

T. KURRELL, H. SCHNEIDER & L. BUKOWSKI.

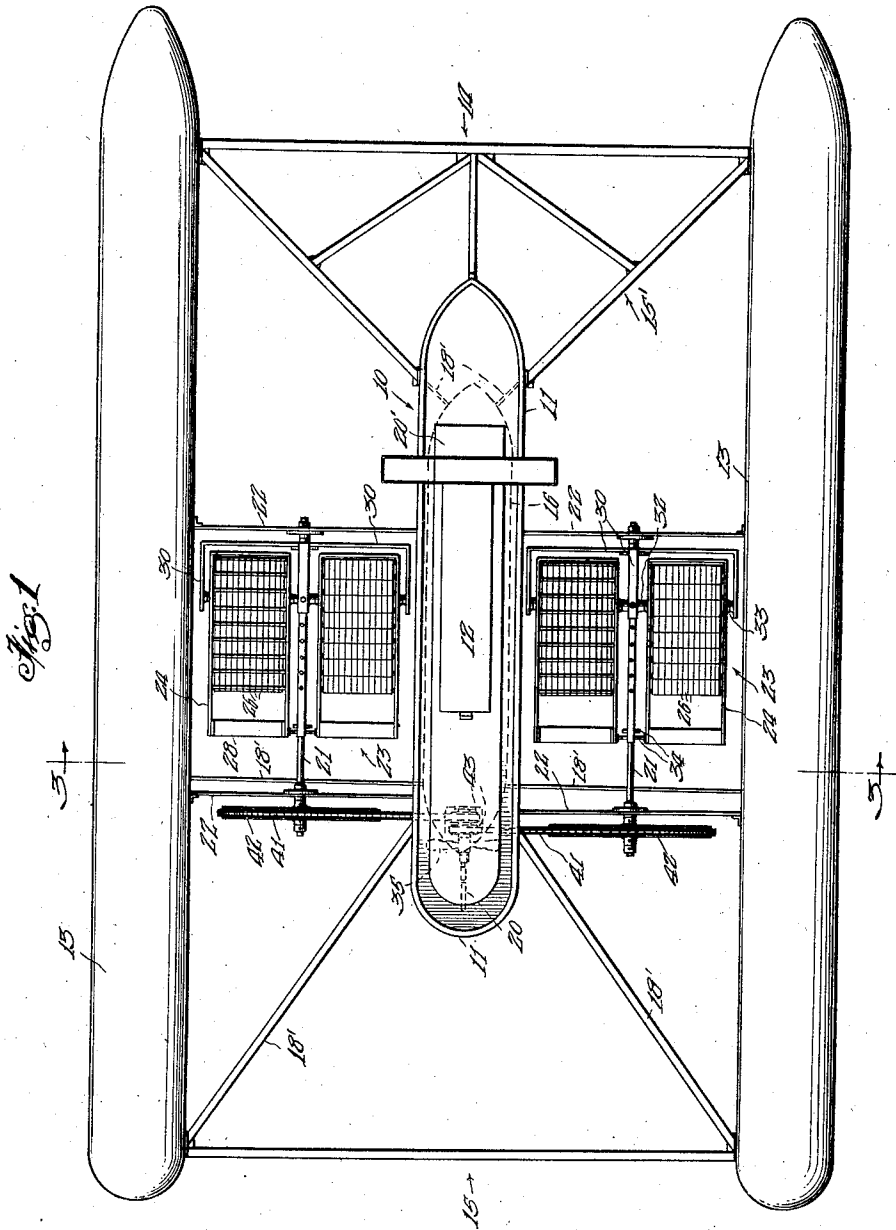
WAVE ACTUATED MOTIVE APPARATUS.

APPLICATION FILED SEPT. 3, 1912.

1,062,832.

Patented May 27, 1913.

4 SHEETS—SHEET 1.



Witnesses:
M. Maupied
W. M. Gentle

Inventors,
Theodor Kurrell,
Heinrich Schneider,
and Leonard Bukowski;
Alex. N. Lidders
their attorney.

