



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
01.09.2010 Bulletin 2010/35

(51) Int Cl.:
E04B 1/80 (2006.01)

(21) Application number: **10388003.5**

(22) Date of filing: **22.02.2010**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK SM TR
Designated Extension States:
AL BA RS

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(30) Priority: **25.02.2009 DK 200900257**
19.05.2009 DK 200900634

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(54) **Rabbit element, use hereof and method of mounting a rabbit element**

(57) A rabbit element (1) for doors and windows, said rabbit element (1) comprising an insulation (2), where at least two sides of the insulation (2) have screwable plates (3) glued thereon.

The invention also relates to a method of mounting the rabbit element (1) as well as use of the rabbit element.

The said rabbit element (1) and the said method ensure complete airtightness between windows and doors and the facade plane, so that national and/or international requirements with respect to the airtightness of buildings may be observed. Also, line loss (heat loss in the edge zones) around windows and doors is prevented, thereby obviating the risk of draught, condensation and heat loss.

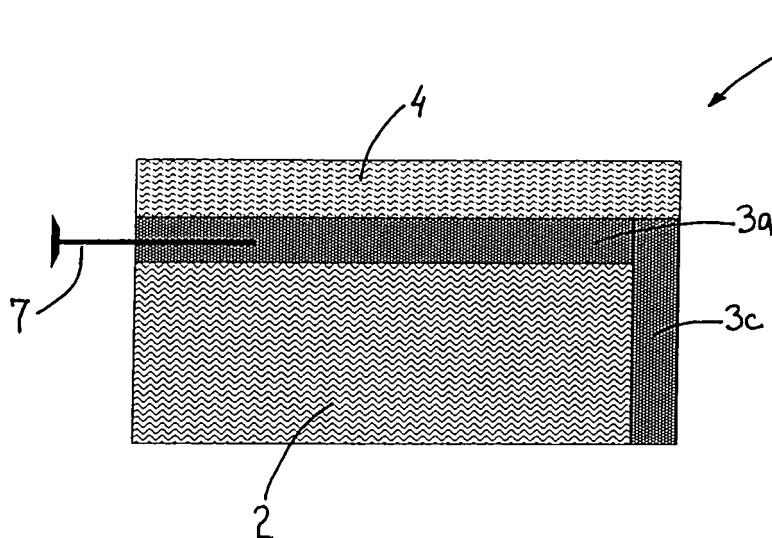


Fig. 5

Description

[0001] The present invention relates to a rabbet element for windows and doors, said rabbet element comprising an insulation.

The prior art

[0002] The traditional problem of rabbet elements for windows and doors is to find a material which is both highly insulating, and which is also capable of absorbing the static and dynamic impacts from doors and windows.

[0003] Since the national and prospective international rules relating to requirements with respect to heat losses from buildings enhance the insulation thickness requirements, the rabbets around windows and doors become considerably deeper. At the same time, provision must be made for a considerably larger insulation of the rabbets in order to reduce the line loss.

[0004] It is known to use a cement-based chipboard which is screwed on the side of the edges of the wall panel to form a face for the openings of windows/doors. The board is insulated on the panel sides with foamed plastics, and the windows/doors are screwed on these chipboards.

The drawbacks of such a rabbet element include:

[0005]

- That the connections between concrete panels and boards are not tight, and
- that connections filled with epoxy mortar crack, because the chipboards do not cooperate with the concrete, as the chipboards work too much in moisture, and
- that the bottom rabbet in windows/doors cannot be made of chipboard, since it is not sufficiently solid. Instead, brackets are used here for supporting window board/door step, together with a membrane for sealing the connection, and
- that the λ -value is too great, which results in a real line loss.

[0006] In spite of this, such rabbet elements are the most used solution.

The object of the invention

[0007] Accordingly, it is the object of the invention to provide a rabbet element in the form of a composite structure, which is mechanically stable and is also airtight and satisfies the criteria for both static and dynamic loads in window and door openings, as well has a λ -value preferably corresponding at least to the λ -value applying to mineral wool.

[0008] Another object of the rabbet element according to invention is that in terms of load it must be capable of

supporting a window/door, absorbing wind pressure and wind suction on window/door as well as absorbing dynamic impacts from windows and doors, which are opened and closed or blow open and in.

