

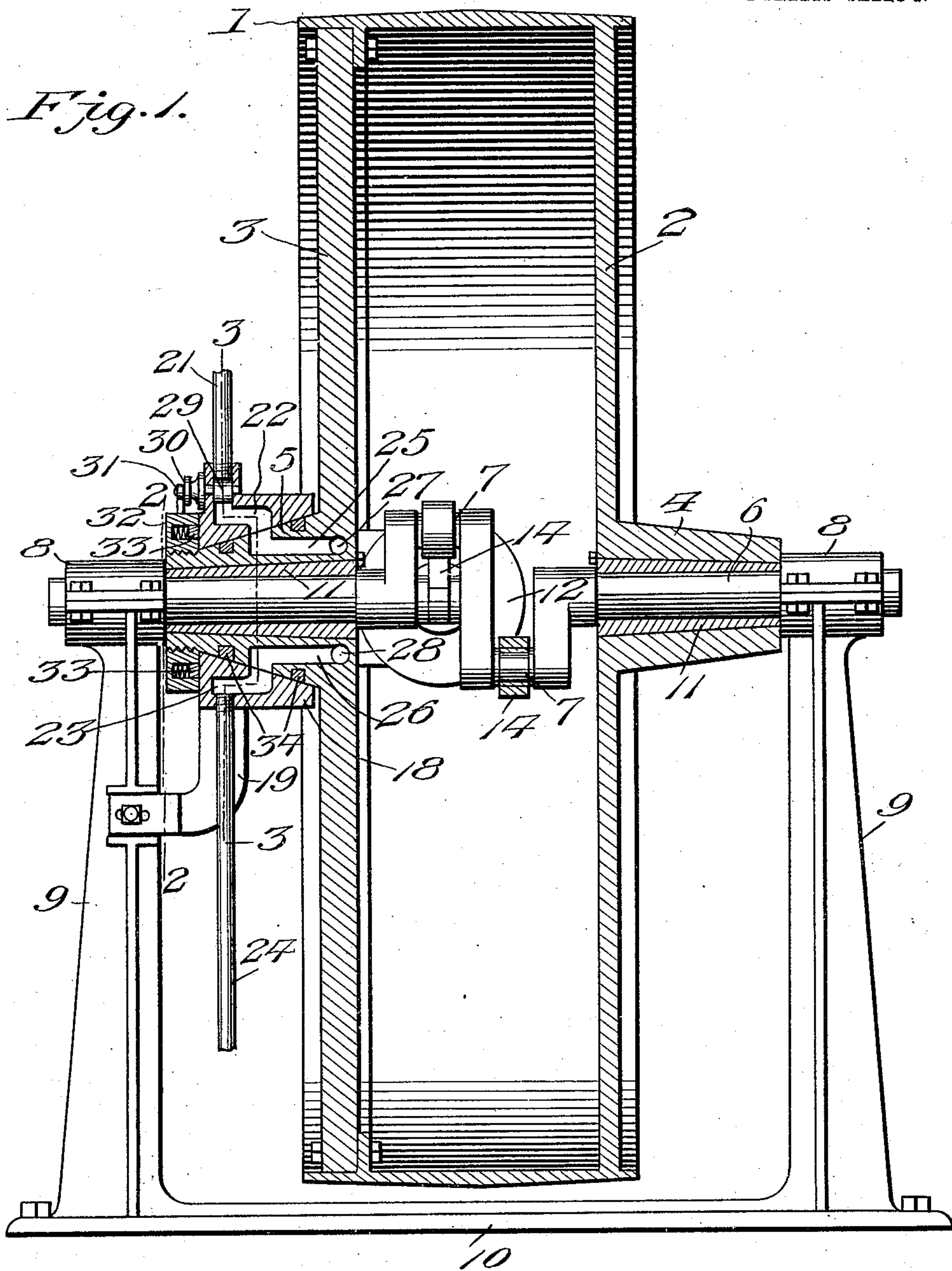
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PATENTED FEB. 5, 1907.

A. A. DARBY.
ROTARY MOTOR.

APPLICATION FILED JUNE 14, 1906.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

Fig. 2.

