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Leone

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[54] **METAL TRESTLE FOR MANUFACTURING REINFORCED-CONCRETE BEAMS FOR FLOORS**

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[52] **U.S. Cl.** **52/414,** 52/694, 52/677, 52/654

[51] **Int. Cl.** **EO4c 5/00,** EO4b 1/14

[58] **Field of Search** 52/646, 648, 650–655, 52/696, 693, 319–324, 633, 677, 694, 414

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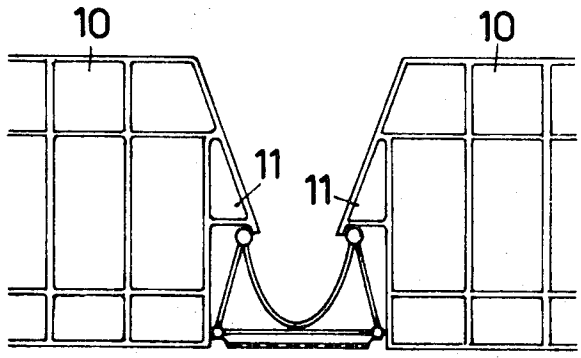
Assistant Examiner—James L. Ridgill, Jr.

[57] **ABSTRACT**

A preformed metal trestle comprises two pairs of elongated parallel supporting elements, such as metal rods, two junction members such as iron bars bent in a substantially sinusoidal shape, for connecting respectively each supporting element of the first pair with each supporting element of the second pair, and a third junction member for connecting the two supporting elements of one of said pairs. The supporting elements and the junction members are mutually connected in such a way to form a prism-shape trestle. Reinforcing elements are also provided, such as arcuated elements fixed at the ends to the pair of supporting elements which are not connected by junction members, and at the centrally bent portion to the junction member connecting the other pair of supporting elements. Another embodiment of said reinforcing elements comprise two additional supporting elements respectively fixed to the pair of supporting elements which are not connected by junction members.

