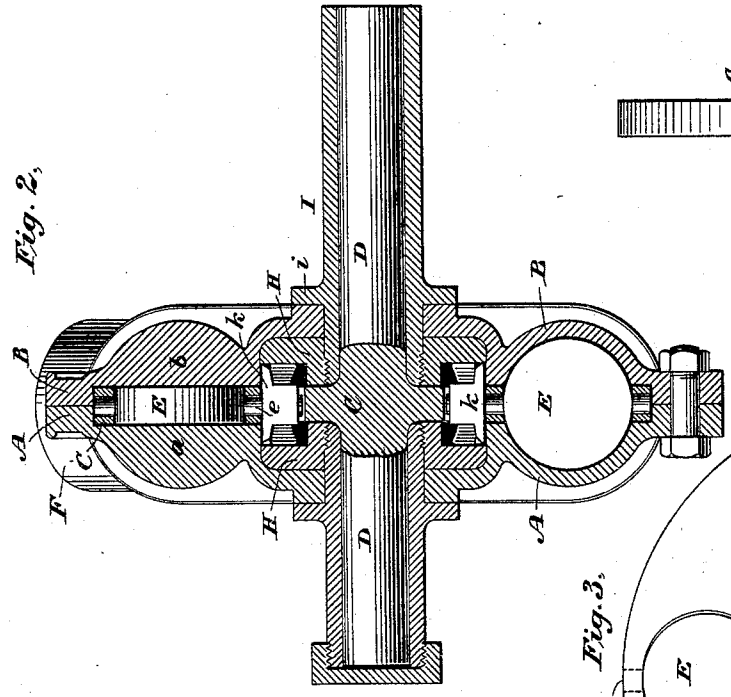
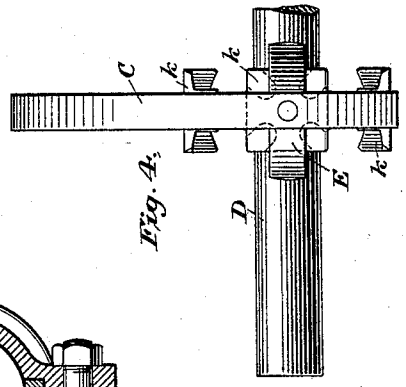
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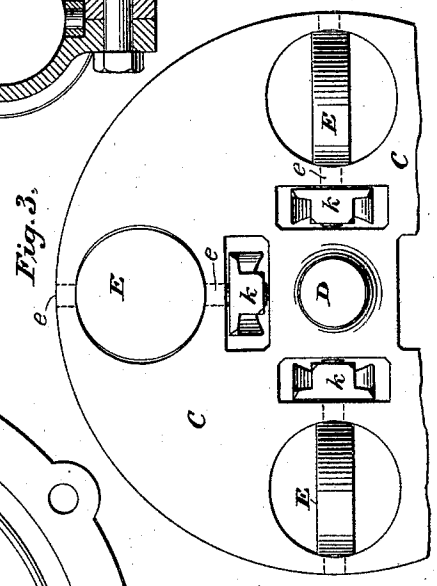
D. WILLIAMSON.

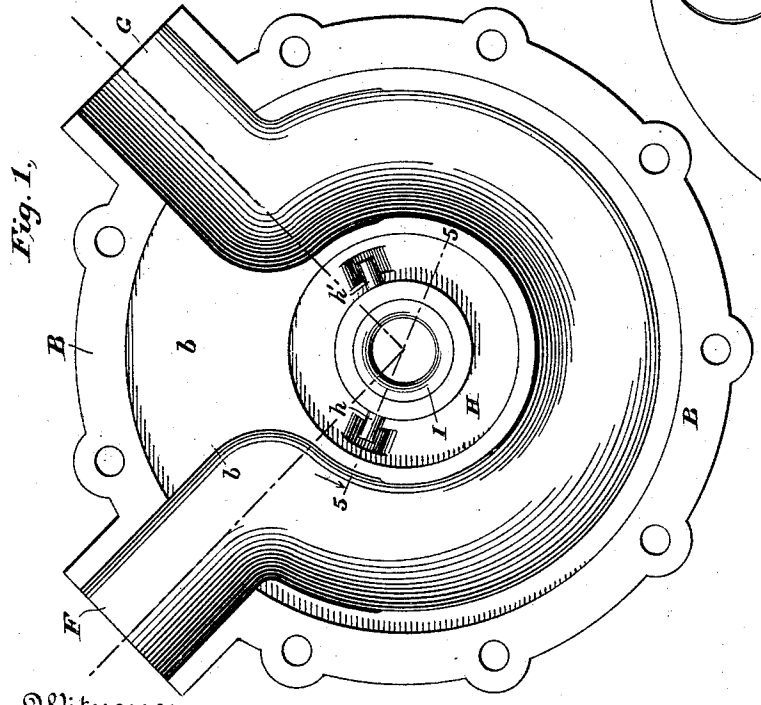
ROTARY ENGINE.

