(No Model.) 2 Sheets—Sheet 1.

J. POLKOWSKI.

FEATHERING PADDLE WHEEL.

No. 486,502. Patented Nov. 22, 1892.

Fig. I

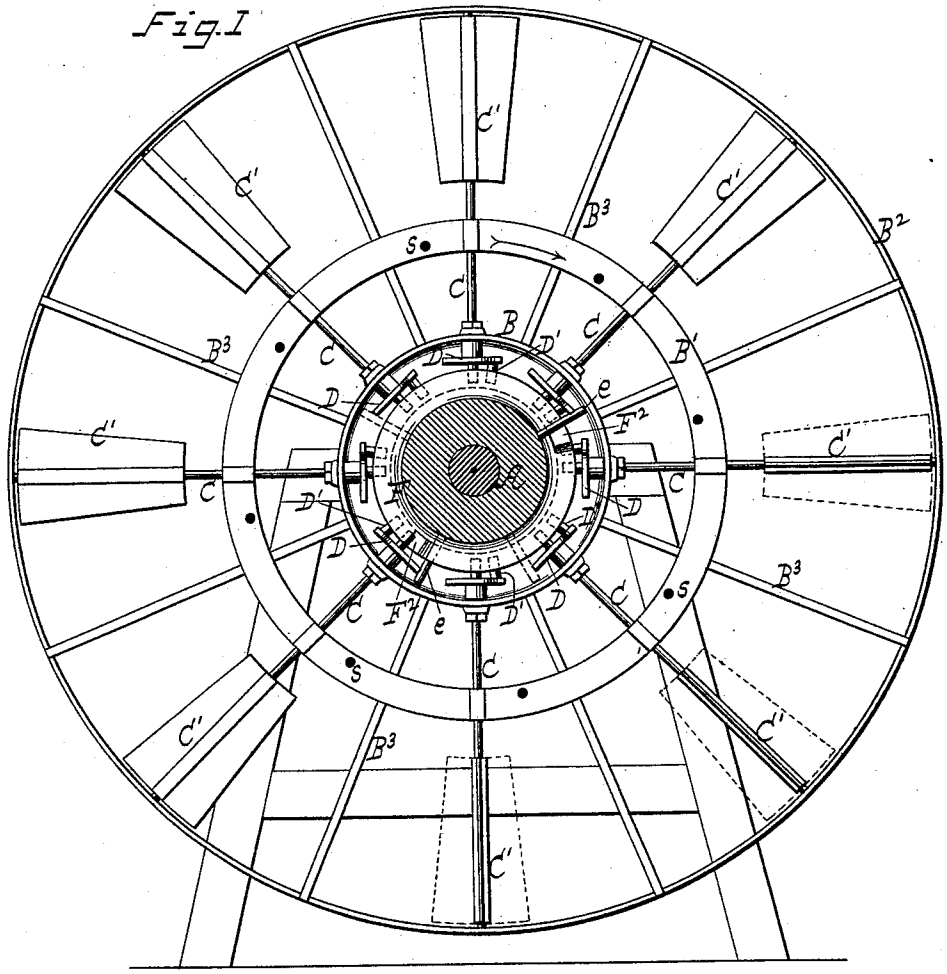
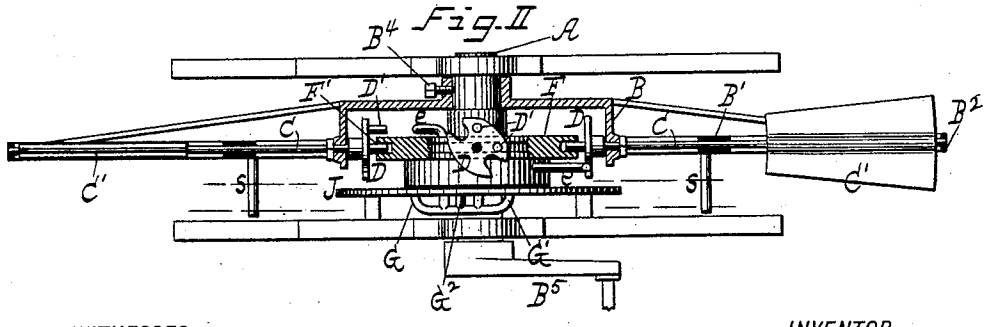


Fig. II



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(No Model.) 2 Sheets—Sheet 2.

