EJECTION TONGUE FOR BUCKLE

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Filed: Oct. 2, 1972

Appl. No.: 294,420

U.S. Cl. 24/230 SL; 24/230 AL
Int. Cl. A44B 11/25
Field of Search 24/230 NP, 230 SL, 230 AK, 24/230 AL, 230 AN, 77, 239, 196, 205.17

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ABSTRACT
A tongue assembly for locking engagement with a seat belt buckle wherein the act of manually inserting the tongue into the buckle places tension on biasing means attached to the tongue, which tension is relieved by ejecting the tongue from the buckle when the latch retaining the tongue is released.

12 Claims, 2 Drawing Figures
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EJECTION TONGUE FOR BUCKLE

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to safety seat belt and harness assemblies of the type used in vehicles for restraining occupants in their seated positions at the moment high rates of deceleration, such as those encountered in a collision, would otherwise throw them forward with respect to the vehicle.

Such seat belt and harness assemblies are generally locked into position about the occupant by means of a buckle to which a safety belt is attached, and a tongue, to which another safety belt is attached for joining with the first by insertion of the tongue into a slot in the buckle for locking engagement therewith. The other ends of the belts are most frequently attached to the frame of the vehicle, either directly, or indirectly by attachment to retractors which keep them out of the way when not in use, and provide just the right length of belting when they are.

Various means are provided for releasing the tongue from the buckle. A latch member, generally biased to extend through an opening in the tongue, is withdrawn by manually lifting a lever, depressing a button or otherwise depressing the latching mechanism.

2. Description of the Prior Art

Recently, various methods have been suggested for systems whereby the occupant, though "buckled up," is free to move about without restraint, for increased comfort. The belt moves with the motion of the occupant, except when the rate of withdrawal of the belt is suddenly increased, or the velocity of the car is suddenly and drastically reduced. Such rapid deceleration triggers one or more mechanisms for preventing further extension of the safety belt, to thus restrain and protect the occupant from being catapulted into the windshield, instrument panel, or completely out of the car.

These methods of freeing the wearer from the restraint of the belt or harness under ordinary driving conditions frequently introduces a new problem, which under certain circumstances, can be serious. Since the belt buckle with tongue locked into position is often not under tension, it sometimes happens that the wearer can release the tongue, for example, by pressing a release button, only to have the latch slip right back into the opening of the tongue the moment pressure on the release button has been removed. Since the buckles produced by various manufacturers differ in their mode of operation, and since a buckled occupant might lack familiarity with the buckle he is using, he can easily release the tongue without knowing it, then not being aware of a response, seek other means of releasing it.

It is conceivable that rapid release of the buckle could be critical, as in the case of a gasoline fire. Means for preventing the inadvertent re-locking or re-latching of the tongue within the buckle, once it has been released, are therefore highly desirable.

SUMMARY OF THE INVENTION

We have now invented a simple device which will prevent inadvertent re-latching of a tongue in a safety seat belt buckle, by ejecting the tongue when the latch is released. It is inexpensive to construct and install, it is trouble free, and generally requires no alteration of the buckle design. Apart from the safety factor, it provides the user with a rather positive and "snappy" release of the tongue, which is noticeably "different" and preferable. The very small amount of energy required for this action is taken from that used in manually thrusting the tongue home, and it is delivered as a tongue-ejecting force the moment the tongue is unlatched.

This invention is directed to a tongue assembly for locking engagement with a seat belt buckle comprising the tongue and a biased tongue-ejecting member attached thereto, which is placed under tension with respect to the buckle by the act of inserting and latching the tongue within the buckle. When the tongue is released it is forcibly ejected. The tongue-ejecting member comprises a slideable structure extending from at least one side of the tongue with biasing means arranged for compressive action between the slideable structure and a point on the tongue, and positioned for contact with the buckle while the tongue is inserted therein, whereby when the tongue is inserted in the seat belt buckle, the slideable member is pressed so as to compress the biasing means and exert a force on the tongue in a direction away from the buckle to eject the tongue upon its release from the buckle.

BRIEF DESCRIPTION OF THE DRAWINGS

The description refers to the accompanying drawings in which like reference characters refer to like parts throughout the two views.

FIG. 1 is an exploded isometric view of a preferred embodiment of the seat belt buckle tongue of our invention.

FIG. 2 is a cross-sectional view of the tongue of FIG. 1 taken along line 2—2 as assembled, including a representation of a seat belt buckle as a means of illustrating the condition of the tongue when in locked position within a buckle.

DESCRIPTION OF THE PREFERRED EMBODIMENT

This invention relates to a tongue for locking engagement with a safety seat belt buckle, comprising a metal structure shaped at one end for insertion into a seat belt buckle for locking engagement therewith; means for retaining the tongue in locking engagement with a latch of the buckle and an opening in an end of the metal structure, opposite to that shaped for insertion into a seat belt buckle, for the attachment of a seat belt.

