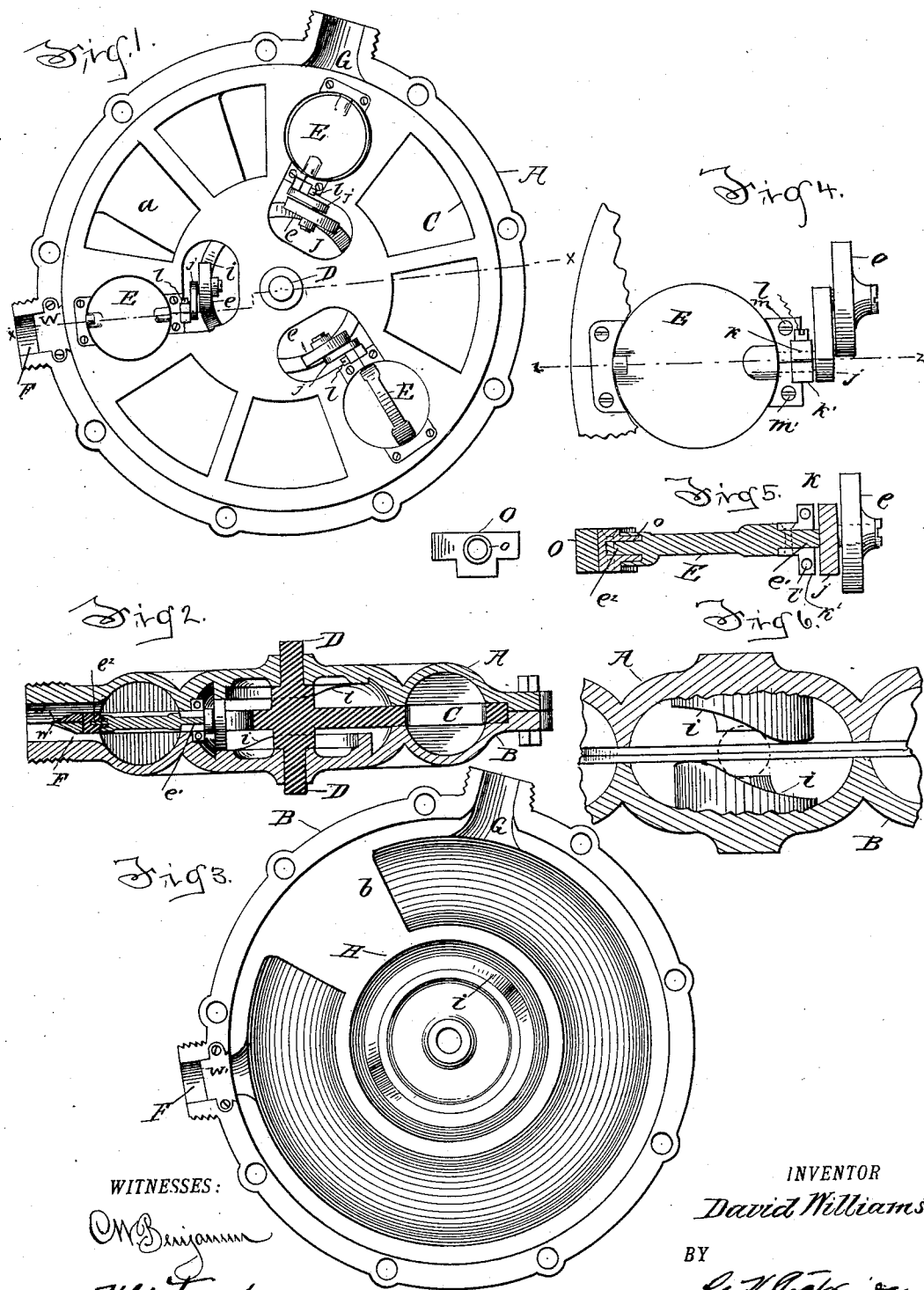


(No Model.)

D. WILLIAMSON.
ROTARY ENGINE.

No. 415,954.

Patented Nov. 26, 1889.



WITNESSES:

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DAVID WILLIAMSON, OF BROOKLYN, NEW YORK.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 415,954, dated November 26, 1889.

Application filed October 31, 1888. Serial No. 289,631. (No model.)

To all whom it may concern:

Be it known that I, DAVID WILLIAMSON, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, 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.

My invention relates to improvements in rotary engines, and especially to that class of engines which are operated by a fluid, as water, and which with slight adaptations can be used for meter, pump, or blower purposes.

In the present specification my apparatus will be spoken of, for convenience, as an "engine" or "motor."

My engine is very simple in construction, consisting, broadly, of a shaft, a casing, and revolving disk or wheel carrying the vanes.

My present invention is an improvement upon that patented to me by United States Patent No. 375,788, dated January 3, 1888, and is especially concerned with providing simple and efficient means for feathering the vanes, and also with preventing shock to the working parts of the apparatus and keeping them free from clogging and wearing substances.

My invention also involves other details, which will be particularly pointed out in the claims which follow the description.

I have illustrated my invention in the accompanying drawings, in which—

Figure 1 represents an elevation of my engine or motor with one-half of the casing removed. Fig. 2 represents a central section taken in the plane of the shaft along line *x x* and in Fig. 1. Fig. 3 shows one of the casing-halves by an interior view. Figs. 4 and 5 show details of one of the vanes, Fig. 5 being a section along line *y y* in Fig. 4. Fig. 6 is a partial sectional view of the casing, showing a cam for feathering the vanes.

