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(72) Inventor; and
(71) Applicant: **VULJAJ, Sokolj** [ME/ME]; Kodrabudan 01, Tuzi, 81206 (ME).

(74) Agent: **VOSSIUS & PARTNER**; Patentanwälte Rechtsanwälte mbB, Siebertstrasse 3, 81675 München (DE).

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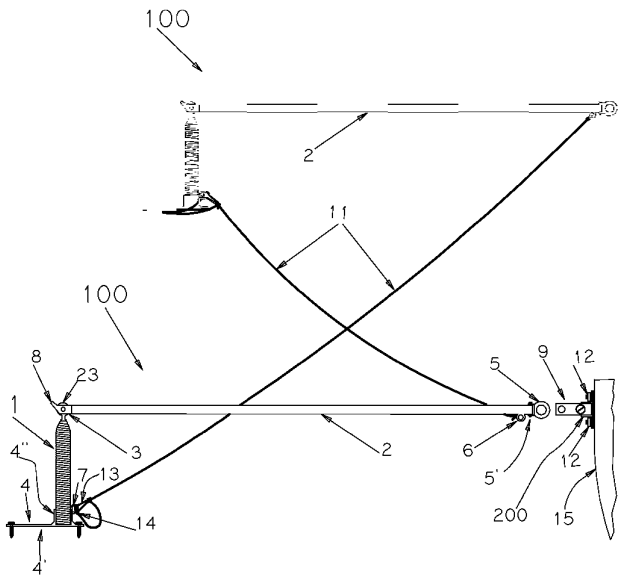
(54) Title: BOAT MOORING DEVICE

Figure 1



(57) Abstract: A boat mooring device (100) for mooring a boat (15) at a boat mooring location (22) such as a dock or pier, the boat mooring device (100) comprising a mooring arm (2) configured for extending between the boat (15) and the boat mooring location (22), a base (4) (such as a foot or support) for supporting the mooring arm (2) at the boat mooring location (22), a spring (1) for coupling the mooring arm (2) to the base (4), and a swivel joint (3) arranged between the spring (1) and the mooring arm (2) for permitting a pivot movement between the spring (1) and the mooring arm (2), wherein a first end of the spring (1) is connected to the base (4) and a second end of the spring (1) is connected to the swivel joint (3).

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Boat Mooring Device

Field of the invention

The present invention relates to a boat mooring device for mooring a boat at a boat mooring location such as a dock or pier.

Background of the invention

Mooring of a boat at a boat mooring location such as a dock or pier may present some problems. For example, the boat may be tied to the dock using ropes. However, if the rope is too loose, fluctuating water levels, winds or waves may cause the boat to bump against the dock or pier. This can result in damage to the boat and/or dock. If the boat, on the other hand, is tied too tightly, the boat cannot move to accommodate fluctuations in water level, at least not without rubbing against the dock which, again, may damage the boat and/or dock. If the water is subjected to tidal fluctuations, it may even be necessary to adjust the ropes periodically over time. Nevertheless, even on lakes or rivers which are not subject to tidal fluctuations, passing boats may cause changes in water level in the wake of the passing boats which again may cause rubbing and/or damaging of either the boat or the dock.

These problems may be avoided, for example, by mooring the boat to a mooring buoy, for example offshore of the dock. But this brings with it another problem of boarding the boat. For example, it may then be necessary to transport boat passengers between the boat and the dock.

It is thus an object of the present invention to propose a boat mooring device which provides a possibility to moor the boat at a boat mooring location such as a dock or pier and allows the moored boat to move without getting damaged at the boat mooring location.

Solution to the problem

These and other objects, which become apparent upon reading the description, are solved by the subject-matter of the independent claims. Further embodiments and developments are provided in the dependent claims.

According to a first aspect of the present invention, a boat mooring device for mooring a boat at a boat mooring location such as a pier or dock is proposed. The boat mooring device comprises a mooring arm such as a pipe, shaft or tubing configured for extending between the boat and the boat mooring location, a base for supporting the mooring arm at the boat mooring location, a spring such as a coil spring or tension spring for coupling the mooring arm to the base, and a swivel joint such as a hinge arranged between the spring and the mooring arm for permitting a pivot movement between the spring and the mooring arm, wherein a first end of the spring is connected to the base and a second end of the spring is connected to the swivel joint.

The boat mooring device according to the first aspect is based at least partially on the idea that the spring permits various movements of the mooring arm relative to the base so as to accommodate for movements of a moored boat, such as a towards-and-away movement of the moored boat, an up-and-

down movement of the moored boat, a fore-and-aft movement of the moored boat, a tilting movement of the moored boat or other movements of the moored boat. The swivel joint which couples the second end of the spring with the mooring arm permits a pivot movement of the mooring arm relative to the spring. The pivot movement helps in accommodating movements of the moored boat so that the mooring arm can pivot relative to the spring and thus relative to the base. By coupling the spring and the mooring arm with a swivel joint, various movements of a moored boat can be accommodated for, without the risk of the moored boat hitting or bumping into the dock or pier. In addition, as the spring is connected to the base and not to the moored boat, any movements of the spring may not interfere with the boat and thus any damage of the boat due to a movement of the spring is prevented.

Preferably, the second end of the spring includes a ring, and the mooring arm includes a bolt extending through the ring so as to provide for the swivel joint.

Preferably, the ring is fixedly or non-rotatably connected to the second end of the spring.

Preferably, the swivel joint is configured for permitting an up-and-down movement of the mooring arm relative to the base, preferably wherein the swivel joint is configured for only permitting an up-and-down movement of the mooring arm relative to the base and no left-and-right movement of the mooring arm relative to the base. In other words, the swivel joint may not allow for any left-and-right movement of the moored boat but only for the up-and-down movement of the moored boat. Left-and-right movement of the moored boat may be permitted using the spring which at its second end can be subjected to torsional forces in case the moored boat moves left-and-right.

Preferably, the mooring arm includes an abutment member for abutting on the second end of the spring during an upward movement of the mooring arm, such as during an upward movement of the mooring arm, when no boat is moored at the mooring arm.

Preferably, the base includes a mounting section for mounting the base to the boat mooring location, and a receiving section connected to the mounting section, wherein the receiving section receives the first end of the spring such that in a rest position of the spring, in which the spring is undeformed and/or not subjected to tension by the moored boat, the spring extends in a substantially upright direction from the mounting section. In other words, the spring may extend at a vertical direction and the mounting section of the base may extend in a horizontal direction to be mounted on the dock or pier.

Preferably, the boat mooring device further comprising an eyelet for attaching the boat to the mooring arm, wherein the eyelet is coupled to the mooring arm by a second swivel joint, such as a hinge, configured for permitting a pivot movement of the eyelet relative to the mooring arm.

Preferably, a swivel axis of the first swivel joint (the swivel joint between the spring and the mooring arm) and a swivel axis of the second swivel joint (the swivel joint between the mooring arm and the eyelet) are arranged at an angle to one another, preferably at a right angle to one another.

Preferably, the first swivel axis may permit an up-and-down movement of the mooring arm relative to the base, and the second swivel axis may permit a left-and-right movement of the eyelet relative to the mooring arm, preferably a 180° degree left-and-right movement of the eyelet relative to the mooring arm.

Preferably, the boat mooring device further comprises at least one mooring line attachment member such as another ring or eyelet for attaching a mooring line to the boat mooring device.

The mooring line may be configured for limiting a movement of the moored boat, for example in a lateral direction of the dock or pier.

Preferably, a first mooring line attachment member is arranged at the mooring arm, preferably near an outer end thereof, and a second mooring line attachment member is arranged at the base. In other words, a mooring line may be attachable to a boat end of the boat mooring device and a base end of the boat mooring device, for example by using first and/or second mooring line attachment members.

Preferably, the boat mooring device further comprises a padlock device which may be an independent aspect of the present invention. The padlock device is configured for connecting the mooring arm to the boat, wherein the padlock device is configured to be connected to the boat and/or to a cleat of the boat.

Preferably, the padlock device includes a padlock with a main body, a slit arranged in the main body, and a bolt extending through the slit, wherein the slit is configured for accommodating an end of the mooring arm, such as an eyelet, and the bolt is configured for securing the end of the mooring arm in the slit.

Preferably, the padlock device further includes a base plate with a rim wall delimiting an opening in the base plate, and an H-profile configured to be connected to the base plate, wherein the H-profile includes a first leg and a second leg, the first leg and the second leg are connected to one another by a central web so as to form the H-profile, the first leg and the second leg are connected to the rim wall such that the central web crosses the opening of the base plate, the padlock is fitted through the opening from underneath the base plate, and the padlock is arranged inside the H-profile such that the central web of the H-profile is received by the slit of the padlock. In other words, the base plate and/or the H-profile may function as a housing of the padlock.

Preferably, the padlock device further includes a securing member such as another plate for securing the padlock in its position inside the H-profile.

Preferably, the securing member is arranged underneath the base plate and secured to the base plate so as to sandwich the padlock between the base plate and the securing member.

Preferably, the spring of the boat mooring device includes a hollow section, preferably at the first end of the spring, and a stabilization member such as another spring is arranged inside the hollow section for stabilizing the spring. The stabilization member may stabilize the spring against torsional deformation of the spring.

Preferably, one end of the stabilization member is connected to the base. The connection may be similar to the connection of the spring to the base.

According to a further aspect of the present invention, a combination of a first boat mooring device according to the first aspect and/or combinations thereof, and a second boat mooring device to the first aspect and/or combinations is proposed. The combination further comprises at least two boat mooring lines connected to the first boat mooring device and the second boat mooring device at respective ends of the first and second boat mooring device, preferably in a cross-configuration, wherein the boat mooring lines are configured to limit a lateral movement, such as a fore-and-aft movement, of a boat moored to the first and second boat mooring device.

Preferably, the combination further comprises at least one hook arranged on each of the two boat mooring lines at a location between a first end and a second end of the respective boat mooring line, wherein the hook is configured to be connected to a base end or a boat end of the respective first or second boat mooring device such that by connecting the hook to the respective first and/or second boat mooring device, an effective length of the respective boat mooring line is reduced for reducing a maximal lateral movement of the moored boat.

According to a further aspect of the present invention, a boat mooring device for mooring a boat at a boat mooring location such as a dock or pier is proposed. The boat mooring device comprises a mooring arm such as a pipe, shaft or tubing configured for extending between the boat and the boat mooring location, a base coupled to the mooring arm for supporting the mooring arm at the boat mooring location, and a spring such as a coil spring or tension spring fixedly connected to the mooring arm and configured for coupling the mooring arm to the boat.

The boat mooring device is based at least partially on the idea that the spring is fixedly connected to the mooring arm. As a result, a first end of the spring is fixedly connected to the mooring arm and a second end of the spring can move freely to accommodate a movement of a moored boat.

Preferably, the spring is connected to the mooring arm such that in a rest position of the spring, in which the spring is undeformed and/or not subjected to tension of the moored boat, the spring extends in a substantially upright direction from the mooring arm, preferably wherein the spring extends in a substantially upright and downward direction from the mooring arm. In this configuration, boats may be moored from on top using the spring extending in an downward direction towards the boat.

Preferably, the spring is connected to the mooring arm by a sleeve or holder. The sleeve or holder ensures that the end of the spring connected to the sleeve or holder cannot move.

Preferably, the spring includes a first end and a second end, wherein the first end is fixedly connected to the mooring arm such as by the sleeve or holder and the second end is coupled to an eyelet configured for connecting the mooring arm to the boat. The second end of the spring which is not connected to the mooring arm is a free end and may move for accommodating movements of the moored boat. The eyelet coupled to the mooring arm may allow for easy connection with the boat or cleats of the boat.

Preferably, the eyelet is rotatably coupled to the second end of the spring, preferably such that the eyelet is rotatable about an axis of the spring, preferably by 360° about the axis of the spring. The rotatable eyelet may be turned and may be connected to the boat or to a cleat of the boat.

Preferably, the spring includes a narrowed shape, preferably at the second end of the spring.

Preferably, the boat mooring device further comprises a swivel joint coupling the mooring arm to the base, wherein the swivel joint is configured to permit a pivot movement of the mooring arm relative to the base.

Preferably, the swivel joint is configured for permitting an up-and-down movement of the mooring arm relative to the base.

Preferably, the swivel joint is configured for permitting only an up-and-down movement of the mooring arm and no left-and-right movement of the mooring arm. Left-and-right movements of the moored boat may be permitted, for example, by the spring moving at its second end (free end) accordingly.

Preferably, the boat mooring device further comprises a padlock device for connecting the spring to the boat, wherein the padlock device is configured to be connected to the boat or a cleat of the boat. The padlock device may be an independent aspect of the present invention. The padlock device may have a similar design and/or shape as the padlock device explained in connection with the boat mooring device according to the first aspect.

Preferably, the padlock device includes a padlock with a main body, a slit arranged in the main body, and a bolt extending through the slit, wherein the slit is configured for accommodating an end of the spring or an eyelet connected to the spring, and the bolt is configured for securing the end of the spring or the eyelet, respectively, in the slit of the padlock.

Preferably, the padlock device further includes a base plate with a rim wall delimiting an opening in the base plate, and an H-profile configured to be connected to the base plate, wherein the H-profile includes a first leg and a second leg, the first leg and the second leg are connected to one another by a central web, the first leg and the second leg are connected to the rim wall of the base plate such that the central web crosses the opening of the base plate, the padlock is fitted through the opening from underneath the base plate, and the padlock is arranged inside the H-profile such that the central web of the H-profile is received by the slit of the padlock.

Preferably, the padlock device further includes a securing member such as another plate for securing the padlock in its position inside the H-profile.

Preferably, the securing member is arranged underneath the base plate and secured to the base plate so as to sandwich the padlock between the base plate and the securing member.

Brief description of the drawings

Figure 1 is a schematic view of one example of boat mooring devices according to the present invention with mooring lines attached in a cross-configuration.

Figure 2 is schematic view of a boat mooring device according to **Figure 1** when subjected to swing or moving of a moored boat.

Figure 3 is a schematic view of a boat mooring device according to **Figure 1** with the boat mooring device in a rest position.

Figure 4 is schematic detailed view a padlock device which can be used for coupling the boat mooring device of **Figure 1** to a boat.

Figure 5 is another schematic view of the padlock device of **Figure 4**.

Figure 6 is another schematic view of the padlock device of **Figure 4**.

Figure 7 is another schematic view of the padlock device of **Figure 4** connected to a cleat of a boat.

Figure 8 is another schematic view of the padlock device of **Figure 4** connected to a cleat of a boat, wherein an eyelet of a mooring arm is secured in the padlock.

Figure 9 is a schematic view of boat mooring devices of **Figure 1** with mooring lines attached in a cross-configuration and a boat moored to the boat mooring devices.

Figure 10 is a schematic view of the configuration of **Figure 9** with the moored boat moving along the dock or pier.

Figure 11 is a schematic view of a boat moored in a lateral or fore-and-aft configuration.

Figure 12 is a schematic view of a boat moored in a rear configuration.

Figure 13 is a schematic view of a moored boat.

Figure 14 is a schematic view of a moored boat tilted towards the dock or pier due to waves or fluctuations in water level.

Figure 15 is a schematic view of a moored boat tilted away from the dock or pier due to waves or fluctuations in water level.

Figure 16 is a schematic detailed view of a spring used in a boat mooring device of present invention.

Figure 17 is another schematic view of a boat such as a large vessel moored in a lateral configuration to the dock or pier using the boat mooring device according to the first aspect of the present invention.

Figure 18 is a schematic view of another example of a boat mooring device according to the present invention.

Figure 19 is a schematic detailed view of the boat mooring device of **Figure 18**.

Figure 20 is schematic view of a boat mooring device according to **Figure 18** when subjected to a swing or moving of a moored boat.

Figure 21 is a schematic view of the boat mooring device of **Figure 18** connected to a padlock device that is connected to a cleat of a moored boat.

Figure 22 is a schematic view of boats moored in a lateral or fore-and-aft configuration using the boat mooring devices of **Figure 18**.

Figure 23 is a schematic view of boats moored in a rear configuration using the boat mooring devices of **Figure 18**.

Figure 24 is a schematic view of a moored boat using a combination of a boat mooring device of **Figure 2** and a boat mooring device of **Figure 18**.

Detailed description

Within the figures, same components are referenced by the same reference numerals.

Figure 1 shows a schematic views of boat mooring devices 100 used for mooring a boat 15 to a boat mooring location such as a dock or pier. The boat mooring device 100 includes a mooring arm 2 such as a pipe, shaft or tubing extending between the boat 15 and the boat mooring location. The boat mooring device 100 includes a base 4 such as a foot or support for supporting the mooring arm 2 at the boat mooring location. The boat mooring device 100 includes a spring 1 which is coupling the mooring arm 2 to the base 4. The base 4 includes a mounting section 4' for mounting the base 4 to the boat mooring location such as the dock or pier, and a receiving section 4'' connected to the mounting section 4'.

A first end of the spring 1 is connected to the receiving section 4'' such that the first end of the spring 1 is fixedly connected to the base 4. In the exemplary embodiment shown, the spring 1 is connected to the base 4 such that the spring 1, when undeformed, extends in a substantially upright direction from the mounting section 4'. The spring 1 includes a second end (free end) which is not connected to the base 4 and can move relative to the first end and/or the base 4 as will be seen, for example in **Figure 2**. Using an example of mooring a boat weighing between 1000 kg and 3000 kg, the spring 1 may have a height of 25 cm, a width of 5 cm and a thickness of 6-8 mm. Using another example of mooring a boat of around 1500 kg, the effective dimensions of the spring 1 may be: height 25cm, width 6cm and thickness 6mm. The free end of the spring 1 may move in circular direction by about 40 cm.

The spring 1 is coupled to the mooring arm 2 using a swivel joint 3. In the exemplary embodiment shown, the swivel joint 3 is provided by a ring 23 fixedly connected to the second end of the spring 1 and a bolt extending through the ring 23. In the exemplary embodiment shown, the swivel joint 3 allows for an up-and-down movement of the mooring arm 2 relative to the spring 1 or the base 4, as can be seen, for example in Figure 3.

An eyelet 5 is coupled to the mooring arm 2 on an opposite side of the swivel joint 3. The eyelet 5 is pivotally connected to the mooring arm 2 using a second swivel joint 5'. In the exemplary embodiment shown, the second swivel joint 5' provides for a left-and-right movement of the eyelet 5 relative to the mooring arm 2. More generally speaking, a swivel axis of the first swivel joint 3 and a swivel axis of the second swivel joint 5' may be arranged at an angle towards one another. In the particular example shown, the angle is a right angle or a 90° angle. In other embodiments, the angle may be different.

The second swivel joint 5' may permit a 180° movement of the eyelet 5 relative to the mooring arm 2 (e.g., at least 180°). The first swivel joint 3 may permit a 90° movement of the mooring arm 2 relative to the base 4 (e.g., at least 90°). In other embodiments, first and second swivel joints 3, 5', respectively, may permit a different angle of pivot movement.

An abutment member 8 is attached to the mooring arm 2. The abutment member 8 is used for abutting on the second end of the spring 1 as will be explained in more detail in **Figure 3**.

The eyelet 5 is configured to be connected to the boat 15 for mooring the boat 15 to the boat mooring device 100. The eyelet 5 can be directly connected or fixated to the boat 15 or a cleat of the boat 15. In the exemplary embodiment shown, the eyelet 5 is coupled to a padlock device 200. The padlock device 200 is used to connect a boat end of the mooring arm 2 or the eyelet 5 to the boat 15. The padlock device 200 includes a padlock 9 that is connected to the boat 15 or a cleat of the boat 15, for example using bolts or screws 12. The padlock device 200 will be explained in more detail in **Figures 4 to 8**.

