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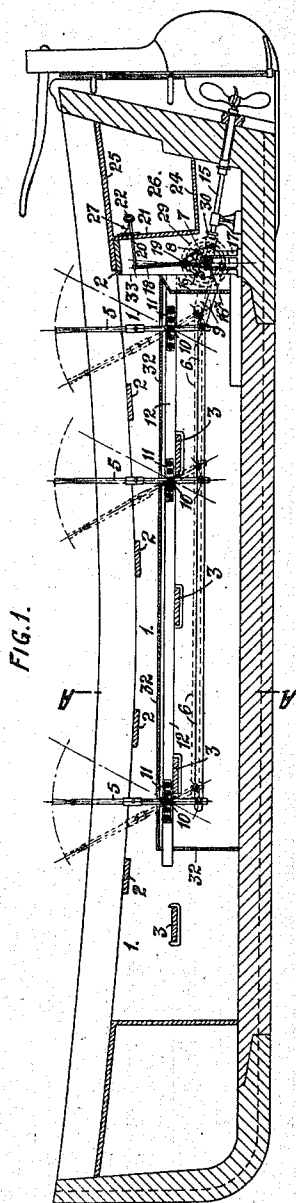
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I. R. FLEMING

BOAT PROPELLED BY MANUALLY OPERATED MECHANISM

Filed April 10, 1922

3 Sheets-Sheet 1



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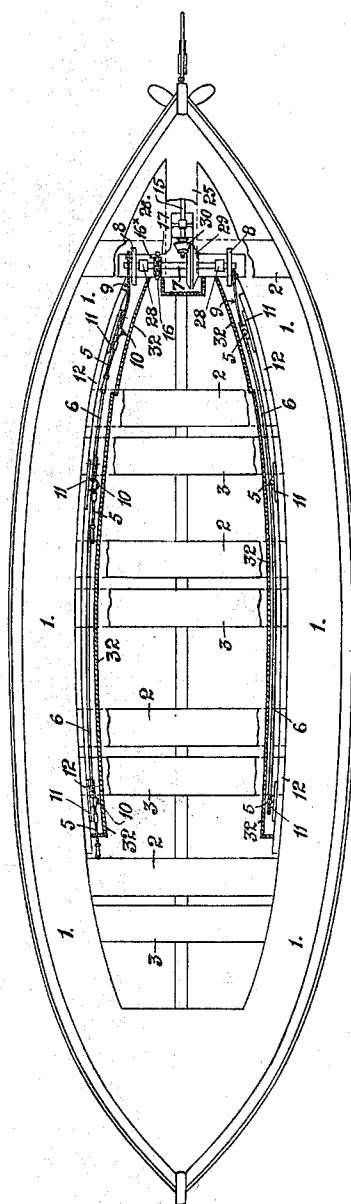
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FIG. 2.



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FIG. 4.

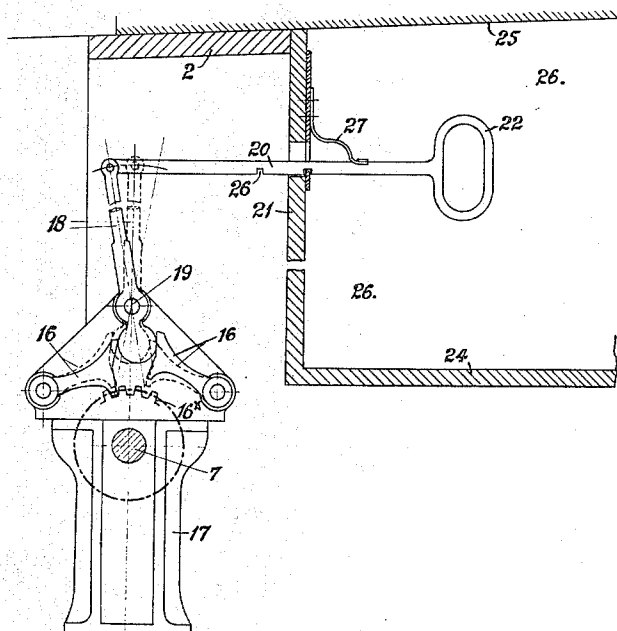
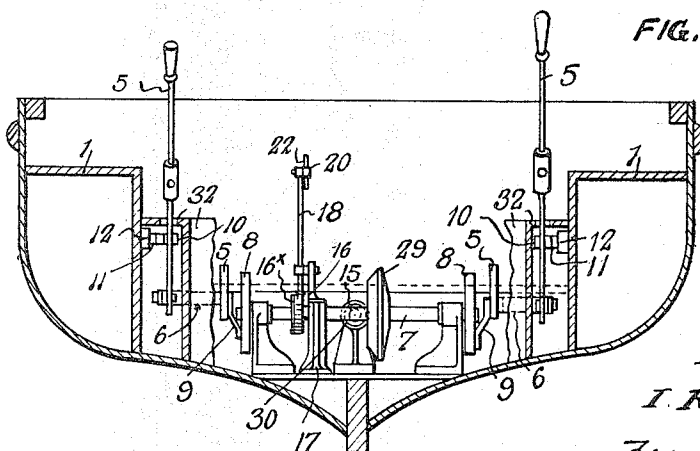


FIG. 3.



