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(12) # EUROPEAN PATENT APPLICATION

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(54) **Playing surfaces for sports.**

(57) A method of constructing a playing surface for sports such as soccer, cricket and tennis comprises the steps of laying at least one flexible water-permeable envelope (4) containing an unbonded base material (5) rising sand, on a drained or water-permeable surface (1), and placing a sheet (9) of a resilient material on to the envelope. In a preferred embodiment, a second sheet (20) of resilient material having different bounce characteristics from the first is placed on the first sheet, and an artificial turf material (10) is laid on top.

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PLAYING SURFACES FOR SPORTS

This invention relates to a method of constructing a playing surface for sports and the like.

Because of the problems of maintaining in good condition traditional grass or turf playing surfaces for such sports as soccer, cricket and tennis, especially when the surfaces are subject to frequent use during periods of excessively high or low rainfall, synthetic turfs, typically in the form of a resilient carpet formed from plastics materials such as polypropylene, have been developed. Synthetic turfs have heretofore been laid in the manner of a carpet, using a resilient underlay placed on a prepared surface such as concrete with suitable drainage. A problem experienced with such playing surfaces is that the playing characteristics of the surfaces are very different from conventional turf, the ball in ball games bouncing faster and rolling differently.

According to the present invention there is provided a method of constructing a playing surface for sports and the like, characterised by the steps of :

(A) laying on a drained or water-permeable surface at least one envelope formed of a flexible water-permeable material and containing an unbonded base material comprising sand; and

(B) placing on the envelope or envelopes a sheet of a resilient material.

The sheet of resilient material may be formed from rubber particles, such as comminuted used motor vehicle tyres, bonded together with a polymeric material. The thickness of the sheet will depend on the game for which the surface is intended and the construction of the underlying envelopes and surface. A typical thickness would be 6mm.

Alternatively, the sheet of resilient material may comprise dense expanded polyethylene. A combination of the two

types of resilient sheet material may be used, with either the bonded particulate rubber material or the polyethylene material lowermost according to the characteristics of the surface required. A synthetic playing surface material, such as a synthetic turf or a carpet material, may be placed on the resilient sheet or sheets, to simulate more closely a turf playing surface. In one embodiment of the invention a synthetic playing surface material itself constitutes the resilients sheet material laid direct on the envelope or envelopes.

Preferably, the thickness of the base material in the envelope or envelopes is in the range of 12mm to 75mm. The thickness chosen will depend upon the characteristics desired. Preferably, especially for surfaces other than for cricket a plurality of envelopes is used, the envelopes fitting together to form a continuous layer, the sheet of resilient material being placed on the continuous layer so formed. The sizes of the envelopes preferably vary from 4m wide x 20m long in areas of less intense wear to 2m wide x 7m long in areas of high intensity wear. The or each envelope may be sub-divided by the use of resiliently-compressible strips, e.g. of expanded plastics material, laid on to the lower layer of envelope material.

Suitable ranges of compositions for the base material are indicated in the following table

TABLE : BASE MATERIAL COMPOSITIONS

	Coarse Gravel	Fine Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Coarse Silt	Fine Silt	Clay
	10mm to 5mm	5mm to 2mm	2mm to 1mm	1.0mm to 0.5mm	0.5mm to 0.25mm	0.250 mm to 0.125 mm	0.125 mm to 0.050 mm	0.050 mm to 0.020 mm	0.020 mm to 0.002 mm	0.002 mm to less
[1] Winter Games Pitches	7 to 1	17 to 2	10 to 4	14 to 12	40 to 54	12 to 24	3			
[2] Cricket Tennis Kick-about areas	- -	42 to 28	7 to 8	19 to 15	13 to 26	5 to 9	2 to 2	2 to 2	5 to 2	5 to 8

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The characteristics of the base material may alternatively be modified by adding to the sand materials such as plastics foam chips or particles. These envelopes may be formed of pairs of sheets of permeable fabric, pinned or glued or otherwise joined together at the edges. Different types of fabric may be used to form the upper and lower layers of the envelope.

