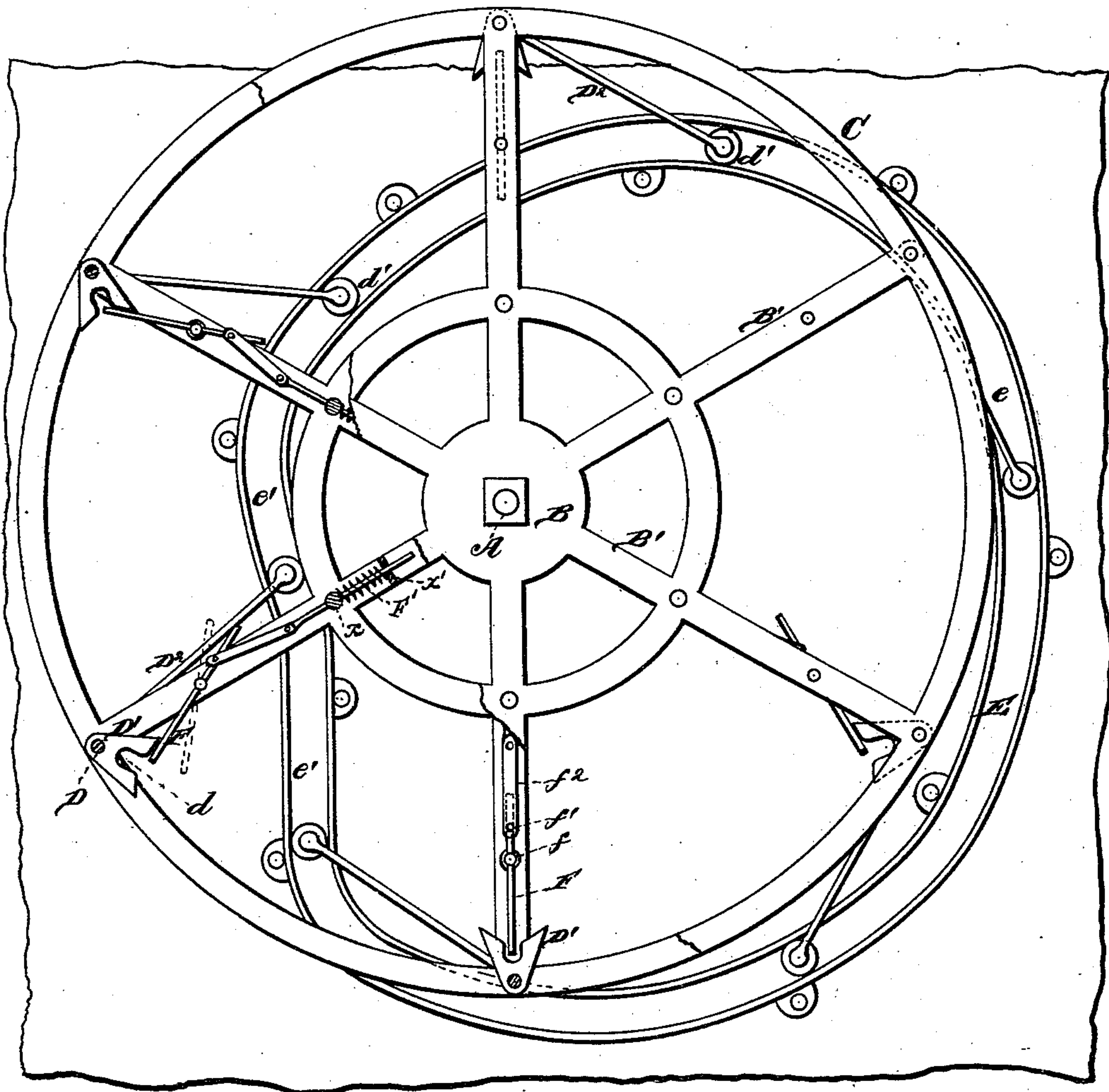


E. E. KILMER.
Feathering Paddle-Wheel.

No. 212,014.

Patented Feb. 4, 1879.

Fig. 1.



