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(54) **Ski-boot with means for actuating corresponding engaging members of ski-touring bindings**

Skistiefel mit Mitteln zur Betätigung von entsprechenden Halteelementen von Tourenskibindungen

Chaussure de ski avec des moyens pour actionner des éléments d'engagement correspondants de fixations de ski de randonnée

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Description

[0001] The present invention relates to a ski-boot with a toe having means for actuating engaging members for relative engagement with ski bindings.

[0002] It is known in the technical sector of ski-touring that there exists the need to provide safety bindings which comprise a front member, or toe-piece, able to lock in position the toe of the boot, while allowing rotation thereof about a substantially horizontal axis transverse with respect to the ski, and a rear member, or heel-piece, able to co-operate with the heel of the boot so as to allow three different modes of use, i.e.: release of the heel (walking mode); supporting with greater/lesser inclination of the boot (uphill mode); and locking of the heel (downhill mode).

[0003] It is also known, for example from WO 2007/10392 in the name of the same present Applicant, that the toe-piece of said bindings has oppositely arranged pins which engage in the transverse direction inwards and which are able to penetrate into corresponding holes on opposite sides of an associated boot which, when the binding is closed, is constrained to the toe-piece, being able to rotate only about a transverse axis consisting of said two pins so as to allow raising of the heel and the walking movement uphill or on the flat. Although fulfilling their function, these binding/boot assemblies have, however, the drawbacks at the moment of engagement resulting in particular from the difficulty of centring correctly the opposite holes of the boot with the corresponding pin which must penetrate into the said holes so as to allow safety closing of the binding.

[0004] This drawback is also made worse by the - often awkward - situation of the ski-tourer who has to perform a precise operation in critical conditions. EP 1,559,457 also discloses a boot which, in the region of each hole for engagement with the associated engaging pin, has a recess extending vertically from the sole to the hole itself; said recess has a cross-section substantially in the form of an angled edge for forming a contact and end-of-travel shoulder in the longitudinal direction for the boot; in this way, when the latter is inserted inside the open binding with a movement in the longitudinal direction of the ski, it engages via the said contact surfaces with the respective pin of the binding against which it stops in a positive and precise manner, allowing the skier to press the boot downwards so as to close the binding and position the two opposite nibs inside the respective hole.

[0005] Said boot with transverse contact seats is however practical only for positioning the boot in the longitudinal direction and only for bindings which at the time of engagement with the boot are open with the pins splayed so as to allow the toe of the boot to be positioned in the longitudinal direction; on the other hand, the known boot does not provide any useful teaching should the binding be closed as for example in the case of the toe-piece described in the already-mentioned document WO2007/10392.

[0006] The technical problem which is posed, therefore, is to provide a ski-touring boot which has a toe able to allow easy, but precise and reliable engagement with the engaging members of a corresponding ski-binding toe-piece for locking in position the toe of the boot with the rigidity normally required for such applications and with the possibility of rotating the said toe about a horizontal axis.

[0007] In connection with this problem it is also required that the boot should have a low weight and longer duration and also be easy and inexpensive to produce using normal standardized means.

[0008] These results are achieved according to the present invention by a ski-touring boot having a toe for engagement with corresponding pins of ski-touring bindings, comprising means for actuating said engaging pins according to the characteristic features of Claim 1.

[0009] Further details may be obtained from the following description of a non-limiting example of embodiment of the subject of the present invention provided with reference to the accompanying drawings in which:

- Figure 1 shows a perspective front view of the toe of the boot according to the present invention;
- Figure 2 shows a bottom view of the boot toe according to Fig. 1;
- Figure 3 shows a side view of the boot toe according to Fig. 1
- Figure 4 shows a partial schematic view of the boot toe according to Fig. 1;
- Figure 5 shows a schematic partial cross- section along the plane indicated by V-V in Fig. 4;
- Figure 6a shows a top view of the boot according to Fig. 1 during positioning for engagement with the toe-piece of the ski binding;
- Figure 6b shows a partial schematic cross- section of the boot/toe-piece assembly according to Fig. 6a
- Figure 6c shows a partial schematic cross- section along the plane indicated by VIc-VIc in Fig. 6b;
- Figure 7a shows a top view of the boot according to Fig. 1 at the end of the positioning movement for closing the toe-piece of the ski binding;
- Figure 7b shows a partial schematic cross- section of the boot/toe-piece assembly according to Fig. 7a and
- Figure 7c shows a schematic partial cross- section along the plane indicated by VIIc-VIIc in Fig. 7b.

