Jan. 1, 1935. G. E. PICKUP 1,986,526

OIL BURNER

Filed Dec. 15, 1932

Fig. 1

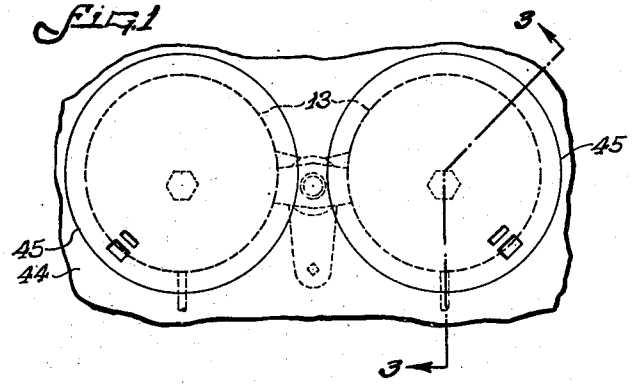


Fig. 2

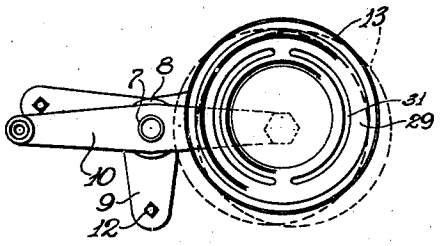


Fig. 3

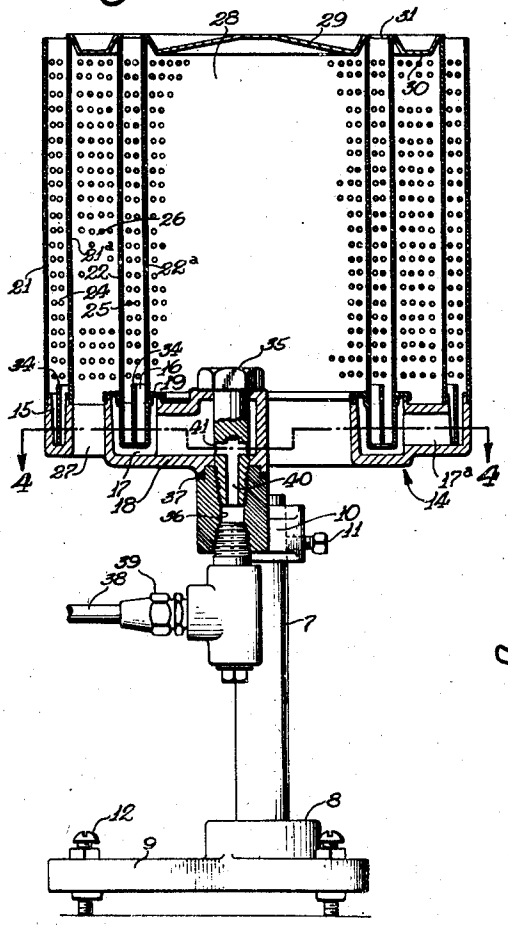


Fig. 4

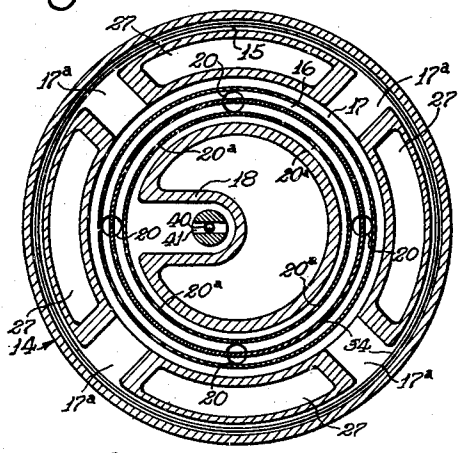
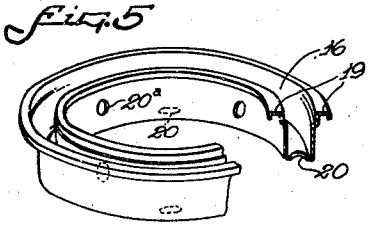


Fig. 5



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UNITED STATES PATENT OFFICE

1,986,526

OIL BURNER

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Application December 15, 1932, Serial No. 647,318

18 Claims. (Cl. 158—87)

The invention relates to oil burners adapted for use in heating or cooking stoves, and has more particular reference to burners of the type comprising a burner bowl structure or base having a vaporizing trough and a plurality of fuel grooves communicating therewith and opening upwardly into the lower ends of combustion chambers formed by a plurality of perforated cylinders.

