

March 27, 1945.

R. E. DOWD

2,372,557

QUICK-RELEASE HARNESS CONSTRUCTION

Filed March 18, 1942

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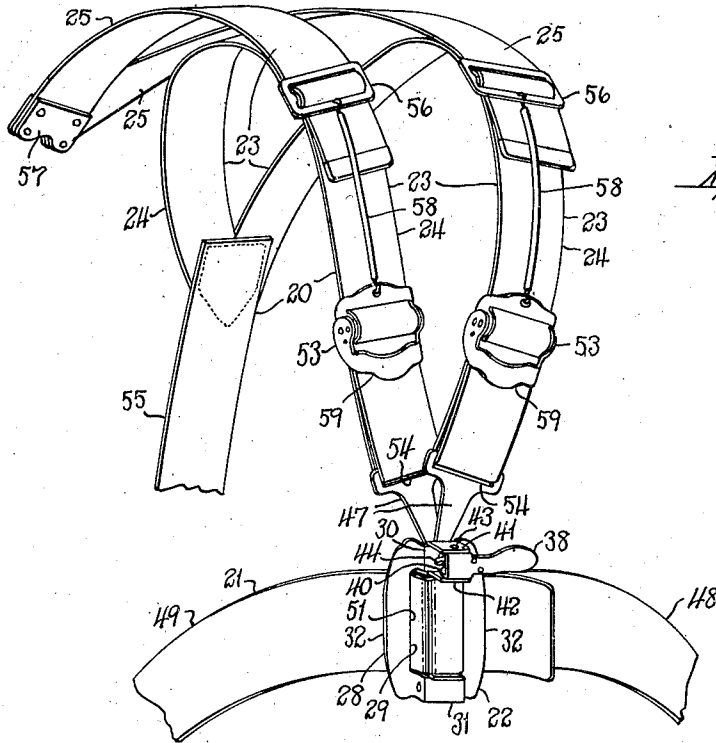


Fig. 1.

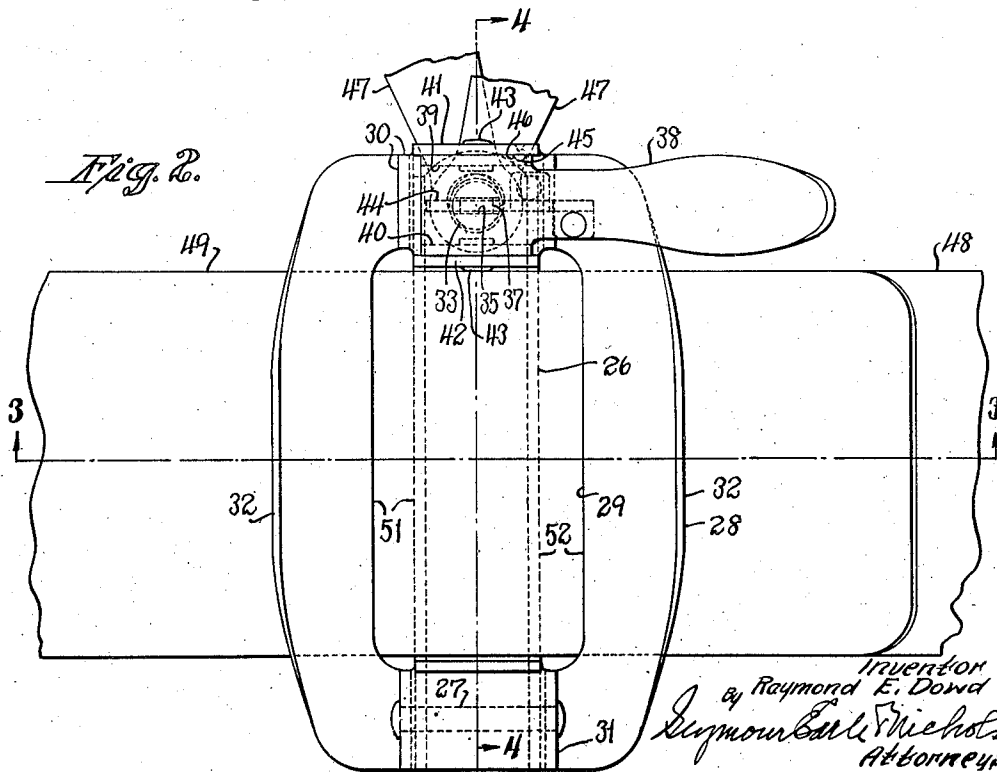


Fig. 2.

