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(71) Applicant: **Knight Marine Design Limited**
Biddenham, Bedford MK40 4AE (GB)

(72) Inventor: **Knight, Andrew Philip**
Biddenham, Bedford MK40 4AE (GB)

(74) Representative: **Franks & Co (South) Limited**
Carlton House
26 Billing Road
Northampton NN1 5AT (GB)

(54) Mooring line retaining mechanism

(57) A mooring line retaining mechanism 10, mountable to a support, comprises a C-shaped retaining ring 12 provided with a deflectable gate 14, the gate 14 being biased to allow passage of a mooring line from an exterior to an interior 19 of the retaining ring 12 only. The gate 14 may comprise a single pivoting gate leaf or a pair of gate leaves 14a, 14b. One portion of a loop provided at an end of a mooring line is passed through the deflectable gate 14 and into an interior 19 of the retaining ring 12, so that the retaining ring 12 and loop are interlocked. When the second portion of the loop is passed through the gate 14, the retaining ring 12 and loop are no longer interlocked and the mooring line is released. An alternative version of the mooring line retaining mechanism 20 also has a pair of horns 34a, 34b extending outwardly from its retaining ring 22 in opposite directions, allowing the mooring line to be wound around the horns 34a, 34b, for added security.

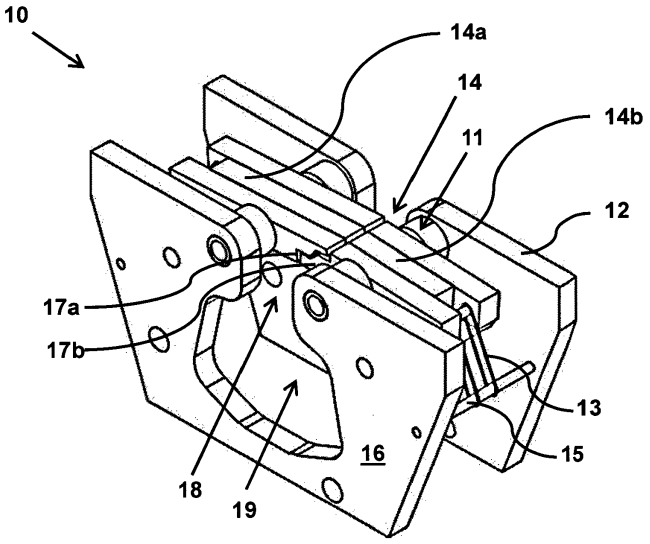


FIG. 1

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Description

Field of the Invention

[0001] The present invention relates to a retaining mechanism for a mooring line or other rope, particularly but not exclusively for mooring a waterborne vessel to a fixed structure.

Background of the Invention

[0002] It is common practice to tie up a waterborne vessel, such as a yacht, dinghy or canal boat, when docked, to avoid damage, loss or theft of the vessel. One or more mooring ropes or lines may be used to secure the vessel to a bollard, pontoon, mooring ring or the like, depending upon the size of the vessel.

[0003] Tying up a vessel correctly can be problematic. If too short a mooring line is used, variations in tidal or weather conditions can lead to the vessel rubbing against the dock or against other vessels, causing damage. In extreme conditions, a mooring line under excessive tension may break, causing the vessel to become unsecured and drift away. Many docks and marinas have to employ dockmasters to supervise docked vessels and adjust the mooring lines as appropriate.

[0004] It is therefore important that the correct knot is used when tying up a vessel, to ensure that the mooring line can be adjusted as required. Knots should be secure, yet adjustable and easy to untie. Tying such knots requires skill and can be time-consuming, particularly when more than one mooring line is required, and can cause problems in adverse weather conditions, or where only one crew member is present.

[0005] It would be preferable to provide a mooring line retaining mechanism which allows waterborne vessels to be tied up quickly and simply, yet securely, without the need for complicated knots, and which can accommodate a number of mooring lines. It would also be preferable for such a mechanism to allow for the mooring line to be released quickly, enabling adjustment of the mooring line as required, or when the vessel is no longer to be moored.

[0006] It is therefore an object of the present invention to provide a mechanism which obviates the above problems and provides the above advantages.

Summary of the Invention

[0007] According to a first aspect of the present invention, there is provided mooring line retaining means comprising retaining ring means provided with deflectable gate means, said gate means being biased to allow passage therethrough of line means from an exterior to an interior of the retaining ring means only.

[0008] Preferably, said retaining ring means is provided with mounting means, suitable for mounting the retaining ring means to a support surface.

[0009] Advantageously, said mounting means comprise permanent mounting means.

