

No. 774,056.

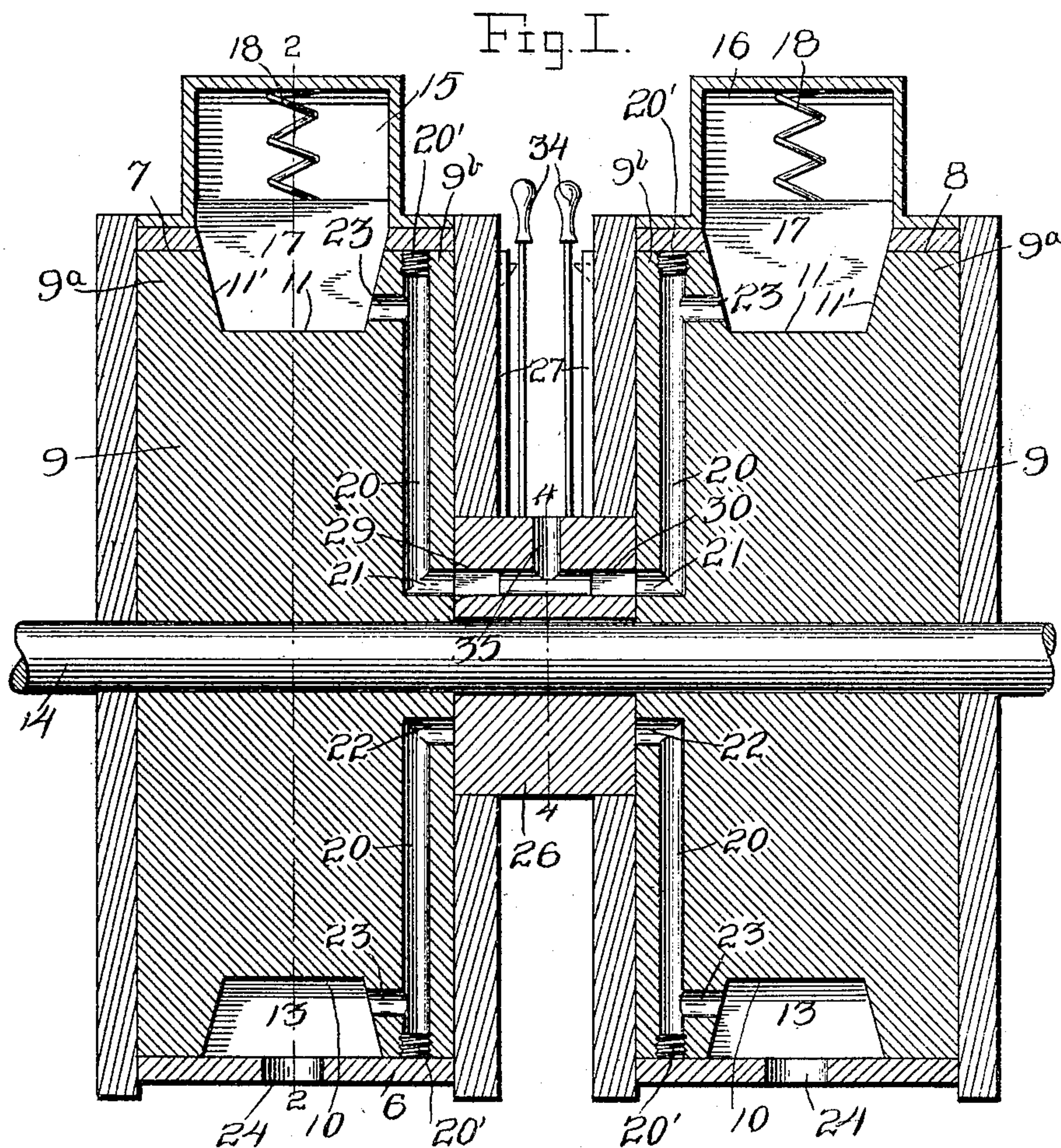
PATENTED NOV. 1, 1904.

A. L. ESTES.
ROTARY ENGINE.

APPLICATION FILED MAR. 25, 1904.

NO MODEL.

