

(21) Application No: 1410313.9

(22) Date of Filing: 10.06.2014

(71) Applicant(s):  
**Flexiloo LLP**  
**(Incorporated in the United Kingdom)**  
**PO Box 2195, FORDINGBRIDGE, Hampshire,**  
**SP6 9AD, United Kingdom**

(72) Inventor(s):  
**Andrew Peter Hay**

(74) Agent and/or Address for Service:  
**Chapman + Co**  
**18 Staple Gardens, Winchester, SO23 8SR,**  
**United Kingdom**

(51) INT CL:  
**E04B 2/74** (2006.01) **E04H 1/12** (2006.01)

(56) Documents Cited:  
**EP 0807723 A2** **DE 004212975 A1**  
**DE 002264677 A1** **DE 102007038670 A1**  
**US 6553724 B1** **US 6308763 B1**  
**KR 1020020001043**  
**AU 2006202122**

(58) Field of Search:  
INT CL **E04B**  
Other: **WPI, EPODOC, TXTE**

(54) Title of the Invention: **Magnetic wall panel assembly**  
Abstract Title: **Wall panel assembly with complementary magnetic connection edges.**

(57) A magnetic wall panel assembly 200, the panels each having ferromagnetic parts e.g. 26,230... for connecting the panels together, two opposed faces (12, 14 fig.1) and an engaging edge with one or more formations, which are complementary to a portion of the formations of another panel. The formations may be male and female, and magnets may be permanent, and located on the engaging edges such that male is attracted by opposing female magnet. Multiple panels may be arranged such that edges are parallel or perpendicular, the formations of the first two panels forming effective formations for further panels e.g. at corners or where many walls join. One engaging edge may be recessed relative to the other. There may also be semi-circular indentations on the engaging edge e.g.32,34... when aligned with corresponding groove, creating a cylindrical aperture into which a dowel rod may be inserted to lock panels together. The panels may be for temporary sanitary installations.

