United States Patent [19]

Hobbs

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[54] **ARTICULATING LEG SLINGS AND BELT**

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Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 88,681, Nov. 12, 1970, abandoned.

[52] **U.S. Cl.** **182/6**

[51] **Int. Cl.** **A62b 1/14**

[58] **Field of Search** 182/6, 7, 5, 3, 191; 297/385; 244/151

[56] **References Cited**

UNITED STATES PATENTS

572,751	12/1896	Hanna	182/3
1,775,736	9/1930	Rose	182/6
1,642,911	9/1927	Thurnau	182/3
2,252,998	8/1941	Watchtel	182/6
2,979,028	4/1961	Zakely	182/6
2,960,180	11/1960	Watchtel	182/3
2,979,153	4/1961	Hoagland	182/3
3,098,479	7/1963	Storey	297/385
3,322,102	5/1967	Windle	182/3

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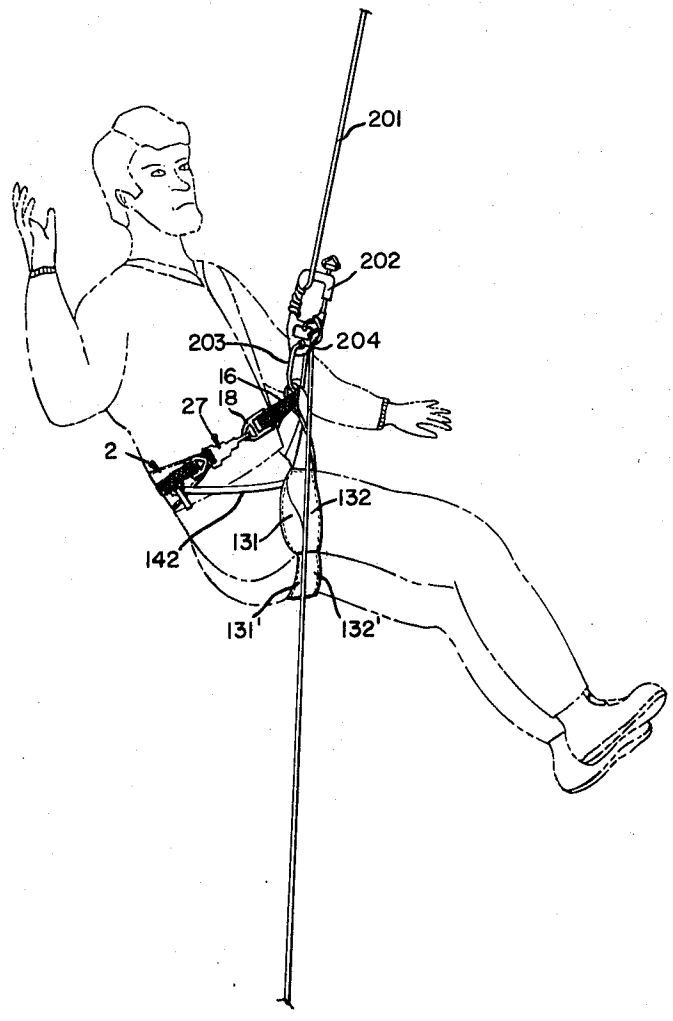
[57] **ABSTRACT**

A pair of independent leg slings connected to a safety belt and adapted for connection to a safety line by means of a carabiner. The leg slings and safety belt providing combined articulation permitting freedom of movement. The belt having an offset fastening means permitting sliding movement along a portion of the belt adjacent the attachment point to the carabiner.

