(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 135 646 A2**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
23.12.2009 Bulletin 2009/52

(51) Int Cl.:
A63C 11/22 *(2006.01)*

(21) Application number: **09160500.6**

(22) Date of filing: **18.05.2009**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK TR

(30) Priority: **19.05.2008 SE 0801146**

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(54) **A ski pole's rotating hand holding means**

(57) A ski pole has holding means configured to hold a hand of a user of the ski pole substantially fastened to an upper end portion of a shaft (2) of the ski pole and comprises a substantially rigid support member (7) having first support portions (8) adapted to form a substantially rigid support to at least portions of the palm of a said user while allowing the hand of the user to grip around a hand grip (3) on the shaft in a first base position of the support member. The support member is pivotably connected to said shaft.

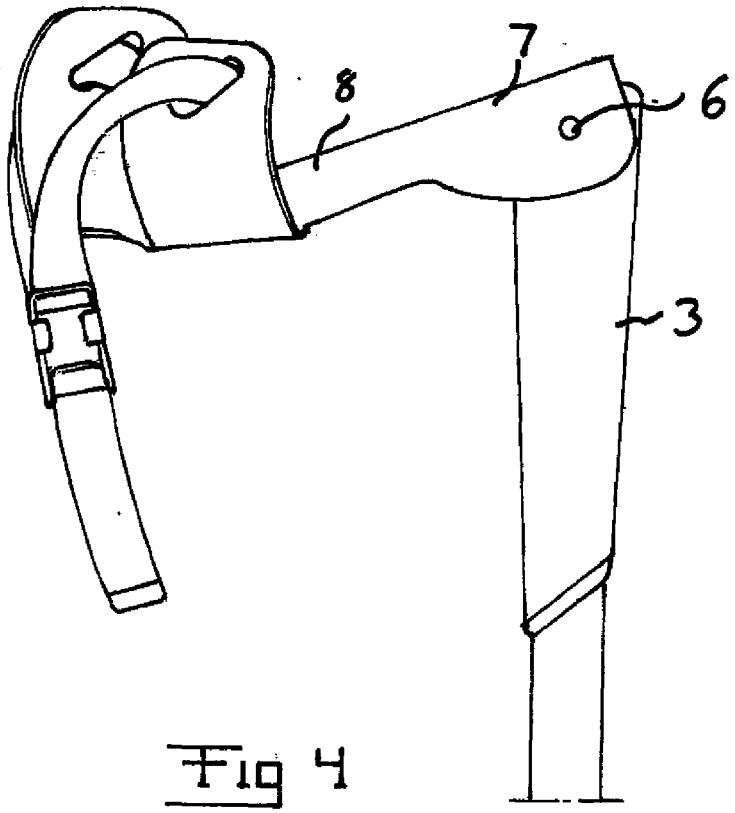

Fig 4

EP 2 135 646 A2

Description

[0001] The present invention relates to a ski pole comprising an elongated shaft, a hand grip arranged around an upper end portion of the shaft and configured to be gripped by a user of the ski pole and means configured to hold a hand of a said user substantially fastened to said upper end portion of the shaft while allowing a pivoting movement of the hand with respect to said upper end portion around an axis substantially transversally to the running direction of said user when skiing for allowing said user to let loose the grip of the hand around said hand grip at an end phase of a pole-pushing. The invention is particularly directed to cross-country ski poles, so that ski poles for that application will be discussed in the rest of this disclosure for illuminating the invention but not restricting it thereto.

[0002] The most simple such holding means are straps in the form of a band loop secured to the upper end portion of said shaft.

[0003] Such holding means have, in an attempt to improve the efficiency of a cross-country pole-pushing, especially at the end phase thereof, being subjected to developments. The simplest measure has been to provide for an adaption of the length of a said strap for adapting it to the size of the hand of a said user. It is then also known to extend said straps with portions partially surrounding the metacarpalian part of a hand of a user and to tighten these portions around the hand for obtaining a firmer support from the strap when the grip of the hand around the hand grip is loosened at said end phase of a pole-pushing. A ski pole with such so called wrist-straps as holding means is known through for example WO 03/039688 A1.

[0004] Similar such ski poles are known through DE-U-9401287.3 and WO 2006/058953 A1.

[0005] WO 2006/005840 A1 describes a further cross-country ski pole of this type provided with a rocker-like member for among others providing better support for a thumb of the hand of a user.

[0006] Ski poles of other types than the one defined in the introduction have also been proposed for improving the effect of the end phase of a pole-pushing. US 6491323 B1 describes such a ski pole, which however do not allow the user to grip around any hand grip arranged around the shaft of the ski pole, so that the use of such a ski pole will be rather unstable and not natural for a cross-country racing skier.

SUMMERY OF THE INVENTION

[0007] The object of the present invention is to provide a ski pole, especially for cross-country skiing, of the type defined in the introduction, which is improved in at least some aspect with respect to such ski poles already known.

