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(71) Applicant: **Camp S.p.A.**
23884 Premana (Lecco) (IT)

(72) Inventor: **Codega, Antonio**
23834 Premana (Lecco) (IT)

(74) Representative: **Siniscalco, Fabio et al**
Jacobacci & Partners S.p.A.
Via Senato, 8
20121 Milano (IT)

(54) Crampon for a climbing boot

(57) A crampon (1) to be fitted to a climbing boot (2) provided with a shaped sole (4) having recesses (13) and protuberances (14) comprises a frame having interconnected rigid members fitted with spikes (5) and means (10, 11, 12) for securing the frame on the climbing boot. Advantageously, the rigid members of the frame define windows (15) into which can be inserted the protuberances (14) of the sole (4) defined by the recesses (13).

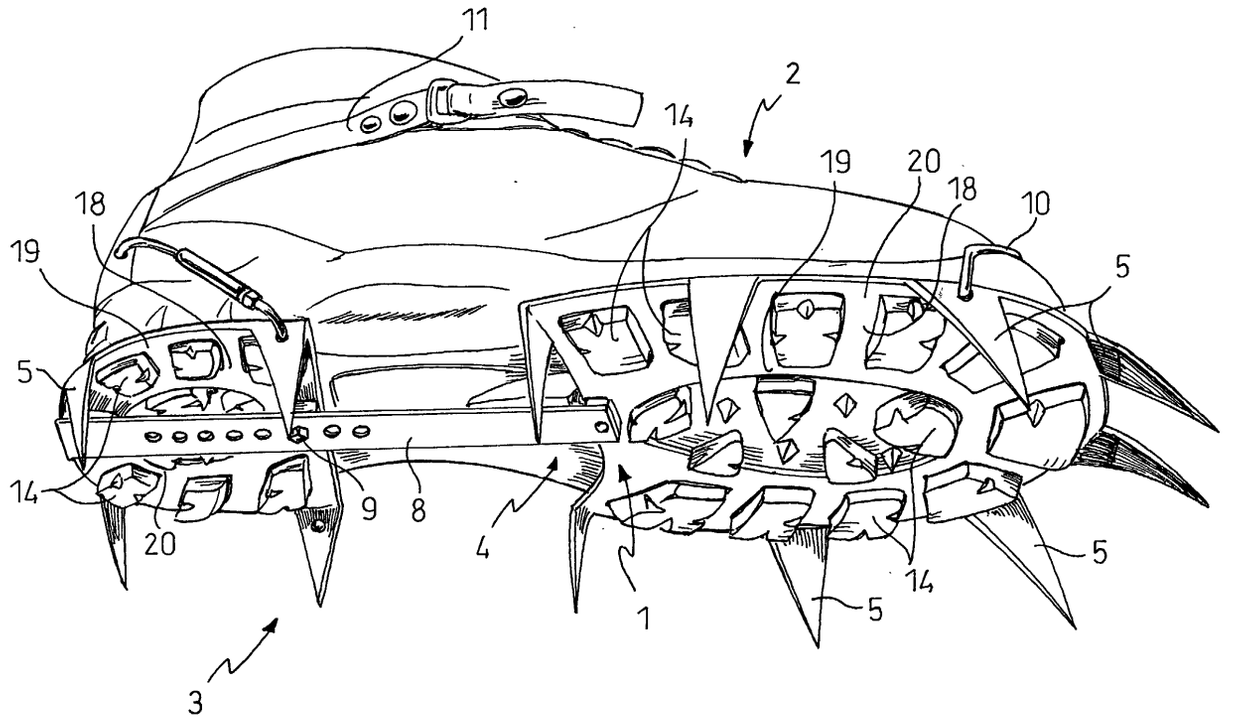

FIG. 2

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Description

[0001] The present invention relates to a crampon for a climbing boot, otherwise known as a mountain boot or climbing shoe.

[0002] As is known, crampons for climbing boots are formed by a frame having interconnected rigid members and provided with sharp spikes projecting therefrom. By means of straps which pass through appropriate rings connected to the frame, the said frame is capable of being fixed on the climber's climbing boot in a manner such as to come into contact with the sole of the climbing boot. Such crampons enable the climber to obtain a grip on hard snow or ice by virtue of the abovementioned sharp spikes which are arranged over the entire perimeter of the mountain boot.

[0003] The frame may be in one piece or in two pieces, one front and one rear, the reciprocal distance between which is adjustable by means of one or more longitudinal adjustment members that can be fixed in the predetermined position by means of one or more pin/hole couplings.

[0004] The requirement that the abovementioned crampons must meet is that of forming, as far as possible, a single entity with the climbing boots to which they are fixed, as if they were an integral part of the said boots, so as to allow a secure grip on the snow or ice while giving the climber the optimum sense of support.

[0005] The crampons known hitherto, although they have been used by climbers for a very long time, are not free from disadvantages.

[0006] First, the crampon does not form a single entity with the boot to which it is fixed, giving rise to the occurrence of gaps and play between crampon and boot which result in the boot/crampon combination lacking in compactness. This is to the detriment of the sensitivity of the climber's feet and his safety, particularly necessary in difficult conditions.

[0007] Secondly, the gaps and play referred to above between crampon and boot cause a build-up of snow and ice between the crampon and the sole of the climbing boot which, as is known, compromises the efficiency of the combination, jeopardizing the safety of the climber. With the crampons of the prior art, in order to avoid this build-up of snow and ice, it is necessary to use additional items to be attached to the crampon which, clearly, constitute an undesirable complication of the boot/crampon combination. In particular, it is important not to forget the situation, which occurs not infrequently, where the climber forgets to take the abovementioned additional items with him and continues on his climb nevertheless, thus exposing himself to a high degree of risk.

