No. 704,456. Patented July 8, 1902.

T. U. GRAY.

ROTARY MOTOR.

(Application filed Mar. 18, 1901.)

(No Model.)

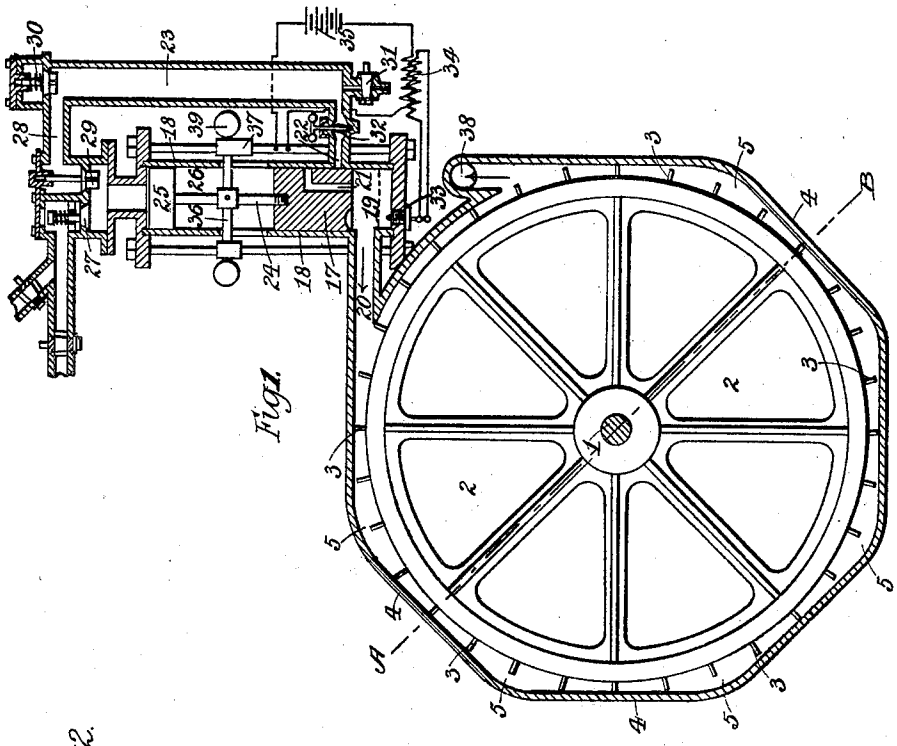


Fig. 1.

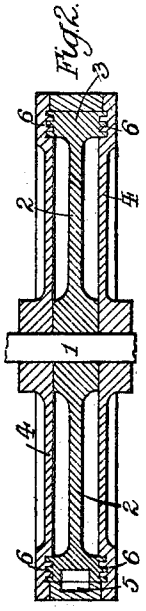


Fig. 2.

Witnesses

Inventor

Thomas U. Gray

by James L. Norris

atty

UNITED STATES PATENT OFFICE.

THOMAS UNDERWOOD GRAY, OF LONDON, ENGLAND.

ROTARY MOTOR.

SPECIFICATION forming part of Letters Patent No. 704,456, dated July 8, 1902.

Application filed March 18, 1901. Serial No. 51,705. (No model.)

To all whom it may concern:

Be it known that I, THOMAS UNDERWOOD GRAY, M. R. C. S., L. R. C. P., surgeon and physician, a subject of the King of Great Britain, residing at Lansdowne House, 340 Essex road, London, England, have invented certain new and useful Improvements Relating to Rotary Motors, of which the following is a specification.

This invention relates to motors, and the improvements are shown embodied in one of the "rotary type."

The invention is clearly illustrated in the accompanying drawings, forming a part of this specification, and in which—

Figure 1 is a sectional elevation of my improved motor; and Fig. 2 is a transverse section of the same, the section being taken in the line A B of Fig. 1.

1 is a rotary shaft carrying a wheel or drum 2, provided with a number of radial pistons or vanes 3 and located within a casing 4. The casing 4 is provided with recesses or enlargements 5 5 and also with suitable inlet and exhaust ports.

6 6 are concentric rings carried by each side of the drum 2 and adapted to rotate in corresponding grooves formed in the end covers of the casing 4 for the purpose of forming a fluid-tight or nearly fluid-tight joint.

17 is the valve adapted to reciprocate in a valve-casing 18, which communicates with a combustion-chamber 19.

20 is a passage leading from the chamber 19 to the fluid-pressure space in the casing.

