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E. H. SPOUGE ETAL

3,190,579

SAFETY HARNESS

Filed June 11, 1963

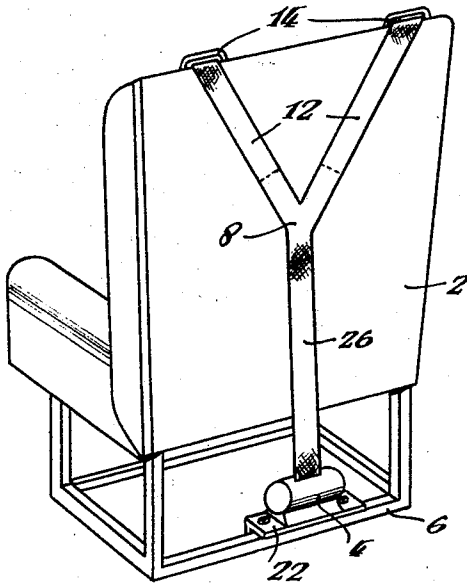


Fig. 1.

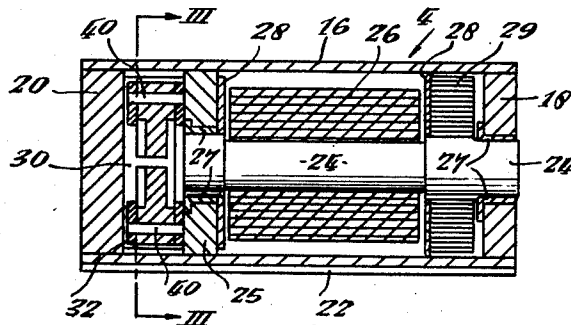


Fig. 2.

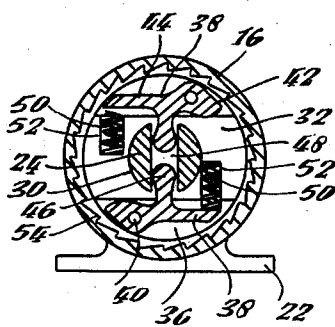


Fig. 3.

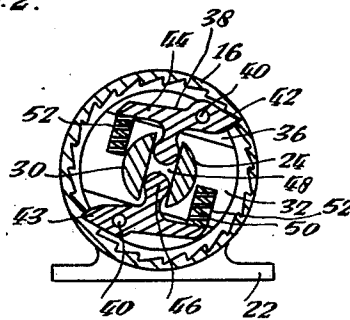


Fig. 4.

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Claims priority, application Great Britain, June 14, 1962, 22,908/62

1 Claim. (Cl. 242—107.4)

This invention relates to a safety harness of the kind in which a strap (which word shall where the context so admits include a cord, cable, or the like) coupled to the harness by one end, is connected by its other end to a take up means the arrangement being such that movement of the wearer of the harness results in pay out by the take up means.

Various forms of locking devices have been proposed such as inertia actuated locking means which are embodied in a take up reel so as to lock the reel if it is accelerated too quickly. In prior U.S. Patent No. 3,058,687 the locking means functions by an axial movement of the inertia member which causes it to engage a fixed member and be locked, thereby locking the take up reel. In prior U.S. Patent No. 2,953,315 there is described a take up reel locking device wherein the locking member is moved radially. It is also known to construct a trolley catcher in which the locking member swings outward away from the shaft of the take up reel.

According to the present invention there is provided a take up device for a safety harness of the kind embodying a take up reel, an inertia member mounted coaxially with and angularly movable with respect to said reel, and at least one locking member carried by said inertia member part of which locking member moves outwardly to a locking position wherein centrifugal forces when present and acting on the locking member do not urge the locking member to the locking position. The centrifugal forces may act to urge the locking member to the unlocking position. The locking member may be pivotally mounted on said inertia member and a spring may be provided to urge said locking member to the unlocked position so as not to be moved by gravity to the locking position.

Referring to the drawings filed with the application:

FIG. 1 is a diagrammatic rear perspective view of one form of car seat fitted with safety harness to which the present invention has been applied.

FIG. 2 is a sectional elevation of the inertia reel shown in FIG. 1 drawn to a larger scale.

FIG. 3 is a section on the line III—III of FIG. 2.

