Dec. 28, 1937. W. CAMPBELL 2,103,708

DEVICE FOR HANDLING BOATS AND OTHER LOADS

Filed Jan. 7, 1935 7 Sheets-Sheet 1

Fig. 1

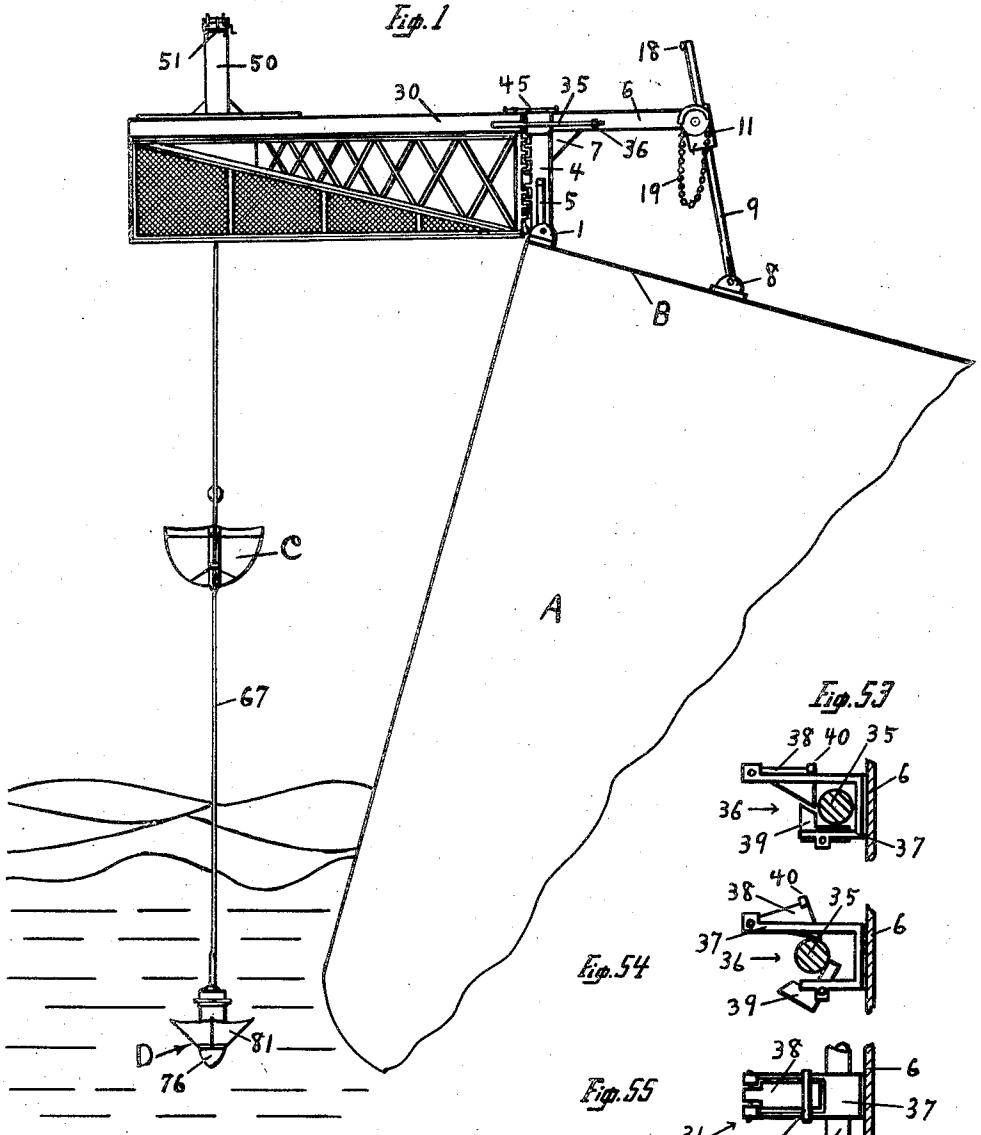

Fig. 53

Fig. 54

Fig. 55

INVENTOR.
Willard Campbell
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Dec. 28, 1937. W. CAMPBELL 2,103,708

DEVICE FOR HANDLING BOATS AND OTHER LOADS

Filed Jan. 7, 1935 7 Sheets-Sheet 2

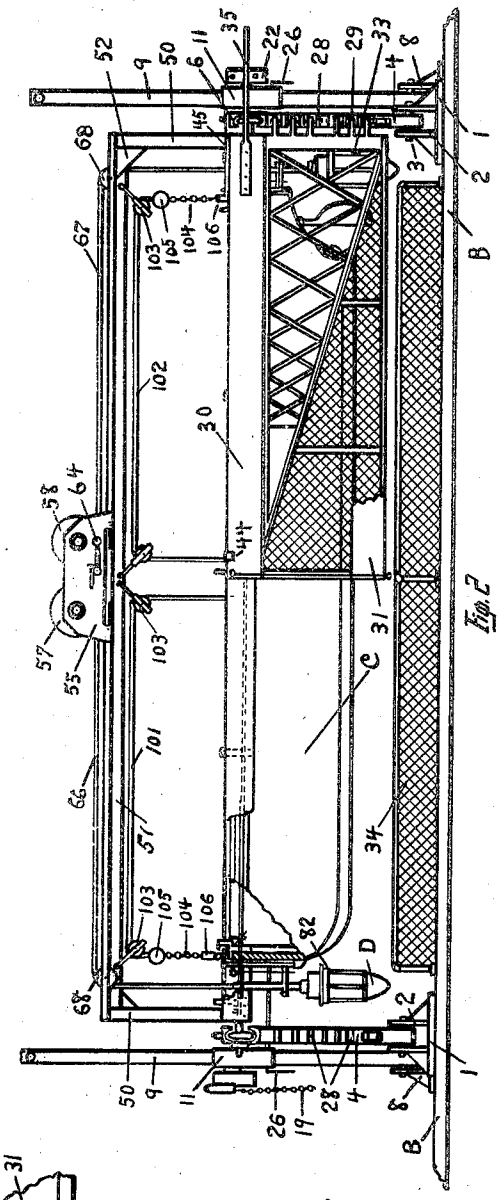

Fig. 2

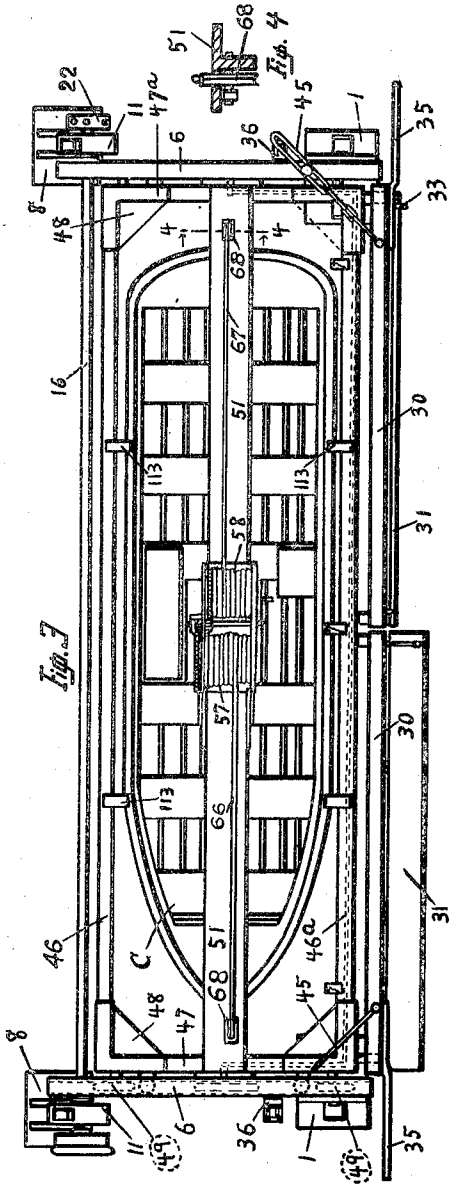

Fig. 3

Fig. 4

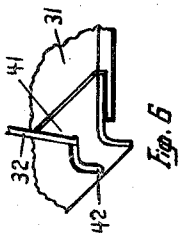

Fig. 6

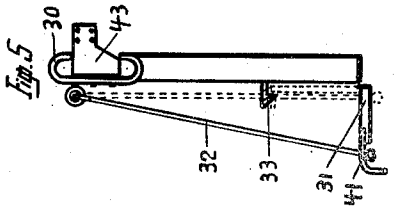

Fig. 5

INVENTOR.
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Dec. 28, 1937. W. CAMPBELL 2,103,708

