June 11, 1929. S. L. LAUGHLIN ET AL 1,716,449

OIL BURNER UNIT

Filed Oct. 4, 1924 3 Sheets-Sheet 1

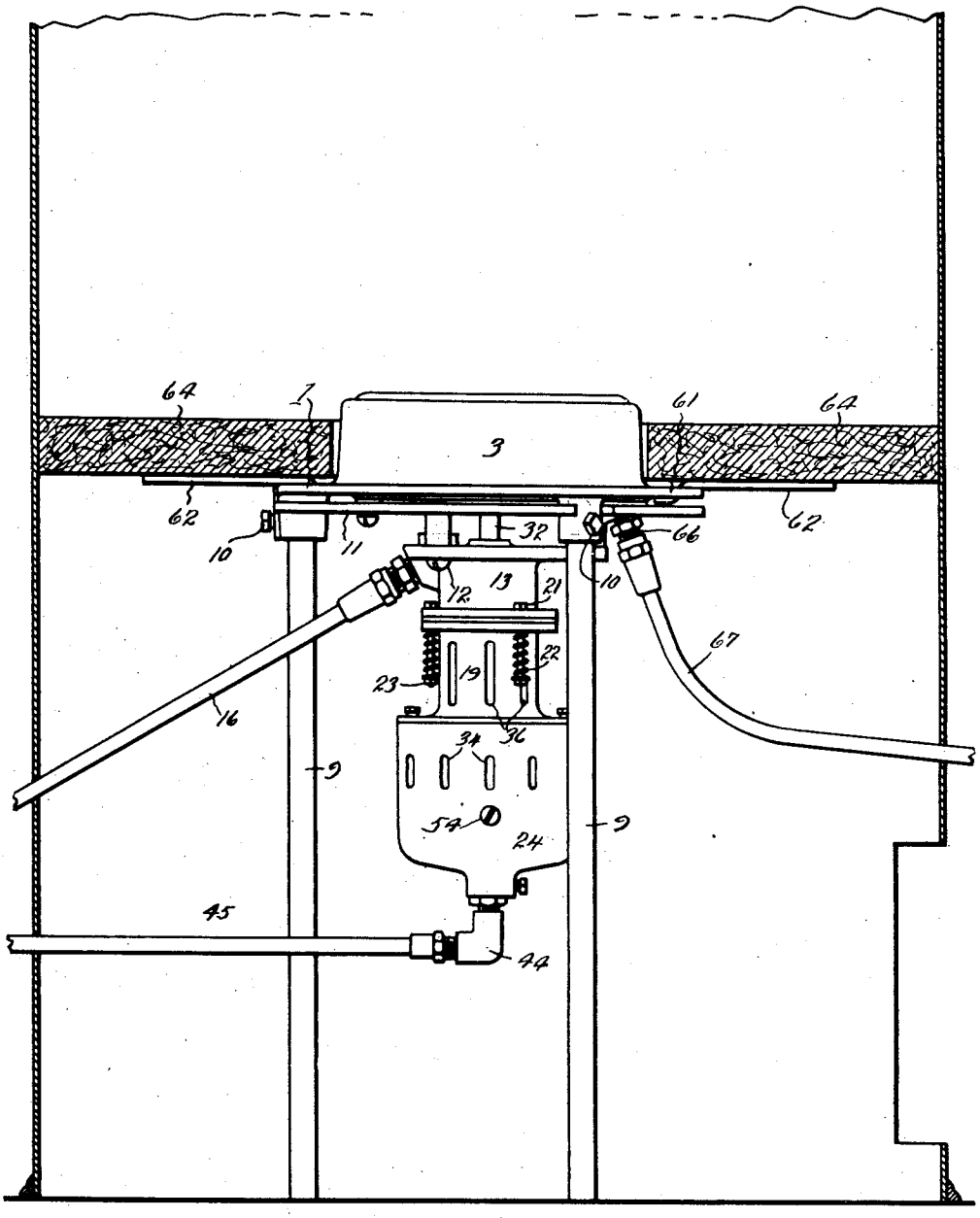

