

March 27, 1962

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3,026,545

RETRIEVING VESSEL AND LAUNCHER THEREFOR

Filed July 31, 1958

3 Sheets-Sheet 1

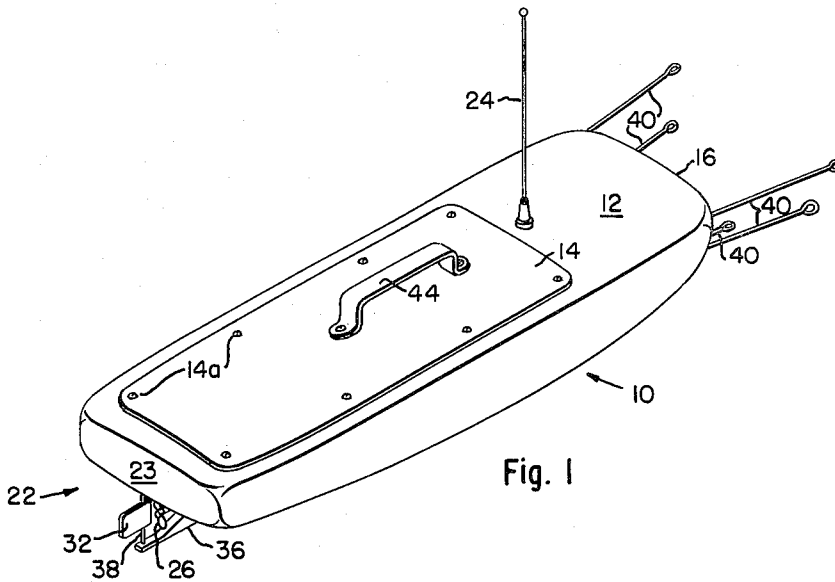


Fig. 1

