SPORTS BOOT SHELL WITH COMFORT SOCK

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ABSTRACT
A sports boot shell of which at least a part of the wall is composed of a sock covered with a rigid material in plastics material, wherein the sock includes, on its inner surface, an insulating means limiting losses of heat by radiation, which may be a polyurethane coating that includes aluminum particles or aluminum pieces bonded on the inner surface. The process for manufacturing such a boot comprises the step of lasting the sock prior to injection-overmolding of plastics material in order to form the wall of the shell.
SPORTS BOOT SHELL WITH COMFORT SOCK

BACKGROUND OF THE INVENTION

[0001] The invention relates to a sports boot shell or sports boot shell subassembly and also to the sports boot itself, and is particularly suited to the field of boots for boards for gliding, such as skiing or snowboarding, or skating boots, which are subjected to significant stresses during use and for which a particularly robust structure is required, although they must offer a high level of comfort, particularly as regards warmth. The invention also relates to a process for manufacturing such a shell.

[0002] A ski boot is a good example of a sports boot that, on the one hand, has to be very robust and, on the other, has to offer a high level of comfort. Indeed, such a boot is subject to numerous stresses during use and consequently has to be very strong. A high level of stiffness is also required in order to achieve a good performance on the part of the boot, which, as intermediary between the skier and the ski, transmits the skier’s effort to the ski in order to guide the latter. However, its constraints in terms of comfort are also significant. The boot must, in particular, have sufficient flexibility to enable the skier to open it in order to put it on and to take it off, enable him to flex his knees forward in order to ski, and provide him with sufficient comfort, particularly in terms of warmth, despite being used in extreme temperature conditions and in a wet, aggressive environment.

DESCRIPTION OF THE PRIOR ART

[0003] As a response to these significant, contradictory constraints, prior-art boots are composed of a stiff upper into which a liner is inserted. The stiff upper is composed of a shell surrounding the foot and a collar articulated on this shell and surrounding the lower leg. This upper is made from stiff material and is produced via a process of dual injection-molding of two plastics materials of different stiffness, in which the quantity of each of these materials is stipulated for each zone of the upper in order to satisfy the requirements for stiffness and comfort. The role of the inner liner for accommodating the foot is to guarantee the skier’s comfort.

[0004] Such conventional boots present the following drawbacks:

[0005] the upper is often too uncomfortable for the skier and the liners do not sufficiently offset this weakness in order to achieve a satisfactory overall level of comfort;

[0006] the upper requires complex liners in an attempt to obtain maximum comfort;

[0007] the upper is unattractive.

[0008] Patent FR 1 565 339 describes a solution that is slightly different and consists in providing a lining inside the shell and a manufacturing process based on the overmolding of a plastics material over this lining shaped in a mold. This solution is, however, insufficient to fulfill the comfort and stiffness constraints.

[0009] Patent EP 1 172 042 describes a boot consisting of a flexible upper in a textile material in the form of a boot and of a shell injection-molded in relatively stiff plastic; the upper and the shell being secured together by means of the injection-molding of a flexible plastics material between the flexible upper and the shell, via the bottom. This solution is, however, insufficient to fulfill the comfort and stiffness constraints.

[0010] There is therefore a need for another solution that attempts to fulfill the stiffness and comfort constraints, particularly in terms of warmth, mentioned above.

SUMMARY OF THE INVENTION

[0011] An object of the present invention consists in proposing a sports boot that does not present the drawbacks of the prior art.

[0012] More precisely, a first object of the present invention consists in proposing a sports boot that offers good comfort, particularly in terms of warmth, and presents satisfactory stiffness.

[0013] A second object of the invention consists in proposing a sports boot that is esthetically attractive.

[0014] A third object of the present invention consists in proposing a sports boot whose manufacturing process remains simple.

[0015] According to the concept of the invention, the sports boot is based on an upper whose comfort is improved by means of a wall comprising an inner comfort sock that has insulating thermal properties with regards to thermal radiation.

[0016] More precisely, the invention is based on a sports boot shell of which at least part of the wall is composed of a sock covered with a rigid layer in a plastics material, wherein the sock includes, on its inner surface, an insulating means limiting losses of heat by radiation.

