

A. McDONALD.
 ROTARY ENGINE.
 APPLICATION FILED NOV. 13, 1908.

925,127.

Patented June 15, 1909.

2 SHEETS—SHEET 1.

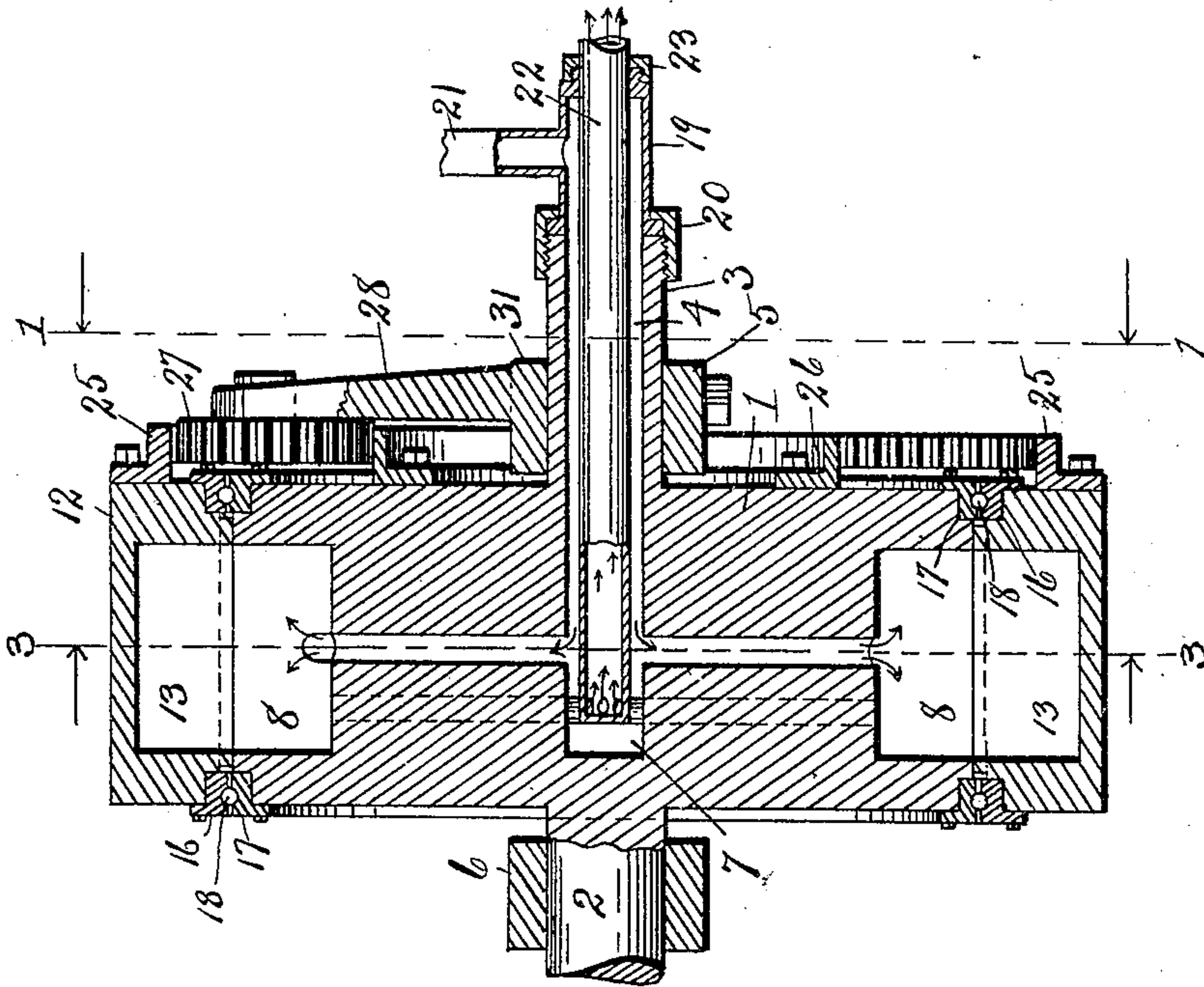


Fig. 2.