5 **[0009]** A further object of the invention is to ensure complete airtightness between windows and doors and the rear wall plane, so that national and prospective international requirements with respect to the airtightness of buildings may be observed.

10 **[0010]** Finally, it is an object of the invention to reduce the risk of draught from connections around windows and doors, and thereby also reduce condensation and heat losses.

15 Summary of the invention

[0011] The object stated above is achieved by a rabbet element as described in the introductory portion of claim 1, which is **characterized in that** the side of the insulation intended to face inwardly toward the door/window opening, and the side intended to face away from the rear wall of the building, have screwable plates glued thereon. In a particular embodiment, which is defined in claim 2, an additional screwable plate is glued on the side of the insulation which is parallel with the first screwable plate, which is intended to face inwardly toward the door/window opening. The mechanical stability of the rabbet element and the possibilities of securing windows/doors in the rabbet element are enhanced hereby.

30 **[0012]** As stated in the characterizing portion of claim 3, at least the side intended to face toward doors and windows, and in a particular embodiment, which is defined in claim 4, also the side intended to face away from the rear wall, are first coated with a fire-stable material, and then, cf. claim 5, coated with a thin layer of a highly adhesive mineral render reinforced with a glass fibre net, which makes the rabbet element very fire-proof.

35 **[0013]** In a preferred embodiment, the fire-stable material is glass foam or a hard mineral wool, as stated in claim 6.

40 **[0014]** As stated in claim 7, the above-mentioned rabbet element may be mounted by a method, wherein the rabbet element is mounted on the rear wall of a building by means of one or more screw anchors and/or wood screws. In a preferred embodiment, which is defined in claim 8, screw anchors and/or wood screws are secured at the free end of one or more of the screwable plates, and the rabbet element is arranged in a mould for the casting of a concrete panel and around an opening which is to constitute a door or window opening in the concrete panel, said screw anchors or said wood screws being thereby embedded in the rear wall of the concrete panel. The rabbet element may be arranged in the mould prior to the casting of the concrete wall, as stated in claim 9, or, as stated in claim 10, the rabbet element may be arranged immediately after the casting of the concrete wall, said screw anchors/wood screws on the rabbet element being pressed down into the wet concrete.

[0015] In an alternative embodiment of the method, the screw anchors are screwed firmly on the facade or rear wall of a building in a direction extending from the front edge of the rabbet element, through the insulation and in parallel with the screwable plate which faces inwardly toward the door/window opening, as stated in claim 11.

[0016] Subsequently, a wind-proof mastic joint is provided between the rabbet element and the facade or the rear wall, and finally, as stated in claim 13, the connection between the rabbet element and the rear wall may be closed by rendering with a thin layer of a highly adhesive mineral render, which is reinforced with a glass fibre net.

[0017] This method ensures that the rabbet element is mounted against the rear wall so as to be torsionally rigid and fixed against displacement, and, at the same time, ensures complete airtightness between windows and doors and the rear wall, so that national and/or international requirements with respect to the airtightness of the buildings may be observed, whereby the risk of draught from connections around windows and doors is reduced, thereby avoiding condensation and heat losses.

[0018] The use of the rabbet element advantageously takes place in the provision of door and window openings in factory-made or in situ-made wall panels for the construction of new buildings.

[0019] Finally, the rabbet element may also be used for incorporation in door and window openings in connection with external reinstatement of existing buildings.

The drawing

[0020] The invention will be explained more fully below with reference to the drawing, in which:

Figure 1 shows a vertical section of the rabbet element at the base frame, incorporated in a building or in a concrete panel.

Figure 2 shows a vertical section of the rabbet element at the side frame, incorporated in a building or in a concrete panel.

Figure 3 shows a cross-section of the rabbet element in a first embodiment.

Figure 4 shows a vertical cross-section of the rabbet element of figure 5, incorporated in a building or in a concrete panel.

Figure 5 shows a cross-section of an alternative embodiment of the rabbet element.