2 SHEETS—SHEET 1



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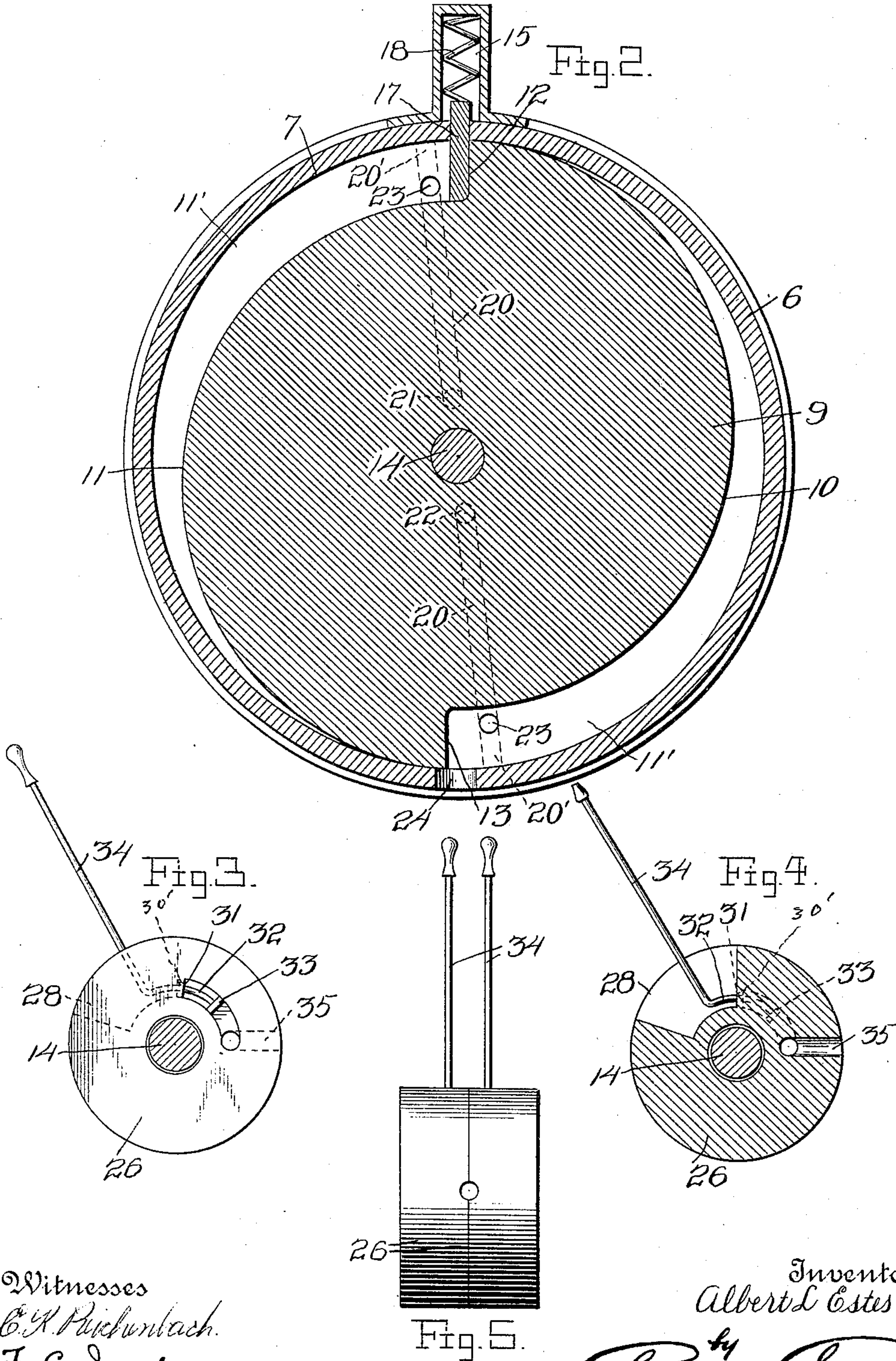
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UNITED STATES PATENT OFFICE.

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ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 774,056, dated November 1, 1904.

Application filed March 25, 1904. Serial No. 199,908. (No model.)

