

Paving and method for laying tiles

Unofficial translation from the French original

International application published under the Patent Cooperation Treaty (PCT). World Intellectual Property Organization, International Bureau. Publication: WO 2009/013148 A1, 29 January 2009. Application: PCT/EP2008/059047, filed 10 July 2008. Priority: EP 07112864.9, 20 July 2007. Filing and publication language: French. International Patent Classification: E04F 13/08 (2006.01), E04F 15/02 (2006.01).

Applicant and inventor: Renato Rossi [BE/BE], Geenrijt 62, B-3550 Heusden-Zolder, Belgium. Representatives: Marie-Paule Vandenberg et al., Avenue Wolfers 32, B-1310 La Hulpe, Belgium. Published with the international search report. The designated national and regional states are reproduced by their original codes in the administrative annex.

This reading translation reproduces the description and all 15 claims, with the original five drawing sheets and translated search-report information. It is not a certified translation. The French original remains the reference document. The duplicate English/French search-report forms in the source are presented once in translation.

Abstract

A device for laying tiles comprises tile or mosaic elements (2) preassembled on a canvas mesh (4). The mesh (4), carrying its elements, is placed on the front of a support plate (8), and a hardening product (10) fills the gaps (6) between the elements and the support plate (8). This plate (8) can be screwed and/or glued to a building wall or floor.

Field of the invention

The invention concerns wall or surface coverings formed from juxtaposed elements, such as tiles and mosaics, and a process for producing this type of covering quickly while making the workers' task easier.

In addition to conventional applications to floors and walls of washrooms, bathrooms and kitchens, swimming-pool walls, prestigious entrance halls, etc., the invention makes it possible to produce coverings suitable for heating embedded in the surfaces of a room, such as its floor or walls.

Prior art

Imitations of tiles or mosaics made from stamped plastic materials are currently commercially available. Their appearance is poor; they scratch easily, become brittle over time, and their colours fade in the light.

Experienced DIY enthusiasts and professionals have long used mosaics whose elements are preassembled on a mesh that takes account of joint thickness. This need only be pressed against a surface, the final positioning and fastening of the elements being provided by grouting.

US 1 932 276 discloses a composite wall structure comprising metal mesh with projections for regularly spacing facing bricks cemented to that mesh. US 3 142 938 discloses another composite wall structure comprising metal mesh supporting facing pieces, the whole being fixed to building facades with mortar. DE-U-8902747 describes an intermediate layer enabling the application of a coating for fastening facing bricks. BE-809 846 describes a process for manufacturing ceramic coverings in which the future positions of ceramic tiles are hot-impressed into a plastic layer.

Summary of the invention

One aim is to facilitate the laying of tiles, particularly mosaics, by making a high degree of prefabrication possible. Another aim is that the coverings thus produced should be indistinguishable from coverings laid traditionally. Another aim is to make it possible to recover mosaics, decorative elements whose price can be very high depending on their complexity.

A device for laying tiles comprises tile or mosaic elements preassembled on a textile mesh such as canvas. The mesh carrying its elements is placed on the front of a flexible support plate, an elastic adhesive product filling the gaps between the elements and the flexible support plate, the flexible plate being capable of attachment to a building element.

The rear of the support plate is advantageously covered with a layer adhering to that rear, facilitating possible removal. In one advantageous embodiment the support plate is made of a polymer material; in another it is made of a metal material. In another advantageous embodiment the flexible support plate can be attached to a building element by screws or adhesive.

The hardening product is preferably a synthetic resin, optionally made more fluid by additives, particularly water and/or a surfactant.

Another subject of the invention is a tile-laying process comprising preassembly of tile or mosaic elements on a textile mesh and the following operations: placing the mesh with its elements on the front of a flexible support plate; coating the elements with a hardening product filling the gaps between the elements and the support plate; leaving at least one gap around the perimeter of the support plate where the tile elements remain uncoated; cleaning the surface of the tile elements to reveal their pattern again; placing the plate on the construction element it is to cover; attaching the plate to that construction element; coating the elements with a hardening product filling the gaps between the elements themselves; placing other plates adjacent to the first and attaching them too to the construction element; and grouting the perimeter of adjacent plates using a compound with characteristics similar to the coating compound.

In one advantageous embodiment the support is attached to the construction element by screws inserted through the plate after removal of a tile element, which is then replaced

over the screw head to conceal it. In another advantageous embodiment attachment is by adhesive. The laying process advantageously includes the preliminary operation of covering the rear of the support plate with a layer adhering to that rear.