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UNITED STATES PATENT OFFICE.

IVAN RUPERT FLEMING, OF AINSDALE, ENGLAND.

BOAT PROPELLED BY MANUALLY-OPERATED MECHANISM.

Application filed April 10, 1922, Serial No. 551,392, and in Great Britain September 9, 1921.

This invention has reference more particularly to ships' life boats, and to that type of boat having manually operated propelling mechanism in which longitudinal shafts or rods inside the boat, are reciprocated to and fro through a plurality of hand operated pivoted levers, and such reciprocating motion is converted into a rotary motion by a crank mechanism from which motion is transmitted to the propeller; and the chief object and effect is to provide means in connection with such mechanism or apparatus of this type by which the power is efficiently and economically applied, and by a slow movement of the hand, and medium effort of the operators is sufficient to propel the boat at a satisfactory speed; and a further object is to provide an arrangement and combination, which is generally advantageous and more suitable both for the operation by the passengers in the life boat, and the coxswain or man in charge of the boat.

In the boat and mechanism hereinafter described, the improvements under this invention are comprised.

The longitudinal shafts or rods which are located along the inside of each side of the boat, in the well which generally exists between partial decks above the buoyancy air tanks or chambers usually employed in such boats, and the fulcras of the hand operated levers, which are arranged in line, are disposed at a point between the gunwales, and the bottom of the boat, and more or less in line or nearly so with a transverse shaft carrying cranks or crank discs, to crank pins of which said rods are directly connected by driving connecting rods, from which shaft motion is transmitted to a propeller shaft and propeller at the stern of the boat.

In this manner, the effort applied to the longitudinal shafts or rods is applied substantially directly in line with the driven crank shaft, and mechanical advantage and efficiency is obtained. The fulcras pins or the like are carried on horizontal members attached to the uprights or supports of the boat which extend from the bottom to the inner edges of the decks; and these members are detachable from the uprights, and lie over the covers which extend between the uprights, and enclose the inside surfaces of the buoyancy air vessels.

In connection with the mechanism, on the transverse shaft, means is employed for con-

trolling the direction in which the shaft can be operated, and such mechanism may consist of pawls operating in connection with a ratchet wheel on the shaft on which the crank discs are fixed, so that one or other pawls may be put into position to engage the ratchet wheel so as to prevent it going in one or other direction, at will. When the pawls are reversed when the gear is being operated, the hand levers are prevented from moving in one direction, and by moving them in the opposite direction the motion is reversed. The cranks being set say 90° from one another, this reversal of motion takes place smoothly and easily.

The improvements, the nature of which is above described, are illustrated in the annexed drawings, and the invention will be further described with reference to them.

In the drawings, Figure 1 is a longitudinal section, Figure 2 a plan, and Figure 3 is a cross section at AA Figure 1, of a boat provided with the improvements.

Figure 4 is an elevation in cross section showing the reversing gear of the machinery.

The boat shown has along each side, a series of air tanks, which are enclosed within the boxes or casings 1, generally of wood; and the boat is provided with thwarts 2 at the level of the tops of the air tank casings 1, from which the operating levers are operated by persons sitting on these thwarts; while below these and between the vertical planes of same and the pivots of the hand operating levers, other thwarts 3 are arranged, and to serve as seats for passengers.

The top of the air tank casings 1 is considerably below the level of the gunwale of the boat, and partake of the sheer of the boat.

In this gear, there are three sets of vibrating operating levers 5, on each side of the boat, two of them near the stern, that is, between the stern thwart 2, and the second and third thwarts, respectively; whilst the other is disposed between the fifth and sixth thwarts 2, there being none between the fourth and fifth; and the continuous coupling rods 6, which connect up all the levers 5, are nearly in line horizontally, with the axis of the crank shaft 7; and the after ends of these rods are connected directly to the crank discs 8 by connecting rods 9, so that there is a direct drive in line substantially with the axis of the crank shaft.

The levers 5 are supported on pins 10 on

plates 11 bolted on to a continuous beam of wood 12, fastened by screws or bolts to the vertical walls of the air tank casings 1.

The ends of the connecting rods 9 of the two sets of coupling rods 6 are connected to crank pins on the crank discs 8 set at about 90°, more or less, apart from one another circularly; and this arrangement, combined with the direction controlling mechanism of the machinery provides for the uninterrupted operating of the levers and gear, as herein-after explained.

