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(54) **Adjustable legrest for a wheelchair**

(57) The legrest comprises a release control device comprising at least two locking pins (30, 30') intended to cooperate with a lock chip element (20) provided with a series of holes (21, 21') corresponding to the different desired slope positions of the legrest. Said locking pins (30, 30') are mounted on a raise chip element (90) provided with at least one tilt angle surface (97, 97') designed to cooperate with at least one tilt angle gliding surface

(67, 67') of a turn chip element (60). A torsion spring (70) cooperates with both the turn chip element (60) and the raise chip element (90), the whole being arranged to have the raise chip element always returned to its original position. A compression spring (80) acts between the raise chip element (90) and the turn chip element (60) to secure that the locking pins (30, 30') lock into the lock chip element (20).

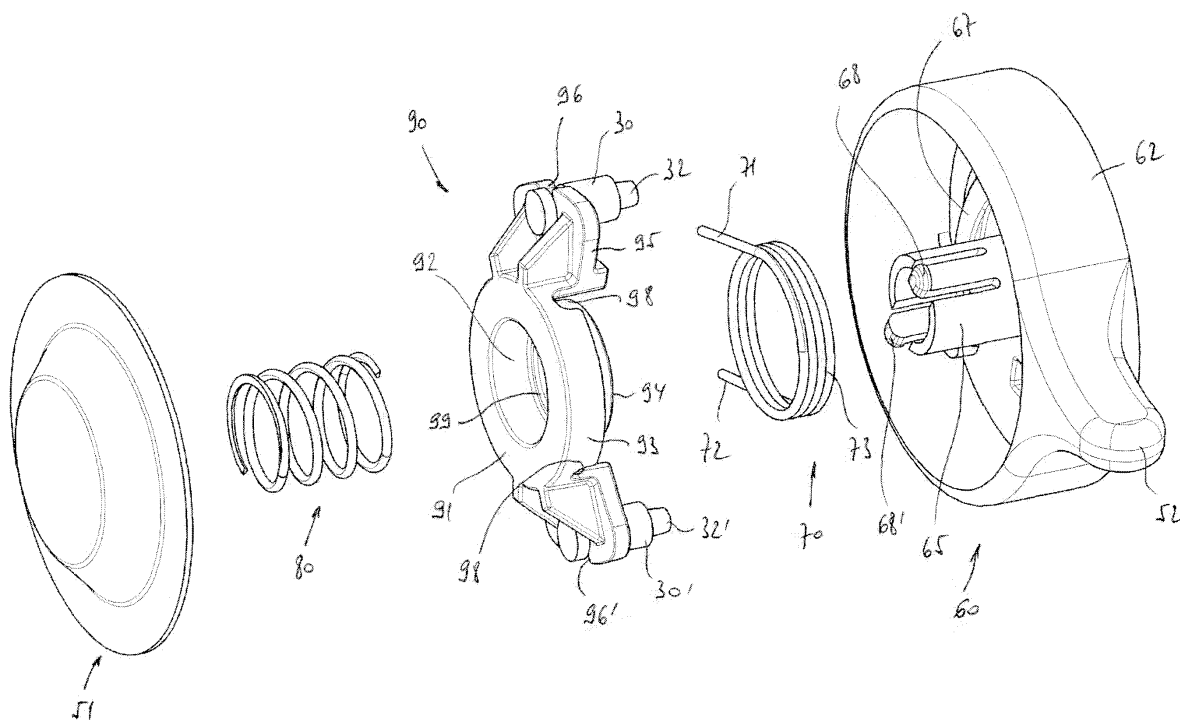


FIG.6

Description

FIELD OF THE INVENTION

[0001] The present invention relates to an adjustable legrest for a wheelchair, and more particularly to an adjustable legrest provided with a calfrest and a footrest. It also relates to a wheelchair comprising a pair of said adjustable legrests.

BACKGROUND OF THE INVENTION

[0002] Legrests for wheelchairs are designed to support the lower parts of a user's legs. They comprise a footrest and most often a calfrest for the comfort of the user. For the further comfort of the user, it may be useful to adjust the position of the legrest. Such adjustable legrests, allowing different slope positions from the vertical to the horizontal are known. In particular one have already proposed adjustable legrest with a tiltable mechanism provided at the upper top part of the legrest tube or frame, said tiltable mechanism comprising a release control device with locking pins cooperating with a lock chip provided with a series of holes corresponding to the different desired slope positions of the legrest. However, said known devices have not revealed satisfactory.

[0003] The aim of the present invention is therefore to provide an adjustable legrest for a wheelchair wherein the drawbacks of the known adjustable legrests are avoided, which is simple to manufacture and easy to be manipulated.

SUMMARY OF THE INVENTION

[0004] In this view the present invention is concerned with an adjustable legrest for a wheelchair as claimed in claim 1. Important features of the adjustable legrest according to the invention are defined in the dependant claims. The present invention also concerns a wheelchair comprising a pair of adjustable legrests as claimed in claim 10.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] Other features and advantages of the present invention will appear more clearly from the detailed description of embodiments of the invention which are presented solely by way of a non-restrictive example and illustrated by the attached drawings in which:

Figure 1 is a general view of a wheelchair of the Applicant provided with two adjustable legrests of the prior art;

Figures 2A and 2B are respectively a three quarter perspective front view from the left and a corresponding exploded view of the upper part of a legrest of the invention;

Figures 3A and 3B are respectively a three quarter perspective front view from the right side and a corresponding exploded view of the upper part of the legrest of Figure 2;

Figures 4A, 4B and 4C are respectively a plan view, a side view and a sectional view of the release control device of the tiltable mechanism of the legrest of Figures 2 and 3;

Figure 5 is a three quarter rear view of the release control device of Figure 4;

Figure 6 is an exploded three quarter front view of the release control device of Figure 4;

Figure 7 is an exploded three quarter rear view of the release control device of Figure 4;

Figures 8A and 8B are respectively a side view and a perspective view, partially cut, of the release control device of Figure 4 cooperating with the lock chip element in the locked position; and

Figures 9A and 9B are respectively a side view and a perspective view, partially cut, of the release control device of Figure 4 cooperating with the lock chip element in the unlocked position.