Detailed description of the invention

[0021] A rabbet element according to the invention appears from figures 1 - 5, which show a rabbet element

comprising an insulation 2, which may be made of polystyrene, hard mineral wool boards or glass foam. On at least two sides, the insulation 2 has glued screwable plates 3a - 3c having a high strength and having a low λ -value. The plates are e.g. inorganic screwable plates having a low λ -value or dimensionally stable plastics plates of e.g. polyurethane. The side intended to face toward the door and/or window opening 10 is additionally coated with a fire-stable material 4, such as e.g. glass foam or a hard mineral wool which, in addition to fire stability, also has a low λ -value. The outer side is rendered with a thin layer of a highly adhesive mineral render 5, which is reinforced with a glass fibre net.

[0022] In the embodiment shown in figs. 1 - 3, the rabbet element 1 (see figures 3 and 5) is configured with plates 3a - 3c on three sides of the insulation element. The side of the insulation 2 intended to face toward door and/or window openings 10 has a first screwable plate 3a glued thereon, and, in parallel with this, a corresponding screwable plate 3b is glued on the opposite side of the insulation 2. Perpendicularly to this, a further plate 3c is glued at the end of the insulation 2 of the rabbet element which connects the end faces of the plates 3a and 3b. The screwable plates 3a - 3c are joined e.g. by nail gluing. This embodiment of the rabbet element has a good mechanical stability and is particularly suitable for the use of screwable plates having a thickness of up to 20 mm, e.g. 10 - 20 mm.

[0023] The mounting of the rabbet element 1 on the rear wall 6 may take place in that the anchor 7 is screwed firmly into the completely or partially hardened concrete wall 6 through the screwable plate 3c and the insulation 2 in the rabbet element 1.

[0024] As appears from figures 1 and 2, the rabbet element 1 is mounted on the facade of the building or the rear wall 6 of the concrete panel with one or more anchors 7 from the front edge 3c of the rabbet element 1 on the facade or rear wall 6. The rabbet element 1 is hereby secured against the facade or rear wall 6 so as to be torsionally rigid and fixed against displacement.

[0025] An alternative embodiment of the rabbet element 1 is shown in figures 4 - 5. The side of the insulation 2 intended to face toward door and/or window openings 10 has a first screwable plate 3a glued thereon, and perpendicularly to this, a second plate 3c is glued at the end of the insulation 2 of the rabbet element which is to face away from the rear wall 6 of the concrete element. The screwable plates 3a, 3c are joined e.g. by nail gluing and are of the same type as stated above, but the thickness in this embodiment is slightly larger than in the above-mentioned embodiment and is e.g. 20 mm or more, and preferably 20 mm - 30 mm depending on the selected plate material and the necessary size of the rabbet element, i.e. its length, corresponding to the size of the door or window opening and/or wall thickness.

[0026] The free end part of the first screwable plate 3a is provided with screw anchors or e.g. wood screws 7, which are intended to be embedded in the rear wall 6 of

a concrete element, it being possible to mount the rabbet element 1 in the mould of the concrete panel prior to the casting of the reinforced concrete wall 6. Alternatively, the rabbet element 1 may be arranged in the mould immediately after the casting of the reinforced concrete wall 6, as the screw anchors or the wood screws 7 are pressed down into the still wet concrete. Hereby, the screw anchors or the wood screws 7 are embedded in the wet concrete. Hereby, the rabbet 1 is secured against the rear wall 6 of the concrete element so as to be torsionally rigid and fixed against displacement.

[0027] However, it is also possible to mount this embodiment of the rabbet element 1 in the same manner as stated above and as shown in figs. 1 - 2.

[0028] The embodiment of the rabbet element 1 shown in fig. 3 may also be mounted in a manner corresponding to what is shown in fig. 4, as screw anchors or wood screws 7 are arranged on the free end edge of the one of the screwable plates 3a, 3b, but preferably on the screwable plate 3a which faces inwardly toward the door/window opening 10. It is also possible to arrange screw anchors or wood screws 7 at the free end edge of both the screwable plate 3a and the screwable plate 3b. Then, the rabbet element 1 is arranged in the mould prior to or immediately after the casting of the reinforced concrete wall 6, as stated above for the alternative embodiment of the rabbet element 1, said screw anchors 7 being pressed down into/embedded in the still wet concrete. The rabbet element 1 is thereby secured against the rear wall 6 of the concrete panel so as to be torsionally rigid and fixed against displacement.

