Feb. 20, 1940. R. E. DOWD 2,191,228

BUCKLE

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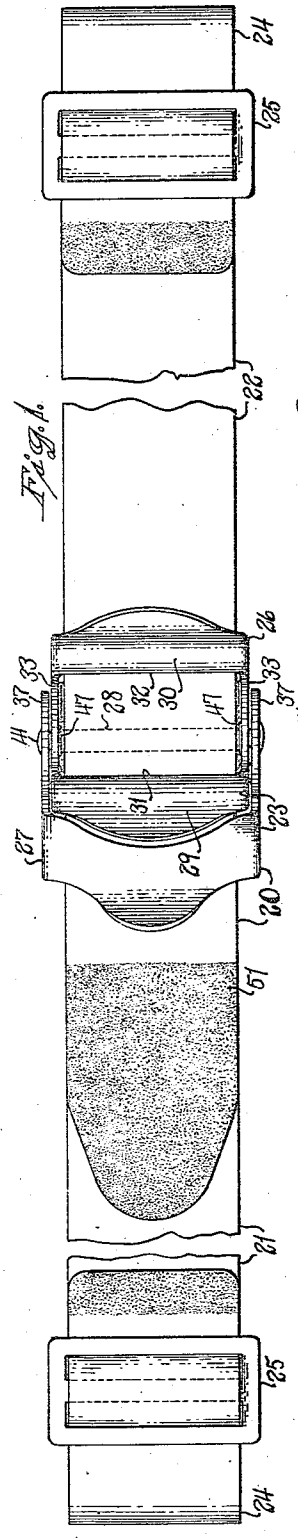


Fig. 1.

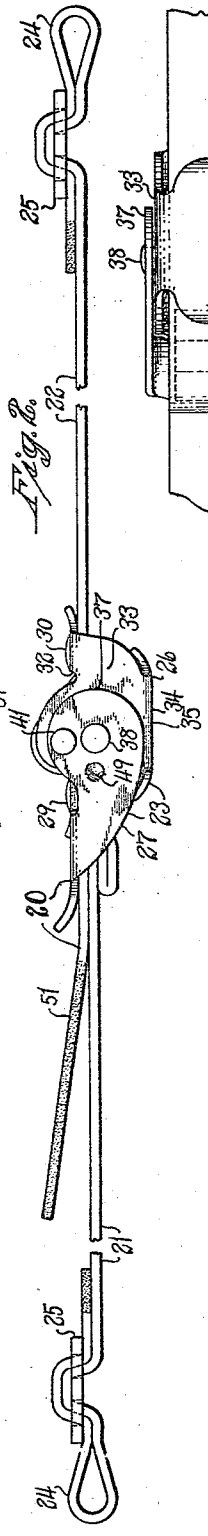


Fig. 2.

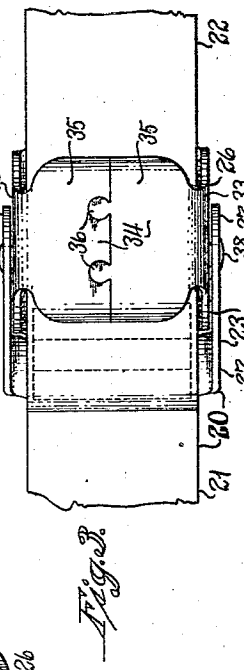


Fig. 3.

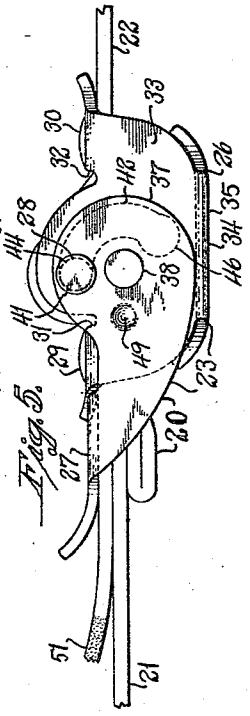


Fig. 5.