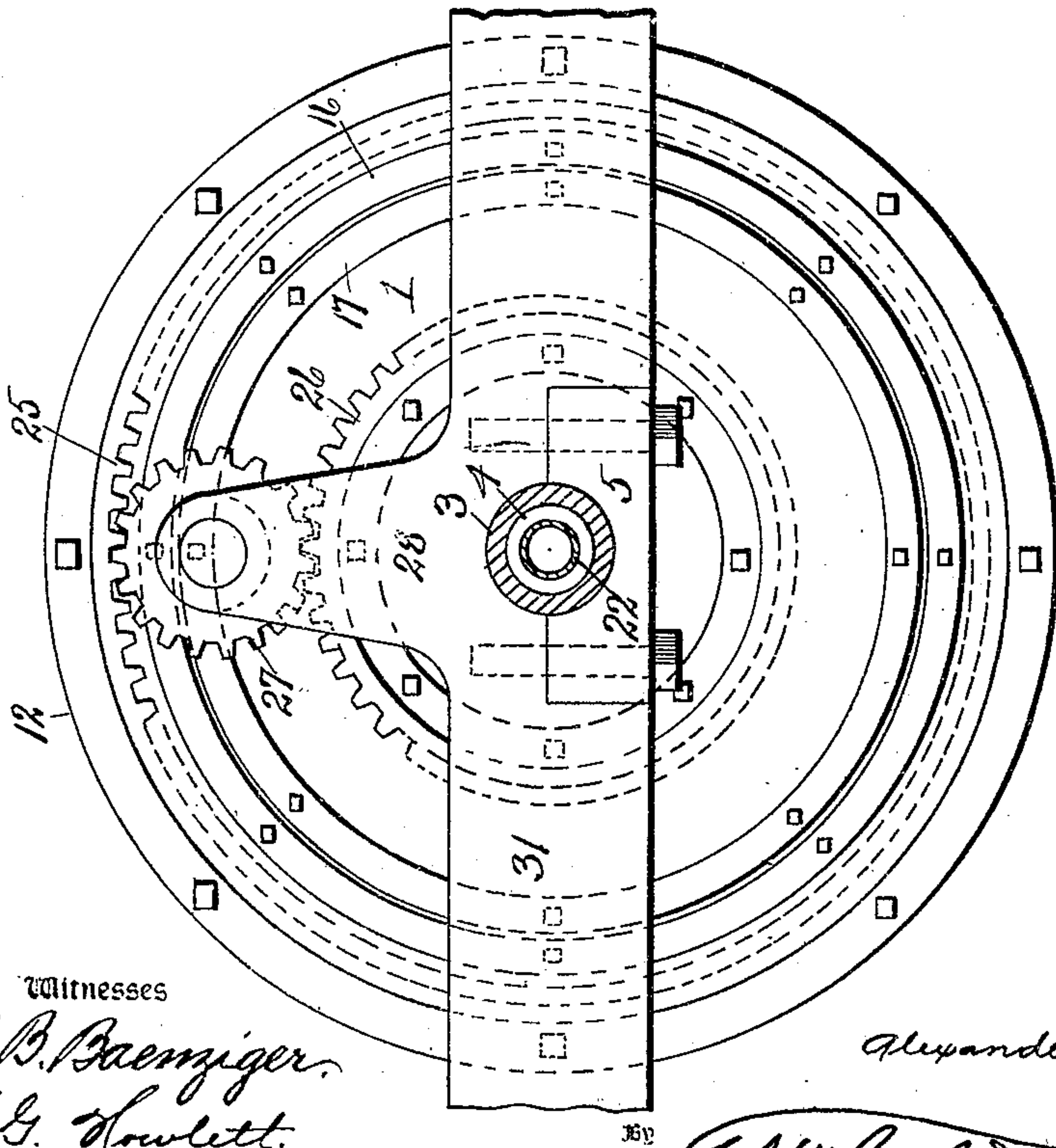


Fig. 1.

