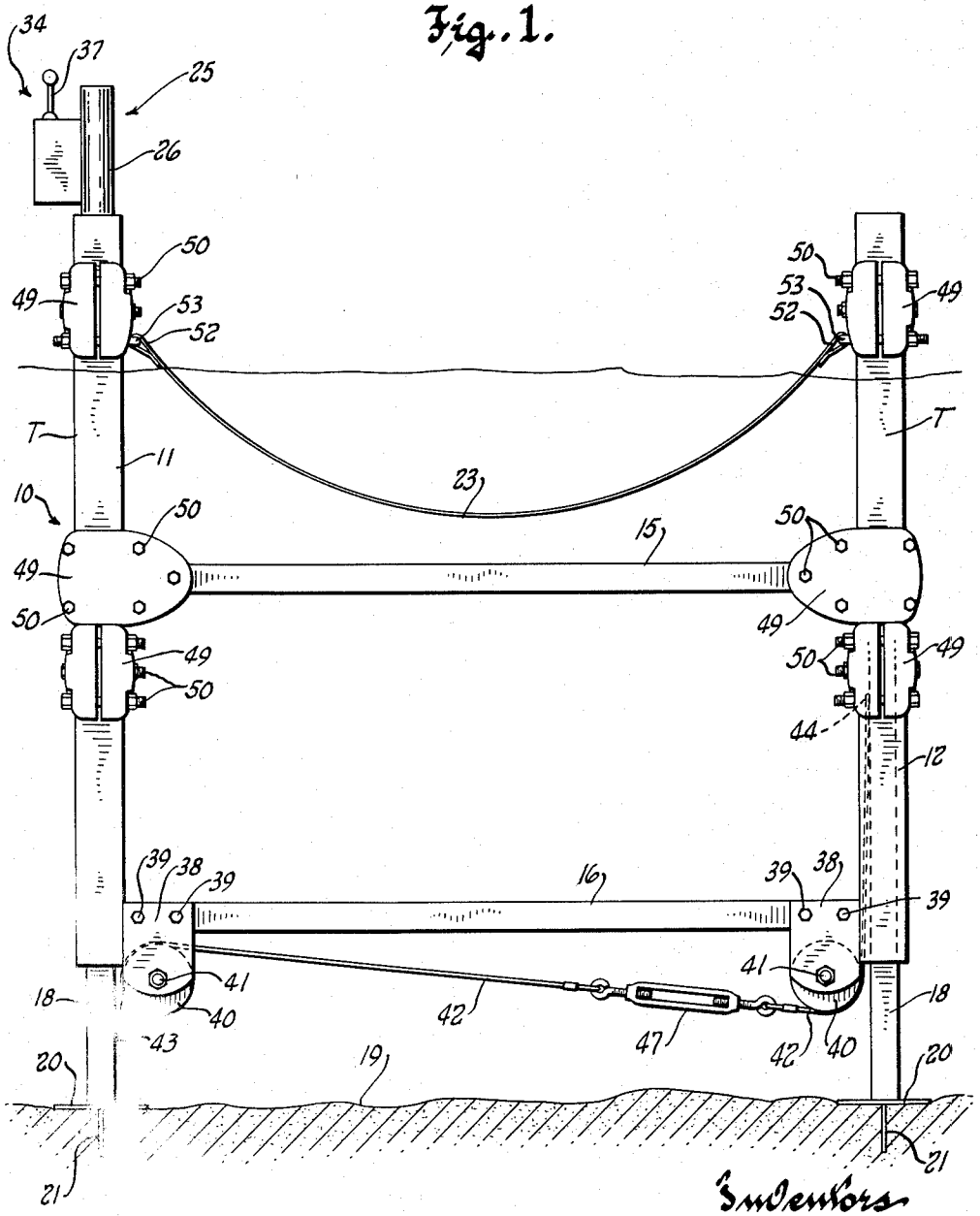
April 13, 1965 D. J. SCHNEIDER ETAL 3,177,668

LIFT TYPE MOORING CRADLE FOR SMALL BOATS

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Fig. 1.