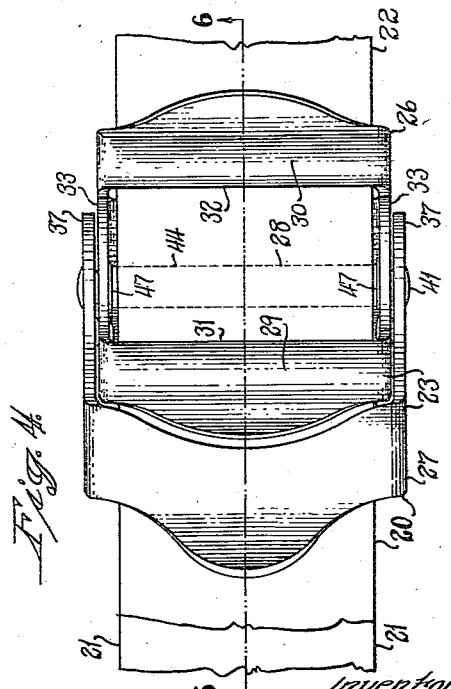


Fig. 4.

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Fig. 6.

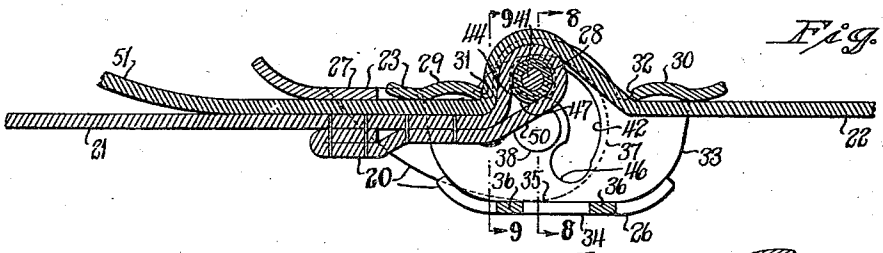


Fig. 7.

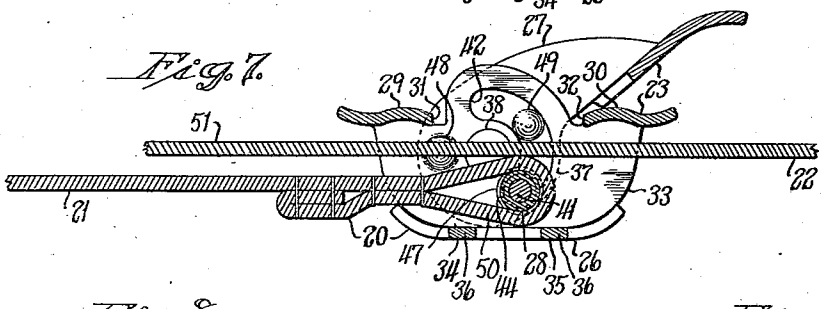


Fig. 8.

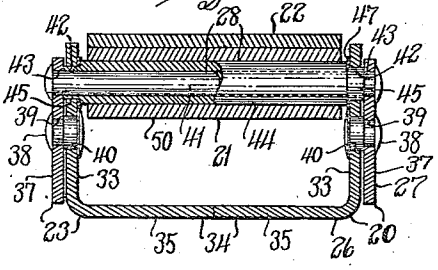


Fig. 9.

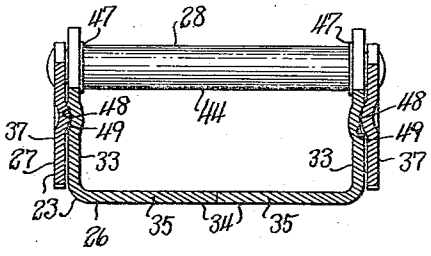


Fig. 10.

