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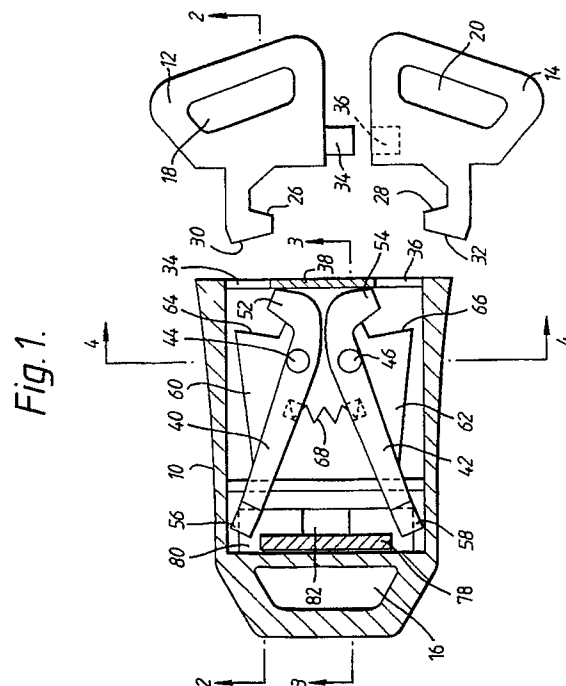
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(54) **Buckle for seat belt.**

(57) A buckle for a seat belt, comprises a buckle housing (10) and two tongues (12, 14). The buckle housing (10, 90) contains two latching levers (40, 42) arranged for angular movement about respective spaced mutually parallel pivot axes (44, 46). The levers (40, 42) have hook formations (52, 54) which are shaped so that a force applied to a tongue (12, 14) in a direction to remove it from the buckle housing (10) tends to cause displacement of the corresponding lever (40, 42) from its locking position to its release position. Blocking means (80) is manually movable between a blocking position in which the levers (40, 42) are retained in their locked positions and a release position in which the levers (40, 42) are free to move between their locking positions and their release positions.



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BUCKLE FOR SEAT BELT

This invention relates to a buckle for a seat belt, comprising a buckle housing and two tongues, the buckle housing containing a latching mechanism having a latching formation for each tongue, the latching formations being arranged for angular movement about respective spaced mutually parallel pivot axes between a locking position in which removal of the corresponding tongue from the buckle housing is prevented and a release position in which the tongue is removable from the buckle housing. A buckle of this type is disclosed in EP-A-0289762.

According to the invention, in a buckle of the type described above, the latching formations are shaped so that a force applied to a tongue in a direction to remove it from the buckle housing tends to cause displacement of the corresponding latching formation from its locking position to its release position and the latching mechanism includes blocking means which is manually movable between a blocking position in which the latching formations are retained in their locked positions and a release position in which the latching formations are free to move between their locking positions and their release positions.

Preferably each latching formation includes an ejector formation shaped to engage with its respective tongue so that movement of the latching formation from its locking position to its release position ejects the tongue, and insertion of the tongue moves the latching formation from its release position to its locked position.

In order to prevent the buckle being fastened with only one tongue in place, each latching formation is preferably arranged so that, when in its release position, it prevents movement of the blocking means into its blocking position.

In one form of the invention, each latching formation comprises a latching lever mounted with its pivot axis at an intermediate position along its length, one end of each latching lever being arranged to engage with the corresponding tongue and the other end of each latching lever being arranged to engage with the blocking means.

