A. E. COOK.

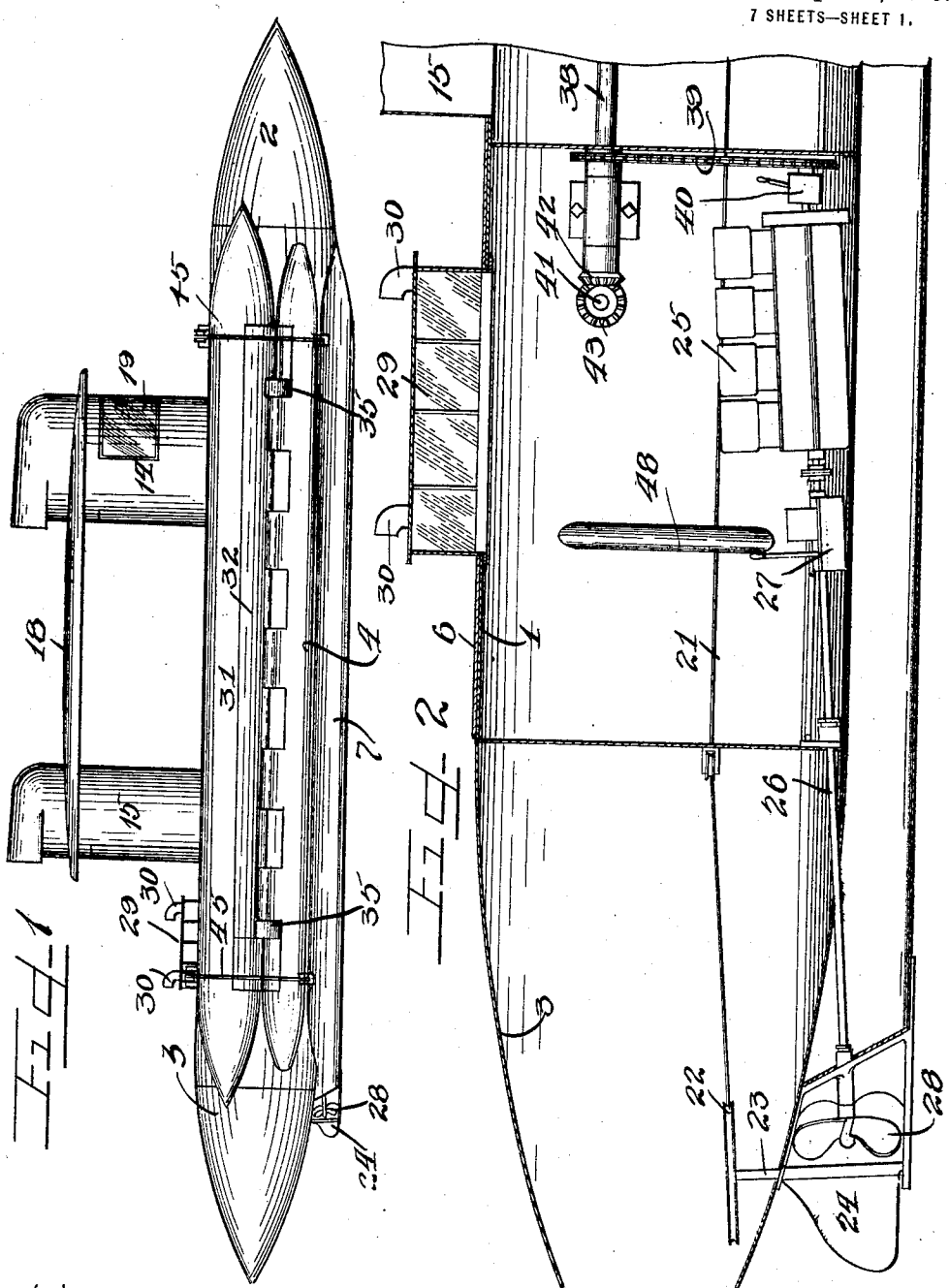
BOAT CONSTRUCTION.

APPLICATION FILED NOV. 27, 1916.

1,316,357.

Patented Sept. 16, 1919.

