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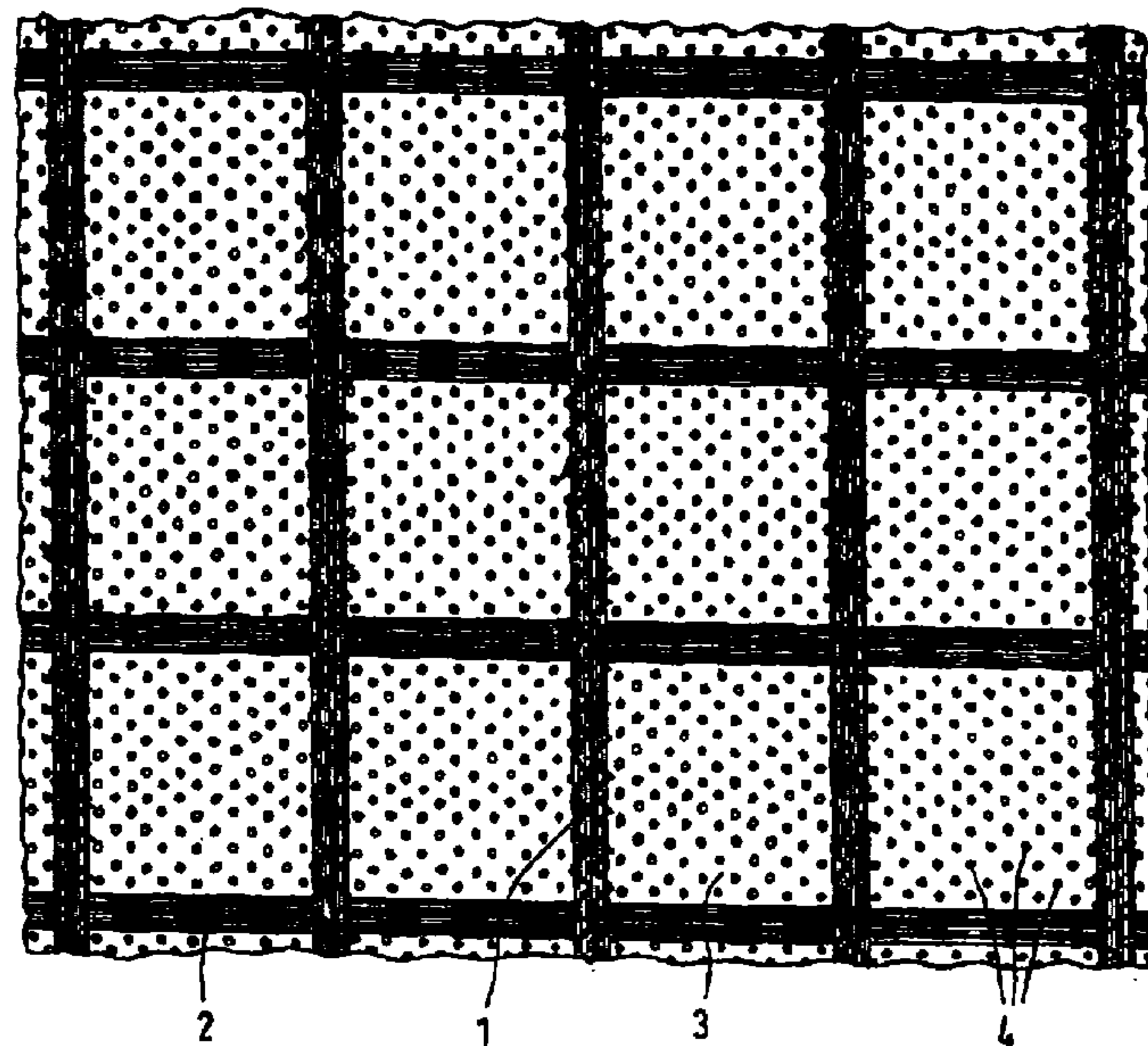
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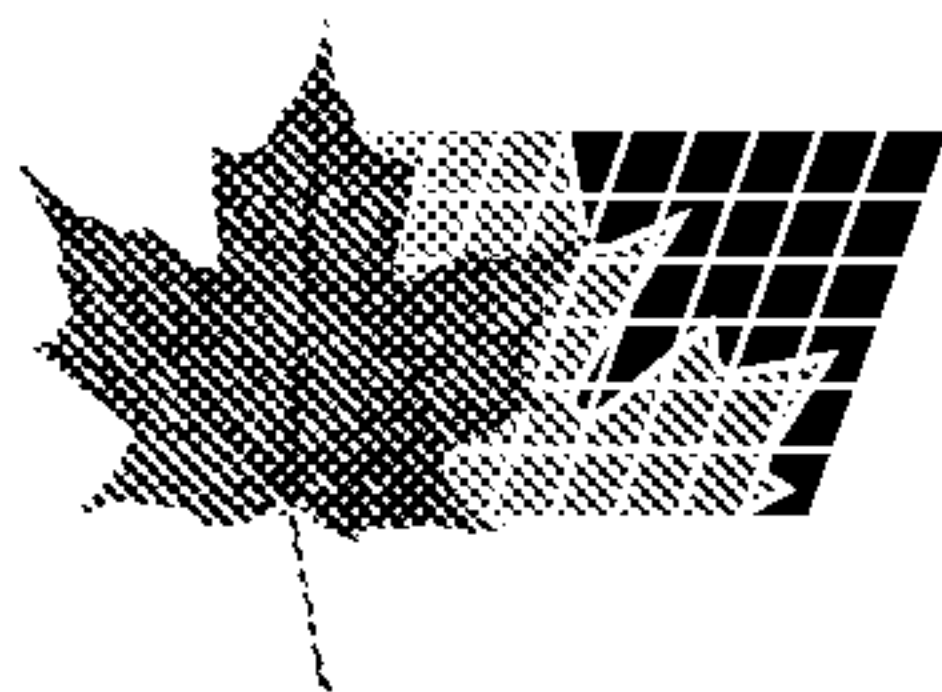
(54) **TREILLIS TEXTILE POUR RENFORCER DES COUCHES LIEES
PAR DU BITUME**

