BOAT CONTROL APPARATUS

A system and an apparatus are described which automatically, manually and/or remotely maintains a vessel in a floating disposition during tide movement events. The system, in some example embodiments, includes a receiver for receiving an actuation signal from a controller, the receiver adapted for electrical connection to a winch; the winch being actuated by the receiver in a direction to move the watercraft away from shore or shallow water in response to a signal from the controller. In other example arrangements, a resilient or retractable anchor line is provided, which in use deploys at an opposite end of the boat from the other anchor line, so as to maintain some control over the vessel at anchor, and to facilitate hauling of the boat back to shore when required, or automatically do so when the tide returns.

Fig. 1
Field of the Invention

The present invention relates generally to a boat or watercraft control apparatus, a processor for operating a boat or watercraft and a system and method for controlling a boat or watercraft. It is to be understood that the present invention may be used in conjunction with a watercraft fixed by one or more mooring or anchor lines and that throughout this specification and claims which follow, the term "anchor" is intended to encompass mooring and other methods of fixing watercraft to solid objects.

Background to the Invention

It is often the case that watercraft at anchor on a body of water are left stranded when the tide ebbs. It is then difficult to launch the stranded watercraft until the tide flows back sufficiently to support the watercraft. This results in the stranding of the watercraft users.

The present invention seeks to ameliorate one or more of the above-mentioned disadvantages and seeks to inhibit beaching of watercraft during tide movement events.

Summary of the Invention

According to one broad form of the present invention there is provided a system and/or an apparatus which automatically, manually and/or remotely maintains a vessel in a floating disposition during tide movement events.

According to one aspect of the present invention there is provided a boat or watercraft control apparatus for a watercraft at anchor on a body of water of a selected depth, the boat control apparatus including: a receiver for receiving an actuation signal from a controller,
the receiver also adapted for electrical connection to a winch; the winch being actuated by
the receiver in a direction to move the watercraft away from shore or shallow water in
response to a signal from the controller.

Preferably the boat or watercraft control apparatus includes an automatic controller which
includes: a processing system for processing selected inputs; a processing system adapted
for electrical connection to a detector for detecting a depth of the body of water under the
watercraft; the processing system also adapted for electrical connection to a relay or winch
for actuation of the winch; the processing system in use causing actuation of the winch in a
direction to move the watercraft away from shore or shallow water in response to selected
input data if the depth of the body of water underneath the watercraft falls below a selected
threshold.

According to another aspect of the present invention there is provided a method of
controlling a boat or watercraft at anchor in a selected depth of water, the method
including the steps of, in a processing system: setting a shore direction proximal one end or
side of the watercraft; receiving a depth signal value from a depth finder; comparing the
depth signal value with a threshold depth; sending an actuation signal to a relay or a winch
for winching the watercraft in a direction a selected distance away from the shore direction
if the depth signal value is below the threshold depth.

According to yet another aspect of the present invention there is provided a winch
apparatus which includes a paying drum and a hauling drum which in use are operated to
pay and haul respective anchor lines in response to inputs from a processing system.

Preferably the apparatus includes the detector which may be in any suitable form but
preferably in the form of an ultrasonic transmitter and receiver. Preferably the detector is
disposed in a base region of the watercraft, preferably mounted on the keel at the lowest
point of the draft of the watercraft.

Preferably the apparatus includes one or more winch assemblies in order to winch anchor
lines, cables or chains so as to draw the boat in one direction away from the shore or closer
to the shore. In one preferred form, the winch assembly includes a double-sided winch unit which has a hauling side and a paying side which operates to haul anchor line in from one side or end of the watercraft while at the same time paying out or extending anchor line from the other side or end of the watercraft. In this embodiment, it is preferred that the winch include a gearbox to simplify the operation and construction of the winch.

In one arrangement the winch assembly is in the form of two discrete or separate single-direction winch units disposed at opposite sides or ends of the watercraft. In this embodiment, the winch units are controlled via a wire loom or wireless link so as to pay line from one winch unit at one end while hauling anchor line with the other winch unit mounted at the other end.

Preferably guides are provided to guide the anchor line into the winch assemblies. The guides in use reduce winch effort and potential knots. Preferably the guides guide the anchor line through large radius bends to reduce winch effort.

Preferably the winches are electrically operated and connected to an electrical power source such as a battery.

Preferably the winch is disposed in a bilge section of the watercraft so as to reduce the centre of gravity of the watercraft. Preferably the winch is of a windlass type so as to reduce the centre of gravity of the vessel. It is possible that the winch be in the form of a capstan.

Preferably the processing system includes an input and output device for receiving and displaying inputs and outputs and includes a console disposed in a cabin of the watercraft.

Preferably the controller is a remote controller which wirelessly transmits a signal for hauling a selected anchor line a selected distance and paying the other anchor line the selected distance.
Preferably the threshold depth is set at the input/output device, and also a maximum depth threshold may be set so as to trigger a hauling of the anchor line adjacent the shore side so that the watercraft is drawn back to shore on a flowing tide.

