

A BUILDING ELEMENT



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Background and Field of the Invention

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This invention relates to a building element.

Building elements for erecting transparent internal or external walls are known. Such elements are formed from glass in a hollow cubic shape and are generally cemented together permanently to form a wall. It is a disadvantage of such elements that the elements are heavy and are of a fixed appearance. The elements also, when cemented together, formed a permanent structure which cannot be modified except by demolition and replacement.

It is an object of the invention to provide a building element which alleviates at least one disadvantage of this prior art.

Summary of the Invention

According to the invention in a first aspect, there is provided a building element comprising a frame having means for receiving a panel and the building element being connectable to like building elements to form a wall-like structure.

Preferably, the building element further comprises at least one, preferably two panels, which may be light transmissible and/or formed from different materials. The panels are also preferably planar and formed from plastics material and/or glass. At least one panel may be formed with a pattern or may be of a translucent colour.

The building element may also comprise a partition element, which may be light transmissible, formed between sides of the frame and, where the element can receive two panels, the partition element may be formed between the means for receiving the first panel and the means for receiving the second panel.

The building element may further comprise lighting means connectable to the frame and the lighting means may comprise a light support to which at least one light source is connected, the frame having an opening through which the light source internally projects.

The building element may further comprise means for securing the panels to the frame.

The building element may further comprise a plurality of openings arranged to be aligned with openings of like building elements and arranged to receive respective connectors to connect the building elements together. The connectors may be selected from rivets and/or screws and may

have an intermediate connection member, disposable between an engagement surface of a said opening and a said connector, preferably formed from resilient material and in the shape of a sleeve receivable in the opening, the sleeve having a lip for engagable with said surface.

The building elements may be combined to form a wall-like structure which optionally has a peripheral frame. The wall-like structure may form, for example, a light transmissible region of a wall of a building, a partition or a display. The wall-like structure may alternatively be mounted on an existing wall.

When used as a partition, a ground-engaging support connected to a base edge of the connected building elements and/or a cover for a side edge of the connected building elements may be provided.

In the described embodiments of the invention, the structure of the building element and thus of any wall-like structure formed from like building elements is provided by the frames of the building elements. First, and optionally second, panels are receivable in the frame but do not form part of the supporting structure. Thus, the panel(s) may be selected according to need and easily replaced, for practical or aesthetic reasons. For example, if the building element is to form a wall-like structure between an indoor living space and the outdoors, an outdoor-facing panel may be of a

weather-proof material, such as a glass pane and an indoor panel may be more lightweight, less hard material, such as transparent or translucent plastics. If the building element is used to form a partition or other internal wall-like structure, the or each panel may be formed from plastics material.

Preferably, the frame is provided with lighting means which enables the building element to be lit internally. Furthermore, a panel may have a translucent design provided thereon, the design thus being illuminated by light transmitted through the building element and/or by the lighting means.

The building elements may be connected together by any suitable means, for example by screws, rivets, snap fit or adhesive. Such means preferably allow the building elements to be disconnected/dismantled and reused.

The building element of the present invention whilst applicable for providing a replacement to a traditional transparent/translucent wall structure as described with reference to the prior art, is equally suitable for uses which do not require light-transmissibility, for example as non-load bearing external wall elements, internal wall elements and partitions of both fixed or temporary construction, as well as advertising displays and merchandise display structures.

Brief Description of the Drawings

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

Figure 1 is an exploded three-dimensional view from a first side of a first embodiment of a building element of the present invention.

Figure 2 is an enlarged view of the region labelled A in Fig. 1.

Figure 3 is a further three-dimensional, similar to Fig. 1, but from an opposed side.

Figure 4 is an enlarged view of the region labelled B in Fig. 3.

Figure 5 is a three-dimensional view in the general direction of Figure 3 of two building elements connected together.

Figure 6 is a sectional three-dimensional view in the general direction of Figure 1 of an assembled building element of Figs. 1 - 4.

