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(54) **SKI BOARD WITH GEOMETRICALLY CONTROLLED TORSION AND FLEX**

SNOWBOARD MIT GEOMETRISCHER KONTROLLE DER TORSION UND DER BIEGSAMKEIT

SKI COMPACT A TORSION ET FLEXION CONTROLEES GEOMETRIQUEMENT

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(73) Proprietor: **K-2 CORPORATION**
Vashon, Washington 98070 (US)

(72) Inventor: **HALL, William, B.**
Seattle, WA 98126 (US)

(74) Representative: **Schulz, Rütger, Dr. Dipl.-Phys.**
Patentanwälte Mitscherlich & Partner,
Sonnenstrasse 33,
Postfach 33 06 09
80066 München (DE)

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Description

Field of the Invention

[0001] This invention relates to short skis, also referred to as "ski boards".

Background of the Invention

[0002] Within the last several years, an alternative to traditional downhill skis and to snowboards, known as "short skis" or "ski boards", has gained in popularity. The ski boards are used with conventional downhill ski boots, and are produced in accordance with traditional ski manufacturing techniques.

[0003] EP-A-546309 discloses a ski which has a longitudinally central raised profile with lateral elongate reduced thickness areas. The thickness of the central raised profile has its maximum in the binding region of the ski and decreases towards the ends of the ski while the width of the ski has its minimum in the binding area and its maximum near to the ends of the ski. Accordingly, the stiffness of the binding region is high whereas flexibility is high in the end portions of the ski.

[0004] However, unlike traditional, adult downhill skis, that typically have a length of 160-210 cm, ski boards typically have a length of 80-90 cm. Currently available ski boards also have a flat upper surface and a thickness that tapers uniformly from the center to both the tip and the tail, similar to a conventional downhill ski.

[0005] A person skiing on ski boards uses a traditional downhill skiing technique. However, currently available ski boards do not track well, but rather skid on the snow, making it difficult to hold an edge and maintain a desired level of control.

[0006] Accordingly, there is a need in the art for an improved ski board, and in particular, for a ski board that is more easy and stable to use. Therefore, it is an object of the invention to make a ski board which is substantially shorter than a ski at a maximum of 90 cm, stiff enough for an adult user while having sufficient torsional softness to track properly in curves.

[0007] This object is achieved by a ski board which is provided with the features of claim 1. The sub-claims disclose advantageous embodiments of the invention.

[0008] The present invention provides an improved ski board that is more stable and easy to use. In a preferred embodiment of the present invention, the ski board has a body provided with a first end region and a second end region on either side of a center region. The top surface of the first end region is contoured to have a first raised profile area extending from proximate the tip of the body towards the center region along a longitudinal axis of the body. A first and second concave area extend laterally from opposite sides of the raised profile area to opposite edges of the body.

[0009] Similarly, the top surface of the second end region is contoured to have a raised profile area extending

from proximate the tail of the body towards the center region along the longitudinal axis of the body. Concave areas extend laterally from opposite sides of the raised profile area to the edges of the body.

[0010] By providing a contoured ski board in accordance with a preferred embodiment of the present invention, the ski is stiff along its longitudinal axis, but is torsionally soft on opposite lateral sides of the longitudinal stiff region, both in the first and second end regions. The ski therefore is allowed to twist around its longitudinal axis, thereby increasing contact between the edges of the ski and the snow, which in turn provides stability and more control.

Brief Description of the Drawings

[0011] The foregoing aspects and many of the attendant advantages of this invention will become more readily appreciated as the same becomes better understood by reference to the following detailed description, when taken in conjunction with the accompanying drawings, wherein:

FIGURE 1 is a perspective view of a ski board provided in accordance with a preferred embodiment of the present invention;

FIGURE 2 is a top plan view of the ski board of FIGURE 1;

FIGURE 3 is a cross-sectional elevational view taken along line 3-3 of FIGURE 2;

FIGURE 4 is a cross-sectional elevational view taken along line 4-4 of FIGURE 2; and

FIGURE 5 is a cross-sectional elevational view taken along line 5-5 of FIGURE 2.

Detailed Description of the Preferred Embodiment

[0012] As illustrated in FIGURES 1 and 2, a ski board 10 is provided in accordance with a preferred embodiment of the present invention with a body 11 having a first end region 12 and a second end region 13 disposed longitudinally on opposite sides of a center region 14. The center region 14 is adapted to receive one of several conventional boot bindings, including a fixed binding, also known as a plate binding, a standard releasable ski binding, and a step-in snowboard binding. The ski board 10 may therefore be used with conventional downhill ski boots, and stiff or soft snowboard boots, depending on the type of binding selected. In a preferred embodiment, the ski board 10 is no longer than 90cm, allowing it to be safely used with a fixed binding.