[0010] Preferably, said retaining ring means comprises a generally C-shaped body with said gate means extending when closed to fill a gap between respective remote tips of said C-shaped body.

[0011] Said gate means may comprise a single deflectable gate leaf means, extending from a tip of said generally C-shaped body.

[0012] Advantageously, said gate means comprises two deflectable gate leaf means, each extending from a respective tip of said generally C-shaped body.

[0013] Said two deflectable gate leaf means may engage, each with the other, when disposed to close said gap.

[0014] Preferably, the gate means or each said gate leaf means thereof is deflectable inwardly towards the interior of the retaining ring means but not deflectable outwardly towards the exterior thereof.

[0015] Advantageously, the gate means or each said gate leaf means thereof is biased towards a disposition closing said gap, optionally being provided with resilient biasing means.

[0016] The gate means or each said gate leaf means thereof may be pivotably mounted to the generally C-shaped body.

[0017] In a preferred embodiment, the mooring line retaining means is provided with one or more elongate arm means, extending outwardly from the retaining ring means.

[0018] Advantageously, the mooring line retaining means is provided with a pair of elongate arm means extending outwardly from respective remote points on the retaining ring means.

[0019] The elongate arm means may extend from substantially opposite extremities of the retaining ring means.

[0020] Said pair of elongate arm means may extend outwardly in substantially opposite directions substantially in a plane of the retaining ring means.

[0021] Said pair of elongate arm means may extend substantially collinearly.

[0022] Said elongate arm means may in use extend generally parallelly to a support surface.

[0023] Said elongate arm means may be adapted to retain mooring line means wound around them.

[0024] Preferably, said generally C-shaped body comprises cradle means and upper body means, said upper body means incorporating said gate means.

[0025] Said cradle means and said upper body means may be separately formed and mounted together.

[0026] Said cradle means may be affixable to support means.

[0027] Said upper body means may be attachable to said cradle means, optionally when the cradle means is mounted to support means.

[0028] According to a second aspect of the present invention, there is provided a method of mooring a water-

borne vessel, comprising providing mooring line retaining means comprising retaining ring means provided with deflectable gate means; providing loop means adjacent an end of the mooring line means distal to the vessel; and passing a portion of the loop means through the deflectable gate means into an interior of the retaining ring means, such that the retaining ring means and the loop means are interlocked.

[0029] Preferably, the method comprises the additional step of passing a further portion of the loop means through the gate means, such that the entire loop means is disposed within an interior of the retaining ring means, whereby the loop means and hence the mooring line means are no longer attached to the mooring line retaining means.

[0030] Advantageously, the method further comprises the step of mounting said mooring line retaining means to support means.

[0031] Preferably, the mooring line retaining means comprises mooring line retaining means as described in the first aspect above.

Brief Description of the Drawings

[0032] For a better understanding of the invention and to show how the same may be carried into effect, there will now be described by way of example only, specific embodiments, methods and processes according to the present invention with reference to the accompanying drawings in which:

Figure 1 is a perspective view of a first mooring line retaining mechanism embodying the present invention;

Figure 2a is a side elevation of the mooring line retaining mechanism of Figure 1;

Figure 2b is a top plan view of the mooring line retaining mechanism of Figure 1;

Figure 2c is a bottom plan view of the mooring line retaining mechanism of Figure 1;

Figure 2d is a left side elevation of the mooring line retaining mechanism of Figure 1;

Figure 2e is a right side elevation of the mooring line retaining mechanism of Figure 1;

Figure 3 is a perspective view of a second mooring line retaining mechanism embodying the present invention;

Figure 4a is a side elevation of the mooring line retaining mechanism of Figure 3;

Figure 4b is a top plan view of the mooring line retaining mechanism of Figure 3;

Figure 4c is a bottom plan view of the mooring line retaining mechanism of Figure 3;

Figure 4d is a left side elevation of the mooring line retaining mechanism of Figure 3;

Figure 4e is a cross section taken along line AA of Figure 4a;

Figure 5a is an enlarged scrap plan view of area X of Figure 4b;

Figure 5b is an enlarged scrap side elevation of area Y of Figure 4e;

Figure 6a is a schematic representation of a method of mooring a waterborne vessel, employing the mooring line retaining mechanism of Figure 1; and

Figure 6b is a schematic representation of a method of releasing a moored waterborne vessel, employing the mooring line retaining mechanism of Figure 1.

