

June 23, 1942.

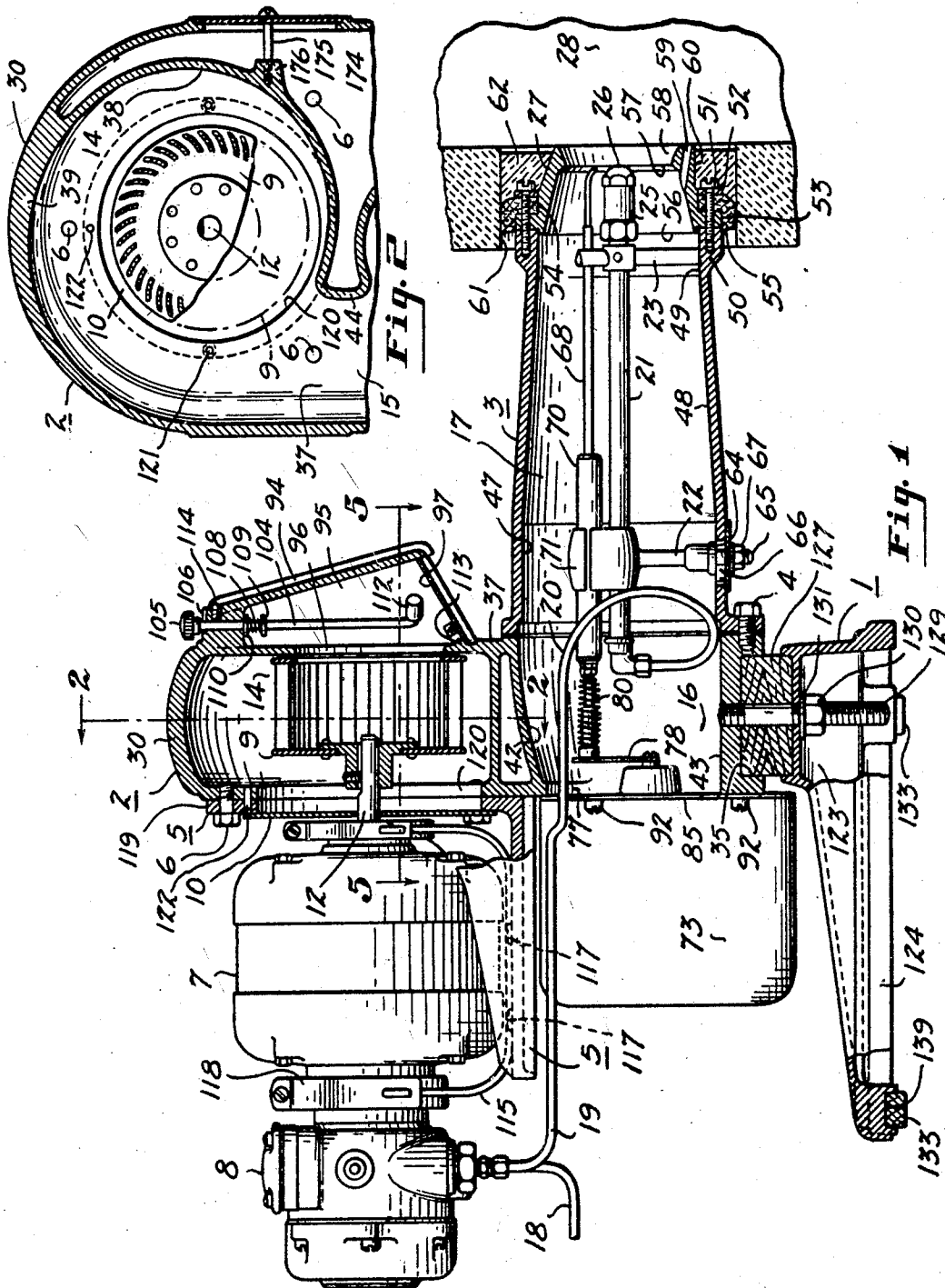
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2,287,462

