United States Patent [19]

Lohr

[11] **3,760,467**

[45] **Sept. 25, 1973**

[54] **SAFETY BELT BUCKLE**

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[73] Assignee: **Allied Chemical Corporation,** New York, N.Y.

[22] Filed: **June 8, 1971**

[21] Appl. No.: **151,039**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 113,867, Feb. 8, 1971.

[52] **U.S. Cl.** ..... **24/230 AL,** 24/230 A, 24/230 AM

[51] **Int. Cl.** **A44b 19/00**

[58] **Field of Search** ..... 24/230 A, 230 AV, 24/230 AL, 230 AN, 230 AM, 230 AT

[56] **References Cited**

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Primary Examiner—Paul R. Gilliam
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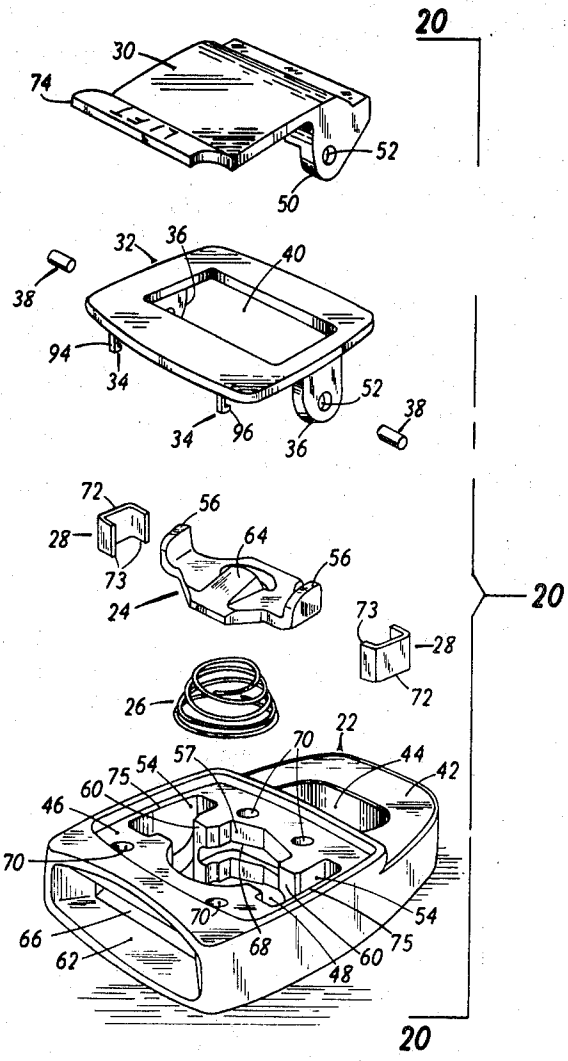
[57] **ABSTRACT**

A seat belt buckle which can be readily assembled by serially arranging its component parts in an open-faced buckle housing, then pressing a cover plate into locking engagement with the buckle housing to complete the assembly. An apertured tongue inserted into a slot in the buckle housing depresses a biased latching member having a wedge shaped latch until said latch coincides with the aperture and is urged into it by the biasing means, thus locking the tongue in place. Release of the tongue is achieved by means of a manually actuated member which depresses the latching member freeing the tongue for withdrawal.

14 Claims, 16 Drawing Figures



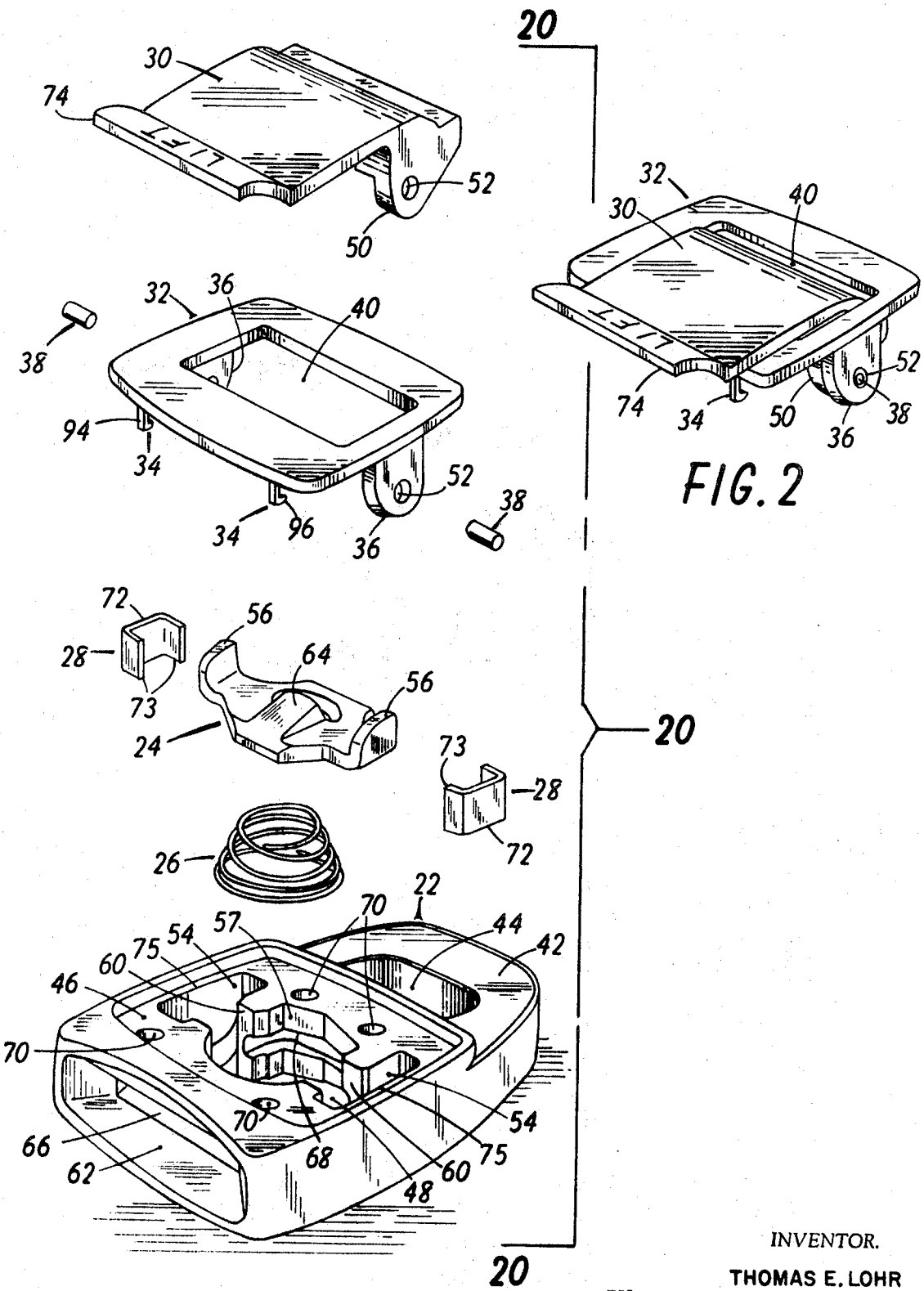


FIG. 1

FIG. 2

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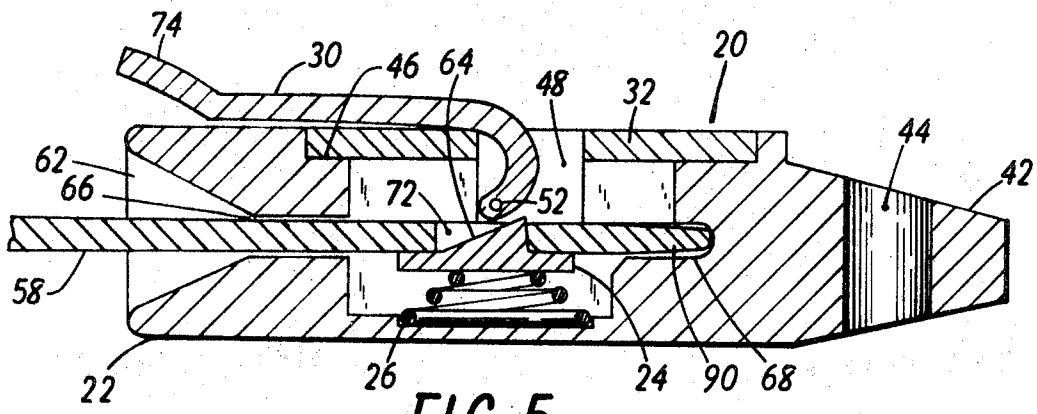

