Nov. 22, 1932. M. A. POWERS 1,888,693

ROTARY OIL BURNER

Filed July 24, 1929 2 Sheets-Sheet 1

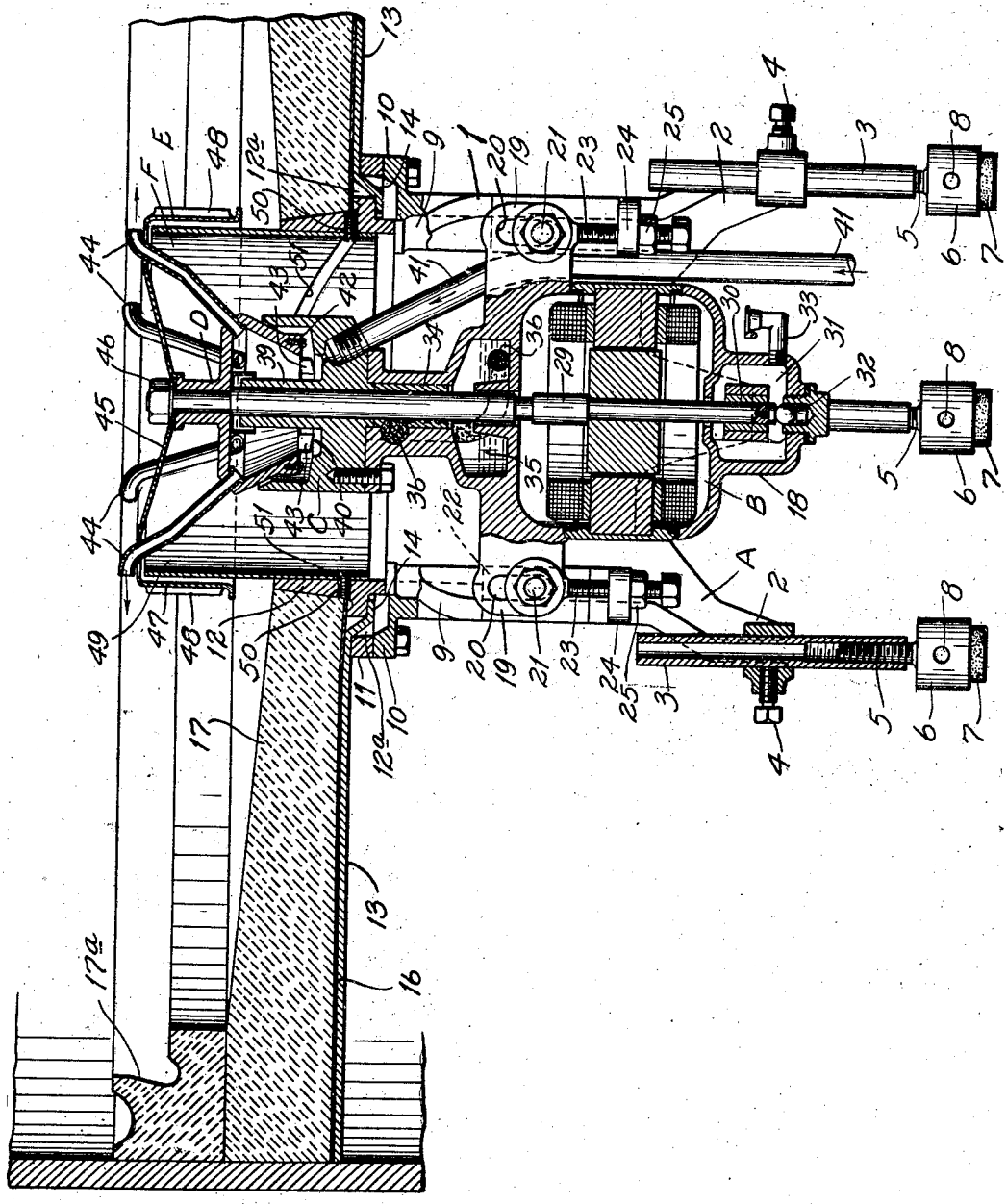


Fig. 1.

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Fig. 2.