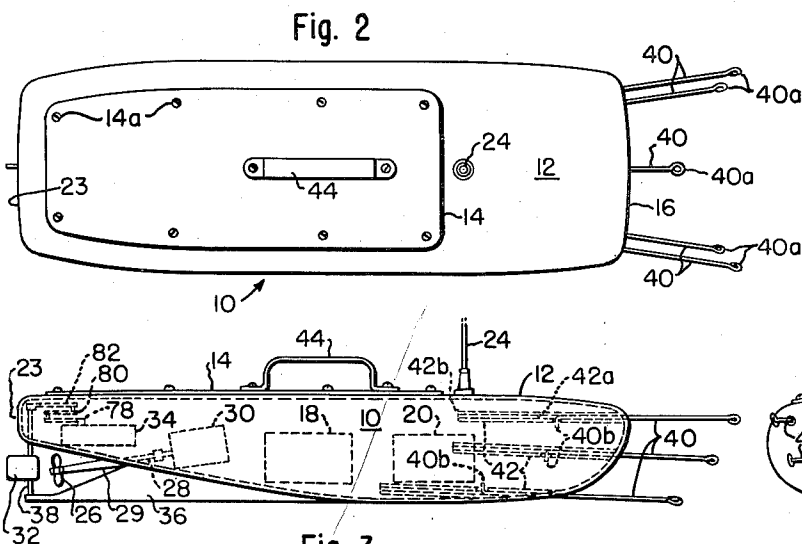


Fig. 2

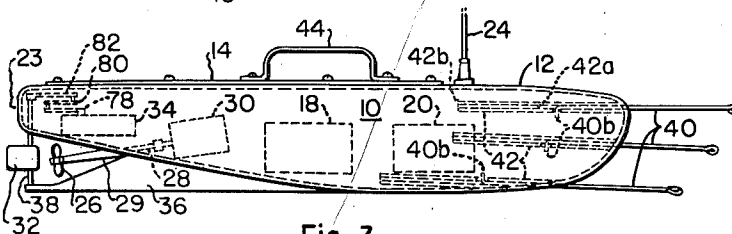


Fig. 3

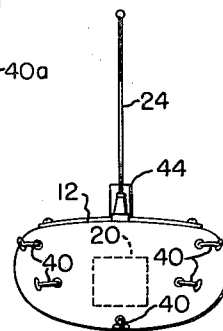


Fig. 4

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3 Sheets-Sheet 2

