(No Model.) 2 Sheets—Sheet 1.

J. B. THOMAS.

ROTARY ENGINE.

No. 600,460. Patented Mar. 8, 1898.

Fig. 3.

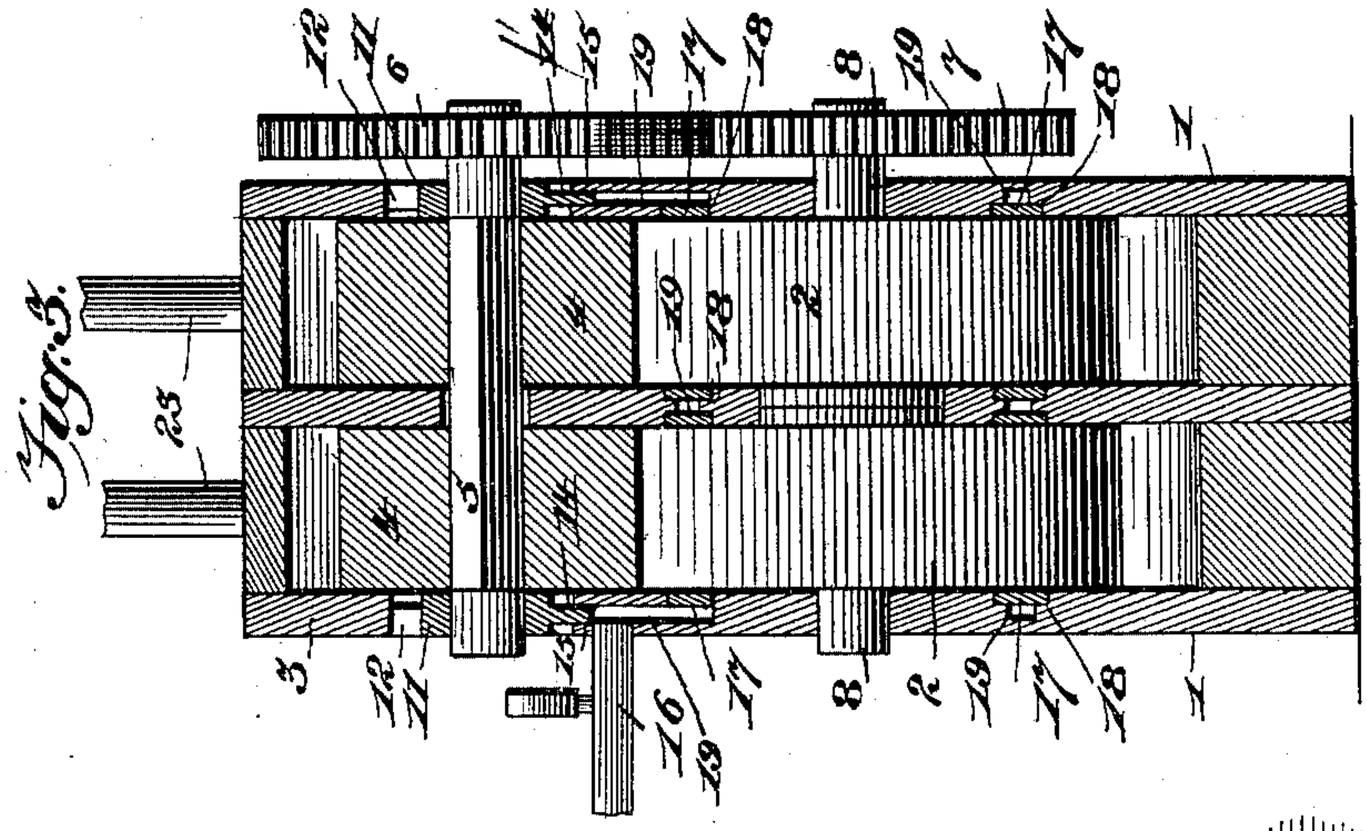
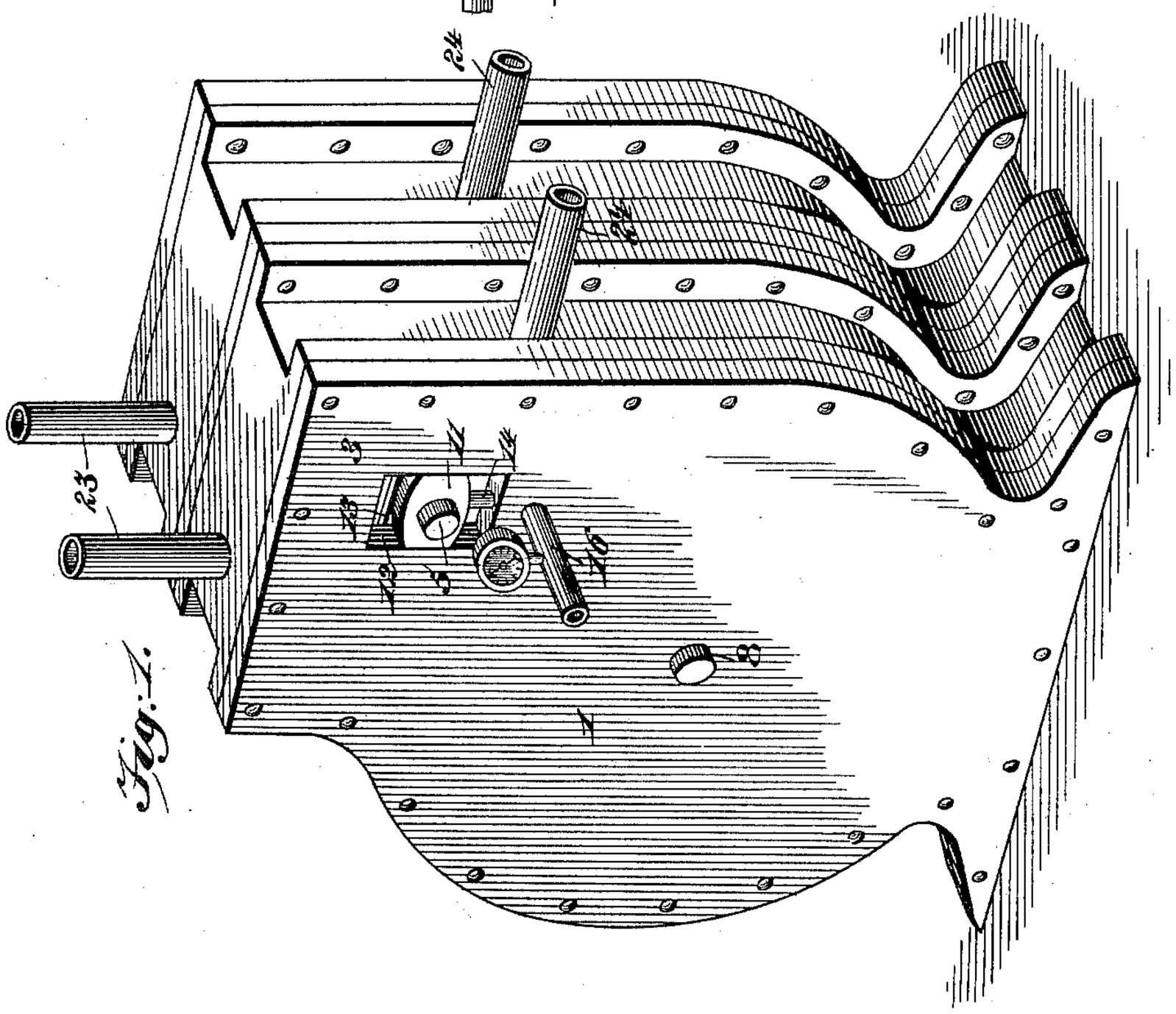


Fig. 4.



