No. 778,421. PATENTED DEC. 27, 1904.

ROBERT DIAMOND MAYO & ROBERT DAVID MAYO.

LIFE BOAT.

APPLICATION FILED MAR. 7, 1904.

2 SHEETS—SHEET 1.

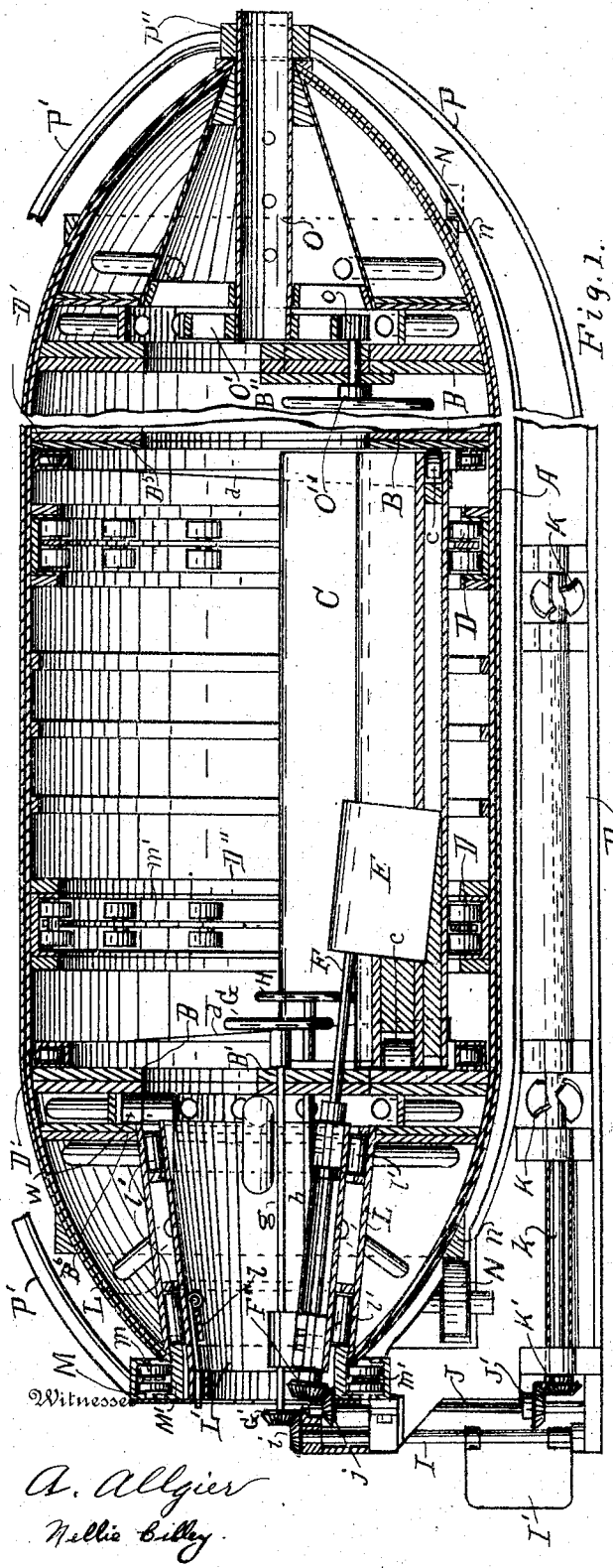


Fig. 1.

