Oct. 10, 1961 J. S. HAMEL 3,003,430

BOAT GUIDING APPARATUS

Filed July 16, 1956 2 Sheets-Sheet 1

Fig. 1

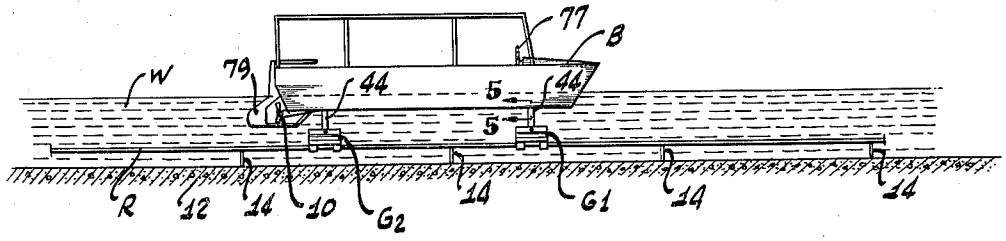


Fig. 2

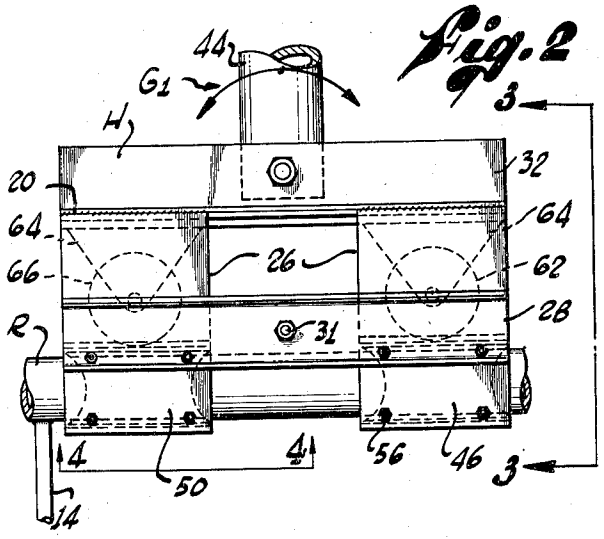


Fig. 4

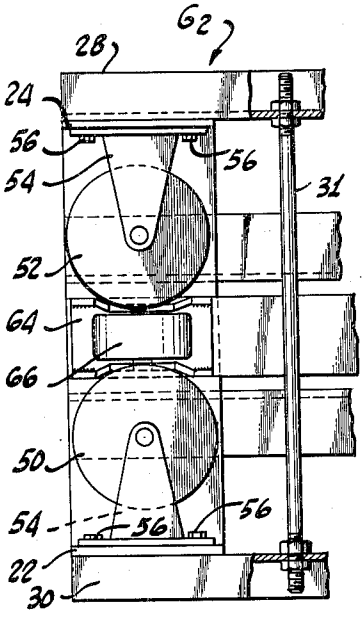


Fig. 3

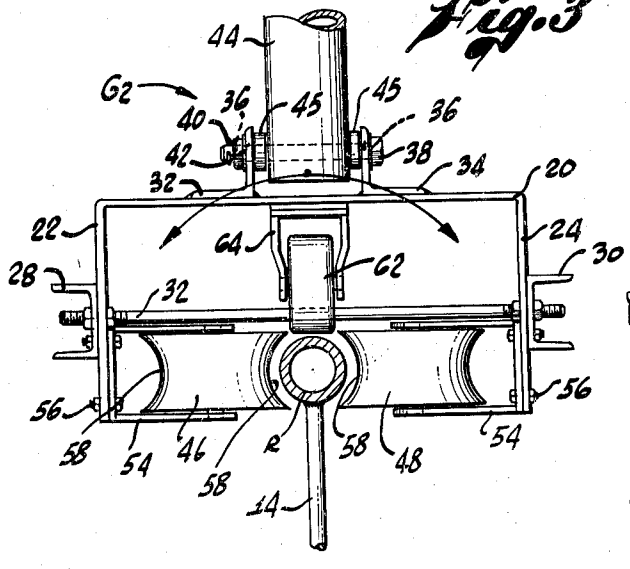
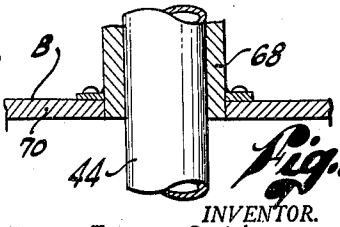


