

March 29, 1938.

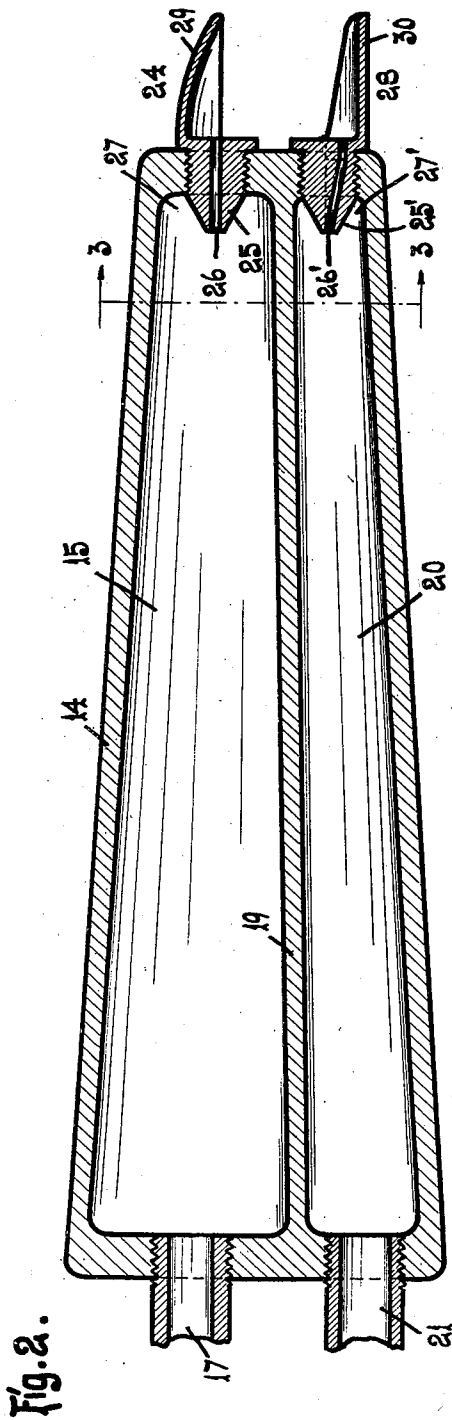
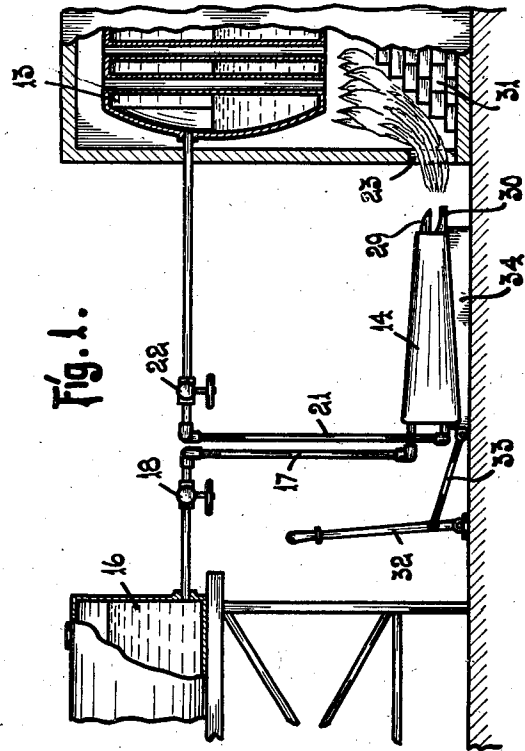
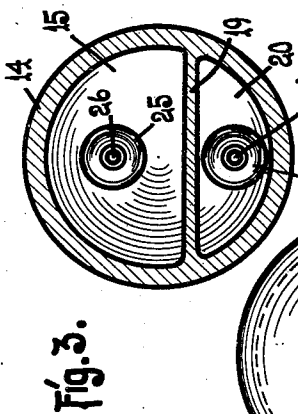
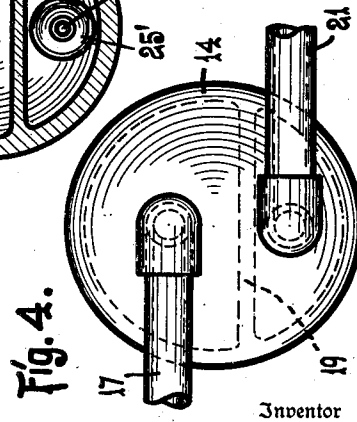
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2,112,618