7 SHEETS—SHEET 1.



Witnesses

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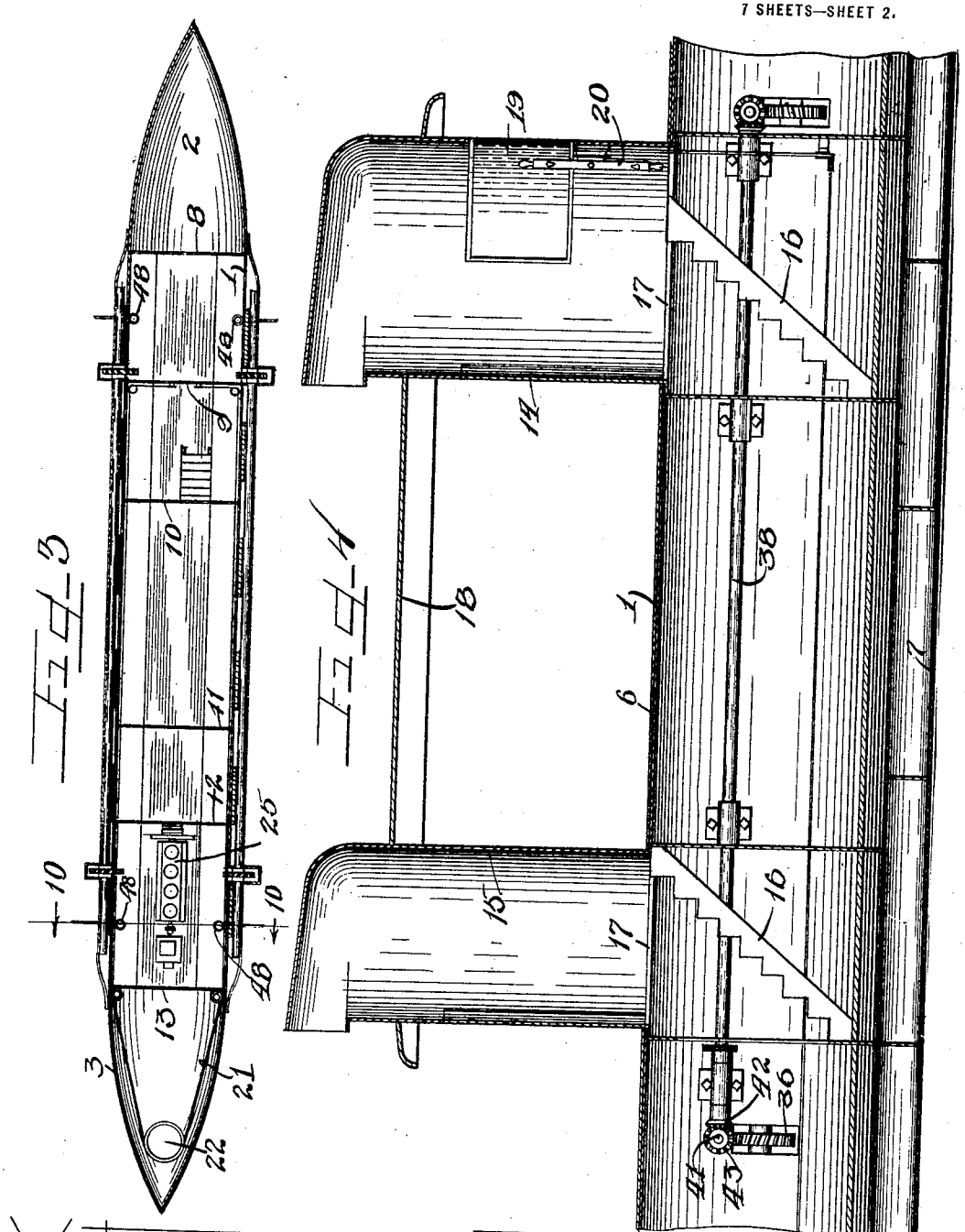
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7 SHEETS—SHEET 2.



Witnesses

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7 SHEETS—SHEET 3.

