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(54) PREFABRICATED HOUSE

(71) I, YOSHIRO OHKAWA, a Citizen of Japan, of 2-2-6- 404 Asahigaoka Kiyosemachi Kitatamagun, Tokyo, Japan, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to prefabricated houses and has the object of providing an improved form of construction for said houses.

In some prior-art constructions basic panels manufactured in plants are assembled and interior and exterior finish work must be done by carpenters or building workers on the spot, and therefore, it is not possible to build a comfortable house easily in a short time by assembling such panels.

On the other hand emergency houses built in a short time by assembling a set of parts provided in case of calamities, just for temporary use are not good for long-term use. Such houses are poor in interior finish and appearance and lacking habitability.

It is the object to eliminate such disadvantages of conventional panel construction as described above, and permit easy assembling of a set of parts into a house of good habitability in a short time by using spanners only for fastening bolts and nuts by any person.

The invention consists in a prefabricated house comprising a groundsill formed of corner channel steel members placed at the four corners, each of which consists of two channel steel members cut at one end at 45° and fixed on hinges on the back of their cut ends and joined at a right angle so as to be folded and unfolded, connecting channel steel members joined between said corner channel steel members according to a building area, and angle steel members attached to the inner and outer sides thereof, said groundsill being fastened with bolts and nuts, inserted through holes in predetermined positions; a top rail formed of corner channel steel members so joined as

to face said groundsill, unequal-sided angle steel members attached to the inner side thereof in a position lower than said corner channel steel members, and outer angle steel members attached and levelled thereto inversely to each other with bolts and nuts, said bolts being inserted through holes made in corresponding positions as those of holes on the groundsill, said outer angle steel members being extended to form stays for roofing members; outer wall panels inserted into and fastened to channels on said groundsill and on said top rail at the lower and upper ends respectively with bolts and nuts, said bolts being inserted through holes made therein, each outer wall panel being formed of two frames on both sides each having a halving joint formed thereon and three panel forming plates being composed of a wooden frame having waterproof plywood sheets attached to its both surfaces, an iron sheet covering the outer surface, and isocyanate foam material with leather cloth bonded thereto covering the inner surface, malleably fixed to said wooden frame together with the upper and lower edges of which with machine screws, floor frames each being shaped like a channel steel having flanges formed integrally on both sides and covered with isocyanate foam material with leather cloth bonded thereto, arranged at specific intervals between the inner angle steel members along the groundsill; floor panels each being composed of a wooden frame having waterproof plywood sheets attached to its both surfaces with an iron sheet covering the back surface and isocyanate foam material with leather cloth bonded thereto covering the front surface, set closely to each other between said floor frames; ceiling frames being the same in shape and put on the inner unequal-sided angle steel members along the top rail, facing said floor frames; ceiling panels each being composed of a wooden frame having waterproof plywood sheets attached to its both surfaces with isocyanate foam material with leather cloth bonded thereto covering the inner surface facing the

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room, set closely to each other between said ceiling frames; roofing members each being composed of a metal sheet with isocyanate foam material bonded to the under surface, fixed to the outer angle steel members along the top rail with bolts and nuts; and partition panels inserted into channels on the ceiling frames at the upper end and held by clips on the floor frames at the lower end.

The accompanying drawings shown, by way of example only one embodiment of a prefabricated house constructed in accordance with the invention, wherein;

Figure 1 is a front view partly in section of the prefabricated house;

Figure 2 is a side view partly in section of the same;

Figure 3 is a plan view of a groundsill;

Figure 4 is a cross-sectional view taken along line I—I of Figure 3;

Figure 5 is an enlarged plan view of the joined portion of angle steel members;

Figure 6 is a bottom view of corner channel steel members;

Figure 7 is a plan view of a top rail taken from thereunder;

Figure 8 is a cross-sectional view of the same taken along line II—II of Figure 7;

Figure 9 is a partly enlarged plan view of the portion where angle steel members are joined;

Figure 10 is a front view of an outer wall panel partly cut away;

Figure 11 is a cross-sectional view of the same taken along line III—III of Figure 10;

Figure 12 is an enlarged vertical sectional view of panel forming plates;

Figure 13 is a plan view of an outer wall panel used at four corners;

Figure 14 is a front view of a window panel;

Figure 15 is a side view of the same partly cut away;

Figure 16 is a front view of a wiring panel partly cut away;

Figure 17 is a front view of a door panel;

