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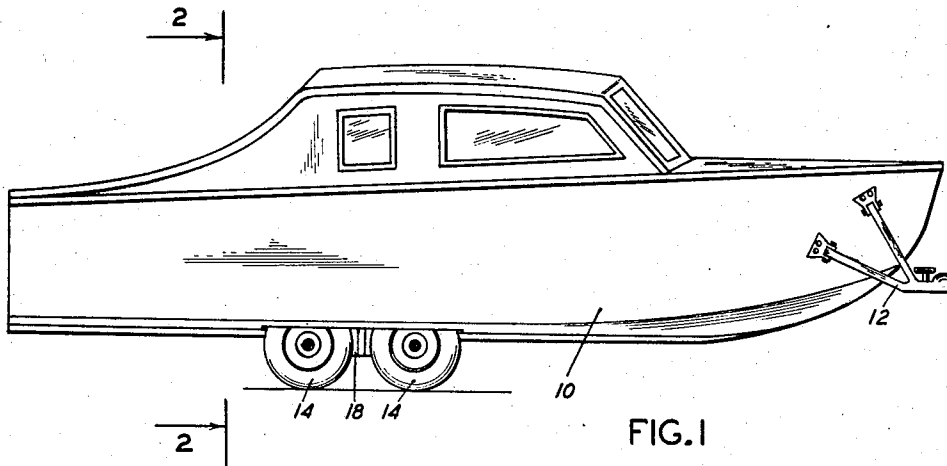
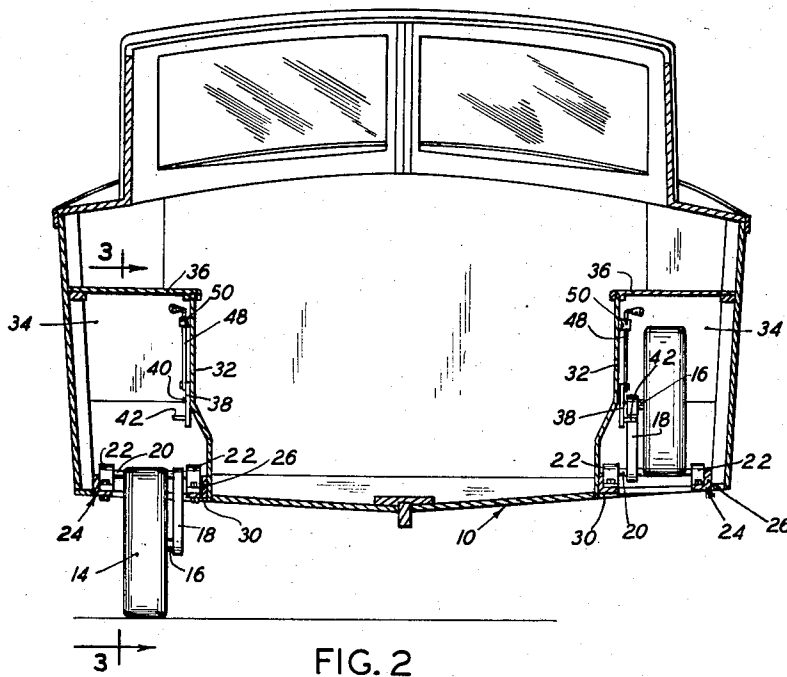
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2,876,466

