Aug. 25, 1931. R. H. FORNEY 1,820,352

STEAM ATOMIZING OIL BURNER

Filed Aug. 12, 1929 2 Sheets-Sheet 1

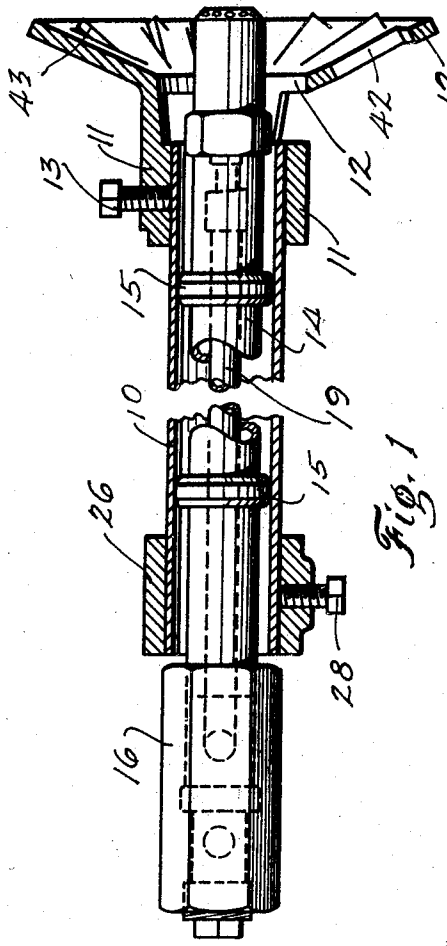


Fig. 1

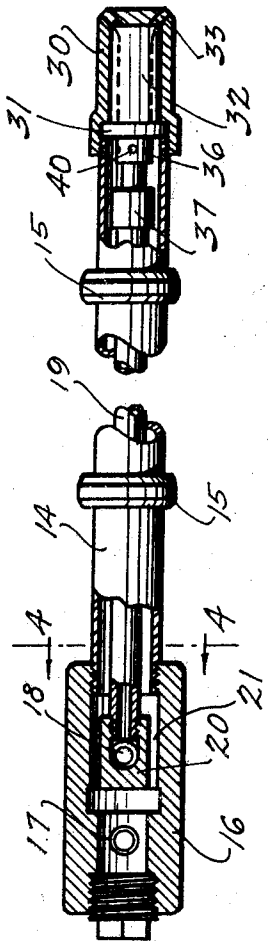


Fig. 3

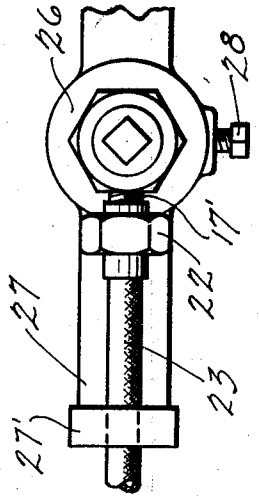


Fig. 2

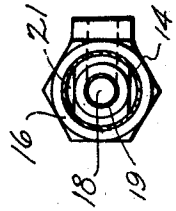


Fig. 4

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STEAM ATOMIZING OIL BURNER

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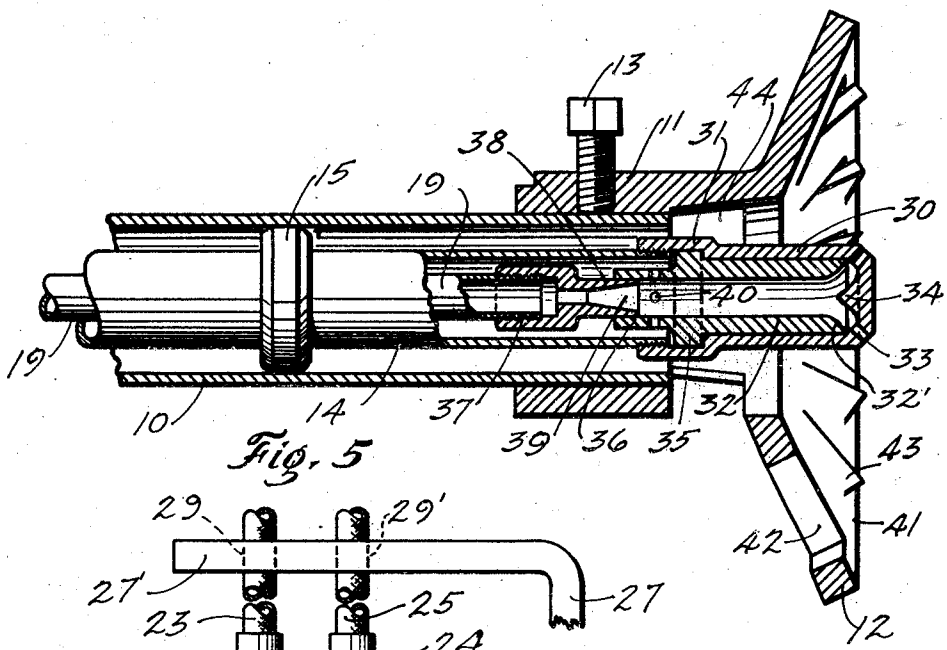


