(No Model.)

J. HOWARD.

PADDLE WHEEL FOR STEAMERS.

No. 481,668. Patented Aug. 30, 1892.

FIG. 1.

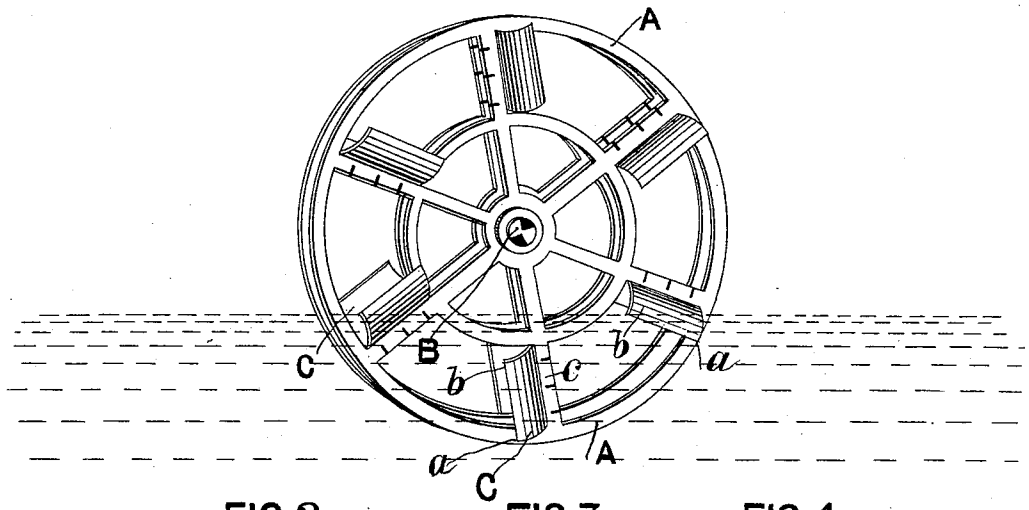


FIG. 2.

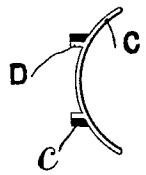


FIG. 3.

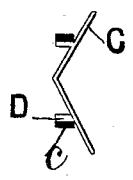


FIG. 4.

FIG. 5.

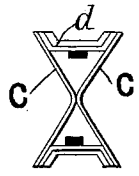
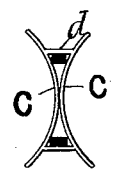


FIG. 6.



Witnesses

Wm. J. Littell

M. J. McMahon,

Inventor

John Howard

by L. R. Littell

Associate Atty.

UNITED STATES PATENT OFFICE.

JOHN HOWARD, OF FARNWORTH, NEAR BOLTON, ASSIGNOR TO THE CONCAVE PADDLE WHEEL COMPANY, LIMITED, OF LIVERPOOL, ENGLAND.

PADDLE-WHEEL FOR STEAMERS.

SPECIFICATION forming part of Letters Patent No. 481,668, dated August 30, 1892.

Application filed January 9, 1892. Serial No. 417,597. (No model.) Patented in England June 24, 1890, No. 9,760.

To all whom it may concern:

Be it known that I, JOHN HOWARD, contractor, a subject of the Queen of Great Britain, residing at Farnworth, near Bolton, in the county of Lancaster, England, have invented certain new and useful Improvements in Paddle-Wheels for Steamers, (for which I have received Letters Patent in Great Britain, No. 9,760, dated June 24, 1890,) of which the following is a specification.

This invention relates to paddle-wheels for steamers, and has for its object certain improvements in the form or construction of the paddles or floats whereby friction is minimized and the propelling power of the wheels is increased.

In carrying the invention into effect I form the paddles or floats with channeled or concaved striking-surfaces. These can be either single or double, the latter producing an effect that will cause a backward motion of the paddle-wheel to be as powerful as a forward motion.

Referring to the accompanying drawings, in which corresponding letters of reference indicate like parts, Figure 1 is a front elevation of the paddle-wheel of a steamer fitted with single floats or paddles with channeled or concaved striking-surfaces; Fig. 2, a section of a single float or paddle; Figs. 3 and 4, sections of other forms of single floats or paddles with concaved striking-surfaces; Fig. 5, a section of a double float or paddle with channeled or concaved striking-surfaces and secured together by means of angle-irons, and Fig. 6 a section of a double float or paddle formed in one piece.

In the figures, A is the paddle-wheel; B, the shaft on which the paddle-wheel is secured; C, the floats or paddles with channeled or concaved striking-surfaces adapted to strike the water in such a manner as to cause the "grip" to be much firmer than that obtained by the ordinary flat or feathering floats. The floats C are provided with the flanges D, by which they are secured to the radial arms of the paddle-wheel by means of rivets, bolts, or the like, or they may be formed without flanges and bolted or riveted directly onto the arms. They are made single, as shown in Figs. 1, 2, 3, and 4, or double, as shown in Figs. 5 and 6. When made with double concave faces, the two parts of the float are tied together by angle-irons or stays *d*, and can be fixed in place by riveting the stays to the radial arms of the wheel; or, if desired, the double convex faces can be made in one piece, in which case the ribs *d*, Fig. 6, are riveted to the radial arms *c* of the wheel. I have described these ways of constructing the channeled or concave paddles; but it is obvious that, once given the general idea, various ways of fastening the floats to the paddle-wheel or of constructing the double floats may be devised.

When the improved paddle-wheel is in operation, the points *a*, Fig. 1, enter the water first, and by the time the concave surface of the float comes into contact with the water the points *a* have a firm grasp of the water and effectively prevent the enormous slip common to the ordinary flat float. The concave floats will not lift the water, as when they leave the water the points *b* leave first and form a cutting process, and what little water there is to lift is thrown out by the speed of the wheel. These concave or gutter-shaped floats can be employed in conjunction with a feathering motion, if desired.

I declare that what I claim is—

1. As an improvement in paddle-wheels for steam-vessels, the combination, with the radial arms of the wheel arranged in pairs, of paddles or floats having concave or channeled striking-surfaces and provided at their rear sides with parallel securing wings or lugs, the latter being adapted to contact with and be secured to said arms, substantially as and for the purpose set forth.

2. As an improvement in paddle-wheels for steam-vessels, the combination, with the radial arms of the wheel arranged in pairs, of concave or channeled floats provided at their rear sides with parallel securing wings or lugs fitting between the pairs of said arms, substantially as and for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN HOWARD.

Witnesses:
G. C. DYMOND,
H. P. SHOOBRIDGE.