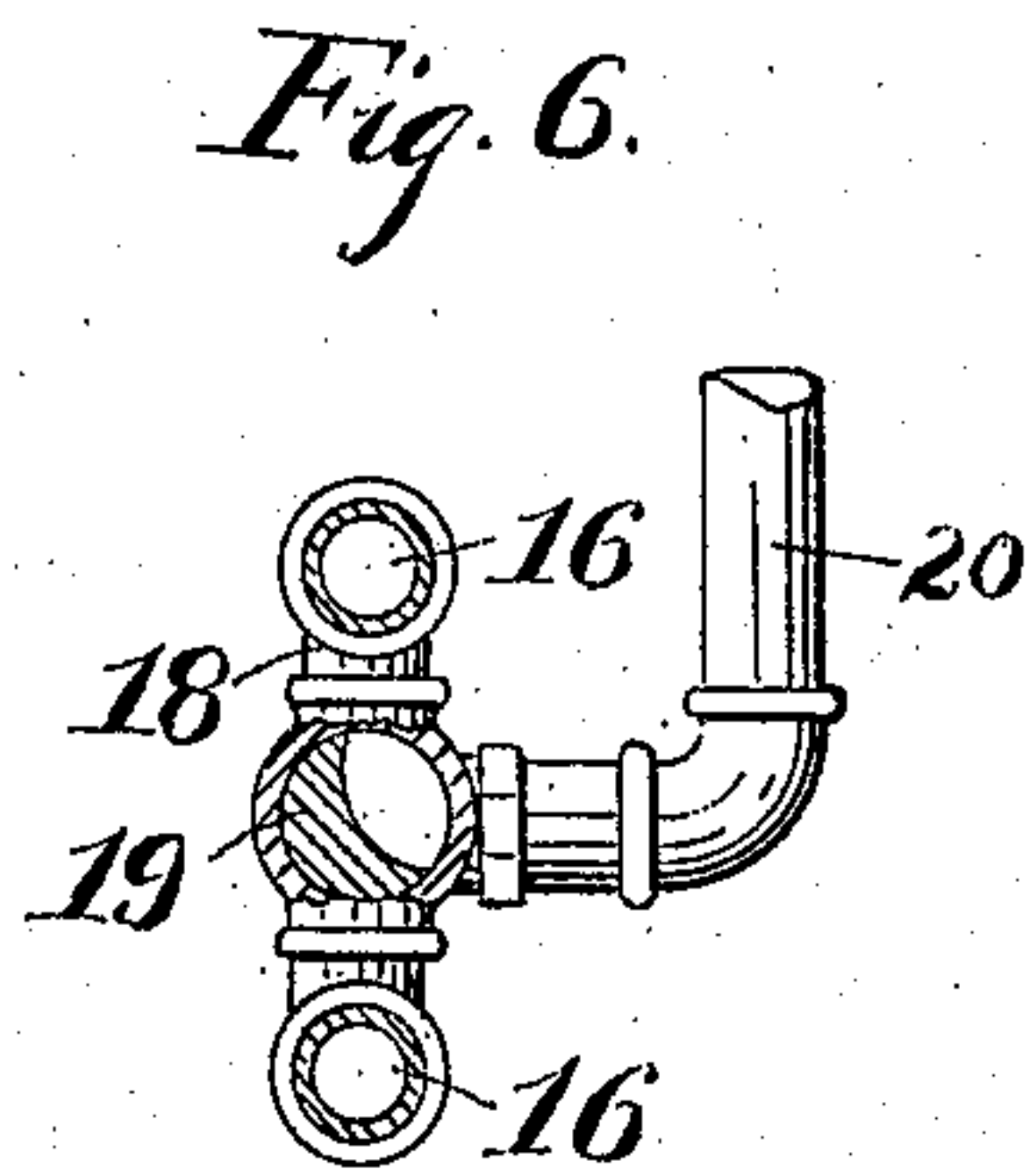