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Fig. III

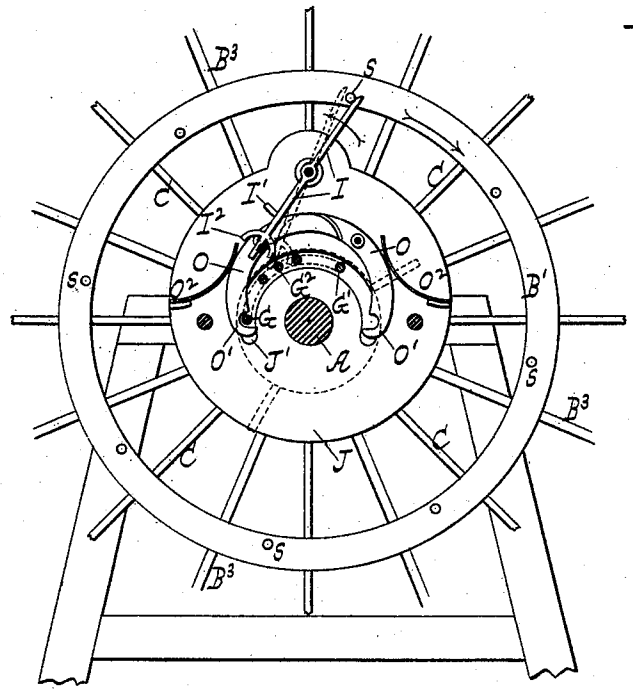


Fig. III*

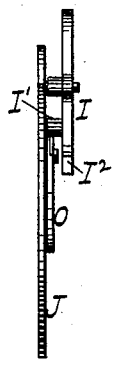
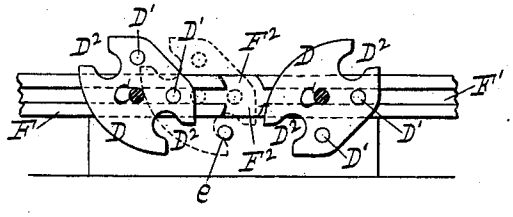


Fig. IV



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JOHN POLKOWSKI, OF NEW YORK, N. Y.

FEATHERING PADDLE-WHEEL.

SPECIFICATION forming part of Letters Patent No. 486,502, dated November 22, 1892.

Application filed April 8, 1892. Serial No. 428,382. (No model.)

To all whom it may concern:

Be it known that I, JOHN POLKOWSKI, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Feathering Paddle-Wheels, of which the following is a specification.

My invention relates to that class of paddle-wheels in which the floats or paddles are on radial spindles, each rotating on its own axis, as well as the axis of the wheel, for bringing the paddles to reverse positions when entering and leaving the water.

The novel features of my paddle-wheel are hereinafter fully described, with reference to the accompanying drawings, in which—

Figure I is a side view, partly in section, thereof, showing the mechanism for automatically reversing the paddles. Fig. II is a horizontal section thereof. Fig. III is a side view of a portion thereof, showing mechanism for automatically changing the point of reversal of the paddles, according to the direction of motion of the wheel. Fig. III* is an edge view of an adjusting-lever and concomitants. Fig. IV is a plan view of parts illustrating the operation of the paddle-reversing mechanism.

Similar letters of reference indicate similar parts.

