June 3, 1930. J. DROST 1,761,440

COMBINATION WATER AND ICE BOAT

Filed May 20, 1929 2 Sheets-Sheet 1

Fig. 1

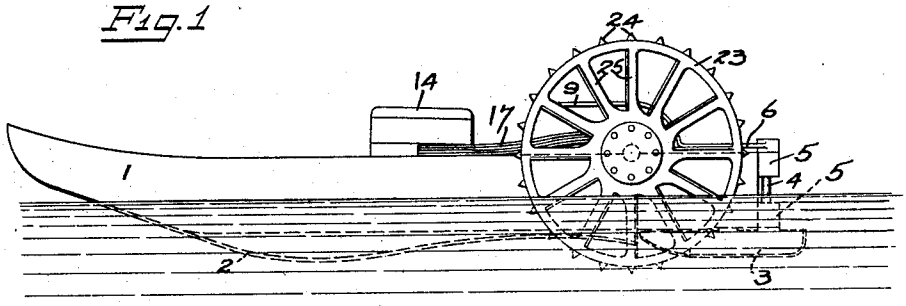


Fig. 2

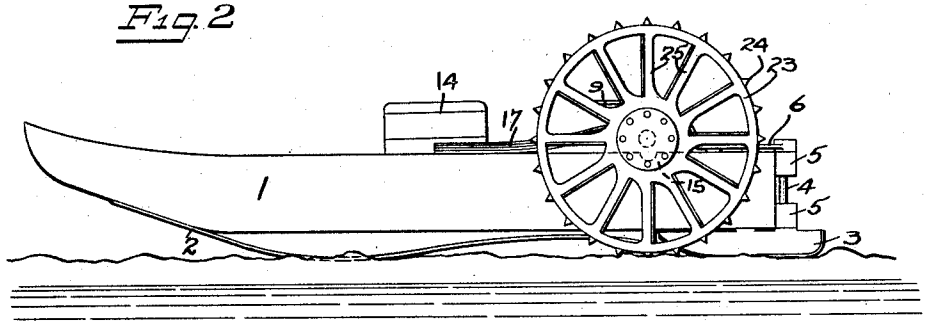


Fig. 5

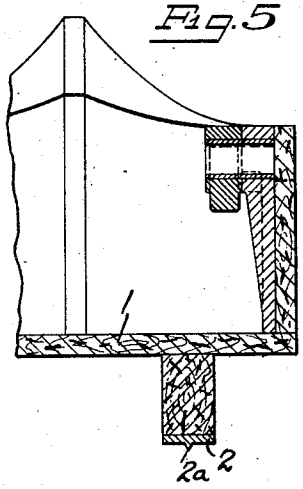
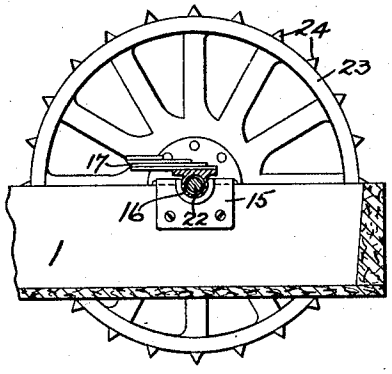


Fig. 6



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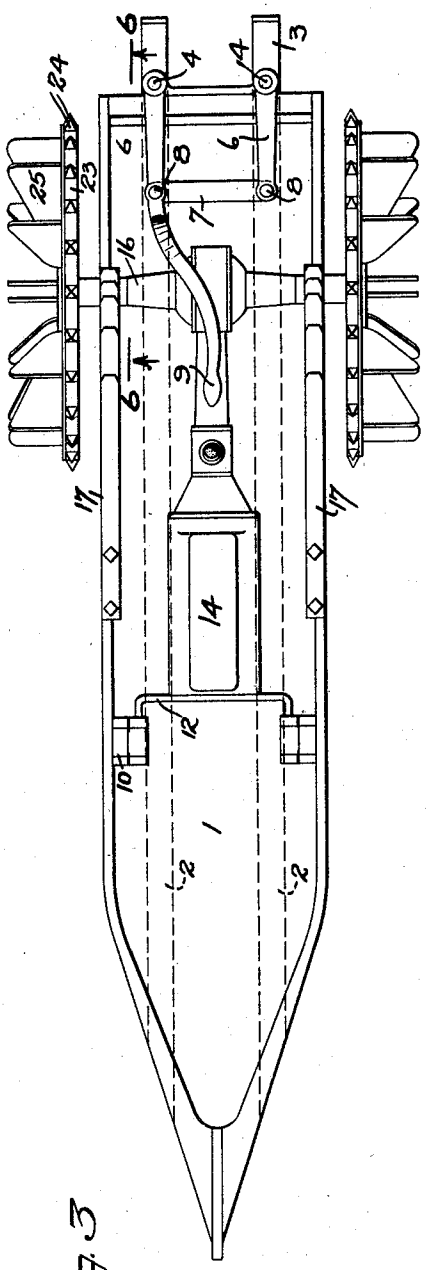


