Aug. 4, 1959 R. M. SHERMAN 2,897,885

FLUID FUEL BURNER

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FIG. 2

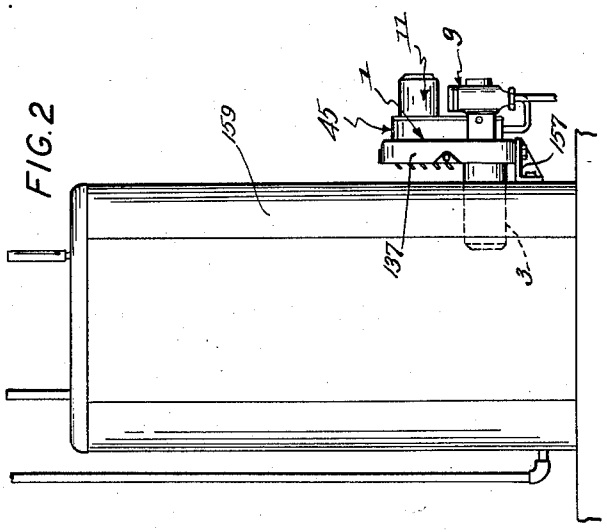
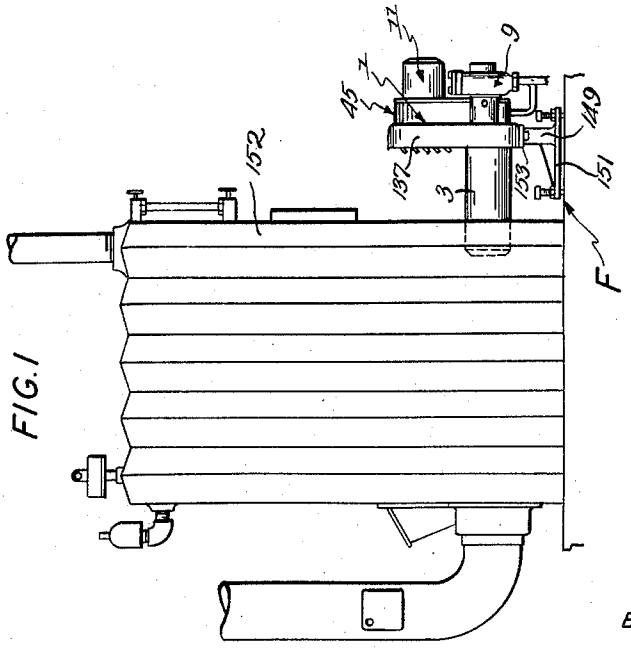


FIG. 1



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FIG. 3

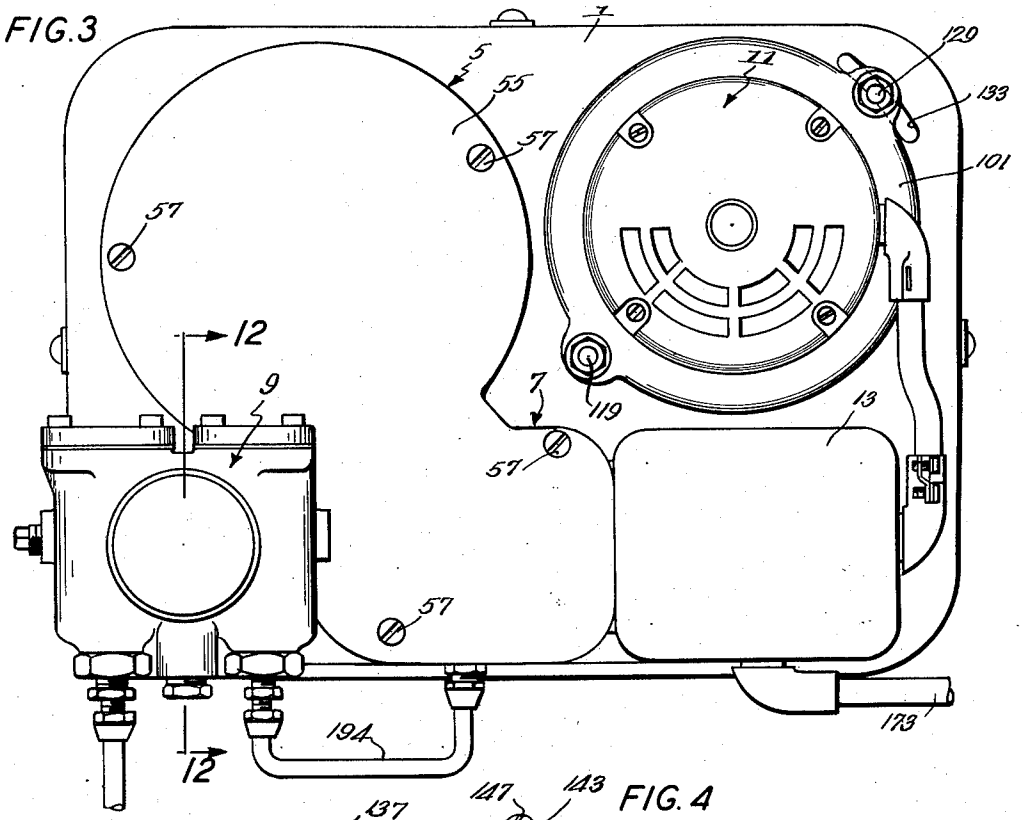
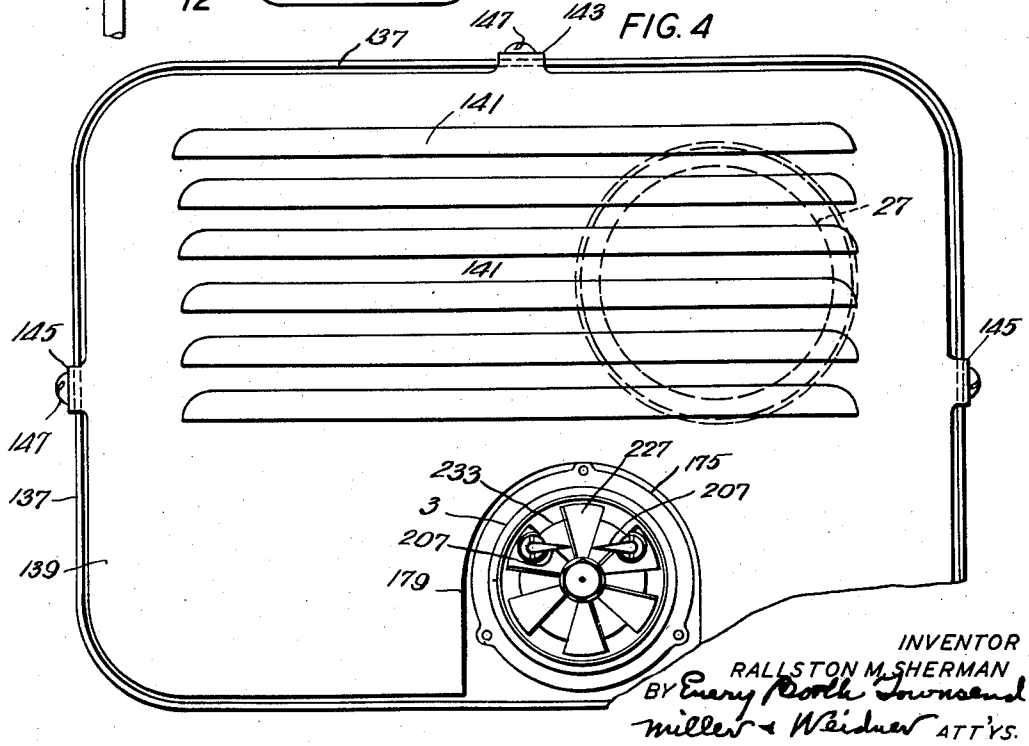