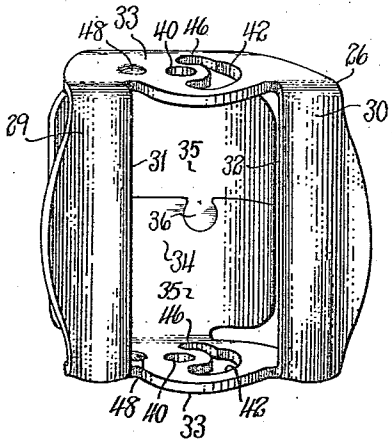
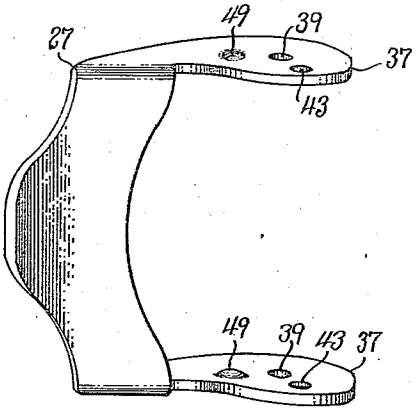


Fig. 11.



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Fig. 12.

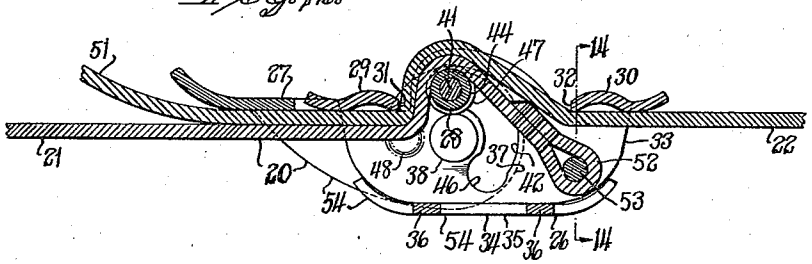


Fig. 13.

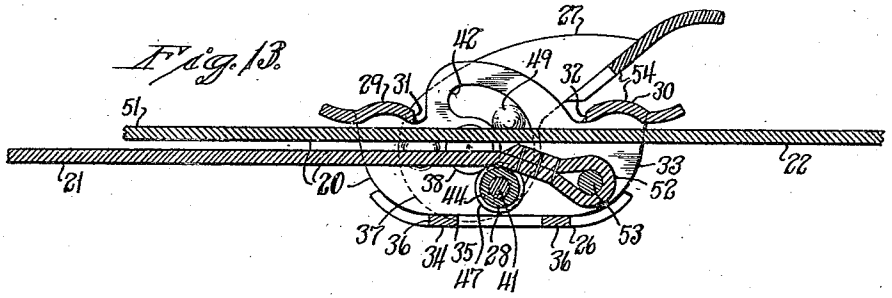


Fig. 14.

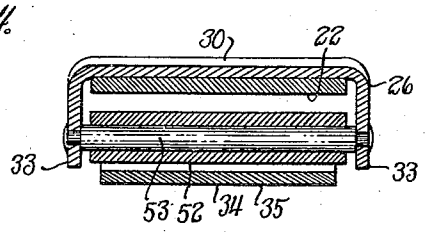


Fig. 15.

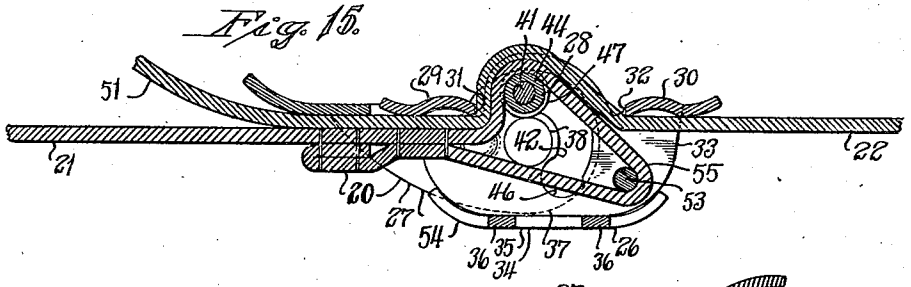
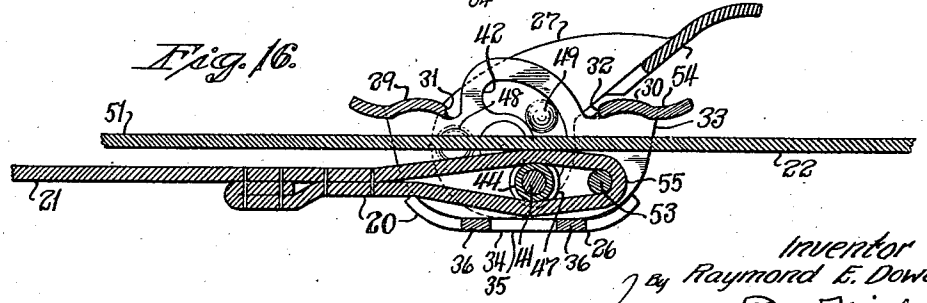