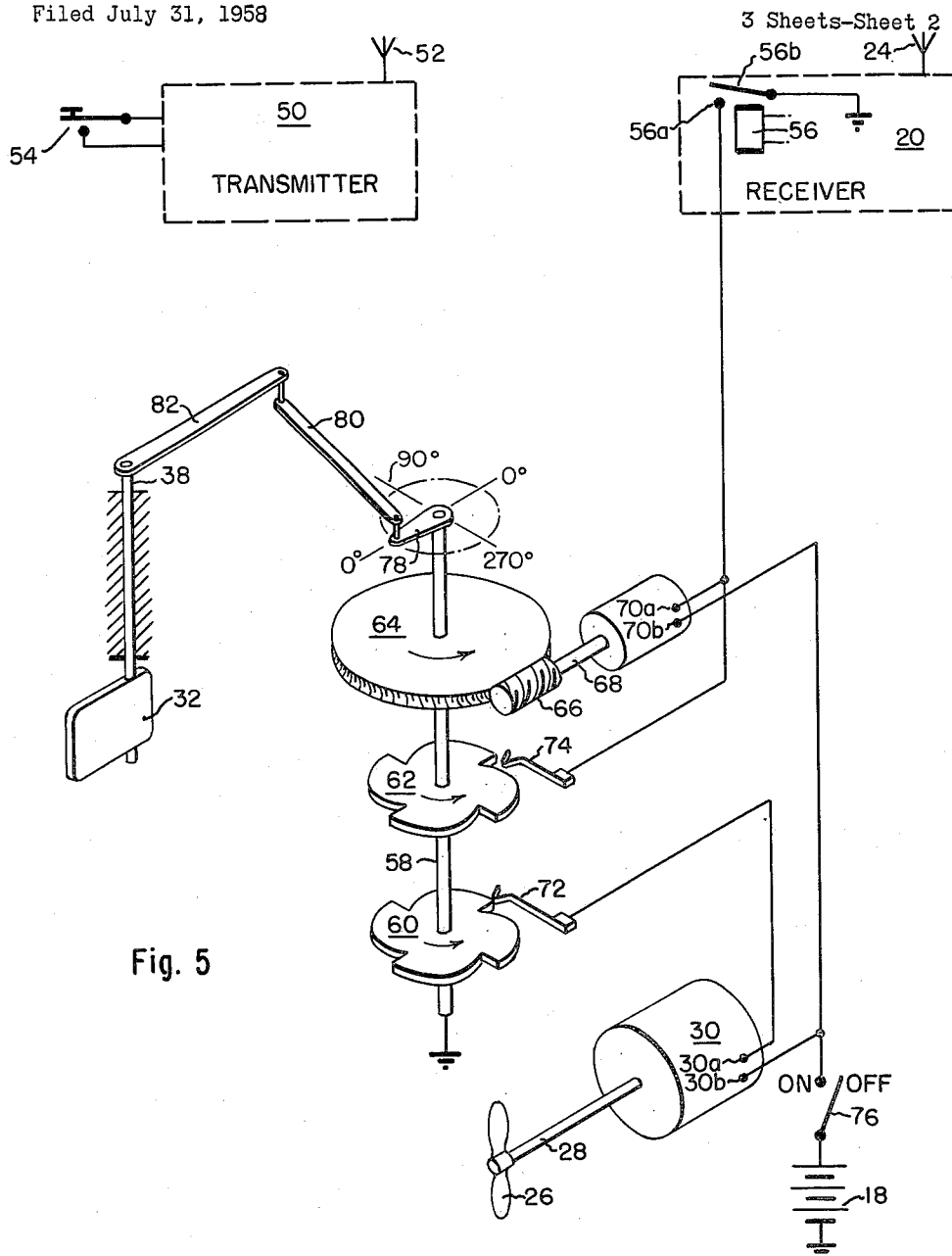


Fig. 5

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Fig. 6

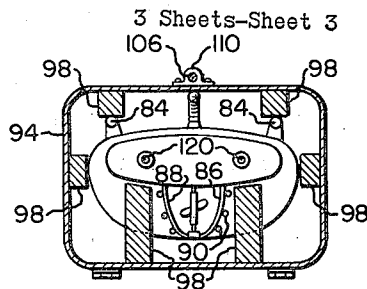
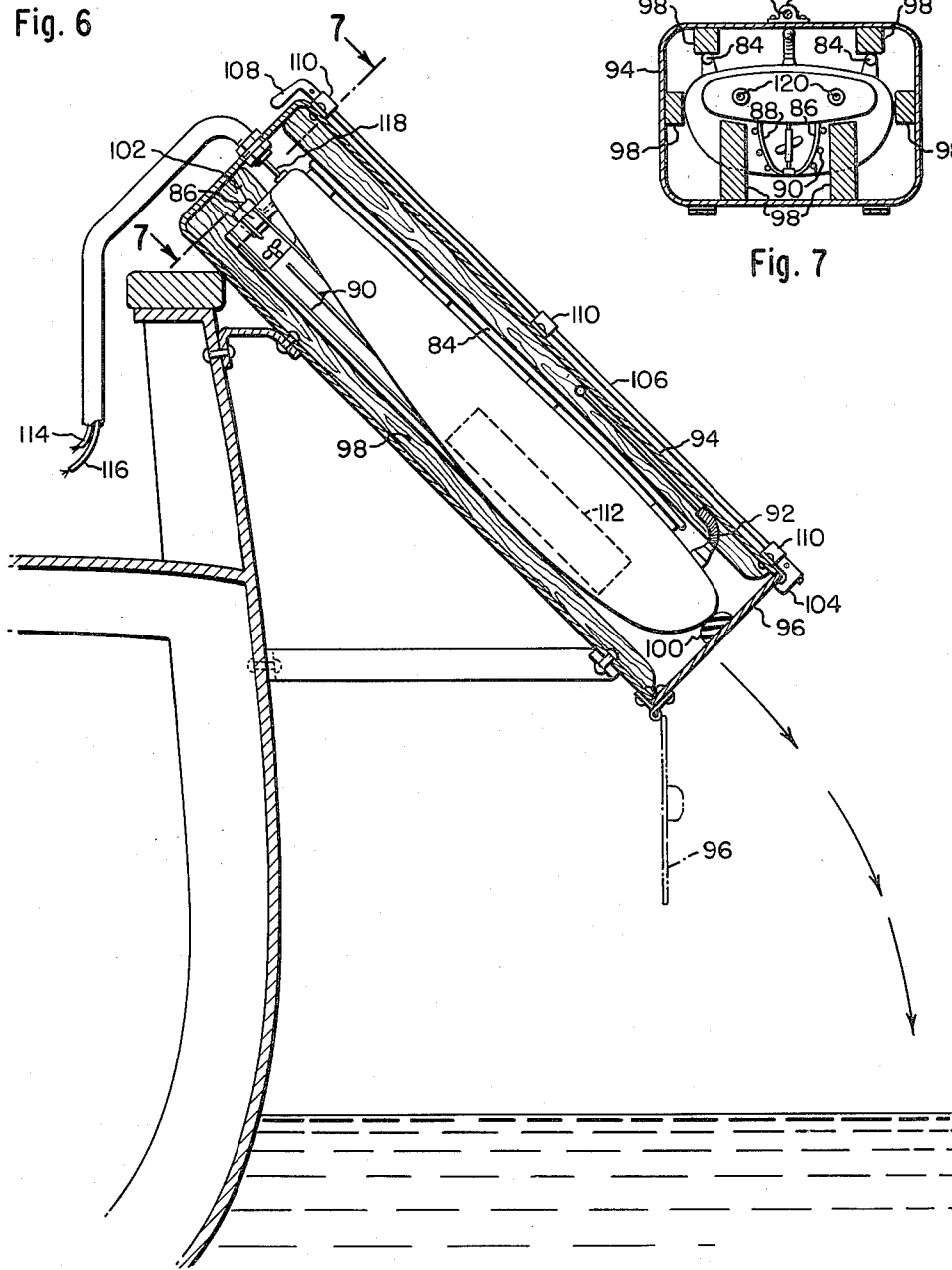


