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Therapeutic mattress

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(54) **THERAPEUTIC MATTRESS**

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(58) **Field of Search** 5/666, 674, 654, 5/655.5, 904, 644, 689, 655.9, 909; 601/2, 601/47, 49, 55

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(57) **ABSTRACT**

The present invention includes a mattress having a fluid-based center portion encapsulated by a stablizing visco-elastic polyurethane covering adapted to prevent lateral or longitudinal movement while a patient is disposed thereon. One or more sonic speakers disposed below or coincident to the fluid-based center generate fluid sound waves. Responsive to the sound waves, the fluid oscillates. The mechanical oscillation of the fluid is translated to the visco-elastic polyurethane covering upon which the patient is disposed. The therapeutic effects of the ultrasound oscillations speed the rate of healing and enhance the quality of tissue repair. Furthermore, the stabilizing effects of the covering make the mattress stationary for surgical operations.

11 Claims, 1 Drawing Sheet

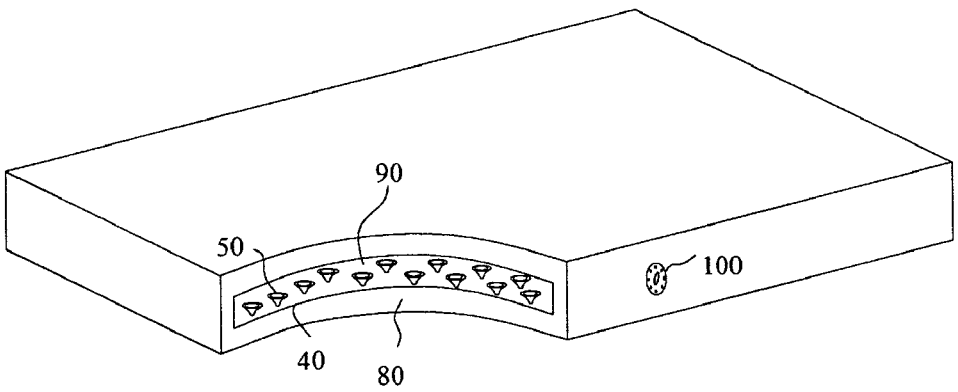

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Fig. 1

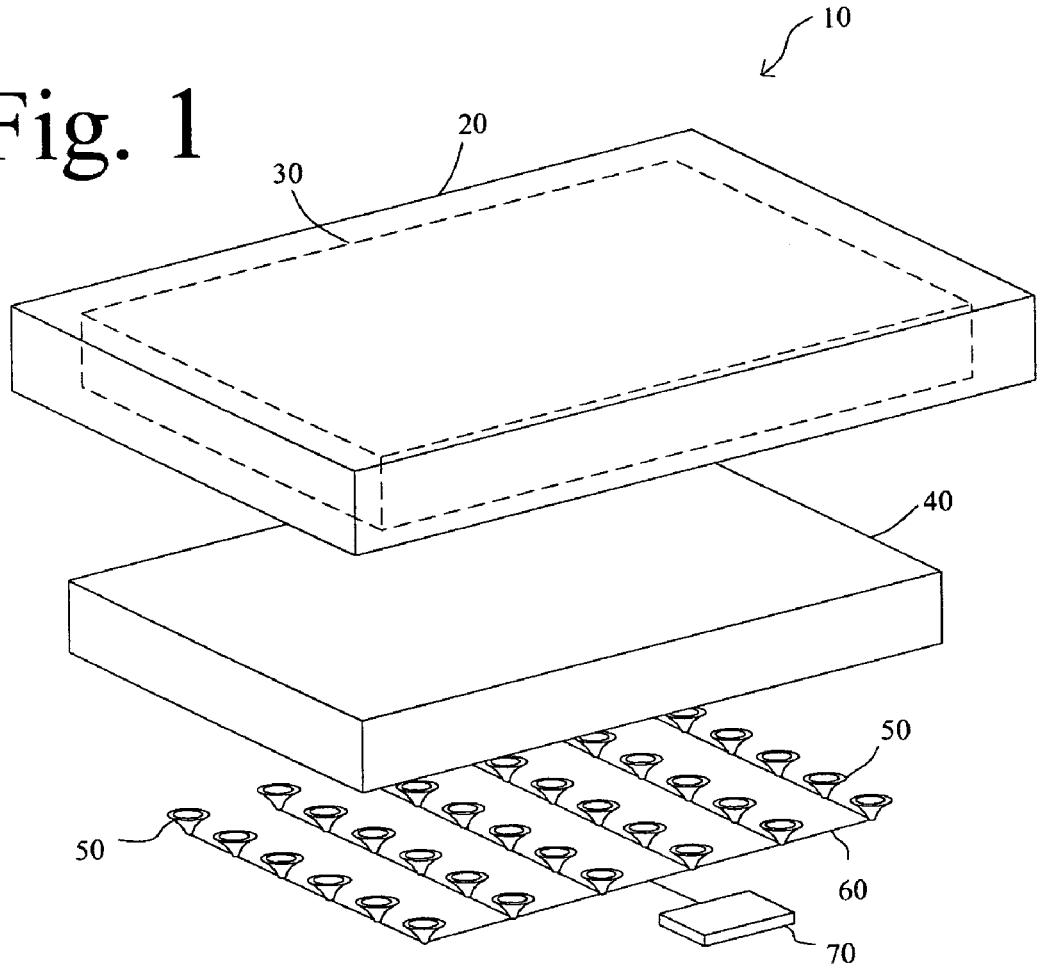
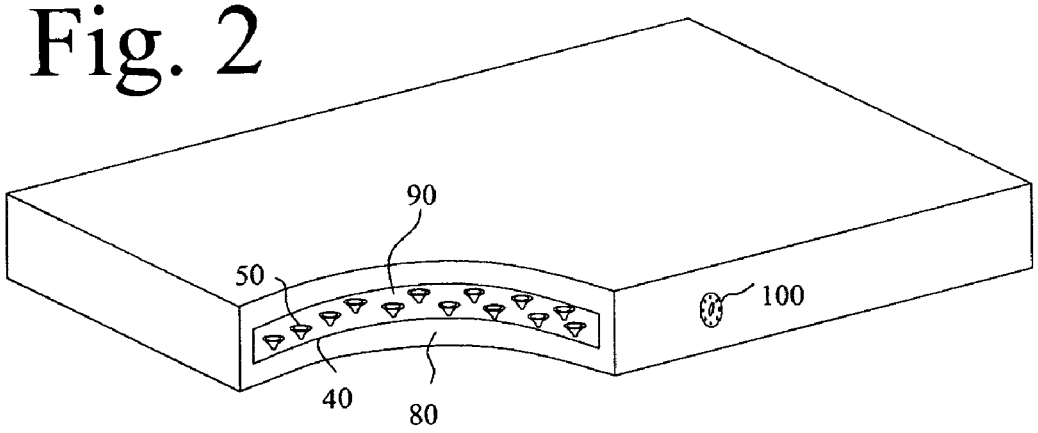