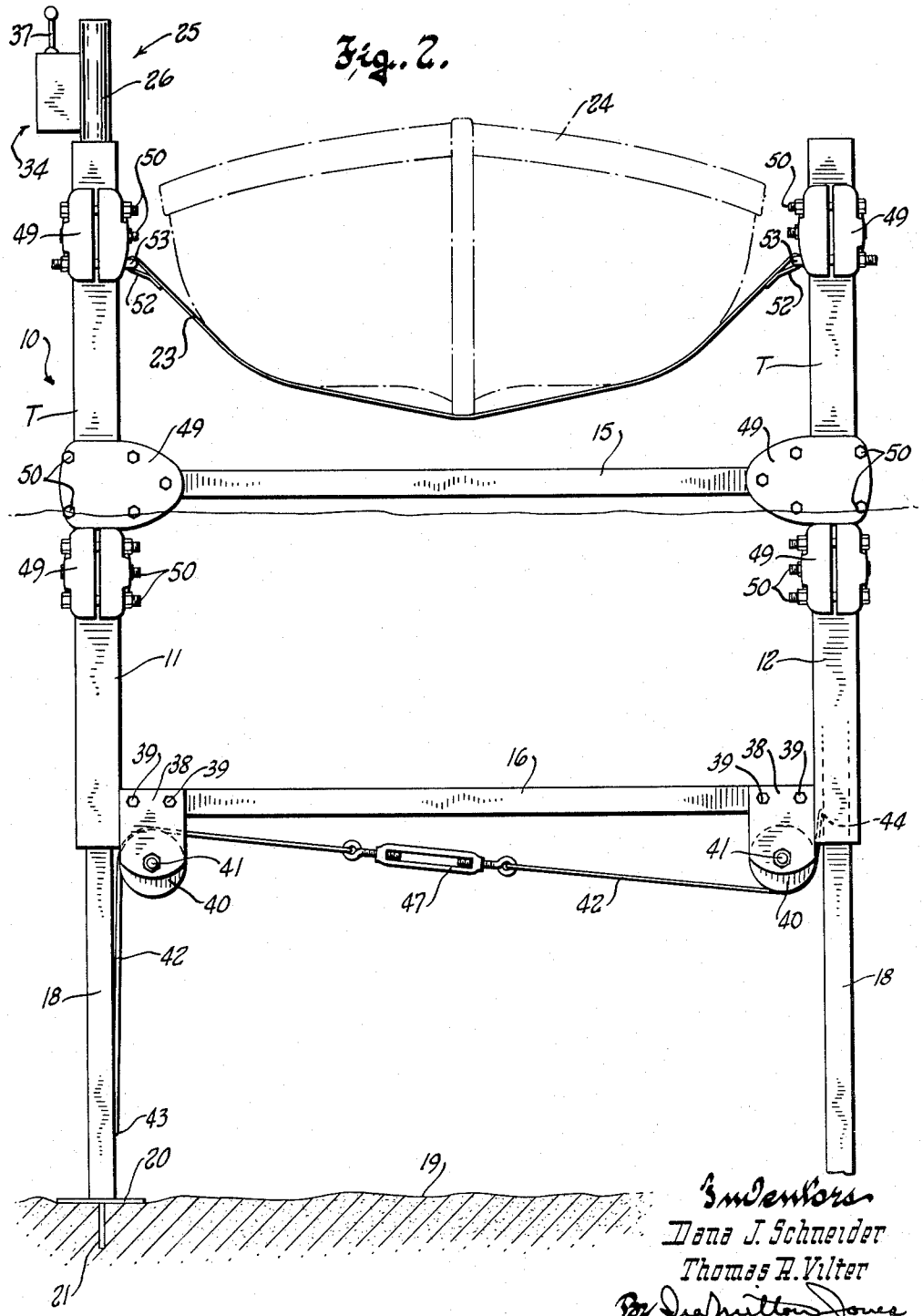
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LIFT TYPE MOORING CRADLE FOR SMALL BOATS

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Fig. 2.



