

Jan. 23, 1968

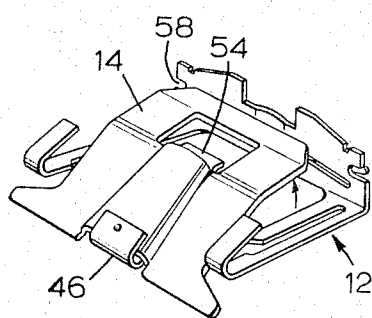
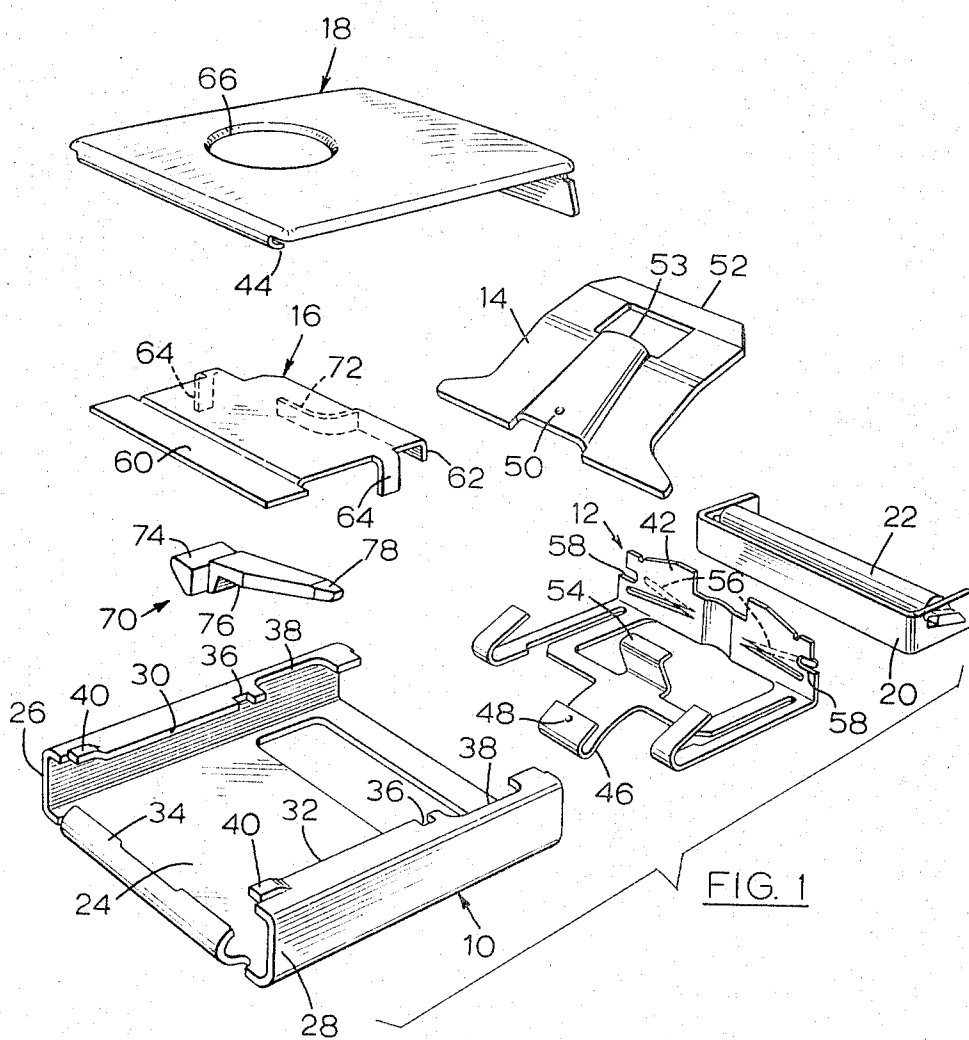
G. E. MOSS