[0010] As shown in Fig. 1 and with reference to the layouts shown by way of example in the figures, where "top" is assumed as referring to the part for putting on the boot and "bottom" as referring to the sole part thereof, and a set of three axes, i.e. longitudinal axis X-X, transverse axis Y-Y and vertical axis Z-Z, conventionally as-

sumed solely for the sake of convenience of description, the ski-touring boot according to the invention comprises essentially:

- a shell 10, the toe 20 of which is shaped in a conventional manner in compliance with the corresponding DIN regulations;
- a reinforcing insert 30 which is integral with the toe 20 and is provided with:
- a circular hole 32 arranged on each side of the toe for insertion of a corresponding pin 52 (Fig. 6a) projecting in the transverse direction Y-Y of each arm 51, rotating about a vertical axis 51a, of the toe-piece 50 of a ski binding, only schematically shown in the figures.

[0011] The inner diameter of the hole 32 corresponds to the outer diameter of the said pin 52.

[0012] In greater detail, said seats 32 are connected to respective guiding and actuating means 30 which are shaped substantially in the manner of a pyramid frustum, the bottom part 31a of which is open underneath the sole and the top part 31c of which is connected to said hole 32.

[0013] As can be seen from the cross-section in Fig. 4, the two transverse sides 31b,31c of the seat 31 have an opposite inclination with respect to the vertical axis Z-Z towards the inside of the said seat, while (Fig. 5) the surface 31d of the seat, situated inside the boot, has an inclination upwards and towards the outside of each side 10a of the toe 10.

[0014] As can be seen from the same Fig. 5, the angle of inclination (α) of the inner side 31d is between 25° and 80° and preferably between 45° and 65°.

[0015] The top part 31c of the pyramid frustum 31 also has an inner width "L1" which is slightly smaller than the outer diameter of the pin 52, while the bottom base of the pyramid frustum has a width "L2" substantially corresponding to the relative distance between the two nibs 52 of the binding when in the closed position.

[0016] With the configuration described above the operating principle of the boot is as follows:

- the toe-piece 50 of the ski is arranged in position for engagement with the arms 51 closed;
- the toe 20 of the boot 10 is positioned opposite and above (in the vertical direction Z-Z) the pins 52 of the said arms 51;
- the sole 11 of the boot is moved downwards, so that the frusto-pyramidal seat 31 engages on top of the pin 52 (Fig. 6b);
- the continued downwards pushing of the sole (Fig. 6b,6c) causes the gradual downwards movement of the hole 32 towards the pin 52 with simultaneous guiding of the said pin in the vertical direction performed by the two transverse sides 31b,31c of the seat 31 and with simultaneous gradual pushing of the pin 52 in the transverse direction Y-Y and towards the outside of the seat 31 as a result of the inclination of the inner surface 31d of the seat 31 on which the pin rests and slides;
- this pushing force on the pin 52 causes the simultaneous opening of the arms 51 of the binding toe-piece (Fig. 7b,7c), allowing the boot to continue its movement downwards until the holes 32 are aligned with the respective pin 52 which, no longer pushed by the inclined surface 31d, is able to penetrate into the respective hole, being recalled by the resilient means (not shown) of the toe-piece which tend to bring the arms 51 back into the closed condition in the transverse direction Y-Y;
- once the pin 52 has entered into the circular seat 32 it is locked in the three directions, i.e. longitudinal direction X-X, transverse direction Y-Y and vertical direction Z-Z, remaining, however, free to rotate about the transverse axis formed by the two opposite pins 52.