A biased movable member, slideably attached to the tongue for limited travel in a direction parallel to the motion of the tongue on insertion into the buckle, said movable member extending from both sides of the tongue, so that said member contacts the buckle when the tongue is inserted therein, but before it has been inserted a sufficient distance for locking engagement therewith, whereby when the tongue is inserted a sufficient additional distance for locking engagement, it is inserted in opposition to the bias of the movable member, thus leaving the movable member stationary with respect to the buckle throughout the remaining insertion operation, while maintaining a bias against the buckle in a direction to eject the tongue from the buckle when the tongue is released from locking engagement therewith.

This concept offers the advantage that it is applicable to buckles already designed and constructed, for it is not a part of the buckle, but of the tongue. Consequently, by designing the tongue to cooperate with a
buckle, the concept becomes applicable to substantially all seat belt buckle designs. Furthermore, the concept is so simple that it could even be applied to tongues already designed and constructed, merely by punching out an additional opening for the movable member, and inserting said member as previously described.

Not only does a safety seat belt buckle so equipped carry an additional safety factor, but it adds a desirable snappy positive action to its operation. The added part is inexpensive, and may be added as an ornament, thus combining attractive appearance with valuable function.

Referring now to the preferred tongue of a safety seat belt buckle of Figs. 1 and 2, and particularly to the exploded view of Fig. 1; numeral 1 is a flat metal structure having an elongated portion 3 for insertion into the slot of a seat belt buckle for engagement with latch member 5 (Fig. 2), thus locking the tongue in the buckle.

Opening 6 is provided for the attachment of seat belt 9 (Fig. 2) and grommet 11, fabricated of a suitable polymeric material, such as nylon, serves to protect the webbing from undue wear at this point.

Slideable member 7 comprises two slideable portions 12 and 13, and spring 14. Portions 12 and 13 are centrally recessed at 10 and 20, respectively, to produce a cavity when joined together through opening 6 in the tongue, said cavity including the sandwiched opening 6 between them. This cavity serves to contain and completely enclose spiral spring 14.

To assemble the slideable member 7, spring 14 is placed in the recess 10 of slideable portion 12, with one end placed against section 16 of the extending part 15, which serves as an end-wall for the spring. Slideable portion 12 which is now holding spring 14, is brought to opening 6 with slideable face 17 toward the tongue, and end-wall 16 toward the tip of the tongue. The end of the spring opposite end-wall 16 is slipped over protuberance 18. This protuberance is centrally located on the edge of opening 6 most distant from the tip of the tongue and is of such size as to fit within the end of the spiral spring and of such length as to extend no more than about one-third of the length of the cavity. The shoulders, where protuberance 18 joins the edge of opening 6, provides the point at which spring 14 acts against the tongue.

Slideable portion 12 is now positioned with its slideable face 17 in contact with the surface of the tongue, and with extending part 15, projecting into opening 6, with surfaces 19 being parallel to, and in slideable contact with sidewalks 21 of opening 6, for lengthwise travel within limits permitted by the length of the approximately rectangular opening. The upper surface 22 of the extending part 15 should now be substantially flush with the surface of the tongue opposite to that with which slideable face 17 is in contact. Finally, slideable portion 13 is brought with its slideable face toward the surface of the tongue opposite that in contact with slideable portion 12. The male members 23 of one portion are mated with the female members 24 of the other, so that extending part 15 now becomes a connecting bridge between the two portions, thus forming the slideable member 7, positioned for guided slideable lengthwise travel, limited by the longitudinal dimension of opening 6. The shape and arrangement of the male and female members is not critical. Both male members may be placed on either portion, or each portion may contain both male and female members to accommodate those oppositely arranged on the other. The male members may be cylindrical, or they may consist of one or more rectangular extensions with matching recepticals.

If it is desired that the two slideable portions enclosing the spring be permanently bonded together, this can easily be done by using an appropriate cement, by heat sealing or by designing the male and female members so they cannot be separated, such as by including tapered heads or other extensions on the male members and splitting their ends a sufficient distance to permit forcing them into the matching openings. The female members would in such a case have corresponding enlargements into which the heads could expand when tension is relieved.

Although a spring is preferred, other biasing means may be employed. For example, compressible materials such as rubber or polymeric substances can be substituted. Pneumatic devices could be employed, if desired, such as gas filled capsules. Spring 14 may be fabricated of steel, brass, phosphor-bronze, stainless steel or other alloys having the necessary degree of flexibility.

The movable member 7 (Fig. 2) comprising the two slideable portions 12 and 13 may be cast from metal, but preferably these two portions are composed of polymeric material such as nylon.

