

FIXING HOLDER OF A TRUCK FOR PRE-FABRICATED MEMBER

Field of the Invention

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The present invention relates to a fastener, in particular to a fixing holder used in a truck. This fixing holder can be used for fixing large-sized goods, such as pre-fabricated members, during transportation.

Background of the Invention

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In prior arts, when large-sized goods, such as the pre-fabricated external walls, pre-fabricated staircases, pre-fabricated bathrooms or the like, are transported with a truck, it is necessary to provide a fixing holder on the truck for fixing these pre-fabricated members. A traditional fixing holder is generally formed as a rectangular frame, which is welded by shafts and has a base. However, this kind of fixing holder has to be customized as required by the structure and size of the whole pre-fabricated members to be transported. Therefore, it cannot be repeatedly used, so that the transportation cost is relatively high. In addition, the fixing holder has a relatively large volume, which means a high cost and a large space occupied. Therefore, few pre-fabricated members can be transported by the truck each time. Moreover, since no structure is provided for fastening the fixing holder on the truck, the pre-fabricated members loaded on the truck would be easily slipped due to braking, so that they would possibly collide with adjacent pre-fabricated members, causing a risk of rollover of these members.

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Summary of the Invention

With respect to the above defects, the present invention aims to provide a fixing holder of a truck for pre-fabricated member, which has a base that can be repeatedly

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used and thus has a low transportation cost. In addition, the present invention further aims to provide a fixing holder of a truck for pre-fabricated member, which, although small in volume, can provide a reliable fixing.

5 In order to eliminate the above technical defects, the present invention proposes a fixing holder of a truck for pre-fabricated member, including a fixing base and a supporting frame for supporting the pre-fabricated member. The fixing holder further includes a connecting element, which is fixedly connected with the supporting frame. The fixing base includes two transverse bottom rods that are arranged on both sides,
10 and at least two longitudinal bottom rods fixed between said two transverse bottom rods. Each of the transverse bottom rods and the longitudinal bottom rods is provided with a plurality of threaded holes along a lengthwise direction thereof. The connecting element is provided with at least two threaded holes along its lengthwise direction. Each end face of each longitudinal bottom rod is provided with a threaded hole. The
15 connecting element is connected with the longitudinal bottom rod and the transverse bottom rod is connected with the longitudinal bottom rod through respective threaded rods.

Each end of the transverse bottom rods is provided with a locking hole for firm
20 connection with the truck.

The connecting element and the longitudinal bottom rod are each formed by a channel beam having a downwardly-oriented groove, and the longitudinal bottom rod is arranged within the groove of the connecting element.

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The supporting frame is used for supporting a pre-fabricated external wall, and includes a vertical stay bar, two bearing elements), and two transverse stay bars. The vertical stay bar has a bottom end fixed to a top surface of the connecting element. The two bearing elements are respectively fixed at both longitudinal sides of a bottom
30 end of the vertical stay bar. The two transverse stay bars are respectively fixed at both

transverse sides of the bottom end of the vertical stay bar.

The vertical stay bar, the two bearing elements, and the two transverse stay bars are each formed by a channel beam and fixed to the connecting element through
5 welding.

The vertical stay bar has a transversely-oriented groove, and each of the bearing elements has a downwardly-oriented groove. Two side walls of the vertical stay bar along its longitudinal direction, a top surface of each bearing element, and an exposed
10 top surface of the connecting element are each provided with a rubber pad.

The supporting frame is used for supporting a pre-fabricated staircase, and includes a rectangular bearing box and four columns respectively fixed to four corners of the bearing box at their bottoms. The four columns are fixed to two connecting
15 elements at their bottoms.

Further, the fixing holder according to the present invention further includes a separating rack placed between two layers of pre-fabricated staircases. The separating rack is shaped as a triangle, and a top surface of the bearing box and an outer surface
20 of the separating rack are each provided with a rubber pad.

The bearing box is formed by welding I-beams together, with the flanges of the I-beams being oriented horizontally. A reinforcing brace is welded at a region where the bearing box is connected with the column.
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The supporting frame is used for supporting a pre-fabricated room, and includes a rectangular mounting seat, a front edge and a rear edge of which are fixed to two connecting elements at their tops.

30 A right edge and a left edge of the rectangular mounting seat are each fixed with

a reinforcing shaft at a bottom thereof. The reinforcing shaft is arranged at a same level as a bottom surface of the connecting element.