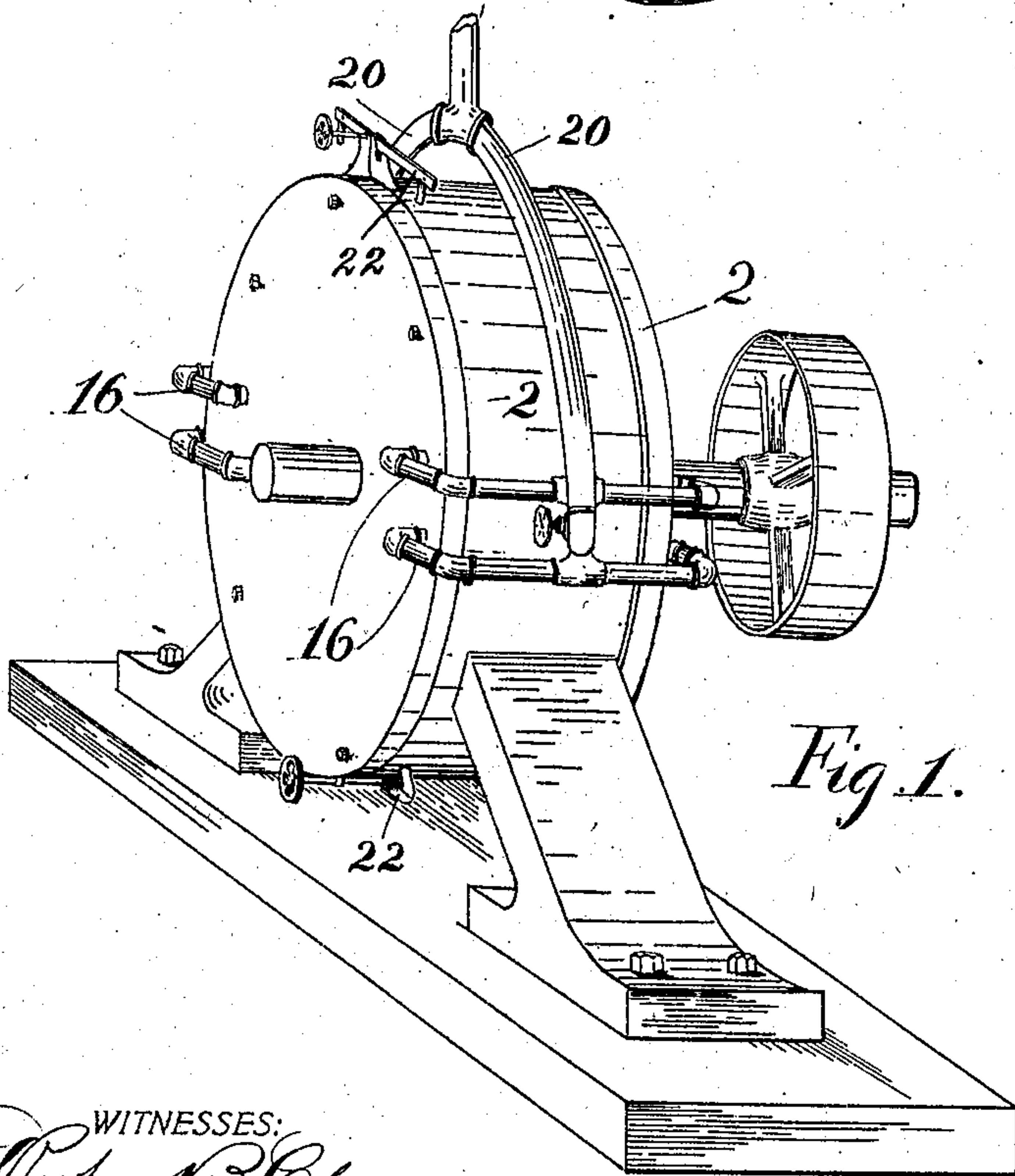
