

No. 644,085.

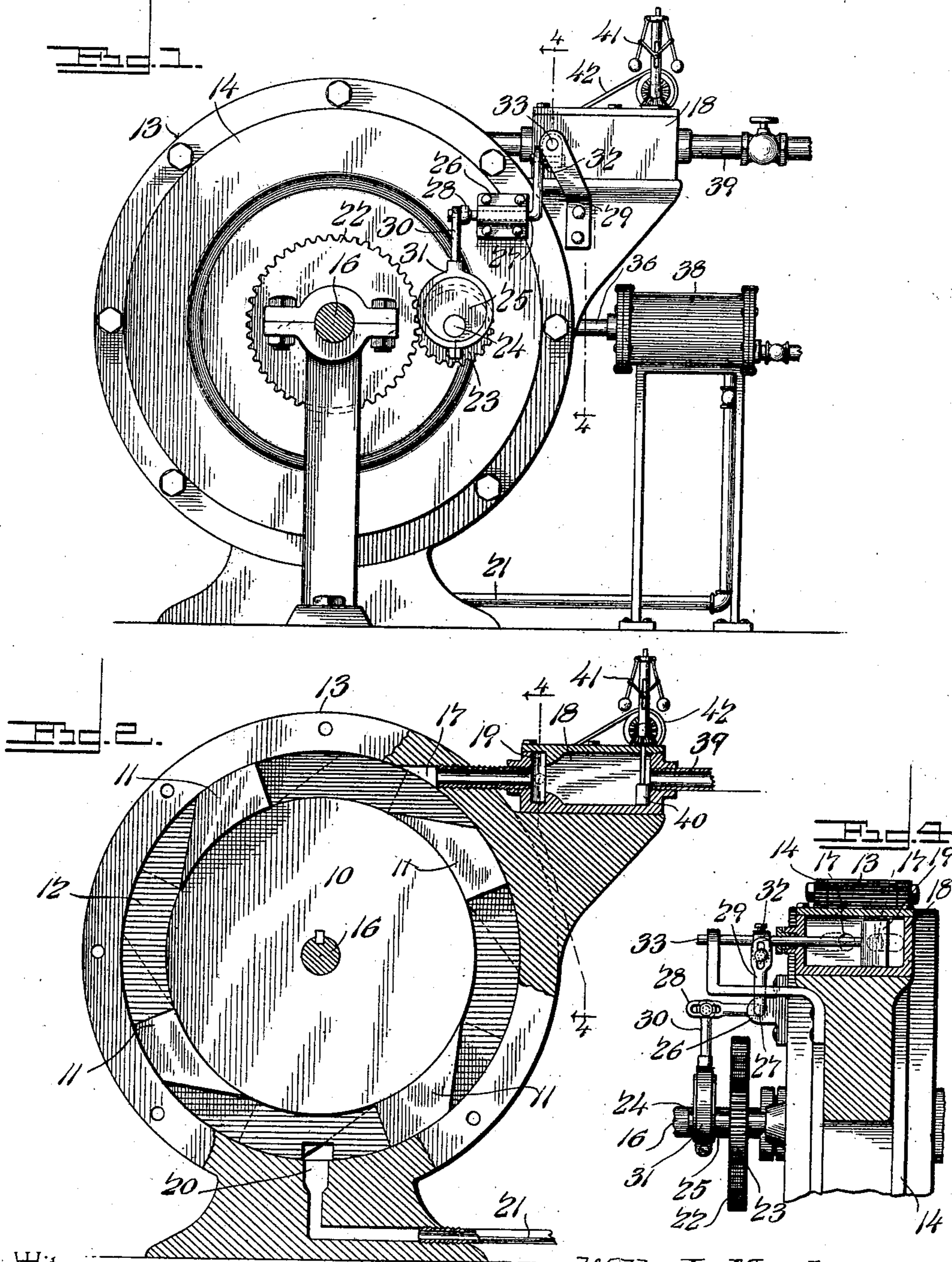
Patented Feb. 27, 1900.

