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Remarks:
Claim 16 is deemed to be abandoned due to non-payment of the claims fee (Rule 45(3) EPC).

(54) **A heat insulating element and a method for forming a heat transfer barrier between an inner leaf and an outer leaf of a cavity wall**

(57) A heat insulating element (1) for preventing heat transfer from an inner leaf (2) to an outer leaf (3) of a cavity wall (4) adjacent a receiving opening (5) for a window frame (6) comprises an elongated carrier panel (18) which carries a heat insulating member (30) and a return heat insulating member (36). The heat insulating return (36) abuts a heat insulating panel (10) secured to the inner leaf (2), and the heat insulating member (30) and the heat insulating return (36) are located for abutting a block-work return 8 of the inner leaf (2) adjacent the receiving opening (5). A resilient water impervious sealing element (25) is secured to the carrier panel (18) for sealably abutting the window frame (6) for preventing the ingress of moisture between the window frame (6) and the outer leaf (5). Two heat insulating elements (1) are provided on respective opposite sides of the window receiving opening (5) and each extends the height of the receiving opening (5).

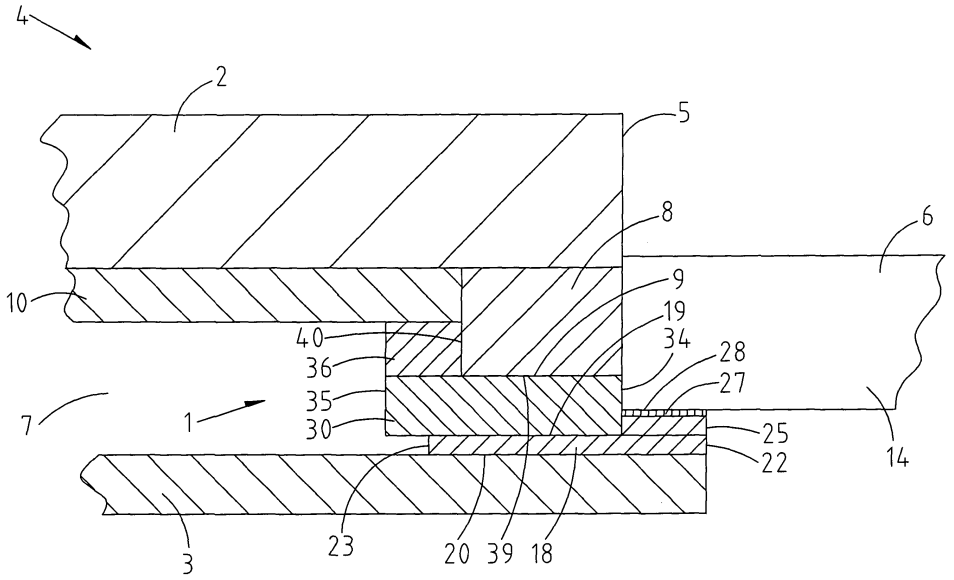

Fig. 4

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Description

[0001] The present invention relates to a heat insulating element, and in particular to a heat insulating element for forming a heat transfer barrier in a cavity wall between inner and outer leaves of the cavity wall adjacent a receiving opening in the cavity wall for receiving one of a window frame and a door frame therein. The invention also relates to a method for forming a heat transfer barrier between inner and outer leaves of a cavity wall adjacent a receiving opening for receiving one of a window frame and a door frame therein, and the invention further relates to a wall having the heat insulating element located therein.

[0002] Buildings, and in particular, buildings which are suitable as dwelling houses, offices, industrial premises and the like, in general are built with an external wall in the form of a cavity wall. A cavity wall is a wall which comprises an inner load bearing leaf and an outer leaf which is not provided to have any significant load bearing capacity. The inner and outer leaves are spaced apart from each other and define a cavity therebetween within which heat insulating material, typically, in the form of panels of expanded polystyrene are located and secured against the surface of the inner load bearing leaf within the cavity, in order to prevent or at least minimise heat transfer from the inner load bearing leaf to the outer leaf. Typically, the inner load bearing leaf is of concrete block construction, or may be provided in the form of a reinforced precast panel or a reinforced cast in-situ panel. The outer leaf, in general is decorative type leaf, and is commonly of brick, although it may be constructed of concrete blocks, which typically, would be subsequently rendered, pebble dashed or otherwise finished.