FIG. 4



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FIG. 6

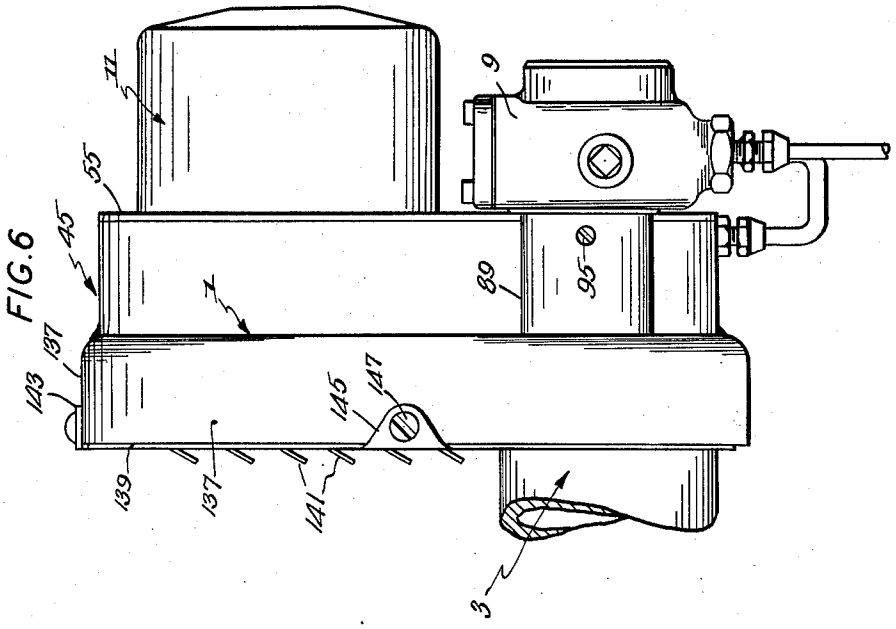
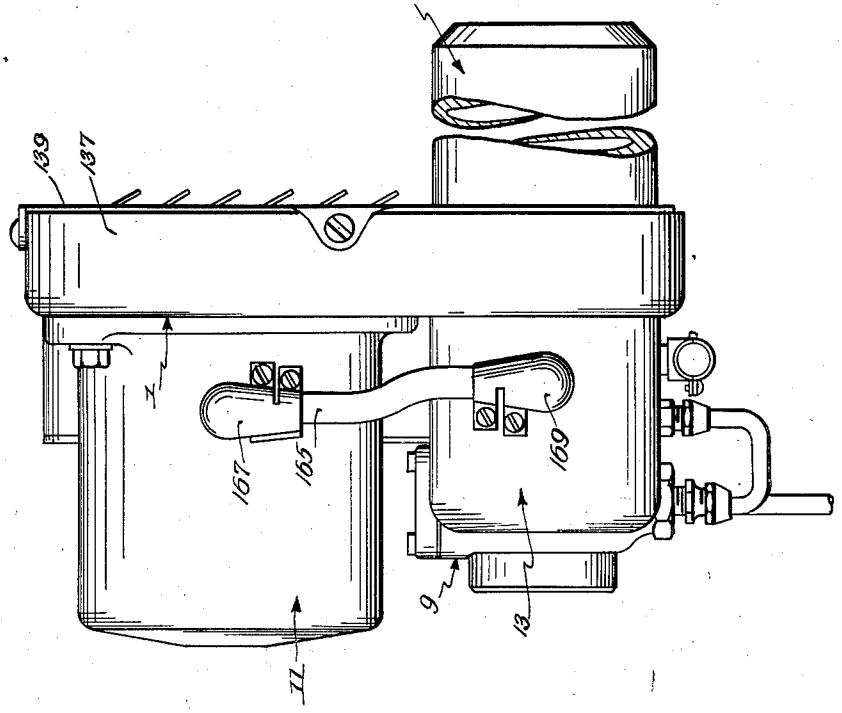


