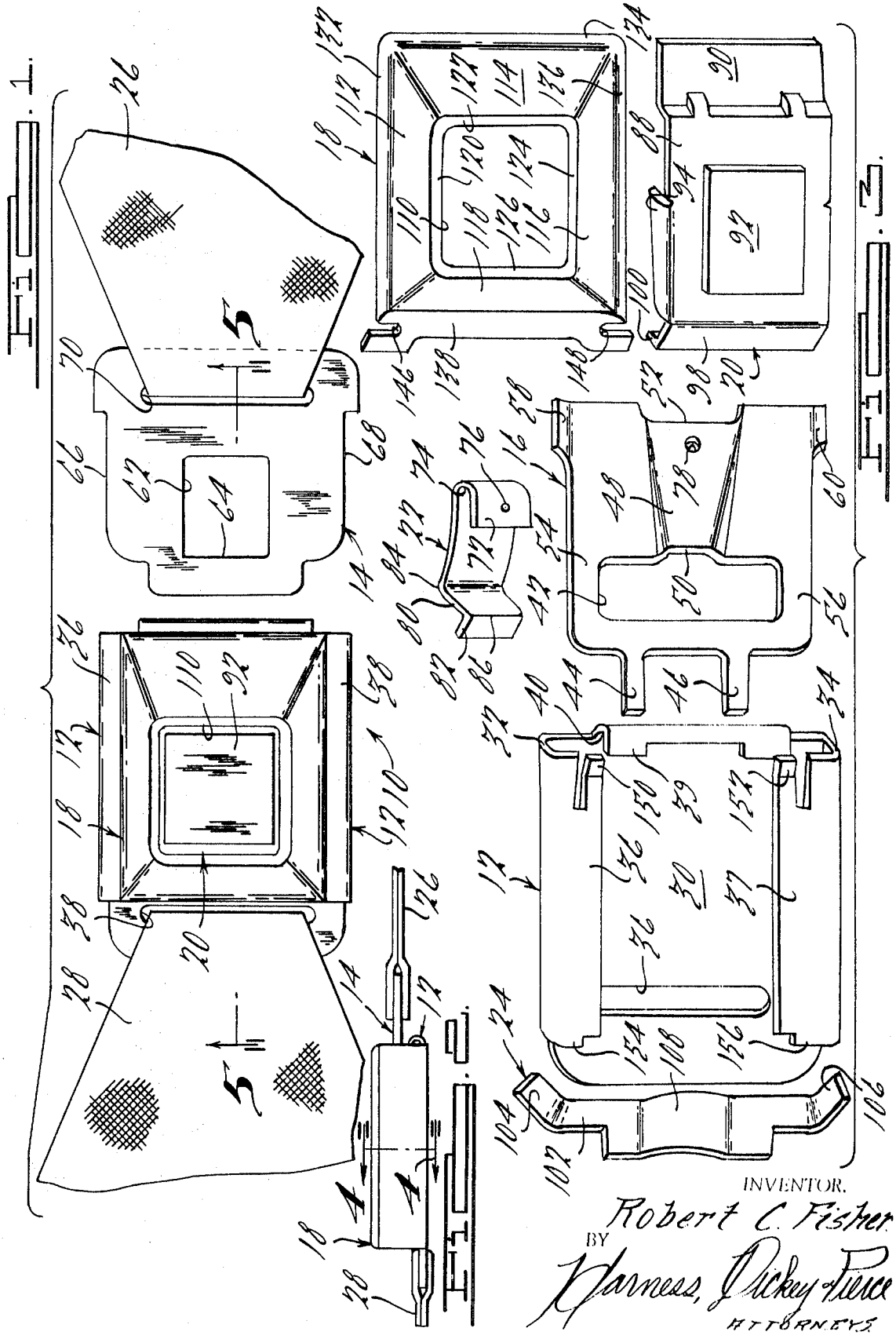
June 29, 1971 R. C. FISHER 3,588,969

SEAT BELT BUCKLE

Filed Sept. 11, 1968 2 Sheets-Sheet 1

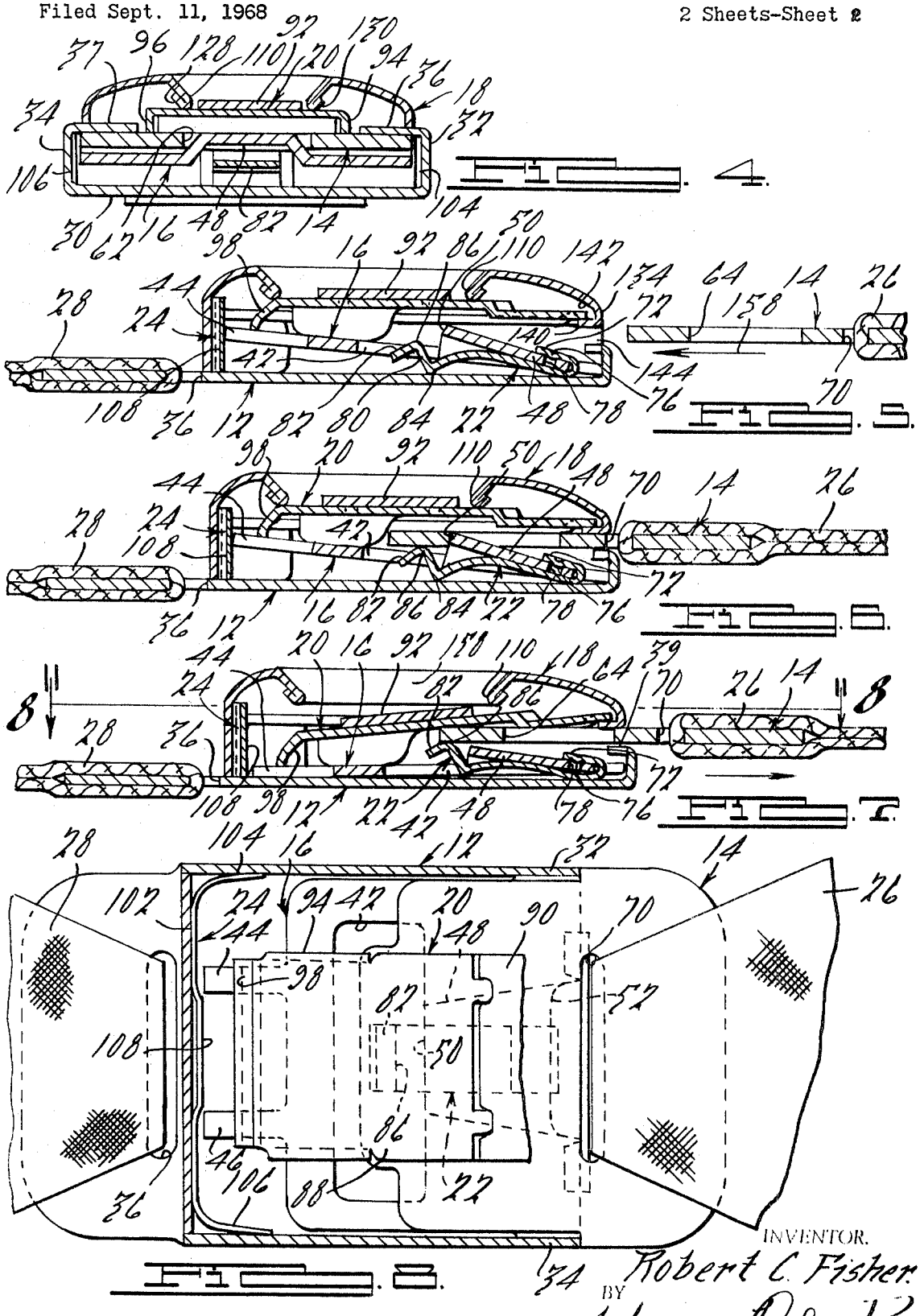


INVENTOR.
Robert C. Fisher
BY
Harness, Dickey & Pierce
ATTORNEYS

June 29, 1971 R. C. FISHER 3,588,969

SEAT BELT BUCKLE

Filed Sept. 11, 1968 2 Sheets-Sheet 2



INVENTOR.
Robert C. Fisher.
BY
Harness, Dickey & Pierce
ATTORNEYS.

United States Patent Office 3,588,969
Patented June 29, 1971

3,588,969

SEAT BELT BUCKLE

Robert Cripps Fisher, 580 E. Long Lake Road,
Bloomfield Hills, Mich. 48013

Filed Sept. 11, 1968, Ser. No. 759,066
Int. Cl. A44b 11/26
U.S. Cl. 24—230 4 Claims

ABSTRACT OF THE DISCLOSURE

A safety belt buckle assembly comprisig a belt tongue having means thereon defining a latching surface; a base member comprising a central web section having a re-entrantly folded latch retainer, and a pair of spaced parallel, upstanding flange sections; a latch member underlying said tongue and engaged in said latch retainer; a belt retainer at the opposite end of said web section from said latch retainer and aligned therewith, the latch member defining a latching face engageable with the latching surface of the tongue; an internal manually operable member; a cover member extending across the upper side of the base member and defining an opening through which the manual operator member is accessible, and means for biasing the latch member toward a position wherein the latching face thereof is engaged with the latching surface of said tongue and wherein the laterally opposite edges of the tongue are clampingly engaged between the marginal edge portions of the latch member and the flange sections of the base member.