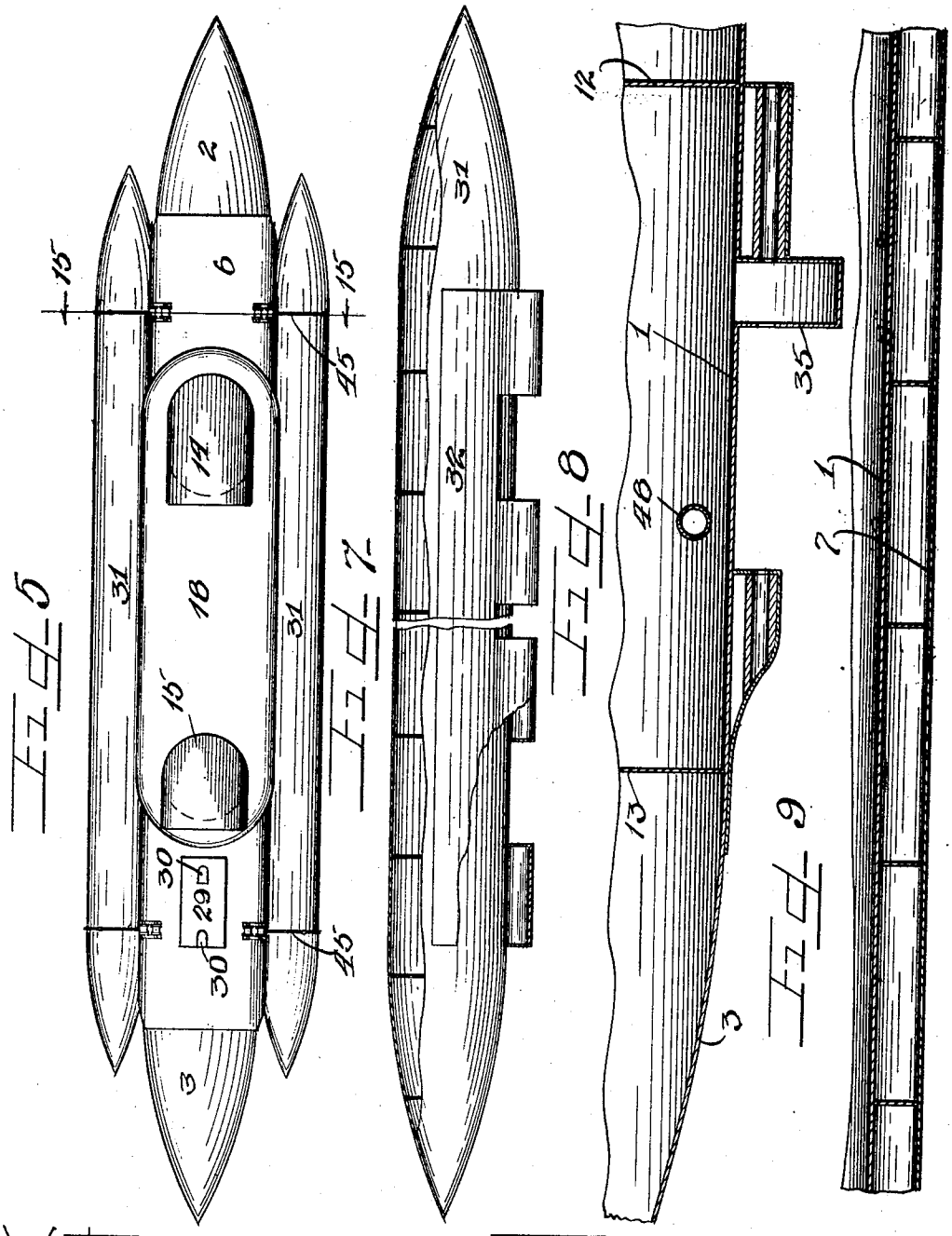


Fig 5

Fig 7

Fig 8

Fig 9

Witnesses

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7 SHEETS—SHEET 4.

Fig. 10

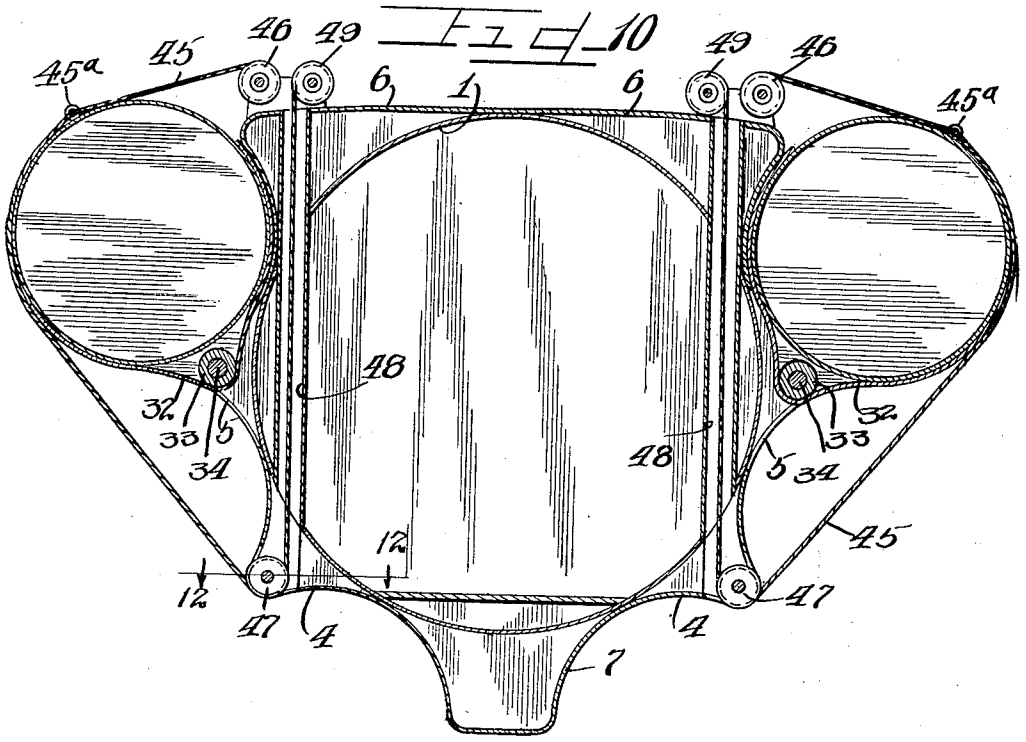


Fig. 11

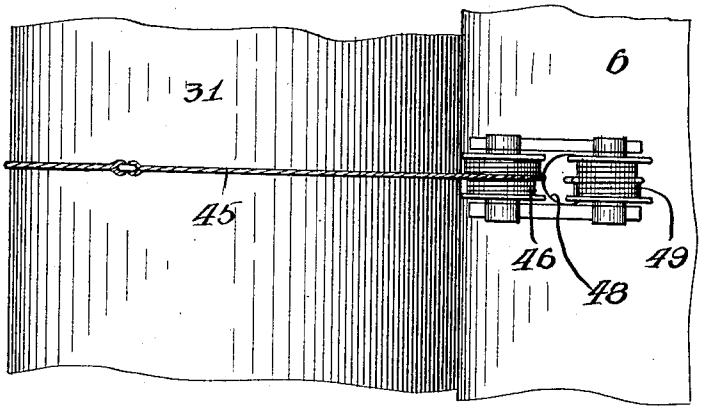
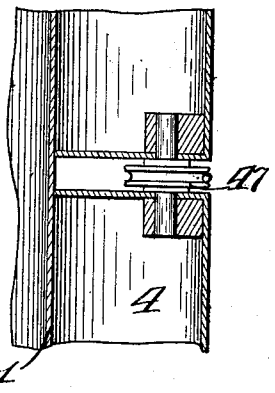


Fig. 12



Witnesses

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7 SHEETS—SHEET 5.

