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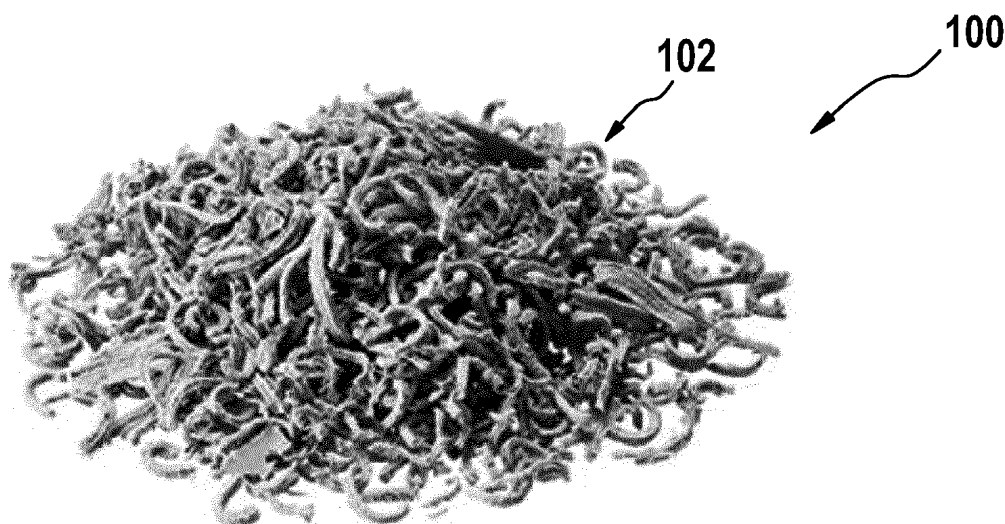
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(54) **A FLOORING COMPOSITION AND MANUFACTURE THEREOF**

(57) A flooring composition (100, 400, 500) includes chips comprised of a plastic or a rubber, and a water regulating agent (104, 504).

Fig. 1



Description

FIELD OF THE INVENTION

[0001] The present invention relates to flooring compositions, and more particularly, to flooring compositions and floorings for use with animals, such as horses, camels, dromedaries or other hooved animals, and manufacture thereof.

BACKGROUND OF THE INVENTION

[0002] Conventional flooring compositions for animals are susceptible to drying out, thereby capable of generating large amounts of dust when trodden on by animals, particularly hooved animals such as horses, for example. In addition, dry flooring compositions can be easily displaced, as well as being unstable to the footing of the animals. Furthermore, conventional flooring compositions are also susceptible to becoming too wet, from weather and/or use by animals, thereby capable of becoming breeding habitat for insects, such as mosquitoes, or sources of bacteria. Flooring compositions that are too wet are typically unstable for the footing of the animals, thus endangering the safety of the animals.

[0003] US 7 104 894 B2 shows a composite material for equestrian sports tracks. A polymer flake material mixed with a filler is size reduced by a hammer mill to small particles. These particles are used as a base layer for the sports track.

[0004] What is needed in the art is a system and method that can overcome some of the previously described disadvantages of known flooring compositions and floorings.

SUMMARY OF THE INVENTION

[0005] In accordance with an aspect of the present invention, a flooring composition includes chips comprised of a plastic or a rubber, and a water regulating agent.

[0006] In accordance with an aspect of the present invention, the chips may be manufactured by machining a polymer block by a chip removing process, e.g. by cutting chips from the polymer from the block.

[0007] Embodiments of the invention may be advantageous in that the plastic or rubber chips look similar to bark-chip mulch which is often used for equestrian flooring. This may provide a natural look even though a synthetic material may be used. In addition, maintenance may also be performed analogous to natural bark-chip mulch such as by means of a rake.

[0008] Embodiments of the invention may be advantageous in that the plastic or rubber chips provide an adequate dampening effect while agglomerating and whirling up of the chips is limited and similar to the mechanical properties of natural bark-chip mulch when impacted by a hooved animal.

[0009] According to another aspect of the present in-

vention, the plastic comprises one of a duroplast and a thermoplast.

[0010] According to another aspect of the present invention, the thermoplast comprises one of a thermoplastic elastomer, TPE, a styrene ethylene butylene styrene, SEBS, and a butadiene styrene, SBS.

[0011] According to another aspect of the present invention, the rubber comprises an ethylene propylene diene monomer, EPDM.

[0012] According to another aspect of the present invention, the EPDM is a sulfur-vulcanized EPDM or a peroxide-vulcanized EPDM.

[0013] According to another aspect of the present invention, the water regulating agent is a zeolite having pores.

[0014] According to another aspect of the present invention, the zeolite comprises zeolite granules, and each zeolite granule has pores.

[0015] According to another aspect of the present invention, the zeolite is of the chabazite and/or clinoptinolite type. The zeolite used within the scope of the invention can be natural or obtained by synthesis.

[0016] According to another embodiment of the invention, the zeolite exhibits a grain size that is between 0.5 and 1.5 millimeters.

[0017] According to another aspect of the present invention, each zeolite granule comprises salt, and the salt is positioned in the pores.

[0018] According to another aspect of the present invention, each zeolite granule comprises a surface, and each zeolite granule comprises a water permeable layer covering at least a portion of the surface.

[0019] According to another aspect of the present invention, the flooring composition comprises a mixture of the chips and the zeolite granules, and the zeolite granules occupying at least a portion of inter-chip spaces.

[0020] According to another aspect of the present invention, the chips further comprise the zeolite granules.

[0021] According to another aspect of the present invention, the water regulating agent comprises water-absorbent fibers.

[0022] According to another aspect of the present invention, water absorbent fibers comprise one or more of hygroscopic fibers, burlap fibers, jute fibers, cotton fibers, wool fibers, hemp fibers, polyester fibers, natural fibers, kenaf synthetic fibers, and fibers with a hydrophilic surface.

[0023] According to another aspect of the present invention, the chips comprise water-absorbent fibers.

[0024] According to another aspect of the present invention, each of the chips comprise a surface, some water absorbent fibers comprise at least one cut end, and the surface contains at least one cut end.

[0025] In accordance with an aspect of the present invention, a flooring for any hooved animal comprises a flooring composition having a first layer including chips and a water-regulating agent.

[0026] According to another aspect of the present in-

vention, the flooring further comprises an elastic base layer positioned below the first layer.

[0027] According to another aspect of the present invention, the flooring further comprises a sealing layer, and the sealing layer is positioned between the first layer and the elastic base layer.

[0028] According to another aspect of the present invention, the flooring further comprises a sand layer positioned above the first layer.

[0029] In accordance with an aspect of the present invention, a method for installing a flooring comprises placing an elastic base layer on a substrate, wherein the substrate is one of a natural earthen surface or a manufactured surface, and placing a first layer on the elastic base layer, wherein the first layer comprises a flooring composition.

[0030] According to another aspect of the present invention, the method further comprises before placing the first layer on the elastic base layer, placing a sealing layer on the elastic base layer, such that the sealing layer is positioned between the elastic base layer and the first layer.

