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SAFETY BELT BUCKLES
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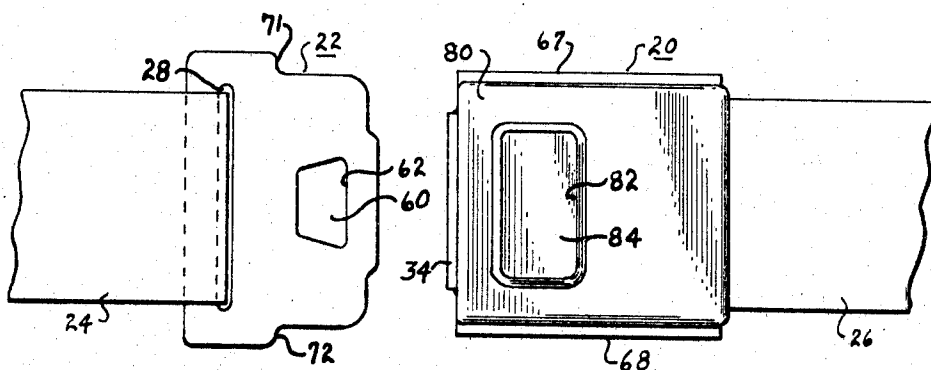


FIG. 1

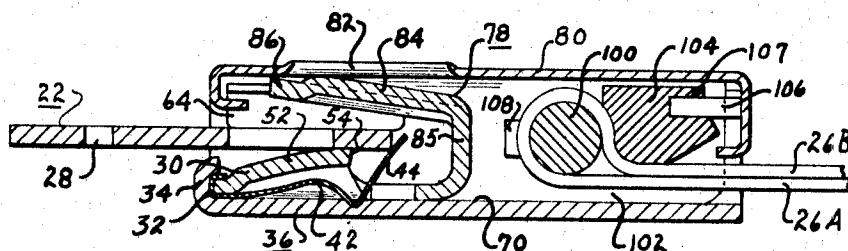


FIG. 5

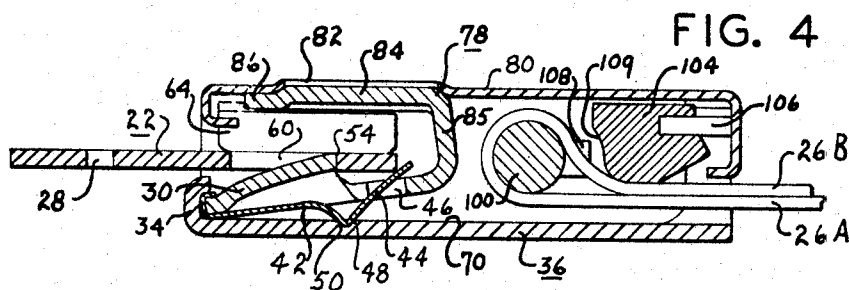


FIG. 4

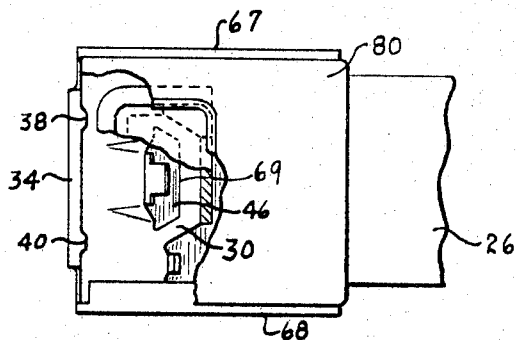


FIG. 3

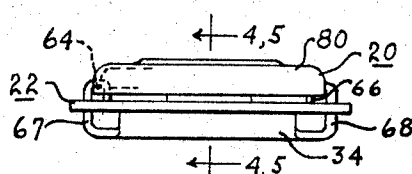


FIG. 2

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SAFETY BELT BUCKLES

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The present invention relates to buckles and more particularly to buckles for safety belts for use in automobiles, airplanes, and other passenger vehicles.

