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2.05 V, 155, 325, 327

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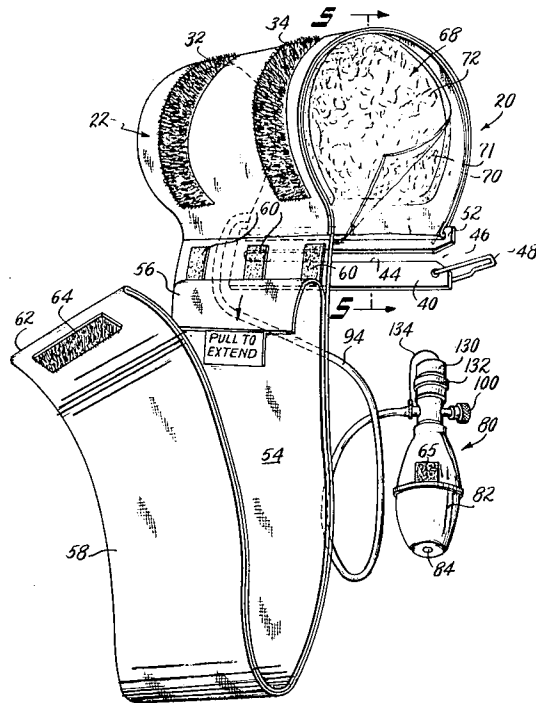
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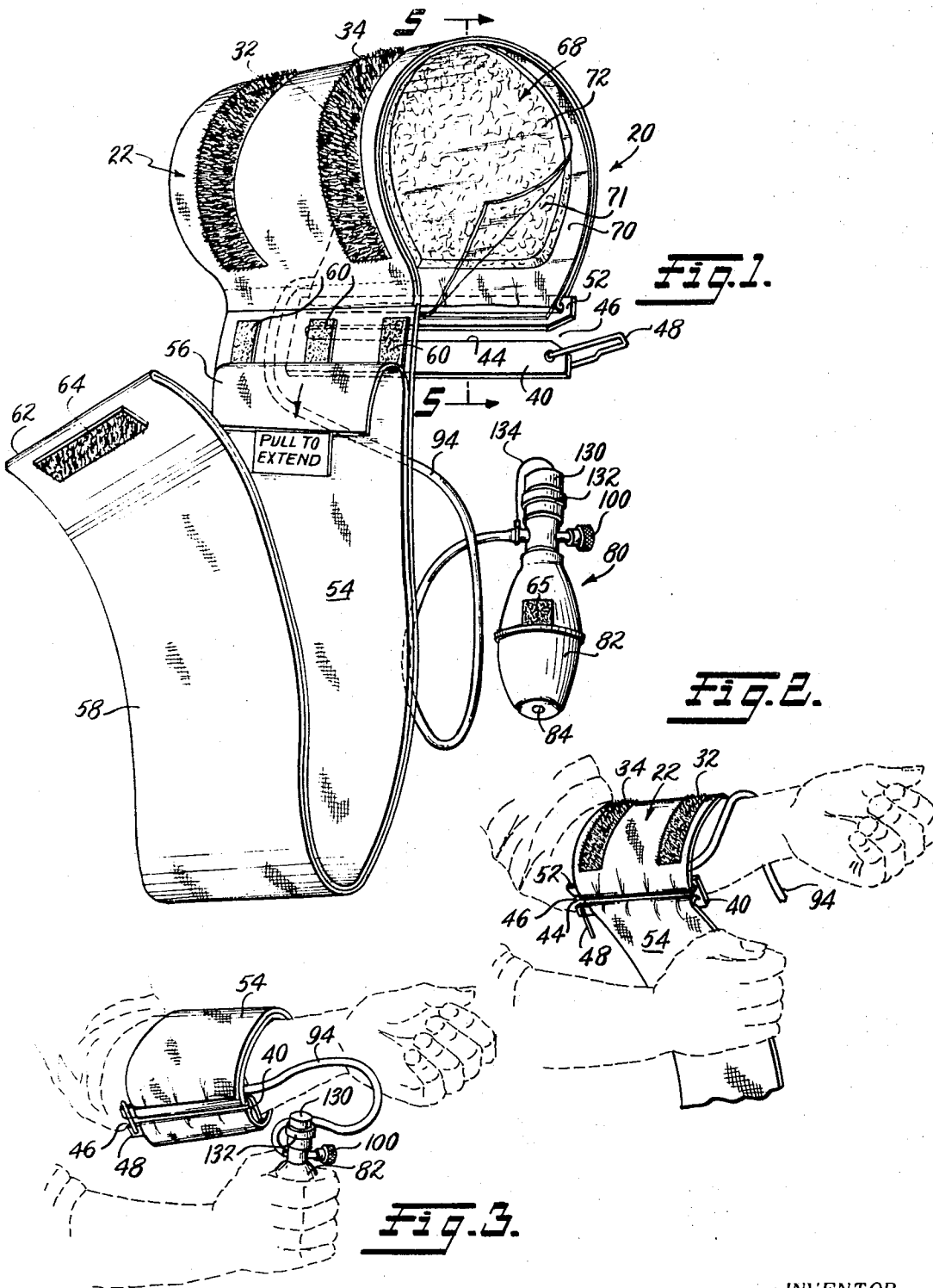
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[54] **PNEUMATICALLY ACTUATED PRESSURE DRESSING**
6 Claims, 10 Drawing Figs.