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Fig. 3.

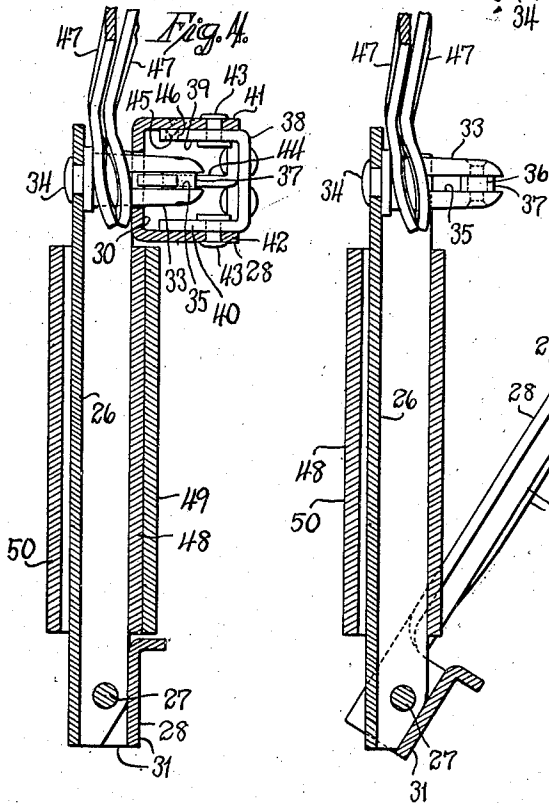
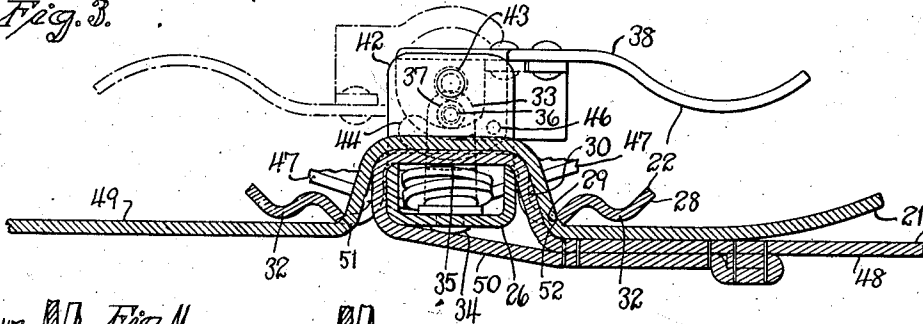


Fig. 5.

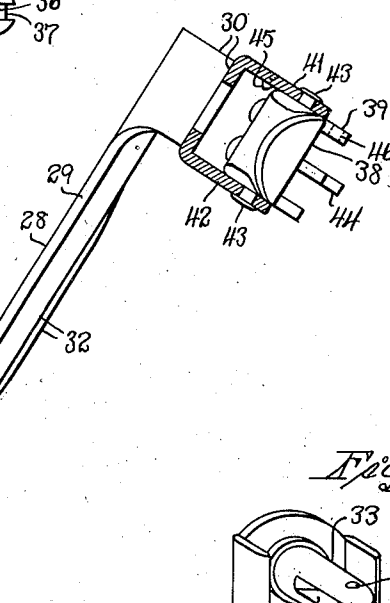


Fig. 6.

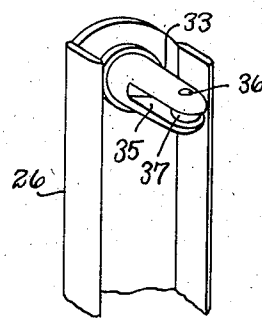
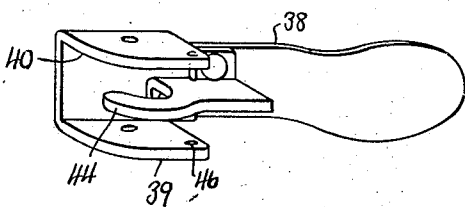


Fig. 7.



