

[54] **BANDAGE SHOCK ABSORBERS FOR SAFETY HELMETS**[75] Inventor: **Ronald Spencer-Foote**, Brooklyn, N.Y.[73] Assignees: **James J. Curran**, Woodside; **Robert J. O'Connell**, Flushing, both of, N.Y.; part interest to each[22] Filed: **Mar. 23, 1972**[21] Appl. No.: **237,366**[52] U.S. Cl. .... **2/3 R, 2/185 R, 206/63.2 R, 206/DIG. 14, 206/DIG. 30**[51] Int. Cl. .... **A42b 3/00**[58] Field of Search ..... **2/3, 5, 6, 185 R, 199; 206/63.2 R, 46 AP, 46 SG, 12; 239/36; 128/163, 155, 156; 229/62.5; 222/546, 563**[56] **References Cited****UNITED STATES PATENTS**

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Primary Examiner—James R. Boler

[57] **ABSTRACT**

This invention is an improvement in the shock absorbing capability of protective headgear in a combination

with a method of storing and carrying first aid wound dressings, particularly in protective headgear such as helmets as worn and used by firemen, military personnel, industrial and construction workers, miners, police, fliers, sports participants, and the like.

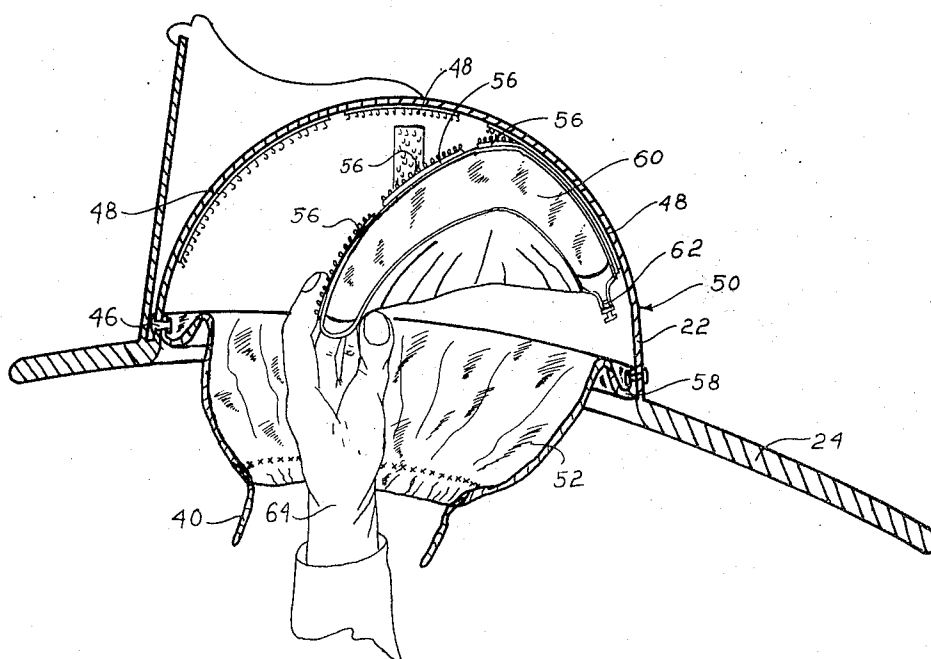
The invention comprises a large wound compress bandage made of a resilient, compressable, expandable, fluid absorbing material that is sealed inside a fluid proof and contamination proof single or multiple walled container.

The compress may or may not be treated with various materials to effect antiseptic, medicative, coagulative, or extra absorbent qualities and the like.

The invention comprises a compress bandage within a container, that is removably fastened and carried within the space available, in helmets commonly in use, that exists between the outer rigid shell of the helmet and the head harness suspension that encompasses the head of the wearer. The compress bandage container enclosing the bandage is fitted with a two-way valve, whereby the space between the inner and outer walls of the bandage container may be filled with a fluid.

According to this invention, the compress bandage container is shaped to fit in a cap-like manner over the top of and around the periphery of the head of the wearer in the space that exists between the top of the suspension and the inner surface of the outer rigid shell of the helmet dome.

This invention teaches that the suspension of the helmet may be comprised in its entirety of the compress bandage container alone, when the compress bandage container is releasably or permanently fastened to the inner surface of the outer rigid shell.

**10 Claims, 14 Drawing Figures**



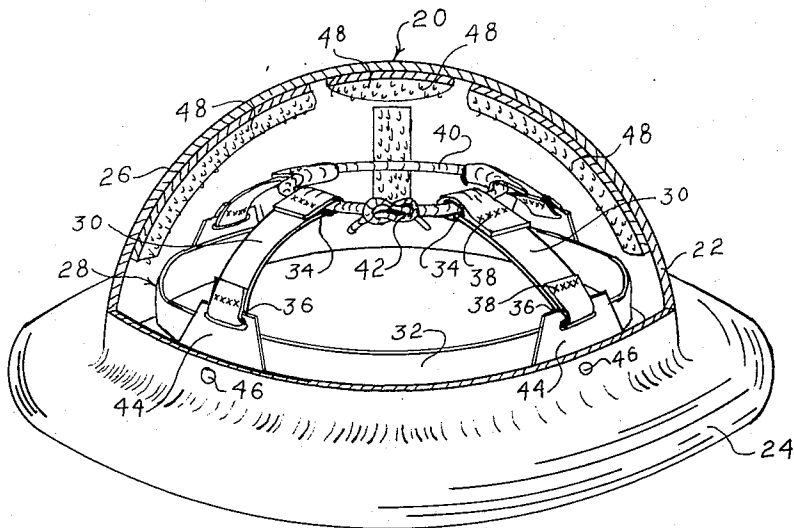


FIG. 1.

