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(71) Applicant: **Nishimatsu Construction Co. Ltd.**
Tokyo 105-8401 (JP)

(72) Inventors:

- **UTSUMI, Nobuki,**
NISHIMATSU CONSTRUCTION CO., LTD
Tokyo 105-8401 (JP)
- **CHIBA, Minoru,**
NISHIMATSU CONSTRUCTION CO., LTD
Tokyo 105-8401 (JP)

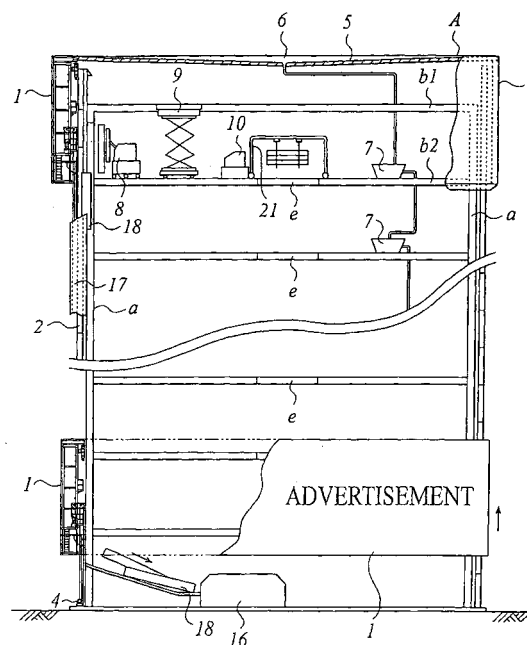
- **GOTO, Norihiro,**
NISHIMATSU CONSTRUCTION CO., LTD
Tokyo 105-8401 (JP)
- **SHIKAMORI, Yasuyuki,**
NISHIMATSU CONSTRUC. CO., LTD
Tokyo 105-8401 (JP)
- **MIYASHITA, Takeshi,**
NISHIMATSU CONSTRUC. CO., LTD
Tokyo 105-8401 (JP)
- **SAKURAI, Etsuo,**
NISHIMATSU CONSTRUCTION CO., LTD
Tokyo 105-8401 (JP)

(74) Representative: **Grünecker, Kinkeldey,**
Stockmair & Schwanhäusser Anwaltssozietät
Maximilianstrasse 58
80538 München (DE)

(54) **BUILDING DEMOLISHING METHOD**

(57) In the building demolishing method, a large-sized heavy machine is not required and scaffolding which is necessary for demolishing a building is always secured. The guide columns 2 are erected at predetermined intervals around a lateral periphery of the building a to be demolished, the shield which is slidable up and down as guided by the guide columns 2 are assembled on a ground or at a level of a low story of the building a to surround the lateral periphery of the building, and the demolishing machines 8-10 are stored in the shield 1. The guide column member 2a is extended upward and the shield 1 is ascended as guided by guide columns 2 to cover a lateral periphery of an highest story of the building a. The building a is demolished by the demolishing machines 8-10, and every time one floor is demolished, the shield 1 storing the demolishing machines 8-10 is descended as guided by the guide column 2 and the guide column is shortened. These operations are repeated to demolish the building a.

FIG.1



Description

Filed of the Invention

[0001] The present invention relates to a building demolishing method which is adaptable for demolishing a building, particularly a high building.

Background Art

[0002] Generally, for demolishing a building, a method is adapted in which a scaffolding is put up around a building to be demolished to cover the whole building and a demolishing is carried out sequentially from an upper story.

[0003] However, specially, when a building to be demolished is a high building, there are disadvantages that it requires a lot of time and expense for work because a large number of scaffoldings are required and the work location is high.

[0004] Further, it is required to take into consideration to prevent a pollution problem which is caused by noise or dust scattering.

[0005] Accordingly, a method to shut off and cover the surrounding of a story on which a demolishing work is carried out is considered. However, in the earlier development, a method in which a movable roof is mounted on a highest story per se of the building to be demolished to cover the highest story, attaching a demolishing machine to the roof, and disclosing a noise and dust shielding apparatus at the end thereof has been proposed.

[0006] In the above-mentioned method of the earlier development, because the movable roof is mounted on the highest story per se of the building to be demolished to cover the highest story and the demolishing machine is attached thereto, the apparatuses for demolishing the building as a whole tends to become heavy. A heavy machine such as a giant crane is required for lifting up the whole apparatuses for demolishing the building, so that there are problems that the work tends to become difficult and need a lot of time, and the shielding apparatus which discloses carries risk to be flapped by strong winds on a high airy region, as the building to be demolished becomes higher. Further, since the floor face itself on which the work is carried out is a floor to be demolished, the floor face space for working becomes narrow as the demolishing work progresses and the working property becomes extremely in bad situation. Therefore, it is considered to mount a demolishing machine on a lower story below a story to be demolished so as to always secure the scaffolding which is necessary for demolishing the building.

[0007] An object of the present invention is to provide a building demolishing method in which structuring a shield does not require a large-sized heavy machine and a scaffolding which is necessary for demolishing a building is always secured so as to smoothly progress a demolishing work.

Disclosure of The Invention

[0008] In order to solve the following problems, the building demolishing method described in claim 1, for example, as shown in FIG. 1 (FIG. 8), comprises:

erecting guide columns 2 (102) at predetermined intervals around a lateral periphery of a building a (c) to be demolished;

assembling a shield 1 (101) which is slidable up and down as guided by guide columns 2 (102) on a ground or at a level of a low story of the building a (c) to surround the lateral periphery of the building a (c);

providing a storing space 1c in the shield 1 adjacent to the lateral periphery of the building a to store a demolishing machine (a glass handling machine 8 (108)), a small lifting platform 9 (109), a cutter 10 (110) or a slab cutter 110 a), or storing the demolishing machine (the glass handling machine 8 (108)), the small lifting platform 9 (109), the cutter 10 (110) or the slab cutter 110 a);

connecting a guide column member 2a (102a) to an upper end portion of the guide column 2 (102) by lifting up the guide column member 2a (102a) by a crane 3 (103) which is attached to the shield 1 to sequentially extend the guide column 2 (102) upward, and covering a lateral periphery of an highest story of the building a (c) by the shield 1 (101) which was sequentially ascended as guided along the extended guide column 2;

a demolishing step which comprises: moving the demolishing machine (the glass handling machine 8 (108), the small lifting platform 9 (109), the cutter 10 (110), or the slab cutter 110 a), to a floor of the building a (c), and demolishing the building by the demolishing machine (the glass handling machine 8 (108), the small lifting platform 9 (109), the cutter 10 (110), or the slab cutter 110 a); and

a descending step which comprises: storing the demolishing machine (the glass handling machine 8 (108), the small lifting platform 9 (109), the cutter 10 (110) or the slab cutter 110 a) in the storing space 1c (101c) and descending the shield 1 (101) to a next lower story, and removing the guide column member 2a (102a) which is at the upper end portion of the guide column 2 (102) to lift down the guide column member 2a (102a) by the crane 3 (103) and shortening the guide column 2 (102) downward sequentially, after the demolishing step,

wherein the demolishing step and the descending step are repeated a predetermined number of times.

[0009] According to the invention as claimed in claim 1, because the shield is sequentially ascended as guided along the guide columns to cover the lateral periphery of the building after assembling the shield on the ground or at the level of the low story of the building, the

shield can be assembled on the ground or at the level of the low story of the building on which the working condition is good in comparison with the level of a high story of the building. Thus, the assembling work can be substantially simplified. Therefore, it is suitable for consisting of the shield by a member which has a strength and high stiffness enough to stand strong winds at the high story of the building and a member which has high sound and heat insulating properties.

[0010] The guide column member is lifted up by the crane which is attached to the shield and connected to the upper end portion of the guide column to sequentially extend the guide column upward. By the opposite procedure, when sequentially demolishing each story of the building, each time the story to be demolished moves downward, the guide column member which is at the upper end portion of the guide column is removed and lifted down by the crane to sequentially shorten the guide column downward. Accordingly, when structuring or demolishing the guide column, there is no need to separately prepare a crane for structuring or demolishing the guide column because the crane which is attached to the shield can be used.

[0011] Each story of the building is sequentially demolished downward from the highest story, and each time the story to be demolished moves downward, the shield is sequentially descended to cover and enclose the lateral periphery of the story to be demolished. Thus, the leakage of dust or noise which is generated when demolishing the building to outside from the side of the story to be demolished can be prevented.

[0012] The shield which covers the lateral periphery of the story to be demolished can shut off wind and weather, so that a good working environment for the story to be demolished can be secured. Accordingly, the demolishing work is less affected by the weather, and the demolishing work can be progressed smoothly.

[0013] The demolishing machine for demolishing the building is stored in the storing space which is provided in the shield, and the storing space is adjacent to the building. Thus, the demolishing machine can be carried easily to the desired story of the building by ascending or descending the shield. That is, it is not necessary to provide a crane for lifting up or lifting down the demolishing machine outside the building to carry out a lifting work. Accordingly, the demolishing work can be carried out with the construction cost for lifting the demolishing machine considerably reduced.

[0014] The low story indicates a story at the level of, for example, a second story to a fifth story, and the story which is preferable for carrying out the building demolishing method is accordingly selected among these stories depending on the site conditions on which the building to be demolished is built. In the demolishing method, when the shield is positioned at the highest story, the wall of the highest story and the roof are demolished, and when the shield is on a story other than the highest story, the wall of the story and the floor of a story which

is one story above are demolished.

[0015] By providing the crane to move in a center direction of the building, the area in which the work can be carried out by the crane can be widened from the outer periphery in the center direction. As a method to movably provide the crane in an inner direction of the building, for example, there are methods such as fixing a gantry frame which doubles as a traveling rail of the crane to the shield so as to be retractable in the center direction and storing it in the shield 1, or fixing the gantry frame in the shield 1 so as to be rotatable in the center direction and storing it in the shield 1.

[0016] The peripheral side wall of the shield consists of a material which partially has a translucency so as to increase brightness inside the building. Therefore, the working environment inside the building can be improved and the cost for the lights inside the building can be reduced.

[0017] In addition, the leakage of the noise during the demolishing work can be prevented by constructing the peripheral side wall of the shield with a material having a sound insulating property such as a sound insulating panel to.

[0018] In the invention described in claim 2, for example, as shown in FIG. 1 (FIGS. 8-10, FIG. 12), the building demolishing method as claimed in claim 1,

wherein the demolishing machine (the glass handling machine 8 (108), the small lifting platform 9 (109), the cutter 10 (110), or the slab cutter 110 a) is provided on a lower story b2 (d2) below a story b1 (d1) to be demolished in the building a to demolish the story b1 (d1) to be demolished.

[0019] According to the invention as claimed in claim 2, the similar effect to that of claim 1 can be obtained, and because the demolishing machine is provided on the lower story below the story to be demolished to demolish the story to be demolished, the scaffolding which is necessary for demolishing the story to be demolished through the demolishing work for the story to be demolished can be secured on the lower story below the story to be demolished and the demolishing work for the story to be demolished can be smoothly progressed by the demolishing machine which is provided on the lower story below the story to be demolished.

[0020] In the invention as claimed in claim 3, for example, as shown in FIG. 1, the building demolishing method as claimed in claim 1 or 2,

wherein a roof 5 is closely attached to an upper portion of the shield 1 when demolishing the building a.

[0021] According to the invention as claimed in claim 3, the similar effect to that of claim 1 or 2 can be obtained, and because the roof is closely attached to the upper portion of the shield when demolishing the building, the leakage of noise or dust which is generated when demolishing the building from above of the story to be demolished to outside of the building demolishing site can be prevented.

[0022] The roof which is closely attached to the upper

portion of the shield which covers and encloses the lateral periphery of the story to be demolished can shut off wind and weather, so that a good working environment for the story on which the demolishing work is carried out can be secured. Accordingly, the demolishing work of the building is not affected by the weather and the demolishing work can be progressed smoothly.

[0023] The roof may have an openable structure. Thereby, it is possible to choose the state depending upon the weather, and the amenity of the working environment can be improved depending on the situation. For structuring the roof in an openable structure, for example, a roof material which is slidable as guided by a framework structuring the roof is provided.

[0024] In addition, the framework which constitutes the roof may be utilized as a traveling rail of a hoist crane or the like. Thereby, the work using the hoist crane can be carried out even at a position inside the building; and workability can further be improved.

[0025] In the invention as claimed in claim 4, for example, as shown in FIG. 1, the building demolishing method as claimed in claim 3,

wherein the roof 5 comprises a drainage 6.

[0026] According to the invention as claimed in claim 4, the similar effect to that of claim 3 can be obtained, and because the drainage is provided on the roof, the rainwater poured on the roof can be collected at the drainage to be utilized for watering to treat dust which is generated by the demolishing work of the building.

[0027] In the invention as claimed in claim 5, for example, as shown in FIG. 1, the building demolishing method as claimed in any one of claims 1-4,

wherein the demolishing machine (the glass handling machine 8 (108), the small lifting platform 9 (109), the cutter 10 (110), or the slab cutter 110 a) which is used for demolishing each story b1 to be demolished is lifted up or lifted down by the crane 3.

[0028] According to the invention as claimed in claim 5, the similar effect to that of any one of claims 1-4 can be obtained, and because the demolishing machine which is used for demolishing each story to be demolished is lifted up or lifted down by the crane which is attached to the shield, workability of the building demolishing work can be improved.

[0029] In the invention as claimed in claim 6, for example, as shown in FIG. 17, the building demolishing method as claimed in any one of claims 1-4,

wherein the demolishing machine (the glass handling machine 8 (108), the small lifting platform 9 (109), the cutter 10 (110), or the slab cutter 110 a) which is used for demolishing the each story b1 to be demolished is lifted up or lifted down by a frame structure for loading and unloading 21 (121) which is provided on the lower story b2 (d2) below the story b1 (d1) to be demolished through a vertical hole e (f) inside the building a (c).

[0030] According to the invention as claimed in claim 6, the similar effect to that of any one of claims 1-4 can be obtained, and because the demolishing machine

which is used for demolishing each story to be demolished is lifted up or lifted down through the vertical hole inside the building by the frame structure for loading and unloading which is provided on the story below the story to be demolished, there is no need to prepare a crane outside the building for lifting up or lifting down the demolishing machine.

[0031] In the invention as claimed in claim 7, for example, as shown in FIG. 1 (FIG. 13), the building demolishing method as claimed in any one of claims 1-6,

wherein a peripheral side wall of the shield 1 (101) is utilized as an advertising medium.

[0032] According to the invention as claimed in claim 7, the similar effect to that of any one of claims 1-6 can be obtained, and because the peripheral side wall of the shield is utilized as the advertising medium, the shield which is utilized as the advertising medium can generate an economic effect through the building demolishing work period.

[0033] In the invention as claimed in claim 8, for example, as shown in FIGS. 3 and 4 (FIG. 8), the building demolishing method as claimed in any one of claims 1-7,

wherein the shield 1 (101) is ascended or descended by winding or unwinding a rope 14 (114) which is connected to the shield using a winch 4 (104), a load detecting apparatus (load cell) 19a (119a) being provided for detecting a force which acts on the rope 14 (114).

[0034] The winch, for example, may be mounted on the ground or inside the shield. Further, depending on the construction condition of the demolishing work, the winch may be interchanged such as from the ground to the inside of the shield or vice versa appropriately.

