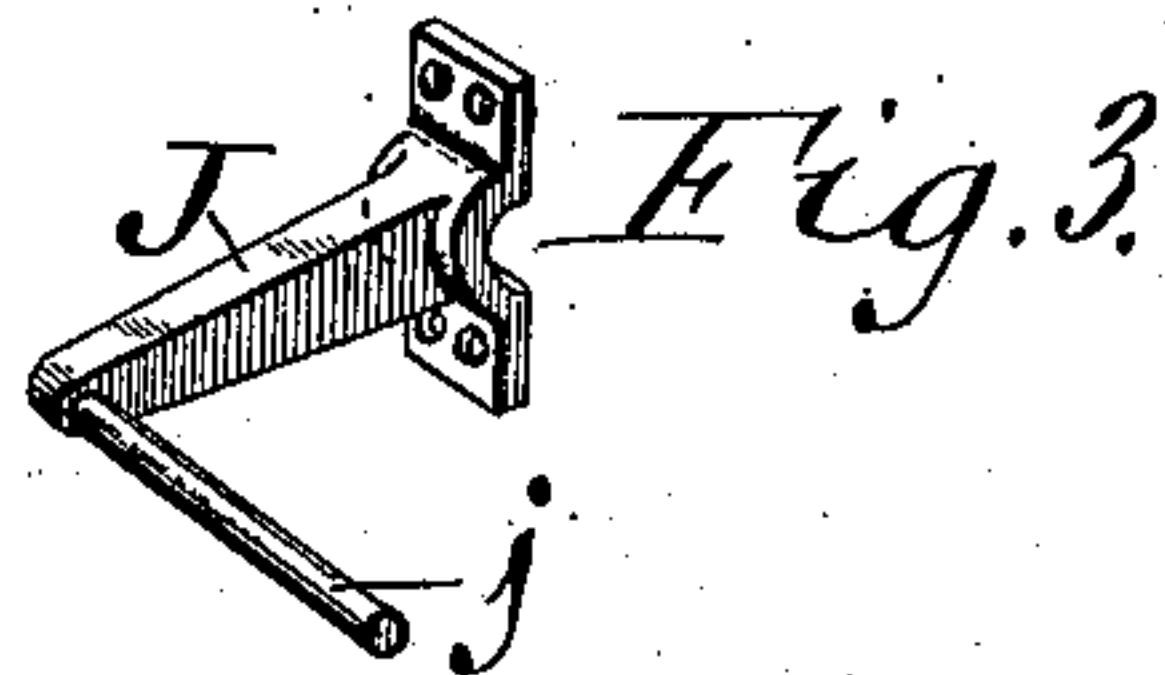
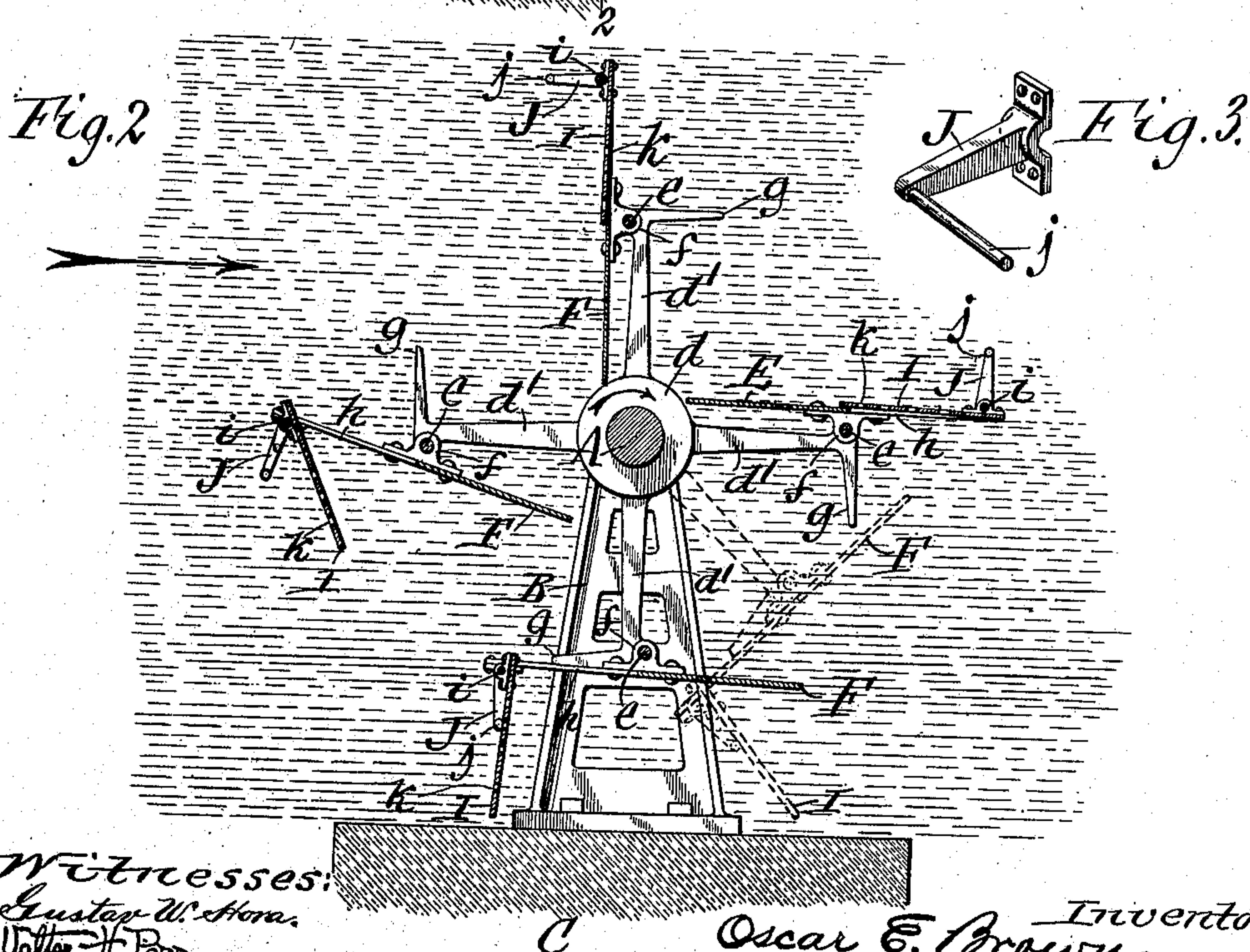