[0008] This object is according to the invention obtained by providing such a ski pole in which said holding means comprises a substantially rigid support member having first support portions adapted to form a substantially rigid support to at least portions of the palm of a said user while allowing the hand of the user to grip around said hand grip in a first base position of the support member, and said support member is pivotably connected to said shaft around said axis at a location closer to an upper end of said shaft than the intended position of the metacarpophalangeal joint of the thumb of a said user gripping the hand grip in said first base position for allowing said pivoting movement of the hand at said end phase of pole-pushing.

[0009] Thus, it will be possible to grip around said hand grip on the shaft in said first base position of the support member and then when letting the grip of the hand around said hand grip loose at least portions of the palm of a said user will bear against said first support portions of the substantially rigid support member allowing efficient pushing, especially at said end phase of a pole-pushing in a way experienced as comfortable to said user. Thanks to the location of said pivotable connection of the support member to the shaft a prolonged lever arm and by that moment transferred from said support member to the shaft will result in said end phase of a pole-pushing making this more efficient than for cross-country ski poles of the type defined in the introduction already known. The efficiency of said end phase of a pole-pushing will be further increased by the increased stability for the hand of a user obtained by said substantially rigid support member compared to a conventional strap forming the support of the palm of the user, especially in the region of the metacarpophalangeal joint of the thumb, in such cross-country ski poles already known.

[0010] It is known that the direction of the force applied on the shaft of the pole is most favourable at said end phase of a pole-pushing, since the component thereof in the horizontal direction rearwards will then be a maximum. Accordingly, it is particularly advantageous to increase said moment exactly at said end phase and also make it possible to prolong this end phase. This makes it possible to lower the frequency of pole-pushings for a certain skiing speed, which is favourable especially for sprint races where the skier has a problem with to high such frequencies.

[0011] It is pointed out that "substantially rigid" as used in this disclosure with respect to said support member and portions thereof is to be interpreted as also covering support members and/or portions thereof that may be bent upon applying a certain force thereupon, such as for making it possible to press such portions apart for introducing a hand of a said user in said holding means. Thus, said support member may be made of any substantially rigid material, such as a metal, but also plastic with a certain stiffness making it substantially rigid.

[0012] According to an embodiment of the invention said support member is pivotably connected to said shaft at a distance to portions of the support member configured to form a support to the hand at said metacar-

pophalangeal joint of the thumb exceeding 1 cm, advantageously exceeding 2 cm and preferably being 3-8 cm. A location of said pivotable connection at such a distance results in a substantially increased moment transferable to said shaft at said end phase of a pole-pushing.

[0013] According to another embodiment of the invention said support member has substantially rigid second support portions configured to support metacarpalian bones of a hand of a said user while partially surrounding and supporting said hand on the thumb side and/or little finger side thereof to at least partially support also the dorsum of said hand. Said second support portions improve the stability of said holding means experienced by a said user, which may contribute to an improved result of especially said end phase of a pole-pushing.

[0014] According to another embodiment of the invention said second support portions are configured to fit tightly around a said hand of a said user while forming a substantially rigid support thereto. This further increases said stability and the advantages resulted therefrom.

[0015] According to another embodiment of the invention said holding means comprises a bracing member, such as a strap, attached to said support member configured to be tightened for bracing a said hand of a said user to said support member. This means that it is ensured that the hand will be firmly received in said holding means.

[0016] According to another embodiment of the invention said bracing member is configured to obtain said tightly fit of said second support member portions around said metacarpalian bones of the hand while being tightened for bracing said hand. This allows the hand to be comfortably introduced in contact with the support member portions in question, whereupon these may be brought to tightly fit around said hand by tightening of said strap.

[0017] According to another embodiment of the invention said support member has substantially rigid support portions for supporting a said hand of said user while substantially surrounding the metacarpalian bones of said hand from the palm to the dorsum thereof. This results in a very firm and stable fit of a said hand in said holding means improving the result of pole-pushing with the ski pole according to the invention.

[0018] According to another embodiment of the invention said support member is pivotably connected to said shaft around a pin.

[0019] According to another embodiment of the invention said support member has substantially rigid third support portions for at least the distal of the two digital bones of the thumb of the hand of a said user, said third support portions extending substantially in parallel with said shaft in said first base position of the support member for supporting a said thumb when directed substantially in parallel with said shaft and pointing towards said upper end of the shaft in said first base position. This means that the thumb may be used especially at said end phase for transferring extra power to said shaft by acting upon said third support portions and by that on said support member.

[0020] According to another embodiment of the invention said support member comprises fourth support portions for at least one of the digital bones of the index finger of the hand of a said user, said fourth support portions extending substantially in parallel with said shaft in said first base position of the support member for supporting said index finger of the hand of a said user directed substantially in parallel with said shaft and pointing towards said upper end of the shaft in said first position. This means that the index finger may be used to help locking the support member in the right position during the return after the pole-pushing by acting upon said fourth support portions.

[0021] According to another embodiment of the invention said support member comprises substantially rigid fifth support portions projecting downwardly away from said upper end of the shaft in an angle out from said shaft in said first base position of the support member for providing support for the little finger and at least also the ring finger of the hand of a said user partially from below with respect to said upper end of the shaft. These fifth support portions may increase the efficiency of the start phase of a pole-pushing when the user is more or less hanging on the ski pole in question.

