

[54] **MULTIPLE POINT BUCKLE**
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[63] Continuation of Ser. No. 95,178, Dec. 4, 1970, abandoned.
[52] **U.S. Cl.**..... **24/205.19, 24/230 A**
[51] **Int. Cl.**..... **A44b 11/25**
[58] **Field of Search** **24/205.17, 205.19, 73 PH, 24/230 D, 230 AV, 230 AS; 292/49; 339/78; 221/69, 110; 294/83 R, 83 H**

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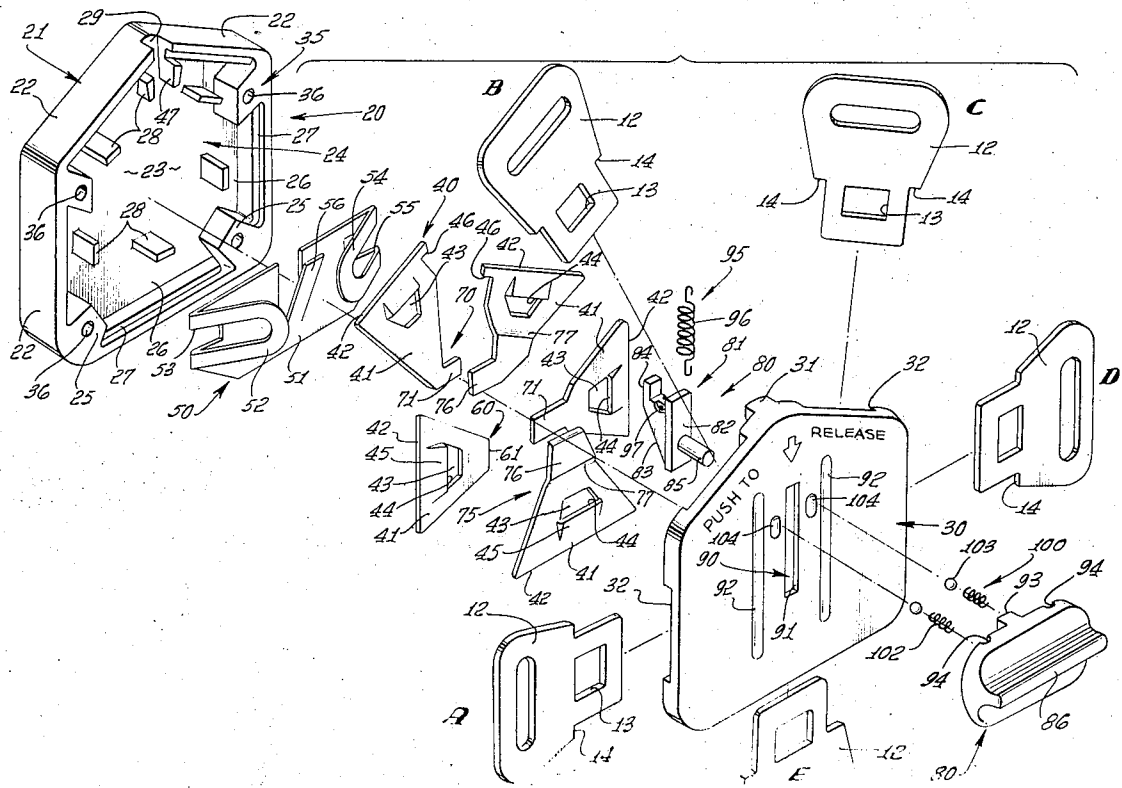
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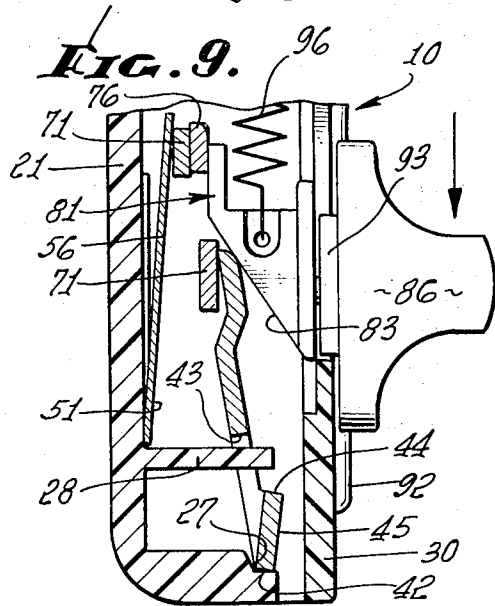
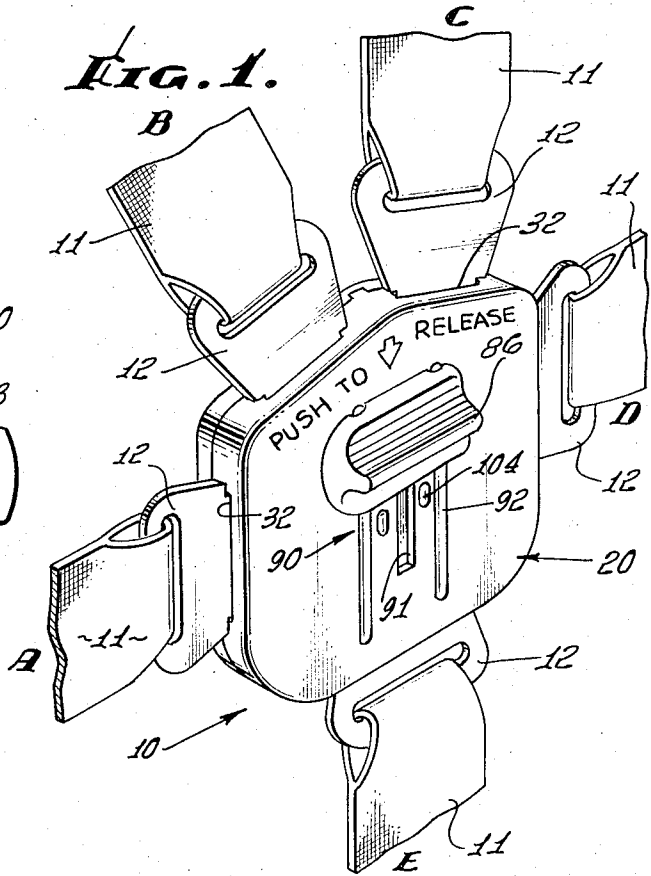
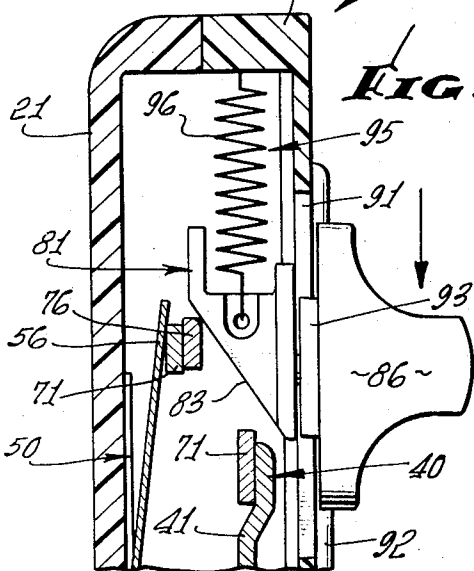
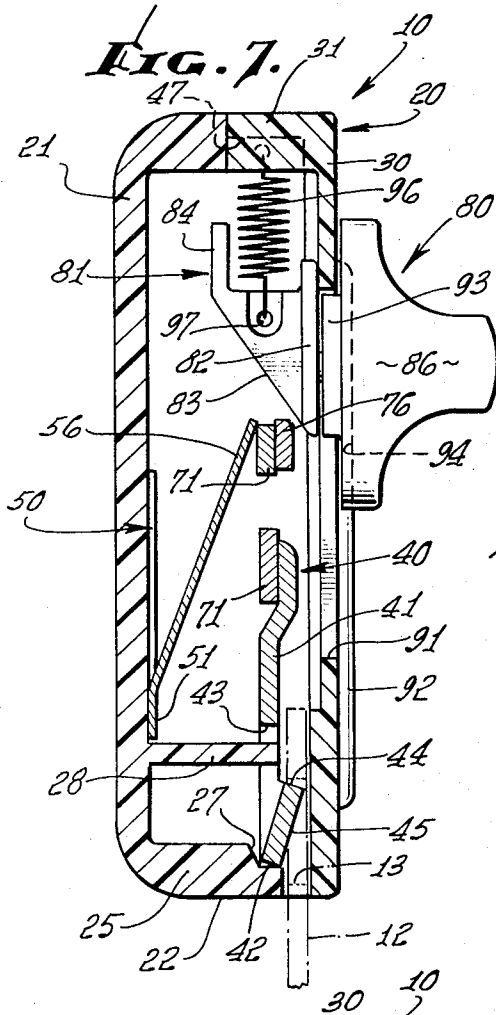
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[57] **ABSTRACT**

