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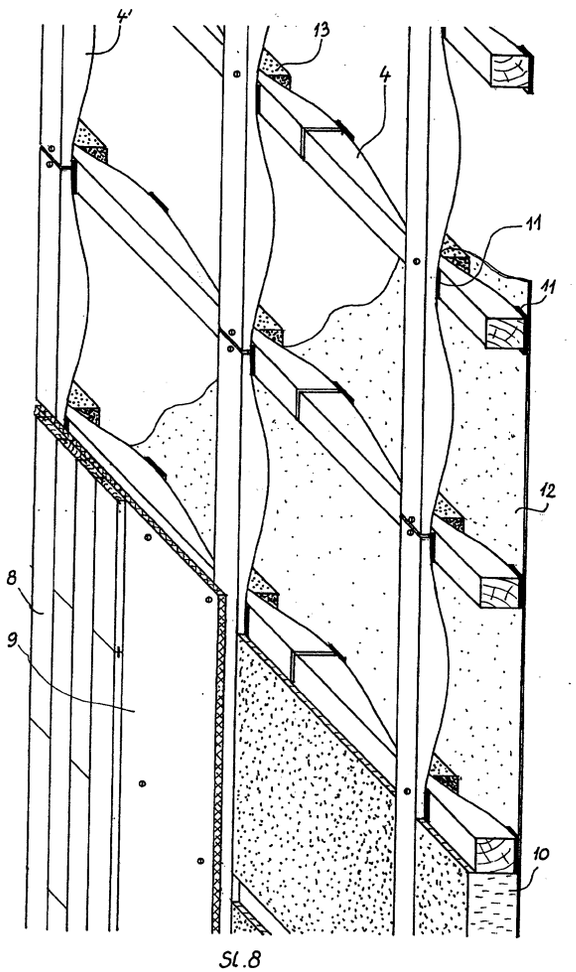
(54) **Resilient sports floor**

(57) The subject of the invention is a resilient sports floor consisting of arcuate shaped laths with equally distributed bending rigidity (4) and of arcuate shaped laths with equally distributed bending rigidity (4'), the latter being put rectangularly across the former ones. This elastic construction is covered by a holding plate (9) which is the base for laying parquet blocks (8).



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Description

[0001] The subject of the invention is a resilient sports floor which is adapted to absorb and soothe the impact of sportsmen when they land on the floor after jumping, whereas a ball rebounds from this floor almost like from a solid concrete surface.

[0002] There are known constructions of sports floors where the parquet blocks are laid on plates under which are placed elastic foam rubber layers which make the floor flexible. Other constructions are known which are made in different embodiments of prismatic-shaped laths under which on the supporting points sole wooden or rubber plates are inserted and which are placed either in parallel or rectangular one across the other. With these prismatic laths deformations occur exclusively in the dangerous profile part, e.g. in the middle between the supporting points, where the tension in the material is the highest.

[0003] The present invention aims at the construction of a resilient or elastic sports floor made of laths or fillets having equally distributed bending rigidity, in which the tension of the material is about the same along its entire length. Furthermore it is an object of the invention to provide a resilient sports floor which combines good integrity with high resiliency.

[0004] This object is solved by a resilient sports floor according to claim 1. The arcuate shaped laths define supporting points of the base structure on the ground and a resilient property of the laths between the supporting point, thereby assuring good integrity and high resiliency as desired.

[0005] It is preferred that the resilient sports floor has its arcuate shape located in the lower part of the lath facing away from the floor. Thereby the supporting points are spaced on the ground.

[0006] It is preferred that the resilient sports floor - in an alternative embodiment - has its arcuate shape located in the upper part of the lath facing to the floor. Thereby the laths are fully supported on the ground, but the floor or an intermediate holding plate are supported on spaced supporting points of the base structure. This brings about a modified resilient behavior.

[0007] Preferred is a resilient sports floor in which two adjacent laths define a sinusoidal, parabolic or wedge shaped form. This achieves a particularly preferred resiliency.

[0008] It is preferred that the resilient sports floor comprises laths which are arranged in a rectangular matrix with horizontally and vertically disposed laths. This provides for a grid of enhanced stability and easy manufacture.

[0009] A resilient sports floor is preferred in which the laths have an equally distributed bending rigidity along their length. This measure ensures uniform resiliency over the total length.

[0010] A resilient sports floor is preferred in which the laths have identical form and are cut out of a prismatic lath in a winding form. This provided for easy manufacture.