[0013] As seen in FIGURES 1-3, the top surface 15 of the first end region 12 is contoured to have a first raised profile area 16 that extends substantially from a first end or tip 17 of body 11 along a longitudinal axis 18 towards the center region 14. In a preferred embodiment, the first raised profile area 16 tapers in width mid-way between the center region 14 and the tip 17, such

that the first raised profile area 16 has a substantially hourglass shape.

[0014] In an alternative embodiment, the first raised profile area 16 extends from the center region 14 to proximate the tip 17, but is displaced laterally from the longitudinal axis towards either a first edge 21 or a second edge 22. In another alternative embodiment, the first raised profile area 16 may have a substantially constant width, extending straight from the center region 14 toward the tip 17, either along or laterally displaced from the longitudinal axis.

[0015] A first concave area 19 and a second concave area 20 extend laterally from opposite sides of the first raised profile area 16 to the first edge 21 and second edge 22, respectively. Beyond the transition area between the first raised profile area 16 and the concave areas 19 and 20, the concave areas 19 and 20 have a constant thickness. In this manner, the first end region 12 has a stiff central portion coinciding with the first raised profile area 16, and a first and second torsionally soft portion coinciding with the first and second concave areas. Furthermore, in a preferred embodiment, the first raised profile area 16 substantially spans the tip 17, such that the first and second concave areas 19, 20 are arcuate and do not extend to the tip 17.

[0016] Similarly, as illustrated in FIGURES 1, 2, and 4, the top surface 23 of the second end region 13 has a second raised profile area 24 extending substantially from a second end or tail 25 along the longitudinal axis 18 towards the center region 14. As best seen in FIGURES 1 and 2, the tail 25 is more blunt than the tip 17. In a preferred embodiment, the second raised profile area 24 tapers in width midway between the center region 14 and the tail 25, such that the second raised profile area 24 has a substantially hourglass configuration.

[0017] In an alternative embodiment, the second raised profile area 24 extends from the center region 14 to proximate the tail 25, but is displaced laterally from the longitudinal axis towards either the first edge 21 or the second edge 22. In another alternative embodiment, the second raised profile area 24 may have a substantially constant width, extending straight from the center region 14 toward the tail 25, either along or laterally displaced from the longitudinal axis.

[0018] Although in a preferred embodiment both the first end region 12 and second end region 13 of the ski board 10 are contoured in a similar manner, alternatively, they may be contoured differently, or only one of the first and second end regions may be contoured.

[0019] A third concave area 26 and a fourth concave area 27 extend laterally from opposite sides of the second raised profile area 24 to first edge 21 and second edge 22, respectively. Beyond the transition area between the second raised profile area 24 and the concave areas 26 and 27, the concave areas 26 and 27 have a constant thickness. In a preferred embodiment, the second raised profile area substantially spans the tail 25, such that the third and fourth concave areas 26, 27 are

substantially arcuate. In this manner, the second end region 13 is provided with a second stiff central portion coinciding with the second raised profile area 24, and with a third and fourth torsionally soft portion coinciding with the third and fourth concave areas. Furthermore, in a preferred embodiment, the center region 14 is lower than the first and second raised profile areas, but is still higher than the concave areas. Alternatively, the center region 14 may be level with the first and second raised profile areas.

[0020] Therefore, the ski board 10 is stiff along the longitudinal axis 18, but is torsionally soft on opposite lateral sides of the longitudinal stiff region, both in the first end region 12 and second end region 13. The ski therefore is allowed to twist or flex a predetermined degree evenly around the longitudinal axis, thereby increasing contact between the edges 21 and 22 of the ski and the snow, which provides better stability. It is believed that preferred results are achieved when the torsional stiffness of the ski board 10 is 10-12°, and more preferably, 12°, according to ASTM standard F779 with a moment of 17.8 Nm (13.125 foot-pound). A ski board provided in accordance with a preferred embodiment of the present invention therefore flexes into a smooth curve, while maintaining fore/aft stability.