Figure 7 is a side view of two building elements connected together to form part of an external wall.

Figure 8 is sectional view across C-C of Fig. 7.

Figure 9 is a view of two building elements of a second embodiment of the invention connected together to form a partition.

Figure 10 is a view in the direction D-D of Fig. 9.

Figure 11 is a part-sectional three-dimensional view of the building elements of Figs. 9 and 10.

Figure 12 shows a completed partition formed from the building elements connected as shown in Figs. 9 - 11; and

Figure 13 shows detail of a corner element of a partition of Fig. 12.

Fig. 14 is a cross-sectional view through a rivet connection between two frame members such as illustrated in Fig. 5.

Fig. 15 is an exploded 3-dimensional view of a third embodiment of the invention.

Fig. 16 is a view in the direction of arrow C of Fig. 15 showing the third embodiment assemble.

Fig. 17 is a cross-sectional view across D-D of Fig. 16.

Fig. 18 is a cross-sectional view across E-E of Fig. 16; and

Fig. 19 is a perspective view of a fourth embodiment of the invention.

Detailed Description of the Preferred Embodiment

A first embodiment of the building element according to the invention is illustrated in Figs. 1 - 4.

The building element comprises a frame member 100 formed by injection moulding as a single piece of plastics material, preferably from polycarbonate and has four edge walls 102 connected to a central planar light transmissible partition 104. The partition provides additional strength as well as insulation from mud, weather, water, heat, atmosphere and dust. The partition 104 is best illustrated in Fig. 6.

An oblong opening 140 is formed in each edge wall 102 on one side of the partition 104 and on the other side of the partition 104, openings 106 are formed for receiving main connection rivets to allow the building element to be connected to others. Further smaller openings 108 are provided adjacent openings 140, for receiving subsidiary connection rivets of smaller size than the rivets to be received in openings 106. Rivets 107, 109 positioned in openings 106, 108 are schematically shown particularly in Figs. 3 and 4.

Each end of the frame member 100 is provided with a recess 110, 120 formed by projecting sides 112, 122 and internal peripheral sills 113, 123 of the edge walls 102.

Four light support members 130 are connected to walls 102 of the frame member 100. Each light support member 130 has attached thereto a plurality of longitudinally spaced light elements 132. Each member 130 rests on lips 142 at the ends of each opening 140 with the light elements 132 projecting through the opening 140. The light supports 130 may be secured to the lips 142 by any suitable means. The light elements may be of any suitable construction, for example light emitting diodes or low-voltage incandescent lamps.

Two light-transmissible panels 200, 300 are connected to the member 100, each panel fitting in a respective said recess 110, 120. The panels 200, 300 are formed from transparent or translucent material. The material may be chosen in dependence upon the use to which the building element is put. In the example illustrated in Figs. 1 - 4, the building element is used as part of an external wall of a building and the externally facing side of the building element receives panel 300 which is formed from weather-proof and breakage-resistant material, for example a transparent glass pane. The internal facing side of the building element received panel 200 which is formed of a more lightweight material, for example, transparent or translucent plastics, e.g. polycarbonate.

The panel 200 can be uniformly transparent or translucent or may be provided with a pattern. That pattern may form part of a larger pattern provided on panels 200 of adjacent building elements. Alternatively, each panel may be of a chosen translucent colour which together with adjacent panels may form a "checkerboard" design or other pattern.

For heavier weight panels, such as the glass panel 300, a secure means of fastening to the frame member 100 is needed and for this, a plurality of connectors 250 are used. Each connector 250 has lips 252 and openings 254 for receiving screws 256.

The panel 300 is provided with a lip 202 around its edge. The lip 202 is provided with gaps 204. The sides 122 of the recess 120 have gaps 124 which match the gaps 204 in the lip 202 of the panel 300. The base of each gap 124 is provided with a hole for receiving screw 256 for attachment of the connector 250.

