

Nov. 9, 1926.

E. BURRELL

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CENTRIFUGAL OIL BURNER

Filed August 29, 1924

2 Sheets-Sheet 1

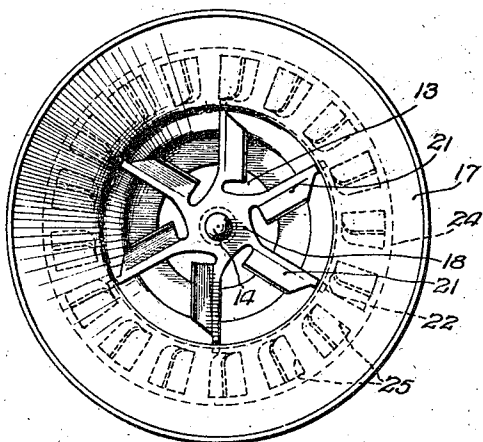


FIG. 4

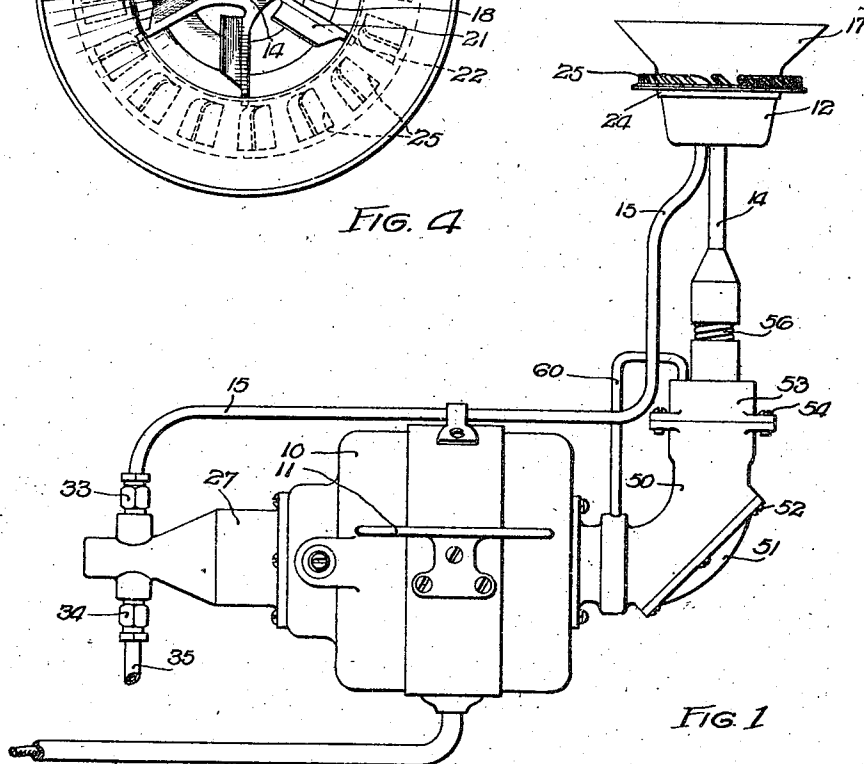


FIG. 1



FIG. 5

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HIS ATTY.

