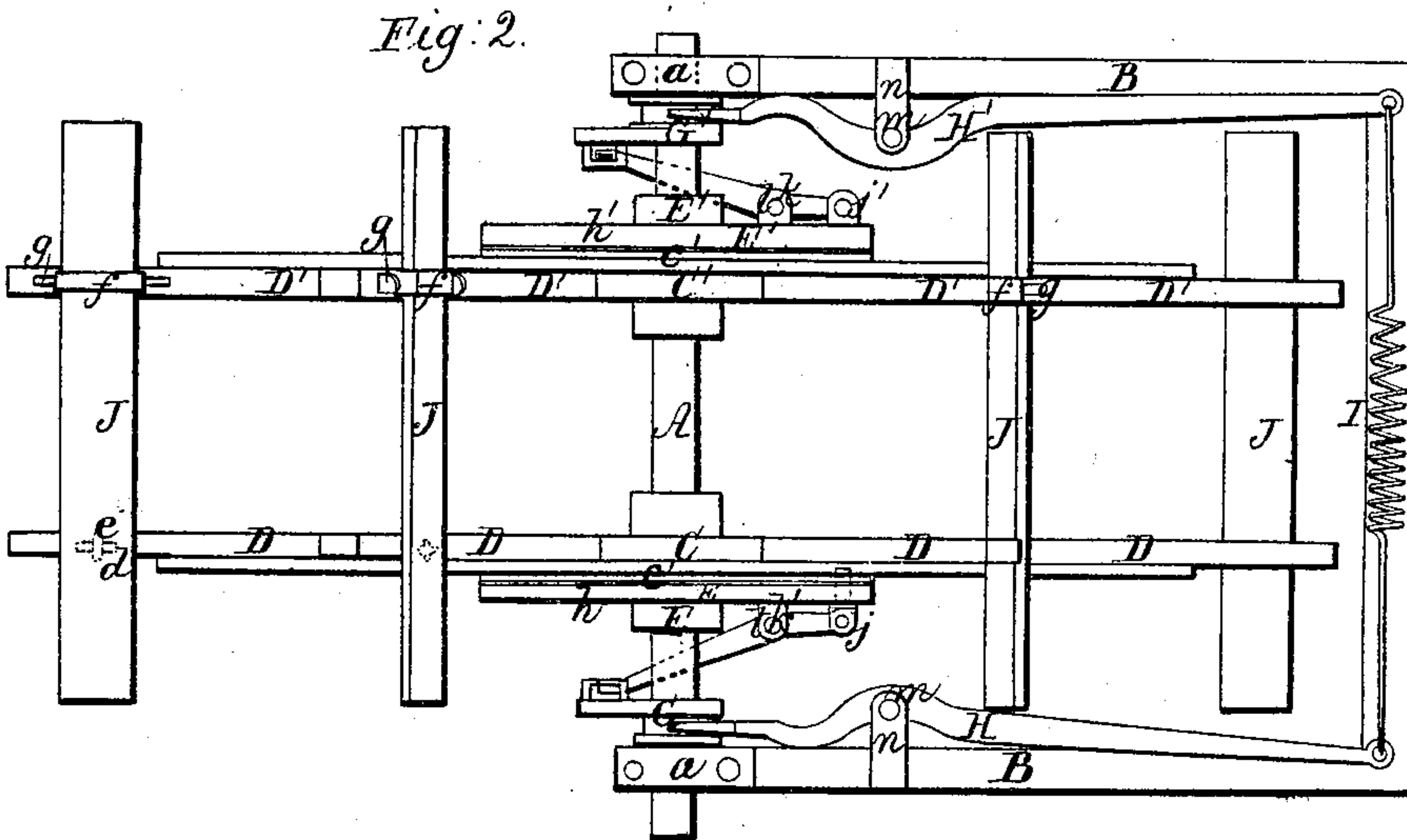
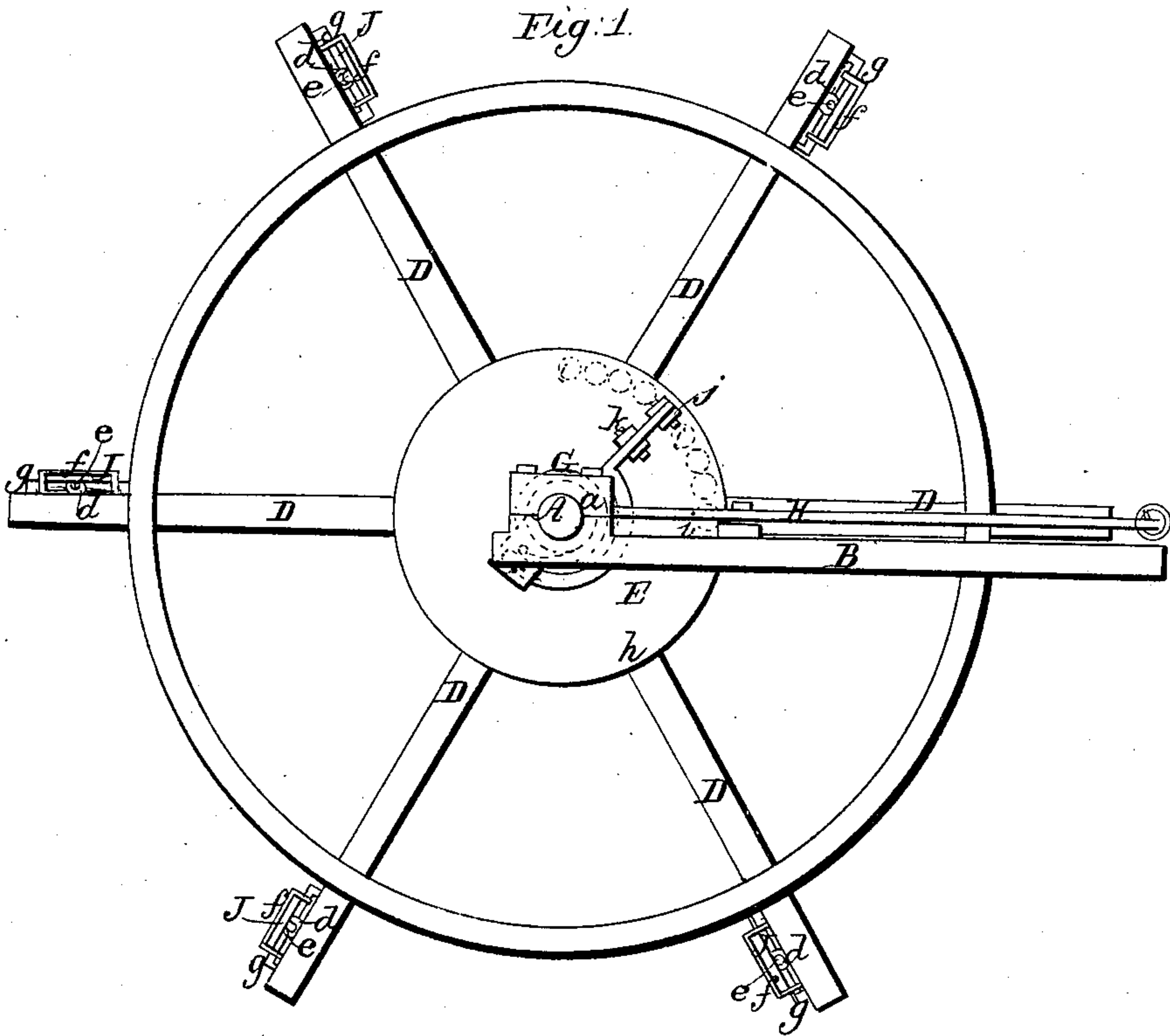


