I. J. PADDOCK.

SINUSOID PROPELLER.

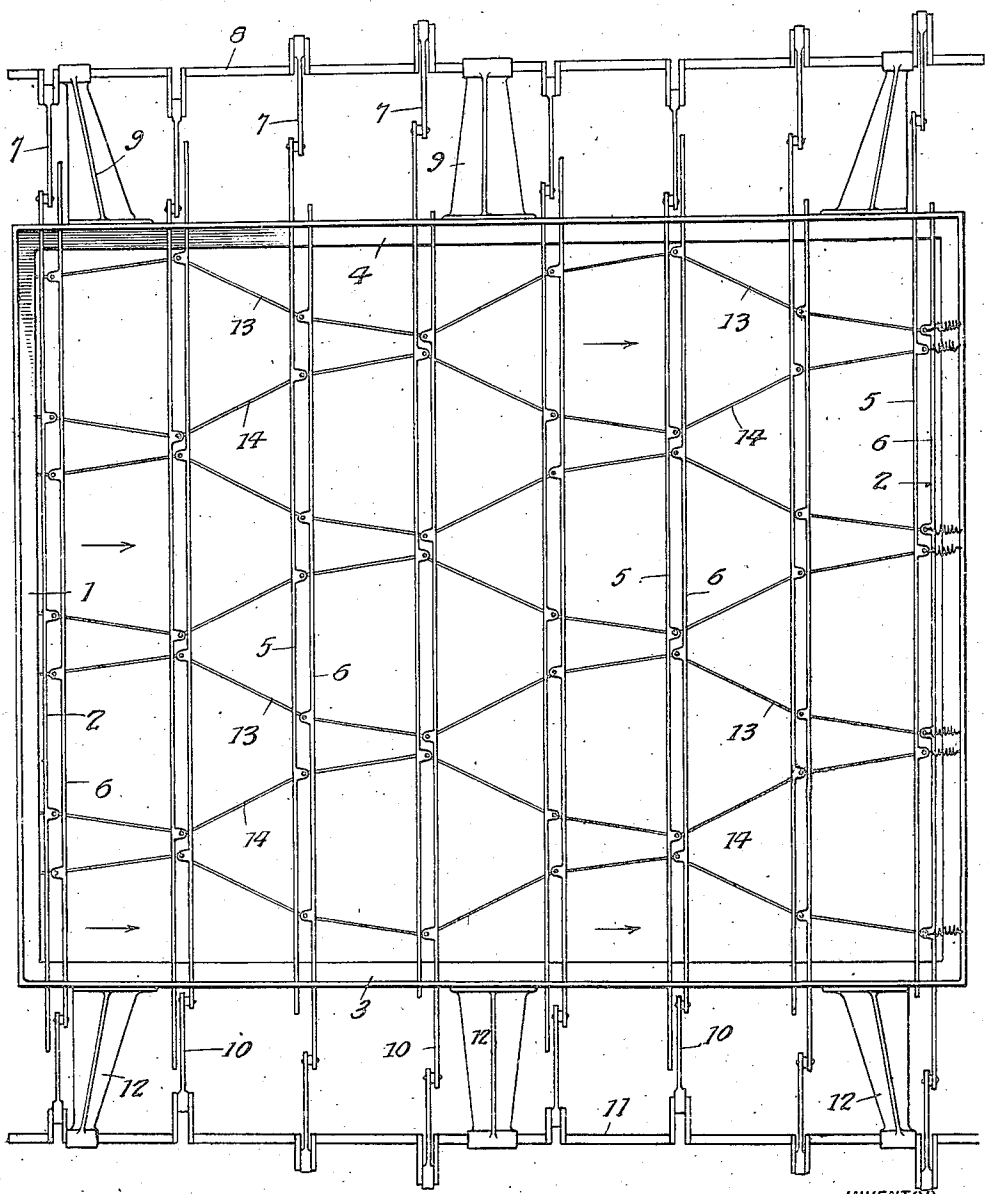
APPLICATION FILED DEC. 31, 1910.

1,052,949.

Patented Feb. 11, 1913.

2 SHEETS—SHEET 1.

Fig. 1.



