



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) **EP 1 067 261 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
10.01.2001 Bulletin 2001/02

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

(21) Application number: **00305753.6**

(22) Date of filing: **07.07.2000**

(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: **07.07.1999 GB 9915764**

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

(72) Inventors:
• **Watson, Richard**
Stirchley, Birmingham B30 3BW (GB)
• **Fisher, Sydney Edward**
Stirchley, Birmingham B30 3BW (GB)

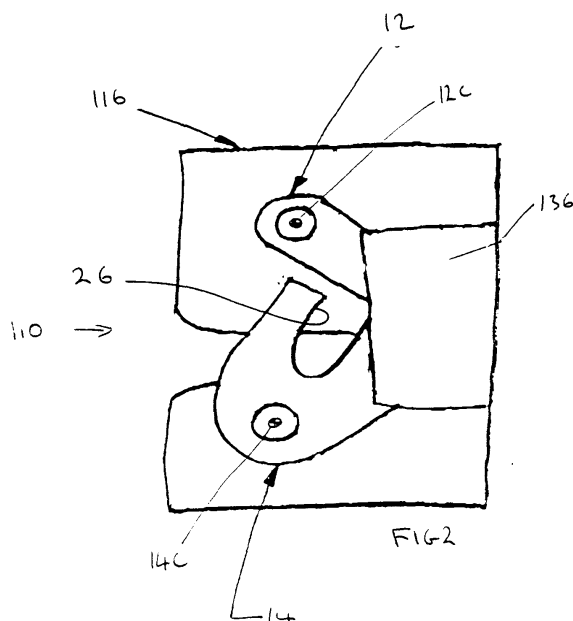
- **Kalsi, Gurbinder Singh**
Stirchley, Birmingham B30 3BW (GB)
- **Spurr, Nigel Victor**
Stirchley, Birmingham B30 3BW (GB)
- **Fairey, Andrew John**
Stirchley, Birmingham B30 3BW (GB)
- **Fauveau, Axel**
Stirchley, Birmingham B30 3BW (GB)
- **Keyes, Gregory**
Stirchley, Birmingham B30 3BW (GB)

(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 releaseably securing a striker (19) in a closed position, the latch bolt being movably mounted on a chassis of the latch mechanism, and a pawl (12) movably mounted on the chassis and engaging the latch bolt to release-

ably secure it in a closed position, the latch mechanism further including at least one limit abutment (136) for retaining the pawl in engagement with the latch bolt following abnormal application of load to the latch mechanism.



EP 1 067 261 A1

Description

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

[0002] When known latch assemblies are used on car doors, and the car has subsequently been involved in a road accident where the door has been deformed, 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 passengers within a vehicle which is involved in an accident are safer if they remain inside the vehicle. Thus an open door allows a passenger to fall out increasing the chance of injury. Furthermore the structural rigidity of a passenger cell of a vehicle is enhanced if all doors remain shut.

[0004] It is an object of the present invention to provide a latch assembly which is less likely to unlatch during an accident.

[0005] Thus 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 engaging the latch bolt to releasably secure it in a closed position, the latch mechanism further including at least one limit abutment for retaining the pawl in engagement with the latch bolt following abnormal application of load to the latch mechanism.

[0006] The invention will now be described, by way of example only, with reference to the accompanying drawings in which:-

Figure 1 is a cut away plan view of a first embodiment of a latch mechanism according to the present invention:

Figure 2 is a further view of Figure 1:

Figure 2A is a side view of Figure 2:

Figure 2B is an isometric view of the retention plate of Figure 2:

Figure 3 and 3A are plan and isometric views of a second embodiment of a latch mechanism according to the present invention:

Figures 4 and 4A are plan and side views of a third embodiment of a latch mechanism according to the present invention:

Figures 5, 5A and 5B are plan, side elevation and isometric views of a fourth embodiment of a latch mechanism according to the present invention:

Figure 6 is a side view of a fifth embodiment of a

latch mechanism according to the present invention: and

Figure 7 is a side view of a sixth embodiment of a latch mechanism according to the present invention.

[0007] Components of the second, third, fourth, fifth and sixth embodiments which fulfil the same function as these shown in the first embodiment are generally labelled 200, 300, 400, 500, and 600 greater than those of the first embodiment

[0008] With reference to Figures 1 to 2B there is shown a latch mechanism 110 which includes a pawl 12, a latch bolt in the form of a claw 14 and a retention plate 16. Pawl 12 is pivotally mounted via pivot 20 which is connected to the retention plate 16. The pawl includes a pawl engagement portion 22.