Inner surfaces of said two connecting elements and inner surfaces of the reinforcing shafts are each fixed thereon with a lifting hook.

The rectangular mounting seat is formed by welding channel beams, with grooves thereof being oriented downwardly. The reinforcing shaft is also formed by a channel beam, which is connected between said two connecting elements through welding. A top surface of the rectangular mounting seat is provided with a rubber pad.

According to the fixing holder of a truck for pre-fabricated member of the present invention, the connecting position between the longitudinal bottom rod and the transverse bottom rod and that between the longitudinal bottom rod and the connecting element can both be flexibly adjusted based on the size of the pre-fabricated member to be transported. Therefore, the fixing holder can be reused many times, thus significantly reducing the transportation cost. In addition, the fixing base can be locked to the truck, so that rollover of the pre-fabricated member caused by slipping of brake during transportation can be avoided. The whole fixing holder is small in volume, which not only achieves a low cost, but also enables more pre-fabricated members can be loaded on the truck. Moreover, the rubber pads arranged at the regions where the fixing holder contacts the pre-fabricated members can prevent the wear between the pre-fabricated members and the fixing holder, thus protecting the pre-fabricated members.

Brief Description of the Drawings

Fig. 1 schematically shows the structure of a fixing base in a fixing holder of a truck for pre-fabricated member according to the present invention;

Fig. 2 schematically shows the connecting structure between a transverse bottom rod and a longitudinal bottom rod;

Fig. 3 schematically shows the connecting structure between a supporting frame
5 for a pre-fabricated external wall and a connecting element;

Fig. 4 schematically shows the state when the supporting frame for the pre-fabricated external wall is connected to the fixing base;

10 Fig. 5 schematically shows the connection between the pre-fabricated external wall and the supporting frame;

Fig. 6 schematically shows the connecting structure between a supporting frame for a pre-fabricated staircase and the connecting element;
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Fig. 7 schematically shows the state when the supporting frame for the pre-fabricated staircase is connected to the fixing base;

Fig. 8 schematically shows the structure of a separating rack;
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Fig. 9 schematically shows the state when two pre-fabricated staircases are placed on the supporting frame;

Fig. 10 schematically shows the connecting structure between a supporting frame
25 for a pre-fabricated room and the connecting element;

Fig. 11 schematically shows the state when the supporting frame for the pre-fabricated room is connected to the fixing base; and

30 Fig. 12 schematically shows the state when the pre-fabricated room is placed on the supporting frame.

Detailed Description of the Embodiments

To enable the purpose, the technical solution and the advantages of the present invention clearly understood, the present invention will be described in further detail with reference to the accompanying drawings and embodiments. The embodiments are provided to elaborate the present invention, with no intention of limiting the scope of the present invention.

Referring to Figs. 4, 7 or 11, the fixing holder of a truck for pre-fabricated member according to the present invention mainly includes a fixing base 1, a connecting element 2, and a supporting frame 3 for supporting the pre-fabricated member. The connecting element 2 is used to connect the fixing base 1 with the supporting frame 3, which can be designed to have different structures according to various pre-fabricated members to be supported.

As shown in Fig. 1, the fixing base 1 includes two transverse bottom rods 11 that are arranged on both sides thereof, and at least two longitudinal bottom rods 12 fixed between said two transverse bottom rods 11. Each transverse bottom rod 11 is provided with a plurality of threaded holes 111 along its lengthwise direction. Preferably, the distance between two adjacent threaded holes 111 is kept unchanged. Each longitudinal bottom rod 12 is also provided with a plurality of threaded holes 121 along its lengthwise direction. Preferably, the distance between two adjacent threaded holes 121 is kept unchanged also. As shown in Fig. 2, each end of the longitudinal bottom rod 12 is welded with an end plate 122, which has a threaded hole 123 at its central position. Therefore, a threaded shaft 15 passing through the threaded holes 111 and 123 can connect the transverse bottom rod 11 with the longitudinal bottom rod 12, and fix them together. In this manner, it is convenient to suitably adjust the position of each longitudinal bottom rod 12 and the distance between two adjacent longitudinal bottom rods 12 based on the shape, size or the like of the pre-fabricated member and the supporting frame 3. Moreover, each end of the transverse bottom rod 11 is provided with a locking hole 13, with which the whole fixing base 1 can be secured on the floor plate of the truck. In this manner, the fixing base 1 can be prevented from slip during transportation, thus avoiding mutual collision or rollover of the pre-fabricated member thus-generated.

