No. 613,223.

Patented Oct. 25, 1898.

C. W. BOUTILIER.

ROTARY ENGINE.

(Application filed Sept. 4, 1897.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

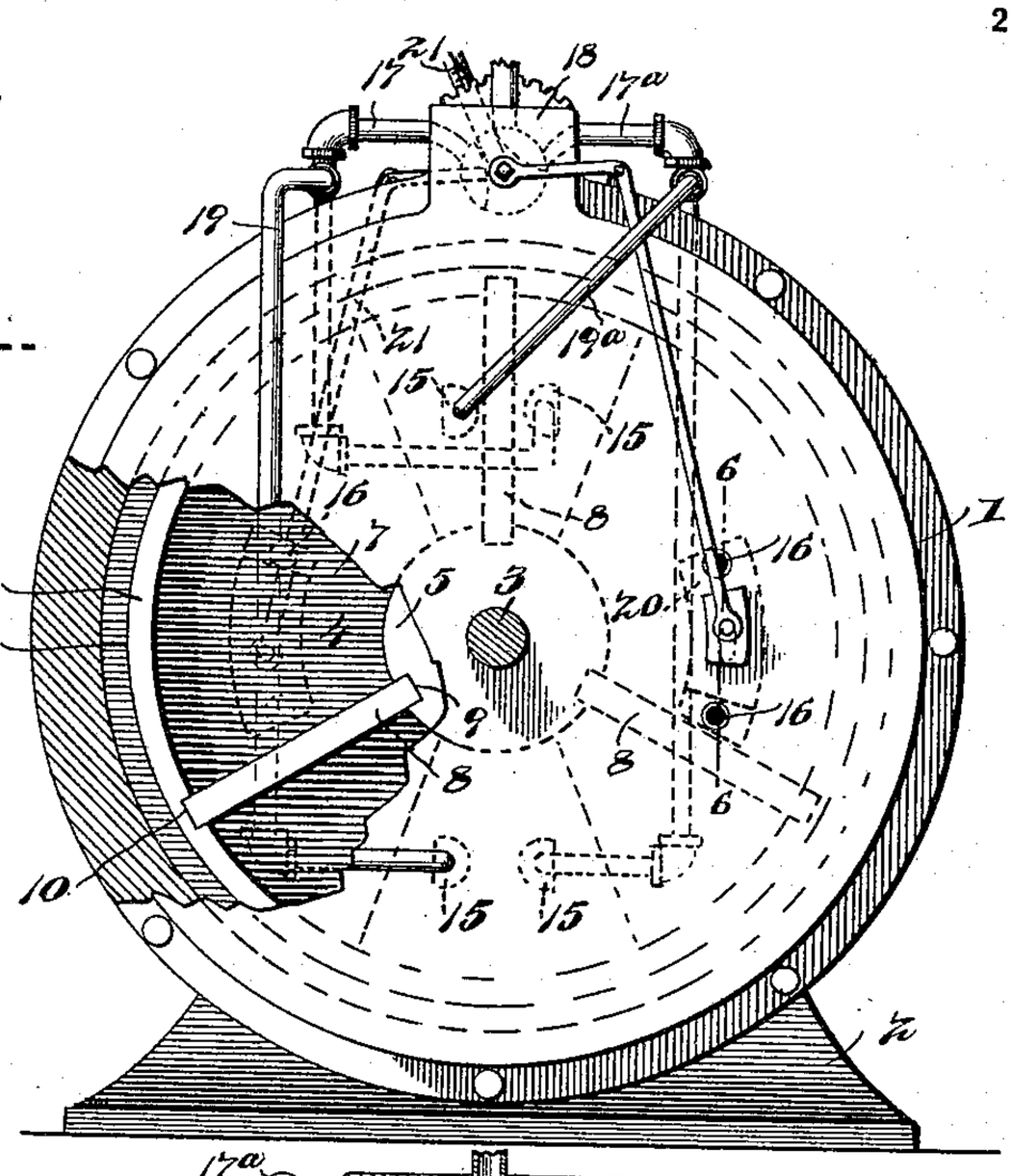
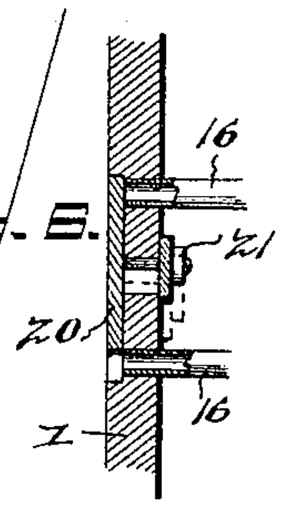


Fig. 2.

