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**surface support structure**

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(56) Related Art  
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ABSTRACT:

A surface support structure (2) comprising a first layer (8) of resilient material, a second layer including a cover (12) placed over or secured to the first layer (8) and a  
5 third layer (14) placed over each of the first layer (8) and the second layer (12).



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**COMPLETE SPECIFICATION  
FOR A STANDARD PATENT**

**ORIGINAL**



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Invention Title:

**SURFACE SUPPORT STRUCTURE**

*Details of Associated Provisional Application:*

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The following statement is a full description of this invention, including the best method of performing it known to us

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**SURFACE SUPPORT STRUCTURE**

The present invention relates to a surface support structure and a method of installing a surface support structure. More particularly, the invention relates to a playing surface support structure and a method of installing the playing surface support structure in the ground.

Existing ground surfaces, particularly encompassing a playground area where children play on and use various equipment, generally comprise a top layer of either grass, sand, or wood chips underneath which exists the native soil and/or rock. Occasionally children playing on such equipment may fall from the equipment and injure themselves when they contact these existing surfaces which provide limited support for the bodies of the children falling from the equipment. As a result of a child being injured there are certain consequences that follow such as the trauma experienced by the child and their family and the cost involved in rehabilitating a child from any injuries obtained.

Furthermore, existing playing surfaces on which sport is played present a hard surface to players that fall onto such surfaces sometimes resulting in injury to the player or players.

The present invention seeks to overcome the abovementioned problems by substantially reducing the risk of injury to a child falling from playground equipment or to a player falling whilst playing a sport. Specifically the present invention provides for a support surface which is resilient and substantially absorbs the impact a child has with the playground surface or substantially absorbs the impact a player has with a playing surface.

According to one aspect of the invention, there is provided a surface support structure comprising:

a first layer formed of resilient materials, wherein said first layer includes a plurality of individual resilient components placed side by side, each resilient component abutting one or more other said components.

a second layer including a cover means, said second layer being placed over



or secured to said first layer; and

a third layer, said third layer being placed over said second layer and said first layer,

such that said support structure provides a resilient surface to substantially absorb  
5 any impact force against said surface.

The surface support structure may be placed on a surface, such as ground, or placed in an open cavity formed in a surface.

The individual resilient components in the first layer of resilient material may have an aperture formed therethrough to assist with absorption of fluid, such as  
10 water, into any layers, such as soil located beneath the first layer of resilient material. Each of the components may be formed from rubber, or a similar resilient material and preferably formed from tyres and more preferably from automobile tyres.

The second layer including a cover means may be formed by a porous  
15 material to assist with migration or flow of fluid such as water down through layers beneath said second layer. The cover means may have formed therein a plurality of holes or apertures and is preferably made of a thin sheet material such as gauze or shade cloth made from a synthetic or polypropylene grid structure. Alternatively, where migration or flow of fluid is not critical, a cover such as a tarpaulin or other  
20 flexible material may be used. The second layer may be secured to the first layer of resilient material by covering a top surface of the first layer and then tying a cord or cords that are fed through a plurality of eyelets located around the periphery of said second layer. The cord or cords may be tied through said eyelets on an underneath surface of said first layer such that tensioning of the cord or cords provides the  
25 adequate tautness of the cover means around the first layer of resilient material such that the top surface of the first layer is substantially covered by the cover means.

The third layer may include particulate material such as tan bark or wood chips for use as a playground surface which when formed as part of said surface support structure is porous to allow fluid, such as water, to drain through the third layer and down to the layers located underneath said third layer. Alternately, the  
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third layer may include a synthetic playing surface or grass.

According to a second aspect of the invention there is provided a playground surface support structure comprising:

5 a first layer formed of resilient material wherein said first layer includes a plurality of individual resilient components placed side by side, each resilient component abutting one or more other said components;

a cover means forming a second layer, said cover means adapted to be placed over or secured to said first layer of resilient material; and

10 a third layer including particulate material such that said particulate material is placed over said cover means and said first layer, wherein said support structure provides a resilient surface to substantially absorb any impact force against said playground surface.