[0022] According to another embodiment of the invention said ski pole further comprises means configured to store potential energy upon pivoting of said support member away from said first base position for influencing the support member to return to said first base position. Such potential energy storing means facilitates the return of the support member to the first base position, in which the hand of the skier in question may grip around the hand grip of the shaft of the ski pole for carrying out the initial phase of a pole-pushing.

[0023] According to another embodiment of the invention said energy storing means comprises an elastic elongated member having one end connected to said shaft and one end connected to said support member. This is a suitable way of designing reliable said energy storing means to a low cost.

[0024] According to another embodiment of the invention said support member is removably connected to said shaft for allowing replacement thereof by a said support member being designed for a hand of a particular said user when the ski pole is to be used by said particular user. This makes it possible to manufacture support members being adapted to the shape of a hand of a particular user and then connect this support member to an elongated shaft with a desired length for obtaining a ski pole perfectly adapted to said user.

[0025] According to another embodiment of the invention said support member is designed to fit either a right hand or a left hand of a said user. This makes is possible to obtain a perfectly adaption of said support member to a hand of a user to be held in said holding means of the ski pole.

[0026] A further advantage of having a substantially rigid support member with a shape adapted to the hand of the user is that the risk of pointwisely applying loads on the hand of a said user resulting in blisters and wounds in the hand is reduced.

[0027] Further advantages and advantageous features of the invention appear from the following description.

BRIEF DESCRIPTION OF THE DRAWINGS

[0028] With reference to the appended drawings, below follows a description of embodiments of the invention cited as examples.

[0029] In the drawings:

Fig. 1-3 are views in different directions of the upper portion of a ski pole for the left hand of a user according to an embodiment of the invention with the support member thereof in said first base position,

Fig. 4 is a view corresponding to Fig. 3 with the support member pivoted away from said first base position,

Fig. 5 illustrates schematically how a left hand of a said user is intended to be held by the holding means of the ski pole according to Fig. 1-4 in said first base position,

Fig. 6 illustrates schematically the upper portion of the ski pole according to said embodiment of the invention at an end phase of a pole-pushing,

Fig. 7-9 are views corresponding to Fig. 1-3 of a ski pole for the right hand of a user according to a second embodiment of the invention,

Fig. 10 is a view corresponding to Fig. 4 of the upper portion of the ski pole according to Fig. 7-9,

Fig. 11 and 12 are views in different directions on the ski pole according to said second embodiment of the invention with a right hand of a user received in said holding means and the support member in said first base position,

Fig. 13 is a view illustrating an end phase of a polepushing in which ski poles according to the present invention are particularly favourable.

DETAILED DESCRIPTION OF EMBODIMENTS OF THE INVENTION

[0030] Fig. 1-3 illustrates an upper part of a cross-country ski pole 1 having an elongated shaft 2 with a basket and tip not shown on the lower end for being pushed into the snow for pole-pushing. A hand grip 3 is arranged around an upper end portion 4 of the shaft and configured to be gripped by a user of the ski pole.

[0031] The ski pole further comprises means 5 configured to hold a hand of a said user substantially fastened to said upper end portion 4 of the shaft while allowing a pivoting movement of the hand with respect to said upper end portion around an axis 6 substantially transversally to the running direction of said user when skiing for allowing said user to let loose the grip of the hand around the hand grip at an end phase of a pole-pushing. The holding means 5 comprises a substantially rigid support member 7 made of for example metal or a synthetic material, such as a composite for lowering the weight thereof. The support member 7 shown in Fig. 1-3 is designed to fit the left hand of a user.

[0032] The support member has first support portions 8 adapted to form a substantially rigid support to at least portions of the palm of a said user while allowing the hand 9 of the user to grip around the hand grip 3 in a first base position of the support member as shown in Fig. 5. It is pointed out that the thumb of the hand may in the position according to Fig. 5 also grip around the hand grip.

[0033] The support member is pivotably connected to the shaft around said axis 6 in the form of a pin 10 at a location closer to an upper end 11 of the shaft than the intended position of the metacarpophalangeal joint 12 of the thumb of a said user gripping the hand grip 3 in said first base position. The distance between said axis 6 and portions 13 of the support member configured to form a support to a hand at said metacarpophalangeal joint of the thumb exceeds 1 cm, advantageously 2 cm and is preferably 3-8 cm, and is for the ski pole shown in Fig. 1-3 about 4 cm. Another advantage of a pivotable connection of the type according to the invention is that it is possible to arrange for instance a said pin at the center of said shaft, so that the forces and loads will be applied closer to the center of the shaft than would straps be used instead of a substantially rigid support member.

[0034] The support member has also substantially rigid second support portions 14, 15 configured to support metacarpalian bones of a hand of a said user while partially surrounding and supporting said hand on the little finger side and the thumb side, respectively, to at least partially support also the dorsum of the hand. These second support portions 14, 15 are configured to fit tightly around a said hand of a said user while forming a substantially rigid support thereto, which is obtained by tightening a strap 16 attached to the support member for bracing a hand of a user to the support member.

