This invention relates to a construction toy for building an edifice by utilizing magnetic coupling between a superstructure and the sidewall panels and roof members to form the exterior surface of the edifice. The superstructure is formed by a plurality of horizontal frame members and vertical frame members coupled to each other by two, three, four, five, and six-way couplings. Each horizontal frame member carries intermediate its ends, a magnetizable member. Each sidewall panel carries a magnet adjacent an upper or lower edge for magnetically coupling with the magnetizable member. The roof members consist of planar panels, outside and inside corner members, truncated prism members, regular pyramid shaped members, and comparable shapes to form the exterior surface of the roof. Each of the roof members is so dimensioned and proportioned to permit a magnet to be carried by an interior surface for magnetically coupling with a magnetizable member to form at least a part of the roof.
MAGNETIC EDIFICE CONSTRUCTION TOY

FIELD OF THE INVENTION

[0001] This invention relates to an edifice construction toy utilizing magnetizable frame members to form the superstructure of the edifice and to permit magnetically the coupling of roof and sidewall panels carrying magnets to form the exterior of the edifice.

BACKGROUND OF THE INVENTION

[0002] This invention relates to the building of toy edifices that have a superstructure containing magnetizable frame members to which sidewall panels and roof members magnetically couple to form the exterior of the edifice. In the prior art, edifices were erected by the exterior members or pieces screwed or snapped to each other. The exterior members or pieces were not readily demonstrated to be used for an alternate edifice design. Erector sets of the prior art required the structural members to be screwed together and generally were limited to a single design. It would therefore be advantageous to create a superstructure having magnetizable elements that would permit sidewall panels and roof pieces to magnetically couple to the superstructure to form the edifice and to be easily demountable for use with superstructures of alternate edifice designs.

SUMMARY OF THE INVENTION

[0003] In one embodiment, there is, therefore, provided according to the present invention, an edifice construction toy for building a toy edifice having a superstructure, side walls, and a roof. The superstructure consists of a plurality of frame members that have a longitudinal axis and a first and second end. At least a multiplicity of the frame members carry a magnetizable member intermediate the first and second ends for magnetic coupling with a plurality of side wall and roof members to form the exterior of the edifice. The sidewall members in the preferred embodiment are planar with an upper and lower edge and of parallelogram shape. Each of the sidewall members contains a plurality of magnets so disposed in the sidewall member to permit the magnetic coupling of a sidewall member with the magnetizable members carried respectively by the frame members thereby forming at least a part of the side wall. A multiplicity of outside roof corner members having an oblique pyramid shape comprising two intersecting lateral faces each face having a base substantially the same lateral dimension as the upper edge of a sidewall member. A lateral face magnet is carried by one of said lateral faces adjacent the base for magnetically coupling with at least one of said frame member magnetizable members to form at least a part of the roof. The superstructure may be so assembled such that the lateral faces of the roof corner members are in abutting relationship after magnetically coupling with respective frame members thereby forming a closed roof of the edifice.

[0004] In another embodiment, the superstructure of the above embodiment may be so assembled to permit the roof of the edifice to be modified by a multiplicity of planar roof insert members having an upper edge, a lower edge, and lateral sides where the lateral sides have substantially the same lateral dimension as a lateral face of a roof corner member and where the planar roof insert members have a magnet carried on a lower edge for magnetic coupling with a frame member. The planar roof insert member lateral sides, after magnetic coupling with a frame, are in abutting relationship with the edge of lateral faces of a roof corner member thereby forming a closed roof of the edifice.

[0005] In yet another embodiment, the superstructure of the edifice may be so assembled to permit the roof of the edifice to be comprised of at least one inside roof corner member and a multiplicity of outside roof corner members where the inside roof corner member has an inverted oblique pyramid shape comprising two intersecting lateral faces. Each of the lateral faces has an upper edge (base of inverted oblique pyramid) having substantially the same lateral dimension as a horizontally mounted frame member where each of the upper edges of the inverted oblique pyramid has a magnet associated therewith to permit magnetic coupling with a respective frame member.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] These and other features and advantages will become appreciated as the same become better understood with reference to the following specification, claims and drawings wherein:

[0007] FIG. 1 is an assembled edifice in perspective illustrating the planar parallelogram shaped sidewall panels, the roof corner members having an oblique pyramid shape, and the planar parallelogram shaped roof panel elements forming the exterior of the edifice.