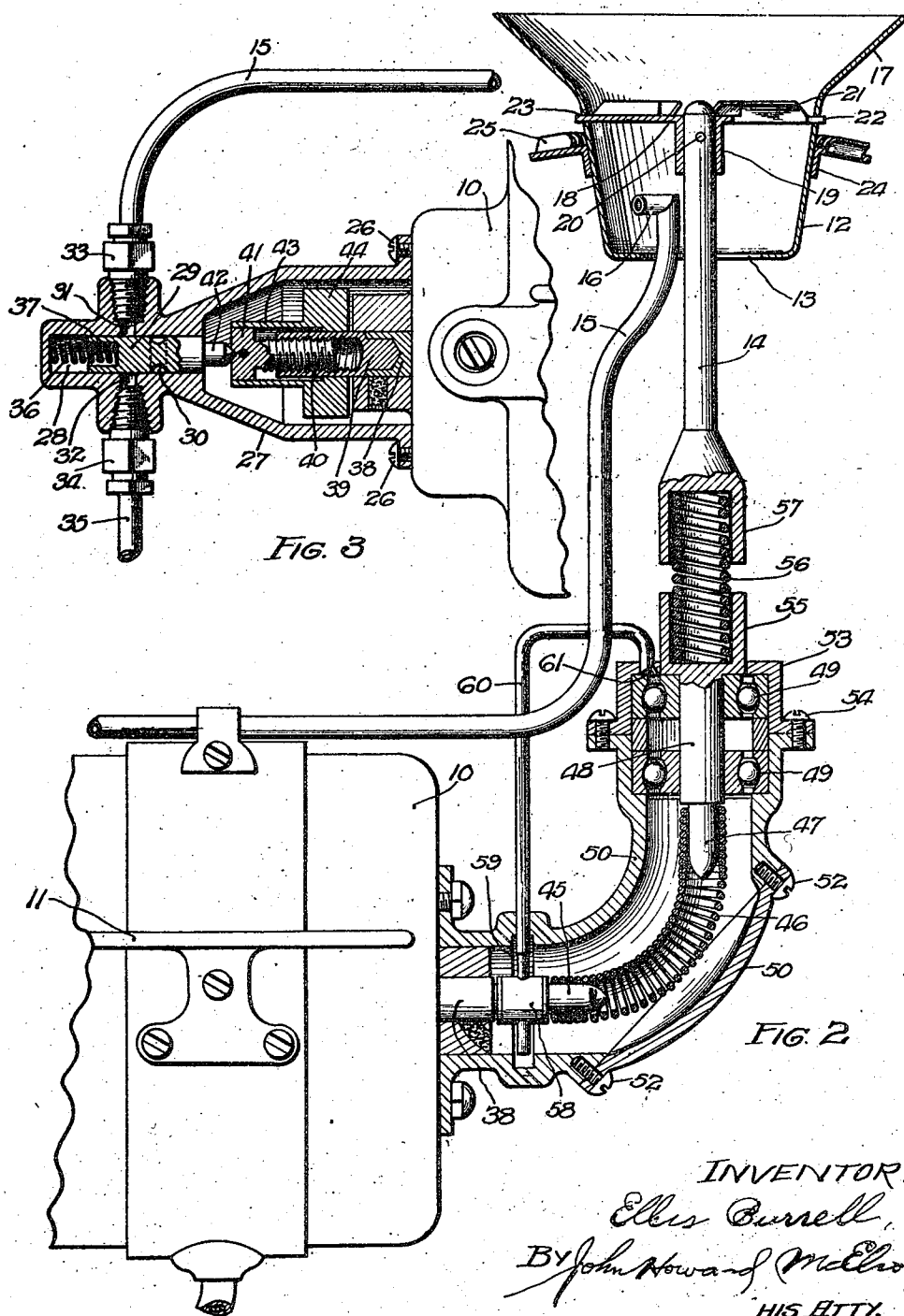
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UNITED STATES PATENT OFFICE.

ELLIS BURRELL, OF CHICAGO, ILLINOIS, ASSIGNOR TO DRYING SYSTEMS, INC., A CORPORATION OF ILLINOIS.

CENTRIFUGAL OIL BURNER.

Application filed August 29, 1924. Serial No. 734,945.

My invention is concerned with oil burners of the centrifugal type, and is adapted to produce a simple structure of the class described adapted to be placed in a furnace, and which can be cheaply manufactured, and which is unusually efficient in its operation. To these ends, it consists of certain novel combinations of elements which will be described at length in the body of this specification, and particularly pointed out in the claims.

To illustrate my invention, I annex hereto two sheets of drawings, in which the same reference characters are used to designate identical parts in all the figures, of which,—

Fig. 1 is a side elevation of the apparatus embodying my invention;

Figs. 2 and 3 are views of portions of the same on an enlarged scale, with parts thereof in central, vertical section;

Fig. 4 is a top plan view of the cup, and Fig. 5 is a side elevation of certain springs detached.

In carrying out my invention in its preferred form, I employ a high-speed electric motor 10 operating, say, at a speed of twelve thousand revolutions per minute, and I preferably provide this motor with a pair of motor support brackets 11 to aid in the ease of installation. The motor has a horizontal armature shaft which is connected by the couplings to be described with the rotary atomizer cup 12, which operates in a manner well known to those skilled in the art. This cup, which is best seen in Figs. 2 and 4, is preferably drawn out of sheet-metal, and consists of the lower portion, which flares upward slightly and has the large circular opening 13 in the bottom to accommodate the shaft 14 upon which the cup is secured and the delivery pipe 15 for the oil. The bottom of the cup is open, as described, except for the short, inwardly-extending, horizontal flange upon which the oil is dropped from the nozzle 16 when the cup is rotating at the proper speed to insure the spraying action. The upper portion 17 of the cup is preferably flared at a considerably greater angle to the vertical than the lower portion to secure the desired projection of the oil for the flame. As a convenient means of securing the same on the shaft 14 and also to secure the desired upward draft of air, I employ the spider 18, best shown in Fig. 4, which is preferably stamped and drawn out of sheet-metal, and has the central sleeve 19 fitting snugly on the upper end of the shaft 14, to which it is preferably secured by the pin 20. The spokes or arms 21 of the spider are stamped out of the sheet-metal body and have their body portions slanted, as shown, so as to produce the desired draft fan action. The ends 22 of the arms 21 are reduced, and shaped to snap into registering apertures 23 formed in the body of the cup for this purpose. To secure the desired draft on the exterior of the cup, I employ the annulus 24, likewise preferably composed of sheet-metal and having the downturned portion of the proper shape to fit on the lower portion of the cup, and to be secured thereto in any desired manner. The substantially-horizontal portion of the flange is stamped to form thereon any desired number of vanes 25, which are also inclined at the proper angle to secure the upward draft of air on the outside of the cup as the same is rotated.

