April 15, 1930. A. H. KELSALL 1,754,828

HYDROCARBON BURNER

Filed Nov. 2, 1925

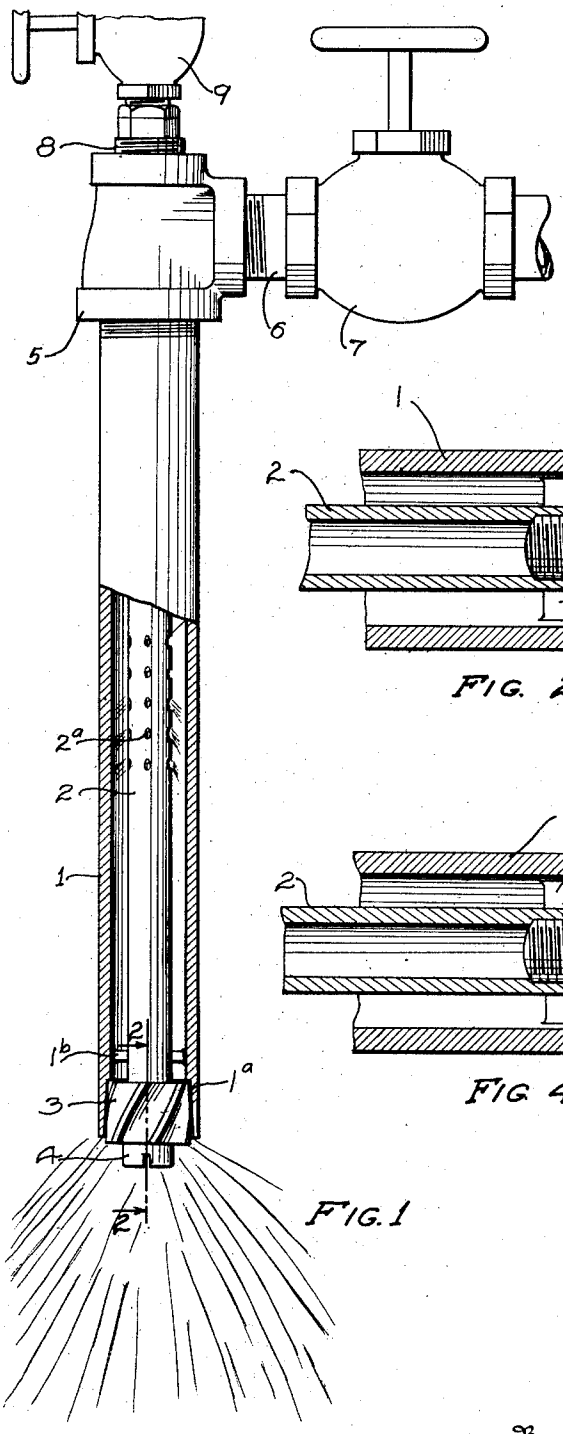


FIG. 1

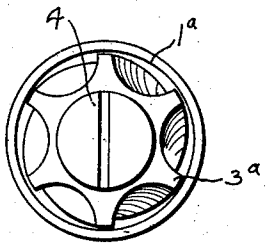


FIG. 3

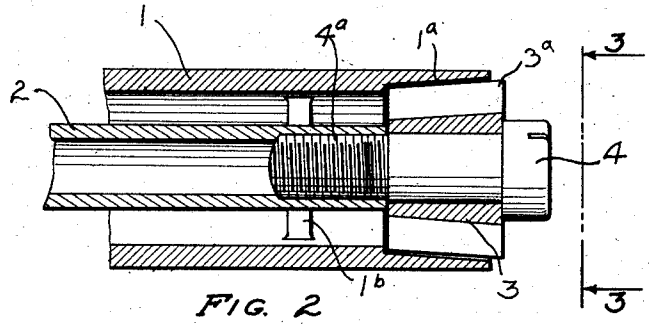


FIG. 2

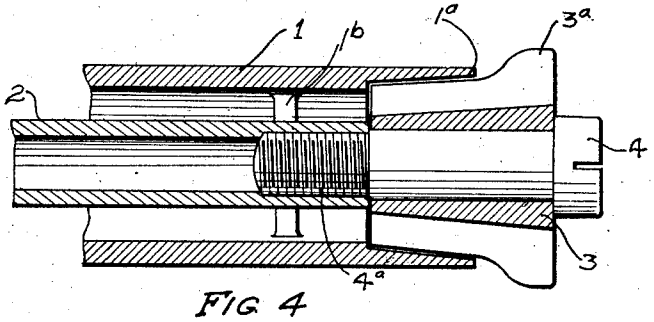


FIG 4

Inventor

ALBERT H. KELSALL

By A. B. Bowman

Attorney

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UNITED STATES PATENT OFFICE

ALBERT H. KELSALL, OF SAN DIEGO, CALIFORNIA

HYDROCARBON BURNER

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My invention relates to hydrocarbon burners and the like, and the objects of my invention are: first, to provide a hydrocarbon burner which produces a long cylindrically shaped flame, thus very uniformly distributing the heat from the front to the rear of the boiler or the like under which it is positioned; second, to provide a hydrocarbon burner whereby the fuel particles are broken up in a plurality of different ways and substantially wholly atomized, thus increasing the inflammability of the fuel and increasing the temperature of the flame to a marked degree over other hydrocarbon burners now in use; third, to provide a hydrocarbon burner in which liquid fuel is adapted to be forced outwardly under pressure through orifices against the inner wall of a surrounding conductor, and further adapted to be broken up by the force or rush of fluid carried by the outer conductor, and still further adapted to be broken up by a revolubly mounted vaned wheel at the discharge end of the burner by the impinging of the already broken up liquid fuel and the fluid in the outer conductor against the vanes; fourth, to provide means comprising a fluid conductor and a spirally vaned wheel at and within the discharge end thereof for breaking up the fluid passing through the conductor into fine, substantially atomized particles and discharging the same from the fluid conductor into a broad and long spray; fifth, to provide a means of this class in which the spirally vaned member at and within the discharge end of the conductor is rotated by the force of the fluid passing through the conductor and impinging against the vanes of the spirally vaned member; sixth, to provide as a whole a novelly constructed hydrocarbon burner for finely breaking up a liquid at the discharge end of the means for conducting the same, and seventh, to provide a burner structure of this class which is very simple and economical of construction, durable, efficient, 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 drawings and to the characters of reference thereon, which form a part of this application, in which:

