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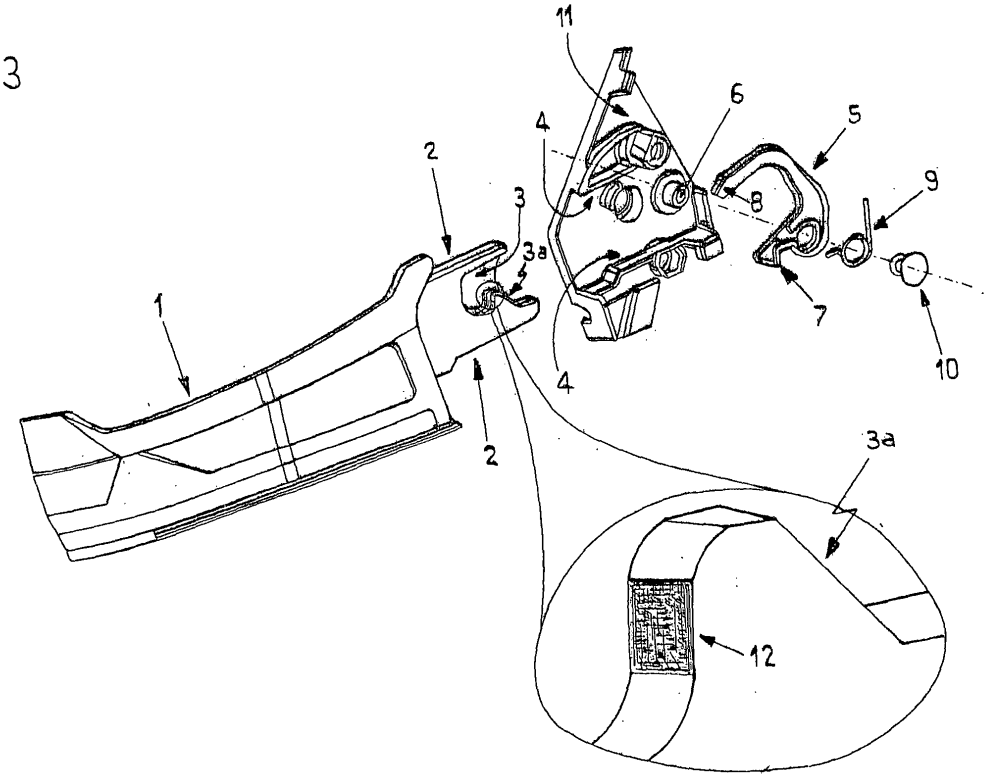
(54) Reversible fastening device for a helmet chinguard

(57) Reversible fastening device of a helmet chin guard (1) for motorcyclist or similar, by snap fit of parts interacting on the two sides of the chin guard (1) and of the helmet, following the insertion, in the operating position, of the chin guard (1) thanks to reciprocally cooperating guides (4), the device comprising, on each helmet side, a hook (3a) belonging to the chin guard and a hook (5) belonging to the helmet, one of which is moveable and subjected to the action of a return spring (9) and it is releasable by a user command, **characterized in that** at least the hook (5) subjected to the action of the return spring (9) is made of metallic material.

Fig.3



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Description

[0001] The present invention refers to a reversible fastening device (i.e. releasable) of a helmet chin guard for motorcyclist or similar.

[0002] The helmets for motorcycle use, or more in general for sport and working uses wherein it is necessary to protect the user head, are becoming more and more perfect and are subjected to stringent regulations guaranteeing their functionalities in every occasion.

[0003] Some of these helmets, specifically designed for motorcycle uses, as afore said, provide an additional protection at the user chin, composed of an arched element, called chin guard, that may be removably applied to the helmet shell.

