985,669.

D. N. GREEN.

ROTARY ENGINE.

APPLICATION FILED AUG. 28, 1909.

Patented Feb. 28, 1911.

2 SHEETS—SHEET 1.

Fig. 1.

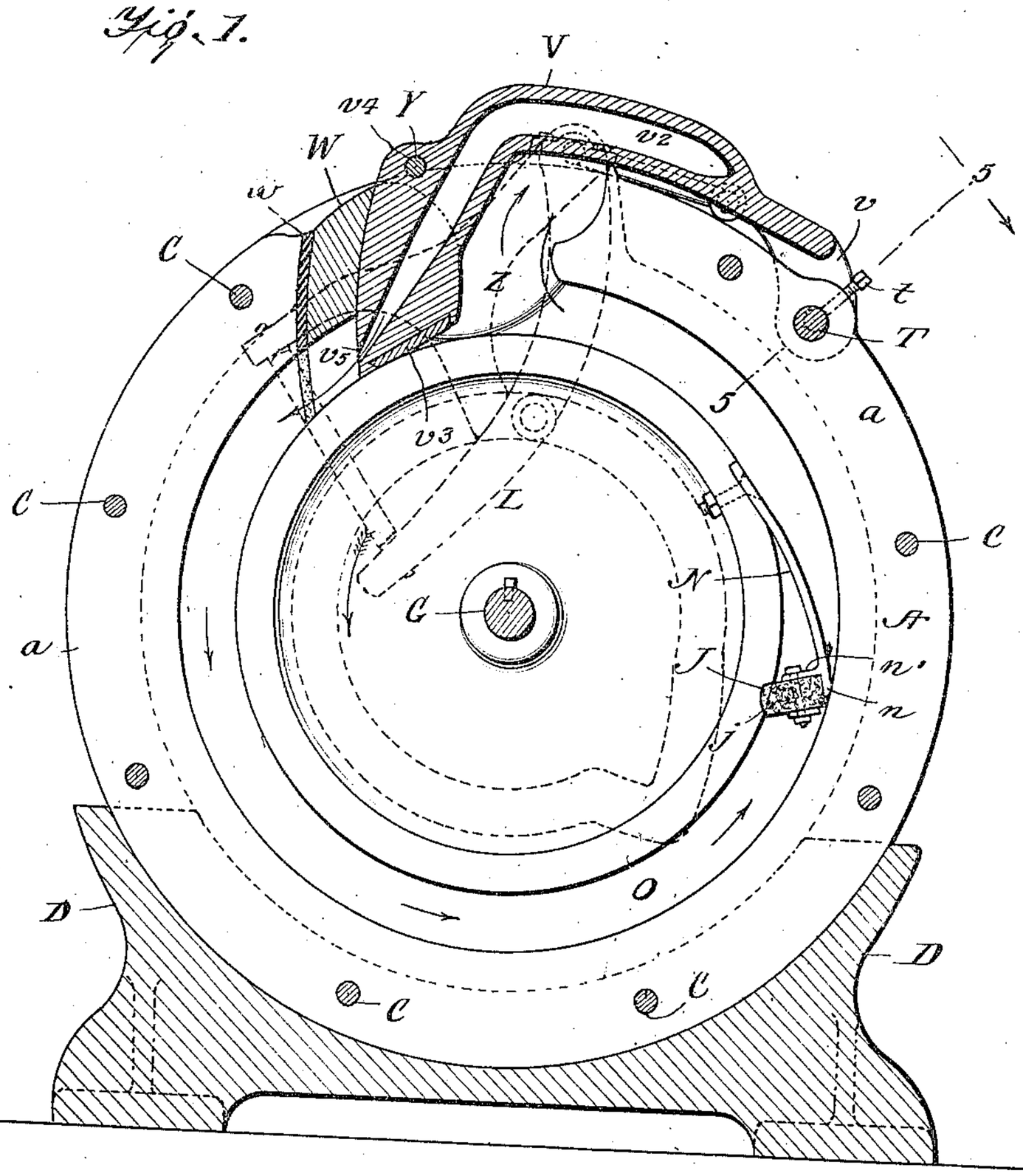


Fig. 5.