Figure 18 is a cross-sectional view of the same partly cut away;

Figure 19 is a front view of a bookcase panel;

Figure 20 is a side view of the same partly cut away;

Figure 21 is an enlarged cross-sectional view of a floor frame;

Figure 22 is a cross-sectional view of a floor panel;

Figure 23 is an enlarged cross-sectional view of a ceiling frame;

Figure 24 is a cross-sectional view of ceiling panel;

Figure 25 is a cross-sectional view of the portion where a roofing member is joined to the top rail;

Figure 26 is a front view of a closing cap;

Figure 27 is a vertical sectional side view of the same;

Figure 28 is a front view of a partition panel;

Figure 29 is a cross-sectional view of the same;

Figure 30 is a plan view showing how to make a clip;

Figure 31 is a perspective view of the clip;

Figure 32 is a perspective view of a permanent partition panel; while

Figure 33 is a perspective view of a window plate partly cut away.

The prefabricated house hereinafter described may have a width of 5760 mm and a depth of 2880 mm.

As a groundsill (see Figures 3 to 6), are used two channel steel members, each being 1440 mm long, 80 mm wide, and 40 mm high and being cut at one end at 45° which meet at the cut end so as to make a right angle, and have on the back of the abutting corner a hinge 2 turned around a pin 1 and fixed with rivets 3. Thus, a corner channel steel member (a) is formed, which has holes 4 made on both channel side walls in such positions as to meet holes made on the front face of outer wall panels to be described hereinafter.

Such corner channel steel members (a) are put at four corners on foundation stones already provided at a building site, after unfolding the channel steel members to a right angle. In the direction of the depth two channel steel members (a) are allowed to abut directly by aligning their respective channels while in the direction of the frontage two connecting channel steel members (b) each being 1440 mm, 80 mm wide and 40 mm high are put between the corner channel steel members and are allowed to abut by aligning their respective channels. Angle steel members (c) and (d) of 40 mm x 40 mm are attached to the inner and outer sides of these corner and connecting channel steel members (a) and (b) (the latter (b) have holes 4 made on both channel side wall panel). Each of such angle steel members (c) and (d) has holes 4 made in the same positions as those on the corner and connecting channel steel members. Through the holes 4 thus registered, bolts 5 are inserted respectively from the inner angle steel members (c) and are fastened temporarily with nuts 6 on the outer angle steel members (c). The inner angle steel members (c) are allowed to abut at four corners, while the outer angle steel members (d) are joined by bolts 9 and nuts 10, the bolts being inserted through holes 8 made on a flange 7 formed by erecting the end of one side of the outer angle steel member and on the side of the other member made in contact with the flange 7. In this manner the four corner channel steel

members (a) and the connecting channel steel member (b) are joined, and at the same time the portions joined by the hinges 2 on the corner channel steel members (a) are protected from being damaged owing to any overload, whereby the ground sill is formed.

As a top rail (see Figures 7 to 9), are used corner channel steel members (c) and connecting channel steel members (f), which are symmetrical with and the same in shape as the four corner channel steel members (a) and the connecting channel steel members (b) used as the ground sill as described above. Unequal-sided angle steel members (g) of 65 x 40 mm are used as inner ones with the long side edge levelled to the corner and connecting channel steel members (b) and (f) and the short side edge lower than the low edge, thereof, while equal-sided angle steel members of 40 x 40 mm are used as outer ones, with the one side face levelled to the upper face of the channel steel members. These three steel members are joined by fastening temporarily with bolts and nuts, the bolts passing through the holes 4 already made in the same positions as those of the holes 4 on the ground sill, from the inner unequal-sided angle steel members (g) to the outer equal-sided ones (h), the inner ones being allowed to abut at their ends at the four corners respectively.

The outer angle steel members (h¹) are joined at four corners by bolts 13 and nuts 14, the bolts 13 being inserted through holes 12 made on a flange 11 formed by erecting one end of the one steel member (h¹), and on the side face of the other steel member (h¹) made in contact therewith. The angle steel member (h¹) for the frontage of 5760 mm is extended by about 547 mm, which is used as stays for roofing members. In this manner the top rail is constructed.

An outer wall panel (see Figures 10 to 13) is formed of frames 1570 mm thick and 2440 mm high used at right and left sides and three panel forming plates 16, 17 and 18 inserted therein. This frame 15 is made of a metal plate, so formed as to have joints on both sides and channels in which such panel forming plates may be inserted. Outer wall panels (i) for ordinary intermediate use except those used at four corners are so arranged as to make their halving joints 19 on both sides of the frame 15 engaged with each other.

