W. ERNST.

ROTARY DRIVER.

APPLICATION FILED OCT. 26, 1915.

1,238,501.

Patented Aug. 28, 1917.

3 SHEETS—SHEET 1.

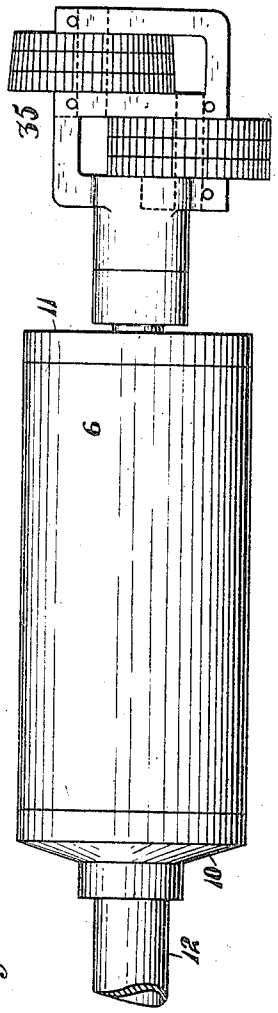


Fig. 1.

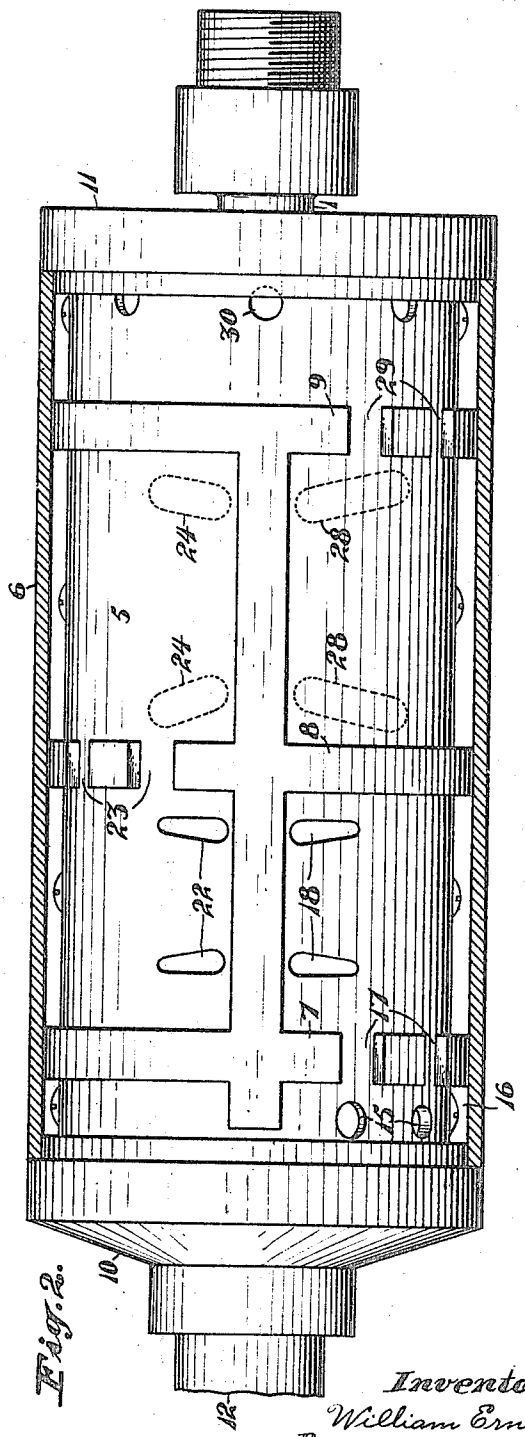


Fig. 2.

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3 SHEETS—SHEET 2.

