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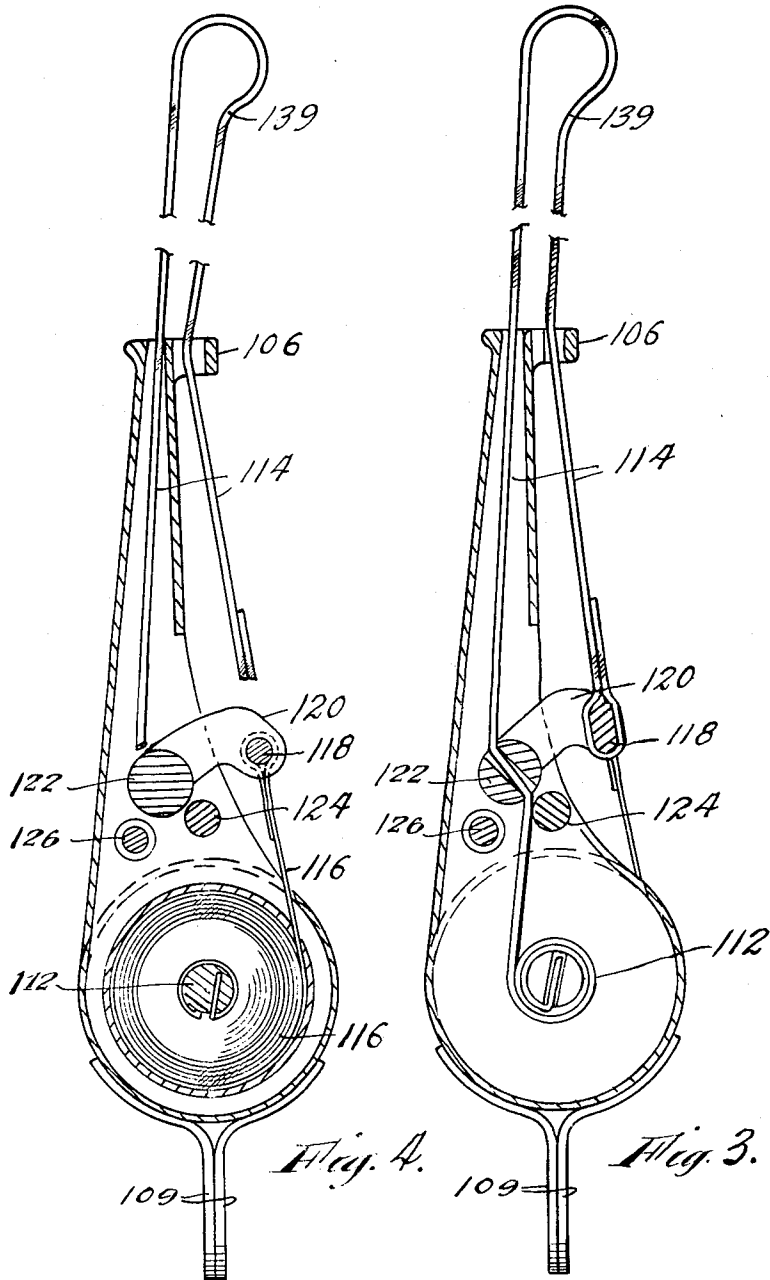
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SECURING DEVICES

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SECURING DEVICES

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9 Claims. (Cl. 242—107.2)

The invention relates to securing devices. Examples of such securing devices are safety belts or harnesses which are fitted to seats to prevent or limit movement of a person seated thereon during acceleration and deceleration of the seat and straps or other elongated flexible members used to secure or hold articles in position, for example during transit of the articles.

One of the difficulties, particularly with seat straps in aircraft or other vehicles is that the buckle ends of the straps are either left lying on the seat or are allowed to hang down. If left on the seat they are uncomfortable to sit down on and not easy to withdraw when so seated while if moved off the seat they drop between the seats and are difficult to retrieve.

