April 26, 1932. F. H. CORNELIUS 1,855,339

LIQUID FUEL BURNER

Filed April 17, 1928 4 Sheets-Sheet 1

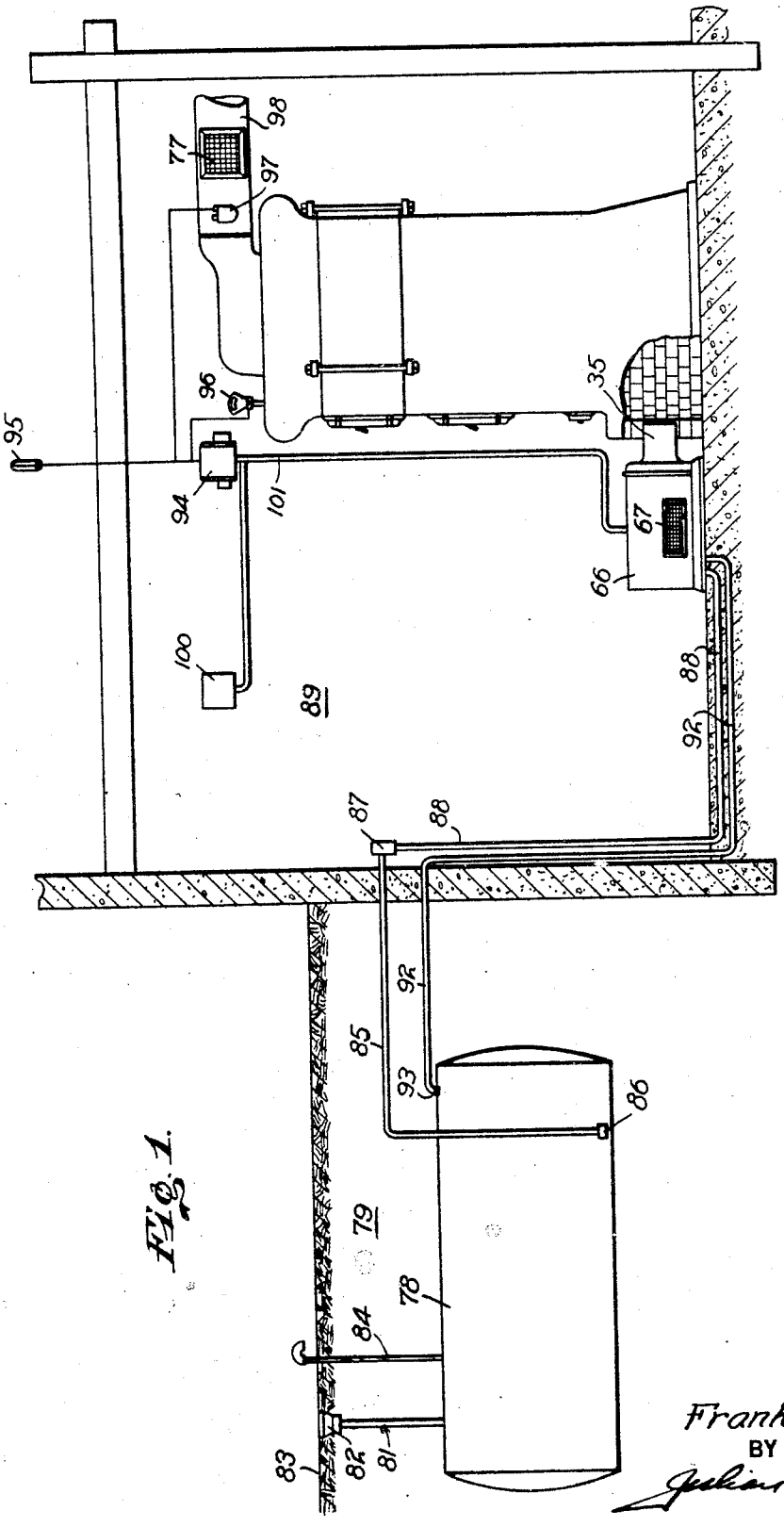

Fig. 1.

INVENTOR
Frank H. Cornelius
BY
Julian H. Mendig
ATTORNEY

April 26, 1932. F. H. CORNELIUS 1,855,339

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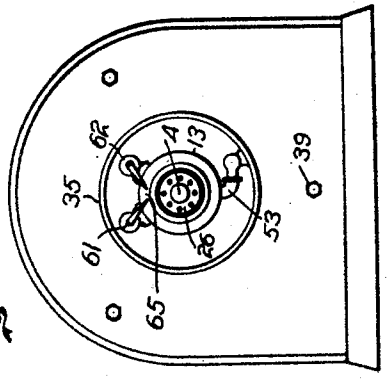

Fig. 4.

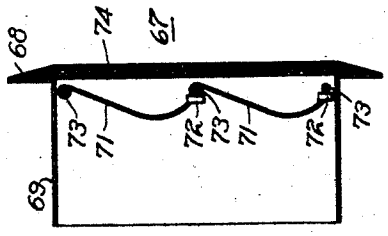

Fig. 11.

