Aug. 28, 1962 J. E. BURTON 3,050,947

SELF-OPERATING FLOATING DOCK FOR VARYING LEVEL WATERS

Filed Sept. 9, 1960

3 Sheets-Sheet 1

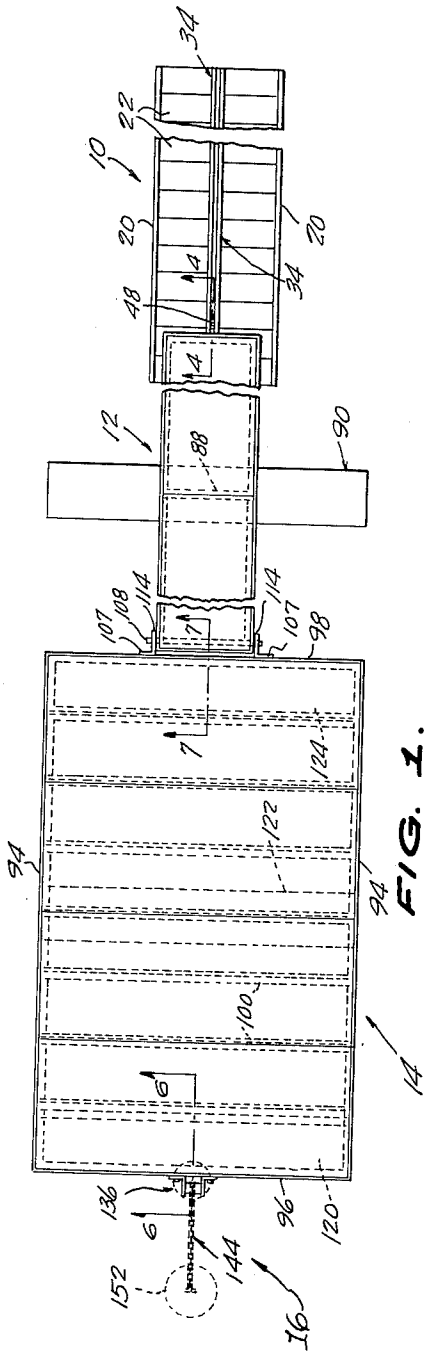


FIG. 1.

