(No Model.) 2 Sheets—Sheet 1.

J. MERKEL.

STEERING PADDLE WHEEL WITH FEATHERING BLADES.

No. 421,955. Patented Feb. 25, 1890.

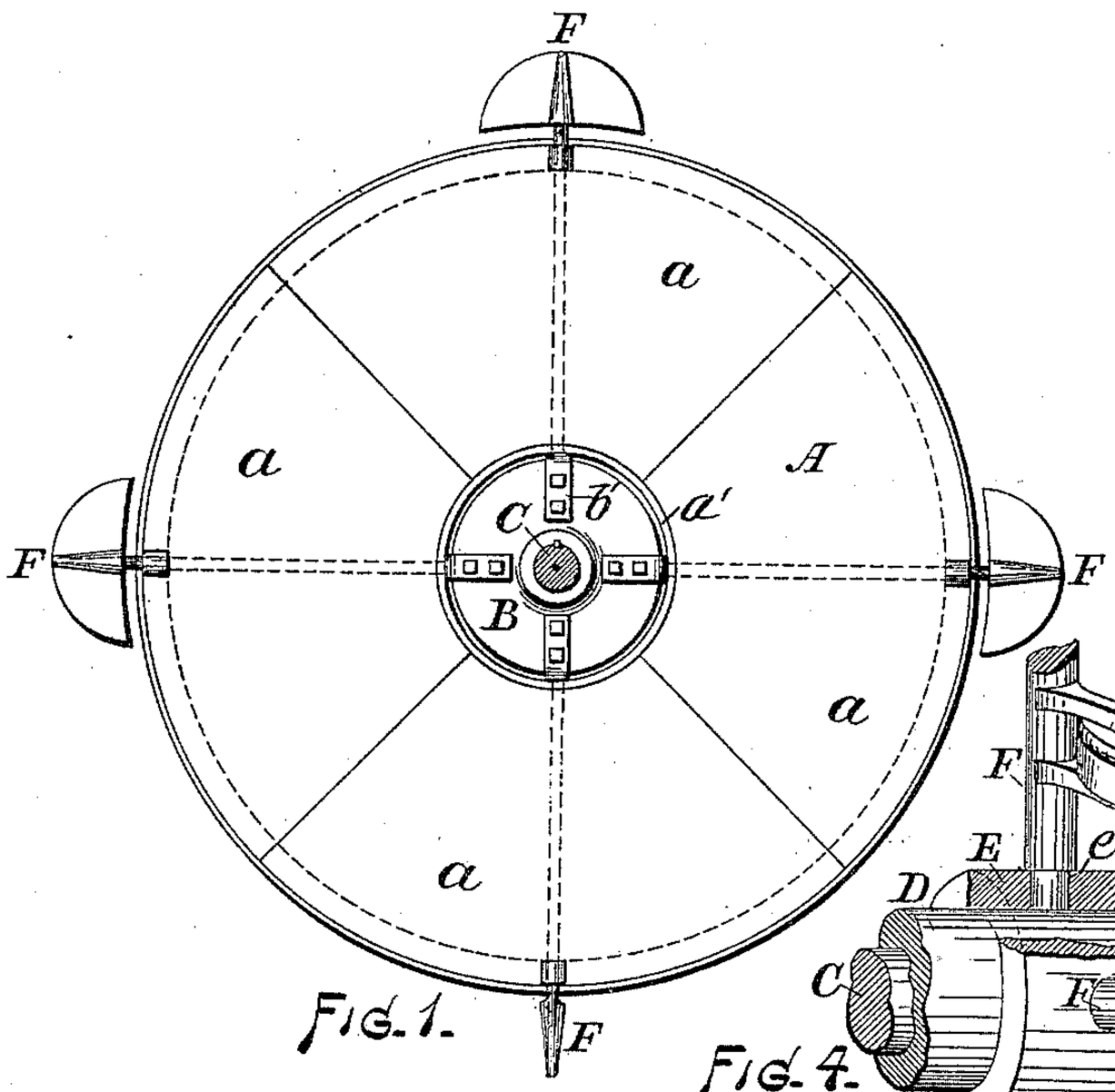

FIG. 1.