The panel forming plates 16, 17, and 18 are the same in structure. The same 920 mm in width but a little different in height. For example, the upper panel forming plate is 610 mm high, the middle one 1050 mm high, and the lower one 780 mm high. Waterproof plywood sheets 21, 21 are attached with adhesive or nails to both surfaces of a wooden

frame 20 formed in a square or rectangle.

The outer surface is covered with a colour iron sheet and the inner surface is covered with isocyanate foam material 23 and colourful leather cloth 24 bonded thereto. The abutting faces of the panel forming plates 16, 17 and 18 have a long groove 25 and a tongue 26 engaged therewith.

To the borders of the groove 25 and the tongue 26 are bent and bonded individual colour steel sheets 22, isocyanate foam material 23 and leather cloth 24 for close contact between the panel forming plates. (see Figure 12).

The outer and inner surfaces of the frames 15, 15 in which the three panel forming plates are set are pressed down at the upper and lower ends by the edges 27 of the angle steel members. On the edges 27 and the frames 15, 15 are made holes in such positions as to be most effective for fixing the three panel forming plates 16, 17, and 18, which can be firmly set integrally with machine screws 28. After the panel forming plates 16, 17 and 18 have been inserted into the channel on the frame 15, a pipe-like space 29 is formed by the inner surface of the frame where the halving joint 19 projects and the end face of the panel, running through the frame 15. In the opening of such space 29 a wood block 30 is inserted to prevent rain water from flowing therein and protect the space 29 from being deformed by shocks without any block.

The outer wall panels (i) used at four corners are formed by using the frames 15 with the halving joints 19 in the same direction as shown in Figure 13 so that such panels may be combined at four corners without trouble.

As a window panel (j) (see Figures 14, 15 and 33) is used said outer wall panel (i) from which the middle panel forming plate 17 is removed and substituted by a frame 31 having the same external dimensions as those of said panel forming plate 17. Inside this frame 31 is set a window mounting frame 34 having stepped portions made by attaching a board 33 to a plate 32 with adhesive or nails. Between the stepped portions in the window mounting frame 34 a pair of windows 39 are composed of some units of hollow plates 35 made of synthetic resin by setting ridges 36 formed on the end faces thereof into vertical grooves 38 on the frame 37, and are joined with hinges 40 so as to be free to open inside. Also on the board 33 forming the window mounting frame 34 outside the window 39 another pair of windows the same as said window 39 are joined with hinges 40 so as to be free to open outside. In this manner a double window is constructed.

As a wiring panel (k) (see Figure 16) is used the outer wall panel the same in struc-

ture as that (i) for intermediate use, in which cords 41 are distributed in the inner space 29 in the frame. Wiring fixtures 42 such as switches and outlets are then mounted in suitable positions on the panel facing a room (see Figure 16).

A door panel (l) (see Figures 17 and 18) is composed of frames 15, 15 and a door frame 43 fixed thereto, in which is set a wooden frame 44 with stepped portions. The wooden frame is supported by the upper and lower angle steel edges 27 as is the outer wall panel (i) and the door frame 43 is fixed integrally with the frames 15, 15 with machine screws 28. To the stepped portions of the wooden frame 44 is joined a door 48 with hinges 50, the door having a colour iron sheet 45 on the outer surface and isocyanate foam material 46 and leather cloth 47 bonded thereto on the inner surface with edges 49 fixed thereon.

A handle 51 is mounted in the centre of the door 48 so that the door 48 may be used in two ways. A skylight frame 52 is set in the upper section of the wooden frame 44 to which the door 48 is joined.

A bookcase panel (m) (see Figures 19 and 20) has a frame 53 set instead of the middle panel forming plate 17 as in case of said window panel (j). In this frame 53 is set a bookcase 54 made of steel and having the same width as the inner width of the frame 53, and the height lower by about 25 to 30 mm. The front face of the bookcase 54 is levelled to the panel face by setting it outward so that no space is occupied in the room. For fixing the bookcase 54 to the panel frame 53, a wedge 55 having the V-shaped section and the same width as that of the bookcase 54 is driven into a gap between the bookcase 54 and the frame 53 in height.