Detailed Description of the Embodiments

[0033] There will now be described by way of example a specific mode contemplated by the inventor(s). In the following description numerous specific details are set forth in order to provide a thorough understanding. It will be apparent however, to one skilled in the art, that the present invention may be practiced without limitation to these specific details. In other instances well known methods and structures are not described in detail, so as not to unnecessarily obscure the description.

Figure 1

[0034] Figure 1 is a perspective view of a first mooring line retaining mechanism (10), having a retaining ring (12) and a deflectable gate (14) which comprises two gate leaves (14a, 14b), the gate (14) being biased to allow passage therethrough of a loop of a mooring line from an exterior to an interior (19) of the retaining ring (12) only. The retaining ring (12) is adapted to be mountable to a support surface. The retaining ring (12) comprises a generally C-shaped body (16), and each gate leaf (14a, 14b) extends from a respective tip of this C-shaped body (16). The gate leaves (14a, 14b) extend when closed to fill a gap (18) between respective tips of the C-shape (16).

[0035] Each of the two deflectable gate leaves (14a, 14b) engages with the other, when disposed to close the gap (18), the tip of each leaf (14a, 14b) being provided with a co-operating profile (17a, 17b) which overlaps and interlocks with the profile (17a, 17b) of the respective other leaf (14a, 14b), when the gate (14) is closed. The gate leaves (14a, 14b) are both mounted to the C-shaped body (16) on a pivot axle (11), the pivoting motion of each gate leaf (14a, 14b) being restricted by a stop, which allows the leaves (14a, 14b) to be deflected inwardly, towards the interior (19) of the C-shaped body (16), but not outwardly. Each gate leaf (14a, 14b) is resiliently biased towards a closed condition by a plurality of rubber bands (13) anchored to an end distal to the tip, and to a fixed point (15). Other resilient biasing means, including springs, may be used.

[0036] The C-shaped body (16) of the retaining ring (12) provides an interior (19) of sufficient capacity to retain up to four mooring lines at any one time.

[0037] A loop of a mooring line may therefore be passed through the deflectable gate (14) into the interior

(19) of the retaining ring (12), but will be prevented from passing through the gate (14) in the other direction by the gate leaves (14a, 14b), which only deflect inwardly. A mooring line may therefore be retained quickly and held securely within the retaining mechanism (10).

Figures 2a, 2b, 2c, 2d & 2e

[0038] Figures 2a to 2e show various views of the mooring line retaining mechanism (10) of Figure 1. The C-shaped body (16) of the mechanism (10) comprises two substantially identical C-shaped side panels, connected by the pivot axles (11) of the two gate leaves (14a, 14b) and by the fixed point (15) to which the resilient rubber bands (13) attach. The gap (18) between the tips of the C-shape (16) is filled by the two gate leaves (14a, 14b), when closed.

[0039] The gate leaves (14a, 14b) overlap when in a closed condition in such a way as to provide an asymmetric join, as shown in Figures 2b and 2c. The gate leaves (14a, 14b) pivot about their respective pivot axles (11) to deflect towards the interior (19) of the retaining ring (12), but are prevented from outward deflection by a stop.

Figures 3, 4a, 4b, 4c, 4d & 4e

[0040] Figures 3 and 4a to 4e show various views of a second mooring line mechanism (20), having a retaining ring (22) comprising a generally C-shaped body (26), and a deflectable gate (24) which comprises a single gate leaf (24c).

[0041] This gate leaf (24c) extends from a tip of the C-shaped body (26) of the retaining ring (22), to fill a gap (28) between the respective tips of the C-shaped body (26) and thus complete the ring.

[0042] The single deflectable gate (24c) is mounted to one tip of the C-shaped body (26) on a pivot axle (21), about which it can be deflected towards an interior (29) of the retaining ring (22). When in a closed condition, the gate (24) extends from the tip of the C-shaped body (26) to which it is mounted, across the gap (28), to meet the opposing tip of the body (26).

[0043] The gate (24) is prevented from being deflected towards an exterior of the retaining ring (22) by means of a stop. The gate (24) is biased towards a closed condition by at a resilient element, such as rubber band, although other resilient biasing means, such as one or more springs, may be used. The resilient element is mounted between an end of the leaf (24c) remote from the end which extends across the gap (28), and a fixed point on the body (26).

[0044] From Figure 4a it will be seen that the generally C-shaped body (26) of this second mooring line mechanism (20) is asymmetrical, in that the tip of the C-shape (26) to which the deflectable gate (24) is mounted extends further across the gap (28) between the tips than does the opposing tip.

