Jan. 3, 1928. 1,655,083

H. BARLEY

FUEL OIL BURNER

Filed Aug. 31, 1925 2 Sheets-Sheet 1

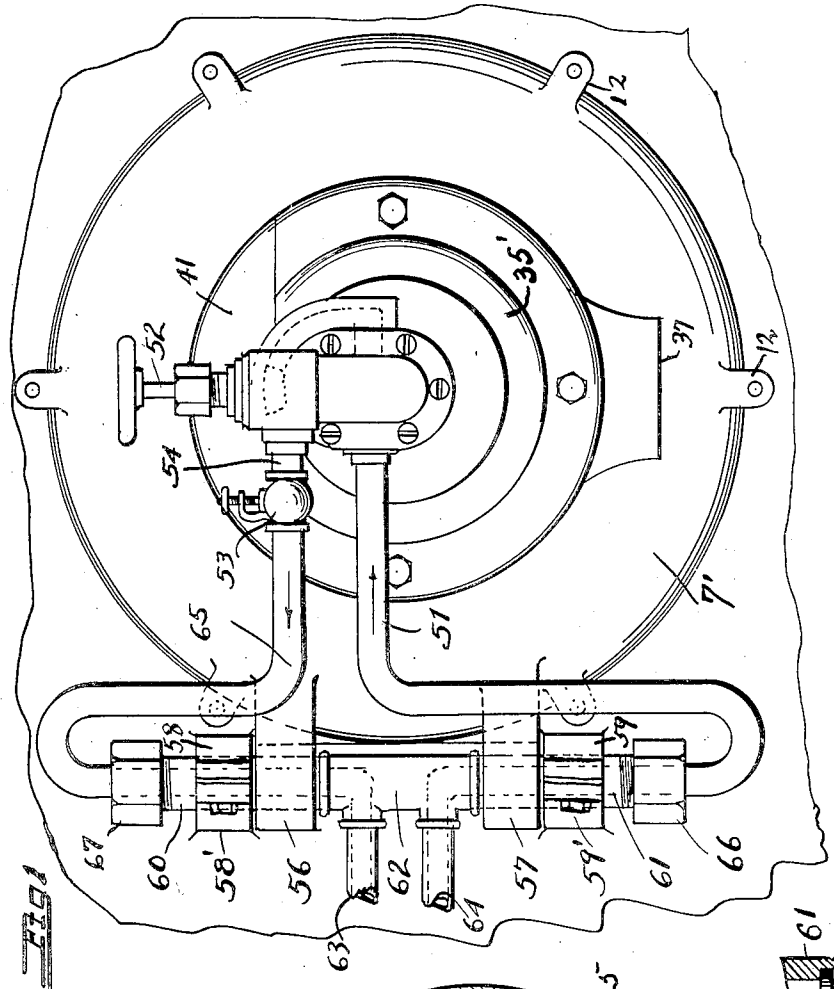


Fig. 1.

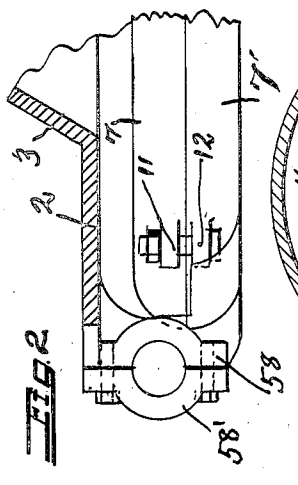


Fig. 2.

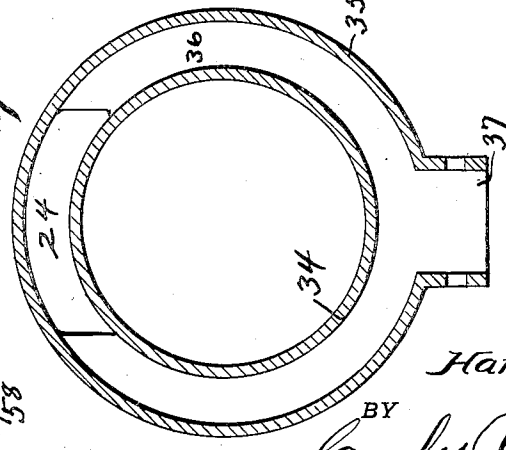


Fig. 3.

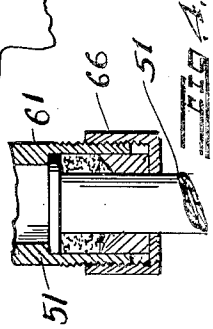


Fig. 4.

