

(19)



(11)

EP 3 834 644 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:

16.06.2021 Bulletin 2021/24

(51) Int Cl.:

A41D 13/015 (2006.01) **A41D 13/05** (2006.01)
A63B 71/12 (2006.01)

(21) Application number: **20209919.8**

(22) Date of filing: **25.11.2020**

(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 MK MT NL NO
PL PT RO RS SE SI SK SM TR**

Designated Extension States:

BA ME

KH MA MD TN

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(30) Priority: **13.12.2019 IT 201900023970**

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(54) **IMPROVED SHIN GUARD AND RELATED MANUFACTURING PROCESS**

(57) The present invention relates to a shin guard (1) of the modular type comprising at least a first shin guard module (2) and a second shin guard module (3) movable to each other. Each shin guard module (2, 3) is configured to protect, under normal-use condition of the shin guard (1), a portion of a shin of a user. The shin guard (1) further

comprises a swivelled articulation skeleton (11) engaged to the first shin guard module (2) and to the second shin guard module (3) at respective surfaces and configured to allow a relative movement between first shin guard module (2) and second shin guard module (3).

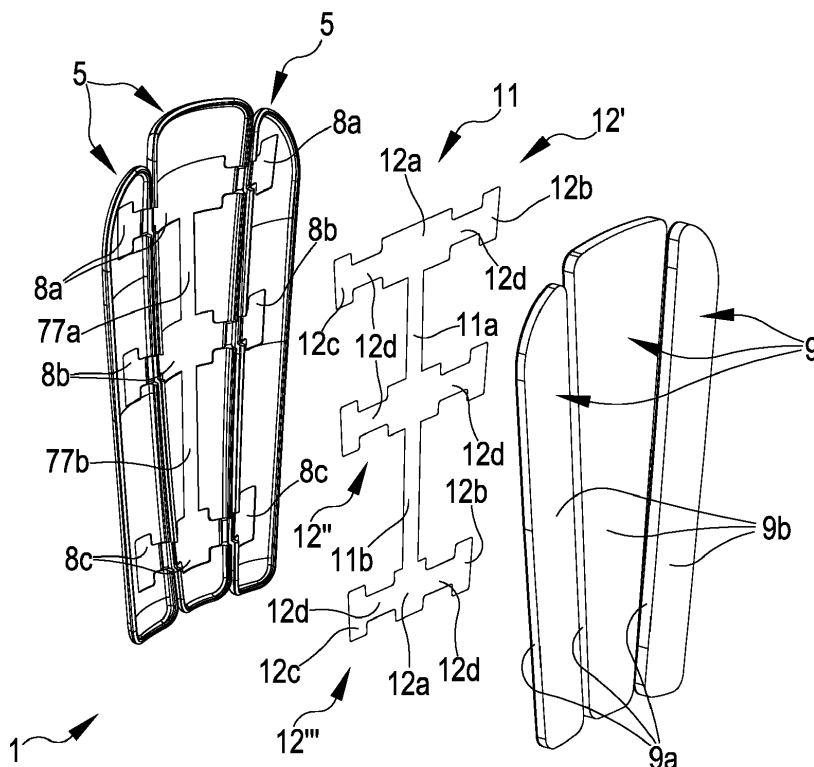


FIG.4

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Description

FIELD OF THE INVENTION

[0001] The present invention relates to a shin guard.

[0002] The invention also relates to a process for making a shin guard.

[0003] The invention can find advantageous application in the sports sector and in particular in sports where shin guards are usually employed. Examples of such sports are football, five-a-side football, hockey, baseball, cricket, American football and the like.

PRIOR ART

[0004] It is known that shin guards are generally used to protect the shins of users (athletes or not) during the practice of sports where an impact could cause trauma or even serious consequences on the lower limbs of users. Examples of such shin guards can be found in documents of known art US4627108, US5732411 and US5829055.

[0005] Known types of shin guards comprise a one-piece protective shield; such shin guards can be inserted in special socks in correspondence with a suited pocket. Basically, in order to use these shin guards, the user must wear special socks too; this can be uncomfortable in certain sports. Moreover, if these socks are not available, these shin guards become substantially unusable.

[0006] Known types of shin guards also comprise an external one-piece protective shield and an internal rubber lining apt to come into contact, when the shin guards are in use, with the shins of the user. Such shin guards can be secured to the lower limbs by means of proper strap bands, which are usually mutually fastened to the height of the calf of the user.

[0007] Some shin guards also have an anklet that can be worn by the user and that ensures a more stable positioning of the shin guard on the lower limb of the user, preventing annoying upward and downward movements of the shin guard when it is in use.

[0008] The known types of shin guards turn out to be awkward to wear and do not guarantee the necessary comfort to users. In particular, the known types of shin guards do not fit optimally, so that, not adhering perfectly to the shin of the user, they rub on the skin of the user, thus causing annoying irritations and even injuries.

AIMS OF THE INVENTION

[0009] The object of the present invention is therefore to solve at least one of the drawbacks and/or limitations of the previous solutions.

[0010] A first object of the present invention is to provide a shin guard that can be worn comfortably by a user and at the same time provide excellent protection to a shin of a user.

[0011] In particular, the present invention aims to pro-

vide a shin guard that, by ensuring optimal fit at all times, can prevent the onset of irritation and even injury to the user.

[0012] It is also an object of the present invention to provide a shin guard that can be used by a plurality of users.

[0013] It is an additional object of the present invention to provide a shin guard that is both light and strong, so that it can be worn by a user with a high comfort and may ensure at the same time an effective protection from impacts.

[0014] It is also an object of the present invention to provide a simple and efficient process of making a shin guard.

[0015] Furthermore, it is an object of the invention to provide a shin guard which can guarantee adequate performance even at low or high temperatures, maintaining in particular its breathability and its impact resistance.

[0016] Furthermore, the present invention is functional to allow customization also in the aesthetic rendering of the shin guard.

[0017] The objects described above with reference to a shin guard and the process of making a shin guard are shared by a use of a shin guard and a kit.

[0018] These and other objects, which will become clearer from the following description, are substantially achieved by a shin guard, by a process of making a shin guard, by a use of a shin guard and by a kit in accordance with one or more of the attached claims and/or with one or more of the following aspects.

SUMMARY

[0019] Aspects of the invention are described below.

[0020] In a 1st aspect, a shin guard of the modular type is provided, comprising:

- at least a first shin guard module and a second shin guard module relatively movable,
- a swivelled articulation skeleton engaged to the first shin guard module and to the second shin guard module and configured to allow the relative movement between first shin guard module and second shin guard module.

[0021] In a 2nd aspect according to the 1st aspect, each shin guard module is configured to protect, when the shin guard is in use, a portion of a shin of a user.

[0022] In a 3rd aspect according to the 1st or 2nd aspect, the articulation skeleton is engaged to the first shin guard module and to the second shin guard module in correspondence of respective surfaces.

[0023] In a 4th aspect according to the 1st or 2nd or 3rd aspect, the articulation skeleton is made of elastic material.

[0024] In a 5th aspect according to any of the previous aspects, the articulation skeleton is made of elastically deformable material.

[0025] In a 6th aspect according to any of the previous aspects, the articulation skeleton is made of, at least partially or predominantly, rubbery material.

[0026] In a 7th aspect according to any of the previous aspects, each shin guard module comprises:

- a protective element having an elongated conformation and, optionally, an at least partially concave profile,
- a padding element engaged to the protective element and intended to be interposed, when the shin guard is in use, between the protective element and the shin of the user.

[0027] In an 8th aspect according to any of the previous aspects, the first shin guard module and the second shin guard module are configured to be angularly offset from each other by means of the swivelled articulation skeleton.

[0028] In a 9th aspect according to any of the previous aspects, the first shin guard module and the second shin guard module are configured to be reversibly angularly offset from each other by means of the swivelled articulation skeleton.

[0029] In a 10th aspect according to any of the previous aspects, the articulation skeleton is configured to allow relative movement between the first shin guard module and the second shin guard module both when moving closer to each other and when moving away from each other.

[0030] In an 11th aspect according to any of the previous aspects, each shin guard module further comprises a shell which is joined or can be joined to the protective element, the shell being configured to stiffen the respective shin guard module, the protective element being interposed between the shell and the padding element in case the shell is joined.

[0031] In a 12th aspect according to the 11th aspect, each shell is monolithic.

[0032] In a 13th aspect according to any of the previous aspects:

- the articulation skeleton comprises a first coupling element and a second coupling element configured to engage respectively to the first shin guard module and to the second shin guard module,
- each protective element includes at least one seat which is configured to house or which houses a respective coupling element of the articulation skeleton.

[0033] In a 14th aspect according to the 13th aspect, said at least one seat of the protective element of the first shin guard module houses the first coupling element and said at least one seat of the protective element of the second shin guard module houses the second coupling element.

[0034] In a 15th aspect according to the 13th or 14th

aspect, each seat is at least partially counter-shaped to the respective coupling portion.

[0035] In a 16th aspect according to the 13th or 14th or 15th aspect, each seat comprises a surface in correspondence of which the articulation skeleton is engaged to the protective element in correspondence of which said seat is defined.

[0036] In a 17th aspect according to any of the aspects from the 13th to 16th, the articulation skeleton comprises at least one coupling band developing transversely with respect to each protective element, the first coupling element being defined by a first coupling portion of said at least one coupling band and the second coupling element being defined by a second coupling portion of said at least one coupling band.

[0037] In an 18th aspect according to any of the previous aspects, the articulation skeleton comprises at least a first coupling band and a second coupling band spaced apart, each coupling band being joined to each protective element of said shin guard modules, for example by means of respective coupling portions, in correspondence of respective portions of the same protective element longitudinally spaced apart.

[0038] In a 19th aspect according to the 18th aspect, the articulation skeleton also comprises a body extending substantially parallel to at least one protective element along a longitudinal direction of development and connecting the first coupling band and the second coupling band, the body being transversal to the first coupling band and the second coupling band.

[0039] In a 20th aspect according to the 19th aspect, the body is attached to the protective element of the first shin guard module.

[0040] In a 21st aspect according to the 18th or 19th or 20th aspect, the first coupling band and the second coupling band are distinct and separated from each other.

[0041] In a 22nd aspect according to any of the 18th to 21st aspects, the first coupling band and the second coupling band are spaced apart by a portion of said body.