To all whom it may concern:

Be it known that I, ALBERT L. ESTES, a citizen of the United States, residing at Yellville, in the county of Marion, State of Arkansas, have invented certain new and useful Improvements in Rotary Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to engines, and more particularly to the class known as "rotary" engines, and has for its object to provide an engine of this nature which will be so constructed that the length of duration of the steam admission may be varied to suit different degrees of energy required, a further object being to provide such an engine in which the parts will be readily accessible when repairs or replacements are necessary.

In the drawings forming a portion of this specification, and in which like numerals of reference indicate similar parts in the several views, Figure 1 is a longitudinal section of the complete engine. Fig. 2 is a longitudinal section of one of the pistons, taken on line 2 2 of Fig. 1. Fig. 3 is an end view of the valve-cylinder. Fig. 4 is a section on line 4 4 of the valve-cylinder. Fig. 5 is a view of a modified form of a portion of the engine.

Referring now to the drawings, the present invention comprises a cylindrical casing 6, which contains the cylinders of the engine. This casing includes two compartments 7 and 8, each of which contains a piston 9. The two compartments 7 and 8, with their pistons, are identical, so that a description of one will suffice for both. Each of the pistons 9 comprises a disk having piston heads or shoulders 12 and 13 projecting radially at diametrically opposite points, one face of each shoulder being flat, while the other face is convex and slopes gradually to the face of the piston proper, so that there are formed two oppositely-disposed cam-grooves 10 and 11, the sides of which are formed by outwardly-projecting portions 9^a and 9^b. The sides of the cam-grooves are beveled, as shown at 11'.

In the casing 6 there is disposed a shaft 14, which passes through both of the compart-

ments 7 and 8, and the pistons 9 are disposed one upon either end of this shaft. At the upper side of the casing are disposed two chambers 15 and 16, which communicate with the compartments 7 and 8, respectively, and in these chambers are disposed plates 17, which are movable vertically within the chambers and which are held normally at the downward limits of their motion by springs 18. These plates 17 are so disposed that they will enter the grooves 10 and 11, and their side edges are beveled to conform to the bevel of the grooves. As will be apparent, these plates 17 act as abutments, which are raised within the chambers as the pistons revolve, and by reason of the beveling of the wearing-faces a tight union is always assured. In the outer periphery of the portions 9^b and extending downwardly into the piston at right angles to the shaft 14 are a pair of passages 20, which enter from diametrically opposite points of the piston. These points lie adjacent to the shoulders 12 and 13. The inner ends of the passages 20 are turned at right angles and communicate with the inner face of the piston, as shown at 21 and 22, and adjacent to their outer ends are passages 23, which communicate with the peripheral grooves adjacent to the shoulders 12 and 13. The outer ends of the passages 20 are closed by plugs 20', so that these passages are accessible only through the small passages 21 and 22 and 23.

In the lower portions of the compartments 7 and 8 are exhaust-ports 24, which communicate with the cam-grooves 10 and 11 as the pistons revolve, thus permitting of the egress of the expanded steam.

Between the pistons 9 there is loosely disposed upon the shaft 14 a cylindrical member 26, which is held from rotation upon the shaft by braces 27. In the periphery of this cylindrical member there is a recess 28, communicating with which are a pair of arc-shaped grooves 29 and 30, which also communicate with the end faces of the cylindrical member which bear against the pistons 9. These grooves are so disposed that as the pistons revolve the passages 21 and 22 alternately register therewith. The communication of the grooves 29 and recess 28 is through openings

30', which are provided with stuffing-boxes 31, and in these stuffing-boxes are disposed shafts 32, which are attached at their inner ends with slides 33, which just fit the grooves 29, the outer ends of the shaft being connected to hand-levers 34.

The cylindrical member 26 has a steam-passage 35 therein, which is connected with both of the grooves 29.

It will be apparent that if steam be admitted to the passage 35 it will pass into the grooves 29 and will be communicated through one of the passages 21 or 22 to a passage 20, by which it will be conducted to one of the cam-grooves 10 and 11, it being understood that these ports are so arranged that one of the passages 21 and 22 is always in registration with one of the grooves 29. When the steam enters the peripheral groove, as just described, it will expand between the plates 17 and the shoulder of the groove, which will cause the piston to revolve, and when this groove has reached the lower portion of the compartment the expanded steam will be allowed to pass out through the exhaust-port 24. By this time the remaining peripheral groove will have reached the upper portion of the compartment and will receive steam, it being understood that the grooves of the remaining piston are disposed oppositely, so that two grooves, one in each piston, will receive steam at the same time. After the engine has attained a high speed it may be blocked up by moving the hand-lever 34 and slides 33 to decrease the length of the grooves 29. It is thus possible to vary the duration of the admission of steam to compensate for the different degrees of energy required from the engine.