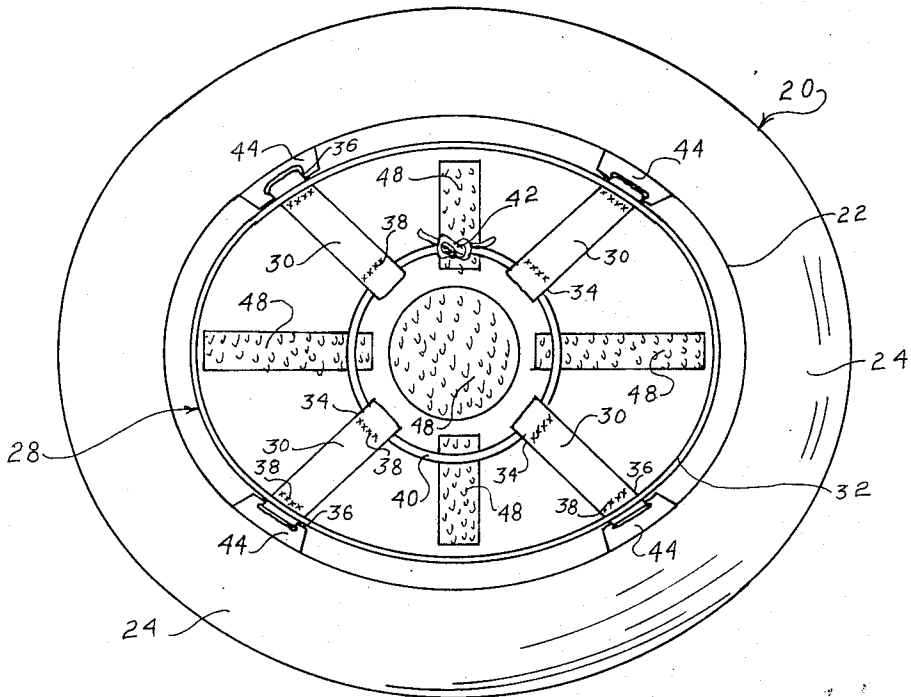


FIG. 2.



SHEET 2 OF 6

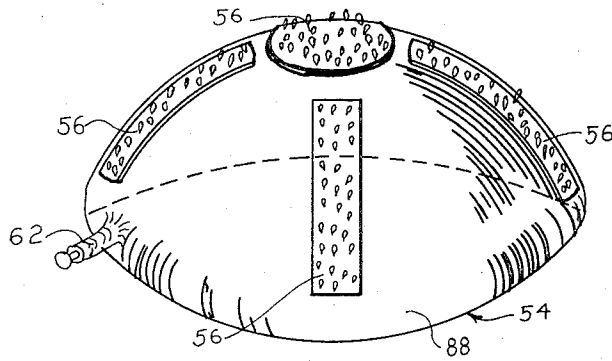


FIG. 3.

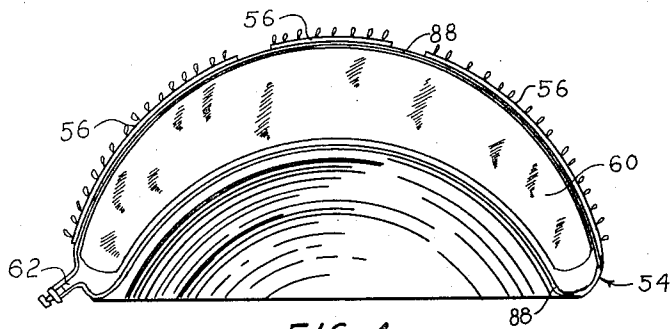


FIG. 4.

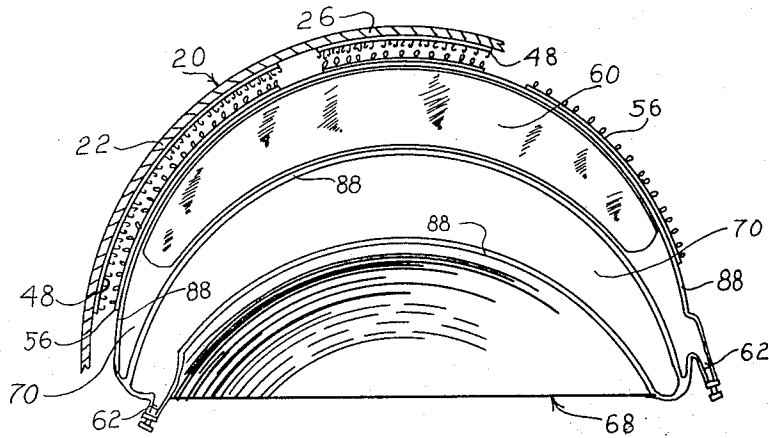


FIG. 5.



