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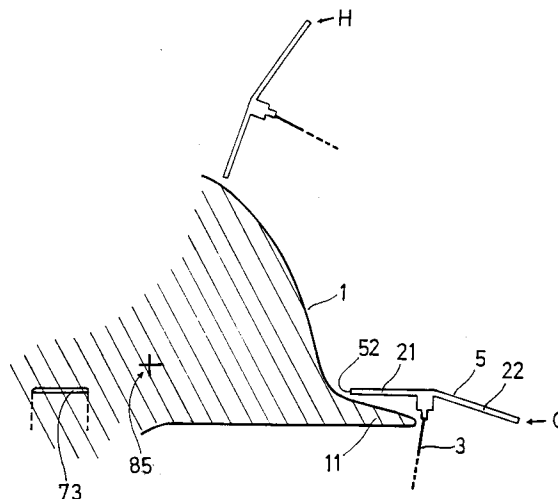
(71) Applicant: **PELTOR AB**
Box 2341
S-331 02 Värnamo(SE)

(72) Inventor: **Palmaer, Leif**
Kristinagatan 14
S-331 41 Värnamo(SE)

(74) Representative: **Barnieske, Hans Wolfgang**
c/o H.W. Barnieske Patentbyrå AB
P.O. Box 25
Turingegatan 26
S-151 21 Södertälje 1 (SE)

(54) **Visor for safety helmets.**

(57) A visor for safety helmets comprises a shield (3) mounted in a frame (4) and attaching means for attaching the visor to a safety helmet (1) and a non-transparent shield holder (5) to which the shield (3) is removably attached. The holder (5) comprises an interconnecting portion (22), a frontal bill portion (20), an interconnecting portion, a rear bill portion (21), and two supporting arms (60,61), arranged for hinged and removable attachment to a safety helmet (1) provided with a frontal guard portion (11). The visor is arranged movably between a protecting position (G) and a non-protecting position (H) and temporarily can be held in either position, the rear bill portion (21) of the holder (5) essentially superimposing the frontal guard portion (11) of the helmet when in the protecting positions (G).

*Fig. 4***EP 0 572 760 A1**

The invention relates to a visor for safety helmets, particularly for safety helmets for persons working in an environment rich in light, airborne, medium-size airborne particles, comprising a shield assembly including a substantially transparent shield mounted in a frame, and further comprising attaching means for attaching the visor to a safety helmet.

Visors of the above-mentioned kind are preferentially used in situations where light particles of medium size, that is, particles with a diameter of between about 0,3 to about 3,0 mm, constitute a major fraction of total airborne material. In the present context, the combination of "light" and "airborne" denotes particles that are being kept airborne for a while, especially when supported by moderate air movements or turbulence. Such particles will generally have a specific weight or, if of a porous or similar nature, an apparent specific weight of less than 1. Saw dust is a good example for a material rich in such particles.

Visors protecting the eyes against particles of the aforementioned kind comprise a substantially transparent shield made of a close-meshed net arranged within a frame. Under most working conditions, the meshes of the net do not substantially impede the view of the bearer. This, however, does not hold true for certain conditions, for example conditions with lighting by a light source placed above and slightly in front of the bearer. Under such conditions, light reflection by the net becomes a nuisance that may be aggravated by other factors, such as rainy weather or humid conditions in general, light reflection by a wet shield net being substantially larger than by a dry one. Humidity also promotes adherence of particles to the net and, thus, further reduces visibility.

The object of the present invention is to provide an improved visor for safety helmets of the aforementioned kind that substantially reduces light-reflection problems.

According to the invention, this object is met by a visor for safety helmets of the aforementioned kind, which visor comprises an essentially non-transparent shield holder to which the shield assembly is removably attached, said holder comprising an interconnecting portion having essentially the horizontal extension of a portion of a circular band, a frontal bill portion projecting generally forwardly from the interconnecting portion, a rear bill portion projecting generally backwardly from the interconnecting portion, and two supporting arms, one each joined to and extending from either end of the interconnecting portion, said supporting arms being arranged for hinged and removable attachment to a safety helmet provided with a frontal guard portion extending in an essentially horizontal plane, whereby the visor is arranged

movably between a protecting position and a non-protecting position and temporarily can be held in either position, the rear bill portion of the holder essentially superimposing the bill portion at close distance when in the protecting position.