WITNESSES
Robert Everett,
H. Clay Smith

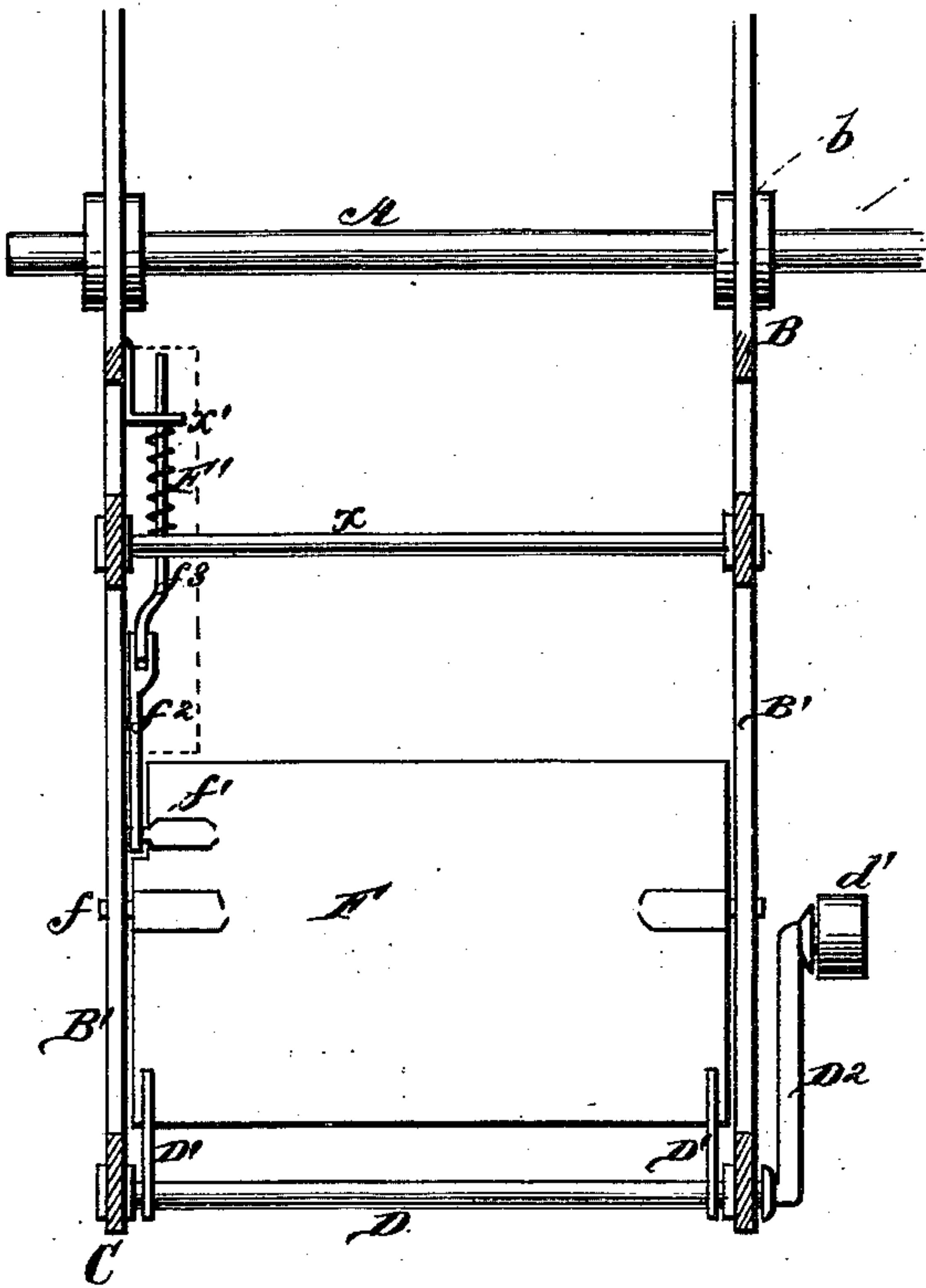
INVENTOR.
E. E. Kilmer
By *Gilman & Smith, Co.*
ATTORNEYS.

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Fig. 2.



WITNESSES
Robert Everett
A. Clay Smith

INVENTOR.
E. E. Kilmer.
By *Gilmore, Smith & Co.*
ATTORNEYS.

UNITED STATES PATENT OFFICE.

ELMER E. KILMER, OF HOWE'S CAVE, NEW YORK.

IMPROVEMENT IN FEATHERING PADDLE-WHEELS.

Specification forming part of Letters Patent No. **212,014**, dated February 4, 1879; application filed December 19, 1878.

To all whom it may concern:

Be it known that I, ELMER E. KILMER, of Howe's Cave, in the county of Schoharie and State of New York, have invented a new and valuable Improvement in Paddle-Wheels; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a side elevation, partly in section, of my paddle-wheel; and Fig. 2 is a sectional detail view of the same.