[0031] According to another aspect of the present invention, the method further comprises placing a sand layer on the first layer.

[0032] In accordance with an aspect of the present invention, a method for manufacturing a flooring composition comprises preparing a reactive mixture comprising one of a EPDM, a duroplast, and a thermoplast, adding to the reactive mixture one of a zeolite and water-absorbent fibers, if the reactive mixture comprises the EPDM, vulcanizing the reactive mixture, otherwise, curing the reactive mixture, and after the reactive mixture is vulcanized or cured, machining the vulcanized or cured reactive mixture for forming chips, wherein the flooring composition comprises the chips.

[0033] In accordance with an aspect of the present invention, a method for manufacturing a flooring composition comprises preparing a reactive mixture comprising one of a EPDM, a duroplast, and a thermoplast, if the reactive mixture comprises the EPDM, vulcanizing the reactive mixture, otherwise, curing the reactive mixture, after the reactive mixture is vulcanized or cured, machining the vulcanized or cured reactive mixture for forming chips, and mixing the chips with a zeolite for forming the flooring composition.

BRIEF DESCRIPTION OF THE DRAWINGS

[0034] The above-mentioned and other features and advantages of this invention, and the manner of attaining them, will become more apparent and the invention will be better understood by reference to the following description of exemplary embodiments of the invention taken in conjunction with the accompanying drawings, wherein:

Fig. 1 illustrates a flooring composition, according to

an exemplary embodiment of the present invention; Fig. 2 illustrates a magnified view of the flooring composition of Fig. 1, according to an exemplary embodiment the present invention;

Fig. 3 illustrates a microporous zeolite granule, according to an exemplary embodiment of the present invention;

Fig. 4 illustrates a flooring composition, according to another exemplary embodiment of the present invention;

Fig. 5 illustrates a flooring composition, according to another exemplary embodiment of the present invention;

Fig. 6 illustrates a flooring for hoofed animals, according to an exemplary embodiment of the present invention;

Fig. 7 illustrates method steps for installing the flooring illustrated in Fig. 6, according to an exemplary embodiment of the present invention;

Fig. 8 illustrates method steps for manufacturing a flooring composition, according to an exemplary embodiment of the present invention; and

Fig. 9 illustrates method steps for manufacturing a flooring composition, according to another exemplary embodiment of the present invention.

[0035] Corresponding reference characters indicate corresponding parts throughout the several views. The exemplifications set out herein illustrate embodiments of the invention and such exemplifications are not to be construed as limiting the scope of the invention in any manner.

DETAILED DESCRIPTION OF THE INVENTION

[0036] The descriptions of the various embodiments of the present invention have been presented for purposes of illustration, but are not intended to be exhaustive or limited to the embodiments disclosed. Many modifications and variations will be apparent to those of ordinary skill in the art without departing from the scope of the described embodiments. The terminology used herein was chosen to best explain the principles of the embodiments, the practical application or technical improvement over technologies found in the marketplace, or to enable others of ordinary skill in the art to understand the embodiments disclosed herein.

[0037] Referring now to the drawings, and more particularly to Fig. 1 and Fig. 2, there is shown a flooring composition 100 according to an embodiment of the present invention. The flooring composition 100 includes a mixture of chips 102 (also referred to as flakes or strips) and a zeolite 104. The zeolite 104 may be in the form of zeolite granules 106. Although the Fig. 1 embodiment of the flooring composition 100 is shown as a mixture of the chips 102 and the zeolite 106 as a pile, the present invention covers a substantially uniform distribution of the flooring composition as a layer.

[0038] In one embodiment, the chips 102 are formed from a duroplast, which is a composite thermosetting plastic (i.e., a resin plastic) reinforced with fibers (either cotton or wool). In another embodiment, the chips 102 are formed from a thermoplast, which is a plastic material, (i.e., a polymer), that becomes pliable or moldable above a specific temperature and solidifies upon cooling. For example, and by way of some non-limiting exemplary embodiments, the thermoplastic chips may be formed from thermoplastic elastomers (TPE), sometimes referred to as thermoplastic rubbers, which are a class of copolymers or a physical mix of polymers (usually a plastic and a rubber) that comprise materials with both thermoplastic and elastomeric properties. Chips manufactured from TPE can be recycled and are environmentally friendly, in the sense that they contain no zinc or sulfur. In addition, the TPE does not require any accelerators for vulcanization (i.e., curing).

[0039] In other embodiments, the thermoplastic chips may be formed from styrene ethylene butylene styrene (SEBS), which is a form of TPE with styrene added, or formed from a butadiene styrene (SBS) thermoplastic elastomer.

[0040] In yet another embodiment, the chips 102 may be formed from an ethylene propylene diene monomer (EPDM), which is well known as a synthetic rubber.

[0041] In one embodiment, and as will be described further below, the chips 102 may be manufactured from blocks of duroplast, thermoplast or EPDM. In one embodiment, EPDM chips are manufactured from an EPDM block that has been vulcanized (i.e., cured) by the addition of sulfur or other equivalent curatives or accelerators, such as peroxides. Chips 102 made from sulfur-vulcanized EPDM (i.e., sulfur cross-linked EPDM) has an advantageous self-healing effect when UV radiation breaks the sulfur bonds, thereby having a high resistance to weathering. Chips 102 made from peroxide cross-linked EPDM (i.e., peroxide-vulcanized EPDM) are not as UV stable, but offer better skin tolerability. Chips 102 made from sulfur-vulcanized EPDM and peroxide cross-linked EPDM are only two exemplary embodiments. The scope of the present invention covers all types of chemical vulcanization processes and all types of accelerators for curing EPDM blocks, and chips 102 that are manufactured from such EPDM blocks.

[0042] The zeolite 104 is composed of microporous, aluminosilicate minerals. Minerals such as zeolites provide a water storage capacity which is useful for regulating the moisture content of the flooring composition 100. For example, the zeolite 104, formed and distributed (i.e., mixed) as zeolite granules 106, for example, reduce dust, when the flooring composition 100 is too dry, reduce excess water accumulation when the flooring composition 100 is too wet, and provide improved biomechanical properties to the flooring composition, such as providing for a more stable footing for walking or running, which may be analogous to walking on wet sand versus walking on dry sand. The scope of the present invention not only

includes mineral zeolites such as analcime, chabazite, clinoptilolite, heulandite, natrolite, phillipsite, and stilbite, but synthetically manufactured zeolites as well. In one embodiment of the present invention, the zeolite 104 of the flooring composition 100 regulates the presence of water in the flooring composition 100 by absorption and release of water from micropores of the zeolite granules 106. However, the present invention also covers any microporous mineral capable of regulating water in a surrounding medium by absorbing into, and releasing water from, its micropores.

