

REINFORCED FRAME STRUCTURE

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to a frame structure and relates
5 particularly to a reinforced frame structure.

2. Description of the Related Art

Generally, steel frame structure is adapted for support purpose
in the processes of constructing a building, especially C-shaped
channel steel structure which is one of the main construction material
10 used in many construction methods. The C-shaped channel steel
structure is employed extensively as purlins, columns, beams in steel
building construction or in light industry. The C-shaped channel steel
structure can be fabricated into lightweight roof truss, bracket,
or other construction elements, therefore it is a commonly used
15 construction material. The C-shaped channel steel structure is also
common in the fields of automobile manufacturing, solar power
generation, mining industry, and constructions of transmission tower,
bridge, highway, railway, and container in machine room.

However, the C-shaped channel steel structure has limits regarding
20 its length. When the C-shaped channel steel structure is manufactured
to have the length larger than the regular length, the C-shaped channel
steel structure becomes weak. In order to maintain the strength of
the C-shaped channel steel structure while reaching larger length
thereof, a support unit must be adapted to connect two C-shaped channel

steel structures. In other words, the C-shaped channel steel structures are manufactured to have the regular length and connected together by the supporting unit to thereby provide larger length and enough strength. However, additional support units will increase the costs and complicate the construction processes. Further, the C-shaped channel steel structure cannot be directly fixed to an external construction material like a corrugated board, and that is inconvenient to the construction processes. These problems need to be improved.

10 SUMMARY OF THE INVENTION

The object of this invention is to provide a reinforced frame structure capable of reinforcing the strength, allowing the length to be adjustable according to demand, facilitating quick installation, and attaining the convenience of use.

15 The reinforced frame structure includes a plurality of main poles, a surrounding member surrounding the main poles, and at least one plate member connected to the surrounding member. The main poles are out of alignment to be spaced apart from each other. An accommodation space having a polygonal outline is defined when the main poles are encircled by the surrounding member. The plate member is joined to the surrounding member by welding and fixed to an external construction material. The surrounding member has a plurality of surrounding units spaced apart from each other and a plurality of connecting units integrally connected to the surrounding units. The

surrounding units and the connecting units are welded to the main poles. Each surrounding unit is integrally bent to provide at least two surrounding sections encircling the main poles. Each surrounding section extends in a straight line between any two adjacent main poles

5 when each surrounding unit is bent. Each connecting unit extends inclinedly between any two adjacent surrounding units. Thus, the surrounding member is bent in succession to surround the main poles continuously and also welded to the main poles. The main poles are positioned stably by the surrounding member whereby the strength of

10 the reinforced frame structure is improved and the length of the reinforced frame structure is adjustable based on demand. The plate member is directly installed to the external construction material to thereby facilitate quick installation and attain the convenience of use.

15 Preferably, the plate member is welded to the surrounding units of the surrounding member.

Preferably, the plate member is welded to the connecting units of the surrounding member.

Preferably, the external construction material is a corrugated

20 board. The plate member is fixed to the corrugated board so that the corrugated board is held in position above the surrounding member via the plate member.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. **1** is a perspective view showing a first preferred embodiment of this invention;

Fig. **2** is a cross-sectional view showing an installation of the first preferred embodiment of this invention; and

5 Fig. **3** is a perspective view showing a variation of the first preferred embodiment characterized in that four main poles are encircled by the surrounding member to define the accommodation space having a quadrilateral outline.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

10 Referring to Fig. **1**, a first preferred embodiment of a reinforced frame structure **3** is disclosed. In this preferred embodiment, the reinforced frame structure **3** includes a plurality of main poles **31**, a surrounding member **32** spirally disposed around the main poles **31**, and at least one plate member **33** connected to the surrounding member

15 **32**. The main poles **31** are out of alignment to be spaced apart from each other. An accommodation space **34** having a polygonal outline is formed when the main poles **31** are encircled by the surrounding member **32**. The plate member **33** is joined to the surrounding member **32** by welding and fixed to an external construction material **4**. Herein,

20 the main poles **31** can be steel poles. The number of the main poles **31** and the surrounding member **32** can be varied according to demand. The main poles **31** are encircled by the surrounding member **32** to define at least three corners **323** whereby the polygonal outline of the accommodation space **34** is formed to have at least three sides. For

example, in the Fig. 1, three main poles **31** are encircled by one surrounding member **32** to define the accommodation space **34** having a triangle outline and define three corners **323** whereby the triangle outline has three sides. In Fig. 3, four main poles **31** are encircled
5 by one surrounding member **32** to define the accommodation space **34** having a quadrilateral outline and define four corners **323** whereby the quadrilateral outline has four sides. Thus, the main poles **31**, the surrounding member **32**, and the plate member **33** are fixed together integrally. Both the surrounding member **32** and the main poles **31** can
10 provide proper support whereby the reinforced frame structure **3** is provided with reinforced strength.