Fig. 7

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3,026,545 RETRIEVING VESSEL AND LAUNCHER THEREFOR

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Filed July 31, 1958, Ser. No. 752,266

6 Claims. (Cl. 9-14)

My invention relates to a remotely controlled vessel for retrieving objects floating on the surface of a body of water. More particularly it relates to a remotely controlled vessel adapted to retrieve wild game such as ducks which have been shot down, or other small floating objects, and a larger size vessel is particularly adapted for lifesaving purposes. My invention also relates to apparatus for storing and launching said vessels when used for lifesaving purposes.

Remotely controlled vessels are of course known. However the vessels which have heretofore been available have not been adapted for use in retrieving because their hull design was in general copied after conventional boats designed for human occupancy, or they were designed for the carriage of equipment. So far as is known a boat designed primarily for the retrieving of floating objects has not heretofore been available. The advantages of a retrieving vessel which is remotely controlled, especially for lifesaving purposes, are quite clear. It is well known that it is highly dangerous for an individual rescuer to swim to a person in distress because of the danger that the drowning person will drag the rescuer down with him. The usual ring buoys cannot be readily manoeuvred to the person in distress once in the water. A remotely controlled vessel however can be manoeuvred to the drowning person. Remotely controlled vessels for lifesaving purposes are particularly adaptable for use on ships underway, since they can be dispatched to a person who has fallen overboard while the ship is slowing and manoeuvring to return. In this manner lost time is minimized, and because the person who has fallen overboard has a relatively large object to grasp, visual contact is maintained. Thus the possibility of a successful rescue is substantially increased.

While these advantages are apparent, a practical design for a remotely controlled vessel for lifesaving or for other purposes has not heretofore been available. In general, a vessel of this type must be simple and inexpensive in construction in order that a number of them may be provided at various lifesaving stations without excessive cost. Further, the vessels must be rugged in construction so that they may be operated in relatively choppy water and can also be launched from a location above the water quickly by merely being dropped therein. The hull is preferably self-righting and watertight. Finally, the vessel must be capable of being stored in a launcher of appropriate design for expeditious launching. Many of the same design problems herein set out for a remotely controlled vessel adapted for lifesaving purposes are also applicable to a smaller boat of the same or similar type for use in retrieving wild game or the like.

Accordingly, a principal object of my invention is to provide a remotely controlled vessel adapted for retrieving objects floating on the surface of the water in which the vessel is floating.

Another object of my invention is to provide a hull design for a vessel of the type described which is particularly adapted for use in a retrieving vessel.

A further object of my invention is to provide simply operated remote control apparatus for use in vessels of the type described.

A still further object of my invention is to provide a

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vessel of the type described which is simple and inexpensive, but rugged in construction.

Yet a further object of my invention is to provide a vessel of the type described having a design particularly adapted for use as a lifesaving vessel.

Yet another object of my invention is to provide a launcher for a lifesaving vessel of the type described which maintains said vessel in a state of readiness for instantaneous launching and which will launch the vessel quickly and expeditiously.

A final stated object of my invention is to provide a retrieving vessel of the type described for inanimate objects floating on the water's surface.

Other and further objects of my invention will in part be obvious and will in part appear hereinafter.

The invention accordingly comprises the features of construction, combinations of elements, and arrangements of parts which will be exemplified in the construction hereinafter set forth, and the scope of the invention will be indicated in the claims.

For a fuller understanding of the nature and objects of my invention, reference should be had to the following detailed description taken in connection with the accompanying drawings in which:

FIG. 1 is a perspective view of a retrieving vessel made according to my invention and adapted for retrieving inanimate objects;

FIG. 2 is a top plan view of the vessel of FIG. 1;

FIG. 3 is a side elevation of the vessel of FIG. 1 showing the location of various parts therein;

FIG. 4 is a bow-on view of the vessel of FIG. 1;

FIG. 5 is a diagram, partially pictorial and partially schematic of a remote control system which may be used to control the vessel of FIG. 1;

FIG. 6 is a view of a lifesaving vessel similar to the vessel of FIG. 1 mounted in a launcher made according to my invention, one side of the launcher being broken away to show the interior thereof; and

FIG. 7 is a section taken along the line 7-7 of FIG. 6.

