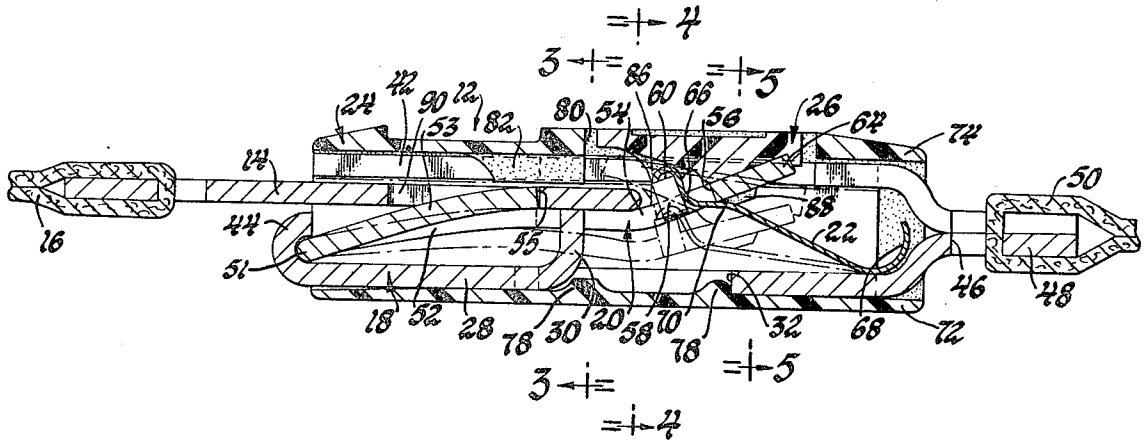


[72] Inventor **Thomas E. Lohr**
 Warren, Mich.
 [21] Appl. No. **855,188**
 [22] Filed **Sept. 4, 1969**
 [45] Patented **Apr. 13, 1971**
 [73] Assignee **General Motors Corporation**
 Detroit, Mich.

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Primary Examiner—Bernard A. Gelak
Attorneys—Warren E. Finken and F. J. Fodale

[54] **PUSHBUTTON BUCKLE**
 5 Claims, 6 Drawing Figs.
 [52] U.S. Cl..... 24/230
 [51] Int. Cl..... A44b 11/26
 [50] Field of Search..... 24/230 (A)

ABSTRACT: A buckle for releasably holding an apertured latch plate consists of three basic metal members (housing, latch lever, and spring) and two plastic ones (pushbutton.) The latch lever is pivotally mounted on an inturned flange on the base of the housing and includes a slot into which a bias spring extends. The pushbutton is movable through an opening in the plastic covering to actuate the latch lever.



