(No Model.) 2 Sheets—Sheet 1.

D. J. BLASIER.

FEATHERING PADDLE WHEEL.

No. 385,232. Patented June 26, 1888.

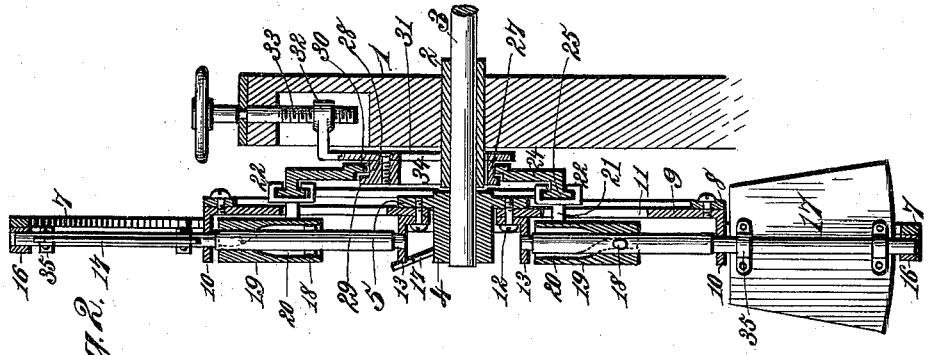


Fig. 2.

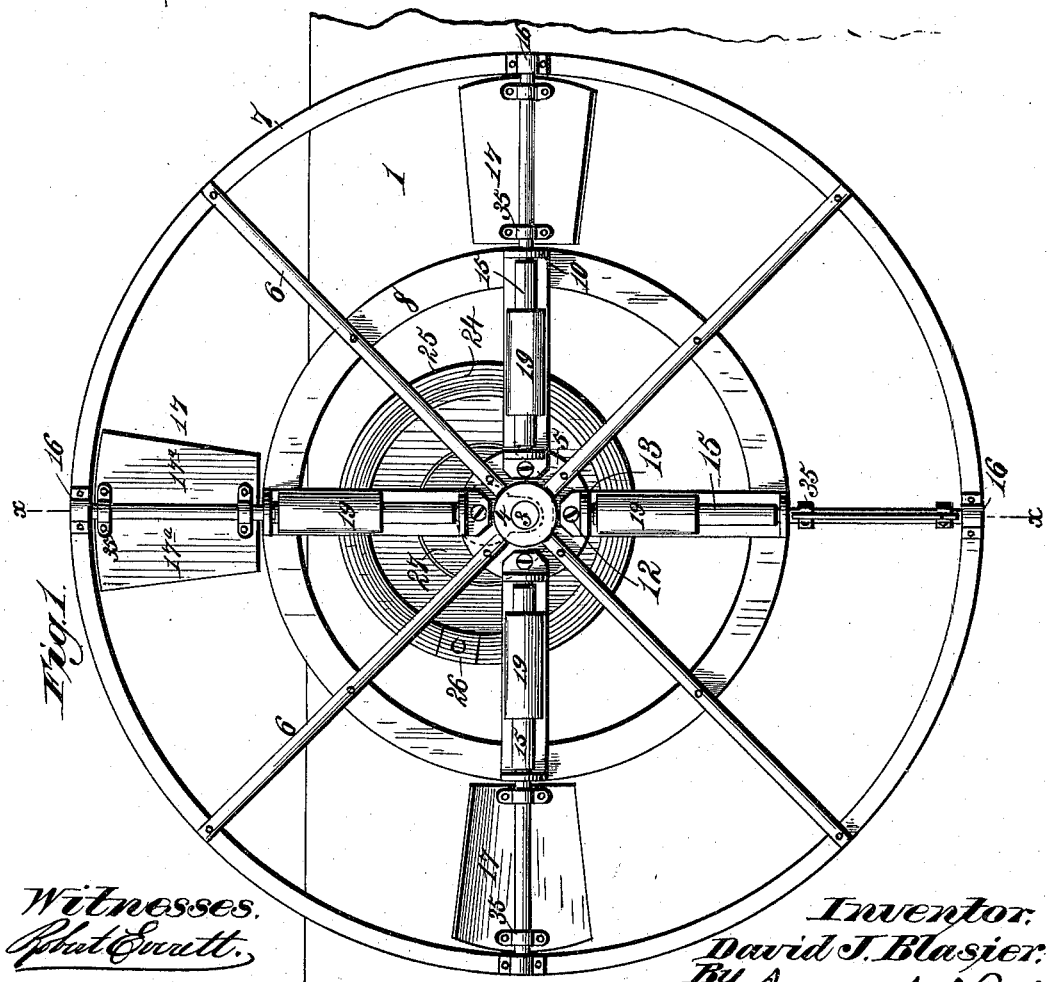


Fig. 1.

