

April 16, 1935.

J. J. KINGMAN ET AL

1,997,586

MOORING DEVICE

Filed Jan. 25, 1934

2 Sheets-Sheet 1

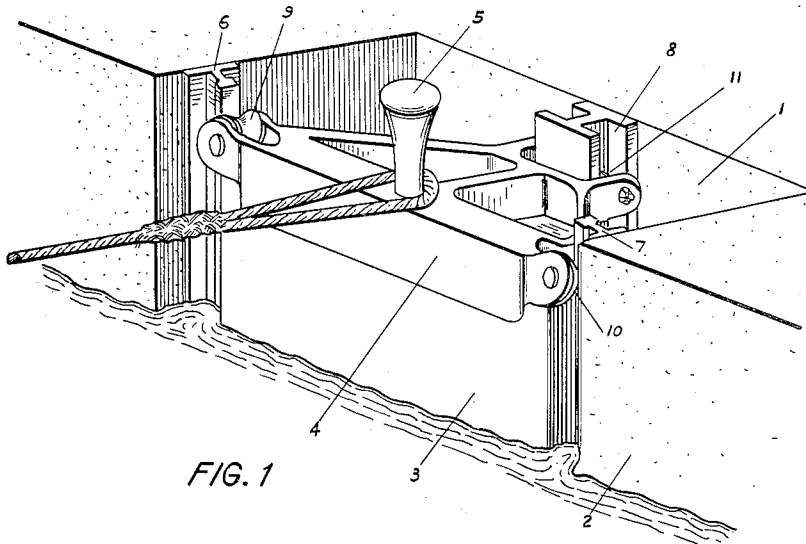


FIG. 1

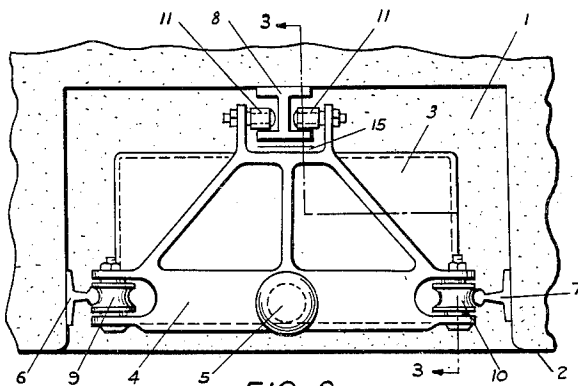


FIG. 2

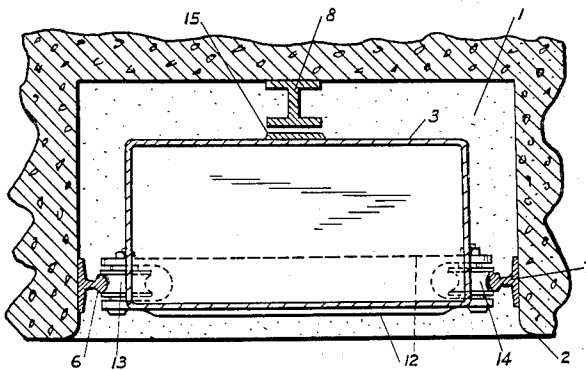


FIG. 3

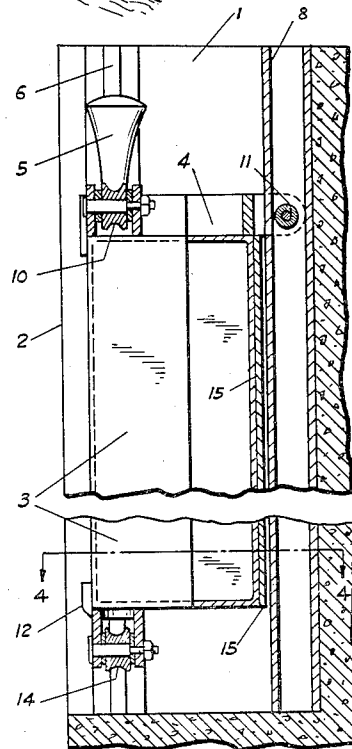


FIG. 4

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2 Sheets-Sheet 2

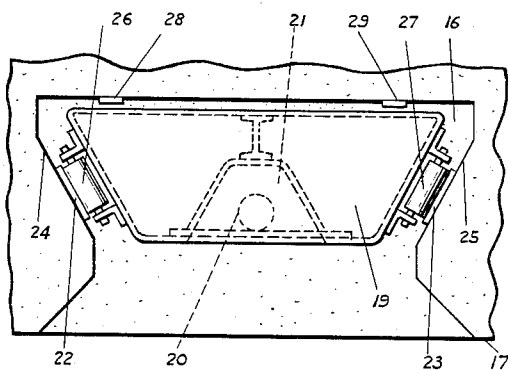


FIG. 5

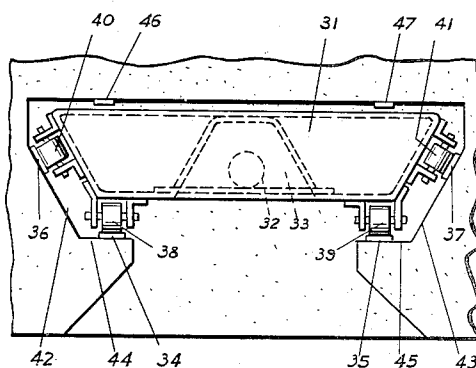


FIG. 7

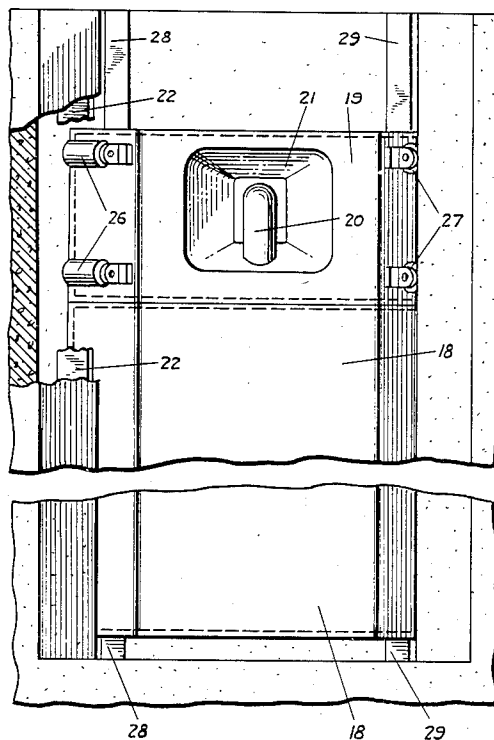


FIG. 6

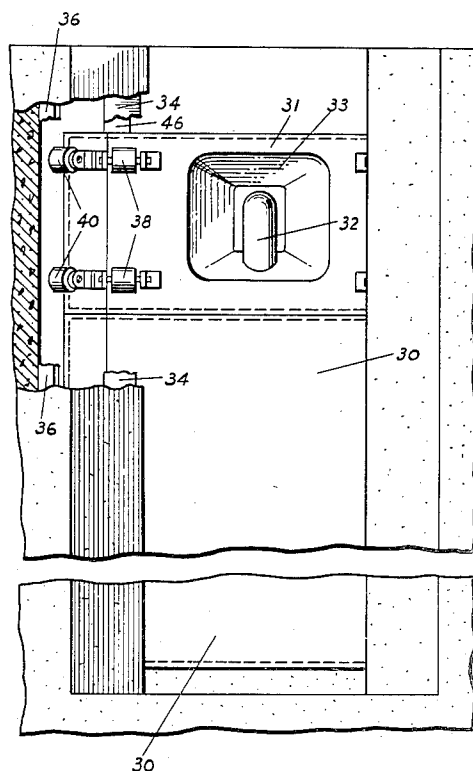


FIG. 8

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1,997,586

MOORING DEVICE

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Application January 25, 1934, Serial No. 708,282

10 Claims. (Cl. 61—48)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

This invention relates in general to mooring devices, and more specifically to floating mooring devices operable automatically to adjust themselves to changes in water level.

5 The principal object of the invention is to provide a floating mooring device operable to maintain a mooring post at a constant height with respect to a variable water level, and at the same time in a substantially fixed vertical line, where-
10 by the necessity of repeated changes of mooring to posts fixed at different levels or repeated adjustments of the mooring hawsers is obviated.

