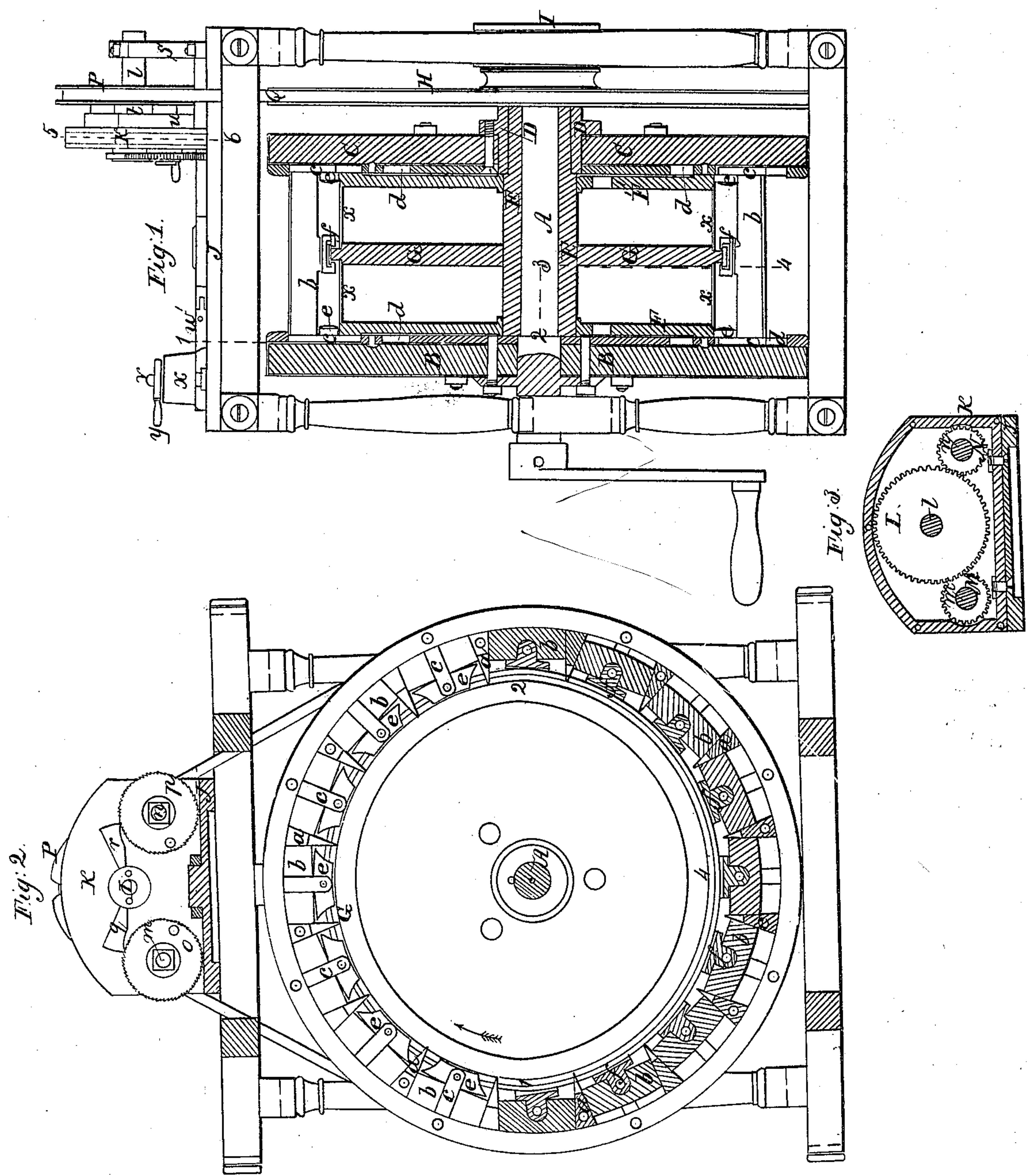


# G. Wingate. Paddle Wheel.

N<sup>o</sup> 20,676.

Patented Jun. 22, 1858.





# UNITED STATES PATENT OFFICE

GEORGE WINGATE, OF PHILADELPHIA, PENNSYLVANIA.

## IMPROVED PADDLE-WHEEL.

Specification forming part of Letters Patent No. 20,676, dated June 22, 1858.

*To all whom it may concern:*

Be it known that I, GEORGE WINGATE, of the city of Philadelphia and State of Pennsylvania, have invented a new and useful Improvement in Side Wheels for Steamboats; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings and to the letters and figures of reference marked thereon.

My invention consists in constructing the side wheels of steamboats with recesses, in which blocks are arranged to slide by devices, fully described hereinafter, toward and from the center of rotation of the wheel as the latter revolves, so as to cause the partitions between the said recesses to assume the character and duty of floats throughout a portion of the circumference, the outer surface of the blocks being level with the outer edges of the partitions during the remaining portion of the circumference.

The objects of my invention are to prevent the effective propelling power of the wheels from being diminished by any alteration as regards the draft of water of the vessel to which they may be connected, and to avoid the shocks caused by the forcible action of the floats of ordinary side wheels on entering the water and the reaction on the floats as they leave the water.

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

On reference to the drawings, which form a part of this specification, Figure 1 is a transverse sectional elevation of my improved side wheel for steamboats; Fig. 2, a sectional elevation of the same, partly on the line 1 2 and partly on the line 3 4, Fig. 1; Fig. 3, a detached section on the line 5 6, Fig. 1.

Similar letters refer to similar parts throughout the several views.

