United States Patent [19]

Holmberg

[11] **3,877,116**

[45] **Apr. 15, 1975**

[54] **PUSH BUTTON BELT FASTENER**

[75] Inventor: **Gote Eskil Yngve Holmberg,** Anderstrop, Sweden

[73] Assignee: **G.E.Y. Patenter Aktiebolag,** Anderstrop, Sweden

[22] Filed: **Oct. 1, 1973**

[21] Appl. No.: **402,645**

[30] **Foreign Application Priority Data**

Mar. 30, 1972 Sweden 4248/72

[52] **U.S. Cl.** ..... **24/230 AP;** 24/230 AV; 24/241 PP

[51] **Int. Cl.** **A44f 11/26;** A44b 13/00

[58] **Field of Search** ... 24/230 AP, 230 AV, 241 PP, 24/241 SB

[56] **References Cited**

UNITED STATES PATENTS

3,337,255	8/1967	Nicoloff	24/230 AP
3,597,811	8/1971	Cunningham	24/230 AV
3,728,764	4/1973	Carter	24/230 AP

FOREIGN PATENTS OR APPLICATIONS

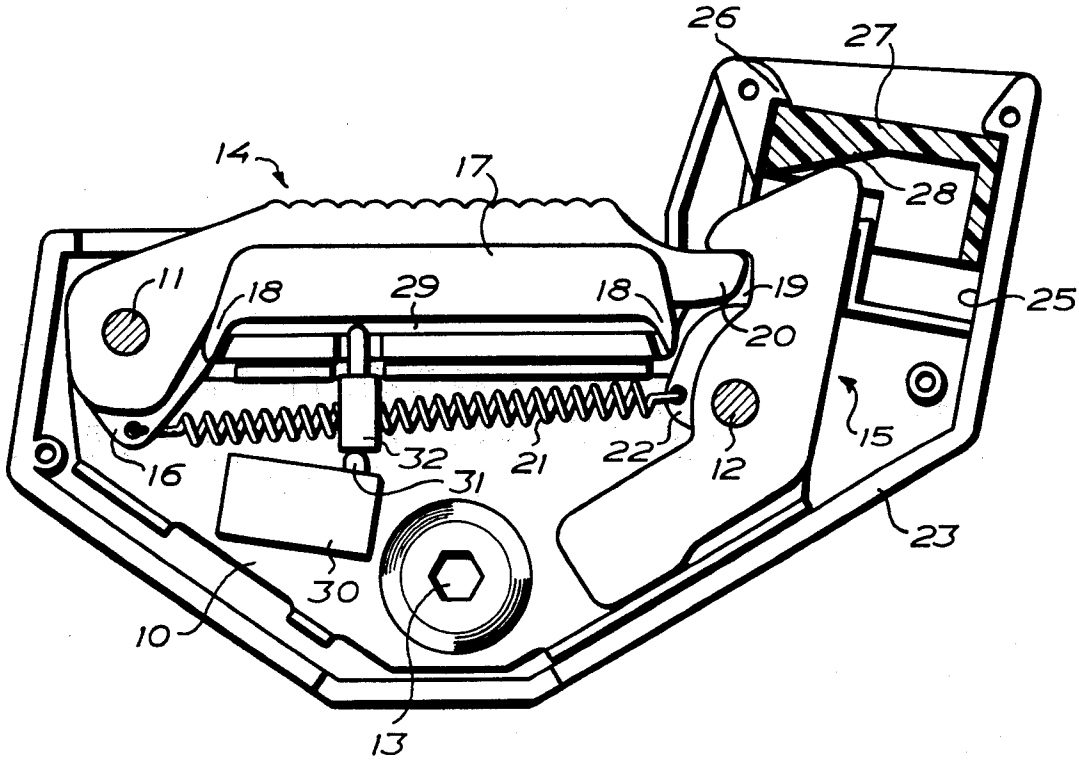
306,249	11/1968	Sweden	24/230 AV
1,320,936	2/1963	France	24/230 AP
1,297	3/1876	United Kingdom	24/241 SB
39,179	1/1907	Switzerland	24/230 AP

Primary Examiner—Bernard A. Gelak

[57] **ABSTRACT**

A lock for a three-point safety belt providing a continuous hip and shoulder strap loop comprises a frame having a pivoted bar and a pivoted latching member for locking the bar in a position in which it closes off an elongated slot receiving the loop. The frame is enclosed by a housing which forms a cavity wherein there is displaceably guided a push button for manually pivoting the latching member to a disengaged position by a cam action provided by the push button when engaging the latching member.