The valve 17 is provided with a passage 21, which coöperates with an inlet-port 22, leading from the compression-chamber 23. The valve-stem 24 carries a piston 25, adapted to reciprocate in a cylinder 26, provided with a combustible-fluid-inlet valve 27 and an outlet 28, controlled by a valve 29 and communicating with the compression-chamber 23. The compression-chamber is provided with a safety-valve 30 and with a tap or cock 31 for the removal of any sediment.

32 is a throttle-valve for controlling the passage 22.

33 is a sparking device of well-known construction included in the circuit of an induction-coil 34 and a battery 35. The valve-stem 24 carries cross-arms 36, which slide upon suitable guide-rods and one of which carries a contact-maker 37 for closing and opening the circuit of the sparking device.

The operation of the motor is as follows: When the valve 17 rests upon the bottom of the combustion-chamber 19, the passage 20 is closed, and combustible fluid under pressure passes from the chamber 23 through the passages 22 21, thereby raising the valve 17 to the position indicated and causing it to close the passage 22. When the valve is in this position, the circuit of the sparking device is closed by the contact 27. The combustion charge in the chamber 19 is fired, raising the valve to the position shown in the drawings and opening the passage 20. When the valve is thus raised, the piston 25 is caused to force a charge of combustible fluid through the valve 29 and passage 28 into the compression-chamber 23, at the same time closing the valve 27. After the combustion when the valve 17 returns, so as to close the passage 20, the pressure within the chamber 23 closes the valve 29, while the piston 25 draws a fresh charge of combustible fluid into the upper part of the cylinder 26 through the valve 27. The high-pressure-fluid products of combustion pass along the passage 20 and act upon two pistons or vanes in the direction indicated by the arrow. As the drum 2 rotates a succeeding piston or vane then cuts off a portion of this high-pressure fluid, which then expands in a recess or enlargement 5, so as to act at reduced pressure on the preceding pistons or vanes. This action is repeated all around the motor until the actuating fluid escapes to exhaust at 38. The position of the exhaust-outlet 38 may be so arranged that the actuating fluid may exhaust at any required pressure. When starting the motor, an initial charge of combustible fluid may be compressed in the chamber 23, if necessary, by operating the valve by hand by means of the cross-arms 36. In order to insure that the valve 17 shall return after the combustion of each working charge, the arms 36 may carry weights or their equivalent 39.

Having described the invention, I claim—

1. In a motor the combination of a piston, a casing for said piston provided with inlet and exhaust ports, a combustion-chamber communicating with the inlet-port, a valve

provided with a passage and adapted to reciprocate in the combustion-chamber, a compression-chamber which communicates with the combustion-chamber and coöperates with the valve-passage, a valve-stem carried by said valve, a piston carried by the valve-stem, a cylinder within which the said piston is adapted to reciprocate and which communicates by means of valves with the combustion-fluid source and with the compression-chamber, and sparking apparatus adapted to be operated after the valve has been moved by the working charge so as to close the communication between the combustion-chamber and the compression-chamber, substantially as described and for the purpose specified.

2. In a motor the combination of a piston and its casing, a combustion-chamber, a valve reciprocative in said combustion-chamber and having a passage, a compression-chamber coöperative with said passage, a cylinder adapted to communicate with a source of fluid-supply and also with said compression-chamber, a piston in said cylinder, a stem connecting the cylinder and valve, the latter being arranged to be acted upon by the working charge to close the communication between the combustion and compression chambers, cross-arms connected to said stem, guides for said cross-arms, and sparking means operable with one of said parts.

3. In a rotary motor the combination of a rotary drum, pistons or vanes carried by said drum, a casing provided with a fluid-pressure passage through which the pistons or vanes travel and having inlet and exhaust ports, a combustion-chamber communicating with the inlet-port, a valve provided with a passage and adapted to reciprocate in the combustion-chamber, a compression-chamber which communicates with the combustion-chamber and coöperates with the valve-passage, a valve-stem carried by said valve, a piston carried by the valve-stem, a cylinder within which the said piston is adapted to reciprocate and which communicates by means of valves with the combustible-fluid source and with the compression-chamber, electric sparking apparatus, and a contact carried by the valve-stem and adapted to close the circuit of said sparking apparatus after the valve has been moved by the working charge so as to close the communication between the combustion-chamber and the compression-chamber, substantially as described and for the purpose specified.

In testimony whereof I have hereunto set my hand, in presence of two subscribing witnesses, this 8th day of March, 1901.

THOMAS UNDERWOOD GRAY.

Witnesses:
WM. J. DOW,
THOS. C. WARDLE.