A five-point buckle has five ratchets, each for lockingly receiving a respective connector on the end of any one of two shoulder belts, two lap belts, or a crotch belt, the end connectors being insertable into the buckle in random sequence, with the two shoulder belt ratchets having overlying tabs, and the crotch belt and left lap belt ratchets having overlying tabs adjacent the overlying tabs of the shoulder belt ratchets, and with a slidable shoe adapted to sequentially engage and depress the adjacent sets of tabs upon manual movement of the shoe to thereby sequentially release first the shoulder belts simultaneously and then the left lap belt and crotch belt simultaneously from the buckle. Detents indicate the position of the shoe to permit release of the shoulder belts only, a spring biases the shoe to a non-tab engaging position, and a blocking plate may be inserted into the buckle to convert the five-point buckle to a four-point or three-point buckle.

24 Claims, 11 Drawing Figures



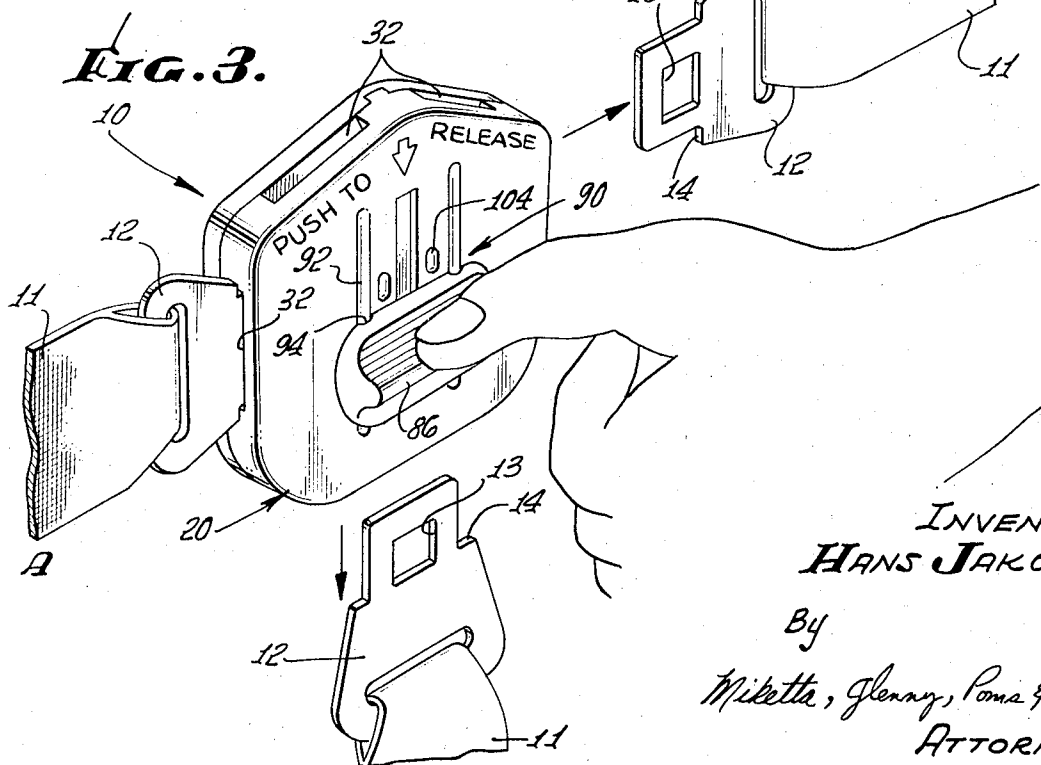
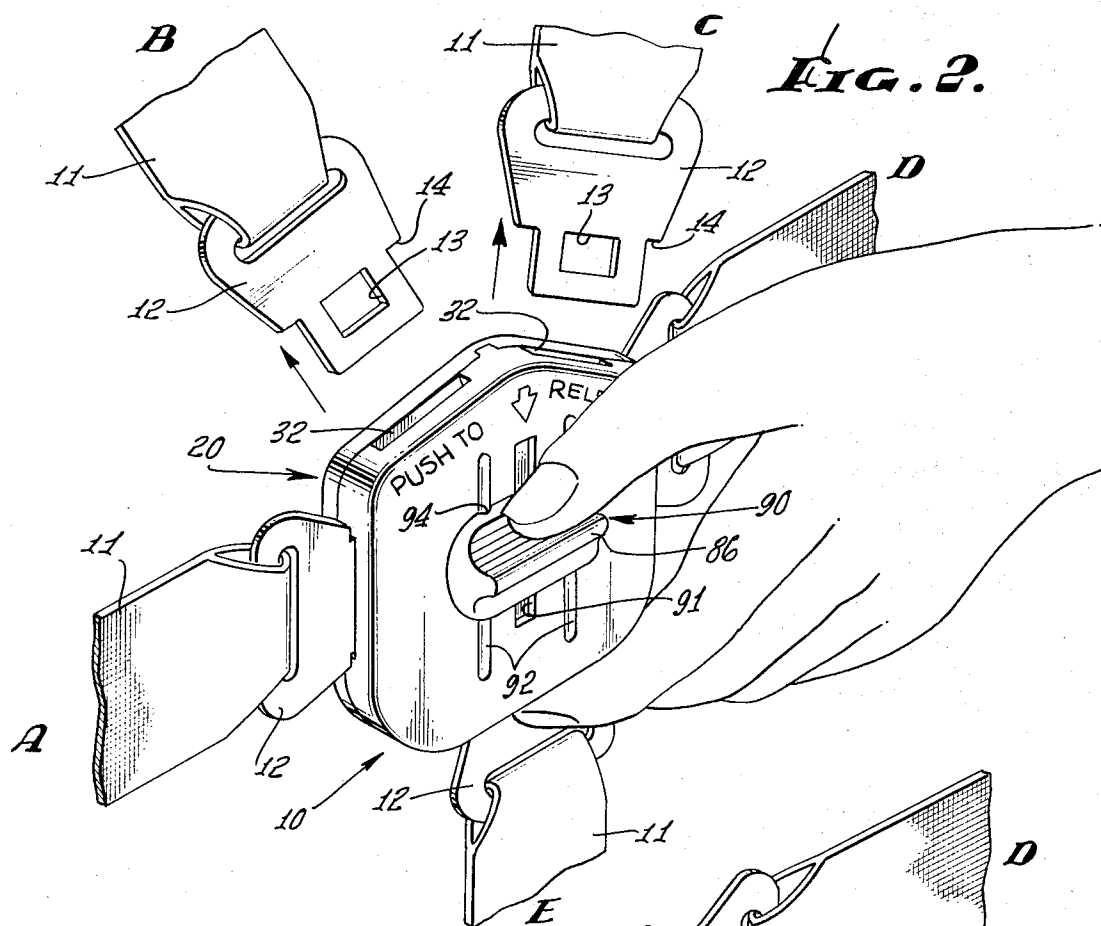