[0017] It is therefore evident how, in the case of the boot provided with actuating means according to the invention, easier and more reliable engagement thereof with the engaging pins of the toe-piece is possible owing to the frusto-pyramidal shape of the said guiding means, which shape allows easy alignment of the toe of the boot with the pins in the vertical direction Z-Z and easy and reliable engagement of the said pins inside the respective circular seat even when the binding is closed.

[0018] Also evident is the advantage which is provided by easier, but precise and reliable engagement of the toe with the binding in view of the particularly difficult situation which the ski-tourer may be in when having to perform said operation.

[0019] Although described and illustrated in an integrated form which is provided at the time of manufacture of the boot, it is understood that the toe with shaped seat according to the invention may also incorporate an additional part to be fitted by means of screws to the toe of already existing boots.

[0020] It is also envisaged that the embodiments described by way of example may have different geometrical layouts which are included within the scope of the present patent as defined by the claims which follow, such that, for example, the cross-section of the pin may be circular or polygonal.

Claims

1. Ski-touring boot comprising a shell (10), a toe (20) provided with a hole (32) on each side for engagement with a corresponding pin (52) of ski bindings (50,51) and a sole (11), **characterized in that** it comprises means (30) for guiding and actuating said pins (52) comprising a frusto-pyramidal seat (31), the larger base of which forms the bottom part (31a) open below the sole (11) and the sides (31b,31c) of which extending in the transverse direction (Y-Y) are

inclined towards the inside of the seat (31) so as to form elements for guiding the pin (52) in the vertical direction (Z-Z) and the surface (31d) of which situated inside the boot is inclined upwards and outwards so as to form the element for performing opening in the transverse direction (Y-Y) of the said pins (52).

2. Boot according to Claim 1, **characterized in that** the top part of the frusto-pyramidal seat (31) has an inner width "L1" slightly smaller than the outer diameter of the pin (52).

3. Boot according to Claim 1, **characterized in that** the bottom base of the frusto-pyramidal seat (31) has a width (L2) substantially corresponding to the distance between the two nibs (52) of the binding (50) when in the closed position.

4. Boot according to Claim 1, **characterized in that** the angle of inclination (α) of the inner side (31d) of the pyramid frustum is between 25° and 80°.

5. Boot according to Claim 4, **characterized in that** the angle of inclination (α) of the inner side (31d) of the pyramid frustum is preferably between 45° and 65°.

6. Boot according to Claim 1, **characterized in that** said actuating seats (31) are incorporated in the toe (20) of the boot.

7. Boot according to Claim 1, **characterized in that** said actuating seats (31) are formed in an external element which can be fitted to the toe of the boot.

Patentansprüche

1. Tourenskistiefel mit einer Schale (10), einer Fussspitze (20), welche mit einem Loch (32) auf jeder Seite für einen Eingriff eines entsprechenden Stifts (52) von Skibindungen (50,51) versehen ist, und einer Sohle (11),
dadurch gekennzeichnet, dass
er Mittel (30) zur Führung und Betätigung der Stifte (52) umfasst, welche einen pyramidenstumpfförmigen Sitz (31) umfassen, dessen grössere Grundfläche den unterhalb der Sohle (11) offenen unteren Teil (31 a) bildet und dessen sich in der Querrichtung (Y-Y) erstreckende Seiten (31 b, 31 c) gegen das Innere des Sitzes (31) geneigt sind, um Elemente zur Führung des Stifts (52) in der vertikalen Richtung (Z-Z) zu bilden, und dessen im Innern des Stiefels angeordnete Oberfläche (31d) nach oben und nach aussen geneigt ist, so dass das Element gebildet wird, das das Öffnen der Stifte (52) in der Querrichtung (Y-Y) ausführt.

2. Stiefel nach Anspruch 1, **dadurch gekennzeichnet, dass** der obere Teil des pyramidenstumpfförmigen Sitzes (31) eine lichte Weite "L1" hat, die geringfügig kleiner als der äussere Durchmesser des Stifts (52) ist.

