

W. F. GOODWIN & J. C. LOW.

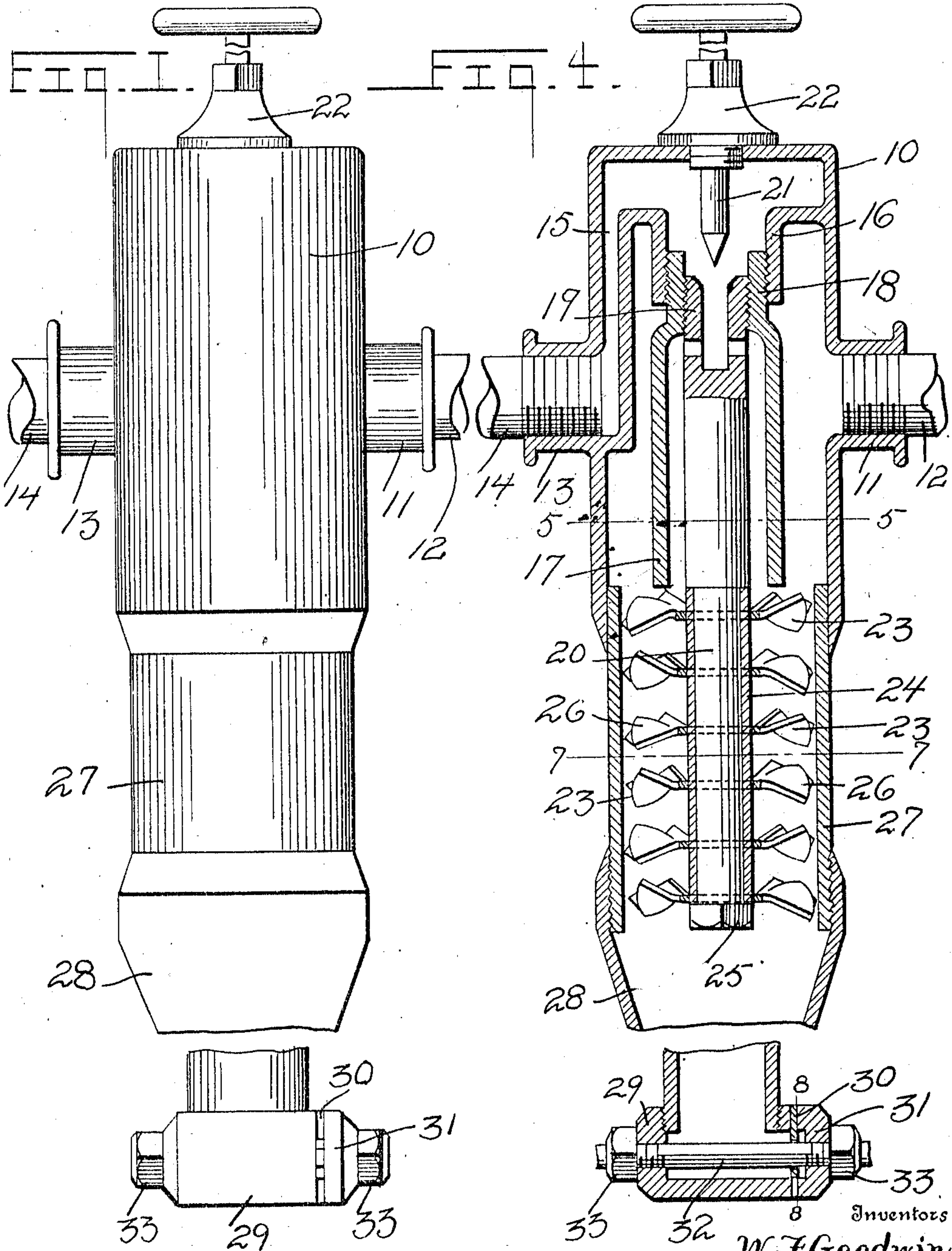
LIQUID FUEL BURNER.

APPLICATION FILED FEB. 17, 1909.

953,136.

Patented Mar. 29, 1910.

