

March 14, 1950

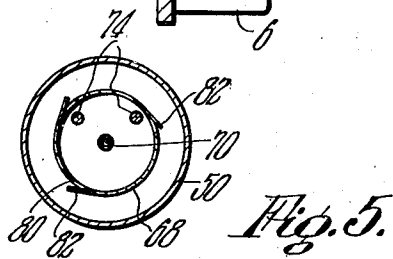
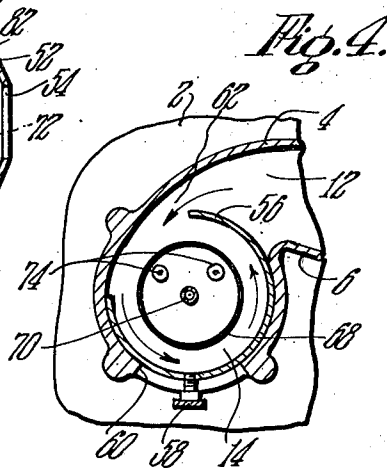
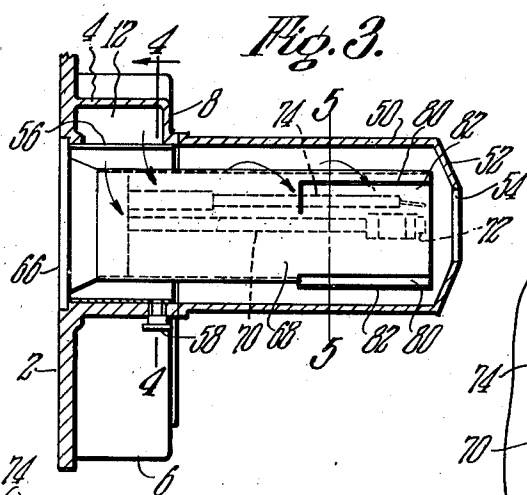
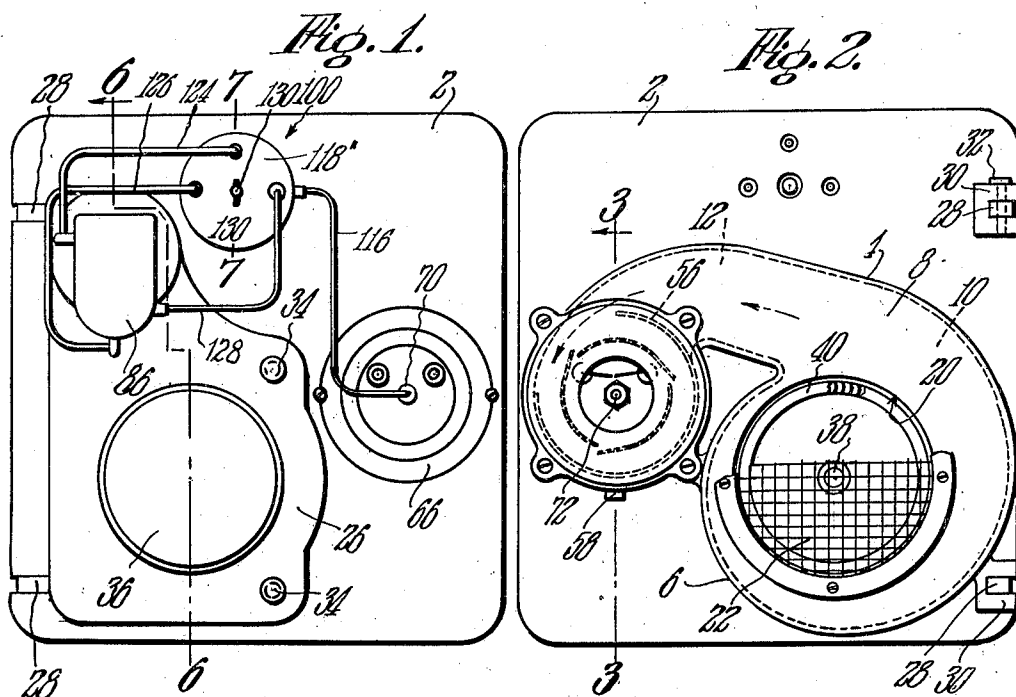
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2,500,344

OIL BURNER APPARATUS

Filed June 3, 1946

2 Sheets-Sheet 1



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Fig. 6.