To complete the assembly of the preferred embodiment grommet 11 is forced into elongated opening 8 of the tongue.

With further reference to Fig. 2, numeral 25 represents any typical safety seat belt buckle. In the illustration, tongue 1 has been inserted into slot 26, and urged forward until the forward surfaces of slideable member 7 come in contact with the seat belt buckle in the area of the slot 26. At this point the tongue has not been introduced far enough for latch 5 to move into opening 4 of the tongue, and, in fact, the tip of the tongue has forced the latch downward against the opposition of spring 27, where it remains, pressed against the tongue.

As insertion of the tongue continues, the sliding member 7 is held stationary with respect to the buckle by its contact with the buckle at 26, but the tongue continues to advance toward locking engagement, as it slides past moving member 7. As it does so, it compresses spring 14 between the shoulders of protuberance 18 and the end wall 16, thus storing potential energy in the spring until finally, opening 4 in the advancing tongue reaches latch 5. The latch is then urged upwardly by spring 27 into opening 4, thus locking the tongue against withdrawal. Compresses spring 14 pressing against the shoulder of protuberance 18 acts in a direction to eject the tongue, which, however, remains locked by latch member 5.

When the latch is withdrawn from the tongue by the action of the wearer in manually activating the release device (button, lever, etc.), spring 14 ejects the tongue as a consequence of the force of the spring against the tongue, specifically by pressure against the wall of opening 6 most distant from the tip. The reaction is against the buckle casing by virtue of the fact that the spring acts against wall 16, a part of movable member 7, which is pressed against the buckle housing at point 26. The ejected tongue slides in relation to the movable member 7 until the spring has expanded to substantially...
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5 fill the cavity within which it is contained. The potential
ergy stored in spring 14 by the act of inserting the
buckle is thereby released as kinetic energy in expelling
or ejecting the tongue.

This does not imply that the tongue is necessarily
projected right out of the buckle. Usually, the buckle
would be held in one hand of the wearer and the tongue
in the other, but the tongue is ejected well away from
the latching mechanism, thus preventing inadvertent
re-latching of the tongue. It also provides a distinctive
snappy separation of the tongue from the buckle which
is noticeable and impressive to the user.

Since certain changes can be made in the design of
the present invention, it is intended that all matter con-
tained in the above description shall be interpreted as
illustrative and not in a limiting sense.

I claim:

1. A tongue assembly for locking engagement with a
seat belt buckle comprising:
a tongue and a biased tongue-ejecting movable mem-
ber attached thereto which is placed under tension
with respect to the buckle by the act of inserting
and latching the tongue within the buckle,
whereby, when the tongue is released, it is force-
ably ejected therefrom;

wherein the biased tongue ejecting member is slide-
ably attached to the tongue for limited travel thereon in a direction parallel to the motion of the
tongue on insertion into the buckle, said movable member extending from at least one side of the
tongue so that said member contacts the buckle when the tongue is inserted therein, but before it has been introduced a sufficient distance for lock-
ing engagement therewith, whereby when the tongue is inserted a sufficient additional distance
for locking engagement, it is inserted in opposition
to the bias of the movable member, thus leaving the
movable member stationary with respect to the
buckle throughout the remaining insertion opera-
tion, while maintaining a bias against the buckle in
a direction to eject the tongue from the buckle
when the tongue is released from locking engage-
ment therewith;

wherein the movable member extends through a sub-
stantially rectangular opening in the tongue, and is
slideably arranged within said opening for limited
travel in a direction parallel to the motion of the
tongue on insertion into the buckle; and

wherein the movable member extends from both
faces of the tongue, and comprises two portions
equipped for substantially permanent attachment
one with the other through the opening in the
tongue with which it cooperates, each portion hav-
ing a surface in slideable contact with its respective
face of the tongue, the contacting surface of these
portions being of a somewhat greater length and
width than the length and width of the opening.

2. The tongue of claim 1 wherein said tongue assem-
by has a tip at one end for insertion into the buckle and
one portion of the movable member has an extending
part projecting from its contacting face and integrated
therewith, said part being adjacent to the end nearest
the tip of the tongue, said part extending through the
opening in the tongue to form a connecting bridge be-
tween the two portions comprising the movable mem-
ber, by means of which they may be attached, said part
having parallel sides for slideable lengthwise travel,
guided by the parallel walls of the rectangular opening
with which it cooperates.

3. The tongue of claim 2 wherein said tongue assem-
by has a biasing means for said tongue-ejecting mov-
able member and each portion of the movable member
has a centrally located recess which, together with the
opening in the tongue with which it cooperates to form
a cavity for totally enclosing the biasing means, and
wherein said recess in the portion of the movable mem-
ber containing the projecting part, extends partially
through said projecting part thereby forming an end
wall to the cavity for containing the biasing means.

