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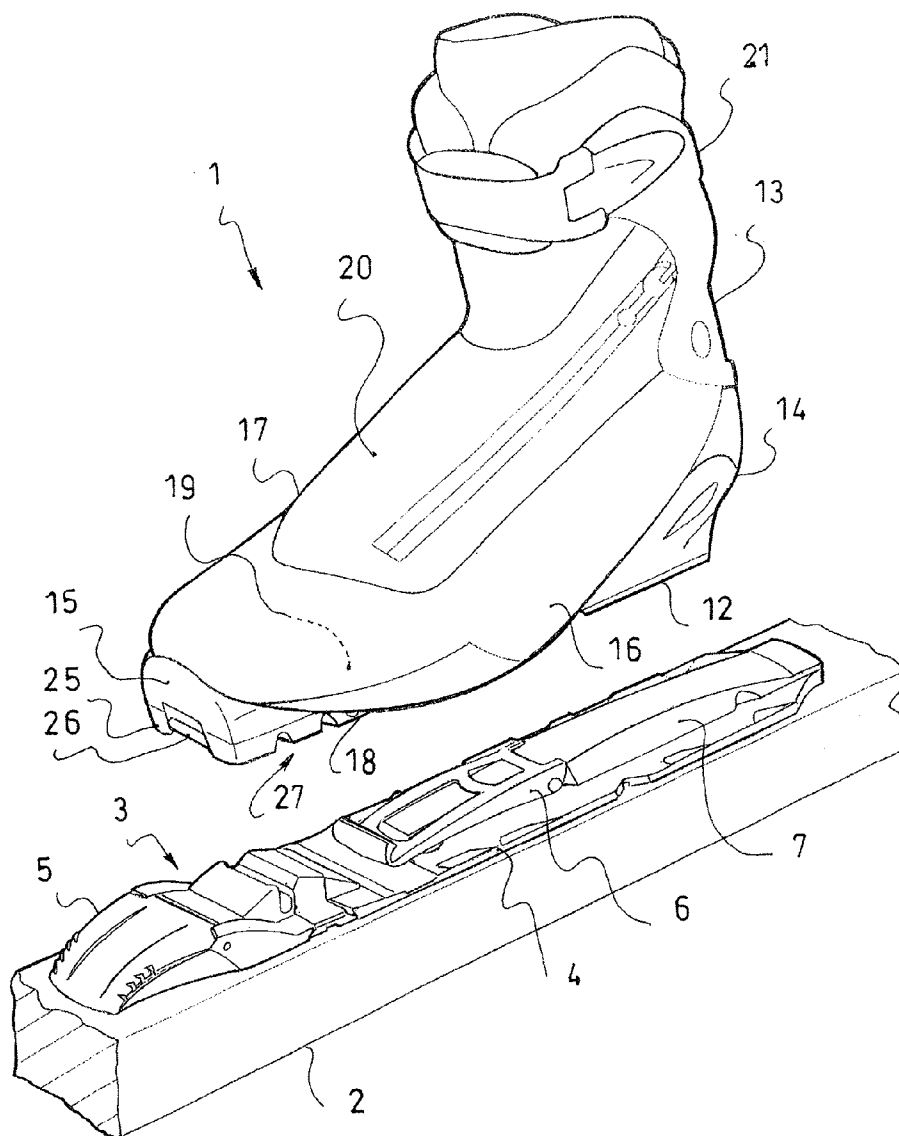
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Franck CONSTANT, Albens (FR)(52) **U.S. Cl.**
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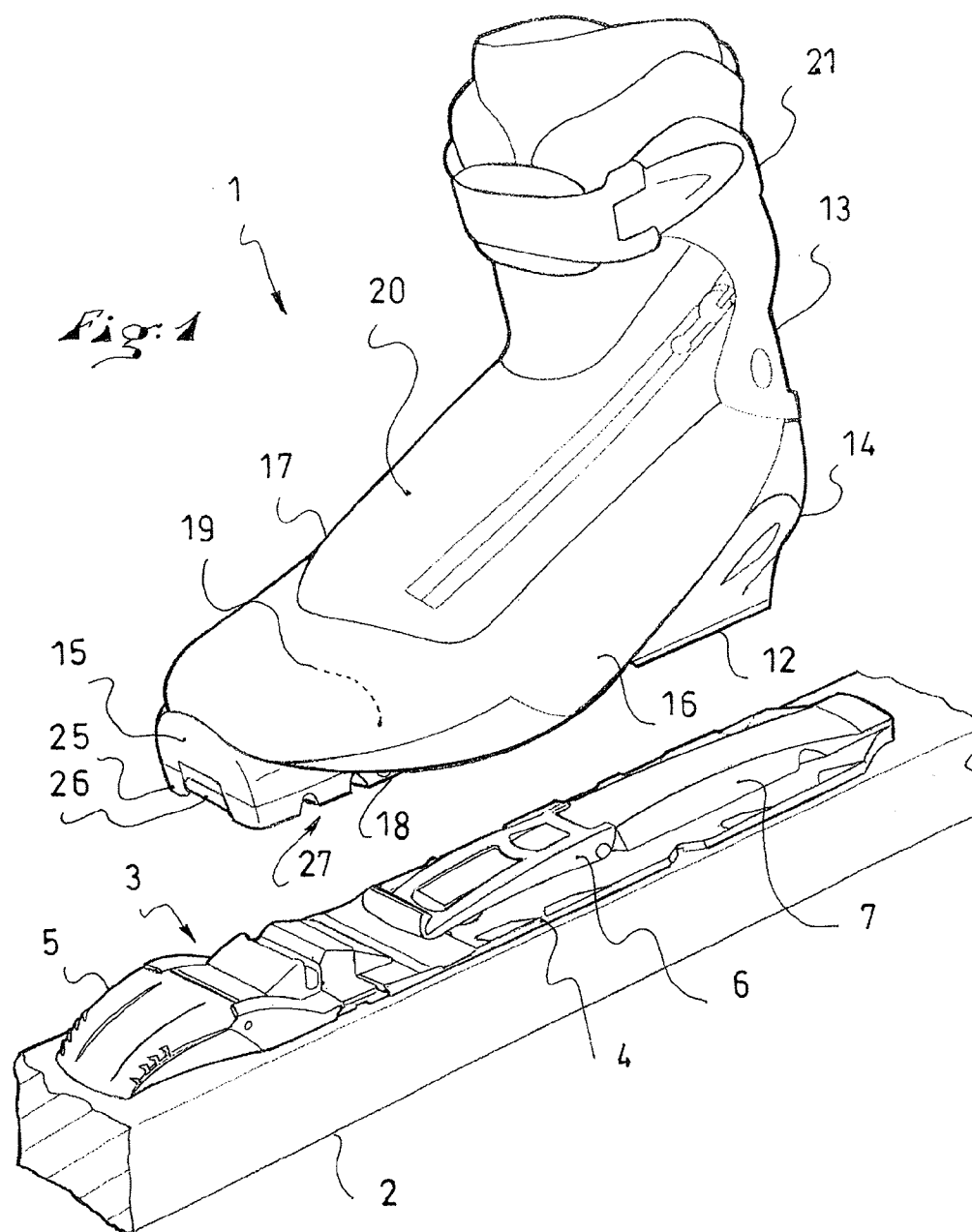
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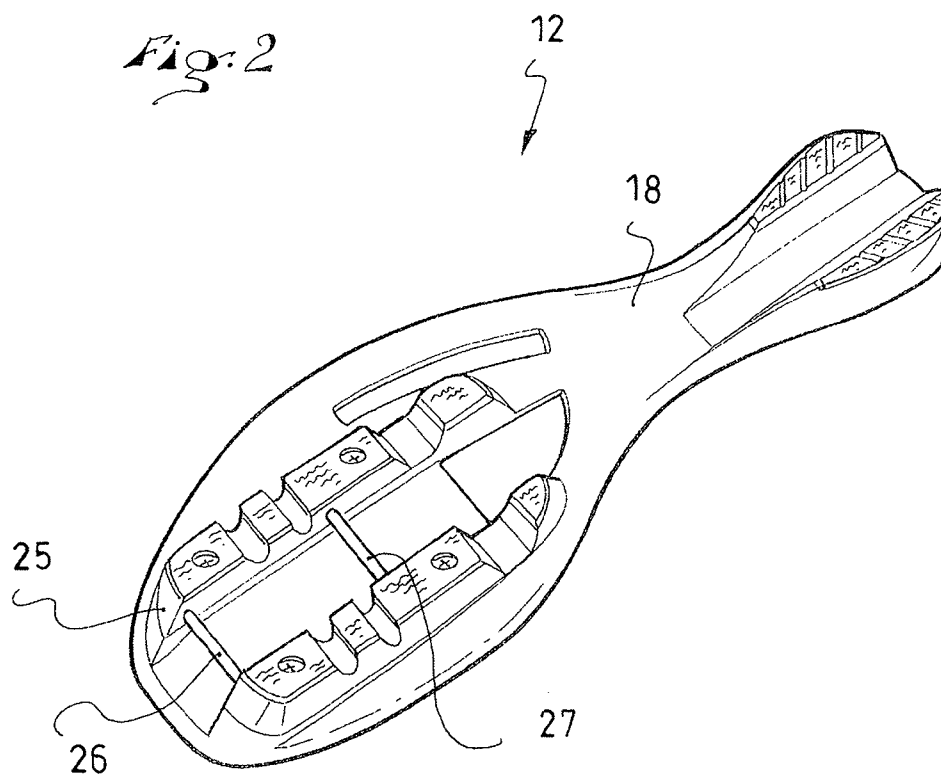
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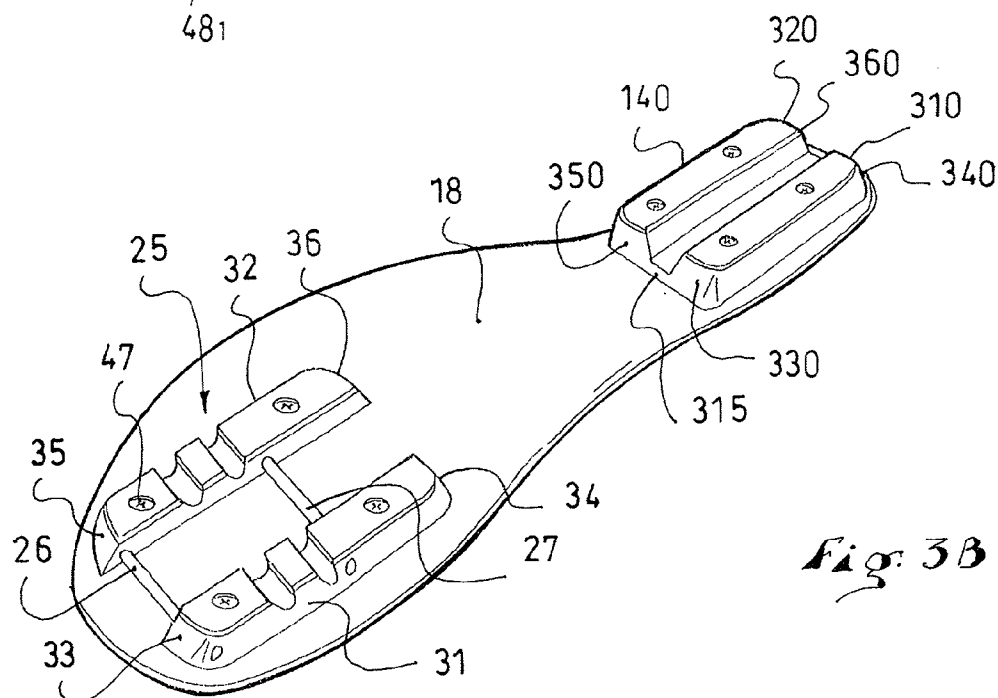
(57) **ABSTRACT**

A boot adapted for the practice of a sporting activity using a gliding or rolling apparatus, in which the heel of the boot is free during movement of the foot, the front end of the boot being provided with an element for fastening to the apparatus. The boot includes a base and an adaptation structure having a first portion to be fixed in a front zone of the base, and a second portion to be fixed in a rear zone of the base, each of which can be removably fixed.









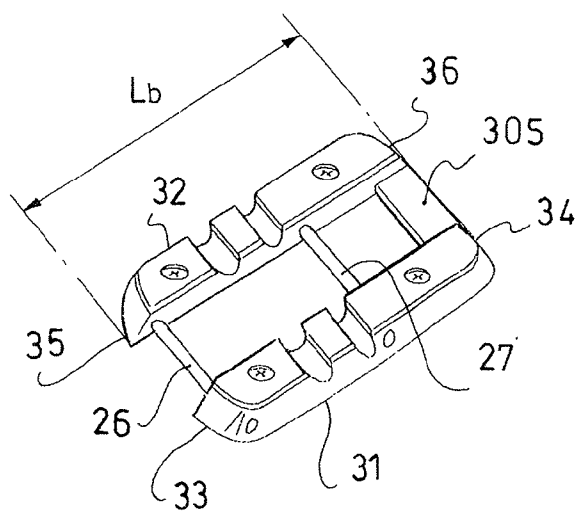
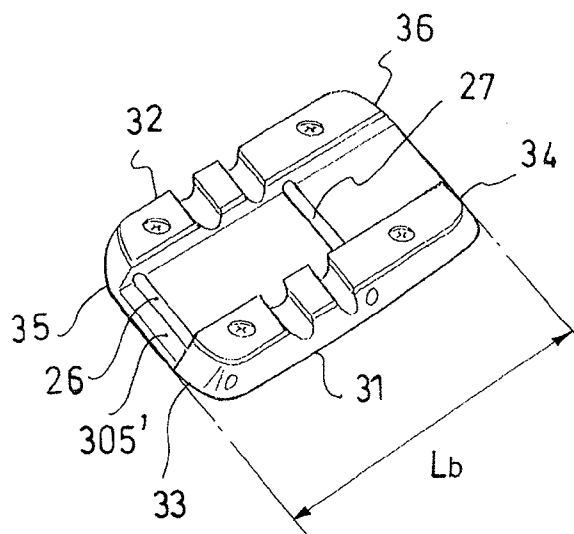
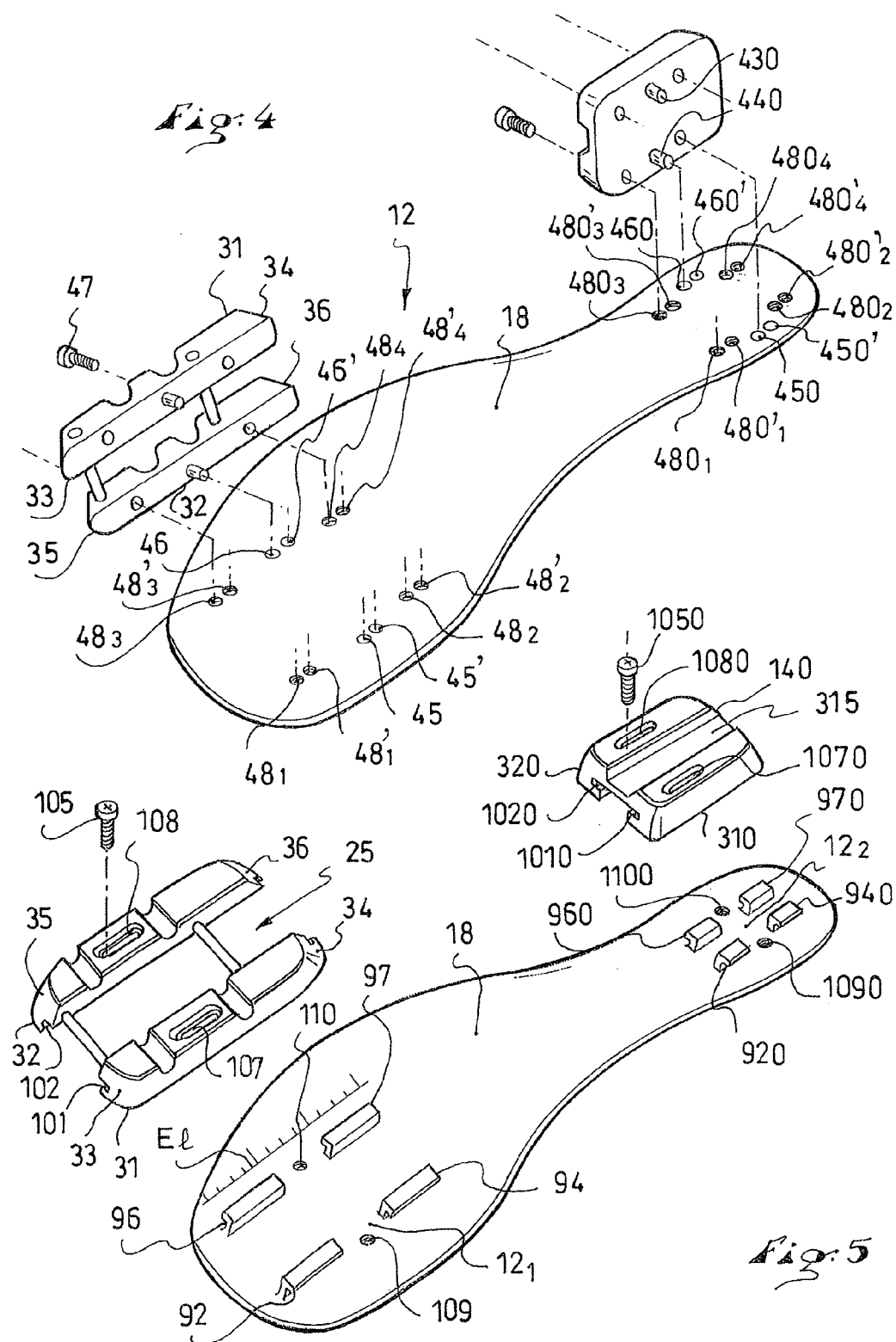