Fig. 13

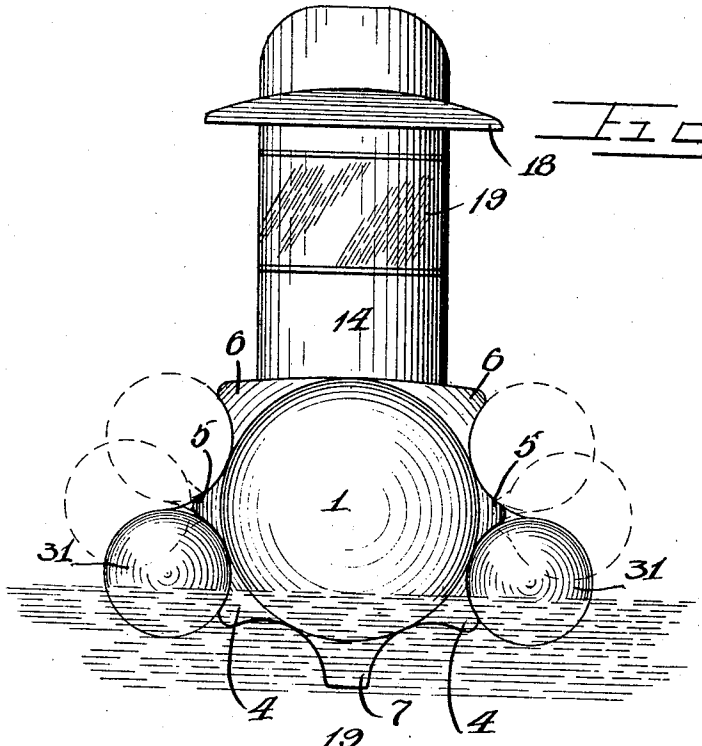
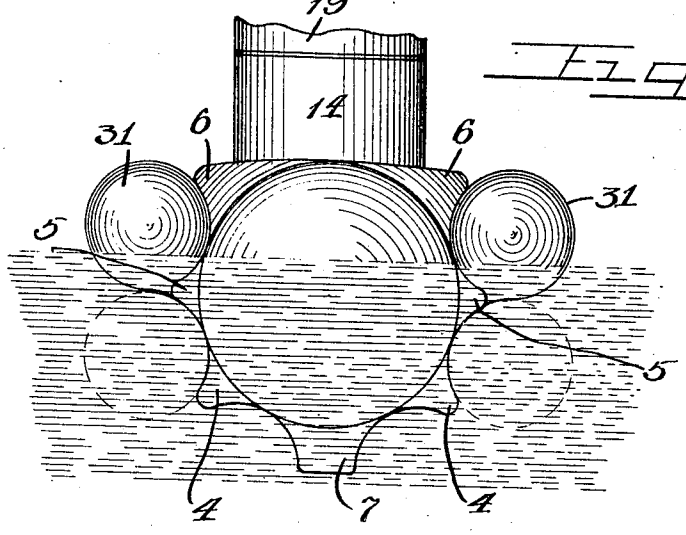


Fig. 14



Witnesses

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BOAT CONSTRUCTION.

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7 SHEETS—SHEET 6.