Fig. 5



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BOAT GUIDING APPARATUS

Filed July 16, 1956 2 Sheets-Sheet 2

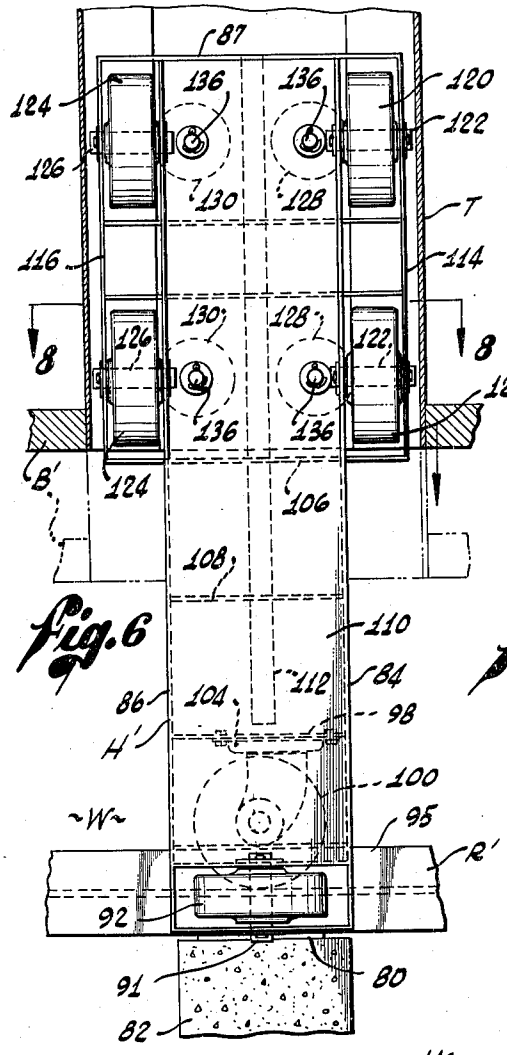

Fig. 6

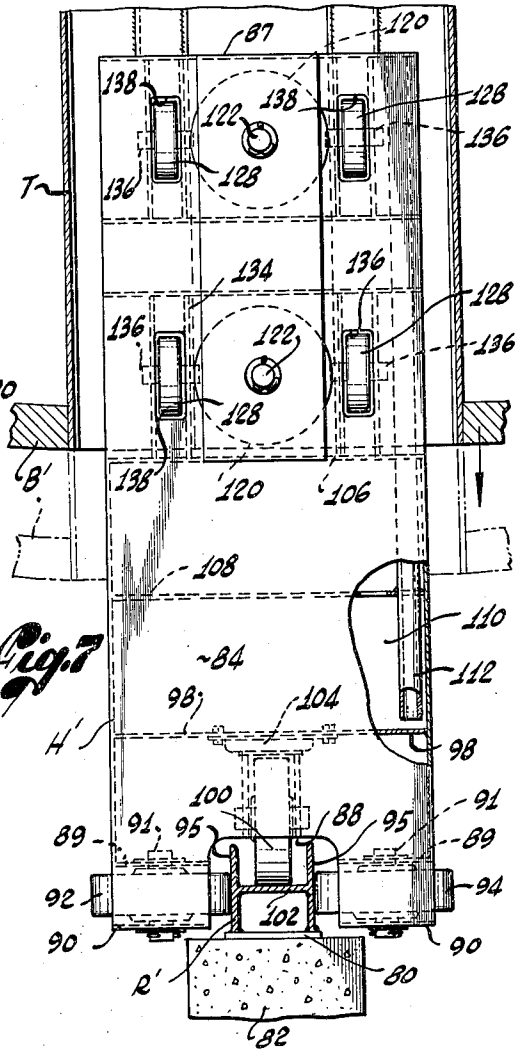

Fig. 7

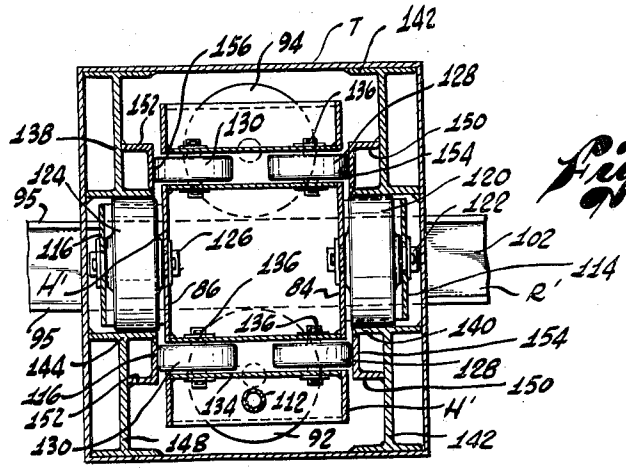

Fig. 8

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United States Patent Office 3,003,430 Patented Oct. 10, 1961

3,003,430

BOAT GUIDING APPARATUS

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Filed July 16, 1956, Ser. No. 598,148
10 Claims. (Cl. 104—72)

The present invention relates generally to amusement apparatus and more particularly to an amusement ride incorporating a boat movable along a predetermined course in a waterway for the entertainment of its passengers.

Amusement rides wherein a passenger-carrying boat is moved along a predetermined path in a waterway have been heretofore proposed. The boats are generally caused to follow the predetermined path by guide mechanisms interposed between the boat and a fixed point of reference. Usually these heretofore-proposed boats are coupled to a motion-transmitting medium, such as a moving chain or cable, whereby they are urged forwardly along the waterway. With such arrangements, the passengers are not afforded a feeling of realism. Moreover, the previously suggested guide mechanisms usually cause the boat to turn far more sharply and roughly than would be the case where the boat was equipped with a conventional rudder. Additionally, where the boat is coupled to a moving chain or cable, the transmission of forward movement to the boat is generally rough and jerky as opposed to the smooth transmission of forward movement which occurs with a self-powered boat.

It is a major object of the present invention to provide new and novel apparatus for guiding a self-powered boat along a predetermined course in a waterway.

A more particular object is to provide boat guiding apparatus of the aforedescribed nature which permits the boat to list, pitch and bob in the exact manner of a free-floating vessel so as to afford the boat passengers an extremely realistic ride.