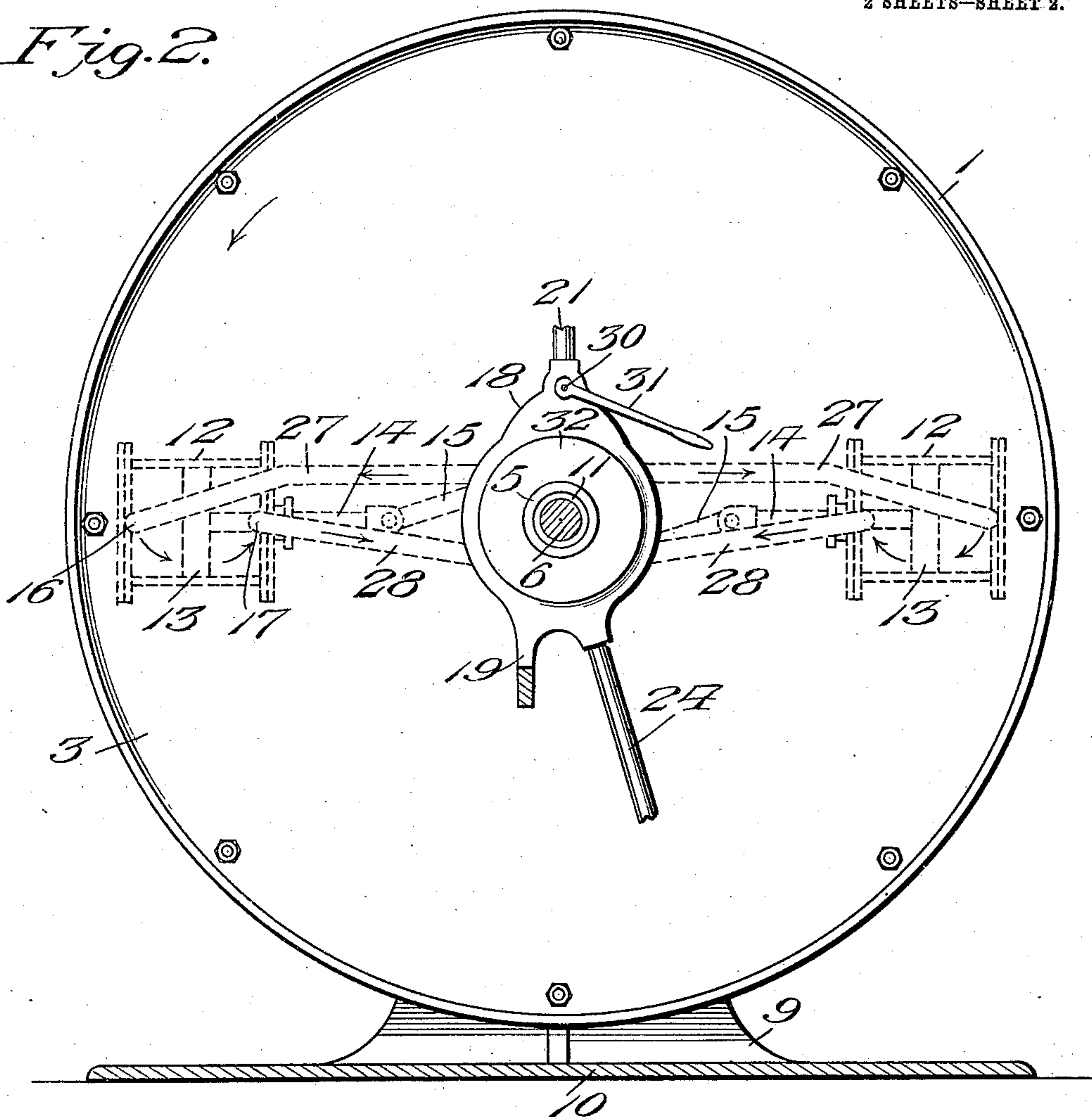