It is preferred for the supporting arms to be arranged in planes essentially perpendicular to the plane defined by the rims of the front bill portion and the rear bill portion, respectively, the planes of the essentially flat front bill portion and rear bill portion being tilted in relation to each other, and the shield having essentially the configuration of a portion of a cylinder mantle, the axis of the corresponding cylinder being arranged about perpendicular to the plane defined by the rims of the front bill portion and the rear bill portion.

It is further preferred for the interconnecting portion to comprise gripping means, particularly gripping means of the snap-in closure type, for gripping and holding the top portion of the shield frame. It is also preferred for the shield to be removably and exchangeably mounted in a frame.

According to an advantageous feature of the present invention, the rim of the rear bill portion of the holder fits the surface of the helmet both in the protecting and the non-protecting position.

According to another advantageous feature of the invention, the means for attaching the visor to the helmet and the hinge means comprise anchoring elements arranged between the respective supporting arm and the respective side wall of the helmet and removably fixed to both, the hinge means also comprising means for temporarily locking the visor in a protecting position and a non-protecting position.

It is also preferred for the means for attaching the visor to the helmet to comprise tongue means of the respective anchoring element for insertion into horizontal slots arranged at the respective lateral wall of the helmet, the tongue means preferably being provided with the male part of snap-in locking means cooperating with a corresponding female part arranged on the inside of the helmet.

According to a particularly advantageous aspect of the invention, the hinge and locking means comprise a wedge-shaped bearing tap portion arranged at an essentially flat lateral surface of the respective supporting arm near the free end of the supporting arm and being fitted into a bearing ring portion having a triangular opening with rounded corners adapted to receive and to hold said bearing tap portion, said bearing ring portion forming part of the anchoring element.

According to another advantageous aspect of the invention, the bearing tap portion includes a circumferential groove for receiving and holding the bearing ring portion.

According to a particularly advantageous aspect of the invention, the shield assembly consists of a mesh of metallic wire or polymer material in a frame.

It is furthermore preferred for the shield assembly to include a curved sheet of translucent plastic material.

Other objects, features, and advantages of the invention will be apparent from a preferred but not limiting embodiment, by reference to which the invention will be explained in more detail, said embodiment being illustrated by a drawing in which is shown by

- Fig. 1 a schematic top view of the visor, with only a portion of the supporting arms shown,
- Fig. 2 a schematic sectional view of the visor shown in Fig. 1, perpendicular to line A - A,
- Fig. 3 a part of Fig. 2, enlarged, showing the interlocking mechanism between shield and shield holder,
- Fig. 4 a schematic partial sectional view of the visor similar to that in Fig. 2, the visor being shown in a protecting position (H) and a non-protecting position (G), in relation to the safety helmet,
- Fig. 5 the hinge and locking means of the right supporting arm, in side view and in a protecting position,
- Fig. 6 the means shown in Fig. 5, in an intermediate position,
- Fig. 7 the means shown in Fig. 5, in a non-protected position,
- Fig. 8 the hinge and locking means in the position shown in Fig. 7, in a sectional view M - M.
- Fig. 6 the hinge means of Fig. 6, disassembled.

A visor for a safety helmet 1 comprises a shield assembly 2 consisting of a shield 3 made of a net of metallic wire with a mesh width (diagonal) of about 1,5 mm embedded in a quadrilateral plastic frame 4 surrounding the net shield 3 and having rounded lower corners, the shield 3 together with the frame 4 having a spatial configuration approximating that of a portion of a cylinder mantle, and a shield holder 5 to which the shield is removably mounted.

Part of the circumference of the helmet 1 is indicated by point-dashed lines D (Fig. 1).