The gear by means of which the rotation of the screw propeller is prevented from being rotated by the hand gear in the wrong direction, and can only be rotated in the direction desired, consists of two oppositely arranged pawls 16 mounted on a bracket 17, fixed to the floor of the boat, the upper ends of which face one another, and operate in connection with a notched wheel 16* on the shaft crank 7. The pawls are operated by a rocking lever 18 pivoted at 19 to the bracket 17, the long arm of which has connected with it a horizontal rod 20 which projects through, and is supported upon a partition or bulkhead 21, and is provided with a handle 22 on the aft side of this bulkhead 21; and aft of this bulkhead 21 there is a cock pit 26 closed below above the gear, by the floor 24; and in this cockpit in the aft part of the boat, the steersman and controller of the boat and mechanisms can stand.

A longitudinal seat extends between the stern of the boat, viz, the aft ends of the sideboards 25, and the first thwart 2; and on the right hand of the cockpit the operating handle 22 of the rod 20 is placed; and this rod has gaps 26 in it which in the two positions are placed over the upwardly projecting edge of the bulkhead plate 21, forming the lower edge of the hole in it through which the rod 20 passes. The rod is normally kept down in position and engaged by a spring 27.

The shaft 7 is supported in bearings 28 mounted on the foundation plate on the bottom of the boat; and this shaft 7 revolves the propeller shaft 15 by a bevel wheel 29 on the shaft 7, and a smaller bevel pinion 30 on the shaft 15, so that the shaft 15 will be revolved at a greater speed than that of the shaft 7.

Outside the vertical walls of the air tank casings 1, there is a projecting casing 32, and the coupling rods 6 are disposed within these casings, and the lower ends of the levers 5 pass through slots in the roof of same, so that the whole of the reciprocating mechanism below the fulcrum 10 of the levers 5 is enclosed, and the action of the machinery cannot be interfered with by people or things in the well of the boat; and this casing 32 extends to the rear transverse bulk head 33 of the boat.

Regarding the operation of the whole

mechanism, including the pawls 16, according to which of the two pawls is engaged with the notched wheel 16*, so will the direction of rotation of the shafts, and the propeller be controlled; and when the gear is operated, as the crank pins of the cranks 8 are set at a distance apart in the circle of their rotation, say about 90° from one another, no matter which pawl is in the notch of the wheel 16*, the power applied to the levers will turn or revolve the shaft the required direction, without any special act or thought of the operators; that is to say, they automatically propel the vessel without skill or attention; and not only in starting off will the propeller be revolved in the right direction by the gear, but when it is required to reverse its direction when running by actuating the direction controlling pawl gear by the navigator, the reversal of the propeller shaft and propeller will take place, without the operating people being inconvenienced or put out.

In some cases when desired or suitable, the lever 5 and coupling rods 6 may be placed along or near the middle of the boat, or away from the sides, instead of as shown in the drawings.

When a reversing gear of the clutch or equivalent type of reversing mechanism is used on the propeller shaft, for reversing the propeller, a click or pawl stop or the like may be used to prevent the primary shaft 7 from reversing, and so that it always must revolve in the same direction.

I have found in my experiments and tests of this boat, that people unused to rowing or operating machinery, are able to work the propelling mechanism efficiently, without training; so that in the emergency of launching a boat, and getting it away, say, from a ship, by untrained passengers, it can be done with certainty and ease; also that by the arrangement by which both the management or control of the operations of the machinery, and the sailing of the boat, is accomplished at the stern by the steersman, a further important advantage is obtained.

What is claimed is:—

1. In a boat having hand operated propelling machinery, the combination of a plurality of hand reciprocating levers, coupling rods at each side of the boat connecting said levers together, a transverse shaft driven by the said coupling rods in substantially the same horizontal plane as said rods, cranks on said shaft, connecting rods connecting said coupling rods with their cranks, a pawl notch wheel device adapted to be operated by hand and control the direction of rotation of the said shaft, a propeller shaft at right angles to the said transverse shaft and driven by the latter, air cases in each side of the boat, a continuous bar along the sides of the air cases adapted to

form supports for the hand operating levers.

2. In a boat having hand operating propelling machinery, the combination of a plurality of hand reciprocating levers at each side of the boat, a transverse shaft near the bottom of the boat, coupling rods at each side of the boat connecting said levers together and to the said shaft and disposed in the lower part of the boat, substantially in the same horizontal plane as said rods, cranks on said shaft, connecting rods connecting said coupling rods with their cranks,

cases in each side of the boat to which the lever supports are attached, and cases on the inboard of the above cases within which the pivots and lower ends of the hand levers and coupling rods are enclosed, a pawl notch wheel device adapted to be operated by hand and control the direction of rotation of the said shaft, and a propeller shaft at right angles to the said transverse shaft and driven by the latter.

In testimony whereof I have signed my name to this specification.

IVAN RUPERT FLEMING.