BLOWER UNIT FOR OIL BURNERS

Original Filed Feb. 4, 1938

2 Sheets-Sheet 1



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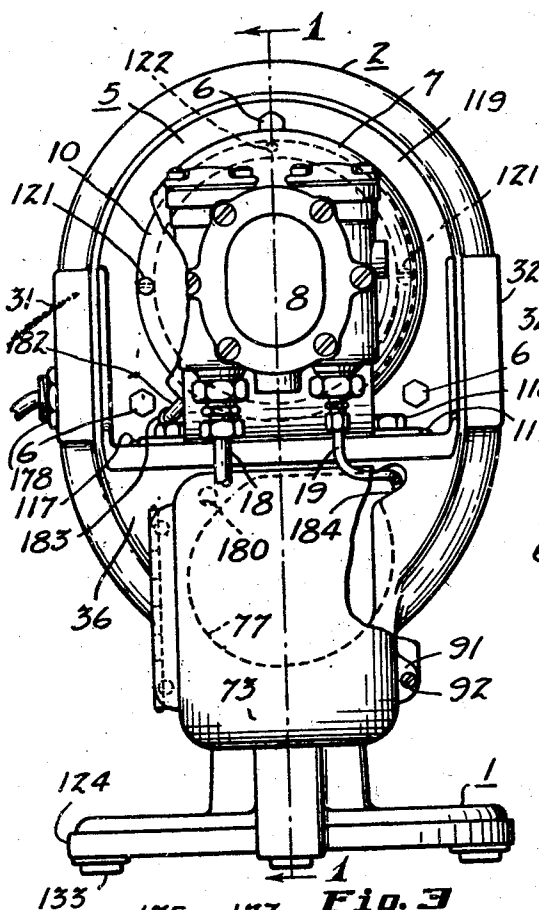


