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- **Salveti, Alberto**
I-24124 Bergamo (IT)
- **Tomasoni, Gabriele**
I-24050 Bariano (BG) (IT)

(71) Applicant: **OPTICOS S.r.l.**
24030 Brembate di Sopra (BG) (IT)

(74) Representative: **Trupiano, Federica**
Marietti, Gislone e Trupiano S.r.l.
Via Larga, 16
20122 Milano (IT)

(72) Inventors:
• **Gafforio, Luca**
I-24040 Comun Nuovo (BG) (IT)

(54) **Extraction and rotation device for the visor of a crash helmet for motorcycles**

(57) A device for extraction and rotation of a visor (2) for helmets (1) comprising a cap (4), a recess or hole (3) made in the cap (4), in which there may be positioned, so that it is perfectly set in, a visor (2), and means for expelling of the visor (2). The means for expelling the visor (2) comprise an extractor ensemble designed to enable the application of a force (F) of thrust on the visor (2) directed towards the outside of the helmet (1), and

two inclined guiding elements (5), which are set at the side ends of the hole (3) and are designed to engage slidably two slide means (6) connected to the visor for enabling translation of the slide means (6) from a first position, in which the visor (2) is set in inside the recess or hole (3) to a second position, in which the visor (2) is extracted from the hole (3) provided in the cap (4) and is ready to be rotated, and vice versa.

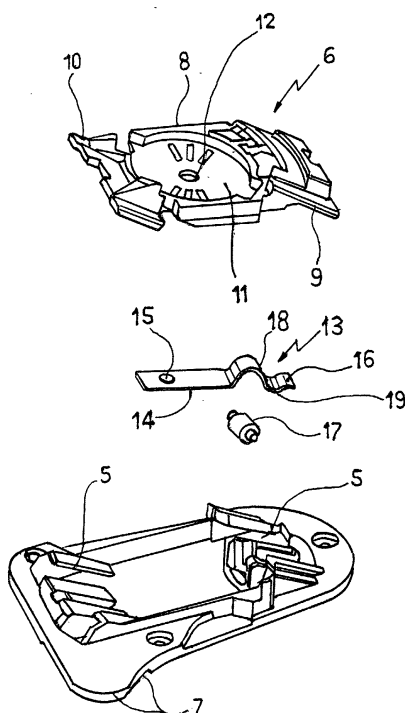


FIG.2

Description

[0001] The subject of the present invention is a device for extraction and rotation of a visor for crash-helmets, and in particular, an extraction device designed to enable extraction of the visor from a first closed position, where it is perfectly set in and flush with the outer surface of the cap, to a second position where the visor is in a forward position outside the recess provided in the cap and ready to be rotated upwards, and vice versa.

[0002] A solution forming part of the prior art is that of anchoring the transparent visor for motor-cycle helmets at the two sides of the cap of the helmet by means of pins integral with the cap and projecting from the latter. The visor, in its closed position, fits into a hole made on the front of the helmet.

[0003] With this hooking system, the visor is mounted in cantilever fashion on the cap both when it is in the closed position on the hole provided in the helmet and when it is raised, namely, in the open position. This causes a discontinuity in the outer surface of the helmet, which results in a decrease in the aerodynamic performance of the helmet and in an appearance that is somewhat unattractive.

[0004] There are moreover known devices for moving the visor which enable the visor, when it is in the closed position, to be perfectly set in and flush with the outer surface of the cap. Such devices solve the aerodynamic and aesthetic problems of helmets with visors mounted in cantilever fashion, but are frequently very complex and involve a high number of articulated joints. The high number of articulated joints normally leads to an increase in the difficulty of assembly of the device and a reduction in the reliability of the device itself.

[0005] A purpose of the present invention is to provide a helmet with a visor which appears, when it is in the closed position, perfectly set in and flush with the outer surface of the cap of the helmet and which is provided with a device for extraction and rotation of the visor that is constitutively simple and easy to assemble.

[0006] Another purpose of the present invention is to provide a device for extraction and rotation of the visor which is highly reliable and at the same time easy and inexpensive to produce.

