

[54] APPARATUS AND METHOD FOR
LAUNCHING AND RECOVERING A
SMALL BOAT

[72] Inventor: Allen A. Peters, 49 Waterside Parkway,
Staten Island, N.Y. 10308

[22] Filed: Jan. 2, 1970

[21] Appl. No.: 262

[52] U.S. Cl.9/39

[51] Int. Cl.B63b 23/02

[58] Field of Search9/39, 32, 36; 114/125, 230

[56] References Cited

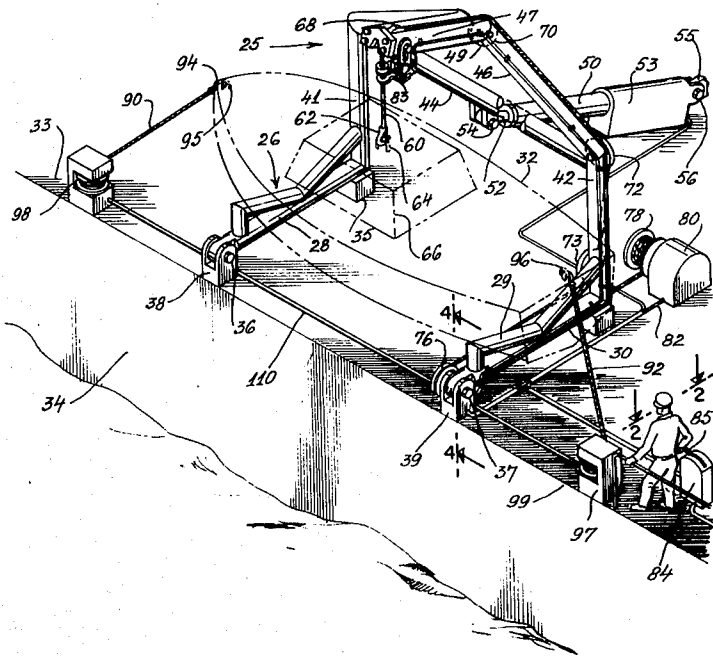
UNITED STATES PATENTS			
1,827,535	10/1931	McKenzie.....	9/39
2,023,258	12/1935	Young.....	9/39
3,418,671	12/1968	Marotta.....	9/39
3,395,668	8/1968	George.....	114/230
2,963,245	12/1960	Bolton.....	114/125
2,902,964	9/1959	Waas et al.	114/125
697,359	4/1902	Petersen.....	9/31
2,509,225	5/1950	Gilbert.....	9/43

Primary Examiner—Trygve M. Blix
Attorney—Polachek, Saulsbury & Hough

[57] ABSTRACT

Apparatus for launching and retrieving a boat comprises a frame rotatably mountable on the deck of a vessel. The frame has rails defining a cradle for the boat. The rails are integrally joined to davit posts and crossbeams to form a rigid frame structure. An electrically operable ram is connected to the frame for rotating it on a horizontal axis. A cable is entrained on sheaves carried by the frame and terminates in a hook suspended from an arm over the boat. The other end of the cable is engaged by a motor driven winch to retract and to play out the cable. The boat can be provided with a centrally located sling engageably by the hook for hoisting the boat while the frame is rotated to shift the boat laterally. Spring loaded spring lines for steadying the boat can be provided. The ram and motor are operable automatically by a control circuit in predetermined launching and retrieval cycles. The boat can be provided with shiftable water ballast or mechanical balance means. The frame may have two arms supporting two cables for engaging spaced points on the boat to hoist it horizontally.