3 Claims, 6 Drawing Figures



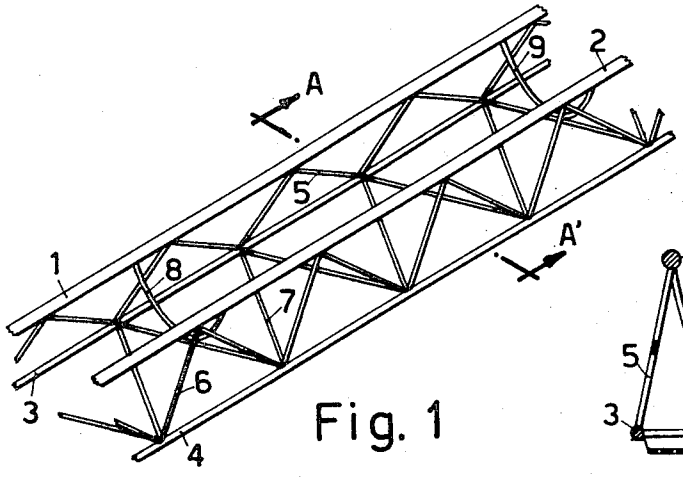


Fig. 1

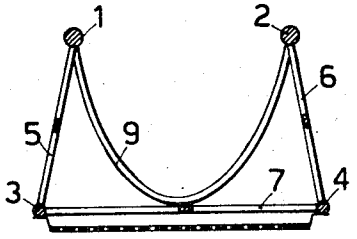


Fig. 2

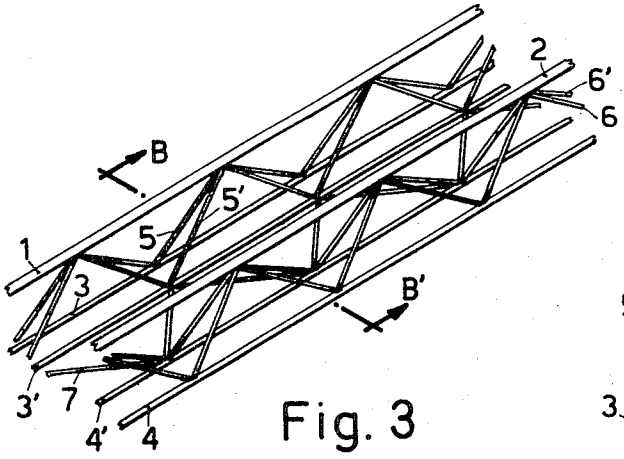


Fig. 3

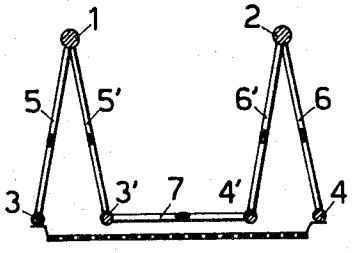


Fig. 4

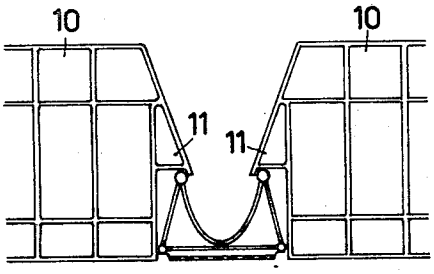


Fig. 5

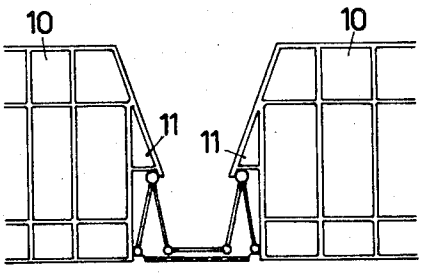


Fig. 6

METAL TRESTLE FOR MANUFACTURING REINFORCED-CONCRETE BEAMS FOR FLOORS

BACKGROUND OF THE INVENTION

This invention relates to a metal trestle for manufacturing reinforced-concrete beams for floors, and particularly a pre-formed trestle suitable for supporting the tiles or blocks of the floors and then for being built-in in the concrete to form the beam.

It is known that at present, in building, the trusses for the floors and of the other similar building components are made either by means of prefabricated beams or by manufacturing directly the beams incorporating the steel structural work in a concrete casting. The use of prefabricated beams has the disadvantage to be subject to the use of fixed standard sizes with the resulting limitation of the degree of freedom both in planning and building. Moreover the prefabricated beams do not allow to inspect how the reinforcement was made and causes the distrust of users. The beams directly made in the building yards have the disadvantage to require long handwork for carpentry and steel structural work. This causes high labour costs and remarkable work difficulties.

SUMMARY OF THE INVENTION

The object of this invention is to provide a method for manufacturing trusses practically free from the mentioned disadvantages of the prior art. This object is achieved with a pre-formed metal trestle made of two pairs of elongated parallel supporting elements, two junction members joining respectively each supporting element of the first pair to each supporting element of the second pair, and a third junction member which joins the two supporting elements of one of said pairs, the supporting elements and the junction members being connected one each other in such a way to form a prism-shaped trestle with the longer edges defined by the said supporting elements.

An important advantage of the trestle of the invention is that it can be manufactured in factories with industrial processes and equipments and can be supplied to the building yards in the requested lengths. A further advantage of the trestle according to the present invention is that it can be reinforced at will by simply adding supplementary reinforcing rods; even the off-cuts of the form rods used in the building yards for the pillars can be used as reinforcing rods.

BRIEF DESCRIPTION OF THE DRAWINGS

Further advantages and characteristics of this new type of trestle will be evident to those skilled in the art from the following detailed description of some embodiments thereof with reference to the attached drawings, wherein:

FIG. **1** shows a perspective view of a trestle according to the invention;

FIG. **2** shows a sectional view taken along the line A—A′ of FIG. **1**;

FIG. **3** shows a perspective view of another embodiment of the trestle according to the invention;

FIG. **4** shows a sectional view taken along the line B—B′ of FIG. **3**;

FIG. **5** shows the trestle of FIG. **1** when installed before the concrete casting; and

FIG. **6** shows the trestle of FIG. **3** when installed before the concrete casting.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to FIG. **1** the trestle is essentially made of two pairs of metal rods **1** and **2**, **3** and **4** parallel one each other and connected by the junction members **5**, **6** and **7**. Junction member **5** connects the rod **1** to the lower rod **3**, junction member **6** connects the rod **2** to the lower rod **4** and junction member **7** connects the rods **3** and **4**. The junction members **5**, **6** and **7** can be manufactured in different ways and in the embodiment represented in the drawings are made of two metal bars, bent in a substantially sinusoidal shape. The upper crests of the sinusoid are fixed to a rod and the lower crests to the opposite rod.

The structure can be also reinforced by arcuated elements **8** and **9**. The ends of these elements are respectively fixed to upper rods **1** and **2**, and the central lower portion is fixed to junction member **7**. Arcuated elements **8** and **9** can be either U-shaped or V-shaped.

Referring to FIG. **2** there is shown that the trestle structure according to the invention defines a prism in which a face is missing, that is the face between the edges formed by the rods **1** and **2**. The other faces of the prism are defined respectively by the rods **1** and **3** with member **5** therebetween, by the rods **3** and **4** with member **7** therebetween and by the rods **2** and **4** with member **6** therebetween. The faces of the prism which are adjacent to the missing face, i.e. those defined by members **5** and **6** and the rods to which they are fixed, may be perpendicular to the other faces, or may be slanting in some extent with respect to them. In the first case the trestle has a parallelepiped shape, in the second case the shape of a prism with trapezoidal base. In the latter case the angle between one of the slanting faces and the face defined by the rods **3** and **4** can opportunely be in the range from 70° to 90°, and preferably between 78° and 85°. The trapezoidal perimeter gives to the trestle shown in FIGS. **1** and **2** improved characteristics of use because it allows the laying of tiles or blocks on the rods **1** and **2** without causing torques which could turn over laterally the trestle.