DEVICE FOR HANDLING BOATS AND OTHER LOADS

Filed Jan. 7, 1935 7 Sheets-Sheet 3

Fig. 7

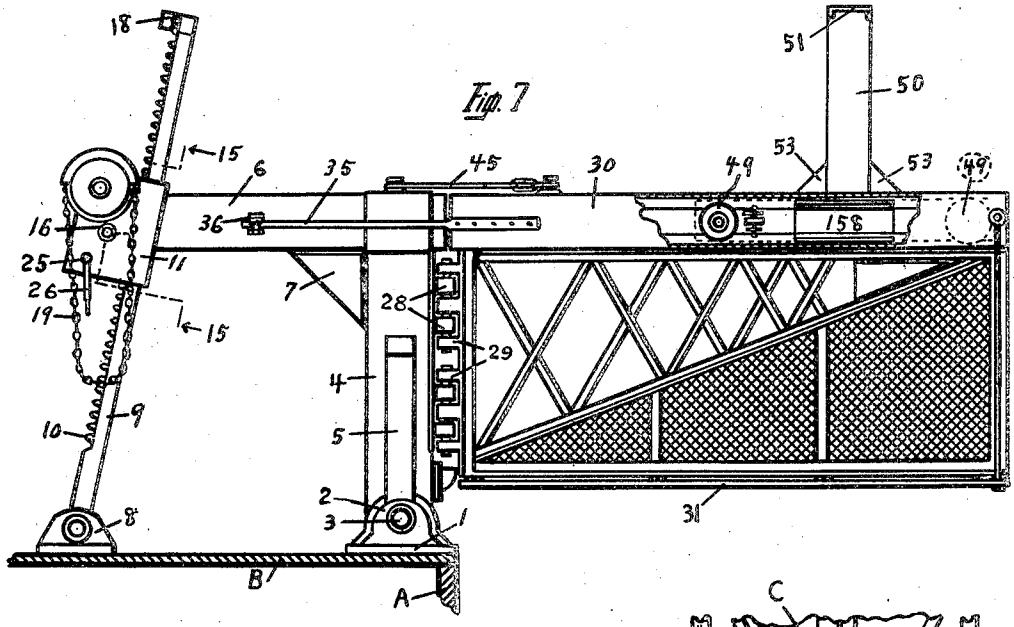
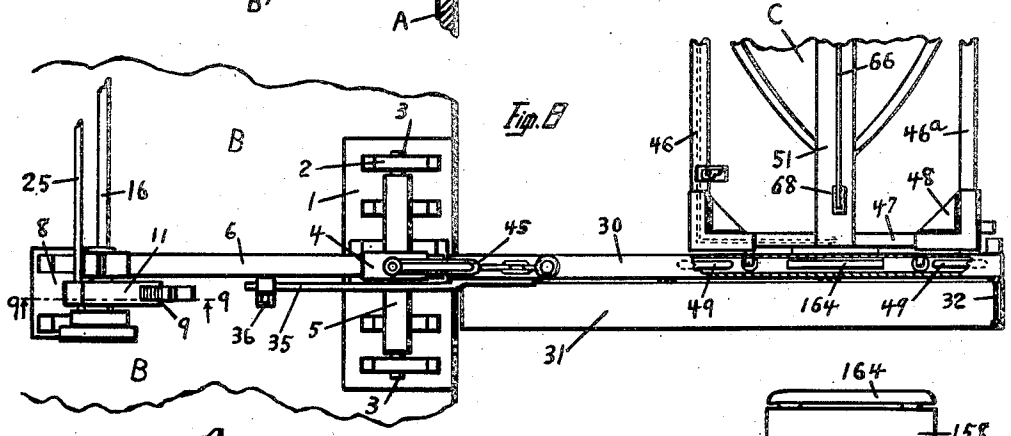


Fig. 8



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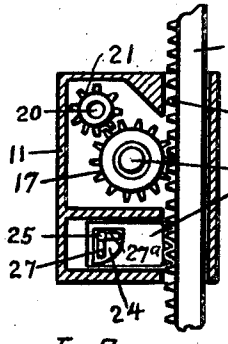


Fig. 10A

Fig. 10

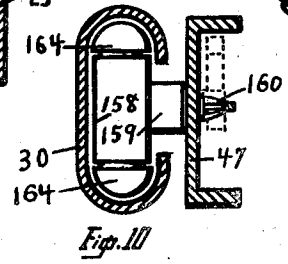


Fig. 12

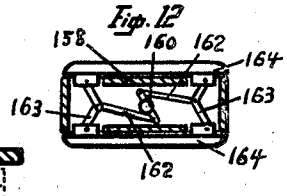
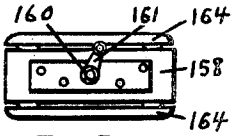


Fig. 11

Fig. 13



INVENTOR.
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BY Samuel E. Foulds
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Dec. 28, 1937. W. CAMPBELL 2,103,708

DEVICE FOR HANDLING BOATS AND OTHER LOADS

Filed Jan. 7, 1935 7 Sheets-Sheet 4

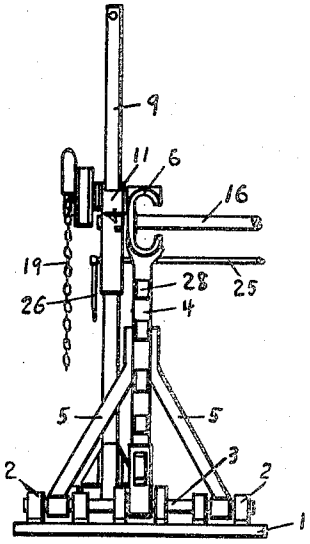

Fig. 14

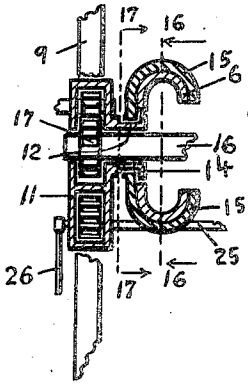

Fig. 15

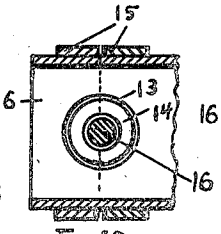

Fig. 16

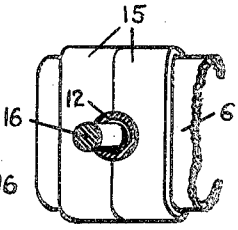

Fig. 17

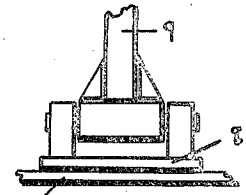

Fig. 18

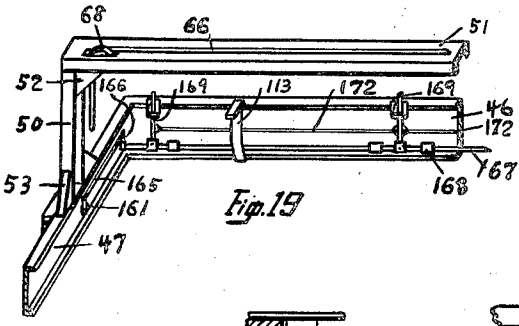

Fig. 19

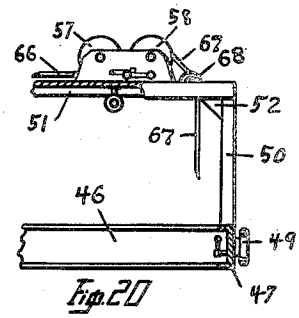

Fig. 20

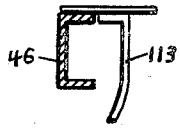

Fig. 21

Fig. 23

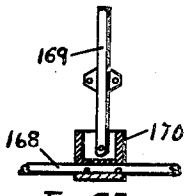

Fig. 25

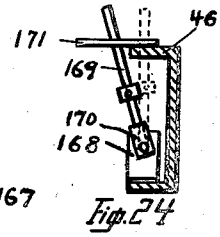

Fig. 24

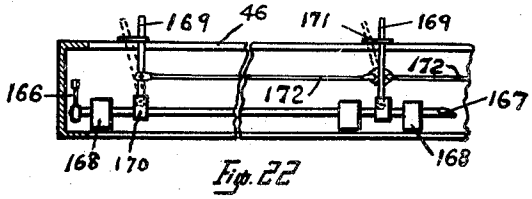

Fig. 22

INVENTOR.
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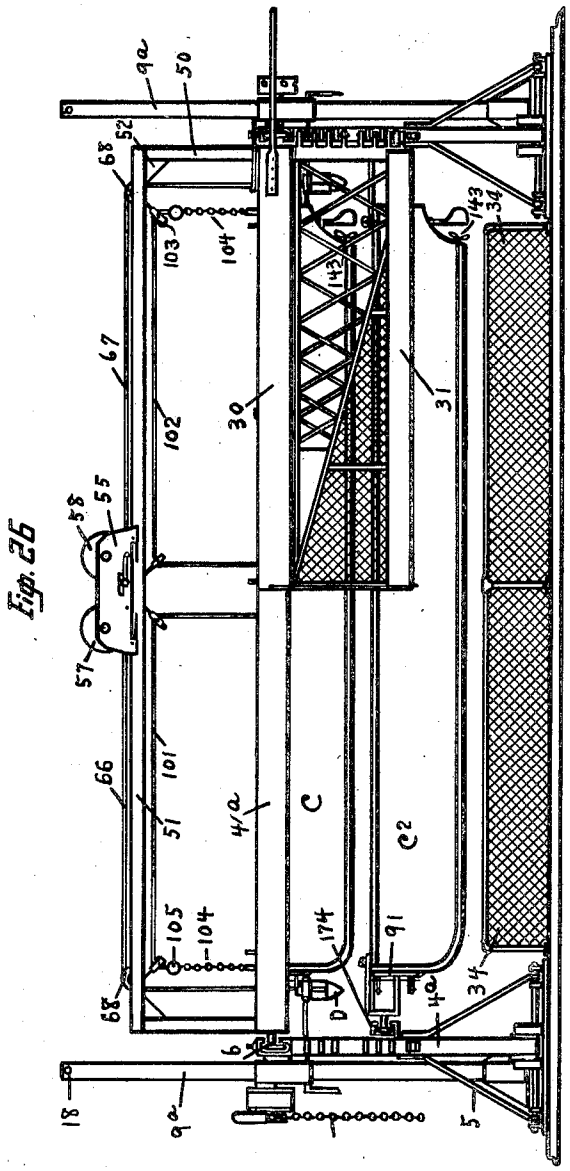
BY James E. Foote

ATTORNEY.

