(No Model.)

G. HART.

CHAIN PROPELLER.

No. 304,426. Patented Sept. 2, 1884.

Fig. 1.

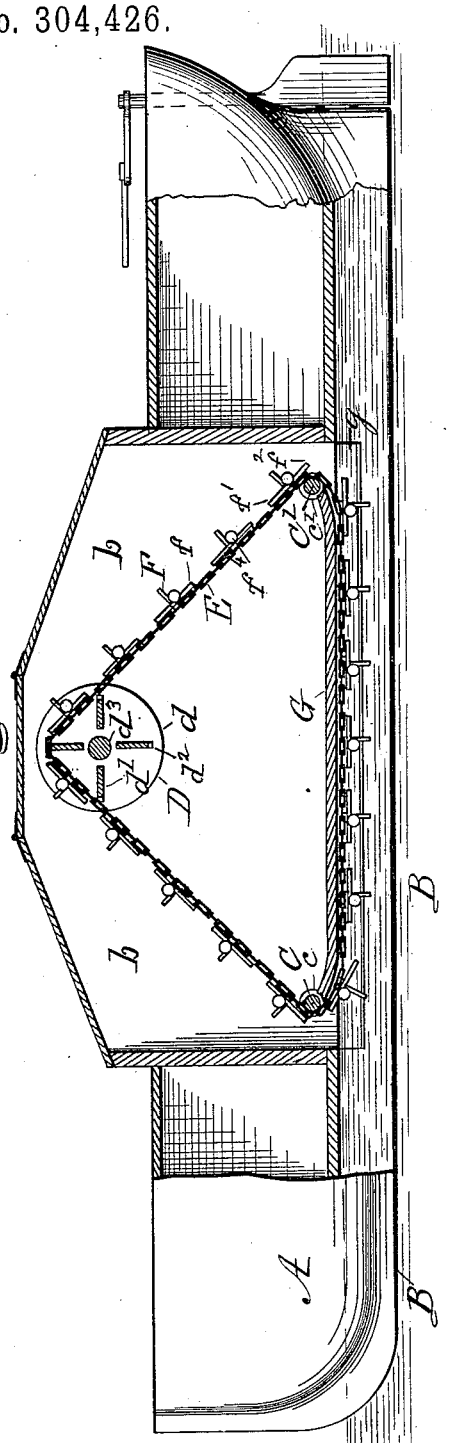


Fig. 4.

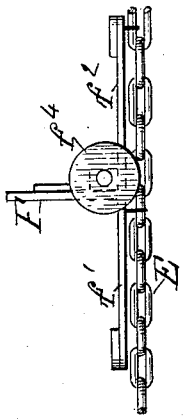


Fig. 2.

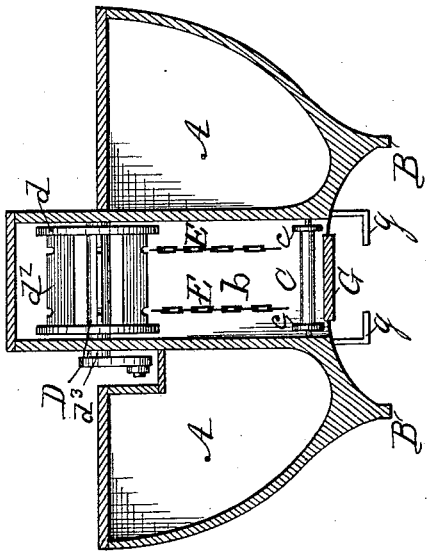
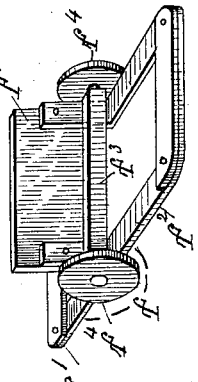


Fig. 3.



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UNITED STATES PATENT OFFICE.

GEORGE HART, OF STEUBENVILLE, OHIO.

CHAIN-PROPELLER.

SPECIFICATION forming part of Letters Patent No. 304,426, dated September 2, 1884.

Application filed May 29, 1884. (No model.)

To all whom it may concern:

Be it known that I, GEORGE HART, a citizen of the United States, residing at Steubenville, in the county of Jefferson and State of Ohio, have invented certain new and useful Improvements in Propellers; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to that class of propelling-machines for any kind of steam-vessels on which the paddle-blades are attached to an endless band, and to endless chains driven by rollers or sprocket-wheels, which are usually situated fore and aft transversely across the axis of the vessel; and it consists, essentially, in an improved mode of attaching the paddle-blades to the endless carrier.

It also consists in driving the carrier by a peculiarly-constructed chain-wheel situated above and midway between the fore and aft rollers, which serve merely to extend and guide the chains that form the carrier, and are made of a relatively small size, for a purpose hereinafter mentioned. It is obvious from the above that the carrier does not return from the after to the fore roller parallel to its course, but ascends over the chain-wheel between the two. To make the paddle-blades move in a direct course when they dip, proper guides for them are fixed to the bottom of the vessel, the hull of which is double-keeled, with the water-opening of the propeller-compartment situated centrally and longitudinally between the two keels.