WITNESSES:

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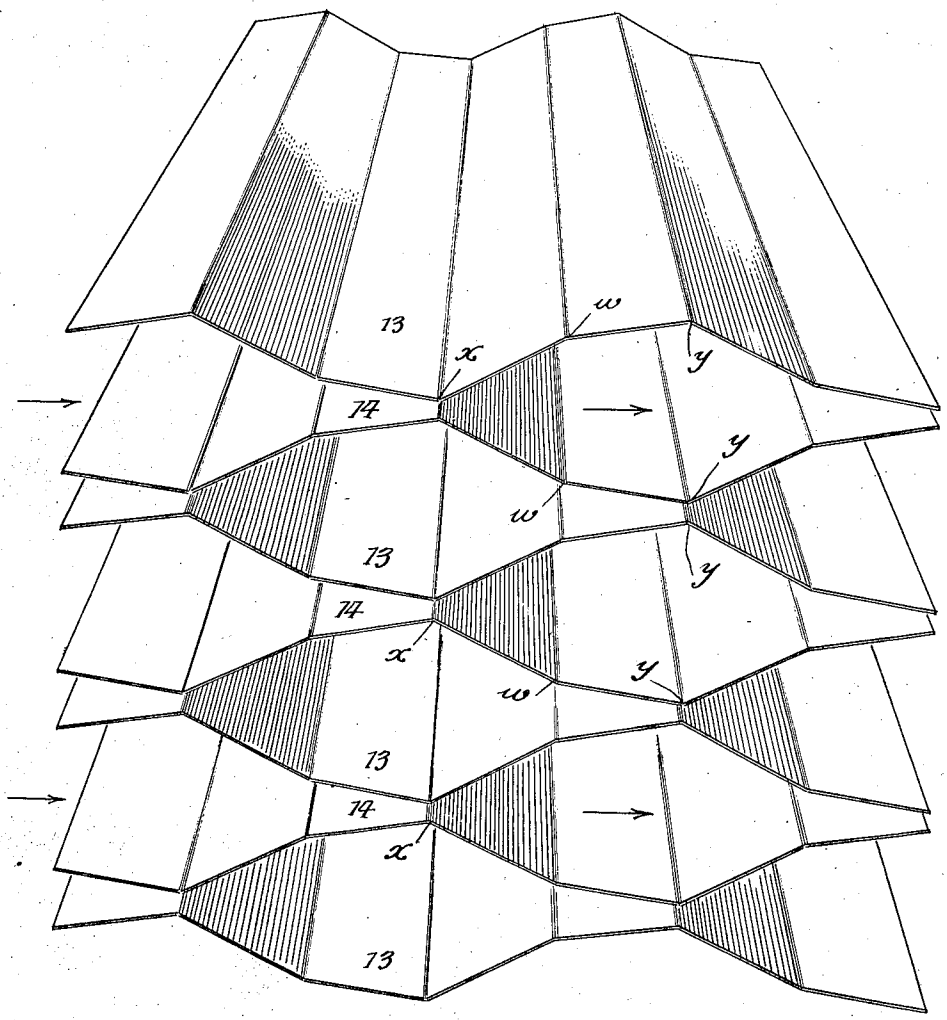
2 SHEETS—SHEET 2.

Fig. 2.



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UNITED STATES PATENT OFFICE.

IRA J. PADDOCK, OF NEBRASKA CITY, NEBRASKA.

SINUSOID PROPELLER.

1,052,949. Specification of Letters Patent. Patented Feb. 11, 1913.

Application filed December 31, 1910. Serial No. 600,220.

To all whom it may concern:

Be it known that I, IRA J. PADDOCK, a citizen of the United States, and a resident of Nebraska City, in the county of Otoe and State of Nebraska, have made certain new and useful Improvements in Sinusoid Propellers, of which the following is a specification.

My invention relates to improvements in propellers, and it consists in the combinations, constructions and arrangements herein described and claimed.

My invention is based upon the fact that when a flexible surface, such as a sheet of fabric, is held at one edge in a current of air or other medium which is traveling in a direction parallel to the normal plane of the sheet, the latter will have imparted to it a series of wave-like motions. These waves follow each other in rapid succession and have the form of a sine curve. Parts of the sheet will be moving upwardly, and other parts of the sheet will be moving downwardly.

An object of my invention is to provide a device by means of which the wave-like movements of the sheet may be utilized for generating power.

A further object of my invention is to provide a novel form of mechanism for transmitting power to a common shaft.

Other objects and advantages will appear in the following specification, and the novel features of the device will be particularly pointed out in the appended claims.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 is a side view of the device, and Fig. 2 is a perspective view showing the position of the sheets when in operation.