[0008] The object of the present invention is to devise a climbing crampon which has structural and functional features such as to satisfy the above-mentioned requirement and, at the same time, makes it possible to prevent the disadvantages referred to above.

[0009] This object is achieved by a crampon in accordance with Claim 1, to be applied to a climbing boot fitted with a shaped sole having recesses and protuberances.

[0010] The idea behind the solution on which the present invention is based is that of providing a climbing crampon which is able to interact with the protuberances, or shaped portions, of the sole of the climbing boot, in a manner such as to penetrate into the recesses defined between the protuberances. In this way, the crampon is effectively integrated with the sole of the climbing boot, making it possible to achieve an advantageous reduction in the distance between the supporting base of the crampon and the said sole, and reducing the possibility of a build-up of snow and ice between the latter.

[0011] The present invention further relates to a climbing boot fitted with a shaped sole having recesses and protuberances according to Claim 13, and to a climbing boot/crampon combination according to Claim 18.

[0012] In the interests of a better understanding of the invention, a description is given below of two embodiments thereof, by way of example and without applying any limitation, illustrated in the attached drawings, wherein:

- Figure 1 shows a perspective view of a crampon according to the present invention;
- Figure 2 shows a perspective view from below of a climbing boot/crampon combination comprising the crampon according to Figure 1;
- Figure 3 shows a perspective exploded view of the climbing boot/crampon combination according to figure 2;
- Figure 4 shows a perspective view of a different embodiment of a climbing boot/crampon combination according to the present invention;
- Figure 5 shows a perspective exploded view of a climbing boot/crampon combination according to Figure 4;
- Figure 6 shows a view in partial section of a detail of the climbing boot/crampon combination according to Figure 4; and
- Figure 7 shows a view in partial section of the detail of Figure 6 in a different configuration of use.

[0013] With reference to Figures 1 to 3, the reference 1 generally designates a crampon according to the invention, which, as is apparent from Figures 2 and 3, is intended to be fitted to a climbing boot, otherwise known as a mountain boot or climbing shoe, generally designated 2, so as to form a climbing boot/crampon combination designated 3.

[0014] The crampon 1 comprises a frame fitted with spikes 5, which are conventional per se, and means for ensuring the fixing of the said frame on the boot 2.

[0015] The frame of the crampon 1 is formed by a plurality of substantially rigid members interconnected

among themselves in a manner such as to identify a supporting base for the sole 4 of the boot 2. In the example shown, the interconnected rigid members identify two separate supporting bases, a front base 6 and rear base 7, which are connected to each other and are intended to come into contact, respectively, with the front part and with the rear part of the sole 4.

[0016] Preferably, the supporting bases 6 and 7 are connected by means for the adjustment of the reciprocal distance between them. In the example, these means comprise a flat connecting rod 8 having one end solidly fixed to the front supporting base 6 and a residual part capable of connection to the rear supporting base 7, in the predetermined position, by means of a bolt connection 9.

[0017] The means for ensuring the fixing of the frame on the boot 2 comprise a strap 11 capable of encircling the boot 2. In the example shown in Figures 1 to 3, the abovementioned means for ensuring the fixing of the frame on the boot 2 further comprise a rapid-action hooking device 12 associated with the strap 11 and capable of engaging the rear portion of the boot 2, together with a rigid hoop 10 positioned in line with the front end of the front supporting base 6. The rigid hoop 10 is able to lock the toe of the boot 2.

[0018] Advantageously, the sole 4 of the mountain boot 2 is shaped, having recesses 13 and protuberances 14, and the rigid members of the frame are arranged and configured in a manner such as to be connected by positive fitting with the recesses 13 of the sole 4. In essence, the rigid members of the frame form windows 15 into which can be inserted the protuberances 14 of the sole 4.

[0019] Preferably, the abovementioned windows 15 are obtained by making holes, or apertures, in the front 6 and rear 7 supporting bases. In this manner, the crampon 1 can advantageously be produced by cutting and bending from a sheet of metallic material, for example steel or aluminium, having a thickness of the order of a few millimetres.

[0020] In the example, the rigid members forming the frame of the crampon 1 are arranged in alignment with each supporting base 6, 7 in a manner such as to identify two bearing structures having the shape of closed rings, respectively an outer structure 19 and an inner structure 20, interconnected by a plurality of transverse segments 18 defining the abovementioned windows 15. In particular, the outer bearing structure 19 identifies the outer perimetral edge of the supporting bases 6, 7 from which the spikes 5 project.

[0021] As an alternative to what is described above, one or both of the outer 19 and inner 20 bearing structures may be shaped as an open ring, so that it is possible to produce the crampon in the manner such that each base possesses a single ring-shaped bearing structure from which the transverse segments extend. In this latter case, the ring-shaped bearing structure may also be disposed in a more inward position relative to the perimetral edge of the supporting base.

[0022] As is clearly apparent from Figure 2, the recesses 13 present in the sole 4 form seatings capable of accommodating both the inner bearing structure 20 and the transverse segments 18 of the frame of the crampon 1 when the latter is associated with the sole 4 of the boot 2 to form the climbing boot/crampon combination designated 3.

[0023] On consideration of the foregoing, it is clear that, in the climbing boot/crampon combination according to the invention, the sole 4 of the boot is not simply supported on the supporting bases 6, 7 but is coupled thereto in a more stable manner by virtue of the interpenetration that takes place between the protuberances 14 and the windows 15 of the frame of the crampon 1. Furthermore, the latter makes it possible to reduce the distance between the sole and the crampon, with the dual effect of increasing the sensitivity of the climber's support and reducing the accumulation of snow or ice in the intervening spaces between the sole 4 and the supporting bases 6, 7 of the crampon.