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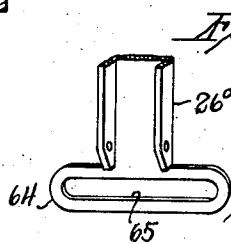
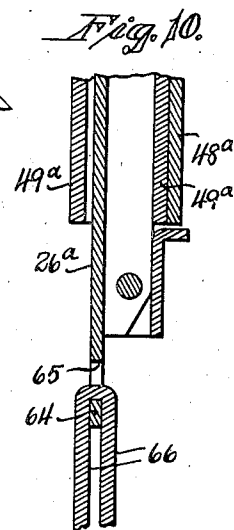
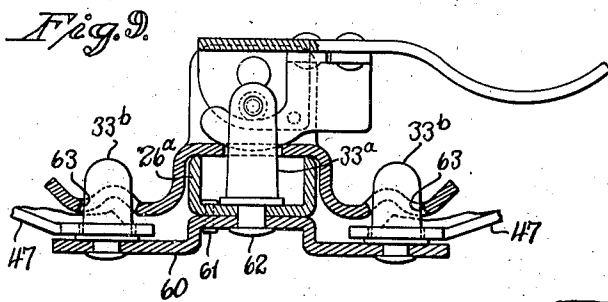
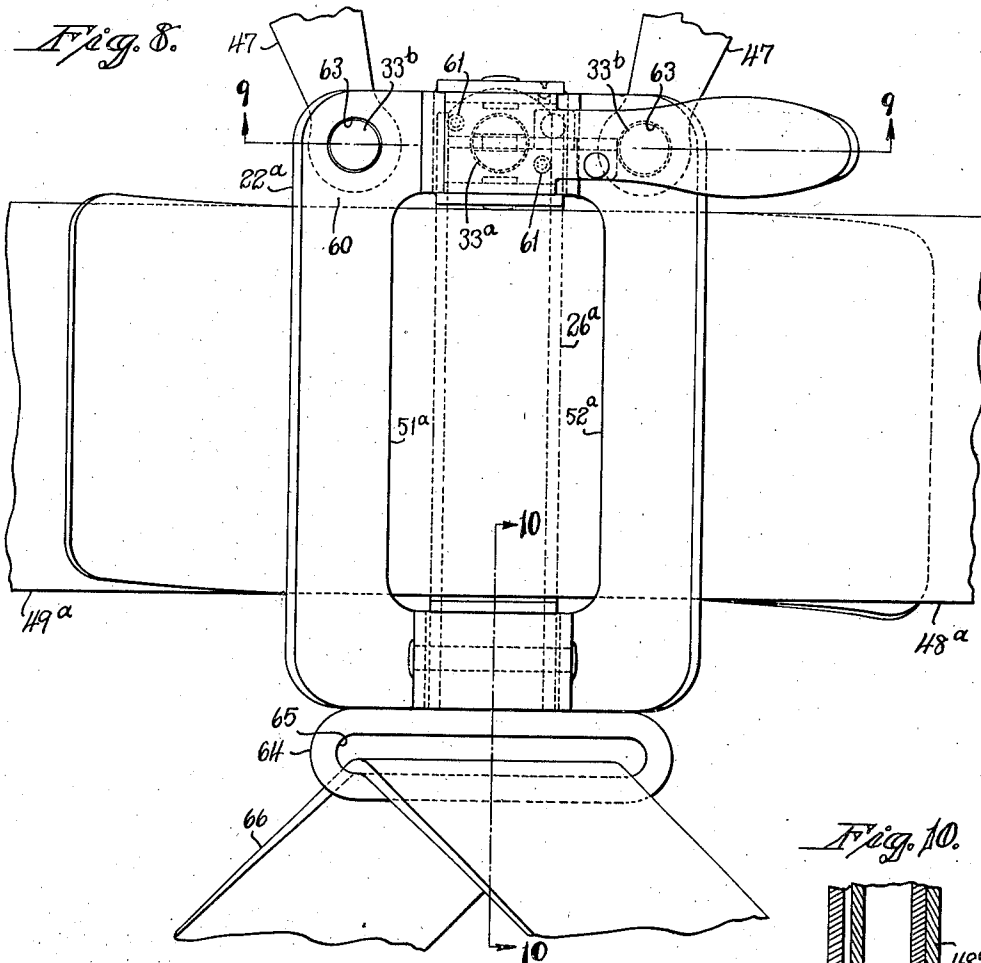
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QUICK-RELEASE HARNESS CONSTRUCTION