(54) **TEXTILE NETTING FOR REINFORCING LAYERS
CONNECTED BY BITUMEN**



(57) L'invention concerne un treillis textile à larges mailles pour renforcer des couches liées par du bitume, notamment des revêtements routiers. Ce treillis est revêtu d'un adhésif présentant une affinité pour le bitume et est constitué essentiellement de deux ensembles de fils (1, 2) porteurs parallèles. L'un des ensembles de fils (1) s'étend dans le sens longitudinal du treillis et l'autre ensemble de fils (2) s'étend perpendiculairement au sens longitudinal du treillis, et les fils (1, 2) sont constitués de fibres de verre ou de fibres synthétiques telles que des fibres polymères ou des fibres de polycondensation. Dans le but de mettre au point un treillis d'armature

(57) The invention relates to a wide-mesh textile netting for reinforcing layers connected by bitumen, in particular road surfaces, which is coated with an adhesive with an affinity for bitumen and consists substantially of two sets of parallel load-bearing threads (1, 2). One of the sets of threads (1) runs in the lengthways direction of the netting and the other set of threads (2) perpendicular to the lengthways direction of the netting, whereby the threads (1, 2) are made of glass fibres or synthetic fibres such as polymer fibres or polycondensation fibres. To develop a reinforcement netting for layers connected by bitumen which adheres more effectively than known netting to a



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destiné à des couches liées par du bitume, qui adhère mieux que les treillis connus à une plate-forme de chaussée préparée et qui ne forme pas de séparation gênante entre les couches, les fils (1, 2) entrecroisés sont cousus selon un procédé Rachel sur un non-tissé (3) fin, les fils de liage Rachel (5) entourant les fils longitudinaux (1) du treillis et assujettissant les fils transversaux (2).

prepared level surface and which does not form a disruptive separating layer between the layers, the interlacing threads (1, 2) are stitched by a Rachel technique onto a thin fleece (3), whereby the connecting Rachel threads (5) enclose the threads (1) running lengthways along the netting and fixe the perpendicular threads (2).



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(21) Internationales Aktenzeichen: PCT/EP97/06809 (22) Internationales Anmeldedatum: 5. Dezember 1997 (05.12.97) (30) Prioritätsdaten: 196 52 584.5 17. Dezember 1996 (17.12.96) DE (71) Anmelder (für alle Bestimmungsstaaten ausser US): HUESKER SYNTHETIC GMBH & CO. [DE/DE]; Fabrikstrasse 13-15, D-48712 Gescher (DE). (72) Erfinder; und (75) Erfinder/Anmelder (nur für US): KASSNER, Jürgen [DE/DE]; Ebbingshof 92, D-48712 Gescher (DE). PINTZ, Heiko [DE/DE]; Siegerlandstrasse 20, D-48527 Nordhorn (DE). VON FRANSECKY, Ulrich [DE/DE]; Margeritenweg 22, D-46395 Bocholt (DE). (74) Anwalt: FREISCHEM, Werner; An Groß St. Martin 2, D-50667 Köln (DE).		(81) Bestimmungsstaaten: AU, CA, CZ, JP, NO, PL, RU, US, europäisches Patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Veröffentlicht <i>Mit internationalem Recherchenbericht. Vor Ablauf der für Änderungen der Ansprüche zugelassenen Frist. Veröffentlichung wird wiederholt falls Änderungen eintreffen.</i>

