

[54] STEERING SYSTEM FOR CANOES AND THE LIKE

[76] Inventors: **Dolphus D. Caton**, 149 Beebe Ave., Elyria, Ohio 44035; **John R. Ralph**, 2690 Harris Rd., Sheffield Lake, Ohio 44054

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[58] Field of Search 114/162-165, 114/152, 153, 132, 128; 115/28, 29, 21, 22, 23, 25; 292/251.5; 85/5 N; 24/201 B; 248/4

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Primary Examiner—Trygve M. Blix

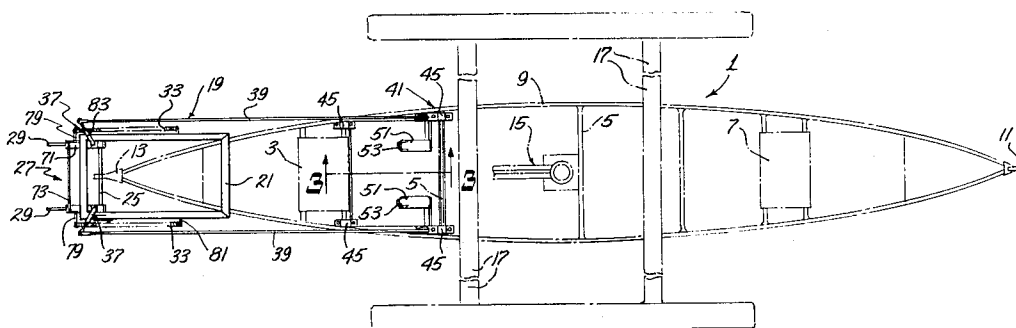
Assistant Examiner—Galen Barefoot

Attorney, Agent, or Firm—Bacon & Thomas

[57] ABSTRACT

A steering system for a boat such as a canoe wherein the system includes an easily detachable frame that is secured to the boat's existing structure without the alteration thereof. The frame has a rudder assembly pivotally secured thereto with the assembly including at least one. A spring serves to bias the rudder assembly downwardly in an operative position but permits an upward yielding of the assembly into an inoperative position when an obstruction or obstacle is met beneath the surface of the water. The steering system is controlled by either a set of foot pedals or a manually operated tiller from a position in the canoe remote from the rudder assembly.