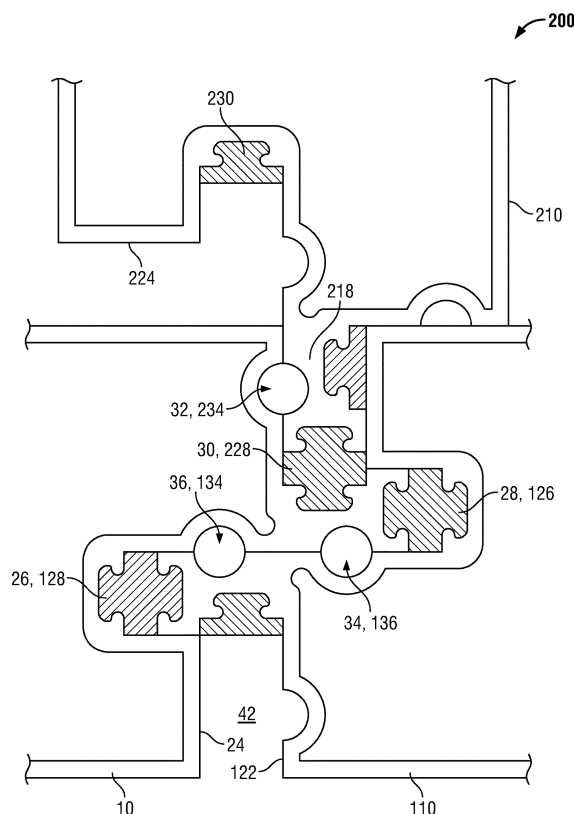


FIG. 3

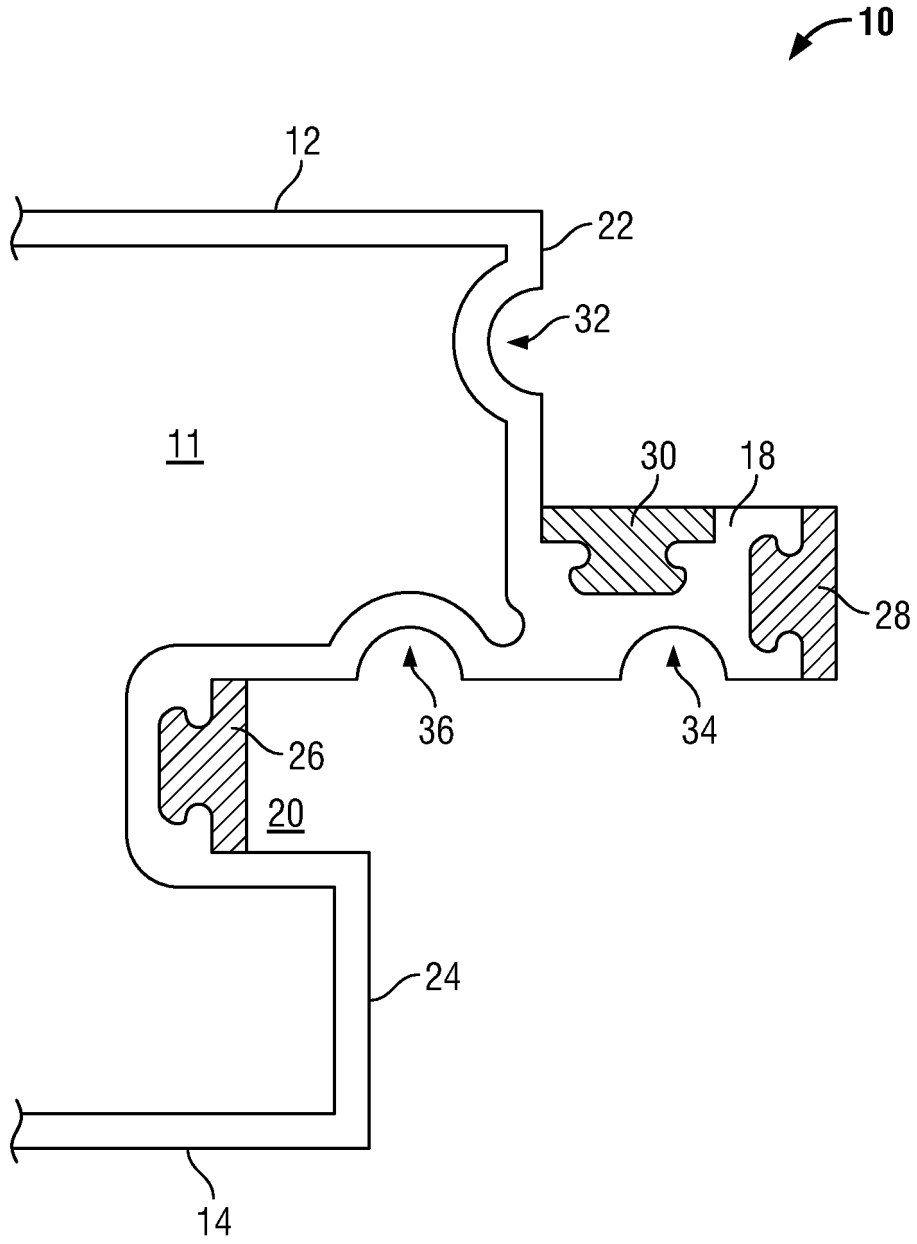


FIG. 1

06 08 14

06 08 14

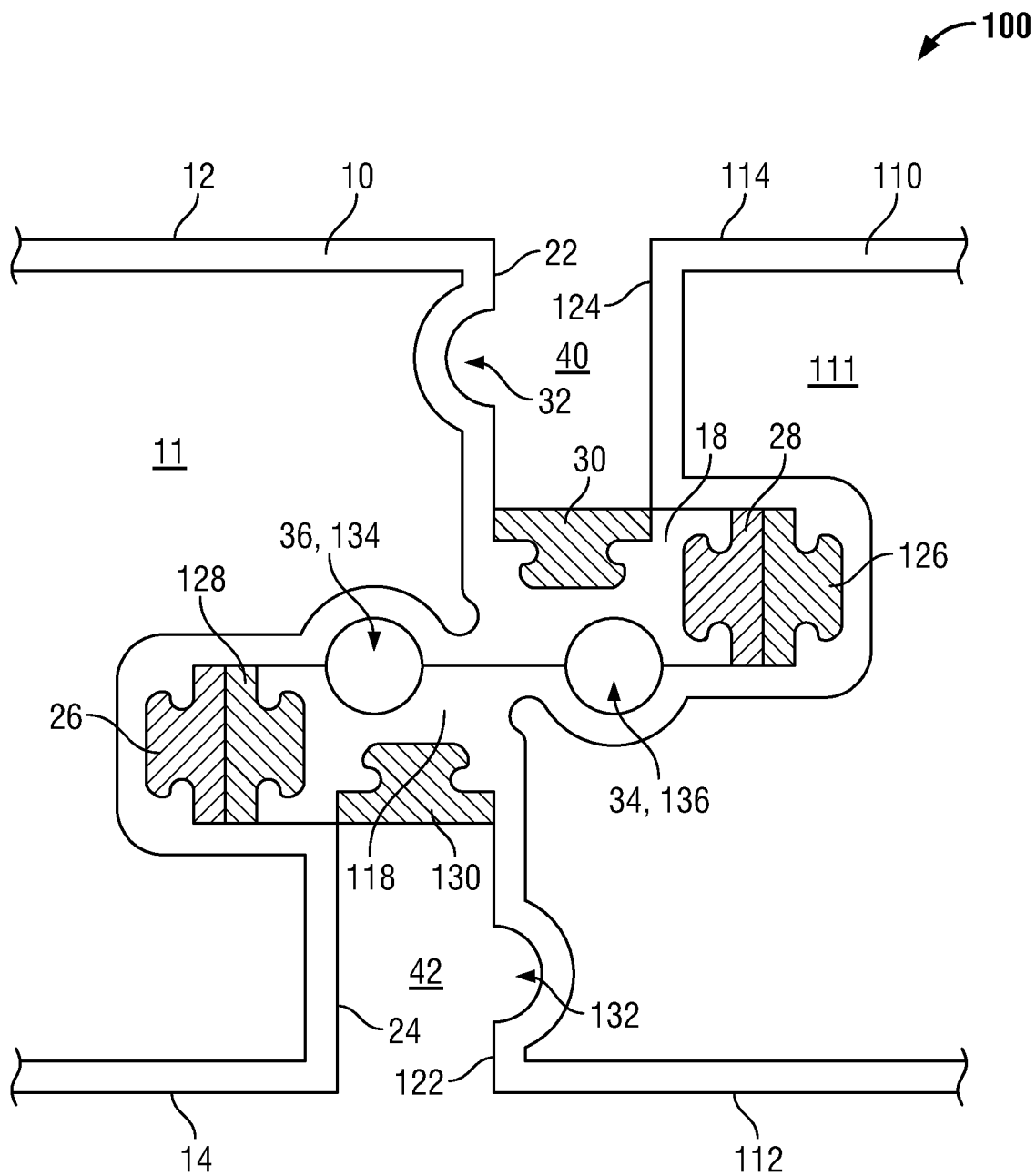


FIG. 2

06 08 14

3/3

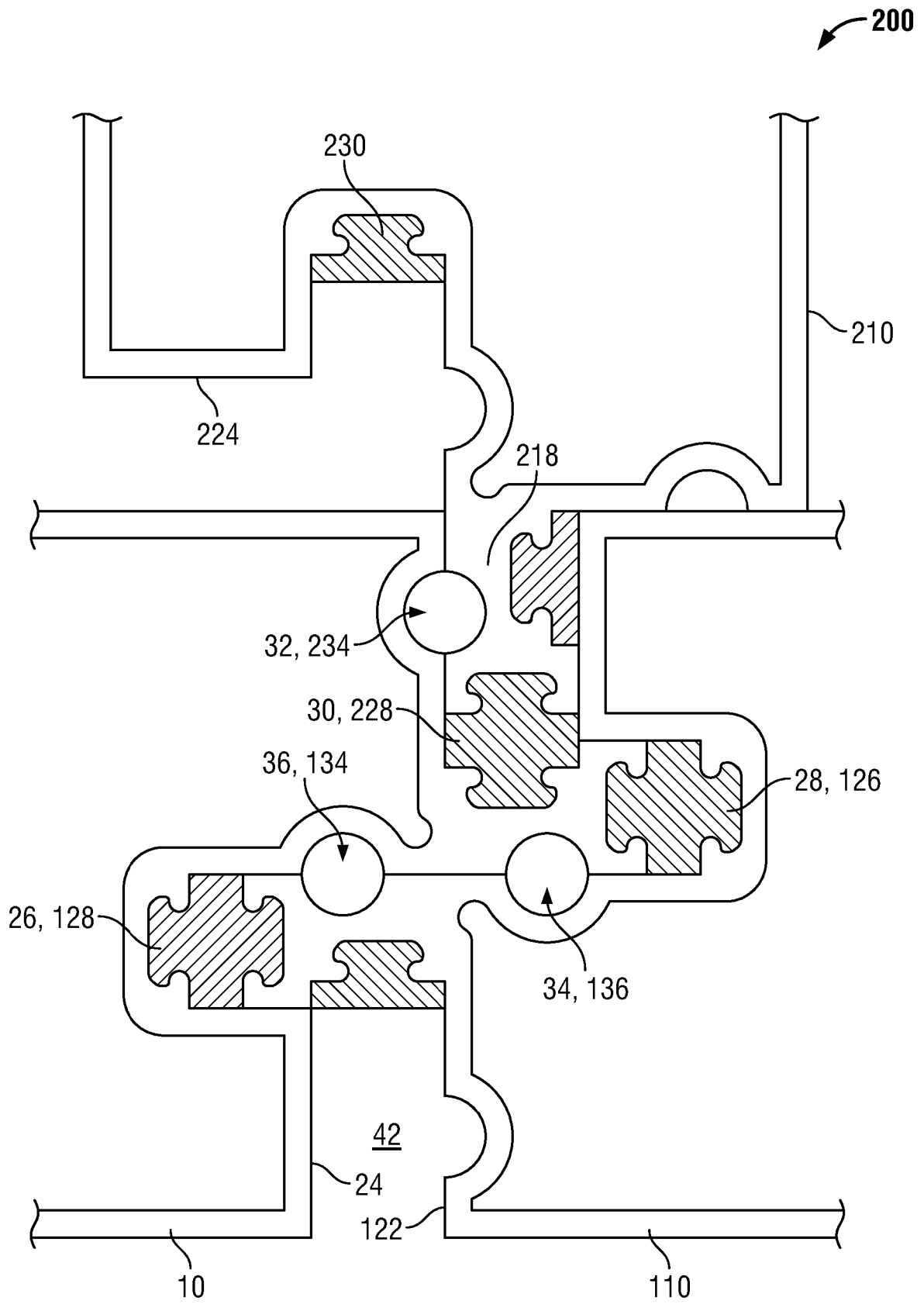


FIG. 3

## MAGNETIC WALL PANEL ASSEMBLY

The present invention relates to a magnetic wall panel assembly for a temporary partition or wall. Example embodiments of the invention relate particularly but not exclusively to a magnetic wall panel assembly for providing temporary partitions or walls as part of a sanitary installation.