A further object of this invention is the provision of a device of the above description capable
15 of being installed in a vertical recess in the wall of a lock chamber, dock face, or the like.

The invention finds its chief utility in the mooring of boats, barges, or other water craft in locks, at docks, or at wharves subject to variation of
20 water level. This is of especial utility in a lock chamber in cases where the watering or unwatering of the same might cause turbulence tending to displace the craft and endanger either it or the component parts of the lock if the filling or
25 emptying were conducted at a rapid rate, as might be done to expedite lockage through a high lock.

In such cases the craft would be held in proper position throughout the rise or fall of the water
30 level without the necessity of repeated mooring and unmooring. It is such repeated operations during rise and fall that would leave the craft free at intervals for displacement.

Other objects and advantages of the invention
35 will be apparent from a perusal of the following specifications and the drawings accompanying the same.

In the drawings:

40 Figure 1 is a perspective view of the device installed in a vertical recess in the wall of a lock chamber.

Figure 2 is a top plan view of Figure 1.

Figure 3 is a section on the line 3—3 of Figure 2.

45 Figure 4 is a section on the line 4—4 of Figure 3.

Fig. 5 is a top plan view of a modified form of our invention; Fig. 6 is a fragmentary sectionized front elevation of the modification shown in Fig.
50 5; Fig. 7 is a top plan view of a further modified form of our invention, and Fig. 8 is a fragmentary sectionized front elevation of the modification shown in Fig. 7.

Referring to the drawings in detail, and Fig-
55 ures 1 to 4, the device is here shown installed in

the vertical recess 1 in wall 2 of a lock chamber. The device consists in the main of a water-tight tank or float 3, surmounted by a rigidly attached yoke 4 carrying affixed thereto the mooring post 5. The tank and yoke as a unit are mounted for
5 vertical movement in the recess by means of a system of vertical guides in the form of a pair of side rails 6 and 7, and a vertically positioned H-column 8, said guides being rigidly fixed to the
10 walls of the recess. The yoke has bearing on the side rails 6 and 7 through suitably mounted grooved rollers 9 and 10, respectively, and has bearing against the inside surface of the front
15 flange of the H-column 8 through a pair of suitably mounted short cylindrical rollers 11. For maintaining vertical alignment, the lower front
20 portion of the tank carries a transverse yoke 12 having bearing on the rails 6 and 7 through grooved rollers 13 and 14, respectively. Mounted
25 on the back of the tank in opposition to the front flange of the H-column is a vertical stiffening plate 15, of substantially the width of the flange. The primary purpose of this plate is to stiffen the back of the tank against buckling strains, and secondarily to act as a wear plate between the
30 tank and the H-column.

The purpose of the H-column in addition to its guiding function is to resist the main outward pull on the mooring post transmitted through the yoke 4 and rollers 11, while the additional func-
35 tion of the side rails and grooved rollers is to resist lateral pull on the mooring post. The tank or float is designed with sufficient buoyance to maintain the mooring post at the desired elevation above the water level in the lock chamber.

Referring now to the modification shown in Figs. 5 and 6, the device as here shown is installed in a reentrant recess 16 in the lock wall 17 and consists in the main of a tank or float 18 surmounted by a fabricated yoke 19 of box section fixed rigidly to the top thereof. In this form of the invention the mooring post 20 is mounted vertically within a flared recess 21 in the outer face of the yoke. The tank and yoke as a unit are mounted for vertical movement in
45 the recess 16 by means of a pair of vertical rail plates 22 and 23 rigidly fixed to the reentrant faces 24 and 25, respectively, of the recess and vertical pairs of cylindrical rollers 26 and 27 suitably mounted on the yoke, engaging the rail
50 plates 22 and 23, respectively. To insure against contact of tank and yoke against the rear wall of the recess, a pair of vertically extending wear plates 28 and 29 are provided, rigidly fastened to the wall and symmetrically disposed with respect
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to the vertical center line of the tank and yoke. The parts are so arranged in relation to each other that when the rollers are in contact with the rail plates, there will be a substantial clearance between the back of the tank and yoke and the wear plates as indicated.

The angular relation of the reentrant faces and rail plates is such as to resist both outward and lateral pull on the mooring post transmitted to the rollers through the yoke.