[0021] In contrast, most currently available ski boards have a substantially flat top surface resulting in a stiffer construction both longitudinally and torsionally. Due to this combined stiffness, it is therefore believed that a conventional ski board applies most of its load at the contact points, which are the points on the edges at the largest width in the tip and at the largest width of the tail. Conventional ski boards, therefore, do not flex into a smooth curve, and do not utilize the full edge of the ski in turning, thereby resulting in decreased stability.

[0022] As further illustrated in FIGURE 5, the thickness 28 of the ski board 10 increases longitudinally from the tip 17 toward the center region 14 and decreases in thickness longitudinally from the center region 14 to the tail 25. This geometry, together with the contours described above, are configured to provide the board with a selected longitudinal or bending stiffness such that the center region deflects substantially, 2.5cm (1 inch) when 400-490N (90-110 pounds of force) or less are applied to the center region 14 of the body 11, when the ski is supported at its fore and aft contact points. In contrast, conventional ski boards have a bending stiffness of 130-220 pounds, using the same standard of measurement. The stiff central portions of the ski board therefore provide a rigid, yet spring-like comfort to the ski.

[0023] Although the ski board 10 may be produced in a variety of ways, in a preferred embodiment, the raised profile areas and the concave areas are built into the core construction. Thus the core is either formed by a shaped unitary core, or alternatively, by laminates of core material, to achieve the desired contour. The core is then suitably sandwiched between glass load-carrying layers, a cap and base:

Claims

1. A ski board (10) comprising:

an elongate body (11) defining a center binding region (14), first and second ends (17, 25), first and second longitudinal edges (21, 22), and an upper surface (12, 23)

characterized in that

the upper surface (12, 23) of the body (11) is contoured to define a first raised profile area (16) extending from proximate at least one of the first and second ends (17, 25) of the body towards the center binding region (14), and elongate first and second reduced thickness portions of the body (11) disposed adjacent the first and second longitudinal edges (21, 22), respectively, between at least one of the first and second ends (17, 25) and the center binding region (14), the body (11) defining an overall length from the first end (17) to the second end (25) of no longer than 90 cm, wherein the body (11) is stiff along a longitudinal axis (18) of the body and is relatively torsionally soft on opposite lateral sides thereof.

2. The ski board according to Claim 1,

characterized in that

the body (11) defines fore and aft contact points and has a longitudinal stiffness such that the center region (14) deflects substantially on 2,5 cm (1 inch), when 400-490 Newton (90-110 pounds) or less of force is applied to the center region (14) of the body and the ski is supported at its fore and aft contact points.

3. The ski board according to Claim 1,

characterized in that

the body (11) has a torsional stiffness that allows it to twist more than 10°.

4. The ski board of Claim 1,

characterized in that

the first raised profile area (16) extends from the first end (12) of the body, and the upper surface defines a second raised profile area (24) extending from proximate the second end (13) of the body (11) towards the center binding region (14).

5. The ski board according to Claim 4,

characterized in that

a width of the first raised profile area (16) tapers between the center binding region (14) and the first end (17) of the body (11), such that the first raised profile area (16) has a substantially hourglass shape, and wherein a width of the second raised profile area (24) tapers between the center region (14) and the second end (25) of the body (11), such

that the second raised profile area (24) has a substantially hourglass shape.

6. The ski board according to Claim 4,

characterized in that

the first raised profile area (16) and the second raised profile area (24) extend substantially along a longitudinal axis (18) of the body (11).

7. The ski board according to Claim 4,

characterized in that

the top surface of the body defines a first and a second concave area (19, 20) extending laterally from opposite sides of the first raised profile area (16) to the first and second longitudinal edges (21, 22), respectively, and a third and a fourth concave area (26, 27) extending laterally from opposite sides of the second raised profile area (24) to the first and second longitudinal edges (21, 22), respectively.

Patentansprüche

1. Skiboard (10), mit einem länglichen Körper (11), der einen mittleren Bindungsbereich (14), ein erstes und ein zweites Ende (17, 25), eine erste und eine zweite Längskante (21, 22) und eine Oberseite (12, 23) definiert,

dadurch gekennzeichnet,

dass die Oberseite (12, 23) des Körpers (11) profiliert ist, um einen ersten erhöhten Profilbereich (16), der sich von nahe wenigstens eines des ersten und des zweiten Endes (17, 25) des Körpers zu dem mittleren Bindungsbereich (14) erstreckt, und längliche erste und zweite Abschnitte geringerer Dicke des Körpers (11) angrenzend an die erste bzw. die zweite Längskante (21, 22) zwischen wenigstens einem des ersten und des zweiten Endes (17, 25) und dem mittleren Bindungsbereich (14) zu definieren, wobei der Körper (11) eine Gesamtlänge von dem ersten Ende (17) zu dem zweiten Ende (25) von nicht länger als 90 cm definiert, wobei der Körper (11) entlang einer Längsachse (18) des Körpers steif ist und an abgewandten seitlichen Seiten davon relativ drehweich ist.