5 There is often a need to provide temporary building installations.

Temporary buildings such as portable cabins, portable toilets, shelters etc. are typically required at large events such as festivals, parties and conferences, or in emergency relief operations following humanitarian or natural disasters. These temporary structures are usually provided as a flat packed kit of panels and fixing elements that can be assembled into a temporary building structure. The panels provide the external walls of the building and may also be used as internal walls to create rooms inside the building. Temporary building structures must be quick and economical to assemble, but still have adequate strength and rigidity.

Temporary partitions or walls are also commonly used within existing building structures to divide the building into different sections. For example, a temporary sanitary installation may comprise a large cabin or trailer and a plurality of toilets and washbasins. Temporary partitions are commonly installed around each toilet to form cubicles and may also be used to divide the installation into two areas for male and female.

Another common use of temporary partitions or walls is within a large room to divide the room into two or more sections. For example, an office or school may wish to divide a room into several sections that can each be used for different functions or to create separate office spaces.

It is known to provide preformed panels for use in the construction of temporary buildings, partitions and walls. The preformed panels can be installed or assembled in a number of ways.

One known method is to first provide a framework or skeleton of the building structure and to align and fix panels to the framework, for example, using screws, nails, bolts etc.

Alternatively, additional clips or brackets may be provided to join panels together without requiring a framework. It is also known to provide panels with interlocking edges to assist with aligning adjacent panels. The panels can then be fixed together to secure them in place.

A disadvantage of many temporary installations is that components such as the panels, framework and fixing elements are bulky and complex. Assembly and disassembly can be time consuming and labour intensive.

5 Panels are often hard to manoeuvre and require several workers to position and align each panel with an adjacent panel or within a framework. Several tools may be required to fix the panels in place with bolts, screws or nails etc. and a significant degree of skill and know-how is required.

It is an aim of the present invention to provide an improved panel assembly for a temporary partition or wall that alleviates some of the above-mentioned problems.

10 According to the present invention as seen from a first aspect, there is provided a magnetic wall panel assembly comprising first and second panels, each panel comprising two opposed faces and an engaging edge for connecting to another panel, said engaging edge comprising one or more engagement formations, the panel assembly further comprising one or more  
15 ferromagnetic parts; wherein the shape of the one or more engagement formations on the first panel are complementary to a portion of the one or more engagement formations on the second panel respectively, the two panels being held together by magnetic attraction.

In use, the first and second panels are positioned with their engaging edges substantially parallel and abutting each another. The one or more engagement formations of the first panel will engage with the one or more complementary engagement formations on the second panel.  
20 Magnetic attraction between the one or more ferromagnetic parts will hold the panels in connection along their engaging edges.

Preferably, the magnetic wall panel assembly of the present invention is arranged to provide a temporary wall, for example, as part of a temporary building. Preferably, the magnetic wall panel assembly is arranged to provide a temporary wall as part of a sanitary installation such as a  
25 toilet cubicle. Said wall may be an internal or external wall of the temporary building or sanitary installation.

Preferably, the first and second panels have two opposed faces and four edges wherein one or more of said edges are engaging edges. Preferably, each engaging edge comprises one or more engagement formations that are complementary to a portion of the one or more  
30 engagement formations on an engaging edge of the first panel, second panels, or a further panel.

The first and/or second panels may be composite panels comprising two thin sheets bonded to a core. The sheets may be made of a material such as a metal e.g. aluminium or a plastic e.g. melamine and may comprise a decorative surface or be painted. The core may comprise a lightweight low density material such as chipboard, ply, foam, polypropylene or polyethylene.

- 5 The core may comprise a honeycomb structure. Alternatively, the panels may be hollow. Alternatively, the core or entire panel may be made of a plastic or of a metal such as aluminium.

The panel assembly of the present invention is lightweight and easy to transport as a flat pack. The panels can readily be manoeuvred into position by a user and the panel assembly is simple to assemble and disassemble and requires no additional fixing parts.

- 10 Preferably, the engaging edge of the first and second panels each comprises a first engagement formation that is a male formation and a second engagement formation that is a female formation. When the engaging edges of the first and second panels are connected substantially in parallel, the female formation on the first panel engages with the male formation on the second panel and vice versa. Advantageously, this arrangement of engagement  
15 formations provides a sturdy connection between the first and second panels when held in connection in the magnetic wall panel assembly.

Preferably, the engagement formations extend along a section of a panel edge. Preferably, the engagement formations extend along the entire length of the engaging edge. Preferably, the engaging edges and any further engaging edges of the first and second panels are identical.