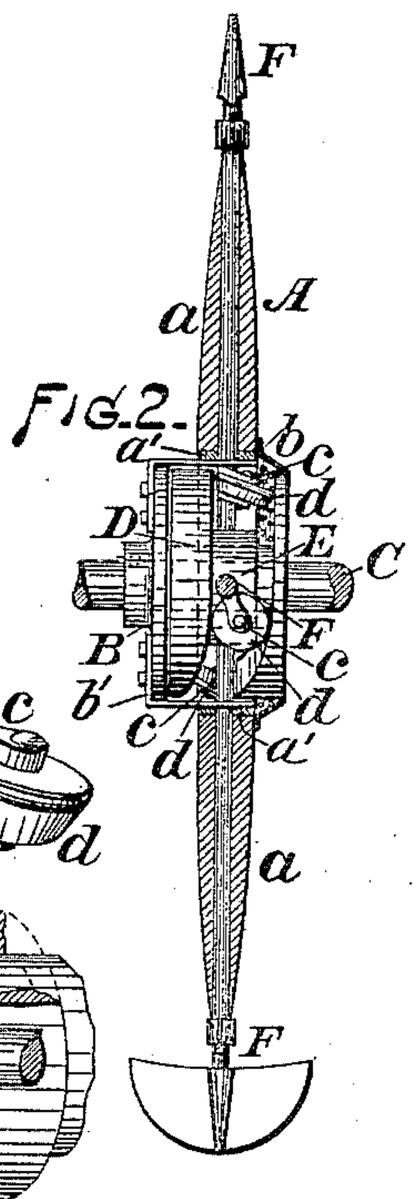

FIG. 2.

FIG. 4.

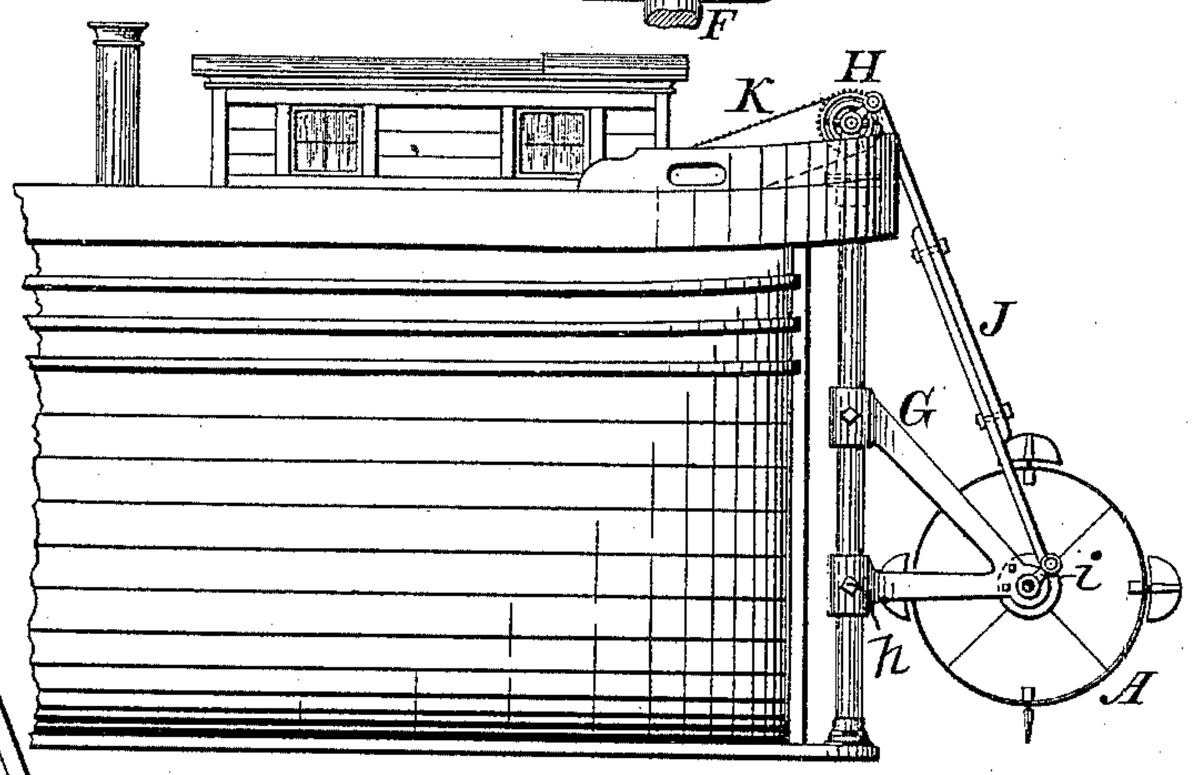

FIG. 3.

