Nov. 16, 1926. 1,606,974

F. W. TEGNER

OIL BURNER

Filed April 9, 1926

Fig. 2.

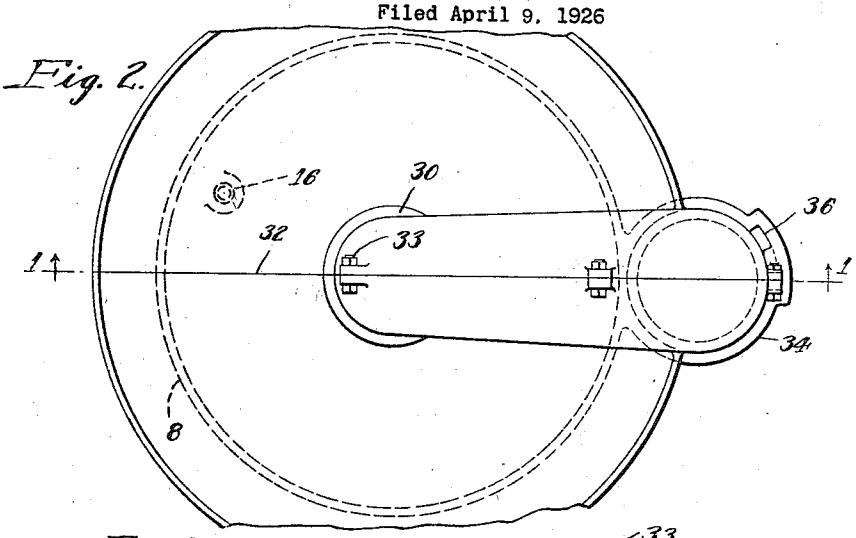


Fig 1.

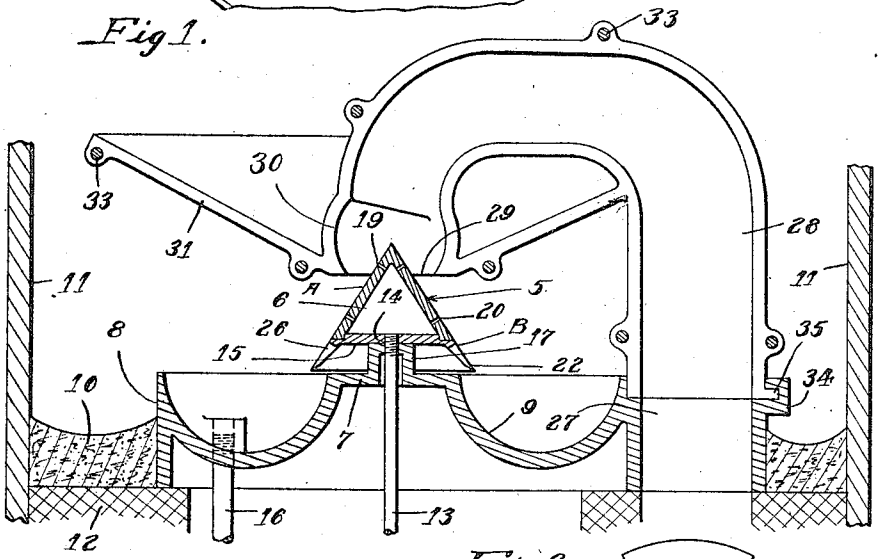


Fig. 3.

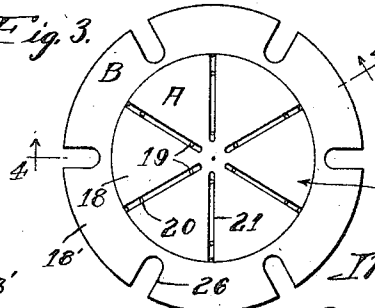
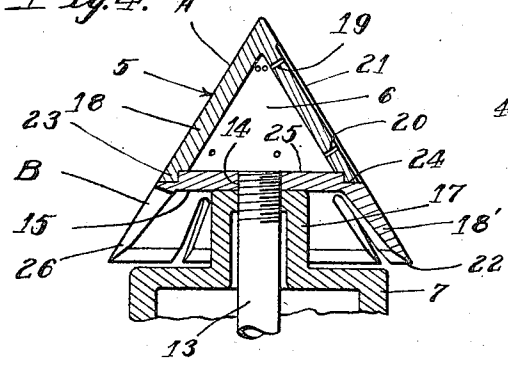


Fig. 4.



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FOLKE W. TEGNER, OF ROCKFORD, ILLINOIS.

OIL BURNER.