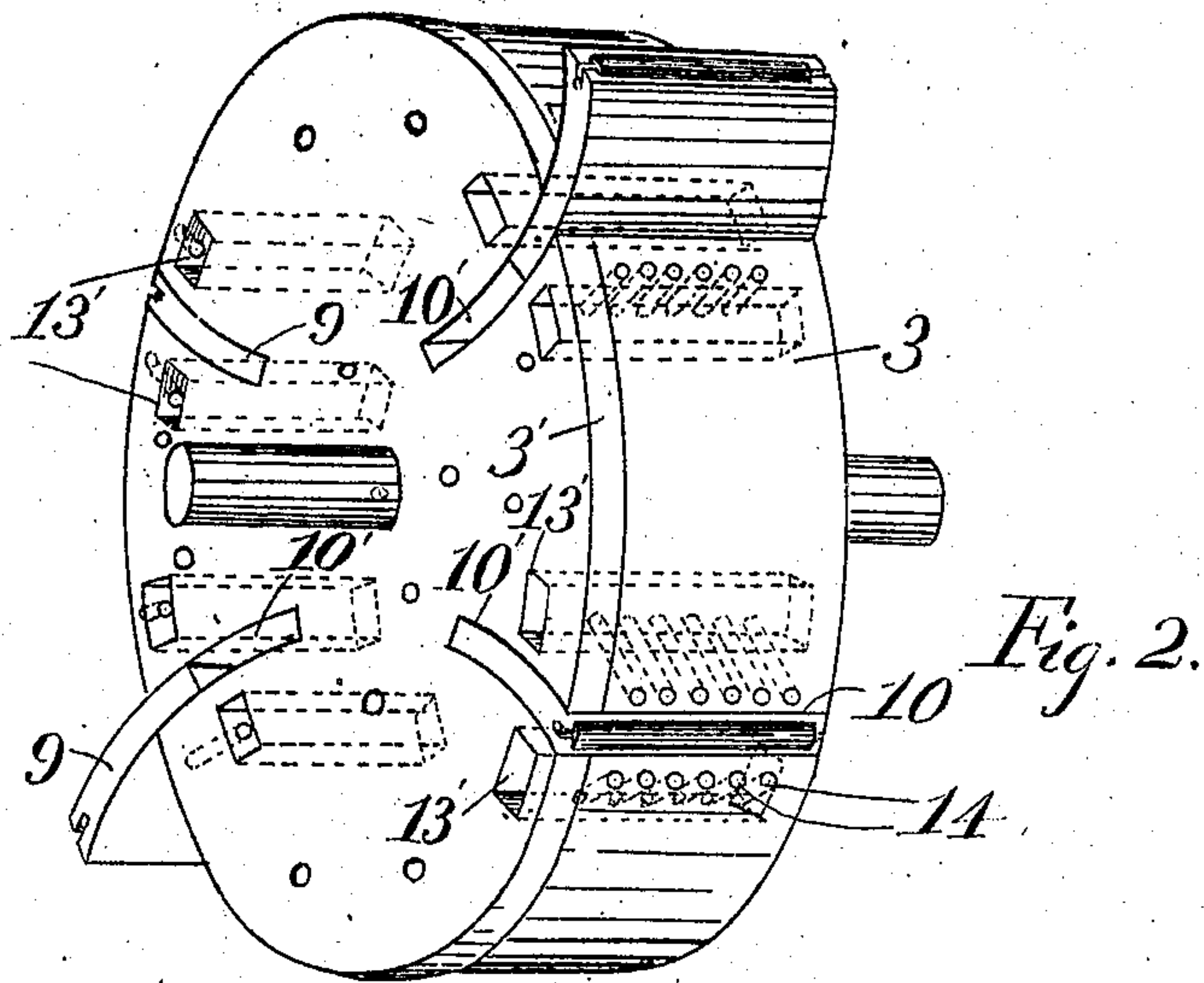