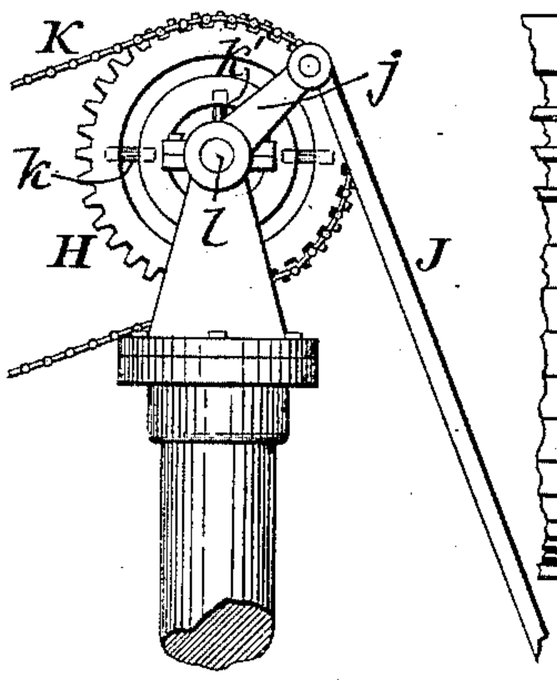

FIG. 5.

ATTEST.

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Joseph Seeberger

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(No Model.) 2 Sheets—Sheet 2.

J. MERKEL.

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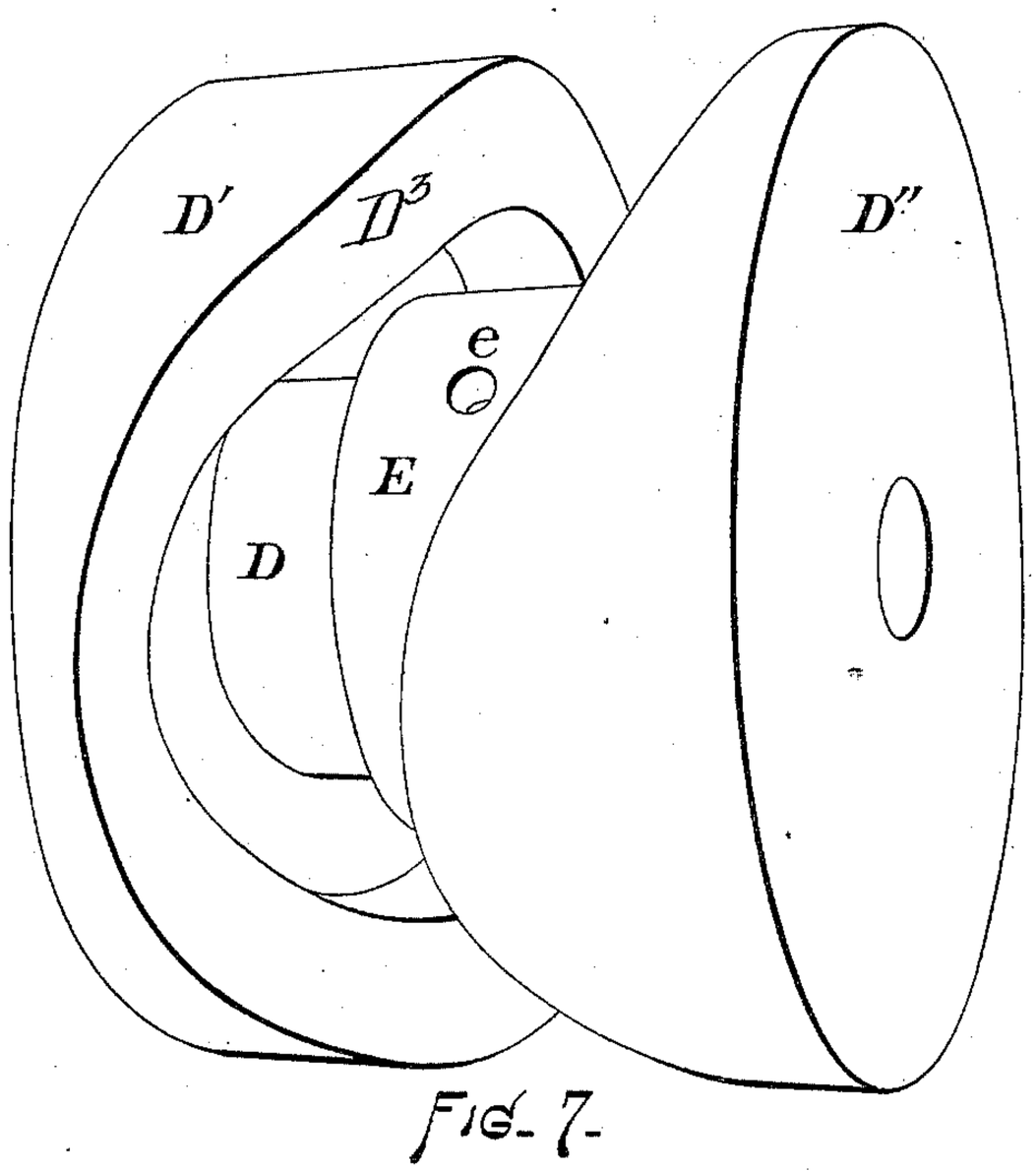