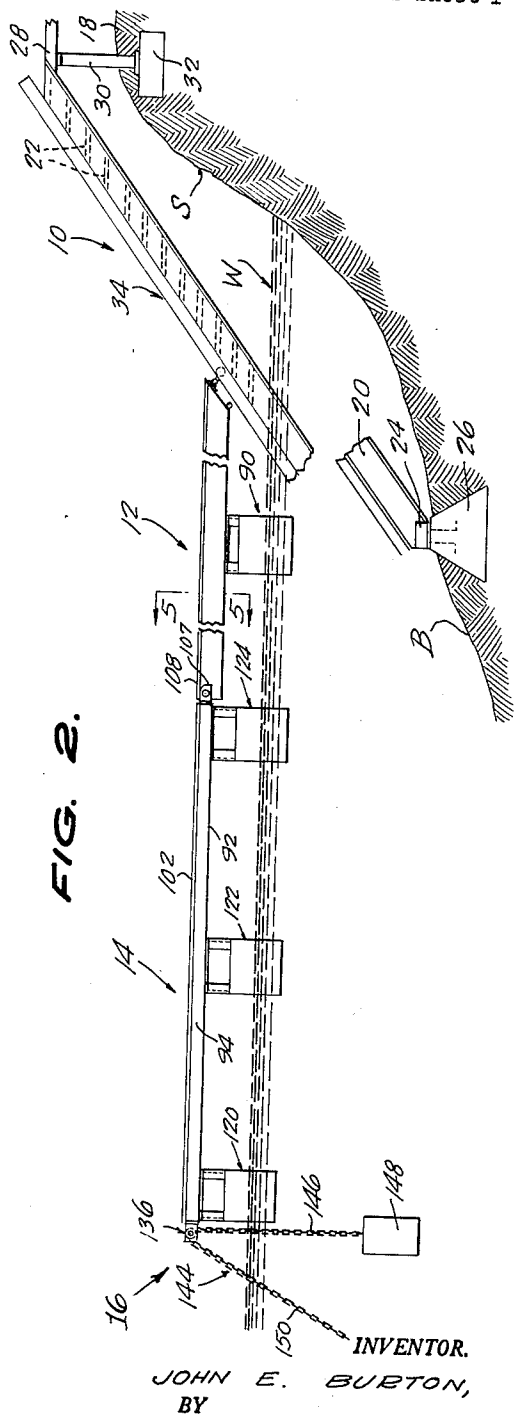


FIG. 2.

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FIG. 3.

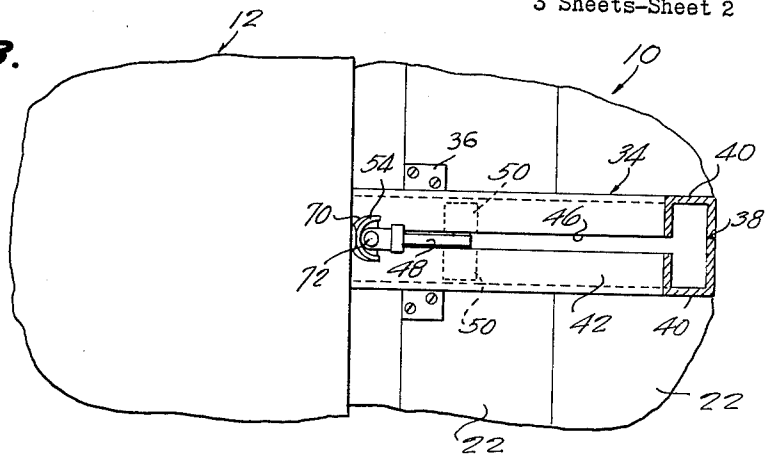


FIG. 4.

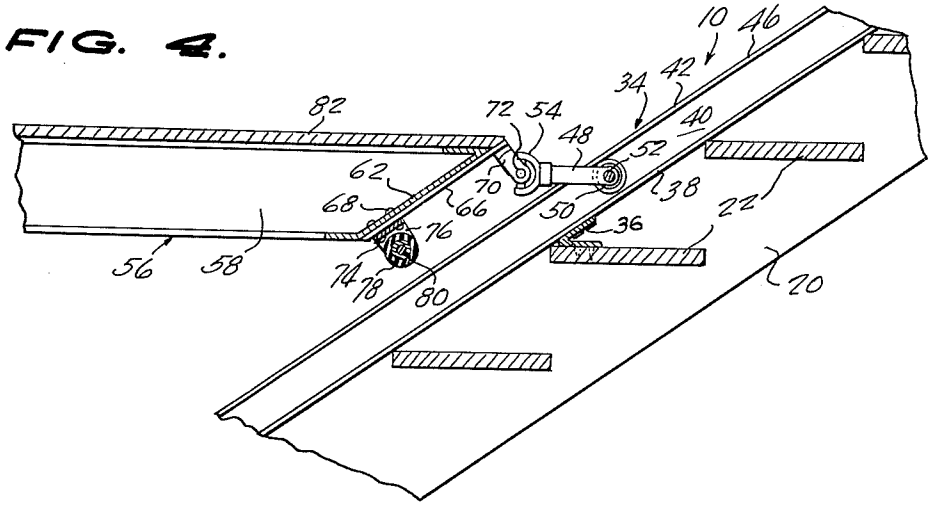
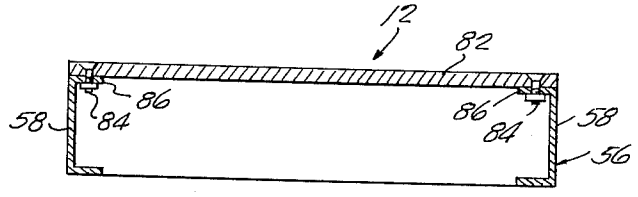


FIG. 5.



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FIG. 6.