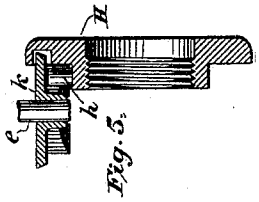
No. 415,953. Patented Nov. 26, 1889.

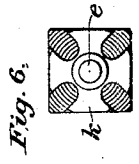












Witnesses
Geo. W. Breck.
Edward Thorpe.

Inventor
David Williamson
By his Attorney
G. H. Stockbridge

N. PETERS. Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

DAVID WILLIAMSON, OF BROOKLYN, NEW YORK.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 415,953, dated November 26, 1889.

Application filed January 30, 1889. Serial No. 298,137. (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 a revolving disk or wheel carrying the vanes.

My present invention is especially concerned with providing simple and efficient means for feathering the vanes.

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

The means which I employ in the present invention for feathering the vanes consist of a square block on the end of each vane-shaft, slotted at the corners so as to cut one end of the block into the form of a Maltese cross. This block engages with pins in such a manner as to cause the feathering of the vanes, as will be hereinafter set forth in detail.

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

Figure 1 shows an interior view of one-half of the casing of my motor. Fig. 2 is a transverse section through the center of my motor. Fig. 3 is an elevation of the disk which carries the vanes, a part thereof being broken away. Fig. 4 is an elevation of the same, taken at right angles to the view shown in Fig. 3; and Figs. 5 and 6 represent details.

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 I find four a convenient number 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 abutments 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 the same 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. In order to bring out fully the construction referred to, it will be necessary to describe also details of construction, which go to render the motor compact and little liable to injurious wear.

It will be observed that there is on each side of the disk C a nut H surrounding the shaft, or, rather, surrounding a sleeve I, within which the shaft is adapted to rotate. The construction is such that the sleeve screws into the nut and holds between the nut and a shoulder *i* on the sleeve the central boss of the casing half. The construction on both sides of the disk is identical. It is evident that a perfectly tight joint is thus made, whereby leakage around the shaft is prevented, and thus one difficulty with motors of this kind is obviated. In case of wear it can be taken up by simply turning the sleeve

and drawing the nut tighter. I have shown a cap at the outer end of one of the sleeves, but that is a mere detail. Projecting from the exterior of one of the nuts is a pair of pins *h h'*, the purpose of which will presently be explained. It will be seen that they project into a circular space in the center of one of the coupling halves, constituting a center box. Now, the vanes E E are provided with shafts *e*, which project over the same space and carry at their inner ends square blocks *k k*. These blocks are slotted at the corners on the side farthest removed from the vanes so as to cut those ends of the squares into the form of Maltese crosses. The sides of these slots engage with the pins *h* and *h'*, and so operate the vanes. I prefer to re-enforce the Maltese cross by the square block, both for the additional strength and because a longer bearing-surface is formed to counteract the tendency of the vanes to tilt. The cross might be formed on the other end of the block if preferred. In that case, the tripping-pins would be correspondingly changed.

The pins and crosses are so related that the vanes will be feathered at the abutment and set again after passing it.

In some instances it will be sufficient to make slots in two of the corners of the square, making one-half of a Maltese cross.

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, what I claim is—

1. In combination with a feathering vane and its axis, a block on the axis shaped like a Maltese cross, and devices co-operating with the block to feather the vanes, the block being squared at one end, as and for the purpose set forth.

2. In combination with a feathering vane and its axis, a block of general square shape on the axis, the said block being slotted at two or more of its corners, and devices co-operating therewith to feather the vane, as and for the purpose set forth.

3. In a rotary engine, the combination, with a shaft and a shouldered screw-sleeve traversing the casing of the engine, of a nut with which the sleeve engages, the nut and the shoulder being on opposite sides of the casing, as and for the purpose set forth.

4. In a rotary engine, the combination, with the casing thereof and a center box in the casing, a part of the center box being removable, of tripping devices attached to the removable portion, as and for the purpose set forth.

5. In a rotary engine, the combination, with a shaft and a shouldered screw-sleeve traversing the casing of the engine, of a nut with which the screw-sleeve engages, the nut being on the opposite side of the casing from the shoulder and being provided with a pair of projecting pins, as and for the purpose set forth.

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

DAVID WILLIAMSON.

Witnesses:
G. H. STOCKBRIDGE,
H. W. POPE.