The boat mooring device 100 further includes multiple mooring line attachment members 6, 7 which are used to attach a mooring line 11 to the boat mooring device 100. The mooring line attachment member 6, 7 may be a ring or eyelet. A first mooring line attachment member 6 is attached to the mooring arm 2, at a boat end thereof. A second mooring line attachment member 7 is attached to the base 4. In other embodiments, the number and/or position of the mooring line attachment members 6, 7 may be different.

In the exemplary embodiment shown, two mooring lines 11 are attached to the two boat mooring devices 100 in a cross-configuration. One end of each mooring line 11 is attached to the base 4 using the second mooring line attachment member 7 and the other end of each mooring line 11 is attached to the mooring arm 2 of the other boat mooring device 100. In other embodiments not shown, the arrangement or configuration may be different.

The mooring lines 11 are configured to limit a movement of the mooring arms 2 and thus a movement of the moored boat 15 in a lateral direction of the dock or pier as will be explained in more detail in connection with **Figures 9 and 10**. The mooring lines 11 may further include a hook 13 which can be connected, for example, to one of the mooring line attachment members 6, 7. The hook 13 is configured for reducing and/or fixating the length of the mooring line 11 in between two boat mooring device 100. The hook 13 may thus limit the lateral movement of the mooring arms 2, as will be explained in more detail in connection with **Figures 9 and 10**.

Referring to **Figure 2**, the boat mooring device 100 is shown in a bent configuration or during a bending configuration. The shown configuration is only one of many examples of how the boat mooring device 100 may respond in order to accommodate a movement of a moored boat. As indicated in **Figure 2**, and as one of many examples, a movement of a moored boat may result in the spring 1 bending in various directions. The second end or free end of the spring 1 may move to accommodate a movement of the moored boat. The first end of the spring 1 is attached to the base 4 and may not move. Movements of the mooring arm 2 relative to the spring 1 or the base 4 are possible using the swivel joint 23. A movement of the eyelet 5 relative to the mooring arm 2 is possible due to the second swivel joint 5'. As a result, various movements of the moored boat can be compensated or accommodated using the boat mooring device 100, such as a movement towards and away from the dock, a fore-and-aft movement of the boat, a tilting of the boat, an up-and-down movement of the boat or other movements of the boat that may result from fluctuations in water level, tidal waves, wakes from passing boats, winds etc.

Referring to **Figure 3**, the boat mooring device 100 is shown in a rest position. The rest position may be a position where no boat is moored to the boat mooring device 100 and where the mooring arm 2 is moved upwards. As can be seen, the abutment member 8 abuts on the second end of the spring 1 and limits an upward movement of the mooring arm 2. For clarity, **Figure 3** also shows base 4, mooring line attachment members 6, 7 and eyelet 5.

Referring to **Figure 4**, a schematic detailed view of the padlock device 200 is shown. The padlock device 200 includes a base plate 10. The base plate 10 may also be called a housing of the padlock which will be explained in more detail in **Figure 5**. The base plate 10 may include one or more holes 17 for connecting the base plate 10 to another component, such as another plate 19 with holes 17, as will be explained later on. The base plate 10 includes a rim wall 10' delimiting an opening 18. In the exemplary embodiment shown, the opening 18 is rectangular, but may have a different shape in other embodiments.

The padlock device 200 further includes an H-profile 16 having a first leg 16' and a second leg 16''. Both legs 16', 16'' are connected to one another by a central web 16''' for forming the H-profile 16. Both legs 16', 16'' are connected to the rim wall 10' of the base plate 10 such that the central web 16''' crosses the opening 18.

Referring to **Figure 5**, an exploded view of the padlock device 200 with the padlock 9 is shown. The padlock 9 includes a main body with a slit 9' and a bolt 9'' extending through the slit 9'. The slit 9' is configured for accommodating an boat end of the mooring arm or an eyelet coupled to the mooring arm. The bolt 9'' is configured for securing the boat end or the eyelet within the slit 9'.

The padlock 9 is fitted through the opening 18 from underneath the base plate 10 and arranged inside the H-profile 16 such that the padlock 9 contacts the central web 16''' of the H-profile 16. In the specific embodiment shown, the H-profile 16 is designed such that the padlock 9 does not protrude from underneath the base plate 10 once fitted inside the H-profile 16.

The padlock device 200 further includes a securing member which in the exemplary embedment shown may be the further plate 19. The securing member 19 is used for securing the padlock 9 in its position inside the H-profile 16. The securing member 19 is arranged underneath the base plate 10 and may have the same shape as the base plate 10. The securing member 19 can be fixed with the base plate 10 using screws 12 fitted through holes 17 such that the padlock 9 is sandwiched between the base plate 10 and the securing member (further plate) 19.

Referring to **Figure 6**, the padlock device 200 is shown in an assembled configuration. In the assembled configuration, the padlock 9 is fitted in the H-profile, the securing member 19 is screwed onto the base plate 10 using screws 12 and secures the padlock 9 in its position inside the H-profile 16.

Referring to **Figure 7**, as an example, the padlock device 200 with padlock 9 and H-profile 16 is connected to a cleat 21 of a boat 15 using screws such as U-screws 20.

Referring to **Figure 8**, another schematic view of the padlock device 200 is shown. In **Figure 8**, the padlock device 200 is connected to the cleat 21 of the boat 15 using screws 20 and the eyelet 5 that is coupled to the mooring arm 2 by the second swivel joint 5' is secured inside the padlock 9 using the bolt 9''. The mooring arm 2 can be easily secured and connected to the boat 15 using the padlock device 200. For example, the boat 15 may be moored by one person in about 10-20 seconds using the padlock device 200.

Referring to **Figure 9**, a similar configuration as already explained in connection with **Figure 1** is shown. In **Figure 9**, a first end 14 of each mooring line 11 is connected to a base end of a respective boat mooring device 100. A second end 14' of each mooring line 11 is connected to a boat end of the respective other boat mooring device 100 resulting in a cross-configuration of the two mooring line 11. The boat end of each mooring arm 2 is connected to the boat 15 using a respective connection member, such as a padlock device 200. In the exemplary embodiment shown in **Figure 9**, each mooring line 11 includes a hook 17 connected to a respective mooring line attachment member 7 arranged at the base 4 of the boat mooring device 100. The hooks 13 connected to the mooring line attachment members 7 reduce the effective length of the respective mooring line 11. As a result, a lateral movement of the moored boat 15, such as a fore-and-aft movement of the moored boat 15, may be limited. A position of the hook 7 on the respective mooring line 11 may be such that the moored boat 15 may only move a limited way along the dock or pier 22. A position of the hooks 13 may be in the about 40-80cm from an end of the mooring line 11. The mooring lines 11 may not be tightened once the boat 15 is moored, permitting a limited swinging of the moored boat 15.

Referring to **Figure 10**, the configuration of **Figure 9** is shown with the hooks 13 released from the respective mooring line attachment member 7. **Figure 10** may show the boat 15 in a loading and unloading position in which the moored boat 15 is closer to the dock 22. When the hooks 13 are released, the effective length of the mooring lines 11 is longer which permits more lateral movement of the moored boat 15. As a result, the boat 15 may move closer to the dock or pier 22. The second swivel joint 5' permits a tilting of the eyelet 5 relative to the mooring arm 2. The eyelet 5 is secured using the padlock devices 200 connected to the boat 15.

Moving the boat 15 closer and in a lateral direction towards the dock 22 results in a torsional deformation of the spring 1. The first end of the spring 1 is fixedly connected to the base 4 whereas the second end may move together with the movement of the mooring arm 2, resulting in a torsional movement of the spring 1. When the boat 15 is moved towards the dock 22, people may board the boat 15. Once the boat 15 is released, the restoring force of the spring 1 may move the mooring arms 2 in its original positions so that the boat 15 may move away from the dock or pier 22.

Referring to **Figure 11**, a boat 15 moored at the dock 22 is shown. In the specific example, the boat 15 is moored using the boat mooring devices 100 with the springs 1 and the mooring lines 11 in a cross-configuration. In the specific example, the boat 15 is moored in a fore-and-aft configuration. The mooring lines 11 may not be necessary for mooring the boat 15.

Referring to Figure **12**, boats 15 are shown to be moored at the dock 22 in a rear configuration using the boat mooring devices 100 with the springs 1, mooring arms 2 and the mooring lines 11. The mooring lines 11 may not be necessary for mooring the boat 15. In other words, the mooring devices may be coupled to the stern of the boat.

Referring to Figure **13**, a schematic view is shown in which the boat 15 is moored at the dock 22 using the boat mooring device 100 with the spring 1 and the mooring arm 2. For clarity it is assumed that in Figure 13, the boat 15 is not subjected to a movement of the water which is why the spring 1 may not be subjected to torsion or deformation caused by movement of the moored boat 15.

Referring to **Figure 14**, the boat 15 is tilting towards the dock 22. As a result, the spring 1 of the boat mooring device 100 deforms. Such a movement of the boat 15 may be caused, e.g., by winds, waves, passing boats or the like.

Referring to **Figure 15**, the boat 15 is tilting away from the dock 22. As a result, the spring 1 of the boat mooring device 100 deforms in another direction as compared with **Figure 14**. A movement of the boat 15 may be caused, e.g., by winds, waves, passing boats or the like.

Various other movements of the boat 15 are possible. **Figures 14 and 15** illustrate examples of movements of a moored boat 15 and may not be seen as limiting the scope of disclosure or the way the spring 1 deforms.

Referring to **Figure 16**, a detailed view of the spring 1 connected to the base 4 is shown. In the specific embodiments shown, the spring 1 includes a hollow section in which a stabilization member 24, such as another spring, is inserted. The stabilization member 24 is used for stabilizing spring 1, preferably during a torsional movement of the spring 1. One end of the stabilization member 24 is connected to the base 4 and received in the receiving section 4''. As the ring 23 is fixedly connected to the spring 1, any rotation of the ring 23 around an axis 1' of the spring 1 may result in torsional movement and/or torsional deformation of the spring 1 which is stabilized by the stabilizing member 24.

Referring to **Figure 17**, a boat 15 such as a large vessel is moored at the mooring location 22 using the boat mooring device 100. As can be seen, in the specific embodiment shown, the boat mooring device 100 is connected to the boat 15 at a side of the boat 15. Other configurations are possible.

Referring to **Figure 18**, another example of a boat mooring device 300 is shown.

Boat mooring device 300 includes a mooring arm 2 extending between the boat mooring location and the boat, a base 4 coupled to the mooring arm 2 for supporting the mooring arm 2 at the boat mooring location, and a spring 1, such as a coil spring or tension spring, fixedly connected to the mooring arm 2 and configured for coupling the mooring arm 2 to the boat. In order to fixedly connect the mooring arm 2 to the spring 1, the mooring arm 2 includes a sleeve or holder 25 arranged on a boat end side of the mooring arm 2. The sleeve or holder 25 ensures that one end, such as a first end, of the spring 1 is fixedly connected to the mooring arm 2. A second end (free end) of the spring 1 includes an eyelet 5, such as a ring. The eyelet 5 is configured for connecting and securing the mooring arm 2 to the boat. This may be done using the padlock

device 200 with the padlock 9, as indicated in the **Figure 18**. In other embodiments, the eyelet 5 or the free end of the spring 1 may directly connected to the boat or cleats of the boat.

The spring 1 may have a narrowed shaped, preferably at the second end, as indicated in **Figure 18**. The eyelet 5 may be rotatably connected to the second end of the spring 1 such that the eyelet 5 may rotate, for example, about an axis 1' of the spring 1. Thus, by turning the eyelet 5, the eyelet 5 may be inserted into the padlock 9 for securing the eyelet to the padlock 9.

In the specific embodiment shown, the spring 1 is connected to the mooring arm 2 such that in a rest position of the spring 1 (as shown in **Figure 18**), in which the spring 1 is not subjected to tension and/or deformation of a moored boat, the spring 1 extends in a substantially upright and preferably downright direction from the mooring arm 2. Hence, the eyelet 5 or free end of the spring 1 may be connected to the boat from on top in a substantially upright and downward direction. Other ways or configurations of the spring 1 and/or the eyelet 5 are possible.

In the specific embodiment shown, the boat mooring device 300 further includes a swivel joint 26, such as a hinge. The swivel joint 26 couples the mooring arm 2 to the base 4. The swivel joint 26 permits a pivot movement of the mooring arm 2 relative to the base 4. In the specific embodiment shown, the swivel joint 26 may permit an up-and-down movement of the mooring arm 2 relative to the base 4. Preferably, the swivel joint 26 may only permit an up-and-down movement of the mooring arm 2 relative to the base 4. The up-and-down movement of the mooring arm 2 may accommodate an up-and-down movement of a moored boat. Movements of the moored boat may be also accommodated by the spring 1 and/or the rotatable eyelet 5, as will be explained in more detail in connection with **Figure 20**.

Boat mooring device 300 may include an abutment member (not shown) for abutting on the base during an upward movement of the mooring arm 2, such as during a rest position of the mooring arm 2, for example, when no boat is moored. The abutment member may be similar in function and/or shape to the abutment member 8 mention in connection with **Figure 3**.

Referring to **Figure 19**, a schematic detailed view of the boat mooring device 300 is shown. The swivel joint 26 may use a bolt 26' fitted through a ring or eyelet or hinge 26'' to permit the pivot movement of the mooring arm 2 relative to the base 4. In other embodiments, the swivel joint 26 may have a different design. The base 4 is connected to the boat mooring location such as the dock or pier, for example, using screws fitted through holes 27 formed in the base 4.

Referring to **Figure 20**, the boat mooring device 300 is shown in a bent configuration or during a bending configuration. The shown configuration is only one of many examples of how the boat mooring device 300 may respond in order to accommodate a movement of a moored boat. As indicated in **Figure 20**, and as one of many examples, a movement of a moored boat may result in the spring 1 bending in various directions. The free end of the spring 1 may move accordingly to accommodate the movement of the moored boat. The first end of the spring 1 is attached to the base mooring arm 2 and fixedly connected to the mooring arm 2 and may thus not move. The second end (free end) may move such as to accommodate the movements of the moored boat. The rotatable eyelet 5 may rotate to accommodate movements of the moored boat or to be fitted into the slit of the padlock. Up-and-down movements of the moored boat may be accommodated by the swivel joint 26. The combination of the spring 1, the swivel joint 26 and preferably also the rotatable eyelet 5 ensures that various movements of the moored boat can be compensated or accommodated using the boat mooring device 300, such as a movement towards and away from the dock, a fore-and-aft movement of the boat, a tilting of the boat, an up-and-down movement of the boat or other

movements of the boat that may result from fluctuations in water level, tidal waves, wakes from passing boats, winds etc.

Referring to **Figure 21**, the boat mooring device 300 is connected to a padlock device 200 that is connected to a cleat 21 of a boat 15 using screws such as U-screws 20. The eyelet 5 is secured within the padlock 9 using a bolt 9''. The padlock device 200 may have the same design as the padlock device 200 described in connection with **Figures 4 to 8**. As can be seen, due to the fixation of the spring 1 on the mooring arm 2 using the sleeve or holder 25, the spring 1 extends in a substantially downright position. The boat mooring device 300 may thus be suited for connecting to a boat 15 from above the boat 15, as indicated in **Figure 21**.

Referring to **Figure 22**, boats 15 moored at the mooring location such as a pier or dock 22 are shown. In the specific example, the boats 15 are moored using the boat mooring devices 300 with the springs 1 fixedly connected to the mooring arms 2. In the specific example, the boats 15 are moored in a fore-and-aft configuration. In other words, the boats 15 are moored with their fore-and-aft direction essentially parallel to the pier 22.

Referring to **Figure 23**, the boats 15 are shown to be moored at the boat mooring location 22 in a rear configuration (and/or at the stern) using the boat mooring devices 300 with the springs 1 fixedly connected to the mooring arms 2. Two boat mooring devices 300 are shown to be in the rest position with no boat moored to these devices 300. As illustrated, the boat mooring devices may be configured to be swung upwards and/or to maintain an upward position when not being used.

Referring to **Figure 24**, a schematic view of a boat 15 moored at the boat mooring location 22 is shown using a combination of the boat mooring device 100 described in connection with **Figures 1 to 17** and the boat mooring device 300 described in connection with **Figures 18 to 23**. In the specific example, the boat mooring devices 100, 300 are connected to the boat 15 using padlock devices 200, but other ways of connecting the boat mooring devices 100, 300 to the boat 15 are possible. As can be seen, the boat mooring device 100 is specifically designed to connect to the boat 15 from a side of the boat 15 and the boat mooring device 300 is specifically designed to connect to the boat 15 from above the boat 15. Various other configurations and/or arrangements are possible.

The following is also part of the disclosure:

The invention in a broader sense belongs to the field of Nautics, and specifically relates to the mooring of boats to the port as well as to fixed and floating surfaces. (IPC B63B21/00;)

Two of the same flexible devices are used to moor the boat. The device consists of a tension spring, pipe, hinge, and foot. The spring (Figure 1. no. I), on the lower side is vertically fixed on the foot (Figure 1, no. 4) which is fixed on the dock, it is narrowed on the upper side and on the very top it has a built-in ring 23 so that it can rotate in a circle and is fixed to a pipe (Figure 1, no. 2) with hinges (Figure 1, no.3) and at the very end of the pipe is a fixed ring (Figure 1, no.5) used to be connected to the vessel. The ring 5 is attached to the top of the pipe so that it can be rotated left and right by 180°. The ring (6 and 7, Figure 1) is used to connect two devices crosswise with a rope (Figure 1, no. 11). The rope is fixed in the beginning 14 to the ring 7 and the hook 13 is fixed on the first 40-80 cm of the rope and the rope is at the end fixed onto the ring 6 of other device so that when the boat is moored, the rope is not fully tightened. When the boat 15 is moored, the hooks 13 are attached to the ring 7 (Figure 9). For loading and unloading, the hooks 13 are released from the ring 7 so that the boat approaches the dock 22 by moving forward or backward (Figure 10). A padlock 9 with a housing 10 is used to attach the device to the boat. The housing is used to fix the padlock in the

appropriate place on the boat (Figure 6) or on the existing cleats on the boat (Figure 7 and 8). The housing 10 is made of a stainless-steel plate which has four holes 17 for fastening to the boat, in the middle it has an opening 18 which is connected by a U-profile cut in the shape of the letter H (Figure 4, no.16) where the unlocked padlock is inserted (Figure 5, no. 9) and folded with another plate (Figure 5, no. 19). It is then screwed with four screws (Figure 5 and no. 12) to the appropriate place on the boat (Figure 6) or on the existing cleats (Figure 7 and 8, no.21) on a boat with U-screws (Figure 7 and 8, no.20). With flexible devices, the boat can be moored in a lateral position (Figure 9 .10 and 11) or in a parallel position (Figure 12).

Older methods of mooring boats, mainly using buoys, anchors and ropes are most frequently used, which means that new research have not brought an effective solution. The essence is that every previous method of mooring boats has its shortcomings, and the result is a large number of damaged vessels at the docks. The most frequently used method of mooring boats is with buoys that serve to prevent the moored boat from coming into direct contact with the dock. Buoys often do not help under the influence of weather conditions such as winds, waves, and fluctuating water levels. Another commonly used method is to use the anchor on the opposite side, to keep the boat away from the dock, but it is not an adequate solution because occasionally the anchor loosens, which causes the boat to come into direct contact with the surface where it is moored. Also, old methods of mooring require a lot more time and effort as well as more human assistance. New research on mooring boats is most often based on suspending boats and keeping them away from the dock.