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This invention relates to liquid fuel burning apparatus and is especially concerned with the provision of a generally improved oil burner of the gravity feed type to secure more complete combustion of the fuel than has heretofore been secured and thereby diminish carboning of the burner and save in fuel consumption.

One of the principal objects is to provide a burner incorporating a hollow pyramidal shaped body providing a chamber therein for complete vaporization of the fuel within the body thereby eliminating carboning and also insuring a more intense and uniform flame than could heretofore be produced where the solid fuel was permitted to overflow the surface of the burner.

Another object is to provide a burner of the character referred to wherein the hollow burner body or head is provided with a plurality of circumferentially spaced openings through the walls thereof in two planes near the bottom and top of the body, the lower set of openings serving as fuel overflow openings when starting the burner while the upper openings serve at all times as outlet openings for the vaporized fuel produced within the body.

Still another object relates to the provision of a novel form of air delivery tube or hood having the delivery end thereof expanded in a spherical form about the top of the burner body with the apex of the latter arranged substantially centrally with respect thereto, and also the provision of an inverted cone shaped baffle carried on the delivery end of said air delivery tube whereby to deflect the flame and heated air produced at the burner body outwardly toward the side walls of the furnace for most efficient operation.

The invention is illustrated in the accompanying drawing wherein—

Fig. 1 is a central vertical section through an oil burner embodying the features hereinabove referred to and showing the same in operative relation to a conventional burner base or bowl within a furnace arranged to operate with oil heat. This view is taken on the line 1—1 of Fig. 2;

Fig. 2 is a plan view of Fig. 1;

Fig. 3 is a plan view of the burner body or head; and

Fig. 4 is a central vertical section taken on the line 4—4 of Fig. 3 looking in the direction of the arrows.

The same reference numerals are applied to corresponding parts throughout the views.

The burner of the present invention comprises a burner body or head 5 which is hollow and preferably pyramidal or, more specifically, conical in form to provide a fuel vaporization chamber 6 therein. The head 5 is mounted on a central support 7 provided in a burner bowl 8 which is cast to provide an annular trough 9 for deflecting the flames upwardly and outwardly toward the side walls of the furnace in a manner well known in this art. The bowl 8 is set in a bed of fire clay 10 covering the entire bottom of the fire box defined by the side walls 11 and closing the interstices between the grate bars at 12. A fuel delivery pipe 13 projects centrally from the bowl 8 in the usual manner and is arranged to deliver the liquid fuel to the fuel vaporization chamber 6 inside the burner head 5 by gravity under a low pressure head. It will be noted that the projecting end of the pipe 13 is threaded for reception in a fuel inlet opening 14 provided in the bottom wall 15 of the burner head. The bowl 8 is provided with the usual overflow pipe 16 and the usual gas lighter may also be provided or any other suitable means for heating the burner head before the admission of oil.

The burner head 5 is arranged to replace any of the conventional gravity feed burners such, for example, as the annularly grooved burners where the liquid fuel is caused to overflow centrally and be disseminated over the surface of the burner to be vaporized and burned. These burners operated unsatisfactorily as the even distribution of the oil over the surface thereof depended on the burner setting exactly level. Furthermore, these burners soon became clogged with carbon and, beyond the fact that they then produced a poor flame giving little heat, they also used considerable fuel. The head 5 may be mounted directly on the support 7 on a boss 17 projecting centrally therefrom or the boss 17 may be provided on an adapter plate arranged to be secured to the support 7. The fuel delivery pipe 13 has its threaded end preferably threading within the outer end of the boss 17 leaving just enough of the pipe projecting above the boss

to mount the burner head thereon. This mounting of the head disposes the bottom wall 15 in spaced relation to the support 7 so that all sides of the head 5 are exposed to the heat in the fire box to insure proper vaporization of the fuel therein.

The side walls 18 of the head 5 have a plurality of holes 19 and 20 spaced circumferentially about the head in two planes near the top and bottom respectively of the chamber 6. In the normal operation of the burner, the gases produced in the vaporization of the fuel escape through the holes 19 which are preferably equally distributed around the top of the head. While the exact theory of the operation cannot be definitely ascertained, it has been found by experiment that satisfactory operation of the burner can be secured only with the additional provision of the holes 20 near the bottom of the chamber 6. A plausible explanation is that the openings 20 afford inlets for air which mixes with the gases rising inside the chamber 6 and issues in the combustible mixture through the holes 19. The holes 20, when starting the burner, allow fuel to overflow on the outside of the head and be vaporized and burned in the usual manner. The holes 20 are of course equally distributed about the circumference of the head so that uniform distribution of the fuel is secured and a flame of the proper character is produced. However, as soon as the head becomes properly heated, it is found that the overflowing of fuel ceases as the vaporization occurs entirely within the head. This is the normal operation of the burner. As a consequence of the vaporization occurring within the head, it is found that the burner operates very efficiently. A very intense flame is produced using comparatively little oil. The flame is practically uniform at all times due to the equal spacing of the holes and there are practically no evidences of carboning on the exterior of the burner head. The burner can be operated practically indefinitely without the necessity of cleaning which in other types of burners had to be taken care of at least once a week or oftener under normal operating conditions.