[0035] According to the invention as claimed in claim 8, the similar effect to that of any one of claims 1-7 can be obtained, and because the shield is ascended or descended by winding or unwinding the rope which is connected to the shield using the winch and the load detecting apparatus for detecting a force which acts on the rope is provided, when ascending or descending the shield, the operation of winding or unwinding by the winch is carried out while consecutively detecting the force which acts on the each rope. Thus, an excessive force which acts on the each rope or the winch can be prevented.

[0036] In the invention as claimed in claim 9, for example, as shown in FIGS. 3 and 4 (FIG. 8), the building demolishing method as claimed in any one of claims 1-7,

wherein the shield 1 (101) is ascended or descended by winding or unwinding a rope 14 (114) which is connected to the shield using a winch 4 (104), a movable pulley 13 (113) being combined with the rope 14 (114) so as to reduce a force which acts on the winch 4 (104).

[0037] According to the invention as claimed in claim 9, the similar effect to that of any one of claims 1-7 can be obtained, and because the shield is ascended or descended by winding or unwinding the rope which is connected to the shield using the winch and the movable

pulley is combined with the rope so as to reduce the force which acts on the winch, the force acting on the rope which is wound or unwound by the winch becomes small in comparison with the case where the rope is not combined with the movable pulley. Thus, the shield can be ascended or descended by a winch which is smaller in size and has a lower performance.

[0038] In the invention as claimed in claim 10, for example, as shown in FIG. 3 (FIG. 8), the building demolishing method as claimed in any one of claims 1-7,

wherein the shield 1 (101) is ascended or descended by winding or unwinding a rope 14 (114) which is connected to the shield using a winch 4 (104), a load detecting apparatus (load cell) 19a (119a) being interposed on the rope 14 (114) for detecting a force which acts on the rope 14 (114), and a movable pulley 13 (113) being combined with the rope 14 (114) so as to reduce a force which acts on the winch 4 (104).

[0039] According to the invention as claimed in claim 10, the similar effect to that of any one of claims 1-7 can be obtained, and because the force acting on the rope which is wound or unwound by the winch becomes small in comparison with the case of not using the movable pulley, the load detecting apparatus which is interposed on the rope can be of smaller in size and lower performance.

[0040] In the invention as claimed in claim 11, for example, as shown in FIG. 2 (FIG. 14), the building demolishing method as claimed in any one of claims 1-10,

wherein the shield 1 (101) is provided with a sway control component 11 (111) which can limit sway of the shield 1 (101) with respect to the guide column 2 (102) by abutting on a surface of the guide column 2 (102).

[0041] According to the invention as claimed in claim 11, the similar effect to that of any one of claims 1-10 can be obtained, and because the shield is provided with the sway control component which can limit the sway of the shield with respect to the guide column by abutting on the surface of the guide column, the sway can be suppressed during the operation of ascending and descending the shield or when the strong winds are blowing.

[0042] In the invention as claimed in claim 12, for example, as shown in FIG. 2 (FIG. 14), the building demolishing method as claimed in claim 11,

wherein the sway control component 11 (111) is provided with a guide roller 12, 112 which is rollable up and down on a surface of the guide column.

[0043] According to the invention as claimed in claim 12, the similar effect to that of claim 11 can be obtained, and because the sway control component is provided with a guide roller which is rollable up and down on the surface of the guide column, the shield can be ascended or descended smoothly as guided along the guide column.

[0044] In the invention as claimed in claim 13, for example, as shown in FIG. 3, the building demolishing method as claimed in any one of claims 1-12,

wherein a supporting member (steel 15 (115)) is fixed on the guide column to make the supporting member (steel 15 (115)) support the shield 1 during the demolishing work of each story to be demolished.

[0045] According to the invention as claimed in claim 13, the similar effect to that of any one of claims 1-12 can be obtained, and because the supporting member is fixed on the guide column to make the supporting member support the shield during the demolishing work of the each story to be demolished, the shield is stably held by guide column through the supporting member during the demolishing work of the each story to be demolished which makes up a majority of the building demolishing work period.

Brief Description of The Drawings

[0046]

FIG. 1 is a front sectional view showing an embodiment of a building demolishing method according to the present invention;

FIG. 2 is a view showing an engaging portion of a guide column and a shield in the embodiment;

FIG. 3 is a view showing the shield which is positioned around a building in the embodiment;

FIG. 4 is a perspective view showing an ascending and descending section (winch, movable pulley, rope) of the shield in the embodiment;

FIG. 5 is a plan view showing the shield and the building in the embodiment;

FIG. 6 is a plan view showing the shield and the building in the embodiment;

FIG. 7 is a plan view showing a personnel positioning during the ascending and descending operation of the shield in the embodiment;

FIG. 8 is a view showing the shield which is positioned around the building in another embodiment other than the embodiment shown in FIGS. 1-7 in the embodiments of the building demolishing method according to the present invention;

FIG. 9 is a perspective view showing a roof which is provided on the shield in the another embodiment;

FIG. 10 is a perspective view showing a hoist crane traveling rail which is formed on a roof surface of the shield in the another embodiment;

FIG. 11 is a view showing a traveling rail of a crane which is provided on an upper portion of the shield in the another embodiment;

FIGS. 12A and 12B are views showing a gantry frame which doubles as the traveling rail of the hoist crane which is stored in the shield in the another embodiment;

FIG. 13 is a perspective view showing the shield which is utilized as an advertising medium in the another embodiment;

FIG. 14 is a view showing an engaging portion of a

guide column and a shield in the another embodiment;

FIG. 15 is a view showing a state in which the shield is supported by the guide column in the another embodiment;

FIG. 16 is a sectional view showing a first step of a demolishing procedure of each story in the another embodiment;

FIG. 17 is a sectional view showing a second step of the demolishing procedure of the each story in the another embodiment;

FIG. 18 is a sectional view showing a third step of the demolishing procedure of the each story in the another embodiment;

FIG. 19 is a sectional view showing a forth step of the demolishing procedure of the each story in the another embodiment;

FIG. 20 is a sectional view showing a fifth step of the demolishing procedure of the each story in the another embodiment;

FIG. 21 is a sectional view showing a sixth step of the demolishing procedure of the each story; and

FIGS. 22A and 22B are sectional views showing a method of conveyance of a demolishing machine by the shield in the another embodiment.

Best Mode for Carrying Out the Invention

[0047] The embodiment of the building demolishing method in the present invention will be described in detail referring to the drawings below.

[First Embodiment]

[0048] The building demolishing method in the embodiment solves a problem of the earlier developed demolishing method in which a large-sized heavy machine is required for structuring a shield and carries risk because the scaffolding becomes narrow as the demolishing proceeds. As shown in FIGS. 1 to 3, a feature of the embodiment is that the shield 1 comprising a sound and heat insulating panel 1a which has high stiffness enough to stand strong winds on a high story at a high airy region and a steel frame 1b which is assembled to comprise a storing space 1c in which the demolishing machines 8-10 can be stored and high stiffness is assembled on the ground so as to be slidable up and down on a guide column which is first assembled around a building a. In addition, the shield 1 which stores the demolishing machines 8-10 is ascended by a winch 4 as guided along the guide column 2, a roof 5 is attached to the highest story of the building to form an enclosed shield A, a ceiling story of a work floor face which is to be a scaffolding is demolished by the demolishing machines 8-10 which were moved to the building a from the storing space 1c inside the enclosed shield A to secure a wide scaffolding for work until completion of demolishing the ceiling story, the enclosed shield A in which the demolishing ma-

chines 8-10 are stored in the storing space 1c is descended each time a story is demolished to sequentially move the demolishing machines 8-10 to a next lower story and rearrange a work position to the next lower story, a waste material of the demolished building is lifted down to the ground for crushing treatment, and the rainwater which is collected from a drainage 6 in a water tank for watering 7 is utilized for watering on each story to treat dust. Furthermore, a peripheral side wall of the shield 1 of the enclosed shield A which is lifted up stands strong winds at the high airy region and is for cold protection and prevention of noise and dust scattering, is used as an advertising medium.

[0049] Specially, the assembling work of the shield 1 is carried out on the ground so that the work is extremely stable in comparison with the earlier developed method. Thus, the shield 1 for prevention of noise and dust scattering can consist of a sound and heat insulating panel with high stiffness enough to stand strong winds at the high airy region. Moreover, because the shield 1 per se is lifted up with the guide column 2 which is assembled upward, only the crane 3 which is able to make small adjustments or the winch 4 is required and heavy equipment is not required. Because the work is always a demolishing work of a ceiling story, the whole space can be secured on the working story for scaffolding until the completion of the work. The demolishing work position and the demolishing machines 8-10 which are stored in the enclosed shield A are moved to the lower story by descending the enclosed shield A for prevention of noise and dust scattering as the demolishing proceeds, and the waste material of the demolished building is lifted down to the ground by the crane 3 to be crushed on the ground. Accordingly, the work is stable, excellent in workability and efficient, so that the work period is shortened. Further, the rainwater can be effectively utilized and the shield can be diversely utilized as an advertising medium for a long time of construction period.

[0050] The shield 1, as shown in FIG. 1 (lower part), comprises a shield plate 1a which consists of a sound and heat insulating panel, and a frame 1b which is structured by assembling steels to make the guide column 2 support the shield 1. The shield plate 1a has high stiffness enough to stand strong winds at the upper story of the building a to be demolished, and the frame 1b has the storing space 1c in which the demolishing machines 8-10 can be stored and high stiffness.

[0051] As shown in FIG. 1 (upper part), the roof 5 is closely attached to the shield 1 on the highest story, so that wind and weather is shut off and the demolishing work of the building a can be smoothly proceeded. The drainage 6 is provided on the roof 5 so as to collect the rainwater which poured on the roof 5 therefrom. The rainwater can be utilized as watering for treating dust which is generated by the demolishing work of the building a to be demolished.

[0052] As shown in FIG. 2, a sway control component 11 is attached to the shield 1 so as to sandwich a pair

of the guide columns 2 which opposes interposing the building a from outside. The sway control component 11 is provided with the guide rollers 12 which are rollable up and down on a surface of the guide column 2.

[0053] Between the guide column 2 and the guide rollers 12, a predetermined clearance is formed so as normally not to abut each other. Normally, the guide column 2 and the guide rollers 12 do not abut each other. During the operation of ascending and descending the shield 1 or if the strong winds are blowing, when the shield 1 is to be moved horizontally with respect to the guide column 2, the guide rollers 12 abut on the surface of the guide column 2 so as to limit a sway of the shield 1 with respect to the guide column 2 within a certain range.

[0054] As shown in FIG. 3, the shield 1 is provided with an upper pulley 13a and a lower pulley 13b. The upper pulley 13a is fixed on the guide column 2a, and the lower pulley 13b is fixed on the shield 1. When the rope 14 is wound by using the winch 4 which is mounted on the ground, the distance between the upper pulley 13a and the lower pulley 13b is shortened to ascend the shield 1. On the contrary, when the rope 14 is unwound, the distance between the upper pulley 13a and the lower pulley 13b is widened to descend the shield 1.

[0055] On a predetermined position of the guide column 2a, a steel (supporting member) 15 is fixed by a bolt or welding, and the shield 1 is stably supported on the guide column 2 with the steel 15 as a stopper.

[0056] As shown in FIG. 4, the rope 14 is wound four-fold between the upper pulley 13a and the lower pulley 13b, so that the lower pulley 13b which is fixed on the shield 1 is supported by the upper pulley 13a through a total of eight ropes 14. That is, the force which acts on the rope 14 is one eighth in comparison with the case in which no movable pulley 13 is used.

[0057] A construction procedure of the building demolishing method of the embodiment will be explained below.

[0058] As shown in FIG. 1, the shield 1 to be assembled on the ground is approximately 8m in height. Considering that the height contains a height of the three guide columns 2a which consist of a piece of H beam constituting the guide column 2 to be assembled, first, three guide columns 2a are connected at some positions on the ground around the building a to be demolished leaving the rest in the building. Next, the steel frame 1b is assembled so as to have the storing space 1c in which the demolishing machines 8-10 can be stored and high stiffness, a sandwich sound and heat insulating panel 1a with a thickness of approximately 30mm is fixed on the outer periphery of the frame 1b, and the sway control component 11 is fixed on the inner periphery of the frame 1b to form the shield 1. As shown in FIG. 2, the sway control component 11 abuts and holds the guide column 2 through some pieces of the guide rollers 12 which are rotatable, so that the shield 1 covers and encloses the surrounding of the building a. That is, the shield 1 which can be assembled on the

ground is provided with a sound and heat insulating properties and high stiffness enough to stand strong winds and coldness at the high airy region, and space and high stiffness for storing and carrying the demolishing machines 8-10. An advertisement of a company which is under contract beforehand is on the outside surface of the shield 1 to utilize it as an advertising medium which has advertising effect for a long time of construction period.

[0059] After storing the demolishing machines 8-10 in the firmly assembled shield 1, the rope 14 is wound by the winch 4 which is mounted on the ground to ascend the shield 1 as shown in FIG. 3.

[0060] When the shield 1 is ascended a certain amount, the steel (supporting member) 15 as a stopper is fixed to the guide column 2a by a bolt or welding. After once holding the shield 1 by the steel 15, the upper pulley 13a is removed. The guide column member 2a which consists of a piece of H beam constituting the guide column 2 is connected to the guide column 2, and the upper pulley 13a is fixed on the guide column 2. The shield 1 is ascended while repeating the above-mentioned process.

[0061] As shown in FIG. 5, the shield 1 is tightly tied at a plurality points to the column member of the building a to be demolished by a wire 22 to prevent the shield 1 from causing shake over permissible range with respect to the building a to be demolished under the strong winds such as by a typhoon.

[0062] As shown in FIG. 1 (upper part), when the guide column 2 and the shield 1 are reached to the highest story of the building a to be demolished, the roof 5 which consists of the sound and heat insulating panel and has a recess portion at the center leading to the drainage 6 covers the shield 1 and is fixed to constitute the enclosed shield A. The roof 5 consists of the sound and heat insulating panel with high stiffness, so that the roof 5 is firmly fixed on the shield 1. Thus, the strong enclosed shield A is structured.

[0063] In the enclosed shield A, the water tank for watering 7 in which the rainwater collected at the drainage 6 is stored is provided on the lower story b2 below the story b1 to be demolished, and the small size demolishing machines such as the glass handling machines 8 for removing a sash or glass by absorbing them, the small lifting platform 9 and the cutter 10 for cutting and receiving a floor or beam on the story b1 to be demolished which are stored in the storing space 1c are moved to the building a to carry out the demolishing work. On the work story, that is, the lower story b2 below the story to be demolished, the work floor space can be secured until the demolishing work of the ceiling story, that is, the story b1 to be demolished is completed, so that the work can be stably proceeded.

[0064] A PC plate 18, glass or sash which constitutes the demolished wall is lifted down through a temporary enclosure 17 as shown in FIGS. 1 and 6 by the crane 3 which is provided on the top portion of the shield 1, and

a portion of which is slid down to the ground to be crushed by the crusher 16 mounted on the ground and exhausted outside. A slab floor, or a steel column and a beam are separately lifted down on the ground by a gantry crane to carry out a crushing treatment.

[0065] Depending on the construction condition, as shown in FIG. 1, the demolishing machines 8-10 may be moved to a desired story or removed by lifting up or lifting down the demolishing machines 8-10 which are used for demolishing the each story b1 to be demolished by the frame structure for loading and unloading 21 which is provided on the lower story b2 below the story b1 to be demolished through a vertical hole e inside the building a.