[0029] Of course, the rabbet element 1 may also be secured to the rear wall 6 by a combination of embedded and screwed-in screw anchors and/or wood screws 7.

[0030] A windtight mastic joint 9 is provided between the rabbet element 1 and the rear wall 6. The outer side is provided with a glass fibre net reinforced mineral render 5, and the connection between the rabbet element 1 and the rear wall 6 as well as the facade is closed by rendering with a thin layer of a highly adhesive mineral render 5, which is reinforced with a glass fibre net.

[0031] The rabbet element 1 is thus mounted in an airtight manner, with a λ -value which is equal to the λ -value of the rest of the insulation, following which windows and doors may be mounted in an airtight manner right in the front of the insulated facade, as shown in figures 1 and 2, whereby the risk of draught from connections around windows and doors is reduced, and also condensation and heat losses are avoided.

[0032] The rabbet element 1 according to the invention may also be used in connection with external re-insulation of existing buildings. The rabbet element 1 is mounted around door and window openings 10 on the existing facade, and the entire facade is re-insulated. Then, doors and windows are mounted in the rabbet element 1 itself and are thus moved forwardly in the opening 10 toward the new facade. The original facade is then used as a rear wall.

Claims

1. A rabbet element (1) to be mounted around openings (10) for windows and/or doors in a building and for securing windows and/or doors in the opening, said rabbet element (1) comprising an insulation (2), **characterized in that** the side of the insulation (2) intended to face inwardly toward the door/window opening (10), and the side intended to face away from the facade or rear wall (6) of the building have screwable plates (3a, 3c) glued thereon.
2. A rabbet element (1) according to claim 1, **characterized in that** a further screwable plate (3b) is glued on the side of the insulation (2) which is in parallel with the first screwable plate (3a), which is intended to face inwardly toward the door/window opening (10),
3. A rabbet element (1) according to any one of claims 1 - 2, **characterized in that** at least the side intended to face toward doors and/or windows is coated with a fire-stable material (4),
4. A rabbet element (1) according to claim 3, **characterized in that** the side intended to face away from the facade or rear wall (6) is coated with a fire-stable material (4).
5. A rabbet element (1) according to any one of claims 3 - 4, **characterized in that** the fire-stable material (4) is coated on the outside with a thin layer of a highly adhesive mineral render (5), which is reinforced with a glass fibre net.
6. A rabbet element (1) according to any one of claims 3 - 5, **characterized in that** the fire-stable material (4) is glass foam or a hard mineral wool.
7. A method of mounting a rabbet element (1) according to claims 1 - 6, **characterized in that** the rabbet element (1) is mounted on the facade or rear wall (6) of a building by means of one or more screw anchors and/or wood screws (7).
8. A method according to claim 7, **characterized in that** the screw anchors or the wood screws (7) are secured at the free end of one and/or more of the screwable plates (3a, 3b), and that the rabbet element (1) is arranged in a mould for the casting of a concrete panel and around an opening which is to constitute a door or window opening (10) in the concrete panel, said screw anchors and/or said wood screws (7) being thereby embedded in the facade or rear wall (6) of the concrete panel.
9. A method according to claim 8, **characterized in that** the rabbet element (1) is arranged in the mould

prior to the casting of the facade or rear wall (6) of the concrete panel, and concrete is cast around the screw anchors and/or wood screws (7) of the rabbet element when the facade or rear wall (6) of the concrete panel is cast.

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10. A method according to claim 8, **characterized in that** the rabbet element (1) is arranged in the mould after the casting of the facade or rear wall (6) of the concrete panel, said screw anchors and/or wood screws (7) of the rabbet element being pressed down into the wet concrete. 10
11. A method according to claim 7, **characterized in that** the screw anchors are screwed firmly on to the facade or rear wall (6) of a building in a direction extending from the front edge (3c) of the rabbet element (1) through the insulation (2) and in parallel with the screwable plate (3c), which faces inwardly toward the door/window opening (10). 15 20
12. A method according to any one of claims 7 - 11, **characterized in that** a windtight mastic joint (9) is provided between the rabbet element (1) and the rear wall (6). 25
13. A method according to any one of claims 7 - 12, **characterized in that** the connection between the rabbet element (1) and the rear wall (6) as well as the facade is closed by rendering with a thin layer of a highly adhesive mineral render (5), which is reinforced with a glass fibre net. 30
14. Use of a rabbet element according to any one of claims 1 - 6 in the provision of door and window openings in factory-made or in situ-made wall panels for the construction of new buildings. 35
15. Use of a rabbet element according to any one of claims 1 - 6 for the provision of door and window openings when reinsulating facades in existing buildings, 40