[0043] In another embodiment of the invention, and as illustrated by Fig. 3, the microporous zeolite granule 106 may include a salt 108, such as sodium chloride, although other salts may be used, and/or may be coated at least partially with a water permeable film 112. As illustrated, the salt 108 may be attached to portions of inner surfaces of the pores 110, and/or be attached to portions of an outside surface 114 of the zeolite granule 106. Although the zeolite 104 without the salt 108 will act as a water regulating agent, the zeolite 104 combined with the salt 104 may have a synergistic effect for a more efficient absorption and/or adsorption of water from a surrounding medium, such as the chips 102 of the flooring composition 100. That is, when the flooring composition 100 is too wet (e.g., too much water is held between the chips 102 in an inter-chip space 116 (e.g., see Fig. 2)), the combination of the zeolite granules 106 and the salt 108 may enhance the absorption and/or adsorption of any surrounding water.

[0044] The water permeable film 112 is any film that provides for a passage of water to and from the zeolite granules 106 while restricting, or in some cases even preventing, the loss of salt 108 from within the micropores 110 of the zeolite and/or from the surface 114 of the zeolite granule 106. The water permeable film 112 may even prevent the addition of salts to the surface 114 or the micropores 110 of the zeolite granules 106 when the flooring composition 100 is exposed to salty environments. In one embodiment, the permeable film regulates salt transport to and from the micropores 110 of the zeolite granules 106.

[0045] Fig. 4 illustrates a flooring composition 400 according to another embodiment of the present invention. Reference numbers which are the same as the reference numbers of the previous figures refer to identical features. The flooring composition 400 includes a mixture of chips 402 (also referred to as flakes or strips). However, unlike the chips 102 of the flooring composition 100 illustrated in Fig. 1 and Fig. 2, the chips 402 of the flooring composition 400 include the zeolite 104. As in Figs. 1-3, the zeolite 104 is composed of microporous, aluminosilicate minerals and may be in the form of zeolite granules 106. Although some of the zeolite granules are completely embedded within the chips 402, the zeolite granules 106, as illustrated, are not completely embedded within the chips 402, but have portions of surfaces 114 that are exposed to the inter-chip space 116 (i.e., the space be-

tween the chips 402), and some of the zeolite granules 106 may contact other completely embedded zeolite granules (not shown), thereby forming a complex pattern of interconnected porosity throughout at least portions of the chips 402.

[0046] As described above, the zeolite granules 106 may include salts 108 (Fig. 3) and/or may be coated with a water permeable layer 112 (Fig. 3). As described above in conjunction with Figs. 1-3, the zeolite 104, in the form of the zeolite granules 106, for example, regulate the amount of water present in the flooring composition 400, also referred to as unbound water (i.e., water that occupies portions of the inter-chip space 116, for example). For example, when the flooring composition 400 is too wet, the microporous zeolite 104 embedded (partially and/or fully) in the chips 402 may absorb and/or adsorb water, and when the flooring composition 300 is too dry, the microporous zeolite 104 may release any absorbed and/or adsorbed water to the inter-chip space 116 of the flooring composition 400.

[0047] Fig. 5 shows a flooring composition 500 according to another embodiment of the present invention. As before, reference numbers which are the same as the reference numbers of any previous figures refer to identical features. The flooring composition 500 includes a mixture of chips 502 (also referred to as flakes or strips). However, unlike the chips of the flooring compositions illustrated in Figs. 1, 2 and 4, the chips 502 of the flooring composition 500 include natural and/or synthetic fibers 504. In one embodiment of the present invention, the fibers 504 are dispersed throughout the chips 502, however, only the cut ends 506 of the fibers 504 are illustrated, since only the cut ends 506 of the fibers 504 are on the surface 508 of the chips 502. As will be described below in more detail, when the chips 502 are manufactured by machining (i.e., cutting or planing) blocks of rubber or plastic (i.e., EPDM, duroplast, or thermoplast blocks) comprising embedded fibers 504, the machining process cuts the fibers 504 when creating the chips 502, thereby exposing the cut ends 506 of the embedded fibers 504 on the surface 508 of the chips 502.

[0048] The scope of the present invention contemplates any fibers that have water-regulating properties, such as fibers that are water absorbent and/or water adsorbent, either via a capillary action (i.e., an ability to draw water up into and along a length of the fiber 504 and/or draw water up into and along a length of any space (not shown) existing between the fiber 504 and the material of the chip 502 surrounding the fiber), or via non-capillary absorption and/or adsorption properties. The water-regulating fibers 504 may thereby provide the same water-regulating effect as the microporous minerals discussed above. The chips 502 of the flooring composition 500 includes water absorbent fibers 504 such as, by way of exemplary, non-limiting embodiments, hygroscopic fibers, burlap fibers, jute fibers, cotton fibers, wool fibers, hemp fibers, polyester fibers, natural fibers, kenaf synthetic fibers, fibers with a hydrophilic surface,

and combinations thereof. In another embodiment of the invention, the flooring composition 500 may include chips 502 that have embedded fibers 502 and embedded zeolite granules 106 and/or zeolite granules mixed in the inter-chip spaces 116.

[0049] According to another exemplary embodiment of the present invention, the fibers 504 are hemp fibers that were previously added to a reactive EPDM mixture before vulcanization of the EPDM mixture. However, the scope of the present invention includes any synthetic or natural water-absorbent fiber added to a reactive EPDM mixture, a reactive thermoplast mixture, or even a reactive duroplast mixture. The duroplast, which by definition includes cotton and/or wool fibers, may also include other natural fibers and/or synthetic fibers added to the duroplast mixture, according to another embodiment of the present invention.

[0050] Fig. 6 illustrates a flooring 600 including any one of the flooring compositions 100, 400 or 500, as described above, for any hoofed animals, but particularly for animals that are typically ridden or even raced, such as horses, ponies, camels, dromedaries, mules, donkeys, according to an embodiment of the invention. However, the flooring 600 may also be useful as a flooring for other hoofed animals, such as goats, cows, sheep and pigs. The flooring 600 may be used as flooring for indoor or outdoor facilities, such as racetracks or training tracks, riding tracks, stables, or any pathways which hoofed animals may use.

[0051] As illustrated, the flooring 600 comprises an optional base layer 602, which is typically elastic, for cushioning the impact of an animal's hooves upon the surface of the flooring 600. The elastic base layer 602 is positioned on a substrate 604, which can be either of a natural earthen material, such as dirt, sod, or gravel, or of a manufactured material, such as concrete, cement, plastic, or wood. The choice of the type of substrate 604, and whether the flooring 600 comprises the optional elastic base layer 602, depends to some extent upon the use of the flooring 600 and the type of animal (e.g., flooring used as a component of a racetrack for horses in contrast to flooring used for a stable for camels or dromedaries).

[0052] When the flooring 600 comprises the optional elastic base layer 602, the flooring 600 may then also comprise an optional sealing layer 606 positioned on the elastic base layer 602. The optional sealing layer may be composed of any type of water impermeable polymer for preventing moisture or other contaminants from reaching the elastic base layer from above.

[0053] The flooring 600 also comprises a first layer 608 comprising one of the flooring compositions 100, 400, or 500, positioned on the optional sealing layer 606, or alternatively positioned on the elastic base layer 602, or alternatively positioned on the substrate 604.