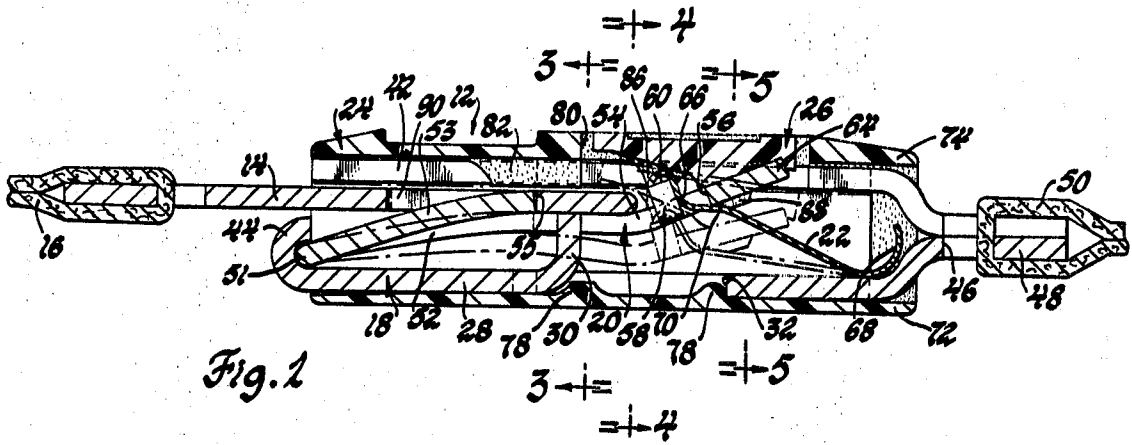


Fig. 1

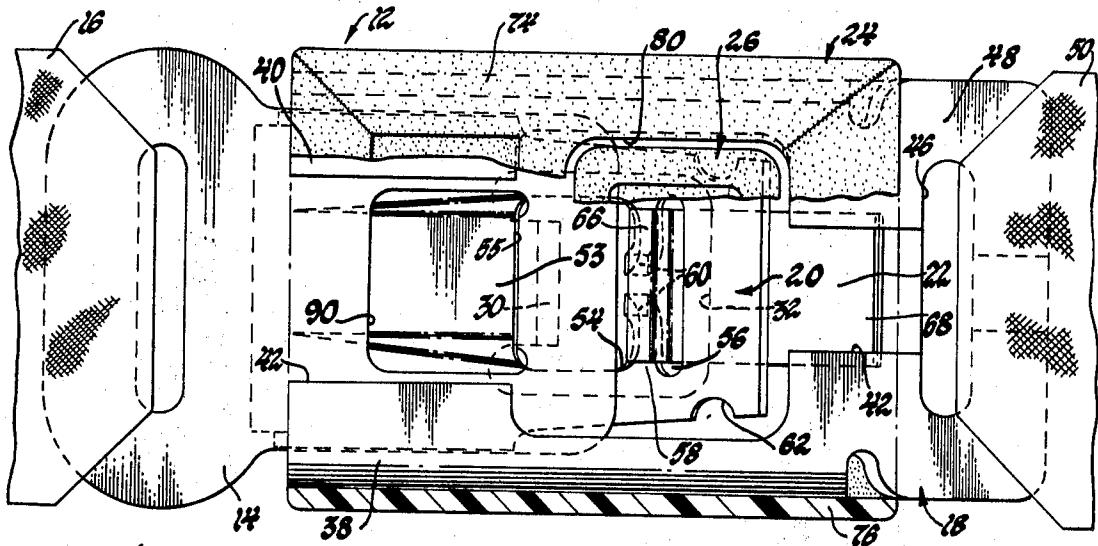


Fig. 2

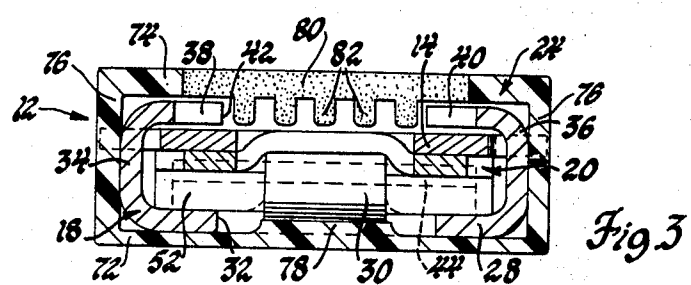


Fig. 3

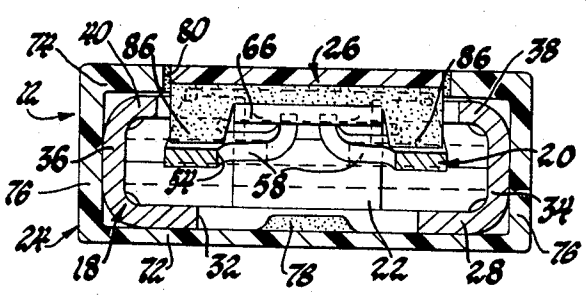


Fig. 4

INVENTOR.
Thomas E. Lohr
BY
F. J. Fedale
ATTORNEY

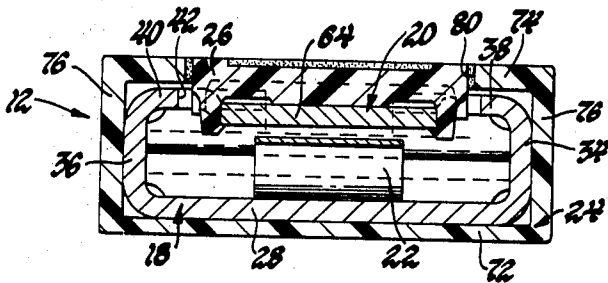


Fig. 5

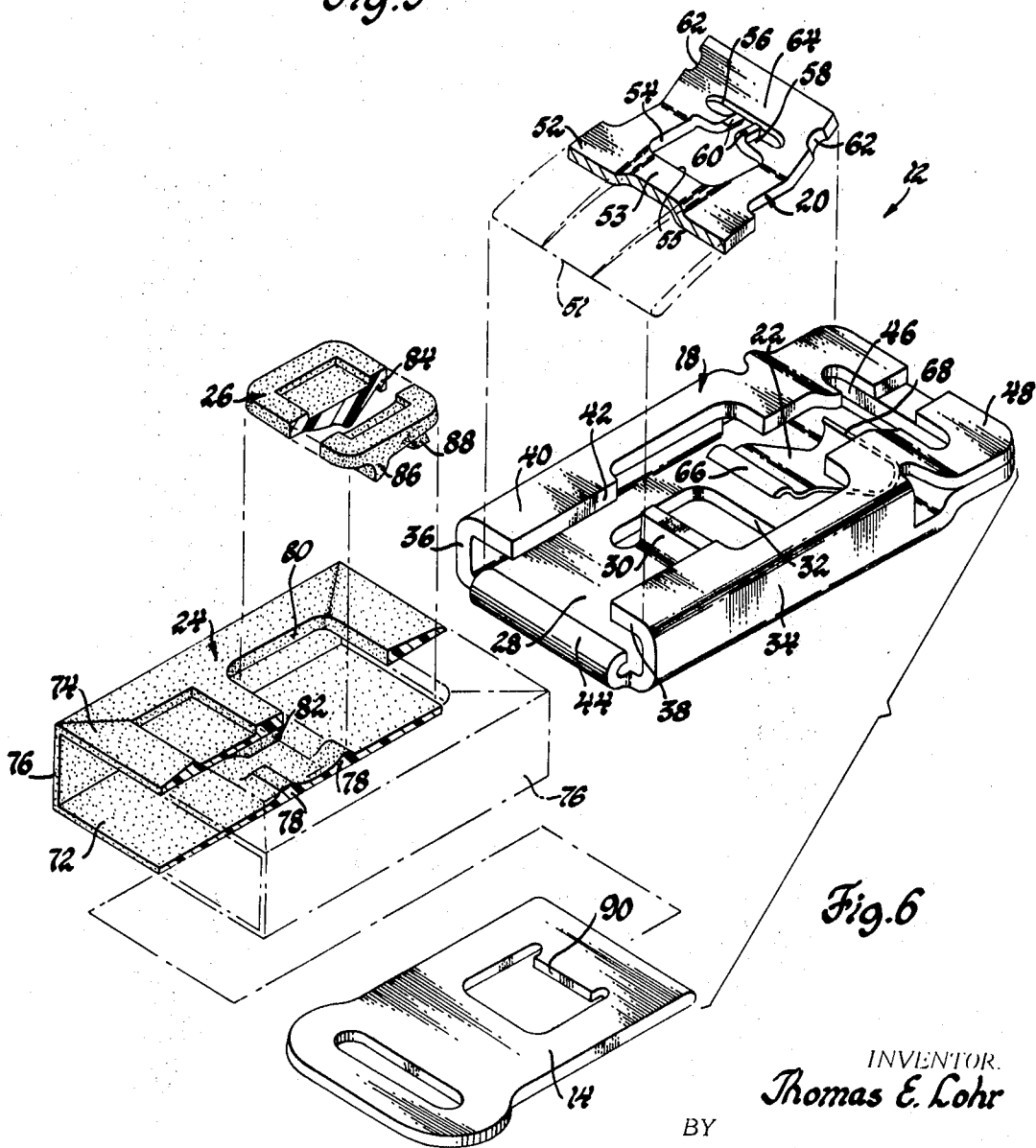


Fig. 6

INVENTOR.
Thomas E. Lohr

BY

F. J. Fradette
ATTORNEY

PUSHBUTTON BUCKLE

My invention relates generally to buckles and more specifically to a quick release buckle operable by a pushbutton.

The general type of buckle which is the subject of my invention is generally used in connection with lap or seat belts or shoulder harnesses in automotive passenger vehicles.

A feature of a buckle in accordance with my invention is that it may readily be color-keyed to the interior of an automobile passenger compartment thereby rendering the buckle more attractive and eye catching which may tend to induce use by a passenger.

Another feature of my invention is simplicity in design which manifests itself in the fact that my buckle has only three basic, unitary metal parts.

Another feature of my invention is that the anchor for the buckle is formed integrally with the buckle housing thereby minimizing the number of links between the belts to three; a latch plate on one belt, a housing on the other belt, and a latch lever interacting between the two.

Another feature of my invention is that substantial reaction surfaces are provided for transfer of the belt loads thereby providing a buckle of high load bearing quality.