No. 815,482.

PATENTED MAR. 20, 1906.

N. R. SMITH.
ROTARY ENGINE.
APPLICATION FILED MAR. 28, 1905.

2 SHEETS—SHEET 1.



WITNESSES:
 *Rufus B. Clark
 Stephen H. Brooks.*

INVENTOR.
 Norman R. Smith
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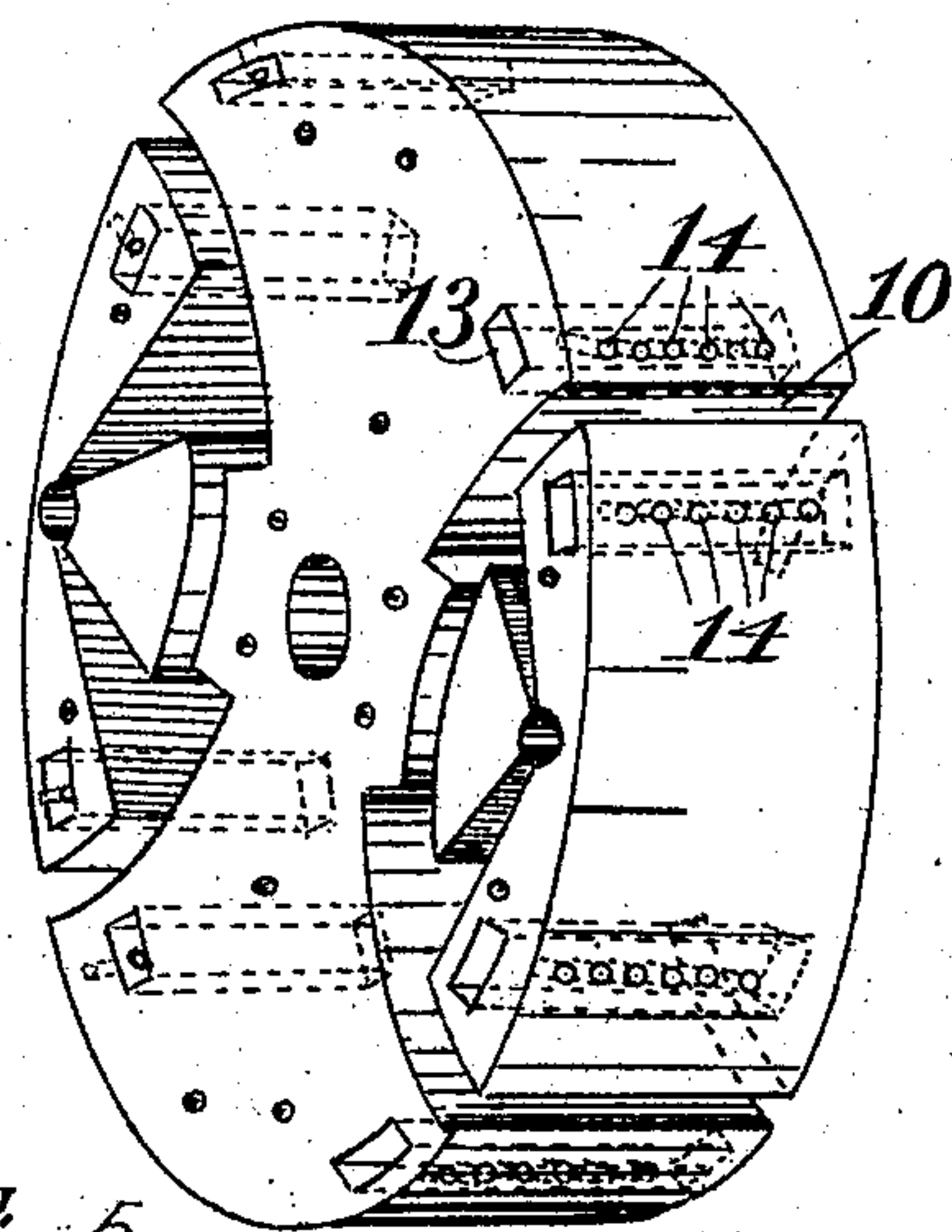