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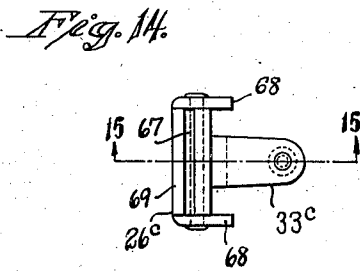
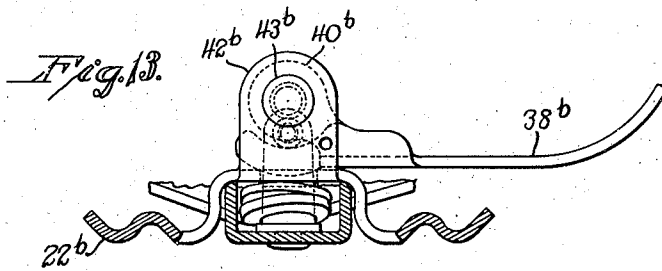
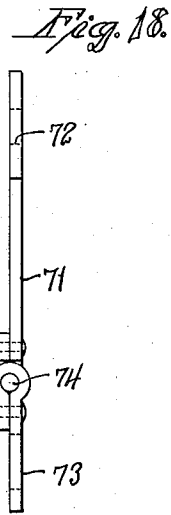
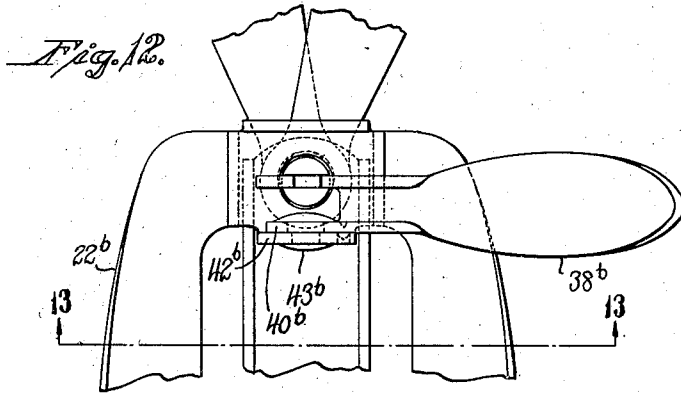
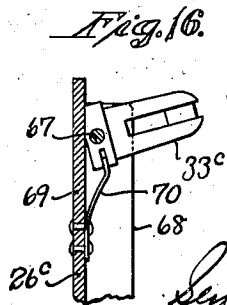
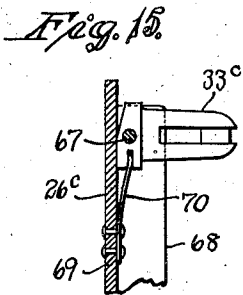
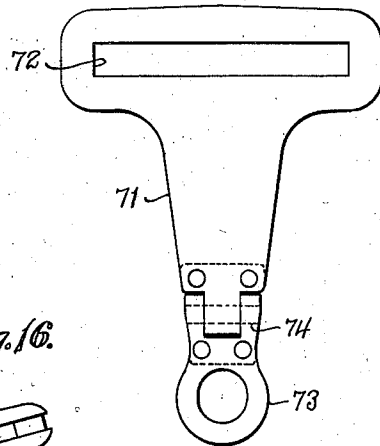


Fig. 17.



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UNITED STATES PATENT OFFICE

2,372,557

QUICK-RELEASE HARNESS CONSTRUCTION

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Application March 18, 1942, Serial No. 435,137

7 Claims. (Cl. 244-151)

This invention relates to improvements in quick-release harness constructions.

One object of this invention is to provide an improved quick-release harness construction for acrobatic flying safety harnesses.

Another object of this invention is to provide an improved quick-release harness construction characterized by simplicity and an obvious mode of operation for application, adjustment and release of the harness.

Another object of this invention is to provide an improved quick-release harness construction which can be quickly released by a single movement of a lever of the main- or waist-buckle of the harness with consequent immediate disconnection or release of the main and auxiliary straps or the like that may form part of the harness.

Another object of this invention is to provide an improved quick-release harness construction including waist- and shoulder-strap members in which shoulder-buckles are employed in conjunction with elastic retrieving-means so that by release of the shoulder-buckles, the person in the harness can temporarily lean forward to accomplish any desired purpose, and when he again returns to his normal upright position, the elastic means retrieves the shoulder-buckles to proper position, whereupon they can be relocked to restore the shoulder-straps to their rigid, unyielding holding condition.

Another object of this invention is to provide an improved quick-release main- or waist-buckle forming part of the foregoing improved quick-release harness construction.