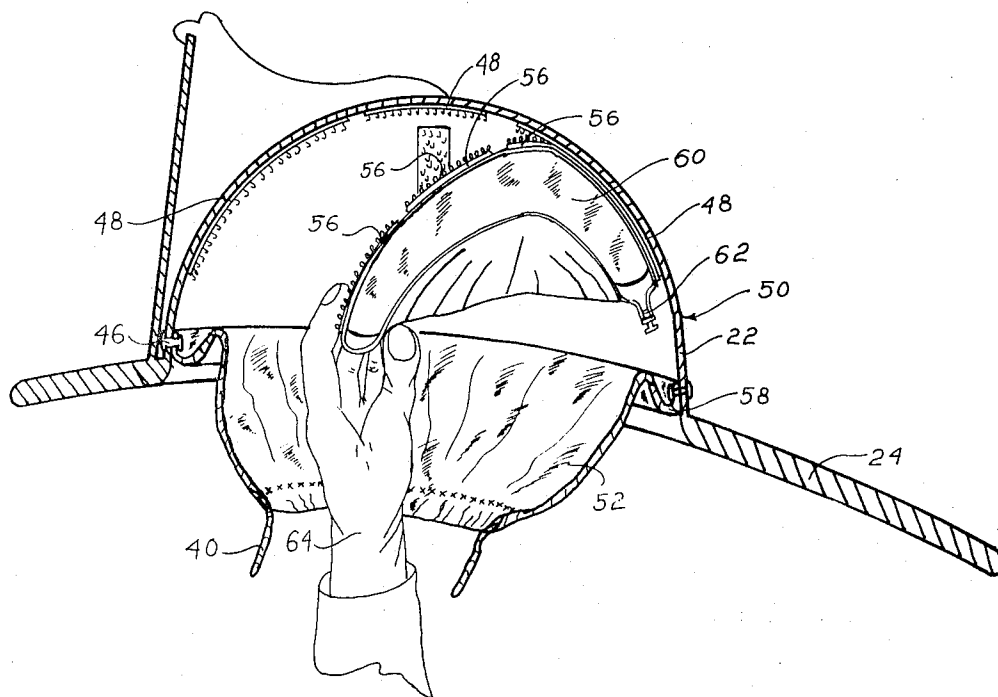
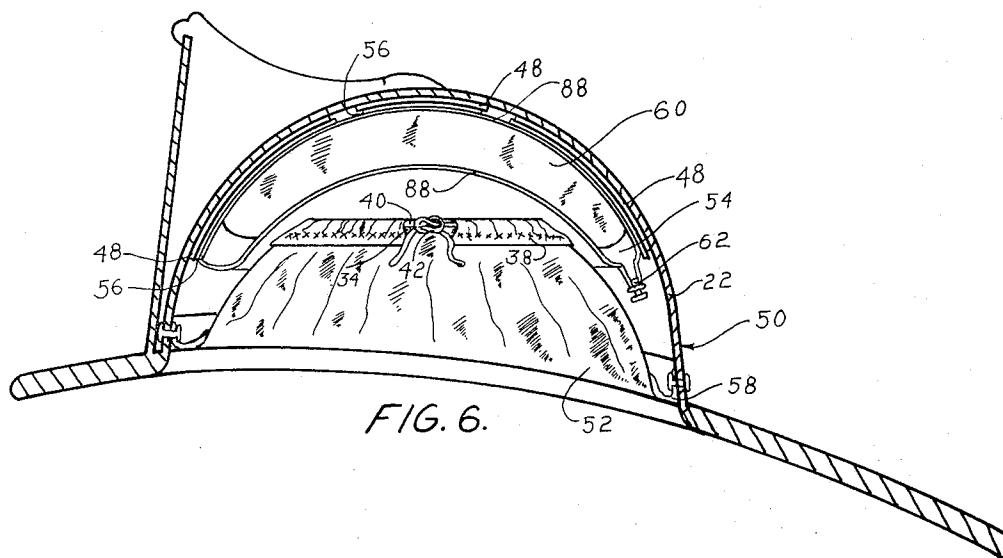
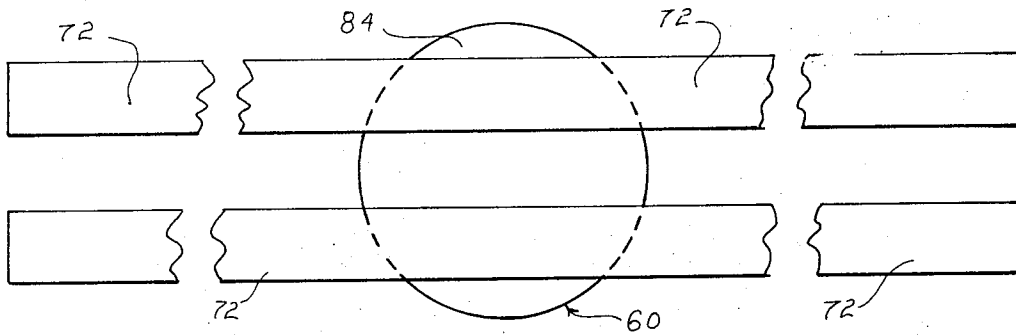
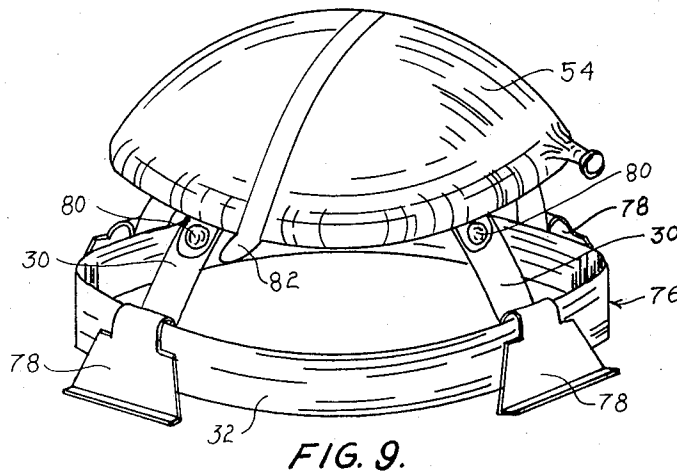
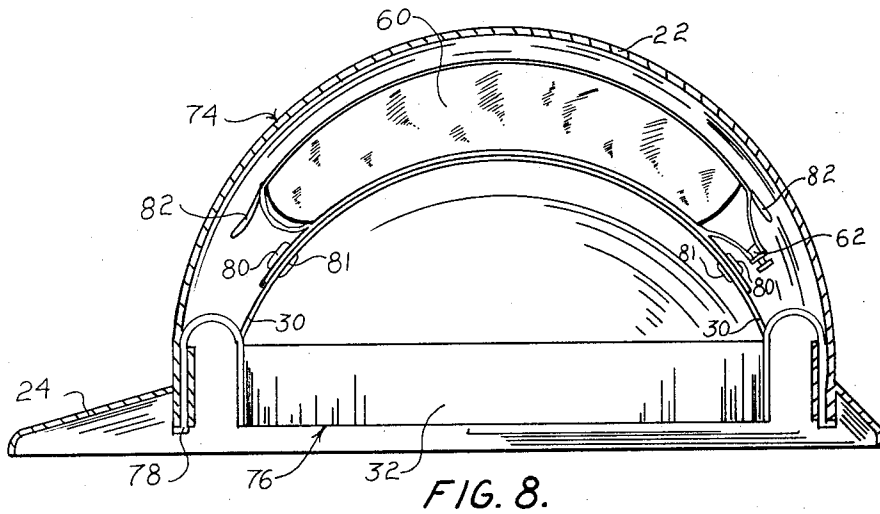