FIG. 5

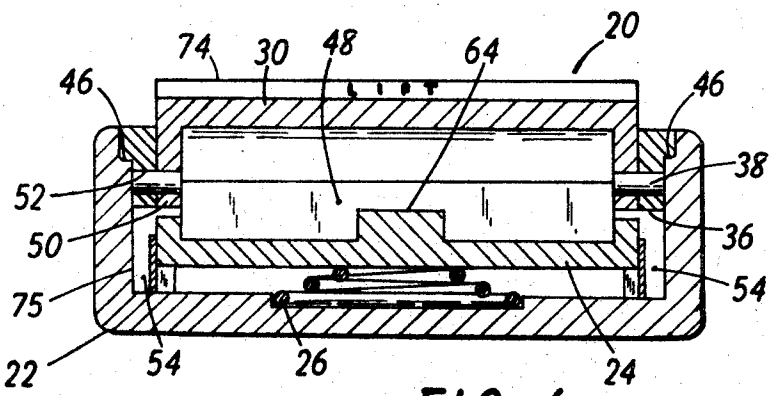

FIG. 4

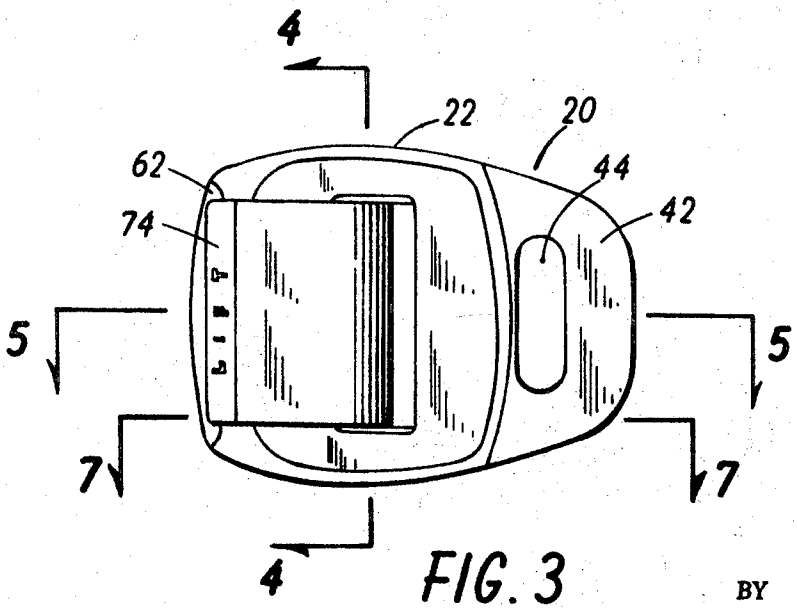

FIG. 3

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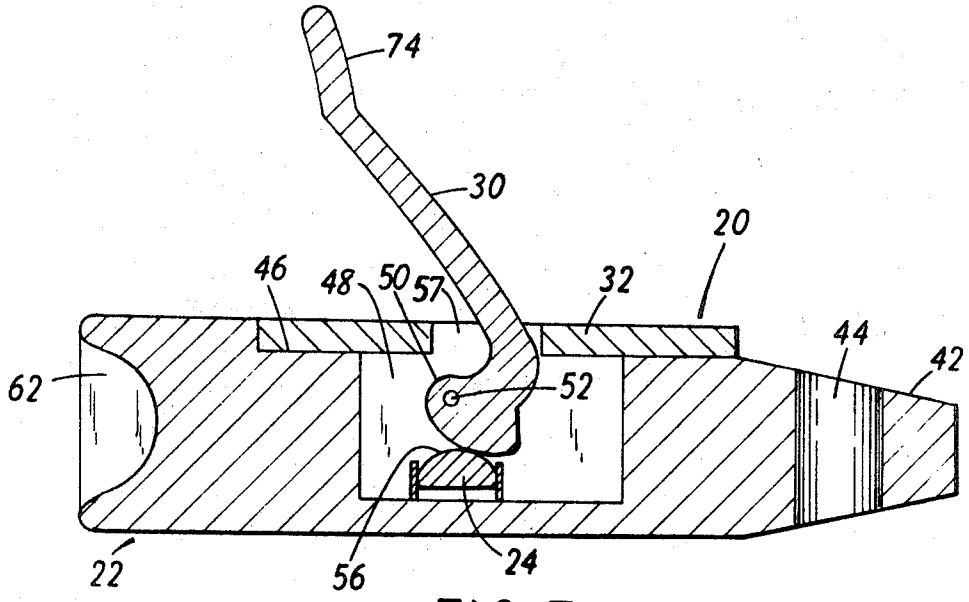