[0017] The insulating means may consist of pieces of aluminum sheet bonded to the inner surface of the sock or of a polyurethane coating that includes particles of material possessing properties of reflection of thermal radiation, these particles possibly being made from aluminum.

[0018] According to a further variant embodiment, the polyurethane coating forms a first inner layer of the sock, which is covered by an intermediate foam layer insulating against conduction of heat, then by a third layer in a compatible material in order to allow overmolding of a plastics material.

[0019] The sock may occupy a wide surface surrounding the foot and be connected to a part in flexible plastics materials forming at least one flap over the instep, which may itself be linked to a very flexible part, in leather, plastics or fabric, in order to form at least one very flexible flap.

[0020] Advantageously, the stiff plastics material then covers the sock and its link with the flexible plastics material. A third plastics material may also cover the border zone between these two plastics materials.

[0021] The invention also relates to a sports boot, and is particularly adapted for a ski boot that includes a shell as described above.

[0022] The invention also relates to the process for manufacturing a sports boot shell comprising the following steps:

[0023] production of a sock from a fabric having a property of thermal insulation against radiation;
lasting of the sock obtained;

injection-overmolding of a plastics material over the entire surface occupied by the sock.

This process may include a step of linking the sock having a notch with a first flexible plastics material in order to form at least one flap covering the notch, then the injection-overmolding of the second plastics material so as to cover this link between the sock and the first plastics material, then the injection-overmolding of a third plastics material over the linking zone between the first two plastics materials.

DESCRIPTION OF THE DRAWINGS

These objects, characteristics and advantages of the present invention will be set forth in detail in the following description of a particular embodiment given by way of non-limiting example in connection with the attached figures, in which:

FIG. 1 shows a perspective view of a ski boot shell according to one embodiment of the invention;

FIG. 2 diagrammatically shows what would be a sectional view on II-II of the shell of FIG. 1, in which the thicknesses of the various layers are deliberately exaggerated and the shapes simplified for reasons of clarity.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIGS. 1 and 2 illustrate a very sophisticated embodiment of the invention applied to a ski boot shell. This shell is composed of three plastics materials 1, 2, 3 obtained by means of three injection-molding operations. The zone in plastics material 1 is relatively flexible and connected to more flexible parts 4, in leather, plastics or fabric, by means of stitching 5 in order to form two flexible flaps in the zone corresponding to the instep and extending as far as the lower leg in order to make it easier to put the boot on. The other end of these parts in plastics material 1 is connected by stitching 6 to an inner sock 7 that therefore has a notch at the level of the instep zone, as shown in FIG. 2.

The sock 7 occupies a wide surface around the foot and includes aluminum in order to form a wall having a property of reflecting thermal radiation, which has the effect of preventing cooling of the inner liner and, more particularly, of the foot placed in this liner, which is at a higher temperature than the outside temperature, by heat radiation. More precisely, use is made for this sock of an aluminized polyurethane-coated fabric, the coating being placed on the inner face of the sock facing the liner, which has, by virtue of the presence of aluminum particles, the sought-after thermal property, associated, furthermore, with a bi-directional elastic property by virtue of the polyurethane coating, which is advantageous for lasting and manufacturing the sock and the shell. This fabric also has an attractive aesthetic appearance, demonstrating and directly taking advantage of the technical effect used in the present invention.

A variant embodiment of this sock 7 (not shown) consists in providing three superposed layers:

the inner layer will likewise be an aluminized polyurethane-coated fabric;

an intermediate layer will include an insulating foam in order to limit losses of heat by heat conduction while fulfilling a shock-absorbing function;

a layer of attaching material compatible with the injection-overmolded plastics 2 in order to allow overmolding and good adhesion as will be described below. The attaching material may be a woven or non-woven fabric.

As a supplementary variant embodiment, metallic particles other than aluminum, offering similar properties, may be used.