2 Claims, 4 Drawing Figures



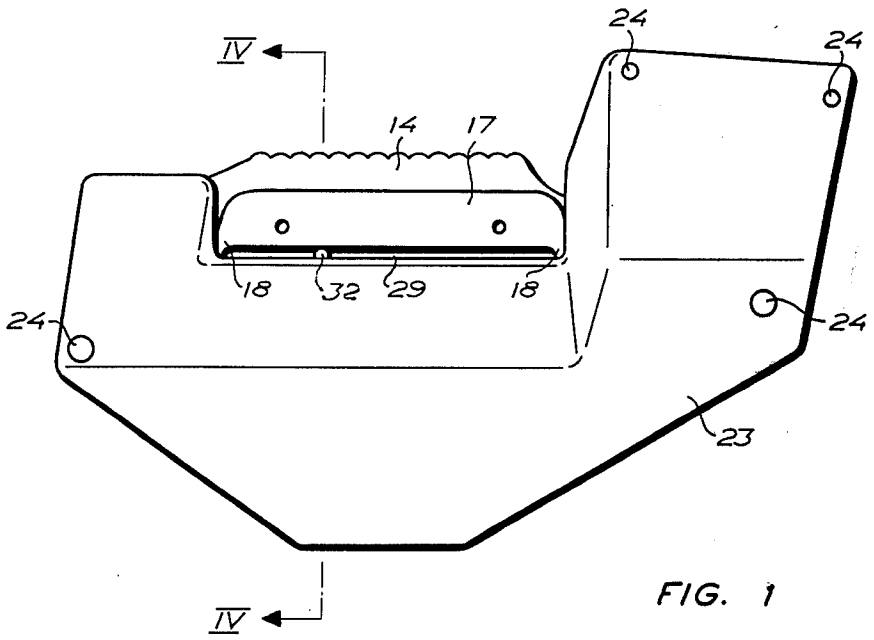


FIG. 1

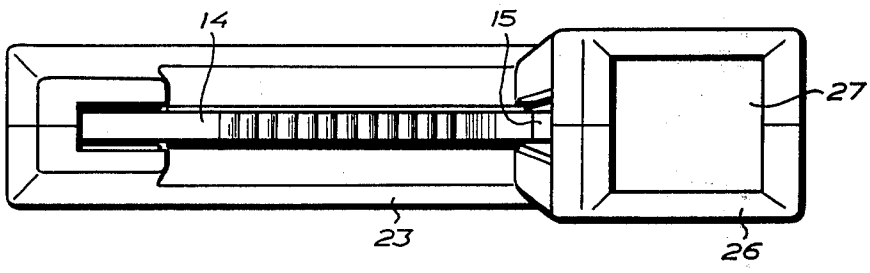


FIG. 2

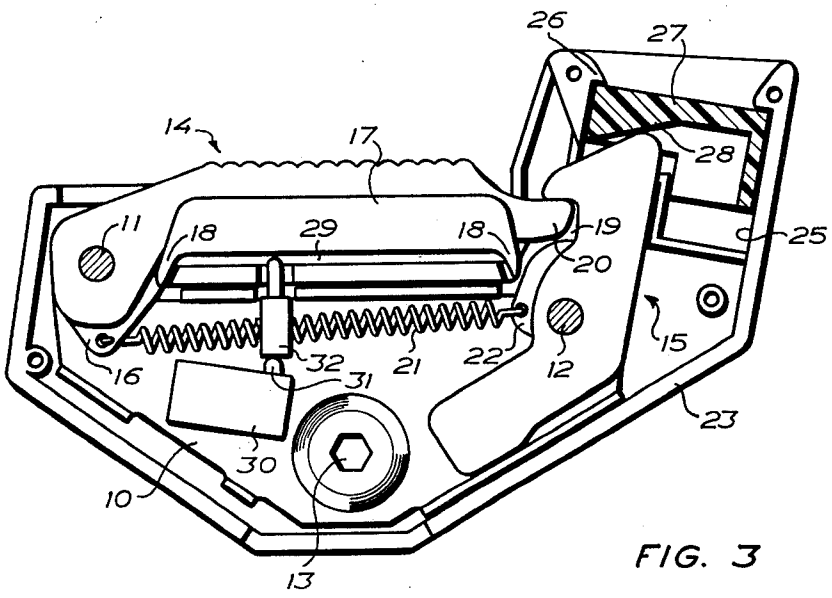

26
27
14
17
28
11
18
29
18
19
25
20
15
16
32
31
21
22
12
23
30
10
13

FIG. 3

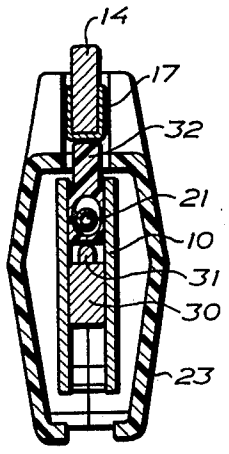

14
17
32
21
10
31
30
23

FIG. 4

PUSH BUTTON BELT FASTENER

The present invention relates to a lock for anchoring a strap loop forming part of a vehicle safety belt, to a vehicle body structure, including a U-shaped frame adapted to be fixedly attached to the body structure, a bar pivotally mounted to one limb of the frame, a latching member pivotally mounted to the other limb of the frame and extending along said other limb, for locking the bar to said other limb in a position to prevent the bar to be released therefrom by an outward pulling movement, the bar when in said locked position, closing off an elongated slot for the reception of the strap loop, and spring means biasing the bar and the latching member to an open position and a latching position, respectively.

These locks are called lay-in locks and are used in vehicle safety belts of the three point type wherein the belt extends between two points on the body structure to form a shoulder strap and a hip strap on one side and the other, respectively, of the anchoring provided by the lock, the shoulder strap and the hip strap thus form a continuous loop between said two points without any metal fitting such as a locking tongue or the like provided thereon. When the safety belt shall be put on it is necessary only to place the loop under the bar when this is disengaged from the latching member, so that it embraces the bar and then to push the bar downwardly to the position thereof in which the bar is locked to said limb by the latching member.

In prior art-embodiments of such locks the latching member is formed as a small lever which when actuated manually by a side pressure will be swung out of engagement with the bar in order to disengage the strap loop from the lock. In order to adapt a lock of the type described above to the requirement now set up, that the lock has to be operated by means of a push button, a lock of the type described is characterized in that a housing of a plastics material, the shape of which is matched to the U-shaped frame and encloses the frame a major part of the bar being uncovered by the housing, forms around said other limb a cavity receiving this limb as well as the latching member and having an opening at the top surrounded by an inwardly projecting border rib, and is further characterized in that in said cavity there is displaceably guided a push button which is engageable under cam action with the upper end of the latching member by an external manual operation to pivot the latching member to a disengaged position against the spring bias, the push button being pressed against the border rib by the spring bias to be held in an at rest position in which it is available through the opening of the cavity to be manually operated.

