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(54) **LOAD-BEARING MAT**

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(57) **ABSTRACT**

A load-bearing mat includes longitudinal tire members and transverse tire members that are interwoven and secured at their ends via fasteners. Typically, the longitudinal tire members and transverse tire members are constructed from the treads of tires. The load-bearing mat may include lifting cables to facilitate transportation, installation, and removal. The load-bearing mat may be used to protect turf areas or soft soil from heavy vehicles or loads.

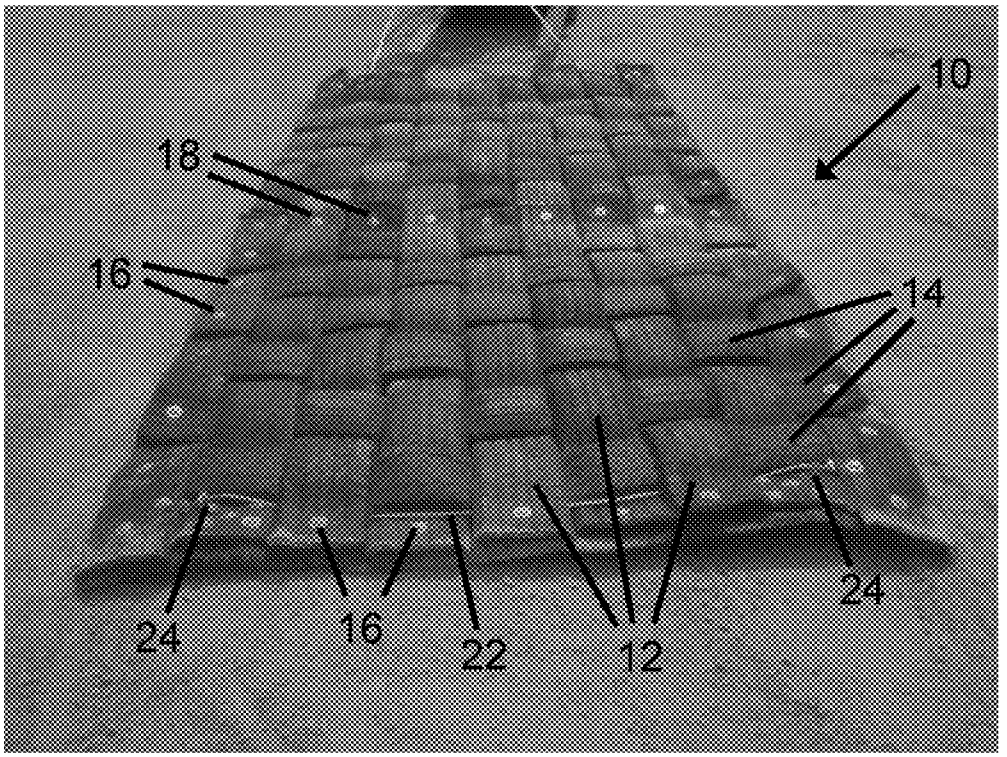


Figure 1

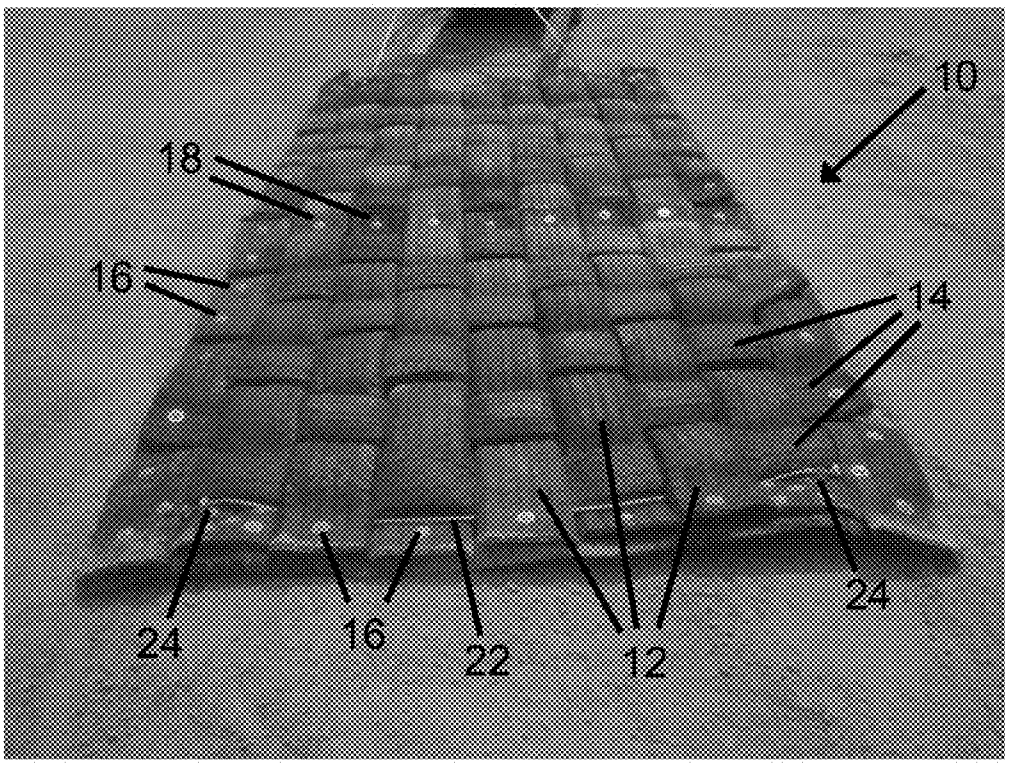
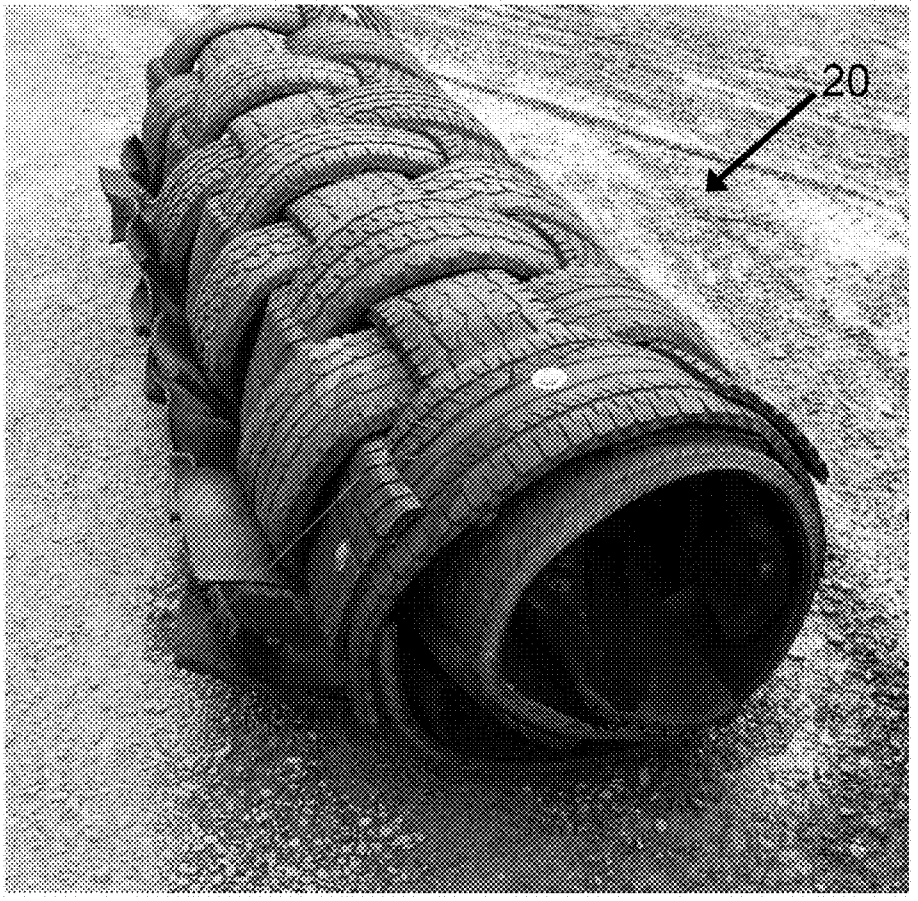


Figure 2



LOAD-BEARING MAT

CROSS-REFERENCE TO PRIORITY APPLICATION

[0001] This application hereby claims the benefit of U.S. Provisional Patent Application No. 61/537,872, for a Load-Bearing Mat (filed Sep. 22, 2011), which is hereby incorporated by reference in its entirety.