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Fig. 2

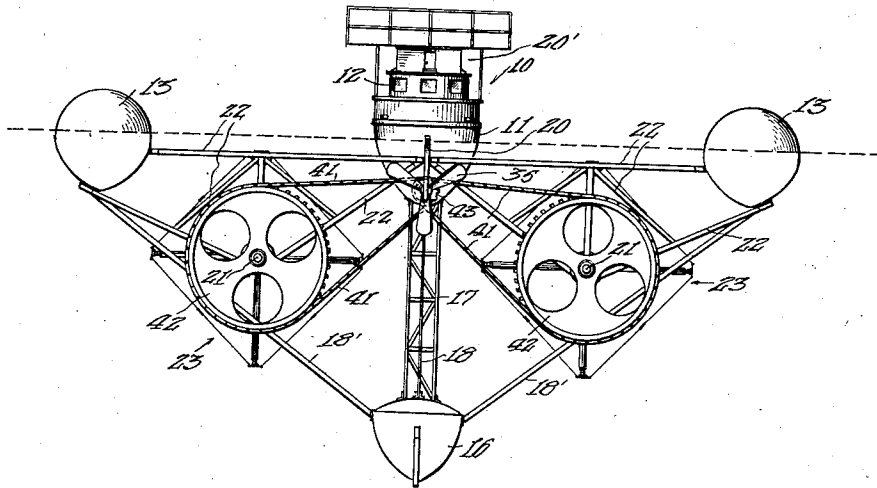
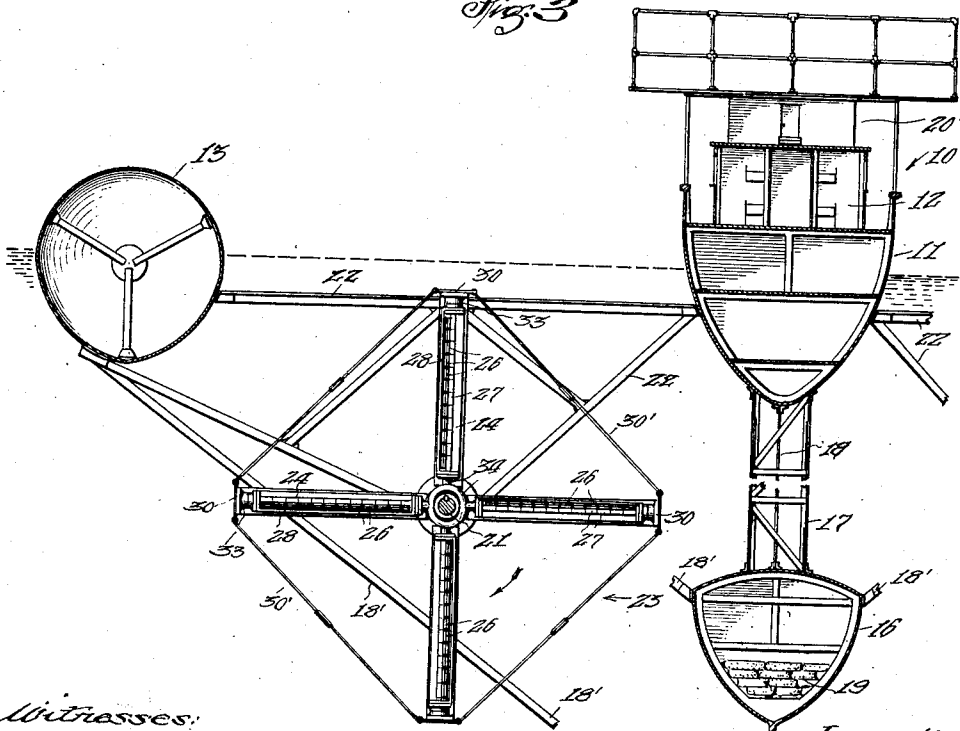