N. Smith.

## Paddle Wheel.

*N<sup>o</sup> 20,096.*

*Patented Apr. 27, 1858.*



# UNITED STATES PATENT OFFICE.

NATHAN SMITH, OF BERWICK, LOUISIANA.

## IMPROVED PADDLE-WHEEL.

Specification forming part of Letters Patent No. 20,096, dated April 27, 1858.

*To all whom it may concern:*

Be it known that I, NATHAN SMITH, of Berwick city, in the parish of St. Mary's and State of Louisiana, have invented a new and useful Improvement in Paddle-Wheels for Stern-Wheel and other Boats; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a side view of a wheel with the invention applied. Fig. 2 is a plan of the same. Fig. 3 is an end view of one pair of arms and an edge view of their attached float.

Similar letters of reference denote like parts in the several figures.

This invention consists in fitting the two hubs carrying the two sets of arms of a paddle-wheel to their shaft and the attachment of the buckets to the arms of the wheel in such a manner as to permit, at the pleasure of the pilot or other person on board the vessel, either hub and its attached arms to be turned on the shaft by the pressure of the buckets against the water to enable the said buckets to assume oblique positions to exert a pressure on the water in either direction laterally to the boat for the purpose of changing the course of the boat in either direction.

It further consists in certain contrivances for the purpose of enabling the hubs to be released from the shaft, so that they may be capable of turning thereon to change the position of the buckets by the pilot or other person on board the vessel.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

A is the paddle-shaft, whose journals are fitted in the usual manner to bearings *a a* in a framing B, which extends rearward from the stem of the vessel.

C C' are the two paddle-hubs, made with broad flanges *c c'* and fitted so as to be capable of turning freely on the shaft A.

D D' D' are the two sets of arms bolted to the flanges *c c'* of hubs C C'.