Dec. 28, 1937. W. CAMPBELL 2,103,708

DEVICE FOR HANDLING BOATS AND OTHER LOADS

Filed Jan. 7, 1935 7 Sheets-Sheet 5



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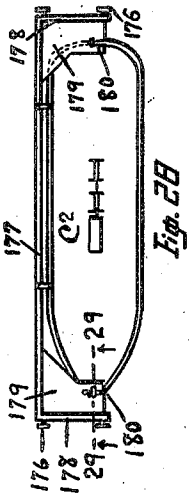

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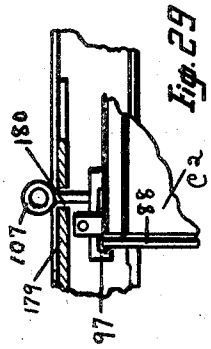

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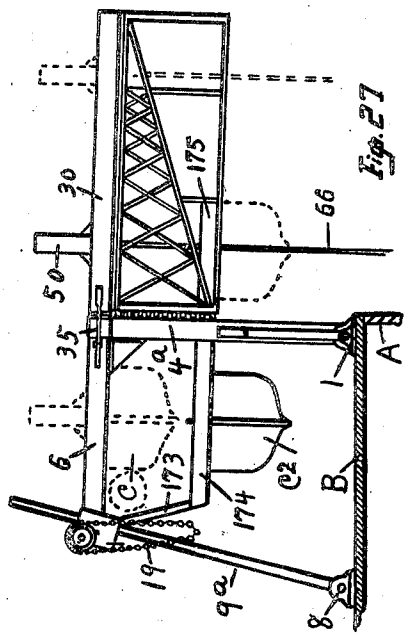

Fig. 27

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BY Samuel E. Frank

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Dec. 28, 1937. W. CAMPBELL 2,103,708

DEVICE FOR HANDLING BOATS AND OTHER LOADS

Filed Jan. 7, 1935 7 Sheets-Sheet 6

Fig. 30

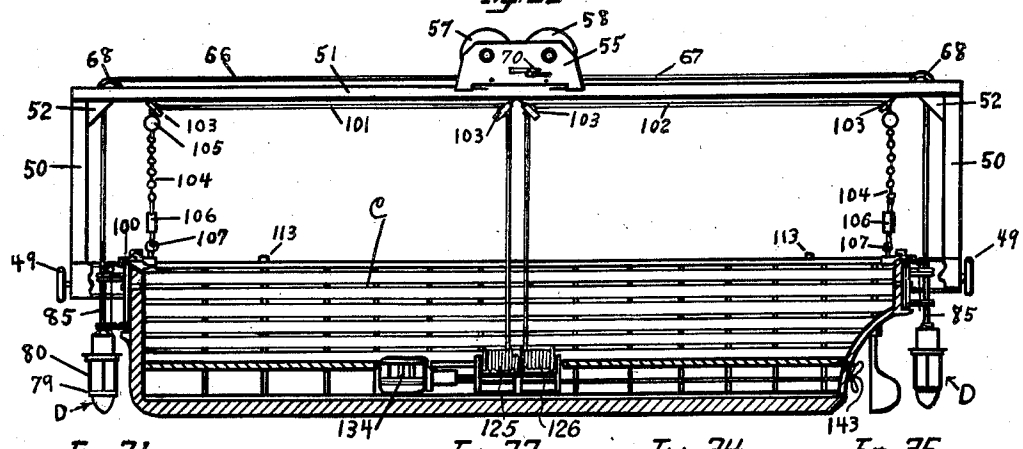
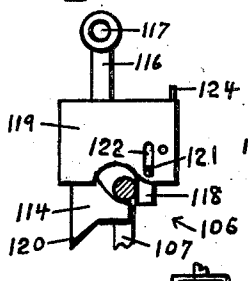


Fig. 31



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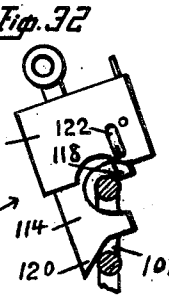


Fig. 33

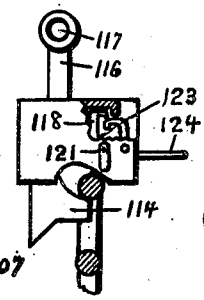
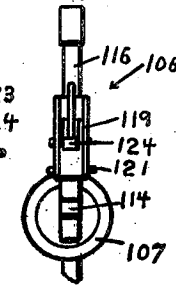


Fig. 34



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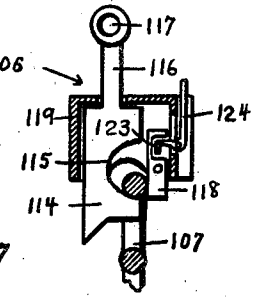


Fig. 36

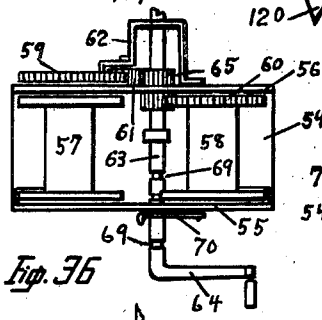


Fig. 37

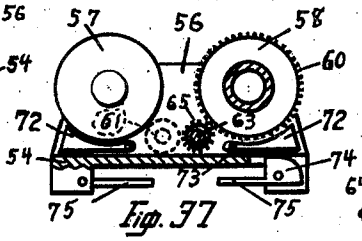


Fig. 38

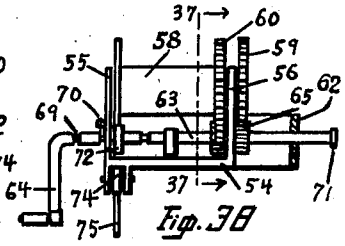


Fig. 39

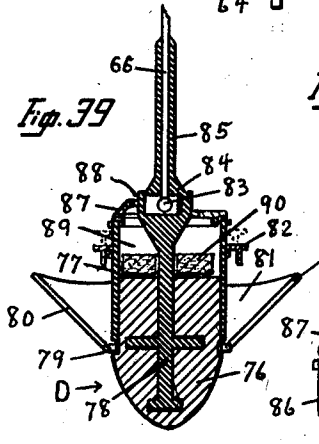


Fig. 40

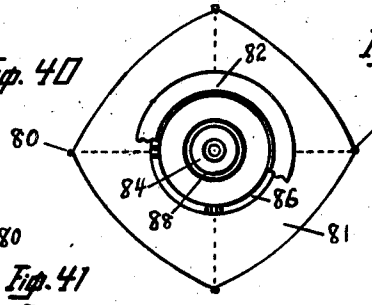
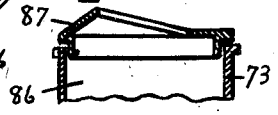


Fig. 41



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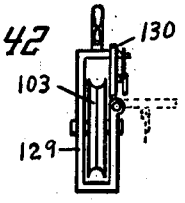

INVENTOR.
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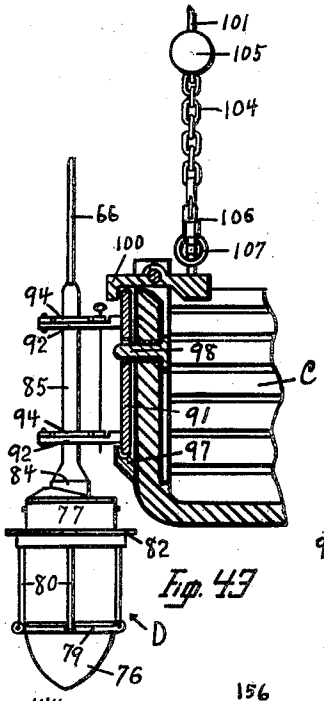
Dec. 28, 1937. W. CAMPBELL 2,103,708

DEVICE FOR HANDLING BOATS AND OTHER LOADS

Filed Jan. 7, 1935 7 Sheets-Sheet 7



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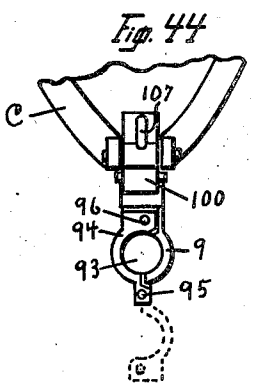

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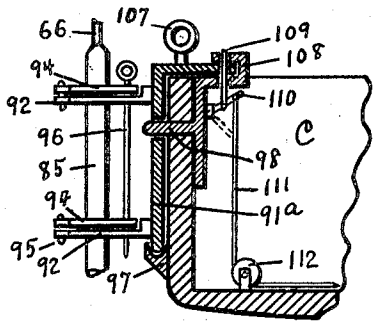

Fig. 45

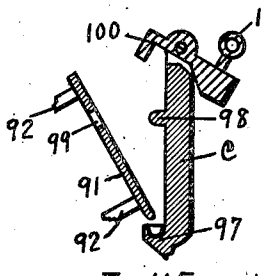

Fig. 46

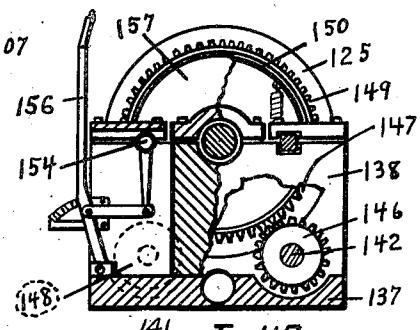

Fig. 49

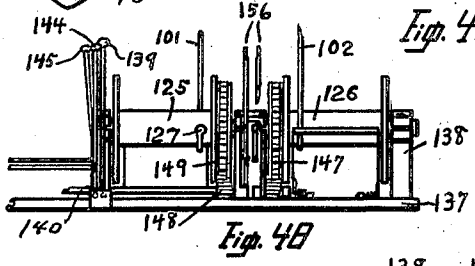

Fig. 48

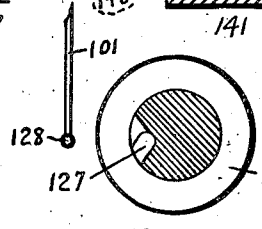

Fig. 50

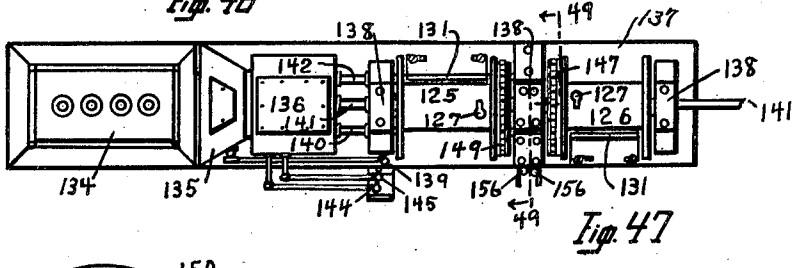

Fig. 47

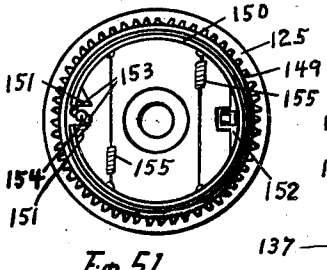

Fig. 51

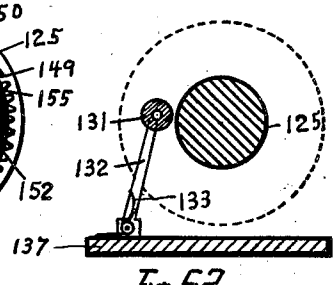

Fig. 52

INVENTOR.
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BY

ATTORNEY.

