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W. DIECKMANN & F. C. ORMROD.

BURNER FOR LIQUID FUEL.

APPLICATION FILED JAN. 23, 1906.

Fig. 1.

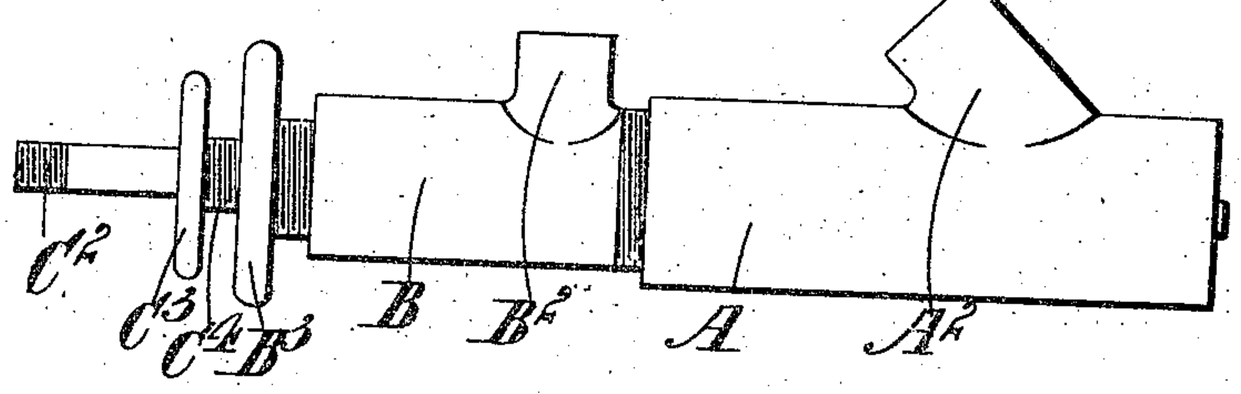


Fig. 2.

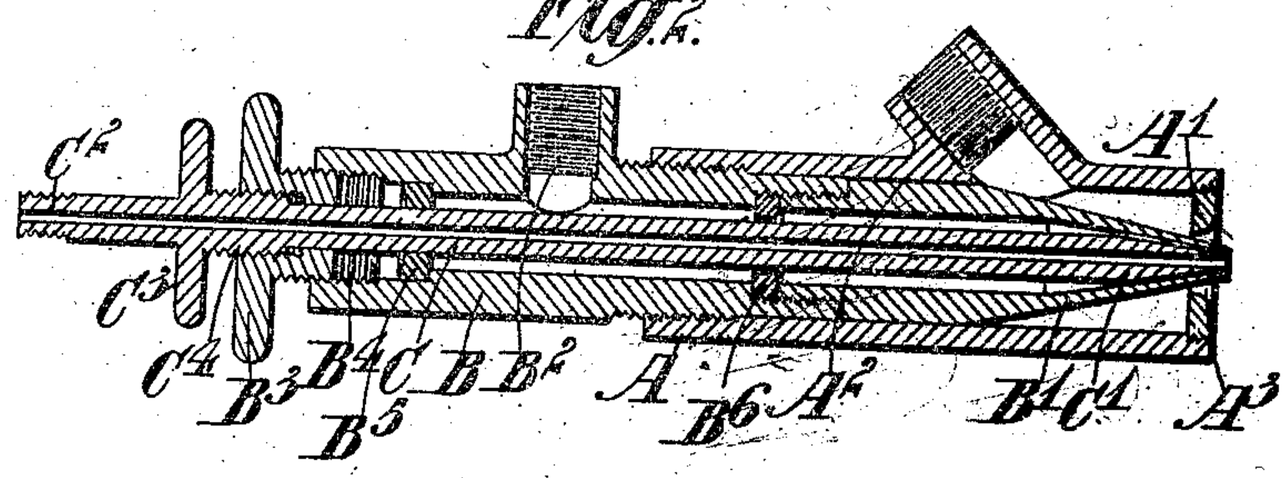


Fig. 3.

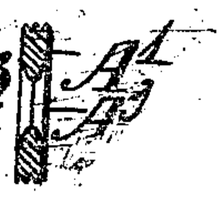


Fig. 4.