The published U.S. Patent Application 4,250,827 describes a device that uses telescopes with springs to buffer forward-backward motion, this and all other models that use springs in a similar way do not give a good result because the spring has the certain strength, and the boat has uncertain strength when swinging, meaning that the spring cannot be adjusted since a strong spring is useless and a soft one will shrink to the end, transferring the impact and thus damaging the device and the boat.

The published U.S. application, patent 5,361,716 shows a device having a spring fixed to the base on one side and fixed to the handle attached to the boat on the other side by bending the spring at an angle of 90 o or semicircular depending on the water level, which means that the spring must be so weak that we can bend it in a semicircle with one hand to tie it to the boat with the other, and the movement of the middle boat under the influence of the wave can have as much as 20 times more force than that spring and will not be bothered by it while impacting the port.

The published application US2938492A shows the device that uses the spring that is installed on the vessel, on the top of which the telescopic tube is fastened and attached to the dock. The device is not efficient because during waves and boat lowering the telescopic tube and spring touch the boat and damage it and it also is not esthetic when the spring is on a vessel, and it is not efficient to dismantle it every time.

The technical problem solved by the invention of this device is the improved method of boat mooring, which implies safer and more efficient method of mooring. The essence of the invention is a flexible device for mooring boats, which uses a tension spring in a way that it operates in two zones in a way that the boat swings freely under the waves or winds impact to a certain extent, and then is moderately restrained without jerking or impacting the dock and that one person can moor or untie the boat in 10 to 20 seconds, by securely mooring the boat with stainless steel devices and locking with a padlock. The flexible device is designed to be used for mooring boats of almost all models and weights by adjusting the size and strength of the device to the boat. Using an example of mooring a boat weighing from 1000 kg to 3000 kg,

the most efficient spring dimensions are height 25 cm, width 5 cm and thickness of spring 6 to 8 mm. This spring is very strong, but when the device is fixed, we can manually move back and forth the upper part of the spring by 20 cm or circularly by 40 cm (Figure 2). This is the zone where the spring moves flexibly following the gentle, medium, and even strong movements of the vessel caused by the waves. There is rarely a stronger or extreme movement of the vessel that would cause the spring to transition from the standard zones into a more stretched zone, where the spring is much stronger and halts any stronger movements, it then returns the vessel into the standard flexible zone. After the waves stop, it will return to its original vertical position. The devices are used for lateral and parallel moorings of vessels and work efficiently on the dock of fixed or floating surfaces in the sea, river, lake, and other places where tides, which cause the water level to fluctuate up to 2 meters, occur.

Figure 1 shows the device in detail in parts. Figure 2 shows how the spring operates when swinging of the boat. Figure 3 shows the device in a vertical position when not in use. Figures 4,5,6,7 and 8- show the padlock housing for connecting the device and the boat. Figures 9 and 11 show the moored boat with the devices in the lateral position. Figure 10 shows the boat in the loading and unloading position. Figure 12 shows a moored boat with devices in a parallel position. Figures 13, 14 and 15 show the operation of the device during the rocking of the boat under the influence of the waves and during the lowering and raising of the water level.

Possible aspects are:

Flexible device for mooring boats to the dock, characterized in that the lower part of the tension spring (1) is fixed in a vertical position on the foot (4), and the upper part is tightened and has the ring (23) which rotates 360 degrees which is connected by hinges (3) to the pipe (2), which at the other end has the ring (5) which rotates left and right at an angle of 180 degrees, towards the end is it has a fixed ring (6) and a fixed ring (7) in the foot.

Housing for fixing a padlock onto a boat, characterized in that one stainless steel plate (10) has four holes (17) in the corners and a quad-rangular cavity (18) connected in the middle by a U-profile (16) and another plate (19) without a cavity of the same dimensions.

The following is also part of the disclosure:

The invention in a broader sense belongs to the field of Nautics, and specifically relates to the mooring of boats to the port as well as to fixed and floating surfaces. (IPC B63B21/00;)

Two devices are used for mooring boats in [Fig.22] and 23. The devices consist of a tension spring, a pipe and a hinge. The pipe 2 is connected to the left end with hinges 26, which are designed to be fastened with four screws to the pier 22. At the right end of the tube, there is a sleeve 25 where a spring 1 is fixed at a 90° angle downwards (Figure 18), which is narrowed on the lower side and has a ring 5 installed at the very end so that it can be turned and attach to the boat 15. A padlock 9 with a housing 10 is used to hang the device on the boat. The housing is used to fix the padlock on the vessel. The housing has an opening on the bottom side that is connected by a U-profile cut in the shape of the letter H (Figure 4), where the unlocked padlock 9 is inserted, and covered with another plate 19 (Figure 5) and screw with four screws 12 to the appropriate place on the boat (Figure 6) or to the existing boat cleats 21 (Figure 7) with U-bolts 20 (Figures 7 and 8).

Older methods of mooring boats, mainly using buoys, anchors and ropes are most frequently used, which means that new research have not brought an effective solution. The essence is that

every previous method of mooring boats has its shortcomings, and the result is a large number of damaged vessels at the docks. The most frequently used method of mooring boats is with buoys that serve to prevent the moored boat from coming into direct contact with the dock. Buoys often do not help under the influence of weather conditions such as winds, waves, and fluctuating water levels. Another commonly used method is to use the anchor on the opposite side, to keep the boat away from the dock, but it is not an adequate solution because occasionally the anchor loosens, which causes the boat to come into direct contact with the surface where it is moored. Also, old methods of mooring require a lot more time and effort as well as more human assistance. New research on mooring boats is most often based on suspending boats and keeping them away from the dock.

The published U.S. Patent Application 4,250,827 describes a device that uses telescopes with springs to buffer forward-backward motion, this and all other models that use springs in a similar way do not give a good result because the spring has the certain strength, and the boat has uncertain strength when swinging, meaning that the spring cannot be adjusted since a strong spring is useless and a soft one will shrink to the end, transferring the impact and thus damaging the device and the boat.

The published U.S. application, patent 5,361,716 shows a device having a spring fixed to the base on one side and fixed to the handle attached to the boat on the other side by bending the spring at an angle of 90 o or semicircular depending on the water level, which means that the spring must be so weak that we can bend it in a semicircle with one hand to tie it to the boat with the other, and the movement of the middle boat under the influence of the wave can have as much as 20 times more force than that spring and will not be bothered by it while impacting the port.

The published application US2938492A shows the device that uses the spring that is installed on the vessel, on the top of which the telescopic tube is fastened and attached to the dock. The device is not efficient because during waves and boat lowering the telescopic tube and spring touch the boat and damage it and it also is not esthetic when the spring is on a vessel, and it is not efficient to dismantle it every time.

The essence of the invention is a new device that solves the problem of mooring boats that, along with the up and down movement of the tube, uses a spring in a special way, by following even the smallest movements of the boat and stopping stronger movements of the boat. The invention of this device, which is tied against the boat, with a tension spring that functions in two zones, solved the problem by making the spring in the first zone easier and it moves flexibly and cushions movements from the very beginning of the boat's movement, and on stronger movements the spring goes into the stretching zone which is incomparably stronger and stops the movements without recoil and returns the boat to its original position. One person can tie up or untie the boat in seconds, and this includes padlocking and securing with stainless steel devices. The devices are used for lateral and parallel mooring of vessels and function effectively on docks of fixed and floating surfaces on the sea, lakes, rivers and places where tides occur, where the water level rises and falls up to 2 meters. The effective dimensions of the spring for a boat around 1500 kg are height 25cm, width 6cm and thickness 6mm. The top of the spring moves in a circle about 40cm (Figure 20), this is the zone where the spring moves flexibly following the rocking of the boat horizontally, while at the same time it moves up and down by means of a tube that is attached to the other side by hinges that are designed to be firmly fixed to the pier.

Figure 18 shows the device in detail in parts.

Figure 19 shows the hinges.

Figure 20 shows the way the spring and tube function when rocking the vessel.

Figures 4 to 7 and 21 show the padlock housing that is attached to the boat together and is used to connect the device to the boat.

Figure 22 shows the boat moored with devices in a sideways position.

Figure 23 shows the boat moored with devices in a parallel position.

Possible aspect is:

A device for mooring boats to the pier, characterized by the fact that the stainless steel tube (2) has on one side attached hinges (26) intended to be fixed on the pier and that the tube moves up and down and on the other side has a fixed tension spring (1) at an angle of 90° down, which is narrowed at the lower end where it has a fixed ring (5) that can be rotated around its axis.

The following aspects are preferred embodiments of the invention:

1. A boat mooring device (100) for mooring a boat (15) at a boat mooring location (22) such as a dock or pier, the boat mooring device (100) comprising:
   - a mooring arm (2) configured for extending between the boat (15) and the boat mooring location (22),
   - a base (4) (such as a foot or support) for supporting the mooring arm (2) at the boat mooring location (22),
   - a spring (1) for coupling the mooring arm (2) to the base (4), and
   - a swivel joint (3) arranged between the spring (1) and the mooring arm (2) for permitting a pivot movement between the spring (1) and the mooring arm (2), wherein a first end of the spring (1) is connected to the base (4) and a second end of the spring (1) is connected to the swivel joint (3).

2. The boat mooring device (100) of aspect 1, wherein the second end of the spring (1) includes a ring (23), and the mooring arm (2) includes a bolt extending through the ring (23) so as to provide for the swivel joint (3).

3. The boat mooring device (100) of aspects 1 or 2, wherein the swivel joint (3) is configured for permitting an up-and-down movement of the mooring arm (2) relative to the base (4).

4. The boat mooring device (100) of aspect 3, wherein the mooring arm (2) includes an abutment member (8) for abutting on the second end of the spring (1) during an upward movement of the mooring arm (2), such as during an upward movement of the mooring arm (2) when no boat (15) is moored at the mooring arm (2).

5. The boat mooring device (100) of any one of the preceding aspects, wherein the base (4) includes:
   - a mounting section (4') for mounting the base (4) to the boat mooring location (22), and
   - a receiving section (4'') connected to the mounting section (4'), wherein the first end of the spring (1) is received by the receiving section (4'') such that in a rest position of the spring (1), in

which the spring (1) is undeformed, the spring (1) extends in a substantially upright direction from the mounting section (4').

6. The boat mooring device (100) of any one of the preceding aspects, further comprising:
   - an eyelet (5) for attaching the boat (15) to the mooring arm (2), wherein the eyelet (5) is coupled to the mooring arm (2) by a second swivel joint (5') configured for permitting a pivot movement of the eyelet (5) relative to the mooring arm (2).

7. The boat mooring device (100) of aspect 6, wherein a swivel axis of the first swivel joint (3) and a swivel axis of the second swivel joint (5') are arranged at an angle to one another, preferably at a right angle to one another.

8. The boat mooring device (100) of aspect 7, wherein the first swivel axis permits an up-and-down movement of the mooring arm (2) relative to the base (4), and the second swivel axis permits a left-and-right movement of the eyelet (5) relative to the mooring arm (2), preferably a 180° left-and-right movement of the eyelet (5) relative to the mooring arm (2).

9. The boat mooring device (100), further comprising:
   - at least one mooring line attachment member (6, 7) for attaching a mooring line (11) to the boat mooring device (100).

10. The boat mooring device (100) of aspect 9, wherein a first mooring line attachment member (6) is arranged at the mooring arm (2), preferably near an outer end thereof, and a second mooring line attachment member (7) is arranged at the base (4).

11. The boat mooring (100) device of any one of the preceding aspects, further comprising:
   - a padlock device (200) for connecting the mooring arm (2) to the boat (15), wherein the padlock device (200) is configured to be connected to the boat (15) or to a cleat of the boat (15).

12. The boat mooring device (100) of aspect 11, wherein the padlock device (200) includes:
   - a padlock (9) with a main body, a slit (9') arranged in the main body, and a bolt (9'') extending through the slit (9'), wherein the slit (9') is configured for accommodating an end of the mooring arm (2), such as an eyelet (5), and the bolt (9'') is configured for securing the end of the mooring arm (2) in the slit (9').

13. The boat mooring device (100) of aspect 12, wherein the padlock device (200) further includes:
   - a base plate (10) with a rim wall (10') delimiting an opening (18) in the base plate (10), and
   - an H-profile (16) configured to be connected to the base plate (10), wherein
   - the H-profile (16) includes a first leg (16') and a second leg (16''),
   - the first leg (16') and the second leg (16'') are connected to one another by a central web (16''') so as to form the H-profile (16),
   - the first leg (16') and the second leg (16'') are connected to the rim wall (10') such that the central web (16''') crosses the opening (18) of the base plate (10),
   - the padlock (9) is fitted through the opening (18) from underneath the base plate (10), and

- the padlock (9) is arranged inside the H-profile (16) such that the central web (16''') of the H-profile (16) is received by the slit (9') of the padlock (9).

14. The boat mooring device (100) of aspect 13, wherein the padlock device (200) further includes:
    - a securing member (19) for securing the padlock (9) in its position inside the H-profile (16).

15. The boat mooring device (100) of aspect 14, wherein the securing member (19) is arranged underneath the base plate (10) and secured to the base plate (10) so as to sandwich the padlock between the base plate (10) and the securing member (19).

16. The boat mooring device (100) of any one of the preceding aspects, wherein the spring (1) includes a hollow section, preferably at the first end of the spring (1), wherein a stabilization member (24), such as another spring, is arranged inside the hollow section, for stabilizing the spring (1), preferably during torsional deformation of the spring (1).

17. The boat mooring device (100) of aspect 16, wherein one end of the stabilization member (24) is connected to the base (4).

18. A combination of a first boat mooring device (100) according to any one of the preceding aspects, and a second boat mooring device (100) according to any one of the preceding aspects, the combination further including:
    - at least two boat mooring lines (11) connected to the first boat mooring device (100) and the second boat mooring device (100), preferably arranged in a cross-configuration, at respective ends of the first and second boat mooring device (100), wherein the boat mooring lines (11) are configured to limit a lateral movement, such as a fore-and-aft movement, of a boat (15) moored to the first and second boat mooring device (100).

19. The combination of aspect 18, further including:
    - a hook (7) arranged on each of the boat mooring lines (11) at a location between a first and a second end of a respective boat mooring line (11), wherein the hook (7) is configured to be connected to a base end or a boat end of the respective first or second boat mooring device (100) such that by connecting the hook (7) to the respective first and second boat mooring device (100), an effective length of the respective boat mooring line (11) is reduced for reducing a maximal lateral movement of the moored boat (15).

20. A boat mooring device (300) for mooring a boat (15) at a boat mooring location (22) such as a dock or pier, the boat mooring device (300) comprising:
    - a mooring arm (2) configured for extending between the boat (15) and the boat mooring location (22),
    - a base (4) coupled to the mooring arm (2) for supporting the mooring arm (2) at the boat mooring location (22), and
    - a spring (1) fixedly connected to the mooring arm (2) and configured for coupling the mooring arm (2) to the boat (15).

21. The boat mooring device (300) of aspect 20, wherein the spring (1) is connected to the mooring arm (2) such that in a rest position of the spring (1), in which the spring (1) is undeformed, the spring (1) extends in a substantially upright direction from the mooring arm (2), preferably wherein the spring (1) extends in a substantially upright and downward direction from the mooring arm (2).

22. The boat mooring device (300) of aspects 20 or 21, wherein the spring (1) is connected to the mooring arm (2) by a sleeve or holder (25).

23. The boat mooring device (300) of any one of aspects 20 to 22, wherein the spring (1) includes a first end and a second end, wherein the first end is connected to the mooring arm (2) and the second end is coupled to an eyelet (5) configured for connecting the mooring arm (2) to the boat (15).

24. The boat mooring device (300) of aspect 23, wherein the eyelet (5) is rotatably coupled to the second end of the spring (1), preferably such that the eyelet (5) is rotatable about an axis (1') of the spring (1), preferably wherein the eyelet (5) is rotatable about 360° about the axis (1').

25. The boat mooring device (300) of any one of aspects 20 to 24, wherein the spring (1) includes a narrowed shape, preferably at an end of the spring (1) that is not connected to the moored arm (2).

26. The boat mooring device (300) of any one of aspects 20 to 25, further comprising:
- a swivel joint (26) coupling the mooring arm (2) to the base, wherein the swivel joint (26) is configured to permit a pivot movement of the mooring arm (2) relative to the base (4).

27. The boat mooring device (300) of aspect 26, wherein the swivel joint (26) is configured for permitting an up-and-down movement of the mooring arm (2).

28. The boat mooring device (300) of aspect 27, wherein the swivel joint (26) is configured for permitting only an up-and-down movement of the mooring arm (2) and no left-and-right movement of the mooring arm (2).

29. The boat mooring device (300) of any one of aspects 20 to 28, further comprising:
- a padlock device (200) for connecting the spring (1) to the boat (15), wherein the padlock device (200) is configured to be connected to the boat (15) or a cleat of the boat (15).

30. The boat mooring device (300) of aspect 29, wherein the padlock device (200) includes:
- a padlock (9) with a main body, a slit (9') arranged in the main body, and a bolt (9'') extending through the slit (9'), wherein the slit (9') is configured for accommodating an end of the spring (1) or an eyelet (5) connected to the spring (1), and the bolt (9'') is configured for securing the end of the spring (1) or the eyelet (5), respectively, in the slit (9') of the padlock (9).

31. The boat mooring device (300) of aspect 30, wherein the padlock device (200) further includes:
- a base plate (10) with a rim wall (10') delimiting an opening (18) in the base plate (10), and
- an H-profile (16) configured to be connected to the base plate (10), wherein
- the H-profile (16) includes a first leg (16') and a second leg (16''),
- the first leg (16') and the second leg (16'') are connected to one another by a central web (16'''),

- the first leg (16') and the second leg (16'') are connected to the rim wall (10') of the base plate (10) such that the central web (16''') crosses the opening (18) of the base plate (10),
- the padlock (9) is fitted through the opening (18) from underneath the base plate (10), and
- the padlock (9) is arranged inside the H-profile (16) such that the central web (16''') of the H-profile (16) is received by the slit (9') of the padlock (9).

32. The boat mooring device (300) of aspect 31, wherein the padlock device (200) further includes:
- a securing member (19) for securing the padlock (9) in its position inside the H-profile (16).

33. The boat mooring device (300) of aspect 32, wherein the securing member (19) is arranged underneath the base plate (10) and secured to the base plate (10) so as to sandwich the padlock (9) between the base plate (10) and the securing member (19).

34. A padlock device (200) configured for connecting a boat end of a boat mooring device (100, 300) to a boat (15) for mooring the boat (15) at a boat mooring location (22) such as a dock or pier, the padlock device (200) comprising:
- a padlock (9) with a main body, a slit (9') arranged in the main body, and a bolt (9'') extending through the slit (9'), wherein the slit (9') is configured for accommodating the boat end of the boat mooring device (100, 300), and the bolt (9'') is configured for securing the boat end in the slit (9') of the padlock (9),
- a base plate (10) with a rim wall (10') delimiting an opening (18) in the base plate (10), and
- an H-profile (16) configured to be connected to the base plate (10), wherein
- the H-profile (16) includes a first leg (16') and a second leg (16''),
- the first leg (16') and the second leg (16'') are connected to one another by a central web (16'''),
- the first leg (16') and the second leg (16'') are connected to the rim wall (10') of the base plate (10) such that the central web (16''') crosses the opening (18) of the base plate (10),
- the padlock (9) is fitted through the opening (18) from underneath the base plate (10), and
- the padlock (9) is arranged inside the H-profile (16) such that the central web (16''') of the H-profile (16) is received by the slit (9') of the padlock (9).

35. The padlock device (200) of aspect 34, further comprising:
- a securing member (19) for securing the padlock (9) in its position inside the H-profile (16).