BACKGROUND OF THE INVENTION

[0002] The present invention relates to the field of load-bearing mats for distributing the weight of heavy loads across a broader surface.

[0003] In a variety of industries, it is necessary to drive vehicles over turf, soft soil, or other grassy areas instead of more typical asphalt or concrete roadways. Driving heavy vehicles over such areas can damage the turf, soil, or grass. In some circumstances, the vehicle may actually sink into the soil and become entrapped. Various solutions have been employed to prevent these problems.

[0004] Some solutions include embedding a supportive mat within the turf area, such that the turf or grass grows between the pieces of the mat, thereby hiding the mat from view. Embedded support mats, however, are not easily removed from the turf area. Furthermore, shifting soil may require costly removal and repositioning of the support mat. Thus, embedded support mats of this variety represent a more permanent solution that is not free from its own problems.

[0005] Other solutions include placing specially designed mats formed of cells or panels that interlock with each other over the turf area. Although these mats are more temporary in nature than embedded mats, they present additional problems. As an initial matter, these cell or panel-based interlocking mats are expensive to manufacture and maintain. Additionally, these mats typically have gaps in their surface that result in an uneven and less efficient spreading of the load across the turf area. Furthermore, these mats must be joined at each of their interlocking points making installation more time-consuming.

[0006] Another solution includes using wooden boards such as plywood. Wood mats are more temporary in nature than embedded mats and less expensive than interlocking mats, but still present their own set of problems. For example, wood mats cannot be folded for transport. Additionally, wood mats can split and splinter thereby creating a safety hazard for installers and those using the wood mats. Furthermore, wood mats have a relatively short service-life.

[0007] Therefore, a need exists for an improved load-bearing mat that can be used to protect turf areas or soft soil from heavy vehicles or loads. More particularly, there exists a need for an inexpensive, durable load-bearing mat that spreads heavy loads across a broad surface.

SUMMARY OF THE INVENTION

[0008] In one aspect, the invention embraces a load-bearing mat that includes longitudinal tire members and transverse tire members that are interwoven. The longitudinal tire members extend from the mat's anterior end toward the mat's posterior end. The transverse tire members are oriented substantially perpendicular to the longitudinal tire members and extend from the mat's left side toward the mat's right side.

[0009] In an exemplary embodiment, anterior fasteners secure the anterior ends of the longitudinal tire members to the transverse tire member located at the mat's anterior end. Posterior fasteners secure the posterior ends of the longitudinal tire members to the transverse tire member located at the mat's posterior end.

[0010] In another exemplary embodiment, left-side fasteners secure the left-side ends of the transverse tire members to the longitudinal tire member located at the mat's left side. Right-side fasteners secure the right-side ends of the transverse tire members to the longitudinal tire member located at the mat's right side.

[0011] In yet another exemplary embodiment, the longitudinal tire members are tightly interwoven with the transverse tire members such that the surface of the mat is free of substantial gaps.

[0012] In yet another exemplary embodiment, the longitudinal tire members and the transverse tire members include the treads of tires (e.g., the rubber tread, steel belting, a portion of the tire plies, and a portion of the inner liner).

[0013] In yet another exemplary embodiment, the load-bearing mat includes fasteners formed of paired nuts and bolts. Typically, the fasteners also include washers.

[0014] In yet another exemplary embodiment, the longitudinal tire members include a first tread and a second tread joined end-to-end via a central fastener.

[0015] In yet another exemplary embodiment, the load-bearing mat includes lifting cables at its anterior and posterior ends.

[0016] In yet another exemplary embodiment, the load-bearing mat includes lifting cables that are interwoven with the longitudinal tire members at the mat's anterior and posterior ends.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] The foregoing and other objects and advantages of the invention and the manner in which the same are accomplished will become clearer based on the following detailed description taken in conjunction with the accompanying drawings in which:

[0018] FIG. **1** depicts an exemplary embodiment of a load-bearing mat according to the present invention; and

[0019] FIG. **2** depicts another exemplary embodiment of a load-bearing mat according to the present invention in a rolled position.

