March 10, 1942. F. G. MANSON 2,275,450

SAFETY BELT

Filed June 25, 1940 2 Sheets-Sheet 1

Fig. 1.

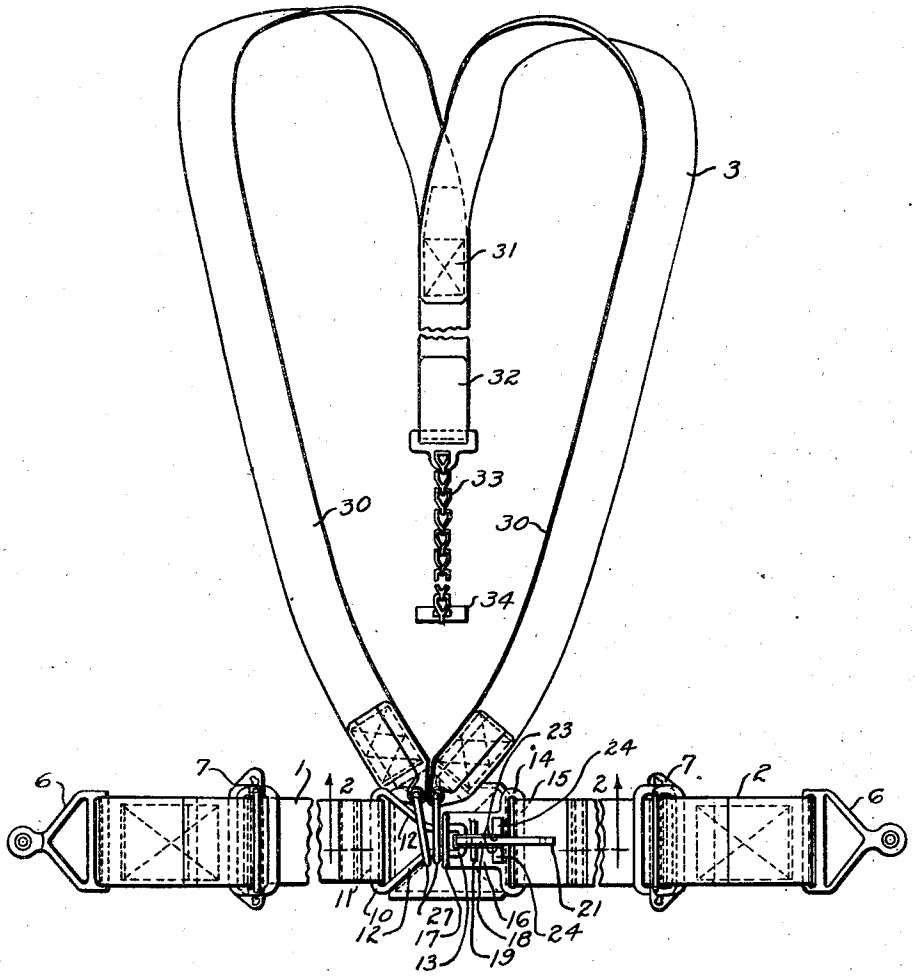
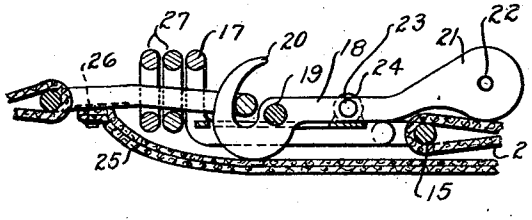


Fig. 2.



INVENTOR
FRANK G. MANSON
By Clyde W. Hodgson and Charles Kent
ATTORNEYS

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Fig. 5.