[0042] In a 23rd aspect according to any of the 18th to 22nd aspects, the shin guard further comprises a third coupling band, the second coupling band being interposed between the first coupling band and the third coupling band.

[0043] In a 24th aspect according to any of the 18th to 23rd aspects, the protective element extends longitudinally between a first end portion and a second end portion and further comprises a central portion interposed between the first end portion and the second end portion, the first coupling band being attached to each protective element in correspondence of the respective first end portion, the second coupling band being attached to each protective element in correspondence of the respective central portion and the third coupling band being attached to each protective element in correspondence of the respective second end portion.

[0044] In a 25th aspect according to any of the 18th to

24th aspects, the first shin guard module and the second shin guard module are complementary to each other in shape.

[0045] In a 26th aspect according to any of the previous aspects, the shin guard also includes a third shin guard module, the first shin guard module being interposed between the second shin guard module and the third shin guard module, the articulation skeleton being engaged also to the third shin guard module and being also configured to allow relative movement between the third shin guard module and the first shin guard module and/or between the third shin guard module and the second shin guard module.

[0046] In a 27th aspect according to the 26th aspect, the first shin guard module and the third shin guard module are complementary to each other in shape.

[0047] In a 28th aspect according to any of the previous aspects, the shin guard develops between a first end and a second end reciprocally opposite to each other, the first end defining, in at least one operating condition of the shin guard, an arched edge, the arched edge including edge portions defined by the first shin guard module, the second shin guard module and, optionally, the third shin guard module.

[0048] In a 29th aspect according to the 28th aspect, said edge portions are discontinuous from one another, each edge portion being spaced with respect to at least one adjacent edge portion by an opening defined between adjacent shin guard modules.

[0049] In a 30th aspect according to the 28th or 29th aspect, the arched edge is substantially shaped like an arc of a circle.

[0050] In a 31st aspect according to any one of the 17th to 30th aspects, each coupling band further comprises a third coupling element configured to engage with the third shin guard module.

[0051] In a 32nd aspect according to the 31st aspect, the third coupling element is defined by a third coupling portion of the coupling band, the first coupling portion being interposed between the second coupling portion and the third coupling portion, said at least one seat of the protective element of the third shin guard module housing the third coupling portion.

[0052] In a 33rd aspect according to any one of the 17th to 32nd aspects, each coupling band extends transversely with respect to said protective elements.

[0053] In a 34th aspect according to any one of the 17th to 33rd aspects, each coupling band includes at least one connector configured for connecting adjacent coupling portions.

[0054] In a 35th aspect according to the 34th aspect, the connector is configured to act functionally as a hinge and allows relative angular movement between shin guard modules.

[0055] In a 36th aspect according to the 34th or 35th aspect, each connector comprises a portion of the coupling band comprised between adjacent coupling portions.

[0056] In a 37th aspect according to the 34th or 35th or 37th aspect, each connector develops over an opening defined between adjacent shin guard modules.

[0057] In a 38th aspect according to any one of the 17th to 37th aspects, each coupling band is monolithic.

[0058] In a 39th aspect according to any of the previous aspects, the first shin guard module and the second shin guard module are spaced apart by an opening between the first shin guard module and the second shin guard module.

[0059] In a 40th aspect according to any one of the 26th to 39th aspects, the first shin guard module and the third shin guard module are spaced apart by an opening between the first shin guard module and the third shin guard module.

[0060] In a 41st aspect according to the 39th or 40th aspect, each shin guard module comprises respective sides, said opening being defined between facing sides of said shin guard modules and developing longitudinally and parallel to said sides.

[0061] In a 42nd aspect according to the 39th or 40th or 41st aspect, each protective element comprises longitudinal edges, said opening being defined between mutually facing longitudinal edges of adjacent shin guard modules.

[0062] In a 43rd aspect according to any one of the 34th to 42nd aspects, said at least one connector extends over said opening.

[0063] In a 44th aspect according to any of the previous aspects, the articulation skeleton is monolithic.

[0064] In a 45th aspect according to any of the previous aspects, the articulation skeleton is made of flexible material, such as polymeric and/or rubbery material.

[0065] In a 46th aspect according to any of the previous aspects, the articulation skeleton is made of polyurethane.

[0066] In a 47th aspect according to any of the previous aspects, the padding element includes a padding cushion and a coating joined to the padding cushion, the padding cushion being interposed between the coating and the protective element, the coating being intended to be facing and/or to come into contact with the shin of the user when the shin guard is in use.

[0067] In a 48th aspect according to any of the previous aspects, each protective element is monolithic.

[0068] In a 49th aspect according to any of the previous aspects, the protective elements constitute a protective shield of the shin guard configured for protecting, when the shin guard is in use, a shin of a user, said protective shield being adaptable to a conformation of the shin of a user by the relative movement of said protective modules.

[0069] In a 50th aspect, a process is provided for making a shin guard of the modular type according to any of the previous aspects and/or the annexed claims, comprising the steps of:

- arranging at least a first shin guard module and a

second shin guard module,

- arranging a swivelled articulation skeleton,
- engaging the articulation skeleton with the first shin guard module and with the second shin guard module.

[0070] In a 51st aspect according to the 50th aspect, the step of engaging the articulation skeleton with the first shin guard module and with the second shin guard module comprises engaging the articulation skeleton with the first shin guard module and with the second shin guard module in correspondence of respective surfaces.

[0071] In a 52nd aspect according to the 50th or 51st aspect, the step of arranging at least a first shin guard module and a second shin guard module comprises arranging, for each shin guard module:

- a protective element having an elongated conformation and, optionally, an at least partially concave profile, and
- a padding element joined to the protective element.

[0072] In a 53rd aspect according to the 50th or 51st or 52nd aspect, the step of arranging at least a first shin guard module and a second shin guard module comprises engaging, for each shin guard module, the padding element with the protective element, for example by using adhesive material such as glue or double-sided tape.

[0073] In a 54th aspect according to the 53rd aspect, the step of engaging, for each shin guard module, the padding element to the protective element follows the step of engaging the articulation skeleton with the first shin guard module and the second shin guard module. In a 55th aspect according to the 53rd or the 54th aspect, the step of engaging, for each shin guard module, the padding element with the protective element involves interposing the protective skeleton between the padding element and the protective element for each shin guard module.

[0074] In a 56th aspect according to any one of the 50th to 55th aspects, the step of engaging the articulation skeleton with the first shin guard module and the second shin guard module involves engaging the articulation skeleton with the protective element of the first shin guard module and with the protective element of the second shin guard module in correspondence of respective surfaces.

[0075] In a 57th aspect according to any of the aspects from 50th to 56th, the articulation skeleton comprises a body, the step of engaging the articulation skeleton with the first shin guard module and with the second shin guard module comprises engaging the body of the articulation skeleton with the protective element of the first shin guard module.

[0076] In a 58th aspect according to the 56th or 57th aspect, the step of engaging the articulation skeleton with the protective element of the first shin guard module and with the protective element of the second shin guard module

in correspondence of respective surfaces comprises engaging the articulation skeleton with the protective element of the first shin guard module and with the protective element of the second shin guard module by means of at least one coupling band of the articulation skeleton.

[0077] In a 59th aspect according to the 58th aspect, the step of engaging the articulation skeleton with the protective element of the first shin guard module and with the protective element of the second shin guard module by at least one coupling band of the articulation skeleton involves:

- engaging the articulation skeleton with the protective element of the first shin guard module by means of a first coupling portion of said at least one coupling band,
- engaging the articulation skeleton with the protective element of the second shin guard module by means of a second coupling portion of said at least one coupling band.

[0078] In a 60th aspect according to the 59th aspect:

- engaging the articulation skeleton with the protective element of the first shin guard module by means of a first coupling portion of said at least one coupling band involves joining by means of adhesive material, such as glue or double-sided tape, the first coupling portion to the protective element of the first shin guard module,
- engaging the articulation skeleton with the protective element of the second shin guard module by means of a second coupling portion of said at least one coupling band involves joining by means of adhesive material, such as glue or double-sided tape, the second coupling portion to the protective element of the second shin guard module.

[0079] In a 61st aspect according to the 59th or 60th aspect:

- engaging the articulation skeleton with the protective element of the first shin guard module by means of a first coupling portion of said at least one coupling band involves housing the first coupling portion in a seat of the protective element of the first shin guard module,
- engaging the articulation skeleton with the protective element of the second shin guard module by means of a second coupling portion of said at least one coupling band involves housing the second coupling portion in a seat of the protective element of the second shin guard module.

[0080] In a 62nd aspect according to any of the aspects from 58th to 61st, the step of engaging the articulation skeleton with the protective element of the first shin guard module and the protective element of the second shin

guard module by means of at least one coupling band of the articulation skeleton involves engaging the articulation skeleton with the protective member of the first shin guard module and with the protective element of the second shin guard module by means of a first coupling band and a second coupling band of the articulation skeleton.

[0081] In a 63rd aspect according to any one of the 50th to 62nd aspects, arranging a swivelled articulation skeleton involves:

- arranging a monolithic articulation skeleton further comprising a body, the first coupling band and the second coupling band developing transversely without solution of continuity with respect to the body, or
- arranging an articulation skeleton comprising at least a first coupling band and a second coupling band distinct and separated from each other.

[0082] In a 64th aspect according to any one of the aspects from 50th to 63rd, the step of arranging at least a first shin guard module and a second shin guard module involves:

- arranging a protective element for each shin guard module, the protective element having an elongated conformation and, optionally, an at least partially concave profile,
- arranging a padding element for each shin guard module,
- joining each padding element to the respective protective element to form the shin guard modules.

[0083] In a 65th aspect according to the 64th aspect, the step of arranging a padding element for each shin guard module involves:

- arranging a padding cushion for each shin guard module,
- arranging a coating for each shin guard module,
- joining the coating to the padding cushion for each shin guard module, for example by means of adhesive material such as glue or double-sided tape.

[0084] In a 66th aspect according to the 64th or 65th aspect, the step of arranging a protective element for each shin guard module involves:

- arranging sheet material, for example plastic sheet or metal sheet,
- obtaining, for example by blanking the sheet material, a protective element for each shin guard module.

[0085] In a 67th aspect according to the 64th or 65th or 66th aspect, the step of arranging a protective element for each shin guard module involves obtaining a protective element for each shin guard module by fusion of plastic or polymeric material or metallic material.