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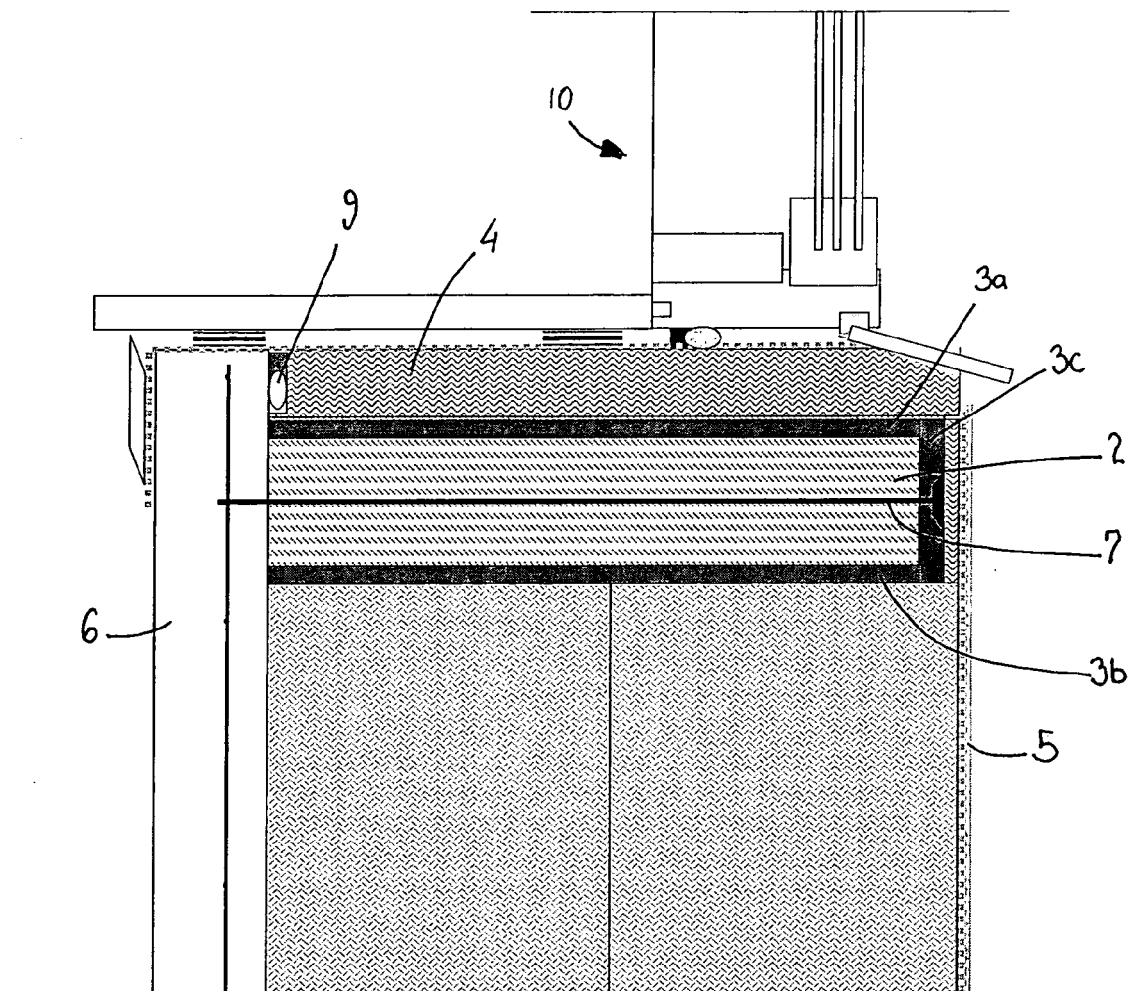