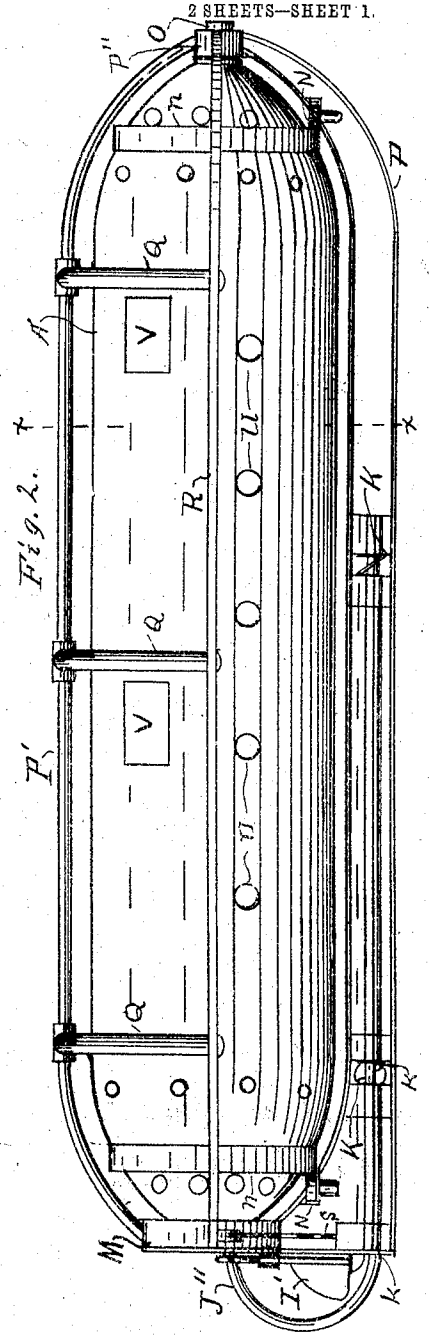


Fig. 2.

Witnesses:
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2 SHEETS—SHEET 2.

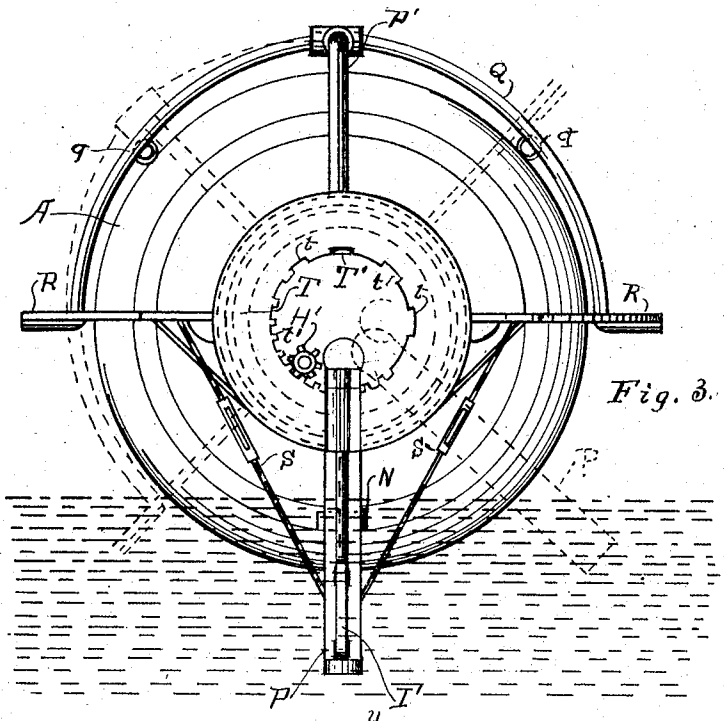


Fig. 3.

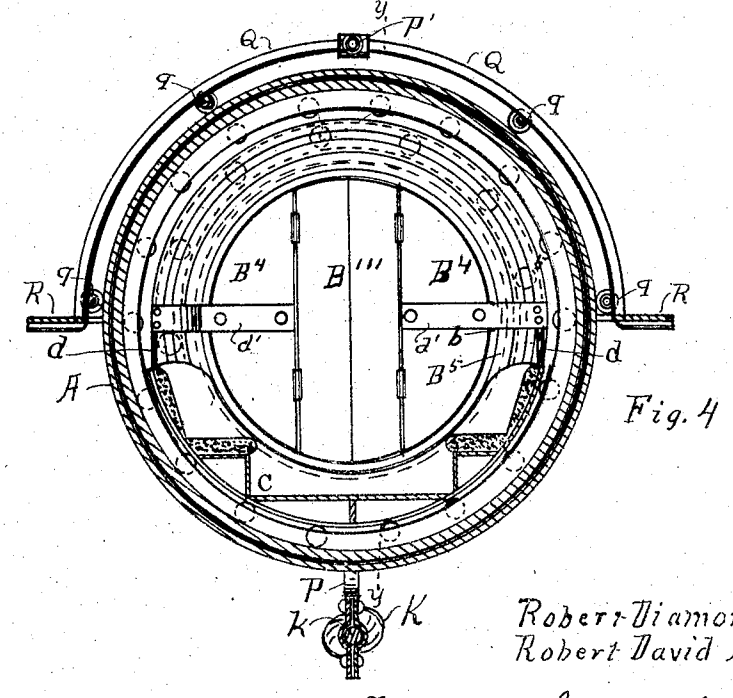


Fig. 4

Witnesses

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UNITED STATES PATENT OFFICE.