[0009] The retention plate in conjunction with further components (not shown) which do not move relative to the retention plate during use, from a chassis of the latch mechanism.

[0010] The claw 14 is pivotally mounted on claw pivot 24 which is secured to the retention plate 16. The claw includes a claw jaw 26 and a claw closed engagement portion 28 and a claw first safety engagement portion 30. The retention plate 16 includes a mouth 32.

[0011] In use the claw jaw 26 releasably secures a striker 19 in mouth 32 of the retention plate. The claw can be secured in its closed position, as shown in Figure 1 by the pawl and in particular by abutment of the pawl engagement portion 22 with the claw closed engagement portion 28 or claw first safety engagement portion 30. Typically this position equates to a vehicle passenger door which is not fully shut.

[0012] Known release means allow pawl 12 to be rotated anti clockwise when viewing Figure 1 to disengage the pawl engagement portion 22 from the claw closed engagement portion 28 or claw first safety engagement portion 30 as the case may be, to allow the claw 14 to rotate in an anti clockwise direction thus releasing the striker 19 from the mouth 32.

[0013] The retention plate 16 further includes a limit abutment in the form of tab 136 which under normal operating conditions is not contacted by the pawl or the claw.

[0014] As best seen in Figure 2A the pawl and claw are substantially planar having respective first planar sides 12A and 14A and second planar sides 12B and 14B. The retention plate 116 substantially lies on the first side 12A and 14A of the pawl and claw whilst the tab 136 lies on the second side 12B and 14B of the pawl and claw.

[0015] Under abnormal conditions such as when the latch mechanism is secured in a door of a vehicle and the door receives a side impact during a road traffic ac-

cident, the retention plate 116 can be distorted resulting in the pivot axis 12C and 14C becoming misaligned. This in turn could result in the pawl engagement portion 22 becoming misaligned with the claw closed engagement portion 28, allowing the door to open, where it not for the limit abutment.

[0016] The limit abutment 136 thus limits the amount by which the pawl engagement portion 22 can become misaligned with the claw closed engagement portion 28, and in particular is designed such that these engagement portions cannot become fully misaligned ensuring that the claw cannot open.

[0017] It should be noted from Figure 2 that the pawl engagement portion 22 and claw closed engagement portion 28 are obscured by the tab and thus fully lie between the tab 136 and an opposing portion of the retention plate 116.

[0018] With reference to Figures 3 and 3A there is shown a latch mechanism 210 which includes a different form of limit abutment, namely an edge 242 of a slot 240 formed in a tab 238 of retention plate 216.

[0019] In this case portions of the pawl and claw project through the slot and in particular a part of the pawl engagement portion and claw closed engagement portion lies between edge 242 and edge 243 of slot 240.

[0020] With reference to Figures 4 and 4A there is shown a latch mechanism 310 in which there are two limit abutments are in the form of a tab 344 and a further tab 346. In this case tab 344 would be contacted by pawl 12 in the event of abnormal loads being applied to the latch mechanism 310 and tab 346 would be contacted by claw 14 under the same circumstances. It should be noted that it is not possible for claw 14 to contact tab 344 and similarly it is not possible for pawl 12 to contact tab 346.

[0021] With reference to Figures 5 to 5B there is shown a latch mechanism 410 in which the limit abutment is in the form of a shoulder 450 of a rivet 448, the rivet being secured to the retention plate 416. In this case the shoulder 450 can be engaged by both the pawl and claw in the event of abnormal load being applied to a latch mechanism 410 and in particular part of the pawl engagement portion and claw closed engagement portion is obscured in Figure 5 thus demonstrating that these portions lie between the shoulder 450 and a part of the retention plate 416.

[0022] With reference to Figure 6 there is shown a latch mechanism 510 in which claw 514 includes a limit abutment in the form of a first projection 552 which lies adjacent surface 512B. First projection 552 is proximal the claw closed engagement portion 528 and in particular the edge 554 is common to both the claw closed engagement portion 528 and first projection 552.

[0023] Pawl 512 also has a limit abutment in the form of a first projection 556 having an edge 558 which is also common to pawl engagement portion 522.

[0024] When abnormal loads are applied to latch mechanism 510 the pawl 512 can only twist in an anti

clockwise direction as shown in Figure 6 until surface 512B contacts projection 552 and side 514A of claw 514 contacts projection 556.

