W. R. RAY.

ELECTRIC MOTOR.

APPLICATION FILED OCT. 22, 1919. RENEWED JAN. 18, 1922.

1,427,416. Patented Aug. 29, 1922.

3 SHEETS—SHEET 1.

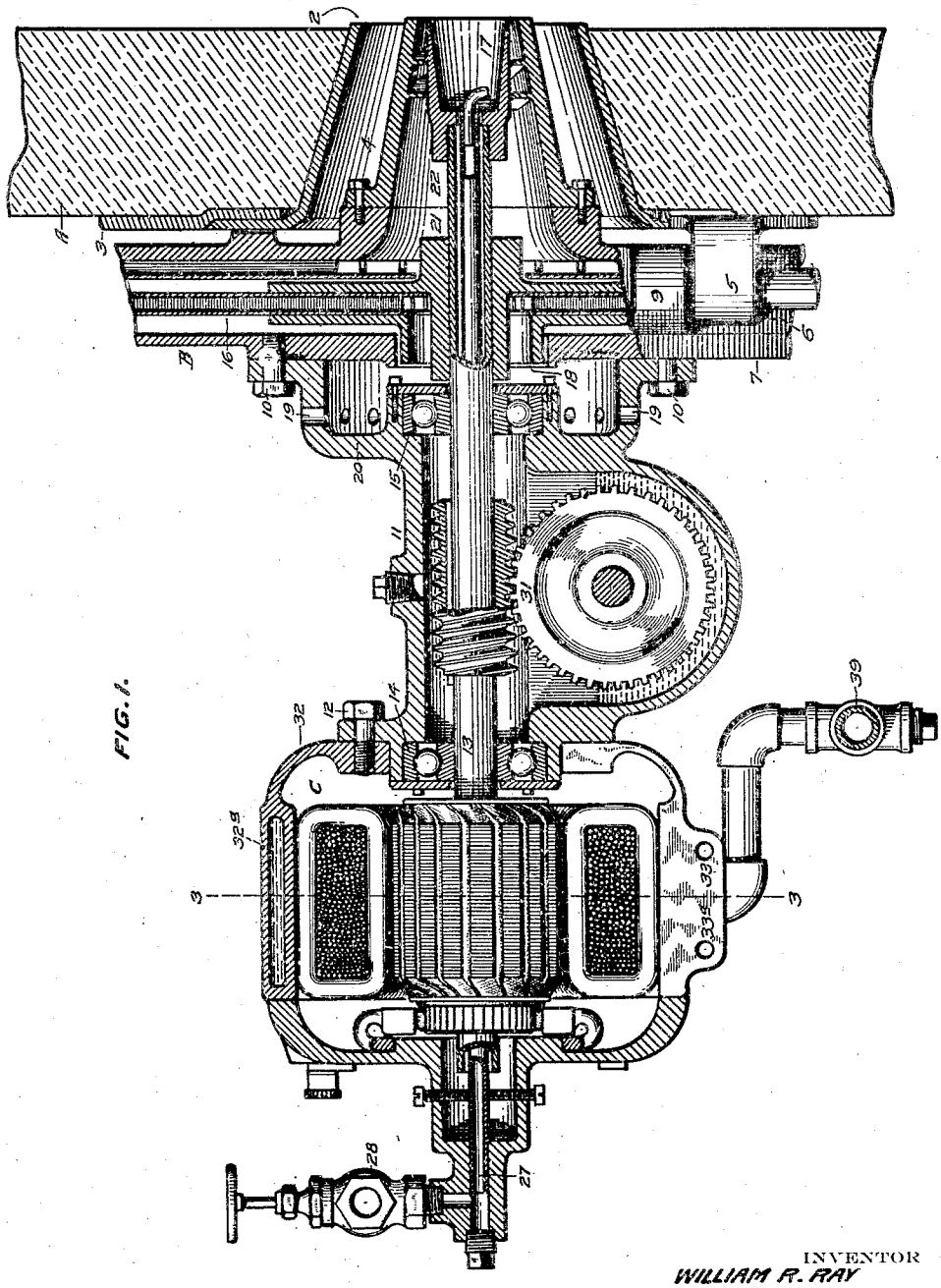


FIG. 1.

