

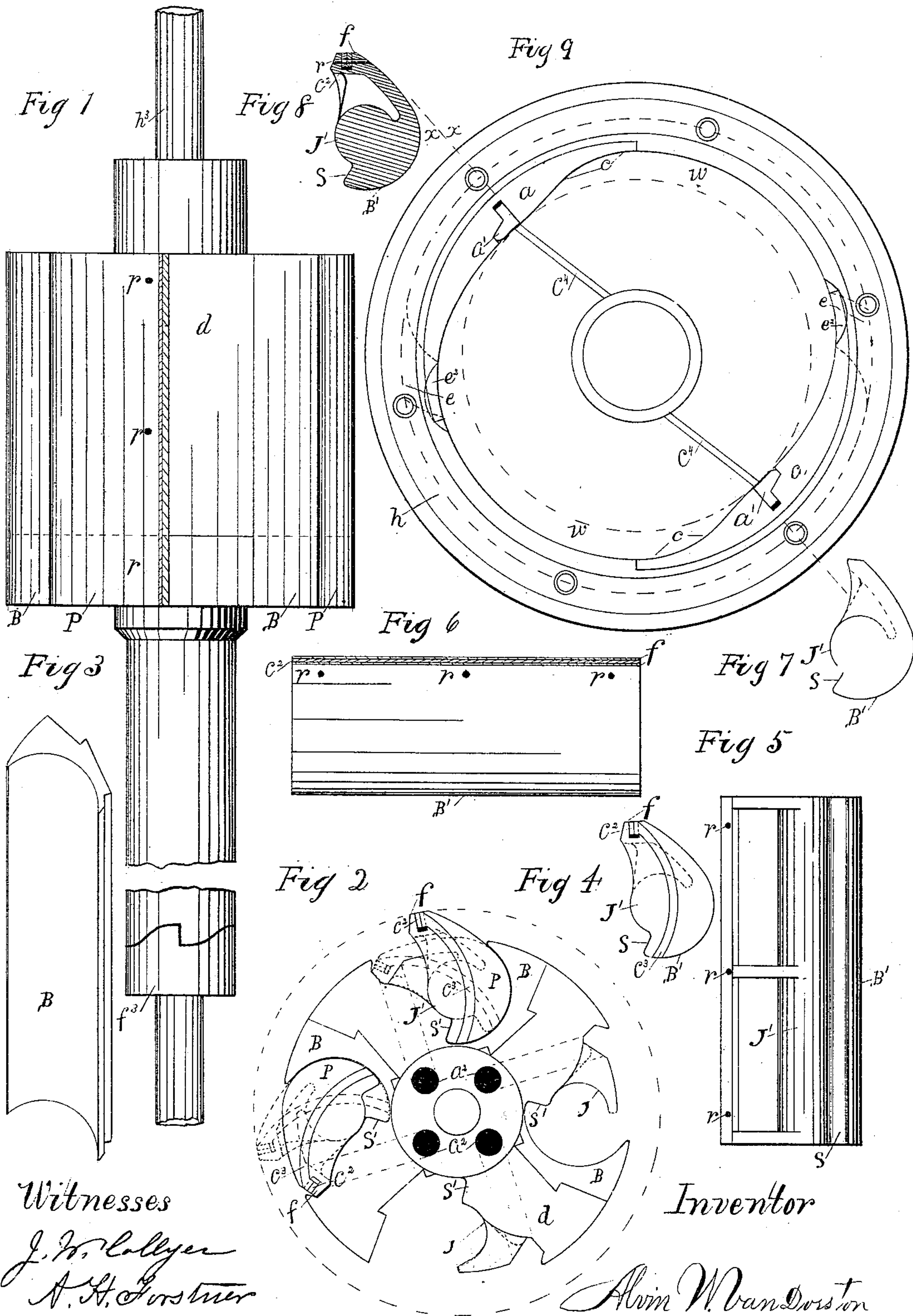
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3 Sheets—Sheet 1.

A. W. VAN DORSTON.
ROTARY ENGINE.

No. 332,765.

Patented Dec. 22, 1885.



Witnesses
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A. H. Forster

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(No Model.)

3 Sheets—Sheet 2.

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Fig 10.