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LIFT TYPE MOORING CRADLE FOR SMALL BOATS

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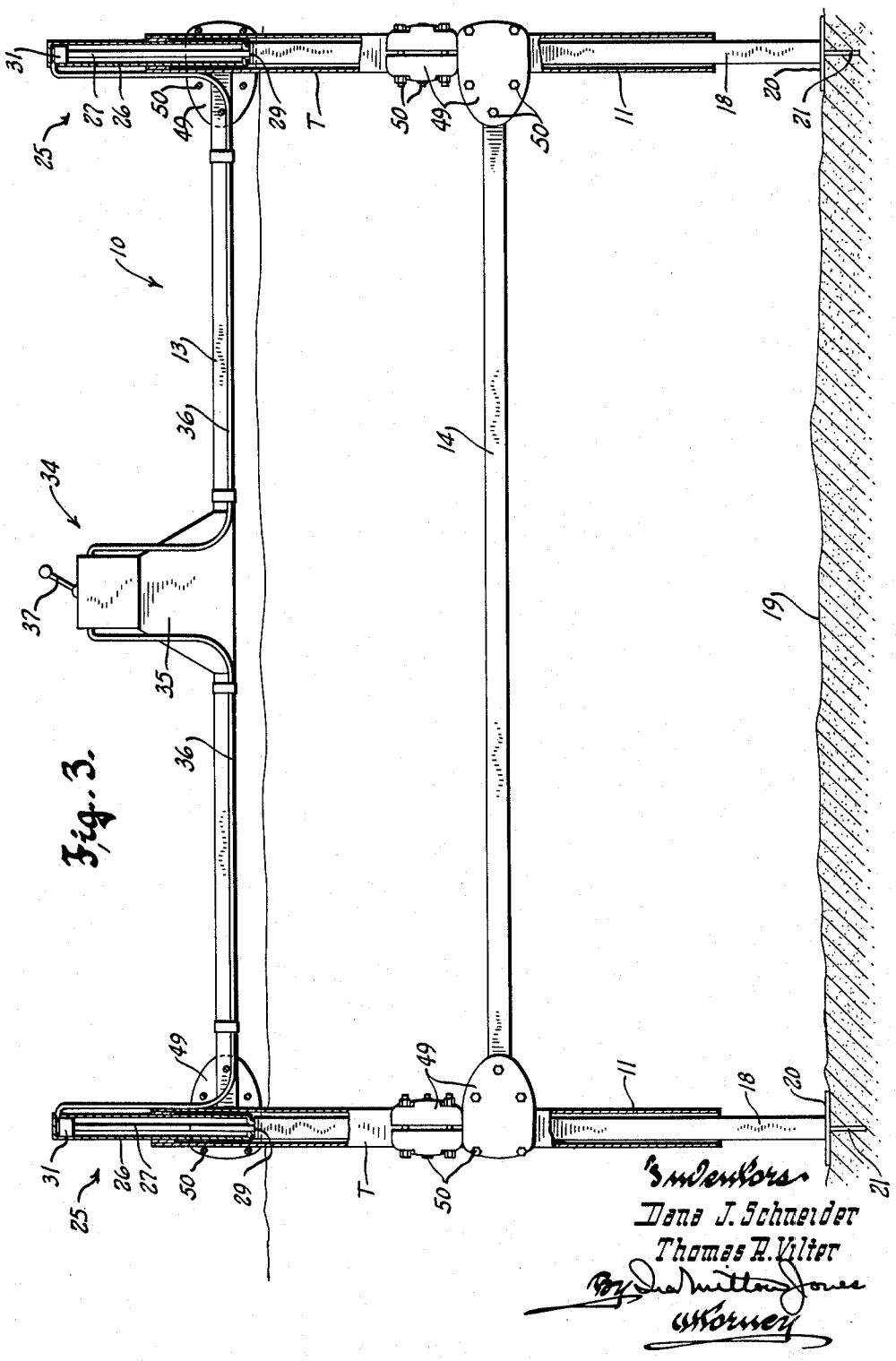


Fig. 3.

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LIFT TYPE MOORING CRADLE FOR SMALL BOATS

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Fig. 4.