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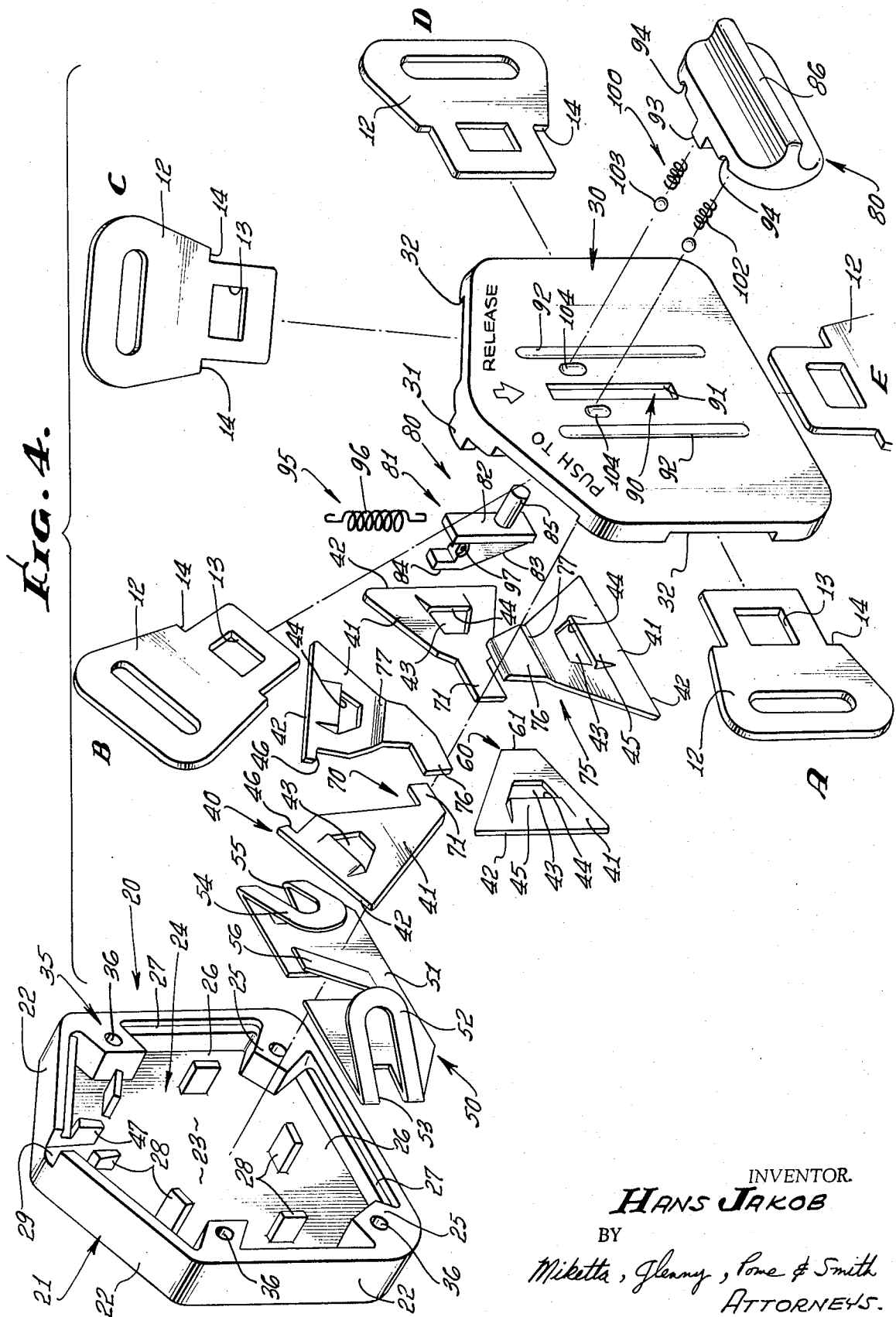
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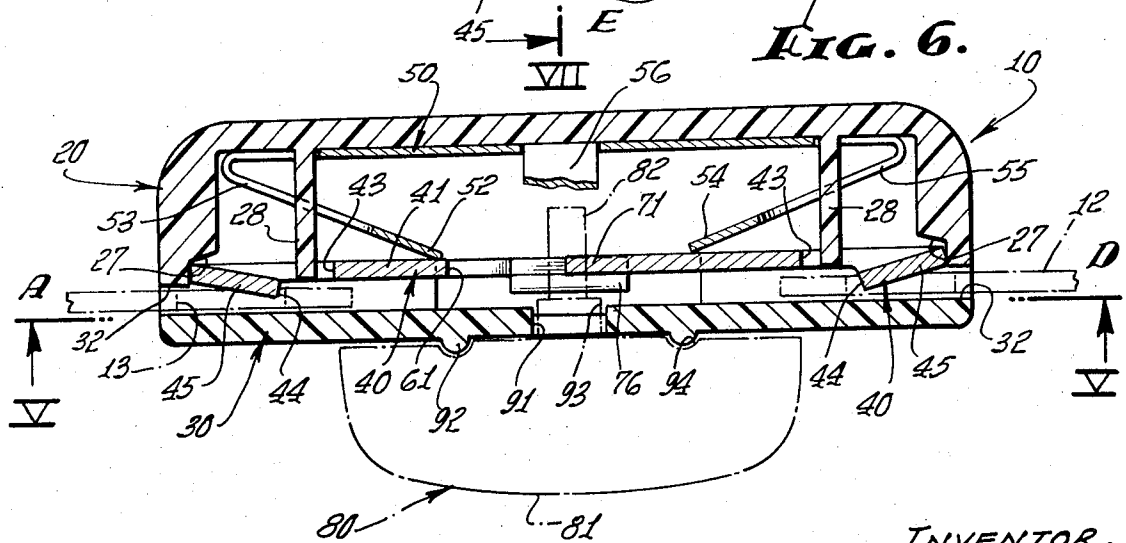
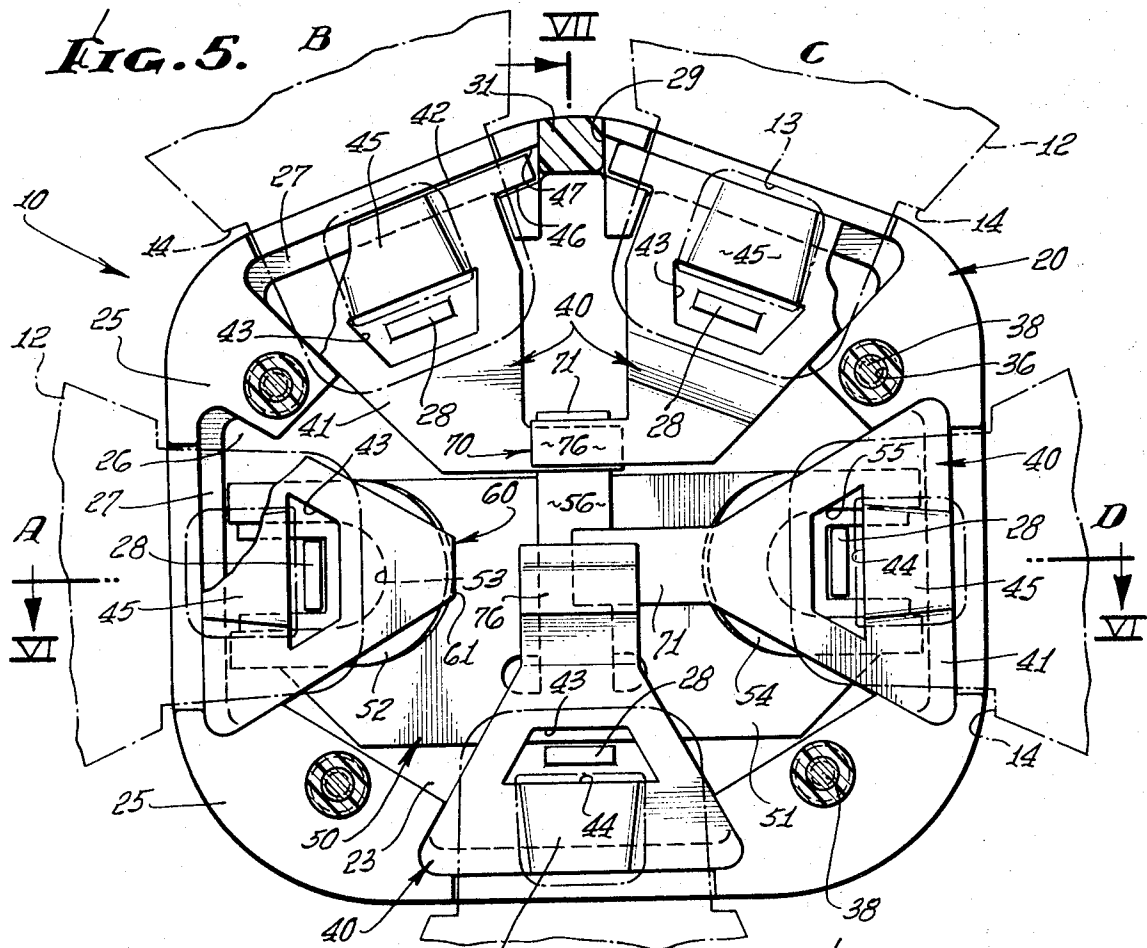