2. Skiboard nach Anspruch 1,

dadurch gekennzeichnet,

dass der Körper (11) vordere und hintere Kontaktpunkte definiert und eine Längssteifheit derart besitzt, dass sich der Mittelbereich (14) im wesentlichen um 2,5 cm (1 Inch) wölbt, wenn 400-490 N (90-110 Pfund) oder weniger auf den Mittelbereich (14) des Körpers ausgeübt werden und der Ski an seinen vorderen und hinteren Kontaktpunkten gestützt wird.

3. Skiboard nach Anspruch 1,

dadurch gekennzeichnet,

dass der Körper (11) eine Drehsteifheit besitzt, die ihn um mehr als 10° verdrehen lässt.

4. Skiboard nach Anspruch 1, **dadurch gekennzeichnet, dass** sich der erste erhöhte Profilbereich (16) von dem ersten Ende (12) des Körpers erstreckt, und dass die Oberseite einen zweiten erhöhten Profilbereich (24) definiert, welcher sich von nahe des zweiten Endes (13) des Körpers (11) zu dem mittleren Bindungsbereich (14) erstreckt. 5 10
5. Skiboard nach Anspruch 4, **dadurch gekennzeichnet, dass** sich eine Breite des ersten erhöhten Profilbereichs (16) zwischen dem mittleren Bindungsbereich (14) und dem ersten Ende (17) des Körpers (11) verjüngt, sodass der erste erhöhte Profilbereich (16) eine im wesentlichen Sanduhr Form besitzt, und dass sich eine Breite des zweiten erhöhten Profilbereichs 24 zwischen dem Mittelbereich (14) und dem zweiten Ende (25) des Körpers (11) verjüngt, sodass der zweite erhöhte Profilbereich (24) eine im wesentlichen Sanduhr-Form besitzt. 15 20 25
6. Skiboard nach Anspruch 4, **dadurch gekennzeichnet, dass** der erste erhöhte Profilbereich (16) und der zweite erhöhte Profilbereich (24) im wesentlichen entlang einer Längsachse (18) des Körpers (11) verlaufen. 30
7. Skiboard nach Anspruch 4, **dadurch gekennzeichnet, dass** die Oberseite des Körpers einen ersten und einen zweiten konkaven Bereich (19, 20), welche sich seitlich an abgewandten Seiten des ersten erhöhten Profilbereichs (16) zu der ersten bzw. der zweiten Längskante (21, 22) erstrecken, und einen dritten und einen vierten konkaven Bereich (26, 27), welche sich seitlich von abgewandten Seiten des zweiten erhöhten Profilbereichs (24) zu der ersten bzw. zweiten Längskante (21, 22) erstrecken, definiert. 35 40 45

Revendications

1. Ski compact (10) comprenant un corps oblong (11) définissant une région de fixation centrale (14), des première et seconde extrémités (17, 25), des premier et second bords longitudinaux (21, 22) et une surface supérieure (12, 23), **caractérisé en ce que** la surface supérieure (12, 23) du corps (11) est profilée pour définir une première zone profilée 50 55

relevée (16) s'étendant d'un emplacement proche d'au moins l'une des première et seconde extrémités (17, 25) du corps vers la région de fixation centrale (14), et des première et seconde portions oblongues d'une épaisseur réduite du corps (11) disposées pour être adjacentes aux premier et second bords longitudinaux (21, 22) respectivement, entre au moins l'une des première et seconde extrémités (17, 25) et la région de fixation centrale (14), le corps (11) définissant une longueur totale de la première extrémité (17) à la seconde extrémité (25) non supérieure à 90 cm, où le corps (11) est rigide le long d'un axe longitudinal (18) du corps et est relativement souple en torsion sur ses côtés latéraux opposés.