DETAILED DESCRIPTION OF EMBODIMENTS OF THE INVENTION

[0006] A wheelchair 1 provided with a pair of adjustable legrests 2, 2', each of which comprising a frame or tube 3, 3', a footrest 4, 4' and a calfrest 5, 5', is illustrated in Figure 1. Each of said legrests is mounted, through an adjustable tilt device 6, 6', on a connecting device 7, 7' fixed on the front part of the seat frame 8 of the wheelchair.

[0007] The legrest of the present invention is of the type illustrated in Figure 1, comprising a frame or tube 3, a footrest 4 and a calfrest 5, and is preferably mounted on a connecting device 7 fixed on the front part of the seat frame 8 of the wheelchair through an adjustable tilt device 10 illustrated in Figures 2 to 9 and which will now be described in detail.

[0008] One can see in Figures 2A to 3B the adjustable tilt device 10 connected to the connecting device 7 and to the upper part of the legrest tube or frame 3. The connecting device 7 is provided with connecting elements 9, 9' for its fixation to a corresponding connecting element of the front part of the seat frame 8 of the wheelchair. On the exploded view of Figure 2B is visible a lock chip element 20 provided with two series of holes 21, 21' intended to receive respectively one of two locking pins 30, 30' mounted in a release control device 50 which will be described in detail later. In the embodiment represented each series of holes 21, 21' comprises eight holes,

thus allowing eight differently slope oriented positions of the legrest. Of course a number of holes smaller or greater than eight can be chosen, depending on the number of differently oriented positions one wish for the legrest. Also visible in Figure 2B is a screw 40 for the assembly of the adjustable tilt device, thereby firstly locking the connecting device 7 with the lock chip element 20 by means of a first bolt 43 to be screwed on the middle part 41 of the screw 40 and secondly locking the release control device 50 by means of a second bolt 44 to be screwed on the end part 42 of the screw 40.

[0009] As illustrated in Figures 4 to 7, the release control device 50 includes a turn chip element 60, a torsion spring 70, a raise chip element 90 provided with the two locking pins 30, 30', a compression spring 80 and a cover 51. As can better be seen in Figures 5 to 7, the raise chip element 90 comprises a main central disc part 91 provided with a central hole 92 and two annular protruding parts 93, 94. The external annular part 93 bears two opposite radially extending lateral parts 95, 95' provided at their extremities with recesses 96, 96' intended to cooperate with corresponding grooves 31 provided in the locking pins 30, 30' for the fixation of said locking pins to the raise chip element 90. Each of said lateral parts 95, 95' is also provided at its base with a tilt angle surface 97, 97' intended to cooperate with corresponding tilt angle surfaces 67, 67' of the turn chip element 60. The external annular part 93 of the raise chip element is provided with four recesses 98, one of which is intended to receive one of the extremities 71 of the torsion spring 70, the other extremity 72 of the torsion spring being held into a corresponding receiving part 61 (see Figure 5) provided at the surface of the turn chip element 60, the central part 73 of the torsion spring being lodged between the two annular parts 93 and 94 of the raise chip element. The whole is arranged so that, once mounted in the release control device, the torsion spring is preloaded. The raise chip element is further provided with a ring part 99 protruding within its central hole 92 and which is intended to receive one first extremity of a compression spring 80 as will be described below.

[0010] The turn chip element comprises an external annular part 62 with a bottom part 63 in the form of a disc provided with a central hole 64 and a central annular part 65. The bottom disc part 63 is provided with two circular openings 66, 66' through which the locking pins 30, 30' can move, and with the two tilt angle gliding surfaces 67, 67' intended to cooperate with the corresponding tilt angle surfaces 97, 97' of the raise chip element 90. The outer diameter of the central annular part 65 is smaller than the diameter of the central hole 92 of the raise chip element, and substantially correspond to the internal diameter of the ring 99, so that the raise chip element 90 can be lodged within the turn chip element 60 by introduction of the central annular part 65 of the turn chip element within said hole 92 of the raise chip element, leaving a radial space 69 between them. In order to have the raise chip element hinged on the turn chip element,

the outer diameter of the annular part 65 of the turn chip element should be chosen to close fit the internal diameter of the ring 99 of the raise chip element. This will make sure that the raise chip element will always remain parallel to the lock chip element.

[0011] The release control device 50 further comprises a compression spring 80 intended to be lodged within the turn chip element 60 around its central annular part 65, once the raise chip element is already lodged therein. Once assembled, a first extremity of the compression spring abuts against the ring 99 of the raise chip element, while its other extremity abuts on the snap locking parts 68, 68' of the central annular part 65 of the turn chip element.

[0012] To release the adjustable legrest, the user just turns the release control handle 52, which will thus turn the turn chip element 60. When the turn chip element rotates, the tilt angle gliding surfaces 67, 67' provided on the internal bottom surface 63 of the turn chip element will act on the corresponding tilt angle surfaces 97, 97' of the raise chip element, which will raise and lift the two locking pins 30, 30'. The two locking pins 30, 30' will thus leave the holes 21, 21' of the lock chip element 20, allowing the legrest tube 3 to be pivoted. After adjusting the position of the legrest, when the user releases the release handle 52, the torsion spring 30 will force the control release device 50 to its original position. The turn chip element 60 will follow the movement and the locking pins 30, 30' lock again into the holes 21, 21' of the lock chip element under the effect of the compression spring 80, thus securing the locking pins into the lock chip element.

[0013] In order to facilitate the introduction of the locking pins 30, 30' into the holes 21, 21', the end parts 32, 32' of the locking pins have a conical shape. Further, the holes 21, 21' are oval-shaped, their radial diameter (radial being considered with respect to the center of the lock chip element) being slightly greater than the greater diameter of the end part 32, 32' of the locking pins.

