(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 103 669 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
30.05.2001 Bulletin 2001/22

(51) Int Cl.[7]: **E04D 3/35**, E04D 1/28

(21) Application number: **00500057.5**

(22) Date of filing: **10.04.2000**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **25.11.1999 ES 9902597**

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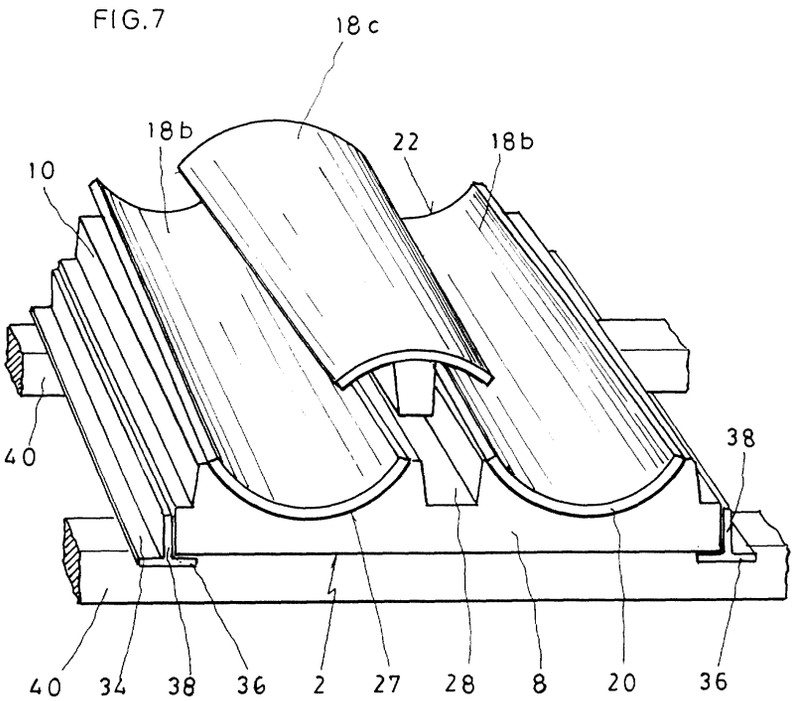
(54) Roof tiling set

(57) A roof tiling set comprising: [a] a body member (2): having a lower surface (4); two side surfaces (10); an upper surface (25) on which there are situated two or more cavities (27), and an intermediate region (28a) situated between each two cavities (27) and directed substantially parallel to the bottom of the cavities (27); [b] first tiles (18b) non-releasably lodged in respective cavities (27); [c] at least one second tile (18c) adapted to rest on the intermediate region (28a); and [d] optionally, sections (34) adapted for attachment to the spars (40) and for joining two adjacent body members.

FIG.7



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Description

[0001] The invention relates to a roof tiling set, applicable to roofing spars, the set comprising tiles having a channel-like configuration with a first end and a second end opposite the former and having a first surface on the inner portion of the channel and a second surface on the outer portion of the channel.

[0002] Roof tiling jobs, particularly the laying of the so-called hollow tiles, are usually plagued by a large number of drawbacks, since considerable effort and the movement of large amounts of materials to a great height, implying considerable risks, are required. Furthermore, the work has to be done in steps, in other words, successively the base, then the insulation and finally the tiles have to be laid. It should also be mentioned that for the final result to be correct, the work must be done by specialized workmen, making the job more expensive. Obviously, if a thermal or acoustical insulation is required, this must be done apart and almost always the absorption of expansions causes a problem. Furthermore, the laying of each tile, one by one, is delicate and requires close attention and not infrequently, incorrect laying obliges the job to be done again.

[0003] There is to be found currently on the marketplace a plurality of tiles having different shapes, apart from the conventional, so-called hollow tiles. Thus, there are tiles already including concave and convex areas simultaneously, whereby they do not need to be laid alternately with the convex side up and then the concave side up, typical of the hollow tiles. Nevertheless, the above named drawbacks are common to all of them.

[0004] It is an object of the invention to overcome these drawbacks: this object is achieved with a set of the type first mentioned above characterized in that it comprises:

> [a] a body member having: [i] a lower surface; [ii] a front surface and a rear surface; [iii] two side surfaces; and [iv] an upper surface on which there are situated at least two cavities, each of which defines a bottom extending between the front and rear surfaces, and at least one intermediate region directed substantially parallel to the bottom of the cavities;
> [b] at least one tile for each of the cavities, each of the tiles being non-releasably lodged in a cavity and where the second end of at least one of the tiles extends beyond the front surface of the body member.

[0005] This object is likewise achieved with a set of the type first mentioned above characterized in that it comprises:

> [a] a body member having: [i] a lower surface; [ii] a front surface and a rear surface; [iii] two side surfaces; and [iv] an upper surface on which there are situated at least two cavities, each of which defines a bottom extending between the front and rear surfaces, and at least one intermediate region located between each pair of cavities and directed substantially parallel to the bottom of the cavities;
> [b] at least one first tile for each of the cavities, each of the first tiles being non-releasably lodged in a cavity and where the second end of at least one of the tiles extends beyond the front surface of the body member;
> [c] at least one second tile for being attached to one of the intermediate regions.

[0006] Indeed, in this way items are obtained which may be prefabricated in the main, and which allow for a rapid simple assembly, without the need of special tools or particularly qualified labor. The items, once assembled, simultaneously form the base and the roof itself of a building.

[0007] There are preferably included sections having a lower flange adapted to receive a side edge region of the lower surface and a projecting web adapted to engage the side surface; said sections being adapted for attachment to the spars.

[0008] The lower surface preferably has a rectangular perimeter and is preferably flat, as also the front and rear surfaces. It is likewise preferable that the side surfaces define a right dihedral angle with the lower surface. All of this defines a geometry of the ensemble which makes assembly quicker and simpler. Another way of obtaining a quicker and simpler assembly is to place a tongue-and-grooved system in the side walls and/or in the front and rear walls, as well as for example tongues and their corresponding grooves, or stubs and their corresponding orifices.

[0009] A particular embodiment of the invention is achieved when: [a] the body member is provided at the intermediate region thereof with a trough directed substantially parallel to the bottom of the cavities, [b] the second tile is provided with a projecting wall directed longitudinally thereto and which extends from the first surface thereof, where the projecting wall is adapted for insertion into one of the troughs,[c] each of the side surfaces has a lower portion, a re-entrant shoulder and an upper portion. With this particular solution, a simple way of assembly and attachment of the second tile to the body member is achieved. It is particularly advantageous when the projecting wall is a separate member from said second tile, and is adapted for attachment to the second tile. In this way, the second tile may be transported more efficiently, and the projecting wall may be attached to the second tile with a simple additional operation.

[0010] The height of the projecting web of the sections is preferably no greater than the height of the lower portion of the side surfaces, since in this way there is no interference when assembling the corresponding projecting wall.

[0011] Advantageously, the upper portion of the side

surfaces and the shoulder define an obtuse dihedral angle, and that when the upper portion of one side surface of one body member is laid face to face with the upper portion of a second adjacent body member, there is defined a space having dimensions of the order of those of the trough, since in this way the shapes are uniformed and a single type of projecting wall may be used for the second tiles which are mounted in the trough and for the second tiles which are mounted on the joint region between two body members.