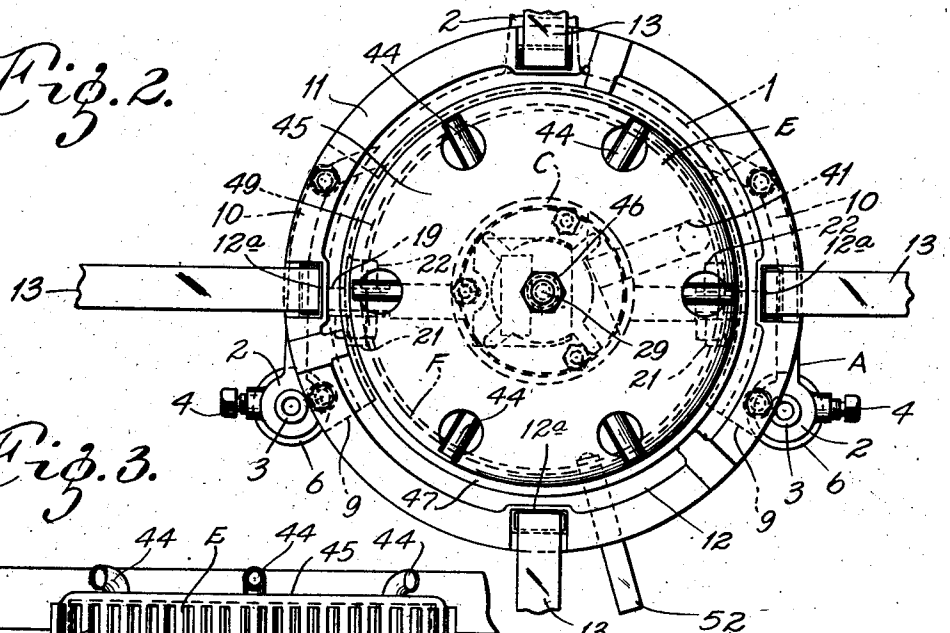
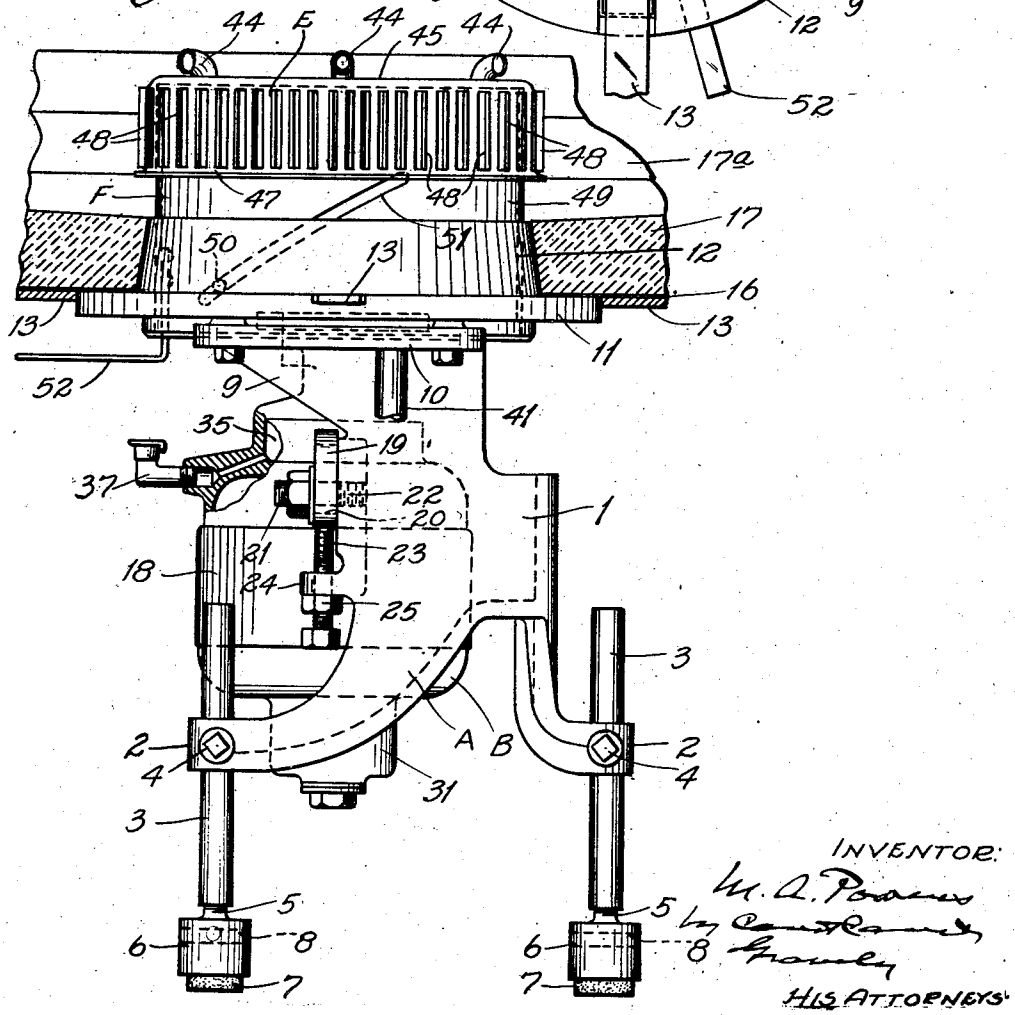


Fig. 3.