Another subject is a floor- or wall-heating process in which the external covering of the heating elements comprises tiling as described above.

Brief description of the figures

These and other aspects are clarified in the detailed description of particular embodiments with reference to the drawings. Figure 1 is a perspective view with a partial cutaway of one element of the laying device. Figure 2 shows two laying elements placed side by side on a wall. Figures 3 and 4 are perspective views of example patterns. Figure 5 is a perspective view with a partial cutaway of another embodiment of a laying-device element. The figures are not drawn to scale. Similar elements are generally denoted by similar references.

Detailed description of particular embodiments

Figure 1 shows the device so that all the elements in its various layers are visible. Starting from the outside, a number of mosaic tiles (2) are seen, preassembled on a textile mesh (canvas) (4), of the kind available from specialist shops.

Regularly shaped tiles were chosen in this example, but the tiles (2) may, depending on the selected pattern, have any appropriate shape and size. Between each pair of mosaic elements there is a gap (6) whose width corresponds to that of the joint intended to hold all the elements in their relative positions.

The mesh (4) with its elements (2) is first temporarily fixed, for example by a few spots of adhesive or silicone sealant, to the front of a support plate (8). In part of the figure the gaps between the elements (2) and the support plate (8) are then filled with a first flexible hardening product (9).

This particularly advantageous embodiment allows preassembled mosaic panels to be transported rolled up, as though they were simple pieces of fitted carpet. In the embodiment shown in this figure, the coating (10) of the gaps (6) between the various tiles (2) is carried out after the flexible panels have been installed.

The second hardening product (10) must initially have a sufficiently fluid consistency to fill not only the gaps between the tiles but also the remaining spaces underneath them, firmly attaching them to the support (8). The hardening products used are generally epoxy-type synthetic resins containing fillers and/or colourants. To give these resins the desired characteristics, particularly consistency, a small percentage of water is added, contrary to the practice recommended by the skilled person for this type of product, together with a surfactant.

The plate (8), a few millimetres thick, generally 2 to 3 mm, is made from a flexible thermoplastic material or thin metal, as discussed below. A particularly interesting material is foamed PVC (PVC foam). Its good mechanical strength already permits easy, safe handling of the preassembled mosaics. Prior fixing to a panel also prevents the mesh from

sagging when the mosaic is installed on a vertical surface, a troublesome phenomenon well known to skilled persons.

Excess second hardening product (10) is removed with appropriate solvents to give the tiling its final appearance and clearly reveal the patterns.

Another embodiment is shown in Figure 5. The gaps (6), both between the elements (2) themselves and between the elements (2) and the support plate (8), are filled from the outset with the same hardening product (10). Since coating is carried out before laying, the product (10) used is generally a flexible resin, retaining the advantage of transporting different parts of a pattern rolled up.

In another embodiment a rigid resin (10) may be used. In that case, however, the panels are handled before the product has fully hardened or polymerised. The freshly coated panels are installed while still retaining some flexibility, especially on curved surfaces such as curved walls, pillars and columns. This technique requires good knowledge of the product's characteristics. Here too, PVC foam is advantageous because of its flexibility.

Panel fastening is explained with particular reference to Figure 2. Two panels have been placed side by side on a construction element, wall or floor. During the coating of each panel, a margin (12) one or two tiles wide was left free of grouting compound.

Each panel is fastened edge to edge with the adjoining panel, either with adhesive or with screws. Each screw head is concealed under a tile subsequently put back to hide it permanently. The craftsman then coats the border tiles with the hardening product, taking care to use a product whose colour exactly matches the initial compound.

This matching presents no problem if products from the same range are used, which can be marketed in a predefined colour palette. Proceeding progressively, the process makes it possible to produce very large mosaics, several or even tens of square metres, at an affordable price and with remarkably short laying times.

Figures 3 and 4 show example patterns obtainable with the process, using personalised colours. Infinitely more complex patterns can of course be created.

When the panels are used for a floor, fixing is not absolutely necessary: the floating-slab principle can be used. The panels' own tile/mosaic weight is sufficient to hold them in place. A flexible joint, for example silicone, need only be provided along the line of connection with the walls. To take full advantage of floating slabs, particularly sound insulation, the panels are generally laid over an insulating layer such as high-density foam.

