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(54) FASTENING ASSEMBLY FOR SPORT ARTICLES

(57) The present invention relates to a fastening assembly (1) adapted to be applied to a sports article (100) provided with a pair of flaps (L1, L2) to be moved mutually towards/away. Said assembly (1) comprises a traction cable (10) which can be constrained with a first end portion (11) to a flap of said pair of flaps (L1, L2) and which can be associated, with at least one portion, with the other flap of said pair of flaps (L1, L2), and a reel-based tightening device (20) comprising a winding mechanism comprising a reel (21) with which there is asso-

ciated a second end portion (12) of said traction cable (10), said reel (21) being rotatable around a first rotation axis (X-X) to tension said second end portion (12) of said traction cable (10). Said reel-based tightening device (20) is adapted to be constrained to a flap of said pair of flaps (L1, L2) through pivot means (50) defining a second rotation axis (Y-Y), distinct and separate with respect to said first rotation axis (X-X), around which said reel-based tightening device (20) can oscillate in use.

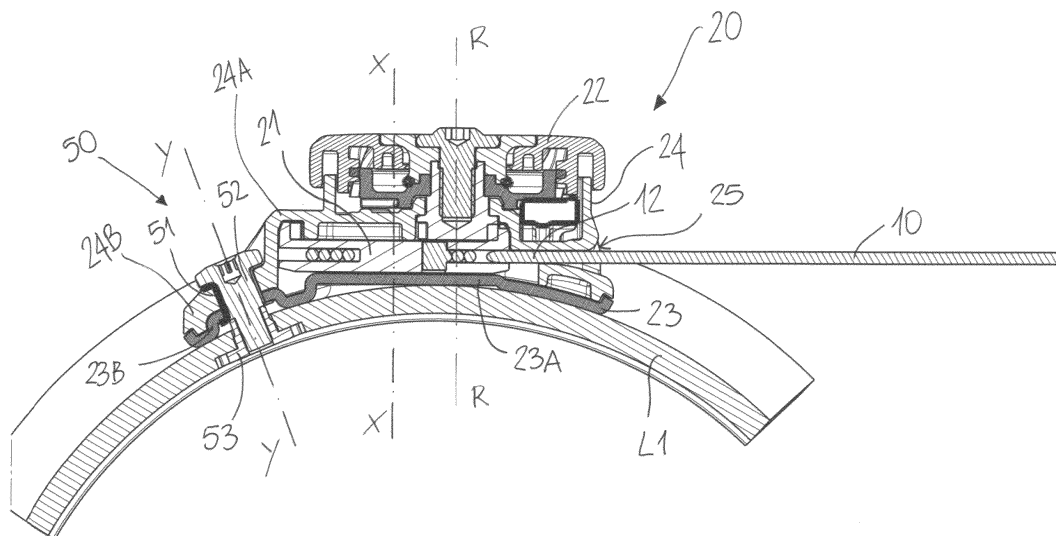


FIG. 3

Description

TECHNICAL FIELD OF THE INVENTION

[0001] The present invention relates to a fastening assembly comprising a reel-based tightening device adapted to be applied to sports articles, in particular sports footwear, such as for example ski boots or cycling shoes, however being also suitable to be applied to backpacks or clothing items.

[0002] Generally, a fastening assembly according to the present invention is used should there arise the need to controllably approach/release a pair of flaps by winding and releasing at least one traction element, such as a cable.

BACKGROUND OF THE INVENTION

[0003] Fastening assemblies which allow the releasable tightening of a traction cable have long been known and used to obtain the controlled fastening of a pair of flaps, whether of sports footwear or other articles. Such assemblies substantially comprise at least one traction cable, which can be constrained with a first end portion to a flap and which can be associated with at least one portion to the other flap of said pair of flaps to be fastened by means of a cable lug element, and a reel-based tightening device, fixed integrally joined with a flap of said pair of flaps, arranged and configured to tighten a second end portion of said traction cable.

[0004] The reel-based tightening device comprises a hollow containment casing inside which there is housed a winding mechanism provided with a reel with which there is associated the second end portion of said traction cable.

[0005] The winding mechanism is operatively connected to a knob through which the user rotatably actuates the reel to wind/unwind the cable around it.

[0006] At least one intermediate portion of the cable is associated with a second flap, so that the flaps can be progressively moved towards/away, and therefore the desired fastening action, by rotatably moving the reel-based tightening device.

[0007] Generally, the reel-based tightening devices of the fastening assemblies currently available on the market are firmly constrained by means of a fixing base to one of the flaps to be fastened, without the possibility of movement. However, in this manner, also due to their shape which protrudes significantly with respect to the surfaces of the flap, they could be impacted when performing sports activities, being damaged permanently without being replaceable.

