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(71) Applicant: **OBER ALP S.p.A.**
39100 - Bolzano (IT)

(72) Inventors:
• **Nalesso, Andrea**
I-39100 Bolzano (IT)
• **Viniero, Nicola**
I-39100 Bolzano (IT)

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(54) **SKI-BOOT OR OFF-TRACK SKI BOOT WITH PERFECTED HINGE MEANS**

(57) Ski or off-track ski boot (4) comprising a lower part or foot portion (8), suitable to embrace the foot of the user and an upper part or leg portion (12), suitable to embrace the lower part of the leg of the user, wherein the leg portion (12) is hinged to the foot portion (8) with respect to hinge means (16) defining a rotation axis (X-X), so as to be able to rotate with respect to the foot portion about said rotation axis (X-X), wherein the hinge means (16) pass through and rotatably connect between them a fastening portion of the leg portion (24) and a fastening portion of the foot portion (28). Advantageously, the hinge means (16) comprise at least one pin (32) having a head (36) and a shank (40), wherein the shank (40) passes through said fastening portions of the leg portion and foot portion (24,28), and the head (36) interfaces with the fastening portion of the leg portion (24), wherein the head (36) of the pin (32), in correspondence of a lower face (44) facing said fastening portion of the leg portion (24), comprises a shaped portion (48) which creates a shape coupling with the fastening portion of the leg portion (24) so as to obtain an undercut and a constraint in the radial direction (R), said radial direction (R) being incident and perpendicular to said rotation axis (X-X).

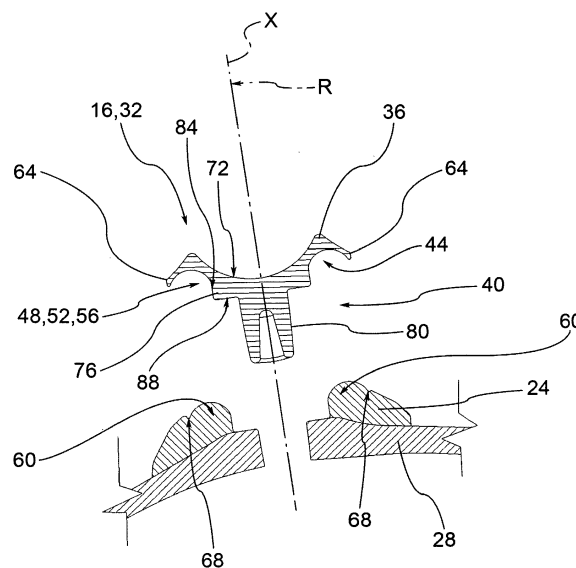


FIG.2

DescriptionFIELD OF APPLICATION

[0001] This invention relates to a ski boot or off-track ski boot comprising perfected hinge means.

STATE OF THE ART

[0002] Ski boots or off-track ski boots comprise a foot portion, typically fixed, and suitable to accommodate the user's foot, and a leg portion, typically hinged to said foot portion, and suitable to accommodate the tibial portion of the user.

[0003] The leg portion is hinged to the foot portion by hinge means, such as typically a pair of pins arranged in correspondence of the user's malleolus.

[0004] These pins are portions of the boot subject to significant mechanical stresses and, therefore, are very strained.

[0005] In fact, the leg portion transmits very high mechanical stresses to the foot portion also by means of the hinging pins, which are subjected to combined shearing and flexion stresses.

[0006] For this reason, the pins of the prior art are made with extremely resistant materials and with significant thicknesses to ensure the reliability of such components over time.

[0007] It should also to be noted that the pins are made of metal materials and are inserted into portions of the foot and leg portions that are, instead, made of polymeric materials: therefore, in the known solutions, it is necessary to over-dimension the portions of the foot and leg portions that receive such pins which, otherwise, would end up scoring and mechanically weakening said portions of foot and leg portions.

PRESENTATION OF THE INVENTION

[0008] Therefore, the solutions of the known art described above have disadvantages due mainly to the fact that they require over-dimensioning both the pins and the portions of the foot and leg portions that receive the latter.

[0009] It follows, then, that the known solutions, to ensure the required reliability, are heavy and aesthetically unattractive because the shapes are constrained by the necessary over-dimensioning of the pins and plastic portions of the foot and leg portions.