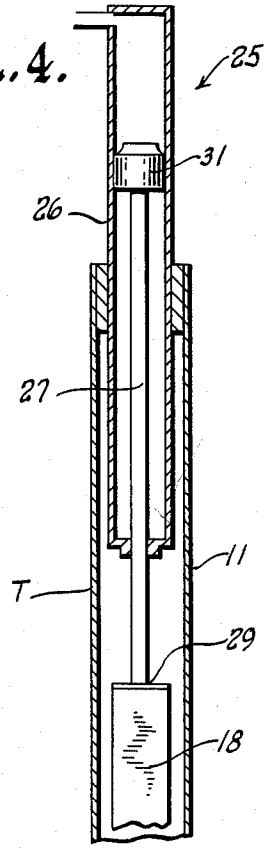


Fig. 5.

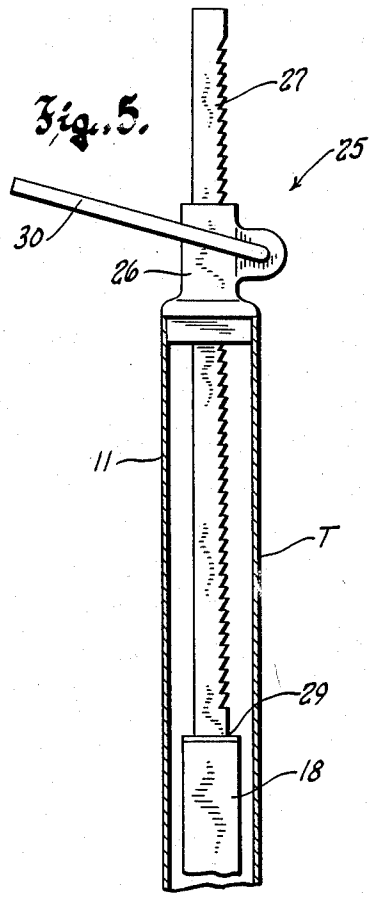


Fig. 7.

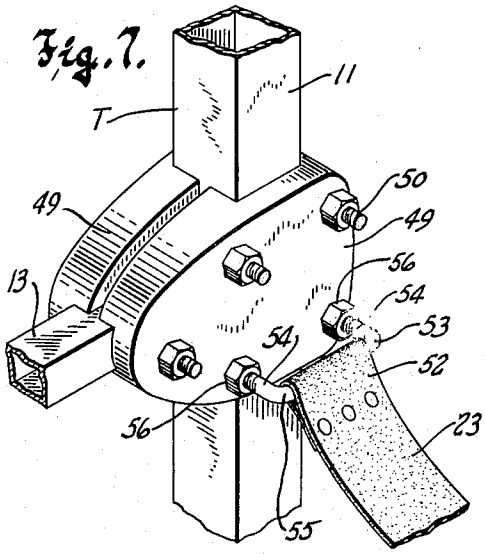
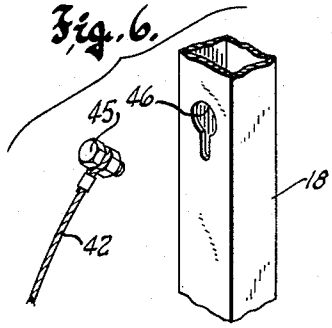


Fig. 6.



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3,177,668

LIFT TYPE MOORING CRADLE FOR SMALL BOATS

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1 Claim. (Cl. 61—65)

This invention relates to small boats of the type including power launches and sailing craft, and concerns the problem of conveniently but safely mooring such boats.

It is the custom to moor larger vessels at substantially deep water sites by attaching them fore and aft to anchored mooring buoys. Access to such boats is had by means of dinghies or tenders, which are used to transport passengers to and from the moored vessel. When departing for a cruise, the dinghy or tender may be stowed on the deck of the vessel, towed behind it, or secured to the mooring buoys of the vessel until it returns to its mooring site.

Most conventional methods of mooring smaller craft, however, are neither as satisfactory nor as simple as those employed for larger vessels. In general, small boats are usually moored directly to a pier, dock or the like, to which they may be tied and rendered easily accessible for use whenever desired. This practice, however, has the disadvantage of subjecting the boat to considerable buffeting against the pier to which it is tied, especially if there is any appreciable wind or wave action. The possibility of damage to a boat thust moored will be readily apparent, unless elaborate steps are taken to cushion the sides of the boat or otherwise prevent it from moving toward and from the pier in consequence of wind or wave action, or both.