[0008] FIG. 2 is the partly assembled edifice of FIG. 1 in perspective illustrating the edifice superstructure with roof and sidewall members magnetically coupled to the frame members of the superstructure.

[0009] FIG. 3 is a perspective view of the superstructure of FIG. 2.

[0010] FIG. 4 is an expanded perspective view of the horizontal frame member and a pair of vertical frame members separated from a three-way and six-way coupling.

[0011] FIG. 5 is a perspective view of one embodiment of a superstructure three-way coupling.

[0012] FIG. 6 is a perspective view of one embodiment of a superstructure four-way coupling.

[0013] FIG. 7 is a perspective view of one embodiment of a superstructure four-way coupling.

[0014] FIG. 8 is a perspective view of another embodiment of a superstructure four-way coupling.

[0015] FIG. 9 is a perspective view of another embodiment of a superstructure two-way coupling.

[0016] FIG. 10 is a perspective view of another embodiment of a superstructure three-way coupling.

[0017] FIG. 11 is a perspective view of one embodiment of a superstructure five-way coupling.

[0018] FIG. 12 is a perspective view of FIG. 11 with the vertical axis rotated clockwise to the horizontal.

[0019] FIG. 13 is a perspective view of one embodiment of a superstructure six-way coupling.

[0020] FIG. 14 is a perspective view illustrating the exterior surface of an embodiment of a planar parallelogram shaped sidewall panel member.

[0021] FIG. 15 is a perspective view illustrating the interior surface of the planar parallelogram shaped panel member illustrated in FIG. 14.

[0022] FIG. 16 is a perspective view illustrating the exterior surface of a roof corner member having an oblique pyramid shape.

[0023] FIG. 17 is a perspective view illustrating the interior surface of the roof corner member illustrated in FIG. 16.
FIG. 18 is a perspective view of another embodiment of the interior surface of a planar parallelogram shaped sidewall panel member.

FIG. 19 is a partly assembled edifice in perspective illustrating the edifice superstructure with roof corner and panel members magnetically coupled to the superstructure.

FIG. 20 is a perspective view of an inside corner roof member having an oblique pyramid shape illustrating the exterior surface of the member.

FIG. 21 is a perspective view of the interior surface of the inside corner roof member illustrated in FIG. 20.

FIG. 22 is a perspective view of the exterior surface of another embodiment of a roof panel member.

FIG. 23 is a perspective view of the interior surface of the roof panel member illustrated in FIG. 22.

FIG. 24 is a perspective view of the exterior surface of one embodiment of a roof peak member.

FIG. 25 is a perspective view of the interior surface of the roof peak member illustrated in FIG. 24.

FIG. 26 is a perspective view of the exterior surface of another embodiment of a roof peak member.

FIG. 27 is a perspective view of the interior surface of the roof peak member illustrated in FIG. 26.

FIG. 28 is a perspective view of the exterior surface of yet another embodiment of a roof peak member.

FIG. 29 is a perspective view of the interior surface of the roof peak member illustrated in FIG. 28.

FIG. 30 is a perspective view of the exterior surface of another embodiment of a roof peak member.

FIG. 31 is a perspective view of the interior surface of the roof peak member illustrated in FIG. 30.

FIG. 32 is a perspective view of the exterior surface of an embodiment of a roof peak member.

FIG. 33 is a perspective view of the interior surface of the roof peak member illustrated in FIG. 31.

DETAILED DESCRIPTION

One embodiment of an assembled toy edifice, utilizing the superstructure and roof and sidewall panels of this invention, is shown in FIG. 1. As can be seen in FIG. 1, the assembled edifice 1 is illustrated in perspective having an exterior surface that consists in this embodiment of four outside roof corner members 2, or roof elements which have an oblique pyramid shape. The outside roof corner member is also illustrated in FIG. 16 where the roof corner member has two intersecting lateral exterior faces 3 and 3', lateral faces and 3 and 3' have bases 4 and 4' and lateral edges 5 and 5' respectively where lateral edges 5 and 5' are of substantially the same length and where lateral faces 3 and 3' intersect at an angle of approximately ninety degrees to form the oblique pyramid shape.

