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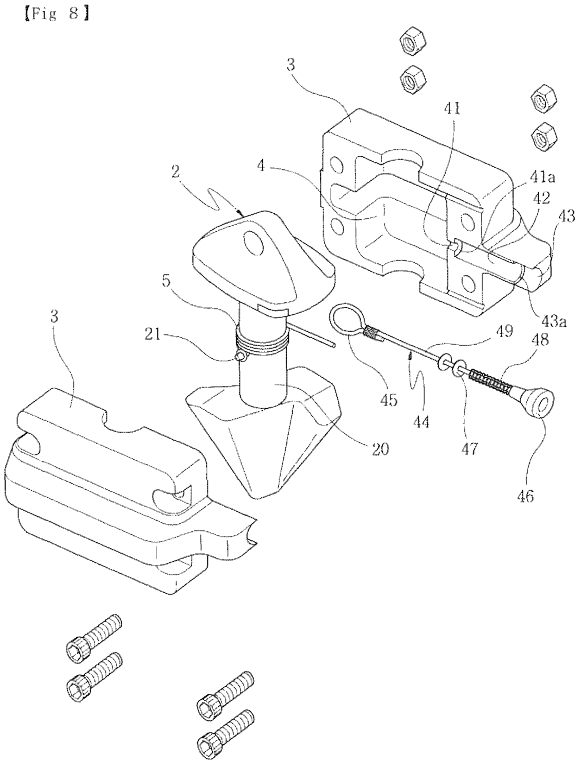
(54) Automatic binding device for a container

(57) Disclosed the automatic binding device (1) for a container is consisted of a latch (2) being twisted during insertion/disengagement it into/from a coupling hole (7) of corner castings (6a,6b); a pair of housings (3) for covering a circumferential surface of a rotating shaft (20) of the latch; and a torsion spring (5) for re-rotating the latch substantially to its original condition before rotating, the torsion spring being installed at the circumferential surface of the rotating shaft. Due to this simple structure of the binding device, it is possible to obtain a considerable reduction in costs and a considerable improvement in value of commodities. Furthermore, the automatic binding device for a container is provided with the indicator (44) capable of allowing a user to see the present state of the binding device with the naked eye. When the containers loaded in a large size of ship by using the binding device at sea, the pitching of the ship has been occurred due to operation of waves, in which the rotation of the latch is delayed during the time interval between the moment when the positive load changes into the negative load and the moment when the negative load changes into the positive load, thereby it is possible to prevent the lower fitting member from being released from the lower corner casting.

【Fig 8】



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Description

Background of the Invention

1. Field of the Invention

[0001] The present invention relates generally to an automatic binding device for a container, and more particularly to an automatic binding device capable of detachably coupling at least two containers with easy, in which an upper fitting member is inserted into an upper corner casting and continuously may be rotated in the clockwise direction due to an elastic force of a torsion spring, thereby it is locked in the upper corner casting, wherein when an upper container descends by means of a crane so as to be combined to a lower container in a state that the binding device is installed in the upper corner casting, then a lower fitting member is inserted into a lower corner casting of a lower container after it contacting with the lower corner casting and continuously being rotated due to the weight of the upper container, in which a rotating shaft of the latch returns to its initial state due to the elastic force of the torsion spring, wherein when the upper container is lifted by means of the crane so as to be released from the lower container, then wing slanted surfaces of the lower fitting member are contacted with the lower corner casting and continuously being rotated in the counter-clockwise direction, thereby the lower fitting member can be released from the lower corner casting.

[0002] The automatic binding device for a container according to the present invention is provided with an indicator capable of allowing a user to see the present state of the binding device with the naked eye, in which the indicator comprises a marker which is capable of protruding to the outside of a housing in accordance with rotation of the rotating shaft, in which a friction resistance member is engaged with the upper fitting member within a fitting groove formed at a corner of the lower portion of the upper fitting member, wherein when the containers loaded in a large size of ship by using the binding device according to the present invention are at sea, the pitching of the ship has been occurred due to operation of waves, in which the rotation of the latch is delayed during the time interval between the moment when the positive load changes into the negative load and the moment when the negative load changes into the positive load, thereby it is possible to prevent the lower fitting member from being released from the lower corner casting.

2. Description of the Prior Art

[0003] A variety of systems for automatically binding containers to be loaded or unloaded into or from a ship have been proposed. One approach is, an automatic binding device for a container had been proposed on Korean Patent No. 10-499,247. This binding device is provided with a rotating shaft for an upper locking head of which two keys are integrally formed with the rotating shaft. One side surface of the key comprises a horizontal plane so as to prevent it from being interfered with a locking pin inserted into a slit. A binding hole for receiving the rotating shaft of the upper locker is formed at the center of a lower locker. A fitting shoulder portion is formed at a one side of the binding hole so that the key may be brought into contact with it during operation. A horizontal cross section is provided from the one side of the fitting shoulder portion to the slit. Due to this structure, it is possible to detachably combine the binding device with the container without using any portable lever.

[0004] However, it has not been possible or practical to exactly maintain the locking state between the biding device and the container when a negative weight is applied. Since the structure of the automatic binding device for the container is complicated, the manufacturing cost thereof is increased. This leads to the economical waste for the patient.

Summary of the Invention

[0005] The device of the present invention has significant advantages over previously known apparatus. In consideration of the above-mentioned disadvantages or inconveniences of the conventional devices, an object of the present invention is to provide an automatic binding device freely attachable to or detachable from at least two containers with easy, which gives a considerable reduction in costs and a considerable improvement in value of commodities by simplifying the structure, in which a latch may be twisted during insertion/disengagement it into/from a coupling hole formed through walls of a corner casting, in which a pair of housings covers a circumferential surface of a rotating shaft of the latch, and in which a torsion spring for re-rotating the latch substantially to its original condition before rotating is installed at the circumferential surface of the rotating shaft.

[0006] When the latch according to the present invention is inserted into or released from the corner casting, it can be twisted due to the weight applied in the vertical direction. Accordingly, if a weight is applied to the latch in any direction not in the vertical direction due to the pitching of the ship, then the latch cannot be rotated, and thereby it is possible to maintain a safe locking state between the latch and the corner casting. Consequently, it is possible to prevent future accidents caused by the malfunction of the latch from being generated.

[0007] The automatic binding device for a container according to the present invention is capable of preventing an upper fitting member from being released from the corner casting by employing a friction resistance member engaged with the upper fitting member within a fitting groove formed at a corner of the lower portion of the upper fitting member, wherein when the containers loaded in a large size of ship by using the binding device according to the present invention are at sea, the pitching of the ship has been occurred due to operation of waves,

wherein the rotation of the latch is delayed during the time interval between the moment when the positive load changes into the negative load and the moment when the negative load changes into the positive load, and thereby it is possible to prevent the lower fitting member from being released from the lower corner casting.

[0008] In order to achieve the object, the present invention provides an automatic binding device for a container of the type in which an upper fitting member and a lower fitting member thereof are inserted into or detachable from coupling holes formed through walls of corner castings, and in which the corner castings are positioned at upper and lower corners of at least two containers for a ship respectively, the improvement comprising:

a latch being twisted during insertion/disengagement it into/from the coupling hole of the corner castings;
a pair of housings for covering a circumferential surface of a rotating shaft of the latch; and
a torsion spring for re-rotating the latch substantially to its original condition before rotating, the torsion spring being installed at the circumferential surface of the rotating shaft;

wherein the rotating shaft is provided with a spring hanger formed at a one side of the circumferential surface of the rotating shaft, wherein the latch has a fitting member body formed at a lower portion thereof and tapered downwards from a lower portion of the rotating shaft, wherein rounding wings are formed at both sides of the fitting member body and tapered downwards at a slanting angle of 45 ± 2 degrees, and the rounding wings have a wing slanted surface formed at the uppermost surface thereof and tapered downwards in a clockwise direction,
wherein an upper fitting member is formed at an upper portion of the rotating shaft and extends at a predetermined distance in the horizontal direction, wherein a projection having a mountain shape upwardly protrudes from an upper surface of the upper fitting member and has a through hole formed there through,
wherein an operating space is provided in halves of the housing respectively, wherein a spring support portion for locking and supporting a one end of the torsion spring is formed in the housing at a position adjacent to the operating space, and
wherein a fixing protrusion edge protrudes from the center of an outer surface of the housing and it is brought into contact with and supported by the slanted guide surface of the coupling hole.

[0009] A fitting groove is formed at a corner of a lower portion of the upper fitting member. A friction resistance member having an internal screw thread is engaged with the upper fitting member within the fitting groove by means of a screw screwed into the internal screw thread and driven into the upper fitting member so that the friction resistance member is brought into contact with an inner bottom surface of the corner castings, and wherein the friction resistance member is a material selected from the group consisting of a rubber, a polyurethane and a soft synthetic resin.

[0010] At least one groove for communicating the operating space with an exterior of the housing is formed at a one inner surface of the housing. An indicator is consisted of a wire main body made of a wire rope, a hanging ring-shaped portion formed at a one end thereof and a marker formed at the other end thereof. At least one washer is disposed at a middle portion of the wire main body and a coiled spring is disposed between the washer and the marker.

