

J. MERKEL.
FEATHERING PADDLE WHEEL.
(Application filed June 15, 1901.)

(No Model.)

2 Sheets—Sheet 1.

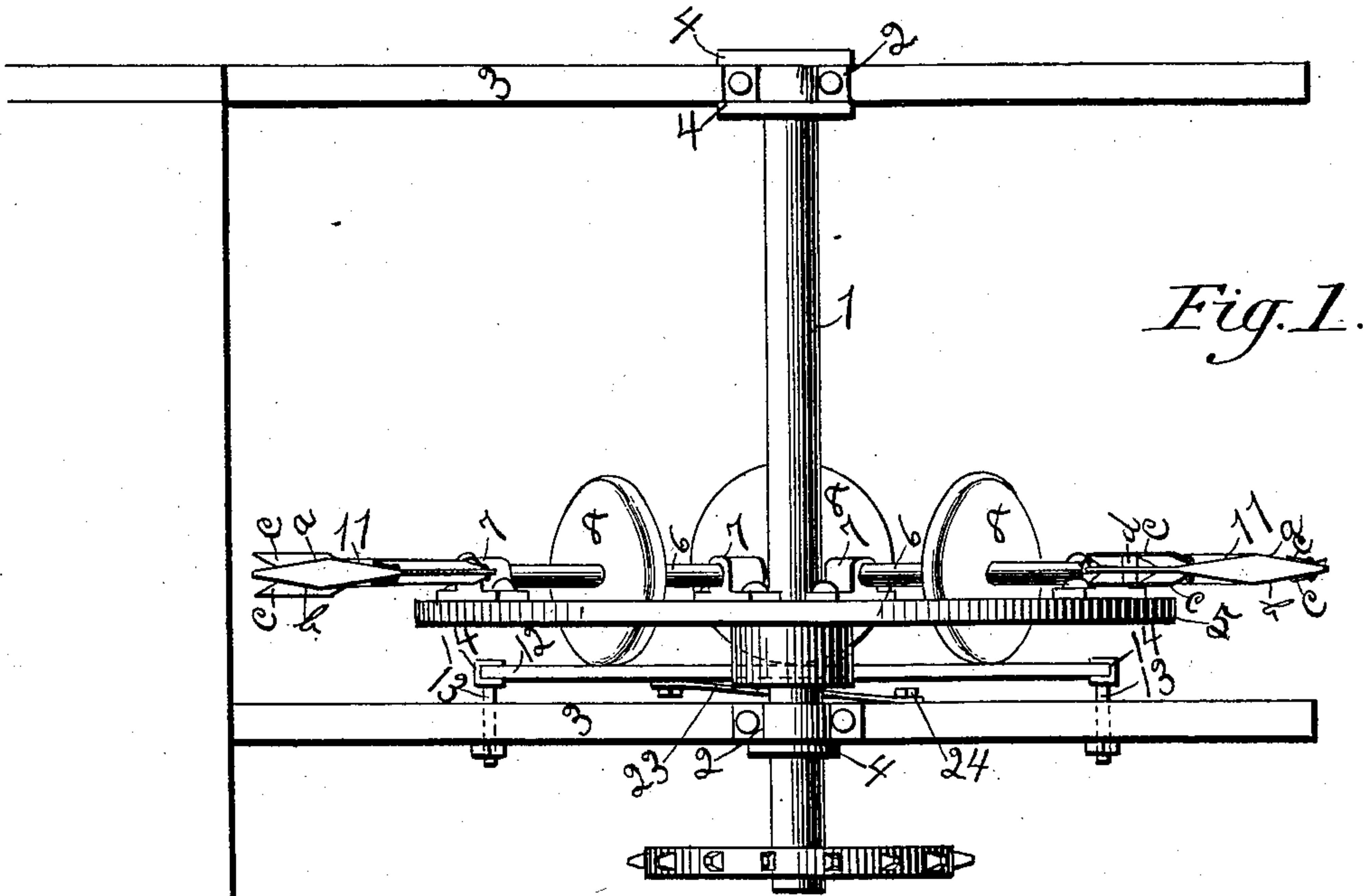
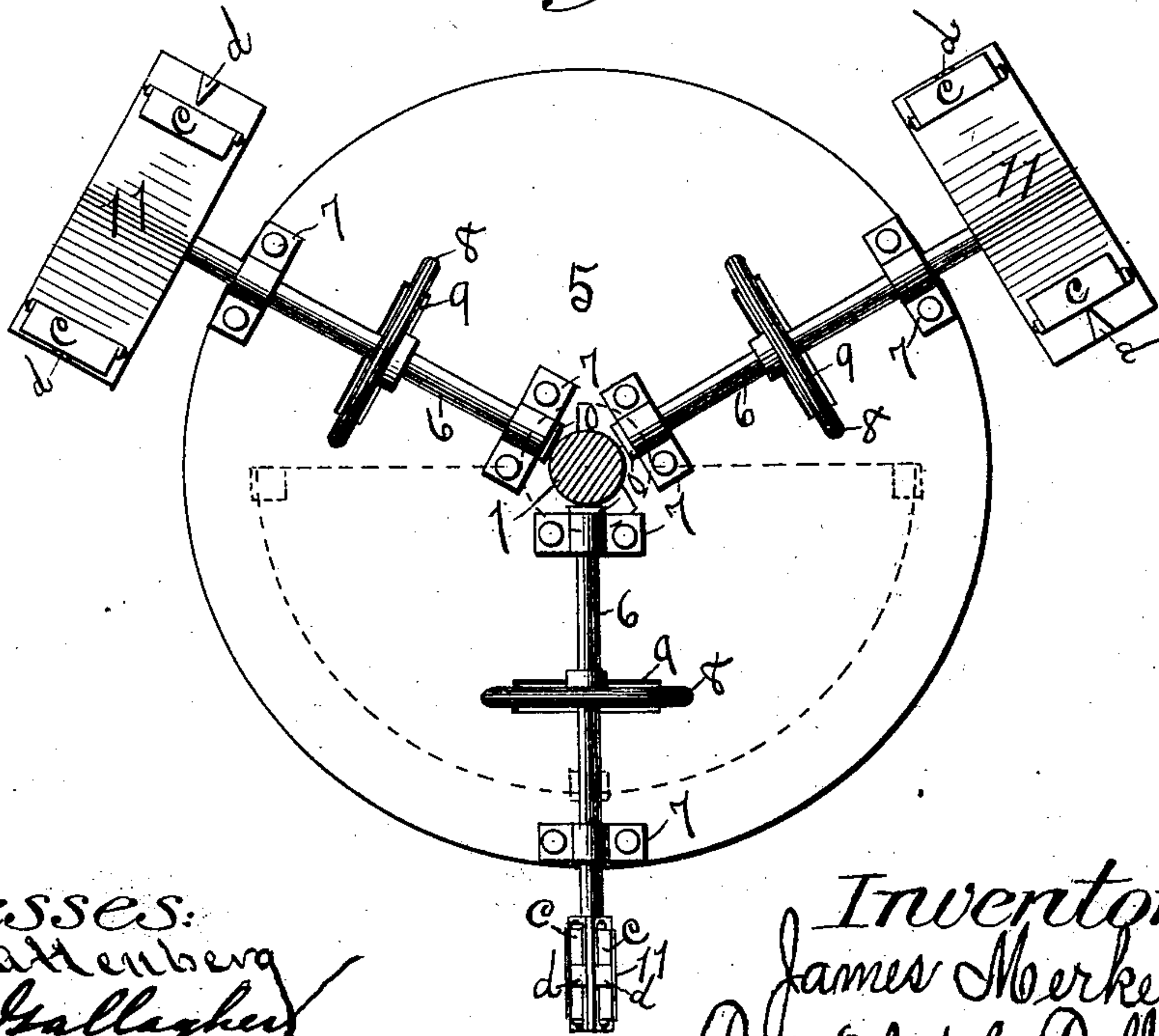