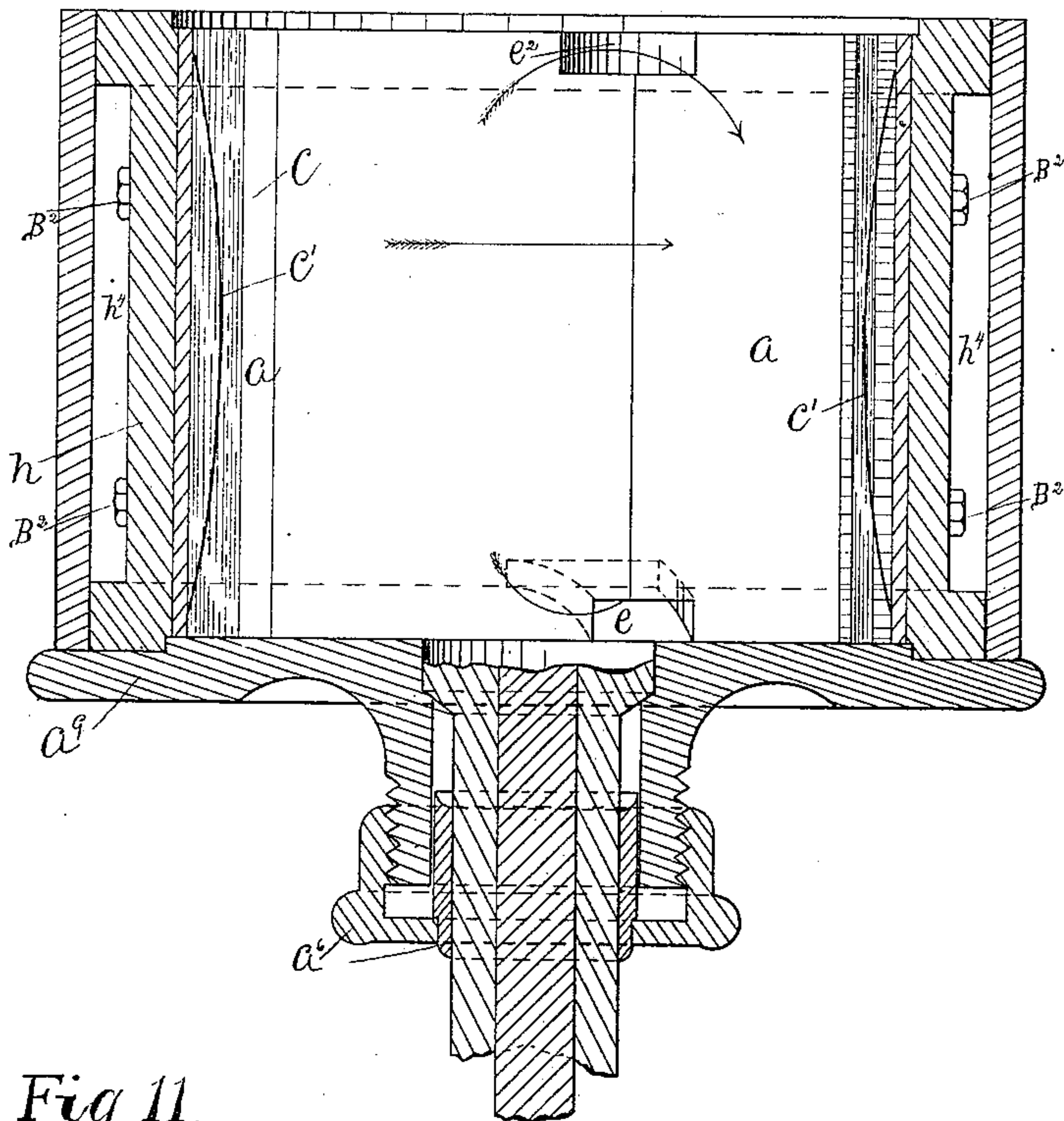