One object of the invention is to provide a burner base of novel and advantageous construction providing for a more uniform distribution of fuel from the vaporizing chamber to the several fuel or combustion grooves and at the same time permitting the vaporizing trough to be cleaned readily.

A further object of the invention is to provide an improved mounting for the burner permitting it to be detached readily from its support for cleaning purposes.

Another object is to provide a burner structure comprising two burners so mounted on a common supporting bracket as to be capable of adjustment toward and from each other so as to accommodate the structure to cook stoves having tops with burner openings positioned at varying distances apart.

Another object is to provide a novel method of mounting the burner bowl on its supporting bracket which is advantageous from the standpoint of increasing the rate of vaporization of the oil.

The objects of the invention thus set forth, together with other and ancillary advantages are attained by the construction and arrangement set forth, by way of example, in the accompanying drawing, in which:

Figure 1 is a fragmentary plan view of a cook stove top having two burner openings and with my improved burner structure shown in broken lines, beneath the top.

Fig. 2 is a plan view of one of the burners mounted on its supporting bracket, the range of lateral adjustment of the burner on the bracket being shown in broken lines.

Fig. 3 is a fragmentary vertical sectional view taken approximately in the plane of line 3—3 of Fig. 1.

Fig. 4 is a transverse section taken approximately in the plane of line 4—4 of Fig. 3.

Fig. 5 is a fragmentary perspective view showing one of the fuel troughs and illustrating its separate detachable form.

The improved burner structure comprises a supporting bracket having an upright standard 7 rising from a base 8 composed of a plurality of arms 9, and an upper burner-carrying arm 10. The arm 10 is supported midway between its ends on the standard 7 and is adapted to be secured in vertically adjusted relation to the standard by means of a set screw 11. The spaced arms 9 of the base are equipped at their free ends with vertically adjustable screws 12 for convenience in positioning the burner structure within the fire box of a stove with the burners accurately leveled.

On the free ends of the carrier arm 10 are mounted two burners 13 (Fig. 1). Each of these burners comprises a burner bowl structure or base 14 (Figs. 3 and 4) providing two concentric annular fuel grooves or channels 15 and 16 and an annular vaporizing trough 17 underlying the inner channel 16. The outer channel 15 and vaporizing trough 17 are formed in an integrally cast structure including hollow connecting webs or ducts 17^a between the two channels and a hollow supporting arm 18 extending radially inwardly from the vaporizing trough 17 and constituting a fuel supply duct. The inner channel 16 is formed separately, preferably from sheet metal of a suitable material, such as stainless steel, and is removably seated upon the upper edges of the trough 17 so as to be suspended in the trough with its side and bottom walls spaced from the adjacent side and bottom walls of the trough. For this purpose the channel 16 has laterally extending side flanges 19 with downturned edges fitting over the upper edges of the side walls of the trough, thus entirely closing the upper side of the trough. Also, it will be observed that the trough 17 is made of a depth somewhat greater than the depth of the outer fuel channel 15, and also of greater width, thus insuring ample space between the trough and the inner channel to permit the free passage of fuel in vapor form to the ducts 17^a. Free communication between the trough 17 and the inner channel 16 is also provided by spaced holes 20 and 20^a formed respectively in the bottom and inner side walls of said inner channel.

While the holes 20 and 20^a formed in the inner channel permit free communication between the trough and the inner channel so that the channel is supplied with an adequate amount of fuel vapor, the channel as a whole serves to restrict the flow of fuel vapor upwardly from the trough 17. The fuel vapors, being unable to rise vertically upwardly unrestrictedly and at the rate generated, are caused to flow laterally through the ducts 17^a to the outer channel 15 in greater volume than if they were free to rise vertically. As a result, the

outer channel too is given an adequate supply of fuel vapor thus materially improving the operation of the burner. The division of fuel vapor between the inner and outer channels may be governed by the size and number of holes in the inner channel.

