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(54) **PREFABRICATED FRAME**

VORGEFERTIGTER RAHMEN

CADRE PRÉFABRIQUÉ

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Description

Technical Field

[0001] The invention relates to a building structure, in particular to a novel prefabricated frame, which is particularly suitable for all buildings with frame structures or frame-shear wall structures.

Technical Background

[0002] A conventional frame structure building, established through assembling prefabricated members, mainly uses prefabricated members such as prefabricated secondary beams, prefabricated slabs, or the like. During construction, a column should be cast in-situ first, followed by mounting of the prefabricated secondary beam and the prefabricated slab, and then in-situ casting of main beam reinforcing bars. Finally, concrete is cast in-situ on the prefabricated slab, so as to connect the main beam, the prefabricated secondary beam, and the prefabricated slab together. The use of prefabricated members can reduce on-site construction work, save labors, and improve construction efficiency.

[0003] CN 108 678 445 A discloses a multi-floor factory building comprising a roof, a waffle floor and a plurality of ribbed floors, wherein the plurality of ribbed floors are upper and lower structural buildings, the waffle floor being located on an upper floor of the top ribbed floor, the roof being constructed on the waffle floor. Furthermore, the frame main beam, the waffle plate and the ribbed plate are prefabricated components. Both ends of the first prefabricated frame main beam are built on the top of the first support column, and two or more of the first support columns support the first prefabricated frame main beam, The construction process is performed by connecting reinforcing bars of the first prefabricated frame main beam and connecting reinforcing bars of the first supporting column, so that the first prefabricated frame main beam and the first supporting column form a connection node of the first prefabricated frame main beam, the first support column and the ribbed plate. The frame main beam, the ribbed plate and the waffle plate can be produced in the prefabricated factory, and the cast-in-place concrete can be reliably connected on site. By installing the waffle plate as a top floor, it meets the cleanliness requirements of a general electronic factory. Compared with the traditional cast-in-place concrete construction process, this concept adopts a prefabricated construction method to improve the quality and construction efficiency and reduce the dependence on labor.

[0004] CN105421632A relates to a stalwart floor covering system comprising a cast-in-place concrete column, wherein the upper and lower layer columns of the cast-in-place concrete column form a step. Prefabricated concrete main beams are placed between the steps. Concrete beams are connected by a number of prefabricated steel secondary beams, and prefabricated reinforcement templates are laid on all prefabricated components. The prefabricated reinforcement formwork is integrally formed with the slab thickness portion reserved for all prefabricated beams and the lower portion of the upper column. Said nodes are simple in construction and can be used as a fixed connection for simple earthquake resistance. All precast beams can be used as continuous beams, and the prestressing can be applied in the precast concrete beams, which makes the construction more economical.

[0005] US 2014/060721 A1 discloses a grout-filled reinforcement joint that is buried in reinforced concrete and is used for joining reinforcing bars in the reinforced concrete. It is proposed to provide a grout inlet being a protruding opening protruding outward, wherein said protruding opening is fitted with a cylindrical sealing body constituted of an elastic body including a check valve provided at one end. Since an outlet of the reinforcement joint is fitted with a removable sealing plug which, when the grout is filled, closes the outlet automatically after the paste components are discharged, an invisible filling state of the grout inside the reinforcement joint can be confirmed from outside, and, at the same time, the grout can be prevented from flowing outside through the outlet.

[0006] CN 108 035 438 A discloses a concrete assembled frame structure system comprising prefabricated reinforced concrete columns, reinforced concrete beams, reinforced concrete columns and joints of reinforced concrete beams on both sides thereof to form a node core region. The prefabricated reinforced concrete columns include concrete prefabricated columns, column longitudinal bars, and column stirrups formed on the upper and lower ends of the concrete prefabricated column. The upper and lower ends of the reserved column longitudinal bars and the lower reserved column bars are respectively formed and exposed in the core area of the node. Column stirrups are reserved on the outside of the longitudinal bars. There are prefabricated beam supports at the top of the prefabricated reinforced concrete columns in the core area of the nodes, and the prefabricated reinforced concrete beams are placed on the prefabricated beam supports.

[0007] However, the prefabricated members used in the existing building structures are limited, and a large number of structures still need to be formed by cast-in-situ concrete. Therefore, the amount of on-site construction workload is still heavy, and the construction period cannot be further shortened.

Summary of the Invention

[0008] The technical problem to be solved by the present invention is to provide a prefabricated frame, in which the prefabricated members account for a large proportion of all structural members used, thus significantly reducing the amount of on-site construction work.

[0009] The present invention is defined by Claim 1. Specific embodiments are defined with the dependent

claims.

[0010] A prefabricated frame is proposed, comprising at least one column, at least one main beam connected to the column, at least one secondary beam connected to the main beam, and a floor. The column, the main beam and the secondary beam are all prefabricated members, and the main beam and the secondary beam are both provided with, on respective top portions thereof, exposed reserve reinforcing bars, and reinforcing bars for cast-in-situ parts. The floor is a laminated plate having a prefabricated slab at a lower portion thereof, and the prefabricated slab, the main beam, and the secondary beam are connected together by means of in-situ casting concrete on respective top portions thereof. The column is a prefabricated column having exposed reserve reinforcing bars at a top thereof and a to-be-cast structure at a bottom thereof, the to-be-cast structure being provided therein with reserve connecting bars. The to-be-cast structure is used for connection with a lower building structure, which has exposed reinforcing bars that are located under the column and inserted into the to-be-cast structure, the connection between the column and the lower building structure being achieved by casting in-situ concrete in the to-be-cast structure.

[0011] The column is recessed inwardly at one or more lower sidewalls thereof to form the to-be-cast structure.

[0012] The exposed reinforcing bars of the lower building structure are overlapped and bundled with the reserve connecting bars of the to-be-cast structure, so that the column and the lower building structure are connected with each other through establishing a template outside of the to-be-cast structure and pouring concrete therewith.

[0013] Optionally, the exposed reserve reinforcing bars on the top of the column are higher than the main beam and the floor.

[0014] Optionally, at a connection node between the main beam and a column located at one end of the frame, the cast-in-situ portion at one end of the main beam is provided with upper and lower connecting bars, each of the connecting bars being bent at a free end thereof.

[0015] Optionally, at connection nodes between the column and two main beams to a right side and to a left side thereof, the cast-in-situ parts at one end of one of said two main beams is provided with upper and lower connecting bars, which pass above the column and extend to the other of said two main beams, and both ends of the upper connecting bars are connected to reinforcing bars arranged on top of the cast-in-situ parts of said two main beams, respectively.

[0016] Optionally, a cement mortar layer is disposed between a bottom surface of the column and the lower building structure.

[0017] Compared with the prior arts, the novel prefabricated frame according to the present invention has the following advantages.