3 Claims, 25 Drawing Figures



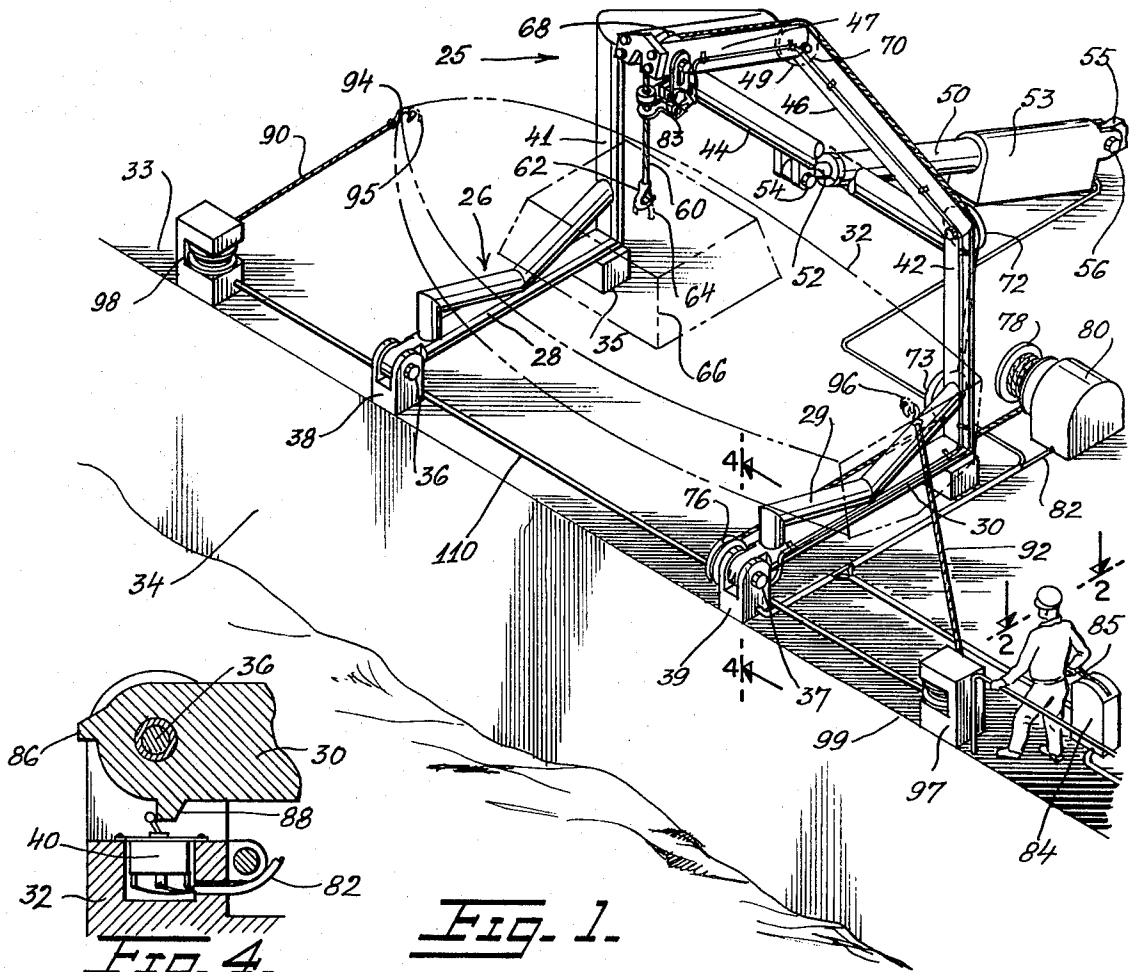


Fig. 1.

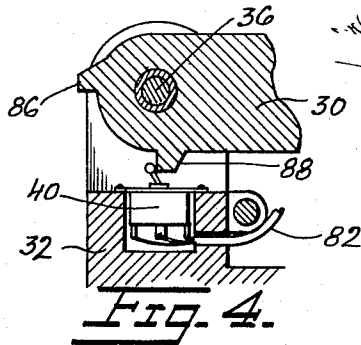


Fig. 4.

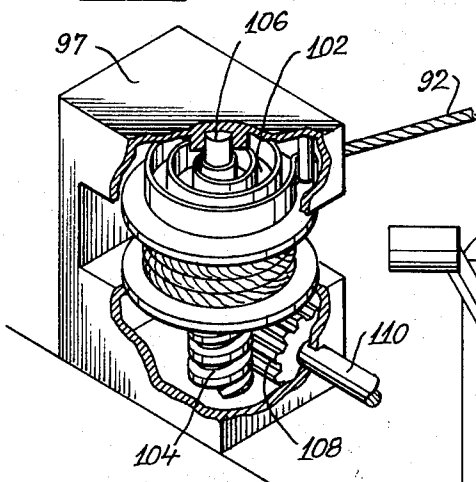


Fig. 5.

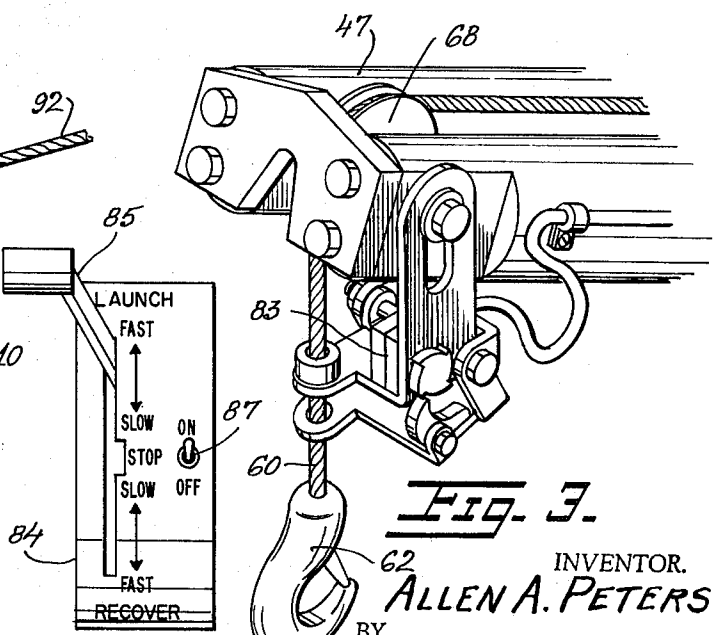


Fig. 2.

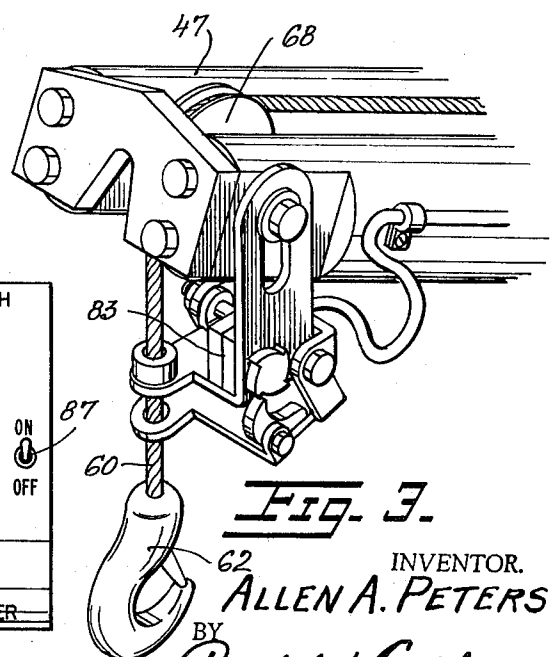


Fig. 3.

INVENTOR.
ALLEN A. PETERS

BY
Plachek & Saulsbury
ATTORNEYS

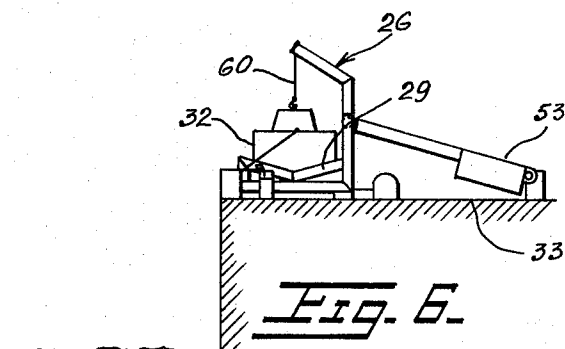


Fig. 6.

