Oct. 7, 1969 C. VAN DER LELY ET AL 3,470,660

PREFABRICATED BUILDING SECTIONS AND SPACED FOUNDATION BEAMS

Original Filed Dec. 28. 1961 6 Sheets-Sheet 1

FIG. 1

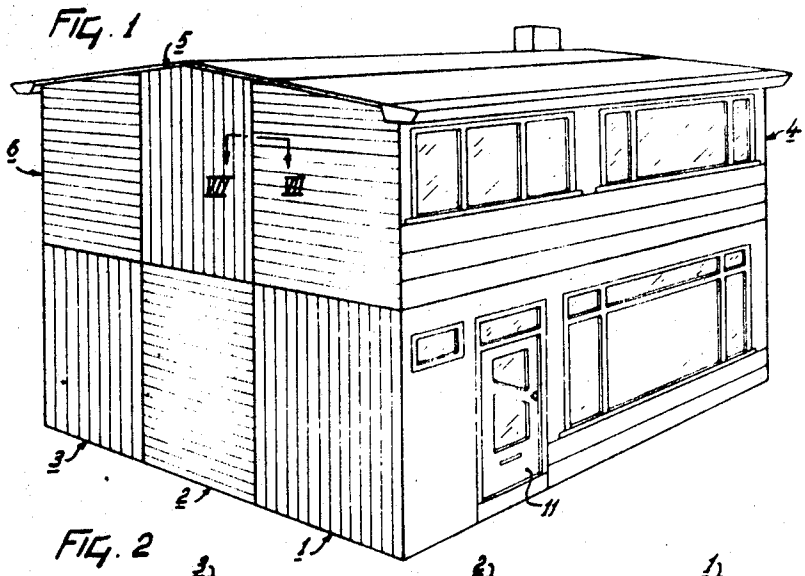

FIG. 2

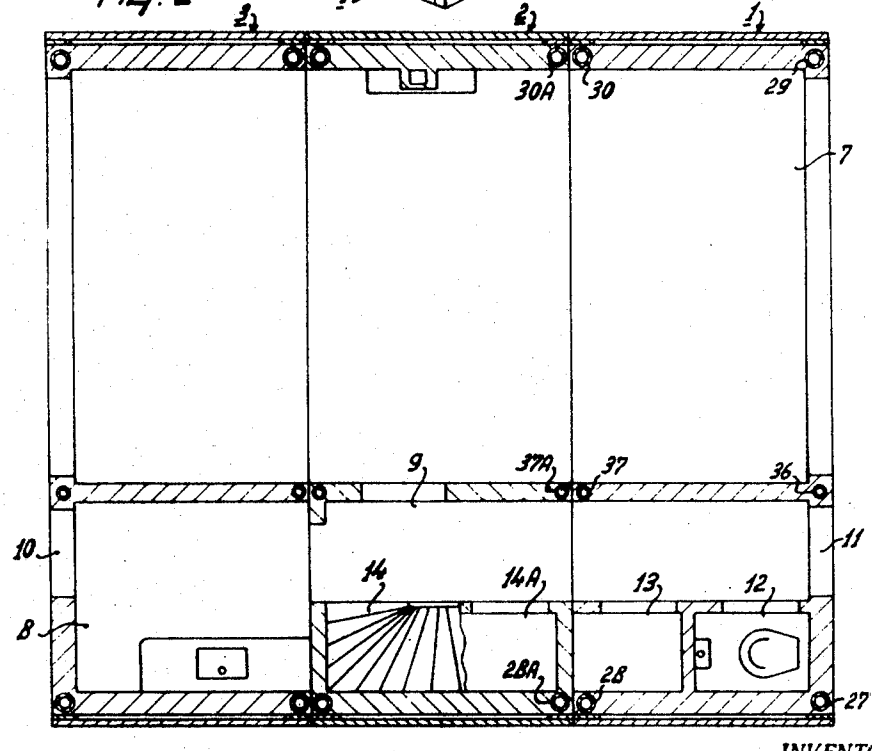

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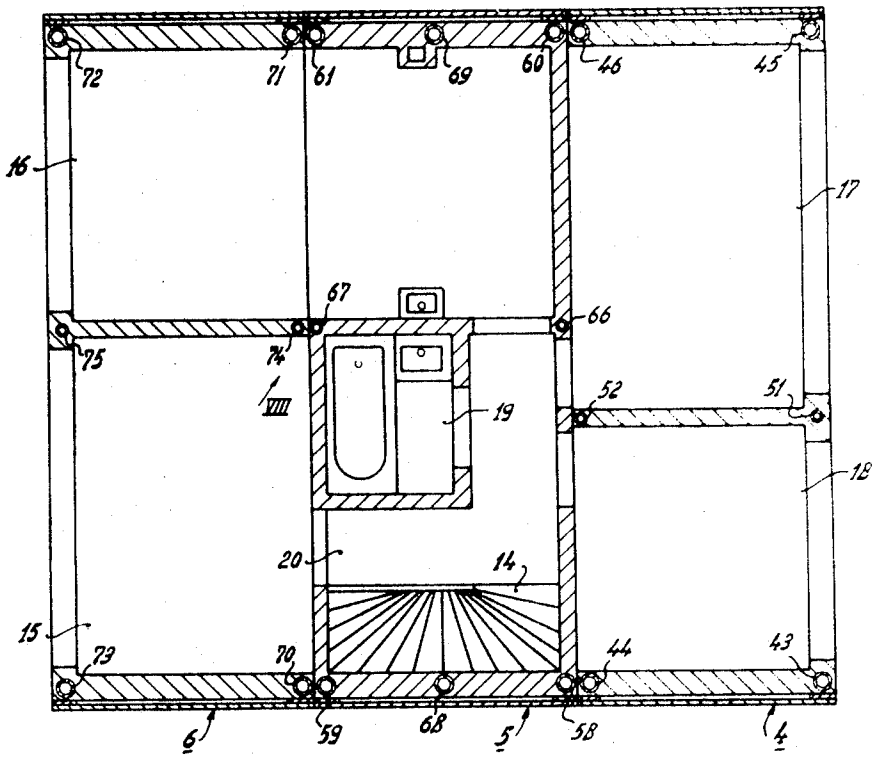
FIG 3