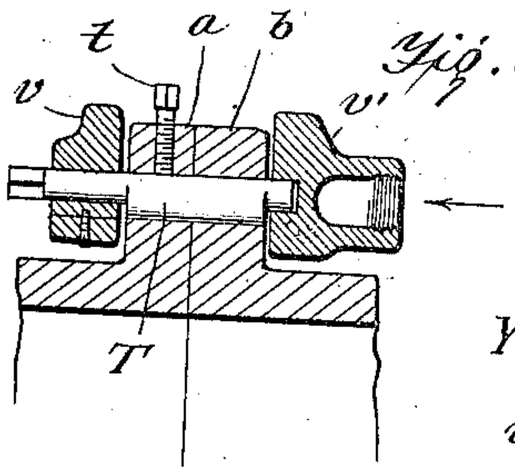
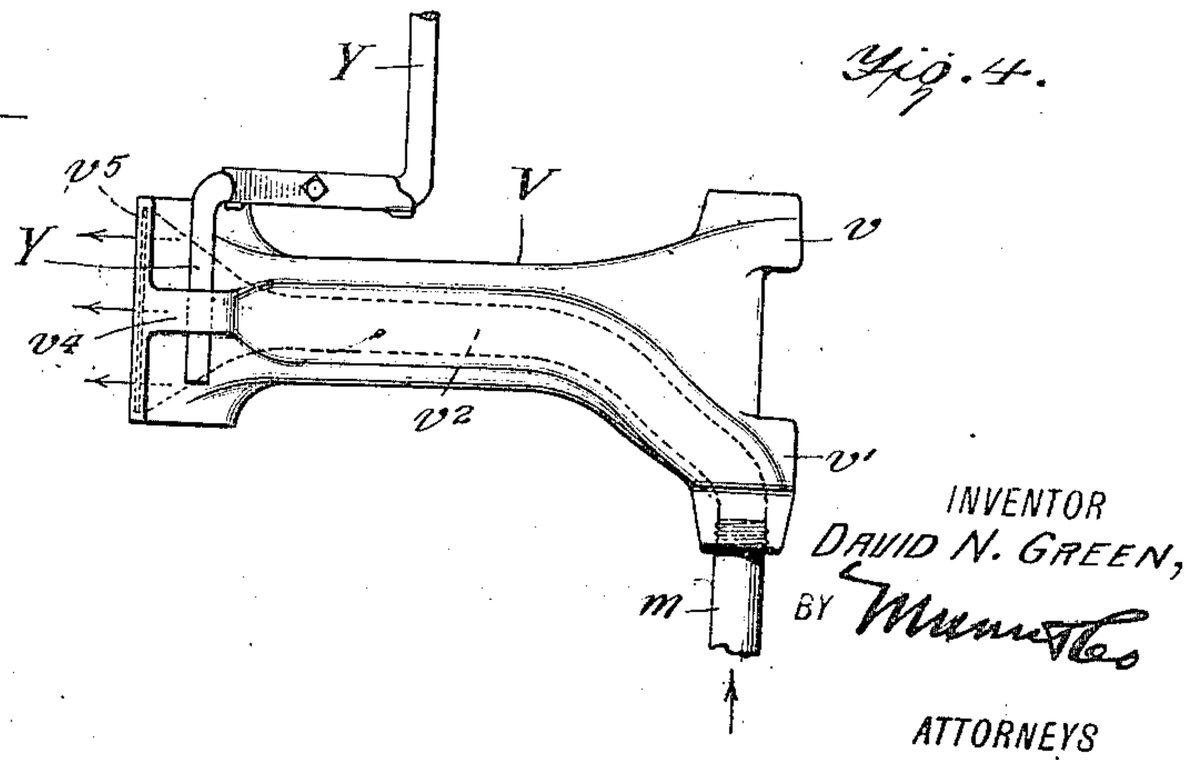


Fig. 4.



WITNESSES

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2 SHEETS—SHEET 2.

Fig. 2.