[0007] These and still other purposes are achieved by the present invention, which relates to a device for extraction and rotation of a visor for helmets comprising a cap, a hole made in the cap, in which a visor may be positioned perfectly set in, and means for expelling the visor, characterized in that said expulsion means comprise an extractor ensemble designed to enable the application of a force of thrust on the visor directed towards the outside of the helmet, as well as at least two inclined guiding elements, set at the side ends of the hole and designed to engage slidably at least two slide means connected to the visor for enabling translation of said slide means from a first position, in which the visor is set in inside the hole, to a second position, in which the visor

is extracted from the hole and is ready to be rotated, and vice versa. In this way, it is possible to provide a helmet that has a visor perfectly set in and flush with the outer surface of the cap of the helmet and that is able to solve the aesthetic and aerodynamic problems presented by helmets of the prior art.

[0008] According to a preferred aspect of the present invention, the inclined guides form a tapering which converges towards the rear part of the helmet.

[0009] According to an advantageous feature of the present invention, the two slide means are connected each to one side end of the visor by means of rotating blocks designed to enable rotation of the visor.

[0010] According to another feature of the present invention, the two guiding elements comprise elastic means which are set between the guiding elements and the slide means and are designed to withhold the slide means in the first position, in which the visor is perfectly set in inside the hole, and to favour the thrust of the slide means in the transition towards the second position, in which the visor is extracted from the hole and ready to be rotated.

[0011] According to a further feature of the present invention, the extractor ensemble comprises a lever which is hinged to an internal portion of the chin-piece of the helmet, and/or of a support anchored to the chin-piece, and is designed to rotate about the hinging point in order to exert a pressure against at least one internal portion of the visor sufficient for extraction of said visor.

[0012] According to a further feature of the present invention, the lever is connected to elastic means set between the lever and at least one internal portion of the chin-piece and/or of the support anchored to the chin-piece of the helmet.

[0013] According to another advantageous feature of the present invention, the extractor ensemble comprises a release device designed to enable the elastic means to exert its force on the lever.

[0014] The considerable constitutive simplicity and the limited number of components of the extractor device make it particularly simple to produce and assemble, as well as highly reliable.

[0015] Further characteristics and advantages of the present invention will emerge more clearly from the ensuing description, provided purely by way of illustrative and non-limiting example, with reference to the attached drawings, in which :

- Figures 1a, 1b, 1c illustrate a helmet equipped with the device for extraction and rotation of the visor according to the present invention, with the visor perfectly set in (Fig. 1a), with the visor extracted from the recess (Fig. 1b), and with the visor rotated upwards (Fig. 1c);
- Figure 2 is an exploded perspective schematic view of some guiding elements according to the present invention;
- Figure 3 is an exploded perspective schematic view

of the extractor ensemble according to the present invention;

- Figure 4 presents detailed cross-sectional views of the elements making up the extractor ensemble of Figure 3; and
- Figure 5 illustrates the internal portion of the support anchored to the chin-piece of the helmet according to the invention.

[0016] Figures 1a, 1b, 1c illustrate a helmet 1 for motor-cyclists of the type with visor 2 that can be perfectly set into a hole 3 made in the cap 4 of the helmet, the said helmet being equipped with the device for extraction and rotation of the visor according to the present invention.

[0017] In particular, Figure 1a illustrates the helmet 1 with the visor 2 perfectly set in and flush with the outer surface of the cap 4; Figure 1b illustrates the helmet 1 with the visor 2 completely extracted from the recess provided and ready to be rotated upwards; and finally Figure 1c illustrates the helmet 1 with the visor 2 rotated upwards.

[0018] The movement of extraction and rotation of the visor 2 is rendered possible by special means for its expulsion which comprise an extractor ensemble designed to enable the application of a force of thrust (indicated in Figure 1b by the arrow F) on the visor 2 directed towards the outside of the helmet 1, and at least two inclined guiding elements which are set at the side ends of the hole 3 and are designed to engage at least two slide means 6 connected to the visor 2.