[0010] The purpose of this invention is to provide a ski and/or off-track ski boot that solves the drawbacks cited with reference to the known art.

[0011] These drawbacks and limitations are solved by an off-track ski boot according to claim 1.

[0012] Other embodiments of the boot according to the invention are described in the subsequent claims.

DESCRIPTION OF THE DRAWINGS

[0013] Further characteristics and advantages of this invention will be more understandable from the following description of its preferred and non-limiting examples of embodiments, wherein:

Figure 1 is a perspective view of a ski boot equipped with hinging means according to this invention; Figures 2, 3 and 4 are sectional views of a detail of the boot of Figure 1, in three different and consecutive phases of assembly of the boot.

[0014] The members, or parts of members, in common between the embodiments described below will be indicated with the same reference numbers.

DETAILED DESCRIPTION

[0015] With reference to the aforesaid figures, the number 4 globally indicates a ski or off-track ski boot consisting of a lower part or foot portion 8, suitable to enclose the foot of the user or skier and an upper part or leg portion 12, suitable to enclose the lower part of the skier's leg.

[0016] The definition of the ski boot or off-track ski boot should not be considered in a restrictive way, since this invention applies to any type of ski boot in general also comprising types of boots for telemark, snowboards and any other application.

[0017] Also the definitions of foot portion 8 and leg portion 12 should be considered in a general and not restrictive manner: this invention presents no type of limitation with respect to shapes, sizes, materials, type of foot portion and leg portion and therefore the invention also covers types of foot portion 8 and leg portion 12 that at least partially embrace the foot and the upper part of the leg, i.e., the shin of the skier.

[0018] For this reason, the type of boot shown in the figures should be considered as a non-limiting example for the purposes of the field of application of this invention.

[0019] In the type of off-track ski boot, as in the case of Figure 1, the leg portion 12 is hinged to the foot portion 8 with respect to hinge means 16 defining an axis of rotation X-X, so as to be able to rotate with respect to the foot portion about said axis of rotation X-X.

[0020] Preferably, there is provided a pair of hinge means 16 arranged on side parts 14,15 opposite with respect to the leg portion 12.

[0021] The leg portion for example comprises closure means 18 to allow the opening/closing of flaps arranged in correspondence of said side parts 14,15.

[0022] Preferably, the said hinge means 16 identify a horizontal rotation axis X-X, i.e., parallel to a sole 18 of the boot 4.

[0023] The leg portion 12 is hinged to the foot portion 8 so as to be able to rotate relative to the foot portion 8 around said hinge means 16 both forwards, i.e., towards

a tip 20 of the boot 4, and backwards towards a heel 22 of the boot 4.

[0024] The hinge means 16 pass through and rotatably connect between them a fastening portion of the leg portion 24 and a fastening portion of the foot portion 28.

[0025] Said fastening portions of the leg portion and the foot portion 24,28 are usually shaped like ears or protrusions respectively of the leg portion 12 and of the foot portion 8 suitably shaped and drilled to rotatably accommodate the hinge means 16.

[0026] In particular, the hinge means 16 comprise at least one pin 32 having a head 36 and a shank 40, wherein the shank 40 passes through said fastening portions of the leg portion and of the foot portion 24,28, and the head 36 interfaces with the fastening portion of the leg portion 24.

[0027] Advantageously, the head 36 of the pin 32, in correspondence with a lower face 44 facing the fastening portion of the leg portion 24, comprises a shaped portion 48 which creates a shape coupling with the fastening portion of the leg portion 24 so as to obtain an undercut and a constraint in the radial direction R, said radial direction R being incident and perpendicular to said axis of rotation X-X.

[0028] According to an embodiment, said shaped portion 48 of the head 36 of the pin 32 comprises an arched surface 52 that delimits a seat 56 of the head 36, and wherein the fastening portion of the leg portion 24 comprises a protuberance 60 counter-shaped in relation to said seat 56 of the head 36 so as to be housed in the latter.

[0029] Preferably, the seat 56 of the head 36 and the protuberance 60 of the fastening portion of the leg portion 24 are axisymmetric with respect to said axis of rotation X-X.

[0030] According to a further embodiment, the shaped portion 48 of the head 36 comprises a protuberance 60 that protrudes toward the fastening portion of the leg portion 24 and the latter comprises a seat 56 housing said protuberance 60.