[0012] A further particular embodiment of the invention is obtained when: [a] the body member is provided at the intermediate region with a flat table directed substantially parallel to the bottom of the cavities, and [b] the second tile is provided with a flat surface directed longitudinally thereof and which emerges from the first surface thereof and is adapted to bear against one of the tables. This flat surface occupies a much smaller volume than the previously described projecting wall and, therefore, allows the transportation costs of the second tiles to be kept low, without the need of including an additional operation, that of attachment of the projecting wall to the second tile, as indicated above.

[0013] A further alternative consists of the second tile not having any special member (neither projecting wall nor table) and that, on the contrary, the intermediate region adopts the shape of the first surface of the second tile. Thus no special action is required on the second tile, and it may be attached to the body member with a simple operation.

[0014] It is likewise possible to provide other variations of attaching the intermediate region to the second tile, combining ease of transportation of the second tiles and ease and accuracy in the installation of the second tiles on the body member.

[0015] The body member may likewise have several preferred shapes, depending on the application and the requirements it has to meet. Thus, the material of the first body member may be a material having high structural properties such as, for example, concrete. It may also be a material having high thermal and/or acoustical insulation properties, such as, for example, expanded plastics materials, such as polyurethane. It may also be a material of interest basically for having a low specific weight, with a view to lightening the total weight of the body member. In certain cases, it will be of interest to combine the properties of various materials. Thus, body members may be formed having, for example, two or more layers of different materials, or, for example, an expanded plastics material having a metal frame in the interior thereof, etc. It is, likewise, possible to add reinforcements to the outer surfaces of the body member which protect the body member from blows and/or the weather. Items having simply an aesthetic function may also be added.

[0016] A particularly advantageous embodiment of the invention is achieved when it is applied for the installation of tiles having a curved shape with a concave first surface and a convex second surface and where the channel formed by the tiles is wider at the first end than at the second end. An example of this are, precisely, the so-called hollow tiles.

[0017] Further advantages and features of the invention will be appreciated from the following description wherein, without any limiting nature, there are described preferred embodiments of the invention, with reference to the accompanying drawings, in which:

[0018] Figure 1 is a plan view of the body member forming part of the roof tiling set of the invention; a second tile is also shown in phantom line.

[0019] Figure 2 is a front elevation view of a first embodiment of a body member, with a trough.

[0020] Figure 3 is a front elevation view of a second tile with a projecting wall.

[0021] Figure 4 is a rear elevation view of the second tile according to Figure 3.

[0022] Figure 5 is a cross section view on the line V-V of Figure 6.

[0023] Figure 6 is a plan view of the second tile of Figure 3, showing the concave surface thereof.

[0024] Figure 7 is a perspective view of said first embodiment of the roof tiling set.

[0025] Figure 8 is a front elevation view of a second embodiment of a body member.

[0026] Figure 9 is a front elevation view of a conventional second tile.

[0027] Figure 10 is a rear elevation view of the tile according to Figure 9.

[0028] Figure 11 is a front elevation view of a third embodiment of a body member, with a flat table.

[0029] Figure 12 is a front elevation view of a second tile with a flat surface.

[0030] Figure 13 is a rear elevation view of the tile according to Figure 12.

[0031] Figure 14 is a plan view of a fourth embodiment of a body member; also shown are second tiles in phantom line.

[0032] Figure 15 is a perspective view of a fifth embodiment of the roof tiling set.

[0033] Figure 16 is a front elevation view of a sixth embodiment of a body member.

[0034] Figure 17 is a front elevation view of a seventh embodiment of a body member.

[0035] The roof tiling set of the present invention makes it extremely easy to lay the tiles in a building.

[0036] The set shown in Figures 1 to 7 incl. comprises a light-weight insulating body member 2, the lower surface 4 of which is flat and preferably it has a rectangular perimeter, although the invention also contemplates other forms for said perimeter. The front surface 6 and the rear surface 8 are also preferably flat and further mention will be made thereto hereinafter.

[0037] In turn, each of the side surfaces 10 is provided with a lower portion 12 which preferably forms a 90° angle with the lower surface 4. From the lower portion 12 there extends a re-entrant shoulder 14 which also pref-

erably forms a 90° angle with said lower portion 12. Finally the side surfaces are provided with an upper portion 16 and it is preferred that the angle formed by the upper portion 16 and the shoulder 14 be slightly obtuse. Thus, the upper portion 16 is sloping as shown in Figure 2.

[0038] As will be understood, the body member 2 serves to retain conventional tiles 18 which have a curved channel-like shape and the width of which is greater at a first end 20 than at a second end 22, opposite to the former; obviously, these tiles have a concave first surface 24 (Figure 3) and a convex second surface 26.

[0039] The upper surface 25 of the body member 2 is provided with concavities 27 having a shape like a mold for a convex second surface of a conventional tile 18 and these concavities 27 define a bottom line extending across both ends 20 and 22. Between each two concavities on the upper surface 25 there is a trough 28 whish is disposed substantially parallel to said bottom line of the concavities 27. For considerations of weight and ease of handling, each body member 2 preferably has only two concavities 27 and, consequently, only one trough 28; nevertheless, the invention also contemplates the possibility of there being three or more concavities 27 and in this case the body member would have two or more troughs 28.

[0040] Each of the concavities 27 serves to house and retain a first tile 18b, which is obviously laid with its convex surface 26 directed downwards. The narrower second end 22 of each of the first tiles 18b projects beyond the front surface 6 of the body member 2.

[0041] Where the tiles are not curved, i.e., the surfaces thereof are not concave or convex, it is sufficient to modify the concavities of the body member with cavities suitably housing the tiles.

[0042] The roof tiling set of the present invention also comprises at least one second tile 18c, the ceramic portion of which is substantially the same as a first tile 18b but which also comprises a projecting wall 30 which is directed longitudinally of the tile 18b and which projects from the concave surface thereof. The dimensions of the projecting wall are appropriate for it to be lodged in a trough 28 of the body member 2. The projecting wall 30 is preferably provided with side walls 32 tapering away from the tile 18c. Correspondingly, the trough 28 is preferably provided with slightly sloping walls.

[0043] It is not necessary for the first tiles and the second tiles to be the same, but they may form two different families of tiles.

[0044] Finally, sections 34 (Figure 7) complete the set. These sections 34 are provided with a lower flange 36 which, after tiling, supports a lateral edge region of the lower surface 4 of the body member 2. There is also a projecting web 38 the height of which is no greater than the height of the first portion 12 of the side surface 10 of the body member 2.

[0045] When placing the tiles in position, the sections 34 are laid across the spars 40 and are fixed (preferably by bolts, not shown) to the spars, such that between the lower flanges 36 of two adjacent sections 34 (naturally laid mutually parallel to one another), there is situated an ensemble formed by a body member 2 having incorporated therein two first tiles 18b. All of this in such a way that the body member 2, with the first tiles 18b incorporated therein, bears on the lower flanges 36 of the sections 34. Furthermore, the lower portions 12 of the side surfaces 10 thereof engage the respective projecting webs 38. In this way, the already installed portion is ready to receive, in due time, a second tile 18c, in such a way that the projecting wall is lodged in the trough 28. The second tile 18c is preferably laid slightly offset longitudinally relative to the first tiles 18b.