[0019] The inclined guiding elements engage the slide means 6 to translate them from a first position, in which the visor 2 is set in inside the hole 3 (Fig. 1a), and hence perfectly flush with the outer surface of the cap 4, to a second position (Fig. 1b), in which the visor is extracted from the hole 3 provided in the cap and is ready to be rotated, and vice versa. Advantageously for the above purpose, the guiding elements are inclined so as to form a tapering converging towards the rear part of the helmet 1. In other words, whilst the distal portion, with respect to the surface of the cap, of the inclination of the guiding element faces the front part of the helmet, the proximal portion of the inclination faces the rear part of the helmet. The orientation of the inclination of the guiding elements enables the ends of the visor, usually U-shaped in plan view, to be deformed towards the outside of the helmet, under the action of the force of expulsion F, in order to prevent, during rotation of the visor, any interference with the outer surface of the cap.

[0020] In detail, the guiding elements, as may be seen in Figure 2, are represented by two pairs of inclined guides 5 made in two bases 7 positioned on the cap 4 at the side ends of the hole 3 for accommodating the visor 2. Advantageously, the two guides 5, forming a single pair, present the same inclination and are therefore set parallel inside a base 7.

[0021] The slide means 6, which are able to slide with

respect to the guiding elements, each have a plane body 8 that is substantially rectangular, at the ends of which are provided two inclined and parallel connecting surfaces 9, 10 which engage in the guides 5 to enable sliding of the slide means 6.

[0022] In a central position, inside each plane body 8, there is provided a circular seat 11 for a rotating block (not illustrated) which is pivoted in an aperture 12 and to which one end of the visor 2 is connected. Once the visor 2 is extracted from the recess provided in the cap (Fig. 1b), the angular sliding of the block in the circular seat 11 is responsible for the rotation of the visor 2 (Figure 1c) integral thereto. The two guiding elements further comprise elastic means, which are set between the bases 7 and the slide means 6 and are designed to withhold the slide means 6 in the first position, i.e., in the position in which the visor 2 is perfectly set in inside the hole 3, and to favour the thrust of the slide means in the transition towards the second position, i.e., the position in which the visor 2 is extracted from the hole 3 and is ready to be rotated.

[0023] The elastic means are represented, again as may be seen in Figure 2, by a flat spring 13 provided with a plane end 14 constrained in 15 to the slide means 6 and with an end having an undulated profile 16 designed to co-operate with a roller element 17. The undulated profile 16 of the end of the flat spring 13 advantageously has a concave portion 18 and a subsequent convex end portion 19 set towards the inside of the helmet. The concave portion 18 has a curved profile of dimensions such as to enable perfect insertion of the roller element 17. The roller element 17 is constrained, in such a way that it can turn, to the base 7 of the cap 4, in which there are provided the guides 5, and in particular it is positioned in appropriate seats made in a position corresponding to the inclined guide 5 facing the rear part of the helmet 1.

[0024] When the visor 2 is set in, the roller element 17 is housed in the concave portion 18 and acts as a retaining element between the slide means 6 and the guiding element; next, under the action of the force of extraction F applied to the visor 2, the slide means 6 starts to slide on the guiding element, and the end of the flat spring 13 slides on the roller 17, which rotates on itself and acts as a retaining element until the roller 17 passes the centre of the convex portion 19. In this condition, the undulated profile is compressed and pushes against the roller element 17, facilitating sliding of the slide means 6 on the guiding element, and consequently expulsion of the visor 2.

[0025] In an alternative embodiment, not illustrated, the elastic means are still constituted by a flat spring 13, which is set between the base 7 and the slide 6 and has the same purposes as in the embodiment already described. The flat spring 13 is again provided with a plane end and an end with undulated profile, but in this embodiment the plane end is constrained to the base 7, and the end with undulated profile co-operates with a

special follower element or projection having a cam profile, which replaces the roller element 17 and is made on the bottom surface of the slide element 6. The spring again works in bending and performs the same functions. Advantageously, in this version the encumbrance is minimal on account of the absence of the roller 17 and of the fact that the lateral undercuts or areas of removed material, which hitherto were present on the outer surface of the cap 4 for accommodating, in the visor-closed position, the free end 16 of the spring 13, are no longer required.

