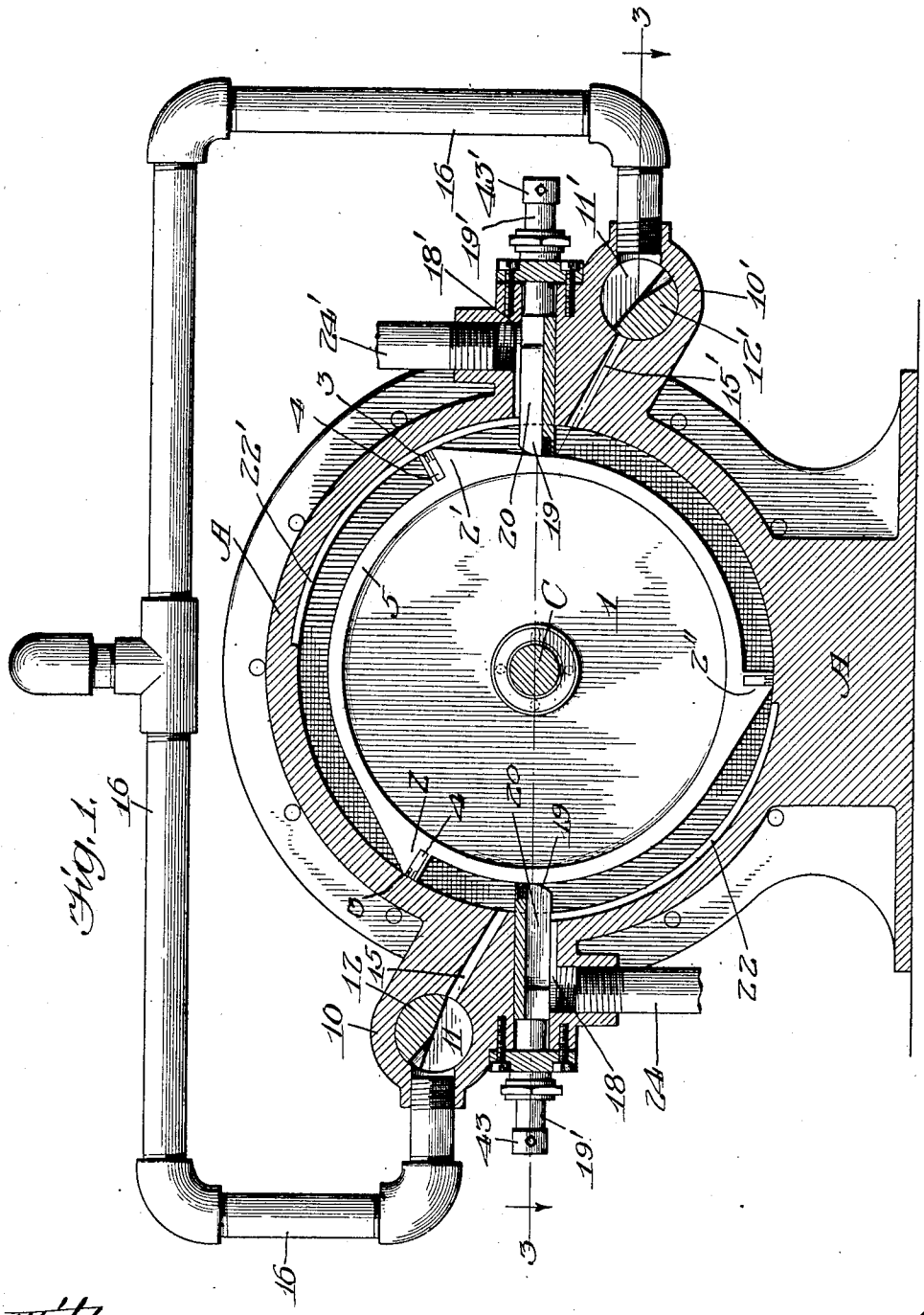
No. 892,351. PATENTED JUNE 30, 1908.

