

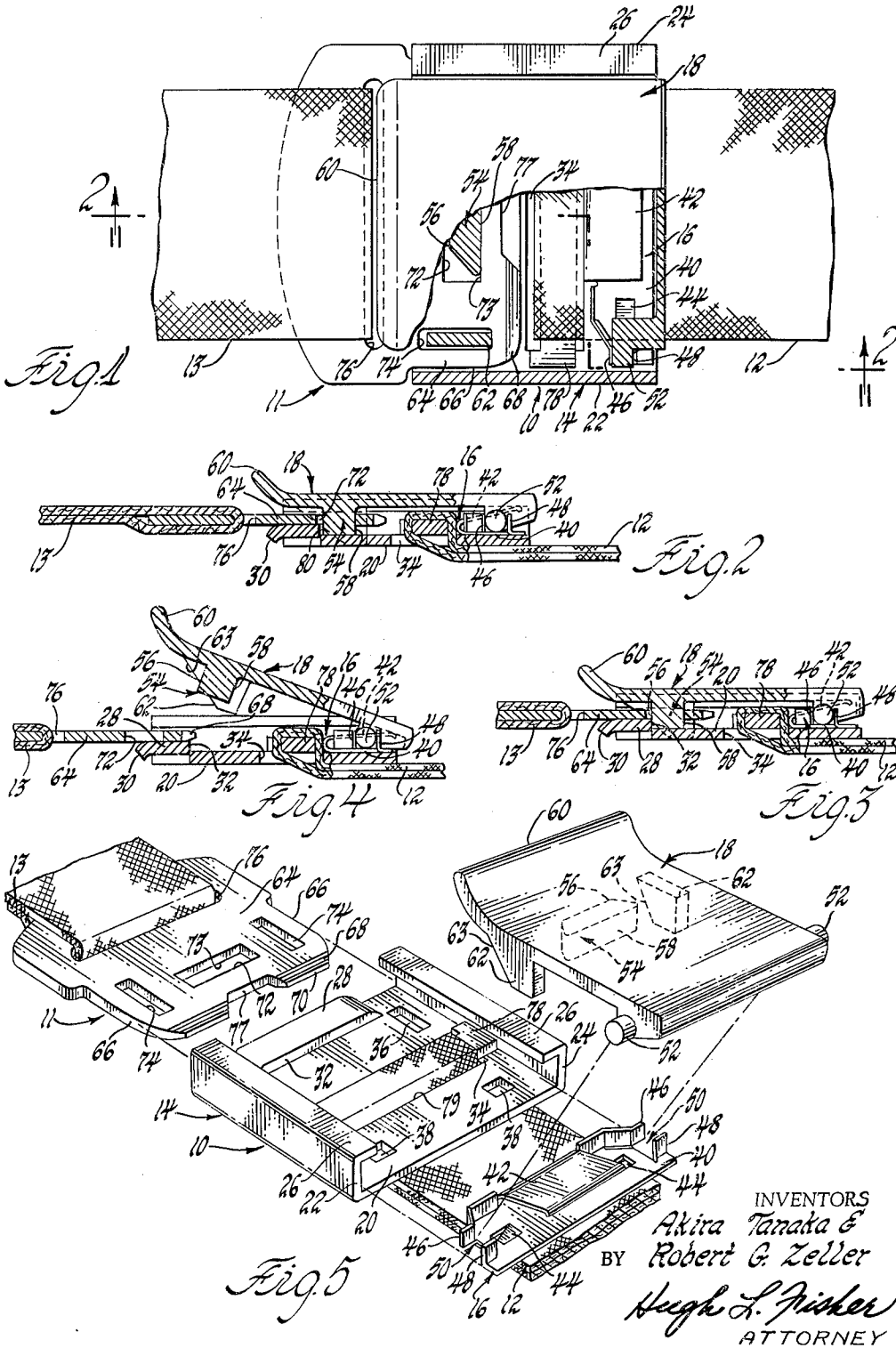
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SEAT BELT BUCKLE

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1

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## SEAT BELT BUCKLE

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This invention relates to fastening devices and more particularly though not exclusively to the seat belt buckles for fastening the free ends of a seat belt.

Buckles of the quick release metal-to-metal type adapted to fasten the free ends of seat belts are widely employed in many applications such as in airplanes or automobiles. Generally, such buckles include a base member to which one of the free ends of the seat belt is attached and which pivotally mounts a first latching member which is connected to a second latching member which is connected to the free end of the other seat belt strap. Normally, the first latching member is attached to the base by means of a pivot pin.

