(No Model.)

W. R. BONHAM.

PROPELLER.

No. 482,225. Patented Sept. 6, 1892.

Fig 1.

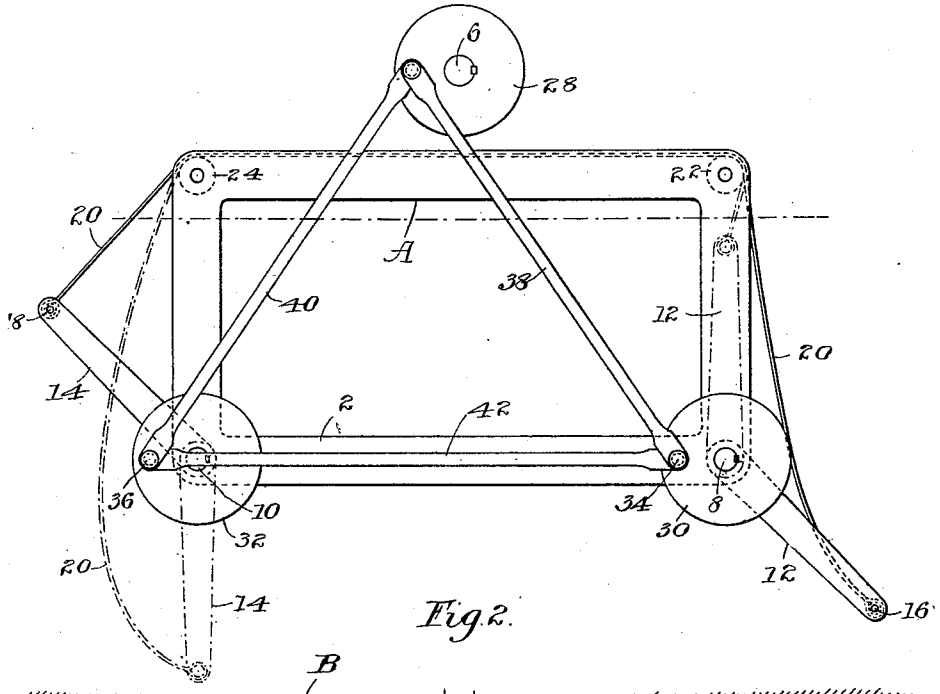
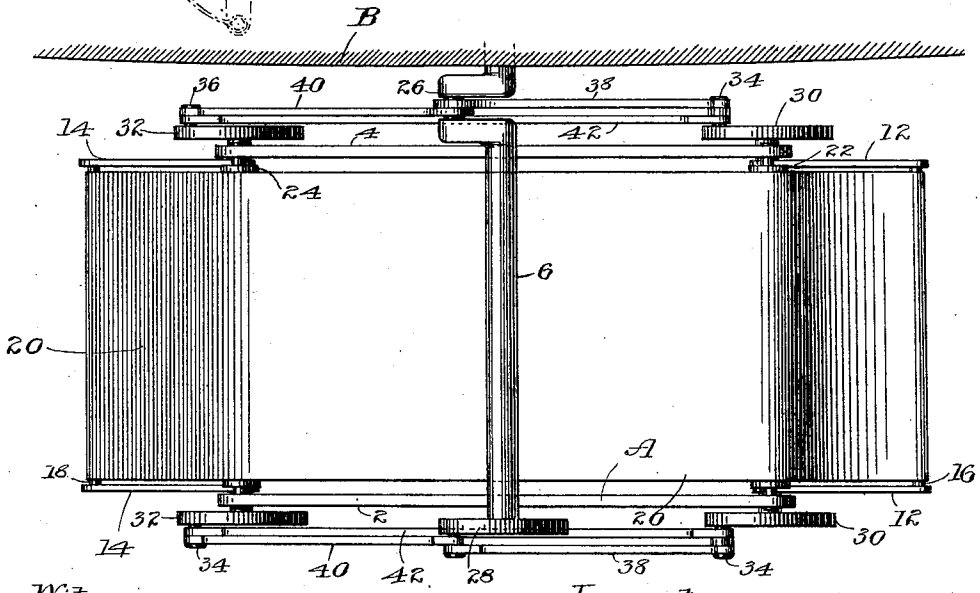


Fig 2.



Witnesses:-
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

WALTER R. BONHAM, OF ST. PAUL, MINNESOTA.

PROPELLER.

SPECIFICATION forming part of Letters Patent No. 482,225, dated September 6, 1892.

Application filed February 12, 1892. Serial No. 421,250. (No model.)