A represents the crank-shaft of the engine, to which is secured one side B of the wheel, the opposite side C being attached to a collar D, which is arranged to turn on the hollow shaft E, to which are secured the two outside plates F and F' and the central plate G. To the hollow shaft E is attached a chain-pulley H, hereinafter referred to. The crank-shaft A passes through the hollow shaft and turns

in a suitable box I, which may be permanently attached to the outside beam of the wheel-house. The side plates of the wheel with the crank-shaft may thus turn freely and independently of the hollow shaft E and its plates F, F', and G, which can only be moved by turning the chain-pulley H.

An annular space between the sides B and C and near the outer edge of the same is divided by partitions *a a* into recesses, and into the latter fit snugly (but so as to move freely) the blocks *b b*. The ends of these blocks have side strips *c*, which fit into grooves *d*, formed in the inside of the two side pieces B and C, thus serving as guides for the blocks and relieving them from any undue friction against the partitions. To the lower end of each strip *c* and on each side of each block a plate *e* is hung loosely, the lower edge of the plate on one side of the block coinciding with and bearing against the edge of the plate F and that on the other side of the block coinciding and bearing against the edge of the plate F'. To the middle of each block is hinged a claw *f*, adapted to fit loosely over flanges formed on the outer edge of the central plate G. Above the wheel and in a suitable position on the wheel-house is secured a plate J, to which is attached a casing K, containing the cog-wheel L and the pinions M and N, the latter being hung to spindles *m* and *n*, which turn in and project through the front of the casing K, where they are furnished with ratchet-wheels *q* and *r*, the teeth of which are adapted to receive the ends of the retaining-pawls *q* and *r*. The wheel L is secured to the shaft *l*, which turns at one end in the casing K and at the opposite end in a bracket *s*, attached to the plate J. A pulley P is secured to the shaft *l*, and around this pulley, as well as around the pulley H, passes a chain of any suitable construction, the edges of both pulleys being adapted to the links of this chain.

An octangular hub *t* projects from the face of the chain-pulley P, and an octangular collar *u* is arranged to fit over this hub when necessary, the collar being arranged to slide in guides on the plate J and being operated by a connecting-rod *u'*, jointed to a crank on a vertical spindle *v*, which turns within a casing *x*, attached to the plate J, and which is furnished with a suitable handle *y*.

It will be observed on reference to Fig. 2



that the edges of the plates F, G, and F' do not form a uniform circle. The edges of the upper portion of the plates from the points 1 to 2 represent segments of circles of which the crank-shaft is the center, the edges of the lower portions of the plates being either a segment of a circle or a curve approaching nearer to the center of the crank-shaft at the point 4 than at the points 1 or 2. Access of water to the interior of the wheel is prevented by plates *x x*, secured to the edges of the plates F, F', and G. When the hollow shaft E, with its plates, is in the position illustrated in Fig. 2 and the crank-shaft, with the wheel, is caused to revolve in the direction of the arrow, the blocks *b* will as they pass the point 1 be forced outward until their outer surfaces are level with the outer edges of the partitions *a*. As the edges of the plates F and F' from the point 1 to the point 2 are at all parts the same distance from the center of the crank-shaft, and as the plates *e* on the strips *c* bear on these edges, it is evident that the blocks will remain forced outward until they pass the point 2. As they move from the latter point toward the point 4, the flanges formed on the edge of the central plate G, acting on the claws *f*, draw the blocks gradually toward the center of the shaft until they arrive at the point 4, after passing which the outer flanges F and F' gradually force the blocks outward until they arrive at the point 1, when their outer surfaces are again level with the outer edges of the partitions *a*. It will be thus seen that as the wheel revolves the blocks of one portion of the wheel are forced and maintained outward, while those in the other portion are drawn more or less within their recesses. One portion of the wheel therefore represents a drum or pulley with a uniform surface, while the other portion has recesses between the partitions *a*, which form the floats.

The propelling power of wheels constructed in the above-described manner cannot be affected by any increase or diminution in the draft of water of the vessel to which they are applied, as they operate quite as efficiently when entirely submerged as when dipping in the water to the extent of ordinary side wheels.

It is proposed to so arrange the wheels on the vessel that one-half, or thereabout, shall

be submerged, so that the partitions *a* do not assume the character of floats until they are some distance under water and cease to be floats before they leave the water. By this arrangement the usual forcible action of the floats of ordinary wheels as they strike the water and the reaction of the water as the floats emerge from the same is obviated.

It will be seen that by sliding back the octangular collar *u* from the hub *t* of the chain-pulley P and by turning the latter the pulley H, and with it the plates F, F', and G, may also be turned, so that the partitions *a* may assume the character of floats at any other positions which may be deemed more advantageous than that designated by the points 1, 4, and 2.

As in sea-going steamboats, when the engines become disabled, it becomes necessary to resort to the sails as the only means of propulsion, the position of the plates F, F', and G may by turning the pulley H be reversed from that shown in Fig. 2, in which case the partitions will assume the character of floats on the top of the wheel only and when out of the water, the portion of the wheel under water having a plain surface, which can present no impediment to the free progress of the vessel.

I claim and desire to secure by Letters Patent—

Constructing side wheels for steamboats with recesses, in which blocks are arranged to slide toward and from the center of rotation of the wheel as the latter revolves by means of the plates F, F', and G when constructed and operating on the blocks *b*, as described, so as to cause the partitions between the said recesses to assume the character and duty of floats throughout a portion of the circumference of the wheel, the outer surfaces of the said blocks being level with the outer edges of the partitions throughout the remaining portions of the circumference, as herein set forth, and for the purposes specified.

In testimony whereof I have signed my name to this specification before two subscribing witnesses.

G. WINGATE.

Witnesses:

HENRY HOWSON,  
HENRY ODIORNE.