When the panel 300 has been positioned in the recess 120, each connector 250 is screwed in place so that the connector 250 projects into the gap 204 of the panel 300, with a lip 252 of the connector 250 abutting the lip 202 of the panel 300 thus holding the panel in place. The connectors are disposed so that they can be connected to two adjacent frame members to hold two panels 300 in position.

Edge covers 270 of straight or 'L' shape are connected to the edges of the frame member, thus concealing the connection of the panel and giving a smart appearance. Each edge connector 270 includes a plurality of spaced resilient clip formations 272 which are wedged between the external surfaces of the recess sides 112, 122 of adjacent building elements, or of a building element and an external frame member or support, as best shown in Fig. 5.

For a lightweight panel such as plastics panel 200, such a secure connection of a panel to the frame member 100 is not required and in such an instance, it is sufficient to secure the panel using a plurality of snap-fit clip portions 114 (see Fig. 2) of any suitable design forming part of the projecting side 112.

The mode of assembly of a plurality of building elements to form a wall will now be described particular with reference to Figs. 7 and 8.

A plurality of peripheral frame members elements of which a corner element 400 is illustrated in Figs. 1 and 3 is provided. The peripheral frame members 400 together form an edgewise external frame for the building elements. The building elements are riveted to the peripheral frame members 400 which are screwed to a wooden frame 450, the wooden frame 450 being connected to the surrounding wall 460. The peripheral frame members are formed in two sectional types,

corner sections 400 and straight sections (not shown) equivalent to one side of the section 400. The internal longitudinal dimensions of the sections are the same as the edge walls 102 of the building elements 100.

In use, an opening in the surrounding wall 460 is prepared by erecting the wooden frame 450 at the periphery of the opening to the correct size to accommodate an integer member of building elements 100 and the peripheral frame. The peripheral frame members 400 are then screwed in place on the wooden frame 450. The building elements 100 are then riveted in place on to the peripheral frame. The building elements 100 may be riveted together in advance to form the wall structure to be connected to the peripheral frame or this can be done on site. The panels 200, 300 are finally inserted in the frame members 100 and fixed in place.

If lighting is provided by means of lighting supports 130, it is preferable to prefabricate the building elements into a wall-like structure in advance, with the wiring for the lighting supports being connected together, for connection to an external power source once the wall-like structure has been fixed to the peripheral frame.

A second embodiment of a building element of the invention is shown in Figs. 9 - 13, in which the building element is used to form an internal partition 600 shown in Fig. 12. The partition is formed from building elements of a similar

general structure to that shown in Figs. 1 - 8, differing principally in the choice of panels 200, 300, in the strength of the frame members and in the peripheral connections of the assembled building elements.

Specifically, and are shown in Figs. 9 - 12, the building elements 515 have a simplified structure in that the central partition element 104 is omitted, as are the openings 140 and lighting elements 130. The openings for large rivets are replaced by similar openings for smaller rivets 520. The structure is thus significantly less robust than the first embodiment but, since the structure is for an internal partition, the additional structural integrity of the first embodiment is not needed. The building elements 515 are connected together but are further connected at the base to a support member 500, which replaces the peripheral frame. The building elements 515 are connected directly to the support member 500 by screws 510, as shown in Fig. 10. The support member 500 further includes openings 512 for receiving screws 514 to connect the support member to the floor as shown in Fig. 11.

Since the partition is for internal use, it is not necessary to provide a glass panel such as panel 300 and this may be replaced with the plastics panel such as panel 200, thus reducing the overall weight of the partition.

A cosmetic cover member 530 is provided to hide the edge of the partition and a corner member 540 may also be provided between partition sections as shown in more detail in Fig. 13.

