

A FRAMEWORK FOR SMALL-SCALE BUILDING

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

The present invention relates to a framework for a small-scale building, more particularly for use of a tent comprising four poles, joint beams, crossbeams and ridge beams, which is easy in assembling and folding.

DESCRIPTION OF THE PRIOR ART

As a conventional framework for a building comprising four poles, joint beams, crossbeams and ridge beams, here is disclosed for example, a Utility Model Laid-open No. Hei 5-49973. In the framework for a building disclosed therein, basically as shown in Fig 63, four poles C separated respectively, two (or four) crossbeams Ga and Gb and four joint beams Ge and Gf are connected with a three direction joint Ja as shown in Fig. 61, and the joint beams Ge and Gf are connected similarly with the three direction joint Jb. Further, in the case the crossbeam is long, it may be divided into two such as Ga and Gb which may be connected as shown in Fig. 62 with joints Jc, and also the ridge beam is divided into two Gc and Gd and are connected similarly with Jc.

Further, as another convention example, a Utility Model Laid-open No. Hei 5-87168 discloses that, in a plan view of a building, a square comprising four poles is connected with a building supporter which joins each opposite sides at each center of the sides of the square to make an assembled figure of four small squares. And, at the crossing point of the building supporter, a rain avoiding frame is provided. And, the building supporter comprises two supporting bars crossed in X-figured shape, the crossing portion of which is joined with a pin to make a pantograph. Thereby, the framework is folded in such a manner as the crossing portion is raised upward along the rain avoiding frame like folding an umbrella and the poles are folded like a pantograph to

collect the building supporter. In development, it looks like a triangle roof just a developed umbrella.

Further, as another conventional example, there is what is disclosed in a Utility Model Laid-open No. Hei 2-20652. In the framework for a building disclosed therein four poles are connected with the joint beams and crossbeams, the joint beams are connected with a ridge beam, wherein one end of the joint beam (lumber for steep rafter) is joined rotatably on an upper conical arm and the other end of the joint beam is fixed on an under conical arm, and on this under conical arm one end of the pole is connected rotatably. And, the crossbeams are held on holding portions provided on the under conical arm and the ridge beam is held on holding portions of the upper conical arm.

The frameworks of the tents for use of such as a sports meeting, and an earthquake disaster, or a small-scale building for use of such as a doghouse are expected to be assembled and folded easily, and after folding to be light and compact to carry, and at the time of non-use for storage, to occupy a small space.

First, some problems of the conventional framework disclosed in JP Laid-open No. Hei 5-49973 are exemplified referring to Fig. 63 will be explained, i.e. the number of the lumber is amounted to 17 pieces in total, including four poles, four joint beams, two crossbeams (in the case of dividing, four) and one ridge beam (in the case of dividing, two), and two kinds of six joints and in the case of the division of crossbeam and ridge beam of additional three joints. When assembling a framework for building using these 17 pieces of lumber, it is a matter of course to require many hands, and if using a type of inserting at every joint, further the following problems are derived therefrom.

That is, in Fig. 63, a span L1 between poles is restricted by the horizontal strength of the joint beams Ge and Gf connected with the joint Jb, and a span L2 is

restricted by the length of two crossbeams and one ridge beam, so that anyone can not assemble it arbitrarily. For example, as an assembling process example, after a pole C, a joint beam Ge and a joint beam Gf are assembled using two set of joints Ja and Jb, one side ends of two sets of crossbeam Ga and Gb which are joined with joint Jc and one set of the ridge beam Gc and Gd are respectively inserted into the one side ends of the joints Ja and Jb, then, the other side ends thereof are inserted into the joints Ja and Jb simultaneously. And that, the rigidity of assembling is maintained at the inserting portion, so that many attentions have to be paid for preventing the poles from being bent and the assembling quality have been threatened to be deteriorated.

Next, in the case of disassembling the assembled framework, it takes many hands to pull out each of the beams and poles from each of the joints, further, as the disassembled beams and poles have to be banded and each joint has to be collected together to store, it takes many hands also. And, since the number of parts is as many as 17 pieces, these happen to be lost.

Next, in the framework for a building disclosed in JP Utility Model Laid-open No. Hei 5-87168, since it can be folded and constructed without separating four poles and a rain avoiding frame, it is easily folded and constructed, but since the portion corresponding to a crossbeam comprises a eight pieces of building supporter (pantograph) and the portion corresponding to the joint beam and the ridge beam which form a four-square figured consists of a four pieces of building supporter (pantograph), in addition there is a rain avoiding frame, the weight is too much to carry it. Further, since in the folded state the rain avoiding frame is projected, it can not be folded short lengthwisely, and as well as in the above weight problem, it matters for example to carry it in an vehicle as an outdoor sports and that it

takes a broad space so as to store it. Further, since the portions corresponding to the crossbeam, the joint beam and the ridge beam are all the building supporters (pantograph), the rigidity of the framework is low when being built as a building, so that it is not appropriate for use of such as sports meetings and any district of an earth disaster, in which a large-scale of framework for a building is needed, eventually it is problematic in general use.

Next, in the framework disclosed in Utility Model Laid-open No. Hei 2-20652, although the joint beam (lumber for steep rafter) and the poles are not separated to be folded and constructed, on the other hand, since the crossbeam and the ridge beam are in the state of being separated, it has been troubled in doing folding and constructing easily.

SUMMARY OF THE INVENTION

The present invention is to provide a framework for a small-scale building in which, in the state that the poles and each beam are connected with joints, the construction and folding are made easy avoiding bundling or missing parts, and further, a compact folding can become available to make the storage management thereof easy, and in the state wherein the framework is built, the rigidity is sufficiently maintained and to provide with the light-weighted small-scale framework for a building.

In order to solve the above problem, in the invention described in the claim 1, the top portions of the four poles are connected with two parallel joint beams and two parallel crossbeams through joints, the central portions of said joint beams are connected to the ridge beam with joints, said ridge beam is divided into two which are connected with a joint and said joint beam is divided into two which are connected with a common joint which connects said joint beam and said ridge beam together, and said two-divided joint beam and crossbeam are made available to be bent downward and two-divided ridge

beam is made available to be bent upward through the joint.

Next, in the means of the present invention described and grasped in the present claim 2, it is characterised in that, at the joint portion where the top portions of the poles, the end of the joint beam and the end of the crossbeam are connected, two reverse U-letter figured members, the inner figure of which is corresponding to the outlines of the joint beam and the crossbeam are combined at right angles in the plane of the building, the end of the joint beam and the end of the crossbeam are coupled with the reverse U-letter figured member to be connected, on the ends of the joint beam and the crossbeam which are coupled with the reverse U-letter figured member pins to be penetrated through the reverse U-letter figured member respectively are provided and on both sides of the reverse U-letter figured members apertures for guiding the pins are provided, wherein said apertures, in the framework-built state, comprise parallel portions parallel to the bottom portion of the U-letter figured member, along which said pins are guided in such a manner as the upper portions of the joint beams and the crossbeams are in contact with the inner surface of the bottom portion of the reverse U-letter figured member, and a bent portions which guide said pins for making the ends of the joint beam and the crossbeam to separate from the bottom portion when the joint beams and the crossbeams are bent downward, and the top portions of the poles are fixed on the reverse U-letter figured member in such a manner the poles are disposed downward vertically from the crossbeams.

Further, according to the claim 3 of the present application, the framework is characterized in that the pins are guided along the parallel portion of the aperture, and in the state where the upper portions of the joint beam and the crossbeam are in contact with the bottom portion of the reverse U-letter figured member, the pins adjacent to the below surfaces of the joint beam and crossbeam are penetrated

through the reverse U-letter figured member.

Next, according to the claim 4 of the present application, at the joint portion where the ends of two-divided joint beams and the end of the ridge beam are connected, the ends of two-divided joint beams are clamped with two plates, said two plates and each end of the joint beams are connected with pins, and when around the pins the joint beams turn, a pin is provided, which is guided and displaced in the long apertures provided on two plates, in such a manner as the ends of the joint beams abut to or do not abut to the pin. Perpendicular to the sides of two plates, a reverse U-letter figured member is provided and at the bottom portion of the reverse U-letter figured member, one portion thereof is cut out, where the ends of the ridge beams are connected with pins, and in the state where ridge beams are horizontal, a pin which is in contact with the under edge of the ridge beam is provided in such a manner as it penetrates the cut out portion and said pin is located at the more inner portion than the other pins which connect the ridge beam.

Next, according to the claim 5 of the present invention, at the joint portion of two divided ridge beam, the divided ends of the ridge beam are coupled with the reverse U-letter figured member and connected with pin penetrating the reverse U-letter figured member, and the both sides of the reverse U-letter figured member are provided with long apertures to guide the pin, said apertures consist of parallel portions parallel to the bottom portion of the reverse U-letter figured member in such a manner as, in the state where the ridge beam is horizontal, the upper surfaces of ridge beams are in contact with the inner side of the bottom portion of the reverse U-letter figured member, and bent portions to guide the pin in such a manner as, when the ridge beam is bent at the joint portion, the ends of the ridge beam separate from the bottom portion of the reverse U-letter

figured member.

Next, according to the claim 6 of the present application, in the state where the upper surfaces of the ridge beam are in contact with the bottom portion of the reverse U-letter figured member by guiding the pin along the parallel portions, a pin which is in contact with the under surface of the ridge beam is provided while penetrating the reverse U-letter figured member.

Next, according to the claim 7 of the present application, the ends of two divided crossbeams are coupled with the reverse U-letter figured member, one part of the bottom portion of the reverse U-letter figured member is cut out, where the ends of the crossbeams are connected with a pin, and when the crossbeams turn around the pin, the ends of crossbeams move in such a manner as those engage or disengage with a pin which is provided and displaced in the long apertures provided on both sides of the reverse U-letter figured member.

Next, how the problems are solved is explained as follows.

In the means of the present invention which are recognized in the description of the claim 1, four tops of the four poles are connected with two parallel joint beams and two parallel crossbeams through the joints, at the central portions of the joint beams the ridge beam is connected through the joints, said ridge beam is divided into two and connected with a joint, said crossbeam is divided into two and connected with a joint, said joint beams are divided into two and the divided joint beams and the ridgebeam are connected with common joints, and two-divided joint beams and two-divided crossbeams are made possible to be bent downward through every joint and two-divided ridge beam are made possible to be bent upward through every joint, thereby, in the state where the pole and every beam are connected through joint, two-divided joint beams and two-divided crossbeams can be bent downward through every

joint to make the joint beams and the poles, the joint beams to come close each other, and next by bending the ridge beam upward the framework can be folded in such a manner as the crossbeams and the poles, the crossbeams and the ridge beam come close each other.

