

March 22, 1966

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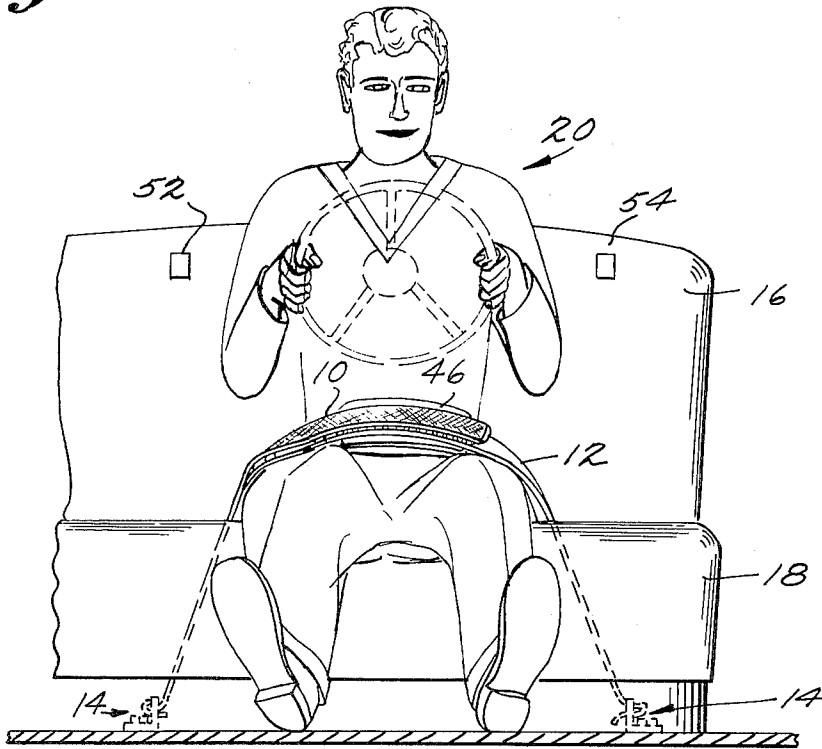
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SEAT BELT

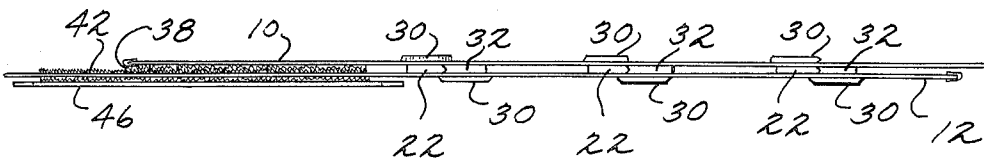
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2 Sheets-Sheet 1

*Fig. 1.*



*Fig. 2.*



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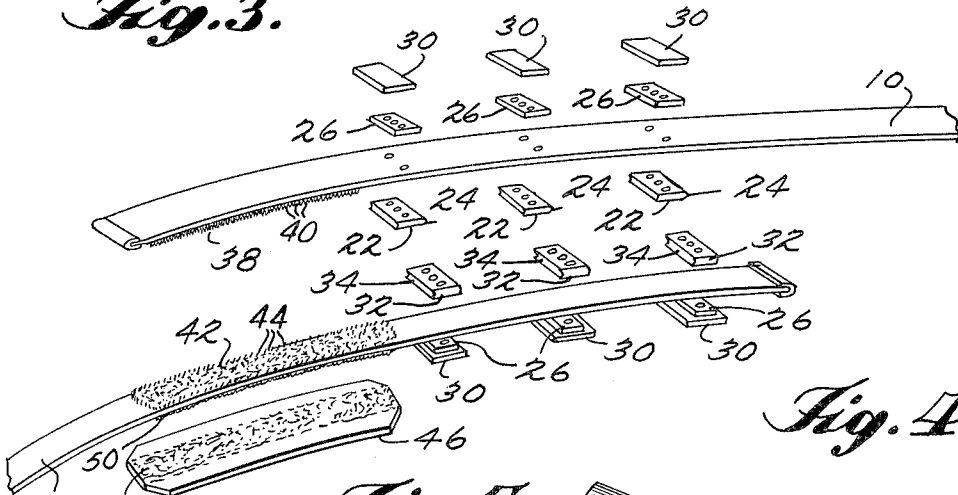
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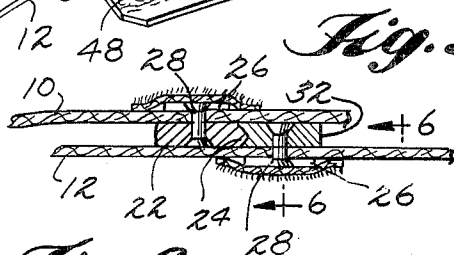
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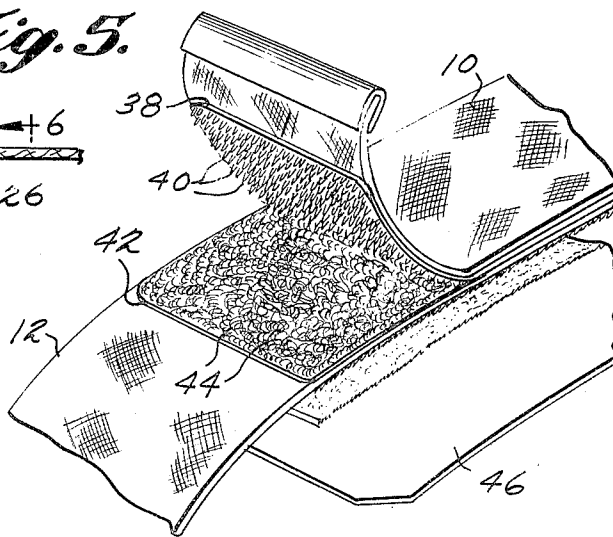
*Fig. 3.*