3,364,531

SEAT BELT BUCKLE

Filed Aug. 15, 1966

3 Sheets-Sheet 1



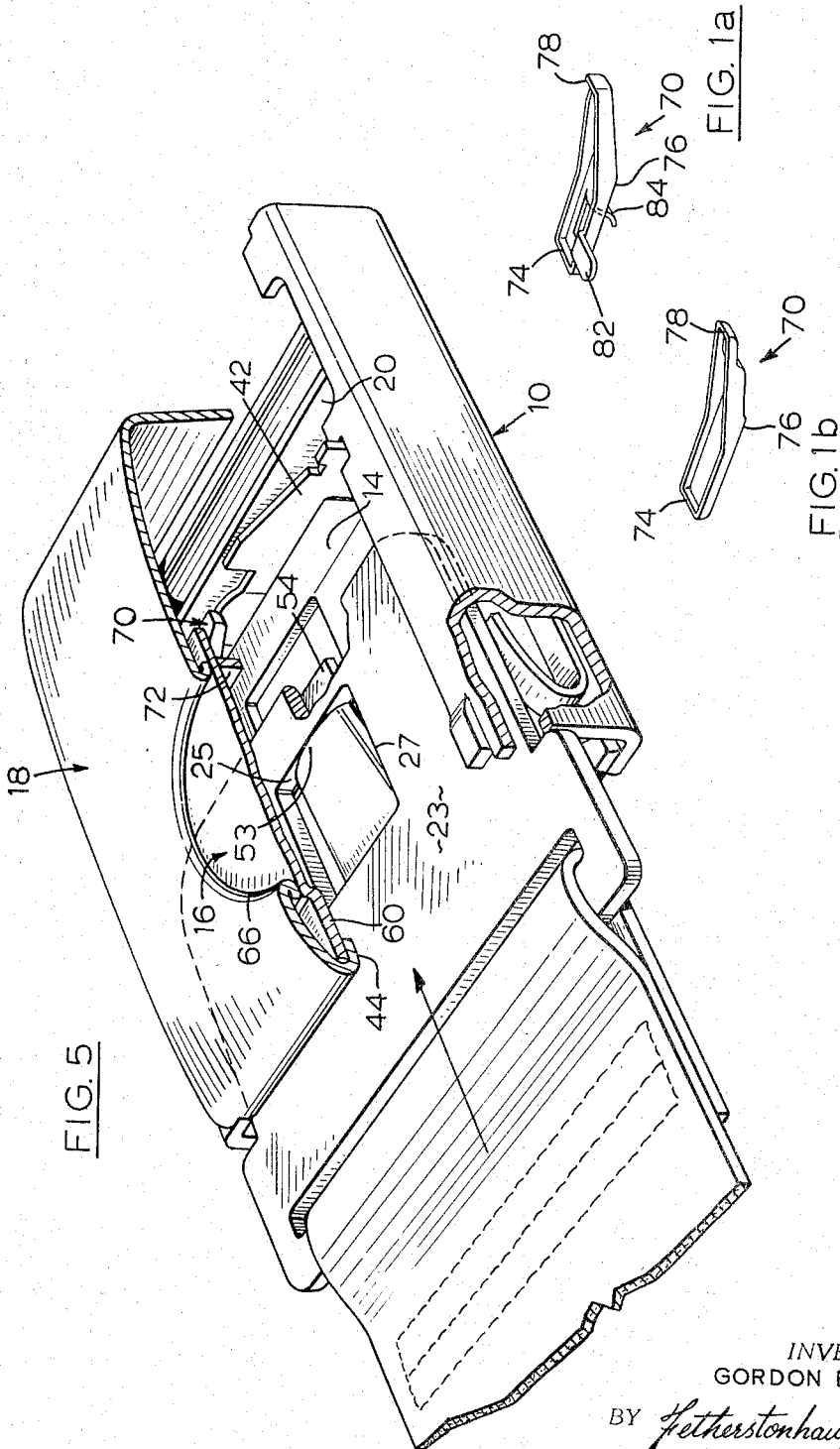
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3 Sheets-Sheet 2