Another feature of my invention is the use of a leaf spring to provide the biasing force urging the latch lever to the latched position thereby adding to simplicity of design.

Another feature of my invention is ease of manufacture which requires only the manufacture of a simple leaf spring, progressively die-formed housing and latch lever, and molded cover and pushbutton.

Another feature of my invention resides in ease of assembly witnessed by the lack of rivets, dowels, keys, or other similar permanent fastening means.

With these and other objects in view, as will hereinafter more fully appear, and which will be more particularly pointed out in the appended claims, reference is now made to the following description taken in connection with the accompanying drawings in which:

FIG. 1 is a longitudinal section taken through a buckle in accordance with my invention.

FIG. 2 is a plan view of the buckle shown in FIG. 1 with various portions of the buckle broken away to more clearly show the shapes and interrelationships of the inner working parts.

FIG. 3 is a section taken along the line 3-3 of FIG. 1 and looking in the direction of the arrows.

FIG. 4 is a section taken along the line 4-4 of FIG. 1 and looking in the direction of the arrows.

FIG. 5 is a section taken along the line 5-5 of FIG. 1 and looking in the direction of the arrows.

FIG. 6 is an exploded perspective view of the buckle shown in FIG. 1.

Referring now to the drawings and more specifically to FIG. 1, a buckle 12 in accordance with my invention is illustrated as releasably securing a latch plate 14 mounted on the end of a first belt 16. The buckle 12 comprises three metal parts (a housing 18, a latching lever 20, and a leaf spring 22) and two plastic parts (a covering 24 and a pushbutton 26). As stated previously, one of the features of my invention is simplicity in design with a minimum number of parts, each of which may be fabricated from simple manufacturing techniques. To this end and in reference to FIG. 6, it is seen that the housing 18 is readily capable of being manufactured from sheet stock in a number of progressive die-forming operations. Structurally, the housing 18 includes a base 28 from which a latch plate stripper 30 has been cut and bent to an upright position leaving an aperture 32. Sidewalls 34 and 36 extend integrally from the opposite lateral sides of the base and terminate in return flanges 38 and 40, respectively. The return flanges 38 and 40 need not meet and their confronting faces may define an open slot 42 running the entire length of the buckle housing. Such an open slot design is advantageous from a conservation of material point of view. It is also to be noted

that an aperture is required in the housing top to make the latch lever accessible and the open slot readily provides such an aperture by a narrowing of the return flanges in the midportion of the housing 18. On the other hand, the return flanges 38 and 40 are preferably wider toward the front or left-hand end of the buckle because belt loads are transferred to this portion of the buckle housing.