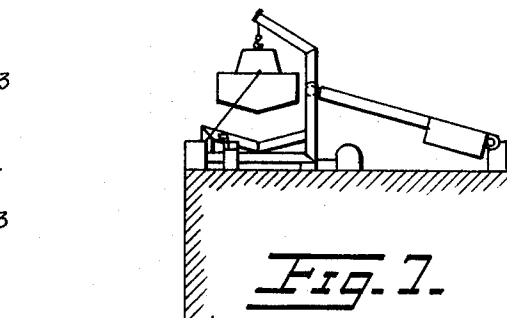


Fig. 7.

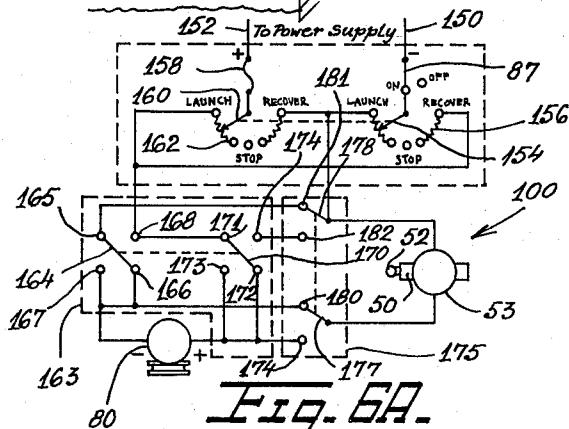


Fig. 6A.

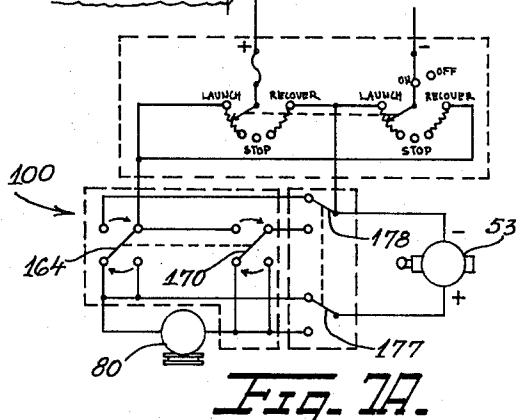


Fig. 7A.

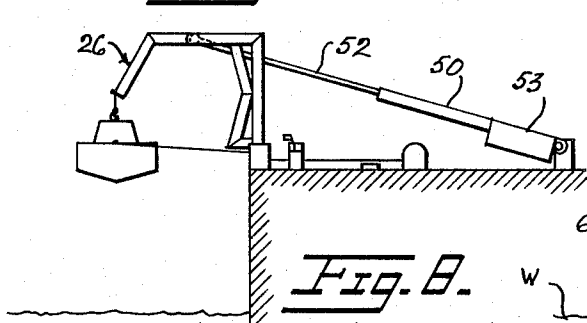


Fig. 8.

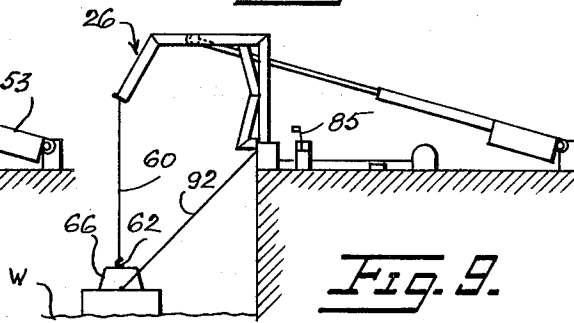


Fig. 9.

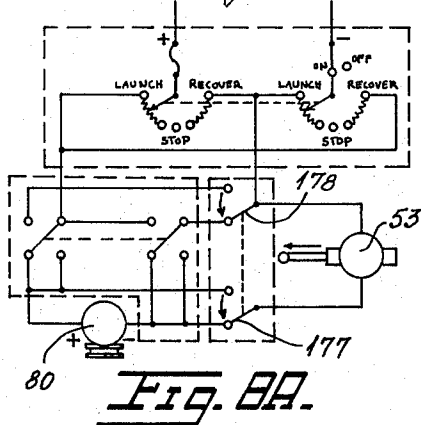


Fig. 8A.

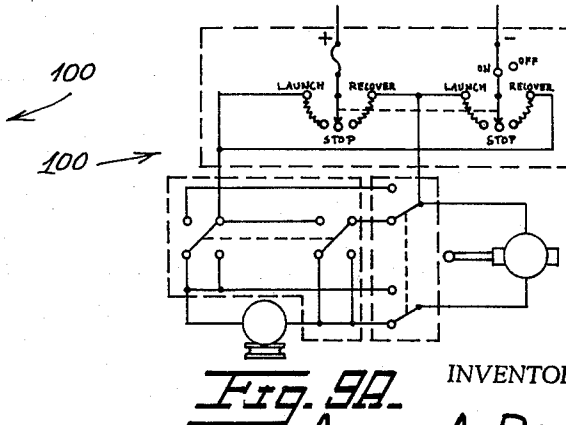


Fig. 9A.

INVENTOR.

BY ALLEN A. PETERS

Plachek & Saulsbury
ATTORNEYS

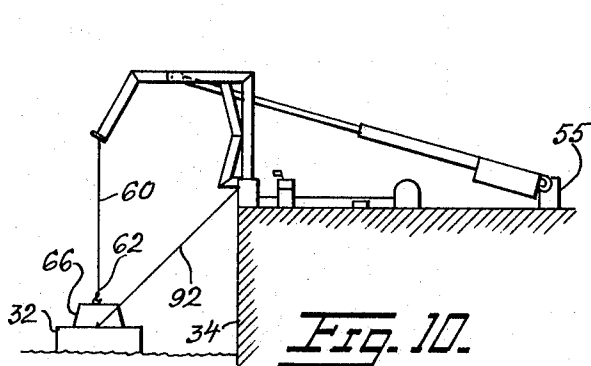


Fig. 10.