RETRACTIBLE WHEEL STRUCTURE FOR BOATS

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2 Sheets-Sheet 1



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2 Sheets-Sheet 2

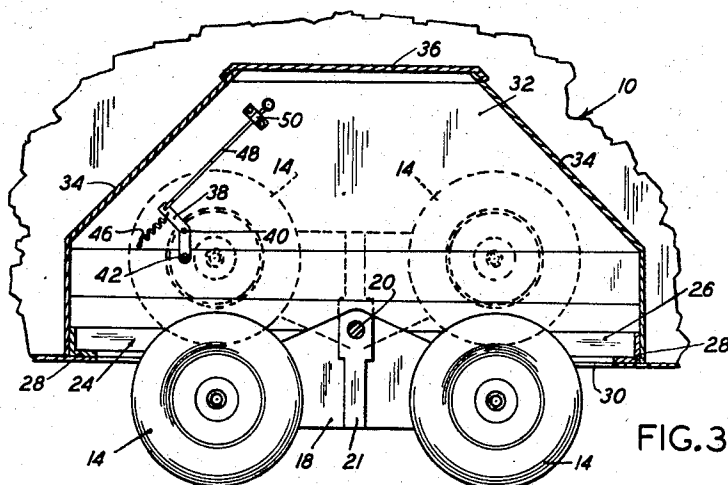


FIG. 3

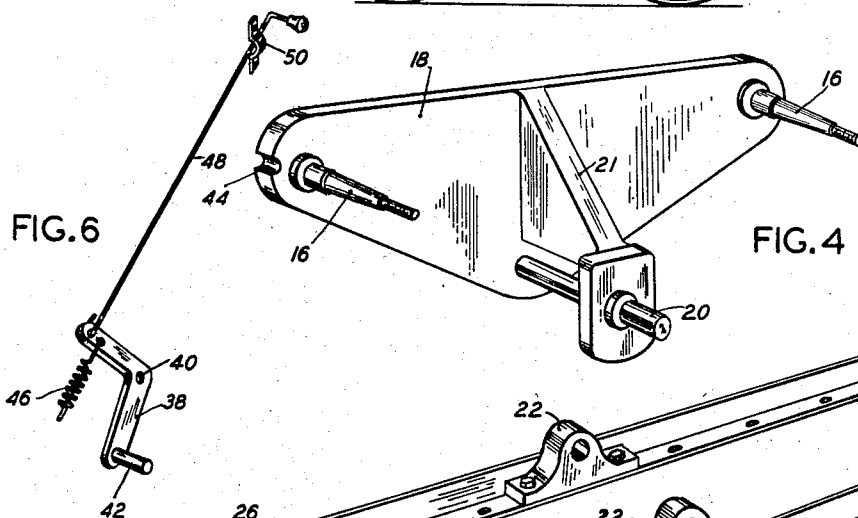


FIG. 4

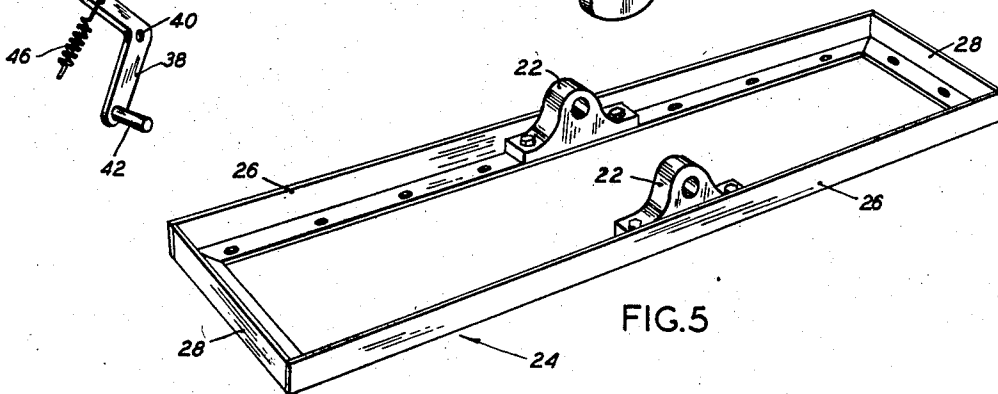


FIG. 5

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1

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RETRACTIBLE WHEEL STRUCTURE FOR BOATS

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3 Claims. (Cl. 9—1)

This invention relates to retractible wheel structure for boats and more particularly to an improved structure by which supporting wheels for a boat may be positioned below the boat to convert such boat into a trailer for land travel or by which the wheels may be housed within wells extending upwardly into the boat hull when the boat is floating in water.