Another object of this invention is to provide an improved quick-release buckle formed of simple elements, readily manufactured and readily assembled to produce an efficient, 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 certain ways of carrying out the invention are shown for illustrative purposes:

Fig. 1 is a perspective view of a quick-release harness construction made in accordance with the present invention;

Fig. 2 is a front elevation of the main- or waist-buckle shown in Fig. 1, together with fragmental portions of the harness;

Fig. 3 is a sectional view taken on the line 3-3 of Fig. 2;

Fig. 4 is a sectional view taken on line 4-4 of Fig. 2;

Fig. 5 is a sectional view similar to Fig. 4 but with the parts in unlocked, open position;

Fig. 6 is a perspective view of the locking-lever of the main buckle;

Fig. 7 is a perspective view of a fragment of the tongue or bar with the locking-stud of the main-buckle;

Fig. 8 is a front elevation similar to Fig. 2 of a modified form of main-buckle construction;

Fig. 9 is a sectional view on line 9-9 of Fig. 8;

Fig. 10 is a sectional view on line 10-10 of Fig. 8;

Fig. 11 is a perspective view of the lower end portion of the tongue shown in Figs. 8, 9 and 10;

Fig. 12 is a fragmental front elevation similar to Fig. 2 of another modified construction differing principally from the corresponding construction shown in Fig. 2 by having a different form of locking-lever;

Fig. 13 is a sectional view on line 13-13 of Fig. 12;

Fig. 14 is a top plan view of a modified tongue-member having a pivoted locking-stud;

Fig. 15 is a sectional view on line 15-15 of Fig. 14;

Fig. 16 is a view similar to Fig. 15 with the locking-stud swung up about its pivot to illustrate its limited pivotal movement;

Fig. 17 is a front elevation of a modified form of auxiliary-strap terminal for connecting an auxiliary- or shoulder-strap to the main- or waist-buckle; and

Fig. 18 is a side elevation of Fig. 17.

In the description and claims, the various parts are identified by specific names for convenience, but they are intended to be as generic in their application as the prior art will permit.

In carrying out the invention in the form illustrated in Figs. 1 to 7 of the drawings, a quick-release acrobatic flying safety harness 20 includes main- or waist-strap means 21 with a main- or waist-buckle 22 and auxiliary- or shoulder-strap means 23 which includes two shoulder-straps 24 and two rear anchor-straps 25.

The main- or waist-buckle 22 includes a channel or U-shaped tongue or bar 26 pivoted at 27 to an elongated frame 28 having an elongated opening 29. The frame 28 has upper and lower U-shaped portions 30 and 31 at its opposite ends with their openings directed oppositely to the opening of the tongue 26. The opposite sides 32

of the frame 28 are of fluted form, as shown, to increase the rigidity of the frame. A locking-stud 33 is riveted at 34 to the tongue 26 and is provided with a slot 35 across which extends a rivet or pin 36 on which may be rotatably mounted an antifriction roller 37. A locking-lever 38 has its ears 39 and 40 respectively pivoted to the ears 41 and 42 of the frame 28 by means of rivets or pins 43. The locking-lever 38 has a locking-finger 44 adapted to pass through the slot 35 and have locking engagement with the roller 37 when the locking-lever is swung to the locked position shown in Figs. 3 and 4, in which position the detent-projection 45 of the ear 41 is adapted to yieldingly engage in the detent-opening 46 of the ear 39 to yieldingly hold the locking-lever 38 in its locked position.

Although the rounded end of the locking-finger 44 of the main-buckle 22 can have a camming action on the roller 37 when the locking-lever 38 is being swung to locked position, the shape and position of the locking parts is such that any stress which occurs in use which tends to swing the frame to open position, is effectively resisted by the pressure of the roller 37 against the concaved surface of the locking-finger 44.

The locking-stud 33 is of sufficient length to have room near its base to freely receive and anchor eye-terminals 47 of the auxiliary- or shoulder-straps 23 without interfering with the frame 28 being swung from its unlocked position of Fig. 5 to its closed or locked position shown in Fig. 4.

The main- or waist-strap means 21 comprises two strap-portions 48 and 49. The strap-portion 48 has one of its ends looped at 50 around the tongue or bar 26 (Fig. 3). The other end of the strap-portion 48 may extend downwardly and be anchored to any suitable location as is usual in the case of flying harnesses. The strap-portion 49 is passed up through the strap-passage 51 over the top of the tongue 26 and then downwardly through the strap-passage 52, the left end of the strap-portion 49 being suitably anchored similar to the way described concerning strap-portion 48. It will be appreciated, however, that for some purposes the strap-portions 48 and 49 may, for example, form part of one strap which extends continuously around a person's waist in the usual manner of a waist belt.