One advantage of the product and process is that the mosaic can not only be repaired but also recovered almost in its entirety for installation elsewhere, for example when moving house.

For a conventional mosaic this would seem absurd given the labour cost. It is nevertheless extremely advantageous for patterns of high artistic value, original works or reproductions of old works. Prefabrication allows these works to be made in ideal workshop conditions, like a puzzle. Even under optimal conditions some mosaics can have a substantial price, to which the value of the materials is added. Mosaics may be made from glass, ceramics,

natural stones, marbles of different shades, rare materials, exotic woods, metal, etc. Recovering them practically intact is therefore a decisive advantage.

To dismantle or repair the mosaics, specially calibrated saws produce narrow cuts, typically the width of gap (6) between two tile elements, with a cutting depth corresponding to the panel thickness. If the pattern allows, a skilled worker can separate two panels without losing any tile elements. In any event, by sacrificing a minimum of tile elements, the mosaic can be cut into large panels which need only be detached from their support.

To facilitate transfer, the rear of the panels is advantageously covered with an adhering film, shown as (14) in Figure 1. Overcoming the adhesion between this film (14) and the rear of the panel is sufficient for the panel to detach easily. If screws were used, a conventional locating system or even a simple template permits their rapid location and removal by detaching the covering tile element.

The recovered panels are installed in their new position, fastened and grouted by a similar method, adding new tile elements as necessary to replace any sacrificed or damaged during cutting. When panels are used flat, it is often unnecessary to fix them: the weight of the mosaic tiles is sufficient to keep them very securely in place.

The support plates may also be thin metal. This choice permits mosaics particularly suitable for floor- or wall-heating systems. Such a support is not mandatory, however: surprisingly, flexible vinyl also proves particularly suitable for floor use.

The natural heat resistance and small thickness of the tiles even permit very-low-temperature heating, with environmental advantages: reduced consumption and losses, reduced thermal inertia, the possibility of reducing insulation thickness, and a lighter supporting structure. The heating circuit can also carry a cold fluid in summer, providing inexpensive air conditioning, particularly with a heat pump.

Another fairly revolutionary aspect is the rationalisation of pattern design. Since tile elements are arranged in the workshop, their patterns, dimensions and arrangement can be personalised to an unprecedented extent using software developed alongside the product. The customer can view virtual reconstructions of different laying options and also check the effect in situ in a room of their choice.

Once optimum aesthetic criteria have been established, the computer can prepare the design template for each basic panel, its position, the number and colour of required elements, and the final cost.

Rigorous alignment of the tile or mosaic elements in both longitudinal and transverse directions is essential; otherwise elements may be lost during laying or cutting for later transfer. Assembly workers therefore need accurately square templates.

The skilled person will understand that the invention is not limited to the examples illustrated and described. It encompasses each new characteristic and their combinations. Reference numbers are not limiting. The term 'comprises' does not exclude other elements. Introducing an element with the indefinite article 'a' does not exclude a plurality of such elements. The specific embodiments are illustrative and must not be considered limiting.

Claims

1. A device for laying tiles comprising tile or mosaic elements (2) preassembled on a textile mesh (4), characterised in that the mesh (4) with its elements is placed on the front of a flexible support plate (8), an elastic adhesive product (9) filling the gaps (6) between the elements and the flexible support plate (8), the flexible plate (8) being capable of attachment to a building element.
2. A device according to claim 1, characterised in that the rear of the support plate (8) is covered with a layer (14) adhering to that rear.
3. A device according to any preceding claim, characterised in that the flexible support plate (8) is made from a polymer material.
4. A device according to either claim 1 or 2, characterised in that the flexible support plate (8) is made from a metal material.
5. A device according to any preceding claim, characterised in that the flexible support plate (8) can be attached to a building element by screws or adhesive.
6. A device according to any preceding claim, characterised in that a flexible hardening product (10) fills the gaps (6) between the elements (2) themselves.
7. A device according to any preceding claim, characterised in that the flexible hardening products (9, 10) are synthetic resins.
8. A device according to claim 7, characterised in that at least one hardening product (9, 10) is made more fluid by adding additives.
9. A device according to claim 8, characterised in that the additives comprise water.
10. A device according to any of claims 7 to 9, characterised in that the additives comprise a surfactant.
11. A tile-laying process comprising preassembly of tile or mosaic elements (2) on a textile mesh (4), characterised in that it additionally comprises: placing the mesh (4) with its elements (2) on the front of a flexible support plate (8); coating the elements (2) with a flexible hardening product (9) filling the gaps (6) between the elements and the support plate (8); leaving at least one gap (6) around the perimeter of the plate (8) where the tile elements remain uncoated; placing the plate on the construction element it is to cover; coating the elements (2) with a second hardening product (10) filling the gaps (6) between the elements (2) themselves; cleaning the tile-element surfaces (2) to reveal their pattern; attaching the plate to the construction element; placing other plates adjacent to the first and attaching them too; and grouting the perimeter of adjacent plates with a compound (10) with characteristics similar to that used for coating.
12. A process according to claim 11, characterised in that coating the elements (2) with a hardening product (10) filling the gaps (6) between the elements (2) themselves is carried out with a flexible hardening product before the plate is installed.