The letter A indicates a shaft, which is mounted in bearings of a suitable frame and on which in turn is mounted the paddle-wheel. The body of this wheel is composed of three concentric rings B B′ B^2 and of spokes B^3, uniting said rings, the inner ring B forming the wheel-hub and being fastened to the wheel-shaft A, as by a set-screw B^4, thus causing the wheel to turn with the shaft. In practice motion is imparted to the shaft A, as by a crank B^5, from a proper source of power.

The letter C indicates a series of radial spindles supporting the paddles C′ of the wheel. Each of these spindles C is mounted in the concentric rings B B′ B^2, so as to be capable of rotating axially, and at a point within the inner ring B each of the spindles has a cam D firmly mounted thereon, to the inner face of each of which cams are secured in eccentric position two radial guide-pins D′. The cams D are formed, respectively, of a plate with two hooks D^2, Fig. IV, on the periphery thereof for adapting the cams to engage with each of two trip-pins *e*, as hereinafter explained, and at a point next to the cams, within the inner ring B, is a concentric disk F, with a hole for the wheel-shaft A, it being stationary thereon, while the wheel turns around the disk. This stationary disk F is constructed with a circumferential groove F′, which in practice receives in it one or the other of said guide-pins D′, according to the position of the cams, and the edges of which are cut away at points in fixed relation to each of the trip-pins *e*, so as to form passages F^2 for the cam guide-pins to and from the disk-groove. The trip-pins *e* are at opposite sides of the stationary disk in the path of the spindle-cams D, and each of said pins is firmly connected to a suitable part of the disk, so as to lie in a radial position. The angles of the trip-pins *e*, however, are of different degrees, being in this example of thirty degrees and sixty degrees, respectively, and by this arrangement the operation of said trip-pins is as follows: Assuming that the paddle-wheel shall revolve in the direction of the arrow in Fig. I, in the circulation of the series of cams D around the stationary disk F by the motion of the wheel each of the trip-pins *e* engages with said cams, so as to alternately reverse the positions thereof, together with the radial spindles C and paddles C′, and by the action of the trip-pin lying at the angle of sixty degrees each of the paddles is brought into a plane transverse to the wheel when it reaches a horizontal position, while by the action of the trip-pin lying at the angle of thirty degrees each of the paddles is brought into a plane parallel to the wheel when it reaches a position intermediate of the vertical and horizontal, the result being to produce the desired feathering of the paddles. In the reversal of the cams D one of the guide-pins D′ enters and the other of said pins leaves the circumferential

disk-groove F′ by way of the passages F^2, and hence either of said pins is always contained in said groove, with the effect of controlling the positions of the cams, &c. In order to increase said effect of the cam guide-pins D′, the inner ends of the radial spindles C are extended into the disk-groove F′; but, if desired, the said spindles may be terminated in the cams. When the motion of the paddle-wheel is in an opposite direction to that of the arrow in Fig. I, the two radial trip-pins *e* should be transposed as to their angles, as indicated by dotted lines in Fig. I, this condition being necessary to produce the desired feathering of the paddles in such motion of the wheel, and to fulfill this condition I make use of the automatic adjusting mechanism next described.