BACKGROUND OF THE INVENTION

The continuously increasing importance and emphasis on safety in automobile vehicles has resulted in the need for maximizing the strength of seat belt buckle constructions. This is accomplished by positive metal-to-metal engagement between the seat belt buckle latching assembly and the associated belt tongue, thus minimizing to the extreme the possibility of faulty or spurious latching. Seat belt buckles construction heretofore known and used have generally not been of maximum strength due to the fact that the opening or unlatching forces and internal constructions thereof have resulted in a couple or bending movement acting on the buckle base. Further, it has often been possible to insert the belt tongue under an openable handle or cover in a manner such that positive locking engagement is not achieved.

The present invention provides a new and improved seat belt buckle construction which is designed particularly to satisfy the above requirements through a novel arrangement of component parts permitting the buckle to be constructed in a manner so as to be of maximum strength, extremely compact size and configuration, while at the same time being rugged, durable, and having a positive action. More particularly, the present invention provides a novel seat belt buckle construction which comprises a minimum number of component parts which are arranged so as to be extremely compact, yet function to positively transfer stress without excessive bending movements as well as to prevent spurious latching.

SUMMARY OF THE INVENTION

The buckle construction of the present invention is characterized by a unique geometry which aligns the stress points on the web of the base member.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top elevational view of the seat belt buckle of the present invention, with the tongue member removed therefrom;

FIG. 2 is a side elevational view of the seat belt buckle

of the present invention with the tongue member operatively received therewithin;

FIG. 3 is an exploded perspective view of the seat belt buckle shown in FIGS. 1 and 2;

FIG. 4 is a transverse cross sectional view taken substantially along the line 4—4 of FIG. 2;

FIG. 5 is a longitudinal cross sectional view taken substantially along the line 5—5 of FIG. 1;

FIG. 6 is a longitudinal cross sectional view similar to FIG. 5, with the belt tongue inserted within the seat belt buckle of the present invention;

FIG. 7 is a longitudinal cross sectional view similar to FIG. 6 and illustrates the relative operative positions of the component parts of the seat belt buckle of the present invention when the same has been actuated in order to permit the belt tongue to be removed, and

FIG. 8 is a cross sectional view taken substantially along the line 8—8 of FIG. 7.

DESCRIPTION OF A PREFERRED EMBODIMENT

Referring now to the drawings, and in particular to FIGS. 1 through 3, a seat belt buckle assembly **10** is shown as comprising a plurality of component parts, namely, a base member **12**, a belt tongue **14**, a latch member **16**, a cover member **18**, a push button or manual operator member **20**, a latch spring **22** and an assembly spring **24**. As will be hereinafter described in detail, the buckle assembly **10** is adapted to function in removably receiving the belt tongue **14** internally or interiorly of the base member **12** in a manner such that the tongue **14** is latchingly secured within the member **12** until such time as the operator member **20** is biased from a normal deactuated position to an actuated position, at which time the latch member **16** is biased out of engagement with the belt tongue **14** to permit withdrawal thereof from within the base member **12** and hence separation of a pair of belt sections **26** and **28** which are operatively secured to the belt tongue **14** and base member **12**, respectively.

Referring now in detail to the construction of the base member **12**, as illustrated in FIGS. 3 and 4, the member **12** is generally channel-shaped in transverse cross section and comprises a central web section **30** and a pair of upstanding, spaced parallel flange sections **32** and **34** defining laterally inwardly extending shoulder portions **36** and **37**, respectively, which extend parallel to and are spaced upwardly from the web section **30**. One end of the web section **30** extends longitudinally outwardly from the flange sections **32**, **34** and is formed with an elongated transversely extending opening **38** through which one end of the belt section **28** is adapted to be looped. As shown in FIG. 1, the belt section **28** is folded so as to taper in the event the width of the belt section **28** is greater than the width of the opening **38**. The end of the belt section **28** which is looped through the opening **38** may be reversely bent and be secured to itself by any suitable means, as by sewing, rivets or the like, as is well known in the art. The end of the web section **30** opposite the opening **38** is formed with a re-entrantly folded latch retainer portion **39** which is spaced laterally inwardly from the flange sections **32**, **34** and with the web section **30** defines an internal transversely extending channel **40** which functions in a manner later to be described in operatively supporting the latch member **16** interiorly of the assembly **10**. It is to be noted that in accordance with one of the features of the instant invention, channel **40** is aligned with slot **38** so that stress is transmitted directly through the web portion **30** without a bending movement thereupon.