[0054] The flooring 600 may also include an optional sand layer 610 positioned on the first layer 608. Although not shown, the sand of the optional sand layer 610 may become infused within the first layer 608 (e.g., filling, at

least partially, any inter-chip spaces 116), and in some embodiments, may completely cover the first layer 608, and in other embodiments, may be considered a type of filler material for the first layer 608, whether completely covering the first layer 608 or not.

[0055] The sand of the optional sand layer 610 may not only assist in keeping the chips 402 or 502 embedded with the water regulating agent 104 or 504 in place, and the chips 102 with the water regulating agent 104 positioned in the inter-chip space 116 in place, but may also provide a more stable surface for the footing of any hooved animals, as well as providing a medium for receiving/sending water from/to the water regulating agent for keeping the moisture content of the flooring 600 regulated and relatively constant.

[0056] Fig. 7 illustrates method steps 700 for installing the flooring 600 illustrated in Fig. 6, according to an embodiment of the present invention.

[0057] In optional step 702, an elastic base layer 602 is positioned on a substrate 604. The substrate may be any natural earthen surface, such dirt, sod, clay, gravel, or stone, or may be any manufactured surface, such as a cement surface, a concrete surface, a plastic surface, or a wooden surface.

[0058] In optional step 704, a sealing layer 606 is positioned on the elastic base layer 602.

[0059] In step 706, one of the flooring compositions 100, 400 or 500, defined for convenience as a first layer 608, is positioned on the optional sealing layer 606, or alternatively positioned on the optional elastic base layer 602, or alternatively positioned on the substrate 604.

[0060] In optional step 708, a second layer is positioned on the first layer. In one embodiment, the second layer is a sand layer, however, in other embodiments, the second layer may be composed of any type of natural or synthetic material that offers stability for hooved animals using the flooring 600, secures the components of the flooring composition 100, 400 and 500 in place, and provides a means for redistributing water throughout the flooring 600, thereby enabling the dissipation of water away from overly saturated areas to overly dry areas.

[0061] Fig. 8 illustrates method steps 800 for manufacturing a flooring composition, such as flooring compositions 400 or 500, according to an embodiment of the present claimed invention.

[0062] In step 802, a reactive mixture comprising either a EPDM, a duroplast or a thermoplast is prepared. Conventional EPDM, duraplast, and thermoplastic reactive mixtures are known in the art. A reactive mixture is a mixture that has yet polymerized and/or has yet to be vulcanized, and thus polymerization and/or crosslinking of constituent components of the mixture is not yet complete.

[0063] In step 804, a water regulating agent is added to the reactive mixture. For example, a microporous mineral, synthetic or natural, or fibers 504 with water absorbent properties, synthetic or natural, or a combination thereof, are added to the reactive mixture. A preferred

water regulating mineral is zeolite 104. The zeolite 104 may be in the form of granules 106 of irregular shapes and/or various sizes, or uniform shapes and/or sizes. The fibers 504 include any fibers that have water-regulating properties, such as fibers that are water absorbent and/or water adsorbent.

[0064] In step 806, when the reactive mixture comprises an EPDM mixture, the reactive mixture is vulcanized, thereby forming a solidified mixture, also referred to as an EPDM block. The scope of the invention covers all types of known vulcanization procedures and accelerators and additives, including using sulfur and peroxide additives. Otherwise, when the reactive mixture includes either a duroplast or a thermoplast mixture, the reactive mixture is cured, thereby forming a solidified mixture, also referred to as duroplast or thermoplast block, respectively.

[0065] In step 808, chips 402 or 502 (also referred to as flakes or strips) are created by machining (e.g. planing) the solidified mixture (i.e., the block of EPDM, duroplast or thermoplast). Planning blocks of polymers are known in the art, and the scope of the present invention covers conventional systems and methods of planning blocks of polymers, as applied to the blocks (or solidified masses) of EPDM, duroplast or thermoplast of the present invention. The chips then form the flooring composition 400 or 500.

[0066] Fig. 9 illustrates method steps 900 for manufacturing a flooring composition, such as flooring composition 100, according to an embodiment of the present claimed invention.

[0067] In step 902, a reactive mixture comprising either a EPDM, a duroplast or a thermoplast is prepared. Conventional EPDM, duraplast, and thermoplastic reactive mixtures are known in the art. A reactive mixture is a mixture that has yet polymerized and/or has yet to be vulcanized, and thus polymerization and/or crosslinking of constituent components of the mixture is not yet complete.

[0068] In step 904, when the reactive mixture comprises an EPDM mixture, the reactive mixture is vulcanized, thereby forming a solidified mixture, also referred to as an EPDM block. The scope of the invention covers all types of known vulcanization procedures and accelerators and additives, including using sulfur and peroxide additives. Otherwise, when the reactive mixture includes either a duroplast or a thermoplast mixture, the reactive mixture is cured, thereby forming a solidified mixture, also referred to as duroplast or thermoplast block, respectively.

[0069] In step 906, chips 102 (also referred to as flakes or strips) are created by machining (e.g. planing) the solidified mixture (i.e., the block of EPDM, duroplast or thermoplast). Planning blocks of polymers are known in the art, and the scope of the present invention covers conventional systems and methods of planning blocks of polymers, as applied to the blocks (or solidified masses) of EPDM, duroplast or thermoplast of the present invention.

[0070] In step 908, the chips 102 are mixed with a water regulating agent, e.g., zeolite 104, for forming the flooring composition 100.

[0071] While this invention has been described with respect to at least one embodiment, the present invention can be further modified within the scope of this disclosure. This application is therefore intended to cover any variations, uses, or adaptations of the invention using its general principles. Further, this application is intended to cover such departures from the present disclosure that are within known or customary practice in the art to which this invention pertains and which fall within the limits of the appended claims.

Claims

1. A flooring composition (100, 400, 500), **characterized by** comprising:

chips (102, 402, 502) comprised of a plastic or a rubber; and
a water regulating agent (104, 504).

2. The flooring composition according to claim 1, wherein the plastic comprises one of a duroplast and a thermoplast.

3. The flooring composition according to claim 2, wherein the thermoplast comprises one of a thermoplastic elastomer, TPE, a styrene ethylene butylene styrene, SEBS, and a butadiene styrene, SBS.

4. The flooring composition according to any one of the previous claims, wherein the rubber comprises an ethylene propylene diene monomer, EPDM, wherein the EPDM can in particular be a sulfur-vulcanized EPDM or a peroxide-vulcanized EPDM.

5. The flooring composition according to any of the preceding claims, wherein the water regulating agent is a zeolite (104) having pores (110).

6. The flooring composition according to claim 5, wherein the zeolite (104) comprises zeolite granules (106), each zeolite granule (106) having said pores.

7. The flooring composition according to claim 6, wherein said each zeolite granule (106) comprises salt (108), said salt (108) positioned with said pores (110).

8. The flooring composition according to claims 6 or 7, wherein said each zeolite granule (106) comprises a surface (114), and wherein said each zeolite granule (106) comprises a water permeable layer (112) covering at least a portion of said surface (114).