[0003] In general the construction of such cavity walls significantly reduces heat loss from a building. However, there are areas in a cavity wall which are vulnerable to heat loss, for example, the area of a cavity wall surrounding a window or a door. In general, when building a cavity wall, a receiving opening of an appropriate size is formed in the inner leaf of the cavity wall for receiving a window frame or a door frame. A corresponding opening is formed in the outer leaf of the cavity wall which is aligned with the inner receiving opening, and the area of the opening in the outer leaf is of slightly smaller area than the area of the receiving opening in the inner leaf. The window frame or door frame is then inserted into the receiving opening in the inner leaf of the cavity wall with a portion of the window frame or door frame abutting the inner surface of the outer leaf of the cavity wall.

[0004] In general a small return is formed in the inner leaf of the cavity wall which projects into the cavity on respective opposite sides of the receiving opening. The return, typically, is formed by concrete blocks of an appropriate size which are interlocked with the blocks of the inner leaf. However, the blocks of the return stop short of the outer leaf, thus, leaving a gap between the inner leaf and the outer leaf adjacent the receiving opening. No suitable method has been found for locating heat insulating material in the gap formed between the return from the inner leaf of the cavity wall and the outer leaf thereof.

[0005] Additionally, the area adjacent the opposite sides of the receiving opening where the window frame or door frame abuts the outer leaf of the cavity wall is vulnerable to the ingress of moisture. By virtue of the fact that the window frame or door frame abuts the outer leaf of the cavity wall adjacent the receiving opening, moisture can penetrate between the abutting joint of the window frame or door frame and the outer leaf of the cavity wall. This moisture can travel around the window frame or door frame and run down the surface of the return from the inner leaf within the cavity.

[0006] Once moisture penetrates to the surface of any part of an inner leaf of a cavity wall, the moisture rapidly migrates through the masonry to the interior surface within the building of the inner leaf of the cavity wall. Such moisture leads to unsightly damp patches, mould growth and the like. Such damp patches and mould growth are common on the inner surface of the inner leaf of a cavity wall within a building on respective opposite sides of a window or a door. This, is undesirable in that apart from damp patches and mould growth being unsightly, persistent moisture within an inner leaf of a cavity wall leads to deterioration of plasterwork on the interior of the cavity wall, and indeed, in many cases may lead to deterioration of the inner leaf itself of the cavity wall.

[0007] There is therefore a need for a heat insulating element which addresses at least some of these problems of cavity walls of known construction.

[0008] The present invention is directed towards providing such a heat insulating element and the invention is also directed towards providing a method for forming a heat transfer barrier in a cavity wall which addresses some of the problems of cavity walls of known construction, and further, the invention is directed towards providing a wall which addresses some of the problems of cavity walls of known construction.

[0009] According to the invention there is provided a heat insulating element for locating in a cavity of a cavity wall adjacent a receiving opening for one of a window frame and a door frame to form a heat transfer barrier between an inner leaf and an outer leaf of the cavity wall adjacent the receiving opening therein, the heat insulating element comprising an elongated carrier member defining opposite first and second major surfaces, an elongated sealing element extending longitudinally along the first major surface of the carrier member for sealably abutting the one of the window frame and the door frame, and a heat insulating member extending longitudinally along the first major surface of the carrier member adjacent the sealing element for abutting the inner leaf of the cavity wall for minimising heat transfer from the inner leaf of the cavity wall to the outer leaf thereof, the heat insulating member extending in a direction away from the sealing element.

[0010] In one embodiment of the invention the first and second major surfaces of the carrier member extend between opposite spaced apart longitudinally extending first and second side edges thereof, the sealing element being located adjacent the first side edge of the carrier member, and the heat insulating member extending from the sealing element towards the second side edge of the carrier member. Preferably, the heat insulating member extends beyond the second side edge of the carrier member.

[0011] Advantageously, the heat insulating member is adapted for abutting a heat insulating panel secured to the inner leaf of the cavity wall in the cavity thereof.

[0012] In one embodiment of the invention the heat insulating member defines a first longitudinally extending side edge extending along and adjacent the sealing element and an opposite longitudinally extending second side edge, and preferably, the heat insulating member comprises a return extending longitudinally adjacent the second side edge thereof, and the return is adapted for abutting the heat insulating panel secured to the inner leaf of the cavity wall in the cavity thereof. Advantageously, the return extends from the heat insulating member so that the heat insulating member abuts one face of a projecting portion of the inner leaf of the cavity wall extending into the cavity thereof, and the return abuts an adjacent face of the projecting portion.