[0018] First, the conventional cast-in-situ main beam is replaced with the prefabricated main beam, and the reinforcing bars for cast-in-situ parts of the prefabricated main beam and the prefabricated secondary beam have been prepared in advance and fixed on the prefabricated members. This will save a lot of construction work on site, and reduce investment in the human resources for on-site reinforcement breaking and reinforcement fixing.

[0019] Second, the column is a prefabricated column having exposed reserve reinforcing bars at a top thereof and a to-be-cast structure at a bottom thereof, the to-be-cast structure being used for connection with a lower building structure. With the prefabricated column, the construction can be performed more rapidly and conveniently, and the construction quality can be consistently ensured. Therefore, the on-site workload can be significantly reduced, thus greatly shortening the construction duration. Moreover, construction can be performed in the middle area and in the side areas of the building in parallel, thus reducing labor cost, construction waste, and noise and sand pollution. In this manner, the influence of the construction on surrounding residents can be avoided to a maximum extent.

[0020] Third, construction progress can be accelerated, thereby improving construction efficiency and shortening an overall project duration.

[0021] Fourth, as a result of increase in factory production of the prefabricated members, the quality of products can be more effectively guaranteed. And as the prefabricated members can be favorably completed, on-site polishing and secondary repair procedures can be directly saved.

[0022] Finally, the column, the main beam, the secondary beam, and the floor are all in the form of prefabricated members, which can reduce the use of a large number of wood plate molds. Only a few gaps between members are necessary to be blocked with plate molds. This also remarkably reduces construction waste on site, and thus is more environmentally friendly.

Brief Description of the Drawings

[0023]

Fig. 1 schematically shows the structure of a novel prefabricated frame of the present invention;

Fig. 2 schematically shows a main structural diagram of a prefabricated main beam according to Embodiment 1 thereof, wherein its exposed reserve reinforcing bars are not shown;

Fig. 3 schematically shows a main structural diagram of a prefabricated secondary beam according to Embodiment 1 thereof, wherein its exposed reserve reinforcing bars are not shown;

Fig. 4 schematically shows a temporary support for the main beam, the secondary beam, and a prefabricated slab during construction;

Fig. 5 is a detail view showing an end node at a junction between a cast-in-situ column and the main beam;

Fig. 6 is a detail view showing a central node at a junction between the cast-in-situ column and each of the main beams located at right and left sides of the column; and

Fig. 7 is a detail view showing a node at a junction between the main beam and each of the secondary beams located at left and right sides of the main beam.

Figs. 8 to 10 schematically show a main structural diagram of a column according to a first example.

Detailed Description of the Invention

[0024] The present invention will be described in further detail with reference to preferred embodiments shown in the accompanying drawings.

[0025] As shown in Figs. 1 and 4, a novel prefabricated frame according to the present invention includes at least one column 1, at least one main beam 2 connected to the column 1, at least one secondary beam 3 connected to the main beam 2, and a floor 5. The present invention is characterized in that the column 1, the main beam 2 and the secondary beam 3 are all prefabricated members, and the floor 5 is a laminated plate, wherein a lower part of the floor 5 is a prefabricated slab 51 while an upper part thereof is a cast-in-situ concrete layer 52. The main beam 2, the secondary beam 3, and the prefabricated slab 51 are all provided with exposed reserve reinforcing bars at respective top portions thereof, and provided in advance with reinforcing bars for cast-in-situ parts, all the reinforcing bars being temporarily fixed. During construction, after the prefabricated main beam, the prefabricated secondary beam, and the floor are mounted through hoist, the reinforcing bars for cast-in-situ parts that are arranged in recesses are pulled or inserted into their respective designated positions, bundled in series, and then fixed. The reinforcing bars for cast-in-situ parts are connected to the exposed reserve reinforcing bars of the prefabricated members. The prefabricated slab 51, the prefabricated main beam 2, and the prefabricated secondary beam 3 are used as a bottom mold, and connected together through in-situ casting concrete on the bottom mold. In addition, the column 1 is a prefabricated column having exposed reserve reinforcing bars at a top thereof and a to-be-cast structure at a bottom thereof. The to-be-cast structure is provided therein with reserve connecting bars for connection with a lower building structure. Exposed reinforcing bars of the lower building structure, which are located under the column, are inserted into the to-be-cast structure. The connection between the column 1 and the lower building structure is achieved through in-situ casting concrete in the to-be-cast structure.

[0026] According to the present invention, the main beam 2 may be configured in either of the following two structural modes.

[0027] In Embodiment 1 of the main beam 2 as shown in Fig. 2, the width of the main beam 2 at two end portions 22 thereof is larger than that at a middle portion 21 thereof, so that the middle portion 21 is connected to each of the end portions 22 through a step part. The middle portion 21 and the two end portions 22 of the main beam 2 are provided, on their top portions, with recesses 23 and 24, respectively, wherein the recess 23 of the middle portion 21 is relatively shallow, and the recesses 24 of the end portions 22 are relatively deep and open to respective end faces of the main beam 2. Two sides of the middle portion 21 and two sides of each of the end portions 22 are equally high. Concrete, while being cast in-situ on the floor, is also cast in-situ in the recesses 23 and 24 on the top portion of the main beam 2, thus forming the cast-in-situ parts of the main beam 2.

[0028] The secondary beam 3 may also be configured according to the following two structural mode.

[0029] In Embodiment 1 of the secondary beam 3 as shown in Fig. 3, the width at two end portions 32 of the secondary beam 3 is larger than that at a middle portion 31 of the secondary beam 3, so that the middle portion 31 is connected to each of the end portions 32 through a step part. The middle portion 31 and the two end portions 32 of the secondary beam 3 are provided, on their top portions, with recesses 33 and 34, respectively, wherein the recess 33 of the middle portion 31 is relatively shallow, and the recesses 34 of the end portions 32 are relatively deep and open to end faces of the secondary beam 3. Two sides of the middle portion 31 and two sides of the end portions 32 are equally high. Concrete, while being cast in-situ on the floor, is also cast in-situ in the recesses 33 and 34 on the top portions of the secondary beam 3, thus forming the cast-in-situ parts of the secondary beam 3.

[0030] Main reinforcing bars for cast-in-situ parts of the main beam 2 and the secondary beam 3 can be respectively provided in advance in the recesses 23 and 24 at the top portion of the main beam 2, and in the recesses 31 and 34 at the top portion of the secondary beam 3, and then transported together with the prefabricated members to the construction site. After the main beam 2 and the secondary beam 3 are mounted through hoist, the above main reinforcing bars are separately pulled or inserted into corresponding positions, bundled in series, and then fixed.

[0031] As shown in Fig. 1, the main beam 2 is mounted between two adjacent columns 1, and the end portions of the main beam 2 are disposed on top edges of the columns 1 in a specific floor. The secondary beam 3 is mounted between two adjacent main beams 2. The end faces of the secondary beam 3 abut against sidewalls of the main beams 2. At a position where the sidewall of the main beam 2 connects the secondary beam 3 is pro-

vided with an opening 25, so that the reinforcing bars at the top portion of the secondary beam 3 can conveniently pass therethrough.

