No. 626,595. Patented June 6, 1899.

E. W. COLLINS.

ROTARY ENGINE.

(Application filed May 17, 1898.)

(No Model.) 2 Sheets—Sheet 1.

FIG. 1.

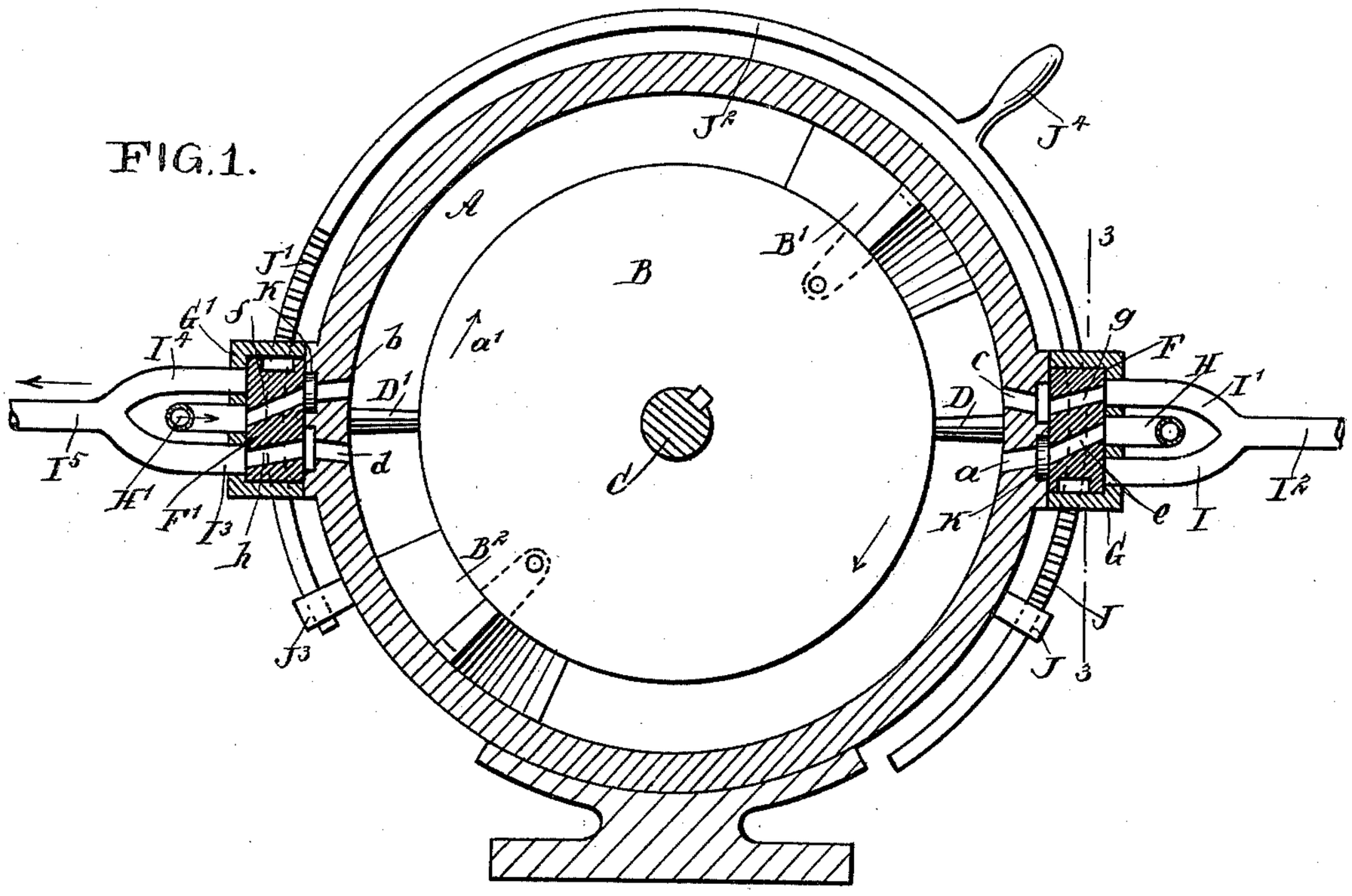

FIG. 2.

