No. 709,908. Patented Sept. 30, 1902.

W. JAMIESON.

ROTARY ENGINE.

(Application filed Nov. 5, 1901.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

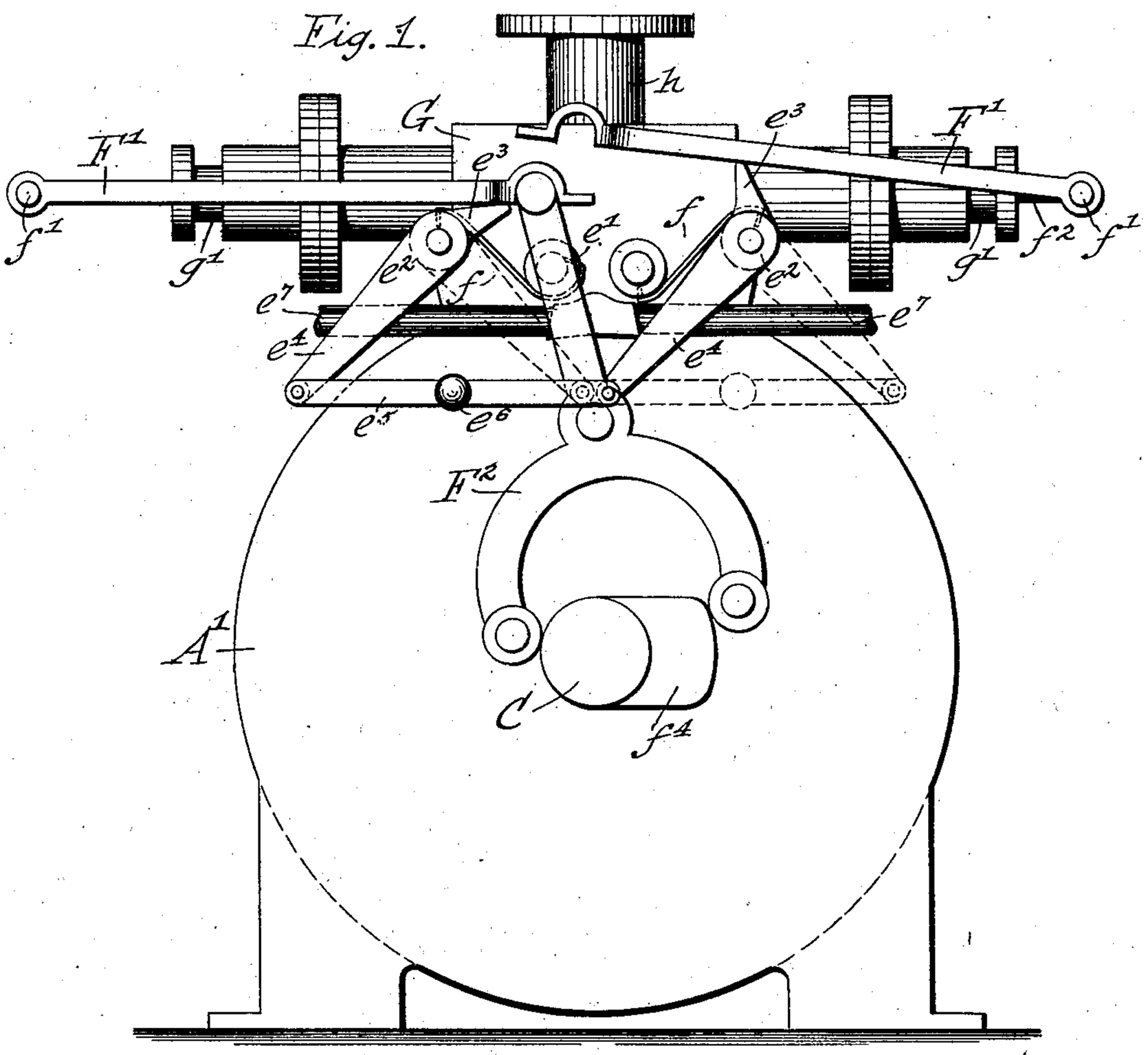

Fig. 2.