[0066] After demolishing the ceiling story, the demolishing machines 8-10 are stored in the storing space 1c, and the enclosed shield A is descended. In this case, the work is opposite to the ascending work, and the guide column 2 is demolished and lifted down by the crane 3 which is attached to the upper portion of the shield 1 in the order of demolished. At the same time, the shield 1 is descended to the story on which the demolishing work is carried out while loosening the rope 14 which is hooked with the pulley 13 which moves to the lower side in every stage by the winch 4. The demolishing machines 8-10 which are stored in the storing space 1c is moved to the lower story b2 below the story b1 to be demolished to secure the scaffolding for work. The shield 1 is normally positioned at an overhead location space from the time of ascending the shield 1 to the time of descending the shield 1 to the ground during carrying out the demolishing work in the construction period. During this period, since the outer wall is utilized as a surface for displaying an advertisement, the shield 1 doubles as an advertising medium which is seen from far away of all directions, and it is extremely effective and of some help to cope with the expenditure. For the watering to suppress dust during the dismantling work, the rainwater which is collected by the roof 5 in the water tank for watering 7 is utilized, so that it contributes to the resource saving.

[0067] Finally, the procedure of an ascending and descending operation of the enclosed shield A will be explained.

[0068] As shown in FIG. 7, a supervisor M1 who manages the whole ascending and descending operation of the enclosed shield A, an operator M2 who operates the winch 4, a watch person M3 for an ascending and descending operation who monitors the status of an ascending and descending apparatus (the movable pulley 13, the rope 14), the tension of the rope 14 which is detected by a load cell 19a, and the level of each point of the enclosed shield A which is detected by winding amount and unwinding amount of the winch 4 and a laser displacement meter (not shown), and a watch person M4 who monitors the status of the enclosed shield A are arranged on the story of the building c on which the enclosed shield A is placed. A winch watch person

M5 who monitors the winch 4 is arranged on the ground on which the winch is disposed.

[0069] The supervisor M1 orders the operator M2 to operate the winch 4.

5 **[0070]** The operator M2 follows the order by the supervisor M1 to carry out the operation of the winch 4.

[0071] During the ascending and descending operation of the enclosed shield A, the watch person M3 monitors the status of an ascending and descending apparatus (the movable pulley 13, the rope 14), the tension of the rope 14 which is detected by the load cell 19a, and the level of each point of the enclosed shield A which is detected by the winding amount and unwinding amount of the winch 4 and the laser displacement meter (not shown). When the watch person M3 found an abnormality in any of them, the watch person M3 gives a signal to the supervisor M1 by using an alarm whistle, and the supervisor M1 who got the signal orders the operator M2 to stop the winch 4.

20 **[0072]** During the ascending and descending operation of the enclosed shield A, the watch person M5 monitors the status of the winch 4 disposed on the ground. When the watch person M5 found an abnormality in the status of the winch 4, the watch person M5 gives a signal to the supervisor M1 by radio, and the supervisor M1 who got the signal orders the operator M2 to stop the winch 4.

25 **[0073]** The ascending and descending operation of the enclosed shield A by the winch 4 is, for example, stopped each 10cm height, and each time the winch 4 is stopped, the watch person M3 confirms the level of each point of the enclosed shield A. When the difference of the level of the each point becomes more than or equal to 10cm, the plurality of winches 4 is operated individually to carry out the level adjustment.

30 **[0074]** When the ascending and descending operation of the enclosed shield A is completed, the steel 15 is mounted on the guide column 2 after the order by the supervisor M1, so that the steel 15 supports the enclosed shield A.

40 **[0075]** Accordingly, the demolishment of the building a can be easily and stably carried out.

[Second Embodiment]

45 **[0076]** The summary of the building demolishing method in the embodiment is similar to that in the first embodiment. As shown in FIG. 8, a feature of the embodiment is that guide columns 102 are erected at predetermined intervals around a lateral periphery of a building c to be demolished, the shield 101 which comprises a shield plate 101a having a sound and heat insulating panel 1a enough to stand strong winds and coldness on a high story at a high airy region, and a steel frame 101b having a space in which demolishing machines 108-110 (110a) can be stored and high stiffness is assembled so as to be slidable up and down as guided by the guide columns 102 at a level of a low story of the

building c and surround the lateral periphery of the building c. In addition, the demolishing machines 108-110 are stored in the shield 101, the guide column member 102a is connected to an upper end of the guide column 102 by lifting up the guide column member 102a using a crane 103 which is attached to the shield 101 to extend the guide column member 102a upward, the lateral periphery of an highest story of the building c is covered and enclosed by the shield 101 which is sequentially ascended as guided along the extended guide column 102, each story of the building c is sequentially demolished downward from the highest story by the demolishing machines 108-110 which are moved to the building c from the shield 101, a waste material of the demolished building is lifted down to the ground for crushing treatment. Moreover, each time a story d1 to be demolished moves downward, the shield 101 is sequentially descended as guided by the guide column 102 and the demolishing machines 108-110 are stored in the shield 101 to be carried downward, the lateral periphery of the story d1 to be dismantled is covered and enclosed and the guide column member 102a which is at the upper end of the guide column 102 is removed to be lifted down by the crane 103 so that the guide column 102 is sequentially shorten downward, and the peripheral side wall of the shield 101 is used as an advertising medium.

[0077] The shield 101, as shown in FIG. 8, comprises a shield plate 101a which consists of a sound and heat insulating panel, and a frame 101b which is structured by assembling steels. The shield plate 101a has high stiffness enough to stand strong winds at the upper story of the building c to be demolished, and the frame 101b has the storing space in which the demolishing machines 108-110 can be stored and high stiffness.

[0078] A winch 104 is provided inside the shield 101 to easily and stably carry out the ascending and descending operation of the shield 101. A load cell (load detecting apparatus) 119a is interposed on the rope 114 for detecting a force which acts on the rope 114, and a movable pulley 113 comprising an upper pulley 113a and a lower pulley 113b is combined with the rope 114 so as to reduce a force which acts on the winch 104. When the rope 114 is wound by using the winch 104, the distance between the upper pulley 113a and the lower pulley 113b is shortened to ascend the shield 101. On the contrary, when the rope 114 is unwound, the distance between the upper pulley 113a and the lower pulley 113b is widened to descend the shield 101.

[0079] The shield 101 is provided with various types of equipment to manage the ascending and descending operation. That is, the load detecting apparatus 119a for detecting a tension of the rope 114, a monitoring camera 119b for monitoring a lifting work by the crane 103 or an engagement portion of the rope 114 and the movable pulley 113, an inclinometer 119c for detecting an inclination of the shield 101, a laser displacement meter 119d for detecting a travel distance in horizontal and vertical directions, a photoelectric proximity sensor 119e or

a wire type displacement meter 119f for detecting the proximity condition between the upper pulley 113a and the lower pulley 113b, an encoder 119g for converting an analogue signal to a digital signal or the like are provided, and the information obtained by these equipment are transmitted to a monitor or a computer in a central control room so that the ascending and descending of the shield is treated collectively by a remote control.

[0080] As shown in FIG. 9, a truss shape beam 105a is formed so as to cross over the whole building c on an upper portion of the shield 101. On a top side of the beam 105a, an openable roof 105 which is slidable as guided by the beam 105a is provided. The roof 105 consists of a sheet or a net. Since the roof 105 is opened or closed depending on the condition such as a rainy weather or a fine weather, the work condition can be improved.

[0081] As shown in FIG. 10, the beam 105a doubles as a traveling rail for a hoist crane 105b, for enabling the hoist cranes 105b which are provided on predetermined positions to perform a horizontal transportation from one end to the other end of the building c.

[0082] As shown in FIG. 11, the crane 103 which is provided on the upper portion of the shield 101 is movable along the traveling rail 103a which is provided along the inner periphery of the shield 101. The traveling rail 103a is also disposed at the external corner and internal corner of the building c in a curved manner. The crane 103 can travel continuously even at the external corner and internal corner and can move freely in a range in which the traveling crane is provided. Accordingly, the number of the cranes 103 can be decreased.

[0083] As shown in FIG. 12A, a gantry frame 101d which doubles as a traveling rail of the hoist crane is stored at a predetermined position in the shield 101. As shown in FIG. 12B, the gantry frame 101d is rotatable in a center direction of the building with a fixed portion to the shield 101 as a base end and can be taken out from the shield 101 only for use. The hoist crane 101e which travels along the gantry frame 101d as a traveling rail expands the area in which a lifting work can be carried out when demolishing the building c in the center direction of the building c from the outer periphery.

[0084] The shield 101, as shown in FIG. 13, can be utilized as an advertising medium during the construction period. The shield 101 is provided with a translucent panel 101f, so that natural light is transmitted so as to brighten the inside of the building c. Accordingly, the working environment can be improved and the cost for the lights inside the building can be reduced.

[0085] The shield 101 and the guide column 102 are engaged with each other by the method shown in FIG. 14. That is, a flange of a column c1 consisting of an H beam in the building c which is internal side of the building c and a flange of the guide column 102 consisting of an H beam which abuts on an outer wall c2 of the building c are sandwiched by a steel plate c4 and fixed with a guide column fixing bolt c3. A concrete c5 is provided

between a flange of a column c1 in the building c which is external side of the building c and the outer wall c2, thereby a horizontal force which acts on the guide column 102 is certainly transmitted to the column c1 of the building c and the shield 101 can stably slide along the guide column 102. That is, the column c1 of the building c and the guide column 102 are easily fixed by the guide column fixing bolt c3 without removing the outer wall c2 over large areas or welding. A sway control component 111 is attached to the shield 101 to secure a predetermined clearance in two directions with respect to the guide column 102, and a sway in horizontal direction of the shield 101 is prevented. Further, guide rollers 112 which are rollable up and down on a surface of the guide column 102 is provided on a tip of the sway control component 111, so that the shield 101 can be stably ascended and descended as guided along the guide column 102. After the completion of ascending and descending the shield 101, during the dismantling work of the building c, the shield 101 is fixed on the guide column 102a by steel 101g or a bolt 101h and firmly supported thereby.

[0086] As shown in FIG. 15, grooves 102b are formed on predetermined positions of the guide column 102, and the steel (supporting member) 115 which is provided on the lower portion of the shield 101 and is movable in horizontal direction is detachable thereto. By inserting the steel 115 into the groove 102b, the shield 101 is easily and firmly supported by the guide support 102.

[0087] A construction procedure of the building demolishing method in the embodiment will be explained below referring to FIGS. 16-22.

[0088] As with the first embodiment, after ascending the shield 101 to the highest story, the steel 115 which is provided on the lower portion of the shield 101 and is movable in the horizontal direction is inserted in the groove 102b which is formed on the guide column 102, so that the guide column 102 supports the shield 101.

[0089] Next, as shown in FIG. 16, glass handling machines 108 which is stored in a storing space 101c is moved and disposed to a lower story d2 below a story d1 to be demolished. When moving the glass handling machines 108, a wooden plate or the like is crossed over the gap between the shield 101 and the building c to carry out the moving smoothly.

[0090] After removing glass and sash on the story d1 to be demolished by the glass handling machines 108, the removed glass and sash d11 are lifted down to the ground floor of the building c through the vertical hole e inside the building c to be demolished by utilizing the frame structure for loading and unloading 121 which is provided on the story d2 below the story d1 to be demolished.

[0091] Next, as shown in FIG. 17, the slab cutter 110 which is stored in the storing space 101c is moved and disposed to the story d1 to be demolished to cut a floor slab d12 on the story d1 to be demolished. The floor slab d12 which was cut is received by the small lifting plat-

form 109 which is disposed on the story d2 and lifted down to the ground floor of the building c by the frame structure for loading and unloading 121.

[0092] Next, as shown in FIG. 18, the cutter 110 which is stored in the storing space 101c is moved and disposed to the story d1 to be demolished to cut internal steelworks d13, d14 on the story d1 to be demolished. The internal steelworks d13, d14 which were cut are received by the small lifting platform 109 and are lifted down to the ground floor of the building c by the frame structure for loading and unloading 121.

[0093] Further, as shown in FIG. 19, an outer wall plate d15 of the story d1 to be demolished is removed by the crane 113 which is mounted on the frame 101b of the shield 101, and lifted down by the crane 113 or the frame structure for loading and unloading 121 for crushing treatment.

[0094] As shown in FIG. 20, external steelworks d16, d17 of the story d1 are cut by the cutter 110. The external steelworks d16, d17 which were cut are received by the small lifting platform 109 and lifted down to the ground floor of the building c by the frame structure for loading and unloading 121.

[0095] Finally, as shown in FIG. 21, after storing the demolishing machines 108-110 in the storing space 101c, the shield 101 is descended to the level of the story which is to be demolished next by the winch 104.

[0096] The shield 101 is descended by the following process. That is, as shown in FIG. 22A, after storing the demolishing machines 108-110 in the shield 101, the shield 101 is descended to the level of the story which is to be demolished next as shown in FIG. 22B. After inserting the steel 115 in the groove 102b of the guide column 102 to make the guide column 102 firmly support the shield 101, the demolishing machines 108-110 are moved into the building c again.

[0097] Depending on the construction condition, as shown in FIG. 17, the demolishing machines 108-110 may be moved to a desired story or removed by lifting up or lifting down the demolishing machines 108-110 which are used for demolishing each story d1 to be demolished through the vertical hole f inside the building c by the frame structure for loading and unloading 121 which is mounted on the story d2 below the story d1 to be demolished.

[0098] As described above, it is possible to demolish the building c easily and stably by repeating the demolishing step of the building c and the descending step.

[0099] According to the second embodiment, the following effects can be obtained.

[1] Because the shield 101 can be assembled at the level of the low story of the building c on which the working condition is good, the assembling work of the shield 101 can be substantially simplified. Moreover, it is suitable for constructing the shield 101 by a member 101a which has high sound and heat insulating properties and a member 101b

which has a strength and high stiffness enough to stand strong winds at the upper story of the building c.

[2] When structuring or demolishing the guide column 102, there is no need to separately prepare the crane for structuring or demolishing the guide column 102 because the crane 103 which is attached to the shield 101 can be used.

[3] Because the lateral periphery of the story d1 to be demolished is covered and enclosed by the shield 101, the leakage of dust or noise which is generated when demolishing the building c to outside from the side of the story d1 to be demolished can be prevented.

[4] The shield which covers and encloses the lateral periphery of the story d1 to be demolished can shut off wind and weather, and a good working environment for the story d1 to be demolished can be secured. Accordingly, the demolishing work is less affected by the weather, and the demolishing work can be progressed smoothly.

[5] Because the demolishing machines 108-110 for demolishing the building can be easily moved to a desired story, the demolishing work can be carried out with the construction cost for lifting the demolishing machines 108-110 considerably reduced.

[6] Because the demolishing machines are provided on the lower story d2 below the story d1 to be demolished of the building c to demolish the story d1 to be demolished, the scaffolding which is necessary for demolishing the story d1 to be demolished can be secured and the demolishing work for the story d1 to be demolished can be smoothly progressed.

[7] Because the demolishing machines 108-110 which are used for demolishing each story d1 to be demolished are lifted up or lifted down through the vertical hole f inside the building c by the frame structure for loading and unloading 121 which is provided on the story d2 below the story d1 to be demolished, there is no need to prepare a crane outside the building for lifting up or lifting down the demolishing machines 108-110.

