

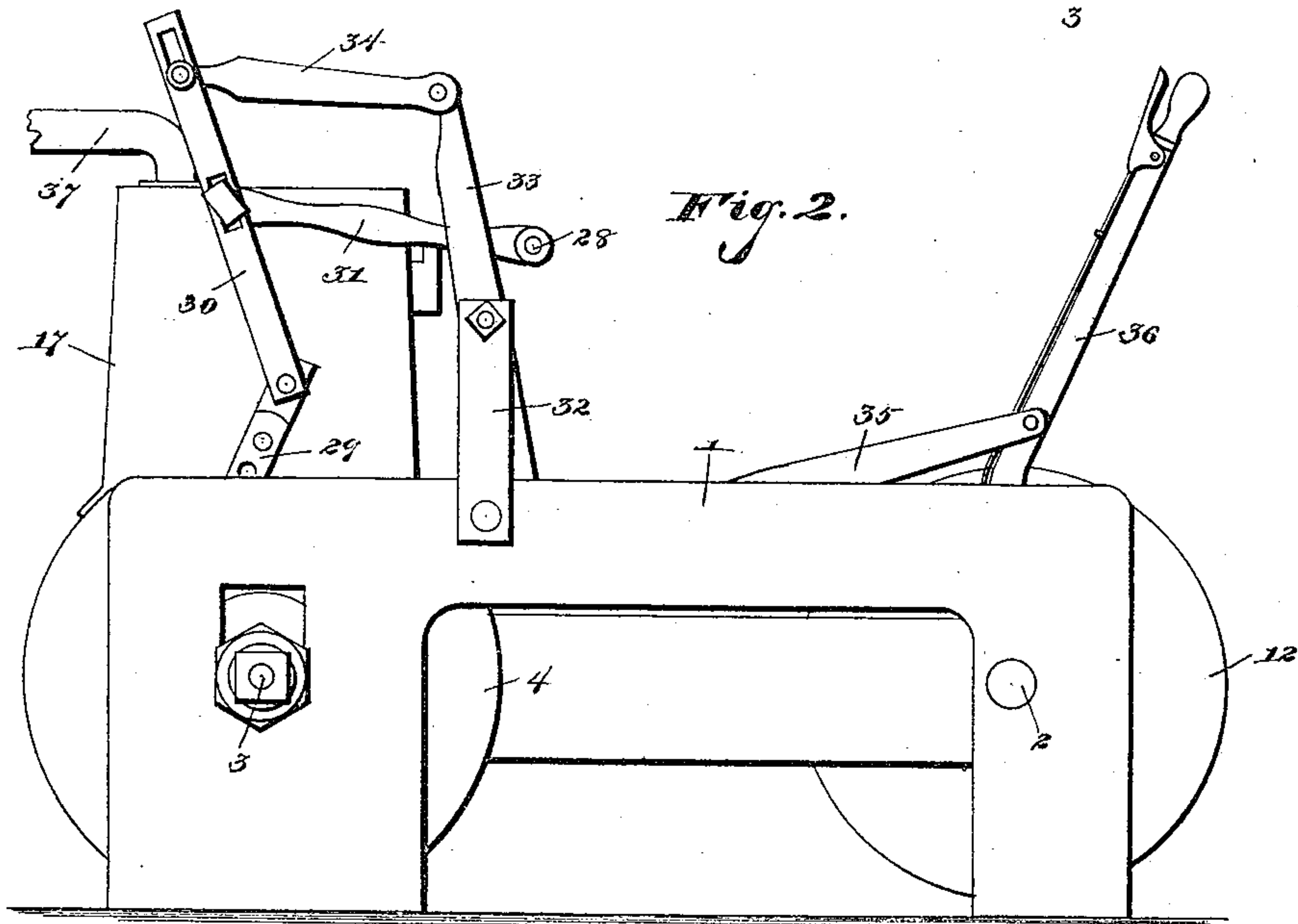