Fig. 1.

Fig. 2.



Witnesses:
H. M. Mattenberg
Joseph Gallagher

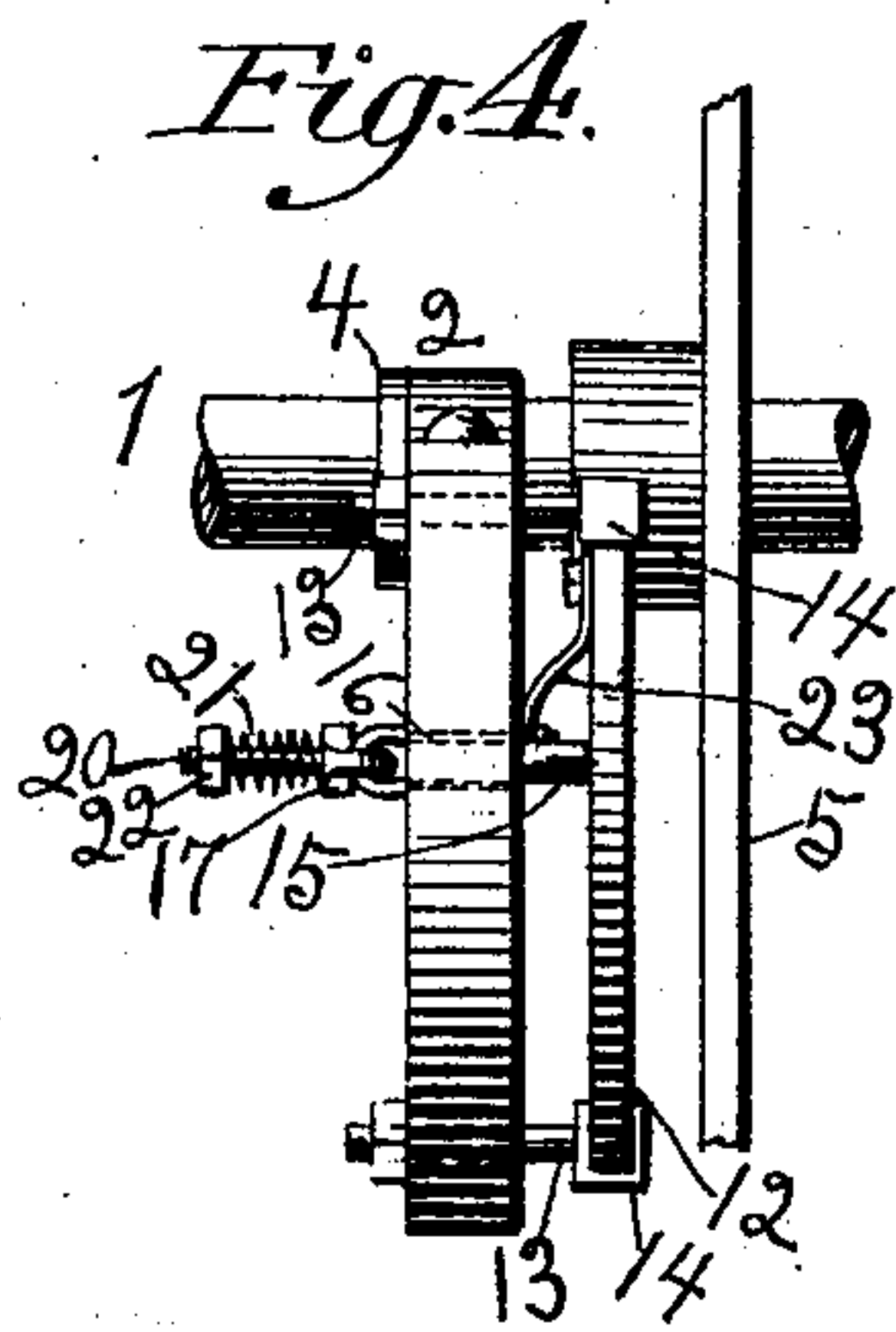
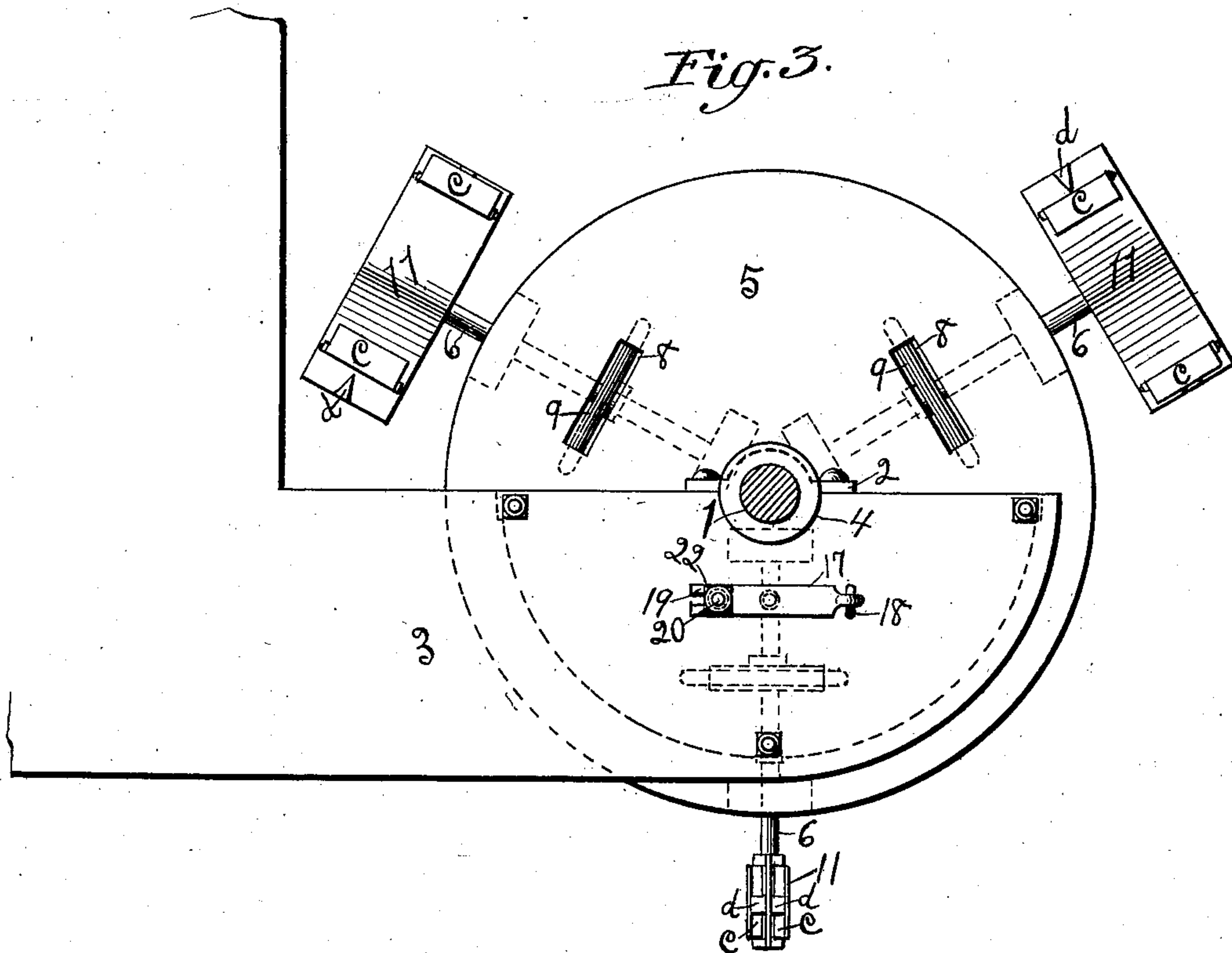
Inventor:
James Merkel
By Obed C. Billman
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FEATHERING PADDLE WHEEL.