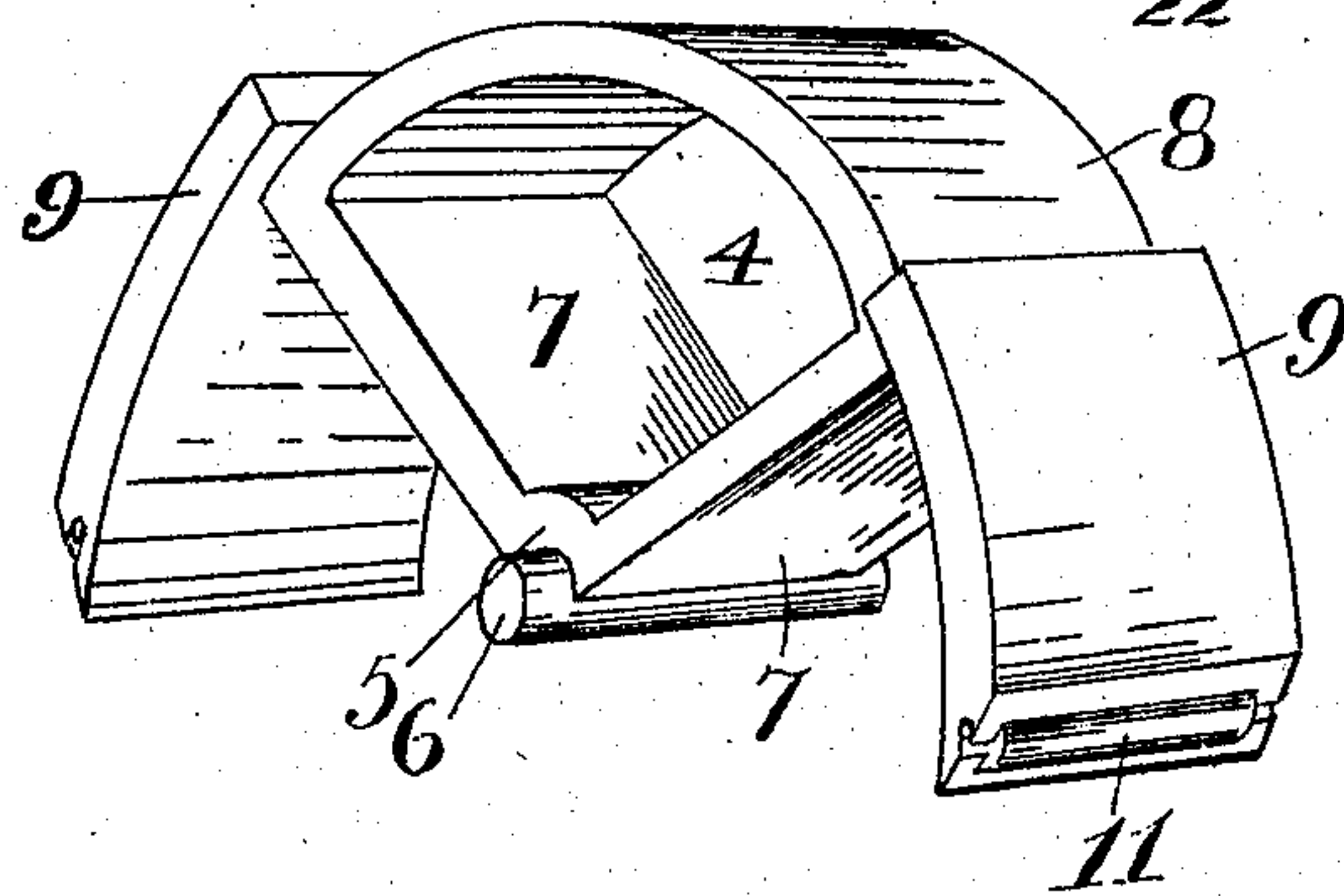
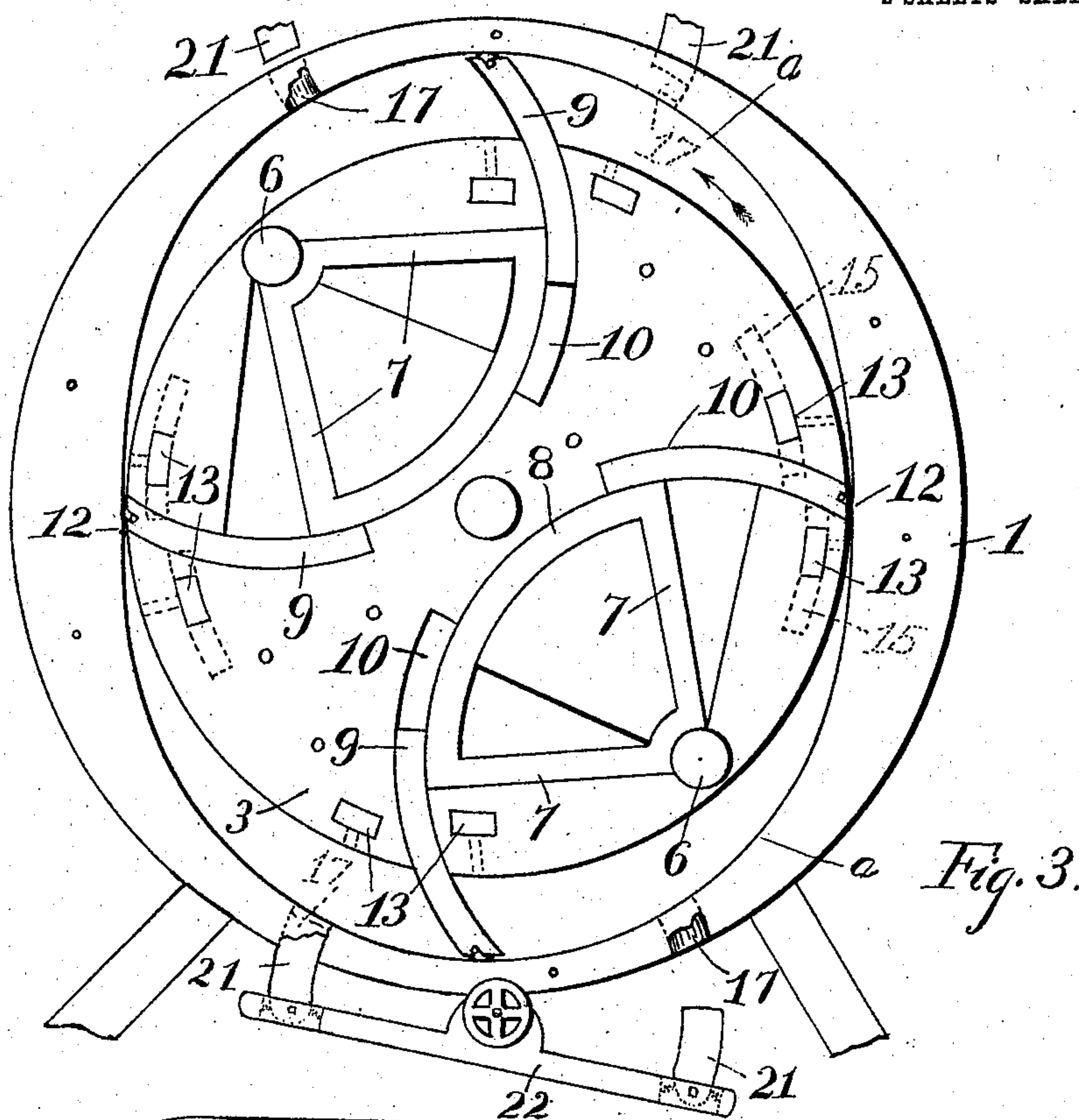
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UNITED STATES PATENT OFFICE.