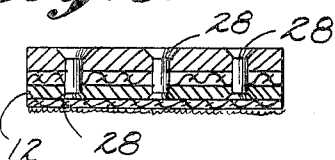
*Fig. 4.*



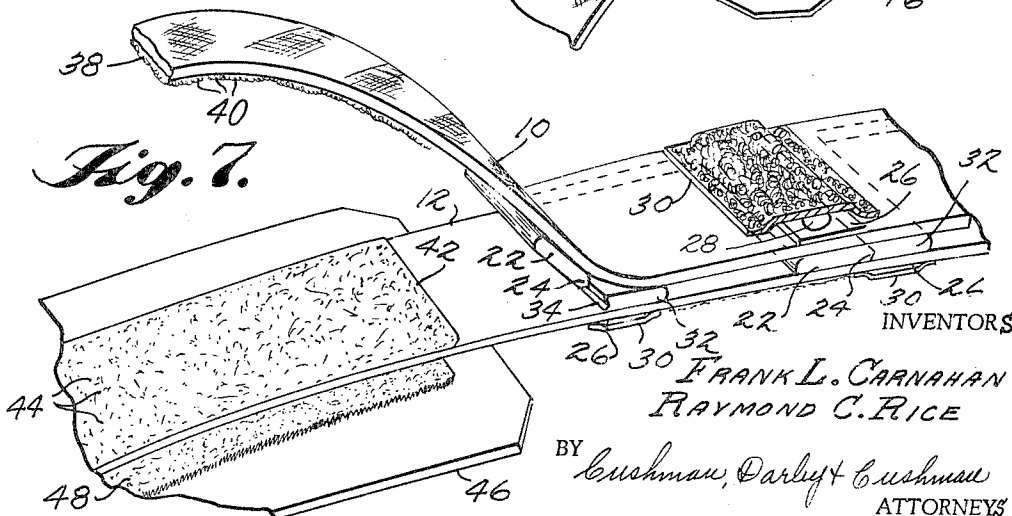
*Fig. 5.*



*Fig. 6.*



*Fig. 7.*



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SEAT BELT

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6 Claims. (Cl. 297—385)

This invention relates to safety belts and in particular to a safety belt having an improved fastener.

In application Serial No. 100,449, filed April 3, 1961, in the name of Frank L. Carnahan, now abandoned, there is described a seat belt the overlapping ends of which are held together, when the belt is in use, by cooperating strips of woven material bonded to opposed surfaces of the two ends. The woven fabric, which may be of the type known as "Velcro" and described in United States Patent No. 2,717,437, includes a foundation structure constituted by the usual warp and weft yarn and additional warp yarn which is looped above the foundation structure to form a raised pile. When the loops on this material are cut so as to form a plurality of hooks the resulting structure can be attached to a piece of the same material merely by pressing the surfaces together. The hooks on the opposed surfaces engage each other and can be separated only by considerable force. Alternatively, the loops of which the hooks are formed may be constructed of relatively coarse, stiff yarn and the woven fabric of the complementary part of the fastener is constructed with a very large number of uncut loops of relatively fine flexible yarn. In this event the hooks tend to engage and hold a plurality of loops, and a much stronger force is required to separate the two pieces.

