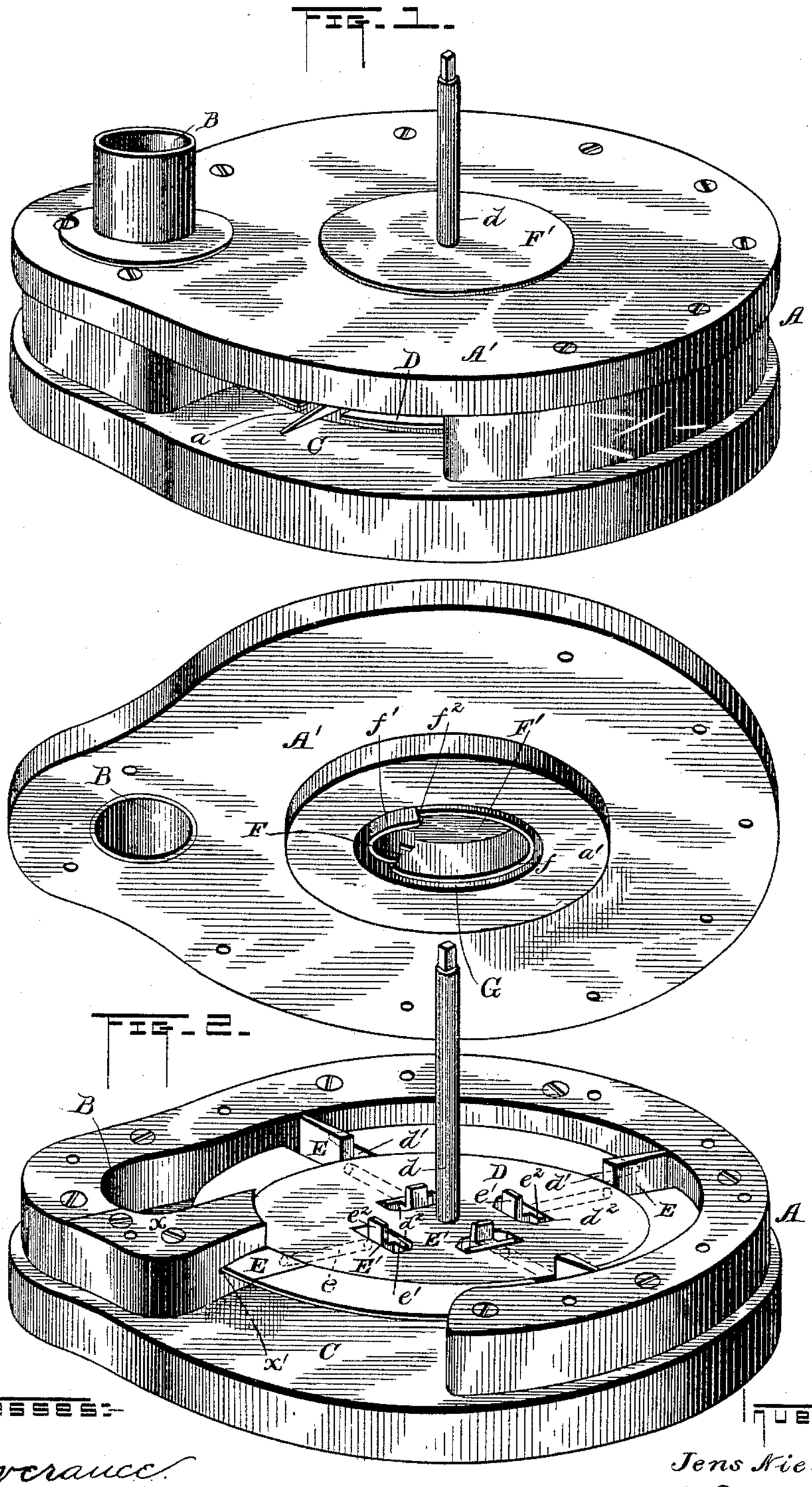
(No Model.) 2 Sheets—Sheet 1.