Fig. 3D





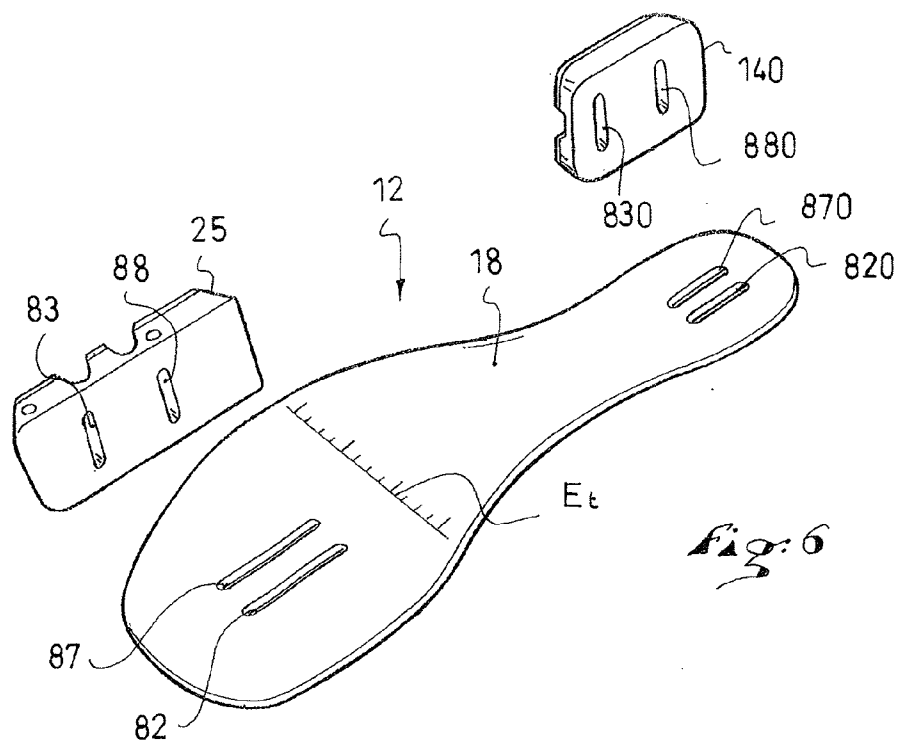


Fig. 7A

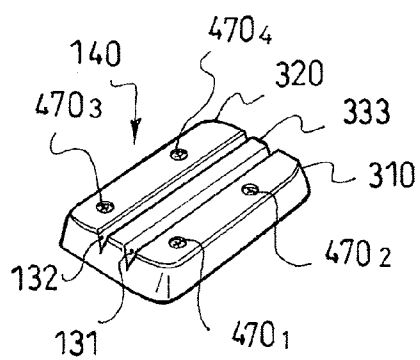


Fig. 7B

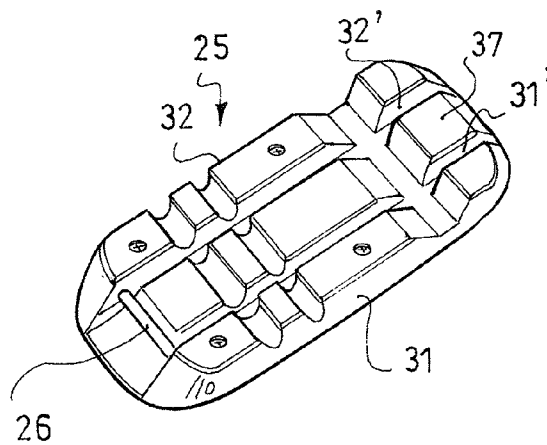


Fig. 8A

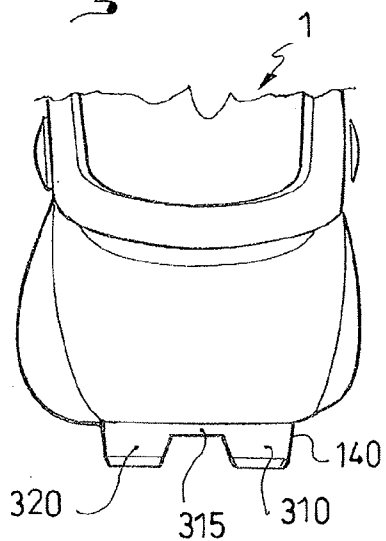


Fig. 8B

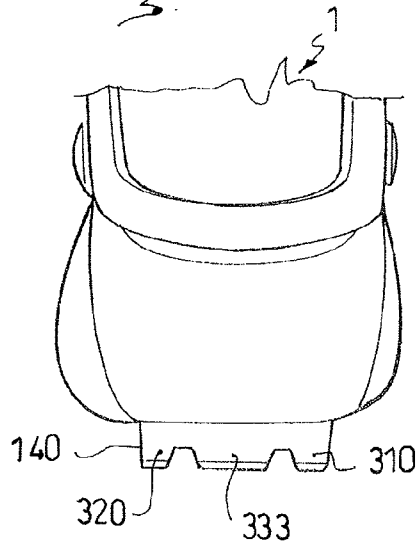


Fig. C

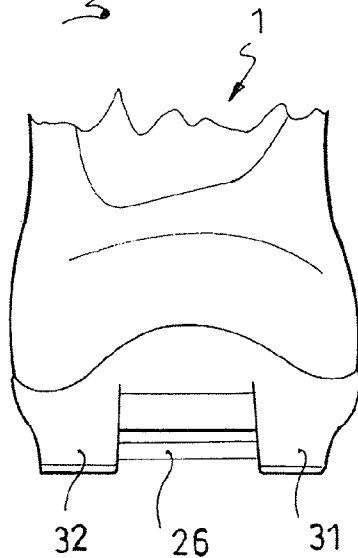
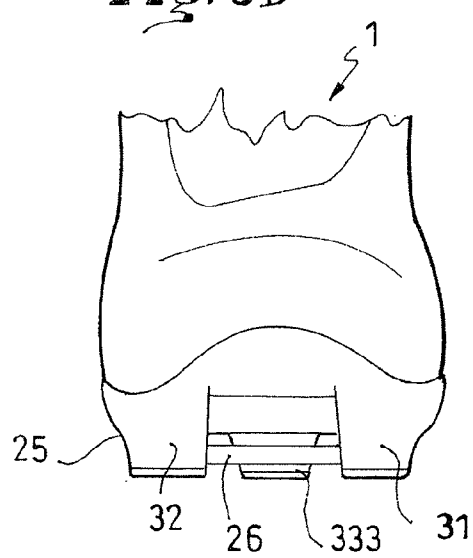
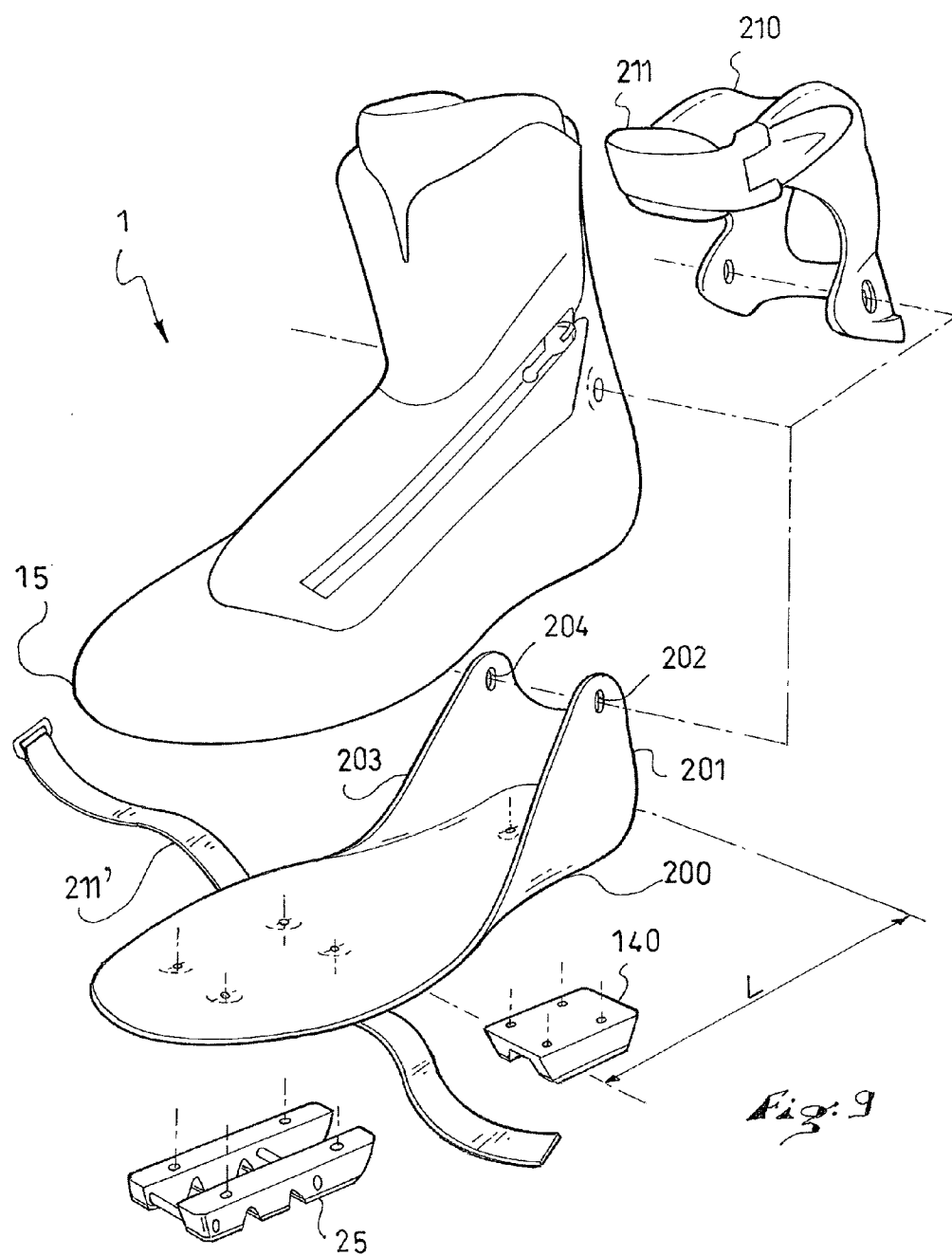
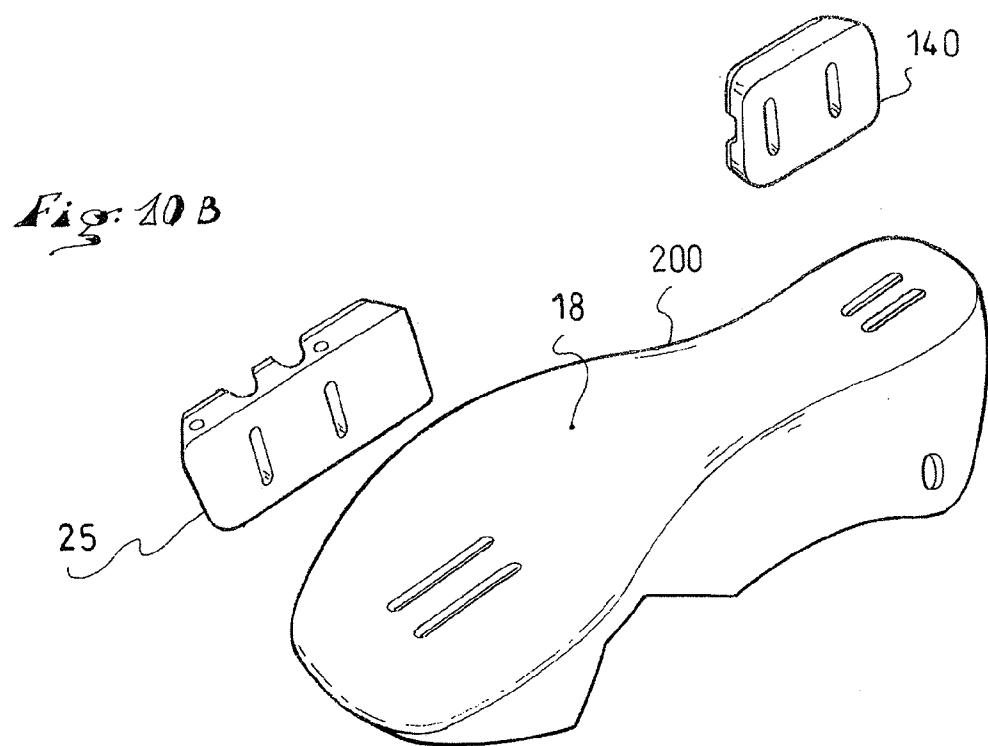
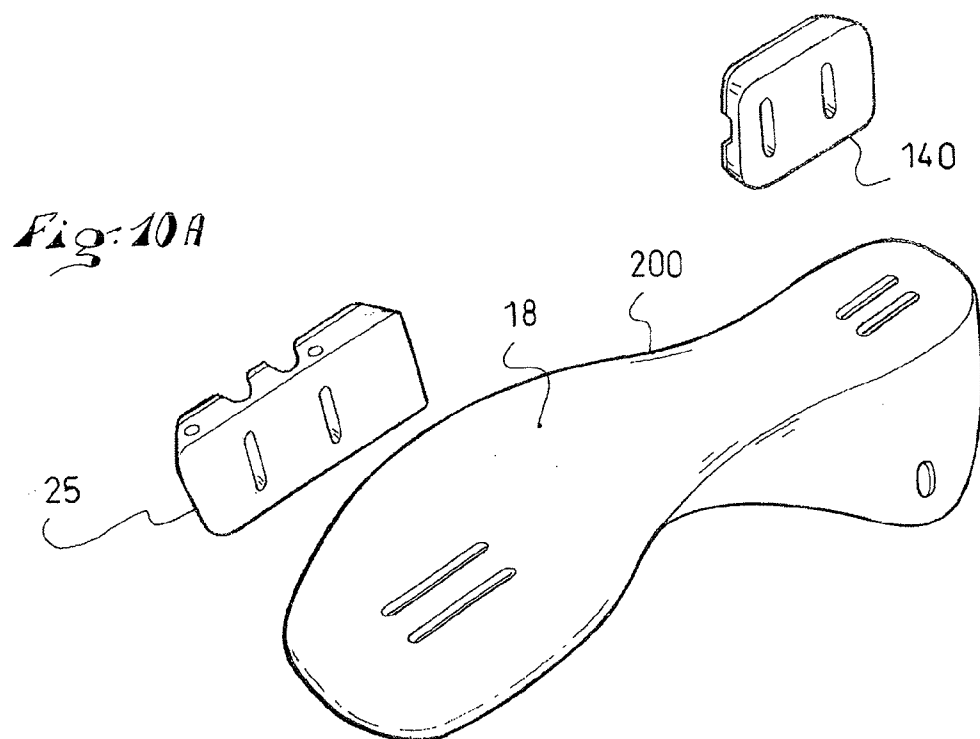
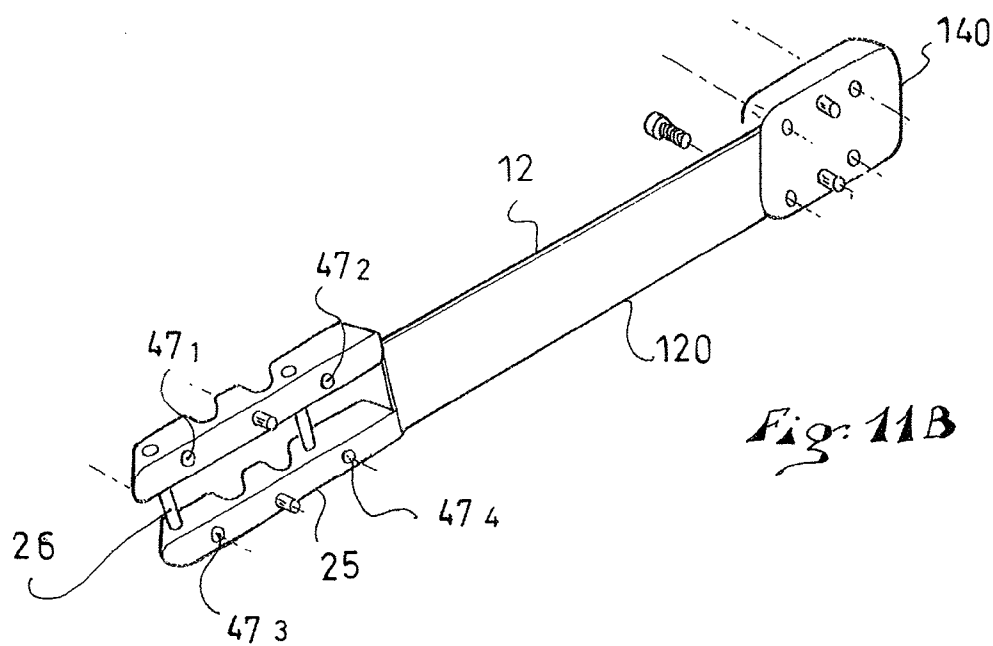
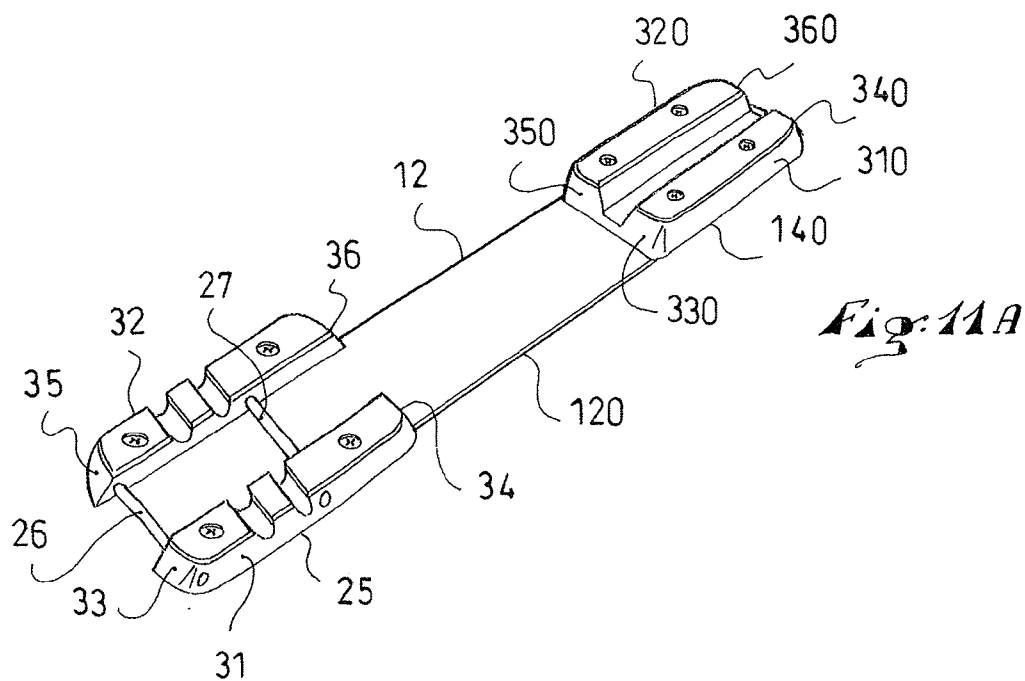


