T. J. Kindleberger,

Water Wheel.

No. 48,694. Patented July 11, 1865.

Fig 1.

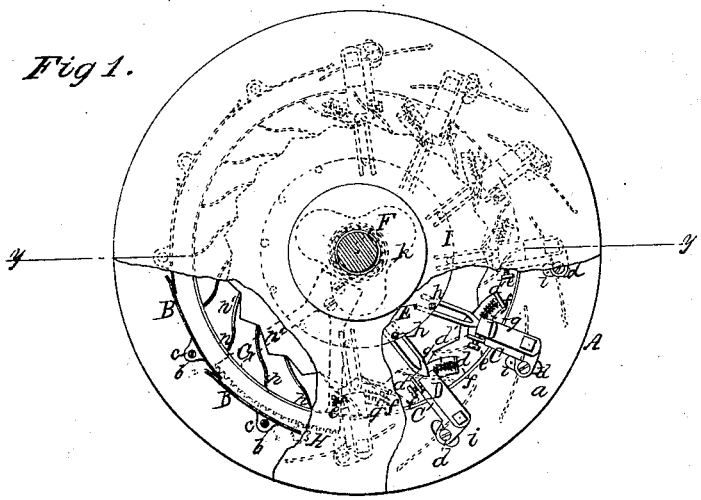
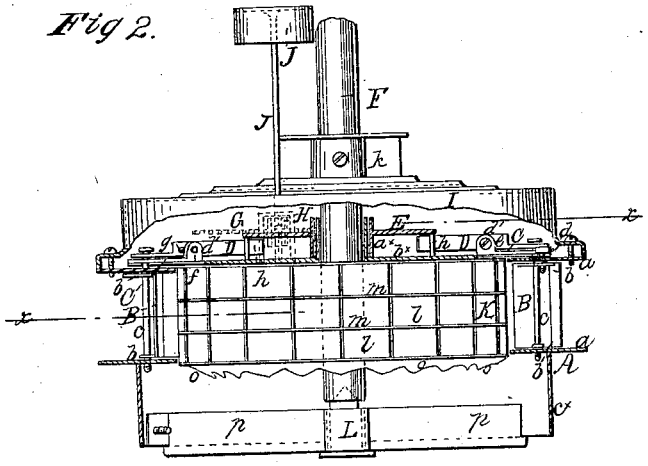


Fig 2.



Witnesses.

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UNITED STATES PATENT OFFICE.

T. J. KINDLEBERGER, OF SPRINGFIELD, OHIO.

IMPROVEMENT IN WATER-WHEELS.

Specification forming part of Letters Patent No. **48,694**, dated July 11, 1865.

To all whom it may concern:

Be it known that I, T. J. KINDLEBERGER, of Springfield, in the county of Clarke and State of Ohio, have invented a new and Improved Water-Wheel; 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 make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a plan or top view of my invention, partly in section, as indicated by the line *x x*, Fig. 2; Fig. 2, a side sectional view of the same, taken in the line *y y*, Fig. 1.

Similar letters of reference indicate like parts.

This invention relates to a new and improved water-wheel of that class which are placed on a vertical shaft and discharge their water at the center into a suction or draft tube.

The invention consists in a novel and improved construction and arrangement of gates, as herein shown and described, whereby the amount of water admitted to the wheel may be regulated as desired and with the greatest nicety, and due provision made against injury by drift-wood passing through or between the buckets.

The invention also consists in a novel construction of the case, as well as in the construction and arrangement of the buckets of the wheel, as hereinafter fully set forth, whereby many advantages are obtained, hereinafter enumerated.

A represents the case of the wheel, provided with two horizontal flanges, *a a*, between which the gates B are placed. These gates are of slightly serpentine form, as shown clearly in Fig. 1, and they are provided with lips *p* at top and bottom, through which shafts *c* pass, as shown clearly in Fig. 2, the buckets being allowed to turn freely on the shafts. The upper parts of the gates B are connected by screws *d* to arms C, of bent or right-angular form, as shown clearly in Fig. 1, and these arms are attached at their angles to the upper ends of the shafts *c*.