[0004] Obviously, the chin guard must pass compression and shock resistance tests, but recently it is arisen the need of introducing regulations imposing passing both (static) tensile resistance tests and (dynamic) shock tensile resistance tests, as for example that usually used for checking the closing system for motorcycle helmets wherein the structure, firstly preloaded by a load of at least 5 Kg, is further stressed "tearing" with the force exercised by the falling of a weight of at least 10 kg from a minimum height of 75 cm.

[0005] Such a need of passing the specific tests additional to the compression resistance tests during shocks comes in useful, in addition to increment the general protection of the helmet, to meet the functional requirements of transporting or moving the helmet grabbing it by the chin guard without the risk of easily and accidentally detachment thereof thereby causing the same helmet tumble.

[0006] The need of passing these tensile tests obviously involves the fastening device of the chin guard to the shell, generally operating by snap fit of interacting parts on two sides of the chin guard and shell, because of the operatively insertion of the chin guard by reciprocally cooperating guides. More precisely, a hook belonging to the chin guard and a hook belonging to the shell are provided in every shell side, one of the two hooks being subjected to the action of a return spring for being releasable by user command and moving because of mutual insertion of the two parts to cause a snap fit.

[0007] Examples of such chin guards are provided in the following patent publications: AT 387134, referring to a chin guard sliding on an arched guide and fixable in different positions by insertion of pins elastically mounted in shell seats; DE 10108458, providing different coupling methods to the chin guard, particularly by a hook insertion in an housing applied outside the shell (fig. 10, 11 and 12); DE 10240744, wherein the chin guard exhibits cooperating pins with hooks applied to the shell; EP 97285, wherein the chin guard and the shell have components reciprocally introducible in the chin guard application direction, one of which carries a hook subjected to a spring action; EP 1803361, wherein the chin guard carries a hook cooperating with a pin fixed into the shell.

[0008] In all the embodiments, with others known too, the means for coupling the chin guard to the shell of the helmet are made in plastic material, with the aim of making the helmet as light as possible.

[0009] All these embodiments have been designed evidently with the object only of realizing an easy chin guard application, eventually a sufficient only tensile and shock resistance thereof, or allowing the chin guard removal from the helmet for changing from a full face to a "jet" configuration or, further, aiding the wearing and/or removing steps of the helmet from the head.

[0010] Up to now, no embodiments worried about the tensile and shock resistance in the chin guard removing direction and/or eventually in other transversal directions relatively to the latter, obviously involving the realizing methods of the fastening device.

[0011] That being stated, it is now object of the present invention to realize a reversible fastening device of a chin guard to the shell of a motorcycle helmet, or similar, combining the easy and economic realization and use, the desired features of passing tensile and shock tensile resistance tests.

[0012] According to the invention, the afore said main object is realized by a device as defined in the appended claims.

[0013] The different features of the device will be illustrated referring to a preferred embodiment, shown in the appended drawings, wherein:

- figure 1 is a front three- quarter view of the helmet provided with the removable chin guard in the released position.
- figure 2 is a front three- quarter view of the helmet provided with the removable chin guard in the fastened position.
- figure 3 is a detail of the releasable chin guard part, in the releasing position, and the corresponding reversible fastening device constrained to the helmet shell, with the component details of the present embodiment.
- figure 4 is a detail of the releasable chin guard part, in the coupling position, and the corresponding reversible fastening device fixed to the helmet shell, with the component details of the present embodiment.

[0014] Referring to the appended figures, one of possible embodiments of the present invention will be described according to a preferred embodiment. The described apparatus is a reversible fastening device, by snap fit, of a removable chin guard of a helmet.

[0015] Such a device is intended for providing a stable joint between the helmet and the chin guard being able to withstand to either tensile mechanical stresses, compression mechanical stresses or shocks. In the latter case the protection is obtained thanks to the aid of the usual absorbing means too (not shown in the figures), as a comfort cover realized in deformable expanded ma-

terial having convenient resilient characteristics.

