

PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Improvements in or relating to Buckles

We KANGOL HELMETS LIMITED, of Southvale Works, Norfolk Street, Carlisle, a British Company, 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:—

The present invention relates to buckles and is particularly concerned with buckles suitable for use on safety seat belt assemblies for use in motor cars, aircraft seat belts, and body harness of a similar type.

In Specification No. 942,282 an arrangement is disclosed suitable for this purpose and the present invention represents an improvement in or modification of the arrangement therein claimed which has been found to be more effective for meeting the various requirements which arise in this connection.

The buckle disclosed in the earlier specification was designed to be more firmly held in the closed position with increasing tension on the belt and having a magnetic locking device to prevent inadvertent release.

In other words, the opening and closing of the buckle involved a slight toggle effect and maintenance of the two parts slightly over the dead-centre position was safeguarded by the action of a magnetic force acting substantially at right angles to the direction of tension of the belt. The chief object of the present invention is to provide a buckle which is generally similar but is more satisfactory in view of greater ease of manufacture and greater strength.

In the earlier arrangement the inner part of the buckle, i.e. that closer to the body, was provided with an outwardly extending hooked portion and this inner part, which was made of non-magnetic material, carried a magnet with suitable pole pieces and these

were arranged to co-operate with a member of magnetic material on the outer part.

According to the present invention, in a quick release two-part buckle suitable for joining the ends of a safety seat belt or the like the co-operating parts are so shaped that during the opening and closing operation the outer part pivots about the inner part to give a toggle effect whereby tension on the belt or the like will maintain the two parts more firmly in the closed position the pivoting movement to open the buckle being resisted by magnetic attraction between the inner part which is made of steel to give additional strength and a permanent magnet carried by the outer part. The outer member is preferably constructed of aluminium alloy, for instance by die casting, and has the magnet recessed therein. To improve the appearance, the magnet may be covered by a label, for instance bearing the makers' name and trade mark.

The invention will be better understood from the following description of a preferred form of carrying it into effect which should be taken in conjunction with the drawings accompanying the provisional specification comprising Figures 1—7. Of these, Figures 1 and 2 represent respectively side views of the two parts of the buckle, a portion being broken away in Figure 1; Figures 3 and 4 are corresponding views from underneath; Figures 5—7 show three different views of the two parts of the buckle in the mated position, Figure 5 being a central longitudinal section, Figure 6 an underneath view and Figure 7 a top view.

The maintenance of correct location of the parts when the belt was not under tension was ensured in the earlier arrangement by a tongue or projection forming part of the

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outer part which extended into a slot in the inner part and this tongue was so dimensioned and shaped that it took a proportion of the pull on the buckle. In the embodiment of the present invention which is illustrated, this tongue is eliminated and the locating function which it previously performed is taken care of by a small stud on the inside of the outer part which co-operates with a corresponding hole in the inner part. This stud may be formed of a small steel self-tapping screw in the aluminium die-casting. The co-operation of the stud and the hole ensures that there shall be no relative transverse movement of the two parts when the belt is only loosely tensioned. Since the stud is not designed to take any of the tension of the belt, this is now borne entirely by the hooked member and manufacturing tolerances accordingly do not affect the stress distribution.

A further modification which makes for more satisfactory operation concerns the shaping of the outer part at its free end which forms the finger-grip to permit the belt to be released. According to this modification, the end portion of the outer part turns slightly inwards rather than outwards as it is found that the outward turning of the end is not necessary for convenient operation and on the other hand can result in undesired release of the belt if it is caught by a sleeve, for instance on a quick arm movement.

Referring first to Figures 1 and 3 which show the outer part of the buckle, this comprises essentially a substantially flat operating member 1 which as suggested above is of aluminium or aluminium alloy and is preferably die-cast. It is shaped as shown and is provided with a shoulder 2 which co-operates with the other portion of the buckle as will appear shortly. It is connected by means of a pivot pin 3 with a link 4 comprising a fixed cross member 5 and a knurled cross member 6 which is slidable without rotation in the slots in the side members one of which is shown at 7. One end of the belt 8 shown dotted in Figure 3 is passed round the knurled member and over the fixed member 5 thence when tension is applied to the belt, the knurled member is moved towards the left-hand extremity of the slots 7 as shown in Figure 1 and the belt is then gripped between the two cross members. This forms a convenient means of adjusting the effective length of the belt. The recessed permanent magnet is shown at 9 and the locating stud at 10.