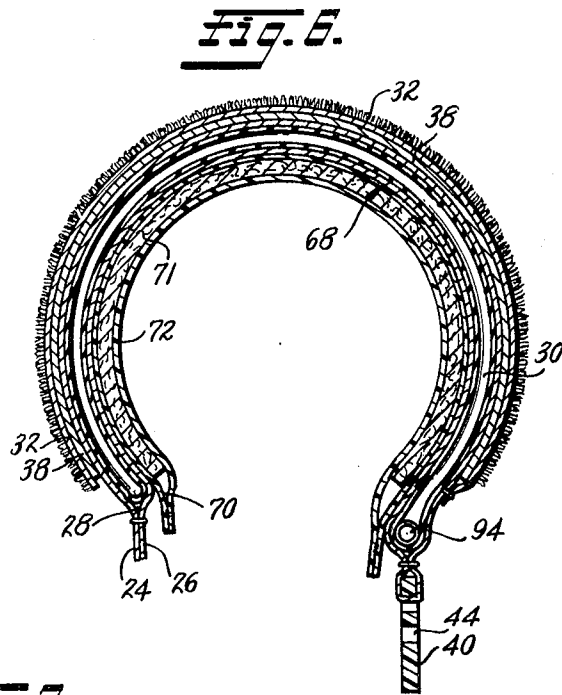
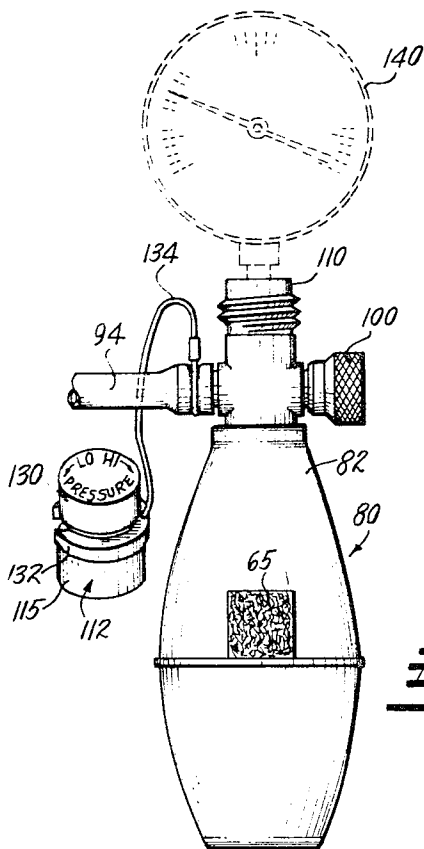
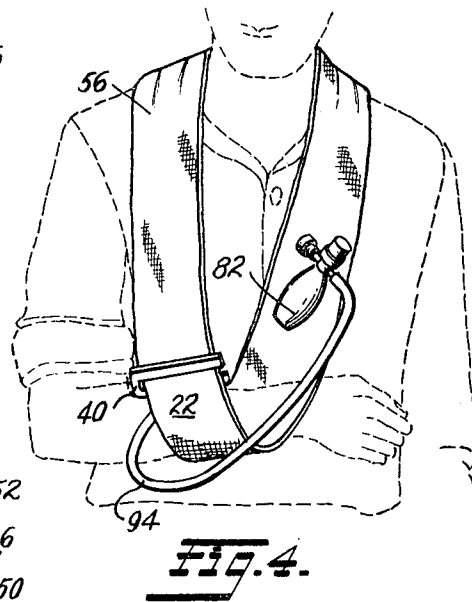
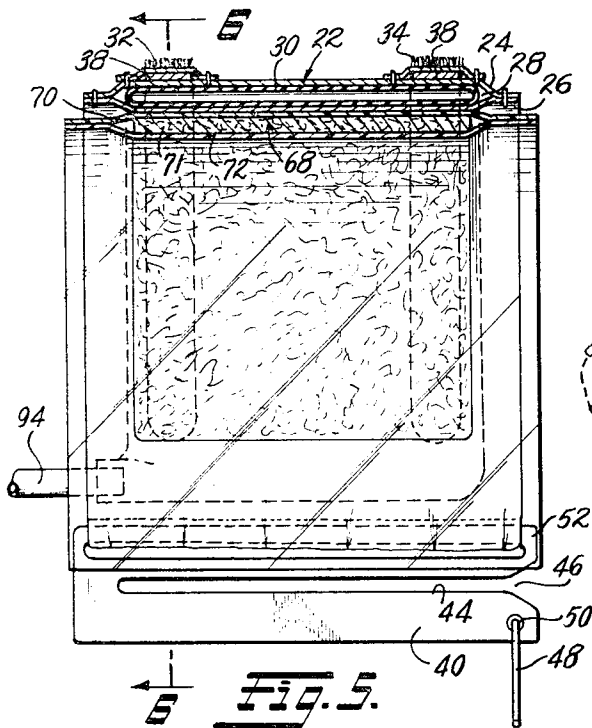
[52] U.S. Cl..... 128/2.05 C,
128/327
[51] Int. Cl..... A61b 5/02

