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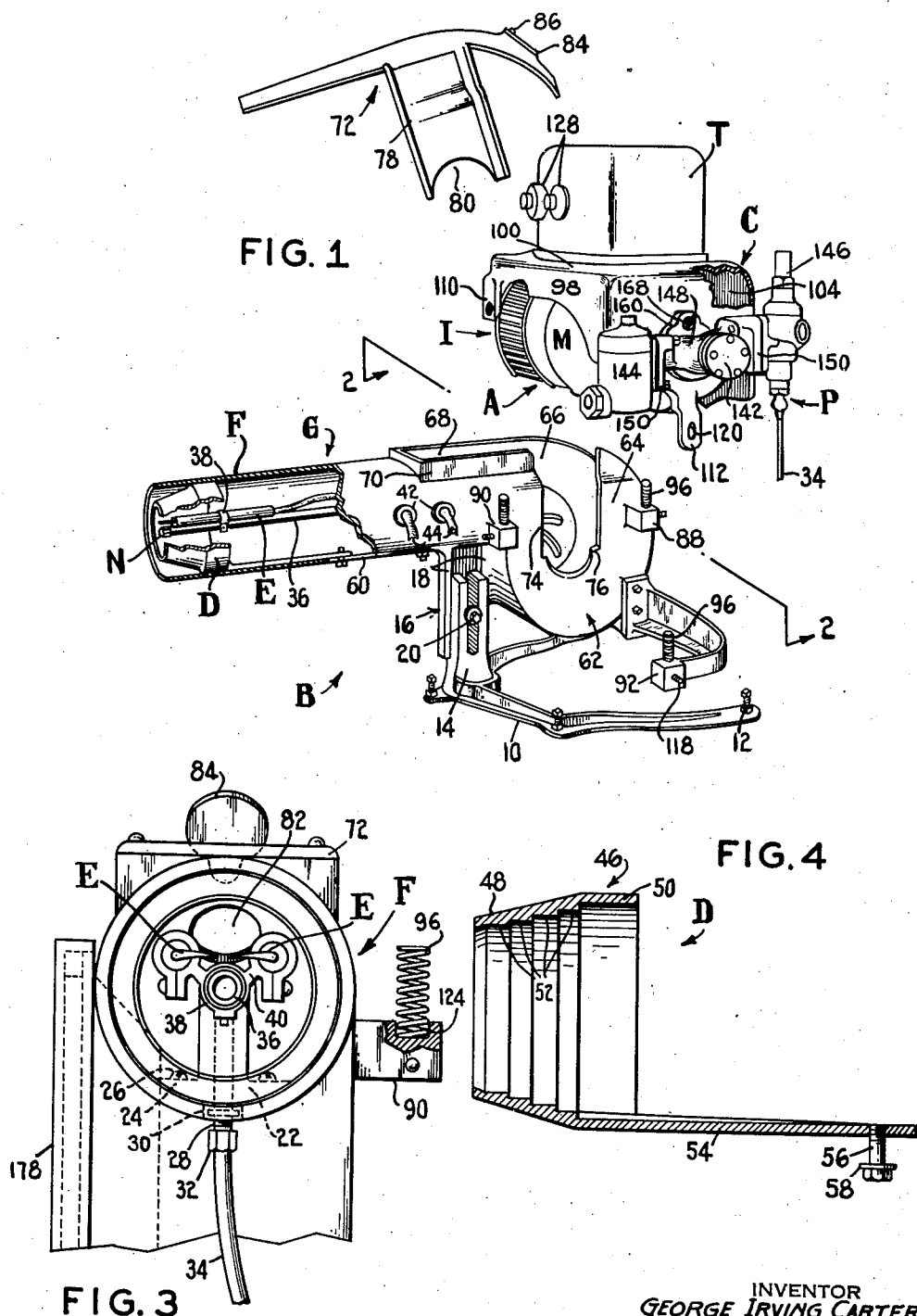
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OIL-BURNER CONSTRUCTION

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OIL-BURNER CONSTRUCTION

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This invention relates to oil-burner construction.