13. A process according to either claim 11 or 12, characterised in that attachment between the support and the construction element is by screws inserted through the plate after removal of a tile element (2), that element (2) being replaced over the screw head to conceal it.
14. A process according to any of claims 11 to 13, characterised in that it comprises the preliminary operation of covering the rear of the support plate (8) with a layer (14) adhering to that rear.
15. A floor- or wall-heating process, characterised in that the external covering of the heating elements comprises tiling according to any of claims 1 to 10.

International search report

Search authority: European Patent Office, P.B. 5818, Patentlaan 2, NL-2280 HV Rijswijk; telephone (+31-70) 340-2040; telex 31 651 epo nl; fax (+31-70) 340-3016. Authorised officer: Valentina Leher. Search completed 3 September 2008; report sent 19 September 2008. Classification: E04F 13/08 and E04F 15/02. Minimum documentation searched: E04F. Electronic database consulted: EPO-Internal.

Relevant documents: Y - FR 1 585 012 A, Binot C, 45 Vitry aux Loges, 9 January 1970, entire document, claims 1-3, 5-7, 15. Y - DE 195 22 412 A1, John Alexander [DE], 19 December 1996, entire document, claims 1, 3, 5-7, 15. Y - DE 89 02 747 U1, Siplast GmbH, 6632 Saarwellingen [DE], 27 April 1989, claim 11, relevant to claim 2. A - DE 195 32 610 A1, Brueggemann Manfred [DE], 28 November 1996, claim 1 and figure 1, relevant to claim 1. A - DE 25 01 174 A1, Harbrecht Wolfgang Dipl Volksw, 15 July 1976, page 2 paragraph 3 and figure 2, relevant to claim 1.

Category definitions: A - general prior art not considered particularly relevant. E - earlier document published on or after international filing. L - document casting doubt on priority, establishing another citation's publication date, or cited for another specified reason. O - oral disclosure, use, exhibition or other means. P - published before international filing but after claimed priority. T - later document, not conflicting with the application, cited to understand the underlying principle or theory. X - particularly relevant document: novelty or inventive step cannot be recognised when it is taken alone. Y - particularly relevant document: inventive step cannot be recognised when combined with one or more such documents, the combination being obvious to the skilled person. & - member of the same patent family.

Patent-family annex: FR 1585012 A (09-01-1970), DE 19522412 A1 (19-12-1996), DE 8902747 U1 (27-04-1989), and DE 2501174 A1 (15-07-1976): no family members listed. DE 19532610 A1 (28-11-1996): family member DE 29508687 U1 (26-09-1996). Forms: PCT/ISA/210, second sheet, continuation and patent-family annex, April 2005.

Administrative annex

Designated states, unless otherwise indicated, for every kind of national protection available:

AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

Designated states for regional protection available:

ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW); Eurasia (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM); EP (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR); OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

