

FLOOR TRUSS STRUCTURE

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to a floor structure and relates
5 particularly to a floor truss structure.

2. Description of the Related Art

When conventional ferrocement system is adapted in the processes
of constructing a floor structure, formworks are adapted to encircle
reinforcing steels after the reinforcing steels are tied and
10 positioned in place. Concrete is then poured into the formworks so
that the reinforcing steels are embedded in the concrete fully. After
the concrete is solidified, the formworks are removed in order to
proceed with next process. However, the construction processes of
the conventional ferrocement system are time-consuming.

15 The conventional ferrocement system is replaced by a steel frame
system accordingly. The steel frame system is commonly used and
improves the processes of constructing the floor structure. Referring
to Fig. 1, a conventional floor structure 1 constructed by the steel
frame system is disclosed. The floor structure 1 includes a plurality
20 of beams 11 spaced apart from each other, a steel plate 12 disposed
above the beams 11, and concrete 2 adapted to cover the steel plate
12 fully. During the construction processes, the steel plate 12 is
fixed above the beams 11, and the concrete 2 is placed on the top
of the steel plate 12 so that the top of the steel plate 12 is covered

by the concrete **2** to thereby form the floor structure **1**. However, the bottom of the steel plate **12** facing the beams **11** is not covered by the concrete **2**. The bottom of the steel plate **12** should be processed and embellished additionally to level the bottom of the steel plate **12**. Alternatively, light gauge steels are adapted to cover and hide the beams **11** and the bottom of the steel plate **12**. However, the additional processes for beautifying the bottom of the steel plate **12** increase costs. These problems need to be improved.

SUMMARY OF THE INVENTION

The object of this invention is to provide a floor truss structure capable of manufacturing support sets in advance, attaining adequate length and strength to facilitate construction processes, and accelerating a leveling operation after pouring concrete.

The floor truss structure includes a plurality of support sets spaced apart from each other and a mesh plate where the support sets are disposed. The support sets and the mesh plate are welded together. The mesh plate has a top surface where the support sets are welded, a bottom surface opposite to the top surface, and a plurality of pores passing through the top surface and the bottom surface. Each support set has a plurality of main bars spaced apart from each other and a surrounding unit encircling the main bars. The surrounding unit has a plurality of surrounding portions spaced apart from each other and a plurality of connecting portions integrally connected to the surrounding portions. The surrounding portions and the connecting

portions are welded to the main bars. Each surrounding portion is integrally bent to provide at least two surrounding segments surrounding the main bars. Each surrounding segment extends in a straight line between any two adjacent main bars while bending each
5 surrounding portion. Each connecting portion extends inclinedly between any two adjacent surrounding portions. Thus, the surrounding unit is bent in succession to encircle the main bars continuously and also welded to the main bars. The support sets are produced in advance to have sufficient length and strength thereby facilitating
10 construction processes. The mesh plate allows concrete to be quickly leveled after pouring the concrete for accelerating a leveling operation.

Preferably, the main bars are out of alignment so that the main bars are spaced from each other, thereby defining an accommodation
15 space having a polygonal outline when the surrounding unit encircles the main bars.

Preferably, the top surface of the mesh plate is welded to the surrounding portions of the surrounding unit.

Preferably, the top surface of the mesh plate is welded to the
20 connecting portions of the surrounding unit.

Preferably, a plurality of auxiliary bars pass through the support sets and are connected to the support sets to hold the support sets in position.

Preferably, the support sets are fully covered by concrete while

pouring the concrete on the top surface of the mesh plate.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. **1** is cross-sectional view showing a conventional floor structure;

Fig. **2** is an exploded view showing a first preferred embodiment of
5 this invention;

Fig. **3** is a schematic view showing an installation of the first
preferred embodiment of this invention;

Fig. **3A** is an enlarged view of the encircled portion 3A indicated
in Fig. 3;

10 Fig. **4** is a cross-sectional view showing that the support sets are
fixed to the mesh plate;

Fig. **5** is a cross-sectional view showing that the concrete is adapted
to cover the support sets;

Fig. **6** is an exploded view showing a variation of the first preferred
15 embodiment characterized in that each support set has four main
bars encircled by the surrounding unit to define the
accommodation space having a quadrilateral outline; and