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2 Sheets-Sheet 2

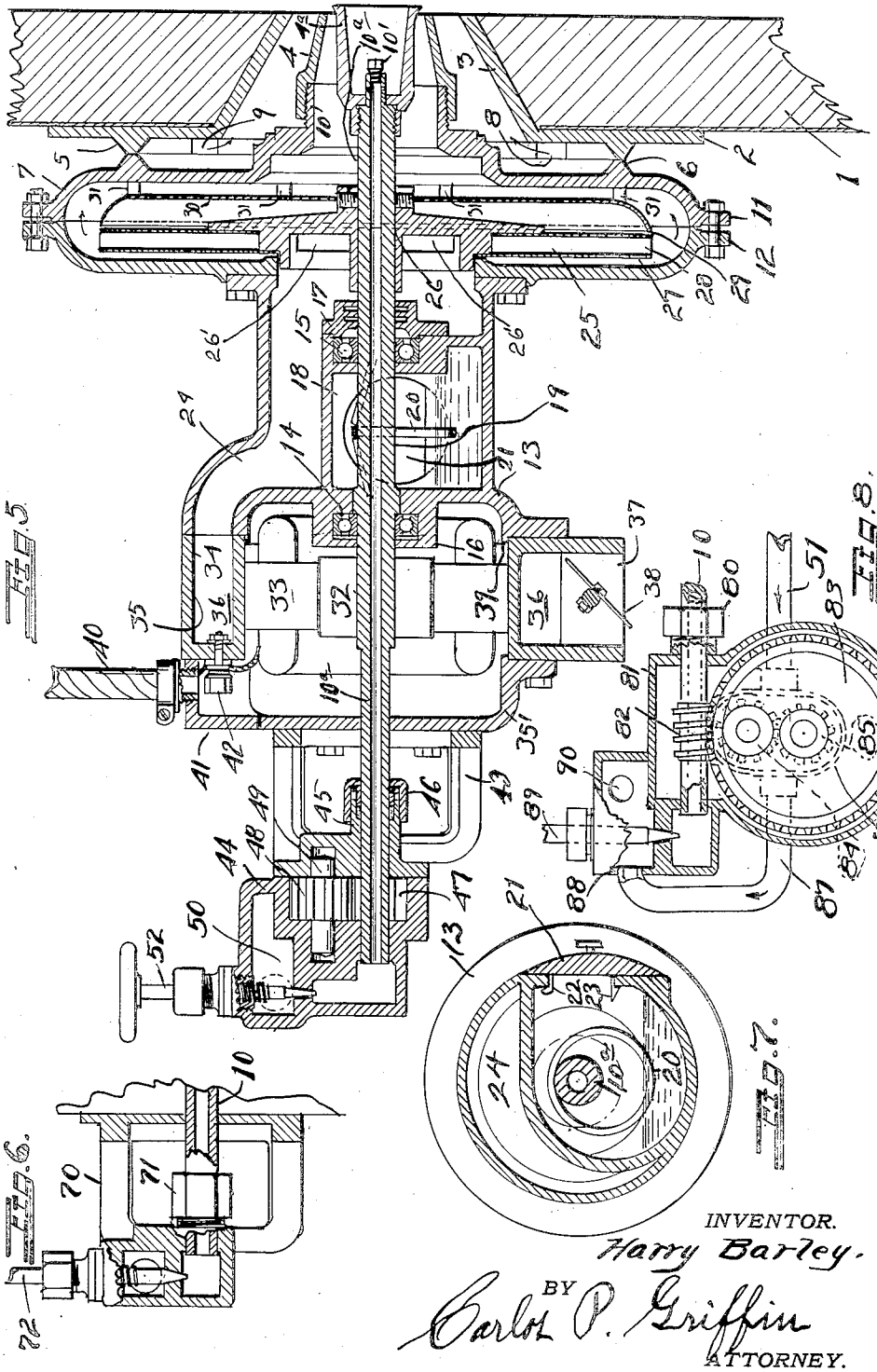


Fig. 5.

Fig. 8.

Fig. 6.

Fig. 7.

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UNITED STATES PATENT OFFICE.

HARRY BARLEY, OF SAN FRANCISCO, CALIFORNIA.

FUEL-OIL BURNER.

Application filed August 31, 1925. Serial No. 53,682.

This invention relates to a fuel oil burner, and its object is to provide a burner which will be mounted on a hinged bracket so it can be swung clear of the furnace when it is to be examined or to have repairs made thereon.