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UNITED STATES PATENT OFFICE

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ROTARY OIL BURNER

Application filed July 24, 1929. Serial No. 380,527.

This invention relates to rotary oil burners and has for its principal objects a simple and compact construction in which the fuel is evenly distributed around the firing zone of the combustion chamber and the proper amount of air for combustion is supplied to the fuel in the region of said firing zone. Another object is to prevent atomizing of the fuel in the distributer head. Another object is an improved shutter construction for regulating the air flow. Other objects are fewness of parts, economy of design and reduced noise of operation. The invention consists in the rotary oil burner and in the parts and combinations and arrangement of parts hereinafter described and claimed.

In the accompanying drawings, which form part of this specification and wherein like symbols refer to like parts wherever they occur,

Fig. 1 is a vertical longitudinal section through a rotary oil burner embodying my invention; and

Fig. 2 is a plan view of said burner; and

Fig. 3 is a side elevation thereof.

The present rotary oil burner comprises a combined burner and hearth supporting frame A adapted to be positioned within the ashpit of a furnace (not shown). The supporting frame A preferably comprises a ringlike body portion 1, which is open on the front side of said frame and has three circumferentially spaced brackets 2 depending therefrom that are provided with vertical openings adapted to slidably engage tubular supporting legs 3. The leg engaging brackets 2 of the supporting frame are provided with set screws 4, whereby the frame may be clamped to the supporting legs 3 in any desired position of its vertical sliding movement thereon. The tubular legs 3 are interiorly threaded to receive the threaded shank portion 5 of foot members 6 that are provided with rubber cushioning blocks 7. The foot members 6 are provided with transverse openings 8 adapted to receive a pin wrench, whereby the foot members may be rotated relative to the supporting legs to secure a fine vertical adjustment of the supporting frame independent of the coarser adjustment afforded by the sliding connection between said legs and said frame.

The main body portion 1 of the supporting frame A is provided with two diametrically opposed upstanding brackets 9 having horizontal top flanges 10 upon which is bolted the outstanding base flange 11 of a hearth ring 12. Arms 13 extend radially beyond the hearth ring 12 to the furnace wall with their inner ends resting on the top of the base flange 11 of said ring and terminating in downwardly offset portions 14 that extend through vertical openings or recesses 12*a* in said base flange and bear against the underside thereof, thereby anchoring the inner ends of said arms to said hearth ring. Supported on the radially extending arms 13 of the supporting frame A is a sheet metal plate 16 upon which is built a hearth 17 of refractory material, which forms the floor of the combustion chamber of the furnace and has a suitable flame retaining ring 17*a* at the outer periphery thereof.

Mounted in the supporting frame A concentric with the ringlike body portion 1 thereof is an electric motor B comprising a casing 18 having oppositely disposed outstanding arms 19 provided with vertically elongated slots 20 adapted to receive cap screws 21 that are threaded into horizontal holes provided therefor in diametrically opposed vertical flanges or lugs 22 on the inner side of said body portion of said supporting frame. The motor B may be adjusted vertically relative to its supporting frame A as far as the elongated slots 20 will permit by means of adjusting screws 23 that are threaded through vertical holes provided therefor in horizontal lugs 24 formed integral with said frame beneath the motor supporting flanges 22 thereof and abut at their upper ends against the lower edges of said flanges. Lock nuts 25 are provided for securing the motor adjusting screws 23 in the desired adjusted position.

The lower end of the armature shaft 29 of the motor B is journaled in a bearing 30 provided therefor in a lubricant chamber 31 formed in the lower end of the motor casing 18. The armature shaft is supported at its

lower end on a ball thrust bearing 32 seated in the lower end of the lubricant chamber 31. A pipe 33 is threaded into the chamber 31 for supplying lubricant thereto. The upper end of the armature shaft 29 is supported in a bearing 34 provided therefor in the upper end of the motor casing 18, which bearing is supplied with lubricant from a chamber 35 located therebelow by means of an oil wick 36. A pipe 37 is threaded into the chamber 35 for supplying lubricant thereto.

