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(54) Fastening device, especially for a sports shoe

(57) Fastening device a sports shoe including a body (102) provided with at least a first side (14) and a second side (27). The fastening device includes at least a first fastening element (103), a second fastening element (104) which can be joined to the first fastening element and includes one or more tensioning devices (101), operatively connected with such first fastening element (103) and/or such second fastening element (104) and with the body (102) of such shoe. The first fastening element (103) is associated to the first side (14) in a sliding way and/or the second fastening element (104) is associated to such second side (27) in a sliding way, respectively.

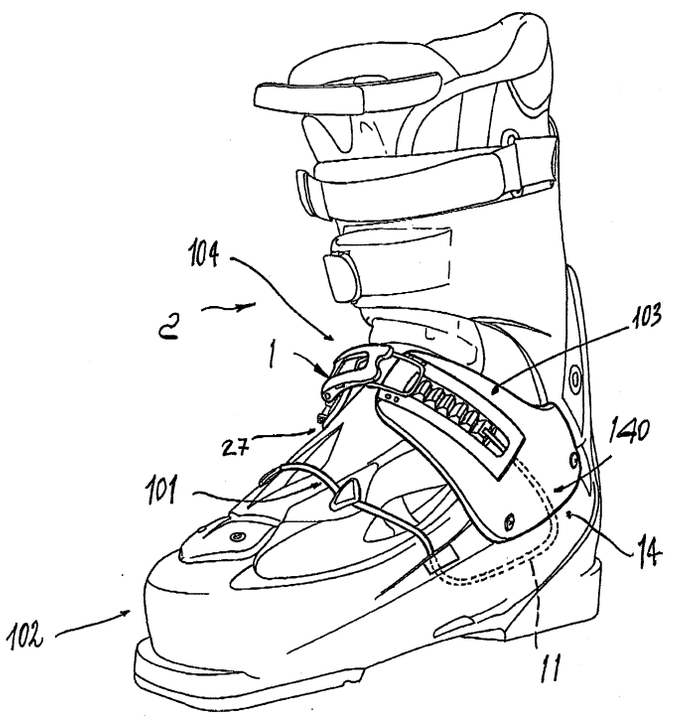

Fig. 1

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Description

[0001] This invention refers to a fastening device for a sports shoe, as for example a ski boot or a mountain boot, an ice skates or roller skates shoe, or similar.

[0002] The shoe fastening, and especially that of sports footwear, as ski boots and similar, foresees that the two sides of the shoe approach and that they are fastened together by means of a fastening. Such known fastenings generally comprise a lever applied on a side, which, thanks to proper coupling devices, engages a rack applied on the other side. The rack, through the large number of teeth that build it up, allows to choose how much the sides of the ski boot should be closed. Through the lever it is possible to apply the necessary force in order to get such closure and to draw near the sides and fasten them together.

[0003] The known and above mentioned fastening devices present some disadvantages. First of all, the single lever-rack coupling allows suitable fastening only at local level, so that in order to successfully fasten the complete boot, it is necessary to have a large number of lever-rack couplings. Hence it derives the disadvantage for the user to be obliged to adjust and fasten all the levers in order to properly use the ski boot.

[0004] There are then contrasting requirements according to which the material for the rack should be chosen. The optimum coupling with the lever coupling devices is actually achieved with high rigid materials, while the optimum adaptability of the ski boot can be achieved with softer materials.

[0005] Task of this invention is to realize a fastening device for a shoe, especially for a sports shoe, which overcomes the disadvantages of the mentioned prior art techniques. Within this task, an aim of the invention is to realize a fastening device, whose comfort of use is improved by the fact that the shoe fastening can be obtained in different points, by acting on a relative limitated number of fastening elements. Another aim of the invention is to realize a reliable and at the same time comfortable fastening device. A further aim is to realize a simple and rugged fastening device. Not last aim of this invention is to realize a fastening device and especially a fastening device for a sports shoe, which is high reliable and relatively easy to realize, at competitive costs.

[0006] This task, as well as these and other aims that will be more clear hereinafter, are realised through a fastening device for a sports shoe, which includes a body provided with at least a first side and a second side. The fastening device according to the invention includes at least a first fastening element, a second fastening element that can be connected with the first fastening element and it is characterised in that it includes one or more tensioning devices, operatively connected with the first fastening element and/or with the second fastening element and with the body of such shoe. The fastening device according to the invention, is further characterised in that the first fastening element is slidingly associated with said first side and/or the second fastening element is slidingly associated with the second side.

[0007] In this way, thanks to its innovative structure, which implies the sliding of the first and/or of the second fastening element on the respective sides of the sports shoe body, the fastening device according to the invention allows to overcome the disadvantages of the known techniques, and to achieve very good results as far as effectiveness and easiness of the fastening procedure is concerned.

[0008] Further characteristics and advantages will be more clear from the description of preferred but not limiting embodiments of the fastening device according to the invention, which are represented as non-limiting examples, with the help of the attached drawings, in which:

- figure 1 is a perspective view of a sport shoe, especially of a ski boot, which includes a fastening device according to the invention;
- figure 2 is a perspective view of an embodiment of the fastening device according to the invention;
- figure 3 is a further perspective view of the embodiment of the fastening device according the invention, represented in Figure 2;
- figure 4 is a front elevation view of the embodiment of the fastening device according to the invention, represented in Figure 2;
- figure 5 is an exploded view of the embodiment of the fastening device according to the invention, represented in Figure 2;
- figure 6 is a front elevation view of another embodiment of the fastening device according to the invention;
- figure 7 is a perspective view of a further embodiment of the fastening device according to the invention;
- figure 8 is a front elevation view of another embodiment of the fastening device according to the invention.