The shield holder 5 is made of a hard but resilient polymer material and is roughly half-moon shaped with an outer rim 51 and an inner rim 52 extending between tips 53 and 54, and, except for what is said below, has a predominantly planar extension which is best approximated by the plane

P (Fig. 2) defined by rims 51 and 52. On the underside of the shield holder 5 two parallel flanges 56, 57, essentially perpendicular to the plane defined by the rear bill portion of the holder 5 and with a narrow groove between them, extend between the tips 53 and 54. The flanges 56, 57 divide the shield holder into a larger frontal bill portion 20 and the smaller rear bill portion 21 and, together with the portion of the holder extending in-between them, define a interconnecting portion 22 joined to the bill portions 20, 21. A mirror plane perpendicular to line A - A in Fig. 1 divides the visor into two symmetric halves.

By designing their respective profiles according to the known snap-in closure principle, as shown in Fig. 3, the two parallel and resilient flanges 56, 57 are arranged for gripping contact with the upper frame rim portion 24 of the shield assembly 2. The upper rim 24 fits into the groove between the flanges 56 and 57. Upon insertion into the groove the rim 24 is locked in place by the locking cooperation of the flanges 56, 57 and the rim 24 profile, as evident from Fig. 3.

The respective upper surfaces of the inner bill portion 21, including that of the interconnecting portion 22, and the outer bill portion 20 are slightly tilted in respect of each other, the tilting angle α being in the order of 5 to 15°; said surfaces meet at a ridge 28 at about center of the shield holder 5.

At its end regions 62, 63 extending for a distance of about 3 cm from the tips 53, 54 the holder 5 is provided with supporting arms 60, 61 extending backwards from the holder 5 and rigidly attached, preferably by moulding the holder 5 and the arms 60, 61 in one single piece, to it at said end regions 62, 63 where the holder 5 has fortified portions B and C, respectively (indicated by point-dashed lines in Fig. 1), the supporting arms 60, 61 with their respective exterior lateral surfaces tangentially joining the outer rim 51. The supporting arms 60, 61 are essentially straight and of moderate width (a few mm) (Fig. 1). For stability reasons their extension (Figs. 5 and 6) in a plane about perpendicular to the plane P defined by the rims 51 and 52 is considerably larger. At their free ends the supporting arms 60, 61 are provided with hinge and locking means (Figs. 5 - 8) arranged for pivoting movement of the visor between a protecting position (G, Fig. 4) and a non-protecting position (H, Fig. 4), and for temporarily locking the visor in the respective position.

Only the hinge and locking means of the right supporting arm 61 is shown in more detail in Figs. 5 to 8. It consists of a bearing tap portion 75 forming part of the free-end portion the supporting arm 61 and of a bearing ring portion 77, 80, 81 forming part of an anchoring element 71. The opening 76 of the bearing ring portion 77, 80, 81 is

about triangular in form and defined by a longer sidewall 77 and two shorter sidewalls 80, 81 of equal length. The corners formed by the longer sidewall 77 and the shorter sidewalls 80, 81 are well rounded.

The wedge-formed bearing tap 75 portion is joined to the flat outer surface at the end region of supporting arm 60 from which it protrudes. It has a flat top surface parallel to the flat surface of supporting arm 60 from which it raises by a few mm. When seen in a direction perpendicular to said flat outer surface of the supporting arm 60, the tap portion 75 has about the form of two hemicircles of different diameter arranged at a distance from each other and symmetrical in respect to a line connecting their centers and with their greatest distance at their intersections with this central line and connected by side lines tangentially joining the respective hemicycle. The smaller hemicycle end of the tap portion 75 is arranged close to the free end of the supporting arm 60 and with said center line having an extension parallel to the edges of the supporting arm. As shown in Fig. 8, the lateral wall of the tap portion 75 is provided with a circumferential groove 79, the inner lateral wall of which coincides with the surface of the supporting arm portion 60 to which the tap portion 75 is joined.