J. NIELSEN.

WATER OR OTHER MOTOR.

No. 453,128. Patented May 26, 1891.

FIG. 1.



Witnesses:-
Severance.
L. D. Moody

Inventor:-
Jens Nielsen,
By L. Deane.
his Attorney.

(No Model.) 2 Sheets—Sheet 2.

J. NIELSEN.

WATER OR OTHER MOTOR.

No. 453,128. Patented May 26, 1891.

FIG. 3.

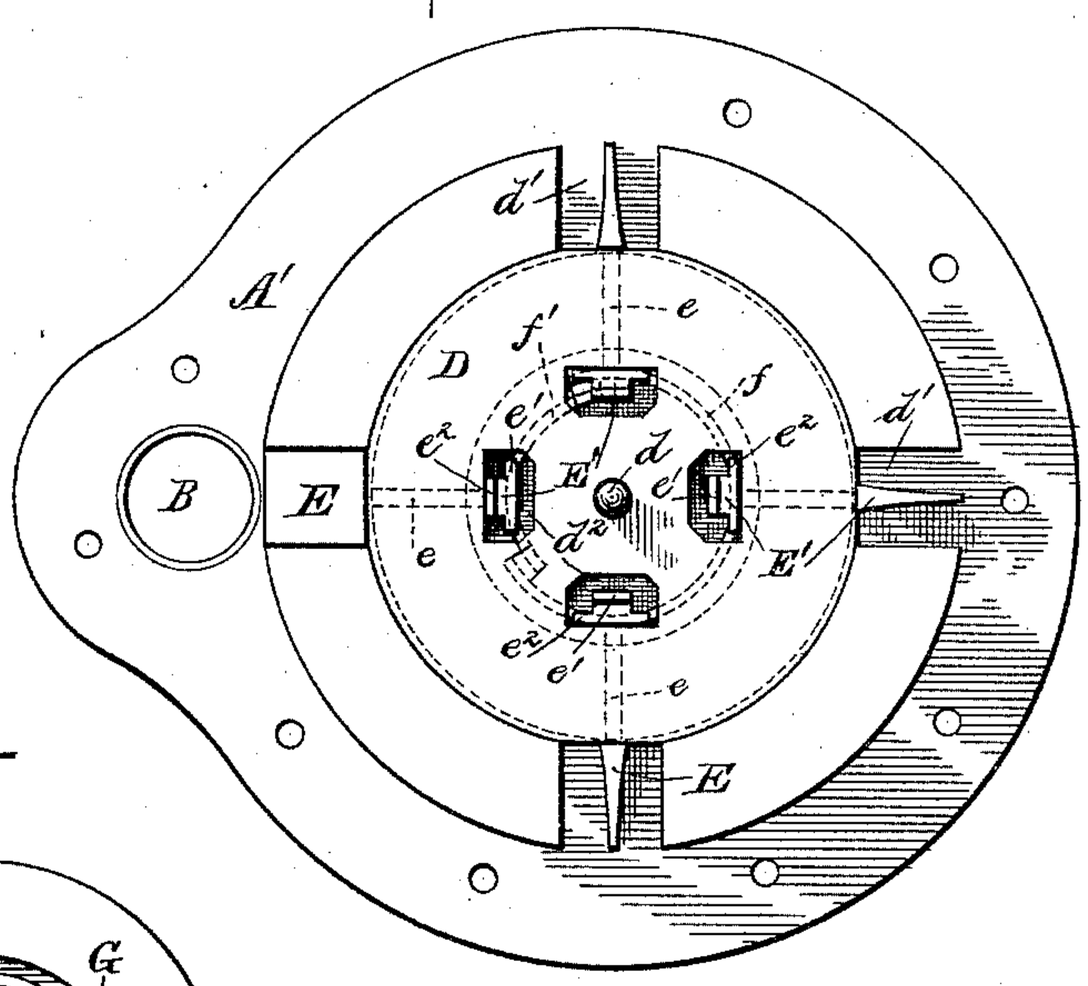


FIG. 5.