2 SHEETS—SHEET 1.



Witnesses
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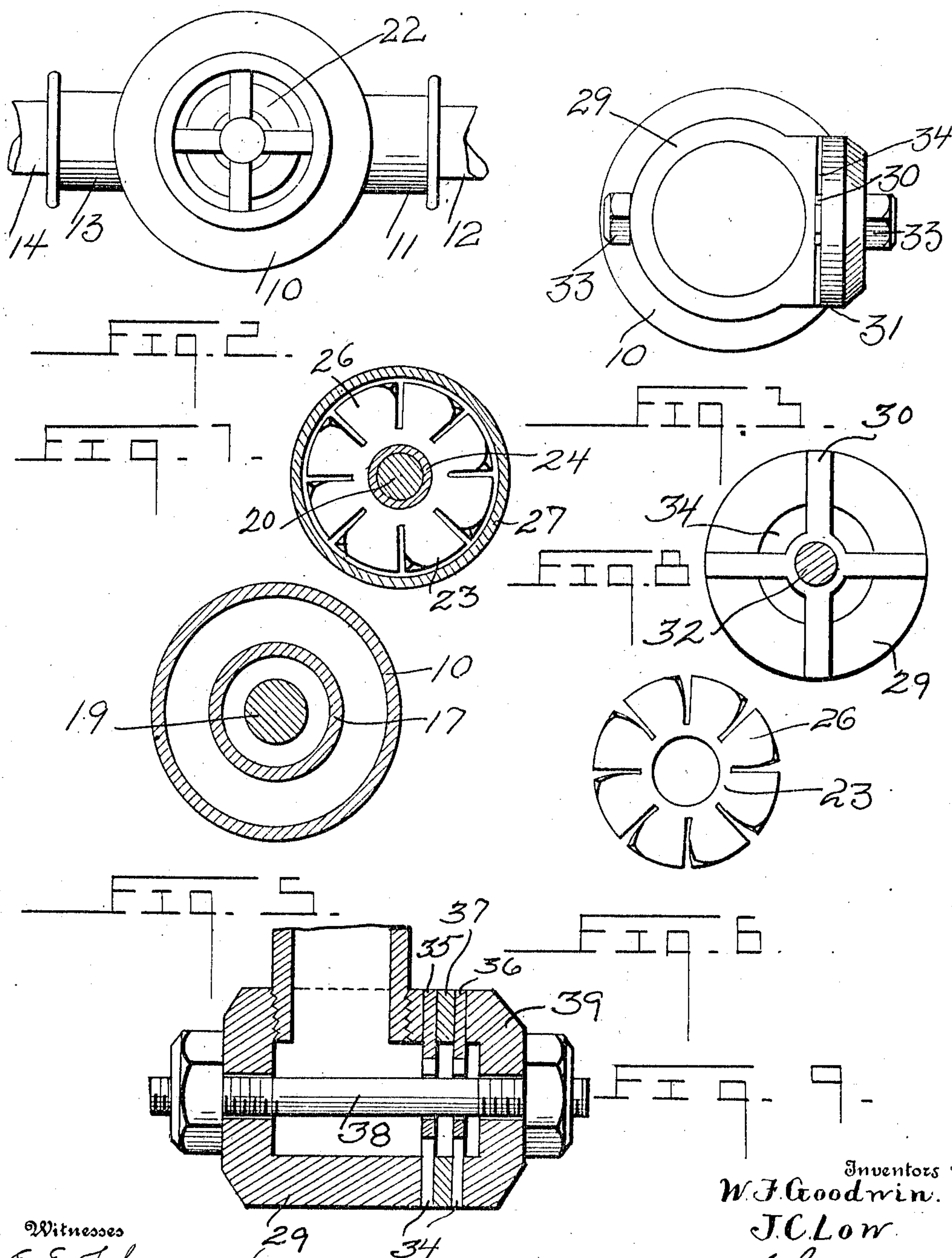
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UNITED STATES PATENT OFFICE.

WILLIAM F. GOODWIN AND JOSEPH C. LOW, OF SAN FRANCISCO, CALIFORNIA.

LIQUID-FUEL BURNER.

953,136.

Specification of Letters Patent. Patented Mar. 29, 1910.

Application filed February 17, 1909. Serial No. 478,393.

To all whom it may concern:

Be it known that we, WILLIAM F. GOODWIN and JOSEPH C. Low, citizens of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Liquid-Fuel Burners, of which the following is a specification.

This invention relates to liquid and gaseous fuel burners, and has special reference to a fuel burner of simple construction in which oil is to be burned.