FIG. 7.







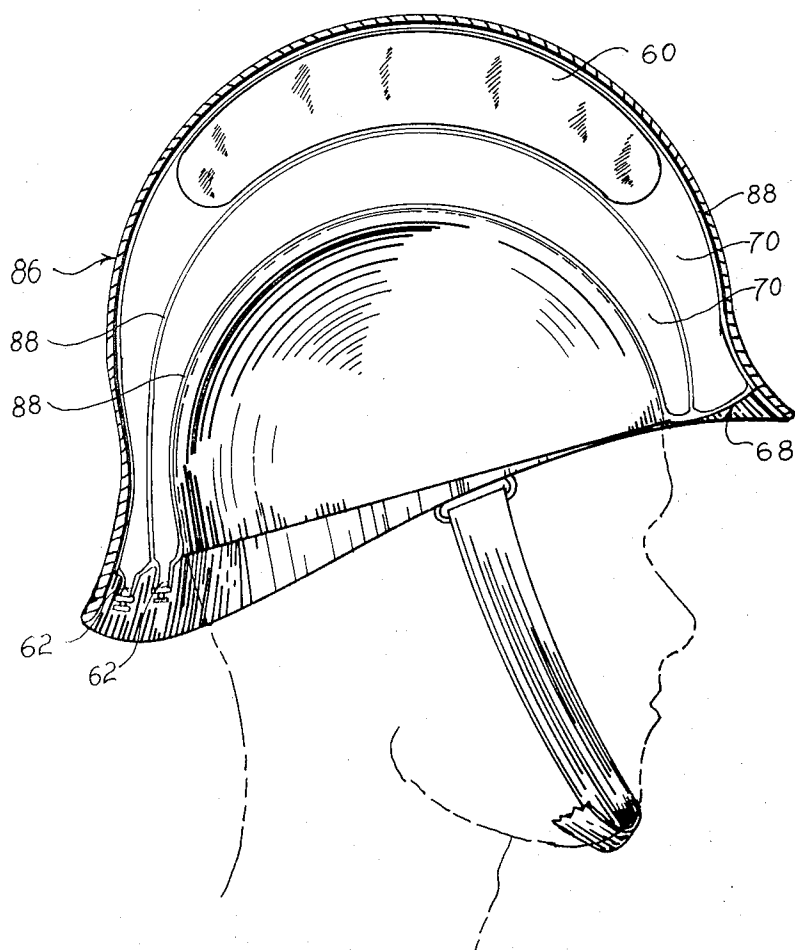


FIG. 11

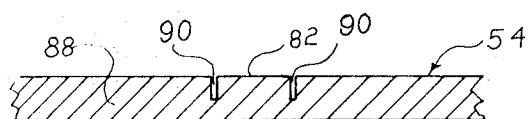


FIG. 12



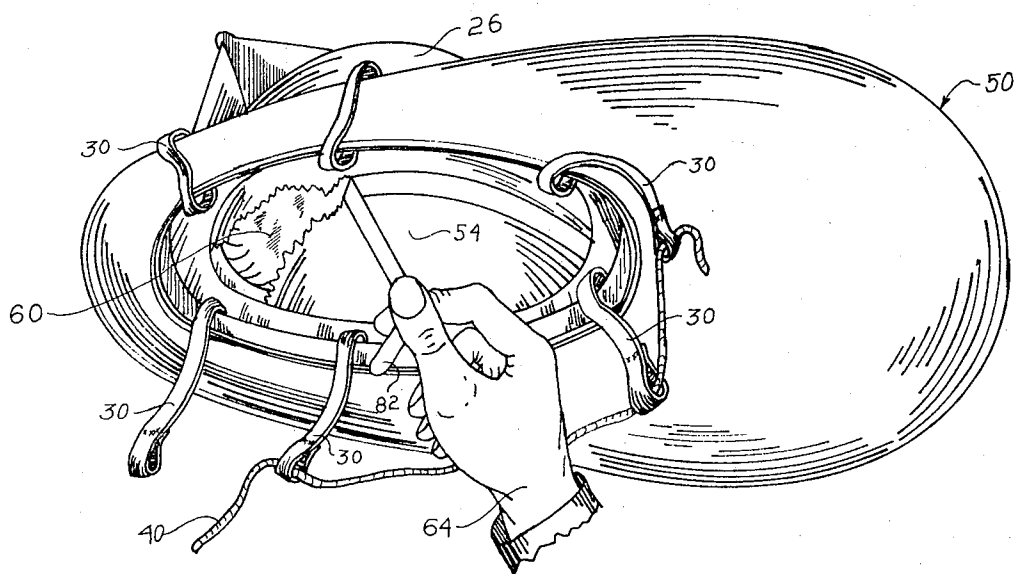


FIG. 13

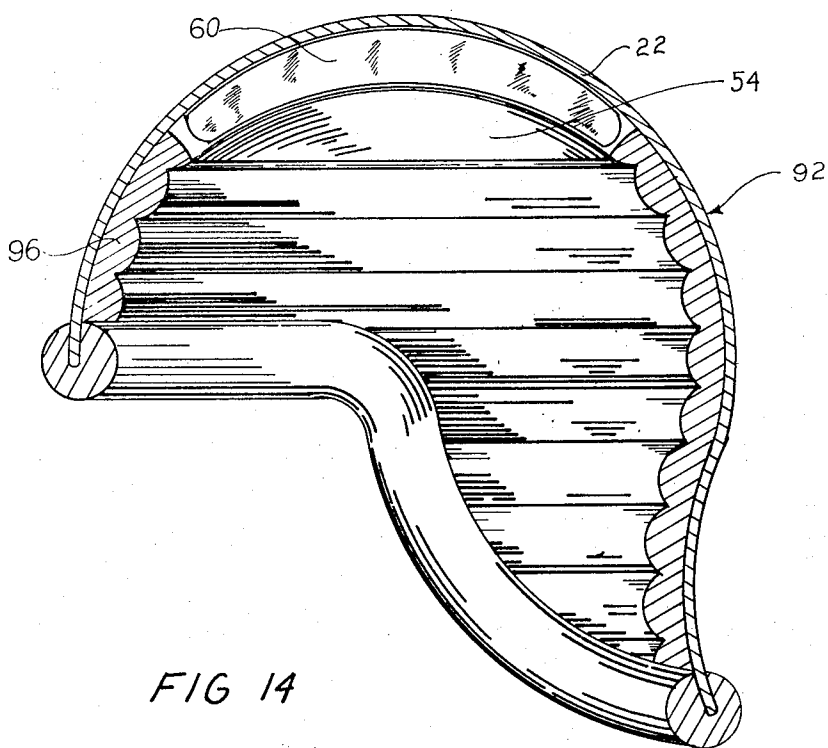


FIG 14



## BANDAGE SHOCK ABSORBERS FOR SAFETY HELMETS

### BACKGROUND OF THE INVENTION

The present invention relates to protective safety helmets as used in industrial, military, and civil usage. There are several types of helmets in general use. A type commonly used consists of an outer shell made of a rigid material and an inner means of suspension, consisting of a web-like arrangement of straps that are fastened to the lower portion of the helmet dome or brim and joined together at the apex of the suspension by means of a drawstring that is threaded through hemlike apertures, formed into the upper terminal ends of the straps that constitute the suspension. Vertical adjustment of the helmet shell in relation to the wearer's head is accomplished by tightening or loosening the drawstring within the hemlike apertures at the upper terminal ends of the suspension straps. After vertical adjustment has been accomplished, the drawstring is securely tied and thereby the desired adjustment is fixed into its position. Lateral adjustment between the helmet shell and the wearer's head is accomplished by means of an adjustable band or strap that surrounds the wearer's head and is connected to the helmet shell by offset means that maintain the lateral strap at a given distance from the inner sides of the helmet shell. In helmets of this general type, there is maintained an air space, completely surrounding the wearer's head circumference, which varies somewhat, depending upon the shape of the helmet dome or crown and the shape or size of the wearer's head within said dome. In some helmets in general use, the suspension is formed by a cap-like, hemispherical, truncated structure made of cloth-like material that is fixedly attached to the base of the helmet dome and joined together at the top by a drawstring that is threaded through a hem sewn into the truncated apex of the cap-like structure.