[0035] Fig. 4 illustrates how the support member may be pivoted away from the hand grip 3 starting from the

first base position shown in Fig. 5 for letting the grip of the hand around the hand grip loose at an end phase of a pole-pushing as shown in Fig. 6. This means that the hand will in the position according to Fig. 6 apply a pushing force on the support member by that allowing the user to prolong said end phase with respect to the case of a strap or the like as said holding means. Accordingly, the phase of a pole-pushing in which the direction of forces applied to the pole is most favourable may by this be prolonged. The forces may also be better transferred to the shaft thanks to the stability of the support member and the connection thereof to the shaft as well as the lever arm created by said distance between said metacarpophalangeal joint 12 of the thumb and said axis 6. This all together means that the frequency of the pole-pushing may be lowered for a determined skiing speed or the skiing speed may be increased while maintaining the frequency or most likely something therebetween may be obtained.

[0036] It is shown in Fig. 1 how the support member may be provided with further holes 26, 26', 26" making it possible to pivotably connect the support member to the shaft at these locations. This provide for an adjustment of the length of the extra lever to the skill and power and/or the size of the hand of different skiers. A hole coming closer to the upper end of the support member may be used for larger hands.

[0037] This end phase, in which the pole-pushing will be very efficient when using ski pools according to the present invention, is illustrated in Fig. 13.

[0038] Fig. 7-12 illustrates a cross-country ski pole according to a second embodiment of the present invention. This ski pole differs slightly from the one according to Fig. 1-6 with respect to the design of the substantially rigid support member, which here is also shown for a ski pole to be used for a right hand.

[0039] The support member 7' has here substantially rigid third support portions 17 for the two digital bones of the thumb of the hand of a said user. These third support portions extends substantially in parallel with the shaft 3 in said first base position of the support member, as shown in Fig. 7-9, for supporting a said thumb when directed substantially in parallel with said shaft and pointing towards said upper end of the shaft, as shown in Fig. 11. These third support portions 17 makes it possible to efficiently and comfortably transfer pushing forces also through the thumb to said support member and by that to the shaft.

[0040] The support member has also fourth support portions 18 for the digital bones of the index finger of the hand of a said user. These fourth support portions extend substantially in parallel with the shaft 3 in said first base position of the support member for supporting said index finger of the hand of a said user directed substantially in parallel with the shaft and pointing towards said upper end of the shaft in said first position, as shown in Fig. 11 and 12. This means that the index finger may be used to help locking the support member in the right position during the return after the pole-pushing by acting upon said fourth support portions.

[0041] The support member further comprises substantially rigid fifth support portions 19 projecting downwardly away from said upper end 11 of the shaft in an angle, such as about 30°, out from the shaft in said first base position of the support member for providing support for the little finger and at least also the ring finger and advantageously also the middle finger of the hand of a said user partially from below with respect to said upper end of the shaft as shown in Fig. 12. This makes it possible for the skier to better "hang" on the ski pole at the initial phase of a pole-pushing when the hand is still in front of the body of the skier.

[0042] Accordingly, by using a substantially rigid support member according to the present invention in said holding means it is possible to provide this with different support portions for providing support to different parts of a hand of a skier for improving the transfer of muscle power of the skier to the shaft of the ski pole.

[0043] Fig. 10 illustrates that means, here in the form of an elastic elongated member 20, may be arranged for storing potential energy upon pivoting of the support member away from the first base position for influencing the support member to return to this position. The elastic elongated member has for this sake one end connected to the shaft and one end connected to the support member.

[0044] The present invention is not in any way restricted to the embodiments described above, but many possibilities to modifications thereof will be apparent to a person with ordinary skill in the art without departing from the basic idea of the invention as defined in the appended claims.

[0045] It is for instance possible that parts of said holding means are more or less flexible, so that for instance the parts surrounding a said hand on the thumb side and/or little finger side are flexible, even if it is advantageous to have also these parts belonging to the substantially rigid support member as shown in the figures.

[0046] The strap shown in the figures for bracing a hand received in the support member does not have to be there, but the support member may in a ground state have a shape adapted to the shape of the hand of a said user and be made resilient for allowing displacement of portions thereof apart when introducing said hand in the support member and then automatically returning to the ground state while releasing potential energy.

[0047] The invention is also applicable to other ski poles than for cross-country, such as alpine ski poles.

[0048] The bracing member may be another than a strap, such as those used for bracing alpine ski boots to the foot.

[0049] The fourth support portions may be designed to extend at least partially over a thumb of a user hand for allowing the thumb to also be used to help locking the support member in the right position during the return after the pole-pushing by acting upon these support por-

tions.

Claims

1. A ski pole comprising

   • an elongated shaft (2),
   • a hand grip (3) arranged around an upper end portion (4) of the shaft and configured to be gripped by a user of the ski pole and
   • means (5) configured to hold a hand of a said user substantially fastened to said upper end portion of the shaft while allowing a pivoting movement of the hand with respect to said upper end portion around an axis (6) substantially transversally to the running direction of said user when skiing for allowing said user to let loose the grip of the hand around said hand grip (3) at an end phase of a pole-pushing,

   characterized in that said holding means comprises a substantially rigid support member (7, 7') having first support portions (8) adapted to form a substantially rigid support to at least portions of the palm of a said user while allowing the hand of the user to grip around said hand grip in a first base position of the support member, and that said support member is pivotably connected to said shaft (2) around said axis (6) at a location closer to an upper end of said shaft than the intended position of the metacarpophalangeal joint (12) of the thumb of a said user gripping the hand grip in said first base position for allowing said pivoting movement of the hand at said end phase of pole-pushing.