(Application filed June 15, 1901.)

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2 Sheets—Sheet 2.



Witnesses:
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UNITED STATES PATENT OFFICE.

JAMES MERKEL, OF WEILERSVILLE, OHIO.

FEATHERING PADDLE-WHEEL.

SPECIFICATION forming part of Letters Patent No. 701,595, dated June 3, 1902.

Application filed June 15, 1901. Serial No. 64,682. (No model.)

To all whom it may concern:

Be it known that I, JAMES MERKEL, a citizen of the United States, residing at Weilersville, in the county of Wayne and State of Ohio, have invented certain new and useful Improvements in Feathering Paddle-Wheels, of which the following is a specification.

My invention relates to marine propulsion, and more especially to that class of propelling devices known as "feathering paddle-wheels."

The object is to save power and to overcome certain well-known objections to the ordinary screw-propeller or side wheel by providing a submerged propeller wherein the parts are so constructed that as the propeller is revolved the paddles will automatically adjust themselves so that the broad flat surfaces of the blades will be at right angles to the line along which the vessel is traveling at times when the blades are in position to force the vessel ahead; but when the blades would otherwise act to retard the onward progress of the vessel they are turned so that their side faces will be parallel with the line along which the vessel is passing. In this way, it will be seen, the most of the power is utilized for the propulsion of the vessel.

I am aware of the fact that paddle-wheels have been constructed which provide means for feathering the blades thereof by means of cam devices, &c.; but such devices are open to certain obvious objections, which it is the purpose of this invention to overcome.

Referring to the accompanying drawings, forming a part of this specification, Figure 1 is a top plan view of the propeller attached to the rear end of a boat. Fig. 2 is a side elevation of the paddle-wheel proper, showing more clearly the paddle-shafts and the manner of attachment to the same. Fig. 3 is a side elevation of the paddle-wheel in its proper operative position attached to the rear end of a boat. Fig. 4 is a detail view of the friction-plate, showing the manner in which it is attached to the rearwardly-extending supporting-frame.

Similar letters and numerals of reference indicate corresponding parts throughout all the figures of the drawings.

1 designates the paddle-wheel shaft, mounted in bearings 2, attached to the rearwardly-

extending supporting arms or frame 3. Secured near the ends of the paddle-wheel shaft 1 or integral therewith there are annular flange-plates 4, which prevent any lateral movement of the same. 5 designates the body of the paddle-wheel, which is securely attached to or integral with the shaft 1, and to which the several paddle-shafts 6 are attached by means of the bearings 7. Integral with or securely attached to the paddle-shafts 6 are friction-wheels 8, having their rims or treads rounded and which extend through openings 9 of the paddle-wheel support or body, and which bear against and travel upon a friction-plate, to be hereinafter described. To the inner ends of the shafts 6 there are small annular beadings or flanges 10, which prevent any lateral movement of the same, and to the outer ends there are attached the feathered blades or paddles 11, which will now be described.

Upon referring to Fig. 1 it will be seen that the blades or paddles 11 are made of two plates or pieces of metal *a* and *b*, which are fastened to the paddle-shafts 6 in any suitable manner and are then bent inwardly toward each other, so that their ends meet, where they are brazed together or securely fastened together in any suitable and convenient manner. Near the ends of these blades or paddles and pivotally attached to the sides thereof there are feathers or wings *c*, which when moved in one direction will lie flat to the sides of the paddles, but when moved in the opposite direction are brought into contact with triangular-shaped stops *d*, which are fastened to the extreme ends of the paddles and which extend out laterally therefrom and which hold the wings *c* outwardly at an angle to the sides of the blades, so as to offer some resistance to the water. It will thus be seen that during the upper half of the revolution of the wheel (during which time the paddle-shafts 6 are left free and the friction-wheels 8 are not in contact with the friction-plate, to be hereinafter described) these wings *c* (no matter in which direction the wheel is revolving) will so operate, by reason of the fact of the wings at the front portion of the paddle lying back flat with the sides thereof and those at the rear being held out, so as to offer resistance to the water, as to always

hold the paddle flat on a line with the periphery of the wheel, and thus offer but little resistance to the water during the upper half of the revolution of the wheel in the water.

5 12 designates a sensitive friction-plate secured to and held out from the rearwardly-extending supporting-arm 3 by means of the bolts 13, which it will be seen have their inner ends bent to form a hook or pocket 14, 10 conforming to the edge of the plate 12 and to form a seat for the same.