Fig. 2



THERAPEUTIC MATTRESS

This application claims benefit of provisional U.S. application No. 60/319,359, filed Jun. 27, 2002.

BACKGROUND OF INVENTION

1. Field of Invention

This invention relates to mattresses, and more particularly to therapeutic mattresses for reducing pressure ulcers during surgery.

2. Background of the Invention

The incidence of pressure ulcer formation on surgical units and post-operative facilities varies between 7 to 66%. Factors that contribute to pressure ulcer formation for hospitalized patients are: body habits, co-morbid disease, age, type of surgery and inter-operative duration. The incidence of peri-operative pressure ulcers can be decreased by reducing operative time or intensity of pressure and shear force on the human body during surgery. One method of accomplishing the latter is to provide a pressure-relief surface to reduce the interface pressure via a combination mattress that relieves interface pressure and provides dynamic pressure reduction.

Accordingly, what is needed in the art is a fluid-based sonic therapeutic mattress suitable for surgical use.

It is, therefore, to the effective resolution of the aforementioned problems and shortcomings of the prior art that the present invention is directed.

However, in view of the prior art in at the time the present invention was made, it was not obvious to those of ordinary skill in the pertinent art how the identified needs could be fulfilled.

SUMMARY OF INVENTION

The present invention includes a mattress having a fluid-based center portion encapsulated by a stablizing visco-elastic polyurethane covering adapted to prevent lateral or longitudinal movement while a patient is disposed thereon. One or more sonic speakers disposed below or coincident to the fluid-based center generate fluid sound waves. Responsive to the sound waves, the fluid oscillates. The mechanical oscillation of the fluid is translated to the visco-elastic polyurethane covering upon which the patient is disposed. The therapeutic effects of the ultrasound oscillations speed the rate of healing and enhance the quality of tissue repair. Furthermore, the stabilizing effects of the covering make the mattress stationary for surgical operations.

Accordingly, a preferred embodiment of the present invention is a therapeutic mattress including a stabilizing visco-elastic polyurethane outer shell about 4-inches thick having a viscosity sufficiently resilient for the performance of surgical procedures, a visco-elastic polyurethane inner shell about 2.5-inches thick disposed within the outer shell, a waterproof circumferential surface enclosing the outer shell, a fluid-based inner cavity encapsulated by the inner shell, the fluid-based inner cavity is filled with compressible shock absorbing fluid, a plurality of speakers emitting low frequency resonance generating fluid sound waves in sonic communication with the fluid-based inner cavity, the speakers are in parallel arrangement throughout the bottom surface of the inner mattress and an external control adapted to adjust the frequency emitted through the speakers.