A preferred building element connector used in the embodiment of Figs. 1 - 8 is illustrated in Fig. 14. Where a large number of frame members are connected together to form a wall, it is desirable to have some tolerance in the connections to accommodate thermal expansion of the frame members and other factors. Preferably, therefore, rivet 107 does not engage directly with the sides of opening 106 in each frame member. Instead, an intermediate connection element in the form of a sleeve formed from elastomeric material, such as rubber, is provided in each opening 106. The sleeve has a hollow cylindrical bore 602 through which the rivet 107 passes and an annular lip 604 which engages, on one side, a corresponding annular shelf of the opening 106 and, on the other side, the head or tail of the rivet 107. In use, when the two frame members 104 are riveted together, the rivet head and tail engage lips 604 of respective sleeves 600 which in turn engage shelf 108 of the opening 106 to hold the frame members together. The conformability of the rubber sleeve allows any slight movement in the relative position and/or size of the frame members to be accommodated without excessive strain being placed on the wall structure as a whole. The sleeve also provides a sealing function.

A third embodiment of the invention is shown in Fig. 15. The second embodiment of Fig. 9 is a more light weight version of the embodiment of Fig. 1. The third embodiment of Fig. 15 is a still more light weight version, in which frame member 600 includes means for receiving only a single panel 602. The panel 602 is received in a recess 601 in the frame member 600 and is attached to the member 600 by a plurality of snap-fit clip portions forming part of projecting sides 604 of the recess 601 of the frame member 600. Frame member 600 is provided with a support member 606 which is similar to partition 104 of the first embodiment except that no means/recess is provided on the other side of the partition for accommodating another panel. The frame members 600 may be connected together to form a wall-like structure in the manner of the previous embodiments and the wall-like structure is arranged to be connected to a peripheral frame 608. The frame 608 is connected to an external wooden frame 620, which is connected to a supporting wall 630. The frame members 600 are connected to the outer frame 608 by rivets 612.

The edges of the panel 602 are provided with edge covers 610 in the manner of the first embodiment, for aesthetic purposes. This embodiment may be illuminated in similar manner to the first embodiment.

With the third embodiment, a wall-light structure can be connected to an existing wall, with the panel 602 providing

any chosen aesthetic effect. For example, the panels may be a translucent sky-blue colour and illuminated from the rear to provide the impression of a window. Alternatively, the panels may provide individual patterns or a single collective pattern.

A fourth embodiment of the invention, which forms a display, is shown in Fig. 19 which uses the panels of Fig. 15 but without the peripheral frame 608 and wooden frame 620. Instead, the panels form a partition in the manner of the second embodiment and are provided with side 640 and base 650 connection members. Furthermore, alternate frame members 600A are not provided with members 602 so that a recess is formed by the edge walls of the frame member 600A in which objects, for example shop merchandise, may be displayed. A light 660 may also optionally be provided to illuminate the merchandise. The remaining frame members in which panels are disposed may bear display information or advertising.

The embodiments described is not to be construed as limitative. For example, the building elements need not include lighting elements, if lighting is not needed and/or the partition 104 if the partition is not required. Furthermore, although the frame member has been formed as a single injection moulded piece, this may be formed from a kit of parts connectable together by the manufacturer or by the user. Although four light supports have been shown connected to the frame member, only a single light support may be

provided and such may only carry a single light source. Furthermore, any other suitable lighting means, for example optical-fibre or piped lighting connected to a single remote light source or light sources directly connected to the frame member without the intermediary of a support may be used. Also, the lighting means may also edge-light as one or more of the panels. Although the frame members have been shown connected by rivets and screws, any other suitable connection method using for example complementary threaded members, a snap-fit connection or adhesive may be used. The intermediate connection member of Fig. 14 need not be in the form shown and any other member providing an accommodation of slight relative movements of connected frame members can be used, for example a washer of suitable resilience.

In some applications, the panels 200, 300, 602 need not be light transmissible, particularly, for example, in the embodiment of Fig. 19 in which the panels may be opaque.