Another object of the invention is to provide a burner which will have the air supplied to its fan pass around the motor thereby cooling the motor and at the same time heating the air to cause better combustion of the oil.

Another object of the invention is to provide a means whereby the oil will be delivered to the burner at a substantially uniform pressure, the quantity thereof being regulated by the opening or closing of a needle valve, the excess oil being returned to the main supply.

Another object of the invention is to provide means whereby the oil will be delivered to the burner nozzle through the motor shaft without the use of a special oil tube, thereby dispensing with one unnecessary part of the present burners.

Another object of this invention is to provide a sectional casing for the fan and motor, which will enable the motor to be easily renewed without disturbing the entire apparatus, and to enable different size motors and different capacity burners to be installed on the same size supporting casting. It will be understood by those skilled in the art by merely increasing the size of the fan, it will be possible to deliver more air, and this increase may be given by widening the fan blades so that a larger motor or a larger fan can be installed on the casting which supports the entire apparatus.

Other objects of the invention will appear as the description proceeds.

An embodiment of the invention is shown in the accompanying drawings in which the same reference numeral is applied to the same portion throughout, but I am aware that there may be modifications thereof.

Fig. 1 is a view in front elevation of the burner as it appears when installed on a furnace.

Fig. 2 is a plan view of a portion of the fan case and the hinge which supports it.

Fig. 3 is a vertical sectional view through the motor casing to show the location of the air inlet passage to the fan.

Fig. 4 is a view of one of the oil pipe joints in the hinge.

Fig. 5 is a longitudinal sectional view of the entire burner.

Fig. 6 is a vertical sectional view of the portion of the burner at the needle valve when a pump or gravity feed is used in the place of the gear pump shown in Figs. 1 and 4.

Fig. 7 is a sectional view of the motor case at one of the bearings showing the relation of the air inlet to the oil chamber.

Fig. 8 is a sectional view of a modified form of the oil pump in which the two pump gears are driven by an intermediate worm wheel.

The numeral 1 indicates the fire wall of the furnace which has a cast iron facing 2 secured thereto, which has a frustoconical portion 3, which is somewhat larger than the air nozzle 4 to allow a certain additional quantity of air to pass into the furnace when necessary. This extra air is allowed to pass into the furnace as may be decided to be necessary at the time the burner is installed and its quantity is determined by cutting away much or little of either or both of the two flanges 5 and 6, the former on the furnace facing 2, and the latter on the half of the fan casing 7, next to the furnace. Note the two openings 8 and 9.

The fan casing 7 has a tubular portion 10, which is threaded to receive the nozzle 4, and it is also provided with ears 11 to bolt it to the ears 12 of the other half of the fan casing, which is faced to fit the front end of the bearing shell 13. This bearing shell is provided with webs to receive the two ball bearings 14 and 15, which bearings are retained in place by the two retaining plates 16 and 17. The object of this construction is to provide means whereby the two bearings may be properly aligned in manufacture independently of the end facing of the castings.

In the space between the two bearings there is formed a chamber 18 to hold a lubricant which is fed to the motor shaft 19 by the oil ring 20. The ring is assembled on the shaft by inserting it through the hole covered by the door 21 by turning it ninety degrees, and the door is held in place by two spring snaps 22 and 23.

Surrounding the bearing holding webs is the air passage 24, which extends to the back

of the fan 25 on the front end of the motor shaft 10^a. The front end of the shaft 10^a has a plug 10', and the shaft also has some holes at that end to allow the oil to escape into the sprayer 4^a, on the end of the shaft.

The fan consists of a hub portion 26, which has holes 26 therein to allow the air to pass outwardly therethrough to the vanes 28, which are secured between the two disks 27 and 29, and which latter are in turn secured to the hub. It will be seen that the periphery of the fan casing is rounded, the object being to direct the air by a smooth curve to the space between the front half 7 of the fan casing and an inner plate 30 secured thereto, which is spaced therefrom by the lugs 31.

The armature 32 is secured on the motor shaft 10^a, inside the field coils 33, which coils are secured to the casing 34, said casing being surrounded by an outer shell 35, which forms with the inner shell the air passage 36, which receives the air at the point 37, the quantity thereof being regulated by the butterfly valve 38. This casing 35 is suitably secured to the faced end of the casing 13, and its centering is provided for by the small flange 39.

The cable for supplying current to the motor is shown at 40, and it is secured to the detachable cover 41, while the wires are connected to the binding posts 42 inside the casing. This cover is secured on the front of the detachable front plate 35' of the motor casing 35.