[0046] It should be noted that with the set of the present invention, the spars may be parallel or perpendicular to the slope, since it is sufficient to change the direction of the sections 34. Furthermore, the said set may be placed on any type of spars (concrete, wood, iron or even on sloping concrete filled bases) and that also the spars may be farther apart than in a conventional roof, which represents a not insignificant saving.

[0047] Obviously, with the above described operations, one set is installed and thereafter the tiling operation continues. To this end, by placing the necessary sections 34, a further set is laid, in such a way that one side edge of the lower surface of the body member 2 thereof (which in all cases has the first tiles 18b incorporated therein) rests on the lower flange portion 36 of the section 34 and in such a way that one side surface 10 of the new set which is being installed is face to face with a side surface 10 of the already installed set. In this way, both side surfaces 10 are adjacent the projecting web 38 of one same section.

[0048] With this arrangement, there is defined between the respective upper portions 16 of both adjacent sets a space of dimensions very similar to those of the trough 28 and, therefore, in this space also the projecting wall 30 of a second tile 18c may be inserted. To install two sets adjacent each other in the downward direction of the roof, it is sufficient for the front surface 6 of the body member 2 of one of them to be superimposed on the rear surface 8 of the body member 2 of the immediately adjacent set.

[0049] It should be noted that the sections 34 put in place for the sets located at the side ends are L-shaped, instead of the T-shape of the intermediate sections 34.

[0050] The different body members 2 may, nevertheless, be joined together in many ways. Thus, Figure 15 shows a variant of the body member 2 of Figure 7, in which the side surfaces 10, the front surface 6 and the rear surface 8 have outwardly projecting tongues 42 and grooves 44, adapted for tongue-and-grooved assembly of the body members 2.

[0051] Figure 8 shows another embodiment of the invention. The body member 2 is provided with an intermediate region 28a having a curved surface such that

the second tile 18c may bear directly on the intermediate region 28a. In this case, the tiles 18c, shown in Figures 9 and 10, do not need to have any special geometry on the first surface (24) thereof, nor is it necessary to add any additional part between the tile 18c and the body member 2.

[0052] The body member of Figure 8 is formed by two different materials and, therefore, has two appropriately joined differentiated regions 2a y 2b.

[0053] Figure 11 shows a third embodiment of the invention. In this case, the body member 2 is provided with an intermediate region 28a forming a flat table. The corresponding second tile 18c, shown in Figures 12 and 13, has a flat surface 30a which allows for correct support of the second tile 18c on the flat table.

[0054] A reinforcement 41, surrounding the entire outer perimeter of the lower surface 4 of the body member 2, is to be seen in the body member 2 of Figure 11

[0055] The corresponding second tiles 18c are preferably attached to the body member 2 with silicone or expanded polyurethane. A waterproofing agent is also preferably used, particularly to prevent damp appearing by capillarity, whereby an additional advantage is obtained with the present invention over conventionally built roofs.

[0056] As will be understood from the foregoing, the set of the invention enormously simplifies tiling jobs and it should be pointed out that the work involved in the construction of the roof tiling sets themselves may be carried out in a workshop, provided with the necessary means, with complete disappearance of the risks inherent in working on site. Nevertheless, the body members 2 may also be supplied to the site separate from the first tiles 18b. The subsequent assembly of the first tiles 18b on the body members 2 on site may be rapid and simple, since the body member 2 is provided with the corresponding cavities 27, allowing for quick, precise assembly. Therefore, the preferred assembly alternative may be decided upon in each particular case.

[0057] The tiles described in this example are the so-called hollow tiles, nevertheless, the invention may be applied to tiles having a different geometrical shape, for example, forming a channel but with flat walls, in such a way that the cross section is rectangular or trapezoidal. There are, additionally, tiles which do not require the more or less alternately inverted assembly of second tiles on first tiles. Nevertheless, in these cases the invention may also be applied, as shown in the examples of Figures 16 and 17.

[0058] Generally speaking, the laying of tiles on a roof is repetitive. In the examples described thus far, body members have been shown which contemplate the inclusion of two or three tiles in a row. Nevertheless, this is not a limiting factor, since the invention is, obviously, perfectly generalizable to body members contemplating the inclusion of more tiles. If the tiles belong to one same row, it is simply a question of making a body member which repeats the basic structure shown in the drawing. If the tiles belong to adjacent rows, it is only necessary to take the precaution of contemplating that the cavities shall have to lodge tiles which will be partly overlapped, as shown in Figure 14. In the example of Figure 14, the second tiles 18c have been disposed without the longitudinal offset relative to the first tiles 18b, nevertheless, a distribution equivalent to the one shown in Figure 1 could be made.

[0059] It should also be noted that the invention affords the advantage of being able to provide thermal and acoustical insulation. Furthermore, any type of guttering may be adapted to collect rainwater.

[0060] Where translucent plastics members are used, these may mean the incorporation of skylights.

Claims

1. A roof tiling set, applicable to roofing spars (40), the set comprising tiles (18) having a channel with a first end (20) and a second end (22) opposite the former and having a first surface (24) on the inner portion of the channel and a second surface (26) on the outer portion of the channel, characterized in that it comprises:

> [a] a body member (2) having: [i] a lower surface (4); [ii] a front surface (6) and a rear surface (8); [iii] two side surfaces (10); and [iv] an upper surface (25) on which there are situated at least two cavities (27), each of which defines a bottom extending between said front and rear surfaces (6, 8), and at least one intermediate region (28a) directed substantially parallel to said bottom of said cavities (27);
> and [b] at least one tile (18) for each of said cavities (27), each of said tiles (18) being non-releasably lodged in a cavity (27) and where said second end (22) of at least one of said tiles (18) extends beyond said front surface (6) of said body member (2).

2. A roof tiling set, applicable to roofing spars (40), the set comprising tiles (18) having a channel-like configuration with a first end (20) and a second end (22) opposite the former and having a first surface (24) on the inner portion of the channel and a second surface (26) on the outer portion of the channel, characterized in that it comprises:

> [a] a body member (2) having: [i] a lower surface (4); [ii] a front surface (6) and a rear surface (8); [iii] two side surfaces (10); and [iv] an upper surface (25) on which there are situated at least two cavities (27), each of which defines a bottom extending between said front and rear surfaces (6, 8), and at least one intermediate region (28a) located between each pair of cav-

ities (27) directed substantially parallel to said bottom of said cavities (27);
[b] at least one first tile (18b) for each of said cavities (27), each of said first tiles (18b) being non-releasably lodged in a cavity (27) and where said second end (22) of at least one of said first tiles (18b) extends beyond said front surface (6) of said body member (2);
and [c] at least one second tile (18c) for being attached to one of said intermediate regions (28a).

3. The roof tiling set according to claim 1 or claim 2, characterized in that it includes sections (34) having a lower flange (36) adapted to receive a lateral edge region of said lower surface (4) and a projecting web (38) adapted to engage said side surface (10); said sections (34) being adapted for attachment to said spars (40).