Such a buckle construction has many disadvantages. For example, when the load is applied to the buckle, this load is carried almost entirely by the pivot pin. Even when the load is transferred to the base by placing a detent of the latching member in shear, some relative movement between the latching member and the base occurs before the load is transferred thus placing the pivot pin under load. Such a construction is likely to cause shearing of the pivot pin thus rendering the buckle useless or if the pivot pin does not shear, it may become deformed and prevent releasing of the buckle.

The disadvantages associated with the prior art seat belt buckles are obviated by the present invention wherein a seat belt buckle is provided which includes a base member, a locking plate, a spring member, and a latching member. The base member supports the spring member and cooperates with the spring member to pivotally mount the latching member. The latching member includes a detent which is placed in shear between the locking plate and the base member when a load is applied to the buckle. The spring member permits longitudinal movement of the latch member which occurs as the detent is placed in shear and also urges the latching member to a latching position. By pivotally mounting the latching member in a manner so as to permit slight longitudinal movement during the shearing action, deformation of shearing at the point where the latching member is pivotally connected to the base member is prevented.

A more complete understanding of the present invention may be had from the following detailed description which should be read in conjunction with the drawings in which:

FIGURE 1 is a top elevational view of the buckle of the present invention with parts broken away;

FIGURE 2 is a sectional view taken along lines 2—2 of FIGURE 1 and showing the buckle in engaged position;

FIGURE 3 is a view similar to FIGURE 2 but showing the buckle in the position occupied when a load is applied thereto;

FIGURE 4 is a sectional view showing the buckle in a released position;

FIGURE 5 is an exploded view of the buckle of the present invention.

Referring now to the drawings there is shown a preferred embodiment of the present invention. The buckle comprises first and second buckle parts generally designated 10 and 11 respectively which are adapted to fasten the free ends 12 and 13 of a seat belt. The ends 12 and 13 may be those of a single strap or the ends of two straps anchored to a common base.

2

The buckle part 10 comprises a base member 14, a spring member 16, and a combination cover and latching member 18. The base member 14 is preferably stamped and integrally formed of a piece of heavy sheet metal and comprises a substantially rectangular bottom wall 20 and longitudinally extending laterally spaced upstanding side walls 22 and 24 having inwardly extending flanges 26. A stop member 28 extends upwardly from the bottom wall 20 and includes a curved end portion 30 and a rearwardly facing transverse abutment edge 32. The base is also provided with a rectangular opening 34, a pair of guide slots 36, and a pair of spring retaining slots 38.

The spring member 16 includes a horizontal lower portion 40 and an inclined portion 42 extending therefrom and is adapted to be removably positioned in the base member 14 and to normally, yieldingly urge the latch member 18 toward a latching position. Tabs 44 extend downwardly from the spring member 16 and are received by the slots 38 in the base 14. Flexible tangs 46 and 48 extend upwardly from the lower portion 40 and define an opening 50.

The combination cover and latching member 18 is provided with trunnions 52 extending laterally therefrom which are received in the opening 50 between the tangs 46 and 48. The flanges 26, side walls 22 and 24, and the bottom wall 20 in combination with the tangs 46 and 48 provide an enclosure for the trunnions 52 so as to pivotally mount the latch member 18 to the base 14. The latch member 18 carries on the underface thereof a detent 54 having forwardly and rearwardly facing transversely extending abutment edges 56 and 58. The latch member 18 also includes an obliquely extending handle portion 60 and laterally spaced downwardly extending guide dogs 62 having camming surfaces 63.

The buckle part 11 is commonly referred to as the locking plate and includes a front tongue portion 64 having side edges 66 and inclined upper and lower edges 68 which converge toward a front edge 70. The locking plate 11 has a rectangular latch opening 72 having a transverse abutment edge 73, laterally spaced guide slots 74 and is also provided with an elongated slot 76 through which the free end 13 of the seat belt is looped and sewn to effect a secure attachment thereto. The tongue portion 64 has a cut out portion 77 providing clearance for the detent 56 during fastening of the buckle parts 10 and 11.

In order to adjustably secure the free end 12 of the seat belt to the base member 14, there is provided a laterally extending lock bar 78. The free end 12 of the seat belt passes through the opening 34 about the lock bar 78 and back through the opening 34. When a load is placed on the seat belt, the lock bar 78 is forced rearwardly and traps the seat belt between the lock bar 78 and the rear edge 79 of the opening 34. In order to shorten the length of the seat belt, it is merely necessary to pull on the free end 12 which forces the lock bar 78 forward allowing the belt to pass through the opening 34 and around the lock bar 78. If it is desired to lengthen the seat belt, it is merely necessary to rotate the buckle part 10 approximately 90° which allows free passage of the seat belt around the lock bar 78.

