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DRAWINGS ATTACHED

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(54) IMPROVEMENTS RELATING TO BUCKLES FOR SAFETY SEAT BELTS FOR VEHICLES

(71) We, WINGARD LIMITED, a British Company of, Kingsham Road, Chichester, Sussex, do hereby declare the invention for which we pray that a Patent may be granted to us and the method by which it is to be performed to be particularly described in and by the following statement:—

This invention relates to improvements in buckles for safety seat belts for vehicles.

The most commonly used form of seat belt comprises a lap strap attached at one end to a floor anchorage on the outer side of the seat and a diagonal shoulder strap attached at one end to an elevated anchorage on the body side, usually a pillar. The two straps are usually formed by parts of a single length of webbing which is threaded through a slot in one part of a two-part separable buckle of which the second part is attached to an anchorage on a load-carrying part of the vehicle such as the floor or shaft tunnel. In some cases the second part of the buckle is connected to the floor anchorage by a short length of webbing, and in other cases it is mounted on a rigid or semi-rigid stalk which supports it in a convenient position and attitude for the engagement with it of the first part of the buckle.

When the belt is being put on the lap and diagonal straps are brought across the body of the wearer and the first part of the buckle is engaged with the second part. If the second part is mounted on a rigid or semi-rigid stalk this operation can be carried out with one hand.

In a two-part buckle for a safety seat belt according to our invention the first part to which the lap and diagonal straps are connected in use comprises a flat shank having a step in at least one side edge behind a tapered or rounded nose, and the second part comprises a frame incorporating two parallel walls between which the shank enters and a spring loaded latch member which is free to rock in the frame and which has a flat strut portion working in aligned openings which are formed in the walls of the frame and are offset from the centre line of the frame, the strut portion

being adapted to engage between the upper ends of the openings in the frame and the step in the shank of the first part of the buckle when that is inserted into the frame, and the latch member being rockable manually to disengage the strut portion from the step in the shank of the first part and to allow that part to be withdrawn from the second part.

The aligned openings in the walls of the frame are conveniently sector-shaped and their apices are directed towards an open upper end of the frame into which the shank of the first part is adapted to enter, and the spring-loading of the latch member urges the strut portion of the member towards the radial edges of the openings nearest the centre line of the frame.

When the shank of the first part of the buckle is entered into the frame the nose engages the strut portion of the latch member and pushes the latch member aside until the nose has passed the strut portion, whereupon the latch member is returned by its spring and the strut portion is engaged between the adjacent step in the shank and the apices of the openings in the frame.

In the fastening condition of the buckle the opposite side of the shank to that engaged by the strut is backed by an end wall of the frame which joins the parallel side walls, and the strut portion of the latch member is inclined at a small angle to the centre line of the frame in a direction such that a force tending to separate the two parts of the buckle has a component retaining the latch member in the fastening position.

To separate the two parts of the buckle the latch member is simply rocked over to displace the strut portion outwardly clear of the step in the shank.

One form of buckle embodying our invention is illustrated by way of example in the accompanying drawings in which:—

Figure 1 is a vertical section of the buckle in the fastening condition:

Figure 2 is a perspective view of the co-operating parts of the buckle without a housing; and

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Figure 3 is a fragmentary view of the latch member and the lower end of the shank of the first part of the buckle.

5 The first part of the buckle illustrated is a flat tongue having a wide upper portion 10 in which there is a slot 11 to receive a length of webbing forming the lap and diagonal straps of a seat belt.

10 Integral with the portion 10 is a flat shank 12 having in each side behind a tapered nose 13 a step 14.

The second part of the buckle comprises a frame into which the shank 12 is adapted to enter.

15 The frame is formed as a stout sheet metal pressing folded to provide two parallel walls 15 joined by a vertical end wall 16. Aligned openings 17 of sector shape each subtending an angle of about 45° are formed in the parallel walls of the frame, the openings being offset to one side of the vertical centre line of the frame. The apices of the openings are directed towards the upper end of the frame which is open and their inner radial edges are directed inwardly from the apices at an acute angle to the vertical centre line of the frame.

25 A latch member which is mounted to rock on the frame includes a portion formed from sheet metal and comprising two parallel limbs 18 which freely embrace the frame from the closed end, and an end part 19 which is extended downwardly to form a finger-piece.