An extensive effort has been made in recent years to have seat belts installed in all automobiles, particularly in the front seats, and in some states laws and regulations have been enacted requiring safety belts in all new automobiles sold in the state. There has been substantial reluctance or resistance to installing the belts and to using them after installation, since the belts are often uncomfortable to the passenger and cause the clothes to become wrinkled, and the buckles used on the belts have frequently caught onto and pinched the passenger's clothes, resulting in damage to the garments and wearing apparel. Damage to the garments has been particularly serious with fur coats and other garments having fur trimming in that the fur becomes caught on protrusions on the buckle or in the buckle operating mechanism, especially if these parts are on the back or inner side thereof, thus often tearing the fur, either by accident or by necessity, in disengaging the buckle from the fur and the garment.

Further, the buckles have been bulky and heavy and have projected away from the wearer's body sufficiently to be uncomfortable to the wearer. Further, protrusions on the buckle, including the operating levers, often constitute a hazard in the event of an accident by providing a cutting edge or prong which can effectively wound the wearer as his body is thrust forward under heavy impact against the buckle during the accident, and/or result in accidental release of the buckle by the wearer, thus leaving the wearer without protection, often without his knowledge. It is therefore one of the principal objects of the present invention to provide a compact, strong and rugged buckle for safety belts which has all the operating parts, such as levers, latches and releases, fully within the confines of the buckle housing with only the belt and connecting male portion otherwise exposed, and which has a push-button type operating mechanism for releasing the buckle.

Another object of the present invention is to provide a safety belt buckle which will fit snugly against the body of the wearer, and which does not contain any protrusions or buckle operating parts on the inner side thereof capable of inflicting an injury to the wearer's body or to the wearer's clothes in the event of an accident, and which is so constructed and designed that the operating parts can easily be reached when the buckle is to be released.

Still another object of the invention is to provide a relatively simple and highly reliable safety belt buckle which is so constructed and designed that the operating means is recessed in the front of the buckle housing where there is little likelihood of the mechanism being inadvertently operated to accidentally release the buckle, so that the operating mechanism is easily accessible and positively operated.

A further object is to provide a buckle of the aforesaid type having male and female parts, which is so constructed and designed that the two parts can readily separate when the buckle is operated to release the belt, and which can be locked by merely pushing the two parts together without operating or moving any external levers or mechanisms to completely and effectively lock or latch the buckle.

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Additional objects and advantages of the present invention will become apparent from the following description and accompanying drawings, wherein:

FIGURE 1 is a front elevational view of the present buckle showing the male and female portions thereof disengaged and showing said portions connected to the two sections of the belt web;

FIGURE 2 is an end elevational view of the female portion of the buckle shown in FIGURE 1;

FIGURE 3 is a front elevational view of the female portion of the buckle, showing more clearly the external features of the push-button operating mechanism;

FIGURE 4 is an enlarged horizontal cross sectional view of the buckle shown in FIGURE 1, the section being taken on line 4—4 of FIGURE 2 and illustrating the buckle in one operating position; and

FIGURE 5 is an enlarged horizontal cross sectional view of the buckle shown in the preceding figures, the section being taken on line 5—5 of FIGURE 2 and showing the buckle in another operating position.

Referring more specifically to the drawings and to FIGURE 1 in particular, numeral 20 designates generally the female portion of the present buckle and numeral 22 the male portion thereof separated from the female portion, and 24 and 26 designate the web sections connected to the male and female portions, respectively. The two web sections of the safety belt are secured by fixtures attached to the ends (not shown), which in turn are secured to suitable anchor bolts or fixtures in the floor or frame of the vehicle. The manner and means by which the web portions 24 and 26 are secured to the vehicle do not form a direct part of the present invention, and hence will not be described in detail herein. The end of web section 26, shown in FIGURE 1, extends through an adjustment means in the female portion and projects laterally therefrom, and the end of web section 24, as shown in FIGURE 1, is looped through a slot 28 of the male portion and the free end thereof firmly and permanently stitched or otherwise joined to the remainder of the web section.

