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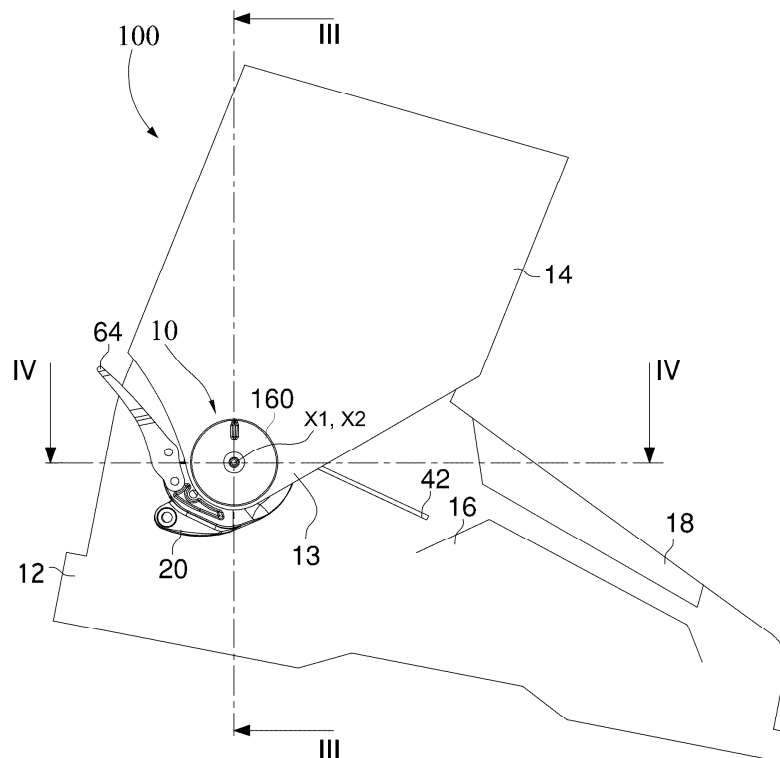
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(54) METHOD OF MOUNTING A CLOSURE DEVICE ON A SKI BOOT

(57) A method is described for mounting a closing device on a ski boot that comprises a shell (12) and a tubular cuff (14), wherein the closing device functions to bring two flaps (16, 18) of the shell and/or cuff closer to each other, and the cuff comprises a rim (13) that in use ends up substantially at the ankle joint of the person wearing the boot. To minimize the bulk overall, the meth-

od has the steps of

1. fastening the closing device (10) to the shell or cuff;
2. placing the rim (13) on the closing device so that the rim at least partially covers the closing device;
3. connecting a retaining member (160) to the closing device to trap the rim between the retaining member and the closing device.

**Fig. 1****EP 4 772 064 A1**

Description

[0001] The present invention relates to: a method for mounting a closing device on a ski boot, a closing device for ski boot, and a ski boot equipped with the closing device.

[0002] Ski boots comprise a shell, which envelops the foot, and a cuff, which envelops the leg from ankle to calf. The shell and cuff are hinged together to better fit the boot to the user's leg.

[0003] The cuff and/or shell has at least two flaps that are tightened by a closing device, most commonly those with closing levers and a toothed rack. Other devices use cables wound around a spool to tighten the boot parts, see for example WO 2005 072208 and recent developments in WO 2024 089603.

[0004] All lever-rack or cable-spool devices not only have very complicated and expensive internal structures but are overall bulky and as such protrude significantly from the boot and are consequently subject to impacts during use.

[0005] The main object of the invention is to eliminate or mitigate the aforementioned drawbacks by creating a different closing device for ski boots.

[0006] Another object is to improve a ski boot, in particular by reducing its external protrusions.

[0007] A method is then proposed for mounting a closing device on a ski boot comprising a shell and a tubular cuff,

wherein the closing device functions to tighten and/or bring together two flaps of the shell and/or the cuff, and

the cuff comprises a lower rim which in use ends up substantially in correspondence with the ankle joint of the person wearing the boot, with the steps of

- fixing the closing device on the shell or cuff (e.g. the closing device is coupled to the material making up the shell or cuff);
- placing the rim on the closing device so that the rim at least partially covers the closing device;
- connecting a retaining member to the closing device to trap/retain the rim between the retaining member and the closing device, particularly within a gap defined by the retaining member and the closing device.

[0008] An advantage of the method is obtaining a closing device that is integrated into the boot and that overall protrudes little from the shell.

[0009] Another advantage is positioning the closing device differently from known positions, giving the boot manufacturer more degrees of freedom to design the boot.

[0010] Another advantage is positioning the closing device where the user can operate it in an ergonomically

more advantageous position as it is closer to the user's center of gravity.

[0011] In one embodiment, the method comprises the step of connecting the retaining member to the closing device to clamp the rim between the retaining member and the closing device. The cuff is thus locked on, and integral with, the closing device.

[0012] In one embodiment the method comprises the step of rotatably coupling the rim of the cuff with respect to the shell by a rotation fulcrum at the closing device, so that the rim of the cuff is constrained to the closing device in an oscillating manner and can oscillate with respect to the closing device about an axis which is substantially horizontal axis in use and passing through the closing device.

[0013] This allows for adjustment of, for example, the sagittal inclination of the cuff.

[0014] In one embodiment, the method comprises the step of moving the cuff relative to the shell and the closing device by a displacement, e.g. a rotation, of a component of the closing device, in particular by a rotation of the retaining member. This allows, for example, adjustment of the lateral inclination of the cuff (*canting*).

