United States Patent [19]

Yeager

[11] **3,777,309**

[45] **Dec. 11, 1973**

[54] **SAFETY GARMENT STRUCTURE**

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[22] Filed: **Mar. 15, 1972**

[21] Appl. No.: **234,921**

[52] **U.S. Cl.** **2/2.5**
[51] **Int. Cl.** **F41h 1/02**
[58] **Field of Search** ..... 2/2.1 R, 2.5; 9/341, 9/342, 330

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[57] **ABSTRACT**

The safety garment structure is designed for use in the construction industry and is adapted to be supported by the shoulders of the body of the wearer. It includes a pair of front and back panels molded or otherwise formed from suitable light weight material, with the panels being hingedly connected at a pair of opposing side edges. The panels when closed on the body surround and protect the chest and the upper part of the body with adequate clearance between the panels and the body to permit lung and abdominal expansion. The panels are provided with opposing arcuate edges to define the neck opening and arm holes and have a configuration generally following the contour of the body. Releasable fastening means interconnect the other pair of opposing side edges of the panels to permit the panels to be fastened together on the body. At least one of the panels is provided on the outer surface with a staple-like half-loop or grasp. In the event of an accident, as an example, if a tunnel or trench should collapse, it may be possible to remove the workman by a suitable lifting device which would engage the grasp provided on the safety garment structure and lift the workman to safety.

