Abstract: Mooring device for boats comprising two main parts, the first being a tug and stretch damper part (5) wholly or partly made in an elastic material and being fixed to a foundation (6), for example a quay, so that it stands approximately vertically. Furthermore tug and stretch damper part (5) may be hollow so that the other main part, a mooring line (2), can be thread in and out of it. The mooring line (2) may extend and/or be attached in different ways, in order to allow the mooring desired degree of elasticity. The mooring device (1) will lower the risk of causing injuries to persons and/or causing material damages when a boat is moored.
Mooring device for boats

Introduction

By modern quays with several piers lying low in the sea, it is often difficult, in particular for high boats and elderly people to grasp the ends of the mooring lines which lie on the piers when the boat is to be moored. The boat deck and pier may often be wet and slippery, and the situation may be worsened by wind and waves, so that it is easy to fall when one bends down to reach the end of the mooring line.

Furthermore it is a point that the mooring has an appropriate elasticity, which will reduce the load on fastenings, as well as pier, boat and mooring lines. Empirically the elasticity should on the other hand not be too high, as the boat may move too much and hit the pier, other boats or something else.

State of the art

It is well known to use rubber dampers in connection with mooring lines to avoid sharp impact in mooring lines and boat fastenings. However these are not designed to raise the mooring line, making it easier available.

Furthermore there are mooring devices which are based on flexible arms which hold the moored boat in position (US 5 425 324). This holds the boat in position from one of the sides, something which makes it necessary with a solid dimensioning of the lifting arm and the fastening of this, which gives increased cost. In order to achieve the necessary armstrength, use of metal or another hard material in the arm will be necessary, which easily may lead to damages on the boat or injuries to the people when mooring under difficult conditions.

GB 2226998 describes a pole which holds the mooring line up in a suitable height for gripping, however this has limited possibilities for adapting the elasticity, since a stiff pole is used so that the elasticity is only achieved in connection with the fastening device in the pier.

There are also devices for lifting the mooring line to a suitable height (US 4 676 182), but in this case the lifting device do not serve to dampen movement from the boat.

Objectives

One object of the present invention is to provide a boat mooring with a suitable and adjustable degree of elasticity in the fitting. It is important to provide a certain degree of elasticity so that the load on mooring line and fastenings does not become too high, at the same time the resistance must be sufficient so that the movement of the boat not becomes so large that the boat or pier is damaged by the movement which arises. Among parameters which count when it comes to decide
how elastic the mooring should be, are the weight of the boat, how much wind there is at the actual place, and available space.

Another object of the present invention is to reduce the risk for falling and injury and/or preventing material damages when a boat is to be moored. A further object is to make the mooring line more available, by lifting it from the pier.

It is also a purpose to create a mooring device which is cheap and has as few parts as possible.

The invention

The invention relates to a mooring device for a boat, as described in the preamble of claim 1, hereafter referred to as mooring device. It is arranged to lift the mooring line up to common height for gripping, so that the end of the line becomes easily available, and it introduces a certain amount of elasticity, which reduces the load on lines and fastenings. It also allows a simple adjustment of the degree of elasticity.

The mooring device consists of two main parts, the first being a tug and stretch damper, partly made in an elastic material which is attached to the foundation, for example a quay, so that it stands approximately vertically. At the lower part of the tug and stretch damper it may be provided with an approximately right angle beyond which the damper has the shape of an attachment plate, for being attached close to, or in connection with, the anchoring point. The attachment plate does not have to be made of an elastic material, even though this often may be practical, while the upper part of the tug and stretch damper must be made of an elastic material.

In an alternative embodiment the attachment plate is replaced by a separate attachment device, which is fastened at the side of the quay, and which also may have the function of a fender. This attachment device may also be used in cases where one wish to fasten the mooring line in the quay itself, or a suitable anchoring point, one just has to assure that the line extends from the tug and stretch damper to such an anchoring point. Furthermore the vertical upper part of the tug and stretch damper has lateral through holes at even spaces. Furthermore it is hollow, so that the other main part, the mooring line may extend through it.

