

(12) **UK Patent Application** (19) **GB** (11) **2468161** (13) **A**

(43) Date of A Publication

01.09.2010

(21) Application No: **0903472.9**
(22) Date of Filing: **02.03.2009**
(30) Priority Data:
(31) **0903397** (32) **28.02.2009** (33) **GB**

(51) INT CL:
E04F 13/08 (2006.01)

(56) Documents Cited:
GB 2108173 A **EP 0134583 A**
DE 102005019977 A1 **FR 002562591 A**
US 7698864 B2 **US 4803821 A**
US 4553366 A **US 20070251181 A1**

(71) Applicant(s):
Aggregate Industries UK Limited
(Incorporated in the United Kingdom)
Bardon Hall, Copt Oak Road, Markfield,
Leicestershire, LE67 9PJ, United Kingdom

(58) Field of Search:
INT CL **E04F**
Other: **WPI & EPODOC**

Bill Dunster Architects-Zed Factory Limited
21 Sandmartin Way, WALLINGTON, Surrey,
SM6 7DF, United Kingdom

(72) Inventor(s):
Kevin Greaves
Bill Dunster

(74) Agent and/or Address for Service:
Hammonds LLP
7 Devonshire Square, London, EC2M 4YH,
United Kingdom

(54) Title of the Invention: **A cladding element and method of cladding**
Abstract Title: **A cladding element with integral hook-shaped mounting member**

(57) A cladding element 102 for mounting on a wall of a building, comprising a front surface; and a rear portion, which includes a mounting member 202. The mounting member is preferably located near to the top of the cladding element and extends along its length. The mounting member preferably has a hook-shaped profile defining recess 208 which corresponds to an upward-angled projection 116 on a horizontal support rail 110 attached to the building. The support rail may be supported in turn by cross-battens. The support rail and battens may both be timber. The upper and lower edges of the cladding preferably have corresponding profiles and are in use bonded together using lime cement. The cladding element may comprise extruded terracotta or moulded concrete. In use, the mounting member and optionally further projections on the rear portion of the cladding element, keep the main body of the cladding spaced from the wall of the building, thereby providing an insulating gap.

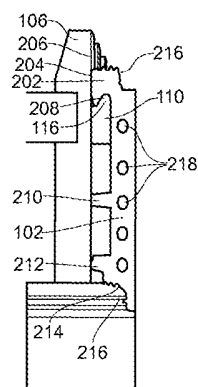


FIG. 2

The claims were filed later than the filing date but within the period prescribed by Rule 22(1) of the Patents Rules 2007.