[0009] Referring to the above mentioned figures, the fastening device according to the invention is indicated with the reference number 1, and it is represented applied on a ski boot 2. The fastening device 1 according to the invention will be described referring to this particular type of sports shoe, without limiting its application. The ski boot 2 includes a body 102, provided with a first side 14 and a second side 27. In Figure 1, the sides 14 and 27 extend centrally, as partial covering of the ski boot instep. Other solutions are obviously possible, therefore the sides 14 and 27 may have different shapes and dimensions, according to the requirements. The fastening device 1 includes a first fastening element 103 and a second fastening element 104, which can be combined with the first fastening element 103. One or more tensioning devices 101 are operatively associated with the first fastening element 103 and/or with the second fastening element 104 and to the body 102 of the ski

boot 2. The first fastening element 103 preferably includes a rack 9 applied on the first side 14, and provided with one or more teeth 91, which can be selectively engaged. The second fastening element 104 advantageously includes a lever arm 3, which is operatively associated with a linking element 8, suitable to selectively engage one or more teeth 91 of the rack 9. The linking element 8 is associated with a rigid element 10, in which the linking element 8 can slide. A tensioner 7 is hinged to the lever arm 3, to the linking element 8 and preferably to the rigid element 10. The tensioner 7 advantageously includes a telescopic body 6, joined to the rigid element 10, with which the linking element 8 is connected. The telescopic body 6 allows an adjustment of the useful length of the tensioner 7, for example through a screw-lead screw coupling.

[0010] According to the invention, the first fastening element 103 is operatively associated in a sliding way to the first side 14 and/or the second fastening element 104 is operatively associated in a sliding way to the second side 27. For this purpose, the first fastening element 103 may advantageously include first sliding coupling devices, which can be coupled with corresponding second sliding coupling devices, which are placed on the first side 14. The first sliding coupling devices preferably include one or more wings 15 joined to the rack 9, while the second sliding coupling devices may include a seat 17, for example a slot, suitable to house the rack 9 in a sliding way, and/or one or more longitudinal grooves obtained in the first side 14, suited to house the wings 15 in a sliding way. The slot 17 is preferably obtained on a plate 140, which is applied on the ski boot first side 14 or, alternatively, is a single body with the first side 14. In this way, the wings 15 of the rack 9 can be housed in a longitudinal groove formed between a side 16 of the slot 17 and a frame 18, which can be applied to the slot 17 itself, advantageously in line with the external surface of the plate 140.

[0011] In a very similar way, the second fastening element 104 may advantageously include third sliding coupling devices, which can be coupled with corresponding fourth sliding coupling devices, placed on the second side 27. The third sliding coupling devices may advantageously include a strip 4, hinged to the lever arm 3, while the fourth sliding coupling devices may include a seat 40, obtained in the second side 27, and suited to house the strip 4 in a sliding way.

[0012] The tensioning devices 101 advantageously include one or more first cables 11, operatively associated with the rack 9 and with the body 102 of the ski boot 2. Each cable 11 preferably presents a first end 13 directly or indirectly fixed to the rack 9, and a second end 12 fixed to the body 102, for example in a point placed on the opposite side as to the one of the rack 9. In a very similar way, the tensioning devices 101 may include one or more second cables 111 operatively with the strip and with the body 102 of the ski boot 2. Each cable 111 preferably presents a first end directly or indirectly fixed to the strip 4 and a second end 112 fixed to the body 102, for example in a point placed on the opposite side as to the one of the strip 4. In this way, each of the first cables 11 and of the second cables 111 is winded around the sides of the ski boot 2, so that they act on these last on more points as a consequence of the rack 9 and/or of the strip 4 fastening. The cables 11 and/or 111 may be advantageously prearranged in a way that they are sliding, at least for a portion of their length, in one or more seats obtained in the body 102 of the ski boot 2, so that they are not exposed to crashes or damages. In figure 1, for example, a cable 11 is represented, which is inside the body 102, for a lateral external section of the ski boot 2, just next to the side 14.

[0013] According to the invention, the functioning of the fastening device 1 is as follows. The fastening of the ski boot 2 is made by the user in a substantially traditional way, by using selectively the linking element 8 and one of the teeth 91 of the rack 9, and by using the lever arm 3 in order to tighten and fasten the sides 14 and 27 of the ski boot 2. However, the rack 9 and/or the strip 4, being joined in a sliding way to the respective sides of the ski boot 2, simultaneously drag the ends of the cables 11 and 111. In this way, the cable 11 and 111 tighten the ski boot sides in one or more prearranged points.

[0014] In this way, the fastening device according to the invention allows the realization of the above-mentioned tasks and aims.

[0015] Acting only on the fastening elements 103 and 104 is actually possible to obtain the fastening of the ski boot 2 in a large number of prearranged points. At the same time, the fastening device 1, thanks to its simple structure, is particularly reliable and of comfortable use.

[0016] The fastening device 1 according to the invention so conceived can be realized in a number of embodiments, all belonging to the same concept of invention.

[0017] For example, in the embodiments represented in the attached figures, both the rack 9 and the strip 4 are substantially placed just next to the instep of the ski boot 2, and the path of the cables 11 and 111 is such that the sides are closed in an area between the tag and the boot instep. However it is evident that the position of the rack 9 and/or of the strip 4, as well as the path of the cables 11 and 111 can be modified in order to vary the number and the position of the fastening areas.

[0018] From the description is evident that both the rack 9 and the strip 4 can be simultaneously sliding as to the respective ski boot sides, as represented in figure 7. However, it is also evident that according to the requirements, the strip 4 (figures 1-6) or the rack (figure 8) can be fixed in turn in a rigid way respectively to the first or the second side, the fastening action being due to the cables 11 only or to the cables 111 only. Moreover it is evident that the number of cables 11 and 111 may vary, according to the different requirements. For example, the embodiments represented in figures 5 and 6 have respectively one and two first cables 11 joined to

the rack 9, while the embodiments of figure 7 foresees only a first cable 11 and only a cable 11 respectively connected with the rack 9 and with the strip 4.