INVENTOR.
GORDON E. MOSS
BY *Fetherstonhaugh & Co.*
ATTORNEYS

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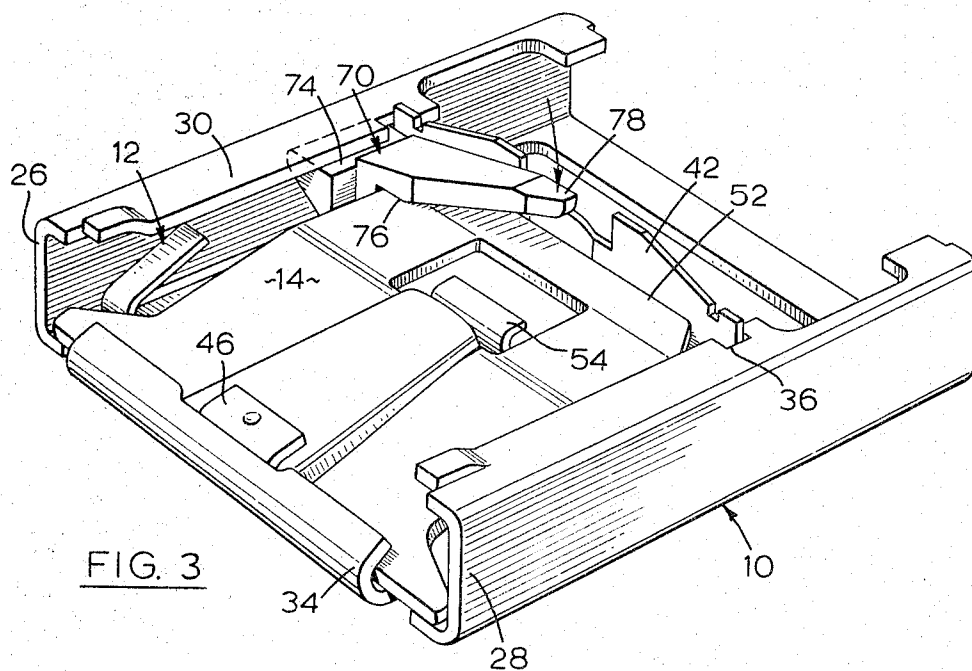


FIG. 3

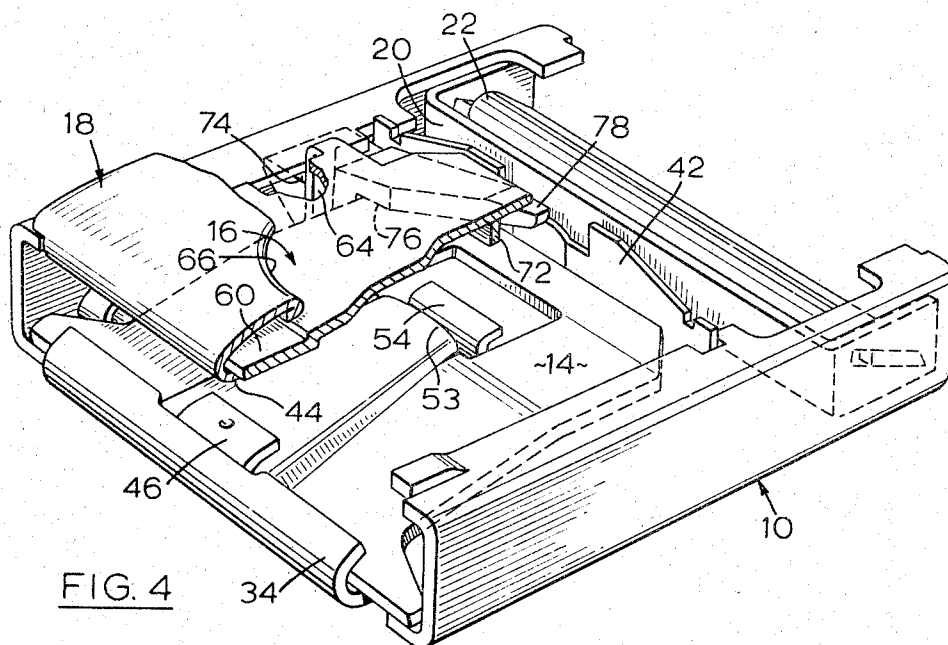


FIG. 4

INVENTOR.
GORDON E. MOSS
BY *Hetherstonhaugh & Co.*
ATTORNEYS

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3,364,531

SEAT BELT BUCKLE

Gordon Ernest Moss, 1 Bay St., Midland,
Ontario, Canada

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951,590

3 Claims. (Cl. 24-230)

This invention relates to the manufacture of seat belt buckles and is particularly concerned with an improvement in push button type seat belt buckles.