[8] Because the peripheral side wall of the shield 101 is utilized as an advertising medium, the shield 101 which is utilized as the advertising medium can generate an economic effect through the demolishing work period of the building c.

[9] The road cell 119a which detects the force acting on the rope 114 is provided between the shield 101 and the movable pulley 113, an excessive force which acts on the each rope 114 and the winch 104 can be prevented.

[10] Because the rope 114 which is connected to the shield 101 is combined with the movable pulley 113, a load which acts on the rope 114 becomes small and the shield 101 can be ascended or descended by a winch 104 which is smaller in size and

has a lower performance.

[11] Because the shield 101 is provided with the sway control component 111 which can limit a sway of the shield 101 with respect to the guide column 102 by abutting on the surface of the guide column 102, the sway of the shield 101 in the horizontal direction can be suppressed.

[12] Because the sway control component 111 is provided with guide rollers 112 which are rollable up and down on the surface of the guide column 102, the shield 101 can be ascended or descended smoothly as guided along the guide column 102.

[13] The shield 101 is firmly supported by the guide column 102 through the steel 115 by inserting the steel member 115 into the groove 102b which is formed on the guide column 102, so that the dismantling work of the building can be stably carried out.

[0100] In the first embodiment, the similar effect to that of the above described [1] -[10] can be obtained, and as described in the first embodiment, the similar effect to that of the above described [11]-[13] can also be obtained.

[0101] It is to be understood that the building demolishing method is not limited to the above described two embodiments, and various modifications and changes may be made to the invention without departing from the scope of the invention.

[0102] According to the invention as claimed in claim 1, because the shield can be assembled on the ground or at the level of the low story of the building on which the working condition is good in comparison with the level of a high story of the building, the assembling work can be substantially simplified and it is suitable for constructing the shield by a member which has a strength and high stiffness enough to stand strong winds at the upper story of the building and a member which has high sound and heat insulating properties.

[0103] When structuring or demolishing the guide column, there is no need to separately prepare a crane for structuring or demolishing the guide column because the crane which is attached to the shield can be used.

[0104] Since the shield covers the lateral periphery of the story to be demolished, the leakage of dust or noise which is generated when demolishing the building to outside from the side of the story to be demolished can be prevented.

[0105] The shield which covers the lateral periphery of the story to be demolished can shut off wind and weather, so that a good working environment for the story to be demolished can be secured. Accordingly, the demolishing work is less affected by the weather, and the demolishing work can be progressed smoothly.

[0106] Since the demolishing machine for demolishing the building is carried easily to the desired story of the building by ascending or descending the shield, the demolishing work can be carried out with the labor and

the construction cost for lifting the demolishing machine considerably reduced.

[0107] According to the invention as claimed in claim 2, the similar effect to that of claim 1 can be obtained, and because the demolishing machine is provided on the lower story below the story to be demolished to demolish the story to be demolished, the scaffolding which is necessary for demolishing the story to be demolished through the demolishing work for the story to be demolished can be secured on the lower story below the story to be demolished and the demolishing work for the story to be demolished can be smoothly progressed.

[0108] According to the invention as claimed in claim 3, the similar effect to that of claim 1 or 2 can be obtained, and because the roof is closely attached to the upper portion of the shield, the leakage of noise or dust which is generated when demolishing the building from above of the story to be demolished to outside of the building demolishing site can be prevented.

[0109] The roof can shut off wind and weather, so that a good working environment for the story to carry out the demolishing work can be secured. Accordingly, the demolishing work of the building is not affected by the weather and the demolishing work can be progressed smoothly.

[0110] According to the invention as claimed in claim 4, the similar effect to that of claim 3 can be obtained, and because the drainage is provided on the roof, the rainwater poured on the roof can be collected at the drainage to be utilized for watering to treat dust generated by the demolishing work of the building.

[0111] According to the invention as claimed in claim 5, the similar effect to that of any one of claims 1-4 can be obtained, and because the demolishing machine which is used for demolishing each story to be demolished is lifted up or lifted down by the crane which is attached to the shield, workability of the building demolishing work can be improved.

[0112] According to the invention as claimed in claim 6, the similar effect to that of any one of claims 1-4 can be obtained, and because the demolishing machine which is used for demolishing each story to be demolished is lifted up or lifted down by the frame structure for loading and unloading which is provided on the story below the story to be demolished through the vertical hole inside the building, there is no need to prepare a crane outside the building for lifting up or lifting down the demolishing machine.

[0113] According to the invention as claimed in claim 7, the similar effect to that of any one of claims 1-6 can be obtained, and because the peripheral side wall of the shield is utilized as the advertising medium, the shield which is utilized as the advertising medium can generate an economic effect through the building demolishing work period.

[0114] According to the invention as claimed in claim 8, the similar effect to that of any one of claims 1-7 can be obtained, and because the load detecting apparatus

is interposed on the rope, an excessive force which acts on the each rope or the winch can be prevented.

[0115] According to the invention as claimed in claim 9, the similar effect to that of any one of claims 1-7 can be obtained, and because the movable pulley is combined with the rope which is connected to the shield, the force acting on the rope becomes small. Thus, the shield can be ascended or descended by a winch which is smaller in size and has a lower performance.

[0116] According to the invention as claimed in claim 10, the similar effect to that of any one of claims 1-7 can be obtained, and because the force acting on the rope which is wound or unwound by the winch becomes small in comparison with the case where the rope is not combined with the movable pulley, the load detecting apparatus which is interposed on the rope can be of smaller in size and lower performance.

[0117] According to the invention as claimed in claim 11, the similar effect to that of any one of claims 1-10 can be obtained, and because the shield is provided with the sway control component which can limit the sway of the shield with respect to the guide column by abutting on the surface of the guide column, the sway can be suppressed.

[0118] According to the invention as claimed in claim 12, the similar effect to that of claim 11 can be obtained, and because the sway control component is provided with guide rollers which are rollable up and down on the surface of the guide column, the shield can be ascended or descended smoothly as guided along the guide column.

[0119] According to the invention as claimed in claim 13, the similar effect to that of any one of claims 1-12 can be obtained, and because the shield is stably supported by the supporting member which is fixed on the guide column, the building demolishing work can stably be carried out.

Effect in Industry

[0120] As mentioned above, the building demolishing method according to the present invention is adaptable for dismantling a building, particularly for a high building.

Claims

1. A building demolishing method comprising:

- erecting guide columns at predetermined intervals around a lateral periphery of a building to be demolished;
- assembling a shield which is slidable up and down as guided by guide columns on a ground or at a level of a low story of the building to surround the lateral periphery of the building;
- providing a storing space in the shield adjacent to the lateral periphery of the building to store

a demolishing machine, and storing the demolishing machine in the storing space;
 connecting a guide column member to an upper end portion of the guide column by lifting up the guide column member by a crane which is attached to the shield to sequentially extend the guide column upward, and covering a lateral periphery of an highest story of the building by the shield which was sequentially ascended as guided along the extended guide column;
 a demolishing step which comprises: moving the demolishing machine to a floor of the building, and demolishing the building by the demolishing machine; and
 a descending step which comprises: storing the demolishing machine in the storing space and descending the shield to a next lower story, and removing the guide column member which is at the upper end portion of the guide column to lift down the guide column member by the crane and shortening the guide column downward sequentially, after the demolishing step,

wherein the demolishing step and the descending step are repeated a predetermined number of times.

2. The building demolishing method as claimed in claim 1, wherein the demolishing machine is provided on a lower story below a story to be demolished in the building, to demolish the story to be demolished.
3. The building demolishing method as claimed in claim 1 or 2, wherein a roof is closely attached to an upper portion of the shield when demolishing the building.
4. The building demolishing method as claimed in claim 3, wherein the roof comprises a drainage.
5. The building demolishing method as claimed in any one of claims 1-4, wherein the demolishing machine which is used for demolishing each story to be demolished is lifted up or lifted down by the crane.
6. The building demolishing method as claimed in any one of claims 1-4, wherein the demolishing machine which is used for demolishing the each story to be demolished is lifted up or lifted down by a frame structure for loading and unloading which is provided on the lower story below the story to be demolished through a vertical hole inside the building.
7. The building demolishing method as claimed in any one of claims 1-6, wherein a peripheral side wall of the shield is utilized as an advertising medium.

8. The building demolishing method as claimed in any one of claims 1-7, wherein the shield is ascended or descended by winding or unwinding a rope which is connected to the shield using a winch,
 a load detecting apparatus being provided for detecting a force which acts on the rope.
9. The building demolishing method as claimed in any one of claims 1-7, wherein the shield is ascended or descended by winding or unwinding a rope which is connected to the shield using a winch,
 a movable pulley being combined with the rope so as to reduce a force which acts on the winch.
10. The building demolishing method as claimed in any one of claims 1-7, wherein the shield is ascended or descended by winding or unwinding a rope which is connected to the shield using a winch,
 a load detecting apparatus being interposed on the rope for detecting a force which acts on the rope, and a movable pulley being combined with the rope so as to reduce a force which acts on the winch.
11. The building demolishing method as claimed in any one of claims 1-10, wherein the shield is provided with a sway control component which can limit sway of the shield with respect to the guide column by abutting on a surface of the guide column.
12. The building demolishing method as claimed in claim 11, wherein the sway control component is provided with a guide roller which is rollable up and down on the surface of the guide column.
13. The building demolishing method as claimed in any one of claims 1-12, wherein a supporting member is fixed on the guide column to make the supporting member support the shield during a demolishing work of each story to be demolished.