Prior art teaches that some forms of helmets in use, as used by fliers, or motorcyclists, etc., are of a construction that consists of a rigid outer shell and a resilient inner liner, permanently or detachably fastened to the outer shell. In this type of helmet, the liner is the suspension and is constructed of a resilient padding, attached to the helmet shell by means of adhesive, rivets, snap fasteners, buckles, or like means. The liner fits snugly to the head of the wearer, both vertically and circumferentially. A disadvantage of this type of helmet is that it must be fitted closely to the size and shape of the individual wearer's head. The invention overcomes this fault of the prior art by being adjustable. In the cases of helmets constructed with an inner web-like suspension, failure of the drawstring or other component parts of the suspension results in contact of the outer shell of the helmet with the wearer's head, resulting in transmission of the inertial force applied to the outer surface of the helmet shell from any direction to the head of the wearer. In the case of a soldier engaged in battle, who receives a severe blow to the top of the helmet, the energy of the blow is transmitted, when the suspension fails, through the helmet shell, directly to the head of the soldier, resulting in a serious or fatal wound. Soldiers are prepared in a manner to expect wounds in battle, and for that reason, are equipped with a battle dressing or wound compress which they

normally carry into action as an accoutrement in a pouch, fastened to their cartridge belt, or elsewhere.

When an industrial worker or fireman or police officers are injured or wounded, the means for immediate treatment of the injury are not usually instantly available. On construction jobs, the first aid treatment means are usually kept at a central point, usually some few feet or possibly several miles from the actual position of work and/or injury. When injury does occur, the injured worker must be either brought to the place of injury treatment, or the first aid treatment means must be brought to the injured worker, resulting in valuable time being lost, specifically in the event of severe bleeding, or an open wound exposed in a contaminated atmosphere.

When firemen or policemen are injured, similar circumstances generally prevail as the first aid treatment means are usually stored on the fire apparatus or in police patrol cars, while the injured fire or police man may be operating at some distance from the apparatus or patrol car, and, possibly alone.

### SUMMARY OF THE INVENTION

Provide means and a method which will avoid the aforementioned faults of the prior art.