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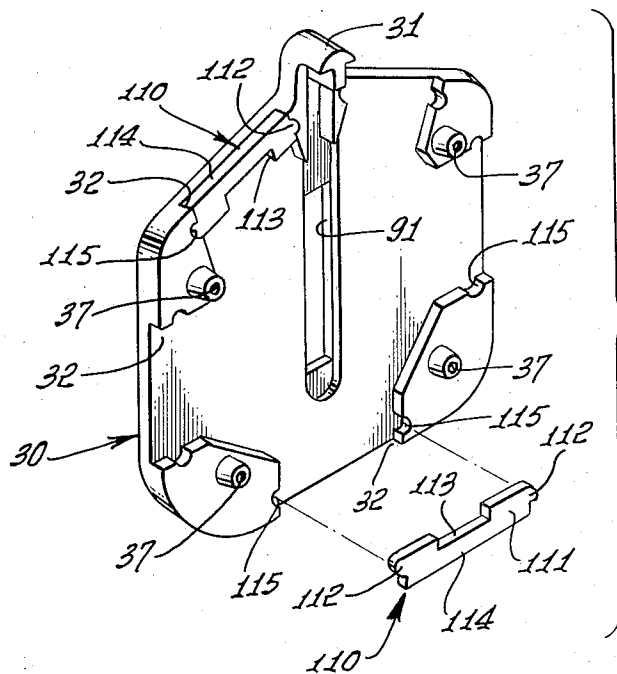


FIG. 10.

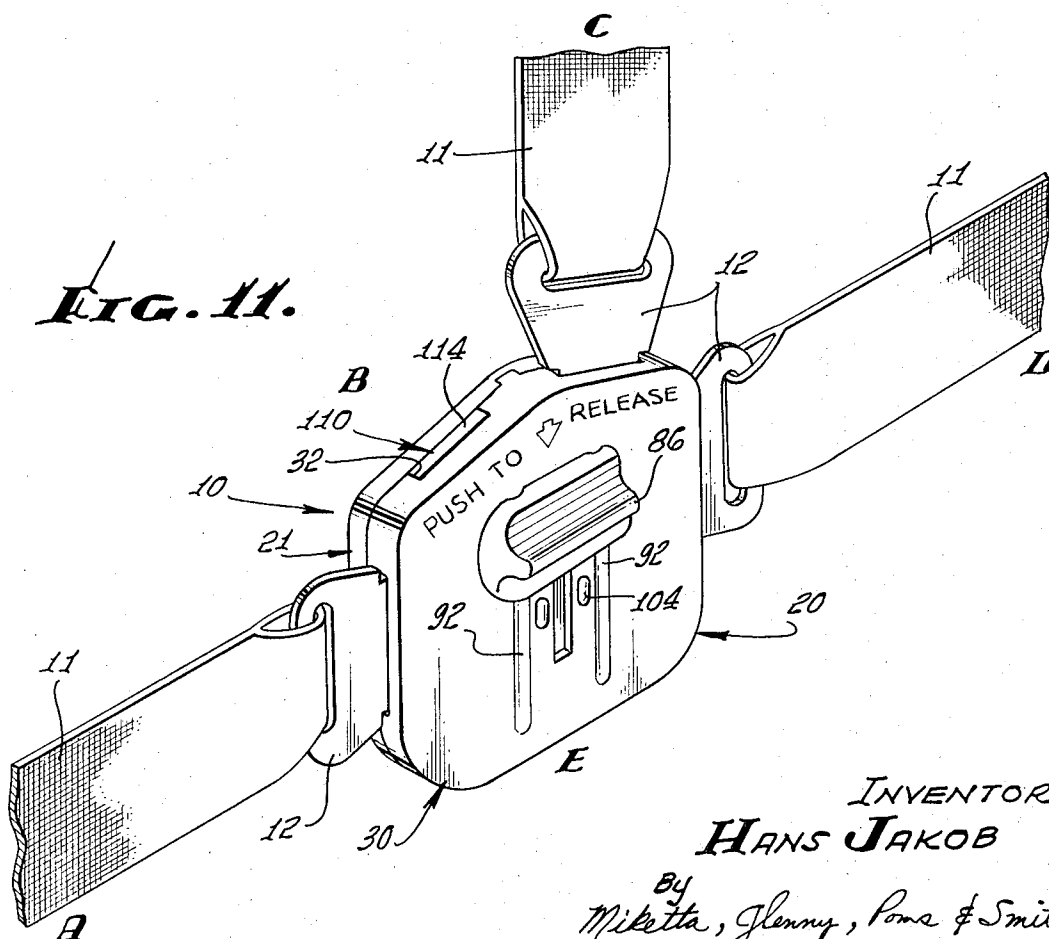


FIG. 11.

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MULTIPLE POINT BUCKLE

This is a continuation of application Ser. No. 95,178, filed Dec. 4, 1970, now abandoned.

BACKGROUND OF THE INVENTION

This invention relates to safety belt buckles for multiple safety belts, and more particularly to such a buckle having a common actuator for sequentially releasing a first belt with the simultaneously releasing of an additional pair of belts.

Multiple point buckles for use with multiple safety belts are used in safety harness systems for aircraft cockpits, racing car cockpits, parachutes, underwater air breathing devices, etc. The existing multiple point buckles can be classified into three broad categories, buckles which individually release the belts, usually by individual operation of separate actuating members, buckles which simultaneously release the belts, and hybrid buckles which simultaneously release all of the belts, and which release some of the belts without releasing the rest of the belts, usually by operation of distinct actuation members.

The buckles which individually release the belts, are exemplified by Whittingham U.S. Pat. No. 3,233,296 and Makinen U.S. Pat. No. 3,451,720, in a three-point system; and Jayet U.S. Pat. No. 3,832,120 in a four-point system. The buckles of the Whittingham and Makinen patents are provided with an individual actuating member for each belt with the manual operation of this individual actuating member releasing the respective belt. To effect simultaneous release of the belts in the buckles of Whittingham and Makinen, the operator must have enough coordination to move both actuating members simultaneously. A need for simultaneous release would be in an emergency situation and the individual actuating members are not suited to simultaneous operation in such a situation.

