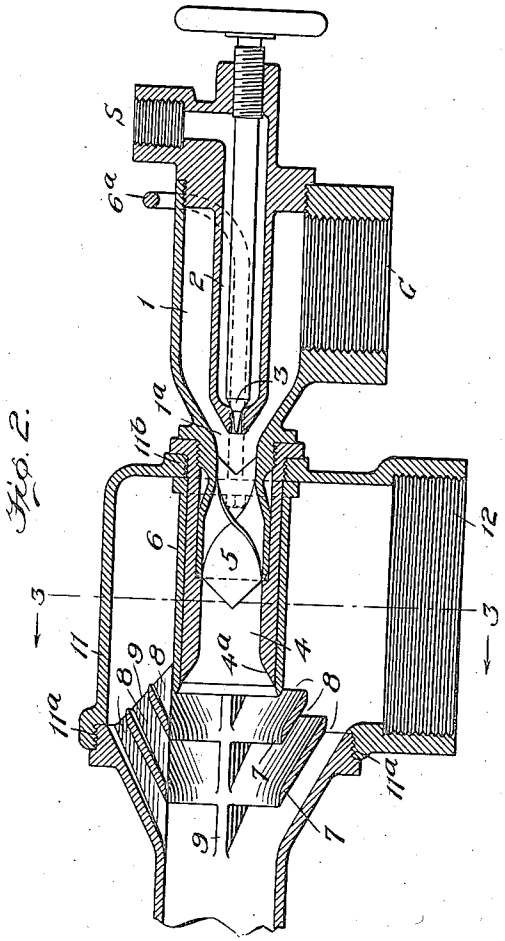
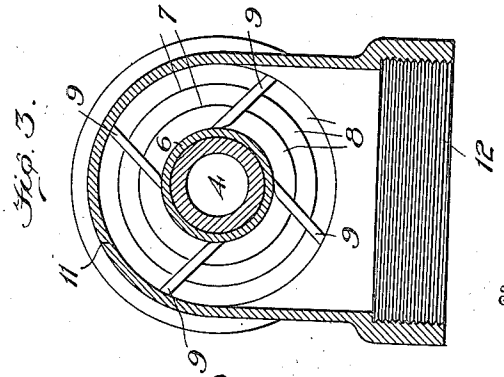


Fig. 3.



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UNITED STATES PATENT OFFICE.

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1,194,740. Specification of Letters Patent. Patented Aug. 15, 1916.

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To all whom it may concern:

Be it known that I, CAMPBELL MURRAY HUNTER, a subject of the King of the United Kingdom of Great Britain and Ireland, residing at London, in the county of Middlesex, England, have invented certain new and useful Improvements in Atmospheric Burners; 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 atmospheric burners for gas and other fuel of like physical nature of relatively large capacity, for heating for industrial purposes, such, for instance, as the heating of boiler and other furnaces, and wherein the fuel is used at a high velocity or pressure, as for example in the burner forming the subject of former Letters Patent No. 1,071,053, granted to me August 26th, 1913.

The object of my present invention is to provide improved means for introducing and controlling the air supply both as regards volume and temperature, and also to suppress or minimize the noise heretofore inherent in such a burner.

My invention, broadly stated, embraces the combination with a centrally disposed fuel-duct, of a series of surrounding air passages, or ducts for supplying the air necessary to maintain combustion of the fuel, and means for successively closing said air ducts or passages at their delivery ends said means being of a character to create a continuous fuel duct of substantially smooth bore and uniform cross sectional area, whereby spaces or pockets productive of eddies in the current are avoided.

To this end my invention furthermore embraces the provision in a gas burner of the following novel features: air ports formed by a series of cone frusta placed symmetrically and in fixed relation one within the other and having a centrally arranged, preferably round, passage through their apices through which the jet of gas passes; an axially movable sleeve valve for controlling the air ports and which at the same time forms an extensible fuel duct and maintains a smooth bore for passage of the gas; a casing forming a chamber inclosing the inlets of the air cones, and also preferably the fuel-duct and sleeve valve extension thereof, an aperture being provided in the casing for entrance of the air, such aperture being adapted for connection to a pipe or conduit so that the air may be fed through a silencing box, heater, or from any desired source; said several elements being variously combined as will appear in the claims hereto appended.

In the drawings chosen for the purpose of illustrating this invention, the scope whereof is pointed out in the claims: Figure 1 is a plan view of an atmospheric burner embodying my invention, a portion of the casing being broken away, Fig. 2 is a longitudinal central section of the same, and Fig. 3 is a transverse section taken in the plane of the line 3—3, Fig. 2, looking in the direction of the arrow.

Like symbols refer to like parts wherever they occur.

With the aid of the drawings I will now proceed to describe my invention more fully, so that others skilled in the art to which it appertains may apply the same.