FIG. 5



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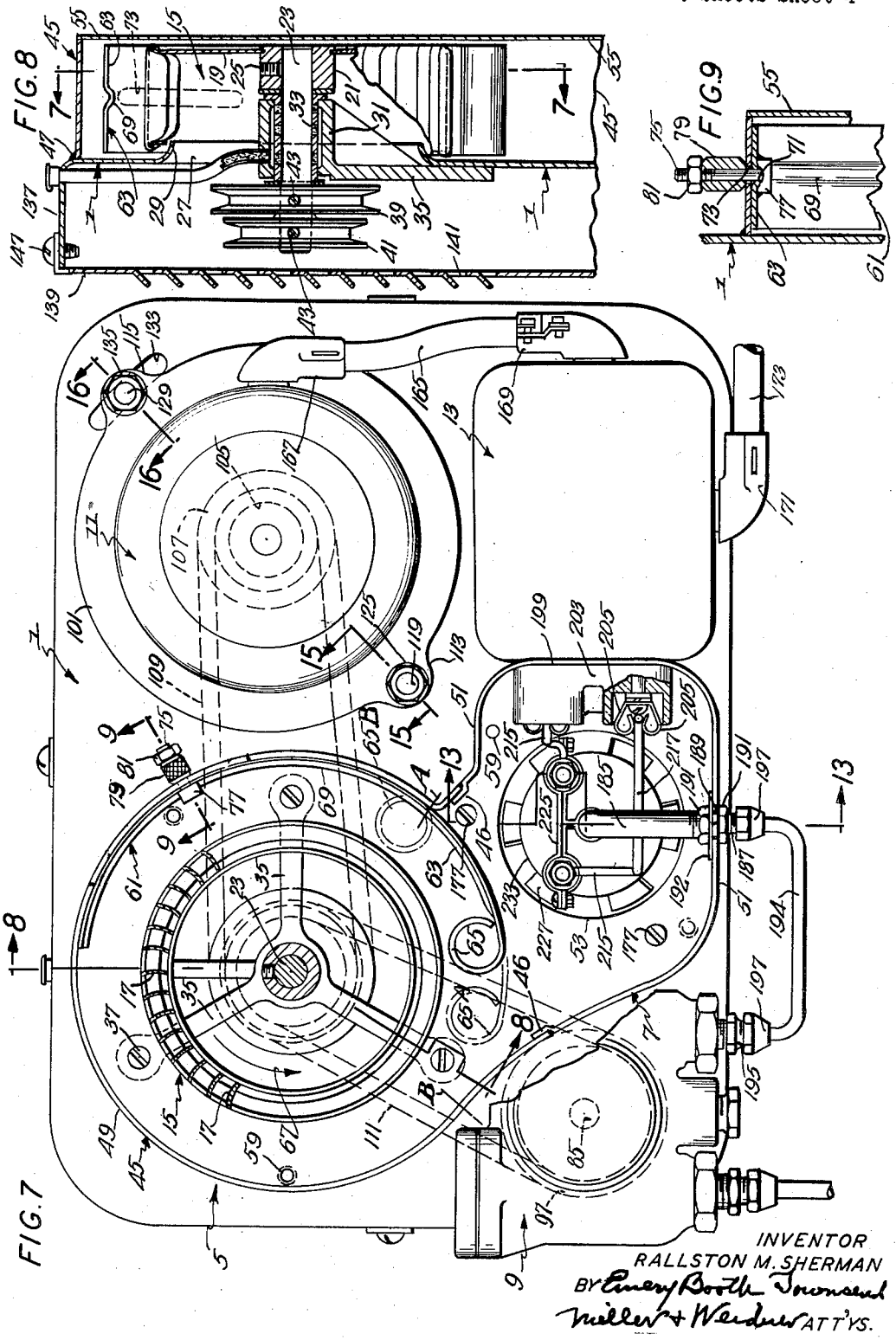


FIG. 7

FIG. 8

FIG. 9

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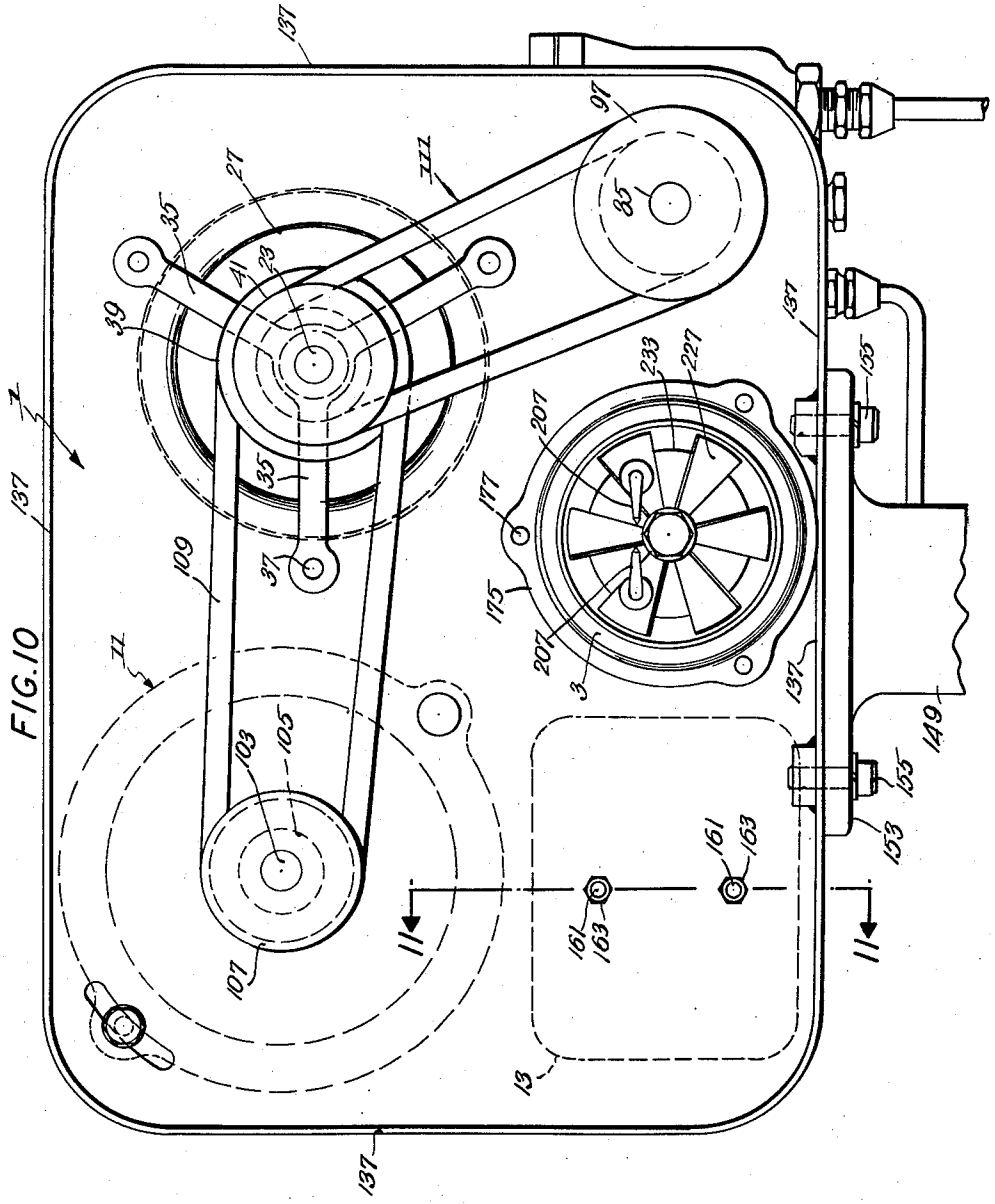


