May 6, 1930. I. E. SMITH 1,757,023

OIL BURNER

Filed Oct. 20, 1926

Fig. 1

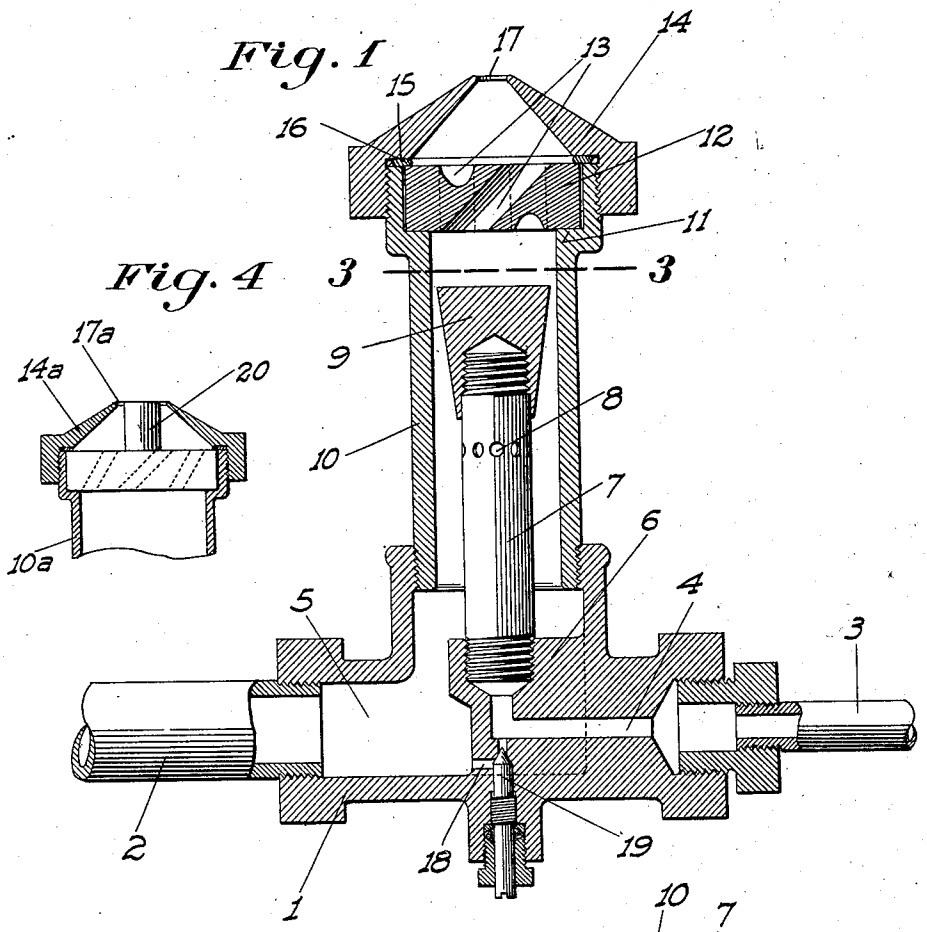


Fig. 4

Fig. 2

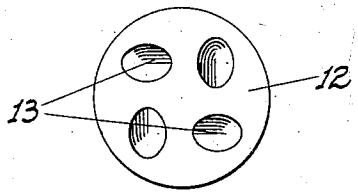
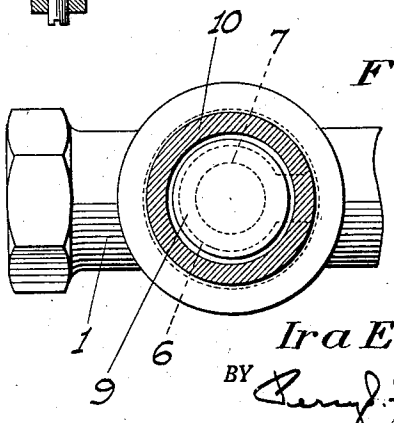


Fig. 3



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OIL BURNER

Application filed October 20, 1926. Serial No. 142,814.

This invention relates to improvements in oil burners of the type in which the oil is mixed while in the burner with a gaseous fluid such as air or steam, my principal object being to provide a burner of this type having no moving parts but provided with such members as will cause a whirling of the oil with the fluid to be had to form a thoroughly atomized mixture, such as is accomplished in other burners by a mechanical rotation of sundry parts.

Another object is to construct the burner unit in such a manner that the various parts may be readily disassociated from each other for cleaning and inspection purposes, and in which the oil line can be easily blown out by fluid pressure whenever necessary to relieve any tendency to choke up.

A further object is to provide a simple, compact and inexpensive unit such as may be readily inserted and used in any firebox, either in a horizontal or a vertical position without having to make any alterations in the firebox.

A further advantage of this burner is that it will operate efficiently either with high or low fluid pressure, as long as the fluid under the latter conditions, is provided in sufficient volume.

These objects I accomplish by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claim.

In the drawings similar characters of reference indicate corresponding parts in the several views:

Fig. 1 is a sectional elevation of my improved burner.

Fig. 2 is a top plan view of a disc having passages therethrough arranged to create a whirling action.

