



Europäisches Patentamt  
European Patent Office  
Office européen des brevets



(11) **EP 1 070 816 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**24.01.2001 Bulletin 2001/04**

(51) Int. Cl.<sup>7</sup>: **E05B 65/32**

(21) Application number: **00306056.3**

(22) Date of filing: **17.07.2000**

(84) Designated Contracting States:  
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU  
MC NL PT SE**  
Designated Extension States:  
**AL LT LV MK RO SI**

(30) Priority: **23.07.1999 GB 9917198**

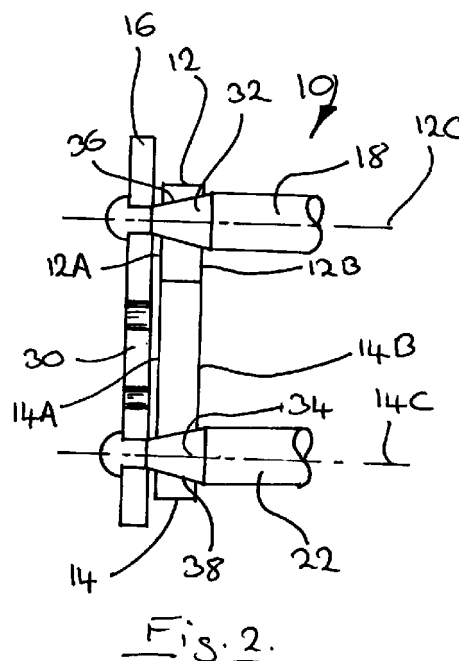
(71) Applicant:  
**MERITOR LIGHT VEHICLE SYSTEMS (UK)  
LIMITED**  
**Birmingham B30 3DW (GB)**

(72) Inventors:  
• **Fisher, Sidney Edward**  
**Stirchley, Birmingham B30 3BW (GB)**  
• **Bland, Timothy**  
**Stirchley, Birmingham B30 3BW (GB)**

(74) Representative:  
**Jones, John Bryn et al**  
**Withers & Rogers,**  
**Goldings House,**  
**2 Hays Lane**  
**London SE1 2HW (GB)**

(54) **Latch mechanism**

(57) A latch mechanism(10) having a latch bolt(14) for releasably securing a striker in a closed position, the latch bolt being movably mounted on a chassis(16) of the latch mechanism, and a pawl(12) movably mounted on the chassis and engagable with the latch bolt to secure it in a closed position, the pawl and latch bolt each having respective pivot apertures and being movable about respective projections of the chassis extending through said respective pivot apertures, wherein at least one of said apertures and projections is tapered.



**EP 1 070 816 A1**

## Description

**[0001]** The present invention relates to latch assemblies and in particular to latch assemblies for releasably securing vehicle doors when such doors are in a closed position.

**[0002]** When known latch assemblies are used in car doors, and the car is subsequently been involved in a road accident where an impact has deformed the door, the very act of deforming the door has been known to cause the latch assembly to unlatch and allow the door to open.

**[0003]** It is generally recognised that occupants of a vehicle which is involved in an accident are safer if they remain inside the vehicle during the accident and immediately thereafter until, for example, the vehicle comes to a stop or is no longer in danger. The presence of an open door during an accident increases the chance of an occupant being injured. Furthermore, the structural rigidity of a vehicle passenger cell is enhanced if all doors remain shut.

**[0004]** A typical vehicle door latch mechanism essentially comprises a rotatable claw mounted on the vehicle door which co-operates with a striker pin mounted on the vehicle body. The action of closing the door causes the claw to rotate to a closed position whereupon it engages and retains the striker pin. The claw is maintained in the closed position by a sprung pawl which abuts an appropriately shaped portion of the claw. In the event of an accident, forces experienced by the latch mechanism can lead to relative movement between the claw and pawl, with the result that the two become misaligned and the pawl no longer maintains the claw in the closed position.