Fig. 16.



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UNITED STATES PATENT OFFICE

2,191,228

BUCKLE

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Application December 14, 1938, Serial No. 245,554

16 Claims. (Cl. 24—170)

This invention relates to improvements in buckles and more particularly to buckles for use in connection with belts, straps, and so forth.

One object of this invention is to provide an improved buckle for use on seat-belts employed in aircraft and other vehicles to provide a belt which will have adequate resistance to static and shock stresses.

Another object of this invention is to provide an improved buckle characterized by simplicity and an obvious mode of operation for application, adjustment and release of a belt or strap with which the buckle is used.

Another object of this invention is to provide an improved buckle for use in connection with a belt, strap or the like, and which can be quickly released by a single movement of a lever of the buckle and without the need of holding the lever in release position.

Another object of this invention is to provide an improved buckle for use in connection with belts, straps and the like, and having a self-energizing grip which is at all times firm and free from variations due to minute variations in thickness of the belt or strap.

Another object of this invention is to provide an improved buckle for use in connection with belts, straps and the like which can be readily released while under load, and after application of a maximum load.

Another object of this invention is to provide an improved buckle formed of simple elements, readily manufactured and readily assembled to produce an attractive, efficient and durable construction at minimum cost.

With the above and other objects in view, as will appear to those skilled in the art from the present disclosure, this invention includes all features in the said disclosure which are novel over the prior art.

In the accompanying drawings forming part of the present disclosure, in which one way of carrying out the invention is shown for illustrative purposes:

Fig. 1 is a top plan view illustrating one embodiment of the invention;

Fig. 2 is a side elevation of Fig. 1;

Fig. 3 is a bottom plan view of the buckle, together with a portion of the belt or strap shown in Fig. 1;

Fig. 4 is an enlarged top plan view thereof;

Fig. 5 is an enlarged view in side elevation of Fig. 4;

Fig. 6 is a sectional view taken on the line 6—6 of Fig. 4;

Fig. 7 is a view similar to Fig. 6 but with the buckle shown in its unlocked position;

Fig. 8 is a sectional view taken on the line 8—8 of Fig. 6;

Fig. 9 is a similar view taken on the line 9—9 of Fig. 6 with the strap-members omitted;

Fig. 10 is a perspective view of the frame;

Fig. 11 is a perspective view of the locking-lever;

Fig. 12 is a view similar to Fig. 6 of a modified construction;

Fig. 13 is a view similar to Fig. 12 but with the buckle of Fig. 12 shown in its unlocked position.

Fig. 14 is a sectional view taken on line 14—14 of Fig. 12;

Fig. 15 is a view similar to Fig. 12 of still another modified construction; and

Fig. 16 is a view similar to Fig. 15 but with the buckle of Fig. 15 shown in its unlocked position.

Referring to the form of the invention illustrated in Figs. 1 to 11 of the drawings, a belt or strap generally designated by the numeral 20 includes the two flexible webbing- or strap-portions or members 21 and 22, and the buckle 23 which serves to secure the strap-portions 21 and 22 together. The flexible strap-portions may be made of woven textile material or may be made of any other material having suitable strength and flexibility. The particular belt illustrated may serve as a seat-belt in airplanes or other vehicles. Each strap-portion or member 21, 22 has a loop- or eye-member 24 formed by means of a three-bar or double-slot slide- or adjustment-buckle 25 in a way that is well known in the art, the eyes 24 serving to secure the strap-members 21 and 22 to fixed portions of the airplane or other vehicle.