[0032] As shown in Fig. 7, a reinforcing bar connector 78 is provided in advance at a lower position of a junction between the main beam 2 and each of the secondary beams 3 located at left and right sides of the main beam 2, and is connected to a reinforcing bar 77 provided in a prefabricated part of the main beam 2. Before concrete is cast in-situ, a reinforcing bar 93 provided in the recess 34 at the end portion of the secondary beam 3 is connected to a corresponding reinforcing bar connector 78, thereby achieving connection between the reinforcing bar 77 provided in the prefabricated part of the main beam 2 and the reinforcing bar 93 for the cast-in-situ part at the end portion of the secondary beam 3. And a connecting bar 79 is provided at a top portion of the cast-in-situ part at the end portion of the secondary beam 3 located at one side of the main beam 2, passes along a bottom portion of a reinforcing bar provided at the top portion of the main beam 2, and extends to the secondary beam 3 located at the other side of the main beam 2. Two ends of the connecting bar 79 partially overlap reinforcing bars 92 provided at the top portions of the cast-in-situ parts of the left and right secondary beams 3, respectively. The end portions of the secondary beams 3 are provided with exposed reserve stirrups 94, which extend from the prefabricated parts of the secondary beams 3. These stirrups 94 connect reinforcing bars 91 provided in the prefabricated part of the secondary beam 3 with the reinforcing bars 92 and 79 provided at the cast-in-situ part of the secondary beam 3, and enclose them. The reinforcing bars 93, 79, and 92 may be arranged in the recesses of the secondary beams 3 at a prefabrication factory in advance, then directly pulled or inserted, after the main beams and secondary beams are mounted at the construction site, into corresponding positions, bundled in series, and then fixed.

[0033] As shown in Fig. 5, at a connecting node between the main beam 2 and an end column 1, connecting bars 74 and 73 are respectively provided at an upper portion and a lower portion of the cast-in-situ part at the end portion of the main beam 2. The lower connecting bar 73 has one end extending into the column 1 connected thereto and being bent upwardly. The upper connecting bar 74 has one end extending similarly into the column 1 connected thereto and being bent downwardly, and another end partially overlapping a reinforcing bar 72 provided at a cast-in-situ concrete part at an upper portion of the main beam 2. The end portion of the main beam 2 is provided with exposed reserve stirrups 75, which extend from the prefabricated part of the main beam 2. These stirrups 75 connect the reinforcing bar 71 provided in the prefabricated part of the main beam 2 with the reinforcing bars 74 and 72 provided at the cast-in-situ part of the main beam 2, and enclose them. The reinforcing bars 72, 73, and 74 may be arranged in the recesses of the main beam 2 at a prefabrication factory in advance, and directly pulled or inserted, after the main beam 2 is mounted at the construction site, into the corresponding positions, bundled in series, and then fixed.

[0034] As shown in Fig. 6, at connecting nodes between the column 1 and the main beams 2 located at left and right sides of the column 1, connecting bars 81 and 82 are respectively provided at upper and lower positions of the cast-in-situ part at the end portion of the main beam 2 located at one side of the column 1, pass through the column 1, and extend to the main beam 2 located at the other side of the column 1. Two ends of the upper connecting 81 partially overlap the reinforcing bars 72 provided at the top portions of the cast-in-situ parts of the left and right main beams 2, respectively. The end portions of each of the main beams 2 located at both sides of the column 1 are provided with exposed reserve stirrups 76, which extend from the prefabricated part thereof. These stirrups 76 connect the reinforcing bars 71 provided in the prefabricated parts of the main beams 2 with the reinforcing bars 72 and 81 provided in the cast-in-situ parts thereof, and enclose them. The reinforcing bars 72, 81, and 82 may be arranged in the recesses of the main beam 2 at a prefabrication factory in advance, and directly pulled or inserted, after the main beam 2 is mounted at the construction site, into the corresponding positions, bundled in series, and then fixed.

[0035] Figs. 8-10 schematically show the structure of the column 1 according to examples of the present invention.

[0036] In a first example, as shown in Fig. 8, the column 1 of this example is a prefabricated column having a reinforced concrete structure made by one-piece prefabrication, comprising prefabricated concrete and reinforcing bars arranged therein.

[0037] The reinforcing bars inside the column 1 may be exposed to a certain length from the top of the column 1. The exposed portions, referred to as exposed reinforcing bars 11, are used for connection with an upper building structure.

[0038] The bottom of the column 1 is provided with a to-be-cast structure 12, which is provided therein with reserve connecting bars 13. Optionally, the sidewalls of the column 1 are inwardly recessed at the lower end thereof, so that the recessed portion forms the to-be-cast structure 12. The recessed portion may be formed such that four sidewalls of the column 1 are all recessed inwardly to a certain depth at a region of the lower end of the column 1, or only part of them is recessed inwardly to a certain depth. The depth of the recessed portion is preferably selected to expose the reinforcing bars inside the column 1. The exposed reinforcing bars in the to-be-cast structure 12 are called as reserve connecting bars, for connection with a lower building structure. The to-be-cast structure 12 can be cast in-situ with concrete, so as to achieve the connection to the lower building structure.

[0039] In order to increase the bonding force between the prefabricated concrete and the in-situ-cast concrete, in a preferred embodiment, the inner wall of the to-be-

cast structure 12 is beveled, thus increasing the contact area between the prefabricated concrete and the in-situ-cast concrete. In this manner, the bonding force therebetween can be further improved.

[0040] The use of this to-be-cast structure facilitates the pouring of concrete and the integrated production of the prefabricated column at the factory, improves the overall prefabrication rate, and thus is advantageous for production and transportation.

[0041] Optionally, the reserve connecting bars 13 in the to-be-cast structure 12 include vertical reinforcing bars 131 and transverse stirrups 132. The vertical reinforcing bars 131 and the exposed reserve reinforcing bars 11 may be formed by exposed ends of the reinforcing bars inside the column 1, respectively.

[0042] Referring to Fig. 9, when the column 1 is installed on the lower building structure 14, the exposed reinforcing bars 141 on the top of the lower building structure 14 are inserted into the to-be-cast structure 12, which is poured with concrete to achieve the connection between the column 1 and the lower building structure 14.

[0043] Optionally, before the concrete is poured, the reserve connecting bars 13 in the to-be-cast structure 12 are firstly connected with the exposed reinforcing bars 141 on the top of the lower building structure 14, and fixed therewith by stirrups. Then, a template is established at the to-be-cast structure 12 and concrete is poured, thus connecting the prefabricated column with the lower building structure 14.

[0044] Optionally, before the column 1 is installed on the lower building structure 14, a cement mortar layer may be disposed between a bottom surface of the column 1 and a top surface of the lower building structure 14, thus realizing a close connection between the column 1 and the lower building structure 14.