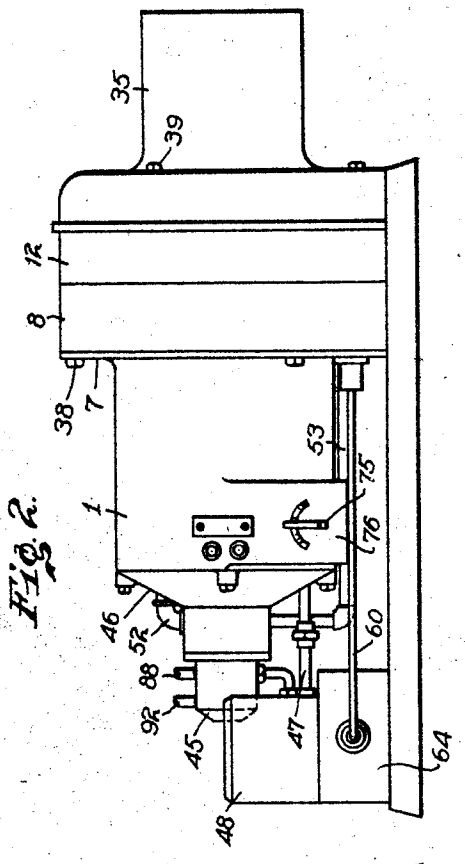

Fig. 2.

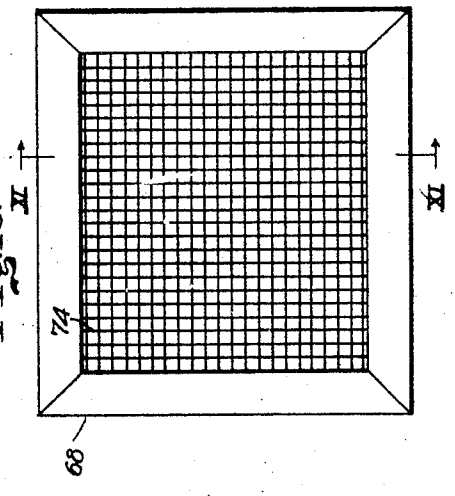

Fig. 10.

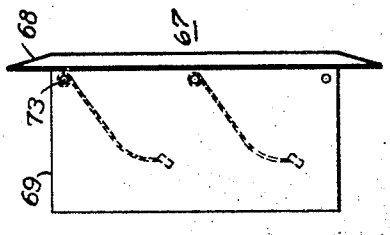

Fig. 12.

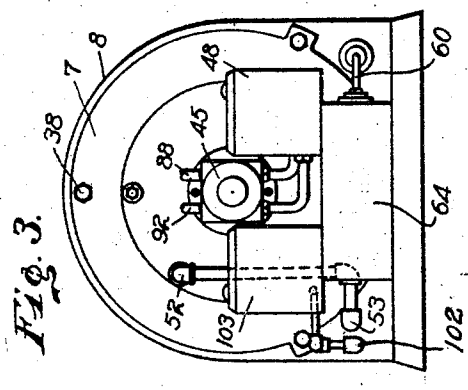

Fig. 3.

INVENTOR

Frank H. Cornelius

BY

Julian A. Wheeler

ATTORNEY

April 26, 1932. F. H. CORNELIUS 1,855,339

LIQUID FUEL BURNER

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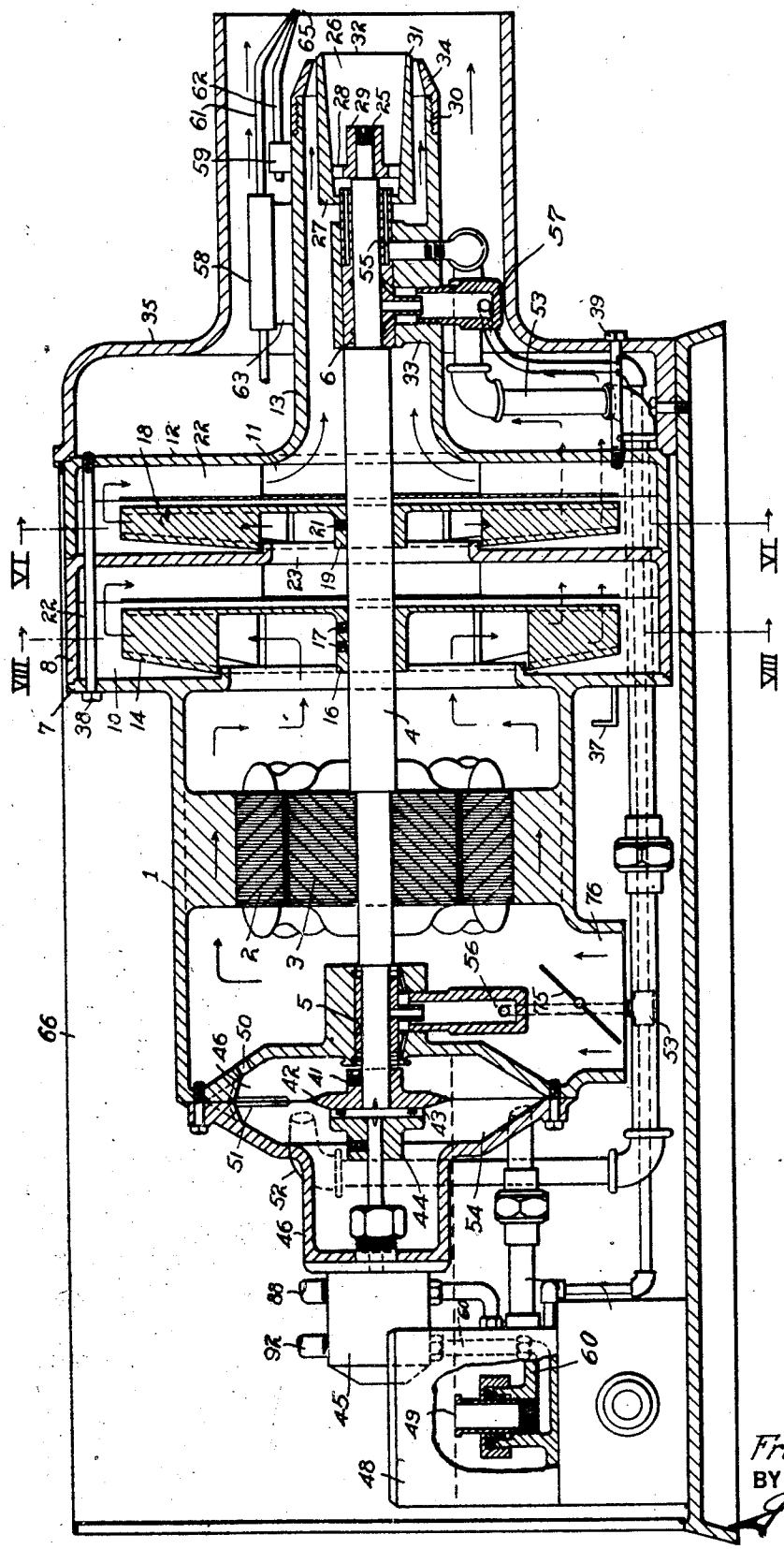