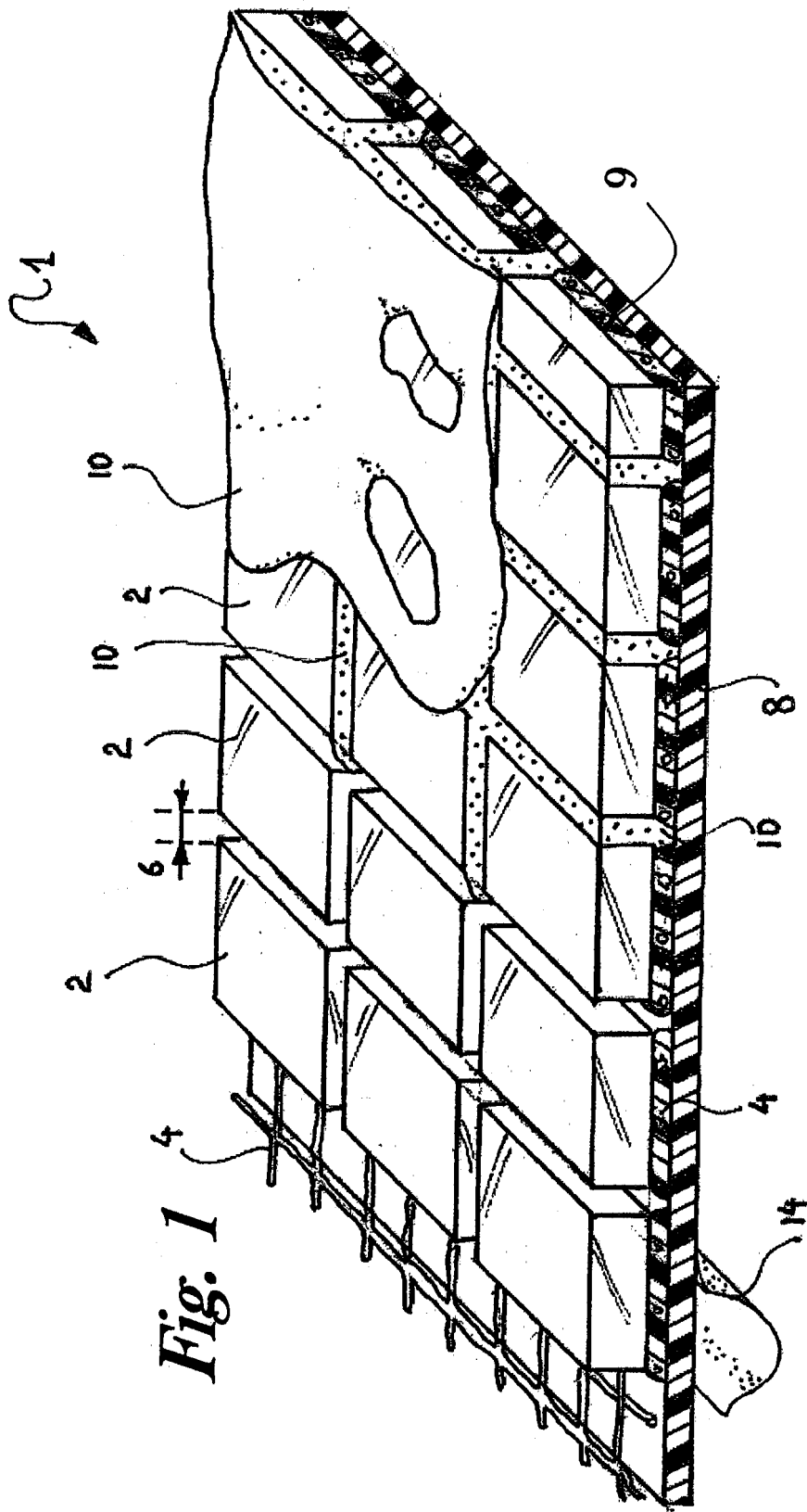


Fig. 1

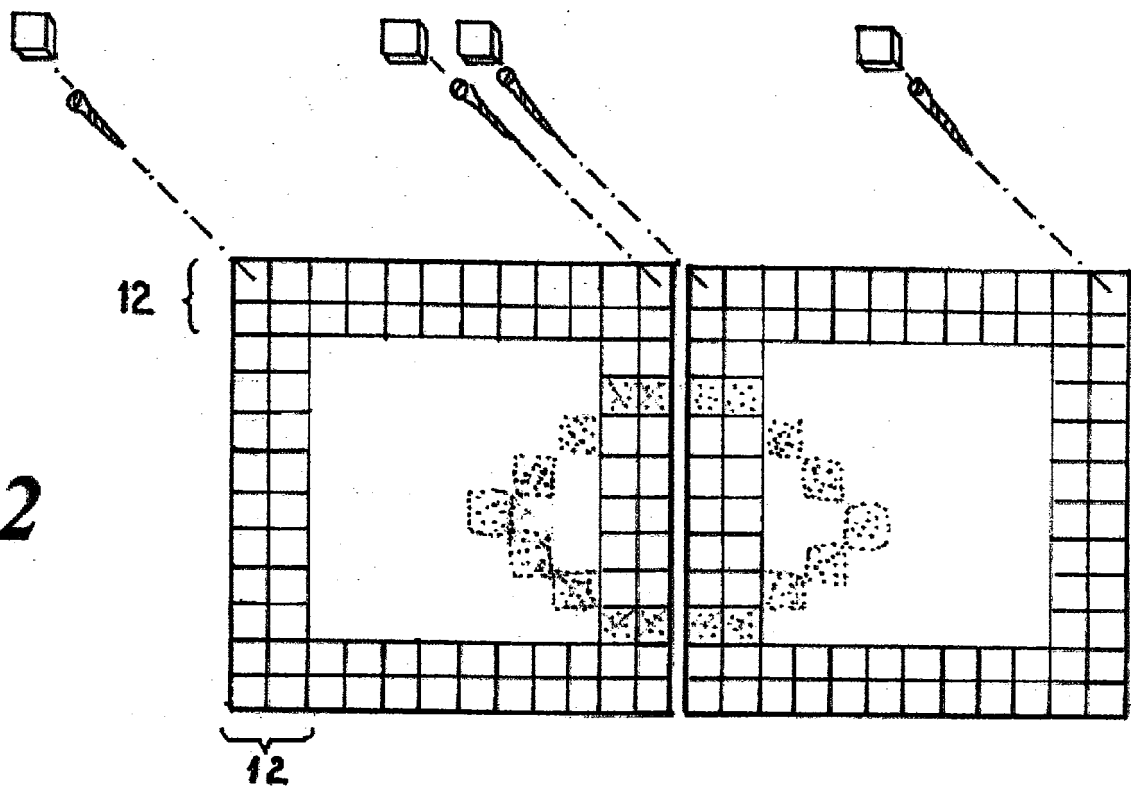


Fig 2