Fig. 1

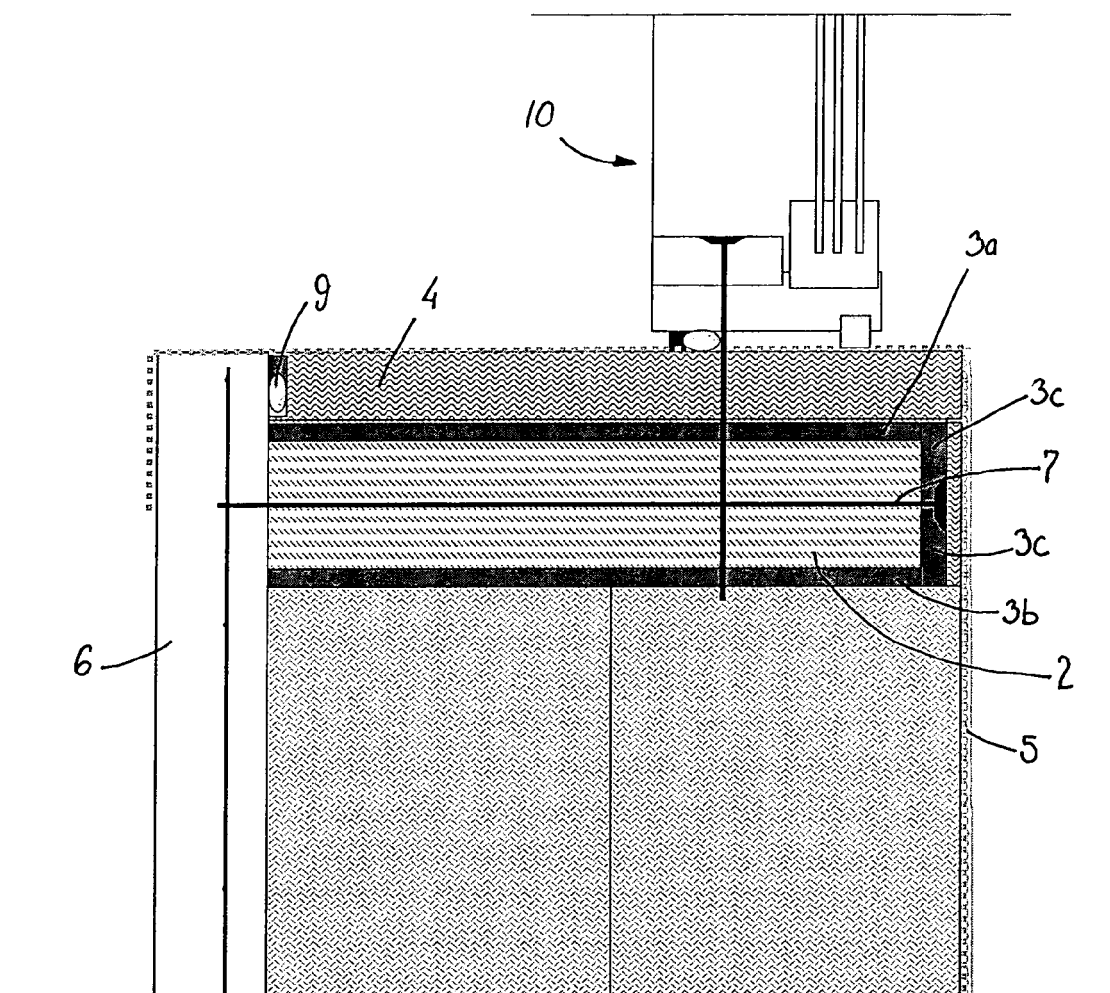


Fig. 2