Fig. **7** is an exploded view showing a second preferred embodiment of
this invention characterized in that a plurality of auxiliary
20 bars thread through the support sets to hold the support sets
in position.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to Fig. **1**, a first preferred embodiment of a floor truss
structure **3** is disclosed. In this preferred embodiment, the floor

truss structure **3** includes a plurality of support sets **31** spaced apart from each other and a mesh plate **32** on which the support sets **31** are installed. The support sets **31** and the mesh plate **32** are joined together by welding. The mesh plate **32** has a top surface **321**, a bottom surface **322** opposite to the top surface **321**, and a plurality of pores **323** penetrating through the top surface **321** and the bottom surface **322**. The support sets **31** are fixed onto the top surface **321** of the mesh plate **32** by welding. Each support set **31** has a plurality of main bars **311** spaced apart from each other and a surrounding unit **312** spirally disposed around the main bars **311**. Herein, the main bars **311** can be steel bars. The main bars **311** are arranged to be out of alignment so that the main bars **311** are spaced from each other to thereby define an accommodation space **313** having a polygonal outline when the surrounding unit **312** encircles the main bars **311**. The number of the main bars **311** and the surrounding unit **312** can be varied according to demand. The main bars **311** are encircled by the surrounding unit **312** to define at least three corners **3123** whereby the polygonal outline of the accommodation space **313** is formed to have at least three sides. For example, in the Fig. **2**, three main bars **311** are encircled by one surrounding unit **312** to define the accommodation space **313** having a triangle outline and define three corners **3123** whereby the triangle outline has three sides. In Fig. **6**, four main bars **311** are encircled by one surrounding unit **312** to define the

accommodation space **313** having a quadrilateral outline and define four corners **3123** whereby the quadrilateral outline has four sides.

The surrounding unit **312** has a plurality of surrounding portions **3121** spaced apart from each other and a plurality of connecting portions **3122** integrally connected to the surrounding portions **3121**.
5 The surrounding portions **3121** and the connecting portions **3122** are joined to the main bars **311** by welding. Each surrounding portion **3121** is integrally bent to surround the main bars **311**. Each surrounding portion **3121** is provided with at least two surrounding segments **31211**.
10 Each surrounding segment **31211** extends between any two adjacent main bars **311** while bending each surrounding portion **3121**. Each surrounding segment **31211** extends in a straight line as shown in Fig. 2. In other words, each surrounding segment **32111** is not curved. Each connecting portion **3122** extends inclinedly between any two adjacent surrounding
15 portions **3121**. In other words, each connecting portion **3122** is inclined to the main bars **311** whereby each connecting portion **3122** extends inclinedly from one surrounding segment **32111** of one surrounding portion **3121** to another one surrounding segment **32111** of another adjacent surrounding portion **3121**. The surrounding unit
20 **312** is bent in succession accordingly to encircle the main bars **311** continuously and also welded to the main bars **311**.

Referring to Fig. 2, each support set **31** is manufactured beforehand through a forming apparatus (not shown) in a factory. After the main bars **311** are arranged to be out of alignment, the forming apparatus

is adapted to bend the surrounding unit **312** successively so that the surrounding unit **312** is spirally disposed around an outer periphery of the main bars **311** to define the accommodation space **313** having a polygonal outline. The surrounding unit **312** and the main bars **311** are then welded together to provide a tight integration whereby each support set **31** is provided. Both the surrounding unit **312** and the main bars **311** can provide proper support whereby each support set **31** is provided with enough strength. Further, the length of each support set **31** is adjustable according to demand.

Referring to Figs. **3**, **4** and **5**, the support sets **31** are transported to a construction site (not shown). After the support sets **31** are situated on the top surface **321** of the mesh plate **32**, the support sets **31** and the mesh plate **32** are welded together whereby the floor truss structure **3** is completed. Referring to Figs. **3** and **5**, after the floor truss structure **3** is situated duly, concrete **4** is poured on the top surface **321** of the mesh plate **32**. The support sets **31** is fully embedded in the concrete **4** accordingly to thereby form a flat floor surface. The concrete **4** then passes through the pores **323** to the bottom surface **322** of the mesh plate **32**. Thus, the bottom surface **322** of the mesh plate **32** is leveled quickly to form a flat ceiling surface by leveling the concrete **4** directly, thereby accelerating a leveling operation. Hence, it is not necessary to process and embellish the bottom surface **322** of the mesh plate **32** additionally, thereby reducing the costs and facilitating the construction