DETAILED DESCRIPTION OF THE INVENTION

[0020] The invention will now be described more fully hereinafter with reference to the accompanying drawings, in which multiple embodiments of the invention are shown. This invention may, however, be embodied in different forms and should not be construed as limited to the embodiments set forth herein. Rather, these embodiments are provided so that this disclosure will be thorough and complete and will fully convey the scope of the invention to those skilled in the art. Like numbers refer to like elements throughout. Further, like numbers with the prime notation refer to like or similar elements of the structure.

[0021] The present invention embraces a durable, load-bearing mat that can be used to protect turf areas or soft soil from heavy vehicles or loads. Typically, the load-bearing mat is constructed using tire members. As used herein, the term "tire member" refers to a portion of a tire that has been modified (e.g., cut) to create a generally rectangular, flat

shape having a length that is substantially greater than its width (e.g., at least twice as long as it is wide).

[0022] For example, the treads of truck tires may be used to construct the load-bearing mat. As used herein, the term "treads" or "treads of tires" refers to the lugged tread portion of the tire, the portion of the plies running underneath the lugged tread portion, any steel belts that may be in the tire, and the inner liner of the tire. Stated differently, the term "treads" or "treads of tires" refers to the portion of a tire that remains after the bead and sidewall are removed.

[0023] Constructing the load-bearing mat from tire members or treads provides particular advantages over typical mats. The load-bearing mat is more durable and has a longer service-life than typical wood mats because it is primarily rubber. For example, the load-bearing mat is generally unaffected by water, heat, cold, insects, oil, or gas. The lugged portion of the tread provides grip at the mat to ground interface and helps prevent vehicle tires from slipping. The load-bearing mat can be folded or rolled up to facilitate transportation as well as installation and removal. The tire-based load-bearing mat is safer than wood mats because it will not split or splinter. For mats constructed of treads that include steel belts, the steel belting provides additional toughness for heavy loads and steel track machines.

[0024] Furthermore, the tire-based material for constructing the load-bearing mats is less expensive than specially designed mats formed of cells or panels that interlock. For example, the treads may be obtained from old or decommissioned vehicle tires (e.g., truck tires) using relatively simple cutting machines that remove a tire's sidewall and bead from the tread. The circular tread may then be cut to form a flat tire member.

[0025] Typically, the load-bearing mat includes longitudinal tire members extending from the mat's anterior end toward the mat's posterior end, and transverse tire members oriented substantially perpendicular to the longitudinal tire members and extending from the mat's left side toward the mat's right side. The longitudinal tire members are interwoven with the transverse tire members. By interweaving the tire members, the load-bearing mat has a thickness that is substantially equivalent to the thickness of two tire members (i.e., the mat is two plies thick).

[0026] As noted, FIG. **1** depicts an exemplary embodiment of a load-bearing mat **10** according to the present invention. As shown, the longitudinal tire members **12** are interwoven with the transverse tire members **14**. To secure the ends of the longitudinal tire members **12** and the transverse tire members **14**, fasteners **16** are placed at the ends of each of the tire members along the sides of the mat. As depicted, the fasteners **16** may include paired nuts and bolts as well as washers. Interweaving the tire members **12** and **14** allows them to be secured using fasteners **16** only at their ends, rather than at each point at which a longitudinal tire member **12** crosses a transverse tire member **14**. Interweaving the tire members **12** and **14** also maintains their alignment under heavy load. Thus, the interweaving provides additional durability, structural integrity, and reduced manufacturing costs.

[0027] As depicted in FIG. **1**, the longitudinal tire members **12** may be tightly interwoven with the transverse tire members **14** such that the surface of the mat is free of substantial gaps. The substantially gap-free surface of the mat allows the mat **10** to spread loads over an even larger surface area, thereby reducing the pressure on the ground surface protected by the mat **10** (e.g., a grass area).

[0028] The exemplary embodiment of the load-bearing mat **10** depicted in FIG. **1** includes longitudinal tire members **12** formed of two treads joined by central fasteners **18**. In this regard, the ends of the two treads are connected via the central fastener **18** to form a longer longitudinal tire member **12**. In this type of embodiment, the load-bearing mat **10** may or may not include a transverse tire member at the point where the two treads are joined by the central fastener **18**. For example, the transverse tire member at the central joining point may be omitted to provide a more uniform height along the length of the mat **10**.