Patented Dec. 28, 1937 2,103,708

UNITED STATES PATENT OFFICE

2,103,708

DEVICE FOR HANDLING BOATS AND OTHER LOADS

Willard Campbell, Los Angeles, Calif.

Application January 7, 1935, Serial No. 677

12 Claims. (Cl. 9—22)

This invention relates, generally, to apparatus for raising and lowering boats or other devices or loads from or toward the water, the same being an improvement on the apparatus disclosed in my Patent No. 1,913,830, granted June 13, 1933. As stated therein, while the invention is designed with special reference to the handling of life-boats, and while the details disclosed particularly adapt it for that purpose, it is capable of more general use and the illustrations and description herein given are not intended as limitations upon the invention but as merely an example of a use to which it is adapted.

Assuming, therefore, that the invention is to be used for handling life-boats, it will usually be installed on a ship or vessel, as is the general practice. However, it may be installed elsewhere, as on the docks at life-saving stations, at lighthouses or on various supporting structures. Wherever used, its general purposes are to enable the boat or other load to be raised from or lowered to the water in safety and while under perfect control; to prevent the boat from swaying, due to high waves, and from bumping or crashing against its supporting structure, whatever it may be; to prevent the boat from tipping sidewise before it is launched or cast off; to enable the boat to be readily, and preferably automatically, cut adrift from its cables when it is once launched, or to be readily stored when it is hoisted from the water, and to prevent the cables from becoming slack and kinking due to the rise and fall of the boat with the waves. When the invention is used aboard ship, a further object is to clear the boat from the side of the ship so that it may be lowered or raised without contact with the latter notwithstanding the heavy listing of the ship or the roughness of the seas.

At present, it is the usual practice to lower and raise life-boats by means of davits which are extended upwardly in spaced relation near the side edges of the deck. These davits are curved so that, when turned on their vertical axes, their upper ends may be swung inwardly over the deck or outwardly beyond the latter, a pulley being carried upon the said ends. When the davits are swung outwardly, these pulleys hang beyond the plane of the ship's side and the life-boat, suspended from the pulleys of a pair of davits, is then in position to be lowered or raised. However, but little clearance is allowed or possible for the boat so that in rough water, it is almost certain to bump against the side of the ship which frequently results in crushing the boat. If the ship be listed toward the side carrying the boat, the latter may usually be lowered or raised without serious difficulty in this regard; but if the ship be listed in the opposite direction or away from the side carrying the davits, the boat can be lowered but a short distance before it contacts with the inclined side of the ship so that further downward movement is prevented or is attended with great danger of overtipping the boat. If, in addition to this condition, the sea be rough so that the ship is rocked, disaster is almost inevitable.

In my invention the boat is suspended from a traveling carriage which is normally supported upon a cradle or stand having tracks thereon for the carriage wheels. The tracks of this cradle terminate within the vertical plane of the ship's side; but the cradle is provided with a pair of gate-like members which are pivoted thereto so that they may be swung out over the side of the ship. These members, which will herein be termed gates, are provided with tracks corresponding to the respective tracks of the cradle. When the gates are opened or swung outwardly, the tracks of the gates form continuations of the tracks of the cradle, and the carriage with its suspended boat may be moved as far out on the gates as may be necessary to permit the boat fully to clear the side of the ship. The carriage may be moved out upon the gates by hand, or various means may be employed for that purpose. However, I prefer to use the gravity system, which is made possible by pivoting the cradle upon the deck so that the tracks on the cradle and gates may be tilted in vertical planes. By thus pivoting the cradle, the tracks may be tilted downwardly at a slight angle from the horizontal notwithstanding the list of the ship, braking means being provided to control the outward movement of the carriage. Further, the tracks may be tilted upwardly above the horizontal to cause the carriage to roll back over the deck after the boat has been lifted. The boat may be raised either by hand or motor power, preferably the latter, as shown; and the motor for this purpose may be placed either on the carriage or within the boat itself. In my said patent I have shown the motor in both of these positions. However, it is preferred to locate the motor in the boat, and it is so disclosed herein. With this construction, the said motor is used both for hoisting the boat and for propelling the same through the water, suitable mechanism being provided for transferring its power from the hoisting drums to the propeller, or vice versa,

as well as for braking the drums so as to hold the boat on an even keel while in the air.

In its simpler form each cradle is provided with a single life-boat. In some installations this form is deemed the more practicable, notwithstanding the objection that, in case of a disaster at sea, but one boat can be launched from a unit of the invention. In another form the cradle carries a plurality of life-boats which are so mounted that, after one boat has been launched another may be taken up by the carriage and run out on the gates to launching position.

The above named and other features will be specifically set forth in the following specification and claims. Numerous details must necessarily be shown and described; but it is to be understood that the said claims are not intended to be limited thereto any further than the specific terms employed render necessary.

In the drawings, Fig. 1 is a side elevation of my invention in its simpler form, showing the same on a vessel which is listed, the life-boat being in mid-air and the steadying cables and weights lowered; Fig. 2 is a front elevation of the invention in its simpler form and in its normal position, the left-hand gate being omitted and other parts broken away for clearer illustration; Fig. 3 is a plan view of the structure shown in Fig. 2, both gates being closed; Fig. 4 shows a cross-section taken on the plane represented by the line **4—4** of Fig. 3; Fig. 5 is an end elevation of one of the gates; Fig. 6 is a detail of the structure shown at the lower part of Fig. 5; Fig. 7 is an elevation of the invention as it appears from the far side of Fig. 1, a portion of the rail of the nearer gate being broken away to disclose the end of the carriage and its brake; Fig. 8 is a plan view of the structure shown in Fig. 7, only the first or nearer gate appearing and the carriage having a life-boat suspended therein; Fig. 9 is a sectional view taken through the casing of the gearing for tilting the cradle, as on a line **9—9** of Fig. 8, although the parts are on a somewhat enlarged scale; Figs. 10 to 13 show details of the carriage brake and parts of the operating mechanisms therefor; Fig. 14 is a front elevation of the left-hand end of the cradle; Fig. 15 is a sectional view through the casing of the gearing for tilting the cradle, the view being taken on line **15—15** of Fig. 7; Fig. 16 and 17 are sectional views on lines **16—16** and **17—17** respectively of Fig. 15, showing the means of attachment of the gear casing to the rail of the cradle; Fig. 18 is a view of the lower end of one of the racks for rocking the cradle, showing the pivotal mounting therefor; Fig. 19 is an isometric view of the rear, left-hand corner of the boat carriage showing the mechanism for operating the brakes thereon; Fig. 20 is a front elevation of the right hand end of the carriage showing the hoisting mechanism for the steadying weights located on the bridge adjacent said end; Fig. 21 shows one of the yielding members on the carriage for holding the boat stationary in its raised position; Figs. 22, 23, 24 and 25 illustrate details of the brake-operating mechanism for the boat-carriage; Fig. 26 is a view similar to Fig. 2 but showing a modified form of the invention in which the cradle and the gates are provided with means for holding and launching a plurality of life-boats; Fig. 27 is an end elevation of the structure shown in Fig. 26, the view being similar to that of Fig. 7 which shows the simpler form; Fig. 28 is a plan view, on a reduced scale, of the lower life-boat of Figs. 26 and 27 and of the carriage therefor; Fig. 29 is a sectional view on line **29—29** of Fig. 28; Fig. 30 is a vertical sectional view taken longitudinally through the boat and carriage near the central plane thereof, the boat and the steadying weights being in their fully raised positions; Figs. 31 to 35, inclusive, show the hook by means of which the boat is connected with its supporting cables; Figs. 36, 37 and 38 are, respectively, a plan, a section through and a side elevation of the weight-hoisting mechanism shown in Fig. 30, the section of Fig. 37 being taken on a vertical plane represented by the line **37—37** of Fig. 38; Fig. 39 is a sectional view taken vertically and centrally through one of the steadying weights, the umbrella-like canvas structure being open, as in Fig. 1; Fig. 40 is a plan view of the said weight, a part being broken away for clearer illustration; Fig. 41 is a sectional view of the upper part of the weight-shell shown in Fig. 39 but being somewhat enlarged; Fig. 42 is a detailed view of one of the cable pulleys or snatch-blocks on the carriage; Fig. 43 is a central, vertical section through one end of the boat showing one of the steadying weights and cables and the means for attaching them to the boat so as to be automatically released when the boat comes to rest on the water; Fig. 44 is a plan view of the end of the boat and the said attaching means; Fig. 45 is a view similar to Fig. 43 but showing a modified structure of attaching means; Fig. 46 shows a part of the attaching means of Fig. 43 but in their released position; Fig. 47 is a plan view of the motor and hoisting equipment of the life-boats; Fig. 48 is a side elevation of the hoisting drums shown in Fig. 47 and of the means for controlling them; Fig. 49 is a transverse section on the vertical plane represented by line **49—49** of Fig. 47; Fig. 50 is a transverse section through one of the hoisting drums showing the key-hole slot structure for holding and automatically releasing the end of the hoisting cable; Fig. 51 is an end view of one of the drums showing the brake therefor; Fig. 52 shows a detail of the means for controlling the cable as it is wrapped on the drum; Figs. 53 and 54 are side elevations of the latch for holding a gate in its open position, and Fig. 55 is a plan view of the said latch.