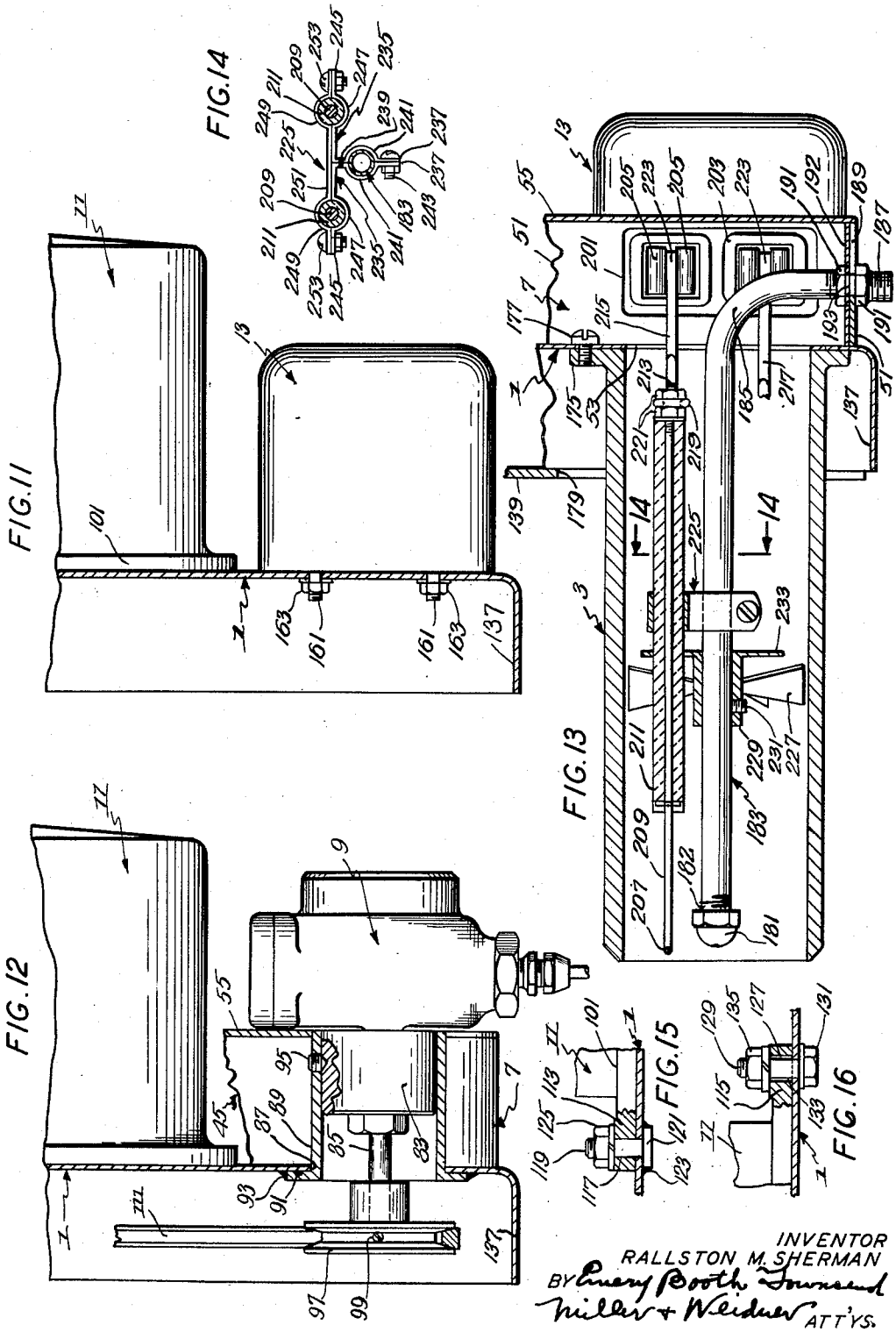
FIG. 10

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United States Patent Office 2,897,885 Patented Aug. 4, 1959

2,897,885

FLUID FUEL BURNER

Rallston M. Sherman, Glastonbury, Conn., assignor to The Silent Glow Oil Burner Corporation, Hartford, Conn., a corporation of Connecticut

Application June 29, 1954, Serial No. 440,112

9 Claims. (Cl. 158—76)

My invention relates to combustion apparatus, particularly but not exclusively to oil burners of the gun type, and includes an air blower or fan of novel construction for use in such apparatus and for other purposes.

The invention has among its objects a gun type oil burner having a compact arrangement of its component parts with provision for ready access to the same for inspection, replacement and repair, and with provision for readily securing dynamic balance of such parts so as to minimize vibration and thus secure silent operation, and one having an air blower or fan with improved means for regulating its effective air discharge capacity. These and other objects of the invention will be best understood from the following description when read in the light of the accompanying drawings of a specific embodiment of the invention, while the scope of the invention will be more particularly pointed out in the appended claims.

In the drawings:

Fig. 1 is an elevation of a house heating or like boiler of the coal burning type with an oil burner according to the present invention applied thereto as a so-called "replacement";

Fig. 2 is an elevation of another form of house heating or like boiler of a type designed for oil burning with an oil burner according to the present invention applied thereto;

Fig. 3 is a front elevation of the oil burners according to Figs. 1 and 2, that is to say, the oil burners of those figures as viewed from the right;

Fig. 4 is a rear elevation, with parts broken away, of the oil burners according to Figs. 1, 2 and 3;

Fig. 5 is an elevation of the oil burners according to Figs. 3 and 4 as viewed from the right;

Fig. 6 is an elevation of the oil burners according to Figs. 3 and 4 as viewed from the left;

Fig. 7 is an elevation corresponding to Fig. 3, with the cover for the fan casing and associated air discharge conduit removed and with parts broken away;

Figs 8 and 9 are, respectively, fragmentary sections on the lines **8—8** and **9—9** of Fig. 7;

Fig. 10 is an elevation corresponding to Fig. 4, with the rear cover plate of the burner removed;

Fig. 11 is a fragmentary section on the line **11—11** of Fig. 10, with parts in elevation;

Fig. 12 is a section on the line **12—12** of Fig. 3, with parts omitted and parts in elevation;

Fig. 13 is a section on the line **13—13** of Fig. 7, with parts in elevation;

Fig. 14 is a section on the line **14—14** of Fig. 13, with parts omitted; and

Figs. 15 and 16 are, respectively, fragmentary sections on the lines **15—15** and **16—16** of Fig. 7.

The embodiment of the burner illustrated from its general aspects comprises a vertical sheet metal panel **1** from the rear side of which projects a blast tube **3** in registry with an opening in the panel, while on the front side of the panel are mounted an air fan indicated in its entirety by the numeral **5**, a conduit **7** which conducts air from the air fan to the opening in the panel with which the blast tube registers, an oil pump **9**, an electric motor **11** for driving the fan and oil pump, and an ignition transformer **13**, the motor, fan and oil pump having shafts which extend through the panel to its rear side and at said side carrying pulleys about which pass driving belts for enabling the motor to drive the fan and oil pump.

Referring particularly to Figs. 7 to 10 of the drawings, the fan comprises a rotor **15** of the so-called "squirrel-cage" type having a circumferential series of fan blades **17**. As shown, this series of blades is carried at the periphery of a disc-like plate **19** mounted on the hub **21** of the rotor. As shown, the rotor is carried at the end of the rotary shaft **23** to which it is removably secured by the set screw **25** carried by the hub **21**. As illustrated, the panel **1** is formed with an opening **27** concentric with the rotor and communicating with the space surrounded by the series of fan blades so as to conduct air from the rear side of the panel to such space. About the periphery of this opening the panel is struck up to form the curved wall **29** (Fig. 8), which wall converges toward the front side of the panel to form a nozzle, which construction it has been found prevents the whistling or roaring noise which otherwise would sometimes be created when the fan is in operation.