It is another object of the invention to provide boat-guiding apparatus of the aforedescribed nature which turns the boat with a motion similar to that obtained with a conventional rudder.

A further object of the invention is to provide boat guiding apparatus which is light in weight and economical to construct and maintain.

Yet another object is to provide boat guiding apparatus of the aforedescribed nature which is simple in design and rugged of construction whereby it may afford a long and useful service life.

An additional object is to provide boat guiding apparatus of the aforedescribed nature which offers a minimum of resistance to the forward motion of the boat.

It is a more particular object of the invention to provide boat guiding apparatus of the aforedescribed nature incorporating a submerged guide rail, a plurality of rollers engaging this guide rail, a housing for supporting the rollers and mounting means interposed between the housing and boat permitting relative vertical movement to take place between the rollers and the boat.

Another object of the invention is to provide boat guiding apparatus of the aforedescribed nature which may be employed with boats of varying size.

These and other objects and advantages of the invention will become apparent from the following detailed description, when taken in conjunction with the appended drawings, wherein:

FIGURE 1 is a side elevational view of a first form of boat guiding apparatus embodying the present invention;

FIGURE 2 is an enlarged view of a guide unit shown in FIGURE 1;

FIGURE 3 is a vertical sectional view taken along line 3—3 of FIGURE 2;

FIGURE 4 is a horizontal sectional view taken along line 4—4 of FIGURE 2;

FIGURE 5 is an enlarged fragmentary vertical sectional view taken on line 5—5 of FIGURE 1;

FIGURE 6 is a side elevational view, taken partly in vertical section, showing a second form of boat guiding apparatus embodying the present invention;

FIGURE 7 is a front view of said second form of apparatus; and

FIGURE 8 is a horizontal sectional view taken on line 8—8 of FIGURE 6.