[0086] In a 68th aspect according to any of the aspects

from 64th to 67th, the step of arranging a protective element for each shin guard module involves obtaining a protective element for each shin guard module by molding plastic or polymeric material or metallic material.

[0087] In a 69th aspect according to any one of the 50th to 68th aspects, the step of arranging at least a first shin guard module and a second shin guard module also involves:

- arranging at least one shell configured to stiffen at least one shin guard module,
- joining said at least one shell to the protective element of the first shin guard module or the second shin guard module.

[0088] In a 70th aspect according to the 69th aspect, the step of joining said at least one shell to the protective element of the first shin guard module or the second shin guard module involves interposing the protective element between the padding element and the shell.

[0089] In a 71st aspect according to the 69th or 70th aspect, the step of joining said at least one shell to the protective element of the first shin guard module or of the second shin guard module involves applying adhesive material, such as glue or double-sided tape, to the shell and/or to the protective element.

[0090] In a 72nd aspect according to the 69th or 70th or 71st aspect:

- arranging at least one shell configured to stiffen at least one shin guard module involves arranging at least a first shell and a second shell configured to stiffen a respective shin guard module,
- joining said at least one shell to the protective element of the first shin guard module or the second shin guard module involves joining the first shell to the protective element of the first shin guard module and joining the second shell to the protective element of the second shin guard module.

[0091] In a 73rd aspect according to any one of the 50th to 72nd aspects:

- the step of arranging at least a first shin guard module and a second shin guard module also involves arranging a third shin guard module,
- the step of engaging the articulation skeleton to the first shin guard module and to the second shin guard module involves engaging the articulation skeleton to the first shin guard module, to the second shin guard module and to the third shin guard module in correspondence of respective surfaces.

[0092] In a 74th aspect according to the 73rd aspect:

- arranging at least one shell configured to stiffen at least one shin guard module involves arranging at least a first shell, a second shell and a third shell

- configured to stiffen a respective shin guard module, joining said at least one shell to the protective element of the first shin guard module or the second shin guard module involves joining the first shell to the protective element of the first shin guard module, joining the second shell to the protective element of the second shin guard module and joining the third shell to the protective element of the third shin guard module.

[0093] In a 75th aspect, a use of the modular type shin guard is provided, in accordance with any one of the shin guard claims and/or aspects from 1st to 49th and/or obtained with the process according to any one of the process claims and/or aspects from 50th to 74th, to protect a shin of a user.

[0094] In a 76th aspect according to the 75th aspect, the use provides for:

- engaging said at least one shin guard to a shin of a user, the shin having its own conformation,
- adapting said at least one shin guard to the conformation of the shin.

[0095] In a 77th aspect according to the 76th aspect, the step of adapting said at least one shin guard to the conformation of the shin involves:

- relatively moving the first shin guard module and the second shin guard module,
- moving at least one of the first shin guard module and the second shin guard module with respect to the shin of the user.

[0096] In a 78th aspect according to the 77th aspect, relatively moving the first shin guard module and the second shin guard module involves angularly offsetting the first shin guard module and the second shin guard module.

[0097] In a 79th aspect, a kit is provided comprising a pair of shin guards of the modular type, each shin guard of the modular type being in accordance with any of the shin guard claims and/or aspects from 1st to 49th and/or obtained with the method according to any one of the process claims and/or aspects from 50th to 74th.

[0098] In an 80th aspect according to the 79th aspect, the pair of shin guards of the modular type comprises a first shin guard of the modular type and a second shin guard of the modular type, the first shin guard of the modular type and the second shin guard of the modular type being configured to be matched, when in use, to a respective shin of a user.

[0099] In an 81st aspect according to any of the previous aspects, the protective elements are not inserted in a housing body.

[0100] In an 82nd aspect according to any of the previous aspects, the protective elements constitute a protective shield of the shin guard configured for protecting,

when the shin guard is in use, a shin of a user, said protective shield not being in one-piece.

[0101] In an 83rd aspect according to any of the previous aspects, the shin guard is the type without anklet.

BRIEF DESCRIPTION OF THE DRAWINGS

[0102] Some embodiments and some aspects of the invention will be hereafter described with reference to the accompanying drawings, provided only for explanatory and therefore non-limiting purposes, wherein:

- figure 1 is a front view of a shin guard according to a first embodiment of the present invention,
- figure 2 is a rear view of the shin guard of figure 1,
- figure 3 illustrates a shin guard during a step of the manufacturing process of the shin guard according to the first embodiment of the present invention, this step being in particular preliminary to the connection of the padding elements with the respective protective elements, which are illustrated in a rear view,
- figure 4 shows an exploded view of a shin guard according to a second embodiment of the present invention,
- figures 5A, 5B and 5C are views of possible configurations of the shin guard that can be assumed both by a shin guard according to the first embodiment of the present invention, and by a shin guard in accordance with the second embodiment of the present invention,
- figure 6 is a view of shells which can be engaged from the front to respective protective elements of a shin guard according to the first or second embodiment of the present invention.

DEFINITIONS AND CONVENTIONS

[0103] Note that in the present detailed description corresponding illustrated parts in various figures are indicated with the same numerical references. The figures could illustrate the object of the invention by means of not-to-scale representations; therefore, parts and components illustrated in the figures relating to the object of the invention could concern only schematic representations. In the context of this description, the use of terms such as "above", "upper", "higher", "below", "lower", "on the side", "side", "laterally", "horizontal", "horizontally", "vertical", "vertically", "front", "frontally", "rear", "posteriorly" and similar refer, unless otherwise specified, to at least one spatial orientation that normally the object of the invention can adopt in operating conditions or in conditions of use. In this regard, see the attached figures illustrating at least one possible spatial orientation of the object of the invention; in particular, see figures 1, 2 and 3 illustrating the vertical spatial orientation that a shin guard in accordance to the invention can assume when in use. Unless otherwise specified, the use of the terms "condition" or "configuration" can be used interchangeably in

this context.

[0104] Hereinbelow are some definitions that can be used to understand of the present invention:

- the term "shin guard" indicates an item, for example a technical and/or sport item, or a device configured to protect a shin of a user from possible impacts,
- the expression "shin guard module" indicates a modular element of the shin guard. Each shin guard module can comprise assembled components and/or components that can be assembled. Optionally, the shin guard modules can differ from each other due to their shape; for example, adjacent shin guard modules can be complementary in shape.

DETAILED DESCRIPTION

Shin guard

[0105] In the attached figures, the numerical reference 1 overall indicates a shin guard according to the present invention.

[0106] The shin guard 1 is of the modular type. As will be seen in greater detail below, the modularity of the shin guard 1 allows it to adapt to the various shin conformations of a plurality of users. In other words, the modularity of the shin guard 1 allows it to be used by a plurality of users; therefore, the shin guard 1 of the modular type has a wide range of possible uses.

[0107] The shin guard 1 of the modular type comprises shin guard modules 2, 3, 4. In particular, the shin guard 1 comprises at least a first shin guard module 2 and a second shin guard module 3. Each shin guard module 2, 3, 4 is configured to protect, when the shin guard is in use, a portion of a shin of a user. The shin guard 1 can comprise a number of shin guard modules 2, 3, 4 greater than two; for example, the accompanying figures illustrate embodiments of the shin guard 1 comprising a first shin guard module 2, a second shin guard module 3 and a third shin guard module 4. The number of shin guard modules 2, 3, 4 can be greater than three. From a functional point of view, as the number of shin guard modules 2, 3, 4 increases, the adaptability of the shin guard 1 to the shin of a user increases too; this is possible because, as will be seen in greater detail below, the shin guard modules 2, 3, 4 are relatively movable in order to be able to adapt to the conformation of the shin of a user. Furthermore, as the number of shin guard modules 2, 3, 4 increases, each shin guard module 2, 3, 4 can have a smaller width than the width of shin guard modules 2, 3, 4 of a shin guard 1 having a minor number of shin guard modules 2, 3, 4; this allows, for example, to cover and protect one same surface of the shin of a user (same surface of the shin with respect to the surface protected by a shin guard having a smaller number of shin guard modules 2, 3, 4) through a different number of shin guard modules 2, 3, 4. Alternatively, as the number of shin guard modules 2, 3, 4 increases, the shin guard 1 allows

to cover and protect a larger area of the shin of a user (greater surface of the shin with respect to the surface protected by a shin guard having a smaller number of shin guard modules 2, 3, 4).

[0108] In the embodiments illustrated in the attached figures, the first shin guard module is substantially a central shin guard module 2 and the second shin guard module and the third shin guard module are lateral shin guard modules 3, 4 opposite to each other with respect to the central shin guard module 2. The central shin guard module 2 and the lateral shin guard modules 3, 4 are configured to be facing, covering and protecting, when in use, respectively a longitudinal central portion and longitudinal lateral portions of the shin of a user. The shin guard modules 2, 3, 4 can have an overall conformation complementing one another, for example a respective overall conformation which allows the shin guard 1 to have a greater width in correspondence of its upper end when compared to the width which it exhibits in correspondence of its own lower end. The upper end and lower end of the shin guard 1 are intended to be respectively positioned, when the shin guard 1 is in use and with reference to body parts of the user, in correspondence of an upper part of the shin close to the knee of the user and in correspondence of a lower part of the shin close to the ankle of the user. The upper end and the lower end of the shin guard are defined with reference to the orientation that the shin guard 1 assumes in its operative configuration; in this regard, see figures 1, 2 and 3. A shin guard 1 is described below, whose modules 2, 3, 4 have a conformation complementary to one another. The central shin guard module 2 can have a tapered conformation which tapers from one end to the other of the central shin guard module 2, while the lateral shin guards modules 3, 4 can be symmetric to one another in their conformation, with a substantially constant width for a prevailing length of the lateral shin guard module 3, 4. The width of the lateral shin guard modules 3, 4 is smaller if compared to an average width of the central shin guard module 2. Being the lateral shin guard modules 3, 4 located at the same distance from the sides of the central shin guard module 2, the lateral shin guard modules 3, 4 are thus shaped to allow the shin guard 1 to have at its upper end a greater width than the width it exhibits in correspondence of its lower end.

[0109] A shin guard module 2, 3, 4 is described below. The technical features of the shin guard module 2, 3, 4 and the related components that will be described with reference to a shin guard module 2, 3, 4 are applicable, except where otherwise indicated, to each shin guard module 2, 3, 4 of the shin guard 1.

