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(54) **Sliding window pane and carrier combination for a motor vehicle door.**

(57) The combination (1) is constituted by a sliding window pane (2) for a motor vehicle door and a carrier (3) for connecting the window pane (2) to a corresponding drive device. The window pane (2) comprises a through bore (6), and the carrier (3) comprises at least one peg (7) cooperating with said bore (6), and connection means (8) for enabling said carrier (3) to be fixed to a suitable mobile member of said drive device.

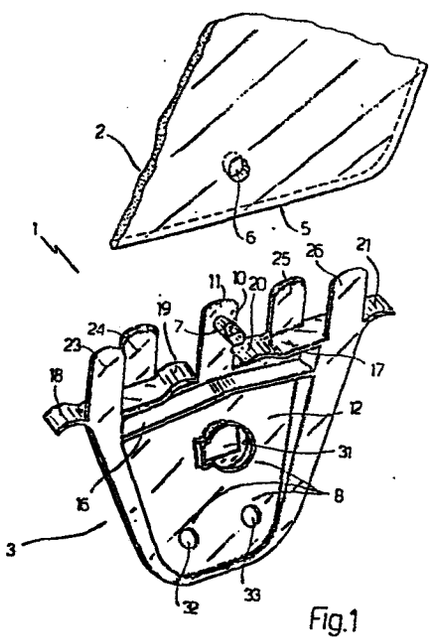

Fig.1

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SLIDING WINDOW PANE AND CARRIER COMBINATION FOR A MOTOR VEHICLE DOOR

This invention relates to a sliding window pane and carrier combination for a motor vehicle door. In particular, the invention relates to an improvement in the system for fixing a sliding window pane of a motor vehicle door to its supporting carrier, which is connected to a suitable drive system.

For sliding the window panes of motor vehicle doors it is known to use special devices which are connected to the window panes by suitable window carriers. The connection between the window pane and carrier is currently effected by friction or by using special adhesives. However, the aforesaid methods for fixing the carrier to the window pane have certain drawbacks. If the fixing is effected by friction, the window pane - carrier combination has to be formed on special benches of the vehicle assembly line, and the position of the carrier on the window pane has to be exactly defined. This leads to a certain time loss because after the window pane - carrier combination has been preassembled on the bench, it has then to be mounted in the door of the said vehicle. A further drawback of this type of fixing is that the force sufficient to detach the window pane from its carrier is fairly small.

If the carrier is fixed to the window pane by adhesive, the most frequently encountered drawbacks are essentially due to the fact that the operations involved in forming the window pane - carrier combination are rather onerous. In this respect, the parts to be joined together have to be carefully cleaned and degreased, and it is very important to define and carefully maintain the position of

the said parts until the adhesive begins to set, and this can require a rather lengthy time period. Provision has obviously also to be made for storing the adhesive. Finally, it has proved rather difficult to replace a broken window pane, and this usually also requires replacement of the carrier.

The object of the present invention is to provide a window pane - carrier combination which obviates the aforesaid drawbacks in an economical manner, is of easy construction, and allows rapid and simple replacement for repair purposes.

Said object is attained according to the present invention by a combination consisting of a sliding window pane for a motor vehicle door and a carrier for connecting said window pane to a corresponding drive device, characterised in that said window pane comprises at least one transverse bore in proximity to its lower edge, and said carrier comprises at least one peg which engages said transverse bore of said window pane, and connection means to enable said carrier to be fixed to a suitable mobile member of said drive device.

The present invention will be more apparent from the description of a preferred embodiment thereof given hereinafter by way of non-limiting example with reference to the accompanying drawings, in which:

Figure 1 is a perspective view from above of a window pane - carrier combination in accordance with the present invention, shown prior to its fixing together;

Figure 2 is an elevational view of the combination of Figure 1, shown fixed together;

Figure 3 is a side view of Figure 2; and

Figure 4 shows the combination of Figure 3, during the fixing together of said window pane and carrier.