As best illustrated in FIG. 3, the latch member **16** is generally rectangular in shape and defines an internal, generally rectangular-shaped opening **42** adjacent one end

thereof. The same end of the latch member **16** is formed with a pair of spaced parallel, longitudinally extending actuating projections or fingers **44** and **46** which are adapted to cooperate with the operator member **20** in a manner later to be described in effecting movement of the latch member **16** between deactuated and actuated positions. The latch member **16** is formed with a central longitudinally extending upstruck section **48** which defines a laterally extending latching face **50** at the juncture thereof with the opening **42**. The end of the upstruck section **48** opposite the latching face **50** is formed with laterally extending recessed portion **52**. The longitudinally extending sides of the latch member **16** define marginal edge portions **54** and **56** which terminate at the end of the member **16** opposite the fingers **44, 46**. A pair of outwardly extending positioning ears **58** and **60** which are bent upwardly or in the same direction as the upstruck section **48**, are formed on the member **16** and function to position the same centrally of the base member **12**, i.e., equidistant from the flange sections **32, 34** upon assembly of the member **16** within the base member **12**.

The belt tongue member **14** is of a generally flat or planar configuration and is formed with a central generally rectangular shaped opening **62** which defines a laterally extending latching surface **64** adapted to be selectively engaged by the latching face **50** of the latch member **16**. The longitudinally extending edges of the tongue member **14** are recessed, as seen at **66** and **68**, in such a manner that the member **14** may be received interiorly of the assembly **10**. The end of the tongue member **14** opposite the opening **62** is formed with an elongated transversely extending opening **70** within which the tapered end of the belt section **26** is looped and is reversely bent and secured to itself in the manner illustrated in FIG. 2.

The spring member **22** is preferably fabricated of hardened spring steel and has one end portion thereof **72** reversely bent upon itself, whereby to define an internal transversely extending channel or recess **74**. Upon assembly of the buckle **10**, the spring member **22** is adapted to be "clipped" onto the lower side of the latch member **16** such that the recessed portion **52** of the latch member **16** is received within the channel **74**, with the result that the main body of the spring **22** is disposed subjacent the latch member **16**, while the end portion **72** thereof overlies a portion of the upper side of the upstruck section **48**. The end portion **72** of the spring member **22** is preferably formed with a downwardly projecting detent or embossment **76** which is adapted to be received within an opening or aperture **78** formed in the latch member **16**, with the detent **76** and aperture **78** functioning to properly position the spring member **22** relative to the latch member **16**.

As best seen in FIGS. 5 through 7, the main body of the spring member **22** is generally arcuate in shape and the end thereof opposite the end portion **72** is formed with an upwardly extending section **80** which terminates at its upper end in a downwardly inclined end section **82**. The sections **80, 82** of the spring member **22** define bearing surfaces **84** and **86** on the lower and upper sides of the member **22** respectively, and the former of which is adapted to bear against the upper side of the web section **30** of the base member **12**, while the latter bearing surface **86** is adapted to selectively engage the lower side of the belt tongue **14** in effecting disengagement of the latching surface **64** thereof from the latch member **16**, as will later be described.

The operator member **20** comprises a main body section **88** and mounting section **90** which is arranged parallel to the section **88** but is offset or spaced downwardly therefrom, as best seen in FIGS. 5 through 7. The body section **88** is adapted to carry an emblem, medallion or the like, respectively designated by the plate **92**, which may be fixedly secured by any suitable means to the upper surface of the member **20**. The laterally opposite sides of the operator member **20** are formed with a pair of spaced,

parallel downwardly extending support sections **94** and **96** which are adapted to bear against the upper side of the latch member **16** in the manner illustrated in FIGS. 4 and 5. The end of the operator member **20** opposite from the offset mounting section **90** is inclined downwardly, as seen at **98**, and is formed with a laterally extending edge portion **100** which is adapted to bear against the upper sides of the fingers **44, 46** of the latch member **16**, with the result that downward movement of the operator member **20** in FIGS. 5 through 7 will result in corresponding downward movement of the latch member **16**, as will be described in connection with the overall operation of the buckle assembly **10**.