[0024] The sole 4 is produced by means of coextrusion of rubber and high-strength thermoplastic which is preferably reinforced with a composite, for example fibreglass.

[0025] Preferably, metallic reinforcing inserts are provided within the sole.

[0026] In order to secure the fixing of the crampon 1 on the climbing boot 2, it is merely necessary to place the boot 2 on the crampon 1 in a manner such as to insert the toe of the boot 2 into the hoop 10, then causing the front and rear parts of the sole 4 to bear on, respectively, the front 6 and rear 7 supporting bases of the frame. Fixing is then completed by actuating the rear rapid-action hooking device 12 and the strap 11.

[0027] Figures 4 to 7 refer to a second embodiment of a climbing boot/crampon combination in accordance with the invention and generically designated 53, comprising a crampon 51 intended to be fitted to a climbing boot 52 (shown in broken lines).

[0028] The parts of the climbing boot/crampon combination 53, of the crampon 51 and of the boot 52, functionally and structurally identical to those of the climbing boot/crampon combination 3, of the crampon 1 and of the boot 2, respectively, are designated by the same reference numerals and are not described again.

[0029] In substance, the climbing boot/crampon combination 53 differs from the combination 3 described previously in that the boot 52 and the crampon 51 comprise means 54 for reciprocal fixing by releasable hooking.

[0030] In the example, the means 54 for reciprocal fixing by hooking comprise a hooking member 55 solidly fixed to the crampon 51 and capable of hooking onto a releasable hooking device 56 associated with the sole 4 of the boot 52.

[0031] The hooking member 55 is positioned in alignment with the rear part of the crampon 51, in a manner such as to project vertically upwards, that is to say to-

wards the boot 52, from the central portion of the rear rim of the rear supporting base 7. In alignment with its upper free end 57, the hooking member 55 is substantially bent square, in a manner such as to project towards the outside of the lower supporting base 7.

[0032] The abovementioned releasable hooking device 56 is accommodated within the sole 4 in a seating made in the heel of the said sole.

[0033] The device 56 comprises a retaining member 55 which is positioned outside the sole and is capable of engaging with the hooking member 55, and in particular with the end 57 thereof, in order to retain it solidly. The retaining member 59 is movable from an operational hooking position (Figure 6), in which it is capable of maintaining the hooking member 55, to a release position (Figure 7), in which it can be displaced to permit the release of the hooking member 55.

[0034] Preferably, the releasable hooking device comprises elastic means 60 for keeping the retaining member 59 in the operational hooking position (Figure 6) under a predetermined elastic load.

[0035] In the example, the retaining member takes the specific form of a crosspiece connected to two rods 61, of circular section in the example, each of which is slidingly supported by the device 56 in a manner such as to be able to slide, from and within the heel of the sole 4, in a direction extending as a substantial prolongation of the said sole. The elastic means 60 act on the rods 61 in the sense of urging them towards the interior of the seating 58, in a manner such as to bring the crosspiece 59 into abutment against the rear flank of the heel of the sole 4 (Figure 6).

[0036] In contrast to what has been described, the hooking member 55 could be solidly fixed to the sole 4, the releasable hooking device 56 in this case being carried by the frame of the crampon 1.

[0037] The crampon 51 is also equipped with the rigid hoop 10, positioned in alignment with the front end of the front supporting base 6, by means of which it is possible to lock the toe of the boot 52.

[0038] From what has been described above, it is apparent that the climbing boot/crampon combination 53 does not require straps 11 to ensure the fixing of the crampon 51 on the climbing boot 52. Specifically, in order to obtain the abovementioned fixing, it is merely necessary to place the boot 52 on the crampon 51 in a manner such as to insert the toe of the boot 52 into the hoop 10, thus causing the front part of the sole 4 to bear on the front supporting base 6. Subsequently, the rear part of the sole 4 is caused to bear on the rear base 7 of the crampon, care being taken, at the same time, to keep the retaining member 59 of the device 56 in the release position (Figure 7). Once the sole 4 of the boot 52 is bearing against the supporting bases of the crampon 51 and the protuberances 14 have been inserted into the windows 15 of the frame, it is merely necessary to release the retaining member 59 in order to stabilize the connection of the crampon 51 to the boot 52. Specifically, when this occurs, the retaining member 59 moves into the operational hooking position (Figure 6) in which it can engage and retain the hooking member 55, thus in effect solidly fixing the crampon 51 to the sole 4 of the climbing boot 52.

[0039] In order to remove the crampon 51 from the boot 52, it is merely necessary to move the retaining member 59 into the release position (Figure 7) and raise the boot from the crampon in a manner such as to remove the toe of the boot 52 from the hoop 10.

[0040] As may be appreciated from the above description, the crampon, the climbing boot and the climbing boot/crampon combination according to the invention make it possible to meet the requirement stated above and to eliminate the disadvantages to which reference was made in connection with the prior art. Specifically, the sole 4 of the boot is not simply supported on the supporting bases but is coupled thereto in a stable manner by virtue of the interpenetration of the protuberances of the sole into the windows of the crampon. Furthermore, this makes it possible to reduce the distance from the sole to the crampon, with the dual effect of increasing the sensitivity of the climber's support and reducing the accumulation of snow or ice in the intervening spaces between the sole and the supporting bases of the crampon.

[0041] A further advantage of the crampon, the climbing boot and the climbing boot/crampon combination according to the invention lies in the fact that they are structurally and functionally simple, so as to be inexpensive to produce and ensure reliable functioning over time.

[0042] Clearly, a person skilled in the art, in order to satisfy contingent and specific requirements, will be able to make numerous changes and variations to the climbing boot/crampon combinations described above, all these however remaining within the scope of protection of the invention as defined by the claims that follow.

[0043] Thus, for example, as an alternative to what is described above, the abovementioned means for reciprocal fixing by releasable hooking may be of the snap-fit hooking type.