FIG. 7

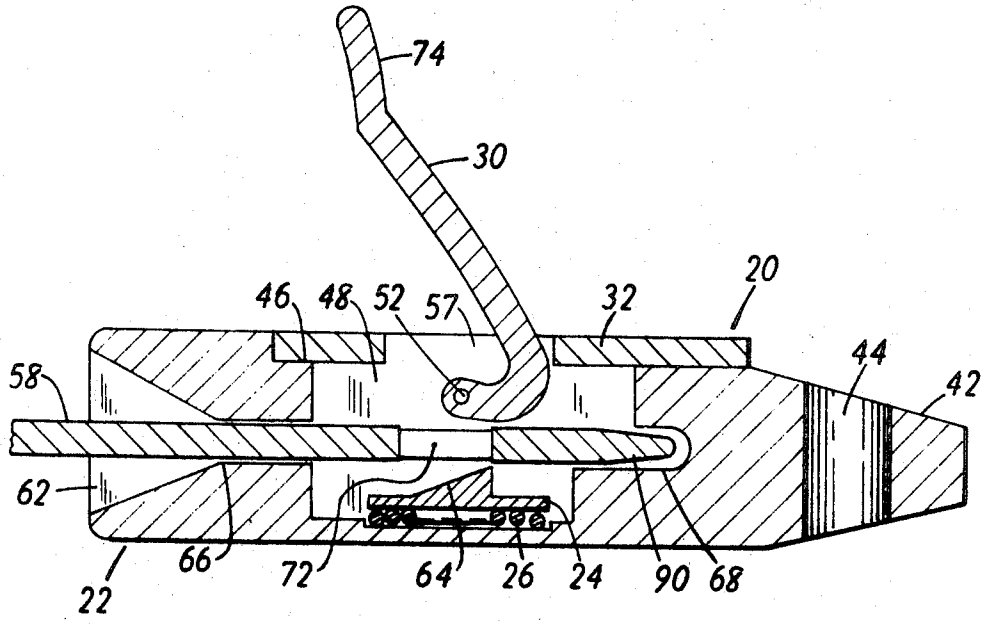

FIG. 6

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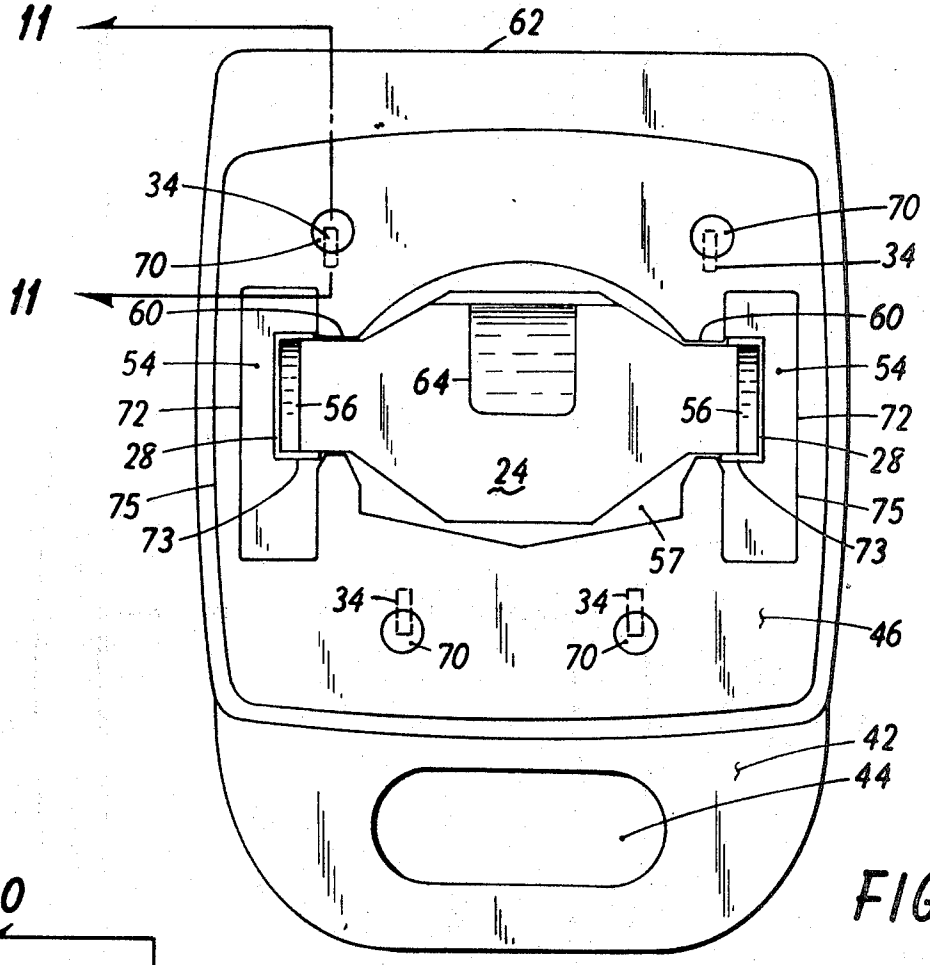

FIG. 8

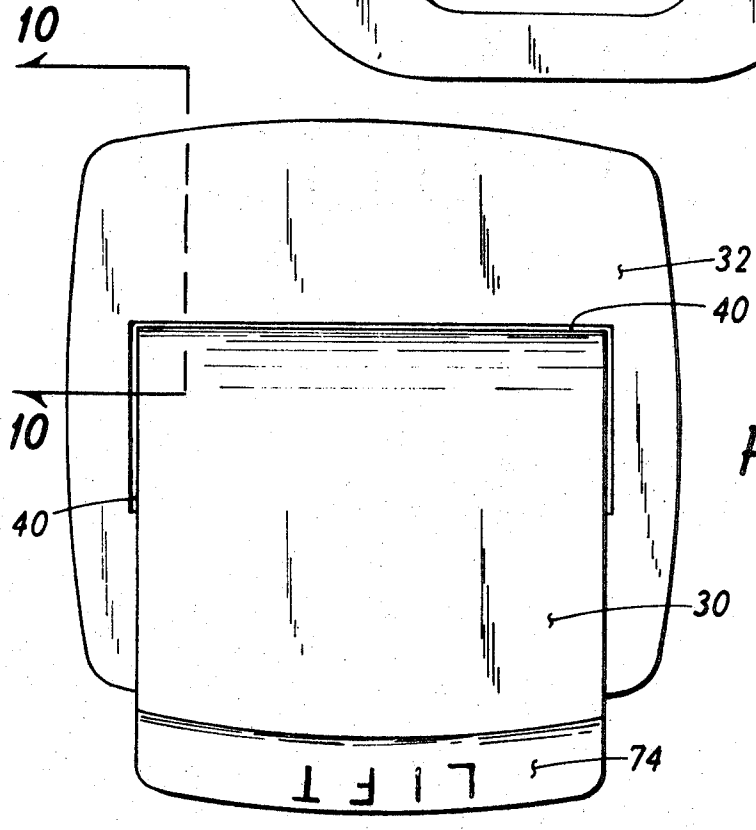

FIG. 9

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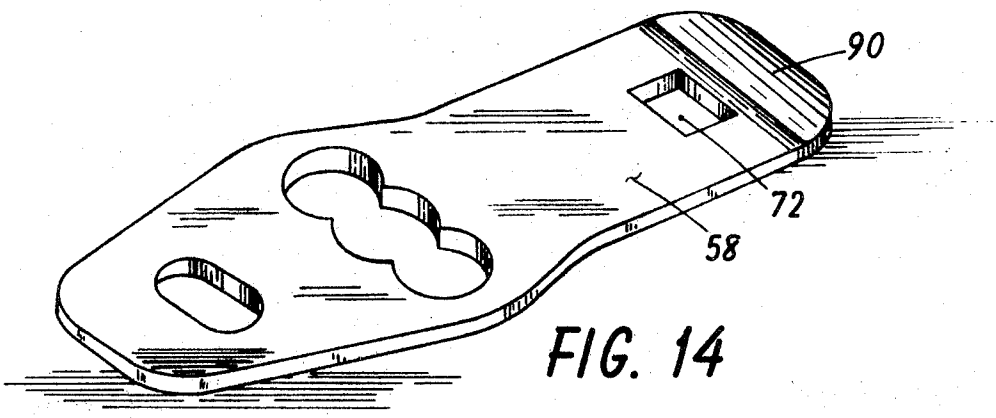


FIG. 14

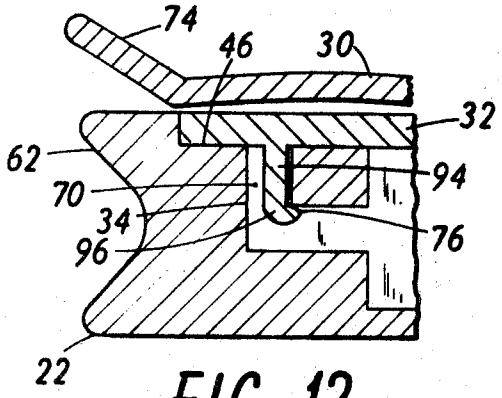
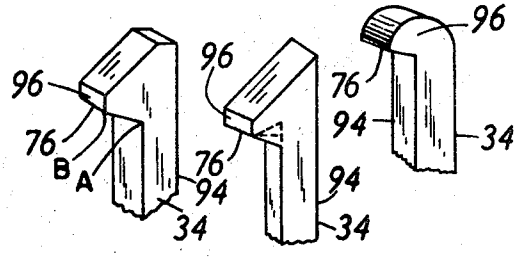