While the use of the above described fabric fastener on a safety belt as set forth in the above-mentioned application constitutes a satisfactory fastener, the resulting belt is susceptible to improvement. It has been found that the strength of the fastener can be improved while retaining simplicity of construction and use by securing rigid fastening elements such as cleats or the like to the opposed surfaces of the free ends of the belt. More particularly, the rigid fastening elements are secured to the ends of the belt in such positions that the terminal edge of at least one element on one belt end will engage the terminal edge of an element on the other belt end when the ends are overlapped. The Velcro, or fabric fastener holds the belt ends in alignment, thus maintaining the fastening elements in engagement and the latter absorb most of the stresses induced by longitudinal forces tending to pull the ends apart.

The principal object of the present invention is the provision of a safety belt having a fastener which is simple in construction and use and which is strong enough to withstand the forces to be expected during its intended use.

It is a further object of the invention to provide a safety belt with a fastener which comprises a fabric fastener of the hook and raised pile type and at least two rigid elements which interlock or abut each other when the free ends of the belt overlap.

Further objects and advantages will become apparent from the following description of a seat belt embodying the principles of the present invention taken in conjunction with the drawings in which:

FIGURE 1 is a front elevational view of an automobile seat showing the safety belt of the invention in its operative position;

FIGURE 2 is a side elevational view of the overlapping belt ends of FIGURE 1;

FIGURE 3 is a perspective exploded view of the overlapping belt ends;

FIGURE 4 is a fragmentary perspective view of the hook and raised pile portions of the fastener;

FIGURE 5 is a fragmentary, longitudinal sectional view through the overlapping belt ends;

FIGURE 6 is a sectional view taken on the line 6—6 of FIGURE 5; and

FIGURE 7 is a perspective view of the overlapping ends of the belt in a partially fastened position.

Referring more specifically to the drawings, the present safety belt comprises two straps 10 and 12, the free ends of which can be overlapped and fastened together over the body of the user. The ends opposite the free ends will, in use, be secured to a fixed support. As shown in FIGURE 1, the fixed ends of the straps 10 and 12 may be secured to the floor or frame of an automobile as by means of brackets 14, and the free ends may be brought up between the top and bottom sections 16 and 18 of the vehicle seat so as to fit over the thighs or waist of a passenger 20. The straps 10 and 12 may be constructed of any strong webbing, such as woven or unwoven fabric of nylon or other synthetic yarn such as Velon, Dacron or the like. Preferably, the fabric is light weight and comprises a fairly loose or open weave which permits ventilation and facilitates cleaning.

In accordance with the principles of the present invention the free ends of the straps which constitute the belt are provided with freely releasable, interlocking, elements which readily fall into their interlocking positions when the ends of the straps are overlapped. Shown in the drawings, the free end portion of the upper strap 10 has secured to the lower surface thereof a plurality of longitudinally spaced, generally rectangular cleats 22 which extend transversely of the belt. As best seen in FIGURE 7, the rear surface of each cleat 22, that is the surface which faces away from the free end of the upper strap 10, is formed with a rearwardly extending sharp-edged rib 24.

The cleats 22, as shown, are constructed of metal such as steel or aluminum, although they may be constructed of high-strength plastics if desired. The spacing between the cleats on each length may be varied as desired; a spacing of about 2¼ inches has been found convenient. The thickness of the cleats will depend, in part, on the material of construction and should be great enough to provide engageable end surfaces of substantial area. It has been found that a cleat thickness of about 3 times the thickness of the belt webbing provides a satisfactory and easily engageable fastening. Obviously, excessive cleat thickness should be avoided in the interest of lightness of weight and ease of manipulation.

Any convenient means may be provided for securing the cleats to the webbing of the strap 10 so long as the means insures a strong connection between the two. As shown, thin metal backing plates 26 of about the same length and width as the cleats 22 are positioned on the surface of the strap opposite each cleat 22 and rivets 28 are passed through the plates, the webbing and the cleats. In order to protect the user from coming in contact with the plates 26 and the rivet heads a soft fleecy strip of fabric 30 is placed over each plate 26 and is secured thereto and to the adjacent portions of the strap 10 as by cementing.

The free end of the lower strap 12 is provided with a plurality of cleats 32 which are similar to the cleats 22 on the upper strap 10 except that the rear edge of the lower cleats 32 are formed with a groove or recess 34 which is complementary to the rib 24 on the upper cleats 22. The lower cleats 32 are longitudinally spaced the same distance apart as the upper cleats 22 so that when the free ends of the straps 10 and 12 are overlapped each of the ribs 24 engages a groove 34. The manner of securing the lower cleats 32 to their respective strap is the same as for

the upper cleats 22, rivets 28, backing plates 26 and fabric strips 30 being used as described above.

