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SEAT BELT BUCKLE.

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Description

The present invention relates to seat belt buckles for seat belts in motor vehicles. One form of such seat belt buckle involves a latch plate having an aperture therein, engageable on one part of the seat belt, and a buckle having a rigid frame including a base having an opening therein and upstanding side walls adapted to guide the latch plate longitudinally of the frame.

The latch plate can be inserted against the action of a spring loaded ejector and when in the fully inserted position a locking member is pivoted to a lower latching position in which a locking element engages in the aperture in the latch plate. A push button is used to release the locking member which pivots back to an unlatched position.

GB-2010955 discloses a seat belt buckle adapted to releasably engage a latch plate having an aperture therein, said buckle comprising a rigid frame including a base having an opening therein, upstanding side walls adapted to guide the latch plate longitudinally of the frame, a bar extending transversely of the frame between said side walls, said bar being spaced above the base, a locking member pivotally mounted on the frame and pivotal between a lower latched position and an upper unlatched position, said locking member carrying a downwardly projecting locking element engageable in said aperture in the latch plate to retain the latch plate in place and passing into said opening, a pair of wings extending laterally from said locking member and engaging in said side walls to pivotally and resiliently mount the locking member for movement between its upper and lower positions.

It is important that such seat belt buckles should have an easy and effective latching of the latch plate and should easily release the latch plate by operation of the push button. It is most important to retain the latch plate in a latch position in the buckle even when the latch plate and buckle are subject to a very heavy impact load.

The present invention is characterised in that a slider is slidable longitudinally of the locking member between a first position in which it is located under said bar, to retain the locking member in the lower latched position and a second position in which it allows said locking member to pivot to its upper unlatched position, in that a slider spring urges the slider towards its first position; in that a push button is provided to push the slider to its second position, in that said slider is resiliently engaged by said slider spring against the rear of said bar to retain the locking member in its upper unlatched position, in that said wings are capable of elastic flexing, upon axial loading of said locking member by said latch plate, and in that at least one stop member extends laterally from said member, said at least one stop member engaging abutments on said rigid frame to prevent flexing of said wings beyond their elastic limit.

The provision of the bar extending over the slider assists in the withstanding of heavy loads and prevents inadvertent release of the buckle. More importantly, however, the provision of the stop member or members prevents excessive flexing of the wings, which acts as the pivot for the locking member, so that the wings never are distorted beyond their elastic limit.

The stop member may take a number of forms but advantageously each stop member extends laterally from the locking member forwardly from the wings and may comprise a pair of arms engaging, at least in the lower latching position of the locking member, against abutments in the side walls. In a simple construction these abutments are in the form of open-topped notches in the upper edges of the side walls into which the arms move in the lower latching position.

Preferably the locking element in the lower latching position of the locking member, has its forward edge spaced from the forward edge of said opening by a given distance under normal conditions. Desirably said at least one stop member has its forward edge spaced from its associated abutment by a spacing less than said given distance, whereby the load bearing capacity of the or each stop member and its associated abutment are enhanced by engagement of the forward edge of the locking element with the rearward edge of the opening. Advantageously the rearward edge of said bar and the forward edge of said slider are cooperatively chamfered to retain the locking member in its upper unlatched position when said forward and rearward edges are inter-engaged by said slider spring.

In order that the present invention may more readily be understood, the following description is given, merely by way of example, reference being made to the accompanying drawings in which:-

Figure 1 is a side elevation of one embodiment of buckle according to the invention shown in the latched position;

Figure 2 is a similar view in section in the unlatched position; and

Figure 3 is a plan view, half in section, of the buckle illustrated in Figures 1 and 2.

Referring first to Figure 1 the buckle includes a rigid frame 10 having a base plate 12 having two upstanding side walls 14 extending from each side edge thereof. A bar 16 extends between the side walls 14 and is spaced from and parallel to the base plate 12. An opening 20 is formed in the base plate 12 and is provided with a front edge 22 (Figure 2).

Pivotally mounted between the side walls 14 is a locking member 24, which includes a forwardly extending body 26 and downwardly extending legs 28. The body is provided with two laterally extending wings 30 engaging in rear notches 32 in the side walls 14. Extending parallel to these wings 30 are arms 34

which can, in the lower latched position as illustrated in Figure 1, engage in forward notches 36 in the side wall.