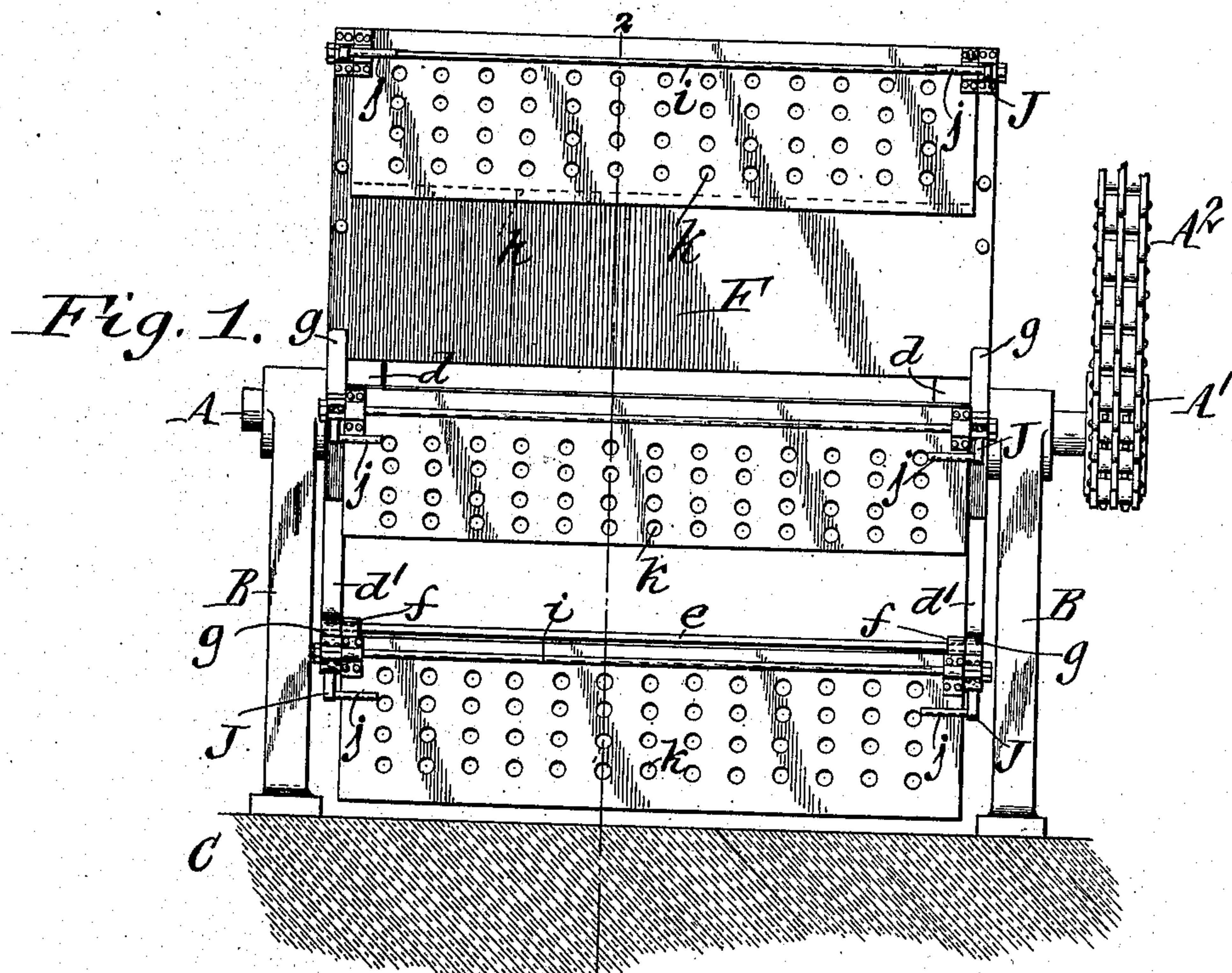


