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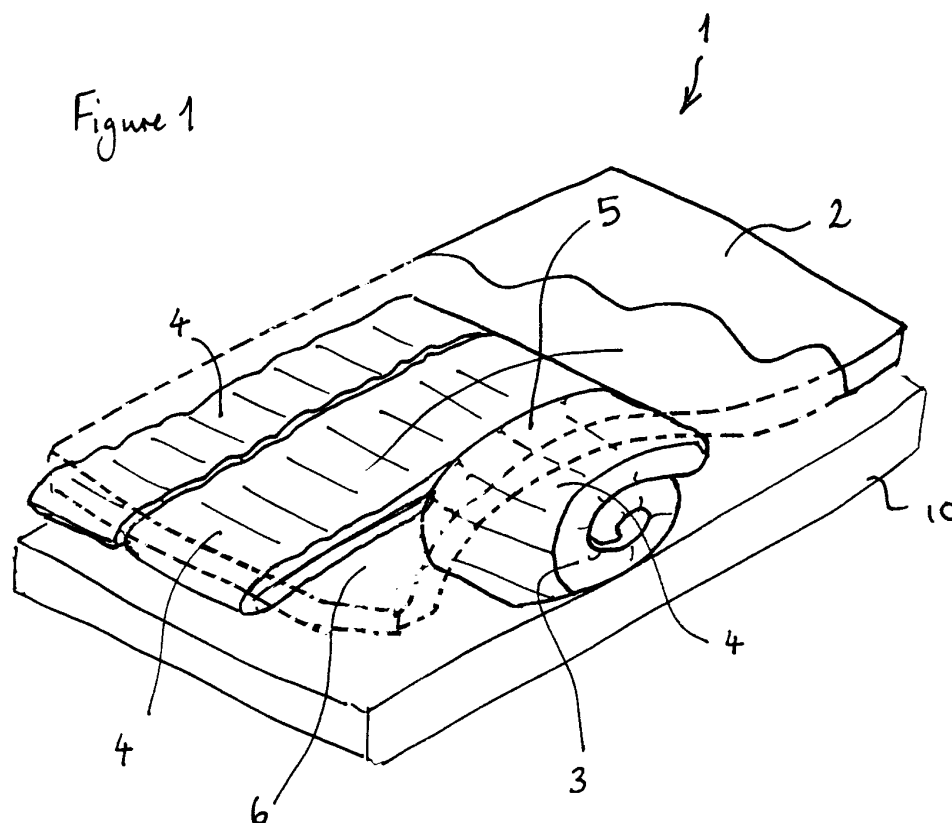
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(54) **Mattress arrangement**

(57) The present invention concerns a mattress arrangement comprising an upper layer 2 and a lower layer 3. The lower layer comprises a plurality of discrete

elongate portions 4 extending longitudinally of the mattress arrangement, the elongate portions being detachably fastenable together, wherein one or more of the elongate portions is foldable upon itself.



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Description

[0001] This invention relates to mattresses for sick patients prone to pressure sores.

[0002] Pressure sores are a growing problem affecting patients unable to move themselves in bed. Tissue damage can develop within a few hours if the patient either has inadequate changes of position or they have been lying on a mattress which does not re-distribute the patient's body weight over a wide skin contact area. The consequences of a pressure sore developing can lead to a lengthy and expensive therapy regime, disregarding the pain and distress involved.

[0003] In my granted UK Patent No. GB 2311217, there is described a mattress overlay formed of a number of laterally arranged support cells, where plies in a limb section of the mattress can be folded upon themselves to increase the depth of the overlay there. This has proven to be highly effective in enhancing the support of patients in various positions.

[0004] However, many patients, especially those suffering from strokes or neurological conditions, are affected by spasms that for example cause the hamstrings to pull the foot up progressively towards the buttocks involuntarily. If insufficient attention is paid to this problem, then the knees can become incapable of being straightened. Not only is it distressing but it also makes the patient more and more prone to pressure sores, as the patient has fewer positions in which they can be lain. Even to try to rectify the problem requires extensive physiotherapy.

[0005] Whilst, the overlay described in GB 2311217 offers an improvement over previous arrangements, it does not cater specifically for such needs.