In particular, it is an object of the present invention to provide a compact, sterile, antiseptic, medicated, compressible, expandable, absorbent, wound dressing, which may be rapidly available to an injured person.

Specifically, it is an object of the invention to seal the wound dressing inside of a single or multiple-walled container, which container is fluid and contamination proof.

It is an object of this invention to fasten the wound dressing container to the inside of the outer shell of the helmet.

Particularly, it is an object of this invention to fasten the wound dressing container to the upper portion of the helmet suspension.

This invention has an object within its structure a single or multiple impermeable wall or walls, dividing the dressing container into compartments for storage of fluids or materials, such as medication.

Particularly, it is an object of this invention to provide a shock absorbing buffer in the vacant space that exists in helmets generally used, which buffer is to be a first aid wound dressing, made of a resilient material, and its container.

Also, it is an object of this invention to provide a two-way fluid valve on one or more of the multiple sections of the wound dressing container, to permit the insertion or removal of a fluid.

Furthermore, it is an object of this invention to form an impact absorbing helmet liner, complete of itself, within the helmet shell, out of the first aid wound dressing, in concert with its container.

### BRIEF DESCRIPTION OF DRAWINGS

The invention is illustrated by way of example in the accompanying drawings which form part of this application, and in which:

FIG. 1 is a partially sectional elevation of a helmet, showing the internal structures and suspension arrangement commonly in use.

FIG. 2 is a plan view of a helmet viewed from underneath, looking into the interior of the helmet dome.



FIG. 3 is a view of the bandage container with looped fastening tapes attached.

FIG. 4 is a sectional elevation of a bandage container showing the bandage in position of storage.

FIG. 5 is a sectional elevation of a multiple walled bandage container, showing its relation to a partial section of a helmet dome.

FIG. 6 is a sectional elevation of a fireman's type of helmet with the bandage container in position.

FIG. 7 is a sectional elevation of a fireman's helmet showing the bandage container in the process of being removed from the helmet.

FIG. 8 is a sectional elevation of a commonly used helmet that utilizes a removable suspension.

FIG. 9 is a view of a removable suspension shown in FIG. 8 with bandage container attached to it.

FIG. 10 is a plan view of a type of wound dressing bandage applicable to this invention.

FIG. 11 is a sectional elevation of a military type helmet showing a multiple walled bandage container, used as both container and helmet suspension.

FIG. 12 is a sectional elevation of a portion of the bandage container wall.

FIG. 13 is a view of a fireman's helmet with a web strap type of suspension, showing a bandage container attached to the inner surface of the helmet dome being torn open.

FIG. 14 is a sectional elevation of a flier's type of helmet.

#### DESCRIPTION OF PREFERRED EMBODIMENTS

Referring to the drawings FIG. 1 illustrates a helmet 20 known in the prior art and in common general use that has been adapted for the present invention by having permanently attached to the inner portion of the dome part 26 of the rigid outer shell 22 the hooked fastening tapes 48 in the positions shown. The helmet consists of the rigid outer shell 22, the brim 24, the dome 26 the suspension assembly 28 with its straps 30 and suspension anchors 44 which are fastened to the lower part of the dome 26 by rivets 46 passing through the rigid outer shell 22. The straps 30 are passed through the suspension anchors 44 and then stitched 38 back on to themselves forming a hemlike aperture 36 which holds the strap 30 to the helmet 20. The straps 30 are joined together at their opposite end by a drawstring 40 that passes through hemlike apertures 34 that are formed by stitching 38 at the upper end of the straps 30. The upper end of the straps 30 are then releasably connected together by adjusting the drawstring 40 to the desired position and fastening it with a knot 42.

FIG. 2 illustrates a bottom view of the same helmet 20 with the suspension assembly 28 in position and secured by the drawstring 40 releasably fastened by the knot 42. The hooked fastening tapes 48 are shown in position fastened to the inner part of the dome 26 by a means such as adhesive.

FIG. 3 is a view of a single-walled bandage container 54 that has a wall 88 that completely surrounds the contained space made of an elastic, impermeable type of material, such as rubber or plastic. The looped fastening tapes 56 are permanently fastened to the upper outer surface of the container 54. The container 54 is fitted with a two way valve 62 to permit the admittance or expulsion of a fluid. The bandage container 54 in this illustration is formed into the shape of a skull cap so as to permit releasable attachment of its uppermost

surface to the innermost surface of the interior of the helmet 20, dome 26.

FIG. 4 is a sectional view of the bandage container 54 showing the encompassing wall 88 that entirely surrounds the bandage 60 and with the flexible two way valve 62 in a position where it may receive within the walls 88 of the container 54 a liquid or gaseous fluid, which may be used as a coagulant, antiseptic, anesthetic, or for other medical uses, and thereafter, release same from confinement within the structure of the invention. This view also shows the looped fastening tapes 56 situated upon the upper circumference of the uppermost wall 88 of the bandage container 54.

FIG. 5 shows a partial section of the dome part 26 of the outer rigid shell 22 of the helmet 20 with the hooked fastening tapes 48 permanently fastened adhesively to its lower surface and a multiple walled bandage container 63 with the looped fastening tapes 56 permanently fastened in position on its outer wall 88 surface so as to engage with loops the hooks of the hooked tape 48. The nature of this type of fastening tape which is prior art and is commonly available is that when the hooked and looped tapes are pressed together, a fastening is achieved that may be released by tearing the two tapes apart by a pulling force on either one. In this manner, the bandage container 54 in FIG. 3 and 4 or 68 in FIG. 5 may be releasably fastened within the dome 26 of the helmet 20. This bandage container 68 is formed of a multiplicity of impermeable walls 88 which form a multiplicity of separate containing spaces 70 that are capable because of the impermeability of the wall structure 88 of maintaining within each space 70 the integrity of the bandage 60, or other materials contained therein.