2. A ski pole according to claim 1, **characterized in that** said support member (7, 7') is pivotably connected to said shaft at a distance to portions (13) of the support member configured to form a support to the hand at said metacarpophalangeal joint (12) of the thumb exceeding 1 cm, advantageously exceeding 2 cm and preferably being 3-8 cm.

3. A ski pole according to claim 1 or 2, **characterized in that** said support member (7, 7') has substantially rigid second support portions (14, 15) configured to support metacarpalian bones of a hand of a said user while partially surrounding and supporting said hand on the thumb side and/or little finger side thereof to at least partially support also the dorsum of said hand.

4. A ski pole according to claim 3, **characterized in that** said second support portions (14, 15) are configured to fit tightly around a said hand of a said user while forming a substantially rigid support thereto.

5. A ski pole according to any of the preceding claims, **characterized in that** said holding means comprises a bracing member, such as a strap (16), attached to said support member (7, 7') and configured to be tightened for bracing a said hand of a said user to said support member.

6. A ski pole according to claim 3 and 5, **characterized in that** said bracing member (16) is configured to obtain said tightly fit of said second support member portions around said metacarpalian bones of the hand while being tightened for bracing said hand.

7. A ski pole according to any of the preceding claims, **characterized in that** said support member (7, 7') has substantially rigid support portions (14, 15) for supporting a said hand of said user while substantially surrounding the metacarpalian bones of said hand from the palm to the dorsum thereof.

8. A ski pole according to any of the preceding claims, **characterized in that** said support member (7, 7') is pivotably connected to said shaft (2) around a pin (10).

9. A ski pole according to any of the preceding claims, **characterized in that** said support member (7') has substantially rigid third support portions (17) for at least the distal of the two digital bones of the thumb of the hand of a said user, said third support portions extending substantially in parallel with said shaft (2) in said first base position of the support member for supporting a said thumb when directed substantially in parallel with said shaft and pointing towards said upper end of the shaft (2) in said first base position.

10. A ski pole according to any of the preceding claims, **characterized in that** the support member (7') comprises fourth support portions (18) for at least one of the digital bones of the index finger of the hand of a said user, said fourth support portions extending substantially in parallel with said shaft (2) in said first base position of the support member for supporting said index finger of the hand of a said user directed substantially in parallel with said shaft and pointing towards said upper end (11) of the shaft (2) in said first base position.

11. A ski pole according to any of the preceding claims, **characterized in that** said support member (7') comprises substantially rigid fifth support portions (19) projecting downwardly away from said upper end of the shaft (2) in an angle out from said shaft in said first base position of the support member for providing support for the little finger and at least also the ring finger of the hand of a said user partially from below with respect to said upper end of the shaft.

12. A ski pole according to any of the preceding claims, **characterized in that** it further comprises means (20) configured to store potential energy upon pivoting of said support member (7') away from said first base position for influencing the support member to return to said first base position.

13. A ski pole according to claim 12, **characterized in that** said energy storing means comprises an elastic elongated member (20) having one end connected to said shaft (2) and one end connected to said support member (7').

14. A ski pole according to any of the preceding claims, **characterized in that** said support member (7, 7') is removably connected to said shaft (2) for allowing replacement thereof by a said support member being designed for a hand of a particular said user when the ski pole is to be used by said particular user.

15. A ski pole according to any of the preceding claims, **characterized in that** said support member (7, 7') is designed to fit either a right hand or a left hand of a said user.