Preferably the console is connected to the inputs and outputs via wiring looms, however it is contemplated that any suitable arrangement is contemplated such as for example wireless connectivity using transmitters and receivers.

Preferably the processing system includes a central processing unit, a memory, a storage device and a display device.
Brief Description of the Drawings

In order to enable a clearer understanding of the invention, preferred embodiments will hereinafter be described with reference to the attached drawings, and in those drawings:

FIG. 1 is a side elevation schematic view of a watercraft having a preferred embodiment of boat control apparatus on board;

FIG. 2 is a similar view to that shown in Figure 1, with a second embodiment of boat control apparatus installed on board; and

FIG. 3 is a section view of a double-side winch unit suitable for use with preferred embodiments of the present invention.

Detailed Description of the Drawings

Referring to Figures 1 and 2 there is shown a watercraft generally indicated at 10 which is at anchor on a body of water 5 at a selected depth. The watercraft 10 includes a watercraft control apparatus 20 which in one embodiment includes a processing system 22 for processing selected input signals, the processing system 22 being electrically connected to those inputs at 27, the input signals being transmitted from a detector 23 for detecting water depth. The processing system 22 is also configured to send output signals through output 28 which is electrically connected to a relay 24 or directly to a winch assembly 26 for actuation of the winch assembly 26 in response to selected input signals from the detector 23.

The winch assembly 26 is shown in Figure 1 as a windlass and is a dual sided winch unit 29 in that it has a hauling drum 30 and a paying drum 32. As shown in Figure 3 a gearbox 35 allows the hauling drum 30 and the paying drum 32 to rotate in opposite directions at the same rate. A similar version of the winch unit 29 may be provided wherein anchor
lines 35 and 37 are attached to the hauling drum 30 and paying drum 32 at upper side 36 and lower side 38 respectively. In this manner the drums 30 and 32 may be mounted on a common shaft for rotation thereabout.

The detector 23 is in the form of a depth finder 40 which is an ultrasonic device 52 having an ultrasonic wave transmitter and receiver. The depth finder 40 is mounted at a base region 54 of the watercraft on the keel 56 at the lowest point of the vessel so that the depth value signal provided to the processing system 22 is the minimum depth required for operation of the watercraft 10.

In Figure 2, similar numerals to those used in Figure 1 are used to denote similar parts of alternative example embodiments of the present invention. Thus, as shown in Figure 2, another embodiment of winch assembly 126 includes two separate winch units 42 and 44, each electrically connected by a communication line to an output 128 of the processing system 122. In this way, if a boat owner already had one winch unit on board, only one additional winch unit would be required to be purchased in order to make an effective system of the preferred embodiment of the present invention.

In operation, the abovementioned arrangement functions as follows: a boat is set at anchor by anchor lines at both ends, in a floating disposition on a body of water 5 of a selected depth, a selected distance from shore. A shore direction is programmed into the console 25 and retained in a storage region of the processing system 22. Usually, the shore end is the bow end 50.

A minimum depth threshold is programmed into the console 25 and stored, and if required, a maximum depth threshold is programmed and stored. The processing system 22 periodically checks the depth of the water 5 using the detector 23 and compares with the threshold stored in the storage region. If the processing system 22 detects that the depth value of the water below the watercraft 10 is below the threshold value, the processing system actuates a relay through output 28 which actuates winch assembly 26 so as to haul the aft anchor line and simultaneously pay out the shore anchor line a selected distance.
The processing system 22 again checks the depth and if it is above the threshold value, no further actuation of the relay takes place.

Another detector may be provided in order to count the revolutions or partial revolutions of the winch drums 30 and/or 32 so as to measure the amount of anchor line paid or hauled. This value is fed back to the processing system to give the processing system 22 further control over the distance the watercraft 10 is hauled from shore.

It is not good practice to have watercraft too far from shore, so, once the tide begins flowing back in to shore, the detector 23 will detect that the depth of the water has exceeded the previously-input maximum depth threshold, and the processor will haul the watercraft 10 back to shore.

A manual apparatus and manual method of anchoring is provided in an alternative arrangement. In this arrangement, the processing system responds to an actuation signal from a remote controller (not shown) to haul in a selected quantity of anchor line 35 from one end and pay anchor line 37 from the other end so as to set the watercraft 10 a selected distance from shore. The watercraft would remain at that location until the remote control was activated. The remote control would override the detector or may operate in the absence of the detector, so that a user wishing to take a trip in the watercraft 10 would simply actuate the remote controller to haul in the anchor line 37 and pay out anchor line 35 to bring the watercraft to shore.