[0008] By way of partial solution to such drawback, there were provided reel-based tightening devices in which the containment housing in which there is housed the winding mechanism is mounted on the respective flap through an interface base, from which it can be decoupled in the event it is subjected to a particularly

intense impact, safeguarding and therefore preventing the inner mechanism from breaking, but still remaining constrained to the flap through a traction cable. The casing may be subsequently reapplied on the interface base, restoring the regular operation of the device.

[0009] However, should the detachment of the casing containing the winding mechanism occur while performing sports activities, this could result in the sudden release of the fastening degree set by the user, risking the safety of the latter.

[0010] Furthermore, the operation for coupling the casing of the mechanism on the interface base is not easy at all, and such operation may not be carried out precisely even due to the fact that there is no possibility of aligning the winding mechanism with the traction direction of the cable, therefore potentially causing malfunctions of the winding mechanism.

SUMMARY OF THE INVENTION

[0011] The main task of the subject matter of the present invention is to provide a fastening assembly comprising a reel-based tightening device, adapted to be applied to a sports article provided with a pair of flaps to be moved mutually towards/away which overcomes the drawbacks highlighted above.

[0012] In the context of the present task, an object of the present invention to provide a fastening assembly provided with a reel-based tightening device which can effectively absorb any accidental impacts without being damaged.

[0013] Another object of the present invention to provide a fastening assembly that is strong and safe.

[0014] A further object of the present invention is to obtain a fastening assembly comprising a light reel-based tightening device, that is compact and provided with a profile remaining as close as possible to the surface of the article.

[0015] Yet another object of the present invention is to provide a fastening assembly that is easy to fit and cost-effective to manufacture.

[0016] Another object of the present invention to provide a fastening assembly in which, in use, the reel-based tightening device is capable of being independently aligned with respect to the traction direction of the cable, so as to enable the winding mechanism housed therein to run at optimal functionality thereof.

[0017] Lastly but not least, an object of the present invention is to provide a fastening assembly that can be obtained by using means and components that are readily available, and which can be obtained using usual and known plants, machines and equipment.

[0018] The task, objects and advantages indicated above, as well as others which will be more apparent in the description below, are attained by fastening assembly as defined in claim 1. Further advantageous characteristics of a fastening assembly according to the present invention are contained in the dependent

claims below.

BRIEF DESCRIPTION OF THE FIGURES

[0019] Advantages and characteristics of a fastening assembly for sports footwear according to the present invention will be better illustrated in the description of a particular, but not exclusive embodiments shown purely by way of non-limiting example in the attached drawings, wherein:

- FIG. 1 shows, with a perspective view, a sports footwear, in particular a ski boot with which there is associated a fastening assembly according to the present invention, comprising a reel-based tightening device;
- FIG. 2 shows, according to an exploded view, a reel-based tightening device of a fastening assembly according to the present invention; and
- FIG. 3 shows, with a cross-sectional view, a reel-based tightening device of a fastening assembly according to the present invention fitted and constrained to the flap of a sports article.

DETAILED DESCRIPTION OF THE INVENTION

[0020] The present invention relates to a fastening assembly 1 adapted to be associated with a sports article provided with a pair of flaps L1, L2 which can be superimposed or approached to attain the releasable and adjustable fastening thereof.

[0021] In the attached FIG. 1 a fastening assembly 1 according to the present invention is shown applied to a sports footwear 100, conveniently represented by a ski boot.

[0022] Said ski boot 100 comprises a shell 101 adapted to receive the foot of a user and essentially formed by a sole S, essentially defining a plane for supporting the foot, from which there depart, on opposite longitudinal sides, a first and a second flap L1, L2 adapted to be arranged respectively on the outer part and on the inner part of the foot, extending between a tip P, located in an area proximal to the tip of the foot, and a heel T, located at an area proximal to the heel of the foot, involving the lateral regions of the foot up to about the area of the malleoli area, and being faced or superimposed preferably in the upper area of the foot.

[0023] The fastening of the boot 100 conferred by the fastening assembly 1 according to the present invention may entail the approaching of the interface edges of said flaps L1, L2, between which there may possibly be positioned a tongue, or the slidable superimposition of one flap with respect to the other.

[0024] The boot 100 may further comprise a cuff 102, adapted to wrap around at least at the rear part the lower part of the leg of the user, said cuff 102 being preferably articulated to the shell 101 around suitable hinge means C, which define a rotation axis essentially horizontal and

parallel to the plane defined by the sole S.

[0025] The fastening assembly 1 according to the present invention is shown applied to the pair of flaps L1, L2 which form the shell 101 of the boot 100; clearly, to a man skilled in the art it will be clear that the same fastening assembly 1 may be equally applied also to a pair of flaps for example arranged at the cuff 102, as well as to any other portion of the upper of a footwear in which there is the need to releasably fasten a pair of adjacent flaps around the foot of the user.