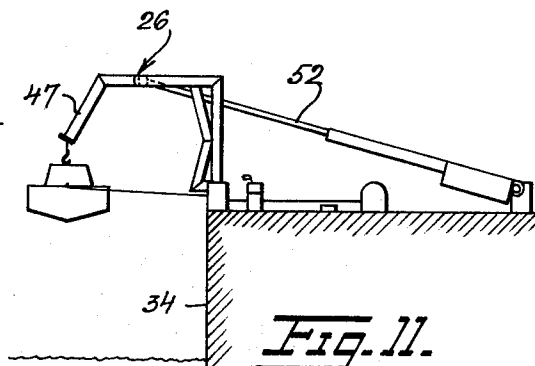


Fig. 11.

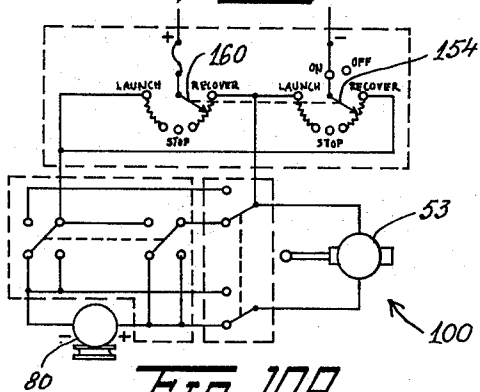


Fig. 10A.

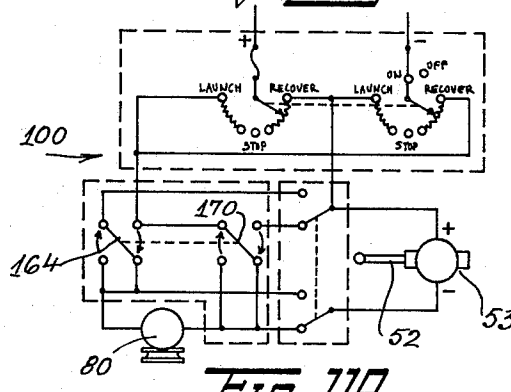


Fig. 11A.

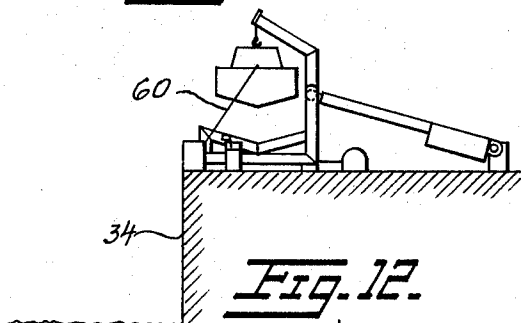


Fig. 12.

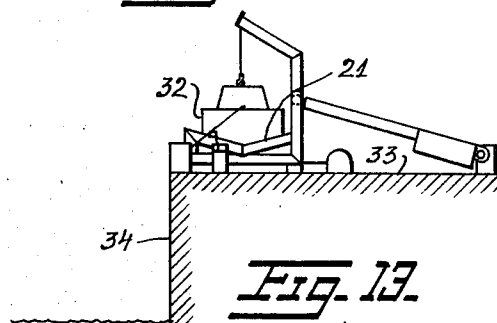


Fig. 13.

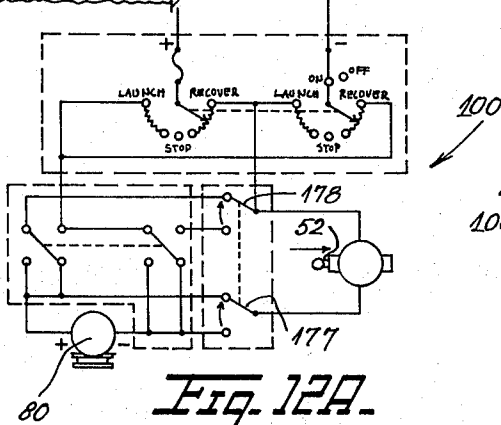


Fig. 12A.