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(No Model.) 2 Sheets—Sheet 2.

J. B. THOMAS.

ROTARY ENGINE.

No. 600,460. Patented Mar. 8, 1898.

Fig. 3.

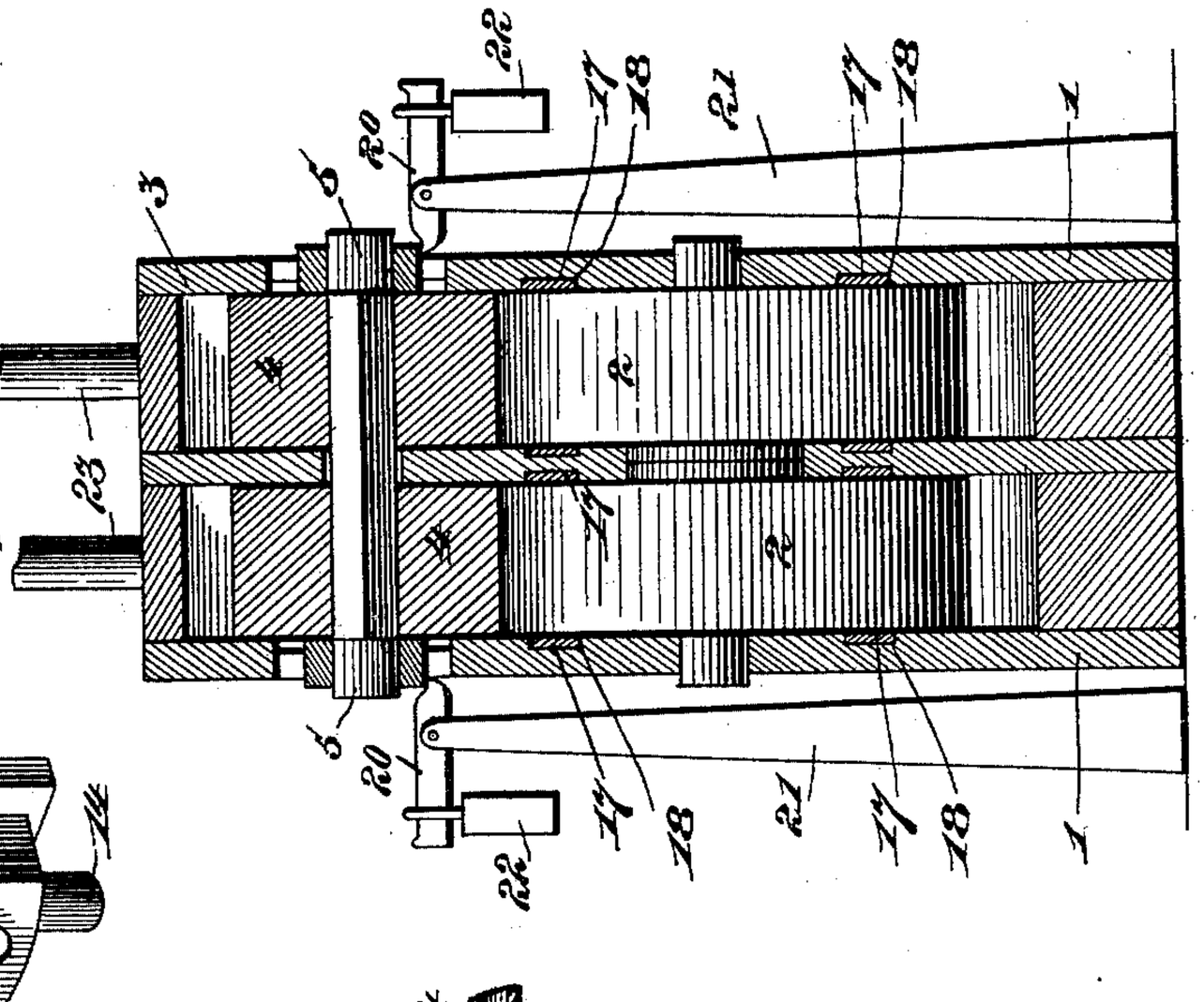


Fig. 4.