[0026] Still with reference to FIG. 1, the fastening assembly 1 according to the present invention comprises at least one traction element 10, essentially formed by a cable or stranded wire, that is flexible and essentially inextensible, preferably metallic, which can be constrained to a first end portion 11, preferably through a cable lug 2, to a flap of said pair of flaps L1, L2, and which can be associated preferably with at least one intermediate portion to the other flap of said pair of flaps L1, L2 through suitable guide means 40, and a reel-based tightening device 20 which can be constrained with a flap of said pair of flaps L1, L2, arranged and configured to tighten a second end portion 12 of said traction element 10.

[0027] Possibly, said fastening assembly 1 may also comprise a lever fastening device 30, which can be constrained to a flap of said pair of flaps L1, L2, and arranged and configured to cooperate with an intermediate portion of said traction cable 10, as described in the patent Italian application No. 1 02023000012099 of the same Applicant.

[0028] Said lever fastening device 30 advantageously comprises a lever arm 31 that is rotatably movable around a pivot pin between an opening position, wherein it is raised and moved away from the surface of the flap to which it is applied, and a closing position, wherein it is lowered and adjacent to said flap, and in which in said opening position said traction cable 10 is not tightened by said lever arm 31 and in said closing position said traction cable 10 is tightened by a lever arm 31.

[0029] With reference to FIGS. 2 and 3, said reel-based tightening device 20 comprises a winding mechanism, of the known type, provided with a reel 21, rotatable around a first rotation axis X-X, with which there is associated said second end portion 12 of said traction cable 10.

[0030] Actuation means 22, such as a knob, are operatively connected to said reel 21 so as to allow the user to drive the latter in rotation around said first rotation axis X-X at least in a first rotation direction, or winding direction, so that said cable 10 is wound around the reel 21, progressively moving the flaps L1, L2 towards each other, therefore obtaining the desired fastening action thereof, and possibly also in the opposite rotation direction, or unwinding direction, so as to obtain the unwinding of the cable 10 from the reel 21 and therefore allow two flaps L1, L2 to move away from each other.

[0031] Said knob 22 is rotatable around a rotation axis R-R thereof, possibly coincident with the rotation axis X-X

of the reel 21 or, preferably, different from the latter, as shown in FIG. 3, so as to reduce, thanks to an appropriate reduction ratio, the effort that user must apply to pull the cable 10 and therefore obtain the fastening of the footwear 100.

[0032] Said winding mechanism may further comprise suitable and known retaining means adapted to retain the progressive position of the reel 21, so as to maintain the tensioning condition of the cable 10 achieved progressively, both in the winding direction and in the unwinding direction, therefore enabling to perform a micrometric and continuous adjustment of the closure of the flaps L1, L2 of the footwear 100, further providing the end-stop for the rotary movement of the reel 21, both in the winding direction and in the unwinding direction.

[0033] Possibly, following a control action by the user, for example carried out by acting on the knob 22, said retention means may further release the reel 21, enabling it to freely rotate around the rotation axis X-X in the unwinding direction so as to allow the quick release of the cable 10.

[0034] Said reel-based tightening device 20 further comprises a mounting base 23, preferably made of metal, adapted to be arranged, in use, on the outer surface of the flap of the footwear 100 and advantageously shaped at the lower part so as to essentially copy the curvature thereof. Advantageously, said mounting base 23 further defines, on the upper surface, a support seat 23A, essentially flat in use, whereon the winding mechanism rests.

[0035] Advantageously, said reel-based tightening device 20 further comprises a containment shell 24, preferably made of polymer material, which can be coupled at the upper part to said mounting base 23 and configured to protect the winding mechanism and support the knob 22.

[0036] Said containment shell 24 comprises a body portion 24A, that is hollow and preferably cylindrical-shaped, which can advantageously be positioned at the support seat 23A of the mounting base 23, in which there is housed the winding mechanism.

[0037] Conveniently, said body portion 24A of the containment shell 24 has a through side opening 25 configured to allow the sliding passage of the second end portion 12 of the cable 10, constrained to the reel 21 housed in the inner cavity thereof.

[0038] According to an advantageous characteristic of the present invention, said reel-based tightening device 20 can be constrained to a flap of said pair of flaps L1, L2 of the footwear 100 (shown by way of example in the figures as first flap L1) through pivot means 50 defining a second rotation axis Y-Y, that is distinct and separated from said first rotation axis X-X, around which said reel-based tightening device 20 can rotate in use.

[0039] Advantageously, both said first rotation axis X-X and said second rotation axis Y-Y extend, in use, each essentially orthogonal with respect to the surface of the flap L1 of the footwear 100 to which said reel-based

tightening device 20 is constrained.