[0025] With reference to Figure 7 there is shown a latch mechanism 610 in which the pawl 612 has a projection 652 having an edge common with pawl engagement portion 622 and a further projection 660 having an edge 662 which is common with pawl engagement portion 622.

[0026] In this case, twisting of pawl 612 and or claw 614 in a clockwise or anti clockwise direction is limited by either projection 652 or further projection 660.

[0027] A further embodiments a claw could have a projection and further projection that lie on opposite sides of an engaging pawl.

Claims

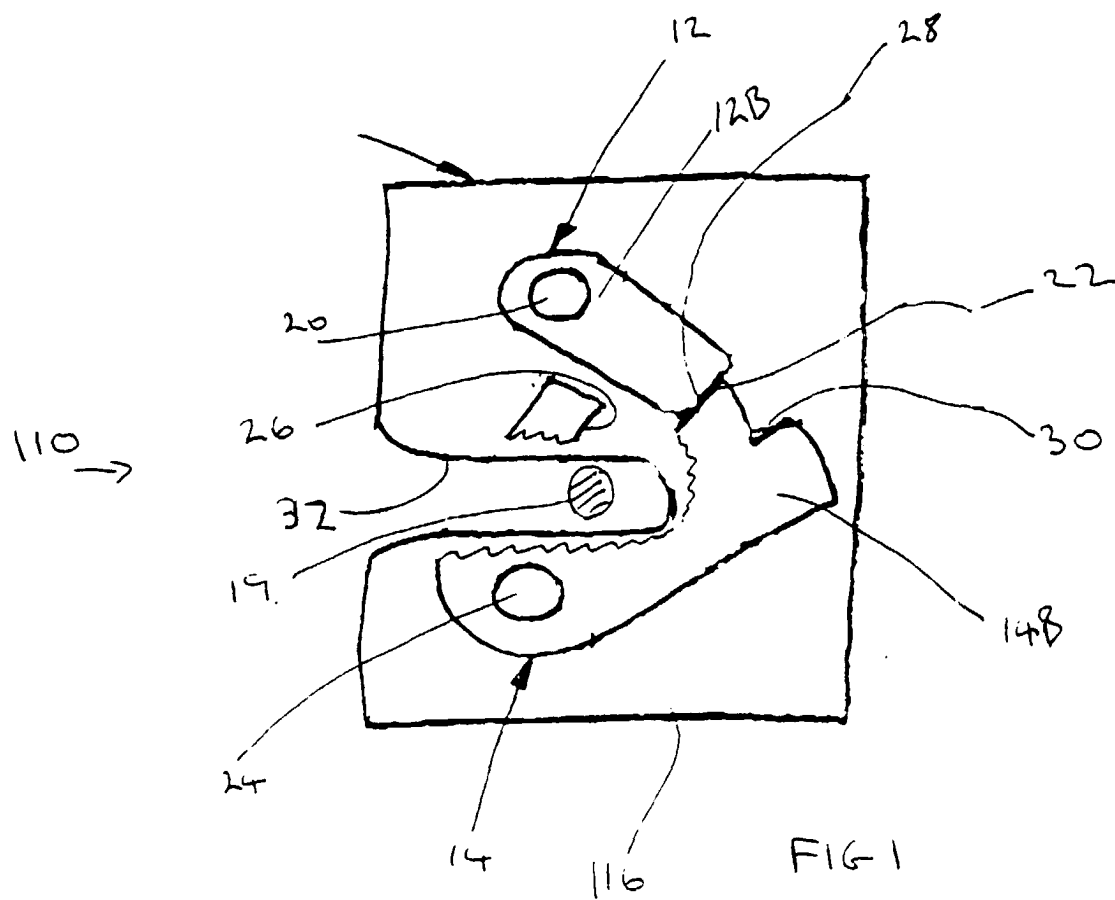
1. A latch mechanism having a latch bolt for releaseably securing a striker in a closed position, the latch bolt being movably mounted on a chassis of the latch mechanism, and a pawl movably mounted on the chassis and engaging the latch bolt to releaseably secure it in a closed position, the latch mechanism further including at least one limit abutments for retaining the pawl in engagement with the latch bolt following abnormal application of load to the latch mechanism.
2. A latch mechanism as defined in claim 1 in which the chassis includes a retention plate situated on a first side of the pawl and latch bolt and having a mouth to accept a striker, the limit abutment being provided by a tab of the retention plate situated on a second side of the pawl and latch bolt which is capable of being engaged by the pawl and is capable of being engaged by the latch bolt following abnormal application of load to the latch mechanism.
3. A latch mechanism as defined in claim 1 in which the chassis includes a retention plate situated on a first side of the pawl and latch bolt and having a mouth to accept a striker, in which the limit abutment is provided by an edge of a slot of the retention plate the edge being situated on a second side of the pawl and latch bolt and which is capable of being engaged by the pawl and which is capable of being engaged by the latch bolt following the abnormal application of load to the latch mechanism.
4. A latch mechanism as defined in claim 1 in which the chassis includes a retention plate situated on its first side of the pawl and latch bolt and having a mouth to accept a striker in which the limit abutments are provided by a first tab of the retention plate situated on a second side of the pawl and latch bolt which is capable of being engaged by the pawl