[0026] As has already been said, the expulsion of the visor 2 from the special recess or hole 3 made in the cap 4 requires the inclined guiding elements to be set and constrained in a position corresponding to the side ends of the visor 2 and requires a force of expulsion F applied to the visor 2. In the preferential embodiment illustrated in Figures 1-4, this force is generated by an extractor ensemble.

[0027] The extractor ensemble, as may be seen more clearly in Figures 3 and 4, comprises a bridge-type lever 20 provided with an L-shaped profile, which has at its bottom ends 21 hinges 22 designed to constrain, in such a way that it can turn, the lever 20 to a support, herein-after referred to as muzzle 37, of the helmet 1. The muzzle 37 is anchored to the chin-piece of the helmet at its front end. The rotation of the lever 20 about the hinges 22 brings the projecting top end 23 to come into contact with an internal portion of the visor so as to exert on the latter a pressure sufficient for its extraction.

[0028] In order to compress the end 23 of the lever 20 against the internal portion of the visor 2, so as to generate a force sufficient for extraction thereof, the extractor ensemble is further provided with elastic means, and in particular with a pre-compressed helical spring (not visible in the figure) set between the lever 20 and a portion of the chin-piece of the helmet.

[0029] In particular, provided for the helical spring, on the rear portion of the top end 23 of the lever 20, i.e., on the portion facing the inside of the helmet 1, is a special housing 24, and an opposed housing (not illustrated) is made on the outer surface of the chin-piece, namely on the surface of the chin-piece which is turned towards the outside of the helmet 1 and faces the muzzle 37.

[0030] The lever 20 is then completed by two contrast elements 25, projecting from the lever 20, for a release device of the helical spring. The pre-loaded helical spring, if left free to act, would bring the top end 23 of the lever 20 into contact with the visor 2, and in particular with one of its internal portions for exerting the force sufficient for generating extraction of the visor 2 from the recess provided; for this reason, the helical spring is forced in a loaded condition by a release device, and consequently the top end 23 of the lever 20 is away from the visor and is inclined towards the inside of the helmet.

[0031] In the preferred embodiment illustrated in Figures 1-4, the release device is nothing but a slider 26 able to translate vertically between a first position, in

which it withholds the contrast elements 25 projecting from the lever 20 to prevent expansion of the helical spring, and a second position, in which, leaving free the contrast elements 25, it enables expansion of the helical spring, and consequently rotation of the lever 20. The expansion of the helical spring and the consequent rotation of the lever 20 enable the top end 23 of the lever 20 to enter into contact with the visor 2 and to exert on the latter the force necessary for its extraction.

[0032] The slider 26 is provided with two sliding pins 27 which project internally from a window 28 made on the slider 26. The pins 27, which engage guides 29 made on a lever-type button 30, are responsible for the vertical translation of the slider 26 with respect to the contrast elements 25.

[0033] The slider 26 is further engaged underneath by a further pin 31, with an elastic means, such as a second helical spring (not illustrated), which works by expanding to keep the slider 26 translated upwards and engaged with the projecting contrast elements 25 of the lever 20.

[0034] The slider 26 is also provided with a safety catch 32 projecting from its top end and designed to withhold the visor 2, up to the moment in which the pins 27 have completed their travel inside the guides 29, in order to prevent premature and/or undesired expulsion of the visor 2 from the special recess provided in the cap 4.

[0035] The release device is operated by a lever-type button 30: the pressure exerted on the portion 33 of the button 30 enables sliding of the pins 27 inside the guides 29 made on the sides of the lever-type button 30, and consequently translation downwards of the slider 26 so as to free the contrast elements 25 that withhold the helical spring in a condition of loading. The helical spring, which is now free to expand, causes the top end 23 of the lever 20 to rotate and brings it into contact with an internal portion of the visor 2 so that the said end 23 can exert the force of extraction necessary for extracting the visor 2 from the recess provided in the cap 4.

[0036] In detail, the lever-type button 30 is provided with a substantially wedge-shaped head 34, as may be seen in Figure 4, designed to be inserted into the window or slot 28 made on the slider 26, and an elongated body 35, which is provided at its bottom end with a hinge 36, the axis of rotation of which, once the device is mounted, is coaxial with the axis of rotation of the hinges 22.

