W. R. QUINN.

OIL BURNER.

APPLICATION FILED NOV. 22, 1920.

1,427,910. Patented Sept. 5, 1922.

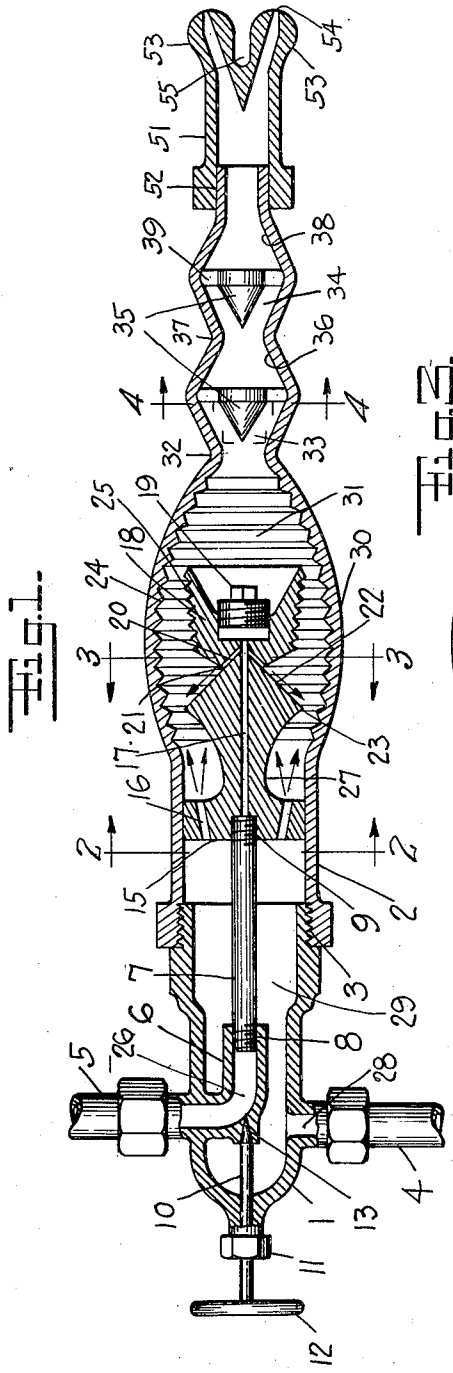


Fig. 1.

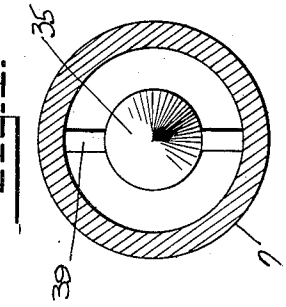


Fig. 4.

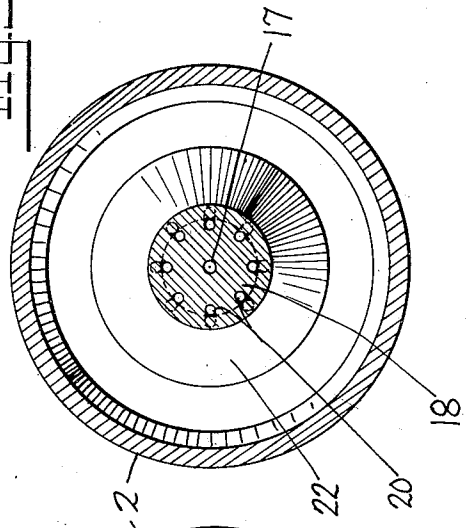


Fig. 5.

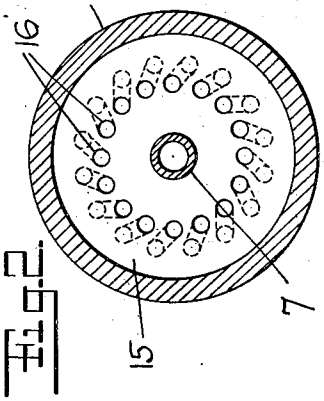


Fig. 2.

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By his Attorney

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UNITED STATES PATENT OFFICE.

WILLIAM R. QUINN, OF NEW YORK, N. Y.

OIL BURNER.

Application filed November 22, 1920. Serial No. 425,602.

To all whom it may concern:

Be it known that I, WILLIAM R. QUINN, a citizen of the United States of America, residing at 242 West 52nd Street, New York, N. Y., have invented new and useful Improvements in Oil Burners, of which the following is a specification.