Referring now particularly to Fig. 1, it will be seen that I have provided a main frame consisting of the uprights 1 and 2, a bottom member 3, and a top member 4. Disposed in the bottom and top members 3 and 4 are a series of slidable rods 5 and 6. These rods are arranged in pairs as will be seen. The upper ends of the rods 5 are connected by pitmen 7 to a common crank shaft 8 which is carried by bearings 9 secured to the frame member 4. As will be seen from the drawing, the adjacent pitmen 7 are connected to the crank shaft at points 90° apart. The rods 6 are connected by pitmen 10 with a common crank shaft 11 which is carried by supports 12 secured to the frame member 3. As in the case of the pitmen 7 the adjacent pitmen 10 are connected to the crank shaft 11 at points 90° apart.

Secured to the frame member 1 is a series of sheets 13 and 14. In Fig. 1, which is a side view of the device, the edges of these sheets are seen. The ends of the sheets opposite the frame member 1 are secured to the frame member 2 by a series of springs. Each of the sheets 13 is secured at equal distances apart to the rods 6, while the sheets 14 are secured to the rods 5, as shown in Fig. 1.

From the foregoing description of the various parts of the device, the operation thereof may be readily understood.

It will be understood that the opposite ends of the sheets are in a similar frame and that the two frames are connected together. If now a current of air should move through the device in the direction indicated by the arrows in Fig. 1, the sheets will be given a sinusoidal movement like that shown in Fig. 2. In this figure any given sheets 13 and 14 are nearest together at the points x; at w they are separated from each other; at y they are farthest apart. It will be understood that this view shows the position of the sheets at any given moment of time, for in accordance with the sinusoidal movement the points x may move so as to be the maximum distance from each other in any given sheets 13 and 14. In making use of this movement I arrange the rods 5 and 6 which are connected at the ends of the sheets as stated. These rods impart motion to the shafts 8 and 11 and the power derived therefrom may be used for any useful purpose.

The propeller may be used for driving purposes as well as for being driven by air currents. With the propeller as described, the rotation of the shafts 11 and 8 would cause a reciprocation of the rods 5 and 6 so as to give the sheets 13 and 14 a sinusoidal movement.

Referring again to Fig. 2, it will be seen that air may be entrained at one end of the device, as for instance, at the left hand side of the figure, and may be forced in the direction indicated by the arrow somewhat in the manner of swallowing. This would tend to drive any device such as an aeroplane, forwardly in the direction opposite to that in which the air is forced.

It is obvious that this same device might

be used in other connections and with other media than air. The same principle might be applied to a structure designed to propel a boat. In the latter instance, the reaction afforded by the rearward drive of the water would propel the boat forwardly.

I am aware that other devices based on the same general principle might be made, but I consider as my own all such modifications as fairly fall within the spirit and scope of the invention.

I claim:

1. In a propelling device, a frame, a series of sheets loosely carried thereby, means for imparting a sinusoidal wave movement to each sheet, the sinusoidal wave movement of one sheet differing in phase by half a period from the wave movement of the adjacent sheet on either side.

2. In a propelling device, a frame, a series of sheets loosely carried thereby, means for imparting a sinusoidal wave movement to each sheet, the sinusoidal wave movement of one sheet differing in phase by half a period from the wave movement of the adjacent sheet on either side, and each sheet cooperating with the sheets on either side thereof for exerting a propelling force in the same direction.

3. In a propelling device, a frame, a series of sheets loosely carried in said frame and arranged to receive a sinusoidal movement, a series of rods carried by said frame, said rods being arranged in pairs, and each rod of a pair being attached to alternate sheets, a pair of crank shafts, and means connecting each rod with one of said crank shafts for imparting movement to the latter.

4. In a propelling device, a frame, a series of flexible sheets secured to said frame at one end, the opposite end of said sheets being secured to the frame by means of springs, a shaft carried by said frame on each side thereof, a series of pairs of reciprocating rods, each rod of a pair being connected to alternate sheets, and means connected to each of said rods for imparting movement to one of said shafts.

5. In a propelling device, a frame, a series of sheets loosely carried thereby, means for imparting a sinusoidal wave movement to each sheet, and each sheet coöperating with the adjacent sheets on each side thereof for exerting a propelling force in the same direction.

IRA J. PADDOCK.

Witnesses:
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B. R. ALLEN.