The method of the invention produces a playing surface which avoids the maintenance requirements of conventional turf but which gives playing characteristics much closer to those achieved by conventional turf and which change with weather conditions in a similar manner to conventional turfs, but without the risk of degradation of the surface into mud, or ruts in very dry or very cold weather.

Reference is made to the drawings, in which :

Figure 1 is a sectional view of a playing surface suitable for winter games; and

Figures 2 and 3 are sectional views of playing surfaces similar to that shown in Figure 1, but modified to produce characteristics suitable for cricket or tennis.

Referring first to Figure 1, the ground 1 upon which the playing surface 2 is to be laid is first prepared, if not already adequately drained, by the installation of drainage channels or 3 filled with suitable permeable material and then levelled.

Envelopes 4 are prepared from sheets of a permeable glass fibre fabric, filled with the sand base material 5, and folded and pinned at the edges. At joins 6 between adjacent envelopes, the edge 7 of the first envelope 4a is left free of sand and is pinned or nailed to the ground using corrosion-resistant nails 8 of suitable length. The second envelope 4b is then positioned over the thin edge portion 7. The composition of the sand base materials is chosen from the range of compositions set out hereinbefore in the Table, for winter games pitches. An underlay 9, comprising a mat of polymer bonded rubber particles, is then laid on top of the

envelopes and suitably secured, e.g. by nails or pins at the edges thereof, and the synthetic turf 10 can then be laid on the underlay 9 in the conventional manner.

The surfaces illustrated in Figures 2 and 3 are modified to suit summer games such as cricket or tennis. The sand base material 5 is chosen from a range of compositions in the second part of the Table hereinbefore. In the surface illustrated in Figure 2, the synthetic turf is replaced by a layer 20 of a dense polyethylene foam with a thickness of about 5mm and a density of 175 kg/m^3. This layer 20 serves to reduce the degree of bounce of a ball striking the surface, and is in itself known for such applications. In Figure 3, the surface illustrated is identical to that of Figure 2, but has a layer of synthetic turf placed on the foam layer 20.

CLAIMS

1. A method of constructing a playing surface for sports and the like, characterised by the steps of :

(A) laying on a drained or water-permeable surface (1) at least one envelope (4) formed of a flexible water-permeable material and containing an unbonded base material (5) comprising sand; and

(B) placing on to the envelope or envelopes a sheet (9) of a resilient material.

2. A method according to Claim 1, characterised in that step (A) comprises laying a plurality of the envelopes so that the envelopes butt together to form a continuous layer.

3. A method according to Claim 1 or 2, charactersied in that the sheet of resilient material is formed from rubber particles bonded together.

4. A method according to Claim 1 or 2, characterised in that the sheet of resilient material comprises dense expanded polyethylene.

5. A method according to any preceding claim, characterised in that a second sheet (20) of resilient material is placed on the first sheet of resilient material, the second sheet having a different stiffness and/or resilience from the first.

6. A method according to any preceding claim, characterised by laying on to the resilient material a synthetic playing surface material (10) such as synthetic turf or carpet material.

7. A method according to any preceding claim, characterised in that the thickness of the base material in the envelope or envelopes is from 12mm to 75mm.

8. A method according to any preceding claim, characterised in that the sizes of the envelopes are from 2m wide and 7m long to 4m wide and 20m long.