Both of the shoulder-straps 24 can be identical and therefore it will only be necessary to describe one of them. Each shoulder-strap 24 has a lever-release buckle 53 of the form shown in Patent No. 2,191,228, granted to Dowd, one end of a strap 24 being secured to the buckle and then passing upwardly through the slot 54 of the eye-terminal 47 and then along through the buckle 53 and upwardly and over the shoulder and downwardly to where it joins with the other strap-portion 24 to a common strap-portion 55 which may be anchored at any downward location, as is usual and well known.

Mounted upon each shoulder-strap 24 is a three-bar or double-slot buckle 56 through which also extends over the top of the strap 24, one of the rear anchor-straps 25 which extends back rearwardly where it joins the other corresponding rear anchor-strap 25 in an anchor-member 57 which may be anchored in any suitable location rearward of the shoulders of the person who is to wear the harness.

In the form of the invention illustrated in Fig. 1, the strap-portions 48 and 49 may extend downwardly across the portions of the thighs adjacent

the trunk of a person, thus aiding in preventing a sudden forward thrust of the lower portion of the body or a sudden upward movement of the thighs or lower portion of the trunk during sudden movements of an airplane, for example, in which the apparatus may be used. The strap-portion 55 of the shoulder-strap means prevents upward movement of the body of the person by holding the shoulders down. The rear anchor-portion 57 of the shoulder-strap means prevents forward movement of the shoulders or upper portion of the trunk. There are times, however, when it is desirable that the aviator or other person wearing the harness shall be free to lean forward for special purposes such, for example, as adjusting an instrument. In order to accomplish this, an elastic-member 58 is interconnected between each two buckles 53, 56. Normally, these elastic-members which may be of elastic rubber or other suitable spring-like means, perform no function since the two buckles 53 and 56 are locked on the shoulder-straps 24 as shown in Fig. 1. But when the person wearing the harness desires to free himself to move forward, he throws up the release-levers 59 of the shoulder-strap release-buckles 53 and moves forward, with the consequence that the strain on the shoulder-straps 24 causes the buckles 53 to be pulled downward on the straps 24 against the elastic action of the elastic-members 58. As the person moves back to normal upright position, the elastic-members 58 pull the buckles 53 back upwardly to their original positions, whereupon the locking-levers 59 of the buckles 53 are swung to the locking position shown in Fig. 1, by the person wearing the harness.

Should any emergency arise in which the person wearing the harness desires to release himself quickly, he merely grasps the lever 38 of the waist-buckle 22 and throws the lever 38 from its position illustrated in Figs. 1 and 3 over to the broken line position shown in Fig. 3, whereupon the locking-finger 44 passes out of the locking-slot 35 of the locking-stud 33, and the strap-portion 49 and the eye-connectors or terminals 47, inasmuch as they are normally exerting stress against the frame 26, cause the latter to be swung outward to some position such as illustrated in Fig. 5, thus releasing the strap-portion 49 and permitting the eye-terminals 47 of the shoulder-straps to be pulled off or to move off the end of the stud 33, thus freeing the person from the harness.

In the form of the invention illustrated in Figs. 8 to 11, a modified form of buckle 22a is the same as the form of buckle 22 illustrated in Figs. 1 to 7 except that instead of relying upon the locking-stud 33a for attaching the shoulder-strap eye-terminals 47, two special anchor-pins 33b are provided on a bar 60 which is attached to the tongue 26a by the rivets 61 and the riveted end 62 of the stud 33a. The anchor-pins 33b extend through holes 63 in the frame 28a. Another feature of the buckle 22a resides in having strap-anchor means formed as an extension 64 at the pivot end of the tongue 26a and provided with a slot 65 to slidingly receive auxiliary-strap means 66 which may, for example, extend down between the person's legs and be anchored suitably at oppositely-spaced locations beneath the legs.