[0013] Preferably, the carrier member is provided by a panel member, and advantageously, the carrier member is of a moisture impermeable material, and ideally, is of plastics material. Preferably, the carrier member is of UPVC material.

[0014] In another embodiment of the invention the sealing element is of a moisture impervious resilient material, and ideally, is of an expanded closed cell plastics material.

[0015] Preferably, the sealing element defines an abutment surface for abutting the one of the window frame and the door frame, and ideally, the abutment surface is a planar surface, and preferably, is coated with a self-adhesive coating for bonding to the window or door frame.

[0016] In another embodiment of the invention the heat insulating member is of expanded plastics material, and preferably, is of expanded polystyrene.

[0017] Ideally, the heat insulating member is of thickness corresponding to the thickness of the adjacent heat insulating panel in the cavity of the cavity wall, and preferably, is of thickness of approximately 25mm.

[0018] In one embodiment of the invention the second major surface of the carrier member is adapted for abutting the outer leaf of the cavity wall.

[0019] The invention also provides a wall comprising an inner leaf and an outer leaf defining a cavity therebetweeen, and a receiving opening for receiving one of a window frame and a door frame, a heat insulating element according to the invention being located in the cavity of the cavity wall adjacent the receiving opening therein with the heat insulating member abutting the inner leaf of the cavity wall, the second surface of the carrier member abutting the outer leaf of the cavity wall adjacent the window opening, the carrier member extending from the cavity into the receiving opening, and one of a window frame and a door frame located in the receiving opening abutting the sealing element of the carrier member.

[0020] Preferably, the one of the window frame and the door frame abuts the heat insulating member of the heat insulating element.

[0021] The invention further provides a method for forming a heat transfer barrier between an inner leaf and an outer leaf of a cavity wall adjacent a receiving opening therein of the type for receiving one of a window frame and a door frame, the method comprising providing a heat insulating element with an elongated carrier member defining opposite first and second major surfaces, providing an elongated sealing element extending longitudinally along the first major surface of the carrier member for sealably abutting the one of the window frame and the door frame located in the receiving opening, providing a heat insulating member extending longitudinally along the first major surface of the carrier member adjacent the sealing element for abutting the inner leaf of the cavity wall, the heat insulating member extending in a direction away from the sealing element, and locating the heat insulting element in the cavity of the cavity wall adjacent the receiving opening with the heat insulating member abutting the inner leaf of the cavity wall and the sealing element located in the receiving opening for sealably engaging the one of the window frame and the door frame.

[0022] In one embodiment of the invention the heat insulating member of the heat insulating element is located in the cavity adjacent the receiving opening for abutting the one of the window frame and the door frame.

[0023] Preferably, the heat insulating member is provided with a return, the return extending to engage the heat insulating panel and one face of a projecting portion of the inner leaf of the cavity wall extending into the cavity thereof adjacent the receiving opening, and the heat insulating member abuts an adjacent face of the projecting portion.

[0024] The invention will be more clearly understood from the following description of a preferred embodiment thereof, which is given by way of example only, with reference to the accompanying drawings, in which:

Fig. 1 is a perspective view of a heat insulating element according to the invention for forming a heat transfer barrier between an inner leaf and an outer leaf of a cavity wall,

Fig. 2 is a front elevational view of the heat insulating element of Fig. 1,

Fig. 3 is a rear elevational view of the heat insulating element of Fig. 1, and

Fig. 4 is a transverse cross-sectional top plan view of a portion of a cavity wall also according to the invention, with the heat insulating element of Fig. 1 located therein.

[0025] Referring to the drawings, there is illustrated a heat insulating element according to the invention, indicated generally by the reference numeral 1, for forming a heat transfer barrier between an inner leaf 2 and an outer leaf 3 of a cavity wall 4 adjacent a receiving opening 5 for accommodating a window frame 6. Before describing the heat insulating element 1 in detail, the cavity wall 4 adjacent the opening 5 therein will first be described. The inner and outer leaves 2 and 3 of the cavity wall 4 are spaced apart from each other and define a cavity 7 therebetween. Typically, the inner leaf 2 is a load bearing leaf and is constructed of concrete block-work. The outer leaf 3, in general, is not required to have a load bearing capacity, and in general, does not have such a load bearing capacity, and typically, may be of brickwork or block-work of lower load bearing capacity than the block-work of the inner leaf 2. A portion projecting from the inner leaf 2 forms a return 8 which extends inwardly into the cavity 7 on respective opposite sides of the receiving opening 5 for partially closing the cavity 7 adjacent the receiving opening 5. The return 8 typically is formed by blocks of appropriate size, or cut to an appropriate size interlocked with the blocks of the inner leaf 2, and stops short of the outer leaf 3 and defines with the outer leaf 3 a gap 9. The window frame 6 abuts the block-work return 8, and depending on the width of the window frame 6 may also abut the portion of the inner leaf 2 from which the block-work return 8 extends. In a conventionally constructed cavity wall the window frame 6 would abut the block-work return 8 and close the gap 9.

