April 13, 1965 G. H. NOLF 3,177,839

BOAT-DOCKING APPARATUS WITH PRESSURE-RESPONSIVE GRAPPLE

Filed Oct. 11, 1963

Fig. 1.

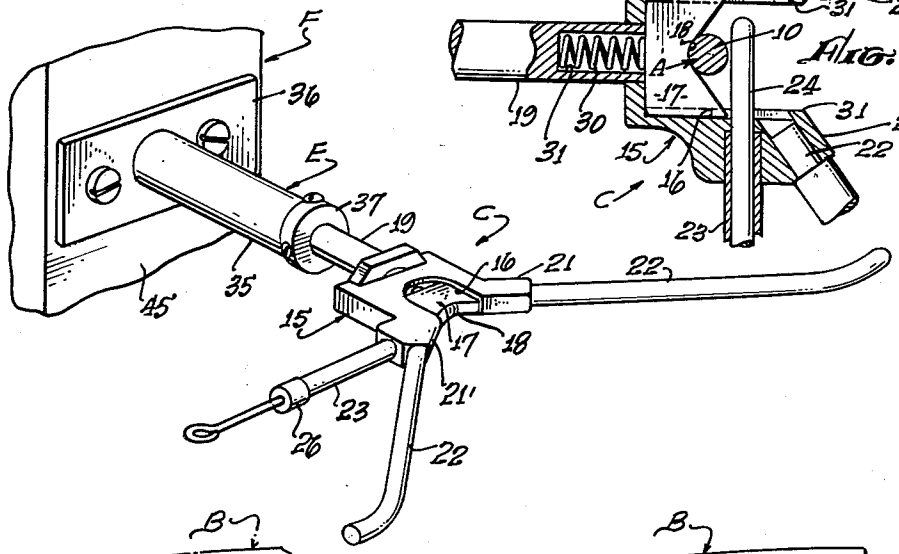


Fig. 4.

Fig. 2.

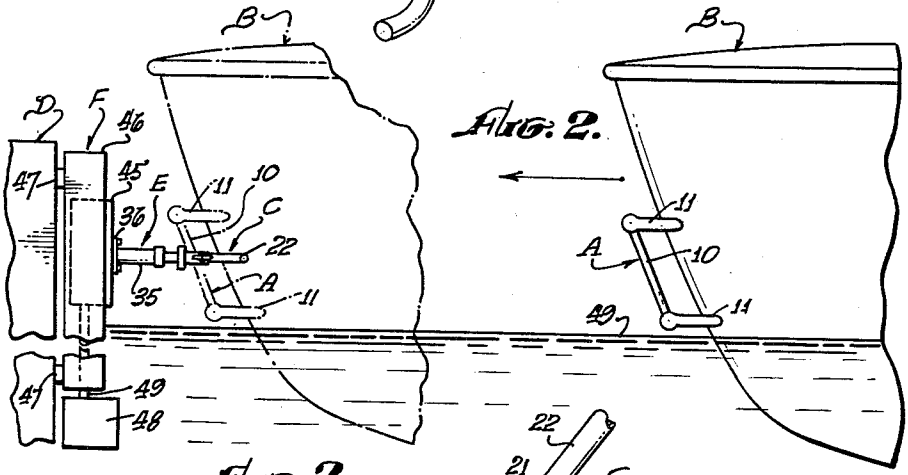
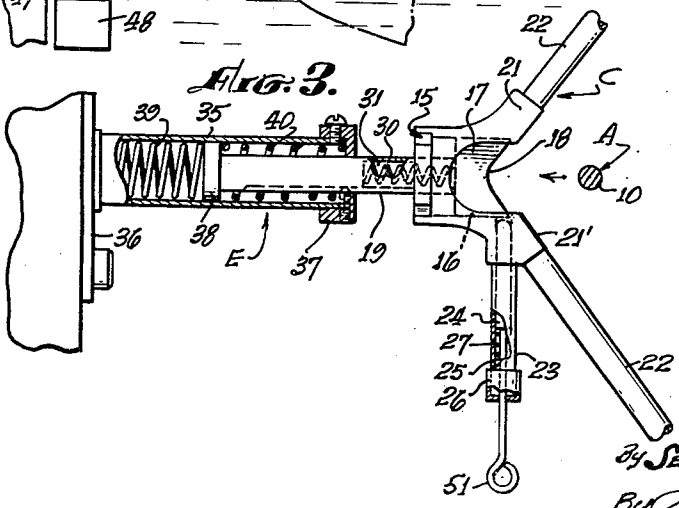


Fig. 3.