As is well known, the use of seat belts in automobiles and other motor vehicles has become quite widespread in recent years. The value of the seat belt in preventing injury is well recognized and increasing attention has been directed to improving the belts as well as to refinements in seat belt buckles, both to improve their appearance and operation.

The first type of buckle to gain widespread use was the lever type wherein release of the buckle was effected by pulling a lever outwardly from the user's body. However, a later development in buckles replaced the lever by a push button. In releasing a belt equipped with the latter type of buckle, the wearer simply depresses what appears to be a button in the front face of the buckle. In fact, the releasing action in both the lever and push button type is quite similar in that the action consists of depressing a latch plate against spring pressure whereby the tongue may be withdrawn from the buckle. As indicated, apart from appearance the two types of buckles differ only in the manner in which the latch plate is depressed.

Safety regulations require that the spring force which urges the latch plate upwardly as to engage the tongue should be a certain minimum value or, in other words, that the force required to depress the latch plate should be of a certain minimum value. This is to guarantee against inadvertent release of the buckle. Unfortunately it has been found that with the push button type, there are certain conditions under which the wearer cannot exert with his thumb or finger, as the case may be, that minimum depressing force which is required to release the buckle. This is particularly true where a load is imposed on the belt. In result, there have been situations in which a belt wearer who has been involved in an accident and has fallen forwardly against his belt finds that he cannot release the buckle due to the weight of his own body placing a load on the belt. This can have serious consequences as there are times when a belt wearer wishes to free himself from the belt quickly. To cite an extreme example, there is the situation wherein a vehicle has gone off a bridge and into water. Under these circumstances, the driver is naturally anxious to free himself from the seat belt so that he might get out of the vehicle quickly but if the vehicle is so oriented in the water that the belt wearer has his full weight bearing against the belt or wherein the buckle has shifted into such position that the wearer can reach the button only with difficulty and can only exert a small depressing force against the button, it is possible he might not be able to free himself. For example, it has been determined that when a buckle is positioned in the normal place at the front center of the wearer's body, the wearer can exert more than enough depressing force against the button to easily depress the

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button to the required degree but with the buckle located in an unusual position at the side of the wearer's body which can only be reached with difficulty, the wearer cannot exert the force required to release the buckle.

It is, therefore, the main object of this invention to provide an improvement in push button type seat belt buckles which will permit ready release of the buckle regardless of the amount of load on the belt and regardless of the position of the buckle relative to the wearer's body.

It is a more specific object of the invention to provide an improvement in this type of belt buckle whereby the buckle can be released with a minimum amount of depressing force exerted against the buckle while at the same time retaining the advantages which the push button type of buckle has with respect to avoidance of inadvertent release.

It is a further object of the invention to provide an improvement in push button type seat belt buckles which modifies the known type of buckle to gain the above noted objects at a minimum expense.

The above and further objects of the invention are achieved by the improvement which consists of including within the buckle a small release arm consisting of a short transversely oriented lever placed between the push button and the latch plate whereby a mechanical advantage is gained for the purpose of permitting depression of the latch plate with a minimum amount of finger or thumb pressure exerted on the push button.

The invention will be more thoroughly understood from the following description of preferred embodiments thereof as read in conjunction with the accompanying drawings.