[0110] The shin guard module 2, 3, 4 comprises at least one protective element 5. The protective element 5 substantially acts as a shield configured to dampen and/or absorb forces deriving from any possible impacts that can occur on the shin guard module 2, 3, 4 when the shin guard 1 is in use, and thus protects at least one portion of the shin of the user. As illustrated in the attached fig-

ures, the protective element 5 can have an elongated conformation defined along a longitudinal direction. Having an elongated conformation allows the protective element 5 to cover and protect, when the shin guard 1 is in use, a predominant portion or entirely the respective longitudinal portion of a shin of a user. The protective element 5 develops longitudinally between a first end portion 5a and a second end portion 5b and has a central portion 5c interposed between the first end portion 5a and the second end portion 5b. The protective element 5 has longitudinal edges 6 extending longitudinally and transversal edges 7, extending transversely with respect to the longitudinal edges 6. The transversal edges 7 can be at least partially arched. The protective element 5 with elongated conformation has a greater length than its own width; the length of the protective element 5 can be defined as the distance between longitudinally opposed transversal edges 7, while the width of the protective element 5 can be defined in correspondence of a longitudinal center line of the protective element 5 (half-length of the protective element 5) as the distance between the opposite longitudinal edges 6. For example, the length of the protective element 5 can be at least equal to the double or triple width of the protective element 5.

[0111] The protective element 5 can have an at least partially concave profile (see figure 4), which allows the protective element 5 to adapt, when the shin guard 1 is in use, to the conformation of the respective longitudinal portion of the shin of a user. Each protective element 5 can advantageously comprise at least one seat 8a, 8b, 8c. The seat 8a, 8b, 8c can develop transversely with respect to the longitudinal direction along which the elongated conformation of the protective element 5 develops. As shown in the attached figures, the seat 8a, 8b, 8c of the protective element 5 of the central shin guard module 2 can extend unbrokenly across opposite transversal edges 7 substantially separated by an entire width of the protective element 5, while the seat 8a, 8b, 8c of the protective elements 5 of the lateral shin guard modules 3, 4 can develop for a portion of the width of the protective element 1 adjacent to the central shin guard module 3, 4. Respective seats 8a, 8b, 8c of the central protective elements 2 and lateral protective elements 3, 4 can be aligned to each other in correspondence of a corresponding portion of the respective protective element 2, 3, 4.

[0112] See figure 4, from which it can be noted that the seats 8a, 8b, 8c can be connected to each other by means of connection seats 77a, 77b, which advantageously extend along a direction which is substantially orthogonal to the development direction of seats 8a, 8b, 8c. Each protective element 5 preferably comprises at least two seats 8a, 8b, 8c longitudinally spaced apart from each other, for example arranged in correspondence of different portions (first end portion 5a, second end portion 5b and central portion 5c) of the protective element 5. In this regard, figure 4 shows protective elements 5, each provided with three seats 8a, 8b, 8c longitudinally spaced apart from each other; essentially, each protective ele-

ment 5 has a first seat 8a defined in correspondence of the first end portion 5a, a second seat 8b defined in correspondence of the central portion 5c and a third seat 8c defined in correspondence of the second end portion 5b. Figure 4 shows three protective elements 5, one for each of the shin guard modules 2, 3, 4, configured to form, when the shin guard 1 is in use, three seat bands longitudinally spaced apart from each other wherein each band comprises a respective seat 8a, 8b, 8c of each protective element 5 arranged in correspondence of a corresponding portion of the protective elements 5. In particular, a first seat band is defined in correspondence of the first end portions 5a and comprises the first seats 8a of the protective elements 5 of the shin guard modules 2, 3, 4, a second seat band is defined in correspondence of the central portions 5c and comprises the second seats 8b of the protective elements 5 of the shin guard modules 2, 3, 4 and a third seat band is defined in correspondence of the second end portions 5b and comprises the third seats 8c of the protective elements 5 of the shin guard modules 2, 3, 4.

[0113] Each protective element 5 is preferably monolithic. Each protective element 5 is preferably made of material whose rigidity is such that it allows the protective element 5 to damper and/or absorb forces deriving from impacts that can occur when the shin guard 1 is in use without plastically deforming and without breaking.

[0114] In one embodiment, each protective element 5 can be made in plastic or polymeric material; for example, each protective element 5 can be made of polyamide, such as nylon. In an alternative embodiment, each protective element 5 can be made of metallic material, such as aluminum, steel or titanium. In another alternative embodiment, each protective element 5 can be made of leather. In further embodiments, each protective element 5 can be partially made of plastic or polymeric material and partially of metallic material or the shin guard 1 can provide at least one protective element 5 in plastic or polymeric material and at least one protective element 5 made of metallic material so as to differentiate the rigidity of portions of at least one protective element 5 or of the protective elements 5 of the shin guard 1, for example depending on the operating position of the protective elements 5 or of portions thereof with respect to the shin of the user. Providing at least one of the aforementioned plastic, polymeric, metallic or leather materials allows the protective element 5 to be light and at the same time resistant to impacts that can occur when the shin guard 1 is in use. Each protective element 5 can have a thickness between 1 and 5 mm, in particular between 2 and 3 mm. Preferably, each protective element 5 can have a thickness substantially equal to 2.5 mm. Providing a thickness within the thickness ranges described above allows to minimize the material without compromising its impact resistance and therefore allows the protective element 5 to be light and resistant at the same time.

[0115] The shin guard module 2, 3, 4 can optionally further comprise at least one padding element 9. The

padding element 9 is joined to the protective element 5; the padding element 9 and the protective element 5 can be joined either directly or by the interposition of a further component. The padding element 9 is intended to be interposed, when the shin guard is in use, between the protective element 5 and the shin of the user. The padding element 9 is configured to let the user wear the shin guard 1 comfortably, preventing the shin from coming into direct contact with the protective element 5. The padding element 9 is made of material with lower rigidity than the rigidity of the material of the protective element 5. The material of the padding element 9 can deform when in contact with the shin of the user. The padding element 9 has plan dimensions equal to or corresponding to or comparable to the plan dimensions of the protective element 5. The plan dimensions of the padding element 9 have dimensions, such as length and width, substantially equal or corresponding or comparable to the respective dimensions, such as length and width, of the protective element 5 to which the padding element 9 is joined. Such plan dimensions of the padding element 9 allow it, when manufacturing a single module of shin guards 2, 3, 4, to be joined to the respective protective element 5 in correspondence of a prevalent portion of its surface, without it protruding from the plan dimensions of the protective element 9.

[0116] The padding element 9 comprises a padding cushion 9a and a coating 9b matched together. The padding cushion 9a is joined to a respective protective element 5 and is interposed between the coating 9b and the protective element 5. The padding cushion 9a is made of material configured to absorb and dampen forces deriving from impacts; providing at least one padding cushion 9a in such material allows the respective shin guard module 2, 3, 4, and consequently shin guard 1, when in use, to protect the shin of the user from impacts.

[0117] For example, the padding cushion 9a can be made of elastically deformable material, for example in rubber or plastic or polymeric material. In a possible embodiment, the padding cushion 9a can be of ethylene octane (EPDM). The padding cushion 9a can be made of washable material, for example it can be water washed at a temperature close to or equal to 40°C or dry cleaned. The padding cushion 9a can be in breathable and water resistant material and, in addition or in alternative, sweat resistant. The material of the padding cushion 9a can also be impermeable, for example to water and sweat. The padding cushion 9a can be attached in such a way that a portion thereof is recessed with respect to edges of the protective element 5 to which the padding cushion 9a is attached and one further portion thereof protrudes with respect to these edges. The padding cushion can have a thickness between 2 mm and 10 mm, in particular between 4 mm and 8 mm. Preferably, the thickness of the padding cushion can be substantially equal to 6 mm, of which about 2 mm can be recessed with respect to edges 6, 7 of the protective element 5 to which the padding cushion 9a is matched and about 4 mm can protrude

from the edges 6, 7 of the protective element 5. The padding cushion 9a and the coating 9b can be joined by using adhesive material such as glue or double-sided tape. When the shin guard 1 is in use, the coating 9b is intended to face the shin of the user and to come into contact with it. Similarly to the padding cushion, the coating can be in washable material. The coating can be in polymeric material, such as polyurethane. The coating 9b can have a thickness between 0.5 mm and 2 mm, in particular between 0.6 mm and 1.4 mm. Preferably, the coating 9b can have a thickness substantially equal to 0.8 mm.

[0118] The shin guard module 2, 3, 4 can further comprise at least one shell 10. The shell 10 can be integrated or coupled or couplable to the protective element 5. Figure 6 shows three shells 10, each of which can be fixed to the protective element 5 of the first shin guard module 2, of the second shin guard module 3 and of the third shin guard module 4 respectively, in correspondence of a surface of the respective protective element 5 opposite with respect to the surface of the protective element 5 in correspondence of which the padding cushion 9a of the padding element 9 is engaged. The shell 10 can be permanently coupled to the respective protective element 5, for example by adhesive material such as glue or double-sided tape or by welding, or it can be removably coupled to the respective protective element 5.

[0119] In the embodiment wherein the shell 10 can be removably coupled to the respective protective element 5, the shell 10 can be coupled to the respective protective element 5 if necessary, for example to increase its rigidity, and can be removed from the respective protective element 5 if necessary.

[0120] The shell 10 is configured to stiffen the respective shin guard module 2, 3, 4. For this purpose, the shell 10 can be made of the same material with respect to the protective element 5 or can be made of material having higher rigidity than the material of the protective element 5. Furthermore, the shell 10 can have similar characteristics in terms of materials and thickness to what previously described for the protective element 5. The shell 10 is preferably monolithic. The shell 10 is preferably made of material whose rigidity is such that it allows the shell 10 to dampen and/or absorb forces deriving from impacts that can occur when the shin guard is in use, without plastically deforming and without breaking. In one embodiment, each shell 10 can be made in plastic or polymeric material; for example, each shell 10 can be made of polyamide, such as nylon. In an alternative embodiment, each shell 10 can be made of metallic material, such as aluminum, steel or titanium. In further embodiments, each shell 10 can be partially in plastic or polymeric material and partially in metal material or the shin guard 1 can provide at least a shell 10 in plastic or polymeric material and at least a shell 10 in metallic material so as to differentiate the rigidity of portions of at least one shell 10 or the shells 10 of the shin guard 1, for example depending on the operative position of the shells 10 or portions thereof with respect to the shin of the user. Pro-

viding at least one of the aforementioned plastic, polymeric or metal materials allows the shell 10 to be light and at the same time resistant to impacts that can occur when shin guard 1 is in use. Each shell 10 can have a thickness between 1 and 5 mm, in particular between 2 and 3 mm. Preferably, the shell 10 can have a thickness substantially equal to 2.5 mm. Expecting a thickness within the thickness ranges described above allows to minimize the material without compromising its resistance to impacts and therefore allows the shell 10 to be light and resistant at the same time.