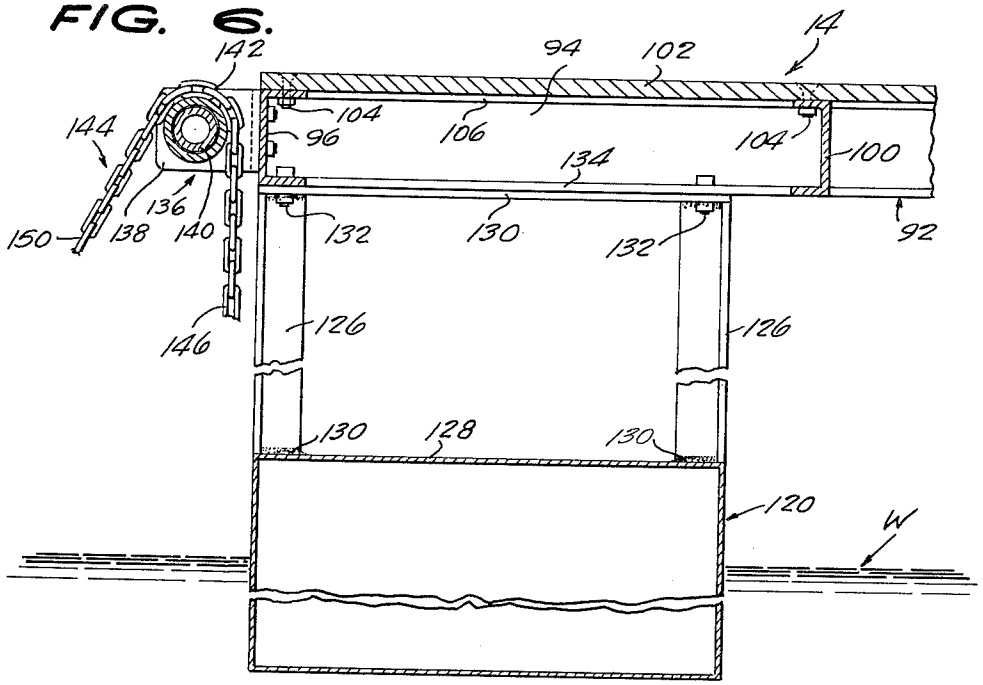


FIG. 7.

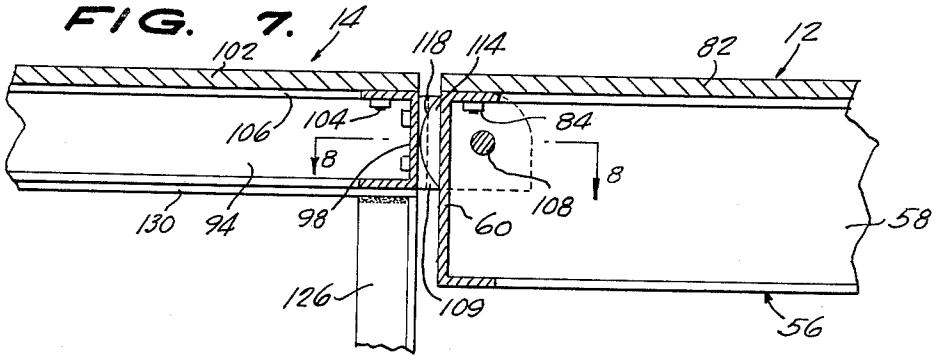
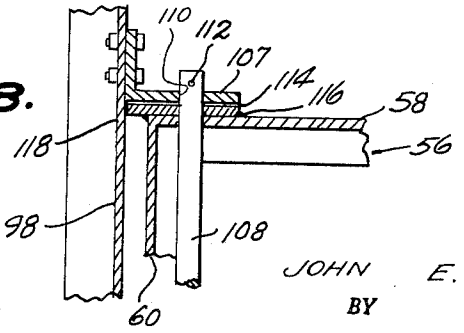


FIG. 8.