In the drawings which illustrate these preferred embodiments,

FIG. 1 is an exploded perspective view of a push button type of seat belt buckle and showing one preferred form of release bar of the invention;

FIGS. 1a and 1b are second and third preferred forms of the release bar of the invention which might be used interchangeably with the release bar shown in FIG. 1;

FIG. 2 is a perspective view of a latch spring assembly and latch plate as shown in their normal operative positions;

FIG. 3 is a perspective view of the various parts shown in FIGS. 1 and 2 in assembled relation exclusive of the push button, cover plate and rear slide;

FIG. 4 is a perspective view similar to FIG. 3 but showing the operative positions of the rear slide, cover plate and push button, with the latter two elements being partly broken away; and

FIG. 5 is a perspective view similar to FIG. 4 but showing a greater portion of the cover plate and also showing the manner in which a belt tongue is received within the buckle.

The improvement in push button type seat belt buckles which constitutes this invention consists of the inclusion within the known type of push button buckle of a release bar consisting of a short transversely extending lever. The inclusion of the release bar involves, as a preferred expedient, a slight modification of the normal type of push button. While the invention is restricted to this improvement, it is considered desirable nevertheless to describe

the other components of the push button type of buckle so that the invention might be better understood.

The buckle illustrated essentially consists of a base 10, a latch spring assembly 12, a latch plate 14, a push button 16, a cover plate 18 and a rear slide 20 carrying a belt bar 22. The other main component of the buckle assembly is a belt tongue 23 (FIG. 5).

The base 10 is normally manufactured of steel in the order of $\frac{1}{16}$ of an inch in thickness and includes a web 24, a pair of upstanding flange portions 26 and 28 having inwardly folded upper edges 30 and 32. The web is apertured towards the rear end of the base to provide a passageway for the belt as to permit engagement about the belt bar 22. At its forward edge, the web is provided with a reentrantly folded button retainer 34. The edges 30 and 32 are each provided with notches 36 and 38 and a pair of cover engaging raised detents 40. The notches 36 serve to retain the forward wall 42 of the latch spring assembly 12 while the notches 38 simply provide clearance for the belt engaged on the belt bar 22. The raised detents 40 serve to provide surfaces which can be engaged by a pair of short hooks carried on the inturned flange 44 carried at the forward end of the cover 18. In this regard it should be noted that at the rear end of the cover plate is a snap fit over the rear end of the base 10 so that this snap fit and the engagement of the hooks carried by the forward end of flange 44 on the raised detents serve to hold the cover plate in position.

The latch spring assembly 12 carries out a number of functions and is normally manufactured of spring steel in the order of $\frac{3}{32}$ of an inch thickness. One of its chief functions is to hold the latch plate 14 in operative position. For this purpose the assembly includes a curved latch plate holder 46 which acts as a leaf spring. The latch plate is held in element 46 by a small nipple 48 engaged in a suitable recess 50 in the latch plate. Due to the curvature of member 46, the rear end 52 of the latch plate is normally biased upwardly. The latch spring assembly also includes a tongue stripper 54 which holds the tongue 23 upwardly when the latch plate is depressed so as to ensure that the tongue will be released from the latch plate. One other function carried out by the latch spring assembly is accomplished through the short leaf springs 56 which are pressed outwardly from the bridge 42 whereby to provide a bias working against the rear slide 20 for a purpose that will be understood by those familiar with this type of buckle construction.

As a first step in assembling the buckle, the latch plate is attached to the leaf spring 46. The assembly as shown in FIG. 2 is pushed through the open rear end of the base with the notches 58 providing clearance whereby the bridge 42 may be passed by the flanges 30 and 32 until the bridge may be dropped downwardly in notch 36. The rear slide 20 is then inserted in the same open rear face of the base and the belt engaged over the belt bar whereby to hold the belt bar in position.

The push button 16 consists of a stamping of sheet aluminum or steel and includes an offset forward edge flange 60 and an angled rear edge flange 62 and two integral side legs 64. The button is held within the buckle assembly by engagement of the forward edge flange 60 within the inturned flange 44 of the top cover plate 18. In the normal course, depression of the latch plate 14 is effected as one presses downwardly against the button through the opening 66 in the cover plate whereby the rear edge flange 62 depresses the latch plate. Thus, the force that can be exerted by the button against the latch plate is limited by the lever action between the pivot point along the forward edge of the flange 60 and the area in which the pressure is exerted by the thumb or finger. As previously stated, this amount of leverage is adequate for normal usage of the buckle but there are circumstances wherein the load on the belt or an awkward position of the buckle relative to the user's body makes it difficult for the user to exert sufficient pressure on the button to effect release.

