

Sept. 6, 1966

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3,270,705

BOLLARDS

Filed Oct. 22, 1965

2 Sheets-Sheet 1

FIG. 1

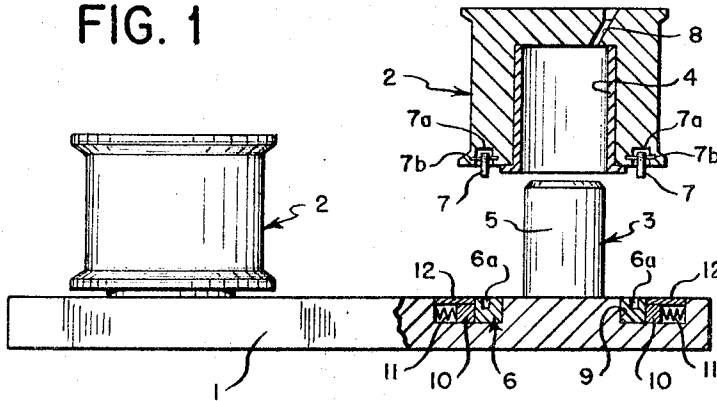


FIG. 2

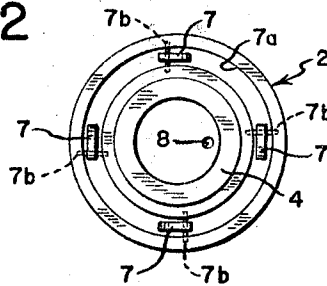
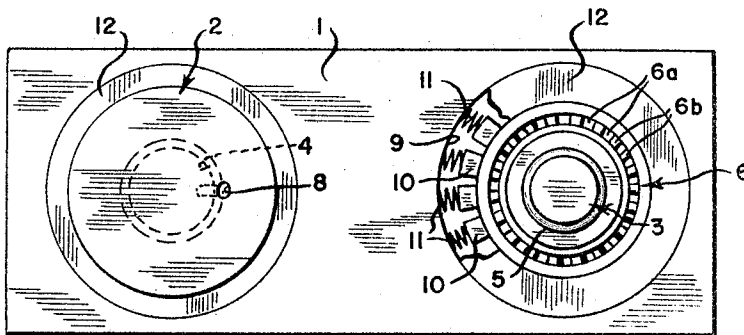


FIG. 3



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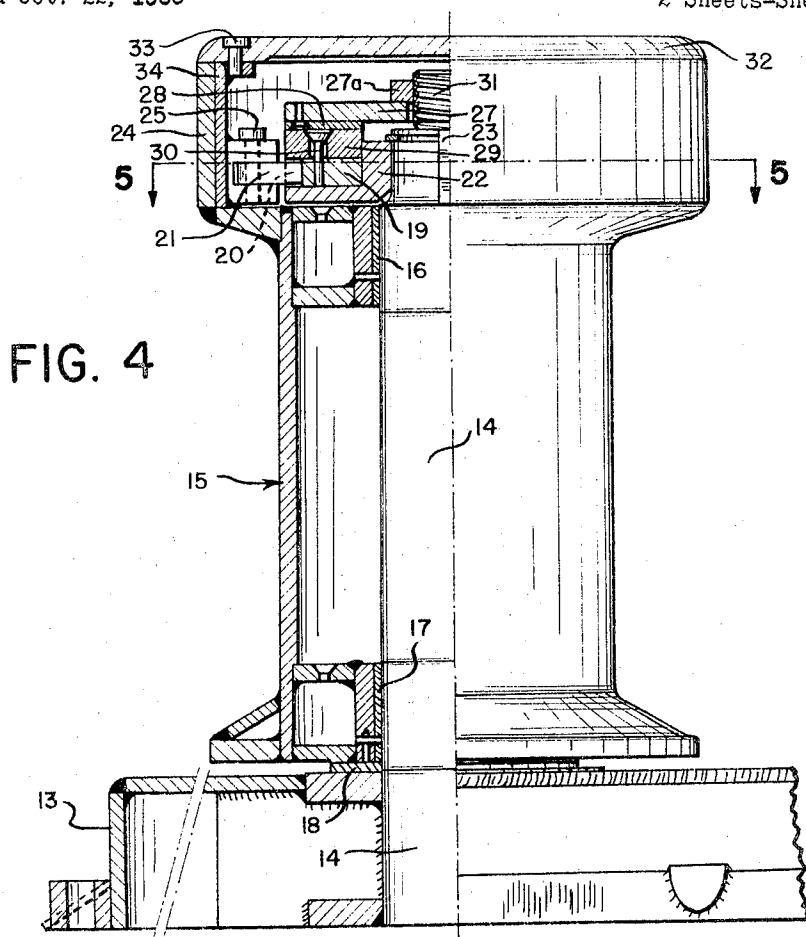