6 Claims, 13 Drawing Figures

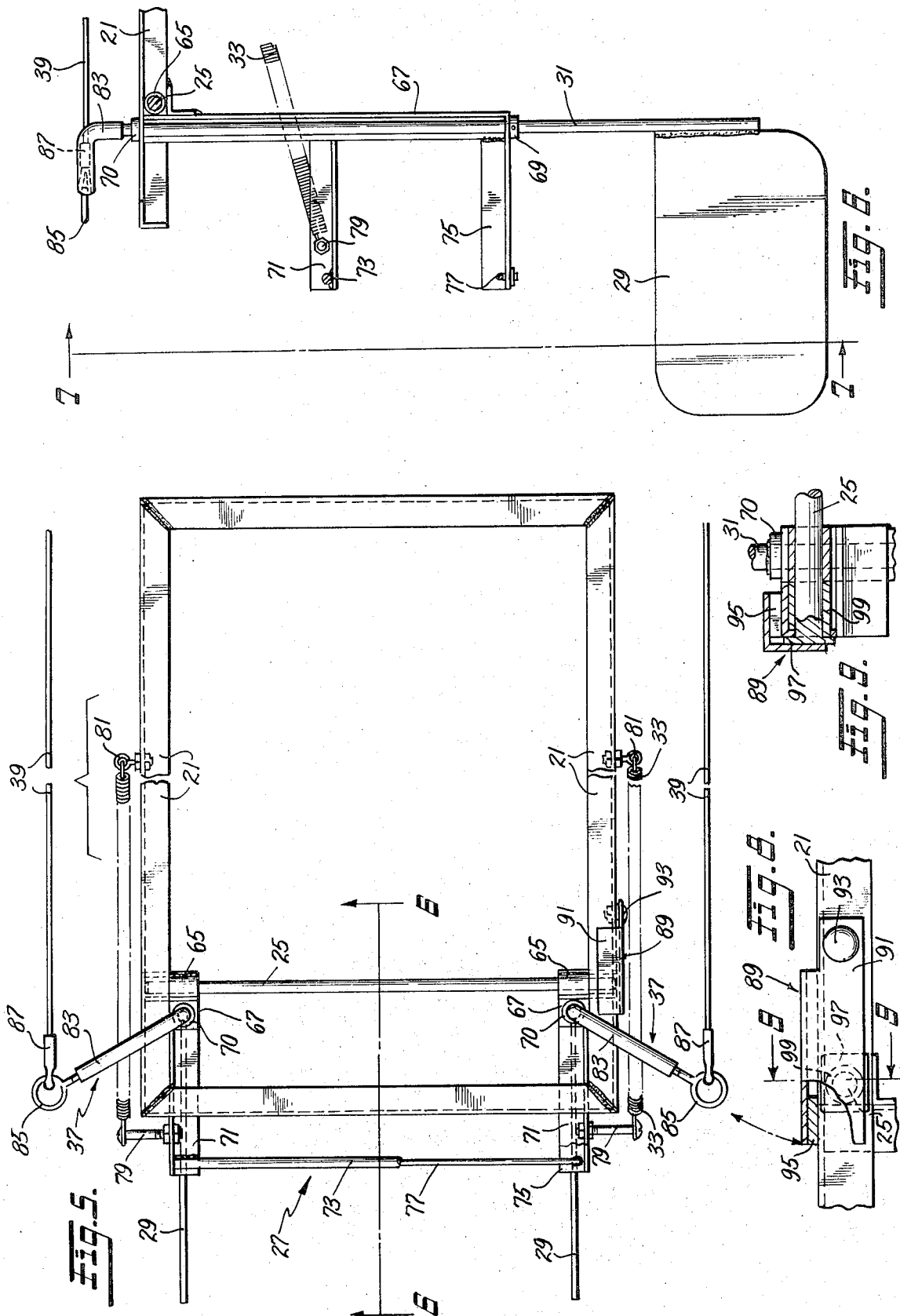


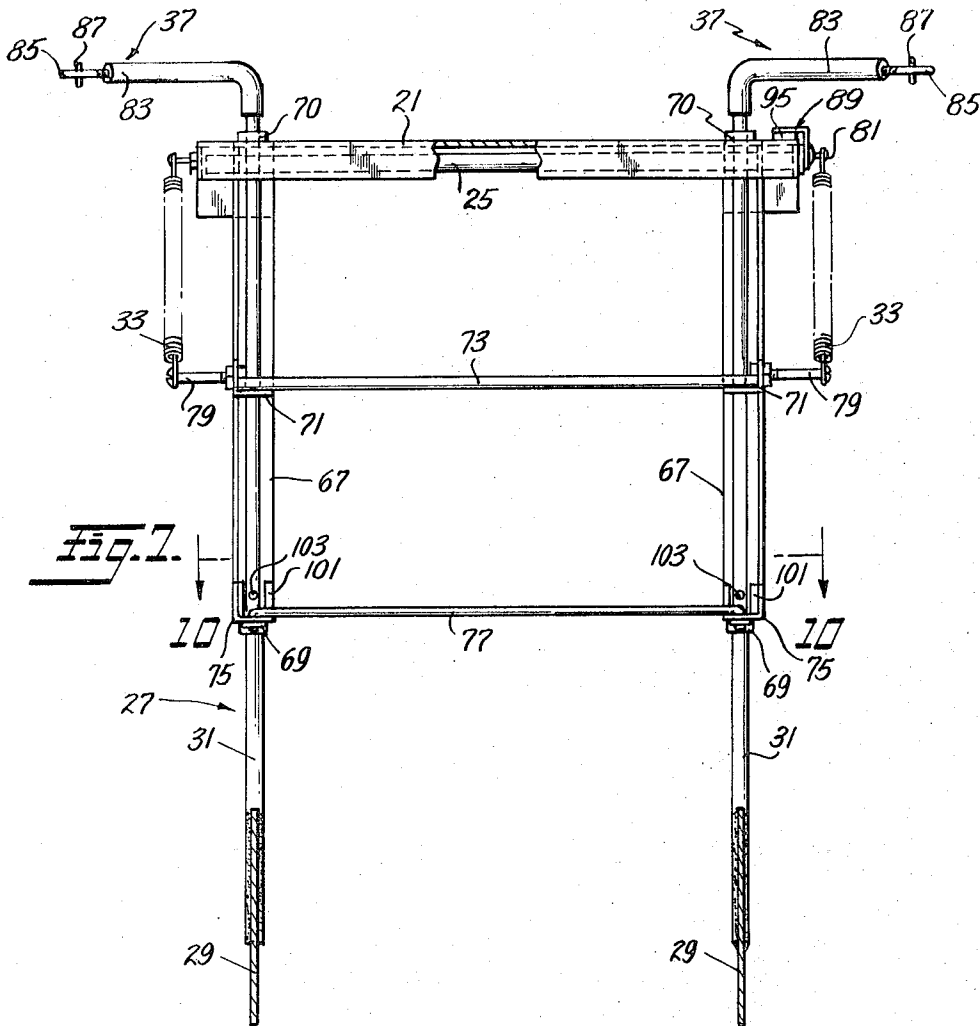
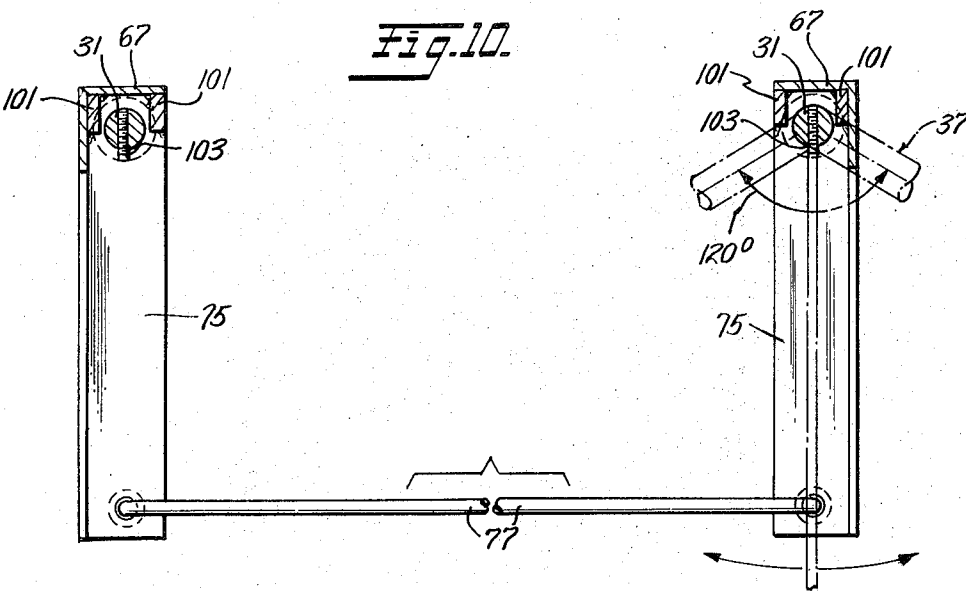