5 Claims, 2 Drawing Figures

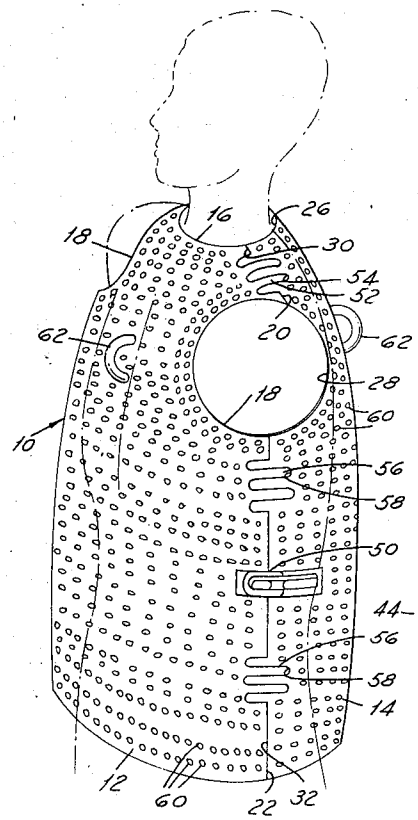


FIG. 1

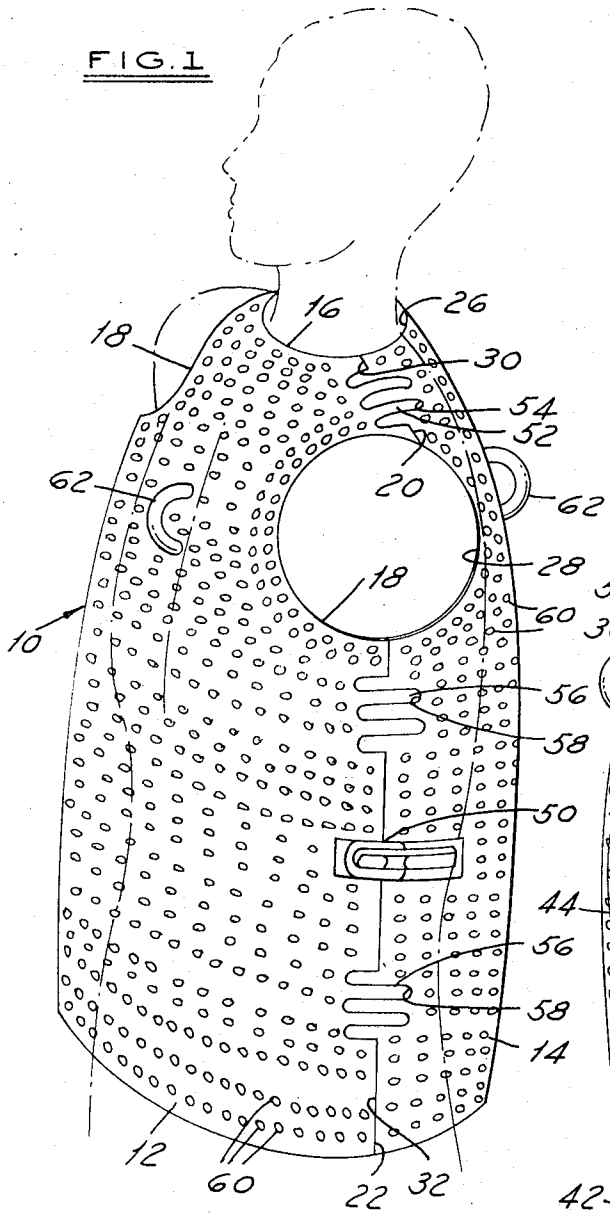
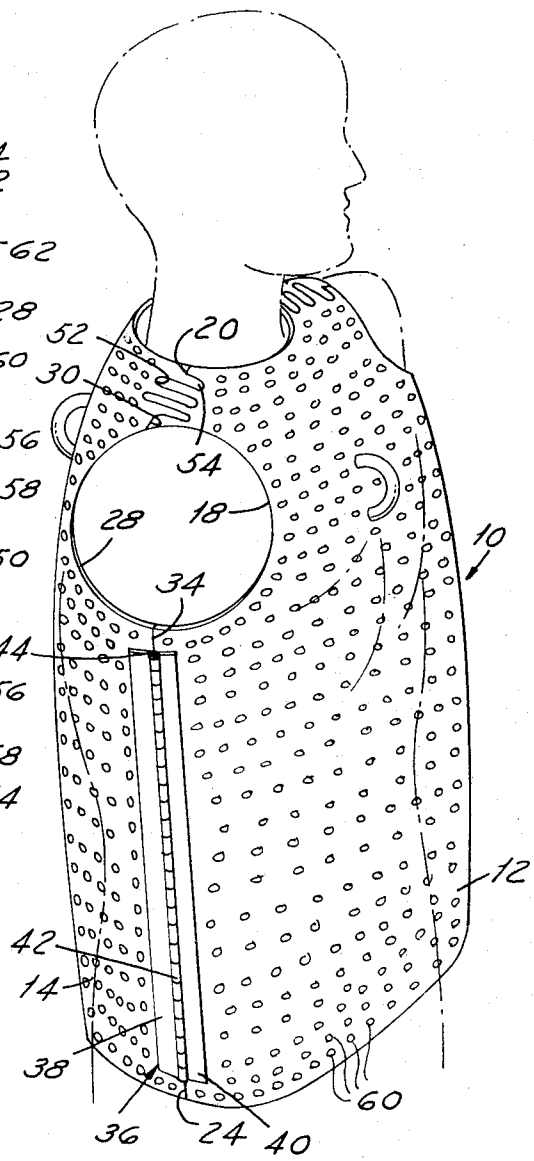

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FIG. 2


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SAFETY GARMENT STRUCTURE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The safety garment structure is particularly suited for use by workers in the construction industry and in particular by persons engaged in the excavation of trenches, tunnels, etc. In the past, even though safety precautions may have been taken by shoring the ground accidents still occur. The shoring or ground collapses trapping the workmen. In the past it has been difficult to remove the injured workmen promptly. The ground and other material must be removed from the area of the trapped workman without injuring him and such removal is normally done manually. The safety garment structure of the present invention protects the upper part of the body from serious injury in the event the workman is trapped by the ground collapsing and in addition a lifting device is adapted to engage the garment structure and help to lift the workman to safety.

2. Description of the Prior Art

Various types of garments, vests and armor devices for protecting the body of the wearer are typified by the following U. S. Pats.: Webster et al., U. S. Pat. No. 2,517,615, Aug. 8, 1950; Lipshitz, U. S. Pat. No. 2,755,475, July 24, 1956; De Grazia, U. S. Pat No. 2,954,563, Oct. 4, 1960; and Blakeney, U. S. Pat. No. 3,337,875, Aug. 29, 1967.Even though the prior art discloses protective vests or devices adapted to cover the front and back of the wearer, such devices are not suitable for use in the construction industry.

SUMMARY OF THE INVENTION

The safety garment structure which is adapted to be supported by the shoulders of the wearer includes front and back panels made from a moldable material, as an example, such as aluminum, a magnesium alloy or a plastic. Each panel is generally of uniform thickness and is substantially concavo-convex in transverse sections so as to follow the contour of the body. The panels are provided with arcuate edges which cooperate to define openings for the neck and for the arms. One pair of opposing side edges of the panels are provided with a hinging device. The other pair of side edges is provided with a releasable fastening device which closes the panels when the structure is mounted on the body.

A feature of the present invention is to provide a safety garment structure made from a material which will suitably withstand the forces exerted by the ground or soil when it collapses around the workman. The safety garment structure must be of a light weight material so as not to unduly interfere with the workman during the performance of his assigned duties. However, it must be sufficiently rigid and firm in order to withstand the forces exerted by the collapsing ground and to thereby prevent serious injury to the upper part of the body.

Another feature of the present invention is to provide on the outer surface of one or both of the panels a staple-like grasp. In certain types of accidents it may be possible to move a lifting device such as a crane to the accident site and to engage the hook of the lifting device with the grasp provided on the garment structure and to thereafter lift the workman to safety.