The invention, in certain of its aspects, is intended to have particular application in connection with the so-called "gun" type oil-burner. Such burners generally utilize a nozzle for atomizing the fuel, and a blower for supplying air in quantities sufficient to carry the atomized fuel into the furnace and there to effect its combustion. The operation of such apparatus is accompanied with many different mechanical noises, noises which detract from the desirability of such apparatus for use in dwellings or for similar purposes. It is an object of the invention to construct such apparatus so that the noise factor is substantially reduced even to the point of being completely eliminated.

It is an object of the invention to eliminate substantially all noise-provoking centers from apparatus of the type indicated, or to eradicate their noise-creating possibilities.

In attempting to make quiet running such oil-burning apparatus, consideration must be given to the fact that centers and axes of vibration may be created in such apparatus about which noise-provoking vibration is facilitated. It is an object of the invention to construct apparatus of the character set forth to make as asymmetric as possible the arrangement of the parts subject to vibration without affecting the structural strength of the apparatus, or its efficiency. At the same time, certain of the elements of the apparatus are so cushioned, and the cushions so arranged as to eliminate the effect of any such possible vibrations about any such axis.

One method of accomplishing this result was considered to lie in properly supporting certain of the parts upon a resilient foundation. In order to secure simultaneously the advantage of both a resilient foundation and a resilient suspension, substantially all the moving parts of the apparatus are, for certain purposes of the invention, disposed so that they may transmit their vibrations to the body of the apparatus only through a carrying means from which such moving parts are suspended, and which, in turn, has its foundation upon vibration-damping elements between it and the body of the apparatus. In one specific construction, the motor, together with such parts as the blower-fan, and the oil-pump and its associated elements, is suspended from such a carrier member which, in turn, is attached to the body of the apparatus through a resilient support co-acting with the body at three points. The resilient support is associated with the body of

the apparatus so that, as a unit, the entire assembly of the motor and the associated elements may be adjusted vertically without the necessity for any adjustment of any of the other elements of the apparatus, and still without affecting the shock-absorbing and vibration-deadening properties of the support.

The servicing of oil-burner installations, that is, the maintenance of such constructions in a continuing serviceable condition, generally involves the necessity for dispatching to the installation, a highly skilled mechanic. The time lost in travel, the necessity for transporting tools and parts, to each such installation, become material problems. If all such apparatus to be serviced could be brought to a central station, where such mechanic would have immediately at hand all the facilities for making proper repairs and adjustments, not only would there be saving for the servicing organization, but satisfaction for the user in the removal of the annoyance of repairs being made upon residential premises. However, in times when such apparatus requires servicing, the immediate benefit of the functioning of the apparatus is also required, so that a minimum cessation in such operation becomes important.

It is an object of the invention to provide an assembly construction for the several parts of oil-burner constructions so that such parts, assembled as a unit, may be removed from, or replaced in, the association of the apparatus, as desired. Especially is this construction designed to make practicable repairing such apparatus in the shop, rather than at the location of the installation. Certain sections of the assembly may be removed bodily and as a unit from the assembly. Such section or sections are then quickly and easily replaced, at least for the period of the repairs, by a substitute unit. This may be accomplished in connection with the entire assembly of operating parts of the apparatus, or, as will hereinafter appear, in connection with a single section of that apparatus.

Since the oil-pump and its immediately related elements are factors in the shut-down of such installations, to facilitate the speedy repair or replacement of such oil-pump and its elements becomes an object of the invention. The oil-pump is made readily separable from the motor to which it is directly coupled. The coupling is such that, merely by bringing the pump into associated relation to the motor, it immediately becomes clutched thereto.

In the "gun" type of oil burner, utilizing a jet nozzle, and, in fact, in some other types, a

straight flow of air is not efficient. To produce a swirl in such air, by which the broken-up fuel stream will become even more dispersed, and so that there may be a greater contact between air and fuel, is highly desirable. In connection with a spray nozzle, the proper location of the nozzle with relation to the eddies in the air currents will add further to the efficiency of the apparatus. Accuracy in the manufacture of the several elements of the apparatus, necessary to assure accuracy in such location, cannot generally be maintained. For such purpose, in the apparatus specifically described herein, an adjustment is provided for determining the most effective relationship after the parts have been assembled and the apparatus placed in commission, after which the relationship may be made a fixed one.