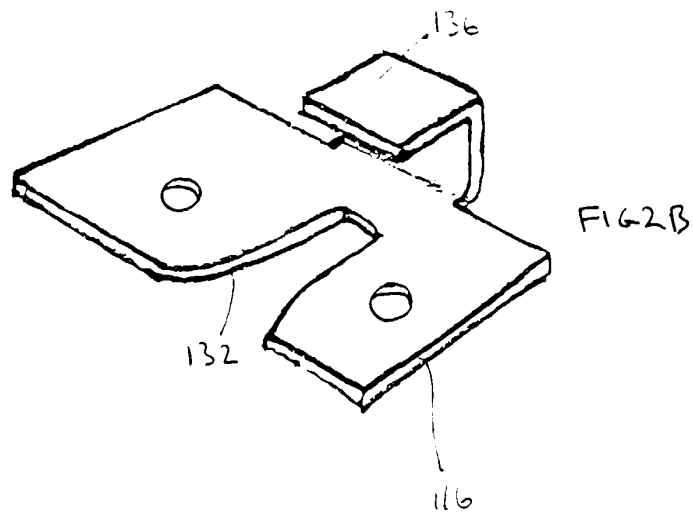
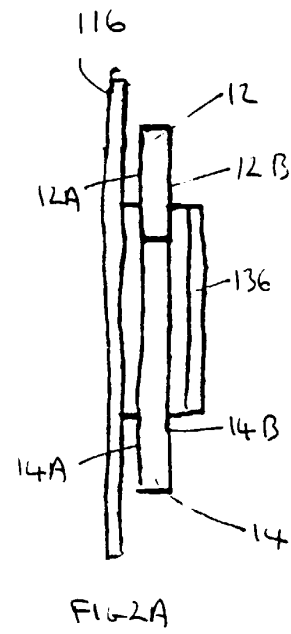
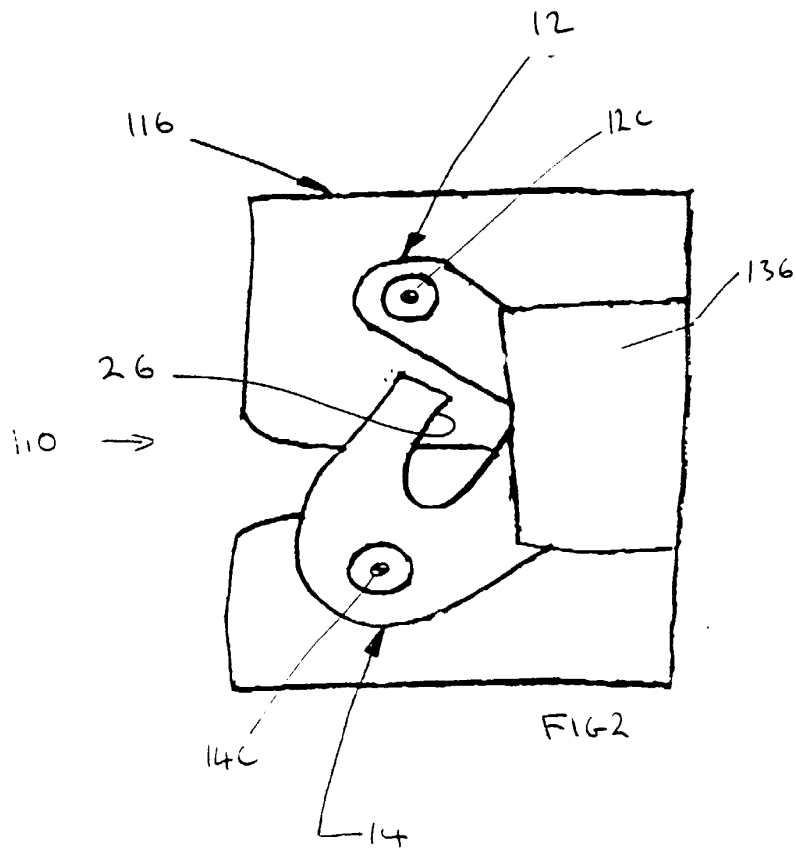
but not the bolt following abnormal application of load to the latch mechanism, and by a second tab of the retention plate situated on the second side of the pawl and latch bolt which is capable of being engaged by the latch bolt but not the pawl following the abnormal application of load to the latch mechanism.