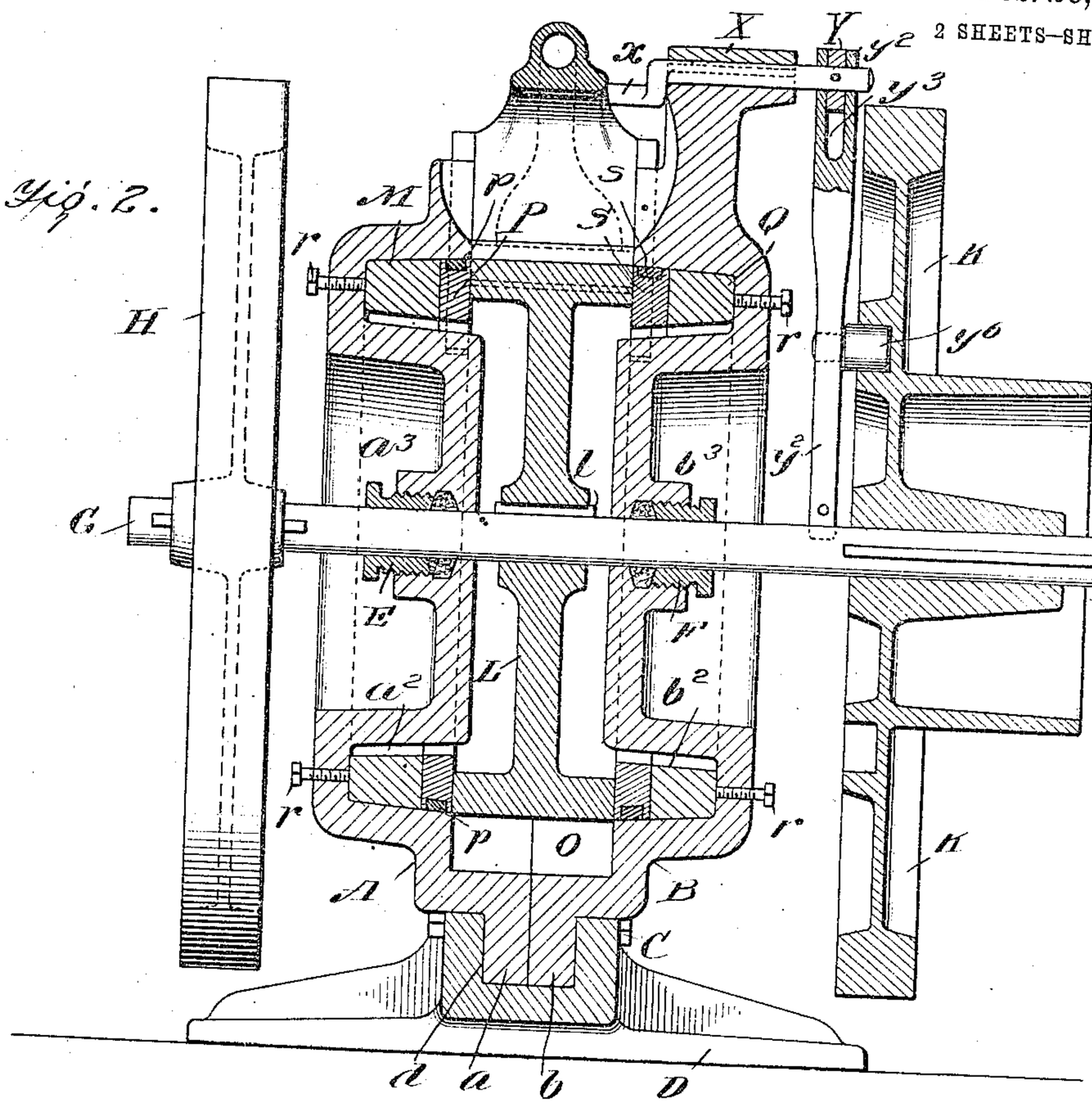


Fig. 6.

