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2,068,286

OIL BURNER

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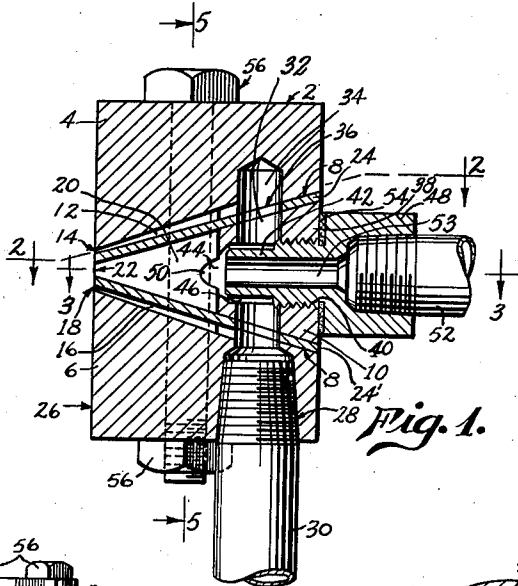


Fig. 1.

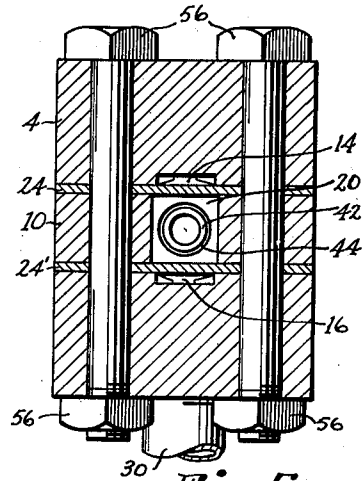


Fig. 5.

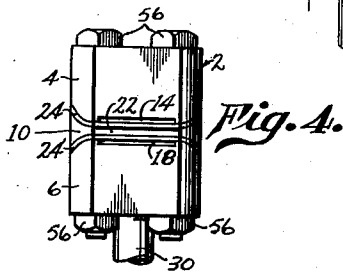


Fig. 4.

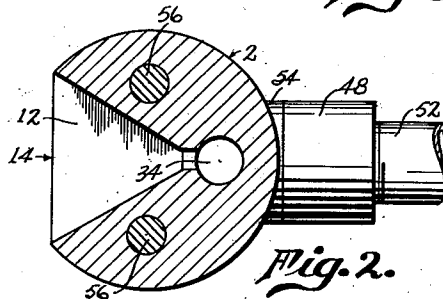


Fig. 2.

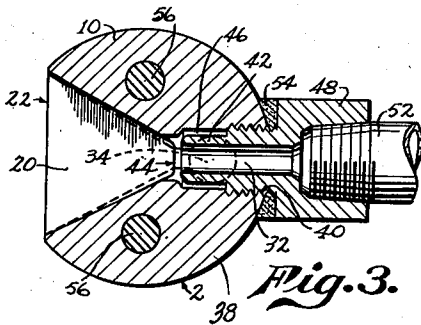


Fig. 3.

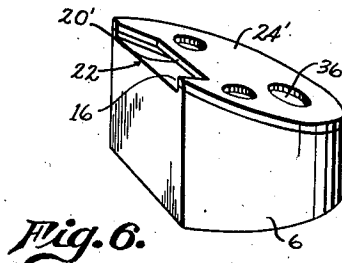


Fig. 6.

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OIL BURNER

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3 Claims. (Cl. 299—140)

My invention relates to fuel burners, preferably of the plural fluid type, and more particularly to oil burners by the use of which crude oil may be burned without the usual carbon deposits in burners of the known types, and without leakage or breaking of the parts thereof.

In fuel burners of the known type, especially where crude oil is burned, said burners are subject to leakage and breakage, due to expansion and contraction caused by inadequate and improper assembly of the parts, frequently causing opening of the joints, and necessitating the addition of extra parts, and hence adding to the expense thereof, and also, due to improper mixing of the fluids and insufficient atomization, objectionable carbon deposits on said burners are encountered, thus reducing the efficiency of said burners.