A number of device have been suggested and to some extent employed which enable wheels carried by a boat to be retracted when the boat is floating in water and to be projected to convert the boat to a trailer for land travel. In general, such devices have included complicated structures employing gearing or other similar expedients for raising or lowering the wheels and for maintaining them in their lowered position or have employed cantilever arms pivoted near one end and carrying wheel axles at the other end in conjunction with load sustaining latch mechanisms or other locking devices for holding the wheel carrying arms in projected position. Such devices have been expensive and difficult to install, have not, in general, been capable of withstanding road shocks over extended periods of time and have applied concentrated stresses, caused by the weight of the boat and road shocks, to the boat hull resulting in damage to the hull structure.

In accordance with the present invention a simple retractible wheel structure is provided in which the wheels tend to remain in their projected or boat supporting position so long as they are in contact with the ground so as to support the boat in a manner eliminating the necessity for devices for locking the wheels in their boat supporting position and also eliminating the application of concentrated or unbalanced stresses to the boat structure. Furthermore, the wheels may be readily and freely moved between such boat supporting position and a retracted position when the boat is floating in water. This is accomplished by providing a wheel mounting structure for each side of the boat, each of which includes a wheel carrying rocker arm extending longitudinally of the boat and pivoted intermediate its ends to the boat hull by a laterally extending pivot so that the rocker arm may be freely rotated about its pivot to move the wheels into a well in the boat. The boat supporting wheels are journaled on laterally extending stub axles carried by the rocker arm and the intermediate pivot for the rocker arm is above the stub axles when the wheels are in their boat supporting position so that rotating the rocker arm through approximately one hundred eighty degrees will carry the wheels into the well referred to, such well providing sufficient clearance to enable the rocker arm to be thus rotated. The pivot for the rocker arm preferably includes a shaft journaled in bearings carried by a unitary reinforcing stress distributing member surrounding the wheel receiving well. When in its retracted position, the wheel carrying rocker arm is substantially balanced such that any suitable releasable holding device which will with-stand small stresses is suf-

2

ficient to hold the rocker arm and wheels in retracted position.

It is therefore an object of the present invention to provide an improved retractible wheel structure for boats enabling such boats to be easily converted into trailers for automobiles.

Another object of the invention is to provide a retractible wheel structure for boats in which the wheels are readily and easily moved from load supporting to retracted position and no stress sustaining locking mechanism is required to hold the wheels in load supporting position.

A further object of the invention is to provide a retractible wheel structure for boats in which the stresses due to the weight of the boat and road shocks are distributed to the boat hull in a manner avoiding concentration of such stresses.

Other objects and advantages of the invention will appear in the following description of a preferred embodiment thereof shown in the attached drawings of which:

Fig. 1 is a side elevation of a boat showing the retractible wheels of the present invention in load supporting position;

Fig. 2 is a vertical section on an enlarged scale taken on the line 2—2 of Fig. 1;

Fig. 3 is a partial vertical section taken on the line 3—3 of Fig. 2 also showing the wheels in retracted position in dotted lines;

Fig. 4 is a perspective view of a rocker arm in accordance with the present invention on a still larger scale;

Fig. 5 is a similar view of the stress distributing member which surrounds each wheel receiving well; and

Fig. 6 is a similar view of a latch mechanism for retaining the rocker arm in wheel retracted position.