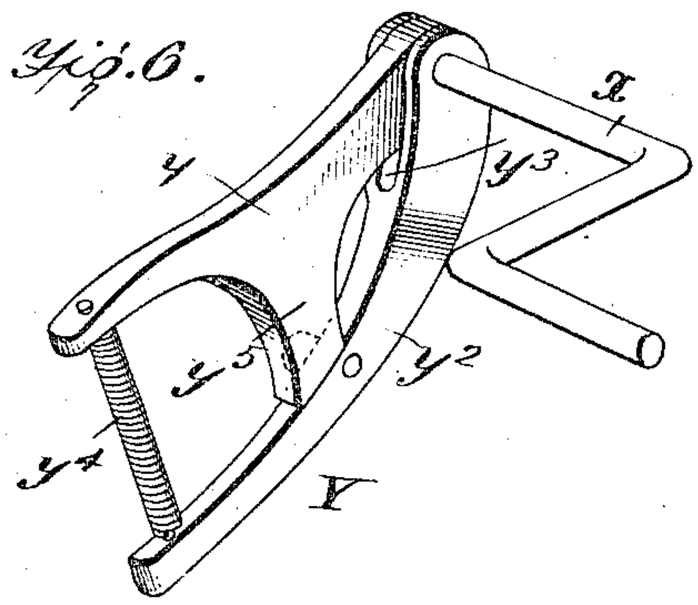
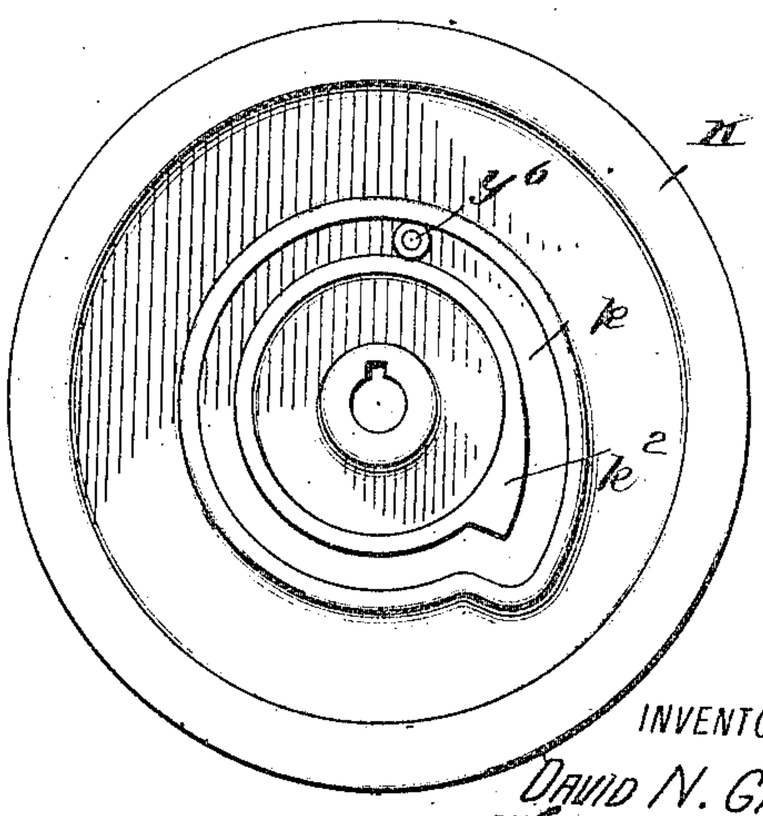


Fig. 3.



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ROTARY ENGINE.

985,669. Specification of Letters Patent. Patented Feb. 28, 1911.

Application filed August 28, 1909. Serial No. 515,043.

To all whom it may concern:

Be it known that I, DAVID NEWTON GREEN, a citizen of the United States, and a resident of Sunbury, in the county of Delaware and State of Ohio, have invented certain new and useful Improvements in Rotary Engines, of which the following is a specification.

My invention relates to improvements in engines, more particularly those engines which are known as rotary engines, and it consists in the combinations, constructions and arrangements herein described and claimed.

An object of my invention is to provide a device with novel means for delivering the propelling fluid, which may be steam, compressed-air, water or any other suitable medium.

A further object of my invention is to provide a novel form of means for raising and lowering the abutment valve in order that the rotating power wheel with its shoe may pass underneath it.

Other objects and advantages will appear in the following specification and the novel features of the device will be particularly pointed out in the appended claims.