In general, it is the purpose of this invention to provide improved mooring means for small boats of the character described, which permits mooring of a boat in a readily accessible location directly alongside a pier or the like, but which readily protects the boat against damage that would normally result from the effects of wind and waves upon the boat.

More specifically, it is an object of this invention to provide a mooring device for small boats, which device may rest upon the bottom of a lake or other body of water, alongside of a dock or the like, and which incorporates a power operated cradle into which a boat may be floated and thereafter lifted out of the water and held in a safe mooring position at which the boat is substantially unaffected by wave action.

Still more specifically, it is the purpose of this invention to provide a mooring device for small boats which comprises a rigid frame constructed to provide a boat receiving cradle, and having jack-type power lift means to enable the frame to be lifted upwardly with respect to a number of posts upon which the frame is mounted to carry a boat in the cradle upwardly out of the water and to hold the boat in a safe mooring position.

A further object of this invention resides in the provision of a lift type mooring cradle of the character described, having power lift means which may comprise either manually actuatable automobile type jacks or fluid pressure operated cylinders.

With these and other objects in view which will appear as the description proceeds, this invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described and more particularly defined by the appended claim, it being understood that such changes in the precise embodiment of the herein disclosed invention may be made as come within the scope of the claim.

The accompanying drawings illustrate two complete examples of the physical embodiments of the invention constructed according to the best modes so far devised for the practical application of the principles thereof, and in which:

FIGURE 1 is an end elevational view of the lift type mooring cradle of this invention, showing the same in a lowered position to receive a boat to be moored in the cradle;

FIGURE 2 is a view similar to FIGURE 1 but showing the mooring cradle in an operative raised position at which it is capable of holding a small boat clear of a body of water in which the device is mounted;

FIGURE 3 is a side elevational view showing the cradle in its lowered condition, parts thereof being broken away and shown in section to better illustrate details of construction;

FIGURE 4 is an enlarged fragmentary detail view illustrating one form of power lift means and the manner in which the same reacts between the cradle frame and the posts upon which the frame is mounted to effect lifting of the frame to its operative position;

FIGURE 5 is a view similar to FIGURE 4 but illustrating how power lift means of another type can be used to advantage in the mooring cradle of this invention;

FIGURE 6 is a fragmentary perspective view illustrating a construction detail of the mooring cradle of this invention; and

FIGURE 7 is an enlarged fragmentary perspective view illustrating another construction detail of the mooring cradle of this invention.

Referring now more particularly to the accompanying drawings, wherein like reference characters have been applied to like parts through the views, the numeral **10** generally designates an elongated rigid frame which is constructed to provide a boat receiving cradle. The frame is of rectangular shape, as viewed in plan, and it comprises two pairs of upright elongated tubes T at the opposite ends of the frame, with the tubes arranged at the corners of the frame and preferably of square or rectangular cross section. Two of the tubes **11** are located at what can be designated the front side of the frame seen in FIGURE 3, and the other two tubes **12** are at the rear side of the frame. These tubes are rigidly connected together in spaced apart relationship by means of upper and lower longitudinal tie members of braces **13** and **14**, respectively, at each side of the frame, and by means of upper and lower transverse tie members or braces **15** and **16**, respectively, at the opposite ends of the frame.

The frame **10** is mounted for bodily up and down motion on upright elongated posts **18**, each of which is received in one of the tubes T. These posts are preferably hollow and have a cross section similar to that of the tubes. All of the posts project from the bottoms of the tubes to have supporting engagement with the bottom **19** of a lake or other body of water to thus mount the frame in a fixed location at the desired mooring site, preferably alongside a pier or dock, extending lengthwise thereof, and with the tubes **11** at its front side adjacent to the pier.

If desired, each of the posts **18** may have a weight distributing foot **20** on its lower end to rest upon the bottom **19** of the lake or other body of water, and if there is danger of the structure shifting its location upon the bottom, this problem may be overcome by the provision of pointed members **21** fixed to the undersides of the feet **20** as by welding. The pointed members are adapted to penetrate into the bottom **19** and to cooperate with the feet **20** in establishing a stable support for the mooring structure.