Moreover, when steam is used, scale is frequently formed in the known burners, which scale causes improper mixing and deflection of the flame of the burner, thus decreasing its efficiency and necessitating more frequent cleaning thereof, it being necessary to shut down the furnace until said burners have been cleaned, which results in loss of time and expense. By the use of my invention all these deleterious results are effectively eliminated.

It accordingly is an object of my invention to provide a novel form of fuel burner, preferably of the plural fluid type, and in which both oil, which may be crude, and steam may be used, said burner comprising a plural part casing provided with a suitable mixing chamber, preferably substantially surrounded by a plurality of intercommunicating fluid or steam chambers, which chambers may terminate in suitable outlets or orifices, preferably positioned upon each side of a burner or orifice communicating with said mixing chamber, a suitable fuel nozzle extending into said casing being provided, and, if desired, made adjustable, so as to control the flow of said fuel or steam into said mixing chamber to provide at all times a proper mixture.

If desired, also, a second mixing chamber, juxtaposed to the burner orifice may be provided, whereby carbon deposits may effectively be prevented, or the steam outlet or orifices may be positioned flush with the burner orifice, so that any drip of the mixture issuing from the burner orifice will be effectively atomized to eliminate all carbon deposits.

The above, and further objects and advantages of my invention, as will hereinafter more fully appear, I attain by the construction described in

the specification and illustrated on the drawing, forming a part of my application.

Reference is had to the accompanying drawing, in which similar reference characters denote similar parts. In the drawing,

Fig. 1 is a longitudinal cross-sectional view of my invention,

Fig. 2 is a transverse cross-sectional view, taken on the line 2—2, Fig. 1, looking in the direction of the arrows,

Fig. 3 is a similar view taken on the line 3—3, also looking in the direction of the arrows,

Fig. 4 is a front elevational view of my invention, looking from the right, Fig. 1, and shown on a reduced scale,

Fig. 5 is a transverse cross-sectional view, taken on the line 5—5, Fig. 1, also looking in the direction of the arrows, and

Fig. 6 is a perspective view of a modified form of my invention in which an additional mixing chamber is provided.

Describing my invention more in detail, I provide a suitable casing 2, which may comprise a plurality of parts, and be constructed of any preferred material, and of any desired configuration.

The casing 2, accordingly, may comprise an end member 4, and an end member 6, preferably of similar construction, for a purpose presently to be explained, and as seen more particularly in Fig. 1, the inner ends of said members are provided with inclined surfaces 8, said surfaces, however, when the casing 2 is assembled being reversely positioned with respect to each other.

Positioned between the end members 4 and 6 is a preferably tapered intermediate member 10 having inclined surfaces complementary to the surfaces 8, all of which surfaces are preferably ground so as to provide an accurate fit, whereby leakage will effectively be prevented.

The end member 4 is provided with a fluid or steam chamber 12, cut out or otherwise produced therein, and said chamber may be flared outwardly and tapered outwardly from its inner end so that it will have a gradually tapered width, and gradually increased, or flared breadth from its inner end to its outer end, the chamber terminating in an outlet or exhaust 14.

So, also, the end member 6 is provided with a steam or fuel chamber 16 of identical construction as the chamber 12, terminating also in an outlet or exhaust 18, said chambers, however, when the device is assembled, being reversely positioned, as more particularly illustrated in Fig. 1.

The intermediate member 10 is preferably cut

away to provide a chamber 20, which is the mixing chamber for the plural fluids, such as oil and steam, said chamber being also of greater width at its inner end and of greater breadth at its outer end. When the device is assembled, the chamber 20 terminates in a burner outlet 22, where the flame of the burner is provided, said chamber being formed by a through cut-out or otherwise formed portion in said intermediate member.