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SELF-OPERATING FLOATING DOCK FOR VARYING LEVEL WATERS

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Filed Sept. 9, 1960, Ser. No. 55,076
8 Claims. (Cl. 61—48)

This invention relates to a novel shore anchored self-operating floating dock for use in varying level waters.

The primary object of the invention is the provision of a simple, practical, efficient, and relatively low cost floating dock of the kind indicated involving a stationary shore-supported stairway, a walkway articulated to the stairway, and a dock platform which is articulated to the walkway, and which is freely anchored to the bottom of the body of water in which the dock is installed, so that wide variations in the water level can be accommodated.

Another object of the invention is to provide a clock of the character indicated above whose components are composed of parts which can be easily and economically stored and shipped unassembled to the site of installation, and easily and quickly assembled, without special tools or skill, at the site, in a do-it-yourself operation.

A further object of the invention is the provision of a floating dock of the character indicated above, whose components can be made of a wide variety of readily available materials, such as steel, aluminum, and marine plywood, or combinations thereof, and can be made in a range of different sizes and shapes.

Other important objects and advantageous features of the invention will be apparent from the following description and the accompanying drawings, wherein, for purposes of illustration only, a specific form of the invention is set forth in detail.

In the drawings:

FIGURE 1 is a contracted top plan view of a floating dock of the present invention;

FIGURE 2 is a contracted side elevation of the dock, showing the same afloat in a body of water and its stairway supported on a bank;

FIGURE 3 is an enlarged fragmentary top plan view partly broken away showing the connecting means between the stairway and the walkway;

FIGURE 4 is a fragmentary vertical longitudinal section, on the scale of FIGURE 3, taken on the line 4—4 of FIGURE 1;

FIGURE 5 is an enlarged vertical transverse section taken on the line 5—5 of FIGURE 2;

FIGURE 6 is an enlarged fragmentary vertical longitudinal section taken on the line 6—6 of FIGURE 1;

FIGURE 7 is a similarly enlarged fragmentary vertical longitudinal section taken on the line 7—7 of FIGURE 1; and,

FIGURE 8 is a fragmentary horizontal section taken on the line 8—8 of FIGURE 7.

Referring in detail to the drawings, wherein like numerals designate like parts throughout the several views, the illustrated floating dock comprises a shore and bank-supported relatively stationary stairway 10, a walkway 12 movably connected to the stairway, a dock platform 14 movably connected to the walkway, and offshore anchoring means 16 for the platform.

The stairway 10 declines from the top 18 of a shore or bank S to the bottom B of a body of water W, such as a lake and river which is characterized by relatively wide variations in its water level. The stairway can comprise, as shown in FIGURES 2 to 4, spaced side rails 20 braced and connected by steps 22 secured thereto. The lower ends of the side rails 20 are fixed, in suitable manner, as

indicated at 24, to the top of a weighted pyramidical anchor 26, which is buried in the bottom B, at an appropriate distance out from the shore S. The upper ends of the side rails are fixed, in suitable manner, as indicated at 28, to suitable stationary support means, such as posts 30, driven in and anchored in the short top 18 by buried weighted anchors 32.

Means is provided connecting the walkway 12 at its inner end to the stairway 10 to move vertically along the stairway as the level of the water changes, the means embodying a pivoted arm 48 which projects from the inner end of the walkway and which has a free end connected to the stairway 10 for movement therealong. Specifically, a track 34 extends longitudinally and preferably centrally of the stairway 22 and is fixedly supported upon some of the steps 22 by means of V-shaped brackets 36, as shown in FIGURE 4. The rack 34 is a hollow rectangular form having a bottom wall 38, to which the brackets 36 are fastened, sidewalls 40, and a top wall 42 which is formed with a central longitudinal slot 46. The arm 48 extends down through the slot 46 into the track 34 and carries rollers 50, at its opposite sides, in an axle 52 extending through the inner end of the arm. The rollers 50 work freely but closely relative to the bottom wall 38, the sidewalls 40, and the top wall 42, and provide longitudinally movable and hinged connection between the stairway 10 and the walkway 12. On its outer end, the arm 48 has a universal joint 54 which is connected to the walkway 12.