[0031] Also in this case, preferably protuberance 60 of the shaped portion 48 of the head 36 and the seat 56 of the fastening portion of the leg portion 24 are axisymmetric with respect to said axis of rotation X-X.

[0032] According to an embodiment, the head 36 of the pin 32 comprises a perimeter appendage 64, axisymmetric in relation to the axis of rotation X-X, which has a truncated-conical shape that widens when moving from the head 36 towards the fastening portion of the leg portion 24.

[0033] Said perimeter appendage 64 creates a radial undercut that encloses and radially delimits the fastening portion of the leg portion 24.

[0034] For example, the perimeter appendage 64 is inserted in a circumferential groove 68 derived on the fastening portion of the leg portion 24.

[0035] Preferably, the head 36 comprises a concave portion 72, on the side opposite the leg portion 12 and the lower face 44, so as to realise a discharge and relief

for the pin 32. Furthermore, said concave portion 72 reduces overall dimensions of the boot in correspondence of the hinge means 16 and reduces the risk of collision/breakage of the hinge means themselves.

[0036] The shank 40 comprises a first section 76 that interfaces with the fastening portion of the leg portion 24 and a second section 80 that interfaces with the fastening portion of the foot portion 28, wherein said first and second sections 76,80 are cylindrical, axisymmetric in relation to the rotation axis X-X, and wherein the diameter of the first section 76 being greater than the diameter of the second section 80.

[0037] The first section 76 is joined to the head 36 by an axisymmetric connecting wall 84 that defines said shaped portion 48, which creates a shape-coupling with the fastening portion of the leg portion 24, so as to obtain an undercut and a constraint in the radial direction R.

[0038] The first section 76 narrows radially with a recess 88 in correspondence to the second section 80, said recess 88 defining an abutment between the first section 76 of the shank 40 and the fastening portion of the foot portion 28.

[0039] The second section 80 comprises closure means 92 that pass through the fastening portion of the foot portion 28 and are bent radially against said fastening portion of the foot portion 28, so as to create an undercut for the fastening portion of the foot portion 28 along the axis of rotation X-X.

[0040] For example, said closure means 92 comprise a bent cylinder; preferably, said closure means include a central hole that facilitates the plastic deformation and bending against the fastening portion of the leg portion 28, in addition to contributing to the lightening of the pin 32.

[0041] It is also possible to use a nut and a screw as closure means 92.

[0042] As can be appreciated from the description, the ski boot or off-track ski boot according to the invention allows overcoming the drawbacks presented in the prior art.

[0043] In particular, the hinge means of this invention are, at the same time, extremely light on the one hand but also reliable and robust on the other.

[0044] In fact, thanks to its particular shape, the pin is overall lighter with respect to a pin of the prior art, which provides a greater thickness as well as the use of a head convex towards the outside.

[0045] It is possible to reduce the thickness of the pin of this invention thanks to the particular shape of both the head and body of the pin, which allow distributing the flexion and shearing stresses received by the leg portion so as not to have excessive local concentrations of stresses that would, instead, require the special thickening required, precisely, by the known solutions.

[0046] In fact, the conformation of the lower portion of the pin head allows obtaining a radial undercut in respect of the portion of the leg portion that surrounds the pin itself. Therefore, the head is intimately fixed to the leg

portion so as to distribute the shear/flexion stresses on a larger portion of the leg portion itself. This avoids having to over-dimension/strengthen the portion of leg portion surrounding the housing seating of the pin, since it obtains a more uniform distribution of the stresses, i.e., it avoids any punctiform/local concentration of the stresses themselves.

[0047] As for the shank of the pin, it has a dual diameter: a first section in correspondence of the head has a larger diameter and a second section, on the side opposite the first section, which has a smaller diameter.

[0048] The first section, of larger diameter, interfaces with the leg portion and cooperates with the head to obtain more uniform distribution of the stresses transmitted by the leg portion itself.

[0049] Thanks to this uniform distribution of the stresses, it is thus possible to reduce the thickness of the pin head, which can then provide a portion concave towards the outside, lighter with respect to the convex pin heads of the prior art.

[0050] The second section has a smaller diameter than the first section and is thinner and therefore lighter, since it receives less mechanical stress compared to the first section.

[0051] In addition, the second section of the shank also includes the tailstock, which has the function of realising an undercut on the side opposite to the head, to ensure the axial locking between the pin, leg portion and foot portion.

