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(54) Damp proof course system.

(57) A damp proof course (DPC) system is provided which comprises an elongate rear member (12) associated with an inner leaf (22) of a cavity wall. The member (12) includes a skirt (13) which cooperates with a damp proof course membrane (24) or a cavity tray in order to span the cavity. The skirt (13) has a longitudinal hinge (15), in the form of a line of reduced thickness, which allows it to be raised away from the rear member (12).

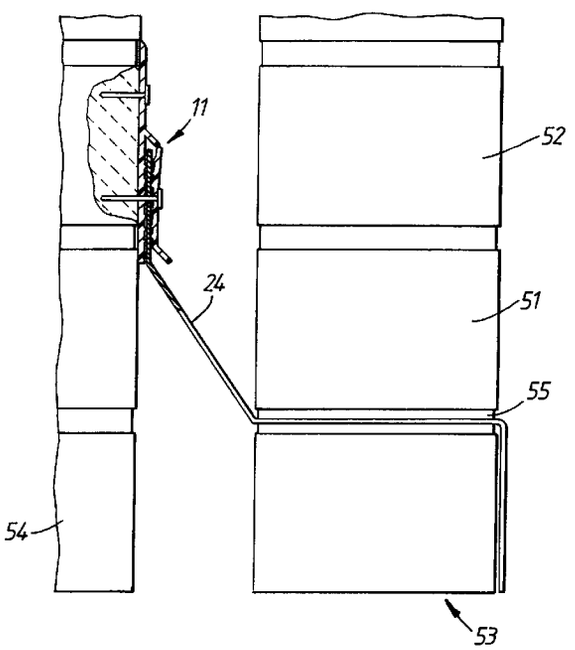

Fig.5

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The present invention is concerned with cavity wall structures and relates particularly to a system which serves as a damp proof course (DPC).

In cavity wall structures it is customary to fit a DPC which spans the cavity, extending downwards from the inner leaf to the outer leaf. The DPC membrane is located in a mortar layer between two brick courses of the outer leaf.

In many instances, it may not be desirable or may not be possible in practice to locate the rear of the DPC membrane in a mortar layer in the inner leaf. These instances include situations where the inner leaf is of ply sheathing or concrete, and also where a DPC is to be installed in an existing cavity wall structure.

When the inner leaf is of ply sheathing, the DPC membrane would normally be nailed, screwed or shot-fired back to the sheeting using timber battens. However, this is a difficult procedure and the junction between the membrane and the sheathing represents an unsatisfactory moisture barrier. Furthermore, the timber battens must be treated, e.g. tannalised, if deterioration over a period of time is to be avoided, and this adds significantly to the cost.

When the inner leaf is of concrete, an alternative system which is sometimes adopted is to cast lengths of timber in the concrete surface facing the cavity. These are then removed to provide a channel in the set concrete and the DPC membrane is set into the channel, again using timber battens. While a superior junction is obtained, the process is more costly and far more difficult.

In the case of an existing cavity wall, in which a DPC is to be installed, the normal procedure is to remove about two or three bricks from each of two adjacent courses of the outer leaf. A process similar to that used for ply sheeting is then carried out progressively along the wall with the removed bricks being replaced and new bricks being removed in turn, to gain access. Again, this is both costly and difficult and the end result may not be satisfactory.

It is an object of the present invention to provide an improved system for locating a damp proof course in a cavity wall, regardless of the material of the inner leaf.

It is a further object of the invention to provide such a system which is simpler to use and less costly than existing systems.

According to the invention, there is provided a system as claimed in Claim 1, in which the rear member of the system is provided in the form of an elongate backing member and the depending member is provided in the form of an elongate skirt depending from the front of the backing member, the skirt leaving a section of the backing member above in the form of a border, and defining a channel between itself and the lower part of the backing member, the channel being arranged to receive the rear edge of the membrane, whereby the rear member performs as a support clamp.

According to a first embodiment the invention, the rear member is in the form of an elongate backing member and an elongate skirt depending from the front of the backing; the skirt leaving a section of the backing above in the form of a border, and defining a channel between itself and the lower part of the backing, the channel being arranged to receive the rear edge of the membrane, whereby the rear member performs as a support clamp.

Thus, an appropriate length of the clamp structure can be shot-fired, spiked, nailed or screwed through the border to the inner leaf of a cavity wall, the rear of a DPC membrane can be located within the channel, and the free edge of the membrane can be subsequently located in the mortar joint between two courses of brick in the outer leaf. Clearly, this would be equally applicable to a wall under construction, or an existing wall in which bricks in the outer leaf would be removed and replaced progressively. The DPC membrane may be of a plastics material or may be lead, or some other metal.

Preferably, the skirt is provided with a longitudinal hinge which allows it to be raised away from the backing in order to permit easy insertion of the membrane. Conveniently, the hinge section is a line of reduced thickness. Preferably, the surface of the backing and/or the surface of the skirt which define the channel is/are provided with barbs, teeth or longitudinal ribs which act to grip the membrane when in position. Preferably the skirt is fixed in position by nails, screws, or shot-fired pins, directed through the skirt, the membrane and the backing, and into the inner leaf.

The backing member may be generally flat, however, in an alternative embodiment, the lower part of the backing below the border has a deviated cross-section. Preferably, this deviated cross-section comprises a downwardly and outwardly inclined section, below this a generally vertical section and below this a downwardly and inwardly inclined section. This would effectively define an elongate ridge, having a generally C-shaped cross-section, spaced away from the inner leaf, in use. Preferably, the skirt is correspondingly shaped in cross-section, whereby the channel is similarly C-shaped in section.

The deviated backing may include an internal spacer rib extending backwards towards the inner leaf, in use. In this way, nails, screws, pins or the like can be provided to extend through the skirt and the membrane when it is in position, and then into the spacer rib, without having to be driven into the surface of the inner leaf.

According to a second preferred embodiment of the invention, the depending member may be provided in the form of a skirt depending from the base of the rear member in use, the skirt leaving the whole of

the rear member above as a backing member. A channel would then be formed between the skirt and the inner leaf. As before, the skirt may be suitably provided with a longitudinal hinge which allows it to be raised away from the backing member to permit easy location of a cavity tray underneath. The hinge is conveniently a line of reduced thickness and in use the skirt is designed to overlap with the upper edge of the cavity tray.

