

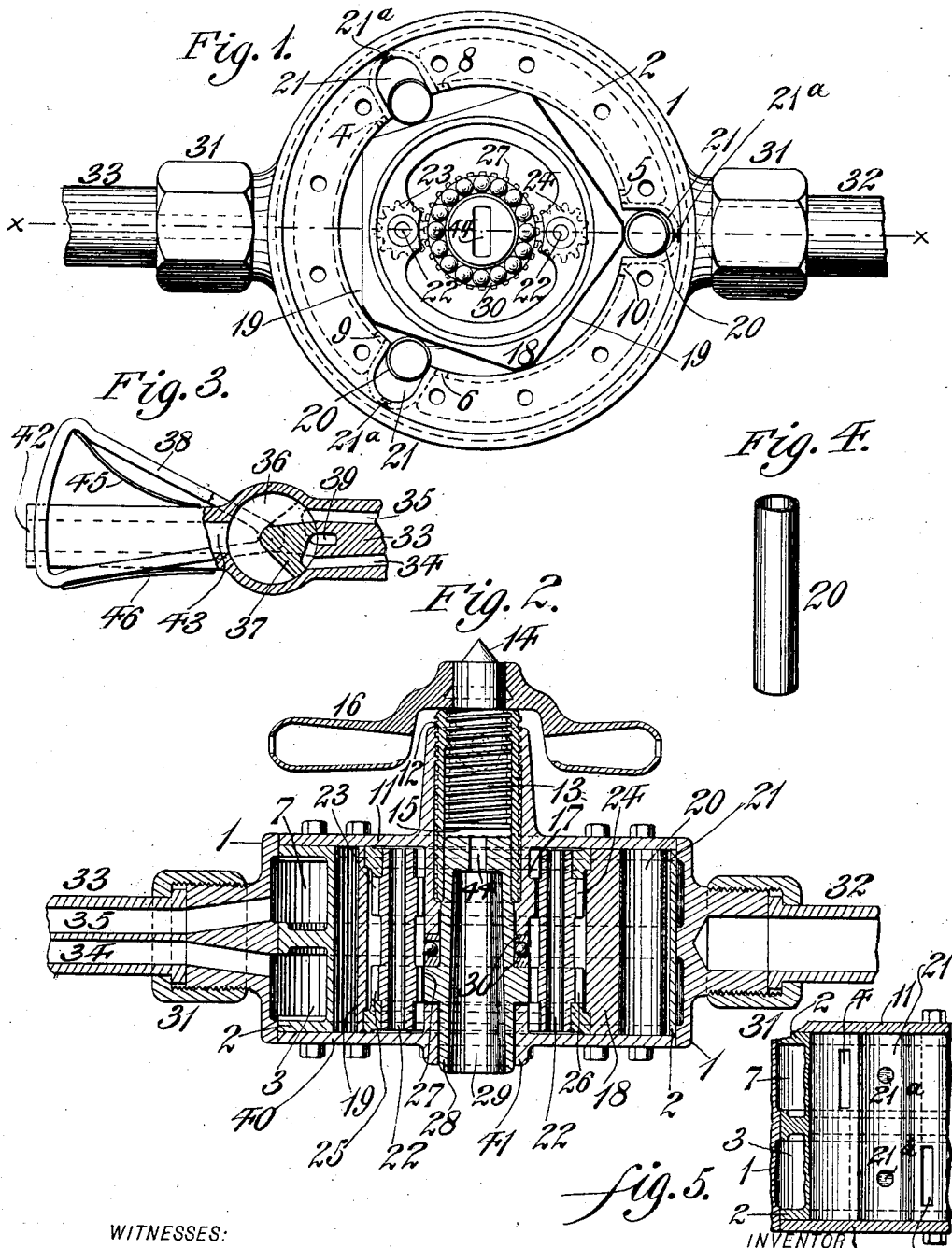
No. 762,126.

PATENTED JUNE 7, 1904.

S. C. BOND.
MACHINE FOR IMPARTING ROTARY MOTION.

APPLICATION FILED JUNE 8, 1903.

NO MODEL.



WITNESSES:

L. Bouville,
P. H. Nagle

fig. 5.
INVENTOR
Samuel C. Bond.
BY
Kiedersheim & Gaubanks.
ATTORNEYS.

UNITED STATES PATENT OFFICE.

SAMUEL C. BOND, OF WILMINGTON, DELAWARE.

MACHINE FOR IMPARTING ROTARY MOTION.

SPECIFICATION forming part of Letters Patent No. 762,126, dated June 7, 1904.

Application filed June 8, 1903. Serial No. 160,554. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL C. BOND, a citizen of the United States, residing at Wilmington, in the county of Newcastle, State of Delaware, have invented a new and useful Improvement in Machines for Imparting Rotary Motion, of which the following is a specification.