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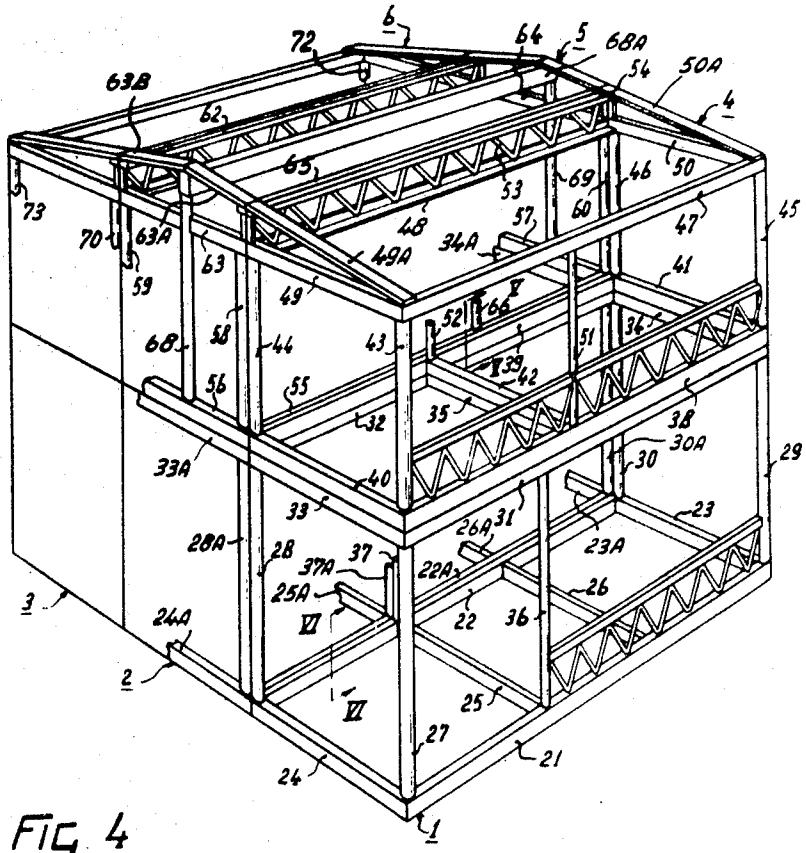

FIG. 4

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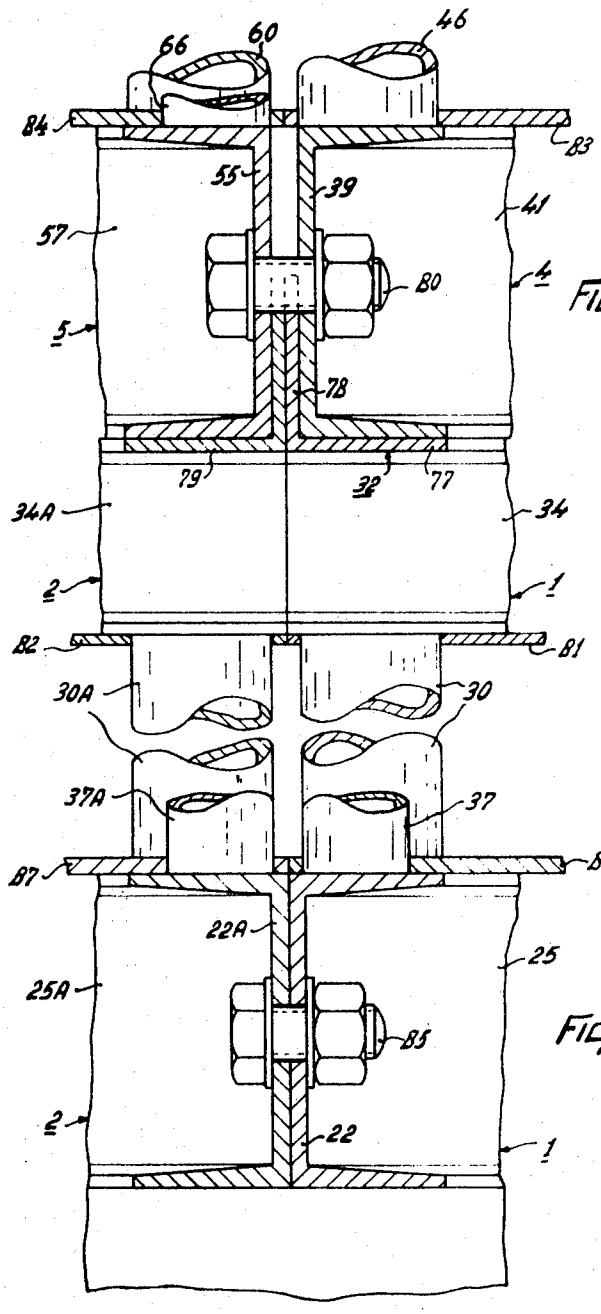

FIG. 5

FIG. 6

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PREFABRICATED BUILDING SECTIONS AND SPACED FOUNDATION BEAMS

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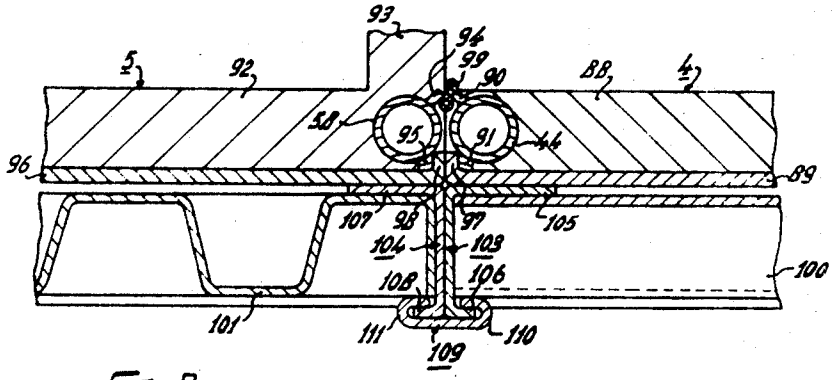