[0015] In one embodiment the method comprises the step of fixing the closing device on the shell by inserting a first portion of the closing device into a through-hole made in the shell. This way the overall thickness and protrusions of the boot are reduced, and by fitting the closing device into the through-hole it is possible to stabilize the closing device in position without it, for example, rotating with respect to the shell.

[0016] In particular, the method comprises the step of inserting the first portion into the through-hole of the shell so that a perimeter of the portion matches the perimeter of the through-hole in the shell.

[0017] In one embodiment, the perimeter of the first portion has a shape other than a circumference, to avoid unwanted rotation.

[0018] In one embodiment, the method comprises the step of inserting a second portion of the closing device into a through-hole made in the rim, said second portion being permanently integral with the shell.

[0019] In particular, the first portion and the second portion are placed on opposite sides of the closing device.

[0020] In one embodiment the first and second portions are integral with each other.

[0021] In one embodiment the first and second portions are mounted relatively rotatable to tilt the cuff relative to the shell.

[0022] In one embodiment, the method comprises the step of inserting the retaining member into a through-hole formed in the rim of the cuff to connect the retaining member to the closing device, in particular to the second portion, so that the closed perimeter of the through-hole of the rim completely surrounds the retaining member.

[0023] In one embodiment, the method comprises the step of fixing the closing device to the shell at the user's

ankle, either on the inner side of the shell (the one facing the other foot), or on the outer side of the shell, or both.

[0024] In one embodiment, the method comprises the step of fixing the closing device to the shell in correspondence with a cavity formed in the shell and/or in the cuff.

[0025] To fix the closing device to the boot, one can use, for example, screws, rivets, joints, or glue.

[0026] Another aspect of the invention is a closing device for a ski boot comprising a shell and a cuff, the closing device comprising:

- a support structure connectable/connected to the shell,
- means installed on the support structure for winding a flexible member, e.g. a cable, capable of clamping two flaps of the shell and/or the cuff;
- a retaining member which is

connectable/connected to the support structure so as to form a gap between the support structure and the retaining member, and configured to trap, and preferably clamp, one rim of the cuff inside the gap.

[0027] In one embodiment the device comprises a lever or traction member pivoted on the structure in oscillating manner about a fulcrum to actuate the means for winding.

[0028] In one embodiment the means for winding comprise a spool rotatable in a first direction for winding the flexible member.

[0029] In one embodiment the device comprises selective retaining means for leaving the spool idle or preventing it from rotating in a direction opposite to the first direction.

[0030] In one embodiment the device comprises:

- a support structure comprising a substantially flat surface extending in a plane;
- a spool rotatably pivoted on the structure about a first rotation axis to wind a flexible member, e.g. a cable, by rotating in a first direction, the rotation axis being substantially orthogonal to said plane;
- a lever or traction member pivoted on the structure in oscillating manner about a fulcrum to operate the spool and make it rotate in the first direction;
- selective retaining means for leaving the spool idle or preventing it from rotating in a direction opposite to the first direction;
- a retaining member connectable/connected to the support structure at the flat surface to retain, and preferably clamp, one rim of the cuff between the flat surface and the retaining member.

[0031] In one embodiment the retaining member is connectable/connected directly to the flat surface.

[0032] In one embodiment, the retaining member is screwed or rotatably coupled to the flat surface and/or the

supporting structure, preferably via a fastening member.

[0033] In one embodiment the retaining member is rotatably pivoted to the flat surface and/or the support structure about a second axis parallel to, and preferably coincident with, said first rotation axis so that it can rotate relative to the flat surface, in particular so that it can rotate eccentrically with respect to said second axis to move the rim of the cuff relative to the shell.

[0034] In one embodiment, the retaining member comprises a surface that faces the flat surface and is substantially parallel to the flat surface; and preferably the facing surface and the flat surface are in direct contact for at least a fraction of their extension.

[0035] In one embodiment, the facing surface or the retaining member comprises a protruding surface that extends from the facing surface or the retaining member parallel to the first axis. Preferably, the protruding surface is

coaxial to said second axis or eccentric with respect to it, and/or created by a raised arched step.

[0036] The protruding surface is adapted to act as an abutment or support for a rim or a hole or a loop of the cuff. In particular, the protruding surface extends, in use, parallel to a horizontal axis.

[0037] In one embodiment the protruding surface is a cylindrical surface or portion thereof, to function as a fulcrum of rotation for the cuff.

[0038] In one embodiment, the protruding surface is a surface that develops with a spiral pattern with respect to an axis which is horizontal and/or orthogonal to said facing surface.

[0039] In one embodiment, the flat surface and the facing surface are coupled by guiding means for moving the retaining member relative to the flat surface according to a predefined trajectory. In particular, the guiding means comprise male and female portions that are provided on said surfaces, respectively, and are configured to slide inside each other.

[0040] In one embodiment, the flat surface and the facing surface are coupled by guiding means for moving the retaining member relative to the flat surface according to a predefined trajectory during a rotation of the retaining member. In particular, the guiding means comprise fins and arcuate grooves that are provided on said surfaces and are configured to slide inside each other.

[0041] Another aspect of the invention is a ski boot comprising:

a shell,
a cuff,
a device as defined above,

wherein the cuff has a rim placed, and preferably clamped, between the retaining member and the flat surface of the device.

[0042] In one embodiment, the rim of the cuff at the closing device is pivotally articulated with respect to the shell by a rotation fulcrum, in particular a rotation about an axis parallel to, preferably coinciding with, said second axis.

[0043] In one embodiment, the rim of the cuff has a through-hole and the retaining member is applied on and/or within such through-hole.

[0044] In one embodiment, the retaining member is movable relative to the flat surface to move (preferably push) the rim of the cuff relative to the shell. In particular, the retaining member is rotatable, preferably eccentrically, relative to the flat surface to move (preferably push) the rim of the cuff relative to the shell.