16. A ski pole according to any of the preceding claims, **characterized in that** it is a cross-country ski pole.

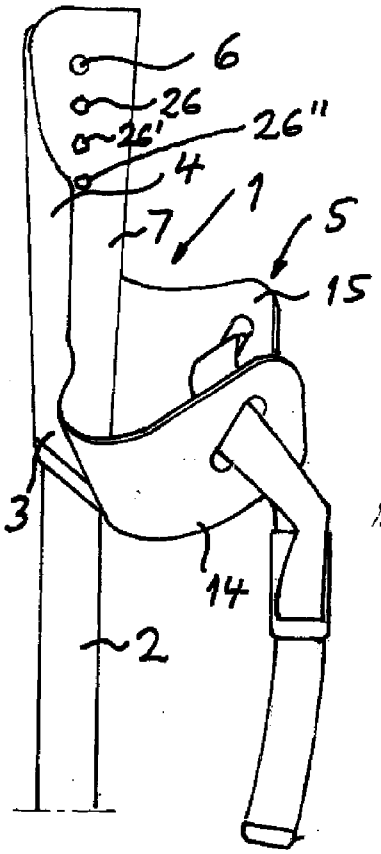

Fig 1

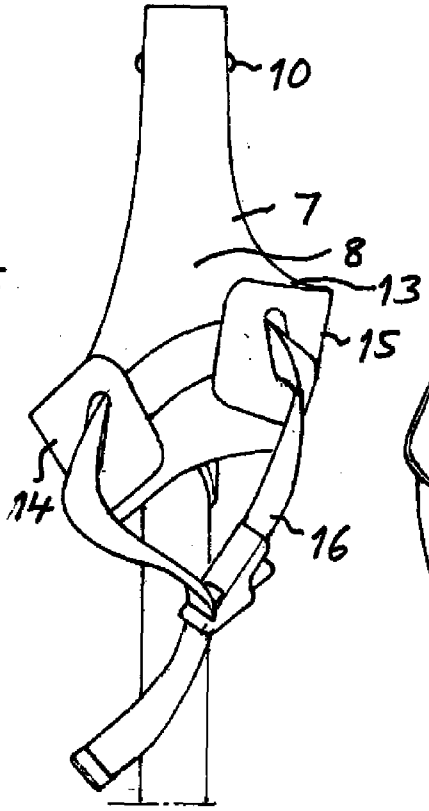

Fig 2

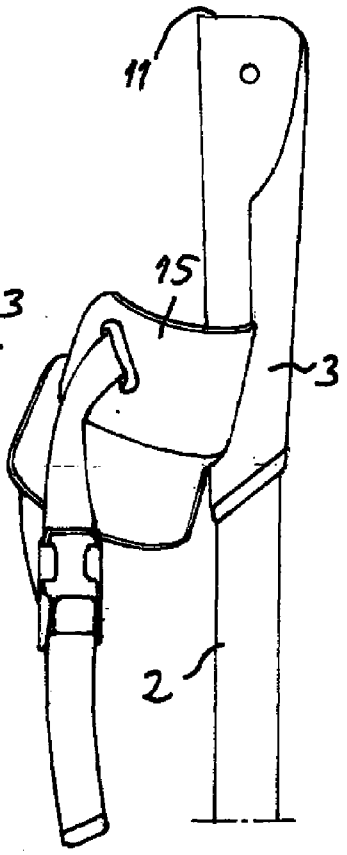

