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(54) **Fitness treadmill**

(57) A fitness treadmill (10), comprising a conveyor belt (11) supported by two rollers (12, 13), at least one of which is motorized, a deck (11a) being arranged between the rollers (12, 13) and within the belt (11) in order to support the user; the conveyor belt (11) has means for the quick reversible fixing of a mat (14) designed to simulate a walkable surface of the outdoor type.

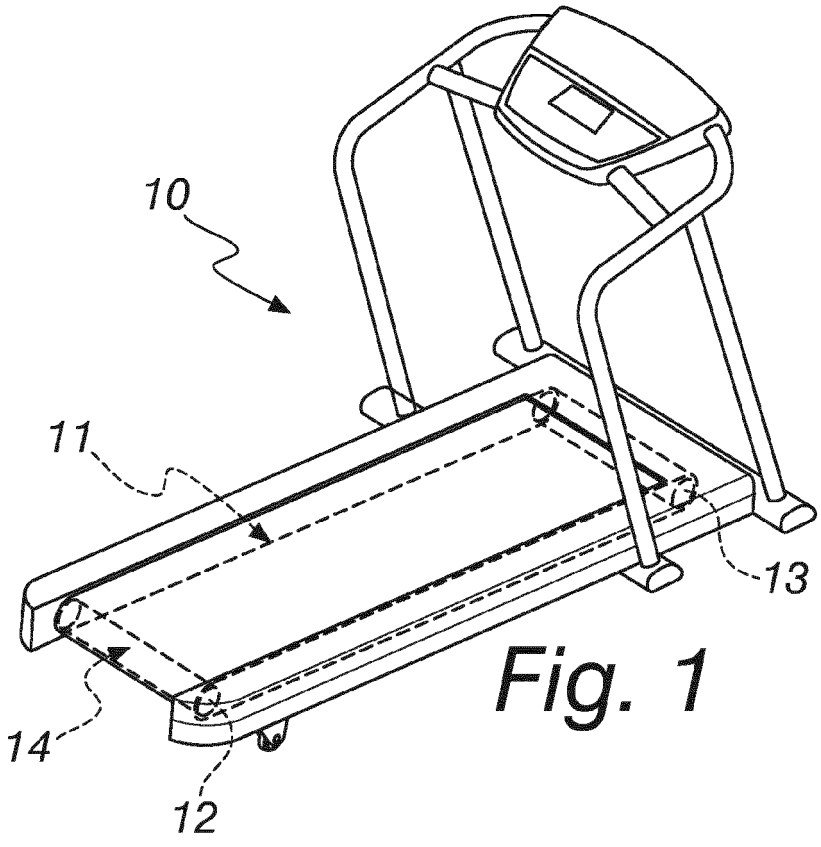

Fig. 1

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Description

[0001] The present invention relates to a fitness treadmill.

[0002] The fitness treadmill makes it possible to practice physical training in terms of running and walking in a closed environment and in the space of a few square meters.

[0003] With the treadmill, in fact, the user can run or walk while keeping his/her own position practically unchanged thanks to a conveyor belt that moves in the opposite direction with respect to the walking direction of the user.

[0004] A covering made of synthetic rubber is generally applied on the conveyor belt by simple adhesive bonding and is used to ensure resistance to wear in relation to the interaction with the shoes of the user.

[0005] The synthetic rubber covering supplies, moreover, friction characteristics aimed at ensuring stability of the user during physical activity.

[0006] Currently known treadmills usually have a mat, available to be walked on and crossed by the feet of a user, which as mentioned is a belt covered with synthetic rubber. A similar mat is well suited to the simulation of indoor surface running, i.e., running which is typical of a gymnasium or of a circuit in an enclosed environment.

[0007] The same belt covered with synthetic rubber is completely unsuitable, instead, for simulating a natural or synthetic surface of the type usually found when one performs physical activity in an outdoor environment, i.e., outside.

[0008] The expression "outdoor surfaces" designates, for example, earth, sand, grass, outdoor athletics track, asphalt road, as well as other similar surfaces.

[0009] The aim of the present invention is to provide a treadmill capable of simulating a surface for running of the outdoor type.

[0010] Within this aim, an object of the invention is to develop a treadmill the walking mat of which is easily replaceable with another one adapted to simulate a different surface.

[0011] Another object of the invention is to propose a fitness treadmill that can be manufactured with known plants and technologies.