FIG. 6 shows the invention with the bandage container 54 releasably fastened within the dome 26 of a fireman's type of helmet 50 by means of the hooked fastening tape 48 being engaged with the looped fastening tape 56. Prior art teaches that this type of helmet utilizes a suspension in the form of a truncated cloth cap 52 which is adjusted at the top by means of a drawstring 40 that is threaded through the stitched 38 hemlike apertures 34 and then fastened with a knot 42.

Referring to FIG. 7 it will be seen that when the caplike suspension 52 is pulled from out of the dome 26 of the helmet 20 and the knot 42 is released to free the drawstring 40 the hand 64 may be inserted into the helmet dome 26 of the helmet 20. By grasping the edges of the bandage container 54 it may be pulled away from the interior surface of the dome 26 thus releasing the fastening means formed by the engagement of the hooked and looped fastening tapes 48 and 56.

Another embodiment of the invention is shown in FIG. 8 which shows a common type of miners or workmen's helmet 74 that comprises a rigid outer shell 22 and a removable suspension assembly 76. Prior art shows that the removable suspension assembly 76 is held within the helmet 74 by means of suspension anchors 78 that slideably fit within recesses that are formed into the rigid outer shell 22 of the helmet 74 and said anchors are fixedly connected to the suspension strap 30 and the headband 32. By exerting a pulling force on the suspension assembly 76 it may be entirely removed from the helmet 74 as shown in FIG. 9. In the drawing the bandage container 54 is shown releasably attached to the removable suspension assembly 76 by means of the snap fasteners 80 and 81 which



fasteners are releasably coupled together the male 80 with the female 81 which is fastened to the strap 30. Either the single walled bandage container 54 or the multiple walled bandage container 68 as shown in FIG. 5 may be so attached to this form of removable suspension assembly 76. Another embodiment of the invention as shown in FIG. 9 is a pull tab that comprises a weakened section of the bandage container 54 that facilitates tearing open of the bandage for use either before or after the contained fluid has been removed from the bandage container through the two way valve 62.

A bandage compress 60 of a type adaptable for use with this invention is shown in FIG. 10. The tie tapes 72 are permanently attached to the absorbent compress 84 so that the compress 84 may be bound to a wound when used.

FIG. 11 is an embodiment of the invention where the bandage container 68 forms the suspension of the helmet 86. In the drawing the helmet 86 shown is a military type of helmet, however, this embodiment of the invention may be used with any form of helmet to accomplish its use as a helmet suspension. The drawing shows the multiple walled bandage container 68 adhesively fastened directly to the interior of the helmet 86. The multiplicity of walls 88 separate the interior of the bandage container 68 into separate compartments 70 that are able to maintain the integrity of the individual compartments by reason of the impermeable character of the walls 88. The valves 62 are positioned to admit the filling of the separate compartments 70 with fluids, which fluids may be extracted from said compartments by the same means. The walls 88 of this embodiment of the invention are impermeable and elastic. It may be seen that with the helmet placed upon the head of a wearer, sufficient fluid may be inserted into one or more of the fluid container compartments 70 of the compress bandage carrier 68 to form a snug fit upon the head of the wearer of the helmet. The fit may be adjusted by the increase or diminution of the amount of fluid contained within the multiplicity of compartments 70 of the compress bandage container 68 by means of the two way valves 62. The innermost wall surface of the bandage container may be lined with a clothlike substance for comfort of the wearer. This type of bandage container may also be fitted with a pull tape 82 which constitutes a weakened section of the container walls 88 in order to facilitate opening as shown in FIGS. 9, 12, 13.

Referring again to FIG. 11, the bandage 60 is shown in the uppermost compartment 70. However, it may be carried in any compartment.

FIG. 12 is a sectional elevation of a portion of the bandage container 54 showing the pull tab 82 that forms of itself a portion of the container wall 88. When forcibly pulled, it separates itself from the container wall 88 because of the weakening cuts 90 that are incised into the container wall 88.

FIG. 13 is a view of a Fireman's helmet 50 showing the bandage container 54. Fastened to the interior of the dome 26, the suspension straps 30 and the drawstring 40 are in a released position by reason of unfastening of the knot 42 as shown. The hand 64 is shown gripping and pulling the pull tab 82, thereby tearing open the bandage container 54 by removing the pull tab 82 from the container walls 88 and exposing the

bandage compress 60 which may now be easily removed and used.

FIG. 14 is a sectional elevation of a motorcyclist's type of helmet 90 that is known in the prior art and is comprised of a rigid outer shell and a cloth covered liner 96, usually composed of a resilient spongelike material 96 that is quilted and adhesively fastened in place, such as foam rubber, plastic, or the like. An embodiment of the invention is shown in FIG. 14.

In the prior art, the quilted liner usually surrounds the entire portion of the wearer's head that is covered by the rigid outer shell 22. The invention embodiment of this instance improves upon the prior art by replacing a portion of the resilient liner 96 with a bandage 60 of a similar resilient material within a container 54, which container may or may not be filled with a fluid and releasably fastened within the interior of the helmet 92.

What is claimed is:

1. A sterile first aid wound dressing in combination with a protective safety helmet, said helmet comprising a hard outer shell and a head enclosing inner liner which liner affords suspension and support of the hard rigid outer shell of said helmet upon the head of a wearer such as policemen, firemen, military personnel, et al, said sterile first aid wound dressing constituting a bandage comprising a plurality of layers of gauze surrounding a filling of fibrous material said bandage being fitted within the available space existing between said head enclosing harness and rigid outer shell of said protective safety helmet, an air and fluid impervious container surrounding said bandage for maintaining said bandage sterile, the outer surface of said container conforming to the shape of the interior of said hard outer shell over a substantial area thereof to thereby provide added protection to the wearers head against severe blows delivered to said outer shell.