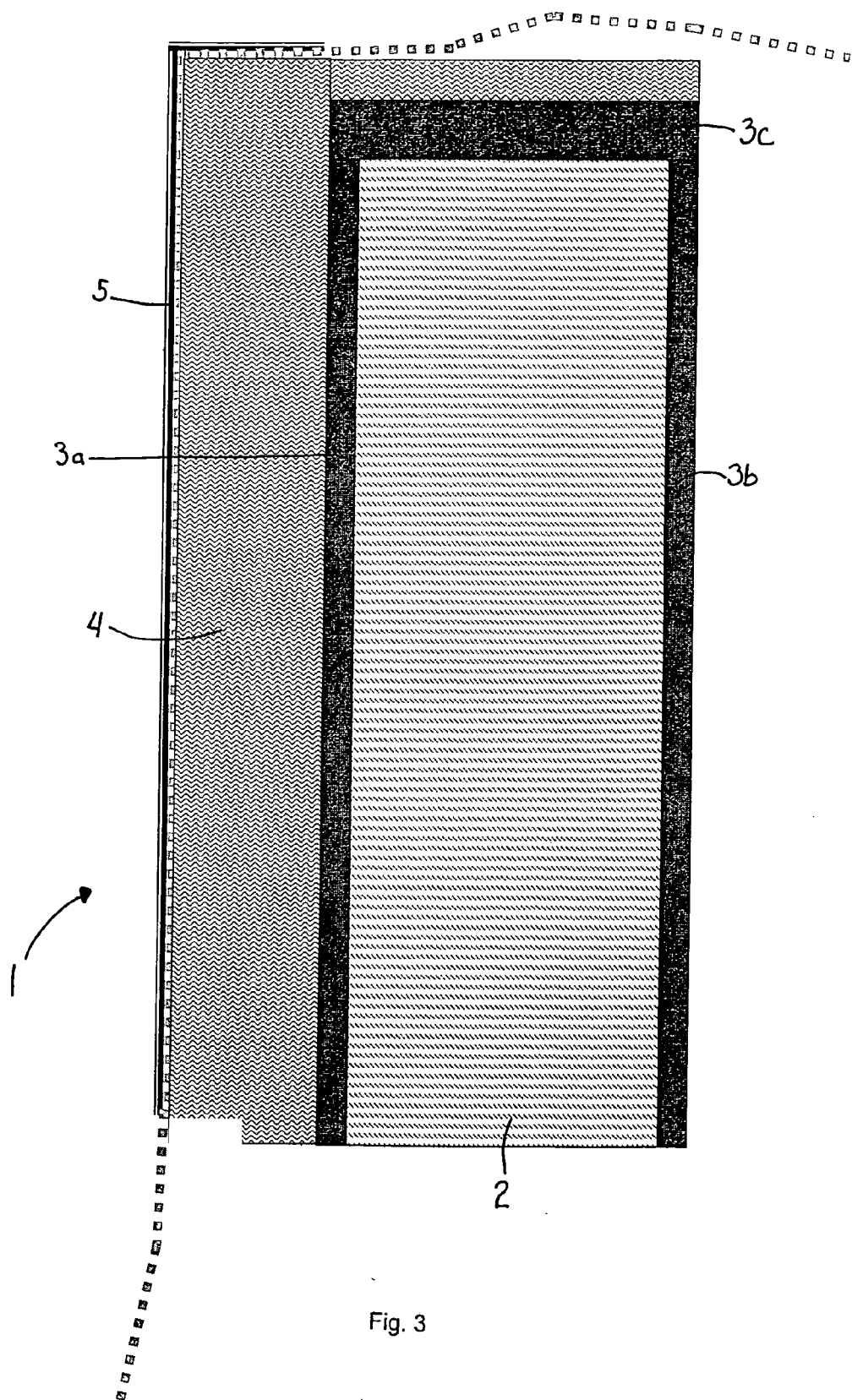


Fig. 3

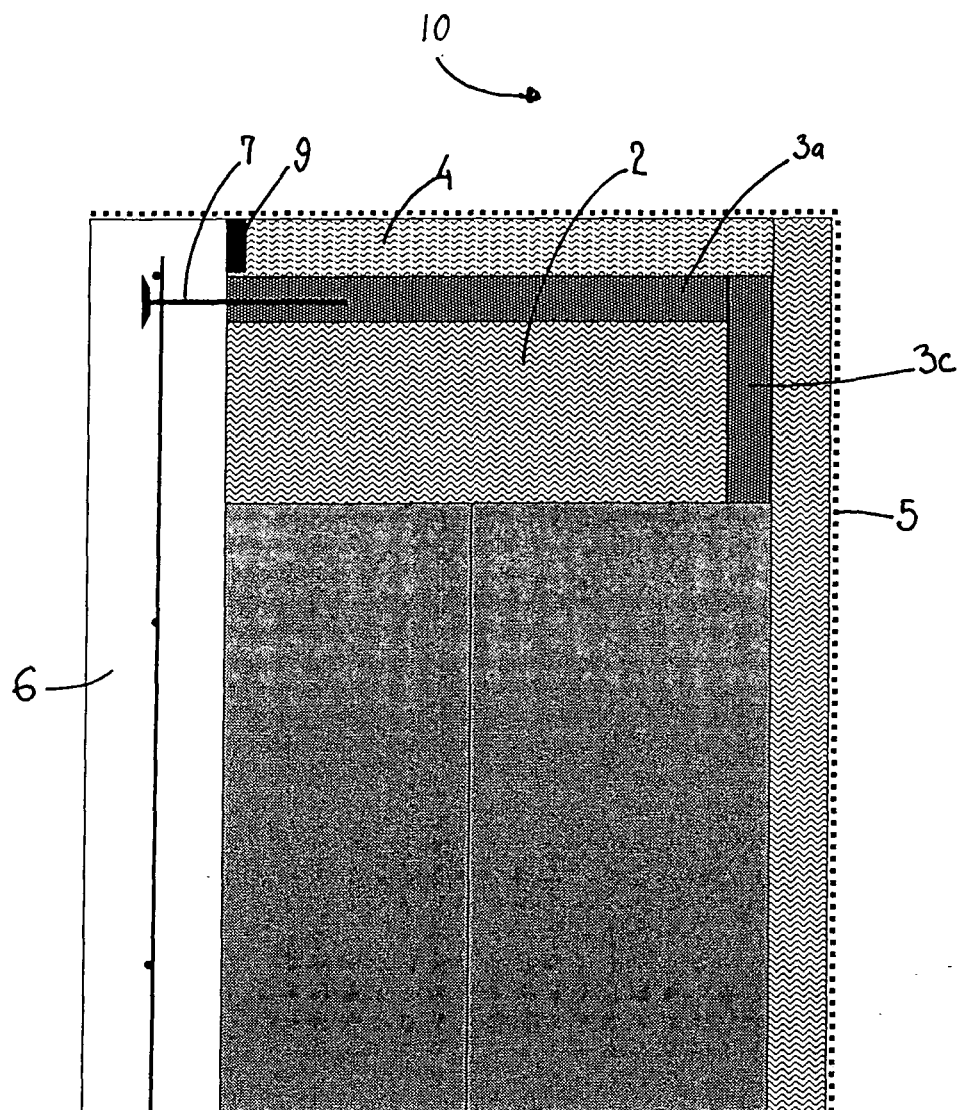