As shown in FIG. 1, a retrieving vessel made according to my invention includes a hull 10 having a substantially flat deck 12 closing the upper surface thereof. An opening is provided in the after portion of the deck, the opening being closed by a watertight cover 14 when the vessel is in use. The cover is attached by a plurality of quick disconnect fasteners 14a so that access may be readily obtained to the hull's interior wherein the motor, rudder control, batteries and remote control apparatus are mounted.

As shown in FIGS. 1 through 4 the hull is elongated having a water line length which is approximately three times its beam. The ratio of length to beam of the hull will be referred to herein and in the claims as the aspect ratio of the vessel. It is of course known that hulls having a relatively large beam in comparison to their length tend to be more stable than long narrow hulls; however long narrow hulls generally require less power to achieve a given velocity. In boats made according to my invention it is desirable to have both stability and low power consumption, but some compromise must be made since one is in general achieved only at the expense of the other. I have found that an aspect ratio of three is an effective compromise for hulls for retrieving vessels. When the aspect ratio is lower than about 2.5 the boat tends to require too much power to drive it through the water, while if it is greater than approximately 4.5, the boat is not sufficiently stable for use in rough waters. Also, a stable vessel is required in duck retrieving in order that a floundering wounded duck will not upset the retrieving vessel by a flip of its wing or foot.

It will also be noted that the bow 16 of my vessel as illustrated in FIGS. 1 and 2 is blunted or flattened in

the horizontal plane. When the vessel is used for the retrieval of floating objects this blunted bow provides a surface against which the floating object may rest. Thus a duck or other object may conveniently be pushed back to the hunter, and a person who lacks strength to grasp the boat, but who can remain afloat may be pushed back to the shore or rescuing vessel.

It is also clear that the vessel shown in FIGS. 1 through 4 has a rather shallow draft to permit its use in fairly shallow water, such as might be found in ponds or swamps. It will also be observed that the components having the greater weight, such as the battery pack 18 and receiver 20 are located in the forward part thereof. By maintaining the heavier components as low as possible in the hull, and by eliminating superstructure, the center of gravity of the vessel is maintained low in the hull. This also tends to make the vessel stable. Also, if by wave action the vessel is overturned, so that it is floating deck down, it will be unstable in this position and any slight disturbance will cause it to return to its normal operating position i.e. it is self-righting. The stern generally indicated at 22 is also blunted, for convenience of manufacture, but other types of stern design might also be used if found more desirable.

As best shown in FIG. 3, the hull curves downward gently to the point of maximum depth, the bow being relatively blunt also in vertical cross section. The stern lines are however much finer, the hull having a relatively long run from the point of maximum depth to the transom 23. The relatively blunt bow and the fine stern lines permit the vessel to be propelled with relatively low power at relatively low speed to length ratios. Accordingly this design is particularly desirable in vessels which are battery operated and in which energy therefore must be conserved.

While the hull of the vessel indicated in FIGS. 1 through 4 might be made of any of the conventional materials used in boat-making, such as wood, metal, etc., it has been designed particularly for simple and expensive manufacture by plastic molding methods. Using these methods either the deck and hull may be molded separately or the entire hull, including the deck, may be molded in a single operation, with the cover 14 being added after installation of the working parts.

The boat illustrated in FIGS. 1 through 4 includes in addition to those parts already described an antenna 24 for the reception of control signals, from a radio transmitter at a remote location. Propulsion for the vessel is provided by a screw 26 mounted on shaft 28 which is enclosed within the stuffing box 29 and driven by motor 30, which is preferably although not necessarily an electric motor. A rudder 32 is provided and, as shown is preferably of the balanced type. Motor and rudder control apparatus 34 to be described in greater detail hereinafter is located in the after portion of the hull. A skeg 36, integrally molded with the hull, increases the lateral stability thereof, provides a base for the rudder post 38, and protects the screw and rudder.