2. Ski compact selon la revendication 1, **caractérisé en ce que** le corps (11) définit des points de contact avant et arrière et présente une rigidité longitudinale de telle sorte que la région centrale (14) dévie sensiblement sur 2,5 cm (1 pouce), quand une force de 400-490 Newton (90-110 livres) ou moins est appliquée à la région centrale (14) du corps et que le ski est supporté à ses points de contact avant et arrière.
3. Ski compact selon la revendication 1, **caractérisé en ce que** le corps (11) a une rigidité en torsion qui lui permet de se tordre sur plus que 10°.
4. Ski compact selon la revendication 1, **caractérisé en ce que** la première zone profilée relevée (16) s'étend de la première extrémité (12) du corps, et la surface supérieure définit une seconde zone profilée relevée (24) s'étendant d'un endroit proche de la seconde extrémité (13) du corps (11) vers la région de fixation central (14).
5. Ski compact selon la revendication 4, **caractérisé en ce qu'une** largeur de la première zone profilée relevée (16) diminue entre la région de fixation centrale (14) et la première extrémité (17) du corps (11) de telle sorte que la première zone profilée relevée (16) a sensiblement une forme en sablier, et où une largeur de la seconde zone profilée relevée (24) diminue entre la région centrale (14) et la seconde extrémité (25) du corps (11) de telle sorte que la seconde zone profilée relevée (24) a une forme sensiblement en sablier.
6. Ski compact selon la revendication 4, **caractérisé en ce que** la première zone profilée relevée (16) et la seconde zone profilée relevée (24) s'étendent sensiblement le long d'un axe longitudinal (18) du corps (11).
7. Ski compact selon la revendication 4, **caractérisé en ce que** la surface supérieure du corps définit une

première et une seconde zone concave (19, 20) s'étendant latérale depuis des côtés opposés de la première zone profilée relevée (16) aux premier et second bords longitudinaux (21, 22), respectivement, et une troisième et une quatrième zone concave (26, 27) s'étendant latéralement depuis des côtés opposés de la deuxième zone profilée relevée (24) aux premier et second bords longitudinaux (21, 22), respectivement.

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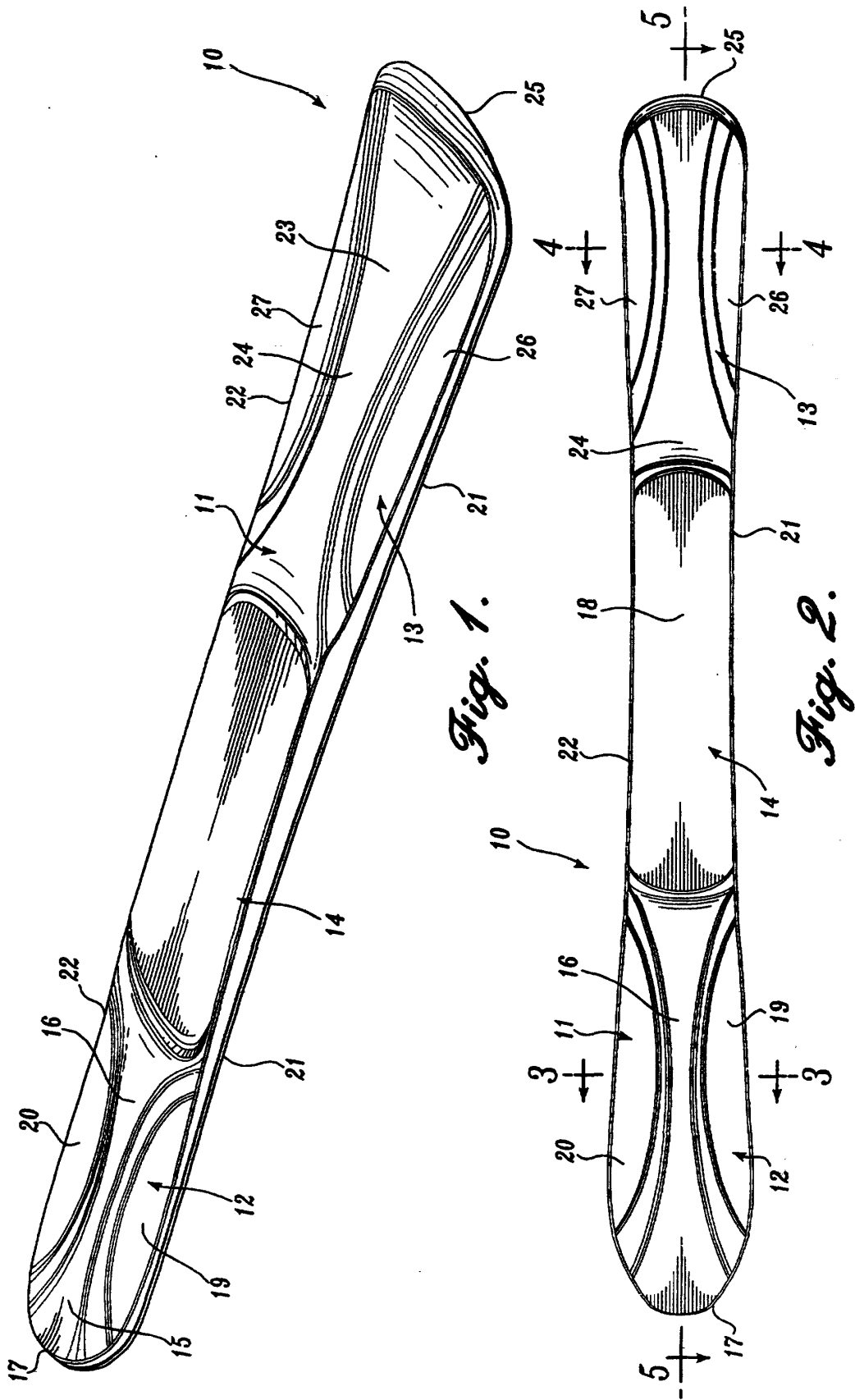
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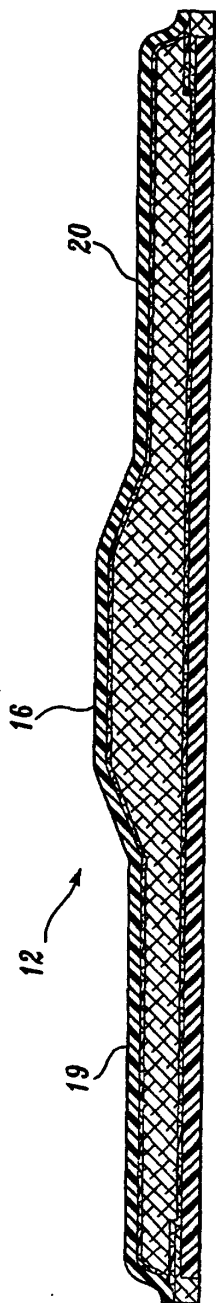