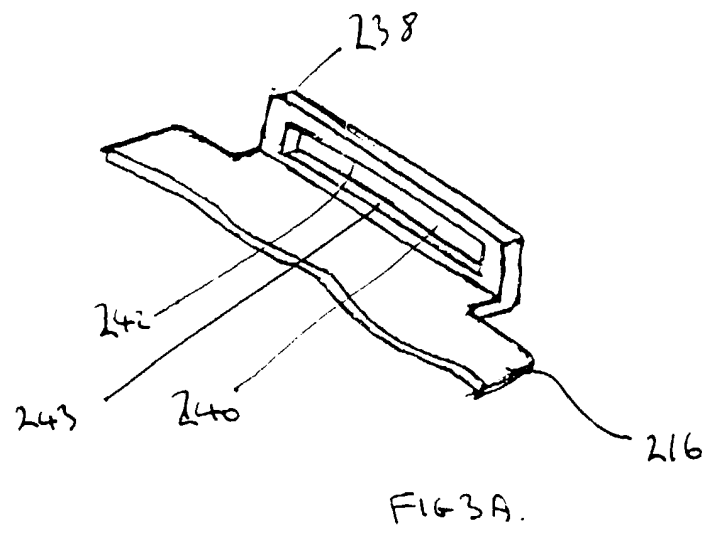
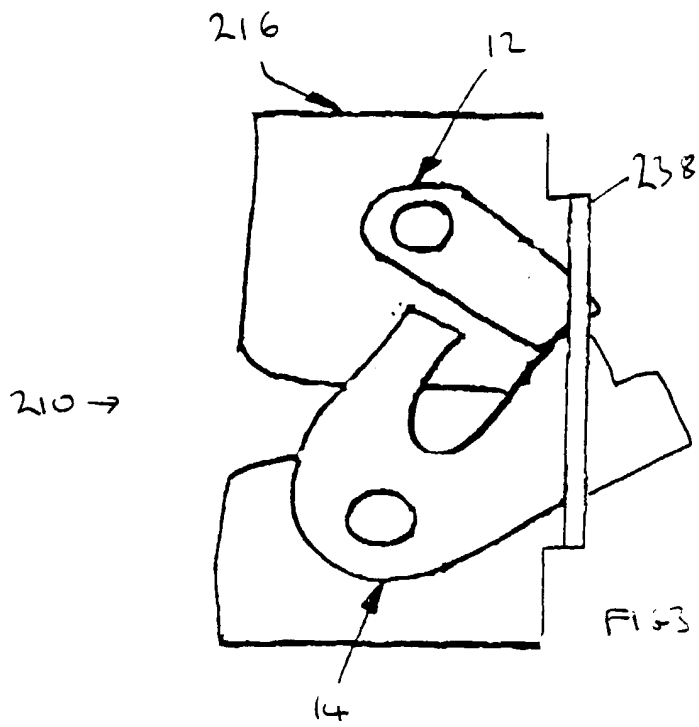
5. A latch mechanism as defined in claim 1 in which the chassis includes a retention plate situated on a first side of the pawl and latch bolt and having a mouth to accept the striker in which the limit abutment is provided by a shoulder of a shouldered rivet, the shoulder being situated on a second side of the pawl and latch bolt which is capable of being engaged by the pawl and is capable of being engaged by the latch bolt following the abnormal application of the load to the latch mechanism, the rivet being secured to the retention plate. 10
6. A latch mechanism as defined in any preceding claim in which at least a part of engaging portions of the pawl and latch bolt are positioned between the retention plate and the limit abutment. 15
7. A latch mechanism as defined in any preceding claim in which the pawl and the a latch bolt are generally planar. 20
8. A latch mechanism as defined in claim 1 in which the latch bolt and pawl are generally planar and a first projection of one of the pawl and latch bolt lies adjacent a first planar surface of the other of the pawl and latch bolt to provide the limit abutment. 25
9. A latch mechanism as defined in claim 8 in which a second projection of the one of the pawl and latch bolt lies adjacent a second planer surface of the other of the pawl and latch bolt to provide a further limit abutment. 30
10. A latch mechanism as defined in claim 8 in which a second projection of the other of the pawl and latch bolt lies adjacent a planer surface of said one of the pawl and latch bolt to provide a further limit abutment. 35
11. A latch mechanism as defined in any one of claims 8 to 10 in which the first or second projection is proximal the engaging portions of the pawl and latch bolt. 40
12. A latch mechanism as defined in claim 11 in which the first or second projections and the engaging portion of the corresponding pawl or a latch bolt have a common edge. 45
13. A latch mechanism as defined in any preceding

