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SAFETY BELT AND CONNECTOR THEREFOR

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Fig. 1.

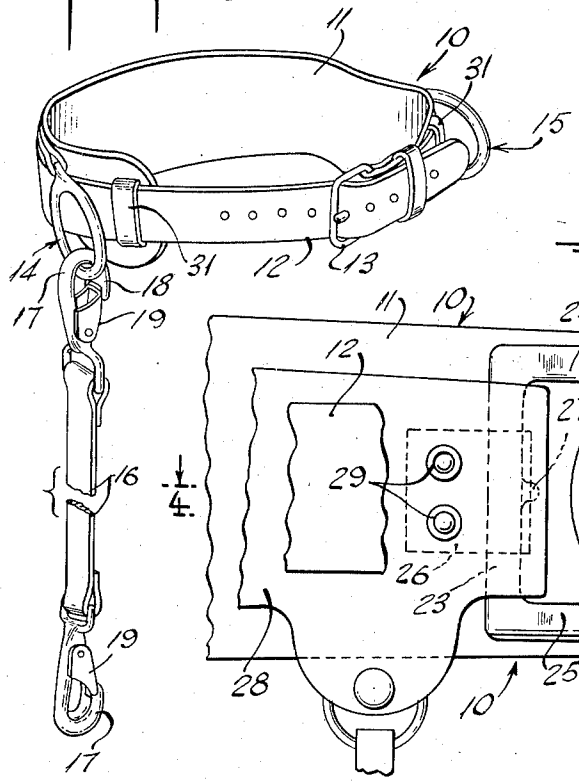


Fig. 2.

Fig. 3.

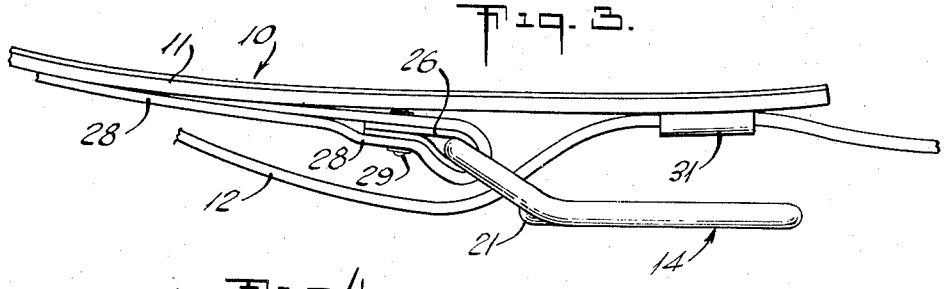
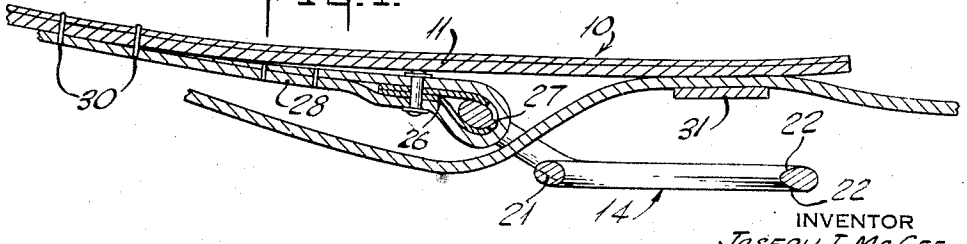


Fig. 4.



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SAFETY BELT AND CONNECTOR THEREFOR

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2 Claims. (Cl. 227—49)

This invention relates to safety belts of the type generally used by linemen for supporting them atop a pole or other similar object, and more specifically to an improved safety belt and detachable connector for attaching a pole encircling safety strap to a belt secured about the waist.

While the invention is useful for a variety of purposes, the lineman's belt probably constitutes one of the more important applications and will be used for illustrative purposes. Known safety belts of the type referred to above include a relatively wide heavy leather belt that is secured generally about the hips of the wearer. So-called D rings are secured to each side of the belt and a pole-encircling strap having safety hooks on each end thereof is attached to the D rings. The term D ring has been applied to the belt connectors because they are formed in the shape of the letter D with the straight portion thereof forming the point of attachment to the belt.

It has been found that present D rings and cooperating safety hooks of the type having a spring loaded clip for closing the hook opening have not been satisfactory for a number of reasons. The more important difficulty resides in the fact that when tension on the pole-encircling strap is relieved by shifting the body position nearer to the pole, it is possible for the one or both hooks to assume a position with respect to the D ring so that when the wearer again places his weight on the strap the hook will automatically become disengaged from the D ring. In the case of linemen, this constitutes an exceedingly dangerous condition as evidenced by the fact that over 25 accidents occurred last year in the power industry alone because of the accidental release of a hook from the D ring.