(54) Title: TEXTILE NETTING FOR REINFORCING LAYERS CONNECTED BY BITUMEN

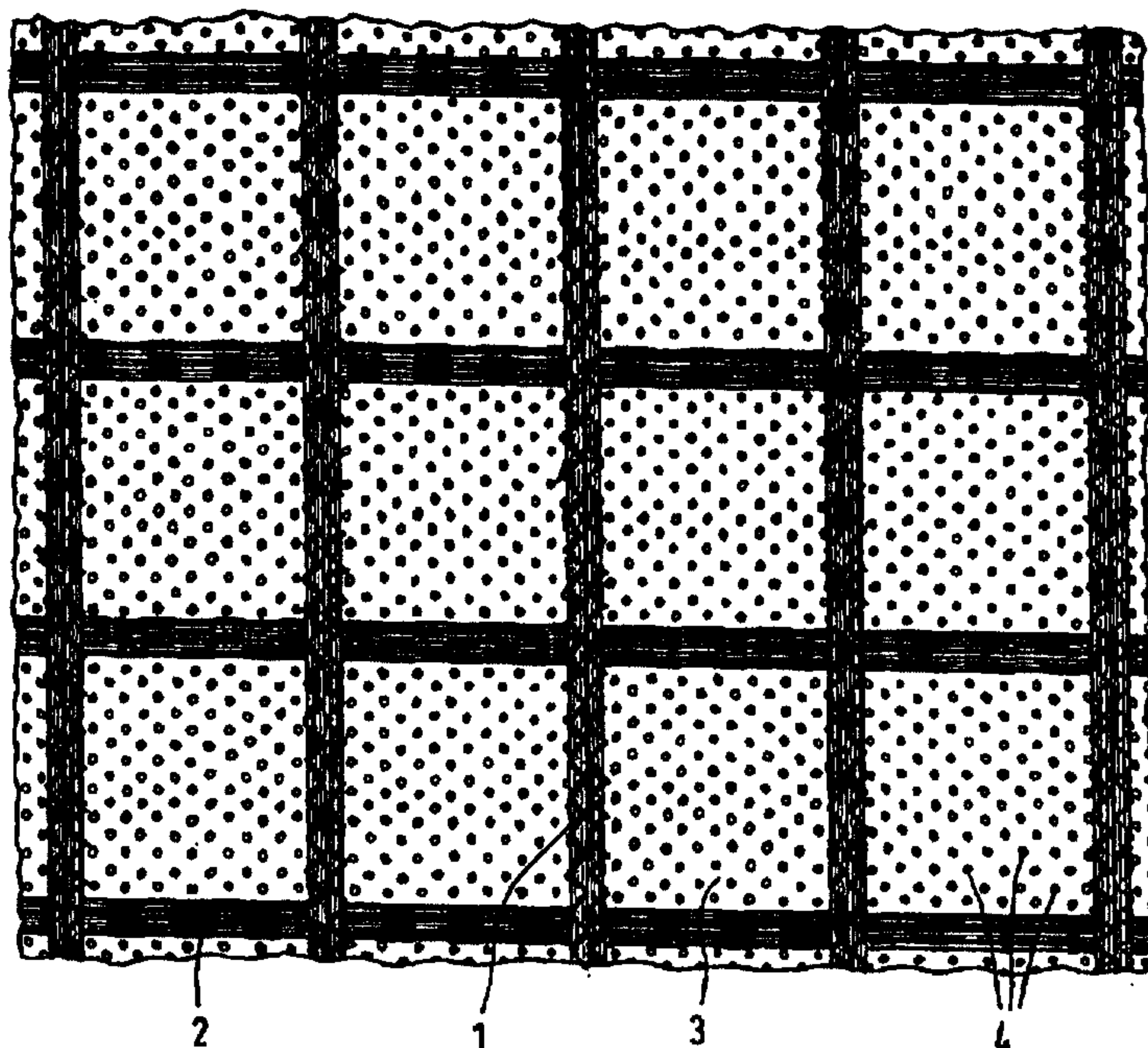
(54) Bezeichnung: TEXTILES GITTER ZUM BEWEHREN BITUMENGEBUNDENER SCHICHTEN

(57) Abstract

The invention relates to a wide-mesh textile netting for reinforcing layers connected by bitumen, in particular road surfaces, which is coated with an adhesive with an affinity for bitumen and consists substantially of two sets of parallel load-bearing threads (1, 2). One of the sets of threads (1) runs in the lengthways direction of the netting and the other set of threads (2) perpendicular to the lengthways direction of the netting, whereby the threads (1, 2) are made of glass fibres or synthetic fibres such as polymer fibres or polycondensation fibres. To develop a reinforcement netting for layers connected by bitumen which adheres more effectively than known netting to a prepared level surface and which does not form a disruptive separating layer between the layers, the interlacing threads (1, 2) are stitched by a Rachel technique onto a thin fleece (3), whereby the connecting Rachel threads (5) enclose the threads (1) running lengthways along the netting and fixe the perpendicular threads (2).