**[0005]** The present invention seeks to provide a latch mechanism which is less likely to unlatch during an accident.

**[0006]** According to the present invention there is provided a latch mechanism having a latch bolt for releasably securing a striker in a closed position, the latch bolt being movably mounted on a chassis of the latch mechanism, and a pawl movably mounted on the chassis and engagable with the latch bolt to secure it in a closed position, the pawl and latch bolt each having respective pivot apertures and being movable about respective projections of the chassis extending through said respective pivot apertures, wherein at least one of said apertures and projections is tapered.

**[0007]** Both the respective apertures and projections may be tapered, with the taper of the projection corresponding to the taper of the aperture. In an alternative embodiment, the projection may be tapered and the aperture of uniform cross-section throughout. In yet a further embodiment the aperture may be tapered and the projection a stepped configuration.

**[0008]** The projections are preferably defined by pins retained in the chassis.

**[0009]** An embodiment of the invention will now be

described with reference to the accompanying drawings in which:

Figure 1 shows a diagrammatic side view of an embodiment of a latch mechanism according to the present invention;

Figure 2 shows the end view indicated by arrow A in figure 1; and

Figures 3 and 4 show end views of two further embodiments of latch mechanisms according to the present invention.

**[0010]** Referring to the drawings there is shown a latch mechanism generally designated 10. The mechanism 10 includes a pawl 12, a latch bolt in the form of a claw 14, and a retention plate 16. The pawl 12 is pivotally mounted via a pawl pin 18 which is connected to the retention plate 16. The pawl 12 includes a pawl engagement portion 20.

**[0011]** The retention plate 16, in conjunction with further components of the latch mechanism 10 (not shown) which do not move relative to the retention plate 16 during use, form a chassis of the latch mechanism 10.

**[0012]** The claw 14 is pivotally mounted on a claw pin 22 which is secured to the retention plate 16. The claw 14 includes a claw jaw 24 and a claw closed engagement portion 26 and a claw first safety engagement portion 28. The retention plate 16 includes a mouth 30.

**[0013]** In use, the claw jaw 24 releasably secures a striker (not shown) in the mouth 30 of the retention plate 16. The claw 14 can be secured in its closed position, as shown in figure 1, by the pawl 12, and in particular by abutment of the pawl engagement portion 20 with the claw closed engagement portion 26.

**[0014]** Known release means allow the pawl 12 to be rotated anticlockwise when viewing figure 1 to disengage the pawl engagement portion 20 from the claw closed engagement portion 26, to allow the claw 14 to rotate in an anticlockwise direction and thus release the striker 30 from the mouth 30.

**[0015]** As can best be seen from figure 2 the pawl 12 and claw 14 are substantially planar having respective first planar sides 12A and 14A, and second planar sides 12B and 14B. The retention plate 16 is positioned on the respective first sides 12A, 14A of the pawl 12 and claw 14. The pawl 12 and claw 14 are pivotable about respective pivot axes 12C and 14C which, in the embodiment shown, are substantially parallel.

**[0016]** Under abnormal conditions, such as when the latch mechanism 10 is secured in a door of a vehicle and the door receives a side impact during a road traffic accident, the retention plate 16 can be distorted with the result that the alignment of the pivot axes 12C and 14C changes. This can lead to the pawl engagement portion 20 becoming misaligned with the claw closed engagement portion 26, and thereby allowing the door to open.

**[0017]** To counter this eventuality the pawl and claw pins 18,22 are arranged so as to resist relative movement between the pawl 12 and claw 14 in the event of an impact. To this end, the portions 32,34 of the pins 18,22 which pass through the pawl 12 and claw 14 are tapered towards the retention plate 16, and said tapered portions 32,34 are received in correspondingly tapered holes 36,38 of the pawl and claw 12,14.