In the buckle of Jayet, the belts must release individually with no simultaneous release possible. Also, the belts must be inserted individually in the proper sequence and the release member indexed with the insertion of each belt. These steps of attachment are a nuisance to the wearer, and the sequence of attachment may not be the desirable sequence for all uses.

The buckles which simultaneously release all of the safety belts are exemplified by Selzer U.S. Pat. No. 3,233,941, Hatfield U.S. Pat. No. 3,364,532, and Stoffel U.S. Pat. No. 3,491,414 in a three-point system; Hopka et al. U.S. Pat. No. 3,473,201 in a four-point system; and Irvin et al. U.S. Pat. No. 2,668,997 in a five-point system. The buckle of the Selzer patent, for example, has a common detent, holding a shoulder belt D-ring, and a lap belt D-ring to the buckle, with a lever actuating member operating the detent to release both D-rings simultaneously. The buckle of Irvin et al as another example has five detents, each with lever moved by depression of the cover actuating member to simultaneously raise all of the detents and release all of the belts.

The hybrid belts are exemplified by patents to Cushman U.S. Pat. No. 2,899,732, and Basham et al. U.S. Pat. No. 3,142,968. The buckle of Cushman has an actuating member which releases all of the belts simultaneously, and an auxiliary actuating lever which releases the two shoulder belts if desired. The buckle of Basham et al is essentially two buckles ganged together with an actuating member that releases all of the breathing ap-

paratus belts, and an actuating member which releases all of the weight belts, with both actuating members being completely independent of each other.

None of the buckles of the prior art patents disclose nor contemplate a buckle which sequentially releases pairs of belts simultaneously and none of the buckles of the prior art patents show a unitary operating member for simultaneously releasing such pairs of belts, with the sequential release of another belt.

SUMMARY OF THE INVENTION

Therefore, it is the primary object of this invention to provide a multiple point buckle which is adapted to allow the initial release of a first belt or set of belts and a subsequent release of a second belt or set of belts sequentially through the manipulation of an actuating member. Other and additional objects of this invention are to provide such a buckle which will sequentially release pairs of belts, to provide such a buckle with a unitary actuating means for sequentially releasing the belts, to provide such a buckle which is easily adaptable for use with a three, four or five-point safety belt harness system, and to provide such a buckle which is economical to manufacture, dependable in operation and versatile in application.

Generally, the safety belt buckle according to this invention for receiving a plurality of belt end connectors in random sequence and for releasably securing the randomly received connectors, includes a plurality of movable latch or ratchet means to hold a connector inserted therein, latch release means for moving the associated latch means to the unlocked position, simultaneous latch release means for two of the belts for releasing these two belts simultaneously and a unitary actuating means for sequentially actuating the release means to simultaneously release two of the belts, but in sequence with the release of the other belt. Four belts may be provided, with the belts related in pairs, and the actuating means may sequentially actuate a separate simultaneous latch release means for each of the pairs of belts. The unitary actuating means may include a shoe having a sloping surface and a flat surface. The simultaneous latch release means may include tabs or extensions on latch means which overlie each other to facilitate the simultaneous movement of the latch means to the unlocked position. Detent means may be provided for indicating the position of the actuating means to permit some of the belts to be released from the buckle without releasing all of the belts. Blocking means may be provided for converting a five-point buckle to a four or three-point buckle as desired.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of the multiple point buckle according to this invention with the knob thereof in a first position and with the end connectors of right and left lap belts, right and left shoulder belts, and a crotch belt secured to the buckle;

FIG. 2 is a perspective view similar to FIG. 1 but showing the buckle with the knob depressed to the second position to simultaneously release the right and left shoulder belts;

FIG. 3 is a perspective view similar to FIGS. 1 and 2 but with the knob of the buckle depressed to the third position to simultaneously release the left lap belt, and the crotch belt;

FIG. 4 is an exploded perspective view showing the details of construction of the buckle according to this invention;

FIG. 5 is a fragmentary top view of the buckle with the cover removed, showing the assembled internal construction of the buckle, with the end connectors shown inserted in the buckle in phantom lines;

FIG. 6 is a fragmentary cross-sectional view taken along the plane VI—VI of FIG. 5 showing the movable latch means in the locking position, the end connectors inserted into the buckle in phantom lines, and the knob and shoe of the buckle in phantom lines;

FIG. 7 is a fragmentary side view taken along the plane VII—VII of FIG. 5 showing the actuating means in the non-tab engaging position, and the movable latch means in the locking position;

FIG. 8 is a fragmentary view of a portion of FIG. 7 but with the actuating means located in the first release position to move the shoulder belt movable latch means to the unlocked position;

FIG. 9 is a view of a portion of FIG. 7 but showing the actuating means in the second release position to maintain the shoulder belt movable latch means in the unlocked position while moving the left lap belt and crotch belt movable latch means to the unlocked position;

FIG. 10 is a perspective exploded view of the back side of the cover showing the blocking plates of the blocking means; and

FIG. 11 is a perspective view similar to FIG. 1 but showing the buckle of this invention containing the blocking means suitably located therein to convert the five-point buckle to a three-point buckle.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings, and particularly to FIG. 1, the multiple point belt buckle according to this invention is generally indicated by the numeral 10. The buckle 10 is illustratively shown as a left side, five-point belt buckle for receiving five belts 11, each having an end connector 12 with apertures 13 and locating shoulder 14 of conventional design. For clarity of discussion, the general numbers when referring to the right lap belt and parts associated therewith will be identified with the letter A. Likewise, when referring to the numbers of the right shoulder belt and parts associated therewith, the letter B will be used; when referring to the left shoulder belt and parts associated therewith the letter C will be used; when referring to the left lap belt and parts associated therewith the letter D will be used; and when referring to the crotch belt and parts associated therewith, the letter E will be used. While the illustrative multiple point buckle 10 is shown as being a five-point buckle, by a simple modification, the buckle 10 according to this invention could be, if so desired, made as a buckle for a three-point system, a four-point system, a six-point system and so on.

Generally the buckle according to this invention includes a housing 20 with a lower body 21 having an upwardly opening cavity 24 closed by cover 30 with openings 32 into the cavity 24, with means 35 for securing the cover 30 to the body 21, with movable latch means 40 in the housing 20 adjacent a respective opening 32 for locking a respective end connector 12, with means 60 for securing the remaining belt 11 to the housing 20, and with latch release means 70 for the movable latch

means 40. The improvement in the buckle according to this invention includes simultaneous latch release means 75 for simultaneously releasing pairs of belts 11, unitary actuating means 80, means 90 for mounting the actuating means 80 for sequentially operating the latch release means 70 and 75, detent means 100 for indicating the position of the unitary actuating means 80, and blocking means 110 for closing some of the openings 32 to convert the five-point buckle 10 to a four-point or a three-point buckle as desired.

Referring now to FIG. 4, the housing 20 has a lower body 21 having five side walls 22 and a bottom wall 23 which together define an upwardly opening cavity 24. At the intersection of each of the side walls 22 is a wall enlargement 25 which, with the adjacent sides of adjacent wall enlargement forms five frustum cavities 26. At the base of each frustum cavity 26 is located a ledge 27 in the side wall 22 of the lower body 21. Centrally located in each frustum cavity 26 is an upstanding post 28 for supporting a respective end connection 12 when inserted in the buckle 10. A tongue notch 29 is cut in one of the wall enlargements 25 for a purpose which will appear later.