Fig. 1

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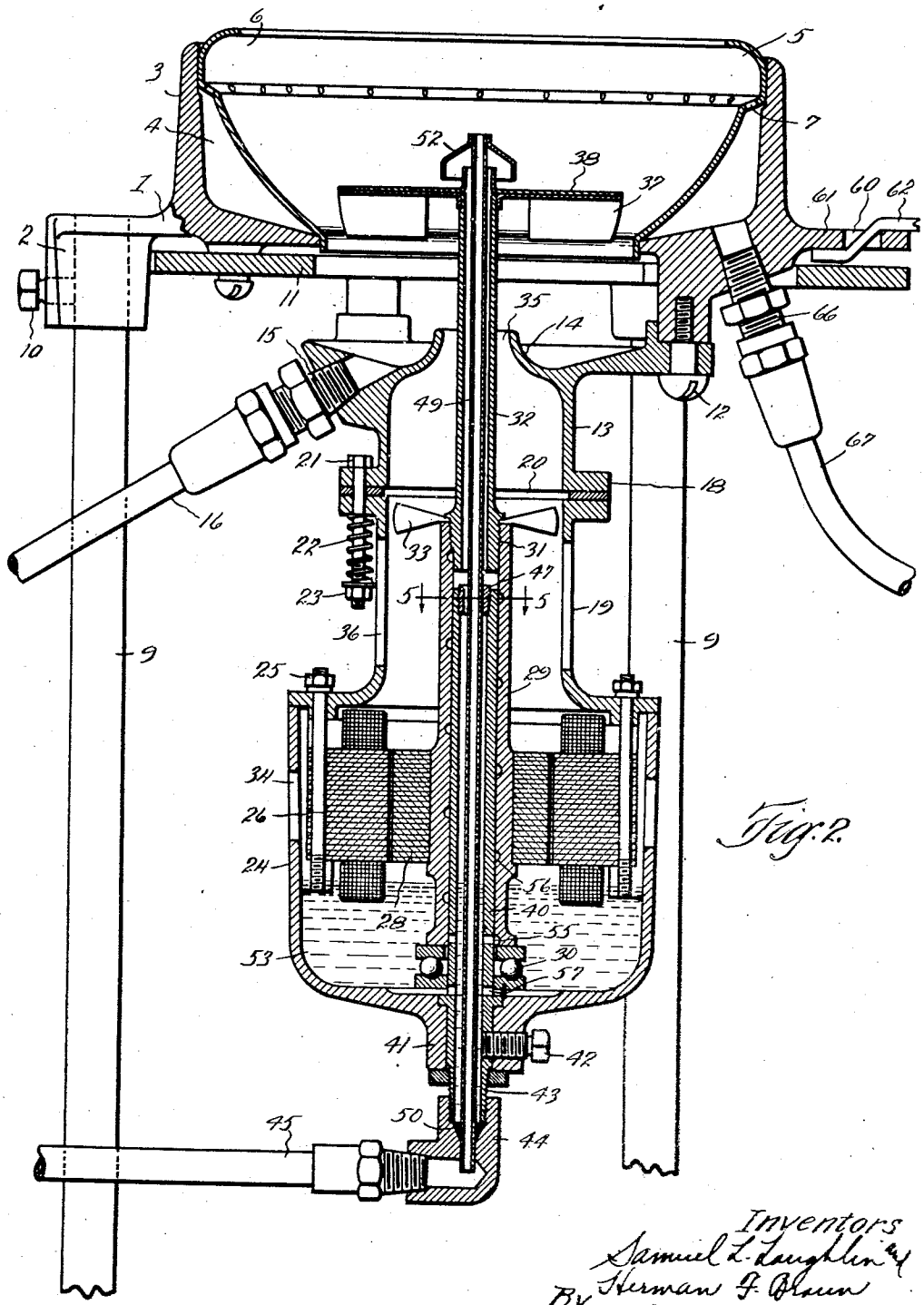

Fig. 2.