Fig. 6.



Witnesses

E. L. Stewart.

C. E. Foulk

Inventor

Charles W. Boutilier

By Wis Attorneys,

C. A. Snow & Co.

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2 Sheets—Sheet 2.

Fig. 5.

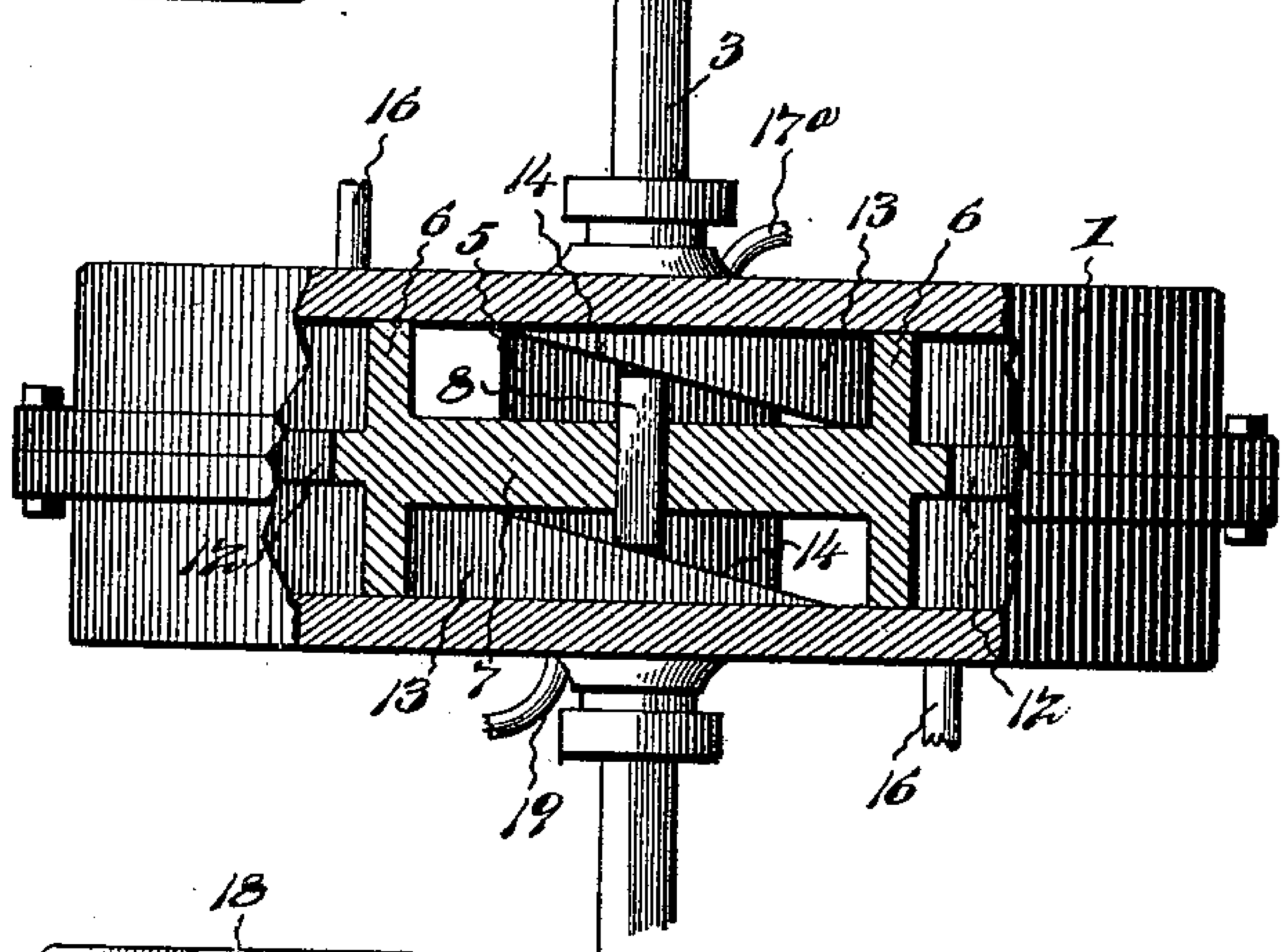


Fig. 4.

