To all whom it may concern:

Be it known that I, REINHOLD HEERE, teacher, a subject of the King of Prussia, German Emperor, residing at 10 Kleine Rosenthalerstrasse, Berlin, Germany, have invented new and useful Improvements in Paddle-Wheels with Feathering Vanes or Blades, of which the following is a specification.

The present invention relates to an improved paddle-wheel with feathering vanes or blades, which by virtue of its special construction is applicable both for high-sea navigation as well as for inland navigation.

The improved paddle-wheel which forms the subject of the present application and the blades of which are actuated upon both ends from the engine on the vessel directly is successfully applicable for high-sea navigation as well as for inland navigation in view of the fact that in the first instance the motive power by the agency of a main shaft, which, if necessary, may be driven at both ends, and by the agency of two cross-shaped frames, one of which is rigidly mounted on said main shaft, is uniformly supplied to both ends of the paddle-wheel blades, while simultaneously the second cross-shaped frame causes the variation in the position of the blades, so that the latter assumes the required angle in regard to the water or their feathering, respectively, by being suitably connected to said cross-shaped frame, which supports the blades at either end thereof. In view of these arrangements the blades are prevented from jamming in their bearings whatever position the vessel may be in, lateral pressure of the waves likewise not demanding any consideration, as it cannot exercise any detrimental effect on the action of the blades, so that these latter may be constructed and employed of any desired suitable width. A paddle-wheel with feathering-blades constructed in such a manner is applicable for the largest-sized vessels. In addition the amount of motive power required is considerably reduced in comparison to the hitherto-known constructions of paddle-wheels and of screw-propellers.

I will now proceed to describe my invention more fully, reference being had to the accompanying drawings, in which—

Figure 1 shows a side elevation of my improved paddle-wheel. Fig. 2 is a section through the paddle-wheel in the direction of the longitudinal axis of same on line AA of Fig. 1. Fig. 3 illustrates a perspective view of one of the blades of the paddle-wheel. Fig. 4 is a diagrammatic view illustrating the position of the paddle-wheel in regard to the stern of the vessel.

On the shaft a are rigidly mounted at either end two cross-shaped structures c, the opposite arms of which are connected by staying-rods d, so that they form a strong frame. The shaft a may, if necessary, be provided with cranks b at either end, arranged at an angle of ninety degrees in regard to each other. The shaft penetrates outside the cross-shaped structures c two eccentrics e, which are stationary, and thus serve as bearings for the shaft. On the circumference f of these two eccentrics e are rotatably mounted two likewise cross-shaped structures g. These structures are situated adjacent to the structures c and firmly connected to each other by means of staying-rods i. The driving-frame c imparts motion to the frame g by means of suitable couplings—such, for instance, as cranks h, which are pivoted on the one hand to one of the arms of the frame c and on the other hand to the adjacent arm of the frame g. The staying-rods i of the frame g pass through slots in projections on the back of the blades or vanes m, or through slots in the body of vanes, respectively.

Rollers k serve for attaining an easy movement in the slots. Each two opposite arms of the driving-frame c, which is firmly mounted on the shaft a, are rotatably connected at their extremities by means of bolt n to one of the blades m, thus supporting them.

The motion imparted to the shaft a from the source of motive power, if necessary by the auxiliary of the cranks b, will rotate the frame c, constituted as above described. Simultaneously, in view of the connection between the frame c and the frame g, the latter will be rotated around the eccentrics e, and by virtue of the movability of the staying-rods i of the frame g in the slots in the vanes or blades m these latter will either or be caused to vary their positions in regard to the two frames in a regular and predetermined manner, respectively, as required.

In view of the novel features of construc-
tion and combination of parts in my improved paddle-wheel motion will be imparted uniformly and directly to the blades or vanes, while simultaneously their feathering is attained in a uniform manner without any jamming, which it has not been able to hitherto obtain in paddle-wheels with feathering-vanes.

Having now particularly described my invention, what I claim as new, and desire to secure by Letters Patent, is—

An improved paddle-wheel with feathering-vanes having the vanes \( \alpha \) supported in a cross-shaped frame \( c \) rigidly mounted on the shaft \( \alpha \), a second cross-shaped frame \( g \) for regulating the feathering of the vanes being movably mounted on stationary eccentrics and rotated by the first frame \( c \) by being pivotally connected to the latter by means of suitable couplings, substantially as and for the purposes set forth.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

REINHOLD HEERE.

Witnesses:

WOLDEMAR HAUPT,
HENRY HASPER.