[0026] Panels 10 of heat insulating material are located in the cavity 7 abutting the inner leaf 2. Typically, the panels 10 of heat insulating material are of expanded polystyrene, and will be well known to those skilled in the art. The window frame 6 comprises a frame sash 14 which may be single or double glazed. The construction of such window frames 6 will be well known to those skilled in the art, and such window frames 6 may typically also include openings which are closed by hingedly mounted single or double glazed window elements.

[0027] Returning now to the heat insulating element 1, the heat sealing element 1 comprises a carrier member, which in this embodiment of the invention is provided by an elongated carrier panel 18 of water impervious UPVC plastics material, which defines opposite first and second major surfaces 19 and 20 respectively. The first and second major surfaces 19 and 20 extend between opposite spaced apart longitudinally extending first and second side edges 22 and 23, respectively.

[0028] A longitudinally extending sealing element 25 of resilient water impervious expanded closed cell plastics material is bonded to the first major surface 19 of the carrier panel 18 and extends longitudinally along the carrier panel 18 adjacent the first side edge 22 thereof. The sealing element 25 defines a planar abutment surface 27 for abutting the window frame 6. The abutment surface 27 is coated with an adhesive coating 28 for bonding to the window frame 6, and the heat insulating element 1 is supplied with a release protective sheet (now shown) covering the adhesive coating 28 on the abutment surface 27 for protecting the adhesive coating 28. In this embodiment of the invention the sealing element 25 is provided by double sided tape of closed cell resilient plastics material having adhesive pre-coated onto the respective opposite surfaces thereof.

[0029] A heat insulating member 30, in this embodiment of the invention provided by a panel of expanded polystyrene material of thickness similar to that of the heat insulating panel 10, which typically, is approximately 25mm, is bonded to the first major surface 19 of the carrier panel 18. The heat insulating member 30 defines longitudinally extending first and second side edges 34 and 35, respectively, and extends longitudinally along the carrier panel 18, with the first side edge 34 extending along and adjacent the sealing element 25. The heat insulating member 30 also extends away from the sealing element 25 and terminates in the second side edge 35 at a location beyond the second side edge 23 of the carrier panel 18.

[0030] A heat insulating return 36 also provided by a panel of expanded polystyrene material of thickness of approximately 25mm is bonded to and extends longitudinally along the heat insulating member 30 adjacent the second side edge 35 thereof. The heat insulating return 36 extends from the heat insulating member 30 to abut the heat insulating panels 10 secured to the inner leaf 2 of the cavity wall 4. The portion of the heat insulating member 30 between the first side edge 34 and the heat insulating return 36 abuts one face 39 of the block-work return 8 which extend inwardly into the cavity 7 from the inner leaf 2, and the heat insulating return 36 abuts an adjacent face 40 of the block-work return 8. Accordingly, the combination of the heat insulating member 30, the heat insulating return 36 and the heat insulating panels 10 secured to the inner leaf 2 of the cavity wall 4 form a complete heat transfer barrier between the inner leaf 2 and the outer leaf 3.

[0031] The combined thickness of the heat insulating member 30 and the carrier panel 18 is such that when the heat insulating element 1 is located in the gap 9 between the block-work return 8 and the outer leaf 3 of the cavity wall 4, the second major surface 20 of the carrier panel 18 abuts the outer leaf 3 of the cavity wall 4.