The present invention also provides for a method of installing a surface support structure in or on a surface, said method comprising the steps of:

15 assembling a first layer of resilient material wherein said first layer includes a plurality of individual resilient components placed side by side, each resilient component abutting one or more other said components;

placing on or securing to said first layer a second layer including a cover means;

20 placing a third layer over said first layer and said second layer such that said third layer substantially covers said first layer and said second layer;

wherein said support structure forms part of said surface such that said structure substantially absorbs any impact force against said surface.

25 An open cavity may be created in the surface such that said support structure is placed in said cavity with the first layer resting on a bottom surface of the cavity.

A preferred embodiment of the invention will now be described, by way of example only, with reference to the accompanying drawings wherein:

Figure 1 is a sectional side view of a surface support structure in accordance with the present invention;

30 Figure 2 is a plan view of a number of surface support structures placed side



4 a

by side;

Figure 3 is a plan view of a second layer of the surface support structure formed of a cover means; and

Figure 4 is an underneath view of the surface support structure showing the  
5 second layer being secured to a first layer of resilient material.

Referring to Figure 1 there is shown a surface support structure 2 formed of a

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number of layers which reside in an open cavity 4 formed in a surface 6 such as the ground located underneath and around or between playground equipment. A first layer 8 is formed of resilient material comprising components made from rubber, such as tyres and more particularly automobile tyres 10. A second layer forming a cover 12 is placed over a top surface of the tyres and wrapped around the periphery of four of these tyres as is more clearly shown in Figure 2 such that the cover is tied firmly underneath the set of components (or tyres) to present a taut surface over the top surface of the tyres. Over the cover 12 is placed particulate material 14 which forms a third layer and is generally placed in the cavity 4 to fill the remaining space of the cavity 4 up to the level ground surface 6. The particulate material may be formed of tan bark or wood chips or a similar material.

An alternative to forming an open cavity 4 is to simply lay or place the first and second layers 8 and 12 on the ground surface 6 in a desired position and cover these layers with the particulate material 14 so that the particulate material is heaped over and all around the first and second layers to provide the required coverage.

The support structure 2 may be used in a field where sport is played. In this application, the first layer 8 is formed of a resilient material, as described before, the second layer 12 is a cover, as described before, but the third layer 14 is formed from a synthetic surface, such as synthetic grass, or natural grass itself. The third layer is simply laid over the first two layers. The structure 2 would then provide a cushioning effect for players who fell on to the surface 6 and substantially reduces the risk of injury to those players through contact with the surface 6.

In Figure 2 there is shown four such surface support structures 2 placed side by side in a cavity of a size and dimension to fit the perimeter of all four structures 2. Such configurations are generally required where the area to be covered to form a resilient surface is large or wherein the space between the equipment is a large area. The tyres 10 have a central aperture 16 which together with the interior of the side walls of the tyres (not shown) form an open area into which fluid such as water may drain down from the ground surface 6 through the particulate material 14 and through the cover 12 so as to drain through to the soil located underneath the resilient first





layer 8. The cover 12, which is preferably formed of a porous material such that holes exist through which such fluid can flow, for example, shade cloth material, is secured around the tyres 10 of the support structure 2 such that the taut surface of the cover on the upper surface of the tyres forms a solid base to support the weight of the particulate material 14 thereon. By doing this it also maintains the resilient properties of the tyres so that if a child falls off equipment located above each of these support structures 2 or if a player falls whilst playing sport, the impact of their body against the ground surface 6 will be substantially absorbed by the resilient properties of the tyres. In other words a child landing on the particulate material 14 will force the material to move in a downwards fashion against the tyre or tyres 10 of which the side walls will be depressed inwardly. Consequently a child or player is less likely to injure themselves while landing on this support structure 2.

In Figure 3 there is shown a cover means 12 which is used to form the second layer between the first layer of tyres and the particulate material 14. The cover has four sides 18, 20, 22 and 24 forming a periphery. The cover also has a border 26 extending around the periphery and having a series of eyelets or apertures 28 formed therein. The border 26 is preferably made from a reinforced material secured to the shade cloth material.