[0016] The device herein illustrated comprises, for each side of the helmet, one shaped plate 11, constrained or made integral with the helmet shell by convenient coupling means not illustrated (such as screw/nut and/or coupling checking elements of different type), every plate 11 including a moveable hook 5, pivoted thereon, as well as parallel guides 4 realised on said plate 11, and designed to be suitable for guiding two complementary and parallel sliding surfaces 2, of which each of the two endings of the chin guard 1 are provided with.

[0017] The moveable hook 5 of every plate 11 is further subjected to the action of a return spring 9 that, as will be clear in the following, aims at biasing the mobile hook 5 in its position of engaging with a corresponding fixed hook 3a, that is provided in the relevant ending of the chin guard 1, when this latter is fitted to the helmet shell.

[0018] The parallel guides 4 are shaped so that to serve as rails for said corresponding sliding surfaces 2, thereby allowing an only translatory motion, in the direction defined by such guides 4, of the afore said endings of the chin guard 1 relatively to the shell of the helmet.

[0019] Further, each plate 11 may provide a stop wall for the corresponding ending of the chin guard 1, placed substantially perpendicularly to the direction defined by the two guides 4, or it is the same helmet shell, which every plate 11 is constrained to, to exhibit - for every plate 11 - a limit stop for the corresponding ending of said chin guard 1.

[0020] Each ending of the chin guard 1, as already mentioned, comprises the aforesaid sliding surfaces 2 and a fixed hook 3a that, in the particular embodiment of the invention herein described, is in the form of a projection defining a housing 3 for the relevant mobile hook 5.

[0021] More in detail, the hook 5 has a coupling head 7 that is suitable to engage the housing 3 of the corresponding ending of the chin guard 1, and the fixed hook 3a has a shape substantially complementary to at least the shape of said coupling head 7 of the mobile hook 5.

[0022] Moreover, the housing 3 of the chin guard 1 provides a sufficient moving space necessary for the coupling head 7 of the hook 5 to move from a blocking position, that is of engagement between the moveable hook 5 and the fixed hook 3a, to a releasing position, that is of disengagement between the coupling head 7 of the mobile hook 5 and the fixed hook 3a.

[0023] It should be noticed that the fixed hook 3a is provided with a surface 12, onto which a corresponding surface (not indicated in the drawings) of the head 7 of the moveable hook 5 rests in the afore said blocking position.

[0024] Such a surface 12, according to a preferred embodiment of the present invention, is realized such that to be disposed along a plane - of mutual support of the hooks 3a and 5 - that is approximately perpendicular to the direction of the guides 4, on which the sliding surfaces 2 of the chin guard 1 slides, or tilted in its upper part - as visible in the figures - towards the same chin guard 1.

[0025] It has further to be noticed that such an insertion guides 4 are extended to at least the reciprocal engagement position of the corresponding moveable hook 5 and fixed hook 3a.

[0026] The geometry of the two hooks, the one placed on the chin guard 3a, and the moveable one 5, placed on the plate 11, is such to reduce to minimum the clearance between the chin guard 1 and the shell.

[0027] In the particular embodiment of the invention, shown in the figures, the moveable hook 5 of each plate 11 is shaped such a lever with two arms, wherein one arm culminates on the afore said coupling head 7 and the other arm presents an operating head 8, intended for protruding externally from the helmet shell (such as it is particularly visible in figures 1 and 2), the two arms pivoting on the plate 11 around a pin 6, acting as the fulcrum of said lever.

[0028] Each moveable hook 5 is thus rotatably pivoted to the pin 6 projecting from the relevant plate 11, and it is held by a rivet 10 or any other mechanical axial holding means, preventing the moveable hook 5 from axially disengaging the corresponding plate 11.

[0029] As already cited, each moveable hook 5 is biased in the engagement position with the fixed hook 3a, when its coupling head 7 is within the housing 3 of the corresponding ending of the chin guard 1, by spring 9 that, in the particular embodiment herein described, is a wire spring 9, conveniently displaced between the coupling head 7 and an apposite checking element obtained over the same plate 11 (see figures 3 and 4).