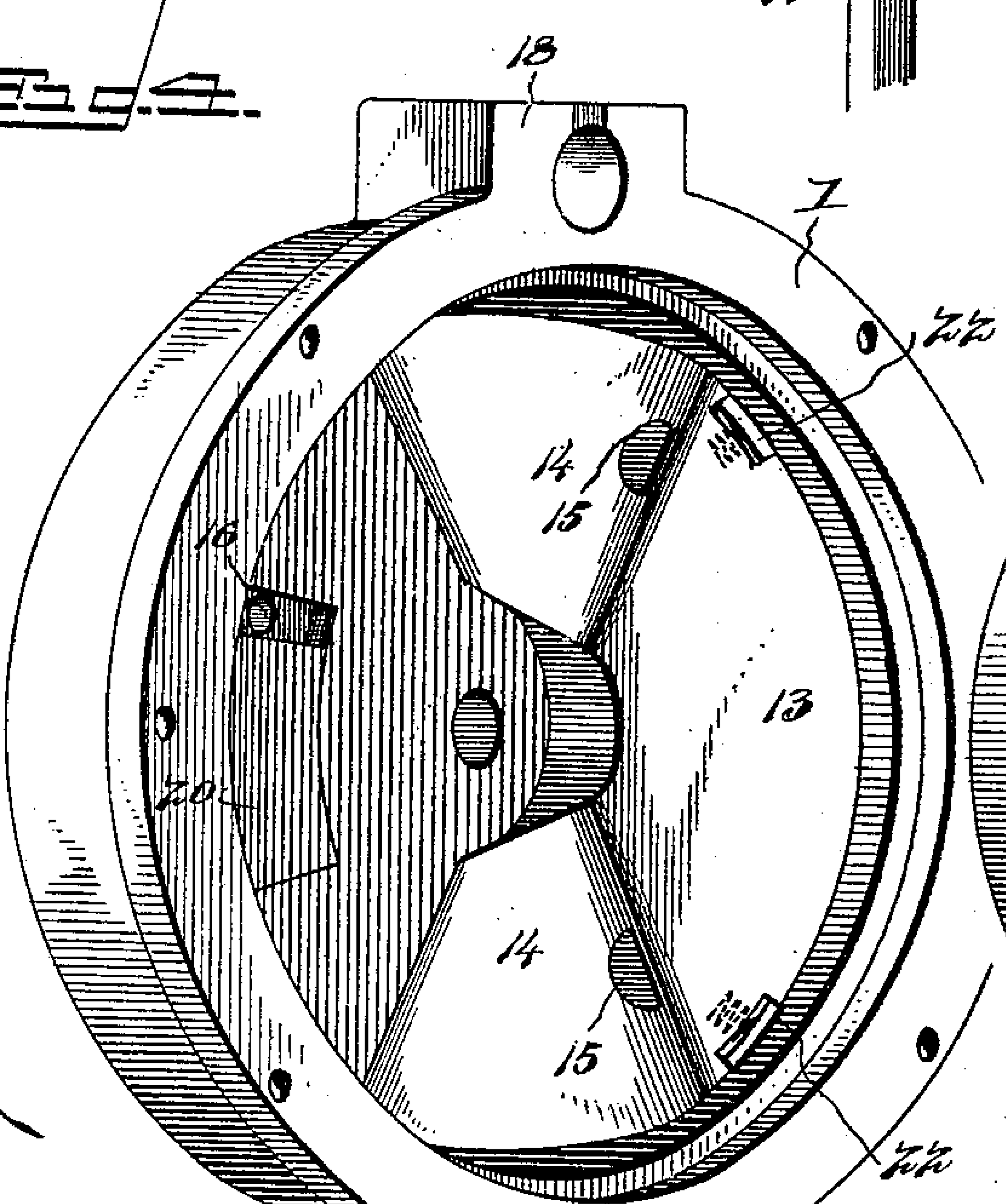