FIG. 7

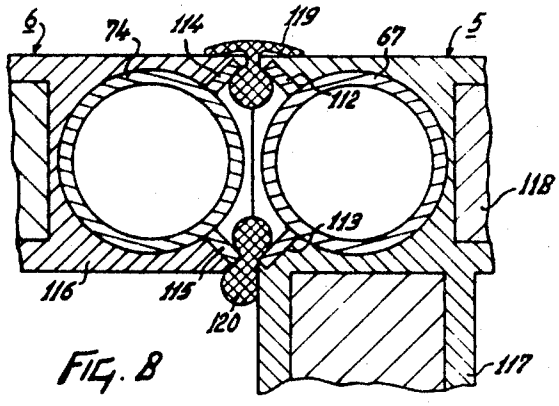

FIG. 8

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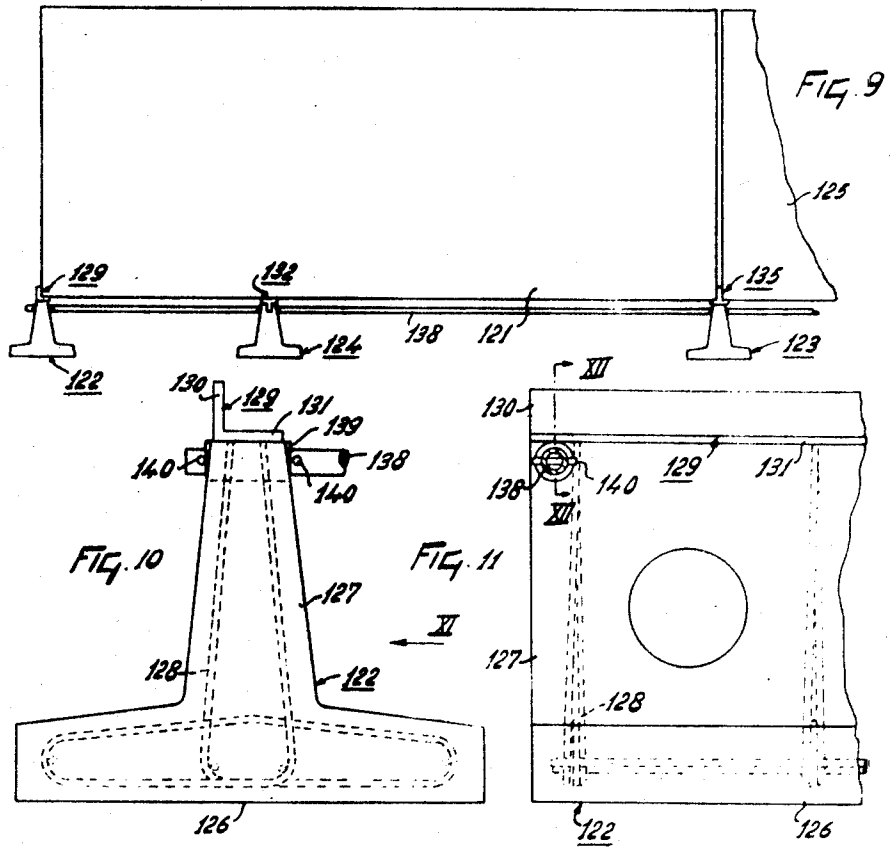

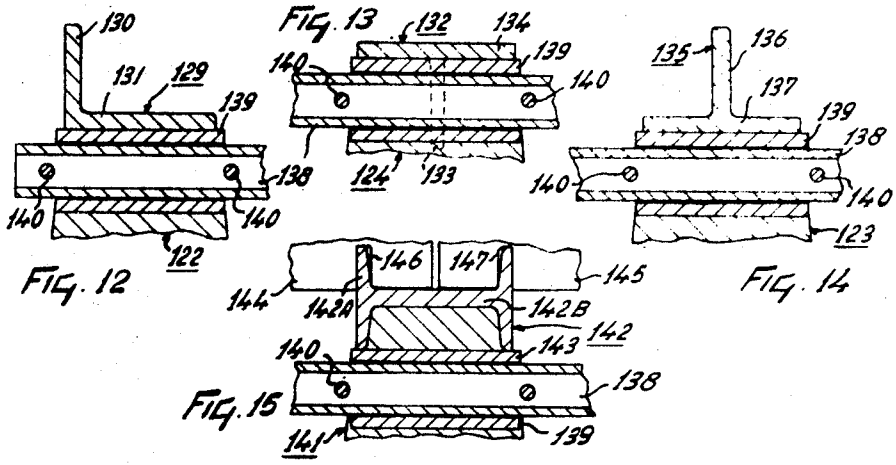

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United States Patent Office 3,470,660
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3,470,660

PREFABRICATED BUILDING SECTIONS AND SPACED FOUNDATION BEAMS

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Continuation of application Ser. No. 162,836, Dec. 28, 1961. This application Sept. 6, 1966, Ser. No. 577,538
Claims priority, application Netherlands, Dec. 30, 1960, 259,632
Int. Cl. E04h 1/02
U.S. Cl. 52—79 18 Claims

ABSTRACT OF THE DISCLOSURE

Prefabricated box-shaped sections each comprising a metal framework and having a floor, ceiling and walls, the sections designed to form a dwelling when fitted together, back-to-back L-beams rising from two adjacent sections disposed on a lower floor clamped between adjacent channel frame beams of adjacent sections disposed in the floor immediately above; parallel foundation beams with normally extending cross connections limiting their minimum and maximum distances apart and otherwise fixing their spatial relationship, ,metal bars on the foundation beams having upward projections which receive the sections and prevent their transverse movement, slots being provided on the bottom of the sections to receive the projections; metal tubes with vertical flanges provided at the corners of the sections which are partly encased in the walls thereof, a waterproofing sheet applied directly to the walls adapted to be turned inward about the flanges whereby sheets of adjacent sections are clamped between adjacent flanges, a covering sheet spaced outward of the waterproofing sheet.

CROSS REFERENCES TO RELATED APPLICATIONS

This is a continuation application, filed in conformity with the Commissioner's Order as set forth in 824 O.G.1, of application Ser. No. 162,836 filed Dec. 28, 1961.

SUMMARY AND BACKGROUND OF THE INVENTION

This invention relates to prefabricated sections for assembly to form buildings.

According to the present invention, there is provided a prefabricated, box-shaped section for use in building, the section having walls arranged so that in use the walls enclose at least part of a story, wherein the section has a box-shaped frame consisting of vertical and horizontal metal beams, the vertical beams being formed wholly or mainly by tubes.

A prefabricated section in this form is lightweight, and resistant to distortion.

According to a second aspect of the present invention, there is provided a building assembled from at least two prefabricated, box-shaped sections, each of which encloses at least part of a story, wherein one section has a projection secured thereto and extending along the other, or another, section in such a manner that relative movement in at least one direction of the two sections is prevented.