Fig. 5

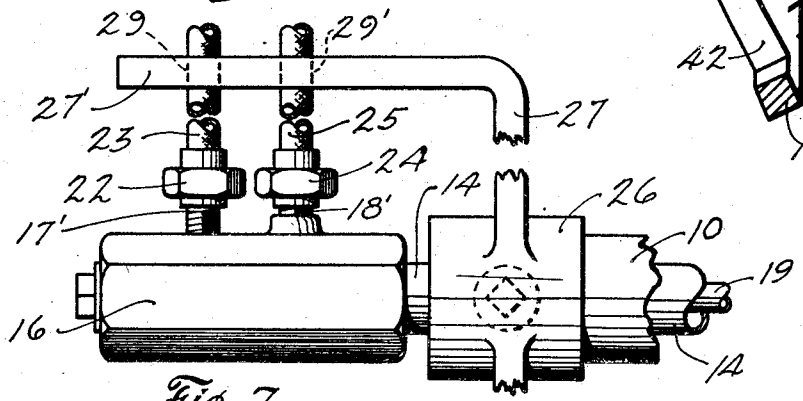


Fig. 7

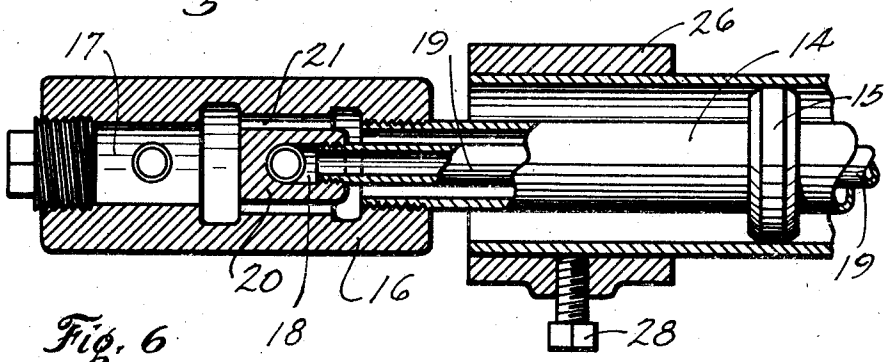


Fig. 6

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Patented Aug. 25, 1931 1,820,352

UNITED STATES PATENT OFFICE

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STEAM ATOMIZING OIL BURNER

Application filed August 12, 1929. Serial No. 385,325.

This invention relates to new and useful improvements in steam atomizing oil burners.

The invention has for one object to produce an improved burner of the type set forth for the consumption of heavy oil and oil residue.

Another object of the invention is to provide a burner structure wherein all parts are rugged and the adjustment and disassemblement is simply and easily accomplished.

An important object of the invention is to produce a burner of high efficiency wherein the complete atomization of the oil is accomplished, and wherein the maximum turbulence for the mixing of the air and the fuel is provided.

A further object of the invention is to produce a burner structure wherein the maximum velocity is obtained in the expansion of steam, thus providing for the low consumption of said steam.

A still further object of the invention is to provide a burner of the interchangeable fuel tube type that can be used in combination with the burners described in applicant's copending applications, Serial No. 349,137 filed March 22, 1929, and Serial No. 351,712 filed April 1, 1929.

A construction designed to carry out the invention will be hereinafter described together with other features of the invention.

The invention will be more readily understood from a reading of the following specification and by reference to the accompanying drawings in which an example of the invention is shown, and wherein:

Figure 1 is a view partly in elevation and partly in section, showing a burner constructed in accordance with the invention mounted in the supporting shell,

Figure 2 is an end view of the same,

Figure 3 is a vertical sectional view showing the relative position of the oil and steam tubes,

Figure 4 is a vertical sectional view taken on the line 4—4 of Figure 3,

Figure 5 is an enlarged sectional view showing the component parts of the burner nozzle in place in the supporting shell,

Figure 6 is an enlarged sectional view showing the oil and steam tube connections, and

Figure 7 is a plan view of the coupling bracket on the rear of the burner.

In the drawings the numeral 10 designates an elongated supporting sleeve forming part of a fuel assembly and having mounted at its inner or front end a deflector 12 which includes a collar 11 encircling the end of the sleeve and fastened thereon by a set screw 13. An elongated steam tube 19 is concentrically supported in an elongated oil tube 14 which is concentrically supported in the sleeve 10 by spacers 15 that are suitably fastened on said oil tube. The spacers have a snug fit but are loose enough to slide freely in the sleeve.