Fig. 8D









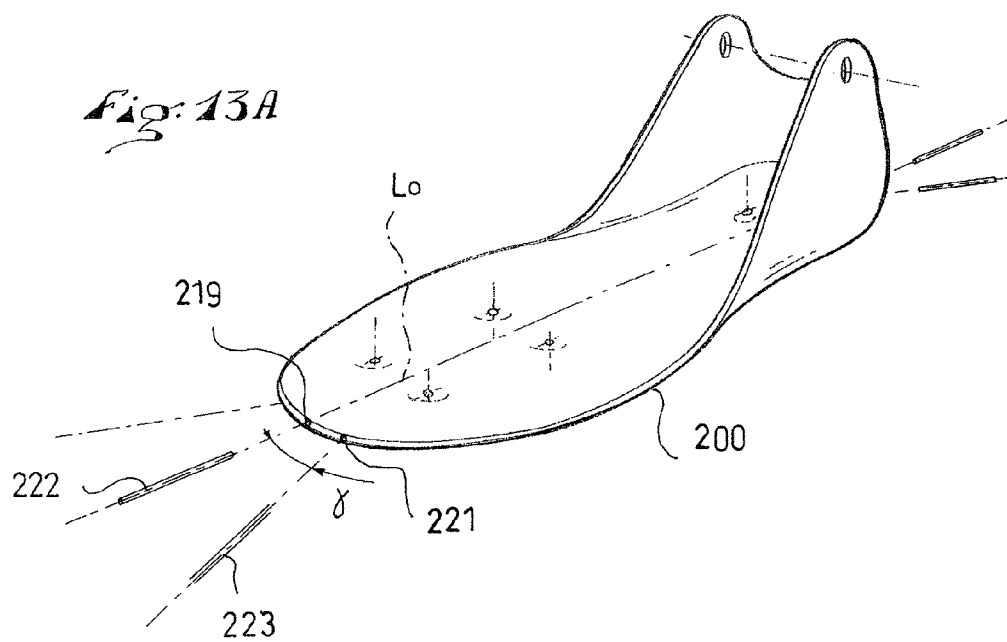
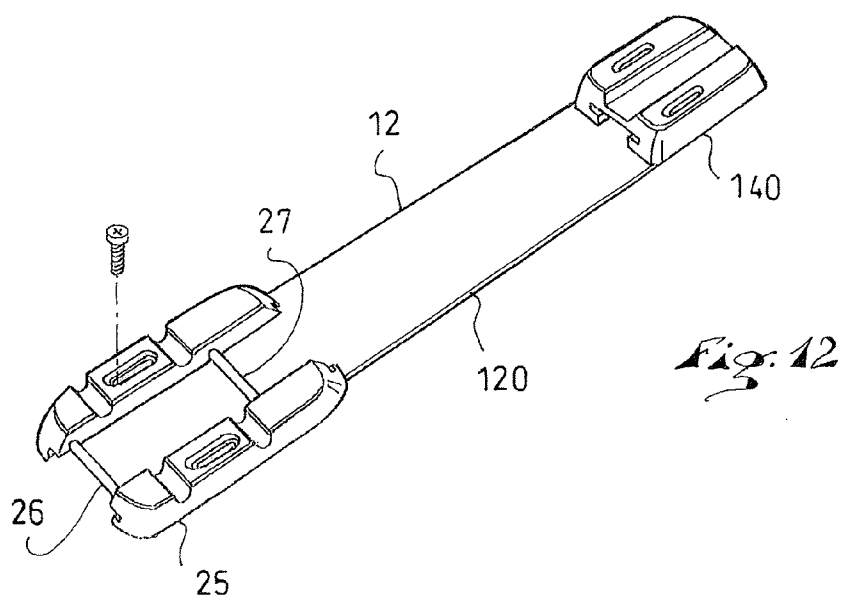


Fig. 13B

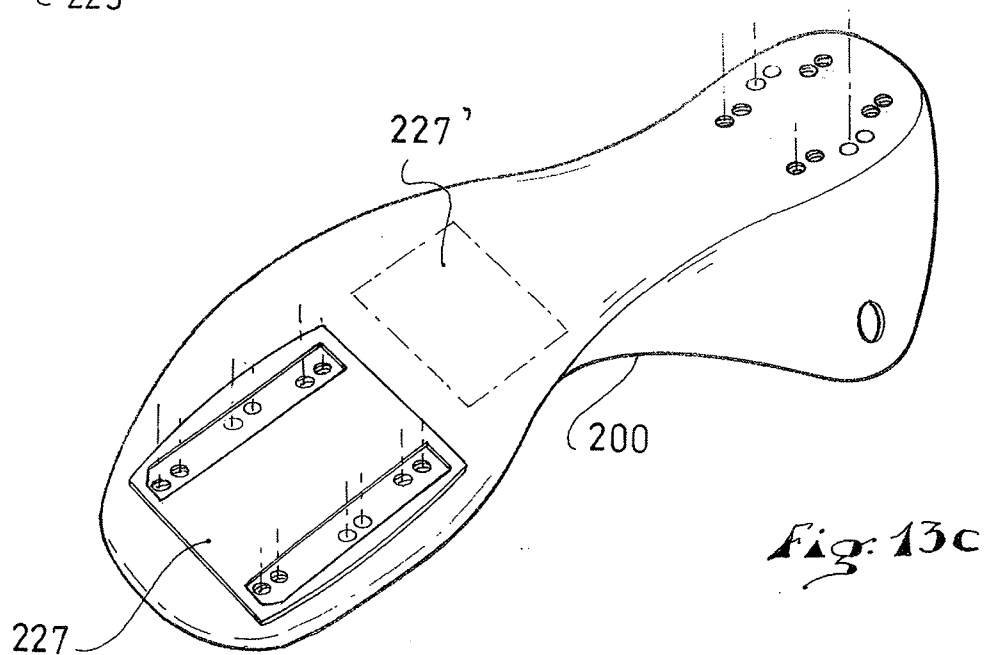
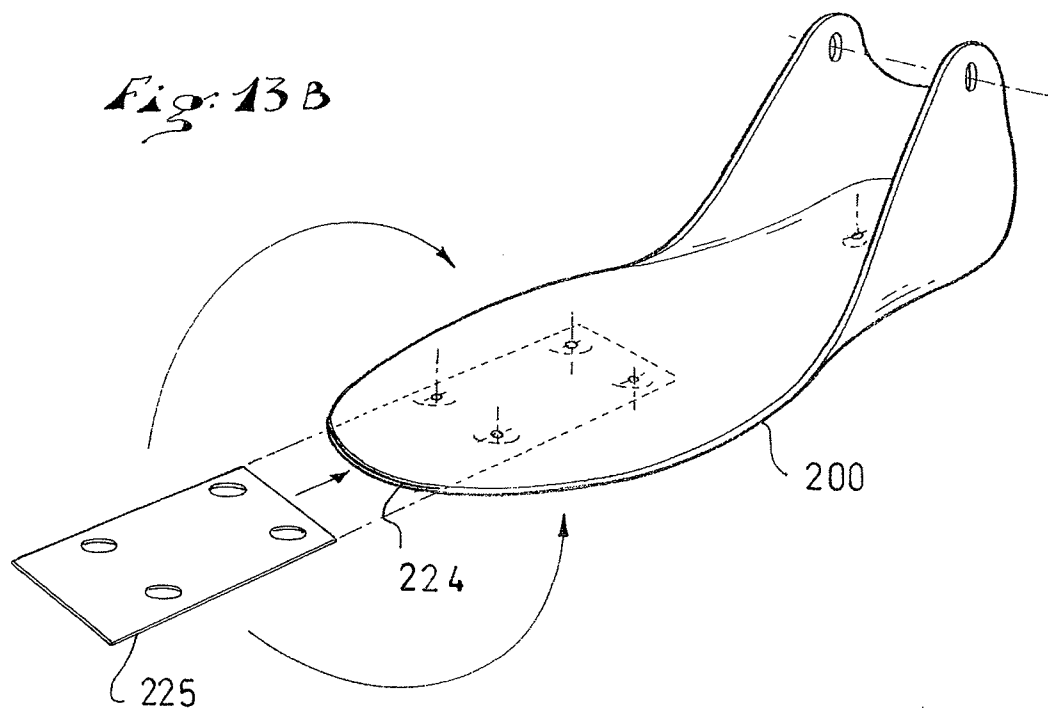