Referring again to FIG. 1, edifice 1 has a plurality of planar sidewall panels 6, or sidewall element, which are like dimensioned and have a parallelogram shape where the upper edge 7 of a sidewall panel 6 has a lateral dimension of the same or substantially the same length as a base 4 or 4' of an outside roof corner member 2. (The upper edge 7 of planar sidewall panel 6 can be more clearly seen in FIG. 14 which illustrates the exterior surface of sidewall panel 6). The lower edge 8 of planar sidewall panel 6 is of like dimension as the upper edge 7 forming the parallelogram shape.

As can further be seen in FIG. 1, edifice 1 has a planar roof panel 9, or roof element, that has a parallelogram shape and has lateral edges 9 and 9' which are of substantially the same length as lateral roof corner edges 5 and 5' respectively.

FIG. 2 is a partly assembled illustration of edifice 1 and illustrates a part of superstructure 12 of the embodiment shown in FIG. 1 of edifice 1. Superstructure 12 is shown in perspective in FIG. 3 and as can be seen in FIG. 3, superstructure 12 is comprised of a multiplicity of vertical frame members 13 and a plurality of horizontal frame members 14 that are interconnected through various couplings. By referring to FIG. 4, it can be seen that a horizontal frame member 14 has a longitudinal axis 16, a first end 17, and a second end 18 for insertion into a superstructure coupling and a magnetizable body 19 made of a metallic material carried by horizontal frame member 14 intermediate its first and second ends, 17 and 18, respectively. By reference to FIGS. 3 and 4, it can further be seen that horizontal frame members 14 and vertical frame members 13 form superstructure 12 by attachment to various coupling designs; an example of such design is three-way coupling 21 illustrated in FIG. 3 and also shown in FIGS. 4 and 10. In FIG. 4, first end 17 of frame member 14 is pressed into first opening 22 of coupling 21 to achieve a press-fit. Vertical frame member 13 has first and second ends, 26 and 27, respectively, which are so dimensioned and proportioned to press fit into a coupling such as the coupling 21 illustrated in FIG. 4. It can further be seen in FIG. 4 that first end 17 of horizontal frame member 14 is, likewise, so dimensioned and proportioned to permit a press fit into a coupling.

The various types of couplings used to form superstructure 11 are illustrated in FIGS. 5 through 13 and also in the assembled superstructure shown in FIG. 3. Each of the couplings have openings of the same diameter to accommodate either the first or second ends of either a vertical or horizontal frame member. FIG. 5 is an illustration of one embodiment of a three-way coupling 21 having openings 22, 23', and 24' and can be seen as a superstructure element in FIG. 3. In FIGS. 8 and 9, two embodiments are illustrated of two-way couplings 26 and 26' having openings 27 and 28 and 27' and 28' respectively. An example of two-way coupling 26' as a superstructure element is illustrated in FIGS. 2 and 3. Five-way couplings 29 and 29' are illustrated respectively in FIGS. 11 and 12; as can be seen in FIG. 11, coupling 29 has a vertical axis which has been rotated to the horizontal 30 in FIG. 12. The five-way couplings 29' are illustrated in FIGS. 2 and 3 as elements of superstructure 11.

In FIGS. 6 and 7, embodiments 31 and 31' of a four-way coupling are illustrated; four-way coupling 31' can be seen as an element of superstructure 11 in FIGS. 2 and 3. By referring to FIG. 13, it can be seen that another coupling embodiment is six-way, namely, coupling 32.