In Figure 1, the reference numeral 1 indicates overall a combination formed from a window pane 2 to be slidably mounted in respective guides, not shown, of a motor vehicle door, and a carrier 3 for connecting the window pane 2 to a corresponding drive device, not shown. According to the present invention, the window pane 2 comprises a transverse through bore 6 in proximity to its lower edge 5. Correspondingly, the carrier 3 comprises a peg 7 which when in use engages the bore 6 in the window pane, and also comprises connection means 8 for enabling the carrier 3 to be connected to a suitable mobile member of said drive device.

Examining in detail the structure of the carrier 3, it can be seen that the peg 7 comprises on its upwardly facing part a bevel 10 which facilitates insertion of the peg into the bore 6 of the window pane 2. In addition, the peg 7 projects from the upper end portion of an essentially rectangular lug 11 extending vertically parallel to the lateral surface of the window pane 2 from the body 12 of the carrier 3. With particular reference to Figures 3 and 4, it can be seen that on the opposite side to that carrying the peg 7, the lug 11 comprises a longitudinal reinforcement projection 14. In addition, it can be seen that the lug 7 is elastically deformable in a direction perpendicular to the lateral surface of the window pane 2 to enable the peg 7 to be engaged with the bore 6 of the window pane 2 as stated heretofore (see Figure 4 in particular).

On opposite sides of the support lug 11 for the peg 7, the body 12 of the carrier 3 comprises two flat portions 16, 17 respectively,

from each of which, namely from opposite ends, there extend deformable elements 18, 19 and 20, 21 respectively, which together define a support surface for the edge 5 of the window pane 2. More particularly, the elements 16, 17, 18, 19 are essentially shaped as a circumferential arc and are elastically deformable so as to exert on the lower edge 5 of the window pane 2 an upward pressure (see Figure 2) sufficient to keep the lower surface of the bore 6 of the window pane 2 always in contact with the lower surface of the peg 7 of the carrier 3.

Retention of the window pane 2 against movement in a direction perpendicular to its lateral surface is provided by four vertical lugs 23, 24, 25, 26 extending from the body 12 of the carrier 3 in a direction parallel to the lug 11 which supports the peg 7. In particular, the lugs 23 and 24 extend vertically from opposite sides of the portion 16 of the body 12, and the lugs 25 and 26 extend vertically from opposite sides of the portion 17 of said body 12. As in the case of the lug 11, the lugs 23, 24, 25 and 26 are also elastically deformable (see Figure 4 in particular) to allow insertion or withdrawal of the peg 7 into or from the bore 6 of the window pane 2. All the lugs 23, 24, 25, 26 have their upper edge bevelled to further facilitate insertion of the window pane 2 during its fixing (see for example Figure 4).

Finally, it will be seen that said means 8 for connecting the carrier 3 to the drive device consist essentially of three through holes 31, 32, 33, one of which is suitably profiled (hole 31).

The carrier 3 is conveniently constructed from thermoplastic material by a single moulding operation.

The operations involved in fixing together or separating the window pane 2 and carrier 3 are extremely simple. In this respect it is necessary only to ease outwards the lug 11 carrying the peg 7 and also the lugs 23 and 26 (with reference to Figures 1 and 4) to enable the lower portion of the window pane 2 to be inserted so as to engage the peg 7 in the bore 6 of said window pane 2. In this manner, said window pane is unable to move in a direction perpendicular to its lateral surface as it is retained by the lugs 11, 23, 24, 25 and 26. It is also secured to the carrier 3 by the peg 7, which as shown in Figure 3 is considerably longer than the thickness of the window pane 2. Moreover, as stated heretofore, the tongues 18, 19, 20, 21 define a lower support surface for the edge 5 of the window pane 2 so as to eliminate any vertical play between the window pane 2 and carrier 3.

An examination of the characteristics of the combination 1 constructed in accordance with the present invention emphasises its advantages. Firstly, it can be seen that the window pane and carrier are fixed together rapidly by snap action, by simply using the elastic deformation of the carrier itself and thus without requiring any interposed adhesive element. This is particularly advantageous as it enables the carrier to be fixed to and removed from the window pane without the aid of special tools, which might not always be available during repair work.

When assembly is complete, no component of the normal forces acting on the combination 1 by the sliding of the window pane during vehicle running is sufficient to separate the window pane from its carrier, thus increasing reliability and ensuring the permanency of the

connection.