Next, according to the claim 2 of the present invention, the joint portion to connect the tops of the poles, the ends of the joint beams and the ends of the crossbeams is formed by combining two reverse U-letter figured members, the configuration of which is in accordance with the outer shape of the joint beam and the crossbeam, at right angles in the plane of the building, to which the ends of the joint beams and the crossbeams are connected by coupling with these, so that the joint beams and the crossbeams are joined in a unitary manner and, in the state where the framework for building is constructed, the rigidity of the connection portion of the joint beams and the crossbeams is obtained, and the structure in which the joint beams and the crossbeams are mounted at right angles can be rigid, and in accordance with the joint having the figure of reverse U-letter, the joint beams and the crossbeams can be bent downward.

And, a pin is provided on the ends of the joint beams and the crossbeams while penetrating the reverse U-letter figured member, and on both sides of which long apertures are provided to guide the pin and these long apertures consist of the parallel portions parallel to the bottom portion of the reverse U-letter figured member to guide the pin in such a manner as the upper surfaces of the joint beams and the crossbeams are in contact with the inner side of the bottom portion of the reverse U-letter figured member, and the bent portions which guide the pin in such a manner as the ends of the joint beams and the crossbeams, when the joint beams and the crossbeams are bent downward, separate from the bottom portion of the reverse U-letter figured member, so that, in the state where the framework for a building is constructed,

the upper surfaces of the joint beams and the crossbeams are in contact with the inner side of the bottom portion of the reverse U-letter figured member, and as the pin is located at the parallel portion of the long aperture, a rigidity against the bending force downward is played, however the displacement of the pin along the bent portion of the long aperture by displacing the joint beams and the crossbeams will allow the joint beams and the crossbeams to be bent downward.

And, by fixing the poles at the top on the reverse U-letter figured member vertically downward, the joints are fixed on the tops of the poles in a unitary manner to become rigid, so that without removing the joints from the tops, the joint beams and the crossbeams can be folded at the joint portion in order to make the joint beams and the crossbeams come close to the poles.

Next, according to the claim 3 of the present invention, in the state where a pin is guided along the long aperture and the upper surfaces of the joint beams and the crossbeams are in contact with the bottom of the reverse U-letter figured member, a pin which is in contact with the under surfaces of the joint beams and the crossbeams is provided while penetrating the reverse U-letter figured member, and the ends of the joint beams and the crossbeams, in the constructed framework for a building, the upper surfaces of which are in contact with the bottom portion of the reverse U-letter figured member and the under of which are in contact with the pin penetrated the reverse U-letter figured member, thereby the ends of the joint beams and the crossbeams are in the state of being clamped, a great rigidity against the force which generates the joint beams and the crossbeams to be bent downward is obtained, and the force to cause the reverse U-letter figured member to be broadened by a horizontal direction force or three dimensional torsion is received as a tensile strength.

Next, according to the claim 4 of the present invention, the joint portion which connects the ends of two-divided joint beams and the ridge beam each other and the ends of the joint beams are formed with two sheet of plates so as to clamp them, and by connecting these plates and each of the joint beams with a pin, at this joint portion, two-divided joint beams can be folded upward or downward, and the horizontal force to cause the two plates to be broadened or three dimensional torsion is received by the joint beams clamped and the pin.

And, a pin is provided, which is guided and displaced in the long apertures provided on two plates, in such a manner as the ends of the joint beams abut to or do not abut to the pin, in the state where the pin is displaced along the long aperture and the ends of the joint beams abut, the bending of the joint beams is restricted in the state of the building, and in the state where the pin is displaced along the long aperture and the ends of the joint beams do not abut, the downward folding of the joint beams at this joint portion is made possible.

And, perpendicular to the sides of the two plates a reverse U-letter figured member is provided, and at the end portion thereof, one part of the bottom portion of the reverse U-letter figured member is cut out, where the end of the ridge beam is coupled and connected with a pin, thereby said joint beams and the ridge beam are connected with a common joint, and ridge beam can be bent upward without abutting to the bottom portion of the reverse U-letter figured member.

And, in the state where the ridge beams is horizontal, the pin which is in contact with the under surface of the ridge beam is provided while penetrating the cut out portion of the bottom portion, and the position of the pin is located at the position of more inside than the pins which connect the ridge beam, thereby the force which causes the ridge beam to be

bent downward is received by this pin, which allows the ridge beam to be bent upward and the force to cause the cut out portion to be broadened by a horizontal direction force or three dimensional torsion is received as a tensile strength of the pin.

Next, according to the claim 5 of the present invention, since the joint portion of two-divided ridge beam, by coupling the ends of two-divided ridge beam with the reverse U-letter figured member and connecting this reverse U-letter figured member with a pin penetrating the reverse U-letter figured member, the rigidity is increased by unification of the ridge beam to the reverse U-letter figured member, and at the joint portion the bending of two-folded ridge beam become possible. And, on both sides of this reverse U-letter figured member, long apertures to guide the pin are provided, these long apertures consist of, in the state where the ridge beam is horizontal, the parallel portions parallel to the bottom portion of the reverse U-letter figured member to guide the pin in such a manner as the upper surfaces of the ridge beam are in contact with the inner side of the bottom portion of the reverse U-letter figured member, and the bent portions which guide the pin in such a manner as the end of the ridge beam, when the ridge beam is bent downward at the joint portion, separate from the bottom portion of the reverse U-letter figured member, so that, at the joint portion, the couple of forces generated by the force which cause the ridge beam to be bent downward is received by the bottom portion and the pin, thereby the downward bending of the ridge beam is restricted and allowed to be bent upward.

Next, according to the claim 6 of the present invention, in the state where the pin is guided in the parallel portions of the long apertures and the upper surfaces of the ridge beam are contact with the bottom portion of the reverse U-letter figured member, by providing a pin which is in contact with the under surfaces of the ridge beam while

penetrating the reverse U-letter figured member, at the portion where the ends of two-divided ridge beam are connected, the rigidity against the force to be bent downward is increased and the horizontal force to broaden or three dimensional torsion of the reverse U-letter figured member is received as a tensile strength of the pin.

Next, according to the claim 7 of the present invention, the one portion of the bottom portion at the coupling portion is cut out and the ends of the crossbeams are connected each other, without contacting with the bottom portion at this joint portion the bending of two-divided crossbeam is made possible, the rigidity against the horizontal force to broaden or three dimensional torsion of the reverse U-letter figured member is secured. And, a pin which is guided and displaced in the long apertures provided on the sides of the reverse U-letter figured member is provided in such an area as, when the crossbeams turn around the pin, the ends of the crossbeam changes to abut and not to abut to the pin.

Next, the manner to realize the present invention according to the claim 1 is described. In Fig. 1, the top portions of four poles C are connected with parallel two sets of joint beam, each set of which consists of two joint beams G1 and G2, and parallel two sets of crossbeam, each set of which consists of two crossbeams G3 and G4 through joints J1, J2, and two joint beams G1 and G2 are connected with ridge beams G5 and G6 through a joint J3. And, two-divided ridge beams G5 and G6 are connected with a joint J5, two-divided crossbeams G3 and G4 are connected with a joint J4 and two-divided joint beams G1 and G2 and two divided crossbeams G5 and G6 are connected with a common joint J3. And, two-divided joint beams G1 and G2 and the crossbeams G3 and G4 are made possible to be folded downward through the joints J3 and J4 as shown in the direction of an arrow (a) in Fig. 1 and an arrow (b) in Fig. 2, further, two-divided ridge beams G5 and G6 is made possible to be bent upward as shown through

the joint J5 in the direction of an arrow (c) in Fig. 2.

Next, the manner to realize the present invention according to the claim 2 is described. In the joints J1 and J2 which connect the tops of the poles C of Fig. 1, the ends of the joint beams G1 and G2 and the ends of the crossbeams G3 and G4, as shown in Fig. 9, the reverse U-letter figured members 1 and 2 (Figs. 10 and 11), which are formed, as shown in Fig. 13, in accordance with the outer configuration (pipe) of the joint beams G1 and G2 and the crossbeam G3 and G4, are combined at right angles each other on the plane of a building, and as shown in Fig. 13 the ends of the joint beams G1 and G2, and crossbeams G3 and G4 are joined into the reverse U-letter figured members 1 and 2.

And, as shown in Fig. 13, on the ends of the joint beams G1 and G2 and the crossbeams G3 and G4 connected to the reverse U-letter figured members 1 and 2, pins 3 and 4 which are penetrated the reverse U-letter figured members 1 and 2 are provided, and both sides of the reverse U-letter figured members 1 and 2 are provided with long apertures 5 and 6 which may guide the pins 3 and 4, as shown in Figs. 11 and 12. These long apertures 5 and 6 consist of the parallel portions 501 and 601 parallel to the bottom portions 101 and 201 of the reverse U-letter figured members 1 and 2, which guide the pins 3 and 4 in such a manner as these pins slide in contact with the inner side of the bottom portions 101 and 201 of the reverse U-letter figured members 1 and 2, and bent portions 502 and 602 which guide the pins 3 and 4 in such a manner as, when bending downward the joint beams G1 and G2 and the crossbeams G3 and G4, the ends of the joint beams G1 and G2 and the crossbeams G3 and G4 separate from the bottom portions 101 and 201 of the reverse U-letter figured members 1 and 2. And, as shown in Figs. 14 and 15, the tops of the poles are fixed on the reverse U-letter figured member 2 so as to make the poles C downward vertically to the crossbeams G3, G4.

Next, the manner to realize the present invention according to the claim 3 is described. As shown in Figs. 14 and 15, pins 3 and 4 are guided along the parallel portions 501 and 601 of long apertures 5 and 6, in the state where the upper portions of the joint beams G1 and G2 and crossbeams G3, G4 are in contact with the bottom portions 101 and 201 of the reverse U-letter figured members 1 and 2, pins 7 and 8 are provided while penetrating the reverse U-letter figured members 1 and 2 in contact with the under surfaces of the joint beams G1 and G2 and the crossbeams G3 and G4.