Other objects of this invention will hereinafter be set forth, or will be apparent from the description and the drawings, in which is illustrated an oil-burner construction representative of one type of apparatus effective for carrying out the invention.

The invention, however, is not intended to be restricted to any particular construction or arrangement of parts, or to any particular application of such construction, or to any specific manner of use, or to any of various details thereof, herein shown and described, as the same may be modified in various particulars, or be applied in many varied relations, without departing from the spirit and scope of the claimed invention, the particular oil-burner construction herein illustrated and described merely representing one particular type by which the invention might be practised.

On the drawings, in which the same reference characters refer to the same parts throughout, and in which is disclosed such representative oil-burner construction:

Fig. 1 is a so-called exploded view of the apparatus, that is, the cover is shown separated from the burner construction, and the carrier is also shown separated from the gun, all the parts being in elevational perspective;

Fig. 2 is a vertical cross-sectional view, to a larger scale, and substantially transversely along the axis of fan, motor and oil-pump, the motor, transformer, fan and oil-pump assembly being shown in phantom;

Fig. 3 is an elevational view of the apparatus as it appears, looking at the mouth of the fire-tube, parts of the apparatus being broken away, and details being broken away in section;

Fig. 4 is a vertical cross-sectional view of the air-deflector, longitudinally along its axis;

Fig. 5 is a view similar to Fig. 3, the cover being omitted, and illustrating a modified construction for carrier, fire-tube and oil-tube;

Fig. 6 is a plan view of the detail shown in Fig. 5; and

Fig. 7 is a side elevational view, illustrating the manner of coupling oil-pump and motor, portions of the parts being shown in section more clearly to illustrate features of the invention.

There is illustrated, in Figs. 1 to 4, and 7 of the drawings, a burner construction B, including a base 10 upon which is carried "gun" G. Supported by the "gun" is carrier C. Suspended from the carrier is assembly A, including motor M and oil-pump assembly P. To motor M may be secured the air-impeller fan I. Within fire-tube F of the gun are located the spray nozzle N, electrodes E, and air-deflector D. Carried 75

upon carrier C may be apparatus such as transformer T.

Base 10 may take any desired character, here being shown as a reinforced crescent-shaped member, flat at its lower surface so that it may rest upon a floor or the like. Adjustment of the entire apparatus vertically with relation to the surface upon which the base is supported may be effected by means of set-screws 12 extending through the base. The base may include an upright 14 comprising, for instance, a forked element.

"Gun" G may be provided with a downwardly depending guide 16 which, if desired, may be a part of a single casting for the "gun." The guide may be formed with outwardly extending walls 18 defining a cavity for the reception of upright 14, the outer edges of the forked element cooperating with walls 18 in guiding the "gun" in vertical movement with relation to base 10. A bolt 20 may be extended through the slot of the forked element, to be engaged in a threaded hole provided in guide 16 for that purpose. By cooperation of the bolt head with a washer positioned over the slot, the upright and the guide may be clamped together to retain the parts in a desired relationship after the "gun" has been vertically adjusted.

The "gun" may include fire-tube F, to be extended into the fire-pot (not shown). The tube, in this case shown as cylindrical in cross-section, provides a housing for spray nozzle N and electrodes E. Properly to support electrodes and nozzle, a bracket 22 may be provided, and may be positioned within the bore of tube F. The base of the bracket, resting upon the bottom of the tube, may be contoured to conform to the shaping of the tube. The bracket thus may consist of a vertical section having toes 24 at its base. With the toes may be associated any suitable means for retaining the bracket in position within the tube, as, for instance, securing devices, such as screws 26, extended through the toes and engaged in the tube walls. The upright section of the bracket may have a passage formed therein and opening through the bottom face of the base of the bracket. A bushing 28, secured in that opening and extending downwardly therefrom, may project through an opening 30 in tube F, to form an element of a union 32 for coupling with the end of supply-line 34.