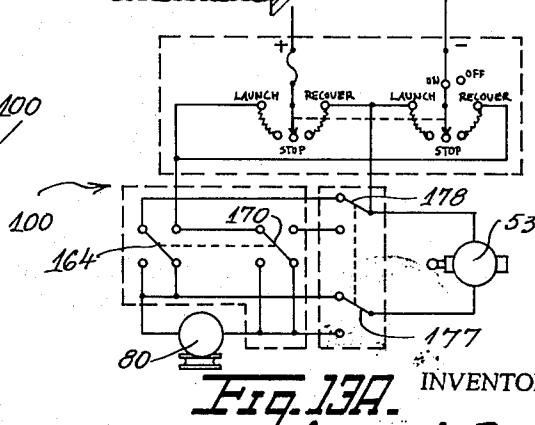
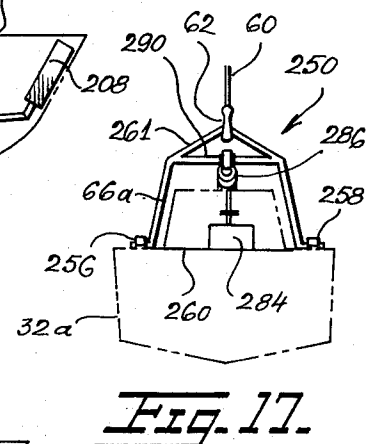
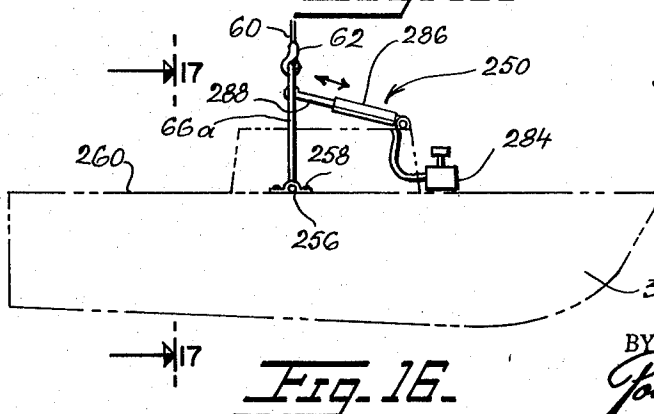
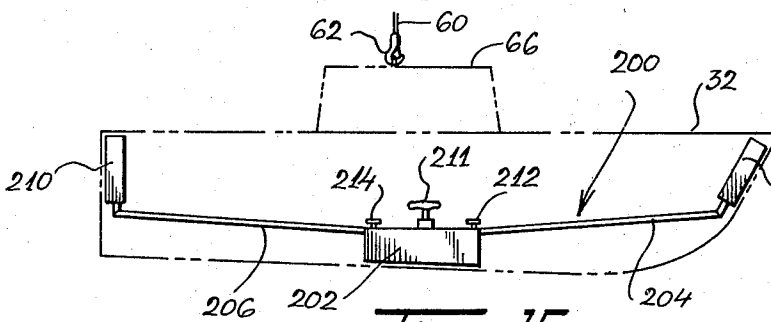
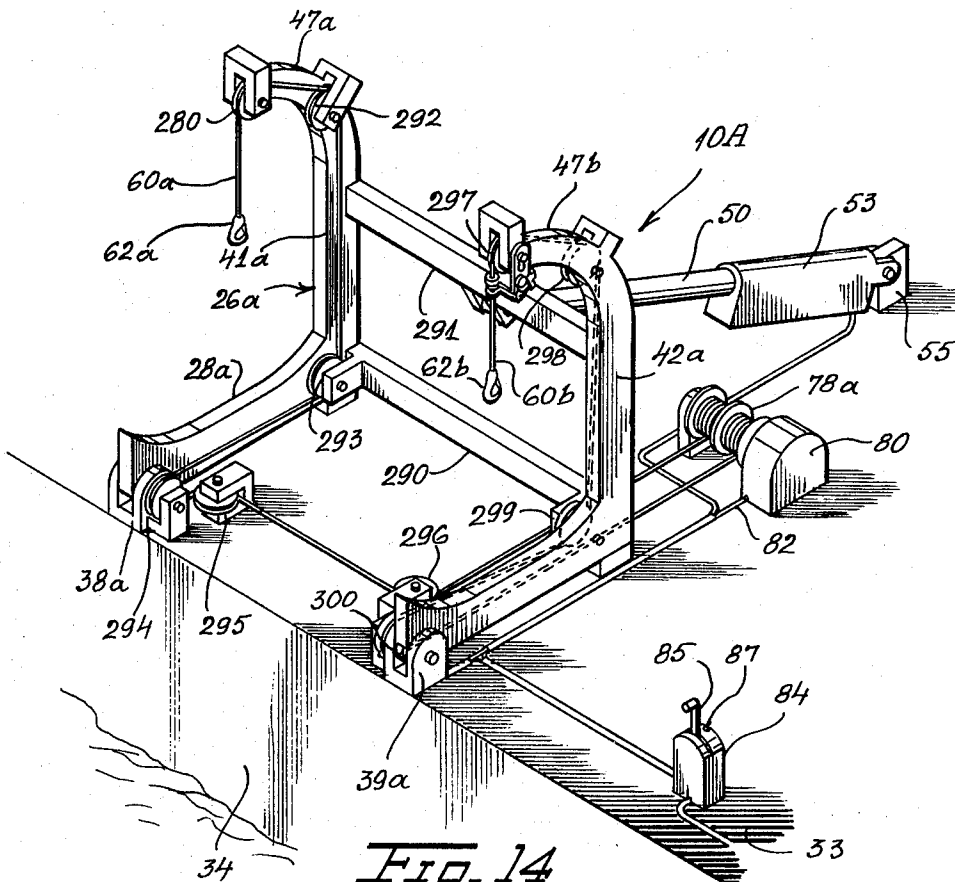


Fig. 13A.

INVENTOR.
BY **ALLEN A. PETERS**
Polachek & Saulsbury
ATTORNEYS



X 32^a,
INVENTOR.
ALLEN A. PETERS
BY
Polachet & Faulstich
ATTORNEYS

APPARATUS AND METHOD FOR LAUNCHING AND RECOVERING A SMALL BOAT

This invention relates to boat handling apparatus and more particularly concerns apparatus and techniques for launching and recovering a small power boat from a ship's deck in a rough sea.

Conventional boat handling gear is usually designed for the express purpose of launching a lifeboat or other small boat from a larger vessel in an emergency when the larger vessel is in distress. Such boat handling apparatus is poorly adapted for recovering the launched boat and in a rough sea may not be capable of retrieving the boat. Frequently, the boat which has been used in rescue operations must be abandoned because it cannot be taken up on board again.

One system which has been proposed for launching and recovering a lifeboat in a rough sea is described in U.S. Pat. No. 3,109,185. The system proposed is quite complex. It has a double drum power boatwinch employed for raising and lowering a single falls block at normal operating speed, and a hydraulic transmission provided with separate multiple sheaves for rapid independent takeup of the hoisting cable to raise the boat during recovery.