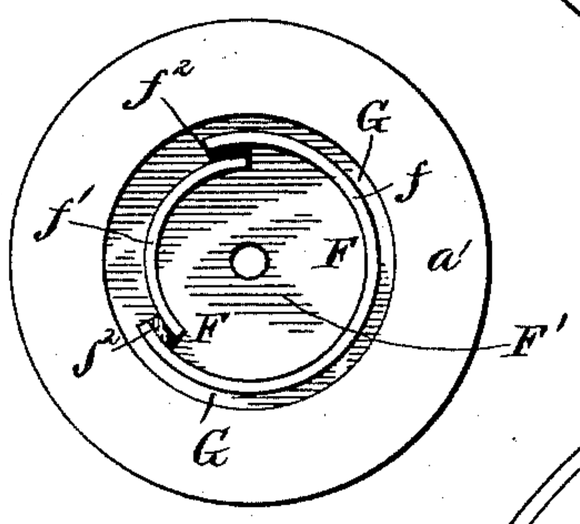
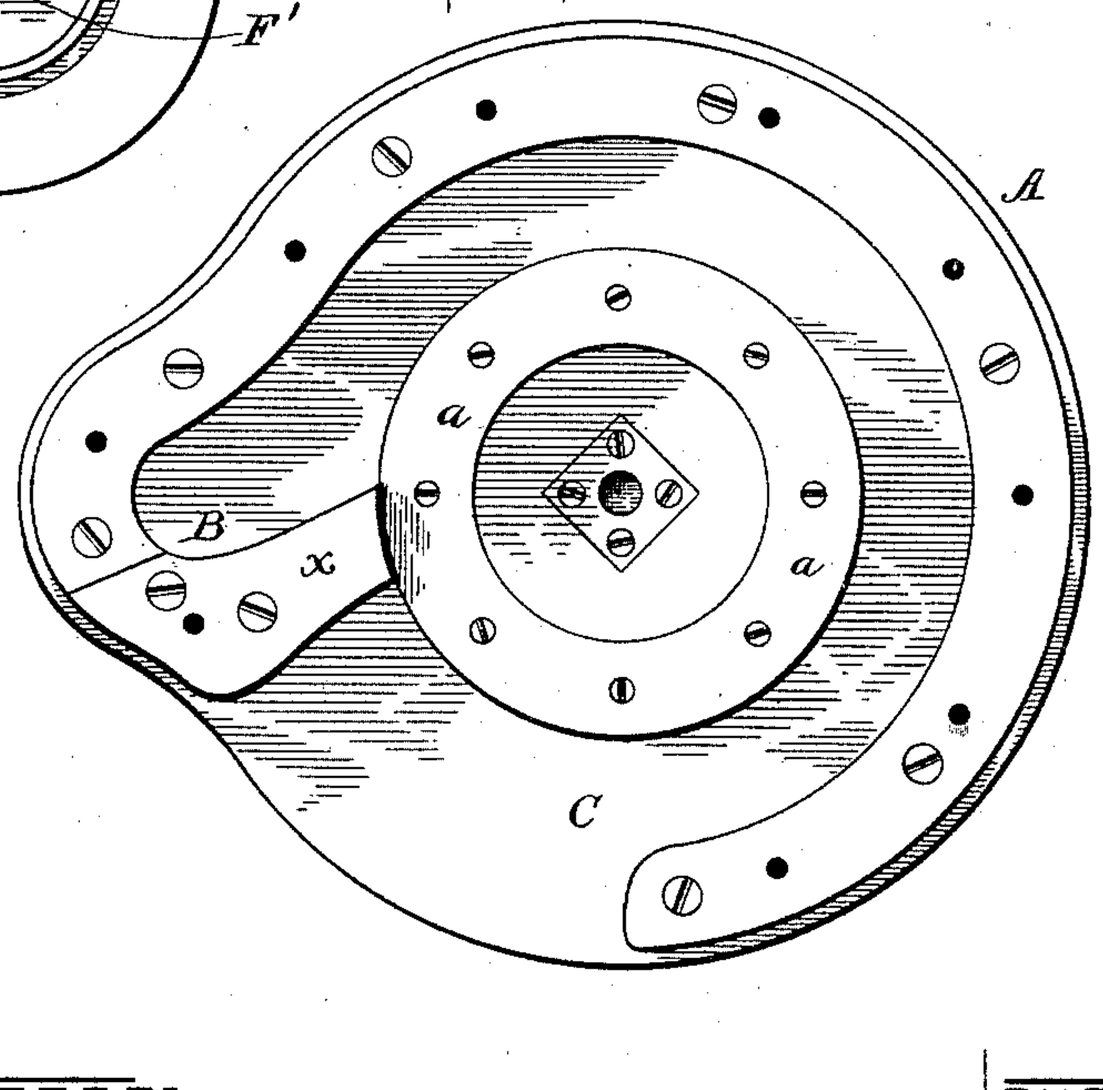