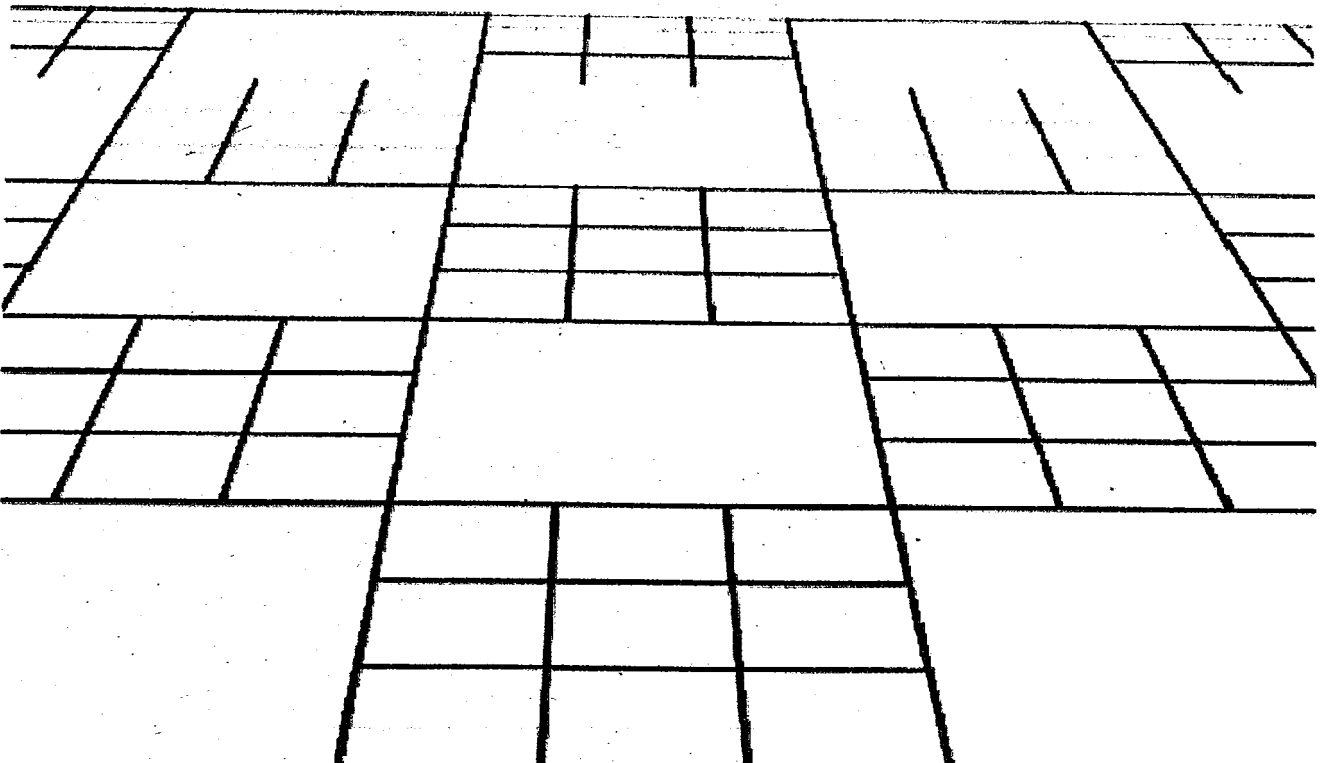


Fig 3

[< Back to the website](#)

[< Back to website](#)

[Share >](#)