[0011] According to a preferred embodiment a resilient sports floor is provided in which sole plates are inserted under the laths, wherein the curved edges of the laths are turned upwards. The sole plates provide for good supporting stability.

[0012] Preferred is a resilient sports floor in which the matrix is formed by superposing laths oriented in one direction onto laths oriented in an orthogonal direction.

[0013] Finally preferred is a resilient sports floor in which the laths have opening slits in their thicker parts. This measure enhances uniform resiliency.

[0014] Laths with equally distributed bending rigidity have a smaller dead weight and can therefore better soothe the impacts of sudden loads.

[0015] The ideal shape of laths with equally distributed bending rigidity and constant width is defined by the equation of a square parabola which is

$$y = h \sqrt{\frac{x}{a}},$$

where the right part of the lath is equal to the left one.

[0016] As it is difficult in practice to design the lath in a parabolic shape, the parabolic planes are preferably replaced by tangential ones, where the height of the lath above both supporting points is not equal to zero but to $\frac{h}{2}$.

[0017] Wedge-shaped wooden laths are from the technological and economic standpoint only preferred in specific applications, as the cut off parts represent waste material and besides it is impossible to cut out the prisms in one piece.

[0018] This problem can be solved by a sinosoidal or arcuate form which is nearer to a parabolic form enabling also industrial production of laths with equally distributed bending rigidity by sawing the prismatic laths in a winding shape.

[0019] The purpose of the invention of an elastic sports floor of the previously described type is to comply primarily with the following physical values (DIN 18032):

- coefficient of impact soothing

$$KADIN \geq 53\ \%$$

- the bounce of the ball where the coefficient between the height of the bounce from the elastic sports floor and the height of the bounce from a stiff surface is as follows:

$$BRDIN \geq 90\ \%$$

- surface elasticity of the floor at a static load where

the floor elasticity on the distance of 500 mm from the place of the acting force is smaller than 15 % of the floor deformation when under force

$$f500DIN \leq 15\ \%\ f\,0$$

- standard deformation which must be at least 2.3 mm.

[0020] The invention is further illustrated by the following described embodiments to be read in connection with the drawings.

Fig. 1 is a diagrammatic drawing of a parabolic, wedge-shaped and sine-shaped lath;

Fig. 2 a prismatic lath sawed in a winding arcuate form;

Fig. 3 a point load of the arcuate lath with equally distributed bending rigidity with supporting points;

Fig. 4 a point loaded arcuate lath with equally distributed bending rigidity supported by its own upper curved edge;

Fig. 5 a evenly distributed loaded arcuate lath with equally distributed bending rigidity supported by its own upper curved edge;

Fig. 6 arcuate laths with equally distributed bending rigidity placed rectangular one across the other and supported by sole plates;

Fig. 7 arcuate laths with equally distributed bending rigidity placed rectangular one across the other without sole plates;

Fig. 8 arcuate laths with equally distributed bending rigidity placed rectangular one across the other and covered by a plate on which parquet blocks are laid;

Fig. 9 arcuate laths with equally distributed bending rigidity placed in parallel and covered by a plate on which parquet blocks are laid.

[0021] The elastic sports floor of the present invention and illustrated in the drawings comprises as can be seen in Fig. 1 laths of parabolic 1, wedge-shaped 2 and preferably of arcuate 3 form with equally distributed bending rigidity.

[0022] The resilient or elastic sports floor of the invention (see Fig. 2) consists of two arcuate laths 4 and 4' of the same dimensions cut out of a prismatic lath and of waste material 5.

[0023] The elastic sports floor of the invention as shown in Fig. 1 and 2 operates in the following way:

[0024] The arcuate laths 4 with equally distributed bending rigidity are supported at their thinner parts and loaded on certain points in the middle between the supporting points and on the thicker lath parts respectively as can be seen in Fig. 3.

[0025] The arcuate laths with equally distributed bending rigidity 4 can be with their upper curved edges turned to the ground and loaded on certain points at the thinner lath parts. The curved edges serve to hold the whole lath (see Fig. 4).

[0026] The arcuate laths with equally distributed bending rigidity 4 are with their upper curved edges turned towards the ground and evenly loaded along its entire length (see Fig. 5). The curved edge thicker parts have slit-like cut-outs 6 which provide elasticity of this part of the lath.

[0027] It follows the description of the elastic sports floor of the invention with the laths placed rectangular one across the other, where the arcuate laths 4' with equally distributed bending rigidity are loaded on certain points of the arcuate laths 4 with equally distributed bending rigidity which are supported by sole-plates 7 equally spaced on the bottom side along the length. (see Fig. 6).