[0012] This aim and these and other objects that will become better apparent hereinafter are achieved by a fitness treadmill, comprising a conveyor belt supported by two rollers, at least one of which is motorized, a deck being arranged between the rollers and within the belt in order to support a user, **characterized in that** said conveyor belt has means for the quick reversible fixing of a mat designed to simulate a walkable surface of the outdoor type.

[0013] Further characteristics and advantages of the invention will become better apparent from the description of a preferred but not exclusive embodiment of the fitness treadmill according to the invention, illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figure 1 is a perspective view of a fitness treadmill according to the invention;
Figure 2 is view of a detail of the treadmill according to the invention:
Figure 3 is a cutaway view of the detail of Figure 2;
Figure 4 is a view of a portion of the mat of a treadmill according to the invention;
Figure 5 is a transverse sectional view of a detail of the mat of Figure 4;
Figure 6 is a full-length perspective view of the mat.

[0014] With reference to the figures, a fitness treadmill according to the invention is generally designated by the reference numeral 10.

[0015] The fitness treadmill 10 comprises a conveyor belt 11 supported by two rollers 12, 13, at least one of which is motorized, a deck 11 a being arranged between the rollers 12, 13 and within the belt 11 in order to support the user.

[0016] The conveyor belt 11 has means for the quick reversible fixing of a mat 14 designed to simulate a walkable surface of the outdoor type.

[0017] The mat 14 is constituted, for example, by two containment sheets, a first upper one 15 and a second lower one 16, between which a padding 17 is enclosed.

[0018] The padding 17 constitutes the main element of the mat 14, since in relation to its thickness and to the materials of which it is made, it makes it possible to define a mat capable of providing, during the execution of physical activity, a sensation that simulates the sensation that occurs during running or walking on natural or artificial ground.

[0019] By working on the thickness and materials that constitute the padding 17 it is possible to obtain different configurations of the mat 14, which represent natural ground (earth, sand, grass) or artificial ground (athletic track, asphalted road). The thickness of the padding 17 is comprised preferably between 1 and 30 millimeters.

[0020] The materials of which the padding 17 is made belong to the following categories:

- polymeric foam of a polyurethane, acrylic, silicone or olefin nature, with open cells, or with closed cells, or in combination with open and closed cells, characterized by viscoelastic behavior, with an apparent density comprised between 20 kg/m3 and 400 kg/m3, initial elastic modulus comprised between 0.01 kPa and 10 MPa, mechanical energy dissipation as a consequence of hysteresis processes comprised between 1% and 99%, breaking elongation comprised between 5% and 400%, bearing capacity comprised between 0.01 kPa and 500 MPa; these materials make it possible to obtain a mat capable of simulating natural ground, such as earth, sand, grass and the like;
- elastomer of a polymeric nature, characterized by

an initial elastic modulus comprised between 1 kPa and 1 GPa, percentage breaking elongation comprised between 5% and 500%, nominal breaking strength comprised between 1 MPa and 100 MPa; this material makes it possible to obtain a mat capable of simulating artificial ground, such as an athletic track, asphalted road and the like.

[0021] The upper containment sheet 15, in an embodiment thereof that exemplifies the invention, has a thickness comprised between 0.1 and 2 mm and defines a walking surface 18 that has a friction coefficient comprised between 0.1 and 2, required for body stability for a user while performing physical activity.

[0022] The optimum value of the friction coefficient depends on the type of ground that one wishes to simulate, on the method of execution of the physical training, if barefoot, while wearing socks or while wearing shoes, and on the types of shoe, as well as on any specific requirements in the case of pathological subjects, such as for example the diabetic foot. The material of which the upper containment sheet 15 is made has an elastic modulus comprised between 100 kPa and 100 MPa, a breaking elongation comprised between 5% and 500%, a breaking strength comprised between 10 MPa and 300 MPa, as well as characteristics of abrasion resistance with respect to processes of repeated interaction with the foot.

[0023] In particular, the materials for providing the upper sheet 15 are preferably:

- natural fabric;
- synthetic fabric;
- lamina made of polymeric material.

[0024] The lower containment sheet 16 has a thickness comprised between 0.1 and 3 mm and defines a surface characterized by a high friction coefficient, comprised between 0.5 and 3, required to prevent relative sliding between the mat 14 and the belt 11 during execution of physical activity.

