

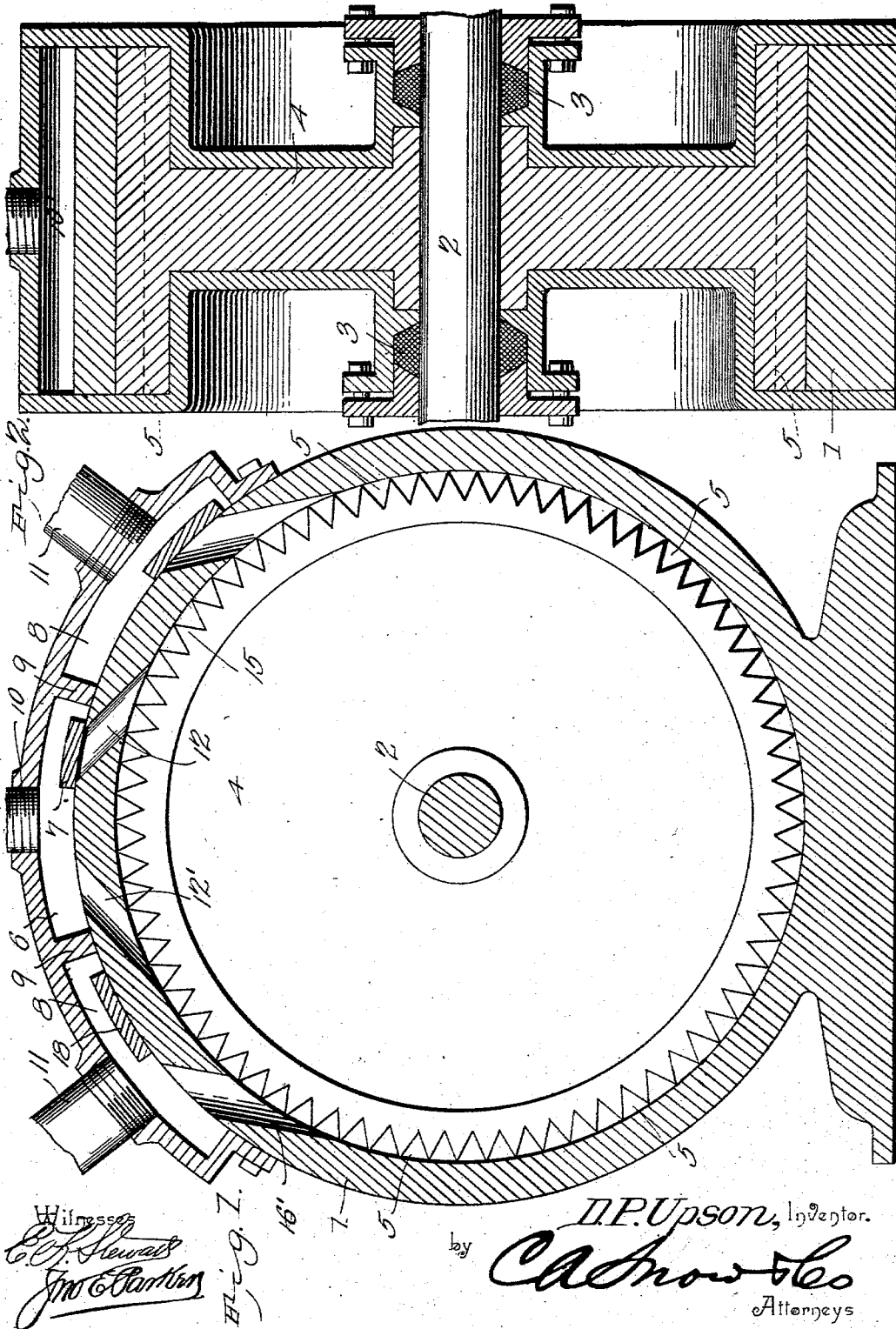
No. 716,791.

Patented Dec. 23, 1902.

D. P. UPSON.
ROTARY MOTOR.

(Application filed Oct. 17, 1902.)

(No Model.)



UNITED STATES PATENT OFFICE.

DELEVAN PAUL UPSON, OF JACKSONVILLE, FLORIDA.

ROTARY MOTOR.

SPECIFICATION forming part of Letters Patent No. 716,791, dated December 23, 1902.

Application filed October 17, 1902. Serial No. 127,729. (No model.)

To all whom it may concern:

Be it known that I, DELEVAN PAUL UPSON, a citizen of the United States, residing at Jacksonville, in the county of Duval and State of Florida, have invented a new and useful Rotary Motor, of which the following is a specification.

This invention relates to certain improvements in rotary impact-motors of that class in which a jet of steam, compressed air, or other fluid is directed against the blades or vanes of a revoluble piston.

The principal object of the invention is to provide an improved motor of this class in which high speed may be attained by an extremely large number of rapidly-recurring impacts on a comparatively small area and in which the port through which the actuating fluid is directed to the piston will be of the same surface area as that of the piston-blade on which its force is expended.