4. The roof tiling set according to at least one of claims 1 to 3, characterized in that said lower surface (4) has a rectangular perimeter.

5. The roof tiling set according to at least one of claims 1 to 4, characterized in that said lower surface (4) is flat.

6. The roof tiling set according to at least one of claims 1 to 5, characterized in that said front and rear surfaces (6, 8) are flat.

7. The roof tiling set according to at least one of claims 1 to 6, characterized in that said side surfaces (10) define a rightangle with said lower surface (4).

8. The roof tiling set according to at least one of claims 2 to 7, characterized in that: [a] said body member (2) is provided at said intermediate region (28a) with a trough (28) directed substantially parallel to said bottom of said cavities (27), [b] said second tile (18c) is provided with a projecting wall (30) directed longitudinally to said second tile (18c) and which extends from the first surface (24) thereof, and being adapted for insertion into one of said troughs (28) , [c] each of said side surfaces (10) has a lower portion (12), a re-entrant shoulder (14) and an upper portion (16).

9. The roof tiling set according to claim 8, characterized in that said projecting wall (30) is a separate member from said second tile (18c), and is adapted for attachment to said second tile (18c).

10. The roof tiling set according to claim 8 or claim 9, characterized in that the height of said projecting web (38) of said sections (34) is no greater than the height of said lower portion (12) of said side surfaces (10).

11. The roof tiling set according to at least one of claims 8 to 10, characterized in that said upper portion (16) of said side surfaces (10) and said shoulder (16) define an obtuse angle therebetween.

12. The roof tiling set according to at least one of claims 8 to 11, characterized in that when the upper portion (16) of one side surface (10) of one body member (2) is laid face to face with the upper portion (16) of the side surface (10) of a second adjacent body member (2), there is defined a space having dimensions of the order of those of said trough (28).

13. The roof tiling set according to at least one of claims 2 to 7, characterized in that: [a] said body member (2) is provided at said intermediate region (28a) with a flat table directed substantially parallel to said bottom of said cavities, and [b] said second tile (18c) is provided with a flat surface (30a) directed longitudinally to said second tile (18c) and which emerges from the first surface (24) thereof and being adapted to bear against one of said tables.

14. The roof tiling set according to at least one of claims 1 to 13, characterized in that said body member (2) is made from a single material.

15. The roof tiling set according to at least one of claims 1 to 13, characterized in that said body member (2) is made from at least two materials.

16. The roof tiling set according to claim 15, characterized in that at least one of said materials is a material having high insulation properties.

17. The roof tiling set according to claim 15 or claim 16, characterized in that at least one of said materials is a material having high structural properties.

18. The roof tiling set according to at least one of claims 1 to 17, characterized in that said body member (2) has a reinforcement (41) extending along the edges formed by the joint between said lower surface (4), said side surfaces (10), said front surface (6) and said rear surface (8).

19. The roof tiling set according to at least one of claims 1 to 18, characterized in that said tiles (18) have a curved shape, with a concave first surface (24) and a convex second surface (26).

20. The roof tiling set according to at least one of claims 1 to 19, characterized in that said body member (2) is provided, on at least two of said front surface (6), rear surface (8) and side surfaces (10) with outwardly projecting elements (42) and inwardly ex-

tending elements (44) adapted for establishing a tongue-and-grooved assembly.

21. The roof tiling set according to at least one of claims 1 to 19, characterized in that said channel formed by said tiles (18) is wider at said first end (20) than at said second end (22),