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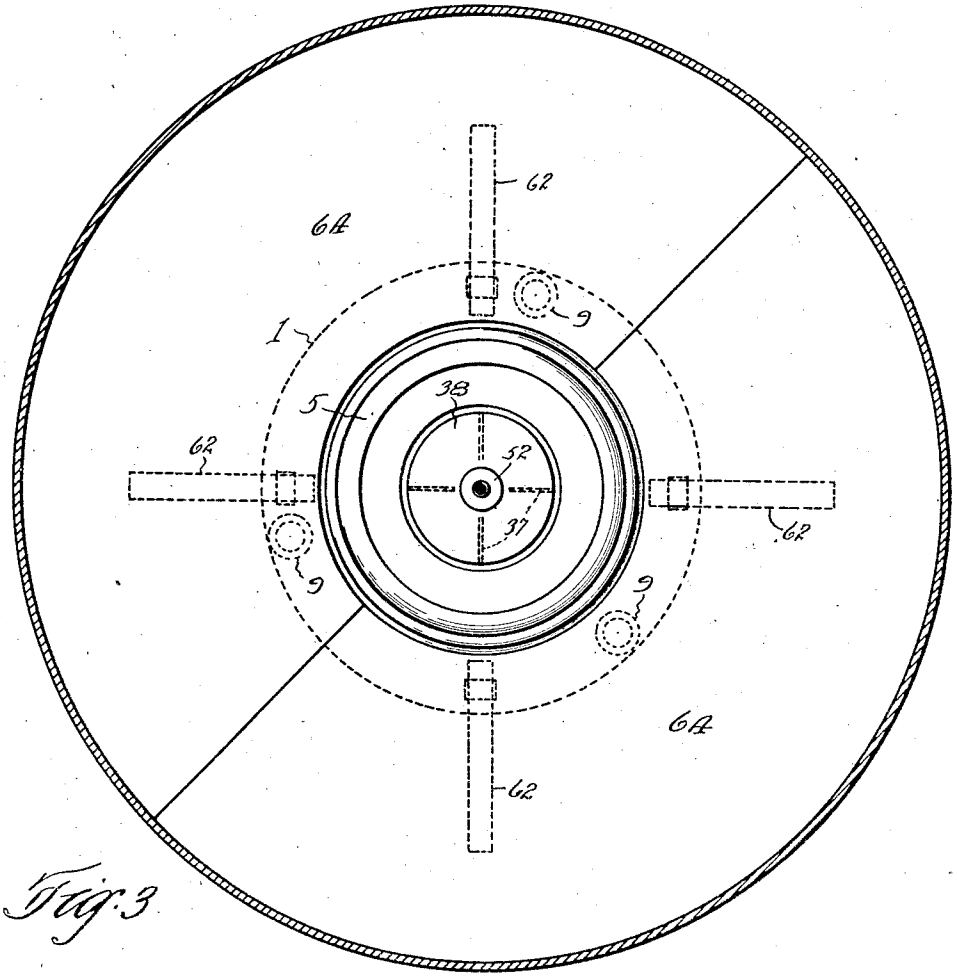

Fig. 3

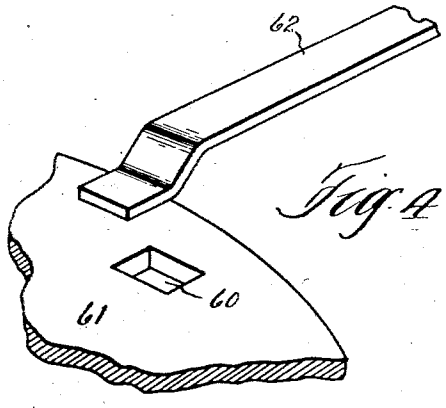

Fig. 4

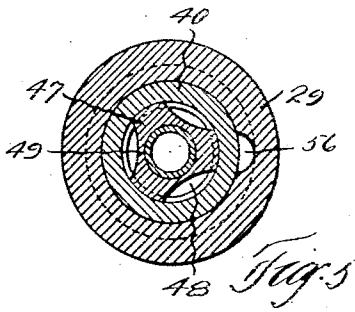

Fig. 5

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UNITED STATES PATENT OFFICE.

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OIL-BURNER UNIT.

Application filed October 4, 1924. Serial No. 741,549.

This invention relates to oil burners and is directed more particularly to an oil burning unit which is designed for use in connection with household furnaces.

The primary object of the present invention is to provide an oil burner unit which may be easily and quickly installed in the average household furnace and when so installed shall be capable of effectively replacing the use of coal, gas or other fuels commonly used for heating purposes.

Another object is to provide an oil burner of this general character which shall thoroughly atomize the oil and mix it with a suitable quantity of air to insure perfect combustion.

A still further object is to provide a novel and simple form of construction which shall be easily accessible to permit cleaning or replacement of any desired part thereof and which shall be easy to assemble and inexpensive to manufacture.

With these and other objects in view, the invention consists in the various novel features of construction and arrangement or combination, all of which will be described hereinafter and pointed out in the claims.

In the drawings accompanying and forming a part of this application, Fig. 1 is a fragmentary vertical sectional view through a portion of a furnace showing our burner unit installed therein, the unit and associated parts being shown in elevation; Fig. 2 is an enlarged vertical sectional view through the burner unit; Fig. 3 is a top plan view of the unit showing the same installed in the furnace; Fig. 4 is a detail perspective view of one of the supporting arms for the heat insulating partition employed; and Fig. 5 is a transverse sectional view taken on the line 5—5 of Fig. 2.

