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(54) Improvements in mountaineering footwear

(57) Footwear for ascending and descending sloping surfaces has a frame (2) and a tread step frame (8) connected by a hinge (6). The frames are diverged to suit the incline by a screw adjuster 36 which moves links (26, 28) attached to the frames. A floating bridge (12)

allows the screw angle to change as the divergence changes.

The screw (36) acts on nut (34). Both have flats (44, 48) to provide rapid adjustment. Dogs (48) engage bores (50) in the bridge to lock the screw in a selected position.

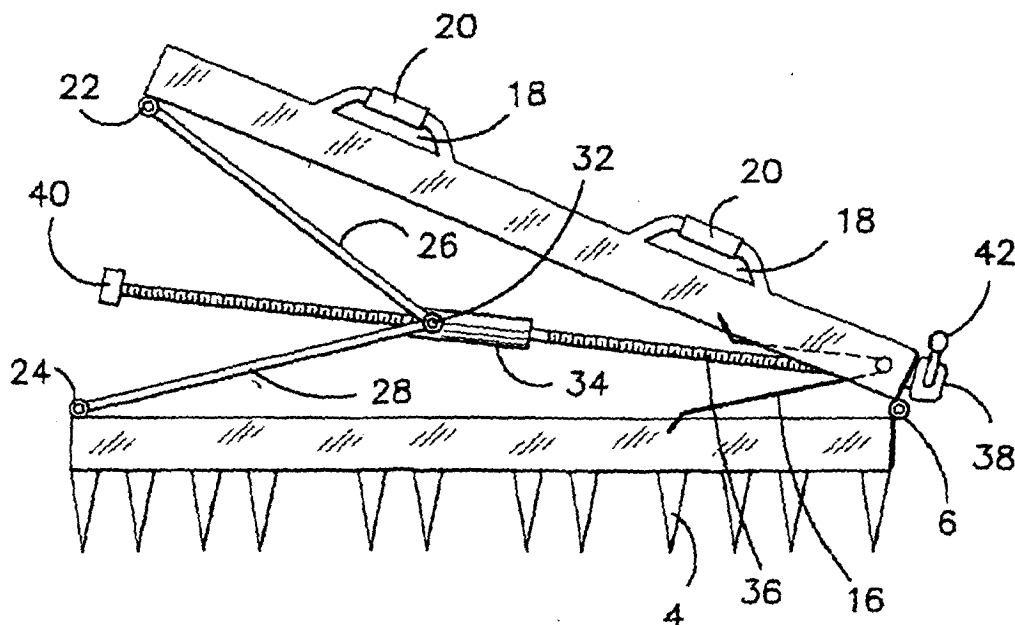


FIGURE 2

Description

FIELD OF THE INVENTION

[0001] This invention concerns special purpose footwear for ascending and descending inclines.

BACKGROUND OF THE INVENTION

[0002] Climbers, rangers, soldiers and shepherds operate on sloping terrain. Tradesmen who repair roofs or attend to roof apparatus, such as aials, operate on sloping structures.

[0003] Ascending and descending an incline works the muscles joints and tendons over ranges of movement which are different from those needed just for walking and such persons find their operations tiring. Descending may produce a variety of injuries.

[0004] Japanese Patent Application No. 2001000091307 describes a device for increasing the comfort of climbing a roof. The device has two steel bars hinged together at the toe end. The step bar has a heel sling and a foot strap. A height adjuster in the form of a triangular double walled bracket projects downwards at the heel end of the step bar. The walls both have a scalloped edge providing a series of lodgements for a link hinged to the adjacent end of the tread bar. The wearer can diverge the bars by selecting a suitable scallop for engagement by the cross pin of the link. As the bars allow the wearer to walk up a sloping roof with ankle, foot and calf at normal walking dispositions, the comfort is substantially greater than without such footwear.

[0005] The maintenance of the selected angle in such footwear is important. If the device were in use to collapse flat, the wearer may suffer an injury or a fall or both.

SUMMARY OF THE INVENTION

[0006] The apparatus aspect of this invention provides footwear for ascending and descending inclines comprising a step member for attachment to a boot or shoe and a tread member for contacting the incline, the members being hinged together and diverged by an adjuster to suit the incline characterised in that the adjuster is a nut connected by links to the members and a screw which reacts at the hinge end of either member.

[0007] Preferably one of the members has a pair of supports for a pivoting, intermediate thrust member against which the screw reacts, whereby the thrust member tilts to align with the direction of the screw.