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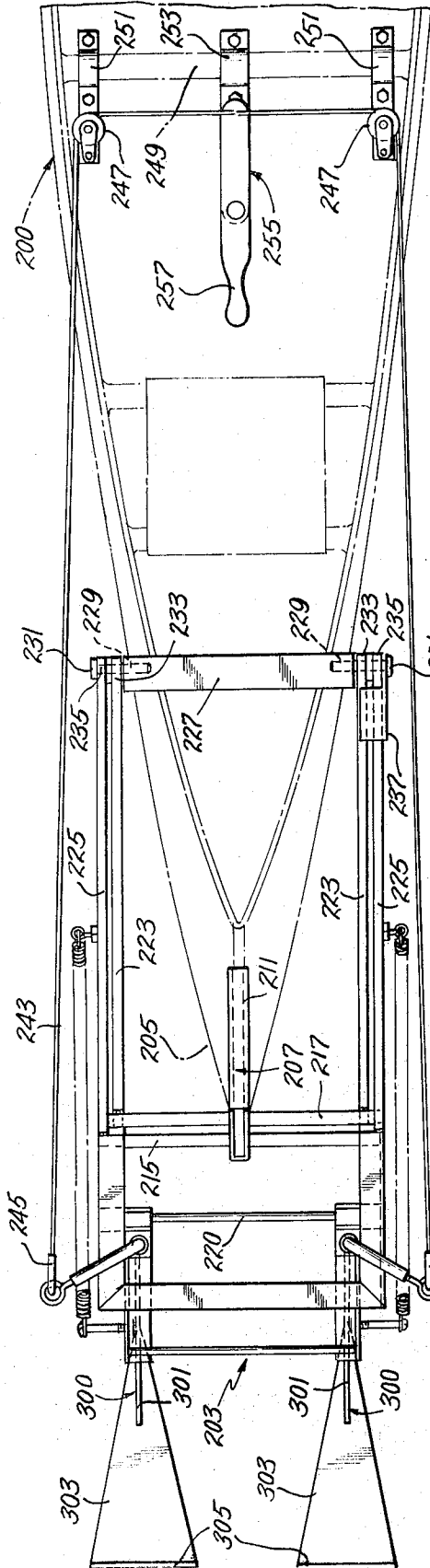


FIG. 11.