(57) Zusammenfassung

Die Erfindung bezieht sich auf ein weitmaschiges textiles Gitter zum Bewehren bitumengebundener Schichten, insbesondere Straßendecken, das mit einem bitumenaffinen Haftmittel überzogen ist und im wesentlichen aus zwei Sätzen paralleler lastaufnehmender Fäden (1, 2) besteht, wobei sich ein Satz der Fäden (1) in Längsrichtung des Gitters und der andere Satz der Fäden (2) quer zur Längsrichtung des Gitters erstreckt und die Fäden (1, 2) aus Glasfasern oder Chemiefasern wie Polymerisatfasern oder Polykondensatfasern bestehen. Um ein Armierungsgitter für bitumengebundene Schichten zu entwickeln, das besser als die bekannten Gitter auf einem vorbereiteten Planum haftet und das keine störende Trennschicht zwischen den Schichten bildet, sind die sich kreuzenden Fäden (1, 2) auf ein dünnes Vlies (3) aufgeraschelt, wobei die verbindenden Raschel-Bindefäden (5) die längs verlaufenden Fäden (1) des Gitters umschließen und die quer verlaufenden Fäden (2) festlegen.



TEXTILE LATTICE FOR REINFORCING BITUMEN-BONDED LAYERS

The invention relates to a wide-meshed, textile lattice to provide reinforcement for bitumen-bonded layers, in particular of road surfacing, essentially consisting of two sets of parallel, load-bearing threads, whereby one set of threads extends transversely to the longitudinal direction of the lattice and the threads are made from glass fibres or chemical fibres such as polymer fibres or polycondensate fibres and are raschel-locked onto a fleece, whereby the connecting raschel-locking threads surround the longitudinally extending threads of the lattice and secur the transversely extending threads.

The lattice may be woven or raschel-locked but alternatively the load-bearing parallel threads running transversely to the longitudinal direction may be laid on the load-bearing parallel threads and bonded to the longitudinal threads at the intersecting points by bonding and welding.

A lattice bonded to a fleece of this type is known from publication EP 0 413 295 A. the geo-textile used for reinforcing layers of asphalt known from this publication is a bonding material consisting of two components, one of these components being a fleece and a second of these components a woven fabric, knitted fabric, thread pattern, lattice or any other flat layout having a defined yarn position. The bonding material is provided as a raschel-locked material in which the two

- components are integrated one in the other by means of an end-latching raschel technique. The fleece is designated to have a good capacity for absorbing bitumen so that when the geo-textile is laid down, this fleece becomes impregnated with bitumen and acts as a barrier to water. The
- 5 fleece is also intended as a means of preventing the occurrence of tearing and the propagation of tearing in the layers of asphalt. The weight of the fleece by surface area should be 50 to 300 g/m², preferably 100 to 180 g/m². The geo-textile forms a separating layer in the installed state.
- 10 DE 20 00 937 discloses a wide-meshed textile lattice for reinforcing road surfacing, which is pre-fabricated so that it is coated with a specific bonding substance having an affinity to bitumen, e.g. a bitumen-latex emulsion, in order to produce a good adhesion between the lattice and the bitumen bonded layers.
- 15 In order to obtain a firm bond between the layers of the road surfacing on the two sides of the reinforcing lattice, there is an advantage to be had if the lattice is made with a wide mesh so that the distance between the parallel threads in the longitudinal direction and those in the transverse direction is 20 to 100 mm. The mesh width should be
- 20 determined on the basis of the largest grain diameter of the surfacing mixture to be used. Advantageously, the mesh width is 2 to 2.5 times greater than the largest grain diameter. The load-bearing threads in the longitudinal and transverse directions should have a breaking

strength of from 10 to 100 kN/m. If necessary or desirable, even stronger threads can be used for the reinforcing lattice.

As a result of the coating of bonding substance, the lattice is of a semi-rigid consistency. The lattice, which is 5 m wide and 30 or 50 m long, for example, is rolled out onto a surface which has been evenly sprayed with a bonding compound or bitumen emulsion. The reinforcing lattice should be laid out flat and free of folds before any further surfacing mixture is applied to the reinforcing lattice. In the case of these known lattices, a difficulty arises in that once rolled out, the reinforcing lattice slides causing creases, particularly when vehicles are driven over the laid-out lattice.

The underlying objective of the invention is to develop a reinforcing lattice for bitumen-bonded layers which does not act as a separating layer between these layers and which provides better bonding than the known lattices on a pre-prepared road level.

This objective is achieved by the invention due to the fact that the fleece has a weight of 10 to 50 g/m² and that the load bearing threads are treated and coated together with the fleece, with a bonding substance having an affinity to bitumen, the fleece having openings in the coating of bonding substance and being perforated in order to be permeable to air.

