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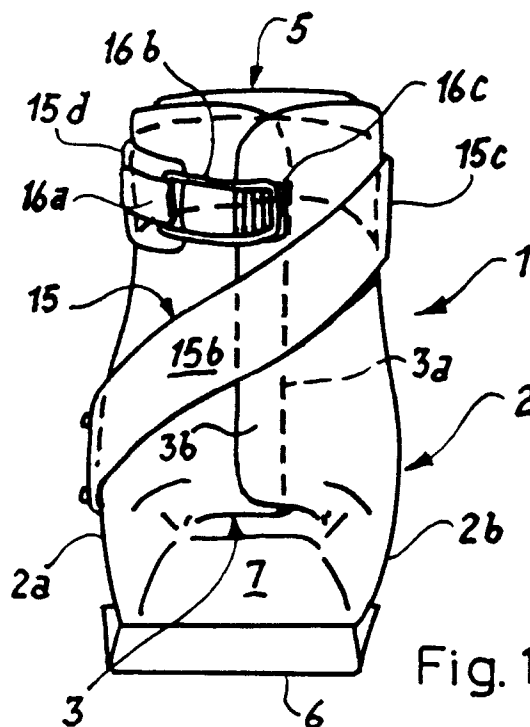
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**AT BE CH DE DK ES FR GB GR IE IT LI LU MC
NL PT SE**(71) Applicant: **DOLOMITE S.P.A.**
Via Feltrina Centro, 3
I-31044 Montebelluna (Treviso)(IT)(72) Inventor: **Vaccari, Franco**
Via De Gasperi 10A
I-31044 Montebelluna (Treviso)(IT)(74) Representative: **Cantaluppi, Stefano et al**
c/o Jacobacci-Casetta & Perani S.p.A.
Via Berchet 9
I-35131 Padova (IT)(54) **A structure of sport footwear, in particular skiing or skating footwear.**

(57) Sport footwear, comprising a shell (2) with two longitudinally juxtaposed openings (3,4), includes a flexible strap element (15,20,30) extending from one lateral member (2a) of the shell, around the other lateral member (2b) and over the openings on their corresponding closure means (9,11), thereby on adjustably tensioning the strap element across the shell, the latter is brought to fit tightly around the user's foot.

**Fig. 1****EP 0 591 600 A1**

This invention relates to a structure of sport footwear, such as skiing or skating footwear, being of a type which comprises:

a shell having longitudinally juxtaposed first and second openings locating two respective lateral members on said shell, respectively an outside one and an inside one which are juxtaposed transversely, said openings extending from a shell entry aperture toward a toe end and a heel end thereof, respectively; and

fastening means for adjustably tightening said shell around the user's foot.

Footwear incorporating these features are well known, especially in the technical field of ski boots. They usually have a shell formed with a deep forward opening, whether of the type with an overlapping edge closure or a tongue closure, and a rearward opening which may be closed by a portion of the bootleg hinged on the shell or by an integral flap with the shell, for example.

This footwear is invariably provided with comparatively complicated and/or elaborate fastening arrangements. A typical application is, for example, that of a set of lever-operated fasteners as described in US Patent No. 3,494,054.

These fastening arrangements, at least with the overlapping edge closures, are operated by pulling the shell edges over each other such that the shell can be brought gradually to a tightened state around the user's foot under the pull exerted on it. In all cases, the shell tightening, while being function-wise adequate to provide effective control of the ski, is not the best for the user both on account of the relatively troublesome boot fastening and adjustment operations involved and from the standpoint of consistent comfort over time. Changes may actually occur to the comfortable fit of a new boot as the elasticity and stiffness characteristics of the plastics from which the shell is formed change due to ageing.

The technical problem addressed by this invention is to provide sport footwear having a structure that suits primarily the manufacture of ski and skating boots, and which incorporates fastening means that are simple in design but specially effective to ensure a tight and comfortable fit for the foot in the shell.

This problem is solved according to the invention by a structure of sport footwear as indicated being characterized in that said fastening means comprise:

at least one flexible strap element extending from one of said lateral members, over said first opening at an instep region of the shell, to around the other lateral member, and thence over said second opening back to said one lateral member; and

means for adjustably tensioning said strap ele-

ment across said shell so as to tighten said shell around the user's foot through said strap element.