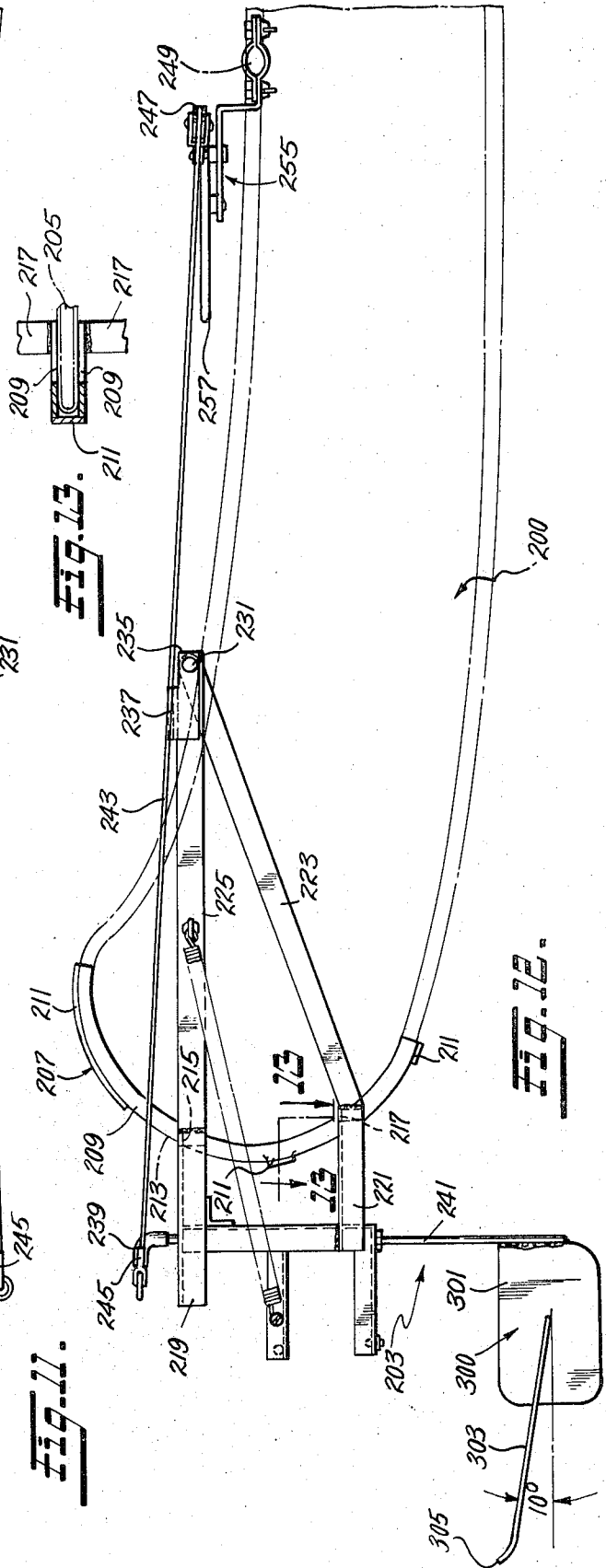


FIG. 12.

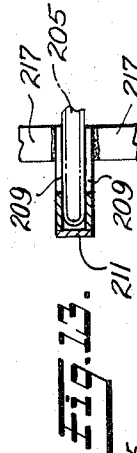


FIG. 13.

STEERING SYSTEM FOR CANOES AND THE LIKE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates generally to steering systems for boats such as canoes or the like which utilize rudders for directing the boat's course or direction of travel. More particularly, the present invention relates to a steering system which is adapted particularly for use with the different kinds of canoes known in the prior art. The steering system is characterized by the presence of two rudders which are pivotally mounted against a spring bias such that they are adapted to flip up as a unit when the rudders encounter obstructions or obstacles beneath the surface of the water, thereby preventing damage to the steering system.

It is well known that canoes and similar type boats which are adapted particularly for use by one or two persons are utilized more frequently for travel over shallow waters which contain rocks, submerged logs and other dangerous obstructions beneath and close to the water's surface. The provision of any steering system which employs a rudder or similar downwardly projecting mechanism for directing the course of the canoe's travel over such shallow waters encounters the strong risk of damage to such apparatus when they strike a submerged obstruction. Further, due to the nature and relatively light weight of a boat such as a canoe, it is highly desirable that any steering system to be incorporated therewith be of the type that is easily attached to and removed from the canoe without the necessity of physically altering or adapting the boat's basic structure. This permits the boat to be easily transported and utilized in the absence of an auxiliary steering system if so desired. In addition, it is sometimes highly desirable that a canoe or similar boat be steered by means of a system other than the standard canoe paddle when the individual within the boat desires to engage in other activities such as photography. As such, it is necessary to have a steering system which requires a minimum of maintenance and attention. Finally, should a light weight boat such as a canoe be utilized in conjunction with a sail and outriggers, it is of utmost importance that a strong and easily controllable steering system be present in this situation from the standpoint of safety, especially when more than one person is participating in the sailing of the boat.