The skirt may comprise an extension projecting from the front of the backing member connected by the hinge section to a portion of the skirt which depends at an angle from the hinge. There may also be a lower portion which depends relatively more vertically. It is also preferred that the backing member is substantially flat.

To facilitate on-site fixing, the backing member may be adapted to form a channel which advantageously prevents stress damage from the affixing means may be used. Any generally suitable affixing means may be used including shot-firing, spiking, nailing or screwing the backing member to the inner leaf of a cavity wall.

In a third embodiment of the invention, the backing member, from which the skirt depends is orientated so that it may be interleaved with or inserted into the inner leaf of a cavity wall, the skirt performing as an inner leaf cloak. As before, the skirt may be suitably provided with a longitudinal hinge which allows it to be raised away from the backing member to permit easy location of a cavity tray underneath. The hinge is conveniently a line of reduced thickness and in use the skirt is designed to overlap with the upper edge of the cavity tray which may, for example be in abutment with a lintol.

In this embodiment, the skirt may comprise an extension projecting downwards at an angle from the backing member, connected by the hinge to a lower portion of the skirt which depends at a steeper angle from the extension above, in use.

This embodiment has the advantage that it may readily be used in association with lintols used in the construction of buildings, for example above doors and windows.

Preferably the elongate member and skirt depending therefrom are a unitary construction and are made from a suitable plastics material such as PVC, polyethylene, polypropylene, etc. Preferably, the system is formed as an extruded profile which can then be cut to length.

The invention also extends to the combination of a support clamp, in accordance with the first aspect of the invention, with a DPC membrane, and to a cavity wall including such a combination. Also encompassed are combinations of the damp proof course systems in accordance with either of the second or third embodiments of the invention with a cavity wall. The invention also extends to a method of installing a DPC system using any of the embodiments of the invention, including a method of installing a DPC using a support clamp, in accordance with the first aspect of the invention, and membrane.

It will be appreciated that the present invention provides a simpler and less costly alternative to existing cavity wall DPC systems which nevertheless results in a superior ultimate construction. Furthermore, it can be applied to a cavity wall of any material, whether vertical or inclined, and can be used to span a cavity of any width.

The invention may be carried into practice in various ways and some embodiments will now be described by way of example with reference to the accompanying drawings, in which:

Figure 1 is a vertical section through a membrane support clamp according to the invention;

Figure 2 is a perspective view of the clamp of Figure 1, in position, and with a membrane located;

Figure 3 is a vertical section through the clamp in use in a timber frame structure;

Figure 4 is a view similar to Figure 3 showing a concrete edge beam structure;

Figure 5 is a view similar to Figure 3 showing the clamp applied to an existing brickwork cavity wall;

Figure 6 is a vertical section through a second embodiment of a clamp;

Figure 7 is a perspective view of the clamp of Figure 6;

Figure 8 is a vertical section through a damp proof course system in accordance with a second embodiment of the invention;

Figure 9 is a perspective view of the embodiment shown in Figure 8;

Figure 10 is a perspective view of a damp proof course system in accordance with a third embodiment of the invention; and

Figure 11, 12 and 13 are vertical sections showing a damp proof course system in accordance with the third embodiment of the invention in use with three different lintols.

Figures 1 and 2 show a membrane support clamp 11 in accordance with the invention. The clamp 11 is an extruded profile in 2.5 mm thick polyvinyl chloride (PVC). It comprises a backing member 12 and a skirt 13 connected to the backing 12 through a downwardly angled lip 14. The junction between the skirt 13 and the lip 14 is a line of reduced thickness which thereby constitutes a hinge 15.

The lip 14 divides the backing 12 into a border 16 above and a lower portion 17 below. A channel 18 is thus formed between the skirt 13 and the lower portion 17. Longitudinal ribs 19 are formed along the channel 18 on the skirt 13 and lower portion 17. The bottom edge 21 of the skirt 13 is bent outwardly for ease of manipulation.

In use, the clamp 11 is first attached to the inner

leaf 22 of a cavity wall by means of spikes 23 (only one of which is shown) which are shot-fired through the border 16. The skirt 13 is lifted away from the lower portion 17 as shown in Figure 1, a flexible DPC membrane 24 is inserted into the opened channel 18 and the skirt 13 replaced, holding the membrane 24 in position. Further spikes 25 are then shot-fired through the skirt 13, membrane 24 and lower portion 17, and into the inner leaf 22 thus clamping the membrane 24 in position. The ribs 19 help to prevent accidental removal of the membrane 24 from the channel 18.

When the outer leaf (not shown) is subsequently constructed, the outer edge of the membrane 24 is embedded in the mortar layer between two courses of brick at a level below the bottom of the clamp 11. Thus, the membrane is inclined downwardly from the inner leaf 22 to the outer leaf.

Figure 3 shows such a construction. Here, the inner leaf 22 is a ply sheathing for a timber frame construction, and the outer leaf 31 is of brick. The membrane 24 is embedded in a mortar layer 32 between two brick courses 33, 34. The wall cavity 35 includes a fire barrier 36.

Figure 4 shows the clamp 11 in use in a concrete edge beam construction. The outer leaf 41 is again of brick and the membrane 24 is embedded in the mortar course 42 between the bottom brick course 43 and the concrete edge beam 44.

Figure 5 shows the incorporation of a clamp 11 in an existing cavity wall. Firstly, bricks 51, 52 are removed from two courses of the outer leaf 53. The clamp 11 is shot-fired to the inner leaf 54 and the membrane 24 is fitted, both as described above. The membrane 24 is then embedded in a fresh layer of mortar 55 and the removed bricks 51, 52 are replaced. Adjacent bricks are removed and the whole process is repeated progressively along the wall.

Figures 6 and 7 show an alternative form of clamp 61. In this case, the backing member 62 again has a border 64 from which a skirt 63 depends via a hinge line 65. However, the lower portion 66 of the backing generally protrudes away from the inner leaf with a C-shaped cross-section. The skirt 63 has a corresponding cross-section and thus a C-sectioned channel 68 is formed, to receive the membrane 24.