FIG. 7.

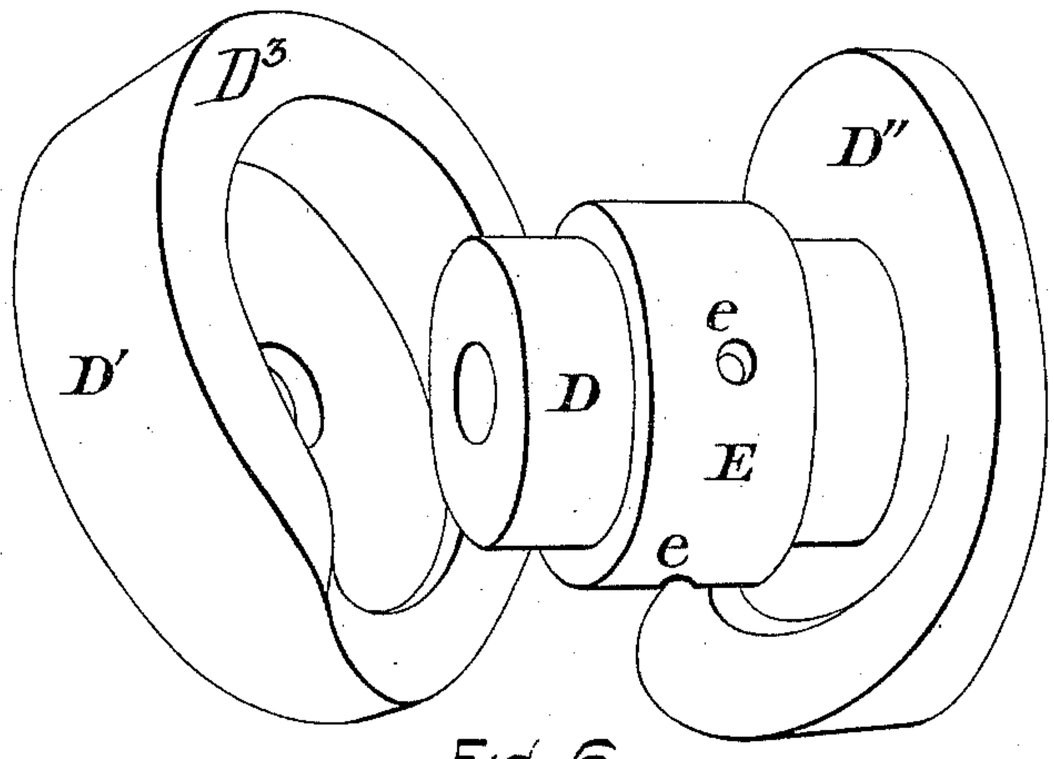

FIG. 6.