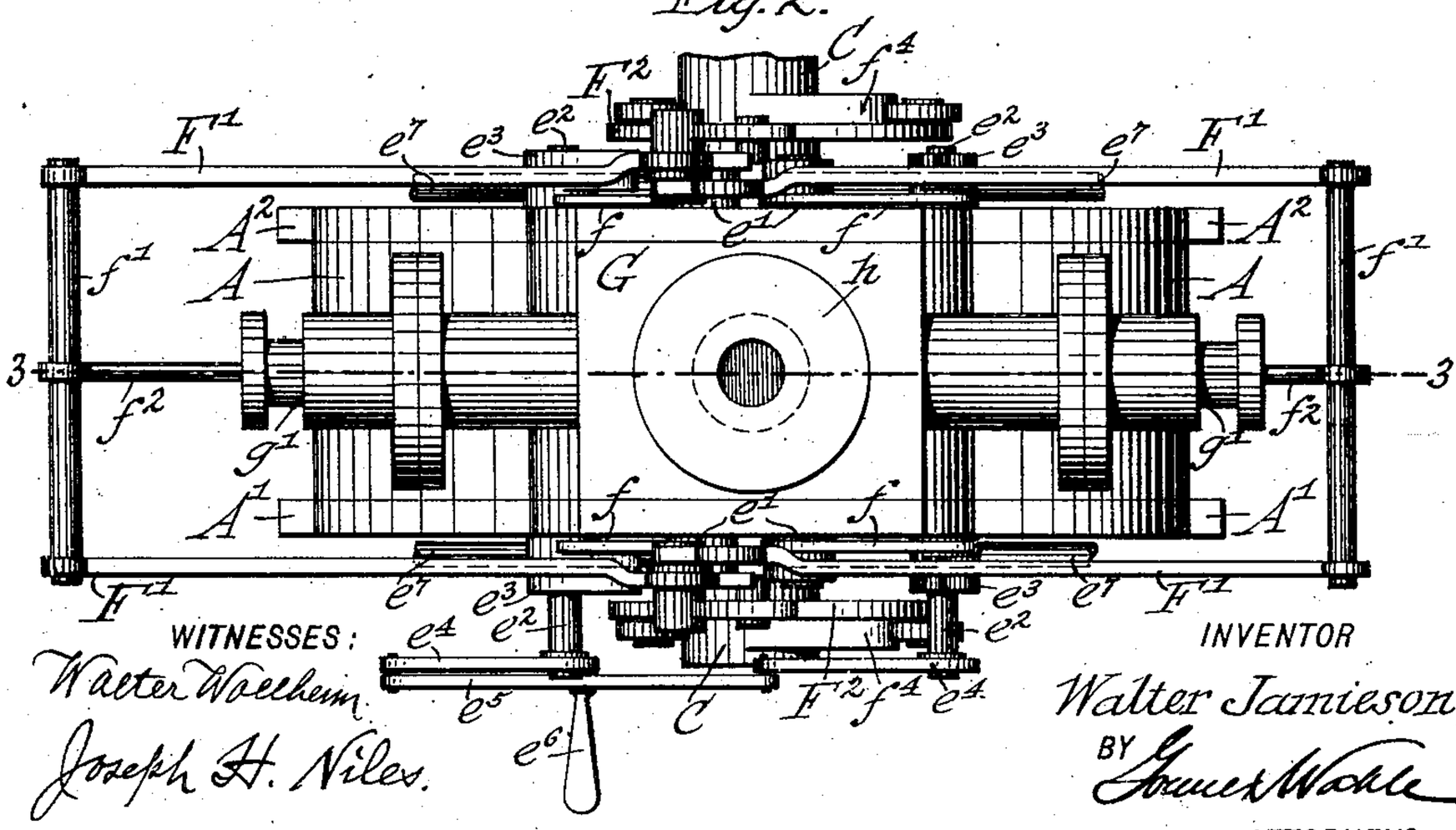

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Fig. 3.

