(12) UK Patent Application (19) GB (11) 2481802 (13) A

(43) Date of A Publication 11.01.2012

(21) Application No: 1011285.2

(22) Date of Filing: 05.07.2010

(71) Applicant(s):
Robin Oakey
Aurora, Well Yard, LEDBURY,
Hereford and Worcester, HR8 1AQ, United Kingdom

(72) Inventor(s):
Robin Oakey

(74) Agent and/or Address for Service:
Avidity IP
Merlin House, Falconry Court, Bakers Lane, EPPING,
Essex, CM16 5DQ, United Kingdom

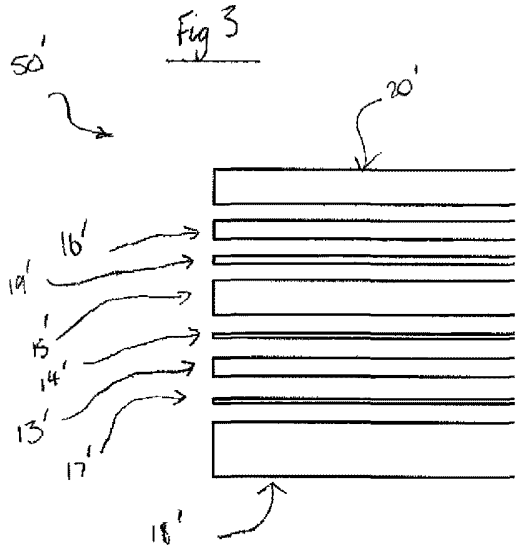
(51) INT CL:
E04D 11/00 (2006.01)

(56) Documents Cited:
WO 2008/029075 A **WO 1999/049722 A**
WO 1998/032323 A **WO 1996/016241 A**
NL 001023289 C **US 20070079547 A**
Dalefoot Composts Website [online]
Green Roofs, Preparation and Construction, Growing medium: Soils or soil substitutes [online]
Slug Gone website [online]

(58) Field of Search:
INT CL **A01C, A01G, E04D**

(54) Title of the Invention: **Uses of carpet**
Abstract Title: **Uses of carpet**

(57) A plant growth medium comprising more than 50 wt/wt% wool when the growth medium is dry. The medium may be made up of carpet which may be recycled. The medium may be provided as a mat. The carpet may be shredded. The growth medium may further comprise a water retention means such as a superabsorbent polymer, which may be reclaimed from diapers or sanitary wear. The growth medium may be included in a system for a green roof which may comprise a layer of carpet having projections of one major face, the layer may be in the form of a container having a base and walls. The system may further comprise a waterproof membrane, a drainage layer and a filter fleece layer which may be of recycled synthetic carpet fibres. Binder and aggregate may be included in the system. A cover may also be provided and may form a pocket housing plant growth medium and fixed to a backing plate. Use of carpet as sound insulation is also disclosed.