[0019] The fastening device so conceived can be realized with number of changes and versions, all belonging within the field of the invention. Moreover, all the details can be substituted by technically equivalent elements. Practically, the materials used, as long as compatible with the specific use and dimensions, can be whichever according to the requirements and to the state of the technics.

Claims

1. A fastening device (1) for a sports shoe (2), which includes a body (102) having at least a first side (14) and a second side (27), said fastening device (1) including at least a first fastening element (103) and a second fastening element (104) which can be coupled to the first fastening element (103), **characterised in that** the tensioning devices (101) are operatively connected with at least one of the fastening elements (103, 104) and with the body (102) of said sports shoe (2), and **in that** at least one of said fastening elements (103, 104) is slidingly associated to the corresponding side (14,27).

2. Fastening device, according to claim 1, **characterised in that** the first fastening element (103) includes a rack (9) associated to the first side (14), provided with one or more teeth (91) selectively engageable.

3. Fastening device, according to claims 1 or 2, **characterised in that** the first fastening element (103) includes first sliding coupling elements (15), which can be coupled with corresponding second sliding coupling devices (17), positioned on said first side (14).

4. Fastening device, according to any one of the previous claims, **characterised in that** the second fastening element (104) includes a lever arm (3) operatively connected to a linking element (8).

5. Fastening device, according to claim 4, **characterised in that** such linking element (8) is selectively engageable with one or more teeth (91) of the rack (9).

6. Fastening device according one or more of the previous claims, **characterised in that** the second fastening element (104) includes third sliding coupling devices (4), which can be coupled with corresponding fourth sliding coupling devices (40), positioned on said second side (104).

7. Fastening device according to claim 3, **characterised in that** said first sliding coupling devices (15) include at least a wing associated to such rack (9).

8. Fastening device according to claim 3, **characterised in that** said second sliding coupling devices (17) include a seat associated with the first side (14) suitable to house said rack (9) in a sliding way, and at least a longitudinal groove suitable to house a wing (15) of said rack (9) in a sliding way.

9. Fastening device, according to claim 8, **characterised in that** said seat is obtained on a plate (140) joined with the first side (14).

10. Fastening device according to claim 6, **characterised in that** the third sliding coupling devices (4) include a strip hinged to the lever arm (3).

11. Fastening device according to claim 10, **characterised in that** said fourth sliding coupling devices (40) include a seat associated to said second side (27) suitable to house the strip in a sliding way.

12. Fastening device according to claim 2, **characterised in that** said tensioning devices (101) include one or more first cables (11) operatively associated with said rack (9) and to the body (102) of said shoe.

13. Fastening device according to claim 10, **characterised in that** said tensioning devices (101) include one or more second cables (111) operatively associated with said rack (9) and with the body (102) of said shoe.

14. Fastening device according to claim 12 or 13, **characterised in that** the first and second cables (11, 111) are sliding for at least a portion of their length in one or more seats obtained inside the shoe body.

15. Fastening device according to claim 4, **characterised in that** said second fastening element (104) includes a tensioner (7) hinged to said lever arm (3) and to said linking element (8).

16. Fastening device according to claim 15, **characterised in that** said tensioner (7) includes a telescopic body (6) joined to a rigid section (10) of said linking element (8) so that it allows an adjustment of the useful length of said tensioner (7).