It is usual to make the straps so that the lengths can be adjusted by each individual occupant of the seat but the means for adjustment at present provided are often not easy to manipulate so that it not infrequently happens in practice that the seat straps are not really properly adjusted and are generally too loose, a fact which is not readily noticeable to the eye.

The above disadvantages could be overcome by fitting inertia controlled take-up reels for the straps but such equipment is expensive besides adding considerable weight.

One of the objects of the present invention is to provide a device which will overcome one or more of the above disadvantages.

Another object of the present invention is to provide a retractable restraining device for use by passengers which is easy to extend and apply and which embodies locking means which automatically locks if the strap is pulled by movement of the body to which it has been applied but does not lock when the strap is extended for applying to the body.

Another object of the invention is to provide in a safety harness a retractable strap or belt having two runs, or flights, a takeup reel fastened to a first one of said runs, and locking means responsive to a pull on both runs for locking said first run.

The invention provides a safety harness assembly including a strap, strap fastening means on said strap and anchorable resilient take up means engaged with said strap said strap being connectible between an anchorage point and said resilient take up means wherein locking means are provided which when actuated lock on said strap, the arrangement when assembled being such that when the fitting is unlocked the take-up device will tend to move said fitting to a stowing position and when said fitting is locked or being pulled on the main strain will be taken by the anchorable end of the strap and not be transmitted to the end connected to the take-up device. The strap preferably forms a loop with the strap fastening means located at the end of said loop.

The invention provides, in another of its aspects, a lap belt for a safety belt or harness, comprising two assemblies each as aforesaid and adapted to be connected together by a single common two-part buckle or other fitting (hereinafter called a "buckle") whereby when the belt is worn and two parts of the buckle are engaged and locked, the said straps extend around the wearer's waist

and the buckle parts are locked to the anchorable ends of the straps.

Conveniently the common buckle may be constructed so that the shoulder straps of a safety harness can be attached thereto.

The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof will best be understood from the following detailed description with reference to the accompanying drawings in which:

FIG. 1 is a diagrammatic sectional side elevation of one form of takeup device made in accordance with the present invention and suitable for use with a lap strap, the section being taken along line VI—VI of FIG. 2;

FIG. 2 is a longitudinal sectional elevation of the device shown in FIG. 1;

FIG. 3 is a view similar to FIG. 1 showing the parts in locking position; and

FIG. 4 is a view similar to FIG. 3 but taken along line IX—IX of FIG. 2, showing the arrangement of the spring.

Turning now to the construction shown in FIGS. 1—4 the take-up device comprises a frame formed by two side members 102 and 104 which are mirror images of each other joined together at the top by a band 106 which may be moulded in a plastic material said band encircling the upper ends of the frames 102 and 104 and holding them in spaced relation. The side members 102 and 104 may be joined at the bottom as shown in FIGS. 1 and 2 by a securing plate 108 provided with a hole 110 for a fastening bolt. Alternative securing plates are shown at 109 in FIGS. 3 and 4. A transverse shaft 112 journaled by its ends in the side members 102 and 104 constitute a take up reel to which one end of a strap 114 is secured (FIG. 1). Torsion springs 116 are secured to each end of the shaft 112 (FIG. 2) by one end and the other ends of the springs are connected to a transverse rod 118 (FIG. 4) the ends of which are secured in levers 120 secured to the ends of a slotted transverse shaft 122 journaled in the side members 102 and 104. The other end of the strap 114 after passing over a roller in a buckle element (not shown) is secured to the transverse rod 118 thus forming two belt runs and a running bight 139. A fixed transverse locking bar 124 is secured by its ends in the side members 102 and 104 and lies close to the slotted shaft 122 just out of contact therewith forming a bite between its cylindrical surface and the surface of the slotted shaft 122. A guide roller 126 is journaled by its ends in the side members 102 and 104. The strap 114 is threaded through the slot in the shaft 122 and the guide roller 126 is so positioned that it maintains the outside face of the strap in line with the slot in the shaft 122 while the shaft is in the unlocked position of FIG. 1 in spite of the changes in diameter of the roll of strap on the take up spindle 112. End caps 128 serve as covers for the springs 116 and are slotted at 130 to pass the outer ends of the springs for attachment to the transverse rod 118.

