

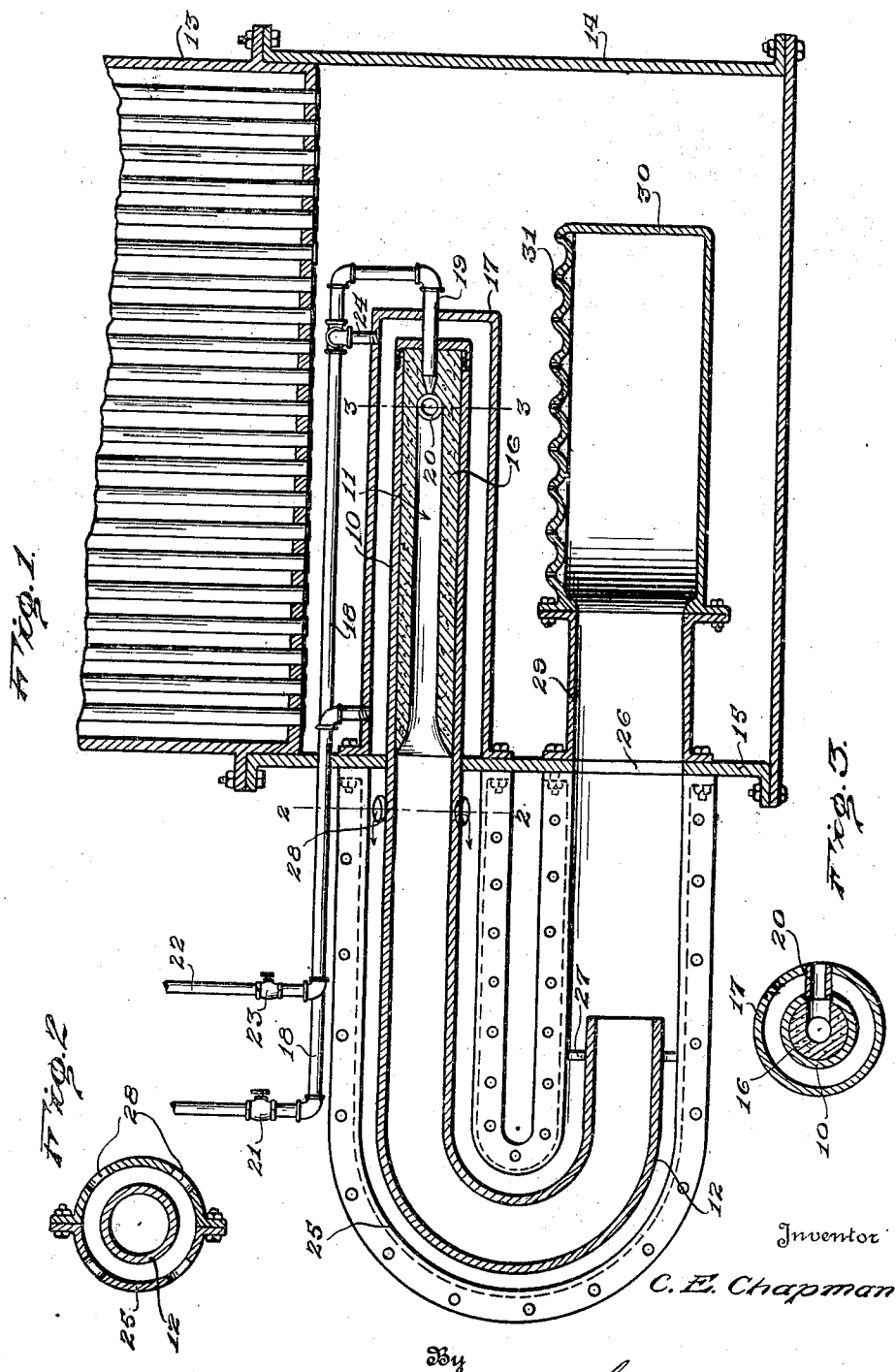
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C. E. CHAPMAN

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APPARATUS FOR BURNING HYDROCARBON OILS

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UNITED STATES PATENT OFFICE.

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APPARATUS FOR BURNING HYDROCARBON OILS.

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To all whom it may concern:

Be it known that I, CHARLES E. CHAPMAN, citizen of the United States, residing at Fort Edward, in the county of Washington and State of New York, have invented certain new and useful Improvements in Apparatus for Burning Hydrocarbon Oils, of which the following is a specification.

This invention relates to an improved apparatus for burning hydrocarbon oils, being similar to the apparatus disclosed in Patent No. 1,386,091, issued to me August 2, 1921, as well as to the apparatus disclosed in Patent No. 1,419,223, issued to me June 13, 1922.

The invention seeks, as one of its principal objects, to provide an apparatus wherein the flame may be forced, cut down, or otherwise regulated without disturbing the proper functioning of the apparatus.