Prefabricated sections in this form have the advantages that they may be correctly located with respect to one another during assembly, and that the sections may be connected together in a simple manner.

According to a third aspect of the present invention, there is provided a building assembled from prefabricated, box-shaped sections, each of which encloses at least part of a story, wherein the sections rest on metal bars which constitute the upper sides of foundation beams.

In this manner the sections can be arranged in a simple way in their correct locations on the foundation beams, the foundation beams being of rigid construction.

According to another aspect of the present invention, there is provided a building assembled from prefabricated, box-shaped sections, each of which encloses at least part of a story, wherein some or all of the sections bear on foundation beams having upwardly extending projections therefrom, the projections serving to prevent movement of the sections bearing on said beams in a direction transverse to said beams.

According to a further aspect of the present invention, there is provided a building assembled from prefabricated, box-shaped sections, each of which encloses at least part of a story, wherein the sections rest on prefabricated, spaced foundation beams, there being a member interconnecting said foundation beams and fixing them in correct spaced relation with one another.

For a better understanding of the invention and to show how the same may be carried into effect, reference will now be made by way of example to the accompanying drawings, in which:

BRIEF DESCRIPTION OF THE DRAWINGS

FIGURE 1 is a perspective view of a two-story building composed of prefabricated sections,

FIGURE 2 is a sectional plan of the ground floor of the building shown in FIGURE 1,

FIGURE 3 is a sectional plan of the upper floor of the building shown in FIGURE 1,

FIGURE 4 is a view similar to FIGURE 1, but showing diagrammatically the structure of the framework of the building,

FIGURE 5 is, on an enlarged scale, a section taken on the line V—V in FIGURE 4,

FIGURE 6 is, on the same enlarged scale, a section taken on the line VI—VI in FIGURE 4,

FIGURE 7 is a sectional plan on an enlarged scale taken on the line VII—VII in FIGURE 1,

FIGURE 8 is a sectional plan, on a further enlarged scale, of a part of the building indicated by the arrow VIII in FIGURE 3,

FIGURE 9 shows diagrammatically an elevation of the arrangement of foundation beams for the building,

FIGURE 10 is an elevation on an enlarged scale of one beam shown in FIGURE 9,

FIGURE 11 is a view in the direction of the arrow XI of the beam shown in FIGURE 10,

FIGURE 12 is, on a further enlarged scale, a section taken along the line XII—XII in FIGURE 11,

FIGURE 13 is similar to FIGURE 12, but is a section of a different beam shown in FIGURE 9,

FIGURE 14 is similar to FIGURES 12 and 13 but is a section of a further beam shown in FIGURE 9, and

FIGURE 15 is similar to FIGURES 12, 13 and 14, but is a section of another embodiment of the beams shown in FIGURE 9.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

As shown in FIGURES 1, 2 and 3, the building is in the form of a two-story dwelling house. The lower story is made up of three prefabricated sections **1**, **2** and **3**, and the upper story is made up of three further sections **4**, **5** and **6**. The ground floor comprises a living room **7**, a kitchen **8**, a passage **9**, a toilet **12** and cupboards **13** and **14A**. The living room **7** extends from the front to the back of the house over the combined width of the three sections **1**, **2** and **3**. The back and front walls of the house have doors **10** and **11**, opening into the kitchen **8** and the passage **9**, respectively. The kitchen **8** is formed

by a part of the section 3 and the passage 9 is formed by a part of each of the sections 1 and 2. Also in the section 1, next to the passage 9, is the toilet 12 and cupboard 13. A staircase 14 leads to the upper story of the house from the passage 9 and is entirely accommodated in the section 2. The cupboard 14A is disposed beneath the staircase 14.

The upper story shown in FIGURE 3 comprises two bedrooms 17 and 18 accommodated entirely within the section 4, a bedroom 15 accommodated entirely within the section 6, and a bedroom 16 extending across the combined width of the two adjacent sections 5 and 6. The upper story also comprises a bathroom 19 and a passage 20, and an opening which communicates with the upper end of the staircase 14. The passage 20 is provided with doors which open into the bedrooms and the bathroom.

Each section of the house is entirely prefabricated and comprises a beam frame to which are secured the walls. Thus the frame constitutes the supporting structure of the section. Referring now to FIGURE 4, the frame of the section 1 includes a horizontal rectangular framework of beams 21, 22, 23 and 24, the beams 21 and 22 being approximately 2½ times the length of the beams 23 and 24. Beams 25 and 26 interconnect the longer beams 21 and 22 and are parallel to the beams 23 and 24. At the corners of the rectangular framework, vertical, circular-section tubes 27, 28, 29 and 30 extend upwardly. The upper ends of the tubes 27 to 30 are interconnected by a second horizontal rectangular framework comprising beams 31, 32, 33 and 34, which are parallel to the beams 21, 22, 23 and 24, respectively. A further beam 35 interconnects the two longer beams 31 and 32, the beam 35 being parallel to the beams 33 and 34.

A vertical tube 36 extends between the beams 21 and 31, the tube being connected to the beam 21 near one end of the beam 25. A similar tube 37 extends between the beams 22 and 32 near the other end of the beam 25. The diameter of the tubes 36 and 37 is less than that of the tubes 27 to 30. The tube 37 is shown broken away in FIGURE 4. It will be seen that the beams and tubes 21 to 37 form a box-like structure, and they constitute the frame of the section 1.

The constructions of the sections 2 and 3 are similar to that of the section 1, and are therefore not shown in their entirety in FIGURE 4. It will be seen from FIGURE 2, however, that these sections also have vertical, circular-section tubes constituting part of their frames. Considering the section 2, FIGURE 4 shows a beam 22A lying alongside and contacting the beam 22. There are also beams 23A, 24A, 25A and 26A which are aligned with the beams 23, 24, 25 and 26, respectively, of the section 1. Vertical circular-section tubes 28A, 30A and 37A are disposed beside the tubes 28, 30 and 37, respectively, and beams 33A and 34A are aligned with the beams 33 and 34, respectively.