[0008] The thrust members may have a bore to accommodate the screw and a thrust face for the head of the screw. The nut may have a quick release in order to make rapid adjustment of the divergence. The screw may have a buttress thread. The screw may have a half thread and the nut has a half thread, whereby unthreaded surfaces of the screw and nut can be aligned in ap-

position to permit slide motion and thereafter re-aligned to give screw feed.

[0009] When the footwear is required for scaling ice or slippery rock, the tread member may have spikes such as form part of a conventional crampon. The step member may support a superimposed rotatable plate to which the boot is attachable. Before descending the rotatable plate is rotated through 180° and locked in position for the descent.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] One embodiment of the invention is now described with reference to the accompanying drawings, in which:

Figure 1 is a side view with the device ready to be adjusted.

Figure 2 is a side view with the device partially diverged.

Figure 3 is a plan of the device shown in Figure 1.

Figure 4 is a perspective of a fragment of the screw.

Figure 5 is an end view of the nut.

Figure 6 is a side view of the bridge and winder.

Figure 7 is the same view as Figure 2 with the device more fully diverged.

DETAILED DESCRIPTION WITH RESPECT TO THE DRAWINGS

[0011] Referring now to the drawings, tread frame 2 is rectangular. The two longer sides have projecting spikes 4. The end of the tread frame has a pair of hinges 6 which connect the frame to rectangular step frame 8. Step frame 8 has a pair of loops 10, both of which are connected to hinges 6, enabling the step frame and tread frame to articulate.

[0012] The loops are separated by a U-shaped screw bridge 12 which pivots on the ends of bridge pins 14 which are supported by the loops. Rat trap springs 16 threaded at the pins act between the tread frame and the step frame to diverge the frames. The frames are bent Dumlumin strip. The step frame is spanned by mesh 18 or boot bars. Boss 20 is fixed to the bridge.

[0013] The longer sides of the step frame have eyes 22 for straps (not shown) protected by roller 24. The ends of the frames have link hinges 26, 28. A pair of flat links 30 made of Duralumin plate extend from the hinges 26. A like pair of flat links 32 extend from hinges 28. The opposite ends of the links are hinged to hinge pins 34, 36 which extend from nut 38.

[0014] Screw 40 has a head 42 which abuts bridge 12

and a stop 44 at the opposite end. Screw 40 causes nut 38 to travel toward and away from the bridge causing the frames to converge and diverge against the rat trap spring. Winder 46 turns screw 36 and four dogs 48 which project from the head engage bores 50 in boss 20. When the screw is to be turned, the head is retracted in order to disengage the boss 20.

[0015] Referring now to Figures 4 and 5, the screw 40 has a pair of flats 52 and nut 38 has a corresponding pair of flats 54. For rapid movement, the flats are aligned and the screw slides through the nut. For final adjustment the winder is rotated and the threads engage. The winder is protected from accidental operation by the dogs.

[0016] As the screw rotates, the angle between the frames changes but the bridge is free to pivot and maintain full contact between the bridge surface and the screw head. When descending ice or rock, the wearer releases the straps, reverses the footwear and re-secures the straps.

[0017] When the footwear is used for roof work, the spikes are not appropriate and a ribbed rubber sole is fixed to the tread frame instead. The wearer does not reverse the footwear to descend the roof but walks backwards.

[0018] I have found the advantages of the above invention to be:

1. Ease of adjustment
2. Considerable angle of adjustment.

[0019] It is to be understood that the word "comprising" as used throughout the specification is to be interpreted in its inclusive form, ie. use of the word "comprising" does not exclude the addition of other elements.

[0020] It is to be understood that various modifications of and/or additions to the invention can be made without departing from the basic nature of the invention. These modifications and/or additions are therefore considered to fall within the scope of the invention.

Claims

1. Footwear for ascending and descending inclines comprising a step member for attachment to a boot or shoe and a tread member for contacting the incline, the members being hinged together and diverged by an adjuster to suit the incline **characterised in that** the adjuster is a nut connected by links to the members and a screw which reacts at the hinge end of either member.
2. Footwear as claimed in Claim 1, **characterised in that** one of the members has a pair of supports for a pivoting, intermediate thrust member against which the screw reacts, whereby the thrust member tilts to align with the direction of the screw.