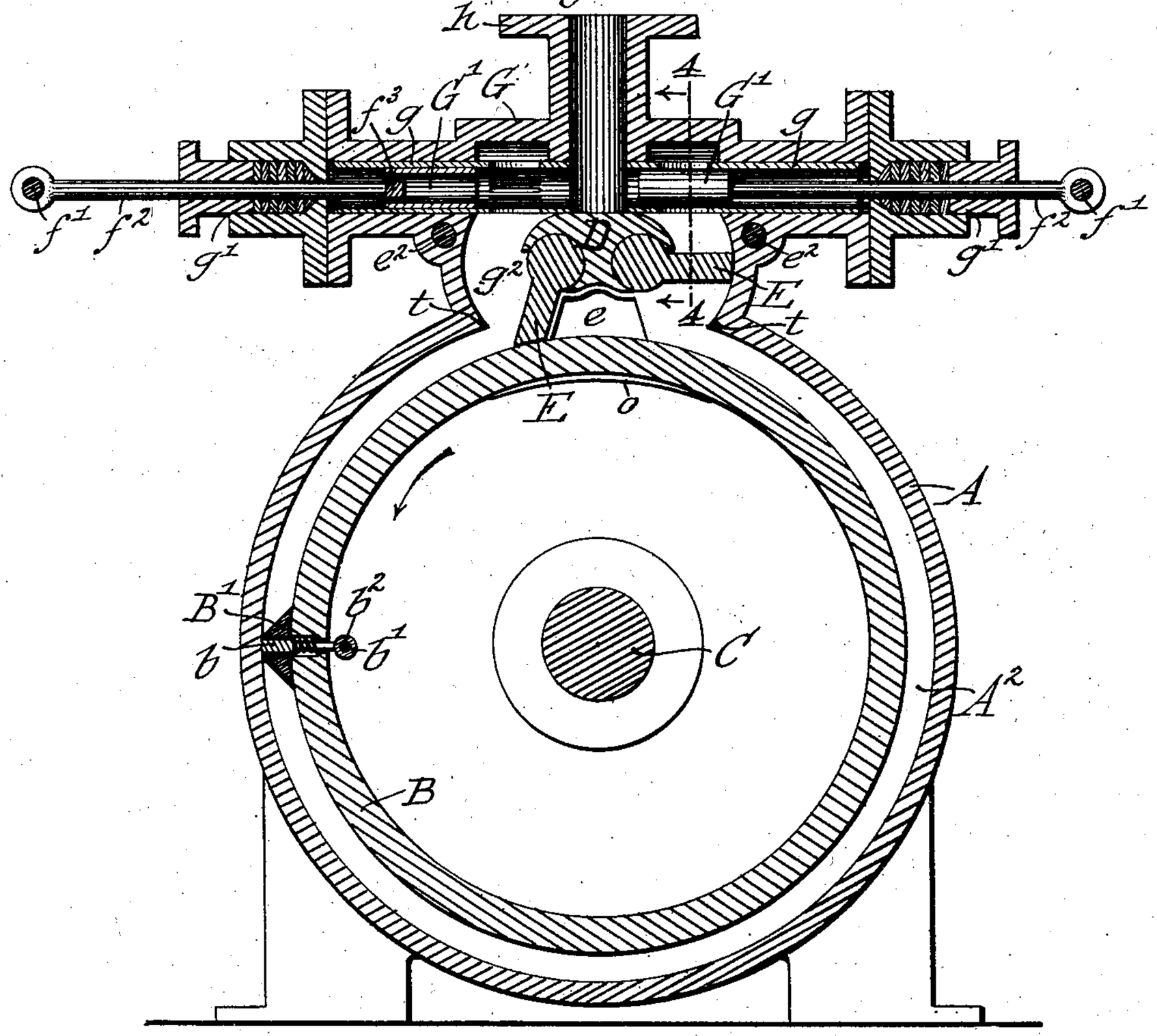
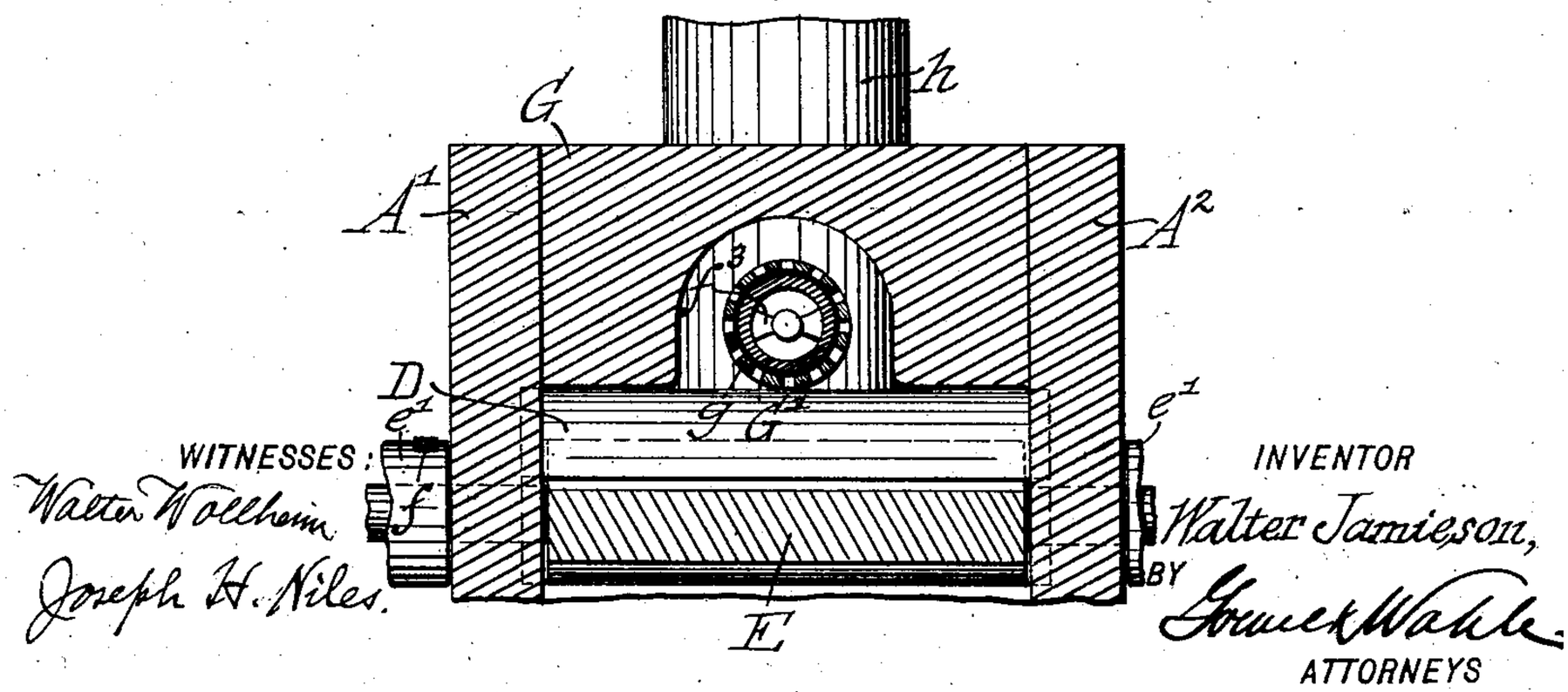