Fig. 5.

INVENTOR
Frank H. Cornelius
BY Julian H. Kendig
ATTORNEY

April 26, 1932. F. H. CORNELIUS 1,855,339

LIQUID FUEL BURNER

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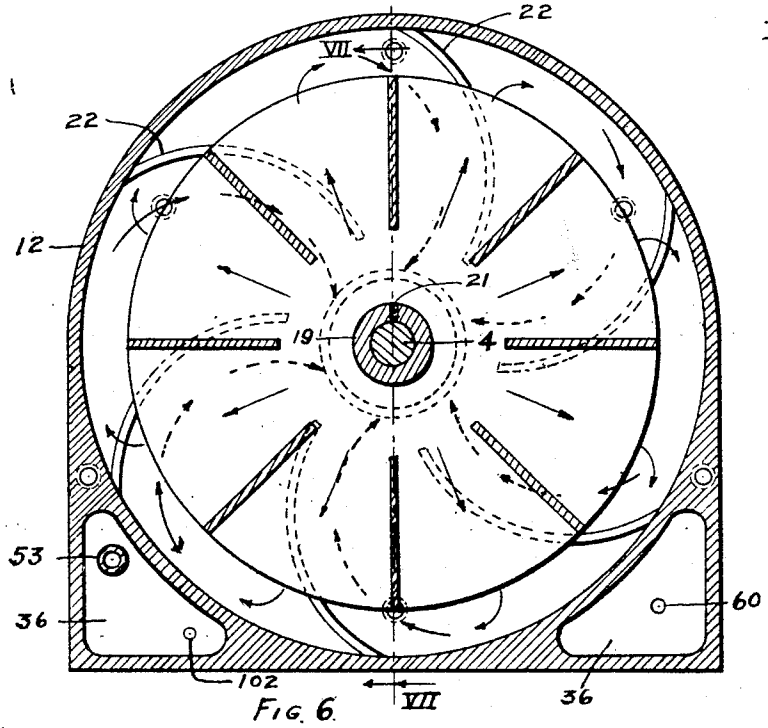

FIG. 6.

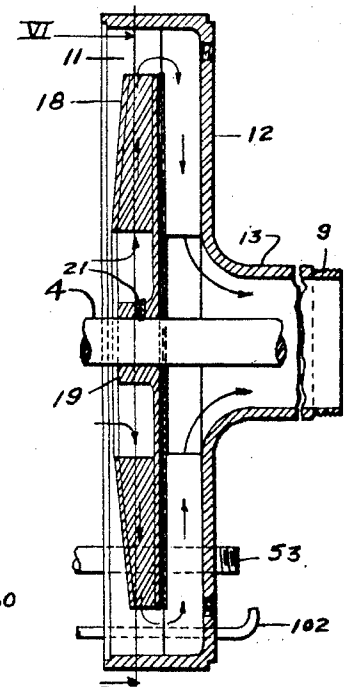

FIG. 7.