My invention is illustrated in the accompanying drawings in which—

Figure 1 is a central vertical section through the device, the power wheel being shown in side elevation; Fig. 2 is a central vertical section at right angles to Fig. 1; Fig. 3 is a side view of one of the fly wheels, the shaft, and engaging cam member; Fig. 4 is a plan view of the oscillating abutment valve; Fig. 5 is a section along the line 5—5 of Fig. 1, and Fig. 6 is a detail view of the spring arm for actuating the abutment valve.

Referring now more particularly to Fig. 2, it will be seen that the main frame of the engine is composed of two opposed parts A and B of a substantially cylindrical shape. These parts are provided with the peripheral flanges *a* and *b* which are placed in contact and are secured together by means of bolts or screws C, see Fig. 1. Each of the parts A and B has an annular recess a^2 and b^2 respectively and a central recess a^3 and b^3 extending inwardly from the exterior as clearly shown in Fig. 2. The frame or casing formed of the two opposed members A and B is supported upon an arc-shaped base D which is provided with a central groove *d* arranged to receive the contacting flanges *a* and *b* of the lower part of the casing in which the flanges are secured by means of the bolts C. The central portions of the members A and B are provided with packing glands E and F respectively. A central shaft G bears on one end a fly wheel H and on the other end another fly wheel K, while at the center of the shaft is located the main power wheel L which is firmly secured to the shaft by means of the key *l*.

Referring now to the member A, it will be seen that the annular channel a^2 is provided with two rings M and P, the latter being provided with a packing *p*. The member B is provided with a similar set of rings Q and S, the latter having the packing ring *s*. The power wheel L is in close contact with the rings P and S on either side thereof. The rings are adjustable in a lateral direction by means of the adjusting screws *r* which bear on the outer rings M and Q as shown in Fig. 2.

The oscillating abutment valve is illustrated in Figs. 1, 4 and 5. It consists of an L-shaped member V having at its rear end two projections *v* and *v'* arranged to straddle the flanges *a* and *b* of the members A and B as clearly shown in Fig. 5. The extension *v'* is threaded to receive the end of a pipe *m* through which the motive fluid is conveyed. A pivot pin T passes through the flanges *a* and *b* and is securely held by means of the set screw *t*. One end of this pivot pin forms a bearing for the extension *v* while the other end forms a bearing for the extension *v'* as shown in Fig. 5. A channel v^2 leads from the pipe *m*, see Figs. 4 and 1, down to the lower end of the valve V. The lower end of the valve V forms the abutment against which the steam or other motive fluid presses in forcing the wheel or rotary piston L around. On the bottom of the abutment valve is a wear-resisting shoe v^3 which may be replaced when worn and which is designed to protect the valve itself. The oscillating abutment valve is arranged to project into an opening in the top of the casing A and B so as to deliver the motive fluid to the inner chamber O. The free end of the oscillating valve V is arranged to swing down into contact with a bearing plate W which is provided with a

resilient backing *w*. From an inspection of Fig. 5 it will be seen that the pivot pin T may be turned so as to bring the abutting edge of the valve V nearer or farther away from the bearing plate W in order to take up any wear.

The power wheel or rotating piston L is provided with a shoe J which is preferably of resilient material and is arranged to be clamped to a spring member N secured to the periphery of the wheel L. The end of the spring member is provided with a portion *n* adapted to bear against the shell A and B while an inwardly projecting arm *n'* serves for the purpose of attaching the shoe J. The latter is adapted to project into a recess *j* in the periphery of the wheel.

The means for raising the oscillating valve is shown in Figs. 2 and 4. It consists of a crank *x* of the shape shown in these figures which is pivotally mounted on an extension X of the member B. One end of the crank projects through the portion v^4 of the valve V while the other end is secured to an arm *y* of a two-part cam Y. The other portion y^2 of the cam member is provided with a slot y^3 into which one end of the arm *y* projects, the end of the crank *x* being disposed in the alined openings in the members Y and y^2. As stated before the member *y* is securely fastened to the member *x* but the member y^2 is loosely connected with the crank thereby permitting the movement of the latter with respect to the arm. The two arms *y* and y^2 are connected by means of a spring y^4, the laterally extending portion y^5 of the arm *y* being held in normal engagement with the member y^2 as clearly shown in Fig. 6. The member y^2 is provided with a cam roller y^6 which is disposed in a groove *k* in the side of the fly wheel K. This groove is of a shape shown in Fig. 3 and has on its inner edge a cam surface k^2 over which the roller y^6 rides thereby causing the lifting of the latter and consequently the cam Y. The shifting of the cam Y causes the rotation of the crank *x* and consequently a swinging of the oscillating valve about its pivots T thus raising the abutment valve whenever the cam roller y^6 rides over the cam surface k^2.

