

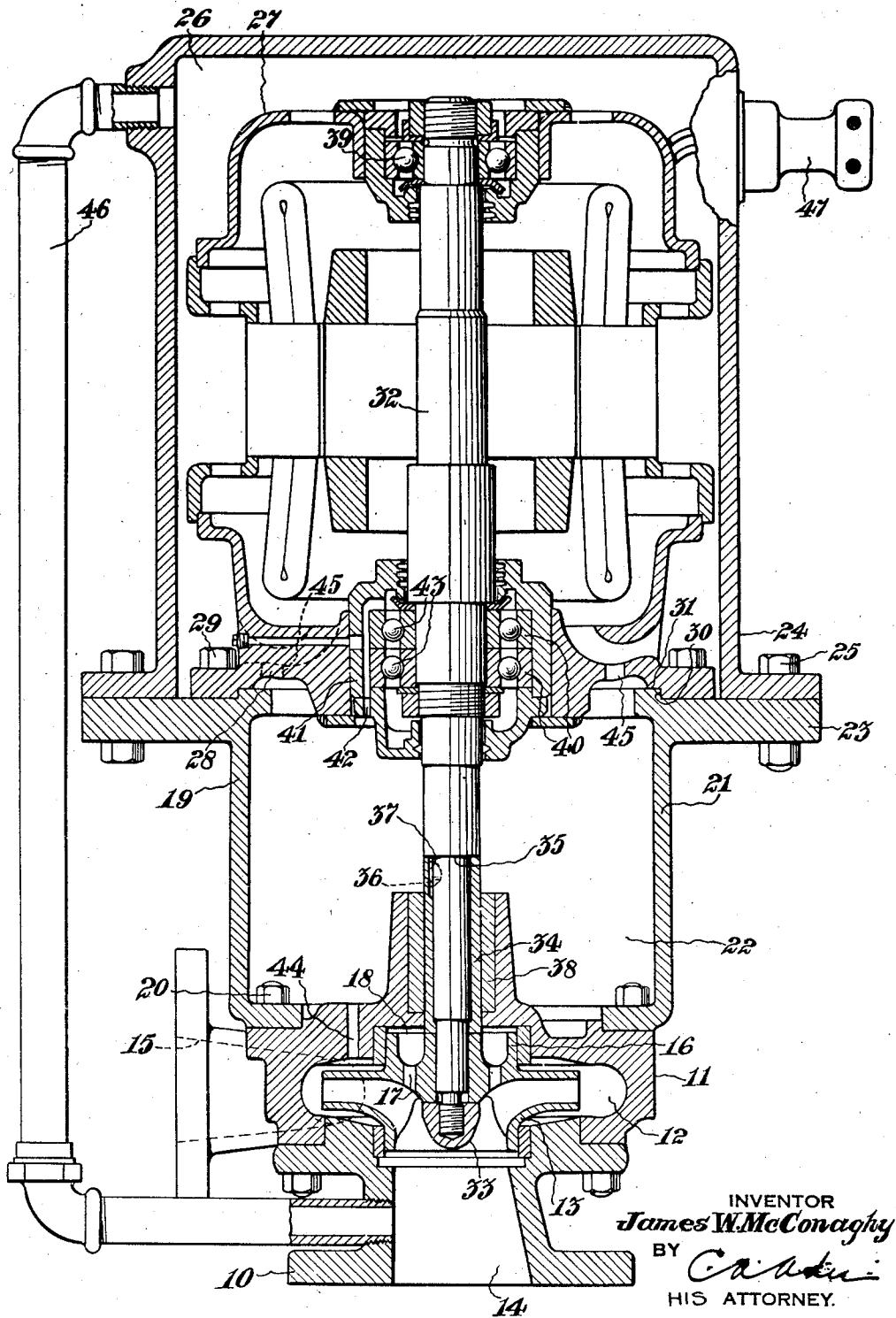
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PUMPING MECHANISM

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PUMPING MECHANISM

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2 Claims. (Cl. 103—87)

This invention relates to pumping mechanism, and more particularly to a pumping mechanism intended for pumping fluid medium that may serve, among other functions, that of a lubricant, as for example the oil used for insulating and cooling transformers.

One object of the invention is to eliminate the use of packing devices for the drive shaft of the pumping mechanism.

Another object is to preclude the possibility of air seepage into the medium being pumped.

Still another object is to use a portion of the discharge output of the pumping mechanism as a cooling agent for the motor driving the pumping mechanism and also as a lubricant for the bearings of the pumping mechanism.

Other objects will be in part obvious and in part pointed out hereinafter.

The figure in the drawing is a longitudinal view, partly in section, of a pumping mechanism constructed in accordance with the practice of the invention.

Referring more particularly to the drawing, the pumping mechanism, designated in general by 10 and capable of use in either a horizontal or a vertical position, comprises a pump casing 11 having a pumping chamber 12 and an impeller 13 in the pumping chamber for pumping fluid from an inlet passage 14 to an outlet passage 15. The impeller may, as shown, be provided with a balancing drum 16 and has ports 17 for the passage of fluid from the rearward end surface 18 of the balancing drum to the inlet passage 14.