2. The combination of claim 1 and wherein said sterile first aid wound dressing and said container are hemispherically shaped and formed into a cap-like structure means releasably fastening said container within the interior of said protective safety helmet so as to store said container and said sterile first aid wound dressing within the interior of a protective safety helmet and to allow removal of said wound dressing from the interior of the protective safety helmet for use in the medical treatment of wounds.

3. The combination of claim 1 wherein said container is an air and fluid impermeable walled container constructed of a plastic material such as polypropylene so molded as to form a hemispherical cap-like structure capable of maintaining an airtight integrity within the container and said container with said sterile first aid wound dressing therein being positioned within the space existing between the inner head liner and the hard outer shell of said protective safety helmet, said container being releasably fastened to the outer shell by a releasable fastening means comprising hooked and looped filamented fabric fastening tapes, said impermeable walled container capable of maintaining said bandage in a sterile condition within said container structure.

4. The combination of claim 3 and wherein the combination of a protective safety helmet and a first aid wound dressing stored within an impermeable walled container including at least one impervious wall entirely surrounding the wound dressing, said wall to be



structured of a fluid impervious plastic like material and sealed air tight and so formed into a hemispherical shape so as to entirely surround the upper portion of the head of the wearer of a protective safety helmet in the space that is commonly available between the inner head harness and the outer shell of a protective safety helmet.

5. The combination of claim 4 wherein said container comprises a multiplicity of separate individual compartments each separate compartment maintaining its individual integrity from the multiplicity of other compartments by means of being entirely separated therefrom by having the compartment area entirely surrounded by a plastic like air and fluid impervious material such as polypropylene such compartment being thoroughly sealed by adhesive means, said sterile first aid wound dressing being enclosed in one of said compartments.

6. The combination of claim 3 wherein the looped part of said hooked and looped filamented fastening tape is permanently fastened by fastening means to the outer surface of said container and said hooked part of said filamented fabric fastening tape is secured by adhesive fastening means to the inner surface of the hard helmet shell, said tapes being formed of hooks and loops and when pressed together effect a releasable fastening of bandage container and rigid helmet shell in the space between the helmet shell and the top of the helmet liner.

7. The combination of claim 6 wherein said container is formed with at least one valve means extending through the wall of said container, permitting fluid to be inserted through the valve means into the interior of the container, which fluid may be withdrawn from the container at will by way of the valve means.

8. A helmet-bandage combination comprising a protective safety helmet, a sterile wound dressing bandage and an impermeable plastic container, said sterile wound dressing bandage being entirely enclosed by said container, said container fitted with a valve means to permit insertion of and removal of fluid into and out of the bandage container, said container having air and fluid impermeable walls, retaining fluid within the interior portion thereof, said impermeable walls, entirely surrounding the wound dressing bandage and said container being releasably attached to the interior of the protective safety helmet outer shell in the space available in between the helmet shell and the head liner by means of fabric tape of nylon filaments, interlocking nylon filament hooked fabric, adhesively fastened to the said container, nylon filament loop fabric, adhesively fastened to the interior dome portion of the said protective safety helmet, said sterile wound dressing bandage comprised of a resilient fabric material that is of itself an energy absorbing means due to the compressibility of the material under pressure from a severe blow on top of said protective safety helmet.

9. A sterile first aid wound dressing bandage, stored within an air and fluid impervious walled container in combination with a protective safety helmet, said hel-

met comprising a hard outer shell, said container structured of air and fluid impervious plastic walls, such as polypropylene, said walls entirely surrounding said first aid wound dressing, said container being so shaped as to fit to the shape of the wearers head, such head being contained within the inner concave portion of said container, which container thereby does constitute a helmet liner, said container being fitted with at least one two way valve means to permit insertion of and removal of a fluid into and out of the interior of said container, which container being filled with said wound dressing bandage and said fluid does conform to the exterior surface of the head of the wearer and to the interior surface of the hard outer shell of said protective safety helmet said container thereby filling the space between the head of the wearer and the inner surface of said hard outer shell, said container being adhesively fastened to the interior surface of said hard outer shell by adhesive means, at least one wall of said container having a section of said wall weakened by means of cuts being incised partially into said container wall around the periphery of said weakened section and said section being formed with a pull tab which tab when pulled does tear said weakened section away from said impermeable wall thereby revealing contents of the inner portion of said container and permitting removal of contents therefrom.

10. A protective safety helmet, comprising a hard rigid outer shell and a removable head enclosing suspension harness assembly in combination with a sterile first aid wound dressing, said wound dressing being priorly rendered antiseptic by antiseptics means common to the medical art, said wound dressing being maintained in a sterile antiseptic condition by means of at least one air and fluid impervious plastic wall formed into a sealed container, which container entirely surrounds said wound dressing, said container being formed into a hollow hemispherical shape so as to fit into the space available within the dome of the hard rigid shell of said protective safety helmet above the head enclosing suspension harness assembly said container being releasably fastened thereto by means of male and female snap fasteners, said male snap fastener being fixedly fastened to said container and said female snap fastener being fixedly fastened to said suspension harness assembly which snap fasteners being releasably coupled together may be released manually by using sufficient force to pull said snap fasteners apart, said container being formed with a strip extending laterally across the uppermost convex impervious wall surface said strip having incised cuts around its perimeter said cuts being in the form of a groove extending partially into said impervious wall surface thereby weakening said wall, said strip being formed at its terminal end with an extended tab which tab when forcibly pulled will tear said strip away from said impermeable wall thereby opening said container and facilitating removal of said first aid wound dressing.

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