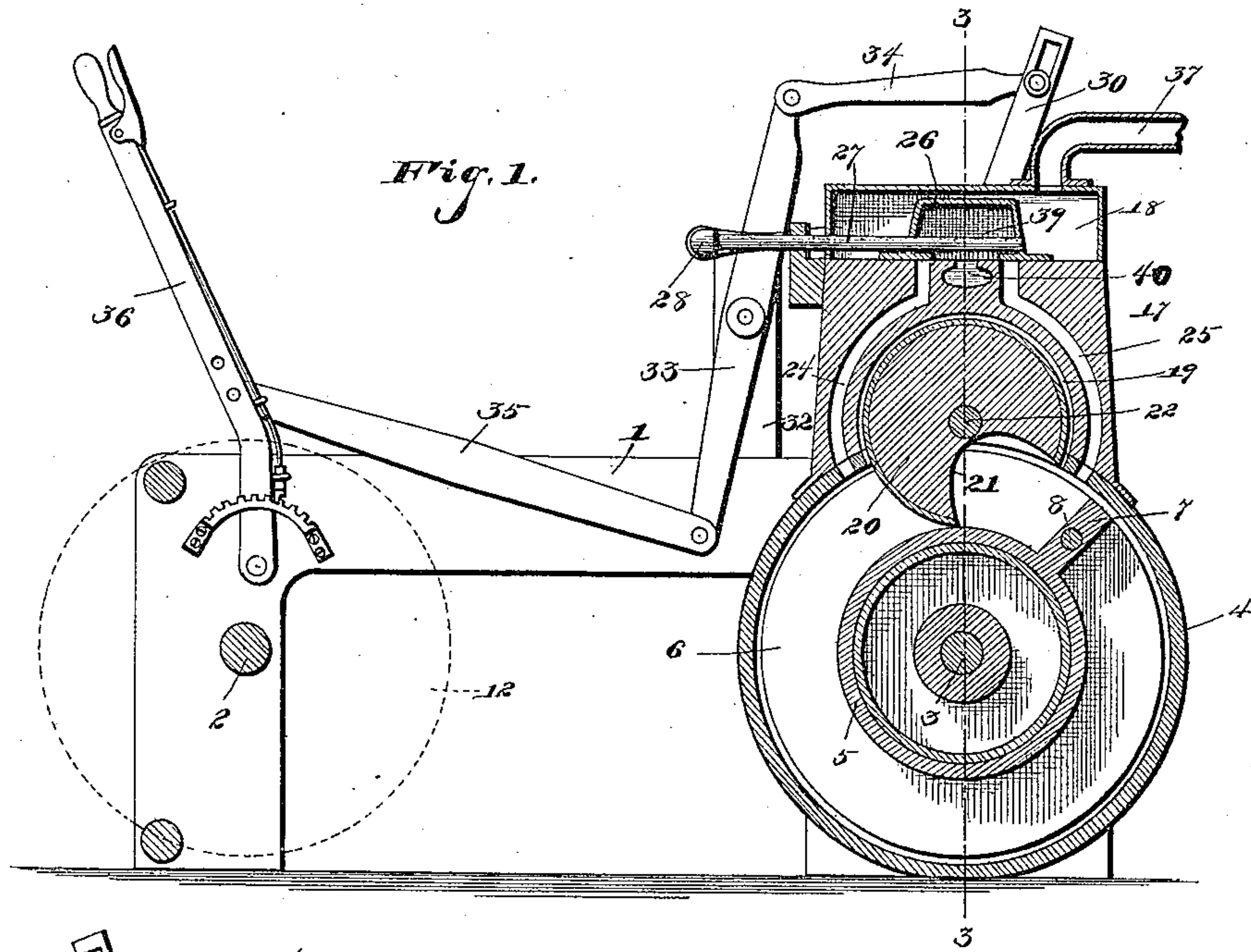
(No Model.)