FIG 1

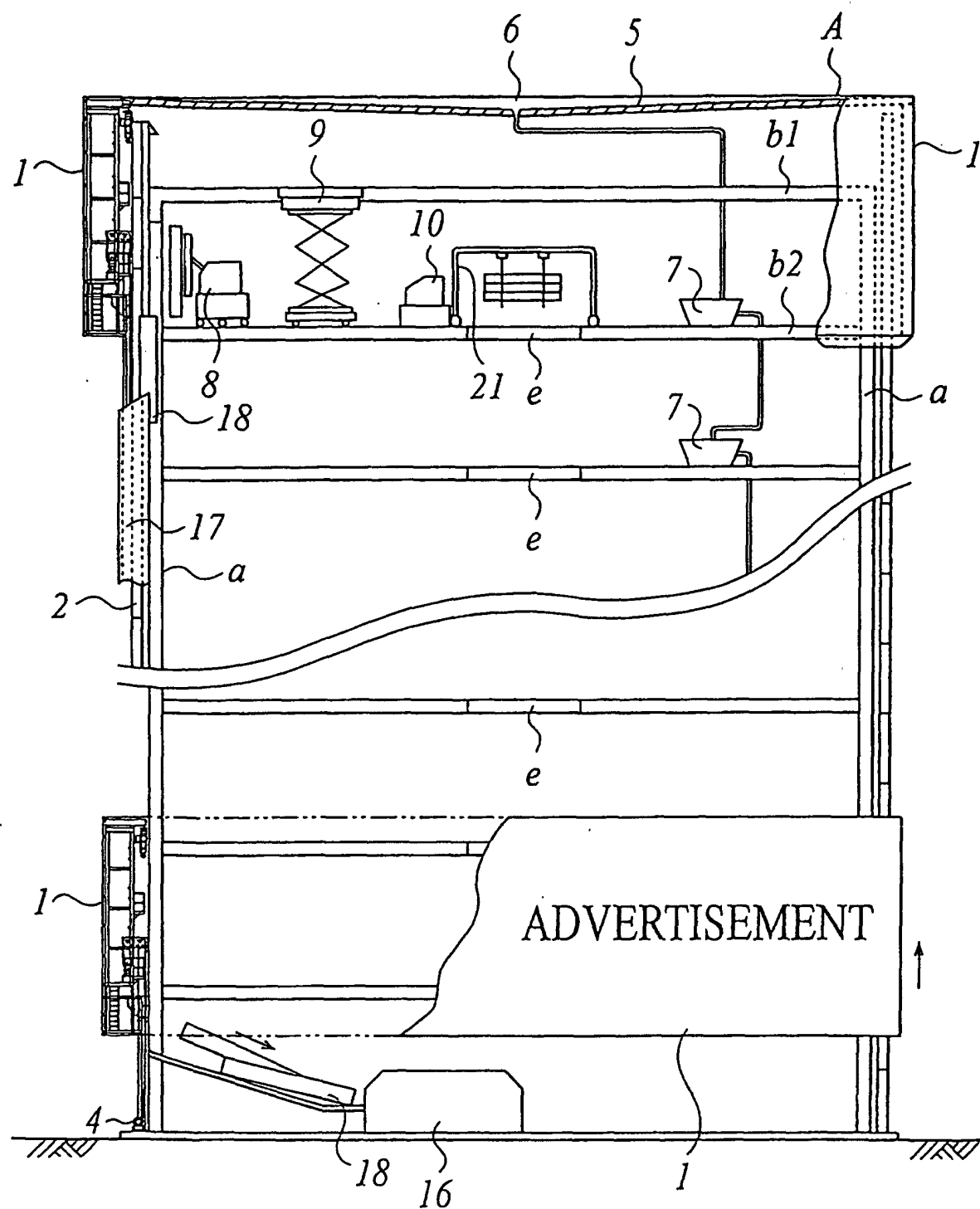


FIG 2

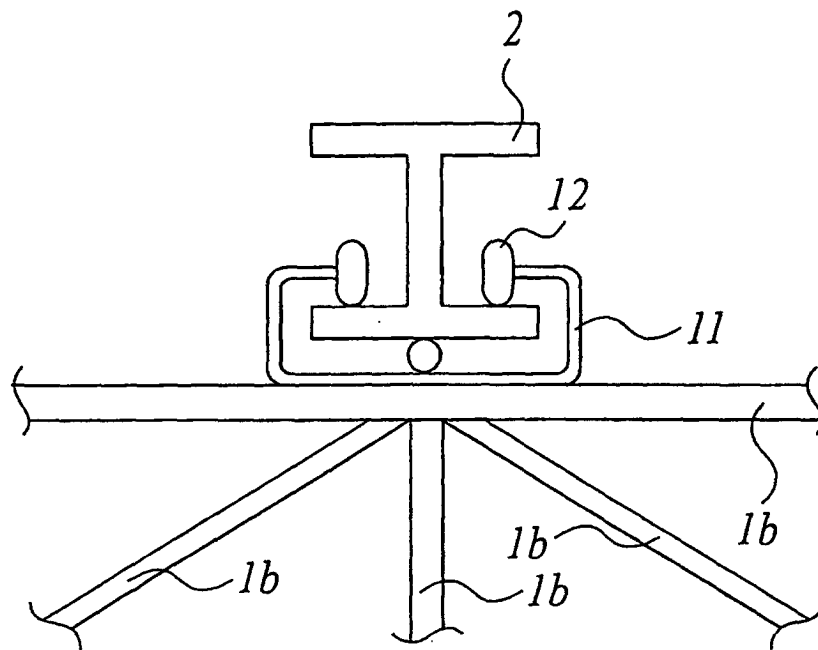


FIG 3

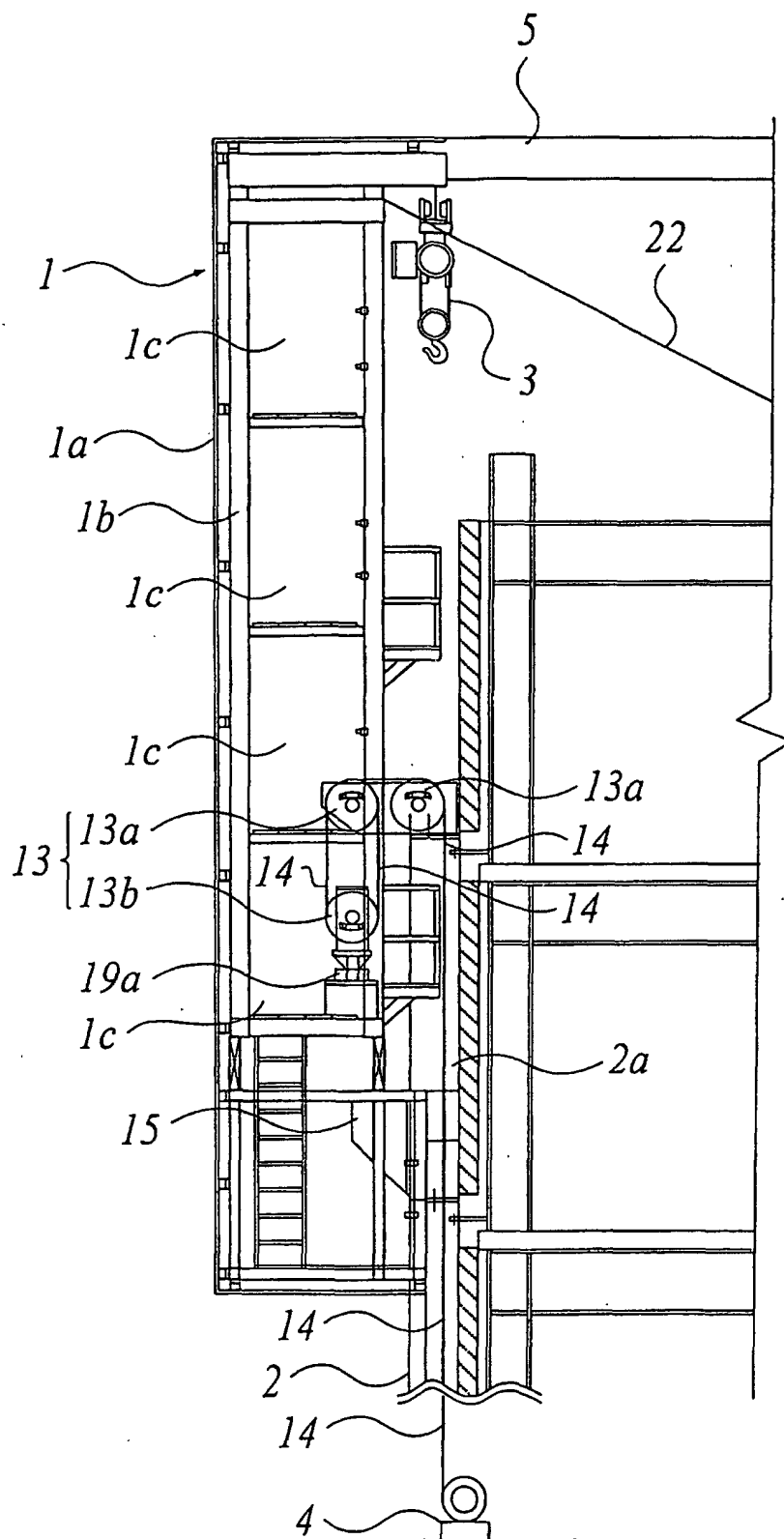


FIG.4

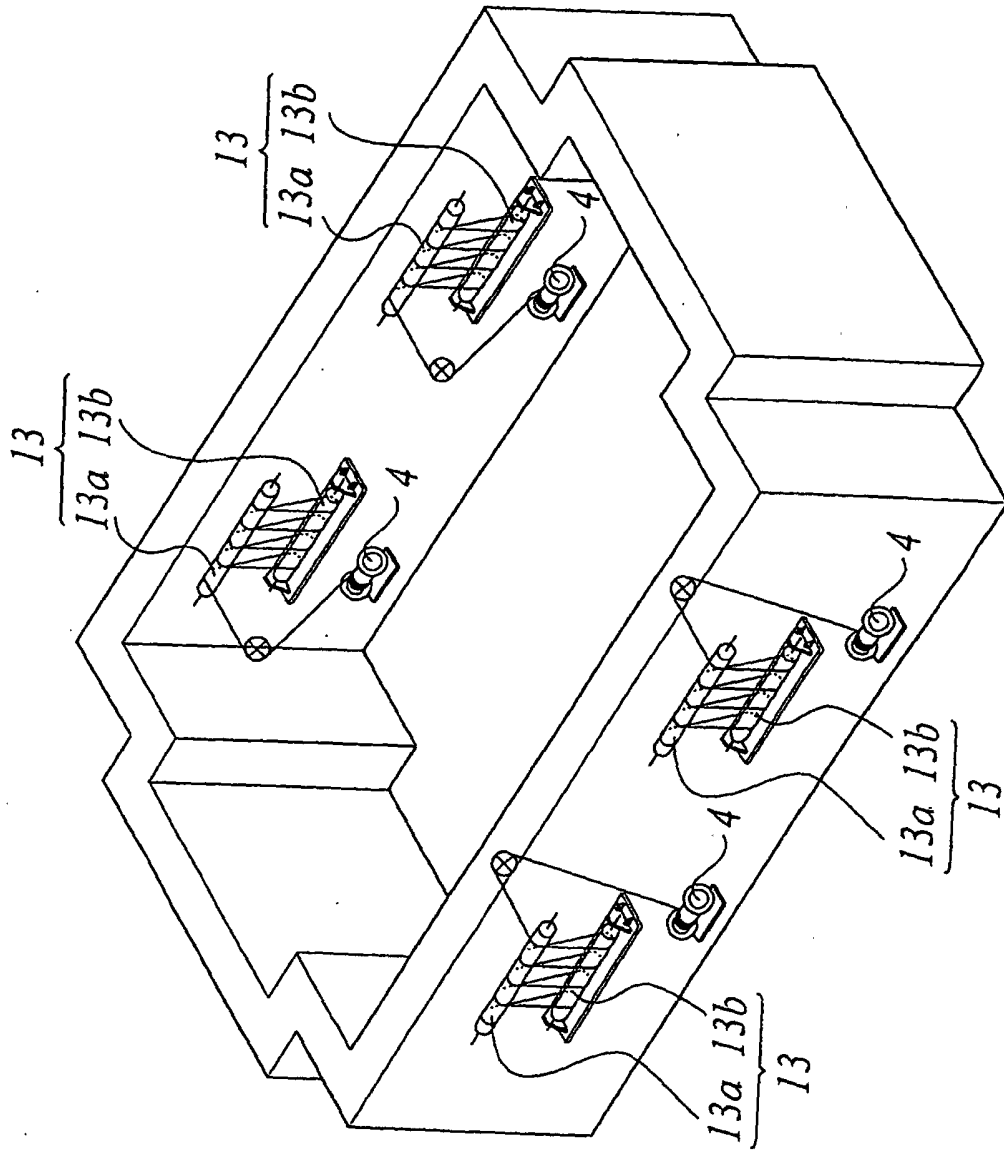


FIG 5

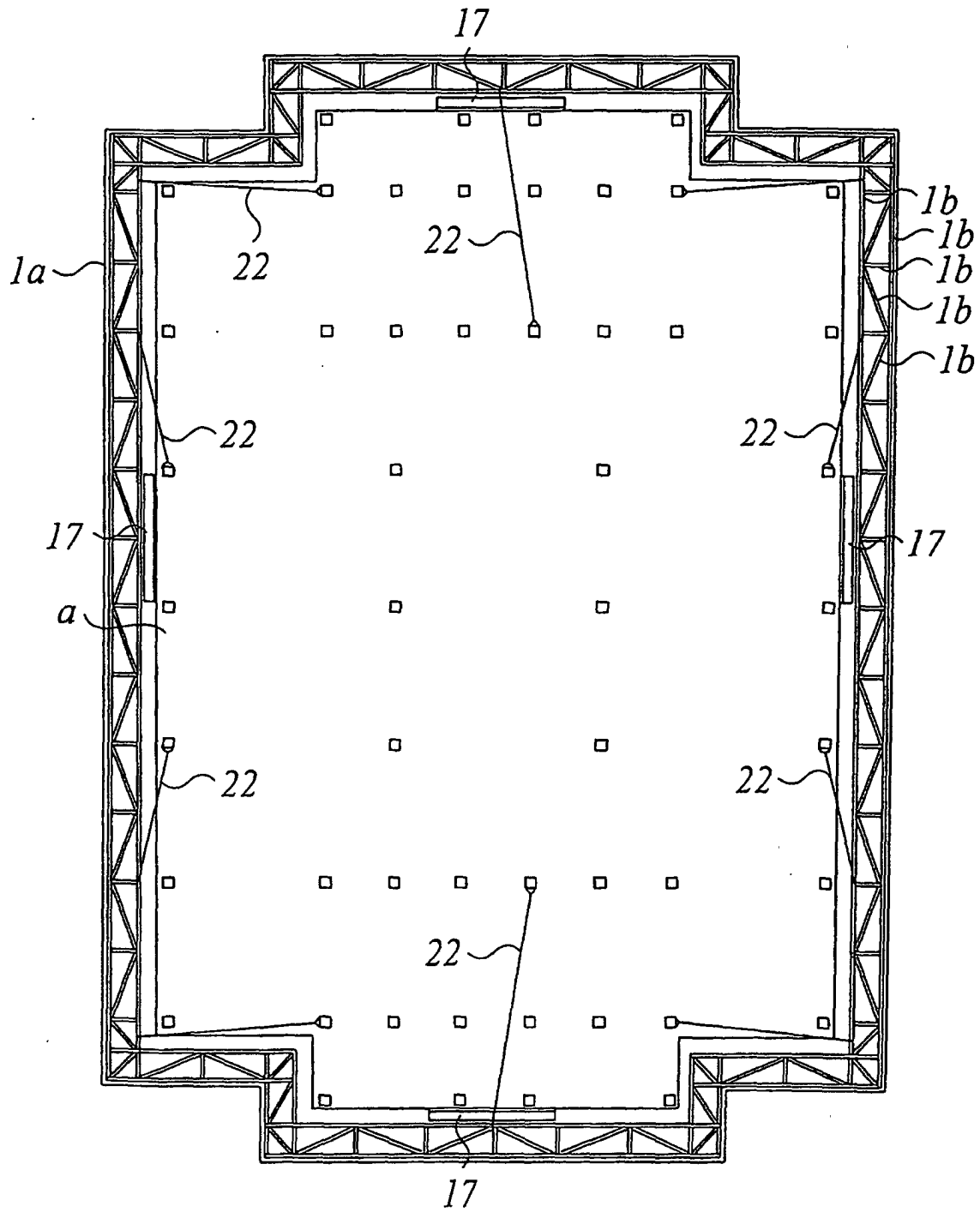


FIG 6