Claims

1. Crampon (1; 51) to be fitted to a climbing boot (2; 52) provided with a shaped sole (4) having recesses (13) and protuberances (14), comprising a frame having interconnected rigid members fitted with spikes (5) and means (11, 10, 12; 10, 54) for securing the frame on the climbing boot (2; 52), **characterized in that** the rigid members of the said frame are arranged and configured in a manner such as to be connected by positive fitting with the recesses (13) of the said sole (4).

2. Crampon according to Claim 1, wherein the rigid

members of the frame define windows (15) into which can be inserted the protuberances (14) of the sole (4) defined by the recesses (13).

3. Crampon according to Claim 2, wherein the said frame substantially comprises one or more perforated supporting bases (6, 7).

4. Crampon according to Claim 3, wherein the said supporting bases (6, 7) are produced by cutting and bending from a sheet of metallic material.

5. Crampon according to Claim 2, wherein the said rigid members define one or more supporting bases (6, 7) comprising at least one bearing structure (19, 20) of substantially annular shape from which extend transverse segments (18) defining the said windows (15).

6. Crampon according to Claim 5, wherein each supporting base (6, 7) comprises two bearing structures (19, 20) of annular shape interconnected by a plurality of transverse segments (18) defining the said windows (15).

7. Crampon according to any one of the preceding claims, wherein the frame comprises a front part (6) and a rear part (7), at least one of the said parts (6, 7) being capable of fitting to corresponding front and rear parts of the sole (4) of the climbing boot.

8. Crampon according to any one of the preceding claims, wherein the said means for securing the frame on the boot (2) comprise straps (11) fixed to the frame and capable of encircling the boot (2).

9. Crampon according to any one of the preceding claims, wherein the said means for securing the frame on the boot (52) comprise means (54) for the releasable hooking of the frame onto the boot (52).

10. Crampon according to Claim 9, wherein the said means for releasable hooking of the frame onto the boot are of the snap-fit type.

11. Crampon according to Claim 7, wherein the said frame is equipped with means (8, 9) for adjusting the reciprocal distance between the front part (6) and the rear part (7) of the frame.

12. Crampon according to Claim 11, wherein the said adjustment means comprise longitudinal adjustment members (8) that can be fixed in the predetermined position by means of a bolt connection (9).

13. Climbing boot fitted with a shaped sole (4) having recesses (13) and protuberances (14), to be associated with a crampon (1; 51) according to one or more of the preceding claims, **characterized in that** the said recesses (13) define seatings capable of accommodating rigid members of the frame.

14. Climbing boot according to Claim 13, wherein the sole (4) is produced by means of coextrusion of rubber and high-strength thermoplastic.

15. Climbing boot according to Claim 14, wherein the thermoplastic is reinforced with a composite.

16. Climbing boot according to Claim 15, wherein the composite is fibreglass.

17. Climbing boot according to any one of Claims 13 to 16, wherein metallic reinforcing inserts are provided within the sole (4).

18. Climbing boot/crampon combination, comprising a climbing boot (2; 52) equipped with a shaped sole (4) having recesses (13) and protuberances (14) and a crampon (1; 51) as defined in any one of Claims 1 to 12.

19. Climbing boot/crampon combination according to Claim 18, comprising a climbing boot (2; 52) as defined in any one of Claims 13 to 17.

20. Climbing boot/crampon combination according to Claim 18 or 19, wherein the boot (52) and the crampon (51) comprise means (54) for reciprocal fixing by releasable hooking.

21. Climbing boot/crampon combination according to Claim 20, wherein the said means (54) for reciprocal fixing by releasable hooking comprise a hooking member (55) solidly fixed to either the crampon or the sole (4) and capable of hooking onto a releasable hooking device (56) associated with the other of the crampon and the sole (4).

22. Climbing boot/crampon combination according to Claim 21, wherein the said releasable hooking device (56) is accommodated in a seating (58) made in the heel of the sole (4) and comprises a retaining member (59) capable of engaging with the hooking member (55) and is positioned outside the sole (4), the said retaining member (59) being movable from an operational hooking position, in which it is capable of maintaining the hooking member (55), to a release position, in which it permits the release of the hooking member (55).

23. Climbing boot/crampon combination according to Claim 22, wherein the said releasable hooking device (56) comprises elastic means (60) for keeping the said retaining member (59) in the operational hooking position.

24. Climbing boot/crampon combination according to Claim 22, wherein, in the said operational hooking position, the said retaining member (59) is kept in pressure contact with the flank of the heel of the sole (4).

25. Climbing boot/crampon combination according to Claim 20, wherein the said means for reciprocal fixing by hooking are of the snap-fit type.