[0040] As a result, given that generally the flaps of a footwear are shaped to wrap around the foot of the user and therefore having a curved shape, this entails that the first rotation axis X-X and the second rotation axis Y-Y are, in use, substantially transverse to each other, as better observed in FIG. 3.

[0041] Advantageously, said second rotation axis Y-Y is spaced from said first rotation axis X-X so as to extend outside the overall dimensions of the winding mechanism, and also preferably of the support seat 23A of the mounting base 23 and of the body portion 24A of the containment shell 24.

[0042] To this end, advantageously, said mounting base 23 defines a first fixing portion 23B, arranged laterally with respect to the support seat 23A, on which there is obtained a first mounting through hole 23C extending, in use, along said second rotation axis Y-Y and adapted to receive said pivot means 50 to constrain said reel-based tightening device 20 to the flap L1.

[0043] Preferably, also said containment shell 24 comprising a second fixing portion 24B, protruding laterally with respect to the body portion 24A, adapted to be arranged at the underlying first fixing portion 23B of said mounting base 23, and on which there is obtained a second mounting through hole 24C adapted to be arranged coaxial to said first mounting base 23C to receive said pivot means 50, so as to constrain said reel-based tightening device 20 to the flap L1 even through the containment shell 24.

[0044] Preferably, said second fixing portion 24B protrudes laterally from said body portion 24A in a position essentially diametrically opposite to the portion in which there is obtained said opening 25, the latter advantageously having a width such to allow said reel-based tightening device 20 to oscillate, in use, around said second rotation axis Y-Y by an angle of up to 60°.

[0045] Said pivot means 50 are conveniently configured to fix the reel-based tightening device 20 to the flap L1 allowing the oscillation thereof around said second rotation axis Y-Y.

[0046] Advantageously, said pivot means 50 comprise a hollow tubular element 51, such as a sleeve, adapted to be arranged along said second axis Y-Y and engage the first mounting hole 23C and, if provided for, said second mounting hole 24C. Said sleeve 51 may possibly be extend beyond the edge at the ends so as not to be removed by pulling axially and for retaining by coupling the mounting base 23 and the containment shell 24.

[0047] Said sleeve 51 preferably has an outer diameter slightly smaller than the diameter respectively of the first mounting hole 23C and of the second mounting hole 24C so as to allow an integrally joined rotation of the containment shell 24 and of the mounting base 23 of the reel-based tightening device 20 around the second rotation axis Y-Y.

[0048] Preferably, said pivot means 50 further comprise a fixing screw 52 provided with a head 52A and a

stem 52B, the latter having a diameter smaller than the diameter of the sleeve 51 and an extension along said second axis Y-Y greater than the extension of the sleeve 51, and a tightening nut 53 adapted to cooperate with the vacant end of said sleeve 52B.

[0049] In order to fix said reel-based tightening device 20 on the flap of the footwear 100 rotatable around said axis Y-Y, the stem 52B of the fixing screw 52 is received in the sleeve 51, inserting it from the side of the latter facing outwards, so that the end of the stem 52B distal from the end 52A protrudes from the opposite end engaging a through hole F obtained in the flap L1 of the footwear 100.

[0050] At this point, the tightening nut 53 is conveniently positioned in the footwear 100 and therefore preferably screwed to the end of said stem 52B, advantageously threaded, on the inner side of said flap L1 so as to prevent the removal of said fixing screw 52 from said sleeve 51.

[0051] Advantageously, said pivot means 50 are configured so that the oscillation of the fastening device 20 around the axis Y-Y is not free but frictioned due to the frictions generated by the pressure exerted by the fixing screw 52. Such pressure may possibly be set, and subsequently changed, by controlling the screwing torque that is exerted on the fixing screw 52 by acting on the head 52A of the latter with a specific and known tool.

[0052] In a preferred embodiment, shown in FIGS. 2 and 3, said pivot means 50 are configured so that the fixing screw 52 and the tightening nut 53 arranged on the inside of the flap of the footwear 100 are axially packed, so as to obtain a repeatable and controlled closure.

[0053] To this end, the stem 52B of said fixing screw 52 comprises a first stem portion 52C, proximal to said head 52A, having a diameter larger than a second stem portion 52D, arranged distal from the head 52A, therefore defining a shoulder 52E between them.

[0054] Said tightening nut 53 is preferably of the T-shaped type and it comprises a counteracting plate 53A, adapted to rest, in use, against the inner surface of the flap L1 of the footwear 100, from which there protrudes a seat body 53B, that is hollow and preferably threaded internally, adapted to receive the second stem portion 52D, advantageously threaded, which is screwed until the shoulder 52E abuts against the upper edge thereof, as shown in FIG. 3.