[0032] In use, when the inner leaf 2 of the cavity wall 4 has been constructed, and the outer leaf 3 has been built up to window sill level of the receiving opening 5, as the heat insulating panels 10 are being secured to the inner leaf 2 of the cavity wall 4 in conventional manner, two of the heat insulating elements 1 are located in the cavity wall 4 in the gaps 9 on opposite sides of the receiving opening 5. Each heat insulating element 1 is located in the cavity 7 of the cavity wall 4 with the second

major surface 20 of the carrier panel 18 abutting the outer leaf 3 and the portion of the carrier panel 18 which carries the sealing element 25 extending out of the gap 9 and into the receiving opening 5 so that the sealing element 25 is located for sealably engaging and abutting the sash frame 14 of the window frame 6. With each carrier panel 18 so located, the heat insulating member 30 and the heat insulating return 36 of each carrier element 18 abut the adjacent faces 39 and 40 of the block-work return 8 extending into the cavity 7 from the inner leaf 2, and the heat insulating return 36 abuts the adjacent heat insulating panels 10 secured to the inner leaf 2 adjacent the block-work return 8. As the outer leaf 3 is being built up above window sill level of the window opening 12, the bricks or other masonry material of the outer leaf 3 abut the second major surface 20 of the carrier panel 18 of the adjacent heat insulating element 1.

[0033] Typically, the heat insulating elements 1 will be supplied in relatively long lengths and will be cut to length corresponding to the height of the receiving opening 5 from the window sill to the top lintel (not shown) of the receiving opening 5.

[0034] When construction of the cavity wall 4 has been completed, and the window frame 6 is ready to be inserted in the receiving opening 5, the protective release sheets (not shown) are removed from the sealing elements 25 of the heat insulating elements 1, thus exposing the adhesive coating 28 of the sealing elements 25, and the window frame 6 is located in the receiving opening 5. The window frame is pressed against the sealing elements 25 in order to bond the window frame 6 to the sealing elements 25 by the adhesive coatings 28. With the window frame 6 bonded to the sealing elements 25 by the adhesive coatings 28, the window frame 6 abuts the side edge 34 of the heat insulating member 30.

[0035] A particularly important advantage of the invention is that it avoids any danger of moisture seeping around the window frame, which would then run down the surface of the inner leaf of the cavity wall within the cavity thereof. Such moisture on the inner leaf of a cavity wall would lead to damp patches and mould growth on the inner leaf within a building, which are unsightly, and which would also lead to deterioration of plasterwork on the inner leaf within a building as well as deterioration of the inner leaf. The fact that the carrier panel is not in moisture sealing engagement with the outer leaf of the cavity wall is not important, since any moisture which seeps in between the carrier panel and the outer leaf merely runs down the surface of the outer leaf within the cavity, and thus has no effect on the inner leaf.

[0036] While the heat insulating element has been described for use adjacent a receiving opening for a window frame, the heat insulating element according to the invention is also suitable for use adjacent a receiving opening for a door frame or any other frame, and the advantages achieved by use of the heat insulating element adjacent a receiving opening for a door frame are similar to those achieved by the use of the heat insulating element adjacent the receiving opening of a window frame.

[0037] While the heat insulating element has been described as comprising a carrier member in the form of a carrier panel of UPVC material, the carrier panel may be of any other suitable water impervious material. Additionally, while the sealing element has been described as being of closed cell plastics material, the sealing element may be of any other suitable resilient moisture impervious material.

[0038] Needless to say, the heat insulating member and the heat insulating return of the heat insulting element may be of any other suitable material and the thickness of the heat insulating member and the heat insulating return will ideally be appropriately dimensioned depending on the dimensions of the cavity wall.

[0039] It is also envisaged that the heat insulating member instead of extending beyond the side edge 23 of the carrier panel may terminate adjacent the side edge 23 of the carrier panel. Indeed, in certain cases, it is envisaged that the carrier panel may extend beyond the side edge 35 of the heat insulating member.

[0040] While the heat insulating member and the heat insulating return have been described as being provided as two separate elements bonded together, in certain cases, it is envisaged that the heat insulating member and the heat insulating return may be integrally formed as a single one piece unit, for example, the heat insulating member and the heat insulating return may be formed as a single elongated extrusion. Alternatively, it is envisaged that the heat insulating member and the heat insulating return may be dimensioned, so that both are secured to the carrier panel. For example, it is envisaged that the heat insulating member would extend from the sealing element to the heat insulating return, which would extend directly from the carrier panel.

[0041] Additionally, it is envisaged that in certain cases, the sealing element may be provided without an adhesive coating, and in which case, the abutment surface of the sealing element would merely sealably abut the window frame or door frame.

[0042] It is also envisaged that a sealing element may be provided for sealing the carrier panel to the outer leaf of the cavity wall. In which case, it is envisaged that an elongated sealing element, which ideally would be moisture impervious, would extend the length of the carrier panel, and ideally, would be located adjacent the first side edge of the carrier panel on the second major surface thereof.