Near the center of the friction-plate 12 there is brought to bear against its outer side a plunger-pin 15, which passes through an iron 15 ferrule 16, secured in the supporting-beam 3 (if this beam is made of wood) and which is firmly pressed inwardly upon the friction-plate 12 by means of an arm or lever 17, one end of which is secured in a bolt-eye or staple 20 18 and the other end of which is forked, as at 19, and straddles a bolt 20, upon which is placed a coiled spring 21, which is regulated in its pressure by means of the nut 22, secured to the bolt 20 and which rests on the 25 top of the spring 21.

The dotted lines in Figs 2 and 3 represent the outlines of the sensitive plate 12.

23 represents a spring or arm one end of which is secured to the supporting arm or 30 frame 3 by means of a bolt or screw 24 and the other end of which is similarly secured to the sensitive friction-plate 12. The object of this is to hold the plate in position and prevent its being jammed or sliding around out of its proper position. It will thus be seen 35 that by means of the spring-pressed plunger 15 pressing against the center of the friction-plate 12 and the manner in which it is attached to the bolts 13, which are free to move 40 outwardly, a lateral movement of the plate is provided for and the same rendered sensitive. It will be observed that the path on the sensitive friction-plate 12 which is traveled by the friction-wheels 8 is exactly equal to 45 one-half the circumference of the said wheels, so that when the friction-wheel first strikes the friction-plate (the paddle then being in line with the periphery of the paddle-wheel) it commences to turn the shaft and paddle, 50 and when it reaches the extreme lower part of its revolution and the friction-wheel has traveled over just one-half of its path on the friction-plate the paddle has been thrown out squarely and is offering its greatest resistance to the water, as shown in Fig. 3 of the 55 drawings. From this position as it travels over the remainder of the path it is gradually returned to the position which it occupied when the friction-wheel first struck the friction-plate. During the remaining half of its 60 revolution the paddles, by means of the wings *c*, are held in line with the periphery of the wheel, and thus offer very little resistance to the water.

65 It will thus be seen that the propeller does its work during the lower half of its revolution and that the paddles take their greatest

hold on the water when they have reached the deepest part of the water in their revolution and where the water is offering the greatest resistance to the motion of the paddles. 70

This wheel may be used either as a stern or side wheel propeller, and any suitable mechanism may be used in attaching it to the source of power. 75

I have shown a sprocket-wheel attached to the end of the paddle-wheel shaft, in which case the same will be connected with the source of power by means of a sprocket-chain.

Various changes in the form, proportion, 80 and the minor details of construction may be resorted to without departing from the principles or sacrificing any of the advantages of this invention.

Having thus described my invention, what 85 I claim, and desire to secure by Letters Patent, is—

1. A feathering paddle-wheel, comprising a shaft, a paddle-wheel support or body portion mounted thereon and provided with a series 90 of openings or recesses in its face, a series of radially-extending axially-rotating paddle-shafts mounted in suitable bearings attached to the said paddle-wheel support or body portion, a series of friction-wheels mounted on 95 the shafts and having their peripheries extending through the said recesses, and a sensitively-supported friction-plate mounted adjacent to the side of the said paddle-wheel support or body portion whereby the said 100 friction-wheels are brought into engagement therewith to rotate the said paddle-shafts, substantially as described.

2. A paddle-wheel, consisting of the main body portion thereof mounted on a shaft and 105 provided with a series of openings or recesses in its face and carrying a series of radial axially-rotating paddle-shafts provided with friction-wheels the peripheries of which extend through the said openings or recesses and 110 which are adapted to come into contact with and ride upon a friction-plate suitably mounted adjacent to the said paddle-wheel whereby the said paddle-shafts are rotated, paddles 115 mounted on the said paddle-shafts, and means attached to the paddles whereby the same are held in line with the periphery of the wheel during a portion of its revolution.

3. A feathering paddle-wheel, comprising a wheel-support or body portion mounted on a 120 shaft and provided with a series of openings in its face, a series of radially-extending axially-rotating paddle-shafts mounted in suitable bearings attached to the said wheel-support or body portion, a series of friction- 125 wheels mounted on the said paddle-shafts and extending through the said openings, a friction-plate suitably mounted beneath the paddle-wheel shaft and parallel with and adjacent to the side of the paddle-wheel body 130 whereby the said friction-wheels come into engagement therewith to rotate the said paddle-shafts during the lower half of the revolution of the paddle-wheel, and feathers or

wings attached to the paddles whereby the same are kept in line with the periphery of the wheel during the upper half of its revolution, substantially as, and for the purpose set forth.

