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A. E. SCHEIN

HYDROCARBON BURNER

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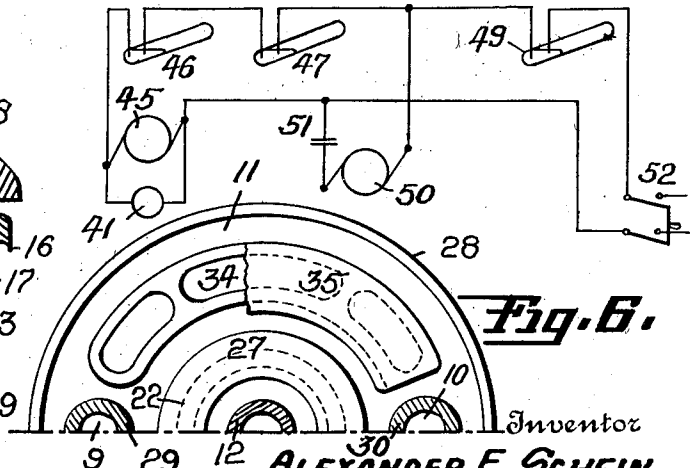
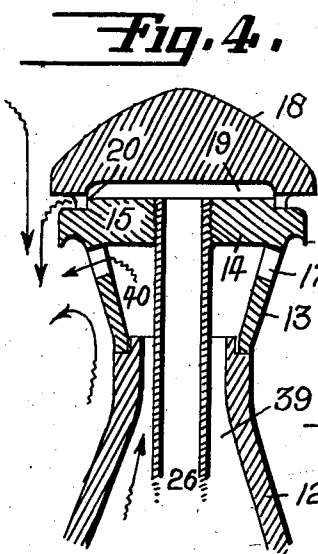
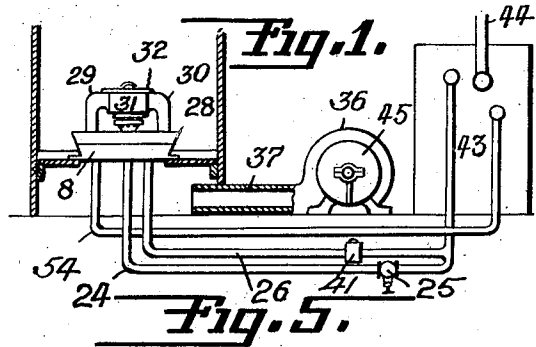
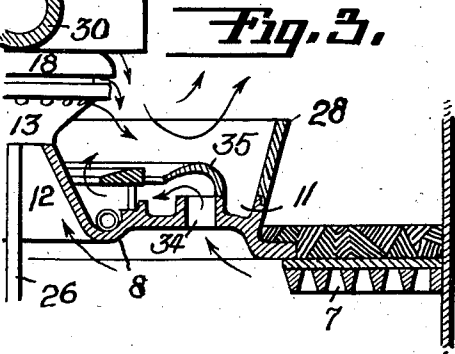
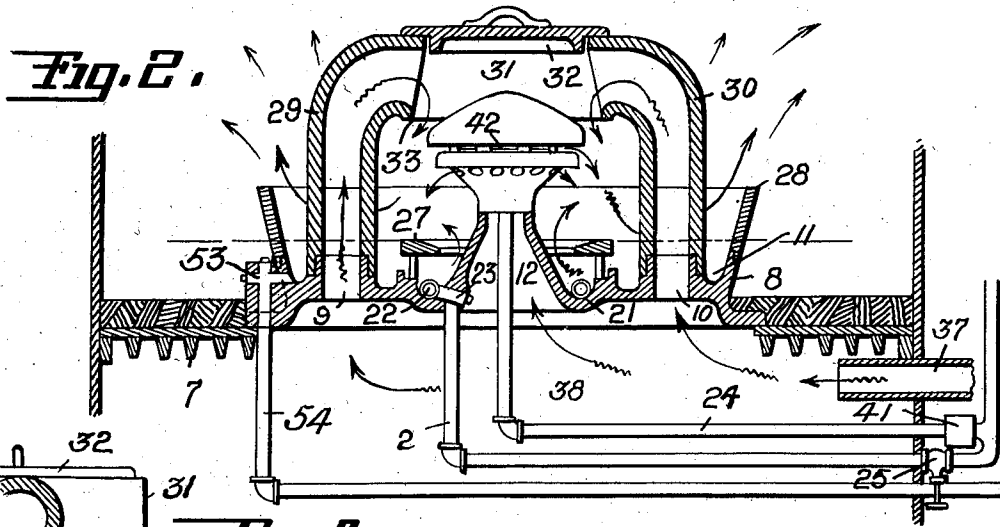


Fig. 6.