The present invention involves an entirely different automatic apparatus. According to the invention a boat cradle and davit assembly constructed as a single unit is pivotally mounted on the deck of a large vessel. A single cable entrained on the davit is connected to a winch on the deck. The cable carries a quick-release hook at its outer end. The hook attaches to a rigid sling on the boat to be launched. A hydraulic ram is drivably connected to the pivotable davit for extending the hoisted boat laterally well clear of the side of the large vessel. An electric drive system automatically controls the launching and retrieving cycles. The apparatus is operable by a single man on the deck. Means for balancing the boat during launching or retrieving operations is further provided.

It is therefore a principal object of the invention to provide apparatus whereby a boat can be safely launched and retrieved frequently under diverse sea conditions.

Another object is to provide a unitary davit and cradle assembly with means for hoisting the boat from its cradle; shifting the boat laterally by pivoting the davit hydraulically, and then automatically lowering the boat into the water; retrieval of the boat being performed by reverse operations.

A further object is to provide a boat launching and recovery system wherein the boat is hoisted by a single point suspension cable, and wherein means is provided for balancing the boat.

A further object is to provide a boat launching and retrieval system operable by not more than one man on the deck of the launching vessel and one man in the boat.

Still another object is to provide a boat launching and retrieval system which can be installed on the deck of a ship or on a pier for automatic operation.

Other and further objects and advantages of the present invention will become apparent from the following detailed description taken together with the drawing, wherein:

FIG. 1, is a perspective view of boat launching and retrieval apparatus embodying the invention.

FIG. 2 is an enlarged plan view taken on line 2—2 of FIG. 1 showing the layout of the control station of the apparatus.

FIG. 3 is an enlarged perspective view of a portion of the apparatus of FIG. 1, showing the suspension arrangement for the hoisting cable.

FIG. 4 is an enlarged fragmentary sectional view taken on line 4—4 of FIG. 1 showing parts of the davit pivot structure.

FIG. 5 is an enlarged perspective view with parts broken away showing the drive mechanism system for a spring line used to steady the boat.

FIGS. 6, 7, 8 and 9 are diagrams showing the apparatus at successive positions during a boat launching cycle.

FIGS. 10, 11, 12 and 13 are diagrams showing the apparatus at successive positions during a boat retrieval cycle.

FIGS. 6A—13A are electrical diagrams showing the control circuitry of the system in different switching positions corresponding to the cyclical steps shown in FIGS. 6 through 13 respectively.

FIG. 14 is a perspective view of another boat launching and retrieval apparatus according to the invention.

FIG. 15 is a diagrammatic side view of a ballast control arrangement for balancing a boat launched and retrieved by the present system.

FIG. 16 is a diagrammatic side view of another boat balancing arrangement.

FIG. 17 is an elevational view taken on line 17—17 of FIG. 16, looking toward the bow of the boat.

Referring first to FIG. 1—5, there is shown a boat launching and retrieval apparatus 25 comprising a davit and cradle frame 26. This frame includes a pair of horizontal rigid arms 28,30 supporting beams 29 having a V-shaped configuration to serve as a cradle for a small boat 32 indicated by dotted lines in FIG. 1. The apparatus can be mounted on the top of a pier or wharf for boat launching and retrieval purposes. The outer or lateral ends of arms 28,30 are pivotally secured to shafts 36,37 engaged in posts 38 and 39 mounted at the port side of the vessel. Inside post 39 is a limit switch 40 shown in FIG. 4. The inboard ends of arms 28,30 and rails 29 are secured to upright davit posts 41,42 which rest on stationary blocks 35. The posts are joined by a crossbeam 44 and two inclined beams 46 connected together at their upper ends. An arm 47 extends forwardly from the peaked junction 49 of beams 46. This arrangement of beams, posts, rails and arms forms the rigid frame 26 pivotable as a unit on posts 38, 39. In order to pivot or rotate frame 26 there is provided a hydraulic ram 50 having a plunger 52 secured to the center of crossbeam 44 by pivot 54. The ram has a drive motor 53 pivotally secured to its support 55 on deck 33 by a pivot 56.

In order to hoist boat 32 there is provided a cable 60. This cable terminates in a hook 62 detachably engageable with eye 64 of a rigid frame or sling 66 erected on the deck of the boat. Cable 60 is entrained over a sheave 68 carried at the outer end of arm 47 which is rigidly secured to the peak 49 of beams 46; see FIG. 3. Cable 60 is entrained over pulley 70 at peak 49, then downwardly around pulleys 72, 73 on davit post 42 and around sheave 76 on shaft 37 to winch drum 78. The drum is driven by motor 80. Electric cables 82 are connected to the limit switch 40, motor 80 and control housing 84 in a circuit 100 described below. Another limit switch 83 may be located on arm 47. Fingers 86, 88 at outer end of arm 30 are spaced apart 90° as shown in FIG. 4 for operating switch 40 at opposite ends of travel of frame 26 when arm 30 is horizontal and vertical respectively. The control housing 84 as shown in FIG. 2 has an operating level 85 settable to different operating positions and a manually operable on-off switch 87.

A pair of spring lines 90,92 are provided for steadying the boat. A hook 94 at the free end of each line engages on an eye 95 or 96 at the bow and stern respectively of the boat 32. The lines 90 and 92 are engaged on axially vertical sheaves 98,99 in posts 97. Coil springs 102 are engaged with the sheaves so that the sheaves turn against increasing tension in the springs. Helical gears 104 on shafts 106 are secured to the respective sheaves. Gears 108 are engaged with gears 104. Horizontal drive shaft 110 carries gears 108 at opposite ends. When the hooks 94 are manually engaged on eyes 95,96 at opposite ends of boat 32 the coil springs 102 are both tensioned. The sheaves 98,99 are operatively coupled via common shaft 110 so that the sheaves cannot rotate to wind up the lines 90,92 unless both lines are released from the boat.

FIGS. 6A—13A show control circuit 100 of the system in different operating positions. The circuit includes power supply cables 150 and 152. Cable 150 is connected via on-off switch 87 to arm 154 of rheostat 156. Cable 152 is connected via fuse 158 to operating arm 160 of rheostat 162. Double pole switch 163 is associated with winch drive motor 80. This switch has pole 164 bridging contacts 165, 166 and is reversible to bridge contacts 167,168. Pole 170 bridges contacts 171,172 and is reversible to bridge contacts 173,174.