[0014] With a view to the limited number of separate parts and their design, the manufacture of the release control device according to the present invention is economically cheap. Furthermore, the device is easy to mount and its design allows a great security of functioning when unlocking and locking the locking pins within the lock chip element. In particular, since the locking pins once mounted on the raise chip element are made one piece with the raise chip element and work as a one piece pair, one can be sure that upon locking of the device both locking pins will be engaged in the holes of the lock chip element. Another advantage resulting from the one part of the one piece realisation of the locking pins with the raising chip element and on the other part of the conical shape of the end parts 32, 32' of the locking pins cooperating with the oval-shaped holes 21, 21', is the absence of any problem of fit tolerance, while the locking of the device is very solid. Further, the design of the tilt angle surfaces 67, 67' and 97, 97' and their cooperation allows

a smooth rotation of the release device without jam.

98, 98' recess

99 ring part

List of reference numerals:

[0015]

1 wheelchair
2, 2' legrest
3, 3' legrest frame or tube
4, 4' footrest
5, 5' calfrest
6, 6' adjustable tilt device (prior art)
7, 7' connecting device
8 seat frame
9, 9' connecting element
10 adjustable tilt device (invention)

20 lock chip element
21, 21' hole

30, 30' locking pin
31, 31' groove
32, 32' conical end

40 screw
41 middle part of locking screw
42 end part of locking screw

50 release control device
51 cover
52 handle

60 turn chip element
61 receiving part for torsion spring
62 annular part
63 bottom part
64 central hole
65 central annular part
66, 66' annular opening
67, 67' tilt angle surface
68, 68' snap locking part
69 radial space

70 torsion spring
71 extremity
72 other extremity
73 middle part

80 compression spring

90 raise chip element
91 main central disc part
92 central hole
93 external annular part
94 internal annular part
95, 95' lateral part
96, 96' recess
97, 97' tilt angle surface

5 Claims

1. An adjustable legrest for a wheelchair comprising a release control device (50) comprising at least two locking pins (30, 30') intended to cooperate with a lock chip element (20) provided with a series of holes (21, 21') corresponding to the different desired slope positions of the legrest, wherein said locking pins (30, 30') are mounted on a raise chip element (90) provided with at least one tilt angle surface (97, 97') designed to cooperate with at least one tilt angle gliding surface (67, 67') of a turn chip element (60).
2. The adjustable legrest of claim 1, wherein said lock chip element (20) is mounted at the top end of the legrest tube (3).
3. The adjustable legrest of claim 1 or 2, wherein the turn chip element (20) is made one part with a release control handle (52).
4. The adjustable legrest of any one of the preceding claims, further comprising a torsion spring (70) cooperating with both the turn chip element (60) and the raise chip element (90), the whole being arranged to have the raise chip element always returned to its original position.
5. The adjustable legrest of any one of the preceding claims, wherein the raise chip element comprises a main central part (91) provided with a central hole (92) and at least two opposite radially extending lateral parts (95, 95') provided with recesses (96, 96') arranged to receive corresponding groove parts (31, 31') of the locking pins (30, 30').
6. The adjustable legrest of any one of the preceding claims, further comprising a compression spring (80) acting between the raise chip element (90) and the turn chip element (60) to secure that the locking pins (30, 30') lock into the lock chip element (20).
7. The adjustable legrest of the preceding claim, wherein the turn chip element (60) comprises an internal annular part (65) around which is positioned the raise chip element through its central hole (92).
8. The adjustable legrest of the preceding claim, wherein the internal annular part (65) of the turn chip element (60) is provided with at least two snap locking parts (68, 68') intended to block the expansion of the compression spring (80) on one of its extremities, while its other extremity abuts on a ring part (99) protruding within said hole (92) of the raise chip el-

ement.

9. The adjustable legrest of any one of the preceding claims, wherein the raise chip element (90) comprises two annular protruding parts (93, 94) between which is lodged the middle part (73) of the torsion spring (70). 5
10. A wheelchair comprising a pair of adjustable legrests as claimed in any one of the preceding claims. 10

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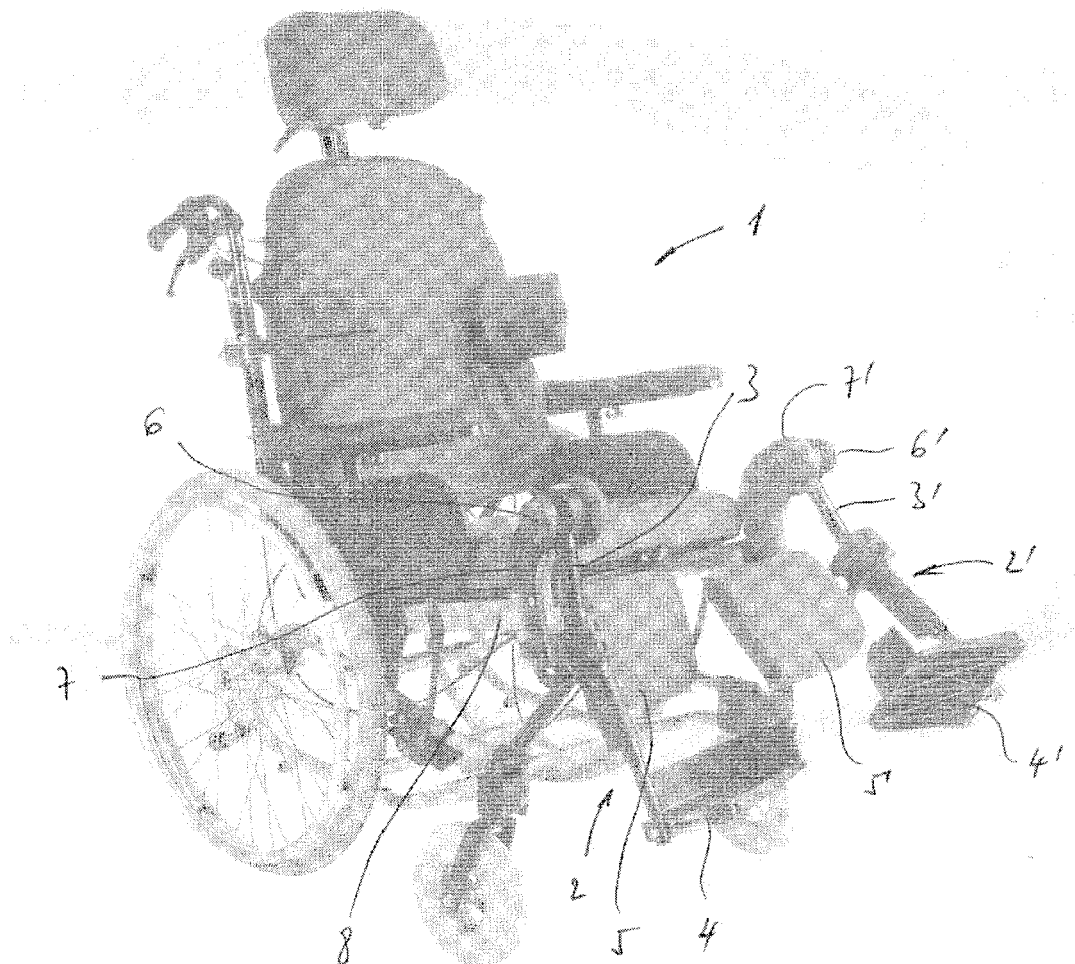