A further advantage derives from the fact that the connection between the window pane and carrier is elastic to forces acting in planes parallel to the ground, and this enables the window pane to properly absorb manufacturing tolerances, thus ensuring that the guide channels normally located in the vehicle door are alone responsible for guiding the sliding of said window pane.

It is also apparent that the window pane and carrier can be fixed together during the completion of the vehicle door, thus obviating the need to provide the said specific production positions and to stock the aforesaid adhesive.

Finally, it is apparent that modifications can be made to the described combination 1 but without leaving the scope of the present invention. For example, the carrier structure could be extremely simplified by providing only the suitable means for connection to the said drive device, whereas the peg which engages the bore 6 of the window pane 2 could instead of being formed integrally with said carrier be connected to it for example by snap-fitting, or alternatively the fixing could be effected with screws or elements of equal function, ie for retaining the peg in the bore of the window pane. Moreover, the constituent material of the carrier 3 could for example be of reinforced thermoplastic type according to requirements. Finally, the provision of two or more through or blind bores in the window pane 2 for engagement with corresponding pegs provided on the carrier 3 obviously constitutes a solution equivalent to that heretofore described.

PATENT CLAIMS

1. A combination (1) consisting of a sliding window pane (2) for a motor vehicle door, and a carrier (3) for connecting said window pane (2) to a corresponding drive device, characterised in that said window pane (2) comprises at least one transverse bore (6) in proximity to its lower edge (5), and said carrier (3) comprises at least one peg (7) which engages said transverse bore (6) of said window pane (2), and connection means (8) to enable said carrier (3) to be fixed to a suitable mobile member of said drive device.

2. A combination as claimed in claim 1, characterised in that said transverse bore (6) is a through bore.

3. A combination as claimed in claim 1 or 2, characterised in that the length of said peg (7) is greater than the thickness of said window pane (2).

4. A combination as claimed in any one of the preceding claims, characterised in that said peg (7) comprises, on its end portion, a bevel (10) for facilitating the insertion and withdrawal of said peg (7) into and from the bore (6) of said window pane (2).

5. A combination as claimed in any one of the preceding claims, characterised in that said peg (7) is carried by a corresponding lug (11) extending from the body (12) of said carrier (3).

6. A combination as claimed in claim 5, characterised in that said support lug (11) for said peg (7) is elastically deformable in a direction perpendicular to that lateral surface of said window pane (2) which faces it.

7. A combination as claimed in claim 5 or 6, characterised in that said lug (11) comprises a reinforcement projection (14) on

that side opposite the side from which said peg (7) extends.

8. A combination as claimed in claim 7, characterised in that said reinforcement projection (14) extends essentially in a longitudinal direction along said lug (11).

9. A combination as claimed in any one of the preceding claims, characterised in that said carrier (3) comprises portions (16, 17) arranged to define a support surface for said lower edge (5) of said window pane (2).

10. A combination as claimed in claim 9, characterised in that said portions (16, 17) are two in number and essentially disposed on opposite sides of said peg (7); each said portion (16, 17) comprising at its ends two respective elastically deformable elements (18, 19; 20, 21) arranged to define said support surface for the lower edge (5) of said window pane (2).

11. A combination as claimed in claim 10, characterised in that said elastically deformable elements (18, 19; 20, 21) are essentially of semicircular arc shape.

12. A combination as claimed in any one of the preceding claims, characterised in that said carrier (3) comprises positioning means (23, 24, 25, 26) for preventing movement of said window pane in a direction perpendicular to its lateral surface.

13. A combination as claimed in claim 12, characterised in that said positioning means (23, 24, 25, 26) are essentially constituted by auxiliary lugs extending from said carrier parallel to the surfaces of said window pane (2) and on opposite sides of this latter.

14. A combination as claimed in claim 13, cahracterised in that said auxiliary lugs (23, 24, 25, 26) are elastically deformable in

a direction essentially perpendicular to the lateral surface of said window pane (2).

15. A combination as claimed in claim 13 or 14, characterised in that each said auxiliary lug (23, 24, 25, 26) comprises a bevelled upper edge on the side facing said window pane (5).