BRIEF DESCRIPTION OF DRAWINGS

FIG. **1** is a partially sectional, isometric exploded view of the invention.

FIG. **2** is a partially sectional, isometric view of the invention.

DETAILED DESCRIPTION

FIG. **1** shows an exploded view of the mattress **10** wherein outer shell **20** is a 4-inch thick visco-elastic polyurethane material **80** (FIG. **2**). An inner cavity **30** is defined within the outer shell **20**. The mattress is the standard operating room mattress length and width with a thin fluid/waterproof circumferential surface. The inner shell is 2.5-inch thick mattress **40** composed of polyurethane material filled with non-compressible shock absorbing fluid **90**. The inner mattress core contains manifolds **60** of miniature sonic speakers **50** placed in various locations in parallel throughout bottom surface of the mattress **40**. These sonic speakers **50** serve to create a fluid sound wave. Hence fluid **90** within the inner mattress **40** (FIG. **2**) is made to oscillate and form "fluid sound waves" via sonic energy. These sonic speakers **50** emit a low frequency resonance to create sound propagation in fluid **90**. The frequency can be adjusted from an external dial **100** to increase the amplitude of the fluid sound wave. However, the frequency will not beyond the limit of low frequency band. This will help to ensure that waves are propagated further and maintain integrity. Power supply **70** provides low voltage current and electrical signals to the speakers **50**.

The effects of sound on the body in this fashion, especially area of increase interface pressure, is to temporarily relieve pressure while promoting blood flow. Hence combating some of the problems faced during prolonged immobilization during surgery. The ultimate effect is to decrease interface pressure and shear force by infinitesimal fluid sonic stimulation of the skin, blood medium/small vessels and capillaries and muscle tissues via: (1) oscillating "fluid sound wave" and (2) pressure reduction afforded by the visco-elastic material. Pressure relief and reduction is achieved by the continuous shifting and releasing of pressure points as well as enhancing blood flow by similar mechanism as massage therapy. All this can be accomplished with the application of a sonic wave fluid propagation technology.

The mattress is removable with industrial strength Velcro straps that wrap fully around underneath the table; and four corner pouches that slip onto each o.r. table corner for a tight and secure fit.

It will be seen that the objects set forth above, and those made apparent from the foregoing description, are efficiently attained and since certain changes may be made in the above construction without departing from the scope of the invention, it is intended that all matters contained in the foregoing description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween. Now that the invention has been described,

What is claimed is:

1. A therapeutic mattress comprising a stabilizing visco-elastic polyurethane outer shell, a visco-elastic polyurethane inner shell disposed within the outer shell, a fluid-based inner cavity encapsulated by the inner shell, and a plurality of speakers in sonic communication with the fluid-based inner cavity, the plurality of speakers positioned to establish a sonic wave within a fluid of the fluid-based inner cavity.

2. The mattress of claim **1**, wherein the viscosity of the polyurethane shell is sufficiently resilient for the performance of surgical procedures.

3. The mattress of claim **1**, wherein the outer shell is about 4-inches thick.

4. The mattress of claim **1**, wherein the inner shell is about 2.5-inches thick.

5. The mattress of claim **1**, whereby a waterproof circumferential surface encloses the outer shell.

6. The mattress of claim **1**, whereby the fluid-based inner cavity is comprised of compressible shock absorbing fluid.

7. The mattress of claim **1**, wherein the speakers are disposed below the fluid-based inner cavity.

8. The mattress of claim **7**, wherein the speakers emit low frequency resonance generating fluid sound waves.

9. The mattress of claim **7**, wherein the speakers are in parallel arrangement throughout the bottom surface of the inner mattress.

10. The mattress of claim **8**, whereby the frequency emission is adjustable through an external control.

11. A therapeutic mattress comprising a stabilizing visco-elastic polyurethane outer shell about 4-inches thick having a viscosity sufficiently resilient for the performance of surgical procedures, a visco-elastic polyurethane inner shell about 2.5-inches thick disposed within the outer shell, a waterproof circumferential surface enclosing the outer shell, a fluid-based inner cavity encapsulated by the inner shell, the fluid-based inner cavity is filled with compressible shock absorbing fluid, a plurality of speakers emitting low frequency resonance generating fluid sound waves in sonic communication with the fluid-based inner cavity, the speakers are in parallel arrangement throughout the bottom surface of the inner mattress and an external control adapted to adjust the frequency emitted through the speakers.

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