

(No Model.)

3 Sheets—Sheet 1.

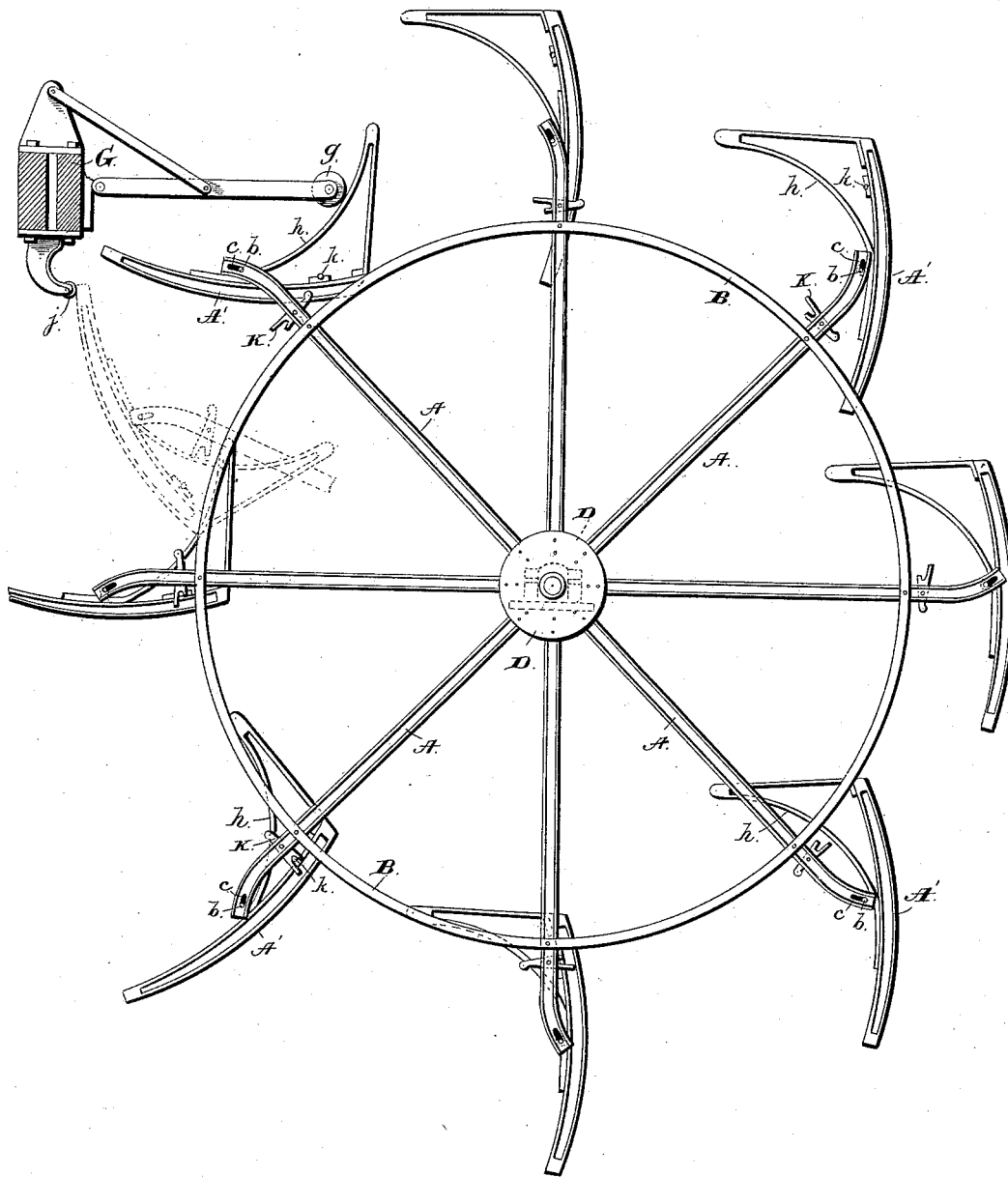
J. F. LEFORT.