2. Description of the Prior Art

The prior art is replete with examples and teachings of various forms of steering systems for boats which utilize some form of rudder arrangement. The particular use of a double rudder system is exemplified by the Rickard et al. U.S. Pat. No. 2,528,608 and the Specht U.S. Pat. No. 3,147,730. These patents both teach similar steering systems which utilize two rudders that are actuated by a control means remote from the general vicinity of the rudders. The concept of providing a rudder which is adapted to flip up out of the way when the rudder encounters an obstruction beneath the surface of the water is exemplified by the Patterson U.S. Pat. No. 2,991,749 and Crabille U.S. Pat. No. 3,085,540. However, the systems disclosed by these patents, and those similar systems well known in the prior art fail to provide for a strong and safe steering assembly which includes two rudders that are adapted to flip up out of the way when an obstruction is encountered. Further,

they fail to teach a steering system which may be easily and quickly attached to a canoe or similar boat without the physical alteration or adaption of the craft to the steering system. The present systems in the prior art are basically permanent installations which are functionally limited and incapable of versatile applications.

It is therefore an object of the present invention to provide a strong and safe steering system which is adapted to be easily attached to or removed from the boat with which it is to be used.

It is another object of the present invention to provide for a steering system which includes a rudder assembly having two rudders that are protected from damage despite the presence of obstructions beneath the surface of the water.

It is a further object of the invention to provide a steering system which is easily adapted for use with many forms of boats such as canoes or the like without the need for altering or adapting the inherent physical characteristics of the boat.

It is yet another object of the present invention to provide a steering system which can be safely used by a lightweight boat such as a canoe or the like when more than one person is riding in the boat.

It is yet a further object of the present invention to provide for a steering system wherein the steering of the boat can be accomplished by the exercise of a minimum amount of attention and effort on the part of the person operating the system.

3. Summary of the Invention

The present invention serves to overcome the basic problems inherent with the steering systems of the prior art by providing for a steering system which comprises a frame that is easily attached to or removed from the canoe or similar boat without altering or adapting the basic structure of the boat to the system. A rudder assembly is pivotally attached to the frame and includes two rudders. A resilient means, such as a pair of coil springs, serves to bias the rudders downwardly in their operative position beneath the surface of the water. Either a pair of foot-operated pedals or a manually operated tiller may be detachably secured to the thwart of the canoe for the purpose of controlling the angular positions of the rudders through a flexible cable system. The frame may be attached to any prior art canoe by utilizing either a horizontal shaft which fits through the eyelet of the canoe or by utilizing a channel-shaped arcuate sling which fits over the end edge of the canoe when the latter is not provided with an eyelet.

BRIEF DESCRIPTION OF THE DRAWINGS

A full understanding of the construction of the present invention together with further novel features and advantages, will be had from the following detailed description of the preferred embodiments thereof, taken in conjunction with the attached drawings wherein:

FIG. 1 is a plan view of the steering assembly of the present invention;

FIG. 2 is a side elevational view of the steering assembly of FIG. 1;

FIG. 3 is an enlarged vertical sectional view, taken along the line 3—3 of FIG. 1;

FIG. 4 is a transverse sectional view, taken along the line 4—4 of FIG. 3;

FIG. 5 is an enlarged fragmentary plan view of the steering system of the present invention;

FIG. 6 is a fragmentary vertical sectional view taken along the line 6—6 of FIG. 5;

FIG. 7 is a rear elevational view, partly in section, taken along the line 7—7 of FIG. 6;

FIG. 8 is an enlarged fragmentary elevational view, partly in section, of the latching mechanism utilized by the present invention;

FIG. 9 is a fragmentary vertical sectional view taken along the line 9—9 of FIG. 8.

FIG. 10 is an enlarged fragmentary horizontal sectional view, taken along the line 10—10 of FIG. 7;

FIG. 11 is a fragmentary plan view of a second embodiment or modification of the steering assembly of the present invention;

FIG. 12 is a fragmentary side elevational view of the steering assembly of FIG. 11;

FIG. 13 is an enlarged fragmentary horizontal sectional view taken along the line 13—13 of FIG. 12.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to FIGS. 1 and 2, there is depicted an embodiment of the present invention as incorporated with a canoe 1. A canoe 1 may be of any standard form and is provided with a rear seat 3, a plurality of thwarts 5 and a front seat 7. The canoe 1 also includes a pair of side rails 9 which taper both forwardly and rearwardly to intersect at a forward eye 11 and a rearward eye 13. As seen, the canoe 1 of this embodiment is provided with a sailing adaptation assembly which includes a mast and sail unit, indicated generally at 15, and an outrigger unit 17, the latter being provided for the purpose of stabilizing the canoe.

