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**EUROPEAN PATENT APPLICATION**

⑳ Application number: **89309607.3**

㉑ Int. Cl.<sup>5</sup>: **A 44 B 11/12**

㉒ Date of filing: **21.09.89**

㉓ Priority: **22.09.88 GB 8822279**

㉔ Date of publication of application:  
**28.03.90 Bulletin 90/13**

㉕ Designated Contracting States:  
**AT BE CH DE ES FR GR IT LI LU NL SE**

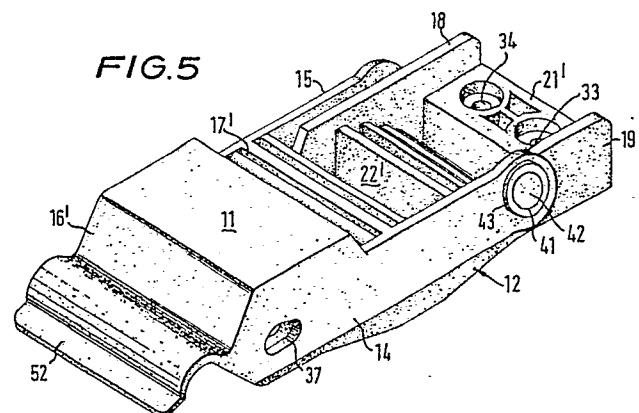
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㉙ **Buckle.**

㉚ The present invention relates to a buckle suitable for use in securing webbing. The buckle is formed of a resilient plastics material and comprises a lever member (11) pivotally mounted on and constructed and arranged to overlie a frame member (12). The lever member and frame members each comprise opposed side walls spaced apart by at least one cross-member to accommodate webbing to be secured by the buckle. The two members fit one within the other and each member has a wall at the front of the buckle. The front wall (16) of the lever member (11) includes means to co-operate with means in or on the front wall (25) of the frame member (12) and so that latching of the buckle can take place.



**Description****BUCKLE**

The present invention relates to a buckle, in particular a buckle made of plastics material suitable for use in securing webbing or the like.

Webbing buckles find extensive use in the transport industry. Such buckles are used to secure webbing which in its turn secures either the load itself or a load cover when disposed on a transport vehicle. However, known buckles tend to be either expensive and/or complex in construction or, in the case of metal buckles, of a relatively high weight.

In British Specification No. 2,167,510A the disadvantages of expense and corrosion (in the case of non-stainless steel metal buckles) are sought to be overcome by providing a buckle comprising a lever member pivotally mounted on a frame member and latching means for securing together the lever member and the frame member, wherein the latching means comprises a one-piece member having an actuating portion connected to one or more latch portions via one or more respective resilient portions. The latching means may be a generally planar one-piece plastics spring member carried in the lever member which can latch together the two members via latch portions passing through apertures in the lever member side walls and which engage in bores in the walls of the frame member. The latch portions are carried on flexible legs extending from the actuating portion.

In the earlier invention the buckle may be constructed from a plastics material and a method of construction is provided, but no disclosure is made of specific plastics materials which are suitable for use in the invention. All that is given is an indication that suitable plastics materials are injection-mouldable, of engineering quality and resistant to sea water and diesel. Also, the earlier invention is based on a three part construction of lever member, frame member and spring member.

Since the prior art buckle is based on the provision of a separate spring member which latches together the two other members through portions passing through the lever member and into the frame member the latching means is prone to failure. The latching portions can jam and the buckle can be rendered difficult to use or useless through such jamming.

We have now found surprisingly that a plastics buckle which is light in weight, corrosion resistant and of a very simple construction can be provided by combining a lever member with a frame member on which it is pivotally mounted and by securing those members together in a latched configuration by interconnection between co-operating portions integral with each said member. In particular, the front wall of the lever member includes means to co-operate with means in or on the front wall of the frame member so that latching of the buckle can take place. In that manner the tendency to failure of the prior art latching means can be avoided.

Accordingly, the present invention provides a buckle suitable for use in securing webbing or the

like, which buckle is formed of a resilient plastics material and comprises a lever member pivotally mounted on and constructed and arranged to overlie a frame member, the lever member and the frame member each comprising opposed side walls spaced apart by at least one cross-member to accommodate webbing to be secured by the buckle, the two members fitting one within the other and each member having a wall at the front of the buckle, the front wall of the lever member including means to co-operate with means in or on the front wall of the frame member and thereby to provide for latching of the buckle.