Next, the manner to realize the present invention according to the claim 4 is described. In the joint portion, where the ends of the joint beams G1 and G2 and the ends of the ridge beams G5 and G6 are connected each other, as shown in Fig. 16, the ends of the two-divided joint beams G1 and G2 are clamped with two sheets of plate 9 and 10, these two plates 9 and 10, and each end of the joint beams G1 and G2 are connected with a pin 11 as shown in Fig. 19. And, a pin 13 is provided which is guided and displaced along the long apertures 12 provided on two plates 9, 10, in such an area as, when the joint beams G1 and G2 turn around the pin 11, the ends of the joint beams G1 and G2 change to abut to or not abut to the pin. Further, as shown in Figs. 16 and 17, perpendicular to the sides of the plates 9 and 10 a reverse U-letter figured member 14 is provided, and at the tip end of the reverse U-letter figured member 14, as shown in Figs. 16 and 18, a cut out portion 15 which is formed by cutting one part of the bottom portion of the reverse U-letter figured member 14 is provided, and as shown in Fig. 19, with this cut out portion 15 the ends of the ridge beams G5 and G6 are coupled and connected with pin 16. And, as shown in Figs. 18 and 19, in the state where the ridge beams G5 and G6 are horizontal, a pin 17 contacting with the under sides of the G5 and G6 is provided so as to penetrate the cut out portion 15. This pin 17 is located, as shown in Fig. 18,

inside more than the pin 16 which connects the ridge beams G5 and G6 by the dimension L3.

Next, the manner to realize the present invention according to the claim 5 is explained. In the joint J5 of two-divided ridge beams G5 and G6, as shown in Fig. 23, the divided ends of the ridge beams G5 and G6 are coupled with a reverse U-letter figured member 18 and connected by a pin 19 which penetrates the reverse U-letter figured member 18. And, as shown in Fig. 23, on both sides of this reverse U-letter figured member 18, long apertures 20 which guide the pin 19 are formed. These long apertures 20 consist of, in the state where the ridge beams G5 and G6 are horizontal, a parallel portion 201 parallel to the bottom portion 181 of the reverse U-letter figured member 18 which guide the pin 19 in such a manner as the upper surfaces of the ridge beams G5 and G6 be in contact with inner surface of the bottom portion 181 of the reverse U-letter figured member 18 and a bent portion 202 which guides the pin 19 in such a manner as, when the ridge beams G5 and G6 are bent at the joint J5, the ends of the ridge beams G5 and G6 separate from the bottom portion 181 of the reverse U-letter figured member 18.

Next, the manner to realize the present invention according to the claim 6 is explained. In Fig. 23, in the state where the upper surfaces of the ridge beams G5 and G6 are, by the pin 19 being guided along the parallel portion 201 of the long aperture 20, in contact with the bottom portion 181 of the reverse U-letter figured member 18, a pin 21 is provided which are in contact with the under sides of the ridge beams G5 and G6 while penetrating the reverse U-letter figured member 18.

Next, the manner to realize the present invention according to the claim 7 is explained. The ends as shown in Fig. 1 of the crossbeams G3 and G4 are coupled each other with the reverse U-letter figured member 22 shown in Figs. 20 and 21 and the bottom portion of the reverse U-letter

figured member 22 is cut out to form the cut out portion 23, where the ends of the crossbeams G3 and G4 are connected with the pins 24. Pin 26 is provided which is displaced in the long apertures 25 provided on the side of the reverse U-letter figured members 22, in such a manner an area as, when the crossbeams G3 and G4 as shown in G4' turn around the pin 24, the ends of the crossbeams G3 and G4 change to abut to or not to abut to the pin 26.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view of a framework for a building according to one embodiment of the present invention.

Fig. 2 is a perspective view of a framework for a building folded according to Fig. 1.

Fig. 3 is a perspective view of a framework for a building further folded from the state shown in Fig. 2.

Fig. 4 is a perspective view of a framework for a building finally folded from the state of Fig. 1.

Fig. 5 is a sectional view of Fig. 4 showing the disposition relation of the poles and beams.

Fig. 6 is a plan view of the framework for a building folded.

Fig. 7 is a front view of Fig. 6.

Fig. 8 is a side view of Fig. 7.

Fig. 9 is a plan view of joints J1 and J2 in Fig. 1.

Fig. 10 is a front view of Fig. 9.

Fig. 11 is a right side view of Fig. 9.

Fig. 12 is a left side view of Fig. 9.

Fig. 13 is a plan view showing the state in which a joint beam and a crossbeam are coupled with the joint in Fig. 9.

Fig. 14 is a right side view of Fig. 13.

Fig. 15 is a front view of Fig. 13.

Fig. 16 is a plan view of the joint J3 in Fig. 1.

Fig. 17 is a front view of Fig. 16.

Fig. 18 is a right side view of Fig. 17.

Fig. 19 is a front view showing the state in which a joint beam and a crossbeam are coupled with the joint J3 of Fig.

17.

Fig. 20 is a plan view of the joint J4 in Fig. 1.

Fig. 21 is a front view of Fig. 20.

Fig. 22 is a plan view of the joint J5 in Fig. 1.

Fig. 23 is a front view of Fig. 22.

Fig. 24 is a side view of Fig. 23.

Fig. 25 is a front view of a framework for a building.

Fig. 26 is a side view of Fig. 25.

Fig. 27 is a plan view of Fig. 25.

Fig. 28 is a front view of the pole in Fig. 25.

Fig. 29 is a front view of the pole in Fig. 25.

Fig. 30 is a plan view of the mounting metals in Fig. 25.

Fig. 31 is a side view of Fig. 30.

Fig. 32 is a front view of Fig. 30.

Fig. 33 is a plan view of a base plate of the pole in Fig.

25.

Fig. 34 is a front view of Fig. 33.

Fig. 35 is a front view of a joint beam in Fig. 25.

Fig. 36 is a plan view of Fig. 35.

Fig. 37 is a front view of a crossbeam of Fig. 26.

Fig. 38 is a plan view of Fig. 37.

Fig. 39 is a front view of a brace of Fig. 25.

Fig. 40 is a plan view of Fig. 39.

Fig. 41 is a front view of a brace of Fig. 25

Fig. 42 is a plan view of Fig. 41.

Fig. 43 is a front view of the mounting metals in Fig. 25.

Fig. 44 is a side view of Fig. 43.

Fig. 45 is a front view of the mounting metals in Fig. 26.

Fig. 46 is a plan view of Fig. 45.

Fig. 47 is a side view of Fig. 45.

Fig. 48 is a front view of the mounting metals in Fig. 25.

Fig. 49 is a side view of Fig. 48.

Fig. 50 is a plan view of the mounting metals in Fig. 25.

Fig. 51 is a side view of Fig. 50.

Fig. 52 is a schematic diagram of the use manner of the framework for a building shown in Fig. 1

Fig. 53 is a schematic diagram of the use manner of the framework for a building shown in Fig. 1

Fig. 54 is a schematic diagram of the use manner of the framework for a building shown in Fig. 1

Fig. 55 is a front view of the mounting metals in Fig. 25.

Fig. 56 is a left side view of Fig. 55.

Fig. 57 is a plan view of a connecting beam mounted on the mounting metal provided on the bottom portion of the pole in Fig. 25.

Fig. 58 is a front view of Fig. 57.

Fig. 59 is a front view showing the state in which the connecting beam of Fig. 57 is mounted to the pole.

Fig. 60 is a front view of a fixing metal to mount the connecting beam shown in Fig. 57.

Fig. 61 is a perspective view of a conventional joint.

Fig. 62 is a perspective view of a conventional joint.

Fig. 63 is a perspective view of a conventional framework for a building.

EMBODIMENT

Next, one embodiment of the present invention will be explained. In Fig. 1, at four tops of four poles C through joints J1 and J2, two sets of parallel joint beams G1 and G2 consisting of two joint beams and two sets of parallel crossbeams G3 and G4 of two crossbeams are connected, and two joint beams G1 and G2 are connected by two ridge beams G5 and G6 through joints J3. And, two-divided ridge beams G5 and G6 are connected with a joint J5, two divided crossbeams G3 and G4 are connected with two joints J4 and two joint beams G1 and G2 and two-divided ridge beams G5 and G6 are connected with a common joint J3.

The joint beams G1 and G2 are bent downward at the portion J3 in the direction of an arrow (a) of Fig. 1, the

crossbeams G3 and G4 are bent at the portion joint J4 in the direction of an arrow (b) of Fig. 2 and the joint J1 and J2 are connected on the tops of the pole C. Next, at the joint J3 two joint beams G1 and G2 are possible to be bent downward in the direction of an arrow (a) of Fig.1, and the ridge beams G5 and G6 are adapted to be bent upward in the direction (c) in Fig. 2 at the joint portion J5. Next, at the joint J4, two ends of two crossbeams G3 and G4 are connected and adapted to be bent downward in the direction (b) in Fig. 2. And, at the joint J5, two ends of ridge beams G5 and G6 are connected and adapted to be bent upward in the direction (c) in Fig. 2.

Next, as to each joint, it will be explained in more detail. First, as to the joints J1 and J2, in this embodiment, as shown in Fig. 13, the joint beams G1 and G2 and the crossbeams G3 and G4 are made of pipe. The joints J1 and J2 are structured, as shown Figs. 10 and 11, in a form of reverse U-letter figured members 1 and 2 in section in accordance with the outline of the pipe of the joint beams and crsossbeams, which are combined in a building plane at right angles as shown in Fig. 9. Further, as shown in Fig. 10, which is a front view of Fig. 9, the reverse U-letter figured member 1 which connects the joint beams G1 and G2 in the state where the building is constructed as in Fig. 1 is fixed to the reverse U-letter figured member 2 which connects the crossbeams G3 and G4, at angle α viewing laterally.

Fig. 13 shows a plan view in which the joint beams G1 and G2 are connected to the reverse U-letter figured member 1 and the crossbeams G3 and G4 are connected to the reverse U-letter figured member 2. And both ends of the joint beam G1 or G2 and the crossbeam G3 or G4 are penetrated by pins 3 and 4 through the reverse U-letter figured members 1 and 2 to be turnable on those. And, as shown in Figs. 10 ~ 12, both sides of each reverse U-letter figured members 1 and 2 are provided with long apertures 5 and 6 to guide the pins 3 and 4.