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

Figure 1 is a cross-sectional view of a three-part buckle in accordance with the invention, with the mechanism in its release position and the tongues ejected, taken on the line 1 - 1 in Figure 2;

Figure 2 is a cross-sectional view taken on the line 2 - 2 in Figure 1;

Figure 3 is a cross-sectional view taken on the line 3 - 3 in Figure 1;

Figure 4 is a cross-sectional view taken on the line 4 - 4 in Figure 3;

Figure 5 is a cross-sectional view taken on the line 5 - 5 in Figure 2;

5 Figure 6 is a cross-sectional view, similar to Figure 1, but showing the buckle in its engaged condition;

Figure 7 is a cross-sectional view taken on the line 7 - 7 in Figure 6;

10 Figure 8 is a side view of the buckle shown in Figures 6 and 7 with one side of the buckle housing removed;

15 Figures 9, 10 and 11 are cross-sectional views taken on the lines 9 - 9, 10 - 10 and 11 - 11, respectively, in Figure 8 but with the aforementioned side of the buckle housing in place; and

Figure 12 is a cross-sectional view, similar to Figure 6, of an alternative three-part buckle in accordance with the invention.

20 Referring first to Figures 1 to 5, the buckle comprises a buckle housing 10 and two tongues 12 and 14, having respective slots 16, 18 and 20 whereby they may be connected to respective straps (not shown) of a seat belt system. As can be seen from Figures 2 and 3, the housing 10 is formed in two parts 22 and 24 for ease of assembly. In Figures 4 and 5 (and also in Figures 9 to 11), the two parts 22 and 24 are shown as integral with one another.

30 As can best be seen from Figure 1, the portions of the tongues 12 and 14 which are insertable into the housing 10 have respective hook formations with latch-engaging surfaces 26 and 28 and ejector-engaging surfaces 30 and 32. To facilitate simultaneous insertion of the two tongues, the upper tongue 18 (as viewed in Figure 1) has a peg 34 which can be inserted into a corresponding recess 36 in the other tongue 14.

40 The buckle housing 10 has two openings 34 and 36 for receiving the tongues 12 and 14 respectively. The openings 34 and 36 are separated by a central partition 38, behind which are located a pair of latching levers 40 and 42. As can be seen from Figures 3 and 4, these latching levers 40 and 42 have pivot axes formed by respective upper stub axles 44, 46 and lower stub axles 48, 50 which are journaled in respective recesses in the housing 10.

50 As can be seen from Figures 1 and 3, the ends of the latching levers 40 and 42 nearer to the openings 34 and 36 are of substantially the same thickness as the adjacent parts of the tongues 12 and 14 and carry hook formations 52 and 54 with surfaces shaped to engage with the latch-engaging surfaces 26 and 28 of the tongues 12 and 14. On the other side of their pivot axes, the latching

levers 40 and 42 taper towards end portions 56 and 58 which are bent outwardly to a small extent, as can be seen in Figure 1. On its outer edge, each latching lever 40, 42 has a respective flange 60, 62 with an ejector surface 64, 66 at the end nearer to the openings 34 and 36 shaped so as to be engagable with the ejector-engaging surfaces 30 and 32 on the tongues 12 and 14. The left hand end of the latching levers 40 and 42 are biased apart by a compression spring 68 so that the formations 52 and 54 are clear of the openings 34 and 36.

A push-button 70 is accommodated in an opening in the top of the housing 10 and hinged thereto along one edge 72 thereof. Flanges 74 and 76 (Figure 5) on the sides of the push-button 70 prevent it from moving above the top surface of the housing 10. Opposite the edge 72, the push-button 70 has a downwardly extending formation 78 (Figure 2) which carries a blocking bar 80 extending under the ends 56 and 58 of the latching levers 40 and 42. The blocking bar 80 has a central recess 82 in its upper surface (see Figures 3 and 5). However, with the latching levers 40 and 42 in the position illustrated in Figures 1 to 5, the ends 56 and 58 thereof engage with the ends of the blocking bar 80 to hold the push-button in its depressed position, against the action of a leaf spring 84 (Figures 2, 7 and 11).