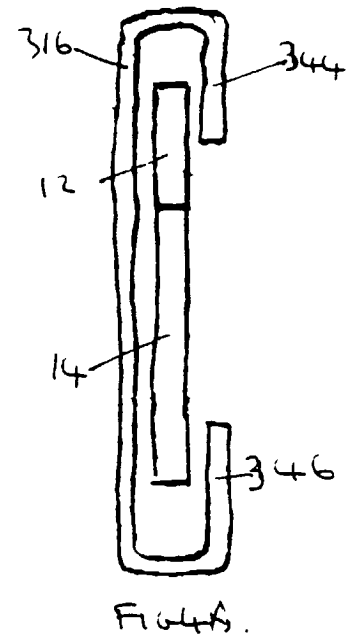
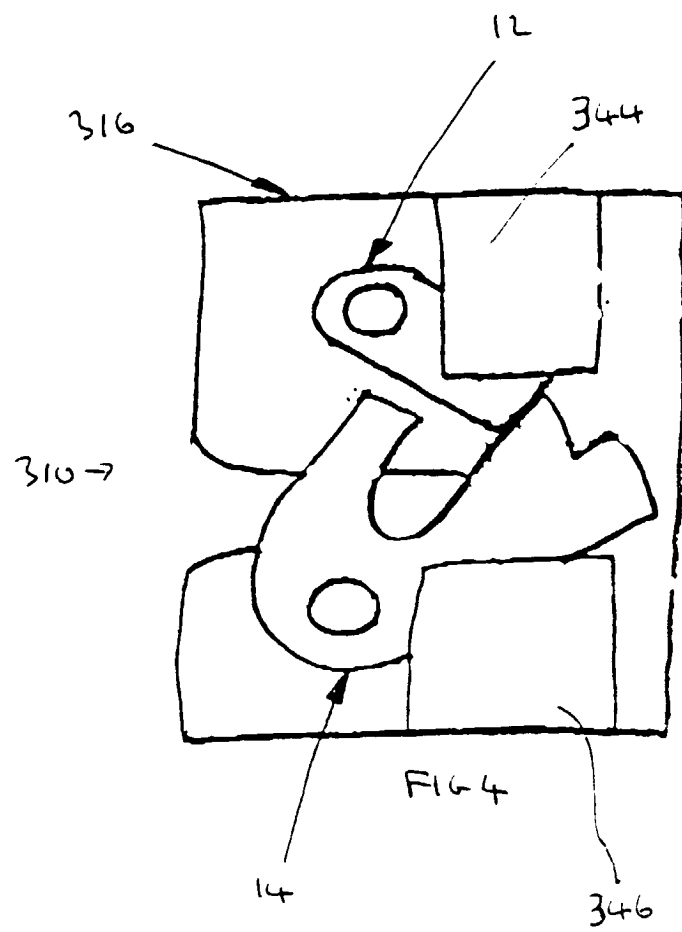
claim in which at least one of the pawl and latch bolt are pivotally mounted on the chassis.