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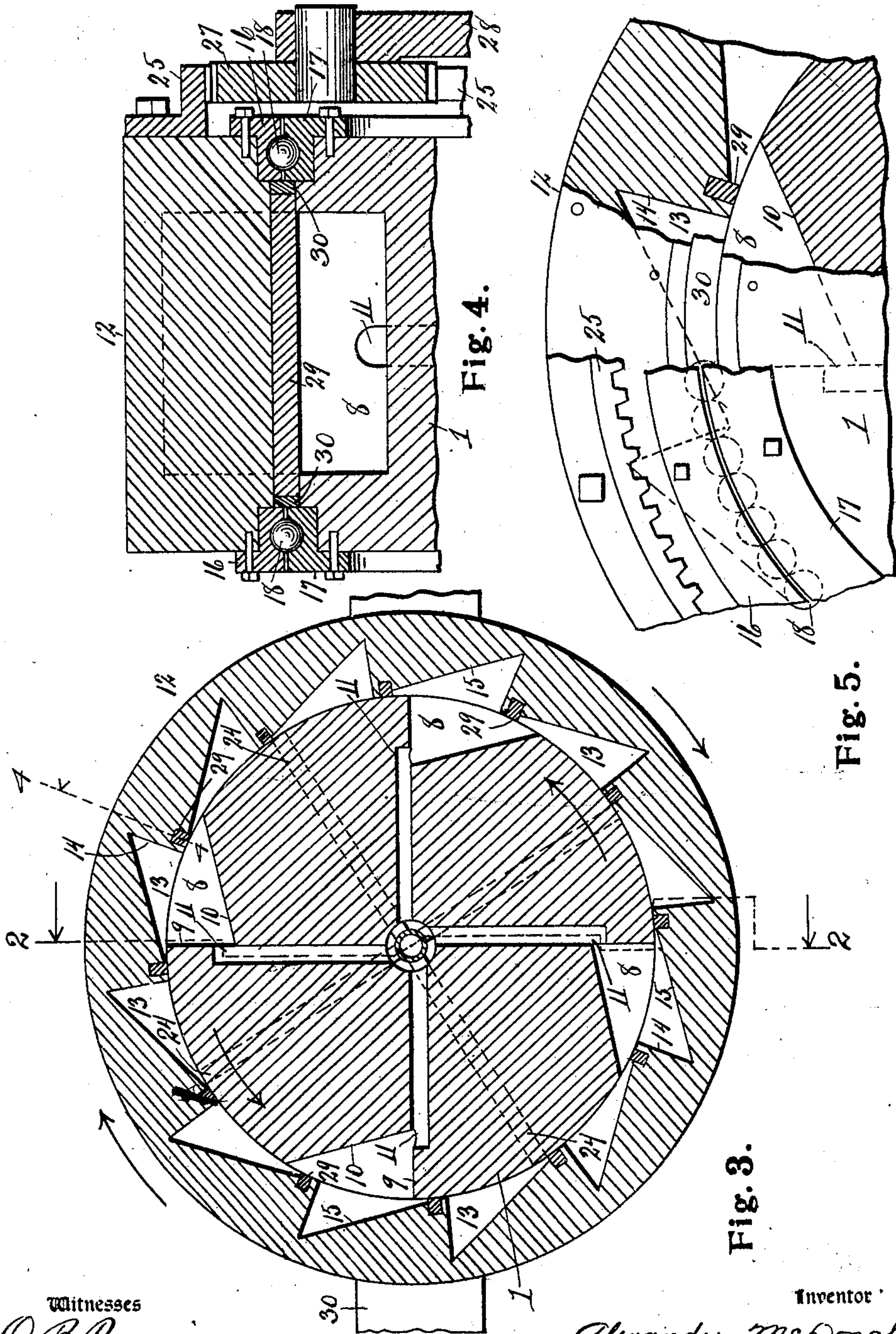
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UNITED STATES PATENT OFFICE.

ALEXANDER McDONALD, OF DETROIT, MICHIGAN.

ROTARY ENGINE.

No. 925,127.