3. Footwear as claimed in Claim 2, **characterised in that** the thrust member has a bore to accommodate the screw and a thrust face for the head of the screw.
4. Footwear as claimed in Claim 2 or 3, **characterised in that** the nut has a quick release in order to make rapid adjustment of the divergence.
5. Footwear as claimed in Claim 4, **characterised in that** the screw has a half thread and the nut has a half thread, whereby unthreaded surfaces of the screw and nut can be aligned in apposition to permit slide motion and thereafter aligned to give screw feed.
6. Footwear as claimed in any one of the preceding claims, **characterised in that** the tread member has multiple protrusions to increase grip and means to reverse the direction of gripping.
7. Footwear as claimed in Claim 6, **characterised in that** the protrusions extend from a plate which is reversibly attached to the tread member.
8. Footwear as claimed in any one of the preceding claims, **characterised in that** a rat trap spring biases the tread member and the step member to mutually diverge.
9. Footwear as claimed in any one of Claims 4-8, **characterised in that** the screw has an arrester which prevents accidental quick release.
10. Footwear as claimed in any one of Claims 1-5 or 8 or 9, **characterised in that** the tread member has a rubber face.

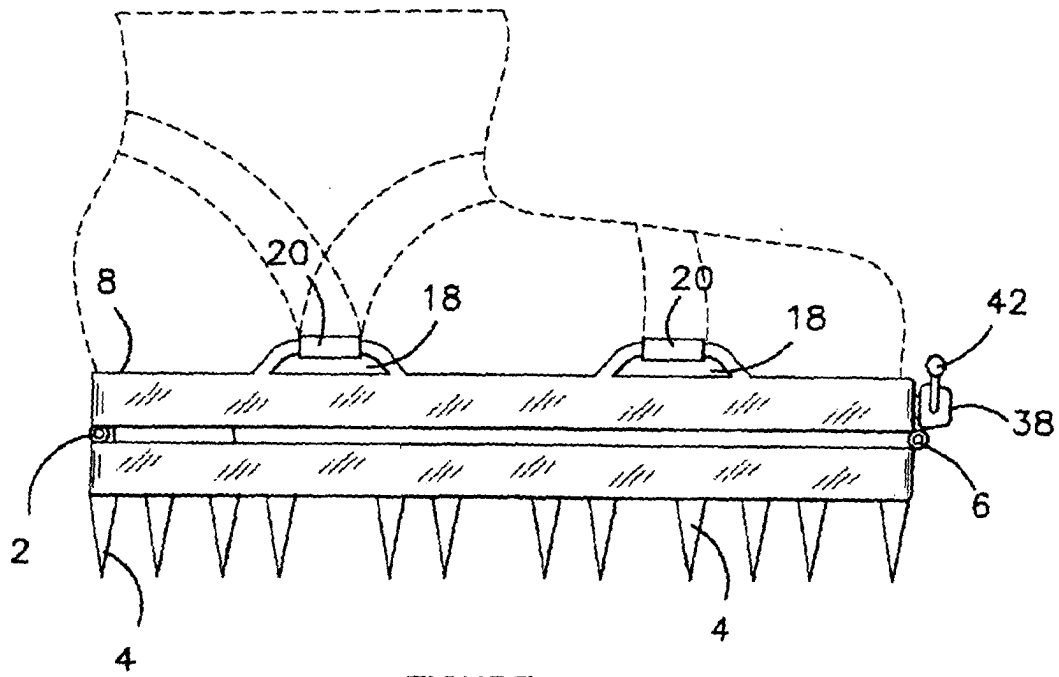


FIGURE 1

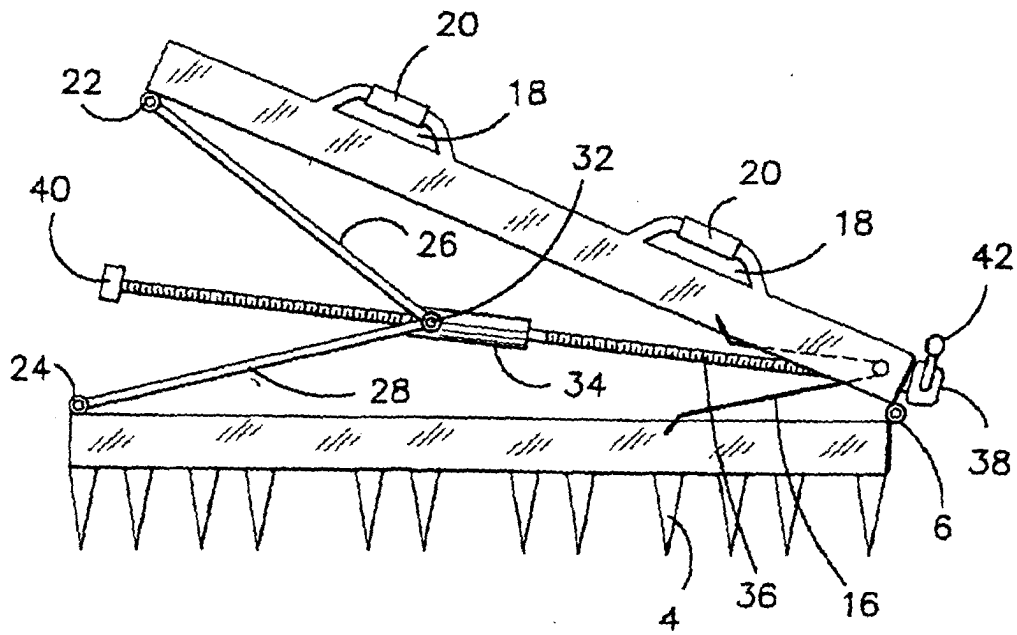


FIGURE 2

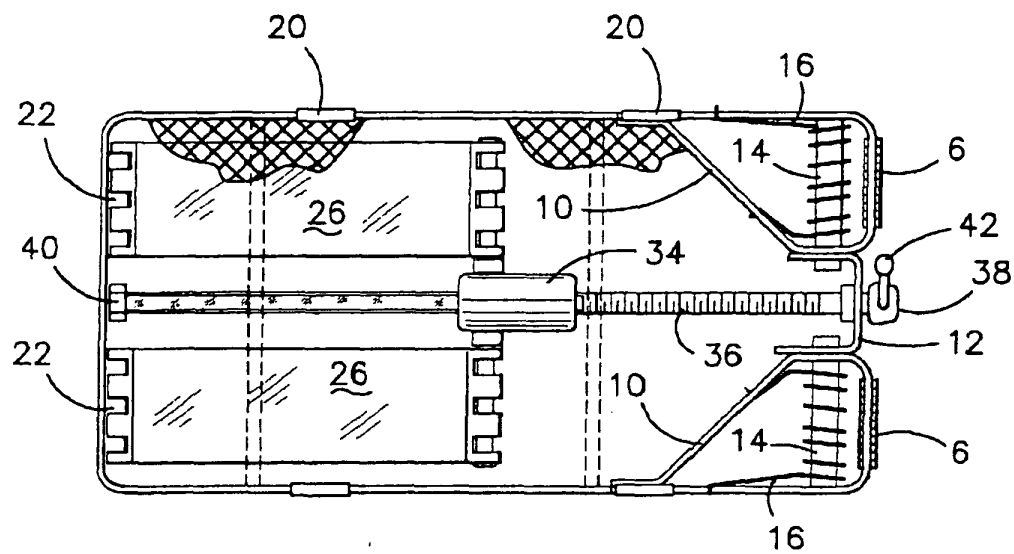


FIGURE 3

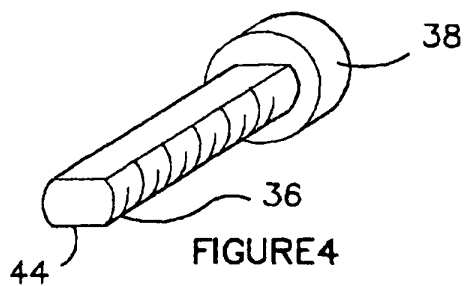


FIGURE 4

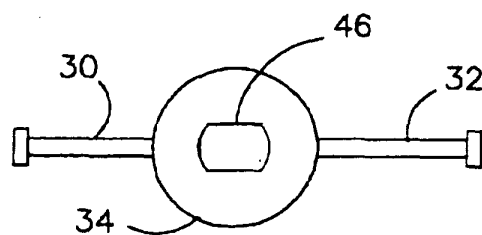


FIGURE 5

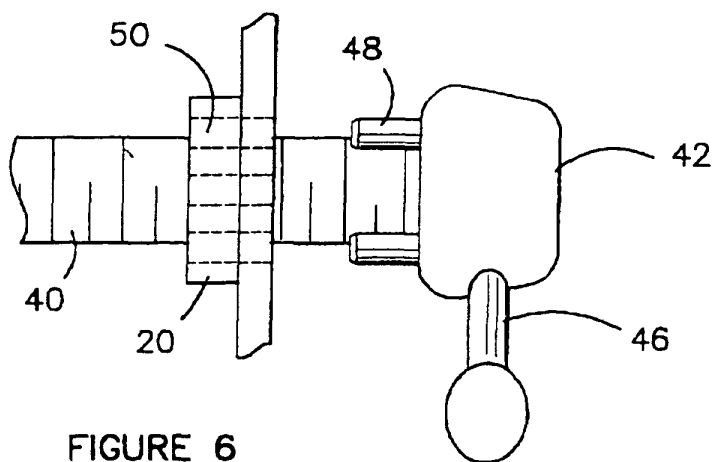


FIGURE 6

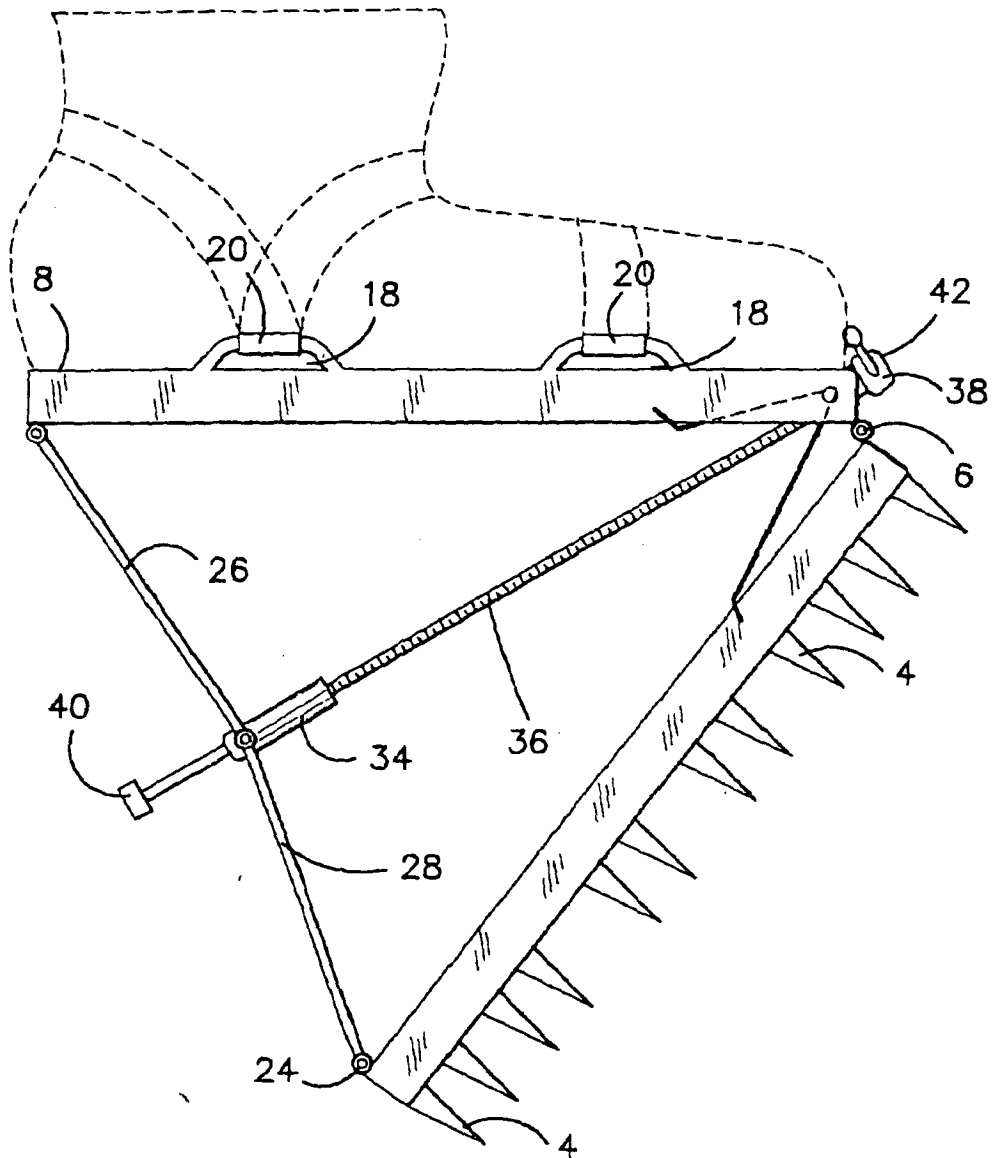


FIGURE 7



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 05 25 3575

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.7)
A	FR 555 195 A (PIERRE RIFAUD) 26 June 1923 (1923-06-26) * page 1, right-hand column *	1-10	A43C15/09
D,A	PATENT ABSTRACTS OF JAPAN vol. 2002, no. 12, 12 December 2002 (2002-12-12) & JP 2002 238618 A (YOSHIMURA ITSUO), 27 August 2002 (2002-08-27) * abstract *	1-10	
A	FR 2 584 277 A (FEL JEAN LOUIS) 9 January 1987 (1987-01-09) * claim 1; figures *	1-10	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			A43C
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		10 August 2005	Claudel, B
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503.03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 05 25 3575

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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10-08-2005

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FR 555195	A	26-06-1923	NONE	
JP 2002238618	A	27-08-2002	NONE	
FR 2584277	A	09-01-1987	FR 2584277 A1	09-01-1987