In the drawings accompanying and forming part of this specification, Figure 1 represents a side view of a vessel broken away to show the invention attached thereto. Fig. 2 is a transverse section of a vessel, with the chain carrier broken away at top and bottom to show the construction of the chain wheel and rollers. Fig. 3 is a perspective view of one of the paddle-blades and the part that carries it. Fig. 4 is a side view of same, showing its attachment to the endless-chain carrier.

In the accompanying drawings, A represents the hull of a vessel with the invention attached thereto.

B B are the equal and similar keels, with the propeller-compartment *b* situated parallel to and centrally between them.

C C′ are the fore and the aft rollers, respectively, journaling in proper bearings transversely across the lower part of the propeller-compartment at equal distances from its central vertical line, and D is the driving chain-wheel fixed on the crank-shaft d^3, which journals in proper bearings in an upward extension of the propeller-compartment on its central transverse plane. The said wheel is situated considerably above the rollers C C′, and is equally distant from each. Without the hull is very high the above-mentioned extension of the propeller-compartment must rise to a considerable height above the deck to render the invention practicable. The crank of the shaft d^3 is connected with the engine in the usual manner. The rollers C C′ are provided, respectively, with the circumferential flanges *c c* and *c′ c′*, which stand at right angles from the same at their points of union with their journals, and serve a purpose hereinafter mentioned.

The chain-wheel D, fixed upon the crank-shaft, is composed of the circular side plates, *d d*, standing the same distance apart as the flanges on each roller C C′, and the transverse bars *d′ d′*, connecting the said plates. These bars are equally distant apart, and are situated within the circumference of the side plates at equal distances from the shaft d^3.

d^2 d^2 are notches in the outer edge of each bar *d′*, near its ends and equally distant from its center, adapted to receive and carry the links of the two endless chains E E, which form the carrier.

F F are the paddle-blades, each standing at right angles from the transverse central line of the rectangular frame *f*, the width of which equals the distance between the outer edges of the chains E E. As each paddle-blade stands centrally from the upper surface of a frame *f* it divides the latter into a forward part, *f′*, and rear part, f^2, the forward part being the one that points toward the bow when viewed from above. The rear part, f^2, is secured at

each outer corner to one of the chains E, by metal loops or other proper means, while the forward part, f', is similarly secured near the front of the paddle-blade, leaving its outer end free. f^3 is a transverse bar fixed across the surface of the paddle, at the base of the same, or to the frame f adjacent to said base, and having the rollers f^4 f^4 journaled on its ends outside the edges of the paddle-blade. These rollers are just sufficiently far apart to pass easily between the side plates, d d, and the flanges c c and c' c', which plates and flanges act as guides to direct their movement and keep the chain carrier and attached blade straight.

A short distance within the water-opening of the propeller-compartment is fixed the horizontal longitudinal guide-plate G, which is between and slightly below the rollers C C', curving up at each end to receive the chain carrier from one and deliver it to the other, and guiding it straight between the two.

g g are proper guides for the rollers f^4 f^4, each one of which is fixed longitudinally on one side of the water-opening of the propeller-compartment, slightly below the same, and just sufficiently below the guide-plate G for the rollers f^4 to successively bear and turn upon its upper surface when the carrier lies against its guide G.

The following are some of the advantages of peculiar construction and mode of arranging the carrier, paddle-blades, rollers, and motor-wheel: the driving-wheel being midway between the end rollers will make the carrier bear equally on each, and being elevated above them will tend to lessen the sagging of the carrier and render it more taut. The fore and aft rollers C C' being comparatively of small diameter, the paddle-blades will change direction very quickly in turning them, and be but a short time in position to drag. This effect is furthered by the manner of securing the frame f to the carrier, as their free ends, in turning, will stand out from the carrier until they reach the middle line of the fore roller, when they will make a quick quarter-turn downward into position, which motion would rather tend to heighten than to retard speed. If desirable, a third chain midway between the above-mentioned two may be added to the carrier. The bars d' d' of the chain-wheel D are just sufficiently far apart to fit between any two frames f f. As the vessel is double-keeled, she might with advantage be steered with two rudders, each hung to its own stem part, the two tillers being turned by any proper parallel motion.

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

1. The combination of the guide-rollers C C' and roller D, provided with end flanges, c c' d, the endless carrier traveling over said rollers, and the paddle-frame secured on said carrier and provided with rollers f^4, suitably arranged to pass close to the inner side of flanges c c' d, substantially as set forth.

2. The combination of the guides g g, the carrier and guide rollers, the endless carrier, and the frames f, provided with paddles F, and with rollers f^4, fitted to engage guides g, substantially as and for the purposes specified.

3. The combination of the boat having double keels B B, and a propeller-compartment b, arranged therebetween, the guides g g, the carrying and guide rollers D C C', the endless carrier, and the frames f, provided with blades and with rollers f^4, substantially as and for the purposes specified.

4. The combination of the guide-rollers C C', the roller D, having radial plates adapted to engage the endless carrier, and suitably arranged to permit one of the blade-frames to rest between each pair of same, and the endless carrier having the blade-frame secured on it, substantially as and for the purposes specified.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE HART.

Witnesses:
WILLIAM HART,
JOHN A. KITHCART.