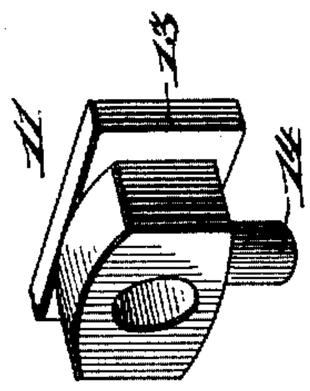
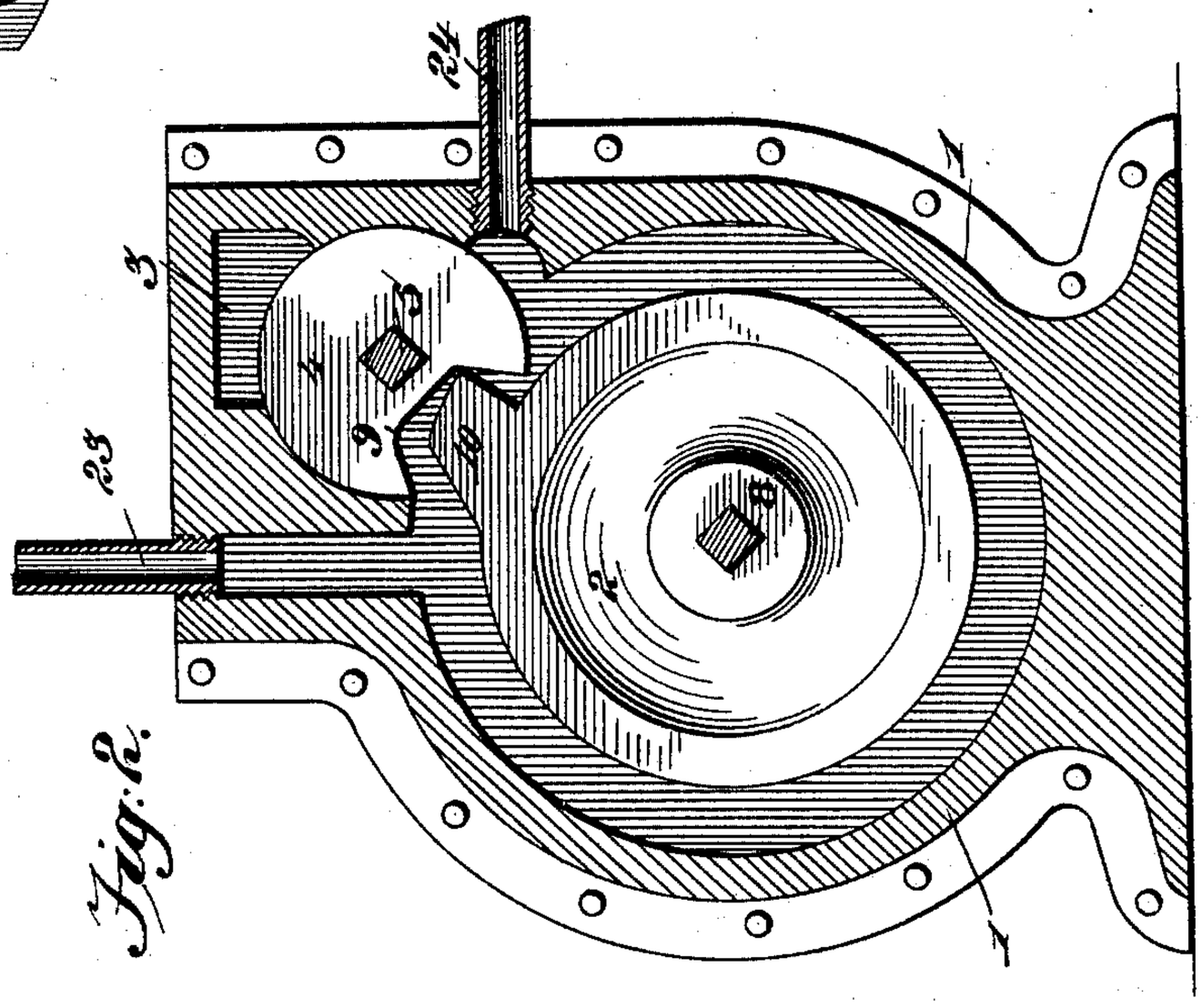