[0028] The elastic sports floor of the invention features laths placed rectangular one across the other, where the arcuate laths with equally distributed bending rigidity 4' are superposed to the arcuate laths with equally distributed bending rigidity 4 which touch on the ground, with the curved upper edges directed to the ground and without sole plates. (see Fig. 7).

[0029] The elastic sports floor of the invention has parquet blocks 8 laid on a holding plate 9 which distributes the load evenly on all arcuate laths with equally distributed bending rigidity 4', wherein these laths further load certain points of the arcuate laths with equally distributed bending rigidity 4. Between the lath layers there is a thermal isolation layer 10 (see Fig. 8). On places where the arcuate laths with equally distributed bending rigidity 4 and 4' are placed rectangularly one across the other, a rubber or any other elastic material 11 is inserted between them and under the arcuate laths with equally distributed bending rigidity 4 at the contacting points, whereas under the whole construction there is placed a hydro-isolation foil 12.

[0030] Under the sections where the arcuate laths with equally distributed bending rigidity 4 and 4' are placed rectangularly one across the other according to one embodiment (Fig. 7) a block 13 made of rubber or any other plastic material is inserted for damping vibrations.

[0031] The elastic sports floor of the invention (see Fig. 1 and 2) with parquet blocks 8 laid on said holding plate 9 puts its load evenly on all arcuate laths with equally distributed rigidity 4", with cut-outs 6 made in the thicker parts of the laths to provide elasticity of the laths. Under the laths there is inserted a rubber or any other

elastic material 11, whereas under the entire construction a hydro-isolation foil 12 is placed (see Fig. 9).

[0032] In an alternative not shown embodiment a three or one layer parquet is mounted on the base construction without any holding plate, wherein the parquet is a ready -to-use parquet. This parquet has a depth of 15-25 mm, preferably around 20 mm.

[0033] The distance of the upper laths bottom side from the ground is greater than 2,3 mm and preferably between 3.8 and 5 mm. This ensures sufficient vertical flexibility.

Claims

1. Resilient sports floor having a base construction, **characterized in that** the base construction comprises a plurality of laths (4,4') forming a supporting grid, wherein the laths each have an arcuate shaped edge.

2. Resilient sports floor according to claim 1, **characterized in that** the arcuate shape is located in the lower part of the lath (4,4') facing away from the floor.

3. Resilient sports floor according to claim 1, **characterized in that** the arcuate shape is located in the upper part of the lath facing to the floor.

4. Resilient sports floor according to one of the preceding claims, **characterized in that** two adjacent laths define a sinusoidal (3), parabolic (1) or wedge shaped (2) form .

5. Resilient sports floor according to one of the preceding claims, **characterized in that** the laths (4) are arranged in an rectangular matrix with horizontally and vertically disposed laths (4,4').

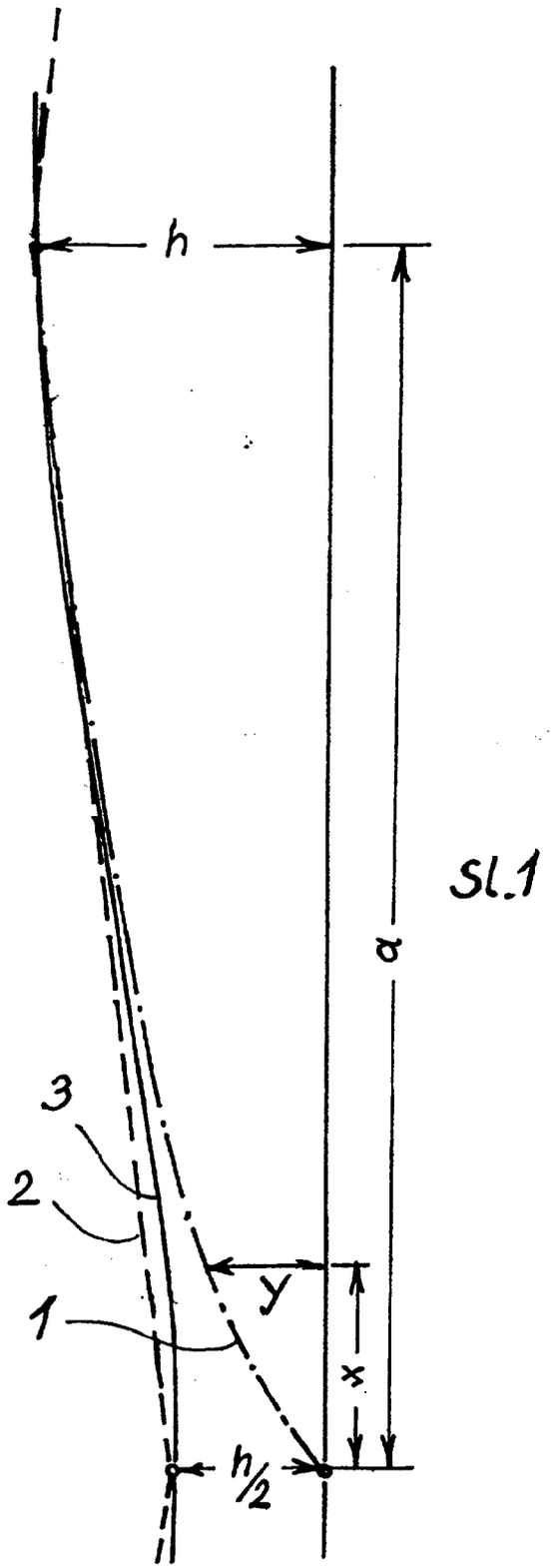
6. Resilient sports floor according to one of the preceding claims, **characterized in that** the laths have an equally distributed bending rigidity along their length.