NORMAN R. SMITH, OF SEATTLE, WASHINGTON, ASSIGNOR TO SEATTLE
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TION OF WASHINGTON.

ROTARY ENGINE.

No. 815,482.

Specification of Letters Patent.

Patented March 20, 1906.

Application filed March 28, 1905. Serial No. 252,584.

To all whom it may concern:

Be it known that I, NORMAN R. SMITH, a citizen of the United States of America, and a resident of the city of Seattle, in the county of King and State of Washington, have invented certain new and useful Improvements in Rotary Engines, of which the following is a specification.

My invention relates to rotary engines; and the primary object thereof is to provide an improved and simplified construction which permits of the steam being economically used.

A further object is to provide improved means whereby the direction of rotation of the piston or carrier can be readily changed; further, novel means whereby one pressure part during its inward movement moves another outward or into action.

With these and other objects in view, made apparent in the following description, the invention consists of the novel construction, arrangement, and combination of parts hereinafter described and those features of construction particularly set forth in the appended claims.

In the accompanying drawings, in which like characters of reference indicate like parts throughout the several views, Figure 1 is a view in perspective of my improved engine. Fig. 2 is a view in perspective of the rotary carrier or piston. Fig. 3 is a side view of the engine with one of the heads thereof removed and the detachable side plate removed from the carrier or piston. Fig. 4 is a detail view in perspective of one of the swing-frames. Fig. 5 is a detail view in perspective of the carrier or piston with the side plate and the swing-frames removed therefrom, and Fig. 6 is a fragmentary view in detail showing the two-way valve arranged to admit steam into ports of ingress at one side of one of the abutments.

In the drawings, 1 indicates the engine-casing, which is provided with removable heads 2, and in this casing I mount a carrier or piston 3. This carrier has mounted therein at diametrically opposite points swing-frames 4, which comprise hubs 5, provided with trunnions 6, and rigidly connected to these hubs are radial arms or webs 7. The inner ends of these arms or webs 7 are rigidly connected to a curved plate 8, which has rigidly affixed to its ends the curved pressure parts

or wings 9. It will be understood that the carrier is formed with suitable cut-out portions extending inward from one side face in which the swing-frames 4 are mounted, and curved ways 10 extend from these cut-out portions. These curved ways 10 are designed to receive the pressure parts or wings 9, and removable plate 3' of the carrier is formed with curved ways 10', adapted to register with ways 10 and receive the adjacent side portions of said pressure parts. (See Fig. 2.) The pressure-plates carry in their outer ends rollers 11, which are in continual engagement with the inner face of the casing 1, which is so shaped as to cause alternate inward and outward movement of the pressure-plates during rotation of the carrier. The bore of the casing has opposite-curved portions *a* arranged eccentrically to the center of rotation of the carrier, and the inner end of these portions *a* curve inwardly toward the carrier in converging planes, thereby forming opposite abutments 12. The carrier is formed on opposite sides of the pressure-plates with steam-channels 13, which extend inwardly from the sides of the carrier, said section 3' also having openings 13', which register with the channels 13 for a purpose made apparent in the following, and from said channels 13 lead small ducts 14, which are adapted to deliver the steam from said channels without the bounds of the carrier and on opposite sides of the pressure-plates.

The opposite heads of the engine-casing are formed with elongated steam-grooves 15 at opposite sides of the abutments 12, and these grooves receive steam from suitable pipes 16. (See Fig. 1.)

In operation assuming that the carrier is being rotated in the direction of the arrow it will be observed that the two projected pressure parts are being acted upon by the steam. When, however, the other two pressure parts or wings of the respective pairs pass abutments 12, steam will be admitted in the rear thereof and will act upon the same before the first-two-named pressure parts pass exhaust-ports 17. The engine is therefore always positively driven by live steam, and consequently made powerful in its action.

In order to prevent the steam-channels 13 on both sides of the pressure parts from taking steam from the same ports of ingress 15.

I arrange those channels on one side of the pressure parts closer to the periphery of the carrier than those on the opposite, and those ingress-ports in the heads of the casing are correspondingly arranged, so that those ports designed to admit steam for driving the carrier in one direction will register only with those steam-channels of the carrier at the proper side of the pressure parts. In reversing the movement of the carrier steam is admitted through the ingress-ports 15 at the opposite side of the abutments 12, which ports will register with the other steam-channels 13 of the carrier, and consequently as the pressure parts pass the abutments steam will be admitted into the casing in the rear thereof.

For the purposes of reversing the engine I mount in pipe 18 a two-way valve 19, through the medium of which steam from steam-pipes 20 can be directed into either the upper or lower pairs of pipes 16, which lead to the ingress ports or grooves 15, arranged at opposite sides of the abutments 12. Further, other exhaust-ports, as 17', are formed in the casing, and either these or exhaust-ports 17 can be closed, this depending upon the direction in which the carrier is rotated, and for the purposes of illustration I have shown two plugs, as 21, mounted on swing-frame 22, alternately closing the respective exhaust-ports. A suitable hand-wheel is connected to each swing-frame, which can be operated by the operator for swinging the frames, as is obvious.