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HYDROCARBON BURNER.

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My invention relates to certain new and useful improvements in hydro-carbon burners, or oil burning devices, one that is designed and adapted to be placed in the fire pot of a stove or furnace, its simple construction permits of any and all parts being accessible for any purpose whatsoever.

My invention consists in certain novel features of construction and arrangement of parts that permits of the same being operated manually or may be operated automatically, the same requiring no more attention than to see that the proper amount of fuel be kept on hand for consumption.

My invention comprises a vaporizing type of oil burner, means for supplying air under pressure having a continually burning oil pilot which maintains the vaporizing plate sufficiently hot to start immediately the oil as it comes from the main source and drips upon the vaporizing plate and becomes vapor then bursts into a flame. The air circulation throughout the burner is so arranged and proportioned that a perfect combustion of the hydro-carbon is assured.

The burner in case of failure of the electric current, may also be run as a natural draft burner on account of the thorough premixture of the air and the oil vapors generated through the oil pilot or from the vaporizing cap.

One of the objects of the present invention is to maintain a low and high flame, the former as a pilot with a natural draft, and a high flame as a power burner supplying the proper proportion of air for a definite amount of oil regardless of the draft conditions.

Another object of the invention is to proportion the air distribution as to insure a complete combustion. The air being forced by a blower always insures of a uniform draft, and the various leads of the air through the numerous passages as shown by arrows in Figs. 2, 3 and 4 gives not only the proper amount of air from the blower to the burners but causes a turbulent motion to the particles which assists materially the combustion.

A still further object of my invention is to provide an oil vaporizer in such a way as to control the upper limits of temperature of the vaporizing cap so as to prevent any possibility of carbon forming in the oil supply pipe, or in the vaporizing cap, while a still further object of my invention is to pro-

vide a flow of air that will facilitate the complete mixture of the air and oil as to insure a proper combustion.

My invention consists in certain new and novel details of construction that will add materially to the utility of the furnace housing my device, while the arrangement, as illustrated, permits of it being used in any kind of a stove, furnace or heater. These and other objects and features of the invention will be hereinafter described and pointed out, particularly in the appended claims.

My invention, as at present preferred, will be more understood by reference to the drawing which illustrates merely an example of means for putting my invention into practice, and wherein:—

Fig. 1 is a view on a small scale of the general arrangement and location of my device as it appears in a furnace, with the air supply pipe, and other pipes in position for their respective purposes;

Fig. 2 is an enlarged sectional view of the burner, showing more clearly its relation to the furnace and its arrangement therein;

Fig. 3 is a detail similar in some respects to Fig. 2, but taken 90 degrees around so as to clearly show the lower air ducts;

Fig. 4 is a detached detail of the burner and its associated parts;

Fig. 5 is a plan view taken on lines 6—6 Fig. 2.

Referring to the several figures of the drawing, similar reference characters indicate like parts throughout the several figures. The furnace comprising its usual elements, namely the enclosure provided with a grate, fire box and other parts are all of the usual and common construction and need not be explained in detail here.

Suitably placed in the center of the grate 7 in the fire box of the heater, I prefer to place my base 8, it being preferable to remove some of the grate bars from immediately beneath my device, as shown. When said base 8 has been placed in position it is preferably to seal the space between the said base plate and the inner walls of the fire box so as to prevent any air passing from below the grate other than through either of the respective passages provided for the purpose.

The base plate 8 is provided with main air passages 9 and 10 near its outer periphery (see Fig. 5), while between such passages or openings and the outer edge is a reservoir 11; its purpose and object will be explained

further on. The base plate has a central hollow pedestal 12 extending upwardly therefrom (see Fig. 4), to the upper part of which is applied an extension 13 that is provided with a top flat distributing plate 14, having a shoulder 15 and a depending lip 16, while just below are openings 17. To the top of the extension is placed the cap 18 which has preferably a small chamber 19, into which the oil is fed, said chamber being formed by reason of the recess in the under side of the cap and the flat distributing plate 14. The cap 18 is supported by three or more legs or lugs 20 which holds the same at such a height as to have a series of contracted openings 42 to allow only enough oil to seep out between the edges of the cap and the top edges of the distributing plate 14 where it drips from the lip 16, when the oil is cool or when the oil has been turned for heating purposes. Of course, it is understood when the distributing plate 14 and the cap 18 have become pre-heated, the oil will immerse through the contracted opening 42 in a vapor and become mixed with the swirling air as shown by the arrows Figs. 2 and 3.