7. Resilient sports floor according to one of the preceding claims, **characterized in that** the laths have identical form and are cut out of a prismatic lath in a winding form.

8. Resilient sports floor according to claim 3, **characterized in that** sole plates (7) are inserted under the laths, wherein the curved edges of the laths are turned upwards.

9. Resilient sports floor according to one of the preceding claims, **characterized in that** the matrix is formed by superposing laths (4') oriented in one direction onto laths (4) oriented in an othogonal direction.

10. Resilient sports floor according to one of the preceding claims, **characterized in that** the laths have opening slits (6) in their thicker parts.



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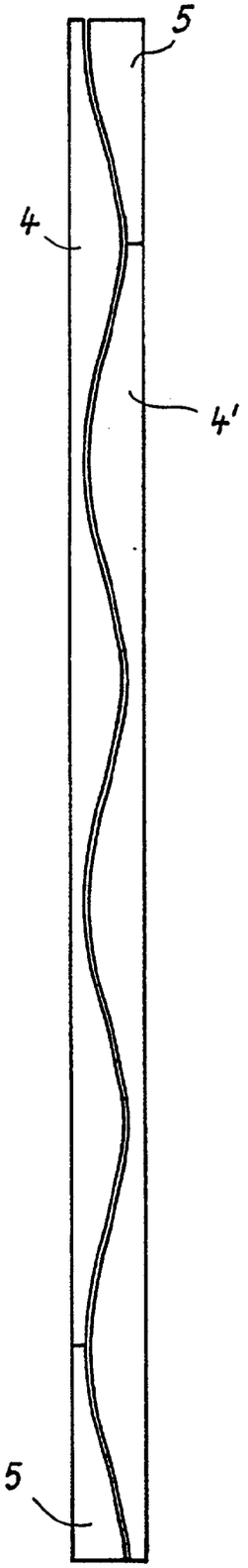

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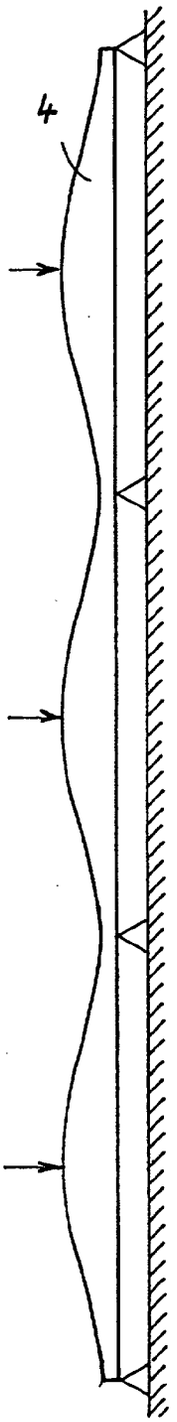

