

COLUMN FRAME STRUCTURE FOR PREFABRICATED HOUSE

Description

Technical Field

- 5 [0001] The present invention relates to a column frame structure for a prefabricated house which is produced in a factory and is assembled locally, which enhances the efficiency of transportation and design and which can maintain waterproof performance.

Background Art

- [0002] Conventionally, as this type of prefabricated house, folding prefabricated houses
10 disclosed in patent literatures 1 and 2 are proposed.

[0003] The holding prefabricated house disclosed in patent literature 1 is previously proposed by the present applicant, a column frame, a wall panel and the like are folded between a floor panel and a roof panel and they are transported in a folded state and are assembled locally.

- 15 [0004] On the other hand, in the prefabricated house disclosed in patent literature 2, an eaves gutter is provided on a gable end portion of a roof. The eaves gutter is formed such that rainwater received on the roof is received in a gutter so as to be drained through a chain.

Citation List

- 20 Patent Literature

[0005] Patent Literature 1: Japanese Utility Model Registration No. 3058646

Patent Literature 2: Japanese Unexamined Utility Model Application Publication

No. 61-184054

Summary of Invention

- 25 Technical Problem

[0006] However, in the prefabricated house disclosed in patent literature 1, when the prefabricated house is assembled, an eave on a gable is extended outward of the column frame and a gable wall panel. Hence, when the house is folded, since the eaves portion of the roof panel is greatly protruded, the eaves portion is disadvantageously an obstacle at the time of stacking.

[0007] When as in patent literature 2, the eaves gutter is fitted to the eaves portion on the gable, the eaves gutter which is fitted to the gutter that is greatly protruded is fitted in an extremely prominent position, and thus the eaves gutter is problematic in terms of appearance. In other words, in recent prefabricated houses, attention is also focused on the applications of noticeable high-quality buildings such as a shop, an office and a showroom. However, conventionally, in the conventional prefabricated houses in which the eave and the gutter on the gable are greatly protruded, it may be difficult to adapt the prefabricated houses to the noticeable high-quality buildings.

[0008] On the other hand, since the eaves gutter is provided in the protruded eaves portion so as to enhance waterproof performance, if in order for a satisfactory appearance to be achieved, the eaves portion and the eaves gutter are provided so as not to be protruded, the waterproof performance of the eaves gutter may be degraded.

[0009] Hence, the present invention is made so as to remove the problem described above, and an object of the present invention is to provide a column frame structure for a prefabricated house which enhances the efficiency of transportation, which maintains waterproof performance and which achieve a satisfactory appearance in terms of appearance.

Solution to Problem

[0010] In order to achieve the above object, a first means in the present invention is provided such that in a prefabricated house P in which a column frame 20 is foldably

fitted onto a floor panel 40, in which a roof panel 10 is stacked on the column frame 20 and which is transported, when the prefabricated house is assembled, the outside surface of a gable end portion in the roof panel 10 is prevented from being protruded beyond the outside surface of the column frame 20 on a gable that is arranged to stand, an eaves
 5 gutter 50 is installed so as to extend downward from the gable end portion in the roof panel 10 and the eaves gutter 50 is prevented from being protruded outward beyond the outside surface of the column frame 20 on the gable.

[0011] In a second means, a top plate 21 which makes contact with the lower surface of the gable end portion in the roof panel 10 is provided on an upper end portion of the
 10 column frame 20, and a concave portion 21A is formed in a part of the top plate 21 which makes contact with the eaves gutter 50 such that the outside surface of the eaves gutter 50 which is overlaid on the concave portion coincides with the outside surface of the column frame 20 on the gable.

[0012] In a third means, a gable beam 22 which is arranged along the gable of the roof
 15 panel 10 is mutually provided in the upper end portion of the column frame 20, the gable beam 22 swings together with the column frame 20 and when the prefabricated house P is assembled, the gable lower surface of a roof beam 11 which supports the roof panel 10 is overlaid on an upper end portion of the gable beam 22.

[0013] In a fourth means, the column frame 20 is coupled with a coupling tool 60
 20 formed with a coupling fixed member 61 which is fixed to the gable of the roof beam 11 and a swing fixed member 62 which is swingably coupled to the coupling fixed member 61 and which is fixed to a side surface of the column frame 20 on the side of the upper end portion, an insertion hole 62A through which a coupling pin 61A that is provided on a side surface of the coupling fixed member 61 so as to be protruded is inserted is
 25 formed in the coupling fixed member 62 and the insertion hole 62A is formed in the

shape of a long hole such that the upper end portion of the column frame 20 which is arranged to stand when the prefabricated house P is assembled is moved in a longitudinal direction.

Advantageous Effects of Invention

5 [0014] As in claim 1, when the prefabricated house P is assembled, the outside surface of the gable end portion in the roof panel 10 is prevented from being protruded beyond the outside surface of the column frame 20 on the gable that is arranged to stand, and thus when the prefabricated house P is folded, the eaves portion of the roof panel 10 is prevented from being greatly protruded, with the result that it is possible to perform
10 very efficient stacking.