Specification of Letters Patent.

Patented June 15, 1909.

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To all whom it may concern:

Be it known that I, ALEXANDER McDONALD, a citizen of the United States, residing at Detroit, in the county of Wayne, State of Michigan, have invented certain new and useful Improvements in Rotary Engines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

This invention relates to rotary engines, and consists in the construction and arrangement of parts hereinafter more fully set forth and claimed.

The object of the invention is to produce a rotary engine of the character described wherein two concentric, parallel disks having buckets in their adjacent faces are caused by the introduction of the propulsive agent to revolve in opposite directions through the impact and expansive force of said agent, the arrangement being such that the rotary motion of said disks in opposite directions is transmitted to a single shaft to drive said shaft continuously in one direction. A further arrangement provides for the introduction of the propulsive agent through a hollow shaft and through radial passages in one of said disks, and the escape of said agent after its force has been expended through other radial channels in the same disk and through a second hollow shaft to the exterior air. A still further arrangement provides for suitable packing between the rotary disks to prevent the escape of the propulsive agent, and also affords suitable bearings between said disks to obviate undue friction. The above object is attained by the mechanism illustrated in the accompanying drawings, in which:—

Figure 1 is an elevation of a rotary engine involving my invention. Fig. 2 is a diametrical section as on line 2—2 of Fig. 3. Fig. 3 is a transverse section as on line 3—3 of Fig. 2. Fig. 4 is a fragmentary view in diametrical section as on line 4—4 of Fig. 3. Fig. 5 is an enlarged fragmentary view

partly in section and partly in side elevation, of a portion of said disks illustrating the construction and association of the parts.

Referring to the characters of reference, 1 designates the inner of the rotary disks having a shaft 2 projecting from one face thereof upon which a pulley, gear, or crank may be mounted for the purpose of transmitting motion therefrom. Projecting from the opposite face of said disk is a hollow shaft 3 the opening 4 through which continues transversely of the disk 1 forming a central aperture 7 therein concentric with its axis of oscillation and communicating with said hollow shaft. Embracing the shaft 3 is a suitable bearing 5 supported by the frame, and embracing the shaft 2 is a similar bearing 6, also supported by the frame.

Formed in the periphery of the disk 1 are the buckets 8 having a wall 9 in the plane of the diameter of the disk, and a wall 10 nearly at right angles thereto leading from the base of the wall 9 to the periphery of the disk. The hollow shaft and the communicating central aperture 7 afford a steam induct pipe through which steam or other propulsive agent is supplied to the engine. Formed diametrically of the disk 1 and leading from said central aperture 7 are the steam passages 11, the outer ends of said passages communicating with the buckets 8 through the walls 9 thereof.

Embracing the periphery of the disk 1 is an outer disk or ring 12 provided in the inner face thereof with the buckets 13 having a diametrical wall 14 and an inclined wall 15, said diametrical wall being opposed to the wall 9 of the buckets 8, thereby causing the buckets in the respective disks to face in opposite directions. To associate said disks in operative relation so as to permit of the rotation thereof in opposite directions without undue friction, their opposite margins are provided with the circular ball races 16 and 17 respectively which are securely bolted to the vertical sides of said disks and between which are confined the bearing balls 18.

Upon the end of the hollow shaft 3 is a coupling 19 connected thereto by a union 20 which permits of the rotation of said shaft

without turning said coupling. Communicating with said coupling is a supply pipe 21 through which steam or other expansive fluid under pressure may be conveyed to the hollow shaft of the engine. Passing centrally through said coupling and hollow shaft is an exhaust pipe 22, a stuffing box 23 being provided around said pipe where it passes through the end of said coupling. The inner end of the exhaust pipe 22 communicates with the tubes or passages 24, shown by dotted lines in the drawings, which pass diametrically through the body of the disk 1 to the periphery thereof, forming exhaust ports through which the propulsive agent may escape into the exhaust pipe 22 after expending its force in the driving of the engine. The outer end of said exhaust pipe may be made to communicate with the exterior air, or with a condenser, as desired. It will now be understood that the entrance of steam or other fluid under pressure into the buckets 8 through the passages 11 will act upon the walls 9 of the buckets 8 in the disk 1, and upon the walls 14 of the buckets 13 in the disk 12 to turn said disks in opposite directions.