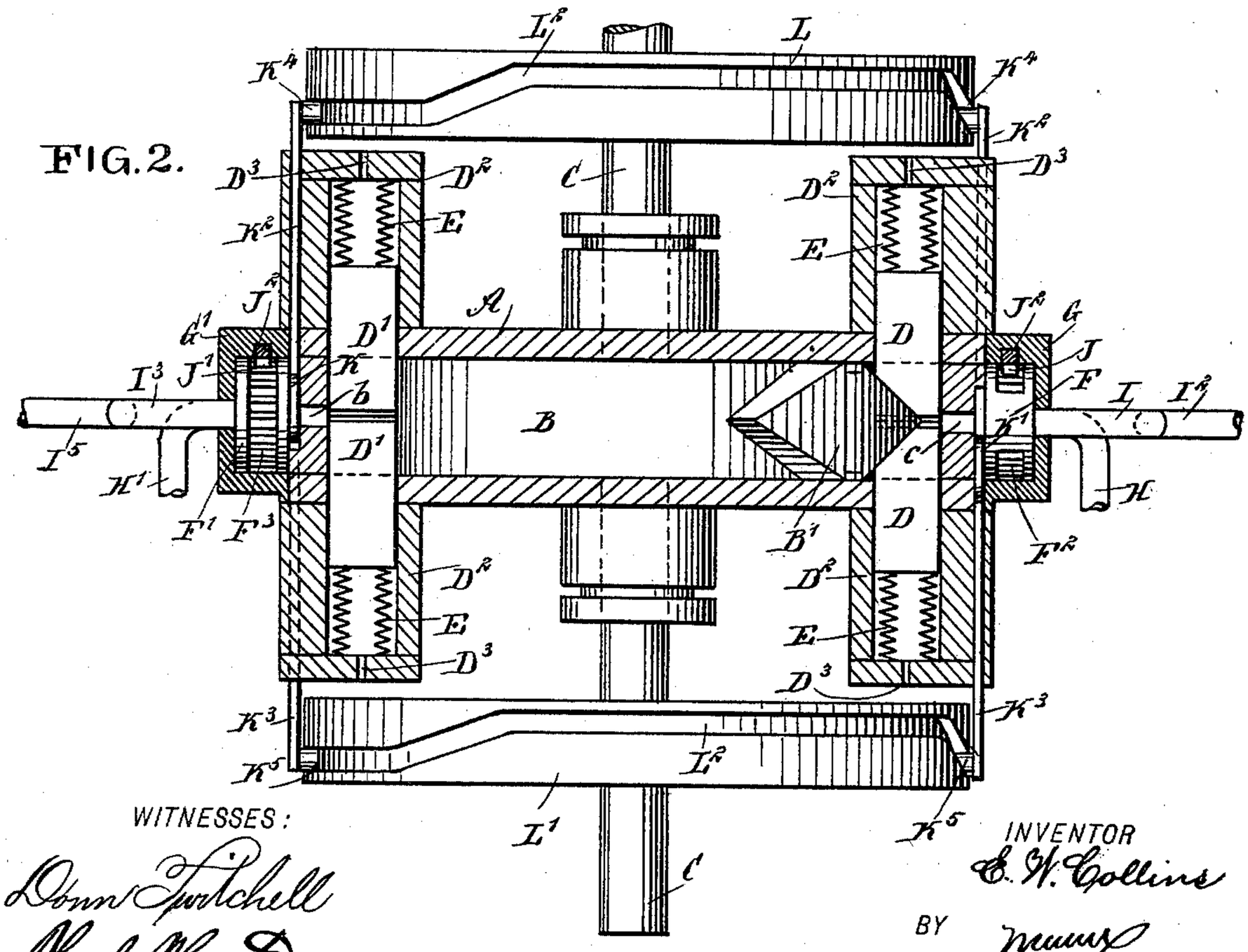

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FIG. 3.