FIG.1

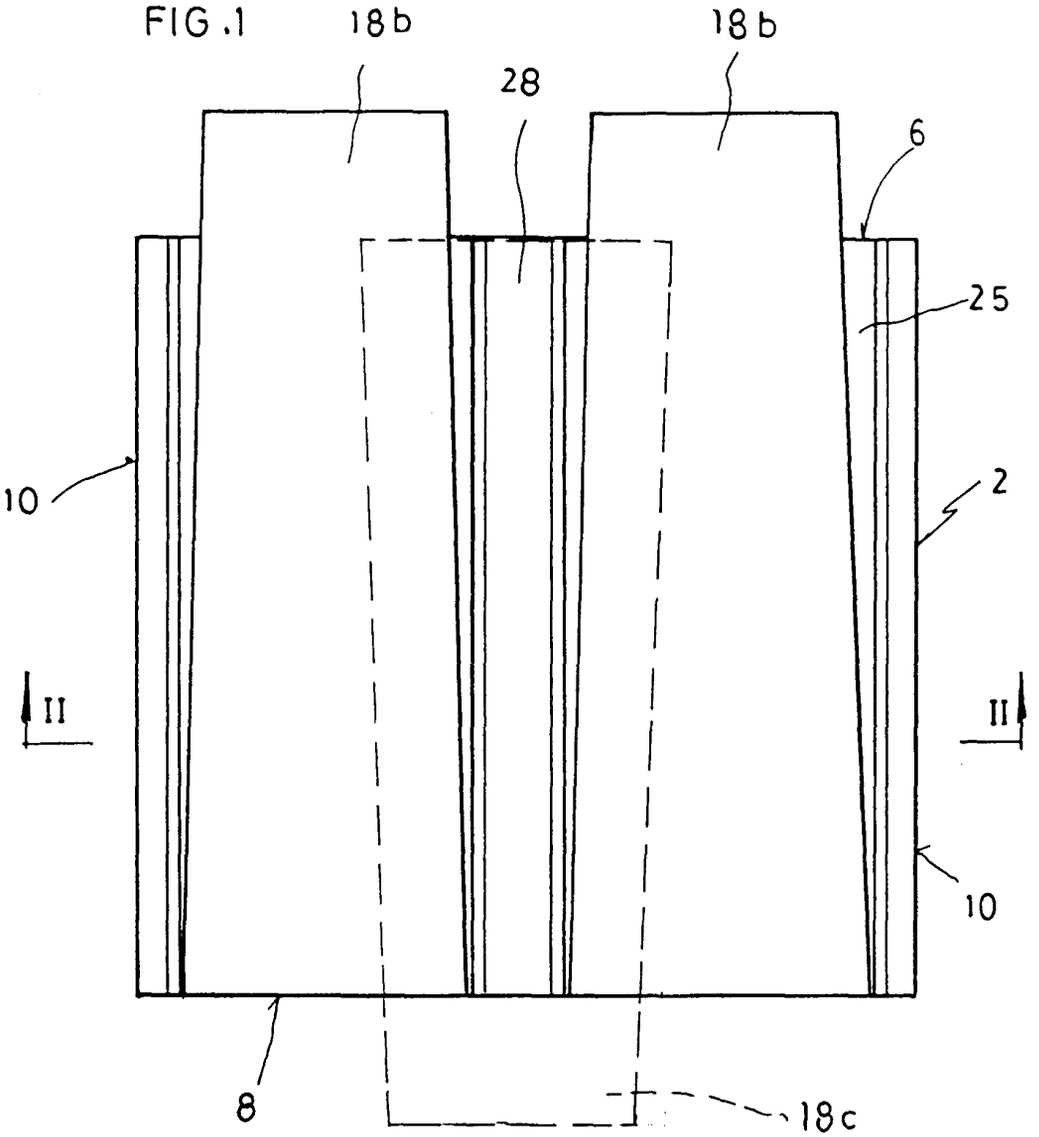


FIG.2

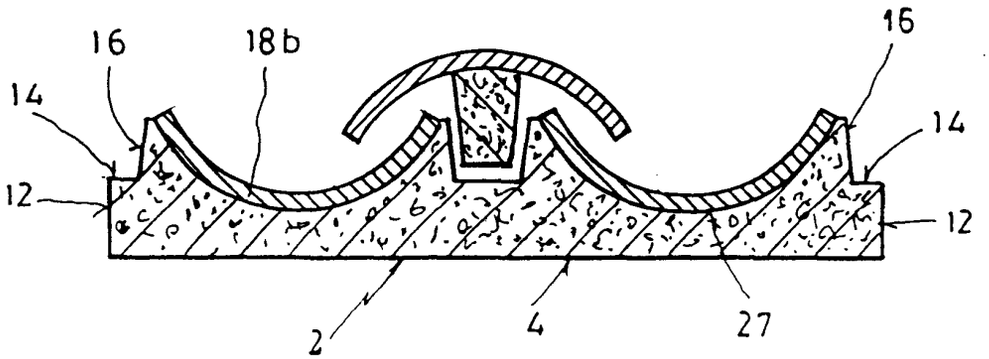


FIG.3

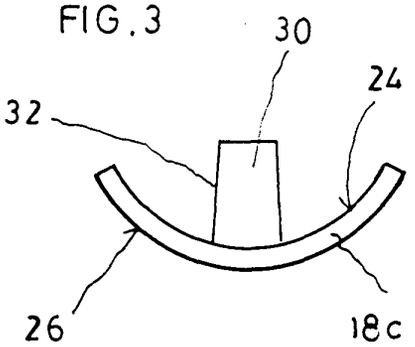


FIG.4

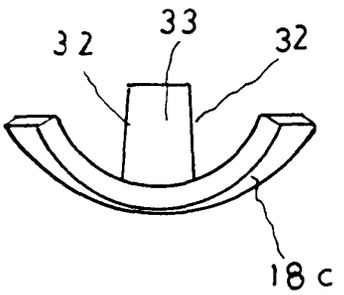


FIG.5

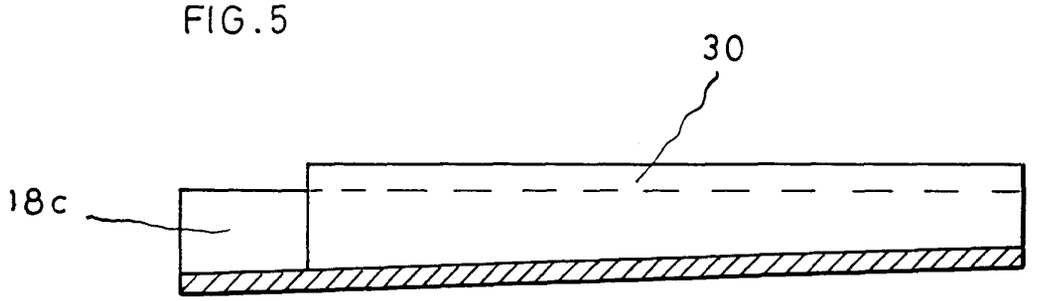