The housing 20 also includes a cover 30 for closing the upwardly opening cavity 24. The cover 30 has protruding therefrom a tongue 31 for engagement with the tongue notch 29 to provide registry between the lower body 21 and the cover 30. Along each of the sides of the cover 30 is a cutout which, when the cover 30 is on the lower body 21, forms with the walls 22 thereof, openings 32 for receiving therein the apertured end 13 of the connector 12 with the locating shoulders 14 engaging the walls 22 adjacent these openings.

The means 35 for securing the cover 30 to the lower body 21 to complete the housing 20 are shown illustratively as being holes 36 in four of the wall enlargements 25 of the lower body and tapped holes 37 in the cover 30 which are aligned with the holes 36 when the cover 30 is in registry with the body 21. Machine screws 38 extend through the holes 36 and thread into the holes 37 to secure the cover 30 to the lower body 21 and form the housing 20.

The buckle 10 has movable latch means 40 in the housing 20 for lockingly receiving the belt end connectors 12. The means 40, according to the preferred embodiment of the invention, are triangular plates or ratchets 41 for location in each of the frustum cavities 26. Each triangular plate or ratchet 41 has a base or pivot edge 42 which rests on a ledge 27 with the sides of the wall enlargements 25 engaging the sides of the triangular plate 41 to prevent horizontal movement of the triangular plate and keep the base or pivot edge 42 of the triangular plate on the ledge 27.

Each triangular plate or ratchet 41 is provided with a central cavity 43 for receiving therethrough a respective post 28. The edge of the central cavity 43 closest the base or pivot edge 42 has formed therein a raised locking edge 44 which merges along ramp 45 into the surface of the triangular plate. Because of the tongue notch 29, the right and left shoulder belt triangular plates 41B and 41C are provided with a cutout 46 for insertion into a groove 47 in the wall enlargement 25 through which the tongue notch 29 extends. Each of the triangular plates or ratchets 41 when positioned in the housing 20 are movable between a locking position as shown in FIG. 7, wherein the locking edge is raised against the lower surface of the cover 30, and an un-

locked position as shown in FIG. 9 wherein the triangular plate 41 is pivoted on the base edge 42 to space the locking edge 44 away from the bottom surface of a cover 30.

The movable latch means 40 also includes plate or ratchet spring means 50 provided for biasing the ratchets 41 to the locking position. In the preferred embodiment the ratchet spring means 50 includes a plate 51 made of spring material such as spring steel. The plate 51 has a right ear 52 with a cutout 53 therein, a left ear 54 with a cutout 55 therein and a center ear 56. The spring plate 51 is located in the bottom of cavity 24 on bottom wall 23 of the lower body 21 with the posts 28 protruding up through the cutouts 53 and 55. The right ear 52 engages triangular plate 41A, the left ear 54 engages triangular plate 41D, and the center ear 56 engages triangular plate 41B to bias all of the triangular plates or ratchets 41 to the unlocked position, as will be explained later.

The buckle 10 also includes means 60 for securing one belt 11 effectively permanently to the housing 20. In the preferred embodiment, the means 60 includes the triangular plate 41A having a cutoff end 61 for a purpose which will appear later. The triangular plate 41A mounts the end connector 12A of the right lap belt 11A to the buckle 10 upon insertion of the end connector 12A into the opening 32A as is shown in FIG. 6.

The buckle 10 is provided with latch release means 70 for the movable latch means 40. In the preferred embodiment, the latch release means includes tabs 71 extending from adjacent ends of the plates or ratchets 41B and 41D, and located adjacent each other.

The improvements according to this invention for the buckle 10 include the provision of simultaneous release means 75 for simultaneously releasing two of the belts 11, unitary actuating means 80, means 90 for mounting the actuating means 80 for sequentially actuating the release means 70 and 75, detent means 100 for indicating the position of the unitary actuating means 80, and blocking means 110 for blocking some of the openings 32 in the housing 20.

In the preferred embodiment, the simultaneous latch release means 75 includes overlying tabs 76C and 76E having a jag 77 to extend outwardly from adjacent ends of triangular plates 41C and 41E and overlie tabs 71B and 71D respectively. Because of the overlying relationships of the tabs 71B and 76C and tabs 71D, and 76E respectively, depression of the overlying tabs moves both of the triangular plates or ratchets 41 in such association to release the respective belts simultaneously. Notice in FIG. 5 that the pairs or sets of tabs 71B and 76C, and 71D and 76E in overlying relationship are adjacent one another.

The unitary actuating means 80 in the preferred embodiment includes wedge, actuating means 81 having a shoe 82, and a knob 86.

As best seen in FIG. 4, the shoe 82 of the wedge, actuating means 81 has a ramp or sloping surface 83 merging with a flat surface 84. A pin 85 extends upwardly from the shoe 82 to act as means operably connecting the shoe 82 to a knob 86. The knob 86 is located on the outside of cover 30 over pin 85 for being manually engaged.

The means 90 for mounting the actuating means 80 to the housing 20 for movement relative to latch release means 70 and 75 include a centrally located vertical slot 91 in the cover 30. On either side of the slot 91

are raised vertical parallel ridges 92. The knob 86 has an oblong protrusion 93 sized to slide in the slot 91 and parallel spaced vertical grooves 94 receiving ridges 92 to guide the movement of the knob 86 and the shoe 82 secured thereto by pin 85. The knob 86 guided by the mounting means 90 is movable from a first position as shown in FIG. 1 through a second position as shown in FIG. 2 to a third position as shown in FIG. 3. When the knob 86 is in the first position, the shoe 82 is in the non-tab engaging position as shown in FIG. 7; when the knob 86 is in the second position, the shoe 82 is in the first release position as shown in FIG. 8; and when the knob 86 is in the third position, the shoe 82 is in the second release position as shown in FIG. 9.

The spring means 95 for biasing the shoe 82 to the non-tab engaging position, and thereby biasing the knob 86 to the first position includes a spring 96. The spring 96 has one end secured to an aperture 97 in the shoe 82 and the other end secured in the groove 47 in the uppermost wall enlargement 25. The spring 96 biases the shoe 82 to the non-tab engaging position and therefore the knob 86 to the first position as shown in FIG. 7.

In the preferred embodiment of the buckle 10, detent means 100 is provided for indicating the position of the actuating means 80. In the preferred embodiment, the detent means includes two holes 101 in knob 86 with springs 102 being seated in the holes 101 and having balls 103 on the lower ends thereof. Dimples 104 are aligned with the holes 101 when the knob 86 is in the second position. When the knob 86 reaches the second position, the springs 102 bias the balls 103 into the dimples 104 to indicate the second position. It is contemplated that the spring values of springs 102 and the depth of dimples 104 will be such that the spring or biasing means 95 will move the knob 86 from the second to the first position unless manually held. If it is desired to hold the knob 86 in the second position the strength of spring 102 or the depth of dimples 104 could be arranged such that the balls 103 will hold the knob 86 against the action of the spring means 95 in this position. A set of dimples could be provided at the third position of the knob if so desired.

To assemble the buckle 10 the spring plate 51 is placed in the upwardly opening cavity 24 on the lower wall 22 and the triangular plates 41 are placed in respective frustum cavities 26 with the tabs 71 and 76 in overlying relationship. The springs 102 and balls 103 are inserted into holes 101 in the knob 86, and the knob 86 is placed on the outside of the cover whereupon the pin 85 of the shoe 82 is inserted through slot 91 and into knob 86 to be secured thereto. The spring 96 has one end inserted into the aperture 97 of the shoe 82 and the other end inserted into groove 47, with the cover 30 being placed in registry with the lower body 21 for insertion of machine screws 38 which close the housing 20 and complete the assembly of the buckle 10.