In Fig. 1, there is shown a portion of a ship or vessel A, upon the deck, B, of which my invention in its simpler form is mounted. The gates are open and a life-boat, C, is shown suspended above the water, being held from swaying or tipping by the steadying cables which extend for a considerable distance into the water where they are each attached to a steadying weight, D. There are two of these weights and cables for each unit of the invention although but one of each is shown in this view since they are presumed to be in direct alinement with each other. The vessel A is shown as listed at an angle of some fifteen degrees, notwithstanding which the gates slope downwardly toward their outer ends so that the carriage, supporting the boat C and weights D, will move outwardly by gravity until the boat is in position to clear the side of the vessel with a large margin of safety. Some distance back from the edge of the deck means are provided for tilting the gates into the desired angle with respect to the horizontal. While but a single unit of my invention is shown, each vessel equipped with the invention would be provided with such a number of units as would be required in launch-

ing the life-boats necessary for holding all persons aboard the vessel.

Closely adjacent the outer edge of the deck B are pivot blocks 1, there being a pair of these blocks for each unit of the invention. As will be noted from Fig. 2, the blocks of a pair are spaced apart a distance somewhat greater than the length of the life-boat C. Each of the blocks comprises a base plate and a plurality of upwardly projecting supports or journals 2 for a pivot pin or pintle 3. Pivoted at their lower ends upon these pintles are the upright members 4 of the pivoted cradle. To hold these members from tilting sidewise, they are provided with side braces 5, as best shown in Fig. 14, the lower and outer ends of which are pivoted on the pintle 3, which is preferably extended for some distance from the upright 4 and is supported by a plurality of the bearings 2. At their upper ends, the members 4 are each provided with an arm 6 which projects rearwardly therefrom at substantially a right angle, forming therewith a rigid L-shaped pivoted structure. In cross-section, the arms are C-shaped to form tracks for the carriage wheels, as hereinafter more fully described. The arms and uprights are held rigid by corner braces 7, as best shown in Fig. 7. Each unit of the invention comprises a pair of these L-shaped structures which, taken together, constitute the pivoted cradle of that unit. For clearness, the C-shaped arms 6 will hereinafter be designated cradle-rails. The cradle is pivoted upon the pintles 3 and is rocked in a vertical plane by means now to be described.

Fixedly secured to the deck B at the rear of each of the pivot blocks 1, is a block 8 within which is pivoted the lower end of a rack-bar 9 (see Fig. 18). Upon either its rear or its front side, the bar is provided with gear teeth 10. In Figs. 7 and 9, for example, the teeth are upon the rear side of the rack-bar whereas, in Fig. 1, they would be on the front side thereof. It is a matter of choice which side of the bar is thus toothed. Each of these rack-bars is extended upwardly from its pivot block through a gear casing 11 which is pivotally secured to the adjacent cradle-rail 6. As shown in Figs. 15 and 17, the casing is provided with a sleeve 12 which extends into an opening 13 in the side web of the cradle-rail, a flange 14 being secured in any suitable manner to the end of the sleeve. Bolted or otherwise attached to the cradle-rail is a pair of C-shaped clamping members 15, the abutting edges of which fit about the sleeve 12 and engage the flange 14. By this means, the gear casing is pivoted within the cradle-rail and is firmly attached thereto. Extending across the cradle from one gear-casing 11 to the other and journaled within the said sleeves 12 and the outer sides of the casings, is a shaft 16, the same having a pinion 17 at each of its ends and within the respective casings 11. These pinions mesh with the teeth 10 of the respective racks 9 and, when turned, cause the casings to slide up or down on the racks, as is obvious. To prevent the casings from sliding too far upwardly, the racks are each provided with a stop-member 18 at its upper end. Any suitable means may be employed for rotating the shaft 16, but I prefer to use the well-known chain-hoist, as shown. By pulling upon one side or the other of the loop of the endless chain 19, a short shaft 20, journaled in the gear casing 11, is rotated and a pinion 21 thereon, meshing with the pinion 17, rotates the latter and the shaft 16. While, if desired, a chain-hoist may be employed at the right-hand end of the shaft, as viewed in Fig. 2, I prefer to use at that end a simple drum 22 having radial sockets therein to receive hand levers. By pulling on such levers the shaft may be turned by manual power in case something should go wrong with the chain-hoist.

While the resistance offered by the chain-hoist is ordinarily sufficient to hold the shaft 16 from unintended rotation, I prefer to employ means for positively locking said shaft. Such means is shown in Fig. 9, the same consisting of a sliding block 23 having gear teeth thereon to mesh with the teeth 10 of the rack bar. The block has a quadrant-shaped opening 24, through which projects a rock-shaft 25 which is journaled in the gear-casings 11 and is extended across the cradle from one of said casings to the other. At one, or preferably both, of its ends, the shaft is provided with a crank 26. From the shaft projects a pair of lugs or cams 27, 27^a at a substantially right angle to each other. These lugs are within the opening 24 of the block and are adapted to slide the latter back and forth as the shaft is rocked, thus to lock the block when in either of its two positions. It is obvious that, when the teeth of the block mesh with the teeth of the rack-bar 9, the gear casing cannot move and the shaft 16 cannot turn. Consequently, the cradle is positively held at whatever angle it may thus have been tilted.

The front side of each of the uprights 4 is provided with rigid hinge members 28 which cooperate with complementary hinge members 29 on the gates whereby the gates are hinged to the cradle. These gates are adapted to be closed so as substantially to meet at their free ends, as shown in Fig. 3, or to be opened, as in Fig. 1, so as to extend out at substantially right angles from the deck of the ship and in the planes of the cradle-rails 6. The upper horizontal member 30 is C-shaped in cross-section, corresponding in that regard to the cradle rails. For clearness, the members 30 will hereinafter be designated gate-rails. When the gates stand open, the gate-rails are in alinement with and form virtual continuations of the cradle-rails, so that the carriage, later described, may pass from one to the other. The gates may be fabricated in any manner consistent with good engineering practice, it being borne in mind that the gates project far out from their hinges and are required to support a heavy load when the carriage is at their far ends and the life-boat is loaded. Consequently, they must be very strong and rigid. It is deemed unnecessary to describe the particular structure of the gates shown further than to state that their height is approximately that of the uprights 4 to which they are hinged and that, at their lower and outer or forward edges, they are each provided with a foot-board or cat-walk 31. These are hinged to said edges of the gates and are adapted to be lowered, as shown at the left hand gate of Fig. 3, or raised to lie flat against the front of the gate, as shown at the right-hand gate in said figure. They may be held in their lowered position by any suitable means, as by a rod 32 attached at its lower end to the outer edge of the foot-board and hinged at its upper end to the corresponding gate-rail 30, as shown in Figs. 5 and 7. Or, a chain may be used instead of the said bar. The foot-boards may be held in their raised positions by any suitable means, such as a latch 33 pivoted to the gate. The lower edges of the gates may be in any desired position above the deck. If they are some

distance above the latter, as in Fig. 2, the deck below them may be provided with a guard-rail **34**, as shown.

The gates are swung into their open positions by means of levers **35** which are fixed to the respective gates and project from their hinged ends; and they are held open by latches, which are generally represented by the numeral **36**. There is one of these latches for each gate, and it is located on the outer side of the corresponding cradle-rail **6** in position to hook over the lever **35** when the gate is fully open, as best shown in Fig. 8. One of these latches is illustrated in detail in Figs. 53, 54 and 55. It comprises a channel-shaped body member **37** which is secured to the cradle-rail **6**, as stated, with the channel opening outwardly to receive the lever **35** as the gate is swung open. Pivoted in the upper and outer part of the member is a latch member **38**, the same having an inclined lower and outer face positioned to be engaged and lifted by the lever as it enters the channel opening, as shown in Fig. 54. When the lever has fully entered, the latch falls, as shown in Fig. 53, to hold the lever in position. In the lower part of the body member is another pivoted latch member **39** of a reversed L-shape, the same being so pivoted as to be unbalanced and to hang open normally with the stem of the L projecting upwardly into the path of the lever **35** as it enters the channel. In so entering, the lever rocks the latch and causes the outer end thereof to rise behind the lever, as in Fig. 53. The lever is thus held by both the latch members **38** and **39**. To prevent the member **38** from dropping too far, it is provided with a stop-bar **40** which, in its lowest position, rests on the body member. This bar **40** serves also as a means for lifting the latch member **38** when it is desired to close the gate.

In Figs. 5 and 6 there is shown a preferred form of attachment between the foot-board **31** and its supporting rod **32**. At the forward edge of the board is secured a plate **41** which projects beyond said edge and is bent downwardly, as shown, leaving a space between the edge and the downward flange of the plate. The latter is provided with a slotted opening **42** at and across its bend, and through this opening the rod **32** extends, said rod having a ball or knob on its lower end and normally within said space. When the board is raised and is engaged by the latch **33**, the rod passes through that part of the slot which is in the flange of the plate and lies substantially against what was previously the lower side of the board. In their forward or swinging ends each of the gate-rails **30** is provided with a stop **43** which extends within the channel thereof to engage the carriage and prevent it from overrunning the rails. The gates may be held rigidly in their closed positions by any sort of means, such as a clip **44** at their adjacent ends. Further they may be held by a pivoted and slotted brace-bar **45**, such as is shown in Fig. 13 of my said Patent No. 1,913,830. This brace-bar does not require further description herein.

The carriage is a horizontal open rectangular frame having side members **46** and **46a** and end members **47** and **47a** secured rigidly together, with corner braces **48**, the frame having wheels **49** at or adjacent its four corners. The interior of the frame has a width but slightly greater than that of the life-boat C, as is clear from Fig. 3, while its length is somewhat greater than that of the said boat. The axles upon which the wheels **49** are mounted project through the side slots of the C-shaped cradle and gate-rails, and the wheels are within the said rails. If desired, power-driven means may be employed to turn the wheels, thus to move the carriage, as in Figs. 17 and 18 of my said patent. However, that is not necessary, since the carriage may be caused to travel by gravity simply by tilting the cradle, as has been described. At the mid-centers of the end members rise the ends of what I shall term the bridge. It is of inverted U-shape, having the uprights **50** at the ends and the horizontal member **51**, which spans the space between the upper ends of the uprights. In cross-section, the member **51** may be of any suitable shape, it being necessary that it be very stiff so as not to sag. In Figs. 2 and 3, it is a heavy T-bar as seen particularly in Fig. 4, while, in Figs. 7 and 19, it is a heavy channel-bar. Suitable corner braces **52** stiffen the bridge at its angles, and similar braces **53** hold the uprights rigidly on the end members **47** and **47a** of the carriage frame. On top of the bridge, and preferably at its longitudinal center, is the hoisting mechanism for the steadying weights D. In Fig. 20, however, this mechanism is located adjacent one end of the bridge, thus to show that the exact location of the mechanism on the bridge is not important. Its change of location involves a change in the relative lengths of the hoisting cables for the weights, as will be made clear hereinafter.