GB 2481802 A

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

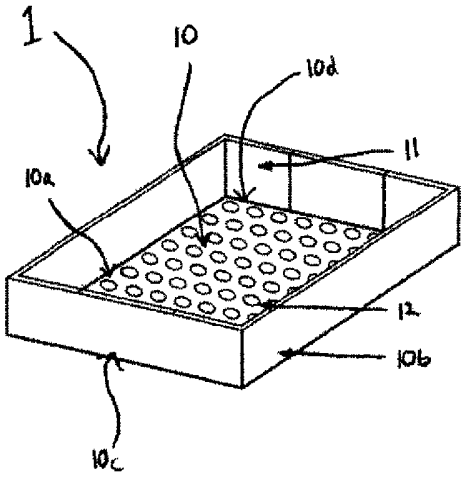


Fig 1

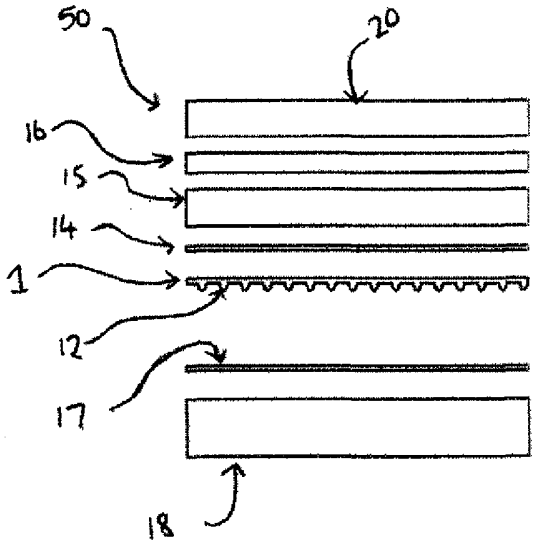


Fig 2

11 11 11 11

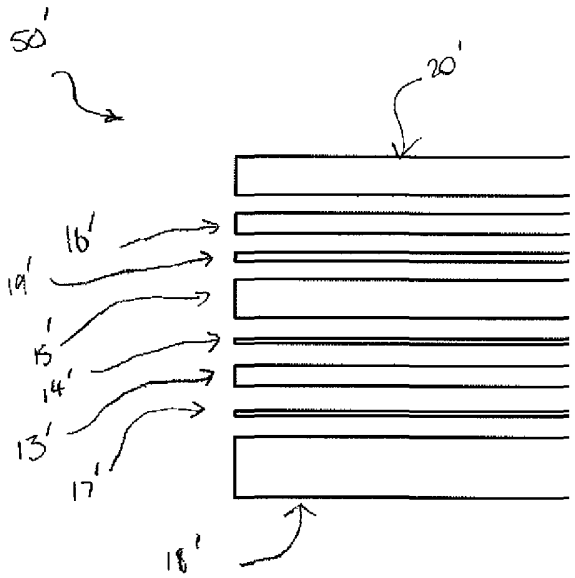


Fig 3

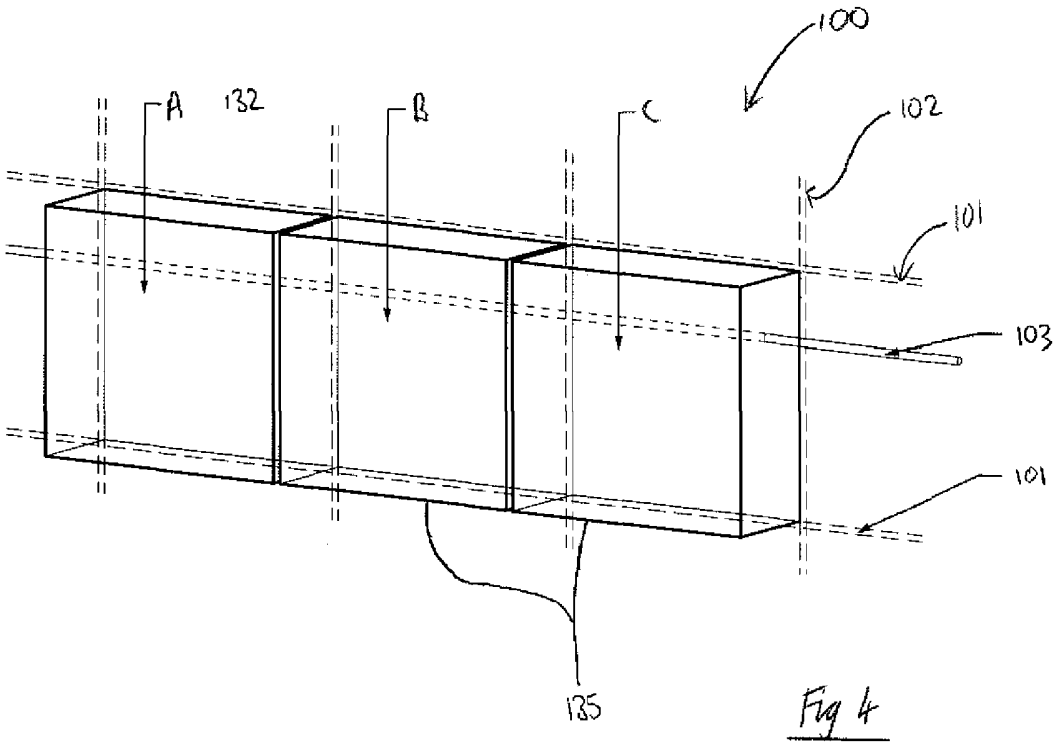


Fig 4

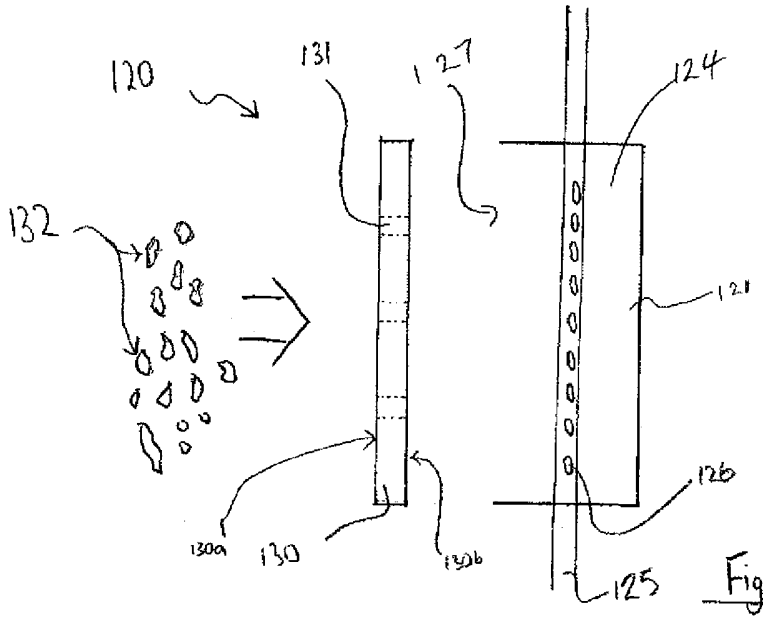

120
131
127
124
132
121
126
130a
130
130b
125

Fig 5

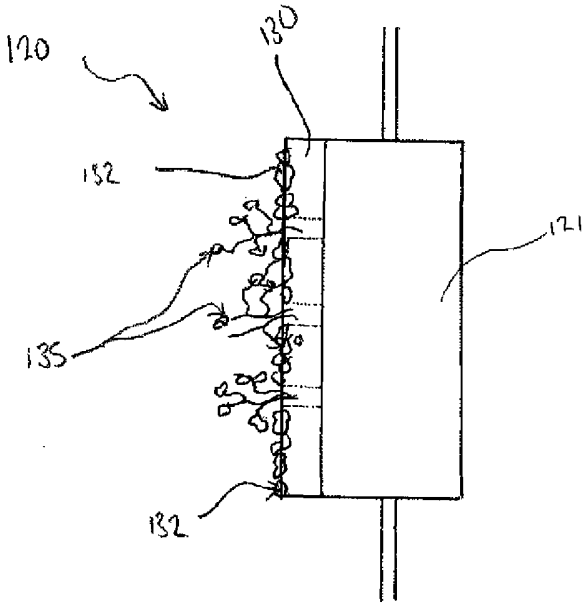

120
130
132
121
135
132

Fig 6

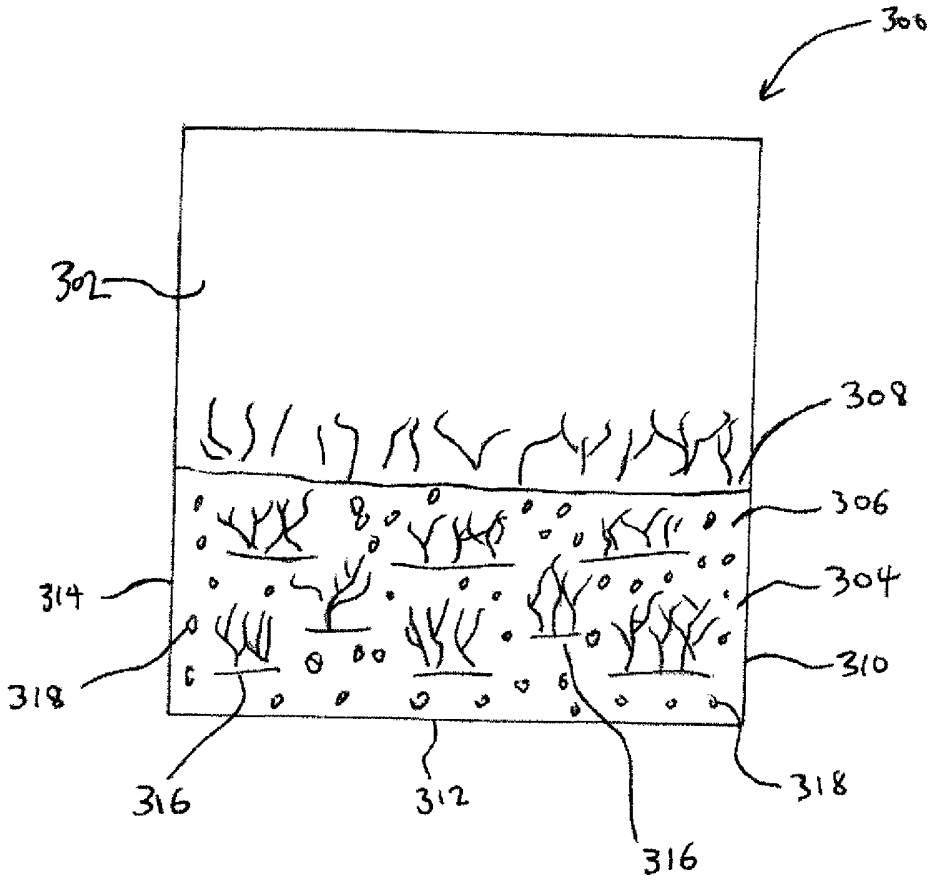


FIGURE 7