[0045] Referring to Fig. 10, when the upper building structure 15 is formed or mounted on the column 1, the exposed reserve reinforcing bars 11 on the top of the column 1 are inserted into the upper building structure 15, with top ends thereof being exposed from the top of the upper building structure 15. The exposed portions of the reinforcing bars 11 are used as exposed reinforcing bars 151 at the top of the upper building structure 15. In this manner, a firm connection between the prefabricated column and the building structures can be achieved.

[0046] In addition, optionally, one or more sidewalls of the column 1 may be provided in advance with a decorative surface layer, so as to reduce the workload of subsequent on-site construction.

[0047] As described above, the member to be cast at the bottom of the prefabricated column can be formed as a toothed joint. The top and bottom of the prefabricated column are both provided with exposed reinforcing bars. The top of a lower prefabricated column can be formed into one piece with the cast-in-situ beam. In addition, the exposed steel bars at the top of the lower prefabricated column can be connected with the reserve connecting bars at the bottom of the upper prefabricated column, tied together by wires, and then fixed by stirrups. The upper and lower prefabricated columns can be connected with each other into one piece by establishing a template on the outer part of the prefabricated columns and then casting concrete therewith.

[0048] According to the novel prefabricated frame of the present invention, the prefabricated column, the prefabricated main beam, the prefabricated secondary beam, and the prefabricated floor slab are used, thereby remarkably reducing the amount of construction work on site, reducing pollution and waste, and saving labor forces significantly. Thus the construction efficiency can be effectively improved, and the duration can thus be shortened.

[0049] The foregoing is merely preferred embodiments of the present invention, but is not intended to be limitation of the present invention. It will be apparent to those skilled in the art that various changes and modifications can be made to the present invention..

Claims

1. A prefabricated frame, comprising at least one column (1), at least one main beam (2) connected to the column (1), at least one secondary beam (3) connected to the main beam (2), and a floor (5),

wherein the column (1), the main beam (2) and the secondary beam (3) are all prefabricated members, and the main beam (2) and the secondary beam (3) are both provided with, on respective top portions thereof, exposed reserve reinforcing bars, and reinforcing bars for cast-in-situ parts,

wherein the floor (5) is a laminated plate having a prefabricated slab (51) at a lower portion thereof, and the prefabricated slab (51), the main beam (2), and the secondary beam (3) are connected together by means of in-situ casting concrete on respective top portions thereof,

wherein the column (1) is a prefabricated column having exposed reserve reinforcing bars (11) at a top thereof and a to-be-cast structure (12) at a bottom thereof, the to-be-cast structure (12) being provided therein with reserve connecting bars (13), which include vertical reinforcing bars (131) and transverse stirrups (132),

wherein the to-be-cast structure (12) is used for connection with a lower building structure (14), which has exposed reinforcing bars (141) that are located under the column and inserted into the to-be-cast structure (12), a connection between the column (1) and the lower building structure (14) being achieved by casting in-situ concrete in the to-be-cast structure (12),

characterized in that

the exposed reinforcing bars (141) of the lower

building structure are overlapped and bundled with the reserve connecting bars of the to-be-cast structure (12), whereby the vertical reinforcing bars (131) are connected with the exposed reinforcing bars (141), and fixed therewith by the transverse stirrups (132), so that the column (1) and the lower building structure (14) are connected with each other through establishing a template outside of the to-be-cast structure (12) and pouring concrete therewith, and
wherein the column (1) is recessed inwardly at one or more lower sidewalls thereof to form the to-be-cast structure (12).

2. The prefabricated frame according to claim 1, wherein inner wall of the to-be-cast structure is beveled.

3. The prefabricated frame according to claim 1, wherein the exposed reserve reinforcing bars on the top of the column (1) are higher than the main beam (2) and the floor (5).

4. The prefabricated frame according to claim 1, wherein at a connection node between the main beam (2) and a column (1) located at one end of the frame, the cast-in-situ portion at one end of the main beam (2) is provided with upper and lower connecting bars, each of the connecting bars being bent at a free end thereof.

5. The prefabricated frame according to claim 1, wherein at connection nodes between the column (1) and two main beams (2) to a right side and to a left side thereof, the cast-in-situ parts at one end of one of said two main beams (2) is provided with upper and lower connecting bars, which pass above the column (1) and extend to the other of said two main beams (2), and both ends of the upper connecting bars are connected to reinforcing bars arranged on top of the cast-in-situ parts of said two main beams (2), respectively.

6. The prefabricated frame according to claim 1, wherein a cement mortar layer is disposed between a bottom surface of the column (1) and the lower building structure.

Patentansprüche

1. Vorgefertigter Rahmen, umfassend mindestens eine Säule (1), mindestens einen Hauptträger (2), der mit der Säule (1) verbunden ist, mindestens einen Nebenträger (3), der mit dem Hauptträger (2) verbunden ist, und einen Boden (5),

wobei die Säule (1), der Hauptträger (2) und der Nebenträger (3) alle vorgefertigte Rahmen sind, und der Hauptträger (2) und der Nebenträger (3) beide an ihren jeweiligen oberen Abschnitten mit freiliegenden Reserve-bewehrungsstäben versehen sind, und Bewehrungsstäben für vor Ort gießbare Teile,
wobei der Boden (5) eine laminierte Platte ist, die eine vorgefertigte Scheibe (51) an ihrem unteren Abschnitt hat, und die vorgefertigte Scheibe (51), der Hauptträger (2) und der Nebenträger (3) durch Ortbeton an ihren jeweiligen oberen Abschnitten miteinander verbunden sind, wobei die Säule (1) eine vorgefertigte Säule ist mit freiliegender Reserve-Bewehrungsstäben (11) an ihrer Oberseite und einer zu gießenden Struktur (12) an ihrer Unterseite, wobei die zu gießende Struktur (12) darin mit Reserve-Verbindungsstäben (13) versehen ist, die vertikale Bewehrungsstäbe (131) und Querbügel (132) umfassen,
wobei die zu gießende Struktur (12) zur Verbindung mit einer unteren Gebäudestruktur (14) verwendet wird, die freiliegende Bewehrungsstäbe (141) aufweist, die unter der Säule angeordnet sind und in die zu gießende Struktur (12) eingesetzt sind, wobei eine Verbindung zwischen der Stütze (1) und der unteren Gebäudestruktur (14) durch Gießen von Ortbeton in die zu gießende Struktur (12) erreicht wird,
dadurch gekennzeichnet, dass
die freiliegenden Bewehrungsstäbe (141) der unteren Gebäudestruktur überlappt werden und mit den Reserve-Verbindungsstäben der zu gießenden Struktur (12) gebündelt werden, wobei die vertikalen Bewehrungsstäbe (131) mit den freiliegenden Bewehrungsstäben (141) verbunden werden, und mit diesen durch die Querbügel (132) fixiert sind, so dass die Säule (1) und die untere Gebäudestruktur (14) miteinander verbunden sind, durch Bildung einer Schablone außerhalb der zu gießenden Struktur (12) und durch Gießen von Beton darin, und wobei die Säule (1) an einer oder mehreren ihrer unteren Seitenwänden nach innen eingebuchtet ist, um die zu gießende Struktur (12) zu formen.