W. L. MARSH.
ROTARY ENGINE.

(Application filed Mar. 1, 1899.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses

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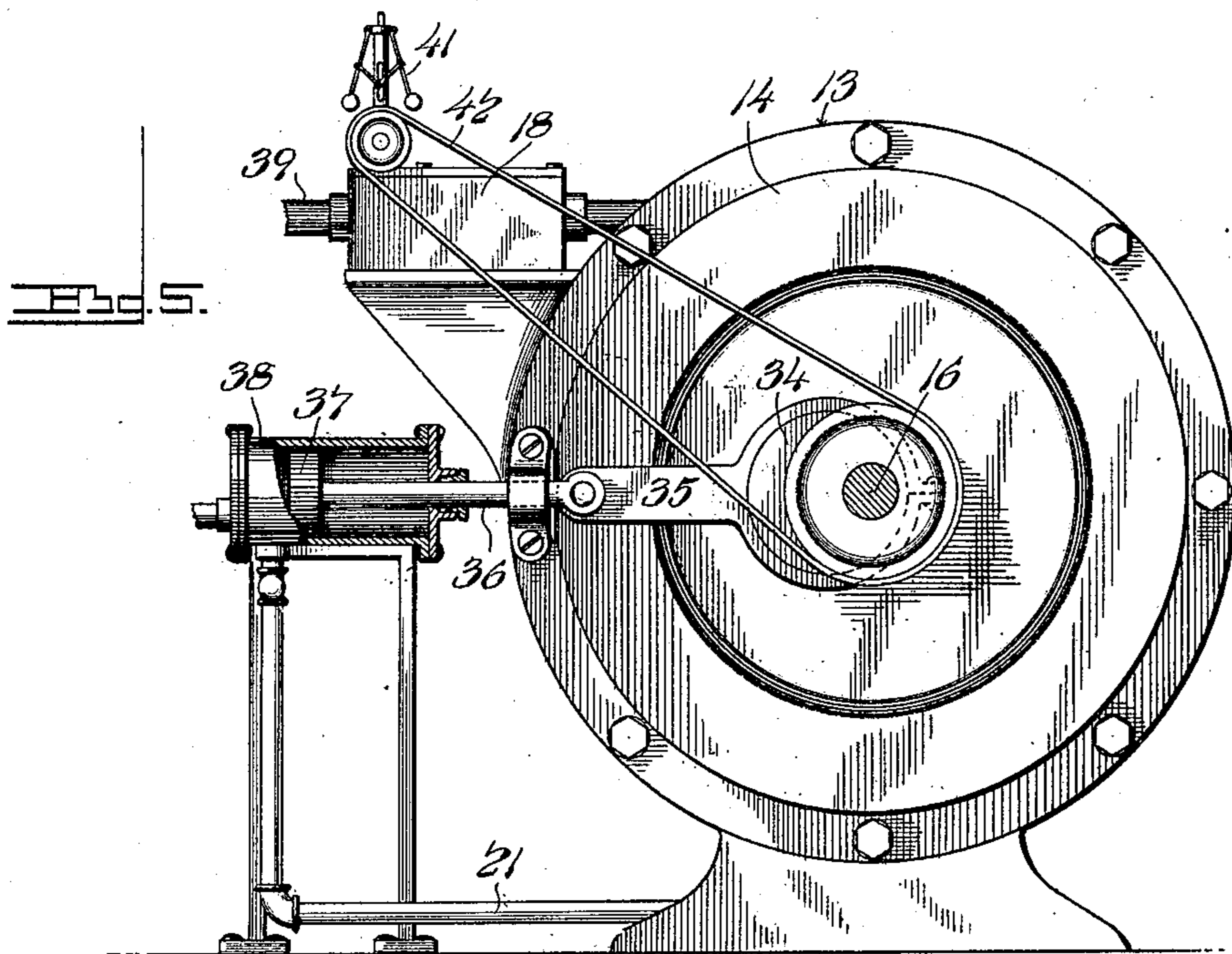
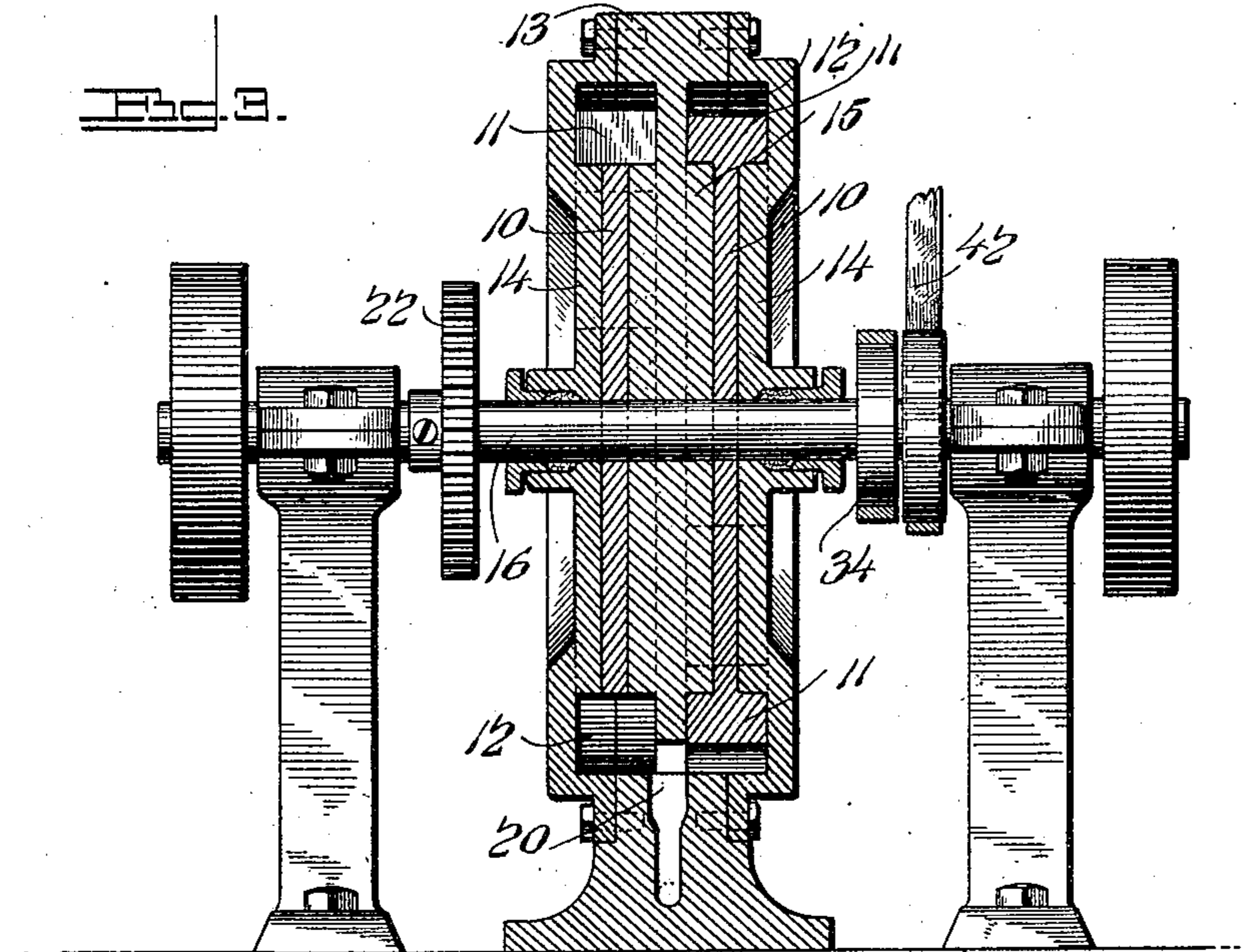
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UNITED STATES PATENT OFFICE.