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

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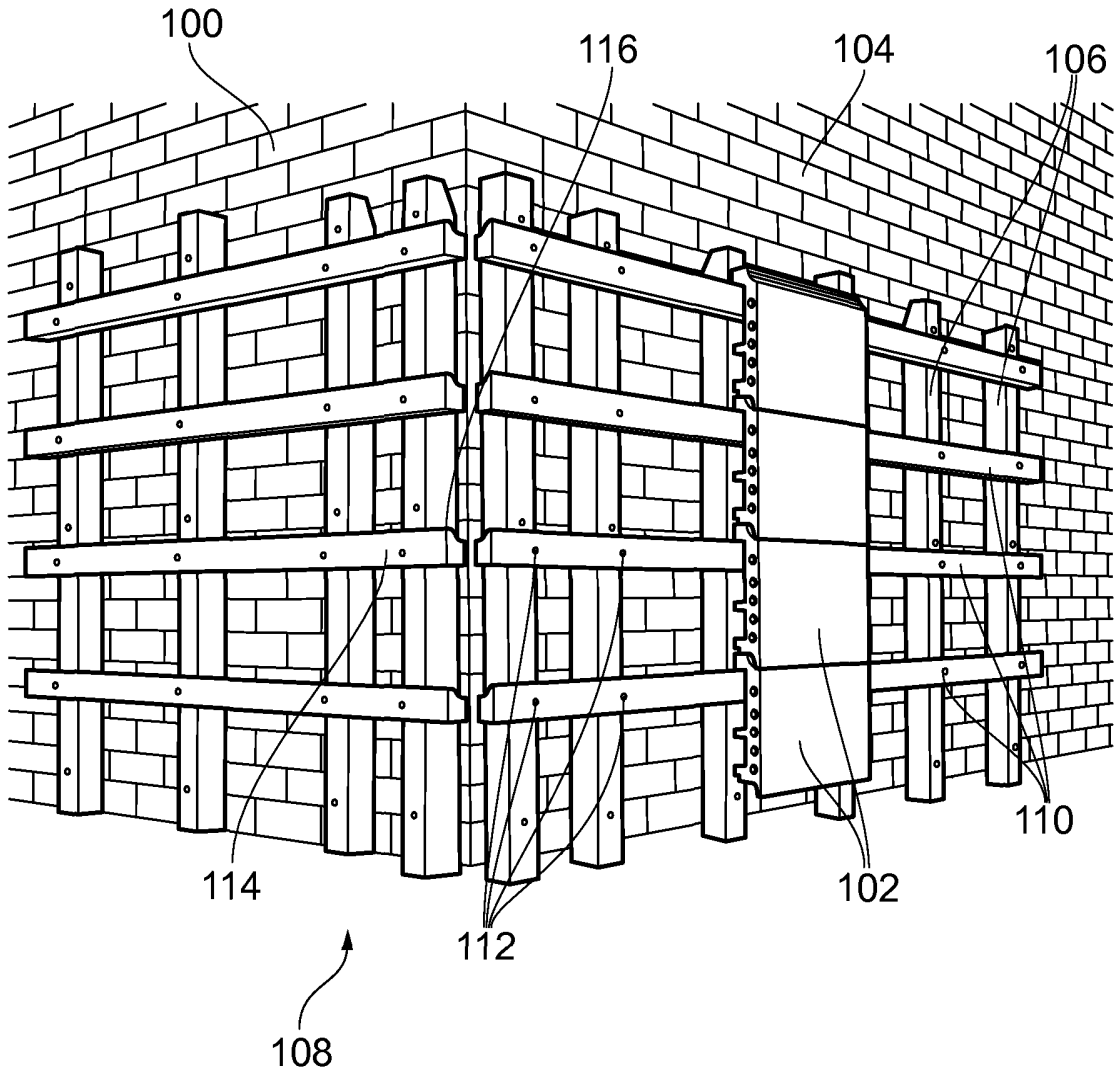