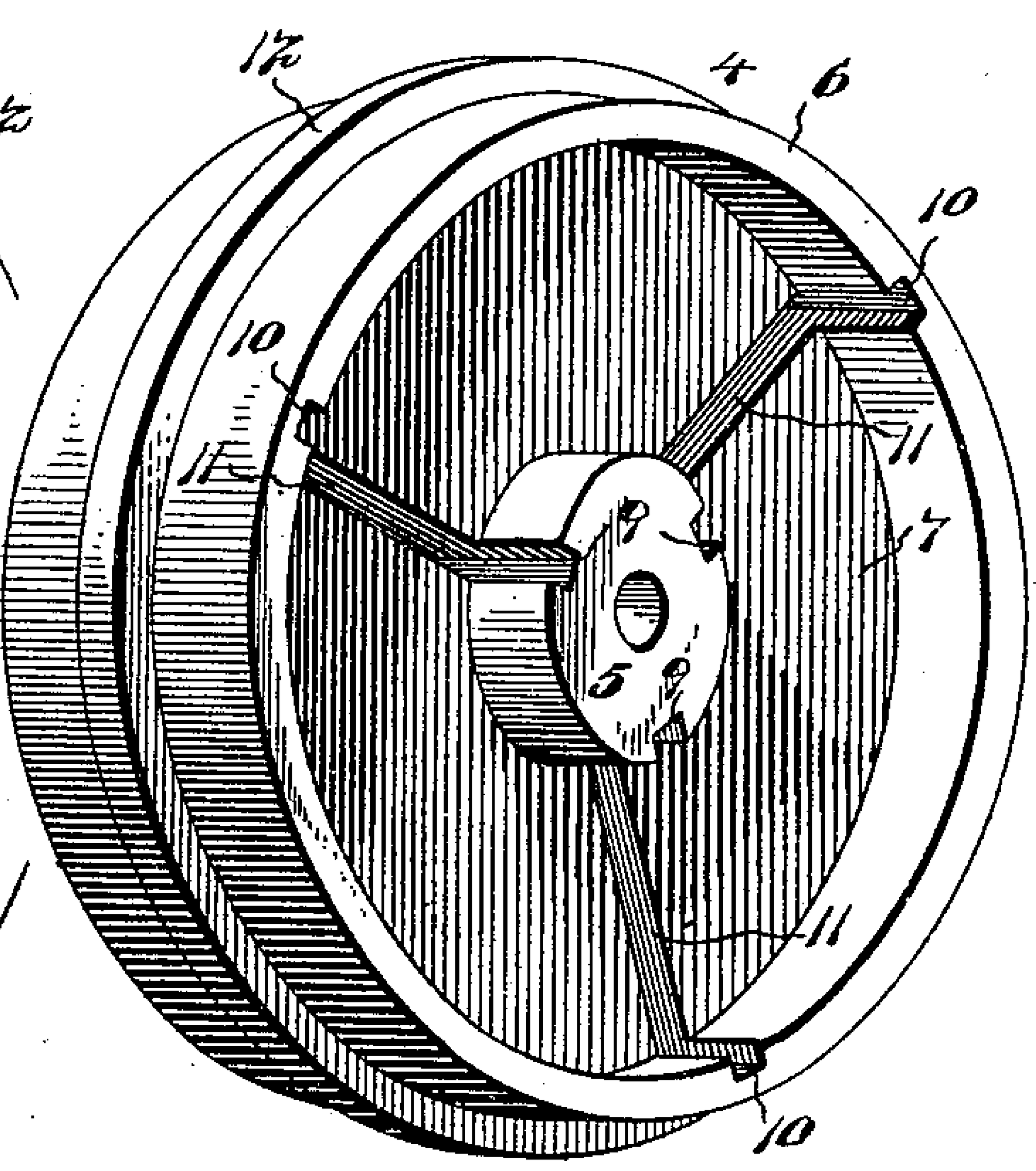


Fig. 3.