At the forward end of the body 26 of the locking member is a locking element 38 which, in the latched position, passes through an aperture 40 in a latch plate 42 to retain the latch plate in place. It will be noted that longitudinally slidable on the locking member 24 is a slider 44 having a chamfered leading edge 46. The slider is urged towards the front (the left in the Figures) by a slider spring 48 engaged over a projection 50 on the body 26 of the locking member 24.

Longitudinally slidable on the side walls 14 is a push button 52 which has rearward projections 54 engaging forward projections 56 on an ejector 58 longitudinally slidable in the opening 20 in the base plate 12, and urged to the forward position by an ejector spring 60.

In use, starting from the position illustrated in Figure 2, a latch plate 42 is inserted in the guide channel formed by the base plate 12 and the side walls 14, it causes the ejector 58 to move rearwardly, that is to the right, against the action of its spring 60. This movement continues until the ejector is moved so far rearwards that it engages on the bottom of the leg 28 of the locking member 24. The resulting couple rotates the locking member/slider system causing the slider 44 to move down and return under the bar 16 to the position illustrated in Figure 1. When the plate 42 is unloaded, the aperture 40 therein abuts the locking element 38 which retains the latch plate 42 in place so that the buckle cannot unlatch.

In this condition, if an accident or the like occurs, and a very great strain is put on the buckle, then the latch plate 42 will be urged forward and will move with it the locking element 38, thereby closing the gap 64 illustrated in Figure 2, so that the front face of the locking element 38 abuts the front face 22 of the aperture 20. During this movement, the wings 30 will flex rearwards but the arms 34 engaging the front of the notches 36 will prevent anything more than a limited flexing so that the wings are not stressed beyond their elastic limit.

With the reduction of load (after impact) both the wings and the main body of the locking member recover elastically to restore the clearances 64, 66 (Figure 3) between the locking member 34 and the frame sufficient to allow the front face 70 of the locking element 38 to sweep past the frame edge 22, when the locking member is released to the unlatched position and in particular with the release preformed whilst specific test loads are being applied longitudinally through the latch plate.

Claims

1. A seat belt buckle adapted to releasably engage

a latch plate (42) having an aperture (40) therein, said buckle comprising a rigid frame (10) including a base (12) having an opening (20) therein, upstanding side walls (14) adapted to guide the latch plate longitudinally of the frame, a bar (16) extending transversely of the frame between said side walls, said bar being spaced above the base, a locking member (24) pivotally mounted on the frame and pivotal between a lower latched position and an upper unlatched position, said locking member (24) carrying a downwardly projecting locking element (38) engageable in said aperture (40) in the latch plate (42) to retain the latch plate in place and passing into said opening (20), a pair of wings (30) extending laterally from said locking member and engaging in said side walls to pivotally and resiliently mount the locking member for movement between its upper and lower positions, characterised in that a slider (44) is slidable longitudinally of the locking member between a first position in which it is located under said bar (16), to retain the locking member in the lower latched position and a second position in which it allows said locking member to pivot to its upper unlatched position, in that a slider spring 48 urges the slider towards its first position, in that a push button (52) is provided to push the slider to its second position, in that said slider is resiliently engaged by said slider spring against the rear of said bar to retain the locking member in its upper unlatched position, in that said wings (30) are capable of elastic flexing, upon axial loading of said locking member by said latch plate (42), and in that at least one stop member (34) extends laterally from said member, said at least one stop member engaging abutments (36) on said rigid frame to prevent flexing of said wings beyond their elastic limit.

2. A seat belt buckle according to claim 1, characterised in that at least one stop member (34) extends laterally from said latching member forwardly of said wings (30).
3. A seat belt buckle according to claim 2, characterised in that at least one stop member (34) comprises a pair of arms engaging, at least in the lower position of the latching member, against said abutments (36) which are provided in said side wall.
4. A seat belt buckle according to claim 3, characterised in that abutments (36) are in a form of notches in the upper edges of said side walls.
5. A seat belt buckle according to any preceding claim, wherein the locking element (38), in the lower latching position of the locking member,

has its forward edge spaced from the forward edge of said opening (20) by a given distance under normal conditions.