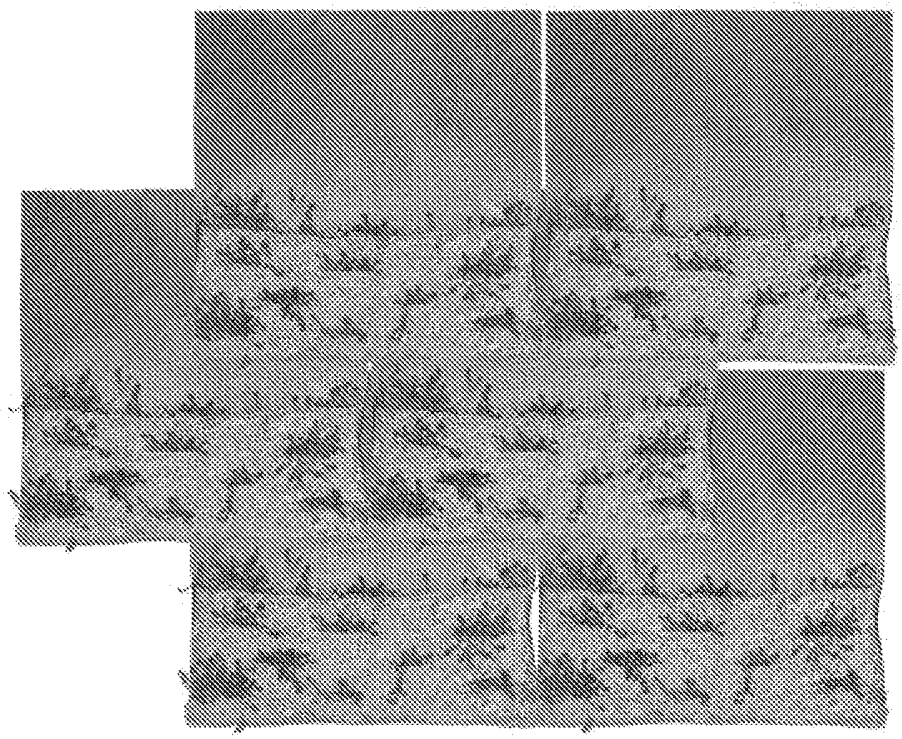


Figure 8

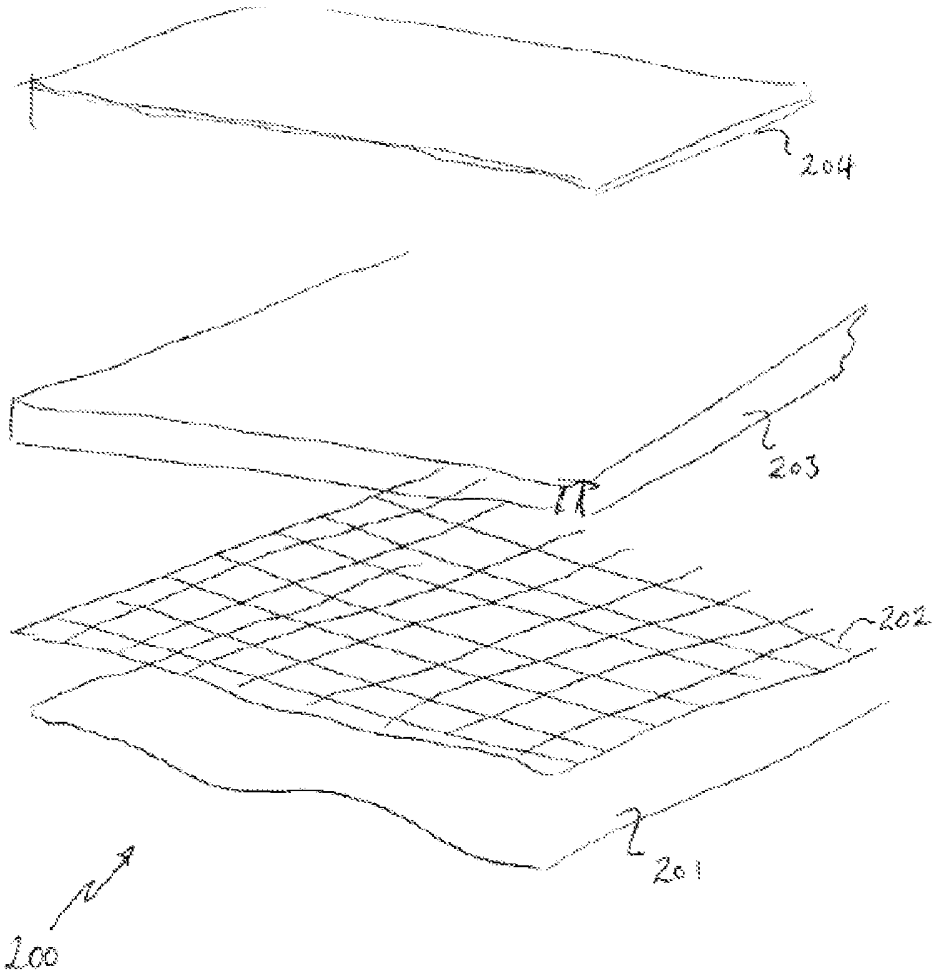


Figure 9

Figure 10a

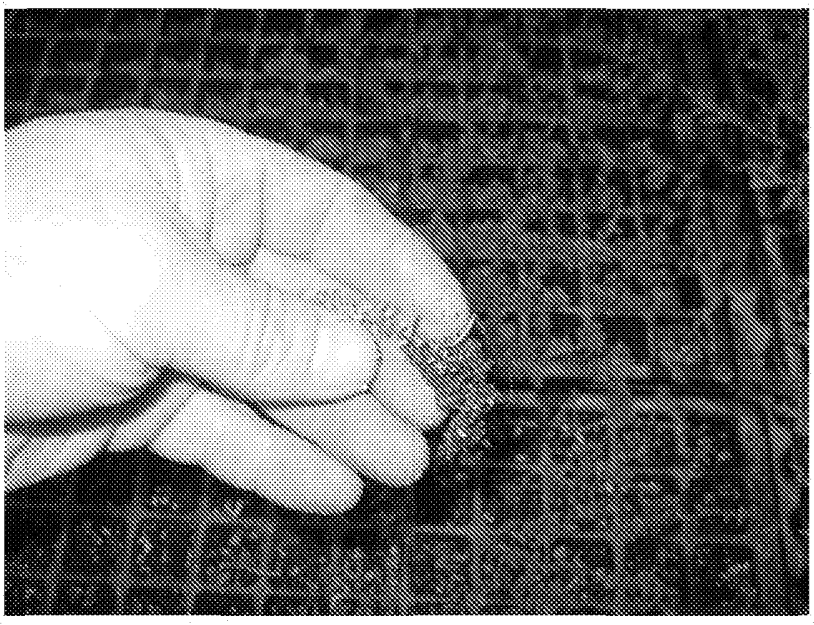


Figure 10b

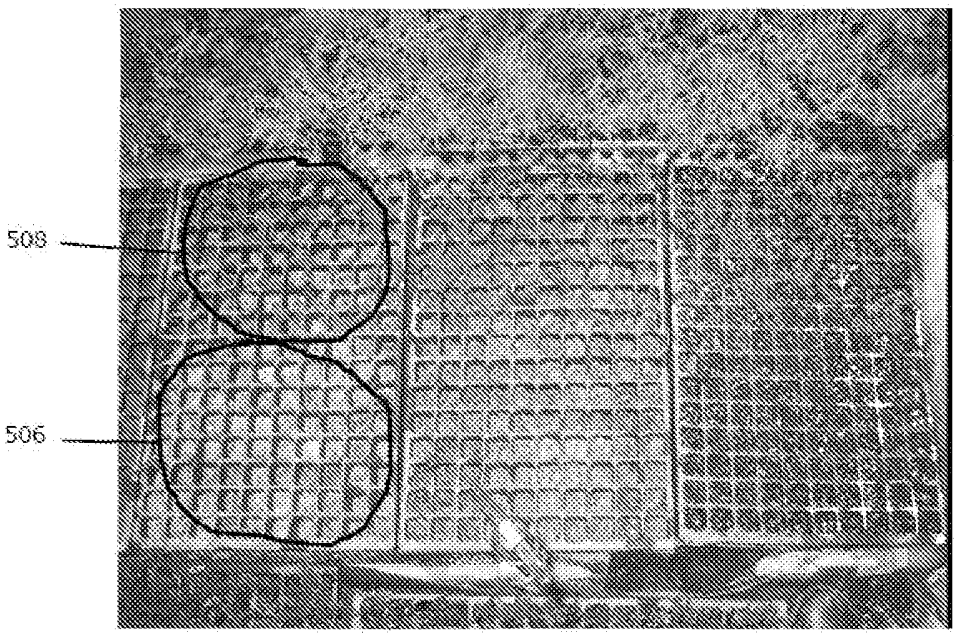


Figure 10c

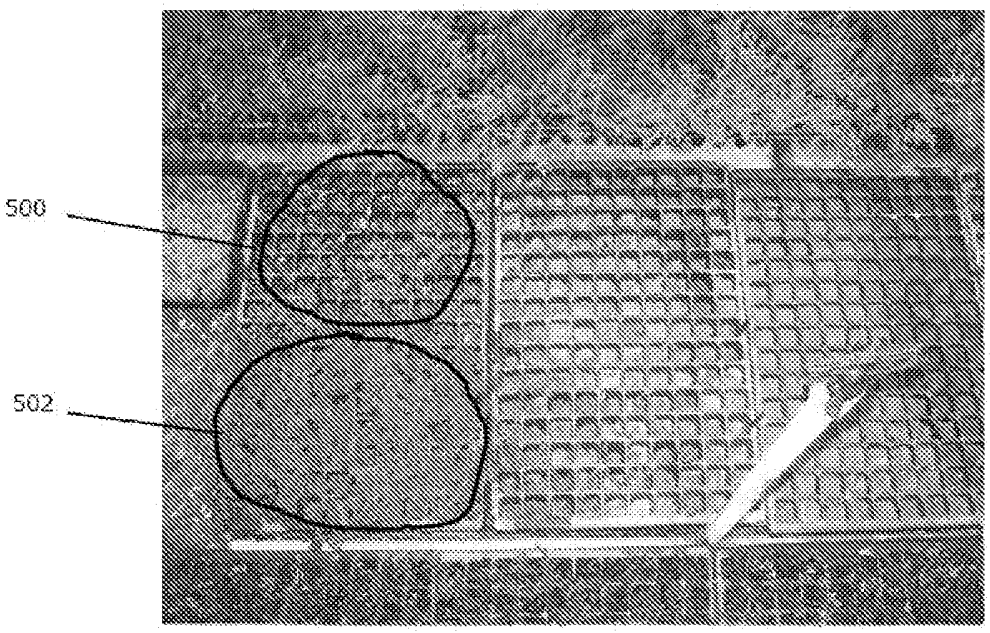


Figure 10d

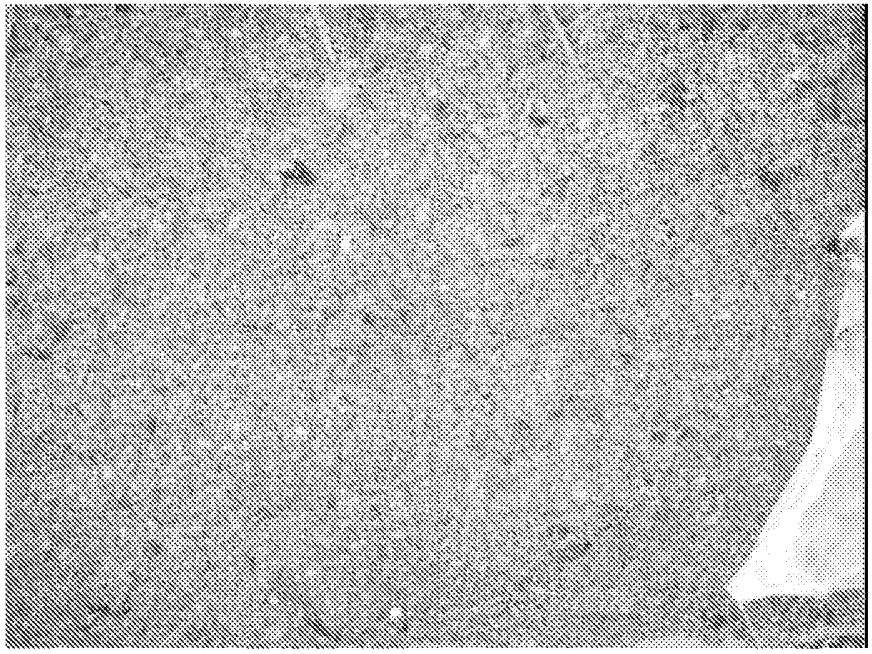


Figure 10e

Figure 10f

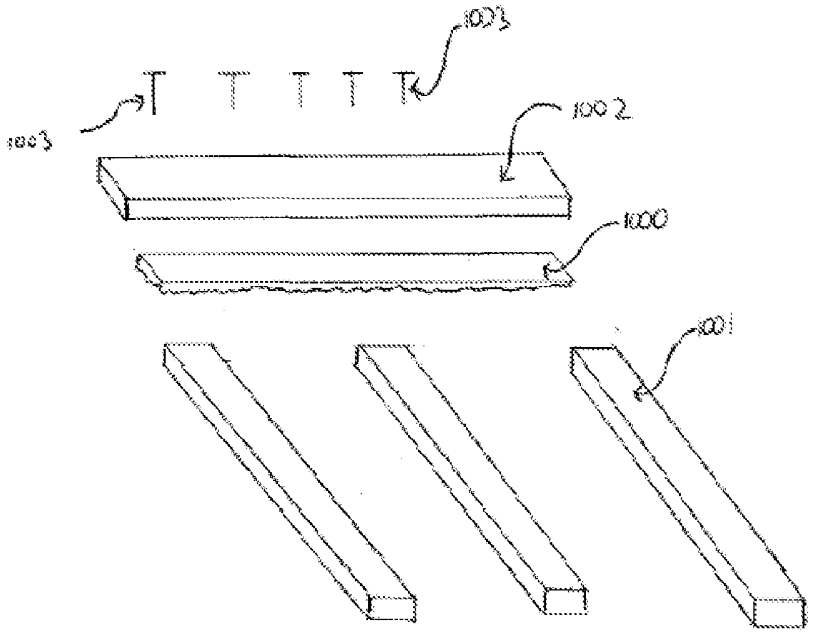


Figure 11

USES OF CARPET

The present invention relates to uses of carpets, for example methods of recycling carpets.

The disposal of unwanted carpets has heretofore been a significant problem, with as much as 500,000 tonnes of carpet being placed in UK landfill each year. The degradation of carpets is relatively slow and their recycling has been viewed as challenging. This is especially the case where a proportion of man made fibre is incorporated into the carpet.

Green infrastructure, e.g. roofs and walls, are becoming increasingly common in many European countries, for example, as ecological means to conserve energy.