- 20 This reduces manufacturing costs and makes installation simple for a layperson; the engaging edge and further engaging edges of the first panel may be connected to any engaging edge on the second panel.

Preferably, the one or more ferromagnetic parts on the engaging edge of the first panel comprise permanent magnets. Preferably the one or more ferromagnetic parts on the engaging  
25 edge of the second panel comprise one or more complementary ferromagnetic parts e.g. permanent magnets of opposite orientation or non-magnetised ferromagnetic parts.

Alternatively there may be a combination of permanent magnets and non-magnetised ferromagnetic parts on the engaging edges of both the first and second engaging edges.

- 30 It will be appreciated that for there to be magnetic attraction between the first and second panels, the one or more ferromagnetic parts on each panel must align when the panels are connected along their engaging edges and must also be complementary i.e. ferromagnetic parts that are aligned must be magnetically attracted.

Preferably, the one or more ferromagnetic parts are located on the one or more engagement formations. Preferably, a first ferromagnetic part is located on the female engagement formation and second and third ferromagnetic parts are located on the male engagement formation.

5 Preferably, the second ferromagnetic part is located at the end of the male engagement formation that protrudes from the engaging edge. Preferably, the third ferromagnetic part is located on a side surface of said male engagement formation. Alternatively, said one or more ferromagnetic parts comprise one or more engagement formations i.e. the engagement formations are made of a ferromagnetic material.

10 In an alternative embodiment, said one or more ferromagnetic parts comprise said engaging edge. For example, the whole engaging of the first panel may be made of a ferromagnetic material and the engaging edge of the second panel may comprise one or more complementary ferromagnetic parts. Alternatively the whole engaging edge of the second panel may be made of a complementary ferromagnetic material.

15 In one embodiment of the present invention, the first and second panels are connected such that their engaging edges are substantially parallel. In this embodiment, the female engagement formation on the first panel engages with the male engagement formation on the second panel and vice versa. Magnetic attraction between complementary ferromagnetic parts on the female and male engagement formations hold the two panels together.

20 In an alternative embodiment of the present invention, the first and second panels are connected such that their engaging edges are substantially perpendicular. In this embodiment, the male engagement formation of the first panel abuts the side of the male engagement formation on the second panel. Magnetic attraction between complementary ferromagnetic parts on each male engagement formations respectively hold the two panels together.

25 The magnetic wall panel assembly may further comprise a third panel. Preferably, the first and second panels are arranged to provide one or more effective engagement formations complementary to a portion of the one or more engagement formations on the third panel.

30 Preferably, the one or more effective engagement formations are provided when the first and second panels are connected such that their engaging edges are substantially parallel. In use, the engaging edge of the third panel is arranged substantially perpendicular to the engaging edges of the first and second panels. The third panel is held connected to the first and second panels by magnetic attraction between the one or more ferromagnetic parts on the engaging edge of the third panel and the first or second panels respectively.



The magnetic wall panel assembly may further comprise a fourth panel. Preferably, the first and second panels are arranged to provide one or more effective engagement formations complementary to a portion of the one or more engagement formations on the fourth panel. Preferably, the one or more effective engagement formations are provided when the first and second panels are connected such that their engaging edges are substantially parallel. In use, the engaging edge of the fourth panel is arranged substantially perpendicular to the engaging edges of the first and second panels and substantially parallel to the engaging edge of the third panel. The fourth panel is held connected to the first and second panels by magnetic attraction between the one or more ferromagnetic parts on the engaging edge of the third panel and the first or second panels respectively.

Preferably, the engaging edge further comprises first and second edge portions, wherein the first edge portion is elevated relative to the second edge portion. Preferably, the first (male) engagement formation is located on the first edge portion and the second (female) engagement formation is located on the second edge portion. In use, when the first and second panels are connected substantially in parallel, a gap between the engaging edges is provided due to the elevation difference between the first and second edge portions. Said gap provides an effective female engagement formation that is complementary to the male formation on the engaging edge of the third or fourth panel.

Preferably, the first and second panels further comprise one or more indentations that extend along a portion or entire length of each engaging edge respectively. Preferably, when the indentations on the first panel are aligned with the indentations on the second panel, an aperture is formed between two engaging edges.

Preferably, the third or fourth panel further comprise one or more indentations that extend along a portion or entire length of each engaging edge respectively. Preferably, when the indentations on the third or fourth panel are aligned with the indentations on the first or second panel, an aperture is formed between two engaging edges.

Preferably, one or more of the indentations are substantially semi-circular such that when two panels are connected, a substantially circular aperture is formed between two engaging edges. Alternatively, the indentations may take any other suitable shape.

Preferably, a dowel or rod is inserted into an aperture formed by two indentations on aligned engaging edges so as to lock two panels together. Advantageously, this creates a more robust join between panels in the panel assembly and provides a secure connection when the panel assembly is arranged to provide a temporary wall.