[0045] The C-shaped body (26) of the retaining ring (22) in this example is made up of a cradle (32) and an upper body (33). The cradle (32) and the upper body (33) are separately formed and mounted together. The cradle (32) comprises a solid base (35) provided with opposing upstanding walls (36), and is adapted to be affixed to a support structure, such as a dock, pontoon or mooring post, by means of bolts, screws or other fixing means. The necessary holes in the base (35) to receive these fixing means are omitted for clarity. The upper body (33), which incorporates the deflectable gate (24), comprises a base (37) which is adapted to be received within the upstanding walls (36) of the cradle (32), and may be attached to the cradle (32) by means of bolts or other fixing means. The upper body (33) may conveniently be attached to the cradle (32) after the cradle (32) has been affixed to a support structure

[0046] The retaining ring (22) in this example is further provided with elongate arms or horns (34a, 34b), which each extend outwardly from respective extremities of the upper body (33). These elongate arms (34a, 34b) extend substantially parallelly to a longitudinal axis of the deflectable gate (24), and generally parallelly to a surface on which the mechanism (20) is mounted. These arms (34a, 34b) are thus adapted to retain a mooring line, in the manner of a cleat, wherein the mooring line may be wound in a figure of eight, hitched or otherwise wound, around the two elongate arms (34a, 34b) in turn.

[0047] It is thus possible to quickly retain a loop of a mooring line by passing the loop through the deflectable gate (24), into an interior (29) of the retaining ring (22) (see below for details). The mooring line may then be further secured by winding slack in the line around the elongate arms (34a, 34b), as desired.

Figure 5a and Figure 5b

[0048] Figure 5a is a scrap view of area X of Figure 4b, providing an enlarged plan view of the mounting of the pivot (21). In addition to being mounted upon a horizontal, in use, pivot axle (21), the axle (21) is further secured by two pins and rivets (38) which pass through holes provided in the axle (21).

[0049] A further view of these pins and rivets (38) is provided in Figure 5b, which is a scrap cross-section taken along line AA in Figure 4a. In this enlarged cross-sectional view it can be seen that the two pins and rivets (38) pass through holes in the pivot axle (21), holding the axle (21) in place.

Figures 6a and 6b

[0050] Figure 6a and 6b are schematic representations demonstrating a method of securing a waterborne vessel using the first mooring line retaining mechanism of Figure 1 (10). The second mooring line retaining mechanism (20) operates in the same manner.

[0051] To secure a mooring line, a loop is formed in an

end of the line distal to the vessel to be moored. This loop is represented in Figures 6a and 6b in cross-section, as a first (42) and second side of a loop (44) respectively.

[0052] The first side of the loop (42) is pushed against the gate leaves (14a, 14b), which deflect inwardly towards an interior (19) of the retaining ring (12), allowing the first side of the loop (42) to enter the retaining ring's interior (19). The gate leaves (14a, 14b) are then biased to return to their closed position.

[0053] The loop and the retaining ring (12) are now interlocked, securing the mooring line securely since even if the line is put under strain, the loop will be pulled against an internal face of the gate leaves (14a, 14b), which cannot open since they are prevented from deflecting outwardly.

[0054] Figure 6b demonstrates how the mooring line can be quickly released from the retaining ring (12). The second side of the loop (44) (i.e. the side which was previously outside the retaining ring (12)) is pushed against the gate leaves (14a, 14b), causing them to deflect inwardly and allowing the second side of the loop (44) to pass through the gate (14) and into the interior (19) of the retaining ring (12). As shown in Figure 6b, both sides of the loop (42, 44) are now inside the retaining ring (12). The loop and the retaining ring (12) are no longer interlocked and the mooring line is released.

[0055] The mooring line retaining mechanisms (10, 20) described above thus provide a quick and convenient way to reliably secure one or more mooring lines, yet allows a mooring line to be quickly released from the mechanism (10, 20) to enable adjustment of the mooring line, or when the vessel is unmoored.

[0056] Such retaining and quick-release mechanisms (10, 20) should prove to be useful in other applications in addition to those described above, for example in equestrian applications to allow horses to be tied up quickly and securely, and to be released as quickly when desired. Reins may for example act as the loop to be engaged with the retaining ring (12, 22), and the term "mooring line" herein should be understood to refer to any elongate flexible member usable to tie a mobile object or animal to a support.

Claims

1. Mooring line retaining means (10,20), **characterised in that** it comprises retaining ring means (12,22) provided with deflectable gate means (14,24), said gate means (14,24) being biased to allow passage therethrough of line means (42,44) from an exterior to an interior (19,29) of the retaining ring means (12,22) only.

2. Mooring line retaining means, as claimed in claim 1, **characterised in that** said retaining ring means (12,22) is provided with mounting means, adapted to mount the retaining ring means (12,22) to a support surface.