To fasten the seat belt, the locking plate 11 is inserted in the opening defined by the stop 28 and the flanges 26 of the buckle part 10. The tongue portion 64 engages the camming surfaces 63 of the guide dogs 62 to raise the latching member 18 against the bias of the spring 16. As the locking plate 11 reaches its fully inserted position, the latching member 18 is returned to its latching position by the spring 16. At this point the detent 54 extends through the latch opening 72 and rests against the bottom wall 20 of the base 14 and the guide dogs 62 extend through the guide slots 36 and 74 to insure proper alignment of the

locking plate 11. The buckle is now in the position shown in FIGURE 2. It will be noted that a slight clearance 80 exists between the abutment edge 56 of the detent 54 and the abutment edge 32 of the stop member 28. This is necessary in order to insure that the latching member 18 will fully return to its latched position. As illustrated in FIGURE 3 when a load is applied to the buckle, the load is initially transferred from the locking plate 11 to the combination latch and cover member 18. The cover member 18 is thus pulled forward against the tangs 46 until the clearance 80 between the detent and the stop member 28 is closed. At this point the detent 54 is placed in shear between the locking plate 11 and the stop member 28 thus transferring the load to the base member 14. The base member 14 now carries the entire load and the remaining parts of the buckle are not subjected to undue stressing which might require eventual replacement.

From the above it will be apparent that a quick release metal-to-metal seat belt buckle is provided requiring a minimum of parts in which the spring member not only biases the latching member toward latching position but also cooperates with the base member to provide a mounting for the latching member allowing both pivotal and slight longitudinal motion thereof. As constructed a separate pivot pin is not required and neither the latching member nor its mounting is required to sustain the load placed on the buckle.

While a preferred embodiment of the invention is illustrated in the drawings and described in the specification, it is to be understood that the invention is not so limited but shall cover and include any and all modifications and forms of the invention which fall within the scope of the appended claims.

We claim:

1. A seat belt buckle for securing the free ends of a seat belt, said buckle comprising a base member and a latching member, said base member including upstanding side walls with inwardly extending flanges, a spring member carried by said base member, said spring member having a lower portion including flexible tangs and an inclined portion extending from said lower portion in engagement with said latching member for normally, yieldingly urging said latching member toward a latching position, said latching member including pivot means, said tangs and said flanges cooperating with said pivot means for pivotally mounting said latching member to said base, said base being secured to one of the free ends of said seat belt, a locking plate secured to the other free end of said seat belt and adapted to cooperate with said latching means to fasten said buckle.

2. A seat belt buckle for securing the free ends of the seat belt, said buckle comprising a base member and a latching member, said base member including upstanding side walls with inwardly extending flanges, a spring member carried by said base member, said spring member having a lower portion including flexible tangs which cooperate with said side walls to provide a bearing, said latching member including trunnion means extending therefrom and adapted to cooperate with said bearing for pivotally mounting said latching member to said base member, a detent extending from the underside of said latching member, a stop member extending upwardly from said base member, said spring member including an

inclined portion extending from said lower portion in engagement with said latching member for normally, yieldingly urging said latching member toward a latching position, said base member secured to one of the free ends of said belt, a locking plate secured to the other free end of said belt and including a latch opening having a transverse abutment edge, said detent registering with said opening when said buckle is fastened, said detent being placed in shear between said abutment edge and said stop member when said buckle is under load whereby the entire load is carried by said base member.

3. A seat belt buckle for securing the free ends of a seat belt, said buckle comprising a base member and a latching member, a spring member carried by said base member and including a first portion thereof pivotally supporting said latching member and a second portion thereof normally, yieldingly urging said latching member toward a latched position, said base member being secured to one of the free ends of said seat belt, a locking plate secured to the other free end of said seat belt and provided with an aperture formed therein having a transverse abutment edge, said latching member including detent means projecting through said aperture when said latching member is in a latched position, said base member including stop means projecting therefrom and spaced longitudinally from said detent means, said detent means being placed in shear between said abutment edge and said stop means when a load is applied to said seat belt whereby the entire load is applied to said base member.

4. I combination with a locking plate having an aperture formed therein, a seat belt buckle for securing the free ends of a seat belt and comprising a base member having upstanding side walls and inwardly extending flanges, a latching member having integrally formed detent means projecting toward said base member, a spring member carried by said base member and cooperating with said flanges to pivotally support said latching member while normally, yieldingly urging said latching member toward a latched position, one of the free ends of said seat belt being secured to said base member, the other free end of said seat belt being secured to said locking plate, said detent means projecting through said aperture when said latching member is in a latched position, said base member including stop means longitudinally spaced from said detent means when said latching member is in a latched position and cooperating with said locking plate for placing said detent means in shear when a load is applied to said seat belt whereby the entire load is carried by said base member.

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