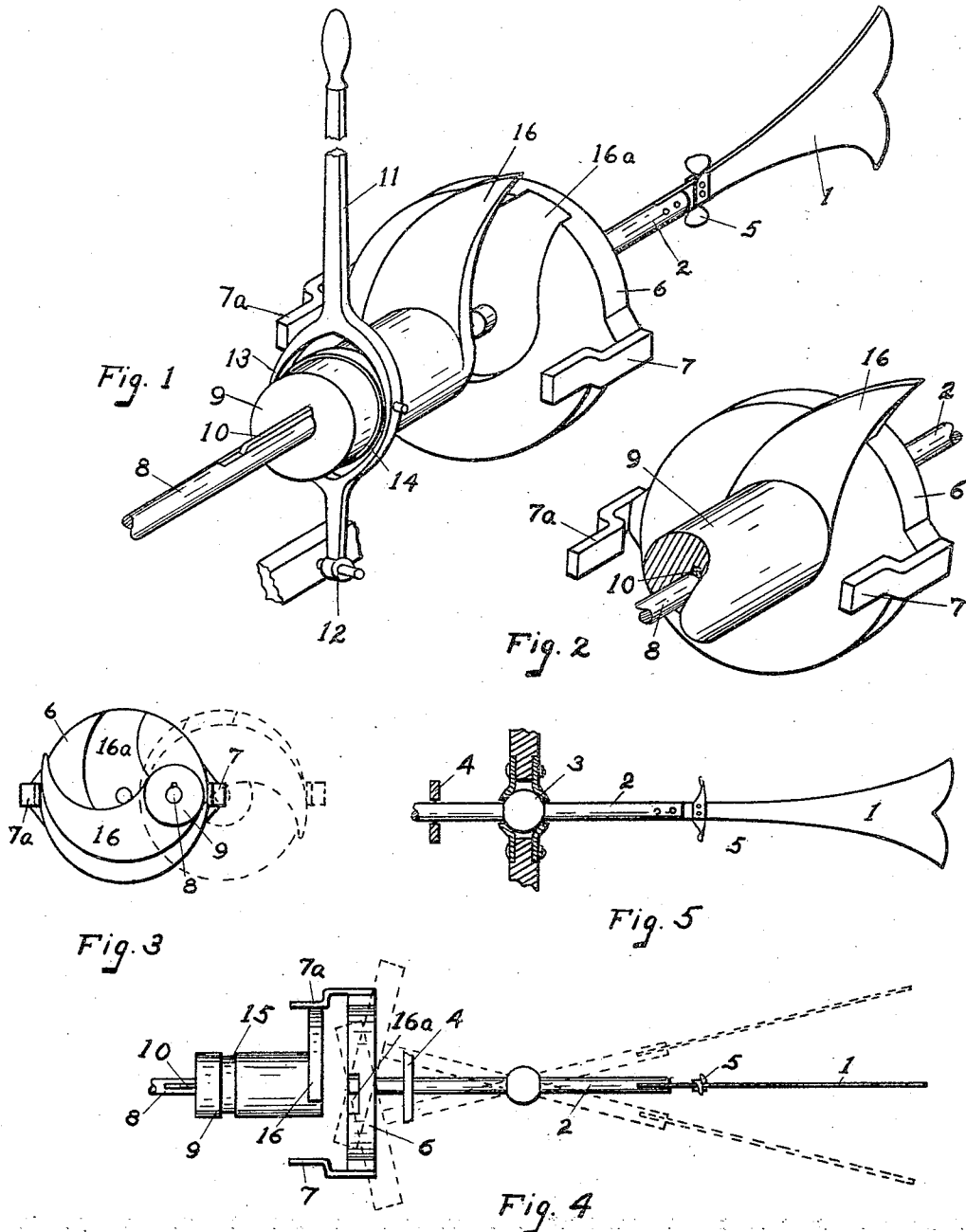


E. HILDEBRANDT.
VIBRATING PROPELLER.
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943,074.

Patented Dec. 14, 1909.



WITNESSES:

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ELLIETT HILDEBRANDT, OF SPOKANE, WASHINGTON, ASSIGNOR OF ONE-HALF TO
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VIBRATING PROPELLER.

943,074.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ELLIETT HILDEBRANDT, a citizen of the United States, residing at Spokane, in the county of Spokane and State of Washington, have invented a new and useful Vibrating Propeller, of which the following is a specification.

My invention relates to improvements in propellers having a flexible blade adapted to be vibrated, and the objects of my improvement are to provide means for vibrating the propeller, and also for reversing the motion and backing the boat.