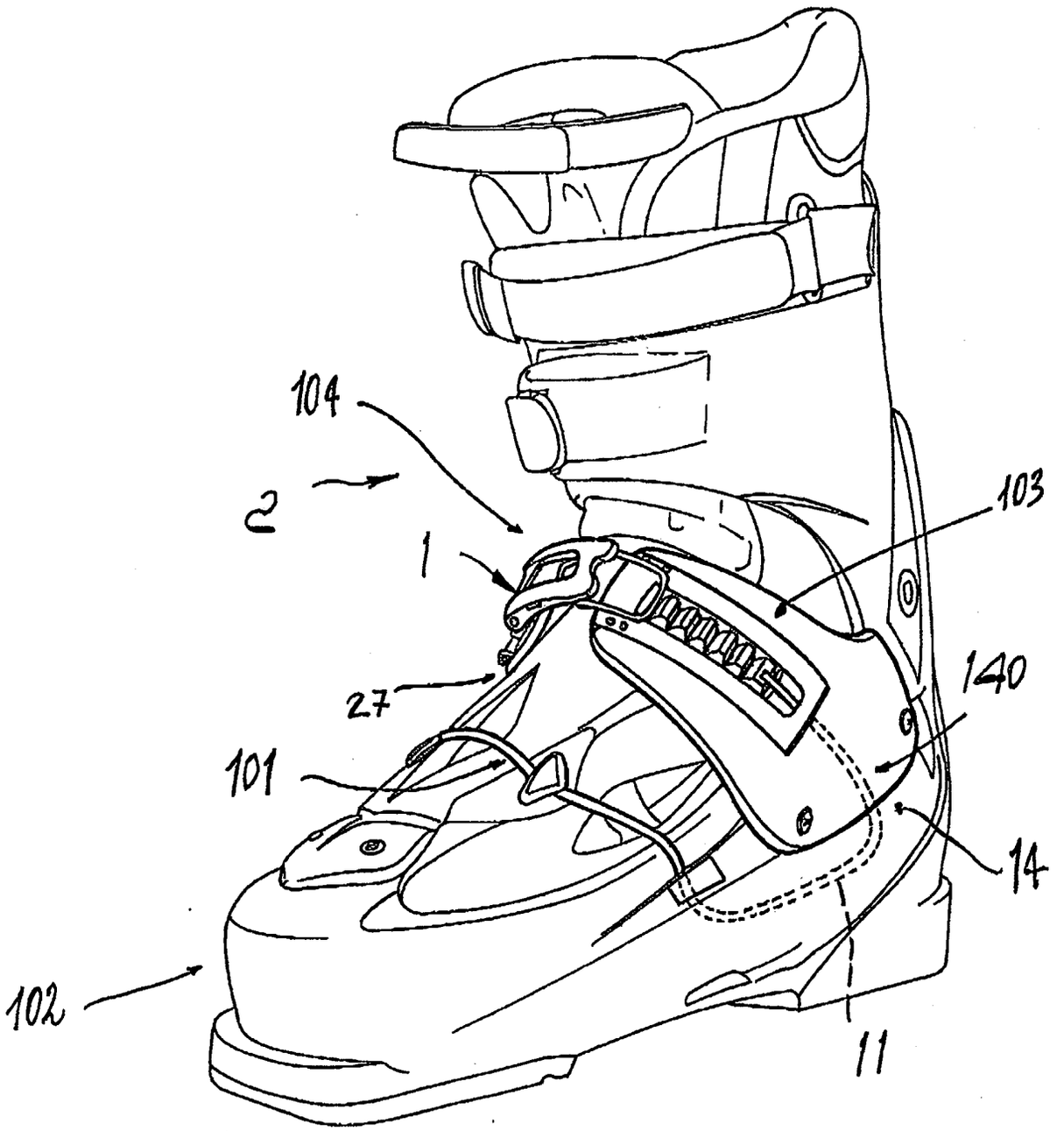

Fig. 1

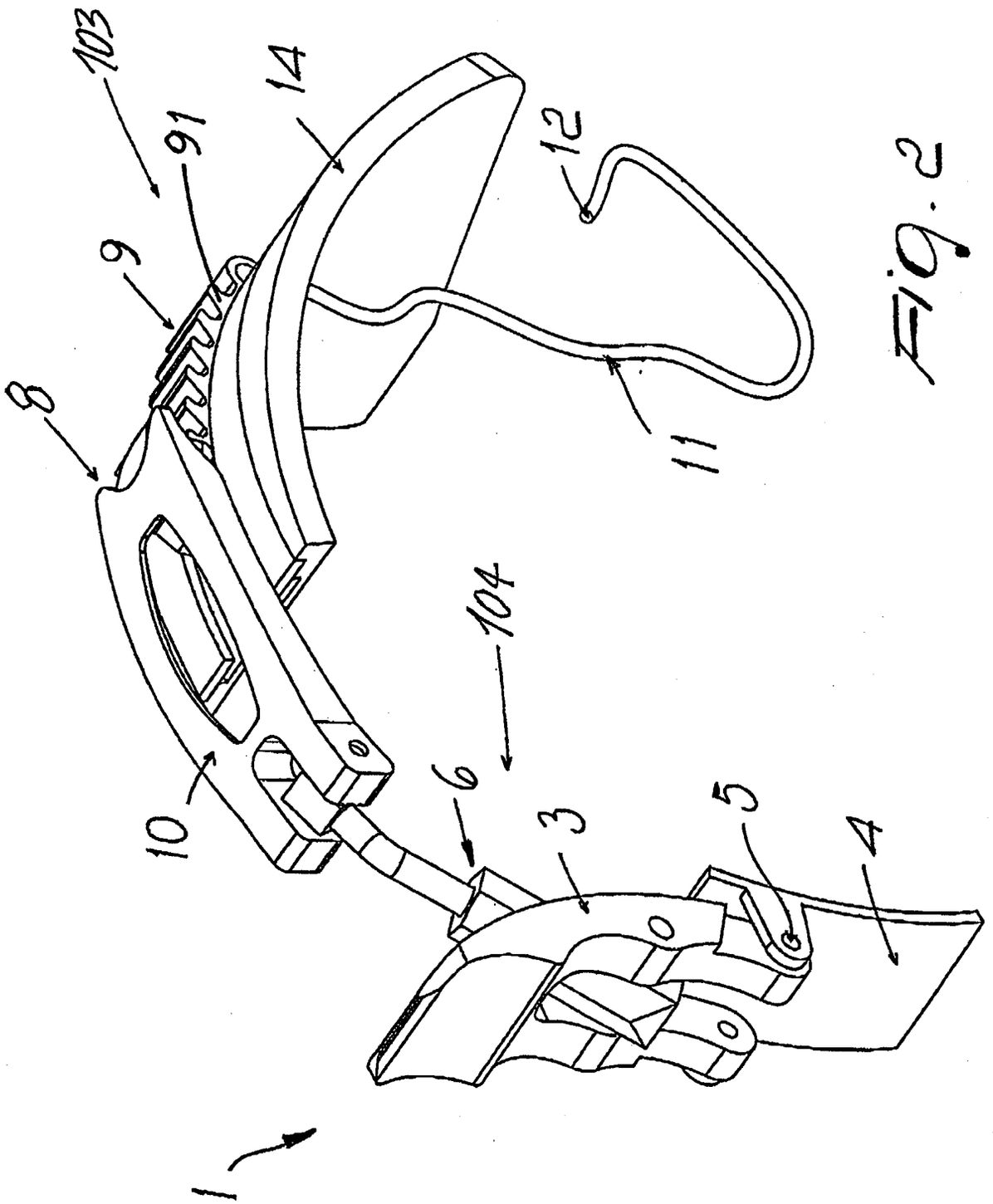

Fig. 2

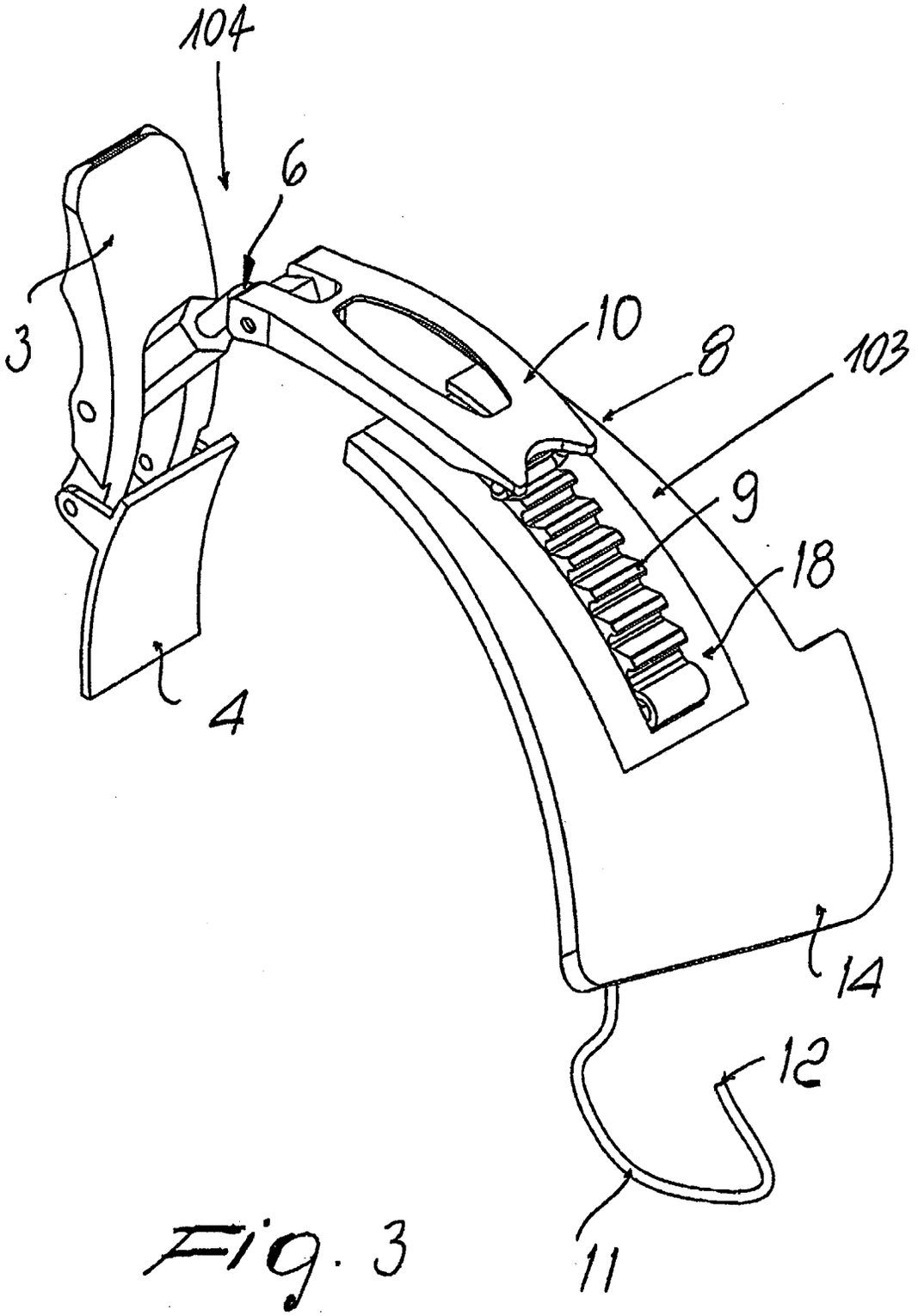