As shown, the fan rotor shaft **23** is removably mounted in a bearing comprising the outer sleeve **31** (Fig. 8) and inner sleeve **33** non-rotatably carried by the sleeve **31**, this bearing being received within the opening **27** of the panel for making a compact arrangement of parts. For supporting the bearing the outer sleeve **31** is shown as integrally formed with the radially extending arms **35** (Fig. 7), the outer ends of which arms lie against the rear side of the panel and are removably secured thereto by screws **37**.

At the rear side of the panel the rotor shaft **23** carries the belt pulleys **39** and **41** removably secured to the shaft by set screws **43**. It will be observed that in this construction the shaft **23** with the rotor may be readily removed from the rotary bearing by pulling the shaft therefrom toward the right, as viewed in Fig. 8, when the cover of the fan casing hereinafter described is removed and the pulleys **39** and **41** are removed from the shaft, and after being so removed the rotor if desired may be readily removed from the shaft by loosening the set screw **25**.

It will also be observed from the construction so far described that the rotor lies wholly at the front side of the panel **1** in closely adjacent relation thereto, the panel forming one of the end walls of the fan casing. The peripheral wall of the fan casing is shown as formed by a portion of a sheet metal flange indicated in its entirety by the numeral **45** (Fig. 7). This flange, which is shown as formed in two sections jointed at **46** by lapped welded joints, projects normally from the front side of the panel and has its edge adjacent the panel continuously welded thereto as indicated at **47** (Fig. 8). The flange is shown as having a curvilinear part **49** which is concentric with the rotor and surrounds the latter throughout the major part of its circumferential extent in spaced relation thereto, the fan blades discharging air into the space between the two. This curvilinear part terminates at opposite ends thereof at points indicated by the intersection with the flange **45** of the broken lines A and B respectively (Fig. 7) so as to form an air discharge opening for the fan between said points. From these points the flange **45** is continued to provide a wall part **51** which surrounds an opening **53** in the panel, with which opening the blast tube **3** registers, this wall part **51** therefore forming the lateral wall of the conduit **7** which connects the discharge

opening of the fan to said opening 53 so that the fan may supply the blast tube with combustion air. As shown, the space surrounded by the flange 45 is closed by a cover 55 resting on the outer edge of such flange, this cover being removably held in place by screws 57 (Fig. 3) tapped into the screw holes 59 (Fig. 7) in the panel.

As shown, there is positioned interiorly of the fan casing a sheet metal member 61 of width approximately that of the flange 45. This member has an arcuate part 63 lying against the peripheral part 49 of the fan casing. The member is adjustable circumferentially of the rotor to in effect form a prolongation of adjustable length of the peripheral wall of the fan casing extending, from the point indicated by the intersection of the line A with such wall, across the air discharge opening of the casing. At its end adjacent this opening the arcuate part 63 of the member is shown as curled across its entire width to provide a portion 65 of approximately tubular shape extending transversely of said part and toward the rotor radially of the latter so as to cooperate with the series of rotor fan blades, which series rotates in the direction of the arrow 67, to form a so-called "cut-off" for said series. It has been found that when so shaped the cut-off tends to eliminate the whistling noise produced with cut-offs of other shape.

As shown, the arcuate part 63 of the member 61 is formed intermediate its width with a stiffening rib 69. Extending through a perforation 71 (Fig. 9) in this rib and an elongated slot 73 of the fan casing wall 45 is shown the shank 75 of a bolt having a head 77, which head is welded to the member part 63 so that the shank of the bolt forms a handle extending through the peripheral wall of the fan casing for use in adjusting the member 61 about the rotor. Preferably the length of the slot 73 is such that the cut-off at the end of the member 61 may be adjusted from its dotted line position 65A (Fig. 7) to its dotted line position 65B and to points therebetween, the slot 73 being of sufficient length to permit this adjustment and the arcuate part 63 of the member 61 preferably being of sufficient length to cover the slot in all positions of adjustment of said member and thus prevent leakage of air from the fan casing through the slot. As illustrated, a sleeve 79 is placed over the shank 75 to serve as a handle grip, and outwardly of this sleeve the shank is screw-threaded and carries a nut 81, which nut when tightened is effective to clamp the arcuate part 63 against that portion of the inner surface of the peripheral wall of the casing which it faces, thus to hold the member 61 in its adjusted positions. As this inner surface of the wall is concentric with the rotor the cut-off will be at the same radial distance from the series of fan blades in all positions of adjustment of the member 61.

Referring particularly to Figs. 7 and 12, the oil pump 9 is shown as having a casing which is provided on its side adjacent the panel 1 with a boss 83 operatively forming an integral part of said casing. Extending through this boss from the interior of the casing is the rotary driving shaft 85 for the internal mechanism of the pump, which mechanism may be of a known construction and therefore need not be here described. For supporting the pump in spaced relation to the panel 1, so that it may overlie the cover 55 for the air fan, and the discharge conduit 7 from the fan, to make a compact arrangement of parts, the panel is formed with an opening 87 (Fig. 12) through which extends a sleeve 89 to the front side of the panel, this sleeve at the rear side of the panel having a flange 91 welded to the panel as indicated at 93. The boss 83 of the oil pump casing is inserted in the outer open end of this sleeve and removably secured therein by a set screw 95. The shaft 85 of the pump extends through the sleeve 89 to the rear side of the panel where it carries a belt pulley 97 removably secured to the end portion of the shaft by a set screw 99. It will be observed that by removing the pulley from the shaft the pump may be readily removed from the panel upon loosening the set screw 95.

As shown, the motor 11 has a base portion 101 (Figs. 3 and 11) which rests against the front side of the panel 1, and has a shaft 103 (Fig. 10) which extends through an opening 105 in the panel to its rear side where it removably carries a belt pulley 107, this pulley being removably secured to the shaft by a set screw in the same way that the pulleys on the fan and pump shafts are secured to those shafts. As shown in Fig. 10, a belt 109 passes around this motor pulley and the fan pulley 39, while a second belt 111 passes around the fan pulley 41 and pump pulley 97. In this way the motor drives both the fan and pump. If the belt 109 should break, both the fan and pump will cease operating. If the belt 111 should break, the fan but not the pump will continue operating. If the pulley and belt arrangement were such that the motor were belted to the pump and the pump belted to the fan, breakage of the belt connecting the pump to the fan would cause the fan to cease operating while the pump continued to operate, which would result in hazardous conditions because oil would continue to be supplied by the burner for a period during which no air would be supplied for combustion purposes.