Fig. 13c

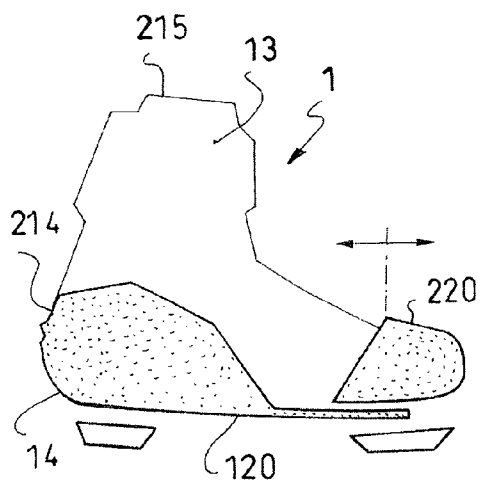


Fig. 14A

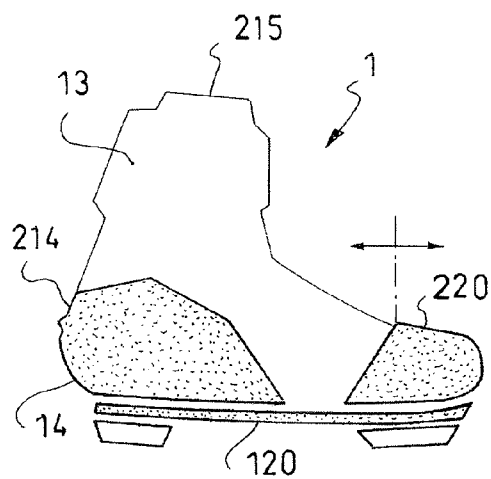


Fig. 14B

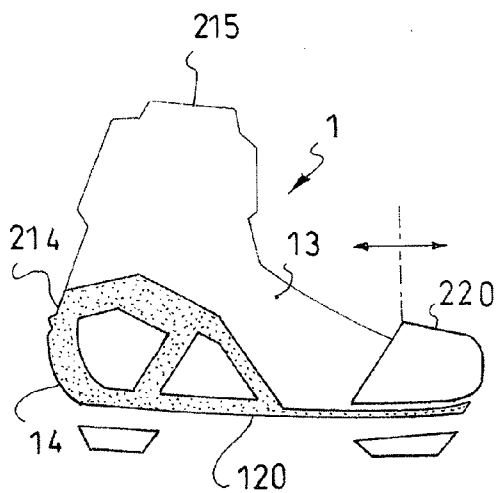


Fig. 14C

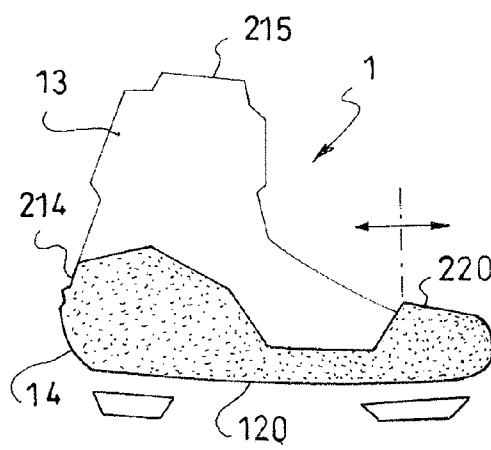


Fig. 14D

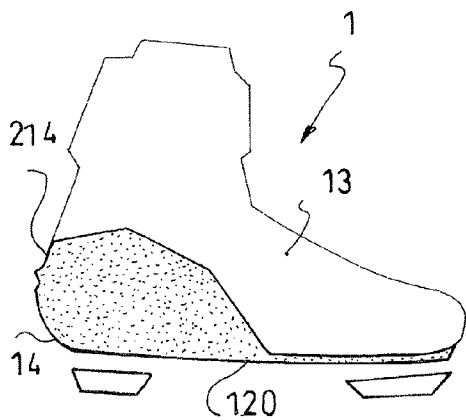


Fig. 14 E

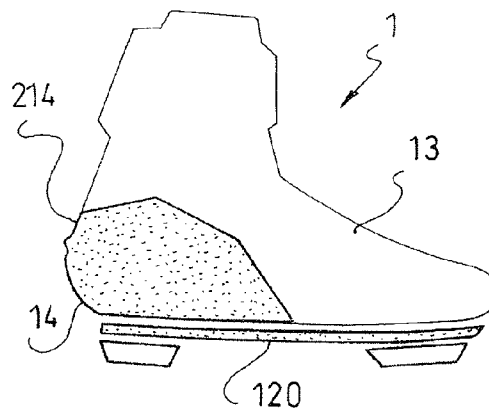


Fig. 14 F

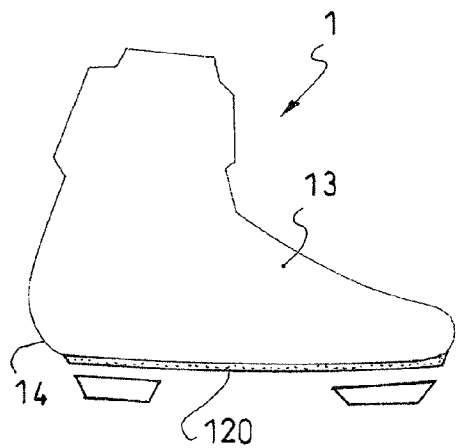


Fig. 14 G

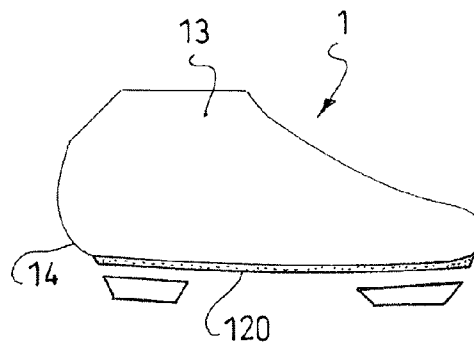
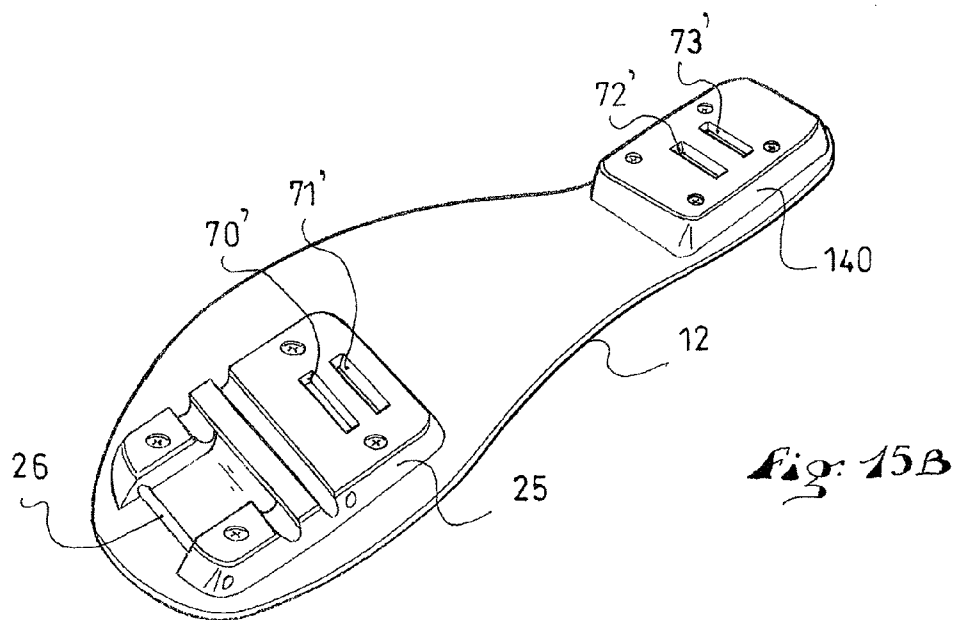
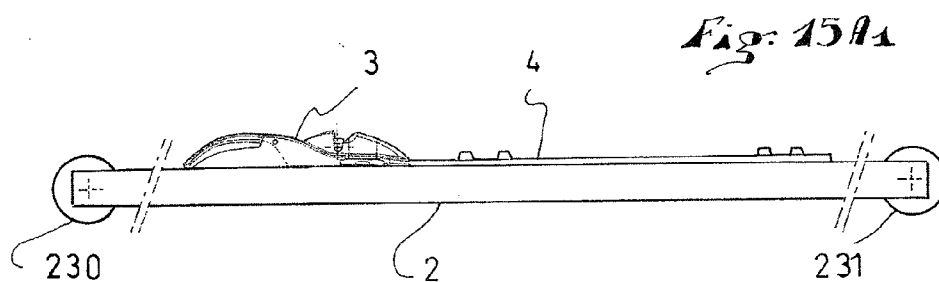
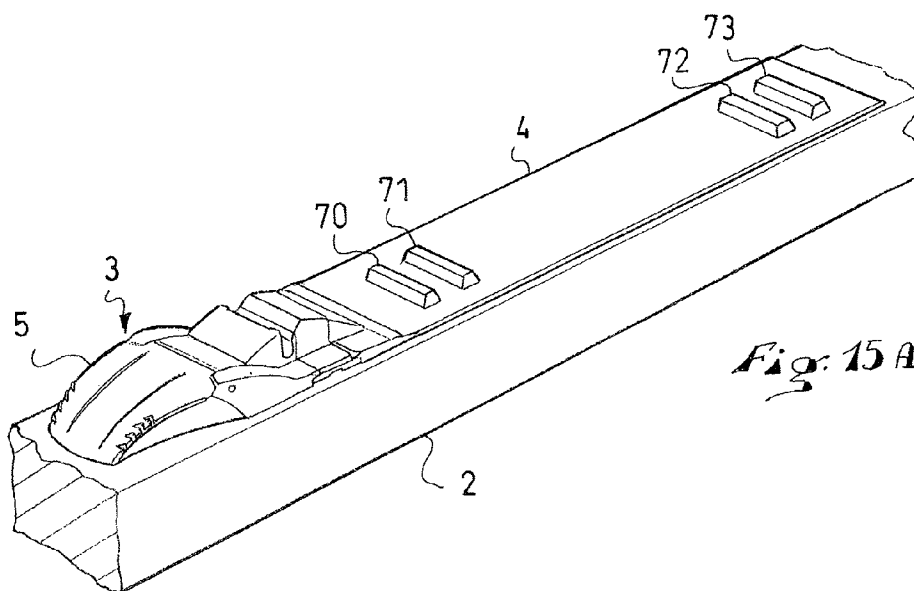
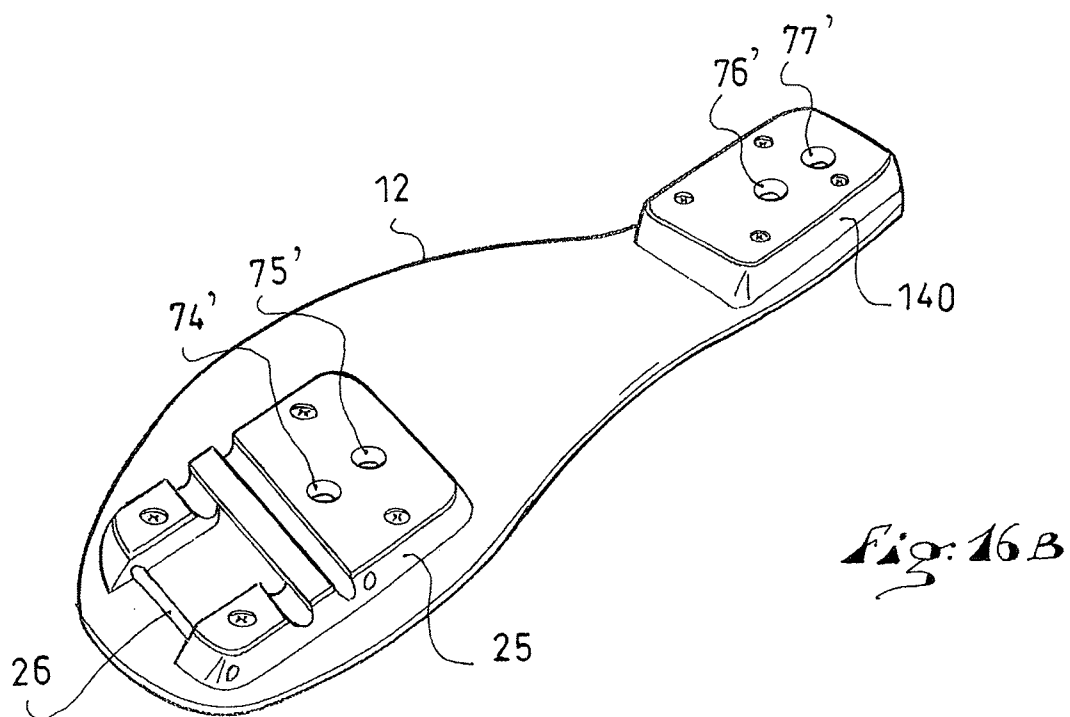
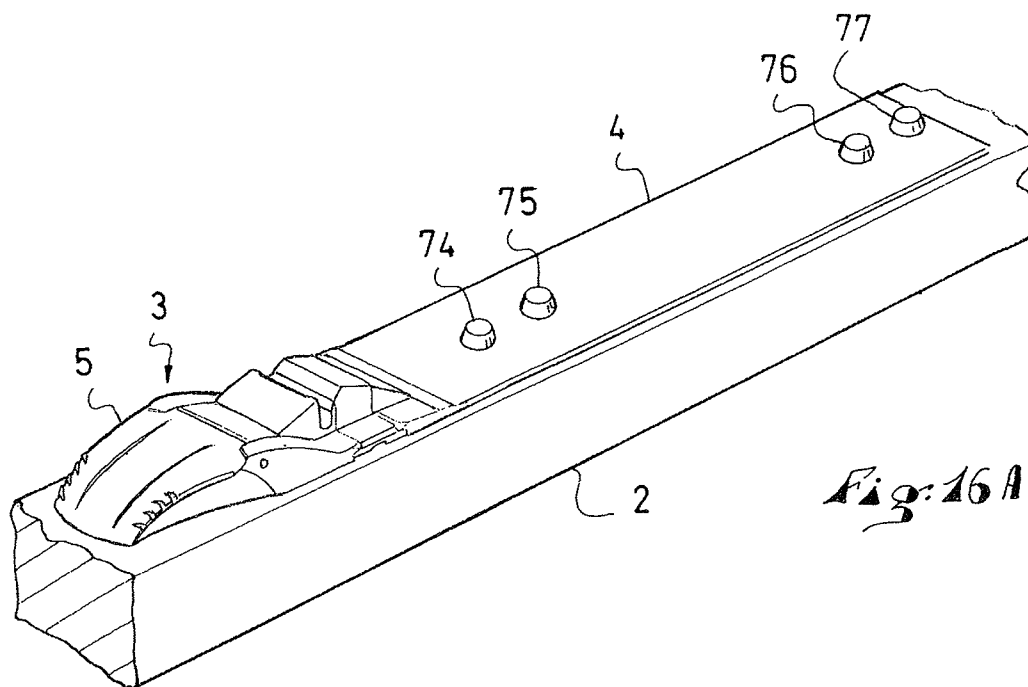
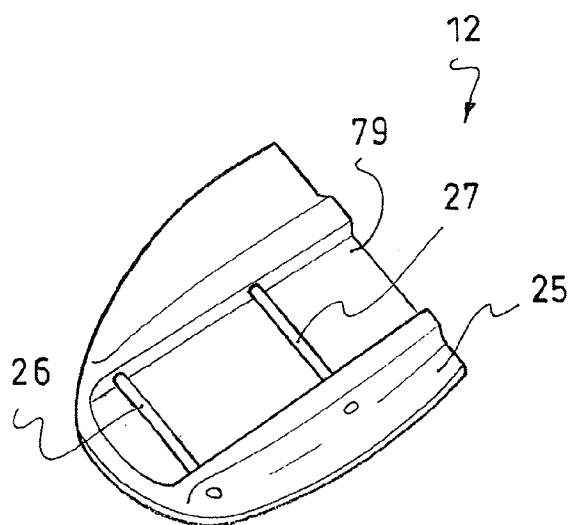
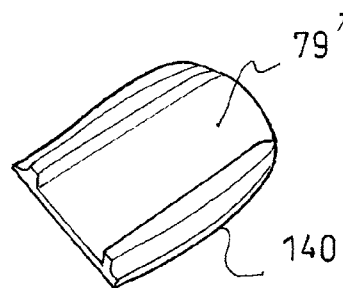
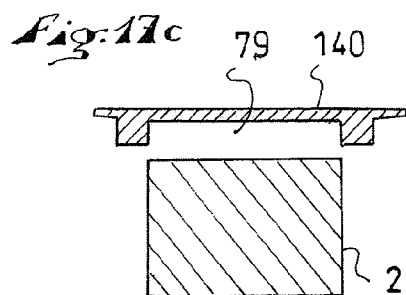
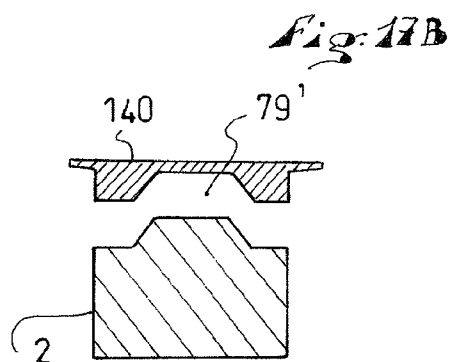
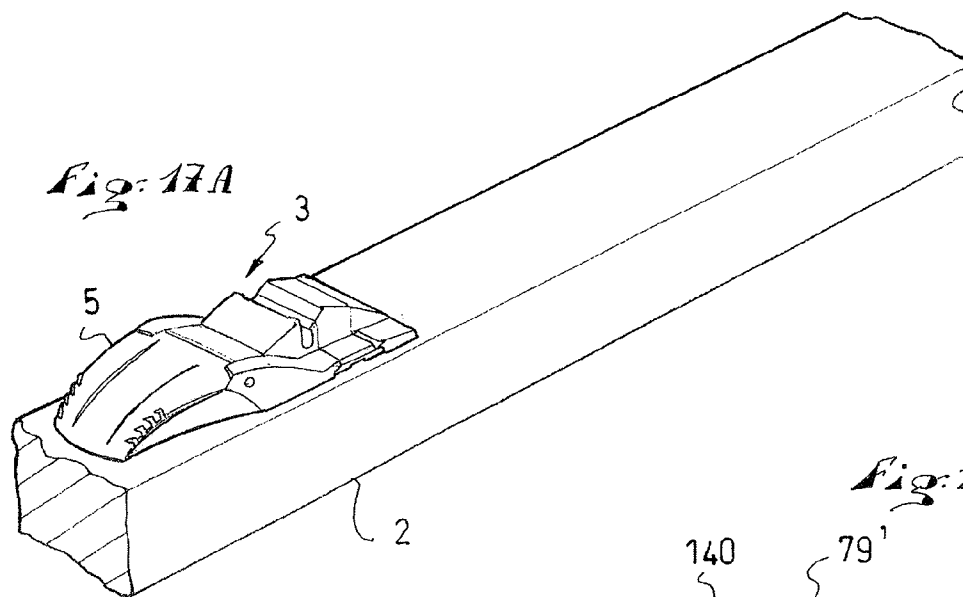