The configuration of the long aperture 6 comprises, in the state of assembling the building, a parallel portion 601 (Fig. 11) parallel to the bottom portion 201 of the reverse U-letter figured member 2, as shown in Fig. 14, in order to guide the pin 4 along the inside of the long aperture 6 in such a manner as the upper surfaces of the crossbeams G3 and G4 are in contact with the bottom portion 201, and a bent portion 602 in order to guide the pin 4 in such a manner as it guides the crossbeams G3 and G4 to separate from the bottom portion 201 of the reverse U-letter figured member 2 when the crossbeams G3 and G4 are bent downward as shown in Fig. 14.

Further, in the long aperture 5 of the reverse U-letter figured member 1 as well, in the state of assembling the building, the configuration of the long apertures comprises a parallel portion 501 (Fig. 10) parallel to the bottom portion 101 of the reverse U-letter figured member 1, as shown in Fig. 15, which guides the pin 3 along the inside of the long aperture 5 in such a manner as the upper surfaces of the joint beams G1 and G2 are in contact with the bottom portion 101, and a bent portion 502 which guides the pin 3 in such a manner as the upper surfaces of the joint beams G1 and G2 be separate from the bottom portion 101 of the reverse U-letter figured member 1 when the joint beams are bent downward, as shown in Fig. 15. Further, as shown in Figs. 14 and 15, the tops of the poles C are connected with two pins 27 to the reverse U-letter figured member 2 so as to be vertically downward to the crossbeams G3 and G4.

As shown in Figs. 14 and 15, the pins 3 and 4 are guided along the parallel portions 501 and 601 of the long apertures, in the state where the surfaces of the joint beams G1 and G2, and the crossbeams G3 and G4 are in contact with the insides of the bottom portions 101 and 201, pins 7 and 8 penetrate the reverse U-letter figured member in such a manner as those are in contact with the under surfaces of the joint beams G1

and G2 and the crossbeams G3 and G4.

In Fig. 14, the location relation between the pins 4 and 8 is in such a manner as the pin 8 is dislocated inside the pin 4 by the size of L4 and receives a couple of forces generated when a force F is effected between the pin 8 and the bottom portion 201 of the reverse U-letter figured member 2. And, when the crossbeams G3 and G4 are bent downward to the position of G3' and G4' by the displacement of the pin 4 along the aperture 6, the pin 4 guides the under surfaces of the crossbeams G3 and G4 and makes easy the crossbeams G3 and G4 to be bent and constructed. Further, by the provision of the pin 8 penetrating the reverse U-letter figured member 2, the rigidity of the reverse U-letter figured member 2 is increased. That is, in the Fig. 13, when a force to broaden the distance of the reverse U-letter figured member 2 with a force of indicated in the arrow F or a three-dimensional distortion is added, the pin 8 receives that force as its tensile strength.

In addition, as shown in Figs. 9 and 10, when a building is constructed, in which the length L₆ of the reverse U-letter figured member 2, and the length of L₇ of the reverse U-letter figured member 1 are prolonged, the contact area between the joint beams G1 and G2 and the bottom portion 101 of the reverse U-letter figured member 1 and the contact area between the crossbeams G3 and G4 and the bottom portion 201 of the reverse U-letter figured member 2 are enlarged to guarantee the rigidity against the couple of forces or the three dimensional torsion. Further, in the case of small houses like dog house or using panels on such as the wall and the roof, as the framework itself does not need the rigidity, the pins 7 and 8 can be omitted to simplify the structure. In such case, the force F acting on the joint beams G1 and G2 and the crossbeams G3 and G4 can be received by the pins 3 and 4 and the bottom portions 101 and 201 of the reverse U-letter figured member 1 and the reverse

U-letter figured member 2 respectively, with which the joint beams G1 and G2 and the crossbeams G3 and G4 are in contact.

Further, as well as in Fig. 15, the position relation between the pins 3 and 7 is set in such a manner as the pin 7 is displaced inside the pin 3 by the dimension L_5 and a couple of forces generated when the force F actions downward on the joint beams G1 and G2 is received by the pin 7 and the bottom portion 101 of the reverse U-letter figured member 1, and when the joint beams G1 and G2 are bent downward, the pin 7 is in contact with the under side of the joint beams G1, G2 to guide it, by which the bending of the joint beams G1 and G2 and the construction thereof are smoothly carried out. In addition, due to the provision of the pin 7 penetrating the reverse U-letter figured member 1, the rigidity of the reverse U-letter figured member 1 is increased. That is, in Fig. 13, when a horizontal force F or any three dimensional torsion force acts on the joint beams G1 and G2, which is likely to broaden the reverse U-letter member 1, such force is received by the pin 7 as a tensile strength.

Further, the position relation between the long apertures 5 and 6 and the pins 7 and 8 is set in such a manner as the pins 3 and 4 are guided from the horizontal portions 501 and 601 to the bent portions 502 and 602 of the long apertures 5 and 6 and when the joint beams G1 and G2 and the crossbeams G3 and G4 are displaced, the under sides of the joint beams G1 and G2 and the crossbeams G3 and G4 are guided by the pins 7 and 8 to make the bending process of the joint beams G1 and G2 and the crossbeams G3 and G4 and their construction to be carried out smoothly.

Although the joints J1 and J2 shown in Fig. 13 are such type as the reverse U-letter figured member 2 is not penetrated by the crossbeams G3 and G4, in the joints J1 and J2 of Figs. 12, 14 and 15, a through-hole 28 is provided in the reverse U-letter figured member 2, as shown in Fig. 14, the crossbeams G3 and G4 are adapted to be mounted by

penetrating. In this case, as shown in Figs. 14 and 15, a ring 73 is provided around the crossbeams G3 and G4 and on both sides of the ring 73 pins 4 are planted, and the tip ends of the crossbeams G3 and G4 are provided with stoppers 74 to prevent the crossbeams G3 and G4 from being pulled out. By this structure, even though the crossbeams G3 and G4 are disposed at any arbitrary position on the joints J1 and J2, the above position relation of between the pins 4 and 8 and the long aperture 6 is kept, and as shown in Fig. 14 as G3' and G4', when the crossbeams G3 and G4 are bent downward, the ring 73' abuts to the stopper 74' to prevent the crossbeams G3 and G4 from being pulled out. Further, as shown in Fig. 15, a mounting hole 29 for mounting a connection beam G7 to reinforce the rigidity of the framework for a building is provided on the reverse U-letter figured member 1.

In addition, the reverse U-letter figured member 1 and 2 are provided with embossments 30 projecting inside them, and when the joint beams G1 and G2 and the crossbeams G3 and G4 are bent they abut to the embossments to keep the folded state. Further, as shown in Fig. 10, the height of H1, H2 of the reverse U-letter figured member 1 and 2 is increased to provide two embossments 30 at two positions, by which the folded state of the joint beams G1 and G2 and the crossbeams G3 and G4 is more guaranteed. The reference numeral 31 shows a pole mounting hole.

Next, the joint J3 is explained. The joint J3 is, as shown in Figs. 16 ~ 19, formed with two plates 9 and 10 made in one unit at a bottom portion 75 having a U-letter configuration, by these two plates the ends of the joint beams G1 and G2 are clamped, which are connected with the pin 11 as shown in Fig. 19. And, a pin 13 is provided, which is guided and displaced along the long apertures 12 provided on two plates 9 and 10, in such an area as, when the joint beams G1 and G2 turn around the pin 11, the ends of the joint beams G1 and G2 change to abut to or not to abut to the pin 13.

In the state shown in Fig. 19, the joint beams G1 and G2 are supported by the pins 13 and not allowed to be bent in the direction of (a) shown in Fig. 1, and from this state, if the pins 13 are dislocated along the aperture 12 the ends of the joint beams G1, G2 are not engaged with the pins 13 to be allowed to be folded in the direction of (a) shown in Fig. 1. And, as the joint beams G1 and G2 are clamped by the plates 9 and 10, as shown in Fig. 19, the joint beams G1 and G2 are allowed to be folded at right angles to each other as shown in G1' and G2'.

Further, the inclination of these long apertures 12 is set in such a manner as the pins 13 fall freely by weight from the upper to the lowest portion (to the position of Fig. 19) when constructing the framework to make the process of assembling the framework easier. Of course, in the state where the joint beams G1 and G2 are bent in the direction (a) of Fig. 1, the long aperture 12 is up side down, so that the pins 13 are naturally displaced to the position where the pins 13 do not abut to the joint beams G1 and G2 and at the time of constructing the framework by raising the joint beams G1 and G2, the pins 13 are displaced naturally to the position of Fig. 19.

As to the position relation between the pins 11 and 13, the latter are displaced toward the center of the joint J3 by the dimension L , and the couple of forces generated due to the force F which acts on the center of the joint J3 is adapted to be received by the pins 11 and 13. In Figs. 16 and 18, on the side of one of two plates 9, 10 a reverse U-letter figured member 14, which is prepared in accordance with the outline of the ridge beams G5 and G6 made of pipe, is attached vertically, and at the end of which, i.e. a bottom portion thereof a cut out portion 15 is formed, and as shown in Fig. 19, with which the ends of the ridge beams G5 and G6 are coupled and connected with a pin 16.

And, as shown in Figs. 18 and 19, in the horizontal state

of the ridge beams G5 and G6 a pin 17 is provided so as to be in contact with the under side of the ridge beams G5 and G6 in such a manner as the pin 17 penetrates the cut out portion 15. The position of this pin 17, as shown in Fig. 18, is located toward inside the building by the dimension L_1 than a hole 32 for the pin 16 which connects the ridge beams G5 and G6. Therefore, when a downward direction force is applied to the joint J5 of Fig. 1, a thus-generated couple of forces is adapted to be received by the pins 16 and 17. Or, by contacting the ends of the ridge beams G5 and G6 to a bottom portion 141 of the reverse U-letter figured member 14, as shown in Fig. 18, the couple of forces may be received by the pin 17 and the bottom portion 141. Further, as shown in Fig. 18, even when the ridge beams G5 and G6 turn at right angles around the pin 16 to the position of G5' and G6', while the ridge beams G5 and G6 are in contact with the pin 17, it abuts to a stopper face 33 of the reverse U-letter figured member 14 and is limited to turn to adjust the folded form of the framework.

