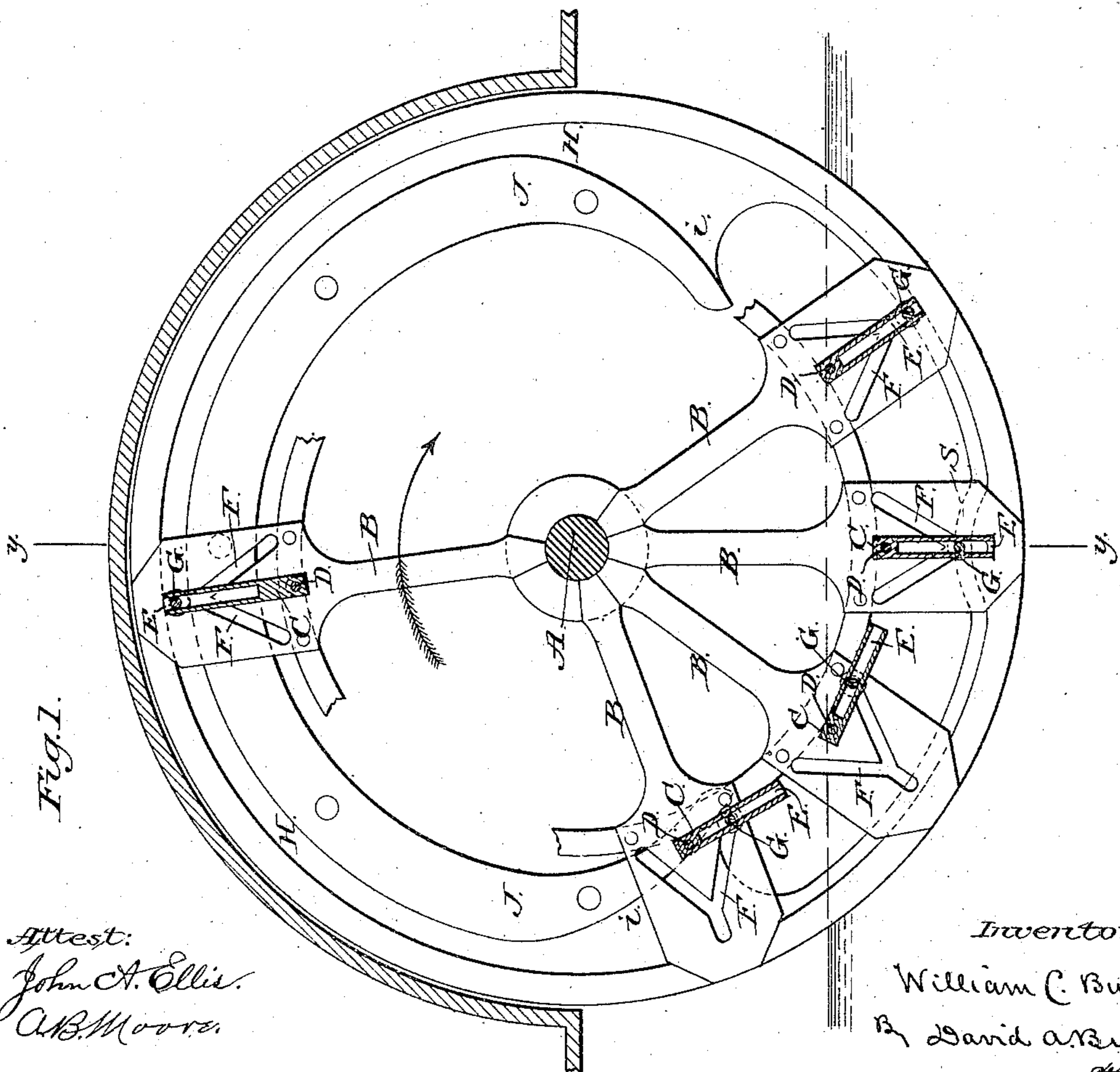