In order to elucidate the invention this will be described in more detail in the following reference being made to the attached drawings in which

FIG. 1 is a side view of a lock according to the invention;

FIG. 2 is a plan view of the lock;

FIG. 3 is a vertical sectional view of the lock; and

FIG. 4 is a sectional view taken along line IV—IV in FIG. 1.

The lock disclosed in the drawings comprises a U-shaped frame **10** consisting of two metal sheet stampings which are interconnected by two rivets **11** and **12** provided as spacers between the stampings, and is adapted to be attached to a vehicle body structure by

means of a member upstanding from the floor of the body structure or from the cardan tunnel thereof said member being connected to the frame by means of a bolt. For this purpose there is provided in the frame a hole **13.** In the space between the stampings forming the frame there is pivoted a bar **14** to rivet **11** as well as a latching member **15** to rivet **12.** The bar which is pivoted to the associated rivet at one end thereof is formed as a metal sheet element which provides a projecting arm **16,** and has along the lower edge thereof a channel lining **17.** This lining forms two smoothly curved end flaps **18** projecting from the bar at the lower side thereof. Latching member **15** is pivoted to the associated rivet between the ends thereof and is formed as a bell crank. One arm thereof provides a notch **19** for engagement with the free end of the bar, which forms a nose **20.** A helical tensile spring **21** is engaged between arm **16** and a lug **22** on the latching member and biases the latching member to engagement with the bar as is shown in FIG. **3** and at the same time biasses the bar in an upward direction such that the bar will be swung upwardly when the latching member is disengaged from nose **20.** The other arm of the latching member forms a counter-weight of the latching member so that this member has substantially the same mass on each side of rivet **12** defining the fulcrum of the latching member. When the lock is mounted in a vehicle with the frame extending in the longitudinal direction of the vehicle and with the latching member disposed at the end of the lock, facing the front end of the vehicle this arrangement will prevent the latching member from being subjected to a torque at a sudden retardation of the vehicle, which could disengage the latching member from the bar.