5 Claims, 9 Drawing Figures



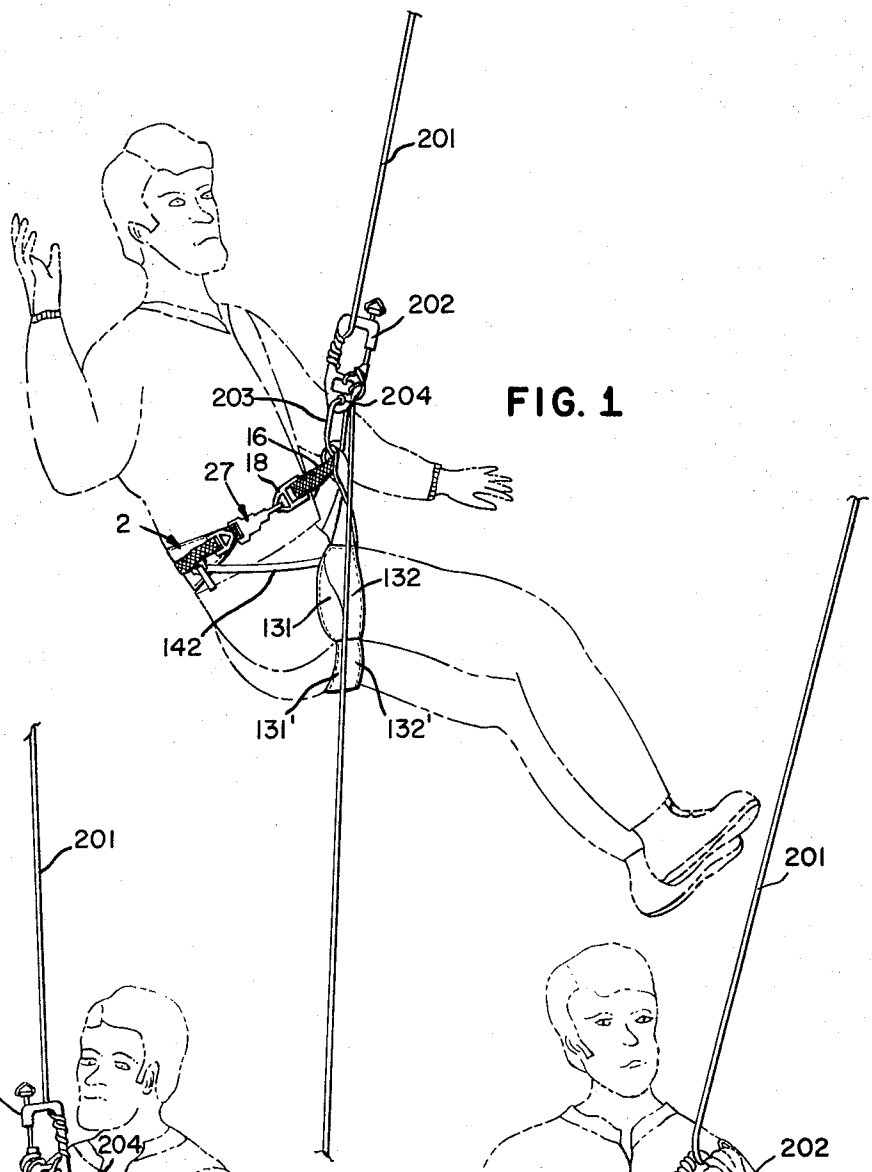


FIG. 1

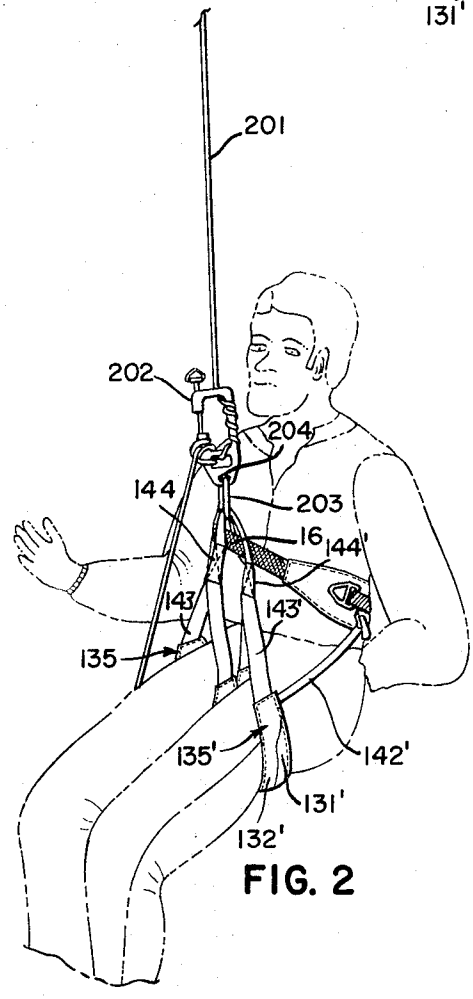