The rearward end of the pumping casing 11 is connected, in sealing relation, to the end of a distance piece 19 that is attached to the pump casing by bolts 20. The wall 21 constituting the body of the distance piece is imperforate so that the interior thereof may serve as a container 22 for fluid medium, and at the rearward end of the distance piece is an external flange 23 that abuts the open end of a casing 24 which is clamped in fluid tight engagement to the flange 23 by bolts 25.

The casing 24 is of cup-shape, having a wall at one end and an opening at the other end, and defines a chamber 26 for an electric motor 27 serving to rotate the impeller 13. The motor 27 is of the open type. Its peripheral and rear end surfaces are suitably spaced from the walls of the casing 24 to admit of free circulation of fluid through the chamber 26 and the motor. The front end, or head, 28 of the motor is secured to the flange 23 by bolts 29 for supporting the mo-

tor, and in the end of the head 28 is a shallow recess 30 to receive a boss 31 on the end of the distance piece for holding the motor in axial relationship with the impeller 13.

In the form of the invention shown, the shaft 32 of the motor 27 is of a length to extend through the chamber 22 and into the impeller 13 which is clamped to the shaft 32 by a cap nut 33 threaded on the end of the shaft. The rear end of the impeller 13 abuts the end of a sleeve 34 on the shaft 32, and the sleeve 34, in turn, seats with its rearward end against a shoulder 35 on the shaft 32 and is held firmly against said shoulder by the impeller.

The sleeve 34 is preferably held against rotation upon the shaft by a key 36 embedded in the shaft and in a slot 37 in the inner surface of the sleeve. The sleeve 34 extends through a bushing 38 in the pump casing 11, immediately adjacent the balancing drum 16, and is of sufficiently smaller diameter than the bore of the bushing 38 to permit of a restricted flow of fluid from the chamber 22 to the surface 18 of the balancing drum.

The bearings for the portion of the shaft 32 associated directly with the motor 27 are of the anti-friction type commonly provided for the purpose. One of these, designated 39, is arranged in the rearward end of the motor casing and a pair of similar bearings, designated 40, are arranged in a cage 41 in the head 28 and having a suitable passage 42 to afford communication between the chamber 22 and the anti-friction members 43 of the bearings 40.

In order that a portion of the fluid discharged from the impeller 13 into the pumping chamber may be diverted for use as a lubricant for the various bearings of the pumping mechanism and as a cooling agent for the motor 27, the pump casing 11 is provided with a passage 44 that leads from the pumping chamber 12 to the chamber 22, and in the head 28 is a passage, or passages, 45 for conveying fluid from the chamber 22 into the lower portion of the chamber 26. Owing to this arrangement, a portion of the fluid discharged by the impeller 13 will flow directly from the pumping chamber into the chambers 22 and 26 to fill these chambers so that the motor and the bearings of the pumping mechanism will be constantly immersed, it being understood that the rearward bearing 39 of the motor is directly exposed to the fluid in the chamber 26.

Means are provided to assure a constant circulation of fluid through the chambers 22 and 26. To this end the pumping mechanism is pro-

vided with a conduit 46 to convey fluid from the chamber 26. The conduit 46 is preferably attached to the chamber 26 at a point above the motor 27 to assure the complete displacement of air from the chamber 26, and the opposite end of the conduit 46 opens into a point of low pressure in the pumping mechanism, as for example the inlet passage 14.

The electrical energy supplied to the motor may be introduced thereto through a sealed terminal box 47 attached to the casing 24 in such wise as to prevent leakage of fluid along the cooperating surfaces of the said casing and the terminal box.

In the operation of the device some of the fluid discharged from the pump passes from the pumping chamber 12 through the passage 44 into the chamber 22, thence through the passages 45 into the chamber 26. The fluid in the chambers 22 and 26 floods the bearings of the pumping mechanism and the motor 27 will also be fully immersed in the fluid to carry away the heat generated during pumping. Upon leaving the chamber 26 the fluid is again returned to a point of low pressure in the pumping system, in the present instance to the inlet passage 14, to commingle with the fluid flowing from the source of supply to the pump.

As will be readily appreciated, by keeping the chambers 22 and 26 filled with fluid discharged from the impeller all danger of air entering the pumping system will be eliminated. No stuffing boxes will, therefore, be required between the

impeller and the motor and the danger of damage, through oxidation, to the transformer insulation will be entirely obviated.

I claim:

1. Pumping mechanism, comprising a pump having inlet and outlet passages, a motor for driving the pump, a support member for the motor, a casing having a chamber with an opening at only one end to permit the entrance of the motor into the chamber and the walls of said casing being spaced from the motor to permit the free flow of fluid medium through the chamber, conduit means for conveying discharge fluid medium from the pump into the chamber to inundate the motor, and a conduit leading from the chamber to the inlet passage for conveying fluid medium from the chamber.

2. Pumping mechanism, comprising a pump having inlet and outlet passages, a motor for driving the pump, a support member for the motor, a casing having a chamber with an opening at only one end to permit the entrance of the motor into the chamber and the walls of said casing being spaced from the motor to permit the free flow of fluid medium through the chamber, conduit means for conveying discharge fluid medium from the pump into the lower portion of the chamber to inundate the motor, and a conduit leading from the upper portion of the chamber to the inlet passage for conveying fluid medium from the chamber.

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