Green infrastructure has been shown to reduce heating and cooling loads on buildings, thereby maintaining an average inside temperature. They serve further purposes such as absorbing rainwater, creating a habitat for wildlife and helping to lower urban temperature, in addition to filtering pollutants, e.g. carbon dioxide, from the air.

Green infrastructure is typically constructed from vegetation rooted in soil, e.g. compost, as a growing medium. A building may be partially or completely covered with such components.

It is an object of the present invention to find uses for used or waste carpet e.g. end of life carpet and/or off cuts or waste from the production of carpets.

Accordingly, in a first aspect, the present invention provides plant growth medium comprising more than 50 wt/wt% wool when the growth medium is dry.

Preferably, the growth medium comprises more than 60 wt/wt %, e.g. more than 70 wt/wt %, 80 wt/wt % or 90 wt/wt %, wool. Preferably, the growth medium comprises carpet.

Preferably, the growth medium has a thickness of 10 to 40 mm, e.g. 25 to 30 mm.

Preferably, the carpet comprises wool carpet and/or a mixed fibre (e.g. wool/synthetic fibre mix) carpet.

Preferably, the carpet is shredded, e.g. such that the carpet passes through a 50mm screen, a 40mm screen, a 30mm screen, a 20mm screen, a 10mm screen or a 5mm screen.

Preferably, the growth medium comprises water retention means. Preferably, the water retention means comprises a superabsorbent polymer, e.g. a polyacrylic acid.

In certain embodiments, the superabsorbent polymer comprises virgin or reclaimed superabsorbent polymer, e.g. reclaimed from diapers or sanitary wear.

Preferably, the growth medium comprises a source of lime, for example crushed (*e.g.* reclaimed) concrete. Preferably, the growth medium comprises less than 5 w/w% concrete.

Preferably, the growth medium comprises at least some organic composted matter and/or manure, *e.g.* chicken manure.

In a second aspect, the invention provides a plant growth medium comprising more than 50 wt/wt % carpet when the plant growth medium is dry.

Preferably, the growth medium comprises more than 60 wt/wt %, e.g. more than 70 wt/wt %, 80 wt/wt % or 90 wt/wt %, carpet, such as 100 % carpet.

In a further aspect, the invention provides a plant growth system e.g. for a green roof, the system comprising a layer of carpet having a plurality of projections formed on one major face thereof.

The projections may aid drainage from the plant growth system, for example by spacing the carpet from (and possible supporting the carpet on) a surface to which it is laid (or to which it is adjacent). The support preferably allows at least part of the carpet to be spaced from the surface, providing a gap for excess water to drain away from or through.

Preferably, the projections are integrally formed with the carpet.

Preferably, the projections are formed by pressing dimples into the second major face of the carpet, e.g. by heat pressing dimples into the second major face of the carpet.

Preferably, the carpet comprises synthetic, e.g. polypropylene carpet.

Preferably, the system further comprises a plant growth medium as described herein.

In a further aspect, the invention comprises a plant growth system comprising a plant growth medium as described herein.

Preferably, the system comprises a layer of carpet, e.g. a layer of carpet having a plurality of projections formed on one major face thereof.

Preferably, the layer of carpet is in the form of a container having a base and one or more walls. Preferably, the projections, if present, are formed in the base of the container.

Preferably, the system comprises a waterproof membrane, which may be laid underneath the layer of carpet.

Such a waterproof membrane protects, e.g. a roof upon which the system is laid, from water damage.

Preferably the system comprises a further drainage layer, which may be positioned between the carpet layer and the waterproof membrane, if present. The drainage layer may comprise recycled synthetic fibre, e.g. polypropylene and/or nylon, which may be obtained from recycled carpet.

Preferably, the system further comprises a barrier, e.g. a filter fleece, which may be positioned above the carpet layer. Preferably, the filter fleece comprises fibres, e.g. synthetic fibres such as polypropylene and/or nylon as may be obtained from recycled carpet.

Preferably, the system further comprises an aggregate layer comprising aggregate, e.g. recycled aggregate, and optionally synthetic and/or natural fibres, e.g. wool, nylon or polypropylene as may be obtainable from recycled carpet.

Preferably the aggregate layer is positioned above the carpet layer or, if present, the filter fleece.

The aggregate layer may provide an appropriate roofing substrate for the growth of certain (e.g. alpine) plant varieties such as sedums. Other plants may also be grown using the invention.

Optionally, the system comprises a binder layer, comprising long fibre carpet waste.

The long fibres are preferably obtained from recycled carpet, e.g. by shaving, carding or shredding.

Preferably, the fibres have lengths of 1mm to 50mm, e.g. 5 to 40 mm.

Preferably the binder layer lies above the aggregate layer.

Preferably the plant growth medium lies above the aggregate layer or, if present, the binder layer.

The plant growth medium may comprise seeds for the growth of plants, such as sedum seeds.

In a further aspect, the invention provides a plant growth system for a green wall or green roof, the system comprising a layer having plant growth medium as substantially described herein, further comprising a cover.

The cover may be a carpet layer comprising nylon or polypropylene.

Preferably, the cover has one or more apertures formed therein. In use, the apertures may provide a passage for plant growth.

Preferably, the cover comprises aggregate, e.g. recycled aggregate, embedded on or within a major surface thereof, preferably the outer surface.

The aggregate is preferably heated and pressed onto the cover layer. By heating the aggregate it has been found that the cover layer partially melts which enables the aggregate to form a permanent bond thereto. Alternatively, aggregate may be bonded to the cover layer by other appropriate means, for example by gluing.

Preferably the cover forms or comprises a pocket housing the plant growth medium layer, the pocket affixed to a backing plate such that the pocket covers at least part, but preferably not all, of the backing plate.

In some embodiments, the pocket is and the backing plate are formed from a unitary body, *e.g.* by folding a portion of the backing plate onto itself to form the pocket.

In other embodiments, the pocket comprises a folded material, *e.g.* carpet such as natural and/or synthetic fibre carpet.

Preferably the backing plate comprises a water impermeable layer. The impermeable layer may, for example, be ethylene propylene diene monomer (EDPM) rubber and/or may be directly bondable to a roofing material.

Carpet tiles may be particularly preferred backing plates, as they are often backed with water impermeable materials, e.g. bitumen or plastics. Impermeable layers prevent water damage to a root or wall to which the growth system is attached.

Preferably, the pocket is bonded to backing plate by heat treatment.

Preferably the backing plate comprises carpet, *e.g.* reclaimed carpet. Preferably the backing plate comprises thermoplastic fibre carpet, *e.g.* nylon or polypropylene.

Preferably, the system comprises integral irrigation. The irrigation may be in the form of a network of piping supplying water and/or (if required) fertiliser.

In other embodiments, the plant growth medium may carry one or more plants, e.g. sedum plants or mosses.

In some embodiments, the plant growth medium may comprise one or more fertilisers.

In a yet further aspect, the invention provides a plant growth medium for a surface, e.g. a roof, comprising recycled carpet for the direct reception of seeds.

Preferably, the carpet may be topped with recycled shredded carpet to provide additional growth medium.

When used as a growing medium the carpet may be composted for a period (e.g. 1, 2, 3 days, weeks or months or multiples thereof).

