(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 4 197 382 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
21.06.2023 Bulletin 2023/25

(21) Application number: **22213161.7**

(22) Date of filing: **13.12.2022**

(51) International Patent Classification (IPC):
A43B 5/04 *(2006.01)* ***A43C 1/00*** *(2006.01)*

(52) Cooperative Patent Classification (CPC):
A43B 5/0405; A43C 1/00; A43C 1/003

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC ME MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA
Designated Validation States:
KH MA MD TN

(30) Priority: **14.12.2021 IT 202100031364**

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(54) INNER LINER FOR SKI BOOT PROVIDED WITH AN IMPROVED TIGHTENING SYSTEM AND SKI BOOT COMPRISING SAID INNER LINER

(57) The present invention relates to an inner liner (1; 1') for a ski boot, said inner liner comprising an improved tightening system (11, 17; 11', 17l', 17m'). The inner liner according to the invention comprises, on each of the sides (i.e., the lateral side and the medial side) of the upper, one or more tie members (17, 17') extending from the heel region to the instep region, and tensioning means arranged to exert onto said tie members a traction force facing towards said instep region. By means of the action of said tensioning means it is possible to eliminate possible gaps that may be present between the inner liner and the user's heel. The present invention further relates to a ski boot comprising an outer shell and said inner liner (1; 1') housed in said outer shell.

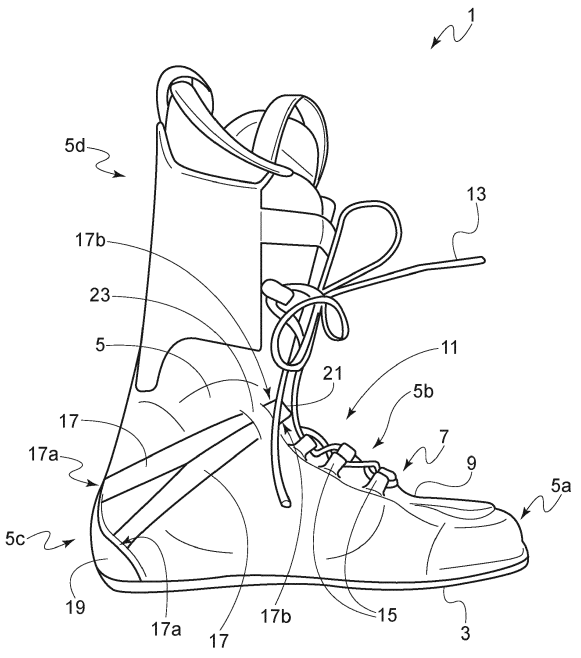

Fig. 1

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Description

Technical Field of the Invention

[0001] The present invention relates to an inner liner for a ski boot, said inner liner being provided with an improved tightening system.

[0002] The present invention further relates to a ski boot comprising an outer shell and said inner liner.

Background Art

[0003] Ski boots comprising an outer member, or outer shell, made of a substantially rigid material, and an inner member, or inner liner, housed in said outer member or shell and made of a substantially soft material, are known in the state of the art.

[0004] Although several solutions were implemented in the past in order to modify, at least partially, the structure of the outer shell (particularly the inner volume of said outer shell), in accordance with the morphology of the foot of each specific user, the possibility to adapt said outer shell to the specific morphology of the user's foot finds a limit in the very nature of the rigid material of which said outer shell is made.

[0005] Accordingly, the user's comfort is largely influenced by the inner liner made of a soft material.

[0006] Said inner liner must adhere as closely as possible to the user's foot, on one part, and to the inner surface of the outer shell, on the other part.

[0007] Indeed, the presence of gaps between the inner liner and the user's foot, or between the inner liner and the outer shell would be detrimental to comfort, because the user's foot would be free to move inside the rigid outer shell and bump against the walls thereof. Taking into account also the intense stresses to which the user is subjected during sports practice, impacts against the inner wall of the ski boot would be likely to be repeated and violent, and therefore painful.

[0008] Any movement of the user's foot inside the inner liner would also cause a reduction of the user's comfort, because the rubbing of the foot against the inner wall of the inner liner might cause skin irritation, blisters and the like.

[0009] In many cases, the presence of gaps between the inner liner and the user's foot, or between the inner liner and the outer shell is also detrimental to the sports performance of the user, because it reduces the user's sensitivity. In the case of ski boots, for example, in order to properly handle the ski, the movements must be rigidly transferred from the user's foot to the ski boot, and from the latter to the ski. In the presence of gaps between the inner liner and the user's foot, or between the inner liner and the outer shell, the kinematic chain of the motion transmission from the user's foot to the ski loses precision, and this loss of precision negatively affects a proper and accurate handling of the ski.