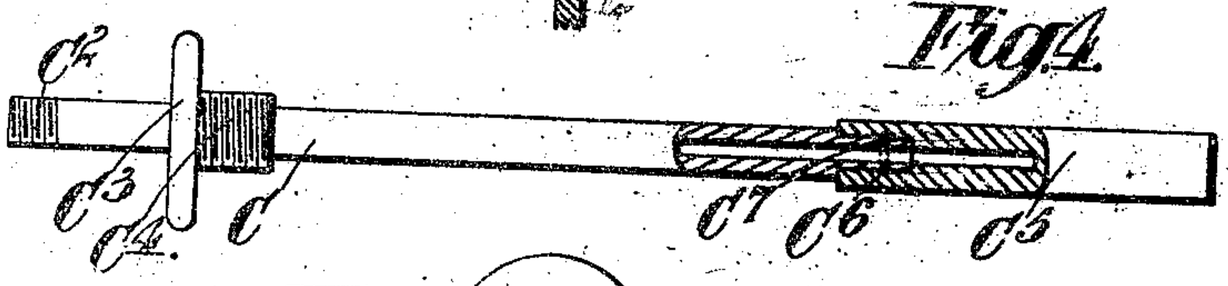
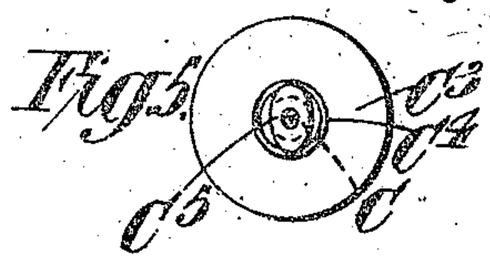


Fig. 5.



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UNITED STATES PATENT OFFICE.

WILHELM DIECKMANN, OF EDMONTON, AND FREDERICK CHARLES ORMROD, OF WALTHAMSTOW, ENGLAND; SAID ORMROD ASSIGNOR TO JAMES ANDREW CURLE, OF WOODFORD, ENGLAND, AND STEPHEN FRANK STACKARD, OF MIDDLESEX, ENGLAND.

BURNER FOR LIQUID FUEL.

No. 859,926. Specification of Letters Patent. Patented July 16, 1907.

Application filed January 23, 1906. Serial No. 297,437.

To all whom it may concern:

Be it known that we, WILHELM DIECKMANN, a subject of the German Emperor, residing at Edmonton, Middlesex, England, and FREDERICK CHARLES ORMROD, a subject of the King of England, residing at Walthamstow, Essex, England, have invented certain new and useful Improvements in Burners for Liquid Fuel, of which the following is a specification.

This invention relates to burners for liquid fuel and has for its object to effect an economy in working in combination with simplicity of construction and ready adjustment.

According to this invention the burner comprises three concentric nozzles the innermost for the supply of air or other gas, the intermediate one for fuel and the outer one for air. In one construction the fuel nozzle is of tapered form and the central nozzle is in effect a hollow needle valve which is adjustable longitudinally within the fuel nozzle and can be used not only to vary the opening but also to entirely shut off the flow of fuel. The intermediate or fuel nozzle lies within a cylindrical casing provided with an annular opening around the nozzle. Air is supplied under pressure to this casing and issues around the nozzle.

In operation the liquid fuel is supplied to the intermediate nozzle under gravity or in some cases under pressure. Air under pressure is supplied to the hollow needle valve and also to the outer casing. The effect of the air jets on the oil is to cause a very complete atomization as the central air jet causes the oil to diverge in a spray which is met by the converging annular jet of air from the outer casing and this spray is still further broken up.

Preferably a low pressure of air is used in the outer nozzle, one main object of which is to supply air for combustion, while a higher pressure is employed in the innermost nozzle for purposes of inducing current in and spreading of the fuel.

The central nozzle and the tube constituting what has been previously termed the hollow needle valve conveniently passes through a bushing at the end of the fuel nozzle, this bushing being partly screw-threaded to engage with the corresponding screw thread formed on the air tube. A further bushing or bearing piece is conveniently disposed a short distance within the nozzle and a third bearing piece which is perforated or formed as a spider lies towards the outer end of the fuel nozzle. The hollow needle is thus held steadily against any vibration and is maintained central. The screw-thread previously referred to enables the necessary longitudinal adjustment of the needle when rotation is imparted to it.

Fuel is conveniently supplied to the intermediate nozzle and air to the outer casing through lateral openings.

The hollow needle valve is conveniently provided with a union piece to enable it to be connected at will either to an air supply or to a gas container from which for example, oxygen may be supplied under pressure. This enables this nozzle to fulfil the function of a stand-by flame for lighting up purposes. Other gas may be used if desired where special qualities of flame are required. This hollow needle of course carries some form of hand wheel or other device to enable it to be rotated and the necessary adjustment of the burner effected.