Above the outer channel 15 are supported two perforated concentric cylinders 21 and 21ª, and similarly spaced concentric cylinders 22 and 22ª are supported above the inner channel 16. Annular combustion chambers 24 and 25 are thus provided above the channels 15 and 16, and between these two annular chambers 24 and 25 is formed an annular air chamber 26 to which air is supplied through elongated openings 27 formed between the hollow connecting webs 17ª between the two channels. A central air chamber 28 is also formed by the inner cylinder 22ª, the upper end of which chamber is closed by a cover plate 29 which is extended so as to close the upper end of the annular air chamber 26. Preferably the peripheral portion of the cover plate 29 is formed with an annular depression or bead 30 fitting between the upper ends of the cylinders 21 and 21ª and serving to hold the cover plate 29 in proper position. Above the annular combustion chamber 25 the cover plate 29 is provided with elongated slots 31 (Fig. 2) for the escape of the products of combustion.

Oil is supplied to the channels 15 and 16 through the hollow supporting arm 18, the outer end portion of which opens into the annular supply trough 17. Said arm has its bottom disposed in the plane of the bottom of the trough 17 below the bottoms of the annular channels 15 and 16, as shown in Fig. 3. Within the channels may be supported the usual asbestos lighting rings 34.

It will be understood that in the operation of the burner heat from the inner combustion chamber 25 and the tubes 22 and 22ª forming the same is conducted to the inner channel 16 and is transmitted thereby to the oil in the vaporizing trough. The thin sheet metal construction of said channel insures a rapid conduction of heat and effectual transmission to the vaporizing trough.

An important feature of my invention resides in the manner of mounting the burner bowl structures upon the ends of the carrier arm 10. This is accomplished in the preferred embodiment by means of a single clamping screw 35 for each burner, which screw is entered through alined openings in the inner end of the hollow supporting arm 18 and screw-threaded into the upper end of an opening 36 in the corresponding end of the arm 10. Suitable coacting bearing surfaces are provided on the under side of the arm 18 and the upper side of the arm 10, with a gasket 37 interposed therebetween, so that when the screw is tightened the parts are secured together in oil-tight relation. An oil supply pipe 38 is connected by means of a fitting 39 with the lower end of the opening 36 in the arm 10, and to permit the passage of oil from the opening 36 to the hollow supporting arm 18 of the burner bowl, the screw 35 is provided with a duct having an axial portion 40 and a transverse portion 41, the latter opening at its opposite ends into the interior of the arm 18.

It will be seen that oil is supplied to each of the burners through one end of the carrier arm 10, the screw 35 and the hollow supporting arm 18, to the annular vaporizing trough 17; and that from the trough 17 the fuel is permitted to pass freely and substantially uniformly to both fuel channels 15 and 16, thus insuring proper operation of the burner. Moreover, upon the removal of the inner combustion cylinders 22 and 22ª from the burner structure, the inner channel 16 may be removed to provide access to the trough 17 for cleaning purposes.

To permit of the adjustment of the burners laterally relative to each other, the clamping screw 35 is in each instance disposed eccentrically of the burner bowl structure. This is advantageous in cases where the burner structure is used in a cook stove for the reason that the openings in the cooking top are customarily variously spaced. In Figure 1, I have shown a cooking top 44 having openings closed by removable lids 45, the burner structure being shown in broken lines beneath the top. In Fig. 2 the range of lateral adjustment of each of the burners is shown, it being apparent that it is only necessary by reason of the eccentric disposition of the screws 35 to loosen the same and to revolve the burner bowl structure about the screws in order to vary the lateral spacing between the two structures.

One of the principal advantages in the method of mounting the individual burner structures is the ease with which they may be removed for cleaning purposes. This will be apparent from the fact that it is only necessary after removing the combustion cylinders to remove the clamping screw 35, whereupon the burner bowl structure may be disconnected entirely from the supporting bracket for the convenient removal of carbon and other deposits which may have accumulated.