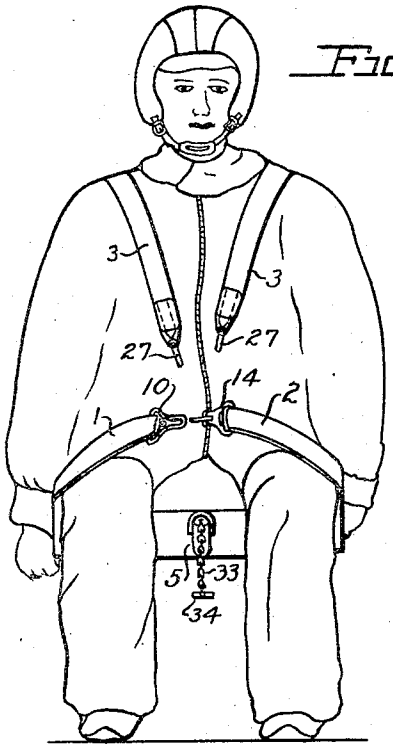


Fig. 3.

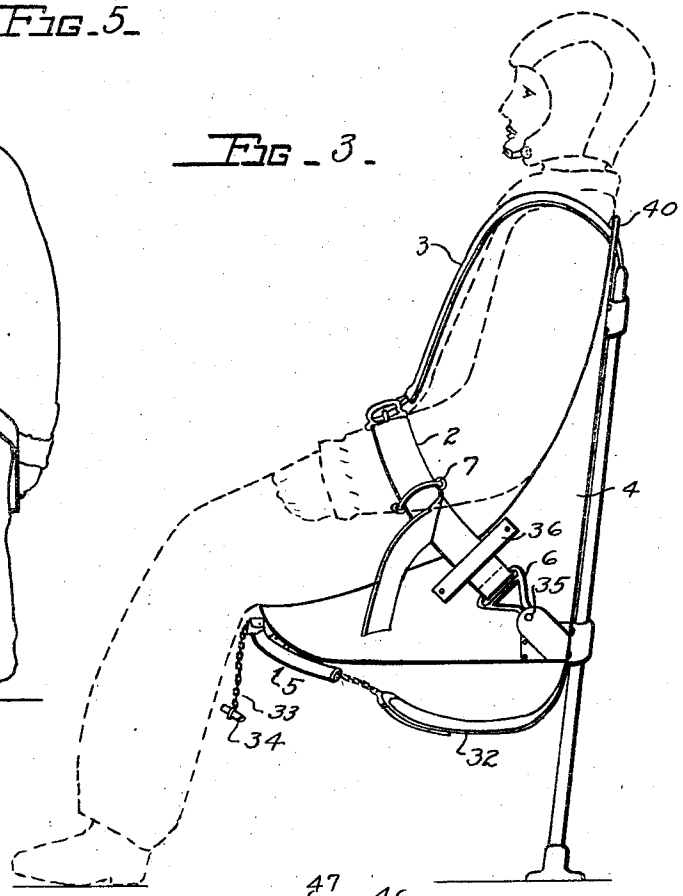
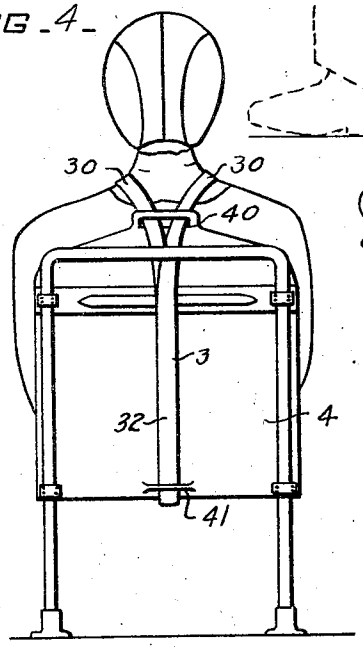


Fig. 4.