[0025] The material for providing the lower containment sheet 16 has an elastic modulus comprised between 100 kPa and 100 MPa, breaking elongation comprised between 5% and 500%, breaking strength comprised between 10 MPa and 300 MPa, as well as characteristics of resistance to abrasion as a consequence of interaction with the belt 11.

[0026] The materials for providing the lower containment sheet 16 are preferably:

- lamina made of polymeric material;
- natural or synthetic fiber impregnated with elastomer or other polymeric material.

[0027] The padding 17 and the upper sheet 15 and lower sheet 16 that cover it are mutually fixed by adhesive bonding.

[0028] The means for quick and reversible fixing of the mat 14 to the belt 11 are constituted by two series of clips or buttons 19, 20, or by zip fasteners, or by Velcro, applied at the lateral longitudinal flaps 21, 22 of the mat 14 and 23, 24 of the belt 11. The system thus defined allows easy and correct arrangement of the mat 14 with respect to the belt 11.

[0029] The absence of relative sliding between the belt 11 and the mat 14 is ensured, during the execution of physical activity, by tangential friction forces, which develop between the mutually contacting surfaces of the belt 11 and of the mat 14, as a consequence of the high friction coefficients that characterize them.

[0030] The closure of the mat 14 onto itself, as a consequence of winding around the conveyor belt 11, occurs by means of Velcro 25 or by zip fastener.

[0031] In an alternative embodiment of the treadmill according to the invention, the mat instead of being constituted by a three-layer sandwich, is provided with a single padding 17 capable of performing autonomously the performance required of the upper and lower containment sheets as described above.

[0032] In practice it has been found that the invention achieves the intended aim and objects.

[0033] In particular, with a treadmill 10 according to the invention it is possible to achieve two types of important advantages.

[0034] A first advantage is given by the fact that the mat 14 is capable of offering a sensation, as regards interaction with the foot during physical activity, that simulates the sensation perceived as a consequence of interaction with natural ground like loose earth, compact earth, grass, dry sand, wet sand, or with an artificial surface, athletic track, asphalt, concrete, depending on the specific material used to provide the core of the padding of the mat.

[0035] The mat thus conceived enables, therefore, to practice in an indoor environment a physical activity, such as running or walking, that actually simulates the sports practice performed in an outdoor environment.

[0036] A second advantage is related to healthiness, safety and comfort of the motor activity performed.

[0037] The materials used to manufacture the mat make it possible in fact to determine, during the execution of physical activity, a system of stresses, which act on the lower limb and in general on the whole structure of the body, that is more advantageous than what happens during physical activity on corresponding natural ground or artificial ground.

[0038] The fixing system between the mat and the conveyor belt ensures, moreover, the possibility to replace the mat easily and quickly.

[0039] In this manner the user can have at his/her disposal, by using different mats, a treadmill system that simulates physical activity performed on different types of ground.

[0040] The invention thus conceived is susceptible of numerous modifications and variations, all of which are

within the scope of the appended claims. All the details may furthermore be replaced with other technically equivalent elements.

[0041] In practice, the materials used, as well as the contingent shapes and dimensions, may be any according to requirements and to the state of the art.

[0042] The disclosures in Italian Patent Application no. PD2011A000188, from which this application claims priority, are incorporated herein by reference.

[0043] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A fitness treadmill (10), comprising a conveyor belt (11) supported by two rollers (12, 13), at least one of which is motorized, a deck (11a) being arranged between said rollers (12, 13) and within said belt (11) in order to support a user, **characterized in that** said conveyor belt (11) has means for the quick reversible fixing of a mat (14) designed to simulate a walkable surface of the outdoor type.

2. The treadmill according to claim 1, **characterized in that** said mat (14) comprises two containment sheets, a first upper one (15) and a second lower one (16), between which a padding (17) is enclosed which, in relation to its thickness and to the materials of which it is made, makes it possible to define a mat capable of providing, during the execution of physical activity, a sensation that simulates the one that occurs during running or walking on natural or artificial ground.