[0011] The at least one groove comprises a first groove, a second groove and a third groove which are integrally communicated with each other, in which a dimension of the first groove is smaller than that of the second groove and continuously the dimension of the second groove is smaller than that of the third groove. When the latch and the housing are combined with each other, then the indicator is received in the grooves and the operating space, and thereby permitting relative motion of the indicator with respect to the housing. The hanging ring-shaped portion of the indicator is locked at the spring hanger of the rotating shaft. When the indicator is positioned within the interior of the housing, the marker is received in the third groove, and the washer is locked at a fitting shoulder portion formed at a border between the first groove and the second groove.

Brief Description of the Drawings

[0012] The above object and other characteristics and advantages of the present invention will become more apparent by describing in detail preferred embodiments thereof with reference to the attached drawings, in which:

FIG. 1 shows an application of an automatic binding device for a container according to a preferred first embodiment of the present invention, for visually illustrating an appearance and a combing state of the automatic binding device for a container between an upper corner casting and a lower corner casting;
FIG. 2 is a perspective view of the automatic binding device for a container according to the preferred first embodiment of the present invention;
FIG. 3A is a longitudinal sectional view of the automatic binding device for a container according to the preferred first embodiment of the present invention;
FIG. 3B is a plan view of the automatic binding device for a container according to the preferred first embodiment of the present invention;
FIG. 4A is a longitudinal sectional view similar to that of FIG. 3A and illustrates the automatic binding device for a container according to the preferred first embodiment of the present invention shown with a latch in the operative mode after being rotated at an angle of 90 degrees;
FIG. 4B is a plan view similar to that of FIG. 3B and

illustrates the automatic binding device for a container according to the preferred first embodiment of the present invention shown with a latch in the operative mode after being rotated at an angle of 90 degrees;

FIG. 5 is a plan view of the automatic binding device for a container according to the preferred first embodiment of the present invention shown with a latch in the operative mode after being rotated so as to be inserted into a coupling hole provided in a corner casting;

FIGS. 6A to FIGS. 6H are sectional views for illustrating the invention in different operative positions;

FIG. 7 is an enlarged view in partial cross-section taken along the dashed dotted line "A" shown in FIG. 6D;

FIG. 8 is an exploded perspective view of an automatic binding device for a container according to a preferred second embodiment of the present invention; and

FIG. 9A and FIG. 9B are sectional plan views of the automatic binding device for a container according to the preferred second embodiment of the present invention, for illustrating the invention with an indicator 44 in different operative positions.

Detailed Description of the Invention

[0013] Hereinafter, the constitution and the operation of an automatic biding device for a container according to the preferred embodiments of the present invention will be explained in more detail with reference to the accompanying drawings FIGS. 1 to 9.

[0014] As will be best seen in FIG. 1, this invention relates to the automatic binding device for a container according to the present invention for efficient and expeditious binding of an upper container and a lower container to be loaded in a ship by inserting itself into coupling holes 7 of corner castings 6a,6b, which may be installed at corners of the upper container and the lower container, respectively.

[0015] Referring to FIGS. 1 and 2, the binding device 1 comprises a latch 2, a pair of housings 3 for covering a circumferential surface of a rotating shaft 20 of the latch 2, and a torsion spring 5. The latch 2 may be twisted during insertion/disengagement it into/from the coupling hole 7 formed through walls of the corner casting 6a,6b. The torsion spring 5 is installed at the circumferential surface of the rotating shaft 20 and can operate to re-rotate the latch 2 substantially to its original condition before rotating.

[0016] Referring to FIGS. 2 to 4B, the rotating shaft 20 of the latch 2 is provided with a spring hanger 21 formed at a one side of the circumferential surface of the rotating shaft 20. The latch 2 has a fitting member body 11 formed at a lower portion thereof and tapered downwards from a lower portion of the rotating shaft 20. Rounding wings 12 are formed at both sides of the fitting member body 11 and tapered downwards at a slanting angle of 45±2 degrees. The rounding wings 12 have a wing slanted surface 13 formed at the uppermost surface thereof and tapered downwards in the clockwise direction.

[0017] As shown in FIG. 3B, the spring hanger 21 protrudes from the one side of the circumferential surface of the rotating shaft 20 at a predetermined length. When the latch 2 rotates in the clockwise direction or the counter-clockwise direction, a distal end of the spring hanger 21 may locked at an inner surface of the housing 3 so that the latch 2 can be rotated only in the range of predetermined rotating angles. That is, the spring hanger 21 functions as a stopper for limiting the range of the latch's rotation.

[0018] In the meantime, an upper fitting member 30 is formed at an upper portion of the rotating shaft 20 and extends at a predetermined distance in the horizontal direction. A projection 32 having a mountain shape upwardly protrudes from an upper surface of the upper fitting member 30 and has a through hole 31 formed there through. If a user wants to make the latch 2 rotate manually, he or she may put a rod into the through hole 31.

[0019] As best seen in FIG. 2, an operating space 4 is provided in halves of the housing 3, respectively which are combined with each other by means of a plurality of bolts. The operating space 4 receives the rotating shaft 20, the spring hanger 21 and the torsion spring 5 while permitting rotational movement of the latch 2. A spring support portion 5a for locking and supporting a one end of the torsion spring 5 is formed in the housing 3 at a position adjacent to the operating space 4. A fixing protrusion edge 3a protrudes from the center of an outer surface of the housing 3 and it is brought into contact with and supported by the slanted guide surface 8 of the coupling hole 7.

[0020] As shown in FIG. 7, a fitting groove 34 is formed at a corner of a lower portion of the upper fitting member 30. A friction resistance member 33 having an internal screw thread is engaged with the upper fitting member 30 within the fitting groove 34 by means of a screw screwed into the internal screw thread and driven into the upper fitting member 30 so that the friction resistance member 33 is brought into contact with an inner bottom surface of the corner casting 6. The friction resistance member 33 is made of some materials having a high frictional resistance. Preferably, the friction resistance member 33 is a material selected from the group consisting of a rubber, polyurethane and a soft synthetic resin. It is preferable here that a lower surface of the friction resistance member 33 protrude downwards beyond a lower surface of the upper fitting member 30 in the range of 1~2mm. Due to this structure, the friction resistance member 33 having a high friction resistance operates to reduce the rotational speed of the latch 2 when it is brought into contact with the inner bottom surface of the corner casting 6.

[0021] A preferred second embodiment of the present invention as shown in FIGS. 8 and 9B has a basic structure which is constituted at the same manner as the first

embodiment of the present invention, except for supplement of an indicator 44 for allowing a user to be known whether the binding device 1 is set at locking state or not. Prior to proceeding to the more detailed description of the second embodiment according to the present invention, it should be noted that, for the sake of clarity and understanding of the invention identical components which have identical functions have been identified with identical reference numerals throughout the different views which are illustrated in each of the attached drawing Figures.

[0022] Referring to FIGS. 8 to 9B, in the second embodiment according to the present invention, at least one groove for communicating the operating space 4 with an exterior of the housing 3 is formed at a one inner surface of the housing 3. The at least one groove comprises a first groove 41, a second groove 42 and a third groove 43 which are integrally communicated with each other. The dimension of the first groove 41 is smaller than that of the second groove 42 and continuously the dimension of the second groove 42 is smaller than that of the third groove 43. A fitting shoulder portion 41a is formed at a border between the first groove 41 and the second groove 42. Likewise, another fitting shoulder portion 43a is formed at a border between the second groove 42 and the third groove 43.

[0023] Meanwhile, the indicator 44 is consisted of a wire main body 49 made of a wire rope, a hanging ring-shaped portion 45 formed at a one end thereof and a marker 46 formed at the other end thereof.

[0024] If the latch 2 and the housing 3 are combined with each other, then the indicator 44 is received in the grooves 41,42,43 and the operating space 4, and thereby permitting relative motion of the indicator 44 with respect to the housing 3. At this time, the hanging ring-shaped portion 45 of the indicator 44 is locked at the spring hanger 21 of the rotating shaft 20.

When the indicator 44 is positioned within the interior of the housing 3, the marker 46 is received in the third groove 43 and the washer 47 is locked at the fitting shoulder portion 41a formed at the border between the first groove 41 and the second groove 42. Furthermore, at least one washer 47 is disposed at a middle portion of the wire main body 49 and a coiled spring is disposed between the washer 47 and the marker 46.

[0025] In the detailed description of the present invention, an upper corner casting 6a is referred to a corner casting to be installed at a lower corner of an upper container. Likewise, a lower corner casting 6b is referred to a corner casting to be installed at a lower corner of a lower container.

[0026] Hereinafter, the operation of the automatic biding device for a container according to the present invention will be explained as follows with reference to the accompanying drawings FIGS. 1 to 9.

[0027] Since the structure of the latch 2 becomes a common feature of first and second embodiments according to the present invention, a process for engaging the automatic binding device with the corner castings 6a, 6b will be commonly illustrated, except for supplement of the indicator 44 of the second embodiment.

[0028] FIGS. 6A to FIGS. 6H show a process for engaging the automatic binding device 1 with the corner castings 6 of the container in different operative positions.

[0029] FIGS. 3A, 3B and 6A illustrate an initial position of the binding device 1 according to the present invention.