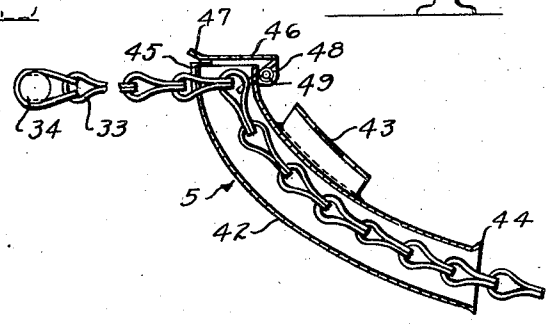


Fig. 6.

INVENTOR
FRANK G. MANSON
BY Edgar H. Snodgrass and Wade Kenney
ATTORNEYS

Patented Mar. 10, 1942 2,275,450

UNITED STATES PATENT OFFICE

2,275,450

SAFETY BELT

Frank G. Manson, Dayton, Ohio

Application June 25, 1940, Serial No. 342,312

10 Claims. (Cl. 244—122)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

The present invention relates to safety belts for use in airplanes and the like, and has particular reference to safety belts of the type including both a lap belt and shoulder straps secured together by a single quick release fastening means.

The general object of the invention is to provide an improved safety belt which will reduce the forward movement of the head and upper portion of the body of the wearer, so as to reduce the likelihood of head injuries in aircraft accidents.

A further object of the invention is to provide a combination lap and shoulder belt secured together by an improved quick release fastening means in a conventional position in front of the wearer.

A further object is to provide an improved securing and adjusting means for a safety belt strap, which may be operated quickly and conveniently without careful attention on the part of the user.

While it is recognized as highly desirable to provide a safety belt for airplanes and the like to reduce head injuries, yet there still exists a need for a safety belt which will accomplish this purpose without being cumbersome, difficult of adjustment, and slow and impositive in the release action in freeing the user in time of emergency. In present day airplanes, the pilots and others having functions to perform incident to the operation of the airplane are so completely occupied by the complex duties of their functions that they should not be required to give conscious thought to effect the proper adjustment of the safety belt. It is highly desirable that the initial adjustment, as well as subsequent adjustments, necessitated by body movements in flight, be accomplished without attention to a plurality of separate adjusting devices which are slow and difficult to operate. It is accordingly desirable that the tension of the shoulder straps may be instantly released to allow a momentary freedom of movement of the wearer, and quickly readjusted, by a single means capable of easy manipulation, even though the wearer's hands may be encased in heavy gloves or mittens which would prevent the easy manipulation of small levers, buttons or known belt adjustment devices.

It is further desirable that the quick release device, for entirely freeing the user from the safety belt, be located in a conventional position and be operated in a conventional manner to which experienced pilots have long become accustomed. It is still further desirable that the safety belt be independent of the parachute harness or other equipment worn by the user, and that the safety belt be self contained with the chair or seat, and remain with the chair or seat, both when the user is secured in the chair and after the user has left the chair.

The above objects and desirable features are attained in the present invention in the novel structure herein shown and described, wherein, for the purpose of illustration, is shown only a preferred embodiment.

In the drawings:

Figure 1 is a view showing the safety belt of the present invention detached from the chair;

Figure 2 is a section taken along the line 2—2 in Figure 1;

Figure 3 is a side elevation showing the manner in which the safety belt is attached to a chair in an airplane or the like;

Figure 4 is a rear view of the chair and the safety belt;

Figure 5 is a front view showing the loose ends of the belt as they are disposed when the quick release coupling is unfastened;

Figure 6 is a view in section of the chain adjusting device.

The belt of the present invention is composed of a lap belt, having two parts 1 and 2, and a generally V-shaped shoulder belt 3, having means of attachment with the lap belt when the two parts of the latter are coupled together. The lap belt and the shoulder belt are disposed on a chair 4 in the general manner shown in Figure 3, with the shoulder belt anchored to the chair by means of a chain adjusting device 5.