According to a second aspect of the present invention as seen from a second aspect, there is provided a magnetic wall panel comprising two opposed faces and an engaging edge for connecting to another panel, the engaging edge of the panel comprising one or more engagement formations and a ferromagnetic part, wherein the shape of the one or more engagement formations is complementary to a portion of the one or more engagement formations on another panel respectively, and wherein the panel is arranged to be held together with said other panel by magnetic attraction.

Advantageously, the magnetic wall panel assembly of the present invention is lightweight and can be quickly and easily installed or de-installed by a user. The arrangement of the engagement formations on the engaging edges of the panels guide the user to easily align the edges of adjacent panels in the wall panel assembly such that they are substantially parallel or perpendicular, depending on the installation requirements. The ferromagnetic parts allow the engaging edges of the panels to lock in position such that the panels are aligned correctly and negate the need for mechanical fixing elements or adhesives. Very little effort or time is required by the user to align, engage and fix panels in place when installing the magnetic wall panel assembly as part of a temporary building or to disengage panels when disassembling the temporary building.

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

Figure 1 illustrates part of the cross section of a panel according to an embodiment of the present invention, as seen from a second aspect;

Figure 2 illustrates part of the cross section of a panel assembly according to an embodiment of the present invention as seen from a first aspect, the panel assembly comprising the panel shown in Figure 1 engaged with a second panel;

Figure 3 illustrates part of the cross section of the panel assembly shown in Figure 2, the panel assembly comprising a third panel;

Referring to Figure 1, there is illustrated part of the cross section a panel according to an embodiment of the present invention. The panel comprises a hollow body 11, two opposed faces 12, 14 and an engaging edge 16. Although not shown in Figure 1, the panel further comprises three further edges which may or may not be engaging edges 16. The two opposed faces 12,14 and edges may be made of aluminium but alternatively could be made of plastic or any other suitable material e.g. the faces 12,14 may comprise decorative melamine, high

pressure laminate and/or paint. In alternative embodiments, the hollow body 11 may comprise chipboard, ply, foam or a polypropylene honeycomb core. It will be appreciated that there are many variations of materials that may be used for the body 11, the opposed face 12, 14 and the edges of the panel 10.

5 The engaging edge 16 comprises a male engagement formation 18 that is a substantially rectangular protrusion 18 and a female engagement formation 20 that is a substantially rectangular indentation. The female engagement formation 20 is complementary in shape and size to an end portion of the male engagement formation 18. The engaging edge 16 also comprises first and second edge portions 22, 24 disposed at different levels. The first edge  
10 portion 22 has greater prominence on the engaging edge than the second edge portion 24 i.e. the first edge portion is elevated relative to the second edge portion when viewed from within the body 11. Although not shown in Figure 1, it will be appreciated that the engaging edge 16 extends along the entire length of the panel edge.

The engaging edge 16 comprises three ferromagnetic parts that comprise permanent magnets  
15 26, 28, 30 keyed into the engaging edge 16. The first magnet 26 is positioned within the female engagement formation 20, the second magnet 28 is positioned at the very end of the male engagement formation 18 and the third magnet 30 is positioned on a side surface of the male engagement formation 18. The magnets 26, 28, 30 are continuous and extend along the entire length of the engaging edge. In an alternative embodiment (not shown), one or more magnets  
20 are set into the engaging edge 16 at various locations along the length of the engaging edge 16.

Referring to Figure 2, there is illustrated part of the cross section of a panel assembly 100 comprising the panel 10 and a second panel 110. The second panel 110 is largely identical to the first panel 10 and like features are labelled with like reference numerals. The second panel 110 differs from the first panel 10 in that the ferromagnetic parts 126, 128 are magnets that are  
25 orientated in reverse to magnets 28, 26 respectively such that there is magnetic attraction between the first and second panels. Alternatively, one or both of the ferromagnetic parts 126, 128 may be made of a non-magnetic ferromagnetic material.

The engaging edge 16 of the panel 10 is aligned opposite the engaging edge of a second panel 110 such that the two engaging edges are substantially parallel. The male engagement  
30 formation 18 of the first panel 10 is engaged with the female engagement formation 120 of the second panel 110 and vice versa to connect the two panels.

The magnets 26, 126 set into the female engagement formations 20, 120 and the magnets 28, 128 located at the end of the male engagement formations 18, 118 securely hold the engaging

edges of the first and second panels together in alignment by magnetic attraction. In use, the magnets enable the user to quickly construct the panel assembly 100 without the need to accurately align and fix each panel. It is envisaged that the user will not be required to apply force to bring the engaging edges into connection, but that the magnetic attraction created between the ferromagnetic parts will allow the engaging edges to 'snap' or 'jump' into connection with the correct alignment such that the first and second panels are aligned side by side to create a wall or partition i.e. they will be self-aligning. The magnets also negate the need for additional fixing elements to hold the panel assembly 100 together.

In the panel assembly 100, a gap is created between the first edge portion 22 of the first engaging edge 16 and the second edge portion 124 of the second engaging edge 116 due to the disposition of the first and second edge portions 22, 124. A further gap is created between the first edge portion 122 of the second engaging edge 116 and the second edge portion 24 of the first engaging edge 16. Said gaps provide effective female engagement formations 40, 42 that are complementary to the male engagement formation on the engaging edge of a further panel.

