

No. 612,962.

Patented Oct. 25, 1898.

W. H. BOND.
ROTARY ENGINE.

(Application filed Dec. 16, 1897.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

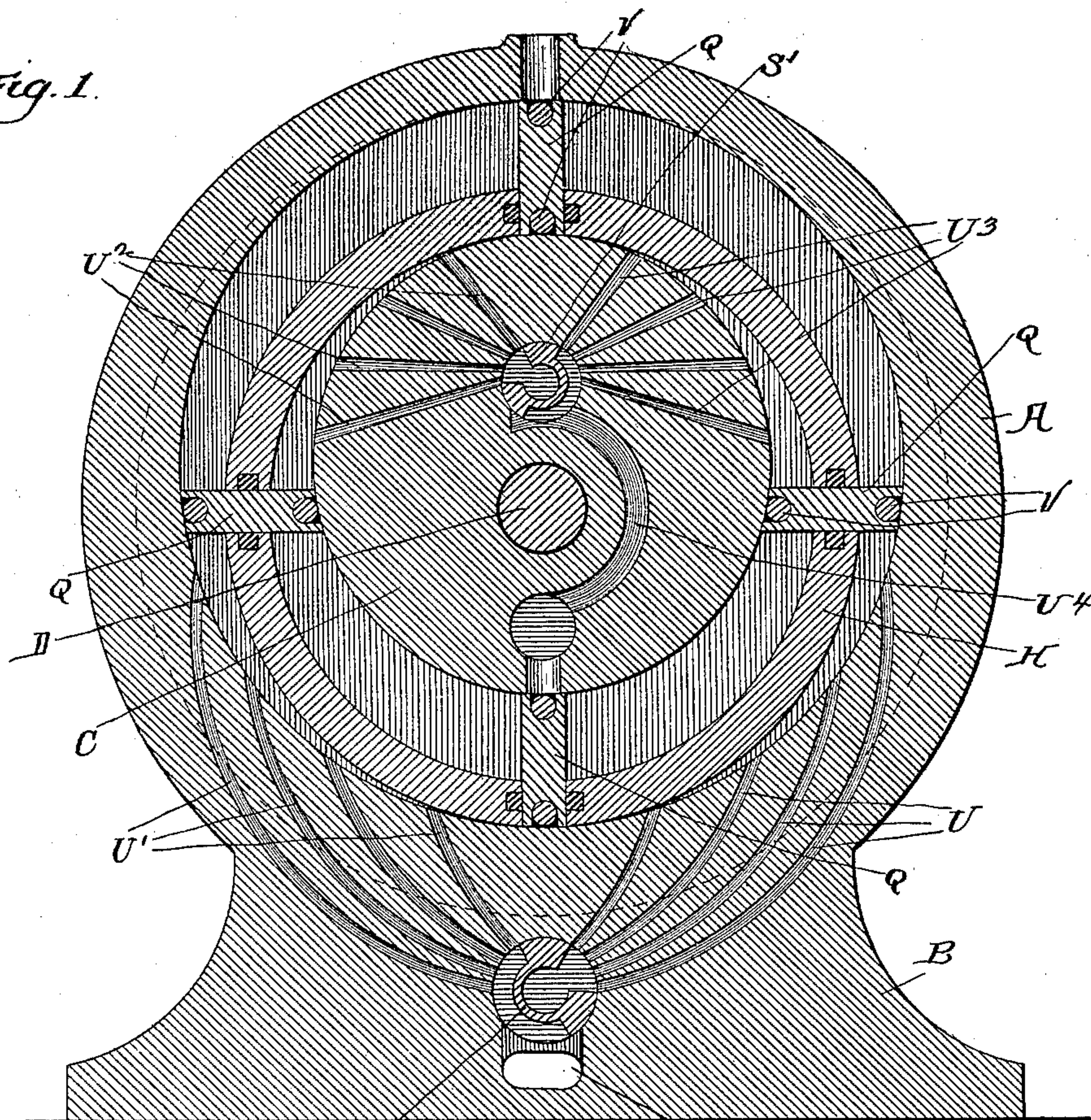
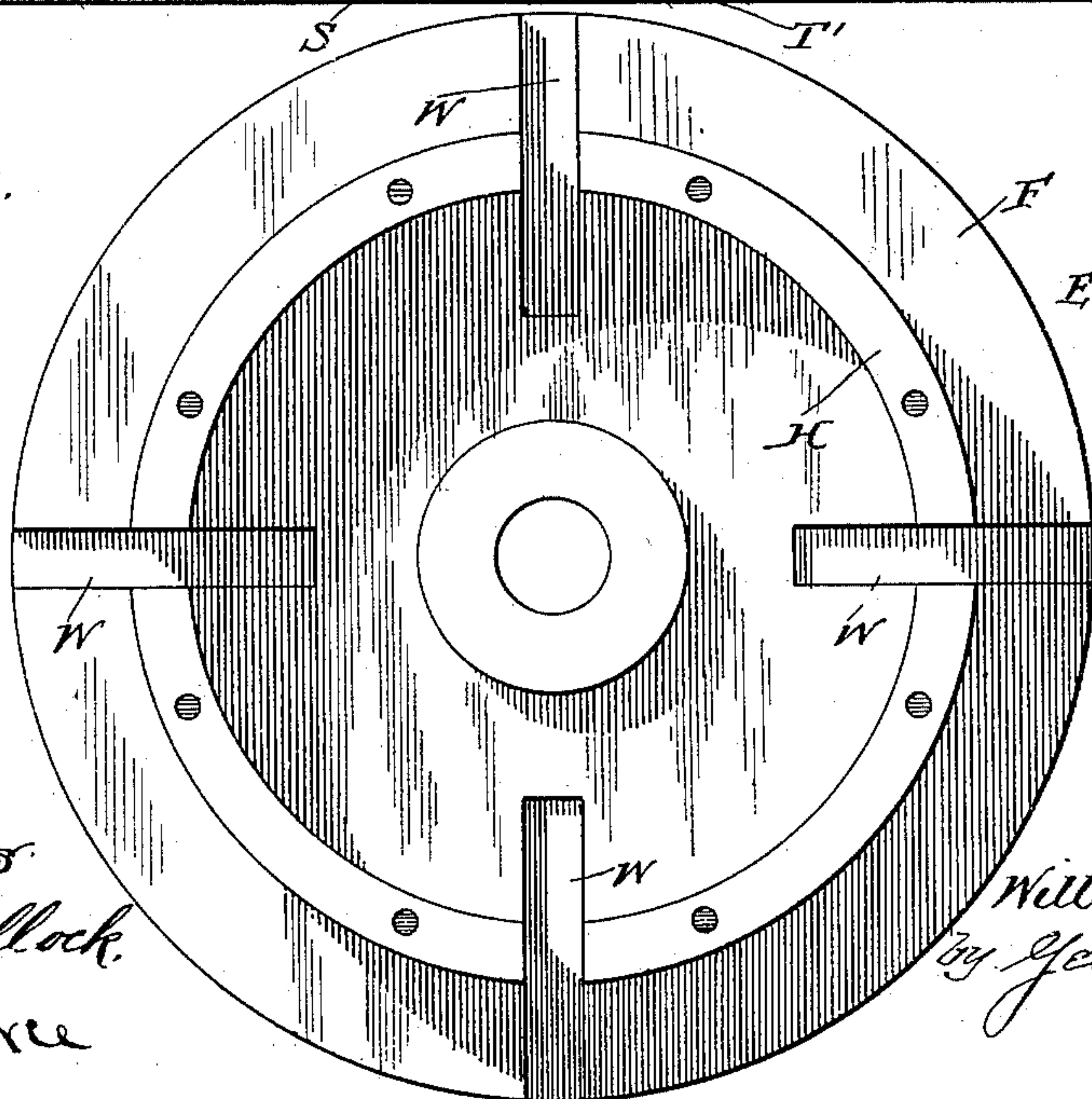