To magnetically attach the sidewall elements and roof elements to superstructure 11, a magnet or a pair of magnets may be carried on the interior surface of the sidewall element or roof element for coupling with magnetizable body 19. By referring to FIG. 15, the interior surface 33 of sidewall panel 6 is illustrated having a first magnet 34 adjacent to upper edge 7 and a second magnet 36, adjacent to lower edge 8. As can further be seen by reference to FIG. 15, interior surface 33 has spacing pins 37 and 37' adjacent to upper edge 7 and lower spacing pins 38 and 38' for engaging a horizontal frame member 14, to permit the coupling of a magnet with the frame member. In FIG. 2 second magnet 36 and lower spacing pins 38 and 38' are
shown magnetically coupling with magnetizable body 19. By referring to FIG. 17, the interior surface 37 can be seen with roof magnets 38 and 39 located adjacent bases 4 and 4’ of outside roof corner member 2 for magnetically coupling with a magnetizable body 19 of a horizontal frame member 14. Spacer pins 41 and 41’, and 42 and 42’, extend from interior surfaces 37 and 37’ for bearing against a frame member to provide spacing for outside roof corner 2 thereform. The interior of another planar sidewall panel 43 is shown in FIG. 18. First and second magnets 34’ and 36’ are carried adjacent upper edge 7’ and lower edge 8’ for magnetically coupling with a magnetizable body 19 of a horizontal frame member. In this illustrated embodiment of a planar sidewall member, spacer pins are shown adjacent the upper, lower, and lateral edges of the sidewall panel for engagement with a frame member in spacing the sidewall panel from the frame member.

[0046] A modification of superstructure 11 is illustrated in FIG. 19 as another edifice embodiment that can be erected utilizing the couplings, sidewalk panels, and outside roof corner members described above. The edifice 46 shown in FIG. 19 has an expanded superstructure that includes at least an inside corner roof member having exterior and interior surfaces as shown in FIGS. 20 and 21. As can be seen in FIG. 20, inside corner roof member 47 has exterior surfaces 48 and 49 which intersect at an angle of approximately ninety degree, and lateral edges 51 and 52, and bases 53 and 54. A perspective view of inside corner roof member 47 is shown in FIG. 20, and illustrates bases 53 and 54 intersecting at an angle of approximately ninety degrees forming an oblique pyramid shape. By referring to FIG. 19, inside corner member 47 can be seen positioned and attached to the superstructure of edifice 46. Magnetic coupling of inside corner roof member 47 to a horizontal frame member 14 having a magnetizable body 19 is achieved by magnets 56 and 57 (shown in FIG. 21) coupling with magnetizable body 19.

[0047] In FIGS. 22 and 23, the exterior and interior surfaces 58 and 59 are illustrated for a roof window panel 61. Magnetic coupling is achieved with a magnetizable body 19 of a horizontal frame member 14 by magnets 62 and 63. Window structure 64 can be seen in FIG. 19 extending from window panel 61 after window panel 61 has magnetically coupled to the superstructure of edifice 46.

[0048] Another roof construction panel element, or roof element, is illustrated in FIGS. 24 and 25. Roof peak panel 66 is illustrated in FIGS. 24 and 25 and as can be seen has a V-trough shape and an exterior surface 67 and interior surface 68. Interior surface 68 carries magnets 69 and 71 to permit magnetically coupling of the magnets with another magnetizable body 19 carried by a horizontal frame member 14; interior surface 68 further carries a multiplicity of spacer pins 70 for bearing upon a horizontal frame member 14. The assembly of roof peak member 66 to form a part of the roof for superstructure 46 is shown in FIG. 19.

[0049] Roof construction elements of edifice 46 are further illustrated in FIGS. 26 and 27. Inside corner roof member 72 is shown in FIG. 26 and has an exterior surface 73 and an interior surface 74 which are shown in FIG. 27. Inside corner roof member can be visualized as being composed of two intersecting planar elements 75 and 75’ forming an inverted right oblique pyramid shape having bases 80 and 80’ of substantially the same length and lateral edge 85 formed by the insertion of planar elements 75 and 75’. By referring to FIG. 19, inside corner roof member 72 can be seen assembled to the superstructure of edifice 46. The panel magnetically couples through magnets 73 and 74 with magnetizable body 19 carried by horizontal frame members 14 which are mutually perpendicular.