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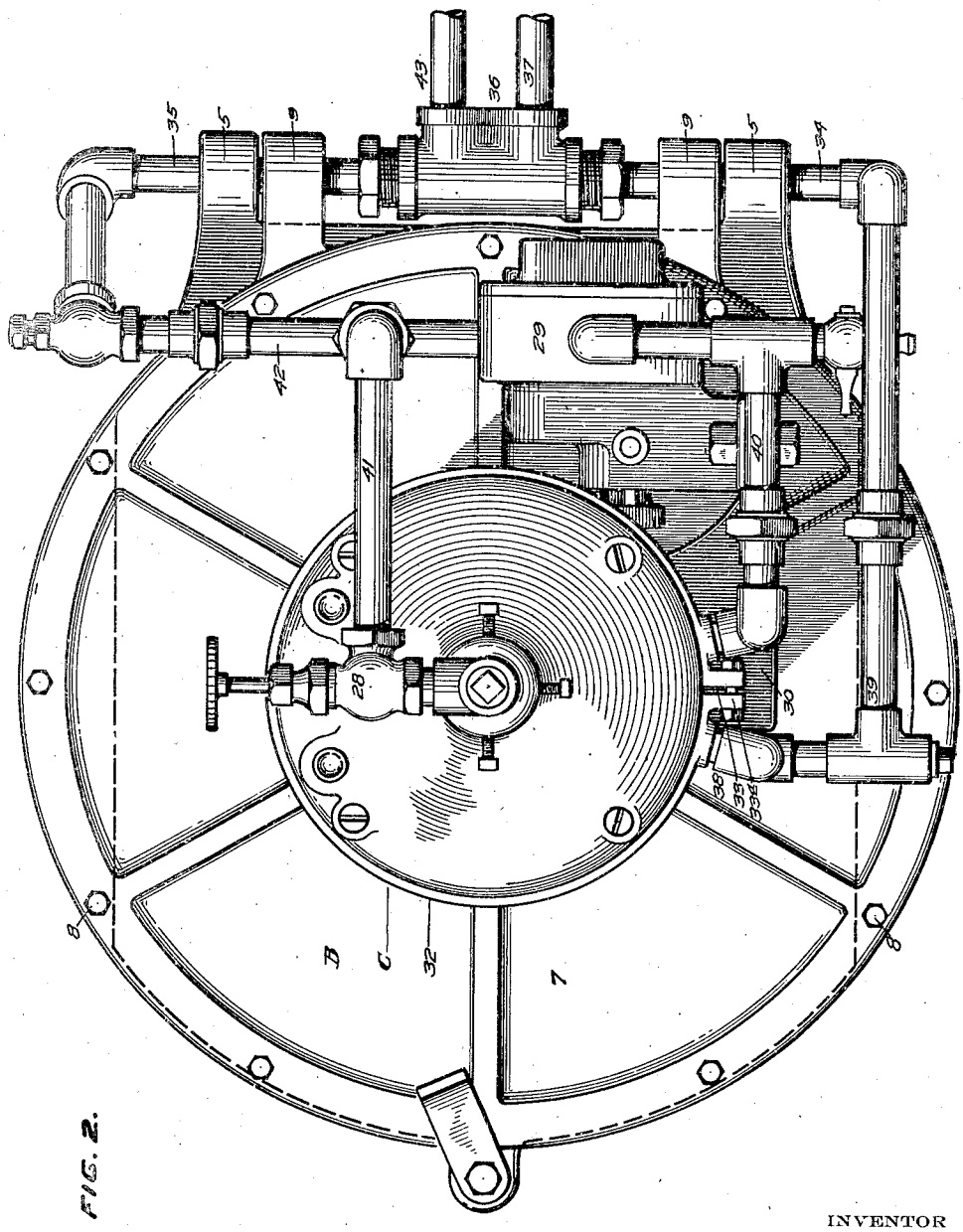


FIG. 2.