If the two tongues 12 and 14 are placed in abutment with one another so that the peg 34 engages in the recess 36, and the ends of the tongues are inserted into the openings 34 and 36, the ejector-engaging surfaces 30 and 32 thereon abut against the corresponding ejector surfaces 64 and 66 on the latching levers 40 and 42, rotating the latching lever 40 in the counter-clockwise direction and the latching lever 42 in the clockwise direction so as to compress the spring 68 and bring the offset ends 56 and 58 of the latching levers 40 and 42 into abutment with one another, in alignment with the recess 82 in the blocking bar 80, as shown in Figure 6. The leaf spring 84 is then free to displace the blocking bar 80 and, with it, the push-button 70 upwardly, as shown in Figure 11 so that the ends 56 and 58 of the latching levers 40 and 42 are prevented from moving apart by the side walls of the recess 82. The tongues 12 and 14 are then held in the buckle housing by engagement of their latching surfaces 26 and 28 with the hook formations 52 and 54 on the latching levers 40 and 42 as shown in Figure 6.

If the push-button 70 is now depressed, the blocking bar 80 is moved clear of the ends 56 and 58 of the latching levers 40 and 42 which are therefore free to return to the position illustrated in Figure 1 under the influence of the spring 68. Abutment of the ejector surfaces 64 and 66 on the

flanges 60 and 62 with the ejector-engaging surfaces 30 and 32 on the tongues 12 and 14 causes the latter to be ejected from the housing 10.

If an attempt is made to insert only one of the tongues, for example the tongue 12, into the housing 10 without the other tongue 14, then the corresponding latching lever 40 is displaced to the position shown in Figure 6 but the other latching lever 42 remains in the position shown in Figure 1, holding the push-button 70 in its depressed position. Consequently, as soon as the tongue 12 is released, it is ejected by the action of the spring 68.

The buckle illustrated in the drawings requires the two tongues 12 and 14 to be inserted in mutually parallel directions. However, the mechanism can be modified to allow the two tongues to be inserted in non-parallel directions, for example, at right angles to one another. In order to do this, the latching levers are bent in the region of their pivots so that the ends 56 and 58 which engage with the blocking member 80 are set at a different angle the hook formations 50, 52 and the ejector surfaces 64 and 66.

Figure 12 illustrates an alternative embodiment, in which the buckle comprises a buckle housing 90 and two tongues 92 and 94, having respective slots 96, 98 and 100 whereby they may be connected to respective straps (not shown) of a seat belt system. The tongues 92 and 94 differ from the tongues 12 and 14 of the embodiment illustrated in Figures 1 to 11 in that their hook formations 102 and 104 face outwardly and the buckle housing 90 has a single opening 106 through which both tongues can be inserted simultaneously. A pair of latching levers 108 and 110, mounted on respective pivot axles 112 and 114, have inwardly facing hook formations 116, 118 shaped to embrace the outwardly facing hook formations 102 and 104 of the tongues 92 and 94. A push-button (not shown), similar to the push-button 70 carries a blocking bar which differs from the blocking bar 80 of Figures 1 to 11 in that the central recess 82 therein is replaced by a central projection 120 which engages between ends 122 and 124 of the latching levers 106 and 108 to hold them in their engaged position as illustrated in Figure 12. The operation of the buckle shown in Figure 12 is analogous to that of the buckle shown in Figures 1 to 11.

Claims

1. A buckle for a seat belt, comprising a buckle housing (10, 90) and two tongues (12, 14, 92, 94), the buckle housing (10, 90) containing a latching mechanism having a latching formation (40, 42, 108, 110) for each tongue (12, 14, 92, 94), the latching formations (40, 42, 108,

110) being arranged for angular movement about respective spaced mutually parallel pivot axes (44, 46, 112, 114) between a locking position in which removal of the corresponding tongue (12, 14, 92, 94) from the buckle housing (10, 90) is prevented and a release position in which the tongue (12, 14, 92, 94) is removable from the buckle housing (10, 90), characterised in that the latching formations (40, 42, 108, 110) are shaped so that a force applied to a tongue (12, 14, 92, 94) in a direction to remove it from the buckle housing (10, 90) tends to cause displacement of the corresponding latching formation (40, 42, 108, 110) from its locking position to its release position and the latching mechanism includes blocking means (80) which is manually movable between a blocking position in which the latching formations (40, 42, 108, 110) are retained in their locked positions and a release position in which the latching formations (40, 42, 108, 110) are free to move between their locking positions and their release positions.