FIG. 2

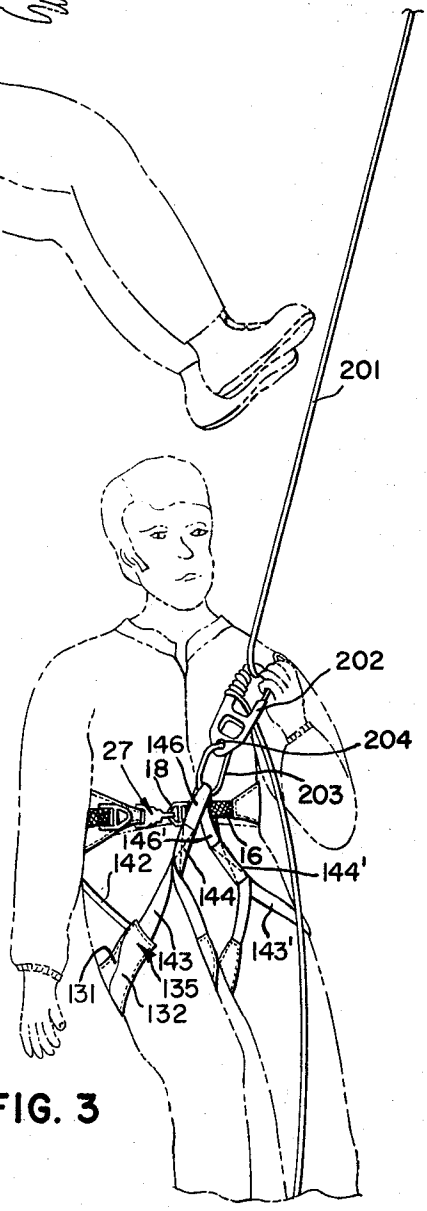
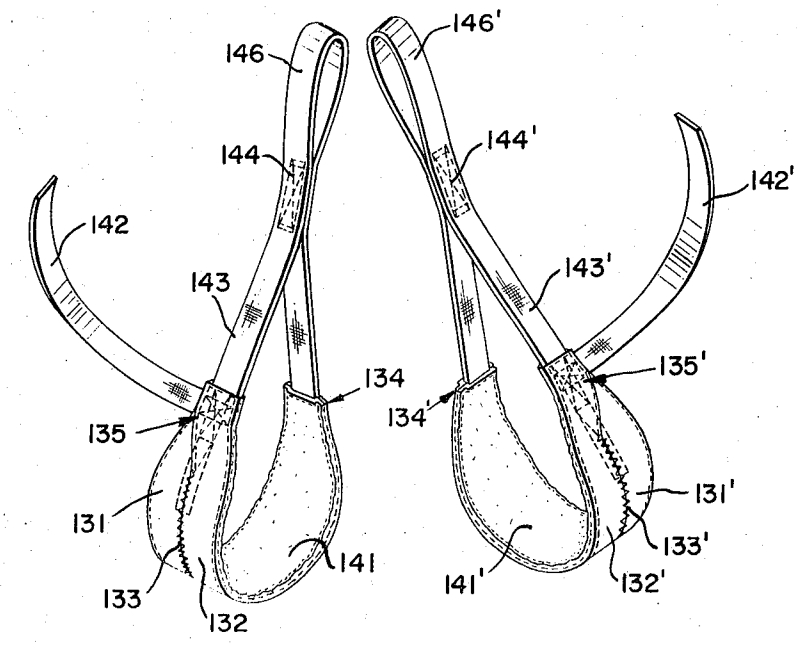