FIG. 1

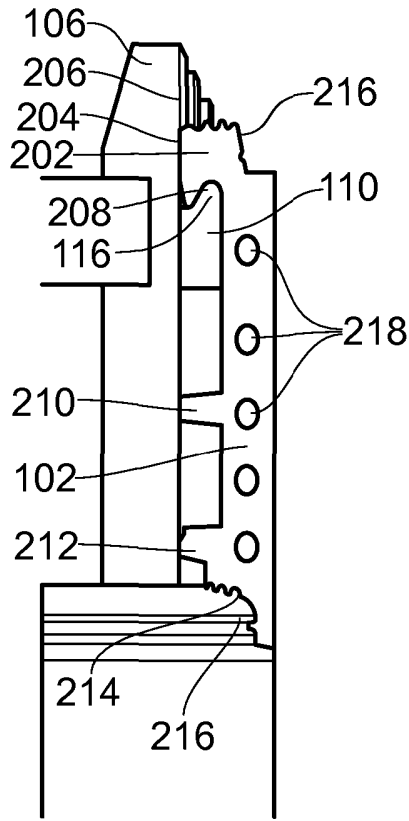


FIG. 2

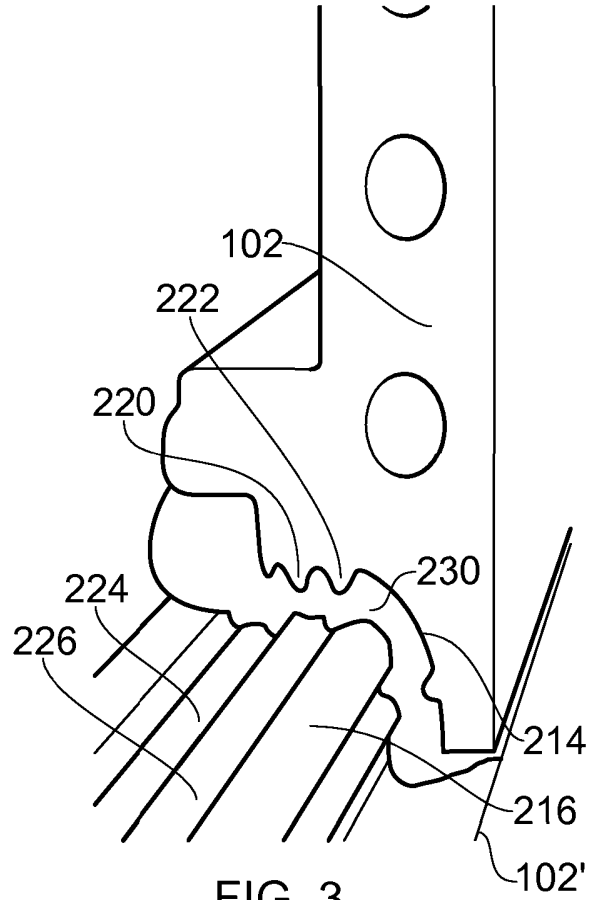


FIG. 3

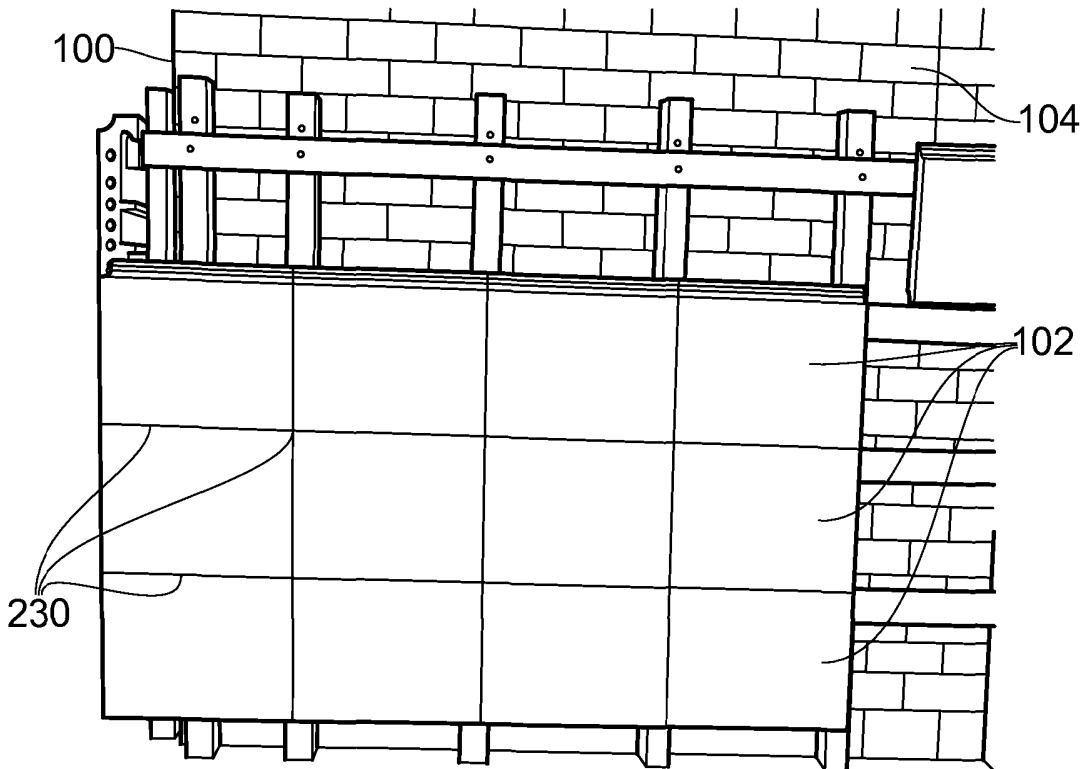


FIG. 4