CONSTRUCTION OF WATER WHEELS WITH MOVABLE FLOATS OR PADDLES

No. 382,887.

Patented May 15, 1888.

*Fig. 1.*



Witnesses:

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*Robert Smith.*

*Inventor.*

*Jules Francois Lefort,*  
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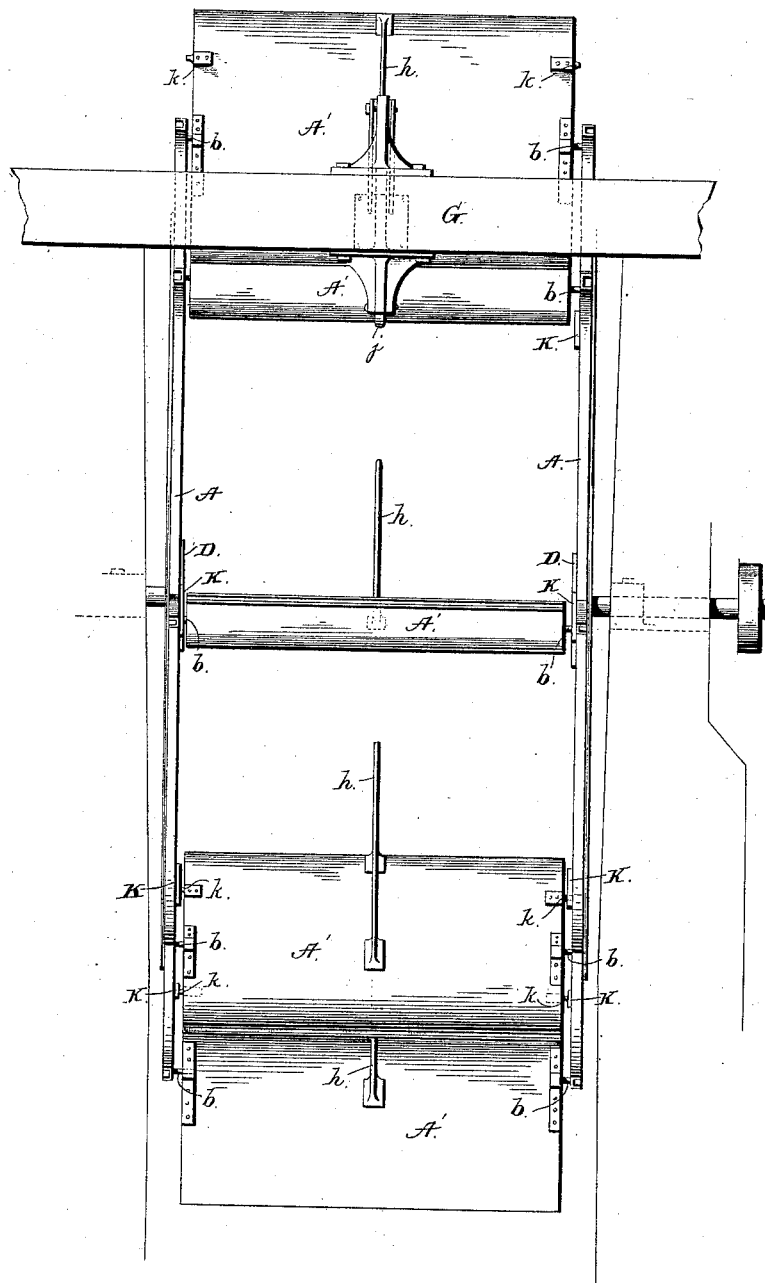
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Patented May 15, 1888.

Fig. 2.