[0055] This advantageously allows to eliminate the possibility that the rotation of the reel-based tightening device 20 caused by an impact generates unwanted rotations of the fixing screw 52 which can, over time, loosen the coupling with the fastening screw 53, with the risk of full detachment of the screw 52 and therefore of the device 20.

[0056] As a matter of fact, the rotation of the device 20 occurs around the sleeve 51, while the screw 52 is stably kept in position and it is not involved in the rotation. Furthermore, the friction between the mounting base 23 and the flap L1 of the footwear 100 to which the reel-based tightening device 20 is fixed is predefined

and essentially constant.

[0057] In conclusion, it is clear that the present invention allows to attain the initially envisaged objects and advantages. As a matter of fact, provided herein is a fastening assembly 1 comprising a reel-based tightening device 20 adapted to be applied to a sports article, such as in particular but not exclusively a footwear, provided with a pair of flaps to be moved mutually towards/away that is strong and safe.

[0058] As a matter of fact, in the event of an inadvertent impact of a foreign body on the reel-based tightening device 20 for example when performing sports activities, the possibility of the latter to oscillate around a second rotation axis Y-Y defined by said pivot means 50, it confers a further degree of freedom with respect to the conventional solutions in which the reel-based tightening device 20 is fixed statically, therefore being able to effectively absorb the impact, without being damaged and without resulting in the detachment of the device 20 from the flap to which it is fixed, therefore ensuring greater safety for the user.

[0059] Furthermore, it is clear that the possibility of oscillating around said second axis Y-Y enables to maintain the alignment between the cable 10 and the reel-based tightening device 20 at all times, therefore obtaining an effective distribution of the loads.

[0060] Should the winding mechanism of the reel-based tightening device 20 reveal malfunctions for example due to wear, it is quick and immediate to replace, given that it can be done even by inexperienced operators by unscrewing, using a common tool, the screw 52 which is arranged in a position that is easily accessible given that it is outside the body portion 24A of the containment shell 24 which houses the winding mechanism.

[0061] Given the position of the pivot means 50, the reel-based tightening device 20 of the fastening assembly 1 of the present invention is rather compact and provided with a profile remaining as close as possible to the surface of the article with respect to those of the prior art.

[0062] Furthermore, given that it can be constrained to the flap of the sports article through pivot means 50 formed by few and simple elements, it is even lighter and this characteristic is rather valued when performing sports activities.

[0063] Advantageously, in use, the reel-based tightening device according to the present invention can be independently aligned with respect to the traction direction of the traction cable, therefore ensuring optimal functionality of the winding mechanism housed therein.

[0064] Obviously, the present invention is susceptible of numerous applications, modifications or variants without departing from the scope of protection, as defined in the attached claims.

[0065] Furthermore, the materials and equipment used in the present invention, as well as the shapes and dimensions of the individual components, may be the most appropriate depending on the specific require-

ments.

Claims

1. Fastening assembly (1) adapted to be applied to a sports article (100) provided with a pair of flaps (L1, L2) to be moved mutually towards/away, said assembly (1) comprising:

- a traction cable (10) adapted to be connected with a first end portion (11) to a flap of said pair of flaps (L1, L2) and associable, with at least a portion, to the other flap of said pair of flaps (L1, L2),
- a reel-based tightening device (20) comprising a winding mechanism comprising a reel (21) with which a second end portion (12) of said traction cable (10) is associated, said reel (21) being rotatable around a first rotation axis (X-X) for tensioning said second end portion (12) of said traction cable (10),

characterized in that said reel-based tightening device (20) is adapted to be connected to a flap of said pair of flaps (L1, L2) through pivot means (50) defining a second rotation axis (Y-Y), distinct and separate from said first rotation axis (X-X), around which said reel-based tightening device (20) can oscillate, in use.

2. Fastening assembly (1) according to claim 1, wherein said first rotation axis (X-X) and said second rotation axis (Y-Y) extend, in use, essentially orthogonally to the surface of the flap of said pair of flaps (L1, L2) with which said reel-based tightening device (20) is associated.
3. Fastening assembly (1) according to claim 1 or 2, wherein said second rotation axis (Y-Y) is spaced from said first rotation axis (X-X) so as to extend outside the overall dimensions of said winding mechanism.
4. Fastening assembly (1) according to any one of the preceding claims, wherein said reel-based tightening device (20) comprises a mounting base (23) adapted to be arranged, in use, on an outer surface of a flap of said pair of flaps (L1, L2) and defining a support seat (23A) on which there rests said winding mechanism, and a first fixing portion (23B), arranged laterally with respect to said support seat (23A), on which there is obtained a first mounting through hole (23C) extending, in use, along said second rotation axis (Y-Y) and adapted to receive said pivot means (50).
5. Fastening assembly (1) according to claim 4, where-

in said reel-based tightening device (20) comprises a containment shell (24) adapted to be coupled to said mounting base (23) and configured to support actuation means (22) operatively connected to said reel (21), said containment shell (24) comprising a hollow body portion (24A) adapted to be arranged at said support seat (23A) and provided with a side opening (25) configured to allow the sliding passage of said second end portion (12) of said traction cable (10).

