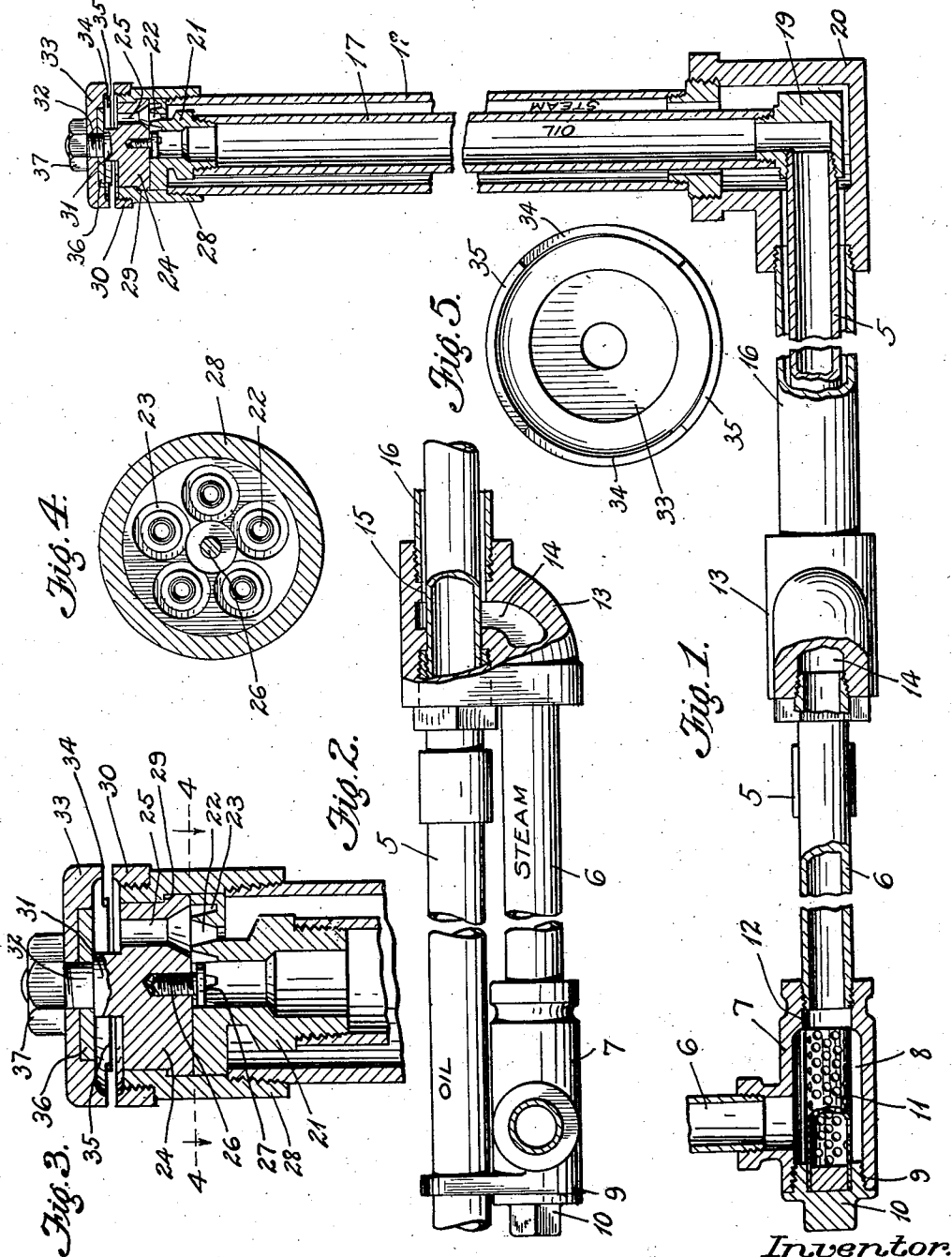


H. C. RUGGLES.
OIL BURNER.
APPLICATION FILED NOV. 13, 1911.

1,061,011.

Patented May 6, 1913.



Witnesses.

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UNITED STATES PATENT OFFICE.

HIRAM C. RUGGLES, OF PHOENIX, ARIZONA.

OIL-BURNER.

1,061,011.

Specification of Letters Patent.

Patented May 6, 1913.

Application filed November 13, 1911. Serial No. 659,971.

To all whom it may concern:

Be it known that I, HIRAM C. RUGGLES, a citizen of the United States, residing at Phoenix, in the county of Maricopa and the State of Arizona, have invented new and useful Improvements in Oil-Burners, of which the following is a specification.

This invention relates to improvements in hydro-carbon burners and particularly to that class of burners in which steam or other pressure producing means is employed, for atomizing and carrying the oil to the burner and flame.

It is an object of the invention to provide a burner in which the hydro-carbon substance will be drawn from nozzles which thoroughly distribute the same about the jet of steam, air or other material.

It is also an object of the invention to provide a burner having a distributing nozzle device for spreading the oil or hydro-carbon material around the jet openings through which the pressure means for distributing the same must pass, whereby an even atomizing of the material will be accomplished.