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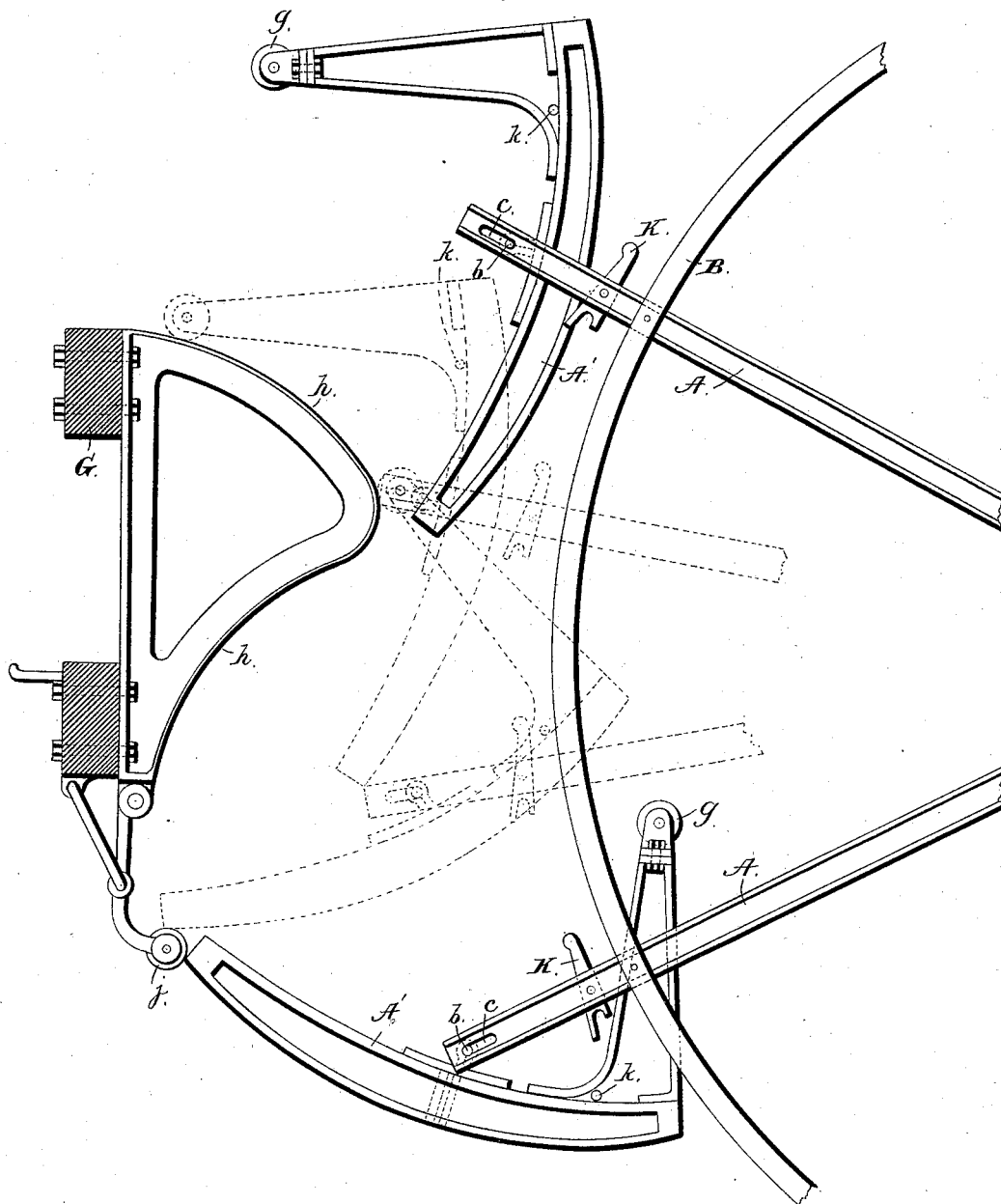
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*Fig. 3.*



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# UNITED STATES PATENT OFFICE.

JULES FRANÇOIS LEFORT, OF PARIS, FRANCE.