Fig. 2.



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UNITED STATES PATENT OFFICE.

JAMES BRYANT THOMAS, OF ST. LOUIS, MISSOURI.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 600,460, dated March 8, 1898.

Application filed April 12, 1897. Serial No. 631,804. (No model.)

To all whom it may concern:

Be it known that I, JAMES BRYANT THOMAS, a citizen of the United States, residing at St. Louis, State of Missouri, have invented a new and useful Rotary Engine, of which the following is a specification.

My invention relates to rotary engines, and has for its object to provide a simple and efficient construction and arrangement of parts, including means for relieving the piston core or body of unnecessary friction by the weight of a rolling abutment mounted for radial adjustment in order to take up wear and insure a steam-tight contact with said piston core or body, and, furthermore, to provide efficient means for applying variable yielding resistances to the journal-blocks of the rolling abutment and also to the packing-strips for the piston core or body, whereby the pressure applied thereto may be varied by exterior means to suit the pressure of the motive agent employed for driving the piston.

Further objects and advantages of this invention will appear in the following description, and the novel features thereof will be particularly pointed out in the appended claims.

In the drawings, Figure 1 is a perspective view of an engine constructed in accordance with my invention. Fig. 2 is a vertical section of the same, taken perpendicular to the plane of the piston-axis. Fig. 3 is a similar view taken in a plane parallel with the piston-axis. Fig. 4 is a detail view in perspective of one of the rolling-abutment bearing-blocks. Fig. 5 is a detail view showing a slightly-modified form of means for counterbalancing the weight of the fixed abutment.

Similar numerals of reference indicate corresponding parts in all the figures of the drawings.

1 designates a cylinder or casing in which is mounted a concentric piston 2, said casing having an offset 3, in which is mounted a fixed abutment 4 of the rolling type, the same having its spindle 5 connected by intermeshing gears 6 and 7 with the shaft 8 on the piston-core. Said abutment is provided with a recess 9 to allow the wing or moving abutment 10 of the piston to pass, as shown in the ordinary construction. The casing preferably comprises two cylinders with a corresponding number of pistons and fixed abutments, as shown in Fig. 3, said pistons and fixed abutments being carried, however, by common shafts, and hence being connected for simultaneous movement by the common gears 6 and 7 above described.

The spindle of the fixed abutment is mounted in bearing-blocks 11, which are fitted to slide in guides 12 in the cylinder-heads, the same being flanged, as shown at 13, at their inner ends, and these bearing-blocks are fitted with depending plungers 14, arranged to operate in chambers 15, also formed in the cylinder-heads, whereby a yielding force—such as compressed air, steam, or the equivalent thereof—admitted to the pressure-chambers has the effect, by acting upon the plungers, of counteracting a portion of the downward tendency, due to weight, of the fixed abutment.

In the construction illustrated in the drawings Figs. 1 to 4 I have shown the pressure-chamber adapted to be supplied with compressed air by means of a pump (not shown) which is connected with said chamber by means of a supply-pipe 16, and it is obvious that by varying the pressure the weight of the fixed abutment may be counterbalanced more or less to give the desired pressure of the surface of said abutment upon the surface of the core or body of the piston without allowing such an excessive pressure as would result in impeding the movement of the piston.