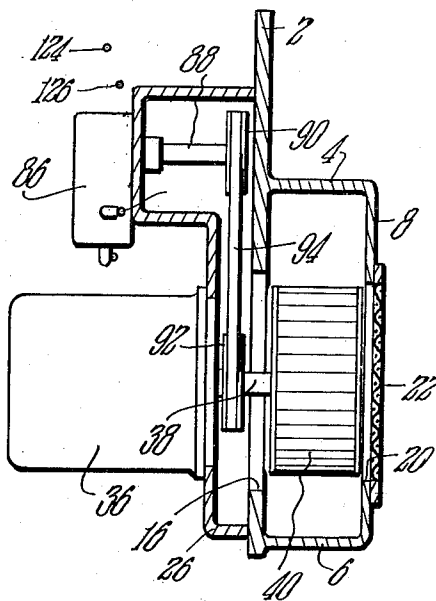


Fig. 7.

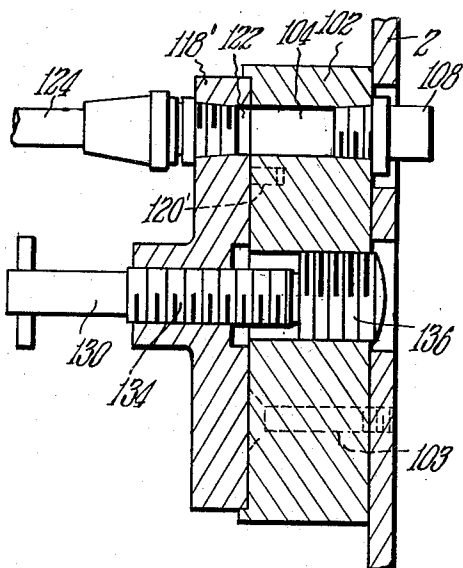
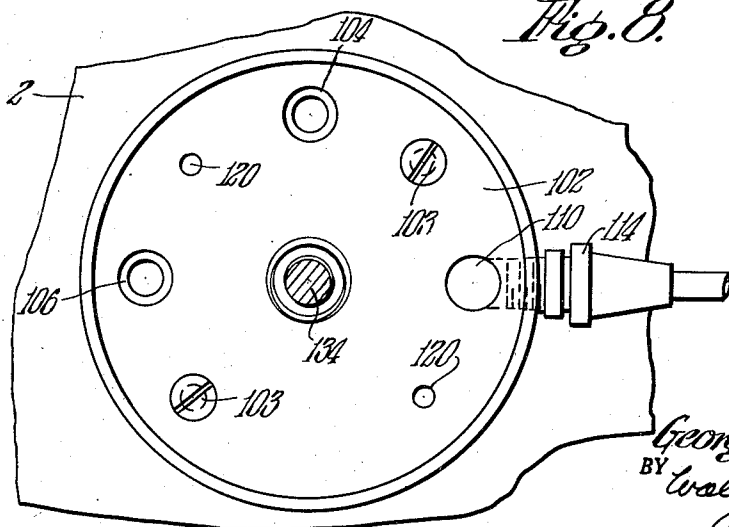


Fig. 8.



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UNITED STATES PATENT OFFICE

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OIL BURNER APPARATUS

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4 Claims. (Cl. 158—76)

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This invention relates to fuel burning apparatus and is directed more particularly to oil burner apparatus.

The principal object of the invention is the provision of oil burning apparatus which is of novel form for its economical production and its efficiency and low cost operation.

