No. 685,646. Patented Oct. 29, 1901.

R. SANDERSON.

ROTARY ENGINE.

(Application filed May 3, 1901.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.

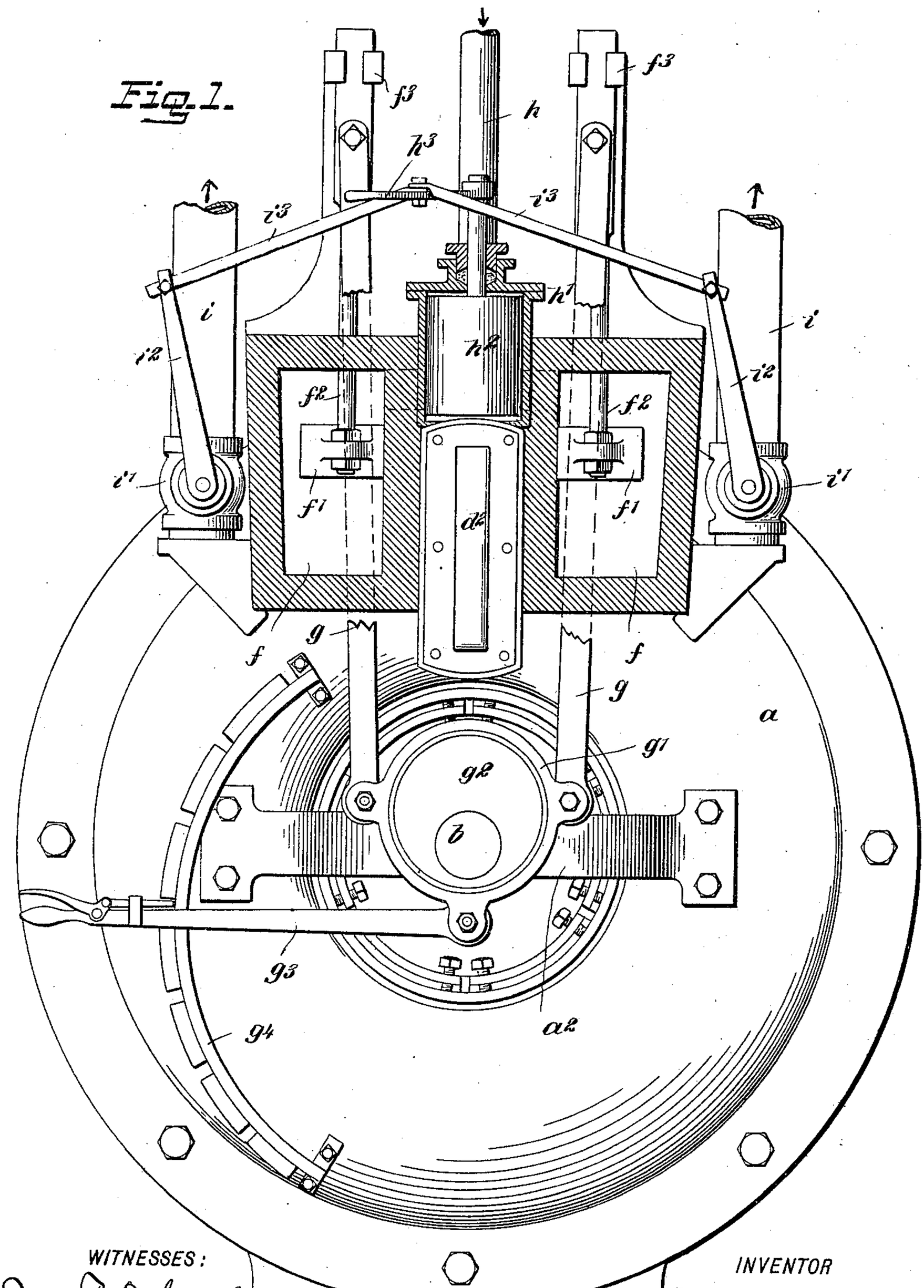

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Fig. 2.