[0030] The pin 6, as can be seen in figures, is preferably placed in such a position to reduce or nullify possible torques (moments) acting in the opposite direction to the clamping torque exercised by the spring 9 and rising because of possible tractions exercised on the chin guard 1.

[0031] That is, in the particular embodiment of the invention herein shown, the base of the pin 6 lies on a straight line, basically orthogonal to the axis of the same pin 6, passing through the afore said surface 12 of the fixed hook 3a.

[0032] Advantageously, the moveable hook 5, for realizing the resistance and the friction increasing in contact with the fixed hook 3a, usually obtained from plastic material, is realized in metallic material, preferably in die - cast aluminum.

[0033] In alternative embodiments of the present invention, herein not shown, the fixed hook 3a may be, at least partially, realized in metallic material, or both fixed and moveable hooks 3a, 5 may be obtained in metallic material, for example aluminum.

[0034] Finally, both the coupling head 7 of the moveable hook 5 and the corresponding ending of the chin guard 1, may be conveniently shaped such that the engaging/blocking step of the moveable hook 5 with the fixed hook 3a would occur during the insertion of the chin guard 1, guided, thanks to the surfaces 2 of the chin guard 1, along the guides 4 without the necessary activation, by the user, of the operating head 8 of the same mobile

hook 5.

[0035] The hook 5 with the corresponding pin 6, around which it rotates, are designed such that the coupling of the chin guard 1 to the helmet shell will occur when the endings of the same chin guard 1 are in proximity, or reach, their stops.

[0036] Each ending of the chin guard 1, thanks to its sliding surfaces 2, moving forward the guide 4 of the corresponding plate 11, will arrive to block when reaching the afore said limit stop.

[0037] In such a position the chin guard 1 is blocked by the coupling head 7 of the moveable hook 5, having the fulcrum on the pin 6, going to fit into the housing 3 of the ending of the chin guard 1, abutting against the fixed hook 3a.

[0038] In the blocked condition, the position of the moveable hook 5 is maintained by the spring 9, holding the coupling head 7 engaged with the fixed hook 3a, at the surface 12.

[0039] The reversible fastening device, after the insertion and blocking of the chin guard 1, may be unblocked by the user acting, for each ending of the chin guard 1, on the operating head 8 of the moveable hook 5, so that to create a torque able to win the clamping torque exercised by the spring 9, thereby causing the same moveable hook 5, or better the corresponding coupling head 7, to disengage from the fixed hook 3a from the housing 3 of the ending of the chin guard 1 and in this way rendering the chin guard 1 free to translate along the adapted guides 4 until the release.

[0040] Such an embodiment is able to absorb the transversal stresses relatively to the chin guard guides, thanks to the same guides 2, 4 and to the moveable hook 5, that may exhibit a surface preferably having such a roughness to increase the friction between the same hook 5 and the chin guard 1, with the scope to reduce the hook movement under tensile effect. Such transversal movements may be limited by a conveniently shaped shell structure too, in addition to apposite and possible additional guides (herein not illustrated).

[0041] For example, the shell may be provided with inner ribs, parallel to the guides 4 of the plate 11, coupling with some non - null clearance to the surface of the endings of the chin guide 1, such that to accommodate possible deformations therein, transversally to this plane during the stress application.

[0042] It has to be noticed that the chin guard is further designed to resist to longitudinal stresses both in compression, thanks to the afore said limit stop, and in tensile stresses, thanks to the moveable hook 5 acting on the fixed hook 3a, to the geometry of the reversible fastening device and the corresponding used materials.

[0043] The reversible fastening device according to the present invention may both be comprised in an independent package, but advantageously constrained in the helmet shell accommodating it, be wholly or partially part of the same helmet structure.