Fig. 14 H







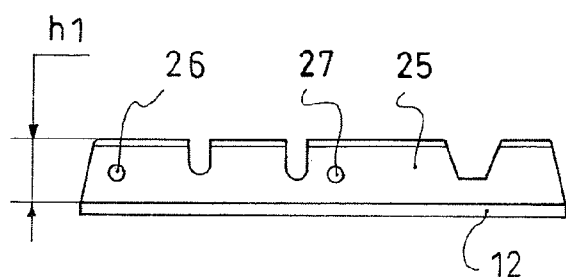


Fig. 18A

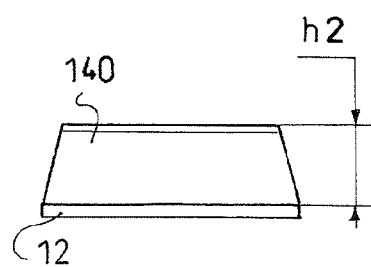


Fig. 18B

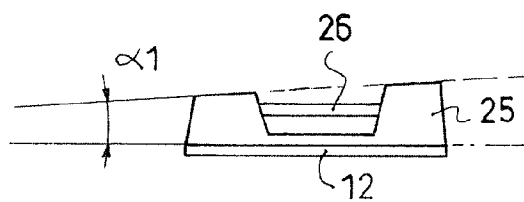


Fig. 19A

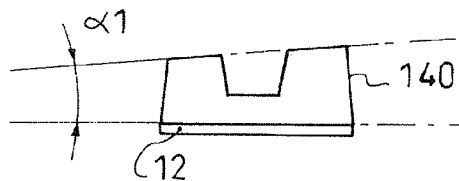


Fig. 19B

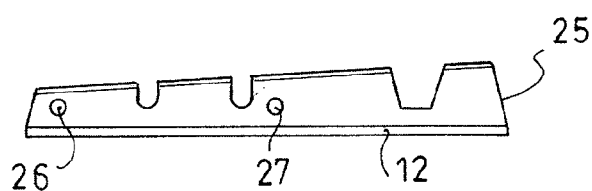
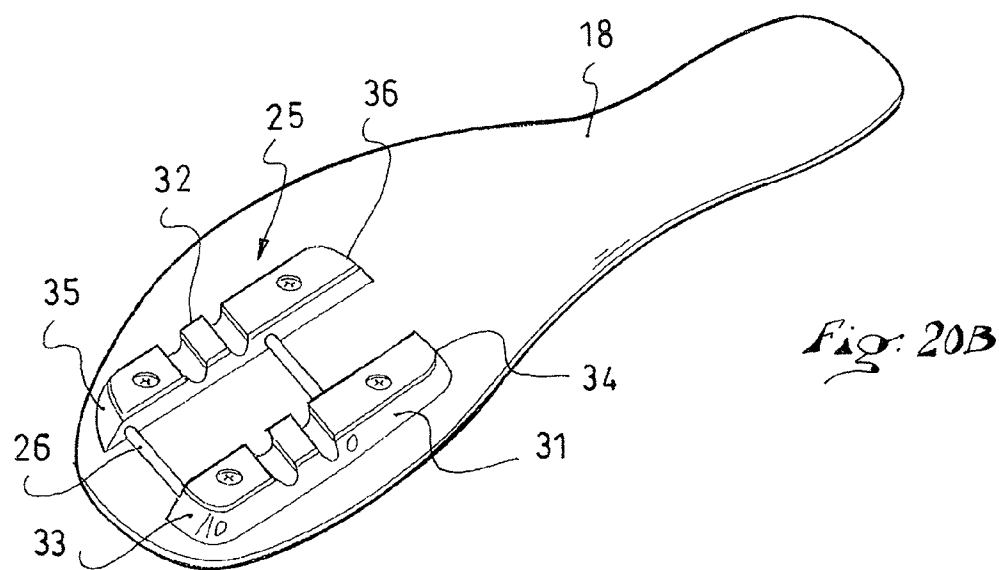
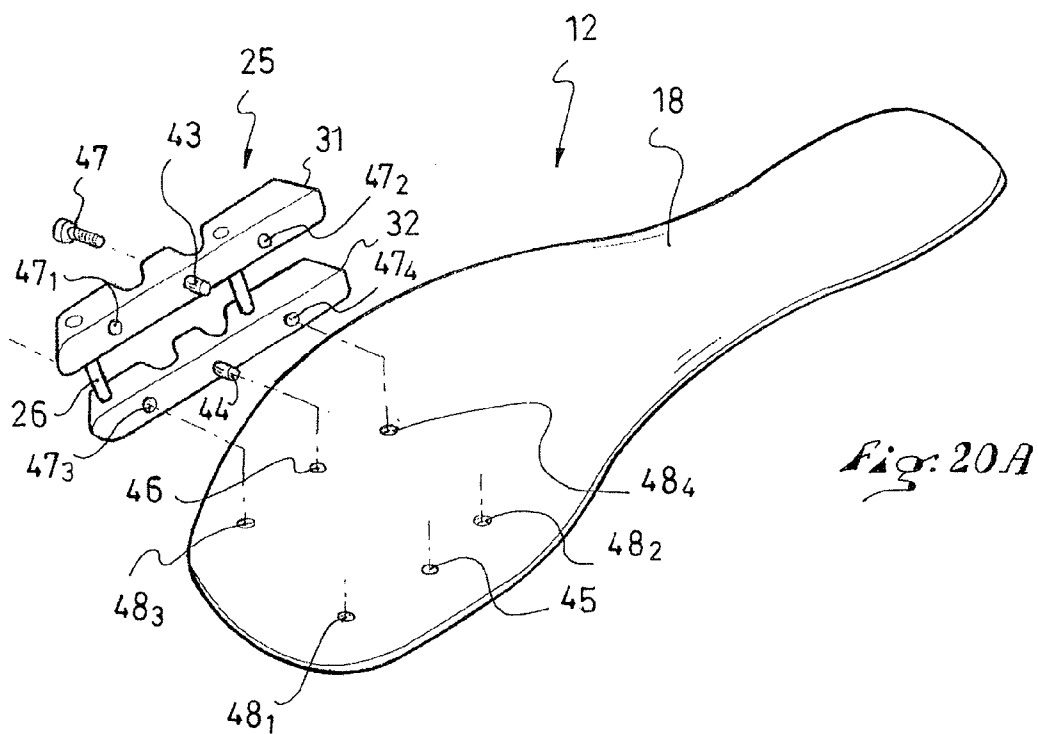


Fig. 19C



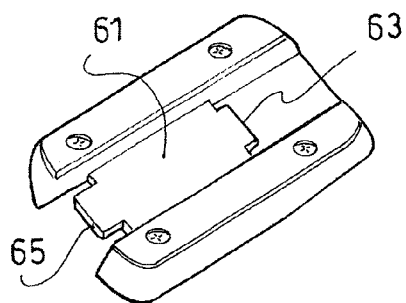
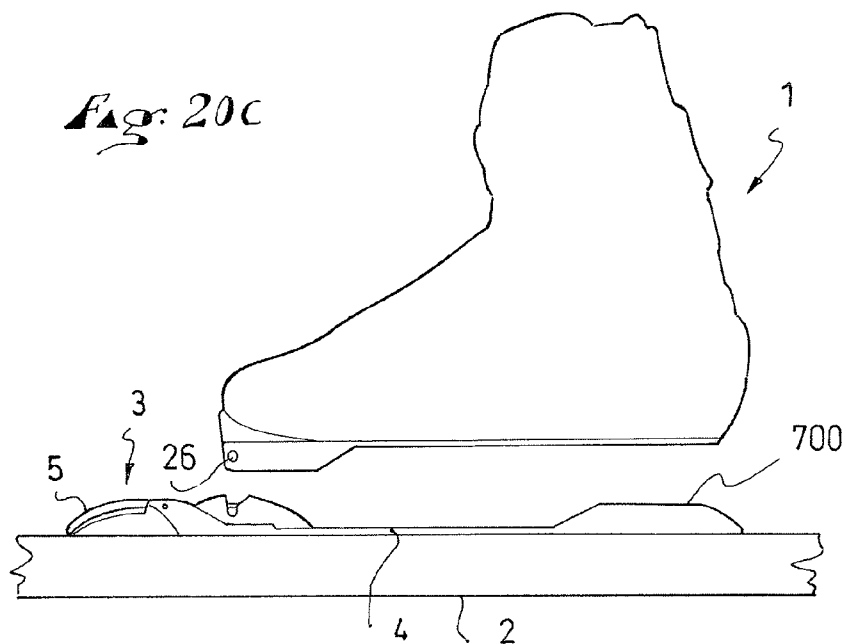
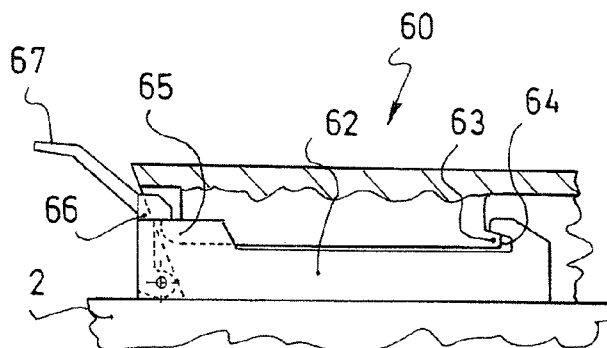


Fig. 21A

Fig. 21B



ADAPTABLE SPORTS FOOTWEAR

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is based upon French Patent Application No. 12/03259 and French Patent Application No. 12/03261, both filed Nov. 30, 2012, the disclosures of which are hereby incorporated by reference thereto in their entireties, and the priorities of which are claimed under 35 U.S.C. §119.

BACKGROUND

[0002] 1. Field of the Invention

[0003] The invention relates to an article of footwear, such as a boot, adapted to be reversibly retained or fixed to a sports apparatus, and relates more particularly to a boot intended for winter sports.

[0004] Such article of footwear can be used in fields such as cross-country skiing, telemark skiing, snowshoeing, and the like.

[0005] 2. Background Information

[0006] A boot from the aforementioned family includes an outer sole assembly, an upper, and a fastening element; the latter being adapted to cooperate with a locking mechanism, itself adapted to be affixed to the apparatus. The fastening element and the locking mechanism form a fastening assembly that is often provided to retain the boot reversibly on the apparatus.

[0007] For example, in cross-country skiing, each locking mechanism is typically capable of retaining or releasing a boot, thereby enabling the user to selectively operate the skis, or to walk.

[0008] FIG. 1 shows a known assembly comprising a boot 1, a ski 2, and a device 3 for retaining the boot on the ski.

[0009] The retaining device 3 comprises a base 4 carrying a reversible locking mechanism 5, an elastic return mechanism 6, and a longitudinal guiding rib 7. For example, it is possible to affix the locking mechanism 5, the return mechanism 6 and the guiding rib 7 to the base 4, so that the retaining device 3 is coherent, i.e., the individual components are integrated into a single device. As a matter of background, further information relating to exemplary devices of this type, including the components thereof, is disclosed in U.S. Pat. No. 6,017,050 and U.S. Pat. No. 7,644,947, the disclosures of which are hereby incorporated by reference thereto in their entireties.

[0010] The boot 1 comprises an outer sole assembly 12 and an upper 13.

[0011] The boot 1 further comprises a fastening element 25 adapted to cooperate with the retaining device 3, the retaining device itself adapted to be affixed to the ski 2. The fastening element 25 cooperates with the locking mechanism 5 and the elastic return mechanism 6.

[0012] The sole assembly 12, shown in more detail in a bottom view in FIG. 2, also extends height-wise, or depth-wise, between an outer surface 18 and a connecting surface 19. The outer surface 18 is adapted to be turned toward the ground, the retaining device 3, or the ski 2.

[0013] The connecting surface 19 is used to affix the sole assembly 12 to the remainder of the boot by gluing.

[0014] The fastening element 25 is connected to the outer sole assembly 12, so that it can selectively be affixed thereto, or separated therefrom.

[0015] As explained in the document FR 2968898 and in family member US 2012/0151801, the fastening element 25, and the rods or pins 26, 27 thereof, can be disassembled and reassembled, as desired, for example to replace it, or to change its position in relation to the sole assembly 12.

[0016] A boot of this type, and in general, known boots, have a limitation that is their inability to adapt to various types of equipment. In particular, there are two large families in the field of cross-country skis, namely the NNN® (“New Nordic Norm”) family and the SNS® (“Salomon Nordic System”) family. A boot provided with structures for connection to skis from one the two aforementioned types cannot be used for the other type, thus requiring from the user to have two pairs of boots if he/she wishes to freely use both types ski.

[0017] Another drawback is that of the longitudinal flexibility of the boot along a transverse axis thereof. This flexibility is inherent in the manufacture of the boot and cannot be adjusted as needed by the user.

[0018] Yet another drawback is that of the number of molds required to make a sole for a boot of this type. Indeed, this number ranges between about 8 and 15, depending upon the number of sizes to produce, each mold having an indicative unit cost between 10 and 40 k€ (approximately \$13,500-\$54,000).

[0019] Still another drawback lies in the wear on the portions that are in contact with the ground, the ski, or the snowshoe. The wear on these portions requires replacement of the entire boot.