Mounted on and rigidly secured to the upper end of the motor casing 18 is an oil cup C having a hub 39 through which the armature shaft 29 extends and a comparatively shallow annular recess 40 in its bottom adapted to be supplied with oil through an oil feed pipe 41 threaded into said cup. The flow of the oil to the annular recess 40 in the bottom of the oil cup C may be regulated by any suitable means (not shown). The armature shaft 29 extends upwardly above the oil cup C and has the hub of a distributer head D rigidly secured thereto for rotation therewith. The distributer head is made in the form of a hollow cone disposed with its small end down and extending into the oil cup C. The small lower end of the hollow cone-shaped distributer head has an annular plate 42 screwed thereto, which is provided at its inner periphery with a series of annularly spaced picker blades or tabs 43 that extend downwardly to or slightly below the level of the oil in the annular recess 40 in the bottom of the oil cup C. The blades 43 rotate with the hollow distributer head D and are shaped and arranged to lift or pick up the oil from the annular oil recess 40 in the oil cup C and deposit it upon the lower edge of the cone-shaped inner surface of said distributer head without being broken up or atomized. The centrifugal action of the rotating distributer head, together with the gradually increasing diameter of the inner surface thereof, causes the oil to spread out in a thin layer on the conical inner surface of said distributer head and advance toward the upper end thereof.

The oil upon reaching the upper end of the hollow cone of the centrifugal distributer head D is thrown radially outward therefrom to the firing ring 17*a* of the hearth 17 through a series of circumferentially spaced radially disposed flinger tubes 44 that extend upwardly and outwardly from the upper edge of said head and terminate at their upper ends in horizontally disposed portions located at about the level of the firing ring 17*a*. The oil that is discharged from the flinger tubes is not finely atomized but leaves the tip of said tubes in the form of a thin sheet and is evenly distributed around the firing ring 17*a* of the hearth in the form of fine drops.

Air for combustion is supplied to the oil deposited on the firing ring 17*a* of the hearth by a fan E mounted on the upper end of the hub of the distributer head D. Said fan comprises a dished circular plate 45 that is perforated at its center to receive the armature shaft, and is clamped to the upper end of the hub of the distributer head by means of a nut 46 threaded on the upper end of said shaft. The plate 45 of the fan is provided with a series of openings through which the flinger tubes 44 extend. The top plate 45 of the fan is provided at its periphery with a depending flange 47 having outstanding blades 48 struck from openings therein. It is noted that the fan blades 48 are located below the tips of the flinger tubes 44, whereby air flows from said fan below the level of said tips and does not mix to an appreciable extent with the oil particles until it reaches the region of the firing ring of the hearth. With this arrangement, oil is distributed around the periphery of the hearth without being atomized, with the result that its inflammability is reduced and the tendency for the flame to flash back towards the burner is eliminated.

The amount of air delivered by the fan E is regulated by means of a shutter F comprising a cylindrical tube 49, whose lower end has a slidable and rotatable fit in the upstanding annular flange of the metal hearth ring 12 and whose upper end fits within the depending peripheral flange 47 of said fan. The air shutter F is secured to the upstanding annular flange of the hearth ring 12 by means of threaded studs 50 that extend through a series of elongated slots 51 in the cylindrical tube 49 of said shutter and are threaded into said upstanding flange. The slots 51 are disposed at an oblique angle to the axes of the shutter, whereby rotation of the shutter causes it to move vertically across the openings in the peripheral flange of the fan and thus regulate the flow of air from the fan. An operating handle 52 projects radially outward from the lower end of the shutter whereby it may be conveniently adjusted. An important advantage of this shutter construction is that it allows a full open intake to the fan at all times thus greatly increasing the maximum capacity of the fan over that of other fans of the same size but with the conventional air intake having overlapping shutter surfaces. In fact, the air intake area is more than 200% of the maximum with the conventional design. Another advantage lies in the fact that the air is evenly distributed from the periphery of the fan. Another advantage is that the shutter collar protects the inside burner parts against radiant heat from the combustion chamber and it allows adjustment of the fan vertically in the firebox without chance for air leakage between fan and hearth ring.