Referring to the drawings and particularly FIGURE 1 thereof, the first form of boat guiding apparatus embodying the present invention is adapted to guide a boat B along a predetermined course in a waterway W. The boat B includes a self-contained propulsion device, such as a screw 10 connected to a conventional engine (not shown) mounted within the confines of the boat B. The boat guiding apparatus includes a horizontally extending guide rail R supported above the surface of the ground 12 underlying the waterway by a plurality of longitudinally spaced upright bars 14. It is to be understood that the boat B is adapted to follow a predetermined course laid out in the waterway and including several curves and bends. The submerged guide rail R is accordingly configured in plan view to the shape of the desired curves and bends to be followed by the boat B.

The boat guiding apparatus also includes a pair of guide units G_1 and G_2 interposed between the boat B and the guide rail R. These guide units may be of identical construction and one is secured to the rear portion of the boat while the other is secured to the front portion thereof. The details of the guide units G_1 and G_2 are disclosed in FIGURES 2 through 5. Each guide unit includes a generally rectangular housing or truck H of hollow construction. Housing H includes a horizontal top wall 20 from the sides of which depends side walls 22 and 24. A vertically extending aperture 26 is formed in the mid-portion of each of the side walls, as indicated in FIGURE 2. A longitudinally extending stiffener is rigidly affixed as by welding to the intermediate portions of the side walls 22 and 24. These stiffeners are designated 28 and 30, respectively. A transverse tie-bar 31 rigidly interconnects the mid-portion of the stiffeners 28 and 30. A second pair of generally L-shaped stiffeners 32 and 34 are rigidly affixed as by welding to the upper surface of the top wall 20. The mid-portion of these stiffeners 32 and 34 are formed with horizontally aligned transverse bores 36 receiving a pivot bolt 38. This bolt 38 is engaged with a nut 40 that is retained in place by a cotter key 42. The pivot bolt 38 extends through the lower end of an upright tubular mounting post 44. A pair of spacers 46 are interposed between the opposite sides of this post 44 and the adjacent sides of the stiffeners 32 and 34.

A pair of side rollers 46 and 48 are mounted between the front portion of the side walls 22 and 24. A similar pair of rear side rollers 50 and 52 are mounted between the rear portions of these side walls. Each of these side rollers is rotatably carried by a generally U-shaped mounting element 54 that is rigidly secured to the side walls by bolt and nut combinations 56. As shown particularly in FIGURE 3, the guide rail R is of tubular configuration. The side rollers are of concave configuration, as indicated at 58, complementary to the curvature of the guide rail R. A forward top roller 62 is rotatably mounted above the forward side rollers by means of a bifurcated mounting element 64. A similar rear top roller 66 is mounted between the rear side rollers by a similar mounting element. The upper ends of the mounting elements

64 are rigidly affixed as by welding to the underside of the housing's top wall 20.

Referring now to FIGURE 5, the upper end of the tubular mounting post 44 is telescopically slidably received by a cylindrical sleeve 68. This sleeve 68 is rigidly affixed to the hull 70 of the boat B. With this arrangement, the boat B is free to undergo vertical movement while the housing H and its rollers remain horizontally fixed relative to the rail R.

In the operation of this form of apparatus, the boat B will be urged forwardly through the waterway W under the influence of its propulsion device. The side and top rollers of the guide units G_1 and G_2 will roll along the tubular rail R so as to maintain the boat in alignment with the rail R. Preferably, the guide rollers will be formed of a non-metallic wear-resistant material, such as neoprene, in order that the action of the guide mechanism will be silent. The telescopic slidable engagement of the mounting posts 44 of the guide units G_1 and G_2 with sleeves 68 automatically compensates for varying displacements assumed by the boat with different loadings. It likewise makes it unnecessary to carefully control the height of the water level in the waterway W relative to the guide rail R. This vertical slidable connection together with the pivotal interconnection of the lower end of the mounting posts 44 with the housing H permits the boat to bob freely in the waterway on its longitudinal axis. The utilization of the grooved side rollers in conjunction with the tubular guide rail R permits the boat to list and rock freely in the waterway responsive to shifting of the passengers from one side of the boat to the other. The pivotal movement permitted between the mounting posts 44 and their sleeves 68 provides a motion similar to that obtained with a conventional rudder as the boat rounds a turn.