SUMMARY

[0020] In view of the preceding, the present application discloses a boot adapted for the practice of a sporting activity using a gliding or rolling apparatus, for example skis or snowshoes, in which the heel of the boot is free during movement of the foot, the front end of the boot being provided with an element for fastening to the device, this boot comprising a base.

[0021] The boot further comprises adaptation structure, comprising a first portion to be fixed in a front zone of the base of the boot, in relation to a direction of extension of the foot, i.e., the length of the foot, and second portion to be fixed in a rear zone of the base of the boot, in relation to such direction of extension of the foot, each portion being capable of being removably fixed in relation to the base. This is to adapt the boot, for example, to a first type of interface of contact with the apparatus, or to a second type of interface of contact with the apparatus, different from the first type of contact interface, or to any other type of interface.

[0022] The rolling or gliding apparatus may be ski, as indicated above, but more generally an apparatus for moving on snow or ice, or on a natural surface and/or a synthetic surface, such as an asphalt-covered surface.

[0023] Depending upon the wear on the constituent portions of the adaptation structure, and/or the technical constraints imposed on the user, such as the presence of a specific type of retaining device and/or standard, or a specific type of ski or apparatus, the user is able to adapt these structures easily, without it being necessary to change the boot.

[0024] The two front and rear portions may be affixed to one another, for example connected by a base/blade, which may or may not be flexible, in order not to interfere with the bending of the boot.

[0025] The first type of contact interface may be with a single longitudinal rib, the first portion and/or second portion

of the adaptation structure each comprising a longitudinal groove adapted to receive at least a portion of the single longitudinal rib.

[0026] The second type of contact interface can be with at least two longitudinal ribs, or even n longitudinal ribs, n being greater than two, the first portion and/or second portion of the adaptation structure each comprising at least two, or n , longitudinal grooves, each groove being adapted to receive at least a portion of one of the two, or of n , longitudinal ribs.

[0027] According to other examples, a contact interface comprises at least one transverse rib and/or at least one stud, the first portion or second portion of the adaptation means comprising at least one transverse groove or at least one opening, each groove or each opening being adapted to receive a transverse rib or a stud.

[0028] The base of the boot may have flexibility along a direction of extension of the foot, i.e., along the length of the foot, when positioned in the boot.

[0029] The base may comprise a flexion blade, such flexion blade having flexibility along a direction of extension of the foot, and a construction that fastens the adaptation structure against the blade.

[0030] The base, or flexion blade, may be substantially flat, or it may also comprise walls, and possibly a stiffener-forming portion for supporting the rear portion of the upper or the liner of a boot. In a non-limiting fashion, the stiffener is an outer subdivision of the boot. Alternatively, however, the stiffener could be covered with another element and, as a result, the stiffener would be set back in relation to the outside of the boot.

[0031] Removable structure may further be provided to vary the flexibility of the base or flexion blade, such structure comprising, for example, one or more inserts and/or one or more rods and/or one or more plates or blades to be inserted into, or against, such base.

[0032] Structure may be provided for fixing the adaptation structure in relation to the base, for example screws, slides, or snap-fasteners, in one position or a plurality of discrete or continuous positions.

[0033] In a particular embodiment, at least one contact interface comprises a surface of the apparatus itself, the first portion and/or second portion of the adaptation structure comprising at least one longitudinal groove. Each groove may have a width at least equal to the width of the apparatus.

[0034] More generally speaking, the first portion and/or second portion of the adaptation structure has a transverse cross-section whose profile is complementary to a profile of a transverse cross-section of a retaining device, of an interface element between the boot and the apparatus, or of the apparatus itself. In any case, the idea is to adapt the boot to the apparatus.

[0035] The invention also relates to a boot, adapted for the practice of a sporting activity using a gliding or rolling apparatus, in which the heel of the boot is free during movement of the foot, the front end of the boot being provided with an element for fastening to the apparatus, the boot comprising a base, and adaptation structure, to be removably fixed in a front zone of the base of the boot, in relation to a direction of the extension of the foot, in order to adapt the boot to a first type of contact interface of the apparatus, or to a second type of contact interface of the apparatus, different from the first type of contact interface, the rear portion of the base being adapted to rest directly or indirectly on a surface of contact interface of the apparatus. This means that the base, depending upon the

configuration, can rest directly on the apparatus or, alternatively, on an interface plate, on the base of a retaining device, or on both the plate and the base, if they are superimposed.

[0036] The front portion and rear portion of the adaptation structure may have different heights.

[0037] The front portion and/or rear portion of the adaptation structure may have a surface, adapted to come into contact with the base, forming a non-zero angle with the opposite surface, adapted to come into contact with, or to be turned toward, the apparatus. This assembly is obtained in at least one direction.

[0038] In a boot as described above, or as described in one of the above alternative embodiments, the adaptation structure may comprise first removable structure for adapting the boot to the first type of contact interface of a ski, of a snowshoe, or of another apparatus, and second removable structure for adapting the boot to the second type of contact interface of a ski, of a snowshoe, or of another apparatus.

[0039] A boot as described above may be of a shell-type, made of one, two, or three portions, receiving a liner or an upper mounted, for example with a removable front and/or rear end-piece, in relation to the base. It may also be a Strobel-mounted upper receiving a glued base, itself receiving the adaptation structure.

[0040] In general, the contact interface of the apparatus may comprise a device for retaining or fastening the boot, adapted to cooperate with the front end thereof, or may be a surface of the apparatus itself.

BRIEF DESCRIPTION OF DRAWINGS

[0041] Other characteristics and advantages of the invention will better understood from the description that follows, with reference to the annexed drawings illustrating, by way of non-limiting embodiments, how the invention can be embodied, and in which:

[0042] FIG. 1 is a front perspective view of an assembly comprising a boot, as well as a ski shown partially and a device for retaining the boot on the ski;

[0043] FIG. 2 is a front perspective bottom view of the outer sole assembly of the boot of FIG. 1;

[0044] FIGS. 3A and 3B illustrate an embodiment of the invention;

[0045] FIGS. 3C and 3D illustrate other embodiments of the front removable structure;

[0046] FIGS. 4-6 illustrate other embodiments of the invention;

[0047] FIGS. 7A, 7B show front and rear elements provided for a ski of the NNN® type;

[0048] FIGS. 8A, 8B are rear views of a boot equipped according to the two types of families, SNS® and NNN®;

[0049] FIGS. 8C, 8D are front views of a boot equipped according to the two types of families, SNS® and NNN®;

[0050] FIG. 9 is a front perspective view of an assembly comprising a boot, as well as a base and removable structure according to the invention;

[0051] FIGS. 10A, 10B illustrate various removable structures according to the invention, in cooperation with a bending base;

[0052] FIGS. 11A, 11B, 12 show removable structures according to the invention, in a unitary, single-piece construction;

[0053] FIGS. 13A, 13B, 13C show flexible bases with structure for adapting flexibility;

[0054] FIGS. 14A, 14B, 14C, 14D, 14E, 14F, 14G, 14H show other types of boots to which the invention can be applied;

[0055] FIGS. 15A, 15A1, 15B show other configurations of ski and adaptation structures according to the invention, as well as FIGS. 16A-16B, and 17A, 17B, 17C, 17D;

[0056] FIGS. 18A-18B show adaptation structures according to the invention, with front and rear portions having different heights;

[0057] FIGS. 19A, 19B, 19C show the adaptation structures according to the invention, with front and rear portions capable of being inclined, along at least one direction;

[0058] FIGS. 20A, 20B, 20C show another embodiment of the invention; and

[0059] FIGS. 21A, 21B show an alternative of the fastening assembly.

DETAILED DESCRIPTION

[0060] The embodiments of the invention described here relate more specifically to boots for the practice of cross-country skiing, ski touring, telemark skiing, or snowshoeing. However, the invention applies to other fields, such as ice skating or roller skating, for example. In the case of a ski, the latter can possibly be provided with rollers, such as the rollers 230, 231, which are shown in FIG. 15A1.

[0061] In the following description, reference is made to a ski boot having a structure of various types. According to an example, this structure may be identical or similar to that already described with reference to FIG. 1, except for the portion located under the upper and turned toward the skis.

[0062] The structure of FIG. 1 comprises a boot 1, a ski 2, and a device 3 for retaining the boot on the ski:

[0063] the boot 1 comprises an outer sole assembly, or outer base 12, and an upper 13, these two elements being assembled for example with glue, rivets, or screws, or they can be at least partially integrated into the same element, which may be molded, for example, in a thermoplastic or composite material. The base 12 may include one, two, or more portions. The boot 1 extends lengthwise, from a rear end, or heel 14, to a front end, or tip 15, and a widthwise, between a lateral side 16 and medial side 17. The base 12 also extends lengthwise, from the heel 14 to the tip 15, and widthwise, between the lateral side 16 and medial side 17,

[0064] the upper 13 comprises a lower portion 20, provided to surround the foot, and possibly a top portion 21, provided to surround the ankle and even extend above the ankle. The upper may comprise only the lower portion,

[0065] a fastening element 25 is provided to cooperate with the retaining device 3, in particular the locking mechanism 5, itself adapted to be affixed to the ski 2, and possibly with an elastic return mechanism 6,

[0066] the retaining device 3 comprises a base 4 carrying a reversible locking mechanism 5, possibly an elastic return mechanism 6 and, in the example shown in FIG. 1, a longitudinal guiding rib 7, the locking mechanism 5, the possible return mechanism 6 and the guiding rib 7 can be affixed to the base 4.

[0067] The invention also applies to other types of boots, especially the types of boots shown in FIGS. 14A-H, or to other types of bindings.

[0068] Thus, the boot of FIG. 14A comprises a removable front end piece 220 and a cradle 214 which, in particular,

serves as the base 120 and the stiffener. The stiffener is an outer subdivision of the boot. In a non-limiting fashion, the end piece 220 has the appearance of a removable and/or adjustable shell, making it possible to adapt the boot to the size of the user. The user slips a liner 215 or a boot into this assembly, in which the user's foot is inserted. The end piece is fitted on the cradle, to which it can then be fixed, for example with rivets, screws, or glue. This end piece can be made of a plastic and/or composite material, and/or a flexible, textile or synthetic material.

[0069] In an alternative embodiment, according to FIG. 14B, the outer stiffener is also removable: similar end piece, it is adapted to be fixed on a base or flexion blade 120 (as explained below), and it can be disassembled therefrom. The blade itself then constitutes most of the base.

[0070] The boot of FIG. 14C is similar to that of FIG. 14A, but has a perforated cradle 214. This reduces the mass of the boot, and therefore its mechanical inertia.

[0071] According to the embodiment shown in FIG. 14D, the end-piece 220, the cradle 214, and the base 120 form a unitary, single-piece element. This has the advantage of simplicity.

[0072] In FIG. 14E, the boot has no end-piece, but only a base 120 and a rear cradle 324, which form a unitary, single-piece element. This embodiment promotes reversible bending of the base 120 forward, and in the area of the metatarsus of a foot.

[0073] In FIG. 14F, the boot does not have an end-piece, but includes the base 120 and the rear cradle 214, which are two separate elements assembled to one another by any suitable expedient.

[0074] In FIG. 14G, the boot comprises a base 120, but does not include an end-piece or a cradle. The boot also includes a high upper 13, removably or permanently affixed to the base 120 by any suitable expedient. The high upper is well-suited to the skating step technique of skiing, for which the user exerts lateral thrust with the legs.

[0075] In FIG. 14H, alternatively, the upper of the boot is a low upper, which is suitable for the alternate step technique of skiing.

[0076] More typically, the boot or footwear element according to the invention comprises a base, which is not necessarily glued against an upper.

[0077] In general, the base is adapted to receive, on one of its surfaces, either a boot, or structural elements of an upper, themselves adapted to receive a boot or a liner in which the user's foot is inserted.

[0078] More particularly, the boot can be provided to include a base on which a mounted upper is attached. For example, this latter comprises an envelope for covering the foot and a lasting board adapted to close the envelope beneath the foot, to the exclusion of any conventional sole assembly. The mounted upper is affixed to the base by means of a glue, for example, or any other appropriate expedient, it being known that, in the prior art, in a very different approach, would have led to affixing the mounted upper to a sole assembly.

[0079] According to the alternative embodiment of FIG. 14B, the base comprises a longitudinal flexion blade, a removable cradle, and a removable end-piece. This means that the flexion blade, the cradle, and the end-piece are elements assembled to one another to form the base. In other words, these elements, in this case, do not form a unitary, single-piece element.

[0080] The base has another surface that is generally facing the ground or the apparatus (e.g., the ski) and has the function of interfacing with the adaptation structure described below.

[0081] Such adaptation structure 25, 140 are shown in FIGS. 3A and 3B. Here again, the base 12 extends depthwise, between an outer surface 18 and a connecting surface 19. The outer surface 18 is adapted to be turned toward the ground, the retaining device 3, or the ski 2.

[0082] The connecting surface 19 serves to affix the base 12 to the remainder of the boot, for example by gluing (but other methods of affixing or fixing are possible, as explained above).

[0083] According an embodiment, the adaptation structure comprises a front fastening element 25 including a first longitudinal bar 31 and a second longitudinal bar 32, both provided to be supported on the base 12. The base may also be designated by the reference numeral 120. The first bar 31 extends longitudinally from a first end 33 to a second end 34, and the second bar 32 extends longitudinally from a first end 35 to a second end 36. For example, the first ends 33, 35 and second ends 34, 36 of the bars are provided to be transversely opposite one another, respectively.

[0084] Each bar 31, 32 comprises one or more synthetic materials, such as plastic, rubber, or the like, for example.

[0085] Each of the bars is provided with at least one possibly through opening 47₁, 47₂, 47₃, 47₄, for example; possibly two through holes, each of which may be threaded to receive a screw 47 adapted to cooperate with a threaded opening 48₁, 48₂, 48₃, 48₄ of the base. Alternatively, a threaded insert can be provided in the base, but also a reverse embodiment, with an internal screw thread or a threaded insert in the front or rear adaptation structure, is within the scope of the invention.

[0086] Positioning studs 43, 44, for example beneath each bar 31, 32, can further cooperate with corresponding openings 45, 46 of the base. Each stud and the corresponding opening can have a circular cross section.

[0087] The two longitudinal bars 31, 32 described may not be connected to one another otherwise than by the connector rods or pins 26, 27. Variations are shown schematically in FIGS. 3C, 3D, in which the bars may then be connected to one another by a portion 305, 305' made of the same material as the bars, this portion extending either to a limited extent in relation to the length L_b of the bars 31, 32 (in the case of FIG. 3C), or over the entirety of this length (in the case of FIG. 3D). The bars and the portion can form a unitary, single-piece element.

[0088] FIGS. 3A, 3B also show a removable heel 140 comprising a first longitudinal bar 310 and a second longitudinal bar 320, connected by a bridge made in the form of a flat zone 315, for example, set back in relation to the outer surface of the heel, in order to cooperate with the single rail of a ski or of the retaining device, for example of the SNS® type. This assembly is adapted to take support on the outer base 12. The first bar 310 extends longitudinally from a first end 330 to a second end 340, and the second bar 320 extends longitudinally from a first end 350 to a second end 360. For example, the first ends 330, 350 and second ends 340, 360 of these bars are provided to be transversely opposite one another, respectively. A heel is shown here, in which the two longitudinal bars 310, 320 are connected along their entire length by a flat zone 315. However, this zone may be further reduced in relation to the length of the heel.

[0089] Each bar 310, 320 is comprised of one or more synthetic materials, such as plastic, rubber, or the like.