Secured to and extending forwardly from bracket 22 is a tube 36, the bore of which communicates, within the bracket, with the passage therein. Tube 36 carries, at its extreme outer end, nozzle N, which may be of any desired type.

A collar 38 may encircle tube 36, and be secured in any desired manner against movement with relation thereto. Openings through extensions 40 of the collar provide for the reception of electrodes E, which may be of any desired type. The openings may be defined by split collar formations in extensions 40, so that, by contracting such split collars, the electrodes are clamped in position. Properly insulated openings 42 through tube F provide for the passage of conductors 44, leading up to and connected to electrodes E, the connection being made by a slip-slide fastener (not shown) of standard construction which permits assembly of the parts with expedition and without any difficulty.

Air-deflector D, within tube F, may include a sleeve 46, which may include an end section 48 substantially frusto-conical in shape. The end section is so constructed, in the case shown, that

the mouth of the frustrum of the cone is immediately adjacent the location of the nozzle. Beyond the conical section may be a substantially cylindrical section 50 to fit within the bore of the tube F and function properly to retain the deflector in position. The internal surface of sleeve 46 need not conform to the shaping of the outside faces thereof. In fact, the formation of a plurality of steps 52, each step consisting of a substantially cylindrical ring, is indicated. It is also possible to have, in the interior surface of end section 48, a plurality of substantially spiral grooves.

Means may be provided for adjusting the air-deflector into, and retaining it in, position. Such means may take the form of a strap 54 extending rearwardly from the sleeve. At the rear end of the strap, a threaded hole may be provided for the reception of a bolt 56. The head of this bolt and a washer 58 are positioned externally of tube F, the bolt extending through a slot 60 in the tube. By this construction, it is possible to move strap 54, and, therefore, sleeve 46 and its stepped formation, with relation to the nozzle, thus obtaining a different effect between the fuel being discharged from nozzle N and the swirling air at the steps. Once an adjustment has been made, tightening of bolt 56 will retain the deflector properly in position.

For certain of the purposes of the invention, the "gun" and the blower-motor-oil-pump assembly A may be separated readily so that repairs or replacements may readily be made. At the rear end of the "gun," tube F opens into a casing 62. This casing may be integral with tube F, as, for instance, by being cast as one piece therewith. In this casing air-impeller fan I functions. The casing may be of substantially circular contouring, with substantially vertical side walls 64 and 66 which are united with the walls of tube F. However, that portion of tube F which would overlie, and become the top wall of, the casing is cut away to provide an opening 68, preferably further defined by a flange 70, bounding the opening and providing a support for a cover 72, which may be held in covering position by suitable securing devices. Bracket 22 may be mounted upon the walls of the fire-tube so that its securing devices are easily accessible through opening 68, immediately below the front edge of which the bracket may be located. Side wall 64 is cut away to provide a vertically extending slot 74, terminating in a semi-circular section the diameter of which is less than the width of the slot above such section. Thus a pair of shoulders 76 are provided so that, when cover 72 is in position and functions to close both opening 68 and slot 74, the lower extremities of the cover 72 will rest upon these shoulders.

The cover is shaped to conform to the contour of flange 70 and of the casing beyond the flange. It also has a depending leg 78 wider than slot 74 but with an inwardly directed beading to fit within the slot and retain leg 78 in position. The leg, at its lower end, is cut-out, as at 80, for cooperation with assembly A, as hereinafter to be described.

In the rear section of cover 72, where it is contoured for the casing, there may be provided an inspection port 82. By its position (see Fig. 3), this port is in line with the bore of tube F, and permits one to look through the "gun," and to determine if apparatus, such as the electrodes, is operating properly. Port 82 may be sealed by a plate 84, pivotally mounted at 86 so that, when

moved to closed position, it will wedge tightly against the metal around the port.

Laterally extending from side wall 64, and, if desired, made an integral part of the casing, may be a plurality of brackets 88, 90, and 92. In the instance shown, bracket 92 has been constructed as a reinforced L-shaped arm, separate from the casing, and bolted to side wall 64. Each bracket may have a recess 94 provided therein for the reception of a coiled spring 96 which thereby is retained vertically disposed. These springs, by the disposition of brackets 88, 90, and 92, are in position to form a three-point support for assembly A, the spring in association with bracket 92 being substantially in the plane of the center-line of motor M.