Witnesses

[signature]

[signature]

Inventor

Charles W. Boutilier

By his Attorneys,

C. A. Snow & Co.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

CHARLES W. BOUTILIER, OF BRITT, IOWA.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 613,223, dated October 25, 1898.

Application filed September 4, 1897. Serial No. 650,594. (No model.)

To all whom it may concern:

Be it known that I, CHARLES W. BOUTILIER, a citizen of the United States, residing at Britt, in the county of Hancock and State of Iowa, have invented a new and useful Rotary Engine, of which the following is a specification.

My invention relates to rotary engines, and has for its object to provide a simple and efficient construction and arrangement of parts adapted for adjustment with facility to reverse the direction of rotation, and to provide a rotary engine of the sliding cam-actuated abutment type wherein simple and efficient means for packing and for concentrating the pressure of the motive agent upon the moving parts are employed.

Further objects and advantages of this invention will appear in the following description, and the novel features thereof will be particularly pointed out in the appended claims.

In the drawings, Figure 1 is a side view, partly in section, of a rotary engine constructed in accordance with my invention and showing in dotted lines the positions of the several ports and conductors. Fig. 2 is a sectional view taken parallel with and in the plane of the axis of the piston. Fig. 3 is a detail view in perspective of the piston. Fig. 4 is a similar view of one of the cylinder-heads to show the abutment-actuating cam carried thereby. Fig. 5 is a plan view, partly in section. Fig. 6 is a detail sectional view of one of the exhaust-controlling slides and contiguous parts on the line 6 6 of Fig. 1.

Similar numerals of reference indicate corresponding parts in all the figures of the drawings.

The casing 1 of the engine embodying my invention is mounted upon a suitable base 2 and is of sectional construction divided upon a mid-line, the members or sections being connected by suitable bolts engaging contacting flanges, and mounted in suitable bearings in the heads of the cylinder thus formed is the shaft 3 of the rotary piston 4. This piston is provided with a coaxial hub 5 and a concentric rim 6, which is equal in lateral projection to the hub from the plane of the web 7, which forms the body portion of the piston. The peripheral rim and the hub preferably project equally upon opposite sides of the plane of the web to form opposite steam-chambers, in which operate the moving abutments or wings 8. These moving abutments are fitted terminally in alined grooves 9 and 10, formed, respectively, in the hub and rim of the piston, and operate in radial slots 11, registering with said grooves, whereby each abutment is adapted to occupy a position spanning either of the steam chambers or spaces, and hence to receive actuating-pressure upon either side of the plane of the web.

In order to secure the accurate rotary movement of the piston, I preferably provide it with a central peripheral rib 12, fitted in a cross-sectionally-coextensive groove in the inner surface of the casing or cylinder, and thereby interlocking the parts to prevent either endwise displacement or vibratory movement of the piston.

Arranged upon the opposite heads of the cylinder are segmental approximately semicircular enlargements 13, approximately equal in projection with the rim and hub of the piston beyond its intermediate web and of a radial width equal to the interval between the periphery of the hub and the inner surface of said rim. Each of these enlargements is terminally beveled to form cam-faces 14, which also perform the functions of fixed abutments, respectively, according to the direction of rotation of the piston, and hence according to the points at which the motive agent is admitted. The enlargements which terminally form the said fixed abutments are oppositely disposed upon the heads of the cylinder, and as each enlargement is approximately semicircular in length it will be seen that as the piston rotates each moving abutment or wing will be extended alternately beyond opposite sides of the web and piston, remaining in each position approximately throughout one-half of a revolution of the piston. Hence by placing feed-ports 15 in the enlargements, and preferably at the points of greatest projection of said cam-faces or fixed abutments from the heads, and arranging exhaust-ports 16 at intermediate points between the extremities of said enlargements I am enabled to apply motive agent to each

piston wing or abutment throughout one-fourth of a revolution. Furthermore, by employing an uneven number of piston wings or abutments, preferably three, this relative disposition of feed and exhaust ports makes it impossible for the piston to stop at such a point that at least one of said wings shall not be wholly extended and hence wholly exposed to the pressure of motive agent admitted through either of the feed-ports.

