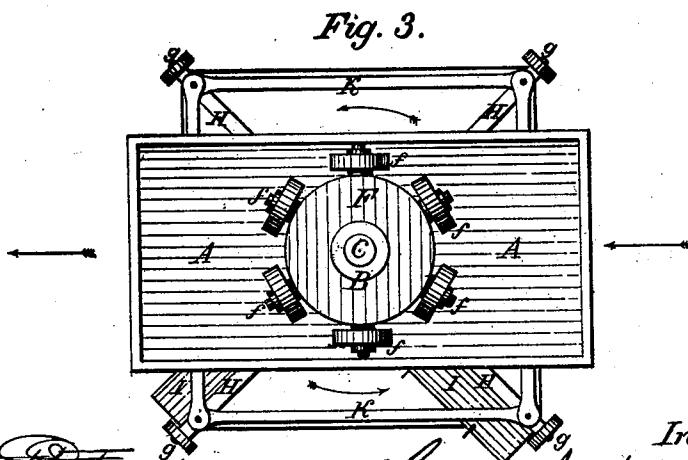
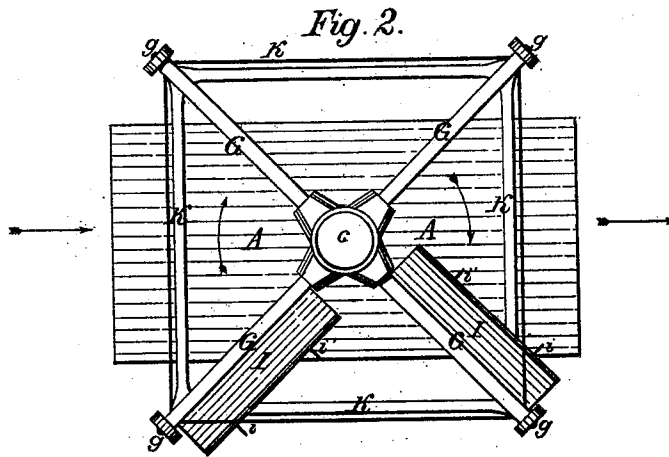
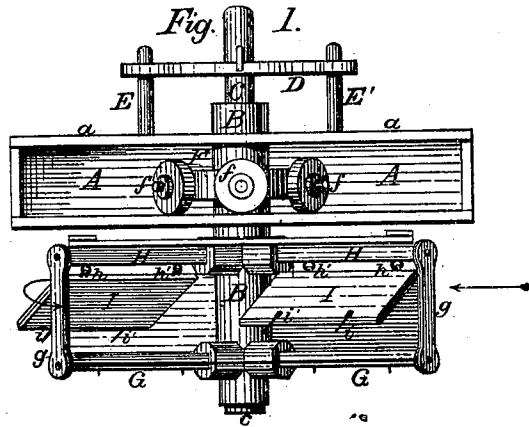


L. JOHANNESSEN.
WATER-WHEEL.

No. 178,529.

Patented June 13, 1876.



Attest:
August Peterson.
Wm Bagger.

Inventor:
Lars Johannesen,
by Louis Bagger
att'y.

UNITED STATES PATENT OFFICE.

LARS JOHANNESSEN, OF MANISTEE, MICHIGAN.

IMPROVEMENT IN WATER-WHEELS.

Specification forming part of Letters Patent No. **178,529**, dated June 13, 1876; application filed February 3, 1876.

To all whom it may concern:

Be it known that I, LARS JOHANNESSEN, of Manistee, in the county of Manistee and State of Michigan, have invented certain new and useful Improvements in Water - Wheels; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to that class of water-wheels which are immersed entirely under the surface of the water, and propelled by the current or tide of the body of water into which they are placed; and it consists in the construction and arrangement of the various operating parts of such a machine, substantially as and for the purpose hereinafter set forth.

Figure 1 is a side elevation, partly in section. Fig. 2 is a bottom view. Fig. 3 is a top view, the deck or cover of the boat being removed.

Similar letters of reference indicate corresponding parts in all the figures.