It has been found that with the foregoing arrangement, unsuspecting passengers are given the impression that the operator is actually guiding the boat through the curved course laid out in the waterway W. To further assist in obtaining this impression, the boat is provided with a dummy steering wheel 77 for use by the operator, as well as a freely hung dummy rudder 79. Although, as pointed out hereinabove, the connection of the boat to the guide rail R is sufficiently flexible that it may undergo movements simulating those of a free floating vessel, the boat may be caused to follow a predetermined path over curves far too sharp for negotiation by boats having a conventional rudder.

Referring now to FIGURES 6, 7 and 8 there is shown a second form of boat guiding apparatus embodying the present invention. This second form of boat guiding apparatus is especially adapted for use in guiding boats of larger draft and it includes a pair of guide units (only one of which is shown in the drawings) interposed between a guide rail R' and the boat B'. Preferably, as in the case of the first form of boat guiding apparatus, one of these guide units will be disposed at the front portion of the boat and the other will be disposed at the rear portion thereof. The two guide units are identical and, as shown in FIGURES 6, 7 and 8, include a housing or caisson H' which is vertically slidably carried within a waterproof trunk T formed in the lower portion of the boat. As particularly indicated in FIGURE 7, the guide rail R' in this second form of apparatus is H-shaped in vertical cross-section. The lower legs of the guide rail R' are rigidly affixed as by welding to a plurality of longitudinally spaced flat plates 80. Each of these plates 80 is in turn affixed to the upper end of one of a plurality of concrete piles 82 (only one of which is shown) which extend upwardly from the bottom of the waterway W.

The housing H' will preferably be of steel construction and it includes a front wall 84, a rear wall 86 and a top wall 87. The lower portion of the front and rear walls 84 and 86 are formed with vertically aligned apertures 88 for accommodating the guide rail R'. A pair of horizontally extending vertically spaced roller-supporting walls 89 and 90 interposed between the lower portions of the front and rear walls support a pair of vertically extending shafts 91. These shafts rotatably support a pair of side rollers 92 and 94. These side rollers are in rolling engagement with the side surfaces 95 of the guide rail R'. The front and rear walls 84 and 86 are rigidly interconnected at a point spaced above the side rollers 92 and 94 by a horizontal wall 98. This horizontal wall 98 serves to support a top roller 100 having its periphery in rolling engagement with the upper surface of the web 102 of the guide rail R'. This top roller 100 is rotatably supported by a castering unit 104 affixed to the wall 98 whereby it may caster freely about a vertical axis relative to the housing H'.

A second horizontal wall 106 interconnects the front and rear walls 92 and 94 at a point intermediate their upper and lower ends. Yet another horizontal reinforcing wall 108 may be interposed between this intermediate wall 106 and the roller-supporting wall 98. Preferably, the space between the roller-supporting wall 98 and the intermediate wall 106 will be sealed so as to provide a watertight compartment 110 for a purpose to be set forth hereinafter. A vent pipe 112 extends from the lower portion of this watertight compartment 110 to the upper end of the housing H' for use in removing water accumulating in the compartment by condensation.

As shown particularly in FIGURE 6, a forwardly directed bracket 114 extends from the upper central portion of the housing H' to the intermediate wall 106. A similar rearwardly directed bracket 116 is formed on the rear central portion of the housing. A pair of vertically aligned front mounting wheels 120 are rotatably supported upon longitudinally extending shafts 122 interposed between the front bracket 114 and the front wall 84. Likewise a pair of vertically aligned rear mounting wheels 124 are rotatably supported upon longitudinally extending shafts 126 interposed between the rear bracket 116 and the rear wall 86. Outwardly of front mounting wheels 120 are rotatably mounted a vertically aligned pair of smaller mounting wheels 128. A pair of similar vertically aligned mounting wheels 130 are mounted outwardly of the rear wheels 124. These smaller mounting wheels 128 and 130 are rotatably supported between vertically extending plates 134 rigidly interconnected between the front and rear housing walls, the rollers being carried by transversely extending shafts 136. These smaller mounting wheels 128 and 130 extend through slots 138 formed in the front and rear housing walls.