Referring now to the inner part of the buckle shown in Figs. 2 and 4, this is curved as shown to form a hook 11 and is provided at its other end with a slot 12 suitable for

receiving the other end of the belt 13 (shown dotted). This part is made of steel, preferably by a stamping operation, and is provided with a hole 14 which co-operates with the projection 10 of the other part. The slot carries a metallic member 15 of U-section which is forced on to the outer edge of the slot 12 and serves to protect the belt against chafing by possible roughness on the edge of the edge of the slot.

Referring now to Figures 5, 6 and 7, these show the two parts in co-operating relationship. It will be seen that the shoulder 2 of the part 1 now engages with the hooked end of the inner part and the shape and location of the two parts is such that increased tension on the belt will tend to hold the buckle more tightly in place. In order to release it, the end of the part 1 is raised, whereupon this portion by means of the shoulder 2 pivots about the end of the hooked inner part and a considerable mechanical advantage is obtained for overcoming the magnetic attraction and also the transverse component of tension holding the two parts together. The engagement of the projection 10 in the hole 14 ensures that the two parts will be properly located when the buckle is fastened but the belt is not under tension.

WHAT WE CLAIM IS:—

1. A quick-release two-part buckle suitable for joining the ends of a safety seat belt or the like in which the co-operating parts are so shaped that during the opening and closing operation the outer part pivots about the inner part to give a toggle effect whereby tension on the belt or the like will maintain the two parts more firmly in the closed position the pivoting movement to open the buckle being resisted by magnetic attraction between the inner part which is made of steel to give additional strength and a permanent magnet carried by the outer part.

2. A buckle as claimed in claim 1 in which transverse movement of the two parts when mated but not under tension is prevented by a stud on the outer part which seats in a hole in the inner part.

3. A buckle as claimed in claim 1 or 2 in which the end portion of the outer part is curved inwards to reduce the risk of inadvertent operation.

4. A buckle as claimed in claim 1, 2 or 3 in which the inner part is a stamping and includes a slot for the end of the belt or the like, the edge of the slot contacted by the belt being provided with a protective metallic member of U-shape to avoid chafing of the belt.

5. A quick-release two-part buckle suitable for a safety seat belt substantially as



Co-operates.



outer part which extended into a slot in the inner part and this tongue was so dimensioned and shaped that it took a proportion of the pull on the buckle. In the embodiment of the present invention which is illustrated, this tongue is eliminated and the locating function which it previously performed is taken care of by a small stud on the inside of the outer part which co-operates with a corresponding hole in the inner part. This stud may be formed of a small steel self-tapping screw in the aluminium die-casting. The co-operation of the stud and the hole ensures that there shall be no relative transverse movement of the two parts when the belt is only loosely tensioned. Since the stud is not designed to take any of the tension of the belt, this is now borne entirely by the hooked member and manufacturing tolerances accordingly do not affect the stress distribution.

A further modification which makes for more satisfactory operation concerns the shaping of the outer part at its free end which forms the finger-grip to permit the belt to be released. According to this modification, the end portion of the outer part turns slightly inwards rather than outwards as it is found that the outward turning of the end is not necessary for convenient operation and on the other hand can result in undesired release of the belt if it is caught by a sleeve, for instance on a quick arm movement.

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2. A buckle as claimed in claim 1 in which transverse movement of the two parts when mated but not under tension is prevented by a stud on the outer part which seats in a hole in the inner part.

3. A buckle as claimed in claim 1 or 2 in which the end portion of the outer part is curved inwards to reduce the risk of inadvertent operation.

4. A buckle as claimed in claim 1, 2 or 3 in which the inner part is a stamping and includes a slot for the end of the belt or the like, the edge of the slot contacted by the belt being provided with a protective metallic member of U-shape to avoid chafing of the belt.

5. A quick-release two-part buckle suitable for a safety seat belt substantially as



described and illustrated in the drawings
accompanying the provisional specification.

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