Various forms of weight-hoisting mechanisms may be employed, but that shown in detail in Figs. 36, 37 and 38 is, at present, deemed most suitable, due regard being had to the width of the bridge member **51** and the independent operation of the hoisting drums to provide for separate control of the steadying weights, if and when desired. This mechanism comprises a frame having a base-plate **54** and a pair of uprights **55** and **56** between which two parallel drums **57** and **58** are rotatably mounted, being journaled in said uprights. The drum **57** has connected therewith a large gear **59** on the outer side of the upright **56** while the drum **58** is provided with a similar gear **60** on the inner side of said upright. Also outside the upright **56** and in mesh with the gear **59** is an idler pinion **61** on a short shaft which is journaled in said upright and in a bracket **62**. On a shaft **63**, which is provided with a crank **64**, is a pinion **65** which is elongated to mesh simultaneously with both the gear **60** and the idler pinion **61**. When thus meshed, any rotation of the shaft **63** results in the simultaneous rotation of both drums in the same direction, thus to haul in or pay out the hoisting cables **66** and **67**. These cables lead off from the lower sides of the drums, extend outwardly along the upper side of the bridge member **51**, pass over pulleys **68** on said member and thence downwardly to the steadying weights D.

The crank-shaft **63** is provided with a series of peripheral grooves **69**, four of such grooves being present in the structure shown. On the outer side of the frame upright **55** is a pivoted latch **70** which is adapted to engage in said notches and hold the shaft from unintended endwise movement. When the latch is in engagement with the left-hand groove **69**, the pinion **65** is in mesh with the idler pinion **61** only, and the drum **57** is alone in gear with the crank-shaft. When the latch is in engagement with the next succeeding groove, as shown in Figs. 36 and 38, the pinion **65** is in mesh with both the

idler pinion and the drum gear 60, so that the rotation of the crank-shaft results in the simultaneous rotation of both drums in the same direction. When the latch is in engagement with the next groove, the pinion 65 is out of mesh with the idler 61 and in mesh with the gear 60 only so that the drum 58 alone is rotated when the crank-shaft is turned. When the latch is in engagement with the last of the grooves, the pinion 65 is out of mesh with both the pinion 61 and the gear 60 and both drums are free from the crank-shaft. It is when the drums are thus freed that the steadying weights are dropped, as shown in Fig. 1. To prevent the shaft from being drawn out too far, the end of the shaft is provided with a stop 71.

When either, or both, of the drums is free from the crank-shaft it is under control of brakes so that it may be held stationary or allowed to rotate under the pull of its weight and cable. The brakes are adapted to engage with the end-flanges of the drums adjacent the frame upright 55. The brakes and their operating mechanisms for the two drums are identical. They comprise a friction member 72 which is pivoted at 73 and is curved on its edge to engage with the periphery of the drum flange. The member 72 is rocked on its pivot by a cam 74 below it, the cam being pivoted between lugs on the base-plate 54. To rock the cam, it is provided with a handle or lever 75 which may be operated directly by hand or through mechanism connected therewith. Due to the control of the brakes and the independence of rotation of the drums, it is possible to raise and lower the steadying weights independently and to hold them wherever positioned.

The cables 66 and 67 are attached at their lower ends to their respective weights D, one of which is shown in vertical cross-section in Fig. 39. It comprises a body 76 of lead, or other suitable heavy substance, which is cast within an open-ended shell 77 and about an axially-positioned anchoring member 78, the latter having flanges or processes thereon to more firmly secure the member within the lead. Surrounding the body 76 below the shell is a ring 79 to which are pivoted arms 80, like the ribs of an umbrella. To these arms is attached a sheet 81 of a suitable flexible material, such as canvas. The arms are adapted to open outwardly, as in Fig. 39, to extend or unfold the canvas, or to close against the side of the shell 77, as in Fig. 2, in which latter position they are held by a flanged ring 82, which is adapted to slide up and down between limiting stops on the shell. While the weight is immersed and is falling, the canvas 81 is in folded condition, being so maintained by the movement through the water notwithstanding the fact that the holding ring 82 is lifted by the rush through the water and the arms 80 are free to open. While so folded, the canvas is pressed against the shell and exerts an outward pressure on the arms. When, therefore, the weight is brought to rest, the canvas forces the arms outwardly a distance sufficient to prevent them from being caught and detained by the ring 82, which also falls when the weight stops its downward movement. Thereafter, any upward movement of the weight results in fully opening the canvas; and, when so opened, the weight offers a great resistance to such upward movement. The cable, 66 or 67, is attached to the anchoring member 78 by a knot 83 on its end and within a chamber formed in an enlargement 84 on said member. Above said enlargement, the member is provided with a tubular extension 85, for a purpose hereinafter set forth. As will be noted, particularly from Fig. 40, the canvas 77 does not extend fully to the shell but leaves an annular space 86 about the latter to facilitate the upward movement of the weight as it is being hauled back to its normal position and also to permit the water to drain out of the umbrella-like structure formed by the opened canvas. The upper end of the shell 77 is closed by a cover 87 except for an annular space 88 about the enlargement 84. As shown in Fig. 39, the lead 76 does not extend to the upper end of the shell so that a chamber 89 is provided for oil. When in its normal position this chamber is kept full of oil so that, when the weight is dropped, the water enters the chamber through the space 88 and displaces the oil which floats outwardly on the water thus to still the waves, as is well understood. To facilitate this displacement one side of the cover 87 is made higher than the other which assumes a slight excess of hydraulic pressure on the lower side. Consequently the water enters at the lower side while the oil issues at the higher side. The rapidity of escape of the oil depends, of course, upon the width of the space 88; and, to prevent the too free escape of all the oil, I prefer to fill the chamber, more or less, with oakum or some similar material 90 to soak up part of the oil and then give it up slowly. The weights D are, of course, heavy and, being deep in the water, are scarcely affected by the waves. Consequently, the steadying cables are substantially anchored at their lower ends. In a large ship there may be as many as twelve or more life-boats at either side, each having two steadying cables and weights. When a weight is lowered, the ship cannot rock without lifting the weight in the water. With the canvas on the weight open, a very great resistance is offered to the lifting motion; and if all the weights or a considerable number of them be lowered, they combine in creating a very substantial steadying effect on the ship, tending to prevent or reduce rocking motion. Moreover, the weights tend to keep the ship on an even keel; for, if it be listed toward one side, the weights on that side need be advanced on the gates but a relatively short distance while those on the opposite side must necessarily be advanced much farther in order for the boat to clear the deck and side of the ship. This difference in positions of the weights affects the center of gravity of the ship and tends to hold it upright, much as if the cargo had been shifted.

Referring particularly to Figs. 43 and 46, inclusive, it will be seen that the life-boat C is provided at its end with a detachable plate 91, the same having a pair of spaced eye-members 92 projecting outwardly therefrom. It is to be understood that this structure is duplicated at the opposite ends of the boat, as shown in Fig. 30. These members form half of the eye 93 through which the tubular extension 85 of the weight D extends when the latter is hoisted. The other half of the eye is formed by members 94, which are pivoted to the respective members 92 at 95. The eyes are opened by swinging the members 94 upon these pivots and they are held closed by a pin 96, which is passed downwardly through all of said members. The plate 91 rests at its lower end in a socket member 97 on the end of the boat, being held upright therein by an outwardly projecting pin or dowel 98 in the

boat, which dowel extends into an opening 99 in the plate, and by a latch 100 which is pivoted to the boat and is extended over the upper end of the plate. It is to be understood that when the weight D is lowered the tubular extension 85 is withdrawn from the eyes 93 and that, when the said extension is within the eyes, the weight is held to the boat and is thus prevented from swaying and knocking about during high seas.

The life-boat C is lifted by a suitable mechanism, which may be variously located but is preferably in the boat itself, and is lowered under control by brakes cooperating with the hoisting drums. The boat is supported by cables 101 and 102 which pass over pulleys 103 on the under side of the bridge member 51 and near its ends and center. Between the pulleys and the lifeboat are chains 104 which are connected to the cables through weights 105. These weights hold the cables taut while the chains flex during the rise and fall of the boat on the waves. At the lower end of each of the chains is a hook assembly 106 which is adapted to engage in an eye-bolt 107. This assembly is specifically shown in Figs. 31 to 35, inclusive, and will be described in detail hereinafter. The eye-bolts 107 are attached to the latches 100. These latches are weighted on their ends opposite the plates 91 and below the chains 104 so as to rock on their pivots, as in Fig. 46, thus to release the said plates automatically as soon as the boat reaches the water and the chains are relieved of its weight. In the form shown in Fig. 45, the plate 91a is angular in shape, having an arm extending over the top of the boat and beneath a hook 108 where it is perforated to receive a sliding bolt 109 which is mounted on the boat and is extended upwardly through the plate and the overhanging part of the hook. The lower end of the bolt is pivoted to a pivoted lever 110 to which is attached a rope or cable 111 which is passed under a pulley 112 and is extended toward the center of the boat. It is of course, understood that there is one of these cables at each end of the boat and that they are intended to be pulled simultaneously to release both ends of the boat. While the boat is supposed to be released from the plates 91a as soon as it reaches the water, the release is not automatic, as in the form of Fig. 43. When the boat is lifted into its normal position within its carriage it is held against possible side swaying by a plurality of resilient side clamps 113, one of the same being shown in detail in Fig. 21. These clamps are attached to the side members 46 and 46a of the carriage and are engaged and spread outwardly by the boat as it comes to the limit of its upward movement.

