No. 738,016. PATENTED SEPT. 1, 1903.

C. W. EDWARDS.

ROTARY STEAM ENGINE.

APPLICATION FILED NOV. 24, 1902.

NO MODEL.

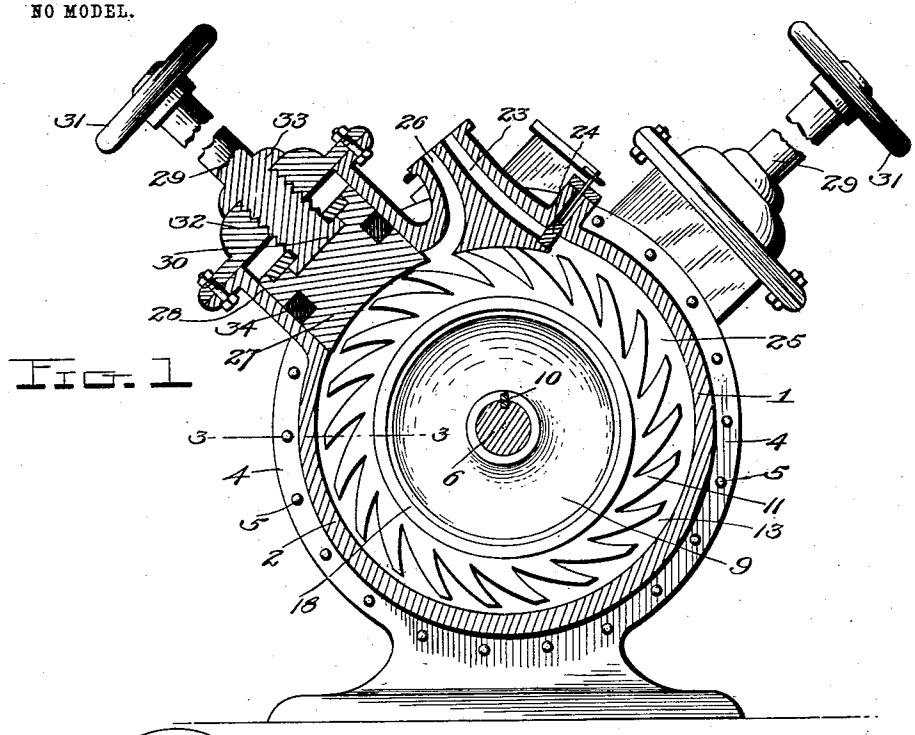


FIG. 1

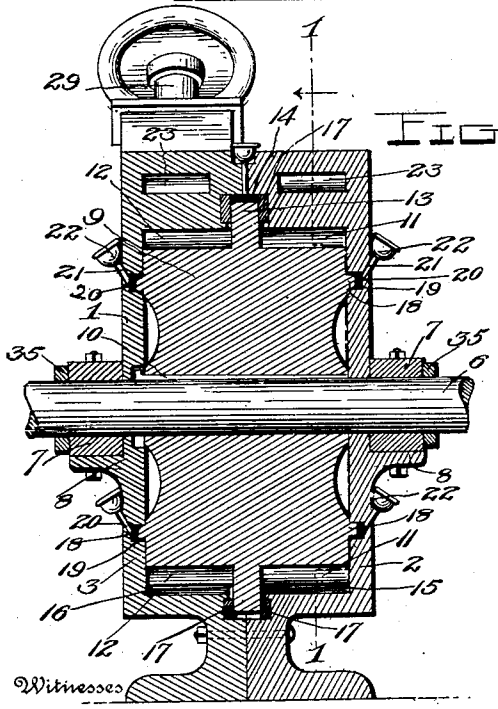


FIG. 2

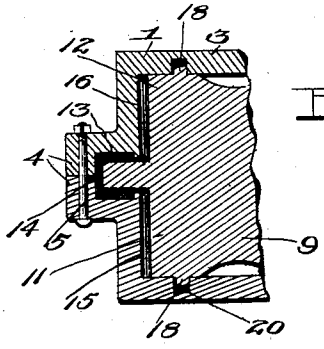


FIG. 3

Witnesses

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No. 738,016. Patented September 1, 1903.

UNITED STATES PATENT OFFICE.

CHARLES W. EDWARDS, OF WASHINGTON, DISTRICT OF COLUMBIA.

ROTARY STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 738,016, dated September 1, 1903.

Application filed November 24, 1902. Serial No. 132,588. (No model.)

To all whom it may concern:

Be it known that I, CHARLES W. EDWARDS, a subject of the King of Great Britain, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Rotary Steam-Engines; and I do 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.

My invention relates to steam-engines of the rotary impact type; and its object is to provide an engine which is simple and durable in construction, which is efficient and powerful in operation, and which may be quickly reversed and run at various speeds.

With these and other objects in view the invention consists of certain novel features of construction, combination, and arrangement of parts, as will be more fully described, and particularly pointed out in the appended claims.

In the drawings, Figure 1 is a vertical cross-sectional view through my improved engine, taken on the plane indicated by the line 1 1 of Fig. 2. Fig. 2 is a vertical central longitudinal sectional view. Fig. 3 is a detail sectional view taken on the line 3 3 of Fig. 1.