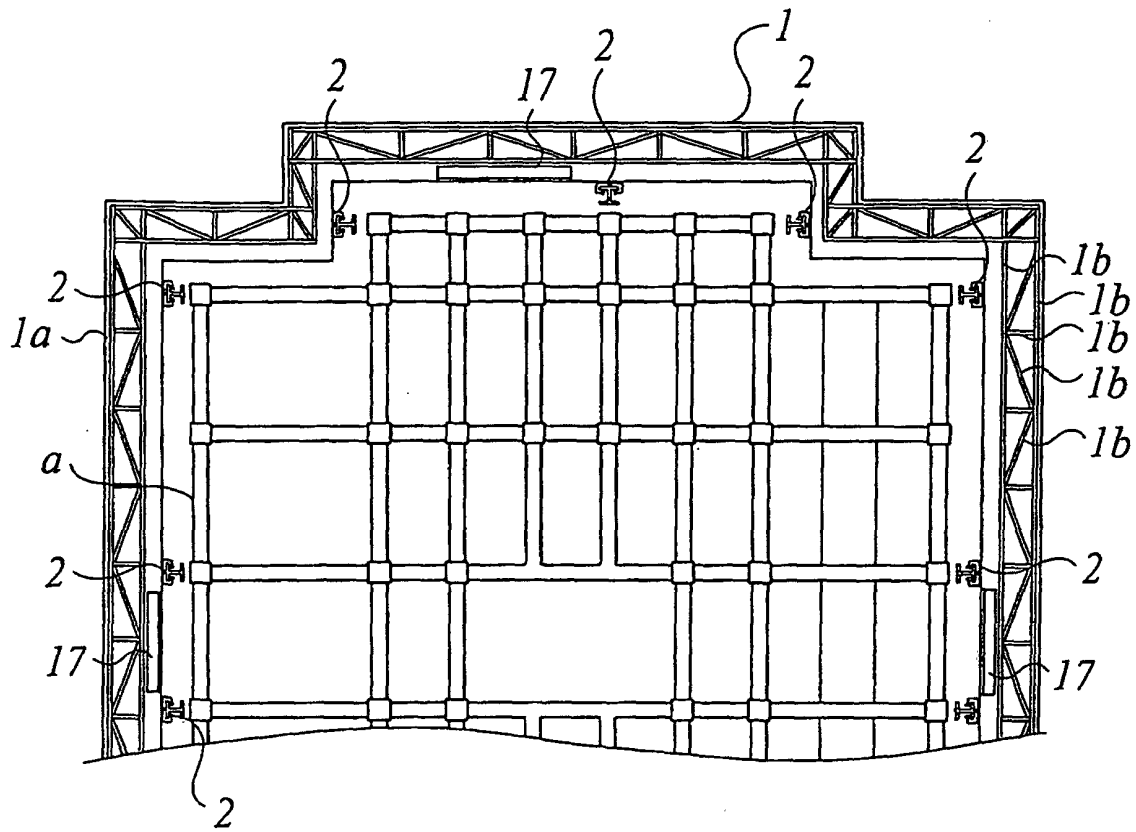


FIG 7

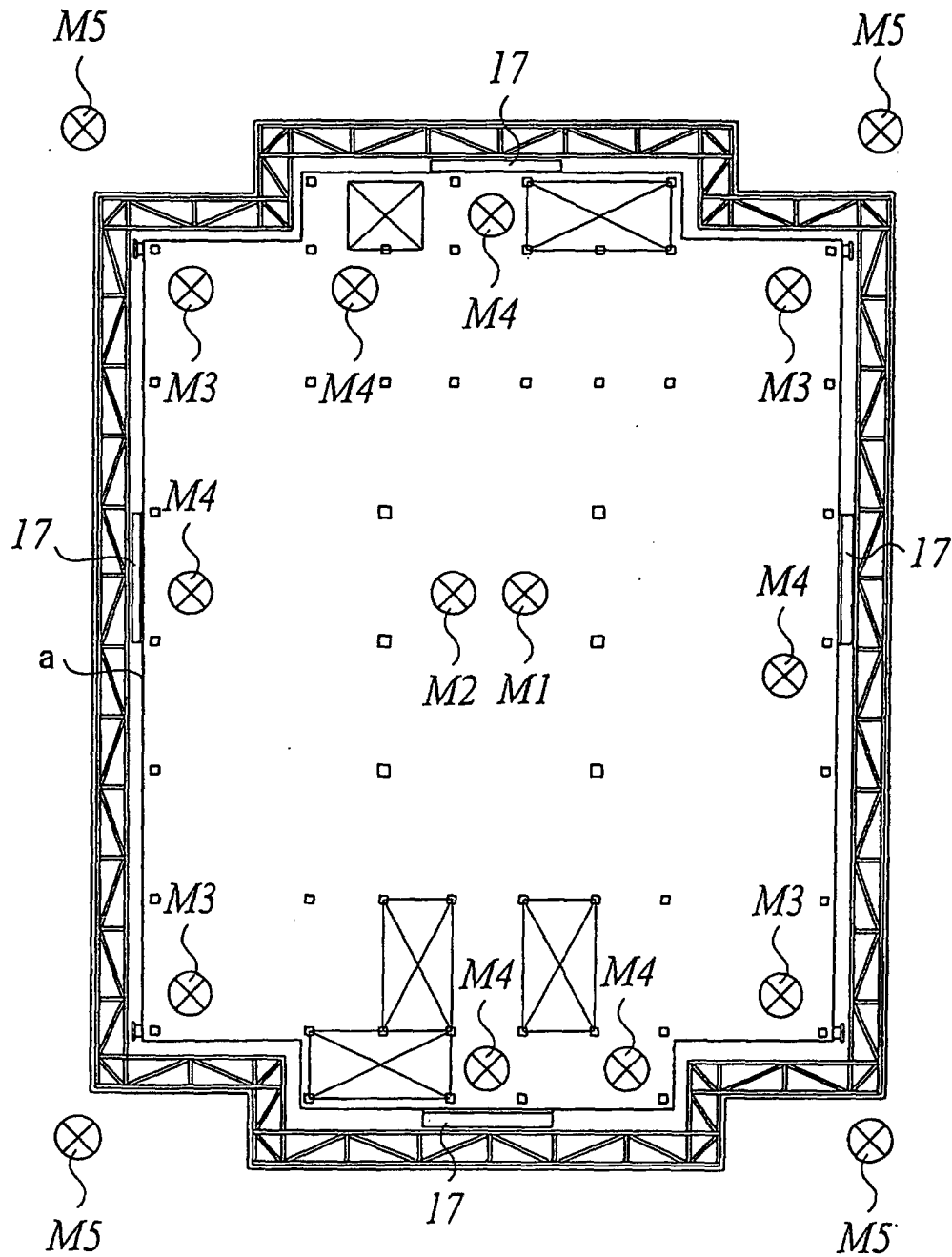


FIG. 8

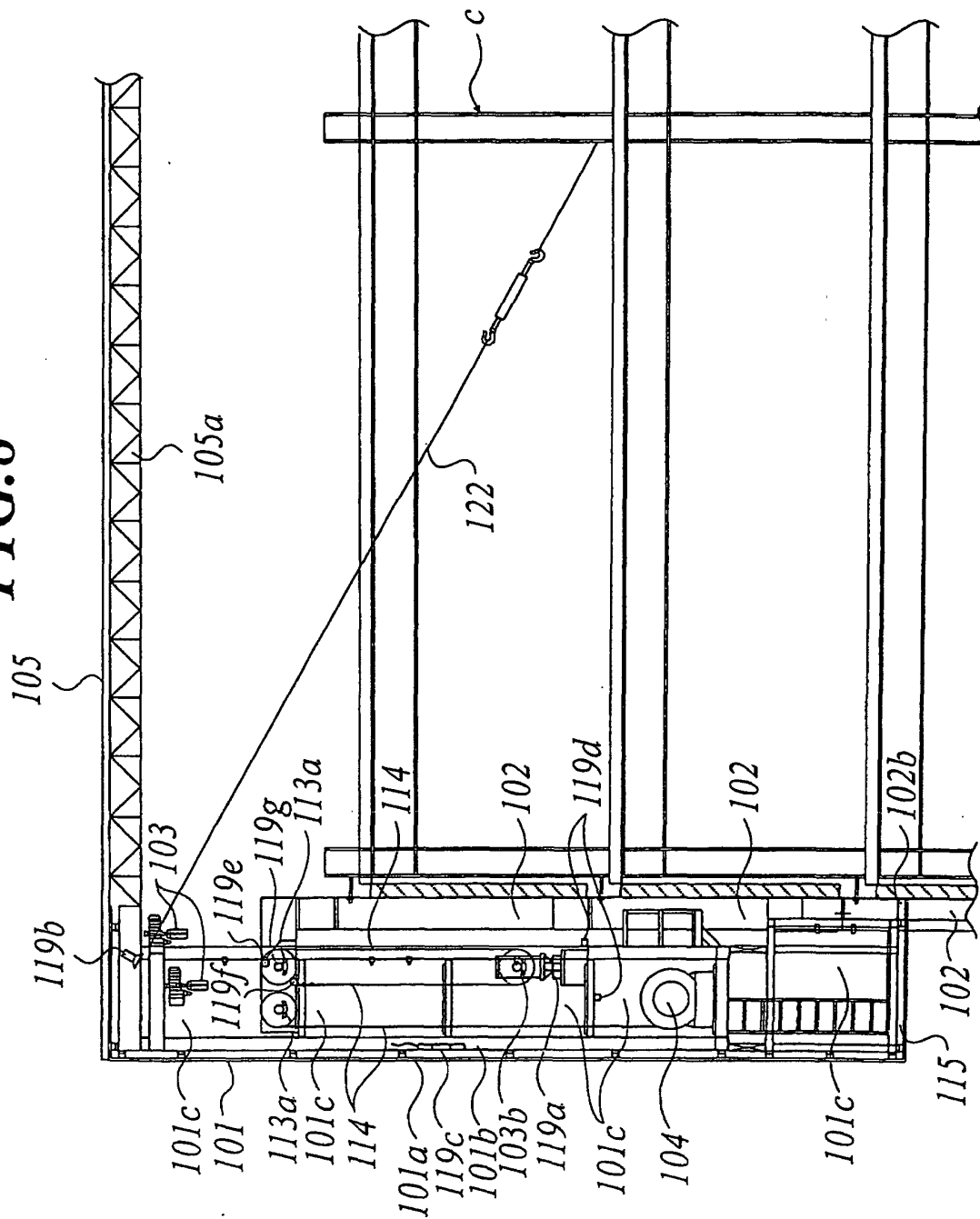


FIG 9

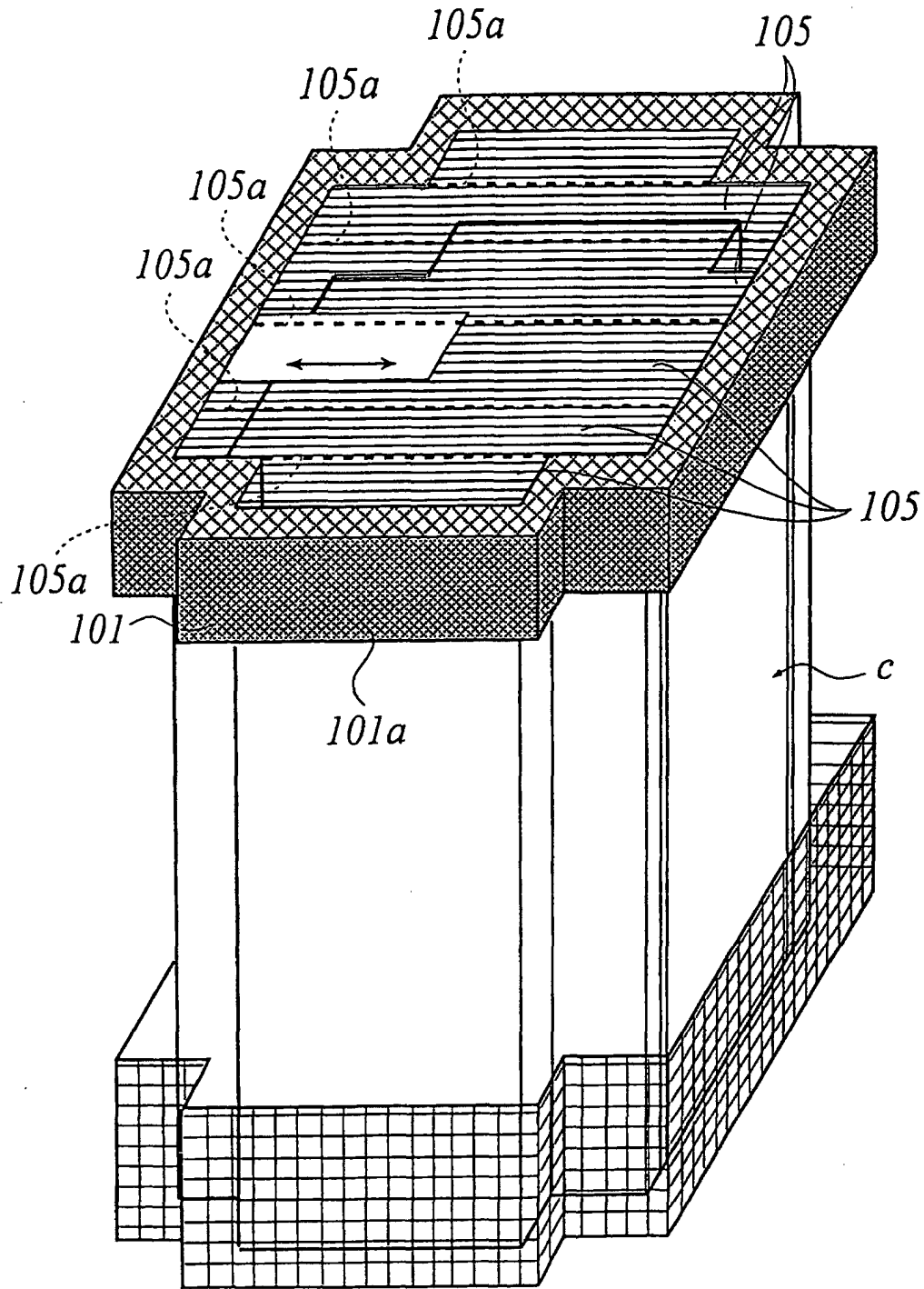


FIG 10

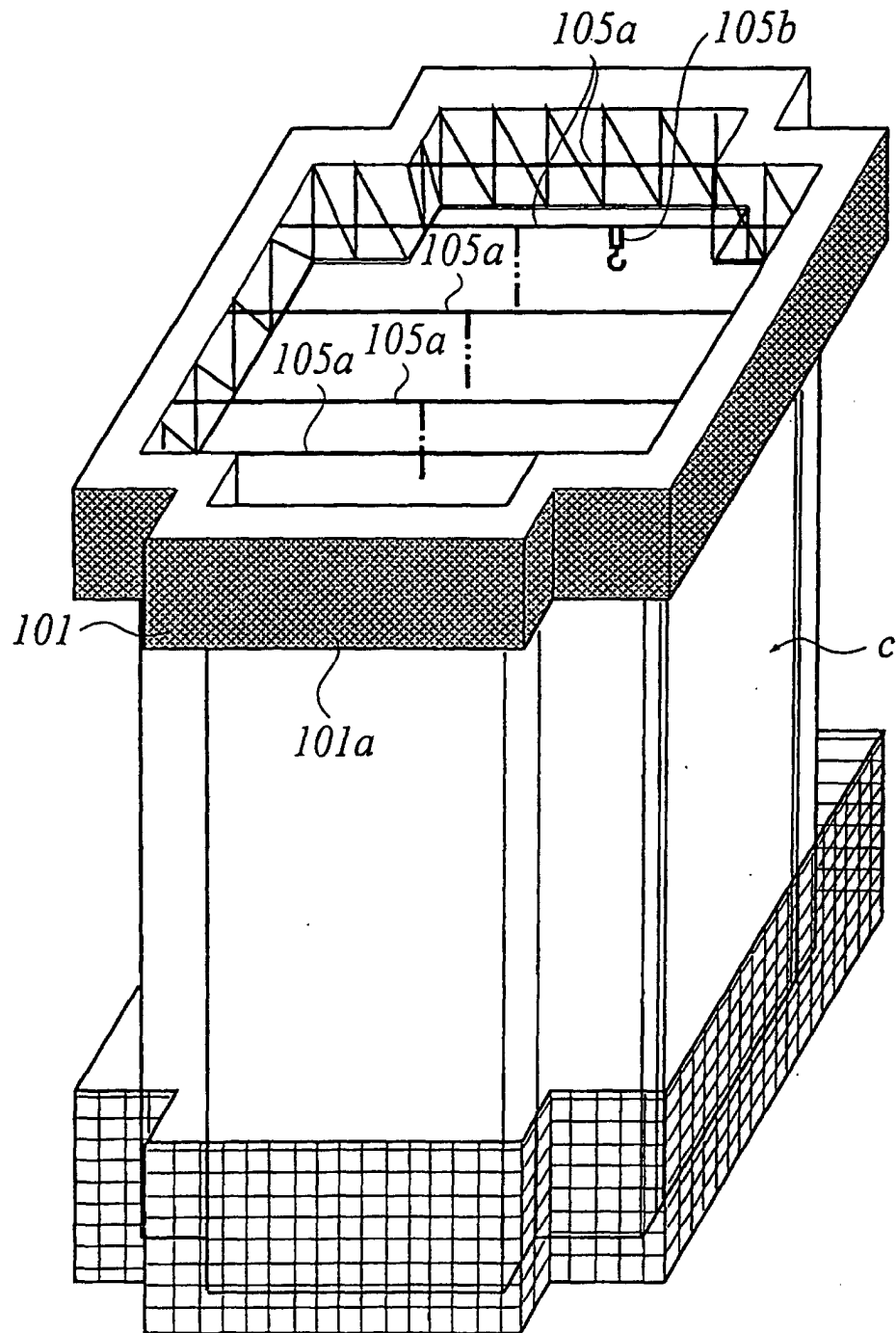


FIG 11

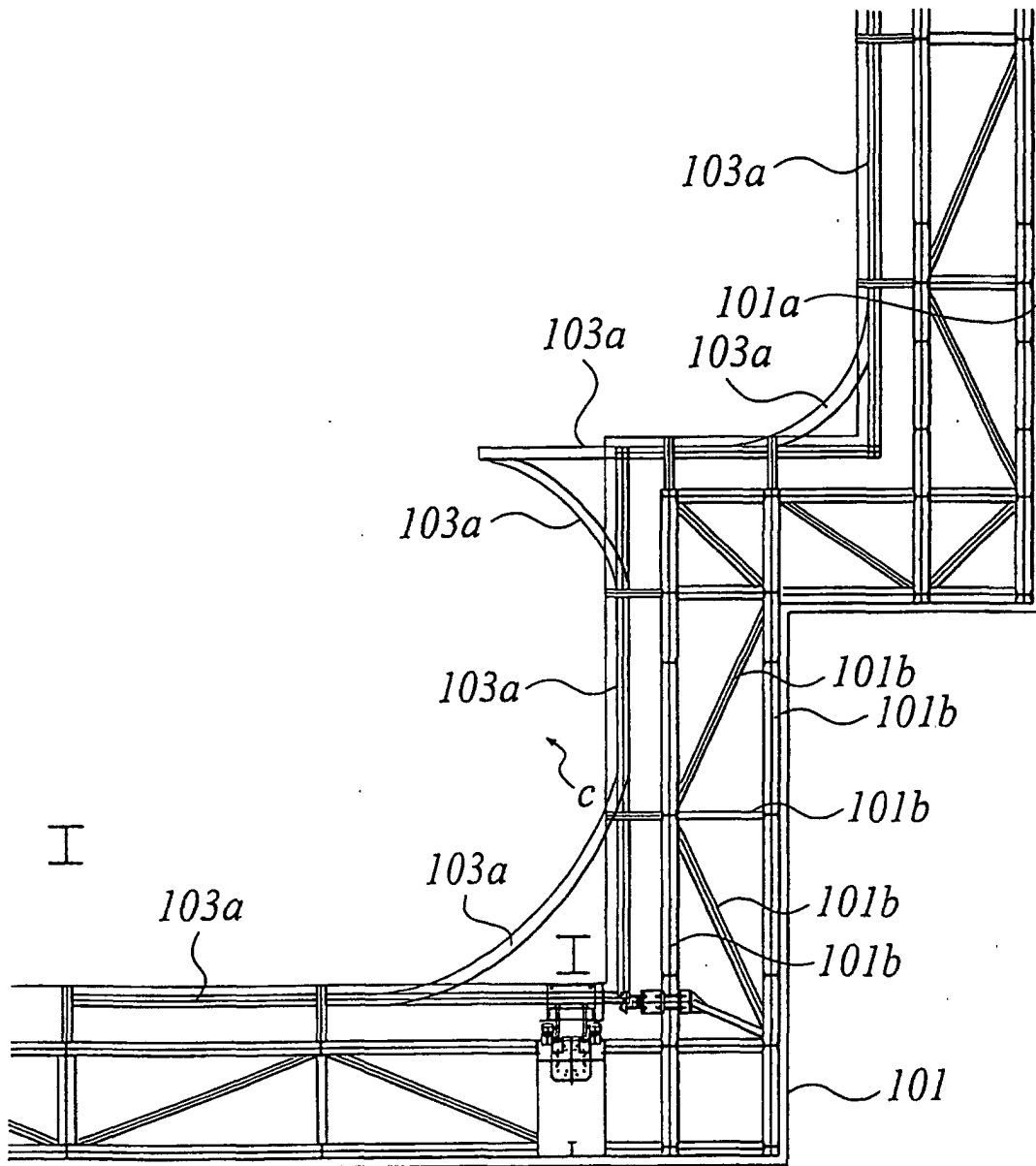