2. A buckle according to claim 1, wherein each latching formation (40, 42, 108, 110) includes an ejector formation (64, 66) shaped to engage with its respective tongue (12, 14, 92, 94) so that movement of the latching formation (40, 42, 108, 110) from its locking position to its release position ejects the tongue, and insertion of the tongue (12, 14, 92, 94) moves the latching formation (40, 42, 108, 110) from its release position to its locked position.
3. A buckle according to claim 1 or 2, wherein each latching formation (40, 42, 108, 110) is arranged so that, when in its release position, it prevents movement of the blocking means (80) into its blocking position.
4. A buckle according to claim 1, 2 or 3, wherein each latching formation comprises a latching lever (40, 42, 100, 110), mounted with its pivot axis (44, 46, 112, 114) at an intermediate position along its length, one end (52, 54) of each latching lever (40, 42, 108, 110) being arranged to engage with the corresponding tongue (12, 14, 92, 94) and the other end (56, 58) of each latching lever (40, 42, 108, 110) being arranged to engage with the blocking means (80).
5. A buckle according to claim 4, wherein each latching lever (40, 42) carries an outwardly facing hook formation (52, 54) and each tongue (12, 14, 92, 94) engages between a respective latching lever (40, 42) and a respective part of

the housing (10).

6. A buckle according to claim 4, wherein each latching lever (108, 110) carries an inwardly facing hook formation (116, 118) and the tongues (92, 94) engage between the two latching levers (108, 110).

Fig. 1.