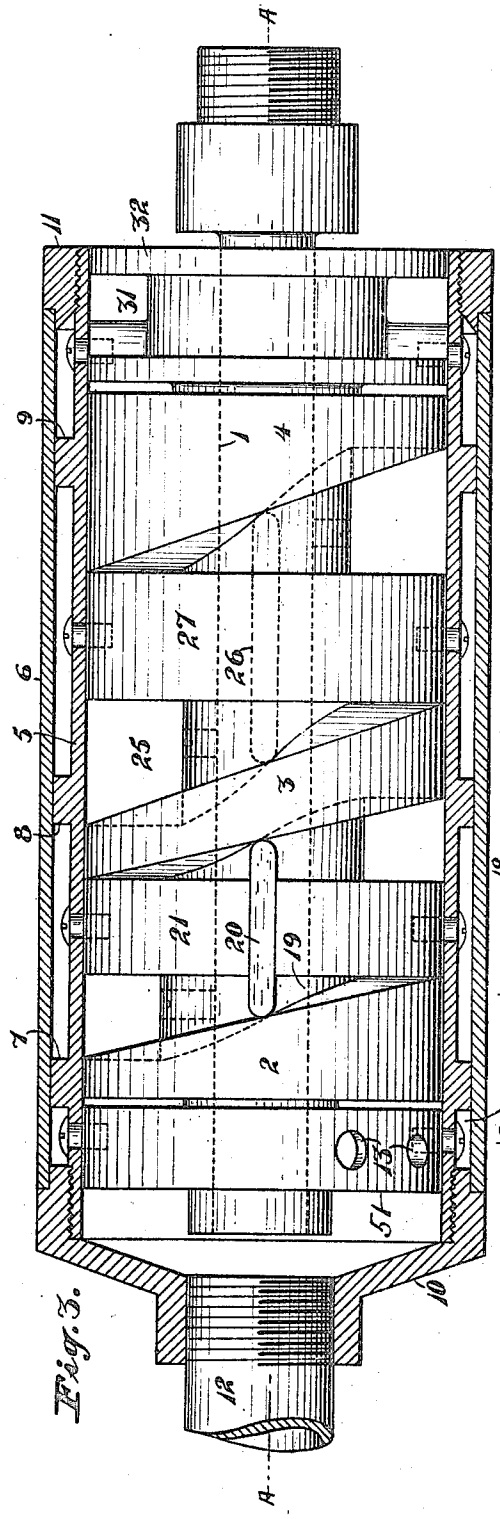


Fig. 3.

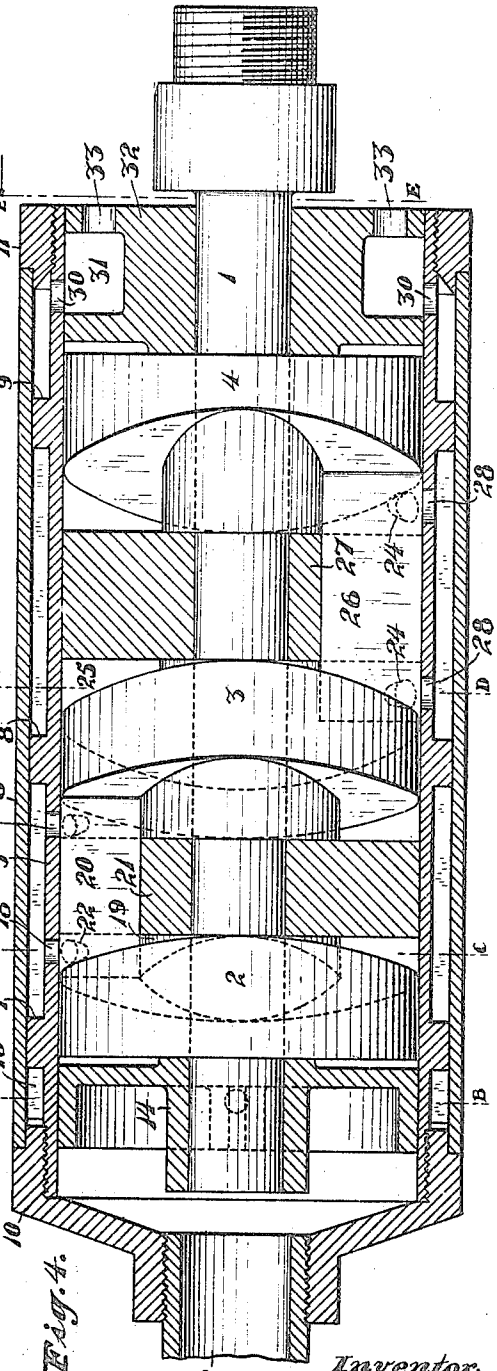


Fig. 4.