A further feature of the present invention is to provide on the side edges of the panels provided with the releasable fastening device a plurality of fingers on each edge which are spaced apart, the fingers on each panel being adapted to interfit in the spaces between the fingers on the other panel and help to retain the panels together.

Another feature of the present invention is to provide on the generally horizontally extending edges of the panels connecting the neck opening with the arm openings a plurality of fingers which are spaced apart, with the fingers on each panel being adapted to interfit in the spaces between the fingers on the other panel and help to retain the panels together.

Still another feature of the present invention is to provide panels made from a moldable material, each panel containing a plurality of relatively small air ventilation holes.

A further feature of the present invention is to provide a safety garment structure which is of simple construction, inexpensive to manufacture, has a minimum number of parts, light in weight, compact, easy to put on the body and to remove from the body, effective and efficient in use.

IN THE DRAWINGS

FIGS. 1 and 2 are perspective views of the safety garment structure mounted on a person.

DESCRIPTION OF A PREFERRED EMBODIMENT

The safety garment structure illustrated in the drawings is designated by the numeral **10**. The structure **10** includes front and back panels **12** and **14** respectively. The panels **12** and **14** as illustrated are elongated from top to bottom and each are concavo-convex or slightly curved in transverse sections so as to follow the contour of the body.

The panels **12** and **14** are molded from a suitable relatively light weight material such as from aluminum, a magnesium alloy or from one of any number of plastic materials. It is important that the material selected be rigid enough to withstand the forces exerted by the collapsing ground in order to prevent serious injury to the upper part of the body of the workman.

The front panel **12** includes a first arcuate edge **16** for the neck, a pair of second arcuate edges **18** for the arms and a pair of generally horizontally extending edges **20** overlying and adapted to engage the shoulders of the body. The horizontal edges **20** extend between opposite portions of the first edge **16** and the pair of second arcuate edges **18.** The panel **12** is further provided with a pair of vertically extending side edges **22** and **24** which extend from the second arcuate edges **18** to the bottom of the front panel **12.**

The rear or back panel **14** includes a first arcuate edge **26** for the neck, a pair of second arcuate edges **28** for the arms and a pair of generally horizontally extending edges **30** overlying and adapted to engage the shoulders of the body. The horizontal edges **30** extend between opposite portions of the first arcuate edge **26** and the pair of second arcuate edges **28.**

The first arcuate edges **16** and **26** define a neck opening and the cooperating and opposing pairs of second arcuate edges **18** and **28** define arm openings.

The back panel **14** is further provided with a pair of vertically extending side edges **32** and **34** which extend from the second arcuate edges **28** to the bottom of the back panel **14.**

The opposing longitudinal or vertical side edges **24** and **34** of the front and back panels **12** and **14** are ar-

ranged opposite one another and are connected by a hinging device or mechanism **36.** The hinging mechanism is be in the form of an elongated, vertically and pivotally stable piano type hinge having two elongated hinge elements **38** and **40** which are provided with interengaging-interfitting pintle-like elements **42** throughout their lengths the interfit inhibiting relative vertical shift of the panels **12, 14.** An elongated hinge or pivot pin **44** extends through the pintle like elements **42** to connect panels **12** and **14** for a controlled stable swing thereof to and from the operative positions of FIGS. **1** and **2.** The flanges of the hinging mechanism **36** are secured to the panels **12** and **14** by conventional fastening methods or devices, not shown.

The opposing longitudinal or vertical side edges **22** and **32** of the front and back panels **12** and **14** are arranged opposite one another when the panels are in a closed position as illustrated in the drawing. An appropriate releasable type fastening mechanism **50** secured to panels **12** and **14** by appropriate means, not shown, is interposed between side edges **22** and **32** midway between the arm opening and the bottom of the panels **12** and **14** as shown in FIG. **1.** The fastening mechanism **50** may be opened to permit the panels **12** and **14** to separate or closed to permit the panels **12** and **14** to close as shown in the drawing.

The horizontal shoulder edges **20** and **30** of the panels **12** and **14** on each side of the neck opening are each provided with a plurality of elongated fingers, flanges or elements **52** separated by spaces **54.** The fingers **52** on one edge interfit in the spaces **54** opposite same in the other opposing edge. The interfitting finger construction **52, 54** interlock the panels together. The fingers have substantially the same thickness as the panels, are formed when the panels are molded and when interlocked rest upon the shoulders of the wearer.

The opposing side edges **22** and **32** are also provided on each edge with a plurality of elongated fingers, flanges or elements **56** separated by spaces **58.** The fingers **56** are arranged in upper and lower sections on opposite sides of the releasable fastening mechanism **50** as shown in FIG. **1.** The fingers **56** on one edge **22, 32** interfit in the spaces **58** opposite same on the opposing edge. The interfitting finger construction **56, 58** interlock the panels **12** and **14** and assist the fastening mechanism **50** in maintaining edges **22** and **32** together. The fingers **56** have substantially the same thickness as the panels, are constructed integral with the panels when the panels are molded and when the fingers **56** are interlocked are located at a side of the body of the wearer.