The buckle of the present invention may be formed of any resilient plastics material. Suitable plastics materials which provide the necessary degree of resilience will be apparent to those skilled in the art, and examples of suitable plastics materials are glass filled (or reinforced) nylon and glass filled polypropylene, of which the former is preferred. More preferably, the plastics material is a long grain glass fibre reinforced nylon, most preferably one having about 50% by weight of glass, such as the material known as Verdon. While various plastics material can provide the necessary resilience in the buckle of the present invention such materials may afford a buckle which has a weight outside the preferred range. In fabricating a buckle from non-preferred materials various sections may have to be made too thick to provide a buckle which is of the preferred relatively lightweight construction. Accordingly, to provide a relatively lightweight buckle the plastics material is preferably Verdon, in particular Verdon RF-700-10EM. That material is a 50% long grain glass fibre reinforced nylon 66 sold by ICI for applications which require a balance of mechanical performance coupled with good surface finish.

The buckle of the present invention is, in general terms, an over-centre buckle. Thus, the buckle includes in its lever member and in its frame member such parts or portions as are necessary and which may be arranged to provide pivotal mounting of the lever member on the frame member to give the necessary over-centre action, and preferably the lever member overlies a frame member which fits within the lever member when the buckle is latched. Also, the buckle in its lever member and its frame member is provided with such cross-members as are necessary to accommodate and/or be attached to webbing or the like to be secured by the buckle and, typically, the lever member may include a single cross-member and the frame member may include three cross-members. It is of course to be understood that while reference is made to suitability for use with webbing no limitation only to such use is implied, and like strapping material whether woven or non-woven may be secured using the buckle of the invention.

In one preferred construction of the frame member, the member has a front wall including at least a portion thereof disposed forward of the frame

member, and preferably the lever member includes a front wall constructed and arranged downwardly to depend towards and overlie the front wall of the frame member in a latchable configuration. More preferably the frame member includes a front wall having means comprising a lip portion to co-operate with the said latching means of the front wall of the lever member. More preferably also, the lever member includes a front wall having means comprising a lip portion or an aperture or slot, to co-operate with the said lip portion or other said means of the front wall of the frame member.

Thus, in one preferred embodiment the frame member includes a front wall in which there is a first wall portion inclined upwardly and away from the front of the buckle, which front wall portion includes a terminal lip portion comprising a forwardly disposed flange. Such a flange generally will be of relatively shallow depth and sufficient merely to co-operate with a corresponding flange on the front wall of the lever member or to fit within an aperture or slot in the front wall of the lever member. In addition, the frame member may include a body portion, extending between its opposed side walls, the body portion being adjacent the front of and at the base of the buckle.

Furthermore, the lever member preferably includes a body portion which extends across between the opposed side walls of the lever member adjacent the front of and at the top of the buckle and the front wall of the lever member preferably depends from said body portion. Preferably also, the lever member front wall and the body portion are arranged so that the front wall is enabled to pivot slightly about the upper edge of the front wall which joins the body portion sufficient due to the slight resilience of the plastics material from which the buckle is constructed to provide a latching action in fitting the lip portion of the front wall of the frame member into say the aperture or slot of the front wall of the lever member or in otherwise achieving latching through co-operation of said latching means.

In another preferred construction of the buckle of the invention, the front wall of the frame member extends from the front of the frame member body portion and is at about 90° to the frame member body portion, the front wall being arranged so that the front wall is enabled to pivot slightly about the front of the frame member body portion due to the resilience of the plastics material. Preferably, the front wall of the frame member again includes at its upper edge remote from the frame member body portion a terminal lip portion comprising a forwardly disposed flange. More preferably, the front wall of the frame member is connected to the frame member body portion but not to the frame member side walls. Furthermore, the forwardly disposed flange in any of the above arrangements may have a surface to co-operate with latching means in or on the opposite lever member which is inclined upwardly away from the front of the buckle. Similarly, where the latching means of the lever member is a lip portion that may comprise a flange having an inclined surface to match the flange of the front wall

of the frame member.