Double pole switch 175 is associated with drive motor 53 of hydraulic ram 50. This switch 175 has poles 177,178 reversible between contacts 179,180 and 181,182. The ram has extensible plunger 52 as above mentioned in connection with

FIG. 1. The double pole switches and rheostats are operatively controlled by lever 85 and limit switches shown in FIGS. 1-4.

The launching cycle will now be described in connection with FIGS. 6-6. The different switch positions and circuit conditions will be explained with reference to corresponding FIGS. 6A-9A.

In FIG. 6, the boat 32 is shown disposed on cradle beams 29. The cradle and davit assembly 26 is shown in its retracted position on deck 33. Suppose now that the boat is to be launched. Switch 87 will be closed as shown in FIG. 6A. This applies power from a suitable electrical power supply (not shown). Rheostat arms 154, 160 are set by lever 85 to the LAUNCH position. Switch poles 164, 170, 177 and 178 are in the positions shown in FIG. 6A. Upon closing of switch 87, motor 53 is deenergized but motor 80 is energized and cable 60 hoists the boat 32 up to the position shown in FIG. 7, whereupon limit switch 83 on arm 47 shown in FIG. 3 operates to reverse switch poles 164, 170. This is shown in FIG. 7A. Motor 80 is now stopped. At that time hydraulic motor 53 is energized via switch poles 177. This causes extension of plunger 52 of ram 50 as shown in FIG. 8. The extension of the plunger rotates frame 26 through 90° to shift the boat laterally. Poles 177, 178 are reversed in position and limit switch 40 operates motor 80 which is again energized. This circuit action is shown in FIG. 8A. Motor 53 is deenergized. Power is applied to motor 80 in reversed polarity so that the motor plays out cable 60. This is shown in FIG. 9. The cable is played out until boat 32 reaches water level W. The spring lines 90 and 92 are drawn out fully when the boat reaches the water. Now the spring lines can be unhooked from the boat and they will retract automatically as tightened springs 102 in posts 97 expand. The control lever 85 is set to STOP position when the boat reaches and floats on the water as shown in FIG. 9A. This cuts off power from both motors 53 and 80 leaving hook 62 attached to sling 66 of the boat, as shown in FIG. 9. The boat is now launched. Hook 62 can be quickly disengaged automatically or by someone on the boat so that the boat will entirely be free of the vessel. During the foregoing launching cycle the lever 85 can be advanced for increasing the speed at which the cable 60 is played out and plunger 52 is extended to turn the cradle and davit frame 26.

Suppose now that the boat has returned and is to be retrieved by the apparatus. FIG. 10 shows the boat 32 in position for retrieval. Spring lines 90 and 92 are pulled out and made fast on the bow and stern. Hook 62 is engaged with the eye on sling 66. The operator sets lever 85 to RECOVER position. Arms 154 and 160 of the rheostat are shown in this position in FIG. 10A. Motor 80 becomes energized with same polarity as in FIG. 6A so that cable 60 is drawn up on the winch. Motor 53 remains deenergized.

FIG. 11 shows the boat hoisted up to arm 47 of frame 26. When the boat 32 reaches this position the limit switch 83 operates to reverse switch poles 164, 170 to the position shown in FIG. 11A. Motor 80 stops and motor 53 becomes energized via the reversed poles 164, 170. The polarity of voltage applied to motor 53 is reversed from that of FIG. 7A and the plunger 52 is retracted. The frame 26 is rotated clockwise as viewed in FIGS. 11 and 12 while the boat is carried laterally inboard of vessel 34. Spring lines 90 and 92 follow the travel of the boat inwardly. When the frame 26 reaches fully retracted position shown in FIG. 12, motor 80 is turned on. Motor 53 becomes deenergized by action of the limit switch 40 which reverses poles 177, 178. The polarity of motor 80 is reversed from that of FIG. 10A and cable 60 is played out. The boat 32 then descends and comes to rest on the cradle beams 29 as shown in FIG. 13. The operator then sets lever 85 to the STOP position as shown in FIG. 13A. This stops motors 53 and 80 and leaves all switch poles 164, 170, 177, 178 in the same position as shown in FIG. 6A for starting another launching cycle.

It may be found necessary to balance the boat 32 in fore and aft direction, while being launched or retrieved. This can be accomplished by a balancing system 200 as shown in FIG. 15.

A centrally located tank 202 containing sea water or any liquid ballast is connected by fore and aft pipes 204, 206 to bow and stern tanks 208, 210. Hand pump 211 drives the liquid out of tank 202. Valves 212 and 214 are located at the points of connection of pipes 204, 206 to tank 202. Either valve can be opened to pass the ballast liquid to the selected for or aft tank 208 or 210 and the opened valve will be then closed. This will balance the boat. After the boat is fully launched or retrieved, the closed valve can be opened to drain the filled tank 208 or 210 via pipes 204, 206 back into tank 202.

FIGS. 16 and 17 show another balancing system 250 which can be employed without use of ballast tanks. Instead of rigid sling 66 there is provided a pivotable U-shaped sling 66a. Legs of the sling have feet 256 pivotally engaged in brackets 258 on the deck 260 of boat 32a. Hook 62 at the free end of cable 60 engages in triangular loop 261 at the upper end of the sling. A manually operable hand pump 284 is connected to a ram 286 having a plunger 288 pivotally connected to crossbar 290 of the sling. The plunger, under control of pump 284, can be operated for pivoting the sling 66a fore or aft to balance the boat. With either balancing system 200 or 250, the same launching and retrieval apparatus 10 will be employed as shown in FIGS. 1-13.