A plugged head 16 is screwed onto the outer end of the oil tube 14 and the head is divided into chambers 17 and 18 by a central web 20. The steam tube 19 is screwed into said web 20. Ducts 21 are provided in the web for the passage of the oil around the inner chamber to the oil tube. The chambers 17 and 18 have spuds 17′ and 18′ screwed into their sides, as is shown in Figure 7. A union 22 is screwed onto the spud 17′ to connect an oil line 23; while a union 24 is screwed onto the spud 18′ to connect a steam hose 25.

On the outer or near end of the sleeve 10 is fastened a collar 26 of a yoke-shaped bracket 27, said bracket being fastened in a horizontal position by a set screw 28 engaging the sleeve. An arm 27′ of the bracket 27 has eyes 29 and 29′ which receive and support the oil line and steam hose respectively.

An oil tip 30 has an enlarged collar 31 internally screw threaded and into which the forward end of the oil tube 14 is screwed. A mixing sleeve 32 is telescoped into the tip and has a flared end 32′ conforming to the pitch of ports 33 in the end of the tip. The tip has a small internal spreader cone 34 disposed concentrically in the flare 32′, whereby the atomized mixture is spread and more evenly distributed to the ports.

The mixing sleeve has an annular flange 35 fitting in the collar 31 and abutting the shoulder thereof so as to space the flared end

32′ with relation to the cone 34 and ports 33. A reduced shank 36 extends rearwardly from the collar and is integral with the sleeve. A nipple 37 is fastened on the forward end of the steam tube 19 and has a reduced nozzle 38 telescoping into the shank 36.

The nozzle 38 has an axial bore leading from the tube 19 to a flared discharge port 39 in the forward end of the nozzle. The shank 36 has oil inlet openings 40 between the flange 35 and the nozzle so as to admit oil from the tube 14 into the path of the steam discharged from the port 39.

It will be seen that the steam is sprayed into the shank 36 and sleeve 32, thus giving the steam full opportunity to expand, thus making for a maximum velocity and thus giving greater turbulence and more complete atomization of the oil when it leaves the ports 33 of the tip. The oil and steam being thoroughly mixed in the sleeve 32 produce an atomized mixture which is spread by the cone 34.

The deflector 12 also includes a flared annular spreader 41 surrounding the tip 30 and provided with air openings 42 having upset vanes 43. The deflector also has air admitting openings 44 in its neck between the collar 11 and the baffle 41. The efficiency of the burner is very high, due to the fact that complete atomization of the oil is accomplished and the fuel is thrown out in a cone shape at an angle to the entering air, thereby giving maximum turbulence for the mixing of the air and fuel.

Owing to the fact that the mixing of the oil and steam takes place within the tip 30 and adjacent the ports 33, the oil has no chance to settle out before it leaves the burner tip. If the mixing takes place remote from the tip there is a tendency for the oil to settle out and liquefy, thus running out the lower ports 33 in liquid form. This I avoid.

The tube 14 and the parts attached thereto may be removed from the sleeve 10 and a gas fuel tube substituted as in my co-pending applications herein before referred to. By unscrewing the tip collar 31 from the tube 14 and slipping out the mixing sleeve 32, access may be had to the parts.

Various changes in the size and shape of the different parts as well as modifications and alterations, may be made within the scope of the appended claims.

What I claim, is:

1. In a fuel burner, an oil tube, a steam tube within the oil tube, a burner tip, a mixing sleeve within the tip, and a nipple connected with the steam tube and projecting into the sleeve, said sleeve having oil admitting openings beyond the nipple, said nipple having a nozzle with a flared port for discharging and expanding steam in the sleeve, the sleeve having a flared discharge end and the tip having ports also flared therefrom, together with a cone projecting in the sleeve.

2. In a fuel burner, an oil tube, a steam tube within the oil tube, a burner tip having flared ports, a mixing sleeve within the tip having a discharge end flared to the ports of the tip, a nipple connected with the steam tube and projecting into the sleeve, the nipple having a nozzle with a flared port for discharging and expanding steam in the sleeve, and said sleeve having oil admitting openings beyond the nipple.

3. In a fuel burner, an elongated axial oil tube, an elongated steam tube within the oil tube, a nipple mounted on the forward end of the steam tube and having a reduced nozzle, an elongated burner tip mounted on the forward end of the oil tube, and a removable mixing sleeve fitting snugly in the sleeve and having a reduced shank telescoping into the forward end of the oil tube, the reduced nozzle of the nipple fitting snugly in the shank of the sleeve, the said sleeve shank having oil admitting ports.

4. A fuel burner as set forth in claim 3, in which the mixing sleeve is held in the tip by the end of the oil tube, and wherein the tip has its forward end closed and formed with ports.

In testimony whereof I affix my signature.

ROSS H. FORNEY.