FIG. 12



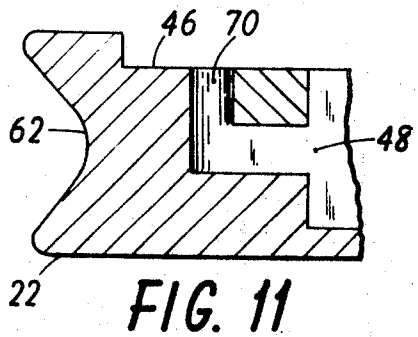


FIG. 11

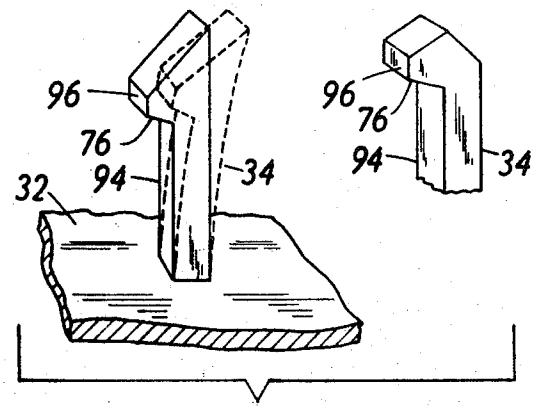


FIG. 13

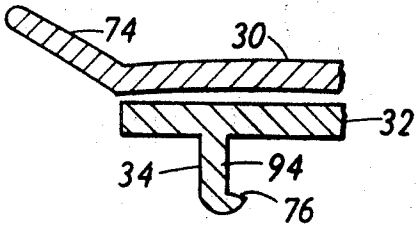


FIG. 10

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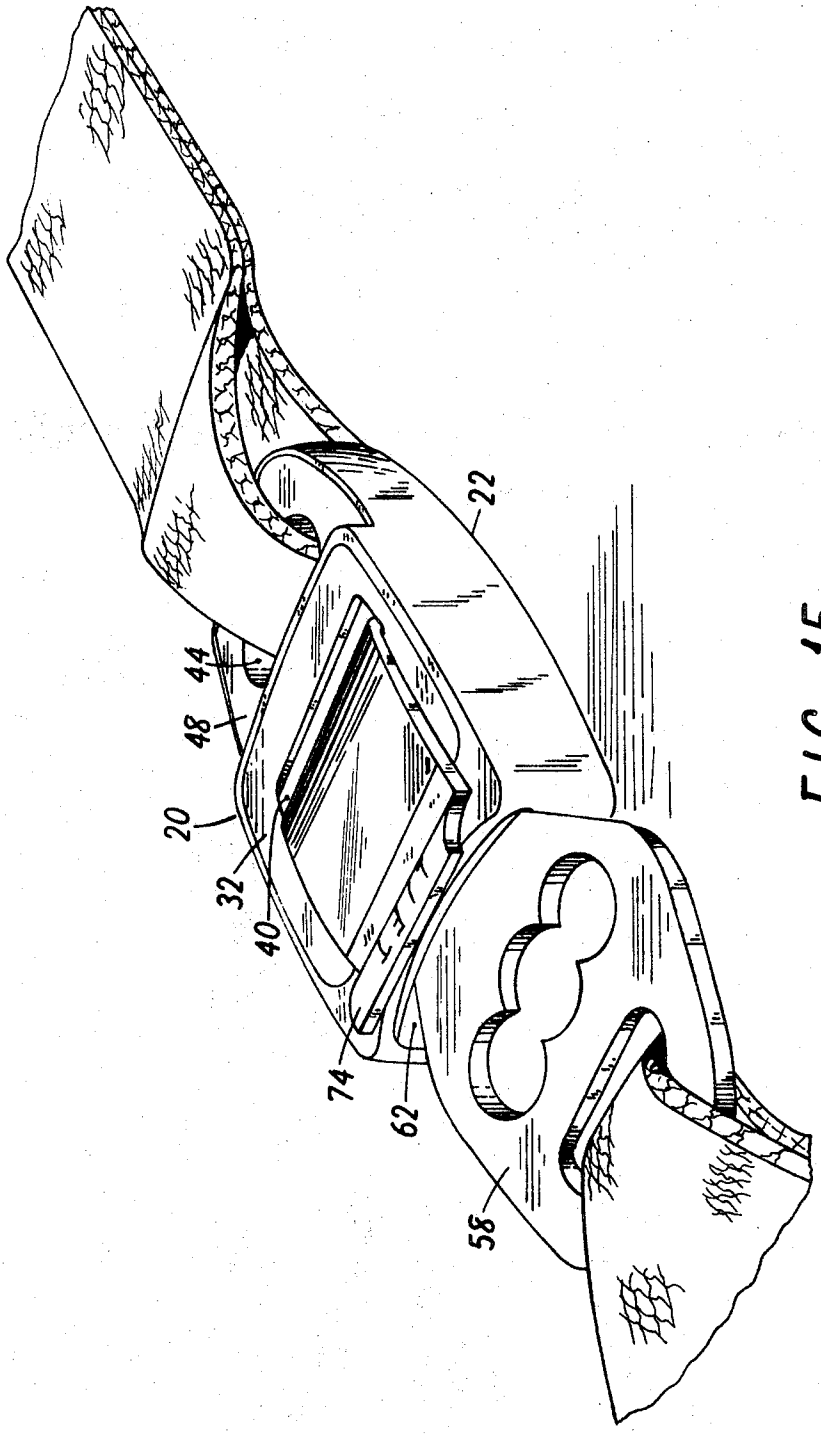