Referring now particularly to Figure 1, parts 1 and 2 have attached thereto pivoting coupling rings 6 and length adjusting buckles 7, in a manner well understood in the art, the parts 1 and 2 being composed of fabric webbing or the like. Secured in a loop in the end of the part 1 opposite the pivoting coupling ring 6 is the catch loop 10, having a connecting bar 11. The catch loop 10 contains a shoulder portion 12 of considerable width and a narrow tongue portion 13. Part 2 carries, at the end opposite the pivoting coupling ring 6, the coupling member 14, having a connecting bar 15 secured in a loop in the webbing. Coupling member 14 has a body portion 16, a receiving loop 17 and a pivoted latching member 18. The pivotal support for the latching member 18 is indicated at 19 and is attached to the body portion 16, the latter being cut away to allow for pivoting action of the member 18. The latching member 18 is provided on one end with a hook portion 20 of arcuate contour concentric about the pivot 19, and on the other end with a release arm 21, which may be provided with an aperture 22. Release arm 21 is provided on opposite sides with recesses 23 for a frictional

engagement with spring operated detent means contained within cylindrical housings 24 on the body portion 16. The detent means preferably consists of ball elements urged into extended position by coil springs within the housings 24, the ends of said housings being peened over to prevent loss of the balls when the latching member is moved to open position. A guard 25 may be secured to a plate 26 which is, in turn, attached to the catch loop 10.

The length of the tongue 13 is such that, when it is received within the receiving loop 17 and engaged behind the hook portion 20, there will be sufficient space to retain loosely thereon a pair of loops 27 between the catch loop 17 and the shoulder portion 12, in the manner shown. It will be seen from Figure 1 that the loops 27, which may be metal rings or the like, are carried by the ends of the shoulder straps 30—30 on the shoulder belt 3. By reason of this construction, the ends of the shoulder straps may be positively anchored to the lap belt coupling when the parts of the latter are secured together. When the lap belt coupling is released by movement of the release arm 21, so as to unhook the tongue 13 from the hook portion 20, the tension on the lap belt will draw the ends thereof apart, causing the rings 27 to immediately become disengaged from the catch loop 10. By reason of the loose fit of the rings 27 upon the tongue 13 and the sloping sides of the shoulder portions 12, the release of the loops 27 will be quick and positive and will be accomplished without attention on the part of the user.

Each pivoting coupling ring 6 is attached to the lower part of the chair by a bolt, or the like, 35 in the position shown in Figure 3. Straps 36 may be provided on each side of the chair to hold the parts 1 and 2 of the lap belt in an accessible position prior to use.

The shoulder straps 30—30 are secured together in the form of a V, preferably by stitching, at the point 31, and the shoulder belt 3 then continues as a single strap or web 32, which is attached at its end to the chain 33, carrying the bar 34. The shoulder belt 3 is trained over the back of the chair in the manner shown in Figure 4, passing through the upper guide slot 40 and the lower guide means 41. Strap 32 then passes forwardly beneath the chair where its forward end is anchored in adjusted position by means of the chain adjusting device 5.

The chain adjusting device 5 comprises a tube 42 of curved form, corresponding roughly to the shape of the forward portion of the bottom of the chair 4, and provided with a bracket 43 for attachment to the chair bottom. The lower or rearward end of the tube 42 may be provided with a bell mouth 44 to guide the chain. The upper or forward end of the tube 42 is directed substantially vertically upward and is provided on its forward side with a chain engaging slot 45 of a width to lock the chain against sliding movement. The upper end of the tube 42 is further provided with a capping cover 46 having a curved lip 47, the cover being pivoted to the tube at 48 and provided with a spring 49 to urge the cover to closed position as shown in Figure 6.