[0045] Preferably, the relative displacement of the rim of the cuff occurs parallel to the flat surface, i.e. orthogonally to the second axis.

[0046] In particular, the retaining member comprises on said facing surface a support or abutment surface for the rim of the cuff, wherein the support or abutment surface extends parallel to said second axis. In one embodiment, the support or abutment surface is a cylindrical surface or portion thereof.

[0047] In particular, the support or abutment surface has such a perimeter so as to match the perimeter of the through-hole in the cuff.

[0048] In one embodiment, the retaining member comprises a surface that faces the flat surface and is substantially parallel to the flat surface; preferably, the facing surface and the flat surface are in direct contact for a fraction of their extension, and the remainder of the extension of the flat surface is in direct contact with the rim of the cuff.

[0049] In one embodiment, the retaining member is substantially disc-shaped.

[0050] For the closing device and the boot, in one embodiment the closing device comprises a first portion fixable to the shell and inserted in a through-hole or recess made in the shell. In particular, the first portion is inserted/insertable in the through-hole or recess of the shell such that a perimeter of the portion matches the perimeter of the through-hole or recess in the shell.

[0051] In one embodiment, the perimeter of the first portion has a shape other than a circumference, to avoid unwanted rotation.

[0052] In one embodiment, the closing device comprises a second portion inserted/insertable in a through-hole or recess made in the rim, said second portion being permanently integral with the shell.

[0053] In particular, the first portion and the second portion are placed on opposite sides of the closing device.

[0054] In one embodiment, the first and second portions are integral with each other.

[0055] In one embodiment the first and second portions are mounted relatively rotatably to allow the cuff to be tilted relative to the shell.

[0056] In one embodiment, the closing device is fixed

to the shell in correspondence with a cavity or recess made in the shell and/or on the cuff.

[0057] Preferably, the closing device is attached to the boot by screws, rivets, interlocking, or gluing.

[0058] The advantages of the invention will be further apparent from preferred embodiments described below with reference to the accompanying drawings, wherein:

- Figure 1 shows a side view of a ski boot;
- Figure 2 shows a side view of a closing device;
- figure 3 shows a cross-sectional view along the III-III plane of fig. 1;
- figure 4 shows a cross-sectional view along the IV-IV plane of fig. 1;
- Figure 5 shows a side view of a cuff;
- Figure 6 shows a vertical cross-sectional view of the closing device of Fig. 2;
- Figure 7 shows a side view of the inside of the ski boot.

[0059] A boot 100 (fig. 1) comprises a known cuff 14, equipped with a rim 13, and a known shell 12. At least one of the cuff 14 or the shell 12 is equipped with a first flap 18 and a second flap 16.

[0060] A closing device 10 is mounted on the boot 100, in the example illustrated on the shell 12, and comprises means for tightening the two flaps 16, 18 against each other.

[0061] The device 10 comprises a substantially flat surface 140, which extends in a plane substantially parallel to the surface of the rim 13 or of the shell 12 at the ankle, and a retaining member 160, e.g. a disc, connectable/connected to the device 10 at the flat surface 140 to accommodate, and preferably clamp, the rim 13 between the flat surface 140 and the retaining member 160.

[0062] The retaining member 160 preferably comprises a surface 170 that faces the flat surface 140, and is substantially flat and parallel to the flat surface 140.

[0063] The rim 13 is housed, and trapped, between the surfaces 140, 170.

[0064] In one embodiment, the surface 170 comprises an arched step 172 in relief that forms a cylindrical surface 174 that extends substantially orthogonally to the surface 140.

[0065] In one embodiment, the rim 13 has a through-hole 15 (fig. 2) inside which the retaining member 160 is placed, and in particular the perimeter of the through-hole 15 is mounted in abutment or resting against the cylindrical surface 174. In one embodiment, the hole 15 can also be "open", i.e. have a U-shaped perimeter or form a loop.

[0066] The cylindrical surface 174 advantageously constitutes an abutment and/or centering or support surface for the rim 13. In particular, the cylindrical surface 174 has a perimeter that matches the perimeter of the through-hole 15, for better stability of the cuff.

[0067] In one embodiment, the step 172 generates a surface with a spiral profile with respect to an axis ortho-

gonal to the surface 170, so that when the rim of the cuff 14 rotates and slides over this surface it tilts laterally (*canting*).

[0068] In one embodiment the retaining member 160 is directly connected/connectable to the flat surface 140.

[0069] To facilitate the relative movement between the cuff 14 and the shell 12, in one embodiment the retaining member 160 is pivotally connected to the flat surface 140 (and/or to the support structure 20, see below), e.g. via a pin 162.

[0070] In one embodiment, the retaining member 160 is rotatably pivoted to the flat surface 140 (and/or to the support structure 20, see below) about a rotation axis X2 substantially orthogonal to the rim 13 and/or to the surface 140, so that the cuff 14 can oscillate with respect to the flat surface 140, in particular in an eccentric manner.

[0071] In one embodiment, the cuff 14 can swing by making the through-hole 15 larger than the cylindrical surface 174.

[0072] Therefore the device 10 not only integrates clamping means for the flaps 14, 16 but also constitutes a rotation fulcrum of the cuff 14 with respect to the shell 12.

[0073] In one embodiment, to limit the thicknesses of the device 10 the surface 170 and the flat surface 140, or at least two portions thereof, are in direct contact.

[0074] In one embodiment, the flat surface 140 and the surface 170 are coupled via guiding means 190 for moving the retaining member 160 relative to the flat surface 140 according to a predefined trajectory.