As shown in Figs. 3 and 4, the connecting element 2 is provided with two or

more threaded holes 21 along its lengthwise direction, each threaded hole 21 corresponding to one of the threaded holes 121 of the longitudinal bottom rod 12 in position. A threaded shaft 16 passing through the threaded holes 21 and 121 can connect the connecting element 2 with the longitudinal bottom rod 12, and fix them together. The connecting element 2 is fixed to the supporting frame 3 through welding. Of course, other common connecting means, such as the above connection with threaded shaft, can be also used. In this embodiment, the transverse bottom rod 11, the longitudinal bottom rod 12 and the connecting element 2 are each formed by a channel beam having a downwardly-oriented groove. The threaded holes are arranged on respective side walls of the channel beam. A width of the groove of the connecting element 2 is slightly larger than an outer width of the longitudinal bottom rod 12, so that the longitudinal bottom rod 12 is exactly nested within the groove of the connecting element 2.

When the supporting frame 3 is used for supporting a pre-fabricated external wall, it can adopt the structure as shown in Fig. 3. In this case, the supporting frame 3 includes a vertical stay bar 311, two bearing elements 312, and two transverse stay bars 313. In this embodiment, the above bars/elements are each formed by a channel beam. The vertical stay bar 311 has a bottom end that is welded to a top surface of the connecting element 2, with its groove being oriented along the transverse direction, and an upper portion having a lifting hole 314 for hoisting. The two bearing elements 312, each having a downwardly-oriented groove, are respectively welded to the top surface of the connecting element 2 at both longitudinal sides of the vertical stay bar 311. The two transverse stay bars 313, each having a downwardly-oriented groove, are respectively welded to the top surface of the connecting element 2 at both transverse sides of the vertical stay bar 311.

As shown in Figs. 4 and 5, during transportation, one supporting frame 3 can be fixed on each of two or more longitudinal bottom rods 12, so that two or more supporting frames 3 can be arranged in one and the same transverse line. The pre-fabricated external wall 6 is hoisted to the position where the vertical stay bar 311

of the supporting frame 3 is located, so that a recess 61 formed at the bottom of the pre-fabricated external wall 6 will be exactly supported by said two bearing elements 312 from both sides, while an upper wall body of the pre-fabricated external wall 6 is supported by the vertical stay bar 311. In addition, the two transverse stay bars 313
5 can improve the supporting force in the transverse direction. In order to prevent the pre-fabricated external wall 6 from being worn due to the friction between the pre-fabricated external wall 6 and the supporting frame 3 or the pre-fabricated external wall 6 and the connecting element 2, a rubber pad 91 is arranged on each of two longitudinal side walls of the vertical stay bar 311, the top surfaces of two bearing
10 elements 312, and the exposed top surface of the connecting element 2.

When the supporting frame 3 is used for supporting a pre-fabricated staircase, it can adopt the structure as shown in Fig. 6. In this case, the supporting frame 3 includes a rectangular bearing box 321 and four columns 322. In order to increase the
15 strength of the supporting frame 3, a reinforcing brace 323 is welded at the region where the bearing box 321 is connected with each of the columns 322. In this embodiment, the bearing box 321 is a rectangular frame formed by welding I-beams together, with the flanges of the I-beams being oriented horizontally. The column 322 is formed by welding a channel beam at a bottom of each of four corners of the
20 bearing box 321. Two of the four columns 322 are welded to the top surface of a front connecting element 2, while the other two columns 322 are welded to the top surface of a rear connecting element 2. The reinforcing brace 323 can be formed by a triangular corner fitting, a diagonally-oriented steel angle, or the like.