6. A seat belt buckle according to claim 5, characterised in that at least one stop member (34) has its forward edge spaced from its associated abutment (36) by a spacing less than said given distance, whereby the load bearing capacity of the or each stop member (34) and its associated abutment (36) are enhanced by engagement of the forward edge of the locking element (38) with the rearward edge of the opening (20).
7. A seat belt buckle according to any preceding claim, wherein the rearward edge (18) of said bar (16) and the forward edge (46) of said slider (44) are co-operatingly chamfered to retain the locking member in its upper unlatched position when said forward and rearward edges are inter-engaged by said slider spring.

Patentansprüche

1. Sicherheitsgurtschloß, das so ausgelegt ist, daß es lösbar mit einer Halteplatte (42) in Eingriff kommen kann, die in sich eine Öffnung (40) aufweist, wobei das Schloß einen starren Rahmen (10), der eine Grundplatte (12) beinhaltet, die in sich eine Öffnung (20) aufweist, nach oben stehende Seitenwände (14), die so ausgelegt sind, daß sie die Halteplatte in der Längsrichtung des Rahmens führen können, eine Stange (16), die sich quer zu dem Rahmen zwischen den Seitenwänden erstreckt, wobei die Stange oberhalb der Grundplatte mit Zwischenraum angeordnet ist, ein Verriegelungsglied (24), das schwenkbar an dem Rahmen angebracht ist und zwischen einer unteren Verriegelungsstellung und einer oberen Entriegelungsstellung verschwenkt werden kann, wobei das Verriegelungsglied (24) ein nach unten vorstehendes Verriegelungselement (38) trägt, das in die Öffnung in der Halteplatte (42) eingreifen kann, um die Halteplatte an Ort und Stelle halten zu können, und das in die Öffnung (20) wandert, ein Paar von Flügeln (30) umfaßt, die sich seitlich ausgehend von dem Verriegelungsglied erstrecken und in die Seitenwände eingreifen, um das Verriegelungsglied schwenkbar und elastisch zu lagern, damit es zwischen seinen oberen und unteren Stellungen bewegt werden kann, dadurch gekennzeichnet, daß ein Gleitstück (44) in der Längsrichtung des Verriegelungsglieds zwischen einer ersten Stellung, in der es sich unter der Stange (16) befindet, um das Verriegelungsglied in der unteren Verriegelungsstellung zu halten, und einer zweiten Stellung gleiten

kann, in der das Verriegelungsglied in seine obere Entriegelungsstellung verschwenkt werden kann, daß eine Gleitstückfeder (48) das Gleitstück in Richtung auf seine erste Stellung treibt, daß eine Drucktaste (52) vorgesehen ist, um das Gleitstück in seine zweite Stellung zu drücken, daß die Gleitstückfeder federnd mit dem Gleitelement gegen die Rückseite der Stange in Eingriff kommt, um das Verriegelungsglied in seiner oberen Entriegelungsstellung zurückzuhalten, daß die Flügel (30) elastisch durchgebogen werden können, wenn das Verriegelungsglied von der Halteplatte (42) axial mit Last beaufschlagt wird, und daß sich zumindest ein Anschlagelement (34) seitlich ausgehend von dem Glied erstreckt, wobei das zumindest eine Anschlagelement in Widerlager (36) auf dem starren Rahmen eingreift, um ein Durchbiegen der Flügel über ihre Elastizitätsgrenze hinaus zu vermeiden.

2. Sicherheitsgurtschloß nach Anspruch 1, dadurch gekennzeichnet, daß sich zumindest ein Anschlagelement (34) seitlich ausgehend von dem Verriegelungsglied nach vorne gerichtet vor den Flügeln (30) erstreckt.
3. Sicherheitsgurtschloß nach Anspruch 2, dadurch gekennzeichnet, daß zumindest ein Anschlagelement (34) ein Paar von Armen umfaßt, die zumindest in der unteren Stellung des Verriegelungsglieds in die Widerlager (36) eingreifen, die in der Seitenwand vorgesehen sind.
4. Sicherheitsgurtschloß nach Anspruch 3, dadurch gekennzeichnet, daß die Widerlager (36) die Form von Kerben in den oberen Kanten der Seitenwände aufweisen.
5. Sicherheitsgurtschloß nach einem der vorhergehenden Ansprüche, bei dem die vordere Kante des Verriegelungselements (38) in der unteren Verriegelungsstellung des Verriegelungsglieds unter normalen Bedingungen von der vordere Kante der Öffnung (20) um eine vorbestimmte Entfernung beabstandet ist.
6. Sicherheitsgurtschloß nach Anspruch 5, dadurch gekennzeichnet, daß die vordere Kante zumindest eines Anschlagelements (34) von ihrem zugehörigen Widerlager (36) um einen Abstand beabstandet ist, der geringer als die vorgegebene Entfernung ist, wodurch die Tragfähigkeit des oder jedes Anschlagelements (34) und seines zugehörigen Widerlagers (36) verbessert wird, indem die vordere Kante des Verriegelungselements (38) in die hintere Kante der Öffnung (20) eingreift.