In the upper story, the section 4 lies directly above the section 1. The section 4 has a horizontal rectangular framework on its lower side consisting of beams 38, 39, 40 and 41 which rest on the corresponding beams 31 to 34 of the section 1. A further beam 42, corresponding to the beam 35, interconnects the two longer sides 38 and 39 of the rectangular framework. Vertical, circular-section supporting tubes 43 to 46 extend from the corners of the rectangular framework and their upper ends are interconnected by a further horizontal rectangular framework consisting of beams 47 to 50. The beam 48 is angle-sectioned and is connected by a latticework structure 53 to a beam 54 lying vertically above the beam 48. Inclined beams 49A and 50A, supported by the beams 47 and 54, are located vertically above the beams 49 and 50, respectively. Vertical tubes 51 and 52 (the latter being broken away in the figure) extend between the beams 38, 47, and 39, 48, respectively, the tubes being of smaller cross-section than the tubes 43 to 46.

The section 5 is similar to the section 4, and has a lower rectangular framework (which is broken away in FIGURE 4), the framework having two shorter sides formed by beams 56 and 57 and two longer sides, one of which is formed by a beam 55 lying beside the beam 39 of the section 4. This lower rectangular framework of the section 5 rests on the upper framework of the section 2. As with the other sections, vertical tubes 58 to 61 are fixed to the corners of the rectangle (see FIGURE 3). The upper ends of the tubes are interconnected by a further rectangular framework consisting of beams 63 and 64, parallel to the beams 56 and 57, and latticework girders 62 and 65. Two vertical tubes 66 and 67 are arranged between the upper and lower rectangles of the section 5 (see FIGURE 3). Two further tubes 68 and 69 extend between the shorter sides of the two rectangles, and project upwardly from the upper rectangle. These upward projections constitute king posts for the support of a ridge-piece 68A. One end of the ridge-piece 68A supports one end of each of two beams 63A and 63B, the other ends of the beams being supported on the beams 62 and 65. The arrangement is the same at the other end of the ridge-piece 68A. It will be seen that at each end of the building the composite beams like the beam 63A–49A constitute the principal rafters of the building. The composite beams like the beam 63–49 constitute the tie-beams of the building.

The section 6, which rests on the section 3, is constructed in substantially the same manner as the section 4. The upper rectangular framework of the section 6 is spaced from the lower framework by main tubes 70, 71, 72 and 73, and by intermediate tubes 74 and 75 (see FIGURE 3).

The connection between the lower sides of two adjacent sections of the upper story, and the upper sides of two adjacent sections of the lower story, is shown in detail in FIGURE 5. This figure shows the connection between the sections 1, 2, 4 and 5. The beams 34 and 34A of the sections 1 and 2, respectively, are channel-section, as are the beams 38 to 41 of the section 4 and the beams 55 to 57 of the section 5. The beam 32 is of angle-section, having two limbs 77 and 78 which are horizontal and vertical, respectively. The beam 32 rests on the ends of the beams 33 and 34, the upper flanges of these beams having recesses formed therein for accommodating the ends of the horizontal limb 77, the arrangement being such that the upper side of the limb 77 is flush with the upper side of the beams 33 and 34. The upper sides of the beams 31 and 33, which are also of channel-section, are co-planar with the upper side of the beam 34.

As described above, the upper framework of the section 2 is arranged so that one of the longer sides thereof lies adjacent a longer side of the upper framework of the section 1. This longer side of the section 2 is in the form of an angle-section beam 79 which is connected to the beams 33A and 34A in the same way as the beam 32 is connected to the beams 33 and 34. The vertical limbs of the beams 32 and 79 lie in contact with one another and between the beams 39 and 55, the former of which forms one longer side of the lower framework of the section 4 and the latter of which forms the adjacent, similar side of the section 5. The beams 39, 32, 79 and 55 are clamped together with the aid of bolts 80. The vertical limbs of the beams 32 and 79 constitute projections of the sections 1 and 2, respectively, the projections serving to prevent a displacement of the upper sections 4 and 5 in a direction transverse to the lower sections 1 and 2. Thus the positive location of the upper sections on the lower sections is facilitated.

Ceiling portions 81 and 82 are fixed to the beams forming the upper framework of the sections 1 and 2, respectively. The beams forming the lower frameworks of the sections 4 and 5 have floor portions 83 and 84, respectively, resting thereon.

Referring now to FIGURE 6, there is shown the interconnection between adjacent ends of the channel-section beams **22** and **22A** of the lower frameworks of the sections **1** and **2**. The beams are connected by bolts **85** passing through the upright portions thereof, so that a composite I-section beam is in effect formed. The beams of the lower frameworks support floor portions **86** and **87**.

FIGURE 7 shows in sectional plan the connection between the outside walls of the two adjacent sections **4** and **5**. It is to be understood that the connection between any other two adjacent sections is similar. The section **4** has a wall **88** which constitutes part of the side of the building, the wall having an outer covering layer **89** extending thereover. This covering layer is made of rubber or similar waterproof material. The material of the end of the wall **88** surrounds the major part of the periphery of the vertical tube **44**. A vertical, flat, continuous projection **90** is secured to the tube **44**, the projection extending radially therefrom and along the major part of the length thereof. A second projection **91**, which is similar to the projection **90**, is secured to the tube **44** so as to extend in a direction at right-angles to the face of the wall **88**. The projection **91** extends along the major part of the length of the tube **44** and is secured thereto so as to be non-radial. An outside wall **92** of the section **5** is connected to an internal wall **93** at right-angles thereto. The wall **92** constitutes part of the side of the building. The material of the end of the wall **92** adjacent the section **4** surrounds the major part of the periphery of the vertical tube **58**. The latter has projections **94** and **95** similar to the projections **90** and **91** of the tube **44**. The outer face of the wall **92** is covered with a waterproof layer **96** similar to the layer **89** of the wall **88**. The edges **97** and **98** of the layers **89** and **96**, respectively, are clamped between the projections **91** and **95** of the tubes **44** and **58**. It will be noted that, to ensure the correct disposition and clamping of the edges **97** and **98**, the ends of the projections **91** and **95** are substantially co-planar with the surfaces of the walls **88** and **92**. A sealing strip **99** is located between the projections **90** and **94**.

The wall **88** has a facing consisting of a sheet **100** which has horizontally extending corrugations. The wall **92** has a similar facing formed by a sheet **101** which is vertically corrugated. Vertical flanged plates **103** and **104** are disposed between adjacent edges of the sheets **100** and **101**. The plate **103** has a flange **105** which is disposed between the covering layer **89** and the sheet **100**, and a flange **106** is bent around the outer edge of the sheet **100**. The plate **104** has flanges **107** and **108**, corresponding to the flanges **105** and **106**. A sealing strip **109** is slipped over the flanges **106** and **108**, the strip having bent-over rims **110** and **111** which engage around the flanges.