In use assuming that the strap-locking parts are in the rest position shown in FIG. 1 the strap can be drawn freely from the spindle 112 by pulling on the buckle element (not shown) since it is relatively free to run in the buckle and therefore the pull on both ends of the strap 114 is equal. In consequence therefore there is no displacement of the lever 120, which is held down by the spring 116. After the belt has been fastened by the buckle the run of the belt attached to shaft 118 and thus to the spring is next to the body consequently any movement of the body of the wearer will pull both runs of the belt simultaneously. Due to friction with the body and between the two runs of the strap this will immediately rock the lever 120 turning the slotted shaft 122 and

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forcing the belt as it leaves the slot into the bite between the slotted shaft 122 and the fixed locking shafts 124 thereby locking the belt. Any increase in pull increases the locking effect.

The foregoing description is considered illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described and accordingly all suitable modifications and equivalents may be resorted to which fall within the scope of the invention as claimed.

What we claim and desire to secure by letters Patent is:

1. In a restraining device the combination comprising at least one strap, means for mounting said strap to define at least two runs and one running bight in said strap, take-up means connected to only one run of said strap and spaced from said bight, strap locking means operating on said one run between said take up means and said running bight, resilient means urging said strap locking means to the unlocked position, actuating means for said strap locking means, and means connecting said actuating means to the other run of said strap.

2. A restraining device according to claim 1 wherein said resilient means comprises a coil spring one end of which is connected to said take-up means and the other to said actuating means.

3. A restraining device according to claim 1, wherein said actuating means comprises a lever connected between said locking means and the end of said other run of said strap.

4. A restraining device according to claim 3 wherein said resilient means is connected between said take-up means and said lever.

5. A safety harness assembly including at least one strap, means for mounting said strap to define at least one running bight in said strap, said mounting means including a frame, a transverse shaft journaled in said frame to form a take-up reel for said strap, a slotted transverse guide shaft journaled in said frame, and a lever arm fastened at one end to said slotted guide shaft; one end of said strap passing through the slot in said guide shaft and being connected to said take-up reel and the other end of said strap being fastened to the other end of said lever arm; spring means mounted on said take-up reel tending to rotate said reel in a direction to cause said strap to be wound up on said reel, and a locking bar adjacent said slotted guide shaft and mounted to form a

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bite between its surface and the surface of said slotted guide shaft, whereby upon rotation of said slotted guide shaft said strap will be forced into said bite to lock the strap.

6. The safety harness of claim 5 wherein said spring means comprises a torsion spring connected at one end to said take-up reel and at its other end to said other end of said lever arm, whereby said torsion spring urges said lever arm against the pull of said strap.

7. In a restraining device the combination comprising at least one strap, means including a frame for mounting said strap to define at least two runs and one running bight in said strap, take-up means connected to one run of said strap and spaced from said bight, strap-locking means between said take-up means and said running bight, said strap-locking means comprising a slotted transverse guide shaft journaled in said frame and a locking bar mounted adjacent said guide shaft to form a bite between its surface and the surface of said guide shaft, resilient means urging said strap-locking means to the unlocked position, actuating means for said strap-locking means, and means connecting said actuating means to the other run of said strap.

8. A restraining device according to claim 7 wherein said actuating means comprises a lever arm having first and second ends connected at its first end to said guide shaft for rotation therewith.

9. A restraining device according to claim 8, wherein said resilient means comprises a spring connected between said take-up means and said second end of said lever arm.

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