July 21, 1936. S. KALFAS 2,048,339

BOAT AND MEANS OF PROPELLING BOATS

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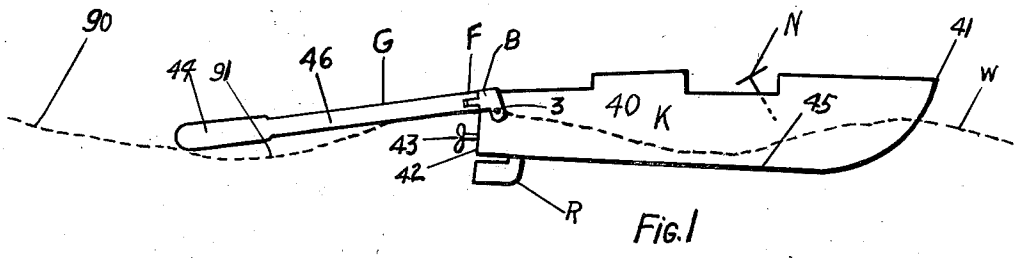


Fig. 1

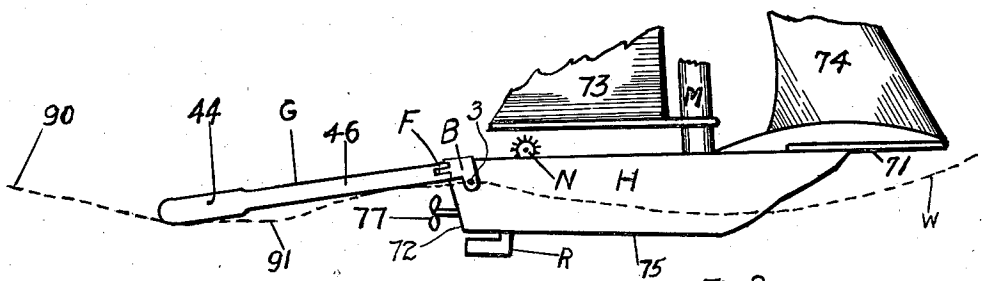


Fig. 2

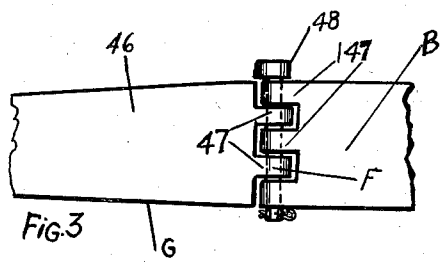


Fig. 3

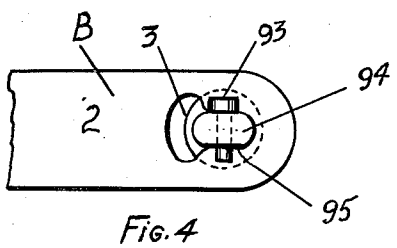


Fig. 4

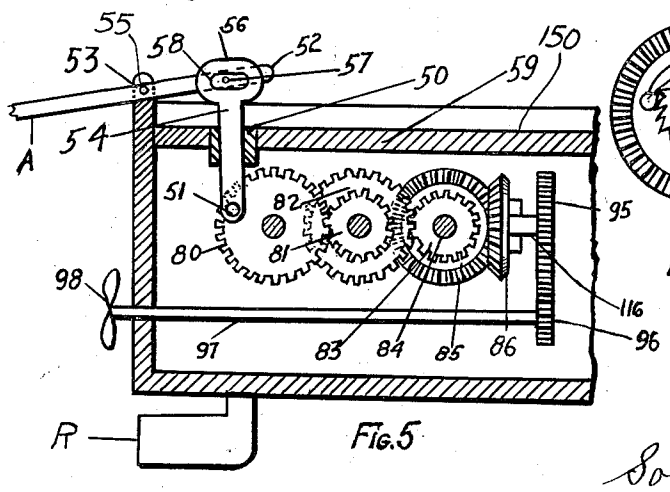


Fig. 5

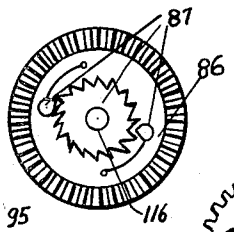


Fig. 6

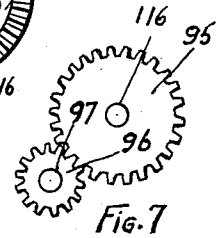


Fig. 7

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BOAT AND MEANS OF PROPELLING BOATS

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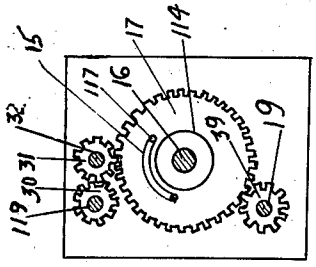