Although the form of strap or strap-portions illustrated in connection with the construction shown in Figs. 1 to 7 could be equally well employed in the construction illustrated in Figs. 8 to 11, a different form of strap construction has

been illustrated to illustrate another mode of use, namely, having two free-end strap-portions 48a and 49a passed oppositely through the strap-passages 51a and 52a between the tongue 28a and the frame 28a, the anchoring action being in the nature of a snubbing action on both strap-portions 48a and 49a. While the preferable way of securing free-end waist-strap portions in the main- or waist-buckle is to pass them through the strap-passages at opposite sides of the buckle-tongue while the buckle is in closed condition, the free-end strap-portions can be passed across the space (Fig. 5) between the buckle-frame and tongue before the frame is swung to closed position. The release of the buckle 22a is accomplished by throwing the lever 38a about its pivot in the same manner as described concerning the form of the invention illustrated in Figs. 1 to 7, whereupon the strap-portions 48a, 49a and the shoulder-strap terminals 47 will be promptly released from their connection with the buckle 22a, the lower strap 66 remaining connected with the buckle 22a by means of the slot-connection 65.

A still further modified form of buckle construction is illustrated in Figs. 12 and 13 in which a buckle-frame 22b has a locking-lever 38b having an ear 40b pivoted at 43b to an ear 42b on the frame 28b, the mode of locking and securing strap-elements or portions being the same as described concerning the construction illustrated in Figs. 1 to 7.

Figs. 14 to 16 illustrate a modified form of locking-stud 33c which, instead of being rigidly connected to the tongue 26c, is pivoted thereto by a pivot-pin 67 riveted in the side walls 68 of the channel-shaped tongue 26c to facilitate the automatic removal of the shoulder-strap terminals 47 off of the holding-pin or pins by the terminals pulling the stud 33c upward to a slight angle, as illustrated in Fig. 16, thereby facilitating the sliding off of the eye-terminals 47 of the shoulder-straps. The stud 33c is shown in the drawings as being returned to its normal position at right angles to the bottom wall 69 of the tongue 26c by means of a leaf-spring 70 riveted to the bottom wall 69 of the tongue 26c, although it will be appreciated that this return to position could be accomplished in any suitable way, as for example, by gravity acting on the stud 33c. This form of tiltable stud 33c could be employed in the place of any of the studs heretofore illustrated on which it may be desired to anchor shoulder-strap eye-terminals or the like.

Instead of having the shoulder-strap eye-terminals each made of a single integral piece of metal, as shown in Figs. 4 and 5, such terminals may consist of a main body-member 71 (Figs. 17 and 18) provided with a strap-slot 72 and having an anchor eye-portion 73 hinged at 74, which thus makes it unnecessary to provide any angular relationship between the anchoring eye-portion and the main body-portion.

It will be appreciated that any of the quick-release buckles hereinbefore illustrated, can be used with a belt without employing any shoulder-straps or other auxiliary-strap means, if so desired.

It will be appreciated that the hereinbefore described buckles and harness can be used by observers and gunners and other on planes as well as by aviators, and also can be used elsewhere as, for example, in armored military equipment and so forth, and can also be used for holding emergency equipment such as holding life rafts in

place aboard ship or planes or holding freight on planes.

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 quick-release harness construction comprising: a buckle including a tongue, a frame having one end pivoted to one end of said tongue and having an opening, and being adapted to be swung to and from a closed position in which said tongue extends across said opening and in spaced relation to the sides of said frame at opposite sides of said tongue to provide strap-passages between said tongue and sides, said frame and tongue having cooperating engaging-means adapted to detachably hold auxiliary strap-means when said frame is in closed position; strap-means including a first main strap-portion constructed and arranged to be attached to said tongue and have a portion extend through one of said strap-passages and past one of said sides, and a second main strap-portion constructed and arranged to have a portion extend past said one side between said one side and said first main strap-portion and through said one strap-passage and over said tongue and through the other of said strap-passages, such that when said two main strap-portions are pulled in opposite directions, said first main strap-portion presses said second main strap-portion against said one side, and at least one of which main strap-portions is releasable when said frame is swung away from said closed position, said strap-means also including auxiliary strap-means adapted to be held by said engaging-means when said frame is in closed position, and releasable when said frame is swung away from said closed position; and releasable locking-means adapted to lock said frame and tongue in said closed position.