The hereinbefore described oil burner is simple and compact in construction and com-

paratively inexpensive to manufacture, the air shutter, fan, and distributer head may be removed and the legs raised, thus reducing the height of the device and enabling it to readily pass through the opening in the ash-pit. The legs may be then adjusted to bring the hearth ring to the proper elevation, after which the air shutter, fan, and distributer head may be placed in position and a fine final adjustment obtained by adjusting the foot portions of the legs. The oil and air leave the burner at different elevations and do not mix to an appreciable extent until they reach the region of the firing ring at the periphery of the hearth, thereby overcoming the tendency for the flame to flash back towards the burner. The shutter may be adjusted to any desired position to regulate the flow of air without decreasing the width of the fan openings, thereby securing an even discharge of the air around the periphery of the fan in all positions of adjustment of the damper; and the construction of distributer head secures an even distribution and steady flow of oil to the flinger tubes without breaking up or atomizing the oil.

Obviously, the hereinbefore described oil burner admits of considerable modification without departing from the invention, and I do not wish to be limited to the precise construction shown and described.

What I claim is:

1. A rotary oil burner comprising a supporting member, an electric motor thereon, an armature shaft for said motor, a cup mounted on said motor and having a hub portion sleeved on the armature shaft thereof, means for feeding liquid fuel to said cup, and a distributer head fixed to said shaft with its lower end disposed in said cup, said distributer head having an inverted cone-shape chamber therein communicating at its bottom with the interior of said cup, said distributer head chamber being provided at its upper end with a series of circumferentially spaced discharge openings, and means on the lower end of said distributer head adapted to pick up the fuel in said cup and deposit it on the conical surface of said distributer head chamber.

2. A rotary oil burner comprising a supporting member, an electric motor thereon, an armature shaft for said motor, a cup mounted on said motor and having a hub portion sleeved on the armature shaft thereof, means for feeding liquid fuel to said cup, and a hollow inverted cone-shaped distributer head fixed to said armature shaft with its lower end disposed in said cup, said distributer head being provided at its upper end with a series of circumferentially spaced discharge openings, a series of finger tubes projecting outwardly from the upper end of said distributer head, a series of picker blades on the lower end of said distributer head adapted to pick up the fuel in said cup and deposit it on the conical inner surface of said distributer head, and a fan rotatable with said distributer head and operating to deliver air for combustion at a level below the level of the discharge ends of said flinger tubes.

3. A rotary oil burner comprising a supporting member, an electric motor thereon, an armature shaft for said motor, a centrifugal distributer head rotatable with said shaft, flinger tubes projecting outwardly from said distributer head, means for supplying liquid fuel to said head, a fan rotatable with said shaft and surrounding said distributer head below the discharge ends of said flinger tubes, and an axially adjustable tubular shutter interposed between said distributer head and said fan.

4. A rotary oil burner comprising a supporting member, an electric motor thereon, a vertical armature shaft for said motor, a centrifugal fuel distributing head rotatable with said armature shaft, a fan rotatable with said armature shaft and provided with a depending peripheral flange having a series of openings, and an axially adjustable cylindrical tube disposed concentric to said peripheral flange with one end inside thereof.

5. A rotary oil burner comprising a supporting member, a hearth ring mounted on said support, an electric motor mounted on said support concentric with said ring, an armature shaft for said motor, a fuel distributing head fixed to said armature shaft, and a fan rotatable with said distributer head, said fan being provided with a depending peripheral flange having a series of openings, a cylindrical tube disposed in said hearth ring with its upper end fitting within the peripheral flange of said fan, said tube being provided with a series of elongated slots, and pins projecting from the inner face of said ring into said slots, said slots extending at an oblique angle to the axis of said tube, whereby said tube when rotated on its axis will be shifted axially relative to the peripheral flange of said fan.

6. A rotary oil burner comprising a supporting member, an electric motor thereon, an armature shaft for said motor, a fixed cup concentric with said armature shaft, means for feeding liquid fuel to said cup, and a centrifugal distributer head rotatable with said armature shaft and operating to pick up the fuel in said cup and project it radially outward, said head having an inverted cone-shaped recess therein opening into said cup and a series of blades at the lower edge of said recess operating to pick up the oil in said cup and deposit it on the walls of said recess.

7. A rotary oil burner comprising a supporting member, a rotary shaft, a cup mounted on said supporting member and having a

hub portion sleeved on the rotary shaft, means for feeding liquid fuel to said cup, and a distributer head fixed to said shaft with its lower end disposed in said cup, said distributer head having an inverted cone-shape chamber therein communicating at its bottom with the interior of said cup, said distributer head chamber being provided at its upper end with a series of circumferentially spaced discharge openings, and means on the lower end of said distributer head adapted to pick up the fuel in said cup and deposit it on the conical surface of said distributer head chamber.

Signed at Detroit, Michigan, this 19 day of July, 1929.

MILTON A. POWERS.