It is a further object of the invention to provide a hydro-carbon burner with an oil feed pipe and a steam spraying pipe inclosing a portion of the oil pipe so as to thoroughly warm the oil before it is to be sprayed or atomized, the couplings in the piping being mounted loosely one within the other to allow for expansion and contraction in the metal.

It is a further object of the invention to provide an oil burner with means for supplying steam thereto, the said steam pipe having a removable strainer mounted in the piping in such a manner that it may be withdrawn at any time without disjoining the piping for cleansing the said strainer.

In the accompanying drawing forming a part of this specification, Figure 1 is a view partially in central section and partially in elevation of the improved oil burner forming the subject matter of this invention. Fig. 2 is a top plan view of a portion of the piping of the burner showing the relation of the oil and steam pipes, while they are separated, a portion of the connection where the piping is brought together being shown in section. Fig. 3 is an enlarged detail sectional view through the

atomizing end of the burner. Fig. 4 is a transverse sectional view through the nozzle portion of the burner, taken upon the line 4-4 of Fig. 3. Fig. 5 is a plan view of the lower face of the burner cap plate.

The details and features of the invention will now be more particularly described, reference being had to the said drawing in which—

5 indicates an oil supply pipe, and 6 a steam supply pipe. The burner is so constructed that the hydro-carbon oils employed are preferably fed to the burner from an oil pipe which extends to the atomizing nozzle. The means for spraying or atomizing the oil is usually steam, compressed air or other pressure producing means, but the burner is admirably adapted for the use of steam, since the heat thereof can be utilized for warming the oil before it reaches the atomizing portion of the burner.

The piping which carries the pressure and atomizing agent will be hereinafter termed the steam pipe, and adjacent to the oil pipe 5, the said steam pipe is preferably provided with an elbow 7 having an enlarged chamber 8 formed therein, the said elbow having an open end portion 9 which is adapted to receive and be closed by the plug 10. The said plug 10 carries a perforated cylindrical member forming a strainer 11, and is adapted to insert or remove the same when the plug is put in place or taken from the said elbow. The inner end of the said strainer 11 is preferably open and approaches so closely to the reduced portion of the elbow at 12 that the steam must pass through the perforations of the strainer in order to pass onwardly to and through the other portions of the burner. From the strainer the steam passes to a coupling 13 which is adapted to surround the oil pipe as clearly shown in Fig. 2. The said coupling has a steam chamber 14 formed therein, and is provided with an outlet 15 which is of larger diameter than the oil pipe so as to distribute the steam around the said pipe as it passes onwardly toward the atomizing portion of the burner. From this coupling to the atomizing portion of the burner the oil pipe passes inside the steam pipe, the steam pipe being enlarged as indicated at 16.

The burner is provided with an upright portion made up of the inner oil pipe and

the outer enlarged steam pipe as indicated at 17 and 18 respectively in Fig. 1. The portions of the burner heretofore described are preferably arranged in horizontal form to properly reach the fire box or combustion chamber in which the burner is to be mounted, and the horizontal portion of the burner carries at its inner end the upright or vertical portion for holding the atomizing end of the burner in proper position within such combustion chamber.

The horizontal and upright portions of the burner are connected by inner and outer elbows 19 and 20, the said outer elbow being made of ample size and shape to accommodate the inner elbow 19, without the touching of the two elbows, whereby ample room for expansion and contraction in the parts is accommodated and also whereby a steam space is maintained around the oil piping and its connections within the said elbow.

The upper end of the inner pipe 17 terminates a short distance within the outer pipe 18 and carries an atomizer 21 which is usually screwed into the end of said pipe 17 and is formed with an enlarged circular head having a series of nozzles 22 formed therein. The atomizer is so constructed that annular troughs 23 extend around each of said nozzles 22. The edges of the nozzles are also tapered and the said edges overhang the space between the pipes 17 and 18, so as to receive the steam or other atomizing agent from the said pipe 18.

The central bore of the atomizer 21 cuts into the inner edges of the annular troughs 23 as shown in Figs. 1, 3 and 4 whereby outlets from the said central bore into the said troughs are afforded for the oil. Resting upon the atomizer is an upper atomizer piece 24 which is formed with openings 25 having flaring lower ends approximately fitting over the said annular troughs 23 so as to receive the steam from the nozzles and the oil sucked upwardly by the same and atomized. The said upper atomizer piece 24 is provided also with a centrally arranged screw 26, the enlarged disk head 27 of which fits into the upper end of the bore in the atomizer 21. The adjustment of said screw not only assists in the assembling of the parts but controls the size of the openings from the bore of the atomizer into the annular troughs 23 as will be clearly understood by reference to Fig. 3 of the drawing.

An outer sleeve 28 is adapted to fit over the peripheral edges of the nozzle piece 24 and the atomizer 21 and the upper end of the said pipe 18, so as to firmly hold the parts in proper position. The said nozzle piece 24 is formed with an annular shoulder 29 which is engaged by an inwardly projecting annular flange carried by the sleeve 28 and the lower end of the said sleeve screws upon 65 threads formed on the pipe 18. The upper

outer edge of the sleeve 28 is offset and screw threaded and adapted to receive a nozzle cap ring 30, the outer edge of which projects slightly above the said sleeve 28.