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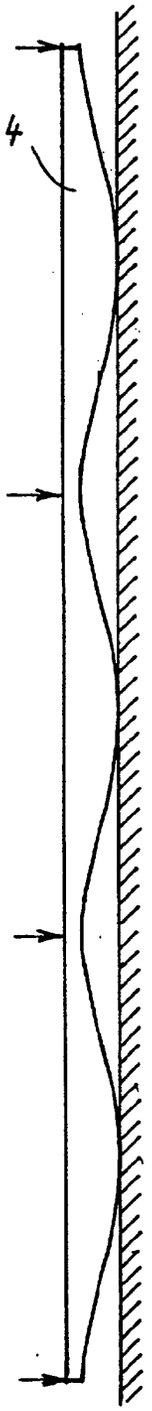

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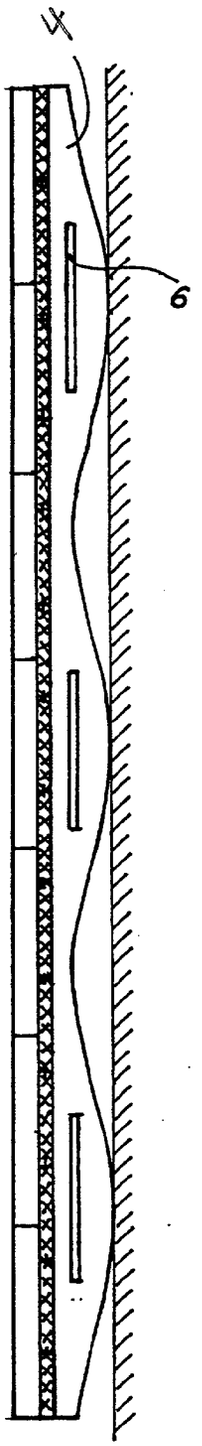

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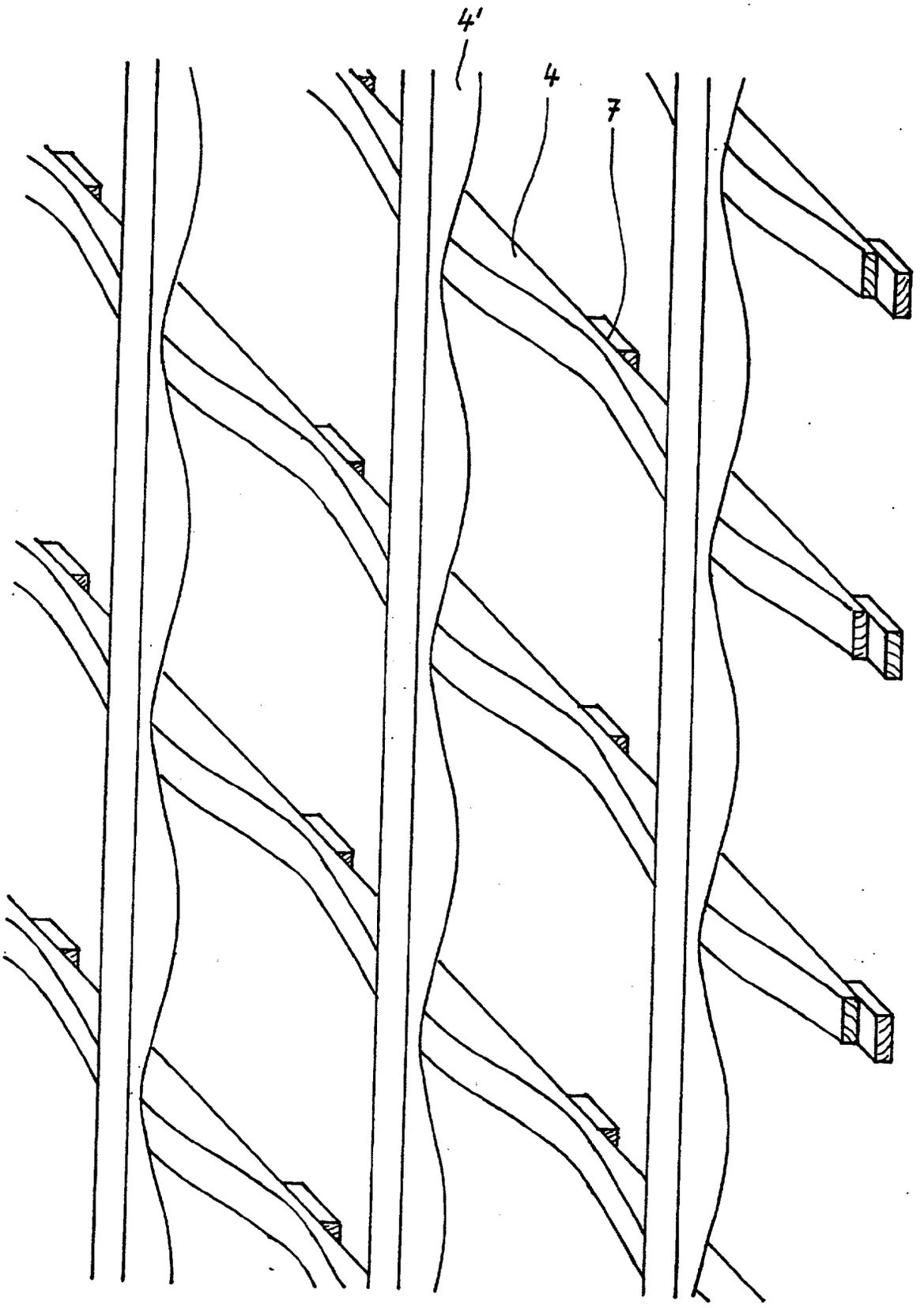