Witnesses.
Robt. Everett.
Lucy B. Hills.

Inventor.
David J. Blasier.
By James L. Norris
Atty.

(No Model.) 2 Sheets—Sheet 2

D. J. BLASIER.

FEATHERING PADDLE WHEEL.

No. 385,232. Patented June 26, 1888.

Fig. 3.

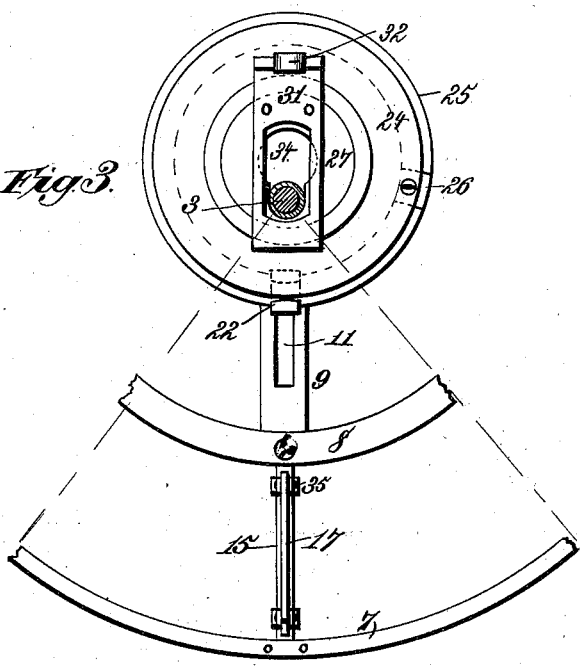


Fig. 4.

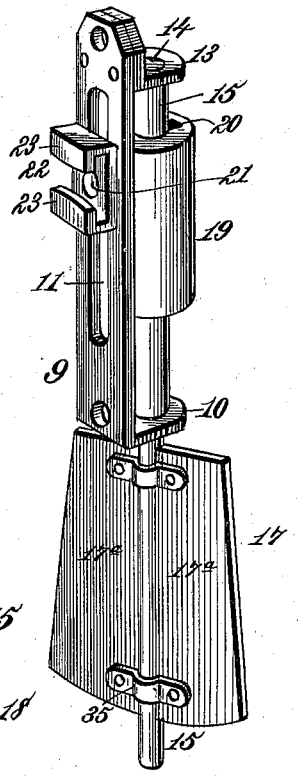


Fig. 5.

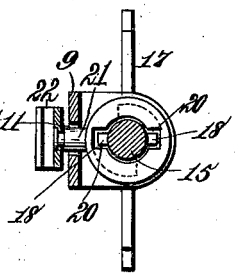


Fig. 6.

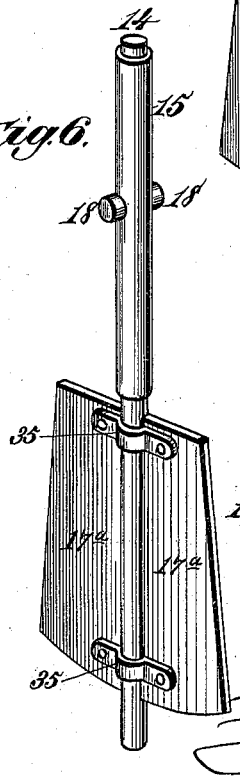
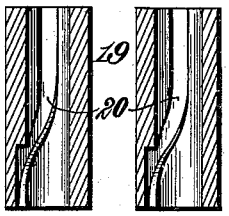


Fig. 7.



Witnesses.
Robt Swatt.
Percy B. Hills.

Inventor.
David J. Blasier.
By James L. Norris.
Atty

UNITED STATES PATENT OFFICE.

DAVID J. BLASIER, OF WESTERNVILLE, ASSIGNOR OF ONE-HALF TO HENRY D. HAGER, OF ROME, NEW YORK.

FEATHERING PADDLE-WHEELS.

SPECIFICATION forming part of Letters Patent No. 385,232, dated June 26, 1888.

Application filed September 10, 1887. Serial No. 249,349. (No model.)

To all whom it may concern:

Be it known that I, DAVID J. BLASIER, a citizen of the United States, residing at Westernville, in the county of Oneida and State of New York, have invented new and useful Improvements in Paddle or Propeller Wheels, of which the following is a specification.