If desired, the member 26 may be formed of two parts, as shown in Fig. 5.

The shaft 14 is provided with a fly-wheel and suitable lubricators, and other steam-engine adjuncts are provided.

In practice modifications of the specific construction shown may be made and any suitable materials and proportions may be used for the various parts without departing from the spirit of the invention.

What is claimed is—

1. A rotary engine comprising a cylinder having an expansion-chamber provided with inlet and outlet ports, a piston mounted rotatably in the cylinder and having a peripheral groove and piston-heads interrupting the groove, said piston-heads having cam-faces at one side, and an abutment movable into and out of the groove of the piston and disposed for engagement by the cam-faces of the piston-head, the piston having valve-openings communicating with its peripheral groove and disposed to register successively with the inlet-port, the portions of said groove at opposite sides of the piston-heads being adapted to communicate with the outlet-port successively.

2. A rotary engine comprising a cylinder having separate expansion-chambers therein, a shaft passed centrally through the cylinder, a piston member in each chamber fixed upon the shaft, each of said piston members having a peripheral groove and piston-heads in the grooves and having each a cam-face and having inlet-valve passages in the side walls of its groove, each of the chambers of the cylinder having inlet and outlet ports, the inlet-port being disposed for registration by the inlet-passages, and the outlet-port being disposed for communication with the groove, and an abutment slidably mounted and movable into and out of the peripheral groove of each piston member and means for holding the abutments yieldably in the grooves.

3. A rotary engine comprising a cylinder having an expansion-chamber provided with inlet and outlet ports, a piston rotatably mounted in the cylinder and having a peripheral groove and a piston-head interrupting the groove and having cam-faces at one side, the sides of the groove being beveled, and an abutment movable into and out of the groove of the piston and disposed for engagement by the cam-faces of the piston-head, the sides of the abutment being beveled to correspond with the bevel of the groove, the cylinder being provided with passages for the ingress and egress of steam to and from the expansion-chamber.

4. A rotary engine comprising a cylinder having an expansion-chamber provided with inlet and outlet ports, a piston rotatably mounted in the cylinder and having a peripheral groove and piston-head interrupting the groove and having cam-faces at one side, and an abutment movable into and out of the groove of the piston and disposed for engagement by the cam-faces of the piston-head, the piston having valve-openings formed in the side walls of its peripheral groove and disposed to register with the inlet-port, the cylinder having an outlet-port therein disposed for communication with the peripheral groove, and means for varying the length of duration of the admission of steam.

5. A rotary engine comprising a cylinder having a piston rotatably mounted therein, said piston having a peripheral groove, and piston-heads interrupting the groove, said piston having inlet-passages communicating with the groove and with a face of the piston, a member having a groove disposed for registration with the inlet-passages alternately as the piston revolves, said groove communicating with a steam-supply, and means for varying the length of the groove, and an abutment movable into and out of the groove of the piston.

6. A rotary engine comprising a cylinder having an expansion-chamber, a shaft revolvably mounted centrally of the cylinder, a piston mounted upon the shaft and revoluble therewith and having piston-heads, an abutment

movable into and out of the paths of movement of the piston-heads, means for holding the abutment yieldingly in its first-named position, means for moving the abutment against
5 the action of the holding means, said piston having inlet-passages communicating with the space between the abutment and piston-heads and with a face of the piston, a member disposed against the face of the piston and having
10 a groove disposed for alternate registration with the inlet-passages as the piston revolves, said groove communicating with a steam-sup-

ply, a follower disposed within the groove and movable longitudinally thereof to vary the length of the groove, and a handle connected with the follower for movement of the
15 latter longitudinally of the groove, said cylinder having an exhaust-port therein.

In testimony whereof I affix my signature in presence of two witnesses.

ALBERT L. ESTES.

Witnesses:

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