Fig. 3



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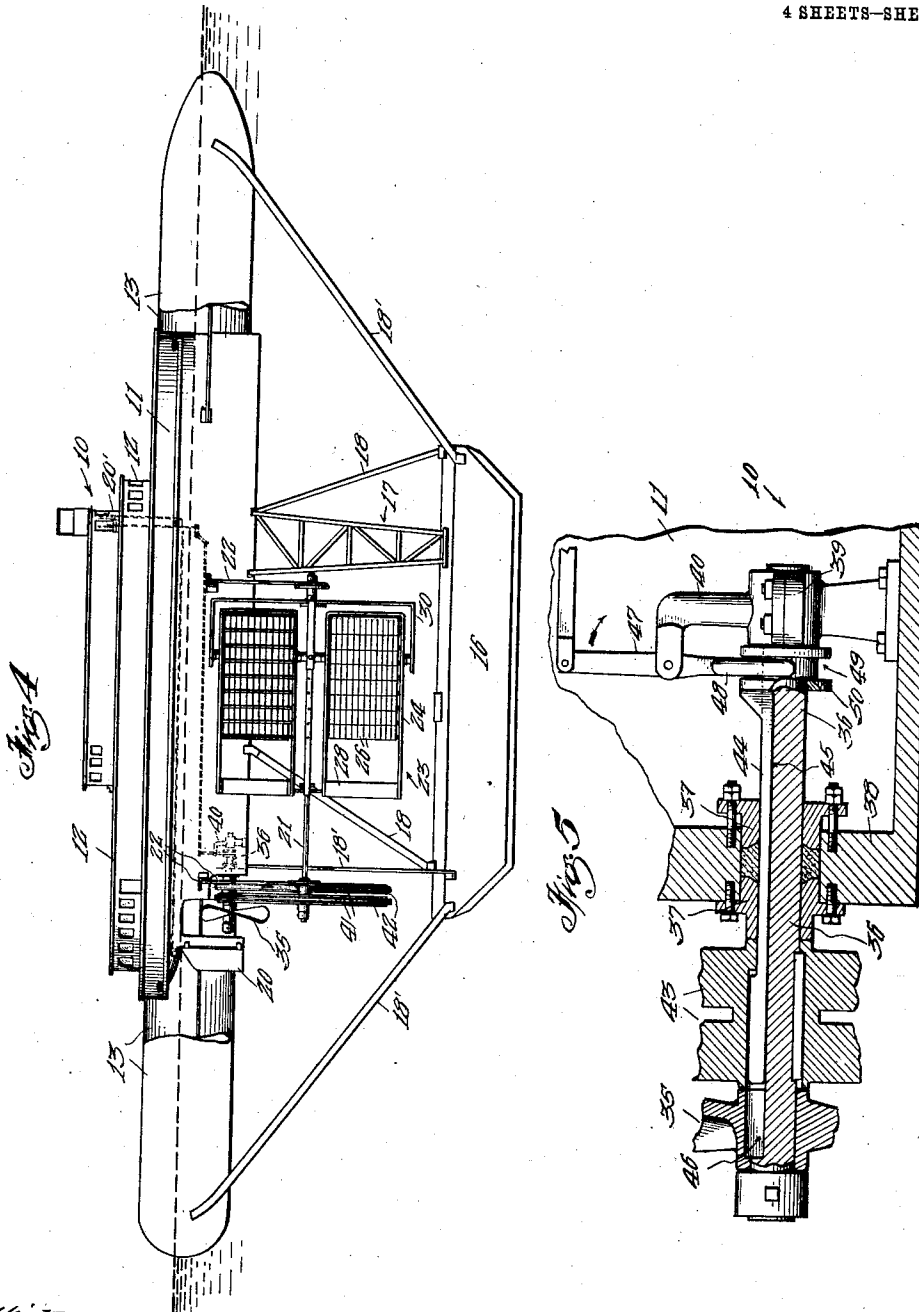
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