When the mooring cradle is mounted alongside a dock

or pier or the like in the manner described, a small craft to be moored in the cradle may be floated lengthwise along the pier into position above the cradle provided by the frame 10, and over transverse boat engaging elements 23 carried by the frame adjacent to each end thereof. The transverse elements 23 are preferably, though not necessarily, in the form of flexible straps of a length substantially greater than the transverse dimension of the frame 10, and they are adapted to have lifting engagement with the bottom of the boat upon elevation of the frame 10, to lift the boat out of the water and hold it in a safe mooring position. A boat 24 so moored in the device of this invention is indicated by construction lines in FIGURE 2.

According to this invention, such elevation of the frame or cradle is accomplished by power lift means generally designated 25, reactively coupled between portions of the frame and certain of the posts upon which the frame is guided for up and down motion. The power lift means, of course, also enables the frame to be readily lowered from its operative mooring position seen in FIGURE 2, to the boat receiving position shown in FIGURE 1.

The power lift means may comprise conventional single acting fluid pressure operated cylinders such as seen in FIGURE 4, or pawl and ratchet type automobile bumper jacks such as shown in FIGURE 5. In either case, two such power lifting devices are employed in the specific embodiment of the invention herein disclosed, one at each end of the frame at its front side. Each of the lifting devices has a body 26 fixed, as by welding, to the upper end of one of the tubes 11 at the front or dock side of the frame, and an elongated lengthwise projectable and retractable work performing element 27 which projects downwardly into its tube and into endwise thrust transmitting engagement as at 29 with the top of the post 18 therein.

The automobile bumper type jacks (FIGURE 5) also have operating handles 30 which, when manually operated, effect projection or retraction of their work performing element 27, depending upon the setting of a selector lever (not shown) on the body of each jack.

From this it will be evident that if the work performing elements 27 of the lifting devices are propelled downwardly from their bodies, they will effect lifting of the tubes 11 upon which the jacks are mounted.

Certain advantages are achieved when the power lift means 25 are provided by fluid pressure actuated, or hydraulic cylinders such as shown in FIGURES 1 through 4. In that case, the body 26 of the jack constitutes the cylinder per se. These cylinders are preferably of a size to fit within the upper ends of their tubes 11, and they may be fixed to the tubes with different preselected lengths thereof projecting into the tubes, depending upon the depth of water in which the mooring device is to be situated. Within limits, of course, this predeterminable mounting of the cylinders in their tubes thus enables the range of up and down motion of the cradle to be preset in accordance with the depth of water at the chosen mooring site.

The elongated work performing element 27 of each cylinder, of course, is a piston rod that projects upwardly into the lower end of the cylinder and has its inner end affixed to a piston 31 within the cylinder.

Though each of the two fluid pressure operated cylinders may have its own manually operable pump and selector valve to effect projection and/or retraction of its piston rod, a double piston pump and reservoir unit 34 common to both cylinders is preferably provided to effect simultaneous operation of the cylinders. The unit 34 is most conveniently mounted on a bracket 35 fixed to the upper brace 13 on the front or dock side of the frame, and it will be understood that the unit 34 is of a conventional type that includes a selector valve (not shown) by which pressure fluid may be selectively simultaneously supplied to or relieved from the upper ends of the cylinders through ducts 36 that connect the cylinders with the unit.

The combination pump and reservoir unit 34 illustrated is of the manually operated type haivng a handle or lever 37 which, when swung backwardly and forwardly by an operator, effects reciprocation of the piston mechanism of the unit to thus enable pressure fluid to be simultaneously pumped into the upper ends of both cylinders. Obviously, the cylinders could be supplied with fluid under pressure and controlled by manually or electrically operated instrumentalities located remotely from the mooring device.

It will also be appreciated that when pressure fluid is allowed to exhaust from the cylinders, as in the "lowering" position of the selector valve on the pump unit, the weight of the frame or cradle, plus that of a boat in the cradle, is relied upon to effect lowering of the frame on the posts 18.