25 As shown in Fig. 7, the supporting frame 3 for the pre-fabricated staircase is fixed on two adjacent longitudinal bottom rods 12 by means of two connecting elements 2 with threaded bolts 16. During transportation, the pre-fabricated staircase 7 is placed on the bearing box 321, as shown in Fig. 9. In order to improve the transportation efficiency, two or more layers of the pre-fabricated staircases 7 can be
30 placed on the bearing box 321 in form of a stack. For this purpose, a separating rack 5

is arranged between an upper layer and a lower layer of the pre-fabricated staircases 7. As shown in Fig. 8, the separating rack 5 is shaped as a triangular component, which is formed by welding steel angles, T-shaped steels or other short shafts, with the flange thereof facing outwardly. The separating rack 5 can be exactly disposed in a triangular space enclosed by a step face of the lower layer of the pre-fabricated staircase 7 and a bottom face of the upper layer of the pre-fabricated staircase 7, and three angles of the triangular space exactly correspond to those of the separating rack 5 respectively. Two separating racks 5, one after another, can be arranged between two layers of the pre-fabricated staircases 7. Moreover, in order to avoid friction, the top surface of the bearing box 321 and the outer surface of the separating rack 5 are provided with rubber pads 93 and 92 respectively.

When the supporting frame 3 is used for supporting a pre-fabricated room, such as a pre-fabricated bathroom, a pre-fabricated kitchen, or the like, it can adopt the structure as shown in Fig. 10. In this case, the supporting frame 3 includes a rectangular mounting seat 331. A front edge and a rear edge of the rectangular mounting seat 331 are welded to the upper surfaces of two connecting elements 2, while a right edge and a left edge of the rectangular mounting seat 331 each are welded with a reinforcing shaft 332 at respective bottoms thereof. The reinforcing shaft 332 is arranged at the same level as the bottom surface of the connecting element 2, so as to improve the supporting strength. Moreover, the inner surfaces of two connecting elements 2 and the inner surfaces of the right and left reinforcing shafts 332 each are fixed thereon with a lifting hook 333, for facilitating the hoisting of the supporting frame. In this embodiment, the rectangular mounting seat 331 is formed by welding channel beams together, with the groove of each channel beams being oriented downwardly. The reinforcing shaft 332 is also formed by a channel beam, which is connected between said two connecting elements 2 through welding. As shown in Fig. 11, the supporting frame 3 for the pre-fabricated room can be fixed on two adjacent longitudinal bottom rods 12 by means of two connecting elements 2 with threaded bolts. During transportation, the pre-fabricated room 8 is placed on the

bearing box 321, with a bottom recess of the pre-fabricated room 8 being supported on the rectangular mounting seat 331, as shown in Fig. 12. Similarly, in order to avoid friction, the top surface of rectangular mounting seat 331 is provided with a rubber pad 94.

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When the fixing holder of a truck for pre-fabricated member according to the present invention is used, the whole fixing base 1 is firmly fixed on the truck plate through the locking hole 13 of the fixing base 1. Then, the positions of the longitudinal bottom rods 12 are adjusted according to the pre-fabricated member to be transported and the structure and size of the supporting frame. Subsequently, the supporting frame 3 is mounted on the fixing base 1 by means of the connecting elements 2 through threaded bolts. After that, the pre-fabricated member is hoisted on the supporting frame 3. Finally, a plurality of woven belts is used to fix the pre-fabricated member on the truck from both sides.

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Thus it can be seen that the fixing base 1 of the fixing holder of a truck for pre-fabricated member according to the present invention can be mounted on the truck for reuse, with replacement thereof unnecessary. Thus the transportation cost can be reduced and the transportation efficiency can be increased. In addition, the fixing base 1 and the supporting frame 3 are both small in volume and reasonably designed, thus the manufacturing cost thereof are relatively low. Moreover, the truck can deliver more pre-fabricated members each time, and adjacent pre-fabricated members would not be easily damaged during hoisting. With the fixing base 1 being firmly mounted on the truck, risks caused by slip or rollover of the pre-fabricated member during transportation can be avoided. Further, the rubber pads arranged on the supporting frame 3 can also protect the pre-fabricated members and thus prevent them from wear.

The foregoing description is merely illustrative of preferred embodiments of the present invention, and is not intended to limit the present invention. Various changes and modifications may be made by those skilled in the art. Any modifications,

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equivalent substitutions, improvements, and the like within the spirit and principles of the present invention are intended to be included within the scope of the present invention.

CLAIMS

1. A fixing holder of a truck for pre-fabricated member, including a fixing base (1) and a supporting frame (3) for supporting the pre-fabricated member,

5 characterized in that the fixing holder further includes a connecting element (2) which is fixedly connected with the supporting frame (3);

the fixing base (1) includes two transverse bottom rods (11) that are arranged on both sides, and at least two longitudinal bottom rods (12) fixed between said two transverse bottom rods (11);

10 each of the transverse bottom rods (11) and the longitudinal bottom rods (12) is provided with a plurality of threaded holes along a lengthwise direction thereof, the connecting element (2) is provided with at least two threaded holes along its lengthwise direction, and each end face of each longitudinal bottom rod (12) is provided with a threaded hole; and

15 the connecting element (2) is connected with the longitudinal bottom rod (12) and the transverse bottom rod (11) is connected with the longitudinal bottom rod (12) through respective threaded rods.