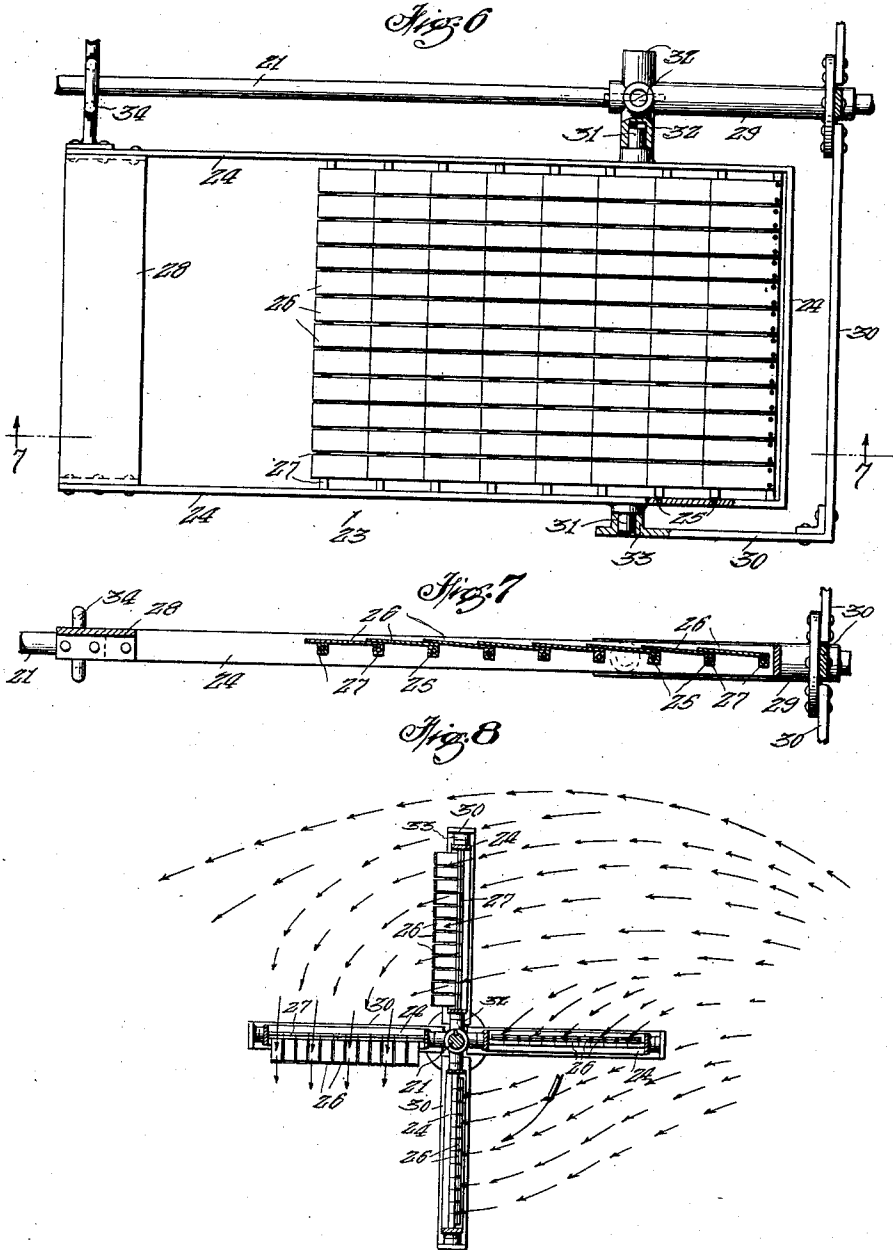
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4 SHEETS—SHEET 4.