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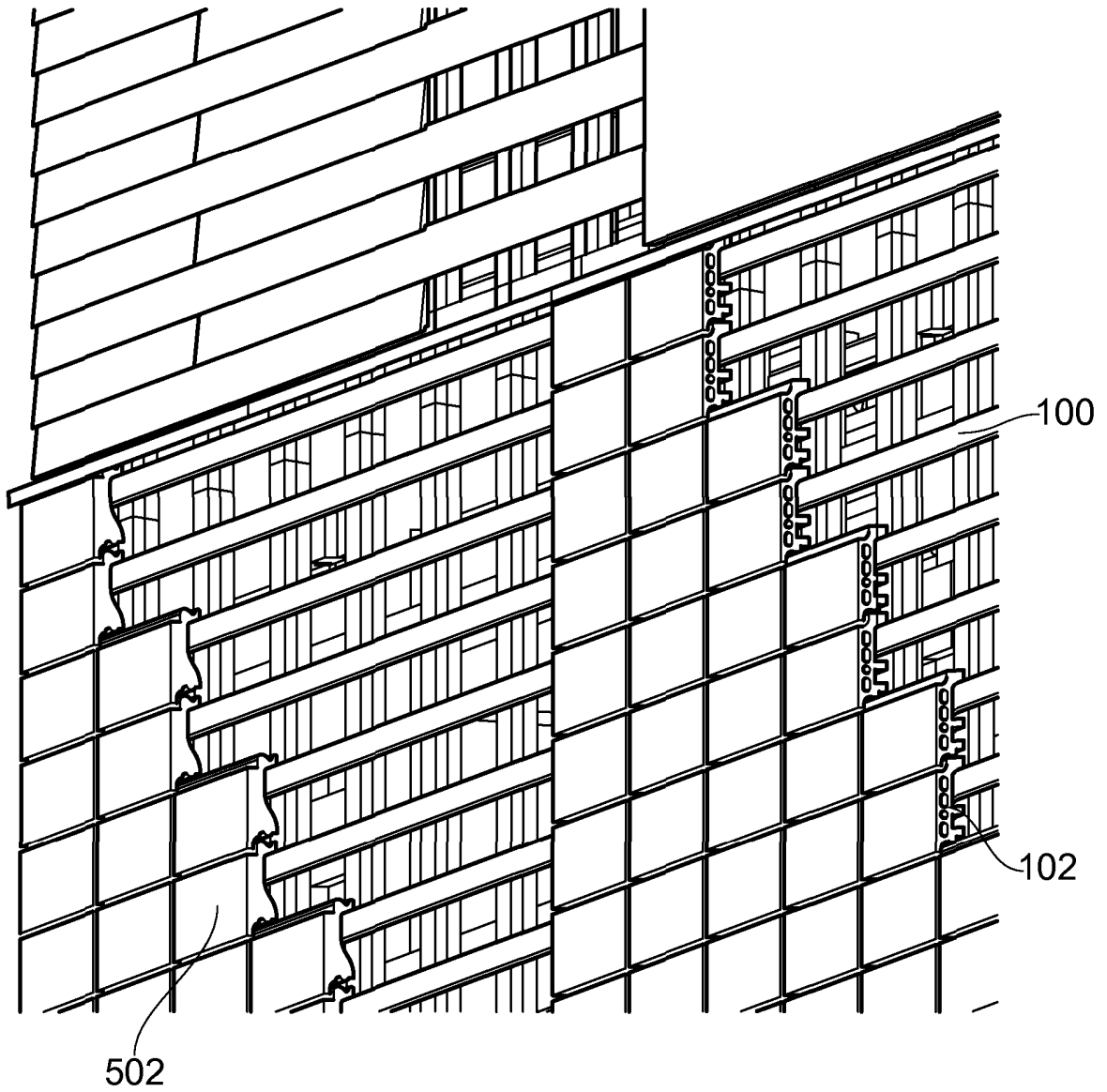


FIG. 5

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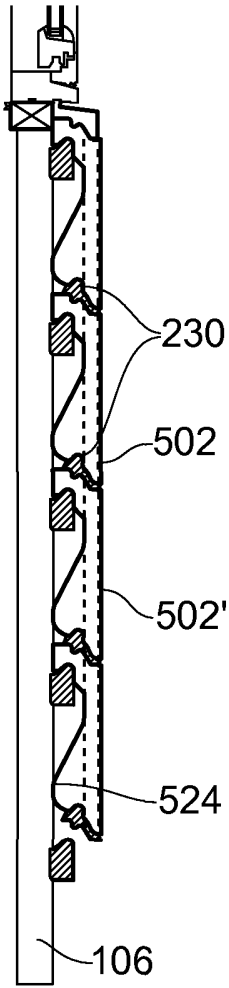


FIG. 6(b)