FIG. 1

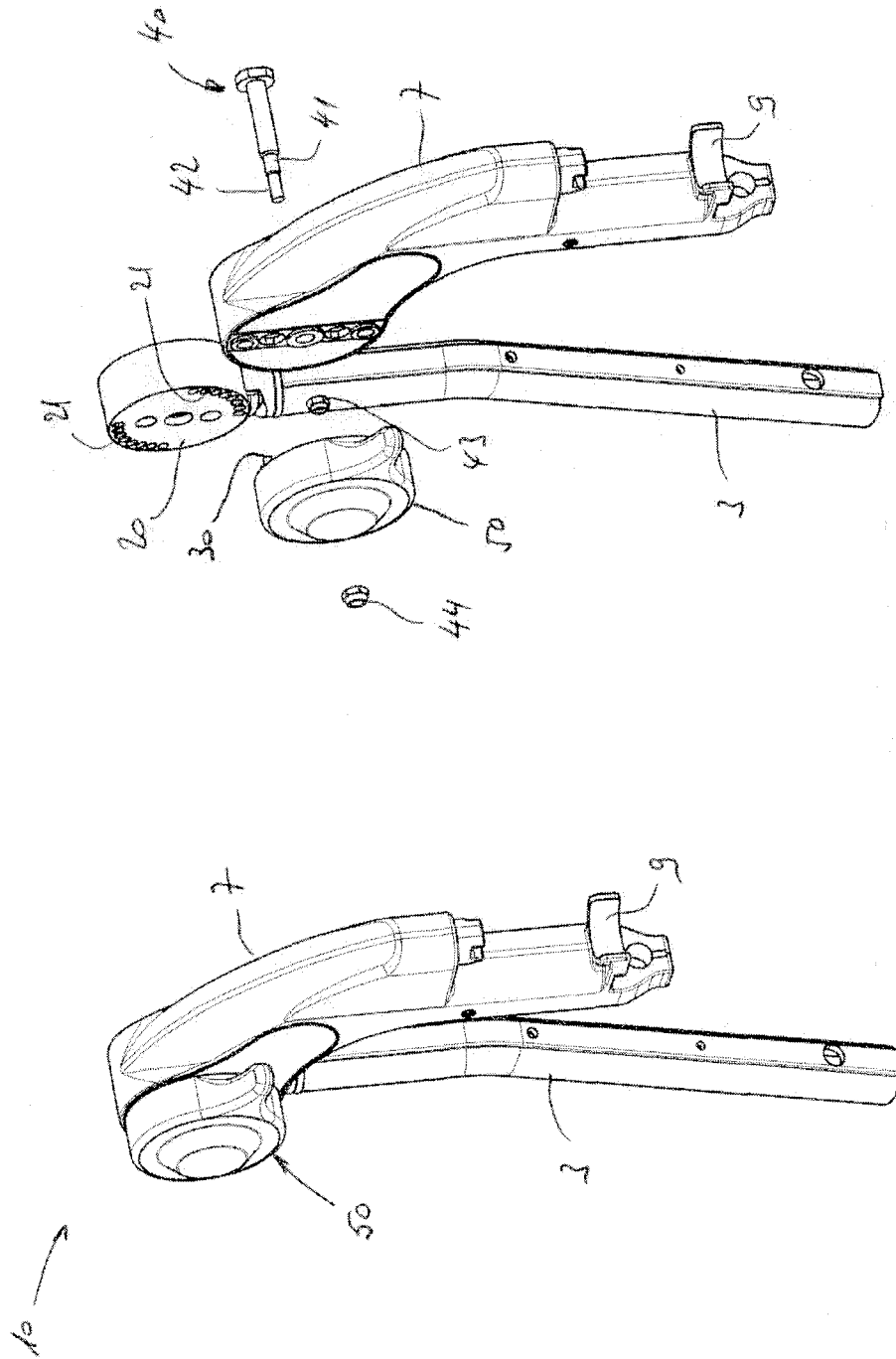


FIG. 2B

FIG. 2A

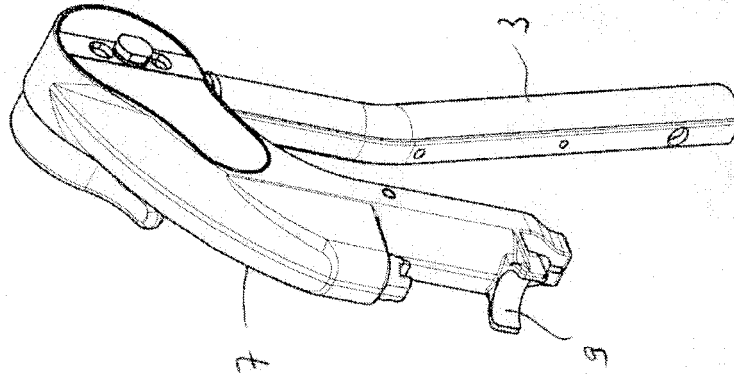


FIG. 3A

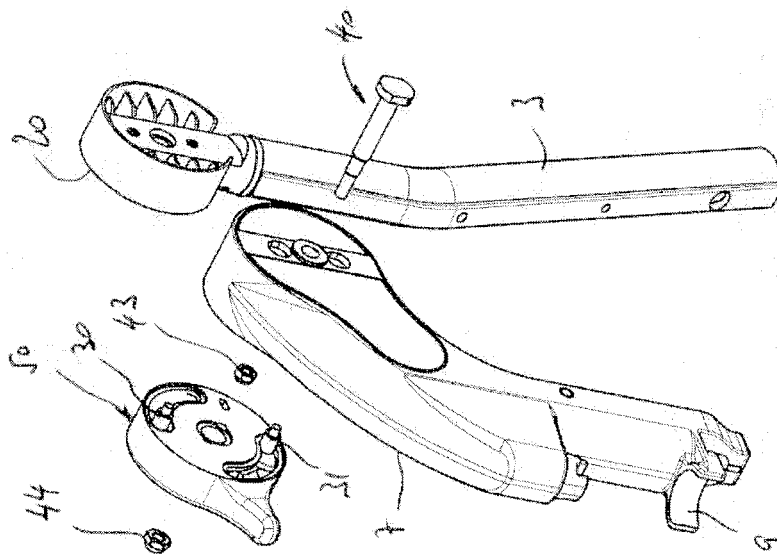


FIG. 3B