[0030] Referring to FIG. 3B, an initial position of the latch 2 falls outside of a rectangle which correspond to the housing 3. In the initial position of the latch 2, the upper fitting member 30 has been rotated at an angle of 90 degrees so that it is perpendicular to the longitudinal direction of the rectangle. Therefore, front and rear sides of the upper fitting member 30 having a relatively narrow width, respectively may protrude to the outside of the housing 3. At this time, the lower fitting member 10 has been rotated at an angle of 45 degrees so that both sides thereof protrude to the outside of the housing 3.

[0031] With seen the binding device 1 from the top view, the housing 3 having a rectangle-shape may be made at a size of allowing it to be snugly inserted into the corner castings 6a,6b via the coupling hole 7. Since the fitting members 30,10 have protruded to the outside of the housing 3 respectively, it is impossible to insert the upper fitting member 30 into the corner casting 6a via the coupling hole 7.

[0032] As shown in FIG. 6B, if a user makes the binding device 1 rotate in a state that he or she grasps the housing 3 of the binding device 1 with one hand and continuously turns the lower fitting member 10 to the right(=in the counter-clockwise direction), then the upper fitting member 30 and the housing 3 overlap each other, thereby a rectangle shape created by the upper fitting member 30 may be located within a rectangle shape created by the housing 3. The dimension of the rectangle shape provided by the upper fitting member 30 is smaller than that of the rectangle shape provided by the housing 3. Therefore, it is possible to insert the upper fitting member 30 and the housing 3 into the corner casting 6a via the coupling hole 7, as shown in FIGS. 6B and 6C.

[0033] After inserting the upper fitting member 30 and the housing 3 into the corner casting 6a via the coupling hole 7, if the user held the lower fitting member 10 and then let it go, the latch 2 may return to its initial state due to elastic force of the torsion spring 5.

[0034] If the upper fitting member 30 returns to its initial state in a state that it enters into the corner casting 6, the part "B"(illustrated as deviant crease lines in FIG. 3B) protruding outside to the housing 3 may be locked at an inner portion of the corner casting 6a. Accordingly, the upper fitting member 30 positioned at the upper portion of the latch 2 is locked at the inner portion of the corner casting 6a as shown in FIG. 6D, and thereby the binding device 1 may be positioned and fixed at the upper corner casting 6a.

[0035] After coupling the upper fitting member 30 of the binding device 1 with the upper corner casting 6a,

the upper container is lifted by means of a crane. Thereafter, the user make the upper container descend so as to insert the lower fitting member 10 disposed at the lower portion of the binding device 1 into the coupling hole 7 of the lower corner casting 6b.

[0036] If the upper container descends and is positioned onto the lower container by means of the crane, then the lower fitting member 10 of the binding device 1 begins to be contacted with the coupling hole 7 of the lower corner casting 6b that is installed at an upper corner side of the lower container.

[0037] However, as shown in FIG. 3B, the lower fitting member 10 rotates at an angle of 45 degrees so that both rounding wings 12 thereof protrude to the outside of the rectangle, which correspond to the housing 3, taken along a direction perpendicular to the longitudinal direction of the rectangle. As a result, the slanted surface of the rounding wing 12 is locked at the slanted guide surface 8.

[0038] Then, both rounding wings 12 is brought into contact with the slanted guide surface 8 of the lower corner casting 6b due to the weight applied by moving the upper container downwards. Since the rounding wings 12 is rounded in the clockwise direction and it is slanted downwards, the lower fitting member 10 rotates in the counter-clockwise direction as shown in FIG. 6E.

[0039] If the lower fitting member 10 enters into the coupling hole 7 having a rectangle-shape and continuously enters into the operating space 4 provided in the inner side of the lower corner casting 6b as shown in FIG. 5, then it returns to its initial state due to elastic force of the torsion spring 5, which is compressed due contact with the slanted guide surface 8 while it rotates in the counter-clockwise direction. Consequently, the lower fitting member 10 is locked at the inner side of the lower corner casting 6b.

[0040] When the lower fitting member 10 rotates and continuously enters into the coupling hole 7 of the lower corner casting 6b, it seems that the upper fitting member 30 may be disengaged from the upper corner casting 6a while the upper and the lower fitting members 30,10 rotate together with the latch 2 with centering around the rotating shaft 20.

[0041] Since the rounding angle of the rounding wing 12 of the lower fitting member 10 is consistent with the torsion angle of the upper fitting member 30, the upper fitting member 30 is not released from the upper corner casting 6a due to the structure and the operation of the part "C" (illustrated as deviant crease lines in FIG. 5) protruding outside of the housing 3 beyond the coupling hole 7.

[0042] As shown in FIG. 6F, the upper corner casting 6a is positioned onto the lower corner casting 6b by inserting the lower fitting member 10 of the latch 2 into the inner side of the lower corner casting 6b, and thereby the upper and the lower containers are combined together by means of the binding device 1 according to the present invention.

[0043] After laying containers and then binding them using the binding device 1 according to the present invention, the cargo containers are transported to their destination. In order to load and unload the cargo containers, the upper container is lifted by using a crane.

[0044] As shown in FIG. 6G, when the upper container is lifted by using the crane, the wing slanted surfaces 13, which is formed at the uppermost surface of the rounding wing 12 and tapered downwards in a clockwise direction, are locked at inner side surfaces of the couple hole 7 formed through the wall of the lower corner casting 6b. Under this state, since the upper container is continuously lifted and the lower container is heavy, the lower corner casting 6b may rotate in the clockwise direction.

[0045] If the lower fitting member 10 enters into the coupling hole 7 of the corner casting as shown in FIG. 5 during rotation of the lower fitting member 10, the lower fitting member 10 may be released from the lower corner casting 6b due to the lifting force applied by the crane. Continuously, the upper container is separated from the lower container and then they are ready to unload cargoes contained therein.

[0046] As described above, the lower fitting member 10 is released from the lower corner casting 6b and the latch 2 returns to its initial state as shown in FIGS. 3A and 3B together the lower fitting member 10 due to the elastic force of the torsion spring 5. Thereafter, the containers are ready to unload cargoes contained therein.

[0047] Meanwhile, when the containers loaded in a large size of ship by using the binding device according to the present invention are at sea, the pitching of the ship may frequently occurred due to operation of waves. Accordingly, the ship may be jumped up and then dropped wild. At this time, the ship drops at first and thereafter the container loaded on the ship drops after a lapse of 0.5sec due to a weight difference between the ship and the stowage loaded on the ship.

[0048] Then, the wing slanted surfaces 13 positioned at both upper sides of the lower fitting member 10 is brought into instantaneously contact with the corner portion of the coupling hole 7 of the lower corner casting 6b. As a result, the lower fitting member 10 has the possibility of being released from the lower corner casting 6b.

[0049] As described above, the friction resistance member 33 is engaged with the upper fitting member 30 within the fitting groove 34 by means of a screw screwed into the internal screw thread and driven into the upper fitting member 30 so that the friction resistance member 33 is brought into contact with an inner bottom surface of the corner casting 6. The friction resistance member 33 is a material selected from the group consisting of a rubber, polyurethane and a soft synthetic resin, which has a high frictional resistance, respectively. When the lower fitting member 10 and the upper fitting member 30 of the latch 2 integrally combined together begin to instantaneously rotate, rotation of the latch 2 is delayed because of the friction resistance member 33 having a high friction resistance is brought into contact with the

inner lower surface of the upper corner casting 6a. At this time, if a minus load becomes large, the frictional force increases in proportion to the rise in load.

[0050] As described above, when the pitching of the ship has been occurred due to operation of waves, the time between the moment when the positive load changes into the negative load and the moment when the negative load changes into the positive load is about 0.5sec. If rotation of the latch 2 is delayed for the time interval, it is possible to prevent the lower fitting member 10 from being released from the lower corner casting 6b.

[0051] Hereinafter, the second embodiment of the present invention having the indicator 44 as shown in FIGS. 8 and 9 will be explained in more detail.

[0052] According to the present invention, the latch 2 can rotate at an angle of 90 degrees within the housing 3. Since the indicator 44 consisted of the wire main body 49, the hanging ring-shaped portion 45 and the marker 46 is installed in the binding device 1, a user has learn through the marker 46, which is capable of protruding to the outside of the third groove 43, the fact that the latch 2 is rotated at a predetermined angle. If the marker 46 protrudes to the outside of the housing 3, it illustrates the fact that the binding device 1 locked in the corner castings 6a,6b has been released. Alternatively, if the marker 46 gets into the housing 3, it illustrates the fact that the binding device 1 has been locked in the corner castings 6a, 6b. The user can see the present state of the binding device 1 with the naked eye due to operation of the marker 46.

[0053] As shown in FIG. 9A, the hanging ring-shaped portion 45 formed at a one end of the indicator 44 is locked at the spring hanger 21 protruding from the one side of the circumferential surface of the rotating shaft 20. The wire main body 49 is wounded around the rotating shaft 20 at its one portion and continuously it is inserted into the grooves 41,42,42 at its other portion. The marker 46 formed at the other end of the wire main body 49 is received in the third groove 43. The washer 47 installed at the middle portion of the wire main body 49 is locked at the first groove 41a and the coiled spring 48 is positioned and pressed between the fitting shoulder portion 41a and the maker 46.