Lastly, a further manufacturing variant may consist in bonding pieces or cutouts of aluminum film onto the inner surface of the sock. In order to obtain the elasticity required for lasting of the sock, these pieces of aluminum sheet will be smaller on those parts of the sock 7 that require greater elasticity because they undergo significant deformation during lasting, corresponding to the lateral parts of the foot, for example, and strips of larger dimensions will be used for the other parts of the sock, such as the sole and the toe. A kind of mosaic of aluminum pieces will thus be created on the inner surface of the sock, making it possible to obtain an effect equivalent to that obtained by the preceding variant embodiments. It should be noted that it is unnecessary to cover the entire surface of the sock, but the effect obtained will be all the greater if a larger surface area of the foot is covered, more particularly if the surfaces that are most vulnerable to the cold are covered.

Finally, the essential characteristic of the invention is that the sock 7 should include, on its inner surface, an insulating means limiting losses of heat by radiation.

The sock 7 as a whole is covered by a stiff plastics material 2 that gives the shell its stiffness in its lower part. This zone in plastics material 2 therefore occupies a surface surrounding the foot around a wide notch extending over the instep and rising as far as the lower leg. It also covers the stitching 6 between the flap and the sock 7 in order to protect it and to guarantee its leaktightness. The plastics material 2 is obtained by an injection-molding operation over the sock 7 and over the stitching 6, which results in adhesion between the zone in material 2 and the sock 7.

The material of the sock 7 is thus chosen to withstand the temperature of the injection-molded plastics material.

Lastly, in the embodiment shown, zones in a third plastics material 3 are obtained by means of a third injection-molding operation. This material 3 makes it possible to obtain esthetic effects in zones of the shell where only the material 2 is present and also attractive esthetic effects in other zones where the three different materials combine, while still making it possible to obtain different mechanical properties through the combination of plastics materials having different properties. Furthermore, this material 3 covers a large surface area of the linking zone 8 between the above two plastics materials 1 and 2, which improves the performance of this link in terms of longevity, leaktightness and strength. Indeed, this zone 8 comprises the axes of rotation of the flaps formed by the plastics material 1 and the very flexible part 4 relative to the stiffer shell in plastics material 2 and thus undergoes particular, repetitive stresses. Moreover, this zone 8 also includes the stitching 6 between the sock 7 and the material 1, which is fragile by nature and
not leaktight. For these reasons, this zone is more vulnerable and justifies the superposition of the three plastics materials 1, 2, 3 obtained by triple injection-molding.

[0042] In brief, a first solution for achieving the sought-after objects consists in providing a shell whose wall includes an inner sock having properties of insulation against losses of heat by radiation and an attractive aesthetic appearance. A second, supplementary solution consists in providing flexible flaps based on flexible plastics, leather, fabric or any equivalent flexible material. A third solution consists in making provision for a triple injection-molding operation in order to superpose three layers of plastics materials over certain zones that are particularly vulnerable.

[0043] The preceding sophisticated embodiment described above with reference to FIGS. 1 and 2 combines the three above solutions by way of example.

[0044] Nevertheless, other variant embodiments or combinations may be envisaged. For example, one of the simplest solutions could consist in a shell composed of a sock comprising an aluminized polyurethane coating covered by a single plastics material, also forming the flaps, obtained by a single plastics injection-molding step.

[0045] The invention also relates to the process for manufacturing such a ski boot shell, which comprises the following steps:

[0046] production of a sock 7 on the instep from a substantially elastic fabric having a property of thermal insulation against radiation;

[0047] lasting of the sock 7 obtained;

[0048] injection-overmolding of a plastics material 2 over the entire surface occupied by the sock 7.


[0050] As a variant embodiment, the first step may consist in bonding pieces of aluminum sheet on the inner surface of the sock.

[0051] As illustrated by the embodiment of FIGS. 1 and 2 described above, the manufacturing process may also comprise the following supplementary steps:

[0052] before lasting of the sock 7, linking 6 between the sock 7 having a wide notch over the instep and an assembly 1, 4 in order to close the notch and to form at least one flap; more precisely, this step may include the production of a first stitching 5 between a part in plastics material 1 formed by injection-molding and a flexible element 4 and a second stitching between the part in plastics material 1 and the sock 7;

[0053] a last stage of injection-molding a third plastics material 3 over the two plastics materials 1 and 2 in their linking zone 8 may be effected.