At the centre of the protruding lower portion 66, there is an elongate spacer bar or rib 67 extending back to the position of the inner leaf 69 (in use). An elongate ridge 71 extends along the skirt 63 in a corresponding position. A series of ring-shank nails 72 are located in holes formed in the ridge 71.

The clamp 61 is used in the same way as the clamp 11. However, the C-sectioned profile means that when the nails 72 are hammered home, the membrane 24 is clamped in position without the nails penetrating the inner leaf 69.

Figures 8 and 9 show a damp proof course system 100 in accordance with the second embodiment of the invention. The DPC system 100 is composed of a backing member 102 connected to a downwardly depending member 104 through a downwardly angled lip 106. The junction between the lip 106 and the backing member 102 is a line of reduced thickness which thereby constitutes a hinge 108.

The upper portion 110 of the depending member 104 would normally extend downwards at an angle from the lip 106. However, the lower portion 112 of the depending member 104 depends from the upper portion 110 relatively more vertically. The backing member 102 is formed with a longitudinal channel 114 in its front surface. The rear of the backing member 102 is provided with a compressible sealing strip 116 bonded thereto.

In use, the backing member 102 is located in position with the sealing strip 116 against the surface of the wall inner leaf. It is then fixed in position by nailing or stapling through the channel 114. The use of the channel 114 helps to prevent stress damage to the backing member. A cavity wall tray (not shown) is located in a suitable mortar layer in the wall outer leaf and an upwardly and rearwardly extending rear portion is located behind and beneath the depending member 104. This is facilitated by the action of the hinge 108 as shown in Figure 8. In combination, therefore, the backing member 102 and the cavity tray would span the cavity.

Figures 10 to 12 show a damp proof course system 200 in accordance with the third embodiment of the invention. As with the second embodiment, the system 200 comprises a backing member 202 and a cavity tray 203. In this case however, the backing member 202 comprises an elongate horizontal plate 210 from which a skirt 214 extends downwards and forwards at an angle. The skirt 212 includes a first portion 214 and a lower portion 216 connected to the lower edge of the first portion 214. The cavity tray 203 includes a horizontal base 221 and a rearwardly and upwardly extending rear portion 222. The junction between the first portion 214 and the lower portion 216 is a line of reduced thickness which thereby constitutes a hinge 218.

In use, the horizontal plate 210 will be located within the mortar layer between adjacent courses of brick 206, 208 in the inner leaf, as shown in either of Figures 11 and 12. In many instances bricks 206 and 208 will be brieze blocks or other similar suitable buildings materials.

The cavity tray is located with the plate 221 located in the mortar layer between adjacent brick courses of the outer leaf. The rear portion is located behind and beneath the skirt 214 of the backing member 202, accommodated by the hinged lower portion 216.

In Figure 11, the system 200 is shown in use with a cavity wall, where the lower portion 216 overlaps with a cavity tray 203 which is supported by an open-

back lintol 204. In use the DPC system 200 will have a greater length than the lintol 204 and will extend to the stop end of the lintol (not shown). Figure 12 shows the DPC system of Figure 10 in operation with an I.G. lintol 230.

Figure 13 shows a DPC system similar to those of Figures 11 and 12 in operation with a box lintol 240 in which a cavity tray 250 is adapted to be supported by the shape of the lintol 240.

The embodiments of Figures 11, 12 and 13 all show frame elements 260 and 262 which border a window 264.

Claims

1. A damp proof course (DPC) system for a cavity wall, characterised in that is comprises an elongate rear member associated with the inner leaf of the cavity wall the rear member including an elongate depending member, the depending member cooperating with a damp proof course membrane or a cavity tray, thereby spanning the cavity.

2. A system as claimed in Claim 1, characterised in that the rear member of the system is provided in the form of an elongate backing member and the depending member is provided in the form of an elongate skirt depending from the front of the backing member, the skirt leaving a section of the backing member above in the form of a border, and defining a channel between itself and the lower part of the backing member, the channel being arranged to receive the rear edge of the membrane, whereby the rear member performs as a support clamp.

3. A system as claimed in Claim 2, characterised in that the lower part of the backing below the border has a deviated cross-section which comprises a downwardly and outwardly inclined section, followed by a downwardly and inwardly inclined section which defines an elongate ridge having a substantially C-shaped cross-section, spaced away from the inner leaf, in use.

4. A system as claimed in Claim 3, characterised in that the skirt has a corresponding shape to the backing below the border whereby the channel is substantially C-shaped in cross-section.

5. A system as claimed in any of Claim 4, characterised in that the deviated backing includes an internal spacer rib extending backwards towards the inner leaf, in use, and the membrane is fixed in position by nails, screws or shot-fired pins, directed through the skirt and the membrane and then into the internal spacer rib without breaking the surface of the inner leaf.

6. A system as claimed in any preceding Claim in combination with a DPC membrane.

7. A system as claimed in Claim 1, characterised in that the rear member of the system is provided in the form of an elongate backing member and the depending member is provided in the form of a skirt depending from the bottom edge of the backing member, the backing member extending generally upwards from the skirt in use.

8. A system as claimed in Claim 1, characterised in that the rear member of the system comprises an elongate backing member in the form of a plate and the depending member is provided in the form of a skirt depending from the plate, in use, the plate being generally horizontal and being interleaved with or inserted into the inner leaf of a cavity wall in use.

9. A system as claimed in any preceding Claim, characterised in that the skirt is provided with a longitudinal hinge which allows it to be raised away from the backing member, the hinge section preferably being a line of reduced thickness.

10. A system as claimed in Claim 9 when dependent on Claim 7, characterised in that the skirt comprises a lip projecting forwards from the bottom edge of the backing member, the lip being connected by a hinge section to a lower portion of the skirt.

11. A system as claimed in Claim 9 when dependent on Claim 8, characterised in that the skirt comprises a first portion projecting downwards at an angle from the plate and a lower portion, connected by a hinge section to the first portion of the skirt.