[0052] From the above, one can see that the particular geometry/shape of the pin allows reducing the thickness of the pin itself and the portions of the leg portion and foot portion engaged in housing of the pin, since a uniform distribution of the stresses is obtained and local concentrations of mechanical stresses are avoided.

[0053] A person skilled in the art, in order to satisfy contingent and specific needs, may make numerous modifications and variations to the boots described above, all however contained within the scope of the invention as defined by the following claims.

Claims

1. Ski boot and/or off-track ski boot (4) comprising a lower part of foot portion (8), suitable to enclose the foot of the user and an upper part or leg portion (12), suitable to enclose the lower part of the user's leg,

- wherein the leg portion (12) is hinged to the foot portion (8) with respect to a hinge means (16) defining an axis of rotation (X-X), so as to rotate relative to the foot portion about said axis of rotation (X-X),

- wherein the hinge means (16) pass through and rotatably connect between them a fastening portion of the leg portion (24) and a fastening portion of the foot portion (28),

characterised in that

- the hinge means (16) comprise at least one pin (32) having a head (36) and a shank (40), wherein the shank (40) passes through said fastening portions of the leg portion and the foot portion (24,28), and the head (36) interfaces with the fastening portion of the shank (24),

- the head (36) of the pin (32), in correspondence with a lower face (44) facing the fastening portion of the leg portion (24), comprises a shaped portion (48) which creates a shape coupling with the fastening portion of the shank (24) so as to obtain an undercut and a constraint in the radial direction (R), said radial direction (R) being incident and perpendicular to said axis of rotation (X-X),

wherein the head (36) of the pin (32) comprises a perimeter appendage (64), axisymmetric in relation to the rotation axis (X-X), which has a truncated-conical shape that widens when moving from the head (36) towards the fastening portion of the leg portion (24).

2. Ski or off-track ski boot (4) according to claim 1, wherein said shaped portion (48) of the head (36) of the pin (32) comprises an arched surface (52) that delimits a seat (56) of the head (36), and wherein the fastening portion of the leg portion (24) comprises a protuberance (60) counter-shaped in relation to said seat (56) of the head (36) so as to be housed in the latter.
3. Ski or off-track ski boot (4) according to claim 2, wherein the seat (56) of the head (36) and the protuberance (60) of the fastening portion of the leg portion (24) are axisymmetric with respect to said axis of rotation (X-X).
4. Ski or off-track ski boot (4) according to claim 1, wherein the shaped portion (48) of the head (36) comprises a protuberance (60) that protrudes toward the fastening portion of the leg portion (24) and the latter comprises a seat (56) housing said protuberance (60).
5. Ski or off-track ski boot (4) according to claim 4, wherein the protuberance (60) of the shaped portion (48) of the head (36) and the seat (56) of the fastening portion of the leg portion (24) are axisymmetric with respect to said axis of rotation (X-X).
6. Ski or off-track ski boot (4) according to any one of the preceding claims, wherein said perimeter appendage (64) creates a radial undercut that encloses and radially delimits the fastening portion of the leg portion (24).

7. Ski or off-track ski boot (4) according to any of the preceding claims, wherein said perimeter appendage (64) is inserted in a circumferential groove (68) derived on the fastening portion of the leg portion (24). 5

8. Ski or off-track ski boot (4) according to any of the preceding claims, wherein the head (36) comprises a concave portion (72), on the side opposite the leg portion (24), so as to realise a discharge and a relief for the pin (32). 10

9. Ski or off-track ski boot (4) according to any of the preceding claims, wherein the shank (40) comprises a first section (76) that interfaces with the fastening portion of the leg portion (24) and a second section (80) that interfaces with the fastening portion of the foot portion (28), wherein said first and second sections (76,80) are cylindrical, axisymmetric in relation to the axis of rotation (X-X), the diameter of the first section (76) being greater than the diameter of the second section (80). 15 20

10. Ski or off-track ski boot (4) according to claim 9, wherein the first section (76) is joined to the head (36) by an axisymmetric connecting wall (84) that defines said shaped portion (48), which creates a shape-coupling with the fastening portion of the leg portion (24), so as to obtain an undercut and a constraint in the radial direction (R). 25 30

11. Ski or off-track ski boot (4) according to any of claims 9 to 10, wherein the first section (76) narrows radially with a recess (88) in correspondence to the second section (80), said recess (88) defining an abutment between the first section (76) of the shank (40) and the fastening portion of the foot portion (28). 35