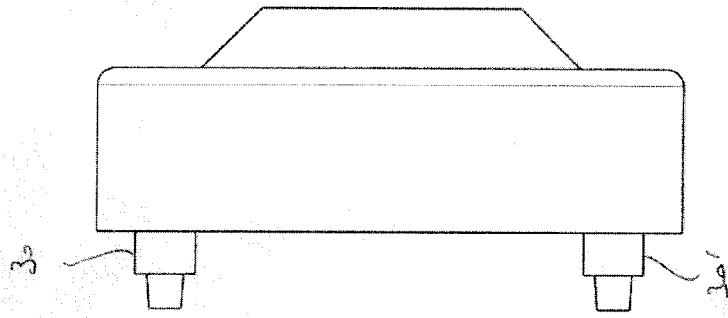


FIG. 4B

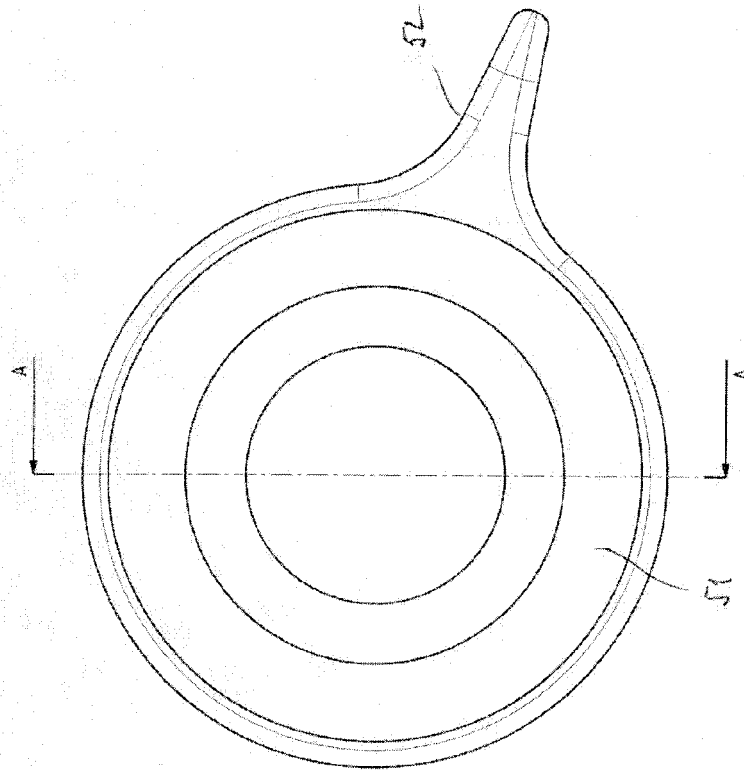


FIG. 4A

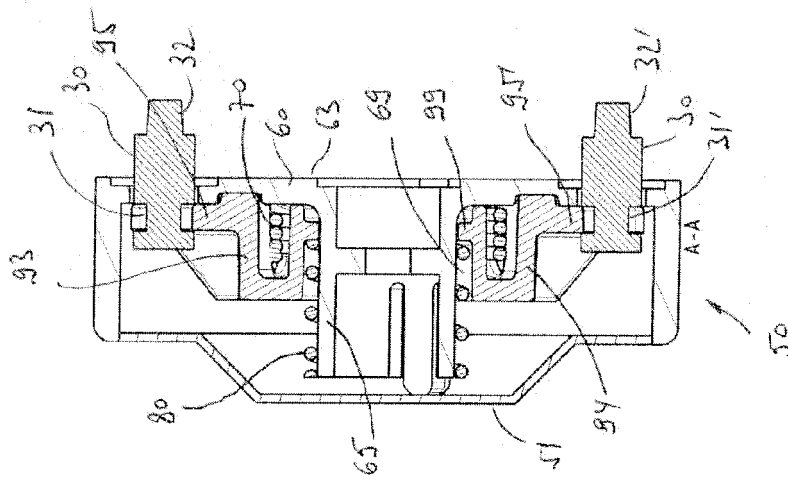
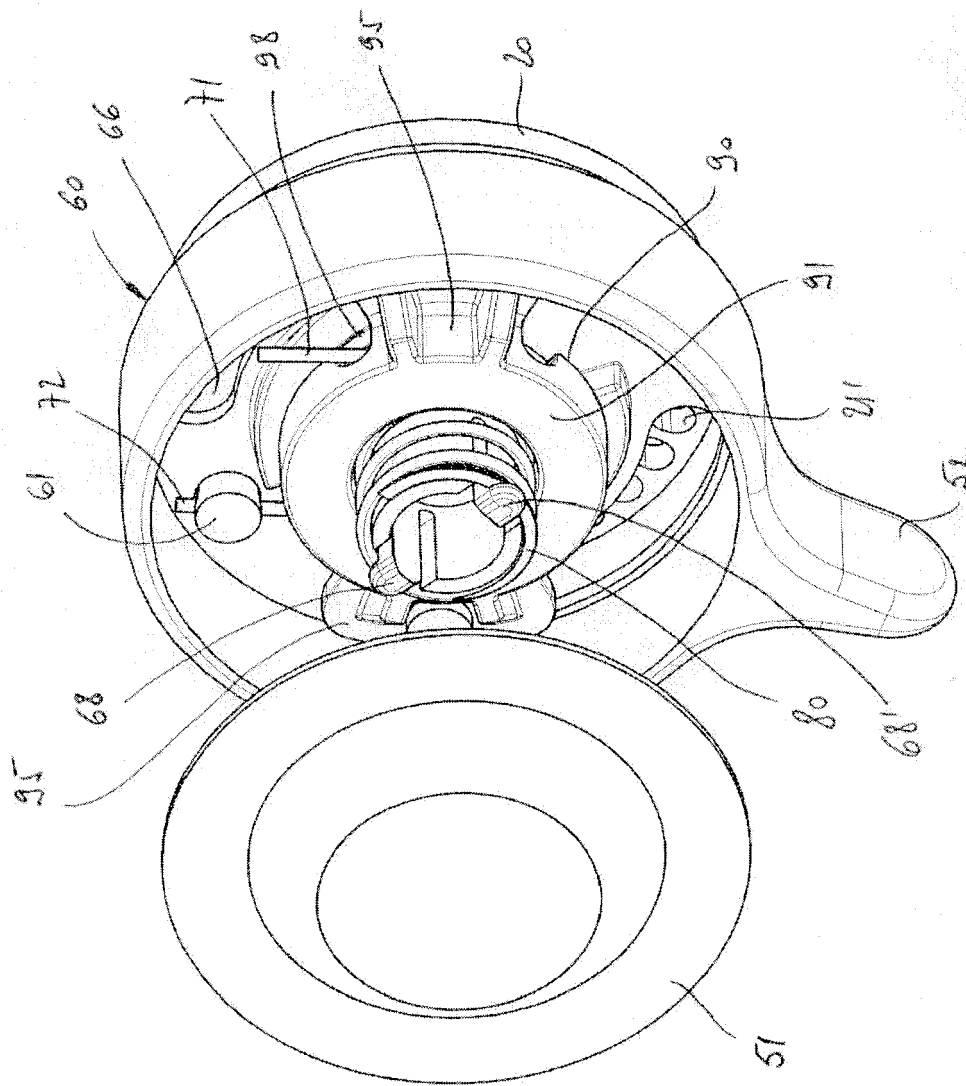