Fig. 9

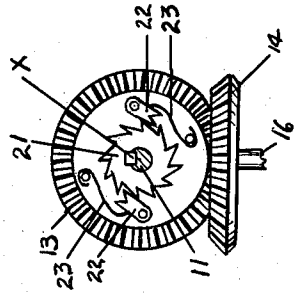


Fig. 11

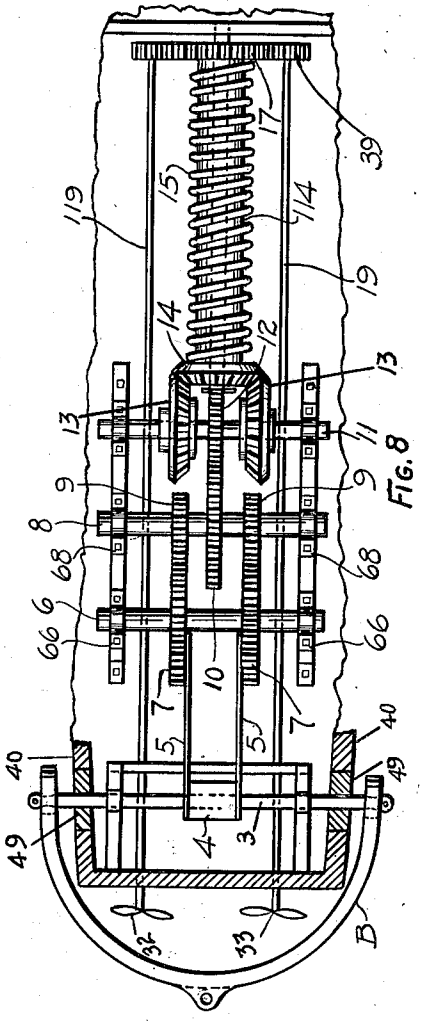


Fig. 8

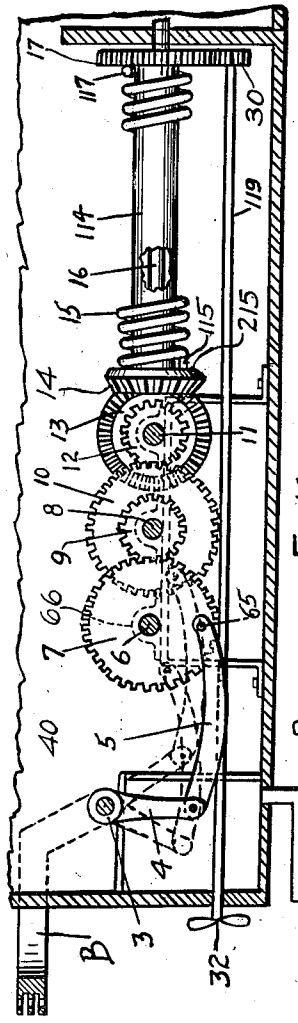


Fig. 10

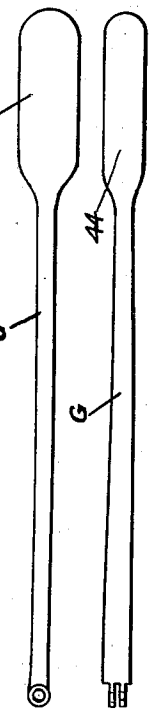


Fig. 12

Fig. 13

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BOAT AND MEANS OF PROPELLING BOATS

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Application March 4, 1935, Serial No. 9,140

2 Claims. (Cl. 115—4)

This invention relates to means of propelling boats. It may be used in some cases as the primary source of power, or in other cases, as an auxiliary or emergency source of power.

The general idea is to utilize the force of the waves or swells in rising and falling, to move vertically the float at the end of a spar pivoted or carried by trunnions at the stern of the boat. The device is especially useful as an auxiliary or emergency device to be carried by power boats or sailing craft, to be used in case the engines break down or in case there is no wind. It may also be used as a toy or an amusement device in amusement parks.

In the drawings, Fig. 1 is a diagrammatic side elevation of a boat with my device attached.

Fig. 2 is a diagrammatic side elevation of a sailing boat with my device attached as an auxiliary.

Fig. 3 is a detail showing the pivot between the power spar and the trunnion.

Fig. 4 is a detail showing the means of attaching and detaching the trunnion to the cross shaft in the boat.

Fig. 5 is a vertical longitudinal section showing a modified arrangement of gearing, pawls, ratchets and other parts.

Fig. 6 is a detailed elevation of the pawls and ratchet used in the construction shown in Fig. 5.

Fig. 7 is a detail showing part of the gearing shown in Fig. 5.

Fig. 8 is a plan view of the trunnions, propellers, shafts, gearing and other parts which connect with the trunnions for the transmission of power.

Fig. 9 is an elevation of the gearing which transmits power from the spring to the shafts.

Fig. 10 is a side elevation of Fig. 8, the hull of the boat being broken away to expose the interior.

Fig. 11 is a detailed elevation of the pawls and ratchet and adjoining gearing.

Fig. 12 is a plan view and Fig. 13, an elevation of the power spar.

In the drawings, W represents the water, the surface of which is shown as agitated, forming waves or swells, the high parts being indicated by 90, and the low parts by 91.