2. Der vorgefertigte Rahmen nach Anspruch 1, wobei die Innenwand der zu gießenden Struktur abgeschrägt ist.

3. Der vorgefertigte Rahmen nach Anspruch 1, wobei die freiliegender Reserve-Bewehrungsstäben an der Oberseite der Säule (1) höher sind als der Hauptträger (2) und der Boden (5).

4. Der vorgefertigte Rahmen nach Anspruch 1, wobei an einem Verbindungsknoten zwischen dem Hauptträger (2) und einer Säule (1), die sich an einem Ende des Rahmens befindet, der vor Ort gießbare Ab-

schnitt an einem Ende des Hauptträgers (2) mit oberen und unteren Verbindungsstäben versehen ist, wobei jeder der Verbindungsstäbe an einem freien Ende gebogen ist.

5. Der vorgefertigte Rahmen nach Anspruch 1, wobei an Verbindungsknoten zwischen der Säule (1) und zwei Hauptträgern (2) auf einer rechten Seite und einer linken Seite davon die vor Ort gießbaren Teile an einem Ende eines der beiden Hauptträger (2) mit oberen und unteren Verbindungsstäben versehen ist, die über der Säule (1) verlaufen und sich bis zum anderen der beiden Hauptträger (2) erstrecken, und beide Enden der oberen Verbindungsstäbe jeweils mit Bewehrungsstäben verbunden sind, die auf der Oberseite vor Ort gießbaren Teile der beiden Hauptträger (2) angeordnet sind.

6. Der vorgefertigte Rahmen nach Anspruch 1, wobei eine Zementmörtelschicht zwischen einer Bodenfläche der Säule (1) und der unteren Gebäudestruktur verteilt ist.

Revendications

1. Cadre préfabriqué, comprenant au moins une colonne (1), au moins une poutre principale (2) reliée à la colonne (1), au moins une poutre secondaire (3) reliée à la poutre principale (2), et un sol (5),

dans lequel la colonne (1), la poutre principale (2) et la poutre secondaire (3) sont toutes des éléments préfabriqués, et la poutre principale (2) et la poutre secondaire (3) sont toutes deux pourvues, sur leurs parties supérieures respectives, de barres d'armature de réserve exposées et de barres d'armature pour pièces coulées sur place,
dans lequel le sol (5) est une plaque stratifiée ayant une dalle préfabriquée (51) au niveau d'une partie inférieure de celle-ci, et la dalle préfabriquée (51), la poutre principale (2) et la poutre secondaire (3) sont reliées ensemble au moyen de béton coulé sur place sur des parties supérieures respectives de celles-ci,
dans lequel la colonne (1) est une colonne préfabriquée ayant des barres d'armature de réserve exposées (11) au niveau de son sommet et une structure à couler (12) au niveau de son fond, la structure à couler (12) étant pourvue de barres de liaison de réserve (13), qui comprennent des barres d'armature verticales (131) et des étriers transversaux (132), dans lequel la structure à couler (12) est utilisée pour la liaison avec une structure de bâtiment inférieure (14), qui a des barres d'armature exposées (141) qui sont situées sous la colonne et insérées dans la structure à couler (12), une liaison entre la colonne (1) et la structure de bâtiment inférieure (14) étant réalisée en coulant du béton sur place dans la structure à couler (12),
caractérisé en ce que
les barres d'armature exposées (141) de la structure de bâtiment inférieure sont chevauchées et regroupées avec les barres de liaison de réserve de la structure à couler (12), les barres d'armature verticales (131) étant reliées aux barres d'armature exposées (141) et fixées à celles-ci par les étriers transversaux (132), de sorte que la colonne (1) et la structure de bâtiment inférieure (14) soient reliées l'une à l'autre en établissant un gabarit à l'extérieur de la structure à couler (12) et en coulant du béton avec celle-ci, et
dans lequel la colonne (1) est évidée vers l'intérieur au niveau d'une ou plusieurs de ses parois latérales inférieures pour former la structure à couler (12).

2. Cadre préfabriqué selon la revendication 1, dans lequel la paroi intérieure de la structure à couler est biseautée.

3. Cadre préfabriqué selon la revendication 1, dans lequel les barres d'armature de réserve exposées au sommet de la colonne (1) sont plus élevées que la poutre principale (2) et le sol (5).

4. Cadre préfabriqué selon la revendication 1, dans lequel au niveau d'un noeud de liaison entre la poutre principale (2) et une colonne (1) située au niveau d'une extrémité du cadre, la partie coulée sur place au niveau d'une extrémité de la poutre principale (2) est pourvue de barres de liaison supérieures et inférieures, chacune des barres de liaison étant pliée au niveau d'une extrémité libre de celle-ci.

5. Cadre préfabriqué selon la revendication 1, dans lequel au niveau des noeuds de liaison entre la colonne (1) et deux poutres principales (2) vers un côté droit et vers un côté gauche de celle-ci, les parties coulées sur place au niveau d'une extrémité de l'une desdites deux poutres principales (2) sont pourvues de barres de liaison supérieures et inférieures, qui passent au-dessus de la colonne (1) et s'étendent vers l'autre desdites deux poutres principales (2), et les deux extrémités des barres de liaison supérieures sont reliées à des barres d'armature disposées au sommet des parties coulées sur place desdites deux poutres principales (2), respectivement.

6. Cadre préfabriqué selon la revendication 1, dans lequel une couche de mortier de ciment est disposée entre une surface inférieure de la colonne (1) et la structure de bâtiment inférieure.