Claims

1. A heat insulating element for locating in a cavity of a cavity wall adjacent a receiving opening for one of a window frame and a door frame to form a heat transfer barrier between an inner leaf and an outer leaf of the cavity wall adjacent the receiving opening therein, the heat insulating element comprising an

elongated carrier member defining opposite first and second major surfaces, an elongated sealing element extending longitudinally along the first major surface of the carrier member for sealably abutting the one of the window frame and the door frame, and a heat insulating member extending longitudinally along the first major surface of the carrier member adjacent the sealing element for abutting the inner leaf of the cavity wall for minimising heat transfer from the inner leaf of the cavity wall to the outer leaf thereof, the heat insulating member extending in a direction away from the sealing element.

2. A heat insulating element as claimed in Claim 1 in which the first and second major surfaces of the carrier member extend between opposite spaced apart longitudinally extending first and second side edges thereof, the sealing element being located adjacent the first side edge of the carrier member, and the heat insulating member extending from the sealing element towards the second side edge of the carrier member.

3. A heat insulating element as claimed in Claim 2 in which the heat insulating member extends beyond the second side edge of the carrier member.

4. A heat insulating element as claimed in Claim 2 or 3 in which the heat insulating member is adapted for abutting a heat insulating panel secured to the inner leaf of the cavity wall in the cavity thereof.

5. A heat insulating element as claimed in Claim 4 in which the heat insulating member defines a first longitudinally extending side edge extending along and adjacent the sealing element and an opposite longitudinally extending second side edge.

6. A heat insulating element as claimed in Claim 5 in which the heat insulating member comprises a return extending longitudinally adjacent the second side edge thereof, and the return is adapted for abutting the heat insulating panel secured to the inner leaf of the cavity wall in the cavity thereof.

7. A heat insulating element as claimed in Claim 6 in which the return extends from the heat insulating member so that the heat insulating member abuts one face of a projecting portion of the inner leaf of the cavity wall extending into the cavity thereof, and the return abuts an adjacent face of the projecting portion.

8. A heat insulating element as claimed in any preceding claim in which the carrier member is provided by a panel member of a moisture impermeable material.

9. A heat insulating element as claimed in any preceding claim in which the sealing element is of a moisture impervious resilient material.

10. A heat insulating element as claimed in any preceding claim in which the sealing element defines an abutment surface for abutting the one of the window frame and the door frame, and is coated with a self-adhesive coating for bonding to the one of the window frame and the door frame

11. A heat insulating element as claimed in any preceding claim in which the second major surface of the carrier member is adapted for abutting the outer leaf of the cavity wall.

12. A wall comprising an inner leaf and an outer leaf defining a cavity therebetween and a receiving opening for receiving one of a window frame and a door frame, a heat insulating element as claimed in any preceding claim being located in the cavity of the cavity wall adjacent the receiving opening therein with the heat insulating member abutting the inner leaf of the cavity wall, the second surface of the carrier member abutting the outer leaf of the cavity wall adjacent the window opening, the carrier member extending from the cavity into the receiving opening, and one of a window frame and a door frame located in the receiving opening abutting the sealing element of the carrier member.

13. A wall as claimed in Claim 12 in which the one of the window frame and the door frame abuts the heat insulating member of the heat insulating element.

14. A method for forming a heat transfer barrier between an inner leaf and an outer leaf of a cavity wall adjacent a receiving opening therein of the type for receiving one of a window frame and a door frame, the method comprising providing a heat insulating element with an elongated carrier member defining opposite first and second major surfaces, providing an elongated sealing element extending longitudinally along the first major surface of the carrier member for sealably abutting the one of the window frame and the door frame located in the receiving opening, providing a heat insulating member extending longitudinally along the first major surface of the carrier member adjacent the sealing element for abutting the inner leaf of the cavity wall, the heat insulating member extending in a direction away from the sealing element, and locating the heat insulting element in the cavity of the cavity wall adjacent the receiving opening with the heat insulating member abutting the inner leaf of the cavity wall and the sealing element located in the receiving opening for sealably engaging the one of the window frame and the door frame.

15. A method as claimed in Claim 14 in which the heat insulating member of the heat insulating element is located in the cavity adjacent the receiving opening for abutting the one of the window frame and the door frame.

16. A method as claimed in Claim 14 or 15 in which the heat insulating member is provided with a return, the return extending to engage the heat insulating panel and one face of a projecting portion of the inner leaf of the cavity wall extending into the cavity thereof adjacent the receiving opening, and the heat insulating member abuts an adjacent face of the projecting portion.