Fig. 3

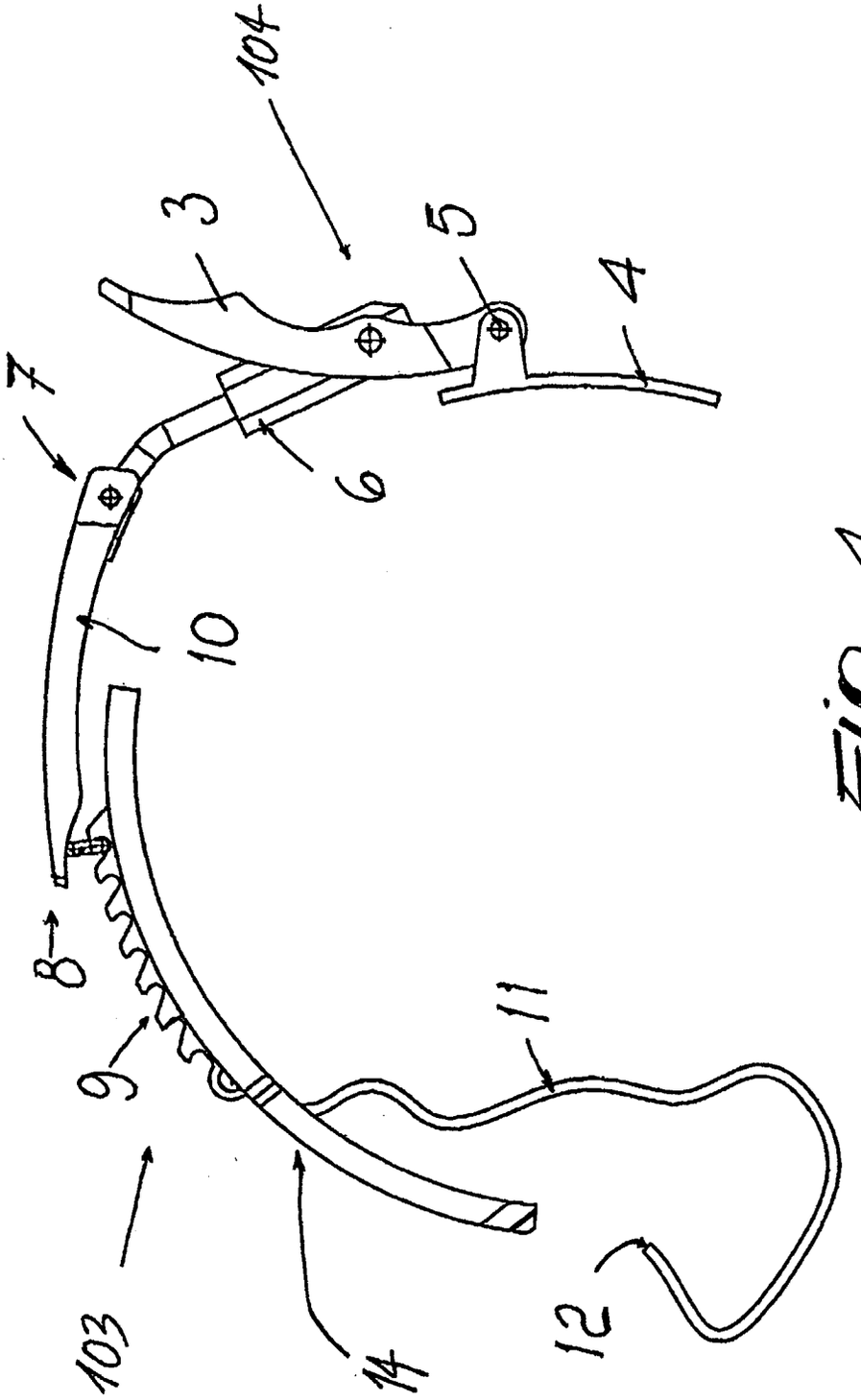

Fig. 4

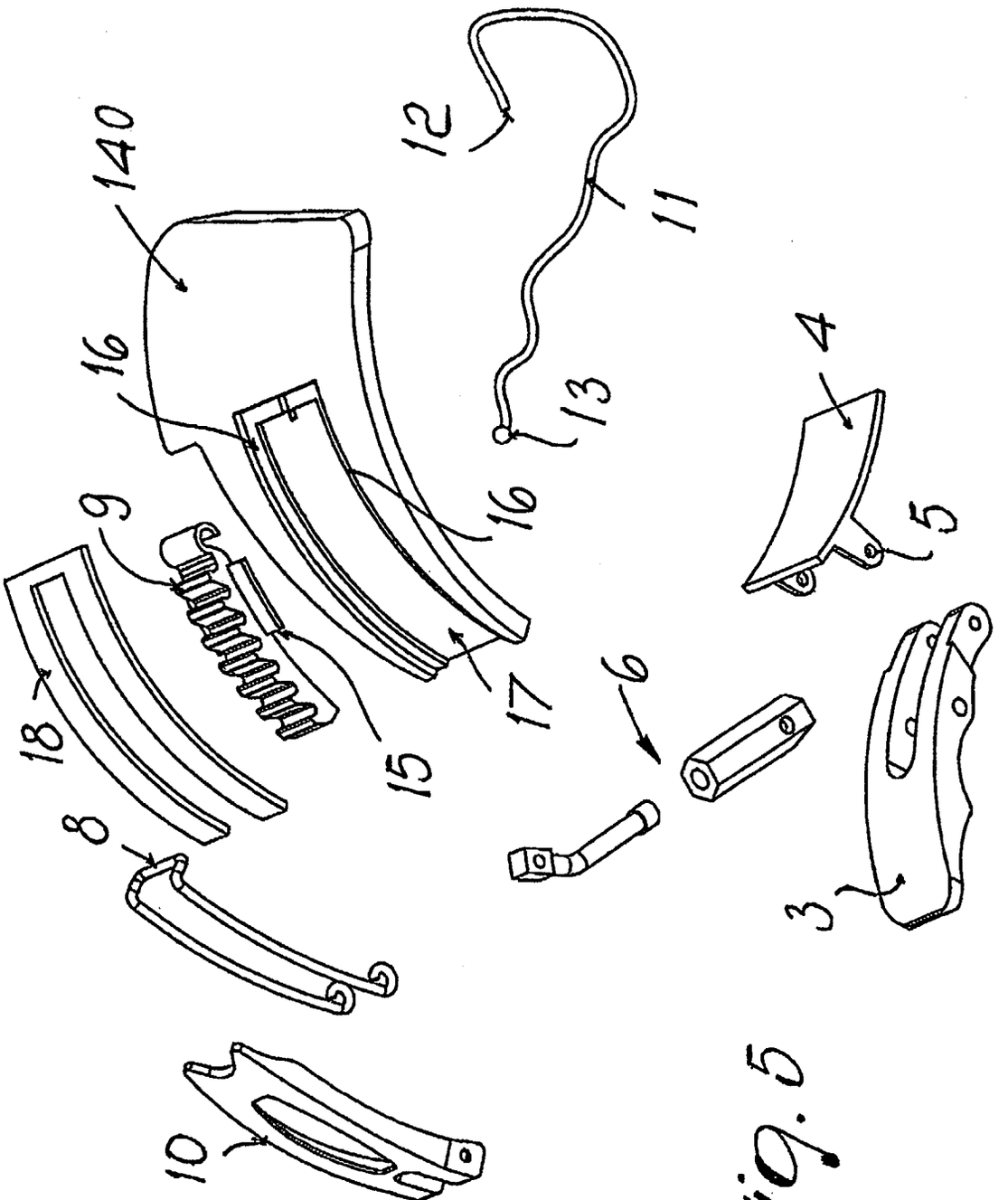

Fig. 5