My invention relates to the propelling mechanism employed upon steam-vessels, and especially to that class of mechanism in which the vessel is driven by a wheel having floats or paddles, such as side or stern wheel steamers and the like.

It is the purpose of my invention to provide simple and efficient and comparatively inexpensive mechanism by which the floats or paddles may be feathered as they approach the end of their effective stroke, whereby there will be little or no loss of power by the paddle or propeller wheels by reason of the paddles acting upon the water at small angles with the horizontal line of motion of the vessel.

It is my further purpose to combine with the feathering mechanism simple means of adjustment, whereby the floats may be feathered or turned to lie in the plane of rotation from the end of one stroke to the beginning of another and turned during the effective stroke into any desired angle with said plane of rotation.

The invention consists in the several novel features of construction and combinations of parts, hereinafter fully set forth, and definitely pointed out in the claims following this specification.

In the accompanying drawings, Figure 1 is a front elevation illustrating my invention. Fig. 2 is a central vertical section of Fig. 1 in the line *x x*. Fig. 3 is a partial elevation of Fig. 1, taken from the rear. Fig. 4 is a detail perspective of one of the floats with its immediate adjuncts removed from the wheel. Fig. 5 is a transverse section of one of the float-shafts. Fig. 6 is a detail perspective of one of the floats, showing the manner of constructing and attaching the same to the float-shaft. Fig. 7 is a central longitudinal section of one of the cam-sleeves, the two halves formed by the section being placed side by side.

In the said drawings, the reference-numeral 1 designates the support in which the journal-bearings 2 of the wheel or propeller-shaft 3 are arranged. Upon the end of this shaft is mounted a hub, 4, having a circumferential flange, 5, and projecting radially from said flange at equal intervals are arms 6, riveted or bolted to said flange and connected at their ends to an outer annulus, 7, and between their ends to a ring, 8. These radial arms 6, preferably four in number, alternate with brackets 9, which are bolted to the flange 5 and to the ring 8. At their outer ends they have outwardly-projecting lugs 10, and between their ends they are provided with longitudinal slots 11. By the same screw or bolt, 12, fastening the inner end of each bracket to the flange 5, is secured an angle-plate, 13, having a perforation in which is placed the journal 14 of a float-shaft, 15, the other extremity of said shaft having bearing in a bracket, 16, mounted upon the annulus 7, while the central or intermediate portion of said shaft passes through an opening in the lug 10 on one of the brackets 9. Between the ring 8 and the outer annulus, 7, floats 17 are mounted on the float-shafts 15 in any suitable manner, the preferred construction being set forth hereinafter.

Upon each float-shaft are formed or mounted oppositely-projecting pins 18, and surrounding each shaft, between the inner end thereof and the lug 10, is a cam-sleeve, 19, having interior cam-grooves, 20, in which the pins 18 lie. These cam-grooves, which are shown in Figs. 5 and 7, as well as in Fig. 2, are so formed that by reciprocating the cam-sleeve 19 far enough to cause the pins to traverse the grooves from end to end the float-shaft will be turned one-quarter of a complete revolution or through an arc of ninety degrees, thereby turning the float or paddle 17 into a plane at right angles to the plane of rotation, and swinging it at the return movement of the sleeve so that the float will lie in or parallel to the plane of rotation.

Projecting from the back of each cam-sleeve 19 is a lug or pin, 21, which lies in the longitudinal slot 11 of the bracket 9. Upon the end of the pin 21 is mounted a clasp, 22, having its back adjacent to the back of the slotted bracket 9. These clasps have their parallel flanges 23 arranged at right angles, or substantially so, with the brackets, and they

embrace an annulus, 24, which is provided with a suitable projecting flange, 25, in which is a removable gate, 26, to permit the insertion of the flange in the clasps.

The annulus 24 is supported upon a circular bearing, 27, having a circumferential collar, 28, behind and a flange, 29, in front, forming a groove or channel, in which rests a flange, 30, on the annulus. The connection of the parts is such that the annulus may turn upon the support with ease. An arm, 31, is attached to the back of the bearing 27 and provided with a threaded ring, 32, which receives a vertical adjusting-screw, 33, swiveled in the support 1. The bearing 27 has a central opening, 34, through which pass the journal-bearing 2 and shaft 3. The opening 34 is of such size as to permit the vertical adjustment of the bearing 27 from a point where it is concentric with the shaft to a degree of eccentricity corresponding with the required longitudinal movement of the cam-sleeves 19.