Referring to FIGURE 8, there is shown the connection between two inside walls of the section **5** and an inside wall of the section **6**, i.e. the connection at the location of the tubes **67** and **74**. On those sides of the tubes **67** and **74** which face one another, are secured projections **112**, **113**, **114** and **115**. Each of these projections is formed by a vertically-extending, flat strip projecting radially from the respective tubes. The projections **112** and **113** are inclined at 90° to one another, as are the projections **114** and **115**. The material of the end of a wall **116** surrounds the major part of the periphery of the tube **74**, and the ends of two walls **118** and **119** at right angles similarly surround the tube **67**. Only those sides of the tubes facing one another are not surrounded by the material of the walls.

Sealing strips **119** and **120** are disposed between the projections **112**, **114** and **113**, **115**, respectively. The free ends of the projections **112** to **115** lie substantially in the plane of the surface of the wall.

The sections **1** to **6** described above may be prefabricated in a factory, and need only be assembled together and connected to each other on the building site. The frame of each section may be of lightweight construction and yet resistant to distortion, since the vertical beams are formed by tubes and the horizontal beams are formed by channel- or angle-section beams. The tubes are resistant to bending in any direction, and may carry compressive forces. The sectioned beams are suitable for fastening ceilings and floors thereto, and are also resistant to bending.

The building described above is arranged on foundation beams in the manner shown in FIGURE 9. In this figure, there is diagrammatically shown a box-like prefabricated section **121** which corresponds for example to the section **1** of the building described above. The two shorter sides of the section **121** bear on two foundation beams **122** and **123**, there being a third foundation beam **124** located between the first two and parallel thereto. It will be appreciated that in the case of the section **1**, the beams **23** and **24** rest on the foundation beams **122** and **123**, while the beam **25** rests on the foundation beam **124**. In FIGURE 9 there is shown a second prefabricated section **125** which also rests at one end on the beam **123**. This illustrates the case where a second building is erected adjacent the first building consisting in part of the section **121**. In this manner, if desired, a row of adjacent buildings may be erected.

FIGURE 10 is an enlarged elevation of the foundation beam **122**. This foundation beam has a wide foot **126** to which is attached an upstanding leg **127**. The foundation beam is made of concrete and has reinforcing rods **128** set therein. The length of the foundation beams is preferably equal to the width of the house, i.e. in the case of the house shown in FIGURES 1 to 3, the length of foundation beams is three times the width of one prefabricated section. Alternatively, a single foundation beam may be built up from a number of parts.

An angle-section metal bar **129** is fixed along the length of the upper end of the leg **127** of the foundation beam **122**. The angle-bar **129** has a vertical limb **130**, and a horizontal limb **131**, the vertical limb constituting a projection fixed to the beam **122** and extending along the bottom edge of the side of the section **121**. This projection limits movement of the section with respect to the foundation beam in a direction transverse to the beam.

The foundation beam **124** is similar to the beam **122** but has along the length of its upper edge, a T-section metal bar **132** (see FIGURES 9 and 13). The vertical limb **133** of the T-section extends downwardly and is embedded in the material of the beam **124**. The horizontal flange **134** of the T-section constitutes the flat upper side of the beam **124**.

The upper edge of the beam **123** has secured along the length thereof an inverted T-section bar **135** (see FIGURES 9 and 14). The T-section has an upwardly extending projection **136**, and has a horizontal flange **137** secured to the upper edge of the beam **123**. It will be seen from FIGURE 9 that an edge of the section **121** rests on the part of the flange **137** on one side of the projection **136**, whereas the adjacent edge of the section **125** rests on the other part of the flange. The projection **136**, which is effectively secured to the beam **123**, prevents displacement of the sections **121** and **125** in a direction transverse to the beam **123**.

As shown in FIGURE 9, the foundation beams are interconnected by a member **138**. Referring in particular to FIGURES 12, 13 and 14, it will be seen that the interconnecting member **138** is in the form of a pipe. The pipe **138** extends through aligned sleeves **139** fixed in holes near the upper ends of the legs **127** of the foundation beams. The pipe **138** is secured against axial displacement in the sleeves **139** by pins **140**, which are taken through holes in the pipe **138**, one hole being located on its side of each sleeve **139**. If desired, the sleeves **139** may be rigidly secured to the metal bars **129**, **132** and **135**. In this manner, the foundation beams are held spaced at the correct distance from one another, so that they cannot be displaced relatively to one another. Advantageously, a

number of pipes **138** are provided extending parallel to one another.

Referring now to FIGURE 15, there is shown a cross-section similar to those of FIGURES 12, 13 and 14, but showing part of a further embodiment of a foundation beam. The upper end of the leg of a foundation beam **141** has secured along the length thereof an I-section bar **142** lying on its side. Thus the flanges **142A** of the bar **142** are vertical while the web **142B** is horizontal. The two downwardly extending portions of the flanges **142A** extend along the upper flanks of the leg of the beam **141**. A sleeve **139** is secured to the free edges of these flanges, through which sleeve a tube **138** passes in the manner described above for the beams **122**, **123** and **124**. The beam **141** supports the edges of two adjacent sections **144** and **145**. These sections are formed with slots **146** and **147**, respectively, extending parallel to and near to the adjacent shorter sides of the sections, the arrangement being such that the upwardly extending parts of the flanges **142A** enter into the slots **146** and **147**, and the edges of the sections rest on the horizontal web **142B**. The sections **144** and **145** are thus positively located and a displacement thereof transverse to the foundation beam **141** is prevented.

By supporting a prefabricated section along three transverse lines relative to the longer beams of the section, the beams constituting the lower framework of the section need not be of very heavy construction, since the distance between the points of support is comparatively small. The upwardly extending projections **130**, **136**, and the projections formed by the upstanding parts of the flanges **142A** in FIGURE 15, facilitate the positive location and correct assembly of the prefabricated section. It will be noted that both the upper sides of the foundation beams and the lower sides of the framework of the sections have metal surfaces. This facilitates sliding of the sections along the foundation beams during assembly.

The foundation beams are prefabricated and are taken to the building site where they are laid out on the ground in their correct dispositions. The prefabricated sections of the buildings are then arranged on the foundation beams and are placed in their correct positions. The metal bars **129**, **132**, **135** and **142** ensure rigidity of the foundation beams. If desired, the reinforcing rods **128** may be secured to these metal bars.