Assembly A includes motor M, together with fan I and oil-pump assembly P. Entire assembly A is carried by carrier C which may take the form of a carrier plate 98. This plate may be of one-piece construction, as, for instance, a casting. Included in such plate may be a base portion 100, a support section 102, and an end wall 104. A pair of sockets 106 are formed in base portion 100 adjacent that edge thereof which will be located in proximity to casing 62. These sockets are located so that they will cooperate with the brackets formed on wall 64 and the springs associated therewith. On the depending support section 102, and substantially medially thereof, at the bottom, may be formed another socket 108, this socket to cooperate with the recess in bracket 92. In the case of bracket 88, end wall 104 provides a guard for it and its associated bracket, while in the cases of the socket associated with bracket 90 and of socket 113, suitably positioned guard extensions 110 and 112 may be provided, thus concealing bracket 90 and socket 113 from view, and, at the same time, guarding against outside contact with the springs received in the recesses and sockets.

It can well be understood that once the springs have properly been located in recesses and sockets, the entire assembly will rest substantially constantly in the one position as the tensile resistance of the springs will remain constant, as also will the weight of the supported assembly. Therefore, to adjust the assembly into a properly related position, there may be provided, in sockets 106, movable heads 114 which may be the heads of threaded members or screws, the ends of which extend through, and out beyond the top face of, the base portion of the carrier plate. At this position, a lock-nut 116 may be assembled with the threaded portion. In connection with socket 108, for accessibility, the adjusting means may be associated with the recess in bracket 92 (see Fig. 2), the adjusting means, if desired, taking a similar form. In this manner, the entire assembly may be adjusted vertically to eliminate vibration by placing the assembly on a proper axis. Any vibration which does occur will be absorbed in the springs, and will not, in any manner, be imparted to the "gun" or the base, as the springs will remain compressed under the weight of the assembly. To retain assembly A against undesired separation from the "gun," stops 118 may be passed through vertically directed slots 120 in extensions 110 and 112 and in end wall 104 immediately adjacent the respective sockets 106 and 108. These stops may be secured, as, for instance, by threading, to the sockets, thus preventing unwarranted movement of assembly A with relation to the "gun."

The weight of the apparatus of assembly A will

be substantially centrally disposed with relation to the carrier-plate, the greatest weight being that of the motor, which is directly supported and suspended from base portion 100. The suspension is in the nature of a ceiling suspension, feet 122 of the motor being clamped to the ceiling of base portion 100 by proper means, such as bolts 124. Further to eliminate the effect of vibration between feet 122 and the ceiling, suitable cushions may be provided, these cushions being here shown in the form of sponge rubber washers or grommets 126. In the same manner, transformer T may be positioned upon the top and outer surface of the base portion, and there be secured in any desired manner, either by the same means as used to secure the motor to the base portion, or by other means. Suitable electrical connections are provided, both for the motor and from terminals 128 to the electrodes.

Extending from the motor at one side is shaft 130 upon which may be mounted fan I, which may taken any desired form. For certain purposes, however, the cylindrically disposed vane type may efficiently be coordinated with other elements of the apparatus for effectuating results desired. In the apparatus shown, the position of the shaft and the form and positioning of the fan are such that the entire assembly may simply and easily be positioned in association with the apparatus. A single individual, by removing cover 72, may lift the entire assembly A out of its associated relation to "gun" G and casing 62, shaft 130 moving easily along slot 74 while the fan is moved upwardly through the casing and out through opening 68. In the same manner, assembly of these parts may quickly, and with minimum labor requirements, be effected.

The motor may be provided with an end-plate 132, including a projecting body or boss 134. Centrally of this boss may be defined a bore 136. End 138 of the motor shaft extends into the bore and, for certain purposes of the invention, may be constructed to facilitate coupling oil-pump assembly P thereto quickly and easily. In the particular instance shown, the shaft end is formed with a transverse slot 140.