**[0018]** With this arrangement, forces acting laterally on either the pawl 12 or claw 14 urge the tapers of the pins 18,22 and holes 36,38 against one another with the result that the pawl 12 and/or claw 14 are forced against the retention plate 16. This limits the twisting of the pawl 12 and claw 14 relative to one another and hence seeks to prevent the condition wherein the pawl engagement portion 20 becomes misaligned with the claw closed engagement portion 26.

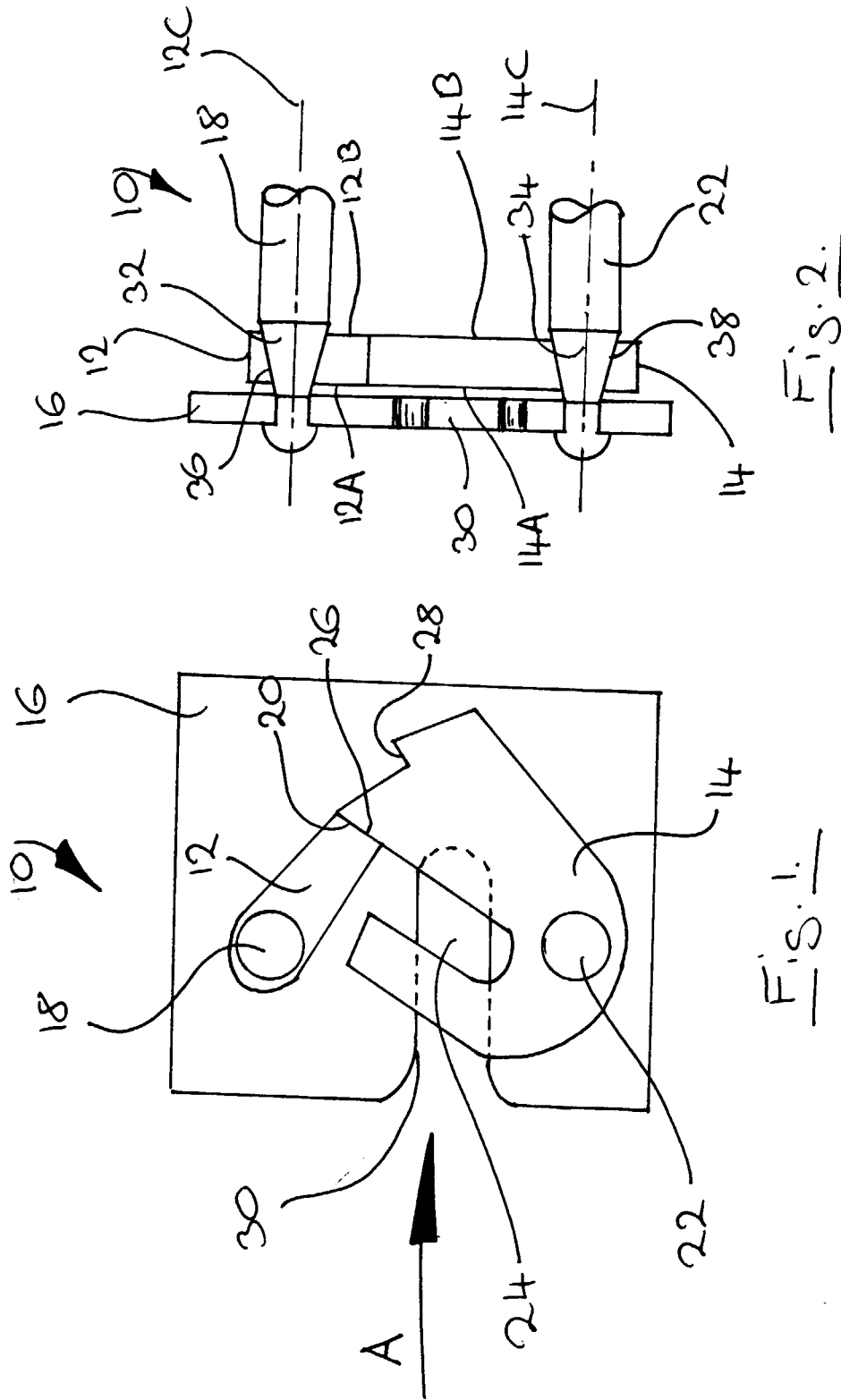
**[0019]** The pawl 12, claw 14 and pins 18,22 do not need to be provided with correspondingly shaped tapered portions 32,34,36,38. As can be readily seen in Figure 3, pins 18, 22 with tapered portions 32,34 can be used in conjunction with pawl and claw holes 40,42 of uniform diameter to achieve the same effect. Similarly, Figure 4 shows the pairing of tapered holes 36,38 with stepped pins 44,46.