My invention relates to fuel or oil burners particularly of the type in which oil is fed under pressure to the burner in which it is broken up, and mixed with the aid of steam, or compressed air if preferred, the mixture of steam and oil being delivered at the burner tip in highly atomized condition where it meets the air and is burned to create heat for use under boilers, or otherwise as desired.

The main object of my invention is to provide an improvement in the construction of burners in which the fuel or oil will be more thoroughly atomized prior to its delivery from the burner tip, thus enabling it to be burned more efficiently, and making it possible to obtain a greater amount of useful heat from a given quantity of fuel. With the accomplishment of this purpose in view, it is my object to provide means for spreading out the fuel oil into a thin film prior to its engagement with the steam, thus overcoming the disadvantages that are present when small streams of fuel are shot out into the steam, which streams of fuel normally break up into globules, which it is thereafter a very difficult matter to break up and atomize finely. My invention also has for its object the provision of supplemental means for breaking up into still finer particles the oil or fuel after the steam has taken it up, and during the passage of the oil and steam through the burner to the tip thereof.

My invention consists in the construction, combination and arrangement of parts herein described and claimed and illustrated in the accompanying drawings.

In these drawings I have illustrated a preferred embodiment of my invention, similar reference characters designating corresponding parts in all views, and

Figure 1 is an approximately central, longitudinal section through a preferred form of burner embodying my invention;

Figure 2 is a transverse section taken approximately on the line 2—2 of Figure 1 looking in the direction of the arrows;

Figure 3 is a transverse section taken approximately on the line 3—3 of Figure 1 looking in the direction of the arrows; and

Figure 4 is a transverse section taken approximately on the line 4—4 of Figure 1 looking in the direction of the arrows.

Referring to these drawings, the burner comprises a head portion 1 which may be connected with the burner casing 2 by a screw thread 3. The head portion 1 is provided with an inlet 28 to which is connected a pipe 4 for admitting steam to the interior of the head; and the head portion 1 is also provided with an interior elbow portion 6 having a passage 26 leading from a pipe 5 carrying oil under pressure to the device.

The casing 2 contains a plug 15, serving as a steam head and completely blocking the passage of steam from the head 1 to the other portions of the burner except for the holes 16 provided therein to control the action of the steam in passing through. The plug 15 is provided with an oil passage 17, preferably extending axially to the forward end thereof where a head 18 is provided, and a plug 19 closing the end of the passage, the oil emerging from the passage 17 through a plurality of passages 20. A small section of pipe 7 may connect the passage 26 with the passage 17, so that the oil is carried through the head portion of the burner and the plug 15 without in any way coming in contact with the steam until after it has emerged from the passage 20.

Formed upon the plug 15 I provide a substantially conical surface 22 disposed at the rear of the head 18 where the plug is narrowed to a small diameter 21, and where the passages 20 are located, these passages 20 being directed in line with the surface 22, so that oil emerging from these passages 20 spreads out smoothly over the surface 22, and does not strike against it, so that the oil is thus evenly spread out and distributed over the surface, flowing therefrom at the edge 23 in a very thin even film. The surface 22 may be shielded from the direct action of the steam by making it of reverse conical form as shown.

The steam coming from the pipe 4 through the inlet 28 passes through interior 29 of the main portion of the head 1 outside of the pipe 7 carrying the oil, and meets the head of the plug 15, passing through the openings 16, which are preferably arranged in an inclined position (Fig. 2) so as to direct the steam outwardly from the axis of the burner,

and at the same time to impart a spiral motion to the steam as it emerges, so that the steam initially expands into the chamber provided by the reduced portion 27 of the plug 15, and with a whirling motion picks up the oil as it flows from the edge 23 of the conical surface 22, carrying on a mixture of steam and finely atomized oil through the casing 2. The casing 2 is preferably provided with an enlarged portion 30 to accommodate the plug 15 and its head 18, beyond which there is thus provided an expansion chamber 31. Corrugations 24 are provided on the interior of the enlarged portion 30 of the shell 2, and also corrugations 25 are provided upon the head 18 of the plug 15, these corrugations acting upon the steam and oil mixture and serving to further break up and atomize the oil.