The frames 15, 15 facing the room, of the outer wall panel (i), window panel (j), wiring panel (k), door panel (l), and bookcase panel (m) are covered with isocyanate foam material 23 and leather cloth 24 attached thereto to cover the heads of machine screws 28 and the metal face of the frames 15, and have holes 56, through which the bolts 5 are inserted to join the frames 15 to the groundsill and the top rail, and made in such positions as to be far from the both sides by one-fourth of the panel width on the upper and lower edges 27. Such holes 56 between combined panels are so positioned as to have the same distance therebetween, and holes on the groundsill and the top rail are made in such space relation.

A floor frame (n) (Figure 21) is made of channel steel 57 with flanges 58 provided integrally therewith at right angles with its both edges. The channel steel 57 is 60 mm high, having the flanges 58 25 mm wide, the channel 30 mm wide, and long enough to

let it be suspended from between the angle steel members (c) attached to the corner and connecting channel steel members (a) and (b) at intervals of 944 mm parallel in the direction of the depth.

The surface of the floor frame is covered with isocyanate foam material 59 and leather cloth 60 attached thereto.

A floor panel (o) Figure 22, measures 914 x 920 x 65 mm which is rectangular and is composed of a wooden frame 61, waterproof plywood sheets 62 attached to the upper and lower sides thereof, colour iron sheet 63 covering the lower side as a floor back face by bending it to the middle of each side of the wooden frame 61, and isocyanate foam material 64 and leather cloth 65 attached thereto covering the upper side facing the room by bending them in the same manner.

A ceiling frame (n) Figure 23 is the same in size as said floor frame (n) except the surface not covered with any material, and is arranged between the unequal-sided angle steel members (g) used inside the top rail in such a manner as to face the floor frame (n) correspondingly. A ceiling panel (p) Figure 24 measures 914 x 920 x 60 mm in a rectangular form like said floor panel (o) but without colour iron sheet. In other words, it is composed of a wooden frame 66, waterproof plywood sheets 67 attached to the upper and lower sides thereof, and isocyanate foam material 68 and leather cloth 69 bonded thereto covering the lower side facing the room by bending them fully to the thickness of each side of the wooden frame 66.

As a roofing member (q) (see Figure 25) is used a structural material 70 made of corrugated steel sheet, to the back of which isocyanate foam material 71 is bonded.

Such roofing members (q) are placed on the outer angle steel members (h) and the extended stays (h)¹ with ridge-like channels directed to cross them at right angles. Joined portions are fixed by bolts 73 and nuts 74, the bolts being inserted through holes 72 made previously on the outer angle steel members (h), stays (h)¹, and roofing members (q), after overlapping some of such ridge-like channels. In this manner the roofing is finished.

In such roofing, closing caps (r) Figures 26 and 27 are inserted in spaces formed by the top rail and the roofing members (q). This closing cap (r) is so shaped as to be set in the ridge-like channel and has standing edges 75 formed therearound and bent outward. Thus, when the closing cap is inserted in the space between the top rail and the roofing member (q), it is a force fit with the help of such edges 75 opening outwards together with the isocyanate foam material 71 acting as packing. Therefore, the closing

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cap may not be pushed farther inwards even when some wind pressure is given thereto.

A partition panel (s) (see Figures 28 and 29) is composed of wooden frames 76, 76, window plates 35 set therein in block, which are the same as those made of synthetic resin used for the window panel (j), and other wooden frames 77, 77 more slender than the vertical frames 76 for fixing at the upper and lower ends. This partition panel (s) is inserted at the upper end in a gap on the ceiling frame (n)¹ and held at the lower end on a clip (t) on the floor frame (n). In this manner such partition panels (s) are provided, as many as required.

Said clip (t) (see Figures 30 and 31) is formed by making two cuts on a square metal sheet from its two opposite sides respectively and bending right and left portions on the both sides downward and middle portions upward to make channels. The downward portions 78 are inserted and fixed to the floor frame (n) and the floor panel (o), while the upward portions 79 hold the lower end of the partition panel (s), when inserted therein.

In addition to such temporary partition panels, a partition panel (u) (see Figure 32) is provided for making any permanent section, which is the same in structure as said outer wall panel (i) but is covered with isocyanate foam material 23 and colour leather cloth 24 bonded thereto instead of the colour iron sheet 22 on the outer surface. This partition panel (u) is permanently installed by fixing upper and lower angle steel members 80 at one side with nails in position on the floor and ceiling, and then fixing other upper and lower angle steel members 80 at other side in the same manner.