Fig. 4.



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UNITED STATES PATENT OFFICE.

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ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 709,908, dated September 30, 1902.

Application filed November 5, 1901. Serial No. 81,173. (No model.)

To all whom it may concern:

Be it known that I, WALTER JAMIESON, a citizen of the United States, residing in New York, borough of Brooklyn, in the State of New York, have invented certain new and useful Improvements in Rotary Engines, of which the following is a specification.

This invention relates to an improved rotary engine of that class in which a rotary piston having an abutment is employed in connection with a swinging abutment, oscillating supply-valves, and a reversing mechanism for the same, so that the engine can be run in either direction at will; and for this purpose the invention consists of a rotary engine comprising a stationary cylinder, a rotary piston in said cylinder provided with a fixed abutment, two swinging abutments, means for maintaining one of said swinging abutments out of action, steam supply and exhaust ports, reciprocating supply-valves, one above each swinging abutment, and means for actuating either one of the supply-valves from the main shaft of the engine.

The invention consists, further, of certain features of construction by which either one of the supply-valves and the swinging abutment below the same can be moved out of action; and the invention consists, lastly, of a reversing mechanism by which either one of the supply-valves and the swinging abutment below the same can be thrown into action by means of a suitable reversing-gear, as will be fully described hereinafter and finally pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation of my improved rotary engine. Fig. 2 is a plan view of the same. Fig. 3 is a vertical longitudinal section on line 3 3, Fig. 2; and Fig. 4 is a detail vertical transverse section on line 4 4, Fig. 3, drawn on a larger scale.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, A represents the cylinder or casing of my improved rotary engine. The casing is supported between the side plates or heads A′ A^2, which are secured to the floor or other suitable support. A cylindrical piston B is arranged in the casing and keyed to the shaft C of the engine. The piston B is tightly packed at its sides against the side plates A′ A^2 and provided with a fixed abutment B′, having inclined sides, said abutment being provided with a central recess, in which a metallic or other packing bar *b* is placed, which is connected at its inner edge with a spring-cushioned stirrup *b*′.