36. The padlock device (200) of aspect 35, wherein the securing member (19) is arranged underneath the base plate (10) and secured to the base plate (10) so as to sandwich the padlock (9) between the base plate (10) and the securing member (19).

CLAIMS

1. A boat mooring device (100) for mooring a boat (15) at a boat mooring location (22) such as a dock or pier, the boat mooring device (100) comprising:
   - a mooring arm (2) configured for extending between the boat (15) and the boat mooring location (22),
   - a base (4) for supporting the mooring arm (2) at the boat mooring location (22),
   - a spring (1) for coupling the mooring arm (2) to the base (4), and
   - a swivel joint (3) arranged between the spring (1) and the mooring arm (2) for permitting a pivot movement between the spring (1) and the mooring arm (2), wherein a first end of the spring (1) is connected to the base (4) and a second end of the spring (1) is connected to the swivel joint (3).

2. The boat mooring device (100) of claim 1, wherein the second end of the spring (1) includes a ring (23), and the mooring arm (2) includes a bolt extending through the ring (23) so as to provide for the swivel joint (3).

3. The boat mooring device (100) of claims 1 or 2, wherein the swivel joint (3) is configured for permitting an up-and-down movement of the mooring arm (2) relative to the base (4).

4. The boat mooring device (100) of claim 3, wherein the mooring arm (2) includes an abutment member (8) for abutting on the second end of the spring (1) during an upward movement of the mooring arm (2), such as during an upward movement of the mooring arm (2) when no boat (15) is moored at the mooring arm (2).

5. The boat mooring device (100) of any one of the preceding claims, wherein the base (4) includes:
   - a mounting section (4') for mounting the base (4) to the boat mooring location (22), and
   - a receiving section (4'') connected to the mounting section (4'), wherein the first end of the spring (1) is received by the receiving section (4'') such that in a rest position of the spring (1), in which the spring (1) is undeformed, the spring (1) extends in a substantially upright direction from the mounting section (4').

6. The boat mooring device (100) of any one of the preceding claims, further comprising:
   - an eyelet (5) for attaching the boat (15) to the mooring arm (2), wherein the eyelet (5) is coupled to the mooring arm (2) by a second swivel joint (5') configured for permitting a pivot movement of the eyelet (5) relative to the mooring arm (2).

7. The boat mooring device (100) of claim 6, wherein a swivel axis of the first swivel joint (3) and a swivel axis of the second swivel joint (5') are arranged at an angle to one another, preferably at a right angle to one another.

8. The boat mooring device (100) of claim 7, wherein the first swivel axis permits an up-and-down movement of the mooring arm (2) relative to the base (4), and the second swivel axis permits a left-and-right movement of the eyelet (5) relative to the mooring arm (2), preferably a 180° left-and-right movement of the eyelet (5) relative to the mooring arm (2).

9. The boat mooring device (100), further comprising:
   - at least one mooring line attachment member (6, 7) for attaching a mooring line (11) to the boat mooring device (100).

10. The boat mooring device (100) of claim 9, wherein a first mooring line attachment member (6) is arranged at the mooring arm (2), preferably near an outer end thereof, and a second mooring line attachment member (7) is arranged at the base (4).

11. The boat mooring (100) device of any one of the preceding claims, further comprising:
   - a padlock device (200) for connecting the mooring arm (2) to the boat (15), wherein the padlock device (200) is configured to be connected to the boat (15) or to a cleat of the boat (15).

12. The boat mooring device (100) of claim 11, wherein the padlock device (200) includes:
   - a padlock (9) with a main body, a slit (9') arranged in the main body, and a bolt (9'') extending through the slit (9'), wherein the slit (9') is configured for accommodating an end of the mooring arm (2), such as an eyelet (5), and the bolt (9'') is configured for securing the end of the mooring arm (2) in the slit (9').

13. The boat mooring device (100) of claim 12, wherein the padlock device (200) further includes:
   - a base plate (10) with a rim wall (10') delimiting an opening (18) in the base plate (10), and
   - an H-profile (16) configured to be connected to the base plate (10), wherein
   - the H-profile (16) includes a first leg (16') and a second leg (16''),
   - the first leg (16') and the second leg (16'') are connected to one another by a central web (16''') so as to form the H-profile (16),
   - the first leg (16') and the second leg (16'') are connected to the rim wall (10') such that the central web (16''') crosses the opening (18) of the base plate (10),
   - the padlock (9) is fitted through the opening (18) from underneath the base plate (10), and
   - the padlock (9) is arranged inside the H-profile (16) such that the central web (16''') of the H-profile (16) is received by the slit (9') of the padlock (9).

14. The boat mooring device (100) of claim 13, wherein the padlock device (200) further includes:
   - a securing member (19) for securing the padlock (9) in its position inside the H-profile (16).

15. The boat mooring device (100) of claim 14, wherein the securing member (19) is arranged underneath the base plate (10) and secured to the base plate (10) so as to sandwich the padlock between the base plate (10) and the securing member (19).

16. The boat mooring device (100) of any one of the preceding claims, wherein the spring (1) includes a hollow section, preferably at the first end of the spring (1), wherein a stabilization member (24), such as another spring, is arranged inside the hollow section, for stabilizing the spring (1), preferably during torsional deformation of the spring (1).

17. The boat mooring device (100) of claim 16, wherein one end of the stabilization member (24) is connected to the base (4).

18. A combination of a first boat mooring device (100) according to any one of the preceding claims, and a second boat mooring device (100) according to any one of the preceding claims, the combination further including:
    - at least two boat mooring lines (11) connected to the first boat mooring device (100) and the second boat mooring device (100), preferably arranged in a cross-configuration, at respective ends of the first and second boat mooring device (100), wherein the boat mooring lines (11) are configured to limit a lateral movement, such as a fore-and-aft movement, of a boat (15) moored to the first and second boat mooring device (100).

19. The combination of claim 18, further including:
    - a hook (7) arranged on each of the boat mooring lines (11) at a location between a first and a second end of a respective boat mooring line (11), wherein the hook (7) is configured to be connected to a base end or a boat end of the respective first or second boat mooring device (100) such that by connecting the hook (7) to the respective first and second boat mooring device (100), an effective length of the respective boat mooring line (11) is reduced for reducing a maximal lateral movement of the moored boat (15).

20. A boat mooring device (300) for mooring a boat (15) at a boat mooring location (22) such as a dock or pier, the boat mooring device (300) comprising:
    - a mooring arm (2) configured for extending between the boat (15) and the boat mooring location (22),
    - a base (4) coupled to the mooring arm (2) for supporting the mooring arm (2) at the boat mooring location (22), and
    - a spring (1) fixedly connected to the mooring arm (2) and configured for coupling the mooring arm (2) to the boat (15).

21. The boat mooring device (300) of claim 20, wherein the spring (1) is connected to the mooring arm (2) such that in a rest position of the spring (1), in which the spring (1) is undeformed, the spring (1) extends in a substantially upright direction from the mooring arm (2), preferably wherein the spring (1) extends in a substantially upright and downward direction from the mooring arm (2).

22. The boat mooring device (300) of claims 20 or 21, wherein the spring (1) is connected to the mooring arm (2) by a sleeve or holder (25).

23. The boat mooring device (300) of any one of claims 20 to 22, wherein the spring (1) includes a first end and a second end, wherein the first end is connected to the mooring arm (2) and the second end is coupled to an eyelet (5) configured for connecting the mooring arm (2) to the boat (15).

24. The boat mooring device (300) of claim 23, wherein the eyelet (5) is rotatably coupled to the second end of the spring (1), preferably such that the eyelet (5) is rotatable about an axis (1') of the spring (1), preferably wherein the eyelet (5) is rotatable about 360° about the axis (1').

25. The boat mooring device (300) of any one of claims 20 to 24, wherein the spring (1) includes a narrowed shape, preferably at an end of the spring (1) that is not connected to the moored arm (2).

26. The boat mooring device (300) of any one of claims 20 to 25, further comprising:
    - a swivel joint (26) coupling the mooring arm (2) to the base, wherein the swivel joint (26) is configured to permit a pivot movement of the mooring arm (2) relative to the base (4).

27. The boat mooring device (300) of claim 26, wherein the swivel joint (26) is configured for permitting an up-and-down movement of the mooring arm (2).

28. The boat mooring device (300) of claim 27, wherein the swivel joint (26) is configured for permitting only an up-and-down movement of the mooring arm (2) and no left-and-right movement of the mooring arm (2).

29. The boat mooring device (300) of any one of claims 20 to 28, further comprising:
    - a padlock device (200) for connecting the spring (1) to the boat (15), wherein the padlock device (200) is configured to be connected to the boat (15) or a cleat of the boat (15).

30. The boat mooring device (300) of claim 29, wherein the padlock device (200) includes:
    - a padlock (9) with a main body, a slit (9') arranged in the main body, and a bolt (9'') extending through the slit (9'), wherein the slit (9') is configured for accommodating an end of the spring (1) or an eyelet (5) connected to the spring (1), and the bolt (9'') is configured for securing the end of the spring (1) or the eyelet (5), respectively, in the slit (9') of the padlock (9).

31. The boat mooring device (300) of claim 30, wherein the padlock device (200) further includes:
    - a base plate (10) with a rim wall (10') delimiting an opening (18) in the base plate (10), and
    - an H-profile (16) configured to be connected to the base plate (10), wherein
    - the H-profile (16) includes a first leg (16') and a second leg (16''),
    - the first leg (16') and the second leg (16'') are connected to one another by a central web (16'''),
    - the first leg (16') and the second leg (16'') are connected to the rim wall (10') of the base plate (10) such that the central web (16''') crosses the opening (18) of the base plate (10),
    - the padlock (9) is fitted through the opening (18) from underneath the base plate (10), and
    - the padlock (9) is arranged inside the H-profile (16) such that the central web (16''') of the H-profile (16) is received by the slit (9') of the padlock (9).

32. The boat mooring device (300) of claim 31, wherein the padlock device (200) further includes:
    - a securing member (19) for securing the padlock (9) in its position inside the H-profile (16).

33. The boat mooring device (300) of claim 32, wherein the securing member (19) is arranged underneath the base plate (10) and secured to the base plate (10) so as to sandwich the padlock (9) between the base plate (10) and the securing member (19).

34. A padlock device (200) configured for connecting a boat end of a boat mooring device (100, 300) to a boat (15) for mooring the boat (15) at a boat mooring location (22) such as a dock or pier, the padlock device (200) comprising:

- a padlock (9) with a main body, a slit (9') arranged in the main body, and a bolt (9'') extending through the slit (9'), wherein the slit (9') is configured for accommodating the boat end of the boat mooring device (100, 300), and the bolt (9'') is configured for securing the boat end in the slit (9') of the padlock (9),
- a base plate (10) with a rim wall (10') delimiting an opening (18) in the base plate (10), and
- an H-profile (16) configured to be connected to the base plate (10), wherein
- the H-profile (16) includes a first leg (16') and a second leg (16''),
- the first leg (16') and the second leg (16'') are connected to one another by a central web (16'''),
- the first leg (16') and the second leg (16'') are connected to the rim wall (10') of the base plate (10) such that the central web (16''') crosses the opening (18) of the base plate (10),
- the padlock (9) is fitted through the opening (18) from underneath the base plate (10), and
- the padlock (9) is arranged inside the H-profile (16) such that the central web (16''') of the H-profile (16) is received by the slit (9') of the padlock (9).

35. The padlock device (200) of claim 34, further comprising:
- a securing member (19) for securing the padlock (9) in its position inside the H-profile (16).

36. The padlock device (200) of claim 35, wherein the securing member (19) is arranged underneath the base plate (10) and secured to the base plate (10) so as to sandwich the padlock (9) between the base plate (10) and the securing member (19).