A further aspect of the invention provides a method of forming a fascia, the method comprising providing a piece of carpet which contains at least a portion of synthetic fibres and bringing particles, e.g. aggregate, into contact with the carpet, further comprising heating one or both of the carpet or particles to secure the particles to the carpet. Other techniques other than heating may be deployed to secure the particles to the carpet.

In a yet further aspect, the invention provides use of carpet, e.g. recycled carpet, for the provision of sound and/or vibration and/or heat insulation in a building, e.g. a house.

Preferably, the carpet may be provided between the joist and a floorboard during construction of the building. More preferably, the joist, carpet and floorboard are held firmly together by hammering nails therethrough.

In order that the invention may be more fully understood, preferred embodiments of plant growth medium and systems in accordance with the present invention will now be described by way of example only and with reference to the accompanying drawings, in which:

Figure 1 is an isometric view of a component of plant growth medium according to an embodiment of the present invention;

Figure 2 is a side elevation showing multiple components of plant growth medium according to an embodiment of the present invention;

Figure 3 is a side elevation showing multiple components of plant growth medium according to an alternative embodiment of the present invention;

Figure 4 is an isometric view showing a modular system according to a yet further embodiment of the present invention;

Figure 5 is a sectional view of a component;

Figure 6 is a side elevation of the assembled component of Figure 5;

Figure 7 shows a plant growth system;

Figure 8 shows an array of plant growth systems;

Figure 9 is a schematic representation of a test growing regime incorporating the invention;

Figure 10 shows sedum plants grown in growth media according to the invention and the prior art;

Figure 11 is a sectional view of an alternative embodiment of the present invention.

Referring first to Figure 1 of the accompanying drawings, there is shown a tray, indicated generally at 1, comprising a substantially planar base portion 10 having an upstanding wall 11 around its peripheral edge.

The base portion 10 is substantially square-shaped, having opposed side edges 10a, 10b lying orthogonal to side edges 10c, 10d. In alternative embodiments, the tray 1, and consequently the system, may be formed into any shape suitable to conduct the requisite task.

The base portion 10 comprises projections 12 provided on or within a major face thereof. The projections 12 are preferably downwardly extending in so far as they form a support for the tray 1 to stand upon when in use. The projections enable part of the base portion 10 to stand proud of a surface (not shown) on which it is laid, therefore providing a space or gaps for excess water, e.g. rain water or feed water, to drain away under the tray 1.

Alternatively, the projections 12 may be inwardly extending.

The projections 12 are preferentially distributed substantially evenly throughout the major face of the base portion 10. Alternatively, the projections 12 may be distributed at or towards a section of the base portion 10, e.g. a major surface or towards the centre or edge of the base portion 10.

The tray 1 is preferably formed from carpet, including natural or synthetic fibre carpets.

In this particular embodiment, the tray 1 is formed from synthetic carpet, e.g. nylon or polypropylene carpet, such that the tray 1 may be folded from, say, a single piece of carpet. The carpet is cut to form a blank, the wings of which are secured, for example by welding, e.g. by direct application of heat, or applying adhesive, to form corners of the tray 1. Alternatively, carpet tiles could be used. The walls may be folded from a flat and the corners secured in place to provide upstanding walls.

The projections 12 are usually formed after the tray 1 has been assembled by pressing a pattern (not shown) into a major face of the base portion 10. The most effective method for forming permanent projections 12 is to heat a pattern before pressing onto the base 10. Heating may occur during pressing as well or instead. The projections 12 may have through holes formed therein before during (e.g. as a result of) of after the heating. Other or additional holes may be provided.

Referring now to Figure 2, there is shown a first embodiment of a plant growth system 50 according to the present invention.

The system 50 is comprised of a tray 1 as described in relation to Figure 1, a first layer 4, a second layer 15 and a third layer 16. Layers 14, 15, 16 are suitably sized and dimensioned so as to fit within the tray 1.

The first layer 14 lies adjacent the tray 1, in use, and comprises a barrier, for example a fleece formed preferentially from shredded carpet. The carpet used to make the first layer 14 preferably comprises polypropylene

or some other synthetic fibre, though may additionally or alternatively comprise wool-based carpet.

The second layer 15, which lies adjacent the first layer 14, in use, comprises aggregate, e.g. recycled aggregate, stones, cement pieces and so on, which is or may be mixed with polypropylene, nylon or shredded carpet or other plastics material.

The third layer 16 which lies adjacent the second layer 15, in use, comprises a growing medium of fibrous material, e.g. shredded mixed fibre carpet, but particularly containing wool fibres.

In alternative embodiments the second and/or third layers 15, 16, may further comprise a polymer, e.g. a superabsorbent polymer, preferably reclaimed from sterilised diapers or other sanitary wear. In addition the second layer 15 may further comprise fibres from the or other sterilised diapers or other sanitary wear.

The superabsorbent polymer and/or fibres have been shown to aid water retention.

Seeds or seedlings, particularly sedum, are sown or planted on or within the third layer 16. Alternatively, a further layer (not shown), e.g. a mat which may comprise recycled carpet materials, is placed onto the third layer 16. The mat may be embedded with seeds and/or seedlings.

Systems 50 are typically assembled, watered and kept until growth of the plants are well established, typically six months. Alternatively, systems 50 are installed before growth of the plants.

Systems 50 are intended to be placed upon a waterproof membrane 17 on the surface 18, e.g. a roof, of a building (not shown). Alternatively, such systems 50 may have use elsewhere, e.g. gardens, temporary exhibition features and so on.

It has been found that by shredding pieces of recycled carpet, e.g. wool carpet, so that the pieces will pass through openings in a screen of predetermined size provides a useful growth medium for plants.

In particular, sedum plants grown for six months in shredded carpet, in the absence of any compost, have been shown to perform better than sedum plants grown in compost over the same period of time.

Referring now to Figure 3, there is shown an alternative embodiment of a plant growth system 50'.

The system 50' is comprised of a first layer 13', a second layer 14', a third layer 15' and a fourth layer 16'.

The first layer 13' is formed, for example, from polypropylene or nylon recycled from a synthetic fibre carpet. The first layer 13' functions primarily as a drainage layer and may comprise projections (not shown) and/or holes (not shown) in order to effect drainage.

The second layer 14' which is adjacent the first drainage layer 13', in use, comprises a fleece formed from shredded carpet. The carpet used to make this layer 14' preferably comprises polypropylene or some other synthetic fibre, e.g. nylon, or a wool based carpet.

Adjacent the second layer 14' lies a third layer 15' comprising aggregate mixed with recycled carpet or other plastics material. The second layer 14' contains a superabsorbent polymer and addition fibres in order to aid water retention.

In this embodiment the third layer 15' may be covered by a layer of binder 19', e.g. long fibres obtained from recycled carpet.

The binder 19' is topped by a fourth layer 16' of growth medium comprising fibrous material, e.g. shredded mixed fibre carpet, particularly containing wool fibres.

Seeds or seedlings are sown or planted on or within the fourth layer 16', as discussed in the previous embodiment. Alternatively, a further or alternative layer (not shown), impregnated with seeds and/or seedlings may be placed onto the fourth layer.

The system 50' is then placed upon a waterproof membrane 17' on a surface 18'.

Referring now to Figure 4, there is shown a plant growth system 100 for application to walls. The system 100 is comprised of modular components A, B, C positioned adjacent one another. Such modular components are typically stacked, e.g. using horizontal 101 and vertical 102 support rails, to provide partial or entire walls of buildings. An irrigation system 103 is fitted to supply water and, if required, fertiliser to the growth medium.