FIG. 3

FIG. 4



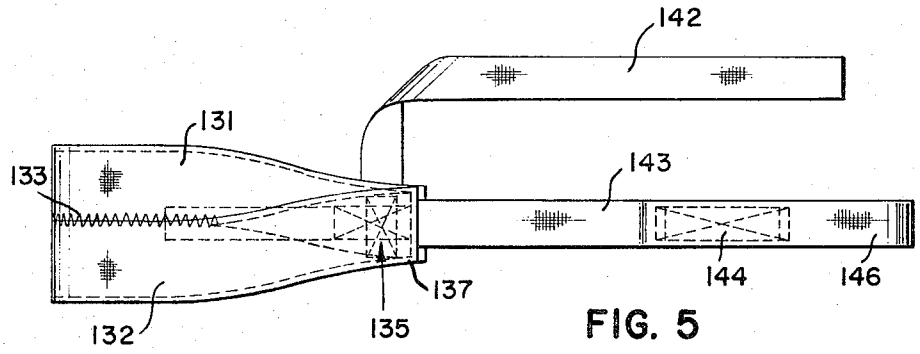
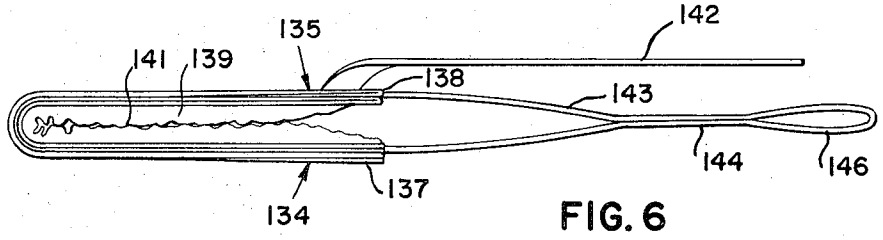


FIG. 5



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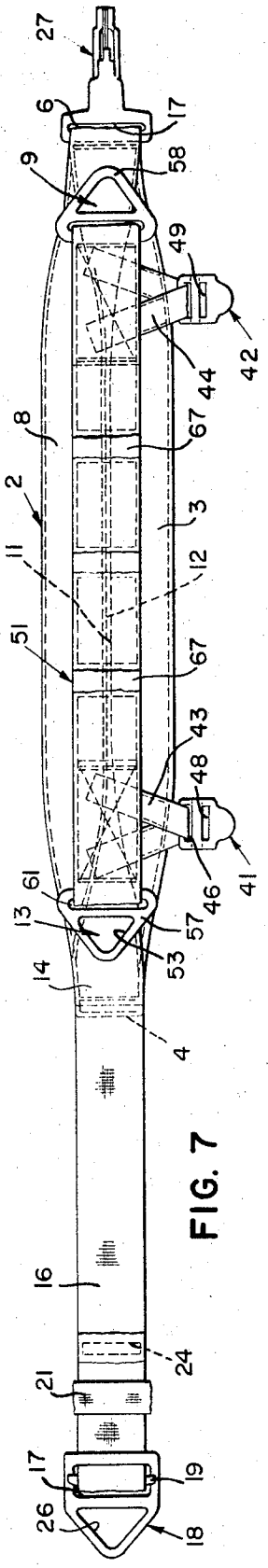