The steam passing the head 18 expands into the chamber 31 of the shell 2, which gradually tapers to a reduced neck portion 32, beyond which are expansion and contraction spaces, the shell being expanded at 33, and again contracted at 37, expanding again at 34, and contracting at 52, where the burner tip is secured to the shell.

In the chambers 33 and 34 there are preferably provided conical baffles 35, which may conveniently be supported upon webs 39, these baffles tending to force the steam entering the chambers 33 and 34 respectively outwardly against the walls 36 and 38, which, being tapered inwardly, direct the steam and oil mixture again towards the axis of the burner.

By the time the steam and fuel have reached the burner tip 51 the mixture is very thorough, and the oil or fuel has been very highly atomized, so that it is readily and efficiently burned as it emerges from the openings 54 of the burner tip 53, these openings being preferably separated so as to provide a space or chamber 55 through which air may have access to the tips to mix more readily with the fuel mixture as it emerges from the tips.

For the purpose of blowing out the oil passages 17, 20 and cleaning them from time to time, there may be provided a needle valve 10 seated at 13 in an opening entering the passage 26, which passes through a gland 11 and may be operated by a small hand wheel 12, to permit steam from the head to blow through the valve opening 13 into the passage 26 and through the pipe 7, passage 17 and passages 20 to clear out these parts should they have become clogged by inpurities in the fuel.

The operation of the device is as follows: Steam is admitted through the pipe 4 to the interior of the head portion 1, and advances to the plug 15, where it passes through the passages 16 which impart to it a whirling outward motion. Oil is admitted to the pipe 5 under pressure passing through the passage 26, pipe 7, and passage 17, and then in a partially reversed direction through the passages 20, emerging in line with and upon the conical surface 22, upon which the oil spreads out in a very thin film, escaping at the edge 23 in a very thin film, and meeting there the steam coming with a whirling motion, which steam picks up the oil and carries it along, striking against the corrugated interior of the bulb portion 30 of the casing 2, and also against the corrugated portion 25 of the head 18, thus tending to further atomize and break up the particles of fuel, this action being continued as the mixture of steam and fuel pass on through the chambers 33 and 34 to the tip 51, emerging from the openings 54 of which the steam and oil meet the air, and combustion takes place.

Having now described my invention I claim and desire to secure by Letters Patent:

1. A burner for fluid fuel comprising a casing, means for causing steam to pass through said casing, an oil spreading surface provided in said casing and shielded from the steam, and means for directing oil tangentially upon said surface whereby a thin film of oil is formed and passes from the edge of the surface into the steam substantially free from globules.

2. A burner for fluid fuel comprising a casing, means for causing steam to pass through said casing, a plug disposed therein, a fuel passage through said plug, a conical surface formed on the exterior of said plug, and openings from said fuel passage arranged to discharge the fuel tangentially upon said surface.

3. A burner for fluid fuel comprising a casing, a plug disposed therein, a plurality of outwardly and angularly inclined steam openings through said plug adapted to impart a spiral motion to the steam, a conical surface formed on said plug beyond said steam openings and shielded from the steam, fuel passages passing through said plug and opening to direct fuel tangentially upon said conical surface to pass in a thin film therefrom into the path of the steam.

4. A burner for fluid fuel comprising a casing, means for causing steam to pass therethrough with an initially spiral motion, means disposed in said casing for forming a thin even film of fuel in the path of the steam, corrugations formed on the interior of said casing, a succession of expansion and contraction chambers at the outlet of said casing, and conical baffles disposed in said expansion chambers.

5. A burner for fluid fuel comprising a casing, a plug disposed therein, a plurality of steam openings through said plug, a conical surface formed on said plug beyond said steam openings and shielded from the steam, fuel passages passing through said plug and

opening to direct fuel tangentially upon said conical surface to pass in a thin film therefrom into the path of the steam, a corrugated head portion formed on said plug beyond said surface, and corrugations formed on the interior of the casing.

6. A burner for fluid fuel comprising a casing, means for causing steam to pass through said casing, means within said casing for mixing oil with said steam, said casing having a series of longitudinally spaced contracted portions and intermediate expanded portions forming chambers, and baffles centrally disposed in said chambers, the walls of said chambers being inclined between the expanded and contracted portions to act as baffles to direct the mixture towards the center of the passage.

In testimony whereof I have signed my name to this specification.

WILLIAM R. QUINN.