12. A system as claimed in any of Claim 7 to 11, characterised in that the skirt overlaps with the upper edge of a cavity tray.

13. A system as claimed in any of Claims 2 to 12, characterised in that the backing member is substantially flat.

14. A system as claimed in any of Claims 2 to 13, characterised in that the skirt and/or backing member is fixed in position by nails.

15. A system as claimed in any preceding Claim, characterised in that the rear member is formed as an extruded profile which is then cut to length.

16. A cavity wall in combination with a system as claimed in any preceding Claim.

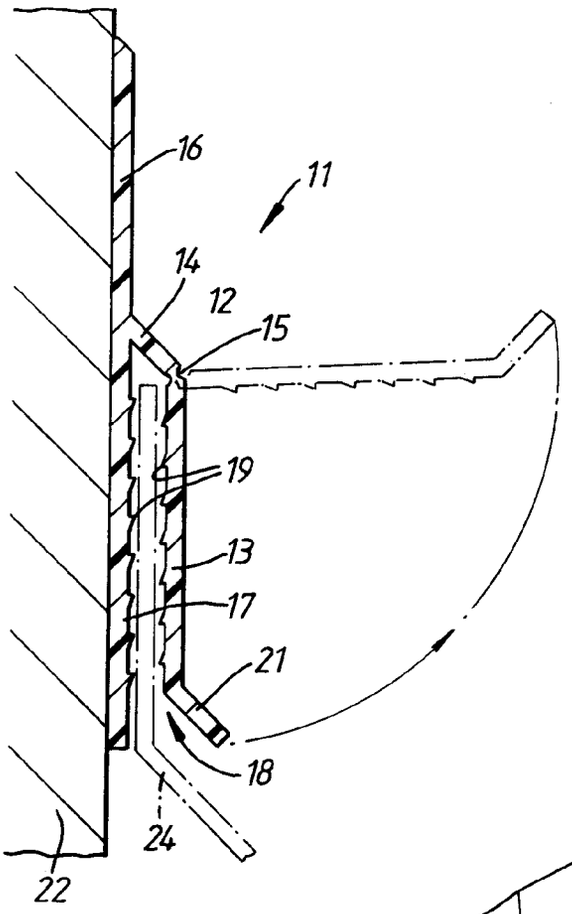

Fig.1

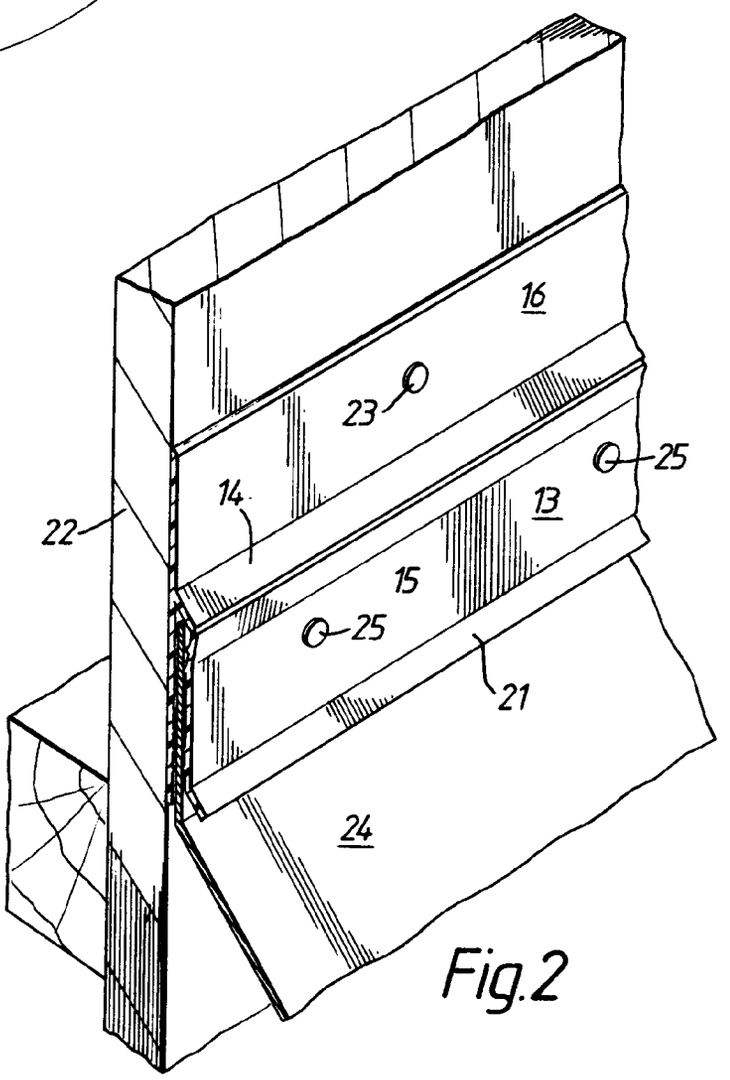

Fig.2

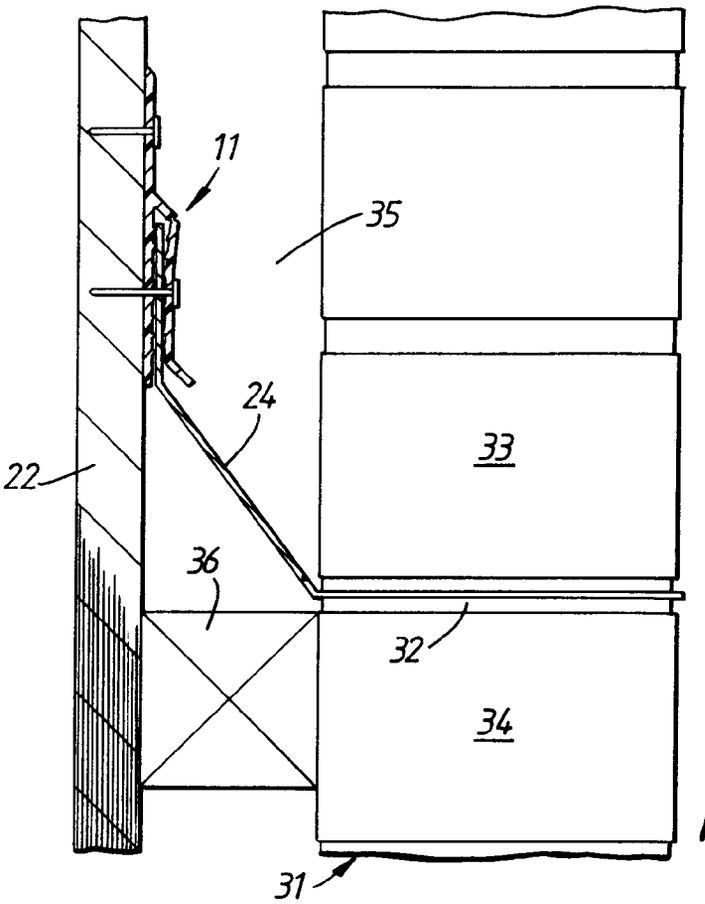

Fig.3

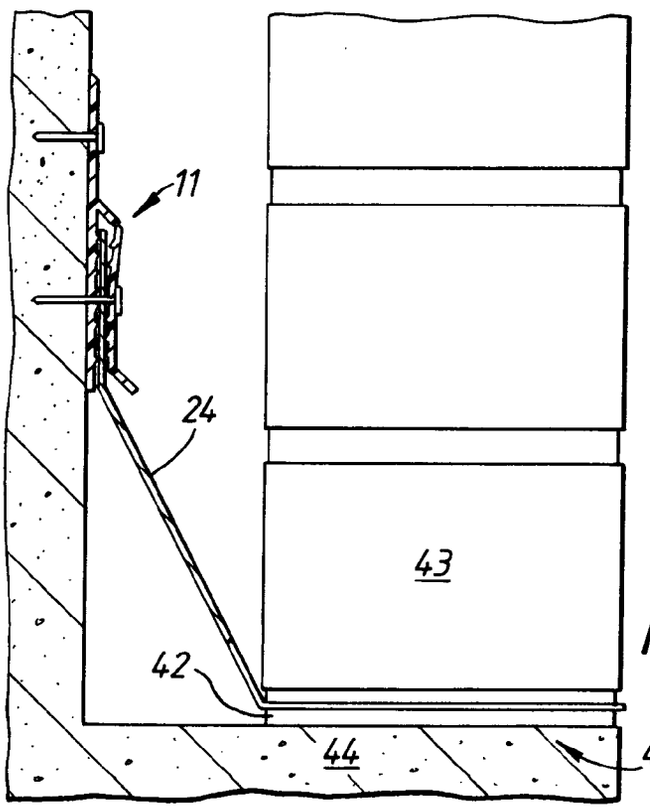

Fig.4

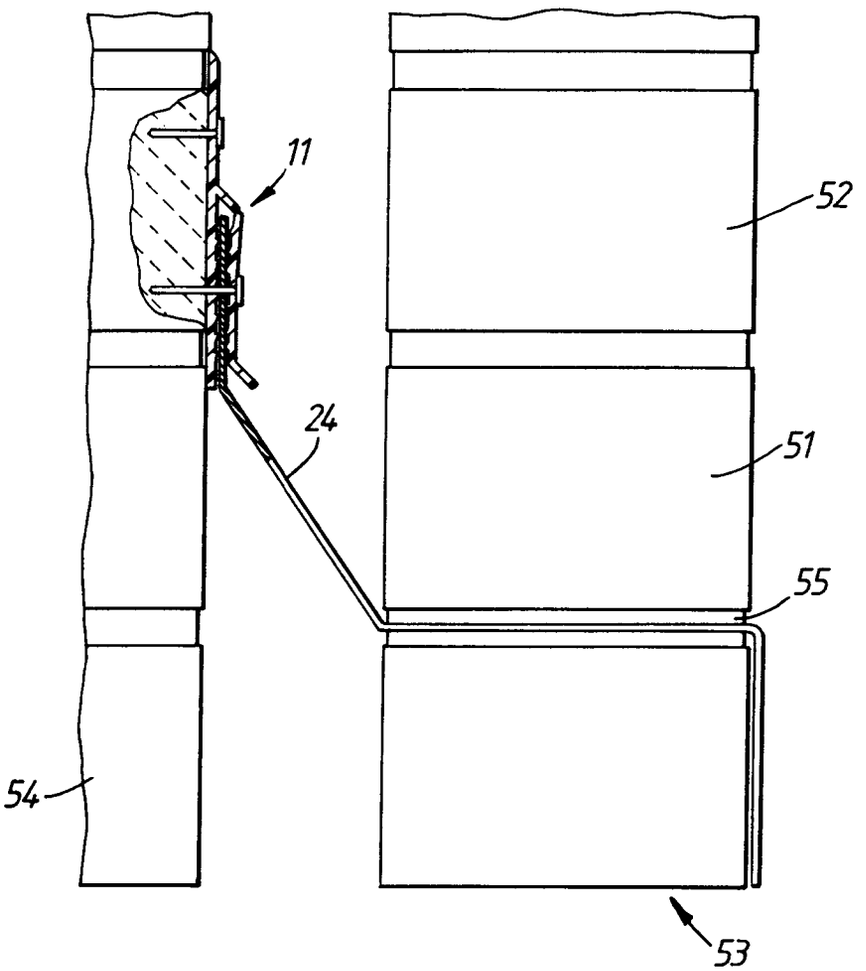

Fig.5