The width of the groove 79 is slightly larger than the thickness of the bearing ring portion 77, 80, 81. The hinge and locking means is assembled by inserting the bearing tap portion 75 in the opening 76 of bearing ring portion 77, 80, 81 and turning the tap portion 75 until it snaps into one of the two stable positions illustrated in Figs. 5 and 7. The hemicurcular (center at point 85) end of the tap portion 75 with the smaller radius will then be fitted into the corner between the shorter sidewalls 80, 81 and the other end of the tap portion 75 will assume a position close to one of the rounded corners (rounded with a radius slightly larger than that of the larger one of the two hemicircles of the tap portion 75) between the shorter sidewalls 80, 81 and the longer sidewall 77, in which position it will be locked. By applying an upward lateral force to the supporting arm 60 either directly or indirectly, e.g. by lifting the visor, the tap portion 75 will turn around the center 85 of the smaller circle defining the wedge tip end of the tap portion 75. This will lead to lateral displacement of the longer sidewall 77 resisting that displacement by a resilient force. When this resilient force has been overcome, the tap portion 75 will be in the unstable position indicated in Fig. 6, that is, with its wedge top end at the center of the longer sidewall 77. Pushing a little further in the aforesaid direction will make it assume the other stable position illustrated in Fig. 7, in which it will be locked.

In a mounted state, the locking and hinge means 70 thus can occupy either of the two stable positions shown in Figs. 5.

The comparatively flat anchoring element 71 is provided with a rectangular tongue 72 for mounting it in a horizontal slot 73 of a vertical pocket (not shown) arranged in the lower part of the right lateral wall of the helmet 1. By adapting the width and the depth of the pocket to the shape of the tongue 72 and by providing the tongue 72 and the pocket 74 with a snap-in design, the visor can be removably fixed to the helmet. Preferably, the tongue 72 is adapted to function as the male part and the pocket 74 to function as the female part of the snap-in connection.

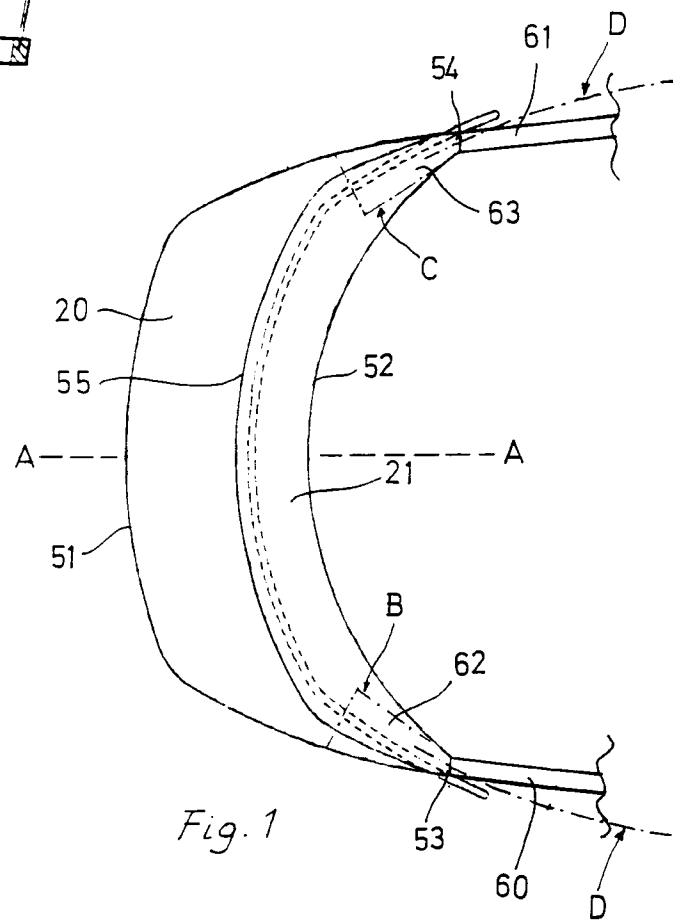
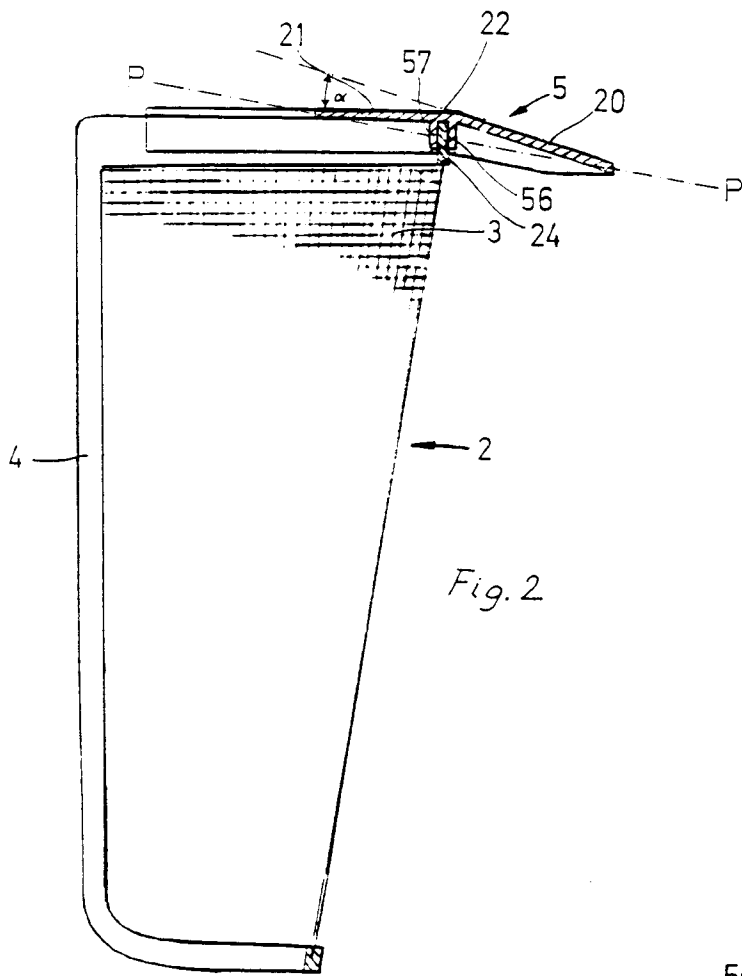
Supporting arm 62 is provided with corresponding hinge and fixation means not shown, mirroring the arrangement illustrated in Figs. 5 - 7.