While the frame 10 may be sufficiently rigid to enable it to be satisfactorily raised and lowered on its posts 18 by power lift means 25 on only the front or dock side of the frame, it is desirable to eliminate any twisting stresses on the frame that might cause it to bind upon its posts. Hence, according to this invention, the tubes 11 and 12 at each end of the frame are connected together by means which provide motion transmitting connections between them such as to constrain the tubes to up and down motion in unison.

For this purpose, the tubes 11 and 12 at each end of the frame have brackets 38 welded to their lower end portions, on the opposing faces of said end tubes. The lower end braces 16 may join the lower ends of these tubes by bolts 39 which connect the braces to the brackets 38. These brackets project downwardly from the lower end braces 16, slightly beyond the lower ends of their respective tubes 11 and 12, and each carries a pulley 40 which rotates about a horizontal axis extending lengthwise of the frame and defined by a pin 41 supported in the bracket.

The pulleys 40 at each end of the frame receive a flexible cable 42, which extends transversely across the frame beneath the lower end braces 16. The forward ends of these cables are trained over the pulleys 40 on the front tubes 11 and extend downwardly therefrom to have their extremities anchored as at 43 to the front posts 18 at a location near their lower ends. The rear ends of the cables 42 are trained under the pulleys 40 on the lower ends of the rear tubes 12 and extend upwardly into said rear tubes, to be anchored as at 44 to the posts therein at locations spaced a substantial distance above the bottoms of said posts.

The connections 44 may be conveniently provided by bolts 45, secured to the rear extremities of the cables 42, and passed through key hole openings 46 in their respective posts so that the bolts occupy positions inside the rear posts, directly behind the narrow lower ends of the key hole openings 46.

From this it will be that whenever the power lift means are actuated to drive the tubes 11 at the front or dock side of the frame upwardly, the forces which effect such upward movement of the tubes will be equally transmitted and applied to the tubes 12 at the rear of the frame through the pulleys 40 and the cables 42 trained thereabout, to cause them to raise in unison with the tubes 11 and thus preclude any tendency for the frame to twist and bind as it is being elevated. The cable connections also, of course, prevent such binding of the frame during its descent.

Preferably the transverse stretch of each cable 42 has a turnbuckle 47 secured therein. The turnbuckles enable the tensions on the two cables 42 to be balanced and the tubes at all four corners of the frame to be brought to the same level.

While one form of mooring cradle embodying this invention has been described thus far, it should be observed that the basic structure of the device readily lends itself to considerable variation from the specific embodiment shown in the drawings without departing from the spirit

of the invention. For example, the hydraulic jacks or cylinders 25 which comprise the power lift means for the cradle may be mounted on two of the tubes at one end of the frame, in which event the pulley and cable connections would be rearranged to couple the tubes at each side of the frame rather than those at the ends as shown. On the other hand, it may be desirable in some instances to employ but a single bumper type jack or hydraulic cylinder as the power lift means for the cradle, mounted, for example, on one of the end posts at the front of the frame for accessibility. In that event, the provision of a pulley and cable connection between the two front tubes, in addition to those at the ends of the frame, would assure equal transmission of lifting force to all of the tubes whenever the single jack or cylinder was operated.

From the description thus far, it will be appreciated that the lengths of the tubes 11 and 12 and also of the posts 18 will depend upon the depth of water at the chosen mooring site. If the water at the mooring site is relatively shallow, the frame tubes and their posts may be relatively short. If the water is substantially deep, however, the frame tubes and their posts may be made substantially longer.

In either event, the lengths of the tubes and posts are preferably so predetermined with respect to the depth of water at the chosen mooring site that when the frame or cradle 10 is in its lowered boat receiving position, the entire structure will be nearly submerged. The upper longitudinal braces or tie members 13, however, should be close to, and preferably slightly above the surface of the water. The purpose of this is to keep the pump and reservoir unit 34 above water level. Also in this position of the frame or cradle, it will be noted that the transverse boat engaging straps 23 will be entirely, or nearly so, submerged in the water so as to enable the boat to be moored in the cradle to be freely floated into position over the straps. In this connection, it is to be noted that the straps 23 have their ends connected to upper portions of the frame, while the upper end braces 15 of the frame are connected to the frame tubes at locations low enough as to at all times dispose the braces 15 beneath the straps and at levels such that they will not interfere with floating of a boat into position over the straps of the lowered cradle.