30 The latch member incorporates a strut portion comprising a flat steel member 21 of rectangular outline. Its ends are held in slots in the limbs of the latch member and it passes freely through the aligned sector-shaped openings 17 in the frame. A compression spring 22 located between the finger piece 19 of the latch member and the adjacent closed end of the frame normally holds the strut against the inner radial edges of the openings.

40 At the upper end of the frame inwardly cranked lugs 24 are provided on the walls 15 at their free edges to guide the shank 12 of the first part of the buckle, any gap between the lugs being less than the thickness of the shank.

50 Near their lower ends the walls of the frame are drilled to receive a pin 25 for connecting to the frame a rigid or semi-rigid stalk 26, which is anchored to a load-carrying part of the vehicle and supports the frame in a convenient attitude and position for the insertion of the first part.

55 The frame is enclosed in a moulded plastics or other housing 27 which has at its upper end a separate funnel-shaped portion 28 leading into the upper end of the frame to facilitate the entry of the shank on the first part of the buckle.

60 The finger-piece 19 of the latch member is accessible through an opening 29 in the side of the housing.

65 It will be appreciated that in the fastening

condition of the buckle shown in Figure 1 the strut portion 21 of the latch member is engaged between the apices of the sector-shaped openings 17 in the frame and the step in one side of the shank 12. The side of the shank opposite that engaged by the strut is backed by the end wall 16 of the frame and the strut is inclined at a small angle to the centre line of the frame in a direction such that a force tending to separate the two parts of the buckle has a component retaining the latch member in the fastening position.

Further, any pull applied to the first part of the buckle is transmitted through the strut directly to the frame which is itself secured to the anchored stalk 26 so that the buckle can be kept relatively short.

In the above description the term 'vertical' has been used for convenience in relation to the frame, but it will be understood that in use the frame need not be vertical but can be inclined at any angle convenient for the insertion into it of the first part of the buckle.

In the buckle illustrated the shank 12 of the first part has a tapered nose and a step in each side edge, but in alternative arrangements it may have a rounded nose and/or may have a step in one side edge only.

WHAT WE CLAIM IS:—

1. A two-part buckle for a safety seat belt for vehicles in which the first part to which lap and diagonal straps are connected in use comprises a flat shank having a step in at least one side edge behind a tapered or rounded nose, and the second part comprises a frame incorporating two parallel walls between which the shank enters and a spring-loaded latch member which is free to rock in the frame and which has a flat strut portion working in transversely aligned openings which are formed in the walls of the frame and are offset from the centre line of the frame, the strut portion being adapted to engage between the upper ends of the openings in the frame and the step in the shank of the first part of the buckle when that is inserted into the frame, and the latch member being rockable manually to disengage the strut portion from the step in the shank of the first part and to allow that part to be withdrawn from the second part.

2. A two-part buckle as claimed in Claim 1 in which the aligned openings in the walls of the frame of the second part are sector-shaped and their apices are directed towards an open upper end of the frame into which the shank of the first part is adapted to enter, and the spring loading of the latch member urges the strut portion of the member towards the radial edges of the opening nearest the centre line of the frame.

3. A two-part buckle as claimed in Claim 2 in which the radial edges of the sector-shaped openings nearest the centre line of the frame are inclined at a small angle to that centre line in a direction such that in the fas-

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Figure 3 is a fragmentary view of the latch member and the lower end of the shank of the first part of the buckle.

5 The first part of the buckle illustrated is a flat tongue having a wide upper portion 10 in which there is a slot 11 to receive a length of webbing forming the lap and diagonal straps of a seat belt.

10 Integral with the portion 10 is a flat shank 12 having in each side behind a tapered nose 13 a step 14.

The second part of the buckle comprises a frame into which the shank 12 is adapted to enter.

15 The frame is formed as a stout sheet metal pressing folded to provide two parallel walls 15 joined by a vertical end wall 16. Aligned openings 17 of sector shape each subtending an angle of about 45° are formed in the parallel walls of the frame, the openings being offset to one side of the vertical centre line of the frame. The apices of the openings are directed towards the upper end of the frame which is open and their inner radial edges are directed inwardly from the apices at an acute angle to the vertical centre line of the frame.

20 A latch member which is mounted to rock on the frame includes a portion formed from sheet metal and comprising two parallel limbs 18 which freely embrace the frame from the closed end, and an end part 19 which is extended downwardly to form a finger-piece.