[0044] The so far described device is further **characterized in that** the holding means, provided in the endings of the chin guard in the assembled condition, are placed inside the shell.

Claims

1. Reversible fastening device of a helmet chin guard (1) for motorcyclist or similar, by snap fit of parts interacting on the two sides of the chin guard (1) and of the helmet, following the insertion, in the operating position, of the chin guard (1) thanks to reciprocally cooperating guides (2, 4), the device comprising, on each helmet side, a hook (3a) belonging to the chin guard and a hook (5) belonging to the helmet, one (5) of which is moveable and subjected to the action of a return spring (9) and it is releasable by a user command, **characterized in that** at least the hook (5) subjected to the action of the return spring (9) is made of metallic material.

2. Device according to claim 1, **characterized in that** the hook (5) subjected to the action of the return spring (9) is assembled on the helmet.

3. Device according to claim 1 or 2, **characterized in that** the metallic hook (5) is made of die - cast aluminum.

4. Device according to claim 1 or 2, **characterized in that** the moveable hook (5) exhibits at least one its surface frictionally resting on a surface (12) of, or integral with, the fixed hook (3a).

5. Device according to claim 1 or 2, **characterized in that** in the operating position the two hooks (3a, 5) exhibit a reciprocal support plane that is substantially perpendicular to the direction of the chin guard insertion.

6. Device according to claim 1 or 2, **characterized in that** in the operating position the two hooks (3a, 5) exhibit a reciprocal support plane that is tilted forwardly, in the chin guard direction, from the base of the hook (3a) applied on the chin guard towards its free ending.

7. Device according to at least one of the preceding claims, **characterized in that** the insertion guides (2, 4) for reciprocally sliding between the chin guard (1) and the shell extend at least to the place of the corresponding hooks (3a, 5).

8. Device according to claim 5, **characterized in that** the insertion guides (2, 4) are dimensioned for reciprocally sliding with a minimum clearance in the direction perpendicular to the sliding direction, reducing to the minimum the clearance of the hooks (3a,

5) coupled in the reciprocal support plane.

9. Device according to at least one of the preceding claims, **characterized by** providing means for holding the chin guard endings in the assembled condition inside the shell, adapted to prevent any reciprocal clearance in the direction perpendicular to the coupled surfaces.