CONSTRUCTION OF WATER-WHEELS WITH MOVABLE FLOATS OR PADDLES.

SPECIFICATION forming part of Letters Patent No. 382,887, dated May 15, 1898.

Application filed November 16, 1887. Serial No. 255,333. (No model.) Patented in France June 2, 1887, No. 171,026; in Belgium October 22, 1887, No. 79,278; in Eng' and October 26, 1887, No. 14,605, and in Germany November 2, 1887, No. 4,550.

*To all whom it may concern:*

Be it known that I, JULES FRANÇOIS LEFORT, a citizen of France, residing at Paris, in the Republic of France, have invented a new and useful Improved Construction of Water-Wheels with Movable Floats or Paddles, (for which I have obtained patents in France, dated June 2, 1887, No. 171,026; Belgium, dated October 22, 1887, No. 79,278; Germany, dated November 2, 1887, No. 4,550; and have made application for patent in Great Britain, October 26, 1887, No. 14,605,) of which the following is a specification.

My invention relates to water-wheels that are partly immersed in a stream or flowing water so as to receive motion therefrom. Such wheels have heretofore been made with fixed floats or paddles, and have not met with great application on account of the loss of effect due to the resistance of the paddles in rising on the tail side.

According to my present invention, I obviate this defect by suspending the paddles on pivots and so arranging them that they are automatically held in fixed positions as they enter on the stream side, but become perfectly free so as to remain in a vertically-suspended position as they leave the water on the tail side. For this purpose the paddles or floats are suspended by pivots from radial arms, the pivots being so placed that the part of the paddle below them is heavier than that above, so that they tend to hang vertically, or nearly so. To the front face of the upper part of each paddle is fixed a curved projecting arm, which, as the paddle in revolving with the wheels begins to descend on the stream side, comes in contact with a fixed roller, whereby the paddle is partially turned on its pivots and brought into a horizontal position. Its lower part is then brought in contact with a second fixed roller situated below the first one, which turns it still farther in the same direction, and in doing this two projecting studs on the sides of the upper part of the paddle are made to pass down behind forked catches on the wheel-frame. The pivots of the paddle are carried in slots formed in the radial arms of the frame, and while the paddles are performing the above-described movements, their pivots

are situated at the inner ends of the said slots. As the arms continue to descend with the paddles, the pivots of these slide by gravity outward and downward in the slots, thus shifting the paddles to a corresponding extent farther away from the center of the wheel. In consequence of this, when the lower heavier end of the paddle passes away from the second above-named roller, and it consequently tends to drop down again, the before-mentioned studs on the upper end, in rising again, pass into the forks of the catches, and thus the paddle becomes fixed in an approximately radially-projecting position, in which it now enters the water on the stream side and takes the pressure of the water. As the paddle begins to rise out of the water on the tail side, the preponderance of its lower part causes it to maintain its vertical position, turning on its pivots, and moving the studs out of the catches again. When the paddle has been raised by the arms to such a point that the slots in the arms are inclined downward at the inner ends, the pivots of the paddle slide back to the inner end of the slots, whereupon the above described operations are repeated.

Instead of causing a curved arm on the paddle to come in contact with a fixed roller, as described, the roller may be carried by the paddle and be brought in contact with a fixed cam-shaped surface that effects the turning of the paddle, as described.

Figure 1 of the accompanying drawings shows a part side view and part longitudinal section of a water-wheel constructed according to my above-described invention. Fig. 2 shows a front view of the same, and Fig. 3 shows an enlarged view of a modified construction.