Fig. 3

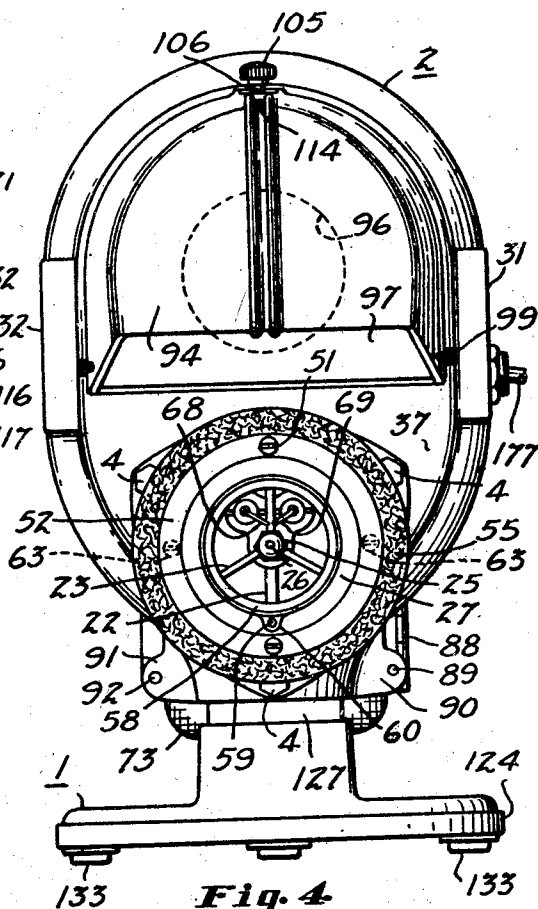


Fig. 4

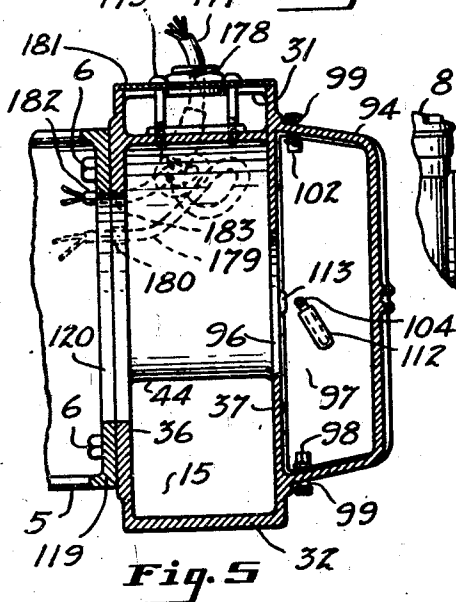


Fig. 5

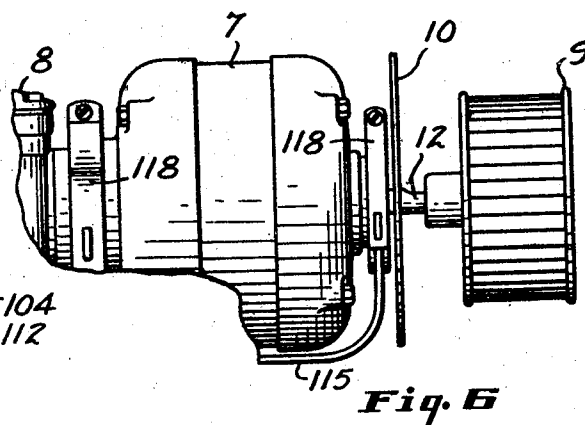


Fig. 6

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UNITED STATES PATENT OFFICE

2,287,462

BLOWER UNIT FOR OIL BURNERS

Reginald W. Beckett, Elyria, Ohio

Original application February 4, 1938, Serial No. 188,731. Divided and this application February 5, 1940, Serial No. 317,245

12 Claims. (Cl. 230-117)

This invention relates to fuel burners, and more particularly to an improved apparatus for mounting the movable or driven parts of oil or other liquid fuel burners. The present application is a division of my co-pending patent application Serial No. 188,731, filed February 4, 1938.

It is an object of the invention to provide a burner design in which the several parts are readily accessible for adjustment or repair and in which individual parts may be replaced with a minimum of effort.

Another object is to provide an oil burner or the like, having the movable or driven parts arranged in a unit which is bodily removable from the burner with a minimum of effort and in a relatively short time. More specifically, the invention resides in a burner having a chambered blower housing from which the blower impeller can be withdrawn while attached to the motor shaft so that the impeller, motor, and a fuel pump also, if desired, can be carried by the motor, and can be removed from the burner in the form of a compact unit. Included in the advantageous features of the invention are: an improved motor supporting bracket and attaching or mounting means for the same; a unique arrangement of fuel pump and blower impeller on a common motor shaft; and an improved closure for the blower chamber in the housing.

A still further object is to provide a generally improved oil burner which is economical and efficient in operation and is of relatively simple design and construction and one which is inexpensive to manufacture. Other objects and advantages of the invention will become apparent from the following detailed description of a suitable burner or apparatus embodying the invention and made in connection with the accompanying drawings, in which:

Figure 1 is a side elevational view partly in section and with parts removed showing the burner connected to a furnace, and taken substantially on the line 1-1 of Fig. 3;

Fig. 2 is a fragmentary sectional view of the burner housing, with parts broken away, taken substantially on the line 2-2 of Fig. 1;

Fig. 3 is a rear elevational view of the burner with parts broken away;

Fig. 4 is a front elevational view of the burner;

Fig. 5 is a fragmentary sectional view taken substantially on the line 5-5 of Fig. 1; and

Fig. 6 is a view with parts broken away showing the movable or driven parts of the burner which are removable therefrom as a unit.

Referring to the drawings by numerals of ref-

erence, which indicate like parts throughout the several views, the burner comprises a pedestal or base, indicated generally by the numeral 1, which is surmounted by and supports a main body portion or housing, indicated generally by the numeral 2. A horizontally disposed air or blast tube 3 is secured to the lower portion of the housing 2 at one end thereof by cap screws or studs 4 which extend through a radially directed flange 11 formed at the inlet end of the air tube. On the upper portion of the housing 2 at the end thereof opposite the blast tube 3 a supporting member or bracket 5 is removably secured by cap screws or studs 6.

The bracket 5 carries a removable unit which comprises all the movable or driven parts of the burner, including motor 7, fuel pump and pressure regulator 8, blower 9 of the sirocco type, and cover plate 10. The blower 9 is actuated and supported by shaft 12 of the motor 7 which also actuates the fuel pump. The circular cover plate 10 has a running or clearance fit on the shaft 12 and closely surrounds the same between the motor 7 and blower 9.

The blower 9 is received in a chamber 14 formed in the upper portion of the housing 2 and forces air downwardly through a throat 15 tangentially into inlet end 16 of combustion air passageway 17 extending longitudinally through the bottom 30 of the housing 2 and the air tube 3.

The fuel pump and pressure regulating device 8 draw liquid fuel through supply conduit 18 and force it under relatively high pressure through fuel pressure conduit 19 having a flexible loop 20 into fuel pipe 21 supported by bracket 22 and spider 23 in the air tube 3. A vaporizing or spray nozzle 25 is secured on the end of the fuel pipe 21 at the discharge end of the air tube 3 so that its outlet orifice 26 is disposed substantially in the plane of the smallest cross-sectional area portion of a burner head 27, to be later described. Air forced through the passageway 17 by the blower 9 and moving in a helical path commingling with the oil spray emerging from the nozzle orifice 26 to form a mist of finely dispersed oil particles which burn in combustion chamber 28 of the heating unit such as a domestic furnace.