[0054] Finally, the advantages of the solution are thus as follows:

[0055] the boot shell globally retains a conventional plastics material structure and thus has significant stiffness;

[0056] the shell has a wall insulating against losses by thermal radiation in order to conserve the foot’s heat, which increases its comfort;

[0057] the shell has an attractive aesthetic appearance for its inner wall by virtue of the material used for its radiation-reflecting properties, of the aluminum type, which also demonstrates implementation of the invention;

[0058] according to a supplementary variant embodiment, the shell may comprise flexible flaps that make it much easier for the boot to be put on and taken off, thereby further increasing its comfort;

[0059] according to a supplementary variant embodiment, the shell may comprise the superposition of three layers of plastics material, obtained by a triple injection-molding process, in order to reinforce certain zones that would possibly be made fragile and to enhance the aesthetic appearance of the outer wall of the boot. It should be noted that this triple injection-molding operation could, in fact, also be used in any boot in order to take advantage of its primary function of mechanical reinforcement of a more fragile zone and of its second function of decorating the outer surface of a boot;

[0060] the process for manufacturing such a shell remains simple, based essentially on injection-molding steps as in the prior art;

[0061] this shell allows the use of liners that are not as warm and/or globally less comfortable.

[0062] The embodiment described above relates to ski boots, but the concept of the invention could be reproduced for any other sports boot subject to similar constraints.

1. A sports boot shell of which at least part of the wall is composed of a sock (7) covered with a rigid layer in a plastics material (2), wherein the sock (7) includes, on its inner surface, an insulating means limiting losses of heat by radiation.

2. The sports boot shell as claimed in claim 1, wherein the insulating means consists of pieces of aluminum sheet bonded to the inner surface of the sock (7).

3. The sports boot shell as claimed in claim 1, wherein the insulating means is a polyurethane coating that includes particles of material possessing properties of reflection of thermal radiation.

4. The sports boot shell as claimed in claim 3, wherein the insulating means is a polyurethane coating that includes aluminum particles.

5. The sports boot shell as claimed in claim 3, wherein the polyurethane coating forms a first inner layer of the sock, which is covered by an intermediate foam layer insulating against conduction of heat, then by a third layer in a compatible material in order to allow overmolding of a plastics material (2).

6. The sports boot shell as claimed in claim 1, wherein the sock (7) occupies a wide surface surrounding the foot and is connected (6) to a part in flexible plastics material (1) forming at least one flap over the instep.

7. The sports boot shell as claimed in claim 6, wherein the plastics material (1) is linked (5) to a very flexible part (4) in order to form at least one very flexible flap.

8. The sports boot shell as claimed in claim 6, wherein the plastics material (2) covers the sock (7) and its link (6) with the plastics material (1).
9. The sports boot shell as claimed in claim 8, wherein a third plastics material (3) covers the border zone (8) between the two plastics materials (1, 2).

10. A sports boot that includes a shell as claimed in claim 1.

11. A process for manufacturing a sports boot shell as claimed in claim 1, comprising the following steps:
   production of a sock (7) from a fabric having a property of thermal insulation against radiation;
   lasting of the sock (7) obtained;
   injection-overmolding of a plastics material (2) over the entire surface occupied by the sock (7).

12. The process for manufacturing a boot shell as claimed in claim 11, wherein production of the sock (7) comprises a step consisting in bonding aluminum pieces onto its inner surface.

13. The process for manufacturing a boot shell as claimed in claim 11, which also comprises the following step prior to lasting of the sock (7):
   linking (6) the sock (7) having a notch with a plastics material (1) in order to form at least one flap covering the notch;
   and wherein injection-overmolding of the second plastics material (2) covers this link (6) between the sock (7) and the first plastics material (1).

14. The process for manufacturing a boot shell as claimed in claim 13, which also comprises the supplementary step consisting in injection-molding a third plastics material (3) over the linking zone (8) between the two first plastics materials (1, 2).

15. The process for manufacturing a boot shell as claimed in claim 11, which also comprises the step of forming at least one flap via a link between the first or the second plastics material (1, 2) and a very flexible part (4), in leather, plastics or fabric.