The operation of the chain adjusting device is such that the cover 46, under the action of the spring 49, normally holds the chain 33 pressed into the slot 45 and thus secured against sliding movement within tube 42. An upward pull on the bar 34 will disengage the chain from the slot 45 and raise the cover 46 and, the chain, when extending substantially vertically upward, will hold the cover 46 open so that by virtue of the curved lip 47 the chain may slide in either direction through the tube. The strap 32, and hence the entire shoulder belt 3, is tightened by raising the bar 34, in the manner described, to apply the desired tension, this action causing the chain 33 to pass through the tube 42 in a direction from right to left as viewed in Figures 3 and 6. When it is desired to loosen the shoulder belt, the bar 34 is held so as to extend the loose end of the chain 33 upward under slight tension, so as to maintain cover 46 in open position, and then tension is applied to the chain in the reverse direction by means of the shoulders and body of the wearer so that the chain will slide freely past the lip 47 to allow the desired looseness to be obtained in the belt. When the desired looseness or tension has been obtained in the belt, merely releasing the bar 34 will allow the spring 49 to return the cover 46 to closed position, thus locking the chain securely in the slot 45 without attention on the part of the user to secure the proper locking action. The bar 34 constitutes positive means for limiting the maximum slack obtainable in the shoulder belt, the amount of such slack depending, of course, upon the length of the chain 33.

Thus it will be seen that the chain adjusting device herein described provides a quick and convenient means for adjusting the tension on a shoulder belt, or other element of a safety belt or harness, without precise manipulation or careful attention on the part of the user. Further, if it is desired to obtain a momentary freedom from the restraint of the shoulder belt, such additional freedom may be instantly obtained by merely raising the bar 34 and allowing an additional length of the free end of the chain to slide through the tube, while the occupant is naturally leaning forward or sidewise in an effort to obtain the desired freedom. As soon as the occupant has returned to his normal position in the chair, another quick tug on the bar 34 will return the chain to the position giving the desired tension. In any case, locking of the adjustment is effected automatically when the user releases the bar 34, making the chain adjusting device rapid and certain in its action.

Figure 5 illustrates the positions assumed by the ends of the various parts of the safety belt when the coupling device on the lap belt has been released. It will be seen that all the attached parts have separated from each other and are free of restraint so that the occupant may leave the chair without giving attention to the disposition of the belt ends. The positions of the belt ends in Figure 5 may also be said to represent the way they would be applied over the shoulders and lap of the occupant prior to engaging the loops 27—27 over the tongue 13 in the securing of the coupling.

While I have shown and described but a single embodiment of my invention, it is to be understood that it is capable of many modifications. Changes, therefore, in the construction and arrangement may be made which do not depart from the spirit and scope of the invention as disclosed in the appended claims.

Having now described my invention and the preferred manner in which the same may be practiced, what I claim as new and desire to secure as Letters Patent is:

1. In a safety belt for an airplane or the like, a chair having a bottom portion and a back por-

tion, a lap belt having ends attached to said bottom portion, said lap belt including a quick release coupling, said coupling comprising a catch loop and a pivoted, hook-like latching element to engage said catch loop, a V-shaped shoulder belt having a single point of attachment with said chair, the legs of said V terminating in loops loosely receivable over said catch loop, the apex of said V extending over said back portion and terminating in a chain passing beneath said bottom portion, a tubular housing for said chain on said bottom portion and constituting said single point of attachment, a slot in an end of said tubular housing, and spring means on said housing for urging said chain into said slot.

2. In a safety belt for an airplane or the like, a chair having a bottom portion and a back portion, a V-shaped shoulder belt having a single point of attachment with said chair, said attachment being effected through the apex of said V and including adjustable means for controlling the tension on said belt, a lap belt having end portions attached to the bottom portion of said chair, said lap belt having a quick release coupling disposed approximately in the lap of the wearer, and said shoulder belt having free ends terminating in means of attachment with said coupling such that release of said coupling simultaneously frees both the lap belt and the free ends of said shoulder belt from the wearer.