Modular components A, B, C are shown at various stages of their life: component C, showing a fully grown green wall, is older than component B, showing a partially grown green wall, which is older than component A, showing bare polypropylene wall cladding.

Figures 5 and 6 show, respectively, a disassembled and assembled component 120 which is similar to the components shown in A, B and C of Figure 4.

The modular component 120 comprises a tray portion 121 and a cover portion 130. The tray 121 comprises a base portion 122, side walls 123 and an opening 127. The tray 121 is provided with plant growth medium 124 such as that described herein. The tray 121 is formed from recycled polypropylene carpet. The tray 121 is provided with an integral irrigation system 125 comprising apertures 126 for the supply of water and fertiliser.

The cover portion 130 is formed from recycled polypropylene carpet. Apertures 131 are formed into the cover 130, e.g. by stamping

therethrough. The apertures 131 provide a passage from one major surface 130a of the cover 130 to the other 130b.

The cover portion 130 has recycled aggregate 132 embedded on the major surface 130a. The aggregate 132 is first heated, e.g. by placing in an oven, before being applied to and pressed onto the surface 130a. The hot aggregate 132 partially melts the cover portion 130 and after cooling the aggregate 132 remains attached. This method ensures that the component 120 has a natural wall-like appearance, e.g. like that of a stone wall (see component A of Figure 4).

After approximately one to three months the plant seeds inside the component 120 germinate and grow through the apertures 131 (see component B of Figure 4). Alpine plants 135, such as sedum, root onto the aggregate 132 and develop further over time, approximately six months, until the wall is fully developed (see component C of Figure 4).

A further embodiment of the invention is shown in Figure 7. A tile 300 is provided for use as a wall tile or roof tile. The tile 300 comprises a first carpet portion 302, for example a polypropylene carpet tile having a water impermeable backing, at least a portion of which is covered by a second carpet portion 304 to provide a pocket 306 having an opening 308 at an intended upper portion thereof.

The second carpet portion 304 is formed at least in part from polypropylene or some other thermoplastic fibre, such that its edges 310, 312, 316 may be sealed to the first carpet portion 302 by the application of heat.

In some embodiments, the pocket may comprise a piece of carpet folded, e.g. in half, and sealed along the sides, then attached to the back plate. Slots 316 are provided in the pocket 306 and aggregate material 318 is affixed to the pocket 306, for example by application of heat, as described above.

The pocket is filled with a growth medium comprising shredded carpet and optionally some additional aggregate material.

Plants, for example sedum plants 320 are provided to grow out of the opening 308 and the slots 316, for example by planting cuttings and/or seeds.

The resultant tile 300 thus provides a convenient and efficient means for constructing a green wall or roof, for example by arranging the tiles 300 such that the exposed region 322 of the first carpet portion 302 is hidden behind the pockets 306 of one or more adjacent tiles 300, as shown in Figure 8.

Referring now to Figure 9, a series of tests were carried out to determine the efficacy of various types of growing media. The test protocol required use of the following equipment 200, requiring a layer of black weed suppressing plastic 201, a polypropylene mesh layer 202 a layer of growing medium 203 and a seed layer 204. The seed layer 204 was either seeds sprinkled directly onto the growing medium 203 or a layer of seeds incorporated into a substrate, a suitable substrate may be obtained from Terraseed Limited of Hampshire UK comprising an absorbent layer and a degradeable upper layer formed in a mat, the seeds being located between the upper and lower layers. Other seed mats may be used.

Various growing mediums were used, including chopped and ground carpet, shredded carpet, carpet shearings and composted carpet. Of these pure wool, wool blend and wool and nylon, polypropylene carpets were tested, as follows.

	Composted carpet	100% wool carpet	80:20 wool:pp blend carpet	50:50 wool: pp/nylon blend carpet
Chopped and ground	✓	✓	✓	✓
Shredded	✓	✓	✓	✓
Shearings		✓		
Felt		✓		

The growing medium was typically between 10 and 40 mm thick.

The trials demonstrated that all of the growing media 203 were suitable although some showed greater efficacy in terms of growth of plants than others. It was noted, for example, that the chopped and ground carpet and the shredded carpet performed better as a growth medium than the felted carpet.

Referring to Figure 10, a series of tests were performed to establish the efficacy of the growth medium against a commercially available peat based compost.

Figure 10A shows sedum plants grown from cuttings between September 2009 and February 2010 in a polytunnel in a growth medium according to the invention. At the end of the growth period, the stems were around 7 cm to 10 cm long and bushy and the root system was strong and well developed.

Figure 10B shows sedum plants grown from cuttings between September 2009 and February 2010 in a polytunnel in compost. At the end of the growth period, the stems were around 3 cm to 4 cm long with sparse foliage and the root system was fragile.

Figure 10C shows sedum plants grown from seeds 506 and sedum plants grown from cuttings 508 in a polytunnel in compost. During the growing

period, only a few of the seeds germinated to produce seedlings and the cuttings produced smaller plants than those grown in shredded carpet.

Figure 10D shows sedum plants grown from seed 500 and sedum plants grown from cuttings 502 in a polytunnel in shredded wool carpet. During the growing period, the seeds have produced strong seedlings and the cuttings have grown into strong small plants.

Figures 10E and 10F respectively show before and after pictures of sedum cuttings thrown onto a bed of shredded carpet and left outside for 3 months. At the end of the growing period, the sedum had rooted well and was growing into strong plants.

These results clearly demonstrate the surprising result that sedum plants grown in a growth medium according to the invention perform better than those grown in compost.

Referring now to Figure 11, there is shown an alternative use for recycled carpet. Typically, strips of unwanted carpet 1000 are interposed between the joists 1001 and floorboards 1002 of a building, e.g. a house (not shown), during construction or renovation. Nails 1003 are typically hammered through the floorboard 1002, carpet piece 1000 and joist 1001 to secure in place.

It has been found that the carpet 1000 provides sound, heat and vibration insulation.

It will be appreciated that the use of carpet will provide a valuable sink for otherwise difficult to dispose of materials, especially those comprising a portion of artificial fibres. Moreover, the growing medium is sterile insofar as it is weed free. The use of re-cycled (or waste or off-cut) growing medium will obviate the need to import coya, peat, plastics or indeed trays of sedum. The carpet has a high water retention capacity. Other advantages will be readily understood by the skilled addressee.

Any of the features disclosed herein may be omitted and/or replaced with similar means able to perform the requisite task and/or any combination of any of the features disclosed herein is envisaged without departing from the scope of the invention. For example, the carpet may be composted, *e.g.* left to at least partially rot, before use as a growth medium, whereupon released methane may be collected and stored.

Claims

1. A plant growth medium comprising more than 50 wt/wt% wool when the growth medium is dry.

2. A plant growth medium according to Claim 1, comprising more than 60 wt/wt %, e.g. more than 70 wt/wt %, 80 wt/wt % or 90 wt/wt %, wool.

3. A plant growth medium according to Claim 1 or Claim 2, wherein the growth medium comprises carpet.

4. A plant growth medium according to any preceding Claim in the form of a mat having a thickness of 10 to 40 mm, e.g. 25 to 30 mm.

5. A plant growth medium according to any preceding Claim, comprising the carpet comprises wool carpet and/or a mixed fibre (e.g. wool/synthetic fibre mix) carpet.