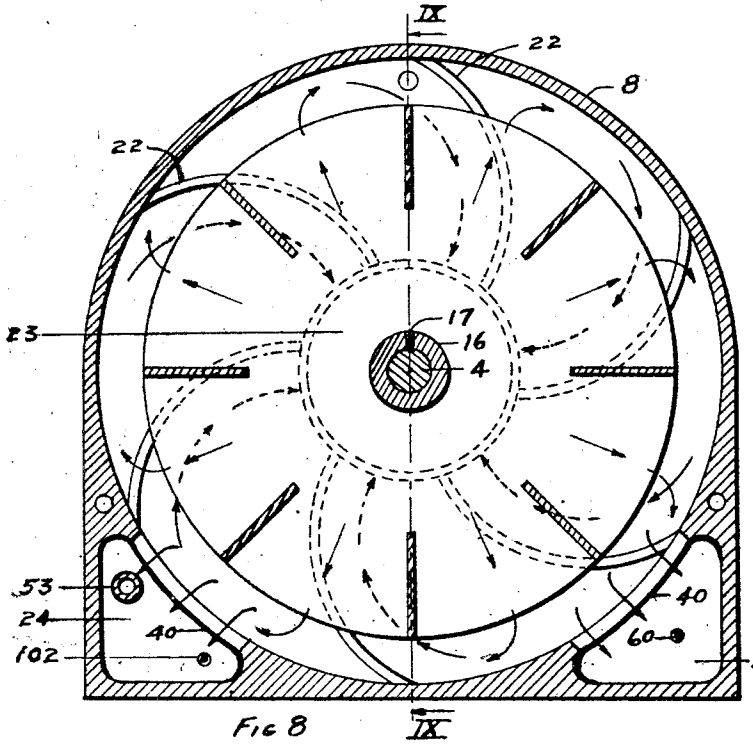

FIG 8

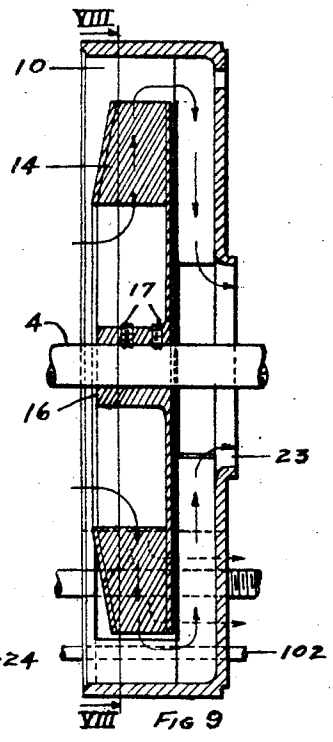

FIG 9

INVENTOR
FRANK H. CORNELIUS.

BY Julian H. Mendis
ATTORNEY

Patented Apr. 26, 1932 1,855,339

UNITED STATES PATENT OFFICE

FRANK H. CORNELIUS, OF SWISSVALE, PENNSYLVANIA

LIQUID FUEL BURNER

Application filed April 17, 1928. Serial No. 270,605.

My invention relates to fuel burners and more particularly to burners employing oil as a fuel.

One object of my invention is to provide a burner of the above described type that shall generate a current of air, both for procuring the propulsion of the atomized fuel and the complete combustion thereof.

Another object of my invention is to provide an oil burner that shall be sealed into the wall of a furnace so that substantially all of the air required for combustion will be supplied by the burner.

Still another object of my invention is to provide a burner of the above described type that is sealed into the wall of the furnace that shall comprise a ventilating means in the enclosed casing of the burner that is actuated to open position by the current of air generated within the burner.

A further object of my invention is to provide a sealed furnace with damper means in the flue and in the burner casing that shall automatically be closed or opened to correspond with the status of the burner to thereby prevent the fire box of the furnace from being cooled by a passage of air therethrough when the source of heat is cut off.

A still further object of my invention is to provide an enclosed burner of the above described type having air compressing means that shall compress the air in different stags; the one stage supplying secondary air for combustion; the other stage of higher pressure being employed to propel the atomized fuel and to supply some of the air for combustion.

A still further object of my invention is to provide a burner, having different stages of compressed air, with damper means in the air passage thereof that shall provide regulation between the air supplies in order to assure complete combustion at all times.

A still further object of my invention is to provide an oil burner of the above described type that shall supply oil for combustion without passing the oil through a needle valve or other obstructionable structure.

Still another object of my invention is to provide a reservoir for a burner of the above described type having an adjustable oil leveling device that shall provide a predetermined height of oil therein from which a supply is provided to the atomizing cup.

A still further object of my invention is to provide a reservoir for oil associated with a burner of the above described type that shall be raised into supply position when the burner is in operation and shall be lowered to out of supply position when the burner is shut down.

Heretofore, oil burners employed in the art provided a current of air to atomize or spray the fuel into the combustion chamber. Openings were left about the burner in the entrance of the combustion chamber through which the oxygen required for combustion was supposed to be automatically supplied. I have found by experiment, however, that the difficulty experienced in obtaining complete combustion in oil burners has been caused by the lack of oxygen required to obtain correct combustion. This failure of the air supply through the said opening from time to time was probably caused by a stoppage in the flue, humidity in the atmosphere, the location and height of the chimney or of any one or a combination of the various causes of poor drafts.

In practising my invention I provide an oil burner in which the air for atomization is supplied in a manner somewhat similar to that found in the art, but is combined with the additional structure that supplies all of the air required for combustion. Regulating means is supplied for the air at several parts of the structure so that complete combustion is assured under all conditions. I am able to accomplish this result by completely enclosing the burner end of my structure within the combustion chamber which thereby receives air only through the source of supply within the burner, a sufficiency of which is always assured when the burner is in operation.

The above said construction provides further novelty to my invention as regulating means may be supplied both on the burner and on the flue, so that the air is completely shut off from the heated combustion chamber

when the air currents from the burner are shut off and the natural draft that would ordinarily pass therethrough will then automatically open a venting device in the flue or which will be opened when the natural draft is greater than that necessary to carry off the gases of combustion.

My invention will best be understood by referring to the drawings in which:

Figure 1 is a diagrammatical view of a complete installation and of a burner embodying my invention.

Figures 2, 3 and 4 are views in elevation of a particular form of my burner taken from its side, rear and front, respectively.

Figure 5 is a side view partly in elevation and partly in section of a particular form of a complete burner unit.

Figure 6 is a sectional view of the burner taken along the line VI—VI of Figures 5 and 7.

Figure 7 is a sectional view taken along the line VII—VII of Figure 6.