4. The tongue assembly of claim 1 wherein means for
the substantially permanent attachment of the two por-
tions constituting the movable member comprise male
structures in one portion and mating female structures
in the other portion for engagement therewith.

5. The tongue assembly of claim 3 wherein the bias-
ing means comprises a coiled spring having cylindrical
outside dimensions such as to fit within the cavity
formed by the opening in the tongue and recesses in the
movable member so that by forcing the movable mem-
ber, in a direction away from the tip of the tongue, the
spiral spring is compressed between the end wall of the
cavity, and the edge of the opening in the tongue most
distant from the tip of the tongue.

6. The tongue assembly of claim 5 wherein the open-
ing for the movable member is rectangular except for
a protuberance, centrally located in the edge of the
opening most distant from the tip of the tongue, of such
size as to fit within one end of the spiral spring and of
such length as to extend no more than about one-third
of the length of the cavity.

7. A tongue assembly for locking engagement with a
seat belt buckle comprising:
a tongue and a biased tongue-ejecting movable mem-
ber attached thereto which is placed under tension
with respect to the buckle by the act of inserting
and latching the tongue within the buckle,
whereby, when the tongue is released, it is force-
ably ejected therefrom;

wherein the biased tongue ejecting member is slide-
ably attached to the tongue for limited travel thereon in a direction parallel to the motion of the
tongue on insertion into the buckle, said movable member extending from at least one side of the
tongue so that said member contacts the buckle when the tongue is inserted therein, but before it has been introduced a sufficient distance for lock-
ing engagement therewith, whereby when the tongue is inserted a sufficient additional distance
for locking engagement, it is inserted in opposition
to the bias of the movable member, thus leaving the
movable member stationary with respect to the
buckle throughout the remaining insertion opera-
tion, while maintaining a bias against the buckle in
a direction to eject the tongue from the buckle
when the tongue is released from locking engage-
ment therewith;

wherein the movable member extends through a sub-
stantially rectangular opening in the tongue, and is
slideably arranged within said opening for limited
travel in a direction parallel to the motion of the
tongue on insertion into the buckle; and

wherein the movable member extends from both
faces of the tongue, and comprises two portions
equipped for substantially permanent attachment
one with the other through the opening in the
tongue with which it cooperates, each portion hav-
ing a surface in slideable contact with its respective
face of the tongue, the contacting surface of these
portions being of a somewhat greater length and
width than the length and width of the opening.

8. The tongue of claim 1 wherein said tongue assem-
by has a tip at one end for insertion into the buckle and
one portion of the movable member has an extending
part projecting from its contacting face and integrated
therewith, said part being adjacent to the end nearest
the tip of the tongue, said part extending through the
opening in the tongue to form a connecting bridge be-
tween the two portions comprising the movable mem-
ber, by means of which they may be attached, said part
having parallel sides for slideable lengthwise travel,
7 one with the other through the opening in the tongue with which it cooperates, each portion having a surface in slideable contact with its respective face of the tongue, the contacting surface of these portions being of a somewhat greater length and width than the length and width of the opening.

8. The tongue assembly of claim 7 wherein said tongue has a tip at one end for insertion into the buckle and one portion of the movable member has an extending part projecting from its contacting face and integrated therewith, said part being adjacent to the end nearest the tip of the tongue, said part extending through the opening in the tongue to form a connecting bridge between the two portions comprising the movable member, by means of which they may be attached, said part having parallel sides for slideable lengthwise travel, guided by the parallel walls of the rectangular opening with which it cooperates.

9. The tongue assembly of claim 8 wherein said tongue has a biasing means for said tongue-ejecting movable member and each portion of the movable member has a centrally located recess which, together with the opening in the tongue with which it cooperates to form a cavity for totally enclosing the biasing means, and wherein said recess in the portion of the movable member containing the projecting part, extends partially through said projecting part thereby forming an end wall to the cavity for containing the biasing means.

10. The tongue assembly of claim 7 wherein means for the substantially permanent attachment of the two portions constituting the movable member comprise male structures in one portion and mating female structures in the other portion for engagement therewith.

11. The tongue assembly of claim 9 wherein the biasing means comprises a coiled spring having cylindrical outside dimensions such as to fit within the cavity formed by the opening in the tongue and recesses in the movable member so that by forcing the movable member, in a direction away from the tip of the tongue, the spiral spring is compressed between the end wall of the cavity, and the edge of the opening in the tongue most distant from the tip of the tongue.

12. The tongue assembly of claim 11 wherein the opening for the movable member is rectangular except for a protuberance, centrally located in the edge of the opening most distant from the tip of the tongue, of such size as to fit within one end of the spiral spring and of such length as to extend no more than one-third of the length of the cavity.

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