FIG. 15

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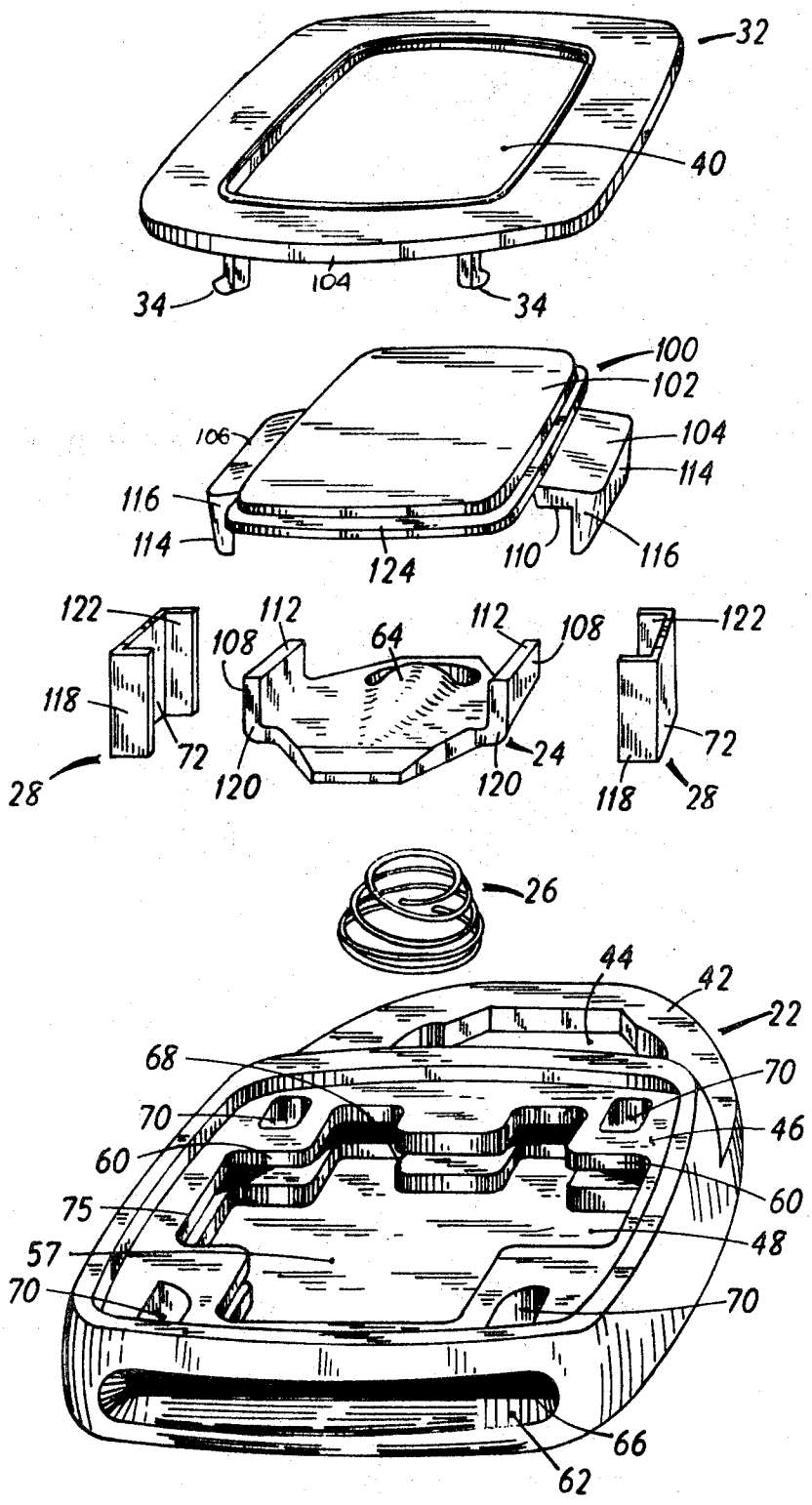

FIG. 16

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SAFETY BELT BUCKLE

CROSS-REFERENCE TO RELATED APPLICATION

This application is a continuation-in-part application of copending application Ser. No. 133,867, filed Feb. 8, 1971.

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to seat belt and harness assemblies of the type utilized in automobiles for retaining an occupant in a seated position within the automobile. Such seat belt assemblies usually include at least two straps or belts anchored to the vehicle body with one of the straps being connected to a tongue and the other to a buckle, whereby two of the straps may be disposed over an occupant's lap and the tongue inserted into the buckle so as to be retained therein until manually released by manipulation of the buckle mechanism.

2. Description of the Prior Art

A large number of such buckle assemblies are found in the prior art and practically all incorporate some type of latching means which co-acts with a tongue and is movable between latched and release positions whereby the tongue is retained within the buckle in the latched position and may be removed from the buckle in the release position. The buckles employ various sub-assemblies, devices, linkages, etc. for attachment or co-action with latching means. Additionally, the assemblies normally include a support structure such as a housing. Quite frequently the housing takes the form of a flat metal plate wrapped into a channel-like member having a substantially rectangular or similarly enclosed cross-section. Examples of such prior art assemblies are shown in U.S. Pat. No. 2,995,792 and 3,203,065. One problem encountered with such prior art assemblies relates to the difficulty experienced in inserting the various elements and components into the housing and into proper cooperating relationship, one with the other. The elements are usually placed into a housing either separately or in sub-assemblies which must be assembled within the housing. This presents a difficult and expensive assembly operation and also increases the possibility of defective assemblies due to the improper positioning of the components during assembly.

Still another difficulty characteristic of some buckles of the prior art may be traced to the manner in which the assemblies are fastened together. With hard useage, they can become loose or they may even fall apart, thus becoming dangerous or totally inoperative. A buckle assembly is shown in U.S. Pat. No. 2,882,581 which does not utilize an enclosed housing. Although it does not require any substantial assembly of components after they are inserted into the housing, it does require that the components be inserted into the housing from two opposite directions. Such a buckle, therefore, still presents assembly problems.

These limitations, characteristic of many of the buckles of the prior art, have been largely overcome by the disclosure of U.S. Pat. No. 3,522,640 which discloses a buckle assembly which may be easily assembled manually or automatically by merely serially moving the components of the assembly into the housing from one direction and without the necessity of assembling or interconnecting components once they are in the housing.

The tongue of the buckle disclosed is released by pressure on a push button in the top center of the buckle. Releasing a safety buckle by the operation of a push button such as that of the last cited patent generally requires the use of two hands, one to hold the buckle while the button is pushed. This can become a time consuming operation, and might be a problem for arthritics or others who lack the full facility of both hands. Furthermore, the push button of U.S. Pat. No. 3,522,640, as illustrated, occupies a small fraction of the total area of the face of the buckle; hence, in an emergency, the user might have difficulty in quickly locating the actuating area. In one embodiment the push button in hinged, so that should the user press at a point near the hinge, he would actuate the release mechanism at a considerable mechanical disadvantage.

SUMMARY OF THE INVENTION

The buckle of the present invention is designed for easy assembly by arranging its component parts in an open-faced buckle housing, then pressing a cover plate into substantially permanent locking engagement with the buckle housing to complete the assembly of the buckle as a functional unit. The design of the buckle permits ready release of the tongue by either one or two handed operation.

Objects and attendant advantages of the present invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an exploded perspective view of one embodiment of the present invention.

FIG. 2 is a perspective view illustrating the manner in which two elements of one embodiment are themselves assembled into the last component to be fitted into the housing at the time of assembly.

FIG. 3 is a plan view of a complete assembly, representing one embodiment.

FIG. 4 is an enlarged cross-sectional view taken substantially along line 4—4 of FIG. 3.

FIG. 5 is an enlarged longitudinal half section through line 5—5, FIG. 3, illustrating the locked position of the buckle.

FIG. 6 is the same as FIG. 5 with the exception that it illustrates the release position of the buckle.

FIG. 7 is an enlarged longitudinal section through line 7—7, FIG. 3, differing only in that the buckle is shown in the release, rather than in the locked position.

FIG. 8 is a plan view of the partially assembled buckle, all components being present with the exception of that of FIG. 2, which serves as a cover for the opening of the housing when the buckle is completely assembled.

FIG. 9 is a plan view of the assembled component of FIG. 2, which when pressed into place as the cover of the partially assembled buckle of FIG. 8, completes the assembly.

FIG. 10 is a partial section through line 10—10 of FIG. 9.

FIG. 11 is a partial section through line 11—11 of FIG. 8.

FIG. 12 combines the partial sections of FIG. 10 and 11 to illustrate how they cooperatively and permanently lock together when the component of FIG. 9 is

pressed into place as the cover of the partial assembly of FIG. 8 to provide the final complete assembly.

FIG. 13 is an enlarged perspective view of the preferred type of fastening hooks accompanied by four partial perspective views of other possible variations. These hooks are common to all embodiments of the present invention.

FIG. 14 is a perspective view of the tongue, illustrating the opening into which the latching member is urged, when the buckle is in locked position. The two-dimensional taper of the leading edge is also shown.

FIG. 15 is a perspective view of the complete assembly in lock position with the tongue secured in place, and the seat belting attached.