FIG. 4

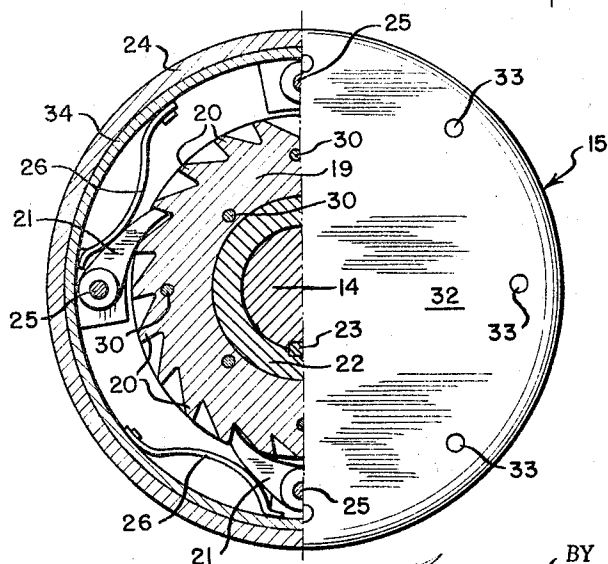


FIG. 5

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BOLLARDS

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8 Claims. (Cl. 114-218)

This application is a continuation-in-part of applicant's pending United States patent application Serial No. 396,683, filed September 15, 1964.

The present invention relates to an improvement in bollards on ships for fastening ropes, hawsers and the like. Such bollards usually consist of a footplate with two fixed posts around which a rope or hawser may be laid in loops and thus fastened. When hauling in a mooring hawser, the hawser is wound in by means of a winch, and the hawser must then be laid in the above mentioned loops around a bollard for fastening. This required a considerable effort from a number of the crew, and even then one will have no assurance that the hawser will be sufficient taut.

To overcome this difficulty, bollards have previously been proposed with a rotatable post, enabling the hawser before hauling in, to be wound in the necessary loops around the posts, the posts rotating in one direction during the hauling in. When the hawser has been hauled in, the rotatable posts are then locked by, for example, a separate part which is pushed through holes in the post and into corresponding holes in the footplate. This operation also requires several men, and the loose parts are liable to be lost and not available when required. In such an event, a bollard of this type would be completely useless for exerting any firm hold on a line or hawser.

To eliminate these disadvantages, it has been previously proposed to provide the footplate and the posts with a ratchet mechanism which permits the post to rotate in one direction, while locking the post against rotation in the other direction. With this construction it will then be possible to haul the rope or hawser in by means of a winch while the posts of the bollard rotate in one direction. When the rope is sufficiently taut, the winch may be used for other purposes since the bollard will hold the line or hawser in a safe manner without letting it out. This mooring operation or any other operation in which it is necessary to fasten the hawser by means of bollards, may with this equipment be carried out with the aid of only a few men.

However, as the vessels increase in size, it becomes more and more difficult to feed out rope or hawser when required, for example, during unloading, and in many cases the only solution is to cut the expensive hawser in order to save the ship because it would have been impossible to let out the tensioned hawser from the bollard.