The walkway 12 comprises an open, elongated rectangular horizontal frame 56, having channel side members 58, an outer end cross member 60, and an iner end cross member 62. The inner cross member 62, as shown in FIGURE 4, is canted downwardly and outwardly, preferably at substantially the same angle as the stairway 10. A reinforcing plate 66 is suitably secured, as indicated at 68, to the exposed side of the cross member 62, and has fixed thereon, at its upper end, a declining brack 70 through which extends a pin 72, which is part of the universal joint 54. A U-shaped bracket 74 is secured to and extends across the cross member 62, at the lower end thereof, and has declining ears 76 between and on which are journalled the ends of the axle 78 of a compressible bumper roller 80. The bumper roller 80 is provided for harmless and shockless engagement with the stairway track 34, as the walkway is swung upwardly and downwardly relative to the stairway 10, by changes in the level of the water W, and by waves.

As shown in FIGURE 1, the walkway 12 is preferably slightly narrower than the stairway 10, and a floor panel 82, not substantially wider or longer than the frame 56, is removably secured thereon, as by means of bolts 84, extended through the floor panel 82, and the upper flanges 86 of the frame side members 58.

Suitably secured to the underside of the walkway frame 56 and to a central cross member 88 of the frame, is a transversely elongated float or pontoon 90, which is substantially longer than the width of the walkway. The pontoon 90 is preferably elongated rectangular in plan and of rectangular cross section, and is positioned relative to the center of gravity of the walkway, so that the walkway is normally floated in a level position so as to impose no unnecessary strain, either on the stairway 10 or the dock platform 14 to which the walkway is connected. The universal joint 54 enables the walkway to tilt relative to the stairway 10, on axes extending both longitudinally and transversely of the stairway, as produced by movements of the water W and changes in the level thereof.

The dock platform 14 is substantially wider than the walkway 12, and comprises an elongated rectangular open frame 92, preferably of bolted construction for easy

knock-down and transportation, having longitudinal channel side members **94**, outer and inner channel end members **96** and **98**, respectively, and equally spaced intermediate channel cross members **100**. A platform floor panel **102** is removably secured upon the frame **92**, as by means of bolts **104**, extended through the panel **102**, and upper flanges **106** of frame members, as shown in FIGURES 6 and 7. As shown in FIGURE 2, the dock platform frame **92** is shallower than the frame **56** of the walkway **12**.

Spaced L-shaped brackets **107** are fixed to and extend inwardly from the inner end member **98** of the frame **92**, at the middle thereof, and a horizontal transverse rock shaft **108** extends between the brackets and is journalled, at its ends, therethrough, as indicated at **110**, in FIGURE 8, and has retaining means, such as pins **112** on its ends outside of the brackets. Discs **114** are suitably secured, as indicated at **116**, to the outer sides of the side members **58** of the walkway frame **56** and project longitudinally outwardly beyond its outer end member **60**, as shown in FIGURES 7 and 8, and have arcuate bearing edges **118** to bear slidably against the inner end member **98** of the dock platform frame, with the shaft **108** extending through the walkway frame side members **58** and through the discs **114**. This arrangement allows the dock platform **14** and the walkway **12** to tilt relative to each other, while in mutually supporting contact, while preventing sidewise or yawing movements of the platform and the walkway, relative to each other.

The dock platform **14** further comprises a plurality of transversely elongated, longitudinally spaced similar floats or pontoons, such as an outer end pontoon **120**, an intermediate pontoon **122**, and an inner end pontoon **124**. The pontoons extend the full width of the platform frame, and are preferably elongated rectangular in plan and rectangular in cross section, and can be the same in construction and size as the pontoon of the walkway **12**.

As shown in FIGURES 6 and 7, the pontoons **120**, **122**, and **124** are similarly rigidly connected to and spaced below the dock platform frame **92**, by means of angle iron uprights **126** which are suitably fixed, at their lower ends, to the top walls **128** of the pontoons, at the corner thereof, as indicated at **130**. At opposite sides of the pontoons the uprights **126** have fixed horizontal bars **130** extending therebetween, and bolts **132** extend through the ends of the bars **130**, and the lower flanges **134** of the frame side members **94**, or of the frame end members **96**, **98**, so as to connect the pontoons removably to the frame **92**.