[0054] If the latch 2 including the fitting members 30,10 and the rotating shaft 20 rotates in the clockwise direction so as to be released, the wire main body 49 becomes relax as shown in FIG. 9B. Then, the coiled spring 48 disposed between the fitting shoulder portion 41a and the maker 46 expands and thereby the maker 46 protrudes from the third groove 43 to the outside of the housing 3. As a result, the user can see the release state of the binding device 1 with the naked eye.

[0055] Alternatively, if the latch 2 rotates in the counterclockwise direction so as to be locked, the wire main body 49 becomes tightened as shown in FIG. 9A. Then, the coiled spring 48 disposed between the fitting shoulder portion 41a and the maker 46 is contracted and thereby the maker 46 enters into the third groove 43 to the outside of the housing 3. As a result, the user can see the locking state of the binding device 1 with the naked eye.

[0056] As described above, the automatic binding device for a container is consisted of a latch being twisted during insertion/disengagement it into/from a coupling hole of corner castings; a pair of housings for covering a circumferential surface of a rotating shaft of the latch; and a torsion spring for re-rotating the latch substantially to its original condition before rotating, the torsion spring being installed at the circumferential surface of the rotating shaft. Due to this simple structure of the binding device, it is possible to obtain a considerable reduction in costs and a considerable improvement in value of commodities.

[0057] Furthermore, the automatic binding device for a container according to the present invention is provided with the indicator capable of allowing a user to see the present state of the binding device with the naked eye.

[0058] When the containers loaded in a large size of ship by using the binding device according to the present invention are at sea, the pitching of the ship has been occurred due to operation of waves, in which the rotation of the latch is delayed during the time interval between the moment when the positive load changes into the negative load and the moment when the negative load changes into the positive load, thereby it is possible to prevent the lower fitting member from being released from the lower corner casting.

[0059] While the invention has been described with reference to a preferred embodiment, it will be understood by those skilled in the art that various changes may be made and equivalents may be substituted for elements thereof without departing from the scope of the invention. In addition, many modifications may be made to adapt a particular situation or material to the teachings of the invention without departing from the essential scope thereof. Therefore, it is intended that the invention not be limited to the particular embodiment disclosed as the best mode contemplated for carrying out this invention, but that the invention will include all embodiments falling within the scope of the appended claims.

Claims

1. An automatic binding device for a container of the type in which an upper fitting member and a lower fitting member thereof are inserted into or detachable from coupling holes 7 formed through walls of corner castings 6a,6b, and in which the corner castings 6a, 6b are positioned at upper and lower corners of at least two containers for a ship respectively, the improvement comprising:

   a latch 2 being twisted during insertion/disengagement it into/from the coupling hole 7 of the corner castings 6a,6b;
   a pair of housings 3 for covering a circumferen-

tial surface of a rotating shaft 20 of the latch 2; and
a torsion spring 5 for re-rotating the latch 2 substantially to its original condition before rotating, the torsion spring 5 being installed at the circumferential surface of the rotating shaft 20;

wherein the rotating shaft 20 is provided with a spring hanger 21 formed at a one side of the circumferential surface of the rotating shaft 20, wherein the latch 2 has a fitting member body 11 formed at a lower portion thereof and tapered downwards from a lower portion of the rotating shaft 20, wherein rounding wings 12 are formed at both sides of the fitting member body 11 and tapered downwards at a slanting angle of 45±2 degrees, and the rounding wings 12 have a wing slanted surface 13 formed at the uppermost surface thereof and tapered downwards in a clockwise direction, wherein an upper fitting member 30 is formed at an upper portion of the rotating shaft 20 and extends at a predetermined distance in the horizontal direction, wherein a projection 32 having a mountain shape upwardly protrudes from an upper surface of the upper fitting member 30 and has a through hole 31 formed there through, wherein an operating space 4 is provided in halves of the housing 3 respectively, wherein a spring support portion 5a for locking and supporting a one end of the torsion spring 5 is formed in the housing 3 at a position adjacent to the operating space 4, and wherein a fixing protrusion edge 3a protrudes from the center of an outer surface of the housing 3 and it is brought into contact with and supported by the slanted guide surface 8 of the coupling hole 7.

2. The automatic binding device for a container as claimed in claim 1, wherein a fitting groove 34 is formed at a corner of a lower portion of the upper fitting member 30, in which a friction resistance member 33 having an internal screw thread is engaged with the upper fitting member 30 within the fitting groove 34 by means of a screw screwed into the internal screw thread and driven into the upper fitting member 30 so that the friction resistance member 33 is brought into contact with an inner bottom surface of the corner castings 6a,6b, and
wherein the friction resistance member 33 is a material selected from the group consisting of a rubber, a polyurethane and a soft synthetic resin.

3. The automatic binding device for a container as claimed in claim 2, wherein at least one groove for communicating the operating space 4 with an exterior of the housing 3 is formed at a one inner surface of the housing 3,
wherein an indicator 44 is consisted of a wire main body 49 made of a wire rope, a hanging ring-shaped portion 45 formed at a one end thereof and a marker 46 formed at the other end thereof, and
wherein at least one washer 47 is disposed at a middle portion of the wire main body 49 and a coiled spring 48 is disposed between the washer 47 and the marker 46.

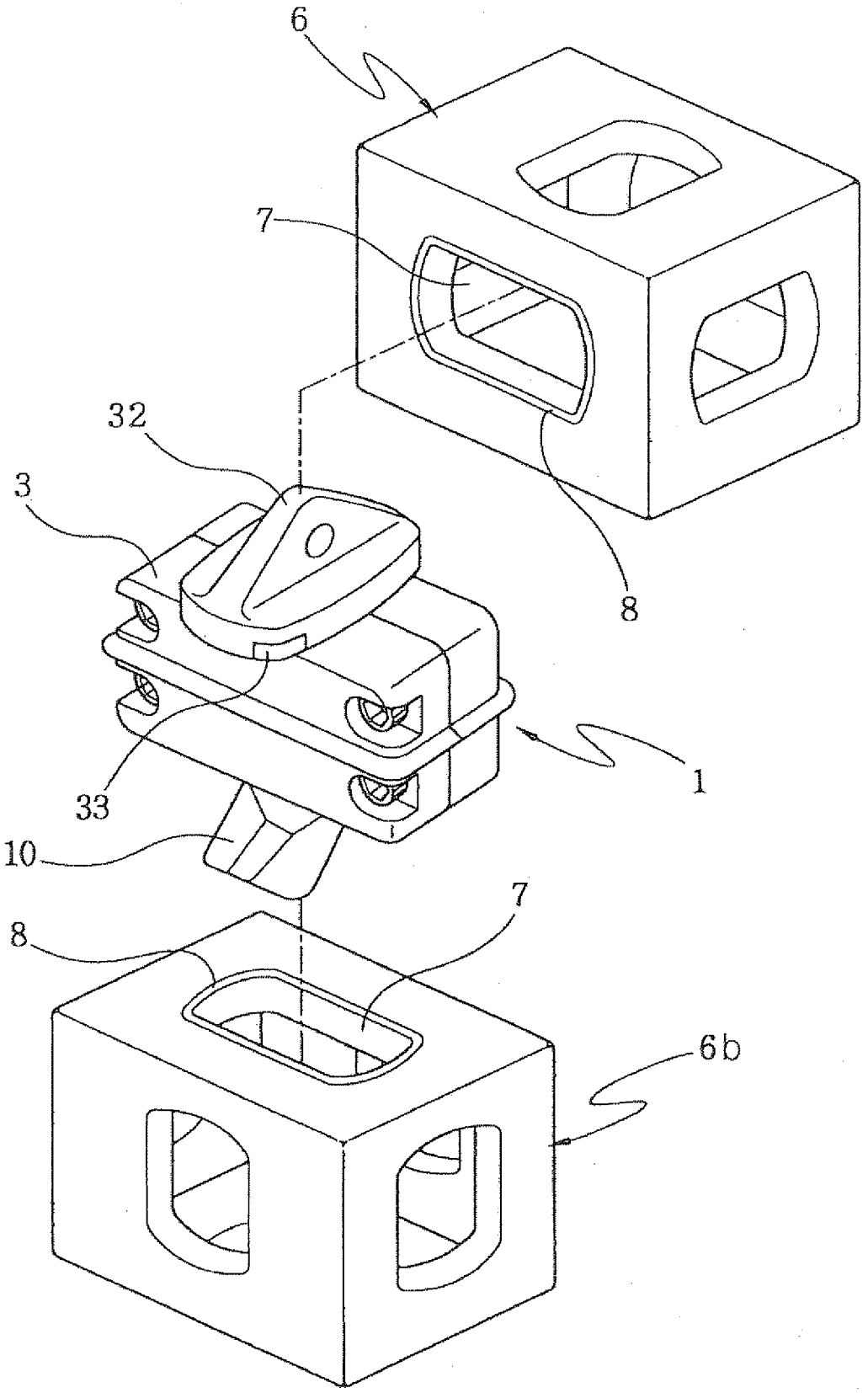
4. The automatic binding device for a container as claimed in claim 3, wherein the at least one groove comprises a first groove 41, a second groove 42 and a third groove 43 which are integrally communicated with each other, in which a dimension of the first groove 41 is smaller than that of the second groove 42 and continuously the dimension of the second groove 42 is smaller than that of the third groove 43, wherein when the latch 2 and the housing 3 are combined with each other, then the indicator 44 is received in the grooves 41,42,43 and the operating space 4, and thereby permitting relative motion of the indicator 44 with respect to the housing 3, wherein the hanging ring-shaped portion 45 of the indicator 44 is locked at the spring hanger 21 of the rotating shaft 20, wherein when the indicator 44 is positioned within the interior of the housing 3, the marker 46 is received in the third groove 43, and the washer 47 is locked at a fitting shoulder portion formed at a border between the first groove 41 and the second groove 42.