No. 885,141.

PATENTED APR. 21, 1908.

O. E. BROWN.  
WATER MOTOR.

APPLICATION FILED AUG. 23, 1907.



Witnesses:  
Gustav W. Horn.  
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# UNITED STATES PATENT OFFICE.

OSCAR E. BROWN, OF BUFFALO, NEW YORK, ASSIGNOR OF ONE-FOURTH TO LEMUEL VASBINDER, OF BUFFALO, NEW YORK.

## WATER-MOTOR.

No. 885,141.

Specification of Letters Patent.

Patented April 21, 1908.

Application filed August 23, 1907. Serial No. 389,809.

*To all whom it may concern:*

Be it known that I, OSCAR E. BROWN, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented a new and useful Improvement in Water-Motors, of which the following is a specification.

This invention relates to the class of water motors which are submerged in rivers and other currents and which are provided with pivoted paddles which present their edges to the current on the return side of the motor wheel to reduce their resistance.

The principal object of my invention is to improve the construction of such motors with a view of materially increasing their power.

A further object is the provision of a motor of this kind which when placed in streams affected by the tides will always turn in the same direction regardless of whether the tide is coming in or going out.

In the accompanying drawings:—Figure 1 is a face view of the motor. Fig. 2 is a vertical section thereof in line 2—2, Fig. 1. Fig. 3 is a perspective view of one of the stops of the auxiliary paddles.

Similar letters of reference indicate corresponding views in the several views.

A indicates the rotary horizontal shaft of the motor which is supported in standards B resting upon piers C rising from the bottom of the stream. This shaft has a driving sprocket A<sup>1</sup> from which power is transmitted to the driven part, not shown, by a sprocket chain A<sup>2</sup>, or other suitable means.

The wheel is provided at each end with a hub *d* secured to the shaft A and carrying radial arms *d*<sup>1</sup>, these hubs and arms constituting the frame of the wheel. The opposing arms of these hubs carry horizontal shafts *e* upon each of which is pivoted a main paddle F having bearings *f* on its rear side which surround said shaft. These paddles extend across the full width of the motor wheel and are preferably pivoted centrally or about midway between their inner and outer edges. At their outer ends the arms *d* are provided with rigid, rearwardly-extending stops or lugs *g* which stand in the path of the paddles and limit their tilting movement in a rearward direction. Each paddle is provided on the outer side of its pivot with an opening or passage *h* preferably extending to its outer edge and nearly throughout its length. The

opening or cut-away portion of each paddle is normally closed by a flap or auxiliary paddle I hinged at its outer edge to the front side of the main paddle while its free inner edge overlaps the edge of said opening, whereby the auxiliary paddle is incapable of swinging rearwardly beyond the main paddle but free to swing forwardly.