ABSTRACT: A pneumatically actuated pressure bandage adaptable for use as a compression bandage, tourniquet or cuff wherein the pressure is applied by a manually operated pump and further wherein regulating means are provided to selectively bleed off the pressure.





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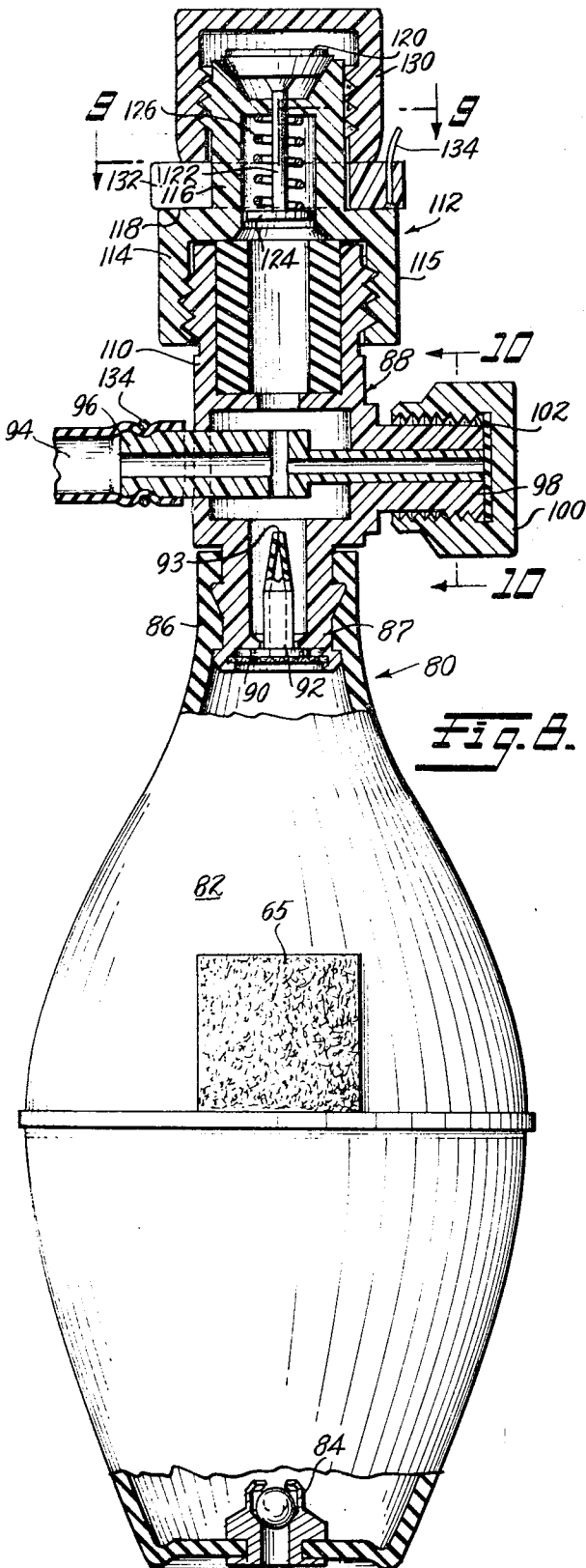


Fig. 8.