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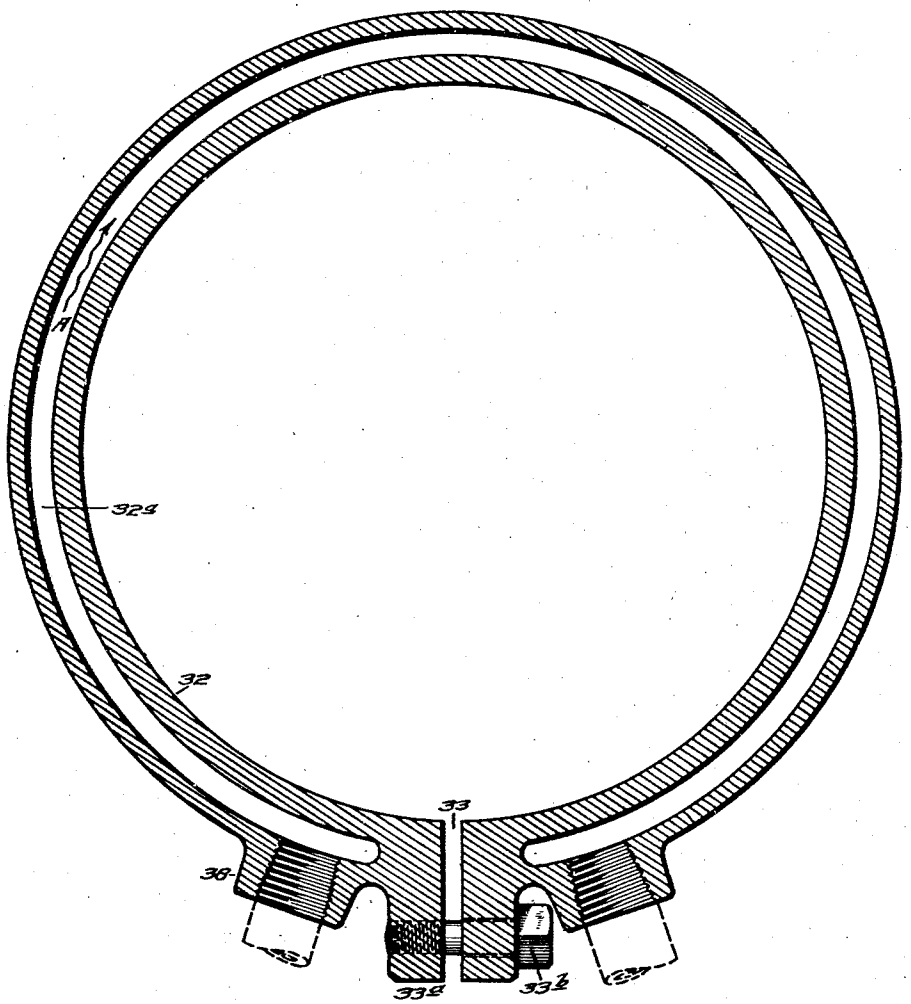
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3 SHEETS—SHEET 3.

FIG. 3.



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UNITED STATES PATENT OFFICE.

WILLIAM RUTH RAY, OF SAN FRANCISCO, CALIFORNIA.

ELECTRIC MOTOR.

1,427,416. Specification of Letters Patent. Patented Aug. 29, 1922.

Original application filed September 25, 1916, Serial No. 122,014. Divided and this application filed October 22, 1919, Serial No. 332,395. Renewed January 18, 1922. Serial No. 530,229.

To all whom it may concern:

Be it known that I, WILLIAM R. RAY, a citizen of the United States, residing at the city and county of San Francisco and State of California, have invented new and useful Improvements in Electric Motors, of which the following is a specification.