Figure 8 is a sectional view of the particular embodiment of my invention taken along the line VIII—VIII of Figures 5 and 9.

Figure 9 is a sectional view of the structure taken along the line IX—IX of Figure 8.

Figure 10 is a view in elevation of my venting means showing a particular embodiment thereof.

Figure 11 is a sectional view taken along the line XI—XI of Figure 10.

Figure 12 is a side view of my venting arrangement shown in Figure 10.

My invention comprises in general a casing 1 that supports a stator 2 of an electric motor having a rotor 3, mounted on a shaft 4, that is supported on bearings 5 and 6 and is the means for operating the burner that will now be described in detail.

The casing 1 is provided with an extended portion 7 that forms the rear wall of a low compression chamber 10 that is formed by a cover portion 8. The front surface of the cover portion 8 forms the rear wall of a second stage or high compression chamber 11 that is enclosed by a cover portion 12. The cover portion 12 contains an extended portion or air passage 13 that will be more fully described hereinafter.

A rotating fan or blade member 14 is contained within the low stage compression chamber 10 and is mounted on the shaft 4 by means of a hub 16 that is secured thereto by set screws 17. The high stage compression chamber 11 encloses a fan or blade member 18 that is supported on the shaft 4 by means of a hub 19 and set screw 21.

Referring to Figure 8, the cover portion 8 is shown in section disclosing air-directing vanes 22 that direct the air supplied by the blades 14 into the provided passages.

The air supplied from the exterior of casing 1 passes around and cools the motor as shown by the arrows, and is propelled by the blades 14 through a central annular opening 23 into the chamber 11 or into openings 24 for a purpose that will be hereinafter related. The air passing through the orifice 23 is further compressed by the rotating fan 18 and is directed by the vanes 22, contained within the face of the cover 12, into the air conduit 13 at a high velocity, the purpose of which will be described hereinafter.

Figures 5 to 9 clearly disclose the different types of blades or rotating fans that are required to produce the volume or pressure in the different air supplies. The short, broad blades 14 are employed to move a large body of air and to compress it only a minimum amount. The blades 18 are narrow but long and operate on that part of the air supplied by the blades 14 through the opening 23, to produce a much greater degree of compression. From many experiments that I have made I have found that blades bearing a relation similar to that disclosed in Figures 5 to 9 are the most economical in supplying air for both atomization and combustion. A single fan member might be employed to compress the air to the maximum degree required for fuel propulsion allowing an amount to expand to be employed in a manner similar to my above described secondary air but tests have proven that this method is not as economical as that produced by my preferred structure.

The front end of the shaft 4 contains a threaded portion 25 to which an atomizing cup 26 is attached and which is substantially similar to atomizing cups that have heretofore been supplied in the art. The sides of the cup 26 slope outwardly toward the front and terminate at the rear or support end in a projection or flange portion 27 that is employed to prevent the oil from flowing over this end and thereby forces the oil to pass along the sloping sides towards the front end of the cup. Holes 28 are provided in mounting hub 29 of the cup 26 to permit a constant flow of oil into the front end of the cup.

The front end of the cup 26 terminates in a sloping portion 31 that forms a knife edge 32 around the rim of the cup 26. The object of this sharp edge 32 is to permit the oil to leave the rim of the cup in a spray rather than permit it to collect thereon in drops and to be thrown therefrom in sludges rather than in a complete atomized state that is required to produce good combustion.

The air passage or conduit 13 projects substantially to the end of the cup 26 and contains a rib portion 33 that supports the bearings 6 and the shaft 4 that is aligned substantially centrally thereto. The end of the outer surface of this passage 13 contains a threaded portion 30 on which an annular sloping ring portion 34 is screwed and which provides an adjusting means for regulating the

distance at which the air supply in the high compression chamber is allowed to expand before striking the volume of oil that is thrown centrifugally from the rim 32 of the cup 26. By this adjustment, regulation is provided to adapt my burner so that it may employ different grades of oil as a fuel and also to diverge the flame to adapt it to various shaped combustion chambers within which it may be employed.

Completely enclosing the air conduit 13 is a secondary air conduit 35 that supplies the additional air for the complete combustion of the atomized fuel and which is directed into the furnace substantially concentric to the air conduit 13. This air supply passes from the low compression chamber 10 through the orifices 24 heretofore mentioned and passes through a similar orifice 36 in the walls of the high compression chamber 11, although not being in direct communication therewith, and passes into the secondary air conduit 35. The passages 24 contain a damper 40 that is operated by the rods 37 to regulate the amount of secondary air supplied to the conduit 35. By this means the exact amount of secondary air to produce complete combustion is obtained.

I will now describe my novel method of supplying the fuel to the atomizing cup in which needle valves and other means of possible obstruction are eliminated from the supply line. The rear or opposite end of the said shaft 4 is provided with a hub member 41 that contains an enlarged portion on its outer end that is circular in shape and comprises sides 42 beveled toward its outer circumference. A flexible connection 43 is attached to the hub 41 forming a flexible connection with a hub 44.

The hub 41 revolves within a chamber 46 that forms the closure member for the rear end of casing 1. The lower portion of the chamber 46 comprises a well 54 for the oil, the height of which is regulated by a leveling device 48 that will be described hereinafter. The upper portion of the chamber 46 comprises a slot portion 51 aligned with the beveled edge 42 of the hub 41 and is connected to an oil conducting conduit 52. The level of the oil in the well is regulated to have the said beveled edge 42 revolve therein and to throw the oil centrifugally into the slot 51, thereby passing it by means of the conduit 52 and a conduit line 53, through which it is carried by gravity, into an annular orifice 55, from which it will readily flow into the atomizing cup 26.