The housing is of substantially uniform length from top to bottom and has a top wall 30 of generally rounded form merging into relatively straight vertical side walls 31 and 32. Inwardly curving or rounded bottom walls 33 and 34 extend downwardly as continuations of the side walls 31 and 32 and terminate in a downwardly

directed socket 35, to be later described. Rear end wall 36 carries the bracket 5 which supports the removable motor unit, and front end wall 37 carries the air tube 3 as mentioned above.

The blower chamber 14 is of the form commonly employed with rotary blowers of the sirocco type having axially extending blades, and is partially defined by a curved internal wall or partition 38 which extends between the end walls 36 and 37 of the housing 2 from a point 39 where it is formed into the top wall 30 of the housing at substantially the center thereof downwardly to the left in a circular fashion and then to the right, as viewed in Fig. 5. The lower end of the wall 38 extends beyond the middle of the housing and to cut-off 40 of the throat 15. The radial space between the peripheral margin of the rotary blower 9 and the walls of the chamber 14 progressively increases from the cutoff 40 in a clockwise direction around the rotational axis of the blower substantially to the throat 15.

One side of the inlet end 16 of the passage, opposite the throat 15, is defined by an internal wall or partition 42 which starts substantially at the bottom center of the housing 2 where it is connected to the lower part of the bottom wall 33, as indicated at 43, and is then curved upwardly to the left and then to the right in a clockwise direction following the general curvature of the passage 17 as defined by the tube 3. The upper end of the partition 42 and the lower end of the partition 38 are joined by a short, vertically disposed partition 44 which partially defines the throat 15. The margin 45 of the partition 42, adjacent the end wall 36 of the housing 2, progressively approaches the axis of the air passage 17, while the margin 46 of the partition 42, adjacent the end wall 37 of the housing, remains substantially flush with the internal wall of the air tube 3.

Tube 3 is substantially circular in cross-section throughout its length and has a portion 47 of cylindrical form and uniform diameter adjacent the housing 2 which merges into a tapering portion 48 which extends toward the discharge end of the tube where a second cylindrical portion 49 of uniform internal diameter and relatively short axial length is formed. The walls of the tube 3 are relatively thick and of heavy section at the discharge end thereof, preferably being in the form of an integral, thick-sectioned, annular collar 50 which reinforces the tube end and receives the screws which hold the head 27. A circular, radially directed flange 53 is integrally formed about the large diameter end of the head 27 and circumferentially abuts against the annular collar or thickened section 50 on the discharge end of the tube 3. A pair of screws 63 extend through suitable drill holes in the flange 53 and are threadedly secured in the collar 50 to clamp the head 27 in heat exchanging circumferential contact with the collar.

Another pair of screws 51 extend through an annular holding ring 52, disposed about the head 27, through the flange 53 and are threadedly received in the annular thickened collar portion 50 at the discharge end of the tube 3. The ring 52 and flange 53 preferably have substantially the same outside diameter and the ring is axially movable over an external cylindrical portion 54 of the head 27 which extends forwardly from the base of the flange 53. Between the ring 52 and flange 53, and seating on the cylindrical portion 54 of the head, is an annular ring 55 of fireproof fibrous material such as asbestos. This ring is

clamped between the holding ring 52 and flange 53 by the screws 51 which also hold the head 27 to the tube 3.

The head 27 is formed to present a substantially continuous circular shoulder 56 to the advancing air and effects an agitation thereof which is beneficial in forming a suitable combustible mixture with the fuel oil. At substantially the region of smallest cross-sectional area the head 27 is formed with a shoulder 57 which further turbulates or agitates the moving air. From the shoulder 57 to the extreme end of the head 27 there is an outwardly tapering outlet or mouth 58.

A downwardly sloping passage or drill hole 59 extends through the bottom wall of the head 27 from the inside thereof between the annular shoulders 56 and 57, through a depending boss 60 integral with the head, to the foremost edge of the head. This hole serves as a drain for fuel oil that may drip from the nozzle 25 and directs the same into the combustion chamber 28. Preferably the end of the hole 59 inside the head is enlarged or dished to more effectively drain off the oil.