[0006] According to a first aspect of the present invention there is provided a mattress arrangement comprising:- an upper layer; and a lower layer; the lower layer comprising a plurality of discrete elongate portions extending longitudinally of the mattress arrangement, the elongate portions being detachably fastenable together; wherein one or more of the elongate portions is foldable upon itself. With such an arrangement each elongate portion can be folded up or coiled separately, meaning that the shape of the mattress arrangement as a whole can be manipulated across its width and length to suit requirements. Preferably, the lower layer comprises three elongate portions.

[0007] Preferably, one or more of the elongate portions is configured to interlock with itself when folded upon itself. By affording the elongate portions with interlocking configurations, they will more effectively hold their folded or coiled position.

[0008] Conveniently, the lower layer and/or the upper layer is formed of laterally extending cells. Such cells may be tubular and are cost effective to manufacture and offer effective support characteristics.

[0009] In preferred embodiments, the elongate portions of the lower layer are detachably fastenable to-

gether by way of zips, buttons or velcro. These are suitable alternatives, although do not exclude the possibility of other fastening means.

[0010] Conveniently, the upper and/or lower layer are filled with soft resilient material, liquid, gas (e.g. air) or a combination of these. Preferably, the upper and/or lower layer are filled with air and are coupled to an alternating pressure source. The use of alternating pressure source with in particular the upper layer enhances the support characteristics of the mattress arrangement.

[0011] In preferred embodiments, the lower layer has a non-slip coating to enhance the interlocking of elongate portions when folded.

[0012] In preferred embodiments, the lower layer extends only partly along the full length of the upper layer. Conveniently, the lower layer is provided in the region of the mattress arrangement intended to support the buttocks and legs of a patient.

[0013] In preferred embodiments, the mattress arrangement is provided together with a support frame; the support frame comprising a patient support surface whose inclination can be varied and which is arranged to pivot in relation to a support frame base at a point at or adjacent the patient's buttocks region.

[0014] Examples of the present invention will now be described with reference to the accompanying drawings, in which:-

Figure 1 shows in perspective view and in part cross-section an embodiment of the present invention;

Figure 2 shows in perspective the embodiment of Figure 1 together with a patient;

Figure 3 shows in plan view from above the embodiment of Figure 2 together with a patient;

Figures 4-6 show different positions of the mattress of the present invention; and

Figures 7A and 7B show apparatus for use with the present invention.

[0015] As shown in Figures 1 and 2, the mattress arrangement 1 of the present invention comprises an upper layer 2 which can be filled either with soft resilient material, liquid, gas (e.g. air), or a combination of these and can where appropriate be arranged to work with apparatus providing an alternating pattern of pressures.

[0016] Underneath this layer there are one or more lower layers 3 of soft resilient filling (such as foam chips), liquid, gas or a combination of these. One such layer 3 is shown in the Figures. The lower layer or layers may extend fully or partly along the length of the mattress arrangement. The lower layer may be attached to a base mattress 10.

[0017] One or more of the lower layers 3 can be di-

vided into several equal or unequal elongate strips or portions 4 that extend in the longitudinal direction of the mattress arrangement. In the Figures three such portions are shown. The separate portions 4 are capable of being held together with any suitable fastening means such as zips, buttons or Velcro.

[0018] By undoing and fastening the portions 4 it is possible for some portions to lie flat and others to be folded or coiled. As shown in Figure 1 the nearest portion 4 has been so folded, the remaining two remaining flat.

[0019] The effect of this is to create a hump 5 and associated dip 6 at the folded portion. If this hump is created at a level just below the patient's 7 hips then it would both hold the patient tilted at perhaps 30 degrees and prevent the knee flexing more than approximately 60 degrees, as shown in Figure 3. If the hump was created a bit lower down it would resist the knee flexing more than say 45 degrees.

[0020] The upper layer 2 is draped over this arrangement of humps and dips. The upper layer can be attached to the lower layer with any suitable means.

[0021] With the present invention therefore, one is able to create a hump in the mattress arrangement that can prevent for example the knees of a patient flexing too far and the feet reaching the buttocks. It involves the patient lying on their back but with a mild tilt to their hips, they can either lie somewhat on their left or their right - according to which side the hump and dip have been created.

[0022] In a possible embodiment the lower layer 3 extends longitudinally from around the middle of the mattress arrangement down to the foot end and is attached to the upper layer 2 along a transverse line. With all the fastening means, e.g. zips closed and portions thus joined, the lower layer can be folded or coiled as one to provide a full width coiled lower layer that will stop the patient sliding down the bed when in the semi-recumbent position as shown in Figure 6. This is helpful in preventing shearing stress to patients' buttocks. Similarly with the zips closed the lower layer 3 can be folded as one to provide full pressure relief to the feet as shown in Figure 5.