In Fig. 4 the visor holder 5, (the supporting arms 60, 61 having been excluded for the sake of clarity) is shown in positional relation to the on safety helmet 1 on which it is mounted, the helmet 1 having a front bill portion 11 and being borne by a person with the head in a normal, upright position. In the protecting position G, the inner bill 21 of the visor overlaps the front bill portion 11 of the helmet, thereby preventing airborne particles or light to enter from above between the shield and the face of the bearer. Entrance of water between the bills 11 and 21 can be avoided by arranging a sealing element (not shown) made of, for example, spongy polyurethane rubber, at the underside of bill 21 and parallel to rim 52, thus closing the gap between the bills 11 and 21. Figure 4 also shows that the outer bill 22 is tilting downwards in the protecting position G. As is explained in more detail in connection with the description of the hinge and locking means, a moderate upward pressure on the shield holder 5 or the shield 2 assembly suffices for moving the visor from the protecting position G to the non-protecting position H and to lock it in the latter, each part of the holder and the shield thereby being displaced along circular paths having their center at point 85.

To provide for a good but not abutting fit the negative curved shape of the inner rim 52 of the shield holder 5 is made to correspond about to the positive curved shape of the frontal profile of the helmet 1, the hinge means 70, as well as the corresponding hinge means for the left supporting arm 60, being positioned (center of rotation 85 in Fig. 4) for maintaining said fit in the protecting position G and in the non-protecting position H, thereby minimizing the dimensions of the supporting arms 60, 61 necessary to provide a reliable and safe connection of the visor to the helmet 1.