When installing the burner in a heating system, such as a domestic furnace, having the refractory lined combustion chamber or fire pot 28, the asbestos ring 55 is moistened to render it pliant and flexible so that the head 27 can be inserted into opening 61 in the fire pot 28 and the asbestos ring 55 accommodates itself to the walls of the opening 61 to effect a circumferential seal therewith. If desired, an additional quantity 62 of plastic asbestos cement or the like may be packed around the head 27 in advance of the asbestos ring 55 so as to provide a more permanent seal and to protect the head 27 from the heat of the fire pot.

The bracket 22 which holds the fuel pipe 21 has a curved or cylindrical bottom surface 64 which corresponds in curvature to the internal cylindrical surface of the portion 47 of the tube 3. This curved surface 64 assists in aligning the bracket in the air passageway 17 and affords a snug fit between the bracket and tube. The bracket is held in place by a depending threaded stud 65 which extends through an elongated slot 66 formed in the bottom of the cylindrical portion 47 of the air tube 3. A nut 67 on the stud 65 locks the bracket in adjusted position and the novel shape of the tube 3 which provides a cylindrical portion for holding the bracket 22 retains the fuel pipe 21 centered in the air passageway 17 in all positions of adjustment.

A pair of ignition electrodes 68 and 69 are disposed longitudinally through the passageway 17 slightly above and on opposite sides of the oil pipe 21. These electrodes are mounted in porcelain insulators 70 held in a clamp 71 on the top of the bracket 22.

A transformer, carried in a box 73 disposed against the rear end wall 36 of the housing, furnishes high tension current to the electrodes 68 and 69. Conductors 74 and 75 enclosed by insulators 76 extend into the inlet end 16 of the air passageway 17 from the transformer box 73 through an opening 77 formed in the rear wall 36 of the housing which is normally covered by the transformer box 73. Each of the conductors is provided with a spring-like brush 78 formed of suitable sheet metal such as bronze or brass and which extends upwardly and at right angles across the axes of the electrodes 68 and 69.

Electrical contact is made between the brushes

175 secured in a boss 176 formed on the partition wall 38. Electrical conduit 177 leads to the burner and enters the wiring box 174 through a fitting 178 in the removable side wall plate 31. The power leads 179 to the transformer extend through a cored hole 180 in the rear wall 36 of the housing and the power leads 182 to the motor 7 pass through a cored hole 183 extending through both the rear wall 36 of the housing and the upright portion 119 of the bracket 5. The fuel pressure conduit 19 extends through a slot 184 formed in the rear wall 36 of the housing.

By the use of the present invention an oil burner can be provided with a removable unit which includes all the rotating parts of the burner. This unit can easily be disassembled from the burner in a very short time and without the use of special tools or appliances. The closure plate or element which closely surrounds the motor shaft substantially seals the opening into the impeller chamber within the blower housing through which the impeller is inserted. Since the opening through the blower housing is of sufficient size to permit the passage therethrough of the impeller when the latter is secured on the motor shaft, the impeller can be removed from the impeller chamber without disconnecting the impeller from the motor shaft. The cover plate or closure 10 may be modified in size and shape and may be supported by the shaft of the motor if desired instead of by the housing structure.

The principles of the present invention may be utilized in various ways, numerous modifications and alterations being contemplated, substitution of parts and changes in construction being resorted to as desired, it being understood that the embodiment shown in the drawings and described above is given merely for purposes of explanation and illustration without intending to limit the scope of the claims to the specific details disclosed.

What I claim is:

1. In an oil burner having a supporting structure including a housing providing a blower chamber, a bracket having a vertical portion disposed against the housing and removably attached thereto and a horizontal portion extending from the housing, a rotor in the chamber, a motor supported by the horizontal portion of the bracket and having a shaft extending through openings in the vertical portion of the bracket and the housing to support and actuate the rotor in the chamber, said openings being in register and sufficiently large to pass the rotor while the latter is on the shaft, and a closure member having a running fit with the shaft and normally disposed over the openings to substantially close the latter, whereby the bracket with the motor, rotor, and closure attached thereto are removable from the housing as a unit or alternatively the motor with the rotor and closure attached thereto are removable from the bracket and housing as a unit.