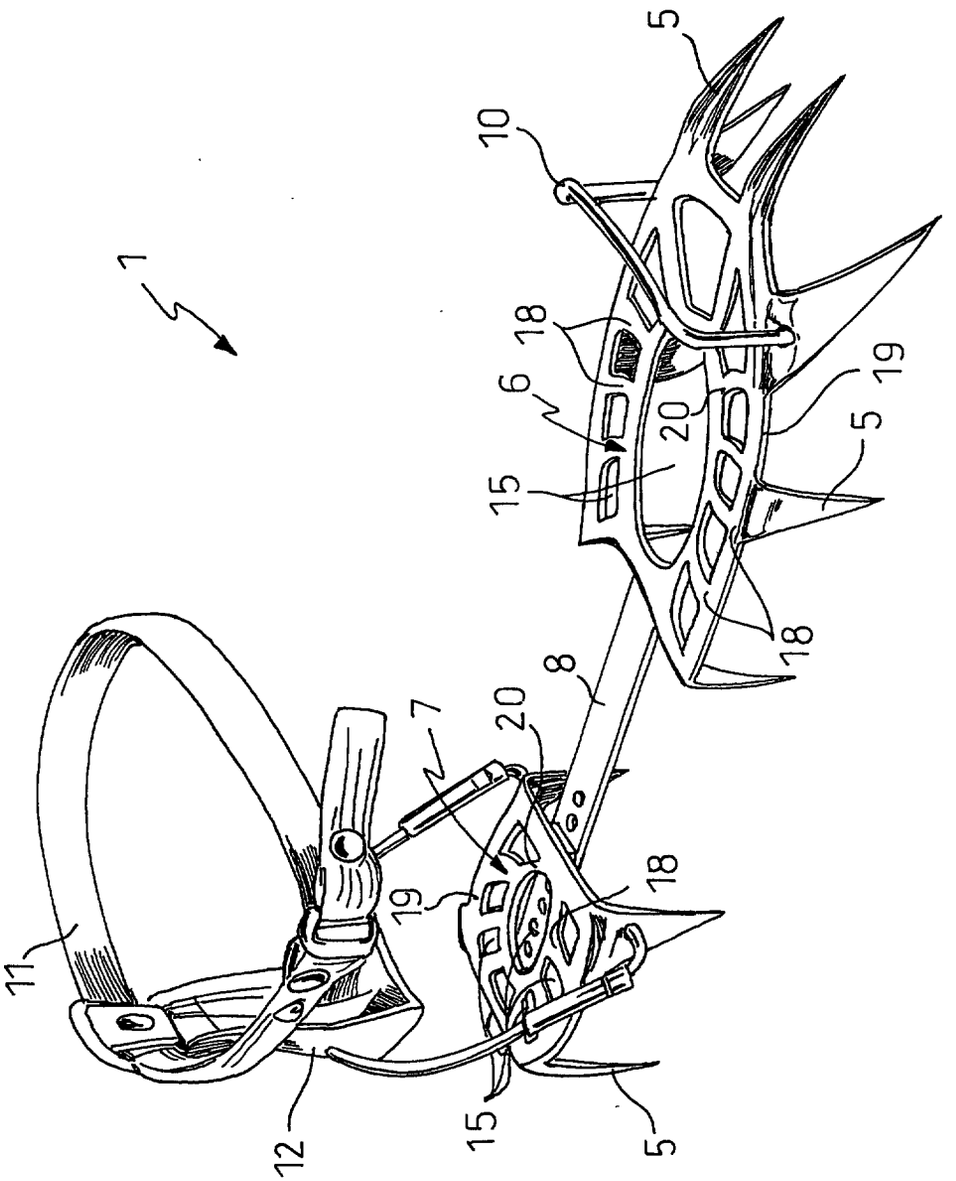

FIG. 1

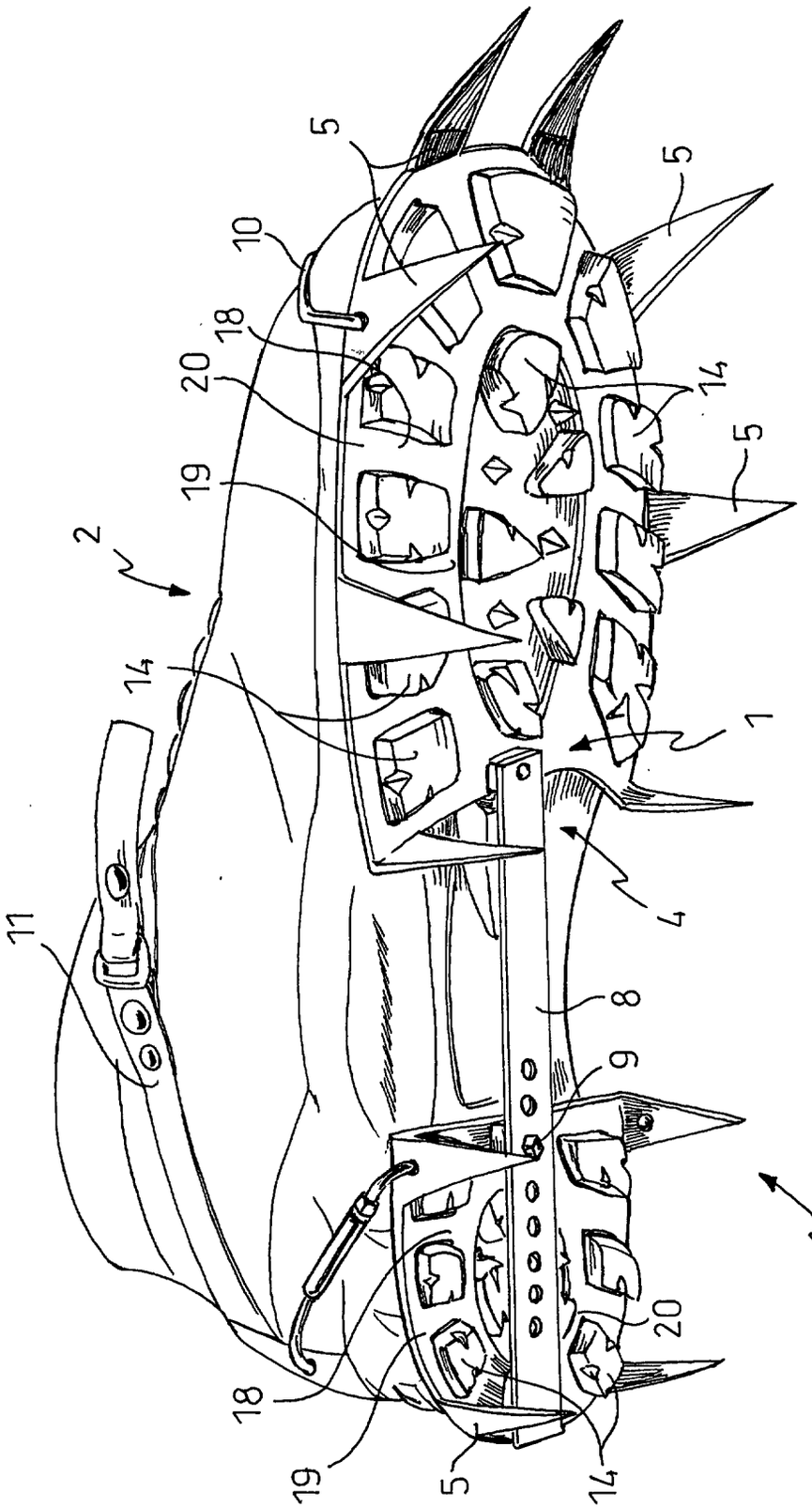

FIG. 2

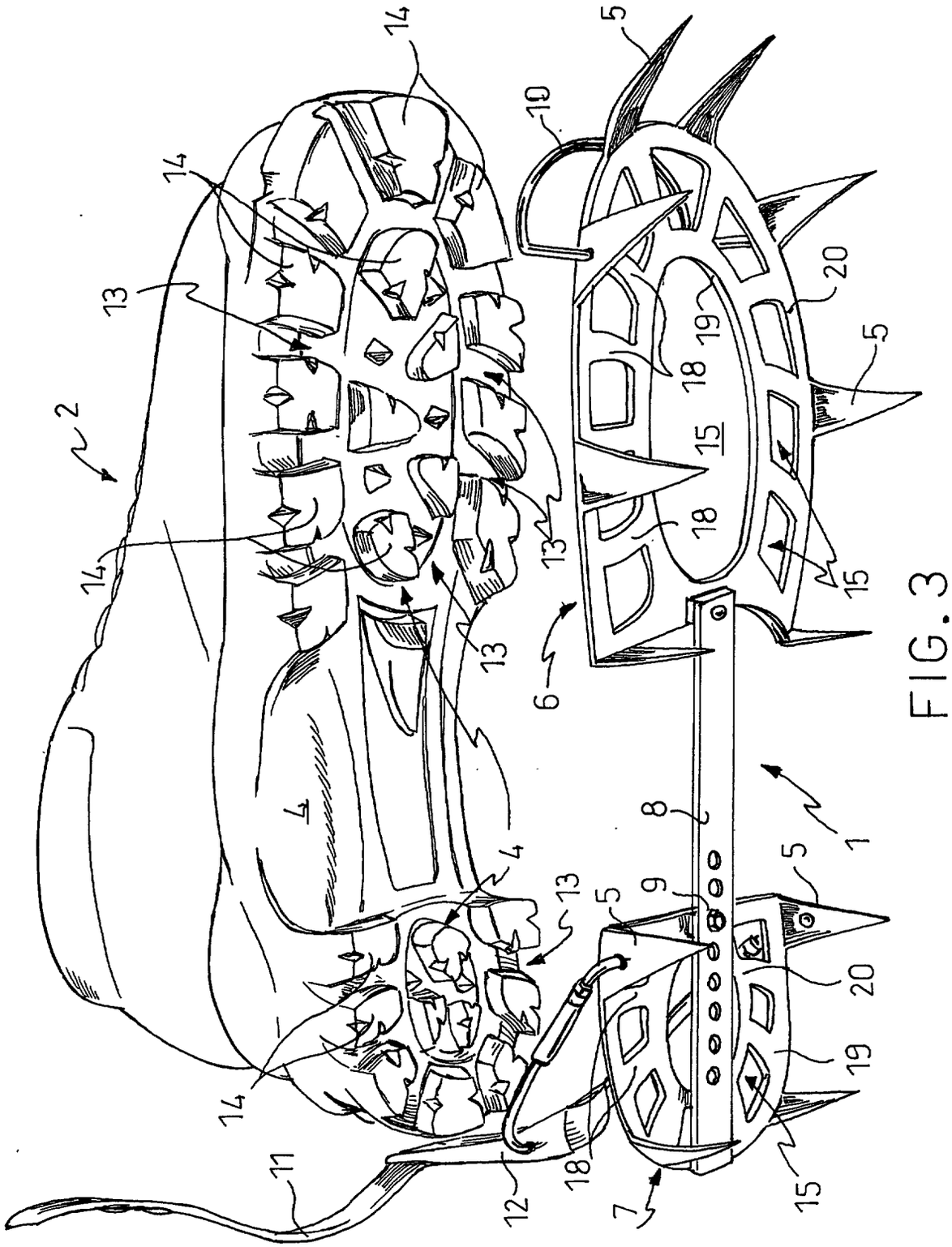

FIG. 3

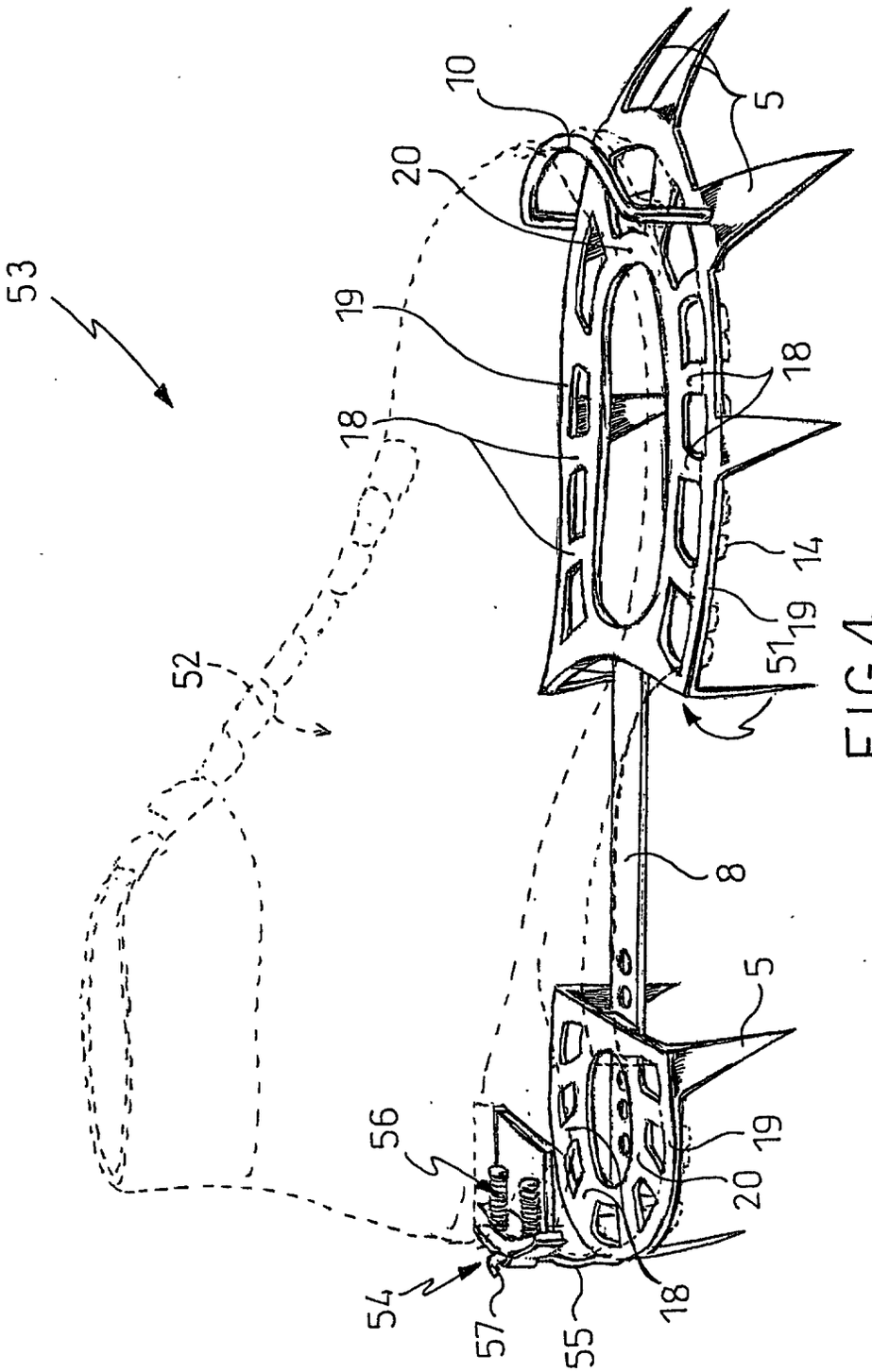

FIG.4

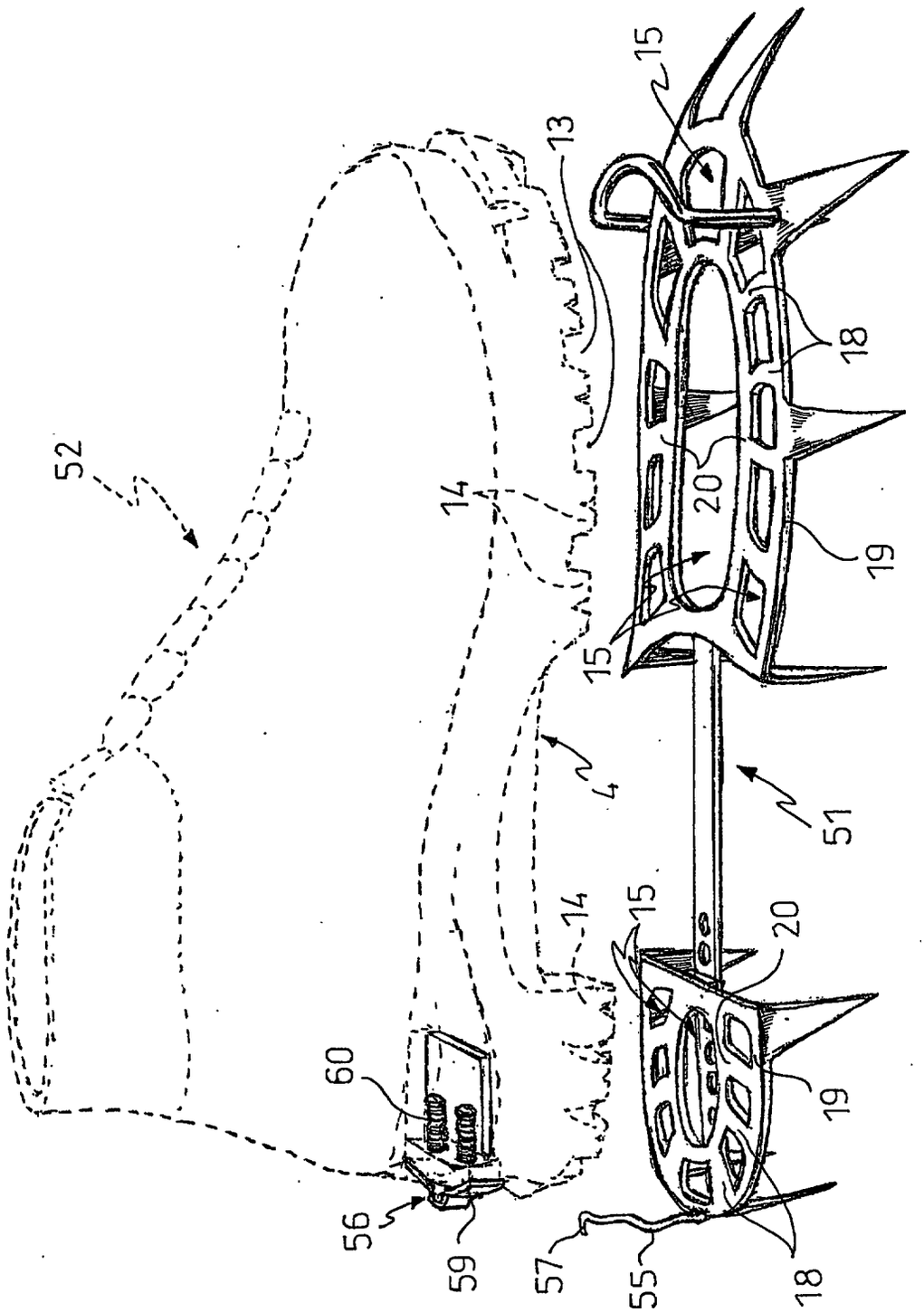

