Nov. 5, 1935. G. J. HOLTHAM 2,019,815

OIL BURNER TIP

Filed Aug. 5, 1933

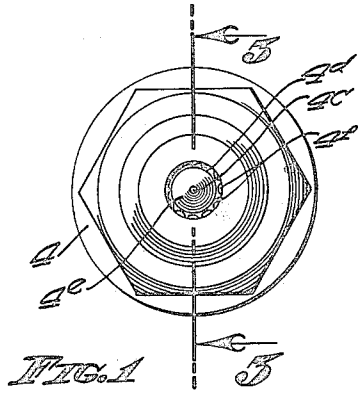


FIG. 1

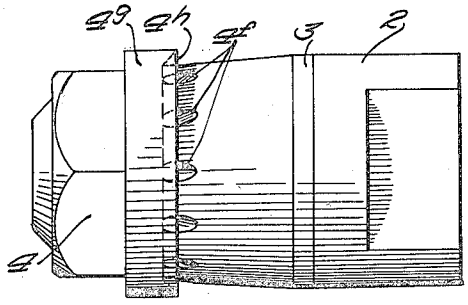


FIG. 2

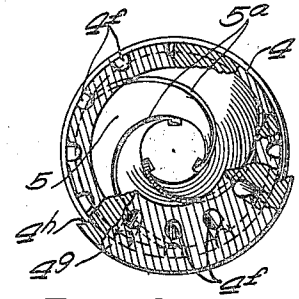


FIG. 4

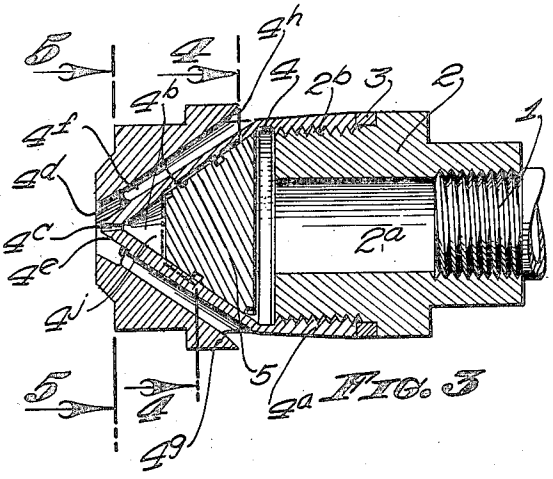


FIG. 3

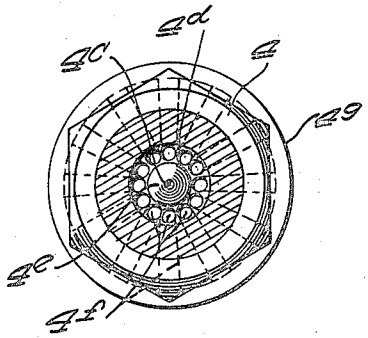


FIG. 5

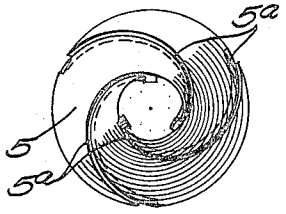


FIG. 6

INVENTOR

GERALD J. HOLTHAM

BY A. B. Bowman

ATTORNEY

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OIL BURNER TIP

Gerald J. Holtham, Pensacola, Fla.