[0037] The slide guides 29 made on the outer sides of the wedge-shaped head 34 are inclined and define a reversible travel for the pins 27. The position of start of travel, located towards the top part of the wedge-shaped head, corresponds to the position of the slider 26 that withholds the contrast elements 25 projecting from the lever 20, and the position of end of travel, located in the bottom part of the wedge-shaped head 30, corresponds to the position of the slider 26 that leaves the contrast elements 25 free.

[0038] Advantageously, the inclination and length of the travel of the guides 29 are such as to enable a delay in the expulsion of the visor, the said delay resulting in the engagement of the catch 32 with the visor 2.

[0039] In the preferred embodiment illustrated in Figures 1-4, the extractor device is mounted on the muzzle 37 anchored to the chin-piece of the helmet; however, it would in any case be possible to install it directly on the chin-piece of the helmet 1 without departing from the scope of protection of the present invention.

[0040] In detail, the extractor device is mounted on the internal portion of the muzzle 37 (illustrated in Figure 5), which for this purpose is provided with hinging seats 38, which are designed to enable coaxial rotation of the lever 20 and of the lever-type button 30 about the hinges 22 and 36, as well as with guides 39 for vertical translation of the slider 26, and with a central cross member 40, which determines the end of travel of the lever 20 during its rotary movement towards the visor 2. On the internal portion of the muzzle 37 there is further present a seat 41, set opposite to the pin 31, for the spring provided for vertical translation of the slider 26.

[0041] As an alternative to the extractor ensemble just described, it would be possible to provide the helmet 1 with any device able to exert a force of thrust on the visor 2 directed towards the outside of the helmet, designed to extract the visor from the recess provided in the cap. In an essential embodiment, without departing from the scope of the present patent, the extractor ensemble could be represented by a cavity made in the muzzle of the helmet, designed to enable insertion inside it and underneath the visor of at least one finger so that the motorcyclist can exert on the visor the necessary force of extraction manually.

[0042] Once the visor 2 has been extracted and rotated upwards (Fig. 1c), to bring it back into the closed condition it will be sufficient to rotate it and bring it back to the hole 3 (Fig. 1b). In this situation, by exerting manually a force on the visor directed towards the inside of the helmet, it will immediately be possible to overcome the resistance of the lever 20 and of the corresponding helical spring provided on it and bring back the visor 2 into the closed position on the hole 3 (Fig. 1a). This action will be further facilitated by the action of the second helical spring engaged in the pin 31 which tends to translate the slider 26 upwards in engagement with the projecting contrast elements 25 of the lever 20.

Claims

1. A device for extraction and rotation of a visor for helmets comprising a cap, a hole made in the cap, in which there may be positioned, so that it is perfectly set in, a visor, and means for expelling the visor, said device being **characterized in that** said expulsion means comprise an extractor ensemble designed to enable application of a force of thrust on

the visor directed towards the outside of the helmet, and at least two inclined guiding elements, set at the side ends of the hole, and designed to engage slidably at least two slide means connected to the visor for enabling translation of said slide means from a first position, in which the visor is set in inside the hole, to a second position, in which the visor is extracted from the hole and is ready to be rotated, and vice versa.

2. The device for extraction and rotation of a visor according to Claim 1, **characterized in that** said inclined guiding elements form a tapering converging towards the rear part of the helmet.

3. The device for extraction and rotation of a visor according to any one of the preceding claims, **characterized in that** said two slide means are each connected to one side end of the visor by means of rotating blocks housed in such a way that they can turn on said slide means.

4. The device for extraction and rotation of a visor according to any one of the preceding claims, **characterized in that** said two guiding elements comprise elastic means, which are set between said guiding elements and said slide means and are designed to withhold the slide means in said first position, in which the visor is perfectly set in inside the hole, and to favour the thrust of said slide means in the transition towards said second position, in which the visor is extracted from the hole and ready to be rotated.

5. The device for extraction and rotation of a visor according to Claim 4, **characterized in that** said elastic means comprise at least one flat spring provided with an end having an undulated profile designed to co-operate with a follower element, said flat spring being constrained on the guiding element and said follower element being constrained on the slide means, or vice versa.