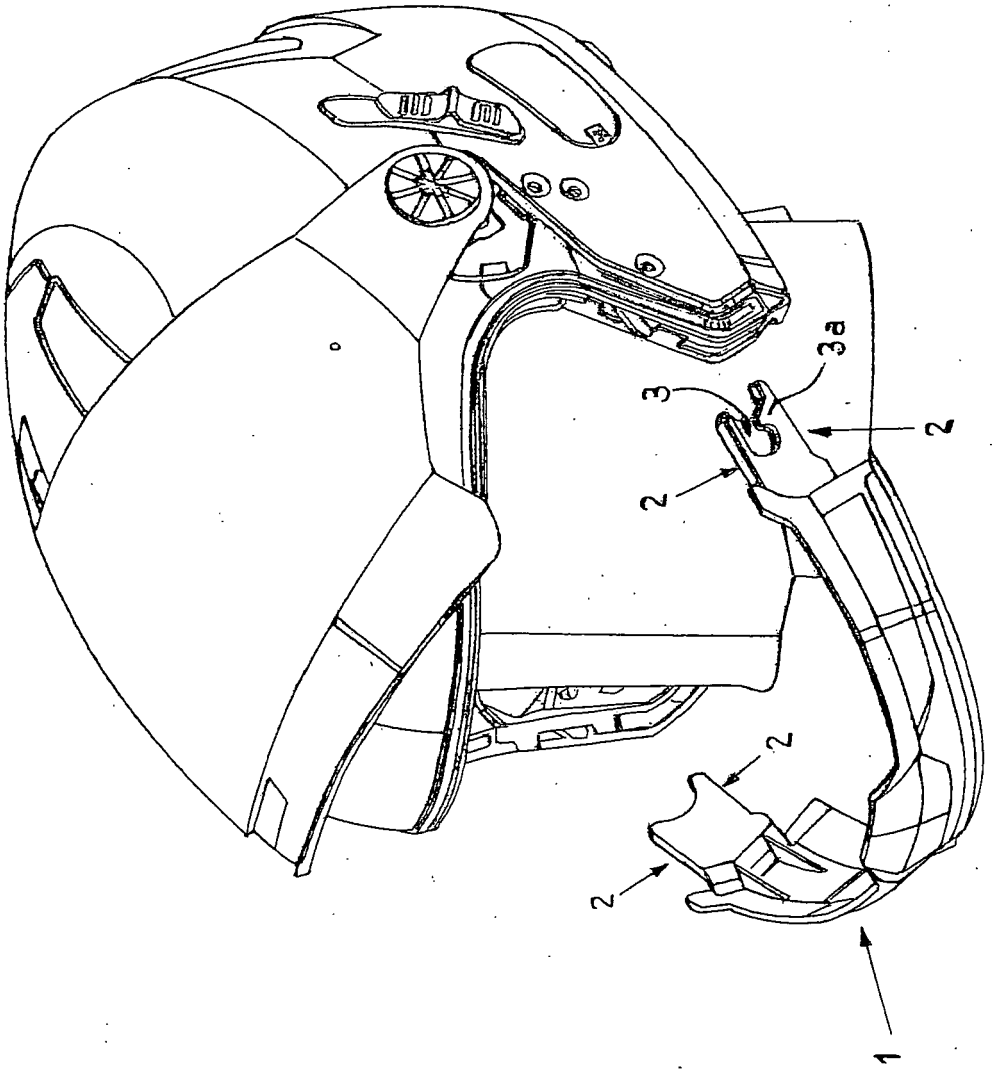

Fig.1

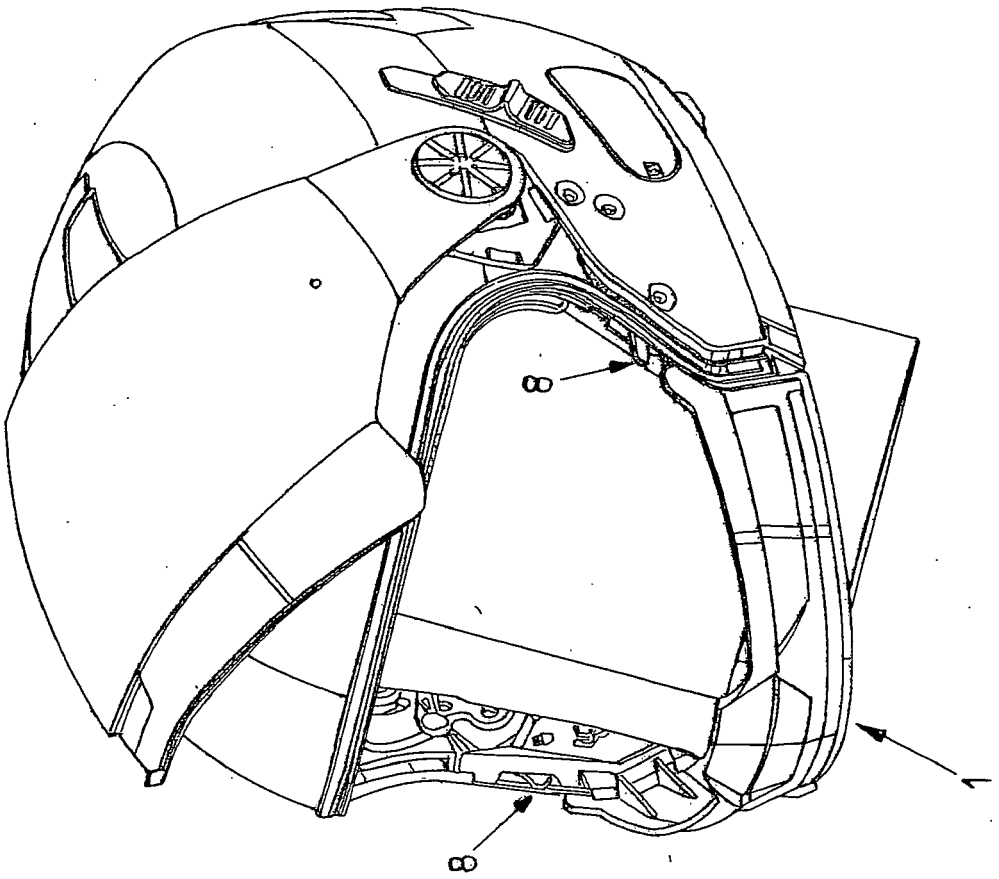

Fig. 2

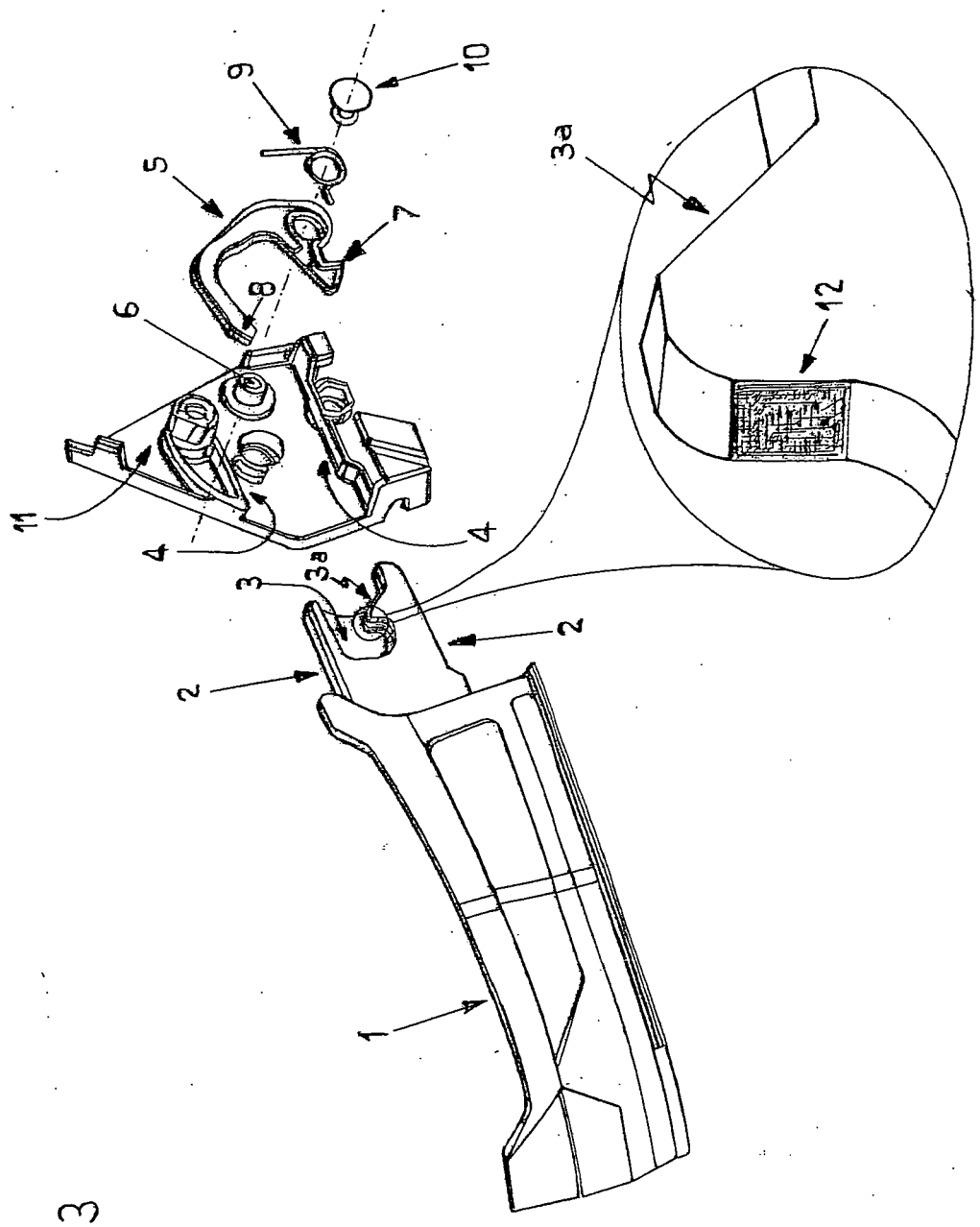