[0121] In order to optimize the user experience, the outermost component of the shin guard 1, which can be the shell 10 in the embodiments of the shin guard 1 which provide the shell 10 or the protective element 5 in the embodiments of the shin guard 1 which do not provide the shell 10, can also be personalized or customized, for example by selecting and adding coats of arms, symbols, letters or specific chromatic applications.

[0122] The shin guard 1 further comprises an articulation skeleton 11. The articulation skeleton 11 is made of flexible or swivel material and is engaged at least to the first shin guard module 2 and to the second shin guard module 3 in correspondence of respective surfaces. In embodiments which provide also a third shin guard module 4 or further shin guard modules, the articulated skeleton 11 can also be engaged to the third shin guard module 5 (see for example figure 3) or to further shin guard modules. Being in flexible or swivel material, the articulation skeleton 11 is configured to allow relative movement between the first shin guard module 2 and the second shin guard module 3 and, where provided, also the movement of the third shin guard module 4 as regards the first and the second shin guard module 2, 3 or further shin guard modules. The articulation skeleton 11 is configured to assume a plurality of configurations obtainable by means of relative angular movement between the shin guard modules 2, 3, 4 (in this regard, see figures 5A, 5B and 5C). Being in flexible or swivel material, the articulation skeleton 11 allows the shin guard 1 to adapt optimally to the shape of the shin of the user in such a way as to prevent the creation of space between the shin guard 1 and the shin, avoiding the movement of the shin guard 1, which would create actually unwanted sliding between the shin guard 1 and the shin, irritating the skin and annoying the user.

[0123] The articulation skeleton 11 is advantageously made of elastic material. Preferably, the articulation skeleton 11 is made of elastically deformable material, since providing elastically deformable material allows the articulation skeleton 11 to deform reversibly and to move, therefore, the shin guard modules 2, 3, 4 reversibly. The articulation skeleton 11 can be made of at least partially or predominantly rubbery material.

[0124] In the embodiments of the shin guard 1 illustrated in the attached figures, the articulation skeleton 11 is configured to angularly move the first, the second and the third shin guard module 2, 3, 4 with respect to each

other; thus, the articulation skeleton 11 allows to provide flexibility and adaptability of use to the shin guard 1. In this regard, see: figure 5A where the shin guard 1 is in an open configuration wherein the second and third shin guard modules 3, 4 are unfolded with respect to the first shin guard module 2 to form a concavity of the shin guard 1 configured to accommodate, when in use, the shin of the user, figure 5B where the second and third shin guard modules 3, 4 are folded over the first shin guard module 2 to form a kinked configuration of the shin guard 1 and figure 5C where the second and third shin guard modules 3, 4 are unfolded even further with respect to the open configuration of figure 5A to define a fully open configuration. Basically, the open configuration of figure 5A is an intermediate configuration between the kinked configuration of figure 5B and the fully open configuration of figure 5C. The open configuration of figure 5A can be obtained by unfolding, starting from the kinked configuration of figure 5B, the second and third shin guard module 3, 4 moving away from the first shin guard module 2 and the fully open configuration shown in figure 5C can be obtained by unfolding even further, starting from the open configuration of figure 5A, the second and the third shin guard module 3, 4 with respect to the first shin guard module 2. Conversely, the open configuration of figure 5A can be obtained by folding, starting from the fully open configuration of figure 5C, the second and third shin guard module 3, 4 towards the first shin guard module 2, and the kinked configuration of figure 5B can be obtained by folding even further, starting from the configuration of figure 5A, the second and the third shin guard module 3, 4 towards the first shin guard module 2 until at least one of the second and third shin guard module 3, 4 stops against the first shin guard module 2.

[0125] The articulation skeleton 11 can be constituted by the assembly of a plurality of single elements separated from each other or, alternatively, by a single-piece element, which can reproduce a more complex geometry. The articulation skeleton 11 comprises at least one coupling band 12', 12'', 12''' which connects to each other at least the first and the second shin guard module 2, 3. Devising at least one coupling band 12', 12'', 12''' allows to provide an articulated constraint to the shin guard 1 aimed at improving the shape adaptability of the shin guard 1, optimizing the relative movement between the shin guard modules 2, 3, 4.

[0126] Hereinafter, a coupling band 12', 12'', 12''' is described, connecting the first, the second and third shin guard modules 2, 3, 4. In this regard, see figure 3, wherein the articulation skeleton 11 is assembled to the shin guard modules 2, 3, 4, and figure 4, wherein the articulation skeleton 11 is in exploded view with respect to protective elements 5 and padding elements 9. In alternative embodiments, the coupling band 12', 12'', 12''' is configured for connecting further shin guard modules 1 together. Besides connecting the shin guard modules 2, 3, 4, the coupling band 12', 12'', 12''' allows to engage the padding elements 9 to the respective protective elements

5. The coupling band 12', 12'', 12''' comprises a first coupling portion 12a, a second coupling portion 12b and a third coupling portion 12c; the first coupling portion 12a is interposed between the second coupling portion 12b and the third coupling portion 12c. The first coupling portion 12a can be defined in correspondence of a central portion of the coupling band 12', 12'', 12''' while the second and third coupling portions 12b, 12c can be defined in correspondence of opposite ends of the coupling band 12', 12'', 12'''. The first coupling portion 12a is advantageously housed in correspondence of the seat 8b of the protective element 5 of the first shin guard module 2 and engages the padding element 9 of the first shin guard module 2 to the protective element 5 of the first shin guard module 2. Similarly, the second and third coupling portions 12b, 12c can be housed respectively in correspondence of the seats 8a, 8c of the protective elements 5 of second shin guard module 3 and of the third shin guard module 4 and engage the padding element of the second shin guard module 3 and of the third shin guard module 4 respectively to the protective element 5 of the second shin guard module 3 and the third shin guard module 4. It is worth noting how the presence of seats 8a, 8b, 8c on the protective element 5 (although the latter are undoubtedly useful as they are functional to optimize accuracy in positioning and stability of the housing of the coupling bands 12', 12'', 12''') shall not be considered as an essential characteristic of the present invention, since the coupling bands 12', 12'', 12''' could alternatively be applied (for example by gluing) to one surface of the protective element 5 devoid of suitable housing means for the coupling bands 12', 12'', 12'''.

[0127] Each coupling band 12', 12'', 12''' further comprises at least one connector 12d connecting to each other coupling portions 12a, 12b, 12c adjacent to the coupling band 12', 12'', 12'''. Each connector 12d can be separated with respect to the coupling portions 12a, 12b, 12c of the coupling band 12', 12'', 12''' or can be integrated with the coupling portions 12a, 12b, 12c of the coupling band 12', 12'', 12'''. In the embodiments illustrated in the attached figures, each coupling band 12', 12'', 12''' is monolithic (meaning that coupling portions 12a, 12b, 12c of the same coupling band 12', 12'', 12''' are part of a single piece) and each connector 12d integrated with the coupling portions 12a, 12b, 12c of the coupling band 12', 12'', 12''' and is formed by a portion of the coupling band 12', 12'', 12''' interposed between the adjacent coupling portions 12a, 12b, 12c. Advantageously, the width of the connectors 12d is a reduced width compared to the prevailing width of the coupling bands 12', 12'', 12''', so as to improve the articulation between the shin guard modules 2, 3, 4.

[0128] In the first embodiment, each coupling band 12', 12'', 12''' is monolithic (made up of a respective piece), distinct and separated from the other coupling bands 12', 12'', 12''' (see figure 3). Instead, in the second embodiment all the coupling bands 12', 12'', 12''' are part of a single monolithic articulation skeleton 11 (see figure 4).

[0129] The articulation skeleton 11 can comprise at least a first coupling band 12' and a second coupling band 12'', each of which may be of the type described above. The first coupling band 12' and the second coupling band 12'' are spaced apart and are engaged, by means of the aforementioned coupling portions 12a, 12b, 12c, to each protective element 5 of said shin guard modules 2, 3, 4, by means of the respective coupling portions 12a, 12b, 12c, in correspondence of respective portions of the same protective element 5 longitudinally spaced apart. For example, the first coupling band 12' and the second coupling band 12'' can be engaged to the respective protective elements 5 in correspondence of two of the central portion 5c, the first end portion 5a and the second end portion 5c. Providing at least one first coupling band 12' and at least a second coupling band 12'' engaged in correspondence of respective portions of the same protective element 5 longitudinally spaced apart allows to provide two articulated constraints designed to optimally control the articulation performance of the shin guard 1, optimizing the relative movement between shin guards modules 2, 3, 4. In some embodiments, the first coupling band 12' can be engaged to the protective elements 5 in correspondence of one of the first and the second end portion 5a, 5b and the second coupling band 12'' can be engaged in correspondence of the central portion 5c of the protective element 5 (see figures 3 and 4), while in another embodiment the first coupling band 12' is engaged to the protective elements 5 in correspondence of the first end portion 5a and the second coupling band 12'' is engaged to the protective elements 5 in correspondence of the second end portion 5b or vice versa. Optionally, the articulation skeleton 11 also comprises further coupling bands 12'''. For example, as illustrated in the embodiments of figure 3 and figure 4, the articulation skeleton 11 can comprise at least a third coupling band 12''' of the previously described type. The first coupling band 12', the second coupling band 12'' and the third coupling band 12''' are engaged to the protective elements 5 in correspondence of respective seats bands. By way of example, the first coupling band 12' can be engaged in correspondence of the seats band defined in correspondence of the first end portion 5a of the protective elements 5, the second coupling band 12'' can be engaged in correspondence of the seats band defined in correspondence of the central portion 5 of the protective elements and the third coupling band 12''' can be engaged in correspondence of the seats band defined in correspondence of the second end portion 5b of the protective elements 5; in this regard, see figures 3 and 4. Providing a first coupling band 12', a second coupling band 12'' and a third coupling band 12''' engaged as just described to the protective elements 5 allows to provide three articulated constraints aimed at controlling optimally the articulation performances of the shin guard 1, optimizing the relative movement between shin guard modules 2, 3, 4.