The end connector 12A on right lap belt 11A is inserted through opening 32A to slide along ramp 45A of the triangular plate 41A. The insertion of the end 12A pivots the triangular plate 41A downwardly against the biasing of spring plate 51 until the aperture 13A is located over the blocking edge 44A whereupon the right ear 52 moves the triangular plate upwardly moving locking edge 44 into aperture 13 to effectively perma-

nently secure the five-point buckle 10 to the right lap belt 11A.

The buckle 10 is now ready to receive the end connectors 12B, C, D and E in openings 32B, C, D and E. The end connectors 12 can be inserted in the respective openings 32 in any order. Upon insertion of any end connector 12, the connector 12 will slide along ramp 45 of the respective triangular plate 41 to pivot the triangular plate 41 downwardly against the action of spring means 50 until the locating shoulders 14 engage the walls 22 to locate the aperture 13 above the locking edge 44 whereupon the spring means 50 will move the locking edge 44 into the aperture 13 to releasably secure the belt 11 to the buckle 10. The post 28 supports the end connector 12 while located in the buckle 10. The buckle 10 is shown in FIG. 1 with the four belts 11 releasably secured thereto and with the right lap belt secured thereto. FIG. 7 is, of course, the cross-sectional view and shows the end connectors 12 inserted into the buckle 10 with the unitary actuating means 80 in the non-tab engaging position.

To release the right and left shoulder belts 11B and 11C, as is shown in FIG. 2, the knob 86 is manually moved from the first position to the second position wherein the balls 103 drop into dimples 104 indicating the second position. As the knob 86 moves from the first position to the second position, the shoe 82 moves from the non-tab engaging position as shown in FIG. 7 to the first release position as shown in FIG. 8 whereupon the ramp surface 83 of the shoe engages overlying tab 76C to depress both overlying tab 76C and tab 71B simultaneously moving the triangular plates 41B and C to the unlocked position while the end connectors 12B and 12C remain supported by posts 28B and 28C to release the end connectors 12B and 12C from the locking edge 44B and 44C.

If the wearer wishes the remaining safety belts 11D and 11E to remain attached to the buckle 10, the knob 86 is released and the spring biasing means 95 returns the knob 86 to the position of FIG. 7. If, however, the wearer wishes to release the remaining belts 11 from the buckle 10 he moves the knob 86 from the position shown in FIG. 2 to the third position shown in FIG. 3 thereby moving the shoe 82 from the first release position shown in FIG. 8 to the second release position shown in FIG. 9 to move the overlying tab 76C and tab 71B from the sloping surface 83 to the flat surface 84 to maintain the triangular plates 41B and 41C in the unlocked position and moves the overlying tab 76E and tab 71D along the ramp surface 83 to move the triangular plates 41E and 41D simultaneously to the unlocked position while the connectors 12D and 12E remain supported by posts 28D and 28E to release end connectors 12D and 12E as shown in FIG. 3. Release of knob 86 enables the spring means 95 to return the knob 86 to the first position shown in FIG. 1 and moving the shoe 82 to the non-tab engaging position as shown in FIG. 7 and permitting the spring means 50 to move the triangular plates 41 to the locking position ready to receive the end connectors 12 on belts 11 again.

By moving the knob 86 from the first position to the second position and from the second position to the third position slowly, the shoulder belts 11B and 11C can be simultaneously released and then sequentially thereafter the left lap belt 11D, and crotch belt 11E can be simultaneously released. If the knob 86 is moved from the first position quickly through the second posi-

tion to the third position, the belts 11 are effectively simultaneously released from the buckle 10 enabling complete freeing of the harnesses as may be required in an emergency situation.

The buckle 10 is shown illustratively as being effectively permanently secured to end connector 12A on the right lap belt 11A for receiving the end connector 12D of the left lap belt 11D. However, by simply switching location of the triangular plates 41A and 41D in the housing 20, the buckle 10 can be effectively permanently secured to the end connector 12D on the left lap belt 11D for receiving the end connector 12A of the right lap belt 11A. The switching operation can be easily done by the buckle installer or by the customer. This switching eliminates the need for making mirror images of the buckle 10 for right and left side vehicle use.

To add to the versatility of the buckle 10 according to this invention, blocking means 110 may be provided for converting a five-point buckle 10 to a four-point or three-point buckle 10. In the preferred embodiment, the blocking means 110 as seen in FIG. 10 includes a blocking plate 111 having protruding rounding ears 112, a cutout space 113 and an oblong protrusion 114 sized to correspond to the size of each opening 32. To block off a particular opening 32 the plate 111 is placed with its ears 112 in a groove 115 provided in each cover wall enlargement with the oblong protrusion 112 extending into the opening 32 to close that particular opening 32. The cutout space 113 provides clearance for the ramp 45 on the particular triangular plate 41 which will remain in the housing 20. For example, as shown in FIG. 11, the five-point buckle 10 can be converted to a three-point buckle 10 by assembling a plate 111 in the B position and E position to close openings 32B and 32E. Upon movement of the knob 86 from the first position to the second position, the left shoulder belt 11C is released, and upon movement of the knob 86 from the second position to the third position, the left lap belt 11D is released.

This three-point buckle may be used with the right shoulder strap 11B by locating the plate 111 in the C position, without requiring any other changes. This eliminates the need for making the mirror images of the buckle 10 for right side and left side vehicle use.

A variation of the blocking means 110 could include the use of a suitable plastic or rubber button (not shown) with the triangular plates 41 adjacent the opening 32 blocked by the rubber button remaining in the housing 20 as an unused part. The use of such a button would provide a single standard buckle 10 for use with a five-point harness system, a four-point harness system, and right and left three-point harness systems with little or no modification to the buckle. Such economy and versatility is not found in any other buckle.

Thus, the improved multiple point buckle 10 according to this invention provides a buckle adapted to allow the initial release of a first belt or pair of belts and subsequent release of a second belt or pair of belts sequentially through the manipulation of a unitary actuating member.

I claim:

1. A safety belt buckle for releasably receiving and securing a plurality of safety belt end connectors in random sequence, comprising a plurality of movable latch means, each pivotally mounted to said buckle and normally biased therein to locking position and independently movable to unlocked position by the receipt of

an associated end connector, whereupon the latching means each returns to the locked position under the urging of the bias thereon to hold the associated end connector until released through the operation of a unitary actuating means;

a tab extending from each of a plurality of said movable latch means for use in moving the associated latch means between locking and unlocked positions, and

means for moveably mounting said unitary actuating means and said movable latch means relative to each other in said buckle so that said unitary actuating means is manually movable from an initial non-tab engaging position through a first tab engaging position wherein the tab of a first movable latching means is moved to release a first associated belt end connector and thereafter through a second tab engaging position wherein a tab of a second movable latch means is moved to release an associated second belt end connector to thereby cause a sequential release of the associated first and second releasably secured belt end connectors.

2. The improvement as in claim 1 wherein the tabs of two of the movable latch means are in overlying relationship, engagement of one of said tabs in overlying relationship by the actuating means moving both of said tabs in overlying relationship simultaneously to the unlocked position to simultaneously move the associated movable latch means to the unlocked position thereby simultaneously releasing the two associated end connectors and belts secured thereto from the housing.

3. The improvement as in claim 1 wherein the release means includes a shoe having a ramp surface, and a flat surface, said ramp surface engaging the tabs to move them between the positions, and said flat surface engaging the tabs after they have been moved to the unlocked position by the ramp surface, to maintain the tabs in the unlocked position.

4. The improvement as in claim 3 wherein the actuating means includes a knob slideably mounted to the buckle housing for manual movement between several positions, and

means are provided for operably connecting the knob to the shoe to move the shoe between the positions when the knob is manually moved between its positions.

5. The improvement as in claim 1 wherein: detent means are additionally provided for indicating the position of the actuating means to facilitate the release of one or more of the connectors without the release of all of the connectors.