Figure 1

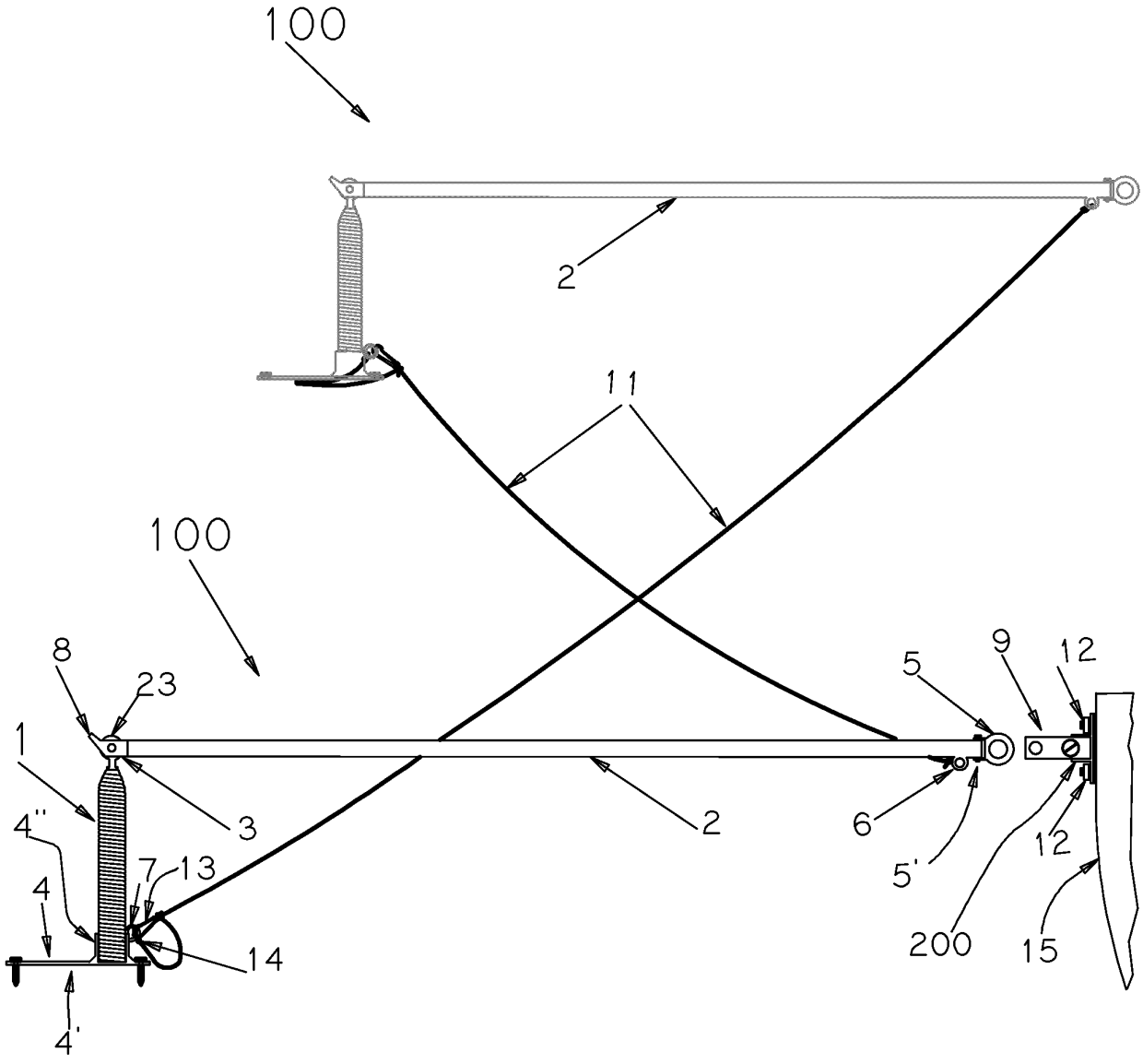


Figure 2

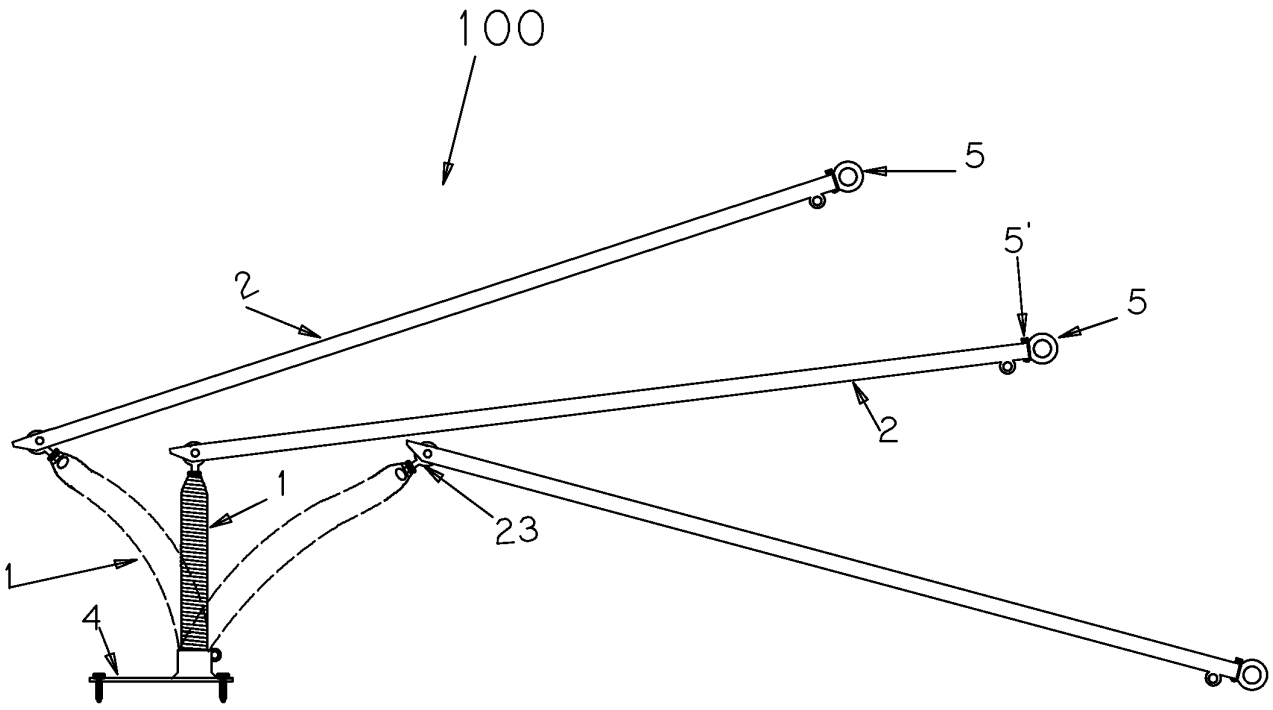


Figure 3

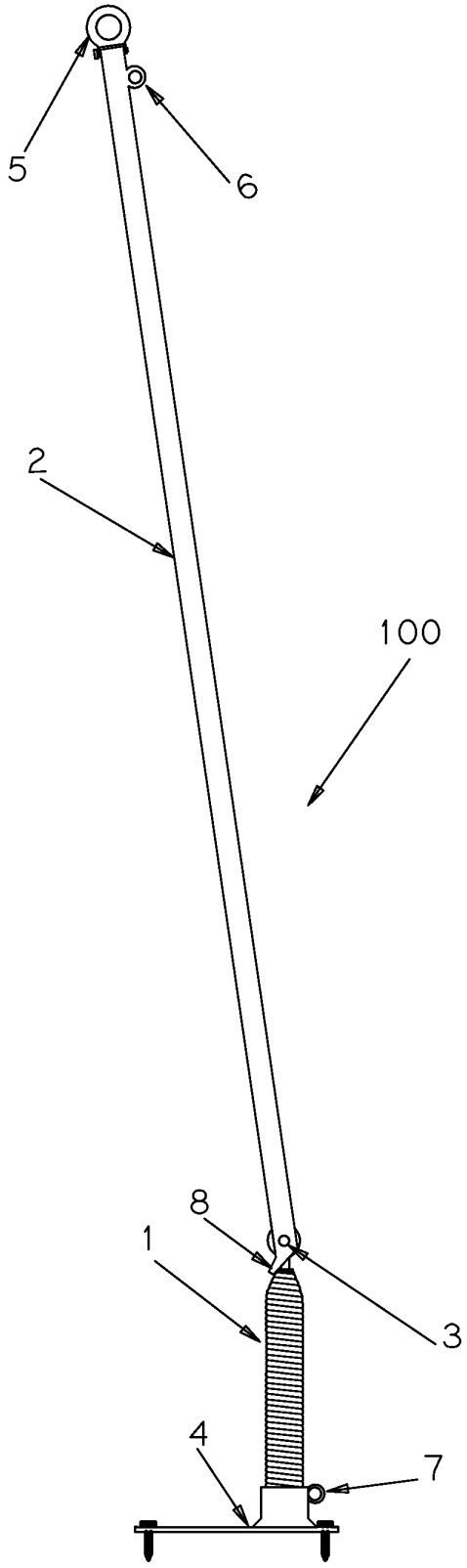


Figure 4

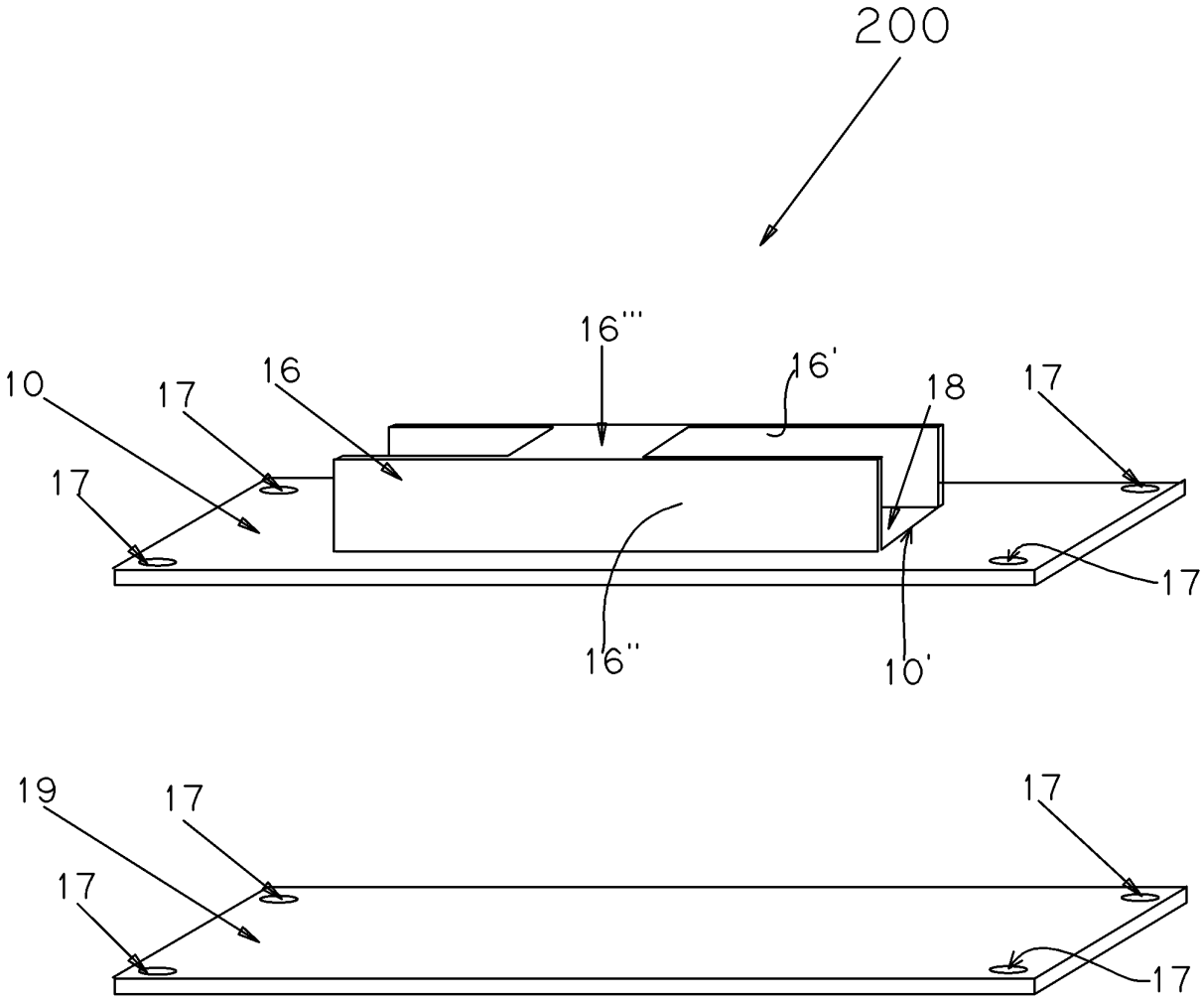


Figure 5

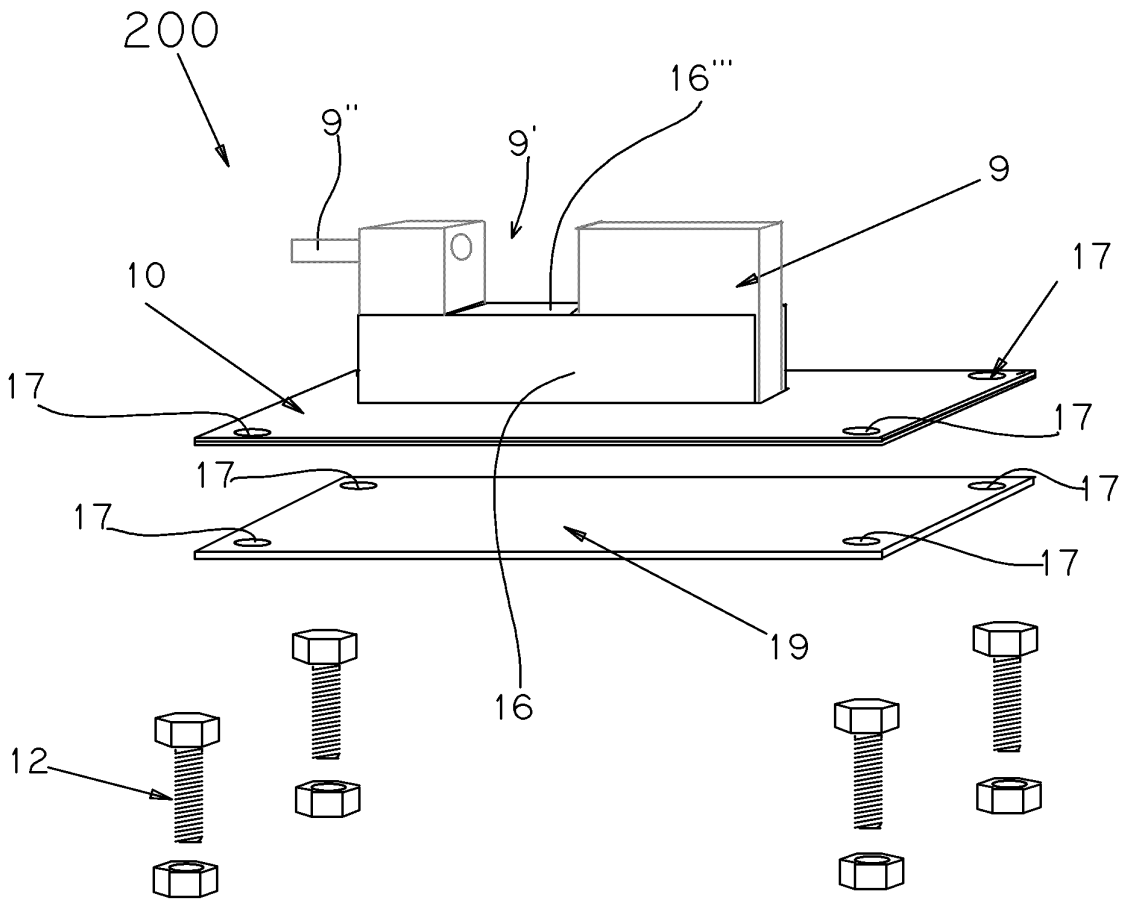


Figure 6

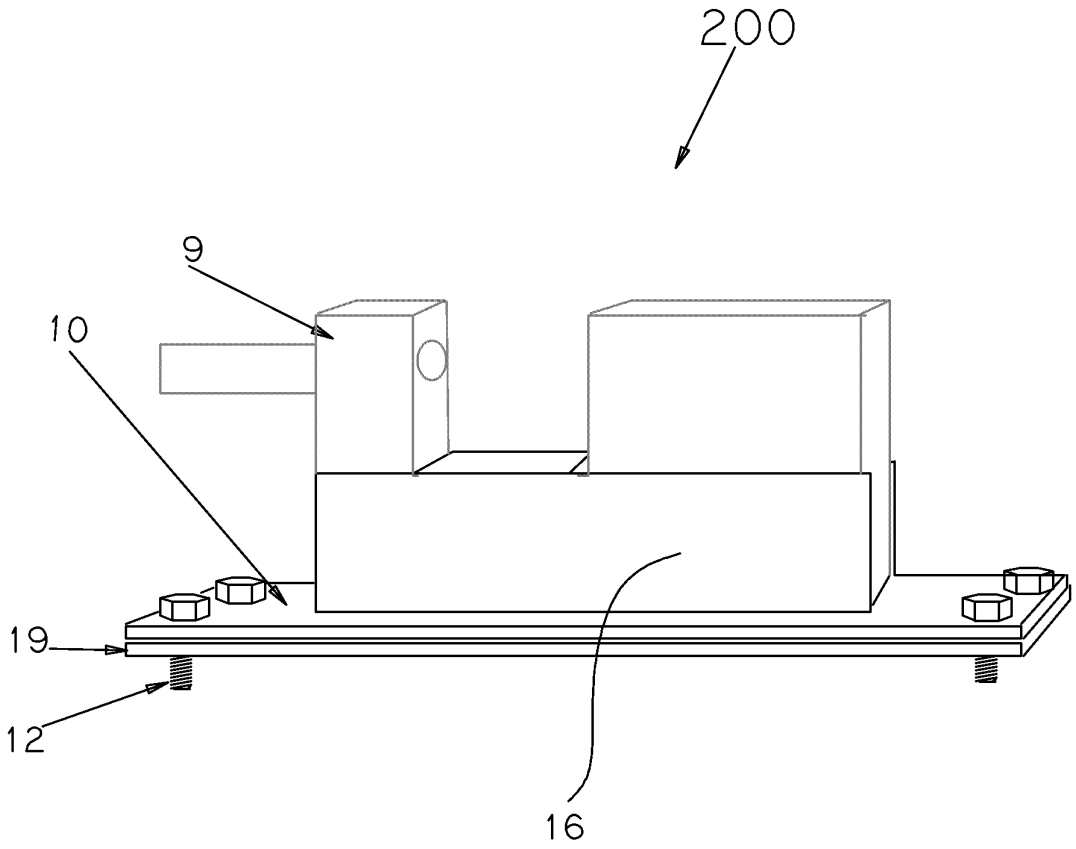


Figure 7

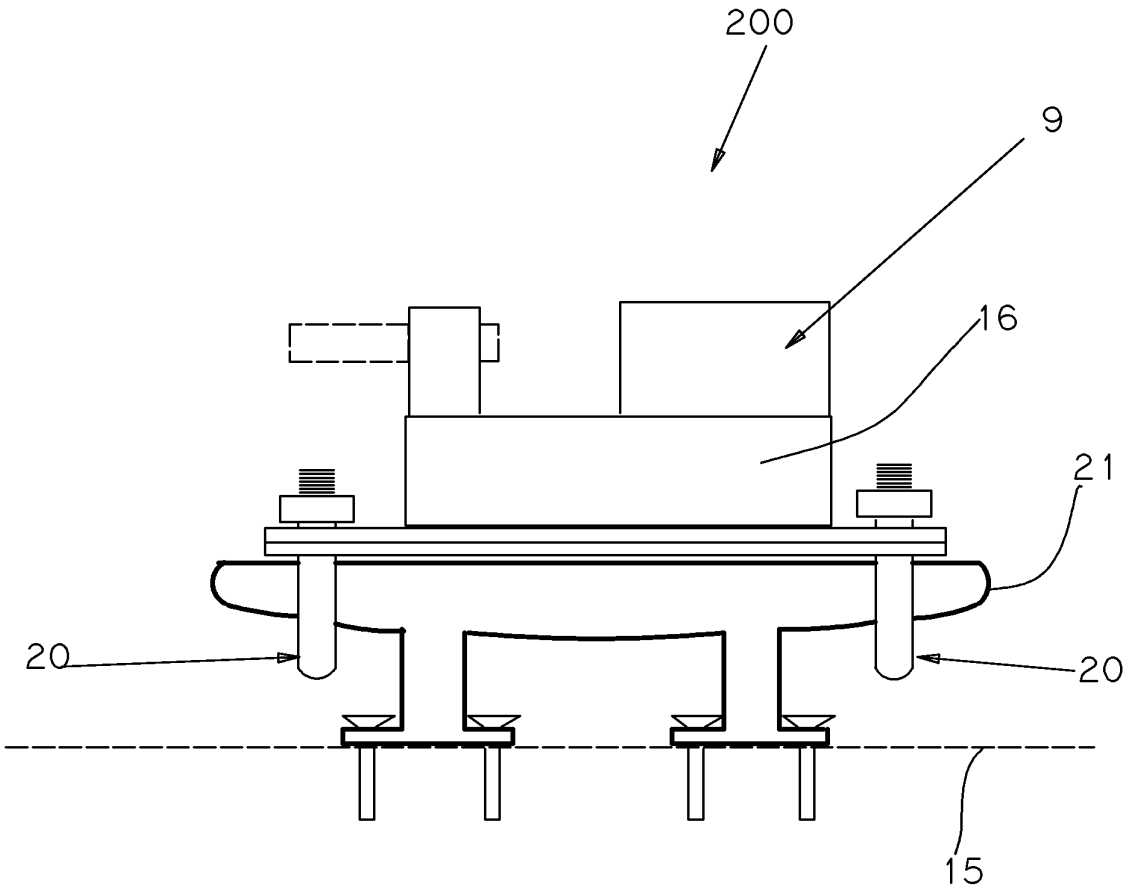


Figure 8

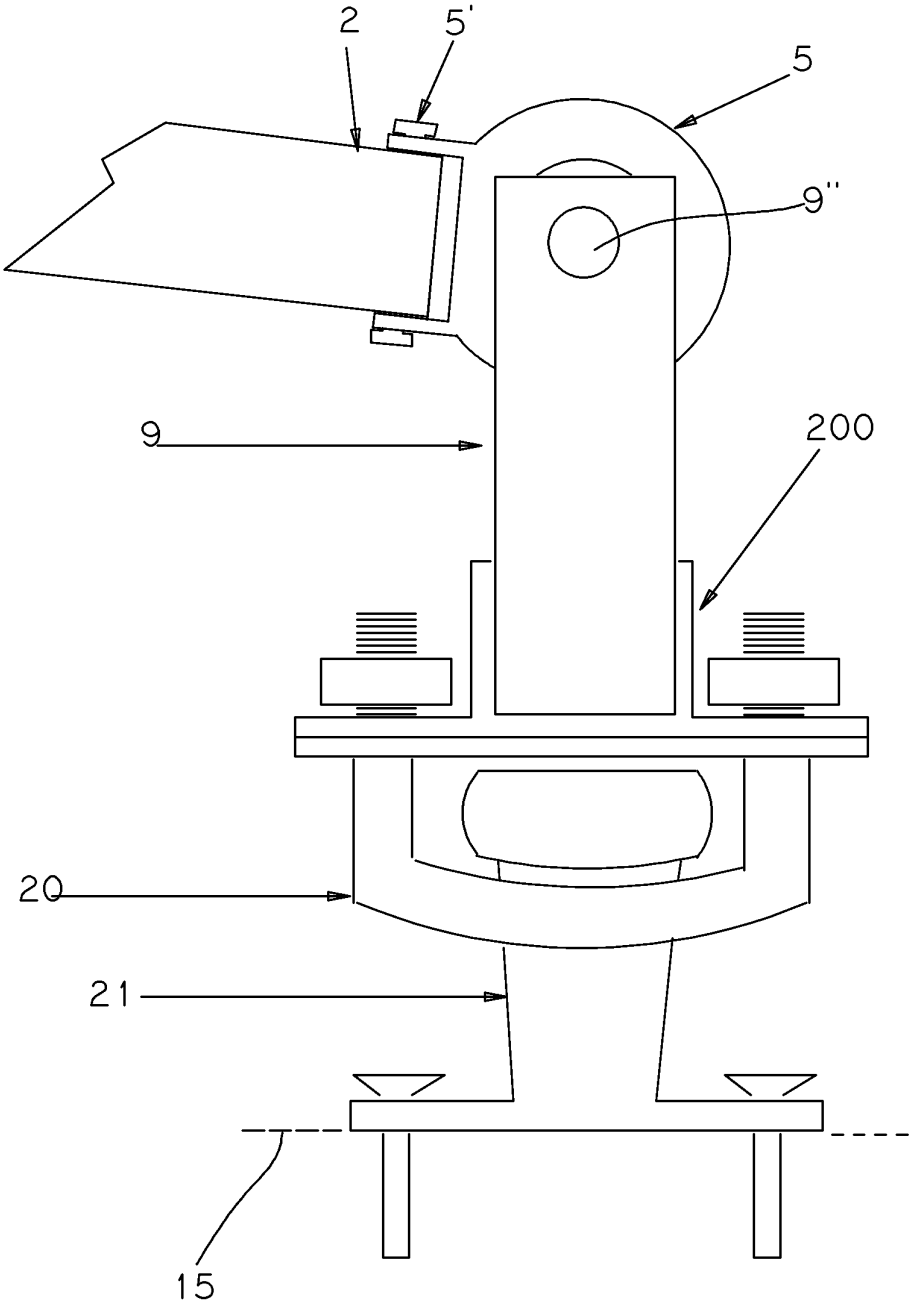


Figure 9

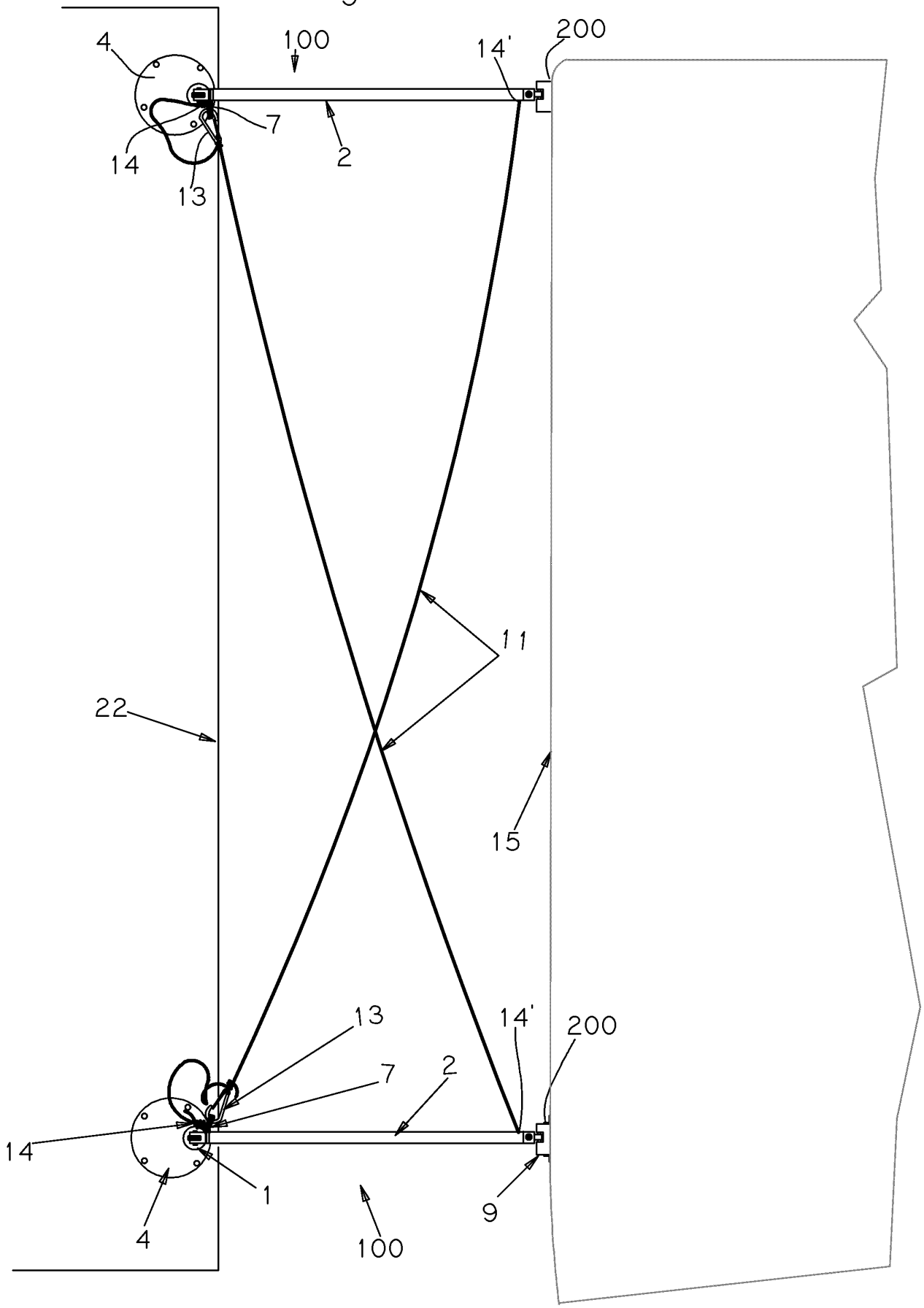


Figure 10

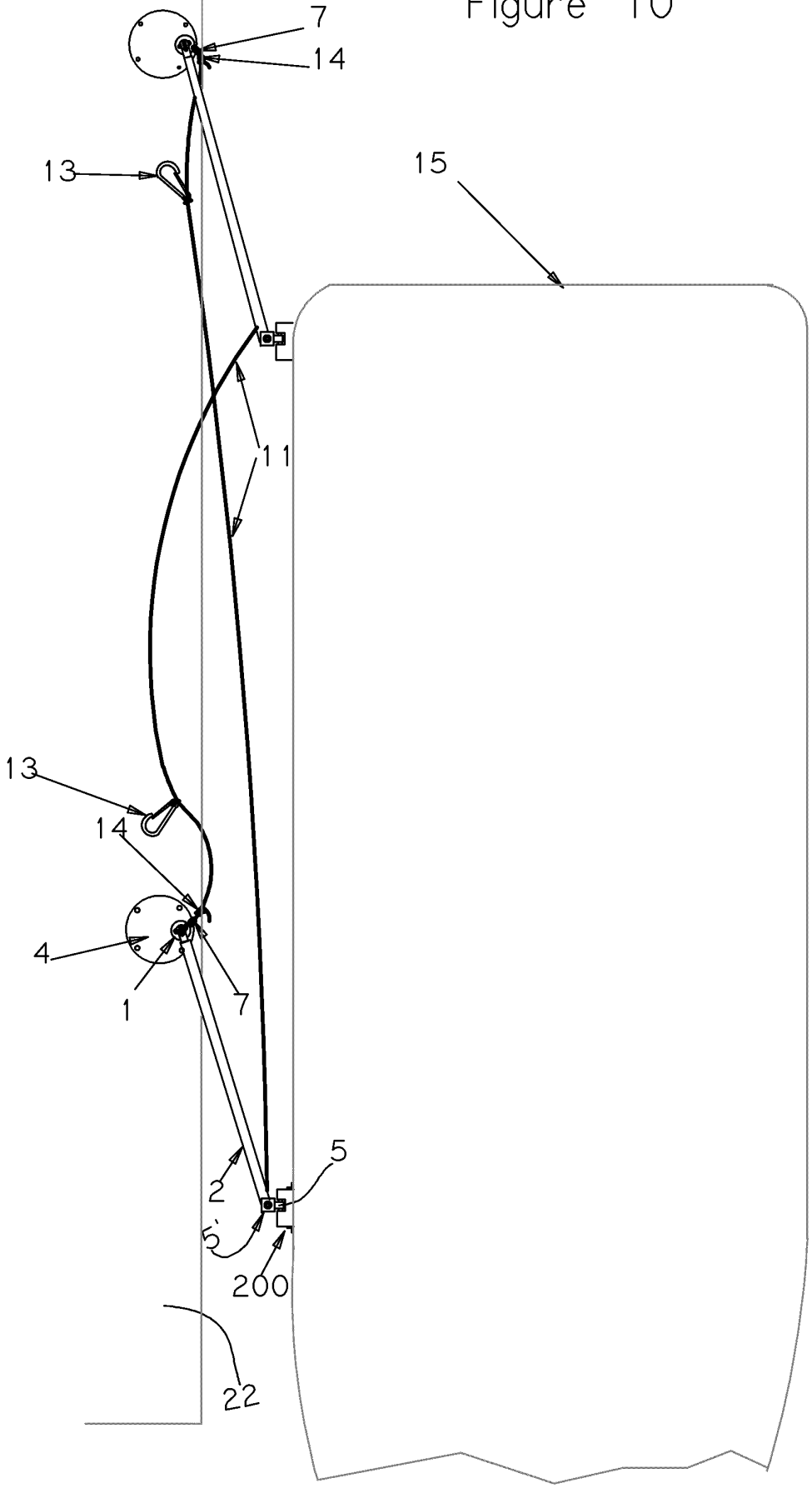


Figure 11

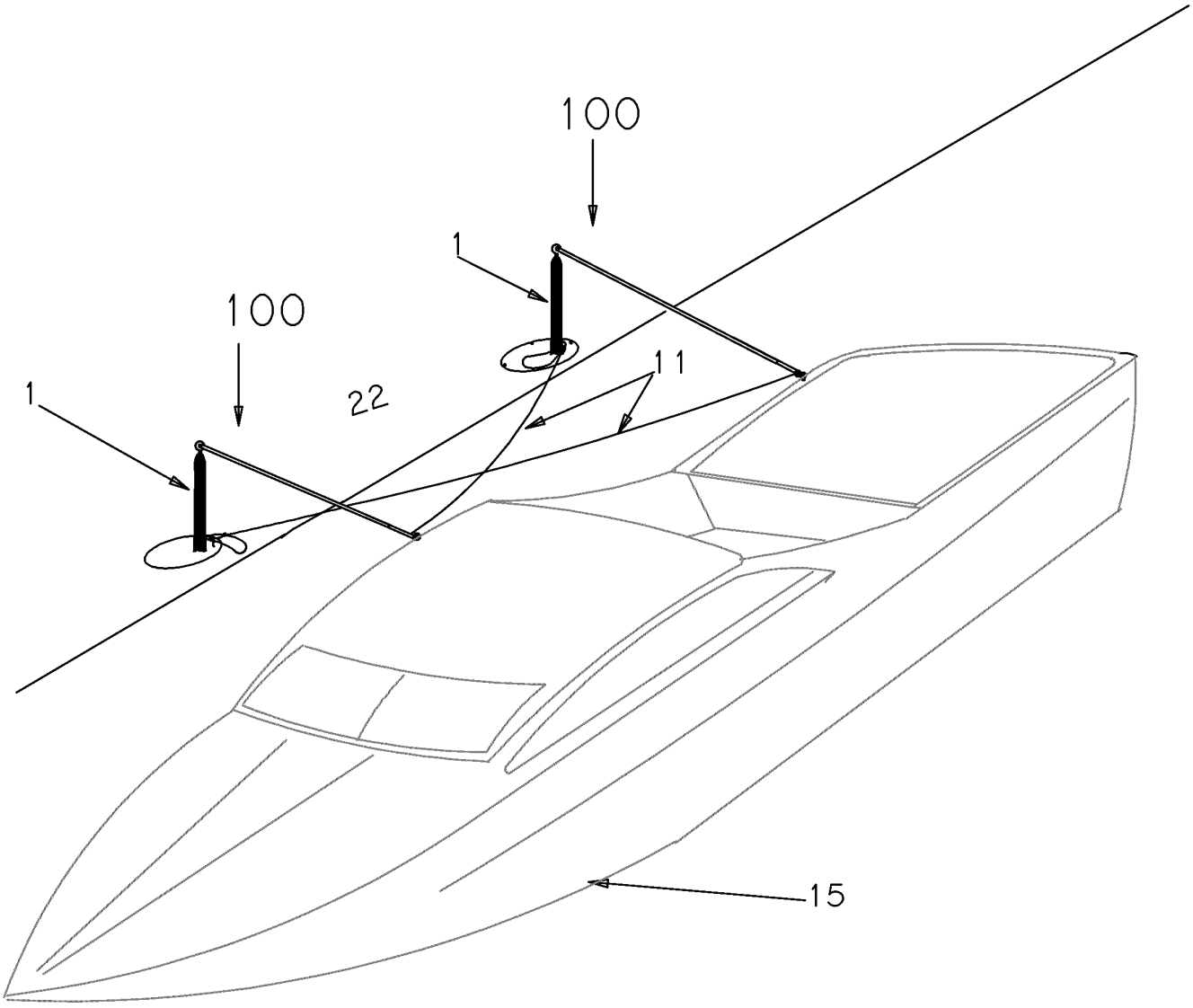


Figure 12

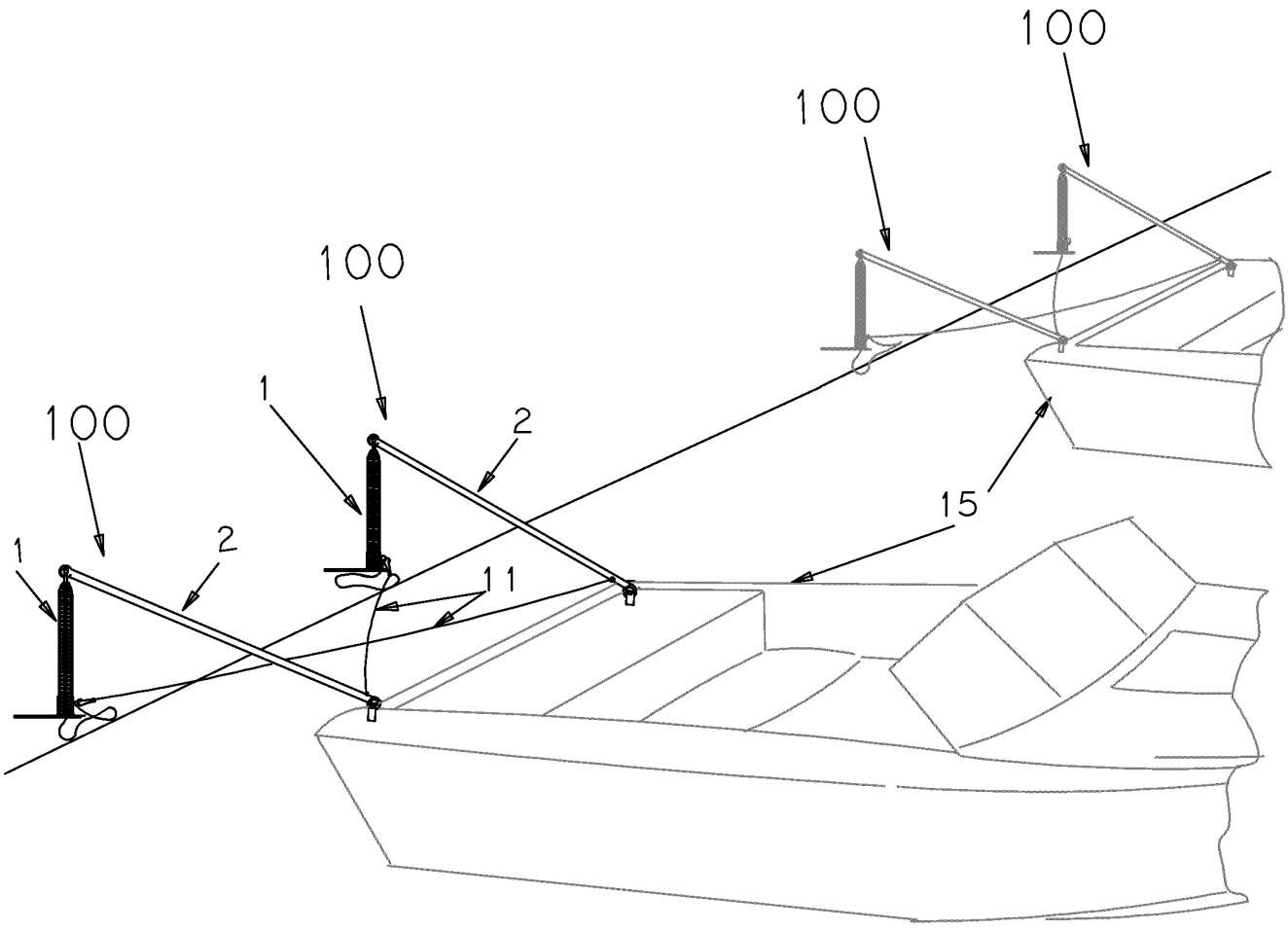


Figure 13

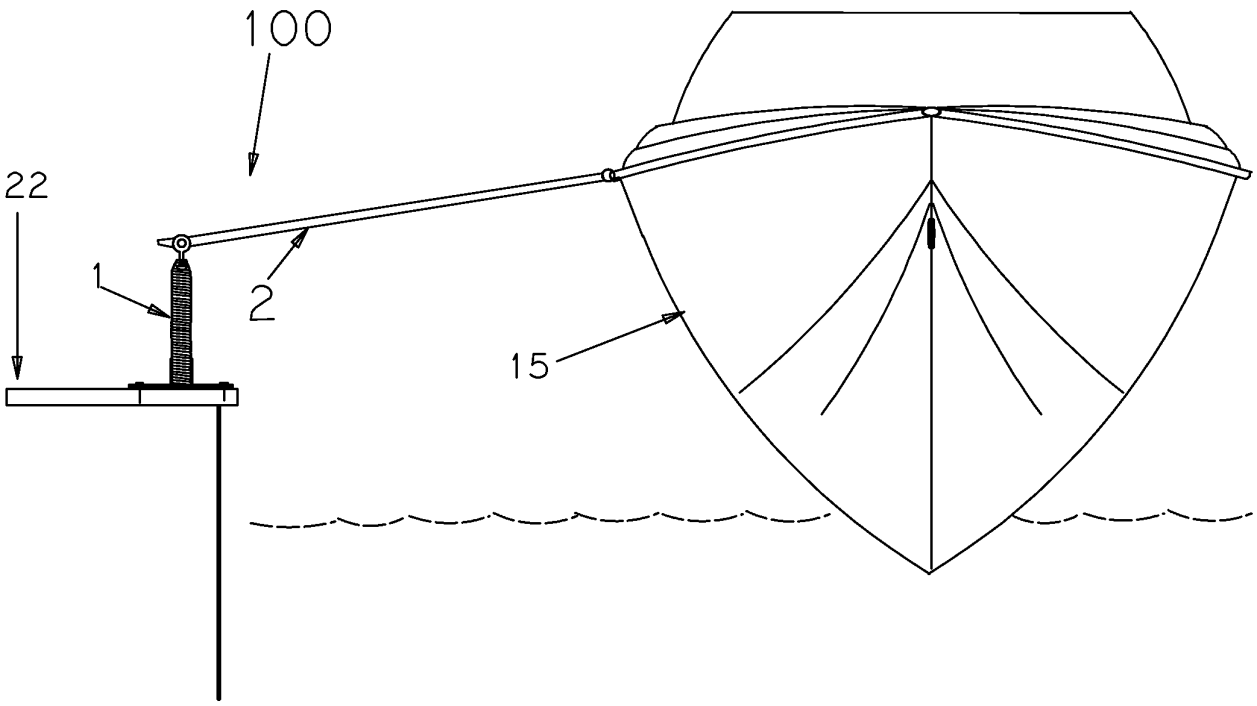


Figure 14

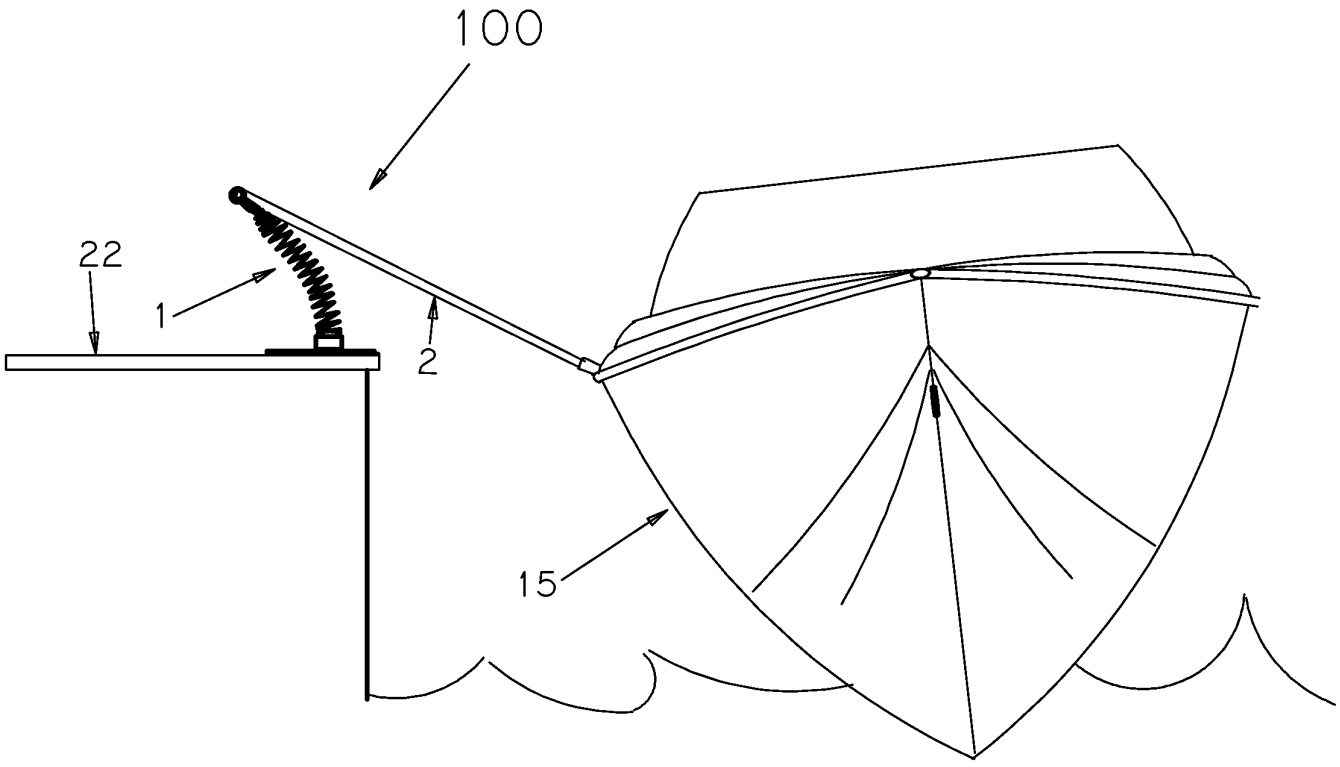


Figure 15

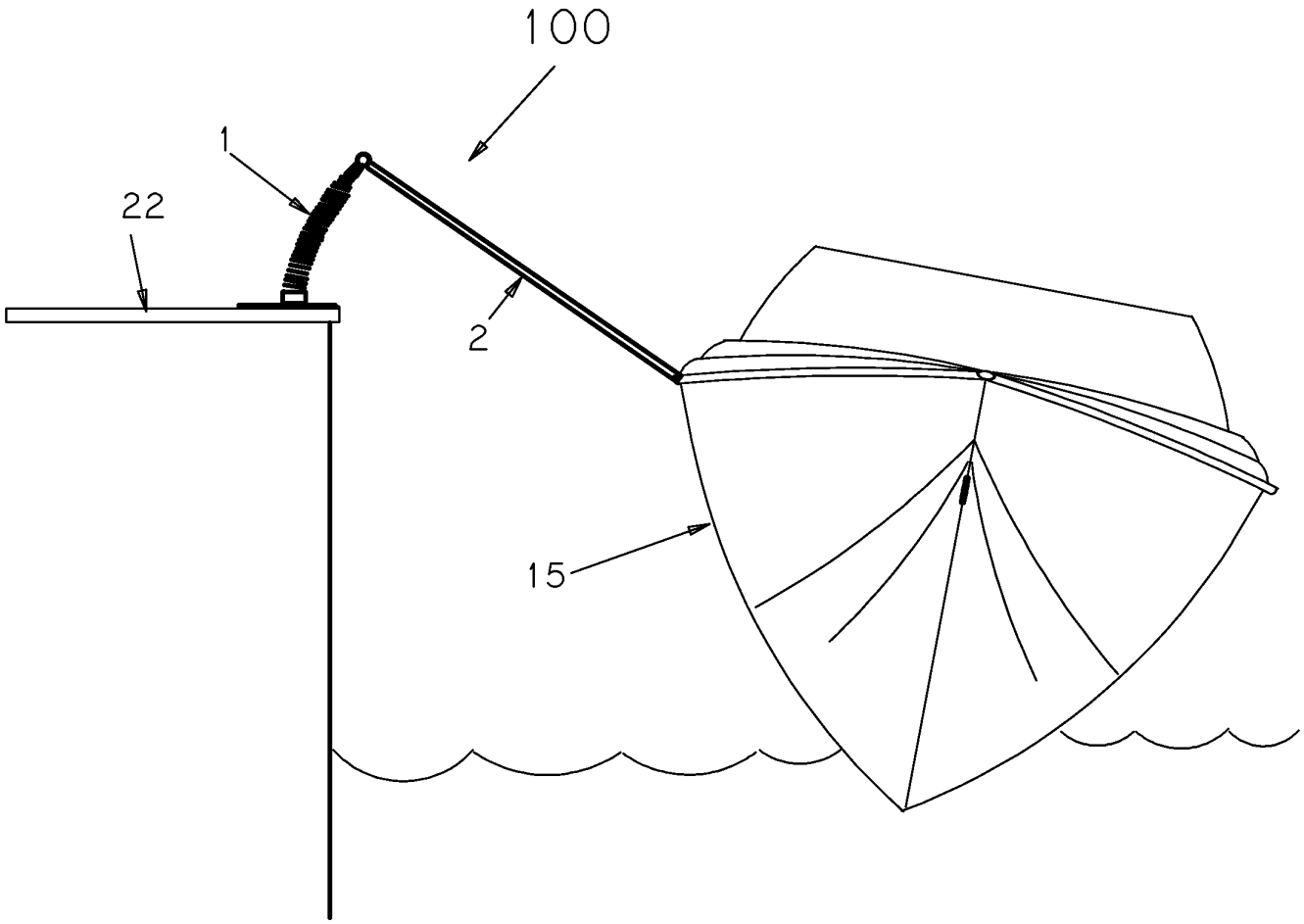


Figure 16

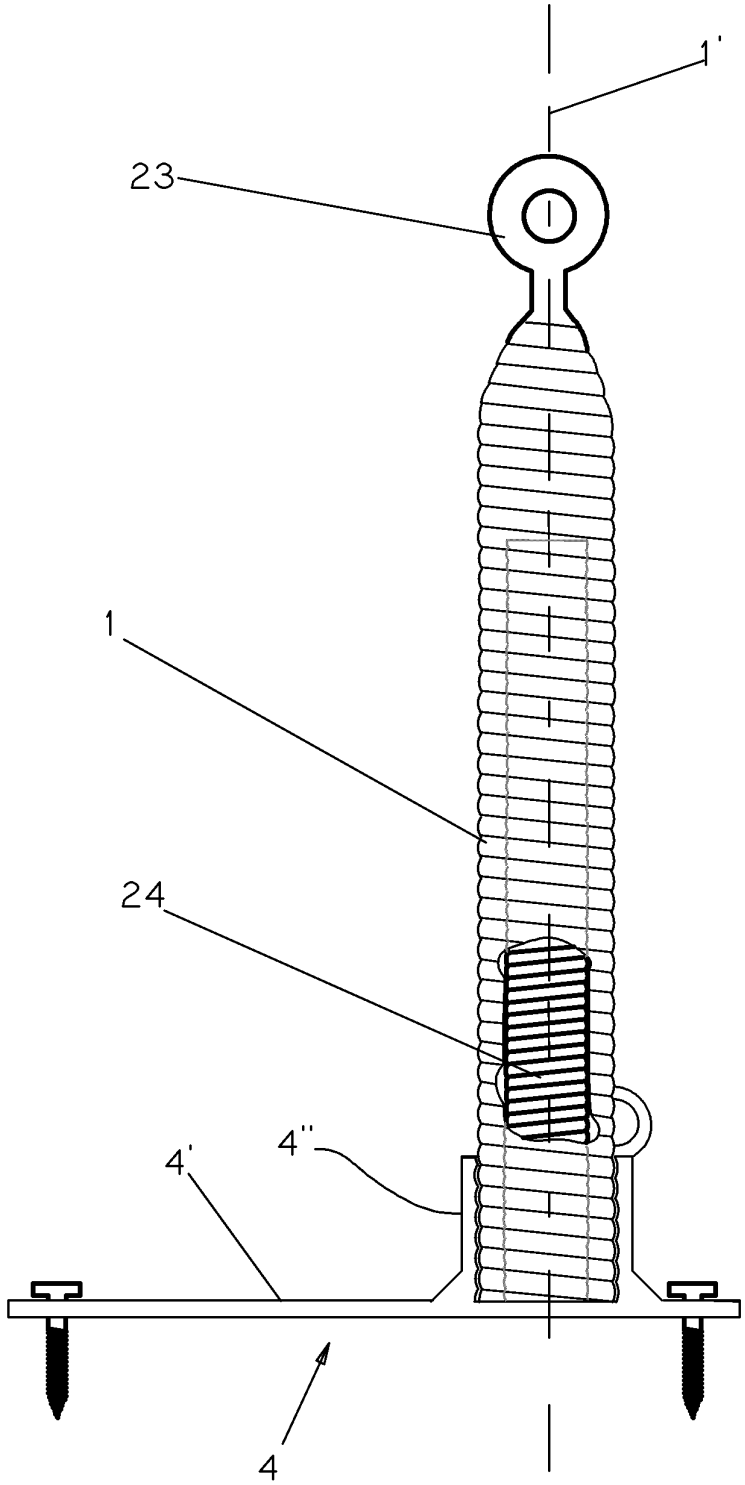


Figure 17

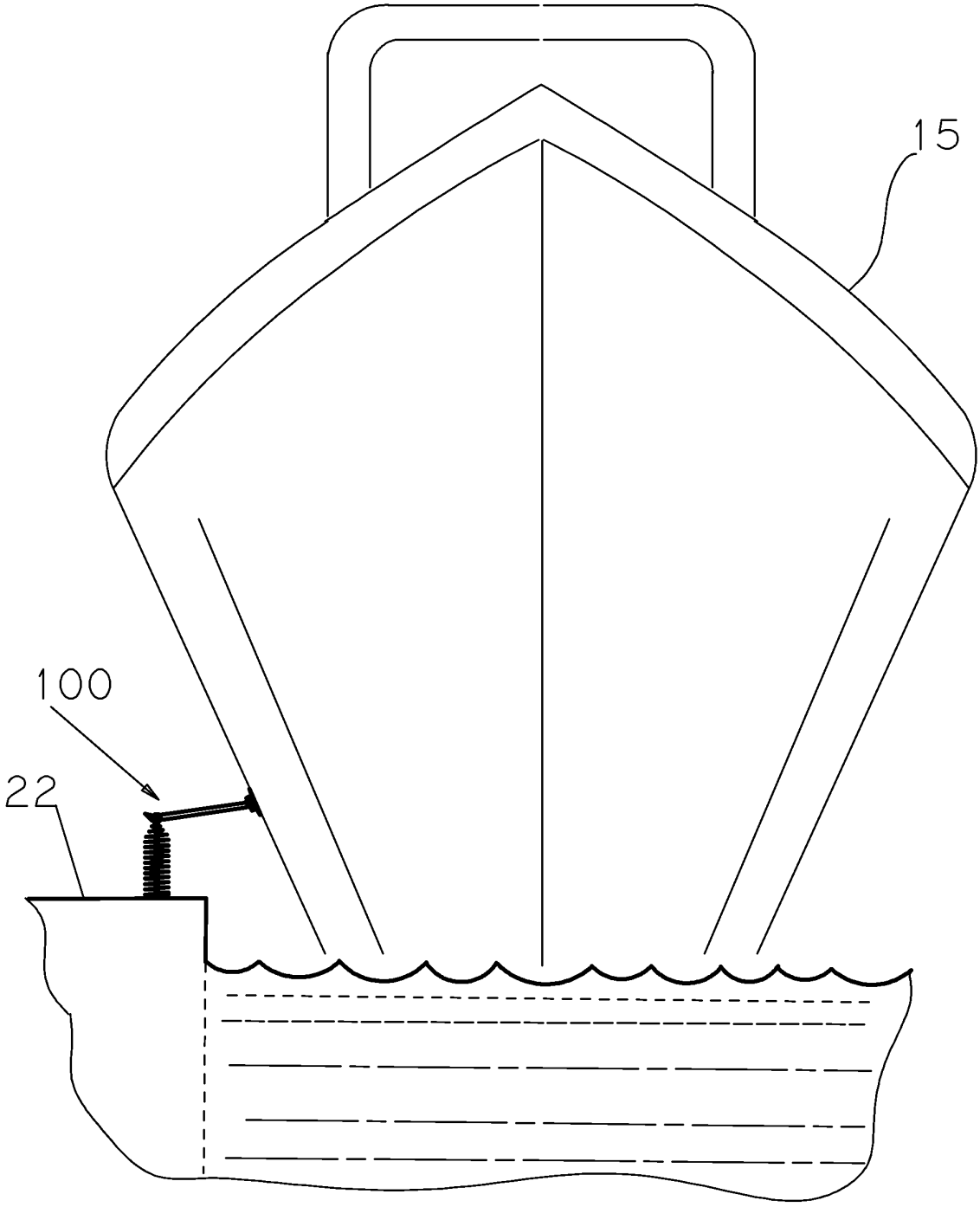


Figure 18

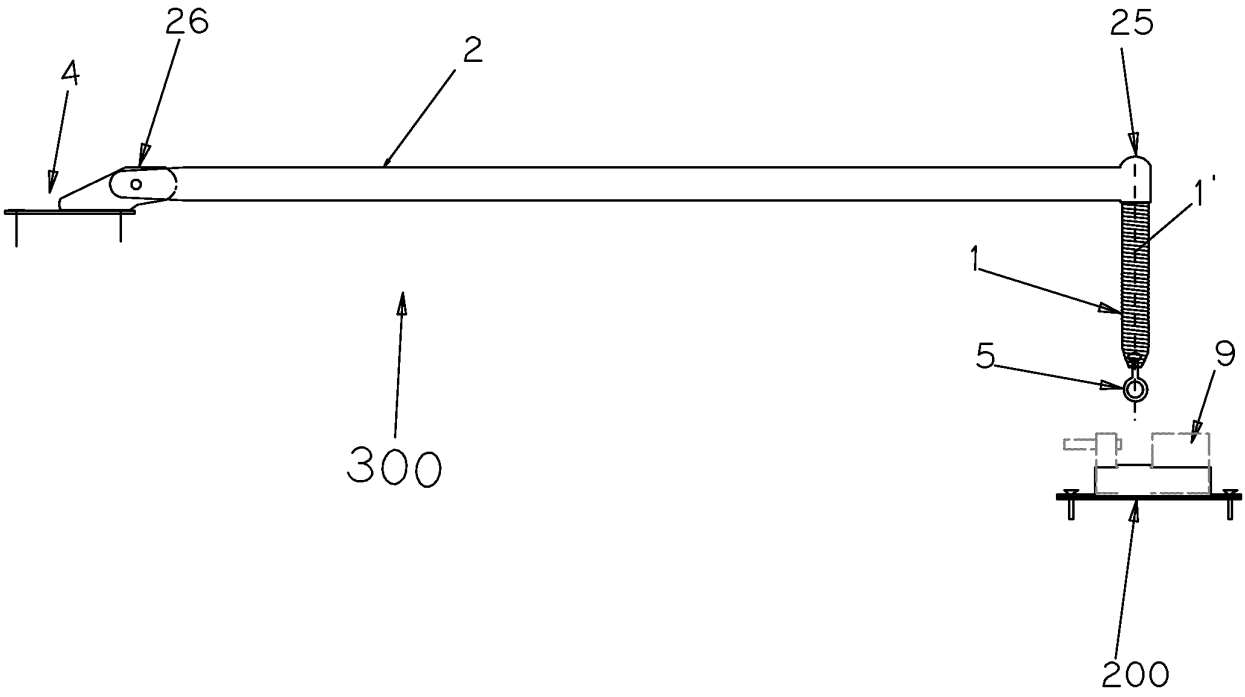


Figure 19

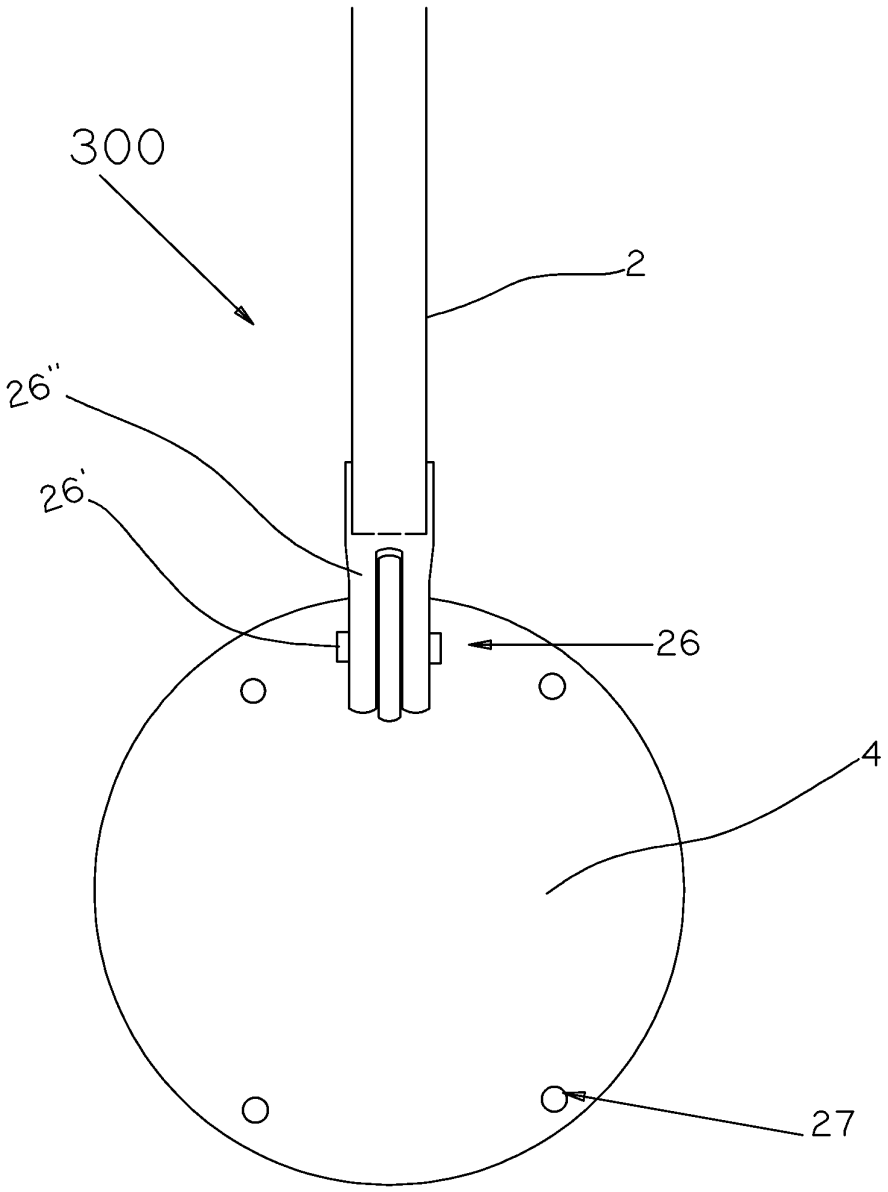


Figure 20

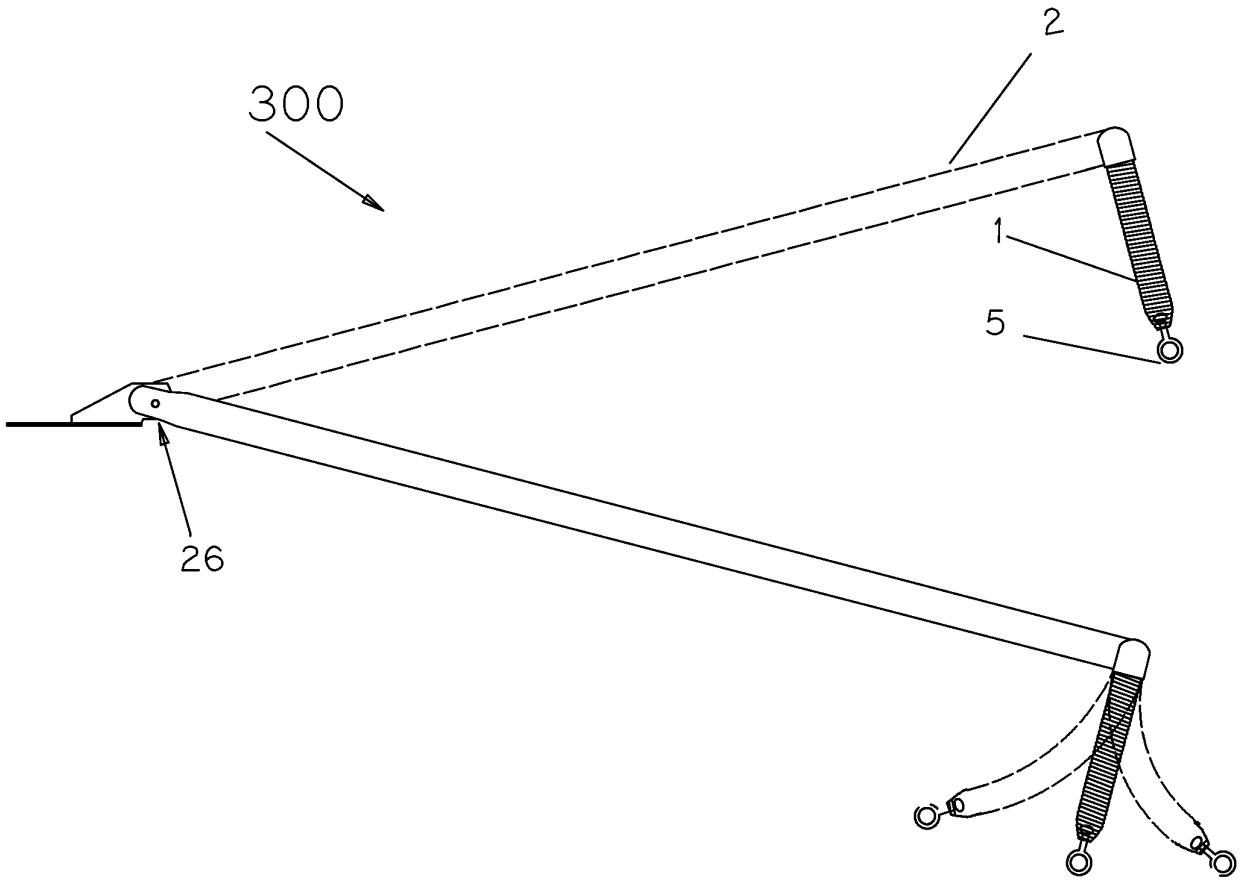


Figure 21

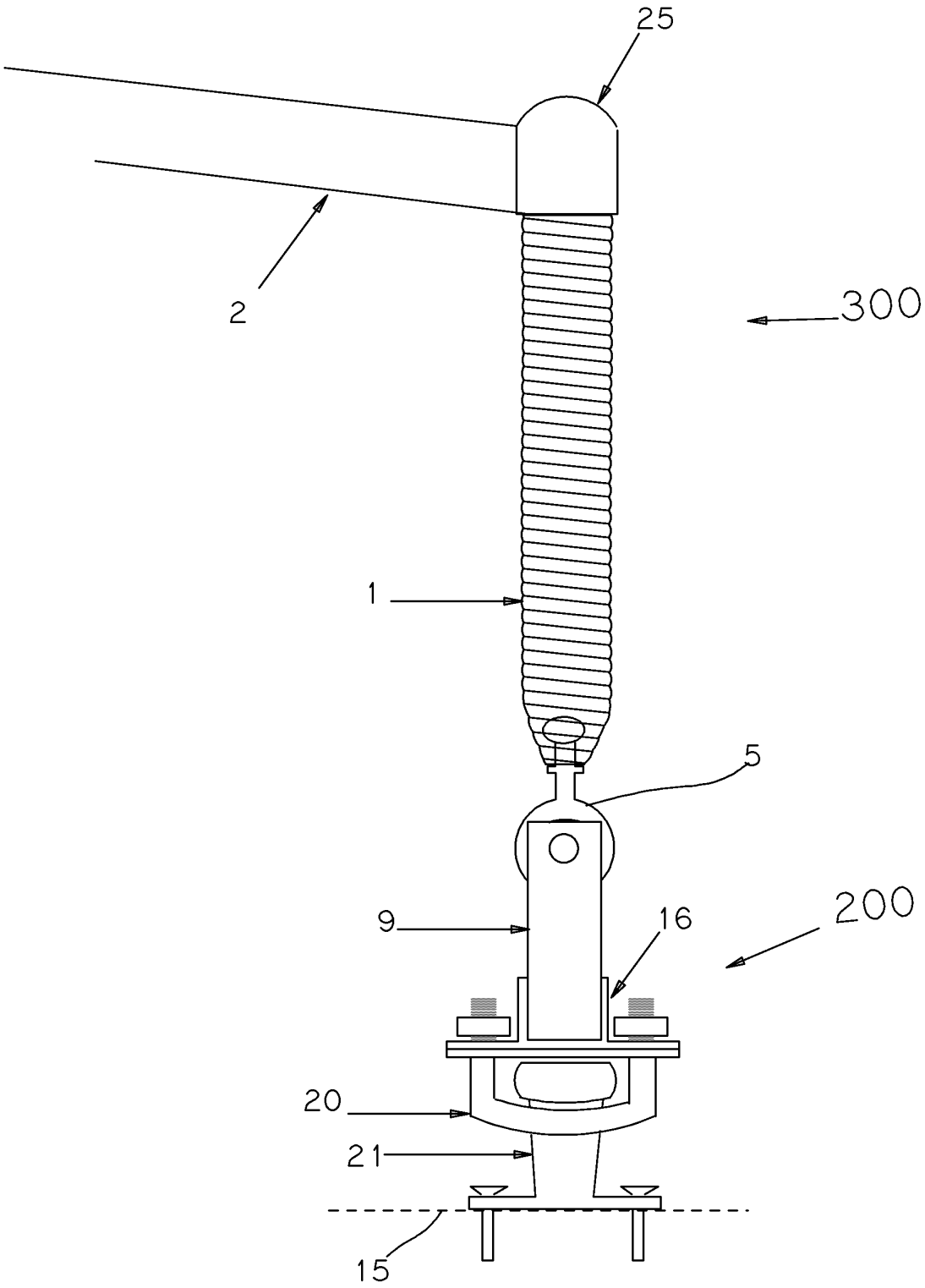