[0075] This allows for positional adjustment of the cuff 14 on the shell 12.

[0076] In particular, the means 190 comprise male and female portions 192, 194 which are provided on the surfaces 140, 170 respectively and are configured to slide inside each other.

[0077] In one embodiment, which reduces the thickness of the device 10 protruding from the shell 14, at least a part of the structure 20, opposite the surface 170, is inserted into a cavity, or preferably a through-hole 300, made in the shell 12 (see fig. 7).

[0078] Note that the structure of the device 10 is not essential, here mainly counting its placement between the rim 13 and the shell 12.

[0079] Such placement is facilitated by a device 10 being thin. For this purpose, the device 10 has the following preferred construction: it comprises a support structure 20 which houses a spool 40 rotatably pivoted on the structure 20 about a first rotation axis X1 to wind a flexible member 42, e.g. a cable, by turning in a first direction.

[0080] The structure 20 comprises the surface 140, which therefore extends in a plane substantially orthogonal to the axis X1.

[0081] The flexible member 42 is connected to the two flaps 16, 18 to tighten them when the flexible member 42 is put under tension and wound on the spool 40 by means of a lever 60.

[0082] The lever 60 is pivoted on the structure 20 in

oscillating manner about a fulcrum to actuate the spool 40 and make it to rotate in the first direction. Selective retaining means 80 installed in the structure 20 can leave the spool 40 idle or prevent it from rotating in a direction opposite to the first direction, thus the flexible member 42 maintains its tension.

[0083] The pin 162 allows the rotation of the retaining member 160 about an axis X2 parallel to, and preferably coinciding with, the axis X1.

[0084] In this embodiment the axes X1, X2 are substantially parallel to each other, and the cylindrical surface 174 develops parallel to these axes.

[0085] The forced rotation of the spool 40 is aided by an external circular toothing composed of a circular series of teeth 44 (only one indicated for simplicity).

[0086] The lever 60 has one end 62 pivoted on the base 20 in an oscillating manner, the other opposite end 64 of the lever 60 is free and can be operated manually.

[0087] The lever 60 is connected to an arm 30 having a free end 34 capable of engaging the spool 40 and causing it to rotate counterclockwise. For this purpose, the second end 34 preferably comprises one or more teeth 36 (only one is indicated for simplicity) capable of engaging at least one of the teeth 44.

[0088] The terms clockwise and counterclockwise are not limiting but are used here only to simplify the understanding of Figure 6, wherein a clockwise rotation of the spool 40 results in the unwinding of the cable 42 while a counterclockwise rotation results in the winding of the cable 42 onto the spool 40.

[0089] The lever 60 allows manually controlling the operation of the device 10.

[0090] Without manual intervention, the device 10 is designed so that the lever 60 is at rest and the spool 40 is blocked by the retaining member 80 to prevent traction of the cable 42 from the outside.

[0091] To wind the cable 42 onto the spool 40, the user pulls the lever 60 (fig. 4, arrow F). By doing so the arm 30 moves relative to the spool 40 so that the second end 34 travels a portion of the outer circumference of the spool 40. During this phase, at least one tooth engages a tooth 44 and the spool 40 is rotated counterclockwise. By returning the lever 60 to the first position and repeating the operation, the spool 40 can be rotated by a desired angle.

Claims

1. Method for mounting a closing device on a ski boot that comprises a shell and a tubular cuff,

wherein the closing device functions to bring two flaps of the shell and/or cuff closer to each other, and

the cuff comprises a rim that in use ends up substantially at the ankle joint of the person wearing the boot,

with the steps of

- fastening the closing device to the shell or cuff;
 - placing the rim on the closing device such that the rim at least partially covers the closing device; 5
 - connecting a retaining member to the closing device to trap the rim between the retaining member and the closing device. 10
2. Method according to claim 1, with the step of connecting the retaining member to the closing device to trap the rim within a gap delimited by the retaining member and the closing device. 15
 3. Method according to any preceding claim, comprising the step of connecting the retaining member to the closing device to clamp the rim between the retaining member and the closing device. 20
 4. Method according to any preceding claim, comprising the step of coupling the rim of the cuff rotatably with respect to the shell by a rotation fulcrum arranged at the closing device. 25
 5. Method according to any preceding claim, comprising the step of moving the cuff relative to the shell and the closing device by a displacement of a component of the closing device. 30
 6. Method according to claim 5, comprising the step of displacing the cuff relative to the shell and the closing device by a rotation of the retaining member. 35
 7. Method according to any preceding claim, comprising the step of fastening the closing device to the shell by inserting a portion of the closing device into a through-hole or recess made in the shell. 40
 8. Method according to any preceding claim, comprising the step of inserting a portion of the closing device into a through-hole formed in the rim of the cuff.
 9. Method according to claims 7 and 8, wherein the portion defined in claim 7 and the portion defined in claim 8 are relatively rotatably mounted to permit the cuff to be tilted relative to the shell. 45
 10. Method according to any preceding claim, comprising the step of inserting the retaining member into a through-hole formed in the rim of the cuff to connect the retaining member to the closing device. 50