OIL BURNER

Filed Jan. 22, 1937

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 5.

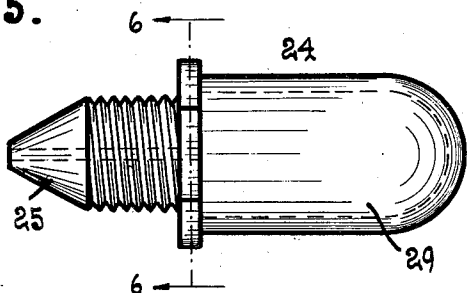


Fig. 6.

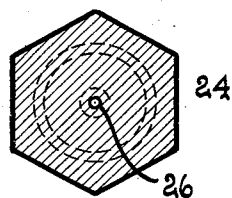


Fig. 7.

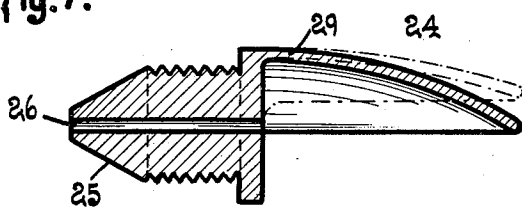


Fig. 8.

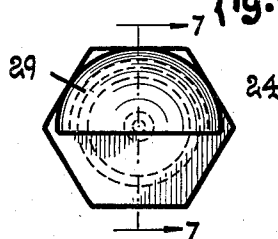


Fig. 9.

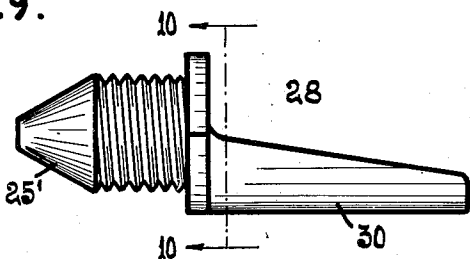


Fig. 10.

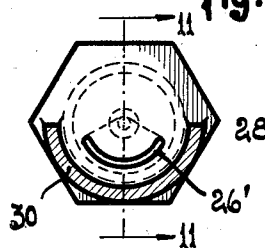


Fig. 11.

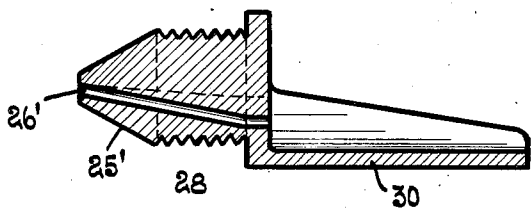
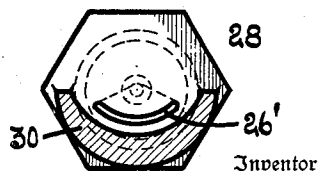


Fig. 12.



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UNITED STATES PATENT OFFICE

2,112,618

OIL BURNER

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Application January 22, 1937, Serial No. 121,781

8 Claims. (Cl. 299—143)

This invention relates to oil burners and more particularly to an oil burner for use to generate steam required at oil wells, and has for its object to provide an improved oil burner including an elongated, cylindrical casting having a streamline, rearwardly-tapered chamber operating as a conduit and dispenser of oil, and having a second chamber of similar form but of lesser area in cross-section for conducting steam and provided with a dispenser which in conjunction with the dispenser for oil, operates to break up and vaporize the oil for complete exposure to the air before ignition.