7. Sicherheitsgurtschloß nach einem der vorhergehenden Ansprüche, bei dem die hintere Kante (18) der Stange (16) und die vordere Kante (46) des Gleitstücks (44) kooperierend abgeschrägt sind, um das Verriegelungsglied in seiner oberen Entriegelungsstellung zu halten, wenn die vorderen und hinteren Kanten durch die Gleitstückfeder miteinander in Eingriff stehen.

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Revendications

1. Boucle pour ceinture de siège adaptée pour recevoir de manière amovible une plaque de verrouillage (42) présentant une ouverture (40), ladite boucle comprenant un corps rigide (10) incluant une base (12) dotée d'un dégagement (20), des parois latérales verticales (14) adaptées pour guider la plaque de verrouillage le long du corps, une barre (16) disposée perpendiculairement au corps entre lesdites parois latérales, ladite barre étant montée à distance au-dessus de la base, un membre de verrouillage (24) monté sur le corps de manière à pouvoir pivoter entre une première position inférieure verrouillée et une seconde position supérieure déverrouillée, ledit membre de verrouillage (24) portant un élément de verrouillage (38) dépassant vers le bas et susceptible de s'engager dans ladite ouverture (40) de la plaque de verrouillage (42) afin de maintenir en place la plaque de verrouillage et passant dans ledit dégagement (20), une paire de bras (30) s'étendant latéralement depuis ledit membre de verrouillage et s'engageant de façon élastique dans lesdites parois latérales afin que le membre de verrouillage puisse pivoter entre ses positions supérieure et inférieure, caractérisée en ce qu'une coulisse (44) peut se déplacer le long du membre de verrouillage entre une première position dans laquelle elle est située sous ladite barre (16), pour retenir le membre de verrouillage dans la position inférieure verrouillée, et une seconde position dans laquelle elle permet audit membre de verrouillage de pivoter jusqu'à sa position supérieure déverrouillée, en ce qu'un ressort de coulisse (48) presse la coulisse en direction de sa première position, en ce qu'un bouton-poussoir (52) est prévu pour pousser la coulisse vers sa seconde position, en ce que ladite coulisse est pressée de façon élastique par ledit ressort de coulisse contre l'arrière de ladite barre pour retenir le membre de verrouillage dans sa position supérieure déverrouillée, en ce que lesdits bras (30) peuvent plier de manière élastique sous la charge axiale exercée sur ledit membre de verrouillage par ladite plaque de verrouillage (42), et en ce qu'au moins un élément d'arrêt (34) s'étend latéralement depuis ledit membre, ledit ou lesdits élé-

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ment(s) d'arrêt s'engageant dans des butées (36) ménagées dans le corps rigide afin d'éviter la flexion desdits bras au-delà de leur limite d'élasticité.

2. Boucle de ceinture de siège selon la revendication 1, caractérisée en ce qu'au moins un élément d'arrêt (34) s'étend latéralement depuis ledit membre de verrouillage à l'avant desdits bras (30).

3. Boucle de ceinture de siège selon la revendication 2, caractérisée en ce qu'au moins un élément d'arrêt (34) comprend une paire de doigts venant buter, au moins dans la position inférieure du membre de verrouillage, contre lesdites butées (36) qui sont prévues dans ladite paroi latérale.

4. Boucle de ceinture de siège selon la revendication 3, caractérisée en ce que les butées (36) se présentent sous la forme d'entailles pratiquées dans les bords supérieurs desdites parois latérales.