This invention is a division of my copending application entitled "Oil burner", filed September 25, 1916, Serial No. 122,014, patented Mar. 29, 1921, No. 1,373,149, and relates to an electric motor and means for mounting and cooling the same.

One of the objects of the present invention is to provide an electric motor of novel construction and particularly to provide means for cooling the same.

Another object of the invention is to provide a split motor housing to permit ready removal or insertion of the field coil ring and to permit the ring to be substantially secured when in place.

Another object of the invention is to provide a mounting for the motor housing and a bearing therein for the reception of the motor shaft and the armature supported thereby.

Further objects will hereinafter appear.

The invention consists of the parts and the construction, combination and arrangement of parts as hereinafter more fully described and claimed, having reference to the accompanying drawings, in which—

Fig. 1 is a central vertical longitudinal section through the motor and the bearing supporting the same, said section also showing a centrifugal atomizing burner and means for supplying air thereto.

Fig. 2 is a front view of the motor.

Fig. 3 is a cross section of the motor housing taken on line 3—3, Fig. 1.

Referring to the drawings in detail, A indicates the front end of an ordinary furnace and 2, the opening which is generally closed by the furnace door. Suitably secured to the furnace front is a plate 3 provided with a conical extension 4 which projects into the opening 2 to form a metallic lining for the same. Formed integral with the plate 3 or otherwise secured to the same is a pair of hinge lugs 5 which are provided for the purpose of supporting a fan casing generally indicated at B. This casing consists of a housing 6 and a front cover 7 secured thereto by means of screws 8. Formed integral with the housing 6 is a pair of hinge lugs 9 which cooperate with the lugs 5 to form a hinge about which the fan casing as a whole may be swung.

Secured to the cover 7 by means of screws 10 is a bearing extension 11 and secured to the outer end of said extension by means of screws 12 is an electric motor C which forms the subject matter of the present application. This motor is provided with a hollow shaft 13 which extends through the bearing extension 11, being supported therein by means of ball bearings 14 and 15, the outer end of the shaft being extended as shown, to provide a support for a fan 16 and an atomizing cup 17. The cover section 7 is provided with an air intake opening 18, to which air is admitted through perforations 19 formed in an enlarged portion 20 of the bearing extension. The housing proper is provided with a discharge opening 21 which is extended by securing to the housing a tapered nozzle 22. This nozzle is sufficiently long to enclose the atomizing cup 17 and forms in conjunction therewith an annular discharge passage for the air discharging from the fan.

The burner or atomizing cup shown at 17 is particularly designed to handle low gravity fuel oils and this oil is delivered to the atomizing cup in the following manner: Extending through the hollow shaft 13 of the motor is a stationary pipe 27 which opens into the atomizing cup at one end and is connected at the opposite end with a controlling valve 28. The oil to be atomized is delivered to the valve 28 and the connected stationary pipe 27 by means of a pump 29 of suitable construction, which is supported with relation to the bearing extension 11 by means of a bracket 30 and directly driven from the motor shaft at a reduced speed by means of the worm gear drive generally indicated at 31.

The features to be covered by the present application are the mounting and construction of the motor housing. Referring to Figs. 1, 2 and 3 it will be seen that the housing on the motor consists of a single casting 32 which is secured to the bearing extension 11 by means of screws 12. The casing is provided with a jacket or annular channel 32ª which, practically speaking,