Fig. 4.



Witnesses
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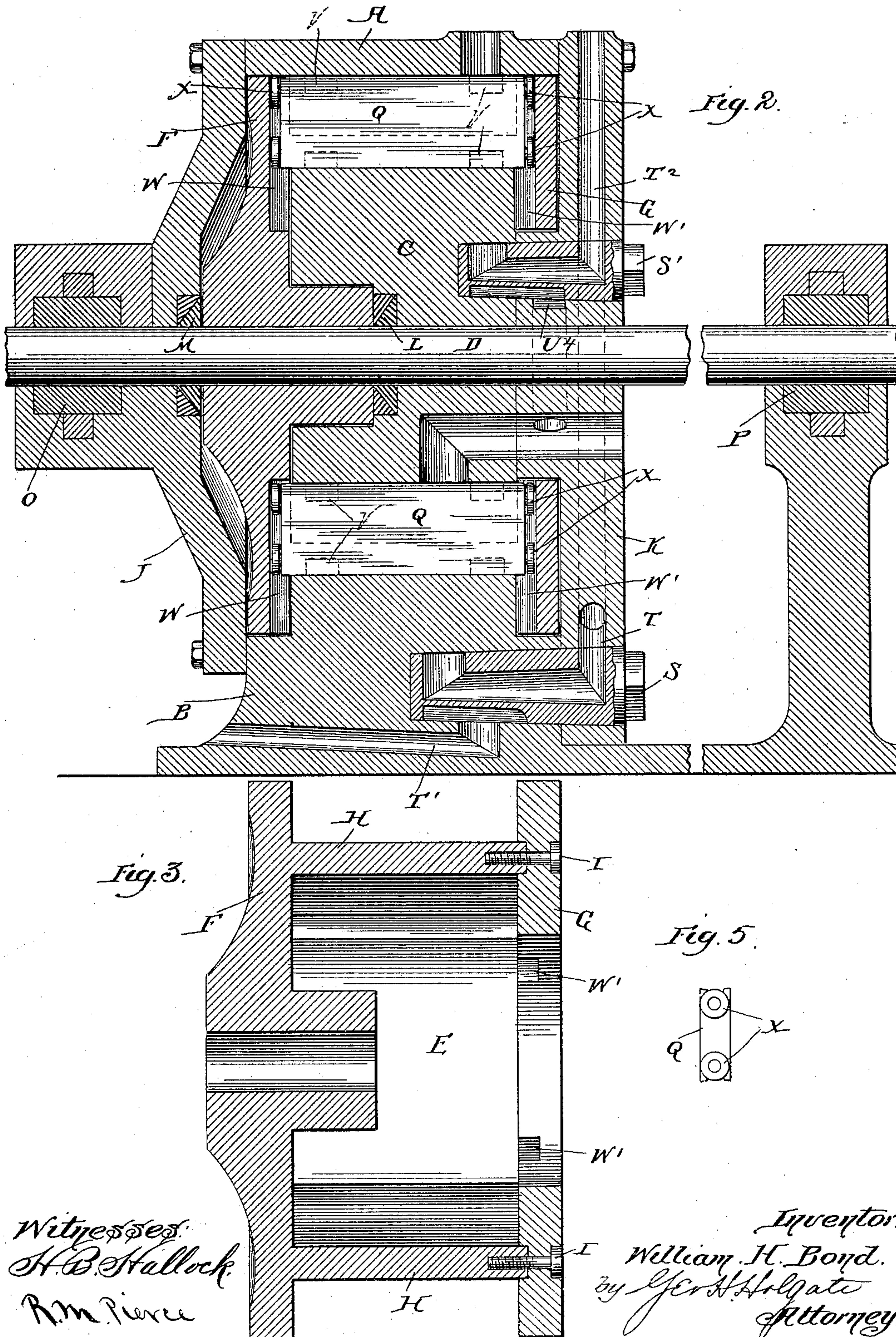
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R. M. Pierce

Inventor:
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UNITED STATES PATENT OFFICE.

WILLIAM H. BOND, OF NESQUEHONING, PENNSYLVANIA.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 612,962, dated October 25, 1898.

Application filed December 16, 1897. Serial No. 662,184. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. BOND, a citizen of the United States, residing at Nesquehoning, in the county of Carbon and State of Pennsylvania, have invented certain new and useful Improvements in Rotary Engines, of which the following is a specification.

My invention relates to a new and useful improvement in rotary engines, and has for its object to provide an exceedingly simple and durable engine of this description which will make economical use of steam-space and embody all the advantages of an ordinary engine, while gaining many advantages over the same, and which is adapted for use either as a stationary or locomotive engine.

A further object of my invention is to reduce the friction between the operating-surfaces.

With these ends in view this invention consists in the details of construction and combination of elements hereinafter set forth, and then specifically designated by the claim.

In order that those skilled in the art to which this invention appertains may understand how to make and use the same, the construction and operation will now be described in detail, referring to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a section of an engine made in accordance with my improvement; Fig. 2, a cross-section; Fig. 3, a central section of the revolving member which corresponds to the piston of an ordinary engine; Fig. 4, an elevation thereof; and Fig. 5, a detail view of one of the blades or heads, showing the anti-friction-rolls fitted therein.

In carrying out my invention as here embodied, A represents the casing, which is mounted upon a suitable base B, and within this casing is located a stationary hub C, and it is to be noted that the compartment within the casing and this hub are concentric to each other, but eccentric in relation to the shaft D, which is journaled in the casing, for the purpose hereinafter set forth.

The rotary member E is composed of the disks F and G, the former having formed therewith the section-ring H, to which the disk G is secured by the bolts I, as clearly shown in Fig. 3. By this arrangement the rotary

member may be placed within the casing prior to the cap J being secured in place, and the disk G thereof is then secured to the section-ring, and finally the cap K secured in place upon the opposite side of the casing. The shaft D passes through the stuffing-boxes L and M, so as to avoid the escape of steam at these points, and is suitably journaled in the bearings O and P, the rotary member being secured upon this shaft, so as to cause the latter to revolve when motion is given to said member.