It will be seen from FIGURE 11 that the foundation beams are formed with holes **148** which reduce the weight of the beams. The holes also facilitate the transportation of the beams, since for example the hooks of a hoisting device may be inserted in the holes **148**.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent of the United States is:

1. A two-story building assembled from at least four prefabricated, box-shaped sections, two of said sections disposed adjacent to each other in the lower story, said latter sections each having vertically extending projections comprising angular metal beams secured to their upper portions, said projections in contact with each other, the further two of said sections disposed adjacent to each other in the story above said lower story with said projections extending between them, at least one of said projections extending along the entire length of the side of the section to which it is secured, said further adjacent sections including beams in their lower aspects, the beam of one of said other further sections being adjacent and parallel to a like beam of said other further section, said projections extending between said parallel beams.

2. A building assembled from prefabricated, box-shaped sections, said sections resting on spaced, prefabricated foundation beams, transverse horizontally disposed holes in said foundation beams, a metallic sleeve in each of said holes fixed to said foundation beams, a bar received in said sleeves of at least two of said beams, pins extending transversely through said bar on both sides of said beams securing said bar in a fixed relationship to said beams whereby said beams are maintained in a fixed spatial relationship.

3. A building assembled from prefabricated, box-shaped sections, said sections carried by at least two spaced parallel prefabricated foundation beams, upwardly extending projections from said foundation beams extending along vertical sides of said sections and interlocking with at least one of said sections whereby movement by said one section is restricted in at least one direction, at least two parallel connective members interconnecting said foundation beams, said connective members limiting the distance between said beams to a distance not greater than the greater length of said sections, a first horizontal rectangular frame included in the bottom of at least one of said sections, a second similar horizontal rectangular frame spaced above said first frame included in the top of said one section, said frames composed of steel and being in the peripheral portions thereof vertically disposed, a plurality of vertical tubes rigidly connecting said frames, walls, said tubes contained at least in part in said walls and being arranged at the vertical edges thereof, and a vertical member extending upwardly from said frame included in the top of said one section.

4. A section in accordance with claim **3** wherein said tubes are of circular cross section and have projections extending radially outwardly therefrom to coincide approximately with the corners of said walls, an adjacent section similar to said one section including further projections extending radially outwardly therefrom to coincide approximately with the corners of its walls.

5. A section in accordance with claim **3** wherein there is a truss structure interconnecting at least two of said tubes.

6. A building assembled from prefabricated, box-shaped sections, said sections each including a first horizontal rectangular frame at the bottom of said section, a second similar horizontal rectangular frame spaced above said first frame at the top of said section, a plurality of vertical tubes rigidly connecting said frame, a truss structure interconnecting at least two of said tubes, walls, said tubes and truss structure within said walls, said tubes arranged at the vertical edges and corners of said walls, said sections resting on at least two spaced prefabricated foundation beams, said foundation beams including vertically projecting members extending along vertical sides of said sections, at least two connective members interconnecting said foundation beams limiting the distance between them to a distance not greater than the greater length of said sections.

7. A building having at least two stories assembled from at least four prefabricated, box-shaped sections, each of said sections including a first horizontal rectangular frame in the bottom portion thereof, a second similar horizontal rectangular frame spaced above said first frame in the top portion thereof, and a plurality of vertical tubes rigidly connecting said frame, two of said sections disposed adjacent to each other in the lower story of said building, said second frame of said latter sections each including vertically extending projectons, said projections in contact with each other, the further two of said sections disposed adjacent to each other in the story above said lower story with said projections extending between them, and securing means securing all of said sections together to said projections.

8. A building of at least two stories assembled from at least four prefabricated, box-shaped sections, each of said sections including a first horizontal rectangular frame in the bottom portion thereof, a second similar horizontal rectangular frame spaced above said first frame included in the top portion thereof, and a plurality of vertical tubes rigidly connecting said frames, two of said sections disposed adjacent to each other in the lower story, said latter sections each having vertically extending projections se-

cured to their second frames, said projections in contact with each other, the further two of said sections disposed adjacent to each other in a story above said lower story with said projections extending between their first frames, securing means securing all of said sections through said projections, two parallel spaced prefabricated foundation beams supporting said sections, at least two connective members interconnecting said foundation beams and limiting the distance between them to a distance not greater than the greater length of said section.

9. A building of at least two stories assembled from at least four prefabricated, box-shaped sections, each of said sections including a first horizontal rectangular frame in the bottom thereof, a second similar horizontal rectangular frame spaced above said first frame in the top thereof, a plurality of vertical tubes rigidly connecting said frame, walls, a truss structure connecting at least two of said tubes, said tubes and said truss structure included in said walls, said tubes located at the vertical edges and corners of said walls, two of said sections disposed adjacent to each other in the lower story, said latter sections having vertically extending projections secured to their upper sides, said projections extending along the entire length of the side of the section to which they are secured, said projections in contact with each other, the further two of said sections disposed adjacent to each other in the story above said lower story with said projections extending between them, securing means securing said sections together through said projections, said sections carried by at least two spaced parallel prefabricated foundation beams, upwardly extending projections from said foundation beams interlocking with said sections in said lower story whereby movement of said sections is restricted in a direction transverse to said beams, at least two parallel connective members interconnecting said foundation beams, said connective members limiting the distance between said beams to a distance not greater than the greater length of said sections.

10. A building of at least two stories assembled from at least four prefabricated box-shaped sections, each of said sections including a first horizontal rectangular frame in the bottom portion thereof, a second similar horizontal rectangular frame spaced above said first frame included in the top portion thereof, and a plurality of vertical tubes rigidly connecting said frames, two of said sections disposed adjacent each other in the lower story, said latter sections each having vertically extending projections secured to their second frames, the further two of said sections disposed adjacent each other in a story above said lower story, said projections extending along sides of said sections in the upper story and said last-mentioned sections being connected to the said projections, two parallel spaced prefabricated foundation beams supporting said sections, at least two connective members interconnecting said foundation beams and limiting the distance between them to a distance not greater than the greater length of said sections, said foundation beams having upwardly extending extensions from their upper sides, said extensions interlocking with at least the sections of the lower story whereby movement by said sections is restricted in at least one direction relative to the foundation beams.