Although the construction illustrated for the cleats 22 and 32 is a preferred construction from the standpoint of strength, economy, ease of construction and ease of operation, it will be appreciated that other complementary, engageable fastening structures may be provided. According to the principles of the invention, the opposed fastening means should provide mutually engageable surfaces which when placed in abutting relationship by overlapping the free ends of the straps 10 and 12 strongly resist longitudinal movement of the two straps in opposite directions. Accordingly, the opposed fastening means should have complementary portions of substantial surface area which extend generally transversely of the straps in planes which are at an angle to the straps. While a variety of hooked, flanged or sharp-edged structures can be employed to accomplish the desired holding function it will be apparent that hooks and sharp edges should be avoided from the standpoint of safety and that intricate or complicated fasteners should be avoided from the standpoint of ease of construction and use. As pointed out above, the illustrated cleats 22 and 32 are simple in construction yet constitute a positive restraint against relative longitudinal movement of the straps 10 and 12. Further, the cleats 22 and 32 automatically abut each other when the free ends of the straps are overlapped, only a very slight amount of relative longitudinal movement of the straps being required to engage the ribs 24 member into another or pivotal movement of one fastening member relative to another is required.

It is apparent from the above description that some means must be provided to maintain the free ends of the straps 10 and 12 in alignment so as to maintain the cleats 22 and 32, or other fastening means, in abutting or engaging relationship. According to the present invention, the concept of simplicity and ease of operation is carried forward by providing the straps 10 and 12 with cooperating fabric fastening means, such as Velcro.

As shown in the drawings, a strip 38 of Velcro-like material having warp yarn extending therefrom in the form of hooks 40 is sewn, cemented or otherwise secured to the lower surface of the upper strap 10 near the free end thereof and forwardly of the cleats 22. As shown, the strip 38 is a single strip of the same width as the strap 10 but it will be understood that a plurality of strips extending either transversely or longitudinally of the strap may be used. The hooks 40 may be disposed in rows running lengthwise or widthwise of the strip 38 or they may be randomly distributed.

The lower strap 12 has secured to the upper surface thereof rearwardly of the cleats 32 a strip 42 of Velcro-like fabric having a large number of loops 44 on its surface for engagement with the hooks 40 or the upper strip 38. As shown, the loops 44 are formed of relatively fine yarn and are randomly distributed so that the strip 42 has a fleecy appearance and a soft warm feel. While a single wide strip 40 has been illustrated, a plurality of smaller strips arranged either lengthwise or widthwise of the strap 12 may be used.

A further feature of the invention is the provision of a relatively wide flap 46 of heavy fabric or the like which is attachable to the belt so as to rest on the abdomen or thighs of the user when the straps 10 and 12 are in their operative position. The flap 46 being wider than the straps 10 and 12 will apply the pressure of the belt on the passenger 20 over a greater area than would the belt alone. Thus, the flap 46 renders the belt more comfortable and, in the event of an accident, reduces the tendency of the belt to cut into and injure the passenger. As seen in the drawings, the flap 46 is removably attached to the under surface of the bottom strap rearwardly of the cleats 32 by means of a Velcro-like fabric fastener. As shown, a single strip 48 of fabric having hooks extending therefrom is sewn or otherwise secured to the flap 46 and a

single strip 50 of looped fabric is secured to the under surface of the lower strap 12 opposite the strip 42 of looped fabric. Obviously, the flap 46 may be attached to the belt by other combinations of Velcro-like material or even by a different type of fastening means. However, the Velcro-type fastener is preferred because it does not involve any rigid or hard projections which could cause injury.

A still further feature of the invention is the provision of Velcro-type fasteners for holding the straps 10 and 12 against the top portion 16 of a vehicle seat when the belt is not in use. Since the end portion of the top strap 10 already has the strip 38 of hooked fabric thereon, a piece 52 of looped fabric may be sewn or otherwise secured to the upholstery of the top seat 16 near the top thereof. The fabric 30 covering the rivets 28 and backing plates 26 for the cleats 32 on the lower strap 12 may conveniently be looped fabric of the Velcro-type. The strap 12 may then be held out of the way when not in use by providing a piece 54 of hooked fabric on the top seat 16 near the top thereof.