According to certain features of the invention, the burner apparatus includes a support from which a blast tube extends that is adapted to be inserted in a furnace or boiler. Said blast tube is readily removable from said support and means for supplying air is movable relative to said support so as to be accessible for inspection and servicing.

According to other features of the invention, separable connecting means is provided between the fuel pump and the blast tube and between said pump and the fuel supply which cooperates with the movable air supplying means and the removable blast tube to enhance the inspection and servicing of the apparatus.

According to special features of the invention, a blast tube has a conical centrally apertured outer end and a controlled flow of air is delivered tangentially to the periphery of said tube at its inner end. An inner tube is disposed within and spaced from the blast tube providing a longitudinally extending annular air space therebetween. A fuel nozzle and igniting means are disposed within said inner tube at its outer end and said tube at its outer end is provided with circumferentially spaced longitudinal slots and outwardly extending scoop-like members adjacent thereto.

Air entering the inner end of the blast tube moves forwardly of the annular air space in helicoid fashion and by the resultant wall friction becomes a conical flow and is discharged through the opening of the conical blast tube.

The air is discharged so that it forms a complete circle and is in the form of radial rays extending radially at an angle according to a predetermined angle of the conical end wall. A portion of the air is scooped through the slots into the inner tube, which is smaller in diameter than the blast tube, and flows at an increased velocity in said inner tube in helicoid fashion and resolving into a cone by action of the air in the air space. In this way not only is air supplied for proper combustion thereby tending to reduce operating costs and efficiency but a stable condition exists in a combustion chamber overcoming unfavorable conditions brought about by changes in atmospheric pressures.

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With the foregoing and various other novel features and advantages and other objects of my invention as will become more apparent as the description proceeds, the invention consists in certain novel features of construction and in the combination and arrangement of parts as will be hereinafter more particularly pointed out in the claims hereunto annexed and more fully described and referred to in connection with the accompanying drawings wherein:

Fig. 1 is a front elevational view of an oil burner apparatus embodying the novel features of the invention;

Fig. 2 is a rear elevational view of the oil burner apparatus shown in Fig. 1;

Fig. 3 is a sectional elevational view on the line 3—3 of Fig. 2;

Fig. 4 is a sectional elevational view on the line 4—4 of Fig. 3;

Fig. 5 is a sectional elevational view on the line 5—5 of Fig. 3;

Fig. 6 is a sectional elevational view on the line 6—6 of Fig. 1;

Fig. 7 is an enlarged sectional elevational view on the line 7—7 of Fig. 1; and

Fig. 8 is a plan view of the pipe coupling body shown in Fig. 7.

Referring now to the drawings more in detail, the invention will be fully described.

A support 2 is provided which is more or less plate like and which may have a base or foot of any desired form to facilitate locating the support in vertical position in front of a boiler or the like. The base forms no part of the invention for which reason it is not shown.

On the rear side of the plate there are upper and lower horizontally extending walls 4 and 6 and an outer wall 8 arranged to provide an air receiving chamber 10 from which extends a narrowing air delivery passageway 12 that is connected to a circular air chamber 14. For purposes of distinction the chambers 10 and 14 may be called primary and secondary chambers.

The support 2 is provided with an opening 16 and the wall 8 is provided with an opening 20 over which is a grill indicated by 22.

A swinging member 26 at the forward side of the support has ears 28 adjacent upper and lower sides thereof which are disposed between ears 30 on the rear side of the support 2 and to which said ears 28 are hinged by pins such as 32.

Screw members 34 threadedly engage the support 2 and extend through the member 26 to hold the member 26 in place against the support 2.

A motor 36 is secured in any suitable manner to

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the member 26 and has a shaft 38 to which is fixed a fan or air impeller 40. With the member 26 in place against the support 2 the fan is disposed in the air chamber 10 so that on rotation of the fan air is drawn through the opening 20 and propelled through the passageway 12 to the air chamber 14.

Extending forwardly from the chamber 14 there is a tubular member in the form of a blast tube 50 which is adapted to extend into the fire box of a boiler. This has a forwardly inclined or conical end wall 52 provided with a discharge outlet or opening 54.