Fig. 15

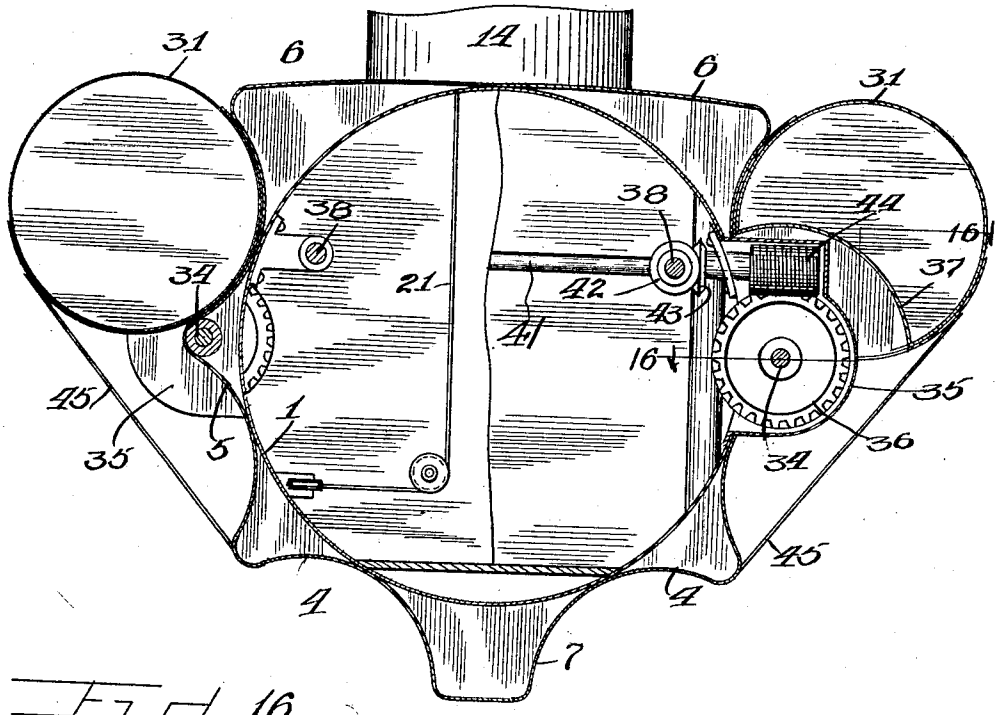


Fig. 16

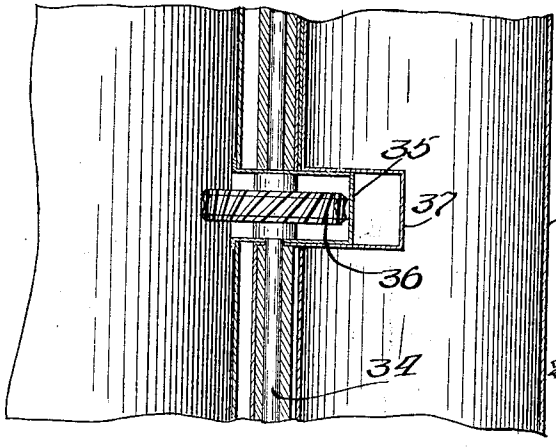
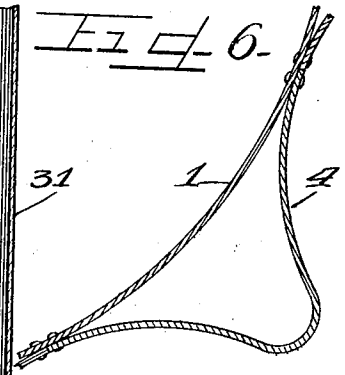


Fig. 6.



Witnesses

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BOAT CONSTRUCTION.

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7 SHEETS—SHEET 7.

Fig 18

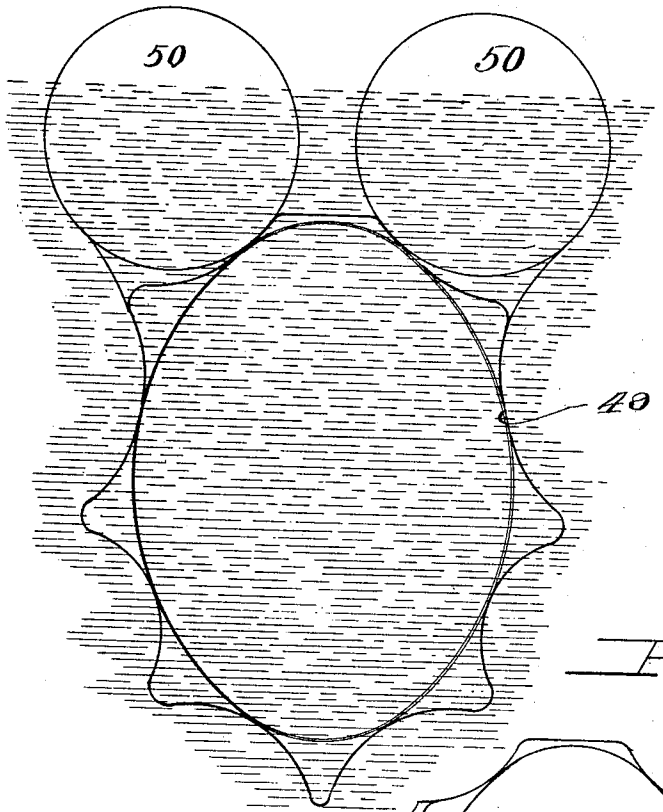
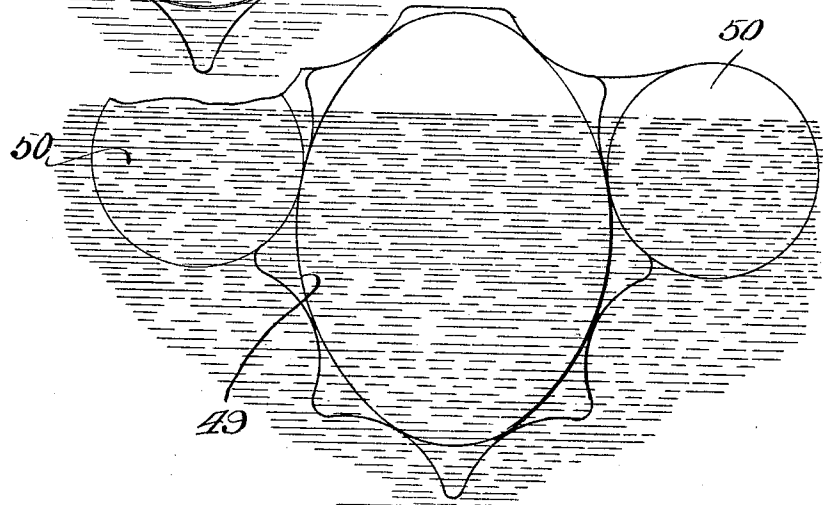


Fig 17



Witnesses

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UNITED STATES PATENT OFFICE.

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BOAT CONSTRUCTION.

1,316,357. Specification of Letters Patent. Patented Sept. 16, 1919.

Application filed November 27, 1916. Serial No. 133,738.

To all whom it may concern:

Be it known that I, ALBERT E. COOK, a citizen of the United States, and a resident of the city of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Boat Construction; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the numerals of reference marked thereon, which form a part of this specification.