In a further preferred form, a panel may be formed using the technique disclosed in published PCT application WO 98/41968, the contents of which are incorporated herein by reference, with a picture or design being formed on fabric material sandwiched between two layers of plastics material to form the panel. It is particularly preferable in such a preferred form for the lighting means to edge-light the panel, as noted above.

Whilst the panels have been shown planar, this is not to be construed as limitative. For example, a pattern may be formed in relief projecting or being recessed relative to the surface of the panel.

It is further envisaged that the frame member and panels may be sold separately to the user as required.

CLAIMS

1. A building element comprising a frame having a formation arranged to receive a separate panel, the building element being connectable to like building elements to form a wall-like structure.
2. A building element as claimed in claim 1 further comprising a panel able to be received by the formation.
3. A building element as claimed in claim 2 wherein the panel is formed from plastics material.
4. A building element as claimed in claim 2 or claim 3 wherein the panel is formed from glass.
5. A building element as claimed in any one of claims 2 to 4 wherein the panel is of planar form.
6. A building element as claimed in any one of claims 2 to 5 wherein the panel is formed with a pattern.
7. A building element as claimed in any one of claims 2 to 6 wherein the panel is light transmissible.
8. A building element as claimed in any one of claims 2 to 7 wherein the panel is of a translucent colour.

9. A building element as claimed in claim 2 wherein the panel comprises a first layer of light transmissible material, a second layer of woven fabric having a design formed thereon; and a third layer of light transmissible material bonded to the first layer to sandwich the second layer.

10. A building element as claimed in any one of claims 2 to 9 comprising a first said panel and a second said panel, the panels being received by respective said receiving means.

11. A building element as claimed in claim 10 wherein the first and second panels are formed from different materials.

12. A building element as claimed in any one of the preceding claims further comprising a partition element formed between walls of the frame.

13. A building element as claimed in claim 12 dependent directly or indirectly on claim 10 wherein the partition element is formed between the means for receiving the first panel and the means for receiving the second panel.

14. A building element as claimed in any one of the preceding claims further comprising lighting means connectable to the frame.

15. A building element as claimed in claim 14 wherein the lighting means comprises a light support to which at least one light source is connected and the frame having an opening through which the light source internally projects.

16. A building element as claimed in any one of the preceding claims further comprising means for securing the or each panel to the frame.

17. A building element as claimed in any one of the preceding claims further comprising a plurality of openings arranged to be aligned with openings of like building elements and arranged to receive respective connectors to connect the building elements together.

18. A building element as claimed in claim 17 wherein the connectors are selected from rivets and/or screws.

19. A building element as claimed in claim 17 or claim 18 further comprising an intermediate connection member disposable between an engagement surface of a said opening and a said connector.

20. A building element as claimed in claim 19 wherein the intermediate connection member is formed from resilient material.

21. A building element as claimed in claim 20 wherein said intermediate connection member is formed in the shape of a sleeve receivable in the opening, the sleeve having a lip for engagable with said surface.

22. In combination a plurality of building elements as claimed in any one of the preceding claims.

23. A combination as claimed in claim 22 connected together to form a wall-like structure.

24. A combination as claimed in claim 23 and a frame connected to the periphery of the structure.

25. A combination as claimed in claim 24 wherein the wall-like structure is a light transmissible region of a wall of a building.

26. A combination as claimed in claim 23 wherein the wall-like structure is a partition.

27. A combination as claimed in claim 26 further comprising a ground-engaging support connected to an edge of the connected building elements.

28. A combination as claimed in claim 26 or claim 27 further comprising a cover for an edge of the connected building elements.

29. A combination as claimed in claim 23 wherein the wall-light structure forms a display.

30. A combination as claimed in claim 29 wherein at least some of the frame members of the wall-light structure form recesses for objects to be displayed.

31. A combination as claimed in claim 23 wherein the wall-light structure is wall-mountable.

32. A panel adapted for use with the building element of claim 1.