N. C. DAVISON.

FUEL BURNER.

APPLICATION FILED FEB. 15, 1919.

1 338,679. Patented May 4, 1920.

FIG. 1.

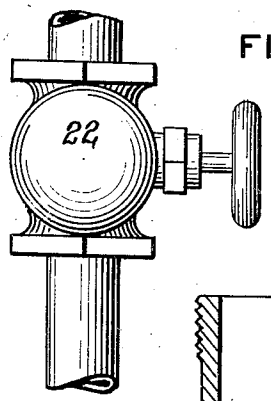
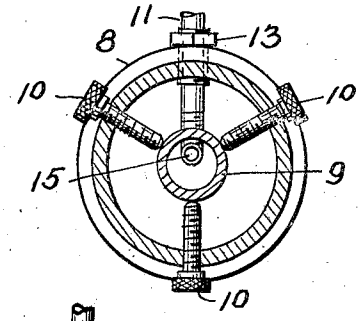


FIG. 2.



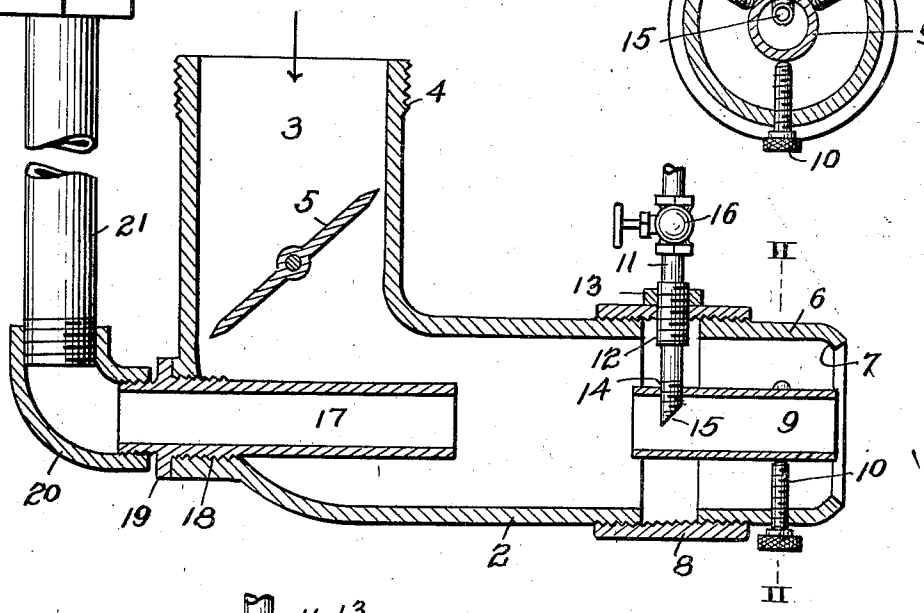


FIG. 3.

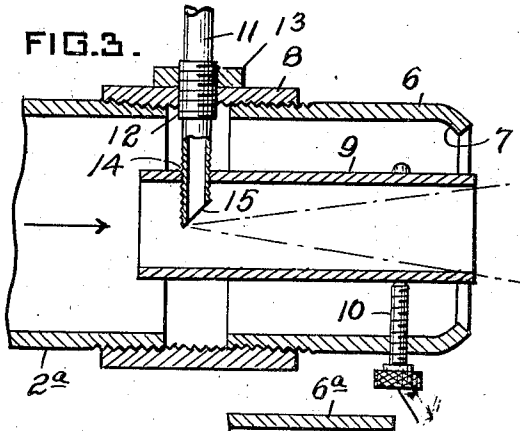


FIG. 4.

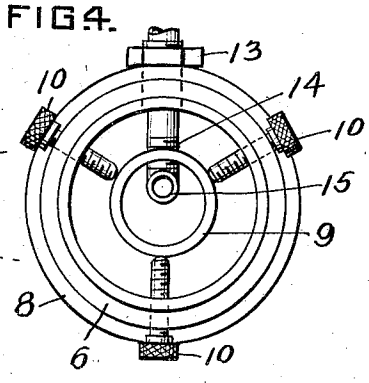
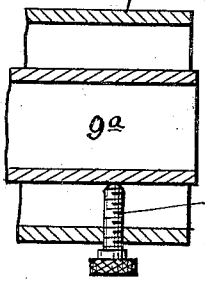


FIG. 5.