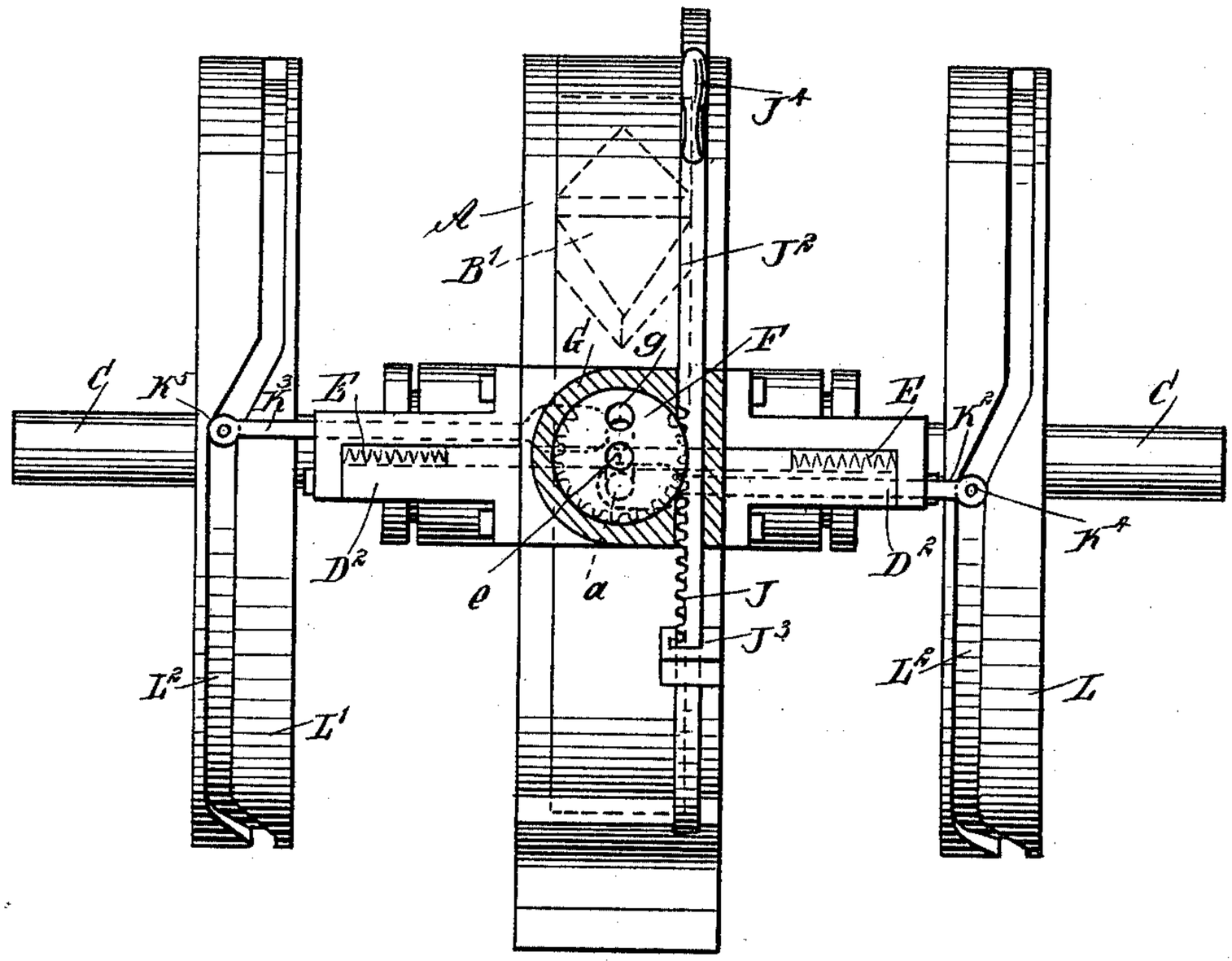


FIG. 4.