As shown in Figs. 16 and 18, the reverse U-letter figured member 14 is provided in such a manner as it penetrates two plates 9 and 10, and the rigidity of two plates 9 and 10 is increased by unifying the plates 9 and 10 with a bottom portion 75 and the ridge beams G5 and G6 can be constructed in such a manner as the ridge beams G5 and G6 penetrate the plates 9 and 10. Thus, in the case that the ridge beams G5 and G6 penetrate the plates 9 and 10, as well as in Fig. 14, on a ring 73 a pin 16 is planted, and the ring 73 is rotatably fixed on the cut out portion 15, and the ridge beams G5 and G6 are inserted there-into and a stopper 74, as shown in Fig. 14, is mounted on the end of the ridge beams G5 and G6. In addition, by the connection of the pins 16 and 17 too, the rigidity thereof is increased. When the broadening force may act on the cut out portion 15 due to the horizontal or the three dimensional force, the pin 17 receives it as a tensile

strength and restricts the broadening force.

Next, as to a joint J5 which connects the two-divided ridge beams G5 and G6, as shown in Fig. 23, the divided ends of the ridge beams G5 and G6 couple with a reverse U-letter figured member 18 and are connected by a pin 19 which penetrates this reverse U-letter figured member 18. And, as shown in Fig. 23, both sides of the reverse U-letter figured member 18 are provided with long apertures 20 to guide the pin 19 penetrating the reverse U-letter figured member 18. The configuration of the long aperture comprises a parallel portion 201 parallel to the bottom portion 181 of the reverse U-letter figured member 18, which guides the pin 19 in such a manner as the upper surface of the ridge beams G5 and G6 are in contact with the inner side thereof in the horizontal state of the ridge beams G5 and G6, and a bent portion 202 which guides the pin 19 in such a manner as the ends of the ridge beams G5 and G6 separate from the bottom portion 181 of the ridge beams G5 and G6, when the ends of the ridge beams G5 and G6 are bent upward at the portion of the J5 in the arrow direction (c) of Fig. 2. In the present embodiment, the parallel portion 201 of the long aperture 20 is located at the end portion of the bent portion 202 of the long aperture 20 where the pin 19 stops. The reverse U-letter figured member 18 is, as shown in Fig. 24, configured in accordance with the ridge beams G5 and G6 made of a pipe member.

In Fig. 23, in the state where the pin 19 is guided to the parallel portion 201 of the long aperture 20 and the upper sides of the ridge beams G5 and G6 are in contact with the bottom portion 181 of the reverse U-letter figured member 18, a pin 21 which is in contact with the under sides of the ridge beams G5 and G6 is provided by penetrating the reverse U-letter figured member 18. And, a couple forces generated when a downward force F is applied to the joint J5 is adapted to receive it by the pin 21 and the bottom portion 181 of the reverse U-letter figured member 18. Further, as shown in Fig.

22, the length L_0 of the reverse U-letter figured member 18 is prolonged, the length L_1 , shown in Fig. 24 is prolonged, and a reaction generated by the couple forces between the pin 21 and the ridge beams G5 and G6 is reduced, and which accords to the length of the framework which is folded finally as shown in Figs. 6 and 7. Further, since the pin 21 is provided so as to penetrate the reverse U-letter figured member 18, the pin 21 receives the force to broaden the reverse U-letter figured member 18 as the tensile strength, the force of which is generated when a horizontal or three dimensional force acts on the ridge beams G5 and G6, to increase the rigidity of the reverse U-letter figured member 18, and when bending the ridge beams G5 and G6 upward while displacing the pin 19 along the aperture 20, the pin 21 is in contact with the under sides of the ridge beams G5 and G6 and guide them, which makes the bending the ridge beams G5 and G6 and the construction thereof to be carried out more smoothly.

Next, a joint J4 which connects the ends of two divided crossbeams G3 and G4 shown in Fig. 1 and can be folded in the direction (b) as shown in Fig. 2 is explained. In Figs. 20 and 21, the crossbeams G3 and G4 made by pipe member are coupled with the reverse U-letter figured member 22 which is formed in accordance with the configuration of the crossbeams G3, G4, at the bottom portion 221 of which is cut out to form a cut out portion 23, and each end of the crossbeams G3 and G4 is connected by a pin 24. And, a pin 26 is provided which is displaced along long apertures 25 provided on the sides of a reverse U-letter figured member 22, in such an area as, when the crossbeams G3 and G4 turn around the pin 24 like as G4', the ends of the crossbeams G3 and G4 change to abut to or not to abut to the pin 26.

Fig. 21 shows the state where the pin 26 is in contact with the ends of the crossbeams G3 and G4, and 26' shows the case where the pin 26 is not in contact with the end. The long aperture 25 is inclined for the pin 26 to be slid

naturally from a position of 26' into the position of 26 to make the framework easy to be assembled. And, when the crossbeams G4 is turned to the position G4' around the pin 24 at right angles, a stopper surface 222 prohibits it to be turned further by abutting thereto.

The position relation between the pin 24 and the long aperture 25 is, in the state where the pin 26 is in contact with the ends of the crossbeams G3 and G4 (Fig. 21), the pins 26 are dislocated toward the center by the dimension L_{11} and are adapted to receive the couple of forces generated when a downward force F is applied to the joint J4 by the pin 24 and the pin 26. And, L_{11} is determined in such a manner as the rigidity of the pins 24 and 26 is maintained by reducing the reaction force generated by the couple of forces between the pins 24 and 26.

Figs. 25 ~ 27 show the state where the framework, which is structured by connecting each of poles and each of beams with each of the joints, is built as the framework for a building. And, in the case where panels are used for tents for use of any outdoor sports, small dog houses and for use of roof member or wall member, the structure is reinforced with themselves without using other members, but for the large tents for use of such as sports meeting or disaster, a necessary rigidity is demanded.

In Fig. 25, in order to obtain the above rigidity, a brace B1 is provided between the joint beams G1 and G2 and the poles C and a brace B4 is also between the joint beam G1 and G2. Further, in Figs. 26 and 27, a brace B2 is provided between the crossbeams G3 and G4 and the poles C and a brace B3 is provided between the crossbeams G3 and G4 and the joint beams G1 and G2. And, the pole is divided into two parts C1 and C2, and the pole C1 is inserted into the C2 in order to regulate the height of the building and to be adapted to be compacted when folding the framework.

Next, the details of the above brace will be explained.

The braces B1, B2 and B3 are, as shown in Figs. 39 and 40, comprise two plates 34 and 35 connected with a connecting member 36 by pins 37 foldably and slidably thereon a stopper 38 is provided to prevent the plates 34 and 35 from being bent. In the state of figures, the two plates 34 and 35 are able to be folded because the slide type of stopper 38 is displaced to another stopper 39 while separating from the connecting member 36, and when reversely the slide type of stopper 38 slides to the other stopper 39, the stopper 38 prevents two plates 34 and 35 from being bent. Reference numeral 40 is a hole for a bolt. In addition, in Figs. 25, 26 and 27, although the braces 1, 2 and 3 are indicated linear, those are for simplifying the drawing and the structure is identical with the above.

In Figs. 25 and 26, a mounting metal 41 for mounting the ends of the braces B1 and B2 on the pole C1 is, as shown in Figs. 48 and 49, divided into two members 413 and 414, i.e. a terminal 411 connecting the end of the brace B1 and a terminal 412 connecting the end of the brace B2, in which one mounting metal 41 can connect two ends of the braces B1 and B2. And, This mounting metal 41 is fixed on the pole C1.

Next, the mounting metal 42 between the end of the brace B1 and the joint beams G1 and G2, as shown with Figs. 43 and 44, is provided with a cut and raised portion 424 formed by cutting a part of the circumference of a ring pipe 421 and raising it, on which a lever 423 with a spring is supported by a pin 422, and a lock pin 425 is provided so as to appear inside the ring pipe 421 by operating the lever 423. Further, a connection part 426 which connects the end of the brace B1 on the outer circumference of the ring pipe 421 is provided. In Figs. 35 and 36, the joint beams G1 and G2 are attached with this mounting metal 42 and the mounting metal 42 is able to be displaced between a displace type of stopper 43 and a stopper 44. Further, the joint beams G1 and G2 are holed with lock holes 45, a lock pin 425 shown in Fig. 44 is coupled

with the lock hole and lock the displacement of the mounting metal 42.

Thus, one end of the brace B1 is connected with the mounting metal 41 fixed on the pole C1 and the other end thereof is connected with the mounting metal 42 which is able to be displaced against the joint beams G1 and G2 and to lock this displacement, so that at the time of folding the framework, while displacing the mounting metal 42, the bending is carried out by bending the brace B1, and to use the brace B1 as a brace after assembling the framework, it is needed to lock the mounting metal 42.

Next, a mounting metal 46 to connect the other end of the brace B2 with the crossbeams G3 and G4 is, as shown in Figs. 45 ~ 47, made from a C-ring 461, the end of which is bent to form a connection part 462. In Figs. 37 and 38, the crossbeams G3 and G4 attached with the mounting metal 46 are shown and in Fig. 26, a stopper 47 is provided as being able to be displaced toward the side of the joints J1 and J2 and not toward the side of the joint J4.

Thus, one end of the brace B2 is connected with the mounting metal 41 fixed on the pole C1, the other end thereof is connected with the mounting metal 46, so that, when carrying out the folding the framework, the brace B2 is bent while displacing the mounting metal 46 toward the side of the joint J1 and J2, and in the state where the framework is assembled, as the stopper 46 is not displaced due to the stopper 47 toward the side of the joint J4, the brace B2 can be functioned as a brace.

Next, a mounting metal 48 connecting one end of the brace B3 and the crossbeams G3 and G4 and a mounting metal 49 connecting the other end of the brace B3 and the joint beams G1 and G2 are as well as the mounting metal 46, as shown in Figs. 45 ~ 47, are made of C-rings 481 and 491 and form connecting portions 482 and 492. Figs. 37 and 38 show the crossbeams G3 and G4 attached with the mounting metal 48,

and as shown in Fig. 26, it is adapted able to be displaced toward the side of joints J1 and J2 and not toward the side of the joint J4 by the stopper 47 through the mounting metal 46.

Further, a mounting metal 49 connecting the other end of a brace B3 and the joint beams G1 and G2, as shown in Figs. 26, 27, 35 and 36, is provided so as not to be displaced against the joint beams G1 and G2 by the stopper 44. Thus, since one end of the brace B3 is connected with the mounting metal 49 and the other end is connected with the mounting metal 48, when folding the framework, while displacing the mounting metal 48 toward the joints J1 and J2, the brace B3 is bent, and in the state of assembling the framework, since the mounting metal 48 is not displaced toward the joint J4 due to the stopper 47, the brace B3 can be functioned as a brace.