The stationary disk F, being mounted loosely on the wheel-shaft A, is capable of motion thereon, and to said disk are firmly connected two pins G G′, forming gages, and a third pin G^2, forming, together with a lever I, an adjusting device. Each of the pins G G′ G^2 is parallel to the axis of the stationary disk F and projects from the latter through a concentric slot J′ of a plate J, which is suitably fastened to the wheel-supporting frame. The gage-pins G G′ are equidistant from the adjusting-pin G^2, as more clearly shown in Fig. III. The letter O indicates two pawls, which are suitably pivoted to the plate J, and at one end of each of which is formed a hook O′, whereby it is adapted to engage one of the gage-pins G G′, so as to lock this pin, together with the stationary disk F, while the other or tail end of each of said locking-pawls is arranged in the path of a spur I′ of the adjusting-lever I. On the intermediate ring B′ of the paddle-wheel is a concentric row or series of tappets *s*, and the adjusting-lever I is pivoted to the plate J in such a manner that its one end lies in the path of said concentric-wheel tappets, while the other end of the adjusting-lever is formed with a fork I^2, or otherwise adapted to engage with the disk-adjusting pin G^2. When the wheel revolves in the direction of the arrow, the gage-pin G is in engagement with the proper locking-pawl O, and the stationary disk F is held in one of its two predetermined positions; but when the wheel revolves in a direction opposite to the arrow one of the tappets *s* comes in contact with the adjusting-lever I, and, displacing the same, causes its spur I′ to engage with the disk-locking pawls O, so as to retract the latter, thereby releasing the disk gage-pin G, the forked end I^2 of the adjusting-lever at the same time engaging with the adjusting-pin G′, so as to displace the same, together with the disk, bringing the disk into the other of its positions. The locking-pawls O having meanwhile been set free, the gage-pin G′ is brought in engagement with the proper pawl with the effect of re-securing the parts. When the fork I^2 of the adjusting-lever is used, a stop-pin may be located at each side of the adjusting-pin G^2, and, if desired, the several pins G G′ G^2 may be joined, as shown in Fig. II. In order to insure a proper action of the locking-pawls O, a spring O^2 may be combined with each of the pawls.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a paddle-wheel, the combination of a series of radial axially-rotating spindles supporting the paddles, a cam on each of the said spindles, having two radial eccentric guide-pins, a stationary concentric disk on the paddle-wheel shaft, with a circumferential groove receiving alternately each of said cam guide-pins for controlling the positions of the cams, and two radial trip-pins at opposite sides of the stationary disk, connected thereto, with different degrees of angle for engaging with the spindle-cams to alternately reverse the positions thereof, together with the spindles and paddles, the edges of said circumferential disk-groove being cut away at points in fixed relation to each of said trip-pins to form passages for the cam guide-pins to and from the groove, substantially as and for the purpose herein described.

2. In a paddle-wheel, the combination of radial axially-rotating spindles supporting the paddles, a reversing mechanism for said spindles, comprising the stationary concentric disk mounted loosely on the paddle-wheel shaft, two gage-pins connected to the stationary disk for determining the positions thereof on the shaft, two locking-pawls, each alternately engaging one of said disk gage-pins, an adjusting-pin connected to the stationary disk, a concentric series of tappets at one side of the wheel, mounted thereon, an adjusting-lever for engaging at one end with said disk-adjusting pin and at the other end with the concentric wheel-tappets, and a spur on said adjusting-lever for engaging with the disk-locking pawls to retract the latter, whereby the stationary disk is automatically set to different positions, according to the direction of motion of the wheel, substantially as and for the purpose herein described.

3. In a paddle-wheel, the combination of radial axially-rotating spindles supporting the paddles, a cam on each of the said spindles, having two radial eccentric guide-pins, a stationary concentric disk mounted loosely on the paddle-wheel shaft and constructed with a circumferential groove receiving alternately each of said cam guide-pins, two radial trip-pins at opposite sides of the stationary disk, connected thereto, with different degrees of an angle, the edges of said circumferential disk-groove having passages for the cam guide-pins to and from it at points in fixed relation to said trip-pins, two gage-pins connected to the stationary disk in fixed relation to the trip-pins, two locking-pawls, each alternately engaging one of said disk gage-pins, an adjusting-pin connected to the stationary disk,

a concentric series of tappets at one side of the wheel, mounted thereon, an adjusting-lever for engaging at one end with said disk-adjusting pins and at the other end with the concentric wheel-tappets, and a spur on said adjusting-lever for engaging with the disk-locking pawls to retract the latter, all substantially as and for the purpose herein described.

JOHN POLKOWSKI.

Witnesses:
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FRANK POLKOSKI.