Oil-pump assembly P may include, in addition to oil-pump 142, which may be of any desired construction, such devices as may be considered necessary for the efficient functioning of the apparatus, as, for instance, strainer 144, and pressure-governing valve 146. In the instance illustrated, the oil-pump is of the gear type and includes a casing 148 having end flanges 150 which, by means of similar flanges on the strainer and regulating valve, provide for the association of these parts with the oil-pump for constructing a single unitary system.

Extending laterally from casing 148 is a pump body 152, which may be accurately faced to such diameter that it may be slipped into bore 136, and fit and be held snugly therein. For this purpose, support section 102 is provided with an opening 154, through which body 152 may be moved when being fitted into bore 136. Extending beyond body 152 is shaft 156 of the pump, in this case formed with a splined end 158, the spline being of such dimensions that it will fit snugly into slot 140 of motor-shaft-end 138. The apparatus is so constructed that, when body 152 is fitted into bore 136, end 158 is aligned with, and if they are properly radially disposed, will seat within, slot 140. Thus the simple operation of positioning body 152 in bore 136 results in the coupling of

shaft 156 with shaft-end 138, and the consequent positive drive of the oil-pump thereafter.

Means are provided to retain assembly P in this relation, once the coupling has thus been effected. In the construction illustrated, there extends substantially at right angles to body 152 and spaced from casing 148, a flange 160, in which are formed a plurality of openings 162. As a part of boss 134 of end-plate 132 there may be defined, as radial extensions therefrom, a plurality of wings 164. In wings 164 may be formed threaded recesses 166. When a proper association of body 152 and bore 136 has been effected, openings 162 may be aligned with recesses 160. Then bolts 168 may be extended through openings 162 to engage in recesses 166, thus firmly to associate assembly P with the motor.

When so associated, as shown, the assembly will be positioned at the outside face of support section 102. Supply line 34, extending away from regulating valve 146, may be secured to bushing 28 or separated therefrom at will. Thus, the removal of the oil-pump assembly from the apparatus is made a simple operation, so that, if desired, in the case of any defect in the operation of this apparatus, a complete oil-pump assembly may be substituted, in a few moments, for that on the apparatus, and repairs made, not on the premises, but at the plant, where better facilities may be had.

Not only is the oil-pump assembly thus separable from the apparatus, but assembly A, with or without the oil-pump assembly, is removable from the casing quickly and simply. It will be noted that the distance between fan I and the vertical edges of carrier-plate 98 is but slight. However, it is sufficient to permit one, by grasping the carrier-plate, to lower the entire assembly into position, with the fan within the well of the casing, while the motor, the carrier-plate, the transformer, and all the other apparatus are located externally of the casing. At the same time, assembly A is brought almost instantly into position, resting upon springs 96, in which relationship it is then sealed up by the association of cover 72. Depending leg 78 closes up slot 74, cut-out 80 co-operating with the shaft of the motor to leave a sufficient opening about the shaft for a minimum air allowance, as now required, in many cases, by the underwriters.

Side wall 66 of the casing may also be provided with an opening 170 to be guarded by an air-intake regulator 172. This regulator may be of the shutter type, including a stationary member 174, the inner portion 176 of which is bevelled to seat snugly in the opening. A movable member 178 is retained upon the stationary member in any suitable manner, and may be provided with a combined index and end stop (not shown), whereby to retain the movable member in any position to which it is adjusted.

End wall 104 provides an end guard for the entire assembly, providing against unwarranted access thereto at any time. There may be displayed thereon a trade-mark or such similar indicia of the manufacturer. Also, this plate may provide a mounting for automatic means to cut off the operation of the electrodes, as, for instance, in the cases where stack thermostats are used. The entire assembly of many commercial appliances of this character are of small enough dimensions so that they may be mounted upon this section of the apparatus.

In the construction shown in Figs. 5 and 6, all operating parts are supported from carrier

plate 182. In this construction, not only are motor, oil-pump, and transformer so supported, but also the nozzle and the electrodes. In this apparatus, the carrier-plate is constructed with a boss 184 provided with a passage 186 to which, at one end, there is secured coupling means 188 for the supply line from the pressure-governing valve. Boss 184 is extended into an overhanging member 200 through which passage 186 continues. At the end of the member there is retained a tube 202 similar to tube 36. This tube, in like manner, has the nozzle secured thereto, and carries the electrodes. A clearance passage 204 is formed in the upright wall 206 at the opening into the well of the casing past which member 200 extends without contact.