The assembly spring member **24** is preferably fabricated of a suitable spring steel material and is of a generally C-shaped configuration in top elevational view, as best seen in FIG. 8. The member **24** comprises a main, laterally extending section **102** and a pair of longitudinally extending leg sections **104** and **106** which are adapted to be received interiorly of the base member **12** and bear against the laterally inner sides of the flange sections **32** and **34**. A central portion of the spring section **102** is longitudinally offset, as seen at **108**, and projects between the fingers **44** and **46** of the latch member **16**. Upon assembly of the belt buckle **10**, the latch member **16** is positioned interiorly of the base member **12** and thereafter, the spring **24** is inserted within the end of the base member **12** defined between the flange sections **32, 34** to the position shown in FIG. 8, whereby the spring **24** functions to properly position the latch member **16**.

The cover member **18** is of a generally dome shaped configuration, i.e., concave downwardly, and defines a centrally located, generally rectangular shaped access opening **110** through which the operator member **20** is manually accessible and with which the medallion or insignia plate **92** is centrally aligned. The cover member **18** comprises four generally trapezoidal shaped side sections **112, 114, 116**, and **118** comprising downwardly inclined edge portions **120, 122, 124** and **126**, respectively, which define the periphery of the opening **110**. Preferably the innermost edges of the portions **120–126** are reversed upon themselves, as seen at **128** and **130** in FIG. 4. The side sections **112–118** are inclined outwardly and downwardly and terminate at the outermost portions thereof in downwardly extending portions **132, 134, 136** and **138**, respectivley. The edge portion **134** is formed with a generally horizontally disposed inwardly extending flange portion **140** which defines a transversely extending internal channel **142** adapted to receive and operatively support the offset mounting section **90** of the operator member **20**, as best seen in FIGS. 5 through 7, whereby the operator member **20** is pivotably supported along a transversely extending axis for movement between the positions shown in FIGS. 6 and 7. The flange portion **140** and reentrantly extending portion **39** defines a tongue receiving opening **144** which is adapted to removably receive the tongue member **14** in the manner hereinafter to be described. The edge sections **112–118** are inclined outwardly and downwardly from the cover member **18** and is adapted to close the end of the base member **12** opposite the opening **144**, with the edge portion **138** being formed with a pair of laterally inwardly extending recesses **146** and **148** adapted to receive the ends of the shoulder portions **36** and **37** upon assembly of the cover member **18** on the base member **12**.

The seat belt buckle **10** of the present invention is assembled by first mounting the spring member **22** on the lower side of the latch member **16**, and thereafter inserting the latch member **16** and spring member **22** between the flange sections **32** and **34** of the base member **12** from the end of the base member **12** opposite the reentrantly portion **39**. The latch member **16** is moved longitudinally of the base member **12** until the end thereof carrying the spring member **22** overlies the portion **39** of the base member **12**. It will be noted that when the latch member **16** is thus positioned, the surface **84** of the spring

member 22 bears against the upper side of the web section 30 of the base member 12. Thereafter, the assembly spring 24 is inserted into the end of the base member 12 to the position illustrated in FIG. 8, whereby to maintain the latch member 16 in its operative position. The operator member 20 is then positioned directly above the latch member 16, with the support sections 94, 96 and edge portion 100 bearing directly against the upper side of the latch member 16, as previously described. Finally, the cover member 18 is oriented directly above the base member 12, and a pair of upwardly extending tangs 150 and 152 formed on the ends of the shoulder portions 36, 38, respectively, are received within the channel 142 of the member 18. The edge portion 138 is thereafter "snapped" over the offset ends of the flange sections 32, 34, with the recesses 146 and 148 thereby receiving a pair of longitudinally extending locking tab portions 154 and 156 formed on the shoulder portions 36, 38, respectively.

In operation of the buckle assembly 10, the belt tongue member 14 is inserted through the opening 144 and thereby biases the latch member 16 from the position shown in FIG. 5 to the position shown in FIG. 7. When the tongue 14 is fully inserted, the latch member 16 will be biased upwardly under the influence of the spring member 22, whereby the latching face 50 will engage the latching surface 64 to positively maintain the tongue member 14 in its latched position. Simultaneously, the spring member 22 will resiliently maintain the latch member 16 in a position wherein the marginal edge portions of the tongue member 14 will be clampingly secured between the undersides of the shoulder portions 36 and 38 and the edge portions 54, 56 of the latch member 16, thereby assuring against any relative movement of the tongue member 14 within the base member 12 upon insertion and latching thereof. This feature is of a particular importance in that it assures against rattling of the tongue member 14 and positively prevents spurious latching.