ROBERT DIAMOND MAYO AND ROBERT DAVID MAYO, OF GRAND RAPIDS, MICHIGAN, ASSIGNORS OF ONE-THIRD TO HIRON S. OSBORN, OF GRAND RAPIDS, MICHIGAN.

LIFE-BOAT.

SPECIFICATION forming part of Letters Patent No. 778,421, dated December 27, 1904.

Application filed March 7, 1904. Serial No. 197,042.

To all whom it may concern:

Be it known that we, ROBERT DIAMOND MAYO and ROBERT DAVID MAYO, citizens of the United States, residing at Grand Rapids, in the county of Kent and State of Michigan, have invented certain new and useful Improvements in Life-Boats, of which the following is a specification.

Our invention relates to improvements in revoluble life-boats; and its objects are, first, to successfully apply power for propelling the boats; second, to provide a means whereby the keel of the boat may be easily and readily thrown to one side to prevent striking the ground in shallow water, and, third, to provide a means whereby the operator may pass around outside of the boat for handling lines, arranging lights, &c. We attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a longitudinal section of the boat on the line *y y* of Fig. 4. Fig. 2 is a side elevation of the boat. Fig. 3 is an elevation of the stern of the boat, and Fig. 4 is a vertical cross-section of the same on the line *x x* of Fig. 2.

Similar letters refer to similar parts throughout the several views.

In the several views of the drawings, A represents the shell of the boat.

B B represent bulkheads near the ends of the boat and provided with the dashboards B′ and B″.

In lieu of the dashboards above mentioned we place in the center bulkhead—that is, the bulkhead shown to the right of the carriage C in Fig. 1—swinging doors B‴, so arranged that passengers may pass from one compartment of the boat to the other when two-compartment boats are used.

To secure the engine or motor E to the boat and avert the danger of cramping or straining the shaft F, we find it necessary, first, to provide as firm a support for the carriage C as is possible and allow the shell A to revolve freely, and for this purpose we provide a series of roller-bearings D, that encircle the shell of the boat within and provide a safe steady support for the carriage; second, to prevent the carriage from vibrating endwise, and for this purpose we provide a series of closely-fitting rollers *c c*, journaled into the ends of the carriage in position to travel upon the surface of the bulkheads B; third, to so arrange the keel P that the shell A may revolve freely and yet the keel and the carriage will be solidly locked together, and for this purpose we suspend the keel P at the stern of the boat upon the rim M, which is mounted upon the roller-bearings *m*, which in turn travel freely around the bearing M′, and the front end of the keel P is supported by the hub P″ upon the cylindrical bearing O, which projects from the bow of the boat back to the bulkheads B, where a gear-wheel O′ is secured to it in position to engage the actuating gear-wheel *o*, the shaft of which passes through the dashboard B″ and is provided with an actuating-wheel O″, so that when the wheel O″ is turned in any direction the bearing O turns and carries the keel P with it, the back end of the keel being likewise carried around by means of the gear-wheel H′, which is mounted on the shaft *h* (see Fig. 1) and terminates with an actuating-wheel H within the boat, and as the gear-wheel H′ meshes in the gear-teeth *t′* on the plate T, which plate is securely attached to the ring M, which supports the keel P, so that the turning of the wheel H actuates the stern end of the keel the same as the turning of the wheel O″ actuates the front end of the keel, and by actuating both at once the keel may be thrown over to one side, as indicated by the dotted lines in Fig. 3.

The platforms R and their supporting-frame P′ Q serve a double purpose. First, they may be utilized as platforms extending the length of the boat on either side, so that the occupants can emerge from the boat either through the opening L′ at the stern or through the port-holes V V on the sides of the shell and walk along upon the platforms for handling ropes, arranging lights, &c., utilizing the rod P′ as a railing or safety-guard to which they may hold when operating upon the platforms, and, second, they act as a support and counterbal-

ance for the keel of the boat by reason of being attached directly to the ring M and being braced by the braces S, as shown in Fig. 3, so that the ring M and the keel P are always held firmly in the same relative position, and the weight of the platform and the framework connected therewith overcome to a great extent the weight of the keel and greatly assist the gear H′ *t*′ in throwing the keel P over, as indicated. When the keel stands in its normal position, as in Fig. 3, it is necessary to firmly lock the ring M in proper position with the carriage C, and for this purpose we provide notches *t* in the plate T and place a key *l* in the cylinder L′ in position to engage the same, and the cylinder L′ is securely attached to the dashboard B, which in turn is securely attached to the carriage. The cylinder L′ and the dashboard B′ always stand firmly in the same relative position, while the keel may be disconnected, as hereinbefore stated, and swung around independent of the carriage and the cylinder L′ and the dashboard B′ or B″.