3. Mooring line retaining means as claimed in either claim 1 or claim 2, **characterised in that** said retaining ring means (12,22) comprises a generally C-shaped body (16,26) with said gate means (14,24) extending when closed to fill a gap (18,28) between respective remote tips of said C-shaped body (16,26).

4. Mooring line retaining means as claimed in any preceding claim, **characterised in that** said gate means (24) comprises a single deflectable gate leaf means (24c), extending from a tip of said generally C-shaped body (26).

5. Mooring line retaining means as claimed in any one of claims 1 to 3, **characterised in that** said gate means (14) comprises two deflectable gate leaf means (14a,14b), each extending from a respective tip of said generally C-shaped body (16).

6. Mooring line retaining means as claimed in any preceding claim, **characterised in that** the gate means (14,24) or each said gate leaf means (14a,14b,24c) thereof is deflectable inwardly towards the interior (19,29) of the retaining ring means (12,22) but not deflectable outwardly towards the exterior thereof.

7. Mooring line retaining means as claimed in any preceding claim, **characterised in that** the gate means (14,24) or each said gate leaf means (14a,14b,24c) thereof is biased towards a disposition closing said gap (18,28).

8. Mooring line retaining means as claimed in any preceding claim, **characterised in that** it is provided with a pair of elongate arm means (34a,34b) extending outwardly from respective remote points on said retaining ring means (26).

9. Mooring line retaining means as claimed in claim 8, **characterised in that** said elongate arm means (34a,34b) extend outwardly in substantially opposite directions substantially in a plane of the retaining ring means (26).

10. Mooring line retaining means as claimed in either claim 8 or claim 9, **characterised in that** said elongate arm means (34a,34b) are adapted to retain mooring line means wound around them.

11. Mooring line retaining means as claimed in any preceding claim, **characterised in that** said generally C-shaped body (26) comprises cradle means (32) and upper body means (33), said upper body means (33) incorporating said gate means (24).

12. Mooring line retaining means as claimed in claim 11, **characterised in that** said cradle means (32) is affixable to support means.

13. A method of mooring a waterborne vessel, **characterised in that** it comprises the steps of providing mooring line retaining means (10,20) comprising retaining ring means (12,22) provided with deflectable gate means (14,24); providing loop means (42,44) adjacent an end of the mooring line means distal to the vessel; and passing a portion (42) of the loop means through the deflectable gate means (14,24) into an interior (19,29) of the retaining ring means (12,22), such that the retaining ring means (12,22) and the loop means (42,44) are interlocked.

14. A method of mooring a waterborne vessel as claimed in claim 13, **characterised in that** it comprises the further step of passing a further portion (44) of the loop means (42,44) through the gate means (14,24), such that the entire loop means (42,44) is disposed within an interior (19,29) of the retaining ring means (12,22), whereby the loop means (42,44) and hence the mooring line means are no longer attached to the mooring line retaining means (10,20).

15. A method of mooring a waterborne vessel as claimed in either claim 13 or claim 14, **characterised in that** it further comprises the step of mounting said mooring line retaining means (10,20) to support means.

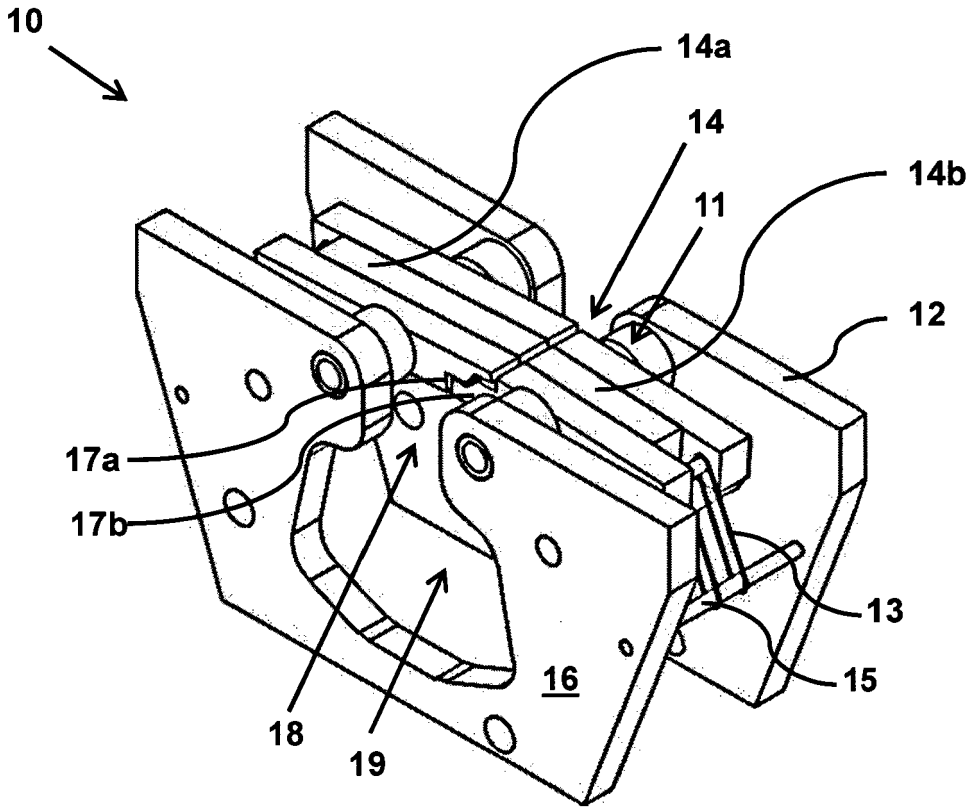
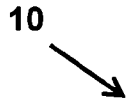