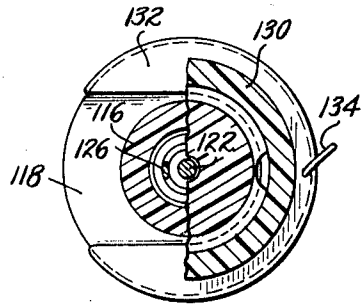


Fig. 9.

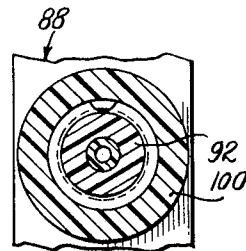


Fig. 10.

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PNEUMATICALLY ACTUATED PRESSURE DRESSING

This application is a continuation-in-part of application Ser. No. 587,336, filed Oct. 17, 1966, entitled "Pneumatically Activated Pressure Dressing," now abandoned.

The pneumatically actuated pressure bandage of this invention overcomes many of the objections and inadequacies of prior related devices in many respects as set forth in the following objects.

It is an object of this invention to provide a bandage which can be variously used as a pressure dressing, as a tourniquet for stemming the flow of blood or as a cuff in the checking of blood pressure.

It is another object of this invention to provide a pressure actuated bandage which may be completely applied by the patient himself.

It is yet another object to provide a pressure actuated bandage having means for causing it to assume a semicircular position in order to make application of the bandage much easier particularly when the bandage is being applied by the patient who may have only one useable hand.

It is still a further object of this invention to provide a pressure actuated bandage including a flexible support with means thereon to resiliently retain the support in a semicircular position, a dressing packet affixed to the concave face of the flexible support, an inflatable bladder carried by the flexible support and adapted to apply pressure to the dressing packet when inflated, means for securing the ends of the flexible support together and a fluid pressure system for supplying fluid pressure to the inflatable bladder.

The above and other objects and advantages will become more apparent when taken in conjunction with the following detailed description and drawings illustrating a preferred embodiment of this invention.

IN THE DRAWINGS

FIG. 1 is a pictorial view of the pressure bandage of the present invention;

FIG. 2 is a pictorial view illustrating the one-handed application of the pressure bandage to the forearm;

FIG. 3 is a pictorial view illustrating the complete application of the bandage and use of the pump to apply pressure;

FIG. 4 is a pictorial view of the bandage when used as a sling;

FIG. 5 is a cross-sectional view taken along line 5-5 of FIG. 1;

FIG. 6 is a cross-sectional view taken along line 6-6 of FIG. 5;

FIG. 7 is an elevational view of the pressure bulb assembly with a pressure gage assembled therewith for the checking of blood pressure;

FIG. 8 is an enlarged elevational view, partly in section, illustrating the pressure bulb assembly components without the pressure gage;

FIG. 9 is a sectional view taken along line 9-9 of FIG. 8, and

FIG. 10 is a sectional view taken along line 10-10 of FIG. 8.

DETAILED DESCRIPTION

Referring particularly to FIGS. 1, 5 and 6, the pressure actuated bandage 20 comprises a main elongated support 22 made up of the two coextensive strips 24 and 26 of flexible material such as nylon, muslin or the equivalent stitched together around all four edges to form a pouch 28. The overall length of the main support 22 should be such that it can be readily fitted over the arm of the patient since one of the various uses of the device of this invention is that of measuring blood pressure wherein the main support becomes a cuff. It is desirable that the width of the main support be approximately 13 cm., although such is not mandatory. An inflatable bladder 30 is positioned within the pouch 28 and is generally coextensive therewith.

As will be apparent from FIGS. 5 and 6, the strip 24 of the main support 22 is the outer face of said support to which is secured parallel strips 32 and 34 of "Velcro" fastening material. These fastening strips 32 and 34 run almost the entire length of the main support and are stitched to the support strip 24 in such a manner as to provide a pocket into which is introduced a longitudinally extending leaf spring 38 formed so as to cause the main support 22 to assume a generally semicircular shape. The advantages attendant such shaping are immediately apparent when it is considered that in several instances the pressure bandage 20 will be applied to the patient by himself with the use of only one hand. This curved shape tends to cause the bandage to preliminarily fit around the limb making it much easier to complete the wrap around with the use of one hand.