As an alternative construction of lever member the front wall, body portion and opposed side walls of the lever member are formed integrally. Furthermore, in any constructions of the lever member the front wall thereof may extend forwardly of the lever member side walls to provide a grippable portion.

Also, the front wall of the lever member preferably may include means to accommodate a webbing end. Such means may comprise a second - if appropriate, and preferably lower - aperture or slot in the front wall of the lever member dimensioned so that the webbing end fits snugly within the aperture or slot. Furthermore, the buckle may include apertures to enable a pin or cable to be passed therethrough and sealed therein for security purposes.

Embodiments of a buckle in accordance with the invention will now be described by way of example with reference to the accompanying drawings, in which:

Figure 1 is a plan view of one form of buckle in accordance with the invention;

Figure 2 is a section at line A-A of Figure 1;

Figure 3 is a side view of the buckle of Figure 1;

Figure 4 is a front view of the buckle of Figure 1;

Figure 5 is a perspective view of another form of buckle in accordance with the invention;

Figure 6 is a plan view of the buckle of Figure 5;

Figure 7 is a section at line B-B of Figure 6; and

Figure 8 is a front view of the buckle of Figure 5 in a half-open configuration and slightly from below.

Referring to Figures 1 to 4 of the drawings, the buckle shown is formed from a resilient plastics material, preferably Verton as discussed above, and comprises a lever member 11 mounted on and overlying a frame member 12. The lever member 11 comprises a body portion 13 and side walls 14 and 15, and includes a front wall 16. In addition there is a cross-member 17 to accommodate webbing.

Similarly, the frame member comprises side walls 18 and 19 and cross-members 21, 22 and 23, together with body portion 24. Cross-member 22 is disposed extending upwardly into the space between side walls 18 and 19 as shown and body portion 24 is at the front of the frame member and merges into an upwardly and forwardly extending front wall 25. At its extremity front wall 25 includes a lip portion formed as a shallow flange 26.

The lever member 11 includes pivot pins 27 and 28 which pass through corresponding apertures in the side walls 19 and 20 of the frame member 12. By that means the lever member 11 is pivotally mounted on the frame member 12 and can function to provide an over-centre buckle.

The front wall 16 of the lever member 11 depends downwardly from the body portion 13 and forwardly of the buckle and at its side edges 29 and 31 is separated from the adjacent walls 14 and 15. By that means the front wall 16 of the lever member 11 is enabled to pivot very slightly due to the resilience of

the material from which the buckle is constructed and about an imaginary line joining the front wall 16 and the body portion 13. The front wall 16 includes an aperture or slot 32 which in the latched position shown in the drawings accommodates the flange 26 on the front wall 25 of the frame member 12.

The frame member 12 includes holes 33 and 34 formed in cross member 21 to accommodate studs through which the frame member 12 may be attached to webbing or the like. In addition, webbing or the like may be fed along beneath the buckle from the front of the buckle up through the gap 35 formed in the frame member 12 between body portion 24 and cross-member 23, across the top of cross-member 23, down beneath and around cross-member 22, then upwardly at an angle as directed by cross-member 22, forwardly to cross member 17 of lever member 11, and over and around that cross-member 17. Then the webbing is fed back down through the frame member and again over cross-member 22 back up and over cross-member 23 and then down and forwardly underneath body member 24.

In addition, the front wall 16 of the lever member 11 includes a lower and narrower slot 36 which can accommodate the end of webbing fed through the buckle as described above. In that way the webbing end can be secured in use and the end portion of the webbing can be used to unlatch the buckle by grasping the webbing portion with one hand and in a single lifting movement removing the webbing end from the buckle and unlatching it.

Also, the buckle includes apertures 37 (only one shown for each side of the buckle) in side walls 15, 18, 19 and 14. Those apertures can accommodate a pin or cable which can be sealed therein for Customs or other security purposes.

In use, in the unlatched position (not shown), the configuration of cross-member 17 of lever member 11 enables the webbing passing round it to be in a relaxed state. Then, at the time it is desired to tighten the webbing and to bring the buckle into play, the lever member 11 is brought down to overlie the frame member 13 so that cross-member 17 moves forward, and the frame member and lever member are latched together through co-operation between the aperture or slot 32 and the flange 26, the webbing thereby being brought under tension.