Fig 3

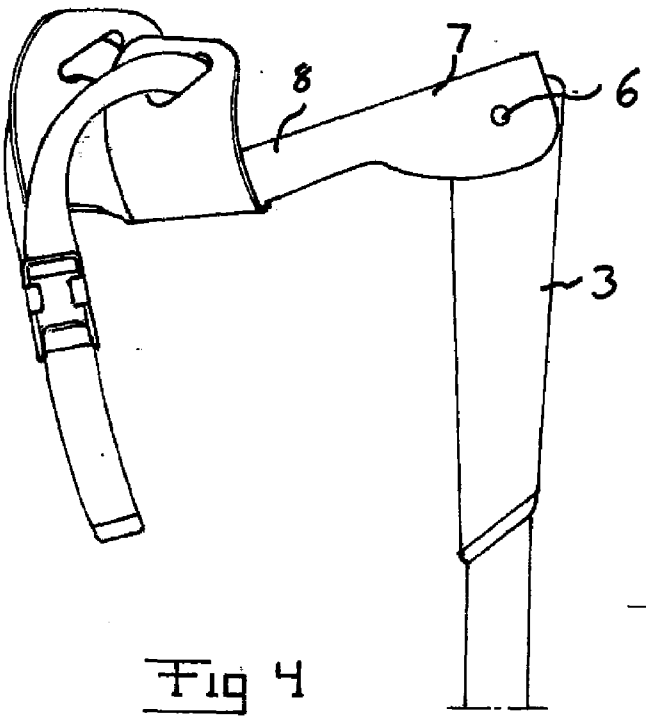

Fig 4

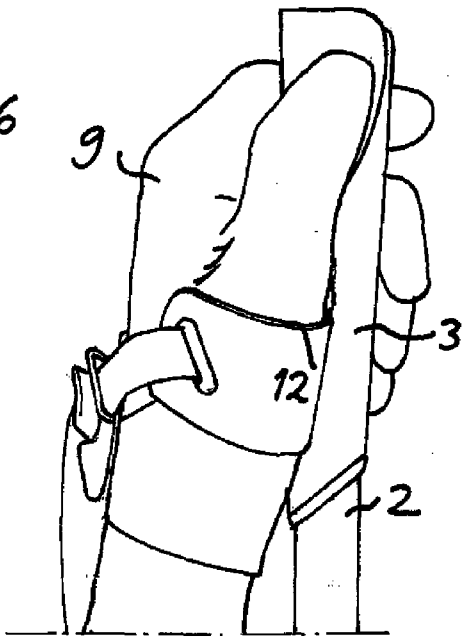

Fig 5

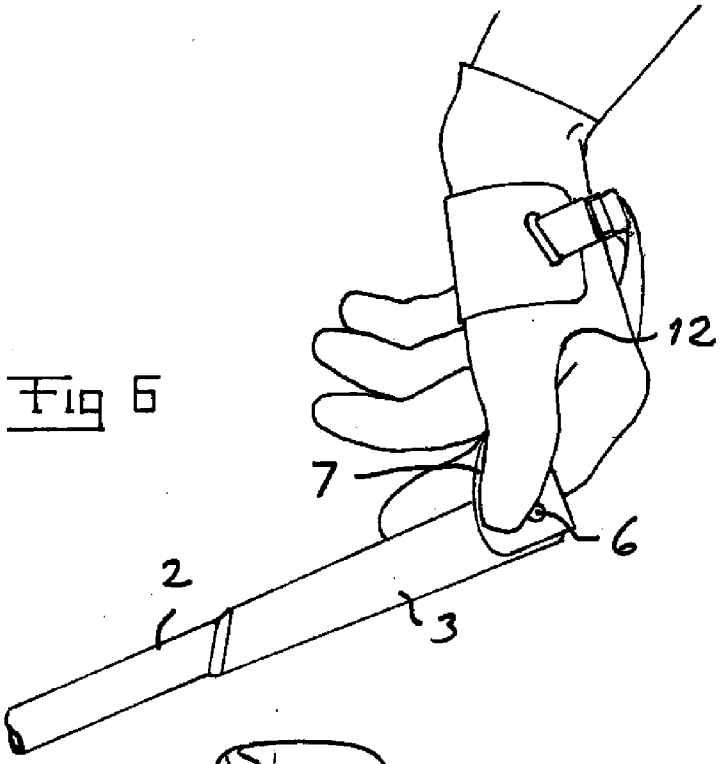

Fig 6

Fig 7

Fig 8

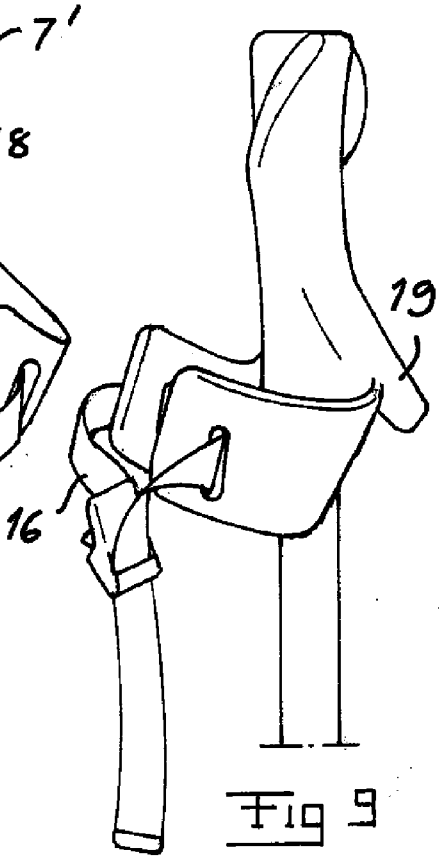

Fig 9

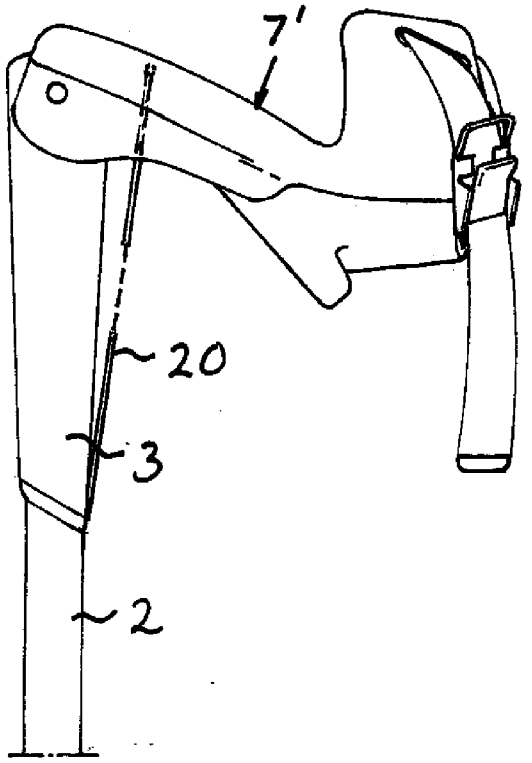