An oil burner unit constructed in accordance with my invention comprises a casting 1 which is provided with suitable depending sockets 2, and an upstanding flange 3 which defines a recess 4 that is adapted to receive a burner bowl 5. This bowl may be formed from sheet metal and is provided with an enlarged aperture 6 in the upper end thereof and a plurality of smaller apertures 7 in the side wall thereof, these latter apertures being for the purpose of burning gas as will be explained hereinafter.

The casting 1 is supported by means of a plurality of tubular legs 9 which are positioned within sockets 2 and retained in the adjusted position by means of set screws 10. A board 11 formed from heat insulating material such as asbestos is secured to the under surface of the casting to prevent the transmission and radiation of heat from the burner to the motor assembly to be described hereinafter.

Fastened to the underside of the casting 1 by means of screws 12 is a second casting 13. Casting 13 is substantially circular in cross section adjacent its lower end, and the upper portion thereof is provided with a basin 14 having an outlet connection 15 to which an oil drain pipe 16 may be connected in any suitable manner. The lower end of casting 13 is flanged, as indicated at 18, and secured to this flange is a motor frame casing 19. Fibre washers 20 are interposed between flange 18 and the flange of the motor casing 19 so as to prevent the transmission of motor noises to the other elements of the burner which might prove undesirable. The motor casing 19 is preferably connected to flange 18 by means of bolts 21 which extend therethrough and are provided each with a spring 22 that is interposed between the casing 19 and a nut 23 threaded on the end of each bolt thereby providing a resilient connection between the motor casing and the casting 13. A field housing 24 is fastened to the casing 19 by means of bolts 25, which also serve to retain the field magnets 26 in position.

An armature 28 is mounted upon a tubular shaft 29 which is rotatably supported upon a thrust bearing 30 that is mounted within the lower end of field casing 24. The upper end of tubular shaft 29 is internally threaded, as indicated at 31 to receive a tubular extension 32, and clamped between shaft 29 and shaft extension 32 is a fan 33 which serves to create an air draft about the motor windings to cool the same, such air draft being drawn through suitable apertures 34 formed in the field casing 24 and about the motor windings and then discharged upwardly through opening 35 formed in the upper end of casting 13. An air draft is also drawn through suitable apertures 36 formed in motor casing 19 and discharged in a similar manner.

The upper end of shaft extension 32 has secured thereto a fan member 37 and a disk 38 normally providing a flat unbroken surface on top of the fan. Disk 38 receives the

fuel oil supply, as will be explained hereinafter, and during rotation serves to discharge the oil therefrom against the side walls of the burner bowl 5.

A stationary sleeve 40 is disposed within tubular shaft 29 and this sleeve extends downwardly through a boss 41 formed on the lower end of the field casing 24 and is held against rotation by means of a set screw 42 threaded through said boss. The extreme lower end portion of sleeve 40 is threaded, as indicated at 43 to receive a pipe connection 44 which is adapted to connect with an oil line 45 which may be connected to any suitable source of fuel oil. The upper end of sleeve 40 is threaded internally to receive a bushing 47 which is shown in detail in Fig. 5. This bushing is cut away along its sides, as indicated at 48, for a purpose to be referred to hereinafter and projecting upwardly through said bushing is a fuel oil feed pipe 49 which is supported thereby. The lower end of this pipe communicates with the pipe connection 44, and is provided with suitable packing 50 to prevent leakage at this point. Fastened to the upper end of feed pipe 49 is a cap 52, which is substantially conical in contour and which is adapted to distribute the fuel oil on disk 38.

The lower portion 53 of the field casing 24 serves as a lubricant reservoir to lubricate the thrust bearing 30 and this reservoir is conveniently filled through an opening normally closed by a screw 54, as shown in Fig. 1. Lubricant in the reservoir enters through the thrust bearing and an opening 55 in the sleeve 40, and is carried upwardly between shaft 29 and said sleeve by means of a spiral recess 56 formed in said shaft. The lubricant is conveyed to the upper end of bushing 47 where it discharges through the aforementioned apertures 48 in said bushing and thence drains downwardly between the sleeve 40 and oil feed tube 49, finally finding its way back to the reservoir through apertures 57 formed in sleeve 40 just beneath the thrust bearing. In this manner, the lubricant from reservoir 53 is circulating continuously about the bearing surfaces between the rotating shaft 29 and stationary sleeve 40, thereby insuring efficient operation.