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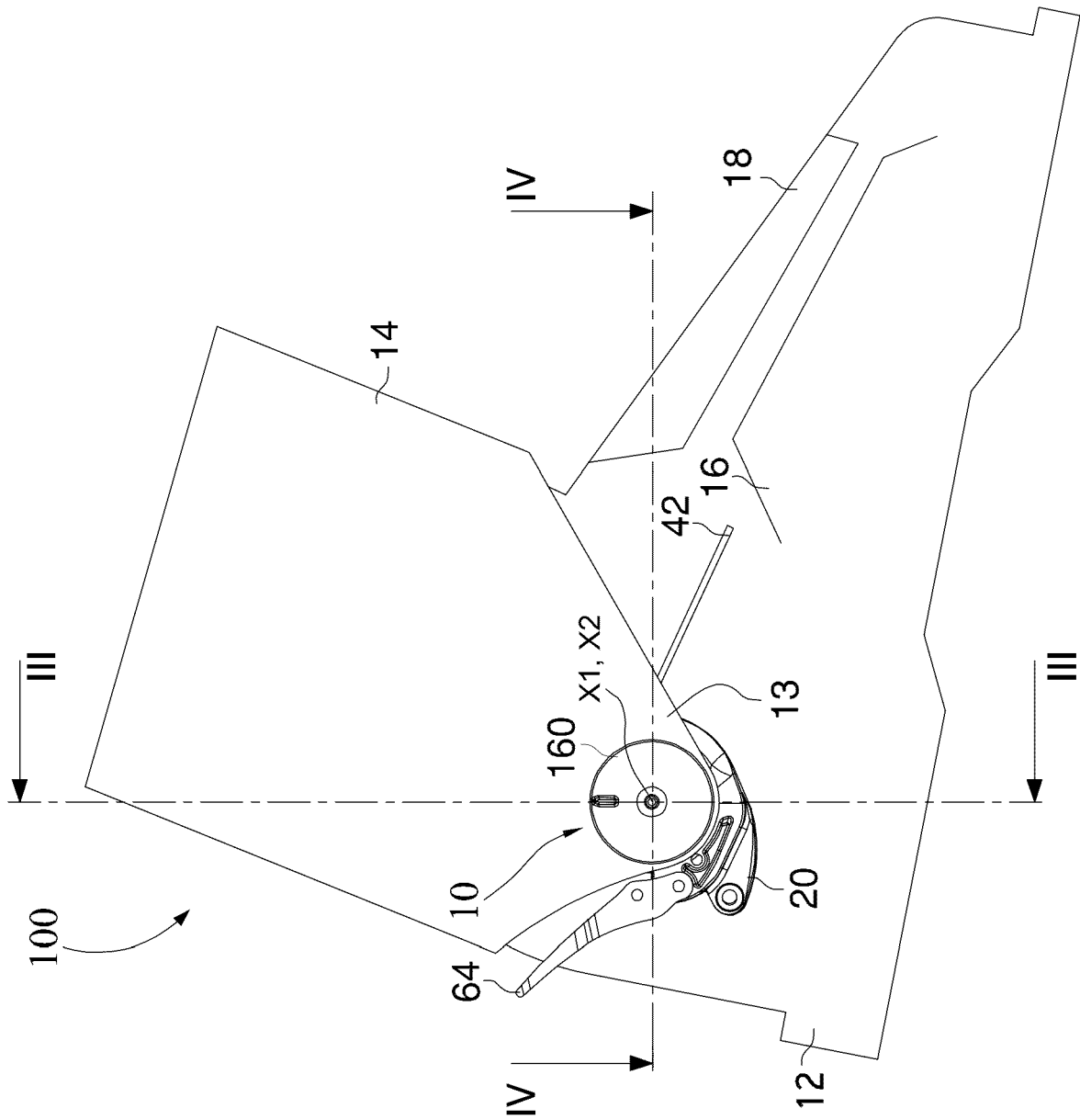