3. In a safety belt for an airplane or the like, a chair having a bottom portion and a back portion, a V-shaped shoulder belt having a single point of attachment with said chair, said attachment being effected through the apex of said V and including adjustable means for controlling the tension on said belt, a lap belt having end portions attached to the bottom portion of said chair, said lap belt having a quick release coupling comprising a catch loop and a hook, and disposed approximately in the lap of the wearer, and said shoulder belt having free ends terminating in loops receivable over said catch loop such that release of said coupling simultaneously frees both the lap belt and the free ends of said shoulder belt from the wearer.

4. In a safety belt, a two part lap belt, an elongated catch loop attached to the end of one of said parts, a pivoted, hook-like latching element attached to the end of the other of said parts and adapted to engage and secure said catch loop, and a pair of shoulder straps, each strap terminating in a loop received over said catch loop when the latter is secured by said latching element.

5. In a safety belt, a two part lap belt, an elongated catch loop attached to the end of one of said parts, said catch loop having at its rearward end a wide shoulder portion and at its forward end a relatively narrow tongue, the other part of said belt being provided at its end with a receiving loop adapted to receive the tongue of said catch loop, a pivoted, hook-like latching element on said other part and adapted to engage and secure the tongue of said catch loop when projected through said receiving loop, and a pair of shoulder straps, each strap terminating in a loop received over said tongue, the loops on said shoulder straps being confined between said shoulder and said receiving loop when said catch loop is engaged and secured by said latching element.

6. In a safety belt for an airplane or the like, said safety belt comprising a two part lap belt and a plurality of shoulder straps to be secured together at a common point, an elongated catch loop on the end of one part of said lap belt, said catch loop having at its extremity a narrow tongue and at its base a wide tapering shoulder, a receiving loop on the end of the other part of said lap belt, said receiving loop being adapted to receive said tongue, a pivoted, hook-like latching element adjacent said receiving loop and adapted to engage and secure said tongue when said tongue is projected through said receiving loop, and a loop on the end of each of said shoulder straps adapted to be loosely received over said tongue, said loops on said shoulder straps being confined on said tongue between said shoulder and said receiving loop.

7. In a safety belt for an airplane or the like, a chair having a bottom portion and a back portion, said bottom portion having an upwardly curved forward edge, a shoulder strap extending over the upper edge of said back portion, a chain attached to said strap and extending forwardly beneath said bottom portion, a tubular housing for said chain attached to said bottom portion and having an upwardly curved forward end, a chain engaging slot in said end, and a resiliently mounted cover for said end to urge said chain into said slot.

8. In a safety belt for an airplane or the like, a chair having a bottom portion with an upwardly directed forward edge, a safety strap having attached thereto a chain passing along the underside of said bottom portion, a tubular housing for said chain attached to said bottom portion and having an upwardly directed forward end adjacent the forward edge of said bottom portion, a chain engaging slot in said end, and spring operated means to urge said chain into locking engagement with said slot.

9. In a safety belt for an airplane or the like, a chair, a strap for adjusting the tension on said safety belt, a chain having one end attached to an end of said strap, a device on said chair for anchoring said chain in a plurality of selective positions to determine the effective length of said strap, said device comprising a tube to house said chain, a chain-engaging slot in a side of said tube and means to urge said chain into said slot in a direction at right angles to the direction of the chain in said tube, said means being ineffective when the free end of said chain is tensioned in alignment with said tube whereby said strap may be both loosened and tightened solely by manipulation of the free end of said chain.

10. In a safety belt for an airplane or the like, a chair having a bottom portion and a back portion, a two part lap belt attached at its ends to opposite sides of said bottom portion, a quick release coupling for uniting the two parts of said lap belt in front of the wearer, a pair of shoulder straps secured together and to said lap belt by means of said coupling, said shoulder straps passing over and behind said back portion, and means carried by the forward part of said bottom portion for applying manual tension to said shoulder straps, for maintaining said tension in locked condition, and for releasing said tension to allow limited slack in said shoulder straps.

FRANK G. MANSON.