16. A combination as claimed in any one of the preceding claims, characterised in that said means (8) for connecting said carrier (3) to the mobile member of said drive device consist essentially of through holes (31, 32, 33).

17. A combination as claimed in any one of the preceding claims, characterised in that said carrier (3) is formed by a moulding operation.

18. A combination as claimed in any one of the preceding claims, characterised in that said carrier (3) is constructed of thermoplastic material.

19. A combination as claimed in any one of the preceding claims, characterised in that said peg (7) is rigid with said carrier (3).

20. A combination as claimed in any one of the preceding claims, characterised in that said peg can be secured to said window pane by screws or similar fixing means.

21. A combination as claimed in any one of claims 1 to 18, characterised in that said peg (7) constitutes a separate element connected to said carrier (3).

22. A combination as claimed in claim 21, characterised in that said peg constituting a separate element is connected to said carrier by snap-connection means.

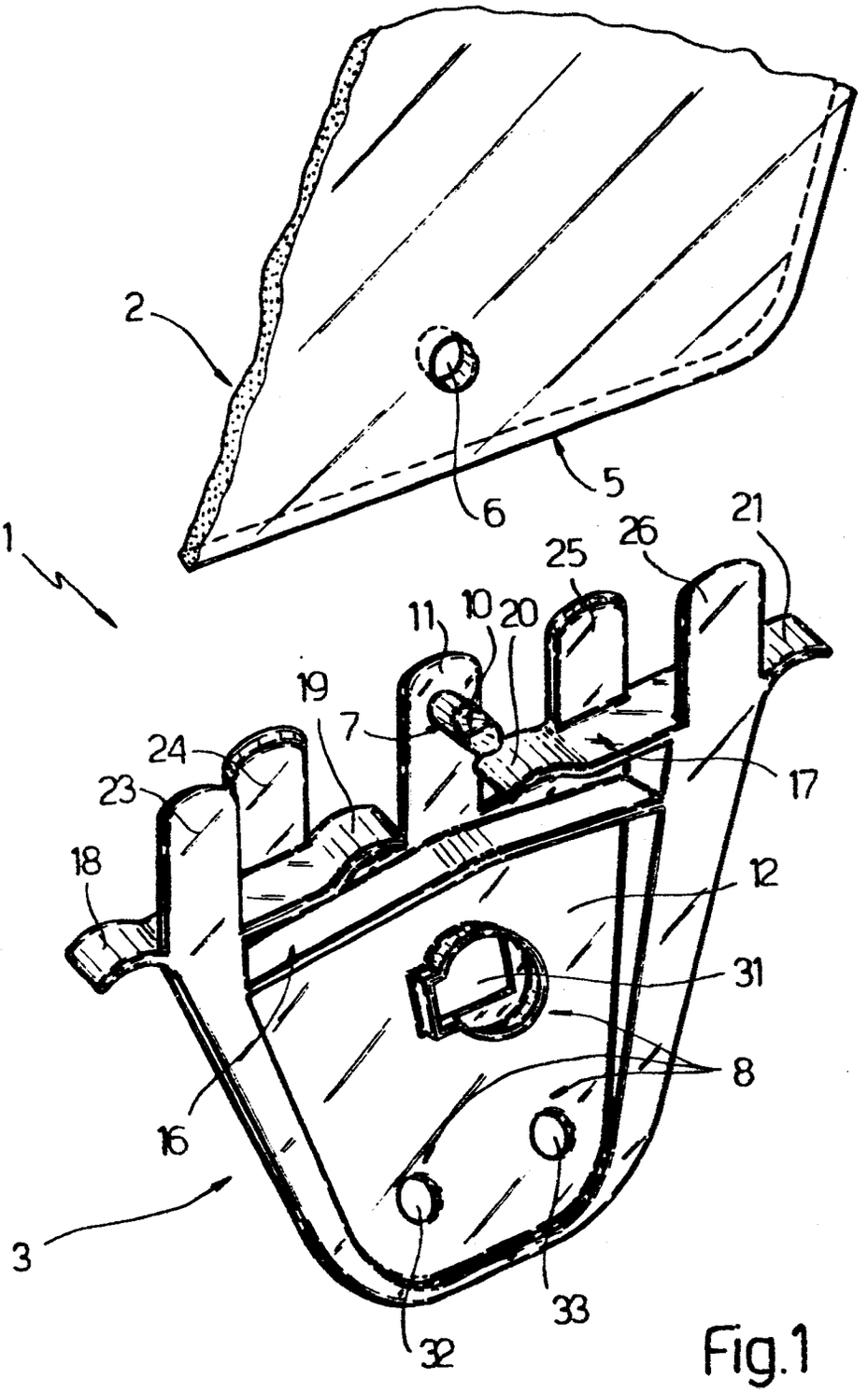

Fig.1

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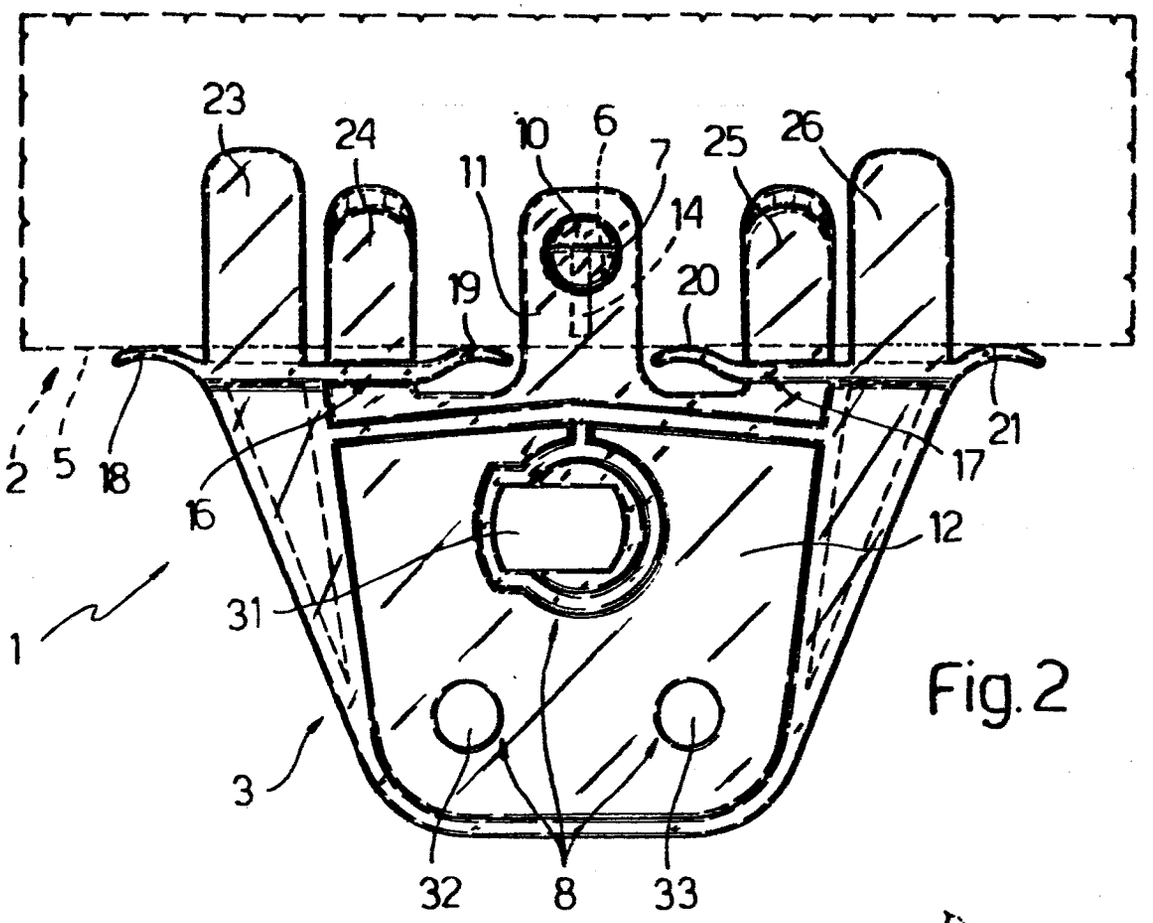