[0050] Other assembly elements of edifice 46 are shown in FIG. 19 and include cornice roof panel member 76 which has an exterior surface 77 shown in FIG. 30 and an interior surface 78 illustrated in FIG. 31. Cornice roof panel member can be visualized as being composed of three intersecting planar elements 93, 94 and 95 forming a truncated triangular prism shape having a peak lateral edge 96 and opposing lateral edges 97 and 98. Magnetic coupling to the superstructure is achieved by magnets 79 and 81 coupling to magnetizable bodies 19 contained intermediate of the ends of two parallel frame members 14.

[0051] Further illustration of roof panel elements are shown in FIGS. 28, 29, 32, and 33 where FIGS. 28 and 29 illustrate the exterior and interior surfaces of a roof closure element that may be utilized with variations of the superstructure. A roof closure element having a design as shown in FIGS. 28 and 29, namely, roof element 82 which has an exterior surface 83 and an interior surface 84 where magnet 86 can be seen extending from interior surface 84. FIG. 32 represents the exterior surface 87 of closed cornice roof member 88; interior surface 89 is illustrated in FIG. 33 having magnets 91 and 92 for magnetically coupling closed cornice 88 to a superstructure. Closed cornice roof member 88 can be visualized as composed of four planar panel elements 101, 102, 103, and 104, intersecting to form a regular pyramid shape having four equally dimensioned bases 105, 106, 107, and 108.

[0052] While I have shown and described embodiments of an edifice magnetic construction toy having a superstructure, sidewalk panel elements, and roof elements that magnetically couple with the superstructure, it is to be understood that the invention is subject to many modifications without departing from the scope and spirit of the claims as recited herein.

What is claimed is:

1. A toy edifice structure having a superstructure, sidewalks, and a roof, comprising:
   a) a plurality of frame members where each said frame member has a longitudinal axis and a first end and second end;
   b) a magnetizable member carried by each of a multiplicity of said plurality of frame members intermediate said first and second ends;
   c) said superstructure comprising a plurality of coupling joints for captively holding a first end or a second end of each said frame member;
   d) said sidewalk comprising a plurality of planar panel members having an upper edge and a lower edge and having an exterior surface and an interior surface and having a parallelogram shape, each said planar panel members further having a magnet so disposed on said interior surface to permit magnetic coupling of said planar panel member with at least one of said magnetizable members;
   e) said roof comprising a roof corner member having an oblique pyramid shape formed by the intersection of two lateral faces at a dihedral angle of substantially ninety degrees, each said lateral face having an exterior surface and an interior surface and a base of substan-
tially the same length as said upper edge of said planar panel member, and a lateral magnet carried by each said interior surface where said lateral magnet is so disposed on said interior surface to permit said interior surface to magnetically couple with at least one of said frame members.

2. The toy edifice structure recited in claim 1 where said multiplicity of said plurality of frame members are horizontal frame members.

3. The toy edifice structure recited in claim 1 where said plurality of frame members comprise horizontal frame members and vertical frame members where each said horizontal frame member carries a said magnetizable member.

4. The toy edifice structure recited in claim 1 where said roof further comprises an inside corner roof member, said inside corner roof member comprising two intersecting planar elements having exterior and interior surfaces forming an oblique pyramid shape, said planar elements further having bases of like dimension and a lateral edge formed by the intersection of said planar elements, said inside corner roof member further comprising a magnet carried by said interior surface adjacent said base.

5. The toy edifice recited in claim 1 where said roof further comprises a roof peak panel member comprising two intersecting planar panel elements where said intersection forms the peak of said roof peak panel, said planar panel elements further having an exterior surface and an interior surface where each said planar panel element has a bottom edge substantially parallel to said intersection, and further comprising a magnet carried by said interior surface adjacent said bottom edge.

6. The toy edifice recited in claim 1 where said roof further comprises a cornice roof panel member comprising three intersecting planar panel elements forming a truncated right triangular prism shape having a peak lateral edge and a pair of opposing lateral edges where said opposing lateral edges are of substantially the same length, said planar panel elements having interior surfaces and a magnet carried by said interior surface for magnetically coupling with said magnetizable member.