FIG. 16 is an exploded perspective view of a second embodiment wherein release of the tongue is achieved by actuating a push button rather than by raising a lever. The tongue illustrated as FIG. 14 is equally applicable to this embodiment, and the operation of the moving parts, the latching member (latch bar), biasing means, and apertured cover plate are sufficiently similar so that their cooperative action can be readily visualized by reference to FIGS. 4–8, 10—13 and 15.

Referring now to the drawings wherein like numerals indicate like or corresponding parts throughout the several views, the embodiments are disclosed:

Referring to the buckle assembly 20 of FIGS. 1, 3, 4, 5, 6, 7 and 15, and particularly to the exploded view of FIG. 1, the buckle assembly comprises a housing 22, a slideably arranged latch bar 24, biasing member 26 for urging the latching bar into latching engagement with a tongue 58, guide members 28 for guiding the latching bar, a lift lever 30 manually operable and pivotally arranged with one arm constituting a lifting member outside the buckle housing and the other comprising two cams 50 and the fulcrum or pivot points 52, within the buckle housing; a housing cover-plate 32 having means 34 for essentially permanent attachment to the housing, lugs 36 extending into the cavity of the housing to which the lift lever is pivotally attached by pivoting pins 38, thereby locating the fulcrum of the lift lever, and an aperture 40 through which one arm of the lever extends downwardly into the housing. Housing 22 further includes a flange 42 and an opening 44 therein, for attaching a seat belt thereto.

More specifically, the housing 22 is recessed on one face 46 (the front) to accommodate the cover-plate 32 so that it may lie flush with the front surface of the buckle, when assembled. In addition, the housing includes surfaces 60 in the cavity 48 which extend from the wall toward cavity section 57 for receiving the latch bar 24, and for limiting movement of the latch bar to movements substantially parallel to the surfaces 60. In other words, there is formed in or by the cavity 48 a pocket for receiving the elongated latch bar 24 and for limiting movement of the latch bar to movement substantially toward or away from cover-plate 32, or the front face of the buckle.

Extended surfaces 60 also serve to shape the cavity into essentially three interconnected cavity sections, two small sections 54, one near each wall of the buckle to accommodate lugs 36 of the cover-plate and cams 50 of the lifting-lever. They are sufficiently commodious to permit free motion of the cams as well as of cam followers 56 of the latch bar 24. In addition, there is a centrally located cavity section 57 to house the biasing means shown as spring 26, and the latching means, shown as latch bar 24 which includes latch bar guides 28 and ramp latch member 64. Connecting these three cavity sections are the parallel sided openings 60.

At the end of the buckle away from flange 42 there is an opening 62 which extends through a thickness of material comprising the wall of the buckle at this point. It presents at the surface a large, substantially rectangular, opening taking up most of the end of the buckle housing, but it funnels down to a long narrow rectangular opening 66, sized to accommodate tongue 58. This rectangular opening continues through an appreciable thickness of material to thus communicate with cavity section 57 within. Rectangular opening 66 has parallel walls and thus serves to guide tongue 58 into the cavity, limiting the motion to an inward thrust or to its removal without appreciable side play. The leading edge of tongue 58 has a two-dimensional taper 90 (FIG. 14) for easy entrance into the opening, and the funnel-like entrance further facilitates the rapid introduction of the tongue without need of searching or probing for the slot.

At a point opposite opening 66 within cavity section 57, there is a groove 68 parallel to opening 66 shaped to substantially fit the end of tongue 58, thus limiting the forward motion of the tongue, and positioning it precisely for latching engagement with latching member 24.

Referring to FIGS. 1, 2, 10, 11, 12 and 13 there are, as shown, a plurality of fastening hooks or catches which extend from the under surface of the cover-plate and preferably constitute an integral part of said cover-plate. Each of these fastening hooks comprise a somewhat flexible shank perpendicular to said cover-plate, and a head or barb at the end of the shank which extends essentially at right angles to the shank. FIG. 13 presents an enlarged perspective drawing of the preferred design of an individual hook, with shank 94 and head or barb 96. Sufficient flexibility is required of the shank, as illustrated by the dotted lines, so that when force, having a horizontal vector in a direction opposite to that in which the barb extends, is applied to said barb, the shank will bend sufficiently to bring the tip of the barb directly over the base of the shank, and when said force is removed, the barb will spring back to substantially its original position. These hooks are preferably positioned on the under surface of the cover-plate, so that the substantially right angled barb of each of the hooks is directed approximately toward another hook, either adjacent or diametrically opposite. Preferably, they should be paired, that is the barbs of a pair, whether adjacent or diametrically opposite should be directed approximately toward each other. Alternately, the barbs of the pairs may be directed away from each other, in fact the direction of the barbs is not critical as long as they do not all face in the same direction, linearly or circularly.

There are also a plurality of shafts or bores 70 equal in number to the fastening hooks, perpendicular to the face of the buckle, which begin in the recessed surface 46 of the buckle housing, and extend perpendicularly through to an inner surface, said surface preferably defining a section of the irregularly shaped cavity 48 of the housing 22. These bores are positioned to essentially correspond with the position of hooks 34 of cover plate 32, when said plate is positioned above recess 46 of housing 22, except that in the case of each hook and its corresponding bore, the side of the bore adjacent to

the barb of the hook is aligned in touching relationship with the shank of the hook. The bore is of sufficient diameter to accommodate the barb of the hook, but as positioned, the barb extends beyond the edge of the bore. The barb is so shaped, however, that when the hook is pressed downwardly toward the bore, the wedge shaped forward end of the barb causes the shank to bend under stress, sufficiently to admit the barb into the bore.

The depth of the holes, between the surface of the recess area **46**, and the surface of the cavity with which they communicate, is shorter than the shank of the hooks by an almost imperceptible amount (no more than a few thousands of an inch).

The attachment means or hooks **34** have limited flexibility, with the hook ends being tapered or shaped to permit entry into the holes, so that the cover-plate may be pressed into the recess. The hooks are thereby caused to bend or "give" sufficiently to enter the holes. The hooks are then under considerable side stress but as the barb of each hook reaches the surface of the cavity to which the opening communicates, it snaps over the edge of the surface of the cavity, thus relieving most of the stress and permanently locking the cover-plate in place, see FIGS. **8, 10** and **12.**

Alternately, the depth of the bores may exceed the length of the hooks, and their walls may be threaded or ribbed. With this alternative, the bore need not enter a cavity. When the hooks are forced into the bores, and the cover-plate is pressed into the recess, the barbs snap from thread to thread or rib to rib until they snap into the last one that each of the hook's full length will permit. Other means for attaching the cover, rather than hooks may be substituted, particularly when the holes are threaded or ribbed. For example, projections, threaded or ribbed to fit the corresponding bores, but longitudinally split one way or two, and rounded or pointed so they may be pressed in and permitted to expand to fill the threads or ribs, may be employed. The hooks, however, are preferred since they cannot pull free and are self-tightening.

Referring again to FIG. **13,** note that the undersurface **76** of barb **96** of hook **34** is not parallel to cover-plate **32.** Rather, the undersurface **76** of the barb slants slightly away from the surface of the cover-plate as it leaves shank **94.** In other words, the vertical distance between the barb **96** and cover-plate **32** is somewhat less, when measured perpendicularly from the point where the barb joins the shank to the undersurface of the cover-plate **32** (distance A), than when measured from the tip of the barb to the undersurface of said cover-plate (distance B). This construction of the barb is preferred, for when the length of the corresponding bore between the surface with which it communicates is more than the distance A, but less than distance B, and is preferred, then when each hook is pressed into its corresponding bore, and the barb snaps over the inner surface, it will pull the cover-plate tight into its recess in the housing. The barb will be stopped in its lateral motion across the inner surface when it reaches the point where the distance between the undersurface **76** of the barb and the surface of the cover-plate precisely equals the length of the bore between the surfaces with which it communicates. Further, the shank will still have residual stress, so that should there be a tendency for any space to develop between the cover-plate and the recessed surface against which it lies, due to expansion, contraction vibration or rough handling, the shank of the hook would straighten further, thus preventing any space or looseness to develop.