12. Ski or off-track ski boot (4) according to any of claims 9 to 11, wherein the second section (80) comprises closure means (92) that pass through the fastening portion of the foot portion (28) and are bent radially against said fastening portion of the foot portion (28), so as to create an undercut for the fastening portion of the foot portion (28) along the axis of rotation (X-X). 40 45

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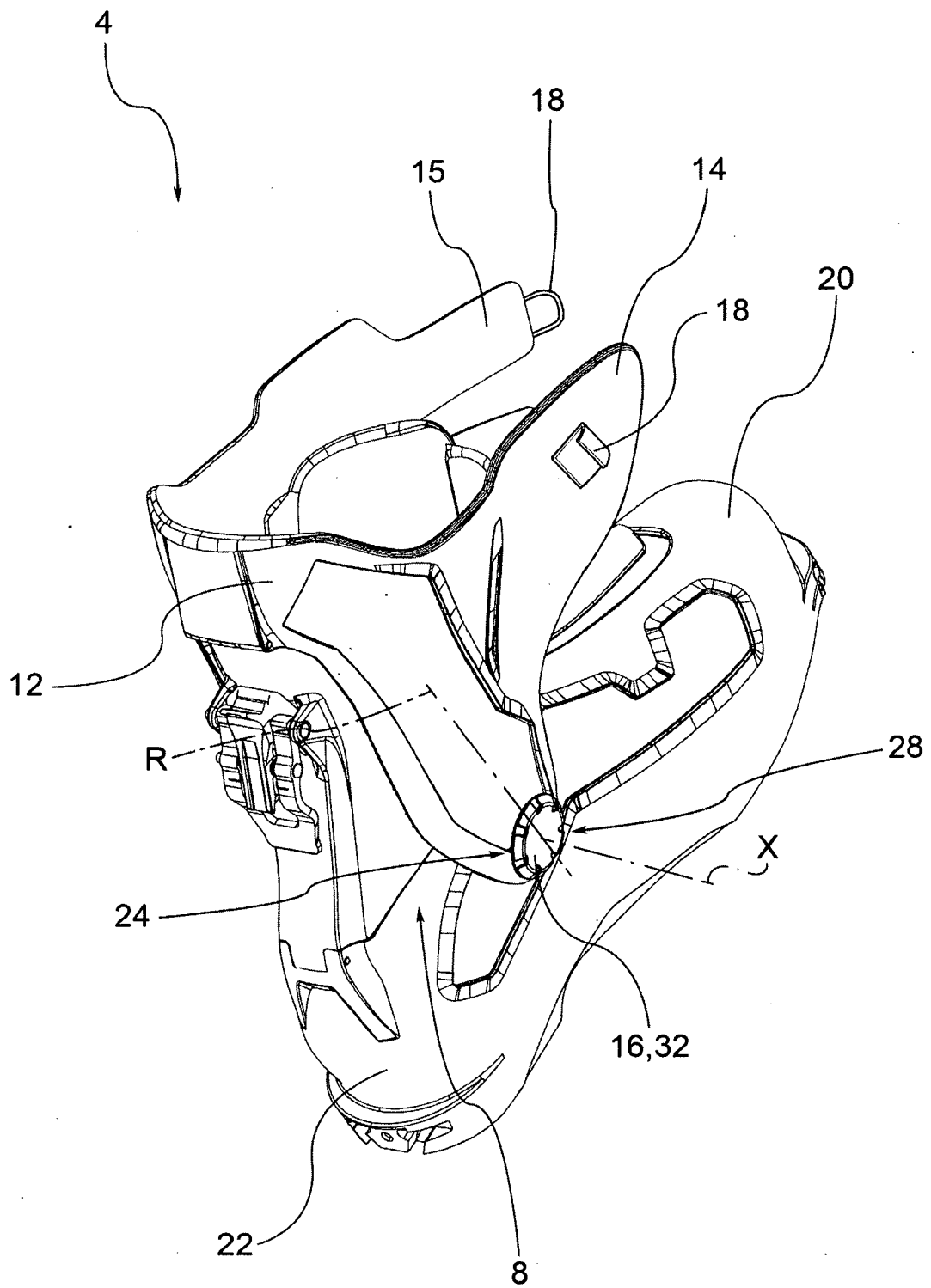


