

UNITED STATES PATENT OFFICE.

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ROTARY MOTOR.

1,048,453.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, HARRIS B. HOLT, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, a citizen of the United States, have invented or discovered certain new and useful Improvements in Rotary Motors, of which improvement the following is a specification.

My invention relates to rotary motors, and particularly to such motors as are used to rotate cutters for cleaning the scale from the interior of boiler tubes.

The object of my invention is to provide a rotary motor comprising a minimum number of parts so arranged that access may be had to the interior of the motor both from the inlet and the outlet ends thereof.

A further object of my invention is to so construct such a motor that the several parts thereof need not be adjusted to, and held in, predetermined relative positions.

My invention is illustrated in the accompanying drawing, which forms part of my specification, and in which—

Figure 1 is a longitudinal sectional view of a rotary motor, the plane of section being taken through the axis thereof; Figs. 2, 3 and 4 are transverse sectional views taken, respectively, on the lines II—II; III—III and IV—IV, Fig. 1; and Fig. 5 is an end view of the outlet end of the motor.

In the several figures like numerals are used to designate like parts.

The essential parts of my improved motor are, as shown particularly in Fig. 1, an inlet head 1, an outlet head 2, a rotary shaft 3, and a casing 4, 5. The inlet head 1 may be suitably secured to one end of the casing 4, 5, which casing is provided with an eccentrically-disposed cylindrical chamber 6, adapted to operatively receive the blade-provided rotary shaft 3; and the outlet head 2 may be suitably secured to opposite end of the said casing. I will first describe the preferred construction of each of the said several essential parts of my improved motor, and thereafter I will describe the operation of the motor as a whole.

The inlet head 1 is preferably cylindrical in form and is provided with a central opening; and secured to one end thereof is shown a screen-carrying member 7, which in turn may be secured to a suitable compressed air conduit, not shown. In the opposite end of the said head a suitable shaft-receiving bushing 8 may be firmly secured by expand-

ing the bushing into tight engagement with the said head. The said bushing 8 is provided with a flange 9 forming with the walls of the head an annular chamber 10, having communication with the inlet orifice of the said head, preferably by means of a plurality of ports 11; also, the said bushing-flange 9 forms a closure for the fluid containing portion of the chamber 6.

The outlet head 2 is preferably similar in its general construction to the inlet head described above, the bushing 12 forming with the walls of the said head 2 an annular chamber 13, and the bushing flange 14 affording a closure for the opposite end of the chamber 6. An escape of the fluid from the annular chamber 13 may be had through a plurality of outlet ports 15.

The rotary shaft 3, preferably of an integral structure throughout, consists of bearing portions 3^a and 3^b, which are rotatably sustained in the bushings 8 and 12, respectively, and an enlarged portion 3^c, extending throughout the length of the chamber 6. The bushing-flanges 9 and 14 fit neatly against the ends of the enlarged portion 3^c of the shaft and prevent any longitudinal movement thereof. Also the portion 3^c is suitably slotted to receive the reciprocating blades, and as shown herein two such blades 16 and 17 may be placed at right angles to each other, the blade 16 being a double or split blade, such a construction being well known to those skilled in the art.

The casing 4, 5 is preferably made in two parts, a cylindrical sleeve 4, to the opposite end of which the said heads 1 and 2 may be secured by screw-threads, and a drum 5. As stated above, the drum 5 is provided with an eccentrically-disposed cylindrical chamber 6, within which chamber the enlarged shaft portion 3^c rotates. The shaft portion 3^c is materially smaller in diameter than the chamber 6, and the said shaft is mounted so as to be substantially in contact with the wall of the said chamber, as particularly shown in Figs. 3 and 4.

Suitable fluid passageways are provided to the end that there may be open communication between the annular chambers 10 and 13 and the shaft operating chamber 6. I preferably form on the left end of the drum a crescent-shaped chamber 18, which, as will be readily seen will be in constant communication with the annular chamber 10 at all relative positions of the head 1 and

casing 4, 5; and I provide suitable ports 19 through the wall of the cylinder chamber 6, such ports affording constant communication between the chambers 18 and 6. Similarly, on the right end of the drum, a crescent-shaped chamber 20 may be formed, having constant communication with the annular chamber 13, and communicating with the chamber 6 by means of the port 21.