2. In an oil burner having a housing with a blower chamber therein and a wall formed with an opening into the chamber, a rotor smaller than said opening, a bracket having substantially horizontal and substantially vertical portions, removable means fastening the vertical portion of the bracket to said housing wall over the opening, a motor supported by the horizontal portion of the bracket and having a shaft extending into the chamber through said opening

and another opening formed in the vertical portion of the bracket and larger than the rotor to support and actuate the latter, a closure member having a running fit with the shaft, and removable means for attaching the member to the vertical portion of the bracket over the opening in the latter, whereby the bracket with the motor, rotor and closure member can be removed as a unit from the housing upon removal of the fastening means or the motor with the rotor and the closure member can be removed as a unit from the bracket and the housing upon removal of the attaching means.

3. In an oil burner, a housing providing a blower chamber, a bracket having an upright portion detachably secured to the housing and a generally horizontal portion extending laterally from the housing, a motor supported by the horizontal portion of the bracket and having a shaft extending through aligned openings in the upright portion of the bracket and in the housing, said bracket being wholly supported by the housing in cantilever fashion, a rotor in the chamber and secured on the shaft to be supported and actuated thereby, said openings each being larger than the rotor to permit withdrawal of the latter therethrough, and closure means having a running fit with the shaft and disposed across the openings to substantially close the latter.

4. In an oil burner including a housing formed to provide a blower chamber and having an apertured upright wall, a removable power unit comprising a bracket having angularly disposed portions, a motor attached to one bracket portion and having a shaft extending through the other bracket portion, a rotor on the shaft and smaller than the aperture in the housing wall to permit positioning the same in the chamber while on the shaft, smooth surfaced relatively small pin means having sliding interengagement with the housing wall and said other bracket portion to locate the unit in predetermined position relative to the housing, and fastening means for securing the unit in said position wholly supported by the housing.

5. In an oil burner including a housing formed to provide a blower chamber and having an apertured upright wall, and a generally horizontal bracket member extending laterally from said wall and wholly supported thereby, a removable power unit comprising a motor having a shaft extending through the aperture in the housing wall, a cradle supported by the bracket member and resiliently connected to the motor to support the latter, means for attaching the cradle to the bracket member, a rotor secured on the shaft to be supported and actuated thereby, said rotor being smaller than the aperture to permit insertion of the rotor into the chamber therethrough, and guide means on the bracket member engageable with the cradle to locate the unit in predetermined position relative to the aperture.

6. In an oil burner having a supporting structure including a housing providing a blower chamber, a bracket having a vertical portion disposed against the housing and removably attached thereto and a horizontal portion extending from the housing, a rotor in the chamber, and a motor supported by the horizontal portion of the bracket and having a shaft extending through openings in the vertical portion of the bracket and the housing to support and actuate the rotor in the chamber, said openings being

78 and the electrodes by means of contact sleeves slidably received on the electrodes and urged toward the brushes 78 by helical compression springs 80. Each of the springs 80 has one end adjustably retained on the electrode by a reduced diameter portion 81 which grips the electrode, and a nut which is threaded onto the electrode.

The transformer box 73 has a flat plate 85 which is arranged to cover the opening 77 in the rear end wall 36 of the housing 2. Flange portions 86 and 87 of the plate 85 extend beyond the sides of the box 73 and are utilized in attaching the box to the housing. The flange 86 has a vertically disposed piano type hinge 88 secured thereto by suitable means such as spot welding.

The flange 87 of the plate 85 is secured to the housing 2 and an ear 91 by fillister head screws 92 (Fig. 1).

Air is drawn into the burner by the blower 9 through a downwardly directed inlet opening in a hood 94 formed on the front wall 37 of the housing 2. An air chamber 95 in the hood 94 communicates with the blower chamber 14 through a circular opening 96 formed in the front wall 37 and concentric with the shaft 12 of the blower and motor.

An air gate 97 is mounted off center on reduced diameter pin ends of adjustable pivot screws 99 which are threadedly carried in aligned holes through the side walls of the hood 94.