From the foregoing description of the various parts of the device the operation thereof may be readily understood. The steam, compressed-air or other fluid motive power is supplied through the pipe *m* and is carried down through the channel v^2 and out at the opening v^5. The fluid fills the space O and presses on the shoe J thereby driving the wheel around in the direction indicated by the arrows. The exhaust gases are driven by the shoe up through the opening Z underneath the oscillating valve and out at the sides as shown in Figs. 1 and 2. The groove *k* in the wheel K is so arranged that the cam roller y^6 is actuated just before the shoe J is about to engage the valve V thereby raising the valve and thus doing away with the loss of energy which would result from the impact of the shoe against the valve. As soon as the shoe has passed, the cam roller falls back into its normal position nearer the center of the shaft thereby allowing the valve to drop back into position. In the position shown in Fig. 1 the valve serves as an abutment against which the pressure of the motive fluid is exerted.

It should be observed that the rings P and S contact closely with the sides of the driving or power wheel L. These rings as stated before are made adjustable so as to bring them into close contact with the wheel if desired.

It will be observed that when the cam arm has brought the abutment valve down in contact with the power wheel the upper member *y* stops, while the lower part, owing to the shape of the groove *k* goes lower, thereby putting a tension on the spring. This insures a good contact between the abutment valve and the power wheel. Now, when the cam roller raises the member y^2, the latter engages the lateral portion y^5 of the upper member *y* thereby raising the latter and the abutment valve.

I claim:

1. In a rotary engine, a casing comprising two hollow members secured together at their outer edges and provided with interior annular channels, bearing rings secured in said channels, a power wheel mounted within said casing and arranged to contact with certain of said rings, an abutment valve provided with a pair of extensions arranged to straddle the upper edges of the casing members, a pivot pin carried by the casing and arranged to extend into said extensions, one of said extensions being hollow to deliver motive fluid to said abutment valve, and means for adjusting the position of the bearing rings with respect to the power wheel.

2. In a rotary engine, a fly wheel provided with a groove, a pivoted abutment valve provided with an interior channel for delivering motive fluid, a crank connected with said abutment valve on one end and bearing a two-part cam member at the other, a spring for holding the parts of the cam in normal engagement with each other, and a cam roller carried by one of said parts and arranged to travel in the groove in said fly wheel.

3. In a rotary engine, a casing comprising two hollow members secured together at their outer edges, a power wheel mounted within said casing, an abutment valve provided with a pair of extensions arranged to straddle the upper edges of the casing members, a pivot pin carried by said casing,

said pivot pin having reduced cylindrical end portions eccentric of the main portion, arranged to pivotally engage the extensions of the abutment valve, and means for securing the pivot pin in adjusted positions.

4. In a rotary engine, a casing comprising two hollow members secured together at their outer edges, a power wheel mounted within said casing, a hollow abutment valve provided with a pair of extensions arranged to straddle the upper edges of the casing members, one of said extensions having a channel for the delivery of motive fluid into the interior of said hollow abutment valve, a pivot pin carried by said casing and having reduced cylindrical ends eccentric of the main portion of the pin, arranged to pivotally engage said extensions, a set-screw carried by said casing and adapted to retain the pivot pin in its shifted positions and a removable bearing plate arranged to be engaged by said abutment valve.

5. In a rotary engine, a casing provided with an opening, an abutment valve carried by said casing having a passage for the purpose of delivering motive fluid to the interior of the casing, one end of said abutment valve having a pair of extensions, and a pivot pin secured to said casing and having its ends passing into each of said extensions for pivoting the valve, one of said extensions having a lateral passage in line with said pivot pin and communicating with the fluid delivering passage in the interior of the valve.

DAVID NEWTON GREEN.

Witnesses:
FRED KEMPTON,
ELMER PROSSER.