The ring H has passed therethrough the heads or blades Q, here shown as four in number, and to prevent the passage of steam at these points suitable packing is inserted within recesses formed in the ring for that purpose, and as the ring lies eccentric to the compartment formed in the casing and concentric with the shaft upon which it is secured it will be seen that the blades will be caused to move to and fro within the ring during the revolutions of the latter. The inner wall of the casing and the outer surface of the hub act as cams to bring about this movement, and as the ring divides the compartment into two sections it follows that steam admitted to either section will act upon the blades upon one side or the other of the ring, as the case may be, thus bringing about the movement of the rotary member, as hereinafter more fully set forth.

The valve S is located in the lower portion of the casing, and is here shown as a conical plug fitted within the corresponding seat, and the admission-port T leads thereto, while the exhaust-port T' leads therefrom. A series of passage-ways U and U' lead from the valve through the body of the casing to the compartment therein upon each side of the portion of the ring which comes in contact with the lower portion of the casing, the object of which is to so introduce steam within the casing as to run the engine in either direction. The valve S' is fitted within the hub and is similar in all respects to the valve S, and has leading thereto the admission-port T'', while the passage-ways U'' and U''' diverge therefrom and communicate with the compartment within the casing upon each side of the point at which the ring comes in contact with the hub for the same purpose as

that just described in connection with the passage-ways U and U'. An exhaust-port U''' leads from the valve S', which latter is so constructed as to permit the outflowing of the
 5 dead steam from the compartment, while at the same time admitting live steam thereto. This is also true of the valve S. From this it will be seen that when the valves S and S' are properly set steam will flow inward to
 10 the compartment both through the passage-ways U and the passage-ways U'', and the pressure thereof will be exerted upon the blade Q upon both sides of the ring, thereby forming a double-action engine and utilizing
 15 almost the entire surface of the blades to bring about the movement of the rotary member and avoiding all dead-points. The steam admitted to the casing may be cut off at the desired point by any suitable mechanism ar-
 20 ranged to control the valves S and S' from a suitable governor, (here not shown,) thereby providing for the economical expansion of the steam under varying conditions. Suit-
 25 able mechanism, such as a reversing-lever, may be also provided for reversing the direction in which the engine is to run by changing the relative positions of the valves S and S', so as to cause the admission side thereof to lie adjacent to the passage-ways which
 30 have been communicating with the exhaust side thereof, and vice versa.

In practice it will be found that great efficiency is attained by my improved engine from the fact that steam is at all times acting
 35 upon the blades throughout their exposed surfaces, and this does not vary, since when the lesser surface is exposed upon one side of the ring the corresponding greater surface is exposed on the opposite side thereof.

40 In order that the friction between the sliding blades and the surrounding surface may be reduced, I set a series of rolls V in recesses formed in these blades, so that they serve as travelers upon the walls of the compartment
 45 and hub; but they should be so fitted as not to carry the ends of the blades entirely out of contact with these surfaces, in which case the leakage of steam would be occasioned. The blades are guided in the disks F and G
 50 by having their ends fitted into grooves W

and W', and friction may also be reduced at this point by the rolls X.

My improvement is especially adapted for use in connection with electric generators and the like where high speed is desired with-
 55 out dead centers or points and where sensitive governing of the engine is essential, since my improved engine is perfectly automatic and steady and there is no jar or jogging in its motion.
 60

Another great advantage of my improvement is that the engine may be used either for stationary or locomotive purposes or for marine construction, as it can be operated forward or backward at any point of the revo-
 65 lution with a full load and is entirely noiseless.

Of course I do not wish to be limited to the exact details of construction here shown, as these may be varied to a certain extent with-
 70 out departing from the spirit of my invention.

Having thus fully described my invention, what I claim as new and useful is—

In a device of the character described, a casing having a cylindrical compartment therein,
 75 a shaft journaled eccentrically with relation to said compartment, a hub in which said shaft turns arranged concentrically with said compartment, disks mounted on the shaft con-
 80 centric therewith, a cylindrical ring formed with one of said disks and secured to the other, blades passed through slots in the cylindrical ring having their ends operating in guideways
 85 in the disks, the sides of said blades bearing against the hub and walls of the compartments, caps secured on the ends of the casing, one of said caps having an extension projecting through one of the disks against the
 90 hub, and rotary plug-valves passed through the last-named cap into the hub and casing respectively controlling ports in each which lead to the compartment, substantially as set forth.

In testimony whereof I have hereunto affixed my signature in the presence of two sub-
 95 scribing witnesses.

WILLIAM H. BOND.

Witnesses:

C. S. MERVINE,
 JAMES BUTLER.