4. In a feathering paddle-wheel, a feathering-paddle attached to the end of a shaft and provided near its ends with feathers or wings pivotally attached to the sides thereof and which when moved in one direction will lie flat to the sides of the paddle but when moved in the opposite direction are brought into contact with stops which hold the wings outwardly at an angle to the sides of the paddles, substantially as described.

5. In a paddle-wheel, the combination with a driving-shaft, of a wheel connected thereto, radial axially-rotating paddle-shafts carried by the wheel, friction-wheels mounted on the said paddle-shafts and extending through openings or recesses in the body of the wheel, a friction-plate suitably mounted adjacent to and parallel with the side of the said wheel whereby the said friction-wheels are rotated during the lower half of the revolution of the paddle-wheel, means connected to the said friction-plate whereby the same is held in position and rendered sensitive, and means connected to the paddles whereby the same are held in line with the periphery of the paddle-wheel during the upper half of its revolution, substantially as described and for the purpose set forth.

6. In a feathering paddle-wheel, the combination with an axially-rotating paddle-shaft provided with a friction-wheel adapted to come into contact with a friction-plate whereby the same is rotated during a portion of the revolution of the paddle-wheel; of a paddle attached to the end of the shaft and provided at or near its ends with feathers or wings pivotally attached thereto and which when moved in one direction will lie flat to the sides of the paddle but when moved in the opposite direction are brought into contact with stops which hold the wings outwardly at an angle to the sides of the paddle whereby the same is held in line with the periphery of the paddle-wheel when the paddle-shaft is not being operated upon by means for rotating the same.

7. In a feathering paddle-wheel, a radial axially-rotating paddle-shaft mounted in suitable bearings attached to the main body portion thereof and provided with a friction-wheel adapted to come into engagement with a friction-plate whereby the said shaft is rotated during a portion of the revolution of the paddle-wheel, and a feathering-paddle attached to its end and provided with means for holding the paddle in line with the periphery of the paddle-wheel when the said friction-wheel is not in engagement with the said friction-plate.

8. In a feathering paddle-wheel, a friction-plate suitably mounted beneath the paddle-wheel shaft and adjacent to the side of the main body portion thereof, means connected

to the said friction-plate whereby the same is held in position and the friction-wheels rotated during a portion of the revolution of the paddle-wheel; and means for rendering the said friction-plate sensitive.

9. In a paddle-wheel, the combination with the main body portion thereof mounted on a shaft, and provided with a series of openings or recesses in its face; of a series of radial axially-rotating paddle-shafts mounted thereon and provided with friction-wheels the peripheries of which extend through the said openings or recesses, and a friction-plate mounted adjacent to the paddle-wheel body whereby the said friction-wheels are adapted to come into contact therewith for rotating said paddle-shafts during a portion of the revolution of the paddle-wheel.

10. In a paddle-wheel, the combination with the main body portion thereof mounted on a shaft and provided with a series of openings or recesses in its face and carrying a series of radial axially-rotating paddle-shafts provided with friction-wheels the peripheries of which extend through the said openings or recesses; of a friction-plate suitably mounted adjacent to the side of the paddle-wheel body whereby the said friction-wheels come into engagement therewith to rotate the said paddle-shafts during a portion of the revolution of the paddle-wheel, and means attached to the paddles for holding the same in line with the periphery of the paddle-wheel when the said friction-wheels are not in engagement with the friction-plate.

11. A paddle-wheel, consisting of a main body portion mounted on a shaft and provided with a series of openings in its face, a series of radially-extending axially-rotating paddle-shafts carried by the main body portion, a series of friction-wheels mounted on said paddle-shafts and extending through the said openings, a friction-plate suitably mounted adjacent to the side of the main body portion of the wheel whereby the said friction-wheels come into engagement therewith to rotate the said paddle-shafts during a portion of the revolution of the paddle-wheel, and means connected to the paddles whereby the same are kept in line with the periphery of the wheel during that portion of the revolution of the paddle-wheel when the said paddle-shafts are not being rotated by the engagement of the friction-wheels with the friction-plate.