The front mounting wheels 120 are in rolling engagement with the inwardly facing webs 140 of a pair of vertically extending I-beams 142 rigidly secured within the front corners of the trunk T. Similarly, the rear mounting wheels 124 are in rolling engagement with the inwardly facing webs 144 of a second pair of vertically extending I-beams 148 rigidly secured within the rear corners of the trunk T, as shown in FIGURE 8. With further reference to this figure, it will be observed that a pair of generally L-shaped elongated bars 150 are rigidly affixed as by welding to the inner rear portions of each of the front I-beams 142. A similar pair of generally L-shaped bars 152 are rigidly affixed to the inner front portions of the rear I-beams 148. The smaller mounting wheels 128 supported by the front portion of the housing H' have rolling engagement with the rearwardly facing surfaces 154 of the front bars 150, while the rear mounting wheels 130 have rolling engagement with the forwardly facing surfaces 156 of the rear bars 152. Accordingly, the I-beams and bars serve as vertically extending tracks in cooperation with the mounting wheels to permit the housing H' to undergo vertical movement relative to the trunk T and thus the boat B.

As noted hereinabove, a watertight compartment 110 is formed in the housing H'. When the housing is submerged the buoyancy of this watertight compartment

serves to partially relieve the downwardly directed component of force which is applied to the guide rail R' by the weight of the housing. With this arrangement, it is possible to employ a guide rail of lighter construction than would be the case where the housing was completely non-buoyant.

In the operation of this second form of apparatus, the boat B' will be urged forwardly through the waterway W under the influence of its propulsion device. During such forward movement the side rollers **92** and **94** will roll along the side surfaces **95** of the guide rail R' while the top roller **100** will roll along the upper surface of the guide rail's web **102** so as to maintain the boat in alignment with the rail. Preferably, the rollers **92**, **94** and **100** will be formed of a non-metallic wear-resistant material such as neoprene in order that the action of the guide mechanism will be silent. Since the top roller **100** is free to caster about a vertical axis, it may follow the curvature of the guide rail R' with a minimum amount of wear. The boat B' is free to assume various vertical elevations relative to the guide rail R' because of the rolling engagement of the mounting wheels **120**, **124**, **128** and **130** with the vertical tracks mounted in the trunk T. Preferably, in the interest of silence these wheels will be formed of a composition material rather than metal. This arrangement makes it unnecessary to carefully control the height of the water level in the waterway W relative to the guide rail R'. Moreover, it will automatically compensate for the various displacements assumed by the boat with different loadings.

From the foregoing description it will be apparent that both forms of boat guiding apparatus embodying the present invention are capable of affording a very realistic amusement boat ride. Boats equipped with this apparatus may traverse a tortuously curved path which could not possibly be negotiated by boats steered with a conventional rudder. Very few unknowing persons, however, can detect that the boat is not being guided by a conventional rudder. The provision of the boat guiding apparatus frees the boat operator from the necessity of steering the boat and accordingly, he may pay more attention to the safety of his passengers as well as their entertainment.

Various modifications and changes may be made with respect to the foregoing description without departing from the spirit of the invention or the scope of the following claims.

I claim:

1. Apparatus for guiding a self-powered boat along a predetermined course in a waterway, comprising: a horizontally extending guide rail submerged in said waterway and defining said predetermined course; a plurality of rollers engaged with said guide rail; a housing supporting said rollers; a mounting member for said housing; means pivotally interconnecting said housing and said mounting member whereby they may undergo relative pivotal movement about an axis transverse to said guide rail; and reception means formed on said boat and telescopically and rotatably receiving said mounting member so as to permit relative vertical movement and relative rotation about a vertical axis between said housing and said boat.