A further advantage resides in the adjustability of the two burners with respect to each other; and it has been found that still another advantage is obtained in that the head of the screw 35, being exposed to the heat of the burner, conducts such heat to the oil passing through the screw into the hollow supporting arm 18 and thereby tends to preheat the oil so as to assist in vaporization and decrease carbon deposits. Moreover, the construction as a whole is relatively simple and susceptible of economical manufacture.

This application is a continuation in part of my copending application Serial No. 614,902, filed June 2, 1932.

I claim as my invention:

1. An oil burner comprising, in combination, a supporting bracket having an opening therein, a burner bowl structure having a fuel channel and a hollow supporting arm providing an oil passage connected with the channel, an oil supply pipe connected with said bracket opening, and a clamping screw passing through said hollow arm and engaging in said bracket, said screw having a duct therein establishing communication between said oil passage and said bracket opening.

2. An oil burner comprising, in combination, a burner bowl structure having a fuel channel, means providing an annular combustion chamber above said channel, a supporting bracket having an upper bearing surface, a supporting member rigid with said burner bowl structure and having a lower bearing surface, and means for removably clamping said member on said bracket with said bearing surfaces engaging with each other, said bracket and arm being constructed to provide an oil passage completed by said clamping means and extending to said channel.

3. An oil burner comprising, in combination, a burner bowl structure having an annular fuel channel, an annular trough communicating with said channel, a hollow supporting arm communicating at its outer end with the trough and projecting inwardly therefrom, a support for the

burner having an opening therein connecting with a supply of oil, and a clamping screw entered through said arm and into said opening in the bracket for securing the arm in oil-tight relation to the bracket, said screw having a passage therein connecting the opening in the bracket with said arm.

4. The combination of an oil burner having an annular fuel channel, a supporting arm extending inwardly from said channel and communicating at its outer end with the channel, a supporting bracket having an opening therein connected with a supply of oil, and a clamping screw for connecting said arm and said bracket, said screw having a passage therein connecting the opening in the bracket with the arm, and said screw being disposed eccentrically with respect to said channel.

5. An oil burner comprising, in combination, a burner bowl having an annular oil channel, an annular combustion chamber above said channel, a central air chamber, an apertured supporting bracket, a fuel feed line connected to said bracket, a hollow arm rigid with the burner bowl structure and extending inwardly therefrom, and means exposed to the bottom of said central air chamber for clamping said arm to said bracket in communication with the aperture therein to provide an oil passage to said channel, said clamping means forming part of the oil passage.

6. The combination of a supporting bracket, a burner comprising a burner bowl structure, and combined means for supplying fuel to said structure and mounting the same on said bracket, said means including two clamping parts providing registering fuel passages and relatively rotatable on a vertical axis disposed eccentrically of the burner bowl structure.

7. An oil burner having a base with an annular fuel channel and a member projecting inwardly from said channel and providing an oil passage, a support providing a bearing for said member, a fuel supply pipe connected with said support, and a fastening device for clamping said member on said bearing and providing a duct leading to said passage, said support having a fuel supply opening communicating with said duct and with said fuel supply pipe.

8. An oil burner comprising a base having two fuel channels in laterally spaced relation, and means for supplying fuel in vapor form to said channels substantially uniformly, said means comprising a vaporizing trough underlying one of said channels and freely communicating at a plurality of spaced points with the other channel, the channel overlying the trough having a plurality of spaced openings therein for the passage of vapor thereto from the trough, and means for supplying oil to said trough.

9. An oil burner having a base providing two concentric fuel channels, perforated cylinders positioned above said channels and providing two spaced combustion chambers communicating at their lower ends with the channels, said base further having a vaporizing trough with side and bottom walls spaced from the side and bottom walls of the inner fuel channel, means providing ducts connecting said outer channel with said trough at spaced points, said inner channel having a plurality of openings therein communicating with said trough, and means for supplying oil to said trough.