6. Fastening assembly (1) according to claim 5, wherein said containment shell (24) further comprises a second fixing portion (24B), protruding laterally with respect to said body portion (24A), adapted to be arranged at the first fixing portion (23B) of said mounting base (23), and on which there is obtained a second mounting through hole (24C) adapted to be arranged coaxial to said first mounting hole (23C) to receive said pivot means (50).
7. Fastening assembly (1) according to claim 6, wherein said second fixing portion (24B) protrudes from said body portion (24A) in a position essentially diametrically opposite to the portion on which there is obtained said side opening (25), said side opening (25) having a width adapted to allow said reel-based tightening device (20) to oscillate around said second rotation axis (Y-Y) by an angle of up to 60°.
8. Fastening assembly (1) according to any one of the preceding claims, wherein said pivot means (50) comprise a hollow tubular element (51) adapted to be arranged, in use, along said second rotation axis (Y-Y), a fixing screw (52) provided with a head (52A) and a stem (52B), said stem (52B) being configured to be received in said tubular element (51) by inserting it from a side facing outwards of said flap, and a tightening nut (53) adapted to cooperate with the end of said stem (52B) from the inner side of said flap to prevent the removal of said fixing screw (52) from said tubular element (51).
9. Fastening assembly (1) according to claim 8, wherein said stem (52B) comprises a first stem portion (52C) proximal to said head (52A) and a second stem portion (52D) distal from said head (52A), said first stem portion (52C) having a section larger than said second stem portion (52D) so as to define a shoulder (52E) between them, said tightening nut (53) comprising counteracting plate (53A) adapted to rest, in use, against said inner surface of the flap, and a seat body (53B) configured to receive said second stem portion (52D) of said stem (52B) up to said shoulder (52E).
10. Sports article (100) comprising a fastening assembly (1) according to any one of claims 1 to 9.