In Figure 4 there is shown an underneath view of the layer of tyres having the shade cloth or cover 12 wrapped tautly around one surface thereof. The cover has been initially placed on a flat surface and then the tyres 12 placed on the cover whereafter the sides 18 through to 24 of the cover 10 are wrapped around the side walls of the tyres such that the cover 12 covering the underneath surface, as appears in Figure 4, is taut. The overlap of the sides 18 through to 24 are then tied together with a cord 30, or alternatively a series of cords 30 so that the cover is maintained in a taut position. The cord is repeatedly threaded through the eyelets of the cover to enable the cord to be tied and to enable the cover 12 to be held in a taut position. When installing the support structure 2, a user is required to set aside a desired area to place the support structure or create an open cavity 4 in the ground 7 by using a shovel or similar appropriate tool to break the surface 6 and then remove the soil, sand or rocks



formed in the ground 7. As an example, the size of the cavity may be made about 40 cm deep and about 120 cm square. This will cater for four tyres to fit or rest on the bottom of the cavity wherein each tyre has a diameter of about 60 cm. A cover or shade cloth 12 may be made from a square having a side dimension of about 180 cm with the spacing between eyelets 28 varying between 25 and 35 cm. The cover 12 will then be laid on a flat surface and then the four tyres 10 will be placed on the cover 12. The user will then pull up each side of the cover so that it overlaps a portion of the side walls of each tyre as is shown in Figure 4 and then tied together by using a cord 30 through the eyelets 28 as previously described so that the cover is held taut around the set of tyres.

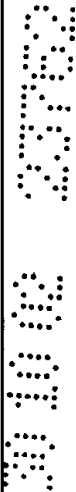
The first and second layers are now formed and ready for insertion into the cavity 4 to rest on the bottom surface thereof or to be placed on the ground in a desired area. Once this is in place the user will then place or distribute the particulate material 14 over the cover 12 and fill the cavity 4 up to the level of the ground surface 6 or heap the material 14 over the first and second layers, as the case may be. Alternatively, grass or a synthetic material may be laid over the first two layers in situations where the support structure is used in a sporting field.

Should a greater area be required to have the resilient support structure a number of support structures may be prepared in similar fashion and laid side by side in a much larger cavity, or area on the ground surface 6, the size of which is the equivalent to fit as many support structures as is required.



**The claims defining the invention are as follows:**

1. A surface support structure comprising:  
a first layer formed of resilient material, wherein said first layer includes a  
5 plurality of individual resilient components placed side by side, each resilient  
component abutting one or more other said components;  
a second layer including a cover means, said second layer being placed over  
or secured to said first layer; and  
a third layer, placed over said first layer and said second layer such that said  
10 support structure provides a resilient surface to substantially absorb any impact  
force against said surface.
2. A playground surface support structure comprising:  
a first layer formed of resilient material, wherein said first layer includes a  
plurality of individual resilient components placed side by side, each resilient  
15 component abutting one or more other said components;  
a cover means forming a second layer, said cover means adapted to be placed  
over or secured to said first layer; and  
a third layer including particulate material such that said particulate material  
is placed over said cover means and said first layer, wherein said support structure  
20 provides a resilient surface to substantially absorb any impact force against said  
playground surface.
3. A structure according to claim 1 or claim 2 wherein said structure is  
positioned in a cavity formed in the ground such that said third layer is substantially  
25 level with the surface of the ground.
4. A structure according to claim 1 or claim 2 wherein said structure is placed  
on a ground surface.
5. A structure according to claim 1 wherein each resilient component has an



aperture to assist with absorption of fluid into layers of soil located beneath said first layer.

6. A structure according to claim 5 wherein said each of said resilient components is a tyre.

5 7. A structure according to any one of the previous claims wherein said second layer comprises thin sheet material.

8. A structure according to claim 7 wherein said sheet material is porous to assist with migration or flow of fluid through each of said first and second layers.

9. A structure according to any one of the previous claims wherein said cover  
10 means has eyelets located about a periphery of said cover means.

10. A structure according to claim 9 wherein in order to secure said cover means to said first layer cords are fed through said eyelets and tied such that said cover means is kept taut over said first layer.

11. A structure according to claim 1 wherein said third layer comprises  
15 particulate material.

12. A structure according to any one of claim 1 or claims 3 to 10 wherein said third layer comprises a synthetic playing surface or grass.

13. A method of installing a surface support structure in or on a surface, said method comprising the steps of:

20 assembling a first layer of resilient material, wherein said first layer includes a plurality of individual resilient components placed side by side, each resilient component abutting one or more other said components;

placing on or securing to said first layer a second layer including a cover means;

25 placing a third layer over said first layer and said second layer such that said third layer substantially covers said first layer and said second layer;



wherein said support structure forms part of said surface such that said structure substantially absorbs any impact force against said surface.