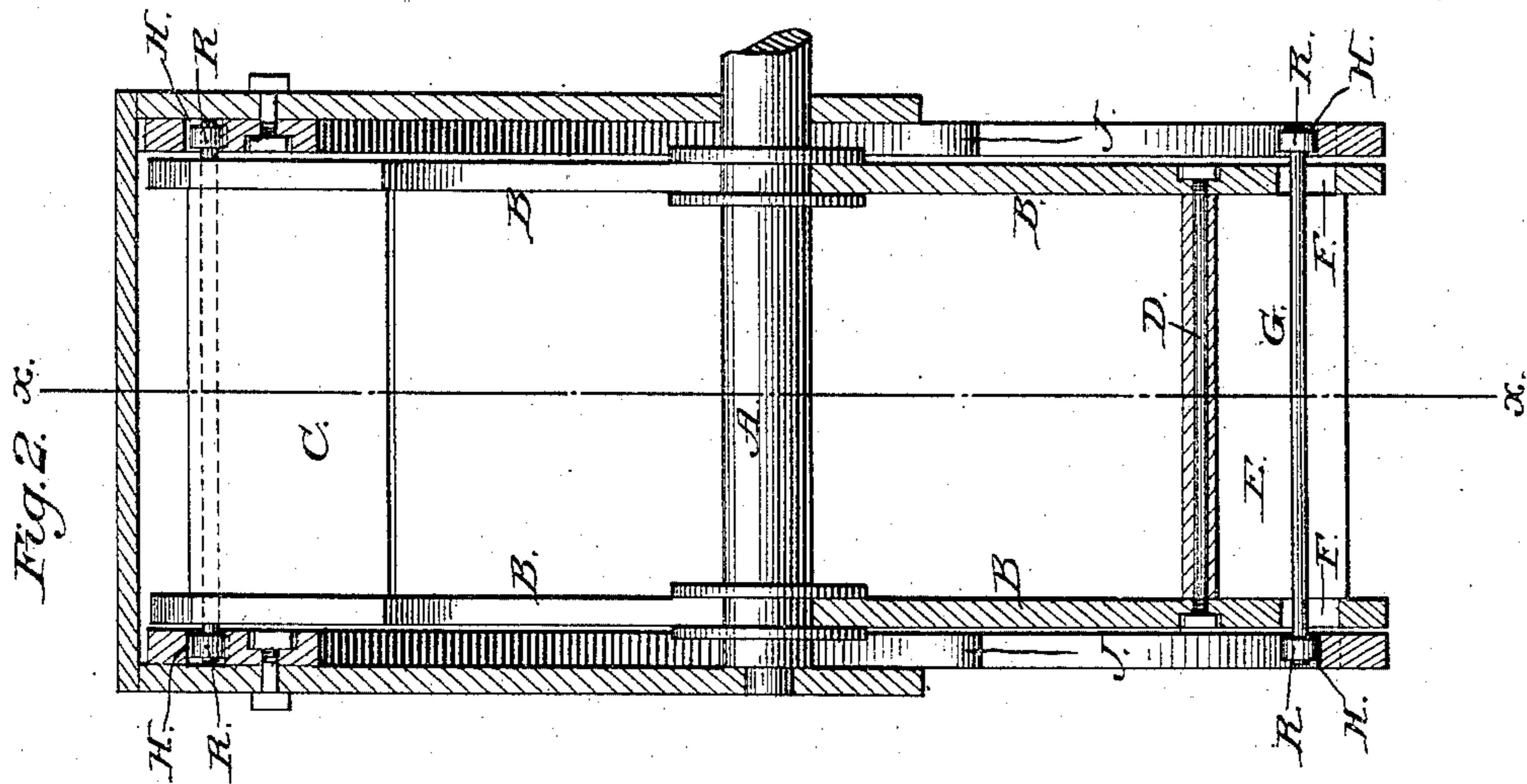