Due to the fact that the mesh of the lattice is filled with a thin

fleece, a significantly stronger bond is produced when the lattice is laid on the formation. On the other hand, the fleece is so thin and consequently so flexible that the fleece does not act as a separating layer between the asphalt layers underneath and above the lattice. In spite of the existence of the fleece, nevertheless a firm keying action between the coarse grains of the surfacing mixture laid on top of the lattice and the coarse grains of the surfacing mixture underneath the lattice is achieved.

Due to the fact that the load-bearing threads of the lattice in the direction of the warp are lashed by the raschel locking threads, the load-bearing threads running at right-angles thereto are fixed at their respective distances from one another.

In another variant of the embodiment of the invention, there is no need for the lattice to be impregnated or coated with a bonding compound having an affinity for bitumen if the load-bearing threads are made from a polymer or polycondensate, which in itself provides a firm bond with bitumen.

Furthermore, the underside of the composite of the textile lattice and the thin fleece may be provided with a bituminous mastic. This bituminous mastic melts when the hot asphalt mixture needed to form the bituminous surfacing is deposited on the laid lattice matting. It is advantageous to apply the bituminous mastic only in spots or stripes parallel with the winding axis in order to preserve the flexibility of

the reinforcing lattice. The quantity of the bitumen-latex emulsion to be sprayed on the road level is considerably reduced by the bituminous mastic on the composite and may even be omitted completely. The installation of the lattice is simplified and the time for installing the reinforcement is reduced. The quantity of the mastic to be applied depends on the condition of the asphalt or road surfacing to be renewed. It ranges preferably from 150 g to 500 g/m².

Further characterising features of the invention are specified in claims to 12.

10 The description given below, in conjunction with the appended drawings, provides an explanation of an embodiment of the invention. Of the drawings,

Figure 1 is a plan view of a reinforcing lattice of the invention,

Figure 2 is a detail of a cross-over point of the reinforcing lattice;
15 and

Figure 3 shows a reinforcing lattice such as that of Figure 1 coated with a bonding compound.

The textile lattice is providing reinforcement for bitumen-bonded layers illustrated in figures 1 to 3 essentially consists of two sets of
20 parallel load-bearing threads 1 and 2. The threads 1 of the lattice run

in the direction of the warp or longitudinal direction of the lattice whilst the threads 2 run transversely thereto. The load-bearing threads are made from highly modular polymer fibres or polycondensate fibres, for example fibres made of aramide or polyvinyl alcohol, in particular in the form of endless fibres. However, the load-bearing fibres may also be glass fibres. The threads 1 extending longitudinally, each made up of two bundles of fibres in the embodiment illustrated, are surrounded by raschel locking threads 5, which join the longitudinally extending threads 1 as well as the transversely extending threads 2 to a thin fleece 3. As can be seen with particular clarity from figure 2, the threads 2 extending transversely are arranged between the fleece 3 and the threads 1 which extend longitudinally. This layout is more stable than an arrangement whereby the threads 2 extending transversely run across the longitudinally extending threads 1. The load-bearing threads 1 and 2 may be impregnated or coated with a bonding compound even before they are secured to the fleece 3 by raschel-locking. For practical purposes, however, the load-bearing threads 1 and 2 are coated with the bonding compound 6 on the fleece 3. In order to keep the consumption of bonding compound, in particular a bitumen-latex emulsion, within limits, the layer applied is so thin that the fleece 3 is still permeable to air.

As can be seen particularly clearly from figures 1 and 2, the fleece 3 is perforated. Holes 4 of a 0.5 to 4 mm diameter are punched through the fleece in a regularly distributed pattern. The proportion of holes in relation to the total surface area of the fleece is at least 10%.

The fleece 3, which is made from PETP, PET or PP fibres, threads or filaments and hardened by heat, chemical or mechanical processing, weighs from 10 to 50 g/m².

The raschel threads 5 used to secure the lattice are perfectly adequate as a rule. In specific circumstances, however, the load-bearing threads may also be additionally bonded to one another by bonding or welding at their cross-over points.

In order to produce a firm bond for the layers of an asphalt surfacing, it is an advantage if the load-bearing threads 1 and 2 are not flat but rounded and of a diameter of from 2 to 4 mm.

A bituminous mastic melting at 60°C is applied to the lower surface of the reinforcing lattice in form of spots (not shown) or stripes parallel to the rolling axis in order to preserve the flexibility of the composite comprising the lattice 1, 2, the fleece 3, the coating 6 having an affinity for bitumen and meltable bituminous mastic is preserved.