FIG 12A

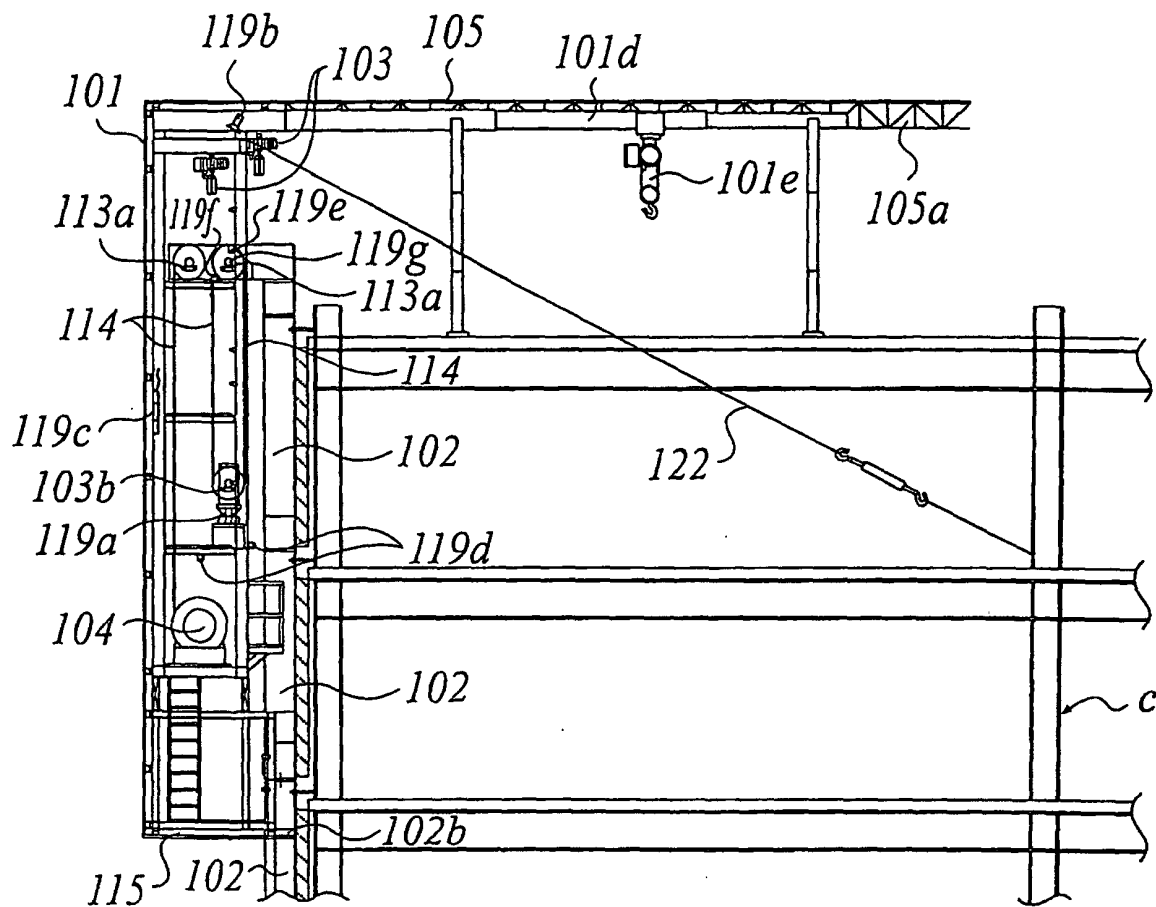


FIG 12B

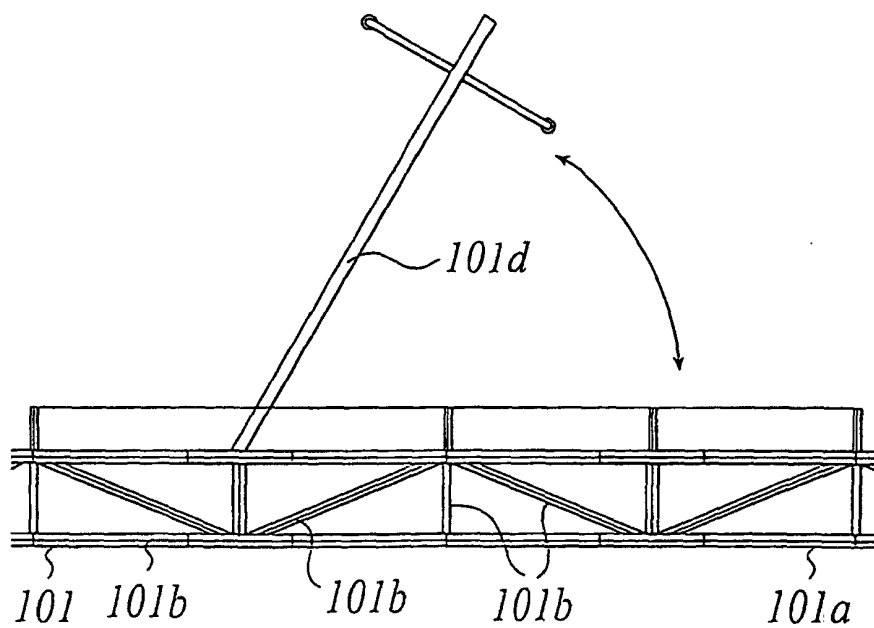


FIG 13

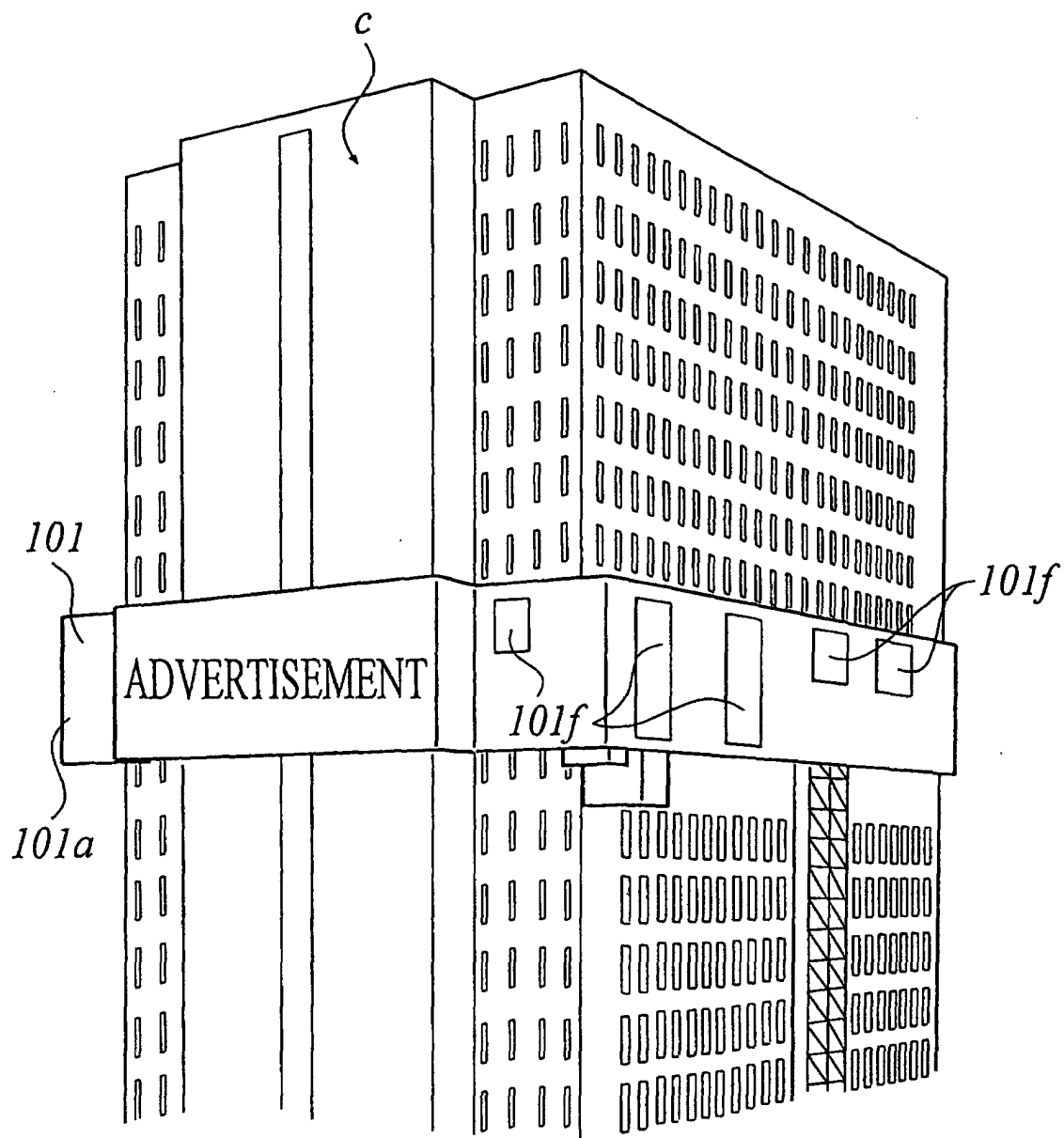


FIG 14

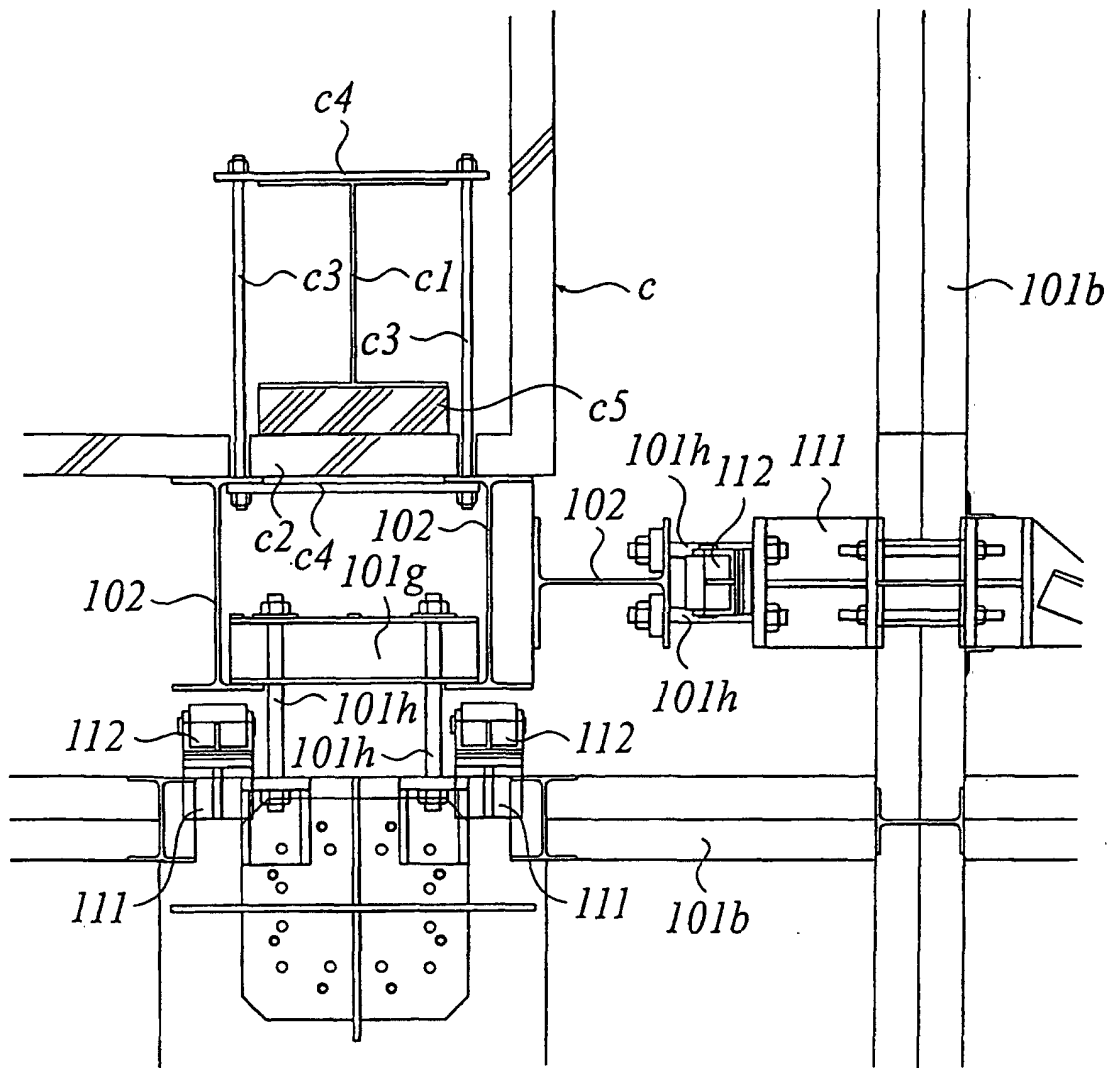


FIG 15

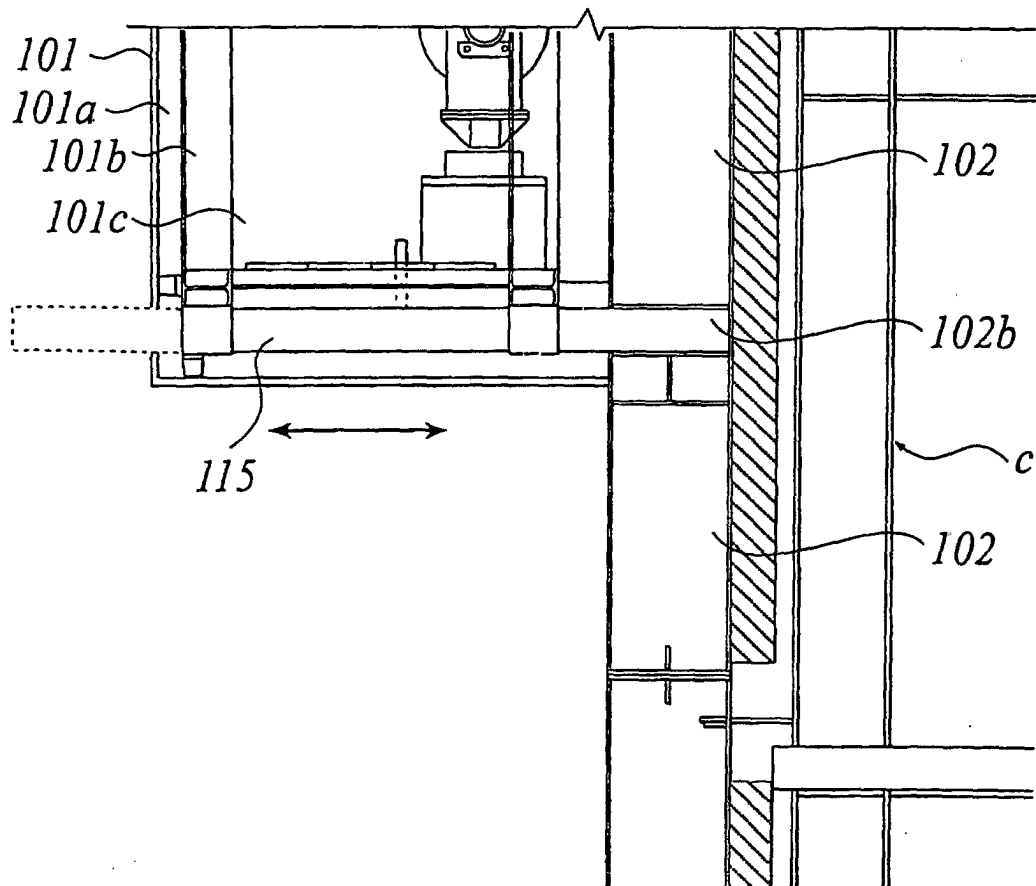