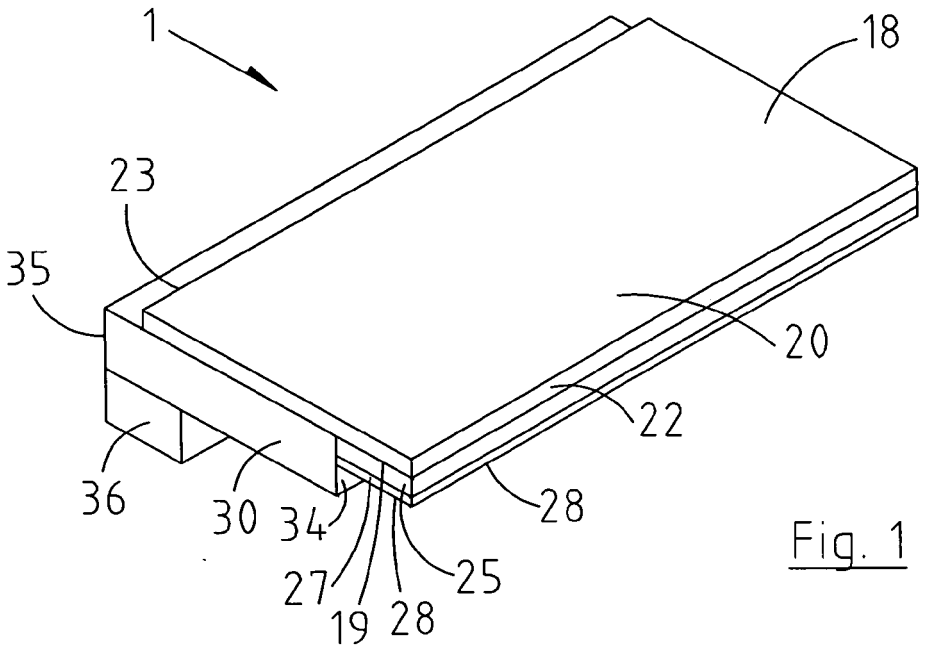

Fig. 1

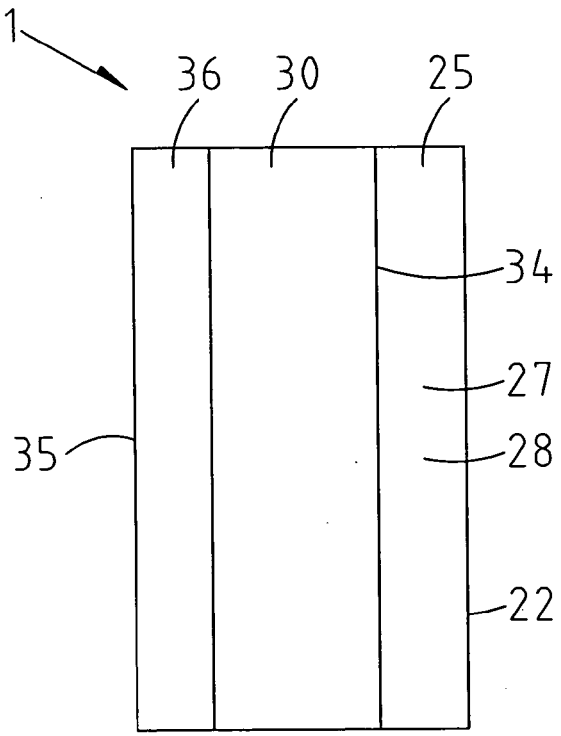

Fig. 2