A further object of the invention is to provide an apparatus wherein, like the previous apparatus of my former patents, heated products of combustion will be drawn into a steam jacketed retort for breaking down the chemical structure of a vaporous mixture of steam and oil injected into the retort chamber but wherein a burner will be provided for directing the flame, produced by subsequent combustion of said vapor, around the retort so that regardless of whether the flame is forced or cut down, the flame will play over the retort across the opening leading into the retort chamber so that the heated products of combustion may always be present at said opening to be drawn into said chamber, thus insuring the proper operation of the apparatus.

And the invention has as a still further object to provide an apparatus wherein the discharge horn employed in connection with the retort will be provided with a jacket through which a supply of heated air will be delivered at the mouth of said horn to become mingled with the vaporous mixture of steam and oil for assisting the combustion thereof and wherein the flow of air through the jacket around the horn will tend to cool the horn.

Other and incidental objects will appear hereinafter.

In the drawings:

Figure 1 is a fragmentary longitudinal sec-

tional view showing my improved apparatus in conjunction with a steam boiler.

Figure 2 is a detail sectional view on the line 2—2 of Figure 1, and

Figure 3 is a detail sectional view on the line 3—3 of Figure 1.

In carrying the invention into effect, I employ a retort tube 10 closed at one end by a removable cap or the like, to provide a retort chamber 11 while the opposite end of the tube is bent to form a discharge horn 12, the tube being of uniform diameter throughout its length. In the drawings, I have shown the apparatus in connection with a conventional boiler 13 having a base 14, one wall of which is, for convenience, indicated at 15, and, as will be observed, the inner end of the retort tube 10 is inserted through said wall to extend within the base beneath the bottom sheet of the boiler. Mounted within the retort chamber 11 is a refractory lining shell 16 closed at its inner end and bolted or otherwise secured at one end to the wall 15 is a steam jacket 17 surrounding said chamber. Leading from a suitable oil supply to the inner end of the tube 10 is an oil supply pipe 18 at the inner end of which is mounted an injector nozzle 19 extending into the retort chamber 11 through the inner end of the shell 16 axially of the chamber and leading into the chamber at one side thereof through the wall of the jacket 17 is, as best shown in Figure 3, an inlet pipe 20 for the heated products of combustion, this pipe being disposed horizontally and entering the chamber immediately at the inner end of the nozzle 19 at substantially right angles thereto. Interposed in the pipe 18 is an appropriate shut-off valve 21. Leading into the steam jacket 17 at the end thereof adjacent the wall 15 is a steam supply pipe 22 in which is interposed an appropriate shut-off valve 23, and leading from the opposite end of said chamber into the oil supply pipe 18 is an outlet pipe 24 for said chamber.

Bolted or otherwise secured at its ends to the wall 15 of the base 14 of the boiler, at the outer side of said wall, is a U-shaped jacket 25 surrounding the discharge horn 12 of the retort tube. This jacket is split longitudinally into companion sections which, as seen in Figure 2, are provided

with mating flanges bolted or otherwise secured together so that the sections may be readily assembled about the horn, and formed through the wall 15 at the lower
 5 end of said jacket is an opening 26. As will be observed, the discharge horn terminates short of the lower end of the jacket, being provided with suitable lugs 27 centering the free end of the horn within the
 10 jacket, and formed in the jacket near its upper end is a series of spaced air inlet openings 28. Bolted or otherwise secured to the wall 15 at its inner side to surround the opening 26 in said wall is a tube 29
 15 forming, in effect, a continuation of the jacket, and detachably mounted upon said tube is a burner 30 lying beneath the retort in a plane therewith. At its upper side, this burner is provided with jet openings 31, the
 20 burner being otherwise closed with respect to the base of the boiler.

In operation, oil under pressure is fed through the pipe 18 to the nozzle 19 while steam is supplied under pressure through
 25 the pipe 22 to the steam jacket 17 and since the burner 30 is located immediately beneath the retort, flame from the burner will play around said jacket for superheating the steam therein. Accordingly, superheated
 30 steam will be discharged through the outlet pipe 24 to become mingled with the oil passing through the pipe 18 for atomizing the oil so that a vaporous mixture of oil and steam
 35 will be discharged from the nozzle into the retort chamber. The discharge of the nozzle will, of course, create a suction in the pipe 20 so that the heated products of combustion will be coincidentally drawn in through
 40 said pipe into the retort chamber to become mixed with the vapor therein. The temperature of said chamber will thus be greatly elevated with the result that the chemical structure of the oil and steam of the vapor
 45 will be broken down. From the retort chamber the vapor will then be impelled through the discharge horn 12 to issue from the mouth thereof into the jacket 25, thereby setting up a suction in the jacket acting to
 50 draw in a supply of air through the inlet openings 28 of the jacket so that before the fuel vapor reaches the burner air will be mixed therewith for supplying oxygen auxiliary to that derived from the steam injected through the nozzle 19. As will be
 55 seen, the air flowing through the jacket will be caused to traverse the length of the discharge horn so that the air, before becoming mingled with the fuel vapor, will be heated to a high temperature for thus further augmenting the combustibility of the
 60 vapor. Practically perfect combustion will accordingly be had at the burner. Furthermore, as will be noted, the air flowing through the jacket 25 will tend to cool the
 65 discharge horn.