The holes 20 also come into play if the burner is crowded with fuel as the vaporization may not occur as rapidly as the oil is admitted so that some of the oil will be forced to overflow onto the outside of the head. In this way, some of the oil is vaporized outside the head and burned in the usual manner while the rest is vaporized within the head and issues in the form of a gas to burn outside the head. The side walls 18 of the head are preferably provided with vertically extending grooves 21 registering with the openings 19 and 20. When the oil overflows through the holes 20 it trickles down the grooves 21 and is vaporized and burned. These grooves may or may not be provided, as desired.

The head 5 is made preferably in two pieces A and B so as to afford easy access to the inside thereof for cleaning. The bottom piece B comprises the bottom 15 having depending side walls 18′ integral therewith forming an annular apron preferably arranged in slightly spaced relation to the support 7 at its lower edge whereby to permit the free circulation of heated air underneath the burner head. The depending side walls, it will be noted, are tapered toward a knife-like edge 22 the purpose of which is to insure the vaporization of any oil trickling down the sides of the head so as not to allow the same to drop off the head into the trough 9. The edge 22 being thin becomes practically incandescent and thereby insures the vaporization of any oil coming in contact therewith. The top piece A comprises the integral side walls 18 of the vaporization chamber 6. The lower edges of these side walls provide an annular shoulder 23 arranged to be supported on an annular ledge 24 depressed from the plane of the flat top surface 25 of the bottom wall 15. By this construction the inside of the head 5 is made easily accessible for cleaning purposes. When the top piece A is removed, the flat top surface 25 is easily scraped clean. The inside of the top piece A is also easily cleaned of carbon and any obstructions in the holes 19 and 20 and in the grooves 21 may be removed by probing. The depending side walls 18′ of the bottom piece B are preferably slotted, as shown at 26, at equally circumferentially spaced intervals whereby to facilitate the circulation of heated air beneath the burner head. These slots furthermore provide a convenient place for the insertion of a tool for tightening the head when assembling the same in the furnace or to loosen the same when unthreading it for removal from the furnace for inspection, cleaning, or replacement purposes.

Air to support combustion is admitted through the air intake opening 27 provided in the side of the burner bowl 8. An air delivery hood or tube 28 is provided in the form of an elbow communicating with the opening 27 at one end and having its delivery end 29 disposed over the burner head 5 in the usual manner. The delivery end 29 of the hood is preferably expanded in a spherical form, as indicated at 30, and disposed with the apex of the conical head 5 substantially central with respect thereto. This conformation of the delivery end of the hood diminishes a tendency for the air to hug one side of the bore of the hood and result in a lop-sided flame and uneven combustion. The spherically conformed side

walls tend to converge the issuing air toward the burner head from all sides. An annular baffle wall 31 is preferably carried on the delivery end of the hood and formed in an inverted cone so as to deflect the flame and heated air toward the side walls 11 of the fire box instead of permitting the same to rise directly to the flue. The baffle wall 31 is preferably cast integrally with the hood, the combined unit being provided in two halves divided in a longitudinal medium plane diametrically of the hood and baffle wall, as indicated at 32 in Fig. 2. A plurality of bolts 33 is preferably provided to secure the halves together. The assembly is mounted in the conventional manner in a bearing 34 wherein a lug 35 is arranged to lock the assembly in place when offset from the slot 36, in a manner requiring no explanation.

It is believed that the foregoing conveys a clear understanding of the objects and principles of my invention prefaced above. I am aware that many changes may be made and numerous details of construction may be varied through a wide range without departing from the principles of this invention, and I therefore do not propose limiting the patent granted hereon, otherwise than necessitated by the prior art.

I claim:

1. An oil burner comprising a hollow substantially conical shaped body providing a fuel vaporization chamber therein, said body having a plurality of circumferentially spaced openings through the walls thereof in two planes, one near the base and one near the apex of said body above the normal level of fuel in said chamber establishing communication with the inside thereof, the lower openings serving as air inlets and the upper openings as outlets for combustible mixture in the normal operation of said burner, and a liquid fuel inlet opening in the bottom of said body.