The tug and stretch damper may have different embodiments, it may for example be tubular, but it does not need to be, the cross section in form of a square or even a cross section specially designed for this purpose is possible. Further the hardness of the material may be chosen so that desired stiffness and elasticity are achieved. With such an alternative one may on a simple and industrial basis choose the dimensions of the tug and stretch damper part in order to adapt it to for example thicker dimensions of the mooring line, meant for bigger boats.
The tug and stretch damper part is fixed with the described attachment plate or an alternative attachment device, close to or in connection with the anchoring point itself which will take the main load of the mooring. The mooring line is fixed to the anchoring point at the quay, and extends from there into the tug and stretch damper and is wound a desired number of times around and through the upper part of the latter, before being extended into the tug and stretch damper again and being further extended through the hollow space of this before finally emerging at its top at a suitable gripping height. The gripping height may easily be adapted, either by cutting the upper part of the tug and stretch damper at a suitable height, or by moving the tug and stretch damper up or down in an alternative attachment device as described previously.

The purpose of the through holes is to be able to vary the degree of elasticity, since the manner the line is led through the tug and stretch damper decides how much flexibility or elasticity the connection shall introduce. If the mooring line is wound several times around the tug and stretch damper before it is extending out of its top, a larger elasticity is achieved. If, on the other side, the line is extending more straight through from hole to hole, a stiffer connection is achieved. The line may also be led back and forth between the different through holes to achieve the desired flexibility. The number of holes, or whether there are holes at all, is something which must be adapted according to the desired elasticity adaptation. There is no need to have holes, if one does not need to adapt the elasticity.

The implementation in an elastic material also has the advantage that the material is gentle to the surroundings. People and animals will for example not be so easily injured, if they by an accident should fall over or in another way come in sudden contact with such a mooring device. Neither will a boat so easily become scratched from contact with such a mooring device.

Method of use

When a boat is being moored, the person mooring the boat grips the mooring line which extends from the upper part of the tug and stretch damper, in order to fix it either directly to the boat or to another mooring line which in turn is fixed to the boat.

This is simply a stretch mooring, which means that the boat is not restricted from driving against the mooring device by the mooring device. Avoiding movement in this direction is achieved by a suitable fender between the boat and quay, or by a similar mooring device at the opposite side of the boat. Movement in one direction or the other sideways compared to the boats normal direction of movement will then be prohibited by the mooring device on one or the other side of the boat. Movement forward or backwards compared to the boats normal direction of movement is prohibited by a balanced tightening of the mooring devices at both sides of the boat.
After the boat has been fixed by a sufficient number of points, with or without fenders against the quay, a suitable tightening of the mooring lines is performed, so that the boat is secured by a suitable fixed as well as elastic mooring.

The invention provides the advantage of improved safety by a simple and practical mooring system, which at the same time is cost effective since one component both lifts the mooring line and provides the needed elasticity in the connection. The solution also provides adaptations related to varying water level.

List of Figures

The individual components are illustrated by Figures, which show examples of how the mooring according to the invention is to be made, but the invention is not limited to the embodiments of the Figures. Equal numbers on the different drawings denote the same part.

Fig. 1 shows a mooring device made in elastic material
Fig. 2 shows a mooring device made in elastic material
Fig. 3 shows the same mooring device as in the Figures 1 and 2, but here in a stretched condition
Fig. 4 shows the mooring device with an alternative attachment device
Fig. 5 shows details of an alternative attachment device
Fig. 6 shows an example of a boat moored by help of the present mooring device.

Description of the Figures

In the following each individual Figure is described more in detail.

Fig. 1 is a side view of a mooring device 1, made in an elastic material. The elastic material may be rubber or plastic, possibly with a reinforcement insert. The mooring device 1 consists of a tug and stretch damper part 5 and a attachment plate 3 and a mooring line 2. The mooring device 1 is attached to a quay 6 via the attachment plate 3. The tug and stretch damper part 5 has through holes 10 through which the mooring line 2 may be thread. The mooring line 2 is fixed to the anchoring point 4 and extends into the tug and stretch damper 5 via one of the holes 10. The mooring line 2 further extends through the tug and stretch damper 5 and out of its upper part. This is the mooring which gives the smallest stretch elasticity.

Fig. 2 is a side view of the mooring device 1, made in elastic material. The mooring device 1 consists of the tug and stretch damper part 5, an attachment plate 3 and a mooring line 2. The mooring device 1 is fixed to a quay 6 via the attachment plate 3. The tug and stretch damper part 5 has through holes 10 through which the mooring line 2 may be thread. The mooring line 2 is fixed to the anchoring point 4 and extends into the tug and stretch damper 5 via one of the through
holes 10. The mooring line 2 extends out of the tug and stretch damper, for example via the through hole at the opposite side, and is thereafter given some turns around the tug and stretch damper 5 before being extended into the tug and stretch damper again. From then the mooring line extends out of one of the other through holes 10, and is further thread a desired number of times out and in/forward and back through several such holes 10. In this way a larger degree of elasticity is achieved. Finally the mooring line 2 extends out of the tug and stretch damper 5 at its upper part.

