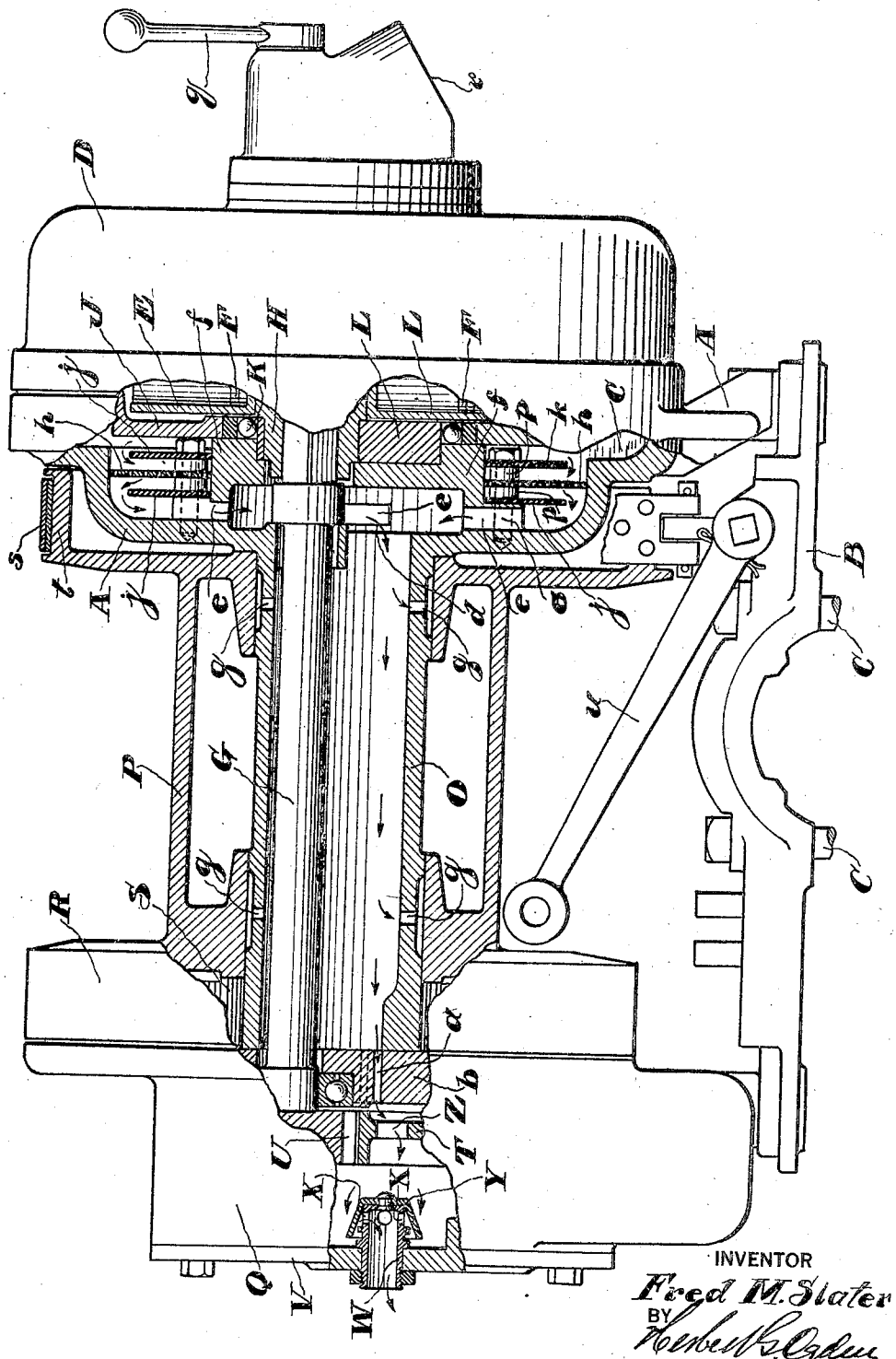
Jan. 9, 1923.

1,441,638.

F. M. SLATER.

OIL AND AIR SEPARATOR FOR ROTARY MOTORS.

FILED JAN. 19, 1922.



INVENTOR

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UNITED STATES PATENT OFFICE.

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OIL AND AIR SEPARATOR FOR ROTARY MOTORS.

Application filed January 19, 1922. Serial No. 530,482.

To all whom it may concern:

Be it known that I, FRED M. SLATER, a citizen of the United States, and a resident of Easton, county of Northampton, and State of Pennsylvania, have invented a certain Oil and Air Separator for Rotary Motors, of which the following is a specification accompanied by drawings.

This invention relates to fluid actuated rotary motors of the cylinder type, but more particularly to a device for extracting the lubricating oil from the motive fluid, thus effecting a saving and permitting the oil to be used over again, either in the motor or in a hoist or other mechanism to which the motor is applied.

In a fluid actuated rotary motor of the cylinder type, pressure is created in the motor casing, due to leakage, and with the splash system of lubrication, oil is carried outwardly to the periphery of the casing by centrifugal action and may be wasted by passing to the atmosphere with the leakage air, through an atmospheric vent, usually provided in the casing.

The object of the present invention is to extract substantially all the oil from the escaping air and return the oil to the motor, and if desired use that small portion of the oil escaping with the air for lubricating a hoist or other mechanism operated by the motor.

The invention is shown in one of its preferred forms in the accompanying drawing, which is an elevation partly in longitudinal section of so much of a motor shown in connection with a hoisting mechanism, as will serve to illustrate the invention.