The back of the casing 35 is faced to provide a flat surface to receive the frame 43, which is bolted thereto, and to which the gear case 44 is secured. The frame 43 has a tubular portion 45 projecting toward the motor and there is a packing nut 46 threaded thereon to hold the packing which prevents the oil passing through the motor shaft from leaking at that point. Inside the casing 44 the shaft 10 has a small gear 47 thereon which is in mesh with the gear 48 on a short shaft 49. These two gears form a well known form of pump and their arrangement is such that the oil delivered thereto through the pipe 51 is thereupon delivered under pressure to the chamber 50. The needle valve 52 determines the amount of the oil that is allowed to pass to the burner, while the regulating valve 53 determines what the pressure of the oil will be, all excess oil passing back to the oil supply through the pipe 54. By this means a sufficient supply of oil is provided for all times.

In order to provide for the support of the burner at the desired elevation in front of the furnace, the outer half of the fan casing 25 has two hinge lugs 56 and 57, which extend between two lugs 58 and 59 on the furnace facing 2, and through which lugs two short nipples 60 and 61 extend into a double elbow 62. The double elbow 62 has the pipes 63 and 64 connected thereto, the upper one leading to the oil tank for the discharge of excess oil and the other leading from the supply tank to the inlet side of the pump. The oil discharge pipe 65 and the oil supply pipe 51 leading from the hinge supporting the burner to the oil pump both extend into their respective nipples 60 and 61 for the purpose of allowing the burner to be turned out from the furnace without disturbing the oil connections. Each pipe 51 and 65 has a flange 51' on its end inside its respective nipple, and it is retained in place under pressure by some packing surrounding it within the pipe 61, which packing is held in place by the packing nut 66, a similar packing nut 67 being placed on the nipple 60 to hold the pipe 65 in place.

In the form of the invention shown in Fig. 6 the bracket to which the oil supply pipe is attached is supplied with oil from an outside pump, or by gravity as may be desired. In this case the bracket 70 fits against the motor case in just the same way as in the previous form of the invention, and the motor shaft 10 extends into the packing nut 71, but as there is a large supply of oil available there is not need for the return oil pipe, so the supply pipe is connected to the frame, and it has the needle valve 72 to determine the oil fed to the burner.

Since the shaft of the motor driving the fan rotates at a very high speed, it may become necessary to reduce the speed of the pump gears in an installation requiring less oil, and in that event the construction shown in Fig. 8 may be used. In Fig. 8 the motor shaft 10 extends into the packing nut 80 on the frame 81 secured on the outside of the motor casing. This frame has recesses cast therein to receive the worm 82, the worm wheel 83, and the two spur gears 84 and 85, the two latter forming the oil pump. The frame casting has the cover 86 to enclose the said gearing and it has the passage leading from the gear pump to the chamber 88. The oil delivery to the burner is regulated by the needle valve 89 and the discharge pipe is connected to the frame 81 at the hole 90. The construction here shown operates in substantially the same way as the construction shown in Fig. 5, except that the pump will have its gears running very much slower.

In the operation of the burner the oil is supplied thereto either by the pump shown, or by gravity, or by some outside pump, and it is delivered into the sprayer 4^a, through the hollow motor shaft, from which place it is thrown outwardly in a fine spray meeting the surrounding blast of air from the fan which tends to carry it straight into the fire box. The spray is so fine, as the oil is

discharged from the cone 4ª, that almost perfect combustion is the result. It will also be seen that the heat of the fire escaping to the motor and its surrounding casing will be largely carried away by the considerable volume of air delivered by the fan to the nozzle 21.

It will be seen that the spraying cup terminates in a sharp edge, which directs the oil outwardly therefrom in a fine spray, but as it immediately meets a column of air moving straight into the fire box, the result is that the oil spray forms a cone of flame of about ninety degrees with its tip at the burner.

What I claim is as follows, but various modifications may be made in the construction shown in the drawings and above particularly described form within the purview of my invention:

An oil burner comprising a bearing housing for an oil feed shaft, a fan fixed to said shaft, a casing for said fan on said housing, a flange on said casing adapted to engage a flange on a casing on the furnace wall, air holes in said flanges to allow air to pass into said furnace from the outside of the fan casing, a threaded tubular portion on said fan casing to receive an air nozzle, an oil pump on said shaft adapted to feed oil through said shaft to said furnace.

In testimony whereof I have hereunto set my hand this 20th day of August A. D. 1925.

HARRY BARLEY.