Fixed centrally to and extending outwardly from the outer end member **96** of the platform frame **92**, is a chain guide **136** comprising a pair of brackets **138** between which extends a tubular shaft **140** on which is journalled a chain guide roller **142**. An anchor chain **144** has an intermediate portion thereof trained over the guide roller **142**, and an inner end portion **146** which extends straight down from the guide and is connected, at its lower end, to a free weight **148** which is suspended above the water bottom B. The chain **144** has an outer end portion **150** which extends at an outward and downward angle from the outer end of the platform **14**, and is connected, at its lower end, to a bottom engaging anchor **152**. This arrangement provides automatically for endwise shifting of the dock platform **14** and the walkway **12** away from the stairway, as the level of the water W subsides, and endwise shifting of the platform and the walkway toward the stairway, as the level of the water rises, with the platform and the walkway in substantially horizontal positions, with their floors **82** and **102** substantially in the same horizontal plane, except as water movements produce anglings of the platform and the walkway relative to each other. Further, the anchored anchor chain **144** serves to hold the dock platform **14** in line with the walkway **12** and the stairway **10**.

While hollow metal pontoons are shown in the drawings, it is intended that this showing is illustrated only, and that any other suitable forms of and arrangements of pontoons are contemplated, such as solid styrofoam floats.

Although there have been shown and described herein preferred forms of the invention, it is to be understood that the invention is not necessarily confined thereto, and that any change or changes in the structure of and in the relative arrangements of components thereof are contemplated as being within the scope of the invention as defined by the claims appended hereto.

What is claimed is:

1. In combination, a body of water having a bottom and a shore having a top spaced above the level of the water, a self-operating floating dock comprising a declining stairway having an upper end fixed on the shore top and a lower end fixed to the water bottom, a horizontal floating walkway having an outer end and an inner end, first means including a pivoted arm projecting from the inner end of said walkway and having the free end connected to said stairway for movement therealong connecting the walkway at its inner end to the stairway to move vertically along the stairway as the level of the water changes, a floating dock platform positioned at the outer end of the walkway, said platform having an outer end and an inner end, second means horizontally hinging the platform at its inner end to the outer end of the walkway, and cable and anchor means on the outer end of the platform.

2. In combination, a body of water having a bottom and a shore having a top spaced above the level of the water, a self-operating floating dock comprising a declining stairway having an upper end fixed on the shore top and a lower end fixed to the water bottom, a horizontal floating walkway having an outer end and an inner end, first means connecting the walkway at its inner end to the stairway to move vertically along the stairway as the level of the water changes, a floating dock platform positioned at the outer end of the walkway, said platform having an outer end and an inner end, second means horizontally hinging the platform at its inner end to the outer end of the walkway, and anchor means connected to the platform, said first means comprising a track fixed to and extending lengthwise of the stairway, an arm pivoted at one end to the walkway and having roller means on its other end, said roller means being securably and rollably engaged with the track.

3. In combination, a body of water having a bottom and a shore having a top spaced above the level of the water, a self-operating floating dock comprising a declining stairway having an upper end fixed on the shore top and a lower end fixed to the water bottom, a horizontal floating walkway having an outer end and an inner end, first means connecting the walkway at its inner end to the stairway to move vertically along the stairway as the level of the water changes, a floating dock platform positioned at the outer end of the walkway, said platform having an outer end and an inner end, second means horizontally hinging the platform at its inner end to the outer end of the walkway, and anchor means connected to the platform, said first means comprising a track fixed to and extending lengthwise of the stairway, an arm pivoted at one end to the walkway and having roller means on its other end, said roller means being securably and rollably engaged with the track, said stairway having spaced side rails, steps extending between and fixed to the side rails, said track being mounted on the steps.