[0090] In general, the outer surface of these bars, adapted to come into contact with the apparatus or with means forming one or more contact interfaces, can be planar and homogeneous, or can comprise notches, such as illustrated in FIG. 5 or 7B, for example.

[0091] Structure is provided for positioning the heel fixedly, but removably, in relation to the base.

[0092] For example, as shown in FIG. 3A, each of the bars is provided with at least one possibly through opening 470₁, 470₂, 470₃, 470₄, for example two openings, each of which can be threaded to receive a screw 470 adapted to cooperate with a threaded opening 480₁, 480₂, 48₃, 480₄ of the base. Alternatively, a threaded insert can be provided in the base, but also a reverse embodiment, with an internal screw thread or a threaded insert in the front or rear adaptation structure.

[0093] Positioning studs 430, 440, for example one beneath each bar 31, 32, can further cooperate with corresponding openings 450, 460 of the base. Each stud and the corresponding opening can have a circular cross-section.

[0094] The example shown in FIGS. 3A and 3B comprises two connector rods or pins 26, 27 in the front portion of the adaptation structure. However, in this example, as in the other examples described below, a single connector rod or pin can also be provided.

[0095] Fastening structure of a different form can also be provided, which is not necessarily a pivot-type connection with the retaining device, but may be a non-rotatable mechanical connection.

[0096] In an alternative embodiment, shown in FIG. 4 (in which the removable elements are the same as those of FIGS. 3A and 3B), the openings of the base 12 can be doubled to make it possible to adapt the position of the heel and/or the front portion.

[0097] Thus, FIG. 4 shows additional openings 48'₁, 48'₂, 48'₃, 48'₄, each shown slightly behind one of the openings 48₁, 48₂, 48₃, 48₄. The same goes for the openings 45, 45', 46, 46' adapted to receive the studs 43, 44. The set of additional openings defines a second possible position of the screws and studs of the removable element 25, which can thus be moved forward or backward on the base, as appropriate. A number of positions greater than two, for example three, may be provided. A discrete longitudinal adjustment with two, three, or any number of longitudinal positions, may be carried out.

[0098] Similarly, FIG. 4 shows additional openings 480'₁, 480'₂, 480'₃, 480'₄, each shown slightly behind one of the openings 480₁, 480₂, 480₃, 480₄. The same goes for the openings 450, 450', 460, 460' adapted to receive the studs 430, 440. The set of additional openings thus defines a second possible position of the screws and the studs of the removable heel, which can thus also be moved forward or backward on the base, as appropriate. A number of positions greater than two, for example three, can be provided. A discrete longitudinal adjustment with two, three, or any number of longitudinal positions, may be carried out.

[0099] Another embodiment of the structure for fastening the removable portions is shown in FIG. 5. It is provided for a continuous adjustment, the displacement of the front and rear elements being longitudinal, which increases the possibilities of adjustment of the position of the front and rear elements. For example, at least two parallel rails 92, 94, 96, 97 are provided on the base to cooperate with the two slides of the front element 25, which may be formed beneath the first longitudinal bar 31 and the second longitudinal bar 32, on the side adapted to be turned towards the base.

[0100] In a plane perpendicular to the surface of the base, and perpendicular to the direction of elongation of the base, each rail has a substantially inverted “L” configuration, comprising a body perpendicular to the base, and a horizontal portion enabling the element 25 to slide on the rail, on one hand, and to retain the latter with respect to the base, on the other hand. In the illustrated embodiment, the horizontal bar of the inverted “L” is directed outward of the boot.

[0101] Each rail itself may be made of two portions 92, 94 and, for the second rail, 96, 97. These two portions are arranged longitudinally in the extension of one another, separated by a zone or surface 121, set back in relation to the outer surface of the rails turned toward the side opposite the upper. This zone or surface 121 can be merged with the outer surface 18 of the base (which has the advantage of a lesser effect on the flexibility of the base). One or more screw-threaded openings 109, 110 are provided in this zone or surface 121. Alternatively, a variation may be provided, in which the hole is a through opening, such as a slot. Each of the longitudinal bars 31, 32 is itself provided with an adjustment slot 107, 108, in which a screw 105 may be inserted to be screwed into one of the openings 109, 110. The slot extends longitudinally along the corresponding bar, in order to slide the assembly along the rails 92, 94, 96, 97 without, in a particular embodiment, completely loosening the corresponding screw.

[0102] The rails 92, 94, 96, 97 cooperate with slots 101, 102 formed in the longitudinal elements 31, 32. These slots open out on the ends or rear portions 34, 36, and possibly on the ends or front portions 33, 35 of the longitudinal elements 31, 32. To insert the element 25, the end of the slots, located on the rear end portions 34, 36 of the longitudinal elements 31, 32, is positioned, for example, so as to be opposite the front portion of the rail elements 92, 96, and the element 25 is pulled in a rearward direction of the boot.

[0103] The same applies to the heel 140, the base comprising at least two parallel rails 920, 940, 960, 970 provided to cooperate with two slides of the heel, each slide being formed, for example, beneath the first longitudinal bar 310, or beneath the second longitudinal bar 320, on the side adapted to be turned toward the base, and, in a particular embodiment, in the extension of the inner surface of the zone 315 for connecting the two bars.

[0104] Each rail may be made of two longitudinally elongated portion 920, 940 and, for the second rail, 960, 970; the two portions being separated by a zone or surface 122, set back in relation to the outer surface of the rails turned toward the side opposite the upper. This zone or surface 122, for example planar, can be merged with the outer surface 18 of the base. In this zone, for example planar, one or more screw-threaded openings 1090, 1100 are provided. Each of the longitudinal bars 310, 320 is itself provided with an adjustment slot 1070, 1080, in which a screw 1050 can be inserted in order to be screwed into one of the openings 1090, 1100. The slot extends longitudinally in order to slide the assembly along the rails 920, 970 without, in a particular embodiment, without completely loosening the corresponding screw.

[0105] The rails 920, 940, 960, 970 cooperate with the slots 1010, 1020, formed in the heel. These slots open out on the front portion, and possibly the rear portion of the heel. To insert the heel, the end of the slots, located on the front portion of the heel, is positioned, for example to be opposite the rear portion of the rail elements 940, 970, and the heel is pulled in the forward direction of the boot.

[0106] The movable elements, that is to say, the front and rear adaptation structures, are retained against the base, for example by screws or snap -fasteners.

[0107] In a particular embodiment, the surfaces in contact with one another, that is to say, the surface 18 and the surfaces of the longitudinal elements 31, 32 facing the base, further have coefficients of friction such that the retention of these two surfaces is reinforced by a friction effect with respect to one another during use. This effect can be achieved by the surface state of the two surfaces in contact with one another and/or by a particular particle size of the constituent material of these surfaces.

[0108] In a plane perpendicular to the direction of elongation of the base, each rail has a substantially inverted “L” configuration, as has been described above, and with the same advantages.

[0109] Another embodiment of the structure for fixing the removable portions is shown in FIG. 6, provided for adjustment in two dimensions in the plane of the base. Such an adjustment is carried out continuously, in a particular embodiment, but alternatively also depending upon a succession of discrete positions. The displacement of the front and rear elements then occurs along the longitudinal direction of the boot and/or along a direction perpendicular to this longitudinal direction, thereby increasing the possibilities of adjustment of the position of the front and rear elements. For example, two parallel slots 82, 87 are formed in the front portion of the base, along the longitudinal direction of the boot, and two parallel slots 820, 870 are formed in the rear portion of the base, also along the longitudinal direction of the boot. Slots 83, 88 (in the front portion 25) and 830, 880 (in the heel-forming portion 140), respectively, are provided in each of the two removable portions 25, 140, such slots being mutually parallel and perpendicular to the slots provided in the base. The removable elements are fixed against the base by screws, and/or expedients such as stop notches, or screw-nut type elements, or by any mechanism for locking the removable elements into a position selected by the user and for unlocking them to change this position or to remove the removable elements.

[0110] In the embodiments of FIGS. 5 and 6, one or more positional reference marks may be provided to enable a user to laterally and/or transversely identify a specific setting, for example a suitable setting for a given type of boot. Thus, a lateral adjustment scale RE is shown in FIG. 5, provided in or on the surface 18, parallel to the direction of insertion of the longitudinal bars. A transverse adjustment scale Et is shown in FIG. 6, provided in or on the surface 18, perpendicular to the direction of insertion of the longitudinal bars. One or more positional reference marks may be present to locate the position of the front portion of the adaptation element (as shown in FIGS. 5 and 6) and/or the rear portion of the adaptation element.

[0111] The various exemplary embodiments given described above with reference to FIGS. 3A-6 are intended for use with a particular type of ski, from the SNS® family, with a single-piece rail 7 (or guiding rib).

[0112] To enable the same boot to be used with the other family, the previously described elements 25, 140 are replaced with corresponding elements, adapted to the other family.

[0113] Indeed, a removable heel and a removable fastening element can also be structured to cooperate with the two ribs of a retaining device from the NNN® type. These two ribs

form longitudinal guiding elements, at least in the portion with which the heel comes into contact.

[0114] A heel **140** of this type is shown in FIG. 7A. It comprises a first longitudinal bar **310**, a second longitudinal bar **320**, and a third longitudinal bar **333**, arranged between the first longitudinal bar and the second longitudinal bar, and separated therefrom, by a first longitudinal groove **131** and a second longitudinal groove **132**, respectively. These grooves are provided to cooperate with the rails of a retaining device from the NNN® family.

[0115] Structures are provided for positioning the heel fixedly, but removably, in relation to the base. They may be of the same type as that described above with reference to FIG. 3A, in which one or more possibly through holes **470₁**, **470₂**, **470₃**, **470₄**, possibly threaded, made, for example, in the longitudinal bars **310** and **320**. Possibly, positioning studs **430**, **440** can further cooperate with corresponding openings **450**, **460** of the base, as has been described above. Here again, each stud and the corresponding opening may have a circular cross section. Alternatively, the structure for positioning the heel fixedly but removably in relation to the base can be of the same type as that described above with reference to one of FIGS. 4, 5, and 6.

[0116] The corresponding front portion **25** is shown in FIG. 7B. A single connector rod or pin **26** is positioned in the front position. The front portion comprises a first longitudinal bar **31**, a second longitudinal bar **32**, and a third longitudinal bar **37** arranged between the first longitudinal bar and the second longitudinal bar, and separated therefrom by a first longitudinal groove **31'** and a second longitudinal groove **32'**, respectively. These grooves are provided to cooperate with the rails of a retaining device from the NNN® type. Structures are provided for positioning the front portion fixedly but removably in relation to the base. They may be of the same type as that described above with reference to FIG. 3A, or one of FIGS. 4, 5, and 6.

[0117] Each of FIGS. 8A and 8B shows a rear view of the boot, on which the removable heel **140** is mounted. Clearly shown is the structural difference that enables each of these heels to be adapted to a particular type of ski. FIGS. 8C and 8D are front views which correspond to FIGS. 8A and 8B, respectively, showing the elements already described above.

[0118] Elements of the type shown and described above with reference to FIGS. 7A-7B, adapted to the NNN® family, can be adapted to the various binding structures that have been described above with reference to FIGS. 3A-6, thereby possibly providing them with discrete (FIG. 4) or continuous (FIGS. 5 and 6) adjustability.

[0119] The above embodiments are provided for direct attachment to the base.

[0120] According to another embodiment, a base **200** receives a liner and/or an upper and/or structural elements of a boot upper, as shown in FIG. 9. The reference numeral **210** designates a collar provided with a strap **211** for retaining the boot. This strap can be opened or closed using means such as hook and loop surfaces, for example. On the side of the heel, the base **200** is provided with two substantially vertical walls **201** (lateral wall) and **203** (medial wall), which make it possible to retain the rear portion of the upper and, more particularly, to block possible twisting of the foot. These two vertical walls may be separate or, conversely, extended at the rear by a portion (rear bridge) which joins the rear portions of the walls **201**, **203** of the boot toward the rear, substantially following the shape of the rear portion of the upper. The walls

201, **203**, may extend, along the longitudinal direction of the foot, over a length *L* which can reach, for example, 70% or 75% of the length of the boot (from the rear end of the boot) or of the total length of the base **200**, which substantially corresponds to the position of the metatarsals. When the boot or the liner is inserted into this base, two openings **202**, **204** make it possible to insert fasteners such as rivets or screws, which cooperate with corresponding openings of the boot and corresponding openings of the collar **210** to retain the assembly or to help to retain the assembly. A strap **211'** for retaining the upper on the base may also be present in the front portion of the base; this strap can be opened or closed using means such as hook and loop surfaces, for example. The upper can also be retained in, or on, the base by glue, screws, or rivets.

[0121] The front and rear removable portions, described above, can then be fixed to the outer surface of the base **200**, with means identical or similar to those mentioned above, in particular screws, and possibly positioning studs. The blade is itself provided with corresponding openings, some of which may be threaded for cooperation with the corresponding screws.

[0122] FIGS. 10A-10B show the various structures for retaining the elements **25**, **140**, described above, but in relation to a base **200** of which the lower or outer surface **18** facing the apparatus or the ground becomes the base **12** described above (the latter thus forming the main portion of the base). More detailed explanations have already been given above with reference to FIGS. 4-6. Here again, elements **25**, **140** provided for the NNN® family or for the SNS® family, or for any other family or device for retention to the apparatus, can be provided.

[0123] In an alternative embodiment, the base does not include walls **201**, **203**, or a stiffener, and therefore forms a surface substantially planar or extending in two dimensions in the manner of a flexion blade, and adapted to be fixed, also removably, against a liner and/or an upper and/or structural elements of an upper. This base or flexion blade then substantially has the form shown in FIGS. 3A-6, replacing the material of the base described above in these drawing figures with the material of the flexion blade. The front and rear portions of the adaptation structure, described above with reference to these FIGS. 3A-6, are then adapted to be fixed against this blade.

[0124] Two removable portions forming two separate elements have been described above.

[0125] In an alternative embodiment, however, a single element can be made, adapted to be applied against the base or the flexion blade; such an element is shown in FIGS. 11A and 11B. These figures show that the structures for retaining the two portions **25**, **140** in relation to the base **12**, or the base **200**, are the same as those described above with reference to FIG. 3A. The two portions **25**, **140** are connected to one another by a base or flexion blade **120**, which has flexibility to accompany the movement of the user. This assembly is compatible with a mode of binding to one position on the base, as in FIG. 3A, or to two or more discrete positions, as in FIG. 4. A method of binding with continuous positional adjustment, although not shown, can also be provided. The base is made, for example, of a metallic and/or composite and/or plastic material and/or a material comprising plant fibers.

[0126] As shown in FIG. 12, an assembly can also be made, comprising two elements **25**, **140** of the type shown in FIG. 5,

also connected by a base **120**, the assembly being capable of being used in cooperation with a base of the type shown in FIG. 5.

[0127] Similarly, the two portions **140**, **25** of FIG. 6 can be connected by a base in order to form a unitary, single-piece element.

[0128] In the various alternative embodiment which have just been described, the connecting element **120** has a forward extension, which is limited in order not to impede the connector rods or pins **26**, **27** adapted to cooperate with the retaining device **3** (see FIG. 1).

[0129] Each of these different single-piece alternatives can be fixed to a base **12**, as described above.

[0130] The base of FIG. 9, like the base **12**, has a certain longitudinal flexibility along a transverse axis of the boot. It can be flexed to accompany movements of the foot. However, it may be necessary to adapt this flexibility. This can be done by replacing the first base with a second base with a different flexibility (more rigid or more flexible than the first). However, a base with adaptable/adjustable flexibility can also be provided.