The operation of this form of the invention is similar in all respects to that of the preferred form above described, except that the pull on the mooring post in this case is resisted by the two rail plates, thus doing away with the necessity for an additional guide and anchorage at the rear of the yoke.

It will be noted that while the device is under load in maintaining the moored craft in a safe position in the lock, either during the filling or emptying of the latter, the load is taken substantially wholly by the rollers and the rail plates, with the yoke and tank clear of the wear plates. It is only during such idling movement of the device as would occur in the filling or emptying of the chamber without the device being in use, that the latter would come in contact with the wear plates, preventing undue abrasion of the rear surface of the yoke and tank.

Referring now to the further modification shown in Figs. 7 and 8, the device here, as to the form and arrangement of the tank 30, the yoke 31, the mooring post 32, and recess 33, is the same as that of the modification shown in Figs. 5 and 6. In the present form, however, the outward and lateral pulls are resisted separately by front and lateral vertically disposed rail plates 34—35 and 36—37, respectively. These pulls are transmitted from the mooring post through the yoke to the rail plates through their associated vertical pairs of cylindrical rollers 38—39 and 40—41, respectively, suitably mounted on the yoke. The laterally disposed rail plates 36 and 37 are rigidly mounted on the angular reentrant recess walls 42 and 43, respectively, while the front rail plates 34 and 35 are rigidly mounted on the forward reentrant faces 44 and 45, respectively. This form of the device is also provided with suitable vertically disposed wear plates 46 and 47, similar in all respects to those of the modification shown in Figs. 5 and 6.

The operation of this form of the invention is similar in all respects to that of the modification referred to above, except that the outward and lateral pulls are resisted separately by the forwardly and laterally disposed rails and rollers, respectively.

From the above it will be clear that in operation, assuming the water in the lock chamber to be at lower pool level, as the water rises in filling the lock, the tank or float will rise, carrying with it the yoke and mooring post, maintaining the latter always at the desired height above the changing water level, the reverse operation taking place in emptying the lock chamber. It will be noted that throughout these operations the mooring post and the mooring bitt on the moored vessel or barge will be kept in substantially constant relation, so that the use of two or more such devices disposed in suitably spaced relation to the moored craft will hold the latter properly positioned in the lock to prevent damage to either, and avoid the necessity of repeatedly shifting mooring points or taking up slack or releasing tension on mooring hawsers.

It is to be noted that while we have herein shown and described certain specific embodiments of the invention for the sake of disclosure, it is to be understood that the invention is not limited to such specific embodiments, but contemplates all such modifications and variants thereof as fall fairly within the scope and purview of the appended claims.

What we claim is:

1. A mooring device comprising a flotation member adapted to be located and vertically actuated within a suitably formed recess, a super-structure secured to and surmounting said flotation member, said super-structure being formed to effect equal distribution of the load there-through, a mooring element carried by the super-structure and means in connection with said recess and said super-structure for guiding said member and resisting the outward and lateral load stresses imparted to the mooring element and uniformly distributed through the union of super-structure and flotation member.

2. A mooring device comprising a flotation member adapted to be located and vertically actuated within a suitably formed recess, a super-structure secured to and surmounting said flotation member, said super-structure being formed to effect equal distribution of the load there-through, a mooring element carried by the super-structure and means in connection with said recess and said super-structure for guiding said member and resisting the outward and lateral load stresses imparted to the mooring element and uniformly distributed through the union of super-structure and flotation member, said means being symmetrically disposed with respect to said mooring element.

3. A mooring device comprising a flotation member adapted to be located and vertically actuated within a suitably formed recess, the latter including rear and side walls, a frame secured to and surmounting said flotation member, a mooring element carried by the frame and means in connection with the walls of said recess and said frame for guiding said member and resisting the outward and lateral load stresses imparted to the mooring element, said means including a vertically arranged bearing surface affixed centrally of the rear wall and in offset relation with respect thereto and a friction roller extending to the rear of the flotation member, said roller being adapted to travel the inner face of said bearing surface.