The buckle 23 includes a frame 26, a locking-and-release lever 27 pivoted to the frame 26 and a locking-bar 28 carried by the locking-lever 27.

The frame 26 includes two bar-portions 29 and 30 having approximately parallel bar-edges 31 and 32, side-portions 33, and a bottom-plate 34 all formed as one integral piece, the bottom-plate 34 being formed by folded bottom-portions 35 which are joined together by tongue and slot connections 36.

The locking-lever 27 has a pair of ears 37 outside of and adjacent the side-portions 33 of the frame 26, the ears 37 being pivoted to the side-portions 33 by the pins or rivets 38 extending through holes 39 in the ears 37 and through holes 40 in the side-portions 33 of the frame 26.

The locking-bar 28 is eccentrically mounted in the ears 37 relatively to the pivot 38 and includes a long pin or rivet 41 extending freely through the arcuate slots 42 in the side-portions 33 of the frame 26 and riveted in the holes 43 of the ears 37, and includes a tubular-member or roller 44 freely rotatable on the pin 41 and having reduced end-portions 45 which slide in the arcuate slots 42. The large-diametered portion of the roller or tube 44 is held spaced from the side-portions 33 and prevented from moving

into the enlarged assembly slot-ends 46 by the spacer-washers 47.

The side-portions 33 have pressed-in detent-depressions 48 adapted to be yieldingly engaged by detent-projections 49 formed by pressed-out portions of the ears 37.

The strap-member 21 has a loop or eye 50 formed at one end in any suitable way as, for example, by stitching, to anchor the strap-member 21 to the locking-bar 28. The end-portion 51 of the strap-member 22 is preferably made stiff and straight in any suitable way as, for example, by impregnating the strap with suitable stiffening and hardening material, thus providing a stiffened end 51 of suitable length which can be readily inserted in a straight line through the frame 26 between the locking-bar 28 and the bar-edges 31, 32 when the buckle is in the open position shown in Fig. 7.

After the strap-member 22 is inserted through the buckle 23 as far as desired to accomplish the proper adjustment of the belt, the locking-lever 27 is swung from the position shown in Fig. 7 toward the left to the position shown in Fig. 6, thus swinging the eccentric locking-bar 28 about the pivot 36 and moving the said locking-bar 28 in an arcuate path from its position shown in Fig. 7 below the general plane of the bar-edges 31, 32, upward toward and past the general plane of the bar-edges and also in a general horizontal direction toward the bar-edge 31 and away from the bar-edge 32, to thus engage the overlapping portions of the strap-members 21 and 22 between the bar-edge 31 and the locking-bar 28 with the strap-member 22 also extending under the bar-edge 32, to thus firmly secure the strap-members 21 and 22 against slippage relative to one another. In this closing movement of the locking-lever 27, the locking-bar 28 moves until it engages against the extreme upper forward ends of the arcuate slots 42, at which time the detents 48 and 49 interengage to firmly but yieldingly hold the lever 27 in its locked position. It will be noted that the thickness of the strap-members 21 and 22 (Fig. 6) is less than the distance between the bar-edge 31 and the locking-bar 28. Thus the locking action of these parts is due to snubbing action on the strap-member 22 and not to any pinching or squeezing of the strap-members between parts 31 and 28, and therefore substantial variations in thickness of the strap-members does not interfere with the locking action.

To release or unlock the buckle, it is merely necessary to lift the end of the lever 27 from its position shown in Fig. 6 and move it toward the position shown in Fig. 7, which results in the locking-bar 28 being swung down along the arcuate slots to its position shown in Fig. 7, to thus freely release the end of the strap-member 22.