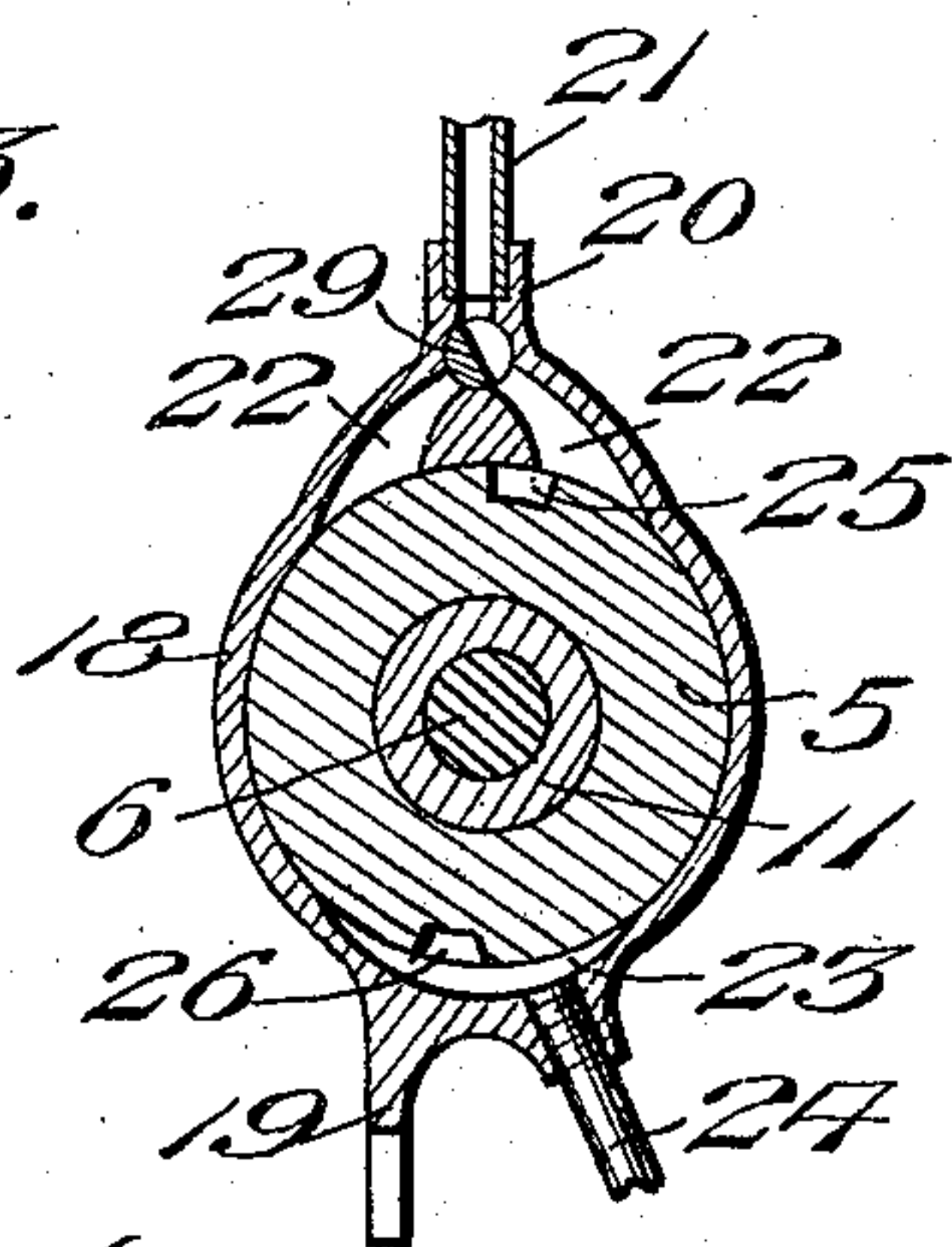