In the embodiment illustrated in FIGS. 1 through 4, a plurality of projecting arms 40 are provided to guide and hold the floating object to be retrieved against the blunted bow 16. The ends of the arms are bent into eyelets or loops 40a to minimize the danger of damage to the object by the ends of the arms, and to provide means for gripping the arms.

As best shown in FIG. 3, each of the arms 40 extends outwardly from a hollow tube 42 mounted horizontally in the bow portion of the hull. These tubes are of sufficient length to receive the entire arm when the arms are retracted except for the eyelets 40a or other protective devices formed on the ends thereof. Further, the tubes are sealed against the entrance of water by a stuffing box or gland (not shown) at the outer ends thereof. A longitudinal slot 42a is provided in the side of the tube to receive therein the bent over end 40b of the rod

40, and a partial circumferential slot is provided in the tube at the outer end of the longitudinal slot 42a into which the end 40b may be rotated. Thus, when not in use, the arm 40 may be pushed all the way into the tube, the end 40b engaging the slot 42a until it passes the inner end 42b of the tube. A slight rotation of arm 40 then causes end 40b to engage the end of the tube 42, and locks it in the retracted position. When it is desired to extend the arms 40, the arm is rotated until end 40b enters the longitudinal slot 42a. The arm is then pulled forward to the end of the longitudinal slot and rotated to engage the circumferential slot, thus locking the arm in the position illustrated in FIGS. 1 through 4. By this construction the arms 40 may be retracted for transportation purposes, and extended when it is desired to use the vessel. A handle 44 may be provided for convenient transportation of the vessel if desired.

Remote control apparatus for use with the retrieving vessel of my invention is illustrated in FIG. 5. As shown therein, it includes a transmitter 50, having an antenna 52 connected thereto, and means for keying the transmitter, illustratively shown as a hand key 54. The remote control transmitter is preferably keyed "on" by operation of the key, and generates a continuous signal when operated. However, frequency or phase modulated signals might also be used if desired. Antenna 24 receives the transmitted signal, which is then amplified and detected in conventional fashion by receiver 20. The output from receiver 20 is utilized to operate a relay 56 in synchronism with key 54. Thus operation of key 54 closes relay contacts 56a and 56b and release the key releases the relay.

The apparatus also includes a shaft 58, which is electrically grounded and on which are fixed a pair of segmented cams 60 and 62. A worm gear 64 is also attached to the shaft and a worm 66 keyed to the shaft 68 of motor 70 is adapted to drive shaft 58 in the counterclockwise direction as seen in FIG. 5. Each of the two cams has four segments having the shape shown; cam 62 is angularly displaced with respect to cam 60 in the counterclockwise direction. Resilient contacts 72 and 74 are adapted to engage the segments of cams 60 and 62 over a portion of their rotation. Battery 18 is connected between ground and one side of motors 30 and 70 through "On-Off" switch 76. Battery 18 may also be used to supply power to the receiver and to minimize battery drain and simplify receiver construction receiver 20 is preferably of the transistor type.

Rudder control is also effected by rotation of shaft 58 and for this purpose arm 78 is keyed to shaft 58. A linkage arm 80 is pivotally attached at one end to arm 78 and at the other is pivotally connected to crank arm 82 which is keyed to rudder post 38.

To explain the operation of the control system illustrated in FIG. 5 it will be assumed that the rudder is at 0° i.e. the boat is set for a straight course, and that the cams are in the position illustrated. Motor 30 is therefore running since the terminal 30a thereof is grounded via contact 72 and a segment of cam 60. Motor 70 is however stopped since relay 56 is unenergized and contact 74 is not in engagement with a segment of cam 62. Accordingly, terminal 70a is open.

In general, the controller sends only two types of command to the remote control system; a short pulse, which is a momentary closure of key 54 and a long pulse of a few seconds duration. The short pulses are used to stop motor 30 from driving while long pulses are used to change rudder position and also to start motor 30 if it has been previously stopped.