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3 SHEETS—SHEET 3.

Fig. 6.

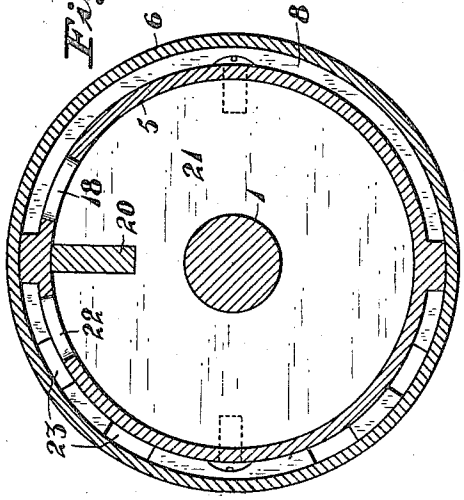
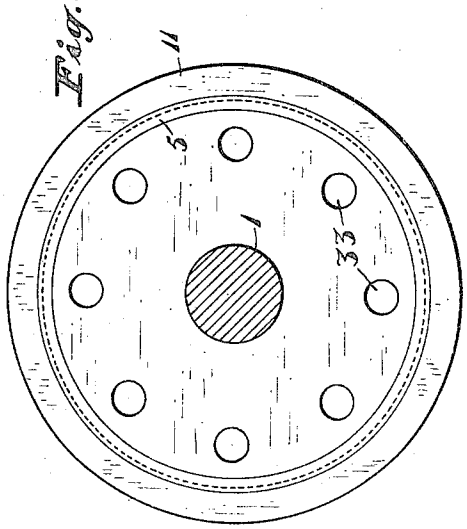


Fig. 8.



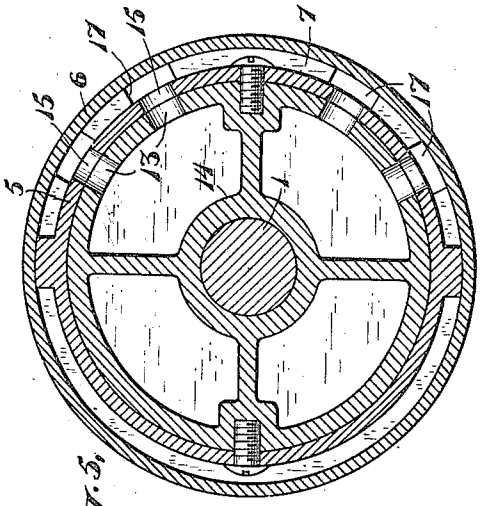


Fig. 5.

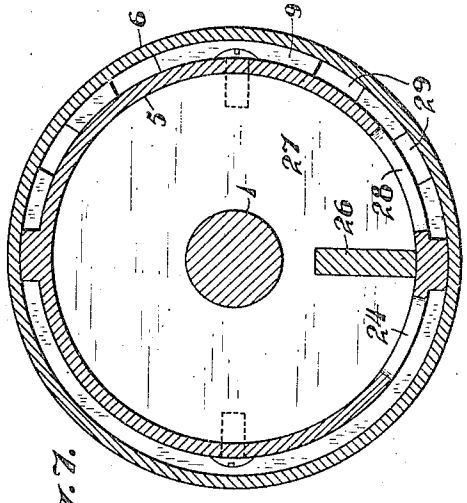


Fig. 7.

Inventor,
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By Lincoln Townley
Attorney

UNITED STATES PATENT OFFICE.