To support the shafts F, *g*, and *h* and hold them in perfect alinement with the carriage C and the motor, we place a relatively revoluble cylinder L′ within the stern end of the shell A within the walls L and mounted upon roller-bearings *l*′, so that the shell may revolve freely around it.

To strengthen the keel P longitudinally, we place antifriction-rollers N in the keel and corresponding bearings *n* around the shell A.

The shaft *k* and the propellers K are supported in the keel P substantially as shown in Figs. 1, 2, and 4, and the shaft is driven as follows: There is a gear-wheel F′ upon the shaft F, that engages a corresponding gear-wheel *j* on the vertical shaft J, which is journaled to the keel P and provided with a gear-wheel J′, which meshes with a gear-wheel K′ on the shaft *k*, so that the motion of the motor E is transmitted through these shafts and gear-wheels to the shaft *k* and causes the propellers K to revolve, forcing the boat through the water in the usual manner.

In Fig. 2, J″ represents an ordinary flexible shaft that takes the place of the shaft J and the gear-wheels in connecting the shafts F and *k* and transmitting the motion of the motor to the propellers K.

To manipulate the rudder I′, we place a gear-wheel *i* at the upper end of the shaft I and engage it with a gear-wheel G′ upon the shaft *g*, which passes through the dashboard B′ and terminates in an actuating-wheel G within the boat.

U U represent openings in the sides of the shell designed to be utilized as row-locks for the use of oars in case accident happens to the motor or shaft connections hereinbefore described, and *q q* represent idlers supported in the arms Q and bearing upon the shell A of the boat to support any excessive weight upon the platforms R.

For the purpose of successfully anchoring the motor we find it very desirable, if not absolutely necessary, to place two carriages in the shell, especially in long boats, and for this purpose we place a central bulkhead B⁵ between the carriages and place narrow long swinging doors B‴ therein, so that the two compartments can be actually divided to make the boat suitable for long use where both men and women are aboard. The dashboards B⁴ in this bulkhead are divided vertically into three divisions, comprising the two sections B⁴ of the dashboard supported in the metallic ring *b*, which is arranged to revolve in the bulkhead B⁵. These sections B⁴ of the dashboards are securely connected with the supporting-rings D′ by the bars *d*′, and these rings are securely connected with the ends of the carriage C by the links *d* or their equivalents, so that the bulkheads must always stand in the exact same relative position with the carriage, thus always supporting the doors B‴ in a vertical position convenient to pass through, and the dashboards B′ and B″ are likewise connected in position so that the open portion is always up, and the dashboard B′ will unite with the carriage C and the cylinder L′ to hold the shafts F, *g*, and *h* firmly in the proper position to render the motor and its connections with the keel P, the shaft *k*, and the propellers K perfectly operative.

The roller-bearings D are placed entirely around the shell of the boat and are held to place by the encircling ring *m*′, so that the rollers D′ travel around the track D″ as the carriage travels over them, substantially as on ordinary loose roller-bearing travels, without the necessity of the bearing upon sides of the rollers extending entirely around the circle of rollers. This roller-bearing is more fully described in the application, Serial No. 195,300, filed February 25, 1904, by Robert David Mayo, and is especially desirable in this connection, as the metallic track D″ not only greatly increases the strength of the shell, but makes a firm support for the carriage against the action of the motor when propelling the boat, so that the motion of the boat will be steady and without jar or trembling.

In the drawings, Fig. 1, we have shown the two propellers K attached to the shaft *k*. This we prefer, for the reason these boats are for use during heavy seas, in storms, as surf-boats, &c., and with a single wheel at the stern the wheel is liable to be carried out of the water much of the time, and thus not only lose much of the exertion of the motor, but endanger breaking and straining the motor by reason of suddenly throwing the propeller into and out of labor, while with two propellers, one of which is practically amidship, one of the propellers must be immersed all

of the time. Another advantage of having two propellers is that they may be set at right angles, and thus more perfectly balance their labor upon the motor.