FIG. 7

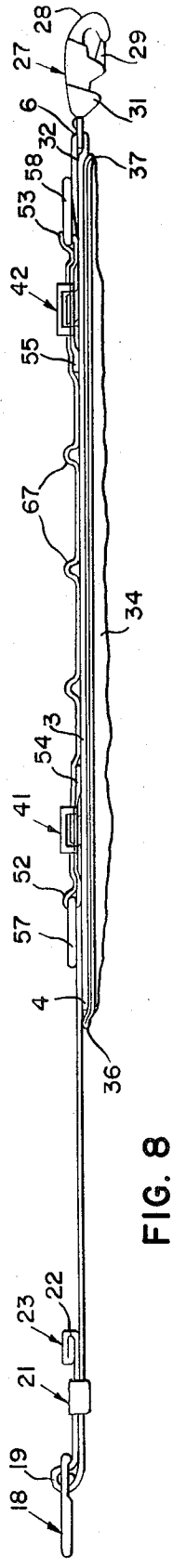

FIG. 8

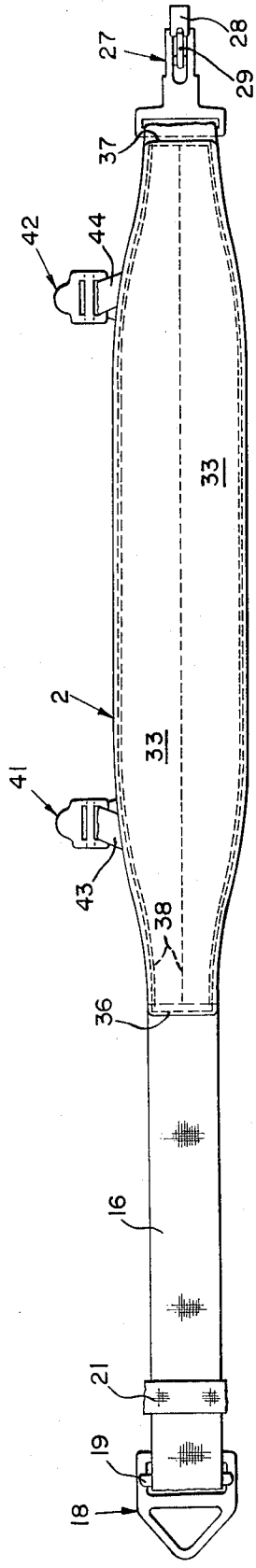

FIG. 9

ARTICULATING LEG SLINGS AND BELT

BACKGROUND OF THE INVENTION

This application is a continuation in part of an application filed Nov. 12, 1970, Ser. No. 88,681 for SAFETY BELT SYSTEMS and now abandoned.

This invention relates to safety apparatus which enables a person to remain comfortably suspended from a line for brief periods of time in order to do tasks at elevated heights, yet have complete freedom of movement to change position and/or move to a new work location.

Present equipment includes tree trimmer harnesses which are too heavy to use in rescue and mountain climbing work and they restrict movement of the wearer unnecessarily. Those harnesses with buckled straps for supporting the leg are uncomfortable as the weight of the wearer rests on the buckle hardware and is not smoothly distributed. Other harnesses for tree trimmers and other workmen provide only a single strap beneath the thighs or buttocks and tend to hold the person's legs together and hamper climbing and lateral movement.

There are also leg loop attachments for climbers but even in this most critical design area, there is a lack of articulation between the loops and the belt permitting the necessary freedom of movement and the straps which prevent downward slipping of the loops are placed so that they can catch on protrusions and restrict freedom of movement. Tree trimmers, for example frequently must slide along a tree limb while seated on the limb. The harness must be completely free of straps and hardware in the posterior area to prevent catching on limb stubs.

SUMMARY OF THE INVENTION

The gist of the present invention is a uniquely constructed pair of leg slings, independently constructed and connected to a specially constructed safety belt so as to permit articulation between all of the elements to provide an unusually unrestricted freedom of movement with an unparalleled degree of support in the sitting working mode of the apparatus.

An object of the present invention is to provide safety equipment for firemen which will enable them to run up a fire ladder with the equipment fully assembled without hampering independent leg movement; permit them to tie off to the top of the ladder or some other protrusion, descend on the line; pick up an accident victim and either place him in another similar set of safety equipment or to descend directly with the victim down the line.

Another object is to provide an apparatus as described above which is equally versatile and will permit tree climbers to climb the tree trunk, tie off, and work at a fixed location without fatigue or pinching the leg supports; will permit them to slide, while seated along branches to reach a different work location without fear of catching the apparatus on limb stubs and other protrusions; and will permit unrestricted spreading of the legs to move laterally about the tree.

Still another object is to provide an apparatus for mountain climbers and rescue teams which is light enough and permits enough freedom of movement so that the apparatus can be worn all day without hampering climbing, will cause the impact of falls to be taken in the thighs and will prevent the safety belt from riding up above the waist.

A further object is to provide a support for workmen such as window washers, steeple jacks, ship painters, structural steel workers and others who must work at fixed elevated locations for extended periods of time while suspended from safety lines.

An objective of the present invention is to provide safety apparatus for the persons and uses stated above which is safe, reliable, economical, and easy to put on and take off after use.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGS. 1–3 are perspective views of a workman wearing the safety apparatus described in the present invention.

FIG. 4 is a perspective view of the leg slings of the present invention.

FIG. 5 is a side view of one of the leg slings shown in FIG. 4.

FIG. 6 is an edge view of the leg sling shown in FIG. 5.

FIG. 7 is a plan view of the outside of a safety belt especially constructed for use with the leg slings of FIGS. 4–6.

FIG. 8 is a side view of the belt show in FIG. 7.