An aperture 50 may be provided in the wall of the chamber 46 through which air may be drawn when the burner is in operation, producing an area of reduced pressure above the well 54 within the housing 46. I have found this reduction in appreciable and as the motor operates at substantially constant speed the reduced pressure raises the level of oil in the well 54 until it engages the beveled sides of the hub 42. I employ this means of disconnecting the oil supply as a safety device to prevent a supply of oil from flowing into the atomizing cup and the air passages after the burner is shut down.

When the aperture 50 is employed the oil level in the well is below the beveled side 42 and is distant therefrom such an amount that the rise of the level when the burner is in operation will be in proportion to the air supply which will vary with the speed of operation of the motor. Thus, when the motor is building up speed or is slowing down, the oil supply will be increased or diminished in an exact predetermined manner proportionate to the amount of air flowing. That is to say, when the motor is slowing down the pressure within the chamber 46 is immediately increased with a corresponding lowering of the level of the oil in the well 54, and the supply to the atomizing cup is diminished.

In this manner, the flame of the burner is put out because of the shutting off of the oil supply and not because of the lack of atomizing air that heretofore caused oil to be fed to the combustion chamber after the flame of the burner was extinguished.

To provide a means of supply for the well 54 a fuel reservoir 48 is provided containing regulating means for varying the levels of the oil in the well 54. Oil is supplied to the reservoir 48 by one side of a twin pump 45 that is connected and operated by the hub 44 of the aforesaid universal joint on the rear end of the shaft 4. The supply side of the pump 45 provides an excess amount of oil to the reservoir 48 so that a sufficient supply will be on hand at all times.

A pipe 47 connects the bottom of the reservoir 48 to the lower extremity of the chamber 46. An overflow connection 60 is located at the bottom of the reservoir 48 and is connected to the return side of the pump 45. An extension 49 is so associated with the connection 60 that it may be raised or lowered through the greater part of its length. By this means, the height of the oil in the reservoir 48 will be that of the overflow or height of the extension 49. As the reservoir 48 is in communication with the chamber 54 the height of the oil in the chamber 54 will be the same as that of the reservoir 48. Thus the level of the oil in the chamber 54 may be raised or lowered by the variation of the extension 49. By this means I am able to adjust the height of the oil level in the well of the chamber 54 when a greater volume of heat is to be supplied by the burner or an oil of greater or less viscosity is employed than that for which the oil level was originally provided.

The high compression air passage 13 has on its upper wall the arcing terminal lugs 58

and 59 that support the arcing terminals 61 and 62, respectively. The lug 59 is directly connected to the metal of the passage 13, while the lug 58 is supported on the insulating member 63 to insulate the terminal 61 therefrom.

A high voltage transformer 64 is provided on the rear of the burner and is grounded to the casing 1, the other terminal of which is connected to the terminal 61 by a high voltage lead 60. By this means a spark may be provided at the tips 65 of the arcing terminals 61 and 62 that may be employed to ignite the atomized fuel at the beginning of each operation of the burner. Heretofore, it has been impossible in the art to provide a direct means of igniting the fuel oil supply from an oil burner of the atomizing type. The intensity of the heat so provided would destroy the arcing contacts that must necessarily be in the vicinity of the atomizing cup in order to ignite the rapidly moving fuel. By placing my arcing contacts 61 and 62 within the secondary air passage 35 above described, I am able to sufficiently cool them and at the same time position them adjacent to the atomizing cup 26 without having them destroyed by the ensuing flame.

A cover 66 that may be of cast metal or of sheet iron construction is provided, entirely enclosing the rear portion of the casing 1, the high voltage transformer 64, the reservoir 48 and the pump 45. A plurality of bolts 38 are employed to unite the covers 8 and 12 of the compression chambers 10 and 11 and a similar group of bolts 39 are employed in the expanded portion of the secondary air conduit 35 to make a complete unitary structure of the air conduits 13 and 35, the compression chambers 10 and 12, the casing 1 and the cover 66.

The cover 66 is provided with an automatic damper 67 shown in Figure 1 that may be of any design that will be automatically operated by an inflow of air produced by the operation of the fans 14 and 18. The form preferred is shown in Figures 10, 11 and 12 in which a frame 68 is the means for supporting the housing or rectangular shaped frame 69, in which the louvres 71 are pivotally supported on rods 73 and upon which they freely swing. In normal position when the burner is not operating the louvres 71 are not attracted to their open position, as shown in Figure 12, but are in a lower or closed position, as shown in Figure 11. The louvres 71 are provided with a fibre or felt strip 72 on its lower most end that abuts against the longitudinally disposed rods 73 to form a tight seal therewith.

The outer portion of the frame 68 is provided with a screen covering 74 to protect the louvres 71 from being distorted by any substance that might be inadvertently thrown thereagainst and to prevent the air currents passing therethrough from carrying paper or any other like material to within the air passages of the burner.

To regulate the amount of air that is drawn within the above described compression system, a damper 75 is provided in the lower portion of the housing at the mouth of an opening 76 by which means the air drawn through the frame 68 in the casing 66 may be regulated to vary the amount of supply furnished to the burner.

