



PATENT SPECIFICATION

(11) S85555

(21) Application No. S2008/0992

(22) Date of Filing of Application: 12/12/2008

(45) Specification Published: 21 July 2010

(51) Int. Cl. (2009)
E04C 2/10

(54) Title: A wall panel

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(73) Patent Granted to: James Howard, 34 Marlton Grove Wicklow Town., Ireland

A Wall Panel

This invention relates to an insulated laminated wall panel.

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In existing techniques for insulating walls on the inside of a building, the walls are battened out using timbers and insulating plasterboards screwed to these battens. This leaves a gap behind the boards for accommodating services such as central heating water pipes and electric

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cables.

Problems with this technique are:

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- It is very difficult to get holes in the boards to line up with the services behind them and often big holes are left at the end of the job that are never properly finished.

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- There is no insulation left on the wall where an electrical socket is placed.

- The grounds for radiators are too far away from the brackets that are fixed on the inside of the wall, thus making the radiator very weak on the wall.

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- There is no insulation behind radiator pipes; thus there is a high distribution loss in the heating system.

- There is no fixing on the insulated plasterboard for a skirting as the board is too thick.

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- There is no fixing on the wall for hanging items like a picture.

- The zone behind the plasterboard is an area where heat is lost very easily if not properly sealed along the bottom and at sockets, etc.

- It is difficult to achieve air tightness with this type of board.
- Overall, with the existing technique there are many weak points in the insulation and the thermal efficiency of the building is greatly diminished.

This type of insulated board can be affixed directly to the wall but if this is done the insulation must be cut off the back to accommodate the services. This greatly reduces the thermal efficiency of the building and is not good building practice. Even if these boards are stuck using a bonding compound, the same disadvantages exist.

It is an object of the invention to provide a wall panel in which one or more of these disadvantages is avoided or mitigated.

According to the present invention there is provided an insulated laminated wall panel comprising a sheet of a substantially rigid thermally insulating material sandwiched between and bonded to a substantially rigid air-tight sheet of an engineered wood and a sheet of plasterboard.

Preferably the engineered wood comprises oriented strand board.

One or more service supply members, such as plumbing pipes and/or electric cable conduits, may be embedded in the insulating sheet.

The wall panel may include a further sheet of substantially rigid thermally insulating material bonded to the opposite side of the sheet of engineered wood.

5 In an embodiment the insulating and plasterboard sheets are substantially in register and the engineered wood sheet is laterally displaced relative to the insulating and plasterboard sheets to form a tongue and a groove along opposite substantially parallel edges of the wall
10 panel.

The invention further provides an internal surface of a wall of a building which is insulated by a plurality of wall panels as aforesaid fixed edge to edge directly to
15 the internal surface with their plasterboard surfaces outermost.

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

Figure 1 is a perspective view, not to scale, of an embodiment of wall panel according to the invention with embedded plumbing services.
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Figure 2 is a perspective view of an embodiment of wall panel according to the invention with embedded electrical services.

30 Figure 3 is a perspective view of part of two adjacent wall panels according to the invention having a tongue and groove construction.

Referring to the drawings, an insulated laminated wall panel comprises a sheet 12 of a rigid thermally insulating material sandwiched between and bonded to a rigid air-tight sheet 14 of an engineered wood and a sheet 16 of plasterboard. The wall panel also comprises a further sheet 10 of rigid thermally insulating material bonded to the opposite side of the sheet 14 of engineered wood. The sheets 10 to 16 have the same rectangular dimensions, and are glued together in register except for the engineered wood sheet 14 which is slightly laterally displaced relative to the other sheets 10, 12 and 16 to form a tongue 18 and a complementary groove 20 respectively along opposite parallel edges of the wall panel.