WITNESSES

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FUEL-BURNER.

1,338,679. Specification of Letters Patent. Patented May 4, 1920.

Application filed February 15, 1919. Serial No. 277,198.

To all whom it may concern:

Be it known that I, NEVILLE C. DAVISON, a citizen of the United States, residing at Edgeworth, in the county of Allegheny and State of Pennsylvania, have invented a certain new and useful Improvement in Fuel-Burners, of which the following is a specification.

My invention consists of an improvement in fuel burners more particularly a burner adapted to economical, efficient combustion of oil or gas, or both, in connection with a suitable air supply.

The invention has in view to provide means for effecting a thorough admixture of the fuel with the air and an intimate commingling for best results. It provides in its construction for preliminary separation of the oil into finely divided particles best adapted to combine with the air supply, or when used with air and gas. The device is so constructed as to be capable of conjoint use either as an oil burner or a gas burner.

One preferred embodiment of the invention is illustrated in the accompanyng drawings in which:

Figure 1 is a longitudinal sectional view through a burner constructed in accordance with my invention;

Fig. 2 is a transverse sectional view indicated by the line II—II of Fig. 1;

Fig. 3 is a partial sectional view similar to Fig. 1, showing a modified construction;

Fig. 4 is an end view of the construction of Fig. 3: and

Fig. 5 is a sectional detail view showing a modification.

In the drawings, 2 represents the main body portion of the burner forming a cylindrical barrel or mixing chamber for the fuel and air. It is preferably made of a casting having a lateral air inlet portion 3 preferably provided with threads 4 by which it may be connected with a conduit leading to any suitable source of air supply, if desired. A damper 5 is mounted within the air inlet opening 3 by which the incoming air may be readily controlled.

The other or outlet end of the burner consists of a separate section 6 having its outlet terminal turned inwardly, as indicated at 7, whereby to partly throttle and deflect the air, or air combined with fuel gas, if used, inwardly toward the center, whereby to effect intimate commingling of the fuel elements.

Terminal section 6 is connected to the main part 2 by a threaded coupling 8, in which the terminal 6 may be adjusted longitudinally, as desired, by screwing inwardly or outwardly.

An oil distributing pipe 9 is mounted centrally in the forward delivery portion of the burner, preferably by means permitting of its lateral centralizing adjustment, as a series of three or more temper screws 10 tapped through the wall of the section 6 and bearing by their inner terminals against the outer sides of pipe 9. By this means, said pipe may be fixedly held in position centrally of the burner, or may be exactly adjusted and there fixed. Pipe 9 is provided with an oil supply pipe or tube 11 extending outwardly through sleeve 8 in which it is mounted by screw connection 12 and lock nut 13 Tube 11 is also connected with inner pipe 9 in the same way, as at 14. The inner end of pipe 11 is beveled toward the outlet of the burner and the pipe is provided with the supply controlling valve 16. The inner end of pipe 7 is open, as indicated, for admission of air or air and gas from the rear.

A gas supply pipe 17 extends inwardly of the burner 2 through its rear wall portion and is connected therewith by means of threads 18 and an outer nut 19. Pipe 17 is connected by a suitable elbow or other coupling 20 with a gas supply pipe 21 having a suitable controlling valve 22 for admission of the desired amount of gas.

In Fig. 5 I show a modified construction of apparatus in which the outer teminal 6^a is straight out to its end, without any inward deflection or partial throttling of the air or gas and air around the central oil pipe 9^a, the other construction being as already described.

The construction of the device will be readily understood and its operation is as follows:

When used as an oil burner, air inlet 3 is connected with any suitable source of air under pressure, say from 2½ to 8 ounces, oil is supplied to the interior of pipe 9 by tube 11 in limited amounts and is taken up by the air supply in passing through, and spread upon the interior surface of pipe 9. Oil from tube 11, preferably in the form of drops, falls from the beveled terminal 15 and is atomized and taken up by the air blast, carrying the mixture forwardly within and against the interior wall of pipe 9 toward its outlet end.