(No Model.)

W. C. BURNE.
FEATHERING PADDLE WHEEL.

No. 313,652.

Patented Mar. 10, 1885.



Attest:
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Atty.

UNITED STATES PATENT OFFICE.

WILLIAM C. BURNE, OF NEW YORK, N. Y.

FEATHERING PADDLE-WHEEL.

SPECIFICATION forming part of Letters Patent No. 313,652, dated March 10, 1885.

Application filed December 27, 1884. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM C. BURNE, of the city, county, and State of New York, have invented a new and useful Improvement in Feathering Paddle-Wheels; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification.

My invention relates to that class of paddle-wheels in which the paddles move automatically to present an effective propelling-surface to the water as they enter the same and turn in leaving, so as to avoid lifting the water, and prevent, consequently, a waste of power.

The object of my invention is to produce by novel devices, as hereinafter fully set forth, a simpler and more effective movement of the paddles than has heretofore been attained.

Figure 1 is a central vertical section through the paddle-wheel at a right angle to its axis, in line *xx* of Fig. 2, a portion of its arms and paddles being omitted; and Fig. 2 is a longitudinal section in line *yy* of Fig. 1, the upper paddle and the shaft being in elevation.

A represents the shaft of the wheel, mounted in any approved manner; B B, the radial arms, rigidly affixed to the shaft, and braced in the customary manner, and which carry the paddles; C C C, the paddles, pivoted to the arms each by a bolt, D, passing longitudinally through the upper edge of the paddle and through the arms B B at each end thereof, to form a hinge-joint which leaves the paddle free to swing loosely between the arms. Each paddle is slotted longitudinally through the center of its outer edge to form a slot or recess, E, therein of a depth equal to about two-thirds the width of the paddle.

Through each arm a bifurcated slot, F, is cut, its two arms converging from points upon opposite sides of the pivot of the paddle to a point in line radially with said pivot and the axis of the wheel, at a distance from the pivot somewhat less than the width of the paddle. From the intersection of its arms the slot is extended radially toward the end of the arm nearly to the line of the outer edge of the paddle. The two arms of the slot diverge at an acute angle. The width of the slot is uniform, and admits of the ready movement through it

of the end of a rod, G, which extends through the longitudinal slot in the paddle from the slot in the arm on one side of the wheel to the slot in the corresponding arm on the opposite side, as is illustrated in Fig. 2.

The ends of the rod G are fitted with friction-rollers R R, (see Fig. 2,) turning freely thereon, and these rollers are made to travel each in an annular groove or recess, H, cut in the face of a circular frame-plate, J, made fast to the wheel-house at each end of the wheel, so that the ends of the paddles as they revolve shall pass in close proximity thereto.

The outer edge of the groove H in each frame constitutes a circle having the axis of the wheel as its center; but the inner edge, opposite the lower half of the circle, bends inward, so as to rapidly widen the groove or recess H, as represented at *i* in Fig. 1, until its width exceeds the distance from the pivot of the paddle to the outer extremity of the bifurcated slot F in each arm. The continuity of the circle formed by the groove is broken at a point vertically beneath the shaft by an inward bend, S, therein, (see dotted lines, Fig. 1,) constituting in fact a cam.

The engagement of the friction-rollers R R with the circular groove H serves, during the movement of each paddle as it sweeps out of the water through the upper part of the wheel-house during a half-revolution of the wheel, to keep the paddle in line radially with the axis of the wheel, for as the friction-rollers move through the narrow portion of the groove the rod G is kept thereby at the extreme outer end of the paddle and of the bifurcated slot in the arms. When, in the rotation of the shaft, the rollers pass into the wide portion of the groove or recess, they remain in contact with the outer edge of the groove, and thus operate to keep the rod G at the outer edge of the paddle, where it will operate to stay the same and prevent its movement until the paddles have reached their point of deepest immersion vertically under the shaft. Here the rollers R R, passing up upon the cam S, carry the rod G inward far enough to permit it to enter the diverging arm of the slot F in the wheel-arm B, and the resistance of the water as the wheel turns forward will operate to carry the rod up this inclined arm of the slot until it has reached its upper end. A

the rod is thus carried toward the upper end of the paddle the latter is left free to swing upon its hinge or pivoted joint, so that its outer end shall drop into line tangentially to the circle which it describes in the movement of the wheel, instead of standing at a right angle thereto, and the resistance of the paddle in passing through the water be correspondingly diminished. As the paddle leaves the water the rollers on the ends of its stay-rod G strike the inner flaring side of the widened groove at *i*, (see Fig. 1,) and, bearing against the same, are forced outwardly, so that the rod is carried gradually toward the outer edge of the paddle, and in its movement causes the latter to swing back into its radial position until finally the ends of the rod pass into the radial ends of the slots F F in the wheel-arms B B, and the paddle is thereby fixed until again released by the engagement of its rollers with the cam S, in manner as described. Each paddle is thus held firmly in a radial position so long as it can do effective work, and is then quickly released and left free to swing back upon its pivotal hinge into a position of least resistance.

As an equivalent for the longitudinal slot E, cut in the edge of the paddle, long straps or staples secured to the outer face of the paddle transversely thereto may be employed to hold

the rod G in contact with the face of the paddle, and yet allow its play inward and outward over the same to and from the outer edge.

I claim as my invention—

The combination, with the paddles of a feathering paddle-wheel, which are so pivoted at each end of their inner edges to and between the arms of the wheel as that their outer edges may swing in and out between said arms, of a movable rod extending through a longitudinal slot or recess in the free outer edge of each paddle, to project at each end through a bifurcated slot cut in each wheel-arm outside of the pivotal bearing of the paddle, and to enter and, during the revolution of the wheel, travel in a cam-groove in an outer fixed frame at each end of the wheel, whereby a radial reciprocating movement of the rod is obtained to determine and to vary the angle of inclination of the paddle during the revolution of the wheel, substantially in the manner and for the purpose herein set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WM. C. BURNE.

Witnesses:

A. B. MOORE,
JOHN A. ELLIS.