An object of this invention is the provision of a burner of this character which will atomize the fuel to a greater per cent. than the burners now employed.

Another object of this invention is the provision of a hood which is positioned in the burner to cause the formation of a vacuum under the action of a fluid admitted thereto under pressure and to thereby cause a suction for the purpose of furnishing a continuous oil feed within the burner.

The invention has for a further object the provision of means disposed within the burner for preventing any excess of steam from choking the oil feed and to thereby eliminate the disadvantages incident to an unsteady flow of mixture at the tip of the burner.

A still further object of this invention is the provision of a plurality of blades for mixing steam or air with oil, which are arranged in a peculiar relation and are of special formation in order to deflect the substances projected thereagainst and direct them in a tortuous path.

Other objects and advantages will be apparent from the following description, and it will be understood that changes in the specific structure shown and described may be made within the scope of the claims without departing from the spirit of the invention.

In the drawings forming a portion of this specification, and in which like numerals of reference indicate similar parts in the several views, Figure 1 is a side elevation of the complete burner, Fig. 2 is a rear elevation of the same, Fig. 3 is an end view disclosing the tip, Fig. 4 is a longitudinal section through the device, Fig. 5 is a section on the line 5—5 of Fig. 4, Fig. 6 is a detailed view of one of the blades employed in connection with the burner, Fig. 7 is a section on the line 7—7 of Fig. 4, Fig. 8 is

a section on the line 8—8 of Fig. 4, Fig. 9 is a sectional detail view of a modified form of burner tip.

Referring now to the drawings, 10 designates a casing of cylindrical formation provided at one side with a circular bored offset portion 11 threaded for the reception of a pipe 12 through which steam or air may be introduced into the casing 10. The casing is provided opposite the portion 11 with a second similar offset portion 13 into which is fitted a pipe 14 for the purpose of conveying a liquid fuel into the casing 10. The offset portion 13 terminates in the outer extremity of a channel 15 which is formed longitudinally within the casing 10 and extends to the inner end thereof, where it terminates in an inner annular flange 16 extending forwardly and concentrically within the casing 10. A cylindrical hood 17 is provided within the casing 10 and is provided with an inner reduced portion 18 for engagement within the flange 16 in any suitable manner as by the provision of threads thereon. The reduced portion 18 of the hood is provided with a piping 19 which projects forwardly therein and terminates in a rod 20, the piping 19 having oppositely disposed apertures formed through the sides thereof at the base of the hood for the purpose of admitting oil from the channel 15. The inner end of the piping 19 is provided with an annular beveled face for the reception of a needle valve 21 carried in a threaded sleeve 22 disposed in the inner end of the casing 10. The hood 17 extends practically the entire length of the casing 10, and beyond this hood, a plurality of blades 23 are positioned upon the rod 20 in spaced relation and held in such position by means of sleeves 24 mounted upon the rod 20 between the blades 23. The blades and sleeves 24 are held upon the rod by means of a clamping nut 25 threaded upon the outer extremity of the rod 20. The blades 23 are each formed of a metal disk which is centrally apertured for the reception of the rod 20 and is provided with a plurality of radially extending wings 26 which are twisted for the purpose of deflecting the oil and steam at an angle during its passage from the casing 10 and the hood 17. The blades 23 are so positioned as to place the wings 26 of the adjoining blades 23 at opposite angles in order to deflect the steam and oil alternately in

opposite directions during their passage through the same. The casing 10 is provided at its outer extremity with a tube 27 which surrounds the blades 23 and forms a passageway for the steam and oil while the same is traveling between the blades 23. The tube 27 is necessarily reduced in diameter so as to fit closely against the outer edges of the wings 26 to prevent the straight passage of the oil or steam about the blades 23. The outer extremity of the tube 27 supports a tip or nozzle for the combustion of the mixture and comprises a tapered channel member 28 which is secured in threaded engagement upon the outer end of the tube 27 and carries at its opposite extremity a cylindrical casing 29 which is positioned at right angles to the channel member 28. The casing 29 is open at its upper extremity, upon which a metal ring 30 is positioned and secured by means of a cap 31 which is held in frictional engagement therewith by means of a bolt 32 extending through the casing 29 and cap 31 vertically and held by clamping nuts 33 positioned against the bottom of the casing 29 and top of the cap 31.