6. The improvement as in claim 1 wherein blocking means are provided at one or more desired openings of the buckle for blocking such openings and therefore the insertion of a respective connector therethrough to change the five-point buckle to a four or three-point buckle when desired.

7. The improvement as in claim 6 wherein the associated blocking means includes a plate in the buckle adjacent the desired opening, said plate having a protrusion sized to mate with the desired opening in the buckle and to close the same.

8. In a safety belt buckle adapted to receive a plurality of belt end connectors in random sequence and for releasably securing the connectors when received in

random sequence, said buckle including a plurality of movable latch means normally biased to locking position and independently movable to unlock position by the receipt of an associated end connector whereupon the latch means each return to the locked position under the urging of said bias to hold the associated end connector, the improvement comprising:

a pair of tabs in overlying relationship associated with a pair of said latch means for causing said pair of latch means to move together to the unlock position simultaneously,

additional tabs associated with other of said latch means for release thereof,

a unitary actuating means, and

means for mounting said unitary actuating means relative to said pair of tabs and additional tabs for causing a sequential release of the end connectors associated with said pair of tabs in overlying relationship relative to end connectors associated with other of said end connectors associated with said additional tabs upon movement of said actuating means relative thereto.

9. The improvement as in claim 8 wherein means are provided in association with said unitary actuating means and said latch means for providing a slight resistance to movement of said actuating means past a position in which the actuating means has moved said pair of latch means to their release position and prior to movement of said other of said latch means to their release positions.

10. In a safety belt buckle for releasably securing at least two belts having end connectors, said buckle including:

a hollow housing having an opening for receiving a respective end connector of each one of the belts;

movable latch means in the housing adjacent each opening for each end connector, each of said movable latch means being movable between an unlocked position and a locking position for lockingly engaging an end connector inserted into the opening to hold the end connector and the belt secured thereto to the housing, each of said movable latch means being biased towards said locking position, insertion of said end connector into said opening moving the associated movable latch means to the unlocked position until said end connector is fully inserted into the housing whereupon the biasing moves the associated movable latch means to the locked position to hold the end connector and belt secured thereto to the buckle thus permitting insertion of the end connectors in random sequence; and

latch release means for moving the movable latch means between locked and unlocked positions upon movement of the latch release means, the improvement therein comprising the provision of:

a unitary actuating means, for actuating the latch release means; and

means for mounting said actuating means to said housing in association with each of said latch release means whereby manual movement of the actuating means to a first release position moves at least one latch release means and the associated movable latch means from the locked position to the unlocked position to release the respective end connector and belt associated therewith, and then

manual movement of the actuating means thereafter to a second release position moves at least one other latch release means and the associated movable latch means from its locked position to its unlocked position to release the respective end connector and belt associated therewith, thereby providing sequential release of at least two of the belts from the buckle.

11. The improvement as in claim 10 wherein each latch release means comprises a tab associated with a movable latch means and wherein:

the unitary actuating means is manually movable from a non-tab engaging position through a first tab engaging position wherein the tab of the first movable latch means is moved, to a second tab engaging position where the tab of the second movable latch means is moved.

12. The improvement as in claim 10 wherein the actuating means includes a shoe having a sloping surface means for engaging and moving one or more of said latch means and flat surface means for maintaining said one or more latch means in a position to which it is moved by said sloping surface means.

13. The improvement as in claim 10 wherein: biasing means is provided in the housing for biasing the actuating means to the non-tab engaging position.

14. The improvement as in claim 10 additionally comprising the provision of:

detent means for indicating the position of the unitary actuating means to facilitate the engaging and moving of at least a first latch release means and first movable latch means from the locked position to the unlocked position to release the end connector and the belt associated therewith without engaging or moving other latch release means and other movable latch means and thereby prevent the release of other belts from the buckle.

15. The improvement as in claim 10 wherein at least three belts are provided for being releasably secured to the buckle and additionally comprising the provision of:

simultaneous latch release means for simultaneously releasing two of the latch means and the associated belts, said simultaneous latch release means being operated by the unitary actuating means in one of the release positions thereof to simultaneously release two belts.

16. The improvement as in claim 15 wherein the latch release means includes a tab associated with each movable latch means for engagement by the unitary actuating means, and

the simultaneous latch release means includes the provision of a tab on each of two movable latch means associated with two belts to be simultaneously released, said tabs being in overlying relationship and being moved simultaneously by the actuating means to move the associated movable latch means to the unlocked position simultaneously.

17. The improvement as in claim 10 wherein at least four belts are provided for being releasably secured to the buckle, said four belts being grouped in two pairs, and wherein:

simultaneous latch release means is provided for each of two pairs of latch means for simultaneous release of each pair of associated belts, and

the unitary actuating means is adapted to sequentially release first one pair of latch means simultaneously and then the second pair of latch means simultaneously.

18. The improvement as in claim 17 wherein the latch release means includes tabs for engagement by the unitary actuating means, and

wherein the simultaneous release means includes the provision of the tabs of the latch release means, associated with the connectors for each pair of belts, in pairs and the tabs of each pair being located in overlying relationship, said pairs of overlying tabs being located adjacent to each other for sequential engagement by the unitary actuating means.

19. In a safety belt buckle adapted to receive a plurality of belt end connectors in random sequence and for releasably securing the connectors when received in random sequence, said buckle including a plurality of movable latch means normally biased to locking position and independently movable to unlocked position by the receipt of an associated end connector whereupon the latch means each return to the locked position under the urging of the aforesaid bias to hold the associated end connectors, the improvement comprising:

a unitary actuating means and means for mounting said unitary actuating means for movement relative to said buckle;

a tab portion on each of two or more of said movable latch means for use in moving the associated latch means between locking and unlocked positions; and

means for mounting said latch means and their associated tab portions in said buckle with the tab portions of two or more of said plurality of movable latch means in overlying relationship, whereby engagement with one of said tab portions by movement of said actuating means relative to said buckle causes said tab portions to move the associated latching means simultaneously to unlocked positions thereby simultaneously releasing the associated belt end connectors from said buckle.

20. The improvement in safety belt buckle of claim 19 wherein means are provided for mounting said unitary actuating means for movement in a plane generally perpendicular to the direction of movement of said movable latch means in causing release of the associated belt end connectors.

21. The improvement in safety belt buckle of claim 20 wherein the unitary actuating means comprises a shoe having a ramp surface and a flat surface, said ramp surface engaging at least one of said tab portions to move said portions to cause release of said belt end connectors with said flat surface thereafter engaging said portion to hold the associated movable latch means in unlocked position.

22. The improvement in safety belt buckle of claim 19 wherein said buckle comprises a five-point buckle for releasably securing two lap belts, two shoulder belts and a crotch belt, at least four of said belts having one of said belt end connectors secured thereto and wherein:

the tab portions of movable latch means associated with the belt end connectors for the shoulder belts and lap belts are all in overlying relationship such that said movement of said unitary actuating means

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causes a simultaneous release of at least four of said belt end connectors.

23. The improvement in safety belt buckle of claim 19 wherein said means for mounting said unitary actuating means also comprises:

means for mounting said unitary actuating means on said buckle for movement from an initial non-tab engaging position to a first tab engaging position to engage a first tab and thereby move its associated latch means to release an associated connector and for subsequent movement to a second release position to move a second tab and its associated latch means to release a second connector in a sequential release of said first and second connectors.

24. The improvement in safety belt buckle of claim 15

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23 wherein said means for mounting said unitary actuating means comprises:

means for mounting said actuating means for sliding movement along a cover portion of said buckle in a plane generally normal to the direction of movement of said latch means to release an associated connector, and

said unitary actuating means includes a shoe having a ramp surface and a flat surface, said ramp surface engaging said tab portions in moving the same and said flat surface overlying said portions to hold the associated movable latch means in unlocked position when said unitary actuating means has been moved from said initial position.

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