One end of the main support 22 is provided with a retaining bar 40 extending transversely of the support and generally coextensive with the width thereof. This retaining bar 40 has a slot 44 extending throughout most of its length to form an open end portion 46. A locking clip 48 is pivotally mounted at point 50 on the bar 40 and is adapted to swing upwardly to fit over point 52 to close off the open end portion 46.

The end of the main support 22 opposite to that provided with retaining bar 40 has an extension band 54 secured thereto. More specifically, this band 54 is actually a single strip 56 of flexible material mounting a Velcro-fastening surface 58, adapted to cooperate with Velcro-fastening strips 32 and 34, throughout its exposed length when folded over in two ply form as illustrated in FIG. 1. The strip 56 is maintained in two ply form with both exposed sides having the Velcro-fastening surface thereon by means of a plurality of pressure sensitive strips 60 extending generally throughout the full folded length of the strip 56. Adjacent the fold line 62 on the extension band 54 there is provided a small Velcro-fastening element 64 for purposes to be discussed later.

Main support strip 26 constitutes the inner concave face of the main support 22 and it is to this surface that the sterile dressing packet 68 is secured. The dressing packet 68 includes a base sheet 70, a dressing 71 adhered thereto and a covering sheet 72. The base sheet 70 may be secured to the face of strip 26 by any suitable adhesive means particularly those of the pressure sensitive type. In use, the covering sheet 72 is readily removable to expose the sterile dressing.

In order to inflate the bladder 30, the bandage is provided with a fluid pressure system 80 comprising a pump bulb 82 having a one-way inlet valve 84 at its bottom and having its upper open end 86 secured to inlet 87 of a four-way junction 88. The junction inlet 87 is provided with a screen 90 and a one-way valve 92 of the type wherein pressure from below causes end 93 to open to allow air to pass therethrough from the bulb 82. A flexible tube 94 is secured over junction outlet 96 and has its other end connected to the bladder 30. The junction 88 is also provided with an exhaust outlet 98 threadedly mounting an exhaust valve cap 100 having a sealing disc 102 carried therein to seal the outlet 98. The threads of the cap and/or the threads of the outlet 98 may be slotted to provide egress for air if necessary.

The junction 88 is additionally provided with a gage outlet 110 which also threadedly mounts a pressure valve assembly 112 comprising a body 114 with a cylindrical base 115 threadedly mounted on gage outlet 110, said base 115 having an upwardly extending cylindrical portion 116 of a diameter less than that of base 115 to provide an annular shoulder 118. The upper open end of the cylindrical portion 116 is closed by a valve 120 having a stem 122 and an enlarged stem base 124 at the bottom thereof. A helical spring 126 is fitted around stem 122 between base 124 and an offset portion of the cylindrical portion 116 to bias the valve 120 to the closed position. A valve cap 130 is threadedly mounted on the upper end of cylindrical portion 116 and is maintained in spaced relation from the top of the said portion 116 by means of a C-shaped spacer 132.

When it is desired to use the pressure bandage for blood pressure checking, the pressure valve assembly 112 is removed from gage outlet 110 and a pressure gage 140 assembled therein as illustrated in FIG. 7. The C-shaped spacer 132 has a flexible line 134 secured thereto with the other end being attached to junction outlet 96. By this means, the C-shaped spacer and valve assembly is tethered to the junction 88 to prevent loss thereof. The pump bulb 82 is provided with a small section of Velcro-fastening material like that of Velcro-fastening strips 32 and 34 in order that the bulb may be affixed to the Velcro-fastening material on extension band 54 for stowage. Exhaust valve 98 is useful in allowing the exiting of pressure from the bladder 30 when the bandage is used for checking blood pressure.

Although the various modes of use of this pressure actuated bandage are more or less apparent, a brief description follows. One of the most important uses of this bandage is the application of the bandage by the patient himself. In this connection reference is made to FIGS. 1, 2 and 3 wherein with the bandage in the condition illustrated in FIG. 1, the open portion of the bandage is passed over the forearm whereby the resilient nature of springs 38 will cause the bandage to lightly grip the forearm. The extension band 54 is slipped into the slot 44 in retaining bar 40 and a slight pull applied thereto to initially tighten the bandage on the forearm. After this, the extension band 54 is wound counterclockwise around the main support 22 so that the Velcro-locking strips 32 and 34 will engage the Velcro-fastening material on the extension band to retain the bandage in wrapped condition as shown in FIG. 3. In the event that extension band 54 is too long, it may be folded back and secured on itself by Velcro tab 64. With the bandage so applied, the bulb 82 is pumped to inflate bladder 30 and force the dressing 71 into contact with the wound. It is obvious that prior to application, the bandage is made ready by stripping cover sheet 72 from the dressing packet to expose the sterile dressing 71.