3. Stiefel nach Anspruch 1, **dadurch gekennzeichnet, dass** die untere Grundfläche des pyramidenstumpfförmigen Sitzes (31) eine Breite (L2) hat, die im Wesentlichen dem Abstand zwischen den zwei Nasen (52) der Bindung (50) entspricht, wenn diese in der geschlossenen Position ist.

4. Stiefel nach Anspruch 1, **dadurch gekennzeichnet, dass** der Neigungswinkel (α) der Innenseite (31d) des Pyramidenstumpfs zwischen 25° und 80° beträgt.

5. Stiefel nach Anspruch 4, **dadurch gekennzeichnet , dass** der Neigungswinkel (α) der Innenseite (31d) des Pyramidenstumpfs vorzugsweise zwischen 45° und 65° beträgt.

6. Stiefel nach Anspruch 1, **dadurch gekennzeichnet, dass** die Betätigungssitze (31) in der Fussspitze (20) des Stiefels eingearbeitet sind.

7. Stiefel nach Anspruch 1, **dadurch gekennzeichnet, dass** die Betätigungssitze (31) in einem externen Element gebildet sind, das in die Fussspitze des Stiefels eingefügt werden kann.

Revendications

1. Chaussure de ski de randonnée comportant une coque (10), un bout de pied (20) prévu avec un trou (32) sur chaque côté permettant un engagement avec une broche correspondante (52) de fixations de ski (50, 51) et une semelle (11), **caractérisée en ce qu'**elle comprend des moyens (30) pour guider et actionner lesdites broches (52) comportant une embase tronc-pyramidale (31), dont la plus grande base constitue la partie inférieure (31 a) ouverte au-dessous de la semelle (11) et dont les côtés (31 b, 31 c) s'étendant dans la direction transversale (Y-Y) sont inclinés vers l'intérieur de l'embase (31) de façon à former des éléments permettant de guider la broche (52) dans la direction verticale (Z-Z) et dont la surface (31d) située à l'intérieur de la chaussure est inclinée vers le haut et vers l'extérieur de façon à former l'élément permettant de réaliser l'ouverture dans la direction transversale (Y-Y) desdites broches (52).

2. Chaussure selon la revendication 1, **caractérisée en ce que** la partie supérieure de l'embase tronc-pyramidale (31) présente une largeur intérieure "L1"

légèrement plus petite que le diamètre extérieur de la broche (52).

3. Chaussure selon la revendication 1, **caractérisée en ce que** la base inférieure de l'embase tronc-pyramidale (31) présente une largeur (L2) correspondant essentiellement à la distance comprise entre les deux pointes de broche (52) de la fixation (50) lorsqu'elle se trouve dans la position fermée.

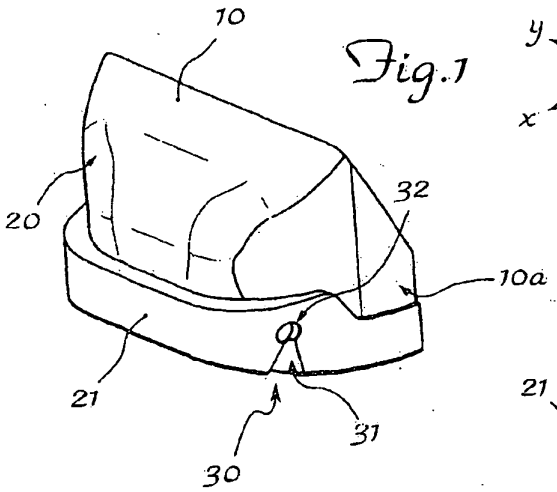
4. Chaussure selon la revendication 1, **caractérisée en ce que** l'angle d'inclinaison (α) du côté intérieur (31d) du tronc de pyramide se situe entre 25° et 80°.

5. Chaussure selon la revendication 4, **caractérisée en ce que** l'angle d'inclinaison (α) du côté intérieur (31 d) du tronc de pyramide se situe, de préférence, entre 45° et 65°.

6. Chaussure selon la revendication 1, **caractérisée en ce que** lesdites embases d'actionnement (31) sont incorporées dans le bout de pied (20) de la chaussure.