Fig. 3

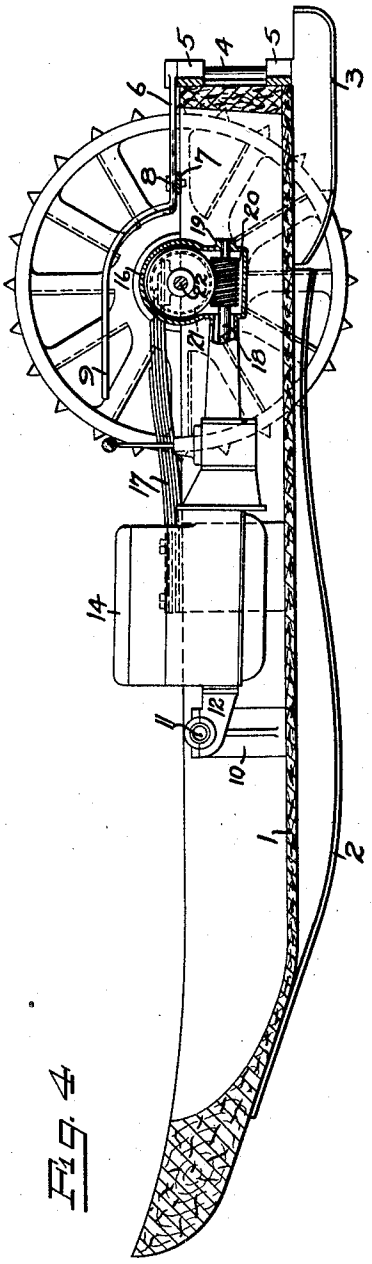


Fig. 4

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COMBINATION WATER AND ICE BOAT

Application filed May 20, 1929. Serial No. 364,372.

This invention relates to improvements in combination water and ice boats. It is an object of the invention to provide such a boat with propelling means that are equally effective either in water or on an icy surface, and that will cause the boat to rise out of the former and climb onto the latter.

Another object of the invention is to provide a combination water and ice boat with its hull so constructed that it will readily climb from water onto ice; and which can be efficiently steered by the same rudder arrangement in either case.

A further object of the invention is to provide a combination water and ice boat having its propelling means so mounted that the latter is resilient and permitted limited movement in a substantially vertical direction, to the end that the propelling means are cushioned against breakage in the event of their encountering a large frozen lump over which they, or either of them, must rise.

Yet another object of the invention is to provide pivotal mounting means for the engine so that the drive shaft from the latter is not strained or damaged when the propelling means move relative to the hull.

With these and other objects and advantages in view which will become apparent as the specification proceeds, the invention is hereinafter more fully described with the aid of the accompanying drawings, in which:

Figure 1 illustrates a side view of the invention in water, and

Figure 2 shows a similar view of the boat upon an icy surface, and the axle housing raised off its rests.

Figure 3 is an enlarged plan view of the invention.

Figure 4 is a sectional view, also enlarged, showing the resilient mounting of the propelling means, and the pivotal engine mounting.

Figure 5 is an enlarged sectional view showing a portion of the hull and one of the runners.

Figure 6 depicts an enlarged sectional view on the line 6—6 of Figure 3.

Referring to the drawings, 1 designates the hull of a boat having its bows downwardly tapered from the front. Two parallel runners 2 are secured longitudinally to the underside of the hull and extend from near the bows to a short distance from the stern. These runners each have a downward longitudinal projection 2^a, shown in Figure 5, substantially centrally of their width, which are adapted to grip an icy surface and hold the boat from skidding or slipping sideways. Rear runners 3, each of which is adapted to assume such a position that it is in line with one of the runners 2, are fixed on the lower ends of vertical rods 4, which are mounted in bearings 5 secured to the stern of the boat. These rear runners are normally adapted to lie parallel with the runners 2, and their front extremities terminate adjacent the rear extremities of the said runners 2.