WILLIS L. MARSH, OF JEFFERSON CITY, MISSOURI.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 644,085, dated February 27, 1900.

Application filed March 1, 1899. Serial No. 707,259. (No model.)

To all whom it may concern:

Be it known that I, WILLIS L. MARSH, a citizen of the United States, residing at Jefferson City, in the county of Cole and 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 one object to provide a simple, compact, and efficient construction and arrangement of parts designed to economize in the expenditure of fuel by deriving the maximum power from that used, the number of parts of the mechanism being reduced to the minimum and the means for controlling the application of pressure to the piston-heads or wings being located outside of the path of said heads or wings, whereby a wholly-unobstructed steam-passage is provided.

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 side view of an engine constructed in accordance with my invention. Fig. 2 is a sectional view of the same, taken in the plane of one of the steam-chambers. Fig. 3 is a transverse vertical section taken in the plane of the piston-shaft. Fig. 4 is a transverse vertical section taken in the plane indicated by the line 4-4 of Figs. 1 and 2 to show the valve mechanism. Fig. 5 is a view of the opposite side of the engine, the same being partly in section to show the exhaust-pump.

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

In the illustrated embodiment of my invention the piston core or body 10 consists of a thin disk or web mounted between the laterally-opposing heads or walls of the cylinder and snugly fitting the interval therebetween, and piston heads or wings 11 operate in the steam or piston chamber 12. It will be understood that either a double or a single cylinder may be employed; but in the drawings I have illustrated a double cylinder, wherein the cylindrical wall 13 is closed by the opposite heads 14, and the parallel annular piston-chambers are separated by an interposed

partition 15, the piston-shaft 16 being mounted in suitable bearings in the heads and partition.