FIG. 4C



LEG

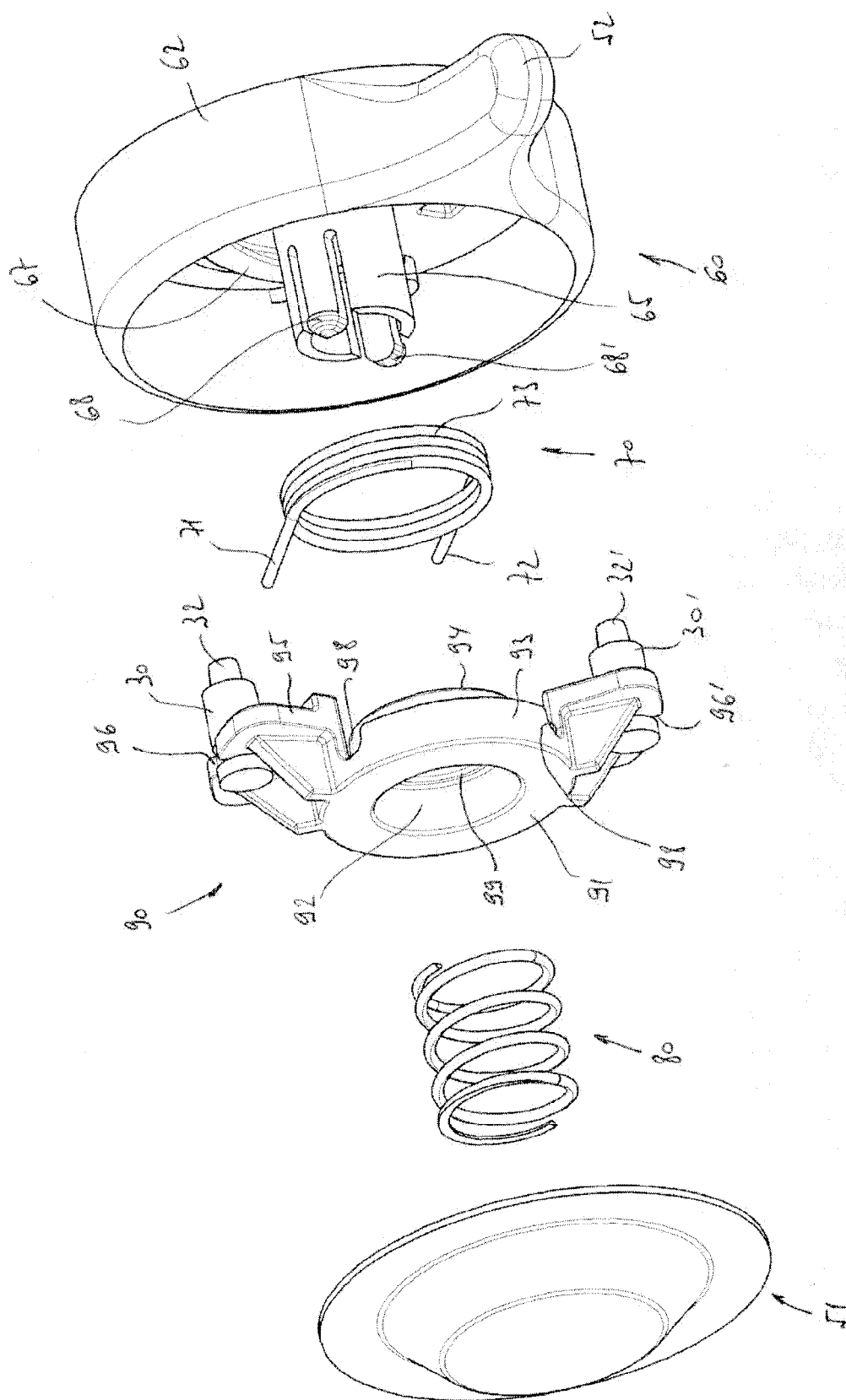


FIG.6

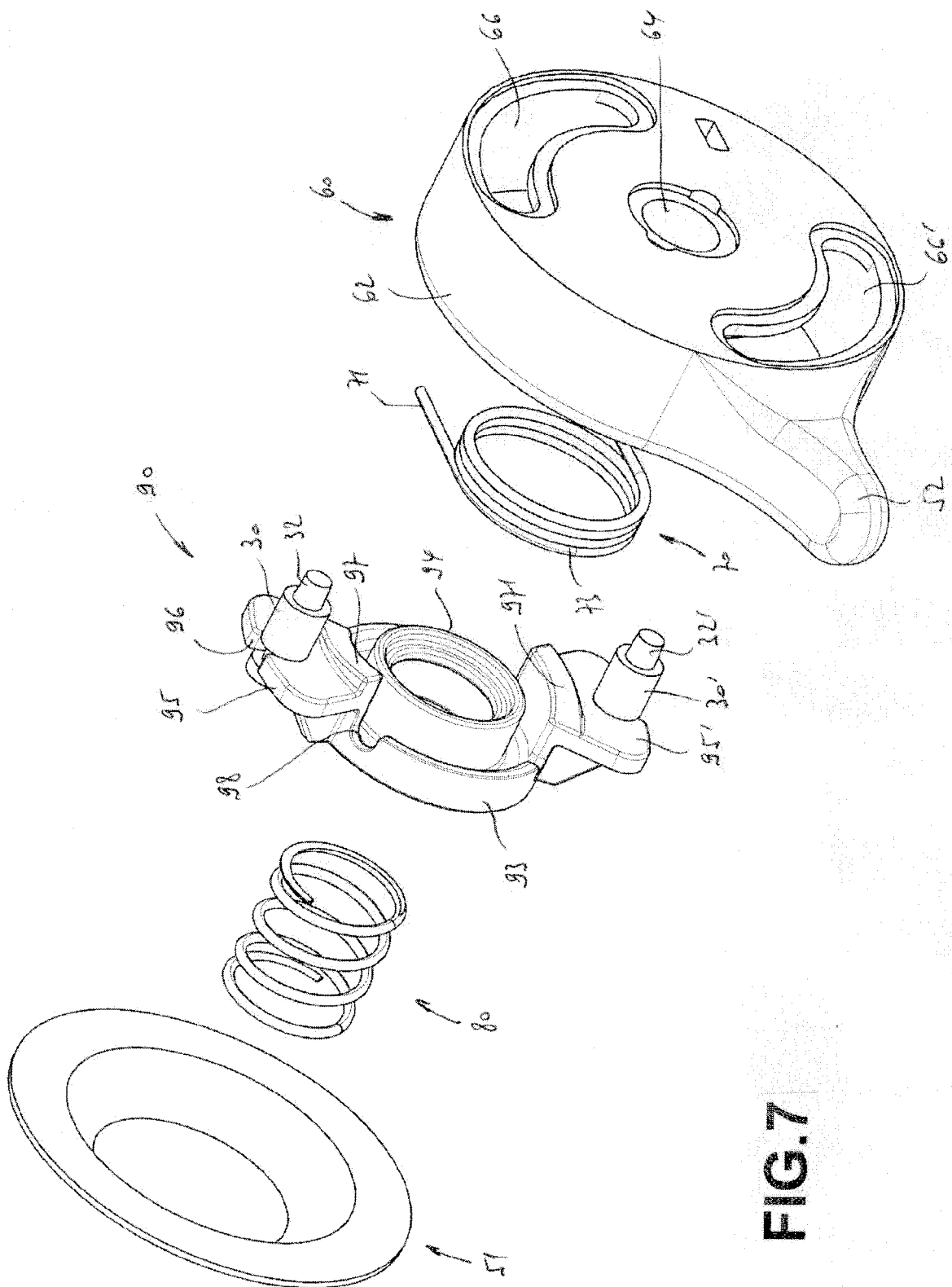


FIG.7

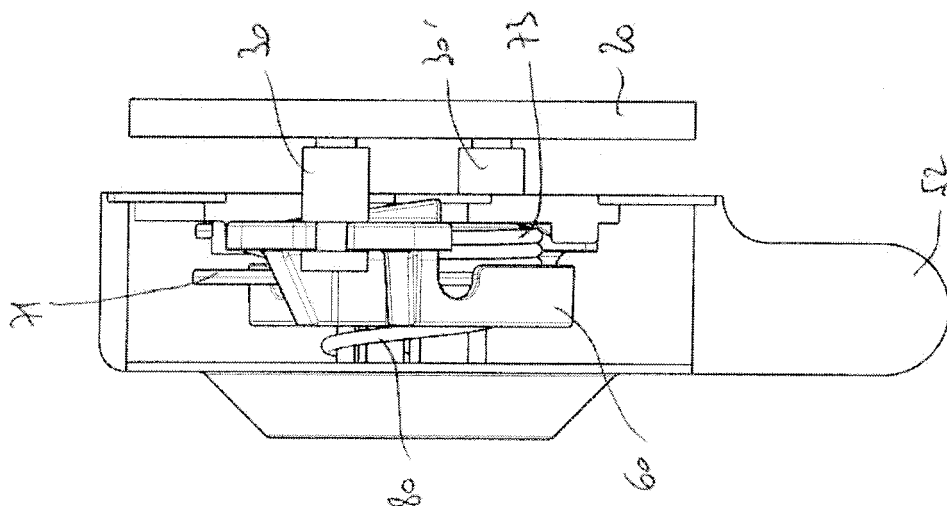


FIG. 8A

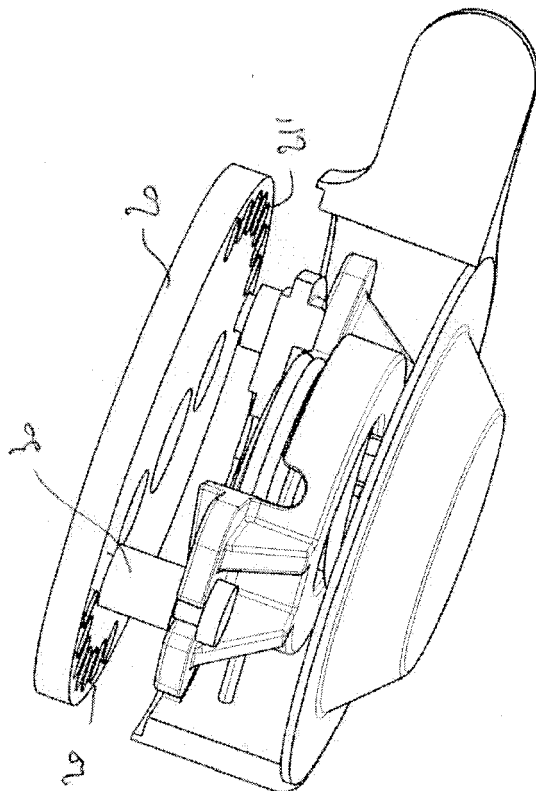


FIG. 8B

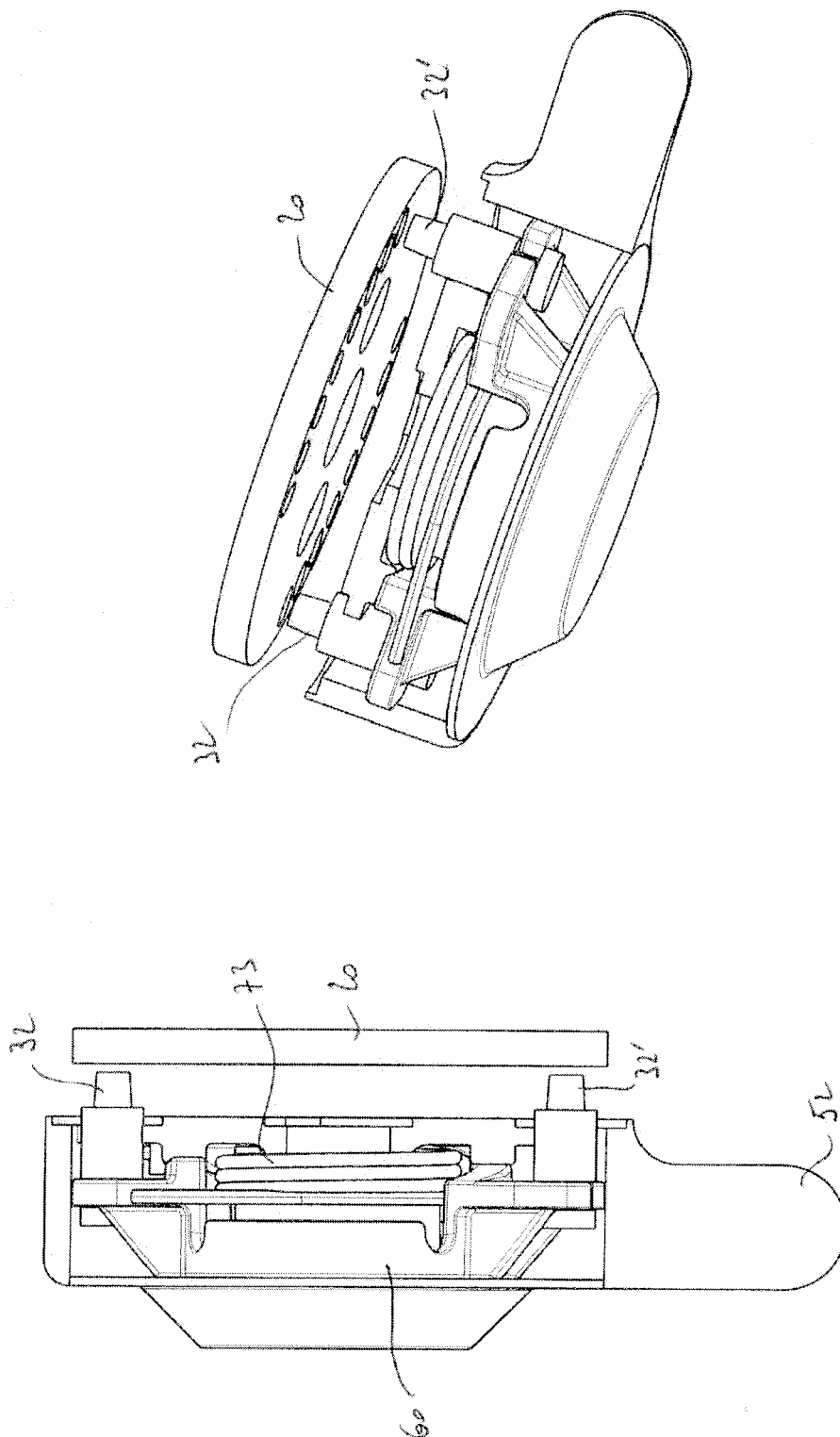


FIG. 9B

FIG. 9A



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 07 11 7160

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 5 689 999 A (WILEY ROBERT A [US] ET AL) 25 November 1997 (1997-11-25) * the whole document *	1-10	INV. A61G5/12
A	FR 2 087 549 A (COUSIN CIE ETS A & M FRERES) 31 December 1971 (1971-12-31) * the whole document *	1	
			TECHNICAL FIELDS SEARCHED (IPC)
			A61G
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 14 February 2008	Examiner Godot, Thierry
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 07 11 7160

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14-02-2008

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