Witnesses:

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UNITED STATES PATENT OFFICE.

THEODOR KURRELL AND HEINRICH SCHNEIDER, OF LOS ANGELES, AND LEONARD BUKOWSKI, OF PASADENA, CALIFORNIA.

WAVE-ACTUATED MOTIVE APPARATUS.

1,062,832.

Specification of Letters Patent.

Patented May 27, 1913.

Application filed September 3, 1912. Serial No. 718,415.

To all whom it may concern:

Be it known that we, THEODOR KURRELL, a subject of the Emperor of Germany, HEINRICH SCHNEIDER, a subject of the Emperor of Austria-Hungary, and LEONARD BUKOWSKI, a citizen of the United States of America, the first two named parties residing at Los Angeles, and the other party residing at Pasadena, in the county of Los Angeles, State of California, have invented a certain new and useful Wave-Actuated Motive Apparatus; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to wave-actuated motive apparatus, designed more particularly for propelling boats, and it may be said to consist in the provision of the novel features and in the novel and improved construction, arrangement and combination of parts, members, and devices as will be apparent from the description and claims which follow hereinafter.

Objects of the invention are to provide novel and improved motive apparatus adapted to be actuated by waves or undulations of water, and also to provide a novel and improved construction whereby the apparatus may be applied to boats.

Further objects of the invention are to provide apparatus which is simple in character, strong and durable, economical to manufacture, install, maintain and use, and effective in action.

Other objects and the advantages of the invention will be apparent to those skilled in the art from a consideration of the following description of one form in which it may be embodied, taken in connection with the accompanying drawings in which—

Figure 1 is a plan view showing the invention applied to a boat; Fig. 2 is a rear end view of the same; Fig. 3 is an enlarged partly broken and sectional view taken on the lines 3—3 of Fig. 1; Fig. 4 is a partly broken side elevation of the parts shown in Fig. 1; Fig. 5 is an enlarged partly broken and sectional view of mechanism for operatively connecting the motive apparatus with the propeller; Fig. 6 is an enlarged partly broken view of part of the motive apparatus; Fig. 7 is a sectional view taken on the line 7—7 of Fig. 6, and Fig. 8 is a

conventional view of a part of the wave actuated devices to illustrate the operation of the devices.

The boat 10 may consist of any suitable form of hull 11 which may have thereon any suitable form of superstructure 12.

At the sides of and spaced from the boat 10 may be arranged any suitable or approved form of buoyant members 13, preferably longer than the boat 10, which may be connected with each other and with the hull 11 by means of suitable crosspieces 14 and 15 at the bow and stern of the boat. A suitable brace frame 15' may be connected between the cross piece 14 and the bow of the boat.

In order to attain great stability for the boat 10, a suitable buoyant member 16, preferably of less length than the boat, may be arranged at a suitable distance directly below the hull 11. The buoyant member 16 may be connected with the hull 11 by any suitable means such as the substantially upright frame 17 and diagonal bars 18, and it may be connected with the buoyant members 13 by means of suitable bars 18'. Any suitable form of ballast 19 may be disposed in the interior of the buoyant member 16.

Any suitable or approved form of steering apparatus may be employed; as shown, the rudder 20 may be operatively connected with a steering wheel in the pilot house 20' as indicated in dotted lines in Fig. 4.

The motive apparatus may consist of shafts 21 which may have the end portions thereof bearing in suitable frames 22 connected between the sides of the hull 11 and the buoyant members 13. To the shafts 21 are operatively connected a plurality of wave-actuated devices 23.

As shown, the devices 23 may consist of substantially rectangular frames 24 on which are mounted a plurality of spaced rods 25 having pivotally mounted thereon supports 27 to which are attached one end of a plurality of preferably rectangular plates 26; the other end of the plates 26 being adapted to overlap the plates on adjacent of the rods 25. Tail plates 28 may be arranged to the rear of the plates 26 and suitably affixed to the sides of the frames 24. The frames 30 may be braced by interconnecting rods 30'.