3. The treadmill according to one or more of the preceding claims, **characterized in that** the thickness of said padding (17) is comprised preferably between 1 and 30 millimeters and the materials of which it is made belong selectively to one of the following categories:

   - polymeric foam of a polyurethane, acrylic, silicone or olefin nature, with open cells, or with closed cells, or in combination with open and closed cells, **characterized by** viscoelastic behavior, with an apparent density comprised between 20 kg/m3 and 400 kg/m3, initial elastic modulus comprised between 0.01 kPa and 10 MPa, mechanical energy dissipation as a consequence of hysteresis processes comprised between 1% and 99%, breaking elongation comprised between 5% and 400%, bearing capacity comprised between 0.01 kPa and 500 MPa;
   - elastomer of a polymeric nature, **characterized by** an initial elastic modulus comprised between 1 kPa and 1 GPa, percentage breaking elongation comprised between 5% and 500%, nominal breaking strength comprised between 1 MPa and 100 MPa.

4. The treadmill according to one or more of the preceding claims, **characterized in that** said upper containment sheet (15) has a thickness comprised between 0.1 and 2 mm and defines a walking surface (18) that has a friction coefficient comprised between 0.1 and 2, required for body stability for a user while performing physical activity.

5. The treadmill according to one more more of the preceding claims, **characterized in that** said upper containment sheet (15) has an elastic modulus comprised between 100 kPa and 100 MPa, a breaking elongation comprised between 5% and 500%, breaking strength comprised between 10 MPa and 300 MPa, and characteristics of abrasion resistance with respect to processes of repeated interaction with the foot, the materials for providing said upper sheet (15) being selectively one from the group consisting of:

   - natural fabric;
   - synthetic fabric;
   - lamina made of polymeric material.

6. The treadmill according to one or more of the preceding claims, **characterized in that** said lower containment sheet (16) has a thickness comprised between 0.1 and 3 mm and defines a surface **characterized by** a high friction coefficient, comprised between 0.5 and 3, required to prevent relative sliding between the mat (14) and the belt (11) during execution of physical activity, the material for providing said lower containment sheet (16) having an elastic modulus comprised between 100 kPa and 100 MPa, breaking elongation comprised between 5% and 500%, breaking strength comprised between 10 MPa and 300 MPa, and characteristics of resistance to abrasion as a consequence of interaction with the belt (11).

7. The treadmill according to the preceding claims, **characterized in that** the materials for providing said lower containment sheet (16) are selectively one from the group consisting of:

   - lamina of polymeric material;
   - natural or synthetic fiber impregnated with elastomer or other polymeric material.

8. The treadmill according to one or more of the preceding claims, **characterized in that** said padding (17) and the upper sheet (15) and the lower sheet (16) that cover it are mutually fixed by adhesive bonding.

9. The treadmill according to one or more of the preceding claims, **characterized in that** said means for quick and reversible fixing of the mat (14) to the belt (11) are constituted by two series of clips or buttons (19, 20), or by zip fasteners, or by velcro, applied at the lateral longitudinal flaps (21, 22) of the mat (14) and (23, 24) of the belt (11).

10. The treadmill according to one or more of the preceding claims, **characterized in that** the closure of the mat (14) onto itself, as a consequence of winding around the conveyor belt (11), is provided by means of a transverse strip of Velcro (25) or by means of a corresponding zip fastener.