FIG. 4.



Witnesses:—
Geverance.
L. D. Moody

Inventor:—
Jens Nielsen,
By L. Deane,
his Attorney.

UNITED STATES PATENT OFFICE.

JENS NIELSEN, OF CEDAR FALLS, IOWA.

WATER OR OTHER MOTOR.

SPECIFICATION forming part of Letters Patent No. 453,128, dated May 26, 1891.

Application filed April 8, 1889. Serial No. 306,390. (No model.)

To all whom it may concern:

Be it known that I, JENS NIELSEN, a citizen of the United States, residing at Cedar Falls, in the county of Black Hawk and State of Iowa, have invented certain new and useful Improvements in Water or other Motors; 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.

Figure 1 is a perspective view of this device. Fig. 2 is a perspective view, the cover tilted; Fig. 3, a bottom plan of the disk or wheel and cover. Fig. 4 is a plan view of the inside of the device, the wheel removed. Fig. 5 is a plain view showing the annulus on the under side of the cover.

This invention is designed for use as a water-wheel or water-motor pump or an air-blower, and the novelty consists in the construction of the parts and in the combination with each other and as a whole, all as will now be more fully described, as well as pointed out in the claims.

In the accompanying drawings, A denotes the casing of the device, which may be of any desired shape or size and made of any suitable material, and B is the inlet-pipe into the water or other chamber, and C the exit; but I merely use these terms generally, because the device can as easily act in a reverse way, in which case B will be the outlet and C the inlet.

With this general statement, which will be sufficient to indicate the adaptability to different forms of use, I will continue the present description on the supposition that B is the inlet and C the outlet, as indicated by the arrows in the drawings. Around the inside of the lower part of the case is a flange or rib *a* sufficiently high to nearly touch the disk or wheel D, leaving only space enough between to allow the wheel to revolve easily on its shaft *d*, which passes centrally through the cover and casing and has bearings in the bottom of the inside. This wheel is a metal disk having rectangular or other shaped notches *d'*, as many as may be desired, in its periphery and a corresponding number of holes d^2 in line therewith and near the shaft. Each set of these notches and holes are adapted for occupancy, respectively, by a blade E and its trip E', the tapering blade being at the outer end of the shaft *e* and the trip at or near the inner end. This trip has two projecting pieces or arms—an inner one *e'* at the inner end and e^2 just within it—said projections being at right angles with each other. Each shaft moves in a suitable opening on the wheel or disk. The blades and the part of the wheel in which they work are tapering from the body of the wheel to the edge.

The cover A' of the case has secured to its under side an annulus F of somewhat irregular form. The larger portion *f* is a part of a circle, and the remaining and smaller part *f'* is also a part of a circle having the same center as the portion *f*, but a shorter radius, so placed with reference to each other that the ends touch the same radii, leaving between the two a slight open space f^2. This annulus thus made is substantially continuous, being practically so in the effect of its operation. It may be part of a casting F', which is secured to the cover or top and within a circular hole therein. The walls of this hole can be extended by placing a flange or rib *a'* around it. The hole so made will be of larger diameter than the annulus, thus leaving a channel G all around the annulus. Mechanically speaking, the flanges or ribs *a* and *a'* would operate equally well if they formed a part of the wheel.