[0023] To help the rolling up of the lower layers, they can be made as a series of foam filled "sausages" joined one to the next along their lengths. As such they are afforded an undulating profile enhancing their interlocking as the portions are folded or coiled upon each other.

[0024] In Figure 6 there is shown use of the mattress arrangement together with a back rest frame support 14. As shown the support comprises a mechanism pivoting about hinge 15. The support can be adjusted to different inclinations by way of the different stop positions 16. The advantage of having the support hinge in the manner shown is that the support can be moved into position very close to the patient's buttock area. This is in contrast to conventional hospital beds where the back rest hinges from a fixed point on the bed frame adjacent the

patient when seated upright. With such a conventional frame a nurse is required to move the patient backwards to be seated, which because of the difficult movement involved causes many injuries to nurses.

[0025] Certain advantages, inter alia, of the present invention are:-

1) There is but one material in contact with the patient which can be one continuous piece of fabric that is impervious to body fluids, and without nooks and crannies;

2) The upper layer 2 rounds off any uncomfortable feel created by the humps and dips;

3) In the case of liquid or alternating air fillings, this optimal patient support material is in all over contact with the patient, rather than being partially obscured by pillows for example;

4) The lower layer 3 is far more likely to hold its original position since it can be made with an interlocking configuration and with high friction/tacky fabric - unlike pillows which slip and flatten over the hours;

5) By rolling up part of the lower layer 3 one not only creates a hump but one also excavates a dip in support in another area. This creates an effective "contrast in heights" which can be effective - for instance in providing a block to a patient's knee flexing more than a certain number of degrees; and

6) It is easy for the nurses to simply fold or coil the lower layer from the side of the mattress when they have put patients in the desired position, and then for that position to be held. Thereby it provides nurses with a greater variety of positions to hold the patient in for a few hours, rather than the stark choice of being flat on their back or fully on their sides. The later position is disliked by many old people.

[0026] An additional application of this invention is to provide a flat side to the mattress arrangement onto which can be placed a mechanism that exercises a damaged knee. On the other side, a hump would serve to stop the patient who is sitting up in bed from slipping down the bed.

[0027] In a similar way, it can be helpful for a partially amputated leg to lie flat whilst the other knee is propped up to prevent them slipping down the bed.

[0028] The present embodiment is also suitable for use in connection with the subject matter of UK Patent Application No. 9605722.9 and EPC Application No. 96935142.8.

[0029] It is also possible to use the arrangement of elongate portions so as to prop up one side of a patient's trunk in such a way as to hold them lying partly tilted on their side.

[0030] In a further embodiment of the present invention, means may be provided for assisting coiling and uncoiling of the elongate portions 4 as shown in Figures 7A and 7B.

[0031] In this respect, for the purposes of illustration a single elongate portion 4 is shown with straps 20 and 21. Strap 20 is attached to the top of the portion 4 at position 22. It then passes around the front of the portion and then underneath the portion (shown in phantom lines) before passing around a pin 23 (acting like a pulley) and then returning underneath the portion to its front end. It will be understood that pulling on strap 20 in direction A will encourage the portion 4 to coil to the position shown in Figure 7B.

[0032] Strap 21 is attached to the front of the portion 4 at position 24 and is used for pulling out the portion in direction B from the coiled position of Figure 7B back to the flat position shown in Figure 7A.

Claims

1. A mattress arrangement comprising:-

an upper layer; and
a lower layer;
the lower layer comprising a plurality of discrete elongate portions extending longitudinally of the mattress arrangement,
the elongate portions being detachably fastenable together;
wherein one or more of the elongate portions is foldable upon itself.

2. A mattress arrangement according to claim 1, wherein one or more of the elongate portions are configured to interlock with itself when folded upon itself.

3. A mattress arrangement according to claim 1 or 2, wherein the or each elongate portions of the lower layer are foldable separately of each other.

4. A mattress arrangement according to any preceding claim, wherein the lower layer is formed of laterally extending cells.

5. A mattress arrangement according to any preceding claim, wherein the upper layer is formed of laterally extending cells.