Reference numerals

- 1 load-bearing threads in the longitudinal direction of the lattice
- 2 load-bearing threads in the transverse direction of the lattice
- 20 3 fleece
- 4 perforations

8

- 5 raschel locking threads
- 6 bonding compound
- 7 cross-over point

WHAT IS CLAIMED IS:

1. A wide-meshed, textile lattice to provide reinforcement for bitumen-bonded layers, in particular of a road surfacing, which essentially consists of two sets of parallel, load-bearing threads (1 and 2) whereby one set of threads (1) extends in the longitudinal direction of the lattice and the other set of threads (2) extends transversely to the longitudinal direction of the lattice and the threads (1 and 2) are of glass fibres or chemical fibres such as polymer fibres or polycondensate fibres and are raschel-locked on the fleece (3), whereby the connecting raschel-locking threads (5) surround the longitudinally extending threads (1) of the lattice and secure the transversely extending threads (2), characterised in that the fleece (3) has a weight of 10 to 50 g/m² and that the load-bearing threads (1 and 2) are treated and coated together with the fleece, with a bonding substance having an affinity to bitumen, the fleece having openings in the coating of bonding substance and being perforated in order to be permeable to air.

2. A lattice as claimed in claim 1, characterised in that holes of a diameter of from 0.5 to 4 mm are punched in the fleece (3) in a regularly distributed pattern and the proportion of holes in relation to the total surface area is at least 10%.

3. A lattice as claimed in claim 1 or 2, characterised in that a bituminous mastic which can be activated by heating is applied to the

underside of the composite, especially of the fleece (3).

4. A lattice as claimed in claim 3, characterised in that the bituminous mastic is deposited in form of spots or stripes extending transversely or orthogonal to the longitudinal direction of the lattice.

5 5. A lattice as claimed in one of claims 1 to 4, characterised in that the transversely extending threads (2) are arranged between the fleece (3) and the longitudinally extending threads (1).

6. A lattice as claimed in one of claims 1 to 5, characterised in that the load-bearing threads (1 and 2) are joined to one another at
10 their cross-over points (7) by bonding or welding.

7. A lattice as claimed in one of claims 1 to 6, characterised in that the load-bearing threads (1 and 2) are in the form of rounded 2 to 4 mm diameter strands or double strands secured to the fleece (3) by raschel-locking.

15 8. A wide-meshed lattice for providing reinforcement for bitumen-bonded layers, in particular for road surfacing, essentially consisting of two sets of parallel, load-bearing threads (1 and 2), whereby one set of threads (1) extends in the longitudinal direction of the lattice and the other set of threads (2) extends perpendicularly to the longitudinal
20 direction of the lattice and the threads (1 and 2) are of chemical fibres such as polymer fibres or polycondensate fibres and the crossing

threads (1, 2) of the lattice are raschel-locked onto a fleece (3), the connecting raschel-locking threads (5) surrounding the longitudinally extending threads (1) and securing the transversely extending threads (2), characterised in that the threads (1, 2) of the lattice are made
5 from a material with an affinity for bitumen, in particular a bitumen bonding substance and the fleece has a weight of less than 50 g/m².