6. A plant growth medium according to Claim 3 or Claim 5, wherein the carpet is shredded, e.g. such that the carpet passes through a 50mm screen, a 40mm screen, a 30mm screen, a 20mm screen, a 10mm screen or a 5mm screen.

7. A plant growth medium according to any preceding Claim, comprising water retention means, for example a superabsorbent polymer, e.g. a polyacrylic acid.

8. A plant growth medium according to Claim 7, comprising virgin or reclaimed superabsorbent polymer, e.g. reclaimed from diapers or sanitary wear.

9. A plant growth medium comprising more than 50 wt/wt % carpet when the plant growth medium is dry.

10. A plant growth medium according to Claim 9, comprising more than 60 wt/wt %, e.g. more than 70 wt/wt %, 80 wt/wt % or 90 wt/wt %, carpet, such as 100 % carpet.

11. A plant growth system e.g. for a green roof, the system comprising a layer of carpet having a plurality of projections formed on one major face thereof.

12. A plant growth system according to Claim 11, wherein the projections are integrally formed with the carpet.

13. A plant growth system according to Claim 11 or Claim 12, wherein the projections are formed by pressing dimples into a second major face of the carpet, e.g. by heat pressing dimples into the second major face of the carpet.

14. A plant growth system according to any of Claims 11 to 13, wherein the carpet comprises synthetic, e.g. polypropylene carpet.

15. A plant growth system according to any of Claims 11 to 14, comprising a plant growth medium according to any of Claims 1 to 9.

16. A plant growth system comprising a plant growth medium according to any of Claims 1 to 9.

17. A plant growth system according to Claim 16 comprising a layer of carpet, e.g. a layer of carpet having a plurality of projections formed on one major face thereof.

18. A plant growth system according to any of Claims 11 to 15 or 17, wherein the layer of carpet is in the form of a container having a base and one or more walls.

19. A plant growth system according to Claim 18, wherein the projections are formed in the base of the container.

20. A plant growth system according to any of Claims 11 to 15 or 17 to 19, wherein the system comprises a waterproof membrane underneath the layer of carpet.

21. A plant growth system according to any of Claims 11 to 15 or 17 to 20 comprising a further drainage layer positioned between the carpet layer and the or a waterproof membrane.

22. A plant growth system according to Claim 21, wherein the further drainage layer comprises recycled synthetic fibre, e.g. polypropylene and/or nylon, which may be obtained from recycled carpet.

23. A plant growth system according to any of Claims 11 to 15 or 17 to 22 further comprising a barrier, e.g. a filter fleece, which may be positioned above the carpet layer.

24. A plant growth system according to Claim 23, wherein the filter fleece comprises fibres, e.g. synthetic fibres such as polypropylene and/or nylon as may be obtained from recycled carpet.

25. A plant growth system according to any of Claims 11 to 24, further comprising an aggregate layer comprising aggregate, e.g. recycled aggregate, and optionally synthetic and/or natural fibres, e.g. wool, nylon or polypropylene as may be obtainable from recycled carpet.

26. A plant growth system according to Claim 25, wherein the aggregate layer is positioned above the carpet layer or, if present, the or a filter fleece.

27. A plant growth system according to Claim 25 or Claim 26, comprising a binder layer above the aggregate layer, the binder

layer comprising long fibre carpet waste, for example containing fibres having lengths of 1mm to 50mm, e.g. 5 to 40 mm, such as may be obtained from recycled carpet.

28. A plant growth system according to any of Claims 25 to 27, wherein the or a plant growth medium lies above the aggregate layer or, if present, the or a binder layer.

29. A plant growth system for a green wall or green roof, the system comprising a layer having plant growth medium as substantially described herein, further comprising a cover.

30. A plant growth system according to Claim 29, wherein the cover comprises a carpet layer, for example a synthetic carpet layer, such as a carpet layer comprising nylon or polypropylene.

31. A plant growth system according to Claim 29 or Claim 30, wherein the cover has one or more apertures formed therein, such as may provide a passage for plant growth.

32. A plant growth system according to any of Claims 29 to 31, wherein the cover comprises aggregate, e.g. recycled aggregate, attached to or embedded on or within a major surface thereof, preferably the outer surface.

33. A plant growth system according to any of Claims 29 to 32, wherein the cover forms or comprises a pocket housing the plant growth medium layer, the pocket affixed to a backing plate such that the pocket covers at least part, but preferably not all, of the backing plate.

34. A plant growth system according to Claim 33, wherein the pocket and the backing plate are formed from a unitary body, *e.g.* by folding a portion of the backing plate onto itself to form the pocket.

35. A plant growth system according to Claim 33, wherein the pocket comprises a folded material, *e.g.* carpet such as natural and/or synthetic fibre carpet.

36. A plant growth system according to any of Claims 29 to 32, wherein the backing plate comprises a water impermeable layer.

37. A plant growth system according to any of Claims 33 to 36, wherein the backing plate comprises a carpet tile and optionally one or more further impermeable (*e.g.* EDPM) layers.

38. A plant growth system according to any of Claims 33 to 37, wherein the pocket is bonded to backing plate by heat treatment.

39. A plant growth system according to any of Claims 33 to 38, wherein the backing plate comprises carpet, *e.g.* reclaimed carpet. Preferably the backing plate comprises thermoplastic fibre carpet, *e.g.* nylon or polypropylene.

40. A plant growth system according to any of Claims 11 to 39, comprising integral irrigation, *e.g.*in the form of a network of piping supplying water and/or (if required) fertiliser.

41. A method of forming a fascia, the method comprising providing a piece of carpet which contains at least a portion of synthetic fibres and bringing particles, e.g. aggregate, into contact with the carpet, further comprising heating one or both of the carpet or particles to secure the particles to the carpet.

42. A use of carpet, e.g. recycled carpet, for the provision of sound and/or vibration and/or heat insulation in a building, e.g. a house.

43. A use according to Claim 42, wherein the carpet is provided between the joist and a floorboard during construction of the building.

44. A use according to Claim 42 or 43, wherein the joist, carpet and floorboard are held firmly together by hammering nails therethrough.

Application No: GB1011285.2 **Examiner:** Eleanor Wade

Claims searched: 1 to 8 **Date of search:** 10 September 2010

Patents Act 1977
Corrected Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	1-8	WO2008/029075 A University of Warwick et al.
X	1-8	NL1023289 C Zinco Nederland
X	1-8	WO99/49722 A Schober
X	1-8	WO98/32323 A Du Pont
A	-	US2007/079547 A Gold
A	-	WO96/16241 A Rieter Automotive Germany
A	1-8	Slug Gone website [online] available at www.sluggone.com [accessed 06/09/2010]
A	1-8	Dalefoot Composts Website [online] available at www.dalefootcomposts.co.uk [accessed 06/09/2010]
A	1-8	Green Roofs, Preparation and Construction, Growing medium: Soils or soil substitutes [online] available at http://wildseed.co.uk/page/preparation-and-construction [accessed 06/09/2010]

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.

&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC[X] :

Worldwide search of patent documents classified in the following areas of the IPC

A01C; A01G; E04D

The following online and other databases have been used in the preparation of this search report

EPODOC, WPI

International Classification:

Subclass	Subgroup	Valid From
E04D	0011/00	01/01/2006