Individual sections of a prefabricated house constructed as has been described above, may be put on the market as a set.

A set of such sections are assembled into a prefabricated house as follows: Place and fix foundation stones (z) at a building site and put corner channel steel members (a) at four corners on the foundation stones (z) after unfolding them around the pin 1 of the hinge 2 to a right angle. Let two corner channel steel members (a) abut in the direction of depth by aligning their respective channels and insert connecting channel steel members (b) therebetween in the direction of frontage by aligning their respective channels. Then attach inner and outer angle steel members (c) and (d) to the channel steel members for a groundsill, insert bolts 5 in holes 4, and fasten temporarily with nuts 6. Tighten the corner channel steel members (a) at four corners by inserting bolts 9 in holes 8 on the flange 7 and other angle steel member in contact therewith and fastening with nuts 10.

After completion of the assembling of

the groundsill, insert two outer wall panels (i) for corner use (with halving joints formed in the same direction) after their engagement. In this case remove bolts 5 for temporary fastening beforehand. Let holes 56 made on the lower side of the outer wall panel (i) meet with holes 4 on angle steel members (c) and (d) and corner channel steel members (a). Insert bolts 5 therein from the inner angle steel member (c) and fasten with the bolts 5 and nuts 6. In this way the outer wall panel (i) is first erected at a corner. Then, set up intermediate panel (i), door panel (l), window panel (j), wiring panel (k), and/or bookcase panel (m), as required and fasten them to the groundsill likewise as described above. Through holes 56 made on the upper side of outer wall panel (i), window panel (j), wiring panel (k), bookcase panel (m) fasten such panels one by one to the top rail. In this way such panels are fixed even at the upper and lower ends at equal intervals to the groundsill and the top rail.

After completion of fastening the panels to the groundsill and the top rail, start flooring and ceiling work.

For flooring suspend floor frames (n) between the inner angle steel members (c) used for the groundsill and set floor panels (o) therein in close contact. For ceiling suspend ceiling frames (n)¹ from between unequal-sided angle steel members (g) inside the top rail so as to face the floor frames (n) (with channels of the ceiling frames (n)¹ directed downwards), and set ceiling panels (p) in close contact. Then, place roofing members (q), overlapping some channels at joined portions, on angle steel members (h) and stays (h)¹ outside the top rail, insert bolts 73 in holes 72 made thereon, and fasten with nuts 74. In spaces formed by the top rail and the channels of the roofing members (q) force fit closing caps (r), making use of standing edges 75 formed therearound and opening outward, so that dust, sand, rain water or snow is prevented from coming under the roof, which may be otherwise blown therein with the wind.

The roofing members (q) are fixed on the angle steel members (h) outside the top rail, that is, out of the room, and therefore, the room is kept from the leakage of rain through any of holes 72, even if leaking occurs owing to isocyanate foam material 71 being damaged and made ineffective as packing. Now, assembly work has been finished. This work can be completed within five actual working hours by two persons using only spanners and hammers.

When it is necessary to partition the room, a partition panel (s) is set up by setting the upper end in the ceiling frame (n)¹ and holding the lower end on a clip (t) between the floor frame (n) and the floor panel (o). 130



(4) (14)

For permanent partition to make a kitchen or toilet room a permanent partition panel (u) is fixed by angle steel members 80 nailed on the floor and the ceiling.

- 5 Disassembly is done in a reverse way to the foregoing assembling work.

WHAT I CLAIM IS:—

- 10 1. A prefabricated house comprising a ground sill formed of corner channel steel members placed at the four corners, each of which consists of two channel steel members cut at one end at 45° and fixed on hinges on the back of their cut ends and joined at a right angle so as to be folded and unfolded, connecting channel steel members joined between said corner channel steel members according to a building area, and angle steel members attached to the inner and outer sides thereof, said ground sill being fastened with bolts and nuts, inserted through holes arranged in predetermined positions; a top rail formed of corner channel steel members so joined as to face said ground sill, unequal-sided angle steel members attached to the inner side thereof in a position lower than said corner channel steel members, and outer angle steel members attached and levelled thereto inversely to each other with bolts and nuts, said bolts being inserted through holes made in corresponding positions as those of holes on the ground sill, said outer angle steel members being extended to form stays for roofing members; outer wall panels inserted into and fastened to channels on said ground sill and on said top rail at the lower and upper ends respectively with bolts and nuts, said bolts being inserted through holes made therein, each outer wall panel being formed of two frames on both sides each having a halving joint formed thereon and three panel forming plates being composed of a wooden frame having waterproof plywood sheets attached to its both surfaces, an iron sheet covering the outer surface, and isocyanate foam material with leather cloth bonded thereto covering the inner surface, releasably fixed to said wooden frame together with the upper and lower edges of which with machine screws; floor frames each being shaped like a channel steel having flanges formed integrally on both sides and covered with isocyanate foam material with leather cloth bonded thereto, arranged at specific intervals between the inner angle steel members along the ground sill; floor panels each being composed of a wooden frame having waterproof plywood sheets attached to its both surfaces with an iron sheet covering the back surface and isocyanate foam material with leather cloth bonded thereto covering the front surface, set closely to each other between said floor frames; ceiling frames being the same in