In the construction shown in the drawings, the auxiliary paddles are hinged to longitudinal rods *i* suitably secured at their ends to the portions of the main paddles which extend outwardly beyond their pivots. The forward movement of the auxiliary paddles is limited by stops or arms *j* extending inwardly from brackets J secured to the front sides of the main paddles. The auxiliary paddles are preferably provided with numerous perforations *k* so as to reduce their effective area below that of the solid or imperforate main paddles and cause the latter to overbalance the auxiliary paddles and assume an upright position upon reaching the top of the motor wheel, as shown in Fig. 2. In this position, the main paddle bears at its lower edge against the hubs *d*<sup>1</sup> or other suitable stops for limiting its rearward movement.

Assuming the stream or current to run in the direction of the arrow in Fig. 2, the operation of the water wheel is as follows: As the paddles successively reach the top of the wheel they assume a substantially upright position, as shown in Fig. 2, in which position they present their greatest area to the water pressure. In this uppermost position of each main paddle, its opening *h* is closed by the auxiliary paddle I which bears at its free lower edge against the front side of the main paddle. Upon reaching the rear side of the wheel, the main paddle and its auxiliary paddle assume a horizontal position and during the time that they travel from that position to the lower side of the wheel the auxiliary paddle I opens, allowing the water to flow through the passage of the main paddle and very materially reducing the resistance of the returning paddle. While traveling from the lower to the front side of the wheel the paddles are presented edgewise to the current.

An important feature of the invention is that when the paddles reach the rear side of the wheel about midway between the shaft A and the bottom of the wheel, as indicated by the dotted lines in Fig. 2, the main pad-



dles assume a forwardly-inclined position. The current acting upon the main paddle in that position tends to deflect the same downwardly and forwardly, giving the wheel an additional impulse which materially increases the power derived from it.

While the wheel is shown in a horizontal position in the drawings, it may be placed vertically as well as horizontally, if desired.

10 This improved construction has the further important advantage that the wheel, when placed in the ocean or in rivers flowing into the same, will turn in one and the same direction irrespective of the direction of the  
15 tide. When the current flows in the contrary direction to the arrow in Fig. 2, the wheel still continues to rotate in the direction of the arrow, inasmuch as the paddles in that case are presented squarely to the current upon reaching the lower side of the  
20 wheel, while assuming a horizontal position upon reaching the upper side of the wheel, the action of the paddles being the reverse of that before described.

25 I claim as my invention:—

1. A water motor comprising a frame, main paddles pivoted to the frame and provided with openings or passages, and auxiliary paddles normally closing said openings  
30 and pivoted to the main paddles, substantially as set forth.

2. A water motor comprising a frame, main paddles pivoted thereto between their inner and outer edges and having openings  
35 in the portions thereof on the outer sides of their pivots, and auxiliary paddles normally closing said openings and hinged to the main paddles, substantially as set forth.

3. A water motor comprising a frame,  
40 main paddles pivoted thereto between their inner and outer edges and having openings in the portions thereof on the outer sides of their pivots, and perforated auxiliary paddles normally closing said openings and

hinged to the main paddles, substantially as  
45 set forth.

4. A water motor comprising a frame, main paddles pivoted thereto and provided in their outer portions with openings, auxiliary paddles hinged at their outer edges to  
50 the main paddles and normally closing said openings, and means for limiting the rearward movement of the auxiliary paddles on the main paddles, substantially as set forth.

5. A water motor comprising a frame,  
55 main paddles pivoted thereto and provided in their outer portions with openings, auxiliary paddles hinged at their outer edges to the main paddles and normally closing said openings, and stops for limiting the forward  
60 movement of the auxiliary paddles, substantially as set forth.

6. A water motor comprising a frame, main paddles pivoted thereto and provided in their outer portions with openings, auxiliary paddles hinged at their outer edges to  
65 the main paddles and normally closing said openings, and stop arms carried by the main paddles and arranged to limit the forward movement of the auxiliary paddles, substantially as set forth.

7. A water motor comprising a frame, main paddles pivoted to the frame between their inner and outer edges and having openings in their outer portions, stops on the  
75 frame for limiting the rearward swing of the main paddles, auxiliary paddles normally closing said openings and hinged at their outer edges to the main paddles, and stops on the front side of the main paddles for  
80 limiting the forward swing of the auxiliary paddles, substantially as set forth.

Witness my hand this 21st day of August, 1907.

OSCAR E. BROWN.

Witnesses:

LEMUEL VASBINDER,  
C. F. GEYER.