5. The automatic binding device for a container as claimed in claim 1, wherein at least one groove for communicating the operating space 4 with an exterior of the housing 3 is formed at a one inner surface of the housing 3,
wherein an indicator 44 is consisted of a wire main body 49 made of a wire rope, a hanging ring-shaped portion 45 formed at a one end thereof and a marker 46 formed at the other end thereof, and
wherein at least one washer 47 is disposed at a middle portion of the wire main body 49 and a coiled spring 48 is disposed between the washer 47 and the marker 46.

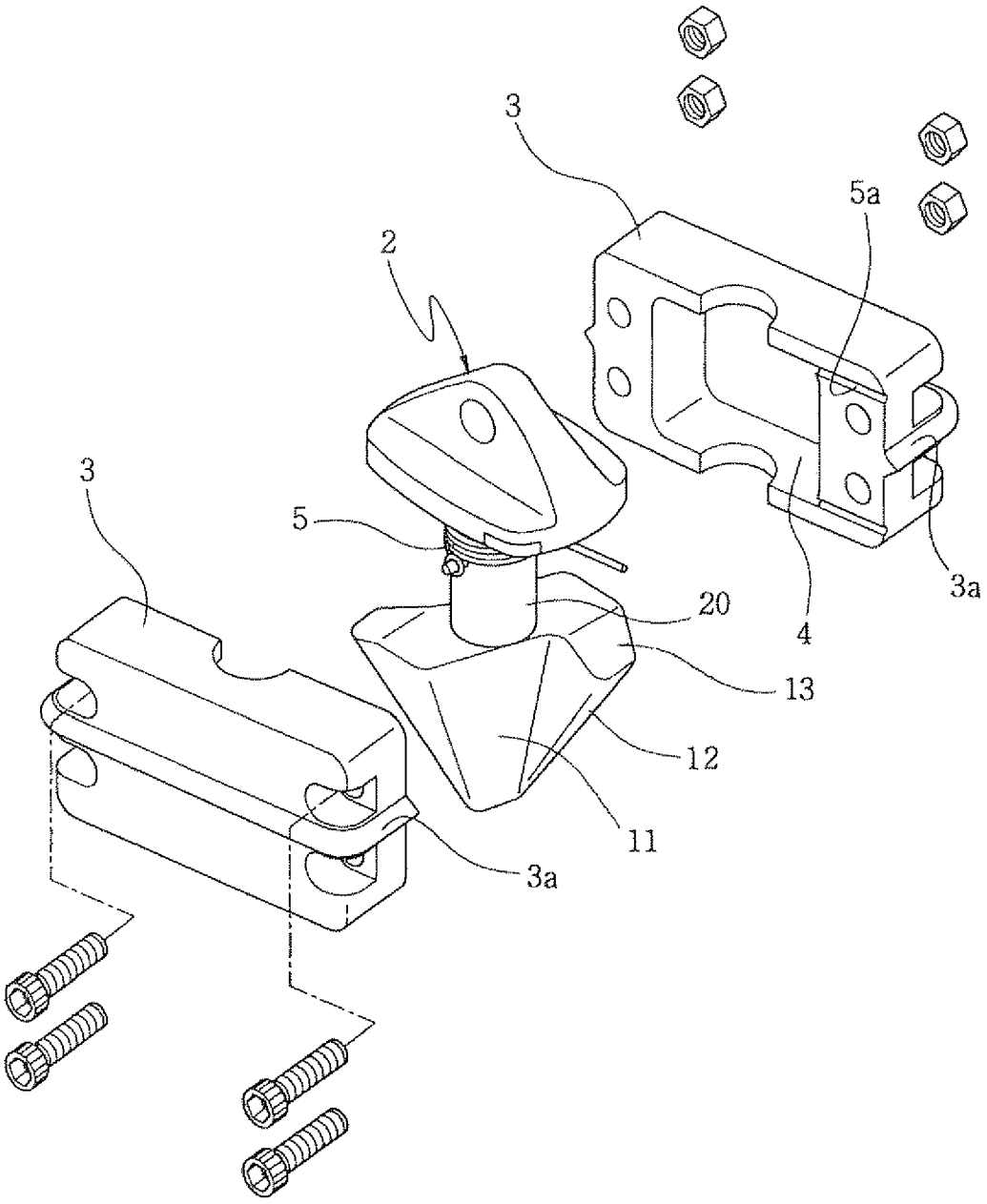
6. The automatic binding device for a container as claimed in claim 5, wherein the at least one groove comprises a first groove 41, a second groove 42 and a third groove 43 which are integrally communicated with each other, in which a dimension of the first groove 41 is smaller than that of the second groove 42 and continuously the dimension of the second groove 42 is smaller than that of the third groove 43, wherein when the latch 2 and the housing 3 are combined with each other, then the indicator 44 is received in the grooves 41,42,43 and the operating space 4, and thereby permitting relative motion of the indicator 44 with respect to the housing 3, wherein the hanging ring-shaped portion 45 of the indicator 44 is locked at the spring hanger 21 of the rotating shaft 20, wherein when the indicator 44 is positioned

within the interior of the housing 3, the marker 46 is received in the third groove 43, and the washer 47 is locked at a fitting shoulder portion formed at a border between the first groove 41 and the second groove 42.