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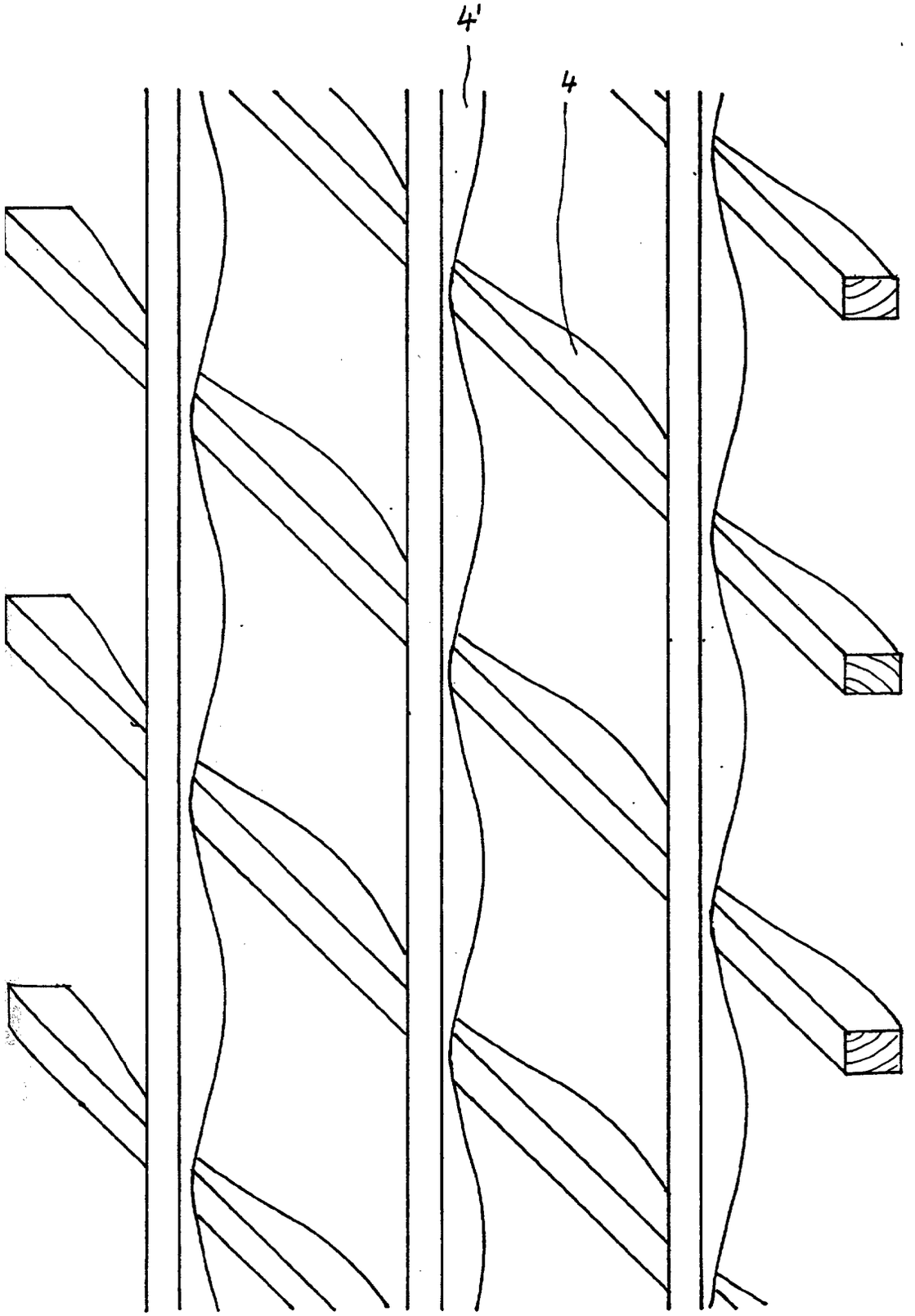