12. In a paddle-wheel, a main body portion mounted on a shaft, a series of radial axially-rotating paddle-shafts mounted on the said main body portion and provided with friction-wheels adapted to come into contact with and ride upon a friction-plate whereby the said shafts are rotated, a friction-plate mounted adjacent to the said main body portion thereof, means connected to the said friction-plate whereby the same is held in position to engage the said friction-wheels, and feathering-paddles attached to the said paddle-shafts

and provided with means whereby the same are held in line with the periphery of the paddle-wheel when the said friction-wheels are not in engagement with the friction-plate.

5 13. In a feathering paddle-wheel, the combination with a rotating paddle-shaft provided with a friction-wheel adapted to come into engagement with a friction-plate whereby said shaft is rotated during a portion of the
10 revolution of the paddle-wheel; of a paddle mounted on the said paddle-shaft and provided with means whereby the same is held in a line with the periphery of the paddle-wheel when the said friction-wheel is not in
15 engagement with the friction-plate.

14. A paddle-wheel, consisting of a main body portion mounted on a shaft, a series of radially-extending axially-rotating paddle-shafts carried by the said main body portion,
20 a series of friction-wheels mounted on said paddle-shafts and adapted to come into contact with and ride upon a friction-plate whereby the said paddle-shafts are rotated during a portion of the revolution of the paddle-
25 wheel, a friction-plate mounted adjacent to the main body portion of the paddle-wheel, means connected to the friction-plate whereby the same is held in position and rendered sensitive, paddles mounted on the said paddle-
30 shafts, and means connected thereto whereby the same are held in line with the periphery of the wheel when the friction-wheels are not in engagement with the friction-plate.

15. In a paddle-wheel, the combination with
35 the main body portion thereof mounted on a shaft; of a series of radial axially-rotating paddle-shafts provided with friction-wheels adapted to come into engagement with a friction-plate whereby the said paddle-shafts are
40 rotated during a portion of the revolution of the paddle-wheel, and a series of paddles attached to the said paddle-shafts and provided with means whereby the same are held in line with the periphery of the wheel when the friction-
45 wheels are not in contact with the friction-plate.

16. In a paddle-wheel, the combination, with the main body portion thereof mounted on a shaft; of a series of paddle-shafts mounted

thereon, paddles attached to the said paddle- 50 shafts, and means attached to said paddles whereby the same are held in line with the periphery of the paddle-wheel during a portion of its revolution.

17. The combination, in a paddle-wheel, 55 with a series of paddle-shafts carried by the main body portion thereof; of a series of friction-wheels mounted thereon for revolving the same during a portion of the revolution of the paddle-wheel, a series of paddles attached 60 to the paddle-shafts, and means attached to the paddles whereby the same are held in line with the periphery of the paddle-wheel during the upper portion of its revolution.

18. A paddle-wheel, consisting of the main 65 body portion thereof mounted on a shaft and carrying a series of radial axially-rotating paddle-shafts provided with friction-wheels adapted to come into engagement with and ride upon a friction-plate suitably mounted 70 adjacent to the said main body portion whereby the said paddle-shafts are rotated during the lower portion of its revolution, paddles attached to the paddle-shafts, and means attached to the paddles whereby the same are 75 kept in line with the periphery of the paddle-wheel during the upper portion of its revolution.

19. In a feathering paddle-wheel, the combination with an axially-rotating paddle-shaft 80 provided at its end with a paddle; of mechanism attached to the said paddle whereby the same is held in line with the periphery of the paddle-wheel when the said paddle-shaft is not being operated upon by means for ro- 85 tating the same.

20. In a feathering paddle-wheel, a series of feathers or wings pivotally attached to a paddle whereby the same is held in line with the periphery of the paddle-wheel when the 90 paddle-shaft is not being operated upon by means for rotating the same.

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

JAMES MERKEL.

Witnesses:

JOSEPH GALLAGHER,
OBED C. BILLMAN.