9. A method according to any preceding claim, characterised in that the base material also contains gravel.

10. A method according to any preceding claim, characterised in that the base material also contains clay.

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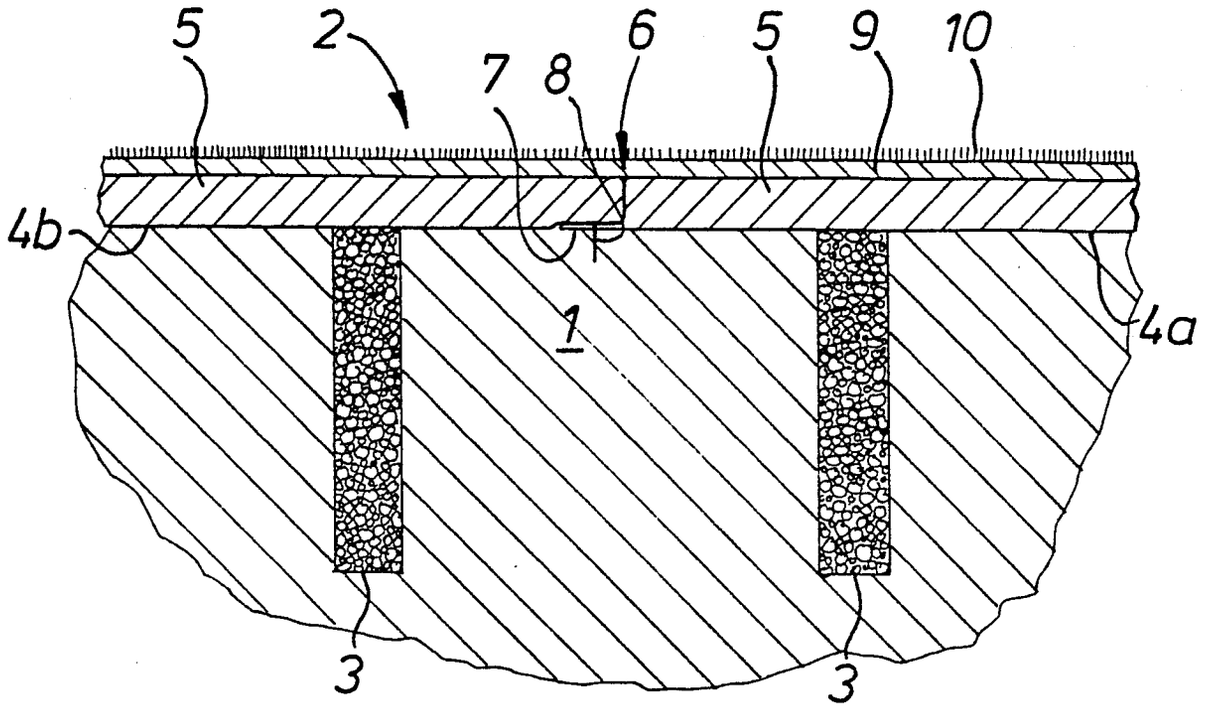