Fig.2

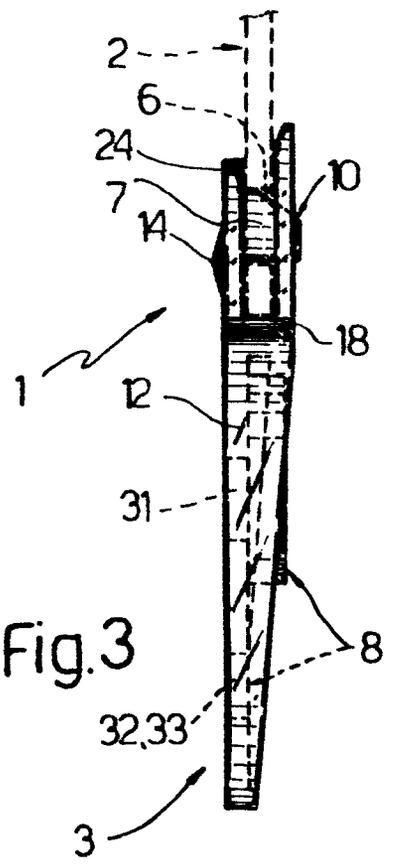

Fig.3

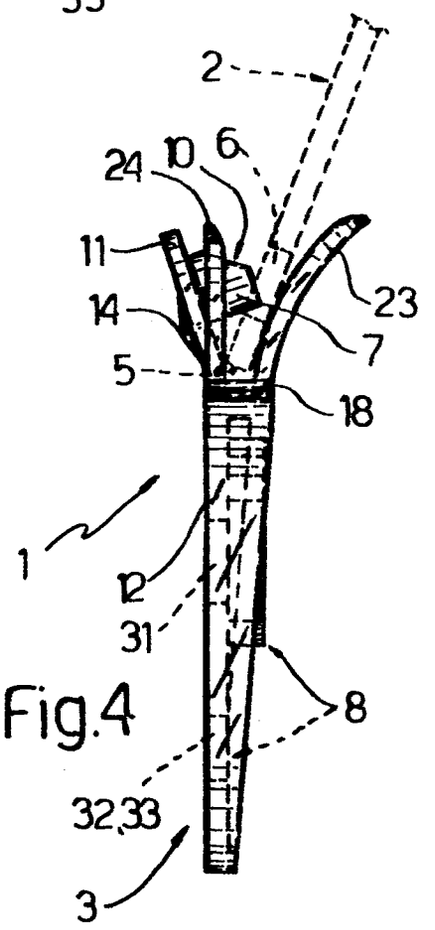

Fig.4

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Application number

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EUROPEAN SEARCH REPORT

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.4)
X	DE-A-3 243 123 (BROSE FAHRZEUGTEILE) * Page 19, lines 20-27; figures 3,4 *	1-3	B 60 J 1/17 E 05 F 11/38
A		9,12, 20,21	
A	US-A-3 868 788 (PODOLAN) * Column 2, lines 18-20; figure 1 *	1,2,9, 12	
A	US-A-3 591 982 (W.E. MONTAU) * Column 2, lines 39-43; figure 2 *	1,2,9, 12	
A	US-A-4 004 371 (PODOLAN) * Column 2, lines 9-15,17-23; figures 2,3 *	1,2,9, 16	TECHNICAL FIELDS SEARCHED (Int. Cl.4) B 60 J E 05 F
A	EP-A-0 143 722 (AUTOMATIC CITROEN) * Page 3, lines 27-32; figures 3-5 *	1,2,9, 16	
A	GB-A-2 099 897 (HORI GLASS) * Page 2, lines 7-11; figure 3 *	17,18	

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	24-09-1986	VALLE,D.

CATEGORY OF CITED DOCUMENTS

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EUROPEAN SEARCH REPORT

0208237
Application number

EP 86 10 8948

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.4)
A	DE-A-3 108 244 (SESSA) * Page 2, lines 10-17; page 6, lines 6-17; figures 2,3 *	6	
A	PATENTS ABSTRACTS OF JAPAN, vol. 7, no. 82 (M-208)[1237], 16th April 1983; & JP - A - 58 16 921 (HORI GLASS) 31-01-1983		

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	24-09-1986	VALLE,D.

CATEGORY OF CITED DOCUMENTS

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