FIG. 4 is a similar view to FIG. 3 showing the parts in the locking position.

Turning to FIG. 1 it will be seen that the seat 2 has the inertia locking device 4 secured transversely to the frame member 6 and the strap 26 is attached at 8 to two harness straps 12 which are threaded through guides 14 secured to the top of the seat.

Turning now to FIGS. 2 to 4 it will be seen that the inertia take up device 4 consists of a diecast or forged body 16 closed by end plates 18 and 20 said body having feet 22 by which it is adapted to be secured to the frame member 6 or to the floor. The body 16 has a cylindrical

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bore within which is housed the take up reel consisting of a spindle 24 journaled in bearings 27 housed in bearing plate 25 secured in the housing 16 and end plate 18. One end of the strap 26 is secured to said spindle 24 said strap passing up through an offset aperture (not shown). The spindle 24 is stepped being reduced where the strap 26 is accommodated. Mounted on the spindle at each side of the reduced portion are guide discs 28 the purpose of which are to confine the strap 26. One end of a torsion spring 29 is attached to the spindle 24 at a point between the bearing 27 in the end plate 18 and the guide disc 28 nearest to it and the other end of the torsion spring 29 is attached to the body 16. Said torsion spring acts as a return spring when strap 26 has been drawn out from the inertia take up device 4. Mounted on the enlarged end portion 30 at one end of the spindle 24 is the inertia plate 32, which is free to rotate thereon. The inertia plate 32 is slotted on opposite diameters at 36 to receive pawls 38 mounted on pivot pins 40 carried in the inertia plate 32 so that the pawls can swing in a radial plane. As will be seen the pawls are provided with a nose 42 a tail 44 and an arm 46 having a rounded end which is adapted to engage a slot 48 diametrically arranged in the enlarged end 30 of the spindle 24. Light compression springs 50 housed in suitable drill holes 52 drilled in the bottom of the slots 36 engage the tail portions 44 of the pawls 38 to urge said pawls to the position in which the nose 42 is withdrawn level with the periphery of the inertia member 32 and in contact with the bottom of the slot 36 which provides an inwardly positioned stop. Surrounding the inertia member 32 is a toothed ring 54 formed on the inner periphery of the housing 16. The operation of the device is as follows:

The action of the spring 50 will normally urge the inertia plate 32 to rotate with the spindle 24, but should a certain predetermined acceleration of the spindle 24 be exceeded the inertia plate 32 will hang back, the pressure of the spring 50 will be overcome, the pawls 38 will be rocked causing the noses 42 to engage in the teeth 54 on the inside of the casing 16 thereby locking the inertia member 32 and in consequence locking the spindle 24 to the casing 16. The pawls 38 will not become disengaged from the teeth 54 until the tension on the strap is relaxed.

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

A safety harness comprising a hollow body, a spindle rotatably mounted in said body, a safety strap having one end portion attached to said spindle and wound therearound, said strap extending outwardly of said body for attachment to a seat occupant's harness strap, a torsion spring within said body having its outer end fixed thereto and its inner end fixed to said spindle for normally retracting said safety strap inwardly of said body and wound around said spindle, an inertia member turnably mounted on said spindle, a pawl pivoted upon said inertia member and having a locking nose portion, a toothed ring provided within said body opposite said locking nose for engagement by the latter, spring means interposed between said inertia member and said pawl for normally holding said locking nose out of engagement with said toothed ring, said pawl having an arm projecting therefrom, said spindle having a recess for receiving said pawl arm, said pawl arm being positioned intermediate the pivot of said pawl on said inertia member and said spring means, said pawl arm projecting radially inwardly into

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said spindle recess, whereby centrifugal forces acting on said pawl tend to urge said locking nose out of engagement with said toothed ring in use, quick movement of said strap outwardly of said body due to sudden movement of the seat occupant beyond a predetermined acceleration determined by the mass of said inertia member and the strength of said spring means producing relative turning motion between said inertia member and said spindle to cause the compression of said spring means and actuation of said pawl arm to effect the movement

of said pawl locking nose into locking engagement with said toothed ring to thereby lock the occupant in his seat.

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2,953,315	9/60	Lautier et al.	242—107.4
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10 MERVIN STEIN, *Primary Examiner.*