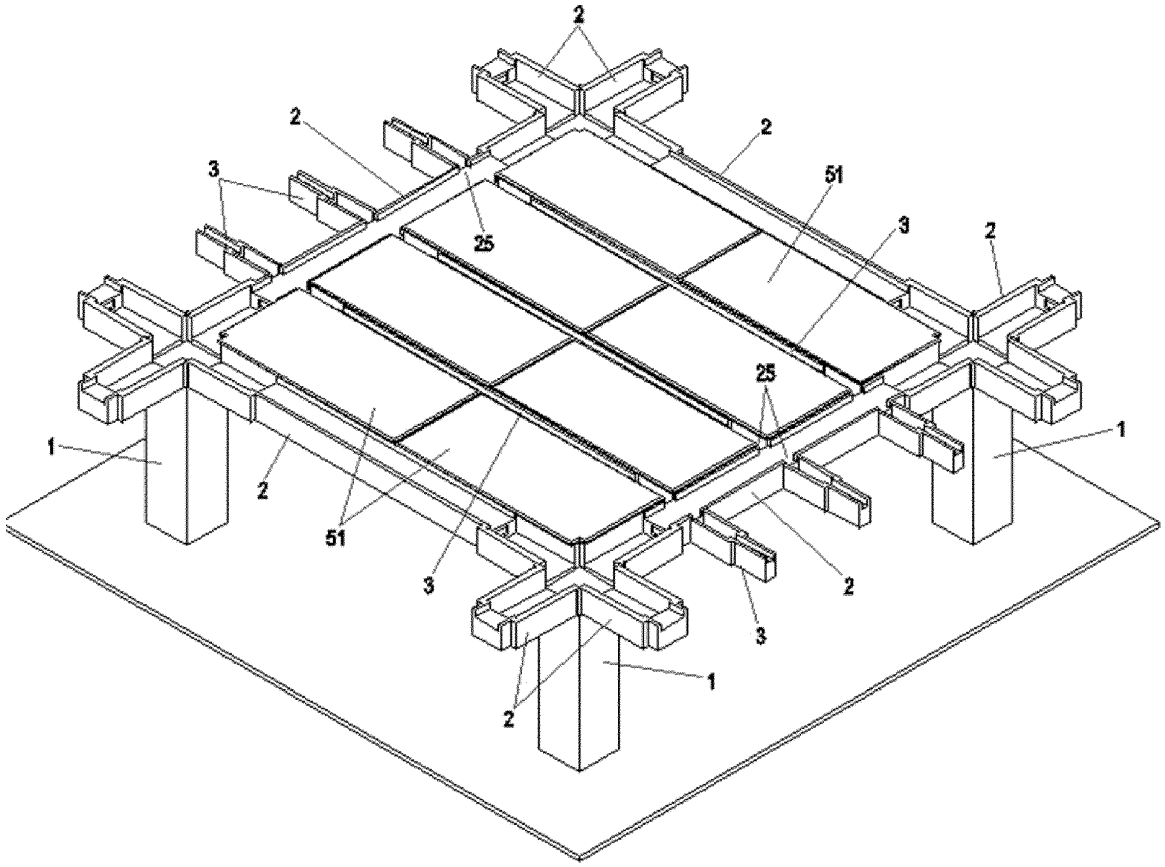

Fig. 1

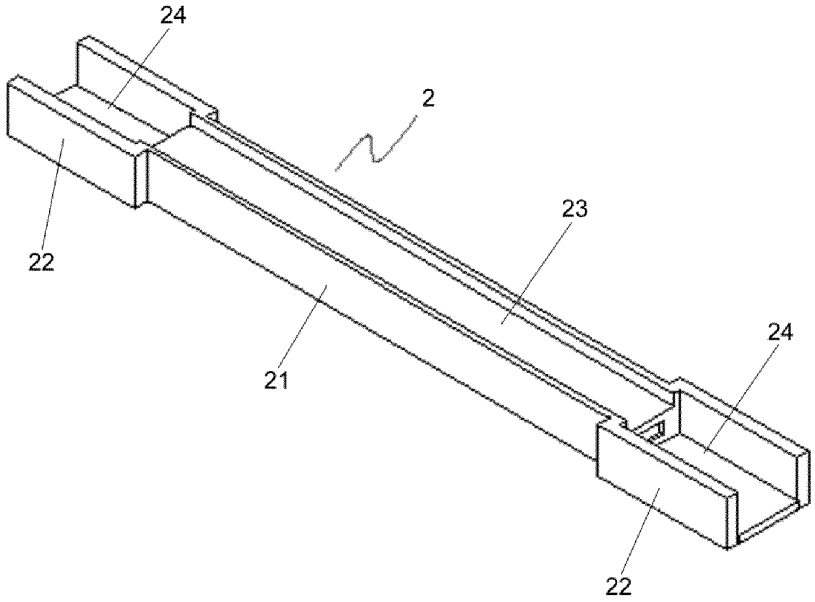

Fig. 2

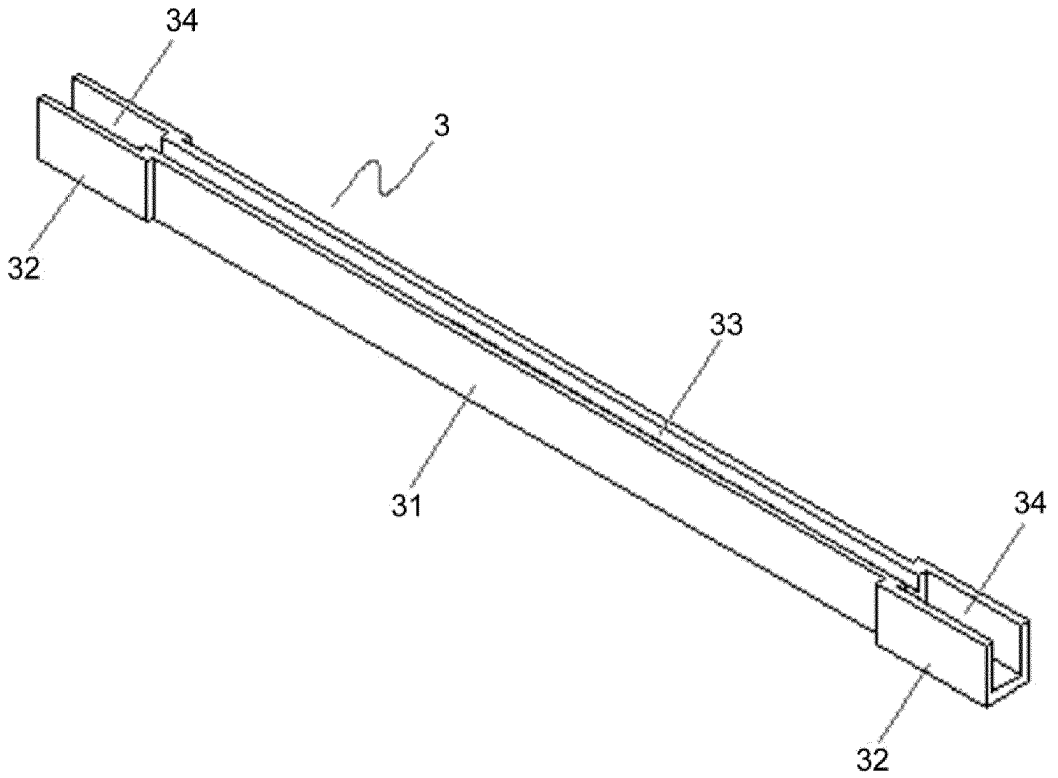

Fig. 3

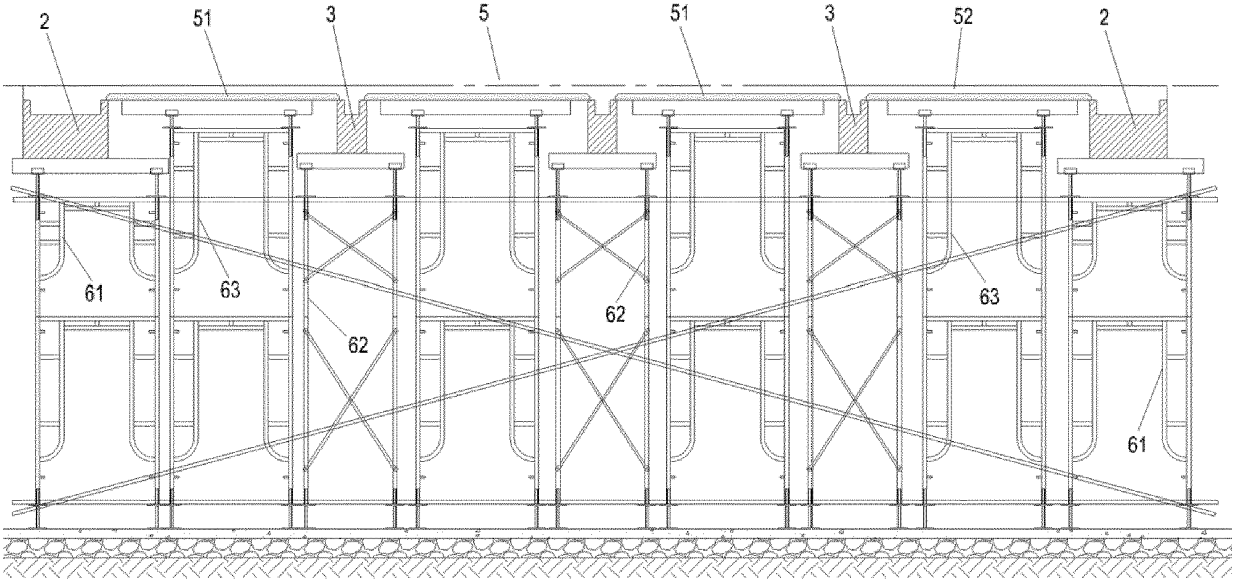

Fig. 4