The steering system, indicated generally at 19, is shown detachably installed over the rear seat 3 and rear eyelet 13 of the canoe. The steering system 19 includes a generally rectangular-shaped frame means 21 provided with a pair of cut-outs 23 at its forward corners for the purpose of resting upon and conforming to the shape of the canoe's side rails 9. The rearward portion of the frame 21 is secured to the canoe 1 by means of a horizontal shaft 25 which is passed through the rear eyelet 13. Pivotaly secured to the frame 21 is a rudder assembly, indicated generally at 27, and includes a pair of rudders 29 which are secured to the ends of a pair of rudder shafts 31. A pair of resilient means 33 in the form of elongated coil springs or the like are each secured at one end adjacent each of the rudder shafts 31 and have their other ends secured to the frame 21. In this manner, the resilient means 33 serve to bias the rudder assembly 27 downwardly in a substantially vertical operative position. However, as indicated in FIG. 2, should the rudders 29 or rudder shafts 31 strike an obstruction beneath the surface of the water, the entire rudder assembly 27 is adapted to pivot upwardly and substantially outwardly from beneath the water level 35 into an inoperative position. The upper ends of the rudder shafts 31 are provided with a pair of steering arms 37 which are operatively connected to the control means located in front of the rear seat 3 of the canoe through a pair of flexible cable means 39.

The rudder control means, shown generally at 41, is more specifically depicted in FIGS. 3 and 4. As shown, the control means 41 includes an integral frame 43 which is adapted to be detachably secured to the canoe's rear seat 3 and thwart 5 by means of a plurality of bracket assemblies 45. The brackets 45 may com-

prise a pair of flanged, U-shaped plate members 47 which are secured together with wing nut and bolt assemblies 49 or any suitable equivalent locking assemblies which can be easily assembled and disassembled. A pair of foot pedals 51 provided with a pair of associated heel plates 53 are pivotally secured by a pair of pivot pins 55 or the like to the frame 43. Extending laterally outwardly from the upper ends of the foot pedals 51 are a pair of extension plates 57 which are provided with a pair of eyelet nut and bolt assemblies 59. The ends of the control cables 39 are secured to the eyelets of the assemblies 59 and pass upwardly through a pair of pulleys or sheaves 61 which are mounted onto the brackets 45 through plate support means 63. The control cables 39 pass over the pulley 61 and are connected at their other ends to the steering arms 37 as previously indicated.

The frame means 21 and the rudder assembly 27 pivotally secured thereto are depicted in detail in FIGS. 5 through 7. The horizontal shaft 25 which secures the frame 21 to the canoe 1 through its rear eyelet 13 also serves to receive pivotally thereon a pair of sleeves 65 of the rudder assembly 27. Welded to the sleeves 65 are a pair of angle-shaped rudder shaft housings 67 through which the rudder shafts 31 are supported for rotational movement. A pair of lower stop collars 69 and a pair of upper stop collars 70 serve to locate and secure the rotatable shafts 31 within the housings 67. Welded to and extending rearwardly from the shaft housings are a first pair of support arms 71. Pivotaly joining the outer ends of support arms 71 is a first rod 73 which serves the dual function of spacing and stabilizing the pair of shaft housings 67. Located directly below and spaced parallel from the first pair of support arms 71 are a second pair of support arms 75 which extend outwardly in a manner similar to that of support arms 71. Pivotaly joining the outer ends of support arms 75 is a second rod 77 which serves as a steering control arm means for the two rudder shafts 31. The first pair of support arms 71 are provided with suitable nut and bolt assemblies 79 which serve to secure the ends of the resilient means 33 to the rudder assembly 27. Likewise, a pair of eyelet bolt and assembly means 81 serve to secure the other ends of the resilient means 33 to the frame 21. The steering arms 37 include a pair of substantially right angle shaped threaded sections 83 having one pair of the right angle leg sections welded to the upper ends of the rudder shafts 31. The other right angle leg portions of sections 83 are provided with hollow threaded ends which receive a pair of eyelet bolts 85. The ends of control cables 39 are secured to eyelets 85 by means of snap connectors 87 or similar easily detachable connection means.

FIGS. 8 and 9 depict in detail a latching mechanism, indicated generally at 89, which serves to detachably secure the above described steering assembly to the canoe 1. The latching assembly mechanism 89 includes a pivotal angle shaped latch member 91 which is secured to the frame 21 by a nut and bolt assembly 93. Fixed to the underside of the latching member 91 is a magnet 95 which is adapted to secure onto the surface of frame 21 when the latch member 91 is in a closed position. The horizontal shaft 25 is provided with a flanged head 97 which has a larger diameter than the sleeve bearings 99 secured to the frame 21 and through which the shaft 25 is slidably received. When the latch member 91 is in its closed position as shown in FIGS.

8 and 9, it serves to retain the head 97 of the horizontal shaft 25 firmly against the wall of the frame 21, thereby preventing accidental dislodging of the slidable horizontal shaft 25.