Fig. 3.

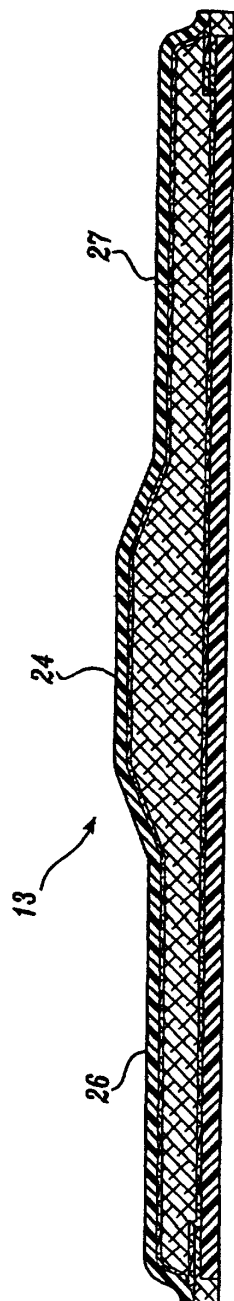


Fig. 4.

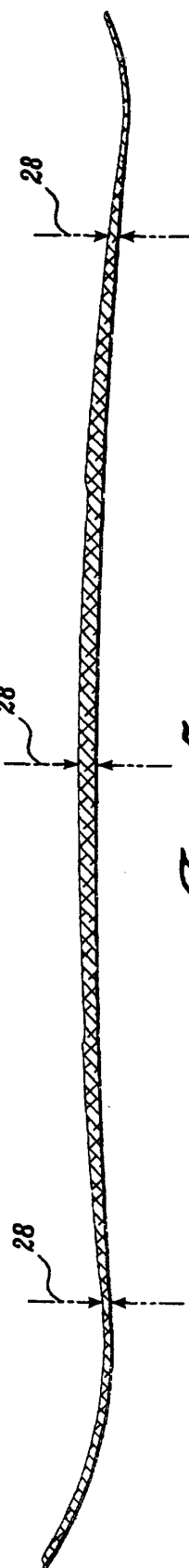


Fig. 5.