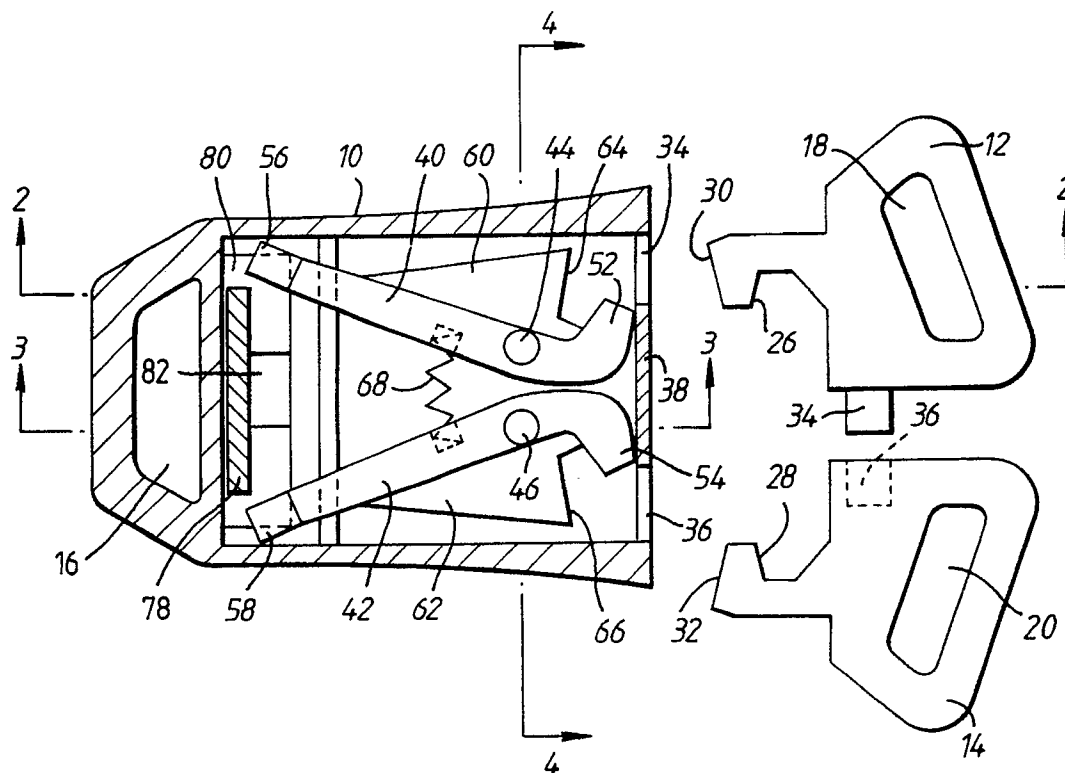


Fig. 2.

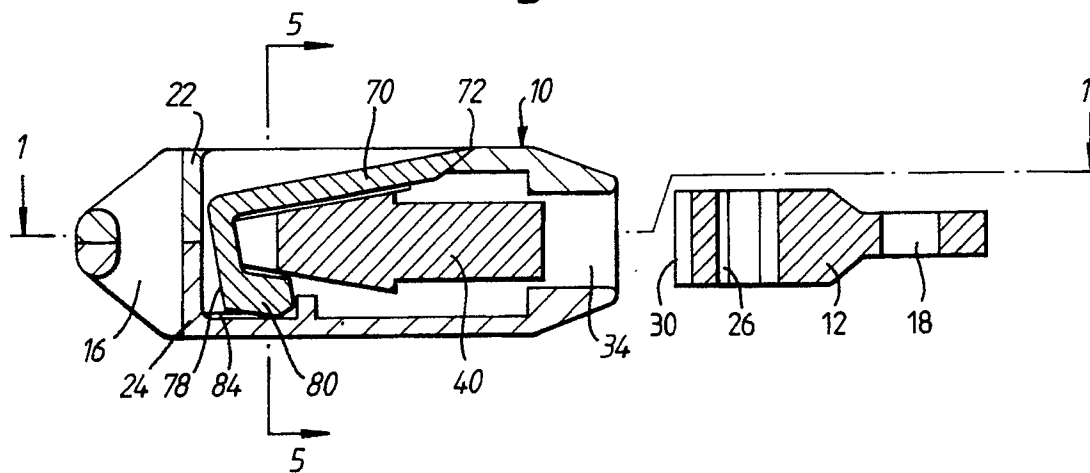


Fig. 3.

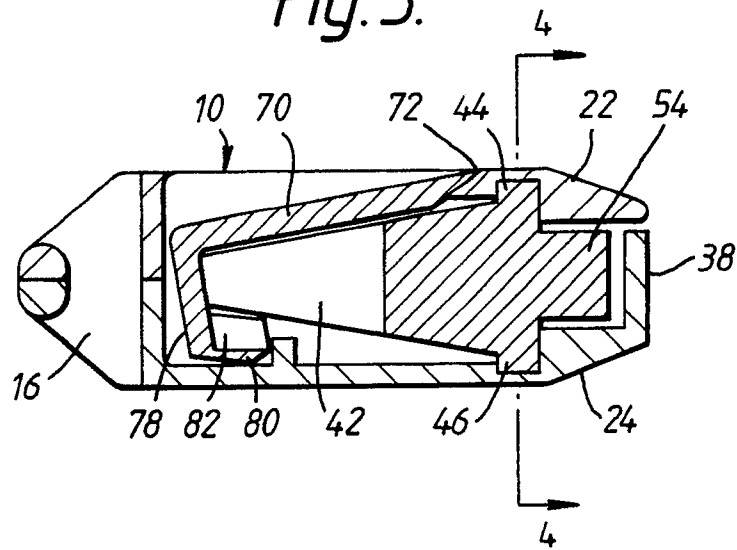


Fig. 4.