At the base of the pedestal 12 is a groove 21, into which is fitted a circular pilot pipe 22 having an extension 23 to which the supply pipe 24 may be attached. Said supply pipe is provided with a valve 25 and a branch pipe 26, with devices that regulate the supply of oil from the source of supply to the pilot and power burners. Just above the pilot burner 22 is a vaporizing plate 27 which the pilot flame will at all times keep heated to such an extent as to ignite any oil that may drip from above.

To the outer periphery of the base plate 8 is secured an upwardly extending bowl 28, which assists in causing the air within the furnace to assume a turbulent mass by reason of the particles of combustion coming into contact with other forces of air together within the inclined wall 28, and thereby cause the particles of the oil to be consumed. While to the openings 9 and 10 may be provided with extensions 29 and 30, their upper parts terminating in an inverted bowl 31, the top of said bowl is provided with a cover 32, the lower part 33 of the bowl is open so as to allow the full force of the air from the blower to cause the flame beneath the cap to be swirled around by reason of the various tangential currents coming in contact with each other as indicated by the arrows.

Air ducts or openings 34 (only one set of which is shown) extend circularly between the openings 9 and 10, as shown in Fig. 5, and such ducts are preferably covered by a suitable curved conveyor plate 35 which will throw the air from the blower in the direction of the pedestal and under the plate 27, thereby assisting in causing a complete swirl to the ignited particles of combustion. For

an ideal combustion a different proportion of air (or its oxygen) and oil vapors is required to be intermixed so that the particles will be uniform for complete combustion of the turbulent mixture. For instance, the air as it passes through openings 34 will cause the mixture to be given a turbulent motion as before noted, to such an extent that it will bring about a well mixed condition for a complete combustion, at the same time air is forced from the openings 17, which further facilitate the mixture of the vapors by causing the same to be turbulent as indicated by arrows in Fig. 4.

As an automatic power burner we will consider the elements and principles of the device in their operation.

A motor driven fan 36 is conveniently located to the heater so as to supply proper quantity of air through a pipe 37 into compartment 38 beneath the grate 7. The air forced from the blower passes through the passages 9 and 10 that lead the pre-heated air into a circular inverted bowl 31, which air is then forced over the vaporizing cap 18. The passage 39 permits comparatively cold air from beneath the grate to enter into a circular chamber 40 and leave through openings 17, which are so arranged and proportioned as to limit the temperature of the vaporizing cap to a value where the cracking of the oil inside of the oil feed pipe 26 is prevented.

The heat of the pilot flame will be absorbed by the lower portion of the base plate 8 as well as by the vaporizing plate 27. The lower portion of the base plate 8, by reason of its large radiating surface, will be kept at a comparatively low temperature. The vaporizing plate 27 having a small area and being supported by suitable studs will maintain a sufficient high temperature to vaporize the oil that may drip on its surface from the distributing plate 14. The plate 27 being so supported, close to the deflector plate 35 permits the free flow of the air under and about the same so as to insure the co-mingling of the particles of combustion and keep the mass therein in a continuous swirling motion.

Oil is admitted through the magnetically operated valve 41 into pipe 26 when power is used, but if natural draft is to be used then an ordinary hand operated valve is used, the oil is led to the flat surface 14 of the extension 13; the oil will spread over the same and then overflow its edges and finally drip upon the surface of the vaporizing plate 27 and then become thoroughly mixed with the air supplied through the various passages when combustion will take place. The radiant heat gradually raises the temperature of the cap to such an extent that the oil will be vaporized before it leaves the space 42 and the combustion takes place as before noted. The conveyor plate 35 is for guiding the air from passage 34 to the oil pilot plate 27. The control

box 43 and its internal workings are too well known to require explanation here. I have shown the Basel Manufacturing Company's heat regulator supply tank, but any other tank of any other manufacture may be used to supply oil to the burners. The oil enters the tank from the source of supply by pipe 44, and flows from the same through pipe 24 to the pilot and pipe 26 to the main burner, the flow being regulated by the valve 25. As a safety and economical means, the oil that is not consumed by the flame will flow from the duct 11, back to the source of supply.

The cap 18 is so proportioned that it has a larger diameter at its lower part, than the lower member 13. The purpose of which is for the creating a suction action of the vapor about the openings 20. This is clearly understood that we imagine pre-heated air from chamber 31 having a considerable velocity passing over the crown 18 then passing on its path around the flat plate 14 will form a slight vacuum in the space 19, causing the vapor to be drawn out and in so doing causing a pre-mixing with the air. The air as it passes through the opening 34 will cause the mixture to be agitated around to such an extent that it will bring about a well-mixed condition for a complete combustion; at the same time air being forced from the openings 17 will further facilitate the mixture of the vapors, as explained above, and as shown by the arrows in Fig. 4.