On the upper ends of the rods 4 arms 6 are fixed which usually project forwardly in alignment with the rear runners 3. The front ends of the arms 6 are pivotally connected to opposite extremities of a cross member 7 as by pins 8. 9 denotes a rudder bar, which, in the present instance consists of a forward extension of one of the arms 6. It will be seen that movement of the rudder bar 9 moves both of the arms 6 in unison so that the rear runners 3 are both turned with and about the rods 4. These rear runners are employed as rudders either in water or on icy surfaces. The rear runners are also preferably provided with longitudinal downward projections similar to the projections 2^a on the fixed runners 2, and are utilized for the same purpose.

Towards the sides of the boat and substantially centrally of its length, bearings 10 are arranged which carry pins 11 on which the ends of a yoke 12 are so mounted as to swing about a horizontal axis; this yoke supports one end of an engine 14. In the upper margins of the sides of the boat two opposed rests 15 are provided in which the underside of the axle housing 16 normally rests. Laminated springs 17 each have one of their ends supported by the side of the boat and their opposite extremities are secured to the said housing 16 and tend to hold the underside of

the latter in engagement with the rests 15. A conventional drive shaft 18 extends rearwardly from the engine 14 and is supported in a bearing 19 generally made integral with the said axle housing. On the shaft 18 is a worm 20 which meshes with a worm wheel 21 on an axle 22 located within the housing 16. Propellers 23 are fixed on the ends of the axle 22 and are provided both with spikes 24 radiating from their peripheries to engage icy surfaces, and also paddles 25 for propelling the boat through water.

From the foregoing description it will be clearly seen that if the spikes 24, or either of them, come in contact with a raised lump of frozen snow or ice that the springs 17 will allow the axle 22 and housing 16 to lift from the rests 15, thus protecting the propellers from damage that would be liable to result if they were rigidly mounted. Moreover when the axle housing 16 lifts off the rests 15 the whole engine 14 is free to swing with the yoke 12 about the pins 11, so that the whole driving mechanism remains in alignment.

While in the foregoing the preferred embodiment of the invention has been described and shown, it is understood that the construction is susceptible to such alterations and modifications as fall within the scope of the appended claims.

What I claim as my invention and desire to secure by Letters Patent is:

1. A combination water and ice boat having a hull the underside of which is downwardly tapered from the bows, runners extending longitudinally on the underside of said hull for the greater part of its length, propellers, means for rotating said propellers, paddles on said propellers adapted to operate in water, spikes extending radially from the periphery of said propellers adapted to engage a hard surface, rear runners adapted to extend rearwardly in alignment with said first named runners, rods on the lower end of each of which one of said rear runners is fixed, means for mounting each of said rods substantially vertically at the stern of the boat, arms extending forwardly from the upper ends of the rods and fixed thereon, a cross member connecting the front portions of said arms, and a rudder bar fixed to one of said arms so that both the latter are turned together with their respective rods by its movement, said rear runners being adapted to function as rudders either when the boat is in water or on a hard surface.

2. A combination water and ice boat consisting of a hull, rests on the side of said hull, an axle housing supported in said rests and extending transversely of said hull, an axle in said housing, brackets on said hull, a yoke carried by said brackets and adapted to swing about a horizontal axis, an engine one end of which is supported by said yoke, the other end of said engine being carried by said axle housing, means for rotating said axle from said engine, propellers on the extremities of said axle, radial spikes on the peripheries of said propellers adapted to engage a hard surface, springs connected to said hull and also to said axle housing adapted to hold the latter on said rests, said axle housing being adapted to lift off said rests against the tension of said springs when an obstruction is encountered by said propellers when travelling over a hard surface, and paddles on said propellers.

3. In a combination water and ice boat, the combination of a hull, runners mounted thereunder, an axle housing extending transversely of said hull, rests on the latter on which the housing is adapted to lie, springs each having one end secured to said hull and its opposite end to said housing tending to hold the latter on its rests, an engine one side of which is pivotally supported, a shaft extending, from the engine supported at its outer end by the axle housing, an axle through the housing, means for driving the axle from the shaft, and means on the extremities of the axle for propelling the boat either through water or over a hard surface, said springs permitting a substantially vertical movement of the axle if an obstruction is encountered by the propelling means, said engine being then adapted to turn about its pivotal mounting so that it and the shaft and axle remain in correct relation to one another.

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