R. E. BEAUBIEN.

ROTARY MOTOR.

APPLICATION FILED MAY 20, 1905.

4 SHEETS—SHEET 1.



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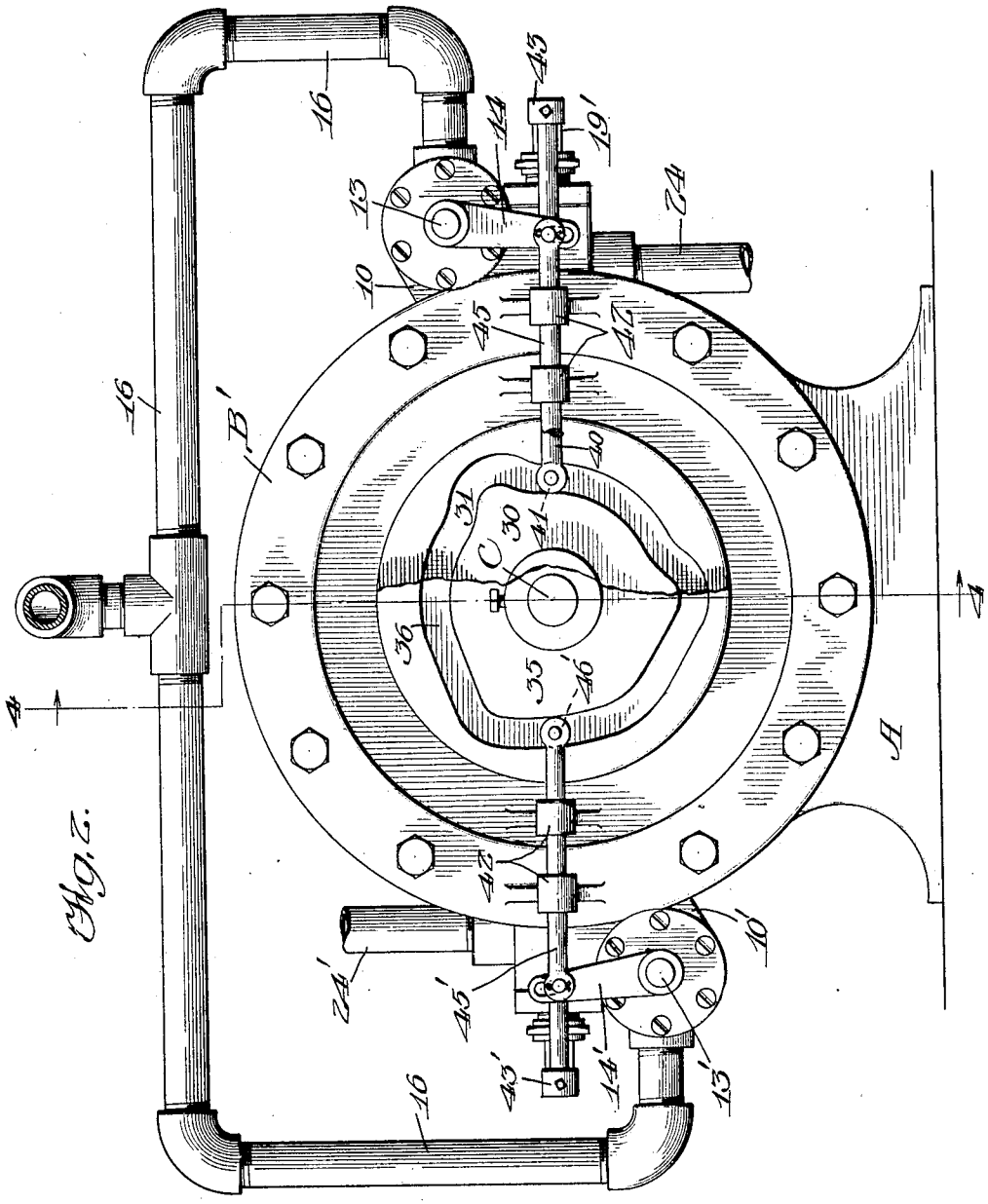

Fig. 2.