J J are the buckets, each attached to one of the arms D D by an iron stirrup or eye *d*, attached securely to the arm, and a similar stirrup or eye *e*, attached securely to the bucket, and each fitted to slide through a long two-eyed iron stirrup *f*, which is at-

tached to one of the opposite arms D' D' by a long pin *g*, which is attached at or near its ends outside of the said stirrup *f* to the arm.

E E' are two hubs, keyed fast to the shaft outside of the paddle-hubs and provided with flanges *h h'* of a size about equal to the flanges *c c'* of the paddle-hubs, the inner faces of said flanges *h h'* fitting close to the outer faces of the flanges *c c'* of the paddle-hubs, which should be confined to the fast hubs E E' by collars on the shaft or other contrivances which do not prevent them turning on the shaft. The paddle-flanges *c c'* have a number of holes *i i* (shown dotted in Fig. 1) arranged as close as practicable together at equal distances apart in circles near the margins of the flanges, and the flanges *h h'* of the fixed hubs have each one hole through it coinciding with said holes *i i*, said holes being for the purpose of receiving one of two bolts *j j'*, which pass through the flanges *h h'* into the paddle-flanges *c c'* for the purpose of securing the latter to the former to prevent the paddle-hubs turning on the shaft till they are desired to do so for the purpose of varying the positions of the buckets. The bolts *j j'* are attached to the shorter arms of two levers F F', whose fulcras are pins *k k'*, fitted to lugs or projections *l l'*, secured to the outsides of the flanges *h h'*. The longer arms of the two levers F F', which are curved, as shown in Fig. 1, to clear the shaft, are connected with two collars G G', which are fitted to slide, but not permitted to turn on the shaft. These collars G G' are grooved to receive the forked ends of two levers H H', which work on fixed fulcras *m m'* in lugs *n n'*, secured to the framing B. These levers H are intended to have a system of rods, chains, or other connections leading to the pilot-house of the vessel, so that either one can have its longer or forward arm forced outward by the pilot or other person to slide either of the collars G G' toward its hub E or E', for the purpose of moving the lever F or F' to draw out the bolt *j* or *j'* from the paddle-flange *c* or *c'*, and thereby release the paddle-hub C or C'. The levers H H' have a spring I applied to them in such a manner as to draw their longer forward arms toward the wheel, which has the effect of pressing the bolts *j j'* toward the paddle-flanges *c c'*; or, instead of this spring, a spring may be applied to each of the levers F F'.



The buckets, when the vessel is desired to go straight ahead or only so far out of a direct course as can be easily varied by the helm, are intended to occupy positions parallel with the shaft; but when it is desired to change the course of the vessel the pilot or other proper person applies the necessary power to the lever H or H', according to the direction in which it is to be changed, to draw the bolt *j* or *j'*, and thus liberate one of the paddle-hubs from the shaft, when the pressure of the buckets upon the water as they revolve will cause the ends of the buckets connected with the detached hub to be thrown forward relatively to the other ends, the liberated paddle-hub with its arms moving on the shaft to permit this, thus giving the buckets an oblique position. When the desired degree of obliquity has been thus produced, the lever H or H' is liberated and the bolt allowed to be forced toward the liberated paddle-hub by the spring I or its equivalent, and the bolt then slips into the first of the holes *i i* in the said paddle-hub that arrives opposite to it. When it is desired to bring the buckets parallel with the shaft again, the other paddle-hub is liberated in the same way by operating the other lever, and the pressure of the buckets upon the water as they revolve soon brings them to the desired position, and the lever being then liberated the spring forces the bolt toward the liberated hub and causes it to enter the first of the holes *i i* that arrives opposite to it.

The setting of the buckets in oblique positions, as described, is very effective in changing the course of the vessel, as the lateral pressure upon the stern of the vessel produced by the obliquity of the buckets it is

obvious has an immense leverage upon the vessel. The stern-wheel constructed in this way may be applied with immense advantage not only in stern-wheel boats for river navigation, but to ocean steamers, as by its use a vessel may be kept from getting into the trough of the sea and be brought under much more perfect control than when side wheels of the usual construction are employed.

The invention may be applied to two or more wheels on the same shaft with separate sets of bolts and levers or their equivalents to permit the liberation and securing of the paddle-hubs for the adjustment of the buckets of the wheels.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The fitting of the two paddle-hubs with their arms D D D' D' to the shaft and the attachment of the buckets to the arms in such a manner that either hub may be permitted at pleasure to be turned upon the shaft by the pressure of the buckets upon the water for the purpose of adjusting the buckets obliquely in either direction to the shaft and of returning them to a position parallel with the shaft, substantially as herein described.

2. The employment of the bolts *j j'* and a system of levers and sliding collars G G', applied substantially as described, in combination with the loose paddle-hubs C C' and fast hubs E E', with their corresponding holes, for the purpose of liberating the hubs from and securing them to the shaft to permit and secure the adjustment of the buckets.

NATHAN SMITH.

Witnesses:

A. J. PYRON,  
NELSON ORCUTT.