In operation the wheel or disk is placed on the casing so that it constitutes a central diaphragm. When the water or other current is admitted at B, it meets the upturned blades E, and thus drives the wheel or disk around. When the trip E' has nearly reached the edge of the exit C, the inner projection *e'* of the trip strikes the end of the part *f'* of the annulus F in the top, and as the disk moves on the blade is returned to its flat position flush with the disk just as it reaches the exit. In this condition it will readily pass through the slot *x'* on the tongue *x* of the casing, which projects inwardly as far as the flange or rib *a* and directs the course of the incoming current. Of course the slot *x'* must be of the proper shape and size to make the blade fit as snugly as possible. When the blade has passed this tongue, the projection e^2 of the

trip strikes against the end of the part *f* of the annulus and the blade is set again at right angles with the disk. Each blade is acted upon and acts in like manner. Thus the inrushing current will pass along the channel formed by the flanges or ribs *a* and *a'* and the outer and inner face of the wall of the casing and impinge above and below against the disk all the upturned blades between the inlet and exit, and at the latter point will find free egress. By regulating properly the size of the blades with respect to the area of the disk or wheel it can be driven at almost any desired rate of speed. It will be noted that the blades are at all points in the revolution of the disk positively held in position except at the precise points where they are turned. Thus there is no opportunity to vibrate or change position, and so all loss of power is prevented. It will also be observed that the blades will make one entire revolution to every two of the wheel. The usual belting, &c., can be applied to the shaft to convey the power. It will be noted that the blades and their trips are so made that they can be operated equally well whether the inflowing current enters by what is now denoted the "exit" or when it enters by what has been above described as the "inlet."

What I claim is—

1. In a motor as described, the disk or wheel having notches in its periphery and holes near the center, together with a series of shafts passing through it, each provided with a blade at one end and a trip at the other, said trip having two arms at right angles with each other, combined and engaging with the annulus above, whereby the blade can be turned either at right angles or flush with the disk, substantially as and for the purposes specified.

2. In combination with the wheel or disk having blades in its periphery, each provided with a trip E', having arms *e'* and e^2 at right angles with each other, the annulus F above it, having a longer part *f* and a shorter part *f'*, said parts being portions of circles having different radii, both adapted to engage successively the said trip E', whereby upon the movement of the wheel in either direction the blades can be automatically set at right angles to or flush with the disk, substantially as specified.

3. In a water-motor as described, the combination of the disk having blades E in its periphery and holes d^2 near the shaft and trips in said holes, with cover A, having the annulus F on the under side, composed of the parts *f* and *f'*, said parts being portions of circles having different radii, in the manner and for the purposes set forth, whereby the blades can be held rigidly in position whether being acted upon by the water or feathered to pass into the water-chamber.

4. In a water-motor, the combination of the following elements, viz: a case having an inlet and exit port for the water, a disk revolving therein centrally and having in its edges blades, and having the tripping and holding mechanism, substantially as described, whereby said blades can be held in fixed position, feathered or at right angles with the disk, and the motor can operate when the water enters at either opening in the case.

5. In a motor as described, the combination, with the disk and blades, of the case therefor provided with the internal annular flange *a* and with the tongue *x*, projecting inwardly from the case to said flange, and having a slot *x'* for the passage of the wheel or disk and of the blades when turned flush with the wheel, substantially as described.

6. In a water-motor, the combination of the following elements, viz: a case having an inlet and exit port for the water and the upper rib *a'* and lower rib *a*, the disk revolving centrally in said case and having in its edges blades, and provided with tripping and holding mechanism, substantially as described, whereby said blades can be held in fixed position, feathered or at right angles with the disk, and the motor can operate when the water enters at either opening or port in the case.

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

JENS NIELSEN.

Witnesses:
I. D. GILKEY,
J. P. LARSEN.