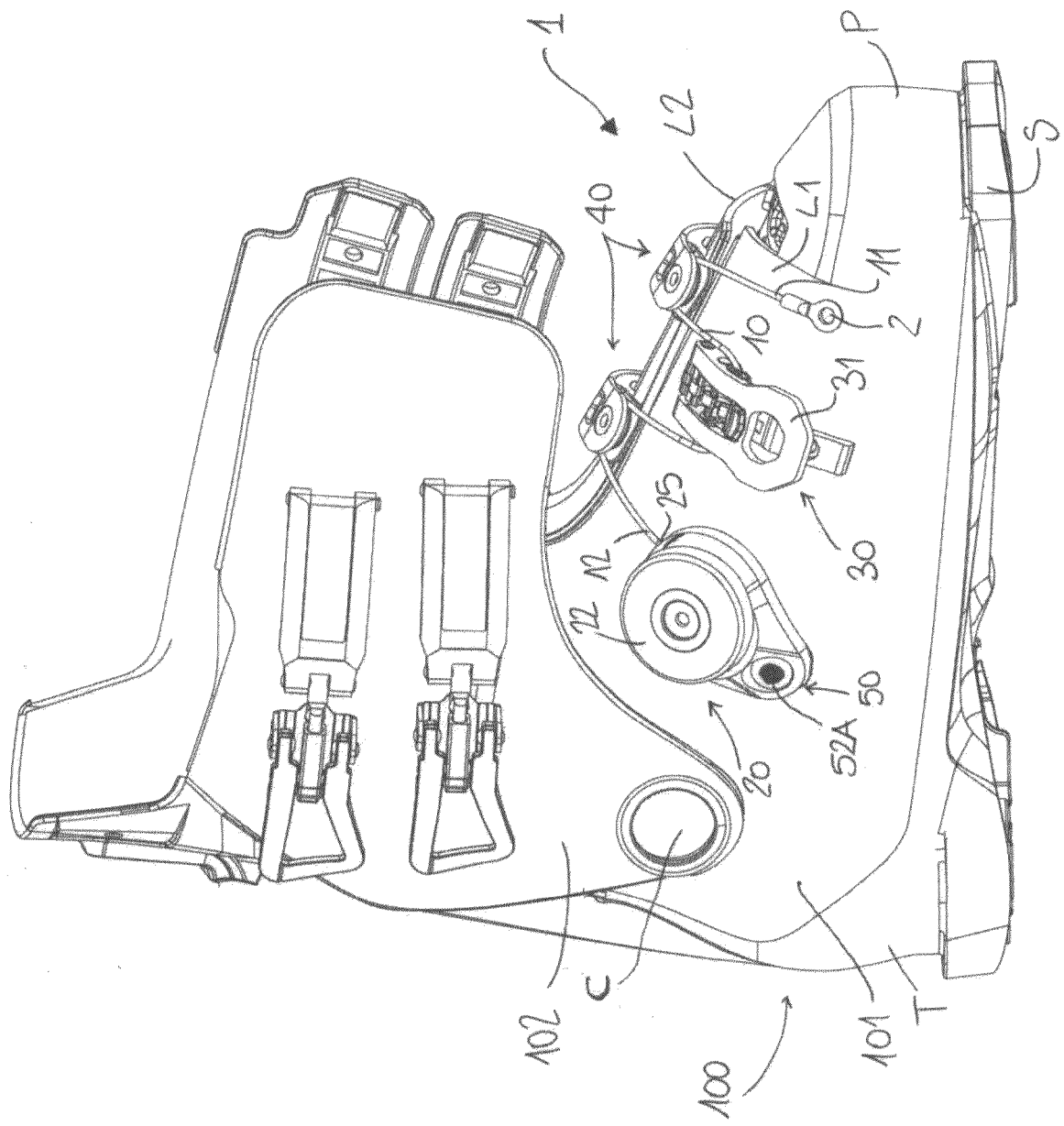


FIG. 1

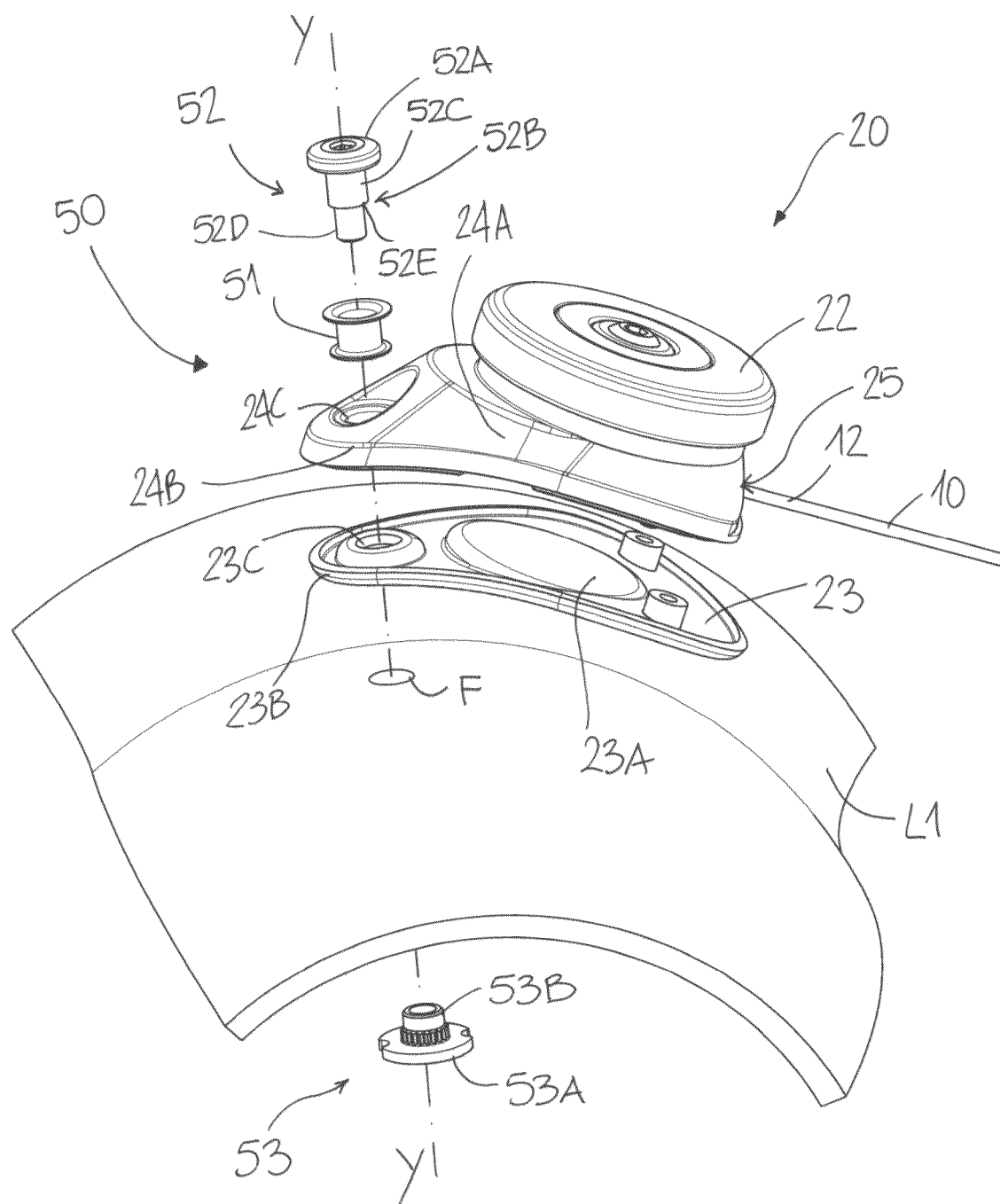
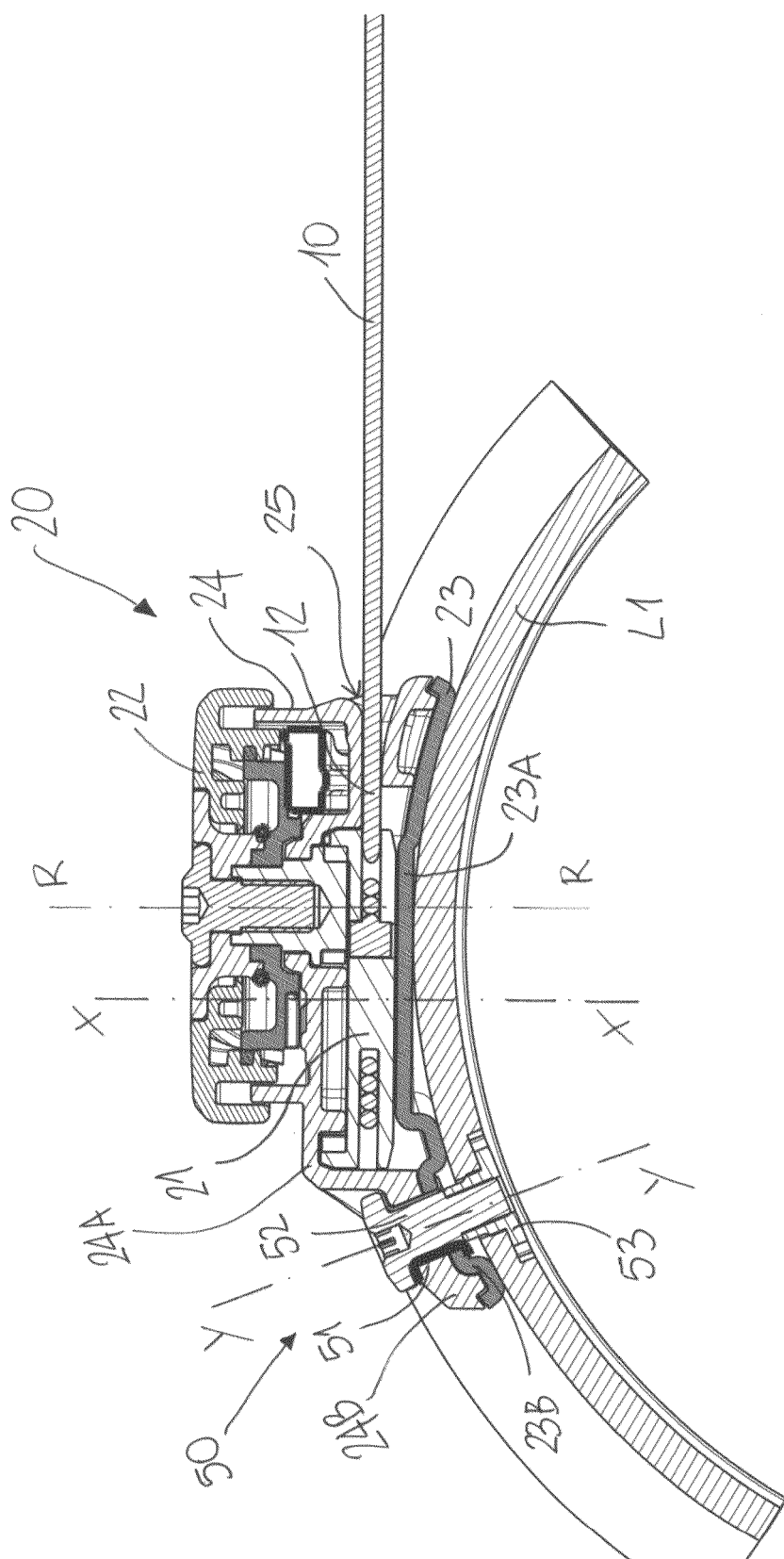


FIG. 2



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EUROPEAN SEARCH REPORT

Application Number

EP 24 21 3954

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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