To transmit the rotary movement from said disks to the shaft 2 so as to turn said shaft continuously in one direction, there is secured to the vertical face of the disk 12 a ring 25 having internal gear teeth, and to the vertical face of the disk 1 a ring 26 having external gear teeth. Meshing with these gear rings is an idle pinion 27 which is journaled in a bracket 28 mounted on a cross bar 31 of the frame. By this arrangement, the disks are geared together and their rotary motion in opposite directions is equalized and caused to effect a continuous rotation of the shaft 2 in one direction.

It will be noted that as the disks revolve through the action of the propulsive agent and the relative rotation thereof carries the buckets of the disk 12 past the point of communication with the buckets of the disk 1, so that the expansive force of the propulsive agent is no longer available, the buckets of the disk 12 in which the propelling agent is confined will then be caused to communicate successively with the exhaust ports 24 through which the propulsive agent from which the energy has been expended may escape out the exhaust pipe 22.

To obviate the passage of the steam or propulsive agent between the buckets 13 of the disk 12 without performing its work, there are provided transverse steam packing strips 29 which are let into the base of the inclined walls 15 of the buckets 13 and have peripheral contact with the disk 1 between the buckets 8, the ends of said packing strips crossing the buckets transversely and

bearing at their terminals upon the periphery of the disk 1 on each side of said buckets.

To obviate the lateral escape of the steam or propulsive agent from between the working face of the disks, there are employed circular packing rings 30, shown more clearly in Fig. 4, which are let into channels in the inner face of the disk 12 at the ends of the packing strips 29, and have engagement with the peripheral margins of the disk 1 on opposite sides of the buckets therein, preventing the passage of the propulsive agent from between the working faces of said disks.

Having thus fully set forth my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In a rotary engine, the combination of the concentric disks adapted for rotation in opposite directions having buckets in their contiguous faces, means for admitting a propulsive agent into said buckets, means for permitting the escape of said propulsive agent, a shaft with which one of said disks is connected, a gear ring carried by each of said disks, and a pinion connecting said gear rings whereby the opposite rotary motion of the disks is transmitted to said shaft to turn it continuously in one direction.

2. In a rotary engine, the combination of the concentric disks having buckets in their contiguous faces, means for rotatively associating said disks to permit them to turn in opposite directions, the inner disk having a central opening and a hollow shaft communicating therewith, there being passages within the inner disk leading from said central opening to the buckets of said disk, an exhaust pipe passing through said hollow shaft and central opening, there being exhaust ports within the central disk extending from the periphery thereof and communicating with said exhaust pipe, a shaft connected with one of said disks, and means for transmitting the opposite rotary movement of the disks to said shaft to turn it continuously in one direction.

3. In a rotary engine, the combination of the concentric disks having buckets in their contiguous faces, means for introducing a propulsive agent to the buckets of said disks, means for permitting the escape of said propulsive agent, a shaft connected with the central disk, a ring upon the outer disk having internal gear teeth, a ring upon the central disk having external gear teeth, and a pinion mounted upon a fixed support and meshing with the teeth of said gear rings, whereby the opposite rotary motion of the disks is transmitted to said shaft to drive it continuously in one direction.

4. In a rotary engine, the combination of the concentric disks having buckets in their contiguous faces, means for introducing a

propulsive agent to said buckets, means for
permitting the escape of said propulsive
agent, transverse packing strips between the
buckets of the outer disk having contact
5 with the periphery of the inner disk, circu-
lar packing rings interposed between the
peripheries of said disks at the terminals of
said transverse packing strips, a shaft, and
means for transmitting the opposite rotary

motion of said disks to said shaft to turn it 10
continuously in one direction.

In testimony whereof, I sign this speci-
fication in the presence of two witnesses.

ALEXANDER McDONALD.

Witnesses:

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