Figure 1 is a top side view of my hydrocarbon burner in one form of construction, showing the same connected to a steam conductor and to a fuel oil supply line, the valve in the latter line being shown fragmentarily, certain parts and portions of the burner being broken away and in section to facilitate the illustration; Fig. 2 is an enlarged fragmentary longitudinal sectional view taken through 2—2 of Fig. 1, showing the shoulder screw for holding the vaned member in position in solid; Fig. 3 is an inner end view of the burner taken at 3—3 of Fig. 2, and Fig. 4 is a view similar to that shown in Fig. 2, with a slightly modified form of construction of the vaned member.

Like characters of reference refer to similar parts and portions throughout the several views of the drawings.

My burner structure, as illustrated in Figs. 1, 2 and 3, consists essentially of a large outer tubular conductor 1, a fuel oil conducting tube 2 positioned centrally within and spaced from the inner wall of the conductor 1 with its outer or forward end positioned inwardly from the forward or discharge end of the outer conductor, a shoulder screw 3 secured with its threaded end 4^a into the forward end of the fuel oil conducting tube 2 and with the shoulder thereof against the end of said tube, and a vaned member 4 revolubly mounted on the shoulder screw 3 and retained in position thereon by the head of the screw. The discharge end of the conductor 1 is counterbored, as indicated by 1^a, some distance inwardly from its discharge end. The vaned member 3 is positioned substantially wholly within the conductor 1 with its peripheral portion contiguous to the wall of the recess formed by the counterbore. The vaned member 3 is preferably made as an integral element with spirially arranged flutes at its periphery forming spiral vanes 3^a.

In the wall of the tube 2 and intermediate

the ends thereof is provided a plurality of spaced fuel oil discharge orifices 2^a, which are preferably positioned at an angle or directed forwardly to facilitate the discharge of the fuel oil through the orifices and the withdrawal of the fuel oil therethrough, it being noted that the pressure of the steam or other fluid is such that the velocity thereof in the space between the conductor and the tube produces a suction on the forwardly directed orifices.