If the apparatus is as shown in FIG. 5 a momentary closure of key 54 will cause closing of relay contacts 56a and 56b and momentary operation of motor 70. This momentary operation causes rotation of shaft 58 with resulting disengagement of contact 72 from cam 60. Terminal 30a is therefore ungrounded and motor 30

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ceases to rotate. Because the angular rotation of shaft 58 is very small, it has little effect on rudder position. Thus from the position shown in FIG. 5, a momentary closure of key 54 results in stopping motor 30, but has substantially no other effect on the vessel.

If, however, key 54 is closed for several seconds when the control system is as shown in FIG. 5, the following sequence takes place. Motor 70 begins to run upon closure of key 54 and rotates shaft 58 and cam 62 until the cam engages contact 74. The key 54 may be released at this point since motor 70 will continue to rotate shaft 58 until contact 74 disengages from the next segment of cam 62. As previously noted cam 62 is angularly advanced with respect to cam 60 in the counterclockwise direction. Thus, it will break contact with cam 74, while cams 60 and 72 remain in contact. Thus a long pulse results in only a momentary interruption of motor 30, but accomplishes a 90° rotation of shaft 58. This rotation will cause rotation of arm 78 and, through linkage arm 80 and crank 82, will position rudder 32 hard over in a direction to cause the boat to make a port turn. Another long pulse will reposition the rudder amidships, and still another long pulse will cause the rudder to be positioned hard over in a direction to cause a starboard turn. The drawing has been marked with the four positions of the arm 78, indicating the relative bearing of the turn at each location.

If the rudder is amidships and in the position shown in FIG. 5 and a starboard turn is desired, three long pulses will be required, one to bring it to 270°, a second to bring it back amidships, and a third to position it at 90°. A long pulse will always leave motor 30 running, but it may be stopped at any time by momentary closure of key 54.

It will be noted that other types of remote control apparatus may be provided if desired, including apparatus for controlling rudder 32 and motor 30 separately, as well as provision for reversing motor 30. However, the remote control apparatus herein illustrated is simple and inexpensive and requires only simple command signals. Accordingly it is preferred over more complex apparatus which is capable of performing additional functions. Also, to further simplify the operation of the vessel a keying device may be provided having two buttons, one producing a transmitter pulse of short duration corresponding to a momentary closure, and one producing a pulse of longer duration for direction changing purposes.

In FIGS. 6 and 7 I have illustrated a lifesaving vessel made according to my invention together with its associated launcher. As shown herein, when the vessel is designed primarily for lifesaving purposes, a pair of hand racks 84 are provided on the deck thereof so that the vessel may readily be grasped, and the person to be rescued may pull himself onto the deck thereof. Also, seen in FIGS. 6 and 7, a guard is provided for the screw consisting of a pair of members 86 and 88 secured between the bottom of the vessel and the skeg near the stern thereof and surrounding the rudder. A plurality of struts 90 extend from the members 86 and 88 horizontally to the bottom, of the vessel thus enclosing the propeller in a barred cage open at the after end. The members 86 and 88 and the bars 90 insure that no damage will result to a person being rescued because of becoming fouled in the screw. This same construction may also be utilized on smaller vessels used for retrieving game or the like to prevent the working parts from becoming fouled by weeds, or the like. The antenna 24 is secured to the vessel shown in FIG. 6 by a flexible connection 92 so that it may be bent substantially horizontal for stowage in the launcher.

The launcher itself, shown herein as mounted on the rail of a ship includes a protective box 94 slightly longer than the vessel and rectangular in cross section. Although I have illustrated the launcher of my invention as fixed to the rail of a ship, it might also be hinged

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thereto and normally positioned with door 96 facing upwardly. Upon release, the launcher would then swing downwardly to the position shown in FIG. 6. Also, launchers of the type herein illustrated may be mounted along beaches on towers for launching vessel made according to my invention into the surf when desired. As shown it is mounted at an angle with respect to the horizontal and the lower end thereof is closed by a door 96 hinged along its lower edge. The interior of the box is provided with launching rails 98 which securely position the lifesaving vessel within the box. This snug fit prevents damage to the lifesaving vessel resulting from motion of the vessel on which it is mounted and also insures a proper trajectory toward the water. Appropriate supports 100 and 102 are provided at bow and stern respectively to limit motion of the vessel along its axis.