2. A quick-release harness construction comprising: a buckle including a tongue, a frame having one end pivoted to one end of said tongue and having an opening, and being adapted to be swung to and from a closed position in which said tongue extends across said opening and in spaced relation to the sides of said frame at opposite sides of said tongue to provide strap-passages between said tongue and sides, said frame and tongue having cooperating pin-and-hole engaging-means adapted to detachably hold auxiliary strap-means when said frame is in closed position; strap-means including a first main strap-portion constructed and arranged to be attached to said tongue and have a portion extend through one of said strap-passages and past one of said sides, and a second main strap-portion constructed and arranged to have a portion extend past said one side between said one side and said first main strap-portion and through said one strap-passage and over said tongue and through the other of said strap-passages, such that when said two main strap-portions are pulled in opposite directions, said first main strap-portion presses said second main strap-portion against said one side, and at least one of which main strap-portions is releasable when said frame is swung away from said closed position, said strap-means also including auxiliary strap-means

adapted to be held by said pin-and-hole engaging-means when said frame is in closed position, and releasable when said frame is swung away from said closed position; and releasable locking-means adapted to lock said frame and tongue in said closed position.

3. A quick-release harness construction comprising: a buckle including a tongue, a frame having one end pivoted to one end of said tongue and having an opening, and being adapted to be swung to and from a closed position in which said tongue extends across said opening and in spaced relation to the sides of said frame at opposite sides of said tongue to provide strap-passages between said tongue and sides, said frame and tongue having cooperating engaging-means adapted to detachably hold auxiliary strap-means when said frame is in closed position; strap-anchor means at the pivot end of said buckle; strap-means including a first main strap-portion constructed and arranged to be attached to said tongue and have a portion extend through one of said strap-passages and past one of said sides, and a second main strap-portion constructed and arranged to have a portion extend past said one side between said one side and said first main strap-portion and through said one strap-passage and over said tongue and through the other of said strap-passages, such that when said two main strap-portions are pulled in opposite directions, said first main strap-portion presses said second main strap-portion against said one side, and at least one of which main strap-portions is releasable when said frame is swung away from said closed position, said strap-means also including auxiliary strap-means adapted to be held by said engaging-means when said frame is in closed position, and releasable when said frame is swung away from said closed position, and said strap-means also including other auxiliary strap-means adapted to be held by said strap-anchor means; and releasable locking-means adapted to lock said frame and tongue in said closed position.

4. A quick-release harness construction comprising: strap-means including waist-strap means and a number of shoulder-straps; a waist-buckle for said waist-strap means; a shoulder-buckle attached to one end of each said shoulder-strap and releasably securable at various positions along such shoulder-strap to provide a loop of adjustable length attachable to said waist-buckle; and elongated elastic means having one end attached to said shoulder-buckle and the opposite end attached to said shoulder-strap to permit said shoulder-buckle when in released condition, to be slid along said shoulder-strap and elongate said

elastic means, said elongated elastic means being adapted to retrieve said shoulder-buckle.

5. A quick-release harness construction comprising: strap-means including waist-strap means and a number of shoulder-straps; a waist-buckle for said waist-strap means; a shoulder-buckle attached to one end of each said shoulder-strap and releasably securable at various positions along such shoulder-strap to provide a loop of adjustable length attachable to said waist-buckle; and elongated elastic means having one end attached to said shoulder-buckle and the opposite end attached to said shoulder-strap to permit said shoulder-buckle when in released condition, to be slid along said shoulder-strap and elongate said elastic means, said elongated elastic means being adapted to retrieve said shoulder-buckle, said shoulder-buckle being located below the said place of attachment of said elastic means to said shoulder-strap.

6. A quick-release buckle comprising: a tongue; a frame having one end pivoted to one end of said tongue and having an opening, and being adapted to be swung to and from a closed position in which said tongue extends across said opening and in spaced relation to the sides of said frame at opposite sides of said tongue to provide strap-passages between said tongue and sides; and releasable locking-means adapted to lock said frame and tongue in said closed position; said locking-means including a locking-lever pivotally mounted on the end of said frame opposite the said pivoted end of said frame and at the face of said frame which is most distant from said tongue when said frame is in open position, the axis of the pivot of said lever being approximately parallel to the general longitudinal axis of said tongue when said tongue and frame are in closed position.

7. A quick-release buckle comprising: a tongue; a frame having one end pivoted to one end of said tongue and having an opening, and being adapted to be swung to and from a closed position in which said tongue extends across said opening and in spaced relation to the sides of said frame at opposite sides of said tongue to provide strap-passages between said tongue and sides; and releasable locking-means adapted to lock said frame and tongue in said closed position; said locking-means including cooperating pin-and-hole engaging-parts, one part on the tongue and the other part on the frame, and a locking-device adapted to releasably engage said pin, said pin being directly pivotally mounted to have limited swinging movement.

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