The main object of the present invention is therefore, to eliminate this disadvantage in order to improve the safety on board a ship, and this, in accordance with the invention, is achieved by providing a bollard construction in which the posts may rotate freely in one direction and are locked against rotation in the other direction to a very large extent, but are permitted to rotate also in the latter direction when required, for example, when subjected to undue loads. A brake mechanism is provided to release the posts to rotate, which will pay out the required length of hawser or rope automatically, thus eliminating any dangers for the ship as well as for the crew.

The invention thus comprises an improvement in bollards having one or more posts around which a line, hawser or rope may be wound, the posts being rotatable in one direction but locked against rotation in the other direction by means of a ratchet mechanism with ratchet teeth, and pawls operated in such a manner that they engage the ratchet teeth, and is mainly characterized in that

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the ratchet teeth are arranged on a rotatable ring which is subjected to the action of a powerful brake which may be adjusted to release the ratchet ring on the application of a predetermined tension in the hawser.

A preferred embodiment of the invention is characterized in that the brake member or lining thereof is pressed against a surface of the ratchet ring.

A modification is possible and is characterized in that the pawls are arranged on a rotatable ring acted upon by the brake, while the ratchet teeth remain stationary.

Further features and details of the invention will be evident from the following description with reference to the accompanying drawings on which:

FIG. 1 is a side view of one form of bollard, provided with rotatable post members, one of which is shown raised and in section;

FIG. 2 is a bottom view of one of the rotatable post members shown in FIG. 1;

FIG. 3 is a top view of the bollard of FIG. 1 with one post member removed;

FIG. 4 is a broken elevation view of a preferred form of bollard post construction according to the invention, shown in half vertical section; and

FIG. 5 is a half sectional view taken on the line 5-5 of FIG. 4.

In the embodiment shown in FIGS. 1 to 3 the bollard comprises a footplate 1, which may be mounted in an expedient position on the deck of a ship. The bollard has two rotatable post members or drums 2 each having a bearing liner 4 fitting over a bearing surface 5 of a post shaft 3. The footplate 1 has under each drum 2 a rotatable ratchet ring 6 comprising a part of a ratchet mechanism and includes a series of ratchet teeth 6a alternating with similarly shaped pockets 6b in the upper surface of the ring 6. This ratchet ring 6 cooperates with pawls 7 on the bottom of the post member 2. As will be seen in FIGS. 1 and 2 four such pawls are mounted in a circular groove or section 7a on radially-extending pivot pins 7b. The number of pawls 7 will depend on the force which will act on the bollard. An oil-hole 8 is provided in the rotatable post member 2 for lubricating the bearing surfaces.

In order to enable the post members of the bollard to pay out hawser or line when subjected to excess loads, the ratchet member 6 is formed as a rotatable ring located in an annular recess 9 in the footplate 1. The ring 6 is externally acted upon by brake blocks 10 by means of springs 11 (FIGS. 1 and 3), both located in the recess 9. The brake mechanism is provided with a cover 12. By distributing the brake blocks or linings 10, evenly around the circumference of the ratchet ring 6, the wear on the different components during use will be reduced substantially.

The embodiment illustrated in FIGS. 4 and 5 is made up of elements welded together as shown. In these views a footplate 13 carries a fixed shaft 14 on which, a rotatable drum 15 is mounted by means of upper and lower bearings 16, 17. The drum 15 rests on a bearing plate 18.

The ratchet mechanism shown in FIGS. 4 and 5 comprises a rotatable toothed ratchet ring 19 having peripherally projecting teeth 20 cooperating with pawls 21. The ring 19 is mounted on the laterally extending portion of an annular support 22, the hub of which is fixed to the upper portion of the shaft 14 by a key 23 and held down by a key ring as shown. The pawls 21 are mounted in the enlarged head portion 24 of the drum 15 on vertical pivot pins 25 and biased inwardly toward the teeth 20 by springs 26 (FIG. 5). The pivot mountings for the pawls 21 and the springs 26 are attached to a ring side plate 34 fixed inside the head 24.