To make the invention more clearly understood, three preferred embodiments thereof will be described herein below which are illustrated by way of example and not of limitation in the accompanying drawings, in which:

Figures 1, 2 and 3 are front, side, and rear elevation views, respectively, of a first embodiment of a ski boot according to the invention;

Figures 4, 5 and 6 are corresponding views to Figures 1, 2 and 3, respectively, showing a second embodiment of the invention;

Figures 7 and 8 are enlarged scale views of a detail of Figure 5 in two different working positions thereof;

Figure 9 is a sectional view taken along line IX-IX in Figure 7; and

Figure 10 is a perspective view of third embodiment of the invention.

With reference to the drawing views, generally shown at 1 is a ski boot having a shell 2, typically made of a plastics material, which is quite conventional in design and construction except as specified herein below.

The shell 2 has first and second openings 3, 4 which are juxtaposed longitudinally to each other and bound two transversely juxtaposed lateral members 2a,b, respectively an outside one and an inside one, on the shell. It is understood that the term inside applies to the two lateral members of a boot pair which are, in use, to face each other, and the term outside to the two others.

Also located on the shell 2 is an entry aperture 5 juxtaposed to a sole 6.

The opening 3, also referred to herein as the forward opening, extends from the entry aperture 5 to the vicinity of a toe end 7 of the shell and is provided with closure means which, in the example of Figures 1-3, are of the overlapping edge 3a,b type and unitary with the shell. In the example of Figures 4-7, the corresponding closure means for the opening 3 are of the tongue 3c type arranged to overlap the opening edge.

The opening 4, also referred to herein as the rearward opening, extends from the entry aperture 5 to the vicinities of a heel region 8 of the shell and is provided with closure means which are, in the example of Figures 1-3 of the flap 9 type formed integrally with the shell and pivotable on it through a narrow portion 10 thereof, whilst in the example of Figures 4-7 they include a portion of the bootleg 11 which is pivoted about pivot pins 12 on the lower portion of each lateral shell member in a so-called malleolar region.

In use, the shell is tightened around the foot and the lower portion of the user's leg using fastening means.

With specific reference to Figures 1 to 3, such means comprise a flexible strap element 15 having one end 15a attached to the outside lateral member 2a of the shell. The strap element 15 extends with a first section 15b diagonally across the forward opening 3 to overlie the edges 3a,b, at an instep region of the shell where the latter changes abruptly its inclination angle to the plane of the sole 6. It then extends with a section 15c up toward the entry aperture across the inside lateral member 2b of the shell, to terminate in a section 15d which extends across the rearward opening 4, over the corresponding closure means thereof, and back across the outside lateral member 2a. The free end of the strap element 15 has lever 16a and ring 16b means for adjusting the tension of the strap element across the shell 2 and tightening the latter around the user's foot. The lever 16a and ring 16b are conventional in design and arranged to engage with a rack 16c attached to the edge 3b of the shell 2. By pulling the ring 16b tight on the rack by means of the lever 16a, a corresponding tension is applied to the strap element 15. Since the latter is substantially independent of the shell 2 along its intermediate sections, this tension will be spread in a substantially even way from one end to the other of the element 15, resulting in the shell being tightened evenly around the user's foot.

With reference to Figures 4 to 9, the boot 1 is provided, in a variant of the invention, with first and second strap elements shown at 20 and 21, respectively. The first element is substantially the equivalent of the element 15 in the previous example. It is attached with one end 20a to the outside lateral member of the shell 2 through a mechanism for anchoring it in an adjustable position 22, of the eccentric type. The mechanism 22 comprises a pin 23 secured off-centrally on a disk-shaped body 24 and a cover 25 having an operation cutout through which the whole mechanism 22 can be turned about the axis of the pin 23.

The pin 23 is held pivotally on the shell 2, while the disk-shaped body 24 is engaged pivotally in a hole 26 provided in the end 20a of the strap element 20, with the latter being held against the shell 2 by the cover 25. By turning the element 22 about the axis of the pin 23, the anchor point of the strap element 20 can be adjusted both along a substantially perpendicular direction to the plane of the sole 6 and a substantially parallel direction to said plane. The former adjustment affords fine adjustment of the amount of tension on the strap element, corresponding to about a half pitch distance relative to the rack 16c pitch, whereas the latter adjustment enables the position and bearing angle of the strap element to be varied longitudinally across the instep region of the shell at the location of the forward opening.