A catch 104 is provided at the outer end of the launcher to hold door 96 closed and the lifesaving vessel within the launcher. A rod 106 extends from the catch to a handle 108 at the inner end of the launcher, the rod being journaled in bearings 110. Rotation of handle 108 releases the catch 104 and permits door 96 to fall to the broken line position of FIG. 6. The lifesaving vessel then plunges from the launcher into the water and the antenna springs up in position to receive control signals.

The batteries, control mechanism, radio receiver and motors which occupy a proportionately smaller portion of the lifesaving vessel interior are mounted together in the box 112, shown by broken lines. Mounting the box in this area insures a low center of gravity; the entire box may be shock mounted to minimize the effect of shock when the vessel strikes the water on launching.

Since lifesaving vessels must be always ready for instantaneous use, I provide a pair of wires 114 and 116 to maintain the batteries within the vessel fully charged at all times. These wires are connected to a pair of plugs mounted in the end of the launcher which mate with jacks 120 mounted in the lifesaving vessel. Preferably, these jacks are similar to the type commonly used with headphones so that when the plugs 118 are inserted they break the circuit between batteries and load. However, when withdrawn, the circuit is closed and the vessel is ready for operation immediately upon striking the water.

While actual dimensions may be varied considerably, I have found that a lifesaving vessel of the type described will be adequate if it has an overall length of about six feet, a beam of two feet and a depth from deck to keel of about one foot. For retrieving small objects, such as floating game, the overall length may be two feet, the beam eight inches and the depth from deck to keel about four inches.

It will thus be seen that I have provided an inexpensive and practical construction for a remotely controlled retrieving vessel both as to the hull design itself and to the apparatus for controlling it. The hull is designed to obtain great stability consistent with a reasonable power requirement. Because of the simplicity of the hull design it may readily be produced in large quantities. The flattened bow and extending arms of one embodiment are particularly adapted for retrieving objects floating on the water's surface and returning them to the operator. I have also provided a launcher which is particularly adapted to provide weatherproof stowage and fast launching for a lifesaving vessel made according to my invention. The launcher includes provisions for maintaining the batteries in the vessel in a charged condition at all times.

It will thus be seen that the objects set forth above, among those made apparent from the preceding description, are efficiently attained and, since certain changes may be made in the above construction without departing from the scope of the invention, it is intended that all matter contained in the above description or shown

in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A vessel for retrieving floating objects comprising, in combination, a shallow draft hull, a deck formed on the upper surface of said hull, said deck completely sealing the interior of said hull from the entrance of water, driving means adapted to propel said vessel including a motor and screw, a rudder secured to the stern portion of said vessel, a radio receiver carried within said hull, apparatus responsive to signals from said receiver for the control of said motor and said rudder, an antenna carried by said vessel externally of said hull connected to said receiver, means forming a scoop at the bow of said vessel, said means including a plurality of arms affixed to said hull near the bow thereof and projecting generally horizontally and in a forward direction from said vessel, and cooperating with the bow to receive and retain a floating object against the bow of said vessel while said vessel is moving in the forward direction.

2. The combination defined in claim 1 in which said hull is substantially blunted in horizontal cross section.

3. The combination defined in claim 1 in which said arms are retractable.

4. The combination defined in claim 1 in which the aspect ratio of said hull is between $2\frac{1}{2}$ and $4\frac{1}{2}$.

5. The combination defined in claim 1 in which the aspect ratio of said hull is substantially 3.

6. The combination defined in claim 1 in which, said hull, in vertical cross section curves downwardly to the point of maximum depth thereof, said point of maximum depth being located near the bow of said vessel to provide a relatively blunt hull, and said hull has a relatively long upward run to the transom, to thereby provide a relatively fine stern.

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