[0010] In order to adapt inner liners to the specific morphology of each user, it is known to resort to thermoformable materials for the making of such inner liners or parts thereof: the use of thermoformable materials allows to form the inner liner to the shape of the user's foot, while the user is wearing the inner liner, so as to ensure accurate customization, at least at those areas that are most critical for comfort (for example, the malleolar area).

[0011] As much as the inner liner can be customized so as to faithfully follow - under in-use conditions - the exact morphology of the user's foot, however, it must however be considered that it will be necessary to provide for the possibility of enlarging, to some extent, the inner liner to allow introduction/extraction of the user's foot into/from the inner liner.

[0012] Therefore, inner liners can be provided with a longitudinal front opening, which defines two facing flaps of upper which can be spread apart for allowing introduction/extraction of the foot.

[0013] Said central opening is usually covered by a tongue and is provided with a tightening system allowing tightening of the inner liner onto the user's foot, once the foot has been introduced into the inner liner, until complete adherence of the inner liner to the shape of the foot.

[0014] Said tightening system is arranged essentially at the longitudinal front opening and bridging said opening, and can be made as a lacing system, in the form of a set of hook- and-loop straps or in other forms known to the person skilled in the art.

[0015] Such tightening system allows to bring the flaps of the upper closer to each other, so that they suitably envelops the user's foot.

[0016] However, such tightening systems of the known type have limitations.

[0017] In particular, they are indeed capable of adjusting the relative position of the flaps of the inner liner - and thus adapt the inner volume of the inner liner to the user's foot - near their position, i.e., near the longitudinal front opening of the inner liner.

[0018] Conversely, however, they are not as effective in adapting the inner liner to the user's foot in regions far from said longitudinal front opening, especially at the heel region.

[0019] It is therefore possible, and indeed common, that even when the tightening system is properly tightened, the inner liner does not fit perfectly on the user's heel.

[0020] As noted above, the presence of gaps between the inner liner and the user's foot remarkably spoils both the comfort and the sports performances of the user.

[0021] There are also situations in which the presence of such gaps at the heel region is particularly penalizing. Take, for example, the ascent phase in ski mountaineering, where, due to the slope, the user's heel is pushed back against the wall of the ski boot with each step.

[0022] Document DE 203 13 763 U describes a boot for winter sports practice comprising an outer shell and an inner liner and provided with a lacing system for the inner liner. Said lacing system for the inner liner compris-

es a plurality of loops arranged on the inner liner and at least one loop arranged on the outer shell, so that the user's foot is held not only against the inner liner, but also against the outer shell.

[0023] Document US 2019/313740 discloses a trekking footwear comprising a sole, an upper provided with a lacing system, and a rigid holding cage comprising support members extending upwards from the support plate, forming a portion of cradle around and rearward of a wearer's calcaneus bone. Said support members are joined to the lacing system so that a forward force of a wearer's instep is transmitted to the rigid holding cage. Document DE 202 19 913 U describes a footwear having a sole and an upper, the upper comprising an elongated opening extending substantially from its rear end to its front end and allowing easy access to the inner face of the upper for cleaning thereof. The upper is further provided with a lacing system comprising a plurality of loops attached to said upper and a lace passing through said loops.

[0024] The main object of the present invention is therefore to provide an inner liner for a ski boot that is provided with a tightening system allowing proper tightening of the upper of the inner liner over the user's foot.

[0025] More specifically, the main object of the present invention is to provide an inner liner for a ski boot that is provided with a tightening system allowing proper tightening of the upper of the inner liner over the user's foot at the heel region.

[0026] This and other objects are achieved with the inner liner for a ski boot as claimed in the appended claims.

Brief Disclosure of the Invention

[0027] The invention relates to an inner liner for a ski boot as claimed in claim 1.

[0028] Said inner liner comprises, on each of the sides (i.e., the lateral side and the medial side), one or more tie members extending from the heel region to the instep region, each of said tie members having a first end facing said heel region and a second end facing the instep region. The second end of each tie member is free with respect to the upper of the inner liner, and the inner liner comprises tensioning means arranged to exert a traction force onto said second end of said tie members.

[0029] Thanks to the configuration according to the invention, the heel region of the upper of the inner liner can be pulled towards the instep region of the upper of said inner liner until it perfectly adheres to the user's heel.

[0030] According to a preferred embodiment of the invention, the first end of each tie member facing the heel region is fastened to the upper of the inner liner.

[0031] According to another preferred embodiment of the invention, the first end facing the heel region of each tie member on the lateral side of the upper of the inner liner is joined to the first end facing the heel region of a corresponding tie member on the medial side of said upper of said inner liner.