Referring more particularly to the drawing, a boat having a hull 10 is illustrated in Fig. 1. The boat is provided with a trailer hitch 12 releasably attached to the bow portion of the hull and with a pair of wheels 14 at either side and beneath the hull. The wheels 14 of each pair are arranged in tandem and are journaled on stub axles 16 shown most clearly in Fig. 2. The stub axles 16 are carried by opposite ends of a rocker arm 18, one of which is positioned at each side of the boat hull. The rocker arms 18 each have an intermediate pivot shaft 20 having its ends extending laterally from the rocker arm. The shaft 20 extends through an aperture in the body of the rocker arm and also through an aperture in a laterally extending support arm 21 and has its ends journaled in bearing members 22 secured to opposite side portions of a stress distributing member 24.

The stress distributing member 24 is preferably of rectangular conformation and is preferably made up of angle iron side members 26 and similar end members 28 having their ends mitered and welded together to form an open top box-like structure also having an open bottom of less size than the open top. That is to say, the angle iron members 26 and 28 have lower inwardly extending flanges defining the bottom opening in the stress distributing member and upwardly extending outer flanges defining the top opening. The bearing members 22 are detachably secured to the inwardly extending lower flanges of the stress distributing member, for example, by bolts and extend upwardly adjacent the upwardly extending flanges of such stress distributing member.

As shown in Figs. 2 and 3, the stress distributing member 24 for each side of the boat has its lower surface positioned against the inner surface of the bottom of the hull 10 and is secured thereto, for example, by suitable bolts. An opening 30 of the same size as the

3

opening in the bottom of the stress distributing member 24 is provided in the bottom of the hull 10 at each side thereof in registry with the corresponding opening in the stress distributing member. In order to prevent leakage of water into the boat hull, a well structure surrounds each stress distributing member 24 and extends upwardly in the hull of the boat. The well structure for each side of the boat includes an inner side panel member 32 having its lower end secured to the upstanding flange of a side member 26 of the stress distributing member. As shown in Fig. 2, the panel member 32, which may be of metal or any other suitable material, may have an intermediate portion inclined toward the outer wall of the hull of the boat and an upper substantially vertically extending portion. The remainder of the well structure includes end panels 34 extending upwardly between the side panel 32 and the side of the boat hull and a removable top member or well cover 36 allowing access to the wells.

When the rocker arm is in the position shown in full line in Fig. 3 and at the left side of Fig. 2, the load on the wheels 14 at each side of the boat is transmitted to the stress distributing member 24 through the rocker arm 18 and the bearing members 22. Somewhat more of the load is transmitted to the bearing member 22 adjacent the outer wall of the hull 10 than it is to the bearing member 22 adjacent the inner side panel 32 of the well structure, since the wheels 14 are somewhat nearer the outer bearing member than they are the inner bearing member. This is advantageous as a greater portion of the load is thereby transmitted directly to the upwardly extending side wall of the boat hull. The stress distributing member 24 distributes the load longitudinally of the boat from the bearing members 22.

As long as the wheels 14 are in contact with the ground or other surface, there is no tendency for the wheels to be rotated upwardly in the well structure. The wheels may therefore be employed to support the boat while being towed by an automobile and may also be employed in launching the boat in water. As soon as the boat is floating freely, the rocker arms 18 may be rotated about their pivot shafts 20 so that the wheels are carried into their upper position shown in dotted lines Fig. 3 and also shown at the right side of Fig. 2. Rotation of the rocker arm 18 about its shaft 20 may be accomplished by removing the well covers 36 and reaching down into the well. Any suitable tool such as a strip of wood may be employed for rotating the rocker arm about its pivot shaft.

A suitable holding mechanism, such as that shown most clearly in Fig. 6, may be employed to retain the rocker arm in its upper position while the boat is floating in water. Such holding mechanism may include a bell crank 38 pivoted at 40 intermediate its ends to the side panel 32 of each well structure. The lower arm of the bell crank 38 may be provided with a laterally extending pin 42 for engagement with a notch 44 in one end of the corresponding rocker arm 18, the bell crank being urged in a counter-clockwise direction in Fig. 6 by a spring 46 connected to the other arm of the bell crank. It will be apparent that the spring 46 will cause the pin 42 to engage in the notch 44 to hold the rocker arm 18 in inverted or retracted position. A pull rod 48 connected to such other arm of the bell crank and sliding in a guide 50 secured to the panel member 32 may be employed to withdraw the pin 42 from the notch 44 and release the rocker arm.