Application August 5, 1933, Serial No. 683,880

4 Claims. (Cl. 158—78)

My invention relates to an oil burner tip, and the objects of my invention are:

First, to provide a burner of this class which does not carbonize or otherwise become clogged with the formation of carbon around the oil discharge orifice;

Second, to provide an oil burner tip in which the quantity and pressure of air required to provide complete combustion is reduced to a minimum, there being a complete and intimate mixture of air and oil;

Third, to provide an oil burner tip which may be installed without altering the other portions of the conventional burner with which it is used;

Fourth, to provide an oil burner tip which is particularly easy to assemble and disassemble, the parts being few in number and having only a single connection holding the several parts in position;

Fifth, to provide an oil burner tip which incorporates a novel means of causing the oil to swirl or rotate as it passes through and issues from its orifice so as to effect a particularly complete atomization of the oil;

Sixth, to provide an oil burner wherein radially and forwardly directed jets of air are introduced into the swirling and atomized oil as it issues from its orifice so that there is formed an intimate mixture of atomized air and oil, there being provided a novel means of collecting and directing the air to produce the above-mentioned jets; and

Seventh, to provide on the whole a novelly constructed oil burner tip which is particularly compact, efficient in its action, durable, simple and economical of manufacture, and which will not readily deteriorate or get out of order.

With these and other objects in view as will appear hereinafter, my invention consists of certain novel features of construction, combination, and arrangement of parts and portions as will be hereinafter described in detail and particularly set forth in the appended claims, reference being had to the accompanying drawing and to the characters of reference thereon which form a part of this application in which:

Figure 1 is a front elevational view of my oil burner tip; Fig. 2 is a side elevational view thereof; Fig. 3 is a longitudinal sectional view thereof taken through 3—3 of Fig. 1; Fig. 4 is a transverse sectional view taken substantially through 4—4 of Fig. 3 with parts and portions shown in elevation to facilitate the illustration; Fig. 5 is another transverse sectional view taken through 5—5 of Fig. 3; and Fig. 6 is a front elevational view of the control plug.

Similar characters of reference refer to similar parts and portions throughout the several views of the drawing.

A conventional fuel conduit or pipe 1 is provided which has a screw threaded extremity and is adapted to receive one end of a coupling 2. The coupling 2 is provided with a bore 2*a* therethrough which is internally threaded at one end to receive the end of the pipe 1.

The forward end of the coupling 2 is provided with an externally threaded portion 2*b* which is slightly less in diameter than the normal diameter of the coupling. The screw threaded portion 2*b* forms with the remainder of the coupling a shoulder against which fits a gasket 3. The screw threaded portion 2*b* is adapted to receive a body member 4, said body member being provided with an internally threaded hollow portion designated 4*a* at its rear end. The body member 4 has a fluid tight connection with the coupling 2.

Forwardly of the coupling 2 the body member is provided with a conical chamber 4*b* with its apex pointed forwardly in axial alinement with the coupling and having an oil discharge orifice 4*c* therein. The conical chamber is adapted to receive a control plug 5 which is frusto-conical in form and has side walls which converge in conformity with the converging walls of the chamber 4*b* and seat therein. There are formed in the converging walls of the metering valve a plurality of helically wound grooves or channels 5*a*. The channels spiral in the same direction and are equally spaced, and form with the converging walls of the chamber 4*b* a plurality of conduits or passages for the oil. The oil pressure within the bore 2*a* and rear end of the chamber 4*b* is sufficient to hold the control plug in its proper position against the converging walls of the chamber 4*b*.

The oil discharge orifice 4*c* terminates flush with or slightly rearwardly of the normally forward face of the body member. Said body member is provided with a substantially frusto-conical recess or port 4*d* cut into its forward end around the orifice 4*c* so that said orifice is located at the apex of a small tip or cone, designated 4*e*. The base of the recess 4*d* surrounding the cone tip 4*e* is intersected by a plurality of passages 4*f*. These passages intersect the recess 4*d* in adjacent relation with each other as shown best in Fig. 5, and extend rearwardly therefrom in diverging relation to the outer periphery of the body member intermediate its ends. Immediately forward of

the points of intersection of the passages **4***f* with the periphery of the body member **4**, there is provided a flange **4***g*, the rear side of which is undercut as indicated by **4***h*; thus air flowing forwardly along the body member is directed inwardly through the passages **4***f*. From the rear extremity of the body member the periphery thereof may converge slightly towards the flange **4***g*.