Referring to Figure 3, there is illustrated part of the cross section of a panel assembly 200 comprising the panel, the second panel 110 and a third panel 210. The third panel 210 is largely identical to the first and second panels 10, 110 and like features are labelled with like reference numerals. The third magnet 30 on the engaging edge of the first panel 16 is orientated in reverse to the second magnet 228 on the third panel such that they are magnetically attracted to each other.

The engaging edge 216 of the third panel 210 is aligned substantially perpendicular to the engaging edges of the first and second panels 16, 116. The male engagement formation 218 of the third panel 210 is engaged with the effective female engagement formation 40 created between the first and second panels to connect the third panel 210 such that it is substantially perpendicular to the first and second panels 10, 110.

In a further embodiment of the present invention (not shown), the panel assembly 200 shown in Figure 3 comprises a fourth panel. The engaging edge of the fourth panel is arranged substantially perpendicular to the engaging edges of the first and second panels and substantially parallel to the engaging edge of the third panel. The male engagement formation of the fourth panel is engaged with the further effective female formation 42 created between the first and second panels to connect the fourth panel such that it is substantially perpendicular to the first and second panels 10, 110 and substantially parallel to the third panel 210.

Referring to Figures 1, 2 and 3, the engaging edges 16, 116, 216 further comprise three semi-circular indentations 32, 34, 36 etc. Referring now to the first panel 10, the first indentation 32 is positioned on the first edge portion 22 and faces in a direction parallel to the engaging edge 16. The second indentations 28 is positioned on a side surface of the male engagement formation 18 and the third indentation 30 is positioned on a side surface of the female engagement formation 20. The second and third indentations 28, 30 face in a direction perpendicular to the engaging edge. Alternatively, the first indentation 32 could be positioned on the second edge portion 24 of the engaging edge 16 (not shown). The second 110 and third panel 210 have like indentations at like locations on each engaging edge 116, 216 respectively and are labelled with like reference numerals.

The semi-circular indentations on the engaging edge 16, 116, 216 of the panels may be aligned to create channels or apertures with a circular cross section. For example in Figure 2, indentation 36 on the first engaging edge 16 is aligned with indentation 134 on the second engaging edge 116 to create a circular aperture that extends along the entire length of the connected engaging edges 16, 116. A circular aperture is also created by aligning indentations 34 and 136.

In use, it is envisaged that after aligning and engaging the engagement edges 16, 116 of the first and second panels in parallel as shown in Figure 2, the user will insert a rod or dowel into the circular apertures 36, 134 and 34, 136 to secure the connection between the two panels.

In Figure 3, indentation 32 on the first engaging edge 16 is aligned with indentation 234 on the third engaging edge 216 to create a circular aperture also suitable for accepting a rod or dowel.

It will be appreciated that where it is only required to fix two panels in parallel, it may not be necessary for the panel to comprise first and second edge portions 22, 24 that are disposed at different levels as it will be preferred for the engaging edges of the first and second panels to sit flush against each other. In this scenario, the first indentation 32 and third magnet 30 may not be necessary. Alternatively, the first indentation 32 and third magnet 30 may be present and the engaging edge 16 may comprise a fourth indentation arranged to align with the first indentation 32 and a fourth magnet arranged to complement the third magnet 30.

It will be appreciated that the above described embodiments are given by way of example only and that various modifications thereto may be made without departing from the scope of the invention. For example, the one or more engagement formations may be disposed in any arrangement on an engaging edge. The engagement formations may comprise one or more

male formations and one or more female formations. The engagement formations may extend part of the length or the full length of an engaging edge.

5 There may be any number of magnets disposed in any arrangement on an engaging edge. The magnets may be at discrete locations along the engaging edge of the panel or may extend part of the length or the full length of an engaging edge.

Similarly, there may be any number of indentations disposed in any arrangement on an engaging edge. The indentations may extend part of the length or the full length of the engaging edge.

10 In alternative embodiments, the whole of the first and/or second panels, including the engaging edges, may be made of a ferromagnetic material.

**Claims**

1. A magnetic wall panel assembly comprising first and second panels, each panel comprising two opposed faces and an engaging edge for connecting to another panel, said engaging edge comprising one or more engagement formations, the panel assembly further comprising one or more ferromagnetic parts;  
wherein the one or more engagement formations on the first panel is complementary to a portion of the one or more engagement formations on the second panel respectively, the two panels being held together by magnetic attraction.
2. A magnetic wall panel assembly according to claim 1 arranged to provide a temporary wall.
3. A magnetic wall panel assembly according to claim 1 arranged to provide a temporary wall as part of a sanitary installation.
4. A magnetic wall panel assembly according to any preceding claim, wherein the panel comprises a first engagement formation that is a male formation and a second engagement formation that is a female formation.
5. A magnetic wall panel assembly according to any preceding claim, wherein the one or more ferromagnetic parts on the engaging edge of the first panel comprise permanent magnets.
6. A magnetic wall panel assembly according to any preceding claim, wherein the one or more ferromagnetic parts are located on the one or more engagement formations.
7. A magnetic wall panel assembly according to any preceding claim, wherein said one or more ferromagnetic parts comprise said engaging edge.
8. A magnetic wall panel assembly according to any of claims 1-7, wherein the first and second panels are connected such that their engaging edges are substantially parallel.
9. A magnetic wall panel assembly according to any of claims 1-7, wherein the first and second panels are connected such that their engaging edges are substantially perpendicular.