Frame **10** and latching member **15** carried thereby are completely enclosed in an outer housing **23** consisting of a plastic material such as DELRIN (polyoxymethylene resin) or HOSTAFORM C (acetal copolymer) and is formed by two halves which are connected to each other and to the frame by means of rivets **24.** The connection of the two halves of the housing may also be effected by ultrasonic welding. The housing has such a form that a major part of bar **14** is uncovered by the housing as will be seen from FIG. **1.** In the housing there is provided a rectangular cavity **25** forming an opening on top of the housing where the cavity terminates in a inwardly projecting rib **26** surrounding the opening. A push button **27** which has been inserted into the cavity before the interconnection of the two halves of the housing is displaceably guided in the cavity, and the upper end of latching member **15** is arranged to cooperate with a cam **28** on the lower side of this push button in order that the latching member will be swung to disengage the bar **14** against the bias of spring **21** when the push button is pressed into the cavity. When the push button is released it will be returned to an upper at rest position in which it engages rib **26,** by the return movement of the latching member under the bias of spring **21.**

When bar **14** is held in the position disclosed in FIG. **1** and **3** by latching member **15** it closes off an elongated slot **29.** This slot is sufficiently wide to allow a strap loop which has been engaged with the bar to slide unobstructedly through the slot when the bar has been pushed downwardly to the position disclosed in FIGS. **1** and **3,** in which the bar is locked by latching member **15.** However, the slot must not be so wide that the belt

strap can be double-folded in the slot. End flaps **18** form rounded end walls of the slot which prevent clamping of the edge portions of the strap at the ends of the slot. It is not necessary to operate the push button when the bar is swung downwardly to the latched position since nose **20** which has a curved lower edge will press back latching member **15** against the bias of spring **21** when it is pressed against the latching member. The latching member is held in a position suitable for co-operation with the nose when it is disengaged from the bar by abutment of the downwardly projecting arm of the latching member against the edge wall of the frame as will be seen in FIG. **3**.

It is desirable to be able to control an electrical circuit in dependence of the placing of the belt strap in the lock for indication of that the safety belt has not been put on when the vehicle is to be started or to prevent the vehicle from being started as long as the safety belt has not been put on, and for this purpose there is provided in the lock a small micro switch **30** attached between the two stampings of the frame. It has a push button member **31** for the operation thereof, and on spring **21** there is provided an actuating member **32** guided by the frame and projecting into slot **29** through an opening in the housing. When the bar is locked in the operative position thereof the strap loop being engaged with the bar, it will depress actuating member **32** by the intermediary of the strap, the actuating member in turn operating push button member **31** in order to operate the micro switch for the closing or opening of an electrical circuit depending on the type of contacts provided in the micro switch.

What I claim is:

1. A lock for anchoring a strap loop forming part of a vehicle safety belt to a vehicle body structure comprising, in combination:

a U-shaped metal frame adapted to be fixedly attached to the body structure;

a metal bar pivotally mounted at one end thereof to one limb of the frame;

a latching member pivotally mounted to the other limb of the frame and extending along said other limb, for pivotal movement into and away from locking engagement with the bar at the other end thereof, locking the bar to said other limb in a position to prevent the bar from being released therefrom by an outward pulling movement, the bar in said locked position closing off an elongated slot for the reception of the strap loop;

spring means biasing the bar and the latching member to an open position and a latching position, respectively;

a housing of a plastic material, which is of a shape matched to the U-shaped frame and encloses the frame, a major part of the bar being uncovered by the housing, which forms around said other limb a cavity receiving this limb as well as the latching member and having an opening at the top;

a projecting border rib on the housing surrounding said opening; and

a recessed push button displaceably guided in said cavity, which is engageable with the upper end of the latching member by an external manual operation to pivot a cam action the latching member to a disengaged position against the spring bias, the push button being pressed against the border rib by the spring bias to be held in an at-rest position in which it is recessed in the housing and is available for manual operation through the opening of the cavity.

2. A lock for anchoring a strap loop forming part of a vehicle safety belt to a vehicle body structure in accordance with claim **1**, in which the housing is U-shaped and includes:

a first upstanding portion enclosing said one limb and an end portion of said bar at said one end thereof which is pivoted to said one limb of the frame;

a second upstanding portion enclosing said other limb and the latching member pivoted thereto and forming a cavity with an opening at the top of said second upstanding portion;

a projecting border rib on the housing surrounding said opening; and

an intermediate portion enclosing an intermediate portion of said U-shaped frame, and enclosing the frame;

a major portion of the bar, which in the latched position thereof extends along the intermediate portion of the housing, being uncovered by the housing between said upstanding portions.

* * * * *