It is also possible and desirable under certain circumstances to employ a yielding pressure fluid for holding packing-strips 17 in contact with the side surfaces of the piston core or body, said strips being arranged in seats 18 in the heads of the cylinder and said seats being connected by means of channels 19 with the pressure-chambers. This construction is illustrated in Fig. 5 in connection with one of the bearing-blocks; but it will be understood that it is duplicated at the opposite side of the cylinder, although a single pump may be employed to supply pressure to both chambers.

Obviously the supply-pipe for fluid-pressure should be fitted with a gage, whereby the amount of pressure may be ascertained and regulated. It is obvious that the pres-

sure upon the plunger of the bearing-block and upon the surfaces of the packing-strips may be varied to suit the pressure of the motive agent applied to the piston, and by connecting the pressure-chamber and the packing-ring seats with a pressure supplied by independent means it is obvious that the pressure admitted to the chamber may be diminished, while that which is admitted to the packing-ring seat may be increased as the pressure of the motive agent is increased to counteract any tendency of the motive agent to escape from the cylinder or pass between the piston-core and the cylinder-heads. The outer periphery of the packing-ring is equal in diameter with the piston-core, whereby the pressure of steam within the cylinder around the piston-core does not operate to counteract the effect of the pressure liquid against the packing-rings.

The cylinder feed-port 23 and exhaust-port 24 are arranged at opposite sides of the fixed abutment and contiguous thereto, whereby the pressure of the motive agent, whether direct or by expansion, is applied to the piston-wing or moving abutment during the major portion of the revolution of the piston, and by using the pistons, as above described, in duplicate a dead-center may be avoided by disposing said wings or abutments relatively on the quarter or at any other suitable angle, whereby the pressure upon the rotary member of the engine remains constant.

In Fig. 5 I have illustrated a slightly different construction of yielding means for counterbalancing a portion of the weight of the fixed abutment, the same consisting of a counterbalancing-lever 20, mounted upon a suitable fixed support 21 and provided with an adjustable weight or counterpoise 22, the inner end of said lever being connected with the bearing-block, and hence exerting an upward pressure thereon.

Various changes in the form, proportion, and the minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of this invention.

Having described my invention, what I claim is—

1. In a rotary engine, the combination with a cylinder, a rotary piston, and a rolling abutment arranged above and coöperating with the piston, of bearing-blocks, for the spindle of said rolling abutment, mounted for movement toward and from the axis of the piston, and yielding counterbalancing devices for said bearing-blocks, to counterbalance a portion of the weight of the rolling abutment, and adjustable to vary the pressure of the abutment upon the surface of the piston, substantially as specified.

2. In a rotary engine, the combination with a cylinder, a piston, and a rolling abutment for coöperating with the piston, of bearing-blocks for the spindle of the rolling abutment, said blocks being mounted in guides for movement toward and from the axis of the piston, and yielding means for counterbalancing a portion of the downward pressure of the rolling abutment, the same including plungers connected with the bearing-blocks and operating in pressure-chambers, and means for communicating pressure to said chambers, substantially as specified.

3. In a rotary engine, the combination with a cylinder, a piston, and a rolling abutment for coöperating with the piston, of bearing-blocks mounted for movement toward and from the axis of the piston and having the spindle of the rolling abutment mounted therein, pressure-chambers adapted to receive a variable fluid-pressure, and plungers depending from the bearing-blocks and fitted in said chambers, substantially as specified.

4. In a rotary engine, the combination with a cylinder, a piston, and a rolling abutment for coöperating with the piston, of bearing-blocks mounted for movement toward and from the axis of the plunger and having the spindle of the rolling abutment mounted therein, pressure-chambers adapted to receive a variable fluid-pressure, plungers connected with the bearing-blocks and operating in said chambers, packing-strip seats in communication with a fluid-pressure supply, and packing-strips mounted in said seats for cooperation with the piston, substantially as specified.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

JAMES BRYANT THOMAS.

Witnesses:
M. W. PEARSON,
DEAN T. ROGERS.