The piston of the engine embodying my invention is driven by the impact or direct pressure of steam admitted through a tangentially-disposed inlet-port 17, and each piston may be provided with any desired number of heads or wings, preferably four, and when the double construction of engine is employed the heads or wings are arranged alternately, as indicated by the full and dotted lines in Fig. 2.

The inlet-port 17 communicates with a valve-chamber 18 and is controlled by a cut-off slide-valve 19, and when the double construction of engine is employed this cut-off valve is adapted to cut off communication between the valve-chamber and one of the ports while steam is being applied to a piston head or wing through the other port, as indicated in Fig. 4. The exhaust-port 20 is located at the lowermost point of the cylinder and communicates with the exhaust-conductor 21, through which exhaust-steam and water of condensation may be withdrawn from the cylinder to prevent interference with the movement of the piston. Preferably in the double construction of engine a single exhaust-port is employed for both piston-chambers, as shown in Fig. 3.

The piston-shaft carries a master or driving gear 22, meshing with a pinion 23, of which the spindle 24 carries an eccentric 25. Also mounted in suitable bearings 26 upon the adjacent head of the cylinder is a rock-shaft 27, having crank-arms 28 and 29, of which the former is connected by a rod 30 with a yoke or strap 31 on the eccentric 25, while the latter is connected by a pitman 32 with the stem 33 of the cut-off valve 19. The relative diameters of the gear 22 and pinion 23 are such that as the piston rotates it causes a reciprocation of the valve 19 through a number of strokes corresponding with the number of piston heads or wings. Thus with the double construction of engine, wherein four piston heads or wings are employed upon each piston, said wings or heads being arranged alternately, the cut-off valve completes four strokes, and thus applies steam or other motive agent, such as compressed air, succes-

sively to the piston heads or wings to maintain a continuous rotation of the shaft 16 at a uniform speed. The engine-shaft 16 also carries an eccentric 34, encircled by an eccentric-strap having an attached eccentric-rod 35, connected with a piston-rod 36, said piston-rod carrying a piston-head 37, operating in an exhaust-pump cylinder 38, which is in communication with the exhaust-conveyer 21. Thus during the operation of the engine the exhaust is drawn from the cylinder to effectually remove water of condensation, and, if preferred, such water of condensation while hot may be reconveyed under pressure to the boiler for subsequent use. Also in connection with the steam-chamber 18 is shown a supply-pipe 39, controlled by a throttle-valve 40, connected with a governor-stem 41, and the governor-spindle receives rotary motion from the engine-shaft by means of a belt 42.

From the above description it will be seen that the engine embodying my invention is provided with a wholly-unobstructed piston-chamber, while the pressure applied to the piston wings or heads is controlled by a cut-off 19, actuated by the piston-shaft, to cause the alternate application of pressure to the two pistons of a double engine, and that during the operation of the mechanism the water of condensation is forcibly withdrawn by a pump mechanism to avoid accumulations, this withdrawal of the water of condensation being facilitated by the fact that the exhaust-port is located at the lowermost point of the cylinder. Furthermore, it will be seen that the cut-off valve is actuated by means consisting, essentially, of a rocker interposed between the engine-shaft and the valve-stem and adapted to be oscillated at a speed regulated by the number of piston heads or wings to which the motive agent is to be applied. It will be understood, furthermore, that various changes in the form, proportion, size,

and minor details of construction within the scope of the appended claims may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

Having described my invention, what I claim is—

1: In a rotary engine, the combination of a cylinder having an inlet and an exhaust port, a piston operating within the cylinder and provided with spaced offstanding wings, an exhaust-pump connected with the exhaust-port of the cylinder, means for actuating the pump directly from the engine-shaft, a valve-chamber, a controlling-valve operating in said chamber, a rock-shaft having angularly-disposed arms, connecting means between one of the rocker-arms and the valve-stem, a master-gear mounted upon the engine-shaft, a pinion intermeshing with the master-gear, an eccentric connected with said pinion, and a yoke mounted upon the said eccentric and connected with the other rocker-arm, substantially as described.

2. In a rotary engine, the combination of a cylinder and a contained piston having spaced wings or heads, said cylinder having a tangentially-disposed inlet-port, a slide-valve controlling said inlet-port, a master-gear actuated by the piston-shaft, a pinion meshing with said master-gear, an eccentric carried by the spindle of the pinion, a yoke mounted upon the eccentric, a rocker having one arm connected with the stem of said slide-valve, and a connecting-rod between another arm of said rocker and said yoke, 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.

WILLIS L. MARSH.

Witnesses:

C. WALDECKER,
R. P. STONE.