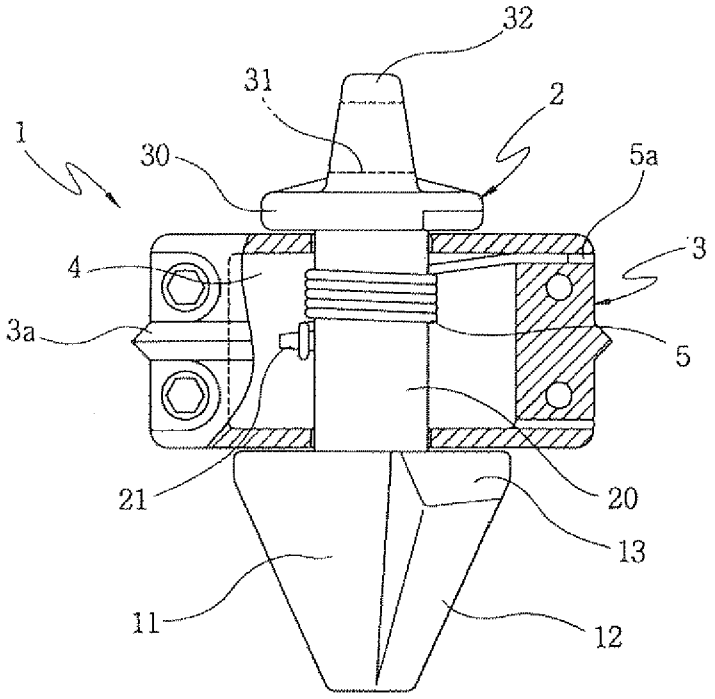
【Fig 1】



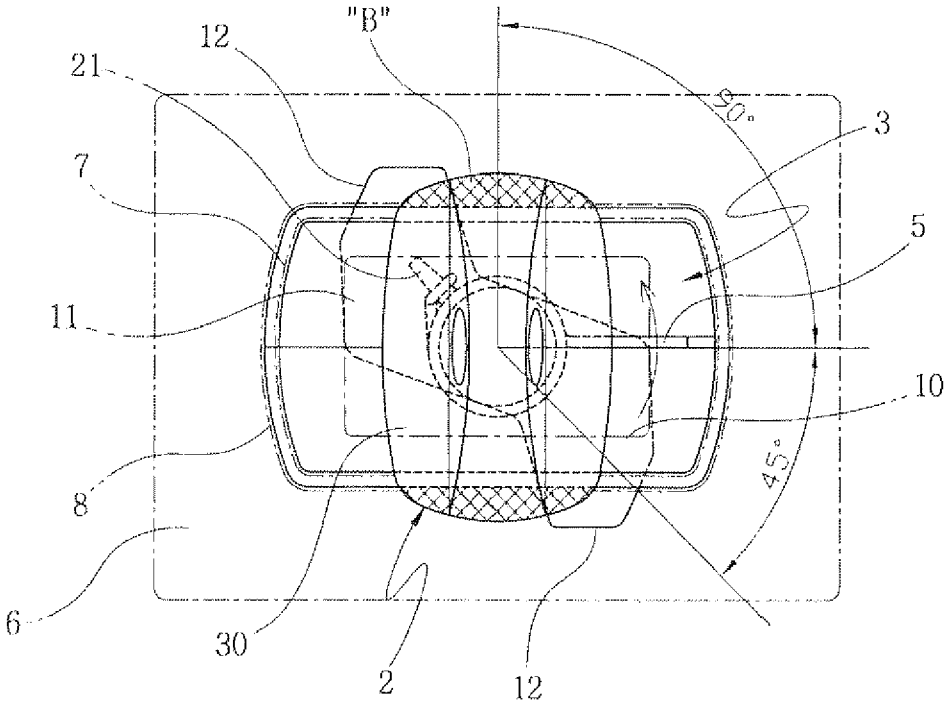
【Fig 2】



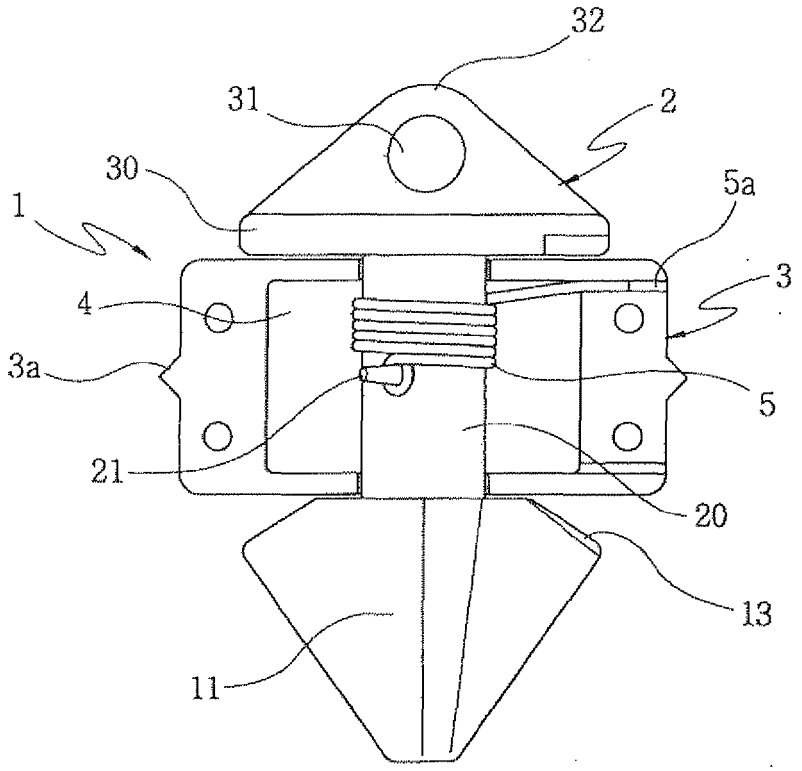
【Fig 3A】



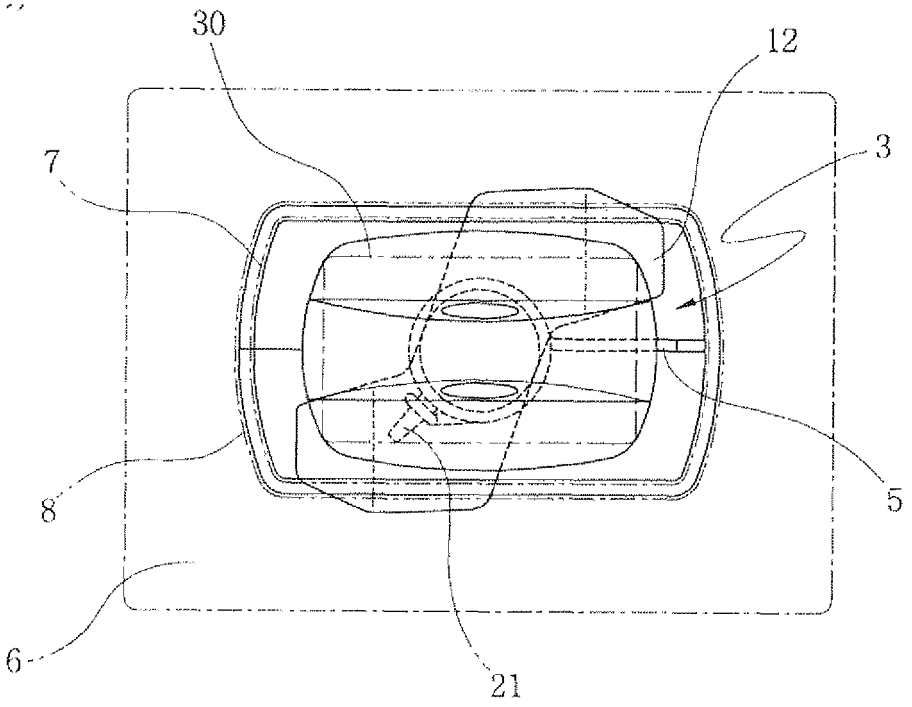
【Fig 3B】



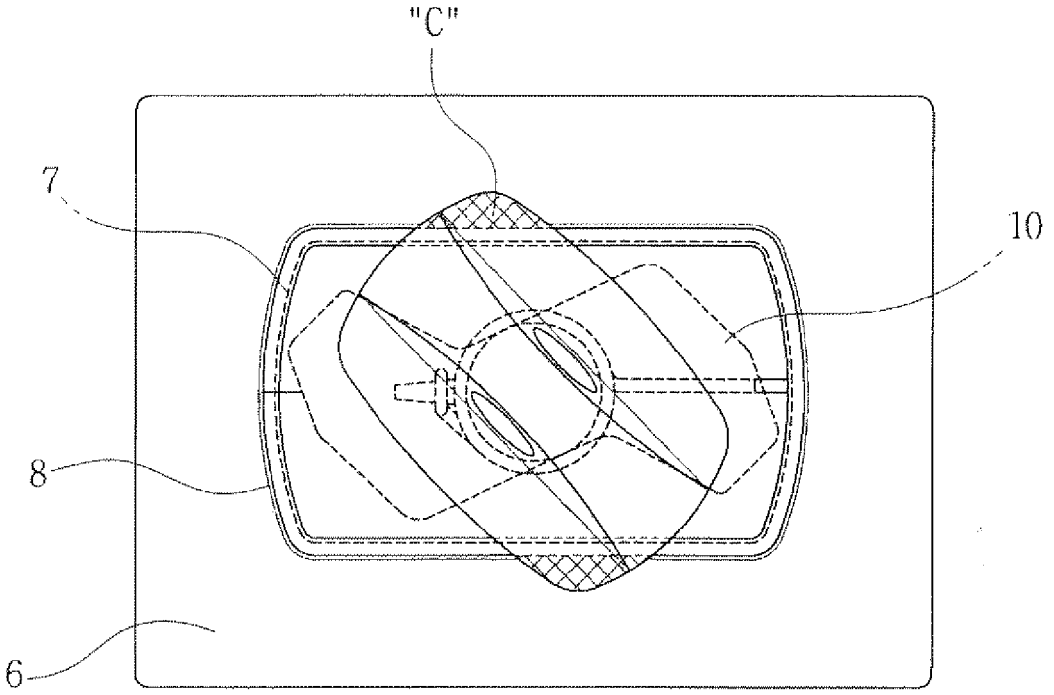
【Fig 4 A】



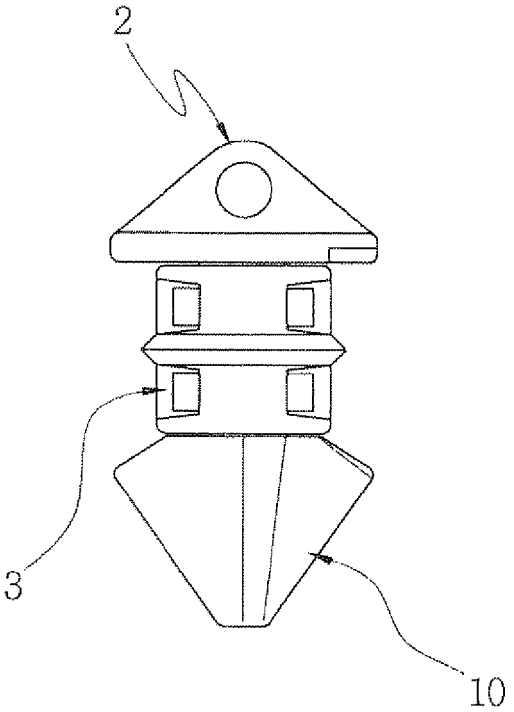
【Fig 4 B】



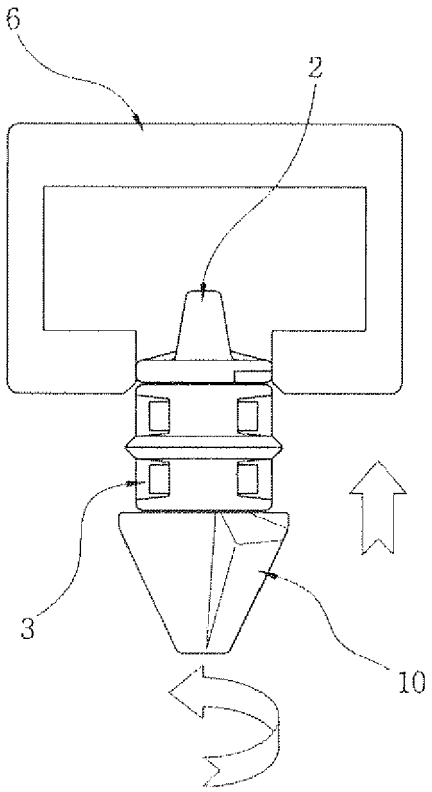
【Fig 5】



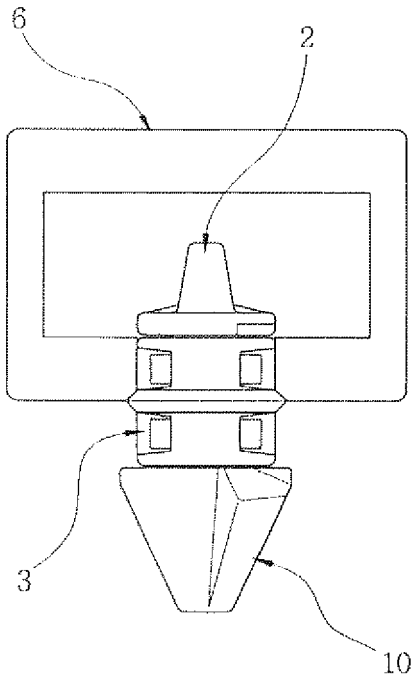
【Fig 6A】



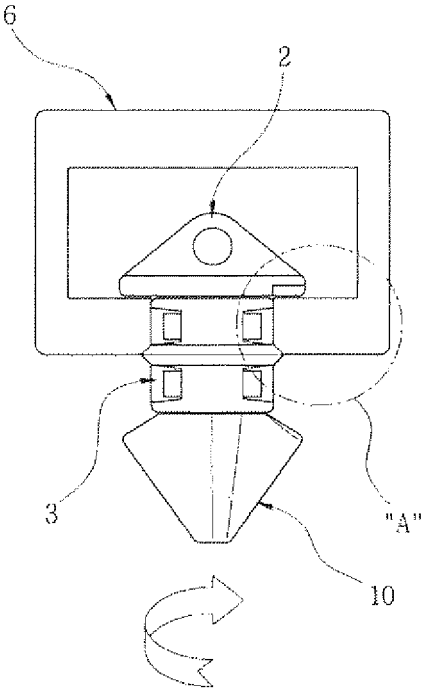
【Fig 6 B】



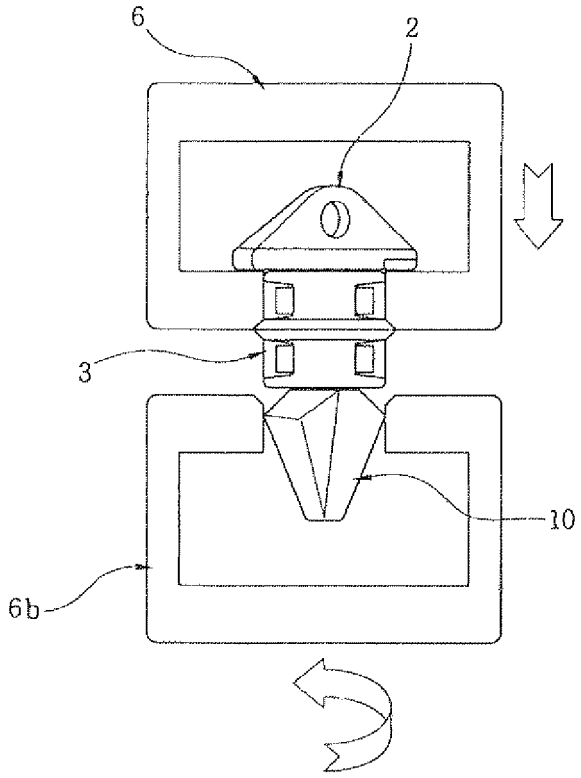
【Fig 6 C】



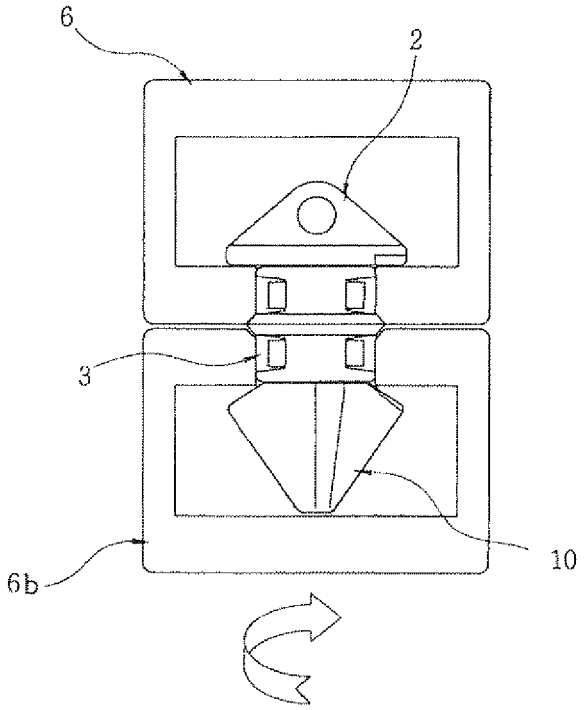
【Fig 6 D】