Attention is now directed to the fact that the burner 30 will direct the flame upwardly around the retort so that regardless of whether the flame is forced by an augmented
 70 supply of fuel or is cut down by a restriction of the fuel supply, the flame will, at all times, play over the outer end of the pipe 20 for not only excluding air but also providing, at all times, heated products of combustion in the proximity of the outer end of the
 75 pipe. Failure in the supply of heated products of combustion at the pipe 20 through deflection or restriction of the flame to, in turn, cause failure of the apparatus, will accordingly be prevented. However, the
 80 pipe 20 is located horizontally to open through one side of the retort rather than vertically to open through the lower side of the retort so that the flame cannot rise directly into said pipe to cause overheating of the retort chamber.
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Having thus described the invention, what is claimed as new is:

1. The herein described apparatus for burning fuel oils including a steam jacketed
 90 retort chamber having a discharge horn, an oil supply receiving steam from the jacket of said chamber and including nebulizing means discharging in said chamber, a burner for directing flame toward the chamber and
 95 fed by the horn, and means for conducting air to the burner.

2. The herein described apparatus for burning fuel oils including a steam jacketed
 100 retort chamber having a discharge horn, an oil supply receiving steam from the jacket of said chamber and including nebulizing means discharging in said chamber, a burner for directing flame toward the chamber and
 105 fed by the horn, means for conducting air to the burner, and a horizontally disposed intake for the products of combustion leading into the chamber at one side thereof.

3. The herein described apparatus for burning fuel oils including a steam jacketed
 110 retort chamber having a discharge horn, an oil supply receiving steam from the jacket of said chamber and including nebulizing means discharging in said chamber, a burner for directing flame toward the chamber and
 115 fed by the horn, and an individual air jacket surrounding the horn.

4. The herein described apparatus for burning fuel oils including a steam jacketed
 120 retort chamber having a discharge horn, an oil supply receiving steam from the jacket of said chamber and including nebulizing means discharging in the chamber, a jacket surrounding the horn, the jacket being provided with an opening whereby air will be
 125 aspirated through the jacket by the discharge from the horn, and a burner for directing flame toward the retort chamber fed by the horn.

5. The herein described apparatus for 120

burning fuel oils including a steam jacketed retort chamber having a discharge horn, an oil supply receiving steam from the jacket of said chamber and including nebulizing means discharging in said chamber, a jacket surrounding said horn having the horn discharging therein and provided with an air inlet opening whereby air will be drawn through the jacket about the horn, and a burner for directing flame toward the retort chamber in communication with said jacket.

6. The herein described apparatus for burning fuel oils including a steam jacketed retort chamber having a discharge horn, an oil supply receiving steam from the jacket of said chamber and including nebulizing means discharging in said chamber, a jacket surrounding the horn, the jacket being provided near one end with an air inlet opening and having the horn discharging therein near the opposite end of the horn whereby air will be drawn through the jacket, and a burner for directing flame toward the retort chamber in communication with said jacket.

7. The herein described apparatus for burning fuel oils including a steam jacketed retort chamber having a discharge horn, an oil supply receiving steam from the jacket of the chamber and including nebulizing means discharging in said chamber, an inlet for the products of combustion leading into the chamber adjacent the discharge end of said nebulizing means, a jacket surrounding the horn, the jacket being provided with an air inlet opening and having the horn discharging therein whereby air will be drawn through the jacket, and a burner for directing flame toward the retort chamber in communication with said jacket.

8. The herein described apparatus for burning fuel oils including a steam jacketed retort chamber having a discharge horn, an oil supply receiving steam from the jacket of said chamber and including nebulizing

means discharging in said chamber, and means for supplying the discharge from the horn with fresh air.

9. The herein described apparatus for burning fuel oil including a steam jacketed retort chamber having a discharge horn, an oil supply receiving steam from the jacket of said chamber and including nebulizing means discharging in said chamber, and aspirating means associated with the horn whereby the discharge from the horn will function to aspirate air through said means.

10. The herein described apparatus for burning fuel oils including a steam jacketed retort chamber having a discharge horn, an oil supply receiving steam from the jacket of said chamber and including nebulizing means discharging in said chamber, a burner for directing flame toward the chamber and fed by the horn, and means supplying the burner with air and directing the discharge from the horn toward the burner.

11. The herein described apparatus for burning fuel oils including a steam jacketed retort chamber having a discharge horn, an oil supply receiving steam from the jacket of said chamber and including nebulizing means discharging into said chamber, a burner for directing flame toward the chamber and fed by the horn, and means supplying the burner with air and forming a jacket for the horn.

12. The herein described apparatus for burning fuel oils including a steam jacketed retort chamber having a discharge horn, an oil supply receiving steam from the jacket of said chamber and including nebulizing means discharging into said chamber, and a jacket associated with the horn whereby the discharge from the horn will function to aspirate air through the jacket.

In testimony whereof I affix my signature.

CHARLES E. CHAPMAN. [L. s.]