Above the shaft C is arranged on top of the casing A a valve-chest G, which has at its interior a stationary center piece D. Between the center piece D and the circumference of the piston is arranged the exhaust-port *e*, from which lead exhaust-pipes e^7. In each side of the center piece D is formed a cylindrical concavity for the pivot of a swinging abutment E. The pivots of the swinging abutments are extended through the heads A′ A^2 of the casing to the outside of the same, collars *e*′ being placed on the projecting pivots, so as to prevent any lateral play of the abutments. To the collars *e*′ are attached straps *f*.

In the walls of the valve-chest G are journaled shafts e^2, which form fulcra for thumb-levers composed of cams or thumbs e^3 and depending levers e^4. The opposite ends of the straps *f* are attached to the hubs of the thumbs e^3, as shown. The two levers e^4 are connected by a link e^5, which is provided with a handle e^6 for operating said thumb-levers and disengaging thereby either of the rods F′ from the upper end of a rocking lever F^2, fulcrumed to the head of the casing, the lower forked end of which is operated by a cam f^4 on the shaft C of the engine. The hooked ends of the rods F′ are offset, so as to pass each other, as shown in Fig. 2. The rods F′ of each pair are connected by a transverse pin *f*′ with the outer eye-shaped ends of the stems f^2 of the supply-valves G′. Each pair of rods, with its connecting-pin *f*′ and valve-stem, forms a valve-operating gear. The valves are of tubular cylindrical shape and are guided in longitudinal cylinders or guide-sleeves *g* of the valve-chest G, each cylinder being provided with a stuffing-box *g*′, so as to prevent the escape of steam from the valve-chest. The valve-operating rods F′ and rocking levers F^2 at both sides of the valve-chest are of the same size and arrangement, so as to balance each other. The

pivot-shafts e^2 of the thumb-levers are passed through the walls of the valve-chest from one side to the other, and the cams and levers at each side are rigidly attached thereto. Steam is supplied to the valve-chest by a steam-port h, from which it passes through the interior of one of the slotted guide-sleeves g and through slots arranged in the same into a channel g^2, arranged below the guide-sleeve between the walls of the chest and the swinging abutments, as shown in Fig. 3. The series of slots of each sleeve constitute, in effect, one opening into the valve-chest—*i. e.*, an opening at one side of the same—the slots of the other sleeve constituting another opening from the inlet-port h into the valve-chest at the other side, and said openings are controlled by the respective independent supply-valves. Each supply-valve G′ is made tubular, so as to be thereby balanced, so that no uneven pressure is exerted on the same, but the pressure is equal and the valve moves easily backward and forward in the guide-sleeve. The inner end of each stem f^2 is screwed into a cross-piece f^3 at the end of its supply-valve G′. The heads A′ A² are provided at their inner faces above the shaft C with stationary segmental cams o, which are of such length that their ends are located approximately in radial lines from the center of the shaft C to the inwardly-projecting corners t t, formed by the main casing and end walls of the valve-chest, as shown in Fig. 3. The packing b in the abutment B′ has to be held in position so that it does not catch on the inwardly-projecting corners referred to when passing the same. This is accomplished by the antifriction-roller b^2 of the stirrup during the passage of the same over the inner surface of the segments o, the stirrup drawing the packing into the abutment B′, so that the packing cannot interfere with the projecting corners t t. This is an important feature for the proper working of the engine, as thereby contact of the packing with the inner corners of the casing is avoided, interruption of the motion of the piston prevented, and the life of the packing lengthened. By the oscillating motion of the rocking lever one valve G′ is moved back and forth in its guide-sleeve, while the opposite valve is out of engagement. When the parts are in the position shown in Fig. 3, live steam passes through the sleeve g into the supply-channel g^2 and through the same into the space behind the abutment B′, moving thereby the piston in the direction of the arrow. The exhaust-steam in front of the abutment passes freely to the outside through the port e. As the cam f^4 actuates the rocking lever, the valve-operating rods are thereby actuated and the supply-valve moved inwardly and the supply of steam shut off. This action is timed to take place when the abutment B′ passes below the downwardly-projecting swinging abutment E, which latter is lifted into the supply-channel g^2. As soon as the abutment B′ has passed the abutment E the latter drops into position on the circumference of the piston, the supply-valve is opened, and steam is again supplied to the piston. Cutting off of the steam-supply at the proper moment is accomplished by proper shaping of the cam f^4. When the engine is to be reversed, the handle of the reversing rod or link e^5 is taken hold of, and the same, with the thumb-levers, shifted into the position shown in dotted lines in Fig. 1, whereby one pair of rods F′ is disengaged with the rocking-lever F² and the other pair engaged, the disengaged pair being held by the thumbs out of engagement, and the valve G′, connected therewith, being retained by friction stationarily in position. Simultaneously the swinging abutments E are changed, one being lifted while the other is dropped into contact with the circumference of the piston. The reversing operation has to be accomplished slowly, a dwell of the piston being produced at the instant of reversal. The exhaust-ports are preferably connected with a suitable condenser, so that exhaust is facilitated and no back pressure exerted on the abutments.