Fig.3

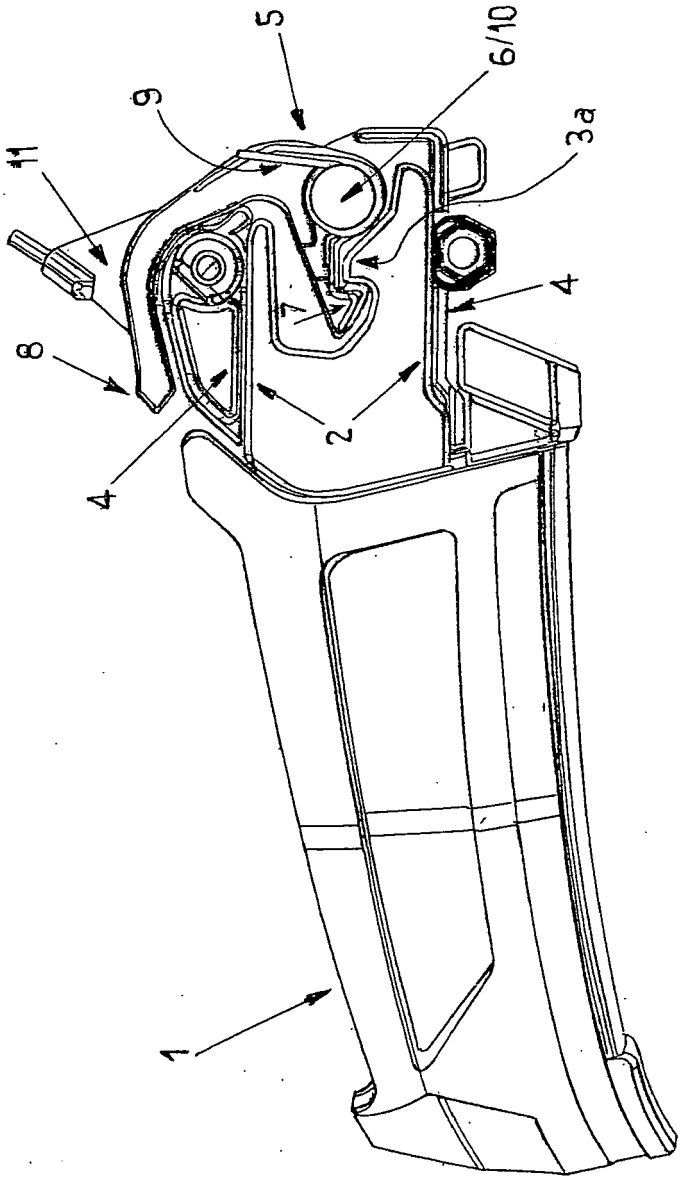

Fig. 4

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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- DE 10108458 **[0007]**
- DE 10240744 **[0007]**
- EP 97285 A **[0007]**
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