The construction being substantially as described, the operation is as follows: Rotation being imparted to the shaft 3, the wheel is turned, carrying the paddles around, and at each complete revolution the cam-sleeves are reciprocated upon the float-shaft by means of the clasps 22, riding upon the flanged annulus 24. As the clasps approach the axis, the floats are swung across the plane of rotation, and as they recede from the axis of the shaft the floats are turned into the plane of rotation or into parallelism therewith. It will be perceived that, so far as this result is concerned, it is immaterial whether the flanged annulus 24 remains stationary or revolves with the wheel. As a means of diminishing friction, however, and avoiding wear, I have provided the construction described, whereby the annulus may turn upon the adjustable circular bearing 27.

It is evident that by a slight adjustment of the screw 33 the eccentricity of the annulus 24 may be so varied that the paddles will be turned during their effective stroke to an angle of less than ninety degrees with the plane of rotation, and will feather as they converge, thereby adapting the wheel to be used as a propeller or stern-wheel.

While I propose to connect the paddles or floats to the float-shafts in any suitable manner, I prefer the construction shown in Fig. 6, wherein the floats are shown as being formed in two equal or substantially equal parts, 17^a, which have their edges lying against opposite sides of the float-shaft, and are connected by straps 35, which embrace the shaft, and are bolted to the halves of the blade or float. With this construction the float-shaft may be of somewhat lesser diameter throughout the part carrying the float, though this is not material.

It will be seen that this wheel may be used not only as a paddle-wheel, a propeller, or stern-wheel, as described, but may also be used as a current-wheel with great advantage. The same devices also may be employed without material change for feathering the blades of wind-wheels.

The construction shown may be modified in many respects without material change. For example, the float-shafts and cam-sleeves may have, respectively, a single pin and a single cam-groove instead of being provided with two each. I prefer the latter construction, however, as it avoids the tendency of the parts to bind when the wheel is laboring, and because it equalizes the action, gives greater strength, and diminishes friction. By a simple reversal of the arrangement of the cam-grooves 20, also, the blades may be feathered as the sleeves 19 move inward instead of outward. Moreover, I may substitute for the clasps 22 a simple finger or other device running in a circular slot in the annulus 24. These and other similar changes are clearly within the scope of my invention.

Having thus described my invention, what I claim is—

1. In a paddle or propeller wheel, a series of floats mounted on radial shafts adapted to turn in their bearings, cam-sleeves moving longitudinally on said shafts and having grooves engaging with pins on the shafts, an adjustable annulus eccentric to and mounted on the axis of the wheel, and a connection between the cam-sleeves and said annulus, substantially as described.

2. The combination, with a series of floats mounted on a series of radial shafts provided with cam pins or lugs, of sleeves having cam-grooves engaging with said cam-pins, an annulus having connection with said sleeves, and a circular bearing upon which said annulus is loosely mounted, substantially as described.

3. The combination, with a wheel having radial slotted brackets, of radial shafts having support therein and in bearings on the hub, cam-sleeves having lugs moving in the slots of said brackets and provided with grooves which engage pins on the shafts, clasps mounted on the lugs of the cam-sleeves, a flanged annulus on which said clasps may slide, a circular bearing on which the annulus may turn, and a set-screw for adjusting the eccentricity of the bearing and annulus, substantially as described.

4. The combination, with an adjustable circular bearing through which the wheel-shaft passes, of an annulus having a loose connection with a channel in said bearing, a series of radial float-shafts having support and turning in bearings on the wheel, radially-reciprocating cam-sleeves engaging with the float-shafts, and loose connections between said sleeves and the annulus, substantially as described.

5. The combination, with the wheel having radial shafts for the floats, said shafts being provided with cam-pins, of sleeves moving upon said shafts and having spiral cam-grooves with which said pins engage, an annulus ec-

centric to said wheel and engaging with said sleeves, and an adjusting-screw engaging with the bearing of said annulus, whereby the eccentricity of the latter may be varied, substantially as described.

6. The combination, with the shaft having a flanged hub, of slotted brackets bolted to said hub and to a concentric ring, float-shafts having bearings in lugs on said brackets, in angle-plates on the hub, and in brackets on an outer annulus, cam-sleeves having grooves 20, engaging pins 18 on the float-shafts, lugs 21 on the sleeves, clasps 22, carried by the lugs, an annulus, 24, with which the clasps engage, a circular bearing with which said annulus has loose connection, and a set-screw swiveled on the wheel-support and engaging with an arm on said bearing, substantially as described.

In testimony whereof I have affixed my signature in presence of two witnesses.

DAVID J. BLASIER.

Witnesses:

JAMES L. NORRIS,

J. A. RUTHERFORD.