To prevent the cylinder L′ from moving endwise, we securely attach antifriction-rollers W to the cylinder in position to travel between the bulkheads B and B^6, so that the revolving of the shell A around the cylinder will be as free from friction as possible and cannot affect the alinement of the motor, motor-shaft, and other actuating-shafts in the cylinder L′.

The principal necessity of having the traveling roller-bearings D, D″, and *m′* around the shell to support and carry the carriage is that with this construction the support under the carriage is more firm and perfect and the roller can be easily reached for adjustment or repairs, which with the rollers journaled to the carriage would be difficult to accomplish.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent of the United States, is—

1. In combination with a revoluble life-boat shell having an opening in each end, a relatively revoluble carriage supported therein, and bulkheads having revoluble dashboards therein, said dashboard securely attached to the carriage, a revoluble cylinder securely attached to the dashboard, a keel suspended from the bow and stern of the shell, a propeller-shaft and wheels carried in said keels, a motor secured to the carriage within the shell, and shafts connecting the motor and the propeller-shaft, substantially as and for the purpose set forth.

2. In a life-boat a revoluble shell having bulkheads therein, a relatively revoluble carriage, a relatively revoluble cylinder in the stern of the shell back of and secured to the dashboard, a relatively revoluble keel suspended from the ends of the shell, a propeller-shaft and propellers supported in said keel, a motor within the shell secured to the carriage, shafts and gear connecting the motor with the propeller-shaft, relatively revoluble platforms and guards secured to the shell, braces securing the keel, a gear-wheel and segment for adjusting the keel and steering-gear, substantially as and for the purpose set forth.

3. In a life-boat, a revoluble shell having bulkheads and an opening from the bulkheads through the ends of the shell, a relatively revoluble carriage within the shell, relatively revoluble dashboards in the bulkheads, a relatively revoluble cylinder between the stern bulkhead and the end of the boat, said cylinder dashboard and the carriage being connected, a relatively revoluble keel pivotally secured to both ends of the boat, gear-wheels and segments for actuating the keel, a propeller-shaft and propeller journaled in the keel, a vertical shaft journaled upon the stern of the keel and provided with a gear-wheel at each end, a motor mounted in the carriage, a shaft extending from the motor, journaled in the cylinder and having a gear-wheel arranged to revolve the vertical shaft, a gear-wheel on the propeller-shaft, engaging the lower gear-wheel on the vertical shaft, a rudder and shaft journaled to the stern of the keel, a gear-wheel at the top of the rudder-shaft, an actuating-shaft journaled to the cylinder, a gear-wheel on said shaft engaging the gear-wheel on the rudder-shaft, a roller bearing-ring supporting the back end of the keel, a segment secured to this ring, and having notches and gear-teeth on its inner edge, a shaft mounted in the cylinder, a gear-wheel on said shaft engaging the gear-teeth on the segment, a latch slidingly attached to the cylinder in position to engage the notches in the segment, antifriction-rollers and a bearing at each end of the boat and keel, and braces supporting the stern of the keel, substantially as and for the purpose set forth.

4. In a life-boat, a revoluble shell, having bulkheads near the ends, a relatively revoluble cylinder back of the bulkhead in the stern of the shell, antifriction-rollers supporting said cylinder, a ring and rollers bearing around the stern of the shell, a shaft extending into the bow of the shell, a gear-wheel and gear for revolving the shaft, a keel suspended from the shaft at the bow, and the ring and roller-bearing at the stern, a segment and gear for actuating the ring, a shaft and propellers journaled in the keel, a motor secured in the carriage, an actuating-shaft connecting the motor and the propeller-shafts, substantially as and for the purpose set forth.

5. In a life-boat, a revoluble shell, a relatively revoluble carriage in the shell, traveling roller-bearings around the shell supporting the carriage, a motor, a keel, platform and guards revolubly secured to the shell, propellers mounted in the keel, a motor in the carriage, connecting-shafts between the motor and the keel and a rudder, shaft and steering-gear, substantially as and for the purpose set forth.

Signed at Grand Rapids, Michigan, March 2, 1904.

ROBERT DIAMOND MAYO.
ROBERT DAVID MAYO.

In presence of—
ITHIEL J. CILLEY,
H. S. OSBORN.