Fig. 3.



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UNITED STATES PATENT OFFICE.

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ROTARY MOTOR.

No. 843,075.

Specification of Letters Patent.

Patented Feb. 5, 1907.

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To all whom it may concern:

Be it known that I, AVERNO A. DARBY, a citizen of the United States, residing at Vidalia, in the county of Toombs and State of Georgia, have invented new and useful Improvements in Rotary Motors, of which the following is a specification.

This invention relates to rotary motors, and embodies in its organization a rotary drive or motor wheel of hollow formation journaled on a fixed shaft and containing a pair of opposed cylinders carrying reciprocating pistons having pitman connections with the shaft and adapted in operation to drive the motor-wheel, which in turn operates a power-transmitting belt, there being connected with the cylinders suitable inlet and exhaust ducts for supplying a motive fluid to and exhausting it from the cylinders for operating the pistons.

The invention has for its objects to provide a comparatively simple inexpensive device of this character wherein a maximum driving force relative to a given expenditure of energy is attained, one in which the pistons will move in unison and simultaneously on their inward and outward strokes, thereby opposing their force to thus minimize vibrations of and properly counterbalance the motor-wheel, and one wherein stoppage of the wheel on a dead-center is obviated.

A further object of the invention is to provide a device of this character wherein the direction of movement of the motor-wheel may be readily reversed, and this without reversing the points of admission of the fluid to the cylinders, one in which the use of slide-valves for controlling the ingress and egress of the fluid to and from the cylinders is rendered unnecessary, and one wherein the admission of the fluid to the cylinders for controlling the movements of the wheel past the dead-center may be governed at will.

With these and other objects in view the invention comprises the novel features of construction and combination of parts, more fully hereinafter described.

In the accompanying drawings, Figure 1 is a vertical transverse section taken through the motor on a line centrally of the shaft. Fig. 2 is a side elevation, partly in section, the section being taken on the line 2 2 of Fig. 1. Fig. 3 is a detail sectional view taken

through the reversing mechanism on the line 3 3 of Fig. 1.

Referring to the drawings, 1 designates a motor-wheel in the form of a hollow belt-pulley having side walls 2 3, provided with outwardly-extending conical tubular hubs 4 5, through which there is extended a crank-shaft 6, having reversely-disposed crank portions 7, located within the wheel 1, said shaft being fixed against rotation in bearing-boxes 8, provided at the upper ends of standards 9, fixed at their lower ends to and arising vertically from a base 10, while arranged on the shaft within the hubs 4 are tubular bushingsleeves 11, preferably composed of brass.

Fixed at diametrically opposite points within the motor-wheel 1 is a pair of cylinders 12, containing reciprocary pistons 13, the rods 14 of which are connected by pitmen 15, respectively, with the crank portions 7 of the shaft, which, it will be noted, is so fixed that the crank portions 7 are disposed on a line pitched diagonally to the vertical axis of the wheel and constituting the dead-center of the latter, as will more fully hereinafter appear, there being provided at the rear ends of the cylinders 12 ports 16 and at their forward ends ports 17, through which ports the motive fluid is alternately admitted at opposite sides of the pistons.

Fitted on the hub 5 is a box 18, fixed against movement by means of an arm 19, attached to the adjacent standard 9, and having a tubular neck 20, in which is coupled one end of a supply-pipe 21, there being extended from the neck 20 and into the box a pair of divergent inlet passages or ports 22, and with an exhaust passage or port 23 in which is coupled one end of an exhaust-pipe 24, there being formed at diametrically opposite points in the hub 5 a pair of passages 25 26, of which the former communicates with a pair of ducts 27, formed through the wall 3 and arranged to communicate, respectively, with the ports 16 at the rear ends of the cylinders, while the passage 26 in like manner communicates with a pair of ducts 28, leading to and communicating, respectively, with the ports 17 for admitting fluid to the forward ends of the cylinders.

Pivoted in the neck 20 at the juncture of the passages 22 and for controlling communication thereof with the inlet is a semicir-

cular reversing-valve 29 having an outwardly-projecting stem 30, on which is fixed an operating-lever 31, while tapped onto the outer end of the hub 5 and for movement therewith is a circular nut 32, containing a spring-pressed packing-gasket 33, designed to bear on the adjacent face of the box 18, between which and the hub 5 there are arranged packing-gaskets 34, fitted in suitable grooves in the hub and at opposite sides of the passages 25 26.

The nut 32, which rotates with the wheel 1, may receive a belt for operating a governor, (not shown,) which in practice will be of suitable form and preferably sustained on the inlet-pipe 21, it being understood in this connection that the wheel 1 receives a power-transmitting belt, (not shown,) and through the medium of which the motor is connected with the mechanism to be driven.