In order to give the parts a toggle or self-locking action, the axis of the locking-bar 28 when in locked position, is located a suitable distance to the left (Fig. 6) of the vertical plane through the axis of the pivot 36 of the locking-lever 27, which vertical plane is at right angles to the general plane of the bar-edges 31, 32, thus resulting in pull on the strap-members 21 and 22 acting downward to hold the locking-lever closed. But inasmuch as it is only necessary that the angle between a vertical plane through the axis of the pivot 36, and a plane through the axes of the pivot 36 and locking-bar 28, be about five degrees, the ample leverage given by the locking-and-release lever 27 enables the lever to be quickly unlocked or released, even when the strap-members are under considerable stress.

In the modified form of the invention illustrated in Figs. 12, 13 and 14, most of the parts are essentially the same and bear the same reference numerals as previously described concerning Figs. 1 to 11, except as will be presently described. Instead of anchoring the loop of strap-portion 21 to the locking-bar 28, a suitably different loop 52 is anchored to an anchor-bar 53 which is secured to the side portions 33 of the modified form of buckle 54, a part of the strap-portion 21 passing over the locking-bar 28 to be locked with a part of the strap-portion 22 similar to the way described concerning the construction illustrated in Figs. 1 to 11.

In the modified form of the invention illustrated in Figs. 15 and 16, the buckle 54 is essentially the same as the buckle illustrated in Figs. 12, 13 and 14, but a different form of loop 55 is provided on an end of the strap-portion 21 to loop around both the locking-bar 28 and the anchor-bar 53, a part of the loop 55 being adapted to be locked with a part of the strap-portion 22 similar to the way described concerning the previously described figures of the drawings.

If desired, the adjacent ends of strap-portions 21 and 22 could be locked together in any of the buckles shown in the drawings without using any loop anchored to the buckle.

Where the buckle is used in connection with a seat-belt in an airplane or other vehicle, the bottom-plate serves as a smooth support of ample area to avoid discomfort or injury to a person or his clothing.

In order to make the buckle light in weight, at least the frame and locking-lever are preferably made of strong light metal, such, for example, as "Duralumin."

The invention may be carried out in other specific ways than those herein set forth without departing from the spirit and essential characteristics of the invention, and the present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive, and all changes coming within the meaning and equivalency range of the appended claims are intended to be embraced therein.

I claim:

1. A buckle comprising: a frame having approximately parallel spaced-apart bar-edges; a locking-bar located at one side of, and approximately parallel to, the general plane of said bar-edges when in unlocked position, and mounted for movement into the space between said bar-edges and toward and from said plane while remaining approximately parallel therewith; and means associated with said frame and adapted to actuate said locking-bar.

2. A buckle comprising: a frame having approximately parallel spaced-apart bar-edges; a locking-bar located at one side of, and approximately parallel to, the general plane of said bar-edges when in unlocked position, and mounted for movement into the space between said bar-edges and toward and past and back from said plane while remaining approximately parallel therewith; and means associated with said frame and adapted to actuate said locking-bar.

3. A buckle comprising: a frame having approximately parallel spaced-apart bar-edges; a locking-bar located at one side of, and approximately parallel to, the general plane of said bar-

edges when in unlocked position, and mounted for movement into the space between said bar-edges and toward and from said plane while remaining approximately parallel therewith; and a locking-lever associated with said frame and adapted to actuate said locking-bar.

4. A buckle comprising: a frame having spaced-apart bar-edges and spaced-apart side-portions; a locking-lever having ears connected to said side-portions; and a locking-bar located at one side of the general plane of said bar-edges when in unlocked position, and actuated by said ears of said locking-lever to move into the space between said bar-edges and toward and from said plane.

5. A buckle comprising: a frame having spaced-apart bar-edges and spaced-apart side-portions; a locking-lever having ears connected to said side-portions; and a locking-bar located at one side of the general plane of said bar-edges when in unlocked position, and actuated by said ears of said locking-lever to move into the space between said bar-edges and toward and past and back from said plane.

6. A buckle comprising: a frame having spaced-apart bar-edges and spaced-apart side-portions; a locking-lever having ears pivoted to said side-portions; and a locking-bar located at one side of the general plane of said bar-edges when in unlocked position, and actuated by said ears of said locking-lever to move into the space between said bar-edges and toward and from said plane.