FIG. 1



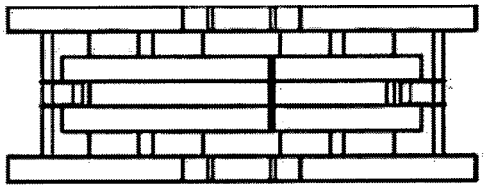


FIG. 2b

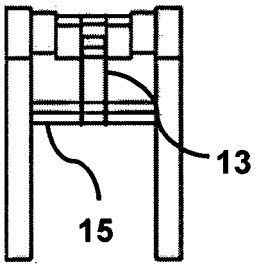


FIG. 2d

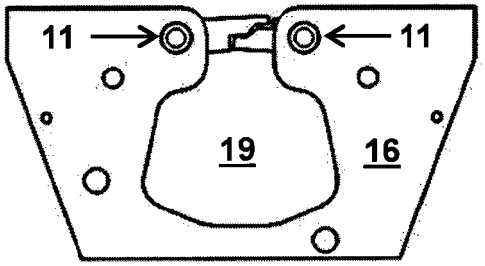


FIG. 2a

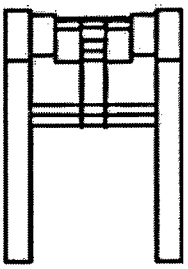


FIG. 2d

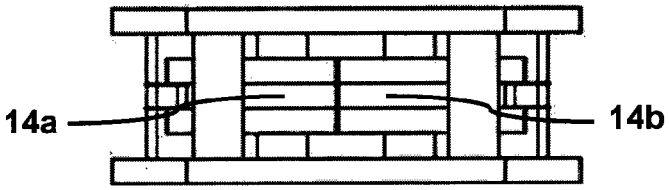