The invention includes the construction of self-cleaning, vaporizing nozzles for the discharge ports of the oil and steam conduits at the tapered end of the casting.

When the burner is used in the oil fields it is disposed in the open air at the front of the furnace of a boiler, and the invention includes adjustments of the casting to positions nearer or more remote from the boiler to permit a lesser or greater exposure to the air of the hydrocarbon mixture before ignition and depending upon the degree of heat required for power, also depending upon the quality of fuel.

The invention has for an important object to provide an oil burner of more simple construction and of greater heat-utilization than ordinary, and having such a variety of adjustments that it will answer all requirements in heating steam boilers of various sizes, by use of crude oil or similar fuel.

While this oil burner is intended to be used in oil fields, it is also intended to be used in all instances where high pressure boilers are needed for a required power.

The invention consists of the new and useful construction, combination and arrangement of parts described herein and claimed, and as illustrated in the accompanying drawings, it being understood that changes may be made in form, size, proportion of parts and minor details, said changes being within the scope of the invention as claimed.

In the accompanying drawings, Fig. 1 is a broken away plan view showing a steam boiler and oil burner and connections therefor.

Fig. 2 is a view of the oil burner in longitudinal section. Fig. 3 is a view in transverse section on line 3—3 of Fig. 2, and Fig. 4 is an end view of the oil burner.

Fig. 5 is a plan view of a nozzle for oil and Fig. 6 is a transverse section on line 5—5 of Fig. 5. Fig. 7 is a view in longitudinal section of the

nozzle for the oil passageway of the oil burner, and Fig. 8 is an end view of the nozzle shown in Fig. 7.

Fig. 9 is a side view of a nozzle for steam, and Fig. 10 is a transverse section on line 10—10 of Fig. 9. Fig. 11 is a view in longitudinal section of the nozzle shown in Fig. 9.

Fig. 12 is a view similar to Fig. 10 to show a modified form for the outlet port of the nozzle for the discharge of steam.

Referring now to the drawings for a more particular description, a steam boiler is indicated at 13, and steam is generated by use of the oil burner 14, said burner, best shown in Fig. 2, having a tapered passageway 15 for oil in communication with an oil tank 16 by means of a conducting pipe 17 under control of a valve 18.

The burner 14 is preferably formed as an elongated, cylindrical casting provided longitudinally with a partition 19, thereby providing a tapered passageway 20 for steam, said steam passageway having a steam conducting-pipe 21 leading to the boiler and under control of a valve 22.

It will be understood that this burner, when used in connection with high pressure boilers may be operated by either heated air or steam.

While this oil burner is intended to be used in oil fields for generating steam, as mentioned, it is obvious that the heat could be utilized for other purposes, but in all instances the casting is placed in such a locality that it will be exposed to the air or, at least, the exposure must permit the presence of oxygen or pure air at the outlets of the casting 14, the space for this exposure requiring a distance of several inches between the end of the casting (Fig. 1) and draft inlet 23 of the fire box.

In the use of the oil burner, the crude oil used for fuel is often lumpy, and on account of the high degree of heat, from exposure to steam, obstructions accumulate in the oil passageway and tend to prevent the flow of oil through its discharge-port and therefore the nozzle 24, to be described, has a cone-shaped part 25 which operates as a housing for its discharge-port 26, and thereby provides an annular recess 27 for holding accumulations of foreign substances which otherwise might prevent a free flow of oil.

Also the nozzle 28 for the steam passageway is provided with a similar cone-shaped part 25' which prevents foreign substances from obstructing its outlet port 26' for the reason that these obstructions, such as rust-scales or the like, would be deposited in the annular recess 27', and these

threaded nozzles may be readily removed for cleaning the oil and steam passageways.