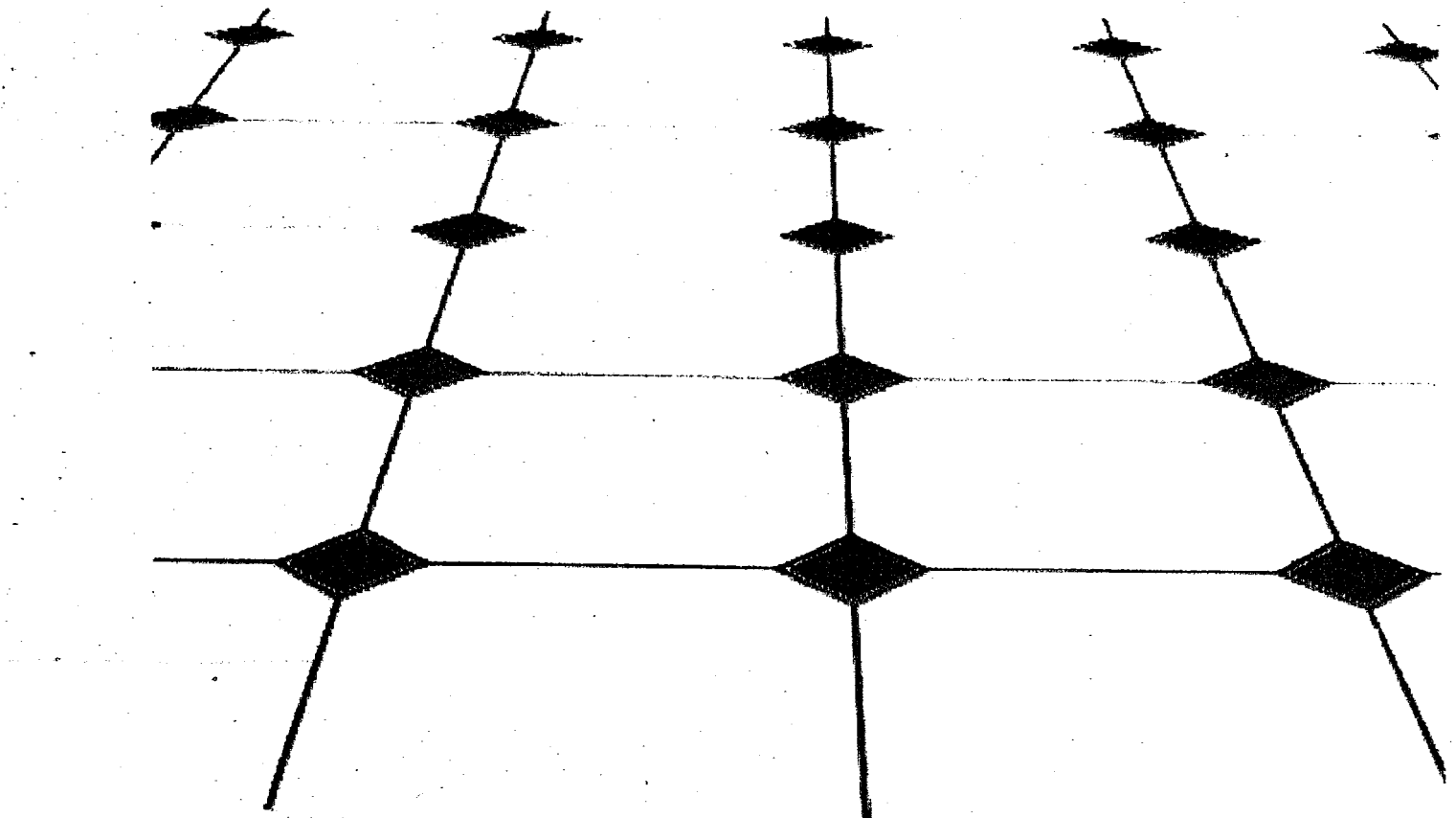


Fig 4