An adjusting rod 104 is vertically disposed in the air chamber 95 and rotatably journaled in a drilled hole in the top of the hood 94. Enlarged knurled head 105 is secured on the top of the rod 104 above the hood 94 so that the rod can be manually rotated and an indexing pin 106 extends through the rod 104 and extends radially therefrom. The rod 104 is urged downwardly by a helical compression spring 108 which seats on a washer 109 secured on the rod 104 and a washer 110 bearing upwardly against the inside of the top wall of the hood 94. A foot 111 is formed at the bottom of the rod 104 by bending the latter substantially through 90°. This foot is disposed a short distance above the air gate 97 when the latter is closed and it is preferably provided with a rubber covering 112 to silence the contact between the foot and the gate when the movement of the latter is arrested by the foot. The rod 104 may be locked in position by set screw 114. As long as the blower 9 is in operation the gate 97 is held open against the foot 111 of the adjusting rod 104. Upon shutting off the burner so that the blower 9 stops, the air gate 97 drops by gravity to the closed position illustrated in Fig. 1. Downward pivotal movement of the gate 97 is limited by a suitable stop 113.

The movable parts of the burner, which are removable together in the form of a unit shown in Fig. 6, are carried by a substantially U-shaped cradle 115 secured to the floor of the supporting member or bracket 5 by studs 116 and centered thereon by raised tracks or bosses 117. The upstanding arms of the cradle 115 are provided with metal bands 118 which confine annular rubber rings or cushions (not shown) embracing the journal bosses on the bells of the motor 7. Accordingly, the motor, blower, and pump are resiliently cushioned and the single rotating shaft is supported intermediate its ends at a plurality of points by rubber cushioned journals.

An upright portion 119 of the supporting member 5 is disposed against the upper portion of the

rear wall 36 of the housing 2 and a circular opening 120 is formed through the portion 119 and the wall 36 of sufficient size to permit passage of the blower 9 when removing or replacing the movable parts or motor drive unit. This opening is normally closed by the cover plate 10 which is secured to the portion 119 of the bracket 5 by screws 121.

Mounting of the movable parts of the burner in the manner described facilitates the servicing of the burner since the complete assembly of moving parts can be quickly detached by removing the screws 121 and the bolts or studs 116, disconnecting the fuel conduits 18 and 19 and the electric leads to the motor. Replacement of a new or repaired unit can be quickly accomplished by a reversal of these operations and is facilitated by the arrangement which permits the relatively heavy unit of assembled moving parts to be supported by the bracket or member 5, leaving the operator's hands free to place and adjust the parts.

Another feature of the construction is that if desired the unit of moving or drive and driven parts may be taken from the burner by withdrawing the three studs or cap screws 6 which secure the supporting member 5 to the housing 2. This procedure may be preferred when the identical unit of movable parts is to be replaced in the burner after some minor adjustment, since a fewer number of bolts, studs or screws are removed than when the cradle 115 is removed from the bracket 5. The reassembling of the device when the entire bracket and drive unit have been removed is facilitated by the use of a locating or guide pin 122 secured in the housing and having sliding engagement in a hole in the bracket 5 which partially supports and locates the bracket until the studs 6 are in place. The pin 122 is also used in originally assembling the burner at the place of manufacture. Its location at the top center of the upright portion 119 of the bracket 5 permits the latter to suspend itself from the pin 122 and pivot by gravity to align the holes for the studs 6.

The pedestal or base 1 has a relatively large footing portion 124 which affords a wide area support for the burner. Square or rectangular pads or cushions 133 are received in sockets 139 at marginal portions of the footing portion 124 of the base. Upwardly directed wall portions 125 formed integrally at the central portion of the front end of the base are surmounted by a substantially horizontally disposed platform portion 126. A vibration absorbing block 127 formed of suitable material such as wood or cork is carried on the platform portion 126 and is surmounted by the housing 2. Preferably, the block 127 fits into the socket 35 formed in the bottom of the housing so that the top sides of the block are embraced by depending portions 128 of the socket. Similarly, the upwardly directed walls 125 of the base extend above the level of the platform 126 to embrace the bottom sides of the block 127.

A stud 129 is secured in the central portion of the socket 35 and extends downwardly through an aperture in the center of the block 127 and has a loose fit in a central hole formed in the platform 126. The parts are drawn together by a nut 130 which forces a washer 131 of a material having the capacity to deaden vibrations, such as lead, upwardly against the bottom of the platform portion 126.

A wiring box 174 has a removable plate or plates 181 held in place by a screw or screws

in register and sufficiently large to pass the rotor while the latter is on the shaft, whereby the bracket with the motor, rotor, and closure attached thereto are removable from the housing as a unit or alternatively the motor with the rotor and closure attached thereto are removable from the bracket and housing as a unit.