Fig. 3 is a cross section on the line 3—3 of Fig. 1. Fig. 4 is a fragmentary section showing a modified form of outlet head-opening construction.

Referring now more particularly to the characters of reference on the drawings, the numeral 1 denotes a T-shaped fitting arranged at its opposie ends for connection to pipes 2 and 3, the former for compressed air or steam, and the latter for oil. The pipe 3 communicates with a passage 4 formed in the body separate from the main chamber 5 which communicates with the passage 2, said passage 4 terminating in a boss 6 whose inner end faces in a direction at right angles to said pipes. Removably secured in the inner end of the boss is a pipe 7, communicating with the passage 4 and provided with a row of radial holes 8 near its opposite end. Beyond the holes the pipe is capped by an inverted frusto-conical member 9. Surrounding the pipe 7 and the cap in spaced and concentric relation thereto is a cylindrical casing 10. This member may be formed integral with the body 1 if desired but is preferably removably secured thereto and in any event communicates freely with the body chamber 5. The diameter of the casing 10 is such that while it is considerably spaced from the pipe 7 it is somewhat close to the upper and large end of the cap 9 so as to form a restricted passage therepast.

A certain distance above the cap the casing is enlarged to form a seat 11 for a disc 12. This disc is provided with a number of holes 13 therethrough, which are grouped symmetrically about the center of the disc and are set at a decided angle to the axis of said disc, as plainly shown in Fig. 1. This disc is removably clamped in place by means of a head 14 screwed onto the outer end of the casing and having a shoulder 15 which engages a ring gasket 16 which in turn engages said disc adjacent its rim. The head is hollow, the interior area being substantially cone shaped, and the sides converging from adjacent the rim of the disc to a relatively small outlet opening 17 disposed at the outer end of the head concentric with the disc. The outer surface of the head is also preferably cone-shaped, the sides diverging from the outlet and being so disposed relative to the interior wall of the head that said walls approach very close at the outlet, so that the latter is very shallow in depth.

A small passage 18 leads from the chamber 5 facing the pipe 2 to the oil passage 4, a normally closed hand operated needle valve

19 projecting into said passage 18 and being operable from outside the casing.

In operation oil is fed into the passage 4 and the pipe 7 from the pipe 3 and air or steam under pressure is fed into the chamber 5 and casing 10 from the pipe 2. Oil can only escape from the pipe 17 through the holes 8, where it is immediately exposed to and caught up by the air or steam moving toward the outlet 17. The oil before reaching said outlet must of course pass the restricted passage between the casing 10 and the cap 9, which passage prevents a great volume of the relatively heavy oil passing through at one time. The oil can therefore pass through said passage only in the form of a thin sheet which is exposed to a relatively great quantity of the steam or air, and hence readily becomes mingled with the same. The passage of the mixture through the slanting holes in the disc causes a whirling motion to be automatically imparted to the mixture by the time the head cavity is reached, thereby of course aiding in the thorough mixing of the elements. The mixture issuing from the disc holes is thrown against the sides of the head cavity, which causes a further whirling and mingling of the oil and fluid to be had before the mixture passes through the final outlet 17. Owing to the whirling of the mixture while in the head, the mixture upon issuing from said head will still have a whirling motion, since the outlet 17 is too shallow or short to destroy this whirling motion to any appreciable extent. The mixture will therefore spread in cone-shaped form after leaving the head and will thus give a fire of large area with the use of a comparatively small amount of oil. The passage 18 and needle valve 19 enable the oil line to be blown out by the steam or air at any time when necessary, if from the operation of the device it appears that said oil line is becoming choked up.

The space between the casing 10 and cap 9, while restricted relative to the space therebelow, is of sufficient area relative to the openings in the disc above as to prevent any back pressure in the casing being formed.

The construction of the outlet head as above described is suitable for small burners.

In large burners, while the sizes and areas of the different parts are proportionately greater, a single large discharge opening cannot be used, since such an opening would not give the restriction of the flow of the mixture therethrough necessary to prevent the oil from separating from the air or steam. In such cases therefore I provide the construction shown in Fig. 4. In this construction, the head 14^a is provided with the central outlet opening 17^a and the orificed disc 12^a seated in the casing 10^a has an upwardly projecting stem 20 extending into the opening 17^a in concentric relation therewith, so that the actual discharge opening is in the form of a narrow ring. The size of the opening 17^a and that of the stem 20 are so proportioned as to cause the area of the ring-like opening to be the same as would be had with a single circular hole proportionate to the size of the parts of the burner as a whole.

From the foregoing description it will be readily seen that I have produced such a device as substantially fulfills the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claim.

Having thus described my invention what I claim as new and useful and desire to secure by Letters Patent is:

An oil burner including a straight-sided casing, a disc across the same adjacent its outer end, said disc having angularly disposed passages therethrough inwardly of its periphery, an oil pipe extending into the casing, a cap on the pipe terminating in spaced relation to the disc, the cap diverging outwardly from the pipe in a continuous straight line to its outer end and terminating in close but spaced relation to the wall of the casing to form a restricted passage, the pipe having openings under the cap, and a nozzle member mounted on the casing outwardly of the disc.

In testimony whereof I affix my signature.

IRA E. SMITH