In order that the oil, under pressure, will be thoroughly broken up and vaporized by action of steam, the nozzle 24 is provided with a transversely and longitudinally curved hood 29, and the nozzle 28 for the steam passageway is provided with a rectilinear control-plate 30 disposed approximately parallel with the axis of the steam passageway 20, with its side walls projecting toward the hood 29 of the nozzle 24, said member 30, as shown in Figs. 11 and 12 being of crescent form in cross-section.

The hood 29 and control-plate 30 may project forwardly of the casting any suitable distance. The side walls of the control-plate 30 project toward the side walls of the hood, and the curvatures for the hood and transverse curvature of the control-plate may be of greater or lesser degree, depending upon the quality of oil and degree of steam pressure.

In operation the oil will attain a high degree of heat and often reaches a boiling point by action of the steam. The oil is projected against the hood, and on account of the curvature at the free end of the hood the oil is thrown into the line of steam, at which time the oil is completely broken up and vaporized.

The function to be discharged by the control-plate 28 is to control and prevent any movement of vaporized fuel to move below the steam line, and to deflect any downward movement of vaporized oil from the oil outlet or steam from the steam outlet.

In operation there will be no flame at the free ends of the nozzles, but the flame will appear a few inches therefrom and will be deflected upwardly to the boiler by the fire-brick 31 below the boiler, as shown in Fig. 1.

It will be noted that the discharge port 26' for the nozzle 28 as shown in Fig. 12 has a lesser degree of curvature than the curvature of said discharge port 26' shown in Fig. 10. This nozzle shown in Fig. 12 is used in instances when a greater heat is required, and at that time the burner is disposed further from the boiler, and it should be explained that a number of nozzles 28 are provided, the outlets of the ports 26' being of crescent-form and differing in curvature, and any one of these nozzles may be used, depending upon the degree of heat required. If the arc of curvature of the discharge port 26' is comparatively greater, the steam will have a greater spread laterally and will enlarge the volume of vaporized fuel to advantage for providing increased heat.

Any suitable means may be provided for adjusting the burner longitudinally, so that the nozzles will be disposed at a selected distance from the boiler for greater or lesser exposure to the air of the hydrocarbon mixture, the means shown in the present instance being a hand-lever 32 (Fig. 1) having a link 33 attached to the tapered slidable base 34 which supports the burner, and it will be understood that the pipes 17 and 21 may become bent and may have swinging movements without injury to permit the adjustments for the burner as may be required.

The volume of the oil passageway for best results should be approximately three times greater than the volume for the steam passageway generally, but proportions may vary, depending, in part, on the quality of the fuel.

By referring to Figs. 2 and 3 of the drawings it will be noted that, as heretofore mentioned, the partition 19 of the tapered casting provides great-

er volume for the oil chamber 15 than for the steam chamber 20, and this is an important feature. One of the functions discharged by the steam is to maintain the oil in a heated condition at somewhat less than the boiling point to prevent it from becoming caked or hardened, and it is obvious that if the volumes of the two chambers were equal the oil would become unduly heated.

Also since the casting and its chambers are of tapered form the flow of oil through its outlet port 26 and the movement of steam through its discharge port 26' will be more uniform, and pulsation and irregular discharges will be avoided, the larger volumes of these chambers at the intakes for oil and steam being adequate and comparatively greater to provide a reserve to permit the gradual heating of the oil before it is discharged.

One reason why the oil chamber should be larger than the steam chamber is the fact, for operation, the oil must be maintained at a temperature not less than 200 degrees F. and must not attain a temperature greater than 400 degrees F., and this control for production of temperature for the oil is governed by the specified areas which, by thorough experimentation, has proven to be of utmost importance and necessary in connection with burners for attaining correct results relative to combustion.

It will be understood, of course, that if the size of the burner is changed, the proportions of the volumes should be changed accordingly. Also, if such change in size is made, the proportions for the nozzles should be changed, the conical ends of the nozzles which extend into the chambers being elongated, according to the quality of fuel used.