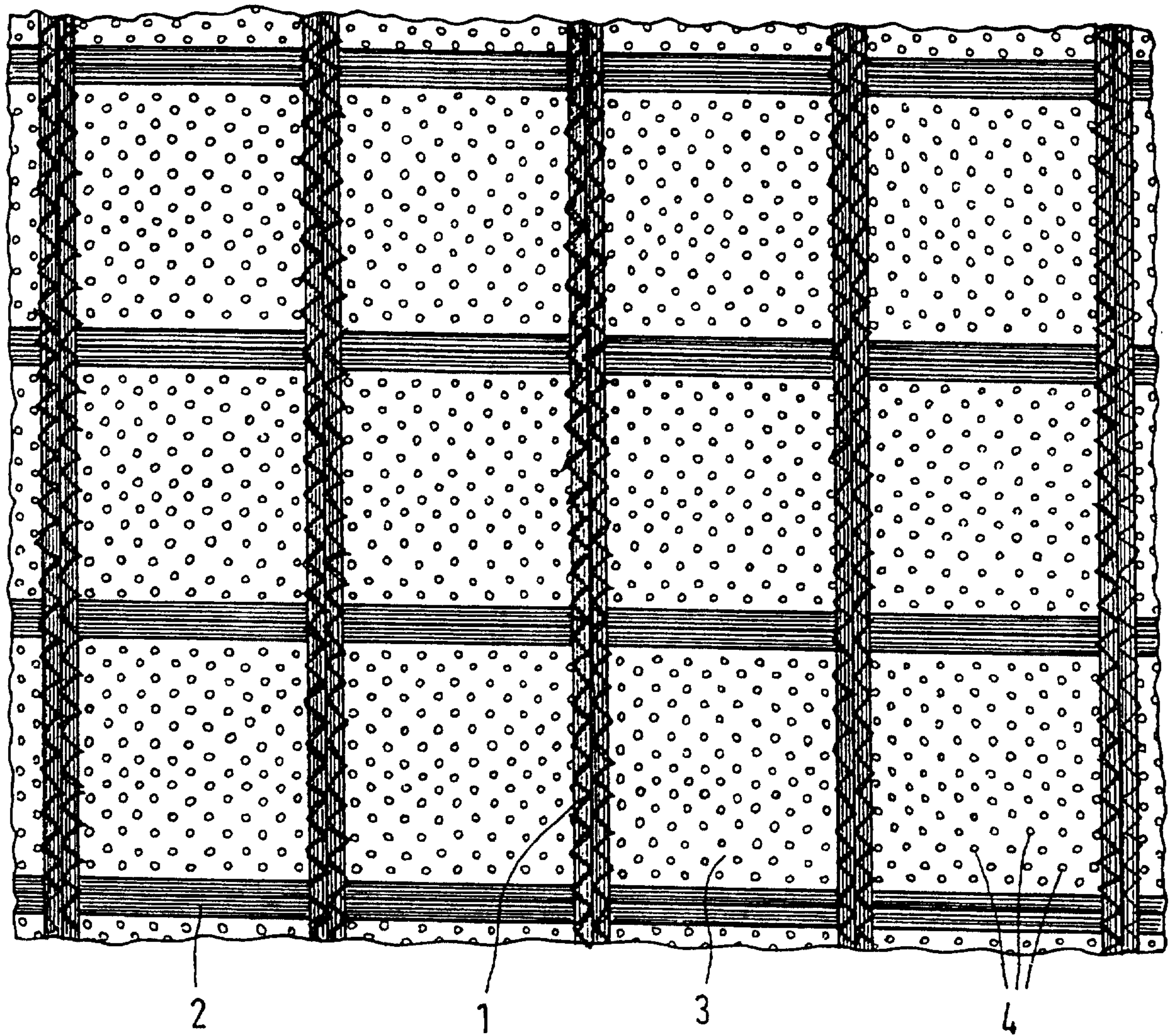


FIG. 1

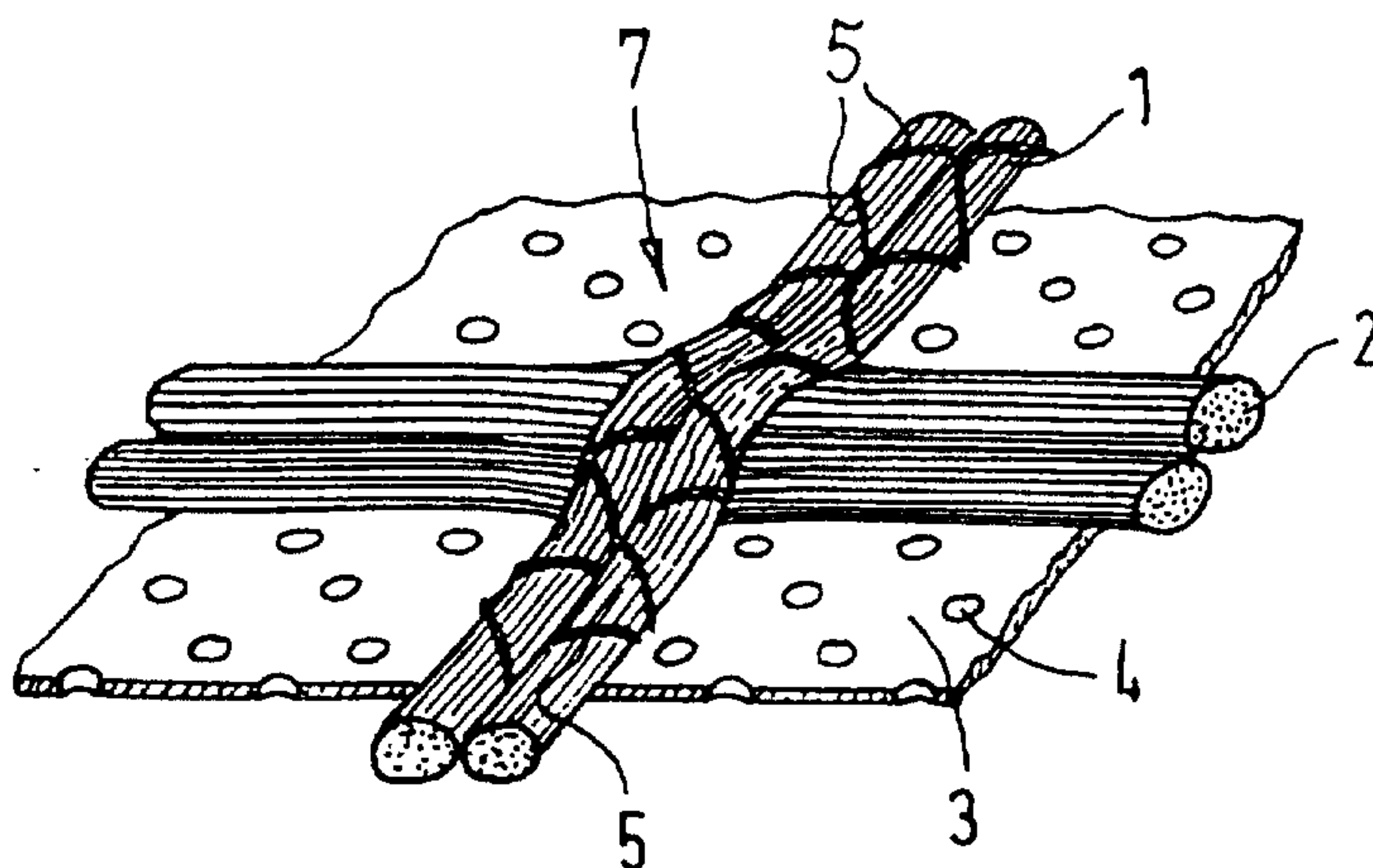