6. The device for extraction and rotation of a visor according to any one of the preceding claims, **characterized in that** said extractor ensemble comprises a cavity which is made on the chin-piece of the helmet or in a support anchored to the chin-piece of the helmet and is designed to enable insertion inside it and underneath the visor of at least one finger designed to exert a force of extraction on the visor.

7. The device for extraction and rotation of a visor according to any one of the preceding claims from Claim 1 to Claim 5, **characterized in that** said extractor ensemble comprises a lever which is hinged to an internal portion of the chin-piece of the helmet

and/or of a support anchored to the chin-piece of the helmet and is designed to rotate about the point of hinging in order to exert a pressure against at least one internal portion of the visor that is sufficient for the latter's extraction.

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8. The device for extraction and rotation of a visor according to Claim 7, **characterized in that** the lever is connected to elastic means set between said lever and at least one internal portion of the chin-piece and/or of the support anchored to the chin-piece. 10
9. The device for extraction and rotation of a visor according to Claim 7 or Claim 8, **characterized in that** said extractor ensemble comprises a release device designed to enable said elastic means to exert a thrust on said lever. 15
10. The device for extraction and rotation of a visor according to Claim 9, **characterized in that** said release device comprises a slider which is able to translate vertically between a first position, in which it withholds at least one element projecting from said lever to prevent the operation of said elastic means, to a second position in which, leaving free said projecting element, it enables the operation of said elastic means. 20 25
11. The device for extraction and rotation of a visor according to Claim 10, **characterized in that** said slider comprises second elastic means designed to maintain said slide in the position for retaining said projecting element. 30 35
12. The device for extraction and rotation of a visor for helmets according to Claim 10 or Claim 11, **characterized in that** said slider further comprises a safety catch for the visor. 40
13. The device for extraction and rotation of a visor according to any one of Claims 9 to 12, **characterized in that** it further comprises a lever-type button designed to operate the release device. 45
14. The device for extraction and rotation of a visor according to Claim 13, **characterized in that** said lever-type button is hinged coaxially to said lever and has inclined lateral guides designed to engage slidably sliding pins present on said slider. 50

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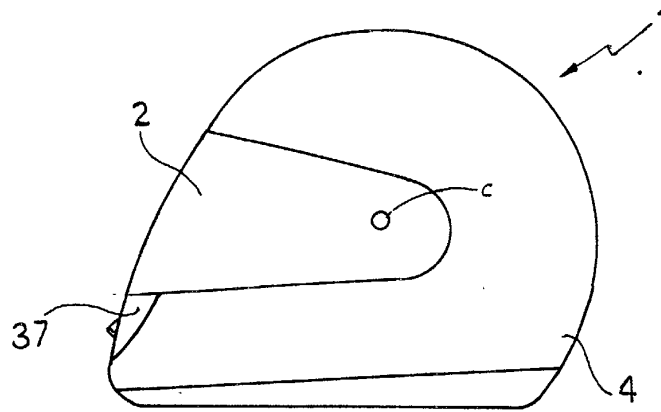