[0015] Moreover, the eaves gutter 50 is installed so as to extend downward from the gable end portion in the roof panel 10 and the eaves gutter 50 is prevented from being protruded outward beyond the outside surface of the column frame 20 on the gable, and thus the eaves gutter 50 is unnoticeable. Consequently, it is possible to adapt the
15 prefabricated house to the applications of noticeable high-quality buildings such as a shop, an office and a showroom.

[0016] As in claim 2, the top plate 21 which makes contact with the lower surface of the gable end portion in the roof panel 10 is provided on the upper end portion of the column frame 20, the concave portion 21A is formed in the part of the top plate 21
20 which makes contact with the eaves gutter 50 such that the outside surface of the eaves gutter 50 which is overlaid on the concave portion coincides with the outside surface of the column frame 20 on the gable and thus a sense of unity of the column frame 20 and the eaves gutter 50 is provided, with the result that it is possible to provide an excellent appearance design.

25 [0017] As in claim 3, the gable beam 22 which is arranged along the gable of the roof

panel 10 is mutually provided in the upper end portion of the column frame 20, the gable beam 22 swings together with the column frame 20 and when the prefabricated house P is assembled, the gable lower surface of the roof beam 22 which supports the roof panel 10 is overlaid on the upper end portion of the gable beam 22, with the result that the gable beam 22 is stored in the side of the lower surface of the roof beam 11. Hence, even when the outside surface of the roof panel 10 is prevented from being protruded beyond the outside surface of the column frame 20 on the gable that is arranged to stand, it is possible to enhance waterproof performance.

[0018] As in claim 4, the insertion hole 62A of the coupling tool 60 is formed in the shape of a long hole such that the upper end portion of the column frame 20 which is arranged to stand when the prefabricated house P is assembled is moved in the longitudinal direction, and thus the column frame 20 is further lifted upward from the state where the column frame 20 is arranged to stand so as to make contact with the lower surface of the roof panel 10. Consequently, while the column frame 20 which is folded is being stored in a compact manner, it is possible to achieve satisfactory storage of the column frame 20 at the time of the assembly.

[0019] As described above, according to the present invention, the original object is achieved in which the efficiency of transportation is enhanced and in which a satisfactory appearance in terms of appearance is achieved while waterproof performance is being maintained.

Brief Description of Drawings

[0020] Fig. 1 is a perspective view showing an embodiment of a prefabricated house in the present invention;

Fig. 2 is a front view showing a state where the prefabricated house in the present invention is folded;

Fig. 3 is a front view showing a process of assembling the prefabricated house in the present invention;

Fig. 4 is a side view showing a state where the prefabricated house in the present invention is assembled;

5 Fig. 5 is a side view of a main part showing a state where the column frame of the present invention is folded;

Fig. 6 is a side view of the main part showing a process of assembling the column frame of the present invention;

10 Fig. 7 is a side view of the main part showing a state where the column frame of the present invention is assembled;

Fig. 8 is a side view of the main part showing a state where the column frame of the present invention is moved to slide; and

15 Fig. 9 is a side view of the main part showing a relationship between a roof beam and an eaves gutter when the prefabricated house in the present invention is assembled.

Description of Embodiments

[0021] An embodiment of the present invention will be described below. The present invention is a prefabricated house P which is produced in a factory and is assembled locally (see Fig. 1).

20 [0022] The prefabricated house P is transported in a state where a column frame 20 is folded so as to be stacked on a floor panel 40 and where a roof panel 10 is further stacked on the column frame 20 (see Fig. 2). Then, when the roof panel 10 is lifted locally (see Fig. 3), the column frame 20 is gradually developed, and when the prefabricated house P is assembled, the column frame 20 is arranged to stand between
25 the roof panel 10 and the floor panel 40 (see Fig. 4).

[0023] In the present invention, when the prefabricated house P is assembled, the outside surface of a gable end portion in the roof panel 10 is prevented from being protruded beyond the outside surface of the column frame 20 on a gable which is arranged to stand (see Fig. 7). Furthermore, an eaves gutter 50 is installed so as to extend downward from the gable end portion of the roof panel 10, and the eaves gutter 50 is formed so as not to be protruded outward beyond the outside surface of the column frame 20 on the gable (see Fig. 1).

[0024] On the upper end portion of the column frame 20, a top plate 21 is provided. The top plate 21 is a portion which makes contact with the lower surface of the gable end portion in the roof panel 10, and in particular, a concave portion 21A is formed in a part of the top plate 21 which makes contact with the eaves gutter 50. The concave portion 21A is formed such that the eaves gutter 50 fitted to the gable end portion of the roof panel 10 is overlaid on the concave portion 21A. Specifically, when the eaves gutter 50 is wound so as to be overlaid on the concave portion 21A of the top plate 21, the outside surface of the eaves gutter 50 coincides with the outside surface of the column frame 20 on the gable (see Fig. 1).