FIG. 14 shows another boat launching and retrieval apparatus 10A which is similar to apparatus 10 and corresponding parts are identically numbered. Frame 26a is provided with two forwardly extending arms 47a and 47b at upper ends of davit posts 41a, 42a joined by crossbars 290 and 291. The plunger at the end of ram 50 is pivotally connected to crossbeam 291 for rotating the frame. Outer ends of beams 28a, are pivotally engaged in posts 38a, 39a. The beams are curved on top to define a cradle for a boat. Two cables 60a and 60b are provided. The cables are engaged on sheaves 292-296 and 297-300, and terminate on double winch drum 78a. The spring lines of apparatus 10 is not required since the hooks 62a and 62b at the ends of the cables attach to eyes at bow and stern ends of the boat 32. Control post 84 is provided as in system 10 and operates control circuit 100 in same manner as shown in FIGS. 6A-13A. Apparatus 10A may be provided where launching and retrieval is to be done in relatively quiet seas. Apparatus 10A may be installed on the pier of a boatyard where boats are to be hauled up for inspection and/or repair. Apparatus 10A will enable very rapid safe, convenient hoisting and launching.

The apparatus 10 and 10A described both involve a frame including unitary davit and cradle structure. The entire structure rotates for shifting the boat laterally inboard or outboard of the ship carrying the apparatus. The apparatus employs an automatically operating control circuit which minimizes chances of human error in launching or retrieving a boat.

What is claimed is:

1. An apparatus for launching and retrieving a boat, comprising in combination: a davit means of a substantially G-shape, having a plurality of cradling elements shaped to receive a boat's bottom, and having an overhanging sheave means; a pivot mounting means mountable on a deck structure having an axis of rotation suitable for mounting said cradling means such that the open side of the G-shape davit means structure is pivotable sidewardly and downwardly such that a boat cradled on the cradling element is dumped from the cradling elements and such that the boat suspendable from said sheave means would by a winch cable line hang outwardly from and free from contact with said cradling elements upon a lowering of the boat; pivoting means for pivotably moving said G-shaped davit means to and from a pivoted position; said G-shaped davit cradling means being mounted pivotably on said axis; said sheave means being about centrally located above and between said cradling elements when said G-shaped davit cradling means is in a non-pivoted position for cradling a boat; a single attaching means for detachably securing to a single boat-supporting element; a boat-supporting means for supporting and balancing a boat at about its center of gravity and

having an attaching element detachably attachable to said attaching means; a cable means for lowering and raising said attaching means from said sheave means; said pivoting means comprising a hydraulic ram; in which said attaching means comprises a hook; said cable means including a single cable attached to said hook and operative through said sheave means, a winch operatively attached to said cable for raising and lowering said hook; a switch and circuit means for, when actuated, launching and retrieving a boat from and to said cradling elements; and switch and circuit means including a winch limit switch automatically actuatable during launching for activating the cable means to lower said hook when said G-shaped davit cradling means pivots to the pivoted position, and including an automatic ram limit switch actuatable by the raising of said hook to a predetermined raised position such that said hydraulic ram is automatically activated to retract said G-shaped davit cradle means to a cradling position; said switch and circuit means further comprising a power source having separate negative and positive electrical terminals and a power switch; attached to each terminal a rheostat switch means having launch, stop and recover terminals, with separate rheostats, one rheostat being between each of launch and stop terminals and one between each of recover and stop terminals, and a conducting lever, one end of said lever pivotably mounted at one of a separate one of said terminals and the other end of each respective one of said levers being manually switchable between its respective launch, stop and recover terminals, said levers including coordinating means for simultaneously moving said other lever-ends to said actuation terminals, to said stop terminals, and to said recover terminals respectively; a reversible winch motor means for alternate winch-line take-up and play-out actions of said winch; a reversible ram motor means for alternate ram-extension and ram-retraction actions of said ram; an electrical circuit interconnecting said power switch, each said rheostat switch means, said winch motor means, said ram motor means, said winch limit switch, and said ram limit switch; said electrical circuit being such that when each said conducting lever's other end is in contact with its respective launching terminal, said winch motor means is actuatable in a take up direction

while said ram motor means is concurrently in parallel electrical circuit with a first by-pass circuit until take-up of said line in said take-up direction is actuatable of said ram limit switch, when said ram switch is actuated by said line take-up said ram limit switch being actuatable of a circuit cut-out of said winch motor take-up action and of a circuit cut-in a ram-extension action of said ram motor means by breaking said first by-pass circuit until said winch switch becomes actuatable by said ram-extension action, when actuated by said ram-extension action said winch switch being actuatable of a cut-in of a second by-pass circuit of said ram-extension circuit such that said ram motor means is deactivatable, and said electrical circuit being such that when each of said conducting lever's other end is in contact with its respective launching terminal, said winch motor means is actuatable in a take-up direction while said ram motor means with the ram in extended position is concurrently in electrical parallel with said second by-pass circuit until take-up action of said line said take-out direction is actuatable of said ram, by being actuatable of said ram limit switch, when said ram is actuated by said line take-up said ram limit switch being actuatable of a circuit cut-out of said winch motor take-up action and actuatable of said ram in a ram-retraction circuit by breaking of said second by-pass circuit until retracting action of said ram motor means is actuatable of said winch limit switch, when actuated by said retracting action said winch switch being actuatable of a cut-in circuit of said winch in winch action in a line play-out direction while being actuatable of a cut-out circuit of said second bypass.

2. An apparatus according to claim 1 in which said boat-supporting means includes a hydraulic ram mountable on a boat such that actuation of the boat hydraulic ram serves to reposition said boat-supporting element relative to the boat's center of gravity.

3. An apparatus according to claim 1 in which said cable means includes fore and aft winch means mountable on a support on which said pivot means is mounted, including lines fed from said fore and aft boat winch means in which said lines are connectable to fore and aft portions of a boat during launching and retrieving operations.

* * * * *

45

50

55

60

65

70

75