surrounds the whole casing. The case, however, is split at the lower end, as at 33, for purposes hereinafter to be described and therefore necessitates a division in the channel or jacket 32^a, such as shown. The annular channel is in this instance provided for the purpose of permitting the circulation of oil; first, to cool the motor, and secondly, to heat the oil to be atomized. The oil is delivered and circulated in the following manner: Extending through the hinge lugs 5 and 9 are a pair of hollow pintle members 34 and 35, the inner ends of which are connected with a centrally divided T-fitting indicated at 36. Oil from any suitable source of supply enters the lower half of the double T through a pipe 37 and then passes down through the hollow pintle 34 which is connected with a motor casing jacket or channel 32^a at the point indicated at 38, by means of a pipe 39. The oil then passes around the housing through the jacket in the direction of arrow *a* and then enters the suction side of the pump 29 through a pipe 40. The major part of the oil discharged by the pump is here directed through a pipe 41 to the valve 28 with connected stationary pipe 27, which finally delivers the oil to the atomizing cup 17. Any surplus amount of oil delivered by the pump is by-passed through a pipe 42 connected with the upper hollow pintle 35, which, as before stated, connects with the upper side of the double T indicated at 36. It then passes through a pipe 43 which connects with the source of supply, thereby permitting a return or overflow action for any surplus amount of oil delivered by the pump.

From this it can be seen that means are provided for circulating a cooling medium through a jacket surrounding the motor housing, this circulation being of great importance, particularly when the motor is used in conjunction with oil burners as it provides means for cooling the motor and for raising the oil to a temperature where it is more readily atomized when delivered to the burner.

Another important feature of the present invention is the splitting of the motor housing at the point indicated at 33. This permits the field ring of the motor to be easily removed for repair and similarly permits easy access to the inner bearing 14. The split portion of the casing is extended by a pair of lugs 33^a which are perforated to receive screws 33^b. The screws, when loosened, permit sufficient expansion of the housing to release the field ring while tightening of the screws will securely lock the same against removal.

Another important feature of the invention is the provision of the bearing member 11, this bearing serving two functions; first, that of supporting the motor housing by means of the screws 12, and secondly, that of supporting the motor shaft and the armature supported thereby. This construction eliminates bearing projections on opposite sides of the motor housing and thereby permits a more compact construction and a simple assembly.

The passage of oil through the motor jacket previous to its delivery to the cup is of great benefit as it permits the heat of the motor to be conducted to the oil, in this manner rendering it more suitable for atomization and simultaneously reducing the motor temperature to such an extent that it may run for hours and days at a time without any danger of burning or overheating. The temperature of the motor proper and the oil passed therethrough may furthermore be regulated to a great extent by permitting a greater or lesser volume of oil to constantly discharge through the overflow provided by the pipes 42, 43 and 35. The mounting of the motor, by securing it to the bearing extension 11 here shown, is of further importance as it entirely eliminates bearings within the motor or supporting brackets and other devices heretofore generally used. It also permits the employment of an entirely enclosed motor and in this manner prevents the admission of dust and grit.

While the motor here shown is employed in conjunction with an oil burner of the centrifugal type, I wish it understood that it may be employed for any purpose desired; similarly, that the materials and finish of the several parts employed may be such as the experience and judgment of the manufacturer may dictate.

Having thus described my invention, what I claim and desire to secure by Letters Patent is—

1. In an electric motor, a housing, said housing being split to permit contraction and expansion of the same, bolts passing through the housing adjacent the split portion to permit contraction and expansion of the housing, a field ring within the housing adapted to be secured by the contraction of the housing, a jacket-formed exterior of the housing terminating at the split portion of the housing, and a pair of pipes connected with the jacket terminating points to permit circulation of a cooling medium through the jacket.

2. In a motor of the character described, an enclosing housing, having an annular surrounding channel to carry a cooling medium, said housing being separated at one side, and having means to contract or expand it, a pump, pipes connecting the pump with each side of the separation to allow a cooling medium to be circulated around the annular channel; and connections whereby the discharge is connected with the motor

shaft, said shaft being hollow and containing a conducting pipe.

3. A motor including a field and an internal revoluble armature, an inclosing split housing jacket, means to introduce a cooling medium into one side of the jacket and discharge it from the other side, a hollow armature shaft and a pipe extending therethrough, means by which the discharge from the motor jacket is conducted to said pipe, and bypass means to return surplus cooling medium to the supply source.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

WILLIAM RUTH RAY.

Witnesses:
JOHN H. HERRING,
W. W. HEALEY.