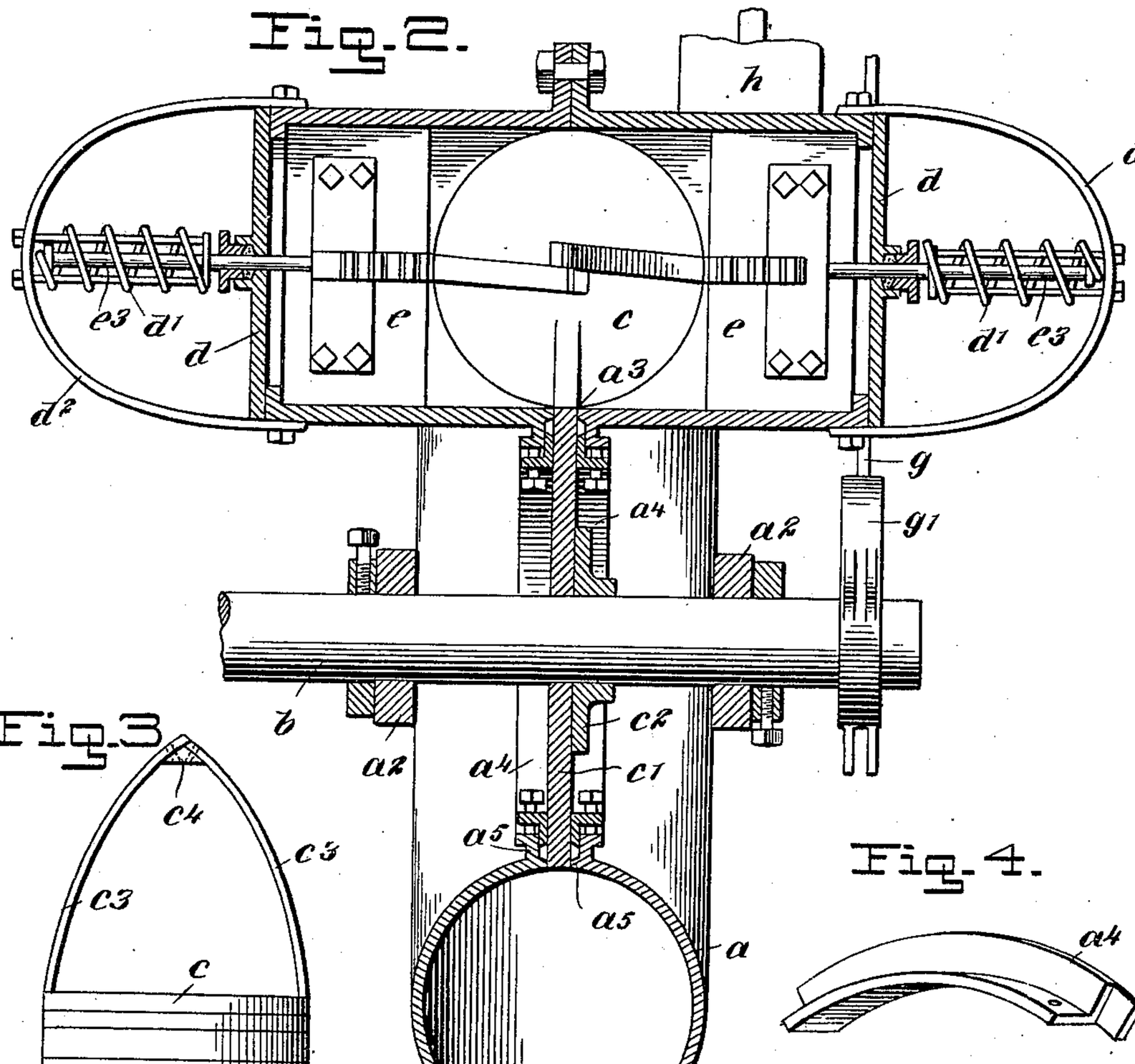

Fig. 3.

Fig. 4.

Fig. 5.