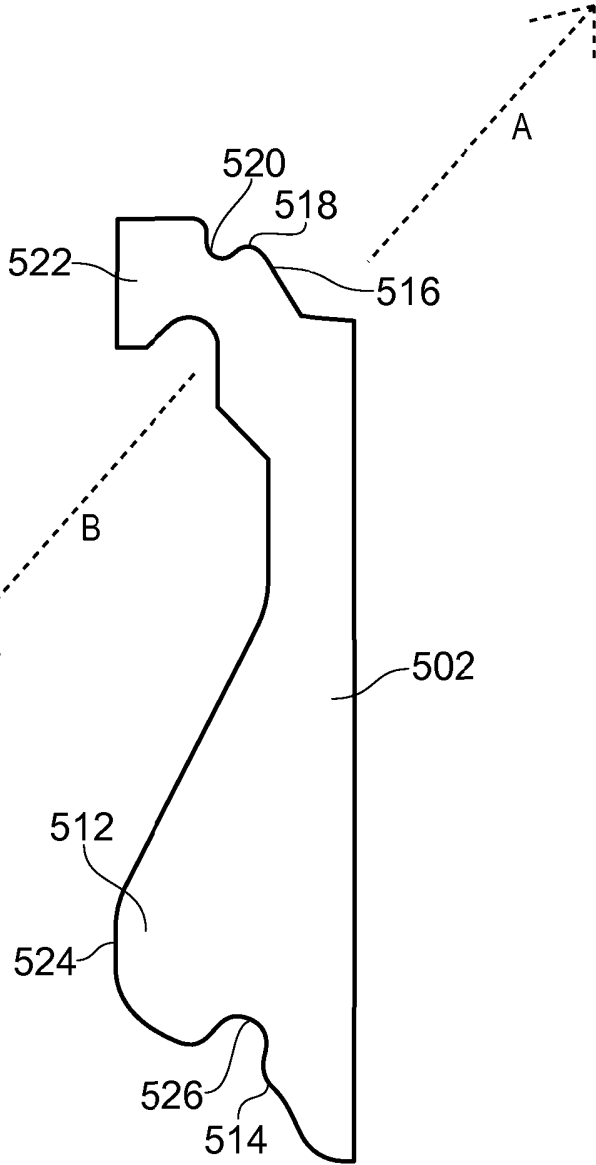


FIG. 6(a)

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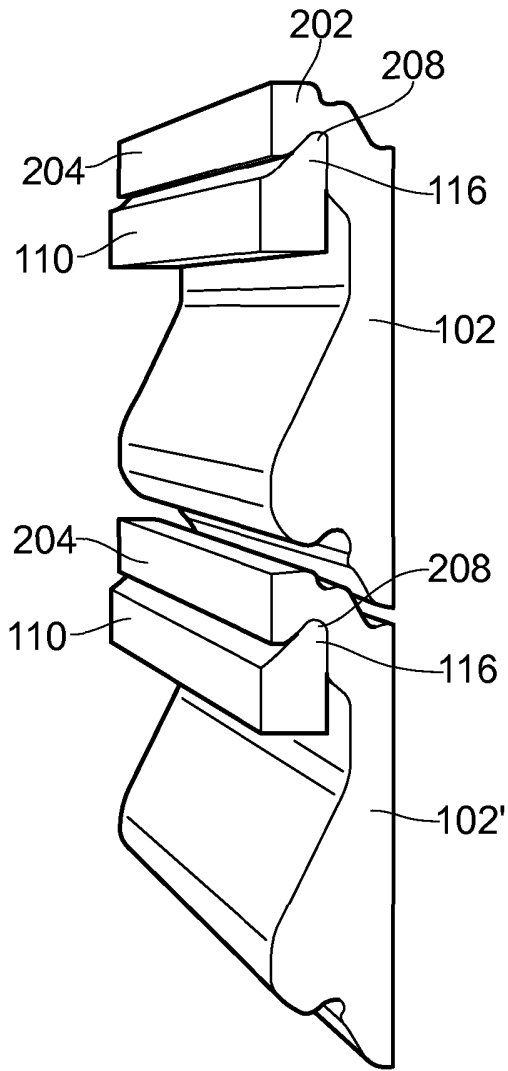


FIG. 7

A cladding element and method of cladding

The present invention relates to construction technologies, and more particularly to a cladding element and method of cladding.

A problem with buildings constructed many years or many decades ago is that the external appearance has deteriorated with time; and demolishing buildings and replacing them with new build can present logistical problems. Further, existing elderly buildings often perform poorly in terms of thermal insulation and protection from noise pollution.