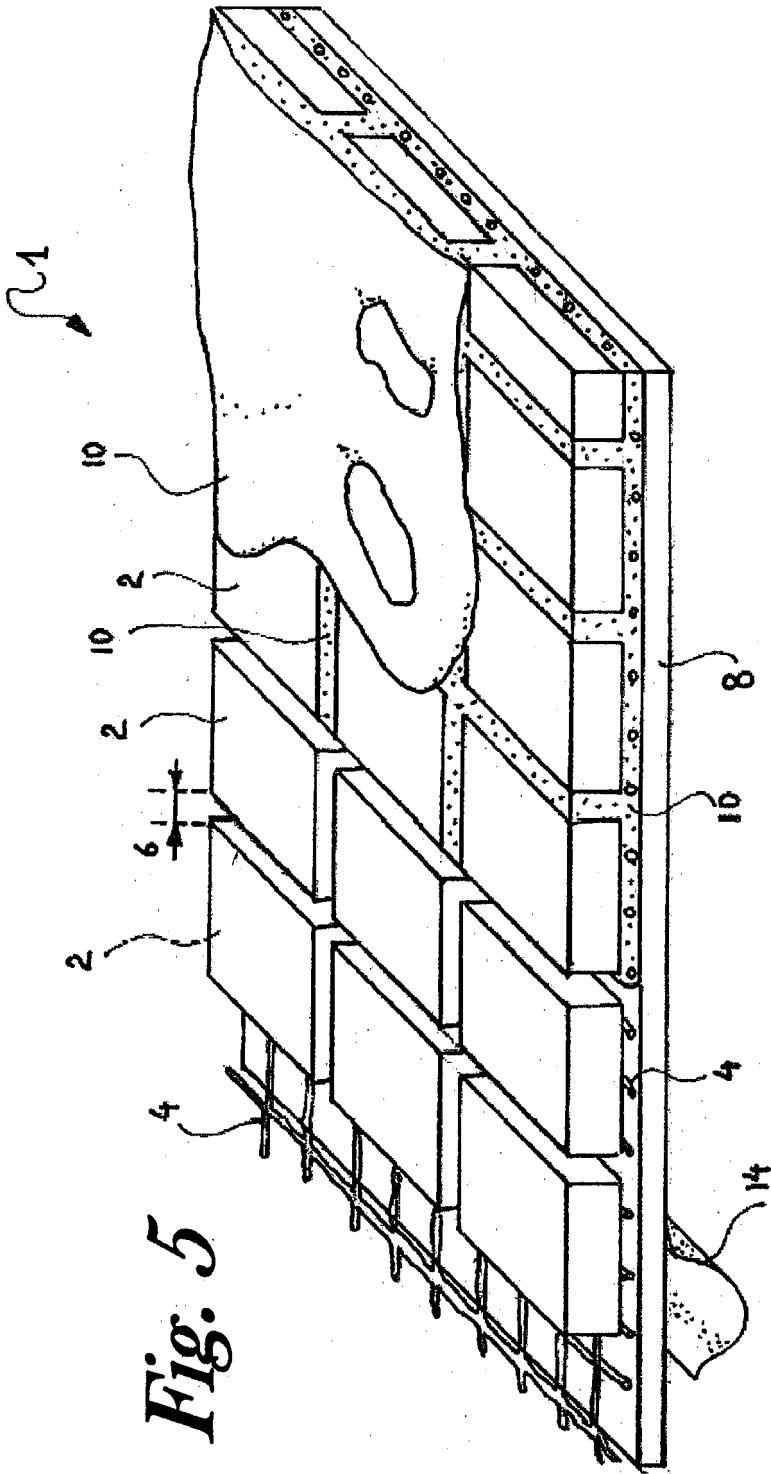


Fig. 5