Another difficulty with present D rings resides in the manner in which the D ring is formed and attached to the belt. Apparently, in an effort to prevent accidental disengagement of the hook and D ring, the latter has been shaped and secured to the belt so that it normally deflects outwardly therefrom. When tension is placed on the D rings by a pole encircling strap at least part of the D ring is forced tightly against the belt and applies substantial pressure to the wearer's hips. This pressure not only subjects the wearer to considerable discomfort but also constitutes a constant source of annoyance that adversely affects his efficiency and materially increases the chance of accident.

A substantial effort has been made by industry to overcome these difficulties by the provision of attachments and enlargement portions of the ring, but these efforts have met with little or no success.

This invention overcomes the foregoing disadvantages of present belts and provides an improved connector that affords substantially complete safety for the wearer and at the same time will not apply pressure to the hips of the wearer when the pole-encircling strap is placed in tension.

Still another object of the invention is a novel and improved safety belt for linemen.

A further object of the invention is a novel and improved connector for safety belts that affords a high degree of safety and comfort and at the same time facilitates engagement and disengagement of the cooperating hook by the wearer.

The above and other objects and advantages of the invention will become more apparent from the following description and accompanying drawings forming part of this application.

In the drawings:

Fig. 1 is a perspective view of a safety belt in accordance with the invention;

Fig. 2 is a side elevation of a fragmentary part of the belt of Fig. 1;

Fig. 3 is a top view of that part of the belt shown in Fig. 2; and

Fig. 4 is a cross sectional view of Fig. 2 taken along the line 4—4 thereof.

Prior safety belts of the general type used by linemen in the power and telephone industries to support themselves atop poles for installation and repair of electric lines and cables include a relatively heavy waist-encircling belt and a cooperating strap. The belt includes a pair of D rings and the safety strap, which encircles the pole, is attached to the D rings by safety hooks. In the use of this safety belt, the lineman, when climbing a wood pole, for instance, imbeds his cleats firmly into the pole, encircles the pole with the strap and attaches it to the D rings. In this way, both of the lineman's hands are free for the work he must perform.

Actual experience with prior belts, however, has shown that they are not safe and dependable as the strap hooks can become disengaged from the cooperating D ring when tension is removed even momentarily from the strap and then reapplied. Disengagement occurs when the lineman leans backward away from the pole to stress the strap and at that moment failure of the strap when the lineman is relying upon it for support causes him to lose his balance and topple from the pole. Industry has of course recognized this difficulty and numerous and continued efforts have been made without success to provide an improved connector that will not accidentally disengage the hook and that can be quickly and easily engaged and disengaged by the user.

Prior D rings, which are permanently affixed to the waist belt, have been given that name because they are in the shape of the letter D with the straight portion including a pair of spaced members or bars. The outer member is used for securing the ring to the waist belt, the securing means being in the form of metal and leather straps passing between the two straight bars or members. This prior ring is also shaped so that upon attachment to the waist belt it will normally deflect outwardly therefrom at a pronounced angle, apparently to facilitate attachment of the hook. By reason of the shape of the ring, and possibly its position on the belt, it has been found that the cooperating hook, which has a spring loaded closure member, can assume a position with reference to the ring that will cause it to automatically disengage itself upon the application of stress. Efforts to prevent this condition including the use of inserts and various appliances have not been found to be satisfactory. Moreover, because the ring is shaped to deflect outwardly from the belt, when stress is applied, the ring is forced inwardly toward the waist belt and bears, uncomfortably, against the hips of the wearer. This often causes the wearer to frequently relax the tension on the D rings which, coupled with added fatigue, greatly increases the chances of accident.

The connector ring in accordance with the invention

greatly diminishes, if not entirely eliminates the danger of an accidental disengagement of the hook and at the same time little, if any, lateral pressure is applied to the hips other than that normally caused by the stress placed on the waist belt itself. In actual practice the waist belt is worn low about the hips so that the weight of the wearer is actually supported by the hips rather than the back.

More specifically and with reference to the figures, the waist or hip belt is denoted by the numeral **10** and includes a relatively wide section **11** surrounding the back of the wearer and a narrower belt part **12** including a buckle **13** for attaching the belt about the wearer's waist. In the case of a lineman's belt, the rear portion of the belt **10** may include numerous means for holding tools and equipment. The belt **10** further includes a pair of connector or D rings **14** and **15** for attachment of the safety strap **16** adapted to encircle a pole, tree or other similar object being climbed. The strap is attached to the rings **14** and **15** by a pair of safety hooks **17** and **18**, each having a spring loaded catch **19** for closing the opening in the hooks.