To form closures for the chambers 10, 12 and 16 suitable partition plates or closures 24 and 24' preferably, though not necessarily, of identical construction, are provided, said partition plates or closures preferably terminating flush with the flat surface 26 of the casing 2, thus providing the burner orifice or outlet 22 and the exhaust or outlet orifices 14 and 18 for the steam or fuel, said exhaust or outlet orifices being positioned on both sides of said burner orifice 22 and preferably in close juxtaposition therewith for a purpose presently to be described.

As seen more particularly in Fig. 1, the end member 6 may be provided with a bored portion 28, preferably threaded to receive the inlet pipe 30 for a fluid, such as steam, which bored portion is preferably in alignment with a bored portion 32, extending through the intermediate member 10.

The end member 4 may also have a bored portion 34 in alignment with the bored portion 32 in the intermediate member 10, and the partition plates or chamber closures 24 and 24' may be provided with holes or openings 36 in direct alignment with the bored portions 28, 32 and 34, so that when the casing 2 is assembled, there will be formed a steam or fluid chamber including the bored portions 28, 32 and 34 with the communicating holes or openings 36, inter-communicating with the chambers 12 and 16, so that the mixing chamber 20 will be substantially surrounded by the steam or fluid at all times during the operation of the device.

As best seen in Figs. 1 and 3, the thickened portion 38 of the intermediate member 10 is provided with a bored and threaded portion 40 into which is screwed the nozzle member. This member is of three diameters. The middle part is threaded to fit into the threaded portion 40 of the bore of the member 10. The inner part, 42, is the nozzle proper. It is of smaller diameter than is the bore which contains it so that an annular space 46 surrounds it. The third part 48 is outside the casing 2 and is larger than the threaded bore 40. It constitutes a manipulating head for the member, and is moved toward and from the casing as it is turned and the screw-threads cause the nozzle member to move endwise. At the inner end of the annular space 46 the bore is reduced in diameter to form a tapered shoulder opposite the inner end of the nozzle 42. The movement of the valve member inwardly from its position in Figs. 1 and 3 results in restricting the passage leading from the annular space 46 to the mixing chamber. Conversely, the outward movement of the valve member enlarges that passage. Thus, by turning the valve member more or less in one direction or the other, the amount of steam furnished the mixing chamber is regulated. This adjustment of the valve member is effected through the outer enlarged part 48 of said member. If desired, the intermediate member is effected through the outer enlarged part 48 of said member. If desired, the intermediate member 10 may be provided with a suitable cut out portion 50 (Fig. 1) to facilitate the introduction of the

steam into the mixing chamber with minimum friction.

As seen more particularly in Figs. 1 and 3, the head 48 may be bored and threaded internally to provide for the reception of the oil inlet pipe 52 which communicates with the nozzle 42 through a passage 53, and, if preferred, a suitable washer 54 may be positioned between the head 48 and the casing 2 so that the position of the inner end of the nozzle 42 may be varied to vary the amount of steam admitted to the mixing chamber 20.

Any suitable means for holding the plural parts of the casing 2 in secured and detachable relation may be provided, and for this purpose I may use the nut and bolt construction 56, in the present instance, two in number.

Particular attention is directed to the manner in which the parts of the casing 2 are assembled. Not only is a minimum number of securing devices or bolts 56 needed, but by positioning the parts and said devices or bolts as shown and described, expansion and contraction of the parts is limited to the longitudinal dimension of the casing 2, whereby breaking of the parts is reduced to a minimum and leakage effectively prevented. The parts as thus assembled form an exceedingly rigid structure, and no packing elements are needed, as is the case in known constructions.

Since the mixing chamber 20 is substantially surrounded by the inter-communicating steam chambers, volatilization of the oil, due to the effective spread of the heat of the steam about said mixing chamber is assured, thus providing for maximum efficiency. Further, an adequate and proper mixture of the oil and steam is at all times provided by the concentric arrangement of the oil nozzle with respect to the steam inlet to the mixing chamber.