In a preferred embodiment, there is provided a remote manual system and remote manual method of operation which includes the following features: A watercraft 10 which includes a winch assembly 26 connected to a detector 23 comprising a radio or ultrasonic or other kind of wired or wireless receiver. The winch assembly may be disposed anywhere on the watercraft: bow, midships or stern. It could be a double-winches as described above, but is preferably a single winch, which operates a single anchor line which extends toward and, when deployed, over one end of the watercraft: bow or stern. The preferred remote manual system also includes a resilient or bungee anchor line disposed at the opposite end from that end associated with the single anchor line. Some arrangements include a retractable
and/or ratchet anchor line such as may be found in a retractable seat belt in a vehicle. A
user operates the system either on board, using a console-mounted control, or, from the
shore, with a wireless or wired key controller.

In operation the preferred system deploys and acts in the following manner: The
watercraft is positioned adjacent the shore, spaced a selected distance therefrom, so that it
is floating on the water's surface in a selected depth of water. A user actuates the winch so
that the anchor chain deploys. It is always good practice to reverse the boat a selected
distance from the anchor so that the anchor bites into the sea, lake or river bed. The
resilient or retractable anchor line is deployed, and either taken ashore or dropped
overboard, so that its distal end is fixed into a ground insertion point. The distal end may
be wrapped around a tree, buried in the sand, or like mountings.

Thus, the main anchor is maintained under a certain amount of tension and the boat is
inhibited from turning with the tide, facilitating a good hold on the sea bed. If the tide
ebbs, the user simply presses a button on the key controller, and the winch winds up the
anchor chain, and the boat is taken offshore a selected distance. The system may include a
processor which indexes the boat a selected distance at the press of a button, or the
operator may hold the button down for a selected time to maintain winching operation, and
release when he or she is satisfied that the boat is in sufficient depth of water. During
winching the retractable or elastic anchor line may extend. The retractable seat belt or
ratchet device may include a solenoid or other device which may actuate to release a lock
so as to allow the extension of the aft or proximal anchor line. The solenoid may release
simultaneously when the winch is in operation, or the elastic anchor line may simply
stretch.

Finally, it is to be understood that the inventive concept in any of its aspects can be
incorporated in many different constructions so that the generality of the preceding
description is not to be superseded by the particularity of the attached drawings. Various
alterations, modifications and/or additions may be incorporated into the various
constructions and arrangements of parts without departing from the spirit or ambit of the
invention.
THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A system and/or an apparatus which automatically, manually and/or remotely maintains a vessel in a floating disposition during tide movement events.

2. The system in accordance with claim 1 wherein the system and/or apparatus includes a receiver for receiving an actuation signal from a controller, the receiver adapted for electrical connection to a winch; the winch being actuated by the receiver in a direction to move the watercraft away from shore or shallow water in response to a signal from the controller.

3. The system in accordance with claim 1 or 2 including an automatic controller comprising: a processing system for processing selected inputs; a processing system adapted for electrical connection to a detector for detecting a depth of the body of water under the watercraft; the processing system also adapted for electrical connection to a relay or winch for actuation of the winch; the processing system in use causing actuation of the winch in a direction to move the watercraft away from shore or shallow water in response to selected input data if the depth of the body of water underneath the watercraft falls below a selected threshold.

4. The system in accordance with claim 1, 2 or 3 wherein a detector is provided which is an ultrasonic transmitter and receiver.

5. The system in accordance with claim 4 wherein the detector is disposed in a base region of the watercraft.

6. The system in accordance with any one of the previous claims wherein the apparatus includes one or more winch assemblies in order to winch anchor lines, cables or chains so as to draw the boat in one direction away from the shore or closer to the shore.
7. The system in accordance with claim 6 wherein the winch assembly includes a double-sided winch unit which has a hauling side and a paying side which operates to haul anchor line in from one side or end of the watercraft while at the same time paying out or extending anchor line from the other side or end of the watercraft.

8. The system in accordance with any one of the previous claims wherein guides are provided to guide the anchor line into the one or more winch assemblies.

9. The system in accordance with any one of the previous claims wherein the controller is a remote controller which wirelessly transmits a signal for hauling a selected anchor line a selected distance.

10. The system in accordance with any one of the previous claims wherein a single winch is provided to operate an anchor line over the bow of the boat, and a retractable or resilient anchor line is provided, and in use deployed over the stern of the boat so as to maintain a degree of tension on the bow anchor line.

11. A winch apparatus which includes a paying drum and a hauling drum which in use are operated to pay and haul respective anchor lines in response to inputs from a processing system.

12. A method of controlling a boat or watercraft at anchor in a selected depth of water, the method including the steps of, in a processing system: setting a shore direction proximal one end or side of the watercraft; receiving a depth signal value from a depth finder; comparing the depth signal value with a threshold depth; sending an actuation signal to a relay or a winch for winching the watercraft in a direction a selected distance away from the shore direction if the depth signal value is below the threshold depth.

13. A system for controlling a boat at anchor substantially as hereinbefore described with reference to the drawings.
14. A method of controlling a boat at anchor substantially as hereinbefore described.

15. A winch apparatus substantially as hereinbefore described with reference to the attached drawings.