[0131] To this end, the invention provides reinforcement structure such as inserts in the form of rods, for example, which can be inserted into openings extending longitudinally or angularly offset with respect to the longitudinal direction, in the base, as shown in FIG. 13A, which shows a base **200**, and openings **219**, **221** enabling reinforcements **222**, **223** to slide in the zones provided in the base itself to cooperate with these reinforcements. These zones are in the extension of the openings **219**, **221**. In one variation; such openings can be provided on the rear surface. The longitudinal openings can be oriented along a longitudinal direction L_0 of the base, or can form, with this direction, an angle γ whose value ranges between 0° and 40° . In another variation, an opening **224**, on the front or rear surface, makes it possible to receive a reinforcing element **225** having, in this case, the form of a rectangular plate, as shown in FIG. 13B. The plate, which may have any shape, may also be arranged either above or below the base **200**. In another variation, a reinforcing member may be a plate or a blade **227**, possibly perforated, as shown in FIG. 13C, and adapted to be pressed against the upper or lower surface of the base, such as in the zone on which the front portion (as in FIG. 13C) or the rear portion of the adaptation structure is to be fixed, or between these two zones, as designated by the reference numeral **227'** in FIG. 13C. This reinforcing structure can be adapted to such a blade, whether the latter is provided in combination with removable elements **25**, **140**, as described above, or with any other means for connection to the ski.

[0132] The connecting structure connecting the fastening element **25** to the base **12**, and the removable heel, both enable adaptation of the boot to any type of ski.

[0133] In all of the embodiments that have been described, the front and rear elements to be fixed to the outer surface of the base are compatible with the NNN® family or the SNS® family.

[0134] However, the invention also relates to other retaining devices or other types of equipment.

[0135] For example, there can be n parallel ribs ($n > 2$), instead of the two ribs of the device with which the elements of FIGS. 7A and 7B cooperate.

[0136] By way of another example, as shown in FIG. 15A, the front interface zone of the retaining device may be provided with one or more transverse ribs **70**, **71**, oriented per-

pendicular to the direction of extension of a ski, i.e., transverse to the longitudinal axis. Possibly, the position of these transverse ribs is adjustable along the direction of extension of the ski. One or more other transverse ribs **72**, **73** may be provided in the rear interface zone. They form guiding structure. In this case, each of the front and rear portions of the adaptation structure of the boot has a shape enabling it to cooperate with all these types of front or rear ribs, and all types of retaining devices (having a wire, two wires, or another type), respectively. Examples of adaptation structure are shown in FIG. 15B, which shows that each of them comprises, in its lower portion adapted to be in contact with the retaining device, one or more recesses **70'**, **71'**, **72'**, **73'** whose shape corresponds to the front or rear ribs, and which make it possible to at least partially receive the front or rear ribs.

[0137] Another example is illustrated in FIG. 16A, in which the front interface zone of the retaining device is provided with one or more studs **74**, **75**, oriented perpendicular to the surface of a ski. Here again, the position of these studs can possibly be adjustable along the direction of extension of the ski and/or along a direction perpendicular thereto. One or more studs **76**, **77** may be in the rear interface zone of the ski, adapted to receive the heel of the boot or of the base. They form longitudinal guide structure. The stud(s) has/have a substantially cylindrical or frusto-conical shape, for example, but other geometric shapes are possible. Each of the front or rear portions of the adaptation structure has a shape enabling it to cooperate with the front or rear stud(s), respectively. Examples of this adaptation structure is shown in FIGS. 16B and 16C, which show that each of them comprises, in its lower portion adapted to be in contact with the retaining device, one or more openings **74'**, **75'**, **76'**, **77'** whose shape corresponds to the front and rear studs, and which make it possible to at least partially receive these front or rear studs.

[0138] The embodiments described above can be combined. For example, the ski may comprise:

[0139] at least one transverse rib **70**, **71**, oriented perpendicular to the direction of extension of the ski, in the front interface zone adapted to receive the front portion of the boot; and

[0140] one or more studs **76**, **77**, oriented substantially perpendicularly to the surface of the ski, in the rear interface zone adapted to receive the rear portion of the boot.

[0141] Or the ski may comprise:

[0142] one or more longitudinal ribs, as shown in FIG. 1, in the front interface zone adapted to receive the front portion of the boot; and

[0143] at least one transverse rib, oriented perpendicular to the direction of extension of the ski, in the rear interface zone adapted to receive the rear portion of the boot.

[0144] In other words, the ski comprises:

[0145] a front interface zone adapted to receive the front portion of the boot, this front interface zone being of a first type, comprising one or more elements in elevation in relation to the planar surface of the ski, having one or more first geometric shapes; and

[0146] a rear interface zone adapted to receive the rear portion of the boot, this rear interface zone being of a second type, comprising one or more elements in elevation in relation to the planar surface of the ski, having one or more second geometric shapes, at least one of which is different from the one or more first geometric shapes.

[0147] Another embodiment is illustrated in FIG. 17A, in which the ski does not have any rib or stud in the zone adapted to receive a boot or a base. In this case, however, the boot is wide enough to comprise adaptation structure, in the form of a slot or groove 79, 79' extending along the direction of extension of the boot, i.e., the longitudinal direction of the boot, as illustrated in FIGS. 17B to 17D. The groove 79, 79' has a width and/or a transverse profile at least equal to the width of the ski.

[0148] When the boot is positioned on the ski, it extends beyond each side thereof. Alternatively, front 25 and rear 140 adaptation structure comprises, in the lower portion adapted to be in contact with the ski, an opening or groove 79, 79' that can at least partially receive the corresponding portion of the ski. Each groove 79, 79' has a width and/or a transverse profile at least equal to the width of the apparatus. Attachment structure makes it possible to retain the adaptation structures of FIGS. 17B-17D against the base. Thus, the openings 47₁-47₄ and 470₁-470₄ make it possible to insert screws, for example, for retention against the base.

[0149] In all of the cases described above, the front and rear elements to be fixed to the outer surface of the base have substantially identical heights.

[0150] However, as shown in FIGS. 18A and 18B, different heights can also be provided for these elements:

[0151] the front element having a first height h1 measured between the two main surfaces of this element (the surface facing the base and that facing the ski or the snowshoe);

[0152] the rear element having a second height h2, measured in the same manner.

[0153] In most of the cases described above, the front and rear elements to be fixed on the outer surface of the base are planar surfaces, substantially parallel to one another. However, non-parallel surfaces can be provided, along at least one direction, in order to adapt the positioning on a device, such as a ski or snowshoe, to a particular morphology of a user (e.g., to compensate for orientations of the knee) and/or to enable amplified or increased acceleration effects.

[0154] Thus, FIG. 19A shows an example of a front element whose outer surface is inclined by an angle value $\alpha 1$, in relation to the inner surface (adapted to come into contact with the base), from the lateral side (facing outward of the user during use) to the medial side (facing inward of the legs of the user during use).

[0155] FIG. 19B shows a rear element also having such a lateral inclination $\alpha 1$.

[0156] FIG. 19C shows an example of a front element, the outer surface of which is inclined in relation to the inner surface (adapted to come into contact with the base), from the rear to the front. Such element enables a forward inclination of the user. However a reverse arrangement can be provided, with an element that enables a rearward inclination of the user.

[0157] A front or rear element may have an outer surface combining the two types of inclinations described above, and is inclined:

[0158] in relation to the inner surface (adapted to come into contact with the base), from the lateral side (facing outward of the user during use) to the medial side (facing inside of the legs of the user during use); and

[0159] in relation to the inner surface (adapted to come into contact with the base), from the rear to the front or vice versa. Such an element enables forward or rearward inclination of the user.

[0160] It is to be understood that a user can choose the type of inclination most suitable for him/her, for physiological reasons and/or performance, and can adjust the element to the base in the manner explained above.

[0161] In all of the cases described above, the adaptation structures comprise a front element and a rear element to be fixed to the outer surface of the base.

[0162] In certain cases, the adaptation structure may comprise a portion to be fixed to the front of the base (reference will then once again be made to a "front" portion), but it is not necessary to fix a rear portion, or heel, to the rear of the base; this is the case in which the fastening element of the front portion is sufficiently rigid to enable to latter to carry out, by itself, a function of guiding the apparatus.

[0163] This embodiment is shown in FIGS. 20A-20B. In these drawing figures the reference numerals designate elements that are identical or similar to those described above with reference to FIGS. 3A-3B. No elements are fixed to the rear portion of the base. The assembly cooperates, for example, with a ski illustrated in FIG. 20C, comprising a retaining device 3 and a support surface 700 for the rear portion of the base, or the heel.

[0164] In all of the cases described above, the fastening means comprise one or two wires. However, as has been shown, other types of fastening means may be implemented, for example those of FIGS. 21A and 21B. In these drawing figures, a fastening device 60 comprises a fastening element 61 affixed by any means, for example to the boot, as well as a locking mechanism 62 also affixed by any means, for example to the apparatus. The fastening element 61 comprises a first finger 63 adapted to fit into a notch 64 of the mechanism 62. The fastening element 61 also comprises a second finger 65 provided to cooperate with a hook 66 of the mechanism 62, the hook being movable against the action of an elastic means, not shown. Pressing with the boot on the ski causes the locking, whereas actuation of a release button 67, against the action of elastic means, releases the boot.

[0165] In any event, the positioning of the front portion or rear portion, respectively, of the adaptation means has a longitudinal extension that can go up to 30%, 35%, or 40% of the length of the base, measured from the rear or front end of the base, respectively.

[0166] The teaching described above in connection with a ski can be transposed to snowshoes.

[0167] In any case, the invention is made from materials and according to technical implementation techniques known to one with ordinary skill in the art. The front and rear portions of the adaptation means are made with a reduced number (2-4) of molds, compared to the number (8-15) of molds used to produce all the sizes of the currently known boot soles. From an economic point of view, the advantage is considerable because an investment ranging between about 10 and 40 K€ is required to make each mold.

[0168] Naturally, the invention is not limited to the embodiments described above, and includes all technical equivalents that fall within the scope of the claims that follow.

[0169] In particular, in certain cases, the first portion 25, or fastening element, to be fixed in a front zone of the base of the boot and the second portion 140, or fastening element, are

provided not to be affixed to one another, or dissociated from one another, when neither one is fixed to the base of the boot.

[0170] Alternatively, in other cases, the first portion 25 to be fixed in a front zone of the base of the boot and the second rear portion 140 are provided to be affixed to one another, when neither one is fixed to the boot.

[0171] According to these alternatives, the first portion 25 and second portion 140 are connected by a flexible blade.

[0172] At least because the invention is disclosed herein in a manner that enables one to make and use it, by virtue of the disclosure of particular exemplary embodiments of the invention, the invention can be practiced in the absence of any additional element or additional structure that is not specifically disclosed herein.

1. A boot structured and arranged for the practice of a sporting activity using a gliding or rolling apparatus and a binding device for fastening a front end of the boot to the apparatus while the heel of the boot is free during movement of the boot, the boot comprising:

a base having a front zone and a rear zone;

adaptation structure comprising a first portion to be fixed in relation to the front zone of the base of the boot, and a second portion to be fixed in a rear zone of the base of the boot;

each of the first and second portions of the adaptation structures being structured and arranged to be removably fixed in relation to the base.

2. A boot according to claim 1, wherein:

the first portion and the second portion of the adaptation structure is not affixed to or dissociated from one another when neither of the first and second portions is fixed to the base of the boot.

3. A boot according to claim 1, wherein:

the first portion and the second portion of the adaptation structure is affixed to one another when neither one is fixed to the base of the boot.

4. A boot according to claim 3, wherein:

the first portion and the second portion are connected by a flexible blade.

5. A boot according to claim 1, wherein:

a first type of contact interface has only a single longitudinal rib, each of the first and second portions of the adaptation structure comprising a longitudinal groove structured and arranged to receive at least a portion of the single longitudinal rib.

6. A boot according to claim 1, wherein:

a second type of contact interface has at least two longitudinal ribs, each of the first and second portions of the adaptation structure comprising at least two longitudinal grooves;

each of the grooves is structured and arranged to receive at least a portion of one of the longitudinal ribs.

7. A boot according to claim 1, wherein:

at least one contact interface comprises at least one transverse rib and/or at least one stud, the first portion or the second portion of the adaptation structure comprising at least one transverse groove, or at least one opening;

each said groove or each said opening is structured and arranged to receive one of the at least one transverse rib or one of the at least one stud.

8. A boot according to claim 1, wherein:

at least one contact interface comprises a surface of the gliding or rolling apparatus, the first portion or the sec-

ond portion of the adaptation structure comprising at least one longitudinal groove.

9. A boot according to claim 8, wherein:

each of the at least one longitudinal groove has a width at least equal to a width of the gliding or rolling apparatus.

10. A boot according to claim 1, wherein:

the front portion and rear portion of the adaptation structure having different heights.

11. A boot structured and arranged for the practice of a sporting activity using a gliding or rolling apparatus and a binding device for fastening a front end of the boot to the apparatus while the heel of the boot is free during movement of the boot, the boot comprising:

a base having a front zone and a rear zone;

adaptation structure structured and arranged to be removably fixed in relation to the front zone of the base of the boot;

the rear portion of the base being structured and arranged to rest on a surface of a contact interface of the gliding or rolling apparatus.

12. A boot according to claim 1, wherein:

the base is structured and arranged to have flexibility along a longitudinal extent of the boot.

13. A boot according to claim 1, wherein:

the base comprises a flexion blade, the flexion blade having flexibility along a longitudinal extent of the boot; the boot further comprises structure for fixing, against the blade, the adaptation structure.

14. A boot according to claim 13, wherein:

the flexion blade includes a substantially flat extent extending from a front end to a rear end of the base and medial and lateral upstanding walls, or the flexion blade includes a substantially planar extent without medial and lateral upstanding walls.

15. A boot according to claim 13, wherein:

the flexion blade includes (1) a substantially flat extent extending from a front end to a rear end of the base and medial and lateral upstanding walls, as well as an stiffener portion for supporting a rear of an upper of the boot, or (2) the flexion blade includes a substantially planar extent without medial and lateral upstanding walls;

16. A boot according to claim 13, further comprising:

removable flexibility-varying structure structured and arranged to vary flexibility of the base or flexion blade.

17. A boot according to claim 16, wherein:

the flexibility-varying structure comprises one or more inserts and/or one or more rods and/or one or more plates or blades to be inserted into, or against, the base.

18. A boot according to claim 1, further comprising:

structure for fixing, using screws, slides, or snap-fasteners, the adaptation structure in relation to the base, in one position, or in a plurality of discrete or continuous positions.

19. A boot according to claim 1, wherein:

the front portion and/or the rear portion of the adaptation structure includes a surface structured and arranged to come into contact with the base, forming a non-zero angle with an opposite surface structured and arranged to come into contact with, or to be turned toward, the gliding or rolling apparatus.

20. A boot according to claim 1, wherein:

the adaptation structure comprises first removable structure to adapt the boot to a first type of contact interface of

an apparatus, and second removable structure to adapt the boot to a second type of contact interface of an apparatus.

21. A boot according to claim 1, wherein:

the boot is a shell-type of boot made of one, two, or three portions;

22. A boot according to claim 1, wherein:

the boot is a shell-type of boot made of one, two, or three portions;

the boot further comprises a front and/or rear end-piece removable in relation to the base.

23. A boot according to claim 22, wherein:

the positions of the respective portions are adjustable in relation to each other.

24. A boot according to claim 1, wherein:

a contact interface of the gliding or rolling apparatus comprises (1) the binding device for fastening a front end of the boot, structured and arranged to cooperate with the front end of the boot, or (2) a surface of the gliding or rolling apparatus.

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