14. A method according to claim 13 further comprising the step of creating an open cavity in said surface, such as ground, into which is placed said surface support structure.

15. A method according to claim 13 or claim 14 further comprising the step of securing said second layer to said first layer by using cords fed through eyelets of said second layer and tying said cords to keep said second layer taut over said first layer.

16. A method according to claim 15 wherein prior to said securing step said second layer is placed on a substantially flat surface and thereafter said first layer is placed on said second layer.

17. A method according to claim 16 wherein said first layer and said second layer when secured are placed on or in said surface prior to placing said third layer over said first layer and said second layer.

18. A support structure substantially as hereinbefore described with reference to the accompanying drawings.

19. A method substantially as hereinbefore described with reference to the accompanying drawings.

Dated: 29 October, 2002

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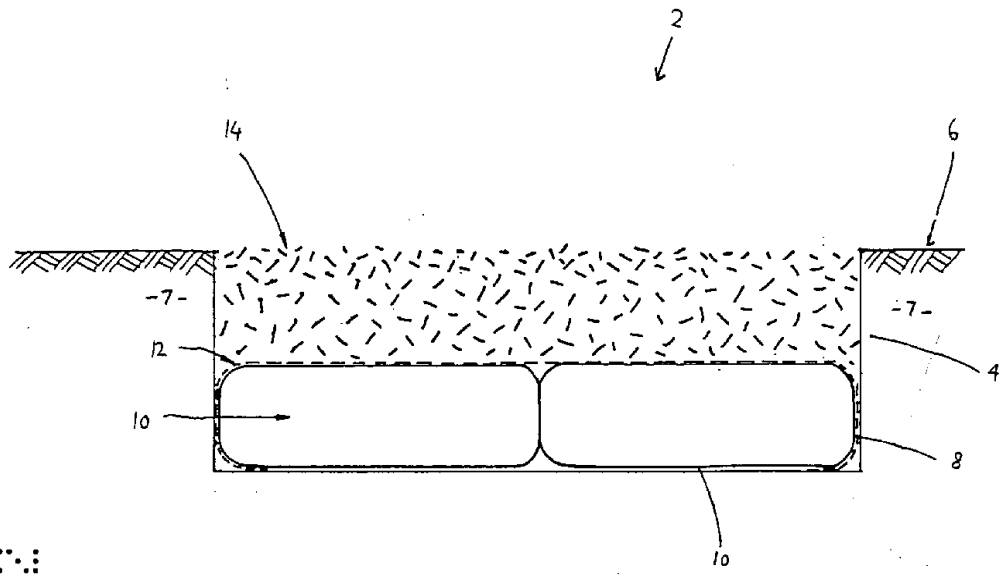