FIG. 9 is a plan view of the inside portion of the belt shown in FIG. 7.

DESCRIPTION OF THE PREFERRED EMBODIMENTS OF THE INVENTION

The present safety belt system briefly comprises: a base 2 having a single length of webbing material of uniform width wherein the first portion 3 of the webbing material extends from a first end 4 a predetermined length and then is looped back upon itself at belt end 6 in superposed attached relation in an area forming a first loop 7. Thereafter a second portion 8 of the webbing continues diagonally at area 9 across the first length portion and thence back toward the first end in edge to edge coupled relation with the first length. Edge 11 of the first length is attached to edge 12 of the second length. Upon nearing the first end, the second portion of the webbing diagonally crosses the first portion at area 13 to an area 14 in superposed position at the first end. The belt system includes attachment means connected to the superposed areas of the webbing which will be explained in greater detail below.

In general, all webbing and cloth used in the construction of the apparatus is 100 percent nylon. The webbing is at least 1 ¾ inches width, rot and mildew resistant and meets rigid safety requirements. The hardware is the same hardware that is used in parachute harness and meets all federal requirements for such items. All the hardware, with the exception of the leg strap retainer buckle has been proof tested to 2,500 pounds.

Referring now specifically to the construction of the basic belt shown in FIGS. 7,8 and 9. The second portion 8 is extended beyond the superposed area 14 providing a single thickness of webbing 16. The extension is passed through an opening 17 in an adjustable V-ring 18 common to parachute harnesses, looped around a brake bar 19, extended back through the opening, through an elastic band 21 and terminates in an end 22. One or more turns are made in the end as shown by arrow 23 and stitched as at 24 to permanently retain the loop and prevent the end of the belt from accidentally passing back through the V-ring. The V-ring has

an opening 26 for receipt of an ejector snap 27 common to parachute hardware. The ejector snap is in the form of a hook 28 with a spring biased gate member 29 closing the opening. The snap is opened by either forcing the spring gate or grasping the lug 31 with the fingers and pulling upwardly as shown in FIG. 2.

The ejector snap is attached integrally to the belt by means of looping the webbing through an opening in the ejector as above set forth and then stitching or otherwise clamping the webbing together at area 32. As explained above, each of the areas where the webbing crosses another portion of the webbing as at areas 9 and 14, except for the adjustable end portions, is securely stitched together.

One of the important features of the invention is the use of nylon fabric 33 padded with polyurethane filler 34 which is stitched to the inside faces of the belts in the doubled portions which are in contact with the body of the belt user. As shown in FIGS. 1,2, and 3, the padding extends from end 36 to end 37. Stitching 38 connects the padding to the webbing.

Another important feature of the invention is the attachment of friction buckles 41 and 42 which are attached to the belt by web straps 43 and 44 by stitching or other means. The straps pass through openings 46 and 47 in the buckles and have another opening 46 and 49 for receiving another strap such as a leg strap to be described.

The basic belt provides a base upon which other attachment devices may be built. As shown in FIGS. 1,2 and 3 a length of web material 51 is stitched to the double width portion of the belt. The length of webbing is folded under at both ends forming loops 52 and 53 and terminating in ends 54 and 55. The loops at both ends hold V rings 57 and 58 by means of the material passing through openings 61 and 62, and openings 63 and 64 are provided to receive snaps from safety belts or other apparatus more fully described below. V rings 57 and 58 are especially useful for linemen and tree trimmers who wish to "tie-off" to the pole or tree using a strap around the pole connected to the V-rings. Half loops 67 may be formed in the strip of material to hold tools, carabiners extra rope and other apparatus.

FIGS. 4,5 and 6 show the leg slings constructed in accordance with the present invention. As in the previous basic belt, the leg slings are constructed of a single length of webbing arranged as previously described. Briefly, the web material forming the leg saddle portion is arranged with a single length 131 in edge to edge relation with another length 132 being joined on line 133. The lengths are diagonally overlapped and stitched together at areas 134 and 135 and are looped in superposed position at 137 and 138. The inside of the saddle is padded with polyurethane foam 139 contained by a nylon cloth 141. A leg strap 142 is attached to the saddle for attachment to the waist belt at friction buckle 41 and 42 to prevent the sling from slipping down the area of the thigh to the knee area nd hampering the climber. A 1 inch nylon strap of webbing material 143 is attached to the saddle portion. The webbing is sewn together in area 144 forming a loop 146 which slidably attaches to the front portion of the safety belt and to a carabiner.