[0032] According to a preferred embodiment of the invention, the upper of the inner liner is provided with a longitudinal front opening extending from the toe region to the ankle region through the instep region and comprising a tightening system arranged along said longitudinal front opening of said inner liner, said tightening system acting as tensioning means for said tie rods.

[0033] According to a particularly preferred embodiment of the invention, said tightening system is a lacing system comprising one or more laces passing through eyelets arranged along the opposite sides of said longitudinal front opening, and the second ends of the tie rods are constrained to said one or more lace(s) of said lacing system.

[0034] According to this embodiment, when the user pulls the laces of the lacing system in order to tighten the inner liner onto his/her foot, he/she automatically also exerts - through said laces - a traction onto the second ends of the tie rods, and through said tie rods he/she pulls the heel region of the inner liner in the direction of the instep until said heel region of the sports inner liner adheres to his/her foot.

[0035] Therefore, by means of the action of the laces on the tie rods it is possible to eliminate any gaps that may be present between the inner liner and the user's heel and that would be in no way affected (or would be affected only to a very limited extent) by the action of the lacing system of said inner liner.

[0036] In a preferred embodiment of the invention, said tie members are made as strings or tapes or comprise strings or tapes.

[0037] In another preferred embodiment of the invention, said tie members are made as rigid rods or comprise rigid rods.

[0038] In any case, it will be evident to the person skilled in the art that the tie members will be made of a less yielding material than the material of the inner liner, so that they can properly exert an action of traction onto the heel region of said inner liner without becoming deformed and thereby losing efficacy.

[0039] The present invention further relates to a ski boot comprising an outer shell, made of a substantially rigid material, and an inner liner as described above.

BriefDescription of Drawings

[0040] Further features and advantages of the invention will become more evident from a detailed description of a preferred embodiment thereof, given by way of non-limiting example with reference to the annexed drawings, in which:

Figure 1 is a side view of an inner liner according to a first embodiment of the invention;

Figures 2a and 2b are side views of an inner liner according to a second embodiment of the invention.

Detailed Description of Preferred Embodiments of the Invention

[0041] Figure 1 schematically shows an inner liner 1 for ski boots.

[0042] The inner liner 1 comprises a sole 3 and an upper 5.

[0043] The following regions can be identified in the upper 5:

- a toe region 5a, suitable for receiving a user's toe;
- an instep region 5b, suitable for receiving the user's instep;
- a heel region 5c, suitable for receiving the user's heel;
- an ankle region 5d, suitable for receiving the user's ankle.

[0044] In a manner known per se, the inner liner 1 comprises a longitudinal front opening 7 extending from the toe region 5a to the ankle region 5d through the instep region 5b.

[0045] Said longitudinal front opening 7 defines, in the upper, two opposite and facing and is preferably covered by a front tongue 9.

[0046] In order to enable the user to tighten the upper 5 of the inner liner 1 onto his/her foot after the user has introduced his/her foot into the inner liner, said inner liner is provided with a tightening system 11 arranged at the longitudinal front opening 7.

[0047] In the illustrated embodiment, said tightening system is made as a lacing system 11 and comprises a lace 13 passing through eyelets 15 arranged on the edges of the opposite and facing flaps of the upper 5.

[0048] However, the tightening system may also be implemented in any other way known to the person skilled in art.

[0049] By pulling the ends of the lace 13, the user can bring the two opposite and facing flaps of the upper 5, until said upper suitably envelops the user's foot.

[0050] When the user must take off the inner liner 1, the ends of the lace 13 can be released, so that the flaps of the upper can be moved away from each other.

[0051] The lacing system 11 thus makes it possible to adjust the relative position of the flaps of the upper of the inner liner and thus adjust the inner volume of the inner liner to the user's foot at the toe region 5a, the instep region 5b and the ankle region 5d.

[0052] However, this lacing system is scarcely effective in adapting the inner volume of the inner liner to the user's foot at the heel region 5c of the upper 5.

[0053] As outlined above, a low adherence of the inner liner 1 to the user's heel (i.e., the presence of a gap between the user's heel and the heel region 5c of the upper of the inner liner) risks to deteriorate both the user's comfort and his/her sports performances.

[0054] In order to overcome this drawback, the inner liner 1 comprises, on each of the sides, i.e., the lateral side and the medial side, of the upper 5, one or more tie member(s) 17 extending from the heel region 5c to the instep region 5b.

[0055] In the present embodiment, two tie members 17 are illustrated.

[0056] In this case, the two tie members are both arranged from the heel region 5c to the instep region 5b, but they have different inclinations, and in particular they converge towards the instep region 5b.