On the strap element 20, there can be located respective contiguous sections 20a-d in continuation of one another and in a similar pattern to that of the corresponding sections 15a-d of the previous example. To change the strap element 20 position at the section 20d relative to the bootleg 11 portion along a direction substantially perpendicular to the plane of the sole 6, further adjusting means are provided which include a spacer 27 pivoted off-centrally at 28 on the portion of the bootleg 11. Juxtaposed sides 27a,b thereof, located different distances away from the pivot axis 28, are arranged to provide a bearing and guide for the section 20d of the strap element 20. To perform a required adjustment, the spacer 27 is turned 180° to present the side 27a,b of choice to the section 20d. Notice that by changing the strap positioning with respect to the entry aperture 5, the amount of backward support afforded to the skier's leg by the boot can be varied.

The section 20d carries on its free end conventional lever means 28a with a ring 28b releasably engaging the serrated portion of a rack 29 which is attached to the free end of the second strap element 21. In the above-described arrangement, the two strap elements 20, 21 cross each other at the instep region of the shell.

In a last embodiment of the invention, shown in Figure 10, the first and second strap elements are interconnected into a single flexible strap 30. The strap 30 extends under the shell 2 and is crossed at the instep region in quite a similar manner to the previous example.

The invention as described is susceptible to many modifications and variations within the same inventive concept. For example, the anchor for the strap element 15 in the first example could be embodied on the lateral member 2a of the shell similar to what has been proposed in the second example. Likewise, the section 20a of the strap element of the second example could be anchored fixedly on the shell.

Claims

1. A structure of sport footwear, such as skiing or skating footwear, comprising:
 - a shell (2) having longitudinally juxtaposed first and second openings (3,4) locating two respective lateral members (2a,b) on said shell, respectively an outside one and an inside one which are juxtaposed transversely, said openings extending from a shell entry aperture (5) toward a toe end and a heel end thereof, respectively; and
 - fastening means for adjustably tightening said shell around the user's foot, characterized in that said fastening means