Referring to the drawings by letter, A and B represent two similar halves of my casing. The two halves are secured together by suitable bolts passing through their rims. In each half there is a semicircular groove extending as an annulus almost entirely around

the casing. When the halves are put together properly, these two grooves coincide in position and form an interior annular chamber or fluid-passage. I prefer to use grooves which are semicircular in form, although the shape may be varied at will. The groove in each half of the casing is interrupted by an abutment or division-wall, the abutment in one half being marked *a* and in the other *b*. Now, when the parts are together there is a space between the abutments and within the rims through which the parts are joined large enough to admit the disk or wheel C, which is secured in any suitable manner to the shaft D. This wheel or disk carries, as shown, vanes E. The number of these vanes may be varied to suit different uses or conditions; but in Fig. 1 I have shown three such vanes, and I find that a convenient number, especially for meter purposes. The vanes correspond in shape to the shape of the chamber, and practically close the same when set across it.

On opposite sides of the abutment are the inlet and exit ports F and G, one-half of each port being formed in each casing half. I find it advantageous to locate the ports in such relation that axial lines running through them will form a right angle.

In using the apparatus as an engine or motor it is of course necessary that the incoming fluid should find a vane-set and that the vanes should be feathered to pass through the abutment. For accomplishing these results I have devised a construction which will now be described.

Referring to Figs. 3 and 6, it will be seen that each casing half contains a center-box H, and that within each box is a cam I. When put together, a double-faced cam is formed, the shape of which appears in Fig. 6. Between the faces of the cam are located anti-friction rollers *e e e*, whose movements control the position of the vanes E. The vanes play in openings in the disk C, pivots being provided at each end, as will appear hereinafter. At one end the pivot *e'* extends through into an opening J in the disk and has attached to it a crank *j*. The rollers *e* are pivoted on pins projecting from these cranks. Now it is clear that the rollers traveling be-

tween the cam-faces will be raised and lowered, thereby altering the position of the vanes. The parts are so related that the vanes will be feathered at the abutment, as shown.

5 The details of the construction at the vanes is apparent from an inspection of Figs. 4 and 5.

Between the aperture J and the vane-opening the disk is cut through centrally and two pieces k and k' are filled into the opening and
10 secured together by screws $l l'$. The pieces when together leave an opening for the pin or pivot e' to turn in. The pieces are flanged at the top and joined to the body of the disk (which is cut away to form a good joint) by
15 screws $m m'$. At the opposite end a single angular piece O is set into the disk and screwed to it. On the piece O is a shoulder o , which is traversed by a hole that also passes entirely through the piece. Pivot-pin
20 e^2 turns in this hole. Thus at each end a long bearing is formed and hurtful wear is accordingly reduced to a minimum.

It will be understood that a second or a third vane may come into range to be operated upon by the incoming fluid before the
25 first gets around to the point of feathering. In other words, some one vane is certain to be in a position where the force of the fluid will be most effective.

30 To the casing halves within the inlet-ports I secure half-wedges w and w' . When in place, they form a wedge for throwing the fluid—such as water—to both sides of the disk with little shock or friction. This saves jar and
35 racking of the parts. Moreover, as the back of the wedge fits closely against the rim of the wheel or disk C, it prevents dirt from getting in outside the said rim and grinding or clogging.

40 The axes of the vanes are not, as will be seen, centered at the shaft D, as, in that case, the rollers would be thrown at an angle with the line of their motion. By placing the vanes at a slight angle this is avoided and all
45 the parts work without strain.

It is obvious that the machine I have described as an engine might easily be used as a fluid meter, pump, or blower.

Having now described my invention, I
50 claim—

1. In a rotary engine, a disk or wheel carrying vanes, the axis of each vane being out of line with any radius of the disk, in combination with rollers joined by crank-arms to the
55 said vane-axes, and a device co-operating with the rollers to feather the vanes, as and for the purpose set forth.

2. In a rotary engine, a disk or wheel carrying vanes, the axis of each vane being out of

line with any radius of the disk, in combination with crank-arms connected with the vane-axes, and a device co-operating therewith to feather the vanes, as and for the purpose set forth.

3. A rotary engine consisting of a suitable casing provided with a fluid-chamber and inlet and exit ports, in combination with a disk or wheel carrying vanes, and a double-faced cam for feathering the vanes, one half the cam being formed on one half the casing and
70 the other half on the other, as and for the purpose set forth.

4. A disk or wheel carrying vanes and mounted on a shaft, the axis of each vane being out of line with any radius of the disk,
75 in combination with rollers joined by crank-arms to the vane-axes, and a cam co-operating with the said rollers to feather the vanes, the said cam extending in a circle around the shaft, as and for the purpose set forth.

5. A casing provided with an annular fluid-chamber, a center-box in the said casing, and a cam within the center-box, the cam being formed on the casing halves, in combination
80 with a disk carrying vanes and devices co-operating with the cam for feathering the vanes, as and for the purpose set forth.

6. The combination, with a disk and a vane carried thereby, of an axis for the said vane and separate bearings for the said axis, the
90 said bearings being separable from the disk and capable of being secured to the disk and thereby attaching the vanes, as and for the purpose set forth.

7. A casing for a rotary engine, provided
95 with a fluid-chamber and inlet and exit ports, in combination with a disk or wheel carrying vanes, and a wedge in the inlet-port abutting against the rim of the disk or wheel and presenting its edge to the entering fluid, where-
100 by the fluid may enter without shock or jar and clogging is prevented, as and for the purpose set forth.

8. A casing for a rotary engine, provided with a fluid-chamber and inlet and exit ports,
105 in combination with a disk or wheel carrying vanes, and a wedge in the inlet-port presenting its edge to the entering fluid, and having its butt substantially flush with the edges of the disk or wheel, whereby the fluid may enter
110 without shock or jar.

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

DAVID WILLIAMSON.

Witnesses:

CHARLES E. SIMMS, Jr.,
G. H. STOCKBRIDGE.