In order to procure a tighter fit between the drum 5 and the sleeve 4, and thereby reduce to a minimum the possibility of fluid escaping around the drum from the chamber 18 to the chamber 20, I provide the said drum 5 and sleeve 4 with cooperating shoulders 22.

In assembling the several parts of my improved motor into an operative structure, the blade-provided shaft 3 may be placed in the drum 5, which may be placed within the sleeve 4. The bushing-provided inlet and outlet heads may then be secured to the sleeve 4, the said heads being screwed thereon until the bushing flanges 9 and 14 bear tightly against the left and right ends, respectively, of the said drum. And in such position the shoulders 22 will be brought to engagement with each other, thus reducing the possibility of leaking between the sleeve and the outer cylinder wall.

In the operation of the motor, a fluid under pressure, such as compressed air passes successively through the ports 11, annular chamber 10, crescent-shaped chamber 18, and ports 19 to the cylindrical chamber 6, wherein the fluid, acting against the blades 16 and 17, becomes effective to rotate the shaft 3. The spent fluid escapes from the chamber 6 by passing successively through the port 21, crescent-shaped chamber 20, annular chamber 13 and ports 15, the fluid then becoming effective when the motor is used to drive a boiler-tube cleaner, to drive the chipped off scale through the tube ahead of the motor.

It will be observed of this construction that, on account of the particular arrangement of passageways for the fluid, it is unnecessary to adjust the inlet and outlet heads to specific predetermined positions with relation to the cylinder 4, 5. And it will also be seen that no pins or other securing members are required to unite the several parts.

I claim as my invention:

1. In a rotary motor, the combination of a casing provided with an eccentric cylindrical chamber having inlet and outlet ports through the walls thereof, and a blade-provided shaft within said chamber; of a head removably secured to said casing and having fluid passageway therethrough, and an extended annular chamber affording communication between one of said ports in the wall of said cylindrical casing and said

fluid passageway at all relative positions of said removable head and casing, substantially as described.

2. In a rotary motor, the combination with a casing having a cylindrical chamber therein, and a blade-provided shaft eccentrically disposed within the said chamber; of inlet and outlet heads secured to the said casing and each provided with annular chambers affording constant communications with the said inlet and outlet ports of said cylindrical chambers in all relative positions of the said casing and heads, substantially as described.

3. In a rotary motor, the combination with a blade-provided shaft; of a drum provided at opposite ends with crescent-shaped chambers and also provided with an eccentric longitudinal cylindrical chamber having ports communicating with the said crescent-shaped chambers, a sleeve surrounding said drum, and port-provided inlet and outlet heads secured to the said sleeve, the ports of said inlet and outlet heads being in communication with said crescent shaped chambers at all relative positions of said heads and casing, substantially as described.

4. In a rotary motor, the combination of a casing consisting of a drum and a sleeve each having cooperating engaging shoulders, a blade-provided shaft within an eccentric cylindrical chamber of the said drum, and a head having screw-thread attachment to the said sleeve and having a bushing provided with a flange adjacent to and bearing against one end of the said drum, whereby a tightening of said head upon said sleeve becomes effective to bring said cooperating shoulders into leakage preventing engagement, substantially as described.

5. In a rotary motor, the combination of a casing provided with a cylindrical chamber extending through it from end to end and with a crescent-shaped inlet chamber surrounding the first-named chamber at the end thereof, a port being provided between the two said chambers, a blade-provided shaft extending through said first-named chamber concentric with the outer wall of said inlet chamber, a head screw-threaded upon said casing, and a block affording a journal for said shaft and a closure for said chambers, said block provided with a circumferentially-extended passageway affording communication with said inlet chamber.

6. In a rotary motor, the combination of a casing provided with a cylindrical chamber extending through it from end to end and with crescent-shaped inlet and outlet chambers surrounding the first-named chamber at the end thereof, ports being provided between said first-named chamber and said terminal crescent-shaped chambers, a blade-provided shaft arranged within said first-

named chamber eccentric to that chamber
but concentric with the outer walls of said
crescent-shaped terminal chambers, jour-
nal blocks for said shaft and forming heads
5 for the said several chambers, and a pas-
sageway through each of said journal
blocks, such passageway extending circum-
ferentially with respect to the journal axis
and in all relative positions of block and

casing affording communication to the said 10
crescent-shaped chamber.

In testimony whereof I have hereunto set
my hand.

HARRIS B. HOLT.

Witnesses:

PAUL N. CRITCHLOW,
FRANCIS J. TOMASSON.