[0029] The load-bearing mat **10** of FIG. **1** also includes a lifting cable **22** at the end of the mat **10**. The lifting cable **22** is secured at its ends near the left and ride sides of the mat **10** via a pair of eye bolts **24**. Additionally, the lifting cable **22** is interwoven with the longitudinal tire members **12** to prevent tripping or stumbling by installers or users of the mat. The lifting cable **24** facilitates installation, positioning, and removal of the load-bearing mat **10** (e.g., using a forklift and/or a sling).

[0030] In some exemplary embodiments, the load-bearing mat includes two or more lifting cables positioned at the ends or sides of the mat. For embodiments including a lifting cable positioned on the side of the mat, the lifting cable may be interwoven with the transverse tire members.

[0031] The load-bearing mat of the present invention can be constructed to have a variety of dimensions. The exemplary embodiment depicted in FIG. **1** has a length of about fourteen feet and a width of about seven feet. Additionally, multiple load-bearing mats may be stacked to accommodate excessively heavy loads. In this regard, the exemplary embodiment of the load-bearing mat **10** depicted in FIG. **1** is capable of spreading loads equivalent to a two-ply board mat (i.e., a wood-based mat).

[0032] FIG. **2** depicts another exemplary embodiment of a load-bearing mat **20** according to the present invention in a rolled position. As previously discussed, constructing the load-bearing mat **20** from tire-based materials (e.g., tire members and/or treads) allows the mat **20** to be folded or rolled up to facilitate transportation as well as installation and removal. FIG. **2** depicts this capability. In this regard, the rolled load-bearing mat **20** can be transported in a more compact form and installed by simply unrolling the mat **20** in a desired location.

[0033] In the drawings and specification, there have been disclosed typical embodiments on the invention and, although specific terms have been employed, they have been used in a generic and descriptive sense only and not for purposes of limitation, the scope of the invention being set forth in the following claims. The use of the term "and/or" includes any and all combinations of one or more of the associated listed items.

That which is claimed is:

1. A load-bearing mat, comprising:

longitudinal tire members extending from the mat's anterior end toward the mat's posterior end;

transverse tire members oriented substantially perpendicular to said longitudinal tire members and extending from the mat's left side toward the mat's right side;

anterior fasteners securing each of the anterior ends of said longitudinal tire members to the transverse tire member located at the mat's anterior end;

posterior fasteners securing each of the posterior ends of said longitudinal tire members to the transverse tire member located at the mat's posterior end;

left-side fasteners securing each of the left-side ends of said transverse tire members to the longitudinal tire member located at the mat's left side; and

right-side fasteners securing each of the left-side ends of said transverse tire members to the longitudinal tire member located at the mat's left side;

wherein said longitudinal tire members are interwoven with said transverse tire members.

2. The load-bearing mat according to claim **1**, wherein said longitudinal tire members are tightly interwoven with said transverse tire members such that the surface of the mat is free of substantial gaps.

3. The load-bearing mat according to claim **1**, wherein said longitudinal tire members and said transverse tire members comprise the treads of tires.

4. The load-bearing mat according to claim **1**, wherein said anterior fasteners, said posterior fasteners, said left-side fasteners, and said right-side fasteners comprise paired nuts and bolts.

5. The load-bearing mat according to claim **4**, wherein said anterior fasteners, said posterior fasteners, said left-side fasteners, and said right-side fasteners comprise washers.

6. The load-bearing mat according to claim **1**, wherein each of said longitudinal tire members comprises a first tread, a second tread, and a central fastener, said first tread's posterior end being joined via said central fastener to said second tread's anterior end.

7. The load-bearing mat according to claim **6**, wherein each of said central fasteners comprises a paired nut and bolt.

8. The load-bearing mat according to claim **1**, comprising an anterior lifting cable at the mat's anterior end and a posterior lifting cable at the mat's posterior end.

9. The load-bearing mat according to claim **8**, wherein said anterior lifting cable and said posterior lifting cable comprise steel cabling.

10. The load-bearing mat according to claim **8**, wherein said anterior lifting cable and said posterior lifting cable are interwoven with said longitudinal tire members.

11. The load-bearing mat according to claim **8**, comprising:

a pair of anterior eye bolts positioned at the left and right sides of the anterior end of the mat;

a pair of posterior eye bolts positioned at the left and right sides of the posterior end of the mat;

wherein the ends of said anterior lifting cable are secured to the mat via said anterior eye bolts; and

wherein the ends of the posterior lifting cable are secured to the mat via said posterior eye bolts.

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