Referring to the drawings, the frame A of a fluid actuated rotary motor of the cylinder type is shown mounted on a clamping member B in the form of a saddle clamp adapted to grip a column or cross bar in cooperation with a similar clamping member or cross bar saddle clamp (not shown) in the usual manner, by means of the bolts C. The motor is provided with a case D adapted to be secured to the frame A and for simplicity, only so much of the interior of the motor is indicated as will serve to illustrate the type of motor employed, that is, a rotary cylinder motor having a plurality of cylinders E and pistons F reciprocating therein. The cylinders E are preferably cast in one piece forming a cylinder member which rotates about the central axis, and the driven shaft G for a hoist or other mechanism, is connected to be driven from the sleeve H, which rotates with the cylinders E. The motor, which is illustrated in part in the present drawing may be any suitable rotary cylinder motor, like that disclosed, for instance, in Letters Patent of the United States No. 725,129 granted April 14, 1903 to C. H. Peck for reversible motor, but as the motor, itself forms no part of the present invention, it will not be further illustrated or described herein, except to point out that in such a type of motor of which said Patent #725,129 is typical, yoke members J are usually provided at each side of the cylinder member, rotating on ball-bearings K located on the circular bearings L which are eccentric to the axis of rotation of the cylinders.

The frame A of the motor is in this instance provided with a hollow center bearing O forming the bearing for a hoisting drum P adapted to rotate thereon and connected to be driven from the main shaft G in any suitable manner. Only so much of the gear case Q and gearing is shown herein as will serve to illustrate my invention relating to lubrication. The flange R of the drum P is provided with an internal gear S driven by any suitable gear connection from an intermediate gear T meshing with the pinion U on the main shaft G. The gear case Q is provided with a cover V through which a vent is provided in the form of a tube or thimble W, having perforations X and a shield Y at the inner end. The intermediate gear T is also provided with perforations Z in its web and a vent *a* is provided in the wall *b* of the gear case and opens into the interior of the center bearing O.

The rotating parts of the cylinder motor are oiled by splash lubrication from oil *c* supplied to the motor casing and collecting in the bottom thereof, regardless of the position in which the motor is placed, whether upside-down or at an angle. The oil is carried outwardly to the periphery of the casing by centrifugal action and the air pressure created in the motor casing by the leakage of air may escape through the opening *d* in the frame A leading to the center bearing O. The air, and oil carried thereby, tends to pass from the motor cas-

ing through the apertures *e* in the web *f* within the motor casing, and from thence through the center bearing out through the vent *a* to the gear casing Q and thence to atmosphere through the apertures X and vent tube W.

In order to separate or extract substantially all of the oil from the air, I provide stationary continuous radially extending plates in the motor casing, in the space between the web *f* and the periphery of the casing, interposed in the path of the flow of air, ahead of the vent to atmosphere, that is, ahead of the central opening *d* in the frame of the motor communicating with the center bearing O. These extracting plates permit the air to escape, while substantially all of the oil extracted from the air and deposited on the plates, flows back to the bottom of the casing. Some of the oil carried over by the air is deposited in the center bearing O and enters through the holes *g* in said center bearing for lubricating the drum P. Some of the oil also passes through the vent *a* in the wall *b* of the gear casing and serves to add lubricating material to the gears in the gear casing.

I preferably form one of the extracting plates *h* of perforated metal, and conveniently carry this perforated plate *h* which may be termed the main extracting plate across the opening from the web *f* to the outside wall of the frame of the motor casing. One or more narrower solid plates *j* and *k* are provided preferably at each side of the perforated main plate *h* so that a tortuous path is provided for the flow of air and the oil impinges on the main perforated plate *h''* and is extracted from the air. The plates *h*, *j*, and *k* may be mounted in any suitable manner on the frame A in this instance, by means of a screw *o* and separators *p*. The auxiliary plate *j* serves to prevent splashing of oil against the main perforated screen plate *h* and also prevents the oil from being driven directly against the plate *h*. The oil is deposited by the air on both sides of the main plate *h* and runs down both sides. The other auxiliary plate *k* prevents the oil which runs down the main plate *h* from passing to the discharge opening *e* and the oil at the top of plate *h*, regardless of the position of the motor, is caused to run around on the plate *h* and pass off the bottom into the motor casing.

The motor is provided with an inlet (not shown) controlled by a throttle having an operating handle *q* and an exhaust *r* is provided for the motor. The hoisting drum is preferably provided with a brake band *s* on the flange *t* controlled by a brake lever *u*.

I have found that my device for extracting oil from the air escaping from the motor casing operates efficiently and well, and saves a large amount of oil, which would otherwise be wasted.

I claim:

1. In a rotary fluid actuated cylinder motor, the combination of a closed casing vented to atmosphere substantially at the axis of rotation, a rotating cylinder member and operative parts oiled by splash lubrication from oil supplied to the bottom of the casing, a perforated main extracting plate located inside the casing and extending radially across the space in the casing ahead of the vent, and at least one solid auxiliary plate adjacent thereto, whereby the air is permitted to escape while substantially all the oil extracted from the air and deposited on the main plate flows back to the bottom of the casing.

2. In a rotary fluid actuated cylinder motor, the combination of a closed casing vented to atmosphere substantially at the axis of rotation, a rotating cylinder member and operative parts oiled by splash lubrication from oil supplied to the bottom of the casing, a perforated main extracting plate located inside the casing and extending radially across the space in the casing ahead of the vent, a shorter solid auxiliary plate on one side to prevent oil being carried directly against said main plate, and another shorter solid auxiliary plate on the opposite side of the main plate to prevent oil passing to the discharge vent of the motor casing, whereby the air is permitted to escape while substantially all the oil extracted from the air and deposited on the main plate flows back to the bottom of the casing.

In testimony whereof I have signed this specification.

FRED M. SLATER.