In this embodiment the sheets have the following thicknesses:

Insulating sheet 10: 60mm

Insulating sheet 12: 30mm

Engineered wood sheet 14: 11mm

Plasterboard sheet 16: 12mm

and overall rectangular dimensions of 8 x 4 sq.ft. The insulating sheets 10, 12 may be made of polyurethane, polyiso or phenolic and the engineered wood sheet 14 may be oriented strand board (OSB). The glue used to bond the sheets may be for example a PVA glue.

Where a particular wall panel is to incorporate plumbing and/or electrical or other services, these are embedded in the 30mm thick insulating sheet 12 between the engineered wood and plasterboard sheets 14 and 16, and are integrated into the panel at the production stage. Thus the insulating sheet 12 is where conduits for

electrical cables, back boxes for faceplates of sockets, plumbing pipes and grounds for radiators can be fixed. These can all be placed with great accuracy during factory production giving a far superior product on the site.

For example, Figure 1 shows a wall panel with vertical plumbing pipes 22 embedded in the insulating sheet 12. Any openings 24 that are made in the sheets 12, 16 to gain access for connecting to the pipes 22 can be filled with accurately machined pieces 26 that exactly fill the openings.

Similarly, Figure 2 shows a wall panel with vertical 20mm conduits 28 for electrical cable embedded in the insulating sheet 12. Also shown are openings 30 containing electrical socket boxes for connection to the cables.

Not all wall panels will need the services in them and this will be determined by the application in which they are to be used.

Each wall panel has pre-drilled holes (not shown) for fixing the panel to a wall using screws or other fixings, and it also has lines marking the position of embedded services and lines for plumb and level. An internal surface of a wall of a building is insulated by fixing a plurality of the wall panels vertically and horizontally edge to edge directly to the internal wall surface with their plasterboard surfaces outermost, i.e. the insulating layers 10 are against the wall, the wall being

drilled through the pre-drilled holes in the wall panel to receive the fixings.

5 The vertical edges of horizontally adjacent wall panels are interlocked with the tongue and groove joints 18, 20 to ensure a high degree of air tightness between these edges. The horizontal edges of vertically adjacent wall panels abut edge-to-edge. To ensure air-tightness between these abutting edges a 100 mm wide portion 32
10 (Figure 1) of the first two sheets 12 and 16 is temporarily removed along each edge to expose a 100 mm wide strip 34 of the OSB sheet 14. An air-tight tape (not shown) is then applied to the exposed strips 34 across the abutting edges of the OSB sheets 14, the
15 portions 32 then being reaffixed using screws. This provides for total air tight sealing of a wall in both horizontal and vertical directions. The portions 32 can be made detachable by omitting adhesive from the corresponding areas of the panel.

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Where the edges of vertically adjacent wall panels abut horizontally along a wall at the level of, and normal to, floor joists, one or both abutting edges will be castellated to fit closely around the joists where they
25 enter the wall.

The OSB sheet 14 has a dual function. It provides a strong base to which items can be affixed, e.g. picture frames, skirting, radiators. It also provides an
30 airtight layer to the perimeter of the room and the interlocking tongue and groove aspect of the panels greatly enhances this.

While the embodiment above has been described in terms of a panel providing a conduit for services including plumbing and electrical feeds, it will be seen that wall panels according to the invention could in fact provide the services themselves. For example, the wall panel could accommodate an array of heating pipes insulated from the rear so that the panel itself could act as a radiator.

10 Advantages of the embodiment are:

- All the services are integrated into the wall panels and are installed during production in the factory. Therefore human error on site is reduced.
- 15 - All parts of the wall will remain insulated as there is no need to remove insulation to fit sockets or grounds for sockets.
- The OSB sheet being over the entire area of the wall means that radiators can be hung easily, skirting board has a fixing point and shelves, pictures, TV support
20 brackets, etc., may be securely mounted.
- All heating pipes are protected from the outside by a continuous layer of insulation.
- The panel allows for achieving an airtight building by
25 having the panels themselves airtight and having a system where the junction between themselves and an adjoining area can be sealed.

