

ROTARY MOTOR.

983,033.

Patented Jan. 31, 1911.



Witnesses;
R A Balderson
Walter Famarica

10
Inventor:
William S. Elliott,
by Babcock, Byrnes & Parmelee,
his Attys.

UNITED STATES PATENT OFFICE.

WILLIAM S. ELLIOTT, OF PITTSBURG, PENNSYLVANIA.

ROTARY MOTOR.

983,033.

Specification of Letters Patent. Patented Jan. 31, 1911.

Application filed October 14, 1908. Serial No. 457,657.

To all whom it may concern:

Be it known that I, WILLIAM S. ELLIOTT, of Pittsburg, Allegheny county, Pennsylvania, have invented a new and useful Improvement in Rotary Motors, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, in which—

Figure 1 is a longitudinal section; and Fig. 2 is a cross-section of a motor embodying my invention, the section of Fig. 2 being taken on the line II—II of Fig. 1.

My invention has relation to rotary motors and is designed to provide a motor of this type which is simple in its construction and which can be readily assembled and taken apart; to provide novel means for insuring efficient lubrication of the piston journals; to provide means for preventing wear of the piston blade; and to improve the construction of various details of the motor, all as hereinafter described.

The motor shown in the accompanying drawings has been more particularly designed for use in operating boiler tube cleaning tools, it being adapted for being carried through the tubes to be cleaned with the cleaning tool, but it may be used for a variety of other purposes.

The precise nature of my invention will be best understood by reference to the accompanying drawings which will now be described, it being premised, however, that various changes may be made in the details of construction and arrangement of the parts without departing from the spirit and scope of the invention as defined in the appended claims.

In these drawings, the numeral 2 designates the cylinder of the motor having the eccentrically located piston chamber 3 extending entirely through the cylinder. In the thickened wall of the cylinder is the longitudinally extending admission port 4 and the longitudinally extending exhaust port 5. Each of these ports 4 and 5 communicates with the interior of the chamber 3 by a plurality of cross ports 6, this arrangement of the ports providing for a uniform admission of pressure throughout the length of the cylinder and for its rapid exhaust therefrom. The cylinder 2 is seated between the cylindrical front and rear heads 7 and 8, these heads being preferably of considerably larger diameter than the diameter

of the cylinder and being provided with the recesses 9 within which the end portions of the cylinder are seated. The parts are preferably secured together by means of the long screws 10 which extend through the front head and through the wall of the cylinder into the rear head.

The rear head 8 is provided with a rearward extension beyond the rear end of the head proper and which is formed with one or more inlet ports 12 which communicate with the admission port 4 of the cylinder around the piston shaft of the motor. The end of the extension 11 is provided with an interiorly threaded socket 13 for connection thereto of a flexible supply pipe or hose 14.

15, designates the piston shaft having a portion 16 of enlarged diameter within the piston chamber 3 and having a slot extending diametrically therethrough to receive the piston blade 17. This blade may be of any suitable construction, being shown as composed of two abutting and interfitting sections arranged to slide one upon the other to maintain contact at all times between their ends and the wall of the chamber 3. The forward end of the shaft 15 extends through the front head 7 and is provided with a screw-threaded shank 18 or other suitable means, to receive the cleaning tool or other part to be operated by the motor. The piston shaft is journaled in the shouldered or flanged bushings 19 which are seated within the respective heads 7 and 8, said heads being shouldered or rabbeted as indicated at 20 to receive the flanges of the bushings. The shoulders 16^a on the piston shaft abut directly against the flanges at the inner ends of the respective bushings 19, and thus form thrust bearings for the shaft. The rear journal portion 21 of the piston shaft is shown of somewhat smaller diameter than the forward journal portion and as extending entirely through its bushing, the end of the bushing and of the journal being separated from the extension 11 by an intervening space 22. Surrounding each end of the enlarged portion 16 of the piston shaft is a hardened annular ring 23. These rings have bearings against the inner ends of the bushings 19, the purpose of these rings being to prevent wear between the ends of the piston blades and the bushings, since all wear will be taken up by the rings instead of by the bushings. The rings also

effectually close the piston chamber against any leakage of the motive fluid around the piston blade.

The motor is especially adapted for use with steam or compressed air as a motive fluid, and the piston chamber, together with the piston bearings are kept efficiently lubricated by applying lubricant into the chamber 3 with the incoming air. The pressure of the air in the chamber 3 will force some of this lubricant outwardly along the journal portions of the piston shaft, there being a slight leakage of air between the shaft journals and the bushings. By reason of the space 22 the air which leaks past the rear shaft journal is permitted to freely escape, thus preventing any accumulated pressure against the end of the shaft and also permitting sufficient freedom of leakage to maintain the lubrication of the bearing.

The motor is capable of construction in very compact form so that it can be used with boiler tubes of small diameter. The enlarged heads 7 and 8 efficiently protect the cylinder against injury. In practice these heads will preferably be made of softer steel than the cylinder which must be of hard steel and can therefore be readily turned down when worn and used in smaller tubes. By using the long screws 10 for securing the parts together, these screws being tapped into the rear head 8, I avoid the necessity for threading the screw seats in the cylinder wall. By removing the screws the motor can be readily taken apart for the purpose of renewing the bushings, or the piston blade, or for any other desired purpose. I do not, however, limit myself to this method of securing the parts together, since the cylinder heads may be secured in any suitable manner. Various other changes can be made in the details of construction and arrangement of the parts without departing from the spirit and scope of my invention.

What I claim is:—

1. A rotary motor, comprising a cylinder, end heads between which the cylinder is secured, a piston shaft having a central portion of enlarged diameter, said portion be-

ing longer than the cylinder and extending into the heads, and the shaft having a journal portion of reduced diameter at each end forming a circumferentially extending shoulder beyond each end of the cylinder, and bushings in the heads forming bearings for said journal portions, said bushings having flanges at their inner ends against which the said shoulders bear; substantially as described.

2. A rotary motor, having a cylinder, and front and rear heads secured thereto, a bushing seated in each of the heads and having a flange at its inner end, a piston shaft journaled in said bushings, a piston blade carried by the piston, and a guard ring or collar seated on each end portion of the piston between the flanges of the adjacent bushing and the end of the cylinder; substantially as described.

3. In a rotary motor, a cylinder having a longitudinally extending admission port in its wall, front and rear heads between which the cylinder is secured, bushings in said heads, and a piston shaft extending entirely through both heads, the rear head having an overhung neck or extension separated by a space from the rear exposed end of the piston shaft, said extension having an admission port entering its rear end in line with the shaft, and thence leading around the end of the shaft to meet the admission port in the cylinder wall; substantially as described.

4. In a rotary motor, a cylinder having an admission port in its wall, heads secured to the cylinder, a piston shaft journaled in said heads, the rear head having an admission extension formed with a port which communicates with the port in the cylinder wall, said extension being separated from the shaft-bearing portion of the rear head by an open space, and the piston shaft extending through its bearing to said space; substantially as described.

In testimony whereof, I have hereunto set my hand.

WILLIAM S. ELLIOTT.

Witnesses:

GEO. B. BLEMING,
H. M. CORWIN.