Each ring or connector **14**, **15**, not only incorporates an improved configuration to facilitate reception of the hook and effectively prevent accidental disengagement, but also an improved arrangement of elements that prevents lateral hip pressure resulting from pressure applied to the ring itself. The structure and contour of the improved connectors or rings **14** and **15** in accordance with the invention is shown more clearly in Figs. 2 to 4 inclusive. It will be observed that the improved ring includes a generally toroidal portion **20** having a circular central opening **21** for reception of a hook **17** (**18**). The diameter of the opening **21** is coordinated with the hook size so that it is not possible for the hook when spanning the toroid to assume a position that will permit release of the catch **19** and disengagement of the hook. If desired the inner edge of the toroid **20** may be tapered slightly as indicated at **22** in Fig. 4 to present a broader surface to the hook elements which in the case of certain types of hooks will further reduce the danger of accidental disengagement.

The connector **14** (**15**) is secured to the belt part **11** so that the plane of the toroid **20** may for practical purposes be considered parallel to the belt as may be observed in Figs. 3 and 4. Moreover, it is spaced a substantial distance from the belt to facilitate engagement and disengagement of a hook **17** (**18**). The toroidal connector **20** is attached to the belt by a U-shaped bracket member attached to the toroid **20** and comprising a transverse member **23** and a pair of legs **24** and **25**. The bracket member is preferably formed integrally with the toroidal part **20**, the legs **24** and **25** extending generally tangentially from opposite sides of the toroid. In addition the plane of the bracket member is preferably disposed at an angle of about 30 degrees with the plane of the toroid **20**. In this way, the transverse member **23**, when secured to the belt part **11**, will hold the toroid **20** in the spaced, substantially parallel position as shown in Figs. 3 and 4.

The attachment of each toroidal connector **14**, **15** to the belt **10** is accomplished by a metal bracket **26** formed about the transverse member **23** and engaging a centrally located stud **27** on the member **23**. This stud aligns the connector **14** (**15**) with the belt so that the latter will assume the desired parallel position. The metal bracket **26** is covered by a broad leather strap **28** encircling the transverse member. The strap **28** and bracket **26** are secured one to the other by rivets **29** and the strap is sewn or otherwise suitably attached to the belt part **11** as indicated at **30**. The strap **26** is preferably substantially coextensive with the belt part **11** and holds both of the toroidal connectors **14** and **15**. The belt part **12** which secures the belt **10** about the wearer passes through loops **31** on the ends of the belt part **11** and extends between the toroidal section **20** of each connector and the associated transverse member **23**. The belt parts **12**, **28** and **11** may be attached one to the other in any suitable manner to provide maximum safety for the wearer.

It will be observed from Fig. 1 of the drawings that the toroidal connectors **14** and **15** in accordance with the invention are actually set slightly forwardly on the belt, and this position is coordinated with the position of the strap **16** about a pole or other object so that the application of stress to the strap **16** will not produce material deflection of the connectors. In this way inward deflection of the connectors when stressed is completely eliminated. As previously pointed out the prior connectors flared outwardly from the belt at an angle of 20 to 30 degrees relative to a tangent to the point of attachment. This flare while resulting partly from the manner of attachment was primarily attained by binding or curving the D ring itself. Thus when this prior connector was stressed it moved through an angle of about 30 degrees or more and applied substantial lateral pressure to the hips of the wearer. With the invention this lateral pressure is completely removed and at the same time ample space is available for easily attaching and disconnecting the hook.

As previously discussed, it is preferable to form the toroidal portion **20** of each connector **14**, **15** in the form of a true toroid. In certain cases it may be desirable to utilize a somewhat modified toroidal section, but in so doing it is important that the center opening **21** be continuously curved with the smallest radius being of a magnitude that will prevent accidental actuation of the catch.

While only one embodiment of the invention has been shown and described, it is apparent that modifications, alterations and changes may be made without departing from the true scope and spirit thereof.

What is claimed is:

1. The combination with a safety belt of a connector secured to each side thereof for the attachment of a pole-encircling strap having safety hooks on each end, said connectors each comprising a generally toroidal part and a generally U-shaped part attached to said toroidal part, said U-shaped part having a linear transverse member spaced outwardly from the periphery of the toroid and displaced from the plane thereof for attaching said toroid to said belt and including means holding with said toroid in a plane generally parallel to a plane tangential to the belt at a point substantially aligned with the center of the toroid.

2. A connector for a safety belt adapted to receive a hook having a spring loaded closure member comprising a substantially circular portion and means attached to the periphery of the circular portion for securing it to said belt, the last said means including a transverse member spaced from the periphery of said circular portion and offset from the plane thereof and having means for positioning said circular portion in substantially uniformly spaced relationship from said belt.

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