With applicant's arrangement of pulleys and belts the relative speeds of the pump and fan to each other and to the speed of the motor may be readily varied to increase or decrease the maximum oil burning capacity of the burner and to take care of fuel oils of different fuel values. This may be done by shifting the pulleys, all of which are preferably of different sizes, from shaft to shaft to secure various speeds of the fan and pump, and, where desired results cannot be secured in that way, by providing one or more pulleys of other different sizes as substitute pulleys.

A most important advantage of having the motor drive the fan and oil pump by use of pulleys and belts in the way shown is that it permits silent operation of the burner to be readily secured. In commercial practice the motor, fan and pump can seldom, if ever, be so constructed as individually, or collectively if rotated at the same speeds, to be in satisfactory dynamic balance when rotated at the necessary high speeds to secure their desired operations. Further, the tensions of the belts connected to the shafts of these instrumentalities act to throw the instrumentalities out of dynamic balance when their shaft bearings are loose or become worn. The lack of dynamic balance of the instrumentalities causes each, and the panel which supports them, to vibrate, and if provision is not made for dampening such vibrations noisy operation of the burner results. If in applicant's burner the motor, fan and pump were rotated at the same speed, as is done in the usual oil burner which has the motor directly connected to the fan and pump, each of these instrumentalities would set up a vibration of the same frequency, and the intensity of the vibration imparted by each to the unit consisting of the motor, fan, pump and supporting panel would be augmented by the intensity imparted thereto by each of the others, with the result that noisy burner operation would occur. On the other hand, it has been found that by rotating the motor, fan and pump at different speeds the vibration imparted by each to such unit will tend to neutralize or dampen the vibration tended to be imparted thereto by each of the others and that as a consequence the resultant vibration imparted to such unit will, if proper relative speeds of said instrumentalities are selected, be of such small intensity that silent burner operation will be secured. This resultant intensity imparted to the unit will, in any usual case, be less than that tended to be imparted thereto by the unit vibrating with the greatest intensity, and commonly will be less than that tended to be imparted to the unit by any of the instrumentalities. Such silent burner operation can readily be secured at the factory by selection of proper sizes of pulleys. If in the field noisy burner operation should

occur, as it sometimes will by reason of a change in the dynamic unbalance of one of the instrumentalities, particularly the fan when it collects dirt or when its shaft bearing wears, silent burner operation may be restored, at least in some instances, by shifting the pulleys about by trial from shaft to shaft. When this fails other pulleys of different selected sizes furnished for the purpose may be utilized as substitute pulleys. After silent operation of the burner is secured the fan and pump may be adjusted to supply the burner with the requisite amount of air and oil, respectively. In practice the ordinary commercial electric motor utilized will rotate at a speed of about 1725 r.p.m. It has been found in practice that commonly satisfactory silent operation of the burner disclosed will be secured with such a motor when the fan is rotated at about 1300 r.p.m. and the pump at about 1150 r.p.m., or the fan at about 1650 r.p.m. and the pump at about 1250 r.p.m., or the fan at about 1900 r.p.m. and the pump at about 1500 r.p.m., or the fan at about 2100 r.p.m. and the pump at about 1650 r.p.m. These combinations of speeds may be selected to suit the approximate amounts of oil and concomitant amounts of air to be supplied by the burner, the exact amounts being secured by subsequent adjustment of the pump and fan.

As illustrated (see Figs. 7, 15 and 16), the base **101** of the motor **11** is provided with diametrically oppositely projecting lugs **113** and **115**. The lug **113** is shown as provided with a perforation **117** (Fig. 15) through which and an aligned perforation in the panel extends the screw-threaded shank **119** of a bolt having a head **121** welded, as indicated at **123**, to the rear side of the panel, this shank at the outer side of the lug carrying a clamping nut **125**. The lug **115** is shown as provided with a perforation **127** (Fig. 16) through which extends the screw-threaded shank **129** of a bolt having a head **131**, the panel being formed with an arcuate slot **133** (Fig. 7) through which such shank passes. Screw-threaded on the shank at the outer side of the lug **115** is a clamping nut **135**. It will be observed that by loosening the nuts **125** and **135** the motor may be swung about the bolt having the shank **119** as a pivot for adjustably tightening the belt **109**, which latter does most of the work done by the belts because it drives both the fan and oil pump. It will also be observed that accidental loosening of the bolt **135** will not result in loosening of the belt **109**, because gravity will in such case tend to cause the motor to swing in belt tightening direction by reason of the pivotal mounting of the motor being in effect at the opposite side of its center of gravity from said bolt.

As shown, projecting rearwardly from the peripheral edge of the panel **1** is a flange **137** surrounding the pulleys and belts. Adjacent its outer edge this flange carries a sheet metal cover **139** (Figs. 4, 6 and 8) for the space surrounded by the flange so as to prevent access of foreign objects to the belts and the opening **27** in the panel leading to the interior of the fan rotor. As shown, the cover is provided with louvers **141** for affording access of air to the rear side of the panel for entrance through the opening **27** therein to the fan. As shown, the cover is secured to the flange **137** by forming the cover with a projecting tab **143** which rests on the upper surface of the top wall of the flange and with like tabs **145** which rest against the outer surfaces of the opposite vertical walls of the flange. As shown, these tabs are removably secured to the flange by screws **147** tapped into the flange. By removal of the screws the cover may be slid upward, when it is in a confined space such as shown in Fig. 2, for removing it from the flange.

The edge flange **137** of the panel **1** not only stiffens it and forms part of the casing for the parts at the rear side of the panel but forms convenient means for attaching the panel to the support for the burner. In Fig. 1 the panel is shown as supported by a bracket **149** the base **151** of which rests on the floor F in front of what normally would be the ash-pit door of the boiler **152**. This bracket has at its upper end a flange **153** (Figs. 1 and 10) on which the lower length of the flange **137** rests, the flange **137** being removably secured to the flange **153** by the bolts **155**. In Fig. 2 the panel is shown as supported by an angle-bracket **157** carried by the casing **159** of the boiler to which the burner is applied, the lower length of the flange **137** resting on and being secured to this bracket in the same way as described in connection with the bracket **149**.

The ignition transformer **13** is shown as detachably secured to the panel **1** by providing the base of the transformer with projecting screw-threaded studs **161** (Fig. 11) which extend through perforations in the panel to the rear side thereof, at which side the studs carry removable clamping nuts **163**.