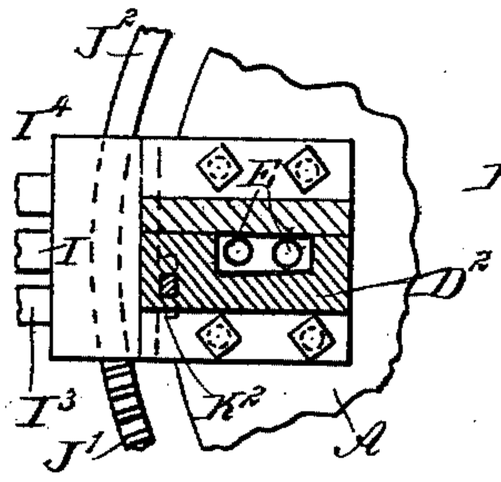


FIG. 5.

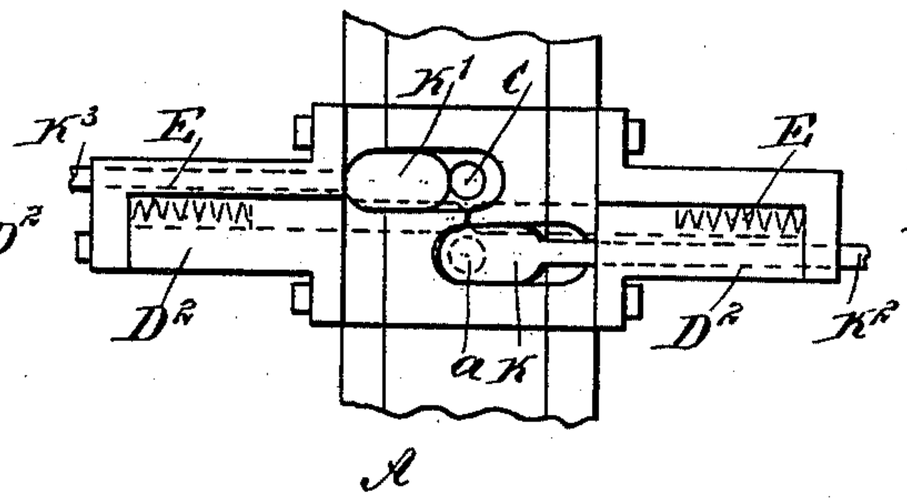
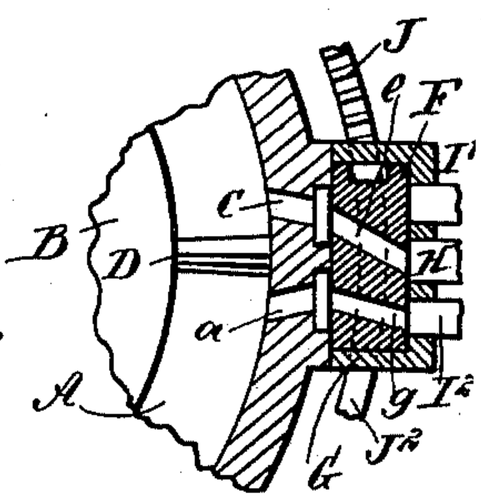


FIG. 6.



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EDWARD WILLIAM COLLINS, OF COALVILLE, IOWA.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 626,595, dated June 6, 1899.

Application filed May 17, 1898. Serial No. 680,947. (No model.)

To all whom it may concern:

Be it known that I, EDWARD WILLIAM COLLINS, of Coalville, in the county of Webster and State of Iowa, have invented a new and Improved Rotary Engine, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved rotary engine which is simple and durable in construction, very effective in operation, arranged to utilize the motive agent to the fullest advantage, to properly balance the working parts and insure a steady and easy running of the engine, and to permit of convenient reversing of the engine whenever desired.

The invention consists of novel features and parts and combinations of the same, as will be fully described hereinafter and then pointed out in the claims.

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 figures.

Figure 1 is a cross-section of the improvement. Fig. 2 is a sectional plan view of the same. Fig. 3 is a side elevation of the same with part in section on the line 3 3 of Fig. 1. Fig. 4 is a cross-section of the abutment-casing. Fig. 5 is a side elevation of the cut-off valves and with the reversing-valve and casing removed, and Fig. 6 is a cross-section of one of the valves in a reverse position.