Claims

1. Visor for safety helmets, particularly for safety helmets for persons working in an environment rich in light, airborne particles of a particle size between 0,3 to 3,0 mm and an apparent specific weight of less than 1, comprising a substantially transparent shield assembly (2) consisting of a shield (3) mounted in a frame (4), and further comprising attaching means for attaching the visor to a safety helmet, **characterized** in that the visor comprises an essentially non-transparent shield holder (5) to which the shield assembly (2) is removably attached, said holder (5) comprising an interconnecting portion (22) having essentially the extension of a portion of a circular band, a frontal bill portion (20) projecting generally forwardly from the interconnecting portion (22), a rear bill portion (21) projecting generally backwardly from the interconnecting portion (22), and two supporting arms (60, 61), one each joined to and extending from either end of the interconnecting portion (22), said supporting arms (60, 61) being arranged for hinged and removable attachment to a safety helmet (1) provided with a frontal bill portion (11) extending in an essentially horizontal plane, whereby the visor is arranged movably between a protecting position (G, Fig. 4) and a non-protecting position (H, Fig. 4) and temporarily can be held in either position, the rear bill portion of the holder (22) essentially superimposing the bill portion (11) at close distance when in the protecting position (G, Fig. 4).
2. Visor according to claim 1, **characterized** in that the supporting arms (60, 61) are arranged in planes essentially perpendicular to the plane defined by the rims (51, 52) of the front bill portion (20) and the rear bill portion (21), respectively, the planes of the essentially flat front bill portion (20) and rear bill portion (21) being tilted in relation to each other, and the shield assembly (2) having essentially the configuration of a portion of a cylinder mantle, the axis of the corresponding cylinder being arranged about perpendicular to the plane defined by the rims (51, 52) of the front bill portion (20) and the rear bill portion (21).
3. Visor according to claim 1 or 2, **characterized** in that the interconnecting portion (22) comprises gripping means (24, 56, 57), particularly gripping means of the snap-in closure type, for gripping and holding the top portion of the shield frame (4).
4. Visor according to any of claims 1 - 3, **characterized** in that the rim (52) of the rear bill portion (21) of the holder (5) approaches the surface of the helmet (1) both in the protecting (G, Fig. 4) and the non-protecting (H, Fig. 4) position to retain a good fit.
5. Visor according to claim 4, **characterized** in that the means for attaching the visor to the helmet (1) and the hinge means comprises anchoring elements (71) arranged between the respective supporting arm (61) and the respective side wall of the helmet (1) and removably fixed to both, the hinge means also comprising means for temporarily locking the visor in a protecting position and a non-protecting position.
6. Visor according to claims 4 or 5, **characterized** in that the means for attaching the visor to the helmet comprises tongue means (72) of the respective anchoring element (71) for insertion into horizontal slots (73) arranged at the respective lateral wall of the helmet (1), the tongue means (72) being provided with the male part of snap-in locking means cooperating with a corresponding female part arranged on the inside of the helmet (1).
7. Visor according to claim 5 or 6, **characterized** in that the hinge and locking means comprise a wedge-shaped bearing tap portion (75) arranged at an essentially flat lateral surface of the respective supporting arm (61) near the free end of the supporting arm (61) and being fitted into a bearing ring portion (77, 80, 81) having a triangular opening with rounded corners adapted to receive and to hold said bearing tap portion (75), said bearing ring portion (77, 80, 81) forming part of the anchoring element (71).
8. Visor according to claim 7, **characterized** in that the bearing tap portion (75) includes a circumferential groove (79) for receiving and holding the bearing ring portion (77, 80, 81).
9. Visor according to any of the preceding claims, **characterized** in that it comprises a shield (3) consisting of a mesh of metallic wire or polymer material in a frame (4).
10. Visor according to any of the preceding claims, **characterized** in that it comprises a shield (3) including a curved sheet of translucent plastic material.