The arms C are each provided with two upright lugs or ears, *d' d'*, one at each side, near their inner ends, and through one lug or ear a set-screw, *e*, passes, and through the other a pin, *f*. These pins *f* project from levers D, the latter being attached by a pivot to the outer part of the arms. Spiral springs *g* are fitted on the pin *f*. The inner parts of the levers D are forked, and between the prongs of the forks pins *h*, which depend from a circular plate, E, project. This plate E is fitted loosely on a collar, $a^{\times}$, on the shaft F of the wheel, and it has a toothed segment, G, attached to it, into which a pinion, H, gears. The collar $a^{\times}$ is supported by arms $b^{\times}$ from the upper flange, *a*, of the case A.

The screws *d*, which connect the gates B with the arms C, pass through openings *i* in the upper flange, *a*, sufficiently large to admit of a requisite movement of the gates, so that they may open and close.

From the above description it will be seen that by turning the pinion H the plate E will also be turned, and the pins *h* will actuate the levers D, and the latter move the arms C, so as to to open and close the gates, the gates being opened when the levers D are pressed against the set-screws *e* and closed when the springs *g* are pressed against the arms C.

By this arrangement or means for opening and closing the gates several advantages are obtained. In case one of the gates, when open, becomes choked or clogged by a piece of drift-wood the others may be closed, owing to the arrangement of the springs *g*, the spring of the fixed or immovable gate yielding under the pressure of its lever D, while the other gates are being closed. Hence the wheel may be stopped and the drift-wood removed without closing or shutting the main gate of the flume or penstock.

By means of the set-screws *e* the levers D may be adjusted so that all the gates will open and close uniformly and operate accurately. This is an important feature of the invention.

The parts above described for opening and closing the gates are covered by a cap, I, through which the shaft *j* of the pinion H passes, said cap having a bearing, *k*, at its center for the shaft F of the wheel.

The shaft *j* may have a pulley, J, upon it for the purpose of applying a governor, or for the direct application of hand-power in operating the gates.

The lower part, $c^{\times}$, of the case A of the wheel

projects down from the lower flange, *a*, about midway between its outer and inner edges, as shown in Fig. 2.

K represents the wheel, which has its buckets *l* at its periphery. These buckets are arranged in rows, one above the other, the rows being separated by the partition-plates *m*. The buckets are of serpentine form, as shown clearly in Fig. 1, the outer face sides being concave, as shown at *n*, and the other parts being convex, as shown at *n'*, and the buckets incline downward at an angle of about twenty-three (23) or twenty-four (24) degrees, as shown at *o* in Fig. 2. The wheel is not close to the gates B. A space is allowed all around in order to insure an unbroken column of water all around the wheel. The lower end of the wheel-shaft F is stepped in a box, L, supported by arms *p* at the lower end of the case A. In consequence of having the lower part of the case A project down from the lower flange, *a*, about midway between its outer and inner edge, a free escape of the water from the wheel is allowed, as well as a large suction or draft tube. By having the buckets inclined the wheel is rendered more powerful than if they had a horizontal position, as a greater length of bucket is obtained within a given width or portion of the diameter of the wheel.

This wheel has been practically tested, and it operates well, giving out a larger percentage of the power of the water.

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

1. The springs applied to the opening and closing mechanism of the gates, where a plurality of gates are used for a single wheel, so that any one of said gates, in case of being prevented from closing, will not prevent the closing of the others, as herein set forth.

2. The arrangement of the bent arms C and levers D with the set-screws *e*, springs *g*, plate E, the pendent pins *h*, the segment G, and pinion H, for operating the gates B, as set forth.

3. The arrangement of the buckets *l*, of serpentine form, substantially as described.

4. The cap I, through which the shaft *j* of the pinion H passes, and which covers and protects the parts for opening and closing the gates, as herein set forth.

T. J. KINDLEBERGER.

Witnesses:

WILLIAM MOORE,

ANNA BRADBURY.