As has been explained, when the boat reaches the water it is released, preferably automatically, from the steadying cables 66 and 67. But it must be released from the hoisting cables 101 and 102, also, and at both ends of the latter. One of the means for effecting this release automatically is the special hook assembly which has been designated as 106. As shown, in Fig. 43 for example, this assembly is interposed between the chain 104 and the eye-bolt 107 on the latch 100. It is shown in detail in Figs. 31 to 35, inclusive, to which attention is now directed. The hook proper, is a member 114 which, as best shown in Fig. 35, comprises a flat and generally rectangular body having a deep and wide notch 115 in one of its side edges and a vertically projecting stem 116 at its upper end, said stem having an eye 117 with which the respective chain 104 engages. The notch 115 is curvilinear in form, particularly in its lower part where it is engaged by the eye-bolt 107, so that it has a tendency to slip out of the eye. It is normally held in hooked engagement with the eye by a plunger 118 which depends from a housing 119 which is slidable upon the stem 116. When the boat C reaches the water, the eye-bolt 107 is arrested in its downward movement but, due to the weight 105, which continues to fall, thus putting a slack in the chain, the hook 114 settles down through the housing 119 which is held up by the eye-bolt. At the same time, the hook and housing cant over backwardly as indicated in Fig. 32, or sidewise, and a passage is thus provided between the hook and plunger 118 through which the eye-bolt 107 may escape. The boat is thus automatically released from its hoisting cables and, being at the same time released from its steadying cables, is free on the water. To prevent the lower end of the hook from entering the eye-bolt too far as the hook is tilted, the latter is provided with a nose or cam 120 on its lower end which engages with the eye, as seen in Fig. 32. In Figs. 31 and 35 the hook assembly is seen in its normal position, as when the boat is suspended therefrom, except that Fig. 35 is in section. As appears from the above, Fig. 32 shows the assembly at the moment the boat is automatically released. It may become necessary to release the boat before it reaches the water, as in case some cable fouls. To accomplish that result, the plunger 118 is made slidable so that it may be withdrawn into the housing, as shown in Fig. 33. When this is done, the hook 114 is cammed outwardly by the rounded surface of the notch 115 and the boat is dropped. The plunger is provided with a pin 121 which projects at its ends into guide slots 122 in the sides of the housing, but one of said slots being shown. The plunger is further provided with a notch 123 near its inner end into which projects one end of a pivoted bell-crank lever 124. When in its normal position, as in Fig. 35 the inner end of the lever not only extends into the notch but its downwardly-bent extremity rests upon the lower wall of the notch and assists in holding the plunger extended. When the lever is rocked through substantially ninety degrees, the plunger is retracted and the bent end of the lever holds the plunger in position. The outer end of the lever normally projects above the housing, as in Fig. 31.

From the sheaves 103 near the center of the bridge of the carriage, the cables 101 and 102 drop to and wind upon the drums 125 and 126, respectively, of the hoisting mechanism in the boat. Each of these drums is provided with a slot 127 in its peripheral surface, the slot having the outward appearance of a key-hole, as seen in Fig. 47. The lower ends of the cables are each provided with a knot or other suitable enlargement 128 which is adapted to enter and normally lock within the slot. It will be understood that, as the boat descends the drums 125 and 126 rotate backwardly under control of their brakes, presently to be described, and that when a boat comes to rest on the water the weights 105 sink and pull the cables off the drum. When the cables are fully unwound they jerk the knots out of the slots 127 and thus fully free the boat from the cables. When so released from their drums their weighted ends continue to sink until the knots 128 catch in the pulleys 103. Thereafter, the cables may be retrieved and hauled onto the deck

or they may be removed from the pulleys and cast overboard. At the time of disaster at sea the latter would be more expeditious; and, for that reason, the pulleys are mounted in snatch-blocks, one of which is shown in Fig. 42. The pulley housing 129 is closed at one side opposite the upper rim of the pulley by a pivoted keeper 130 which is adapted to be released and swing open, as indicated in dotted lines, much the same as are fasteners for lids of trunks. This specific structure is not claimed herein and, for that reason, is not described in detail.

It is, of course, desirable to have the cables 101 and 102 wind evenly upon their drums and not loosen thereon in case the suspended boat or other load rises upon a wave and thus puts slack in the cables. This result is largely attained by the use of the weights 105 and the chains 104. As a further preventive, however, I provide each drum with a pressure roller 131 which extends alongside the drum, being journaled in the upper ends of arms 132 which are pivoted at their lower ends on the base-plate and are pressed toward the drum by suitable springs 133, as shown in Fig. 52.

The hoisting mechanism for the boat is best shown in Figs. 47, 48 and 49. Any suitable mechanism for accomplishing the desired functions may be employed, and that shown is illustrative only, the showing being largely diagrammatic. This mechanism is preferably in the boat, as shown in Fig. 30, being centrally positioned therein. It is driven by a suitable prime-mover, as an internal-combustion engine 134 having clutch and transmission casings 135 and 136 respectively. The engine and hoisting drums are supported upon a base plate 137 from which rise standards or pillow-blocks 138 within which the drums are journaled. The clutch (not shown) within the casing 135 is controlled from the boat, as by means of a lever 139 and suitable connecting elements. From the transmission casing project three parallel shafts 140, 141 and 142, all of which are adapted to be driven through gearing within said casing. The shaft 141 is extended beyond the hoisting mechanism through the rear of the boat and is provided with a screw propeller 143. The shafts 140 and 142 are adapted to be driven either together or separately or in reverse directions by the transmission gearing, which is controlled from the boat through suitable means, as the hand-levers 144 and 145, and their connecting elements. The specific structure of the transmission gearing is not novel and is not claimed herein, and it is deemed unnecessary to disclose it in detail. The shafts 140 and 142 are journaled in the two standards 138 at the right of the transmission casing. At its rear end, the shaft 142 is provided with a pinion 146 which meshes with a gear 147 on the drum 126, through which said drum is rotated. Adjacent its rear end, the shaft 140 carries a pinion 148 which meshes with a gear 149 on the drum 125, through which that drum is rotated. The boat C is lifted by the rotation of the drums through the gearing described, but it is lowered by its own weight; and, while it is lowering, it is under control of brakes, one of which is shown in Figs. 49 and 51. These brakes are within the drums substantially in the planes of the gears 147 and 149. They are of the ordinary split-band type having shoes at their ends. The band is shown at 150 and the shoes at 151. The band is anchored at its center by a suitable stationary member 152, and it is spread into frictional contact with the interior surface of the drum by cams 153 which extend outwardly and in opposite directions from a rock-shaft 154. Except when thus expanded, the band is held from such contact by springs 155. The shaft 154 is rocked by a lever 156, which is connected therewith through an arm and link, as shown in Fig. 49. Each drum has its own brake and operating lever, the levers being preferably mounted side by side opposite the adjacent ends of the drums, as indicated in Fig. 47. To protect the brakes from the sea water, the ends of the drums are, by preference, sealed by a drum-head 157, there being one of these heads at each end of the drums.

As has been described, when a boat is to be launched the cradle and the gates are tilted until the rails 6 and 30 incline downwardly to cause the carriage to roll outwardly. At that time, the boat has been loaded with its crew and passengers, and brakes are provided on the carriage to control its movement. There is a brake at each end and these are adapted for simultaneous operation. One of the brakes is illustrated in Figs. 10 to 13 and the operating mechanism therefor is shown in Figs. 22 to 25, inclusive. Projecting outwardly from and rigidly attached to each of the end members 47 of the carriage is a hollow, elongated box-like housing 158. The housing, proper, is within the C-shaped rails of either the cradle or the gate, depending upon the position of the carriage, and it has a member 159 which connects it with the carriage, said member extending through the slotted side of the rail, as seen in Fig. 10. Journaled in the member 159 and the end member 47 is a short shaft 160 having its end tapered and fluted to receive the fluted hub of a crank-arm 161, best shown in Fig. 10A. On its inner end the shaft is provided with oppositely extending arms, the outer ends of which are connected, through links 162, with toggles 163. These toggles are connected to brake members 164 which are mounted outside of and guided by the housing 158. When the toggles are straightened by rocking the shaft 160, the brake members are forced outwardly in opposite directions into frictional engagement with the interior of the track rails 30 or 6. Any wear in the brakes may be taken up by simply removing the crank-arm 161 and turning it with respect to its shaft 160 until the next succeeding flutes are in engagement and then replacing it, as will be understood.

As shown in Fig. 19, the crank-arm 161 is rocked through a link 165 which is connected with a crank 166 on a rock-shaft 167. This shaft is journaled in suitable bearings 168 on the inner side of one of the side members 46 of the carriage frame, and it extends substantially to the end members 47 thereof, being provided with a crank-arm 166 on both of its ends to move the respective links 165, but one of the latter being shown. It is desirable that the carriage brakes be operable from all parts of the life-boat as well as from the cab-walks of the carriage and, for that reason, the shaft 167 is provided with a plurality of levers 169 for rocking it. As best shown in Fig. 25, the levers are pivoted within members 170 which are pinned or otherwise secured to the shaft. Each of the levers extends through a plate 171 on the carriage frame member 46, the plate having a series of ratchet-teeth with which the lever may engage and become locked to hold the shaft 167 and the brakes in the position to which they have been moved.

The series of ratchet teeth are arranged in a diagonal row with respect to the shaft so that when the lever is pulled toward the boat in setting the brakes it must also be swung to the right, as viewed in Fig. 23, to engage with the ratchet. Since the levers **169** are all secured to the shaft, when one of them is rocked to turn the shaft they all turn with it. In order that they may all be swung into engagement with their respective ratchets, they are interconnected by links **172**. This latter construction is of particular importance in releasing the brakes; for if the levers were not connected together, the release of one of them from its ratchet would not affect the others and the brakes would remain set. But by thus connecting the levers, the brakes may be released from any part of the boat or from the foot-boards **31** on the gates.