The oil will be delivered by pressure through the pipe 15, and to insure that the oil is not delivered until the cup is rotating at the proper speed, I preferably employ the following structure: Secured upon the end of the motor 10 by the screws 26 is a hollow casting 27 which has on its outer end the bore 28 in which slides the valve 29. This valve 29 contains the annular passage 30 which is adapted to register with the two ports 31 and 32 formed in the valve casing and connected by the compression couplings 33 and 34 with the pipe 15 and the pipe 35, respectively. A helically-coiled, expanding spring 36 placed in the circular recess 37 formed in the end of the valve 29 and co-operating with the bottom of the recess 28 serves to hold the valve 29 normally in the position shown in Fig. 3, in which the supply of oil is shut off. To open the valve when the motor has reached the proper speed, I employ the following means: The end 38 of the armature shaft has secured therein the plug 39, the outer end of which consists of an internally-threaded sleeve, with which co-operates the externally-threaded plug 40 projecting from the

base 41, which has the bearing for the reduced conical end 42 of the valve 29. The base 41 also supports, through the sleeve 43, the fly-wheel 44, which has a bearing on the exterior of the internally-threaded sleeve portion of the plug 39. All this mechanism is enclosed within the enlarged, hollow portion of the casting 27, which is preferably filled with lubricating oil.

10 When the motor is attaining the high speed at which it is normally operated, the lag of the fly-wheel 44 due to its inertia causes it to be moved to the left to the dotted-line position shown, where the port 30 is in register with the ports 31 and 32 so that the oil can be delivered. When the motor is stopped, as it slows down, the drag of the fly-wheel 44, aided by the pressure of the spring 36, causes the fly-wheel 44 to move by reason of its threads to the right until the full-line position is reached, in which the flow of the oil is shut off.

The connections from the other end of the armature shaft 38 to the shaft 14 are preferably constructed as follows: The said other end is reduced and tapered, as seen at 45, and has secured thereon the helically-coiled, torsion spring 46, which has its other end secured on the reduced and tapered end 47 of the intermediate shaft 48, which is provided with the ball bearings 49 mounted in the upper end of the casing 50, which is provided to contain the connections described, and which is preferably filled with lubricating oil to insure ease of operation. A cap 51 is secured to the casing 50 by the screws 52, for a purpose which will be obvious. The upper portion of the casing 50 is closed by the cap 53 secured thereon by the screws 54, and the cap 53 contains the upper one of the pair of ball bearings 49. This cap also has projecting upwardly therefrom the cylindrical or cup portion 55, in which is secured the helically-coiled, torsion spring 56, which has its other end secured in the cup 57 which forms the lower portion of the shaft 14. Instead of employing a single spring 56, I preferably employ two springs wound together and having the same diameter. This spring connection 56 enables the cup and the shaft 14 to which it is secured to find its true center of rotation even if the bearings for the shaft 48 should not be exactly adjusted.

55 I preferably provide for the lubrication of the bearings 49 by securing on the adjacent end of the shaft 38 the small rotary pump 58 which co-operates with a suitable pump casing 59 formed in the casting 50, and provided with the pipe 60 leading therefrom and discharging downward through an

aperture 61 in the top of the cap 53 in a manner that will be readily apparent.

The operation of the foregoing apparatus will be readily understood from the foregoing description of the structure, and need not be further elaborated.

While I have shown and described my invention as embodied in the form which I at present consider best adapted to carry out its purposes, it will be understood that it is capable of modifications, and that I do not desire to be limited in the interpretation of the following claims except as may be necessitated by the state of the prior art.

What I claim as new, and desire to secure by Letters Patent of the United States, is:

1. In an oil burner an atomizer, a resilient shaft supporting said atomizer at one end and a bearing for said shaft distantly located with respect to the atomizer a sufficient extent to utilize the flexibility of the shaft for permitting the atomizer to seek a center of rotation under the gyrostatic effect of high speed, and means for rotating said shaft.

2. In an oil burner an atomizer cup, means for feeding liquid fuel to said cup, a supporting shaft for said cup, said shaft being resilient, a bearing for said shaft sufficiently removed from the atomizing cup so that the resilience of the shaft may be utilized for permitting the cup to move to a position of minimum resistance under the gyrostatic force developed by the rotation of the cup, and means for rotating said shaft and atomizing cup.

3. In an oil burner, the combination with an upper shaft section, having an atomizing member secured toward the upper end thereof, of a lower shaft section, means for rotating the lower section, and a strong coiled drive spring connecting the adjacent ends of the two shaft sections so that the upper shaft section and its atomizing member can assume their true center of rotation.

4. In an oil burner, the combination with an upper shaft section, having an atomizing member secured toward the upper end thereof, of a lower shaft section, means for rotating the lower section, and a strong coiled drive spring connecting the adjacent ends of the two shaft sections so that the upper shaft section and its atomizing member can assume their true center of rotation, said shaft sections having their adjacent ends cupped with the ends of the drive spring secured in said cups.

In witness whereof, I have hereunto set my hand this 16th day of July, 1924.

ELLIS BURRELL