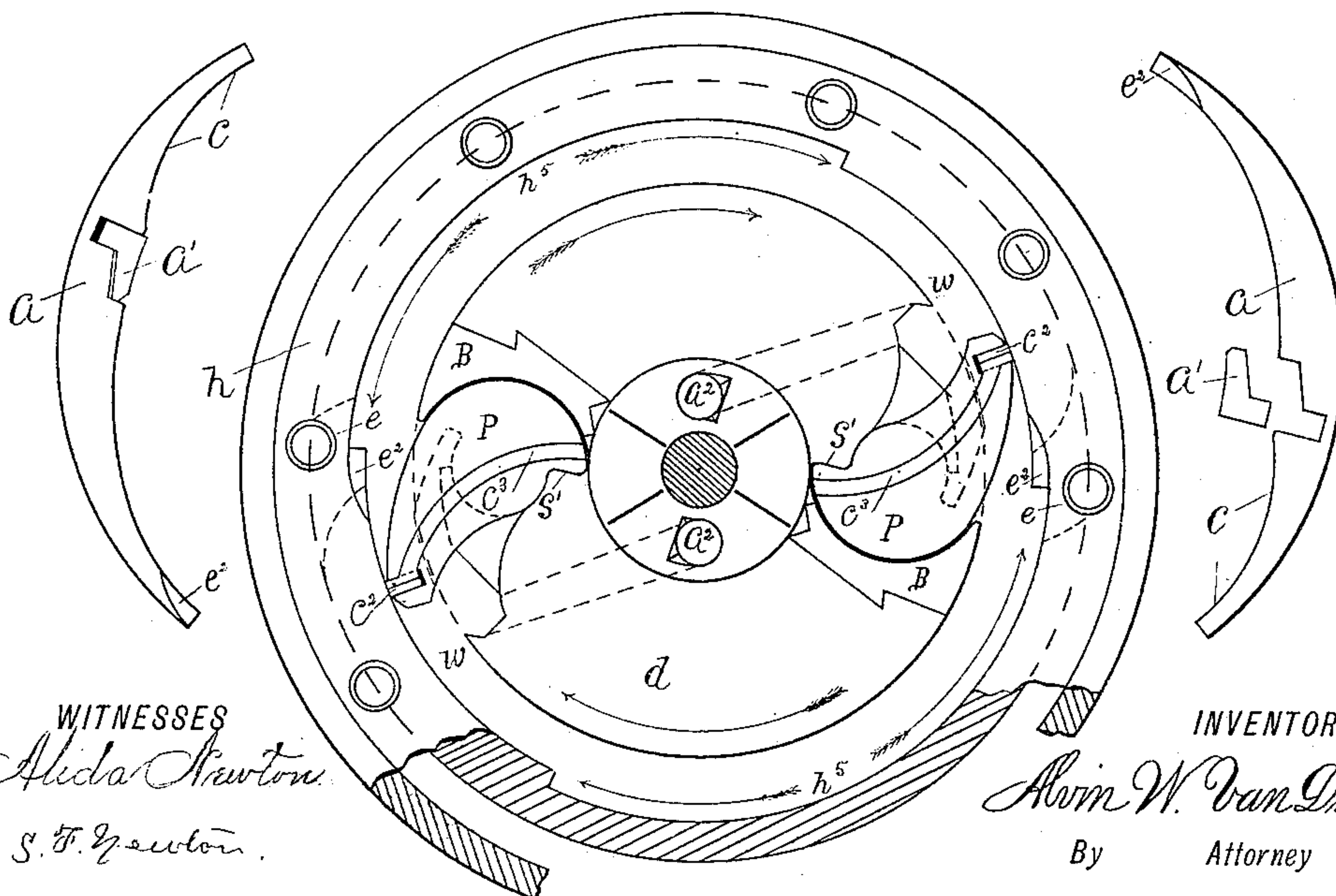