An inturned flange 44 is provided along the front edge of the housing base 28 and serves as the pivot and reaction point for the fulcrum end of the latching lever 20 which is described below. The return flanges 38 and 40 and the base 28 are bent inwardly to abut each other at the rear of the housing. A transverse slot 46 in this rear portion of the housing completes an integral anchor 48 for attachment to a second belt 50 as shown in FIG. 1.

The latching lever 20 which is both located and pivotally mounted in the housing 18 by the inturned flange 44 comprises a simple metal stamping. Adjacent the fulcrum end 51, the latching lever 20 has a generally planar portion 52 with a latch shoulder 53 raised out of the general plane of the portion 52 and terminating in a free latch edge 55. The right-hand portion of the latching lever 20 is narrowed and tapered inwardly. It has a first slot 54 which is bounded on one side by the raised edge 55 of the latch shoulder 53. The slot 54 overlies the latch plate stripper 30 on the housing 18 so that when the lever 20 is depressed to its unlatched position shown in phantom lines in FIG. 1, the latch plate stripper 30 protrudes through the slot 54 and holds the apertured latch plate 14 in an elevated position where it can easily be withdrawn from the buckle 12.

A second narrower slot 56 is provided in the right-hand portion of the latching lever. It is separated from the first slot 54 by a bridge 58 which is severed into two cantilevered bridge halves arcuately bent to provide platforms 60 as is shown best in FIG. 6. An indent 62 is provided in each side edge of the latching lever adjacent the right-hand or operator end 64 of the latching lever 20.

The third metal part is the leaf spring 22 which in FIG. 6 is shown disposed in its operative position in the housing 18. The leaf spring 22 has a hooked end 66 designed for attachment to the latching lever 20. The opposite end of the leaf spring 22 terminates in a gently curving arc 68 and is designed to react against the top inside surface of the base of the housing 18.

Returning to FIG. 1, the relationship between the leaf spring 22, the latching lever 20, and the housing 18 with the latch plate 14 secured is shown in solid lines. As previously indicated, the latching lever 20 is pivotally mounted in the housing 18 through cooperation of the fulcrum end 51 with the inturned flange 44 on the base 28. The hooked end 66 of the leaf spring 22 is threaded through the second slot 56 of the latching lever and rests on the bridge platforms 60 (FIG. 4). The lower rear edge 70 of the slot 56 bears against the leaf spring adjacent the hooked end 66. The curved end 68 reacts on the inside of the housing 18 and biases the latching lever to its upper latching position shown in solid lines in FIG. 1.

The two plastic parts included in the belt buckle illustrated in FIG. 1 are a covering 24 and a push button 26. As best shown in FIG. 6, the plastic cover 24 is an open-ended boxlike structure having a bottom wall 72, a top wall 74, and sidewalls 76. The bottom wall 72 includes a pair of axially spaced transversely disposed ribs 78 projecting from its top inside surface. These transverse ribs 78 protrude into the hole 32 in the base 28 of the housing 18 and axially locate the covering 24 with respect to the housing 18. See FIGS. 1 and 3.

Referring momentarily to FIG. 6, it is seen that the top wall 74 of the covering 24 includes a square aperture 80 which is approximately the same size as the plastic pushbutton 26. From FIGS. 1 and 3, it can be seen that the top wall 74 of the covering 24 also has a plurality of axial ribs 82 projecting inwardly adjacent the left-hand edge of the aperture 80. These axial ribs 82 are disposed between the return flanges 38 and 40 on the housing 18. See FIG. 3. The ribs 82 preferably extend very slightly into the housing 18 and provide a stop for

the latch shoulder 53 on the latching lever 20 when the latching lever 20 is in its latched position as shown in solid lines in FIG. 1 and the latch plate 14 is out of the buckle. Of course, when the latch plate 14 is secured in the buckle, the axial forces from the latch plate are transmitted to the latching lever and into the buckle housing 18 through the inturned flange and through the return flanges 38 and 40 by way of the latch plate 14. The covering 24 envelopes the housing 18 with its square aperture 80 in alignment with the widened midportion of the slot 42 in the housing 18 as best shown in FIG. 2.