Fig.1

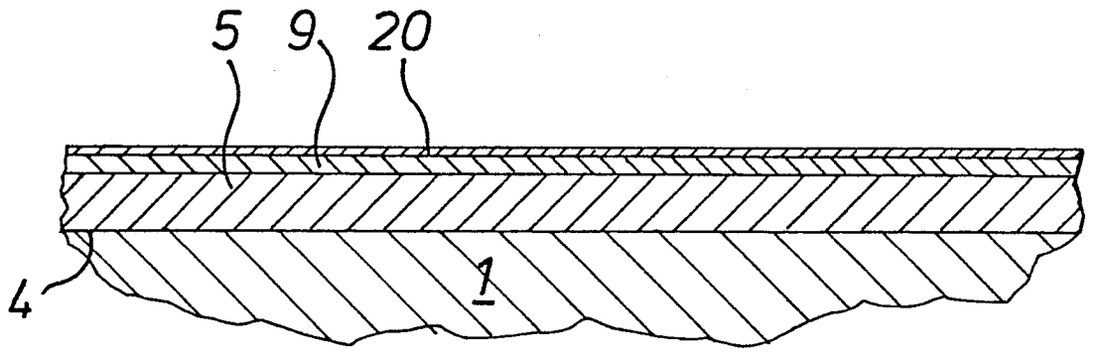

Fig.2

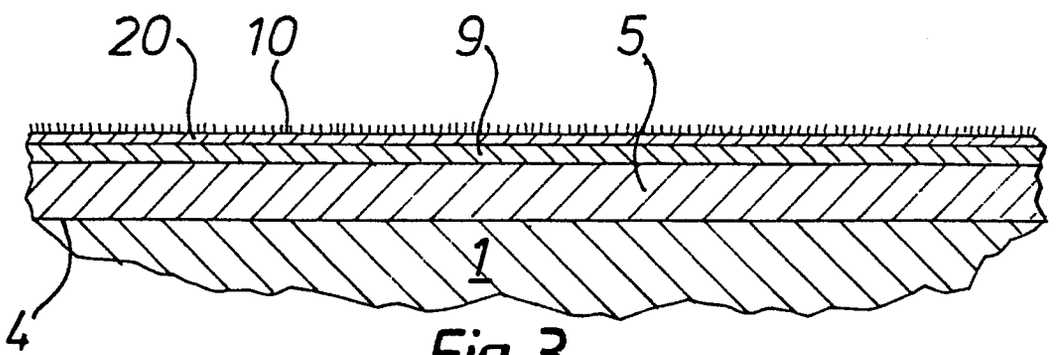

Fig.3

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DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
Y	FR-A-2 105 231 (TECHNISCHE INDUSTRIE BERATUNG) * Page 1, lines 19-30; page 2, lines 9-13, 19,20,25,26, 31-40; page 3, lines 1-9; figures 1,3, 5-7, 9 *	1	E 01 C 13/00 E 01 C 3/00 // E 04 F 15/22
A		5,6,8	

Y	EP-A-0 005 238 (SCHMIDT) * Page 1, lines 1-4, 29; page 2, lines 1,2, 6-8, 35-38; page 3, lines 1, 9-23, 25-28; claims, page 1, lines 1-24; claims, page 2, lines 19-28; figures 1,2 *	1	
A		2,3,7	TECHNICAL FIELDS SEARCHED (Int. Cl. ³)

A,P	EP-A-0 065 622 (J.F. ADOLFF AG.) * Page 1, lines 1-20, 22,23; page 2, lines 5,6,22,23,28,29; page 3, lines 1-4, 7-10, 16-18; page 4, lines 13-20; page 5, lines 19-26; page 6, lines 1,2; figure 1 *	1,5,6, 9,10	E 01 C E 02 D E 04 F

A	FR-A-2 461 063 (CHEVREAU et al.) * Page 1, lines 1,2; page 2, lines 1-6, 22-28, 31-37; page 3, lines 4-6, 13-15; figure 1 *	1,9	
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	04-08-1983	SCHUMAN R.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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A : technological background
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E : earlier patent document, but published on, or after the filing date
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A	DE-A-2 710 578 (BESTMANN) * Page 1, lines 1-13; page 2, lines 4-10; page 3, lines 8-20; page 4, lines 4-9, 14-21; figure *	1	
A	BE-A- 873 556 (VERBEECK et al.) * Page 3, lines 1-5, 15-19; page 4, lines 31-34; page 5, lines 9-11; page 14, lines 22-25, 28,29; page 15, lines 1-15, 20-22; figures 9-11, 13 *	1,2	
A	FR-A-2 318 285 (FRIES) * Page 1, lines 5-9, 18-23, 25,28,29, 34-40; page 2, lines 1-5, 8-9; page 3, lines 2-7; figures 1,2 *	1,2,7	
A	US-A-4 044 179 (HAAS) * Column 3, lines 39-43, 50-53; column 4, lines 5,6, 10-13; figure 2 *	1,6,9, 11	TECHNICAL FIELDS SEARCHED (Int. Cl. ³)
A	NL-A-6 513 549 (STAMICARBON) * Page 2, lines 1,2,4,5; page 3, lines 4-6, 17,18; page 6, lines 14-17, 26-28, 30,31; page 7, lines 4-7; figures 2,3 *	1,6,9	

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A	US-A-3 418 897 (HUMALAINEN) * Column 2, lines 14-21, 24-27, 70-72; figure 2 *	1,6,9	
A	FR-A-2 112 547 (MINNESOTA MINING AND MANUFACTURING CO.) * Page 1, lines 7-11, 25; page 13, lines 9-13; page 14, lines 14-18, 21-27; figures 4,5 *	1,3,5, 6	
A	US-A-4 007 307 (FRIEDRICH) * Column 3, lines 6-9, 12-18, 20-24, 36-39; column 5, lines 50-52; figures 1,2,9 *	1,4,9	
A	GB-A-2 000 726 (FREUDENBERG) * Page 1, lines 5-10, 27-31, 53-59, 65, 69-71, 101-106, 112-114, 116,121,122; figure 1 *	3-5	

TECHNICAL FIELDS SEARCHED (Int. Cl. ³)

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