WILLIAM ERNST, OF SAN FRANCISCO, CALIFORNIA.

ROTARY DRIVER.

1,238,501. Specification of Letters Patent. Patented Aug. 28, 1917.

Application filed October 26, 1915. Serial No. 58,075.

To all whom it may concern:

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

My invention relates to improvements in rotary drivers.

The object of my invention is to provide a rotary driver of the compound type adapted to attain great power with a minimum consumption of air, and which is simple in construction, very durable and uniform in operation.

My invention consists in the novel construction, and combination of parts shown in the accompanying drawings, described in the following specification and claimed in the appended claims.

In the accompanying drawings, Figure 1 shows the application of a rotary cutter designated 35 to my improved rotary driver. Fig. 2 is an exterior view of said rotary driver, the casing being shown in section. Fig. 3 is a longitudinal view of said rotary driver, the casing and cylinder being shown in section. Fig. 4 is a longitudinal sectional view of said driver on the line A—A of Fig. 3. Fig. 5, Fig. 6, Fig. 7, and Fig. 8 are transverse sectional views of said driver on the lines B—B, C—C, D—D, and E—E, respectively of Fig. 4.

In said drawings 1 represents a driven shaft having secured thereto rotors 2, 3 and 4, which rotate within a cylinder 5. The cylinder 5 is surrounded by a casing 6 which casing is spaced from said cylinder by ribs 7, 8, and 9, the said casing 6 being held in place by means of heads 10 and 11, which are screwed on the ends of the cylinder 5 as shown. A pipe 12 is screwed into head 10 of cylinder 5, and in the operation air is admitted through the said pipe into the following chamber at the end of the cylinder, and thereupon passes through holes 13 of flange 51 of end bearing 14, and thereupon the air passes through registering holes 15 in said cylinder, and then into the cylindrical chamber 16, which is between said cylinder and the surrounding casing. The movement of the air continuing passes through passage-ways 17 in the rib 7 and then downwardly through the ports 18 in the cylinder, into a chamber 19, formed by the rotor 2 and blade 20, which blade is slidably supported in the holder therefor marked 21 and secured to the cylinder 5 by screws as shown, and whereby a rotary motion is given to the rotor and shaft until the chamber 19 is open to the ports 22 of the cylinder. From the ports 22 the air passes through the passage ways 23 in the rib 8, then through the ports 24 of the cylinder diametrically opposite the port 18, and then into chamber 25 formed by the rotor 3 and the blade 26, which is slidably supported in the holder 27 secured to the cylinder 5 as shown. The movement of the air then gives a rotary motion to the rotor 3 until the chamber 25 is open to the ports 28, whereupon the air passes through the passageways 29 in the rib 9, then downwardly through ports 30 in the end of the cylinder and then into the chamber 31, formed by the cylindrical flanges on the end bearing 32, as shown, and then passes out into the atmosphere through holes 33 in the flanges last mentioned.

The blades 20 and 26 are given a reciprocating motion by the engagement of the ends thereof with the inclined faces of the rotors as shown in Fig. 3. The forepart of the device nearest pipe 12 having chamber 19 and ports 18 and 22 may be described as a high pressure cylinder, while the following part of the device having the larger ports 24 and 28 and chamber 25 may be described as a low pressure cylinder, the air passing through the rib 23 into said low pressure cylinder, whereby the same is constituted a compound expansion driver, but an additional chamber and parts of larger construction, but of the same design, may be added so that I do not limit myself to any number of particular pressure cylinders, except as set forth in the appended claims but claim a plurality thereof.

Air or steam may be used in the device as

a pneumatic driver for a tube cleaner, but the said device may be applied for other purposes.

In the revolution of the rotors the holes on one side of the cylinder are covered, while on the other side of said cylinder the holes on such side are open, the holes on each side of said cylinder, as shown, being alternately open and closed. The front section of the apparatus is the space occupied by rotors 2 and 3 and the large shaft in connection therewith, and the rear section of the same is the space occupied by rotor 4 and the smaller shaft in connection therewith. The larger shaft lessens the space of the front section so as to contribute to making the same the high pressure cylinder and the smaller shaft increases the space of the rear section so as to contribute to making the same the low pressure cylinder.