The plastic pushbutton 26 which is disposed in the square aperture 80 and secured to the operator end 64 of the latch lever 20 is shown in perspective in FIG. 6. The pushbutton 26 includes a ledge 84 along its lower rear edge, a pair of spaced feet 86 adjacent the front of the lower surface, and two hooklike members 88 depending from its lower surface near the sides and toward the rear edge.

Referring now to FIGS. 1 and 5, it is seen that the plastic pushbutton 26 is located and secured on the operator end 64 of the latching lever 20 with the ledge 84 abutting the free end of the latching lever 20. The spaced feet 86 straddle the cantilevered bridges 58 and allow for the interposition of the hooked end 66 of the spring 22. See FIG. 4. The hooklike members 88 are disposed in the indents 62 on the latching lever 22 and wrap around to the bottom surface to retain the pushbutton 26 thereon. See FIG. 5.

Returning to FIG. 1, it is obvious that the depression of the pushbutton 26 rotates the latching lever 20 downwardly about its fulcrum point 51 against the bias of spring 22 to the phantom line position where the latching shoulder 53 and edge 55 are moved out of the aperture 90 of the latch plate 14 to a noninterfering or nonlatching position with respect to the apertured latch plate 14. In this position, the latch plate 14 is held in an elevated position by the latch plate stripper 30 so that the latch plate 14 may easily be withdrawn from the buckle. Upon release of the manually operable pushbutton 26, the latch lever 20 and spring 22 return to the solid line position. It is equally obvious that insertion of the latch plate 14 into the buckle 12 cams the latch lever 20 downwardly against the bias of spring 22 until the aperture 90 in the latch plate 14 aligns with the latch shoulder 53 at which time the latch lever 20 snaps up into the latch position shown in solid lines in FIG. 1. It is to be noted that the forces transmitted from the latch plate 14 to the housing 18 via the latch lever 20 are transmitted to substantial surfaces, namely, the inturned flange 44 which runs almost the entire width of the buckle and the return flanges 38 and 40 which are also substantial surfaces.

It should be understood, of course, that the foregoing disclosure relates to only a preferred embodiment of the invention and that it is intended to cover all changes and modifications of the example of the invention herein chosen for the purposes of the disclosure, which do not constitute departures from the spirit and scope of the invention.

I claim:

1. A buckle for releasably holding an apertured latch plate, comprising in combination;

a housing including a base with a pair of upstanding spaced sidewalls extending from the lateral sides of the base and an inturned flange adjacent the front edge of the base, said walls having return flanges terminating in mutually spaced relationship to define an opening therebetween;

a latch plate stripper bent out of said base into an upright position;

a unitary lever disposed in said housing with one end fulcrumed in said inturned flange whereby said lever is pivotal between a latched and an unlatched position, said lever including a latch edge and a first slot bounded in part by said latch edge, said first slot overlying said latch plate stripper so that said latch plate stripper protrudes through said slot when the lever is in its unlatched position;

a leaf spring secured to said lever on the side of said latch edge opposite said fulcrum and reacting against the housing biasing said lever toward its latched position where the other end of said lever is accessible through the opening between said return flanges;

an open-ended plastic covering enveloping said housing, said plastic covering having a first portion extending into the aperture in the base created by the latch plate stripper and a second portion extending into the opening between the return flanges to locate said covering on said housing, said plastic covering further including an aperture overlying said opening; and

a button disposed in said aperture and secured to said other end of said lever whereby depression of button pivots said lever to its unlatched position whereby said buckle is adapted to releasably hold an apertured latch plate.