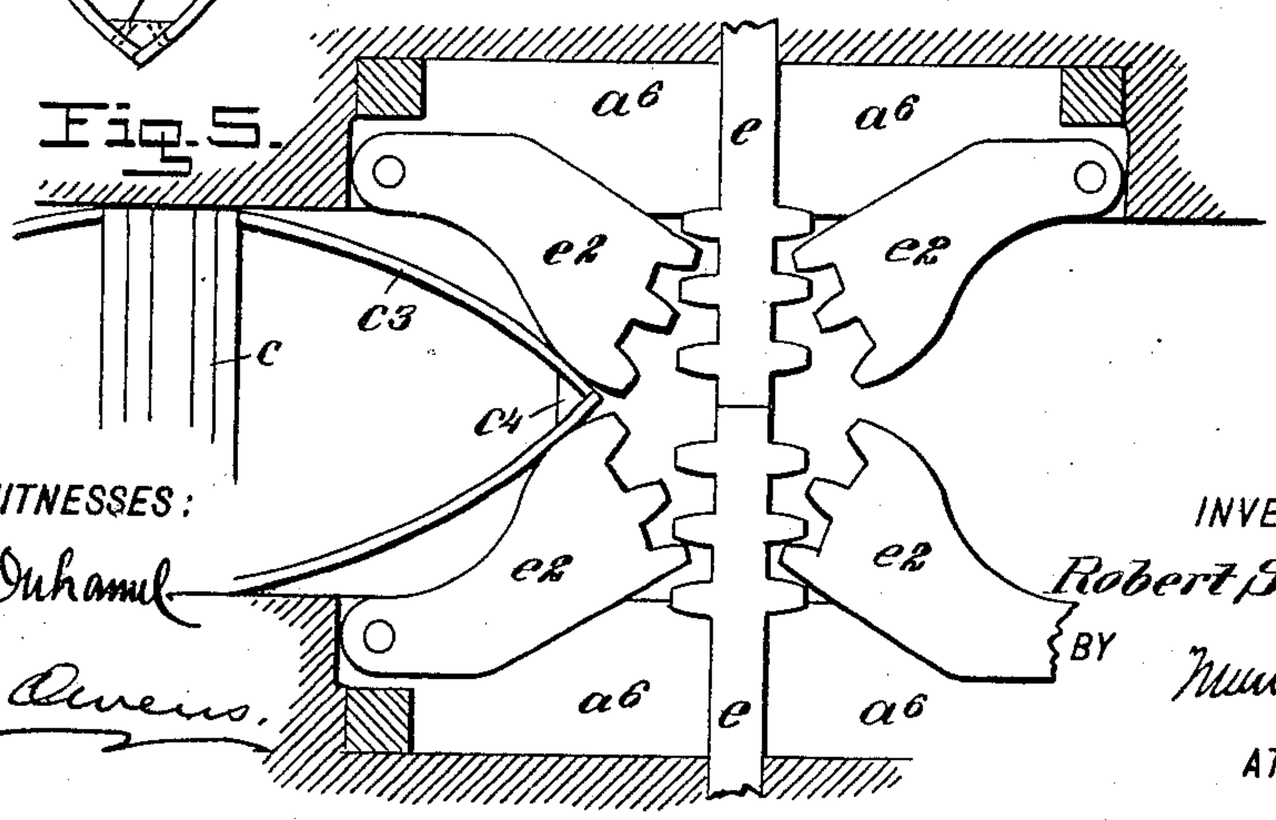

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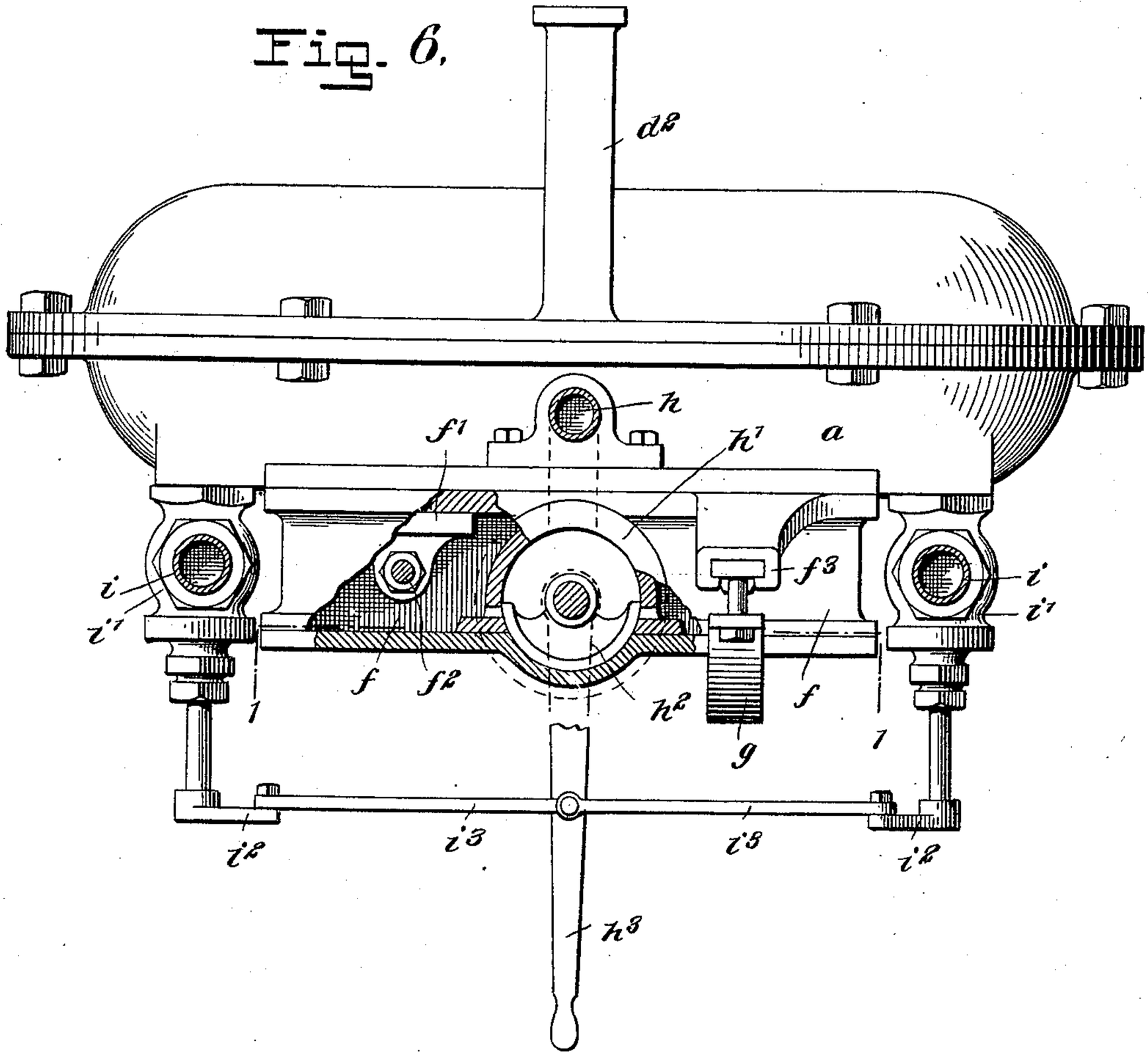
Fig. 6.