The latch mechanism of female portion 20 of the buckle is best shown in FIGURES 4 and 5, consisting of a locking lever 30 seated in a groove 32 adjacent upturned flange 34 of buckle body 36. The lever, which pivots in groove 32, is held securely therein by two inwardly extending lugs 38 and 40 on the inner side of flange 34 and is adapted to move from its locked position, shown in FIGURE 4, to its unlatched position, shown in FIGURE 5, and the lever assumes the position shown in FIGURE 4, whether or not the male portion 22 is inserted in or removed from the female portion, except during the locking and unlocking operations. Lever 30 is yieldably urged between the locked and unlocked positions by a spring operating mechanism 42, one end of which is seated over the outer end of lever 30 and the other end of which is provided with a finger 44 extending upwardly through slot 46 in lever 30, where it is engaged by male portion 22 as the male portion is inserted in the buckle. The spring, which is best seen in FIGURES 4 and 5, is also provided with a downwardly extending protrusion or rib 48 which seats in a V-shaped groove 50 in the bottom of the internal side of body 36 and thereby retains lever 30 in place with the outer edge thereof properly seated in groove 32. Operation of lever 30 between the positions shown in FIGURES 4 and 5 distorts the spring to provide the yieldable force required to operate lever 30 and to disengage male portion 22 from engagement with the lever, without becoming dislodged from groove 50. The lever 30 is provided with an upwardly or forwardly extending boss 52 of wedge-shaped construction, the boss sloping

forwardly and inwardly to provide a rigid locking shoulder 54 on the inner end of said boss for holding the male portion 22 in locked position.

The male portion 22 is a flat member having a hole or slot 60 therein with an edge 62 for engaging shoulder 54 when portion 22 has been fully inserted in portion 20 of the buckle. Body portion 36 of buckle portion 20 is provided with inwardly extending flanges 64 and 66 on the top and bottom sides 67 and 68 thereof, and buckle portion 22 is sufficiently wide to slip beneath and engage the inner edge of the two flanges when portion 22 is inserted in body 36. It is seen that when portion 22 is inserted in the end of body 36, the forward end 69 of portion 22 slides along tapered boss 52, while the edges thereof are held firmly beneath flanges 64 and 66, thereby urging lever 30 rearwardly or toward back 70 until edge 62 slips inwardly over shoulder 54. Thereafter, boss 52 and lever 30 snap forwardly under the influence of spring 42, locking portion 22 firmly on the inner side of boss 52. As the forward edge 69 of portion 22 approaches the inner end of its movement, it engages finger 44 and places the finger and the adjacent portion of spring 42 under tension, thus holding portion 22 firmly against shoulder 54 and flanges 64 and 66, and thereby preventing rattling or any other undesirable noise while the buckle is either in its locked or unlocked position. The full inner movement of portion 22 is determined by shoulders 71 and 72 on the side edges of portion 22. The finger 44 of spring 42 is placed under sufficient tension when portion 22 is fully seated that, upon release of portion 22 by lever 30, portion 22 is forcibly ejected from body 36, thus completely unlatching the buckle and signalling to the wearer that the two portions 20 and 22 have been disengaged and the belt fully released. Thus, it is seen that, should the buckle become inadvertently unlatched, the wearer is effectively notified by the full disengagement of the two parts from one another.

Lever 30 is operated to unlatch and disengage portion 22 by a push-button type of mechanism 78 in which front cover 80 is provided with an opening 82 and a button or lug 84 connected by member 85 to the inner end of lever 30, and leaving an extension 86 positioned beneath the inner side of opening 82. Button 84 is preferably connected integrally to member 85 and this member is preferably connected integrally to the inner end of lever 30. However, lever 84 with or without member 85 may be constructed separately from lever 30 and then merely inserted between the lever and the inner side of cover 80 with the inner side of the button or lug bearing against the inner end of lever 30. In the latter arrangement, the button moves directly inwardly instead of pivoting as the button shown in FIGURE 5.