An air regulating member 56 is rotatable in the air chamber 14. A clamp screw 58 is in threaded engagement therewith and is movable in a circumferential slot 60, as shown more clearly in Fig. 4.

By rotating the member 56 in one direction or the other the said member may be adjusted to vary the opening 62 into chamber 14 and thereby control the flow of air into the tube 50, see Fig. 4.

A plate 66 is carried by the support 2 and is arranged for ready and easy withdrawal therefrom. An inner air tube 68 is secured to and extends from the plate 66 within and spaced from the tube 50 to provide an air space between it and blast tube 50.

An oil tube 70 within the tube 68 and extending from plate 66 has a nozzle 72 on the outer end thereof. Electrodes 74 within said tube 68 also extend from said plate 66. The oil tube, nozzle and electrodes may be of usual form and are carried by the plate 66 as is the tube 68 so that they may be easily and readily withdrawn as a unit from the tube 50 by removing the plate 66 from the support 2.

Air is delivered to the air chamber 14 tangentially so that it travels forwardly of the tubes in the annular space therebetween. The forward end of the tube 68 is provided with longitudinal slots 80 with adjacent portions 82 of the tube displaced outwardly. These portions 82 function as scoops so that air around the inner tube 68 is directed inwardly of said tube.

A pump 86 is carried by the member 26 and it has a shaft 88 extending rearwardly therefrom which has fixed thereto a pulley 90. A pulley 92 fixed to the shaft 38 of the motor 36 is connected by a belt 94 to the pulley 90 whereby the pump is driven by the motor.

Connecting means 100 for connecting the pump, fuel supply lines and nozzle pipe 70 will now be described with particular reference to Figs. 7 and 8.

A body 102 is secured to the support 2 by screws 102 or the like and has openings 104 and 106 therethrough. These openings are connected by connections such as 108 to pipes which extend to a fuel supply tank. One of the openings and the pipe connected thereto may function as the suction line and the other as the return line.

An opening 110 is connected by a passageway 112 to a fitting 114 from which extends a pipe 116 connected to the nozzle tube 70.

A cap 118' has pins 120' thereon which are receivable in sockets 120 provided in the body whereby the cap is held against rotation relative to the body when in engagement therewith. The said cap is provided with openings such as 122 which register with those of the body when the cap is in place thereon.

The upper opening 104 of the body is connected through the opening 122 in the cap and a pipe 124

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to the pump and the opening 106 is similarly connected through a pipe to said pump. Thus the pump is connected to the fuel supply through the connecting means and the opening 110 in the body which is connected to the nozzle pipe is connected through the cap 118' and a pipe 128 to the pump 86.

A screw member 130 has threaded portions 134 and 136 for engagement with the cap 118' and body 102 respectively. The threaded portions are arranged with threads of different pitch and adapted for ready and quick connecting and disconnecting of the cap and body thereby to easily and quickly disconnect the pump from the fuel supply and return pipes and from the nozzle tube and to provide a tight connection between the body and cap.

The cap being removable from the body and the member 26 being swingable relative to the support the structure readily facilitates inspection and servicing of the parts. By swinging the member 26 away from the support 2 the fan is removed from the air chamber 10 so as to be readily accessible and this is accomplished without removing the plate 66 and associated parts which, however, may be removed without the necessity of disturbing either the member 26 or the cap 118' of the connecting means.

Air is delivered through opening 62 in controlled volume to the chamber 14 and tangentially thereof so that it moves forwardly or outwardly in the annular space between tubes 68 and 50. The air moves forwardly in a swirling or helicoid manner and assumes a conical flow as it is discharged through opening 54 in a radial and forward angular manner. A portion of the air is directed into the inner tube 68 by the members 82 from whence it flows more or less in the form of a conoid within the outer conoid.

Thus the air is delivered into a combustion chamber in such a manner as to provide stable conditions overcoming varying atmospheric conditions and thereby bringing about the desired efficiency with a minimum of fuel consumption.