Referring to the drawings, the numeral 1 denotes the cylinder shell or casing, composed of the two similar half-sections 2 and 3, formed with flanges 4, which are bolted together, as shown at 5. The shaft 6 projects through the casing and is journaled in bearings 7, secured upon the brackets 8, formed on the sections 2 and 3. The double piston 9 is keyed upon the shaft 6, as shown at 10, and has formed upon its periphery the two sets of blades 11 and 12, which are separated by the central flange or rib 13. The blades 11 and 12 of the two sets project in opposite directions and form steam-pockets upon the periphery of said piston. The center flange 13 of the piston coacts with a circular recess 14, formed between the two sections 2 and 3, and separates the cylinder shell or casing 1 into the two chambers 15 and 16. A steam-packing 17 is interposed between the flange 13 and the sections 2 and 3 of the casing to effect a steam-tight connection between the two chambers 15 and 16. Upon each side of said piston at the base of the blades 11 and 12 circular flanges or ribs 18 are formed, which coact with similar-shaped grooves or recesses 19, formed in the walls of the casing. A packing 20 in these recesses 19 insures a steam-tight connection between the piston and casing. Oil-passages 21, fed by oil-cups 22, communicate with these grooves and the recess 14 to supply the proper lubrication for these parts. For each set of blades there is a steam-inlet 23 formed in the casing and provided with a cut-off valve 24. This inlet communicates with the steam-passage 25, which extends around the periphery of the piston within the casing and gradually diminishes in size to the point where it communicates with the exhaust or outlet passage 26, located in the casing adjacent to the inlet-passage 23. It will be seen by decreasing the steam space or passage from the inlet to the outlet that the lessening of the energy of the steam as it passes around the passage will be compensated for.

The steam-passage 25 in advance of the exhaust-passage 26 is adapted to be closed or varied in size by the pressure-block 27, slidable in an enlargement 28 of the casing 1. This pressure-block is adjustable toward and from the piston to vary the size of the steam-space 25, and hence the pressure, by means of a screw-rod 29, which is swiveled, as shown at 30, to said block and provided with a hand-wheel 31 upon its outer end. This screw-rod operates in a threaded opening in the cap or cover 32 of the enlargement 28 and is formed with a flange or shoulder 33, adapted to limit the inward movement of the block 27 and prevent the same from moving into the path of the blades of the piston. The block 27 is provided with steam-packing 34 to effect a steam-tight connection with the enlargement 28. In order to prevent any end thrust of the shaft, I secure upon each end of the same adjacent to the bearings 7 the collars 35.

It is of course understood that an inlet-passage, an exhaust-passage, and a pressure-block are provided for each set of blades, and when steam is admitted to one side of the engine to drive the shaft forward steam is cut off from the other side and is not admitted into the same until it is desired to reverse the movement of the shaft.

In the operation of the engine one of the

valves 24 is operated to admit steam through the inlet 23 into the steam-passage 25, which directs the same against the blades 11 or 12, as the case may be, and into the steam-pockets formed thereby. Owing to the pressure and the slight expansion of the steam, the pistons and shaft will rotate. The steam as it passes around the passage 25 will gradually increase in pressure, owing to the decrease in the size of said passage. When it is desired to vary the speed of rotation of the pistons, the hand-wheel 31 is operated to move the pressure-block and vary the size of the steam-passage 25, and thereby confine or check the escape of the steam to a greater or less degree. When it is desired to reverse the engine, the steam is cut off from one piston and admitted to the other.

While I have illustrated in the drawings a reversible or double engine, it will be understood that, if desired, I may build the same single and non-reversible. Any form of governor that is found to be best adapted to the engine may be used upon the same and will be driven from the shaft.

From the foregoing discription, taken in connection with the accompanying drawings, the construction and operation of the invention will be readily understood without requiring a more extended explanation.

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

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

1. In a rotary steam-engine, the combination with a rotary pocketed piston, of a casing, an exhaust-passage in said casing, an inlet-passage in said casing, a steam-passage connecting said inlet and exhaust passages, and means independent of the exhaust-passage and proximate thereto for varying the size of said connecting-passage, substantially as described.

2. In a rotary steam-engine, the combination with a rotary piston, of a casing formed with an inlet-passage, an exhaust-passage, a steam-passage connecting the inlet and exhaust passages, and an enlargement or chamber communicating with said steam-passage at a point proximate to the exhaust-passage, and an adjustable pressure-block in said enlargement or chamber adapted to vary the effective area of said connecting steam-passage, substantially as described.

3. In a rotary steam-engine, the combination with a rotary piston, of a casing formed with an inlet-passage, an exhaust-passage, a steam-passage connecting the inlet and exhaust passages, and an enlargement or chamber communicating with said steam-passage at a point proximate to the exhaust-passage, an adjustable pressure-block in said enlargement or chamber adapted to vary the effective area of said connecting steam-passage, and means for adjusting said pressure-block, substantially as described.

4. In a rotary steam engine, the combination with a rotary pocketed piston, of a casing formed with a chambered enlargement, an inlet to said casing, an exhaust for said casing, a communicating passage between said inlet and exhaust, a sliding pressure-block in said chambered enlargement of casing, and an operating screw-rod swiveled to said block, substantially as described.

5. In a rotary steam-engine, the combination with a rotary piston, of a casing formed with a chambered enlargement and provided with inlet and exhaust passages, a steam-passage connecting said inlet and exhaust, a sliding pressure-block in said chambered enlargement of casing adapted to vary the size of said connecting-passage, and means for limiting the movement of said pressure-block in said passage, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

C. W. EDWARDS.

Witnesses:
HENRY G. COWL,
H. B. WILLSON.