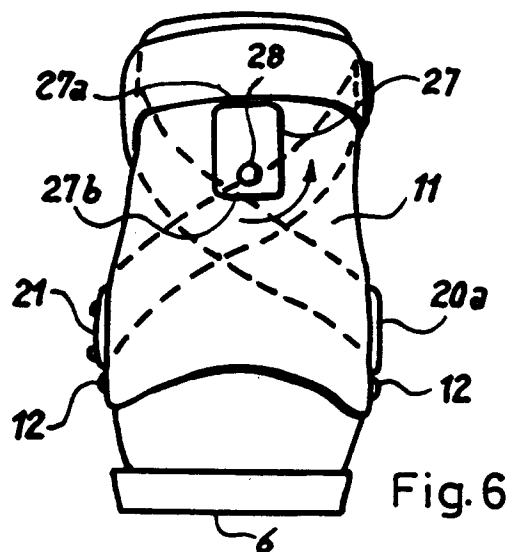
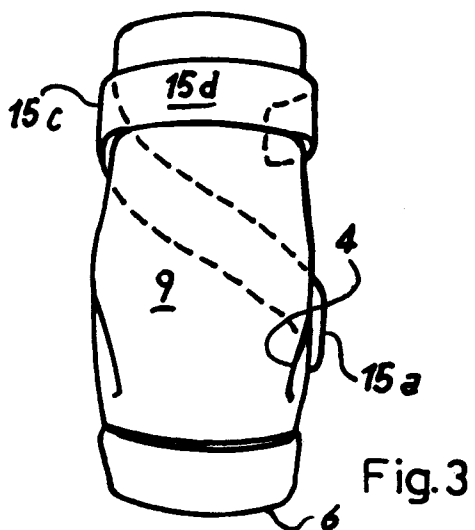
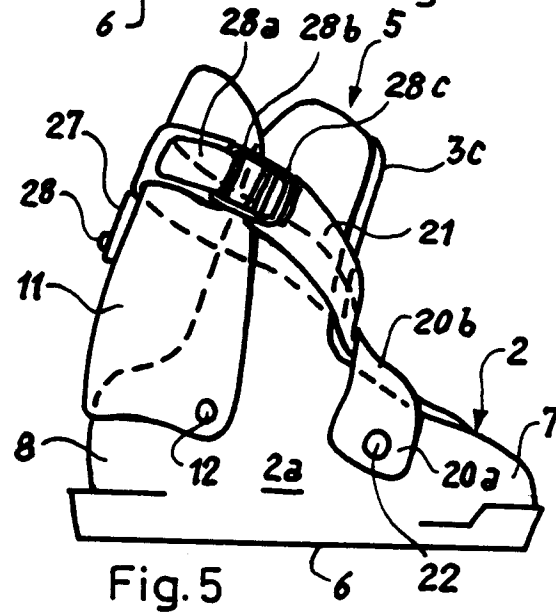
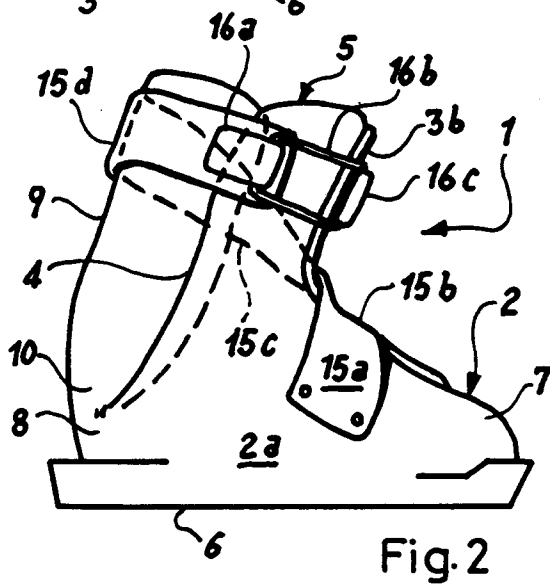
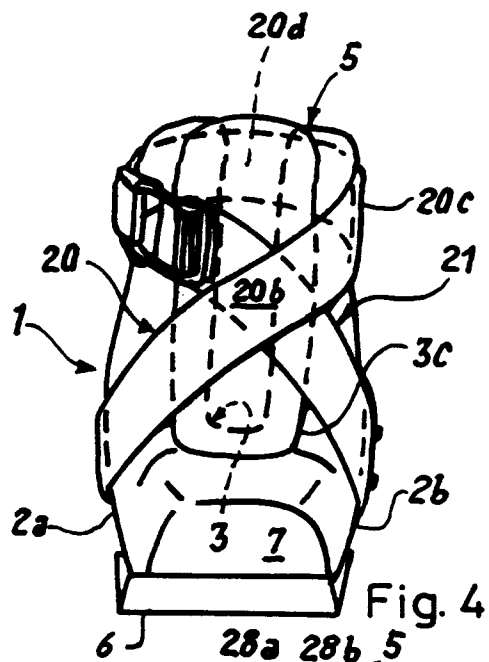
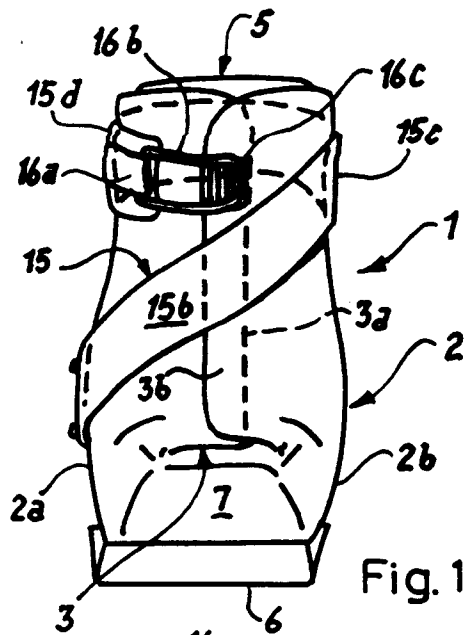
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at least one flexible strap element (15,20,30) extending from one of said lateral members (2a), over said first opening (3) at an instep region of the shell, to around the other lateral member (2b), and thence over said second opening (4) back to said one lateral member (2a); and

means for adjustably tensioning (16a-c;28a-c) said strap element across said shell so as to tighten said shell around the user's foot through said strap element.