Fig 11.



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(No Model.)

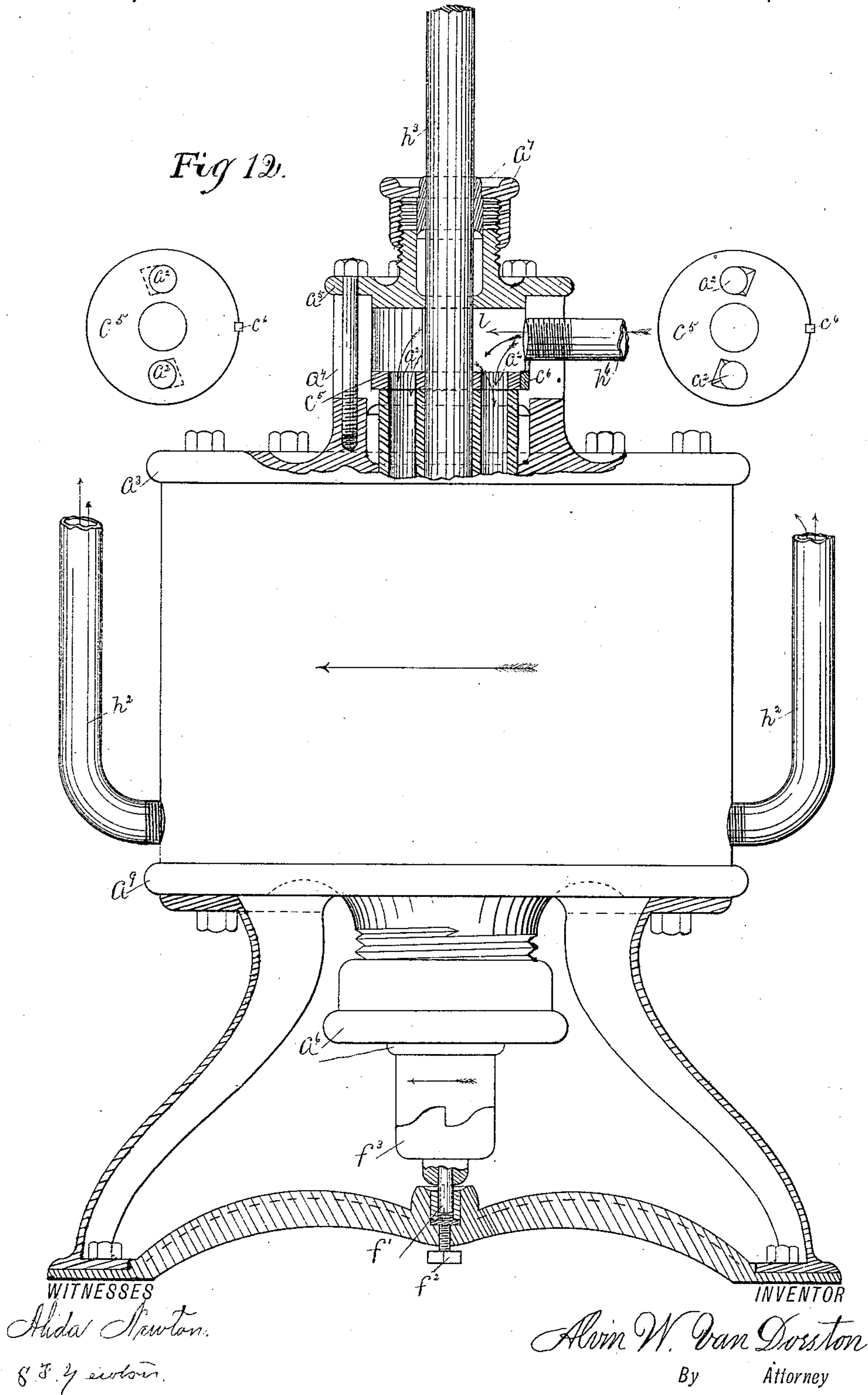
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Fig 12.



UNITED STATES PATENT OFFICE.

ALVIN W. VAN DORSTON, OF EAST PORTLAND, OREGON.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 332,765, dated December 22, 1885.

Application filed June 24, 1884. Serial No. 135,941. (No model.)

To all whom it may concern:

Be it known that I, ALVIN W. VAN DORSTON, residing at East Portland, in the county of Multnomah and State of Oregon, have invented an Improved Rotary Engine Piston-Valve and Bearing, of which the following is a specification.

My present invention relates to improvements in rotary engines, in which the disk is provided with concentric piston-valves and independent bearings, the cylinder of which is provided with two independent abutments.

My present improvement is to provide an improved construction of the disk and piston-valve bearings, the piston-valve journals, and the independent abutments of the cylinder, the operation of which is fully set forth in an application for a patent previously made by me.