25 The latch member incorporates a strut portion comprising a flat steel member 21 of rectangular outline. Its ends are held in slots in the limbs of the latch member and it passes freely through the aligned sector-shaped openings 17 in the frame. A compression spring 22 located between the finger piece 19 of the latch member and the adjacent closed end of the frame normally holds the strut against the inner radial edges of the openings.

30 At the upper end of the frame inwardly cranked lugs 24 are provided on the walls 15 at their free edges to guide the shank 12 of the first part of the buckle, any gap between the lugs being less than the thickness of the shank.

35 Near their lower ends the walls of the frame are drilled to receive a pin 25 for connecting to the frame a rigid or semi-rigid stalk 26, which is anchored to a load-carrying part of the vehicle and supports the frame in a convenient attitude and position for the insertion of the first part.

40 The frame is enclosed in a moulded plastics or other housing 27 which has at its upper end a separate funnel-shaped portion 28 leading into the upper end of the frame to facilitate the entry of the shank on the first part of the buckle.

45 The finger-piece 19 of the latch member is accessible through an opening 29 in the side of the housing.

50 It will be appreciated that in the fastening

condition of the buckle shown in Figure 1 the strut portion 21 of the latch member is engaged between the apices of the sector-shaped openings 17 in the frame and the step in one side of the shank 12. The side of the shank opposite that engaged by the strut is backed by the end wall 16 of the frame and the strut is inclined at a small angle to the centre line of the frame in a direction such that a force tending to separate the two parts of the buckle has a component retaining the latch member in the fastening position.

70 Further, any pull applied to the first part of the buckle is transmitted through the strut directly to the frame which is itself secured to the anchored stalk 26 so that the buckle can be kept relatively short.

75 In the above description the term 'vertical' has been used for convenience in relation to the frame, but it will be understood that in use the frame need not be vertical but can be inclined at any angle convenient for the insertion into it of the first part of the buckle.

80 In the buckle illustrated the shank 12 of the first part has a tapered nose and a step in each side edge, but in alternative arrangements it may have a rounded nose and/or may have a step in one side edge only.

WHAT WE CLAIM IS:—

85 1. A two-part buckle for a safety seat belt for vehicles in which the first part to which lap and diagonal straps are connected in use comprises a flat shank having a step in at least one side edge behind a tapered or rounded nose, and the second part comprises a frame incorporating two parallel walls between which the shank enters and a spring-loaded latch member which is free to rock in the frame and which has a flat strut portion working in transversely aligned openings which are formed in the walls of the frame and are offset from the centre line of the frame, the strut portion being adapted to engage between the upper ends of the openings in the frame and the step in the shank of the first part of the buckle when that is inserted into the frame, and the latch member being rockable manually to disengage the strut portion from the step in the shank of the first part and to allow that part to be withdrawn from the second part.

90 2. A two-part buckle as claimed in Claim 1 in which the aligned openings in the walls of the frame of the second part are sector-shaped and their apices are directed towards an open upper end of the frame into which the shank of the first part is adapted to enter, and the spring loading of the latch member urges the strut portion of the member towards the radial edges of the opening nearest the centre line of the frame.

95 3. A two-part buckle as claimed in Claim 2 in which the radial edges of the sector-shaped openings nearest the centre line of the frame are inclined at a small angle to that centre line in a direction such that in the fas-



tening condition of the buckle any force tending to separate the two parts of the buckle has a component retaining the latch member in the fastening position.

- 5 4. A two-part buckle as claimed in Claim 3 in which, in the fastening condition of the buckle, the side of the shank of the first part opposite to that engaged by the strut is backed by an end wall of the frame of the second part.

- 10 5. A two-part buckle as claimed in Claim 1 in which the latch member includes a sheet metal pressing having parallel limbs which embrace the frame of the second part and in which the ends of the strut portion are located.

- 15 6. A two-part buckle as claimed in any of the preceding claims in which the frame of

the second part is connected near its lower end to a rigid or semi-rigid stalk adapted to be secured to a load-carrying part of the vehicle.

7. A two-part buckle as claimed in any of the preceding claims in which the frame of the second part is enclosed in a housing having an opening in one side through which a finger-piece portion of the latch member is accessible.

8. A two-part buckle for a safety seat belt for vehicles substantially as described with reference to the accompanying drawings.

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