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The brake for the ratchet mechanism is shown in FIG. 4 and comprises an annular disc brake plate 27 having an attached lining 28 bearing on and resting on a brake lining 29 riveted to the ratchet ring 19 by rivets 30. The plate 27 extends around and is fixed against rotation relative to the externally-threaded top end part 31 of the shaft 14 by lugs extending inwardly from the plate 27 into vertical slots in the shaft part 31, or by other suitable lock means. Pressure is applied to the top of the plate 27 by a nut threaded on the part 31 and this nut is used to apply the desired braking force and to preadjust and preset the brake.

The enlarged head portion 24 of the drum 15 is provided with a cover plate 32 secured in place by removable fastener studs 33. Oil holes for lubricating the bearings 16, 17 and 18 are shown.

In the embodiment shown in FIGS. 1 to 3 and pawls 7 are gravity actuated and are respectively pivotable about axes which permit them to ride over the ratchet teeth 6a when the rotatable post member or drum 2 is rotated in one direction. In the embodiment shown in FIGS. 4 and 5 the action is similar with the spring biased pawls. When an excessive force is applied in the opposite direction the pawls, in both embodiments, engage the ratchet teeth to prevent relative rotation in that direction but the brakes release the rotatable drums until a predetermined tension is again established in the hawser looped around the drums.

The brake may be adjusted by means of a handle or the like on top of the post, and in a further modification the pawls may be arranged on a rotatable ring acted upon by the brake while the ratchet teeth remain stationary.

The example shown will merely serve to illustrate the invention, and forms no limitation for same as details and components will vary from one type of bollards to another. The basic feature, is, however, that the bollard is to have rotatable post member with free rotation in one direction and a heavily braked rotation in the other direction.

I claim:

1. In a bollard for a ship including a stationary member and a post member rotatably mounted thereon round which a line, hawser or rope may be wound, in which the post is rotatable in one direction but locked against rotation in the other direction by means of a ratchet mechanism including ratchet teeth and cooperating pawls operable in such a manner that they engage the ratchet teeth and prevent relative movement between the pawls and ratchet teeth, the improvement in which the ratchet teeth are carried by one of said members and the pawls are carried by the other member, and brake means acting on a portion of the ratchet mechanism to normally prevent

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rotation of the post member in said other direction but adapted to permit its rotation in that direction on the application of a predetermined force tending to rotate the post member of the bollard when held by the ratchet mechanism.

2. A bollard as claimed in claim 1, in which the ratchet teeth are carried by one part of the ratchet mechanism and the pawls are carried by a separate part of the ratchet mechanism, one of said parts being fixed with respect to the member by which it is carried while the other part is rotatable relative to the other member but normally held against rotation relative to said other member by the brake.

3. A bollard as claimed in claim 2, in which the stationary member is a shaft on which the post member is rotatably mounted and in which said ratchet mechanism is located at the upper portion of the shaft within the post member, and in which the brake means is a disc brake.

4. A bollard as claimed in claim 3, in which said other part acted on by the disc brake is carried by the upper portion of the shaft.

5. A bollard as claimed in claim 4, in which the pawls are located in the inner periphery of the post member and the ratchet teeth are located on the periphery of a ring carried by the upper portion of the shaft.

6. A bollard as claimed in claim 1, including means for adjusting the brake to apply the desired force.

7. In a bollard for a ship including a foot-plate member and a post member carried thereby and around which a line, hawser or rope may be wound, in which the post member is rotatable in one direction but locked against rotation in the other direction by means of a ratchet mechanism including pawls operable in such a manner that they engage ratchet teeth of the ratchet mechanism, the improvement in which a ring of ratchet teeth is carried by one of said members, a ring of pawls carried on the other member, and brake means acting on a part of the ratchet mechanism to normally prevent rotation of the post member but adapted to permit rotation of the post member on the application of predetermined force tending to rotate the post member when held by the ratchet mechanism.

8. A bollard for a ship as claimed in claim 7, in which the ring of ratchet teeth is mounted on the footplate member and the ring of pawls is carried by the post member.

No references cited.

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B. BELKIN, *Assistant Examiner*.