In our illustration (FIGS. **1, 8** and **16**), when tongue **58** is in position, the two bores nearest the point of entry straddle the tongue, whereas the two bores to the rear may either straddle the tongue or be positioned beyond its reach.

The assembly of the buckle is easily achieved (FIGS. **1** and **16**), since the components are essentially added to the housing serially, and locked into place. First the biasing means, shown as a spiral spring **26,** is placed in cavity **48** of housing **22.** Preferably, the bottom wall of the buckle is recessed or otherwise designed to prevent horizontal slippage of the biasing means. Next, the two guide members **28** are placed, one each in the two cavities **54,** with their backs **72** adjacent and parallel to the outer wall **75** of each cavity **54.** The parallel open channels of the guide members **28** face each other, and their outer surfaces fit snugly within parallel sided surfaces **60** of cavity **48.**

Next, the latching member **24** is placed in the cavity, essentially centered over the biasing means **26,** with cam followers **56** facing upward, slideably positioned within guides **28,** with each cam follower extending into its corresponding cavity **54.** Pressure on the latching member **24** will now cause it to freely move downward in a direction parallel to surfaces **60** against the action of the biasing means, while remaining parallel to the back of the buckle at all times.

Next, the end of the lift lever **30** having the two cams **50** is inserted, cams down, into the opening of cover plate **32** so as to align pivot bearings **52** with the openings in lugs **36,** then these two elements are combined into a hinged assembly by pressing the two pins **38** into the aligned openings.

Finally, the cover-plate/lift-lever assembly of FIG. **2** is placed over the cavity of the buckle housing which now contains the biasing means, the latching member and the two latching member guides. The cams **50** of the lift-lever **30** in pivotal cooperation with lugs **36** of cover plate **32** are dropped into their respective cavities **54** in the buckle housing. The attachment means, shown here as hooks, four in number, attached to the under surface of the cover plate, are then placed into their respective bores **70** and the cover-plate/lift-lever assembly is pressed firmly against the housing containing the remaining parts as in FIG. **8** until all the hooks snap into place and the cover plate is flush with the buckle's surface, thus easily and permanently locking the entire assembly tightly together without the use of nuts, bolts, rivets or the like.

Referring now to FIG. **16,** which is an exploded view of a second preferred embodiment wherein the mechanism is actuated by a push button rather than a lever. Many of the numerals used in the illustrations of the first preferred embodiment have been retained where their action is substantially identical. As with the first preferred embodiment, the buckle assembly comprises housing **22,** a slideably arranged latching member **24,** biasing member **26** for urging the latching member into latching engagement with tongue **58,** and guide members **28** for guiding not only the latching member **24,** but in the case of this second preferred embodiment, the manually actuating member **100** as well.

The manually actuating member comprises push button **102,** positioned on bridge **104** which spans latching

member **24** and therefore the channel into which the tongue is inserted. As assembled, legs **106** slip down over the upward extending legs **108** of latching member **24**, and surfaces **110** bear on the surfaces **112** of the legs of the latching member, so that pressure applied manually to push button **102** will be transmitted through surfaces **110** to the latching member **24**, thus opposing the upward pressure of biasing means **26**.

Guides **28** fit snugly into the pockets formed by surfaces **60** and **75** in the housing, and provide channels for the linear movement of legs **108** of the latching member and legs **106** of the manually operable member or push button assembly **100**. It can be seen according to the illustration of FIG. **16**, that the outer surfaces **114** and the end surfaces **116** of push button assembly **100** will be in slideable contact with the back **72** and inner side surfaces **122** of the guide members and that the side surfaces **120** of the latching member **24** will also be in slideable contact with the inner side surfaces **122** of guides **28**.

When the component parts are inserted into cavity **57** of housing **22** with biasing means **26** placed against the wall of the housing, with guides **28** in their corresponding pockets **75**, with latching member **24** overlaying the biasing means, with push button assembly **100** bringing the latching member **24** and with the legs of both the latching member and the push button assembly slideably fitted in the guide channels, the buckle is ready for the last step in its assembly. Cover plate **32** is now fitted into recess **46** of the buckle housing with hooks **34** substantially coinciding with bores or guide slots **70**. Push button **102** either fits up into aperture **40** of cover plate **32** or is readily accessible through said aperture. The cover plate is finally pressed firmly into recess **46** until hooks **34** snap under the inner surface at the end of the bores, locking the assembly tightly and permanently into a single unit.

In the thus assembled buckle, the biasing means presses the latch member upwardly from the wall into the latched position and indirectly, through contact surfaces **112** of the latching member and **110** of the push button assembly, presses push button **102** into aperture **40** of the cover plate. The dimensions of the push button are preferably a little less than those of the aperture **40** of the cover plate but the surface of said push button is kept substantially flush with the surface of the cover plate by flange **124** below the cover plate. The dimensions of this flange slightly exceed those of the aperture. Preferably, this flange is an integral part of the push button. Alternately, shoulder **104** of the push button assembly or other means may be used to retain the push button within the housing.

The legs of the push button assembly may be tapered so that pressure manually applied unevenly to one side of the button can cause the push button to rock toward the point of pressure without binding and without adversely affecting its operation. This feature of the present invention coupled with the large area of the preferred button relative to the area of the top of the buckle permits ready release of the tongue with only one-handed operation.

The manually operable member or push button assembly may comprise an assembly of components but preferably it is fabricated in one piece and preferably of polymeric materials, reinforced nylon being especially preferred. This construction contributes to the ease of operation as well as to the lightness of the buckle. A smooth action is obtained, because of the self-lubricating quality common to certain polymeric substances and particularly to nylon.

In operation, to couple and lock the two ends of the seat belt over the lap of the user in the case of either embodiment, tongue **58** to which one section of seat belt is attached, is inserted and thrust all the way into opening **66** of the seat belt buckle, to which the other section of seat belt is attached, until it seats in groove **68**. During the moment of thrust, the tapered end of tongue **58** encounters sloping latch member **64**, and thereby urges the latch bar downward toward the back of the buckle against the lesser force of the biasing means **26**. When, however, the tongue is positioned at the end of its thrust, centrally located aperture or recess **72** is aligned with latch member **64** which is then urged upward by the biasing means, into said opening. Because of the slope of the wedge-shaped latch member, it does not restrict the forward movement of the tongue into the buckle, but since the sloping wedge ends in an abrupt shoulder, perpendicular to the buckle and the inserted tongue, no amount of pull on the tongue can release it, once the latch member has snapped up into place, as shown in FIG. **5**.

If, however, in the case of the first embodiment, the fingers are placed under the raised lip **74** of the lift lever, and the lever is lifted, cams **50** press the two cam followers **56** attached to latch **24** against the pressure of biasing means **26**. Latch member **64** drops below opening **72**, and the tongue is readily removed. Although only one latch member is shown in the illustrated embodiment, two or more may be employed, corresponding to two or more apertures or indentations in the tongue.