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4 SHEETS—SHEET 3.

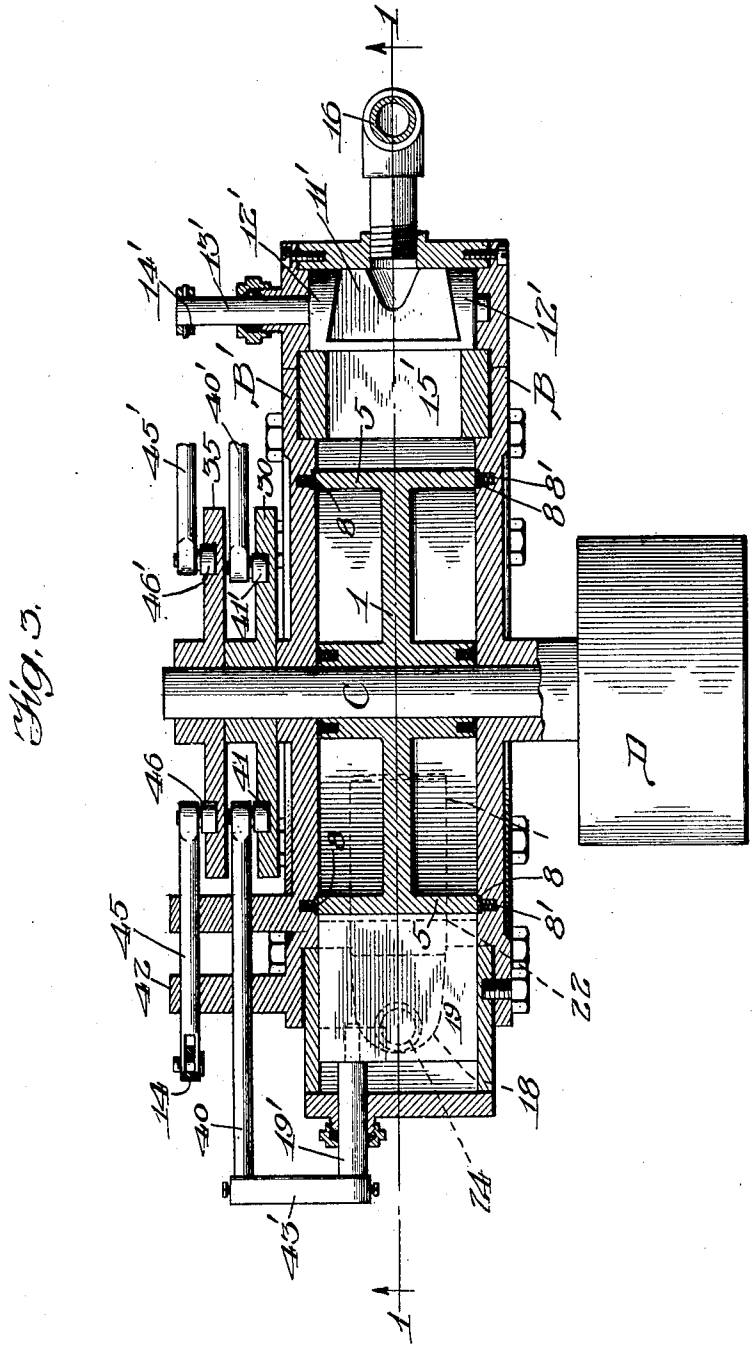

Fig. 3.

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Fig. 5.

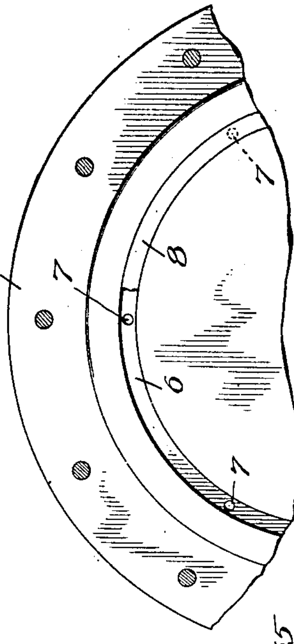


Fig. 6.