At such time as it is desired to unlatch the tongue member 14 from the assembly 10, the operator member 20 is depressed downwardly or in the direction of the arrow 158 in FIG. 7, whereby the operator member pivots about the end thereof disposed within the channel 142, thereby biasing the latch member 16 downwardly from the position illustrated in FIG. 6 to the position shown in FIG. 7. As the latch member 16 is thus moved, the latching face 50 thereof is disengaged from the latching surface 64 of the tongue member 14, and simultaneously, the surface 86 of the spring member 22 biases the tongue member 14 upwardly or away from the latch member 16, thereby permitting the tongue member 14 to be withdrawn from the opening 144. Upon release of the operator member 20, the spring member 22 will function to bias the latch member 16 and operator member 20 upwardly from the actuated position shown in FIG. 7 to the deactuated position shown in FIG. 5, preparatory to the next desired latching operation.

It will be seen from the foregoing description that the present invention provides a new and improved seat belt buckle assembly which comprises a minimum number of parts and hence may be easily assembled and economically manufactured. By virtue of the fact that stress is transferred from the tongue 14 to the latch 16, thence to the latch retainer 39 which is essentially aligned with the belt receiving slot 38, the web 30 is subjected to tension only devoid of a bending movement. In addition, the various parts are compact in size without any loss in structural integrity or latching effectiveness. Thus, the present design readily lends itself to a construction which is of an extremely compact size. Accordingly, the present invention provides a seat buckle assembly 10 which is not only entirely free of exterior openings and appurtenances and thus presents a clean, smooth exterior surface, but which is extremely compact in size and positive in action.

What is claimed is:

1. In a safety belt buckle assembly,
a belt tongue having means thereon defining a latching surface,
a base member comprising a central web section with a latch retainer at one end thereof,
a latch member engaged in said latch retainer and having a latching face engageable with the latching surface of said belt tongue,
the web portion of said base member having a belt receiving opening at the other end thereof, from said retainer,
a manual, push button operator pivotable adjacent said retainer and movable toward said web section and engageable with said latch to affect disassociation thereof from said tongue,
cover means defining an opening providing manual access to said operator, and
means for biasing said latch member away from said web section and toward a position wherein said latching face thereof is engageable with said latching surface, said biasing means being a member formed with a generally U-shaped portion at one end adapted to be engaged with and locked to said latch member, an L-shaped portion formed at the other end engageable with said belt tongue, and a central portion connecting said U-shaped and L-shaped portions.

2. An assembly as set forth in claim 1 wherein said base member has upstanding flange sections with laterally inwardly projecting shoulder portions which extend parallel to said web section to position laterally opposite edges of said tongue.

3. An assembly as set forth in claim 1 wherein said biasing means comprises a spring with said U-shaped portion clampingly engaged with said latch member and a portion juxtapositioned against said web section of said base member for urging said latch member toward said position wherein said latching face is engaged with said latching surface.

4. An assembly as set forth in claim 3 wherein said L-shaped portion projects through an opening in said latch member and engages the underside of said tongue for urging the same out of engagement with said latching face upon actuation of said operator means.

References Cited

UNITED STATES PATENTS

3,181,215	5/1965	Eberhart	24—230.1UX
3,237,258	3/1966	Fisher	24—230.1UX
3,331,108	7/1967	Fisher	24—230.1UX
3,353,234	11/1967	Settimi	24—230.1UX
3,364,531	1/1968	Moss	24—230.1UX

FOREIGN PATENTS

818,988	8/1959	Great Britain	24—230.1

BERNARD A. GELAK, Primary Examiner

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,588,969 Dated June 29, 1971

Inventor(s) Robert Cripps Fisher

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 4, lines 57-58 "The edge sections 112-118 are inclined ourwardly and" should be -- The edge portion 138 of the cover member 18 projects --. Column 4, line 71 after "reentrantly" insert -- extending --.

Signed and sealed this 16th day of November 1971.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

ROBERT GOTTSCHALK
Acting Commissioner of Patents

USCOMM-DC 60376-P69
U.S. GOVERNMENT PRINTING OFFICE 1969 O-366-334