As shown, the casing of the motor **11** is connected to the casing of the transformer **13** by an electric cable **165** (Fig. 7) of sufficient flexibility to permit the motor to be adjustably swung on the panel in the way hereinbefore described. The leads in the cable for energizing the motor may in a known manner be detachably connected to the motor terminals (not shown) housed by the fitting **167** carried by the motor casing, while the leads at the other end of the cable may be detachably connected in a known manner to terminals housed by an outlet fitting **169** carried by the transformer casing. These fittings **167** and **169** are of a known construction which may readily be opened for attachment and detachment of the leads of the cable to and from the terminals housed by the fittings and for removal of the cable from the fittings. As further shown, the transformer casing is provided with a similar fitting **171** to which is connected a flexible or other conduit **173**. This fitting **171** may house terminals from which permanently extend leads within the transformer casing to the terminals of the transformer primary winding for energizing the transformer. Also the fitting **171** may house terminals from which permanently extend leads through the transformer casing to the terminals housed by the outlet fitting **169** to which the leads in the cable **165** are connected. Through the conduit **173** may extend from the terminals housed by the fitting **171** leads which extend to the control mechanism for connecting through such leads the motor and transformer to the power line. The fitting **171**, like the fittings **167** and **169**, may be opened up for giving access to the terminals housed by it and for detachment therefrom of the conduit **173**.

As shown, the blast tube **3** at its rear end is provided with a circumferential flange **175** (Figs. 10 and 13) resting against the rear side of the panel **1** and detachably secured thereto by screws **177**, the back cover **139** being provided at its lower edge with a notch **179** (Figs. 4 and 13) through which the blast tube extends for permitting ready removal of such cover.

As best shown in Fig. 13, within the blast tube **3** adjacent its discharge end is an oil atomizing nozzle **181** removably screw-threaded on the screw-threaded end portion **182** of the oil supply pipe **183**. This pipe is shown as extending rearwardly through the opening **53** in the panel into the air supply conduit **7** leading from the fan casing to said opening. In the conduit the pipe is shown as formed with a downturned portion **185** the screw-threaded lower end **187** of which extends through a slot **189** (Figs. 7 and 13) formed in the lower portion of the peripheral wall **51** of said conduit. At opposite sides of this wall the screw-threaded end of the downturned portion of the pipe carries the nuts **191** which serve removably to clamp the pipe to the wall so as to support the pipe. The slot extends to the outer edge of the wall, and between the inner nut **191** and said wall is positioned a removable plate **192** which normally covers the slot so as to prevent escape of air from the conduit through the slot, this plate having a perforation **193** through which the pipe extends. The oil supply connection **194** leading from the screw-threaded outlet nipple

195 (Fig. 7) of the oil pump 9 to the nipple afforded by the screw-threaded end 187 of the pipe 183 is provided at each of opposite ends with a union coupling 197 for permitting its ready detachment from said nipples. When this connection 194 is so detached and the cover 55 of the fan casing and air conduit is removed and the outer nut 191 is backed off, the pipe 183 may be readily slid rearwardly to remove it from the slot 189 and blast tube, the plate 192 which is operatively carried by the pipe being removed with the latter.

As shown, the peripheral wall 51 of the air conduit 7 leading to the panel opening 53 is formed adjacent the transformer 13 with a flat vertical length 199 (Fig. 7) against which the adjacent flat side of the transformer casing abuts. This portion of the wall, as shown, is formed with an opening 201 (Fig. 13) through which extends into the interior of the conduit 7 at one side of the opening 53 an insulating block 203 which carries the two high potential outlet terminals of the transformer. As shown, each of these terminals comprises a member presenting a pair of opposed spring clip arms 205 (Figs. 7 and 13) to which the spark ignition electrodes of the burner are detachably connected. These electrodes comprise the terminals 207 (Figs. 10 and 13) between the ends of which the spark is struck. The electrodes have rearwardly extending portions 209 which extend through elongated insulating sleeves 211 from the rear ends of which they project as shown at 213 (Fig. 13). Connected to these projecting ends 213 are wire or rod-like conductors 215 and 217 each of which is bent at one end to form an eye or the like 219 through which the projecting rear end 213 of the associated electrode extends, these projecting ends being screw-threaded for receiving nuts 221 which clamp the eyes 219 thereto. Each of the conductors 215 and 217 has a terminal portion 223 which is removably received between the pair of spring arms of each of the high potential terminals of the transformer, as shown in Figs. 7 and 13.

The two insulating sleeves 211 carrying the electrodes are shown as removably clamped by a bracket member 225 to the oil supply pipe 183, so that when the oil supply pipe is slid rearwardly out of the blast tube the electrodes will be removed with it upon the terminal portions 223 of the conductors 215 and 217 being sprung or bent to remove them from between the spring clip arms 205 of the transformer outlet terminals.

Also carried by the oil supply pipe 183 within the blast tube is a series of radially extending stationary fan-like blades 227 for causing a whirling of the air being discharged from the tube. This series of fan blades is shown as carried by a hub 229 through the bore of which the oil supply pipe 183 extends, the hub slidably fitting the pipe and being normally fixedly secured thereto by a set screw 231. As shown, the hub at its rear end carries a baffle disc 233 which acts to throw the air passing through the tube outwardly so that it will contact the end portions of the blades 227 and in this way promote the whirling of the air. The blades and baffle plate adjacent the electrodes are formed with notches or openings to permit the electrode sleeves 211 to pass through them. The blades and baffle plate will likewise be removed from the blast tube with the oil supply pipe 183, and may be afterward removed from that pipe by removal of the atomizing nozzle 181 from the end of the pipe and loosening the set screw 231.

The bracket member 225 which supports the electrodes on the oil supply pipe 183, as best shown by Fig. 14, comprises two angle-members 235 having depending legs 237 the flat sides of which abut each other and are spot welded together at 239. These depending legs are formed with complementary bends 241 which embrace the oil supply pipe 183 and may be slid over the pipe when the atomizing nozzle 181 is removed therefrom, after which the bracket member may be secured to the pipe by tightening the clamping bolt 243. Each of the other legs 245 of the angle-members 235 is formed with a bend 247 complementary to a bend 249 of an otherwise flat strip 251 to form an opening for receiving the insulating sleeves 211. The sleeves may be slid through these openings and clamped to the bracket member by tightening the clamping bolts 253.

It will be understood that the panel 1, panel edge flange 137, and flange or wall 45 forming the lateral sides of the fan casing and air conduit 7, may, instead of being formed of sheet metal, be formed as a casting with said edge flange and flange 45 integral with the panel. It will also be understood that within the scope of the appended claims further deviations may be made from the form of the invention herein described without departing from the spirit of the invention.

I claim:

1. An oil burner having an oil pump, air fan rotor, and motor for driving said pump and rotor; a supporting panel; means separately and directly mounting said pump, rotor and motor on said panel at one and the same side thereof with each in laterally spaced relation to each of the others; the pump, rotor and motor having rotary operating shafts normal to said panel and extending therethrough to the opposite side thereof in parallel spaced relation; means connecting the motor shaft in driving relation to the pump and rotor shafts comprising pulleys on said shafts at said opposite side of said panel and driving belts passing about said pulleys, all of said shafts terminating, and said pulleys being positioned, close to said opposite side of said panel to provide for positioning said opposite side thereof in closely adjacent relation to a heater supplied by said burner; the panel being formed with an opening in laterally spaced relation to said rotor; a blast tube at said opposite side of said panel projecting therefrom in normal relation thereto with its end adjacent said panel in registry with said opening; and means carried by said panel at the same side thereof as said rotor forming a casing for said rotor and a conduit placing said casing in communication with said opening.