The orifice through which air issues from the outer casing around the fuel nozzle may be tapered, flared or otherwise shaped as found desirable. In one construction the orifice has a double taper being reduced about the center of the thickness of the surrounding plate and being enlarged both on the inner and outer sides.

It will be appreciated from the above description that the burner is simple in construction comprising merely the three main portions, namely the outer casing to which screws the fuel nozzle and the central tubular valve which screws into the bushings carried by or forming part of the fuel nozzle. There is thus nothing to get out of order and damaged parts can readily be replaced. To facilitate this the end or actual nozzle portion of the hollow needle may be made detachable so that if it is damaged through heat a new nozzle can readily be put on.

Various shapes and sizes of nozzle may be provided and by their interchangeability the direction, shape and intensity of the spray and flame can be modified.

A burner, embodying the invention in a preferred form will now be described, by way of example, with reference to the accompanying drawings, in which:—

Figure 1 is an elevation; and Fig. 2 a central longitudinal section of a burner according to this invention; Fig. 3 is a detail illustrating a modified construction of mouth piece for the outer nozzle; Fig. 4 is an elevation of an innermost nozzle detached, with a removable mouth piece; and Fig. 5 is an end view of Fig. 4.

Like reference signs indicate like parts in all the figures.

A is the outer nozzle, which constitutes a casing for the intermediate nozzle B, fastened into its rear end, conveniently by screw threads as shown in Fig. 2.

The wall of the nozzle A is provided with a hollow boss A^2 for the supply of air, the boss being preferably screw-threaded to allow of its connection with any convenient source of supply, if it be desired to use air under pressure.

The mouth piece of the nozzle may be formed by a removable plate A^1 having a central orifice A^3. This orifice conforms in shape to the outer wall of the mouth piece B^1 of the intermediate nozzle, so as to leave a ring-shaped passage for the air all round the said mouth piece. This orifice may be flared from within outwards, as shown in Fig. 2, or with a double flare as shown in Fig. 3.

The intermediate nozzle B is provided with a hollow boss B^2 on its side wall, for the supply of fuel to the nozzle; the boss is screw-threaded internally, as shown in Fig. 2, or otherwise arranged to be conveniently connected with a convenient supply of fuel.

Preferably the mouth piece B^1 of the nozzle is formed separately from the body, and is secured thereto in a nipple, as shown in Fig. 2. As shown in the figure the convenient manner, for example by a screw-threaded mouth piece is circular in cross-section and tapered but it may be oval or otherwise shaped.

The rear end of the nozzle is bored out and furnished with a screw-thread to form a gland B^4 through which the innermost nozzle C passes. A guide plate B^5 at the bottom of the gland below the packing holds the nozzle C steady, and preferably a second guide piece or spider B^6 may be provided for this purpose. A headed plug B^3 closes the gland.

As shown in Fig. 2, the mouth piece of the nozzle C constitutes a needle valve, which may be used to regulate the supply of fuel or entirely cut it off. To give endwise movement to the nozzle, the plug B^3 is hollowed out and screw-threaded to receive a corresponding threaded portion C^4 of the nozzle, a round head C^3 being provided for convenience in rotating the same.

The end of the nozzle C is preferably screw-threaded to receive a coupling of a known character, to enable it to be readily connected to an air supply or to an oxygen or other gas reservoir.

The mouth-piece C^1 of the nozzle C may be made interchangeable, as are the mouth-pieces of the other two. In Figs. 4 and 5 a convenient construction is shown, more particularly adapted for use when the mouth-piece is oval or otherwise so shaped as not to permit of rotation in the fuel nozzle. The mouth-piece C^5 in this case is oval in cross section, the nozzle body being circular. The front end of the nozzle body is reduced in diameter to fit into a recess formed in the end of the mouth-piece, and is provided with a circumferential groove C^6, while the wall of the mouth-piece is bored to receive a pin C^7, which fits into the groove, preventing endwise movement relative to each other of the mouth-piece and body, while the latter can be rotated independently of the mouth-piece to give endwise movement to both. In this case a guide-piece or spider (such as B^6 in Fig. 2) would be positioned, or other means provided, so as to hold the mouth-piece from any possible rotary movement.

What we claim as our invention and desire to secure by Letters Patent is:—

In a liquid fuel burner having three concentrically arranged nozzles, the combination with a circular intermediate nozzle of an innermost nozzle having an oval removable mouth-piece which acts as the valve to control the delivery of the said intermediate nozzle, and a connection between said innermost nozzle and this mouth-piece whereby the nozzle may be rotated without rotating the mouth-piece.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

WILHELM DIECKMANN.
FREDERICK CHARLES ORMROD.

Witnesses:
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