My invention relates to a paddle-wheel for steam-vessels and the like; and the novelty consists in the construction and arrangement of parts, as will be more fully hereinafter set forth.

The object of the invention is to hold the paddles in such position relatively to the plane of the hull of the boat and the water as to utilize the greatest amount of force of resistance in the water with a minimum of motive power.

In carrying out my invention, I employ an ordinary perforated hub, having radial arms, which extend outward to the periphery-band, and are secured to or formed in one therewith. These parts are suitably braced, and revolve upon a shaft of ordinary construction, to which shaft the power is applied.

At or near the junction of each radial arm with the periphery-band is journaled a loose shaft, which has a rigid arm, carrying on its extremity a friction-roller, which roller operates in a peculiar cam-guide arranged upon the vertical inner surface of the wheel-house. Upon the shaft thus described are crotched arms, having flaring inclined mouths, and a central circular opening to receive and hold the outer edge of the paddles, which are pivoted between the radial arms at a point on the paddles considerably inward from a central longitudinal line, so as to present the widest part of the leaf to the water.

Suitable arms extending outward from the paddles, as shown, furnish loose pivotal points for arms or links, which are pivoted to rods, which pass through the braces loosely and

carry spiral springs, exerting on such rods a constant force toward the axis of the wheel.

The cam-guide is of such construction as to force the arms carrying the crotched or jawed plates to hold the widest portion of the paddle below the pivots rigid when it meets the surface of the water, the jawed plates changing position, forced by the action of the cam-guides, so as to gradually bring the paddles perpendicular when on a vertical plane with the main shaft, and to entirely release the paddle when leaving the water, allowing the action of the paddle to swing to a nearly vertical position, the spring throwing it back into the jaw when the resistance of the water ceases.

It will thus be observed that the paddles will present their greatest surface to the resistance of the water so long as such resistance exists, and will immediately fly back to the jaws as soon as their utility in the water ceases.

The springs may be housed, as shown, if desired.

Referring to the drawings, A represents the main or power shaft, journaled in any suitable manner; B, the hubs or central disks, perforated at *b* to receive the shaft A, and each having radial arms B', which connect the hub with the periphery-band C, as shown. These parts are of any desired construction, and are braced and bolted together, as shown, to form a strong and durable structure.

Journaled in the periphery-band C, at or near the junction of each of the radial arms therewith, are loose shafts D, which carry rigid jawed plates D¹, having circular recesses *d*, as shown, adapted to receive and operate the lower or outer edge of the paddle-plates, as will be presently set forth. From these shafts D rigid crank-arms D² extend, such arms carrying friction-rollers *d'*, which operate in cam-guides E, as shown.

Pivoted between the arms B' at *f* are the paddle-plates F, such pivotal points being considerably inward from the longitudinal center of the paddle, so as to present the largest surface toward the periphery of the wheel.

Arms *f*¹ upon the paddles furnish pivotal points for a link, *f*², which connects with a rod, *f*³, which operates loosely through the lateral braces *x* and a perforated standard, *x'*,

as shown, the said rod being held toward the axis of the wheel by the constant force of a spiral spring, F' .

The jawed plates D^1 receive the lower edges of the paddles, and hold them firmly, so as to utilize all the resistance of the water, and, actuated by the cam-guides, release them after their propelling power has been expended, allowing them to feather for a certain portion of the revolution, and then to return to the receiving-jaws by the action of the spring.

It will be observed that the action of the paddles is precisely the same with relation to the holding and operating jaws in whichever direction the wheel is revolved.

A portion, e , of the cam-guides is arranged so as to approximately describe an arc of a circle, so as to hold the arms D^2 nearly tangential with the periphery of the wheel, and on the opposite side the cams $e' e'$, as shown, the whole forming an approximate heart-cam.

From the foregoing description the operation and adaptation of my invention may be readily observed and understood.

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

1. The cam-guide constructed as described, in combination with the loose shaft D , jawed plates $D^1 d$, arm D^2 , and paddles F , as and for the purpose set forth.

2. The combination of the paddles F , having arms f^1 , rod f^3 , link f^2 , spring F' , braces x , and a perforated standard, x' , as and for the purpose described.

3. The combination of the paddles $F f^1$, link f^2 , rod f^3 , and spring F' with the jawed plates $D^1 d$, shaft D , arms $D^2 d'$, and cam-guide, as and for the purpose set forth.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

ELMER E. KILMER.

Witnesses:

JAMES J. SHEEHY,
ROBERT M. BARR.