The invention may be embodied in other specific forms without departing from the essential characteristics thereof. Hence, the present embodiments are therefore to be considered in all respects merely as being illustrative and not as being restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all modifications and variations as fall within the meaning and purview and range of equivalency of the appended claims are therefore intended to be embraced therein.

What it is desired to claim and secure by Letters Patent of the United States is:

1. Oil burner apparatus comprising in combination, a vertically disposed support having rear and forward sides and provided with means forming an air receiving and a circular air chamber on its rear side and a passageway connected at opposite ends to said chambers and narrowing from the air receiving to the circular air chamber, said support having an opening extending therethrough from the forward side thereof into communication with the air receiving chamber, a swinging member hinged to said support having inner and outer sides and arranged to swing between a closed position where its inner side abuts the forward side of the support and an open position away therefrom, means to hold the swinging member in closed position, a motor secured to said swinging member pro-

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vided with a shaft extending outwardly from the inner side thereof, and an air propeller on said shaft arranged to pass through the opening of the support as the swinging member is swung between open and closed positions and to be disposed in the air receiving chamber when said member is in closed position.

2. Oil burner apparatus comprising in combination, a vertically disposed support having rear and forward sides and provided with means forming an air receiving and a circular air chamber on its rear side and a passageway connected at opposite ends to said chambers and narrowing from the air receiving to the circular air chamber, said support having an opening extending therethrough from the forward side thereof into communication with the air receiving chamber, a swinging member hinged to said support having inner and outer sides and arranged to swing between a closed position where its inner side abuts the forward side of the support and an open position away therefrom, means to hold the swinging member in closed position, a motor secured to said swinging member provided with a shaft extending outwardly from the inner side thereof, an air propeller on said shaft arranged to pass through the opening of the support as the swinging member is swung between open and closed positions and to be disposed in the air receiving chamber when said member is in closed position, a fuel pump secured to said support, driving connections between said pump and motor, means secured to said support adapted for connection to a fuel supply, a cap for overlying said means, rigid means connecting said fuel pump and cap whereby as the swinging member is swung between open and closed positions the said cap is moved towards and away from said means, and means for securing said cap to said means.

3. Oil burner apparatus comprising in combination, a support having means on a rear side thereof forming air receiving and circular air chambers and a narrowing passageway extending from the former to the latter and connected tangentially thereto, a straight sided blast tube connected to and extending outwardly from the circular air chamber having a restricted outlet at an outer end thereof, means for propelling air from the air receiving chamber through the passageway to and through the blast tube and out said restricted outlet, an inner air tube extending outwardly from said support concentrically disposed within and spaced from said blast tube having an outer open end disposed inwardly of the outer end of the blast tube, the outer end of said inner air tube being provided with circumferentially spaced longitudinal slots extend-

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ing inwardly from said end, and portions of said tube at corresponding sides of said slots being displaced outwardly from said slots and tube providing air scoops in the space between said blast and inner tubes.

4. Oil burner apparatus comprising in combination, a support having forward and rear sides, upper and lower walls connected to the rear side of said support and an outer wall connected to outer edges of said walls cooperating with said support to provide an air receiving chamber and a circular air chamber with a gradually narrowing air passageway extending from the receiving to the circular air chamber, said outer wall being provided with an opening, a straight sided blast tube extending outwardly from said outer wall from said opening, means in said circular chamber for controlling the flow of air to said blast tube, the outer forward end of said blast tube being provided with a restricted outlet, an inner air tube extending forwardly from the rear side of said support having an inner closed end disposed in said circular air chamber and an outer end portion spaced from and disposed concentrically relative to the blast tube, the outer end portion of said inner tube being provided with circumferentially spaced longitudinal slots extending inwardly from the end thereof and portions of the tube at corresponding sides of the slots being displaced outwardly relative to the slots and tube providing air scoops in the space between said blast and inner tubes.

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