The surrounding member **32** has a plurality of surrounding units **321** spaced apart from each other and a plurality of connecting units **322** integrally connected to the surrounding units **321**. The surrounding
15 units **321** and the connecting units **322** are joined to the main poles **31** by welding. Each surrounding unit **321** is integrally bent to encircle the main poles **31**. Each surrounding unit **321** is provided with at least two surrounding sections **3211**. Each surrounding section **3211** extends between any two adjacent main poles **31** when each surrounding unit
20 **321** is bent. Each surrounding section **3211** extends in a straight line as shown in Fig.1. In other words, each surrounding section **3211** is not curved. Each connecting unit **322** extends inclinedly between any two adjacent surrounding units **321**. In other words, each connecting unit **322** is inclined to the main poles **31** whereby each connecting

unit **322** extends inclinedly from one surrounding section **3211** of one surrounding unit **321** to another one surrounding section **3211** of another adjacent surrounding unit **321**. The surrounding member **32** is then bent successively to surround the main poles **31** continuously and also welded to the main poles **31**. In this preferred embodiment, the surrounding units **321** are parallel to each other and arranged to have an equal distance formed between any two adjacent surrounding units **321**. The plate member **33** is joined to the surrounding units **321** of the surrounding member **32** by welding.

Referring to Fig. **2**, the plate member **33** is fixed to the external construction material **4**. The external construction material **4** is a corrugated board in this preferred embodiment. The installation of the reinforced frame structure **3** is executed by positioning the plate member **33** of the reinforced frame structure **3** in close contact with the external construction material **4**. A screwing unit **5** is then adapted to drill into the external construction material **4** and the plate member **33** whereby the reinforced frame structure **3** is fixed to the external construction material **4** firmly. The external construction material **4** is held in position above the surrounding member **32** via the plate member **33**. When the screwing unit **5** is screwed into the plate member **33**, the screwing unit **5** will not be in contact with the main poles **31** or the surrounding member **32** to thereby facilitate the screwing operation of the screwing unit **5**. Meanwhile, a beam **6** is positioned below the surrounding member **32** according to demand to thereby support

the reinforced frame structure **3** duly. Hence, the plate member **33** is directly fixed to the external construction material **4** to thereby attain quick installation and attain the convenience of use. Further, the main poles **31** are encircled by the surrounding member **32** whereby
5 the reinforced frame structure **3** can be manufactured to have the length larger than the regular length while maintaining enough strength to thereby reduce the costs and accelerate the construction processes. The produced length of the reinforced frame structure **3** can be varied according to demand, and that is convenient to the construction
10 processes.

To sum up, the reinforced frame structure of this invention takes advantages that the surrounding member is bent in succession to encircle the main poles continuously, with the plate member connected to the surrounding member and capable of being directly fixed to an
15 external construction material to provide proper support, reinforce the strength, allow the length of the reinforced frame structure to be adjustable according to demand, facilitate quick installation, and attain the convenience of use.

While the embodiments of this invention are shown and described,
20 it is understood that further variations and modifications may be made without departing from the scope of this invention.

WHAT IS CLAIMED IS:

1. A reinforced frame structure (3) comprising a plurality of main poles (31), a surrounding member (32) encircling said main poles (31), and at least one plate member (33) connected to said
5 surrounding member (32),

wherein said main poles (31) are out of alignment to be spaced apart from each other, with said main poles (31) encircled by said surrounding member (32) to define an accommodation space (34) having a polygonal outline, said plate member (33) being joined
10 to said surrounding member (32) by welding and fixed to an external construction material (4), said surrounding member (32) including a plurality of surrounding units (321) spaced apart from each other and a plurality of connecting units (322) integrally connected to said surrounding units (321), said surrounding units (321) and said
15 connecting units (322) being joined to said main poles (31) by welding, each of said surrounding units (321) being integrally bent to surround said main poles (31), each of said surrounding units (321) being provided with at least two surrounding sections (3211) each extending between any two adjacent main poles (31) while
20 bending each of said surrounding units (321), with each of said surrounding sections (3211) extending in a straight line, each of said connecting units (322) extending inclinedly between any two adjacent surrounding units (321), said surrounding member (32)

thereby being bent in succession to encircle said main poles (31) continuously and also welded to said main poles (31).

2. The reinforced frame structure (3) according to claim 1, wherein said plate member (33) is welded to said surrounding units (321)
5 of said surrounding member (32).

3. The reinforced frame structure (3) according to claim 1, wherein said plate member (33) is welded to said connecting units (322) of said surrounding member (32).

4. The reinforced frame structure (3) according to any of claims 1
10 to 3, wherein said external construction material (4) is a corrugated board, said plate member (33) being fixed to said corrugated board so that said corrugated board is held in position above said surrounding member (32) via said plate member (33).