6. A mattress arrangement according to any preceding claim, wherein the elongate portions of the lower layer are detachably fastenable together by way of zips, buttons or velcro.

7. A mattress arrangement according to any preceding claim, wherein the upper and/or lower layer are

filled with soft resilient material, a liquid or a fluid.

8. A mattress arrangement according to claim 8, wherein the upper and/or lower layer are filled with air and are coupled to an alternating pressure source.

9. A mattress arrangement according to any preceding claim, wherein the lower layer has a non-slip coating to enhance the interlocking of elongate portions when folded.

10. A mattress arrangement according to any preceding claim, wherein the lower layer extends only partly the length of the upper layer.

11. A mattress arrangement according to any preceding claim, wherein the lower layer is provided in the region of the mattress arrangement intended to support the buttocks and legs of a patient.

12. A mattress arrangement according to any preceding claim, wherein the lower layer comprises three elongate portions.

13. A mattress arrangement according to any preceding claim, wherein the mattress arrangement is provided together with a support frame; the support frame comprising a patient support surface whose inclination can be varied and which is arranged to pivot in relation to a support frame base at a point at or adjacent the patient's buttocks region.

14. A mattress arrangement according to any preceding claim, wherein the lower layer comprises three elongate portions.

Figure 1

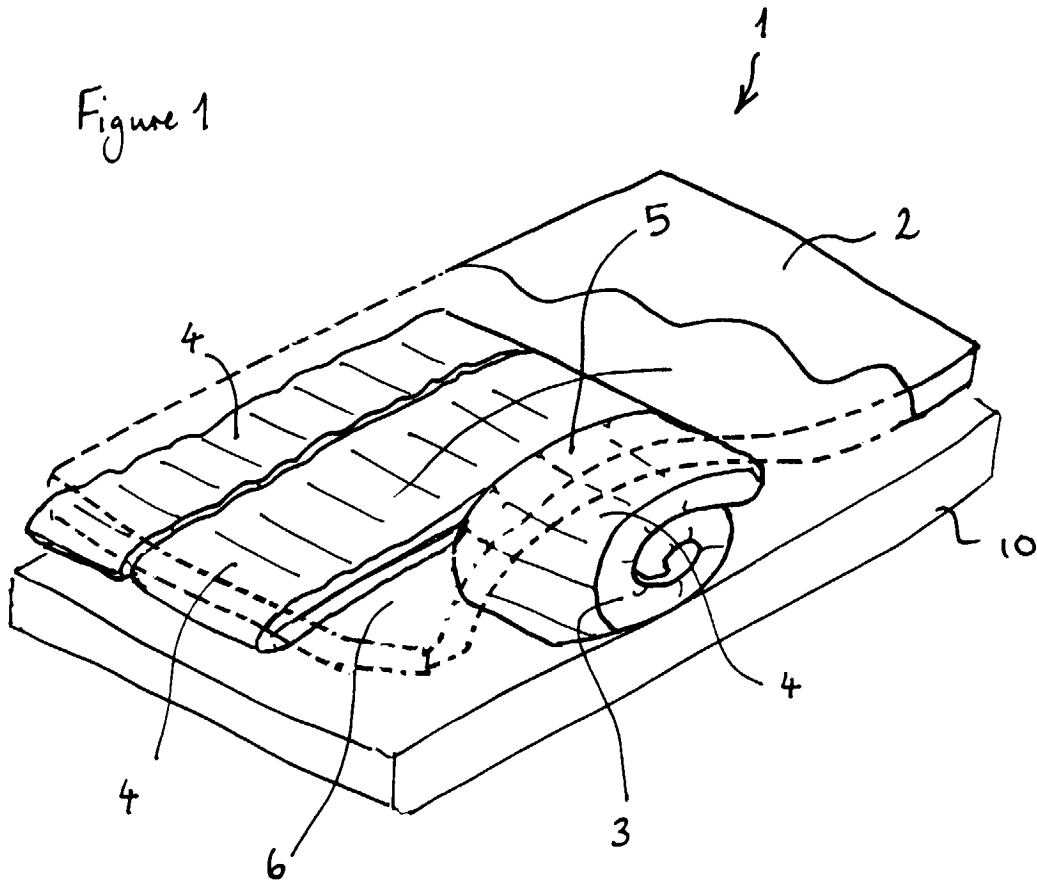


Figure 2

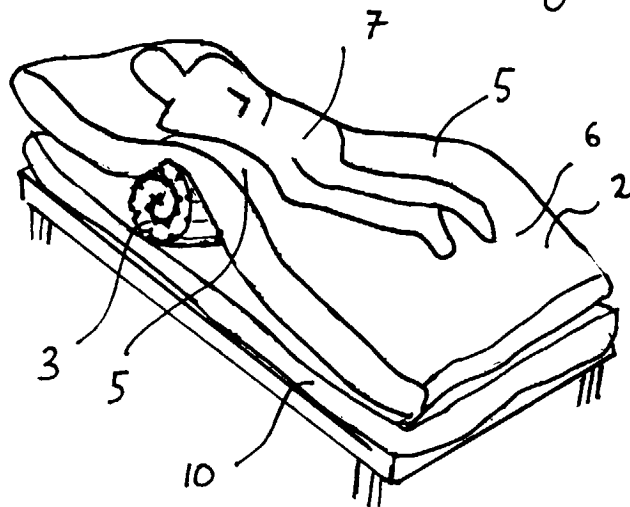


Figure 3

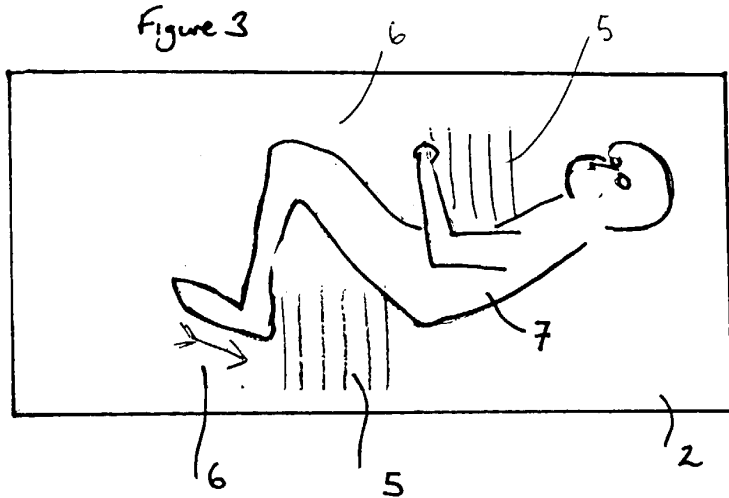


Figure 4

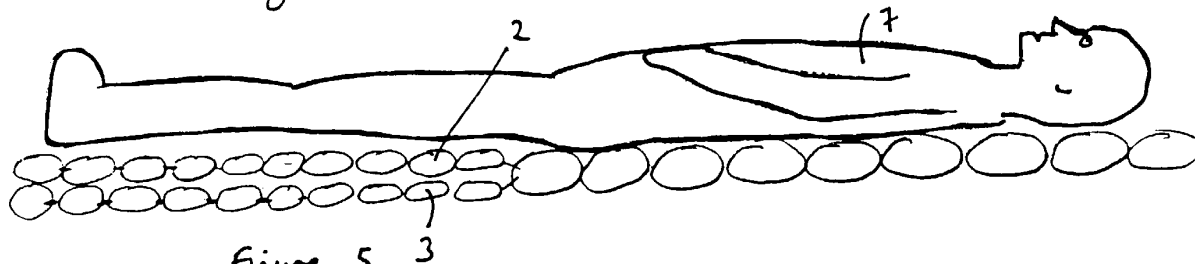


Figure 5

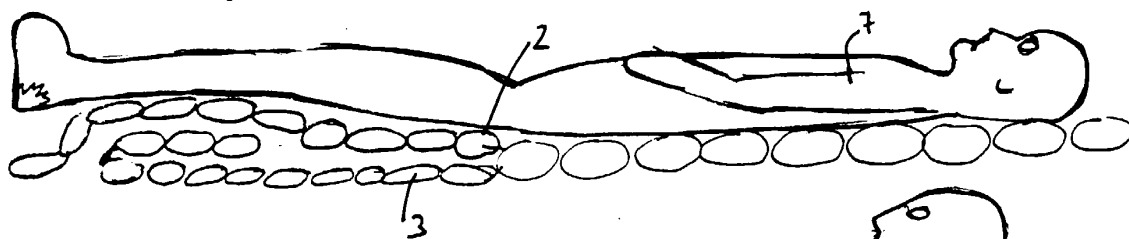


Figure 6