Attention is also directed to the fact that the forming of scale in the instant case will in no case be effective in interfering with the flame of the burner since the steam chambers are distinct and separate from the mixing chamber. Further, as the oil is introduced into the mixing chamber 20, said oil comes into contact with the steam from the steam inlet 46 at an angle, thus insuring proper atomization and mixing between the oil and the steam. Moreover, the chambers may be effectively cleaned without disassembling the parts of the casing, the chambers being easily accessible and the steam blown therethrough to provide effective and quick cleaning; any suitable implement may be used to scrape out any scale that may be formed in the various chambers, said chambers, as just stated, being at all times readily accessible.

By reason of the peculiar construction of the various chambers, an even spread of mixture is provided, so that a continuous and uninterrupted flame is always provided at the burner orifice 22.

Another important feature of my invention is the provision of the smooth surface or face 26 on the exterior of the casing 2 with which the orifices 14, 16 and 22 are preferably flush. This is important since carbon deposits are effectively prevented, both above and below the burner orifice 22. The steam as it issues from the orifices 14 and 18, and more particularly the latter, catches any drip of oil that may issue from the flame orifice 22, atomizing and vaporizing said drip, and effectively preventing any such carbon deposits as are quite prevalent in known devices, thus raising the efficiency of the device to a maximum and increasing the life thereof. Since the number of securing devices and bolts 56 is re-

duced to a minimum a much less expensive device is provided, but withal a more rigid and effective one.

Fig. 6 discloses a modified form of my invention in which an additional mixing chamber may be provided in the mixing chamber 20 and juxtaposed to the burner orifice 22, which additional mixing chamber functions to insure that no drip or liquid content of the mixture will cause carbon deposits upon the face 26 of the casing 2. The lower plate 24' is provided with a cut out portion 20' which permits the steam from the lower steam chamber 16 to enter the mixing chamber 20 above said plate to provide for an additional mixing with the oil before the mixture reaches the outlet nozzle 22.

This is accomplished by providing one of the partition plates or closures, preferably the closure 24' with a suitable cut-away portion 20', to permit the entry of the steam to the mixing chamber, so that an additional mixture of the fuels may be provided. Said modification, however, may be dispensed with. Otherwise, as indicated by duplicate reference characters, the rest of the device is identical with the other form of my invention.

In accordance with the provisions of the patent statutes, I have described the principle of operation of my invention together with the apparatus, which I now consider to represent the best embodiment thereof, but I desire to have it understood that the apparatus and device shown are only illustrative and that the invention can be carried out by other means and ways.

I claim as my invention:

1. A fluid burner comprising an inner casing member in the form of a truncated wedge having smooth sides diverging from the truncated end of the wedge, said member having a wedge-shaped portion removed to form a chamber which opens at the truncated end of the member, an

outer casing member for and at each side of the inner member, said outer members having inner surfaces complementing the diverging sides of the inner member, means for holding said members rigidly in their assembled positions, and means through which two fluids are separately fed to and are mixed in the chamber in the inner member, the mixed fluids passing from said chamber through the truncated end of the inner member.

2. A fluid burner as set forth in claim 1 in which a portion of the inner surface of each of the outer casing members is removed to leave a narrow space corresponding in outline to the mixing chamber in the inner member, a partition plate on either side of the inner member between it and the respective outer member, said plates separating the spaces in the outer members from the mixing chamber, and provisions whereby a portion of one of the fluids passes through said spaces and from the latter adjacent the outlet 20 from the mixing chamber.

3. An oil burner comprising a casing having one of its faces flat and of extended area, said casing having a chamber therein, partitions extending through said chamber and dividing it into a central mixing chamber and a plurality of heating chambers, the mixing chamber opening through an elongated slot in the said flat face of the casing and the heating chambers opening in elongated slots in said flat face in close proximity to the slot for the mixing chamber, one of the partitions being cut away adjacent the opening from the mixing chamber, means for feeding oil into the mixing chamber and means for feeding a heated fluid into the mixing chamber and into the heating chambers, whereby the heated fluid mixes with the oil in the mixing chamber to atomize the oil and form the mixture while the fluid in the heating chambers heats the mixture.

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