The volume of air passing through pipe

9 and also between said pipe and the outer pipe section 6 effects a thorough mixture of the atomized oil and air within the pipe which comes into intimate contact with the inwardly converging outer annular body of air between the exterior pipe 9 and the inwardly converging terminals 7. By this means there is a further intimate commingling of the air and oil, the whole body of vapors or of atomized oil and air converging toward a point in advance of the burner, dependent upon the partial closure or inclination of the terminal 7. At or about such point, combustion occurs, and with the proper supply and proportion of both air and oil the resulting combustion is very complete and with a high resulting heat generation.

When desired, gas may be supplied in any amount under pressure by pipes 21 and 17 and will supplement the oil fuel supply, becoming thoroughly commingled therewitih in connection with the air supply and advancing through the burner as a general mixture.

With the construction as described, pipe 9 and its oil supply tube 11 are fixedly connected with sleeve 8 and section 6 is longitudinally adjustable by screw adjustment in the sleeve. By this means the outlet openings of pipes 6 and 9 may be very delicately and accurately adjusted with relation to each other so as to secure the best results as to mixture and delivery of the fuel to the combustion chamber.

In operation, the oil falling from the end 15 of pipe 11 is carried forward within pipe 9 by the central part of the air current and is broken up or atomized, partly spread as a film around the interior of pipe 9, and carried forwardly mixed with the air, as indicated in Fig. 3. When supplemented by gas from pipe 17, the mixture is further enriched, and in either case the fuel passes outwardly of the burner in a continuous volume, at any desired velocity and of any suitable quality, dependent upon the operation of the several valves and the damper 5.

The burner may be made in various sizes or proportions or changed or modified in various details or otherwise by the skilled mechanic, but all such changes are to be considered as within the scope of the following claims.

What I claim is:

1. In a fuel burner, the combination of a main cylindrical casing having a rear connection for air under pressure and a forward delivery terminal, an inner centrally arranged oil atomizing and distributing tube extending from the delivery terminal of the casing backwardly thereinto with a surrounding annular space and open at each end, and a fuel supply pipe extending inwardly through the casing and said tube at its rear end provided with a beveled delivery terminal facing toward the delivery terminal of the casing whereby to deliver liquid fuel to the rear middle portion of the tube in the path of the middle portion of the main compressed air supply whereby the liquid fuel is disintegrated and spread around and upon the interior forward portion of the tube and is forced in atomized condition into mixing contact with the outer volume of compressed air around and beyond the tube and beyond the terminal of the casing.

2. In a fuel burner, the combination of a main cylindrical casing having a rear connection for air under pressure and a forward delivery terminal, an intervening threaded sleeve coupling, an inner centrally arranged oil atomizing and distributing tube extending from the delivery terminal of the casing backwardly thereinto with a surrounding annular space and open at each end, and a fuel supply pipe threaded through the coupling and through said tube at its rear end whereby to deliver liquid fuel to the rear middle portion of the tube in the path of the middle portion of the main compressed air supply whereby the liquid fuel is disintegrated and spread around and upon the interior forward portion of the tube and is forced in atomized condition into mixing contact with the outer volume of compressed air around and beyond the tube and beyond the terminal of the casing.

3. In a fuel burner, the combination of a main cylindrical casing having a rear connection for air under pressure and a forward delivery terminal, an inner centrally arranged oil atomizing and distributing tube extending from the delivery terminal of the casing backwardly thereinto with a surrounding annular space and open at each end, a fuel supply pipe extending inwardly through the casing and said tube at its rear end whereby to deliver liquid fuel to the rear middle portion of the tube in the path of the middle portion of the main compressed air supply whereby the liquid fuel is disintegrated and spread around and upon the interior forward portion of the tube and is forced in atomized condition into mixing contact with the outer volume of compressed air around and beyond the tube and beyond the terminal of the casing, and a gas supply pipe extending into the main casing rearwardly beyond the inner end of the oil atomizing tube and in central alinement therewith.

In testimony whereof I hereunto affix my signature.

NEVILLE C. DAVISON.