[0057] Said arrangement (also extendable to a number of tie members higher than two) is particularly advantageous for effectively exerting a traction on the heel region 5c of the upper 5 towards the user's heel.

[0058] However, said arrangement should not be regarded as limiting and it is also possible, for example, to envisage two or more tie members extending parallel to each other from the heel region 5c to the instep region 5b.

[0059] The number of tie members on the lateral side and medial side of the inner liner can be the same or different.

[0060] In the case in which the number of tie members on the lateral side or medial side is the same, the tie members on the lateral side and those on the medial side can be arranged either symmetrical or non-symmetrical relative to a plane of symmetry passing through the longitudinal front opening 7 of the inner liner 1.

[0061] Each tie member 17 has a first end 17a facing the heel region 5c of the upper 5, and a second end 17b facing the instep region 5b of the upper 5. Each tie member 17, at its first end 17a, is fixed to the upper 5 of the inner liner 1, in particular at the heel region 5c of the upper 5; to this aim, a heel reinforcement 19 may be provided at the heel region 5c, and the first end 17a of each tie member 17 is fixed to said heel reinforcement 19. Conversely, the second end 17b of each tie member 17 is free.

[0062] In order to make it possible to pull the heel region 5c of the upper 5 of the inner liner 1 towards the user's heel until it adheres to said heel, the inner liner 1 further comprises tensioning means exerting a traction force onto the second end 17b of each tie member 17. By exerting a traction force onto the second ends of the tie members, said tie members will be pulled towards the instep region and "drag" with them the heel region 5c of the upper 5, bringing said heel region close to the instep region 5b. By doing so, any gaps that may exist between the inner liner 1 and the user's foot - particularly at the user's heel - will be compensated for, and the inner liner will adhere to the user's foot also at the heel region.

[0063] Although it is possible to imagine equipping the inner liner with dedicated tensioning means for the tie members 17, according to the preferred embodiment, the tightening system 11 arranged at the longitudinal front opening 7 acts as tensioning means for the tie members 17.

[0064] In particular, with reference to the illustrated embodiment, the lacing system 11 acts as tensioning means for the tie members 17.

[0065] To this aim, a loop 21 is associated with the second end 17b of the tie members 17, and the lace 13 passes through said loop 21.

[0066] In a possible embodiment, each of the tie members 17 arranged on the same side of the upper is provided with its own loop.

[0067] In an alternative embodiment of the invention, the tie members converge towards and are associated with a common loop 21, as shown in Figure 1.

[0068] It will be apparent to the person skilled in the art that, when the user pulls the ends of the lace 13 to bring the opposite and facing flaps of the upper closer to each other, at the same time he/she exerts a traction force onto the loop 21 and - through said loop - onto the second ends 17b of the tie members 17.

[0069] Therefore, the user, while tightening the upper onto his/her foot, will at the same time make the upper adhere to his/her heel.

[0070] The tie members 17 may be made as strings or tapes, as shown in Figure 1, or they may in any case comprise a string or tape over a portion thereof.

[0071] Alternatively, the tie members may be made as rigid rods, or in any way comprise a rigid rod or a similar rigid member over a portion thereof.

[0072] In any case, the tie members 17 are made of a material that is less yielding than the material of the upper 5, so that they can properly exert a pulling action on the heel region 5c of said upper.

[0073] In an embodiment of the invention, the tie members 17 extend outside the upper 5 between the first and second end 17a, 17b and adhere to said upper.

[0074] In the shown embodiment, the tie members 17 extend at least partly inside the upper 5 and to this aim one or more channels 23 (a single channel 23 in Figure 1) are provided in the upper 5, said channels being arranged along the path of the tie members 17, so that the tie members, by penetrating into said channels, pass from the outer side of the upper to the inner side of the upper.

[0075] A path of the tie members 17 that is arranged partly outside the upper and partly inside the upper may advantageously make it possible to increase the efficiency in ensuring adhesion of the upper of the inner liner 1 to the user's foot, especially at the heel region, but also at the path of the tie members between the heel region and the instep region (thus essentially at the malleolar region).

[0076] Figures 2a and 2b show a view of the lateral side and a view of the medial side of an inner liner 1' according to a further preferred embodiment of the invention.

[0077] The inner liner 1' comprises a sole and an upper 5' and differs from the previously described inner liner in that it consists of two different components, combined together to give the overall shape of said sole and said upper.

[0078] In particular, the inner liner 1' consists of a front component 1a', in which the toe region 5a' and an instep region 5a" are defined, and a rear component 5b', in which the heel region 5c' and the ankle region 5d' are defined.