The central portion of the upper atomizer piece 24 is also provided with an upwardly projecting stud 31 which is formed with a reduced threaded portion 32 adapted to receive a burner cap plate 33 having a downwardly extending annular flange 34, the edge thereof being arranged opposite the upper edge of the cap ring 30 so as to form between the edges a discharge space for the atomizing material as it escapes into the flame. Portions of the lower edge of the cap plate 33 are arranged to extend lower than other portions thereof as shown at 35. The depending portions 35 are preferably arranged on opposite sides of the said cap plate 33 varying the distribution of the materials to the flame. Within the cap 33 a baffle plate 36 is arranged upon the reduced portion 32 of the stud 31. The nut 37 holds the said baffle plate and the cap plate 33 in position with a proper space between the said parts, and the nozzle cap ring 30 below.

In the operation of the burner, the hydrocarbon oils are fed in any desired manner through the inner oil pipe and the steam is admitted, passing through the strainer 11 whereby any scale or foreign substance from the boiler will be prevented from clogging the burner. The steam then passes into the piping 16 and the elbow 20 to the piping 18 and will pass through the nozzles 22, atomizing and carrying with it the oil which is supplied to the troughs 23. The mixture will thence pass through the openings 25 and escape beneath the cap plate 33 where it will be ignited, and the supply of oil in the troughs 23 being evenly and thoroughly disposed around the steam jets, the atomizing operation will be thorough and complete and the best result will be obtained in supplying the flame with thoroughly atomized oil. It will be observed that although one pipe is within the other and that there may be a difference in temperature in the pipe and the elbows, that the said elbows will readily move with respect to each other without danger of breaking the parts or of interfering in any way with the steam supply.

What I claim is:

1. A hydro-carbon burner, having pipes connected to a source of oil supply and a fluid under pressure supply, an atomizer formed of two parts, one carried by the oil supply pipe extending over the fluid under pressure supply pipe, said first part of said atomizer having a series of inverted coned nozzles connecting with the fluid under pressure pipe formed with annular oil holding chambers around the base of each of said nozzles, the said chambers communicating with the oil supply pipe, and said second 130

atomizer part having a series of mixing passages formed coinciding with and extending beyond said inverted nozzles and each passage communicating with an adjacent nozzle and its annular oil chamber.

2. An oil burner, comprising an atomizer having a central passage and a series of nozzles formed outside the same, an oil supply pipe connected with said central passage, a steam supply pipe connected with said nozzles, the atomizer being formed with annular grooves around each of said nozzles, the inner portions of said grooves being open to said central passage of the atomizer, an adjustable member controlling the size of said openings, and a piece carrying the same having mixing passages formed therein for receiving the mixed materials from the said nozzles.

3. A burner, comprising an atomizer having a central passage and nozzles arranged outside the same, each of said nozzles being formed with tapering walls and having an annular groove around it, the said grooves intersecting the central passage of the atomizer for admitting oil thereto, an oil supply pipe connected with said central passage, a steam supply pipe connected with the said nozzles, an upper atomizer piece having mixing passages for receiving materials from each nozzle, and a cap plate having depending edges, portions of which project inwardly to a greater extent than other portions, whereby an elongated flame will be produced.

4. A burner, comprising an oil supply pipe and a steam supply pipe, an atomizing member connected with said oil supply pipe having a series of jet openings formed with tapered flanges surrounding the same, the said atomizing member having oil containing troughs around the said jet openings, a nozzle piece having openings with flaring collecting edges overhanging the said jet

openings, and a spreading cap plate arranged above said openings.

5. A burner, comprising an inner oil feed pipe, an outer steam pipe inclosing the same and spaced below to allow for the expansion and contraction of the parts, an atomizing member connected with the end of the oil pipe having a central bore and laterally arranged troughs connected therewith for receiving the oil, nozzles having outlets within said troughs, an upper atomizer plate above said atomizer, and a spreading plate carried by the upper atomizer plate, and having irregular spreading edges for controlling the delivery of the atomized oil for producing an elongated flame.

6. A hydro-carbon burner comprising an oil feed pipe and a steam feed pipe, an atomizing member screwed to the oil pipe, and adapted to extend over the end of the steam feed pipe, the outer surface of said member having a series of annular grooves formed therein and having perforations within said grooves forming nozzles, an upper atomizer plate mounted on the atomizing member and having outlet openings coinciding with the nozzles, the inner ends of said openings being flared, a sleeve for holding the atomizing member and the upper atomizing plate in position upon the burner, a spreading cap ring carried by said sleeve, a burner cap plate mounted upon the upper atomizer member, and a baffle plate within the same, the said spreading cap plate having downturned edges, portions of which project lower than other portions thereof.

In witness that I claim the foregoing I have hereunto subscribed my name this 2d day of November, 1911.

HIRAM C. RUGGLES.

Witnesses: .
FRANK E. WHITTON,
J. T. DUNLAP.