FIG. 1a

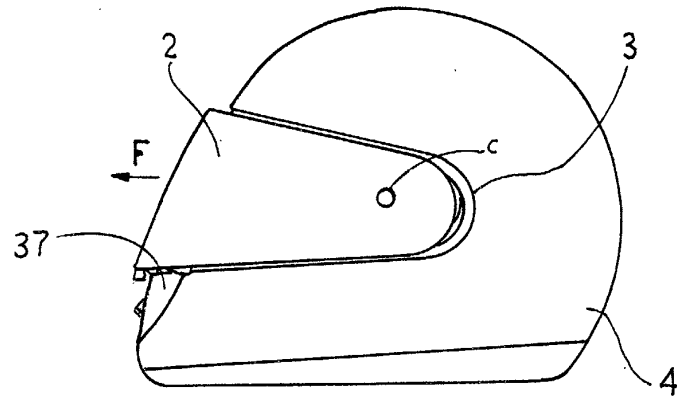


FIG. 1b

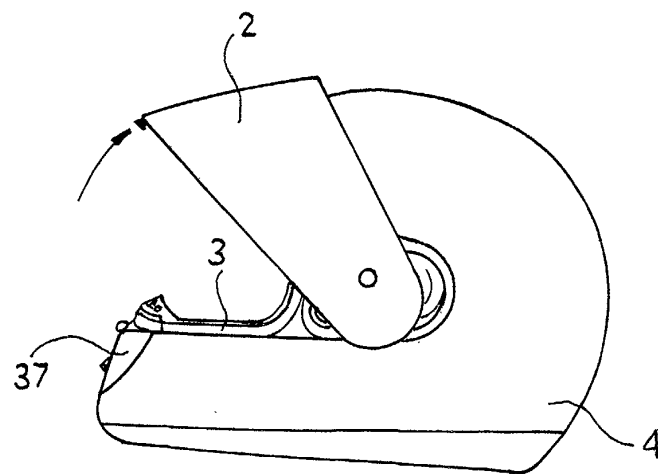


FIG. 1c

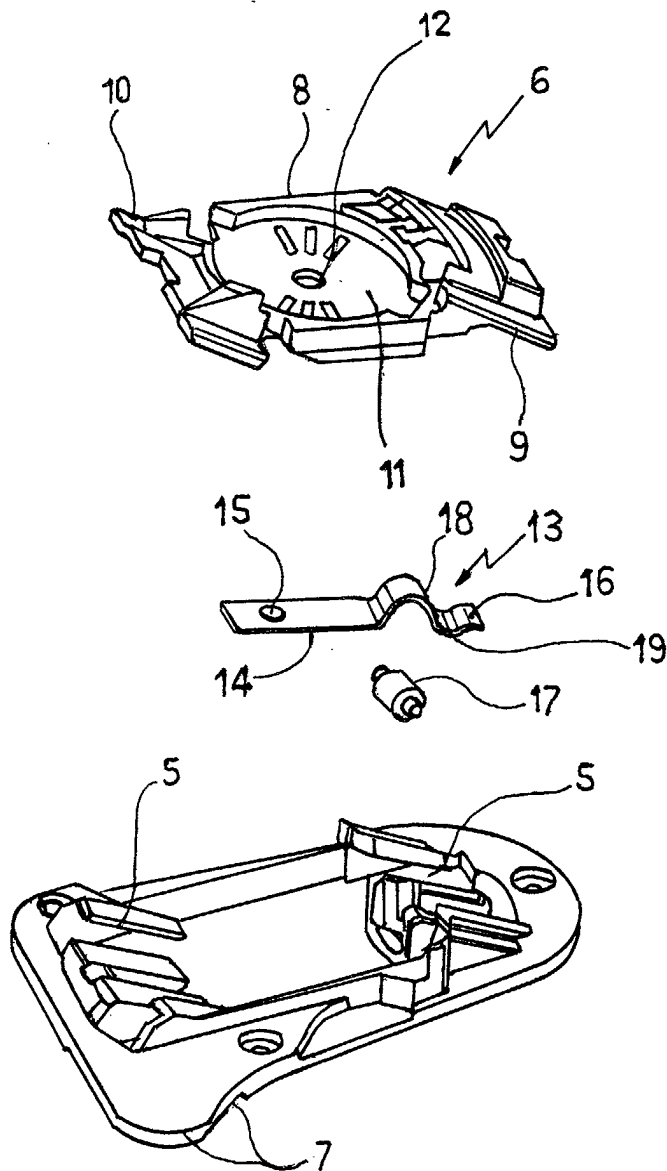


FIG.2

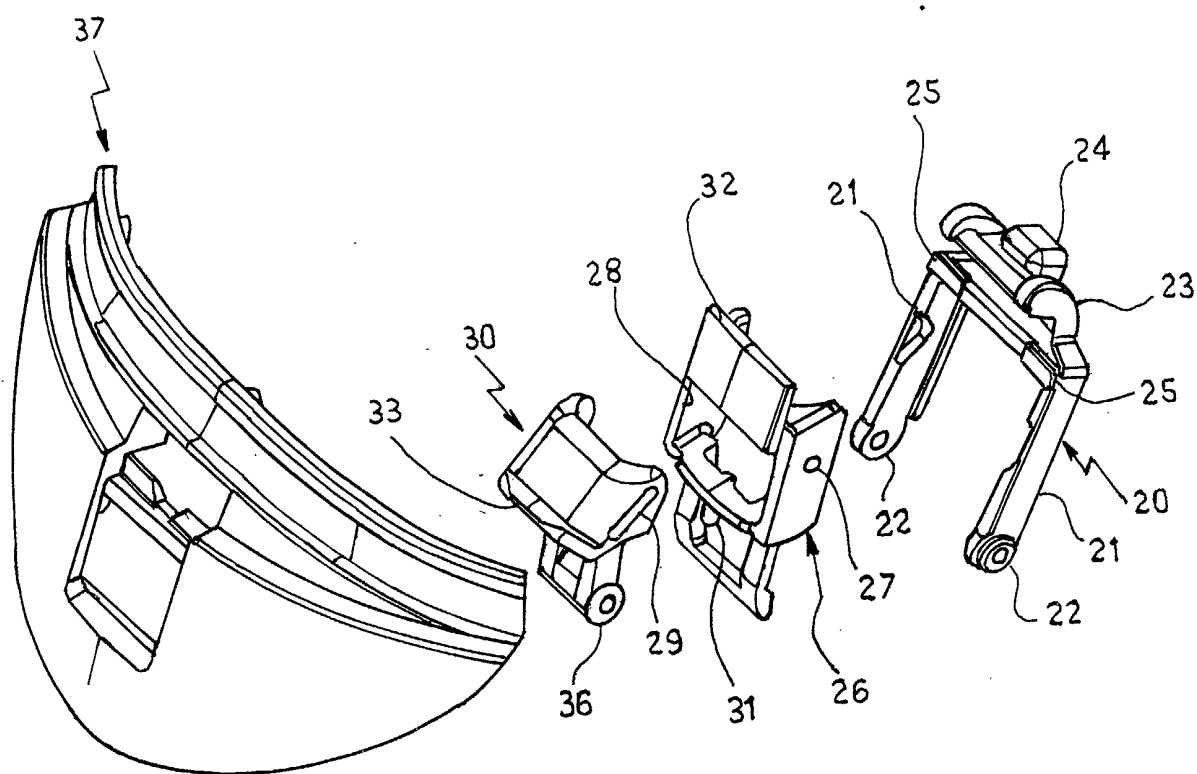


FIG. 3

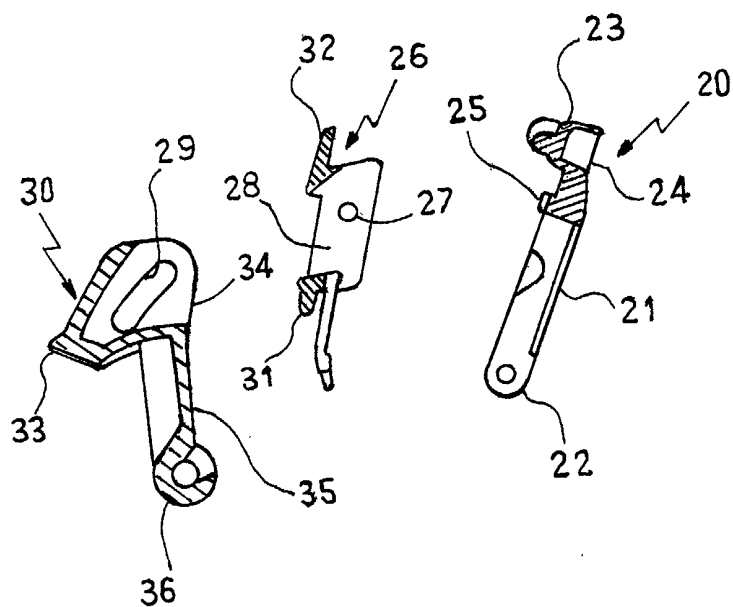


FIG. 4



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EUROPEAN SEARCH REPORT

Application Number
EP 01 83 0587

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)
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The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 12 March 2002	Examiner Bourseau, A-M
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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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 01 83 0587

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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12-03-2002

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