Fig. 3 is a side view of the tug and stretch damper shown in Figures 1 and 2. In this case the line 2 is stretched, and we can see that the tug and stretch damper part now points in the same direction as the stretching forces on the line. It is also indicated that the stretch forces in the line causes the tug and stretch damper 5 to be pressed together. The mooring line 2 is in this case wound a number of times around the tug and stretch damper part 5 to give a moderate degree of elasticity.

Fig. 4 is a side view of a mooring device where the tug and stretch damper part 5 is fixed to the side of the quay 6 with a separate fastening device 15 which for example may be fixed to the quay by means of bolts 16. The separate fastening device 15 may be made in an elastic material, for example rubber or plastic, possibly with a reinforcement inlay, so that it also may function as a fender.

Fig. 5 is a top view of the fastening device for the tug and stretch damper 5 in Fig. 4. The tug and stretch damper 5 is here shown with a circular cross section, but the fastening device 15 may be adapted to other cross section shapes if there is a desire to do so.

Fig. 6 is a top view of a boat which is moored to a quay 6 with several mooring devices 1 according to the present invention. The boat has four mooring points, one at each side, close to the bow, and one at each side close to the stem.
Claims

1. Mooring device for boats comprising two main parts, a tug and stretch damper part (5) which is adapted for mounting near the edge of a quay (6), and a mainly stretch-resistant line part (2) the line part (2) having an end which in its unused position is at a level above the attachment foundation, providing a suitable gripping height, and being arranged for attachment to a mooring line from a boat (9), or to the boat (9) itself, characterized in that the tug and stretch damper part (5) is elastic and that the line part (2) is arranged to cooperate with the tug and stretch damper part (5) so that the mooring achieves an adjustable increase in stretch elasticity.

2. Mooring device according to claim 1, characterized in that the line part (2) is a rope or a ribbon.

3. Mooring device according to claim 1 and 2, characterized in that the tug and stretch damper (5) at its lower end ends up in a attachment plate (3), which is suited for attachment to a foundation (6), in or close to a main anchoring point (4) of the mooring line, the attachment plate (3) being at an approximately right angle in relation to the tug and stretch damper part (5), the tug and stretch damper (5) standing approximately vertically with a suitable height so that a person about to moor a boat easily can grasp the line part (2) which extends from the upper part of the tug and stretch damper (5).

4. Mooring device according to claim 1 - 3, characterized in that the tug and stretch damper (5) is made in an elastic material, the hardness of the material being chosen to achieve the desired properties.

5. Mooring device according to claim 1 - 4, characterized in that the tug and stretch damper (5) is hollow, so that the line part may extend through it.

6. Mooring device according to claim 1 - 5, characterized in that the tug and stretch damper (5) has a freely selectable number, zero included, of lateral through holes (10) at even or uneven intervals, so that the line part (2) may extend from the anchoring point (4) and be wound a freely selectable number of times around the tug and stretch damper (5), and/or may be thread back and forth between different holes (10), if it is more than one hole, before being extended into the interior of the tug and stretch damper for eventually extending therefrom, so that the elasticity of the tug and stretch damper is partly transferred to the line part (2).
7. Mooring device according to claim 1 - 6, **characterized in** that the tug and stretch damper (5) has a cross section which is circular, square or has a shape which is specially designed for the purpose.

8. Mooring device according to claim 1, 2, 4 - 7 **characterized in** that the tug and stretch damper part (5) do not end in a attachment plate (3), but is attached to the quay (6) by means of a separate attachment device (15), which, depending on the choice of material, also can serve as a fender, which is designed as an attachment clamp for attachment to the side of the quay (6), in or close to the main anchoring point (4) of the mooring line, the tug and stretch damper (5) being standing approximately vertically with a suitable height so that the person about to moor the boat easily can grasp the line part (2) which extends out of the upper part of the tug and stretch damper (5).

9. Mooring device according to claim 1 - 8, **characterized in** that for adapting the height in which the line part (2) is held for the actual boat, the upper part of the tug and stretch damper (5) may either be cut or, if the separate attachment device (15) is used, the height may be adjusted by moving the tug and stretch damper (5) up or down in the attachment device (15).
INTERNATIONAL SEARCH REPORT

International application No.
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A. CLASSIFICATION OF SUBJECT MATTER

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According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

DK, NO

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPOQUE: WPI, EPODOC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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