Assuming the condition of natural draft to the burners and the manual control of the burners will only be brought about when the supply of electrical current has failed, as it does frequently in small towns and cities, the operation of the burners under such condition is as follows:

In addition to the air pipe 37 the usual opening is provided in the furnace door (below the grate) to allow sufficient air to pass into the space 38, as may be necessary for proper combustion of the fuel, and said opening normally is closed when the burner is operated as a power burner.

The burner, as described, will operate either as a power burner when a definite amount of air is supplied by the means of an electric driven fan, or when said power has failed it may be operated as a natural draft burner. It is, of course, understood, when operated as a natural draft burner, it cannot operate to full efficiency on account of various draft conditions caused by outside temperature and wind, thereby causing a great variation in the mixture of air and fuel. For a proper combustion of fuel a definite amount of air for a definite amount of fuel must be supplied. And these relations can be kept uniform only when the amount of air is controlled by a power-driven fan.

As before noted with proper well known automatic devices, the burner may be used as

a power burner, which will in no way require hand manipulation once the parts are set, such devices and systems are not illustrated as it forms no part of the present invention.

In accordance with the provisions of the patent statutes I have herein described and shown the principal form of my invention which I now consider, after experimenting with the same, as representing the best embodiment thereof, but I desire to have it understood that the device is only illustrative and that the invention can be carried out in other ways than those shown and described, but all of which are intended to come within the scope of the claims.

What I claim as new is:

1. In an oil burner of the character described, the combination with a base plate having a central opening, a hollow pedestal on the base plate and above and communicating with the opening therein, an oil distributing plate thereon having a downwardly extending lip stepped therefrom, means for conveying oil to said plate, a crown surmounting said distributing plate having a chamber therein, means for maintaining spaced relation between the crown and the distributing plate, air ports below said plate for deflecting the oil vapors, and other air deflecting means for directing the air toward the pedestal.

2. In an oil burner of the character described, the combination with a base plate having a plurality of air outlets, a hollow pedestal centrally located over one of said openings, said pedestal having an oil distributing plate, an oil dripping lip stepped below said distributing plate, a conical member supported in spaced relation to the said plate having a chamber therein with means for feeding the oil to the dripping lip, of a vaporizing plate below said dripping lip, of a pilot flame for keeping said plate hot, deflectors arranged over certain of the air ports for directing the air towards the pedestal, other of the ports having means for conveying air to the top of the conical member, of oil feeding means to the pilot burner and the distributing plate, and means for furnishing air to the several openings under pressure.

3. In an oil burner of the character described, the combination with a base plate adapted to cover part of the fire grate, said plate having outwardly extending flanges, a trough formed in its outer edge, a baffle plate secured to the outer edge of said base plate, a pedestal secured to its central part, air ports between the pedestal and the baffle plate having deflecting plates thereon, of means secured to the pedestal for distributing oil over its outer edges, and means for furnishing air to the upper and lower side of said oil distributing plate.

4. In an oil burner of the character described, the combination of a base plate sup-

porting a pedestal, an oil distributing plate carried thereon, a conical crown above said plate deflecting air from above the same whereby the film of oil from the distributing
5 plate is drawn into the air current, of air discharging ports below said plate for deflecting the vapor as it passes the same, of a plate mounted on the base for vaporizing oil into vapor, means for keeping said plate
10 heated, and means for directing air currents above and below said plate.

5. In an oil burner of the type described, a base plate having a central opening therein and having a hollow pedestal rising there-
15 above through which air is adapted to pass, the material of the plate adjacent the base of the pedestal being formed with a groove for receiving a pilot member, an oil distributing plate carried on the pedestal, a crown above
20 and supported by said plate in spaced relationship thereto for deflecting air from above the same whereby the film of oil from the distributing plate is drawn into the air current, air discharge ports below the distrib-
25 uting plate for deflecting vapor as it passes the same, a vaporizing plate for oil carried

by the base above the pilot pipe, and means for directing air currents above and below said plate.

6. In an oil burner of the type described, a
30 base plate having a central opening therein and having a hollow, vertical pedestal there- above through which air is adapted to pass from beneath the base, the base plate about
35 the base of the pedestal being depressed to receive therein a pilot member, an oil distributing member carried by the pedestal, a crown above and supported by the oil distrib-
40 uting member in spaced relationship thereto for deflecting air from above the same where- by the film of oil from the distributing mem-
45 ber is drawn into the air current, air discharge ports below the distributing member for deflecting vapor as it passes the same, and a vaporizing plate carried by the base in
50 spaced relationship thereto and directly above the pilot member and below the distributing member, and means for directing currents of air both above and below the vaporizing plate.

In testimony whereof I affix my signature.
ALEXANDER E. SCHEIN.