It should also be observed that the braces or tie members 13, 14, and 15 are connected to the frame tubes 11 and 12 by means of clamps 49 which comprise mating clamp sections formed to embrace and fit the tubes, and which sections can be tightly clamped onto the tubes at any desired location therealong by means of bolts 50. Consequently, the braces or tie members 13, 14, and 15 can be adjusted to any desired level with respect to the tubes joined thereby.

Obviously, the cradle may be made in different sizes to accommodate small boats of varying lengths and widths. The length and width dimensions of the frame or cradle, of course, may be varied by using braces or tie members 13, 14, 15, and 16 of different lengths.

As shown best in FIGURE 7, the straps 23 are preferably formed with looped ends 52 to facilitate their securement to the frame 10. Also, the upper clamps 49 on the frame tubes T have U-bolts 53 thereon which cooperate with the bolts 50 to adjustably secure the clamps to the tubes. The legs 54 of the U-bolts straddle the frame tubes, and the bight portion 55 of each U-bolt is accessibly located at the inner side of its clamp, and held spaced therefrom by a pair of stop nuts 56 on the inner end portions of the legs of the U-bolt.

Thus, the bight portions 55 of the U-bolts, when engaged in the looped ends 52 of the straps, provide exceptionally simple but strong anchors for the ends of the boat engaging straps 23.

From the foregoing description taken together with the accompanying drawings, it will be readily apparent to those skilled in the art that this invention provides a simple though efficient mooring cradle for small boats, which will afford maximum protection to a boat moored therein by reason of its ability to hold the boat in a safe mooring position at which it is substantially unaffected by wind and wave action; and which features a construction that requires no overhead mechanism that might damage the mast or other high structure of a sailing craft either during manipulation of the sailing craft into position over the cradle or while the craft is held in an elevated mooring position by the cradle.

What is claimed as our invention is:

In a mooring cradle for boats: a rigid frame structure comprising four elongated upright tubes disposed at the corners of a rectangle, and braces extending between and rigidly joining said tubes; a frame supporting post endwise slidably received in each tube and projecting from the lower end thereof; a hydraulic actuator carried by each of the tubes at one side of the rectangle, and comprising a cylinder coaxially fixed to the top of its tube to form a part thereof, and a rigid piston rod extending downwardly from the cylinder into the interior of its tube and into thrust transmitting engagement with the top of the post therein to in effect form a part of the post; means including a pump for simultaneously operating said cylinders and providing for projection of their piston rods downwardly therefrom so as to cause their respective tubes to be driven upwardly in unison on the posts therein; means providing motion transmitting connections between the hydraulically driven tubes and their opposite tubes at the other side of the rectangle to cause all of the tubes to move upwardly in unison along their respective posts, comprising a pair of cables, one extending transversely across each end of the rectangle and having one end secured to a post supporting one of the actuator carrying tubes at a location beneath the latter and its other end extending upwardly a distance into the tube at the opposite side of the rectangle and anchored to the post therein, a freely rotatable pulley on the lower end portion of each actuator carrying tube and having the adjacent end portion of the cable trained thereover, and a freely rotatable pulley carried by the lower end portion of each tube at said opposite side of the rectangle and having the adjacent end of the cable trained thereunder; and boat supporting members fixed with respect to the frame tubes and extending across the frame structure transversely of the rectangle adjacent to each end portion thereof, to lift a boat in position over said supporting members out of the water in consequence of upward motion of the frame structure relative to the posts.

References Cited by the Examiner

UNITED STATES PATENTS

1,061,213	5/13	Arbuckle	61—65
1,710,442	4/29	Warshaw.	
2,505,832	5/50	Lange	61—65
2,681,712	6/54	West	187—9
2,708,346	5/55	Smith.	
2,750,236	6/56	Middendorf.	
2,775,869	1/57	Pointer	61—65 X
2,796,299	6/57	Freeman	189—14
2,963,176	12/60	Smith.	
3,017,968	1/62	McMahon	189—14

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