My invention relates to a machine that will impart rotary motion to drills, reamers, taps, &c., in which simplicity, durability, adaptability, and minimum cost of construction have been some of the principal objects sought.

It further consists of novel means of reversing the motion as required in tapping, &c.

It further consists of other novel features of construction, all as will be hereinafter fully set forth.

Figure 1 represents a plan view of my invention with the upper head removed. Fig. 2 represents a sectional elevation of the same on line *xx*, Fig. 1. Fig. 3 represents the operating-valve shown partly in section. Fig. 4 represents a side elevation of an abutment. Fig. 5 represents a vertical section, partly broken, of a portion of the device, showing a recess and adjacent parts.

Similar numerals of reference indicate corresponding parts in the figures.

Referring to the drawings, 1 designates the casing, to which is secured the cylinder 2, said cylinder having the annular recess 3, connecting with the ports 4, 5, and 6, and the annular recess 7, connecting with the ports 8, 9, and 10.

11 designates the upper cylinder-head, in which operates the feed-extension sleeve 12, the feed-screw 13 having the point 14 on one end thereof and the thread-stop 15 on substantially the other end thereof, said feed-screw 13 being carried by said extension 12 and co-operating therewith.

16 designates the feed-grip, which is suitably secured to the feed-screw 13.

17 designates the stationary gear, which is suitably secured to the upper cylinder-head 11.

18 designates the piston, having on the circumference thereof the depressions or flats 19, on which roll the abutments 20, said abutments

being retained in the peripheral recesses 21 in the cylinder 2.

21^a designates a check-valve connecting an annular recess 3 or 7 with a recess 21.

22 designates the bearings in the piston 18, in which rotate the driving-pinions 23, 24, 25, and 26, said pinions engaging and driving the differential gear 27, which is suitably secured to the spindle 28, said spindle having therein the socket 29.

30 designates the thrust-bearing, shown as a pair of ball-races carrying the usual balls.

31 designates the handle-retaining nuts, which secure the handles 32 and 33 to the casing 1, said handle 33 having the ports 34 and 35 therein leading from the valve-chamber 36 to the annular recesses 3 and 7 and controlled by the valve 37, said valve being operated by the hand-lever 38.

39 designates the exhaust-port, which is thrown into communication with the ports 34 or 35 by the valve 37 and lever 38, as desired.

40 designates the lower cylinder-head, having the spindle-bearing 41 therein, said head being suitably secured to the cylinder 2.

42 designates the hose attachment, and 43 the motive-fluid inlet.

44 designates the tang-grip for securing the tools from rotating.

45 and 46 designate the springs for holding the hand-lever 38, so that the motor is normally inoperative.

The operation is as follows: In tapping or operations of a similar nature a tap is placed in the socket 29 and the motive-fluid conveyer secured to the hose attachment 42. The action of the hand on the lever 38 in forcing the machine forward to cause the tap to start places the valve 37 in the position shown in the drawings by dotted lines, thereby forming a passage for the motive fluid to the port 34, said motive fluid passing through the port 34 into the annular recess 3, through the annular recess 3 to the ports 4, 5, and 6, through said ports into the cylinder 2, when the depressions 19 of the piston 18 are in communication with said ports, said motive fluid reacting on the abutments 20 and revolving the piston 18, the power at any time being due

to said reaction and in proportion to the amount of projected area of the abutments 20 in the cylinder 2. It is understood that the abutments 20 are in the construction shown held against the piston 18 by fluid-pressure admitted through the check-valves 21^a. When the depressions 19 have passed out of communication with the ports 4, 5, and 6, the motive fluid contained therein is carried idly until it reaches the ports 8, 9, and 10, passing therethrough to the exhaust-port 39 by way of the annular recess 7, the port 35, and valve 37. In reversing the movement of the piston the action of the hand on the lever 38 in trying to withdraw the tool forces the hand-lever 38 and the valve secured thereto to the position shown in full lines in the drawings, the port 34 being in communication with the exhaust-port 39 and the port 35 in communication with the inlet 43, thereby causing the motive fluid to flow in the opposite direction from that described above.

The piston 18, having the bearings 22 therein, in which the shafts carrying the pinions 23, 24, 25, and 26 rotate, said pinions 23 and 24 meshing with and revolving around stationary gear or rack 17, in conjunction with the pinions 25 and 26, imparts a greatly-reduced speed to the gear 27 and spindle 28, this being due to the differential arrangement of the teeth in gear 27.

The feed-screw is operated as follows: The power is applied to the feed-grip 16 and the feed-screw 13 removed until the thread-stop 15 engages with the feed extension 12, when a continued movement of the feed-grip 16 causes the said extension to rotate, thereby obtaining an increased length of feed, as will readily be seen by referring to the drawings.