7. Chaussure selon la revendication 1, **caractérisée en ce que** lesdites embases d'actionnement (31) sont formées dans un élément externe qui peut être ajusté au bout de pied de la chaussure.

Fig.1



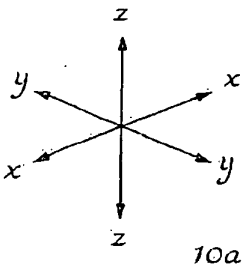


Fig.2

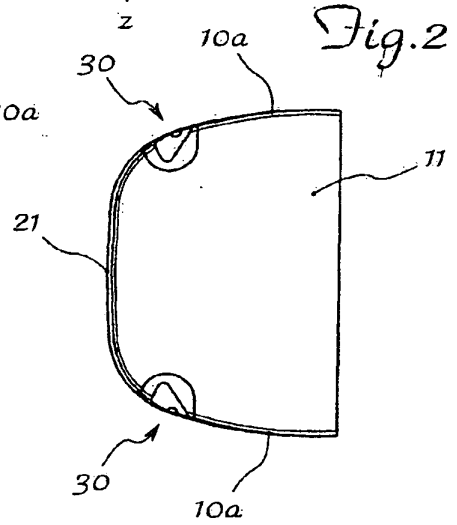


Fig.3

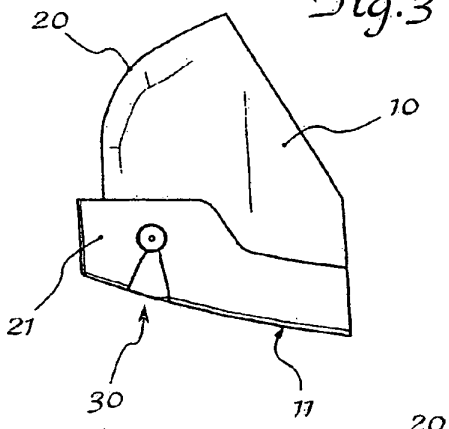
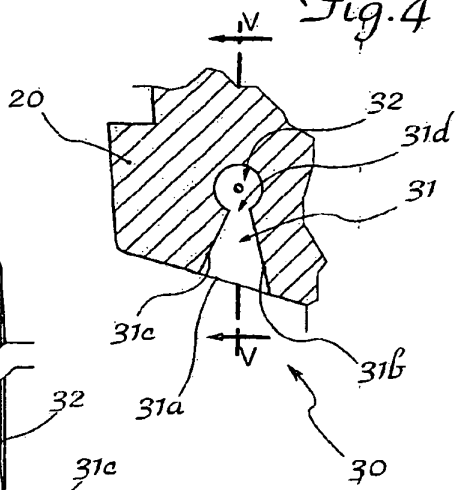