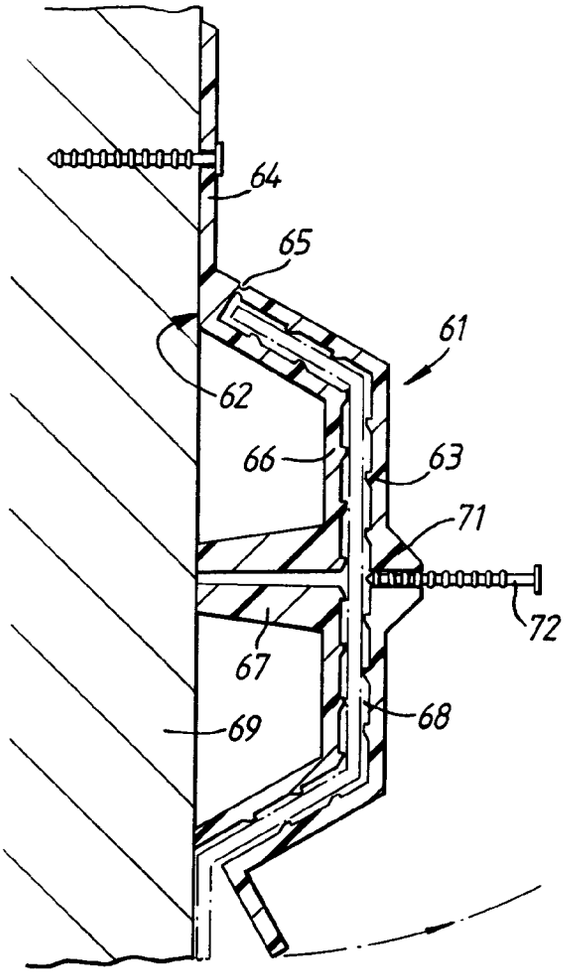

Fig 6

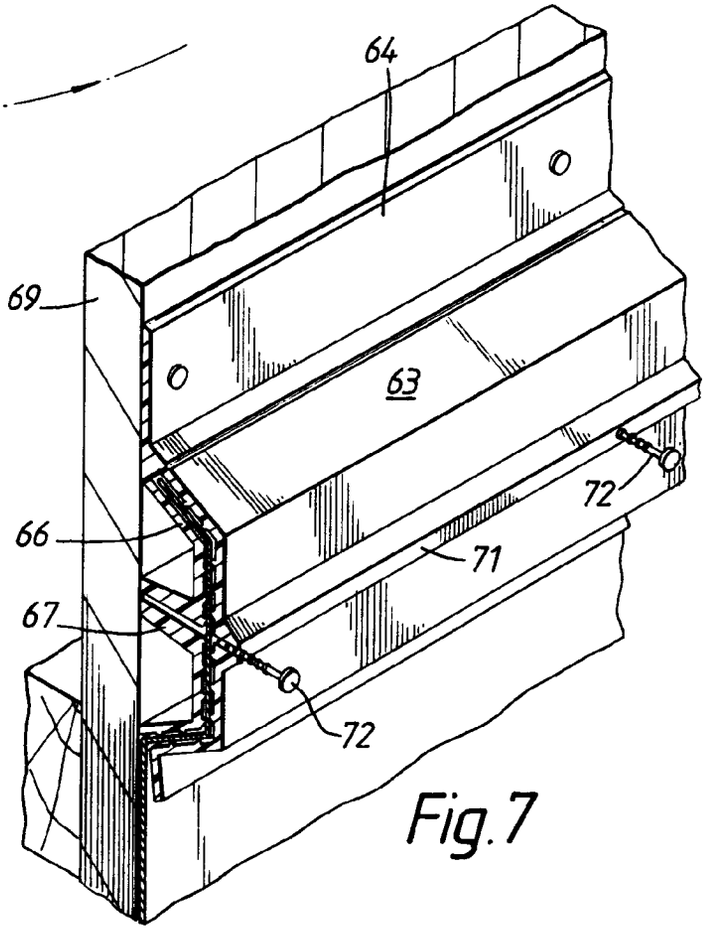

Fig. 7

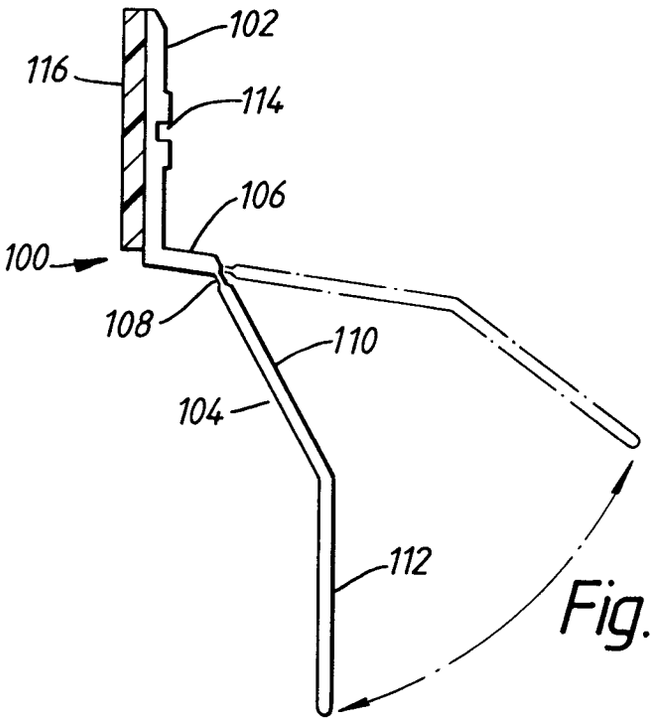

Fig.8

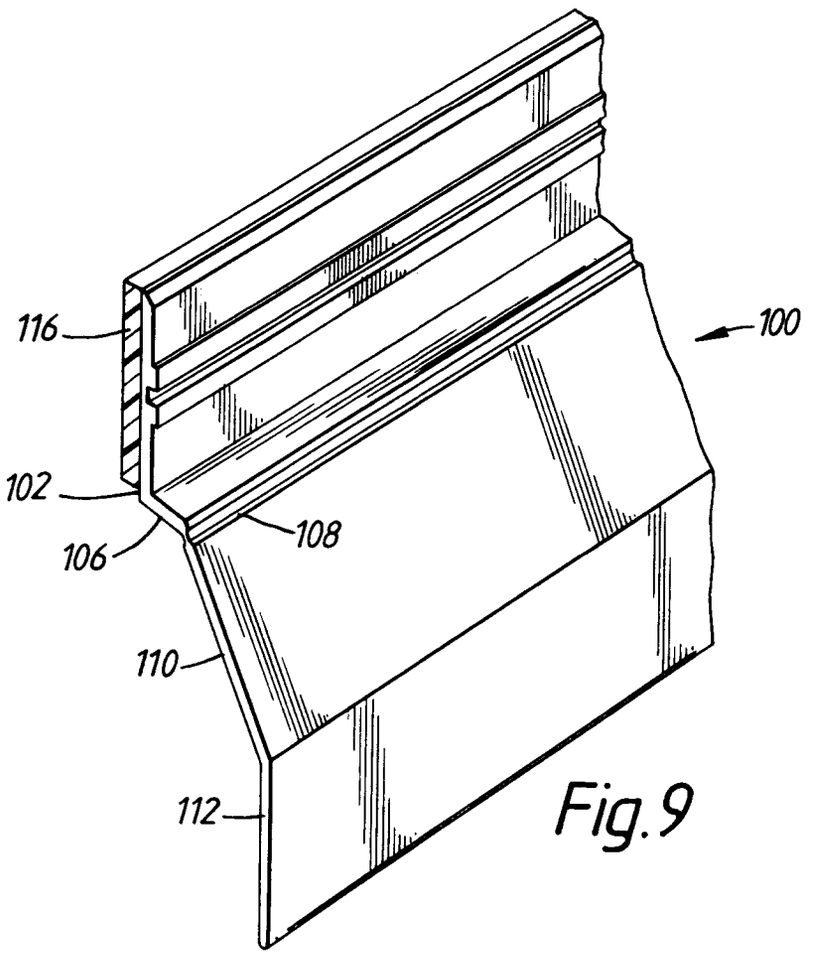

Fig.9

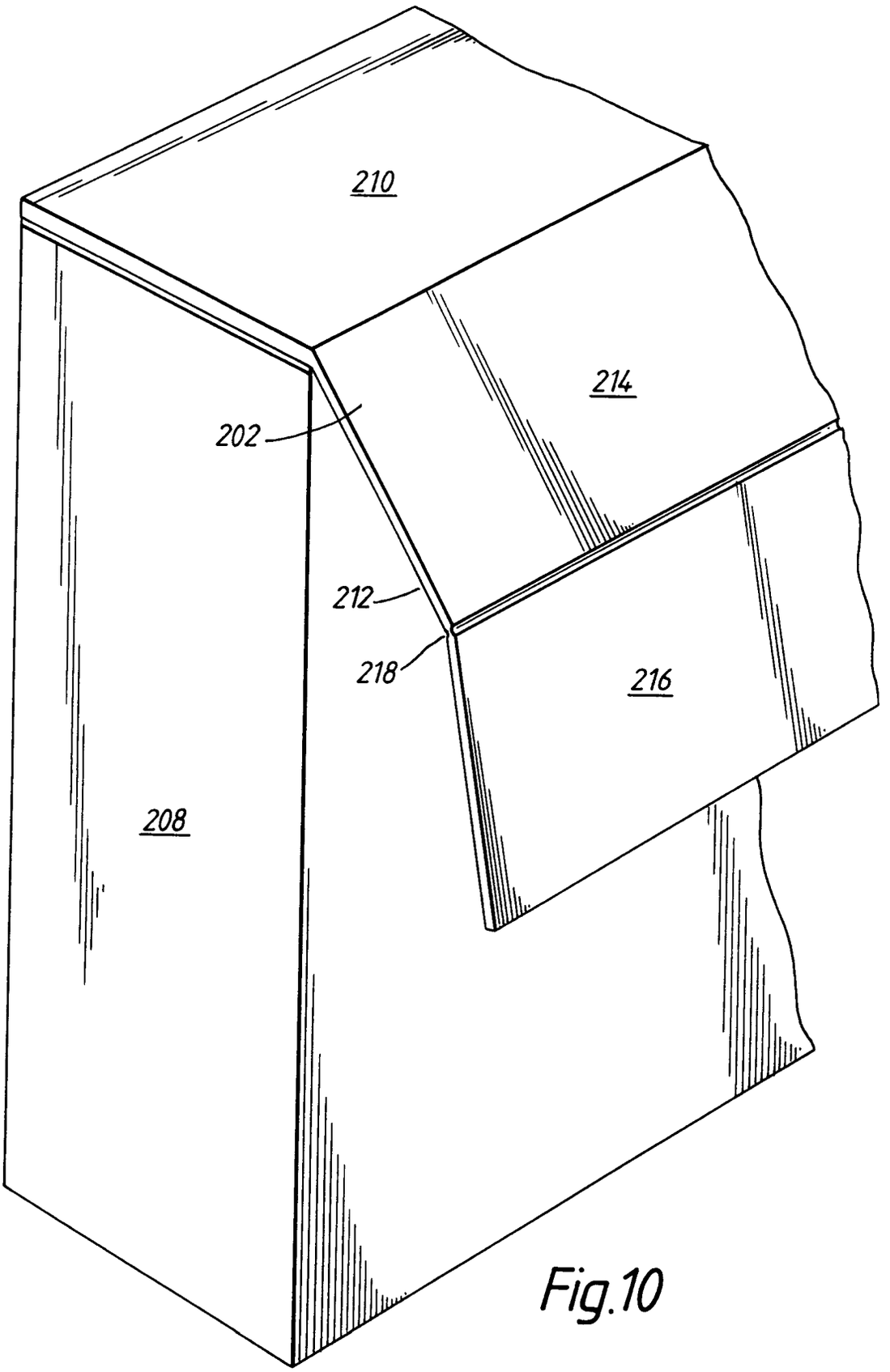

Fig.10

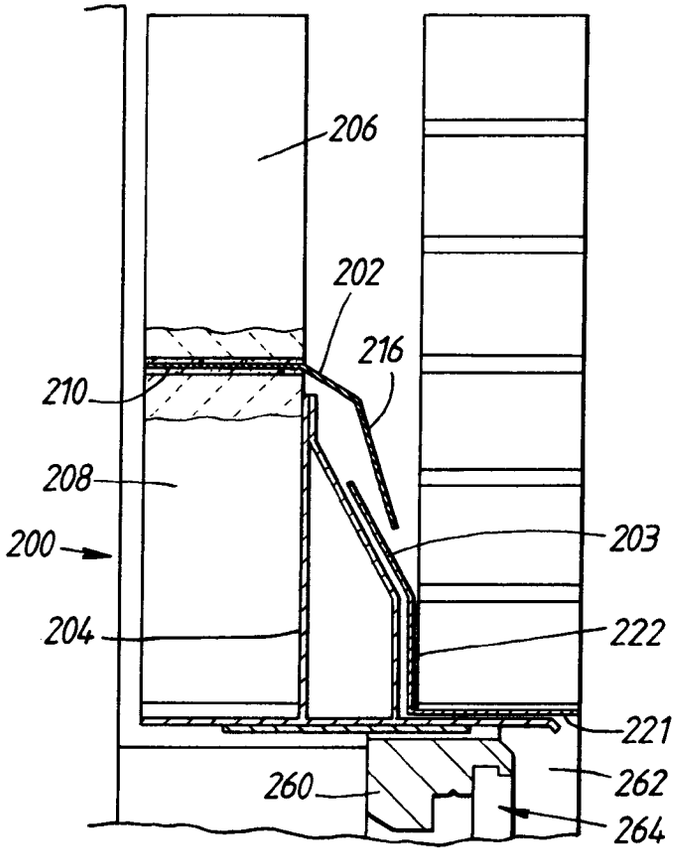
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Fig.11

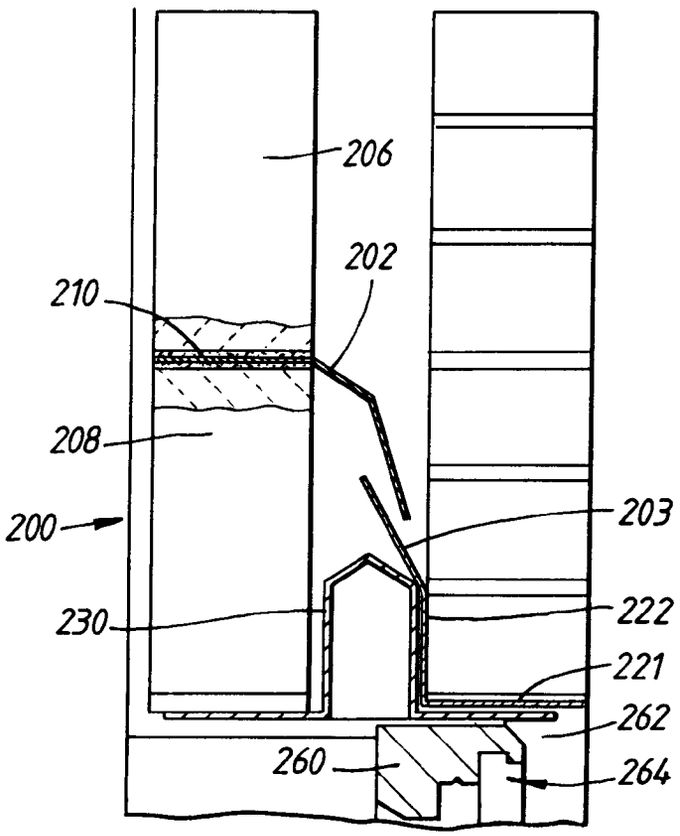
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Fig.12