The devices 23 may be connected with the shafts 21 by means of sleeves 29 keyed to the shafts 21, rightangled frames 30 suit-

ably secured to the sleeves 29, and pivots 31 preferably affixed on the forward end portion of the frames 24 and fitted in preferably radial sockets 32 on the sleeve 29 and in sockets 33 on the frames 30. Between

opposite of the devices 23 at the rear thereof may be arranged rings 34 adapted to fit freely over the shafts 21 and suitably affixed to the frames 24.

It will be understood that the plates 26 may be disposed to be acted on by moving water in a stream or by waves or undulations in a body of water. In this case the plates 26 are adapted to be acted on by waves or undulations in the water to derive power to drive the boat. It will be apparent that the plates 26, the plates being in different positions and at different levels under the surface of the water, are adapted to be moved by the varying waves or undulations in the water which cause pressure to be exerted on one of the faces of some or all of the plates of each of the devices 23, and such pressure either moves the plates to open them to permit passage of the water between the plates or moves the plates to close them and cause them to overlap and bear against adjacent plates, depending on the position of the devices 23 and the zone of the waves or undulations. It will be understood that the pressure exerted by the water on the plates in closed position is effected to actuate the apparatus to drive the propeller shaft.

The propeller 35 may be freely mounted on the end of the shaft 36 which may pass through stuffing box 37 in wall 38 and have its other end journaled in a suitable bearing 39 which may have thereon the arm 40. The shafts 21 may be operatively connected with the propeller shaft 36 by means of sprocket chains 41 which pass over sprocket wheels 42 fast on the shafts 21 and over sprocket pinions 43 fast on the shaft 36.

The propeller 35 may be operatively connected at will to the pinion 43 by means of a bar 44 having one end portion thereof movably fitted in a recess 45 in the hub of the pinions and adapted to be moved by the operator in the pilot house 12 to extend into a recess 46 in the hub of the propeller 35 by means of suitable operative connections, indicated in Fig. 4, with the link 47 which is pivotally mounted on the arm 40 and has on its end a yoke 48 extending into the groove 49 of a collar 50 on the bar 44.

While one form of embodiment for the invention has been illustrated and described there are many changes and modifications thereof that will readily occur to those skilled in the art, wherefore the right is reserved to all such changes and modifica-

tions as do not depart from the spirit and scope of the invention as defined in the appended claims.

We claim:

1. The combination of a boat, buoyant members at each side of and connected with the boat, frames between said buoyant members and the boat, means including wave-actuated motive apparatus mounted on said frames to propel the boat, and a buoyant member arranged below and connected with the hull of the boat.

2. The combination of a boat, a propeller, buoyant members, frames connected between the buoyant members and the boat, shafts mounted on the frames, frames on the shafts, rods mounted on the last mentioned frames, a plurality of plates having one end thereof pivotally mounted on the rods and having the other end portion thereof adapted to overlap adjacent rods, and operative connections between the shafts and the propeller.

3. The combination of a boat, a propeller, buoyant members, frames connected between the buoyant members and the boat, shafts mounted on said frames, frames mounted on the shafts, pivotally mounted frames on the shafts which are mounted on the shafts, rods on said pivotally mounted frames, plates having one end portion thereof pivotally mounted on the rods and having the other end portion thereof adapted to overlap adjacent of the plates, and operative connections between the shafts and the propeller.

4. The combination of a boat, buoyant members at each side of and connected with the boat, a propeller, frames between the buoyant members and the boat, a buoyant member arranged below and connected with the hull of the boat, means to operate the propeller including shafts on the frames, frames operatively connected with the shafts, rods on the last frames, and plates having one end portion thereof pivotally mounted on the rods and having the other end portion thereof adapted to overlap adjacent of the plates, and means to operatively connect the first mentioned means with the propeller.

In testimony whereof, we have signed our names to his specification in the presence of two subscribing witnesses at Los Angeles, county of Los Angeles, State of California, this 26th day of August A. D. 1912.

THEODOR KURRELL.
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Witnesses:

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