FIG. 4 is a perspective view on a reduced scale of the leg slings shown in FIGS. 5 and 6.

An important feature of the saddle construction is the fact that in the area where the saddle supports the thigh, it is two belt widths wide (belts 131 and 132). At the ends, however, at 137 and 138 where the saddle is in the area of the groin, it is only one width of a belt wide.

The use of the safety belt shown in FIGS. 1,2 and 3, and 7 and 8 is as follows: The belt is placed about the waist of the user with the padded portion next to the user and the friction buckles hanging downwardly. The end of the belt is adjusted in an approximate manner for the waist size of the user by pulling the free end through the adjustable V-ring. The ejector snap is then hooked the the V-ring and the final waist adjustment is made.

The V-rings on the belt may be used for attachment to a safety line, for hanging equipment or for attaching a line about a pole to hold the workman in close relation to his work. The friction buckles may be used for attaching ropes and equipment or for attaching the straps to the leg saddles as will also be discussed below. The loops across the back, as at 67, are used to hold tools, carabiners and ropes.

The parts of the leg sling for the left leg are identical to those described previously for the right leg. The corresponding parts are identified by the same numbers and differ only by being designated by a prime mark (').

Referring to FIGS. 1, 2 and 3, the unique combination of the leg slings and the special safety belt is shown. Note that the ejector snap 27 and V-ring 18 are located to one side of the body of the person wearing the apparatus. The loops 146 and 146' of the leg slings, which are threaded through the belt section 16 are free to slide from side to side as the user works from the line 201. The line is threaded through a Tortuous Grip Rope Brake 202 whch is described in my U.S. Pat. application Ser. No. 147,873 filed May 28, 1971. A carabiner 203 is attached to opening 204 in the Brake Mechanism and loops 146 and 146' are attached directly to the carabiner. The safety belt is not threaded through he carabiner and thus the main load is transferred from the leg slings directly to the line 201.

As mentioned above, there is no restriction on the user for spreading his legs. As shown in FIG. 3, the point of attachment of loops 146 and 146' are separate and they are attached at the belt height.

The straps 142 and 142' do not restrict movement of the legs since they are attached at friction buckles 41 and 42 so that they are snug but without placing any strain on the connecting straps.

I claim:

1. A safety apparatus comprising:

a. a safety belt adapted for positioning about the waist of a person, said belt having an elongated portion free of projections located on its front portion which is adjacent the middle front of the person, and said belt having means attaching its ends located to the side of the person;

b. a pair of leg slings each having a saddle portion adapted for supporting the bottom portion of the thigh of the user, a length of webbing material connected to each end of the saddle portion and forming a closed loop, each of said loops encircling said elongated portion of said belt which is free of projections so that said loops can slide along said belt thereby permitting articulation of said belt and said leg slings, and said loops are adapted for connec-

tion to a carabiner for operable connection to a safety line;

c. a pair of spaced connecting means connected to said safety belt inwardly of said belt attachment means and each being located to the sides of said person for adjustably receiving a strap; and,

d. each leg sling have a strap connected thereto and being adjustably and releasably connected to said spaced connecting means.

2. A safety apparatus as described in claim **1** comprising:

a. said saddle portion of said leg slings having at least a double width at its mid portion adapted for distributing the load at the thigh of a person, and having a single width adjacent its ends adapted for resting against the area near the groin of a person.

3. A safety apparatus as described in claim **1** comprising:

a. said webbing material forming a closed loop being connected to one another adjacent the end of the loop, forming a first small loop adjacent the end area for looping through the safety belt and thereby forming a second larger closed loop with the saddle.

4. A safety apparatus as described in claim **2** comprising:

a. said saddle portion being covered with a padded material on one side adapted for cushioning the load in the thigh area of a person.

5. A safety apparatus as described in claim **2** comprising

a. said saddle portion being constructed from a single length of matrial folded and sewn in edge to edge relation at its mid portion and sewn together at its ends in a double thickness and single width relationship.

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