FIG. 2

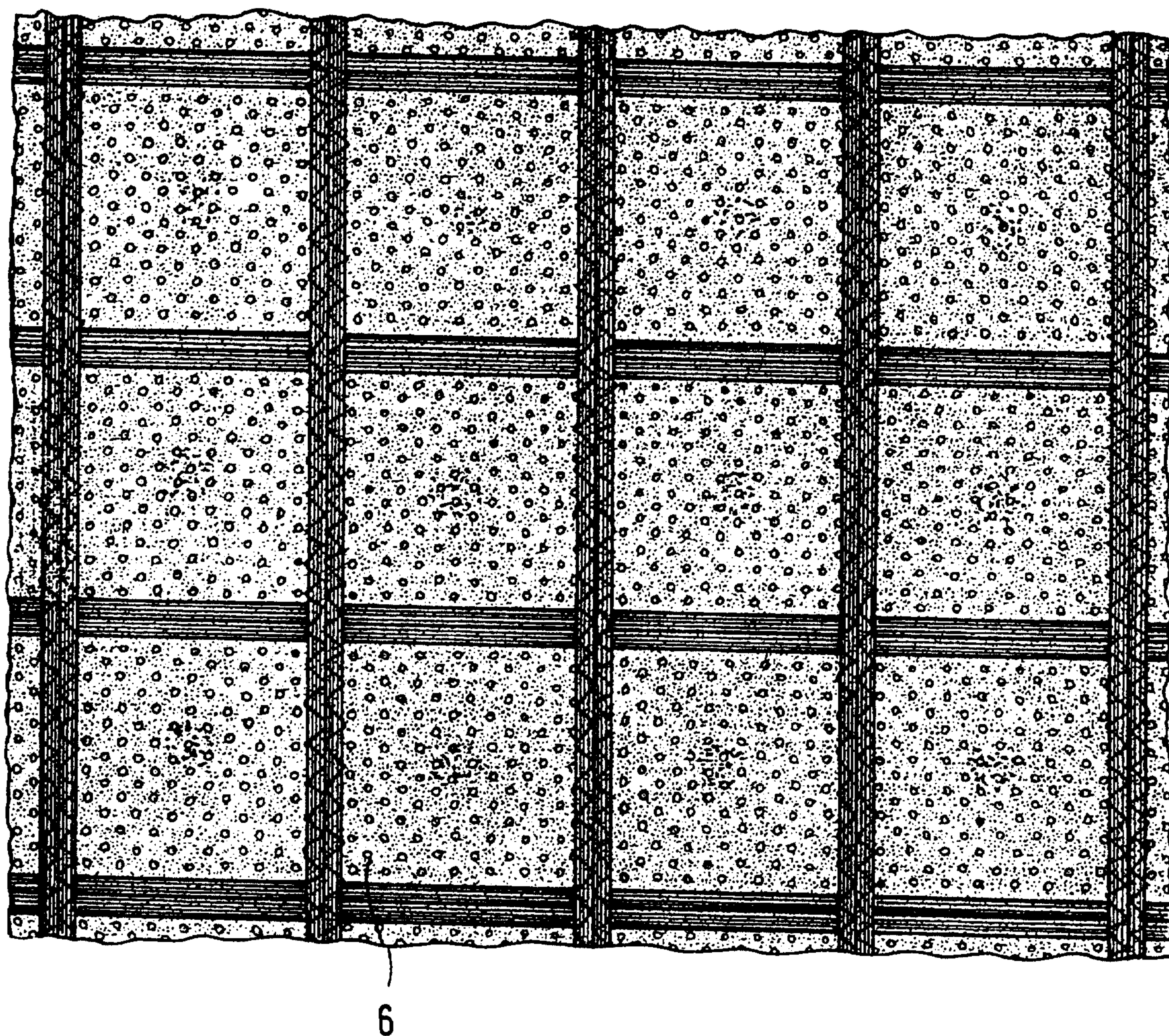


FIG.3