[0025] In the illustrated column frame 20, a gable beam 22 is provided which is arranged along the gable of the roof panel 10, and the gable beam 22 swings together with the column frame 20 (see Fig. 6). When the prefabricated house P is assembled, the gable lower surface of a roof beam 11 which supports the roof panel 10 is overlaid on the upper end portion of the gable beam 22 (see Fig. 9).

[0026] The column frame 20 is swingably coupled through a coupling tool 60 to the roof beam 11 (see Fig. 5). The coupling tool 60 is formed with a coupling fixed member 61 and a swing fixed member 62. Specifically, the coupling fixed member 61 is a member which is fixed to the gable of the roof beam 11, and includes a coupling pin

61A. On the other hand, the swing fixed member 62 is a member which is swingably coupled to the coupling fixed member 61, and is fixed to the side surface of the column frame 20 on the side of the upper end portion (see Fig. 6).

[0027] In the swing fixed member 62, an insertion hole 62A through which the coupling pin 61A of the coupling fixed member 61 is inserted is formed, the insertion hole 62A is formed in the shape of a long hole and thus the column frame 20 is moved in two steps, that is, a swinging movement and a slide movement (see Figs. 6 and 7).

[0028] Specifically, in order for the column frame 20 in a folded state to be arranged to stand, the column frame 20 is moved to swing about the coupling fixed member 61 of the coupling tool 60 (see Fig. 6). Then, the upper end portion of the column frame 20 which is arranged to stand is moved to slide in a longitudinal direction (see Figs. 7 and 8). In the illustrated example, the insertion hole 62A is formed in the shape of a long hole along the longitudinal direction of the column frame 20, and is provided such that the column frame 20 is moved to slide along the insertion hole 62A in the longitudinal direction (see Fig. 7).

[0029] In an actual procedure, when the prefabricated house P is assembled, the roof panel 10 which is lifted is lowered, and thus the position of the column frame 20 is relatively moved to slide. When as described above, the column frame 20 is moved to slide along the insertion hole 62A in the longitudinal direction, the gable lower surface of the roof panel 10 is overlaid on the top plate 21 of the column frame 20 (see Fig. 8). At the same time, the gable beam 22 is stored in the roof beam 11, and thus it is possible to enhance waterproof performance.

[0030] When the column frame 20 is in the folded state, the position of the column frame 20 can be moved to slide horizontally along the insertion hole 62A, and thus it is possible to perform compact storage (see Fig. 5).

[0031] The configuration of the prefabricated house P in the present invention is not limited to the illustrated example, and the configurations and the shapes of the roof panel 10, the column frame 20, the eaves gutter 50 and the like can be arbitrarily changed. The design can freely be changed without departing from the spirit of the present invention.

Reference Signs List

	[0032] P	prefabricated house
	10	roof panel
	11	roof beam
10	20	column frame
	21	top plate
	21A	concave portion
	22	gable beam
	30	wall panel
15	40	floor panel
	50	eaves gutter
	60	coupling tool
	61	coupling fixed member
	61A	coupling pin
20	62	swing fixed member
	62A	insertion hole

Claims

1. A column frame structure for a prefabricated house,

wherein in a prefabricated house in which a column frame is foldably fitted onto a floor panel, in which a roof panel is stacked on the column frame and which is transported, when the prefabricated house is assembled, an outside surface of a gable end portion in the roof panel is prevented from being protruded beyond an outside surface of the column frame on a gable that is arranged to stand, an eaves gutter is installed so as to extend downward from the gable end portion in the roof panel and the eaves gutter is prevented from being protruded outward beyond the outside surface of the column frame on the gable.

2. The column frame structure for a prefabricated house according to claim 1,

wherein a top plate which makes contact with a lower surface of the gable end portion in the roof panel is provided on an upper end portion of the column frame, and a concave portion is formed in a part of the top plate which makes contact with the eaves gutter such that an outside surface of the eaves gutter which is overlaid on the concave portion coincides with the outside surface of the column frame on the gable.

3. The column frame structure for a prefabricated house according to claim 1 or 2,

wherein a gable beam which is arranged along a gable of the roof panel is mutually provided in the upper end portion of the column frame, the gable beam swings together with the column frame and when the prefabricated house is assembled, a gable lower surface of a roof beam which supports the roof panel is overlaid on an upper end portion of the gable beam.

4. The column frame structure for a prefabricated house according to any one of claims 1 to 3,

wherein the column frame is coupled with a coupling tool formed with a coupling fixed member which is fixed to a gable of the roof beam and a swing fixed member which is swingably coupled to the coupling fixed member and which is fixed to a side surface of the column frame on a side of the upper end portion, an insertion hole through which a coupling pin that is provided on a side surface of the coupling fixed member so as to be protruded is inserted is formed in the coupling fixed member and the insertion hole is formed in a shape of a long hole such that the upper end portion of the column frame which is arranged to stand when the prefabricated house is assembled is moved in a longitudinal direction.