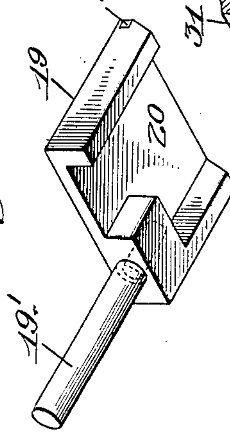


Fig. 7.

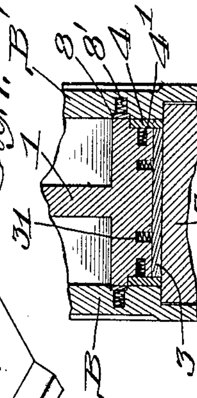
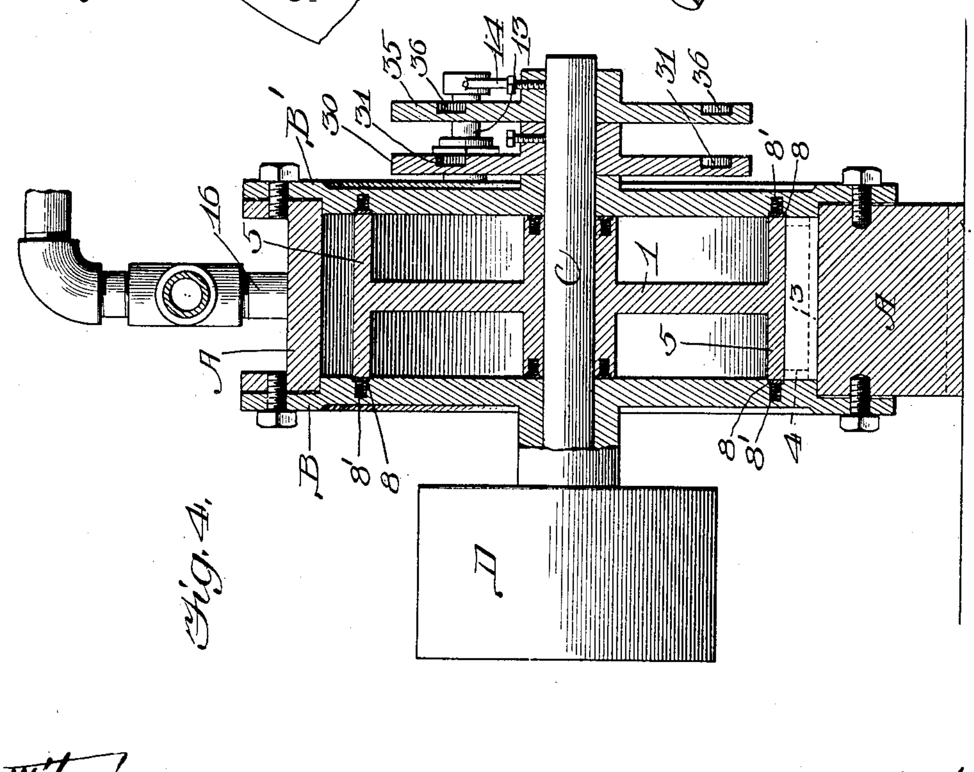


Fig. 4.



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THE NORRIS PETERS CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ROBERT E. BEAUBIEN, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO JAMES BURNS, OF CHICAGO, ILLINOIS.

ROTARY MOTOR.

No. 892,351. Specification of Letters Patent Patented June 30, 1908.

Application filed May 20, 1905. Serial No. 261,310.

To all whom it may concern:

Be it known that I, ROBERT E. BEAUBIEN, a citizen of the United States of America, and a resident of the city of Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Rotary Motors, of which the following is a specification.