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ROBERT SANDERSON, OF NELSON, CANADA.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 685,646, dated October 29, 1901.

Application filed May 3, 1901. Serial No. 58,610. (No model.)

To all whom it may concern:

Be it known that I, ROBERT SANDERSON, a subject of the King of Great Britain, and a resident of Nelson, in the Province of British Columbia and Dominion of Canada, have invented a new and Improved Rotary Engine, of which the following is a full, clear, and exact description.

This invention relates to a rotary engine having an annular cylinder and a gate or gates working across the same to close it and with a piston moving in the cylinder and arranged to strike the gates and by its engagement with certain parts thereof to throw the gates to open position, thus permitting the passage of the piston, the gates being arranged to return automatically to closed position after the piston passes them.

This specification is a specific description of two forms of the invention, while the claims are definitions of the actual scope thereof.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a side elevation of the invention with parts broken away. Fig. 2 is a cross-section thereof. Fig. 3 is a detail view of the piston. Fig. 4 is a detail perspective view of one of the packing-segments. Fig. 5 is a detail view showing the gear for actuating the gates. Fig. 6 is a plan view of the engine with parts in section.

Referring to Figs. 1 and 2, a indicates an annular cylinder mounted on a suitable base a'. The cylinder is provided with bridge-bars a^2, extending across its diameter at each side and carrying the engine-shaft b. To this shaft is attached the web c' of a piston c through the medium of a collar c^2, fastened to the shaft b and suitably secured by bolts or otherwise to the web c'. The web c' projects through a slot a^3 in the circumference of the cylinder and is packed by segmental packing-glands a^4, working in packing-boxes a^5, formed on the inner circumference of the cylinder a. By this construction a steam-tight connection between the parts c' and a is effected. The piston c is fitted steam-tight within the cylinder and is fastened to the web c', so that the movement of the piston will impart movement to the shaft b. The piston is provided at both of its faces with approximately V-shaped cam-shoes c^3. (Best illustrated in Fig. 3.) These shoes are each formed by rods or bars fastened to the piston and curved inwardly toward each other, the outer ends being secured to blocks c^4, which serve to connect the said ends together.