FIG. 2c

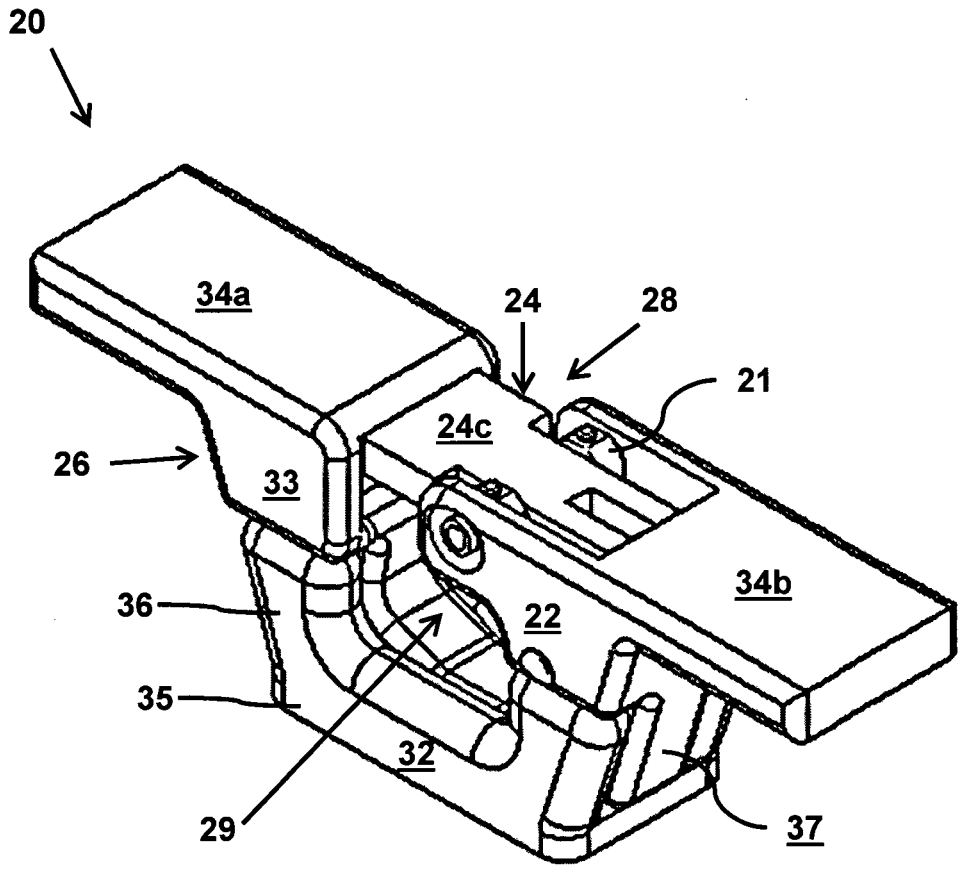


FIG. 3

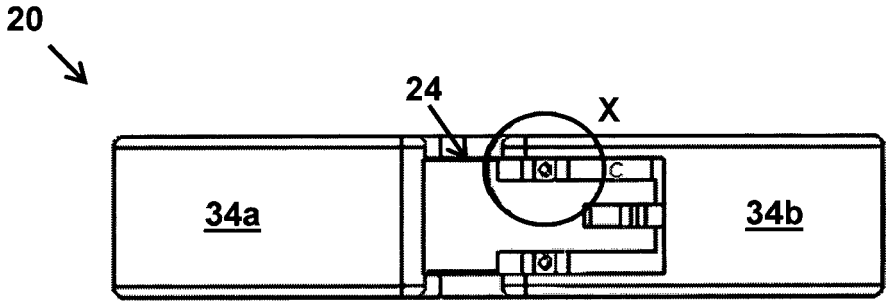


FIG. 4b

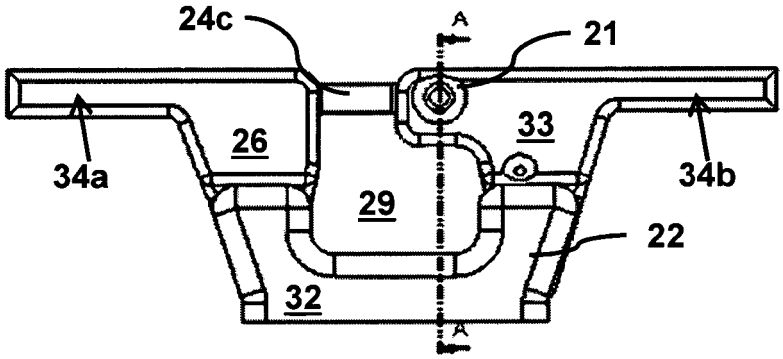


FIG. 4a

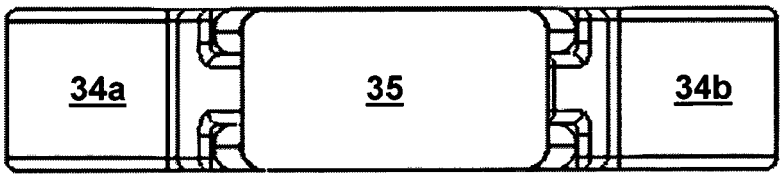
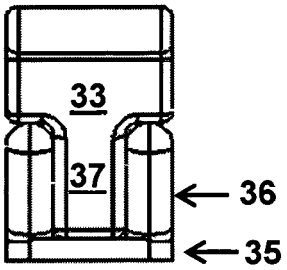