This invention relates to a variable draft boat, that is, one wherein the center of flotation may be changed irrespective of the cargo, to change the draft of the boat in the water, so that for fair weather, a boat of light draft and high speed is obtained, and for rough weather a boat of deep draft and great stability.

By this invention, it is a simple matter to shift longitudinal pontoons which are provided on the exterior of the hull of the vessel to different positions, thereby changing the center of buoyancy without appreciable change in the position of the center of gravity in the vessel.

It is an object therefore of this invention to construct a vessel provided with flotation means for changing the draft of the vessel whereby the stability thereof may be increased for travel in rough and stormy weather, and with the vessel so constructed that with the means adjusted to cause but light draft of the vessel, high speeds may be obtained as the vessel is driven over the surface of the water.

It is also an object of this invention to construct a vessel with means mounted on the exterior of the hull thereof for changing both the position of the center of gravity and the center of buoyancy or flotation of the vessel, so that when the center of flotation is lowered with respect to the longitudinal axis of the vessel for travel of the vessel upon the surface of the water, the center of gravity is also lowered slightly to increase the stability of the vessel, and when said means is adjusted to raise the center of flotation of the vessel to increase the draft thereof, the center of gravity is but slightly raised relative thereto, so that a deep draft vessel of great stability is assured.

It is also an object of this invention to construct a vessel provided with longitudinal recesses on the exterior of the hull, and with pontoons on each side of the vessel movable into said recesses from one to another to vary the buoyant effect so that the center of buoyancy is changed, and also the draft of the vessel, so that a deep draft vessel may be obtained for rough and stormy weather, and a vessel of light draft for high speeds on the surface of the water in fair weather.

It is furthermore an important object of this invention to construct a variable draft vessel comprising a cylindrical hull having an irregular reinforcement outer shell thereon affording longitudinal ribs with recesses therebetween, and with pontoons on each side of the shell shiftable into different recesses to vary the buoyant effect thereof whereby the draft of the vessel is changed and with operating mechanisms within the hull of the vessel for changing the position of said pontoons on the exterior of the hull of the vessel.

It is finally an object of this invention to construct a variable draft vessel for travel as a deep draft craft in rough weather, and as a light draft craft of considerable speed in fair weather, and so constructed that the stability of the vessel, when traveling either as a light draft or deep draft craft, is assured at all times.

The invention (in a preferred form) is illustrated in the drawings and hereinafter more fully described.

In the drawings:

Figure 1, is a side elevation of a vessel embodying the principles of my invention.

Fig. 2, is an enlarged fragmentary central vertical sectional view of the stern of the vessel, with the interior shown in elevation.

Fig. 3, is a reduced horizontal sectional view taken through the vessel, illustrating the arrangement and construction thereof in plan view.

Fig. 4, is an enlarged fragmentary central vertical section taken amidships of the vessel.

Fig. 5, is a top plan view of the vessel.

Fig. 6, is a detail sectional view illustrating means of connection of the outer irregular shell of the vessel to the inner shell thereof, forming the hull of the vessel.

Fig. 7, is a fragmentary elevational view partly broken away and shown in section of one of the pontoons mounted at each side of the vessel.

Fig. 8, is a fragmentary central view near one end of one side of the hull of the vessel, showing the means of attachment of a pontoon thereto.

Fig. 9, is a longitudinal central vertical section taken through the hollow keel element of the vessel, showing the bulk head partitions therein.

Fig. 10, is a central vertical section taken through the vessel with parts omitted on line 10—10, of Fig. 3.

Fig. 11, is a fragmentary enlarged detail view of the cable connections between the pontoons and the hull shown in Fig. 10.

Fig. 12, is a sectional detail taken on line 12—12, of Fig. 10, with parts shown in elevation.

Fig. 13, is an end view of the vessel with the parts shown in adjusted position for light draft use.

Fig. 14, is a fragmentary end view of the vessel with the parts shown in adjusted position for deep draft use.

Fig. 15, is a transverse vertical section taken through the vessel, on line 15—15, of Fig. 5.

Fig. 16, is a detail section taken on line 16—16, of Fig. 15, with parts omitted and parts shown in elevation.

Fig. 17, is a diagrammatic view of a modified form of construction.

Fig. 18, is a similar view illustrating the pontoons in the modified form in another position of adjustment.

As shown in the drawings:

The hull of the vessel consists of a long cylindrical shell 1, which is pointed at its forward and stern ends, as denoted by the reference numerals 2 and 3, respectively. Riveted, electrically welded or otherwise secured on the exterior of the cylindrical hull member 1, for almost the entire length on each side of said cylindrical member are longitudinally extending rib members 4, 5 and 6, respectively, those on one side exactly similar and identical to those on the other side of the hull member 1. Secured along the bottom of the cylindrical shell member 1, is a longitudinal rib member 7, affording a keel for the vessel.

As clearly shown in Fig. 3, and in other views, the interior of said cylindrical hull section 1, is reinforced by transversely and vertically extending bulk heads 8, 9, 10, 11, 12 and 13, thus dividing the interior of the vessel into a number of compartments or chambers, access to and communication between each of which may be had by water tight doors or other well known mechanisms, but since the same form no part of this invention, are not shown nor described. The junction of the two top rib members 6, on the top surface of the cylindrical shell 1, of the hull, forms substantially a horizontal deck, and secured to the hull of the vessel upon the upper side thereof substantially amidships, are two conning towers 14 and 15, respectively, communicating with the interior of the vessel.