9. The flooring composition according to any of claims 6-8, wherein the flooring composition comprises a mixture of the chips (102) and the zeolite granules (106), said zeolite granules (106) occupying at least a portion of inter-chip spaces (116).

10. The flooring composition according to any of claims 6-8, wherein the chips (402) further comprise the zeolite granules (106).

11. The flooring composition according to any of claims 1-4, wherein the water regulating agent comprises water-absorbent fibers (504).

12. The flooring composition according to claim 11, wherein said water absorbent fibers (504) comprise one or more of hygroscopic fibers, burlap fibers, jute fibers, cotton fibers, wool fibers, hemp fibers, polyester fibers, natural fibers, kenaf synthetic fibers, and fibers with a hydrophilic surface.

13. The flooring composition according to claims 11 or 12, wherein said chips (502) comprise said water-absorbent fibers (504).

14. The flooring composition according to claim 13, wherein each of said chips (502) comprise a surface (508), and wherein some water absorbent fibers comprise at least one cut end (506), and wherein said surface (508) contains said at least one cut end (506).

15. A flooring (600) for any hoofed animal, said flooring **characterized by** comprising the flooring composition (100, 400, 500) of any of the preceding claims, wherein the chips (102, 402, 502) and the water-regulating agent (104, 504) form a first layer (608).

16. The flooring according to claim 15, wherein the flooring (600) further comprises an elastic base layer (602) positioned below the first layer (608), wherein the flooring (600) preferably further comprises a sealing layer (606), wherein the sealing layer (606) is positioned between the first layer (608) and the elastic base layer (602).

17. The flooring according to any of claims 15 or 16, wherein the flooring (600) further comprises a sand layer (610) positioned above the first layer (608).

18. A method for installing a flooring (600), comprising:

placing an elastic base layer (602) on a substrate (604), wherein the substrate (604) is one of a natural earthen surface or a manufactured surface,
said method **characterized by**
placing a first layer (608) on the elastic base

layer (602), wherein the first layer (608) comprises the flooring composition (100, 400, 500) of any of claims 1-14.

19. The method according to claim 18, further comprising: 5
before placing the first layer (608) on the elastic base layer (602), placing a sealing layer (606) on the elastic base layer (602), such that the sealing layer (606) is positioned between the elastic base layer (602) and the first layer (608). 10

20. The method according to claims 18 or 19, further comprising placing a sand layer (610) on the first layer (608). 15

21. A method for manufacturing a flooring composition (400, 500), comprising:

preparing a reactive mixture comprising one of a EPDM, a duroplast, and a thermoplast, 20
said method **characterized by**
adding to the reactive mixture one of a zeolite (104) and water-absorbent fibers (504);
if the reactive mixture comprises the EPDM, vulcanizing the reactive mixture, otherwise, curing the reactive mixture; and
after the reactive mixture is vulcanized or cured, machining the vulcanized or cured reactive mixture for forming chips (402, 502), wherein said flooring composition (400, 500) comprises said chips (402, 502). 30

22. A method for manufacturing a flooring composition (100), comprising: 35

preparing a reactive mixture comprising one of a EPDM, a duroplast, and a thermoplast; and
if the reactive mixture comprises the EPDM, vulcanizing the reactive mixture, otherwise, curing the reactive mixture,
said method **characterized by**
after the reactive mixture is vulcanized or cured, machining the vulcanized or cured reactive mixture for forming chips (102); and
mixing the chips (102) with a zeolite (104) for forming said flooring composition (100). 40

Amended claims in accordance with Rule 137(2) EPC. 50

1. A flooring composition (100, 400, 500), **characterized by** comprising:

chips (102, 402, 502) comprised of a plastic or a rubber; and
a water regulating agent (104, 504),

wherein said water regulating agent comprises at least one of:

a salt and a zeolite (104) having pores (110), and
water-absorbent fibers (504),

wherein if said water regulating agent includes said water-absorbent fibers, said chips include said water-absorbent fibers, wherein each of said chips comprise a surface (508), wherein some water absorbent fibers comprise at least one cut end (506), and wherein said at least one cut end (506) is exposed on said surface.

2. The flooring composition according to claim 1, wherein the plastic comprises one of a duroplast and a thermoplast.

3. The flooring composition according to claim 2, wherein the thermoplast comprises one of a thermoplastic elastomer, TPE, a styrene ethylene butylene styrene, SEBS, and a butadiene styrene, SBS.

4. The flooring composition according to any one of the previous claims, wherein the rubber comprises an ethylene propylene diene monomer, EPDM, wherein the EPDM can in particular be a sulfur-vulcanized EPDM or a peroxide-vulcanized EPDM. 25

5. The flooring composition according to claim 1, wherein the zeolite (104) comprises zeolite granules (106), each zeolite granule (106) having said pores.

6. The flooring composition according to claim 5, wherein said salt (108) is positioned with said pores (110) of said each zeolite granule (106). 35

7. The flooring composition according to claims 5 or 6, wherein said each zeolite granule (106) comprises a surface (114), and wherein said each zeolite granule (106) comprises a water permeable layer (112) covering at least a portion of said surface (114). 40

8. The flooring composition according to any of claims 5-7, wherein the flooring composition comprises a mixture of the chips (102) and the zeolite granules (106), said zeolite granules (106) occupying at least a portion of inter-chip spaces (116). 45

9. The flooring composition according to any of claims 5-7, wherein the chips (402) further comprise the zeolite granules (106).

10. The flooring composition according to claim 1, wherein said water absorbent fibers (504) comprise one or more of hygroscopic fibers, burlap fibers, jute fibers, cotton fibers, wool fibers, hemp fibers, poly- 55

ester fibers, natural fibers, kenaf synthetic fibers, and fibers with a hydrophilic surface.

11. A flooring (600) for any hoofed animal, said flooring **characterized by** comprising the flooring composition (100, 400, 500) of any of the preceding claims, wherein the chips (102, 402, 502) and the water-regulating agent (104, 504) form a first layer (608). 5
12. The flooring according to claim 11, wherein the flooring (600) further comprises an elastic base layer (602) positioned below the first layer (608), wherein the flooring (600) preferably further comprises a sealing layer (606), wherein the sealing layer (606) is positioned between the first layer (608) and the elastic base layer (602). 10 15
13. The flooring according to any of claims 11 or 12, wherein the flooring (600) further comprises a sand layer (610) positioned above the first layer (608). 20
14. A method for installing a flooring (600), comprising:

placing an elastic base layer (602) on a substrate (604), wherein the substrate (604) is one of a natural earthen surface or a manufactured surface, 25
said method **characterized by**
placing a first layer (608) on the elastic base layer (602), wherein the first layer (608) comprises the flooring composition (100, 400, 500) of any of claims 1-10. 30
15. The method according to claim 14, further comprising: 35

before placing the first layer (608) on the elastic base layer (602), placing a sealing layer (606) on the elastic base layer (602), such that the sealing layer (606) is positioned between the elastic base layer (602) and the first layer (608). 40
16. The method according to claims 14 or 15, further comprising placing a sand layer (610) on the first layer (608). 45
17. A method for manufacturing a flooring composition (400, 500), comprising:

preparing a reactive mixture comprising one of a EPDM, a duroplast, and a thermoplast, 50
said method **characterized by**
adding to the reactive mixture at least one of: a zeolite (104) and a salt, and water-absorbent fibers (504); 55
if the reactive mixture comprises the EPDM, vulcanizing the reactive mixture, otherwise, curing the reactive mixture; and

after the reactive mixture is vulcanized or cured, machining the vulcanized or cured reactive mixture for forming chips (402, 502), wherein if said water-absorbent fibers are added to said reactive mixture, said machining said vulcanized or cured reactive mixture cuts at least some of the water-absorbent fibers for generating at least one cut end exposed on a surface of a chip of said chips, wherein said flooring composition (400, 500) comprises said chips (402, 502).