FIG. 4c

FIG. 4d



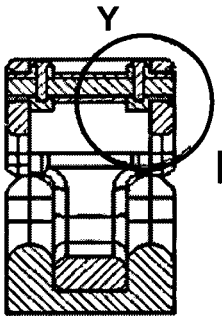


FIG. 4e

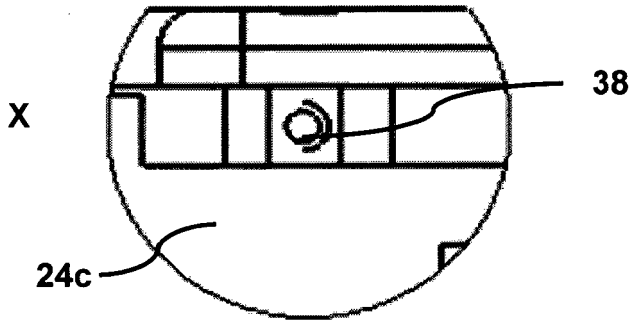


FIG. 5a

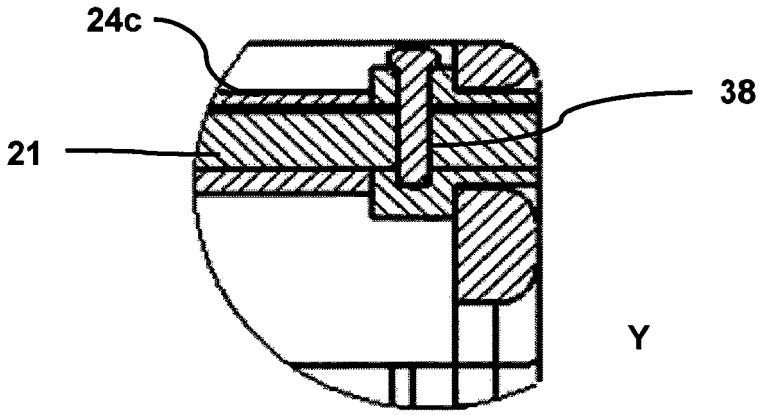


FIG. 5b

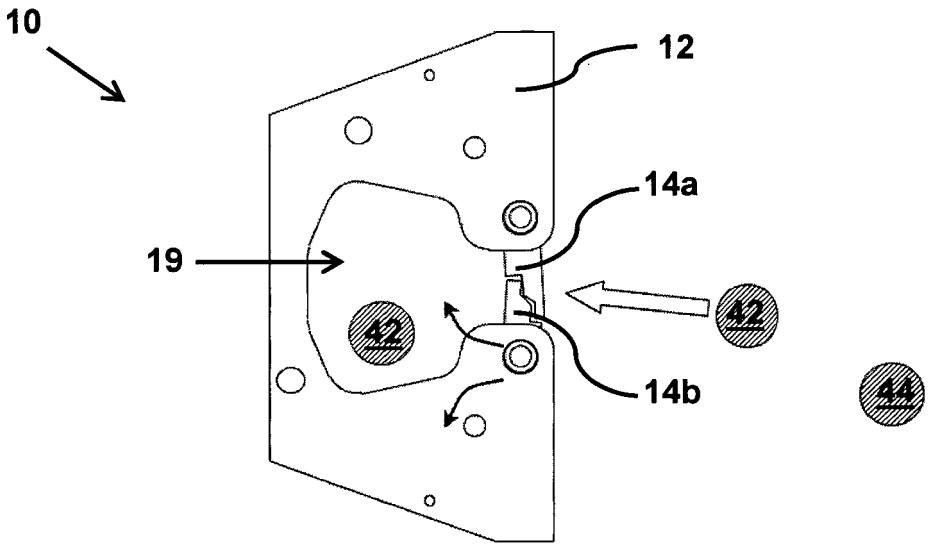


FIG. 6a

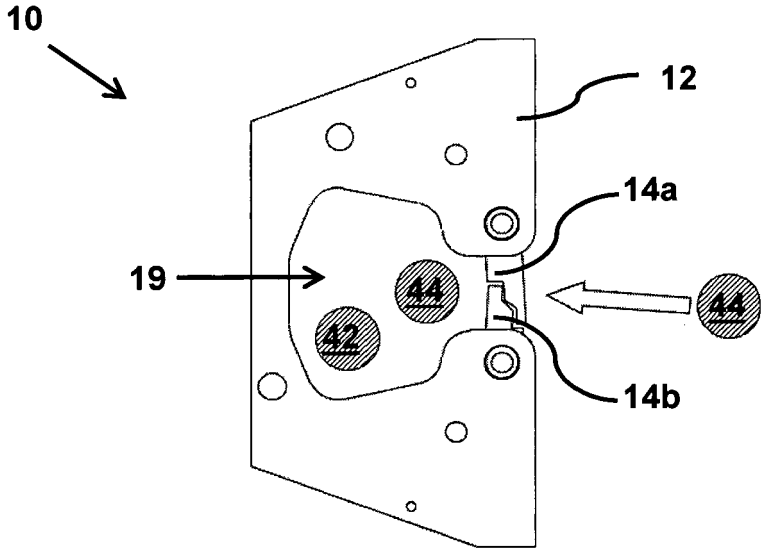


FIG. 6b