10. A magnetic wall panel assembly according to any preceding claim, further comprising a third panel, wherein the first and second panels are arranged to provide one or more effective engagement formations complementary to a portion of the one or more engagement formations on the third panel such that the engaging edge of the third panel is arranged substantially perpendicular to the engaging edges of the first and second panels.

11. A magnetic wall panel assembly according to claim 10, further comprising a fourth panel, wherein the first and second panels are arranged to provide one or more effective engagement formations complementary to a portion of the one or more engagement formations on the fourth panel such that the engaging edge of the fourth panel is arranged substantially perpendicular to the engaging edges of the first and second panels and substantially parallel to the engaging edge of the third panel.

12. A magnetic wall panel assembly according to claims 10 or 11, wherein the third or fourth panels are held connected to the first and second panels by magnetic attraction between the one or more ferromagnetic parts on each panel respectively.

13. A magnetic wall panel assembly according to any preceding claim, the engaging edge of the first and second panels further comprising first and second edge portions respectively, wherein the first edge portion is elevated relative to the second edge portion.

14. A magnetic wall panel assembly according to claim 13, the engaging edge of the first and second panels comprising first and second engagement formations respectively, wherein the first engagement formation is located on the first edge portion and the second engagement formation is located on the second edge portion.

15. A magnetic wall panel assembly according to any preceding claim, wherein the first and second panels further comprise one or more indentations that extend along a portion or entire length of each engaging edge respectively.

16. A magnetic wall panel assembly according to claim 15, wherein the indentations on the first panel are aligned with the indentations on the second panel to form an aperture between two engaging edges.

17. A magnetic wall panel assembly according to any of claims 10 to 16, wherein the third and/or fourth panel further comprise one or more indentations that extend along a portion or



entire length of each engaging edge respectively, and wherein the indentations on the third and/or fourth panel are aligned with the indentations on the first or second panel to form an aperture between two engaging edges.

18. A magnetic wall panel assembly according to any of claims 15 to 17, wherein one or more of the indentations are substantially semi-circular such that when two panels are connected, a substantially circular aperture is formed between two engaging edges.

19. A magnetic wall panel assembly according to any of claims 16 to 18, further comprising a dowel inserted into said aperture so as to lock two panels together.

20. A magnetic wall panel comprising two opposed faces and an engaging edge for connecting to another panel, the engaging edge of the panel comprising one or more engagement formations and a ferromagnetic part;  
wherein the shape of the one or more engagement formations is complementary to a portion of the one or more engagement formations on another panel respectively; and  
wherein the panel is arranged to be held together with another panel by magnetic attraction.

21. A magnetic wall panel and a magnetic wall panel assembly substantially as hereinbefore described with reference to the accompanying drawings.



**Application No:** GB1410313.9

**Examiner:** Mr Tom Simmonds

**Claims searched:** 1-21

**Date of search:** 31 October 2014

**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        | 1-8, 13-14, 20     | DE102007038670 A1<br>(PARADOR) See all figures, particularly figure 2, and description paragraph 21.                            |
| X        | 1-9, 13-14, 20     | US6553724 B1<br>(BIGLER) See figures 6-10, particularly magnetic strips 72 and 74, with associated description columns 4 and 5. |
| X        | 1-12, 20           | EP0807723 A2<br>(MOECKL) See figures, particularly 6.   |
| X        | 1-12, 20           | US6308763 B1<br>(MOECKL) See figures, particularly 10, and description column 3, lines 24-50.                                   |
| X        | 1 -12              | KR 1020020001043 A<br>(YOUNG) See figures and WPI abstract AN; 2002-423950  |
| X        | 1 at least         | DE4212975 A1<br>(MOECKL) See figures and abstract.  |
| X        | 1 at least         | DE2264677 A1<br>(HUEPPE) See figures, particularly figure 7.  |
| X        | 1 at least         | AU 2006202122 A1<br>(WORTHINGTON) See figures and associated description.   |

**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.          |
| & | Member of the same patent family  | E | Patent document published on or after, but with priority date earlier than, the filing date of this application. |

**Field of Search:**

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC<sup>X</sup> :

|  |
|--|
|  |
|--|



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

E04B

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

WPI, EPODOC, TXTE

**International Classification:**

| <b>Subclass</b> | <b>Subgroup</b> | <b>Valid From</b> |
|-----------------|-----------------|-------------------|
| E04B            | 0002/74         | 01/01/2006        |
| E04H            | 0001/12         | 01/01/2006        |