Thus, when assembly A is separated from the "gun," member 200 is easily lifted out of passage 204 and then slid rearwardly by moving assembly A in the proper direction to remove, with the other elements of assembly A, the nozzle and the electrodes. In this construction, the connection of the supply line from the pump need not be disarranged for removal of assembly A from the apparatus, although the electrodes should be disconnected from the transformer. Any vibrational effect which might have been attributed to the nozzle and the electrodes is completely eliminated in the apparatus just described.

Many other changes could be effected in the particular apparatus designed, and in the methods of operation set forth, and in the specific details thereof, without substantially departing from the invention intended to be defined in the claims, the specific oil-burner construction herein set forth merely illustrating certain specific phases of the invention.

What is claimed as new and useful is:

1. In oil-burning apparatus of the class wherein a blast-tube for the burner is in communication with a blower-casing, and wherein a blower in the casing is driven by power means; the combination with said blower and power means of a carrier; supporting means for the carrier, the supporting means including elements on the casing; the casing having an opening in a wall thereof; the carrier, the blower, the power means, and the supporting means being assembled so that lifting the carrier bodily out of, or lowering the carrier into, the casing will cause separation or assembly of carrier, blower, and power means as a unit from or with the casing; and means to close the opening for retaining carrier, blower, and power means in assembled relation to the casing.

2. In oil-burning apparatus of the class wherein a blast-tube for the burner is in communication with a blower-casing, and wherein a blower in the casing is driven by power means; the combination with said blower and power means of a carrier; supporting means for the carrier, the supporting means including elements on the casing; resilient means between the carrier and said elements; the casing having an opening in a wall thereof; the carrier, the blower, the power means, and the supporting means being constructed and assembled so that lifting the carrier bodily out of, or lowering the carrier into, the casing will cause separation or assembly of carrier, blower, and power means from or with the casing; and means to close the opening for retaining carrier, blower, and power means in assembled relation to the casing.

3. In oil-burning apparatus of the class where-

in a blast-tube for the burner is in communication with a blower-casing, and wherein a blower in the casing is driven by power means; the combination with said blower and power means of a carrier; supporting means for the carrier, the supporting means including elements on the casing; the casing having an opening in a wall thereof; the carrier, the blower, the power means, and the supporting means being assembled so that lifting the carrier bodily out of, or lowering the carrier into, the casing will cause separation or assembly of carrier, blower, and power means in the assembled relation for the insertion of the blower into or its removal from the casing without affecting the fixed assembly of carrier, blower and power means to each other; and means to close the opening for retaining carrier, blower, and power means in assembled relation to the casing.

4. In oil-burning apparatus of the class wherein a blast-tube for the burner is in communication with a blower-casing, and wherein a blower in the casing is driven by power means; the combination with said blower and power means of a carrier; supporting means for the carrier, the supporting means including elements on the casing; the casing having an opening through the top wall thereof; the carrier, the blower, the power means, and the supporting means being constructed and assembled so that lifting the carrier bodily vertically out of, or lowering the carrier vertically into, the casing will cause movement of carrier, blower, and power means in the assembled relation for the insertion of the blower into or its removal from the casing through the opening without affecting the fixed assembly of carrier, blower, and power means to each other; and means to close the opening.

5. In oil-burning apparatus of the class wherein a blast-tube for the burner is in communication with a blower-casing, and wherein a blower in the casing is driven through a shaft extending between the blower and power means; the combination with said blower and power means of a carrier; supporting means for the carrier, the supporting means including elements on the casing; the casing having an opening through the top wall thereof; a slot in a side wall of the casing and communicating with the opening; the carrier, the blower, the power means, and the supporting means being constructed and assembled so that lifting the carrier bodily vertically out of, or lowering the carrier vertically into, the casing will cause movement of carrier, blower, and power means in the assembled relation for the insertion of the blower into or its removal from the casing through the opening and the movement of the shaft along the slot without affecting the fixed assembly of carrier, blower, and power means to each other; and means to close the opening and the slot.