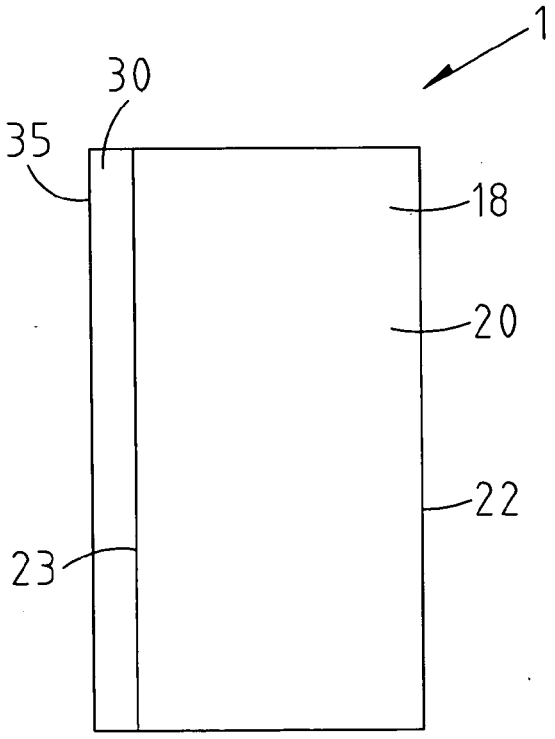

Fig. 3

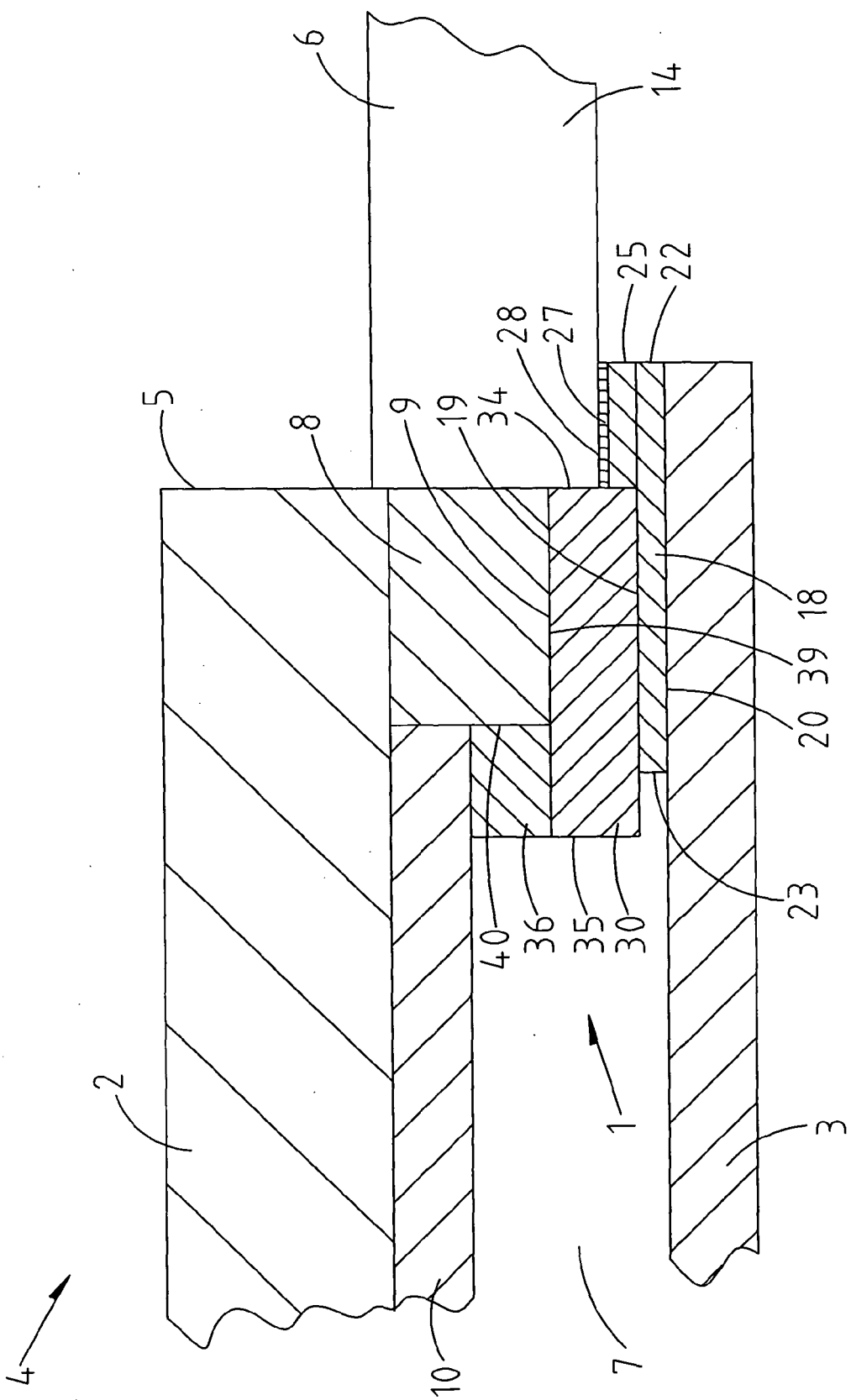

Fig. 4