Fig. 1

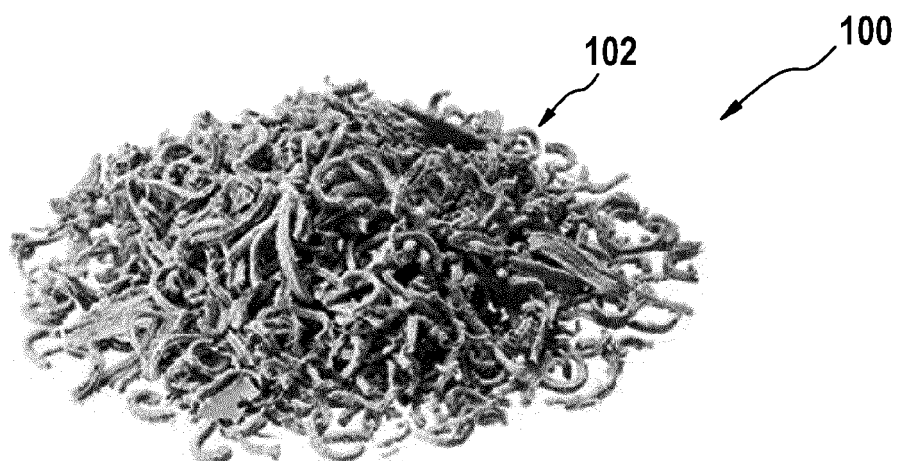


Fig. 2

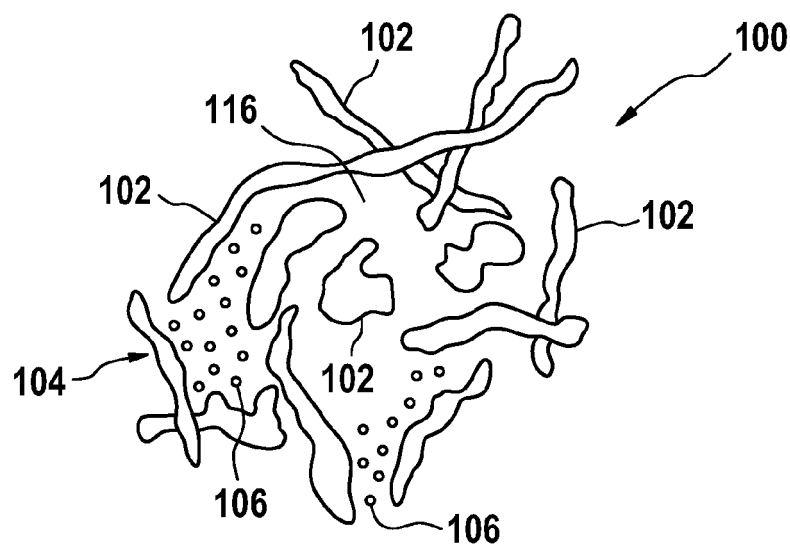


Fig. 3

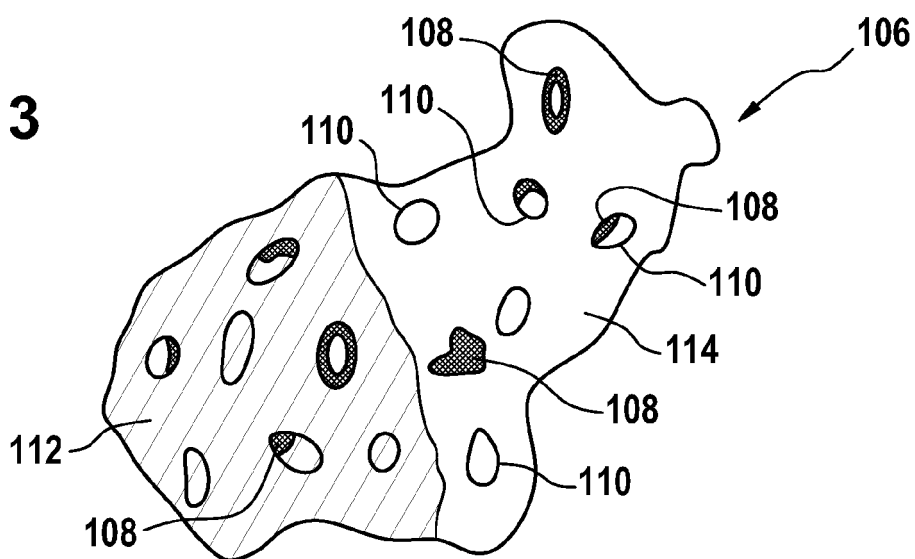


Fig. 4

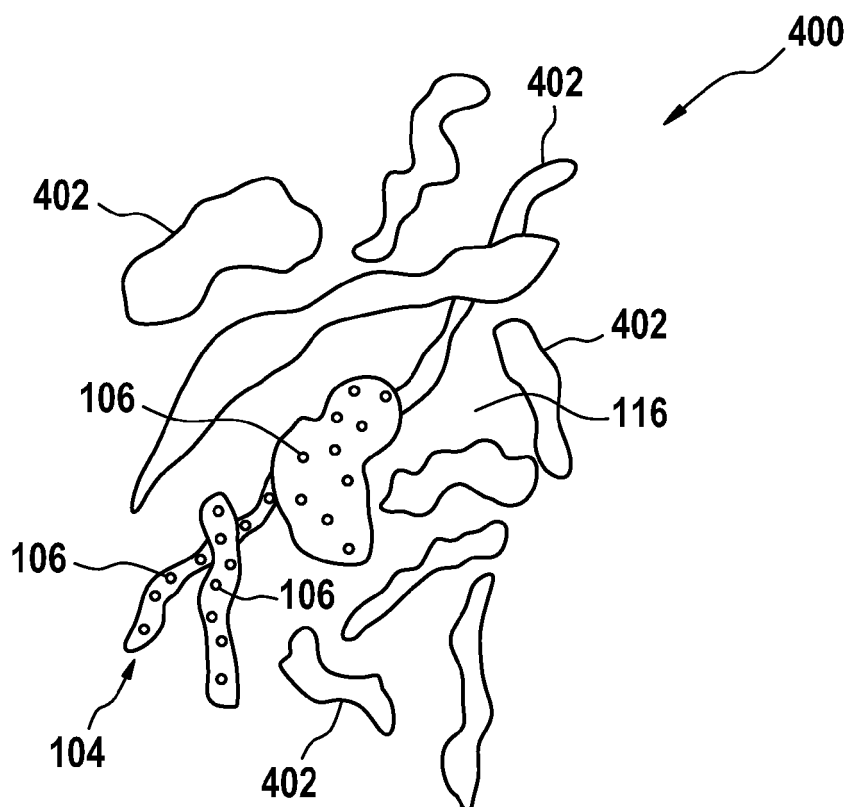


Fig. 5

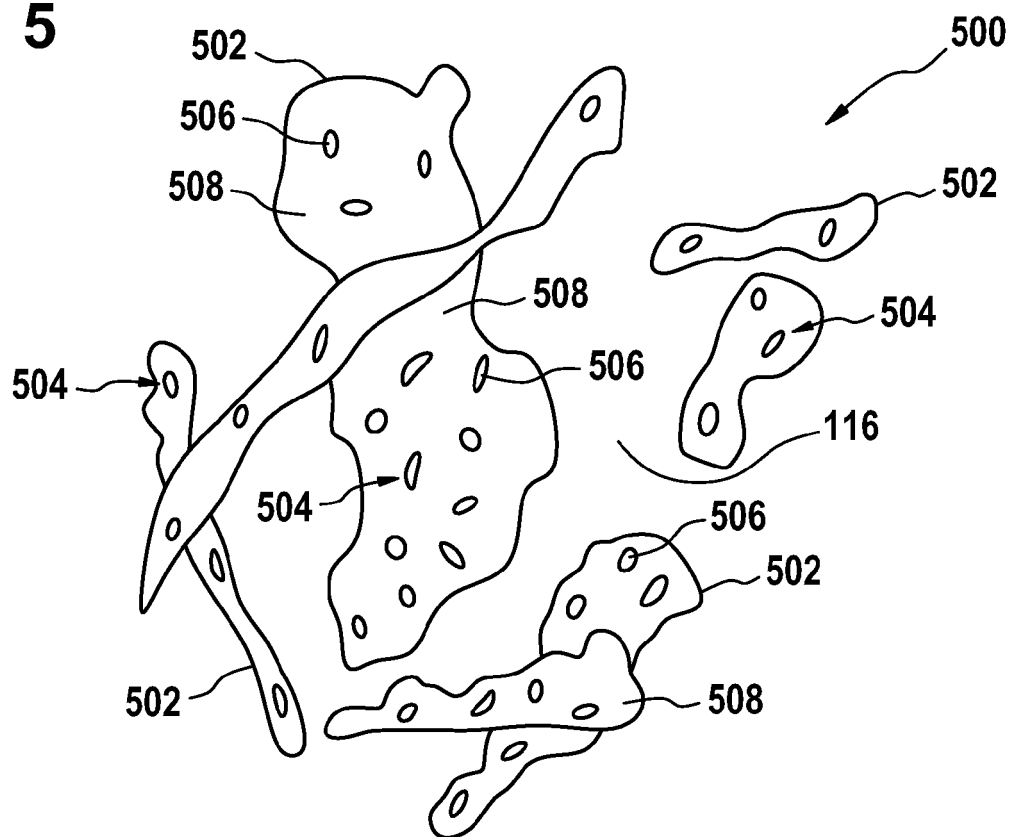


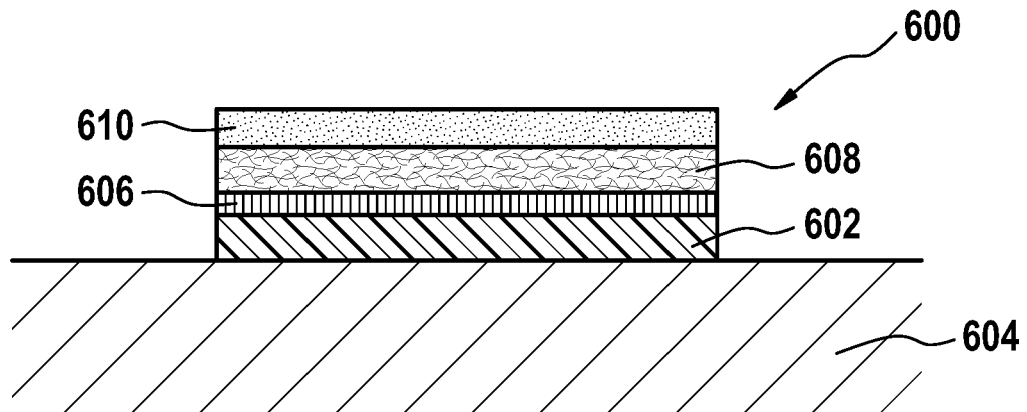
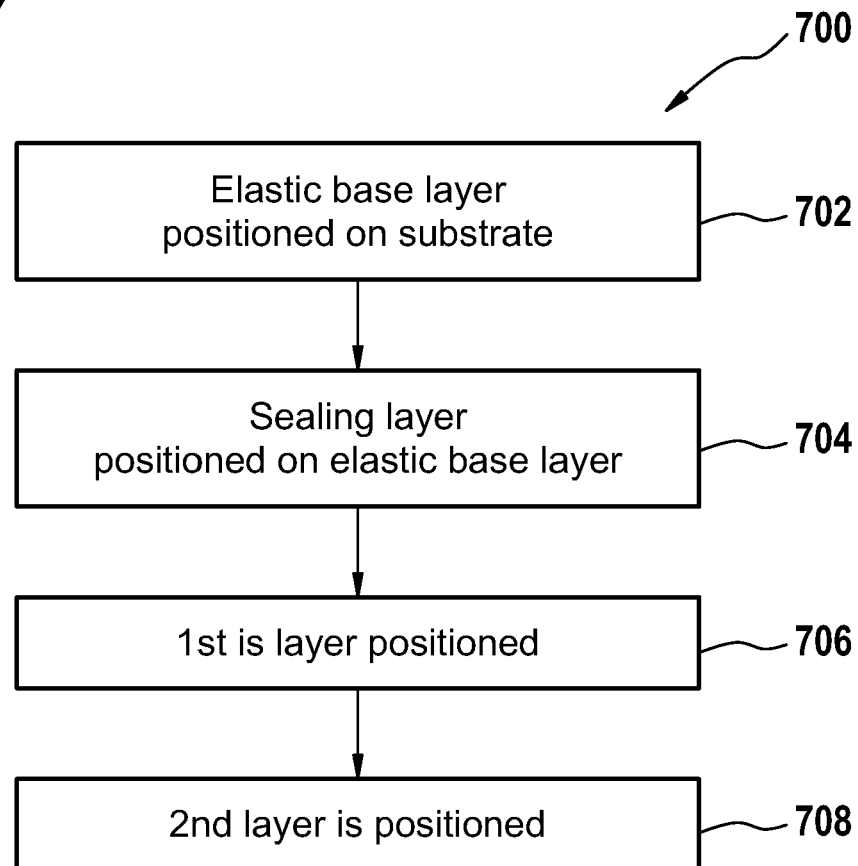
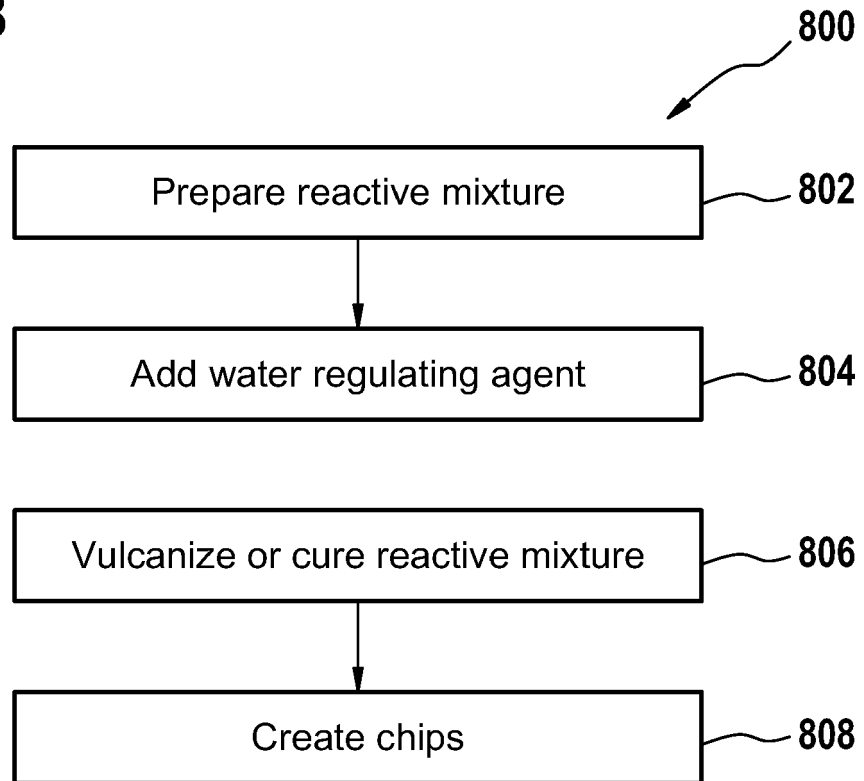
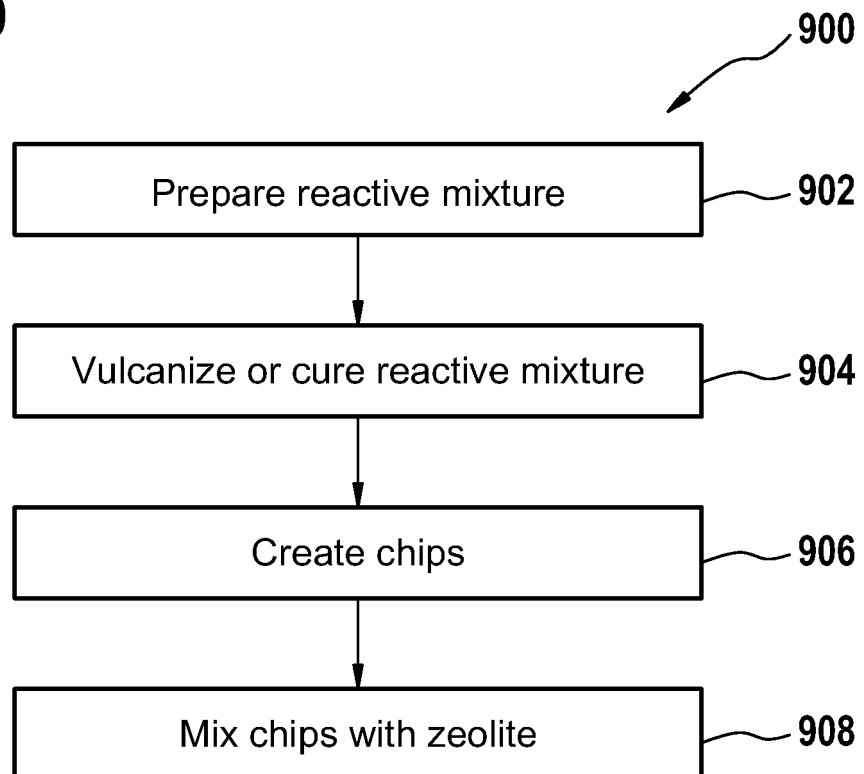
Fig. 6**Fig. 7**

Fig. 8**Fig. 9**



PARTIAL EUROPEAN SEARCH REPORT

Application Number

under Rule 62a and/or 63 of the European Patent Convention.
This report shall be considered, for the purposes of
subsequent proceedings, as the European search report

EP 18 16 1120

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X A	EP 3 216 821 A1 (POLYTEX SPORTBELÄGE PRODUKTIONS-GMBH [DE]; UNIRUBBER SP Z 0 0 [PL]) 13 September 2017 (2017-09-13) * paragraphs [0001], [0002], [0005] - [0008], [0015], [0016], [0034], [0040], [0072], [0073] * * claims 1,2,5; figures 1-3,6 *	1-6, 8-10,13, 15-20 7,11,12, 14,21	INV. E01C13/06