Fig. 1

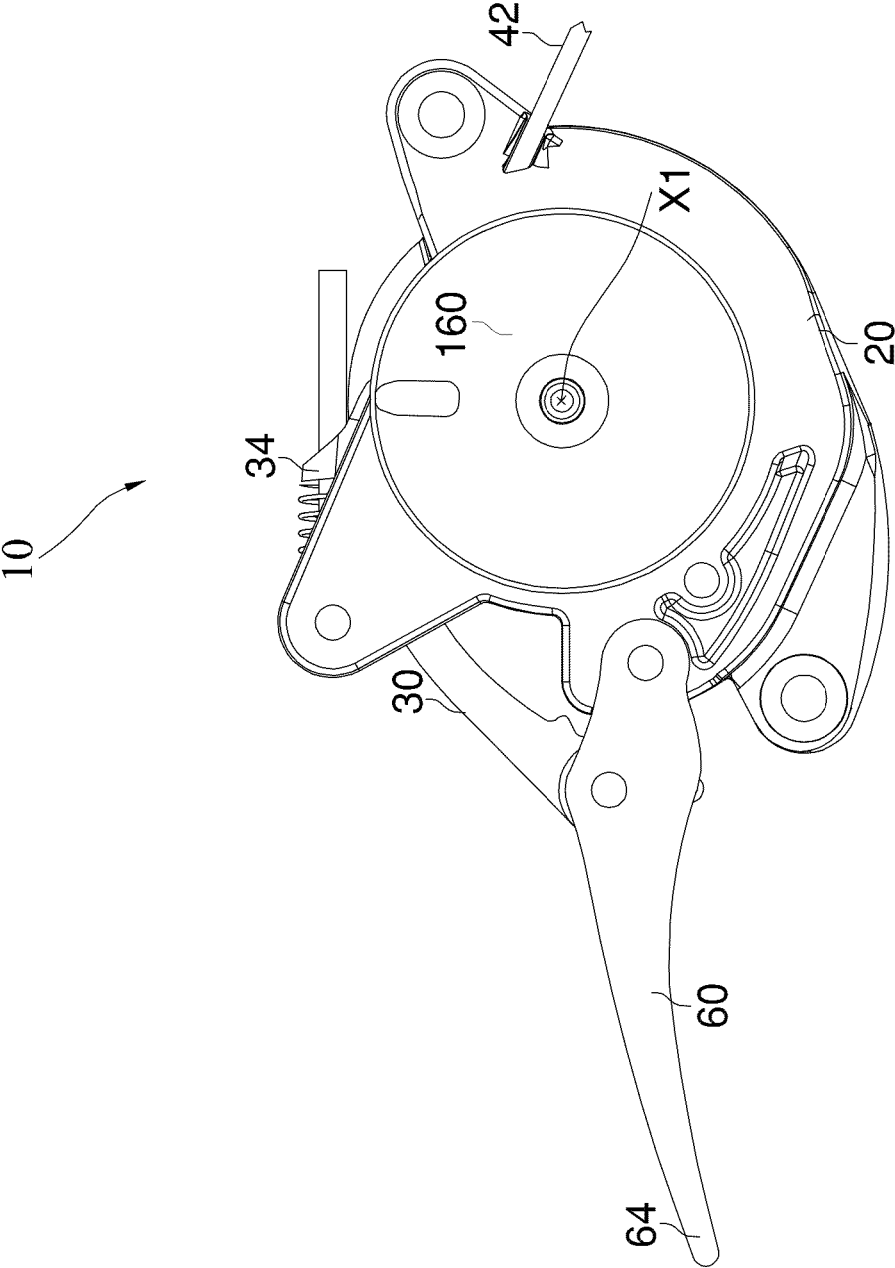


Fig. 2

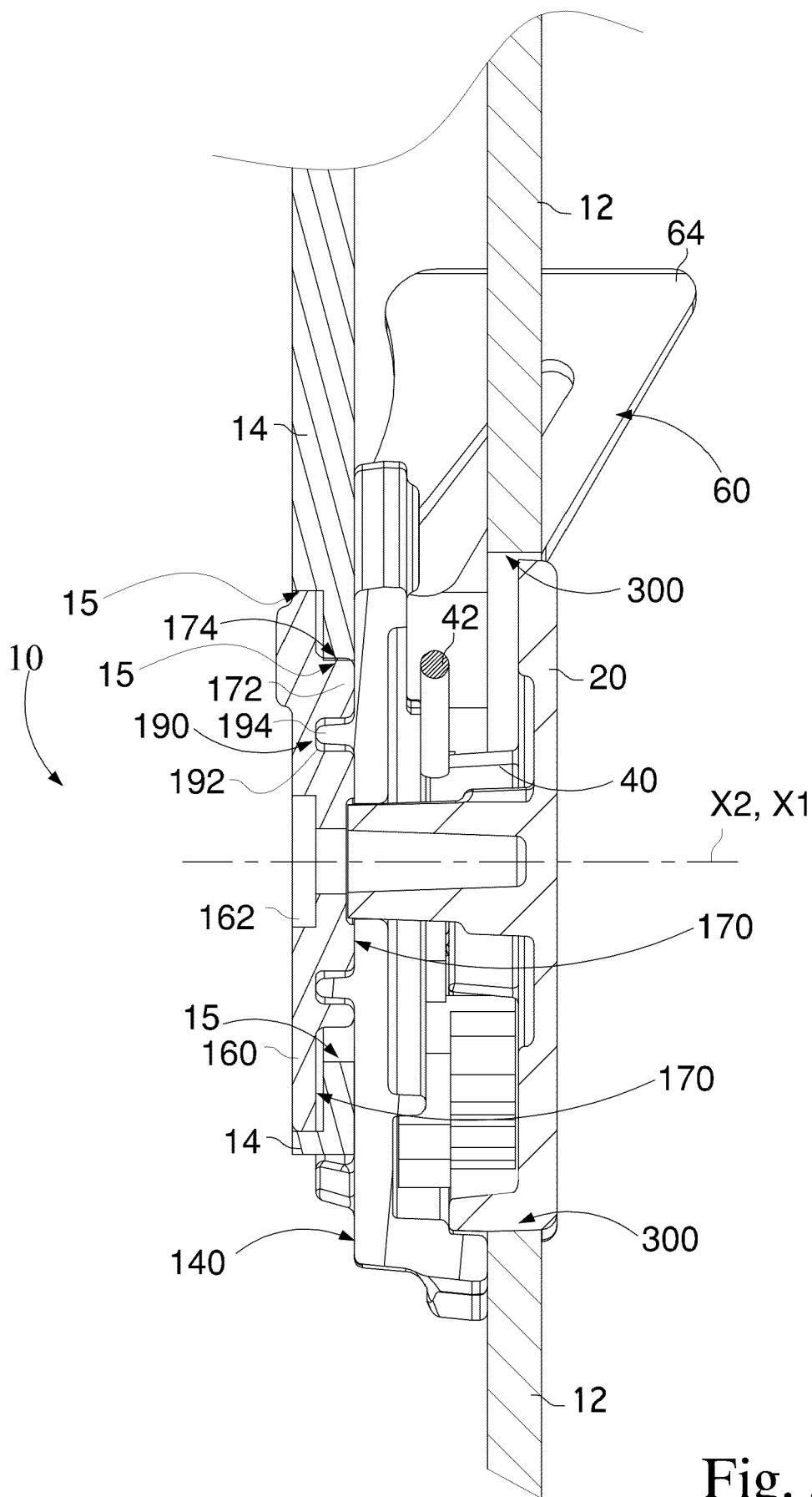


Fig. 3

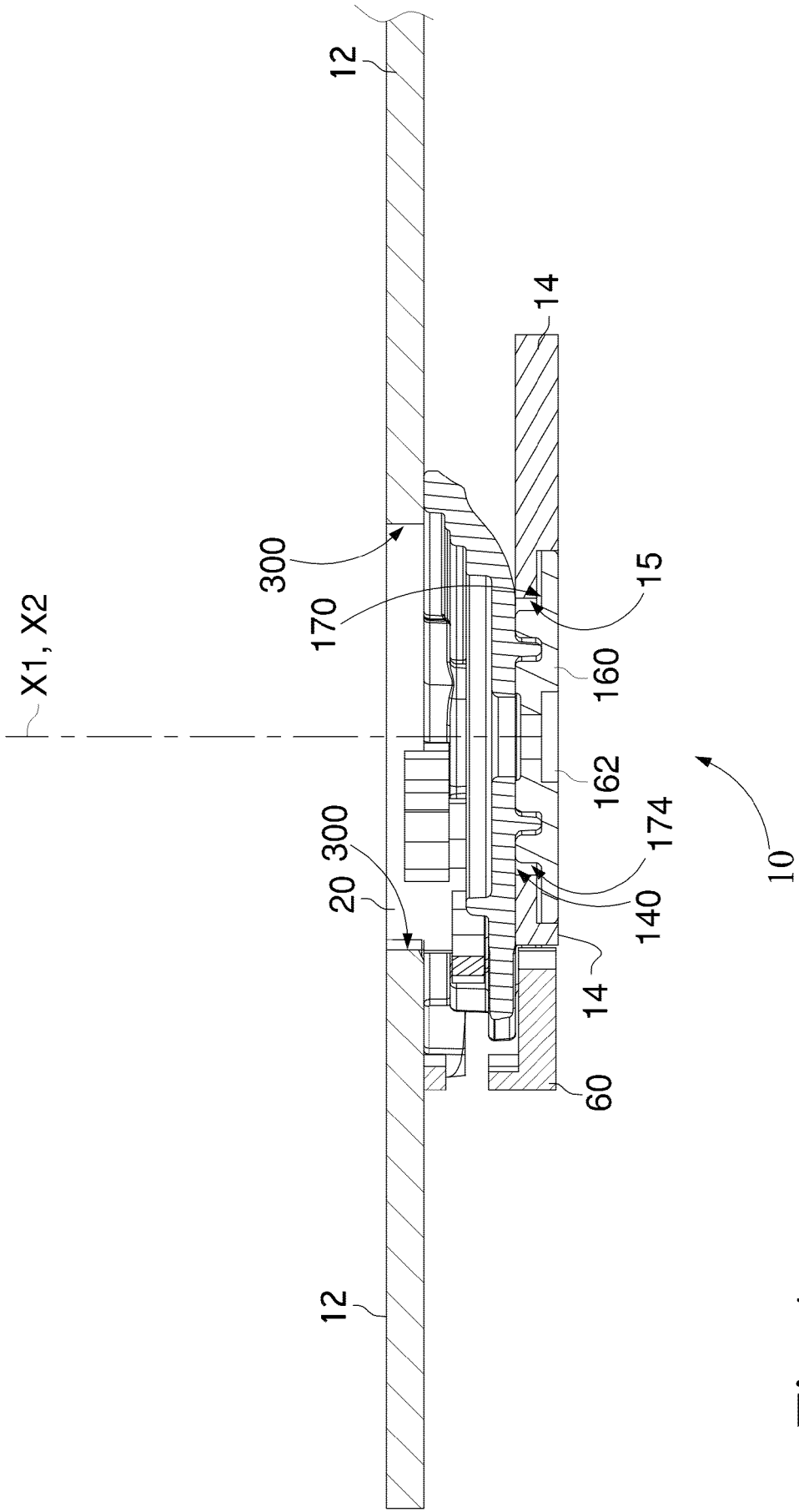


Fig. 4

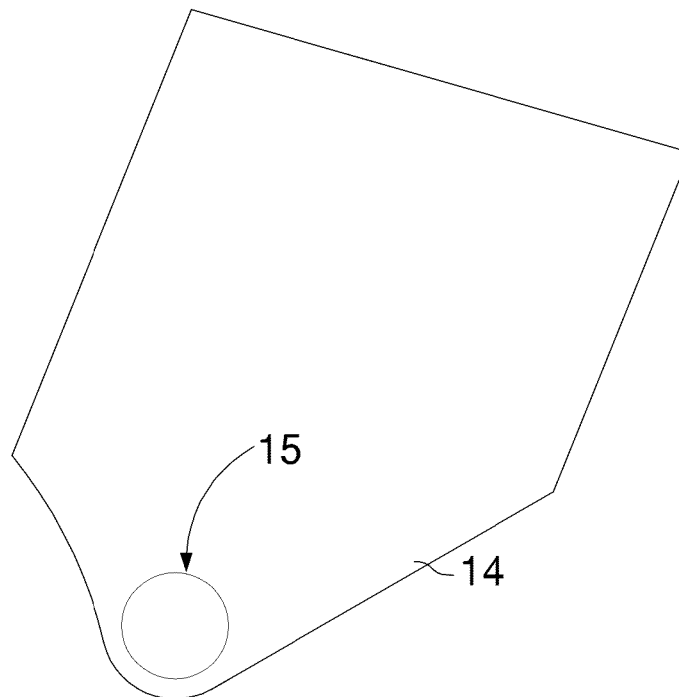


Fig. 5

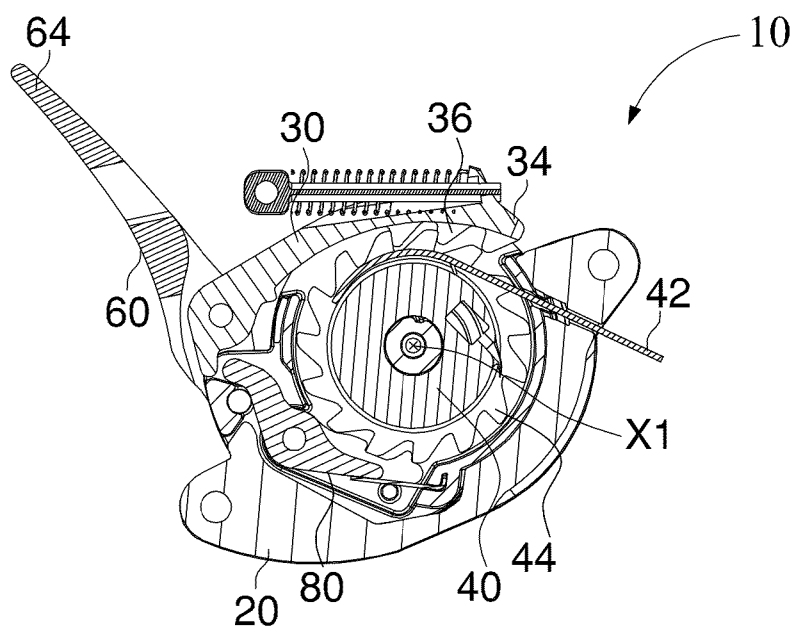


Fig. 6

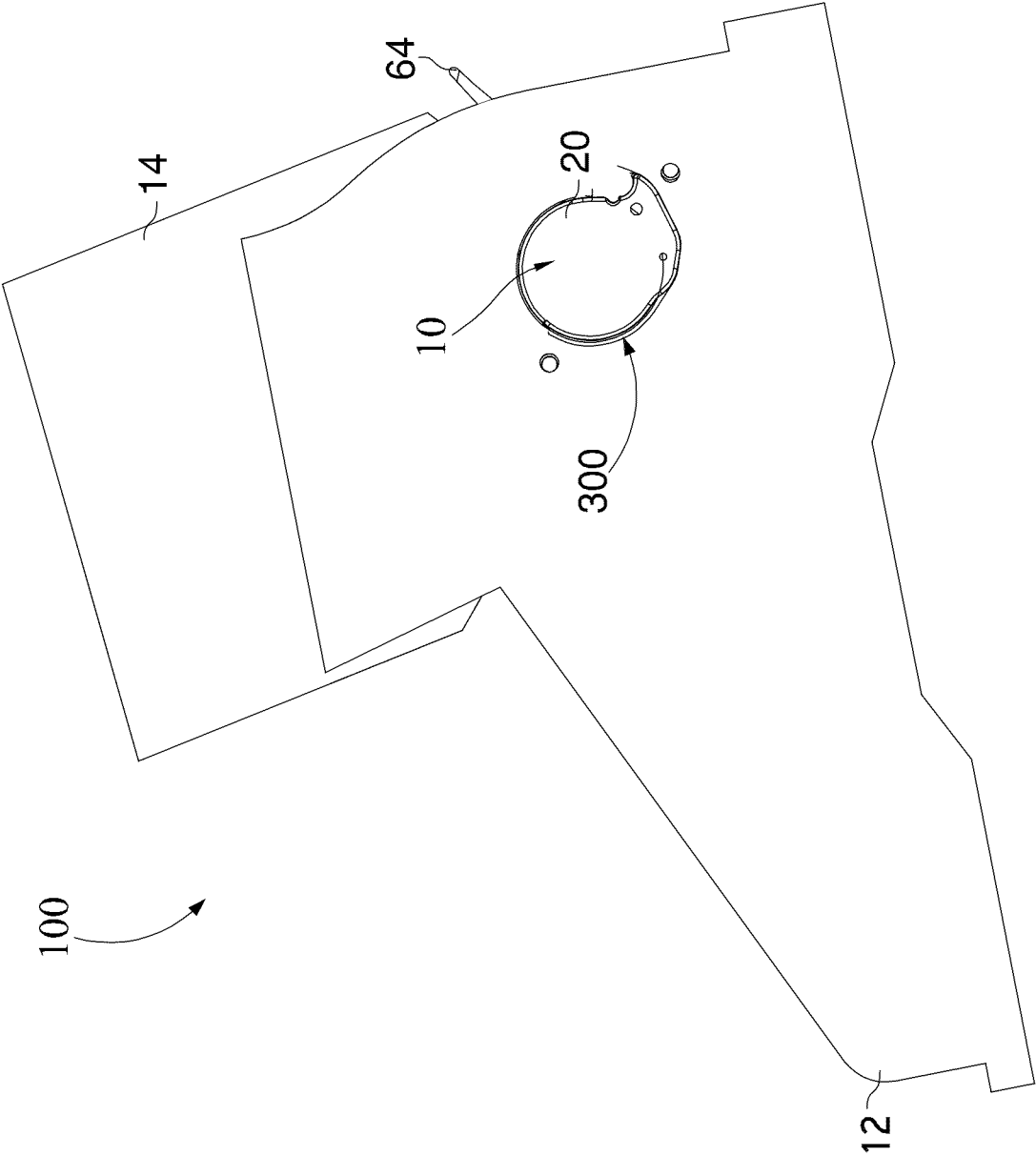


Fig. 7



EUROPEAN SEARCH REPORT

Application Number

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DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 0 553 747 A1 (NORDICA SPA [IT]) 4 August 1993 (1993-08-04)	1,4-10	INV. A43C11/16
A	* column 2, line 49 - column 5, line 1 * * figures 1-7 *	2,3	
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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		28 April 2026	Papatheofrastou, M
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO.

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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