Next, a brace B4 is, as shown in Figs. 41 and 42, formed with two plates 50 and 51 connected by a pin 53, and a stopper 52 is formed in a unit with the plate 51 in order to prevent it from being bent upward by the pin 53. And, as shown in Fig. 25, one end of the brace B4 is connected with the joint beam G1 with a pin 54, and the other end thereof is connected with the joint beam G2 with a mounting metal 55. This mounting metal 55, as shown in Fig. 50 and 51, is formed by providing a ring 551 with a boss 553 in a unit, with which a bolt 552 is engaged, by which the mounting metal 55 is connected to the brace B2. And, when folding the framework, while loosening the bolt 552 and displacing the mounting metal 55, the brace B4 is bent downward.

Next, poles C1 and C2 shown in Fig. 25 will be explained. The pole C2 comprises, as shown in Fig. 28, a height regulator 56 fixed at its top, and a mounting metal 57 on the lower end thereof. Further, the pole C1 comprises holes 58 for adjusting the height of the poles, as shown in Fig. 29, and the mounting metal 41 is fixed and at the tops

thereof there are provided with holes 59 for mounting the joints J1 and J2. And, the pole C1 is adapted to be inserted into the pole C2 to regulate the total height of the pole with the height regulator 56.

This height regulator 56 supports with a pin 563, as shown in Figs. 30 ~ 32, the lever 564 with a spring on the cut and raised portion 562 at the circumference of the ring pipe 561 and is provided with the lock pin 565 which is projected inside the ring pipe 561 by operating the lever 564. And, in the case of adjusting the height of the pole C, by pushing the lever 564 the lock pin is retreated and by releasing the lever 564 at the desired height of the pole by inserting the pole C1 into the pole C2, the lock pin 565 projects so as to make the lock pin 565 to be inserted into the lock hole 58 holed the pole C1.

As shown in Figs. 33 and 34, a base plate 60 may be mounted on the under end of the pole C2. That is, into a cylinder body 61 the under end of the pole C2 is inserted and by hooking an engagement member 63 fixed on the cylinder body 61 on a hook 62 fixed on the pole C2 and pulling down the lever 64, the base plate 60 is adapted to be mounted in a unitary manner to the under end of the pole C2. The reference numeral 65 is a hole for an anchor bolt.

In Fig. 25, a mounting metal 57 provided on the under end of the pole C2, as shown in Figs. 55 and 56, is fixed while inserting the pole C2 into the fixed tube 571 on which a connection tube 572 is provided in a unit. A connection beam 66 shown in Figs. 57 and 58 is, as shown in Fig. 59, larger in the diameter than the connection tube 572, into the connection beam 66, the connection tube 572 is adapted to be inserted. And, one end of the connection beam 66 is provided with two mounting holes 69, and the other end is provided with a mounting pin hole 70 and a slant cutout portion 71 is provided on the other end.

Thus, due to the cut out portion 71, in the state where

the mounting pin hole 70 and the a mounting hole 573 are accorded by inserting the connecting tube 573 to the connection beam 66 and connected with a pin, as shown in Fig. 55, the connection beam 66 can be turned at right angles. Further, by installing the fixed metal 67 to the mounting hole 69, as shown in Fig. 58, the connection beam 66 and the fixed metal 67 are unified without being separated and the fixed metal 67 is not lost.

And, in the case of connecting the connection beam 66 and the pole C2, while pulling out the fixed metal 67 from the mounting hole 69 by compressing the spring 68 substantially and inserting the connection tube 572 into the connection beam 66, and when releasing the fixed metal 67, the fixed metal 67 is by the resiliency of the spring 68 inserted into the mounting holes 69 and 573, and the connection beam 66 is connected to the pole C2. The fixed metal 67 is, as shown in Fig. 60, in a U-letter form bent from a bar, one end 672 thereof is shorter than the other end 673, and the long end 673 is, as shown in Fig. 58, inserted in the mounting hole 69, then the spring 68 is installed, a nut 671 is screwed into a long end portion 673, and the fixed metal 67 is mounted on the connection beam 66. The case where the connection beam 66 is provided is when a high rigidity is required for the framework or a floor is provided.

The functions of the constitutions as described above will be explained as follows. As shown in Fig. 1, the four tops of the four poles C are connected with the four joint beams G1 and G2 and the four crossbeams G3 and G4 through the joint J1 and J2, two joint beams G1 and G2 are connected through joint J3, the ridge beams G5 and G6 are connected through the joint J5, the crossbeams G3 and G4 are connected through the joint J4, the joint beams G1 and G2 and the ridge beams G5 and G6 are connected through the common joint J3, the joint beams G1 and G2 and the crossbeams G3 and G4 are made possible to be bent downward through the joints J3 and

J4, as shown in the arrow direction (a) of Fig. 1 and (b) of Fig. 2 and the ridge beams G5 and G6 are made possible to be bent upward as shown in the arrow direction (c) of Fig. 2, so that, the framework built as shown in Fig. 1 can be folded as follows without disassembling it.

That is, the part of the J3 is bent downward as shown in the arrow direction (a) of Fig. 1, so that, the span L_1 between the poles C can be shortened as shown in Fig. 2, and as shown in Fig. 2, the joint J4 can be bent downward in the arrow direction (b), and the joint J5 can be bent upward in the arrow direction (c), so that, while shortening the span L_2 between the poles C, the framework can be folded in such a manner as the joint beams G1 and G2, the crossbeams G3 and G4, the ridge beams G5 and G6 and the poles C are, as shown in Fig. 3, collected. And, as a final state, as shown in Fig. 4, the framework can be folded quadrilaterally positioning four poles C on the corner. Further, when the framework is to be constructed as shown in Fig. 1, it may be carried out merely by spreading four poles C.

Fig. 5 shows a laterally sectional view of Fig. 4 in which the state where each pole and beam are collected is shown, and the position relation between each pole and beam is as follows; at the four corners the poles are positioned, at the center the ridge beams G5 and G6 are located, and at every opposite sides and between two poles C are located the joint beams G1 and G2 and the crossbeams G3 and G4 respectively.

Next, since the joint J1 and J2 which connect the tops of the poles C, the ends of the joint beams G1 and G2 and the crossbeams G3 and G4, as shown in Fig. 9, are formed in the reverse U-letter figured members 1 and 2, the outer figure of which is accorded with the outer figure of the joint beams G1 and G2 and the crossbeams G3, G4, the joint beams G1 and G2 and the crossbeams G3 and G4 which are coupled with the reverse U-letter figured members 1 and 2 are in the state

where those are coupled tightly with the joints J1 and J2 and made in a unit to increase the rigidity at the connection part. And further in the plane of this building, since the reverse U-letter figured members 1 and 2 are connected at right angles and the joint beams G1 and G2 and the crossbeams G3 and G4 are connected to the reverse U-letter figured members 1 and 2 by coupling with those, when the joint beams G1 and G2 and the crossbeams G3 and G4 are assembled at right angles, the rigidity between the joint beams G1 and G2 and the crossbeams G3 and G4 is increased, and since the under portion of the reverse U-letter figured members 1 and 2 is opened, as shown in Fig. 6, the joint beams G1 and G2 and the crossbeams G3, G4 can be bent downward and the plane configuration of the folded framework is square, thus the framework can be folded in compact manner.

And, as shown in Fig.13, the end portions of the joint beams G1 and G2 and the crossbeams G3, G4 which are coupled with the reverse U-letter figured members 1 and 2 are provided with the pins 3 and 4 which penetrate the reverse U-letter figured member 1 and 2, and as shown in Figs. 10 and 11, on both sides of the reverse U-letter figured members 1 and 2, the long apertures 5 and 6 are provided to guide the pins 3 and 4. These apertures, in the state of the assembled building, are formed with the parallel portions 501 and 601 parallel to the bottom portions 101 and 201 of the reverse U-letter figured members 1 and 2 to guide the pins 3 and 4 in such a manner as the upper surfaces of the joint beams G1 and G2 and the crossbeams G3 and G4 are in contact with the inner side of these bottom portions 101 and 201, and the bent portions 502 and 602 to guide the pins 3 and 4, when the joint beams G1 and G2 and the crossbeams G3 and G4 are bent downward, in such a manner the end portions of the joint beams G1 and G2 and the crossbeams G3, G4 separate from the bottom portions 101, 201 of the reverse U-letter figured members 1 and 2.

Thereby, when the framework is assembled in the state of building, the upper surfaces of the joint beams G1 and G2 and the crossbeams G3 and G4 are in contact with the inner side of the bottom portions 101, 201 of the reverse U-letter figured members 1 and 2, since the pins 3 and 4 are located at the parallel portions 501 and 601 of the long apertures 5 and 6, the couple of forces generated due to the force generated when the joint beams G1 and G2 and the crossbeams G3 and G4 are bent downward may be received by the pins 3 and 4 and the bottom portions 101 and 201, and the framework can have the rigidity. By the displacement of the pins 3 and 4 along the bent portions 502 and 602 of the apertures 5 and 6, the joint beams G1 and G2 and the crossbeams G3 and G4 are allowed to be bent downward to be folded as shown in Figs. 7 and 8.

And, since the tops of the poles C are fixed to the reverse U-letter figured member 2 in such a manner as the poles C are arranged vertically downward against the crossbeams G3 and G4, the tops of the poles C and the reverse U-letter figured member 2 become in a unit to increase the rigidity, and without removing the reverse U-letter figured member 2 from the tops of the poles C the joint beams G1 and G2 and the crossbeams G3 and G4 are bent at the joint J1 and J2 in such a manner as those approach the poles C to be folded as shown in Figs. 7 and 8.

Next, as shown in Figs. 10 and 11, in the state where the pins 3 and 4 are guided along the parallel portions 501 and 601 of the long apertures 5 and 6 and the upper surfaces of the joint beams G1 and G2 and the crossbeams G3 and G4 are in contact with the bottom portions 101 and 201 of the reverse U-letter figured members 1 and 2, since the pins 7 and 8 are provided while penetrating the reverse U-letter figured members 1 and 2, the under surfaces of the joint beams G1 and G2 and the crossbeams G3 and G4 are in contact with the pins 7 and 8 the ends of the joint beams G1 and G2

and the crossbeams G3 and G4 are clamped therebetween, and the couple of forces generated due to the force which is generated when the joint beams G1 and G2 and the crossbeams G3 and G4 are going to be bent downward can be received by the bottom portions 101 and 201 and pins 7 and 8 to give the framework to be assembled a great rigidity, in addition, a horizontal distortion or three dimensional torsion may be received as a tensile strength to increase the rigidity of the reverse U-letter figured members 1 and 2.