2. Apparatus for guiding a self-powered boat along a predetermined course in a waterway, comprising: a horizontally extending guide rail submerged in said waterway and defining said predetermined course; a pair of side rollers that roll along the sides of said rail; a top roller that rolls along the top of said rail; a housing supporting said rollers; a vertically extending mounting post secured to said housing; and a sleeve secured to said boat and telescopically and rotatably receiving said mounting post so as to permit relative vertical movement and relative rotation about a vertical axis between said housing and said boat.

3. Apparatus for guiding a self-powered boat along a predetermined course in a waterway, comprising: a horizontally extending guide rail submerged in said waterway and defining said predetermined course; a pair of side rollers that roll along the sides of said rail; a top roller that rolls along the top of said rail; a housing supporting said rollers; a vertically extending mounting post; means pivotally connecting the lower portion of said post to said housing whereby they may undergo relative pivotal movement about an axis transverse to said rail; and a sleeve secured to said boat and telescopically and rotatably receiving said mounting post so as to permit relative vertical movement and relative rotation about a vertical axis between said boat and said housing.

4. Apparatus for guiding a self-powered boat along a predetermined course in a waterway, comprising: a horizontally extending tubular guide rail submerged in said waterway and defining said predetermined course; a pair of side rollers contacting the sides of said rail, said rollers being grooved to receive said guide rail; a top roller for contacting the top of said guide rail; a housing supporting said rollers; a mounting member for said housing; means pivotally interconnecting said housing and said mounting member whereby they may undergo relative pivotal movement about an axis transverse to said guide rail; and reception means formed on said boat and telescopically and rotatably receiving said mounting member so as to permit relative vertical movement and relative rotation about a vertical axis between said housing and said boat.

5. Apparatus for guiding a self-powered boat along a predetermined course in a waterway, comprising: a horizontally extending tubular guide rail submerged in said waterway and defining said predetermined course; a pair of side rollers contacting the sides of said rail, said rollers being formed with a concave groove for receiving said rail; a top roller contacting the top of said rail; a housing supporting said rollers; a vertically extending mounting post secured to said housing; and a sleeve secured to said boat and telescopically and rotatably receiving said mounting post so as to permit relative vertical and rotational movement between said housing and said boat.

6. Apparatus for guiding a self-powered boat along a predetermined course in a waterway, comprising: a horizontally extending tubular guide rail submerged in said waterway and defining said predetermined course; a pair of side rollers contacting the sides of said rail, said rollers being formed with a concave groove for receiving said rail; a top roller contacting the top of said rail; a housing supporting said rollers; a vertically extending mounting post; means pivotally connecting the lower portion of said post to said housing whereby they may undergo relative pivotal movement about an axis transverse to said rail; and a sleeve secured to said boat and telescopically and rotatably receiving said mounting post so as to permit relative vertical movement and relative rotation about a vertical axis between said boat and said housing.

7. Apparatus for guiding a self-powered boat along a predetermined course in a waterway, comprising: a horizontally extending guide rail submerged in said waterway and defining said predetermined course; a pair of guide units, one of said guide units being connected to the front portion of said boat and the other being connected to the rear portion thereof, said guide units each including a housing formed with rollers that engage said guide rail; and a mounting member for said housing telescopically and rotatably received by said boat so as to permit relative vertical movement and concurrent relative rotation between said housing and said boat.

8. Apparatus as set forth in claim 7 wherein said housing and its mounting member are pivotally interconnected whereby they may undergo relative pivotal movement about an axis transverse to said guide rail.

9. Amusement apparatus for use in a waterway com-

prising: a horizontally extending guide rail submerged in said waterway and defining a predetermined course therein; a passenger-carrying boat; self-contained propulsion means on said boat; a pair of guide units, each of said guide units having a housing, and side and top roller means on said housing that engage the sides and top of said guide rail; a mounting member for each of said housings; means pivotally interconnecting each said housings and its respective mounting member whereby said housings may undergo relative pivotal movement about an axis transverse to said guide rail; and a pair of reception means, one reception means being formed at the front portion of said boat and the other being formed at the rear portion of said boat, with said reception means each telescopically receiving one of said mounting members so as to permit relative vertical movement and relative rotation about a vertical axis between said housing and said boat.

10. Apparatus as set forth in claim 9 wherein said guide rail is of tubular cross-section and said side rollers are formed with a concave groove for receiving said rail.

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