[0079] In this embodiment, too, the inner liner 1' comprises a longitudinal front opening 7', which in this case extends only along the front component 1a', and a lacing system 11' extending along said longitudinal front opening 7' and comprising a lace 13' passing through eyelets 15'.

[0080] In this case, too, the inner liner 1' comprises on each of the sides - i.e., the lateral side and the medial side - of the upper 5' one or more tie members extending from the heel region 5c' to the instep region 5b'.

[0081] In the shown example, a single tie member 17l' is provided on the lateral side of the upper 5' and, accordingly, a single tie member 17m' is provided on the medial side of said upper. Each tie member 17l', 17m' has a first end 17al', 17am' facing the heel region 5c' of the upper 5' and a second end 17bl', 17bm' facing the instep region 5b' of the upper 5'.

[0082] As in the embodiment of Figure 1, the second ends 17bl', 17bm', facing the instep region 5b', of the tie members 17l', 17m' are connected to the lacing system 11' acting as tensioning means for said tie members.

[0083] Unlike the previously described embodiment, the first ends 17al', 17am' of each tie member 17l', 17m' are not fixed to the upper; instead, said first ends 17al', 17am' are joined to each other by means of a joining element 25'.

[0084] Said joining element 25' is made of a substantially inextensible material and passes under the sole of the inner liner 1'.

[0085] In this configuration, too, by exerting a traction force onto the second end of the tie members 17l', 17m', said tie members will be pulled towards the instep region and "drag" with them the heel region 5c' of the upper 5', thus bringing said heel region close to the instep region 5b' and eliminating possible gaps between the inner liner 1' and the user's heel.

[0086] From the above description it is evident that the invention achieves the object set forth above, as it makes it possible to manufacture an inner liner that can be adapted to the specific morphology of the single user in all its parts, and especially at the heel region. The above description of a preferred embodiment of the invention has been given merely by way of non-limiting example, and several modifications and variations within the reach of the person skilled in the art are possible without departing from the scope of the invention as defined by the appended claims.

Claims

1. An inner liner (1; 1') for a ski boot, said inner liner comprising a sole (3) and an upper (5; 5'), in which a toe region (5a; 5a'), suitable for receiving a user's toe, an instep region (5b; 5b'), suitable for receiving

the user's instep, a heel region (5c; 5c'), suitable for receiving the user's heel, and an ankle region (5d; 5d'), suitable for receiving the user's ankle, are defined,

characterized in that said inner liner comprises, on each of the sides - i.e., the lateral side and the medial side - of said upper (5; 5'), one or more tie members (17; 17l', 17m'), extending from said heel region (5c; 5c') to said instep region (5b, 5b'), each of said tie members having a first end (17a; 17al', 17am') facing said heel region of said upper, and a second end (17b; 17bl', 17bm') facing said instep region of said upper, said second end (17b; 17bl', 17bm') of each of said tie members (17; 17l', 17m') being free with respect to said upper (5; 5'), **and in that** said inner liner further comprises tensioning means that exert a traction force onto said second end (17b; 17bl', 17bm') of each of said tie members (17; 17l', 17m').

2. The inner liner (1) according to claim 1, wherein said first ends (17a), facing said heel region, of said tie members (17) are fastened to said upper (5).

3. The inner liner (1) according to claim 1, wherein the first end (17al'), facing said heel region, of each tie member (17l') arranged on said lateral side of said upper is joined, by means of a joining element (25'), to the first end (17am'), facing said heel region, of a corresponding tie member (17m') arranged on said medial side of said upper.

4. The inner liner (1) according to claim 1 o 2 o 3, wherein said inner liner comprises a longitudinal front opening (7; 7 '), which extends from said toe region (5a; 5a') to said ankle region (5d; 5d ') through said instep region (5b) and which defines two opposite and facing flaps of said upper, wherein said inner liner further comprises a tightening system (11; 11') arranged at said longitudinal front opening (7; 7') and configured to bring said opposite and facing upper flaps closer to each other, and wherein said tightening system acts as tensioning means for said tie members (17; 17l', 17m').

5. The inner liner (1) according to claim 4, wherein said tightening system is a lacing system (11; 11') comprising at least one lace (13; 13') which passes through eyelets (15; 15 ') arranged on the edges of said opposite and facing upper flaps.

6. The inner liner (1) according to claim 5, wherein said second ends of said tie members (17) are connected to a loop (21), and wherein said lace (13) of said lacing system passes through said loop (21).

7. The inner liner (1) according to any of claims 1-6, wherein several tie members (17) are provided on each of the sides - i.e., the lateral side and the medial side - of said upper (5), which tie members extend from said heel region (5c) to said instep region (5b) with different inclinations which converge from said heel region (5c) to said instep region (5b).