Figure 22

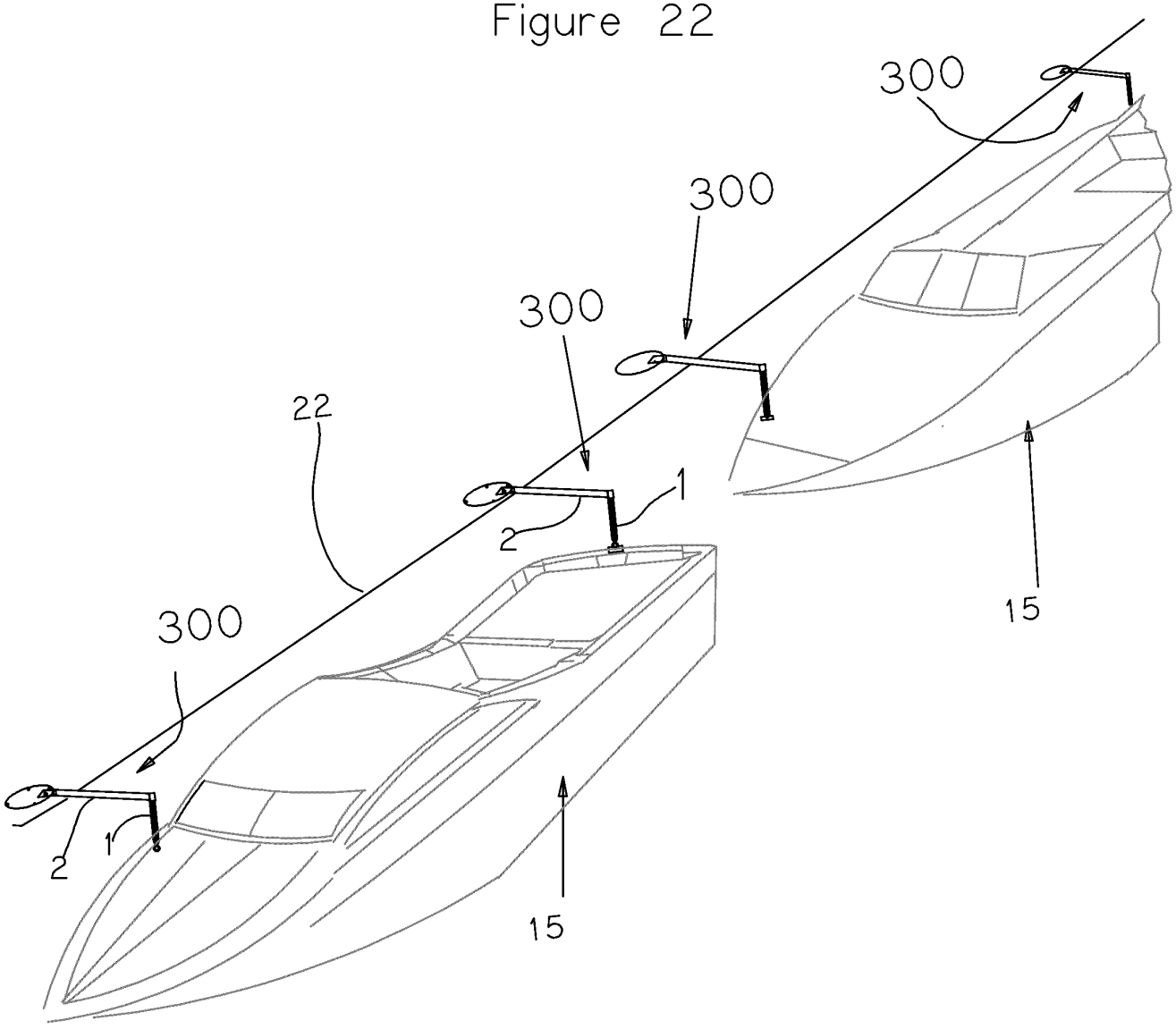


Figure 23

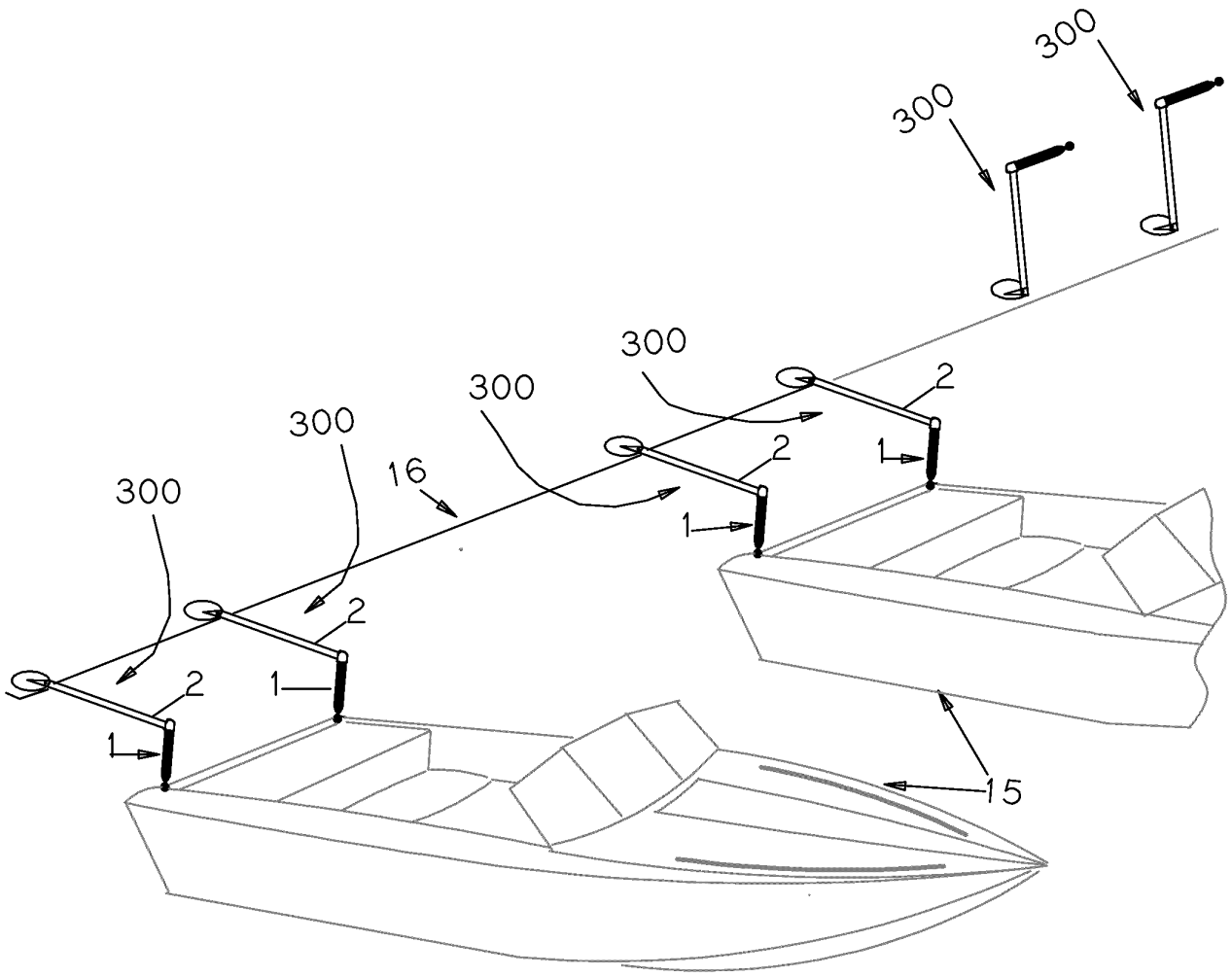
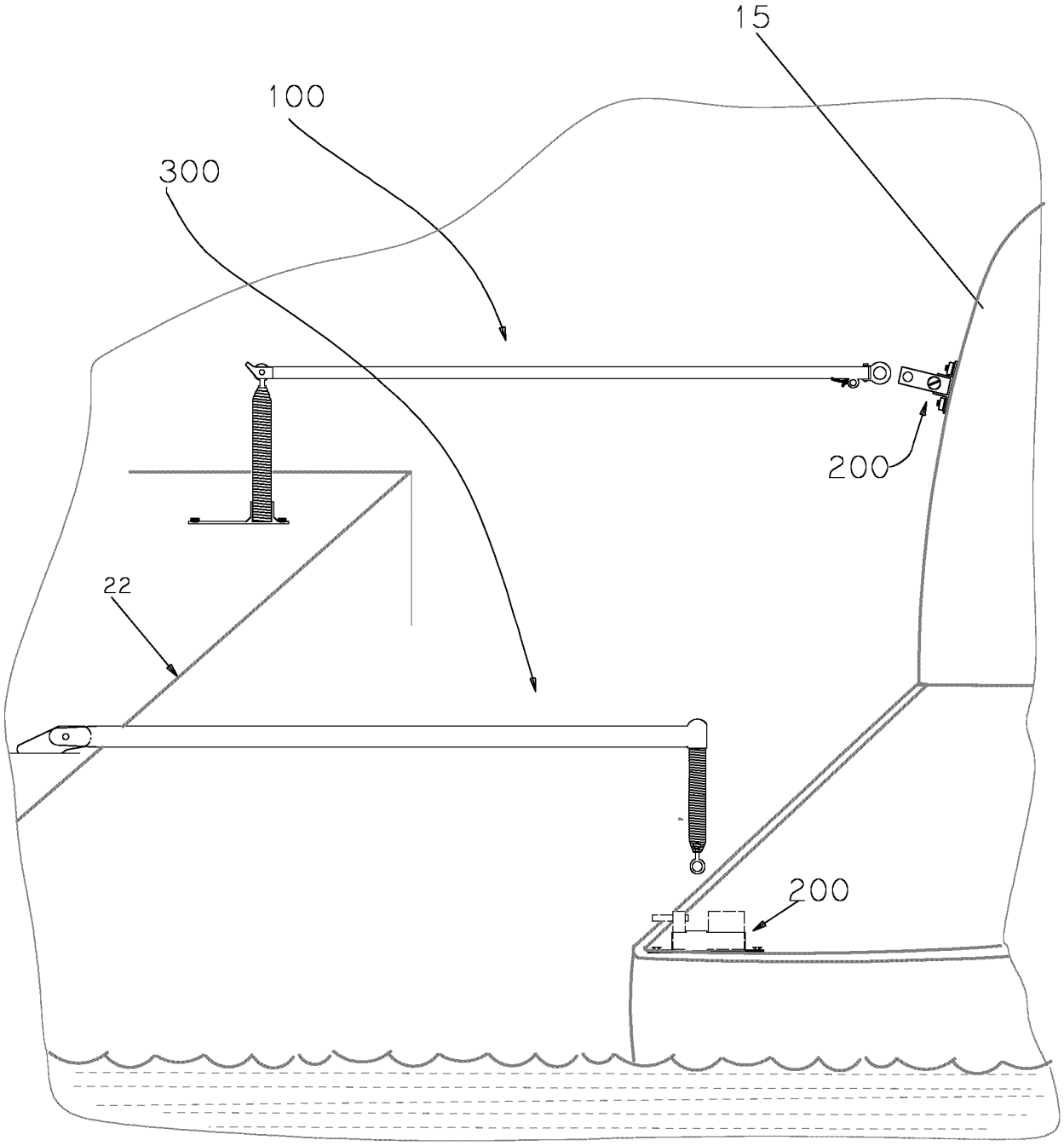


Figure 24



INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2024/058512

A. CLASSIFICATION OF SUBJECT MATTER
INV. B63B21/00
ADD.

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)
B63B

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

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2 938 492 A (KULICK EDWARD L) 31 May 1960 (1960-05-31)	1-3,5-10
Y	figures	11-19
A		4

Y	US 2 996 033 A (YORDI ARTHUR H) 15 August 1961 (1961-08-15) figures 1,2	16,17

X	US 3 195 498 A (JOHNS ROBERT A) 20 July 1965 (1965-07-20) column 1, line 60 - column 2, line 67; figures	1,20-28

X	US 3 157 150 A (FABER JR JOHN) 17 November 1964 (1964-11-17) claims; figures	20-28

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance;; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance;; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
9 September 2024	16/09/2024

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Knoflacher, Nikolaus