Arranged at the upper part of the cylinder a and at opposite sides thereof are casings d, in each of which are fitted, respectively, the sliding gates e. These gates work toward and from each other and serve to close the cylinder at points adjacent to the casings d, so as to form an abutment against which the steam-pressure may exert itself. The approach of the piston is utilized to throw the gates into the open position shown in Fig. 2, so that the piston may pass. This is effected through the medium of the cams e^2, pivotally mounted to swing outward away from each other into cavities a^6, formed in the cylinder a adjacent to the casings d. These cams e^2 are toothed on their outer edges, as shown best in Fig. 5, and these teeth of the cams e^2 mesh, respectively, with teeth formed on the gates e. There are two pairs of cams e^2, and these are arranged one pair on each side of the gates and one member of each pair being meshed, respectively, with the groups of teeth on the gates. When the gates are moved together, as shown in Fig. 5, the action of the various teeth will cause the members of the pairs of cams to be moved together, so that they will occupy the position shown in the last-mentioned figure. As the piston approaches and engages its cam-shaped shoe c^3 between the cams e^2 these latter cams will be spread, and the action of the teeth thereon will cause the gates e to be moved apart. The piston is then free to pass the gates e. The gates are returned to their normal or closed position by means of springs d', which are engaged with the stems e^3 of the gates e. The stems e^3 are held in yokes d^2, attached to the casings d.

The pressure of the steam exerted on the piston causes it to travel continuously through the annular cylinder, and thus movement is imparted to the engine-shaft. The steam may be controlled in its passage to and from the cylinder by any mechanism desired. As here shown I provide valve mechanism which

may be reversed to drive the engine in either direction. To this end two steam-chests f are attached to the cylinder and carry, respectively, valves f', commanding feed-ports arranged in the cylinder at opposite sides of the gates e. These valves f' have stems f^2 attached thereto, the stems passing upward through guide devices f^3, mounted in the cylinder a. The valves f' are given the necessary movements through the medium of connecting-rods g, which are attached, respectively, to the valve-stems f^2 and to an eccentric-strap g', working on an eccentric g^2, fastened to the shaft b. The throw of the eccentric may be regulated at will by an arm g^3, which is connected with the eccentric-strap and works with a quadrant g^4, held on the cylinder a and disposed eccentrically to the shaft, so that by the adjustment of the arm g^3 the eccentric will be adjusted to increase or diminish the movements of the valves. The lever g^3 is allowed a slight swinging movement on the quadrant g^4, so as to accommodate the movement of the eccentric.

h indicates the steam-supply pipe, which leads to a casing h', in which is arranged a valve h^2, by the adjustment of which the steam may be led into one of the chests f exclusive of the other, and vice versa. This valve h^2 therefore serves to control the direction in which the engine is driven, since by letting the steam into one steam-chest the engine is driven in a direction different from that in which it would be turned were the steam led to the other steam-chest.

i indicates the exhaust-pipes, which pass from suitable exhaust-ports in the cylinder a. These ports are commanded by valves i', and the valves i' are thrown in time with the valve h^2 through the movement of arms i^2 on the valves, such arms being connected to links i^3 and these links being in turn connected to the handle h^3 on the stem of the valve h^2. When the valve h^2 is thrown to reverse the engine, the valves i are operated in unison. It should be understood that when the parts are adjusted to throw the steam—say, for example, into the right-hand steam-chest f—the right-hand exhaust-valve i' should be closed and the left-hand exhaust-valve opened. When the engine is reversed, it will be necessary to reverse the exhaust-valves according to this principle.

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

1. An engine having a cylinder, a piston working therein and having a cam-shoe thereon, a gate movable into the cylinder to command the same, and a pivoted cam having toothed connection with the gate and adapted to be struck by the cam-shoe on the piston, whereby to throw the gate to open position and permit the passage of the piston.

2. In a rotary engine, the combination of a cylinder having a continuous annular passage therein and having a casing arranged at each side thereof, the casings being opposite to each other, gates mounted to slide in the casings, springs pressing the gates inward across the passage in the cylinder, to close it, pivotally-mounted dogs having toothed connection with the gates, the dogs normally extending into the cylinder, and a piston arranged to move continuously through the cylinder, the piston being capable of engaging the dogs to throw them and the gates apart.

3. In a rotary engine, the combination of an annular cylinder, a gate movable across the interior thereof to close it, a piston moving continuously through the cylinder and serving to throw the gate momentarily outward to permit the passage of the piston, an engine-shaft carrying the piston and driven therefrom, valve-rods, means for driving the valve-rods from the engine-shaft, valves respectively actuated from the valve-rods and arranged on opposite sides of the gate to control the feed of the motive fluid, a reversing-valve controlling the admission of the motive fluid to the first-named valves, exhaust-valves, and connections between the reversing-valve and the exhaust-valves.

4. In an engine, the combination with the engine-shaft and valves, of an eccentric fastened to the shaft, a strap on the eccentric, a rod connected to the strap, a quadrant, means for loosely and adjustably connecting the rod to the quadrant, and connections between the valves and opposite sides of the eccentric-strap.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ROBERT SANDERSON.

Witnesses:
F. SCHOFIELD,
ROSS THOMPSON.