Upon returning the wheels 14 to their lower position by rotating the rocker arm 18 about its pivot shaft 20, the wheels can be employed in withdrawing the boat from water. It will be apparent that the wheels will tend to remain in their lower position even when the boat is floating in water since the center of gravity of the assembly including the wheels and rocker arm is

4

below the pivot shaft 20 when the rocker arm is in its lower position. It will also be apparent that the retractable wheels structure of the present invention may be installed in new boats as they are being manufactured or that such structure may be sold as an attachment for installation in existing boats.

I claim:

1. A retractable wheel structure for a boat, said structure comprising an elongated stress distributing frame for reinforcing the edges of an opening in the bottom of a hull of a boat, said frame having laterally spaced longitudinally extending side members and laterally extending end members defining an opening through said frame, an elongated rocker arm having a load supporting position in which said rocker arm extends longitudinally of said frame, said rocker arm being pivoted intermediate its ends to the central portions of said side members for movement about a pivotal axis extending laterally of said side members, said rocker arm having load supporting wheels journaled on the ends of said rocker arm for rotation about axes extending laterally of said rocker arm, the axes of said wheels being spaced equal distances from said pivotal axis and being positioned below said pivotal axis to project the lower portion of said wheels below said frame when said rocker arm is in said load supporting position, said rocker arm being rotatable from said load supporting position to a wheel retracting position by pivotal movement about said pivotal axis through an angle of approximately 180 degrees to move said wheels through said opening in said frame and position at least the major portion of said wheels above the lower portion of said frame.

2. A retractable wheel structure for a boat, said structure comprising an elongated stress distributing frame for reinforcing the edges of an opening in the bottom of the hull of a boat, said frame having laterally spaced longitudinally extending side members and laterally extending end members defining an opening through said frame, an elongated rocker arm having a load supporting position in which said arm extends longitudinally of said frame, said rocker arm being pivoted intermediate its ends to the central portions of said side members for movement about a pivotal axis extending laterally of said side members, said rocker arm having laterally extending stub axles carried by its ends, load supporting wheels journaled on said stub axles, the axles of said wheels being spaced equal distances from said pivotal axis and being positioned below said pivotal arm a distance approximately equal to the radius of said wheels to project the lower portion of said wheels below said frame when said rocker arm is in said load supporting position, said rocker arm being rotatable from said load supporting position to a wheel retracting position by pivotal movement about said pivotal axis through an angle of approximately 180 degrees to move said wheels through said opening in said frame and position at least the major portion of said wheels above the lower portion of said frame.

3. A retractable wheel structure for a boat, said structure comprising an elongated stress distributing frame for reinforcing the edges of an opening in the bottom of a boat, said frame having laterally spaced longitudinally extending side members and laterally extending end members defining an opening through said frame, an elongated rocker arm having a load supporting position in which said rocker arm extends longitudinally of said frame, said rocker arm being pivoted intermediate its ends to the central portions of said side members for movement about a pivotal axis extending laterally of said side members, said rocker arm having load supporting wheels journaled on the ends of said rocker arm for rotation about axes extending laterally of said rocker arm, the axes of said wheels being spaced equal distances from said pivotal axis and being positioned below said pivotal axis a distance approximately equal to the radius of said wheels to project the lower portions of said wheels below

5

said frame when said rocker arm is in said load supporting position, said rocker arm being rotatable from said load supporting position to a wheel retracting position by pivotal movement about said pivotal axis through an angle of 180 degrees to move said wheels through said opening in said frame and position at least the major portion of said wheels above the lower portion of said frame, and means for releasably locking said rocker arm in said wheel retracting position.

5

6

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