I desire to call particular attention to the fact that all the parts revolve around a common center and that in any position of said parts a perfect pressure balance is maintained; also, that the abutments roll instead of sliding, as in machines constructed heretofore.

It is evident that means other than that shown may be used to maintain abutments 21 against the depressions 19 in the piston 18. Thus either the piston or the abutments may be magnetic, the adjacent parts being of diamagnetic material. By making the number of depressions 19 greater or even less than that of the recesses 21 a more even movement of the piston 18 is attained.

It will be evident that various changes may be made by those skilled in the art which will come within the scope of my invention, and I do not, therefore, desire to be limited in every instance to the exact construction herein shown and described.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a machine for imparting rotary motion, a cylinder, a rotary piston in said cylin-

der and a spindle rotating at a different speed from and extending into said piston, said spindle having a cavity therein adapted to receive the tool or other device to be operated by said machine.

2. In a machine for imparting rotary motion, a cylinder, a rotary piston in said cylinder and a rotary spindle having a cavity therein adapted to receive the tool or other device to be operated by said piston, extending into said cylinder and said piston, and geared thereto to rotate at a different speed than said piston.

3. In a machine for imparting rotary motion, a cylinder, a hollow rotary piston in said cylinder and gearing within and connected to said piston, said gearing being concentric with and equally distant from the center of said piston.

4. In a machine for imparting rotary motion, a cylinder, a hollow rotary piston in said cylinder, a gearing within and connected to said piston and a spindle concentric with and within said piston and operative by said gear.

5. In a machine for imparting rotary motion, a cylinder, a rack in said cylinder, a rotary piston in said cylinder, a pinion carried by said piston and meshing with said rack and a rotary spindle operatively connected with said pinion.

6. In a machine for imparting rotary motion, a cylinder, a rack in said cylinder, a hollow rotary piston in said cylinder, a pinion within said piston and meshing with said rack and a rotary spindle operatively connected with said pinion.

7. In a machine for imparting rotary motion, a cylinder, a rack in said cylinder, a hollow rotary piston in said cylinder, a rotary spindle, a gear-wheel on said spindle, a shaft in said piston and pinions on said shaft meshing with said rack and said gear-wheel.

8. In a machine for imparting rotary motion, a cylinder, a rack in said cylinder, a hollow rotary piston in said cylinder, a rotary spindle axially disposed in said piston, a gear-wheel on said spindle and a shaft having teeth meshing with said rack and said gear-wheel.

9. In a machine for imparting rotary motion, a cylinder, a rotary piston in said cylinder, a spindle having a cavity therein adapted to receive a tool or other device mounted axially, on said cylinder and contained within the latter, and differential gear within said piston connecting said piston and said spindle.

10. In a machine for imparting rotary motion, a cylinder, a rack in said cylinder, a hollow rotary piston in said cylinder, a spindle mounted axially of said cylinder and within said piston, a gear-wheel on said spindle and a shaft rotatably mounted in said piston having teeth meshing with said rack and said gear-wheel, the number of teeth of said gear-wheel differing from that of said rack.

11. In a machine for imparting rotary mo-

tion, a cylinder, an axial collar in said cylinder, teeth in said collar, a rotary piston in said cylinder, a spindle mounted axially of said cylinder, a gear-wheel on said spindle, a rotary shaft in said piston and pinions on said shaft meshing with said collar-teeth and said gear-wheel.

12. In a rotary fluid-pressure machine, a casing, a cylinder, a rotary piston in said cylinder, rolling abutments contacting with said piston, a passage between the walls of said casing and of said cylinder and a port opening from said passage into said cylinder and check-valves controlling ports behind said abutments.

13. In a rotary fluid-pressure machine, a casing, a cylinder, a piston in said cylinder and rotatable in either direction, a plurality of passages between the walls of said casing and of said cylinder, and ports connecting each of said passages with said cylinder and a rolling abutment between each two adjacent ports.

14. In a rotary fluid-pressure machine, a casing, a cylinder in said casing, a rotary piston in said cylinder, an annular passage between the walls of said casing and of said cylinder and a plurality of ports opening from said passage into said cylinder, rolling abutments between pairs of ports, and check-valves at the rear of said abutments.

15. In a rotary fluid-pressure machine, a casing, a cylinder in said casing, a plurality of superposed passages between the exterior walls of said casing and of said cylinder, ports with check-valves controlling the pressure against the rolling abutments, a piston in said cylinder rotatable in either direction and rolling abutments contacting with said piston.

16. In a machine for imparting rotary motion, a cylinder, a rotary piston therein, a spindle, means within the piston connecting said piston and spindle, abutments adapted to roll on and in contact with said piston and means of maintaining the contact of said piston and said abutments.