FIG.1

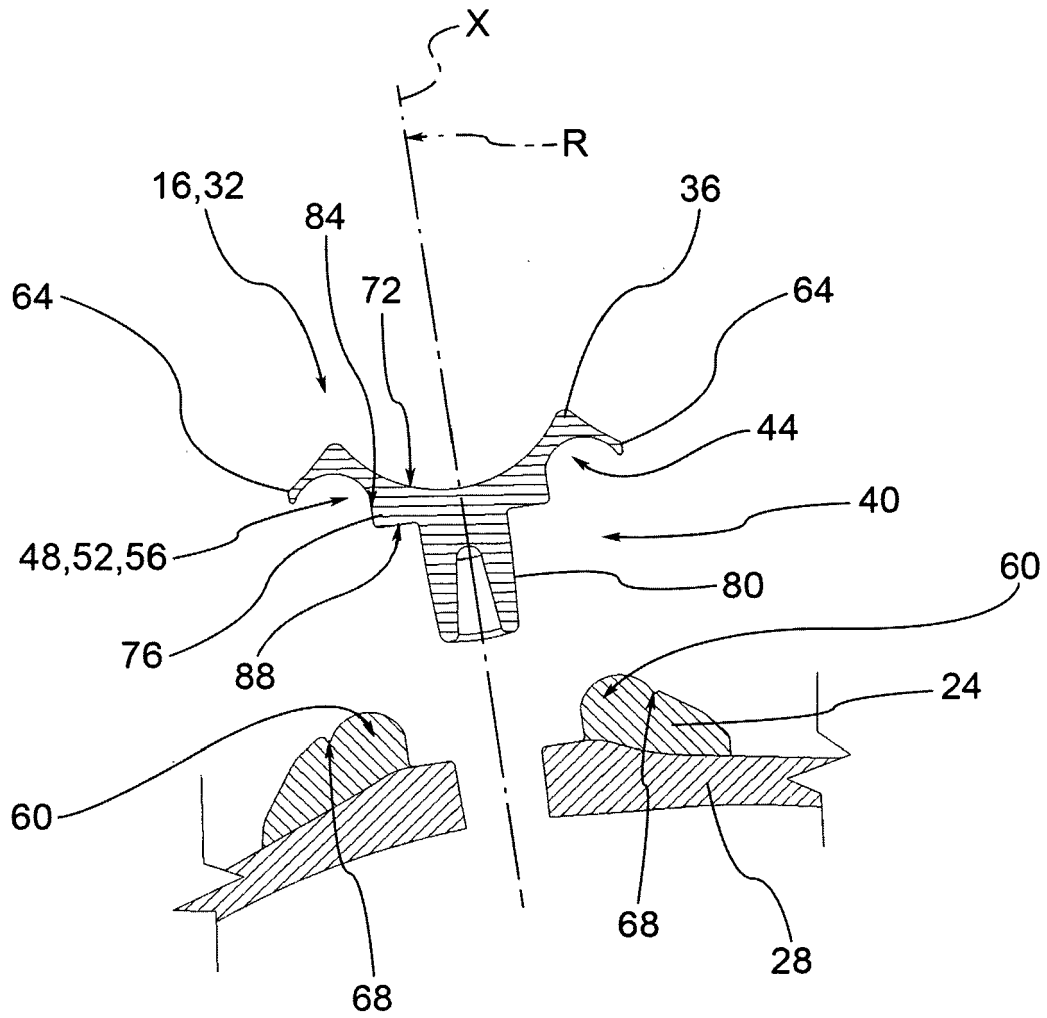


FIG.2

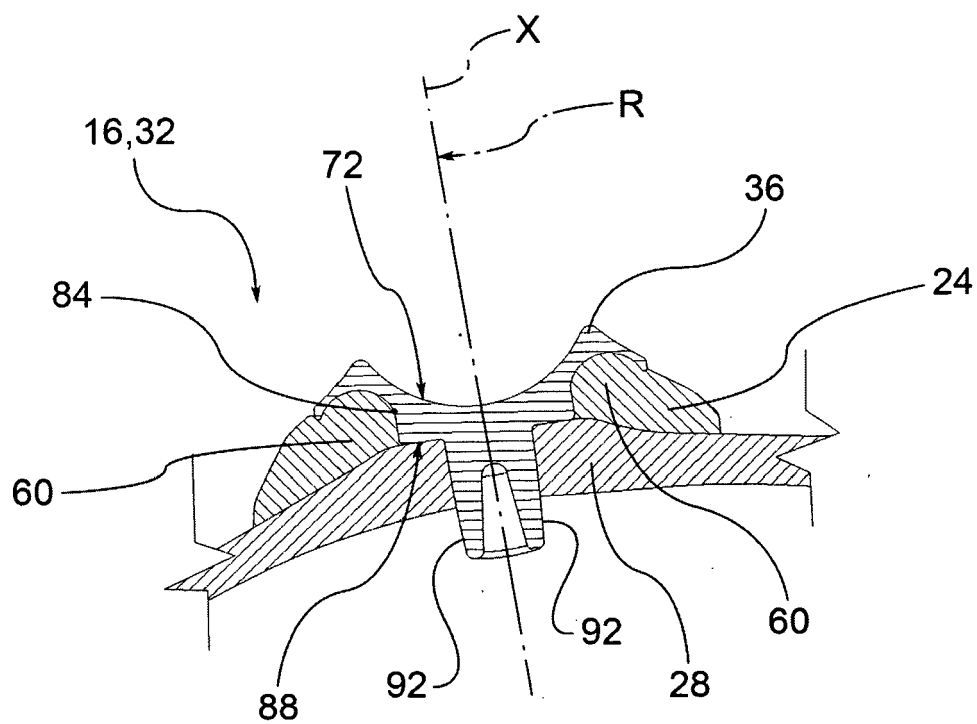


FIG.3

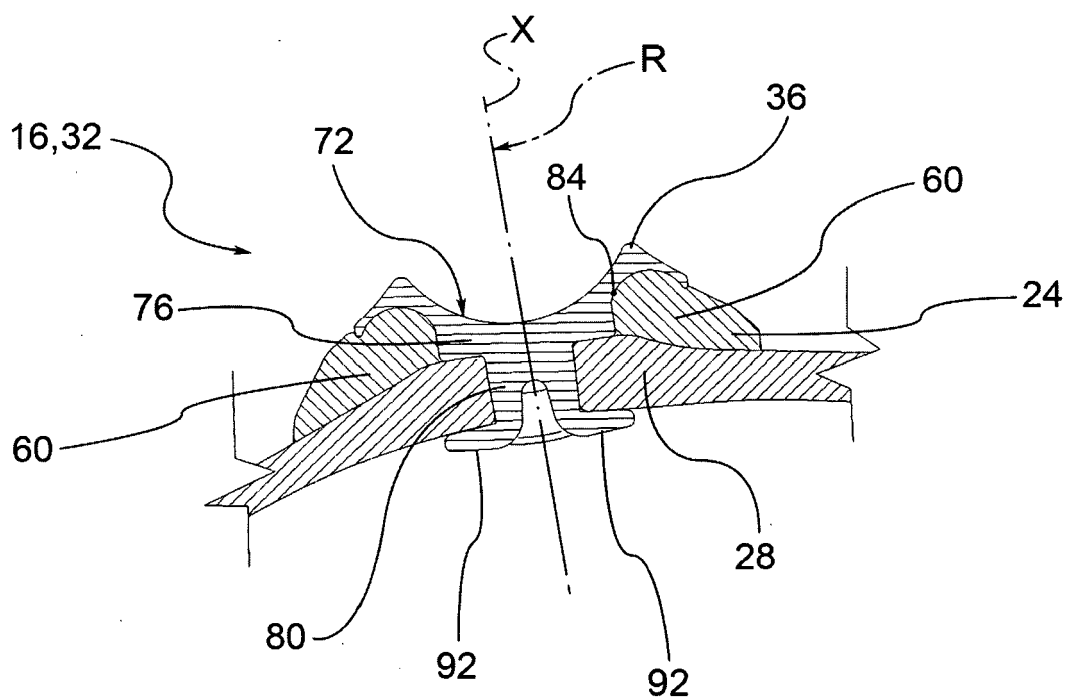


FIG.4



EUROPEAN SEARCH REPORT

Application Number
EP 15 00 3634

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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)
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			TECHNICAL FIELDS SEARCHED (IPC)
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 26 May 2016	Examiner Duquénoy, Alain
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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