More recently, where new buildings are built, it is known to use in some cases a construction with an inner wall and outer facing or cladding elements – forming a tiled appearance – attached by spacer and/or fixing members to the internal wall. However, such new build can entail significant cost, and the fixing members and cladding elements can be energy intensive to manufacture and/or made of non-recyclable materials, increasing the overall carbon usage in relation to the building.

A further problem is that the fixing members can be numerous and difficult to use, and the cladding elements time-consuming to install.

Known systems include Terracotta rainscreen cladding systems. Most precast concrete or extruded terracotta rainscreen overcladding systems have a very high embodied CO₂, require a metal rail support system that is expensive, and rattles in the wind, is easily vandalised, and supports durable material on shortlife easily corroded metal components.

The present invention seeks to address the aforementioned and other issues.

According to one aspect of the present invention there is provided a cladding element for mounting on a wall of a building, comprising: a front surface; and a rear portion, on the opposite side of the cladding element to the front surface, the rear portion including at least one mounting member, for mounting the cladding element on the building.

Preferably, the at least one mounting member includes a first mounting member, shaped for engaging a correspondingly shaped support member attached to the building.

Preferably, the said first mounting member includes a mounting member at or near the top of the cladding element.

Preferably, the said first mounting member extends along the length of the cladding element.

Preferably, the said first mounting member has a hook-shaped profile.

Preferably, the said hook-shaped profile is shaped for engaging an elongate projection on the support member that extends upwardly in a direction at an acute angle to the outer surface of the building.

According to another aspect of the present invention there is provided a method of cladding a wall of a building, comprising: securing a supporting structure to the wall; securing a plurality of cladding elements to the supporting structure in a tiled formation, the cladding elements being in accordance with any of claims 1 to 6 of the appended claims.

Preferably, the support structure includes a plurality of vertically disposed beams.

Preferably, the support structure includes a plurality of horizontally disposed beams, the horizontally disposed beams including an upward projection for engaging first mounting member on the cladding elements.

According to another aspect of the present invention there is provided a cladded building obtainable by the method of claim 7, 8 or 9 of the appended claims.

An advantage of the invention is that the system uses cladding rails supported on cross battens to provide an insulation gap between cladding and structural wall, or the existing wall of a building

A further advantage of the invention arises from the use of uses lime mortar to set each tile in place, effectively allowing future reuse, but preventing all scope for rattle, vibration or theft today.

The same techniques for making blocks or roof tiles (e.g. from terracotta) can be used to make the cladding elements for the insulated wall overcladding according to embodiments of the invention.

A further advantage of the invention lies in the use of low embodied CO₂ treated timber for the cladding rails supported on low cost timber cross battens.

Embodiments of the invention will now be described in detail, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of (corner) portion of a building, which is partially cladded using the cladding element and method according to an embodiment of the invention;

Figure 2 is a side view at the corner of the cladding of Fig. 1;

Figure 3 is a close up view of the cladding of the cladding of Fig. 3, showing in more detail a cladding element according to an embodiment of the invention;

Figure 4 is a front view of the building of Fig. 1, showing part of the cladding fully mounted;

Figure 5 is a perspective view of a building that is partially cladded, and illustrating first and second embodiments of the cladding element according to the invention;

Figure 6 shows (a) a cross-sectional view of a cladding element according to a second embodiment of the invention, and (b) a cross-sectional view of a partially cladded wall using the second embodiment of the cladding element; and

Figure 7 is a partial, perspective view of the cladding of Fig. 6(b), omitting the wall and part of the supporting structure.

In the following, like references will be used to describe like elements. Unless indicated otherwise, and design feature disclosed or illustrated herein may be used in conjunction with any other design feature disclosed or illustrated herein.

Figure 1 is a perspective view of (corner) portion of a building 100, which is partially cladded using the cladding element 102 (also referred to herein as "tiles") and method according to an embodiment of the invention. In the following, the discussion

relates to cladding of one wall 104 of the building 100 using the cladding system, and it will be appreciated that other walls on the remainder of the building are cladded in a similar manner.

According to the method, vertical support member 106, resting on the ground 108, are first secured to the wall 104 – any suitable securing method may be used, including bolting (through to the interior (not shown) of the wall 104), nailing, or plug and screw fastening. The vertical support members 106 are preferably made of timber and have a rectangular cross-section whose dimensions are each 7.5-15 cm.