5. Boucle de ceinture de siège selon l'une quelconque des revendications précédentes, caractérisée en ce que, dans des conditions normales, dans la position inférieure verrouillée du membre de verrouillage, l'élément de verrouillage (38) a son bord avant espacé du bord avant dudit dégagement (20) d'une distance donnée.

6. Boucle de ceinture de siège selon la revendication 5, caractérisée en ce qu'au moins un élément d'arrêt (34) a son bord avant espacé de sa butée associée (36) d'une distance inférieure à ladite distance donnée, la limite de charge du ou de chaque élément d'arrêt (34) et de sa ou leur butée associée (36) étant augmentée par engagement du bord avant de l'élément de verrouillage (38) avec le bord arrière de le dégagement (20).

7. Boucle de ceinture de siège selon l'une quelconque des revendications précédentes, caractérisée en ce que le bord arrière (18) de ladite barre (16) et le bord avant (46) de ladite coulisse (44) sont chanfreinés de manière à coopérer pour retenir le membre de verrouillage dans sa position supérieure déverrouillée lorsque lesdits bords avant et arrière sont plaqués l'un contre l'autre par ledit ressort de coulisse.

Fig. 1.

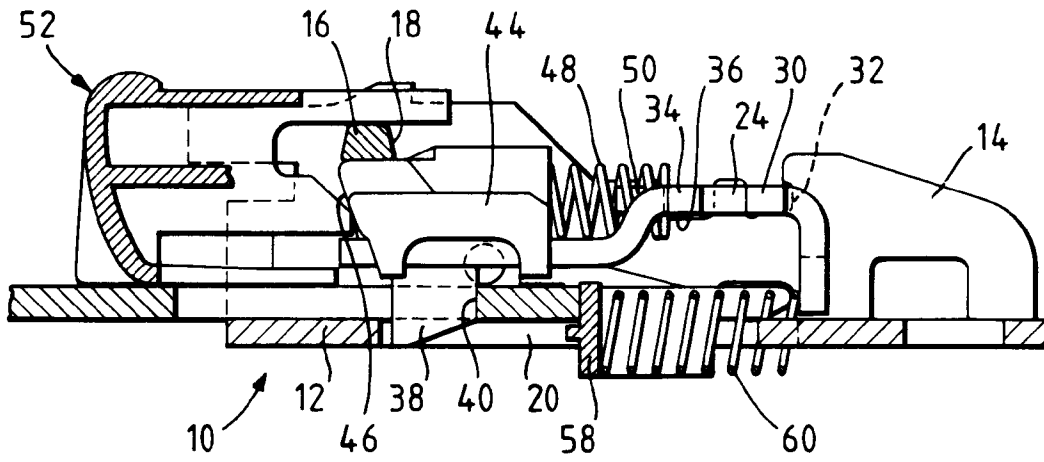


Fig. 2.

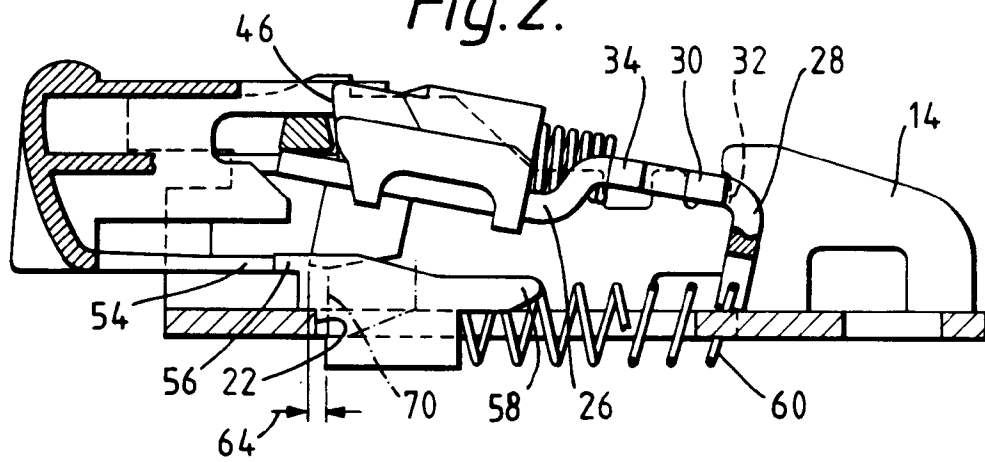


Fig. 3.