K represents a boat of any ordinary type, and is shown as having sides 40, 40, a bow 41, stern 42, keel 45, and a propeller 43. It may or may not have an engine, motor or other device for operating the propeller 43, or all of these may be omitted and dependence for moving be on the power spar G.

This power spar G includes a float member 44, a shaft 46, and a part 47 which by means of a pin 48, which passes through it and a part 147 on the rear of the trunnions B, forms a pivot F and allows spar G to move horizontally, the parts being so connected that when the float 44 moves up or down, it moves the trunnions B also up and down.

The trunnions B are of extended half-circle shape, and are preferably detachably attached to the shaft 3 which extends through water tight bearings 49, 49 through the sides 40, 40 of the boat preferably below the deck.

Rigidly fixed to the middle of this shaft 3, is a rocker arm 4 on each side of which is pivoted a connecting rod, such as 5, 5, the other ends of which connecting rods are pivoted at 65 and 65 to the inside, at a suitable point, of the gears 7, 7, fixed on the shaft 6 which is carried by suitable bearings 66.

These gears 7, 7 mesh with small gears 9, 9, carried by shaft 8 which is adapted to rock in suitable bearings 68, 68, and which carries a gear 10 which meshes with a gear 12, carried by a rocker shaft 11.

The bevel gears 13, 13 are loose on shaft 11, and each carries two pawls 22, 22 operated by springs 23, 23 so as to be engaged by a ratchet 21 fixed on shaft 11, the parts being so arranged that when motion from the float 44 is transmitted through the chain of gearing to these pawl and ratchet assemblies, the up motion will move one gear 13 in such a direction that it will revolve the gear 14, with which both mesh, in the desired direction, and when the float 44 goes down, it will so turn the other pawl and ratchet assembly that this motion of gear 14 will continue.

Gear 14 is carried by shaft 16 which carries at its end a master gear 17 which meshes with the two gears 31 and 39. 31 meshes with another gear 30 which is carried by a shaft 119, while gear 39 is carried by a shaft 19.

Shaft 119 carries a propeller 32 which on account of gear 31 revolves in the opposite direction from propeller 33 carried by shaft 19. The purpose of this is to balance the thrust.

The spring 15 is to take up shocks, one end 117 entering gear 17 and the other end 115 entering the hub 215 of bevel gear 14. This spring serves to take up shock and also to carry the power when float 44 is shifting direction from the top or bottom. 114 is a light drum to prevent spring 15 from buckling.

In Fig. 2 is shown a sailing boat such as a pleasure yacht with a hull H, mast M, steering wheel N for rudder R, bow sprit 71, stern 72,

keel 75, jib 74, and main sail 73. With a sailing craft, this device is an emergency proposition and should be so arranged that the power spar G can be unshipped from the pivot F by withdrawing a pin 48, and the trunnion B can be unshipped from the shaft 3 by removing a pin 93. For that purpose, each end of shaft 3 is provided with a shoulder and tenon 94 which passes through a slot 95 in the end of an arm 2 of trunnion B, this trunnion being sufficiently springy to permit it being removed, after the pins 93 have been removed, and stowed away on deck or in the hold together with spar G.

With a suitable reciprocating arm such as 4, and system of gearing including one or more ratchets and pawls for continuously revolving one master gear in one direction, such master gear being geared to one or more propeller shafts with propellers, all of the gearing and connections can be stowed in a very small space at the stern or in the bottom of the boat. If a sailing boat is becalmed but there is a swell, the movement of the float and spar would provide power to give steerage way and to move the boat along.

While I prefer to use two propellers and a trunnion hung on both sides of the boat, I may, as shown in Fig. 5 use a single post 53 at the stern, and at 55 pivot spar A similar to G in such a way that its short end 52 will project forward. By using a pin 57, working in a slot 58, in the head 56 of a vertical member 54, slidable in water tight bearings 50 in deck 150 and pivoted at 51 to the first gear 80 of a chain of gears, reciprocal motion is transmitted through the gears 81 and 82 to a gear 83 on a shaft 84, and a bevel gear 85 which engages another bevel gear 86, which through a pawl and ratchet system 87, rotates shaft 116 continuously in one direction. This shaft carries a master gear 95 which revolves the gear 96, carried by the propeller shaft 97 which operates a single propeller 98.

I claim:

1. The combination with a boat; of a power spar pivoted on a horizontal pivot at the stern, which extends back of the boat and is pivoted on a vertical pivot back of the stern, said spar terminating in a float; a rocking connection movable with and by the vertical rocking of the spar and extending inside the boat; a propeller carried at the stern by a shaft which extends into the boat; connections between the propeller shaft and the rocking connection which include a pawl and ratchet and a coiled spring for taking up the shock.

2. The combination with a boat; of a power spar pivoted on a readily removable horizontal pivot at the stern, which extends back of the boat and is pivoted on a removable vertical pivot pin back of the stern, said spar terminating in a float; a rocking connection movable with and by the vertical rocking of the spar and extending inside the boat; a propeller carried at the stern by a shaft which extends into the boat; connections between the propeller shaft and the rocking connection which include a pawl and ratchet and a coiled spring for taking up the shock.

SOTIRIOS KALFAS.