2 Sheets—Sheet 1.

G. W. WORLEY & R. B. DAVIS.
ROTARY ENGINE.

No. 440,858.

Patented Nov. 18, 1890.



Witnesses

Samuel Ker.

Wm. Bagger.

Inventors

*Geo. W. Worley and
Robert B. Davis.*

By their Attorneys,

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Fig. 3.

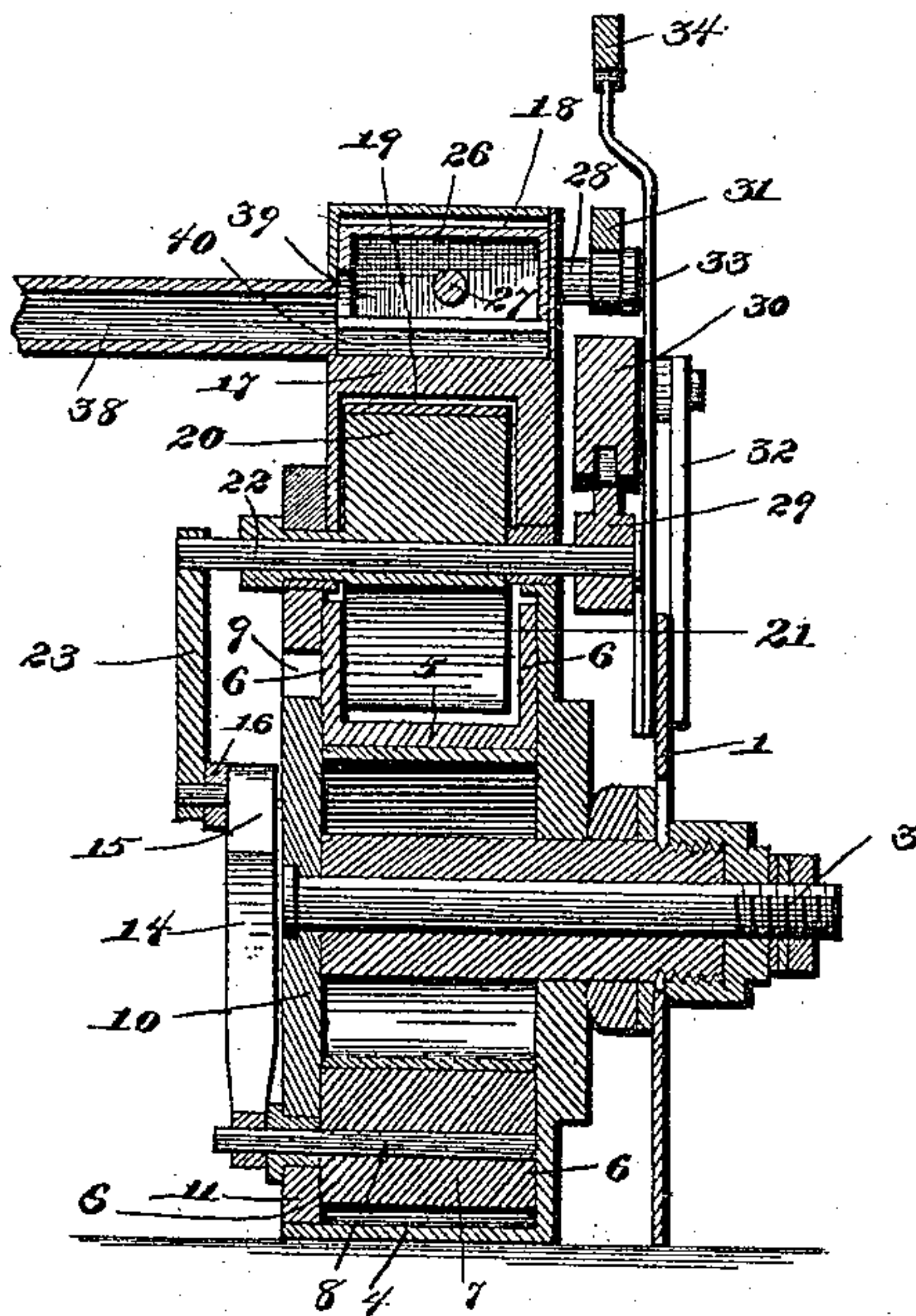
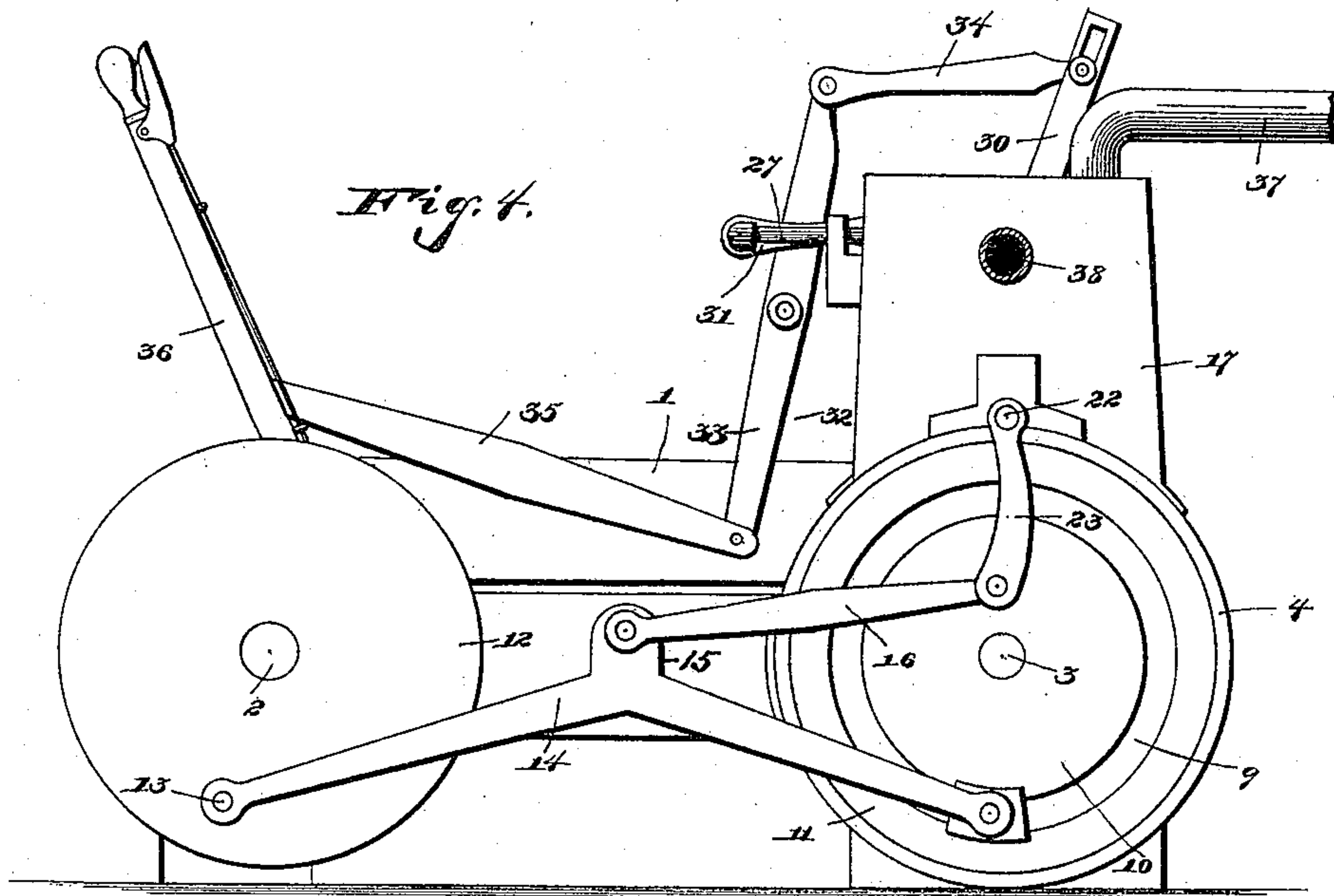


Fig. 4.