The object of my improvements are, first, to provide a disk with removable dovetailed bearings corresponding with the front journal-bearings of the piston-valves; second, to provide a piston-valve as constructed with a concentric journal of unequal diameter, by which construction I provide said valves with the shoulder-bearings, which will be hereinafter more fully set forth, and pointed out in the claims; also, the cylinder of which is provided with the two independent abutments of different construction in the curves of said abutments from that of my former application for Letters Patent made by me. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of the disk; Fig. 2, an end view as it appears from the upper end after being removed from the cylinder, also with two of the piston-valves and one of the piston-valve bearings removed; Fig. 3, a detached perspective view of the piston-valve bearings; Fig. 4, an end view of the piston-valves; Fig. 5, a vertical view representing the inside face, showing the web at each end and center; Fig. 6, a view showing the front or outside face of said valves; Fig. 7, an end view of one of said valves as constructed without the metal packing-strips; Fig. 8, a cross-section of one of the piston-valves as they appear with the center web looking from the end; Fig. 9, represents an end view of the cylinder as it appears with

top cover and disk removed, showing the abutments as they are constructed and dovetailed into the walls of the cylinder; Fig. 10, a half-sectional view of the cylinder, taken on the line xx of Fig. 9, and which also represents the lower head and a portion of the lower hub broken from the disk. Fig. 11 represents an end view of the cylinder and disk as it appears after the removal of the upper head and cut-off valve, also the abutments, including detached views of the abutments; and Fig. 12, a side elevation of the entire engine, partly in section, with detached views of the cut-off valve, representing the top and bottom sides.

Similar letters refer to similar parts throughout the several views.

In the construction of the engine the head a^3 and the lower head, a^9 , provided with the legs and base, as shown in Fig. 12, constitute the frame-work. The cylinder h is constructed with the recesses $h^5 h^5$ in the opposite sides, as shown in Fig. 11, for the reception of the separate and removable abutments $a a$, as shown in the detached end views of said figure. Said abutments $a a$ are secured, in addition to being dovetailed into the wall of the cylinder h , by means of the bolts B^2 , as shown in Fig. 10 in the recess h^4 . The cushion-ports $e^2 e^2$, near the upper end of the cylinder h , are located partly in the abutments $a a$ and in the wall of the cylinder h and partly in advance of the parallel line with the rear side of the exhaust-ports $e e$, which are located at the lower end of the cylinder h , as shown in Fig. 10, said cushion-ports $e^2 e^2$ being provided to admit steam or air in front between the face of the piston-valves $P P$ and the wall of the abutments $a a$, as indicated by the arrow, to prevent wear on the face of said piston-valves and the abutments and cause the piston-valves $P P$ to close by action of the steam. The exhaust-ports $e e$ communicate with the recess h^4 , the steam thence discharging through the exhaust-pipes $h^2 h^2$. The disk d may be constructed with two or four of the non-friction piston-valves $P P$, as shown in Figs. 2 and 11, which are constructed with the concentric journals of unequal diameter, $J' B'$, by means of which the journals are provided with the shoulder S , which extends full length of the journal and the depth from the greater diame-