Next, horizontal support members 110 are attached to the vertical support members 106, using any suitable securing method, such bolting, nailing and/or screw fastening 112. In this embodiment, the horizontal support members 110 do not have a rectangular cross-section; rather, the profile is such that at the outward facing surface 114 thereof is an upwardly extending projection 116 that project away from the wall 104 and provides a supporting and engaging projection, for receiving a correspondingly shaped recess in the cladding elements 104, as discussed further hereinafter.

Figure 2 is a side view at the corner of the cladding of Fig. 1, showing the profile of the cladding element 102. This includes an upper spacing projection 202 having a surface 204 for abutting the outer surface 206 of an upper support member 106 when mounted, the upper spacing projection 202 having a recess 208 defined therein for engaging the upwardly extending projection 116 of the horizontal support member 110 and enabling the cladding element 102 to be supported on the horizontal support member 110.

In this embodiment, the cladding element 102 includes an intermediate spacing projection 210 also for abutting the outer surface 206 of an upper support member 106 when mounted, and a lower spacing projection 212 also for abutting the outer surface 206 of an upper support member 106 when mounted.

The cross-sectional profile of the cladding element 102 preferably also includes a lower abutment profile 214 (in this case of substantially arcuate cross-section), for engaging a corresponding upper abutment profile 216 of a horizontally adjacent cladding element 102'.

Also, in this embodiment, the cladding element 102 is provided with a number (here 5) of through holes 218, thereby saving weight and permitting the circulation of air or other gases.

Figure 3 is a close up view of the cladding of Fig. 3, showing in more detail a cladding element 102 according to an embodiment of the invention. It can be seen that in this embodiment the lower abutment profile 214 of cladding element 102 includes minor downward projections 220, 222, and the upper abutment profile 216 of a horizontally adjacent cladding element 102' includes corresponding minor downward recesses 224, 226.

According to the cladding method, after installing cladding element 102', cement or adhesive material 230 is applied, and cladding element 102 then mounted above, whereby the cement or adhesive material 230 fills the gap between the lower abutment profile 214 of cladding element 102 and the upper abutment profile 216 of a horizontally adjacent cladding element 102' and binds the two cladding elements 102, 102' together. As the cladding elements 102 are supported on the upwardly extending projection 116 of the horizontal support member 110, there is no need to cure the cement or adhesive material 230 after mounting of each cladding element 102, 102', or after mounting of each row of cladding elements 102, 102'.

In preferred embodiments, the cement or adhesive material 230 comprises lime mortar to set each tile in place, effectively allowing future reuse, but preventing all scope for rattle, vibration or theft.

Figure 4 is a front view of the building of Fig. 1, showing part of the cladding fully mounted. It can be seen that the cladding elements 102 are mounted in an array of rows and columns, with cement or adhesive material 230 filling the gaps between adjacent cladding elements 102 so as to provide a substantially continuous and flat front surface, i.e. a new and refurbished exterior surface to the building 100 in place of old wall 104.

Figure 5 is a perspective view of a building 100 that is partially cladded, and illustrating first 102 and second 502 embodiments of the cladding element according to the invention. The cladding element 102 according to the first embodiment is as previously discussed. The cladding element 502 according to the second embodiment is the same as the first embodiment, except as described hereinafter.

Figure 6 shows (a) a cross-sectional view of a cladding element 502 according to a second embodiment of the invention, and (b) a cross-sectional view of a partially cladded wall 104 using the cladding element 502.

Referring to Fig. 6(a), the cladding element 502 includes an upper spacing projection 522, as in the first embodiment, but the upper abutment profile 516, instead of being substantially arcuate, includes a major upward projection 518 and major upward recess 520.

In this embodiment, the intermediate spacing projection is omitted, and the lower spacing projection 512 includes an abutting surface 524 for abutting a vertical support member 106 (see Fig. 6(b)). Also in this embodiment, the lower abutment profile 514, instead of being substantially arcuate, includes a major downward recess 526.

Referring to Fig. 6(b), as before, cement or adhesive material 230 fills the gap between the lower abutment profile 514 of cladding element 502 and the upper abutment profile 516 of a horizontally adjacent cladding element 502' and binds the two cladding elements 502, 502' together.