7. A buckle comprising: a frame having spaced-apart bar-edges and spaced-apart side-portions; a locking-lever having ears pivoted to said side-portions; and a locking-bar located at one side of the general plane of said bar-edges when in unlocked position, and carried by said ears to move into the space between said bar-edges and toward and from said plane.

8. A buckle comprising: a frame having spaced-apart bar-edges and spaced-apart side-portions; a locking-lever having ears pivoted to said side-portions; and a locking-bar located at one side of the general plane of said bar-edges when in unlocked position, and carried by said ears to move into the space between said bar-edges and toward and past and back from said plane.

9. A buckle comprising: a frame having spaced-apart bar-edges and spaced-apart side-portions; a locking-lever having ears pivoted to said side-portions; and a locking-bar located at one side of the general plane of said bar-edges when in unlocked position, and carried by said ears to move into the space between said bar-edges and toward and from said plane; the axis of said locking-bar when in locked position, lying between two parallel planes, one through the axis of the pivot of said locking-lever and at right angles to the general plane of said bar-edges, and the other through the bar-edge nearest said locking-bar.

10. A buckle comprising: a frame having spaced-apart bar-edges and spaced-apart side-portions; a locking-lever having ears connected to said side-portions; and a locking-bar located at one side of the general plane of said bar-edges a sufficient distance away from said bar-edges to permit a strap-end used with the buckle to be passed in a straight line between said bar-edges and locking-bar when in unlocked position, and actuated by said ears of said locking-lever to move into the space between said bar-edges and toward and from said plane.

11. A buckle comprising: a frame having spaced-apart bar-edges and spaced-apart side-portions; a locking-lever having ears pivoted to said side-portions; and a locking-bar located at one side of the general plane of said bar-edges a sufficient distance away from said bar-edges to permit a strap-end used with the buckle to be passed in a straight line between said bar-edges and locking-bar when in unlocked position, and carried by said ears to move into the space between said bar-edges and toward and from said plane.

12. A buckle comprising: a frame having spaced-apart bar-edges, spaced-apart side-portions and a bottom-plate; a locking-lever having ears connected to said side-portions; and a locking-bar located intermediate said bottom-plate and the general plane of said bar-edges when in unlocked position, and actuated by said ears to move into the space between said bar-edges and toward and from said plane.

13. A buckle comprising: a frame having approximately parallel spaced-apart bar-edges; and a locking-bar located at one side of, and approximately parallel to, the general plane of said bar-edges when in unlocked position, and mounted for movement into the space between said bar-edges and toward and from said plane while remaining approximately parallel therewith; said buckle having means designed and adapted to have a looped end of a strap anchored thereto; and means associated with said frame and adapted to actuate said locking-bar.

14. A buckle comprising: a frame having approximately parallel spaced-apart bar-edges; and a locking-bar located at one side of, and approximately parallel to, the general plane of said bar-edges when in unlocked position, and mounted for movement into the space between said bar-edges and toward and from said plane while remaining approximately parallel therewith; said locking-bar being designed and adapted to have a looped end of a strap anchored thereto.

15. A buckle comprising: a frame having approximately parallel spaced-apart bar-edges; a locking-bar located at one side of, and approximately parallel to, the general plane of said bar-edges when in unlocked position, and mounted for movement into the space between said bar-edges and toward and from said plane while remaining approximately parallel therewith; and an anchor-bar secured to said frame and designed and adapted to have a looped end of a strap anchored thereto.

16. A buckle comprising: a frame having approximately parallel spaced-apart bar-edges; a locking-bar located at one side of, and approximately parallel to, the general plane of said bar-edges when in unlocked position, and mounted for movement into the space between said bar-edges and toward and from said plane while remaining approximately parallel therewith; and an anchor-bar secured to said frame; said anchor-bar and said locking-bar being designed and adapted to have a looped end of a strap anchored thereto.

RAYMOND E. DOWD.