A passenger secures the belt about his waist merely by grasping the free end of the lower strap 12 and laying it over his lap or abdomen, cleat-side up, so as to place the cleats 32 at his right side. The upper strap 10 is then held, cleat-side down, directly above and close to the lower strap 12. The slack is removed from the upper strap 10 by pulling it longitudinally against its mounting and then with the fingers of one hand one or more of the upper cleats 22 are placed in abutment with the lower cleats 32 so as to engage the ribs 24 with the grooves 34. During the latter operation the passenger's other hand holds the end portion of the upper strap 10 away from the lower strap 12 so as to prevent engagement of the fabric fastening strips 38 and 42. As soon as the cleats 22 and 32 are abutted, the end of the upper strap 10 is pressed into engagement with the lower strap 12 whereby the fastening strips 38 and 42 secure the overlapping portions against relative movement. To release the belt the passenger merely grasps the end of the upper strap 10 with either hand and pulls it upwardly and to his right. This single movement separates the fabric fastening strips and allows the cleats 22, 32 to move away from each other. This is an important feature of the invention because it permits an injured person or a child to release the belt easily and rapidly in an emergency. The ease and rapidity of release is augmented by a lever action of the outer cleat 22 which occurs as the free end of the upper strap 10 begins to move away from the lower strap 12, the fulcrum of the lever action being the point of engagement of the outer cleat 22 with the inner cleat 32.

It will be understood that only two opposed cleats 22, 32 need be engaged to provide the fastened belt with the necessary holding strength. Thus, the belt is adjustable between a maximum girth at which the forward upper cleat 22 engages the rear lower cleat 32 and a minimum girth at which the rear upper cleat 22 engages the forward lower cleat 32.

Thus it will be appreciated that the present invention provides a strong effective safety belt which is simple in construction and extremely easy to use. While a preferred embodiment of the belt has been described and illustrated, modifications thereof will be apparent to those skilled in the art and the details thereof are not intended to be limiting except as they appear in the appended claims.

What is claimed is:

1. A safety belt for association with a vehicle seat or the like; said belt having means for securing the same with respect to the seat and having a pair of free end portions of sufficient length to overlap each other and to provide upper and lower superimposable lengths; at least one high strength, rigid fastening member on the lower surface of said upper length at a location rear-

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wardly of the free end of said upper length, said fastening member terminating at its rear end in a fastening surface facing away from said free end; at least one high strength, rigid fastening member on the upper surface of said lower length and said last-mentioned fastening member terminating at its rear end in a fastening surface facing away from the free end of said lower length, the contours of said fastening surfaces being complementary to each other so as to be engageable in mating relationship whereby longitudinal movement of said lengths in a direction tending to separate them is restrained by said fastening members, said fastening members when in engagement forming a fulcrum whereby a lifting force applied manually at the free end of said upper belt to move the forward edge of said upper fastening member away from the lower member is augmented by any force tending to separate said belt lengths in a longitudinal direction; and means on said upper length forwardly of the upper fastening member and on said lower length rearwardly of the lower fastening member for releasably holding said lengths in overlapped relationship.

2. A safety belt as in claim 1 wherein each of said fastening members is a cleat-like element extending substantially across its respective belt length and wherein one of said fastening members defines a groove extending widthwise and parallel to the belt and the other of said fastening members defines a rib complementary to said groove.

3. A safety belt as in claim 1 wherein at least one of said superimposable lengths carries a plurality of longitudinally spaced apart fastening members whereby the extent of overlap of said lengths may be varied.

4. A safety belt as in claim 1 wherein said means for holding said lengths in overlapping relationship includes a fabric base secured to each of said lengths, one of said fabric bases having yarn extending out of the face thereof in the form of hooks, the other of said fabric bases having yarn extending out of the face thereof in the form of loops, said hooks and loops being directly opposed and being adapted to interlock with each other and hold said superimposed lengths in superimposed relationship upon application of pressure.

5. A safety belt as in claim 1 further comprising a flexible strip of material wider than said belt releasably secured to the under surface of said lower superimposable length.

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6. A safety belt for association with a vehicle seat or the like; said belt having means for securing the same with respect to the seat and having a pair of free end portions of sufficient length to overlap each other and to provide upper and lower superimposable lengths; means on said lengths for releasably holding the same in superimposed relationship, said means including a fabric base secured to each of said lengths, one of said fabric bases having yarn extending out of the face thereof in the form of hooks, the other of said fabric bases having yarn extending out of the face thereof in the form of loops, said hooks and loops being directly opposed and being adapted to interlock with each other and hold said superimposed lengths in superimposed relationship upon application of pressure; and abutting fastening means on the opposed surfaces of said lengths for restraining longitudinal movement of said lengths in a direction tending to separate them when said lengths are held in superimposed relationship by said holding means and for readily moving out of abutting relationship when said holding means is released, said fastening means including at least one high strength member on the lower surface of said upper length and at least one high strength member on the upper surface of said lower length, each of said members having a fastening surface facing away from the free ends of the lengths, the contours of said fastening surfaces being complementary to and engageable with each other to effect said longitudinal restraint.

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