In the drawings, 1 indicates the gas chamber of a burner with which the gas supply pipe connects at G, said gas chamber preferably having a contracted throat, as at 1^a, where it delivers into the gas or fuel duct 4 of the burner and through which the gas or other fuel issues at a high velocity.

A steam jet pipe 2 with which a steam supply pipe connects as at S, may be utilized where necessary to secure the delivery of the gas or other fuel at a high velocity, and when present said steam jet is centered with the throat 1^a leading to the fuel delivery duct 4, and the jet is controlled by the usual or any approved form of needle valve 3.

The gas or fuel duct 4 of the burner is provided with a helical vane 5 when it is desired to impart a whirling motion to the fuel passing therethrough.

A sleeve 6, the function of which will hereinafter appear, is telescopically mounted on the fuel duct 4, and when advanced constitutes a continuation of the fuel duct, accordingly the portion 4 of the fuel duct should be of such length that when the sleeve is pushed forward thereon the two will form a continuous tube or fuel duct of substantially equal cross sectional area. The outer end of the portion 4 of the fuel duct is preferably beveled as at 4^a to preserve the smoothness of the bore where the slight enlargement thereof at the junction with sleeve portion 6 occurs.

7, 7 indicates cone frusta arranged in fixed relation, spaced at suitable distances apart to form the ports 8 and held in correct relative position by the webs 9, these webs being advantageously arranged in more or less spiral form, as indicated in the drawing, so as to cause the air to impinge on the stream of gas tangentially and so aid or set up a whirling motion therein. These cones are in axial alinement with the fuel duct 4 and may be carried by the mouth piece 10 of the burner as shown, or in any convenient manner. This arrangement of cones constitutes in effect a number of air inductors of high efficiency in series enabling the gas to draw a high proportion of air through the ports by virtue of its kinetic energy.

The function of sliding sleeve 6 which when extended is in effect a continuation of fuel duct 4, is that of a valve to regulate the flow of air through the ports 8. The axial movement of this sleeve or supplemental fuel duct 6 by aid of handle 6^a successively opens or closes air ports 8 as may be required. The closing of the air ports at the inner ends in this manner insures that a smooth bore is always presented for the passage of the gas with no dead side pockets, such pockets being productive of noise and inimical to efficiency. This movable sleeve is also, in effect, a movable prolongation of the portion 4 of the fuel duct.

The mouthpiece 10 of the burner may be of any desired length; it is flared at the outer end, and is proportioned so that a powerful draft is caused through the air ports. It may be integral with or attached to any of the other parts.

11 is a casing or chamber which incloses the air passages and ports, and preferably also the fuel duct and air regulating sleeve, and is constructed for attachment to or is formed integral with the burner mouthpiece, air ports and gas nozzle. It is provided with an opening 12 adapted for attachment of a pipe or conduit.

Although in the foregoing description I have described the burner as being used with gas it is to be understood that it is also applicable for use with carbureted air, oil vapor, coal dust or other fuel or combustible matter in like physical condition.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. In an atmospheric burner, the combination with an internally disposed fuel duct, of a series of surrounding air ducts of constant cross-section for supplying the air to support combustion, and means for successively closing the air ducts at their delivery ends said means being adapted to constitute a continuation of the fuel duct.

2. In an atmospheric burner, the combination of a fuel duct, and a plurality of spaced cone frusta arranged in fixed relation to each other and in axial alinement with the fuel duct, the fuel duct and cone frusta being proportionate in size and relatively movable to close the several air ducts.

3. In an atmospheric burner, the combination of a fuel duct, a plurality of spaced cone-frusta arranged in fixed relation with each other, and a mouth-piece, said elements being arranged in axial alinement, the cone frusta and fuel duct being relatively movable, and a casing or hood which surrounds the fuel duct and cone frusta.

4. In an atmospheric burner, the combination with a fuel duct, of a plurality of spaced cone frusta, and a plurality of webs interposed between the cone frusta and which maintain the frusta in fixed relation, said webs being tangentially disposed with relation to the openings in the apices of the frusta, the fuel duct and the cone frusta being in axial alinement and being relatively movable.

5. In an atmospheric burner, the combination of a fuel duct having an extension telescopically mounted thereon, and a plurality of fixed and spaced cone frusta, the fuel duct extension being relatively movable both to the fuel duct and frusta.

6. In an atmospheric burner, the combination with a centrally disposed fuel duct, of a series of surrounding air ducts for supplying the air to support combustion, and means for closing the air ducts at their delivery ends, said means being adapted to constitute a smooth bore continuation of the fuel duct.

7. In an atmospheric burner, the combination of a centrally disposed fuel duct, and a series of surrounding air ducts of constant area having their delivery ends in alinement and concentric with the fuel duct, said series of air ducts and the fuel-duct being proportionate in size and relatively movable whereby the air ducts are successively closed at their delivery ends.

In testimony whereof I affix my signature.

CAMPBELL MURRAY HUNTER.