10. An oil burner of the class set forth, comprising a base having an outer annular fuel chamber, an inner annular vaporizing trough and web portions between the channel and the trough providing ducts connecting the channel with the trough, said channel, trough and ducts being in the form of an integral casting, and an inner channel formed of sheet metal and suspended within said trough, said inner channel having openings therein communicating freely with the interior of said trough, and means for supplying fuel to said trough.

11. An oil burner of the character set forth, comprising a base having an outer annular fuel channel, an inner annular vaporizing trough and web portions between the channel and the trough providing ducts connecting the channel with the trough, said channel, trough and ducts being in the form of an integral casting, and an inner channel formed of sheet metal and suspended within said trough, said inner channel having openings therein communicating freely with the interior of said trough, and means for supplying fuel to said trough comprising a hollow arm projecting inwardly from said trough and also cast integrally therewith.

12. An oil burner comprising a base having a casting providing an outer annular fuel channel, an inner annular trough communicating with said outer channel, an inner channel formed of sheet metal and having lateral flanges at its upper side edges removably seated upon the upper edges of said trough, said inner channel having side and bottom walls spaced from the walls of the trough and having openings therein communicating with the trough, means for supplying fuel to said trough comprising a hollow arm extending inwardly from the trough and communicating therewith, said channels having a plurality of perforated combustion tubes mounted thereon in spaced concentric relation with the inner tube forming an air chamber above said hollow arm, and means for closing the upper end of the central air chamber.

13. An oil burner comprising a base having a casting providing an outer annular fuel channel, an inner annular trough communicating with said outer channel, an inner channel formed of sheet metal and having lateral flanges at its upper side edges removably seated upon the upper edges of said trough, said inner channel having side and bottom walls spaced from the walls of the trough and having openings therein communicating with the trough, means for supplying fuel to said trough comprising a hollow arm extending inwardly from the trough and communicating therewith, said channels having a plurality of perforated combustion tubes mounted thereon in spaced concentric relation with the inner tube forming an air chamber above said hollow arm, means for closing the upper end of the central air chamber, and means for supporting said burner comprising a bracket having an opening therein communicating with a source of fuel and a clamping screw entered through said arm and into said bracket, said screw having a duct connecting the opening in the bracket with the interior of said arm and having a head exposed to said central chamber.

14. A burner structure comprising, in combination, a pair of burners each having an annular burner bowl and an inwardly projecting hollow arm, a support having a cross-arm upon which said burners are mounted in laterally spaced relationship, a fuel supply pipe for each of said burners terminating at the cross-arm and secured therein in permanently fixed relationship, and a tubular bolt eccentric of the burner bowl

connecting the hollow arm of each burner and the supply pipe therefor and clamping the burner onto said cross-arm for rotational adjustment about the axis of said bolt toward or away from the opposite burner.

15. A burner structure comprising, in combination, a pair of burners, a bracket having a supporting arm upon which said burners are mounted in laterally spaced relationship, a fuel supply pipe for each of said burners terminating at the supporting arm and secured thereto in permanently fixed relationship, and means for clamping said burners to said arm for relative lateral adjustment while said supply pipes remain fixed, said means including passages connecting said fuel supply pipes to the burners.

16. An oil burner comprising, in combination, a support, a burner base providing an oil channel and having a fuel supply opening in the bottom thereof, a fuel supply pipe communicating with said opening, means providing a central air chamber above said base, an integral, tubular, heat conducting element having one end extending into the air chamber and the other end projecting through the opening in the burner base and forming a passage through which the fuel supplied to the burner flows, and means associated with said element for securing the burner to said support.

17. An oil burner comprising, in combination, a base having an annular fuel channel, a hollow arm rigid with and extending inwardly from the base and communicating with the channel, means for supporting said arm for rotational adjustment on an axis offset from the center of the base, and a fuel supply conduit communicating with the interior of said arm concentrically with the axis of rotation.

18. The combination of a burner, a support for the burner, means mounting said burner on said support for rotational adjustment about an axis eccentric of said burner, and fuel supply means fixed on the support and communicating with said burner at the axis of rotation

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