I claim as my invention,—

1. An oil burner comprising an elongated casting provided with an oil passageway with a discharge port and a steam passageway disposed approximately parallel with the oil passageway and having a discharge port disposed adjacent to the discharge port of the oil passageway, a nozzle in the discharge port of the steam passageway having a transversely curved, horizontal, outwardly projecting control-plate arranged below its discharge port, and a nozzle in the discharge port of the oil passageway having a transversely curved hood inclined longitudinally toward said control-plate.

2. An oil burner comprising an elongated, tapered casting provided with a tapered oil passageway with a discharge port and a tapered steam passageway disposed approximately parallel with the oil passageway and having a discharge port adjacent to the discharge port of the oil passageway, a nozzle in the discharge port of the steam passageway having a transversely curved, outwardly projecting control-plate arranged below its discharge port, a nozzle in the discharge port of the oil passageway having a transversely curved hood inclined longitudinally toward said control-plate, and a tapered base-member disposed beneath and arranged to be moved for adjusting said casting longitudinally.

3. An oil burner comprising a casting provided with an oil passageway and a steam passageway disposed side by side and opening on an end of the casting, a nozzle mounted in the steam passageway having a transversely curved control-plate projecting outwardly from the end of the casting below the orifice of said nozzle with its longitudinal axis parallel with the axis of the steam passageway, and a transversely curved hood

mounted in the oil passageway projecting outwardly from the end of the casting and having a longitudinal curvature toward the control-plate.

5 4. An oil burner comprising a casting having a tapered passageway for oil under pressure and a tapered passageway for live steam of lesser volume than the volume of the oil passageway, said passageways opening closely adjacent to
10 each other at one end of the casting, a nozzle including a rectilinear control-plate below its orifice having side walls and mounted in the steam passageway, and a nozzle having a longitudinally curved hood with side walls projecting toward the side walls of the control-plate and
15 mounted in the oil passageway.

5 5. An oil burner comprising a casting having a steam passageway and an oil passageway, a nozzle at an end of the casting providing an
20 outlet for the steam passageway and including an outwardly projecting control-plate disposed below said outlet approximately parallel with the axis of the steam passageway and having transversely curved side walls, and a second nozzle at
25 the end of the casting providing an outlet for the oil passageway and including a longitudinally curved hood overhanging the control-plate and having transversely curved side walls projecting toward the side walls of said control-plate.

30 6. An oil burner comprising an elongated, longitudinally tapered casting having a steam passageway of tapered form and a tapered oil passageway, a nozzle projecting outwardly, from the steam passageway and provided below its
35 orifice with a rectilinear control-plate with transversely curved side walls, a nozzle projecting

outwardly from the oil passageway provided with a longitudinally and transversely curved hood overhanging the control-plate and side walls of the first named nozzle, and a tapered base-member disposed beneath and arranged to be moved
5 for adjusting the casting longitudinally.

7. An oil burner comprising an elongated casting having a steam passageway and an oil passageway, a nozzle having a discharge-port of
10 crescent shape in communication with the steam passageway and having a rectilinear control-plate below its discharge-port with transversely curved side walls projecting outwardly from the casting approximately parallel with the axis of
15 the steam passageway, and a nozzle having a discharge port in communication with the oil passageway having a longitudinally and transversely curved hood overhanging the control-plate of the first named nozzle, the discharge-ports of
20 said nozzles being disposed in a vertical plane.

8. An oil burner comprising an elongated casting provided with a steam passageway and having an oil passageway of greater volume than the volume of said steam passageway, a nozzle projecting from the end of the casting including a
25 rectilinear control-plate of crescent form in cross-section having a discharge-port above the control-plate of crescent-form in communication with the steam passageway, and a second nozzle mounted in the end of the casing adjacent
30 the first named nozzle and provided with a concavo-convex hood with a downwardly curved terminal overhanging the control-plate of the first named nozzle.

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