Fig 10

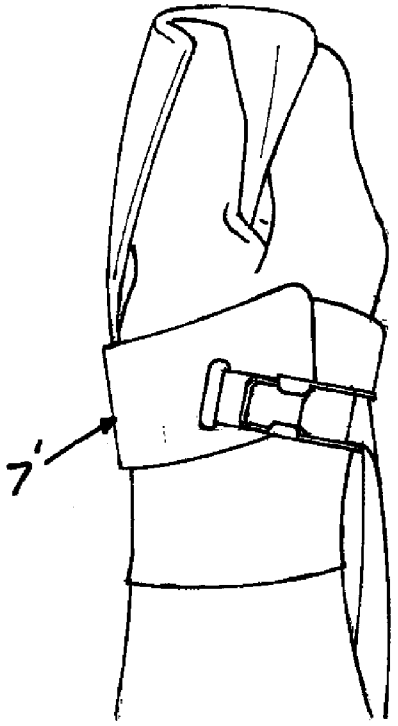

Fig 11

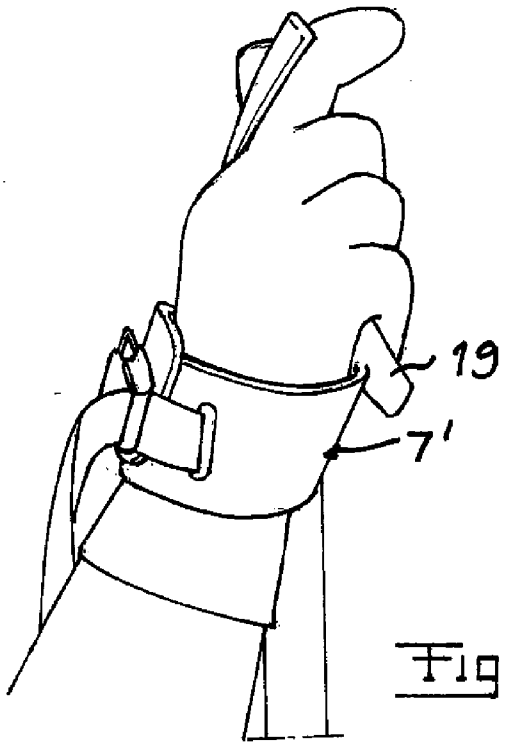

Fig 12

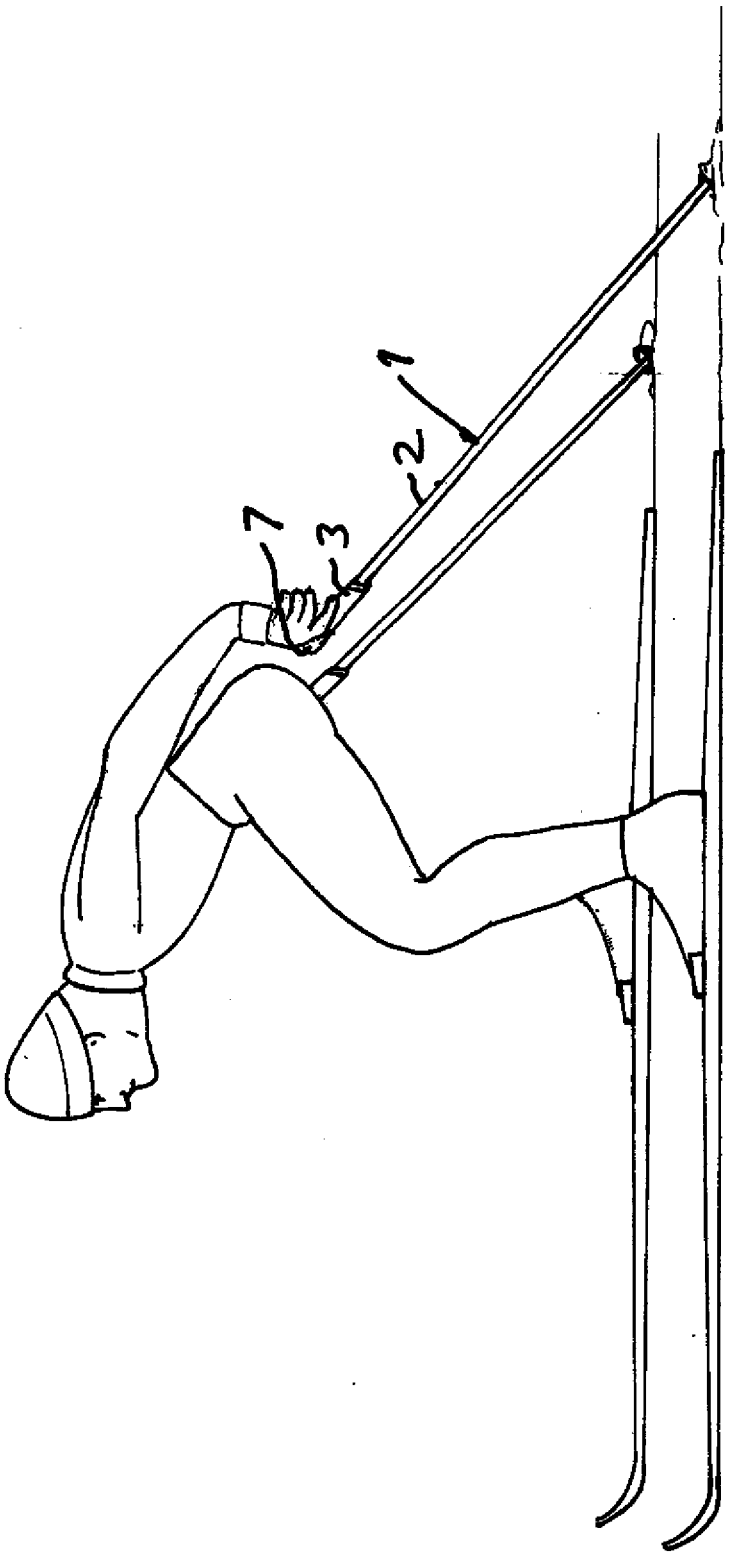

Fig 13

REFERENCES CITED IN THE DESCRIPTION

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