A frame 77, similar to that of the above described frame 68, with the exception that the louvres 71 thereof are arranged to operate with a less pressure than required to operate the louvres 71 of the frame 68, is provided in the flue of the furnace as shown in Figure 1. This difference of operation may be accomplished by enlarging the area of the louvres 71 of the damper 77, or by any other means well known in the art. With this construction, the damper 77 will be moved to its open position when the burner is inoperative by the draft in the flue and which will be closed thereafter by the forced draft supplied by the burner when in operation. The louvres 71 of the frame 77 may also be operated to open or partly open position when the burner is in operation if the force of the draft in the flue exceeds the air supply of the burner.

As above described, the burner is completely sealed within the fire box of the furnace and the air supplied thereto must necessarily pass through the damper 67 to supply the air, both for atomization and combustion. It will thus be seen that when the burner is not operating, the louvres 71 of the damper 67 will be in their closed position and the louvres 71 in the damper 77 will be operated by the natural draft of the flue, by which means the said natural draft will be completely cut off from the furnace and the heat stored therein will not be lost or dissipated by the natural draft that is usually present in burners heretofore employed in the art and which passes directly through the fire box containing the stored heat. By this arrangement my damper system will prevent the excessive draft, that will be present in extra high or large flues, from cooling the combustion chamber while the burner is in operation. By such an arrangement of my dampers I procure a great saving in the amount of the fuel required by a furnace as the large percent that is usually wasted by the above said passage of air through the fire box is thus avoided.

Referring to Figure 1, a complete installation is herein shown in which a tank or storage means 78 is provided buried within the ground 79. A supply pipe 81 therefor is provided with a fill box 82 that projects above the ground, the surface of which is designated by the line 83. An air passage 84 is also connected to the wall of the tank 78 to

provide an outlet for the air, or inlet thereto, as the case may be as the oil is supplied to or removed from the tank 78. A supply line 85 is provided from the bottom of the tank 78 at 86 and is connected to an anti-siphon device 87, from which it passes through the line 88 located within the cellar 89, to the twin oil pump 45. The preferred form of anti-siphon device is that in which no valve is employed and which automatically operates to cut off the oil supply when the system is siphoning. Such valves are well known in the art and as the structure thereof forms no part of the present invention, it will not be described.

An oil line 92 is provided connected to the return side of the twin pump 45 and extends to the top of the tank 78, as at 93. The object of the return line 92 is to provide a passage for the excess oil that is being supplied by the twin pump 45 and which overflows into the extension 49 and the connection 60 and is returned to the tank by the return side of the pump 45 and the line 92. This return of the oil keeps the supply within the tank agitated and prevents the settling of the heavy materials contained within the fluid that would ordinarily collect at the bottom of the tank. For this reason, the twin pump 45 as aforesaid is of greater capacity than would ordinarily be required, so that the oil at all times is being passed to and from the tank 78. Thus, a supply of uniform viscosity will be had at all times for the burner, so that the regulation thereof will remain uniform throughout the entire use of one complete tank of oil.

Any methods of electrical control may be provided for protection and for regulating the heat of the furnace. The system herein shown is a preferred arrangement in which a motor operated switch 94 is actuated to "on" or "off" position by the contact in the thermostat 95. The thermostat 95 may be of any desired type well known in the art and is located in a position within the house wherein uniform temperature is desired. This arrangement causes the furnace to be operated intermittently to keep the space to be heated within certain predetermined degrees of temperature. The temperature desired is set on the thermostat 95 and may be changed from time to time to correspond with the various changes in temperature throughout the year.

A thermostat control 96 is provided within the furnace walls as a safety device to cut off the burner when the temperature of the walls have passed an allowable rise in temperature. For the same purpose, a thermostat control or cut-off 97 is provided in flue 98 which also operates to cut off the burner when the temperature of the flue has passed a similar safe range.

Switch box 100 is provided as a means of control for the system. Herein the main switch is located as well as the fuses and other safety devices that may be employed for the protection of the system. Conduit 101 is employed to connect the box to the switch and to the burner and to protect the wires carried therewithin.

The motor-operated switch 94 is first actuated by the contacts of the thermostat 95 which actuation revolves the switch 180 degrees making contact with the burner motor and with the transformer 64. After about 90 seconds the transformer is disconnected and if the burner has failed to ignite the switch motor operates to cut off the burner motor from the circuit and the burner is again in a completely inoperative position.

However, if the fuel of the burner is ignited before the 90 seconds, after which the transformer is cut off, the burner will continue to be operated until the temperature of the room containing the thermostat 95 again causes the circuit to be broken or which is caused to be broken by the operation of the other thermostats, above mentioned, to shut down the burner.

When the circuit is completed to the burner motor comprising the stator 2 and rotor 3, its operation revolves the shaft 4 that actuates the twin pump 45, the fans or blade members 14 and 18 and the atomizing cup 26. As the air is drawn through the rear of the casing 1 by the aforesaid blade members, a reduced pressure area is formed in the upper area portion of this casing that operates through the aperture 50 to rarify the area of the chamber 46. The inrush of air past the damper 75 in the passage 76 passes about the rotor and stator of the said motor into the compression chambers 10 and 11 through which it passes in different stages of compression through the air supply passages 13 and 35, respectively. The rarified area in the chamber 46 located above the level of the oil contained in the well 54 thereof causes the level of the oil to be raised due to the greater pressure on the surface of the oil in the leveling chamber 48. The level of the oil thus obtained in the chamber 46 is raised to engage the beveled side 42 of the hub 41, which throws the oil due to centrifugal force into the slotted section 51 from which it flows by gravity through the conducting oil passage 52 and 53 into the annular orifice 55 from which it flows along the side of the atomizing cup 26 and is thrown centrifugally therefrom into the air supplied from the passage 13. The electrodes 61 and 62 are located directly in the path of the atomized fuel, thus obtains, and readily procures, its ignition. The air supply in the passage 13 is employed both for atomizing and for combustion but to insure a sufficient amount of oxygen for complete combustion under all conditions, additional air is supplied through the secondary air passage 35,

which passage contains damper means 40 so that the supply required to be added to the air of the passage 13 may be regulated to fit all conditions that are encountered in different installations of my burner.