FIG.6

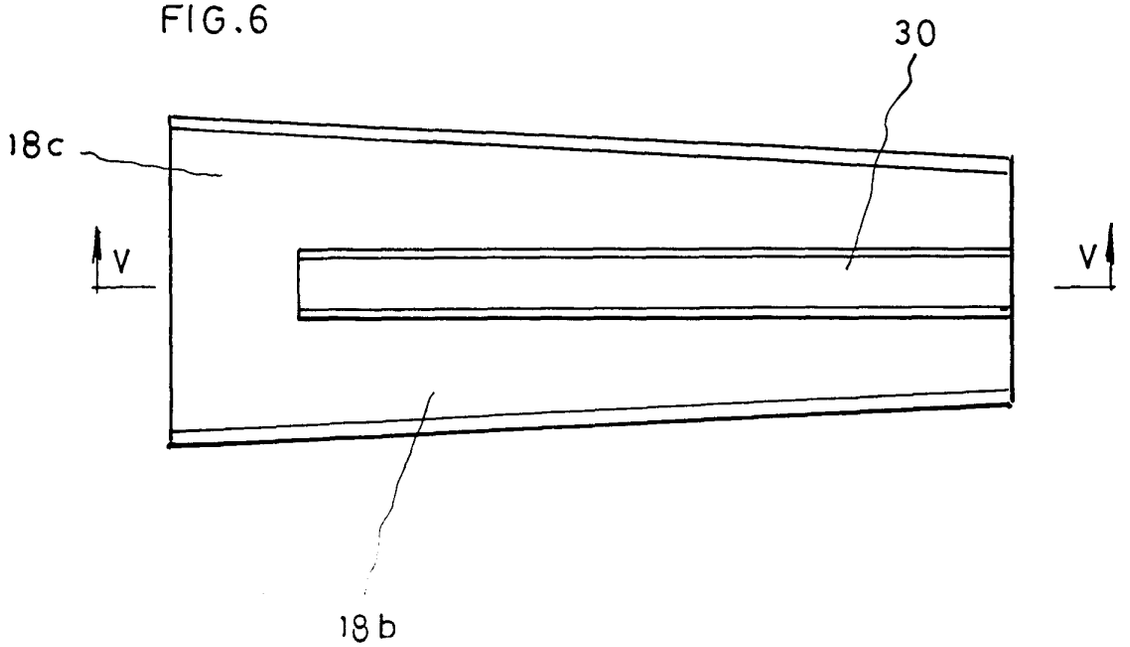


FIG.7

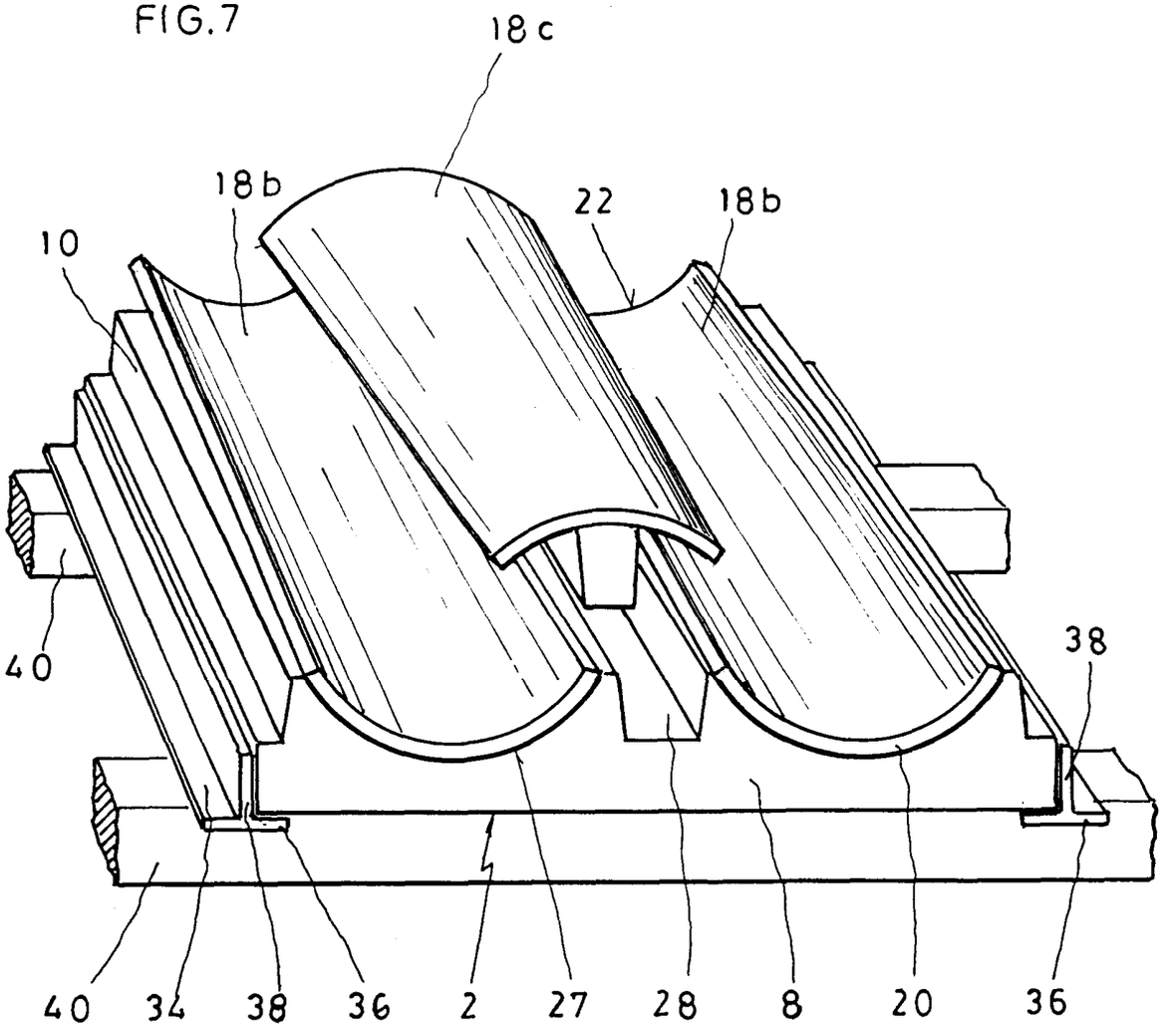


FIG.8

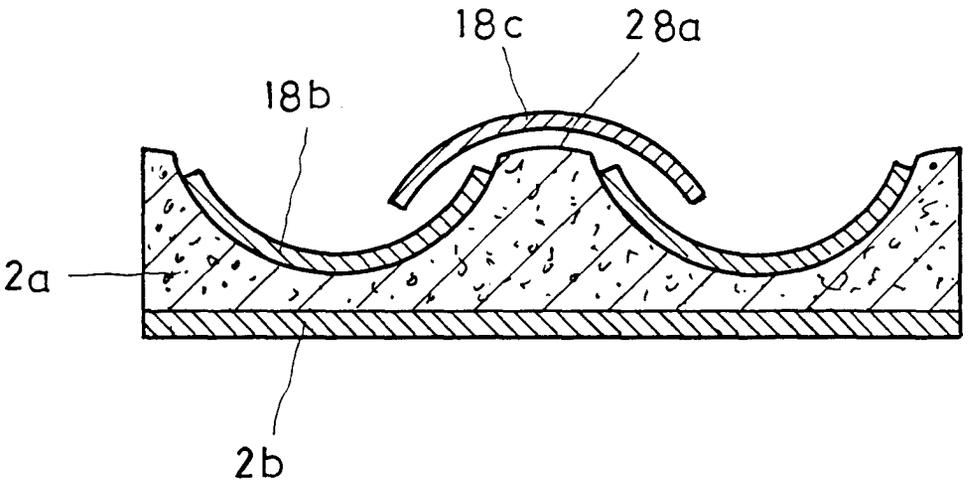


FIG.9

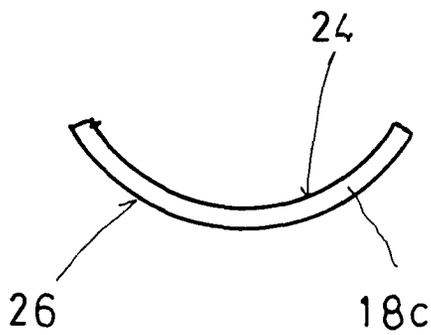


FIG.10