Next, as shown in Fig. 19, the joint J3 which connects two ends of the joint beams G1 and G2 and the end of the ridge beams G5 and G6 is formed with two plates 9, 10 which clamp two ends of the joint beams G1 and G2, and these two plates 9 and 10 and two ends of the joint beams G1 and G2 are connected with pin 11, thereby at this portion of the joint J3 two joint beams G1 and G2 can be bent up-or downward and due to the two joint beams G1 and G2 and the pin 11, there is a rigidity against the horizontal distortion or the three dimensional torsion which acts likely to broaden two plates 9, 10.

And, also as shown in Fig. 19, the pin 13 is provided which is guided and displaced in the long apertures 12 provided on the two plates 9 and 10, in such an area as, when the ends of the joint beams G1 and G2 turn around the pin 11, the ends of the joint beams G1 and G2 change to abut or not to abut to the pin. And, in the state of the figure where the pin 13 is displaced along the long apertures 12 and the ends of the joint beams G1 and G2 abut to the pin 13, the bending of the joint beams G1 and G2 is restricted and the couple of forces acting on the joint J3 in the state of the assembled framework for building is received by the pins 11 and 13 to maintain the rigidity, and in the state where the pins 13 displace along the long apertures 12 and the ends of the joint beams G1 and G2 do not abut to the pin 13, the bending

of the joint beams G1 and G2 become possible on the joint J3.

Further, as shown in Fig. 18, the reverse U-letter figured member 14 is provided perpendicular to the sides of two plates 9 and 10 and at the tip end of this U-letter figured member 14 the bottom portion 141 is cut out, with this cut out portions 15 the ends of the ridge beams G5 and G6 are coupled and connected by the pin 32, so that the ridge beams G5 and G6, are bent without abutting to the bottom portion 141 of the reverse U-letter figured member 14, and the joint beams G1, G2 and the ridge beams G5 and G6, can be connected with the common joint J3. And, since the pin 17 to be in contact with the under sides of the ridge beams G5 and G6, is provided while penetrating the above cut out portion 15 and the position of the pin 17 is inside the pin 32 by L, which connect the ridge beams G5 and G6, the couple of forces generated due to the force which generates when the ridge beams G5 and G6, may be received by these pins 11 and 17, and in addition, at this portion of the joint J3, the ridge beams G5 and G6 allow to be bent upward toward G5' and G6'.

Next, as shown in Fig. 23, at the joint J5 of two ridge beams G5 and G6, the ends of two ridge beams G5 and G6 are coupled with the reverse U-letter figured member 18 and connected thereto with the pins 19 penetrating the reverse U-letter figured member 18, so that the rigidity is increased by the unification of the ridge beams G5 and G6 due to the adhesion to the reverse U-letter figured member 18, and on both sides of the reverse U-letter figured member 18, long apertures 20 to guide the pin 19 is formed, and the configuration of this long apertures 20 in the horizontal state of the ridge beams G5 and G6 comprises the parallel portion 201 parallel to the bottom portion 181 of the reverse U-letter figured member 18 to guide the pin 19 in such a manner as the upper sides of the ridge beams G5 and G6 are in contact with the inside of the bottom portion 181 of the reverse U-letter figured member 18, and the bent portion 202

to guide the pin 19 in such a manner as the ends of the ridge beams G5 and G6 separate from the bottom portion 181 of the reverse U-letter figured member 18 when the ridge beams G5 and G6 are bent at the joint portion of J5. At this joint portion J5, the bottom portion 181 and the pin 19 may receive the couple of forces generated due to the force generating when the ridge beams G5 and G6 are going to be bent to prevent the ridge beams G5 and G6 from being bent downward and allow to be bent upward.

And, in the state where the pin 19 is guided along the horizontal portion 201 of the long aperture 20 and the upper sides of the ridge beams G5, G6 are in contact with the bottom portion 181 of the reverse U-letter figured member 18, the pin 21 which is in contact with the under side of the ridge beams G5 and G6 is provided while penetrating the reverse U-letter figured member 18, thereby at the portion of the joint J5 where two ends of the ridge beams G5 and G6 are connected, the couple of forces generated due to the force generating when the ridge beams G5 and G6 are going to be bent downward may be received by the bottom portion 181 and the pin 21, thereby the rigidity of this portion is increased, and the horizontal distortion or the three dimensional torsion may be received as a tensile strength of the pin 21 and eventually the rigidity of the reverse U-letter figured member 18 is increased.

Next, as shown in Fig. 21, the ends of two crossbeams G3 and G4 are coupled with the reverse U-letter figured member 22, and the bottom portion 221 of the reverse U-letter figured member 22 is cut out partially and each end of the crossbeams G3 and G4 is connected with the pin 24, thereby the reverse U-letter figured member 22 and the crossbeams G3 and G4 are unified in a unit and the rigidity is increased and without abutting to the bottom portion 221 two crossbeams G3 and G4 become possible to be bent, at the joint portion of J4, to G4' (same to G3). And, a pin 26 is provided which is

guided and displaced in the long apertures 25 provided on the sides of the reverse U-letter figured member 22, in such a manner as, when the crossbeams G3 and G4 turn around the pin 24, the ends of the crossbeams G3 and G4 move in such a manner as those engage or disengage with a pin 26, which is provided and displaced in the long aperture 25, and in the state where the ends of the crossbeams G3 and G4 are abutted to the pin 26, the downward bending is restricted, and in the state where the ends of the crossbeams G3 and G4 are displaced from the pins 26, the downward bending of the crossbeams G3 and G4 is allowed. And, the couple of forces generated due to the downward direction force F applied to the joint J4 may be received by the pins 24 and 26 to guarantee the rigidity of the framework.

As shown in Fig. 12, a through hole 28 is provided in the joints J1 and J2, as shown in Fig. 18, the reverse U-letter figured member 14 is provided while penetrating two plates 9 and 10 to prepare the joint J3, by which the ends of the crossbeams G3 and G4 are connected while being penetrated at the joint J1 and J2, and at the joint J3 the ridge beams G5 and G6 are provided while being penetrated. Thereby, as shown in Fig. 52, one framework for a building, or as shown in Fig. 53, a plurality of buildings A, B and C being connected or, as shown in Fig. 54, or an eaves 72 can be formed respectively.

Next, as to brace, in Fig. 25, one end of the brace B1 is fixed to the pole C1 with the mounting metal 41, and the other end is fixed displaceably to the joint beams G1 and G2 with the mounting metal 42. And, as shown in Fig. 26, one end of the brace B2 is fixed to the pole C1 with mounting metal 41, and the other end is fixed displaceably to the crossbeams G3 and G4 with the mounting metal 46, and one end of the brace B3 is fixed to the joint beams G1 and G2 with the mounting metal 49 and the other end is fixed displaceably to the crossbeams G3 and G4 with mounting metal 48, and one end

of the brace B4 is fixed, as shown in Fig. 25, to the joint beam G1 with the pin 54 and the other end is fixed displaceably to the joint beam G2 with the mounting metal 55, and each brace B1, B2, B3, B4 is possible to be bent, so that, in the folded state of the framework, as shown in Figs. 7 and 8, without disassembling each of B1, B2, B3 and B4, the pole and each of the beams can be folded.

Although the above explanation was made about the case where pipe members are used for the joint beams G1 and G2, the crossbeams G3 and G4, the ridge beams G5 and G6 and the poles C, even in the case where square bars or section steel are used, the function is identical. Since the joints J1 ~ J5 are made as the reverse U-letter figured member and the shape of both sides thereof is identical, each shape of each joint can be punched in the form of a developed shape and bent in the form of U-letter by pressing, so that, a mass production can be done. Such processes can be done easily because those are a punched process and a bending process. Further, the joints J1 ~ J5 may be made of hard resin and since the shape of the reverse U-letter figured member is simple, a mold therefor can be prepared in a low cost.

As described in detail, based on the claim 1 according to the invention described in the detailed explanation, tops of four poles are connected with two parallel joint beams and two parallel crossbeams through joints, the center portions of two joint beams are connected with ridge beams through the joints, said two ridge beams are divided into two and connected through the joints, said joint beams are divided into two as well and connected with common joints which connect the joint beams and the ridge beams, said divided joint beams and crossbeams are made possible to be bent downward through each joint respectively, said ridge beams are made possible to be bent upward through each joint, in the state where the pole and each beam are connected through the joint, by bending downward the two divided joint beams

and crossbeams through each joint, the joint beams and the poles, and joint beams themselves through the joints are made to come close, next, the ridge beam is bent upward, and in the state where the crossbeams and the poles and each crossbeam themselves and the ridge beams themselves are folded in such a manner as these come close, thereby a framework can be easily structured and folded while connecting the poles and each beam through joint, and by bending the ridge beam upward the length of the folded framework can be shortened, in which each pole and each beam are formed not as a pantograph type but as a single structure, so that the rigidity as one building is maintained sufficiently and the framework can be light-weighted.

Further, since, the framework can be structured and folded in the state where the poles and each beam are connected through the joints, no parts are separated and there is no anxiety of losing any part and no necessity of handling the parts, and a storage management can become easy.

Next, based on the claim 2 according to the invention described in the detailed explanation, since the tops of the poles, the joint portions connect the ends of the joint beams and the crossbeams in a unitary manner with two reverse U-letter figured members which are combined at right angles in a plane of a building and each of which is formed in accordance with the outer shape of the joint beam and the crossbeam, so that the joint beams and the crossbeams are combined at right angles in the plane of the framework for a building, the rigidity of the framework at the portions of joint is increased, and also at the central portions of the joint beams and the crossbeams those are folded by bending downward in such a manner as those come close to the poles in the state of being connected with the joints, thereby the construction and the folding the framework for a building and the storage management therefor can be easy.