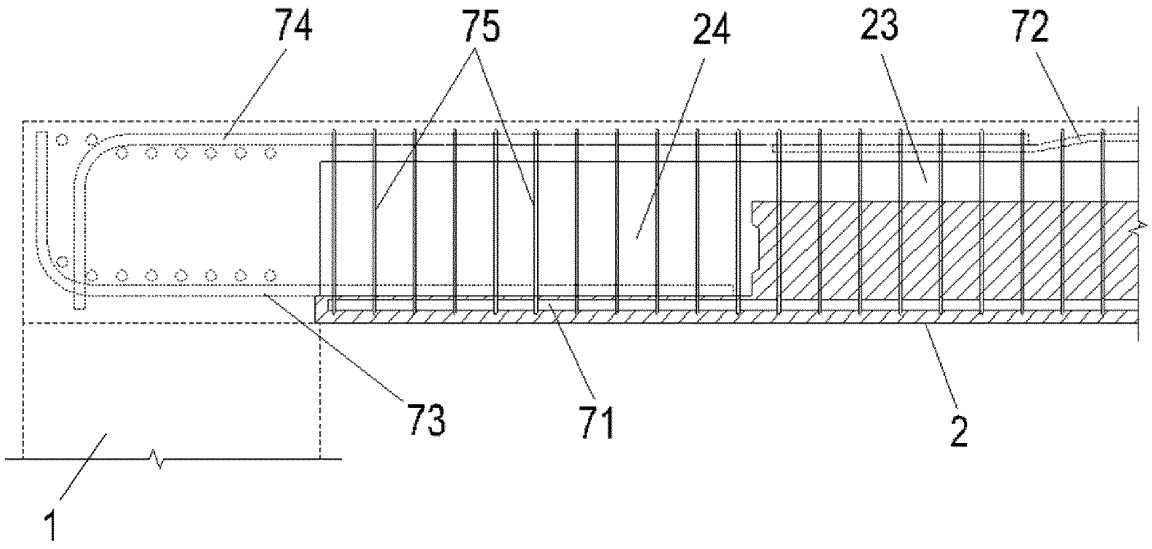

Fig. 5

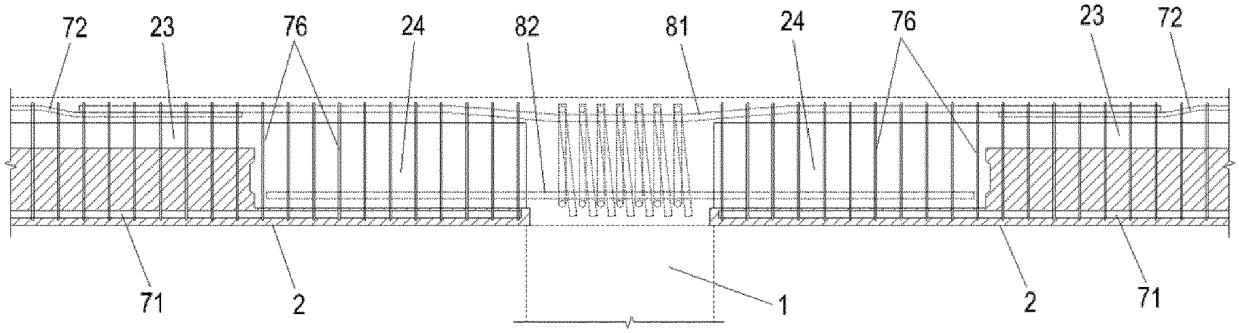

Fig. 6

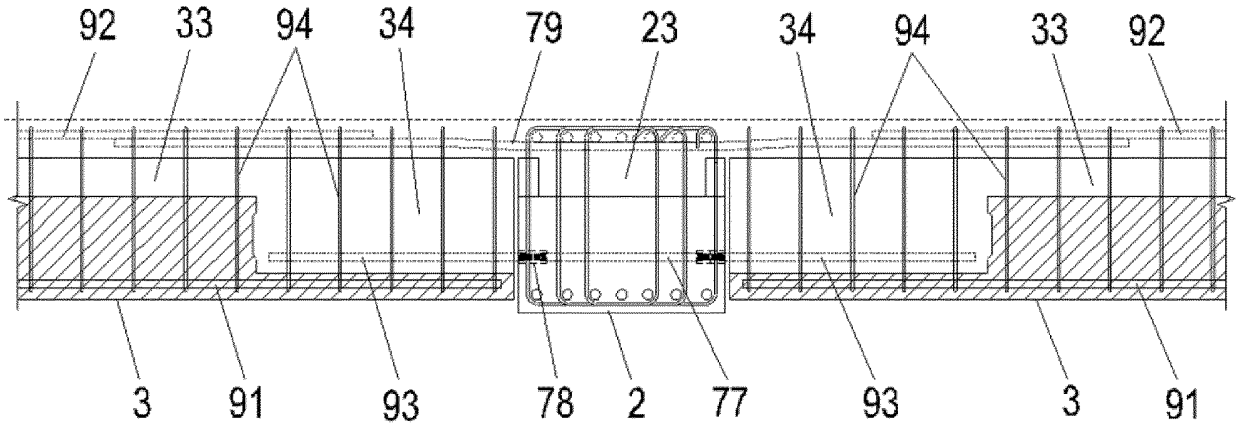

Fig. 7

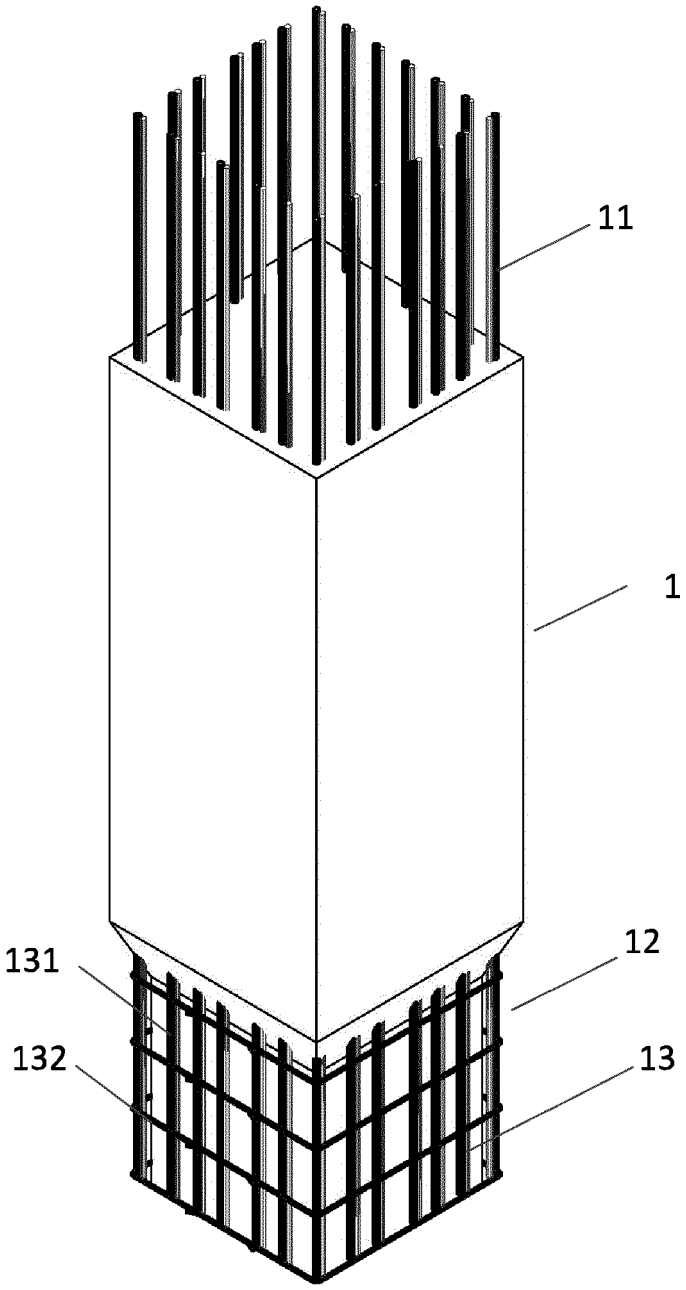