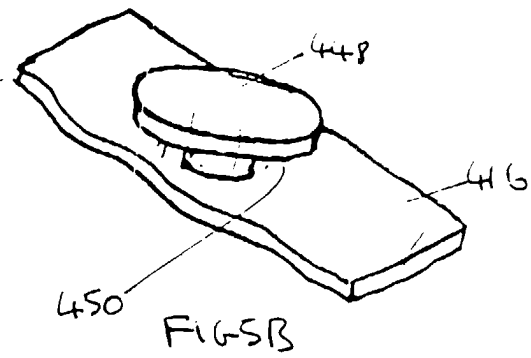
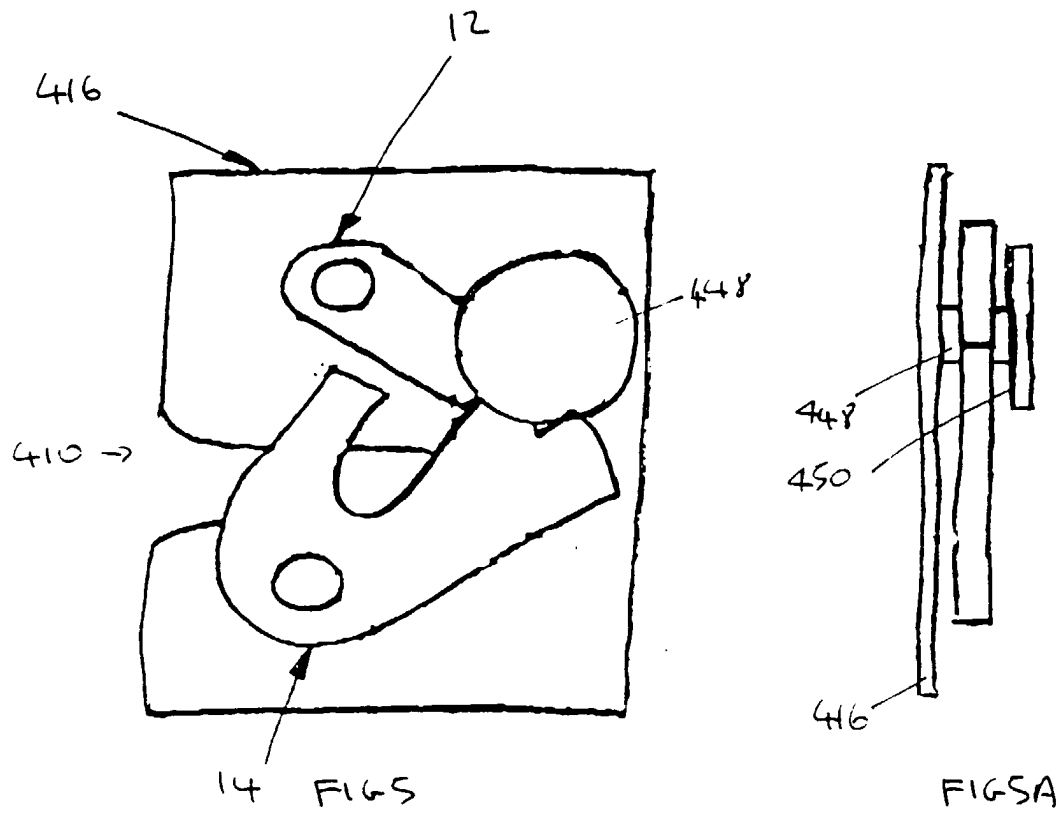
14. A latch mechanism as defined in claim 13 in which at least one of the pawl and latch bolt is pivotally mounted on a pivot secured to the retention plate