17. As an improved article of manufacture, an abutment for rotary engines consisting of a hollow cylindrical tube.

18. In a machine for imparting rotary motion, a cylinder, recesses in said cylinder, suitable hollow cylindrical abutments in said recesses, ports leading to and from said cylinder, a cylindrical piston within said cylinder having depressions on the periphery thereof, non-depressed portions of the periphery of said piston between said depressions contacting with the interior walls of said cylinder excepting when said non-depressed portions are passing said abutments.

19. In a rotary fluid-pressure machine, a cylinder, a rotary piston in said cylinder, a plurality of inlet and exhaust passages leading to and from said cylinder, a tubular handle and a valve in said handle for directing a motive fluid through said passages, whereby

said piston may be rotated in either direction, said valve being provided with a lever, having springs bearing on opposite portions thereof.

20. In a rotary fluid-pressure machine, a cylinder, a rotary piston in said cylinder, a plurality of inlet and exhaust passages leading to and from said cylinder, a tubular handle, a valve in said handle, and means exterior to said handle for operating said valve, the movement of said means being in the same direction as that of said handle in moving the machine toward or from the work.

21. In a rotary fluid-pressure machine, a cylinder, a peripheral recess in said cylinder, a rotary piston having a peripheral depression, a motive-fluid passage leading to the exterior of said cylinder, ports in the wall of said cylinder adjacent and in said recess, a check-valve controlling the latter and a rolling abutment in said recess and adapted to bear adjacent said piston.

22. In a rotary fluid-pressure machine, a cylinder, a peripheral recess in said cylinder, a rotary piston in said cylinder having a peripheral depression, a plurality of motive-fluid passages leading to the exterior of said cylinder, ports in the wall of said cylinder in said recess and adjacent each side thereof, a check-valve controlling the former and a rolling abutment in said recess and adapted to bear adjacent said piston, whereby said piston may be rotated in either direction.

23. In a rotary fluid-pressure machine, a casing, a cylinder in said casing, superposed passages between the exterior walls of said casing and of said cylinder, a peripheral recess in the wall of said cylinder, ports through the wall of said cylinder leading from each of said passages into said recess and from each of said passages on opposite sides of said recess, a rotary piston in said cylinder having a peripheral depression and an abutment in said recess and adapted to bear against said piston.

24. In a rotary fluid-pressure machine, a cylinder, a plurality of peripheral recesses in said cylinder, rotating abutments in said recesses, a plurality of passages adapted to convey a motive fluid to the exterior of said cylinder, ports through the wall of said cylinder leading from each of said passages adjacent said recesses on each side thereof, ports at the rear of said recesses, check-valves controlling the same and a rotary piston in said cylinder having a plurality of peripheral depressions.

25. In a rotary fluid-pressure machine, a cylinder, a plurality of peripheral recesses in said cylinder, a plurality of passages adapted to convey a motive fluid to the exterior of said cylinder, ports through the wall of said cylinder leading from each of said passages adjacent said recesses on each side thereof, ports at the rear of said recesses, check-valves controlling the same and a rotary piston in said cylinder having a plurality of peripheral depressions, the number and arrangements of said

recesses and of said depressions being such as will maintain the rotary balance of said piston.

26. In a rotary fluid-pressure machine, a cylinder, a plurality of peripheral recesses in
5 said cylinder, a plurality of passages adapted to convey a motive fluid to the exterior of said cylinder, ports through the wall of said cylinder leading from each of said passages adjacent said recesses on each side thereof, ports at
10 the rear of said recesses, check-valves controlling the same and a rotary piston in said cylinder having a plurality of peripheral depressions, the number of said recesses and said depressions being unevenly devisable one by the
15 other.

27. In a motor, a rotary engine therein, and handles extending from opposite sides of said motor, one of said handles containing at its outer end both the inlet and exhaust passages
20 for the motor.

28. In a motor, a rotary engine therein, and handles extending from opposite sides of said motor, one of said handles containing at its outer end both the inlet and exhaust passages
25 for the motor, in combination with a reversing-valve located in the handle containing said inlet and exhaust passages, said engine being

automatically inoperative when said valve is in its normal position.

29. In a motor, a cylinder, a rotary piston
30 therein, and concentric with said cylinder, rolling abutments cooperating with said piston, and handles extending from opposite sides of said motor, one of said handles containing both the inlet and exhaust passages for the motor. 35

30. In a motor, a rotary piston and a rotary spindle having a cavity therein extending into said piston, and handles extending from opposite sides of said motor, one of said handles containing at its outer end both the inlet and
40 exhaust passages for the motor.

31. In a rotary motor, a cylinder, a rotary piston in said cylinder, a rotary spindle extending into said cylinder and said piston and geared thereto to rotate at a less speed than
45 said piston, and handles extending from opposite sides of said cylinder, one of said handles containing both the inlet and exhaust passages for the motor.

SAML. C. BOND.

Witnesses:

GEO. L. COOPER,
C. D. McVAY.