Fig. 8

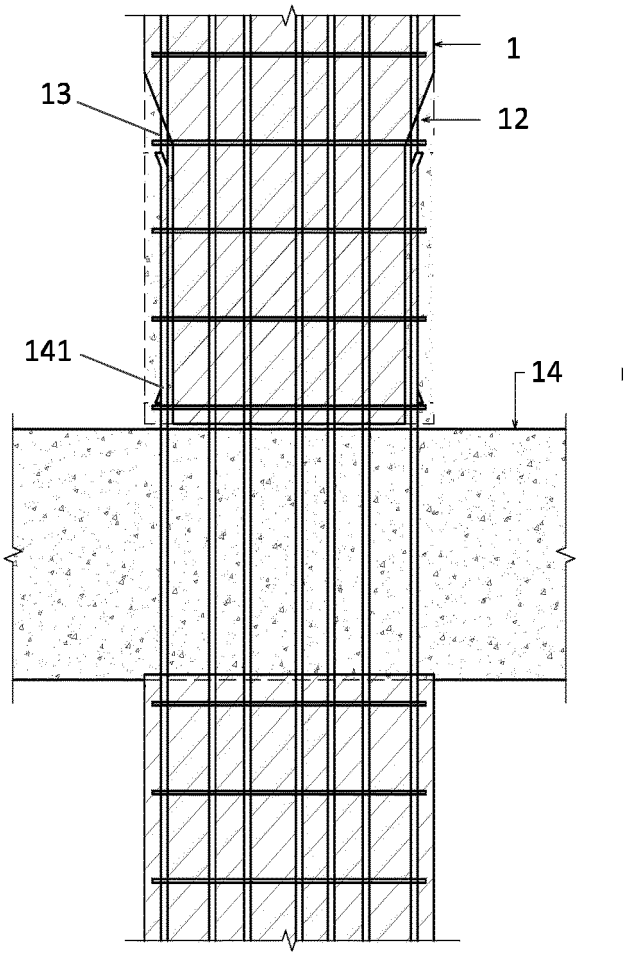

Fig. 9

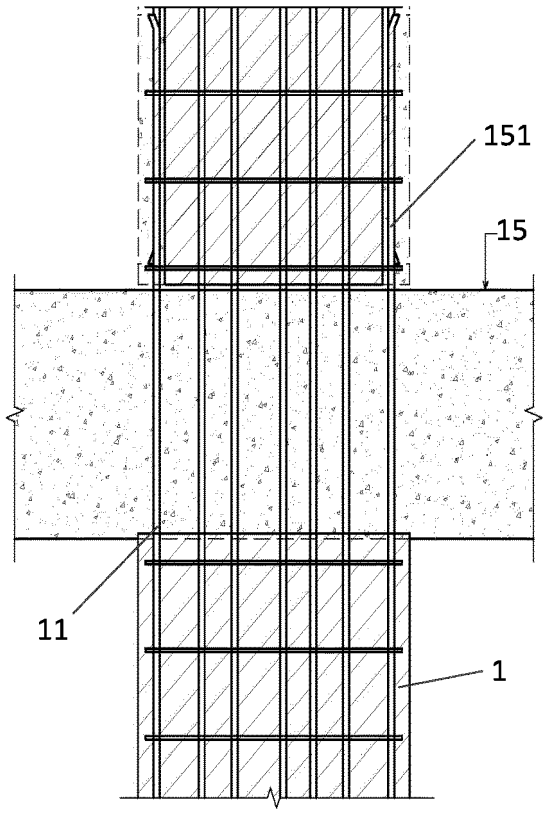

Fig. 10

REFERENCES CITED IN THE DESCRIPTION

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