I attain these objects by the mechanism illustrated in the accompanying drawing, in which—

Figure 1 is a perspective view of the mechanism complete, ready for operation; Fig. 2 shows cam 16 in engagement with depression 16^a in disk 6; Fig. 3 is an end view of the mechanism in operation, with the shifting device removed. Fig. 4 is a plan view of the vibrating mechanism in operation; and Fig. 5 shows ball and socket joint for vibrating the propeller shaft.

Referring to the drawings, the vibrating propeller 1 is attached solidly to auxiliary shaft 2, which is mounted upon the stern of the boat by a ball and socket joint 3 as shown in Fig. 5. Any form of vibrating propeller blade may be used, although I prefer to use the fish-tail construction. To prevent vertical movement of the shaft 2, horizontal guides 4 are provided. It will be seen that, as mounted, the shaft 2 is capable of two movements, a revolving and a horizontal vibrating movement, the former being used to actuate the auxiliary screws to reverse the motion and back the boat, and the latter to vibrate the propeller blade and propel the boat forward. To impart these two movements to the shaft 2, the mechanism hereinafter described is designed.

6 is a disk attached solidly to the end of shaft 2, provided on opposite sides with lugs 7 and 7^a, the outer ends of which are bent inwardly toward the center of the disk.

8 is the main engine shaft on which is adjustably mounted sleeve 9 by key 10. To adjust the sleeve 9 on the shaft 8, the lever 11 is pivoted at 12 on the bottom of the boat, the lever having a yoke 13 on which is pivoted a ring 14 engaging an annular depression 15 in the sleeve. Attached solidly to the sleeve 9 is a cam 16, the dis-

tance from the heel to the toe being approximately the distance between the two lugs 7 and 7^a at their outer ends. To permit of the main shaft 8 and auxiliary shaft 2 being joined and operated as one shaft, a depression 16^a is provided on the surface of the disk 6 to receive the cam 16, thus locking the two shafts together.

In operation, with the different parts in the position as shown in Fig. 1, on the shaft 8 being revolved, the cam 16 will first engage and push aside horizontally the lug 7^a, thus bringing the heel of the cam in engagement with the lug 7 as the toe leaves lug 7^a, as shown in Fig. 3. The lug 7 is then pushed aside by the cam 16 in the opposite direction, causing the shaft 2 and flexible blade 1 to vibrate and propel the boat. To reverse the motion and back the boat, the sleeve 9 is moved backward on shaft 8 by lever 11, which motion first brings the cam 16 out of engagement with lugs 7 and 7^a, the base of the lugs 7 and 7^a being extended outwardly so as to clear the cam. The cam 16 then enters the depression 16^a in the disk 6, as in Fig. 2, binding the shafts 8 and 2 together, which then revolve and operate the screw 5. The vibratory movement is again imparted by moving the cam 16 forward out of engagement with the disk 6 and into engagement with the lugs 7 and 7^a.

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

1. A vibrating propeller actuating mechanism, consisting of an auxiliary vibratory shaft, oppositely disposed lugs on the forward end of the shaft, a main shaft, and a cam on the main shaft adapted to engage the lugs on the auxiliary shaft.

2. A vibrating propeller actuating mechanism, consisting of an auxiliary vibratory shaft, a disk attached to the shaft, lugs oppositely disposed on the circumference of the disk, a main shaft, and a cam carried by the main shaft adapted to engage the lugs on the disk.

3. A vibrating propeller actuating mechanism, consisting of an auxiliary vibratory shaft, oppositely disposed lugs on the forward end of the shaft, a main shaft, an adjustable sleeve on the main shaft, and a cam on the sleeve adapted to engage the lugs on the auxiliary shaft.

4. A vibrating propeller actuating mech-

anism consisting of an auxiliary shaft fulcrumed between its ends, a disk on the forward end of the shaft, lugs oppositely disposed on the circumference of the disk, the
5 outer ends of the lugs being bent toward the center of the disk, a main shaft, an adjustable sleeve on the main shaft actuated by a lever, and a cam on the sleeve adapted to engage the lugs and a depression in the face
10 of the disk.

5. A vibrating propeller actuating mechanism, consisting of an auxiliary vibratory

shaft, a disk on the forward end of the shaft, lugs oppositely disposed on the circumference of the disk and having their ends bent
15 toward and parallel to each other, a main shaft, an adjustable sleeve on the main shaft, and a crescent shaped cam on the sleeve adapted to engage the lugs on the disk.

ELLIETT HILDEBRANDT.

Witnesses:

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