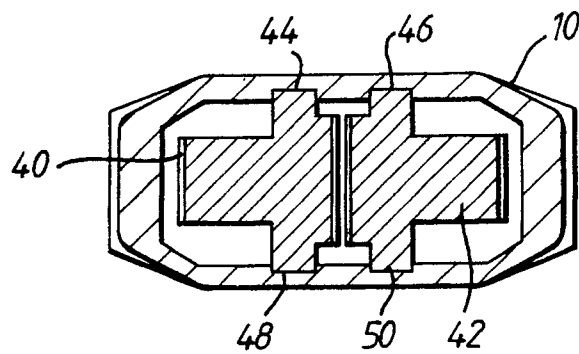


Fig. 5.

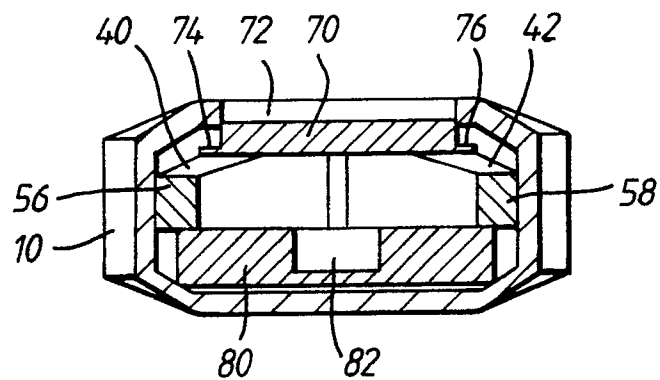


Fig. 6.

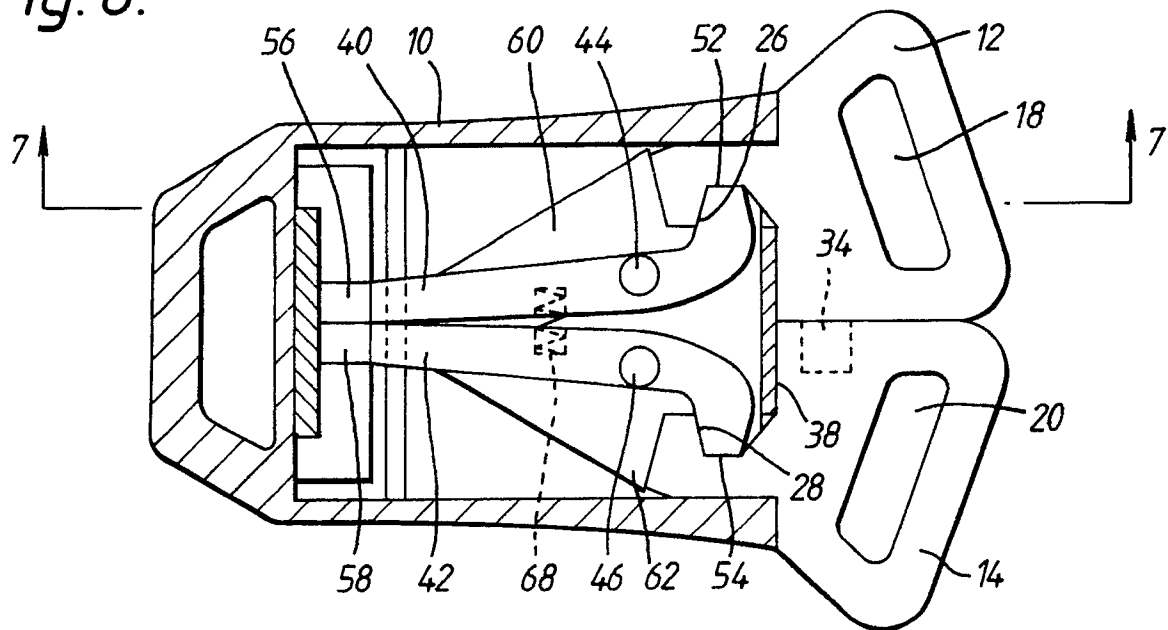


Fig. 7.