Operation of the oil burner tip is as follows: Fuel oil is introduced through the bore **2***a* and passes through the channels **5***a* and by the time it issues therefrom, it is swirling rapidly. The small tip designated **4***j* of the chamber **4***b* facilitates the transfer of the whirling oil from the metering valve to the orifice **4***c*. The oil issuing from the orifice **4***c* tends to draw air through the passages **4***f*. In addition the air is introduced forcefully through the passages **4***f* by reason of the flow of air forwardly along the periphery of main portion of the body member and the deflection of such air by the undercut rear side **4***h* of the flange **4***g*. In view of the fact that the oil spray tends to converge by reason of its rotation and introduction of the converging jets of air, there is a particularly complete and intimate mixture of air and oil which begins from the very tip or orifice **4***c* itself. The jets of air flowing by the orifice **4***c* prevent any accumulation of carbon or other deleterious deposits around the orifice. Because of this fact, it has been found through tests that the oil burner tip here illustrated is perfectly clean after thirty-eight (38) hours of operation whereas the other oil burner tips in service today plug tight in less than eight hours and carbon begins to form on the surface within thirty minutes after beginning operation.

It should be here noted that each of the passages **4***f* taper or reduce their diameters towards their forward extremities. This increases the velocity of air flow at the discharge end of these passages.

Though I have shown and described a particular construction, combination, and arrangement of parts and portions, I do not wish to be limited to this particular construction, combination, and arrangement, but desire to include in the scope of my invention the construction, combination, and arrangement substatially as set forth in the appended claims.

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

1. In an oil burner tip, a body member having a conical recess therein, and a fuel discharge orifice in the apex thereof, and a frusto-conical control plug positioned in said recess with its side walls fitting therein, said control plug having converging helically directed oil passages extending from the base end of said recess toward the apex thereof, said body member having a plurality of air passages with their receiving ends intersecting said body member intermediate its ends and converging towards its forward end, the axes of the air passages intersecting at a common point immediately forward of said fuel discharge orifice, said body member having an annular recess common to the forward extremities of said passages, the wall of said recess converging forwardly, and defining a cone-shaped tip with the fuel orifice at its apex.

2. In an oil burner tip, a body member of generally cylindrical form provided with a flange intermediate its ends, the rear side of said flange being undercut and said body member provided with a plurality of forwardly converging air passages having their inlet ends intersecting the periphery of said body member immediately rearwardly of said flange, said passages extending through said body member and having their axes intersecting at a common point immediately forwardly thereof, and said body member being also provided with a fuel discharge orifice immediately rearwardly of the point of intersection of said passages.

3. In an oil burner tip, a body member of generally cylindrical form provided with a flange intermediate its ends, the rear side of said flange being undercut and said body member being provided with a plurality of forwardly converging air passages having their inlet ends intersecting the periphery of said body member immediately rearwardly of said flange, said passages extending through said body member and having their axes intersecting at a common point immediately forwardly thereof, said body member being also provided with an air discharge port common to the forward ends of said passages, said port having converging walls, and said body member having a conical tip extending into said port in central relation therewith provided with a fuel discharge orifice at its apex.

4. In an oil burner tip, a coupling member adapted to be connected to a fuel supply pipe, a body member connected with said coupling member, said members defining a forwardly directed conical chamber, and a control plug having conical walls seating against the walls of said chamber, said control plug and chamber walls defining spiral passages converging toward the apex of said chamber, said body member having an exterior of generally cylindrical form with a flange intermediate its ends, the rear side of said flange being undercut, said body member being provided with a plurality of forwardly converging air passages having their inlet ends intersecting the periphery of said body member immediately rearwardly of said flange, said passages extending through said body member and their axes intersecting at a common point immediately forwardly thereof, and said body member being provided with a fuel discharge orifice extending from the apex of said chamber and discharging immediately rearwardly of the point of intersection of the axes of said passages.

GERALD J. HOLTHAM.