The paddles A' are mounted with pivots *b* in slots *c*, formed in the radial arms *A A* of the water-wheel, these being fixed to an outer ring, *B*, and to a central boss, *D*. The pivots are so situated that the part of the paddle below them is heavier than the part above them, so that the paddles when freely suspended tend to assume the vertical positions shown on the right-hand side of Fig. 1. To the upper part of the paddle is fixed a curved arm, *h*, which, as the wheel revolves, is brought in

contact with a roller, *g*, carried by a fixed beam, *G*, whereby the paddle will be canted over on its pivots from the position No. 1 into the position No. 2, and on the further descent of the paddle, while it is still held by the roller *g*, its lower end comes in contact with a second roller, *j*, whereby it is canted over still farther, as shown by the dotted position, and while doing so the studs *k* on each side of the paddle are made to pass behind the forked catch *K* on the arm *A*. By the time the paddle has arrived in the dotted position the slots *c*, in which the pivots *b* are carried, are inclined slightly downward at their outer ends, so that the paddle will shift outward by gravity until its pivots are at the outer ends of the slots, as shown. On the further movement of the wheel the paddle, becoming released from the roller *j*, will swing downward with its outer end again, and in doing so the studs *k* will enter the fork of the catch *K*, and consequently the paddle will be retained in the more or less radial position shown at No. 3, in which position it will now enter the water and receive the pressure of the current. As the paddle rises up on the tail side of the stream, it will retain its vertical position due to the preponderance of the lower part, the studs *k* passing out of the forks of the catches again. As the paddle rises the slots *c* will assume a position with their inner ends inclined downward, and consequently the pivots *b* will slide back to that end of the slots again, and the above-described action will then be repeated.

35 In the arrangement shown at Fig. 3 the roller *g* is fixed on the arm of the paddle and is made to bear against the fixed cam surface *h*, whereby the paddle is canted over in the same manner as above described.

40 Having thus described the nature of my invention and the best means I know for carrying the same into practical effect, I claim—

1. In a water-wheel, the combination of a paddle suspended on pivots in an arm of the wheel, said pivots being situated on the paddle somewhat above its center of gravity, so that it tends to hang vertically, an arm projecting from the upper end of the paddle, a stationary roller or rollers carried by a fixed beam with which said arm comes in contact, so as to cant the paddle over from its vertical position into a radial or nearly radial position, and a catch on an arm of the wheel that holds the paddle in the canted or radial position

until the paddle passes out of the water, substantially as described. 55

2. In a water-wheel, the combination of a paddle suspended on pivots in an arm of the wheel, said pivots being situated above its center of gravity and free to slide in radial slots in the said arm, an arm projecting from the upper end of the paddle, one or more stationary rollers carried by a fixed beam and with which the said arm comes in contact, so as to turn the paddle from a vertical to a radial or nearly radial position, a forked catch on an arm of the wheel, and a stud on the paddle which passes behind the catch while the paddle is being turned into the radial position, and which enters the forked catch when the paddle, having slid outward in the slots, is set free by the roller and tends to resume its vertical position, substantially as described. 60 65 70

3. In a water-wheel, the combination of a paddle pivotally mounted in radial slots in an arm of the wheel, a forked catch on the said arm, and a stud on the paddle, said stud being so situated as to pass behind the said catch when the paddle is turned on its pivots and while said pivots are situated at the inner ends of the radial slots, and to pass into the slot of the catch when the paddle is turned on its pivots in a contrary direction and while said pivots are situated in the outer ends of the slots, substantially as described. 75 80 85

4. In a water-wheel, the combination of a paddle pivotally mounted in an arm of the wheel, so as to tend to hang vertically, a curved arm projecting from the upper end of the paddle, an upper stationary roller carried by a fixed beam and against which said arm bears, so as to turn the paddle on its pivots, a lower stationary roller, also carried by said fixed beam, against which the lower end of the paddle bears, so as to be turned still farther on its pivots, and a catch on an arm of the wheel into which a stud on the paddle catches after it has been released by the lower roller, substantially as described. 90 95

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 29th day of October, A. D. 1887. 100

JULES FRANÇOIS LEFORT.

Witnesses:

JULES LIGEO,

FERDINAND MOREL.