2. The fixing holder of a truck for pre-fabricated member according to claim 1,
20 characterized in that each end of the transverse bottom rods (11) is provided with a locking hole (13) for firm connection with the truck.

3. The fixing holder of a truck for pre-fabricated member according to claim 1,
characterized in that the connecting element (2) and the longitudinal bottom rod (12)
25 are each formed by a channel beam having a downwardly-oriented groove, and the longitudinal bottom rod (12) is arranged within the groove of the connecting element (2).

4. The fixing holder of a truck for pre-fabricated member according to any one of
30 claims 1 to 3, characterized in that the supporting frame (3) is used for supporting a pre-fabricated external wall, and includes a vertical stay bar (311), two bearing

elements (312), and two transverse stay bars (313),

wherein the vertical stay bar (311) has a bottom end fixed to a top surface of the connecting element (2);

the two bearing elements (312) are respectively fixed at both longitudinal sides
5 of a bottom end of the vertical stay bar (311); and

the two transverse stay bars (313) are respectively fixed at both transverse sides of the bottom end of the vertical stay bar (311).

5. The fixing holder of a truck for pre-fabricated member according to claim 4,
10 characterized in that the vertical stay bar (311), the two bearing elements (312), and the two transverse stay bars (313) are each formed by a channel beam and fixed to the connecting element (2) through welding.

6. The fixing holder of a truck for pre-fabricated member according to claim 5,
15 characterized in that the vertical stay bar (311) has a transversely-oriented groove, and each of the bearing elements (312) has a downwardly-oriented groove,

wherein two side walls of the vertical stay bar (311) along its longitudinal direction, a top surface of each bearing element (312), and an exposed top surface of the connecting element (2) are each provided with a rubber pad.

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7. The fixing holder of a truck for pre-fabricated member according to any one of claims 1 to 3, characterized in that the supporting frame (3) is used for supporting a pre-fabricated staircase, and includes a rectangular bearing box (321) and four columns (322) respectively fixed to four corners of the bearing box (321) at their
25 bottoms, wherein the four columns (322) are fixed to two connecting elements (22) at their bottoms.

8. The fixing holder of a truck for pre-fabricated member according to claim 7, characterized in that the fixing holder further includes a separating rack (5) placed
30 between two layers of pre-fabricated staircases, wherein the separating rack (5) is

shaped as a triangle, and a top surface of the bearing box (321) and an outer surface of the separating rack (5) are each provided with a rubber pad.

9. The fixing holder of a truck for pre-fabricated member according to claim 7,
5 characterized in that the bearing box (321) is formed by welding I-beams together, with flanges of the I-beams being oriented horizontally, wherein a reinforcing brace (323) is welded at a region where the bearing box (321) is connected with the column (322).

10 10. The fixing holder of a truck for pre-fabricated member according to any one of claims 1 to 3, characterized in that the supporting frame (3) is used for supporting a pre-fabricated room, and includes a rectangular mounting seat (331), a front edge and a rear edge of which are fixed to two connecting elements (2) at their tops.

15 11. The fixing holder of a truck for pre-fabricated member according to claim 10, characterized in that a right edge and a left edge of the rectangular mounting seat (331) are each fixed with a reinforcing shaft (332) at a bottom thereof, the reinforcing shaft (332) being arranged at a same level as a bottom surface of the connecting element (2).

20 12. The fixing holder of a truck for pre-fabricated member according to claim 11, characterized in that inner surfaces of said two connecting elements (2) and inner surfaces of the reinforcing shafts (332) are each fixed thereon with a lifting hook (333).

25 13. The fixing holder of a truck for pre-fabricated member according to claim 11, characterized in that the rectangular mounting seat (331) is formed by welding channel beams, with grooves of the channel beams being oriented downwardly, and the reinforcing shaft (332) is also formed by a channel beam, which is connected
30 between said two connecting elements (2) through welding, a top surface of the

rectangular mounting seat (331) being provided with a rubber pad.