The improved rotary engine is provided with a cylinder A, in which is mounted to rotate a concentric piston B, secured on a shaft C, journaled in suitable bearings in the heads of the cylinder A, as indicated in Figs. 2 and 3. On the peripheral surface of the piston B and diametrically opposite each other are secured the piston-heads B′ B², approximately lozenge shape, as indicated in Figs. 2 and 3, the outer surface of said heads being in contact with the inner surface of the cylinder and with the apexes standing approximately at the middle of the piston to engage and open the sets of abutments D D and D′ D′, mounted to slide longitudinally in suitable casings D², made in sections and secured to the heads of the cylinder A, as shown. The sets of abutments D and D′ are located diametrically opposite each other, and each abutment is slightly beveled at its inner end to permit the apexes of the piston-heads B′ and B² to readily pass between two abutments, so as to open the same against the tensions of springs E, held in the outer end of the casings D² and normally holding the pair of abutments in a closed position—that is, with their inner ends in contact with each other, as indicated at the left in Fig. 2.

The extreme outer ends of the abutment-casings D² are formed with apertures D³ for the ingress and egress of air on the inward and outward movement of the abutments. Below the abutments D is arranged a port *a*, and diametrically opposite this port and above the abutments D′ is arranged a port *b*, and similar ports *c* and *d* are arranged opposite each other, the port *c* being above the abutments D and the port *d* below the abutments D′. The ports described may be either inlet or exhaust ports, according to the direction in which the engine is to be run, and, as shown in Fig. 1, the ports *a* and *b* are inlet-ports and the ports *c* and *d* are exhaust-ports, the piston traveling in the direction of the arrow *a′*. The ports *a* and *b* are adapted to register with ports *e* and *f*, and the ports *c* and *d* are adapted to register with ports *g* and *h*, respectively, the ports *e* and *g* being arranged in a revoluble valve F and the ports *f* and *h* in a revoluble valve F′. The valves F and F′ are mounted to turn in suitable casings G G′, respectively, secured to the outside of the cylinder A, at the opposite sides thereof.

As shown, the port *e* registers with a steam-inlet pipe H and the port *f* registers with an inlet-pipe H′, both pipes being connected with a suitable source of steam-supply. The port *g* registers with a branch pipe I′ of an exhaust-pipe I², but is also adapted to register with a branch pipe I, likewise leading to the pipe I² when the valve F is in a reverse position, as shown in Fig. 6. The port *h* registers with a branch pipe I³, leading to an exhaust-pipe I⁵, and said port is also adapted to register with a branch pipe I⁴, likewise leading to the pipe I⁵.

Now in order to reverse the valves F F′, I provide the same with peripheral teeth F² F³, respectively, in mesh with segmental teeth J J′, respectively, formed on a segment J², fitted to slide in suitable bearings J³, secured to the outside of the cylinder A. On the segment J² is arranged a handle J⁴, adapted to be taken hold of by the operator for imparting a sliding motion to the said segment in

its bearings and causing the segmental teeth J and J′ to give a half-turn to the said valves for reversing the engine whenever desired.

In order to cut off the steam at a desired time to allow the steam to work expansively in the cylinder against the piston-heads, I provide cut-off valves K K′ for each set of ports *a c* and *f h*, said valves being fitted to slide in bearings in the cylinder on the inner faces of the valves F or F′. The cut-off valves K K′ have valve-stems K^2 K^3, respectively, fitted to slide in suitable bearings in the abutment-casings D^2, the outer ends of said valve-stems carrying friction-rollers K^4 K^5, engaging cam-grooves L^2 in cam-wheels L L′, secured on the main driving-shaft C. Now by the arrangement described the valves K K′ are moved inward at the proper time to cut off the steam when it is desired to allow the steam to work expansively in the cylinder A.