As clearly shown in Fig. 4, two stair cases 16, are provided within the hull of the vessel each leading up to a platform 17, within one of the conning towers, and acting to brace the towers is a sheet metal roof 18, affording a shelter for the deck space between the conning towers. The forward conning tower 14, is provided with a curved glass window 19, and a steering wheel 20, is mounted on the forward wall within said conning tower, whereby the vessel may be steered. A cable 21, trained about the hub of said steering wheel 20, is led downwardly and through suitably disposed idler sheaves within the hull of the vessel to the stern, and is there coiled about a large sheave 22, mounted upon a rudder shaft 23, which extends outwardly through suitable packing means in the hull of the vessel, and is provided with a rudder blade 24. A four cylinder or other suitable engine 25, is mounted in one of the stern compartments of the vessel, and serves to drive a propeller shaft 26, through a suitable clutch mechanism 27, and secured on the outer end of said propeller shaft in the usual manner of ship construction, is a propeller wheel 28. A skylight structure 29, is provided for the engine compartment of the vessel, having ventilators 30, mounted thereon so that complete ventilation of the engine compartment is at all times assured.

The pontoons on the exterior of the sides of the hull of the vessel by which the buoyancy thereof may be changed to change the draft of the vessel, are each denoted by the reference numerals 31, and the means of connection thereof to the hull of the vessel and the mechanisms for operating the same are identical in every respect.

As clearly shown in Fig. 1, the longitudinal rib elements 5, on the exterior of the hull of the vessel on each side thereof, are cut away, affording one part of a hinge connection for the pontoons 31, and each of said pontoons is provided with a long hinge member 32, for coaction therewith. Extending through said respective hinge members is a pintle sleeve element 33, having an actuating shaft 34, mounted therewithin. Mounted on the side walls of the hull of the vessel, on the exterior thereof, are watertight compartment members 35, through which said shafts 34, extend, and mounted on each of said shafts within said compartment members in each compartment is a worm gear 36.

As clearly shown, the walls of each of the pontoons 31, are recessed inwardly as denoted by the reference numeral 37, to fit around said compartment members 35, so

that easy movement of said pontoons may readily take place.

A pair of long longitudinally extending shafts 38, are provided mounted in suitable bearings on the interior side walls of the vessel, and near one end of said shafts, sprocket wheels are provided driven by a continuous sprocket chain 39, engaged over the sprocket wheels on both of said shafts 38, and about a sprocket wheel provided on a clutch mechanism 40, affording connection to the engine 25. Journaled transversely in the walls of the vessel at each end of each of the shafts 38, are shafts 41, and a bevel pinion 42, is provided on each end of each shaft 38, each meshing with a bevel pinion 43, provided on a shaft 41, to drive said shaft thereby. Secured upon each of said shafts 41, is a worm 44, adapted to mesh with one of the respective worm wheels 36, so that thus the respective actuating shafts 34, are each driven at each end.

For the purpose of holding the pontoons 31, in place in different positions of adjustment thereof, cables 45, are secured to rings 45[a] rigidly secured on said pontoons as clearly shown in Fig. 10, with one outer end of each cable secured to a winch drum 46, and the other outer end trained downwardly about an idler sheave 47, mounted in a recess on the exterior of the hull of the vessel, and upwardly through a well 48, to another winch drum 49, mounted on the upper deck of the vessel adjacent the drum 46, there being one of said cables 45, and a pair of winch drums therefor at each end of each of the pontoons. In the form of device illustrated in Figs. 17 and 18, the main hull member of the vessel is denoted by the reference numeral 49, and the shiftable pontoons by the reference numerals 50, said pontoons being shiftable by mechanisms (not shown) similar to those already described, into either one of the two uppermost sets of recesses provided therefor dependent upon the load carried by the vessel, and the draft required.

The operation is as follows:

In fair weather, when it is desired to travel at a high rate of speed or with light draft the pontoons are swung downwardly into the position shown in Fig. 13, thus lowering the center of buoyancy with respect to the axis of the vessel, and as well lowering the center of gravity thereof, yet affording a broad flotation surface, so that the vessel draws but little water, and is still exceedingly stable. At high rates of speed, the vessel may actually plane over the surface of the water owing to its slight draft, and it is obvious that a craft of such description forms an ideal means of navigating uncharted, or shallow rivers and streams.

However, in stormy weather, if it is desired to increase the stability of the vessel, and to reduce rolling and pitching thereof in a rough sea, the pontoons 31, are swung into the upward position shown in Fig. 14, thereby elevating the center of buoyancy with respect to the axis of the vessel, so that a greater draft displacement of the vessel occurs and owing to the fact that the center of gravity is then considerably below the water line, the vessel is exceedingly stable.