Rods **1**, **2**, **3** and **4** have a diameter of from 5 to 8 mm, and preferably of about 6 mm for rods **3** and **4**, and preferably of about 7 mm for rods **1** and **2**. It is to be understood that the circular section rods can be replaced by metal elements having a different cross-section, for example a square section, with the same mechanical characteristics.

Members **5**, **6** and **7** can also be of different shape and length, provided that they show always the necessary mechanical characteristics to ensure the stability of the structure. In the preferred embodiment the members **5**, **6** and **7** have a diameter of about 3, 5 — 4 mm. These junction members are preferably sinusoidal-shaped and the relative crests are fixed alternatively to the rods that must be kept together.

The assembly of the different elements is preferably made by welding but any other method can be used, sometimes even appropriate adhesives can be advantageously used.

The wave amplitude of the sinusoidal members can vary within a wide range according to the cases. Every expert of metal structures can easily state the right amplitude.

The arcuate elements **8** and **9**, which are not absolutely needful, improve the characteristics of strength

of the structure both to the vertical and to the transversal stresses. These arcuated elements are fixed to the trestle suitably spaced apart. The distance between two adjacent elements can be chosen as a function of the other static parameters of the structure: preferably it should correspond to six waves of the sinusoid formed by the junction members **5, 6** and **7.** These reinforcing elements can be made of different ferrous materials, but bars with a rectangular cross-section and a thickness of from 6 to 10 mm are preferred.

With reference to FIGS. **3** and **4** which show another embodiment of the trestle, rods **3** and **4** can be replaced respectively by the pairs of rods **3** and **3'**, **4** and **4'**. In this case the junction members to the main rods **1** and **2** must be accordingly doubled. In the drawings they are indicated by reference numbers **5'** and **6'**. In this embodiment the junction member **7** connects the inner rods **3'** and **4'**. Materials similar to those used for embodiment previously specified can also be used for this embodiment. The trestle according to this invention is always provided with a longitudinal side face in order to support the tiles. The trestle is formed by rods or metal bars, or also by perforated or slotted plates in order to allow the passage to the concrete casting that will build in the trestle in a monolithic beam.

The inside of the trestle has a longitudinal seat for housing the additional metal rods, the number of which will be of course in relation with the required capacity load of the beam. Under the trestle, as the concrete must be kept in, there is a restraining means, e.g. a metal net or a sheet grating. The restraining means can also consist of appropriate finned appendages of the tiles.

As shown by FIGS. **5** and **6,** the trestle according to this invention rests horizontally with its ends on the supporting structures of the building. The trestle can be cut to the desired length and this allows the exact regulation of the trestle length in the building yard according to the supporting structures of the building.

At an appropriate distance from the first trestle and parallel with this one, other trestles are laid. In the space between the trestles are put the tiles or blocks **10** which are usually provided with side appendages **11.** The said appendages are made rest on supporting rods **1** and **2** of each trestle. The base of the tiles or blocks **10** rests on the contrary on the lower rods **3** and **4.**

In comparison with the prefabricated beams the trestle according to the invention has the advantage that it is possible to proportion exactly during the laying the quantity of iron rods to be added in relation with the beam capacity load. The insertion of the said additional reinforcement can be done in a simple and quick way by putting the iron rods in the inside of the trestle.

After the possible insertion of the additional iron rods the operation goes on with the concrete casting which can be effected in whichever known way. As already mentioned above, the lower part of the trestle is provided with a restrain means in order to prevent the concrete from running out. This restrain means can be a net or a finned appendage of the tiles.

Even though the invention has been described in detail with reference to some embodiments thereof, as non-limiting examples, it is obvious that additions and/or modifications can be effected by those skilled in the art while remaining within the scope of the invention as defined by the appended claims.

What I claim is:

1. A metal longitudinally disposed trestle for manufacturing beams for floors comprising upper and lower pairs of elongated parallel supporting elements, said upper pair being spaced inwardly of the lower pair, two spaced elongated zigzagged angularly disposed junction member connecting at their bending points one of the supporting elements of the upper pair to one of the supporting elements of the lower pair, respectively, and a third lower elongated zigzagged junction member disposed in a horizontal plane and joining both elements of the lower pair, said spaced and lower zigzagged junction members being secured to said upper and lower pairs of said supporting elements with their respective apices reciprocally connected in opposed relation, said two spaced elongated angularly disposed zigzagged junction members being joined to said respective upper and lower supporting elements at an angle in the range of 70° to 90° with respect to the base face defined by said lower zigzagged junction member whereby an open work beam is formed as a substantially trapezoidal prism with its longest edges defined by said four supporting elements having an elongated opening formed by said upper pair of supporting elements, and a plurality of individual U-shaped arcuate integral one piece cross re-inforcing members provided in spaced relation within said beam with each member having its ends secured respectively to one of said upper supporting elements and its apex secured to the lower zigzagged junction member.

2. The metal trestle of claim **1** wherein said elongated supporting elements are rods having a diameter in the range of 5 to 8 mm.

3. The metal trestle of claim **1** wherein the same is embedded in concrete for re-inforcing the same.

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