The improvement of the invention consists of the insertion of a release bar generally indicated by reference numeral 70 between the button 16 and the latch plate 14. As a preferred expedient the push button is modified somewhat as to assist in holding the release bar 70 in place. To this end, the rear edge flange 62 is cut along its top edge and deformed inwardly on that side of the push button in which the release bar is located. Thus, this inturned portion 72 of the flange 62 serves as a locating member to hold the release bar 70 in position.

The release bar 70 consists of a short transversely oriented lever having three bearing points. These are a bearing surface 74 at the outer end of the release bar and which bears upwardly against the under-side of the flange 30 of the base plate, a second bearing surface 76 working against the top surface of latch plate 14 adjacent one side edge thereof and a third bearing surface 78 in contact with the under surface of push button 14. The lever thus acts as a third-class lever with the fulcrum point at bearing surface 74. As can be seen in the drawings, the bearing surface 74 consists of the top surface of an extended outer end of the release bar. This extension not only increases the size of the bearing surface whereby to give better stability to the release bar but it also provides a means whereby one of the legs 64 of the push button may be employed to assist in holding the release bar in position. It will be appreciated that more or less leverage by the release bar 70 can be gained by re-shaping the release bar as to change the position of the bearing surface 76. Thus, by shifting the bearing surface 76 towards the fulcrum 74, greater leverage action can be obtained and vice versa. Thus, the pressure required to release the buckle can be modified to meet the safety regulations of local jurisdictions.

It should also be understood that the engagement between the tongue 23 and the latch plate 14 is actually effected between the forward edge 25 of the aperture 27 in the tongue and the latch face 53 of the latch plate. As previously described, disengagement of the latch plate from the tongue requires depression of the latch plate and it will be understood that lowering of the latch plate causes sliding of the latch face 53 down the forward edge 25 of the tongue aperture. With the buckles heretofore available, it was necessary to carefully broach edge 25 to eliminate any roughness which might tend to interfere with this sliding movement. One of the subsidiary advantages of the improved buckle of the invention is that this broaching step may be eliminated as the greater leverage gained by the release arm 70 for lowering the latch plate will easily overcome the retarding effect of any roughness in the surface of edge 25.

The alternative release bars shown in FIGS. 1a and 1b are identical in function to the release bar 70 according to FIG. 1 and differ only in their method of construction. Whereas the release bar 70 of FIG. 1 is a cast, forged or machined solid piece of metal, the alternative release bars of FIGS. 1a and 1b can be manufactured by a die stamping operation from sheet material. The alternative release bars have the same bearing surfaces 74, 76 and 78. In the FIG. 1a form the lateral flange 82 and the punched-out detent 84 serve as locating pieces.

What I claim as my invention is:

1. In a seat belt buckle of the push button type having a base including side walls with return flanges, an upwardly biased latch plate, a cover plate and a push button having a forward edge flange pivotally mounted in said cover plate and a rear edge flange whereby depression of the push button causes the rear edge flange of the push button to depress said latch plate; the improvement which consists of a lever positioned between the upper surface of said latch plate and the under-side of said push button, said lever having three bearing surfaces including a first bearing surface adapted to bear against the under-side surface of one of the return flanges on said base, a second bearing surface adapted to bear against the top surface of said latch plate, and a third bearing surface adapted to

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bear against the under-side surface of said push button whereby depression of said latch plate by depression of said push button is aided through the mechanical advantage afforded by said lever.

2. An improved seat belt buckle as claimed in claim 1 in which said lever is transversely oriented so that its longitudinal axis extends transverse to the longitudinal axis of said base.

3. An improved seat belt buckle as claimed in claim 2 in which said push button includes a side edge leg and a deformed rear edge flange which cooperate together and

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with a transversely oriented bridge carried by said base to locate said lever.

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10 BERNARD A. GELAK, *Primary Examiner.*