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Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2024/058512

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 036 787 A (ROGERS ALAN L [US]) 6 August 1991 (1991-08-06) figures	1,25
	- - - - -	
A	US 4 864 956 A (ONSTWEDDER JR JOHN [US]) 12 September 1989 (1989-09-12) figures 3-5	1
	- - - - -	
X	US 5 361 716 A (COTTON OREN L [US]) 8 November 1994 (1994-11-08) cited in the application	20-23
Y	figure 5	18,19, 29-33
	- - - - -	
A	US 5 243 926 A (WRIGHT TERRELL S [US] ET AL) 14 September 1993 (1993-09-14) figures 1,2	11
	- - - - -	
X	US 4 567 740 A (KELLY EAMONN W J [IE]) 4 February 1986 (1986-02-04)	34-36
Y	claims; figures	11-15, 29-33
	- - - - -	
A	FR 2 703 968 A1 (VARIO JEAN MARIE [FR]) 21 October 1994 (1994-10-21) figures	34-36
	- - - - -	

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2024/058512

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims;; it is covered by claims Nos.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-19

Boat mooring device with abutment member
Special technical feature: an abutment member
Problem solved: limiting the movement of the mooring arm

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2. claims: 20-33

Boat mooring device with a mooring arm coupled to a base and a spring fixedly connected to the mooring arm.
Special technical feature: mooring arm coupled to a base and spring fixedly connected to the mooring arm and configured to be coupled to a boat
Problem solved: alternative configuration for mooring a boat

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3. claims: 34-36

Padlock device
Special technical feature: padlock device
Problem solved: securing the boat

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2024/058512

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2938492 A	31-05-1960	NONE	
US 2996033 A	15-08-1961	NONE	
US 3195498 A	20-07-1965	NONE	
US 3157150 A	17-11-1964	NONE	
US 5036787 A	06-08-1991	NONE	
US 4864956 A	12-09-1989	CA 1311394 C US 4864956 A	15-12-1992 12-09-1989
US 5361716 A	08-11-1994	NONE	
US 5243926 A	14-09-1993	NONE	
US 4567740 A	04-02-1986	EP 0104939 A2 US 4567740 A	04-04-1984 04-02-1986
FR 2703968 A1	21-10-1994	NONE	