A is a boat or flat, constructed with a flat bottom, without a keel. The bottom is perforated in the center, to admit of the passage of the vertical hollow shaft B. *a* is the deck or cover of the flat, which is also perforated in the center, to permit of the passage of B. C is a vertical axis, inserted into and through the hollow shaft B, and having at its bottom end a bearing, *c*, on which the end of said shaft rests and revolves.

By raising or lowering C, it will thus be seen that B, with its attachments, will be correspondingly raised or lowered, to suit the varying depths at which the current is encountered.

The top of the axis C is secured adjustably in a square mortise in the cross-beam D, which rests on uprights E E', as shown, so that C may be easily raised or lowered, (by a windlass or other suitable means,) and fastened in any given position in the cross-beam D by set-screws, bolts, or equivalent devices. F is a horizontal wheel or disk, adjustably secured upon the shaft B within the boat, (below the deck *a*.) It is provided around its periphery with a series of vertical rollers, *f*, which run upon a circular iron track, surrounding B, upon the bottom of the boat. By this arrange-

ment the weight of the wheel is distributed over a large surface of the bottom of the boat; the deck is left comparatively unencumbered, and the strain upon the central axis C is greatly relieved. At the bottom of the shaft B, just above *c*, there are four arms, G, projecting laterally at right angles. Some distance above there are four other corresponding arms, H. Each pair of arms G H fall in the same plane vertically, and are joined at the ends by vertical cross-pieces *g*. In this manner each set of arms, of which there are four, forms a parallelogram, having for its top an arm, H, and for its bottom an arm, G, while *g* and B form the sides. Each parallelogram thus formed is occupied by a swinging door, I, hinged to H at *h h'*, and provided at its bottom with two projecting staples, *i i'*, which strike against G, and enable each door to open or swing in the direction indicated by the arrow only. K denotes horizontal braces, which unite the ends of the arms, for the purpose of adding strength and durability to this part of the machine.

From the foregoing description, the operation of my machine will be easily understood. All that part of the machine which projects below the bottom of the boat A, including the arms G H, cross-pieces *g*, doors I, and braces K, &c., is so constructed that it may be taken apart and packed within or on the deck of the boat. The opening in the bottom is plugged or closed with a suitable cover, after B and C have been withdrawn and placed on the deck, and the boat, with its machinery on board, may readily be towed to its destination, where it is desired to operate it. Here the parts are arranged and put together in working order, as shown in the drawing, and the boat is secured to the shore by cables, or it is anchored in the current, as the case may be. The action of the current upon the vertical doors or blades I of the wheel will cause the arms G H and shaft B to rotate by successively closing (and pressing against) the doors. In this figure the current is supposed to set in against the machine in a direction as from the observer. The result is, that it will exert pressure upon the door marked I', which, being prevented from opening by the staples *i i'*, will, in its turn, transmit the pressure to the arms G H, between

which it is suspended, and cause these to revolve in a backward direction, or from the observer. At the same time an equal amount of pressure is exerted by the current against the door *I''*; but here the staples *i i'*, being on the other side of arm *G*, do not prevent its opening, so it is swung open, as shown in the drawing, and the current passes through. In the position and under the conditions indicated in the drawing, the blades to the right of the central shaft *B* will, in succession, be operated upon by the current, while, as soon as they pass the central line and swing round to the opposite side of *B*, the doors will be opened by the force of the current, and allow it to pass through.

The working machinery may be placed either upon or in the boat, (if this is large enough;) or the boat may, as in the drawings, be used only for carrying the water-wheel and its attachments, and the power may be transmitted

to the shore from a drum or cog-wheel, *L*, near the top of the revolving shaft *B*, by means of an endless belt, or any other of the well-known mechanical devices for transmitting power suitable for the purpose.

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

The combination of the boat *A*, central axis *C*, revolving hollow shaft *B*, disk *F*, with runners *f*, lateral and parallel arms *H* and *G*, cross-pieces *g*, and swinging doors *I*, all arranged and operating substantially as and for the purpose specified.

In testimony that I claim the foregoing as my own I have hereunto affixed my signature in presence of two witnesses.

LARS JOHANNESSEN.

Witnesses:

B. M. CUTCHEON,
B. C. LEWIS.