8. The inner liner (1) according to any of claims 1-6, wherein several tie members (17) are provided on each of the sides - i.e., the lateral side and the medial side - of said upper (5), which tie members extend parallel to one another from said heel region (5c) to said instep region (5b).

9. The inner liner (1) according to any of claims 1-8, wherein said tie members (17; 17l', 17m') are made as strings or tapes or they include a string or a tape over at least a portion thereof.

10. The inner liner (1) according to any of claims 1-8, wherein said tie members are made as rigid rods or they include a rigid rod over at least a portion thereof.

11. The inner liner (1) according to any one of claims 1 - 10, wherein said tie members (17l', 17m') extend outside said upper (5') between said first end and said second end (17al', 17am', 17bl', 17bm').

12. The inner liner (1) according to any of claims 1 - 10, wherein said tie members (17) extend partly outside said upper (5) and partly inside said upper between said first end and said second end (17a, 17b).

13. A ski boot, comprising an outer shell and an inner liner which is made according to any of claims 1 - 12 and housed inside said outer shell.

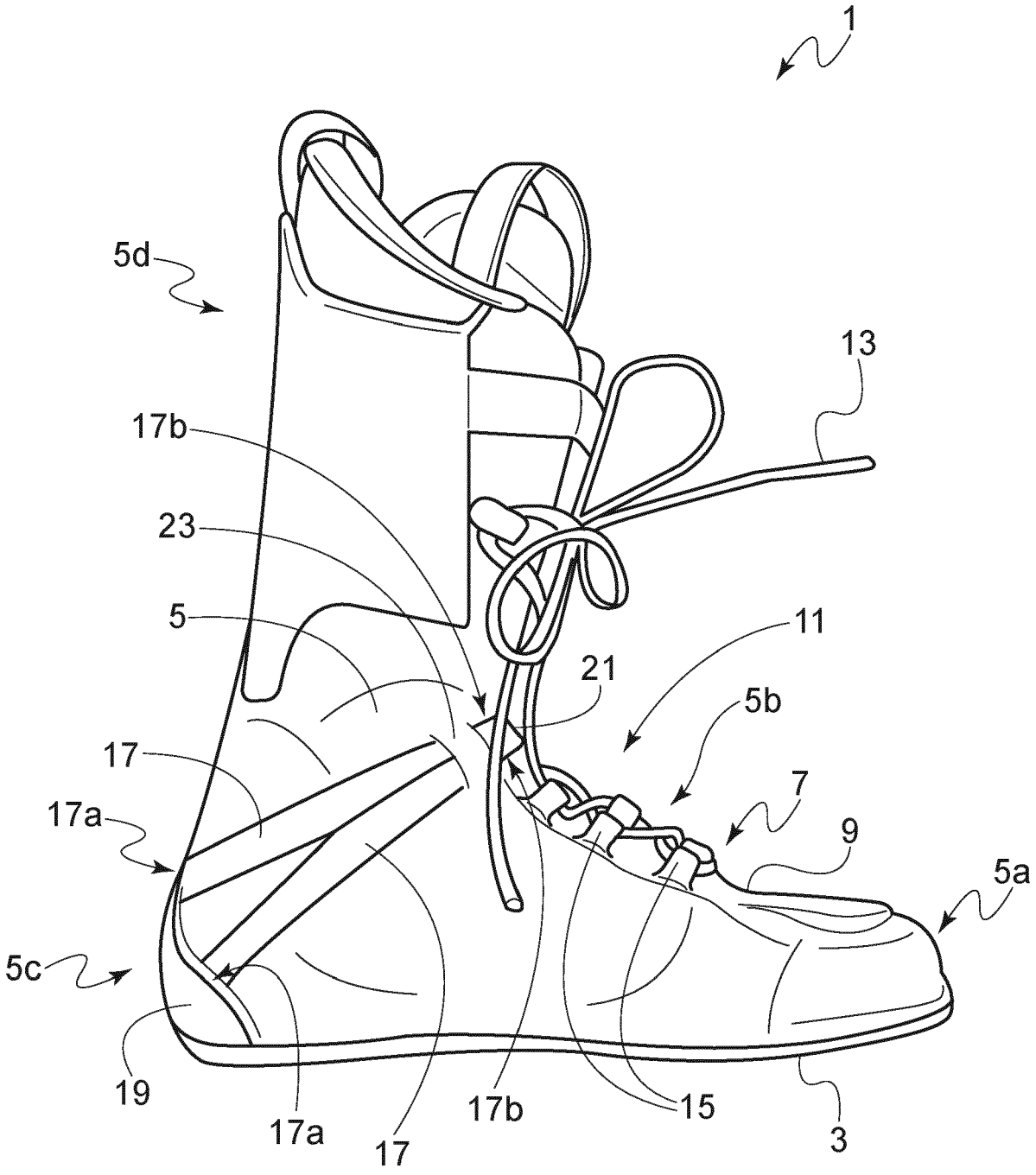

Fig. 1

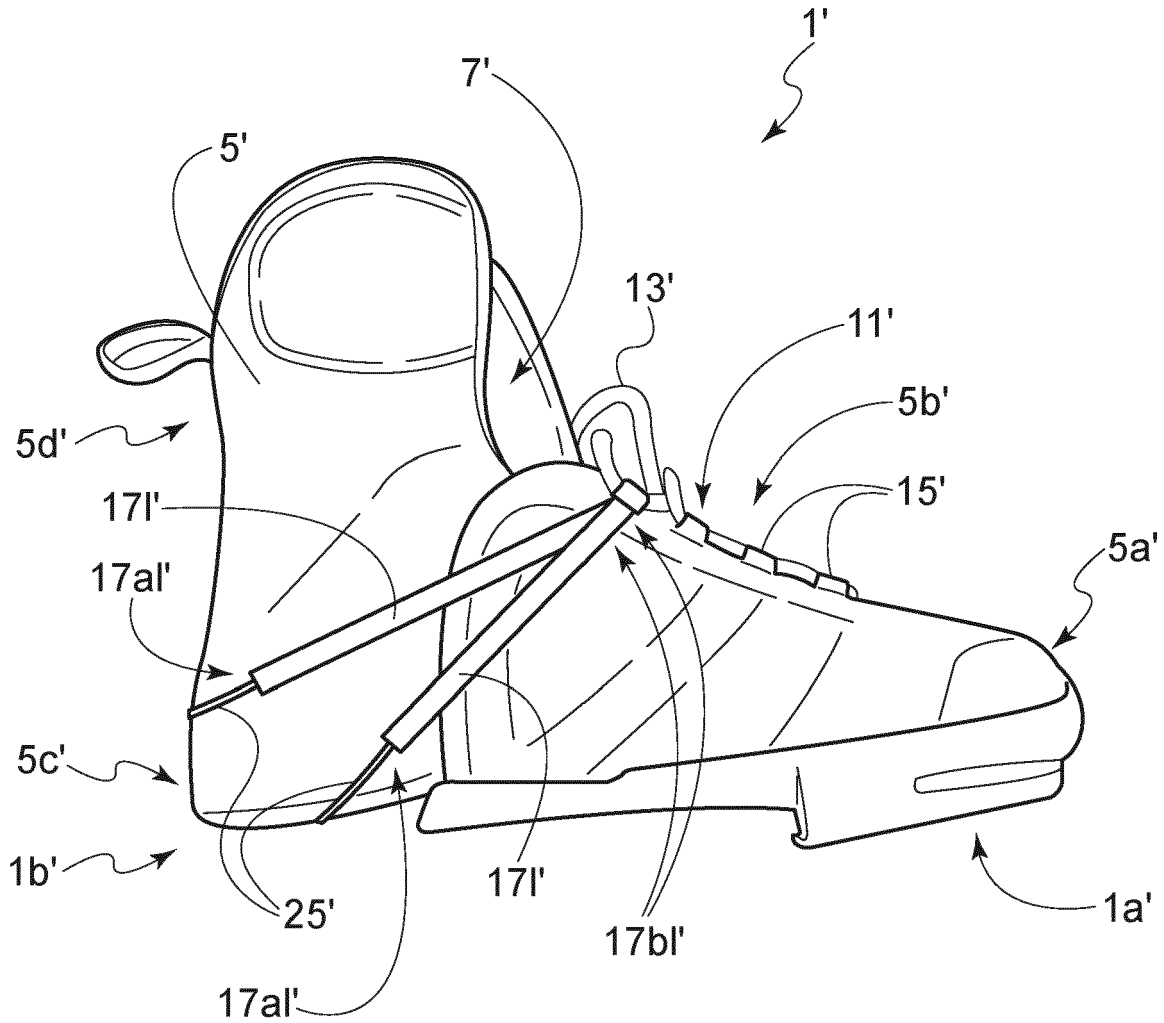

Fig. 2a

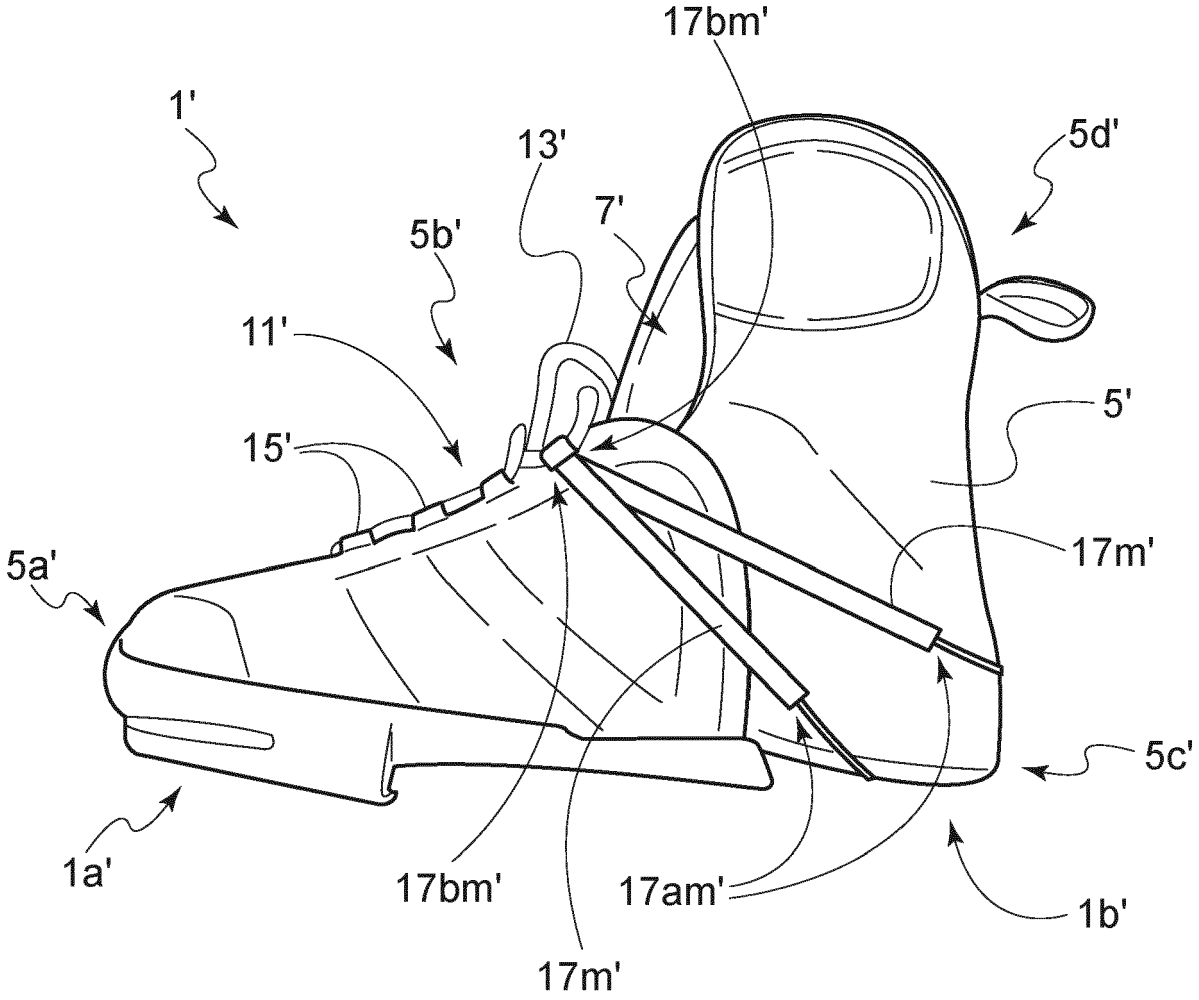

Fig. 2b

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European Patent Office
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EUROPEAN SEARCH REPORT

Application Number
EP 22 21 3161

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	DE 202 19 913 U1 (SALOMON SA [FR]) 20 February 2003 (2003-02-20)	1,2,4-13	INV. A43B5/04
A	* abstract * * page 1, line 5 - page 9, line 11 * * claims 1-10 * * figures 1-3 *	3	A43C1/00
X	US 2005/044749 A1 (HALL WILLIAM BURTON [US]) 3 March 2005 (2005-03-03) * abstract * * paragraphs [0001], [0007] - [0036] * * figures 1-5 * * claims 1-27 *	1-13	
A	DE 203 13 763 U1 (SALOMON SA [FR]) 30 October 2003 (2003-10-30) * abstract * * page 1, line 6 - page 13, line 23 * * figures 1-5 * * claims 1-9 *	1-13	

TECHNICAL FIELDS SEARCHED (IPC)
A43B
A43C
B29D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	24 April 2023	Espeel, Els

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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A : technological background
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L : document cited for other reasons

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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 22 21 3161

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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24-04-2023

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EPO FORM P0459

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