As an optional feature, the panels **12** and **14** are each provided with a series of perforations or holes **60.** The holes **60** are circular in shape and extend completely through the panels **12** and **14** in order to insure adequate air ventilation or circulation. The use of such holes **60** will not destroy the stability or rigidity of the panels. The panels **12** and **14** may be partially or entirely perforated.

The front panel **12** and the back panel **14** are each provided with a generally U-shaped staple like half-loop or grasp **62.** The grasps are mounted externally. Each grasp **62** is located along the longitudinal center line of the garment structure **10** in the area of the panels intermediate the arm openings. The staple like grasps **62** may be secured to the panels **12** and **14** in any appropriate manner. As an example, the ends of the grasps **62** may be threaded and inserted through the panels **12** and **14** with washers inserted over the ends of the grasp and retained thereon by means of nuts threaded on the ends of the grasps **62.** Other conventional type fastening devices may be used to secure grasps **62** to the panels, as an example welding, staples, etc. It should be understood that one or any number of grasps **62** may be provided on one or both of the panels. The staple like grasp or eyelet **62** must be large enough in order to fit over a hook provided on a conventional lifting device.

The safety body garment **10** when mounted on the user is supported by the shoulders. The body garment **10** fits on the shoulders but leaves the deltoid muscles free for movement. The garment structure **10** fits close to the neck as illustrated in the drawings without restricting the sternocleidomastoid. It will be noted by referring to the drawing that adequate clearance is provided between the panels and the upper part of the body to permit normal lung and abdominal expansion. The panels are curved and follow the contour of the body.

What I claim as my invention is:

1. A safety garment structure for use in the construction industry and adapted to be supported by the shoulders of the body of the wearer for protecting same comprising front and back body panels of relatively light weight relatively rigid material for enclosing and protecting the chest and upper part of the body with clearance provided between the panels and the body to permit lung and abdominal expansion, each of said panels being substantially concavo-convex in transverse sections so as to follow the contour of the body, said panels being provided with a plurality of relatively small air ventilation holes, each of said panels having a first arcuate edge for the neck, a pair of second arcuate edges for the arms, a pair of generally horizontally extending edges overlying and being adapted to engage the shoulders of the body, said horizontally extending edges of each panel connecting the first arcuate edge with said second arcuate edges, and a pair of vertically extending edges extending from said second arcuate edges to the bottom of each panel, a vertically elongated piano hinge connecting two opposing vertically extending edges of said panels to stably pivot said panels to one another to permit the structure to be placed on or removed from the body, said piano hinge extending substantially the entire length of said two vertically extending edges, releasable fastening means interconnecting the remaining two opposing vertically extending edges of said panels to permit the panels to be fastened together, said remaining two vertically extending edges on said panels being provided with upper and lower sets of alternate fingers and recesses, said fingers projecting beyond said remaining vertically extending edges and said recesses extending inwardly with respect to said remaining vertically extending edges, the fingers of the upper and lower sets of one panel being adapted to interfit with the fingers of the respective upper and lower sets of the other panel and to extend into the recesses thereof in the closed position of said panels in which said remaining vertically extending edges abut, said recesses being of sufficient depth to fully receive said fingers in said closed position of said panels, said horizontally extending edges of said panels being provided with additional sets of alternate fingers and recesses, the fingers of said horizontally extending edges projecting be-

yond said horizontally extending edges and said recesses of said horizontally extending edges extending inwardly with respect to said horizontally extending edges, the fingers of said horizontally extending edges of one panel being adapted to interfit with the fingers of the horizontally extending edges of the other panel and to extend into the recesses thereof in the closed position of said panels in which said horizontally extending edges of the two panels abut, said recesses of said horizontally extending edges being of sufficient depth to fully receive the fingers thereof in said closed position of said panels, all of said interfitting fingers and recesses when interfitted helping to retain the panels together, said releasable fastening means being located between and spaced from said upper and lower sets of alternate fingers and recesses.

2. The safety garment structure defined in claim **1**, wherein a staple-like grasp is provided on one of the body panels for engagement with a lifting device.

3. The safety garment structure defined in claim **2**, wherein said staple-like grasp is located on the upper half of said one panel midway between the second arcuate edges thereon.

4. The safety garment structure defined in claim **1**, wherein a pair of staple-like grasps is provided on the body panels, one grasp on each of said panels, each grasp being adapted to engage a lifting device.

5. The safety garment structure defined in claim **4**, wherein the grasp on each of said panels is located on the upper half of the panel midway between the second arcuate edges thereon.

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