FIG. 10 depicts the mechanism which serves to limit the rotational movement of the rudder shafts 31, thereby preventing uncontrollable locking or damage to the rudder assembly. The lower portions of rudder shaft housings 67, directly adjacent lower stop collars 69, are provided with two pairs of stop members 101. Threadedly secured to the rudder shafts 31 directly adjacent stop members 101 are a pair of stop pins 103. As is evident in FIG. 10, rotational movement of the rudder shafts 31 are limited to a maximum arcuate displacement of approximately 120° due to the engagement of stop pins 103 against the respective pairs of stop members 101.

Another embodiment of the present invention is depicted in FIGS. 11 through 13. The canoe 200 in this case is of the type which does not have front and rear eyelets. As such, the rudder assembly, indicated generally at 203, of this embodiment is secured to the rear end 205 of the canoe 200 by a sling assembly means indicated generally at 207. The sling assembly means 207 includes a pair of arcuate-shaped members 209 which are joined in a spaced apart manner by welding a plurality of spacers 211 to the outer edges thereof. The sling 207 is adapted to fit over the arcuate-shaped end edge 213 of the canoe and is supported thereon by means of the spacer plates 211. Welded to the sling 207 and extending outwardly and transversely therefrom are a pair of upper support braces 215 and a pair of lower support braces 217. A generally rectangular-shaped first frame means 219 is welded to the outer ends of the first pair of support bars 215. The rudder assembly 203 is detachably secured to first frame means 219 by a horizontal shaft 220 in the exact same manner as indicated for the first embodiment. Located directly below and spaced from the first frame means 219 is a second frame means 221 which is welded to the outer ends of the second pair of support bars 217. As seen in FIG. 12, the forward extending portion of second frame means 221 includes two longitudinal braces 223 that are angled upwardly from the horizontal to join with a pair of horizontal braces 225 extending forwardly from the first frame means 219. A horizontal connection plate 227 is provided with threaded end sections 229 for receiving threaded pins 231. The pins 231 serve to secure the apertured ends 233 and 235 of the pairs of straps 223 and 225, respectively. As is indicated, magnetic latching mechanisms 237, similar to the latching mechanism described for the first embodiment, may be utilized for the purpose of securing pins 231 against accidental dislodging.

As in the case of the first embodiment, the steering system of the second embodiment is also provided with a pair of steering arms 239 which are correspondingly secured to a pair of rudder shafts 241 in the same manner. However, a single control cable 243 is provided having a pair of ends 245 secured to the steering arms 239. The middle portion of control cable 243 is caused to pass around a pair of pulleys 247 which are clamped to the thwart 249 of canoe 200 by means of clamps 251 having the same basic construction as the clamps utilized in the first embodiment. Also secured to the thwart 249 by a similar clamp means 253 is a manually operated pivotal tiller assembly 255. The tiller assembly

bly 255 may be of any type of tiller well known in the art for performing the required function. The control cable 243 is joined with the tiller assembly 255 such that pivoting of the tiller handle 257 causes the respective ends 245 of the control cable 243 to impart synchronized rotational movement to the steering arms 239 and therefore to the rudder shaft 241. However, it is to be understood that the tiller arrangement for actuating the control cable of the second embodiment can be substituted with the foot pedal mechanism described for the first embodiment and vice versa.

FIGS. 11 and 12 depict a pair of rudders, indicated generally at 300, welded to the rudder shafts 241. As shown, rudders 300 include a pair of standard vertical rudder plates 301 having a pair of deflector plates 303 secured thereto by welding, such that the planar surfaces of deflector plates 303 intersect the planar surfaces of rudder plate 301 at substantially right angles. When the rudder shafts 241 are in their downward operative position, the deflector plates 303 assume a rearwardly extending angular position of approximately 10° above the horizontal. The rearwardly extending portions of deflector plates 303 flare outwardly and terminate in a pair of upwardly curved edge portions 305. By virtue of this design and construction, rudders 300 assist in maintaining the rudder assembly downwardly in its operative position notwithstanding the presence of water current pressures which tend to force the assembly upwardly, especially when rotational movement is imparted to the rudder shafts. It is to be understood that the rudder modification construction of rudders 300 may similarly be incorporated in the rudder assembly described for the first embodiment and vice versa.

The materials employed for the construction of the steering assembly for the two embodiments described may be those well known in the prior art as being suitable for the operating conditions and environments encountered by the present invention. Stainless steel, aluminum or similar noncorrosive metals may be utilized to advantage. Also, man made synthetic materials such as plastics and the like may also be utilized. The joining of the basic component parts making up the steering assembly may be effected by welding, bolting or any other suitable means well known in the prior art.