7. In an oil burner having a supporting structure including a housing providing a blower chamber, a bracket having a vertical portion disposed against the housing and removably attached thereto and a horizontal portion extending from the housing, a motor detachably supported by the horizontal portion of the bracket and having a shaft extending through an opening in the housing, a blower rotor in the chamber and secured on the motor shaft to be actuated thereby, and a closure member having a running fit with the shaft and normally disposed over said opening to substantially close the latter, said opening being sufficiently large to pass the blower rotor while the latter is on the shaft whereby the bracket with the motor, blower rotor and closure attached thereto is removable from the housing as a unit, or alternatively the motor with the blower rotor and the closure attached thereto is removable from the bracket and the housing as a unit.

8. In an oil burner, a housing having a blower chamber therein and an opening in one side of the housing into the chamber, a bracket having a vertical portion disposed against the housing and removably attached thereto and a platform portion extending horizontally from the housing below said opening, a motor detachably supported by the platform portion of the bracket and having a shaft extending through said opening, and a blower rotor in the chamber and secured on the shaft to be supported and actuated thereby, said opening being sufficiently large to pass the blower rotor therethrough while the latter is on the shaft and the vertical portion of the bracket being discontinuous across the opening whereby the bracket with the motor and blower rotor attached thereto is removable from the housing as a unit, or alternatively the motor with the blower rotor attached thereto is removable as a unit from the bracket and the housing while the bracket remains attached to the housing.

9. In an oil burner, a housing having a blower chamber therein and an opening in one side of the housing into the chamber, a bracket secured to said housing side and wholly supported thereby, said bracket having a horizontally extending platform portion disposed below the opening, an electric motor mounted on and wholly supported by said platform portion and having a substantially horizontally disposed shaft extending through the opening, a blower rotor secured on the shaft and wholly supported thereby for rotation in the chamber, said blower rotor being smaller than the opening whereby the motor with the blower rotor secured on the shaft thereof is removable as a unit from the bracket and the housing without removing the bracket from the housing, and a closure surrounding said shaft between the motor and the blower rotor to extend across the opening and substantially seal the latter when the blower rotor is in the chamber.

10. In an oil burner, a housing having a blower chamber therein and an opening in one side of the housing into the chamber, a bracket secured to said housing side and wholly supported thereby, said bracket having a horizontally extending platform portion disposed below the opening, an electric motor having support means on the underside thereof resting by gravity on the platform portion of the bracket and having a substantially horizontally disposed shaft, means on the platform portion of the bracket engageable with the motor support means to guide the motor for horizontal sliding movement over the bracket to shift the motor shaft axially into and out of the blower chamber through said opening, a blower rotor secured on the shaft and wholly supported thereby for rotation in the chamber, said blower rotor being smaller than the opening whereby the motor with the blower rotor secured on the shaft thereof is removable as a unit from the bracket and the housing without removing the bracket from the housing, and a closure surrounding said shaft between the motor and the blower rotor to extend across the opening and substantially seal the latter when the blower rotor is in the chamber.

11. In an oil burner, a housing having a blower chamber therein and an opening in one side of the housing into the chamber, a bracket secured to said housing side and wholly supported thereby, said bracket having a horizontally extending platform portion disposed below the opening, a cradle resting by gravity on the platform portion and removably secured thereto, an electric motor resiliently mounted in the cradle and wholly supported thereby, said motor having a generally horizontally disposed shaft extending into the chamber through said opening, a blower rotor secured on the shaft and wholly supported thereby for rotation in the chamber, said blower rotor being smaller than the opening whereby the cradle with the motor and the blower rotor are removable as a unit from the bracket and the housing without removing the bracket from the housing, and a closure surrounding said shaft between the motor and the blower rotor to extend across the opening and substantially seal the latter when the blower rotor is in the chamber.

12. In an oil burner, a base, a housing surmounting the base and wholly supported thereby, said housing having a blower chamber therein and an opening in one side of the housing into the chamber, a bracket extending as a cantilever from said housing and having a generally horizontally disposed platform portion below said opening, a motor removably mounted on said platform portion and having a shaft extending into the chamber through said opening, a blower rotor in the chamber and secured on the motor shaft to be wholly supported thereby, said opening being larger than the blower rotor whereby upon removal of the motor from the bracket the blower rotor on the shaft is withdrawable through said opening, and a plate separable from the bracket and embracing the shaft between the motor and the blower rotor to extend across the opening and substantially close the latter when the blower rotor is positioned within the chamber.

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