The description thus far given relates particularly to what has been termed the simpler form of the invention in which a single life-boat is carried in the cradle. In that form, in order to launch a second boat, not only must the carriage be run back to pick up the boat, but the steadying weights have to be lifted until they can clear the deck. These weights are heavy and can be lifted but slowly so that the structure would, in many cases, be limited to the launching of a single boat from each unit of the invention. This is, of course, a disadvantage, and the structure now to be described with reference to Figs. 26 to 29 is intended to overcome it. In these figures the reference numerals have been retained except when the structure has been modified. The uprights **4a** and the rack-bars **9a** have been lengthened so that the boat carriage is farther above the deck to accommodate another boat C^2 below the boat C in the carriage. The gates, too, are similarly elevated. In other respects, the structure and operations are the same, or substantially the same, as have been described.

Rigidly mounted on the inner side of the upright **4a** and braced at its rear end by a member **173**, is a second cradle track-rail **174**, the same being parallel with the rail **6** above it. Also mounted rigidly on the gate and parallel with the gate-rail **30** is a second rail **175**, the same forming a continuation of the rail **174** when the gate is fully open. The rails **174** and **175** tilt with the upper rails as the cradle is rocked. Within the lower track rails are the wheels **176** of the auxiliary boat-carriage, the same comprising a rear side member **177** and end members **178**. There is no front side member. The corners of the carriage frame are each strengthened by a plate **179**. In its front edge this plate is provided with a slot **180** to receive the stem of the eye-bolt **107** on the boat hook or latch **97**. By this means the auxiliary boat C^2 is normally suspended in the cradle and the auxiliary carriage can be held from rolling by any suitable means, as by brakes like those on the main carriage.

After the main carriage has rolled out onto the gates and its boat has been launched, the cradle and gates are then tilted to cause the carriage to roll back to a position shown in full lines in Fig. 27, the steadying cables **66** being clear of the ship's side A. There it is held by its brakes while the cradle is tilted back to its former position. The auxiliary carriage is now released and permitted to roll out onto the lower gate rails **175**, bringing its boat C^2 into position for passing its hoisting cables **101** and **102** over the pulleys **103**. Of course, the hoisting cables which have just been cast off from the launched boat may be attached to the eye-bolts and the hoisting drums of the boat C^2, but that would take up valuable time and it is preferred that each boat be equipped with its own cables all ready for passing into the opened snatch-blocks **129** and over the pulleys **103** therein (see Fig. 42). The boat C^2 may be loaded before its carriage is moved, but preferably not until it is suspended from the main carriage. When it has taken on its load it is raised by its cables sufficiently to relieve the plates **179** of its weight when the auxiliary carriage may be moved back and the boat attached to the steadying cables by the means shown in Fig. 43. The main carriage may then be permitted to roll out onto the gates for launching boat C^2. In the meanwhile, the steadying weights have remained deep in the water and have not been disturbed except as they have been shifted toward and from the ship as the main carriage is moved in and out. By this double-deck arrangement of tracks and boats, it is possible to launch boat C^2 without serious delay after boat C has been cast off. While I have shown but a single auxiliary boat, it is to be understood that the structure may be enlarged or modified to accommodate additional boats if desired.

The various features of my invention have been described in detail, but the claims hereto appended are not intended to be limited to the details of structure any further than is made necessary by the specific terms employed therein.

Having thus described my invention, I claim:

1. A device for the purposes described comprising a support, a cradle pivotally mounted upon said support, a gate at each end of the cradle, said gates being hinged to the latter so as to close in front of the cradle or to open and extend outwardly over the side of the support and above the water; track rails on the cradle, complementary track-rails on the gates in alinement with the rails on the cradle when the gates are open, a carriage having wheels for rolling on said rails, a boat, a latch member on said boat, means on said carriage for supporting the boat whereby the latter may be lowered to or raised from the water, said supporting means being in engagement with said latch member, a hoisting mechanism on the carriage, steadying cables extending from said mechanism downwardly past the supported boat and into the water, a weight for and attached to the lower end of each of said steadying cables and detachable means on the boat for slidably engaging said cables as the boat moves up and down, said detachable means being normally held to the boat by said latch member, said latch member being adapted to disengage the detachable means from the boat automatically when the boat comes to rest upon the water.

2. A device as set forth in claim 1 in which the cradle is provided with means for rocking it to incline the rails on the cradle and gates from the horizontal, whereby the carriage is caused to move in or out on the rails and means for positively locking the cradle in any position to which it may have been rocked.

3. A device as set forth in claim 1 in which each of the weights is provided with a surrounding distensible member which automatically expands when the weight is moved upwardly in the water, thus to increase the resistance offered by the water to such upward movement.

4. A device as set forth in claim 1 in which each of the weights is made hollow to provide a chamber for oil and a passage for the oil where-

by, when the weight is lowered into the water, the oil is displaced by water, for the purpose specified, and in which each of the weights is provided with a surrounding and distensible member which automatically expands when the weight is moved upwardly in the water, thus to increase the resistance offered by the water to such upward movement.

5. A device for the purpose described comprising a support, a cradle mounted for pivotal movements upon said support, a pair of track-rails mounted in spaced relation on said cradle, a gate hinged to said cradle adjacent the outer end of each of said rails, said gates being adapted to be swung toward each other to close in front of the cradle or to open outwardly to project beyond the side of the support and over the water, complementary track-rails carried by said gates and alining with the respective cradle-rails when the gates are open, a carriage having wheels for rolling upon the rails of the cradle and gates, means on the carriage from which to suspend a boat, a hoisting mechanism on the carriage, said mechanism comprising a pair of drums, a steadying cable for and attached to each of said drums, said cables extending downwardly from the carriage adjacent the respective ends of the boat, a weight for and attached to the lower end of each of said cables, means on the boat for slidably engaging with said cables, mechanism for rotating the said drums to wind the cables thereon, thus to lift the said weights said mechanism being adapted to rotate the drums simultaneously or separately or to be disengaged from both drums to permit the weights to fall and a brake for each of said drums.

6. A structure as set forth in claim 5 in which each of the weights is provided with an upwardly projecting extension rigid therewith and in which the means on the boat for slidably engaging the cables engage with the said extensions, when the boat is lifted into its normal position, thus to hold the weights from swinging.

7. A structure as set forth in claim 5 in which each of the weights is provided with an upwardly-projecting extension rigid therewith and in which the means on the boat for slidably engaging the cables comprise a pair of vertically-spaced rings at each end of the boat which surround their respective cables, each of said rings having a pivoted segment adapted to be opened to provide a gap through which the respective cable can be passed laterally and then closed to surround the cable loosely and to snugly fit about the respective extension on the weight when the boat and weight are in their normal positions, thus to hold the weight from swinging.

8. A device as set forth in claim 5 in which the means on the carriage from which to suspend a boat comprise a cable for and attached to each end of the boat, pulleys on the carriage over which the cables pass and from which they return to the boat adjacent its longitudinal center, a pair of drums rotatably mounted within the boat to which the said cables are respectively attached, means for rotating the latter pair of drums, and brakes cooperating with the drums.

9. A device for handling boats and other loads, comprising a floor, supports secured to said floor adjacent an outer edge thereof, a cradle pivoted at its outer end on said supports, an upper pair of spaced track-rails on said cradle, a gate hinged to said cradle adjacent the outer end of each of the said track-rails, said gates being adapted to be closed in front of the cradle or opened to project over and beyond the support and over the water, an upper pair of spaced track-rails on said gates, an under pair of spaced track-rails on both the cradle and the gates, all of said rails cooperating to form two tracks on the cradle and gates when the latter are open, a main carriage having wheels rolling on the upper rails, an auxiliary carriage movably mounted on the lower rails, boats supported on said carriages, means for rocking the cradle to incline the rails from the horizontal to cause the carriage to move back and forth as may be desired, and means on the main carriage for successively lowering said boats to the water.

10. A device of the character described comprising a support, a cradle mounted for rocking movement upon said support, a pair of gates hinged to the cradle and adapted, when in open position, to project beyond the support, a pair of spaced rails carried by said cradle, a complementary pair of equally spaced rails carried by the gates to be in alinement with the rails on the cradle when the gates are open, all of said rails being channel-shaped in cross section with edge flanges and a connecting web, a carriage, wheels on said carriage within the respective rails and adapted for rolling upon one of the said flanges of the respective rails, means for rocking the said cradle to cause the rails to incline from the horizontal and the carriage to move by gravity on the rails, brakes on the carriage and adapted for engagement with the rail flanges and means for causing said brakes to engage frictionally with said flanges thus to control the carriage in which each of the brakes comprises a pair of friction members and means for separating said members and causing them to contact frictionally with the respective flanges of the rails.

11. A device of the character described comprising a support, a cradle mounted for rocking movement upon said support, a pair of gates hinged to the cradle and adapted, when in open position, to project beyond the support, a pair of spaced rails carried by said cradle, a complementary pair of equally spaced rails carried by the gates to be in alinement with the rails on the cradle when the gates are open, all of said rails being channel-shaped in cross section with edge flanges and a connecting web, a carriage, wheels on said carriage within the respective rails and adapted for rolling upon one of the said flanges of the respective rails, means for rocking the said cradle to cause the rails to incline from the horizontal and the carriage to move by gravity on the rails, brakes on the carriage and adapted for engagement with the rail flanges and means for causing said brakes to engage frictionally with said flanges thus to control the carriage in which each of the brakes comprises a pair of friction members, two pairs of toggles connecting the said members, and means for operating the toggles simultaneously to separate said members and cause them to contact frictionally with the respective flanges of the rails.

12. A device of the character described comprising a support, a cradle mounted for rocking movement upon said support, a pair of gates hinged to the cradle and adapted, when in open position, to project beyond the support, a pair of spaced rails carried by said cradle, a complementary pair of equally spaced rails carried by the gates to be in alinement with the rails on the cradle when the gates are open, all of said rails being channel-shaped in cross section with

edge flanges and a connecting web, a carriage, wheels on said carriage within the respective rails and adapted for rolling upon one of the said flanges of the respective rails, means for rocking the said cradle to cause the rails to incline from the horizontal and the carriage to move by gravity on the rails, brakes on the carriage and adapted for engagement with the rail flanges and means for causing said brakes to engage frictionally with said flanges thus to control the carriage in which the brakes are at the opposite ends of the carriage within the channel-shaped rails and in which the means for causing the brake to engage frictionally with the flanges of the rails operate simultaneously upon the brakes at both ends of the carriage.

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