And, from the structure that, the ends of the joint beams and the crossbeams coupled with the reverse U-letter figured member are provided with a pin penetrating the reverse U-letter figured member, long apertures for guiding the pin are provided on both sides of the reverse U-letter figured member, the long apertures, in the state where the framework is assembled as a building, consist of parallel portions which are parallel to the insides of the bottom portions of the reverse U-letter figured member to guide the pin in such a manner as the upper sides of the joint beams and the crossbeams are in contact with the insides of the reverse U-letter figured member, and the bent portions to guide the pin in such a manner as the ends of the joint beams and the crossbeams separate from the bottom portions of the reverse U-letter figured member when the ends of the joint beams and the crossbeams are bent downward, in the state where the building is built, the upper sides of the joint beams and the crossbeams are in contact with the insides of the bottom portions of the reverse U-letter figured member and the pin is located at the parallel portion of the long apertures, so that the structure plays the rigidity against the force to bent the joint beams and the crossbeams downward, in addition, when the pin is displaced along the bent portions of the apertures while displacing the joint beams and the crossbeams, the joint beams and the crossbeams can be bent downward, thereby without removing the joint beams and the crossbeams from the reverse U-letter figured member, the construction and the assembling of the framework will be carried out and the management for storage is made easy.

And, from the structure that, as the tops of the poles are fixed on the reverse U-letter figured member so as to make the poles downward arranged vertically, the rigidity between the poles and the reverse U-letter figured member is increased, and in the state where the reverse U-letter figured member is attached to the poles, the joint beams and

the crossbeams can be bent at the joint portion so as to approach the poles, so that the construction and the folding of the framework become easy and the storage thereof becomes easy as well.

Next, based on the claim 3 according to the detailed explanation of the present invention, in the state where the upper surfaces of the joint beams and the crossbeams are in contact with the bottom portion of the reverse U-letter figured member by the pin being guided along the long apertures, pins which are in contact with the under surfaces of the joint beams and the crossbeams are provided while penetrating the reverse U-letter figured member, in the state where a building is built, the upper surfaces of the edges of the joint beams are in contact with the bottom portion of the reverse U-letter figured member and the under surfaces thereof are in contact with the pins penetrating the the reverse U-letter figured member, thereby the ends of the joint beams and the crossbeams are clamped and these show the great rigidity against the bending downward, so that the rigidity of the reverse U-letter figured member itself and the framework for building is increased in addition, without removing the reverse U-letter figured member, the framework is possible to be constructed and bent toward the poles, thereby the construction, the folding and the management for storage of the framework are become easy.

Next, based on the claim 4 according to the detailed explanation of the present invention, the joint portion, where the ends of two divided joint beams themselves and the end of the ridge beam are connected, is formed by clamping the ends of two divided joint beams with two plates, and the ends of the joint beams and two plates are penetrated with a pin, where these two divided joint beams are adapted to be bent upward or downward, so that the rigidity of the joint itself is increased and the joint beams can be bent without removing them from the joint, which makes the framework

possible to be constructed, folded and managed for storing easy.

And, another pin is inserted and displaced in the long apertures provided on both sides of said two plates, with which the ends of the joint beams engage or disengage when those beams are turned around the former pin, in such a manner as, in the state where the ends of the joint beams engage with the pin, the bending of the joint beams are restricted to ensure the rigidity in the joint portion of the framework, and in the state where the pin in the aperture is displaced and the ends of the joint beams do not engage with the pin, the bending of the joint beams at this joint become possible, so that without removing the joint beams from the joint, the framework can be folded and structured easily to make the storage management easy.

And, perpendicular to the sides of two plates the reverse U-letter figured member is provided, at the end portion of the reverse U-letter figured member one portion of the bottom portion is removed, where the end of the ridge beam is coupled and connected with a pin. Thus, since the joint beams and the crossbeams are connected with a common joint, the joint beams are bent downward and the ridge beams are bent upward without removing the joint, so that the constructing, the folding and the management for storage of the framework are made easy. Further, a pin penetrating through the cut out portion of the bottom portion is provided, which is in contact with the under side of the ridge beam in a horizontal position, and the position of which is located at a more inner side than the pin which connects the ridge beam, so that the pin may receive the force of the ridge beam to be bent downward and at this joint portion the upward bending of the ridge beam is allowed, thereby the rigidity of the joint itself is increased and without removing the joint, the construction, the folding and the management for storage is made easy.

Next, based on the claim 5 according to the detailed explanation of the invention, the joint portion of two divided ridge beam is coupled with the reverse U-letter figured member in a unit while adhering the ends tight, and is connected with a pin penetrating the reverse U-letter figured member, by which the rigidity at the coupling portion is increased. And, at this point two divided ridge beams become possible to be bent and on both sides of the reverse U-letter figured member long apertures to guide the pin are provided, which consist of parallel portions parallel to the bottom portion of the reverse U-letter figured member, along which the pin is guided in such a manner as the upper surface of the ridge beam, in its horizontal position, is in contact with the inside of the bottom portion of the reverse U-letter figured member, and bent portions to guide the pin in such a manner as, when the ridge beam is bent at the joint portion, the end of the ridge beam separates the bottom portion of the reverse U-letter figured member, and at this joint portion, the ridge beam is prevented from being bent downward and allowed to be bent upward, so that, without removing the joint, the framework is made possible to be constructed and folded, and the construction, the folding and the management for storage of the framework are made easy.

Next, based on the claim 6 according to the detailed explanation of the invention, in the state where, the pin is guided along the parallel portion of the long aperture and the upper surface of the ridge beam is in contact with the bottom portion of the reverse U-letter figured member, a pin which contacts the under surface of the ridge beam is provided by penetrating the reverse U-letter figured member, the rigidity against the force to bend downward is increased and the rigidity of the reverse U-letter figured member itself is increased, so that the rigidity as the framework for a building is increased.

Next, based on the claim 7 according to the detailed

explanation of the invention, the ends of two divided crossbeams are coupled with the reverse U-letter figured member, at these coupled portions the bottom portion of the reverse U-letter figured member is cut out and each end of the crossbeam is connected with a pin to enable two divided crossbeams to be bent, a pin is provided, which is displaced along the long apertures provided on both sides of the reverse U-letter figured member, in such an area as, when the crossbeams turn around the pin, the ends of the crossbeams change to engage with or not engage with the pin, and in the state where the ends of the crossbeam engage with the pin, the downward bending of the crossbeam is prevented, in the state where the ends of the crossbeam do not engage with the pin, the crossbeam is allowed to be bent downward, so that without removing the joint, the construction, the folding and the management for storage can be made easy.



WHAT IS CLAIMED IS:

1. A framework for small-scale building comprising:
four poles,
two joint beams,
two crossbeams,
a ridge beam, wherein tops of the four poles being connected with two parallel joint beams and two parallel crossbeams, each of the joint beams being divided at the central portion and connected through joint which connect the ridge beam, each of the crossbeams being divided at the central portion and connected through the joints, and the joint beams and the crossbeams being possible to be bent downward and the ridge beam being possible to be bent upward through the joint.
2. A framework according to the claim 1, wherein at the portion of the joint where the tops of the poles and the ends of the joint beams and the crossbeams are connected, two reverse U-letter figured members prepared in accordance with the outer figure of the joint beam and the crossbeam are combined, in the plane of a building, at right angles with each other, and connected, a pin is penetrated through the ends of the joint beams and the crossbeams which are coupled with the reverse U-letter figured members, on both sides of the reverse U-letter figured member long apertures to guide the pin are formed, said apertures consist of parallel portions parallel to the bottom portion of the reverse U-letter figured member which guide the pin in such a manner as the upper surfaces of the joint beams and the crossbeams are in contact with the inside of the bottom portion of the reverse U-letter figured member, and bent portions to guide the pin in such a manner as the ends of the joint beams and the crossbeams separate from the bottom portion of the reverse U-letter figured member, when the joint beams and the crossbeams are bent downward, and the tops of the poles are connected to the reverse U-letter figured member in such a



manner as those are vertically downward to the crossbeams.

3. A framework according to the claim 2, wherein in the state where the upper surfaces of the joint beams and the crossbeams are in contact with the bottom portion of the reverse U-letter figured member, a pin which is in contact with the under surfaces of the joint beams and the crossbeams is provided while penetrating the reverse U-letter figured member.

4. A framework according to the claim 1, 2 or 3, wherein, at the joint portion, where the ends of the two divided joint beams and a ridge beam are connected, the ends of two-divided joint beams are clamped with two plates, a pin is penetrated through the ends of the joint beams and the plates, another pin is provided, with which, when the ends of the joint beams are turned around the penetrating pin, such ends of the joint beams engage or do not engage due to the displacement of the pin along the long apertures provided on the sides of the plates, the sides of two plates are provided perpendicularly with the reverse U-letter figured member, and at the distal end of the bottom portion of the reverse U-letter figured member one part of the bottom portion is cut out, at said cutout portion the end of the ridge beam is coupled and connected with a pin, and in the state where said ridge beam is horizontal, a pin which in contact with the under surface of the ridge beam is provided while penetrating said cut out portion, the position of said pin is located at a more inner position than the pin to connect the ridge beam.

5. A framework according to the claim 1, 2, 3, or 4, wherein at the two-divided portion of the joint beams, the divided ends of the ridge beam are coupled with the reverse U-letter figured member, said ends are connected with a pin penetrating the reverse U-letter figured member, on both sides of the reverse U-letter figured member long apertures to guide the pin are provided, said apertures consist of the parallel portions parallel to the bottom portion of the



reverse U-letter figured member, which guide the pin in such a manner as the upper surfaces of the ridge beam are in contact with the inside of the bottom portion of the reverse U-letter figured member in the state where the ridge beam is horizontal, and the bent portions which guide the pin in such a manner as the end of the ridge beam separates the bottom portion when the ridge beam is bent at the joint portion.

6. A framework according to the claim 5, wherein in the state where the pin is guided along the parallel portions of the long apertures and the upper surface of the ridge beam is in contact with the bottom portion of the reverse U-letter figured member, a pin which is in contact with the under surface of the ridge beam is provided while penetrating the reverse U-letter figured member.

7. A framework according to the claim 1, 2, 3, 4, 5 or 6, wherein the divided ends of the crossbeams are coupled with the reverse U-letter figured member, at the coupling portion, the bottom portion of the reverse U-letter figured member is cut out and each end of the crossbeams is connected with a pin, and another pin is provided, which is displaced along the apertures provided on the reverse U-letter figured member, in such an area as, when the crossbeams turn around the former pin, the ends of the crossbeams change to engage or not to engage with the pin.