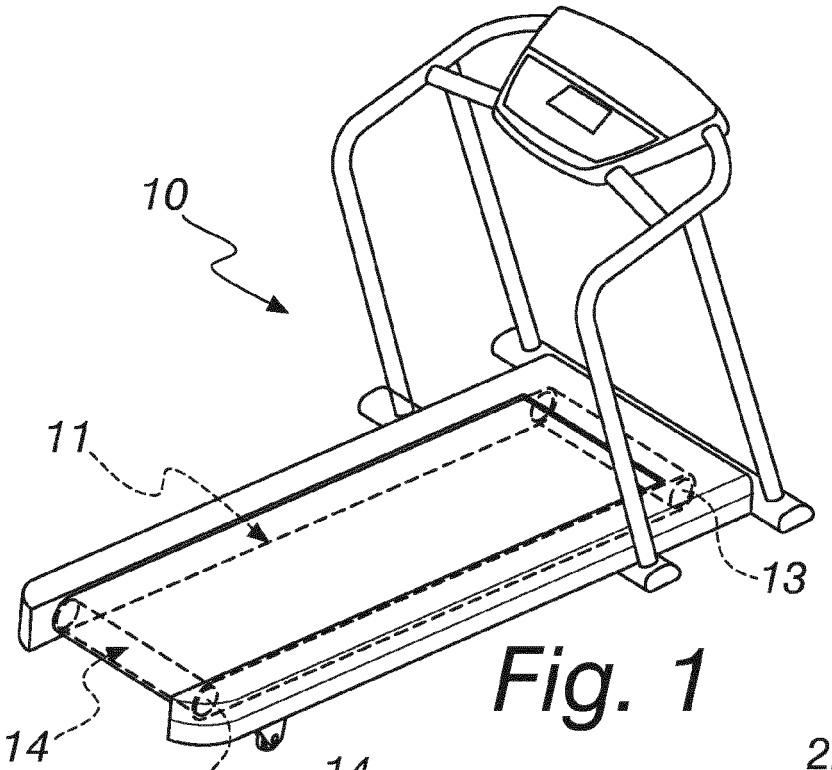

Fig. 1

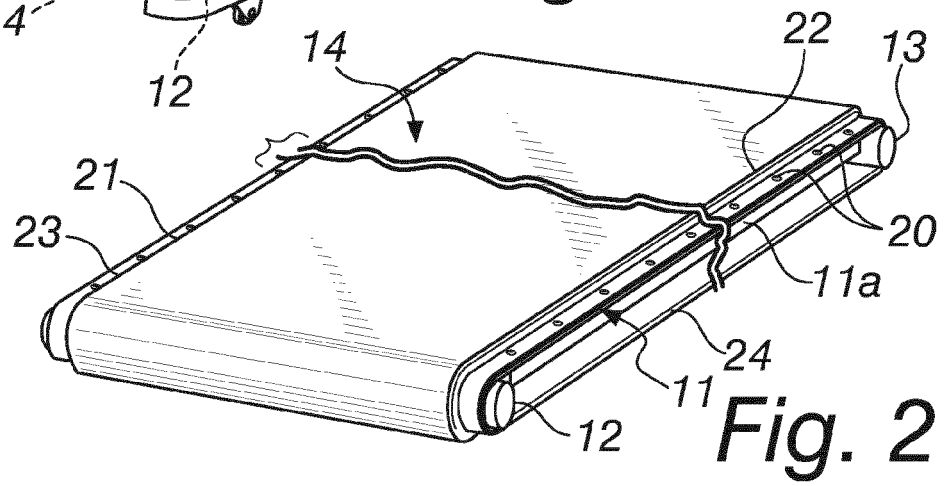

Fig. 2

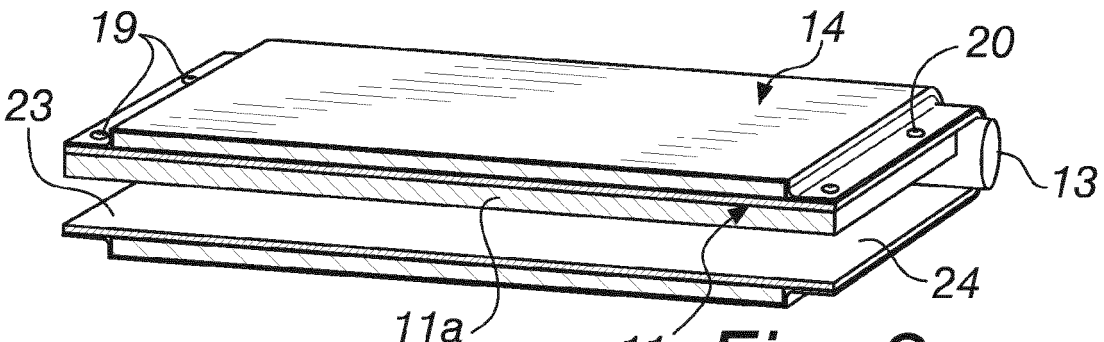

Fig. 3

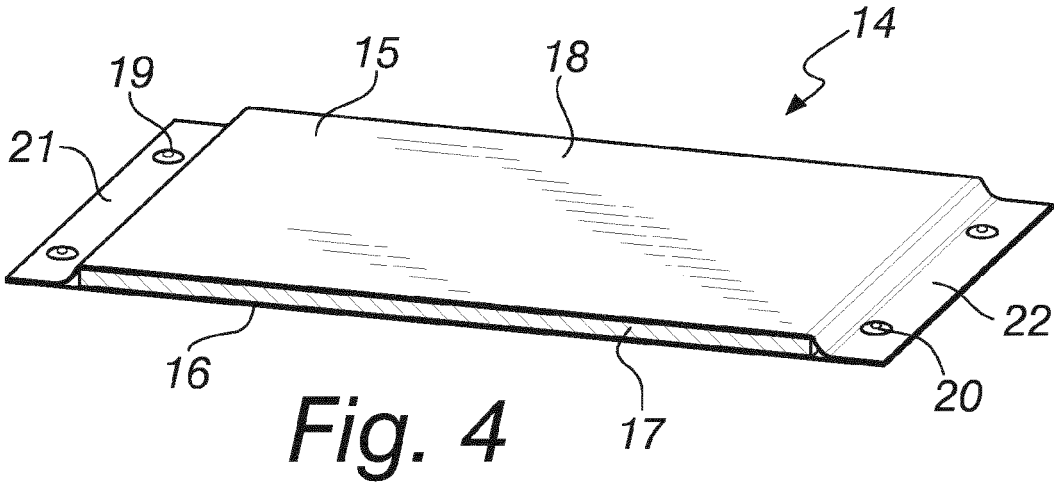

Fig. 4