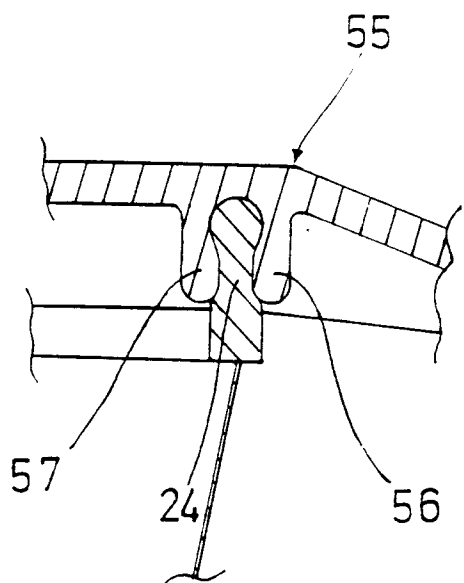


Fig. 3

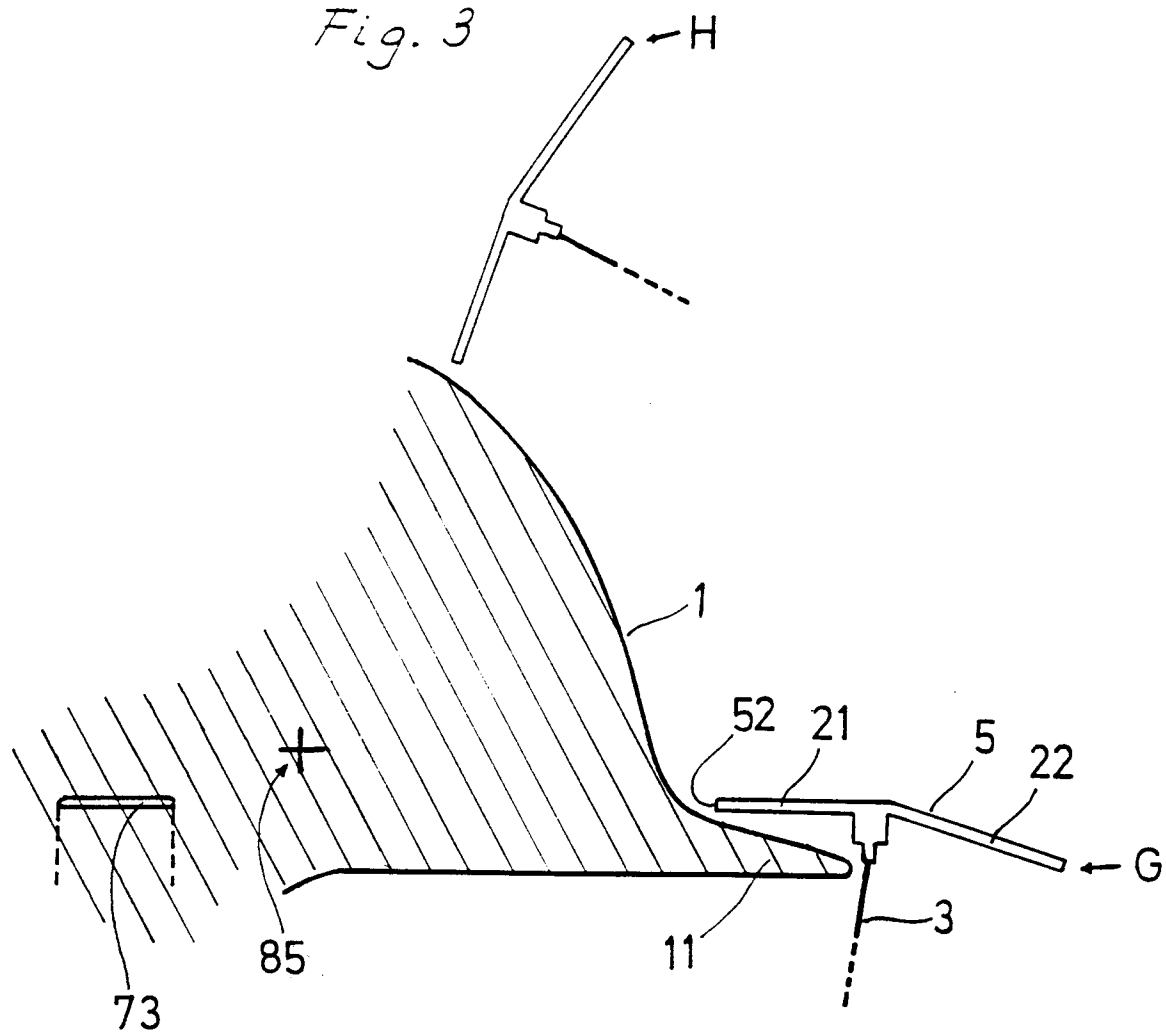


Fig. 4

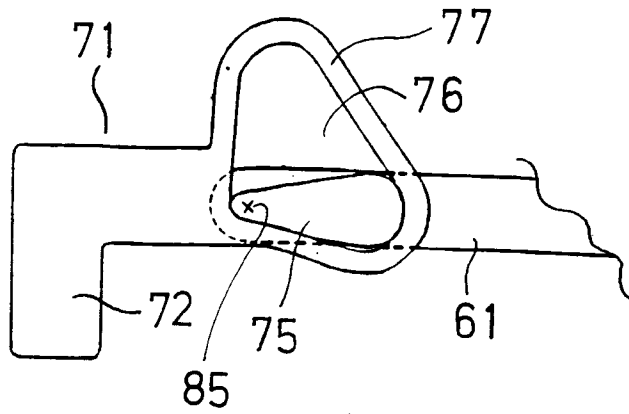


Fig. 5

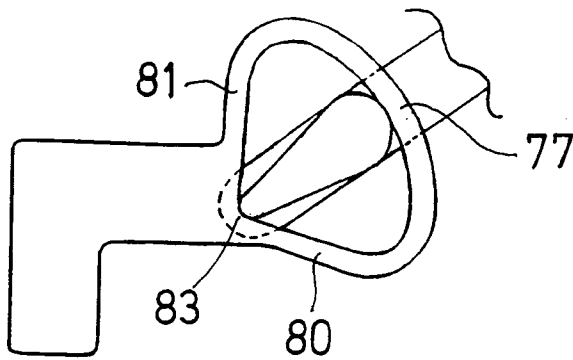


Fig. 6

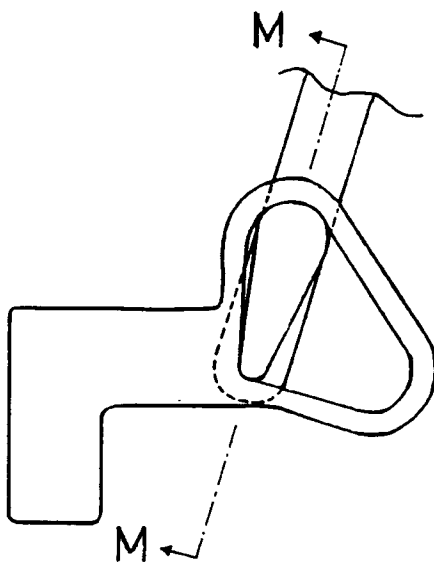


Fig. 7

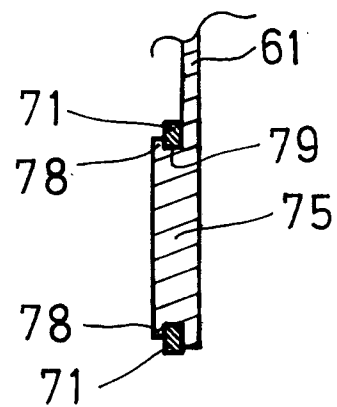


Fig. 8



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EUROPEAN SEARCH REPORT

Application Number

EP 92 85 0130

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.5)
A	DE-U-9 107 264 (OREGON ETABLISSEMENT FÜR PATENTVERWERTUNG) * page 5, last paragraph - page 7, paragraph 1; figures * ---	1,2,4,10	A42B3/22
A	US-A-4 067 065 (P. F. SLOSEK) * column 2, line 18 - column 3, line 3; figures * ---	1,3,4,10	
A	US-A-4 475 254 (W. P. BAY) * column 1, line 39 - line 53 * * column 3, line 3 - line 11 * * figures 1,5 * ---	1,3,10	
A	GB-A-2 015 868 (HELLBERG PROTECTION AB) * page 1, line 83 - page 2, line 3; figures * ---	5,6,9,10	
A	US-A-5 012 528 (M. PERNICKA ET AL.) ---		
A	DE-A-2 317 580 (FONDERMANN & CO) ---		TECHNICAL FIELDS SEARCHED (Int. Cl.5)
A	WO-A-8 603 656 (B. G. LÖNNSTEDT) ---		A42B
A	DE-A-2 659 187 (NORTON CO.) -----		A61F
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 10 FEBRUARY 1993	Examiner BOURSEAU A.M.
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