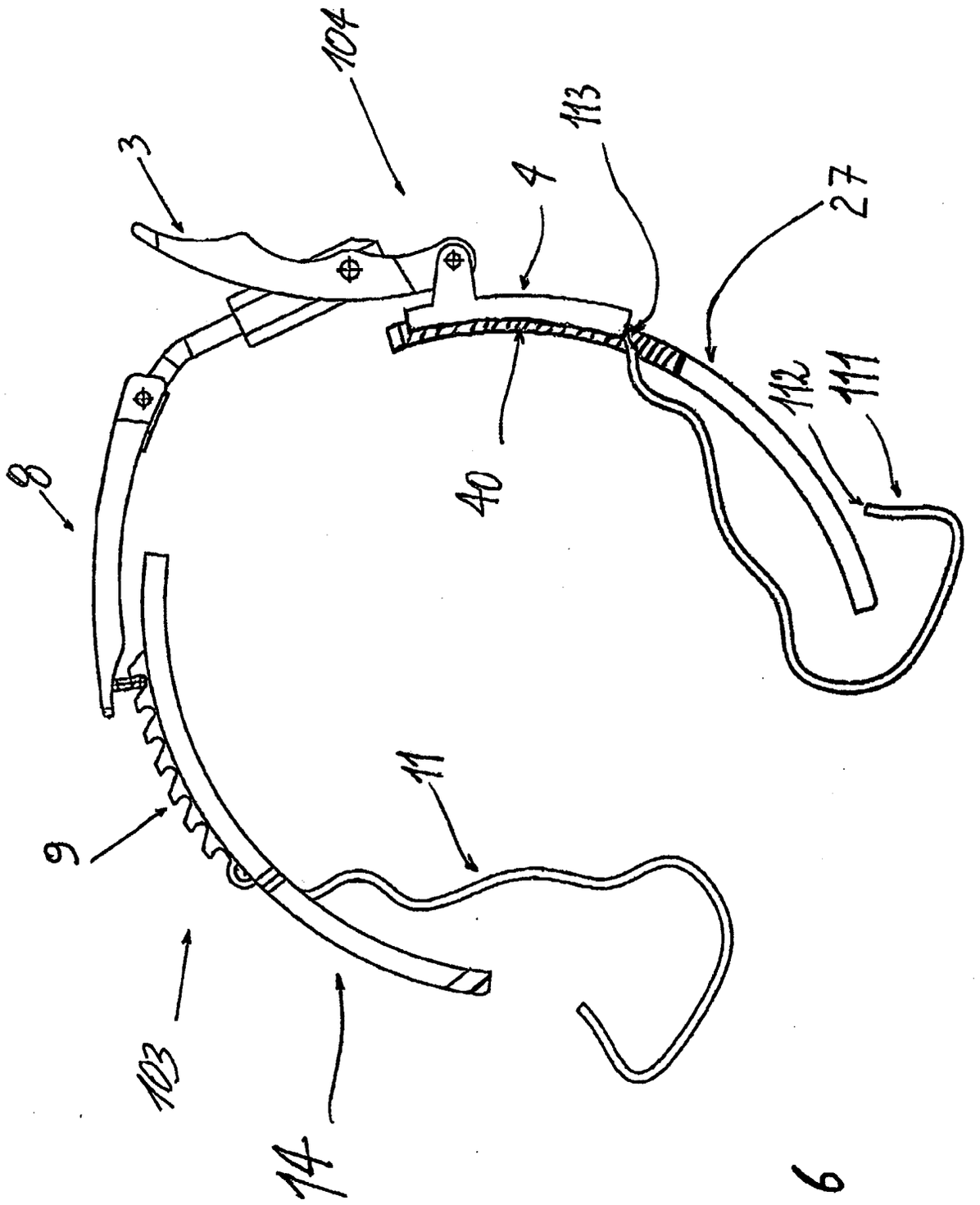

Fig. 6

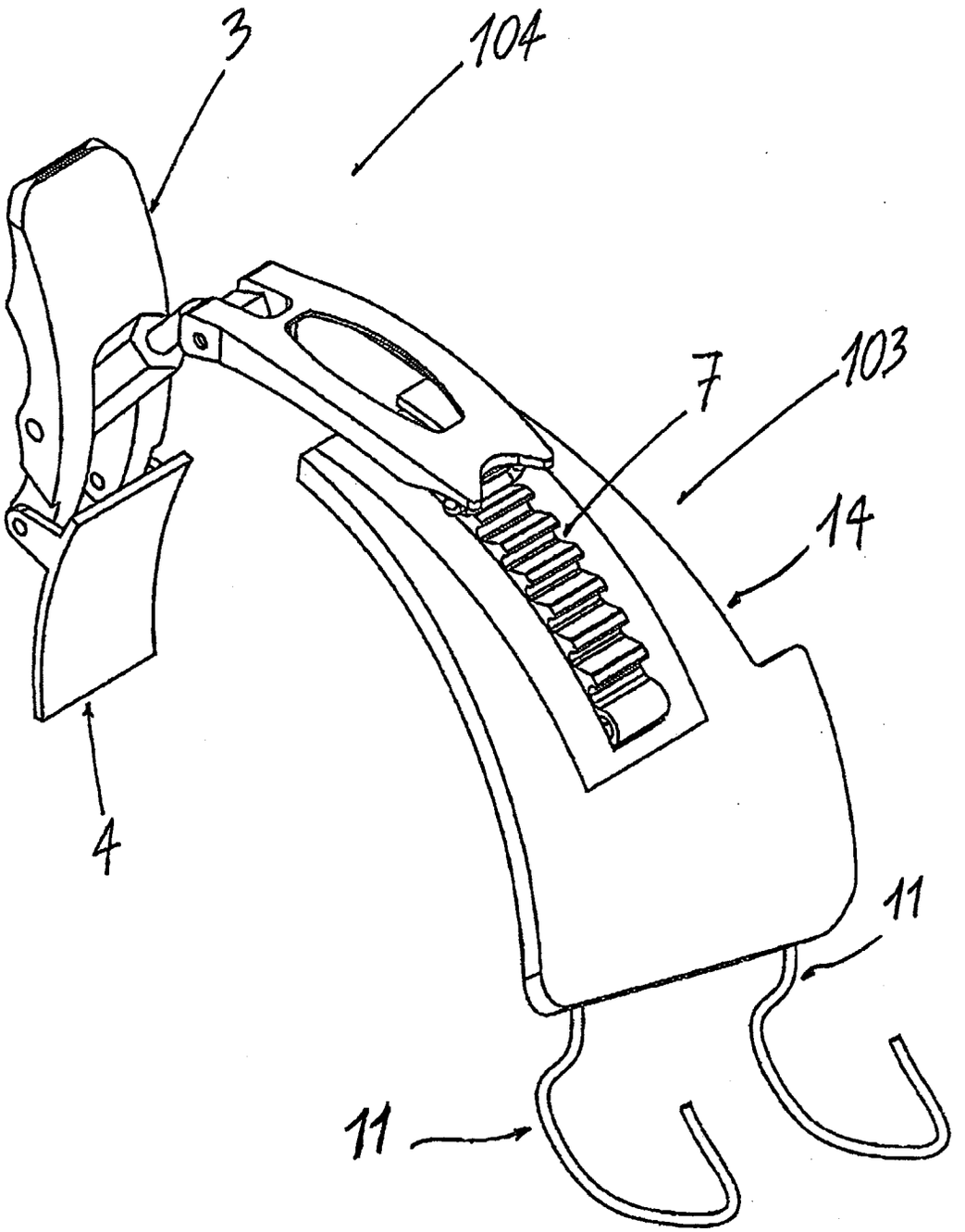

Fig. 7

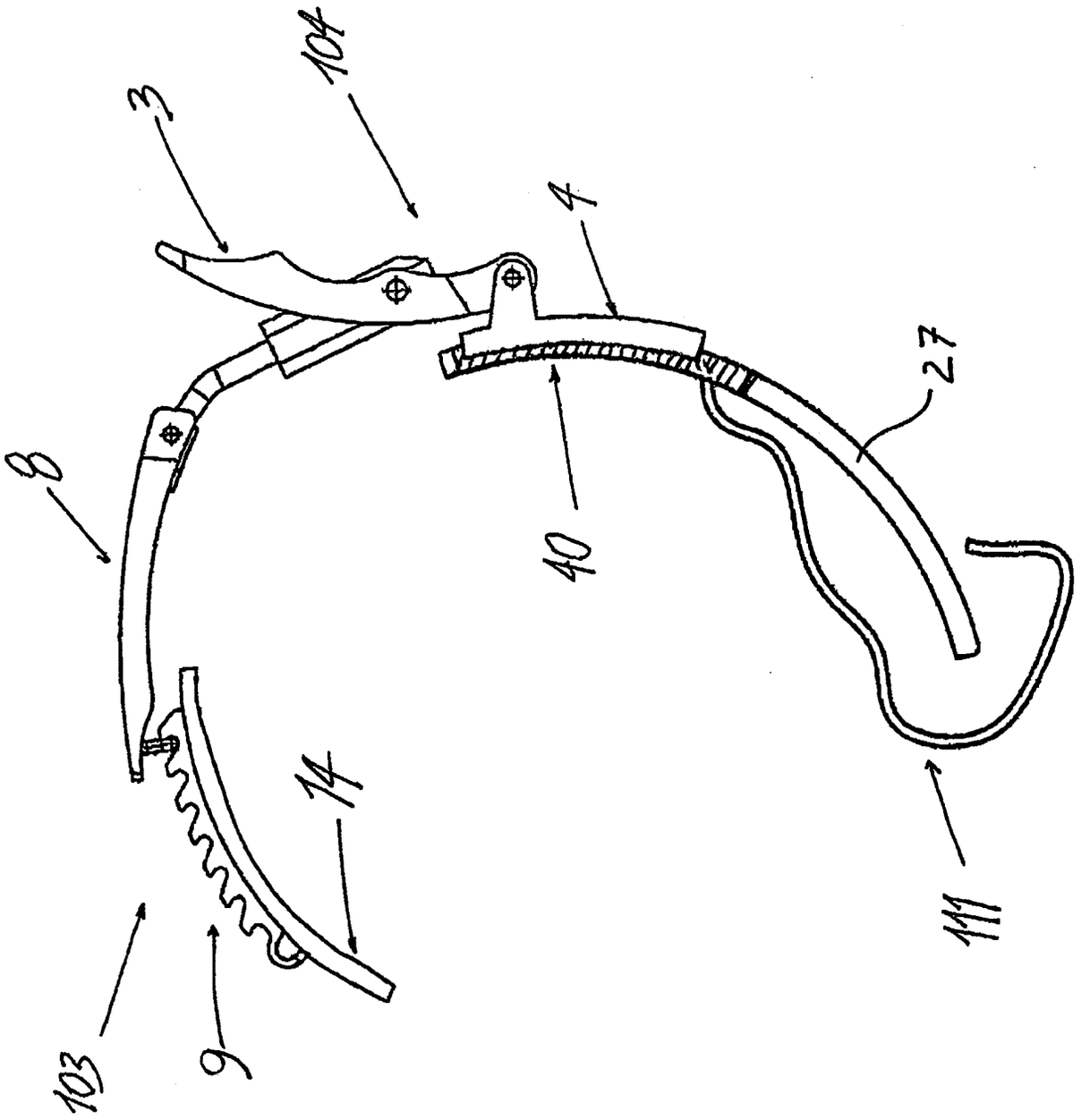

Fig. 8

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EUROPEAN SEARCH REPORT

Application Number
EP 02 08 0669

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	22 August 2003	DECLERCK, J

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