A still further object of the invention is to provide a construction of motor in which the jet of actuating fluid is discharged against the piston-blade in a line directly at a right angle to the plane of the surface of the blade, so that the effective force of the jet will not be diminished by impinging on an inclined plane, and a still further object is to provide for the exhaust of the steam through a port which also extends at a right angle to the plane of the blade, so that the steam may issue freely from the exhaust, and at the same time should the exhaust-steam be led to the entrance-port of a second cylinder, where two or more motors are compounded, the expansive force of the steam will be to some extent available for imparting motion in the proper direction to both motors and the retarding effect due to back pressure be entirely avoided.

With these and other objects in view the invention consists in the novel construction and arrangement of parts hereinafter described, illustrated in the accompanying drawings, and particularly pointed out in the appended claim, it being understood that various changes in the form, proportions, size, and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings, Figure 1 is a sectional elevation of a rotary motor constructed in accordance with my invention. Fig. 2 is a vertical sectional elevation of the same.

The casing 1 is circular in form, and through its central portion passes a shaft 2, suitable stuffing-boxes 3 being employed to prevent leakage of steam. The central portion of the cylinder is comparatively narrow and fits snugly to the central web of the revoluble piston 4, the latter having a widened peripheral portion and the cylinder being of corresponding shape, as illustrated more clearly in Fig. 2.

In the periphery of the piston are formed a large number of substantially V-shaped pockets 5, extending entirely across the piston and forming a corrugated face thereon.

To the cylinder is secured a steam-chest 6, divided into steam and exhaust chambers 7 and 8, respectively, by a transversely-disposed partition 9, the chamber 7 being connected to a steam-supply pipe 10 and the chamber 8 to an exhaust-pipe 11, which may lead to a second engine in order that its expansive force may be more fully utilized. In the wall of the cylinder is formed a steam-port 12, extending approximately in a line tangentially of the piston, the port being of a length equal to the width of the piston and the width of the port being equal to the height of the wall 15 of the piston-recesses, so that the volume of steam directed against the successive walls or blades will impinge thereon at steam-chest pressure and will not be diminished by a contracted inlet-port. It is desirable in a small motor to have the blades of an area about six inches by one-quarter of an inch and about one-quarter of an inch pitch, so that the steam at a pressure of, say, one hundred pounds will exert a force of one hundred and fifty pounds on each of the small blades. The impact-face of each of the blades is arranged in a plane at a right angle to the line of the steam-port, so that the force of the steam is utilized to the best advantage and the piston will be revolved at a high speed and each successive blade will be subjected to precisely the same pressure.

As the motor is of impact type and its expansive force not utilized after the blades

pass the inlet-port, it is desirable to exhaust the steam of the cylinder as soon as possible in order that its expansive force may be utilized in a second motor, as well as to avoid the friction caused by the dead steam, and for this purpose the exhaust-port is arranged at a short distance from the steam-inlet port. The exhaust-port 16 extends in a line at a right angle to the plane of the surface of the blades and substantially at a tangent to the piston, so that should the exhaust be retarded its expansive properties may to some extent be utilized in the further propulsion of the piston in the same direction as that in which it is moved by the impact of the steam. With a motor of this type the exhaust may be fully utilized by arranging a number of similar pistons on the same shaft and connecting the exhaust-port of one to the steam-chest of the next, the surface area of the blades and the corresponding area of the ports being proportionately increased in order that the steam at lower pressure may exert substantially the same force on blades of larger area.

The engine is so constructed as to permit of the reversal of the direction of travel of the piston, and for this purpose an additional steam-port 12' is disposed in the steam-chest, a valve 17 being employed to cover one or other of the steam-ports, in accordance with the direction in which the piston is to travel. This further necessitates the employment of an auxiliary exhaust-port 16', and a separate valve 18 is employed in order that the ex-

haust-port not in use may be closed to prevent the revolving piston from drawing in air or steam through the port. By thus providing for an extremely large number of rapidly-recurring impulses and by employing inlet-ports of an area equal to the surface area of the blade against which the steam is directed I am enabled to secure an effective engine of high speed and power.

Having thus described my invention, what I claim is—

A rotary impact-motor comprising a cylinder or casing, a shaft extending therethrough, a piston having a widened peripheral portion and having in its periphery a plurality of transversely-extended recesses forming piston-blades, an inlet-port leading through the cylinder or casing, said inlet-port having a cross-sectional area equal to that of the piston-blade against which the actuating fluid impinges and the port being disposed on a line tangential to the piston and in a plane at a right angle to the plane of the piston-blades when opposite said port, and an exhaust-port also formed in the cylinder or casing and extending on lines similar to those of the fluid-inlet port.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

DELEVAN PAUL UPSON.

Witnesses:

MILLER H. DANCY,
MARLON I. UPSON.