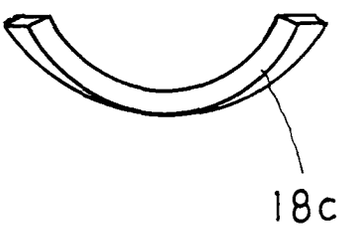


FIG. 11

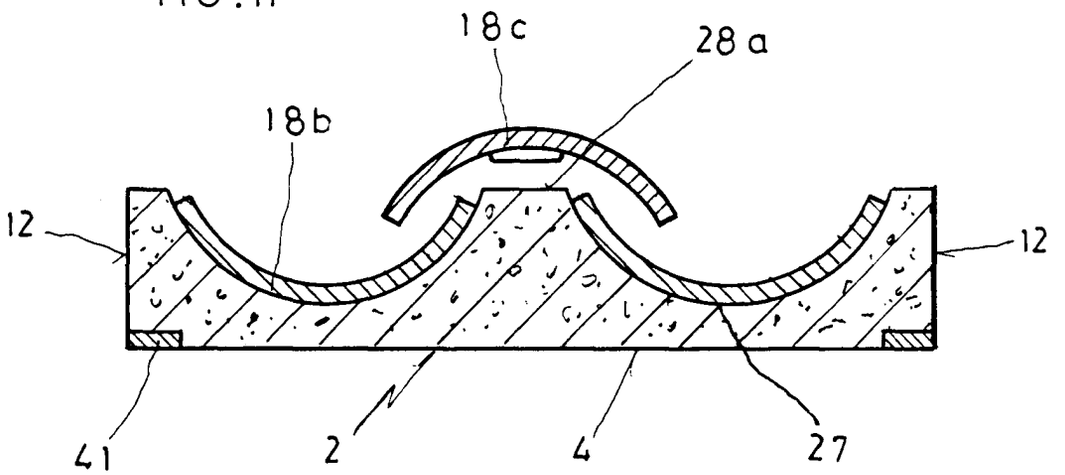


FIG. 12

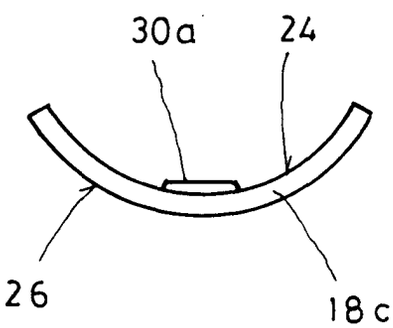


FIG. 13

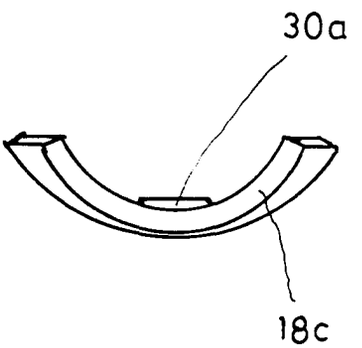
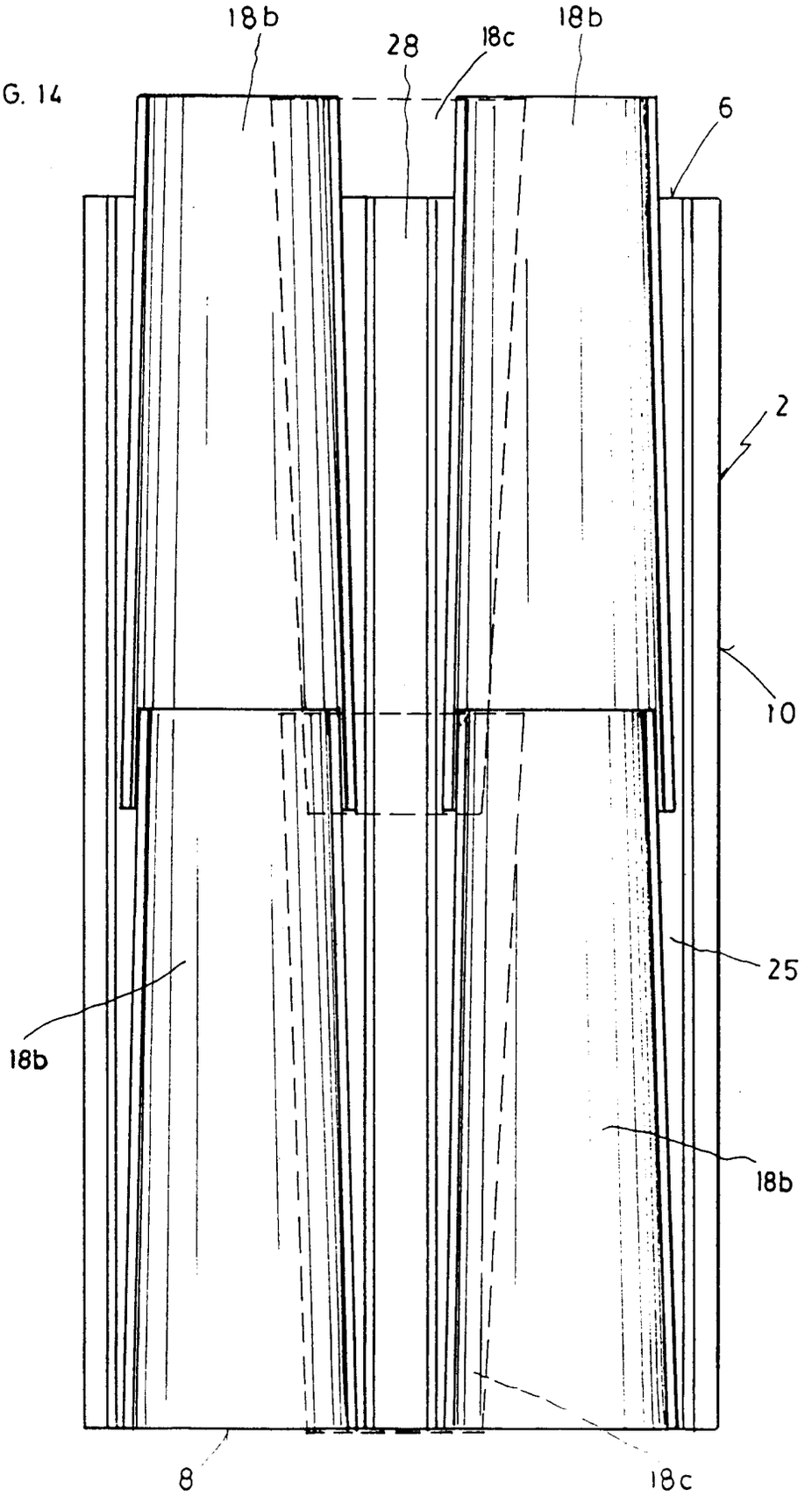