The metal ring 30 is provided with a plurality of radially extended slots 34 to admit of the passage of the mixture therethrough for the even combustion of the same. The slots 34 may be formed of any desired width or length and owing to the fact that they are formed in one edge of the ring 30 it is readily seen that in manufacturing the same a perfect edge can be formed readily about the slot and an even flow of the mixture will thereby be maintained.

In Fig. 9 of the drawings, the casing 29 is disclosed as being provided with two metallic rings 35 and 36 similar to the ring 30 but which are spaced apart by means of an annulus 37, the same being held in rigid position by the passage of a bolt 38 vertically through the casing 29 and a cap 39 positioned upon the upper extremity of the same. This last construction is utilized when a large flame is desired and a greater amount of fuel is to be employed.

The operation of the device is as follows: Steam is passed through the pipe 12 into the casing 10 where it circulates about the hood 17 and passes thence into the tube 27 against the blades 24 causing a suction in the interior of the hood 17. When the needle valve 21 is opened, oil from the pipe 14 is drawn into the interior of the hood 17 and is conveyed with the steam against the blades 24. When the steam and oil strike the first blade 24 they are deflected at an angle and travel at such angle until they are impinged against the second blade when, by reason of the oppositely turned angles of the wings thereof, they are deflected backwardly and are caused to travel in such direction until the next blade is reached. This action takes

place throughout the entire length of the tube 27 during the passage of the steam and oil through the blades 24. It is thus seen that by this action, the steam and the oil are thoroughly mixed and an efficient atomizer is thereby produced. The mixture which results passes from the forward extremity of the tube 27 through the channel member 28 into the casing 29 where it is passed upwardly therein and caused to flow through the slots 34 formed in the metal ring 30. In the construction disclosed in Fig. 8 the mixture is passed from the casing 29 through the rings 35 and 36 which are provided with slots preferably oppositely disposed in order to form a complete circular flame. By the employment of the hood 17 the steam is prevented from entering into the oil pipe 14 and causing a backward pressure on the oil which would produce an interrupted flame and consequent inefficient operation of the burner. The amount of oil required is regulated by means of the needle valve 21 which is provided in the usual manner with a hand-engaging nut upon its outer extremity which is positioned upon the inner end of the casing 10 where it can be readily engaged and operated.

What is claimed is:

1. A burner of the class described comprising a cylindrical casing, a hood concentrically and longitudinally disposed in said casing, a steam inlet pipe disposed in one side of said casing, an oil inlet pipe disposed in said casing and in communication with the inner end of said hood, a needle valve mounted in the inner end of said casing for regulating the oil supply, a supporting member carried in the hood, a plurality of blades disposed in spaced relation upon said supporting member, a tube forwardly extended from said casing about said blades, and a tip secured upon the outer end of said tube.

2. A burner of the class described comprising a casing, a hood mounted in said casing, a steam pipe communicating with said casing, an oil pipe communicating with said hood, a plurality of blades mounted outwardly of said hood, a tube extended from said casing over said blades and a tip disposed upon the end of said tube.

3. A burner of the class described comprising a casing, a steam pipe communicating with the casing, a hood disposed in said casing, an oil pipe communicating with the hood, a plurality of blades disposed at the end of said hood, a tube surrounding said blades and carried by said casing, a tapered channel member carried outwardly of said tube, a cylindrical casing disposed at right angles upon the outer end of said channel member, a ring having a plurality of radially extended slots formed therethrough positioned upon the upper end of said last

named casing, a cap engaged over said ring and a bolt secured through said casing, ring and said cap.

4. A burner comprising a casing, a tube
5 extended forwardly from said casing, a tip
mounted upon the extremity of said tube, a
hood disposed in said casing, a steam pipe
secured in the side of said casing for di-
recting steam about said hood, an oil pipe
10 secured in the side of said casing and con-
nected with the interior of said hood to feed
oil thereto, and a plurality of blades dis-

posed in spaced relation at the outer end of
said hood in said tube, said blades being
consecutively disposed at opposite angles 15
to one another to form a tortuous path for
the steam and oil to mix the same.

In testimony whereof we affix our signa-
tures, in presence of two witnesses.

WILLIAM F. GOODWIN.

JOSEPH C. LOW.

Witnesses:

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