7. The toy edifice recited in claim 1 where said roof further comprises a pyramid roof member comprising four intersecting planar panel elements, said intersecting planar panel elements forming a regular pyramid shape where the lateral dimension of each base segment of said pyramid is substantially of equal length, said pyramid roof member having an interior surface and a magnet carried by said interior surface for magnetically coupling with said magnetizable member.

8. The toy edifice recited in claim 1 further comprising roof panel means for magnetically coupling with said magnetizable member and forming at least a part of said roof.

9. In combination, construction elements for building a toy edifice structure having a superstructure, sidewalks, and a roof, comprising:
   a) a plurality of frame members where each said frame member has a longitudinal axis and a first and second end;
   b) a magnetizable member carried by at least a multiplicity of said frame members intermediate said first and second ends;
   c) a plurality of coupling joints for directionally connecting said frame members to form said superstructure;
   d) a plurality of planar panel members having an upper edge and a lower edge, each said planar panel member having a parallelogram shape;
   e) a plurality of magnets so carried by each of said planar panel members to permit magnetic coupling of said planar panel member with at least one of said frame members to from at least a part of said sidewalk;
   f) a roof corner member having an oblique pyramid shape comprised of two intersecting lateral faces where the base of each said lateral face has substantially the same dimension as said upper edge of said planar panel member; and
   g) a lateral magnet carried by one of said lateral faces adjacent said base for magnetically coupling with at least one of said frame members to form at least a part of said roof.

10. The combination recited in claim 9 where said roof further comprises an inside corner roof member, said inside corner roof member comprising two intersecting planar elements having exterior and interior surfaces forming an oblique pyramid shape, said planar elements further having bases of like dimension and a lateral edge formed by the intersection of said planar elements, said inside corner roof member further comprising a magnet carried on said interior surface adjacent said base.

11. The combination recited in claim 9 where said roof further comprises a roof peak panel member comprising two intersecting planar panel elements where said intersection forms the peak of said roof peak panel, said planar panel elements further having an exterior surface and an interior surface where each said planar panel element has a bottom edge substantially parallel to said intersection, and further comprising a magnet carried by said interior surface adjacent said bottom edge.

12. The combination recited in claim 9 where said roof further comprises a cornice roof panel member comprising three intersecting planar panel elements forming a truncated right triangular prism shape having a peak lateral edge and a pair of opposing lateral edges where said opposing lateral edges are of substantially the same length, said planar panel elements having interior surfaces and a magnet carried by said interior surface for magnetically coupling with said magnetizable member.

13. The combination recited in claim 9 where said roof further comprises a pyramid roof member comprising four intersecting planar panel elements, said intersecting planar panel elements forming a regular pyramid shape where the lateral dimension of each base segment of said pyramid is substantially of equal length, said pyramid roof member having an interior surface and a magnet carried by said interior surface for magnetically coupling with said magnetizable member.

14. The combination recited in claim 9 further comprising roof panel means for magnetically coupling with said magnetizable member so as to form at least a part of said roof.

15. In combination:
   a) a superstructure comprising a plurality of frame members where each said frame member has a longitudinal axis and a first and second end, said frame member further having a magnetizable member carried intermediate said first and second ends, and a plurality of coupling means for captively receiving said first end or said second end of said frame member;
b) sidewall members for removable attachment to said superstructure comprising a plurality of planar panel members having an upper edge and a lower edge, an exterior surface and an interior surface where each of said planar panel members has a parallelogram shape; said sidewall member further comprising a magnet carried by each said planar panel adjacent said upper or lower edge and so adapted to said interior surface to permit said planar panel member to magnetically couple with said magnetizable member whereby said planar panel member may be removably mounted to said superstructure; and
c) a plurality of roof elements for removable attachment to said superstructure comprising a roof corner member having an oblique pyramid shape formed by two intersecting lateral faces, said lateral faces intersecting at a dihedral angle of substantially ninety degrees where each said lateral face has an exterior surface and an interior surface and a base of substantially the same length as said upper edge of said planar panel member, said roof corner member further comprising a lateral magnet so adapted to said interior surface to permit said lateral magnet to magnetically couple with said magnetizable member.

16. The combination recited in claim 15 further comprising roof panel means for magnetically coupling with said magnetizable member so as to form at least a part of said roof.

* * * * *