2. An oil burner according to claim 1 having an oil atomizing nozzle adjacent the discharge end of the blast tube, an oil supply pipe for said nozzle which carries the latter and extends therefrom through said tube and the panel opening with which said tube registers into the means which forms the conduit establishing communication between said opening and the rotor casing; said oil supply pipe having an end portion extending through and detachably carried by a side wall of said conduit, a pipe connection from the oil pump detachably connected to said end portion at the exterior of said conduit, and a removable cover for said conduit opposed to said panel opening whereby to permit ready insertion and withdrawal of said pipe and nozzle into and from said tube when said cover is removed and said pipe connection is detached.

3. An oil burner according to claim 1 having an oil atomizing nozzle adjacent the discharge end of the blast tube, an oil supply pipe for said nozzle which carries the latter and extends through said tube and the panel opening with which said tube registers into the means which forms the conduit establishing communication between said opening and the rotor casing; said oil supply pipe having an end portion extending through and detachably carried by a side wall of said conduit; a pipe connection from said pump detachably connected to said end portion at the exterior of said conduit wall; an ignition transformer carried by said panel at the exterior of said conduit and having an outlet terminal projecting into said conduit through an opening formed in a side wall of said conduit walls; spark electrodes in said blast tube adjacent the nozzle having extensions leading through said tube and the panel opening with which the tube registers into said conduit, said terminals and extensions having provision for ready attachment and detachment of the extensions to and from the terminals, and means operatively

attaching the electrodes with their extensions to said nozzle oil supply pipe as a unit therewith, said conduit having an opening normally closed by a removable cover opposed to said panel opening for permitting ready removal of said unit when said pipe connection is detached, said nozzle carrying pipe is detached from the side wall of said conduit, and said electrode extensions are detached from said terminals.

4. An oil burner having an oil pump, air fan rotor, ignition transformer, and motor for driving said pump and rotor; a supporting panel for said pump, rotor, transformer and motor; means separately and removably mounting said pump, rotor, transformer and motor directly on said panel at one and the same side thereof in laterally spaced relation; the pump, rotor and motor each having a rotary operating shaft normal to said panel in laterally spaced relation to each other, the panel being provided with openinfgs through which said shafts extend to the opposite side of said panel; the motor and pump shafts each carrying a belt pulley and the rotor shaft operatively carrying a pair of belt pulleys, all at said opposite side of said panel; a belt about the motor pulley and one of the rotor pulleys, and a separate belt about the other of said rotor pulleys and the pump pulley; walls projecting from said panel at said opposite side thereof and carried thereby at their edges adjacent that side; a removable cover adjacent the outer edges of said walls, which walls in conjunction with the panel and said cover form a flat casing for said pulleys and belts of shallow depth normal to said panel to enable said panel to be placed close to a heater to be supplied by said burner; an opening in said panel in laterally spaced relation to said rotor; a blast tube carried by said panel at said opposite side thereof and projecting normally therefrom with one end in registry with the last mentioned opening; an operatively continuous wall projecting from the first mentioned side of said panel and carried thereby at its edge adjacent said panel, which wall surrounds said rotor and said opening with which the blast tube registers; a removable cover at the free edge of the last mentioned wall, which wall in conjunction with said panel and cover forms a casing for said rotor having a lateral opening and a conduit connecting such opening to the panel opening registering with the blast tube; the opening in the panel through which the rotor shaft extends placing the casing for the belts and pulleys in communication with said casing for the rotor; and means operatively forming an opening to the atmosphere from said casing for said pulleys and belts.

5. An oil burner according to claim 4 in which the air fan rotor comprises a circumferential ring-like series of fan blades coaxial with the rotor shaft with the blades extending parallel to the line of extent of said shaft, the walls of the opening in the panel placing the rotor casing in communication with the casing for the pulleys and belts surrounding said shaft, a bearing for said shaft, and means carried by the panel and extending across said opening for supporting said bearing.

6. An oil burner according to claim 4 in which the wall surrounding the panel opening in registry with the blast tube has a portion adjacent the side of the ignition transformer and has an aperture in said portion through which the output terminals of the transformer extend into the conduit formed by said wall at a position adjacent such panel opening, electrodes in said blast tube having extensions leading through said opening to said terminals, said terminals and the adjacent ends of said extensions having provision for ready attachment and detachment of said ends to and from said terminals, whereby upon removal of the cover associated with said wall said electrodes and their extensions may be readily inserted in and removed from said blast tube.

7. An oil burner having a supporting panel formed with a pair of laterally spaced openings, an air fan rotor mounted on said panel at one side thereof comprising a peripheral series of fan blades opposite one of said openings for drawing air through such opening from opposite side of the panel into the space surronded by said series and discharging such air outwardly of said rotor laterally thereof, a blast tube carried by said panel at said opposite side thereof and in registry with the other of said openings, means carried by said panel at the side thereof at which said rotor is positioned forming a casing for said rotor and a discharge conduit from said casing connecting the latter to the opening with which the blast tube registers, a motor mounted on said panel at the same side thereof as said casing and in laterally spaced relation to said casing, parallel laterally spaced shafts for said rotor and motor extending through said panel to the side thereof at which said blast tube is positioned, a pulley on each of said shafts at the last mentioned side of said panel, and a belt passing about said pulleys for connecting the motor shaft in driving relation to the rotor shaft.

8. An oil burner according to claim 7 in which the air fan rotor is mounted on a rotary shaft extending through that panel opening opposite which said rotor is positioned to the opposite side of said panel, a bearing for rotatably supporting said shaft, which bearing is positioned between said rotor and the pulley on said shaft and through which said shaft extends, and means carried by said panel extending over said opening for supporting said bearing.

9. An oil burner according to claim 7 in which the air fan rotor is mounted on a rotary shaft extending through that panel opening opposite which said rotor is positioned to the opposite side of said panel, a bearing for rotatably supporting said shaft, which bearing is positioned between said rotor and the pulley on said shaft and through which said shaft extends, and means carried by said panel extending over said opening for supporting said bearing; an oil pump carried by said panel at the same side thereof as said rotor at the exterior of the rotor casing and conduit and with the pump, motor and rotor in laterally spaced relation to each other; the pump having a shaft extending through said panel to the opposite side thereof in parallelism with the rotor and motor shafts; the motor and pump shafts each carrying a belt pulley and the rotor shaft operatively carrying a pair of belt pulleys all at said opposite side of said panel, a driving belt passing about the motor pulley and one of the rotor pulleys and a second driving belt passing about the other of the rotor pulleys and the pump pulley.

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