[0130] The coupling bands 12', 12'', 12''' are engaged

in correspondence of seats 8a, 8b 8c, of the protective elements 5, so as to arrange the shin guard modules 2, 3, 4 to form an opening 13 between them. As illustrated in the annexed figures, a respective opening 13 is formed between adjacent individual shin guard modules 2, 3, 4; between the first shin guard module 2 and the second shin guard module 3 an opening 13 is formed and between the first shin guard module 2 and the third shin guard module 4 another opening 13 is formed. Such openings 13 preferably have one same characteristic dimension, such as a width of the opening 13, which can be defined as the distance between the outer facing longitudinal edges 6 of the shin guard modules 2, 3, 4. Providing these openings 13, in addition to providing the adequate separation between shin guard modules 2, 3, 4 to allow mutual articulation, allows an air passage which, when the shin guard 1 is in use, cooperates in keeping the skin of the user at least partially or substantially dry from sweat. The connectors 12d of the coupling bands 12', 12'', 12''' develop over the openings and allow, by moving at least one shin guard module 2, 3, 4, to angularly offset the shin guards modules 2, 3, 4 with respect to one another. Basically, the connectors 12d functionally act as hinges and allow angular movement by rotation of the shin guards modules 2, 3, 4 with respect to one another.

[0131] Providing such openings 13, in correspondence of which a portion of the connector 12d is arranged (see figure 1), also allows to move the shin guard modules 2, 3, 4 in an optimal manner.

[0132] As previously introduced, the first embodiment illustrated in the accompanying figures (see figure 3 in particular) illustrates an articulation skeleton 11 comprising three coupling bands 12', 12'', 12''' distinct and separated from each other, while the second embodiment comprises an articulation skeleton 11 of the monolithic type, wherein the coupling bands 12', 12'', 12''' are connected to each other (see figure 4). In order to connect the coupling bands 12', 12'', 12''', the articulation skeleton 11 can comprise a body 11a. As shown in figure 4, the body 11a connects the first coupling band 12', the second coupling band 12'' and the third coupling band 12'''. The body 11a develops substantially parallel to at least one protective element 5 along a longitudinal direction and transversely to the first coupling band 12', to the second coupling band 12'' and to the third coupling band 12'''. The body 11a is preferably joined to the protective element 5 of the first shin guard module 2. As shown in figure 4, the body 11a has a smaller width than a width of the protective element 5 of the central shin guard module 2.

[0133] In order to improve the housing of the articulation skeleton 11 when comprising the body 11a, connection seats 77a and 77b are advantageously obtained on the protective element 5, departing without solution of continuity between the seats 8a, 8b, 8c, so that the assembly of seats on the protective element 5 displays a geometry corresponding to the geometry of the articulation skeleton 11.

[0134] As regards the geometry of the articulation skel-

eton 11, it is evident that what is described herein and/or what is represented in the attached figures (in particular in figure 4) is to be understood as a possible example and not as a limitation. It can in fact be hypothesized that further bodies (of analogous configuration to the body 11a) can join the portions 12b and/or the portions 12c. It can then further be provided that the articulation skeleton 11 has a significantly different geometry, for example ring shaped, serpentine shaped, and so on.

[0135] The shin guards 1 according to the present invention can be provided in various sizes. Specific sizes can be obtained, for example, according to the target user for whom the shin guard 1 is conceived. For example, the shin guards 1 can be provided in three different sizes (for example one child size, one adult size and one women size); such sizes can differ in the characteristic dimensions of the shin guard modules 2, 3, 4 and its components (such as the protective elements 5 and the padding elements 9). According to the size of the shin guard 1, the number of coupling bands 12', 12'', 12''' or the distance between coupling bands 12', 12'', 12''' can vary.

[0136] Furthermore, the shin guards 1 can be provided in various versions. Versions can be provided, for example, depending on the sport for which the shin guard is conceived. For example, the shin guards 1 can be provided in a football version, in a hockey version, in a baseball version, in a cricket version, and so on. These versions can differ in at least one of the following: characteristic dimensions of the shin guard modules 2, 3, 4 and their components (such as the protective elements 5 and the padding elements 9), constituent materials of the shin guard modules 2, 3, 4 and related components, such as constituent materials of the protective elements 5, of the padding elements 9 and, if present, of the shells 10, the possible presence of a shell 10, or similar considerations related to the peculiarity of each sport and the foreseeable intensity of possible impacts that the shin of the user may suffer when practicing a particular sport.

Use of the shin guard

[0137] The present invention further provides a use of the shin guard 1 previously described. The use of the shin guard 1 is intended to protect a shin of a user. The use of shin guard 1 can be made in the sports sector, for example in sports such as football, hockey, baseball, cricket and the like. It is understood that the use of the shin guard 1 can be made in any activity, sport or discipline in which the shin of a user can be impacted. The use of the shin guard 1 can provide to secure a shin guard 1 to a shin of a user or to secure a pair of shin guards 1, each to a respective shin of the user. The use of the shin guard 1 can also provide to adapt, for example by the user, at least one shin guard 1 to the conformation of the respective shin on which it is worn. The adaptation of at least one shin guard 1 to the conformation of the shin is carried out by relative movement of the first shin guard

module 2 and of the second shin guard module 3 and, optionally and where provided, of the third shin guard module 4. The relative movement between shin guard modules 2, 3, 4 is of angular type and provides to angularly offset the shin guard modules 2, 3, 4. The adaptation of at least one shin guard 1 to the shape of the shin provides, in addition to the relative movement between shin guard modules 2, 3, 4, also the movement of at least one of the first shin guard module 2, the second shin guard module 3 and, optionally and where provided, the third shin guard module 4 with respect to the shin of the user.

Kit

[0138] The present invention also relates to a kit comprising a pair of shin guards 1 of the type described above. The pair of shin guards 1 comprise a first shin guard 1 of the modular type and a second shin guard 1 of the modular type configured to be secured, when in use, to a respective shin of a user.

Process of making a shin guard

[0139] The present invention also relates to a manufacturing process of a shin guard 1 of the type described above. The process provides to arrange shin guard modules 2, 3, 4 of the type described above, and in particular at least a first shin guard module 2, a second shin guard module 3 and, optionally, also a third shin guard module 4. The step of arranging each shin guard module 2, 3, 4 provides to arrange a shin guard module 2, 3, 4 comprising at least a protective element 5 of the type previously described. Optionally, each shin guard module 2, 3, 4 further comprises a padding element 9, of the type previously described, engaged to the protective element 5. Each protective element 5 can be made by arranging sheet material and obtaining, for example by blanking the sheet material, a protective element 5. The sheet material can be in plastic or polymeric material or metallic material or leather. In alternative embodiments, each protective element 5 can be made by molding plastic or polymeric material or by melting metallic material. The plastic or polymeric or metallic material can be in accordance with what previously described. Each padding element 9 can be arranged through engagement between a padding cushion 9a and a respective coating 9b, both of the type described above; such engagement can be made by means of adhesive material, such as glue or double-sided tape. The step of arranging each shin guard module 2, 3, 4 can provide to join the padding element 9 to the protective element 5 by using adhesive material, such as glue or double-sided tape. For each shin guard module 2, 3, 4, the engagement of the padding element 9 to the protective element 5 provides to join the padding cushion 9a to the protective element 5 so that the padding cushion 9a is interposed between the protective element 5 and the coating 9b.

[0140] The method can also provide to arrange an ar-

ticulation skeleton 11 of the type described above. The procedure provides to engage the articulation skeleton 11 with the protective elements 5 of the first shin guard module 2, the second shin guard module 3 and, where provided, the third shin guard module 4. In the embodiment providing a padding element 9 for each shin guard module 2, 3, 4, the step of engaging the articulation skeleton 11 is preferably carried out prior to the step that provides to engage, for each shin guard module 2, 3, 4, the respective padding element 9 to the respective protective element 5. According to such embodiment, the articulation skeleton 11 is engaged to the protective elements 5 and subsequently the padding elements 9 are engaged to the respective protective elements 5. Thus, at the end of the assembly, for each shin guard module 2, 3, 4, of the respective protective element 5, of the articulation skeleton 11 and of the respective padding element 9, the articulation skeleton 11 of the shin guard 1 is interposed between the protective elements 5 and the respective padding elements 9. The connection of the articulation skeleton 11 to the shin guard modules 2, 3, 4 provides to engage the coupling portions in correspondence of the respective seats 8a, 8b, 8c, in accordance to what was previously described. In the second embodiment, wherein the articulation skeleton 11 is provided with a body 11a, engaging the articulation skeleton 11 to the shin guard modules 2, 3, 4 also provides for engaging the body 11a to the protective element 5 of the first shin guard module 2. Providing an articulation skeleton 11 equipped with a body 11a engaged to the coupling bands 12', 12'', 12''' allows to engage the articulation skeleton 11 to the protective elements 5 by means of a single coupling operation.

[0141] Optionally, the method can further provide to arrange at least one shell 10 and to couple, in a removable or non-removable way, the shell 10 to the protective element 5 of a shin guard module 2, 3, 4, such as the central shin guard module 2. The process can also provide for arranging additional shells 10 and to couple, in a removable or non-removable way, each shell 10 to the protective element 5 of a respective shin guard module 2, 3, 4. Coupling a shell 10 to a protective element 5 of a shin guard module 2, 3, 4 provides to engage the shell 10 in correspondence of a surface of the protective element 5 which is opposite to the surface of the protective element 5 in correspondence of which the padding element 9 is engaged, in such a way that the protective element 5 is interposed between the shell 10 and the padding element 9.

[0142] As regards the production process of the shin guard 1, it is easily understood that having a one-piece articulation skeleton 11 (such as for example the skeleton represented in figure 4) determines appreciable advantages both as regards the speed of this production process (having a lower number of components to be assembled), both as regards the precision in positioning of the coupling bands 12', 12'', 12''' (being perfectly spaced within the articulation skeleton 11).

ADVANTAGES OF THE INVENTION

[0143] The present invention allows to obtain a shin guard 1 which appears to be adaptable to a plurality of possible different conformations of the shin of a user. 5

[0144] The invention allows to obtain a shin guard 1 adaptable to the shin of a plurality of users.

[0145] Therefore, the invention provides a shin guard 1 that can be worn by a plurality of users.