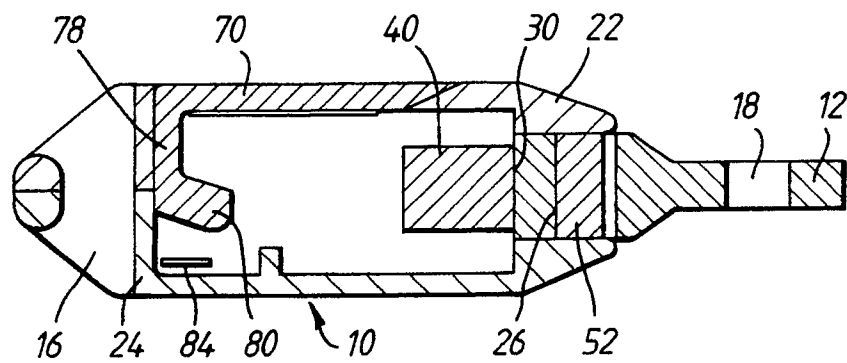


Fig. 8.

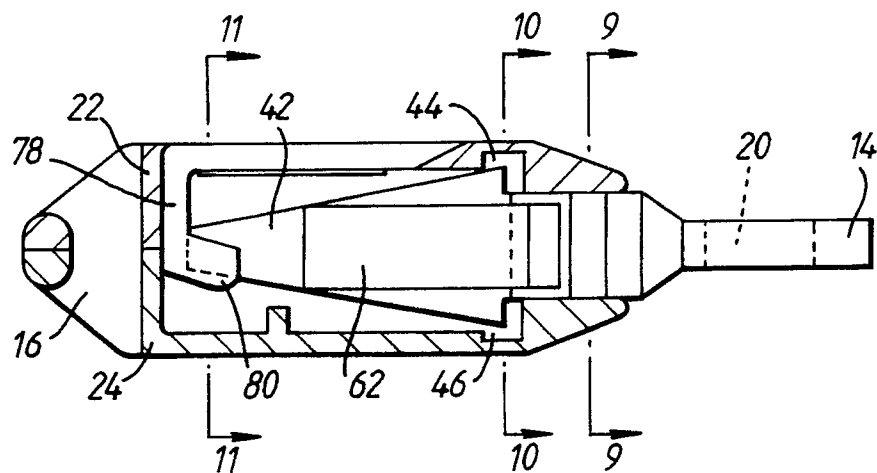


Fig. 9.

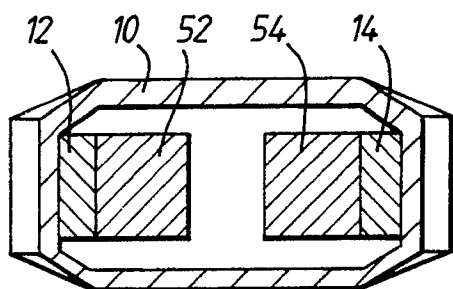


Fig. 10.

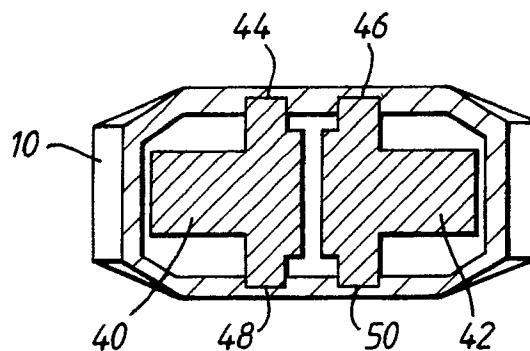


Fig. 11.