The forward end of the fuel oil conducting tube 2 is centrally positioned within the conductor 1 by means of lugs 1^b extending inwardly from the wall of the conductor 1, forming a spider support. At the opposite or rear end of the outer conductor 1 is screwably secured a T-fitting 5, to the side outlet of which is connected a conductor 6 connected with a steam or air supply. In this conductor 6 is preferably positioned a regulating valve 7. At the opposite end of the run portion of the fitting 5 from the conductor 1 is secured a reducer 8 through which extends and is screwably and adjustably secured the outer threaded end of the fuel oil conducting tube 2, which is connected to a fuel supply. In this tube or fuel supply line is also provided a regulating valve 9. The forward end of the wheel member 3, and more specifically the vanes thereof, extend preferably beyond the discharge end of the conductor 1, so that a portion of the fuel, and the like, is thrown laterally outwardly, causing a wide substantially uniform width flame longitudinally outwardly from the burner.

In the modified form of construction, shown in Fig. 4 of the drawings, the vaned member or wheel 3 extends some distance beyond the forward end of the conductor or nozzle 1, and the vanes thereof extending beyond the end of the conductor or nozzle 1 are extended laterally or radially to provide for better direction of a portion of the mixture of broken up fuel oil and steam or air, as the case may be, in a lateral direction near the burner, thereby causing a wide substantially uniform width flame longitudinally outwardly from the burner.

In this type of burner construction it will be readily seen that no auxiliary oiling means need be provided for the bearing of the revoluble vaned member, since a continuous stream of oil is supplied by the conducting tube 2 for lubricating the readily accessible bearing, the atomizing of the fuel oil and the mixing of the same with the steam or air not appreciably destroying the lubricating qualities of the oil.

It will be here noted that the conductor 1, with the spirally vaned wheel revolubly mounted within and at the discharge end of the conductor, is applicable to other breaking up or atomizing means and spray means besides hydrocarbon burners, and though I have shown and described a particular construction, combination and arrangement of parts and portions and a certain modification of a certain hydrocarbon burner, I do not wish to be limited to this particular construction, combination and arrangement nor to the modification, but desire to include in the scope of my invention, the construction, combination and arrangement substantially 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 a burner structure, a large tubular conductor, a fuel conducting tube positioned centrally therein and extending to near the outer end thereof, said fuel conducting tube being provided in its side walls intermediate its end with fuel discharge orifices, a shoulder bearing screw secured at its threaded end centrally into the normal forward end of said conducting tube and closing said end, and a vaned member revolubly mounted on the bearing portion of said shoulder screw and enclosed partially by the wall of said large tubular conductor at the discharge end thereof, the outer portion of said vane member extending beyond said conducting tube.

2. In a burner structure, a tubular conductor open at its forward ends and provided with a threaded hole at its rear end, a smaller fuel oil conducting tube having a closed forward end positioned centrally within said conductor and adjustably mounted at its rear end in the threaded hole of said conductor, said conductor being provided within the same and near the forward end thereof with a foraminous supporting means for supporting said tube at its forward end centrally within the conductor, said tube being provided in its side walls intermediate its ends with fuel discharge orifices, and a vaned wheel revolubly mounted at the forward end of said fuel conducting tube, and extending beyond said tube.

3. In a means of the class described, a tubular conductor, a liquid conducting tube having a closed forward end positioned centrally therein and extending in substantially straight lines toward the forward end of said conductor, said liquid conducting tube being provided in its side walls intermediate its ends with liquid discharge orifices, and a vaned wheel revolubly mounted at the forward end of said conductor and projecting beyond the outer end thereof adapted to permit direct axial flow of fluid from said conductor and to spread said flow slightly.

4. In a means of the class described, an elongated tubular conductor having a slightly outwardly tapered mouth at the discharge end and a substantially cylindrical but slightly outwardly tapered vaned wheel revolubly mounted within and extending beyond said slightly tapered mouth.

5. In a means of the class described, a tubular conductor having a slightly outwardly tapered mouth at the discharge end, a liquid conducting tube having a closed forward end positioned within said conductor and extending toward the forward end thereof adapted to direct an axial flow of fluid beyond said end, said tube having liquid discharge orifices in its side wall intermediate its ends, said orifices being directed against the inner wall of said conductor, and a vaned wheel having a slightly tapered hub portion revolubly mounted within and extending beyond said mouth adapted to direct the flow toward the tapered discharge end of the conductor and to spread said flow slightly when discharged from said conductor.

In testimony whereof, I have hereunto set my hand at San Diego, California, this 24th day of October, 1925.

ALBERT H. KELSALL.