X A	US 2008/017826 A1 (PEARSE IAN [AU]) 24 January 2008 (2008-01-24) * the whole document *	1-4,11, 12,15-21 5-10,13, 14	
X A	DE 20 2016 002097 U1 (EHG GMBH [DE]) 6 September 2016 (2016-09-06) * paragraphs [0001], [0004], [0006], [0014], [0016], [0025], [0031] * * claims 1,3,5 *	1,2,11, 12,15, 16,18,19 3-10,13, 14,17, 20,21	
X A	DE 198 50 021 A1 (WELLER FRANZ [DE]) 4 May 2000 (2000-05-04) * the whole document *	1,2,11, 12,15-20 3-10,13, 14,21	TECHNICAL FIELDS SEARCHED (IPC) E01C A01K
-/--			
INCOMPLETE SEARCH			
The Search Division considers that the present application, or one or more of its claims, does/do not comply with the EPC so that only a partial search (R.62a, 63) has been carried out. Claims searched completely : Claims searched incompletely : Claims not searched : Reason for the limitation of the search: see sheet C			
Place of search		Date of completion of the search	Examiner
Munich		5 September 2018	Kremsler, Stefan
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03.82 (P04E07)

**INCOMPLETE SEARCH
SHEET C**

Application Number

EP 18 16 1120

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Claim(s) completely searchable:
1-21

Claim(s) not searched:
22

Reason for the limitation of the search:

In reply to the invitation to indicate the claims on which the search is to be based, the applicant indicated in his letter of 13.07.2018 that the search should be carried out on the basis of independent claim 21. Thus, the search report has been drawn up on the basis of independent claim 21, whereas independent claim 22, falling into the same category, was not searched (Rule 62a(1) EPC).
Claims completely searched:
Claim 1-21

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 18 16 1120

5

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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