2. A structure of sport footwear according to Claim 1, wherein at least one of said openings is provided with respective closure means associated with the shell such that they are clamped with said shell by said strap element. 15
3. A structure of sport footwear according to either Claim 1 or 2, wherein said strap element (15,20,30) is passed diagonally across said first opening at said instep region of the shell. 20
4. A structure of sport footwear according to one or more of Claims 1 to 3, wherein said strap element (15,20,30) is passed over said second opening proximate to said entry aperture (5) of the shell. 25
5. A structure of sport footwear according to one or more of the preceding claims, wherein said strap element (15,20,30) is adjustable in position relative to said entry aperture (5) of the shell. 30
6. A structure of sport footwear according to Claim 5, wherein a spacer (27) pivoted off-centrally either on the shell (2) or the closure means (9,11) for the second opening and constituting a support and guide for said strap element is provided for adjusting said strap element position relative to said entry aperture of the shell. 35
7. A structure of sport footwear according to one or more of the preceding claims, wherein said shell (2) has a sole (6) plane and said strap element, at the section thereof extending over said second opening (4), is elongated in a near-parallel direction to said sole (6) plane. 40
8. A structure of sport footwear according to one or more of the preceding claims, wherein said strap element extends from the outside lateral member (2a) of the shell. 45

9. A structure of sport footwear according to Claim 8, which comprises a second strap element (21) extending from the inside lateral member (2b) of the shell, over said first opening (3), and being connected to the other strap element through said means (28a-c) for tensioning said strap element. 5
10. A structure of sport footwear according to Claim 9, wherein said strap elements (20,21) cross over at said first opening. 10
11. A structure of sport footwear according to one or more of the preceding claims, wherein said at least one strap element (15,20) has one end attached to the shell (2) by position adjustment anchor means (22). 15
12. A structure of sport footwear according to Claim 11, wherein said anchor means (22) are arranged for adjusting the position of attachment of the strap element end (15a,20a) along two substantially mutually orthogonal directions. 20
13. A structure of sport footwear according to Claim 12, wherein said anchor means comprise a disk-shaped element (24) pivotally secured off-centrally on the shell and through which the strap element end is attached to the shell. 25
14. A structure of sport footwear according to either Claim 9 or 10, wherein said strap elements are interconnected, on the remote side from said tensioning means, into a single flexible strap (30) extending around said shell. 30
15. A structure of sport footwear according to one or more of the preceding claims, wherein said at least one strap element and associated tensioning means constitutes the sole fastening means provided on said shell. 35