BASIC MODE OF OPERATION

The steering assembly of the present invention may be utilized with a canoe which includes a sailing adaptation kit. However, the present invention can also be utilized when it is desired to paddle the canoe in the conventional manner in the absence of a sailing adaptation kit. In the case of the first embodiment, the steering assembly is attached to the rear end of the canoe by placing the frame assembly 21 such that the cut out portions 23 rests upon the side rails 9 of the canoe. The rudder assembly is placed beneath the frame such that the sleeve 65 coincide with the openings in the bearings 99. The horizontal shaft 25 is then inserted through the bearings 99, sleeve 65 and the eyelet 13 of the canoe. Latching member 91 is then closed over the head 97 of the horizontal shaft to secure it in place. The four clamps 45 are then attached to the seat 3 and its adjacent thwart 5 of the canoe by means of nut and bolt assemblies 49. Since the bracket 43 is secured to the clamps 45, it is therefore located in position within the lower portion of the canoe's interior such that the foot

pedals 51 will receive the feet of the person seated in rear seat 3. The steering assembly is completed by attaching control cables 39 from the eyelets 59 of the foot pedals to the eyelets 85 of the steering arms. By alternately manipulating the foot pedals 51, the person sitting on rear seat 3 will effect coordinated rotational movement of the rudder shafts 31 which in turn cause parallel angular deflection of rudders 29, thereby directing the course of the canoe's travel.

Similarly, the steering assembly of the second embodiment may be utilized when the canoe is of the type which does not have eyelets at its opposite ends. In this case, the steering system of the second embodiment is placed over the rear end edge 213 of the canoe such that the channel-shaped sling 207 fits snugly therearound. The straps 223 are brought together on either side of the canoe 200 such that their ends 233 and 235 are coincidental so that threaded pins 231 may be inserted into the apertures 229. The pins 231 are guarded against accidental dislodging. The clamps 251 are secured to the thwart 249 of the canoe and, likewise, the tiller assembly 255 is secured to thwart 249 by means of clamp 253. A single control cable 243 is secured at one end 245 to one of the steering arms and the other end is threaded through pulleys 247 and subsequently brought around for connection to the other steering arm. Directional guidance of the canoe is achieved by pivoting the tiller handle 257, thereby imparting synchronized rotational movement to the steering arms 239 which in turn rotate the rudder shafts 241 with rudders 300 secured to the ends thereof.

As in the case of both embodiments, should the lower portions of the rudder assemblies strike an obstruction or obstacle beneath the surface of the water, the entire rudder assembly is caused to pivot upwardly with respect to the frame upon which it is pivotally mounted. In this manner, the obstruction or obstacle is cleared, thereby preventing damage to the rudder assembly. By virtue of the resilient means connecting the rudder assembly to the frame, the rudder assembly is caused to pivot back downwardly into its normal operative position when the obstruction or obstacle has been bypassed.

It is to be understood that changes and additions may be made to the embodiments of the present invention by those skilled in the art without departing from the basic scope and spirit of the invention.

What is claimed is:

1. A steering system for a boat such as a canoe or the like having an eyelet at one end thereof wherein such system may be attached to and removed from the boat without the physical alteration thereof, which system comprises, in combination:

a. a substantially rectangular-shaped frame,

b. means for detachably securing the frame substan-

tially horizontally across the top of the boat wherein a portion of the frame is freely supported on the side rails thereof, said means including a removable shaft passing through the eyelet of the boat and extending laterally from either side of the eyelet for a total length equal to approximately one-half the width of the boat taken at its widest portion with the ends of the shaft being supported by the sides of the frame,

c. latching means associated with the frame for securing the shaft against accidental removal,

d. a rudder assembly pivotally secured to the frame for movement between a downward operative position and an upward inoperative position,

e. resilient means connecting the rudder assembly to the frame for biasing the rudder assembly in the downward operative position, and

f. a rudder assembly control means detachably secured to the boat and connected to the rudder assembly for steering the boat.

2. The steering system of claim 1 wherein the latching means is a magnetic latch.

3. The steering system of claim 1 wherein the rudder assembly includes:

a. a pair of rudder shafts having two rudders secured at their lower ends,

b. a pair of shaft housings supporting the rudder shafts for rotational movement,

c. a pair of steering arms secured to the upper ends of the rudder shafts,

d. a first means for joining the shaft housings together for spacing and stabilizing the housings, and

e. a second means for joining the rudder shafts together for controlling the rotational movement of the shafts.

4. The steering system of claim 3 wherein the resilient means includes a pair of coil springs connected at one of their ends to the shaft housings and connected at the other of their ends to the frame.

5. The steering system of claim 3 wherein the rudder assembly control means includes:

a. a pair of pivotal pedals,

b. bracket means for detachably securing the pivotal pedals adjacent the floor of the boat, and

c. cable means joining the pivotal pedals to the steering arms such that alternate pivoting of the pedals causes corresponding pivotal movement of the steering arms, thereby imparting rotational movement to the rudder shafts.

6. The steering system of claim 3 wherein the lower portion of the shaft housings include stop means for limiting the rotational movement of the rudder shafts within an arcuate range of approximately 0°-120°.

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