W. H. ANDREWS & H. FULLER.

TIDE-WHEELS.

No. 193,909. Patented Aug. 7, 1877.

Fig. 1

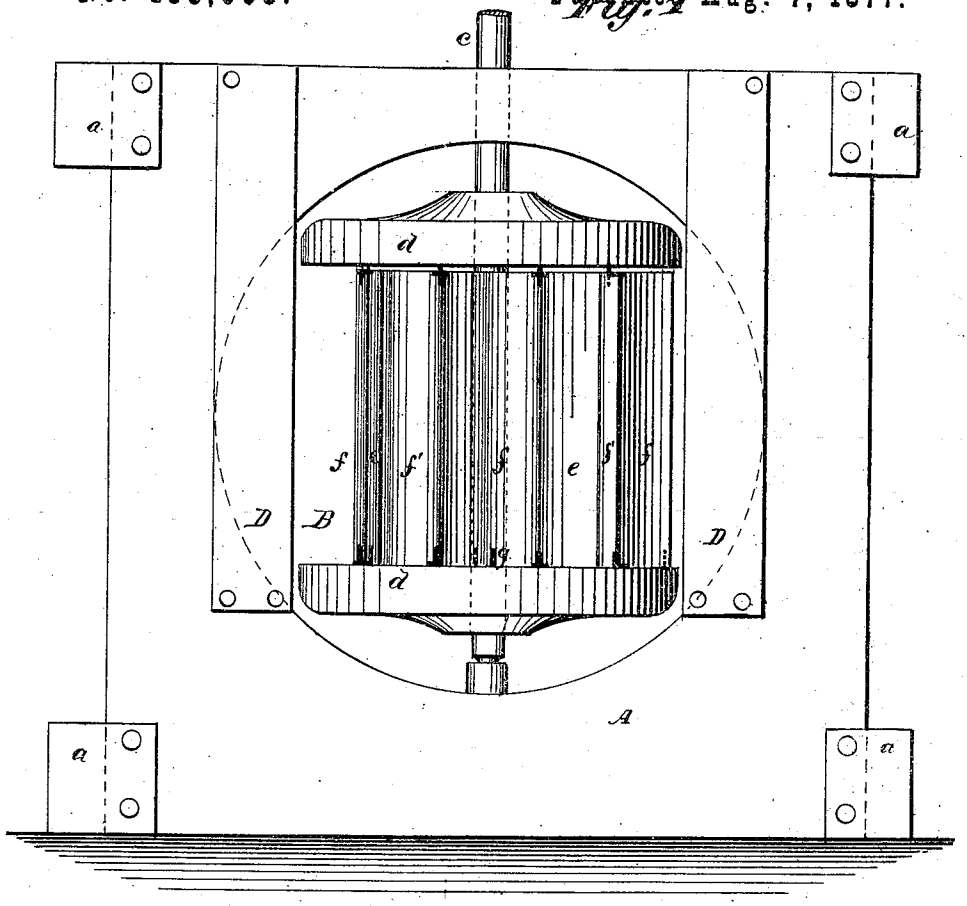
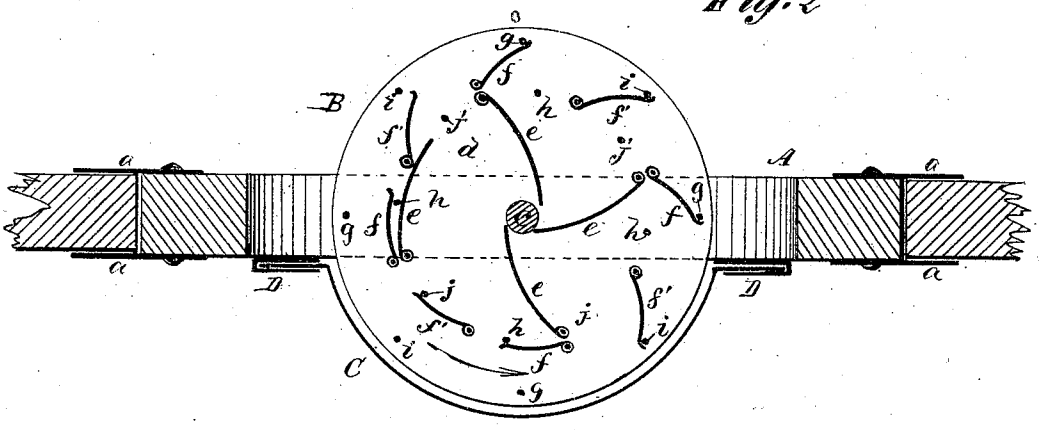


Fig. 2



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WALTER H. ANDREWS AND HIRAM FULLER, OF DECKERVILLE, MICHIGAN.

IMPROVEMENT IN TIDE-WHEELS.

Specification forming part of Letters Patent No. **193,909**, dated August 7, 1877; application filed June 11, 1877.

To all whom it may concern:

Be it known that we, WALTER H. ANDREWS and HIRAM FULLER, of Deckerville, in the county of Sanilac and State of Michigan, have invented a new and Improved Current-Wheel, of which the following is a specification:

Figure 1 is a side elevation of our improved wheel. Fig. 2 is a horizontal section, showing the arrangement of buckets.

Similar letters of reference indicate corresponding parts.

Our invention consists of a wheel placed on a vertical shaft and provided with buckets that open and close by the action of the current. The wheel is journaled in a frame that may be raised out of the water, and a gate is provided for regulating the motion of the wheel.

In the drawings, A is a frame that is provided with guides *a*, that slide upon piles or timbers, and B is a wheel, whose shaft *c* is journaled in the frame A.

The wheel B consists of the heads *d*, that are secured to the shaft *c*, and the buckets or wings *e f f'*, that are pivoted between the heads.

The buckets *e* are of such width as to rest upon the shaft *c* when opened, and the buckets *f*, whose pivots are placed as near the pivots of the buckets *e* as possible, rest against the pins *g* when opened, and when the buckets *e f* are closed together they close against a pin, *h*, that prevents them from vibrating as they move through the water.

The buckets *f'* are pivoted between the pairs of buckets *e f*, and when exposed to the action of the current they rest against the pins *i*; but when drawn against the current, pivot foremost, they rest against the pins *j*, and offer no resistance to the current.

A semicircular gate, C, is placed in front of the wheel B, and is held in place by the guides D, in which it slides vertically.

The operation of the wheel is obvious. It is submerged in the stream and held in place by piles or timbers, and the gate C, being more or less open, the water spreads the buckets *e f* and turns the bucket *f'*, so that all upon one side of the shaft *c* are acted upon by the current, while upon the opposite side they automatically close or fold together, so as to offer no resistance to the current.

The current flows in the direction indicated by the straight arrow, and the wheel rotates in the direction indicated by the curved arrow.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

1. The combination, in the wheel B, of the shaft *c*, heads *d*, and pivoted buckets *e f f'*, substantially as shown and described.

2. The curved gate C, supported by guides D, substantially as shown and described.

WALTER H. ANDREWS.
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Witnesses:
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