One may observe that my burner has been invented with the object of reducing the servicing thereof to the minimum. It will be noted the motor is kept cool to prevent it being burnt out from continued operation, that the supply line contains no valves or other means that may cause a stoppage therein and that the electrodes are placed in an air stream so that they will not be destroyed due to their close proximity to the flame. In order that the wearing parts, that is the bearings 5 and 6, may have an equally long life requiring no attention, I have provided oil reservoirs 56 and 57 to supply oil thereto. These reservoirs are of the wick type and are connected by an oil supply line 102 to a reservoir 103 located adjacent to the burner. The reservoir 103 is filled with a lubricating oil when the burner is first put in service and should contain sufficient lubricating oil to lubricate the bearings 5 and 6 for an exceedingly long period of time.

It will thus be seen that I have constructed an oil burner that should run for an exceedingly long period without requiring any attention whatsoever in order to have it operate correctly at all times. I have accomplished this longevity by supplying the oil to the atomizing cup without having it pass through a single annular orifice or obstruction that would in time clog the line and reduce the oil supply to the combustion chamber. I have accomplished this by my novel leveling device that requires no valve and also by my novel means of supplying oil to the atomizing cup and completely disconnecting the supply therefrom without employing a single obstruction in the supply line.

My invention is further novel in supplying air for combustion in two stages of compression, the higher stage being employed for propelling the atomized fuel and to supply some of the air for combustion; the lower stage containing the regulating means for supplying the remainder of the air that may be required. By this method of so having the burner supply all of the air required for fuel propulsion and for combustion, I am able to completely seal my burner in the walls of the combustion chamber which is thereby completely cut off from the outside atmosphere and which will receive no air except that which is supplied through my novel burner.

By so installing my burner in the fire box of a furnace, I am able to operate it at a great saving by utilizing all of the heat produced by my burner by shutting it off from all drafts or passages of air when the burner is inoperative. I accomplish this by enclosing the burner in a casing in which an automatic damper is arranged that will be open when the burner is in operation and closed when the burner is shut off. A similar damper is arranged in the flue connected to the combustion chamber and is actuated to open position by the draft in the flue when the damper in the casing of the burner is closed. By this means, the heat stored up in the combustion chamber is not immediately passed out of the flue as heretofore has been the custom when the burner is inoperative, but is retained therein as stored heat to later give up its energy; to retain the temperature of the spaces to be heated. The natural draft in the chimney instead of causing air to pass from the heated surface of the combustion chamber, opens the damper in the flue and passes air therethrough from a source exterior of the combustion chamber.

My burner is further novel in employing the cool air in the secondary or low compression air passage to cool the electrodes that I employ to ignite the fuel of my burner.

I do not wish to be restricted to the particular structure herein shown as many changes, additions, subtractions, substitutions and arrangements may be made as would be apparent to anyone skilled in the art. I therefore wish my invention to be limited only by the scope of the appended claims and the prior art.

I claim as my invention:

1. The combination with a liquid fuel burner having a motor, a mechanical fuel atomizer driven thereby and an air compressor driven thereby for supplying air for sustaining combustion of the fuel, of a gravity means for supplying fuel to the said atomizer, a means constantly driven by the motor for delivering fuel to the gravity means and means for varying the degree of effectiveness of the fuel delivering means.

2. A liquid fuel burner having a motor, an atomizer and an oil-throwing member driven thereby, a container for a body of oil surrounding said member and having an outlet for catching oil thrown by the rotating member after dipping, in said body of oil, and means for conducting oil from said outlet to said atomizer.

3. A liquid fuel burner having a motor, an atomizer and a disk driven thereby, a container for a body of oil partly immersing said disk and having an outlet for receiving oil thrown off said disk by centrifugal force, and gravity means for conducting oil from said outlet to said atomizer.

4. A liquid fuel burner having a motor, an atomizer, a fan and an oil-throwing member driven thereby, a container for a body of oil surrounding said member and having an outlet for catching oil thrown thereby, means for permitting a flow of oil into and out of said casing, said casing having a second outlet

to permit air to be withdrawn from said casing by said fan, thereby to permit the level of said body of oil to raise to contact said member when said motor is operating, and means for conducting oil from the first-named outlet to said atomizer.

5. A liquid fuel burner having a motor, an atomizer, a fan and a disk driven thereby, a container for a body of oil enclosing said disk and having an outlet for receiving oil thrown off said disk by centrifugal force, means for permitting a flow of oil into and out of said casing, said casing having a second outlet to permit air to be withdrawn therefrom by the action of said fan, thereby to permit the level of said body of oil to raise to contact said member when said motor is operating, and gravity means for conducting oil from the first-named outlet to said atomizer to permit a stream of air from said fan to act thereupon.

In testimony whereof, I have hereunto subscribed my name this 27th day of March, 1928.

FRANK H. CORNELIUS.