Referring to Figures 5 to 8 of the drawings, the buckle there shown is similar to that of Figures 1 to 4, it can be made of like material, and like numerals are used for like parts. The buckle differs in that the cross-members 17', 21' and 22' are of a somewhat thicker section (shaped as shown) and in the pivoting arrangement. As shown the lever member 11 includes apertures 41 (only one shown) which accommodate pivot pins 42 (only one shown) moulded in the side walls 18 and 19 of the frame member 12. The apertures 41, each include a ring 43 to strengthen the pivot.

Also, the body portion 24 of the frame member 12 includes a front wall 44 integral with and upstanding vertically from its front edge out of a curved portion 24a. The front wall 44 like the front wall 16 of the lever member 11 of the buckle of Figures 1 to 4 is

separated from the adjacent walls 18 and 19 at its side edges 45 and 46. By that means the front wall 44 is enabled to pivot very slightly about the front edge at the curved portion 24a of the body portion 24 so as to achieve the necessary latching action.

The front wall 44 includes at its upper edge a forwardly disposed flange portion 47 including a lower surface 48 which is inclined upwardly away from the front of the buckle. In addition, and to complement the flange portion 47, the front wall 16' of the lever member includes a rearwardly disposed flange portion 49 including an upper surface 51 which is also inclined upwardly away from the front of the buckle. Thus, in use, the two flange surfaces 48 and 51 can be mated together as shown in Figure 7 when the buckle is in a latched configuration.

Furthermore, there extends from the front wall 16' a portion 52 which enables the buckle to be gripped when latched. In that condition, with the buckle under tension from the secured webbing or the like, it can be opened by gripping it with the fingers under portion 52 and then lifting the lever member to release surfaces 48 and 51 from each other. During release there is sufficient resilience in front wall 44 to enable it to pivot backwards very slightly to achieve the necessary release.

As shown in Figure 8, the separation of the front wall 44 itself may extend through the curved portion 24a of body portion 24, and partially into the front of the body portion 24 to separate it too from the side walls 18 and 19 as shown at 53 and 54. Also, as shown in Figure 7 the body portion 24 may include a short rear wall 24b.

The buckle of the invention as illustrated in Figures 5 to 8 when its members are in the latched configuration can remain locked under loads significantly higher than with buckles presently on the market. Accordingly, the latching arrangement in the buckle as shown is significantly superior in its ability to lock and remain locked when compared with the prior art.

It is, of course, to be understood that the invention is not limited to a buckle as described specifically above. It will be appreciated that numerous variations may be made to what is specifically described without departing from the spirit and scope of the invention as defined by the claims which follow.

## Claims

1. A buckle suitable for use in securing webbing, which buckle is formed of a resilient plastics material and comprises a lever member pivotally mounted on and constructed and arranged to overlie a frame member, the lever member and the frame member each comprising opposed side walls spaced apart by at least one cross-member to accommodate webbing to be secured by the buckle, the two members fitting one within the other and each member having a wall at the front of the buckle, the front wall of the lever member including means to co-operate with means in or on the front wall of

the frame member and thereby to provide for latching of the buckle.

2. A buckle according to claim 1 which comprises a glass filled nylon plastics material, preferably a 50% long grain glass fibre reinforced nylon 66.

3. A buckle according to claim 1 or claim 2, wherein the frame member includes a front wall having means comprising a lip portion to co-operate with the said latching means of the front wall of the lever member.

4. A buckle according to any one of the preceding claims, wherein the lever member includes a front wall having means comprising a lip portion or an aperture or slot to co-operate with the said means of the front wall of the frame member.

5. A buckle according to any one of the preceding claims, wherein the lever member includes a body portion which extends across between the opposed side walls of the lever member adjacent the front of and at the top of the buckle and preferably wherein the front wall of the lever member depends from the body portion.

6. A buckle according to any one of the preceding claims, wherein the frame member includes a body portion extending between its opposed side walls, the body portion being adjacent the front of and at the base of the buckle.

7. A buckle according to claim 5, wherein the lever member front wall and the lever member body portion are arranged so that the front wall is enabled to pivot slightly about the upper edge of the front wall which joins the body portion sufficient due to the resilience of the plastics material from which the buckle is constructed to provide a latching action.