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BOAT-DOCKING APPARATUS WITH PRESSURE-RESPONSIVE GRAPPLE

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This invention relates to boat docking apparatus of the type disclosed in my Patent No. 3,060,885, issued October 30, 1962, and has as its general object to provide a docking device of this general type, with improved features of construction and operation. Specifically, the invention contemplates the following objects:

(1) To provide a docking device automatically operable in response to entering movement of a docking rail on the bow of a boat;

(2) To provide such a docking device having means for automatically guiding the docking rail of the boat into position to be grasped by a pressure-responsive grapple;

(3) To provide such a docking device embodying a grapple that is automatically operable in response to the pressure of an entering docking rail to grasp and hold the rail so as to tether the boat to a dock;

(4) To provide such a docking device having cushioning means to absorb the shock of entering movement of the docking rail;

(5) To provide such a docking device having means for manually releasing the docking rail from the grapple;

(6) To provide such a docking device having means for automatically adjusting the level of its grapple to the proper level for engagement of the docking bar on the bow of a boat;

(7) To provide such a docking device which is of simplified and lower-cost construction than former devices of this general type.

Other objects and advantages will become apparent in the ensuing specification and appended drawing in which:

FIG. 1 is a perspective view of the improved grapple mechanism of my docking apparatus;

FIG. 2 is a side elevational view of the same as embodied in an installation on a dock, and illustrating positions of approach and docking of a boat equipped with the docking rail thereof.

FIG. 3 is a plan view of the apparatus, shown fragmentarily and with portions shown in section to illustrate the construction; and

FIG. 4 is a fragmentary detail sectional view showing the docking rail of the boat latched into and held by the grapple device.

Referring now to the drawings in detail, I have shown therein, as an example of one form in which the invention may be embodied, a docking apparatus comprising, in general, a docking rail A attached to the bow of a boat B to be docked; a grapple unit C positioned to receive and grasp the rail A in order to moor the boat to a dock D (FIG. 2); a cushioning mounting E supporting the grapple C; and a self-leveling support F carrying the cushioning mounting E and grapple C at a level constantly related to the water level and thereby constantly related to the level of the grapple rail A.

Docking rail A may comprise simply a bar **10** secured by means of vertically spaced brackets **11** to the bow of the boat B.

The grapple C comprises a yoke **15** embodying laterally spaced slideways **16** in which is slidably mounted a trigger **17** having a V-shaped notch **18** in its forward end. Trigger **17** is mounted on the forward end of a shank **19** the rearward portion of which is slidably mounted in the cushioning unit E.

The yoke **15** has a pair of forwardly diverging bosses **21, 21'** to which are secured guide arms **22**. Boss **21'** is enlarged to provide a mounting for a laterally-projecting latch barrel **23** (FIG. 4) in which is slidably mounted a latch plunger **24**. Secured to the rear end of plunger **24** is a release stem **25** which extends through a cap **26** secured to the rear end of barrel **23**. A coil spring **27** is interposed under compression between the cap **26** and the rear end of plunger **24** and loads the plunger for projection from a retracted position seen in FIG. 3 to a projected position seen in FIG. 4. In the projected position, the plunger **24** is adapted to latch the docking rail **10** between itself and the trigger **17** as shown in FIG. 4. In its latched position, the plunger **24** engages a forward extremity of the adjacent side of trigger **17** to hold the trigger in the retracted position shown at FIG. 4, until the plunger **24** is withdrawn to its retracted position shown in FIG. 3, whereupon the trigger **17** will be projected forwardly by a coil spring **30** disposed in a bore **31** in the forward end of shank **19** and engaged under compression between the bottom of bore **31** and the rear end of trigger **17**. The limit of such forward projection is determined by engagement of the forward corners of trigger **17** against abutment lips **31** (FIG. 4) which overhang the forward extremities of slideways **16**.

In the forwardly projected position of trigger **17**, the end of latch plunger **24** will engage against the adjacent side of the trigger and thereby be held in its retracted position shown in FIG. 3 until the impact of docking rail A against the trigger **17** forces the latter rearwardly against the yielding opposition of coil spring **30** to the retracted position of the trigger, whereupon the forward end of plunger **24** will clear the adjacent forward corner of the trigger **17** and will be projected by its spring **27** to the latching position shown in FIG. 4.