shape and put on the inner unequal-sided angle steel members along the top rail, facing said floor frames; ceiling panels each being composed of a wooden frame having waterproof plywood sheets attached to its both surfaces with isocyanate foam material with leather cloth bonded thereto covering the inner surface facing the room, set closely to each other between said ceiling frames; roofing members each being composed of a metal sheet with isocyanate foam material bonded to the under surface, fixed to the outer angle steel members along the top rail with bolts and nuts; and partition panels inserted into channels on the ceiling frames at the upper end and held by clips on the floor frames at the lower end.

2. A prefabricated house as claimed in Claim 1 in which corner channel steel members each being cut at one end at 45° for the ground sill are fixed on hinges on the back of their joined portion where they meet at a right angle so as to be folded back to back and unfolded.

3. A prefabricated house as claimed in Claim 2 in which the corner channel steel members to form the ground sill and the top rail are used at four corners, between which intermediate connecting channel steel members are provided with inner and outer angle steel members attached and fastened thereto with bolts and nuts, said bolts being inserted through holes made in specific positions where they are allowed to meet.

4. A prefabricated house as claimed in Claim 1 in which outer wall panels are used each of which is composed of frames at both sides each having a halving joint formed on the side face thereof and three panel forming plates set in the channels of said frames, each of said panel forming plates consisting of a wooden frame, waterproof plywood sheets attached to its both surfaces with an iron sheet covering the outer surface and isocyanate foam material with leather cloth bonded thereto covering the inner surface, said frames and said panel forming plates having edges attached thereto at the upper and lower ends and fixed with machine screws.

5. A prefabricated house as claimed in Claim 4, in which the outer wall panels are used as window panels by removing the middle panel forming plate and setting a window frame in its place.

6. A prefabricated house as claimed in Claim 1 in which electrical conductors are distributed in spaces formed inside the halving joints on the frames of the outer wall panel in Claim 4, with wiring fixture mounted suitably on the frames.

7. A prefabricated house as claimed in Claim 4 in which the outer wall panel is used as a bookcase panel by removing the middle panel forming plate and setting the bookcase



For permanent partition to make a kitchen or toilet room a permanent partition panel (u) is fixed by angle steel members 80 nailed on the floor and the ceiling.

- 5 Disassembly is done in a reverse way to the foregoing assembling work.

WHAT I CLAIM IS:—

1. A prefabricated house comprising a
10 groundsill formed of corner channel steel members placed at the four corners, each of which consists of two channel steel members cut at one end at 45° and fixed on hinges on the back of their cut ends and
15 joined at a right angle so as to be folded and unfolded, connecting channel steel members joined between said corner channel steel members according to a building area, and angle steel members attached to the inner and outer sides thereof, said ground-
20 sill being fastened with bolts and nuts, inserted through holes arranged in predetermined positions; a top rail formed of corner channel steel members so joined as to face said groundsill, unequal-sided angle
25 steel members attached to the inner side thereof in a position lower than said corner channel steel members, and outer angle steel members attached and levelled thereto inversely to each other with bolts and nuts, said bolts being inserted through holes made
30 in corresponding positions as those of holes on the groundsill, said outer angle steel members being extended to form stays for roofing members; outer wall panels inserted
35 into and fastened to channels on said groundsill and on said top rail at the lower and upper ends respectively with bolts and nuts, said bolts being inserted through holes made therein, each outer wall panel being
40 formed of two frames on both sides each having a halving joint formed thereon and three panel forming plates being composed of a wooden frame having waterproof plywood sheets attached to its both surfaces,
45 an iron sheet covering the outer surface, and isocyanate foam material with leather cloth bonded thereto covering the inner surface, releasably fixed to said wooden frame together with the upper and lower edges of
50 which with machine screws; floor frames each being shaped like a channel steel having flanges formed integrally on both sides and covered with isocyanate foam material with leather cloth bonded thereto,
55 arranged at specific intervals between the inner angle steel members along the ground-
60 sill; floor panels each being composed of a wooden frame having waterproof plywood sheets attached to its both surfaces with an iron sheet covering the back surface and isocyanate foam material with leather cloth bonded thereto covering the front surface, set closely to each other between said floor frames; ceiling frames being the same in