In said apparatus I utilize for the operation the exhaust from the high pressure cylinder described.

The space between cylinder 5 and casing 6 is divided into separate longitudinal chambers as shown in Fig. 5.

I claim:

1. In a rotary driver a casing, a cylinder in said casing engaging said casing at intervals so as to form chambers between said cylinder and said casing, ribs provided with openings between said cylinder and said casing, a plurality of rotors in said cylinder having inclined faces, a shaft sustaining said rotors, walls between said rotors, blades slidably supported in said walls between said rotors and contacting with the inclined faces of said rotors, and means for admitting air into said cylinder.

2. In a rotary driver a casing, a cylinder in said casing engaging said casing at intervals so as to form chambers between said cylinder and said casing and said cylinder containing holes therethrough opening into said chambers, heads on the ends of said cylinder, ribs provided with openings between said cylinder and said casing, a plurality of rotors in said cylinder having inclined faces, a shaft sustaining said rotors, walls between said rotors, blades slidably supported in said walls between said rotors and contacting with the inclined faces of said rotors, and means for admitting air into said cylinder.

3. In a rotary driver a casing, a cylinder in said casing engaging said casing at intervals so as to form chambers between said casing and said cylinder and said cylinder containing holes therethrough opening into said chambers, heads on the ends of said cylinder, ribs provided with openings between said cylinder and said casing, a plurality of rotors in said cylinder having inclined faces, a shaft sustaining said rotors, walls between said rotors, blades slidably supported in said walls between said rotors and contacting with the inclined faces of said rotors, a fore end bearing having a flange containing openings therethrough, a rear end bearing having a flange containing openings therethrough, and means for admitting air into said cylinder.

4. In a rotary driver, a casing, a cylinder in said casing engaging said casing at intervals so as to form chambers between said casing and said cylinder and said cylinder containing holes therethrough opening into said chambers, heads having openings on the ends of said cylinders, a plurality of rotors having inclined faces in said cylinder, a shaft sustaining said rotors, walls between said rotors, blades slidably supported in said walls between said rotors and contacting with the inclined faces of said rotors, ribs provided with openings between said casing and said cylinder, holders supporting said slidable blades, a fore end bearing having a flange containing apertures therethrough, a rear end bearing having a flange containing openings, and means for admitting air into said cylinder.

5. A rotary driver containing a front section with openings for high pressure and a rear section with openings for low pressure, and including a cylinder containing said front section and rear section, a revoluble shaft extending longitudinally through said cylinder and of greater diameter in said front section than in said rear section, said openings in said cylinder in said front section being smaller than openings in said cylinder in said rear section, a plurality of rotors in said cylinder having inclined faces, walls between said rotors, blades slidably supported in said walls in said front section and in said rear section, the slidable blades in said rear section being of greater extent than the slidable blades in said front section, said slidable blades endwise contacting with the inclined faces of said rotors, and fixed supporting means in said cylinder provided with openings.

6. A rotary driver containing a front section with openings for high pressure and a rear section with openings for low pressure, and including a cylinder containing said front section and said rear section, a revoluble shaft extending longitudinally through said cylinder and of greater diameter in said front section than in said rear section, said openings in said cylinder in said front section being smaller than openings in said cylinder in said rear section, a plurality of rotors in said cylinder having inclined faces, walls between said rotors, blades slidably supported in said walls in said front

section and said rear section, the slidable blades in said rear section being of greater extent than the slidable blades in said front section, said slidable blades endwise contacting with the inclined faces of said rotors, a casing having openings surrounding said cylinder, a head provided with an aperture therethrough secured to the front end of said cylinder and a head having openings secured to the rear end of said cylinder.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM ERNST.

Witnesses:
W. F. GLEESON,
H. ACKERMAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."