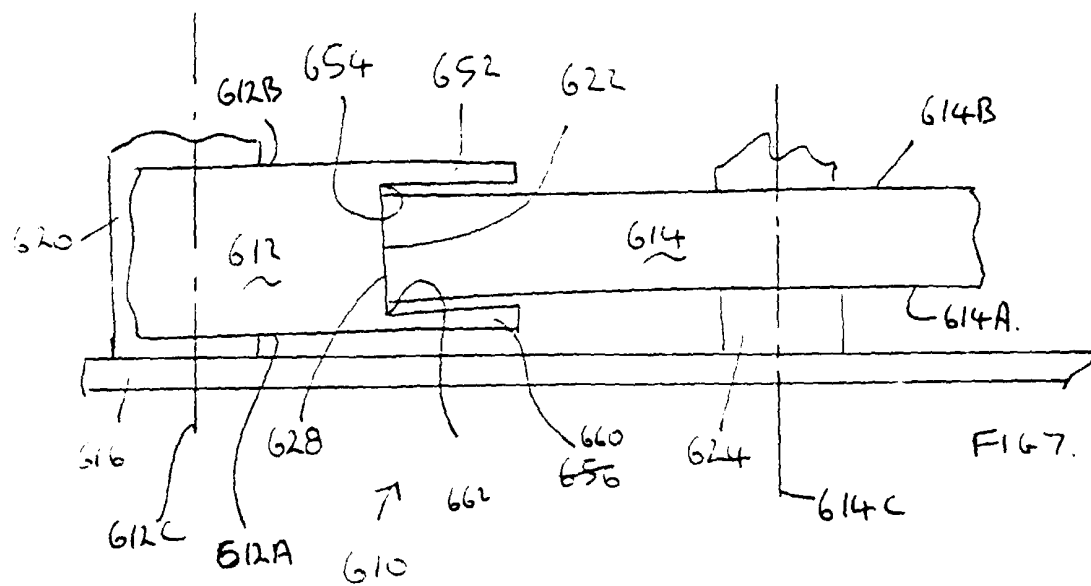
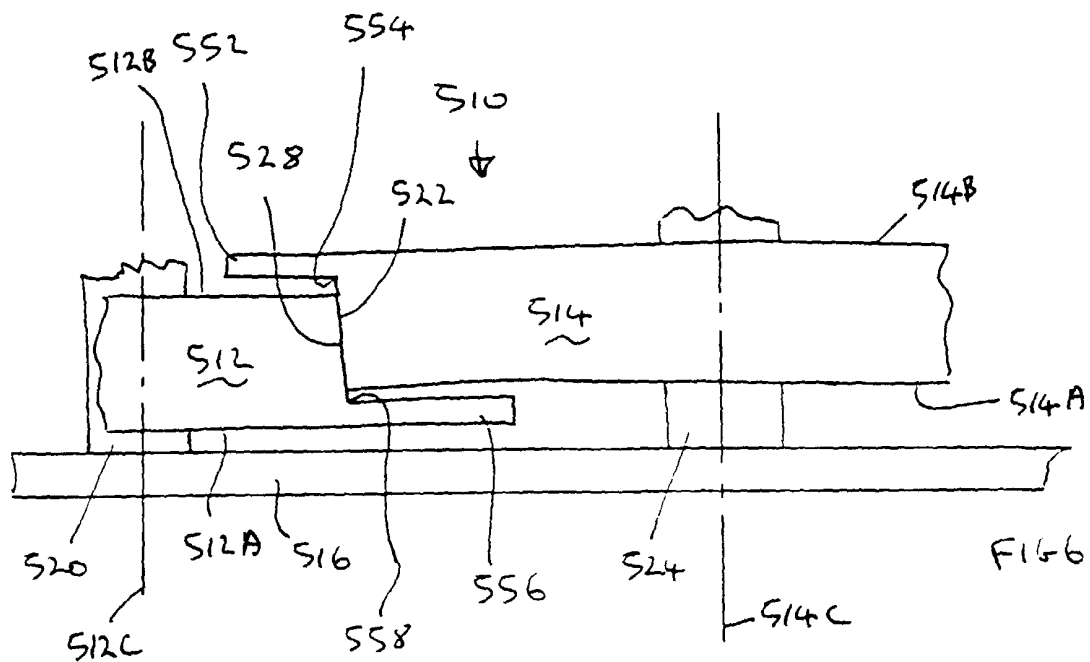














European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 00 30 5753

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	GB 2 197 682 A (OHI SEISAKUSHO CO LTD) 25 May 1988 (1988-05-25) * the whole document *	1-5,7, 13,14	E05B65/32
X	FR 1 594 900 A (AISIN SEIKI COMPANY LIMITED) 8 June 1970 (1970-06-08) * page 8, line 7 - line 11; figures 13,14 *	1,6-14	
X	DE 38 39 568 A (EWALD WITTE & CO) 31 May 1990 (1990-05-31) * the whole document *	1,7-11, 13,14	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			E05B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 18 October 2000	Examiner PEREZ MENDEZ, J
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			

EPO FORM 1503 03 82 (P04C01)

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

EP 00 30 5753

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.

18-10-2000

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 2197682 A	25-05-1988	JP 1778207 C	28-07-1993
		JP 4069713 B	06-11-1992
		JP 63130881 A	03-06-1988
		US 4896907 A	30-01-1990
FR 1594900 A	08-06-1970	DE 1812528 A	16-10-1969
		GB 1229228 A	21-04-1971
DE 3839568 A	31-05-1990	US 5163723 A	17-11-1992