8. A buckle according to any one of the preceding claims, wherein the frame member has a front wall including at least a portion thereof disposed forward of the frame member, and the lever member includes a front wall constructed and arranged downwardly to depend towards and overlie the front wall of the frame member in a latchable configuration and preferably wherein the frame member includes a front wall in which there is a front wall portion inclined upwardly away from the front of the buckle, which front wall portion includes a terminal lip portion comprising a forwardly disposed flange.

9. A buckle according to claim 6, wherein the front wall of the frame member extends from the front of the frame member body portion and is at about 90° to the frame member body portion, the front wall being arranged so that the front wall is enabled to pivot slightly about the front of the frame member body portion and preferably wherein the front wall of the frame member includes at its upper edge remote from the frame member body portion a terminal lip portion comprising a forwardly disposed flange.

10. A buckle according to claim 8 or claim 9,

wherein the forwardly disposed flange has a surface to co-operate with latching means in or on the opposite lever member which is inclined upwardly away from the front of the buckle.

11. A buckle according to claim 9 or claim 10, or claim 8 when dependent on claim 6, wherein the front wall of the frame member is connected to the frame member body portion but not to the frame member side walls.

12. A buckle according to any one of claims 1 to 7 or claims 9 to 11, wherein the front wall, body portion and opposed side walls of the lever member are formed integrally and preferably wherein the lever member front wall extends forwardly of the lever member side walls to provide a grippable portion.