In order to provide pressure control, pressure valve assembly 112 is preset to bleed off air when a prescribed pressure is reached. If in a given situation it is necessary to apply greater pressure than that allowed by such setting, the spacer 132 is removed from the assembly and the cap 130 screwed further down on threaded cylindrical portion 116 so that the inner face of the cap will prevent valve 120 from rising and relieving the pressure in the bladder 30. Such additional pressure might be required when using the bandage as a tourniquet.

A secondary utilization of the pressure bandage is illustrated in FIG. 4 wherein the bandage has been arranged as a sling. In this application, the extension band 54 is unfolded so as to assume its full unfolded length as strip 56. This strip 56 is passed through the slot 44 in retaining bar 40 and secured to the Velcro fastener strips 32 and 34 on the main support 22 to form a loop utilized in the manner illustrated in FIG. 4. It should be noted that the bulb 82 may be secured to the strip 56 by means of Velcro tab 65 mounted on the bulb.

When using this bandage as a means of checking blood pressure, the fluid pressure assembly 80 is modified in the manner illustrated in FIG. 7 wherein a pressure gage 140 has been substituted for pressure valve assembly 112. The bandage is applied to the upper arm in the same manner as previously described in connection with the application of the bandage to the forearm as in FIGS. 2 and 3. Pressure is introduced into bladder 30 by pumping bulb 82 and the exhaust valve 98 is

used to adjust pressure for accurate reading.

Additionally, with the extension band 54 fully let out as used in a sling, this bandage can be applied around the trunk of the body to protect wounds in this area. The bandage in its fully extended configuration is particularly useful in closing a penetrating wound of the chest and thereby preventing air from entering the thorax and collapsing the lungs.

I claim:

1. A pressure actuated bandage adapted to be wrapped around a body portion and fluid pressure applied to a dressing to force it into contact with a specific body location, said bandage comprising an elongated flexible support consisting of two layers of flexible material peripherally connected to form a pouch, spring means mounted on the flexible support to resiliently retain said support in a semicircular position, a dressing packet affixed to the concave face of the flexible support, an inflatable bladder positioned in the pouch beneath the dressing packet, an extension band secured to one end of the flexible support, cooperating Velcro-fastening means affixed to the extension band and the convex face of the flexible support whereby the extension band may be secured to the convex face of the flexible support when it is wrapped therearound in applying the bandage to a body portion, and a fluid pressure system connected to the bladder for inflating same and causing a radially inward pressure to be exerted on the dressing packet to cause it to firmly bear upon a specific body portion.

2. The invention as set forth in claim 1 and wherein the fluid pressure system includes a manually operated pump in the form of a bulb.

3. The invention as set forth in claim 2 and wherein the fluid pressure system includes a variably adjustable exhaust valve for releasing pressure in the inflated bladder.

4. The invention as set forth in claim 1 and wherein the fluid pressure system includes a gage port and a pressure gage mounted therein.

5. The invention as set forth in claim 1 and wherein a retaining bar is secured to the end of the flexible support opposite to that from which the extension band extends, said retaining bar having a slot coextensive with the width of said band whereby in the application of the bandage to a body portion the band will be introduced into the slot with its direction reversed so as to initially tension the flexible support.

6. A pressure actuated bandage adapted to be wrapped around a body portion and fluid pressure applied to a dressing to force it into contact with a specific body location, said bandage comprising an elongated flexible support consisting of two layers of flexible material peripherally connected to form a pouch, spring means mounted on the flexible support to resiliently retain said support in a semicircular position, a dressing packet affixed to the concave face of the flexible support, an inflatable bladder positioned in the pouch beneath the dressing packet, a retaining bar on one end of the flexible support, said retaining bar having a transverse slot with an opening at one side of the bar so that the other end portion of the flexible support may be slidably inserted into the slot through said opening and its direction reversed so as to initially tension the flexible support in wrapped condition, means for securing the reversed flexible support portion in wrapped condition, and a fluid pressure system connected to the bladder for inflating same and causing a radially inward pressure to be exerted on the dressing packet to cause it to firmly bear upon a specific body portion.

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