My invention relates to rotary motors which are operated by direct and expansive pressure of a fluid or vapor introduced therein, and the object thereof is to produce a motor of such kind which shall be simple and cheap in construction, economical in operation, and which shall use the full expansion of the steam or other moving agent introduced thereinto.

The principles of my invention are illustrated in the drawings, in which—

Figure 1 shows a vertical section of my improved motor on the line 1—1 of Fig. 3; Fig. 2 is a rear elevation of my motor, one of the regulating cams being partly broken away; Fig. 3 is a cross section on the line 3—3 of Fig. 1; Fig. 4 is a vertical cross section on the line 4—4 of Fig. 2; Fig. 5 is an inside view of a portion of one of the cylinder heads; Fig. 6 is an abutment slide; and Fig. 7 shows a cross section detail of a portion of the cylinder pistons, together with the packing thereof.

Further describing my invention with reference to the drawings: A represents the base and cylinder of my motor, preferably formed in one piece.

B. and B′ are respectively the front and rear cylinder heads. Centrally of the heads is journaled the main shaft C carrying upon the end in front of the motor the driving wheel D. Within the cylinder upon the shaft C is mounted the revolving piston 1 upon which at equal distances from each other are placed or formed the peripheral wings 2, 2′, 2″. The latter are provided with packings 3, which are kept in contact with the inside of the cylinder head by pressure of the springs 3′ and similar packings 4, which are kept in contact with the portions of the cylinder head adjacent to the barrel of the cylinders by the springs 4′. A further packing for the peripheral portion 5 of the piston 2 is placed on the inner faces of the piston heads as shown in Fig. 5. An annular groove 6 with depressions 7 is made in the inside face of the cylinder heads, such groove corresponding to the portions 5 of the revolving piston. An annular strip 8 is seated in this groove and forced into contact with the corresponding portions of the piston by the springs 8′.

Extensions 10, 10′ of the cylinder casing A may be provided on either side of my device, opposite to each other. Transverse openings therein 11, 11′, form seats for the valves 12, 12′, which rock or rotate upon the stems 13, 13′. The said valve seats and the inside of the cylinder are connected by ports 15, 15′, so that live steam introduced through the pipes 16 may be controlled in its access to the inside of the cylinder by rotating or reciprocal action of the rock valves. Other openings 18, 18′ on opposite sides of the cylinder casing are of proper shape and dimensions to admit the sliding abutment 19 shown in Fig. 6. This element should be provided with packing 21 and is inserted in the said openings with the abutment faces next to the inlet ports 15, 15′. The back of said device has a channel or depression 20, which corresponds in cross section with the exhaust ways 22 and 22′ inside the cylinder and which form a connection therefor with the exhaust ports 24, 24′. The said exhaust way consists of a shallow depression or groove inside the cylinder casing, which extends from a point at the rear of each abutment slide opening for a distance approximating one-third of the inner circumference of the cylinder. A direct connection is thus made between the interior of the cylinder through the exhaust groove 22, the depression 20 in the abutment slide, and the aperture 18 with the atmosphere. Upon the rear end of the shaft C are mounted and firmly secured the cam disk 30, having a cam-groove 31 in its face, and the cam disk 35 having the cam-groove 36 in its face.

Connecting rods 40, 40′ provided at one end with friction rollers 41, 41′ pass through the guides 42, whereby parallel motion is se-

cured. The rollers seat in the cam-groove 31 and the other ends of said rods are attached to the yokes 43, 43′ by which connection is made with the stems 19′ 19′ of the abutments 19 19. Other connecting rods 45, 45′ are provided with the friction rollers 46, 46′, which play in the cam-groove 36, and pass through the guides 42 to the cranks 14, 14′ which give motion to the valve stems 13, 13′ of the valves 12, 12′.