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UNITED STATES PATENT OFFICE.

GEORGE W. WORLEY AND ROBERT B. DAVIS, OF ALTOONA, PENNSYLVANIA.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 440,858, dated November 18, 1890.

Application filed July 30, 1890. Serial No. 360,397. (No model.)

To all whom it may concern:

Be it known that we, GEORGE W. WORLEY and ROBERT B. DAVIS, citizens of the United States, residing at Altoona, in the county of Blair and State of Pennsylvania, have invented a new and useful Rotary Engine, of which the following is a specification.

This invention relates to steam-engines, and more especially to that class of rotary engines in which a revolving cylinder is provided with a piston-plate arranged within a suitable casing to receive the impact of the steam.

The invention consists in certain improvements in the construction and arrangement of the parts of the machine, which will be hereinafter fully described, and particularly pointed out in the claims.

In the drawings hereto annexed, Figure 1 is a transverse vertical sectional view of an engine equipped with our improvements. Fig. 2 is a side elevation taken from the rear side of the same. Fig. 3 is a longitudinal sectional view taken on the line 3 3 in Fig. 1. Fig. 4 is a front elevation.

Like numerals of reference indicate like parts in all the figures.

A suitable frame, which is designated by 1, supports the main shaft 2 and the shaft 3, which extends through the cylindrical casing 4. Suitably mounted in the said casing and adapted to revolve upon the shaft 3 is the cylindrical piston 5, which is provided with peripheral flanges 6 6, between which is mounted the piston-plate 7. The latter is mounted on a short shaft 8, which projects through a circumferential groove 9 in the front wall of the cylinder-casing. Said front wall is composed of the central plate 10 and the annular plate 11, which latter is contiguous to the peripheral wall of the casing.

Upon the front end of the main shaft 2 is mounted a disk or balance-wheel 12, having a crank or wrist pin 13, which is connected by a pitman 14 with the front end of the shaft 8, upon which the piston-plate 7 is mounted. The pitman 14 has an upwardly-extending bracket 15, which is connected by a supplemental pitman 16 with the crank of a valve-stem, to be presently more fully described.

Upon the upperside of the cylindrical casing 4 is mounted a casing 17, upon the upper

side of which the steam-chest 18 is mounted. The casing 17, which communicates with the cylindrical casing 4, is provided with a segmental recess 19, affording a bearing for a valve 20, which is mainly cylindrical in shape and which fits between the flanges 6 and bears against the periphery of the revolving cylinder 5. The valve 20, however, is provided with a segmental recess 21 to admit of the passage of the piston-plate 7 during the operation of the machine. The shaft or stem 22, upon which the valve 20 is mounted, projects through the front wall of the casing and has a crank or wrist pin 23, which is connected with one end of the pitman 16, the other end of which is connected with the arm or bracket 15, extending upwardly from the pitman 14. The casing 17 is provided on opposite sides of the oscillating valve 20 with ports or passages 24 and 25, serving alternately for the admission and exhaust of steam to and from the cylindrical casing. Packing-rings of suitable construction are provided to make steam-tight joints at all necessary points.

In the steam-chest 18 is mounted an ordinary reciprocating slide-valve 26, the stem of which 27 extends through a packing-gland in one end of the steam-chest and is provided with a laterally-extending arm or bracket 28. The rear end of the shaft 22, upon which the oscillating valve 20 is mounted, is provided with a crank 29, which is pivotally connected with an upwardly-extending link 30. The latter is connected at a suitable distance from its pivotal connection with the crank 29 by means of a pitman 31 with the bracket 28, extending from the valve-stem 27. Suitably attached to the frame 1 is an upwardly-extending bracket 32, to which is pivoted a lever 33. The upper end of the lever is connected by a pitman 34 with the upper end of the link 30, and the lower end of said lever 33 is connected by a link-rod 35 with the reversing-lever 36, which is conveniently located within control of the engineer. A steam-supply pipe 37 is connected in the usual manner with the steam-chest 18, and the latter also communicates with an exhaust-pipe 38. Said exhaust-pipe communicates through the cavity 39 in the underside of the slide-valve 26 and through the corresponding cavity 40 in the bottom of the steam-chest

with the passage 24 or 25, as the case may be, through which the exhaust is to be carried off.