The shock mount E comprises a cylinder **35** having at its rear end a mounting plate **36** whereby it may be securely attached to the leveling mount F. Shank **19** is slidably extended through a cap **37** secured to the forward end of cylinder **35** and has as its rear end a head **38** which is slidably guided within the cylinder **35**. A relatively heavy shock spring **39** is disposed between the head **38** and the closed rear end of cylinder **35**, to absorb the shock and momentum of the boat B as it approaches the docking position. A relatively light coil spring **40** is interposed between the head **38** and the cap **37**, to absorb the recoil of the shank **19** after the initial shock has been fully absorbed.

The leveling mount F may be the same as that shown in my prior patent above identified, comprising a slide shoe **45** to which the mounting flange **36** of shock mount E is secured, and a slideway **46** in which the slide **45** is vertically slidable, the slideway **46** having suitable means **47** for attaching it to the dock D, and a float **48** attached to the slide shoe **45** by a stem **49** extending upwardly into the slideway **46**, the float **48** having sufficient buoyancy to support the weight of the shock mount E and grapple C at a constant height above the water line **49** (FIG. 2).

In the operation of the device, the boat can be released from its mooring by simply grasping a suitable handle **51** at the outer end of latch release stem **25** and pulling the plunger **24** outwardly until its forward end is cleared by the trigger **17**, whereupon the latter will be spring-propelled forwardly to its position shown in FIG. 3 in which it in turn will latch the plunger **24** in the retracted position to which it has just been moved. At the same time, the docking rail A is released from the grapple C, freeing the boat from its mooring.

When the boat is returned to the dock, it will be steered into a position in which its docking rail A is received between the guide arms **22** of grapple C, and will then be permitted to slowly move into engagement with the trigger

17, the arms 22 functioning to guide the rail bar 10 into the notch 18 of the trigger 17. The continued movement of the boat will cause the trigger 17 to be retracted by the pressure applied through the docking rail A, until the forward adjacent corner of trigger 17 clears the forward end of plunger 24, whereupon the latter will be spring-propelled to the latching position shown in FIG. 4, thereby mooring the boat to the dock through the shock mount E and the floating mount F. The forward motion of the boat and the docking rail A will be arrested and their momentum will be absorbed by the shock spring 39 of the shock mount E, and the recoil will be absorbed by the recoil spring 40. The boat is then moored until released by actuating the pull stem 25.

The device of my invention can be modified for use as a lock on a boat trailer hitch.

I claim:

1. Boat docking apparatus comprising: a docking rail attachable to the bow of a boat in a substantially vertical plane; a mount attachable to a dock and including a cylinder projecting horizontally forwardly when thus attached; a plunger slidable in said cylinder and including a shank projecting from the forward end of the cylinder; resilient shock-cushioning means interposed between the rear end of the plunger and the rear end of the cylinder; a yoke secured to the forward end of said plunger, said yoke comprising laterally spaced parallel ways; guide arms secured to said ways and projecting therefrom in forwardly diverging relation in a horizontal plane; a trigger having in its forward end a notch to receive said docking bar, said trigger bridging between and having parallel side marginal portions slidably mounted in said ways, said guide arms being arranged to guide said docking bar against the forward end of said trigger and into said notch so as to automatically effect rearward retraction of said trigger in response to boat-docking movement; a cocking spring engaging the rear end of said trigger and loading

it for forward projection to a cocked position for engagement by said docking rail; and a latch comprising a guide barrel attached to a side of said yoke and projecting transversely to the axis of said cylinder, a latch bolt slidable in said barrel, said bolt having a forward end abutting a side of said trigger when the latter is in said cocked position whereby said bolt is held in a retracted position, a latch spring engaged under compression between the rear end of said bolt and the end of said barrel and loading said bolt for projection from said retracted position past the forward end of said trigger and across said docking bar so as to latch the same to said yoke when said trigger is retracted by said docking bar.

2. Docking apparatus as defined in claim 1, including a pull stem attached to said latch bolt and projecting through the end of said barrel for retracting said latch bolt, whereby said trigger will be automatically re-cocked by its said cocking spring.

3. A docking apparatus as defined in claim 1, wherein said cocking spring is mounted in a bore in the forward end of said shank.

4. A docking apparatus as defined in claim 1, wherein said plunger has a head slidably fitted within said cylinder, and further including a recoil spring engaged between said head and the forward end of said cylinder for checking rebound of said plunger and yoke.

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