FIGURE 1

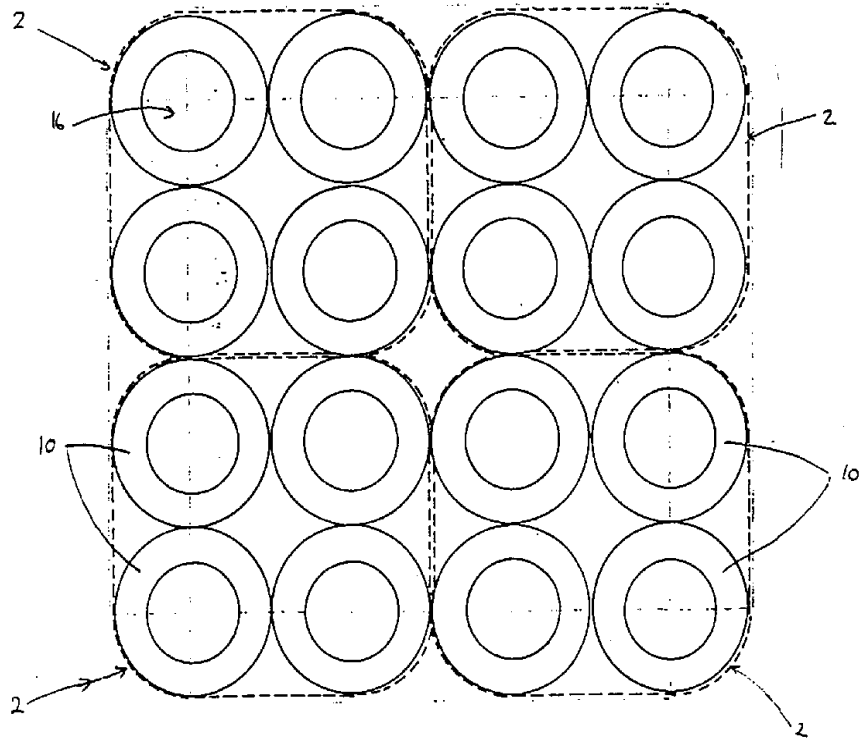


FIGURE 2

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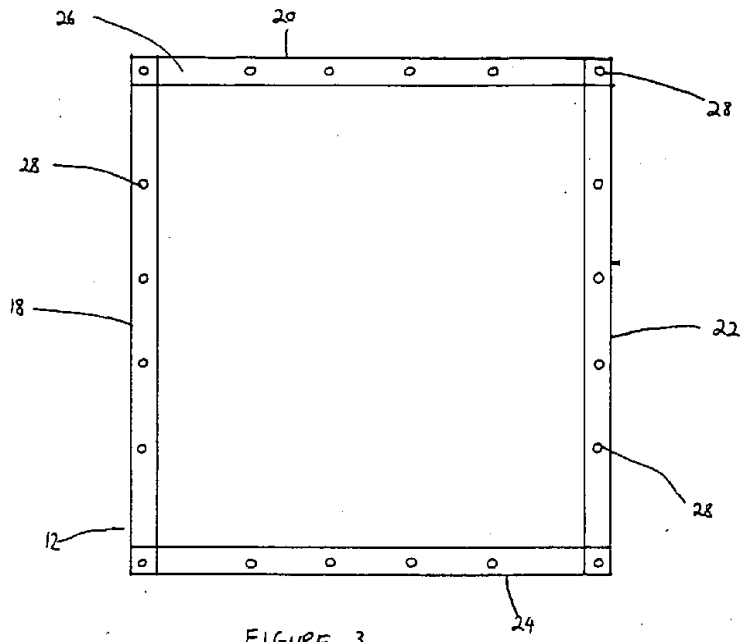


FIGURE 3

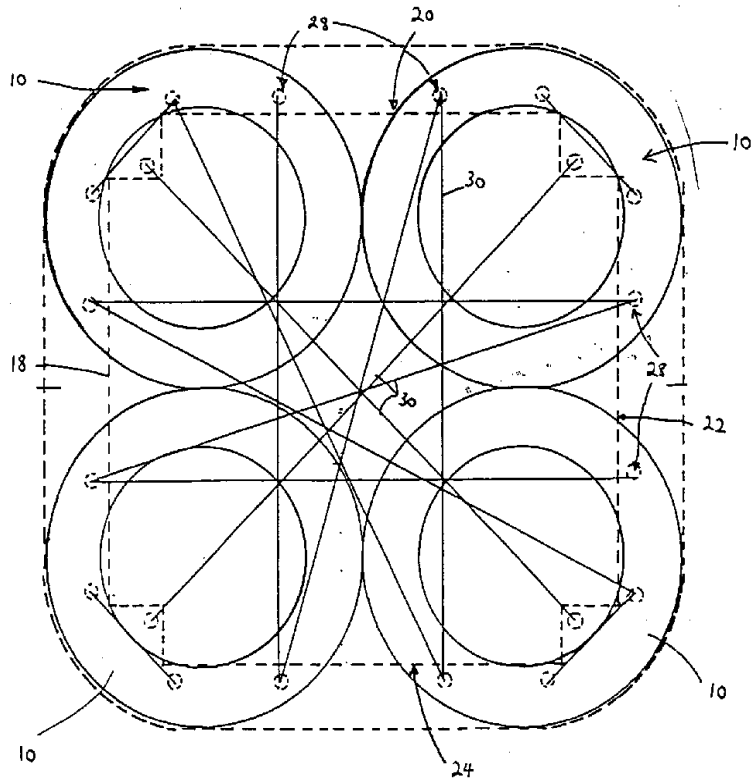


FIGURE 4