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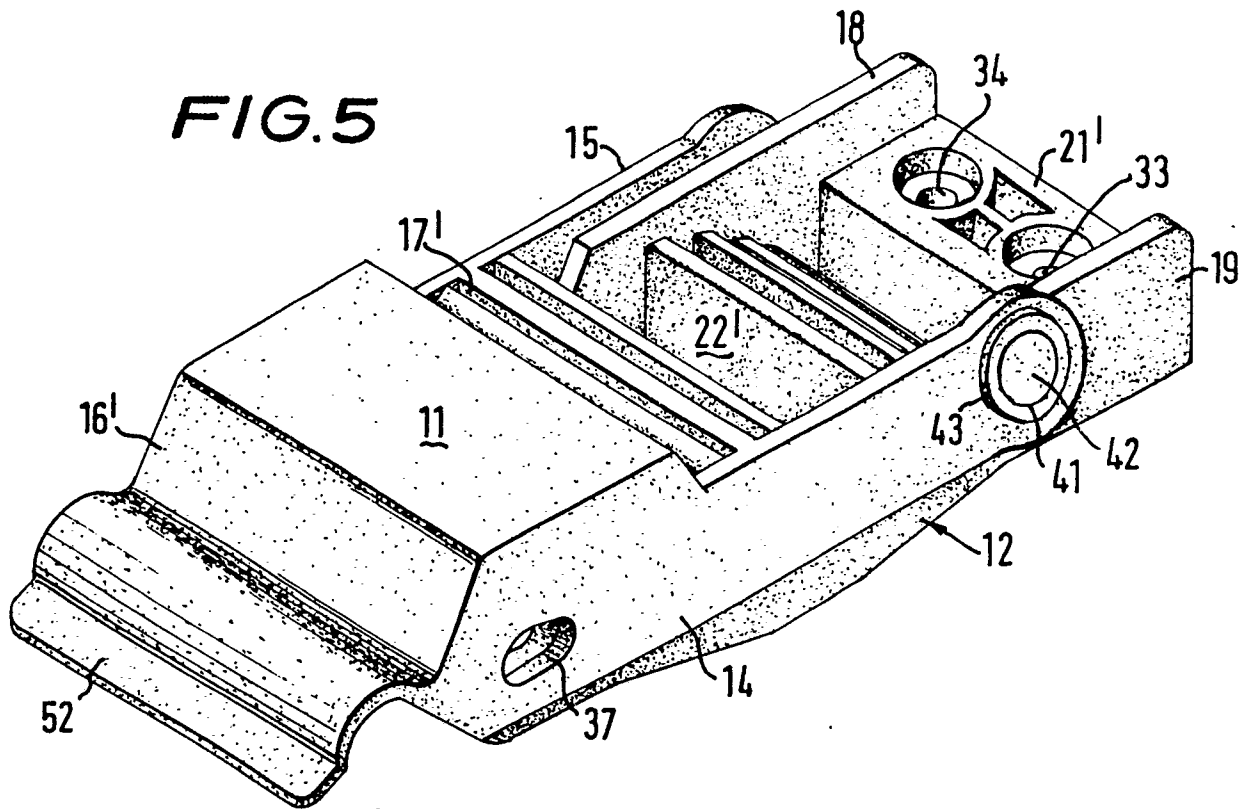
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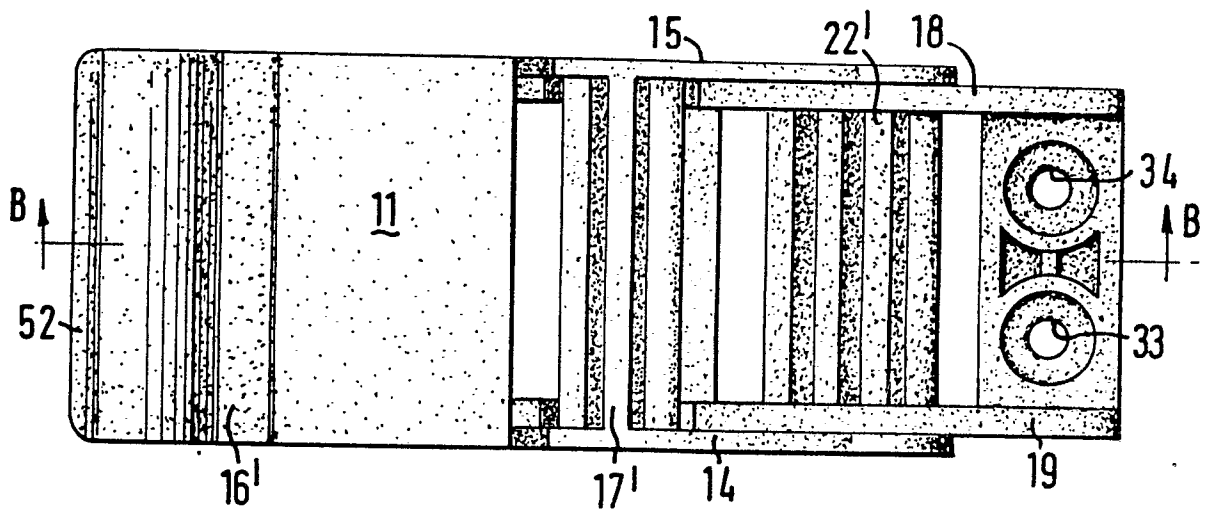
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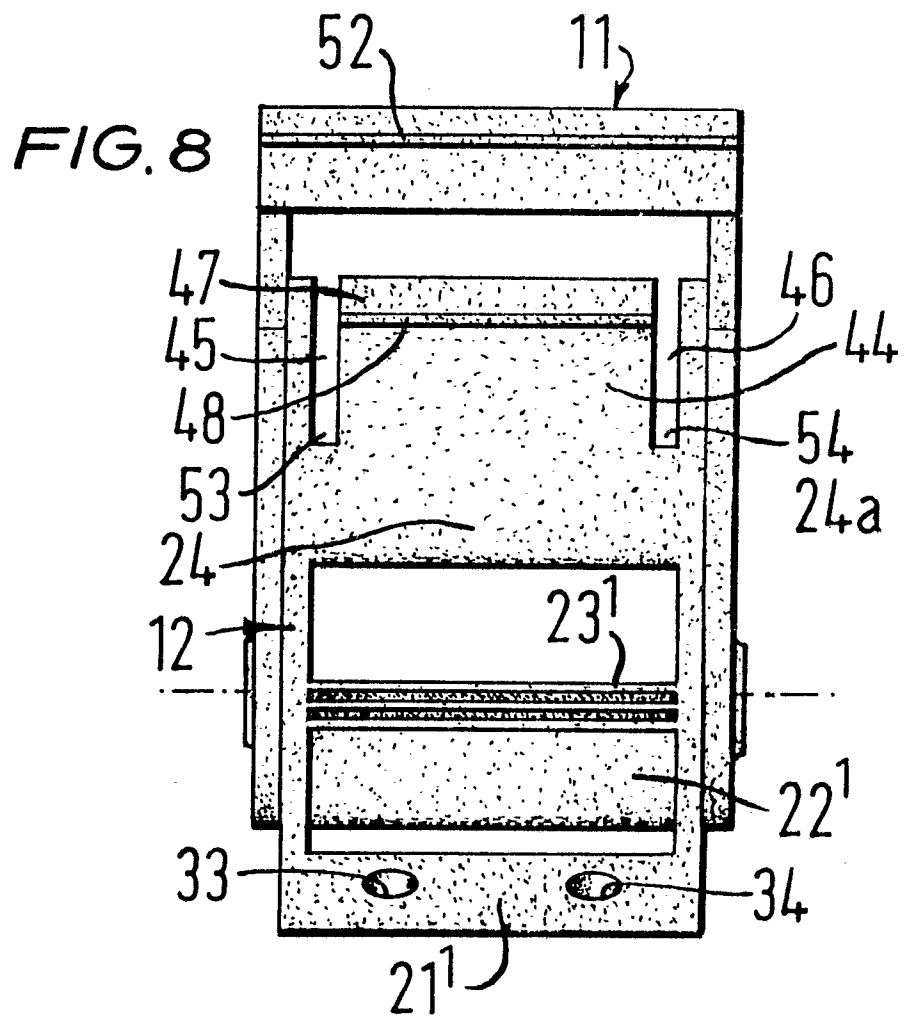
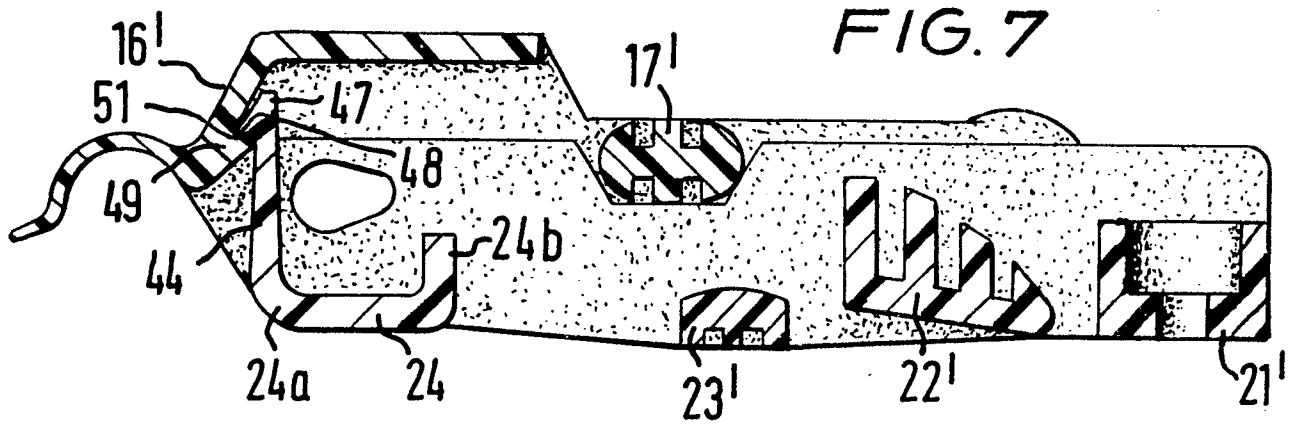
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**FIG. 6**







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)
X	WO-A-8201809 (THE BRITISH ALUMINIUM COMPANY LIMITED) * page 2, lines 8 - 34 *	1, 3, 5, 6, 8, 9	A44B11/12
A	* page 6, line 29 - page 7, line 36; claims 1-9; figures 4-6 *	7, 12	
A	US-A-3703024 (E. L. JOHNSON) ---		
A	WO-A-8203838 (OLLIVENT LENNART LINDBLAD AB) -----		
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			A44B B65D B60P
Place of search	Date of completion of the search	Examiner	
THE HAGUE	08 DECEMBER 1989	GARNIER F.M.A.C.	
CATEGORY OF CITED DOCUMENTS		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	
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			