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JAMES MERKEL, OF MOUNT PLEASANT, IOWA.

STEERING PADDLE-WHEEL WITH FEATHERING-BLADES.

SPECIFICATION forming part of Letters Patent No. 421,955, dated February 25, 1890.

Application filed June 16, 1888. Serial No. 277,297. (No model.)

To all whom it may concern:

Be it known that I, JAMES MERKEL, a citizen of the United States, residing at Mount Pleasant, in the county of Henry and State of Iowa, have invented certain new and useful Improvements in Marine Propelling and Steering Devices; and I do hereby declare that the following is a full, clear, and exact description thereof.

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

The object of the invention is to improve the means of operating the feathering devices, and to provide peculiar means and mechanism for using the paddle-wheel as a steering-rudder without interfering in any way with the mechanism for transmitting power to it as a propeller.

The invention consists in certain novel constructions for carrying out these objects, and is fully hereinafter explained as well as illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of my feathering paddle-wheel. Fig. 2 is a transverse section showing the feathering devices in elevation. Fig. 3 is a side elevation of the wheel in position for propelling and steering. Fig. 4 is an enlarged perspective view of the paddle-wheel shaft, sleeve, and collar. Fig. 5 is an enlarged elevation of the steering devices. Figs. 6 and 7 are enlarged perspective views of the feathering mechanism.

The body of the paddle-wheel which supports the propelling-blades is a circular disk of double-convex or double-tapering cross-section, as shown in Fig. 2, the purpose being to give it as sharp an edge and as favorable lines of resistance as possible. I prefer to construct this disk from radial sections of wood secured together in any suitable manner, or it may be made from metal plates or otherwise formed of metal. The disk has a wide central opening extending transversely through it for the reception of the paddle-wheel shaft and the feathering mechanism.

A represents the disk as a whole, and *a* the sections composing it. The central aperture has an interior bushing or ring, as shown at *a'*.

C represents the driving-shaft, which passes transversely through the central aperture in the disk, and is supported in bearings, as explained in another part of this description. Upon this shaft is keyed a disk or hub B, which is properly the hub of the wheel. The diameter of this hub is not quite equal to that of the aperture of the disk, and hence straps *b'*, bolted to the face of the hub and bent at right angles over its edge, are permitted to pass through the aperture and into the interior of the main disk, where they are firmly secured to the bushing *a'*. This makes a solid connection between the shaft and disk, which communicates the motion of the shaft to the latter. The hub B conforms closely enough in diameter to the aperture of the disk to protect the interior upon one side from the entrance of any rubbish. The opposite side is similarly protected by a screen *b*, secured to the main disk, Fig. 2.

The mechanism for operating the paddles carried by the main disk or wheel consists, first, of a double-flanged sleeve D of peculiar construction, Figs. 6 and 7. The sleeve portion D is loose upon the shaft C, and has the flange D^2 formed with it. The flange D' is separable from the sleeve, Fig. 6, being secured to it by screws or bolts. Upon the interior edges of these flanges are projections or ways D^3, the inner faces of which, when the flanges are in proper relative position, are parallel throughout. These projections or ways are also parallel for the greater portion of their length, with the plane outer face of each flange, Fig. 2, but are abruptly deflected for a short distance on the lower quarter of their circumference. The construction of these flanges, which are loose on the shaft and rigidly secured to the shaft-bearings or other stationary part of the frame which supports the paddle-wheel, permits an annular collar E to be slipped over the sleeve D before the flange D' is placed in position. This collar turns freely on the stationary sleeve, and is connected to the disk A by the paddle-arms F, which are stepped in the collar, as shown in Fig. 4 at *e*, and extend up through the disk, Fig. 2, which is bored out or otherwise formed with bearings for said arms. They extend through the disk, and at their outer ends are provided with paddles. The drawings show four of said paddle-arms and paddles.