For the purpose of operating said pontoons, into either of the adjusted positions thereof, the clutch 40 in the engine compartment of the vessel, is operated to drive the continuous chain 39, by the engine, and thereby operate both of the longitudinal shafts 38, on each side of the interior of the hull, whereby all of the shafts 41, two of which are provided on each side of the hull, are driven to operate the respective worm wheels 36, by which the hinge shafts 34, are driven and said pontoon members therewith. When the pontoons are shifted by the power mechanism of course, the winch drums 46 and 49, are first released to loosen the cables 45. After the pontoons have been moved into adjusted positions by the power mechanism, the winch drums are operated to tension the cables 45, to permit the same to assist in holding the pontoons secured in their respective positions of adjustment. The peculiar construction of the hull affords a very rigid construction, so that the space between the outer irregular shell and the inner cylindrical shell may be utilized for the carrying of ballast, fuel or cargo.

The longitudinally extending rib members on each side of the hull of the vessel serves not only as receptive means for the pontoons but further prevent rolling of the vessel in a heavy sea. The air compartments within the pontoons may be utilized if desired for storage space in carrying cargo or supplies or even ballast if found necessary. Due to its construction, that is its separate compartment interior, and multi-compartment additional flotation means in the form of the pontoons, the vessel is practically non-sinkable.

I am aware that various details of construction may be varied through a wide range without departing from the principles of this invention, and I therefore do not purpose limiting the patent granted otherwise than necessitated by the prior art.

I claim as my invention:

1. A vessel of the class described comprising a hull, recesses formed on the exterior thereof, and flotation means adjustable into different recesses to change the draft of the vessel.

2. A vessel of the class described comprising a cylindrical hull, an irregular reinforcement shell secured on the exterior thereof affording a plurality of recesses, and flotation means adjustable into different sets

of said recesses to vary the draft of the vessel.

3. A vessel of the class described comprising a hull, an exterior reinforcement shell secured thereto affording a plurality of recesses on the exterior of the vessel, longitudinal flotation members adjustably mounted on the exterior of the hull adapted to be positioned in different recesses to vary the draft of the vessel, and means on the interior of the vessel for shifting said flotation members.

4. A vessel of the class described comprising a shell, rib members secured on the exterior thereof to reinforce the same, and affording a plurality of longitudinal recesses on the hull of said vessel, and buoyant members adjustable into different recesses on the exterior of said hull to change the center of buoyancy of the vessel.

5. A vessel of the class described comprising a hull, recesses formed on the exterior thereof, and flotation means pivotally mounted and adjustable into different recesses to change the draft of the vessel.

6. A vessel of the class described comprising a hull, an irregular reinforcement shell secured on the exterior thereof affording a plurality of recesses, and flotation means pivotally mounted and adjustable into different sets of said recesses to vary the draft of the vessel.

7. A vessel of the class described a hull, an exterior reinforcement shell secured thereto affording a plurality of recesses on the exterior of the vessel, longitudinal flotation members pivotally mounted on the exterior of the hull adapted to be positioned in different recesses to vary the draft of the vessel, and means on the interior of the vessel for shifting said flotation members.

8. In a device of the class described, a closed hull, longitudinal recesses formed on the exterior thereof, pontoons shaped to fit in said recesses, a hinged connection between said pontoons and the hull, permitting the pontoons to be swung into different recesses, and interconnected power operated means on the interior of the hull for simultaneously operating said pontoons on the exterior of the hull.

9. In a device of the class described, a closed hull having recesses formed on the exterior thereof disposed longitudinally of the hull, means on the interior of said hull dividing the same into compartments, conning towers mounted on said hull, a rigid roof member extending between said conning towers affording a protection for the upper deck surface of the hull, long pontoon members hingedly mounted on the exterior of the hull adapted to fit in the recesses thereof to vary the center of flotation of the devices, and means for adjusting said pontoon members into different positions on the exterior of the hull.

10. A vessel of the class described comprising a hull pointed at each end, rib members secured along the exterior thereof affording a plurality of recesses, pontoon members hingedly mounted on each side on the exterior of the hull movable into different recesses to vary the draft of the vessel, and means operating said pontoons and holding the same confined in an adjusted position on the hull of the vessel.

11. In a vessel of the class described, a hull pointed at each end, rib members secured on the exterior surface thereof affording a plurality of longitudinal recesses, a flat deck surface on the upper portion of the hull, pontoons disposed on the exterior of the hull longitudinally thereof adapted to seat in the different recesses to vary the draft of the vessel, a pivot connection comprising a shaft extending longitudinally on the exterior of the hull for joining said pontoons thereto, and power mechanisms operated from the interior of the hull for shifting said pontoons to different positions on the exterior of the hull.

12. In a vessel of the class described, a hull, pontoons mounted on the exterior of the hull adjustable to different positions to vary the draft of the vessel, means operating through the connections of said pontoons to the hull to shift said pontoons on the exterior of the hull, cables connected to said pontoons adapted to be loosened during the shifting of said pontoons, means on said hull to receive said cables trained therearound, and mechanisms for tensioning said cables after the shifting of said pontoons to assist in holding said pontoons in their adjusted positions.

13. In a vessel of the class described, a hull, pontoons hingedly mounted on the exterior thereof, a shaft forming a part of the hinged connection of each pontoon, means driving said shafts to adjust the pontoons on the hull, cables connected to said pontoons, tubes formed on the hull through which the cables extend, and winch mechanisms for tensioning said cables after the adjustment of the pontoons to permit the cables to assist in holding the pontoons in their respective adjusted positions.

In testimony whereof I have hereunto subscribed my name in the presence of two subscribing witnesses.

ALBERT E. COOK.

Witnesses:
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EARL M. HARDINE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."