[0146] The invention presents a shin guard 1 that is light and at the same time robust and capable to dampen and/or absorb forces deriving from impacts and therefore able to protect effectively, when in use, the shin of a user. In order to provide a lightness span of the shin guard 1 according to the invention, in the embodiment wherein the protective element 5 is made of polyamide such as nylon, the padding cushion 9a is in ethylene octane and the coating 9b is in polyurethane, the total weight of protective element 5 and padding element 9 can be between 40 and 50 grams, in particular equal to about 46 grams. 10 15 20

[0147] The present invention also provides a shin guard 1 which can be comfortably worn by a plurality of users.

[0148] Being light and comfortable, the shin guard 1 according to the invention can be worn by a user by offering optimal freedom of movement to users, who may not even notice that they are wearing it. 25

[0149] The shin guard 1 according to the invention is capable, by means of the articulation skeleton 11, to adapt optimally to the conformation of the shin of the user in such a way that prevents the creation of space between the shin guard 1 and the shin, avoiding the movement of the shin guard 1, a movement which, if present, would in fact create an unwanted sliding between shin guard 1 and the shin, which would cause annoying irritation of the skin of the user. 30 35

[0150] The invention therefore provides a shin guard 1 which is comfortable to wear and does not irritate the skin of the user.

[0151] These advantages described with reference to the shin guard 1 are also shared by the process of making the shin guard 1, the use of the shin guard 1 and the kit in accordance with the present invention. 40

[0152] It should be emphasized that the present invention fully achieves its purpose to provide a shin guard that always ensures an optimal fit and consequently prevents the onset of irritation and injuries to those who wear this shin guard. In fact, the modular configuration of the shin guard maximizes the adaptability of the shin guard to the shape of the shin of the user. 45 50

Claims

1. Shin guard (1) comprising: 55
 - at least a first shin guard module (2) and a second shin guard module (3), in particular ad-

jacent to each other, each shin guard module (2, 3) being specifically configured to protect and/or cover, under normal-use condition of the shin guard, a portion of a shin of a user,

- an articulation skeleton (11) in flexible material engaged to the first shin guard module and to the second shin guard module and configured to allow a relative movement between the first shin guard module and the second shin guard module.

2. Shin guard according to claim 1, wherein each shin guard module comprises:

- a protective element (5) having an elongated shape and, optionally, an at least partially concave profile,
- a padding element (9) joined to the protective element and intended to be interposed, under normal-use condition of the shin guard, between the protective element and the shin of the user, the padding element comprising in particular a padding cushion (9a) and a coating (9b) attached to the padding cushion, the padding cushion being interposed between the coating and the protective element, the coating being intended to be facing and/or to come into contact with the shin of the user under normal-use condition of the shin guard.

3. Shin guard according to claim 2, wherein each shin guard module also comprises a shell (10) which can be integrated or fixed to the protective element, the shell being configured to stiffen the respective shin guard module, the protective element being interposed between the shell and the padding element when the shell is fixed, coats of arms and/or symbols and/or alphanumeric characters and/or chromatic applications being in particular apt to be applied to the shell in order to obtain a customization of said shin guard.

4. Shin guard according to claim 2 or 3, wherein:

- the articulation skeleton comprises a first coupling element (12a) and a second coupling element (12b) configured to be secured respectively to the first shin guard module and to the second shin guard module,
- each protective element optionally comprises at least one seat (18a, 18b, 18c) housing a corresponding coupling element (12a, 12b, 12c) of the articulation skeleton, said at least one seat of the protective element of the first shin guard module housing the first coupling element and said at least one seat of the protective element of the second shin guard module housing the second coupling element.

5. Shin guard according to claim 4, wherein the articulation skeleton comprises at least one coupling band (12', 12'', 12''') extending transversely with respect to each protective element, the first coupling element being defined by a first coupling portion of said at least one coupling band and the second coupling element being defined by a second coupling portion of said at least one coupling band, optionally wherein the articulation skeleton comprises at least a first coupling band (12') and a second coupling band (12'') spaced from each other, each coupling band (12', 12'') being engaged to each protective element of said shin guard modules, for example by means of respective coupling portions (12a, 12b), in correspondence with respective portions of the same protective element longitudinally spaced apart, wherein in particular said articulation skeleton comprises at least one connection portion (11a) developing between said first coupling band and said second coupling band.
6. Shin guard according to any of the preceding claims, further comprising a third shin guard module (4), the first shin guard module being interposed between the second shin guard module and the third shin guard module, the articulation skeleton being attached also to the third shin guard module and being further configured to allow a relative movement between the third shin guard module and the first shin guard module and/or between the third shin guard module and the second shin guard module.
7. Shin guard according to any one of the preceding claims, wherein the first shin guard module and the second shin guard module are spaced from each other by an opening (13), optionally wherein the first shin guard module and the third shin guard module are also spaced from each other by an opening.
8. Shin guard according to any one of the preceding claims, wherein the first shin guard module and the second shin guard module are configured to be angularly offset from each other by means of the articulation skeleton.
9. Shin guard according to any one of the preceding claims, wherein said articulation skeleton has a substantially symmetrical configuration, preferably the shin guard being substantially symmetrical overall.
10. Process for making a shin guard (1), said shin guard being in particular in accordance with any one of the preceding claims, comprising the steps of:

- arranging an articulation skeleton in flexible material,
- engaging the articulation skeleton to the first shin guard module and to the second shin guard module, the connection between the first shin guard module and the second shin guard module providing the application of the articulation skeleton to corresponding surfaces of said first shin guard module and of said second shin guard module, in particular said surfaces being facing each other.

- arranging at least a first shin guard module (2) and a second shin guard module (3),