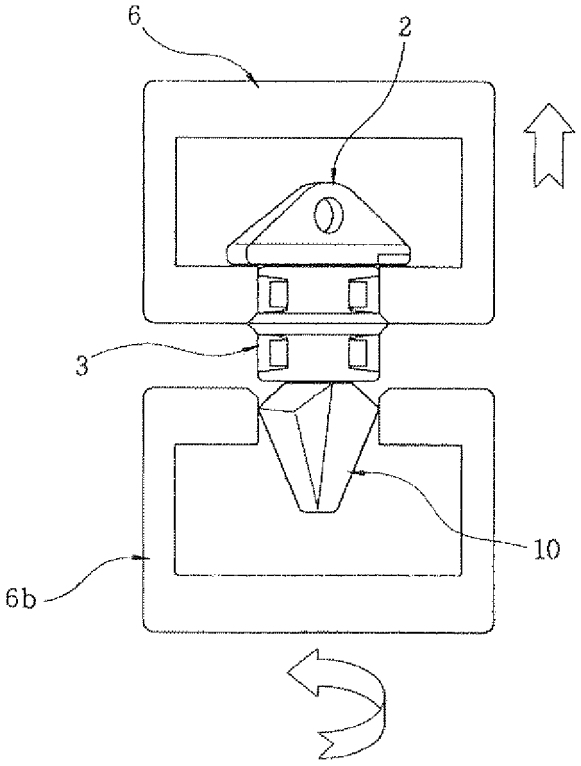
【Fig 6 E】



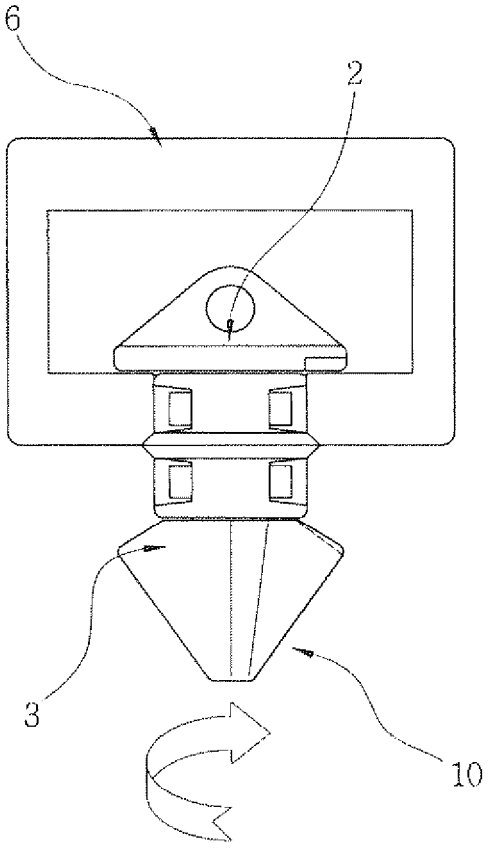
【Fig 6 F】



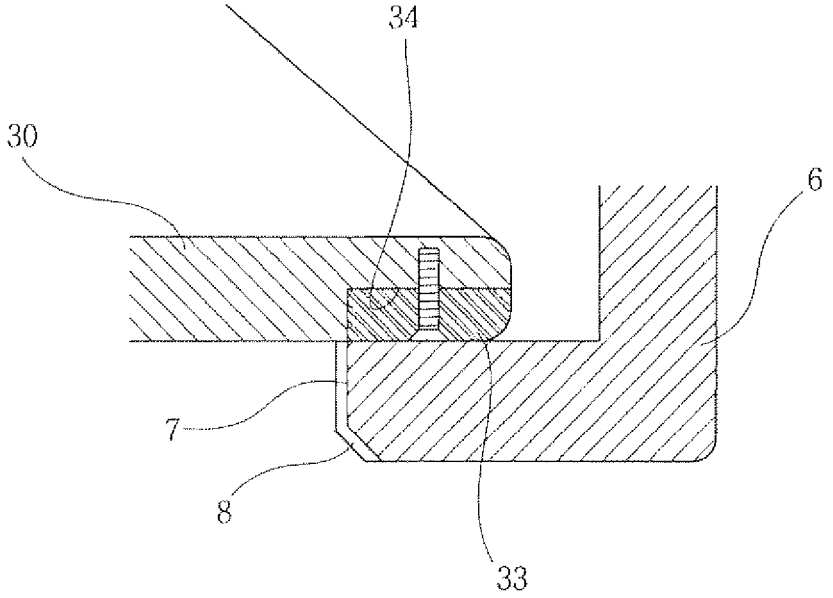
【Fig 6 G】



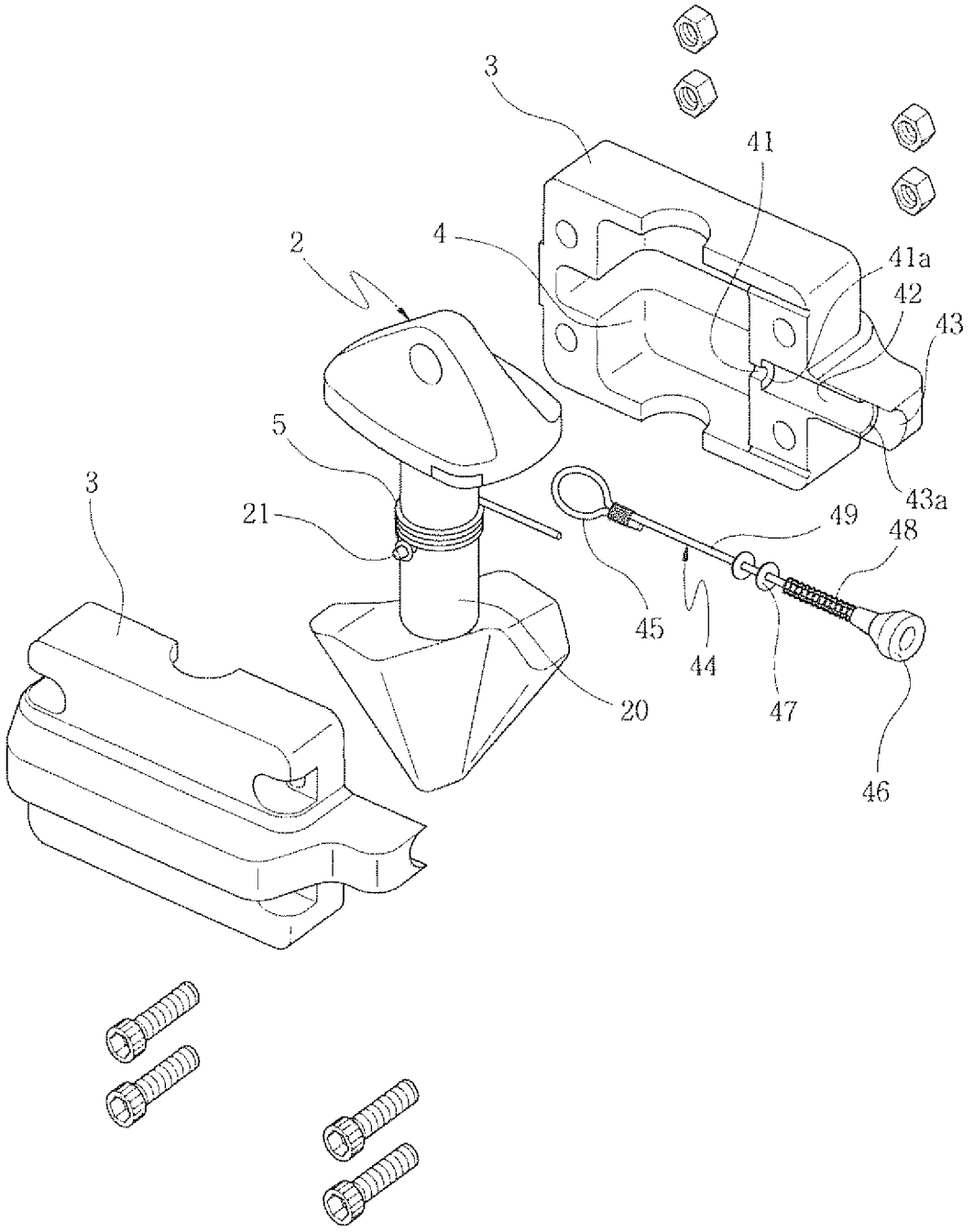
【Fig 6H】



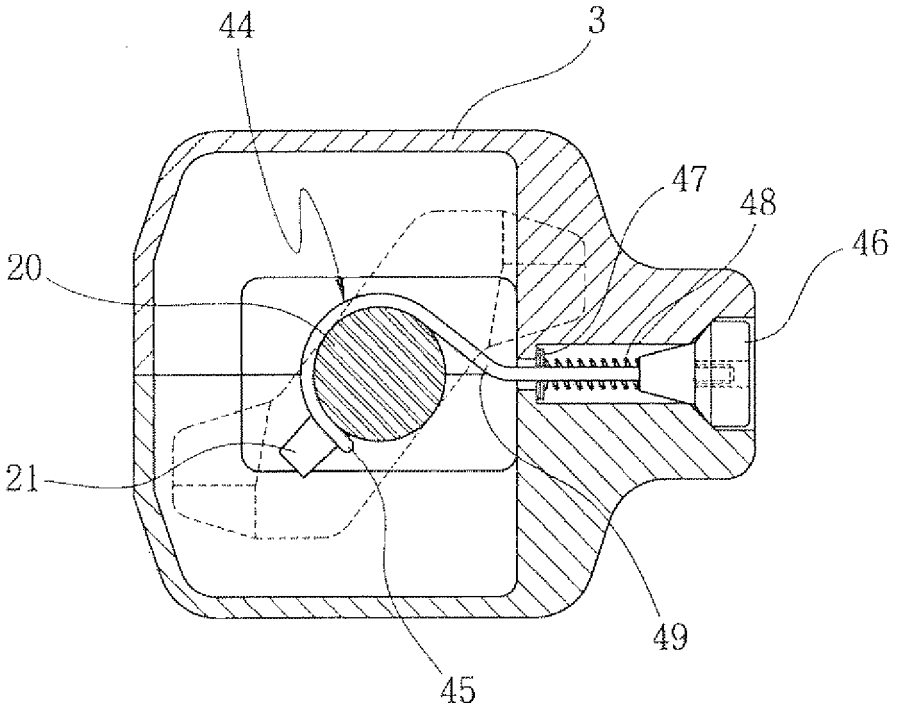
【Fig 7】



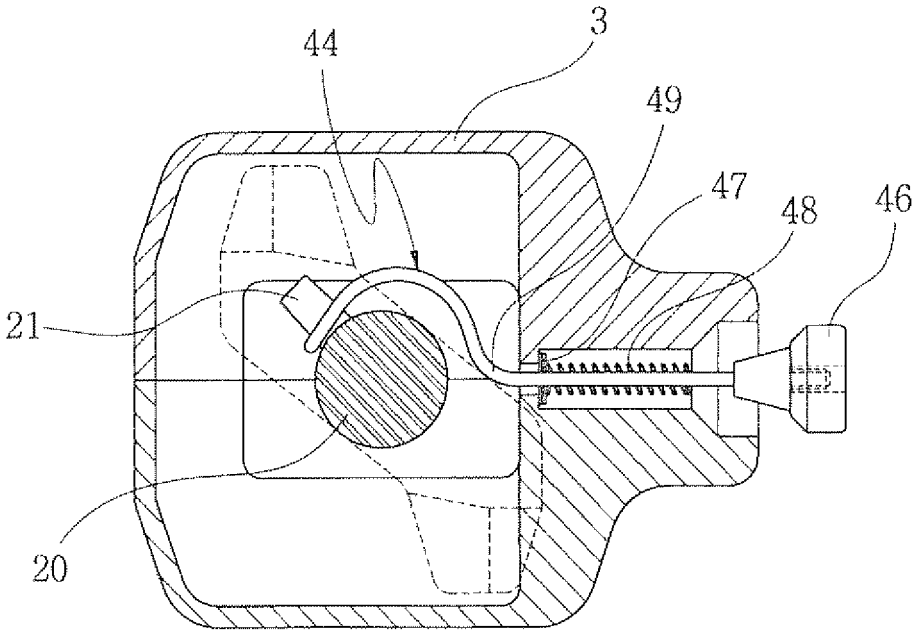
【Fig 8】



【Fig 9A】



【Fig 9B】



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EUROPEAN SEARCH REPORT

Application Number
EP 08 16 1097

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	WO 2006/137759 A (ALL SET MARINE LASHING AB [SE]; BOHMAN HANS [SE]; NYBERG LARS [SE]; NY) 28 December 2006 (2006-12-28) * page 5, lines 1-8 * * page 9, line 29 - line 32; figures 1-3 *	1	INV. B65D90/00
Y	GB 1 337 016 A (BACKTEMANS PATENTER AB) 14 November 1973 (1973-11-14)	1	
A	* page 2, line 32 * * page 2, line 58 - line 65; figures *	3-6	
A	WO 2007/120094 A (ALL SET MARINE LASHING AB [SE]; BOHMAN HANS [SE]; KARLSSON TORBJOERN [) 25 October 2007 (2007-10-25) * page 12, line 22 - page 13, line 35; figures *	1	
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	22 January 2009	Zanghi, Amedeo

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