Fig.4

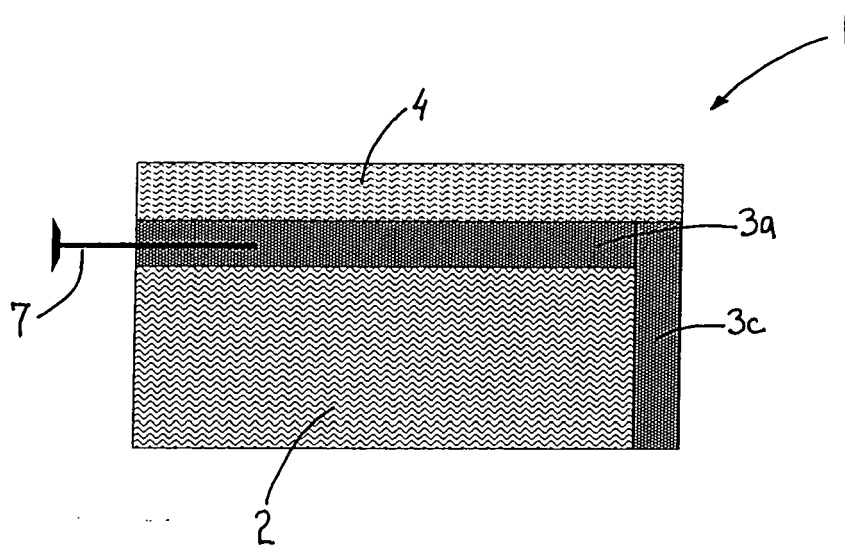


Fig. 5