The feathering of the paddles is accomplished by the cam-faces of the flanges D′ D² through the medium of a crank *c* and a beveled roller *d*. One of these cranks is secured to each paddle-arm F, the roller being journaled in it, so that the edge of said roller bears on the edges D³ of the flanges. The crank is preferably formed in two parts, as shown, with the roller journaled between them. It is evident that as the paddle-arms revolve with the collar E the roller will travel on and between the sleeve-flanges until it reaches the cam portion, when it will be deflected to one side, turning the crank and paddle-arm and throwing the paddle into the position shown at bottom of Fig. 2 at right angles to the paddle-wheel. This takes place as or just before the paddle enters the water, and it remains in position until the crank is deflected in the opposite direction as the paddle leaves the water, feathering it, as shown at top of Fig. 2. The paddle-wheel thus constructed is mounted in a frame G, secured to the rudder-post of the boat, and containing bearings for the shaft C. I prefer to secure the frame to the rudder-post by set-screws *h*, so that it may be adjusted vertically on said post to submerge the wheel to a greater or less extent, as desired. Any form of driving mechanism may be employed. I have shown in the drawings a crank *i* at one end of the shaft C, to which is connected a double sliding pitman J. The upper end of this pitman is connected to a crank *j* on the shaft *l* of a sprocket-wheel H, from which a chain belt K runs to the engine or other source of power employed. The sprocket is mounted in bearings at upper end of the rudder-post. The wheel thus mounted upon the rudder-post is substituted as a steering device for the usual rudder, which is entirely dispensed with. It is evident, however, that the turning of the rudder-post in steering would, in the absence of special means to prevent it, deflect the sprocket-wheel so far from its normal plane as to seriously interfere with or entirely stop the driving. To overcome this difficulty I have devised the construction shown in Fig. 5, in which the sprocket-wheel is made in two concentric parts, the outer having the teeth for the chain, being pivoted to the inner part by pins *k k*, while the inner part is in turn pivoted to a collar on the shaft *l* by pins *k′ k′*, set at right angles to pins *k k*. When the parts are in position shown in Fig. 5, the rudder-post and shaft *l* swing on the pivot-pins *k′ k′* independently of either part of the sprocket-wheel. At a quarter-turn from that position the shaft and inner part of the sprocket pivot on the pins *k k* independently of the outer part, which thus remains in the same plane constantly. The steering is accomplished by devices of any well-known character connected to the rudder-post.

Having thus fully described my invention, I claim—

1. In a paddle-wheel, the combination, with a double-convex rotary disk, of paddle-arms passing radially through said disk and revolving therewith, and feathering-paddles on said arms, substantially as described.

2. In a feathering paddle-wheel, the combination, with a shaft and a rotary disk connected thereto, of a fixed sleeve having cam-flanges, a rotary collar on said sleeve, paddle-arms journaled in said collar and disk, and a connection between said paddle-arms and cam-flanges for giving intermittent partial rotations to said paddle-arms, substantially as described.

3. The combination, with the shaft C and with the rotary disk A connected thereto, of the sleeve D, having cam-flanges, the rotary collar E upon said sleeve, paddle-arms journaled in said sleeve, and a crank upon each arm having a roller traveling upon said cam-flanges, substantially as set forth.

4. The combination, with the shaft C, of the hub B, keyed thereto, the disk A, having a bushing *a′* secured to said hub, the rotary collar E, and paddle-arms journaled in said collar and passing radially through the disk, substantially as set forth.

5. The combination, with a steering paddle-wheel, of a driving-chain, a sprocket-wheel on the rudder-post, having connections, substantially as described, to said paddle-wheel, and a universal joint between said rudder-post and sprocket-wheel, substantially as and for the purposes set forth.

6. In combination with a steering paddle-wheel mounted upon a rudder-post, as described, a two-part sprocket-wheel mounted also upon said rudder-post and forming a gimbal-joint and driving-connections to said sprocket and from said sprocket to the paddle-wheel, substantially as set forth.

JAMES MERKEL.

Attest:
H. LISLE FLEMING,
JOSEPH SEEBERGER.