In installing a device of this general character in a furnace, the grate or other mechanism in the furnace is removed, and the burner unit is positioned therein at a suitable height by adjusting the casting 1 on the tubular legs 9, then locking the same in position by means of the set screws 10. The casting 1 is provided with a plurality of apertures 60 which are formed in a flange 61 encircling said casting. These apertures are adapted to receve each an arm 62 which is engaged with the underside of flange 61, as shown in Figs. 2, 3 and 4. These arms serve to support a partition plate composed of two semi-circular sections 64 which are preferably formed from a heat insulating material such as asbestos. These partition sections closely embrace the upstanding flange 3 on casting 1 and extend outwardly to the side walls of the furnace.

Oil supply pipe 45 is connected with a suitable source of fuel oil and drain pipe 16 may be connected either with a suitable drain opening, or with a bucket arranged to control a shut-off valve, not shown. This latter feature, constituting no part of the present invention, is not shown or described in detail.

The casting 1 is also provided with a pipe connection 66, to which a pipe 67 is connected, and this pipe is adapted to be connected to a suitable source of gas so that in emergency, gas may be used to heat with by permitting said gas to discharge into recess 4 of casting 1 and from thence upwardly through the apertures 7 where it is ignited. The gas connection is also desirable for preheating the burner bowl before turning on the oil supply.

In operating the device, the motor is connected to a suitable source of current to rotate armature 28 which in turn rotates fans 33 and 37. Oil is delivered from pipe 45 upwardly through pipe 49, and at the upper end of this pipe it is discharged onto the cap 52 which distributes the oil to the rotating disk 38. The oil striking disk 38 is whirled against the preheated burner bowl 5, and fan 37 creates a blast of air upwardly through said burner bowl and serves to mix a sufficient volume of air with the oil, which has been vaporized by contact with the heated bowl, thereby to insure complete combustion. The vaporized oil mixture is ignited through the enlarged aperture 6 in the bowl and the flame emitted therefrom provides sufficient heat to operate the furnace and also maintain the bowl hot enough to insure complete vaporization of the oil. If the electric motor which drives fan 37 should stop during the operation of the burner, the oil normally discharged onto disk 38 will drain downwardly into basin 14 formed in casting 13, and from this basin it will drain through pipe 16, as before mentioned.

If, for any reason, it should be desired to replace any parts of the burner unit or to clean the same, the entire unit may be easily removed by lifting out partition sections 64 and disconnecting the pipe lines, whereupon the burner unit as a whole may be completely removed and the necessary repairs or cleaning effected. If desired the motor unit only may be easily detached by removing screws 12 thereby disconnecting said unit from casting 1, whereupon the entire motor unit and associated parts including fan 37 and disk 38 may be easily removed for effecting the necessary adjustments or repairs or if de-

sired a new unit may be easily and quickly substituted. Attention is also called to the fact that the lower portion of the motor unit only may be removed by disconnecting the same at the soundproof joint. This merely necessitates the removal of nuts 23 and bolts 21 and the removal of fan 37 and disk 38. It is thus obvious that the structure as a whole is composed of sections, each of which may be easily and quickly detached from the rest of the structure and new sections substituted therefor while adjustment or repairs are made to the section removed, thereby avoiding delays in operation of the device.

Having thus described our invention, what we claim is:—

1. A burner unit of the character set forth comprising a casting having a recess therein, means for supporting said casting at variable heights, a burner bowl arranged within the recess of said casting, an electric motor carried by said casting and having a shaft projecting within said bowl, a fan and a distributing element carried by said shaft and arranged within said bowl, an oil supply tube extending longitudinally through said shaft, means for supplying oil to said tube, and a cap carried by said tube and adapted to direct the oil onto said distributing element.

2. A burner unit of the character set forth comprising a casting having a recess therein, a plurality of legs adjustably connected to said casting for supporting said casting at variable heights, a burner bowl arranged within the recess of said casting, an electric motor carried by said casting and having a shaft projecting within said bowl, a fan and a distributing element carried by said shaft and arranged within said bowl, an oil supply tube extending longitudinally through said shaft, means for supplying oil to said tube, and a conical shaped cap carried by the upper end of said tube, said cap being adapted to receive and direct the oil from said tube onto said distributing element.

In testimony whereof, we hereunto affix our signatures.

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HERMAN F. BRAUN.