4. In combination, a body of water having a bottom and a shore having a top spaced above the level of the water, a self-operating floating dock comprising a declining stairway having an upper end fixed on the shore top and a lower end fixed to the water bottom, a hori-

zontal floating walkway having an outer end and an inner end, first means connecting the walkway at its inner end to stairway to move vertically along the stairway as the level of the water changes, a floating dock platform positioned at the outer end of the walkway, said platform having an outer end and an inner end, second means horizontally hinging the platform at its inner end to the outer end of the walkway, and anchor means connected to the platform, said first means comprising a hollow track having a top wall formed with a longitudinal slot, an arm pivoted at one end to the walkway and extending into the track through said slot, and roller means on the other end of the arm confined within the track.

5. In combination, a body of water having a bottom and a shore having a top spaced above the level of the water, a self-operating floating dock comprising a declining stairway having an upper end fixed on the shore top and a lower end fixed to the water bottom, a horizontal floating walkway having an outer end and an inner end, first means connecting the walkway at its inner end to the stairway to move vertically along the stairway as the level of the water changes, a floating dock platform positioned at the outer end of the walkway, said platform having an outer end and an inner end, second means horizontally hinging the platform at its inner end to the outer end of the walkway, and anchor means connected to the platform, said first means comprising a hollow track having a top wall formed with a longitudinal slot, an arm pivoted at one end to the walkway and extending into the track through said slot, and roller means on the other end of the arm confined within the track, and a universal joint pivoting said one end of the arm to the rear end of the walkway.

6. In combination, a body of water having a bottom and a shore having a top spaced above the level of the water, a self-operating floating dock comprising a declining stairway having an upper end fixed on the shore top and a lower end fixed to the water bottom, a horizontal floating walkway having an outer end and an inner end, first means connecting the walkway at its inner end to the stairway to move vertically along the stairway as the level of the water changes, a floating dock platform positioned at the outer end of the walkway, said platform having an outer end and an inner end, second means horizontally hinging the platform at its inner end to the outer end of the walkway, and anchor means connected to the platform, said first means comprising a track fixed to and extending lengthwise of the stairway, an arm pivoted at one end to the walkway and having roller means on its other end, said roller means being securably and rollably engaged with the track, and a compressible bumper roller on the inner end of the walkway, said bumper roller being spaced below said arm for harmless engagement, at times, with the stairway.

7. In combination, a body of water having a bottom and a shore having a top spaced above the level of the water, a self-operating floating dock comprising a declining stairway having an upper end fixed on the shore top and a lower end fixed to the water bottom, a horizontal floating walkway having an outer end and an inner end, first means connecting the walkway at its inner end to the stairway to move vertically along the stairway as the level of the water changes, a floating dock platform positioned at the outer end of the walkway, said platform having an outer end and an inner end, second means horizontally hinging the platform at its inner end to the outer end of the walkway, and anchor means connected to the platform, said anchor means comprising a chain guide fixed on the outer end of the dock platform, a chain having an intermediate portion trained over said guide, said chain having an outer end portion extending downwardly in the water, a bottom-engaging anchor to which said outer end portion is secured, said chain having an inner end portion extending downwardly in the water, and a free weight secured to said inner end portion and spaced upwardly from the water bottom.

8. In combination, a body of water having a bottom and a shore having a top spaced above the level of the water, a self-operating floating dock comprising a declining stairway having an upper end fixed on the shore top and lower end fixed to the water bottom, a horizontal floating walkway having an outer end and an inner end, first means connecting the walkway at its inner end to the stairway to move vertically along the stairway as the level of the water changes, a floating dock platform positioned at the outer end of the walkway, said platform having an outer end and an inner end, second means horizontally hinging the platform at its inner end to the outer end of the walkway, and anchor means connected to the platform, said anchor means comprising a chain guide fixed on the outer end of the dock platform, a chain having an intermediate portion trained over said guide, said chain having an outer end portion extending downwardly in the water, a bottom-engaging anchor to which said outer end portion is secured, said chain having an inner end portion extending downwardly in the water, and a free weight secured to said inner end portion and spaced upwardly from the water bottom, said chain guide comprising a horizontal roller over which the intermediate portion of the chain is trained.

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