Any suitable arrangement of conductors for conveying motive agent to the several feed-ports and from the several exhaust-ports may be employed, provided the diametrically opposite feed-ports are connected to receive motive agent simultaneously, and in the construction illustrated I employ feed-pipes 17 and 17ª for connecting the throttle-valve casing 18, with the upper feed-port in one head and the lower feed-port in the other head, and employ feed-pipes 19 and 19ª for connecting the lower feed-port in the first-named head and the upper feed-port in the second-named head with said throttle-valve casing. The feed-pipes 17 and 17ª communicate with a common feed-port in the throttle-valve casing, whereby steam or other motive agent is communicated simultaneously to the diametrically opposite feed-ports of the cylinder, and hence is applied in the same direction to the piston wings or abutments at opposite sides of the web of the piston.

Any suitable system of exhaust-valve mechanism may be employed, that which I have illustrated consisting of segmental slides 20, seated in the inner surfaces of the cylinder-heads and arranged terminally contiguous to the exhaust-ports, and I prefer to connect said slides with the throttle-valve or reversing-lever 21, by which the direction of application of motive agent is controlled. In order to prevent back pressure of the motive agent, I preferably arrange packing-strips 22 on the outer edges of the enlargements contiguous to the beveled faces thereof, said strips being spring-actuated to bear against the inner surfaces of the projecting portions of the piston-rim.

From the above description it will be seen that each piston wing or moving abutment is devoid of springs or other actuating devices dependent upon tension, each being positively reversed in position by fixed cam-faces and each cam-face being radially equal in length with the wings or abutments.

Packing devices have been shown at various points, as in the ordinary practice, to prevent escape and loss of pressure; but it is obvious that other equivalent means may be substituted therefor and that various other changes in the form, proportion, and the minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of this invention.

Having described my invention, what I claim is—

1. A rotary engine having a casing comprising oppositely-positioned sections or heads having inwardly-extending connected flanges forming a cylindrical wall, a rotary piston having a hub and a peripheral rim connected by a web, from the plane of which said hub and rim project in opposite directions, the rim being in contact with the inner surface of the cylindrical wall of the casing, the web being provided with a plurality of radial slots, and the facing surfaces of the hub and rim with guide-grooves registering respectively with said slots at their opposite ends, approximately semicircular enlargements projecting inwardly from the casing sections or heads between the hub and flange of the piston, and arranged alternately with relation to the path of the piston, and wings fitted to slide in said radial grooves of the piston, with their outer and inner edges in the grooves, respectively, of the rim and hub, and hence in contact with the casing only at their opposite side edges, substantially as specified.

2. A rotary engine having a casing comprising oppositely-positioned sections or heads provided with inwardly-extending connected flanges having registering rabbets to form an annular groove, a rotary piston having a hub, a rim parallel with the hub having contact with the inner surfaces of the flanges of the casing-heads, an exterior rib 12 fitting in said annular groove, a web 7 connecting the hub and rim and arranged between the side edges thereof, and in the plane of said rib 12, the web being provided with a plurality of radial slots, and the facing surfaces of the hub and rim with grooves registering with said slots respectively at the inner and outer ends thereof, and wings fitted to slide laterally in said radial slots and arranged at their outer and inner edges in the grooves, respectively, of the rim and hub, approximately semicircular, terminally cam-faced enlargements, projecting inwardly from the heads of the casing between the facing surfaces of said rim and hub of the piston, and arranged alternately with relation to the path of the piston-wings, and valve mechanism for controlling the admission and exhaust of motive agent, substantially as specified.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

CHARLES W. BOUTILIER.

Witnesses:
WESLEY ALDRIDGE,
WILLIAM E. BRADFORD.