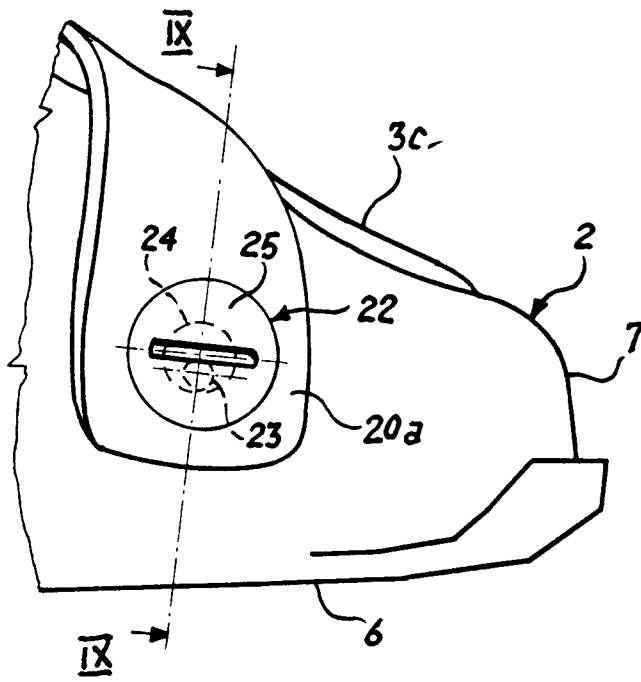


Fig. 7

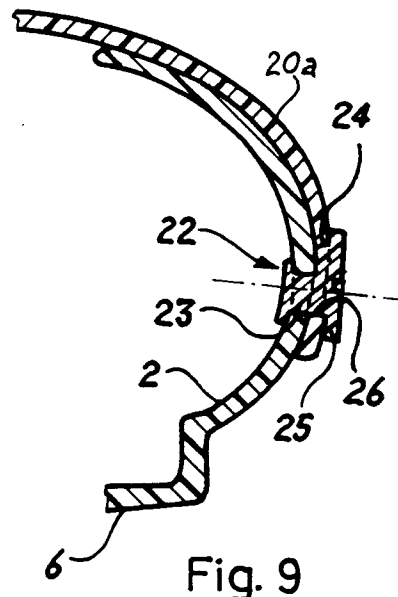


Fig. 9

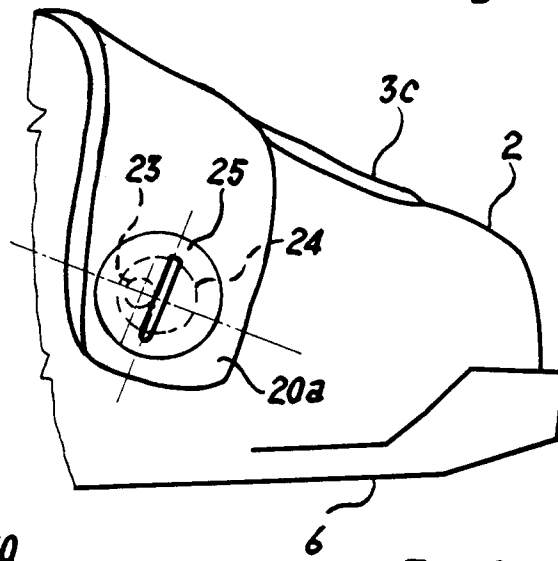


Fig. 8

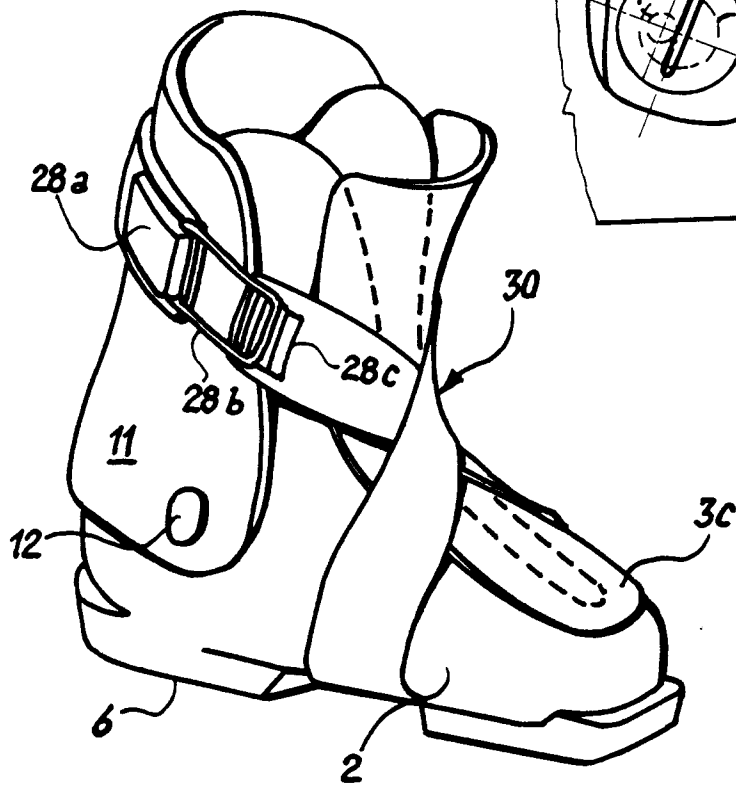


Fig. 10



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EUROPEAN SEARCH REPORT

Application Number

EP 92 83 0560

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	DE-B-1 007 668 (W. BOOS) * the whole document * ---	1-5	A43B5/04 A43B5/16 A43C11/00
X	DE-C-916 696 (E. SCHUCAN) * the whole document * ---	1-5	
X	CH-A-222 236 (H. LOEW) * the whole document * ---	1	
A	DE-C-864 069 (E. SCHUCAN) * the whole document * ---	1	
A	DE-C-652 530 (F. WOLF) * the whole document * -----	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			A43B A43C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 19 MAY 1993	Examiner DECLERCK J.T.
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