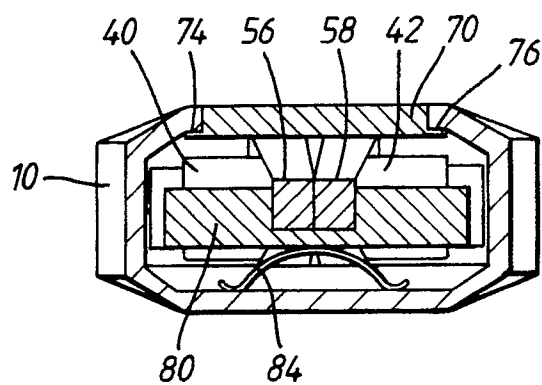
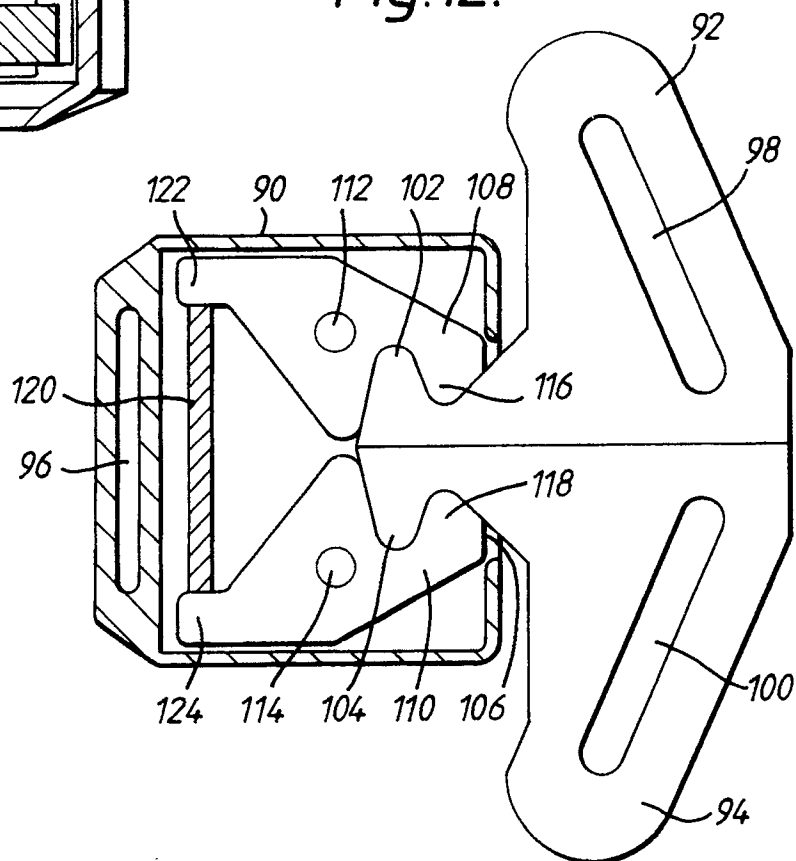


Fig. 12.





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EUROPEAN SEARCH REPORT

Application Number

EP 90 31 2773

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	US-A-3 523 342 (J. P. SPIRES) * column 2, line 35 - column 4, line 44; figures 1-7 * - - -	1,2,6	A 44 B 11/25		
A	US-A-3 648 333 (R. W. STOFFEL) * column 1, line 70 - column 4, line 41; figures 1-4 * - - -	1-4,6			
A	DE-A-2 017 683 (JIM ROBBINS SEAT BELT CO.) * page 6, line 1 - page 10, paragraph 3; figures 1-5 * - - -	1,6			
A	FR-A-2 552 641 (PROIZVODSTVENNOE OBIEDINENIE NORMA) - - - - -				
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int. Cl.5) A 44 B		
Place of search The Hague		Date of completion of search 06 March 91	Examiner GARNIER F.M.A.C.		
<table border="0"><tr><td>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</td><td>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</td></tr></table>				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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