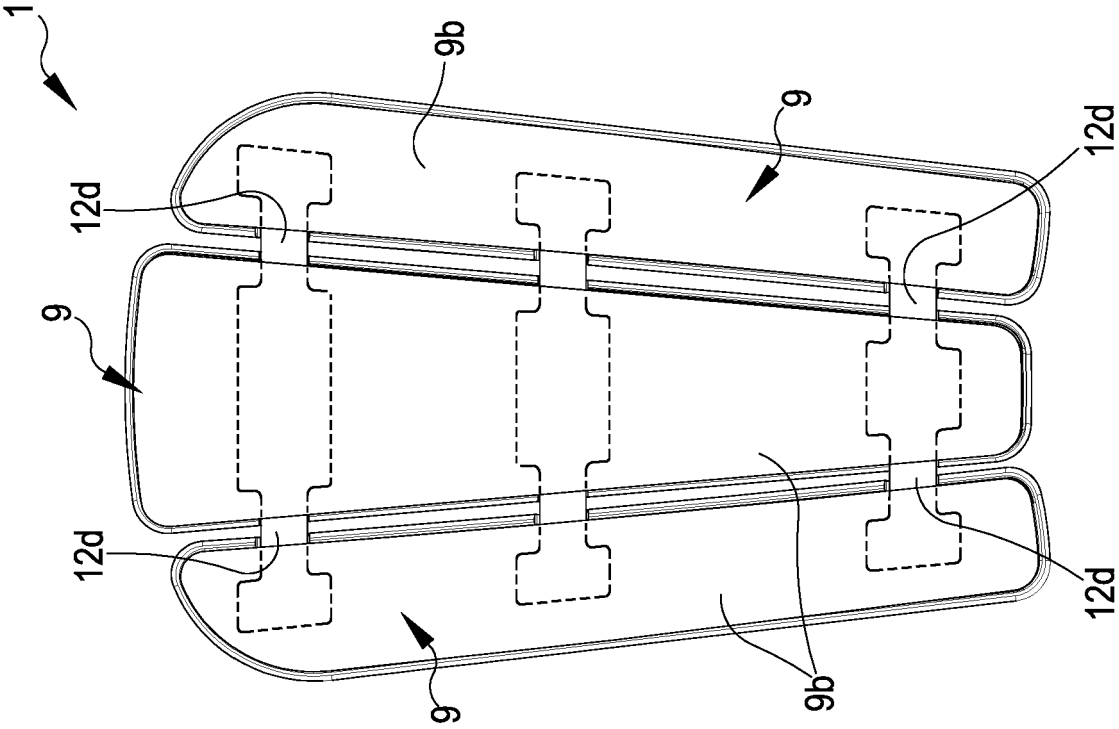


FIG. 2

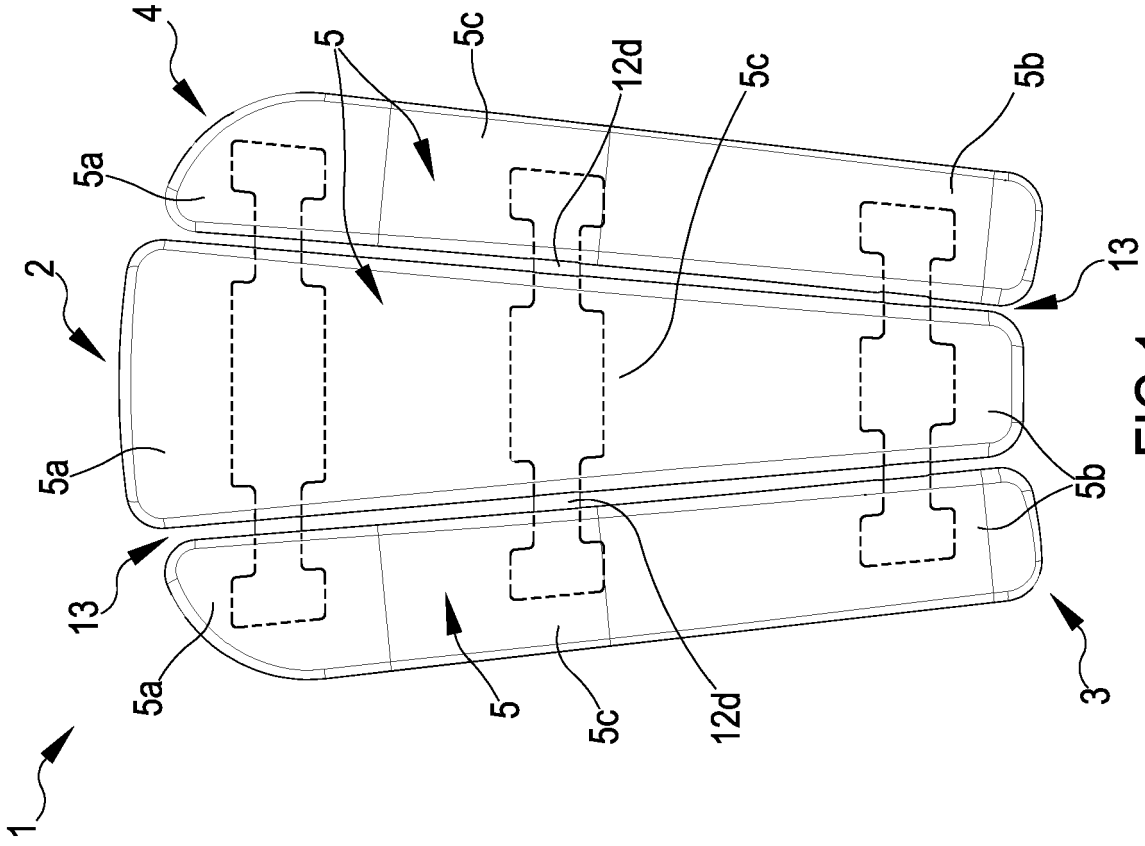


FIG. 1

FIG.3

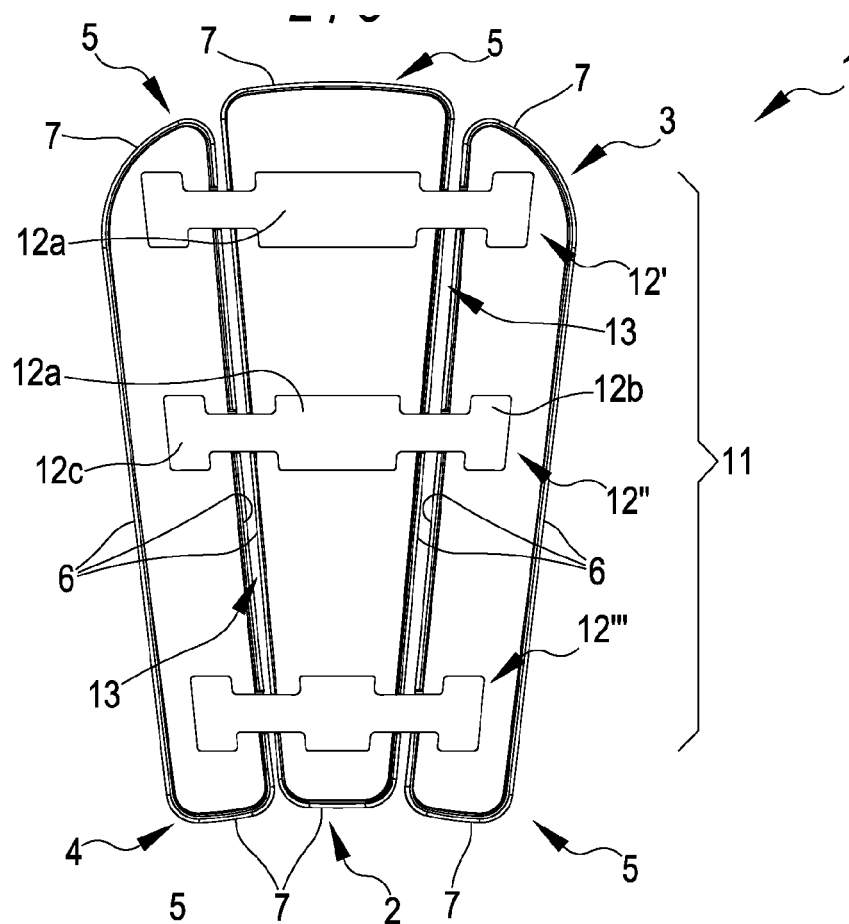


FIG.4

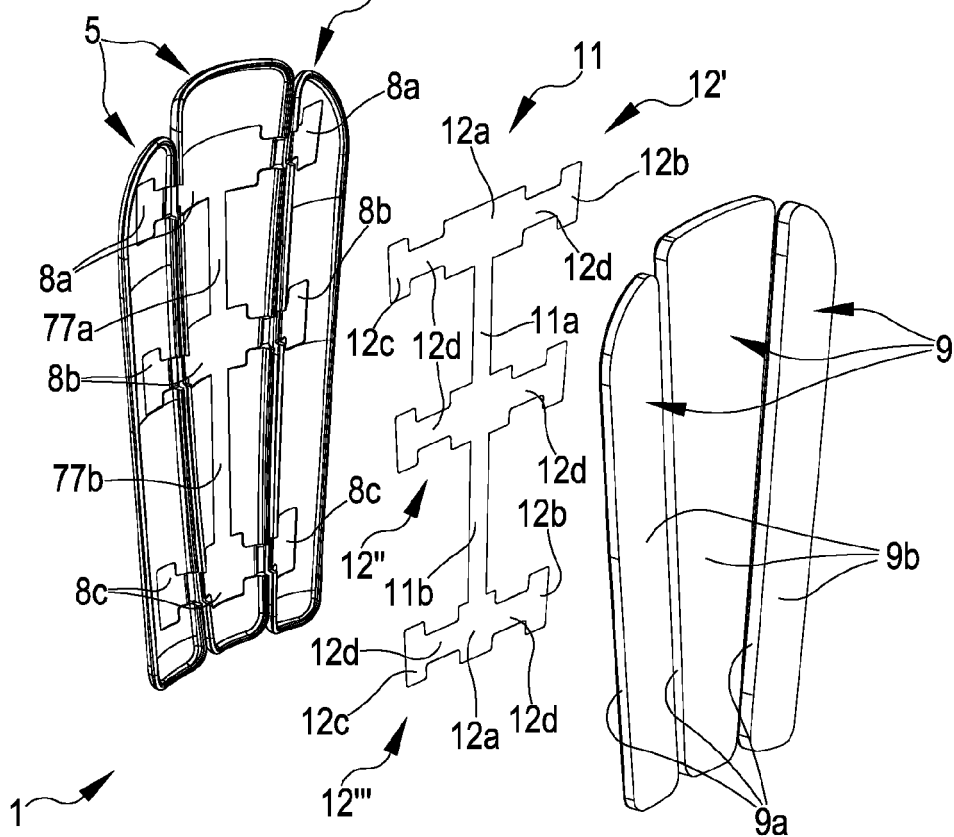


FIG.5A

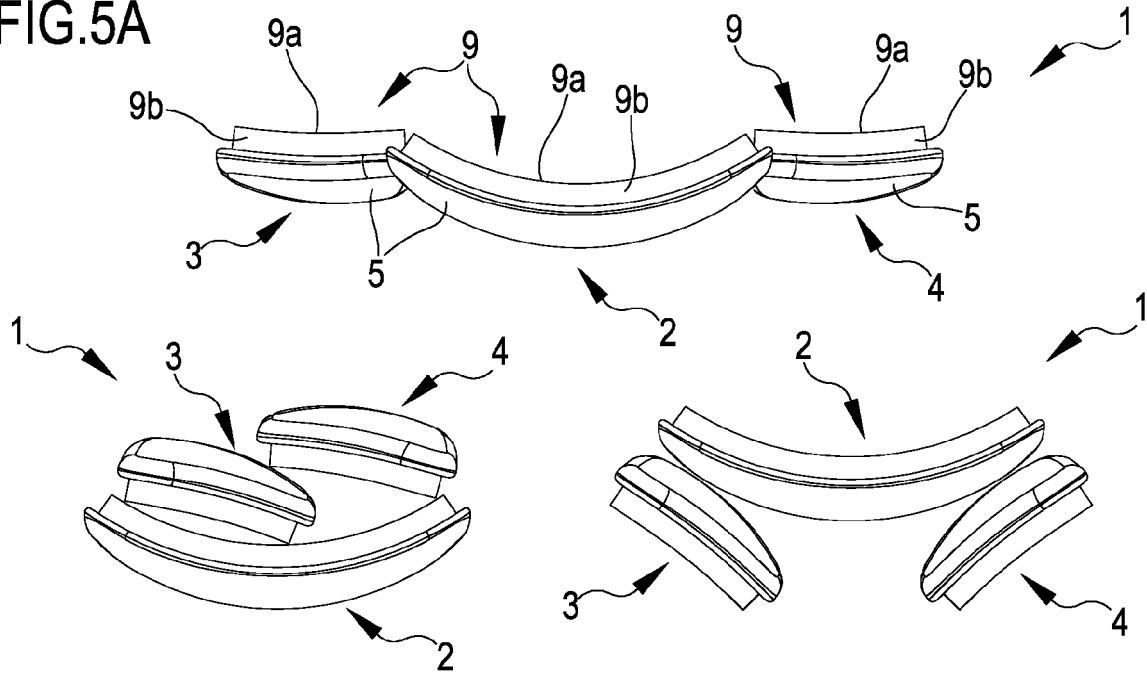
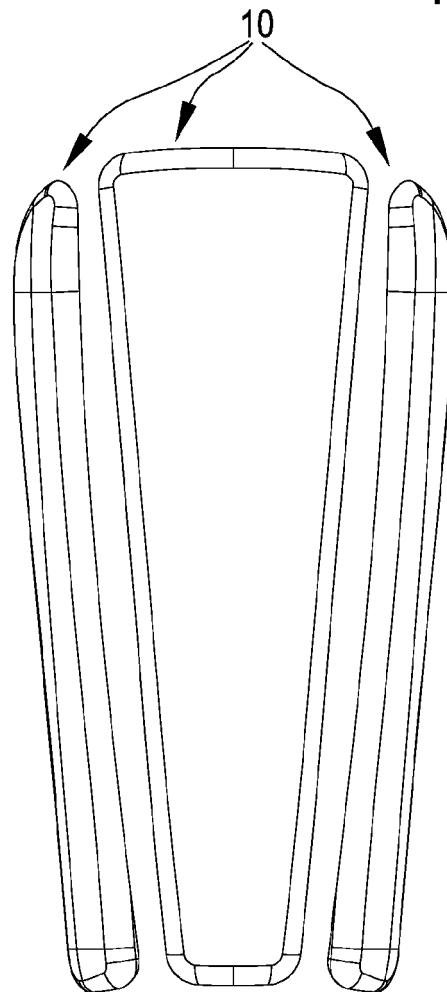


FIG.5B

FIG.5C

FIG.6





EUROPEAN SEARCH REPORT

Application Number
EP 20 20 9919

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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 18 March 2021	Examiner da Silva, José
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