By arranging three rotary engines on the same shaft in such a manner that the piston moves over each abutment alternately at every one-third part of a full rotation of the shaft an effective triple engine for steam-launches and other purposes is obtained, in which the motion can be readily reversed by the reversing mechanism described and in which the use of a fly-wheel may be dispensed with, as live steam is admitted at every one-third part of the rotation of the shaft and the dead-points are entirely overcome.

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

1. A rotary engine, consisting of a cylindrical casing, a cylindrical rotary piston in said casing, an abutment on said piston, a valve-chest on said casing provided with steam inlet and outlet ports, said inlet-port having two openings into the valve-chest, two swinging abutments in said valve-chest, independent reciprocating supply-valves located in said valve-chest, one for each of said inlet-port openings, means for oscillating one of said swinging abutments during each rotation of the piston, and means for reciprocating either of said supply-valves independently of the other, substantially as set forth.

2. A rotary engine, consisting of a cylindrical casing, a cylindrical rotary piston in said casing, an abutment on said piston, a valve-chest on said casing provided with steam inlet and outlet ports, said inlet-port having two openings, one at either side, into the valve-chest, independent reciprocating supply-valves each controlling independently one of said openings, channels, one at each side, communicating with said openings and with the interior of the casing, swinging abutments, one in each channel, adapted to close the same when in raised position, means for

maintaining either abutment in raised position, means for maintaining the corresponding supply-valve in closed position, and means for independently reciprocating the other supply-valve, substantially as set forth.

3. A rotary engine, consisting of a cylindrical casing, a cylindrical rotary piston in said casing, an abutment on said piston, a valve-chest on said casing provided with steam inlet and outlet ports, two swinging abutments arranged in the lower part of said valve-chest, reciprocating supply-valves located at the opposite ends of said valve-chest, operating-rods provided with hooked ends and connected with the stems of said supply-valves, a rocking lever engaging one of said operating-rods at a time, a cam on the piston-shaft for actuating said rocking lever, thumb-levers pivoted to the valve-chest, means connecting said thumb-levers with the swinging abutments, and a reversing mechanism connecting said thumb-levers, substantially as set forth.

4. The combination, with a cylindrical casing, of interior segmental cams on the heads of said casing, a cylindrical rotary piston in said casing, an abutment on said piston, a packing for said abutment, and a spring-actuated stirrup connected with said packing, and adapted to be engaged by the segmental cams on the heads of the casing for withdrawing the packing into the piston-abutment while the latter passes over the supply and exhaust ports of the engine, substantially as set forth.

5. The combination, with a cylindrical casing, of a cylindrical rotary piston in the same, an abutment on said piston, a packing, means for holding said packing below the edge of the abutment when passing over the supply and exhaust ports of the casing, a valve-chest above the cylinder, provided with steam inlet and exhaust ports, reciprocating supply-valves at opposite ends of said chest, two swinging abutments in the lower part of the valve-chest, a valve-operating gear, a rocking lever engaging said valve-operating gear, a cam on the piston-shaft engaging said rocking lever, means for bringing either valve-operating gear into engagement with the rocking lever for operating the supply-valve, and means for simultaneously operating said swinging abutments, substantially as set forth.

6. In a rotary engine, the combination of a casing having an opening in its wall, a piston mounted rotatably in said casing, an abutment between said piston and cylinder, a packing carried by said abutment, means actuating said packing in outward direction toward the casing, and means drawing said packing in inward direction during the passage of the abutment over said opening, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

WALTER JAMIESON.

Witnesses:
PAUL GOEPEL,
JOSEPH H. NILES.