processes. The concrete **4** can be painted or whitewashed directly after being solidified. Meanwhile, the pores **323** of the mesh plate **32** also help the drying and drainage operations of the concrete **4**. Hence, the main bars **311** are joined by the surrounding unit **312** to thereby
5 increase the strength and provide enough support whereby each support set **31** can be produced to have the length larger than the regular length while maintaining adequate strength. It is not necessary to connect different support sets **31** by additional elements in order to attain required length while maintaining the strength thereby
10 reducing the costs. Further, the support sets **31** can be manufactured in advance and combined with the mesh plate **32** thereafter in the construction site, and that accelerates the construction processes.

Referring to Fig. **6** shows a second preferred embodiment of the integrated steel frame **3** of this invention. The correlated elements
15 and the concatenation of elements, the operation and objectives of the second preferred embodiment are the same as those of the first preferred embodiment. This embodiment is characterized in that a plurality of auxiliary bars **33** pass through the support sets **31**. The auxiliary bars **33** are connected to the support sets **31** by welding.
20 The auxiliary bars **33** help hold the support sets **31** in position stably when the support sets **31** are welded respectively to the mesh plate **32**. Further, the auxiliary bars **33** provide duly support to thereby reinforce the strength of the floor truss structure **3** effectively.

To sum up, the floor truss structure of this invention takes

advantages that the support sets are manufactured in advance and have adequate length and strength to facilitate the construction processes. The mesh plate allows the concrete to be quickly leveled after pouring the concrete for accelerating a leveling operation.

5 While the embodiments of this invention are shown and described, 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 floor truss structure (3) comprising a plurality of support sets (31) spaced apart from each other and a mesh plate (32) on which said support sets (31) are installed, with said support sets (31) joined to said mesh plate (32) by welding;

wherein said mesh plate (32) includes a top surface (321), a bottom surface (322) opposite to said top surface (321), and a plurality of pores (323) penetrating through said top surface (321) and said bottom surface (322), said support sets (31) being fixed onto said top surface (321) of said mesh plate (32) by welding, each of said support sets (31) having a plurality of main bars (311) spaced apart from each other and a surrounding unit (312) adapted to surround said main bars (311), said surrounding unit (312) including a plurality of surrounding portions (3121) spaced apart from each other and a plurality of connecting portions (3122) integrally connected to said surrounding portions (3121), said surrounding portions (3121) and said connecting portions (3122) being joined to said main bars (311) by welding, each of said surrounding portions (3121) being integrally bent to surround said main bars (311), each of said surrounding portions (3121) being provided with at least two surrounding segments (31211) each extending between any two adjacent main bars (311) while bending each of said surrounding portions (3121), with each of said surrounding segments (31211) extending in a straight line, each

of said connecting portions (3122) extending inclinedly between any two adjacent surrounding portions (3121), said surrounding unit (312) thereby being bent in succession to encircle said main bars (311) continuously and also welded to said main bars (311).

- 5 2. The floor truss structure (3) according to claim 1, wherein said main bars (311) are out of alignment so that said main bars (311) are spaced from each other, thereby defining an accommodation space (313) having a polygonal outline when said surrounding unit (312) encircles said main bars (311).
- 10 3. The floor truss structure (3) according to claim 1 or 2, wherein said top surface (321) of said mesh plate (32) is welded to said surrounding portions (3121) of said surrounding unit (312).
4. The floor truss structure (3) according to claim 1 or 2, wherein said top surface (321) of said mesh plate (32) is welded to said
- 15 connecting portions (3122) of said surrounding unit (312).
5. The floor truss structure (3) according to any of claims 1 to 4, further comprising a plurality of auxiliary bars (33) passing through said support sets (31) and connected to said support sets (31) to hold said support sets (31) in position.
- 20 6. The floor truss structure (3) according to any of claims 1 to 5, wherein said support sets (31) are fully covered by concrete (4) while pouring said concrete (4) on said top surface (321) of said mesh plate (32).