The invention is not limited to the embodiments described herein but can be amended or modified without departing
30 from the scope of the present invention.

Claims:

1. An insulated laminated wall panel comprising a sheet of a substantially rigid thermally insulating material sandwiched between and bonded to a substantially rigid air-tight sheet of an engineered wood and a sheet of plasterboard.
2. A wall panel as claimed in claim 1 wherein the engineered wood comprises oriented strand board.
3. A wall panel as claimed in claims 1 or 2 further comprising one or more service supply members embedded in the insulating sheet.
4. A wall panel as claimed in claim 3 wherein the service supply members comprise one or more of plumbing pipes or electric cable conduits.
5. A wall panel as claimed in any previous claim further comprising a further sheet of substantially rigid thermally insulating material bonded to the opposite side of the sheet of engineered wood.

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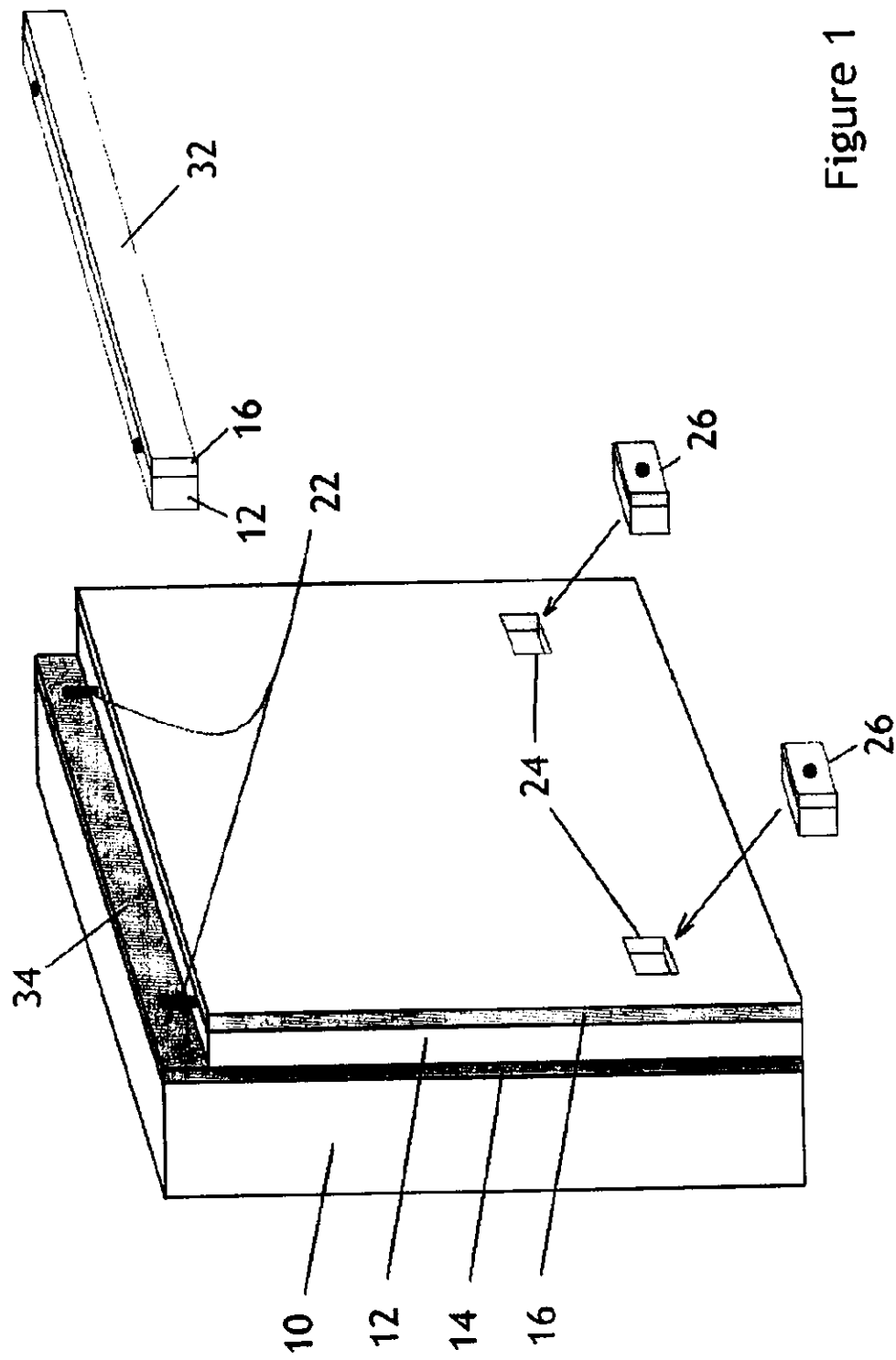
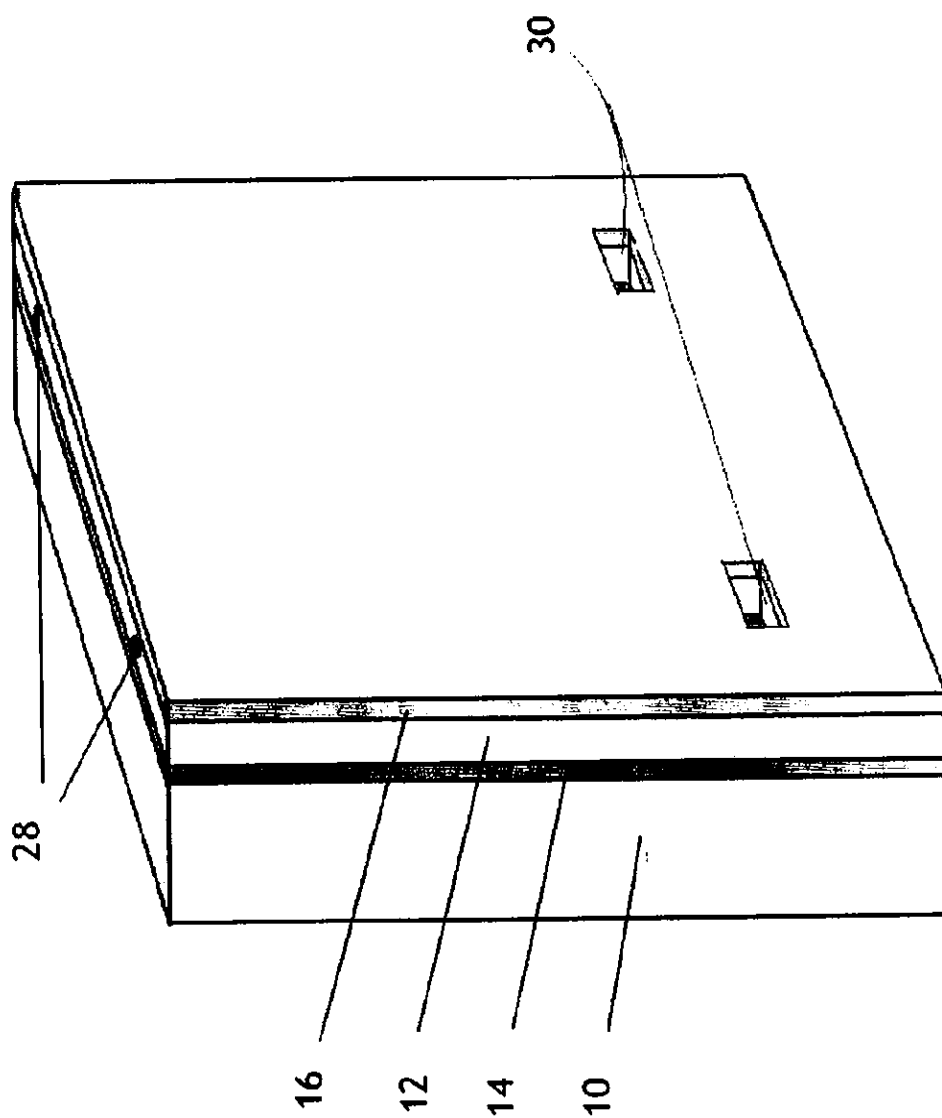