To all whom it may concern:

Be it known that I, WALTER R. BONHAM, of St. Paul, Ramsey county, Minnesota, have invented certain Improvements in Propellers, of which the following is a specification.

My invention relates to propelling devices for boats, its object being to provide paddle-wheels which may be practically entirely submerged, the entire surface of which will act to propel the vessel with the back-stroke and exert no retarding effect with their forward movement.

To this end my invention consists in arranging in a suitable frame or other support connected to the vessel a pair of duplicate crank-shafts, each having a pair of crank-arms connected by an intermediate bar or pin, and in connecting these bars or pins by means of a flexible web carried over drums or rolls above said shafts, and preferably above the water-level. These crank-shafts are driven at equal speed with alternate movement by means of suitable connections with the driving-shaft, so that when one crank or paddle is submerged and propelling the vessel the other is being carried upward and forward. The carrying drums or rolls over which the web passes are arranged, preferably, directly above the crank-shafts, so as to secure the most efficient action of the web as a paddle.

My invention further consists in the construction and combination hereinafter described, and particularly pointed out in the claims.

In the accompanying drawings, forming part of this specification, Figure 1 shows a conventional side elevation of my improved device, illustrating the arrangement and connections of the crank and driving shafts and the paddle-web; and Fig. 2 is a plan view of the same.

In the drawings, A represents the paddle-wheel frame, having two similar rectangular members 2 and 4 arranged in parallel planes.

B represents, conventionally, the side of the boat to which the device is attached.

6 is the driving-shaft projecting from the vessel and connected to the source of power.

Journaled at the lower corners of the frame A are the crank-shafts 8 and 10, parallel with the driving-shaft. These crank-shafts are provided, respectively, with the pairs of crank-arms 12 and 14, the extremities of each pair being connected by the cross-bars or common crank-pins 16 and 18. To these bars or pins are connected the ends of the flexible web 20, which is carried over the idler drums or rolls 22 and 24, journaled, preferably, at the upper corners of the frame A.

The driving-shaft 6 is provided with the crank 26 between the frame and the vessel, and preferably with a disk-crank 28 at its outer end. The shafts 8 and 10 are similarly provided with disk-cranks 30 and 32, the pins 34 and 36 of which are connected to the crank-pins of the driving-shaft by means of pitmen 38 and 40. I also prefer to connect the crank-pins 34 and 36 by means of connecting-rods 42. It will thus be seen that the shafts 8 and 10 are driven at equal speed from the driving-shaft, and being arranged to move alternately it is also evident that either one or the other is at all times doing work in propelling the vessel.

In Fig. 1 the front paddle or forward end of the web is shown by the full lines as just descending into the water, while the other end is just finishing the stroke and rising from the water.

The dot and dash lines show the forward paddle at mid-stroke and the other raised out of the water and moving forward to make the next stroke. With the backward stroke it is evident that the entire surface of the web which is immersed serves to bear against the water and to assist in propelling the vessel, and at no point in the rotation of the crank-shaft is the web carried against the water so as to retard the vessel.

I claim—

1. A propeller consisting of a pair of similar cranks driven at equal speed with alternating movements and a flexible web running over suitable supports above said cranks and having its ends connected, respectively, to their pins, combined and adapted to be operated substantially as described.

2. The combination, with a boat and its driving-shaft, of a pair of similar parallel crank-shafts so connected to said driving-shaft as to be driven thereby with alternate movements, a flexible web having its ends connected, respectively, to the crank-pins of said

crank-shafts, and idler-drums journaled above said crank-shafts and supporting the slack of said web, substantially as described.

3. The combination, with a boat and its driving-shaft, of the two-part rectangular frame, the crank-shafts journaled in said frame, each provided with a pair of crank-arms connected by a cross-bar or common crank-pin, means for driving said crank-shafts simultaneously from said driving-shaft, the flexible web having its ends secured to the pins or cross-bars of said crank-shafts, and the idler-drums journaled in said frame above said crank-shafts and carrying the slack of said web, substantially as described.

4. The combination, with the driving-shaft 6, of the crank-shafts 8 and 10, each provided with a crank-disk at each end, pitmen connecting said crank-disks with said driving-shaft, the crank-arms carried by said shafts 8 and 10, the cross-bars connecting said arms together, the flexible web having its ends attached to said cross-bars, and the idler-drums journaled above said shafts 8 and 10 and supporting said web, substantially as described.

In testimony whereof I have hereunto set my hand this 8th day of February, 1892.

WALTER R. BONHAM.

In presence of—
T. D. MERVIN,
H. S. JOHNSON.