

UNITED STATES PATENT OFFICE.

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PADDLE-WHEEL.

SPECIFICATION forming part of Letters Patent No. 705,397, dated July 22, 1902.

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To all whom it may concern:

Be it known that I, JOHN JOSEPH GRAHAM, a citizen of the United States, residing at Imperial, in the county of Allegheny and State of Pennsylvania, have made certain new and useful Improvements in Paddle-Wheels, of which the following is a specification.

My invention is an improvement in paddle-wheels for use on steamboats; and it consists in certain novel constructions and combinations of parts, as will be hereinafter claimed, whereby the paddle will be set automatically to proper angle to operate in the water and to rise out of the water without lifting the same whether the wheel be revolved in one direction or the other.

In the drawings, Figure 1 is a cross-sectional view of a paddle-wheel embodying my invention. Fig. 2 is a detail perspective view showing the special construction at one end of one of the paddles and the means for operating the paddle. Fig. 3 is a detail sectional view on about line 3 3 of Fig. 1. Fig. 4 is a cross-sectional view of one of the rocking blocks, together with the devices for securing it to the arm of the wheel. Fig. 5 is a cross-sectional view on about line 5 5 of Fig. 4.

The shaft A may be of ordinary construction and has secured to it in any suitable manner the arms B for carrying the paddles. It may be preferred to secure a hub or collar C on the shaft and to bolt the arms thereto, as shown at C', or the said arms may be secured to the shaft in any other suitable manner. Upon the shaft, at the opposite ends of the wheel, I journal adjusting-wheels D, which may be in the form of disks or plates, as shown in Figs. 1, 2, and 3, and may be journaled on bearing bands or collars E, secured on the shaft. These adjusting-wheels D connect with the rocking paddles by means of links F, as will be more fully described hereinafter, said links F being secured at f to the wheel D at intervals and preferably by providing the wheel D with headed studs or pins, as shown at f in Figs. 2 and 3, and forming the rods F with eyes at their inner ends bent around the said studs. The blades G are of suitable length and are jointed between their inner and outer edges to rock on their connections with the arms, as will be understood from Figs. 1 and 2. The blades G may be of

any size and are secured to the arms B in the special manner illustrated in Figs. 1, 2, and 4. To this end I provide the rocking blocks H, secured on the paddles and made triangular in cross-section, with the broad side H' secured to the face of the paddle-blade and the apex H² of the triangle jointed to the arms, so the blocks may be adjusted with its side H³ resting against the arms when the paddles are adjusted to the full-line position shown in Fig. 1 or with the sides H⁴ resting against the arms when the paddle-blades are adjusted to the position indicated in dotted lines in Fig. 1.

In adjusting the paddle-blades from one position to the other the links F are secured at their outer ends to the inner ends of the paddles, and the wheel D constitutes, in connection with the said links F, connecting devices between the several paddle-blades, so the adjustment of one of the blades will effect a corresponding adjustment of the others.

In the construction shown I provide bearing-plates B' on the outer ends of the arms B to form a flat bearing for the angular side of the rocking block H. These blocks are secured to the paddle-blades in any suitable manner and are recessed in their apices, as shown at h, and a strip I extends around the block lying between the same and the paddle-blade and also lying in the base of the socket h and extended at i beyond the inner edge of the block to provide an eye for connection with the outer end of the link F, as will be understood from Figs. 1, 2, and 4. A clip J is passed beneath the strap I in the base of the socket h and has its ears perforated at J' for the pivot-bolt K, which passes through these ears and also through ears L' on a clasp L, which embraces the bar B and the bearing-plate B' and aids in securing a strong pivotal connection between the arms and their respective paddle-blades. It will be understood that the arms B and bearing-plates B' and rocking blocks H are provided in pairs at the opposite ends of the paddle-wheel, and the latter may be of any suitable length, diameter, or other dimension, as may be desired.

In operation it will be seen that as the wheel is turned in one direction or the other the paddles in the water will be adjusted by the pressure to the proper angle, operated

upon the water, and to leave the same without lifting the water, such adjustment of blades within the water operating to effect corresponding adjustment of all the other
5 blades, as will be understood on reference to Fig. 1.

In order to brace the paddle-blades when in the full-line position in Fig. 1, I employ swinging connecting-links M, jointed at M'
10 to the blades G, near the outer edges of the latter, and sliding at their ends M² in engagement with elongated keepers N on the rear side of the arms B. When the blades are in the position shown in full lines, Fig. 1, their
15 outer edges are securely braced by the links M, and said links slide in the dotted-line position to the inner ends of the keepers N, as indicated in Fig. 1.

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

1. The combination in a paddle-wheel substantially as described, of the shaft, the arms provided at their outer ends with the bearing-plates, the adjusting-wheels arranged to
25 turn freely on the shaft, the paddle-blades, the triangular rocking blocks secured at their bases to the paddle-blades and provided in their apices with sockets or mortises, bands
30 passed around said blocks and lying in the base of the said sockets and extending beyond the inner ends of the blocks, the links connecting such extensions of the bands with the adjusting-wheels, the clips passed beneath
35 the bands at the base of the sockets in the rocking blocks and provided with perforated ears, and the clasps embracing the arms and bearing-plates and having lugs pivotally connected with the lugs of the clips, all substantially as and for the purpose set forth.
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2. The combination in a paddle-wheel with the arms and the blades having a rocking connection therewith, of the swinging connecting-links jointed at one end to the paddle-blades, and the keeper-bails secured on
45 the arms and engaged by the other ends of the swinging connecting-links, substantially as set forth.

3. The combination with the arms and the paddle-blades, of the rocking blocks having
50 their broad sides secured to the paddle-blades and pivoted at their apices in connection with their respective arms and having their faces adjacent to their apices arranged to abut the arms in the different adjustments of the
55 blades, and connecting devices whereby the adjustment of one blade will effect a corresponding adjustment of the other blades, substantially as set forth.

4. The combination with the paddle-blades
60 and the rocking blocks, made triangular and provided in their apices with sockets or mortises, straps passed around the said blocks and lying in the base of said mortises, the clips secured by said straps within the base
65 of the mortises, the arms and the clasps embracing said arms and pivoted to the clips, substantially as set forth.

5. The combination with the arms, and the bearing-plates thereon, of the paddle-blades,
70 the rocking blocks made triangular and provided in their apices with sockets or mortises, and pivotal connections between the socket-blocks and the arms and arranged in the sockets or mortises of the rocking blocks, substantially as set forth.
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Witnesses:

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