2. A buckle for releasably holding an apertured latch plate and adapted to be secured to the end of a belt, comprising in combination:

a housing including a base with a pair of upstanding spaced sidewalls extending from the lateral sides of the base and an inturned flange adjacent the front edge of the base, said walls having return flanges terminating in mutually spaced relationship to define an opening therebetween said base and return flanges being bent into abutment to form a belt attachment portion at the rear edge of said base, said attachment portion having a transverse slot whereby the attachment portion is adapted to receive a belt loop;

a unitary lever disposed in said housing with one end fulcrumed in said inturned flange, said lever further including a latch shoulder;

a leaf spring disposed in said housing with one end secured to the lever and the other end reacting against the housing biasing said lever toward said return flanges and locating the other end of said lever in the opening between said return flanges whereby said latch shoulder is adapted to be located in the aperture of a latch plate which is inserted into said housing;

an open-ended plastic covering mounted on said housing, said plastic covering including an aperture overlying said opening and a grooved portion extending inwardly into the opening and overlying said latch shoulder and providing a reaction surface therefor; and

a button disposed in said aperture and secured to said other end of said lever whereby depression of said button pivots said lever about said fulcrum between a latched and an unlatched position.

3. A buckle for releasably holding an apertured latch plate, comprising in combination:

a unitary housing including a base, an upright latch plate stripper bent out of said base, an inturned flange at the front edge of the base, an upstanding sidewall extending from each lateral side of the base, said sidewalls each having return flanges terminating in mutually spaced relationship to define an opening therebetween, an integral anchor formed by said return flanges being bent into abutment with a substantial portion of said base adjacent its rear edge, said anchor having a transverse slot adapted to receive a belt;

a unitary lever disposed in said housing with one end fulcrumed in said inturned flange whereby said lever is pivotal between a latched and an unlatched position, said lever including a latch edge, a first slot bounded in part by said latch edge and a second slot, said first slot overlying said latch plate stripper so that said latch plate stripper protrudes through said slot when the lever is in its unlatched position, said second slot being separated from said first slot by a bridge means; and

a leaf spring having a hooked end extending through said second slot and seated on said bridge means, the opposite end of said leaf spring reacting against said housing biasing said lever toward its latched position

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where the other end of said lever is operatively accessible through the opening between said return flanges whereby said lever is movable to its unlatched position through said opening.

4. The buckle as defined in claim 3 further including: 5

an open-ended plastic covering enveloping said housing, said plastic covering having transverse ribs on its bottom wall extending into the aperture in the base created by the latch plate stripper to locate said covering axially on said housing and a plurality of axial ribs on its top wall extending into said opening between said return flanges and overlying said latch edge to provide a stop surface therefor, said plastic covering further including an aperture overlying said opening; and

a button disposed in said aperture and secured to said other end of said lever whereby depression of button pivots said lever to its unlatched position. 10

5. A buckle for releasably holding an apertured latch plate adapted to be secured to the end of a belt, comprising in combination: 15

a housing including a base with a pair of upstanding 20

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spaced sidewalls extending from the lateral sides of the base and an inturned flange adjacent the front edge of the base, said walls having return flanges forming a top wall means, including;

a unitary lever disposed in said housing with one end fulcrumed in said inturned flange, said lever further including a spaced latch shoulder and an operator portion on the side of said lever opposite said fulcrum, said operator portion being in alignment with said opening;

spring means disposed in said housing and biasing said lever toward said top wall means;

an open-ended plastic covering enveloping said housing, said plastic covering including an aperture overlying said opening, and

a button disposed in said aperture and secured to said other end of said lever whereby depression of said button pivots said lever about said fulcrum to an unlatched position.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,574,902

Dated April 13, 1971

Inventor(s) Thomas E. Lohr

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

In the Abstract:

3rd line, after "two plastic ones", delete "pushbutton.
and insert -- (covering and pushbutton). --

Signed and sealed this 7th day of September 1971.

(SEAL)
Attest:

EDWARD M. FLETCHER, JR.
Attesting Officer

ROBERT GOTTSCHALK
Acting Commissioner of Patent

L