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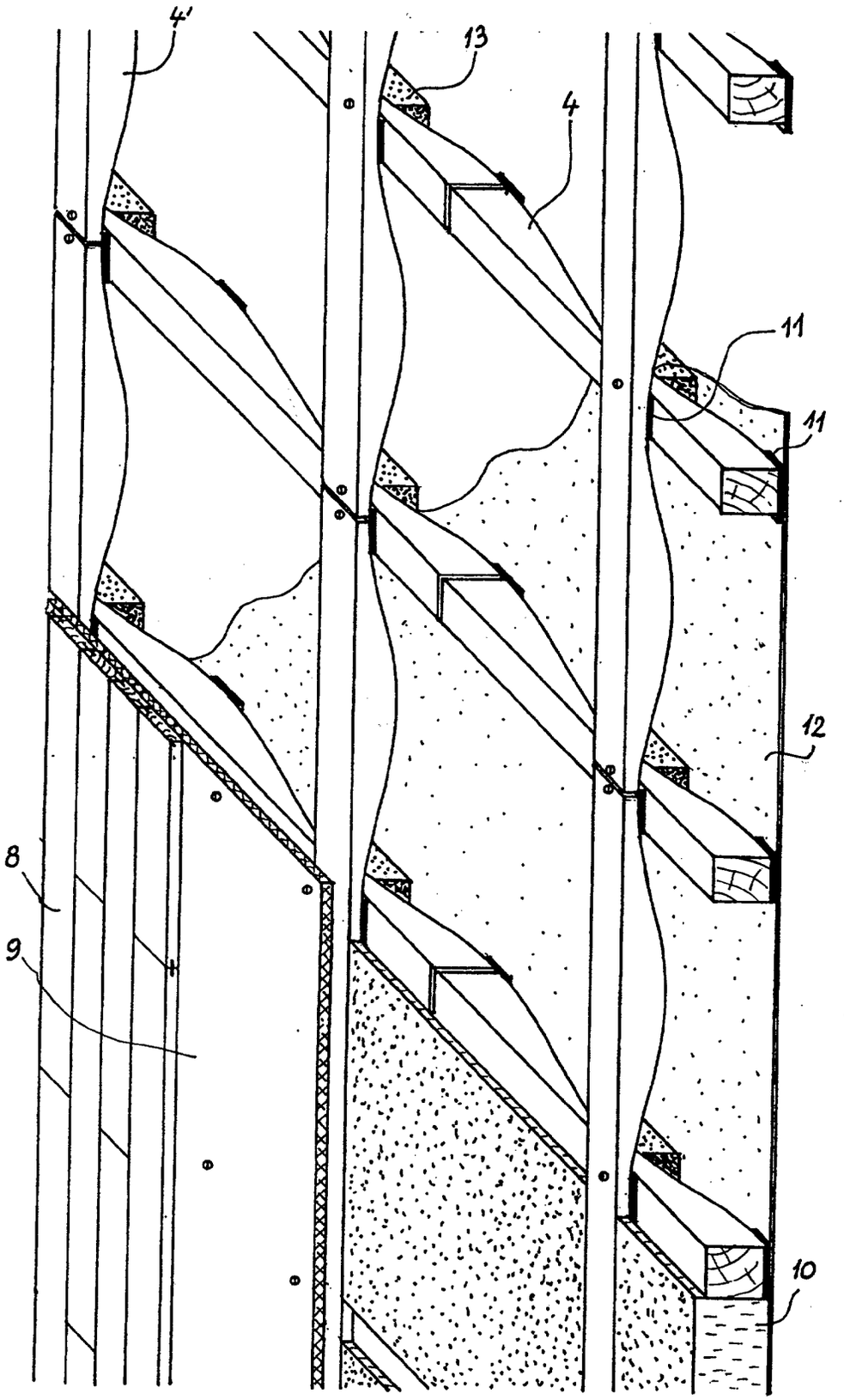