11. A combination of foundation beams with a building assembled from prefabricated box-shaped sections, at least one of said sections supported by said foundation beams, said foundation beams including upwardly extending parallel elongated projections, the said upwardly extending projections of one of said foundation beams being constituted by the upwardly extending flanges of an I-section metal bar, said metal bar fixed on its side along the length of the upper web of said one foundation beam with its flanges extending upwardly and downwardly relative thereto, a recess in the bottom of said section, said recess receiving one of said upwardly extending flanges, a second section adjacent to said first-mentioned section, a second recess in the bottom of said second section, said second recess receiving the other of said upwardly extending flanges, whereby movement of both of said sections in a direction transverse to said one foundation beam is prevented.

12. The combination of at least two spaced-apart parallel prefabricated foundation beams with a building of at least one story assembled from prefabricated box-shaped sections, the first floor sections of the building being supported by said foundation beams, said foundation beams having vertically extending projections from their upper sides, said projections of said foundation beams being parallel to one another, said upwardly extending projections extending along opposite sides of said sections and restricting movement of said sections in directions transverse to said foundation beams, at least two connective members interconnecting said foundation beams, said connective members including means fixing the maximum and minimum distances of said foundation beams from one another, said distances being not greater than the greater length of said sections, and further means associated with said connective members and said foundation beams for maintaining said foundation beams in a substantially parallel position.

13. The combination of prefabricated foundation beams with a building assembled from prefabricated box-shaped sections, said sections being in an adjacent relationship, said sections each including a first horizontal rectangular frame at the bottom of said section, a second similar horizontal rectangular frame spaced above said first frame at the top of said section, a plurality of vertical tubes rigidly connected to and connecting said frames, walls disposed between said frames, inner and outer sheets applied to the exterior sides of said walls, the inner of said sheets being a waterproofing sheet applied directly to said walls and the outer of said sheets being a covering sheet, said inner sheet extending over said vertical tubes at the outer side of the building and at least in part between said vertical tubes of adjacent sections, said sections being supported by said foundation beams, said foundation beams including upwardly extending parallel elongated projections, said projections engaging said sections whereby movement of said sections on said foundation beams in directions transverse thereto is prevented, at least two connective members interconnecting said foundation beams and fixing the distance between them to not greater than the greater length of said sections.

14. The combination of prefabricated beams with a building assembled from prefabricated box-shaped sections, the sections of at least the lower story of the building supported by said foundation beams, said foundation beams including at least two parallel foundation beams which include upwardly extending parallel elongated projections, said projections proximate said sections whereby movement of said sections relative to said foundation beams in a direction transverse thereto is substantially prevented, a further foundation beam parallel to said other two foundation beams and situated therebetween, said third foundation beam having a flat upper portion supporting said sections at least in part, at least two connective members extending transversely through said three foundation beams, said connective members being connected to the foundation beams and fixing the maximum and minimum distances of said foundation beams from one another and limiting the distance between the said first-mentioned two foundation beams to a distance not greater than the greater length of said sections.

15. A building assembled from prefabricated box-shaped sections, at least two of said sections being adjacent, each of said sections including a first horizontal rectangular frame in the bottom portion thereof, a second similar horizontal rectangular frame spaced above said first frame included in the top portion thereof, and a plurality of vertical tubes rigidly connecing said frames

in the corners thereof, and walls situated in two opposite sides of said sections, said walls further situated between said vertical tubes and the walls of said adjacent sections being substantially coplanar, inner and outer sheets applied to the exterior sides of said walls, the inner of said sheets being a waterproofing sheet and extending over said tubes and at least in part between adjacent tubes of said adjacent sections, the outer of said sheets being a covering sheet, at least two parallel spaced prefabricated foundation beams supporting said sections, said foundation beams having upwardly extending projections formed on the upper sides of said beams, said projections extending along at least part of the vertical sides of said sections, two connective members interconnecting said foundation beams and fixing the relative distance between them.

16. A building assembled from prefabricated sections each of which comprises a first horizontal polygonal frame of metal beams included in the bottom of said section, a second similar horizontal polygonal frame of metal beams spaced above said first frame and included in the top of said section, a plurality of vertical tubes rigidly connecting said frames, walls between said frames, inner and outer sheets applied to the exterior sides of said walls, the outer of said sheets being a covering sheet, said tubes included at least in part in said walls and arranged at the vertical edges thereof, said sheets extending over said tubes to at least the vertical edge of said wall, parallel foundation beams, metal bars mounted on the top of said foundation beams, said metal frame beams disposed at opposite sides of said lower horizontal frame resting on said metal bars, upwardly extending projections connected to said bars, said projections extending along opposite vertical sides of said sections whereby movement of said sections on said foundation beams in directions transverse thereto is prevented, connecting members interconnecting said foundation beams and fixing the maximum and the minimum distances between them.

17. A prefabricated section for use in a building which comprises a first horizontal polygonal frame included in the bottom of said section, a second similar horizontal polygonal frame spaced above said first frame and included in the top of said section, plurality of vertical beams rigidly connecting said frames, concrete walls provided between the beams of said frame, inner and outer sheets applied to the exterior sides of said walls, the inner of said sheets being a waterproofing sheet applied directly to said walls and the outer of said sheets being a covering sheet which is spaced from the inner of said sheets, said vertical beams included at least in part in said walls and arranged at the vertical edges thereof, said vertical beams including two flat extensions extending over the major part of the length of the beams, one extension being directed to the interior of the section and with its outer portion substantially coplanar with the innerside of said wall and the other extension being directed to the exterior of the wall and with its outer portion substantially coplanar with the outer side of said wall, said waterproofing sheet extending at least in part around the exterior extensions of said beams.

18. A prefabricated section for use in a building which comprises a first rectangular frame of profiled metal beams in the bottom of said section, a second similar horizontal rectangular frame of profiled metal beams above said first frame and included in the top of said section, said frames having longer sides and shorter sides, said frame beams having horizontally extending limbs, a floor of said section connected to the first frame and a ceiling of said section connected to the second frame, a plurality of vertical metal beams rigidly connecting said frames in the corners thereof, walls, including at least one concrete wall, disposed between said frames, inner and outer sheets applied to the exterior sides of said walls, the inner of said sheets being a waterproofing sheet and the outer of said sheets being a covering sheet, said vertical beams include two flat extensions extending over the major part of the length of the beams, one extension being directed to the interior and the other extension to the exterior of said section, said vertical beams included between said extensions, in said walls and arranged at the vertical sides thereof, said waterproofing sheet extending over said extension to the side of the beam directed away from said concrete wall.

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