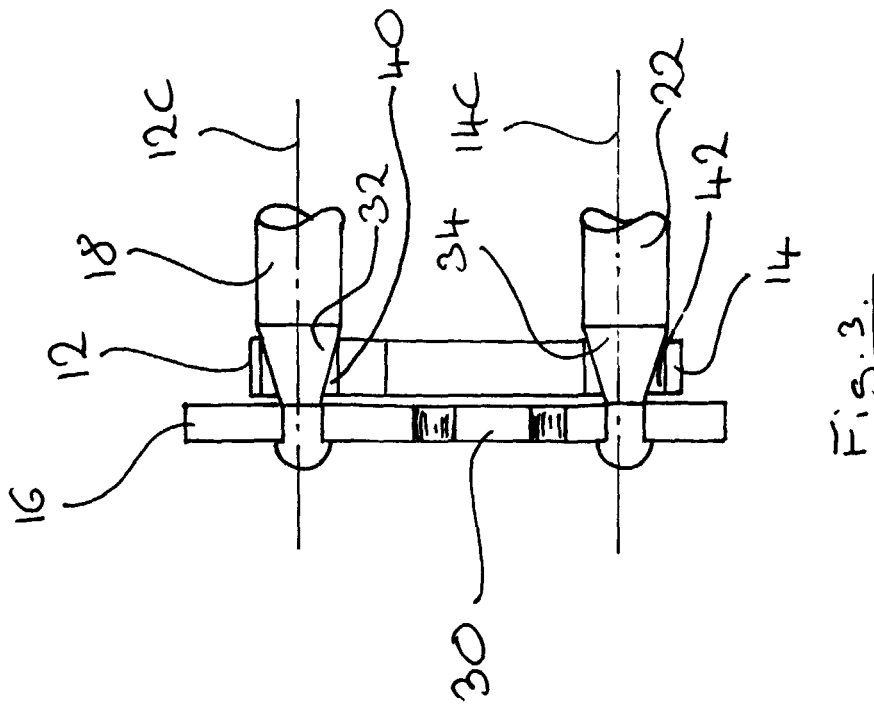
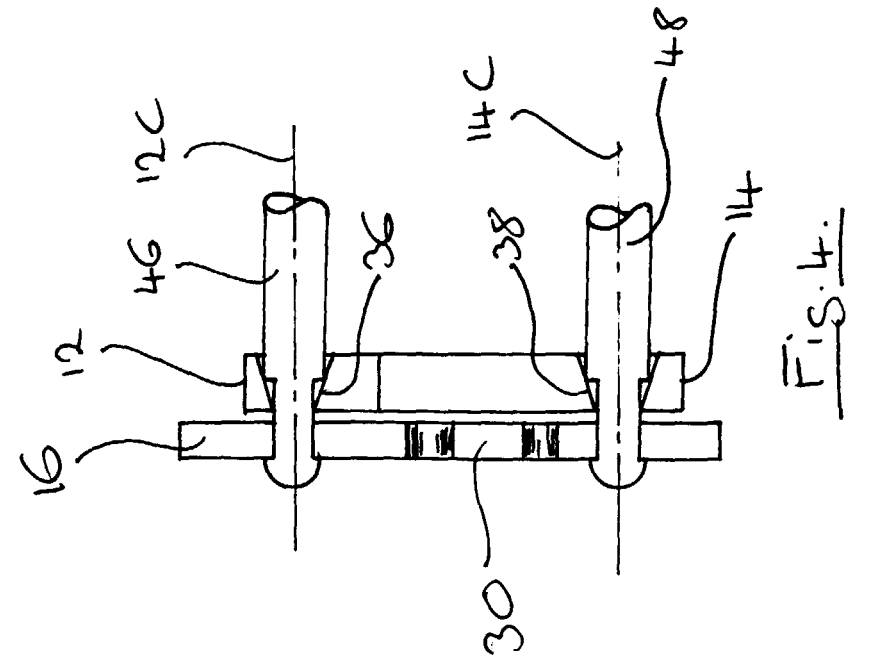
retained in the chassis.