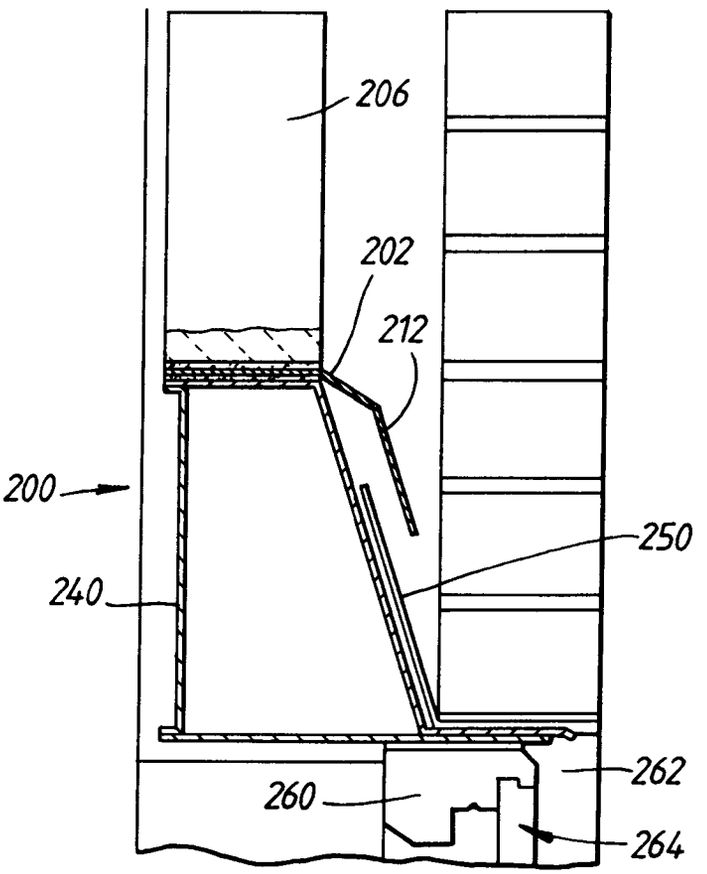

Fig 13

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

DOCUMENTS CONSIDERED TO BE RELEVANT

EP 95300279.7

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 6)
A	GB - A - 2 220 684 (WARD GROUP) * Fig. 1 * --	1,14	E 04 B 2/28
A	GB - A - 1 598 011 (RUFFER) * Fig. 2F * --	1	
A	GB - A - 2 221 934 (IBSTOCK) * Fig. * --	1,8	
A	GB - A - 2 142 359 (SHILLABEER) * Fig. 5 * --	1,9	
A	GB - A - 1 419 570 (HALA) * Fig. 22 * ----	1,12	
			TECHNICAL FIELDS SEARCHED (Int. Cl. 6)
			E 04 B 2/00

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
VIENNA	12-04-1995	KNAUER

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
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P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

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