shape and put on the inner unequal-sided 65
angle steel members along the top rail, facing said floor frames; ceiling panels each being composed of a wooden frame having water-
proof plywood sheets attached to its both 70
surfaces with isocyanate foam material with leather cloth bonded thereto covering the inner surface facing the room, set closely to each other between said ceiling frames; roofing members each being composed of
75 a metal sheet with isocyanate foam material bonded to the under surface, fixed to the outer angle steel members along the top rail with bolts and nuts; and partition panels inserted into channels on the ceiling frames at the upper end and held by clips on the
80 floor frames at the lower end.

2. A prefabricated house as claimed in Claim 1 in which corner channel steel members each being cut at one end at 45° for the groundsill are fixed on hinges on the
85 back of their joined portion where they meet at a right angle so as to be folded back to back and unfolded.

3. A prefabricated house as claimed in Claim 2 in which the corner channel steel 90
members to form the groundsill and the top rail are used at four corners, between which intermediate connecting channel steel members are provided with inner and outer
95 angle steel members attached and fastened thereto with bolts and nuts, said bolts being inserted through holes made in specific positions where they are allowed to meet.

4. A prefabricated house as claimed in Claim 1 in which outer wall panels are used 100
each of which is composed of frames at both sides each having a halving joint formed on the side face thereof and three panel forming plates set in the channels of said frames, each of said panel forming plates 105
consisting of a wooden frame, waterproof plywood sheets attached to its both surfaces with an iron sheet covering the outer surface and isocyanate foam material with leather cloth bonded thereto covering the inner sur- 110
face, said frames and said panel forming plates having edges attached thereto at the upper and lower ends and fixed with machine screws.

5. A prefabricated house as claimed in Claim 4, in which the outer wall panels are 115
used as window panels by removing the middle panel forming plate and setting a window frame in its place.

6. A prefabricated house as claimed in Claim 1 in which electrical conductors are 120
distributed in spaces formed inside the halving joints on the frames of the outer wall panel in Claim 4, with wiring fixture mounted suitably on the frames. 125

7. A prefabricated house as claimed in Claim 4 in which the outer wall panel is used as a bookcase panel by removing the middle panel forming plate and setting the bookcase



therein in such a manner that it projects out of the outer wall panels.

8. A prefabricated house as claimed in Claim 1 in which for flooring and ceiling are used frames shaped like a channel steel having flanges formed integrally on both sides, and said frames are fixed at specific intervals on the inner angle steel members along the groundsill and along the top rail with floor panels set closely to each other therebetween, each being composed of a wooden frame having waterproof plywood sheets attached to both its surfaces, an iron sheet covering the back surface, and isocyanate foam material with leather cloth bonded thereto covering the inner surface facing the room.

9. A prefabricated house as claimed in Claim 1 in which roofing members are corrugated in section with isocyanate foam material bonded to the back surface fixed to the outer angle steel members along the top rail with bolts and nuts.

10. A prefabricated house as claimed in Claim 8 in which partition panels are inserted at the upper end into channels on the ceiling frames and are held at the lower end by clips on the floor frames.

11. A prefabricated house as claimed in Claim 1 in which a partition panel is secured by a clip made of a square metal plate which is given two straight cuts from the two opposite sides where right and left portions are bent downward and a centre portion is bent upward so as to form upper and lower holding channels.

12. A prefabricated house as claimed in Claim 1 in which a closing cap made of synthetic resin is provided to fit a space formed between the ridge of any of the roofing members and the top rail, for covering said space tightly by force fitting therein its edges formed around the cap and erected outward.

13. A prefabricated house as claimed in Claims 5 and 10 in which as panes and partition blocks for the window and partition panels are used hollow double windows and hollow blocks which are made of synthetic resin.

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