6. In oil-burning apparatus of the class wherein a blast-tube for the burner is in communication with a blower-casing, and wherein a blower in the casing is driven by power means; the combination with said blower and power means of a carrier; and supporting means for the carrier, the supporting means including elements on the casing; the supporting means being constructed so that the carrier, during operation of the blower and the power means, will be free to vibrate with relation to the casing and so that the effect of such vibratory action will be dampened and vibrations will not in turn be set up

in the casing; the carrier, the blower, the power means, and the supporting means being constructed and assembled so that the carrier may be lifted bodily out of, or lowered bodily into, the casing.

7. In oil-burning apparatus of the class wherein a blast-tube for the burner is in communication with a blower-casing, and wherein a blower in the casing is driven by power means; the combination with said blower and power means of a carrier; and supporting means for the carrier; the supporting means being constructed so that the carrier, during operation of the blower and the power means, will be free to vibrate with relation to the casing and so that the effect of such vibratory action will be dampened and vibrations will not in turn be set up in the casing; the supporting means including elements on the casing providing a plurality of points of support for the carrier on the casing; the carrier, the blower, the power means, and the supporting means being constructed and assembled so that the carrier may be lifted bodily out of, or lowered bodily into, the casing.

8. In oil-burning apparatus of the class wherein a blast-tube for the burner is in communication with a blower-casing, and wherein a blower in the casing is driven by power means; the combination with said blower and power means of a carrier; and supporting means for the carrier; the supporting means being constructed so that the carrier, during operation of the blower and the power means, will be free to vibrate with relation to the casing and so that the effect of such vibratory action will be dampened and vibrations will not in turn be set up in the casing; the supporting means including a plurality of sockets on the casing; resilient means positioned between the sockets and the carrier; the carrier, the blower, the power means, and the supporting means being constructed and assembled so that the carrier may be lifted bodily out of, or lowered bodily into, the casing.

9. In oil-burning apparatus of the class wherein a blast-tube for the burner is in communication with a blower-casing, and wherein a blower in the casing is driven by power means; the combination with said blower and power means of a carrier; and supporting means for the carrier; the supporting means being constructed so that the carrier, during operation of the blower and the power means, will be free to vibrate with relation to the casing and so that the effect of

such vibratory action will be dampened and vibrations will not in turn be set up in the casing; the supporting means including a plurality of sockets on the casing; coiled springs seated in the sockets; the carrier being mounted upon the springs; the carrier, the blower, the power means, and the supporting means being constructed and assembled so that the carrier may be lifted bodily out of, or lowered bodily into, the casing.

10. In oil-burning apparatus of the class wherein a blast-tube for the burner is in communication with a blower-casing, and wherein a blower in the casing is driven through a shaft extending between the blower and power means; the combination with said blower and power means of a carrier; supporting means for the carrier; the casing having an opening through the top wall thereof; a slot in a side wall of the casing and communicating with the opening; the carrier, the blower, the power means, and the supporting means being constructed and assembled so that lifting of the carrier bodily vertically out of, or lowering the carrier vertically into, the casing will cause movement of carrier, blower, and power means in the assembled relation for insertion of the blow into or its removal from the casing through the opening and the movement of the shaft along the slot without affecting the fixed assembly of carrier, blower, and power means to each other; a closure plate for the opening and the slot; and a peep-hole in the closure plate for sighting through the casing to inspect the end of the blast-tube away from the casing during operation of the burner.

11. In oil-burning apparatus of the class wherein a blast-tube for the burner is in communication with a blower-casing, and wherein a blower in the casing is driven by a motor; the combination of a carrier with the motor and the blower; the motor being supported by the carrier; the blower being mounted upon and carried solely by the motor shaft; supporting means for the carrier including elements on the casing; the casing having an opening in a wall thereof, the carrier, the blower, the power means, and the supporting means being constructed and assembled so that bodily lifting or lowering the carrier will cause separation or assembly of carrier, blower, and power means from or with the casing, and means to close the opening when the parts are in assembled relation.

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