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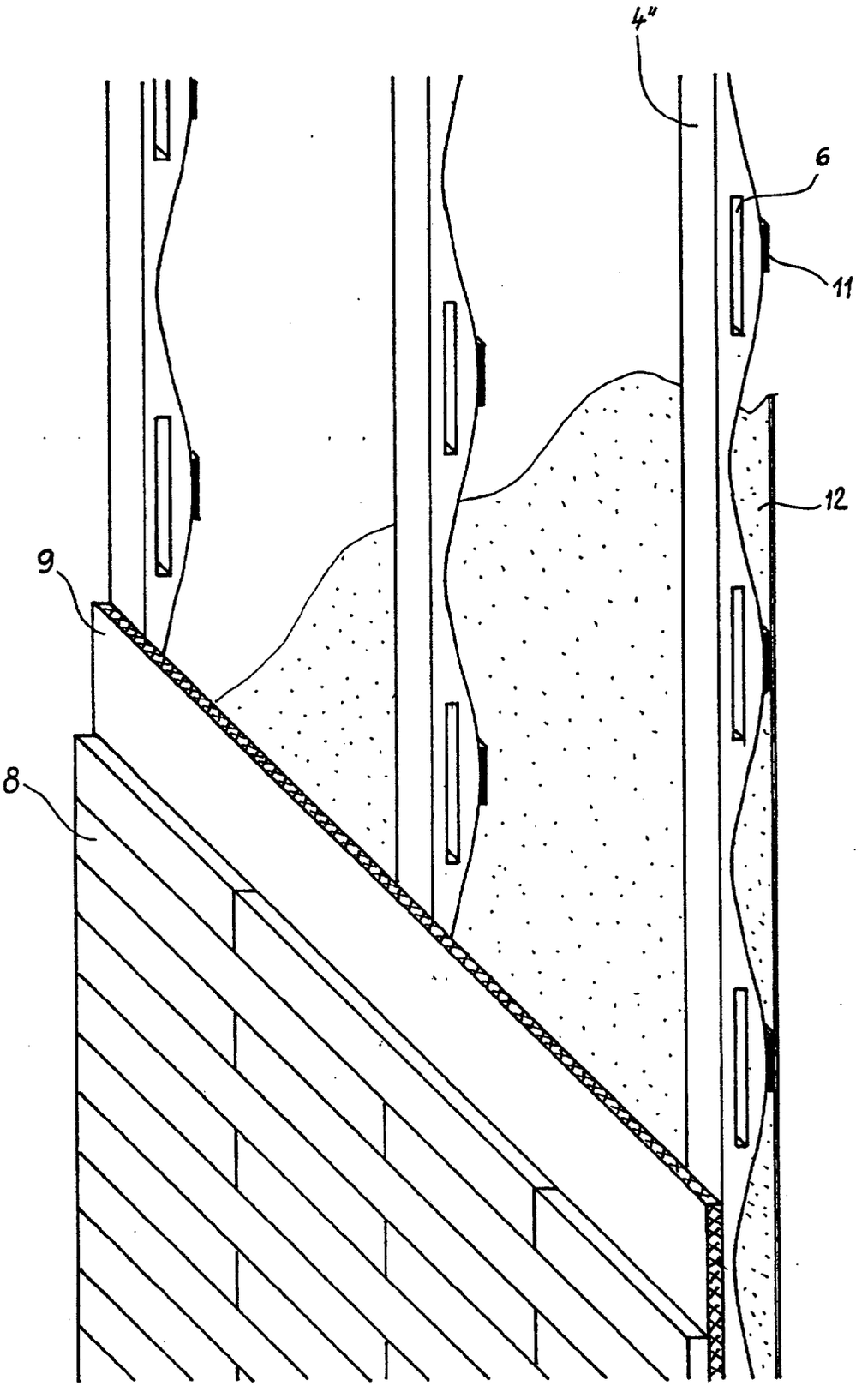

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EUROPEAN SEARCH REPORT

Application Number
EP 01 10 2692

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.7)
X	GB 578 294 A (LARSEN) 24 June 1946 (1946-06-24)	1,4	E04F15/22
A	* page 2, line 5 - page 3, line 29; figures *	2,3,5-9	
A	FR 1 276 467 A (BEMBÉ-PARKETT-FABRIK JUCKER & CO.) 14 March 1962 (1962-03-14) * the whole document *	1,9	
A	AT 389 552 B (FISCHER) 27 December 1989 (1989-12-27) * page 3, paragraph 3; figures *	1,10	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			E04F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	4 July 2001	Vijverman, W

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