In practice, supposing the parts to be in the position seen in Figs. 1 and 2, steam or other motive fluid will be admitted through pipe 21 and enter through one or the other of the by-passes 22 to the passage 25 and thence through the passages or ducts 27 to the rear ends of the cylinders 12 for driving the pistons 13 forwardly. As the pistons move forward they act upon the crank portions 7 of the shaft 6 as fixed abutments, thereby causing rotation of the wheel 1 in the direction indicated by the arrow in Fig. 2, it being noted that during outstroke of the pistons fluid will be exhausted therefrom through the passages 28 to the passage 23, and thence through exhaust-pipe 24. On the outstroke of the piston the wheel 2 makes a half-revolution, thereby bringing the passage 26 into register with the inlet 22 and the passage 25 likewise into register with exhaust-passage 23, whereupon steam will be admitted through ducts 28 and ports 17 to the forward end of the cylinders for imparting an instroke to the pistons, the previously-taken fluid being, under these conditions, exhausted in rear of the pistons through the ports 16 and ducts 27, it being observed that during instroke of the pistons the wheel will be carried throughout the remainder of its complete revolution, and, further, that at the completion of this revolution of the wheel it will have passed beyond the dead-center line indicated by the line of pitch of the crank portions 7. In order to reverse the direction of rotation of wheel 1, the valve 29 is changed from the position shown in Fig. 3 to a position for closing the other by-pass 22, whereby the motive fluid will be admitted to the passages 25 or 26, as the case may be, prior to the wheel passing beyond the dead-center or, that is, before the active strokes of the pistons 13 are completed, thereby shortening such stroke of the pistons and causing them to start upon the

reverse stroke for carrying the wheel in a reverse direction. In other words, the fluid is admitted to the cylinders either before or after the wheel 1 has passed the dead-center line, and if before such line has been reached the direction in which the wheel is rotating will obviously be reversed. It will be observed that in the operation of the device the pistons will move in unison on both the in and out strokes to thus oppose their forces for relieving vibration of the wheel and for properly counterbalancing the latter, and, furthermore, that under the simplified reversing mechanism herein provided the necessity for employing slide-valves on the cylinders is obviated.

Having thus described my invention, what I claim is—

1. In a motor of the type described, a rotary motor-wheel, a fixed abutment on which the wheel is journaled, a pair of opposed cylinders fixed in the wheel and containing reciprocating pistons, connections between said pistons and the abutment, the pistons being adapted to stroke inwardly and outwardly in unison during reciprocation, and means for admitting a motive fluid simultaneously to corresponding ends of the pair of cylinders.

2. In a motor of the type described, a fixed shaft having reversely-disposed crank portions, a motor-wheel journaled for rotation on the shaft, oppositely-disposed cylinders fixed to the wheel, pistons arranged for reciprocation in said cylinders and adapted to stroke inwardly and outwardly in unison, connections between the pistons and respective crank portions of the shaft, and means for admitting a motive fluid simultaneously to corresponding ends of the pair of cylinders.

3. In a motor of the type described, a fixed shaft having reversely-disposed crank portions, a motor-wheel journaled for rotation on the shaft, cylinders fixed at opposite points to the wheel, pistons arranged for reciprocation in the cylinders and adapted to stroke inwardly and outwardly in unison, connections between the pistons and respective crank portions and means for admitting a motive fluid alternately to opposite ends of the cylinders, the fluid being admitted simultaneously to corresponding ends of the pair of cylinders.

4. In a motor of the type described, a fixed shaft having reversely-disposed crank portions, a motor-wheel journaled for rotation on the shaft, a pair of opposed cylinders fixed to the wheel, pistons disposed for reciprocation in the cylinders and arranged to stroke in unison, means for admitting a motive fluid alternately to opposite ends of the cylinders and a reversing-valve for controlling the admission of the fluid to the cylinders in accord with the position of the wheel relative to its dead-center.

5 5. In a motor of the type described, a fixed abutment, a rotary motor-wheel journaled thereon, a pair of opposed cylinders fixed on the wheel and containing reciprocatory pistons designed to stroke in unison, means for admitting a motive fluid alternately to opposite ends of the cylinders, and means for governing the time of admission of the fluid

to the cylinders in accord with the position of the wheel relative to its dead-center. 10

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

AVERNO A. DARBY.

Witnesses:

JOHN L. FLETCHER,
K. ALLEN.