Lift lever **30** permits one hand operation of the buckle and provides a mechanical advantage, so that the buckle may be readily unlatched with a minimum of force, and without resort to a complicated intermediate structure. In the case of the second embodiment, pressure on any portion of the push button **102** is transmitted to the latching member **24** through surfaces **110** of the former which are in direct contact with surfaces **112** of the latching member. Release of the tongue **58** is obtained exactly as in the case of the first embodiment. The introduction of the tongue **58** and the latching thereof by the latching member is also identical to the action of the first embodiment.

In the two embodiments illustrated, the buckle and tongue are preferably made of metal. The housing may be steel or die cast aluminum. The latching member may be of steel or sintered iron. The latching member guides are preferably of stainless steel to insure smooth operation of the latch bar. It will be understood that the guides may be made of various metals, alloys, plastics, or other materials to facilitate the movement of the latching member. As previously stated, in the case of the second embodiment employing a push button, a push button assembly fabricated of polymeric material is preferred with reinforced nylon being especially preferred.

This invention has been described in an alternative manner. It is to be understood that the terminology which has been used is intended to be in the nature of words of description rather than of limitation.

Obviously, many modifications or variations of the present invention are possible in light of the above teachings. It is, therefore, to be understood that within

the scope of the appended claims the invention may be practiced otherwise than as specifically described.

I claim:

1. A seat belt buckle assembly comprising

a. a housing having an opening therein;

b. a cavity extending in said housing from said opening to a wall of said housing opposite said opening;

c. inlet means in said housing communicating with said cavity for receiving a tongue;

d. latching means disposed in said cavity and movable into latching engagement with said tongue;

e. biasing means operatively associated with said latching means to urge said latching means into latching engagement with said tongue;

f. manually actuating means operatively associated with said latching means to move said latching means out of latching engagement with said tongue; said latching means, biasing means and manually actuating means comprising a plurality of components disposed in said cavity, at least portions of all of said components being positioned in overlapping relationship in the direction in which said cavity extends into said housing, with the lowermost component engaging said wall; and

g. ledge means in said housing extending into said cavity in at least one direction which is towards said inlet means and including channels integrally formed in the sides of said cavity adjacent to and opposite said inlet means for guiding and supporting the leading edge of said tongue as the tongue is inserted into said housing, said channels furnishing support to the sides and leading edge of said tongue after it is in latching engagement with said latching means, whereby motion of said tongue during insertion and release is limited to a linear motion with respect to said housing in a plane substantially parallel to the plane of said wall of said housing.

2. The buckle assembly of claim 1 wherein said cavity has surfaces extending from said wall toward said opening, said cavity being unobstructed above said surfaces to said opening for receiving said latching means and other components.

3. The buckle assembly of claim 1 wherein said latching means comprises a latching member confined to motion substantially perpendicular to said wall of said housing, said latching member having legs extending therefrom towards said opening, said legs having surfaces in contact with said manually actuating means.

4. The buckle assembly of claim 3 wherein said manually actuating means comprises a push button, said push button including legs each of which is adjacent to the outermost surface of the corresponding adjacent leg of said latching member.

5. The buckle assembly of claim 4 wherein the outer surfaces of said push button legs slope inwardly from the corresponding surface of said cavity adjacent said legs, whereby uneven pressure applied to said push button will cause the button to cant to a limited degree without adversely affecting its operation.

6. The buckle assembly of claim 4 including surfaces within said cavity extending from said housing wall towards said opening, said surfaces having portions disposed laterally inwardly from the periphery of said opening, and guide members disposed between said surfaces of said housing and said legs of said latching member, and between said surfaces and said legs of said push button to facilitate motion of said latching member and said push button in a direction substantially perpendicular to said wall of said housing.

7. The buckle assembly of claim 4 wherein said push button is mounted on a bridge from which said legs of said push button extend, wherein said inlet means comprises a slot extending into said cavity to provide a channel for receiving said tongue, said bridge spanning said channel, wherein said latching member has two legs extending upwardly toward the opening of the cavity, said legs being positioned on opposite sides of said channel and wherein said bridge contacts said surfaces of said legs of said latching member.

8. The buckle assembly of claim 4 including a cover plate having an aperture disposed over said cover plate and which provides access from the exterior of the buckle to said push button, said cover plate being in locking engagement with said housing and serving to retain the components of said buckle assembly located within said cavity and wherein said cover plate has a plurality of fastening hooks extending downwardly from its lower surface, said hooks having barbs at their distal end, substantially corresponding bores within said housing adjacent to said cavity having sufficient diameter to accommodate said hooks, said bores extending from the contact surface between the said cover plate and said housing to an inner surface within said housing, with the distance between the surfaces substantially equal to the corresponding distance between said cover plate and the barbs of the corresponding hooks, whereby the barbs will extend beyond the bore and over said inner surface when the hooks are inserted into said bores, thereby preventing withdrawal of said hooks and removal of said cover plate from said housing.

9. The buckle assembly of claim 3 wherein said manually actuating member comprises a pivotably movable lift lever, said lift lever having integral cam means in cooperative engagement with cam means provided on said surfaces of said legs of said latching member, whereby said latching member may be moved out of latching engagement against the urging of said biasing means by pivoting said lift lever.

10. The buckle assembly of claim 9 including an apertured cover plate, wherein said cam means of said lift lever extend through said aperture of said cover plate and are pivotably attached to lugs on said cover plate and wherein said lift lever includes an arm, whereby said tongue may be released from said latched position by manually raising said arm, and wherein the components of said assembly are successively inserted through said opening and into said cavity one after the other with the first engaging the wall and disposed in the cavity with at least portions of the components positioned in serial overlapping relationship in the direction in which the cavity extends into said housing, and wherein the last component inserted into the opening comprises a subassembly consisting of said apertured cover plate and said lift lever pivotally connected.

11. The buckle assembly of claim 10 wherein said cover plate has a plurality of fastening hooks extending downwardly from its lower surface, said hooks having barbs at their distal end, substantially corresponding bores within said housing adjacent to said cavity having sufficient diameter to accommodate said hooks, said bores extending from the contact surface between the said cover plate and said housing to an inner surface within said housing, with the distance between the sur-

faces substantially equal to the corresponding distance between said cover plate and the barbs of the corresponding hooks, whereby the barbs will extend beyond the bore and over said inner surface when the hooks are inserted into said bores, thereby preventing withdrawal of said hooks and removal of said cover plate from said housing.

12. The assembly of claim **3** wherein the latching member comprises a substantially flat section resting on the biasing means which in turn is positioned against the wall of the cavity, said latching means having an upwardly sloping ramp positioned toward the slot so that the tongue when inserted through the slot into the cavity will depress the latching member toward the wall, against pressure of the biasing means.

13. The assembly of claim **1** wherein the walls of the bores of the buckle housing are parallel to the shanks of the corresponding hooks of the cover plate when the cover plate is positioned, but with their axes in each case off-set slightly in the direction opposite to that of the barb of the hook, but not more than by the distance the barb extends beyond the shank of the hook, whereby when the hooks are positioned over their respective openings, and the cover plate is pressed into position, the hooks are forced into the slightly off-set bores under stress, said stress being largely relieved as the barbs snap under the inner surface to which the openings communicate, thus locking the cover plate permanently into position.

14. The assembly of claim **1** wherein in each case the vertical distance of the tip of the barb of the hook, from the surface of the cover plate is slightly greater than the distance of said surface to the barb at the point where it joins the shank of the hook, whereby as the barb snaps under the inner surface to which the corresponding bore communicates, it progressively shortens the distance between the barb and the cover plate, thus tightening the connection between the cover plate assembly and the remainder of the buckle assembly, keeping it tight irrespective of the effects of expansion, contraction, vibration or rough handling.

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