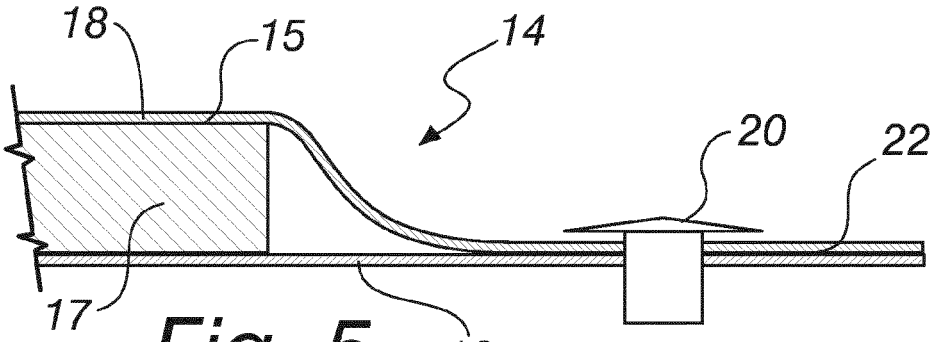

Fig. 5

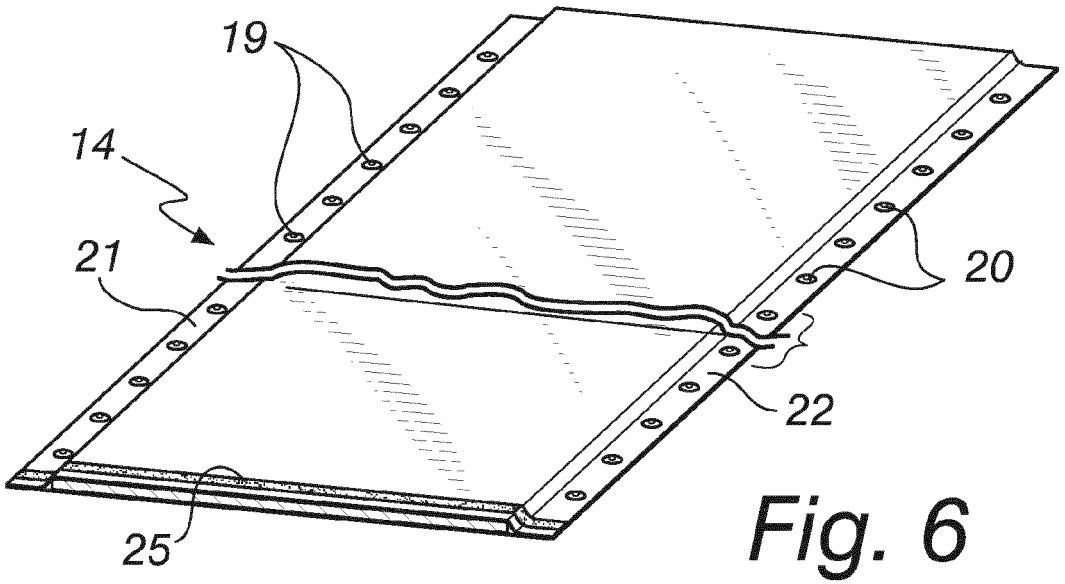

Fig. 6

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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