ter B' to the lesser J', and which shoulder S comes in contact with the corresponding shoulders, S', of the corresponding bearings, B and J, of the disk *d*, as shown in Figs. 2 and 11, which
 5 retains said piston-valves P in a rigid position when fully open, to prevent the face *f* of the piston-valves P from coming in contact with the wall of the cylinder *h* when in motion, with full pressure of steam or air forcing
 10 against the inner face thereof, and the abutments *a a*, which form the heads of resistance thereto, as fully set forth in Letters Patent allowed, No. 112,541, under date of May 19, 1885. The metallic packing-strips *c*² in the
 15 face *f* of the piston-valves P are retained from coming entirely out by means of the rivets *r* and slotted holes through said strips when free from or not in contact with the cylinder-wall *h*, and which packing-strips *c*²
 20 form a steam-tight joint between the face *f* of the piston-valve P and the wall of the cylinder *h* when forced out by means of elliptic springs, (similar to those *c'* of the abutments *a a*, as shown in Fig. 10.) The curved packing-strips *c*³ in each end of the piston-valves P
 25 are also provided with similar springs to force out said packing to form steam-tight joints between the piston-valve ends and the heads *a*⁹ and *a*³. The strips *c*⁴ in the end heads, *a*⁹ and *a*³,
 30 of the cylinder *h* and the strips *A'* in the abutments *a a* perform the same function, but against the disk *d*. It will be seen that the revolving disk *d* is provided with the inlet-ports *a*² *a*², and which are fed through the
 35 opposite sides at the same time as the steam is admitted to the ports *a*² *a*² of the fixed cut-off valve *c*⁵, in order to prevent lateral friction on the part of the disk and hubs at the upper and lower ends. It will be further observed that
 40 the disk *d* is provided with the shaft *h*³, which extends through the entire length of the disk and engine, and which is provided with the toe-pin *f'* in the lower end, in order to carry the disk *d* free of the lower head, *a*⁹, by means
 45 of the frame-work and the screw *f*², which is adjusted for said purpose. The clutch *f*³, which is keyed on the lower end of the shaft *h*³, as shown in Fig. 12, is intended to drive said shaft *h*³ when the disk *d* is in motion.
 50 It will be seen, as shown in Fig. 12, that the head *a*³ is provided with a stuffing-box, and the fixed gland *a*⁴, which also forms the wall of the steam-chest *l*, and which gland is provided with the feed-pipe *h*⁶ and the cut-off
 55 valve *c*⁵, as secured in its relative position to the disk-hub by means of the key *c*⁶, and which admits steam through the ports *a*² *a*² in the opposite sides at the same time, and in the same manner through the ports *a*² *a*² of the
 60 disk *d*, which communicate with the piston-valves P P, and cause the same to open by

action of the steam in contact, and beginning with the curve *c* of the abutments *a a*, which form the heads of resistance, thereby causing the disk *d* to rotate under the fixed cut-off
 65 valve *c*⁵.

The detached view to the right, as shown in Fig. 12, of the cut-off valve *c*⁵, represents the lower or face side, which comes in contact with the hub of the disk *d*, the view to the left
 70 showing the upper side of said cut-off valve. The fixed gland *a*⁴, is also provided with the cover *a*⁵, which is provided with a stuffing-box and the cap *a*⁷, to prevent the escape of steam from the steam-chest *l* when the shaft
 75 *h*³ is in motion.

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

1. In a rotary engine constructed as described, the cylinder *h*, having the exhaust-ports *e e* and cushion-ports *e*² *e*², also recesses
 80 *h*⁵ *h*⁵, and the removable abutments *a a*, in combination with the disk *d*, provided with ports *a*² *a*², and piston-valves P P, substantially as and for the purpose set forth.

2. In a rotary engine, substantially as described, the disk *d*, having piston-valves P P, with concentric journals J' B', of unequal diameter, and shoulders S, in combination with
 90 shoulders S', removable bearings B, and the stationary bearings J, substantially as and for the purpose set forth.

3. In a rotary engine constructed as described, the combination of the head *a*⁹, the
 95 cap *a*⁶, the disk *d*, provided with the shaft *h*³, toe-pin *f'*, the clutch *f*³, and the base provided with the screw *f*², as and for the purpose set forth.

4. In a rotary engine constructed as described, the head *a*³, provided with the fixed gland *a*⁴, the inlet-pipe *h*⁶, fixed cut-off valve
 100 *c*⁵, having key *c*⁶, and the cover *a*⁵, provided with the cap *a*⁷, as and for the purpose described.

5. In a rotary engine such as herein described, the disk *d*, revolving in contact with the fixed cut-off valve *c*⁵, in combination with
 105 cylinder *h*, having abutments *a a*, provided with packing-strips *a' a'*, and heads *a*³ *a*⁹, having packing *c*⁴ *c*⁴, substantially as described.

6. In a rotary engine constructed as described, the heads *a*⁹ and *a*³, provided with the metallic packing-strips *c*⁴ *c*⁴, in combination
 110 with the abutments *a a*, having packing-strips *a' a'* and elliptic springs *c' c'*, as and for the purpose set forth.

ALVIN W. VAN DORSTON.

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