The web 26 consists of the main portion 26A which is anchored at the unseen end to the vehicle floor or frame, and the tail portion 26B which is secured to buckle portion 20 by a mechanism consisting of non-rotatable shaft 100 supported in the end section 102 of the female portion 20, the web being placed around said shaft and under a bar 104 rigidly supported by lugs 106 on side walls 67 and 68 of body 36. The bar has an outwardly facing slot 107 along the edge thereof for receiving the two lugs 106, and a contoured inner face 109 for engaging web portion 26B. The shaft is movable in end slots 108 toward and away from face 109 and grips and releases the web. When tension is placed on web portion 26A, the shaft is automatically pulled to the right, causing the tail portion 26B around shaft 100 to be firmly clamped between the shaft and bar, thus securely holding the web from slipping. The surface of bar 104 facing shaft 100 is contoured to clamp web 26 effectively against shaft 100, the shaft preferably being knurled or otherwise scored to prevent slippage of the web thereon. When it is desired to adjust the belt, if only tightening is required, web tail 26B is pulled, there-

by drawing web 26A around shaft 100 without serious interference from the action of shaft 100 and bar 104. When the web is to be loosened, the two portions of the web are pushed inwardly through opening 108, thereby pushing shaft 100 away from bar 104 and permitting portions 26A and 26B to be shifted relative to one another to obtain the required loosening of the web. Since the adjustment of the web by the use of shaft 100 and bar 104 is not related to the principal part of the present invention, the details of this adjustment mechanism will not be further described herein.

In the operation of the present belt buckle, when it is desired to place the belt around a passenger in the vehicle, the two ends of the buckle are placed in front of the wearer and portion 22 is inserted in the end of portion 20 until edge 62 has seated over shoulder 54 and boss 52 seated fully in hole 60. As the edge 69 approaches the end of its movement into portion 20, it engages finger 44 and places a tension on said finger and the adjacent portion of spring 42. With portion 22 fully seated in end portion 20, the portion 22 is firmly locked in the latter portion, thus securing the two portions securely together. Web portion 26 is then adjusted to give the desired tightness of the belt around the passenger. When it is desired to release the buckle, the wearer merely pushes button 84 inwardly from opening 82, thus pressing lever 30 rearwardly from the position shown in FIGURE 4 to the position shown in FIGURE 5 and permitting spring 42 to disengage edge 62 from shoulder 54 and permitting finger 44 of the spring to forcefully release male portion 22 from female portion 20, thus automatically disengaging the buckle parts.

One of the special advantages of the present buckle is its compactness and confined and enclosed operating parts, and the push-button type mechanism avoids protruding operating levers found on most commercial safety belt buckles. While the ejection function of spring part 44 has definite advantages in the buckle in obtaining optimum operation, it may be eliminated or used to perform only the disengaging function, leaving the ejection function to a spring operated reel-type mechanism located at the anchored end of one of the web portions.

The present buckle, which is preferably formed principally from steel stampings with little machining being required to obtain proper fit between the various parts, can be effectively, simply and safely operated by the push-button; however, other types of levers or operating mechanisms may be used to operate lever 30. While only one embodiment of the present invention has been described in detail herein, various changes and modifications may be made to satisfy requirements without departing from the scope of the invention.

I claim:

1. A buckle for a safety belt having two sections, comprising male and female portions for connecting said sections, said female portion including a body having a back panel and a front cover with an opening therein, a lever in said body, said lever and male portion having interlocking members for releasably holding said lever and male portion in locked position, a guide means in said body on opposite sides of said opening for retaining said male portion in substantially parallel relation to said back panel and front cover while said male portion is being inserted in and withdrawn from said female portion, a spring means between said lever and said back panel urging said lever and male portion into interlocking position, and an operating button facing said opening joined integrally to the inner end of said lever and forming a U-shaped, plate-like structure of a width greater than the width of said opening for depressing said lever to disengage said interlocking members.

2. The buckle defined in claim 1, in which said operating button consists of a member disposed behind said cover across said opening and being adapted to be pushed

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inwardly away from said opening to disengage said interlocking members.

3. The buckle defined in claim 1, in which said operating button is in recessed relation to the front face of said front cover.

4. The buckle defined in claim 3, in which said spring means engages said lever and releasably urges the member of said lever into engagement with the member of said male portion.

5. The buckle defined in claim 4, in which said spring is provided with a means for yieldably disengaging said members when said operating button is depressed to unbuckle the buckle.

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