The operation is as follows: When the several parts are in the position illustrated in Figs. 1, 2, and 3, then live steam has just been cut off at the ports *e* and *f* at the cut-off valves K, the steam in the cylinder now operating expansively between the abutments D and piston-head B^2 and the abutments D′ and the piston-head B′. The exhaust-ports *d* and *c* in the front of the piston-heads are in register with the ports *g* and *h* in the valves F F′, so that the exhaust-steam can pass out through the pipes I′ I^2 and I^3 I^5. On a further rotation of the piston B in the direction of the arrow *a*′ the piston-head B′ passes between the abutments D, so as to open the same and allow the piston-head to pass, and at the same time the piston-head B^2 passes between the abutments D′ to open the same and allow said head to move onward. As soon as the piston-heads have passed the abutments live steam passes into the cylinder between the abutments and the heads, as the valves K are now open, so that live steam presses against said piston-heads to force the same forward in the direction of the arrow *a*′. Live steam passes into the cylinder at opposite sides until the valves K disconnect the inlet-ports, as previously described, so that the steam works expansively during the rest of the stroke. When it is desired to reverse the engine, the operator moves the handle J^4, as previously described, to revolve the valves F F′, so that the port *g* connects the port *a* with the exhaust-pipe I^2, and the port *e* connects the port *c* with the inlet-pipe H, so that live steam passes into the cylinder above the abutments D and acts on the piston B′, so as to rotate the piston B in the inverse direction of the arrow *a*′. A similar action takes place on the other side of the cylinder, as the port *h* is now in register with the port *b* and the pipe I^4 and the port *f* connects the port *d* with the steam-inlet pipe H′.

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

1. A rotary engine, comprising a cylinder having oppositely-arranged sets of inlet and exhaust ports, a revoluble piston in the cylinder and provided with lozenge-shaped heads arranged diametrically opposite each other, sets of spring-pressed sliding abutments arranged at diametrically opposite sides of the cylinder, said abutments extending into the cylinder and adapted to be opened by the said heads, cut-off valves at each side of the cylinder for controlling the inlet of the motive agent, and a reversing-valve for each set of cylinder-ports, substantially as described.

2. A rotary engine comprising a cylinder having oppositely-arranged sets of inlet and exhaust ports, a concentric piston rotatable in said cylinder and provided with oppositely-arranged lozenge-shaped piston-heads, oppositely-arranged sets of abutments slidable in said cylinder with a set of abutments between the ports of each set of ports, and a rotatable reversing-valve for each set of cylinder-ports, and having two ports for connection with the cylinder-ports, substantially as shown and described.

3. A rotary engine comprising a cylinder, a concentric piston rotatable in the cylinder and provided with lozenge-shaped heads, sets of oppositely-arranged spring-pressed abutments extending into the cylinder and adapted to be pressed apart or opened by the said heads, rotatable reversing-valve, sliding cut-off valves for controlling the inlet of the motive agent to the cylinder, and cams on the piston-shaft, for controlling the movement of said cut-off valves, substantially as shown and described.

4. A rotary engine, comprising a cylinder having oppositely-arranged sets of inlet and exhaust ports, a concentric piston rotatable in the cylinder and provided with oppositely-arranged lozenge-shaped piston-heads, oppositely-arranged sets of spring-pressed abutments sliding in the cylinder and adapted to be forced apart by the said heads, a rotatable reversing-valve for each set of cylinder-ports, and a sliding cut-off valve for each cylinder-port, substantially as described.

5. A rotary engine, comprising a cylinder having oppositely-arranged sets of inlet and exhaust ports, a concentric piston rotatable in the cylinder and provided with diametrically oppositely arranged lozenge-shaped heads, oppositely-arranged sets of spring-pressed abutments, said abutments sliding laterally into the cylinder and adapted to be forced apart by the said heads, a rotatable reversing-valve at each side of the cylinder, and a sliding cut-off valve for each cylinder-port, said valves sliding in bearings in the cylinder at the inner faces of the rotatable reversing-valves, substantially as herein shown and described.

EDWARD WILLIAM COLLINS.

Witnesses:
M. F. HEALY,
E. V. BROWN, Jr.