FIG.5

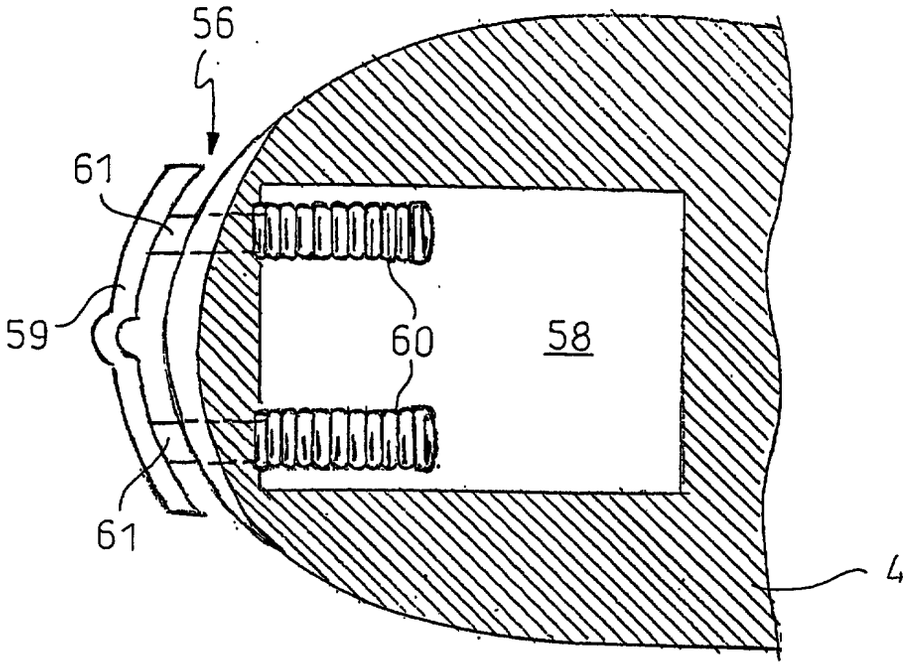

FIG. 7

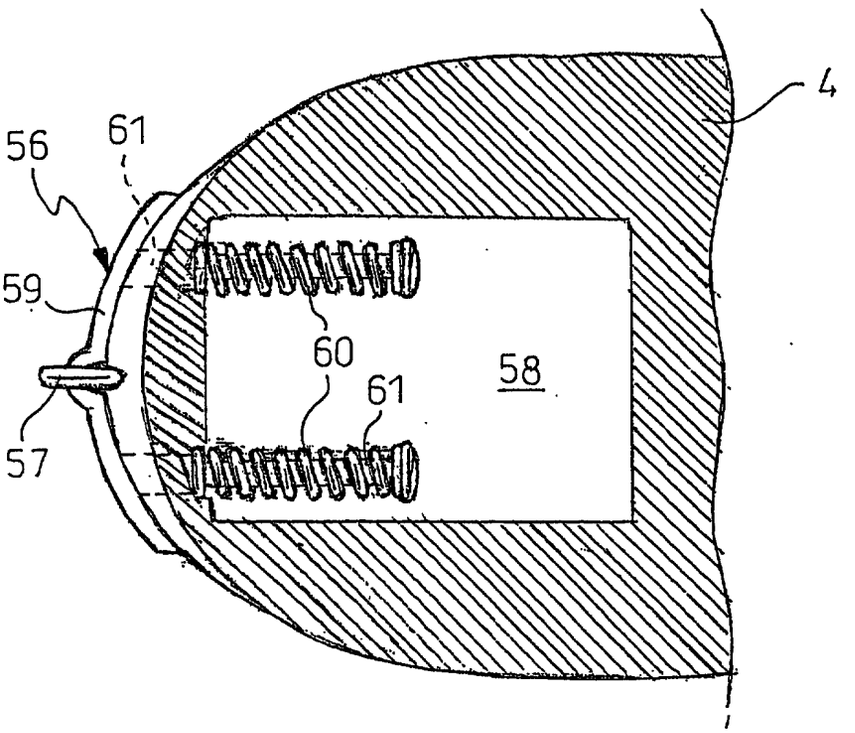

FIG. 6

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EUROPEAN SEARCH REPORT

Application Number
EP 00 83 0773

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	CH 656 052 A (K & E MECHANIK AG) 13 June 1986 (1986-06-13) * abstract; figures *	1-25	A43C15/06
A	WO 98 36654 A (LUNDY JAMES) 27 August 1998 (1998-08-27) * page 8, line 9 - line 11; figure 3 *	1-25	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

A43C
A43B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	10 May 2001	Scholvinck, T

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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