The operation of our invention and its advantages will be readily understood from the foregoing description, taken in connection with the drawings hereto annexed. As shown in Fig. 1 of the drawings, steam will enter from the steam-chest 18 through the passage 25 in rear of the piston-plate 7, thus rotating the cylinder 5 in the direction indicated by the arrow. When the cylinder rotates, motion is communicated through the pitman 14 to the main shaft, and the supplemental piston 16 will gradually reverse the position of the oscillating valve 20 to place the segmental recess 21 of the latter in position to receive the piston-plate 7 when the cylinder 5 has made a partial rotation. During the revolution of the cylinder 5 steam constantly enters through the passage 25, while the dead steam is exhausted through the passage 24. To reverse the direction of rotation it is only necessary to change the position of the slide-valve 26 by means of the lever and reversing-gear herein described. The steam will then enter through the passage 24 and exhaust through the passage 25, and the direction of rotation will be reversed. The slide-valve 26, moreover, serves as a cut-off, which, when the cylinder 5 has partially completed its revolution, shuts off the supply of steam, the use of which is thus greatly economized.

Our improved rotary engine is free from the objection of back-pressure, which commonly exists in this class of engines. It is adapted to be used upon locomotives or as a stationary engine, and it is simple in construction, durable, and easily managed.

Having thus described our invention, we claim—

1. In a rotary engine, the combination of the cylindrical casing having a circumferential slot in its front wall, the rotating cylinder mounted in said casing and having peripheral flanges, the valve-casing mounted upon the cylindrical casing, the oscillating cylindrical valve having a segmental recess, the piston-plate mounted between the peripheral flanges of the rotating cylinder, a pitman connecting a stem extending from said piston-plate through the slot in the casing with a disk or

fly-wheel upon the main shaft of the engine, the steam-chest mounted upon the cylindrical valve-casing, the ports or passages connecting the steam-chest with the cylindrical casing, and the slide-valve arranged in the steam-chest, all constructed and operating substantially as set forth.

2. The combination of the cylindrical casing, the rotating cylinder having the piston-plate, the oscillating cylindrical valve having a segmental recess for the passage of the piston-plate, the pitman connecting the stem of the piston-plate with a crank upon the main shaft and having an upwardly-extending bracket, and a pitman connecting said bracket with the crank upon the stem of the oscillating valve, substantially as set forth.

3. The combination of the cylindrical casing, the rotating cylinder having the piston-plate mounted between peripheral flanges thereon, the valve casing mounted upon the cylindrical casing and having the passages 24 25 and the cavity 40, the cylindrical valve having a segmental recess, a pitman connecting a crank upon the stem of the oscillating cylindrical valve with an upright rising from the pitman that connects the crank upon the main shaft with the stem of the piston-plate of the rotating cylinder, the slide-valve mounted in the valve-chest and having a cavity in its under side, and means for transmitting motion to and for reversing the position of the said slide-valve, substantially as set forth.

4. The combination of the casing, the rotating cylinder, the oscillating valve mounted upon the stem 22, having a crank 29, the link 30, the connecting-rods 31 and 34, the lever 33, pivoted to an upright rising from the frame, the connecting-rod 35, and the reversing-lever 36, all combined and operating substantially as and for the purpose herein set forth.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in presence of two witnesses.

GEORGE W. WORLEY.
ROBERT B. DAVIS.

Witnesses:

WM. H. SEHUM,
C. C. McCORMICK.