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

1. A rotary engine comprising a casing, a carrier rotatable therein, and pressure parts mounted in said carrier and being rigidly secured to pivoted means, said casing being formed to alternately move said pressure parts into and out of the carrier during rotation of said carrier.

2. A rotary engine comprising a casing, a carrier rotatable therein, spaced apart pressure parts rigidly secured to means pivoted to the carrier and moving in unison alternately into and out of the carrier, said pressure parts having their outer ends continually engaging the inner face of the casing.

3. A rotary engine comprising a casing, a carrier rotatable therein, swing-frames mounted in said carrier, and pressure parts rigidly connected to said frames and having their outer ends continually engaging the inner face of said casing, said casing having its inner face so shaped as to cause said pressure parts to move alternately into and out of the carrier.

4. A rotary engine comprising a casing, a carrier rotatable therein, opposite swing-frames mounted in said carrier, pressure parts secured to the ends of said frames, and

means whereby said pressure parts are moved into and out of the carrier during rotation thereof.

5. A rotary engine comprising a casing, a carrier rotatable therein, a plurality of pairs of pressure parts connected to pivoted means and being slidably mounted in said carrier and having their outer ends engaging the inner face of the casing, said casing having its inner face shaped to cause alternate inward and outward movement of said pressure parts.

6. A rotary engine comprising a casing, a carrier rotatable therein, said carrier being formed with opposite curved ways extending through the periphery of the carrier, pressure parts slidably mounted in said ways, swing-frames mounted in said carrier, each of said swing-frames having two of said pressure parts rigidly connected therewith, and said casing being formed to cause swinging movement of said frames.

7. A rotary engine comprising a casing, a rotatable carrier therein, said carrier being formed with diametrically opposite cut-out portions extending inwardly from one side face of the carrier, a removable plate secured to the last-named side of the carrier, swing-frames mounted in said cut-out portion and being journaled in said carrier and removable plate, pressure parts rigidly connected to said swing-frames at their opposite ends and being continually in engagement with the inner face of said casing, and said casing having its inner face shaped to cause inward and outward movement of said pressure parts during rotation of the carrier.

8. A rotary engine comprising a casing, a carrier rotatable therein, and opposite pairs of pressure parts mounted in said carrier and being rigidly secured to swinging means.

9. A rotary engine comprising a casing, a carrier rotatable therein, a plurality of eccentrically-pivoted pressure parts said pressure parts being connected and swinging in common arcs during movement of the carrier.

10. A rotary engine comprising a casing formed with ingress-ports, a carrier rotatable therein, pressure parts slidably mounted in the carrier, said pressure parts having their outer ends continually engaging the inner face of the casing, and said carrier being formed in its sides and on opposite sides of the pressure parts with steam-channels adapted to register with the ingress-ports of the casing during movement of said carrier, the steam-channels on one side of said pressure parts being closer to the periphery of the carrier than those channels on the opposite side.

11. A rotary engine comprising a casing formed with opposite abutments and having its heads formed with ingress-ports arranged on opposite sides of said abutments, a carrier rotatable in said casing, and pressure parts movably mounted in said carrier, said carrier being formed with channels extending in-

wardly from its opposite sides and adapted for registration with the respective ports of the casing, and having ducts leading therefrom to opposite sides of said pressure parts.

5 12. A rotary engine comprising a casing, a carrier rotatable therein, and opposite pairs of pressure parts mounted in said carrier, each pair of pressure parts connected to means swinging eccentrically to the carrier
10 and having their outer ends continually en-

gaging the inner face of the casing, said inner face of the casing being so shaped as to cause alternate inward and outward movement of the respective pressure parts.

Signed at Seattle, Washington, this 15th 15 day of March, 1905.

NORMAN R. SMITH.

Witnesses:

OTIS W. BRINKER,
WM. B. TYLER.