2. An oil burner comprising a substantially conical-shaped hollow burner body providing a fuel vaporization chamber therein, the body comprising a separate bottom wall and a hollow substantially conical-shaped head removably mounted on the bottom wall to afford easy access to the inside of the body for cleaning purposes, said head portion being also provided with a lower set of openings arranged normally slightly above the bottom wall to serve as air inlets for the fuel vaporization chamber, and having a set of upper openings near the apex of the head arranged to serve as outlets for combustible mixture in the normal operation of said burner, said openings being arranged to be easily cleaned when said head portion is removed from the bottom wall.

3. An oil burner comprising a hollow substantially conical shaped body providing a fuel vaporization chamber therein, said body comprising a bottom wall having a flat top surface and defined by an annular ledge depressed from the plane of said surface, there being a fuel inlet opening in said bottom wall, the side walls of said body being provided by a removable top portion having an annular shoulder provided on the bottom thereof arranged to be removably supported on the aforesaid ledge on said bottom wall and having openings therethrough establishing communication with the inside of said body.

4. An oil burner comprising in combination a central support, a hollow conical burner head mounted on said central support having the bottom wall thereof arranged in spaced relation to said support and provided with a liquid fuel inlet opening, the side walls of said head depending in the form of an annular apron from the bottom wall over said central support and having a plurality of circumferentially spaced slots therein to facilitate the circulation of heated air beneath said head and the lower end of said wall being tapered to form a knife-like edge, the inside of said head providing a fuel vaporization chamber and the side walls of said head having a plurality of circumferentially spaced openings in two planes near the bottom and top of said head.

5. An oil burner comprising in combination with a base providing an annular trough shaped burner bowl and a liquid fuel delivery pipe having a threaded end projecting centrally therefrom, a hollow burner head providing a fuel vaporization chamber therein, the side walls of said head being perforated in two planes near the top and bottom of said chamber, the bottom wall of said head having a liquid fuel inlet opening therein threaded for the reception of the threaded end of said fuel delivery pipe and arranged in spaced relation to said base, and the side walls of said head depending circumferentially about said bottom wall in the form of an apron and having openings therein to afford circulation of heated air beneath said head while providing a convenient place for the insertion of a tool whereby to rotate said head to unthread or thread the same on said fuel delivery pipe.

6. An oil burner comprising in combination with a base providing an annular trough shaped burner bowl and a liquid fuel delivery pipe having a threaded end projecting centrally therefrom, a hollow burner head providing a fuel vaporization chamber therein, the side walls of said head being perforated in two planes near the top and bottom of said chamber, the bottom wall of said head having a liquid fuel inlet opening therein threaded for the reception of the

threaded end of said fuel delivery pipe and arranged in spaced relation to said base, and the side walls of said head depending circumferentially about said bottom wall in the form of an apron and having openings therein to afford circulation of heated air beneath said head while providing a convenient place for the insertion of a tool whereby to rotate said head to unthread or thread the same on said fuel delivery pipe, said head being formed in two pieces, the bottom wall and depending side walls being formed integrally in one piece and the side walls being formed integrally in another piece to provide a removable top portion whereby to afford easy access to the inside of said head for cleaning purposes.

7. An oil burner comprising a hollow conical body providing a fuel vaporization chamber therein, said body having a plurality of circumferentially spaced openings through the side walls thereof in two planes near the top and bottom of said chamber and said side walls being further provided with grooves on the surface of said body extending vertically and registering with the lower set of openings.

8. An oil burner comprising a hollow conical body providing a fuel vaporization chamber therein, said body having a plurality of circumferentially spaced openings through the side walls thereof in two planes near the top and bottom of said chamber, and said side walls being further provided with a plurality of circumferentially spaced vertically extending grooves on the surface of said body registering with both sets of openings.

9. In an oil burner the combination of a base providing an annular burner bowl and an air intake opening at one side thereof, a burner head centrally arranged on said base, an air delivery tube communicating with said air intake opening and formed in an elbow terminating over said burner head, and an inverted cone shaped baffle on the delivery end of said tube substantially co-axial with said tube and said head for deflecting the flame and heat produced at said head toward the side walls of the furnace, said baffle and tube being formed integrally and divided in a longitudinal plane diametrically of said baffle and tube, and means for securing the halves together.

10. In an oil burner the combination of a base providing an annular burner bowl and an air intake opening at one side thereof, a pyramidal shaped hollow burner head centrally supported on said base, and an air delivery tube communicating with said air intake opening and formed in an elbow with the delivery end thereof disposed over the top of said burner head, the delivery end of said tube being spherically conformed inside the same and disposed with the apex of said head substantially at the center thereof.

In witness of the foregoing I affix my signature.

FOLKE W. TEGNER.