Figure 7 is a partial, perspective view of the cladding of Fig. 6(b), omitting the wall and part of the supporting structure. As mentioned, the horizontal support members 110 have an elongate upwardly extending projection 116 which engages recess 208 in upper spacing projection 202 of the cladding elements 102, 102', so as to support the latter thereon.

The cladding elements 102, 502 may be fabricated from wet casting of concrete using moulds. In this process, a wet concrete mix is poured into a mould (not shown) made of polyurethane or the like. This mould forms the shape of the product. The concrete is left until cured sufficiently, and thereafter removed from the mould.

In Fig. 6, arrows A and B indicate the direction (angles) of removal of the top and bottom halves of the mould, respectively, when this fabrication methods for the cladding elements 102, 502 is used.

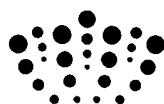
Alternatively, cladding elements 102, 502 may be fabricated by extrusion of terracotta, using techniques well known in the art. As is well known, terra cotta is a clay-based ceramic. An appropriate refined clay is partially dried and extruded into the desired shape. After further thorough drying it is placed in a kiln and then fired. After firing the hot product is cooled, for example by covering with sand. When unglazed, the material is not waterproof, but it is suitable building decoration in tropical environments. For building usage in colder environments, it is required that the material be glazed. Some types of terra cotta are created from clay that includes recycled terra cotta.

Claims:

1. A cladding element for mounting on a wall of a building, comprising:
a front surface; and
a rear portion, on the opposite side of the cladding element to the front surface, the rear portion including at least one mounting member, for mounting the cladding element on the building.
2. The cladding element of claim 1, wherein at least one mounting member includes a first mounting member, shaped for engaging a correspondingly shaped support member attached to the building.
3. The cladding element of claim 1 or 2, wherein said first mounting member includes a mounting member at or near the top of the cladding element.
4. The cladding element of claim 2, or any claim dependent thereon, said first mounting member extends along the length of the cladding element.
5. The cladding element of claim 3, wherein said first mounting member has a hook-shaped profile.
6. The cladding element of claim 3, wherein said hook-shaped profile is shaped for engaging an elongate projection on the support member that extends upwardly in a direction at an acute angle to the outer surface of the building.
7. A method of cladding a wall of a building, comprising:
securing a supporting structure to the wall;
securing a plurality of cladding elements to the supporting structure in a tiled formation, the cladding elements being in accordance with any of claims 1 to 6.
8. The method of claim 7, wherein the support structure includes a plurality of vertically disposed beams.
9. The method of claim 7 or 8, wherein the support structure includes a plurality of horizontally disposed beams, the horizontally disposed beams including an upward projection for engaging first mounting member on the cladding elements.

10. A cladded building obtainable by the method of claim 7, 8 or 9.

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Application No: GB0903472.9

Examiner: Dr Hazel Thorpe

Claims searched: 1-10

Date of search: 20 May 2010

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	1-10	US 4803821 A (FUNAKI), see abstract & all figures.
X	1-8, 10	EP 0134583 A (KLINK), see abstract & all figures, WPI abstract accession no. 1985-069950 [12].
X	1-6, 10	US 7698864 B2 (JUSTICE), see abstract & figure 13 especially.
X	1-3, 5-10	US 2007/251181 A1 (DUPONT), see abstract & figures 2 & 3.
X	1-3, 5-10	US 4553366 A (GUERIN), see abstract & figures 1, 4 & 6.
X	1-7, 9, 10	FR 2562591 A (GEN BATIMENT), see WPI abstract accession no. 1985-291398 [47] & all figures.
X	1-4, 7-10	GB 2108173 A (GOMEI KAISHA OSAWA), see abstract & all figures.
X	1-4, 7-10	DE 102005019977 A1 (DEUT STEINZEUG CREMER & BREUER AG), see WPI abstract accession no. 2006-768125 [79] & figures 1 & 2.

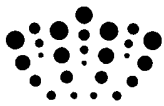
Categories:

X Document indicating lack of novelty or inventive step	A Document indicating technological background and/or state of the art.
Y Document indicating lack of inventive step if combined with one or more other documents of same category.	P Document published on or after the declared priority date but before the filing date of this invention.
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Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^X :

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Worldwide search of patent documents classified in the following areas of the IPC

E04F

The following online and other databases have been used in the preparation of this search report

WPI & EPODOC

International Classification:

Subclass	Subgroup	Valid From
E04F	0013/08	01/01/2006