7. A latch mechanism substantially as hereinbefore described with reference to or as shown in Figures 1 and 2, Figure 3 or Figure 4 of the drawings.

## Claims

1. A latch mechanism having a latch bolt for releasably securing a striker in a closed position, the latch bolt being movably mounted on a chassis of the latch mechanism, and a pawl movably mounted on the chassis and engagable with the latch bolt to secure it in a closed position, the pawl and latch bolt each having respective pivot apertures and being movable about respective projections of the chassis extending through said respective pivot apertures, wherein at least one of said apertures and projections is tapered.
2. A latch mechanism as claimed in claim 1 wherein the pivot apertures and projections are tapered.
3. A latch mechanism as claimed in claim 2 wherein the taper angle of the pivot apertures corresponds substantially to the taper angle of the projections.
4. A latch mechanism as claimed in claim 1 wherein the at least one of said projections is tapered and the corresponding aperture is of uniform cross-section throughout.
5. A latch mechanism as claimed in claim 1 wherein the at least one of said apertures is tapered and the corresponding projection has a stepped profile.
6. A latch mechanism as claimed in any preceding claim wherein the projections are defined by pins







European Patent  
Office

# EUROPEAN SEARCH REPORT

Application Number  
EP 00 30 6056

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.7)
X	US 5 492 378 A (BITTMANN WERNER ET AL) 20 February 1996 (1996-02-20)	1-3,7	E05B65/32
A	* column 2, line 43 - column 3, line 22; figures 1,2 *	4,6	
X	US 4 172 768 A (CERDAN JACQUES) 30 October 1979 (1979-10-30)	1-3,6,7	
A	* column 3, line 7 - line 35; figures 1,2 *	5	
A	US 5 746 457 A (KIM MANYEOB) 5 May 1998 (1998-05-05)	1,5-7	
	* column 2, line 21 - column 3, line 27; figures 3,4 *		
The present search report has been drawn up for all claims			<b>TECHNICAL FIELDS SEARCHED (Int.Cl.7)</b> E05B
Place of search <b>THE HAGUE</b>		Date of completion of the search <b>19 October 2000</b>	Examiner <b>PEREZ MENDEZ, J</b>
<b>CATEGORY OF CITED DOCUMENTS</b> 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			

EPO FORM 1503 03 82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 00 30 6056

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

19-10-2000

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5492378 A	20-02-1996	DE 4303532 A	11-08-1994
		DE 4420185 A	14-12-1995
US 4172768 A	30-10-1979	FR 2372299 A	23-06-1978
		DE 2753078 A	01-06-1978
		ES 464613 A	01-09-1978
		GB 1588145 A	15-04-1981
		JP 53083221 A	22-07-1978
		NL 7713165 A	01-06-1978
		SE 7713495 A	31-05-1978
US 5746457 A	05-05-1998	JP 2972158 B	08-11-1999
		JP 10131582 A	19-05-1998