FIG. 14



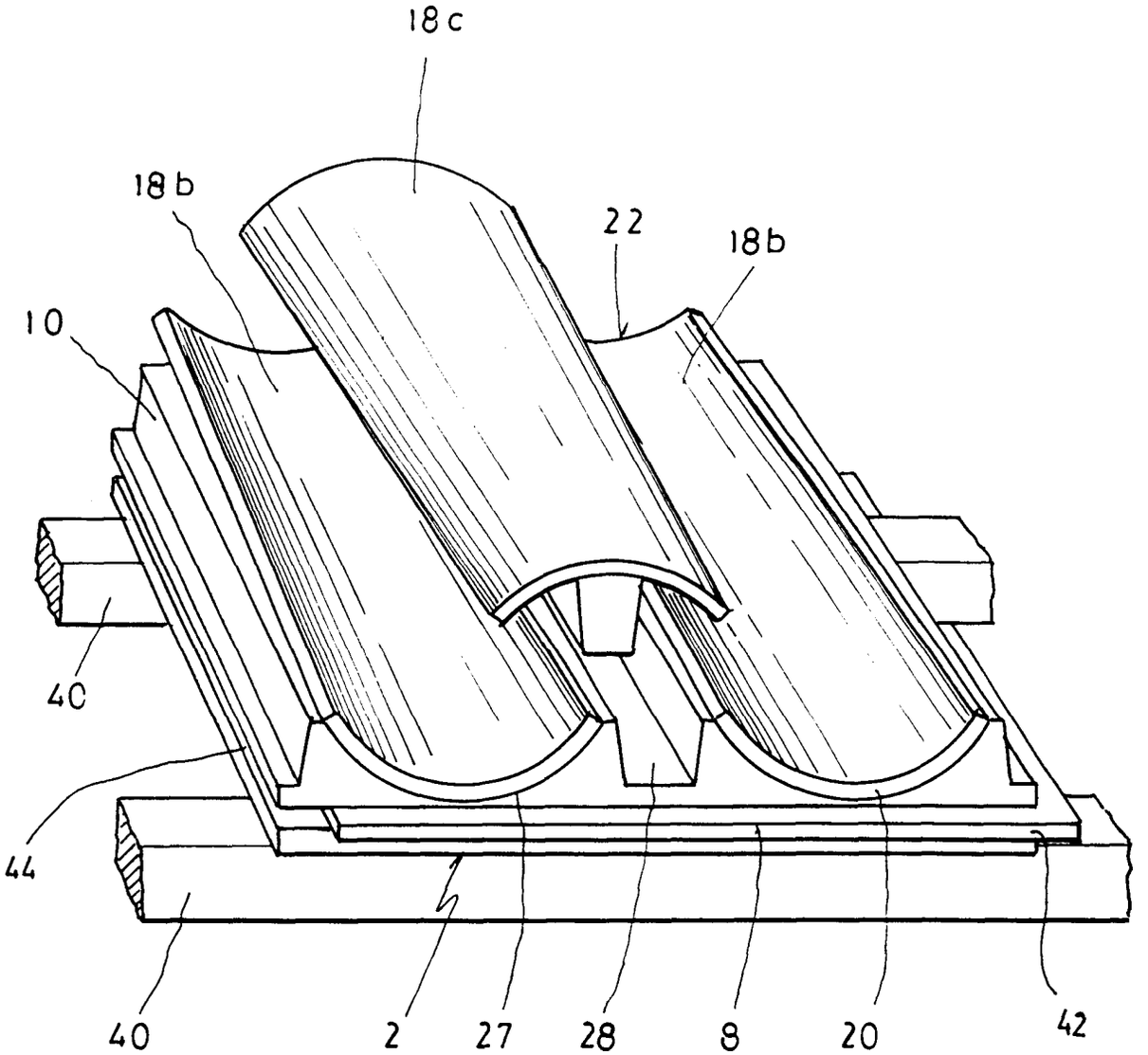


FIG. 15

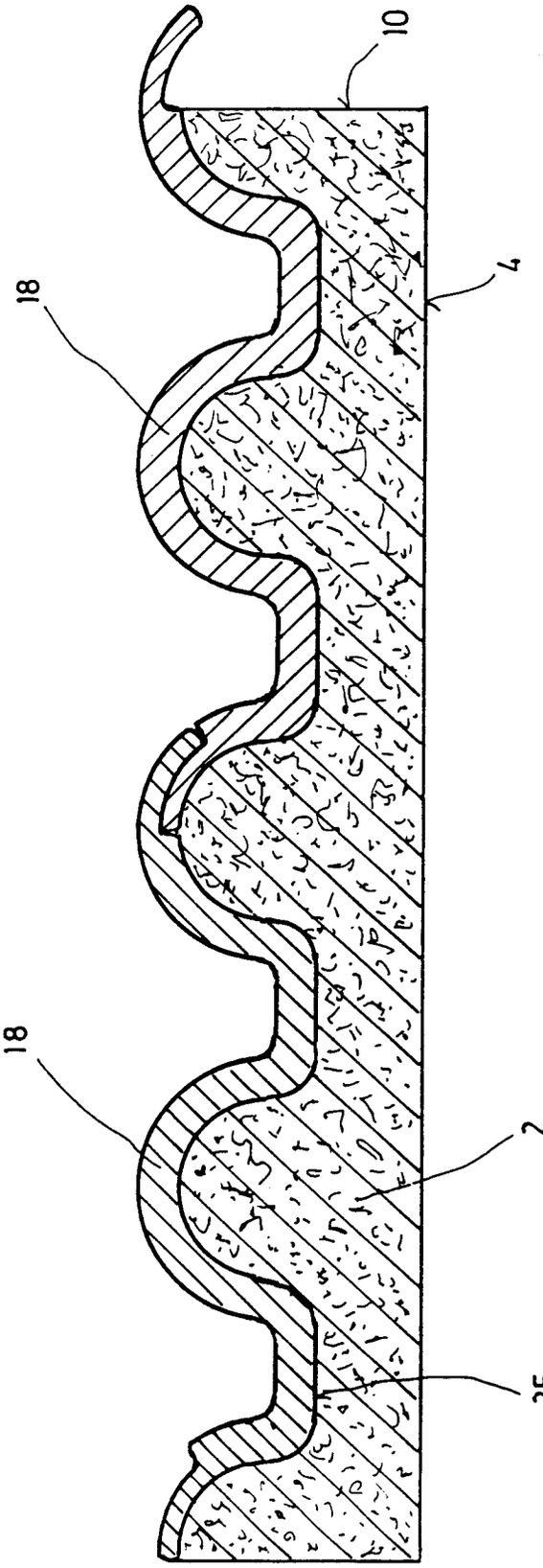


FIG. 16

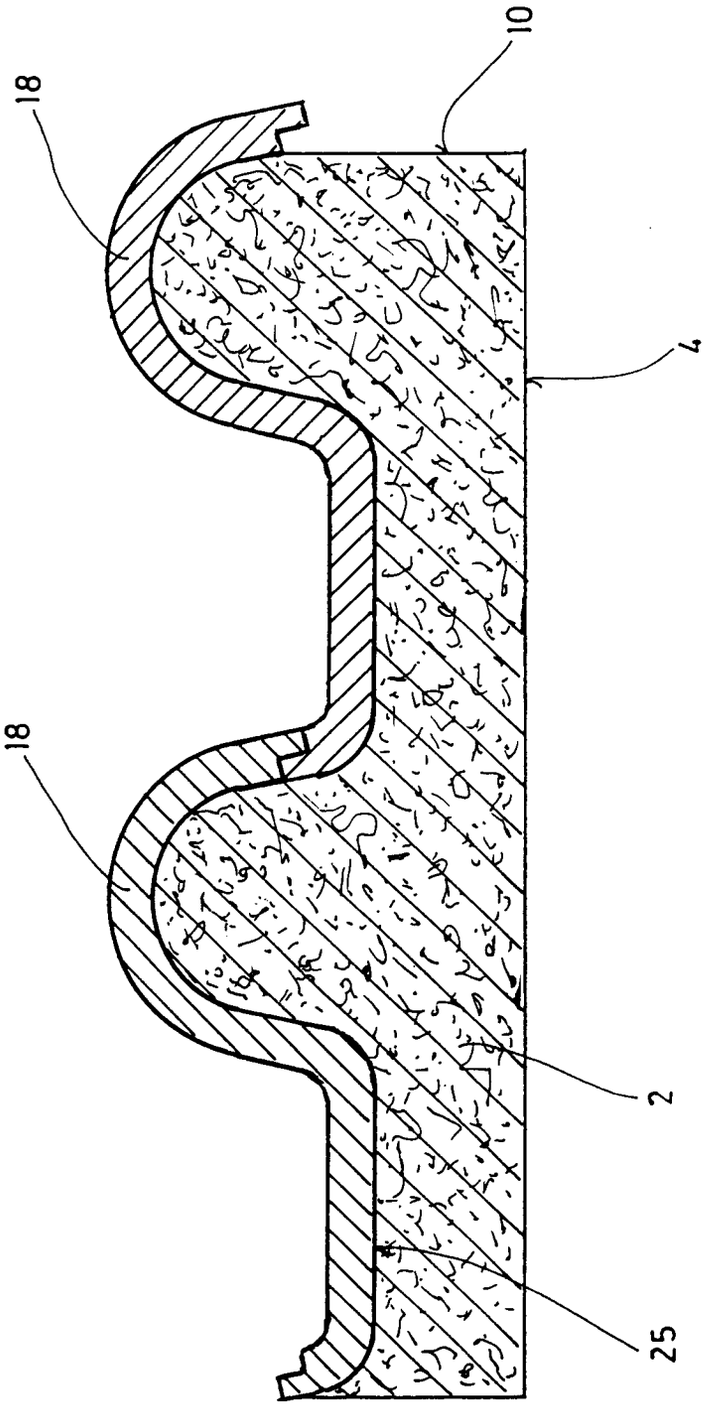


FIG. 17