The operation of my improved motor may be described with reference to one set of the duplicate parts, it being understood that a similar operation takes place on both sides of the machine in such a manner that the successive operations are continuous and those of each side intermittent with each other. When live steam is admitted through the pipe 16 and the valve 12 is open, as shown at the left side of Fig. 1, the steam passes through the port 15 and fills the space between the piston wing 2 and the abutment 19, thus giving an initial impulse to the revolving piston 1. This motion is communicated through the shaft C to the cam 35, which, by further rotation, causes the valve 12 to take the position shown in the lower right hand portion of Fig. 1, in which the further admission of steam is cut off. The expansion of the steam continues to act between the piston wing and the abutment until the former reaches the end 22″ of the exhaust-way or groove 22′, through which the exhaust then passes by means of the passage 20 to the outer air. As the latter part of this operation is taking place the cam-groove 31, through the medium of the connecting rod 40 and yoke 43, actuates the abutment stem 19. The abutment is thereby withdrawn so that the next succeeding piston wing can pass, and as soon as it has done this is returned to the position first shown. At this point the action of the cam 35 opens the valve 11 and one cycle of action is completed. Meanwhile, at about the cut-off point as before described, the piston wing 2′ has passed the abutment on the right side of Fig. 1, it having been retracted and advanced by the cam and its connecting mechanism on the left side of Fig. 2. Thereupon the steam is admitted in the rear of wing 2′. This then advances first under direct pressure and then under expansion until at about the time the exhaust point is reached, wing 2″ is in position to take live steam from the port 15, and by its further revolution through expansion and exhaust complete the third cycle of movement and a complete revolution of the piston.

I have described my device as actuated by steam; but it is evident that other elastic fluid under pressure may be used. And the proportions and construction of the several parts may be greatly varied without departing from the spirit and scope of my invention.

I claim and desire to secure by Letters Patent the following:

1. In a rotary motor, the combination of a casing, a revolving piston, a wing thereon, an abutment adapted to slide in and out of the casing, said abutment having a longitudinally disposed channel extending to the inner end of the abutment and communicating with an exhaust port in said casing, a cam disk on the piston shaft, said cam disk having a cam groove and means for operatively connecting the cam disk and the abutment.

2. In a rotary motor, the combination of a casing, a revolving piston, a wing thereon, an abutment adapted to slide in and out of the cylinder casing, said abutment having a channel affording communication at all positions of the abutment, between the interior of the casing and an exhaust port in the casing, a valve to admit fluid to the casing, and means carried by the piston shaft for operating said abutment.

3. In a rotary motor, the combination of a casing, a revolving piston, a wing thereon, an abutment adapted to slide in and out of the cylinder casing and having a channel communicating with an exhaust port in said casing, a rock valve to admit fluid to the casing, cam disk on the piston shaft and a cam groove in the face thereof to control the said valve.

4. In a rotary motor, the combination of a casing, a revolving piston, a wing thereon, an abutment adapted to slide in and out of the cylinder casing and having a channel communicating with an exhaust port in said casing, a cam disk on the piston shaft, a cam groove in the face thereof operatively connected with said abutment, a valve to admit fluid to the casing, a cam disk on the piston shaft, and a cam groove in the face thereof operatively connected to the said valve.

5. In a motor having a casing, and a revolving piston; an exhaust way in the inside of the casing, an exhaust port, and a movable abutment having a channel therein to connect the exhaust way and the exhaust port.

6. In a motor, the combination of a casing, a revolving piston, a plurality of wings on the piston; openings in the casing, a plurality of abutments adapted to enter the casing through said openings, exhaust ports connected with the openings, and grooves or channels inside the casing and open therethrough throughout their length, into which

the fluid in the rear of each wing may exhaust before said wing reaches each abutment in completing its cycle of action.

7. In a motor, the combination with a casing having two diametrically opposite inlet ports and a plurality of exhaust ports located adjacent the inlet ports, two diametrically opposite exhaust ports, and valves governing said inlet ports, of two movable abutments disposed at diametrically opposite points in the casing and a rotary piston having three wings disposed at equal distances apart on said piston.

In witness whereof, I have hereunto subscribed my name in the presence of two subscribing witnesses.

ROBERT E. BEAUBIEN.

Witnesses:

CLARENCE K. CHAMBERLAIN,

A. S. PHILLIPS.