Figure 1

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Figure 2



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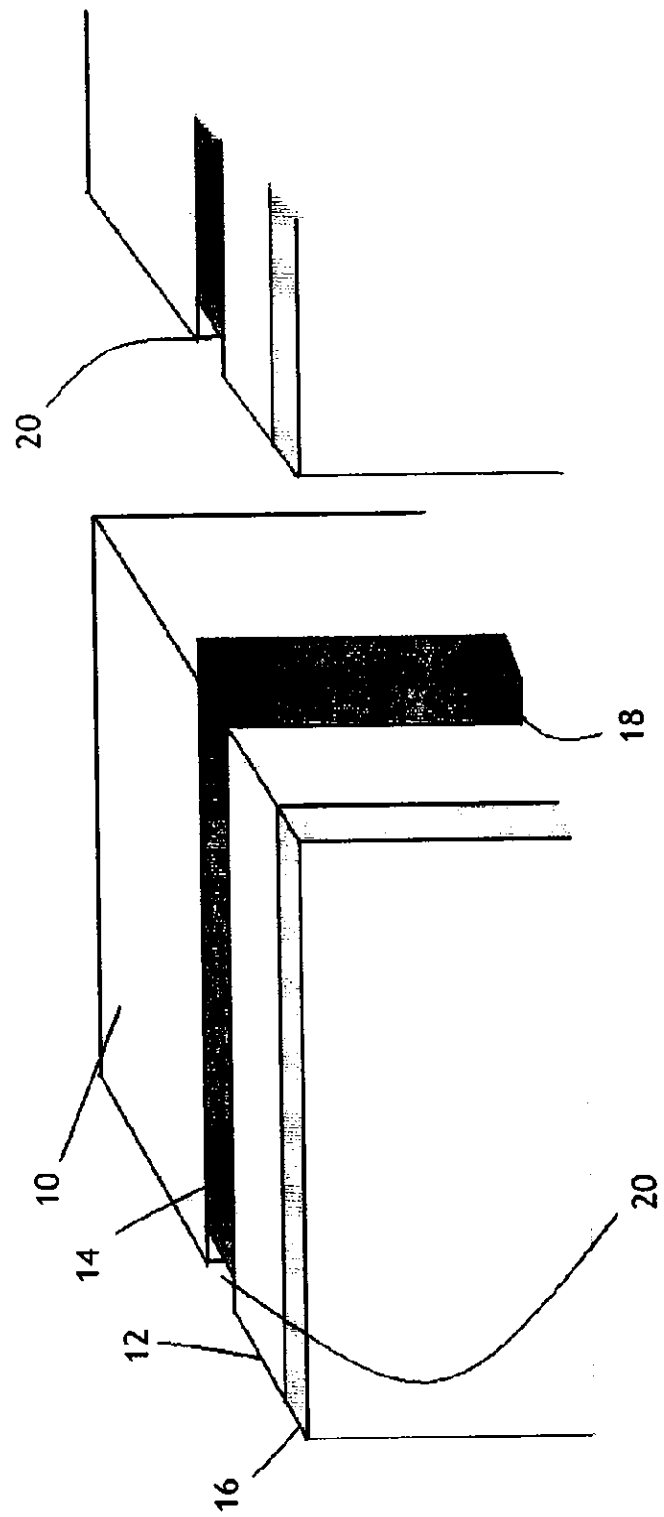


Figure 3