Fig.4



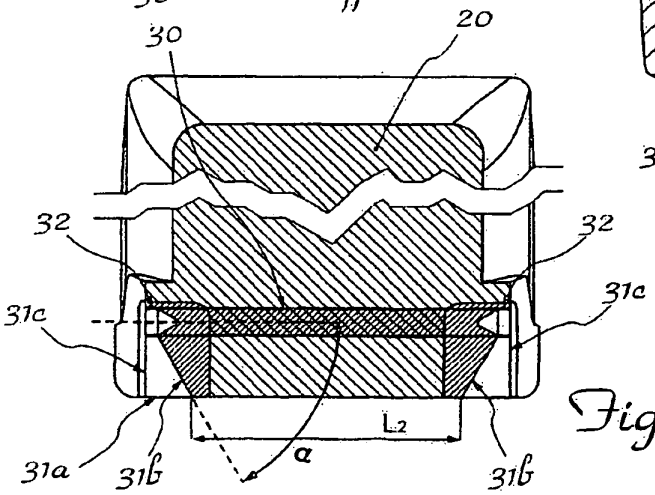


Fig.5

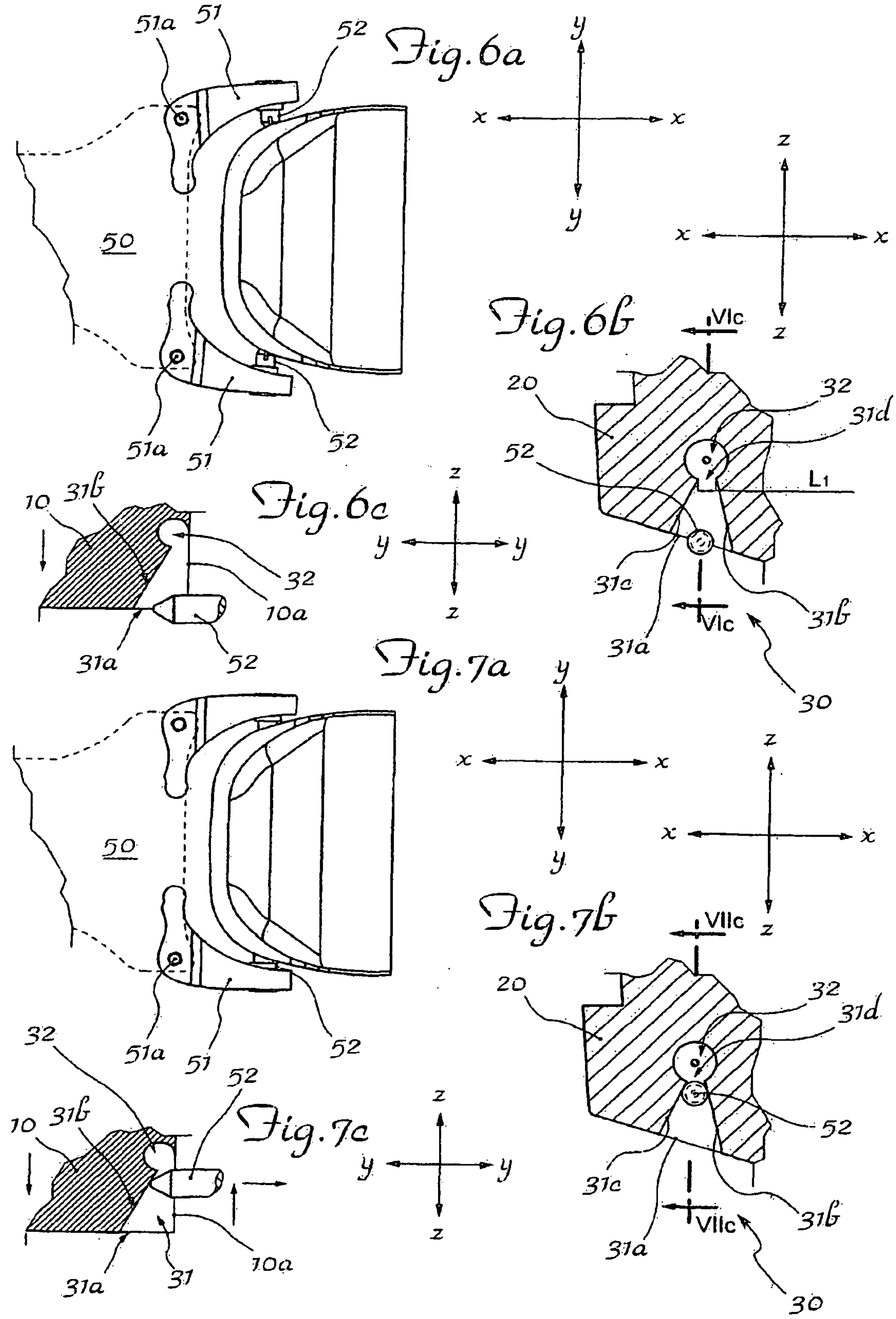


Fig.6a
51a
51
52
50
y
x
z
Fig.6b
VIc
20
32
31d
L1
31c
31b
31a
30
Fig.6c
10
10a
Fig.7a
Fig.7b
VIIc
Fig.7c
31

REFERENCES CITED IN THE DESCRIPTION

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- EP 1559457 A **[0004]**