4. A mooring device comprising a flotation member adapted to be located and vertically actuated within a suitably formed recess, the latter including rear and side walls, a frame secured to and surmounting said flotation member, a mooring element carried by the frame and means in connection with the walls of said recess and said frame for guiding said member and resisting the outward and later load stresses imparted to the mooring element, said means including a vertically arranged bearing surface affixed centrally of the rear wall and in offset relation with respect thereto and a pair of aligned friction rollers journaled in said frame and disposed to the rear and centrally of the flotation member, said rollers being adapted to travel the inner face of said bearing surface.

5. A mooring device comprising a flotation member adapted to be located and vertically situated within a suitably formed recess, the latter including rear and side walls, a triangular shaped frame secured to and surmounting the flotation

member, a mooring element carried by the frame and disposed centrally of its base, and means in connection with the walls of said recess and said frame for guiding the flotation member and resisting the outward and lateral load stresses imparted to the mooring element, said means being symmetrically arranged relative to the mooring element and including a vertically disposed bearing surface affixed centrally of the rear wall of said recess in offset relation thereto and a friction roller journaled in said frame and extending to the rear of said flotation member, said roller being adapted to travel the inner face of said bearing surface.

6. A mooring device comprising a flotation member adapted to be located and vertically situated within a suitably formed recess, the latter including rear and side walls, a triangular shaped frame secured to and surmounting the flotation member, a mooring element carried by the frame and disposed centrally of its base, and means in connection with the walls of said recess and said frame for guiding the flotation member and resisting the outward and lateral load stresses imparted to the mooring element, said means being symmetrically arranged relative to the mooring element and including a vertically arranged bearing surface affixed centrally of the rear wall of said recess in offset relation thereto, and a pair of aligning friction rollers journaled in said frame and extending to the rear and central of said flotation member, said rollers being adapted to travel the inner face of said bearing surface.

7. A mooring device comprising a flotation member adapted to be located and vertically actuated within a suitably formed recess the latter including rear and side walls, a triangular shaped frame secured to and surmounting said flotation member, a mooring element carried by the frame and disposed centrally of its base, and means in connection with the walls of said recess and said frame for guiding said flotation member and resisting the outward and lateral load stresses imparted to the mooring element, said means being symmetrically arranged relative to the mooring element and including guide rollers journaled in the extremities of the base of said frame, guide rails coacting with the rollers, a vertically arranged bearing surface affixed centrally of the rear wall and in offset relation with respect thereto, and a pair of aligning friction rollers journaled in the apex of said frame, and adapted to travel the inner face of said bearing surface.

8. A mooring device comprising a flotation member adapted to be located and vertically actuated within a suitably formed recess, the latter including rear and side walls, upper and lower frames attached to the top and bottom of the flotation member, aligning guide rollers journaled in the frames and projecting laterally of the flotation member, guide rails carried by the side walls of said recess and coacting with said rollers to guide said flotation member and to resist lateral load stresses, and coacting means between the rear portion of said upper frame and the rear wall of said recess for guiding and resisting the outward load stresses imparted by said mooring element, said means including a vertically arranged bearing surface affixed centrally of the rear wall and in offset relation with respect thereto, and a pair of aligning friction rollers journaled in the frame and extending to the rear thereof, said rollers being adapted to travel the inner face of said bearing surface.

9. A mooring device comprising a flotation member embodying front, rear and side walls, the latter being arranged in converging relation, said member being disposed for vertical movement within a suitably formed recess, the walls of which parallel the rear and side walls of the flotation member, a super-structure surmounting the flotation member, the bounding walls of the super-structure forming a continuation of those of the flotation member and an anchoring element positioned in a recess formed in the front wall of said super-structure and means in connection with the side walls of said super-structure and the converging walls of said recess for guiding said member and resisting the outward and lateral load stresses imparted to the mooring element.

10. A mooring device comprising a flotation member embodying front, rear and side walls, the latter being arranged in converging relation, said member being disposed for vertical movement within a suitably formed recess, the walls of which parallel the rear, side and a portion of each end of the front wall of said flotation member, a super-structure surmounting the flotation member, the bounding walls of said super-structure forming a continuation of those of the flotation member, an anchoring element positioned in a recess formed in the front wall of said super-structure and means in connection with the side and front walls of said super-structure and co-operating with the walls of said recess for guiding said member and resisting the outward and lateral load stresses imparted to the mooring element.

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