FIG 16

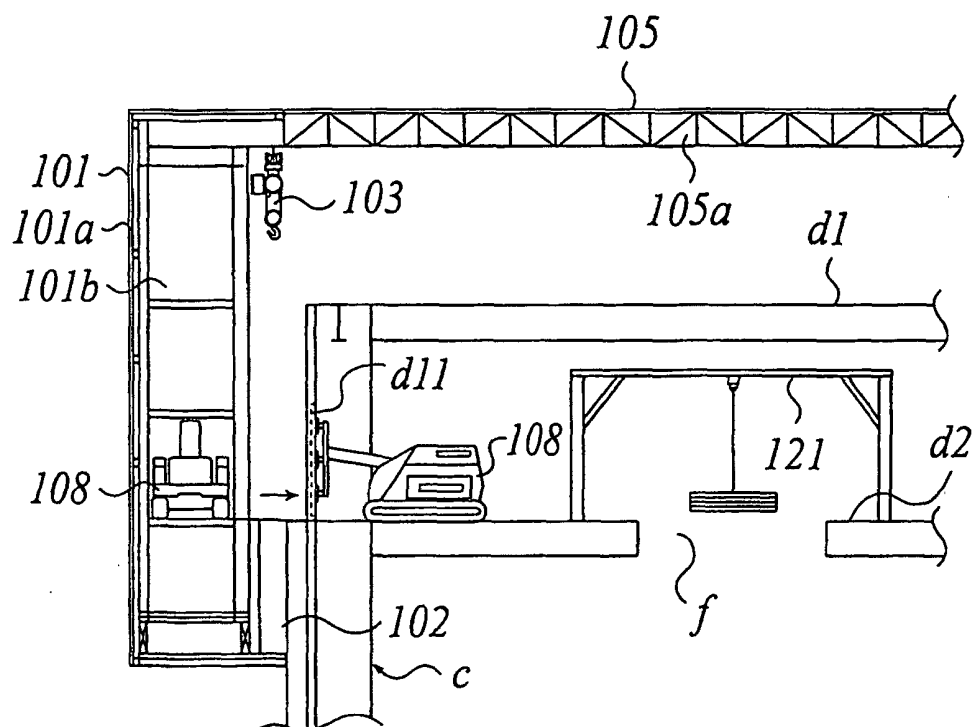


FIG 17

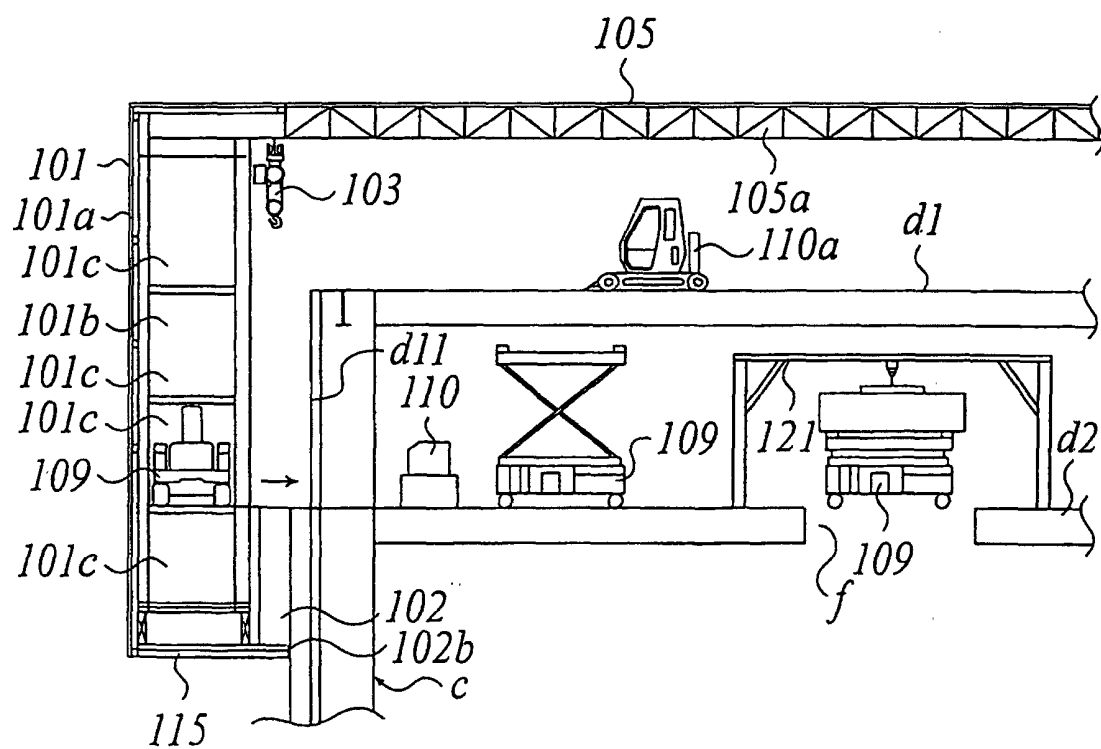


FIG 18

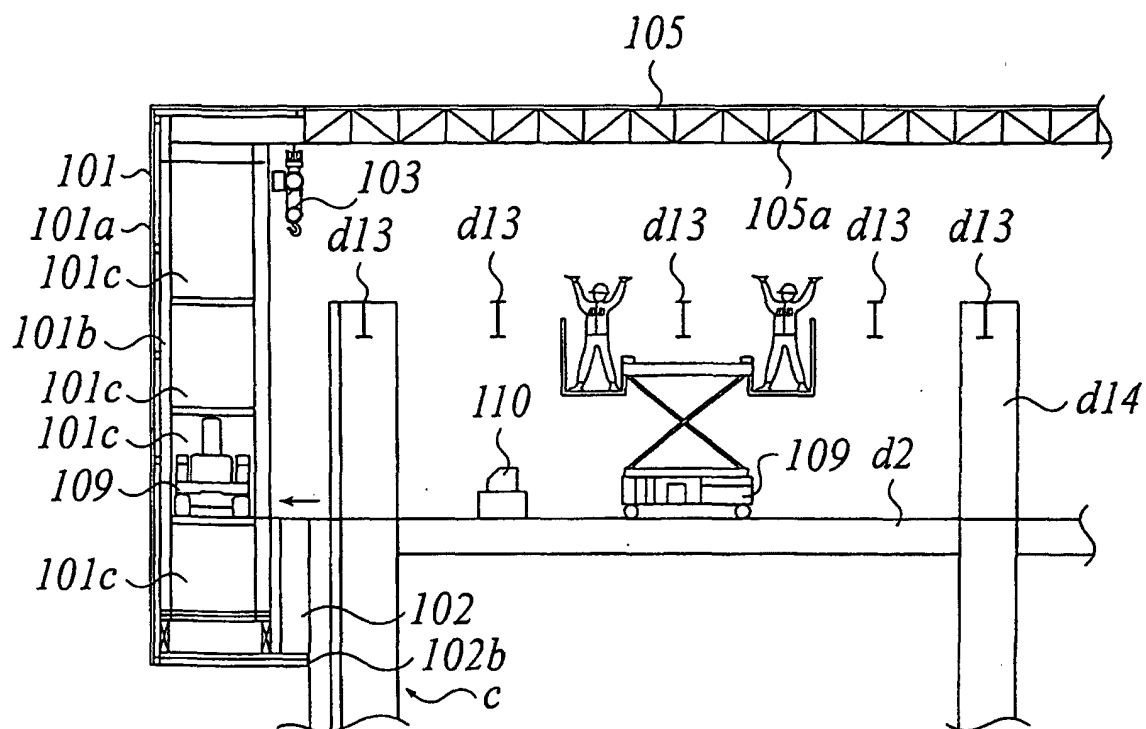


FIG 19

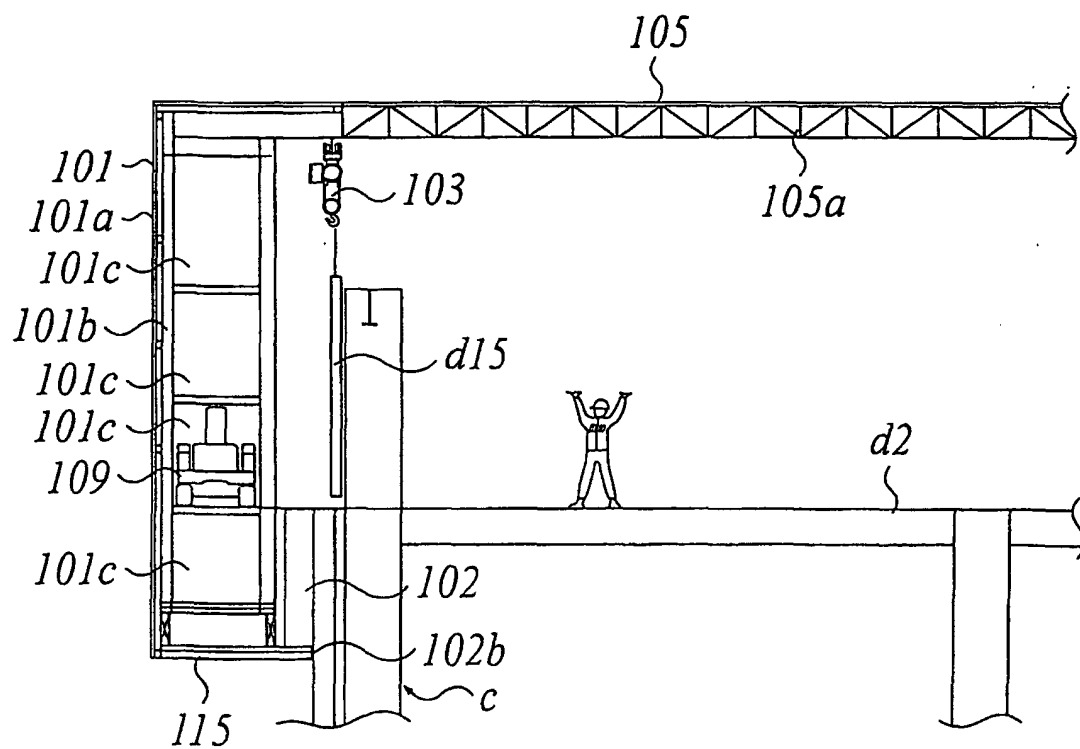


FIG 20

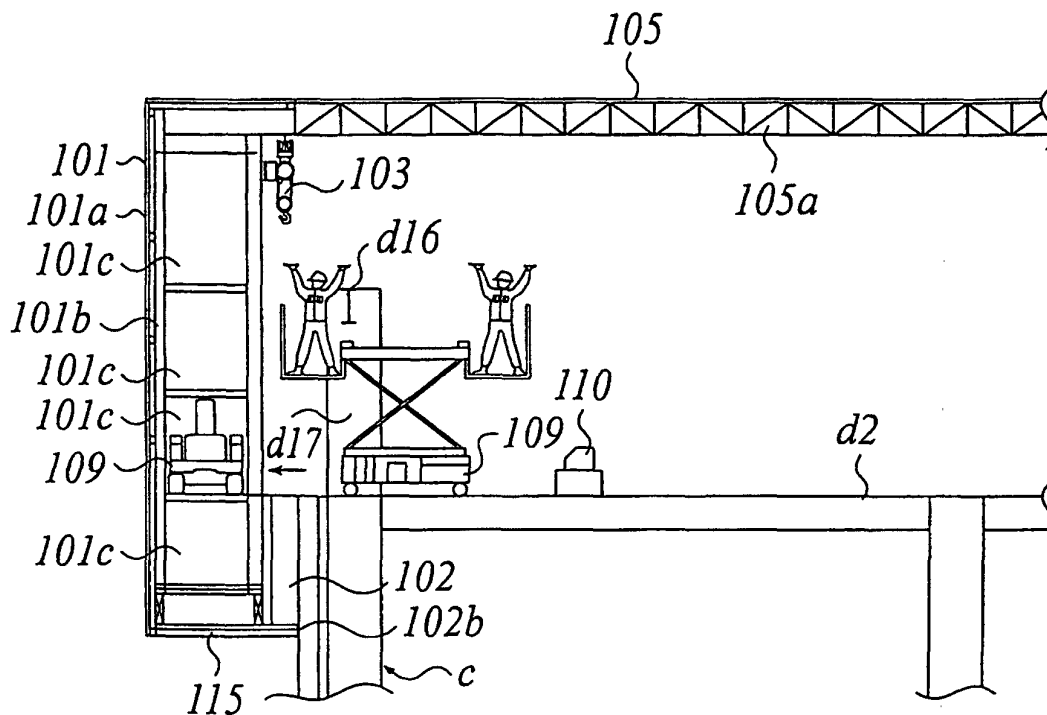


FIG 21

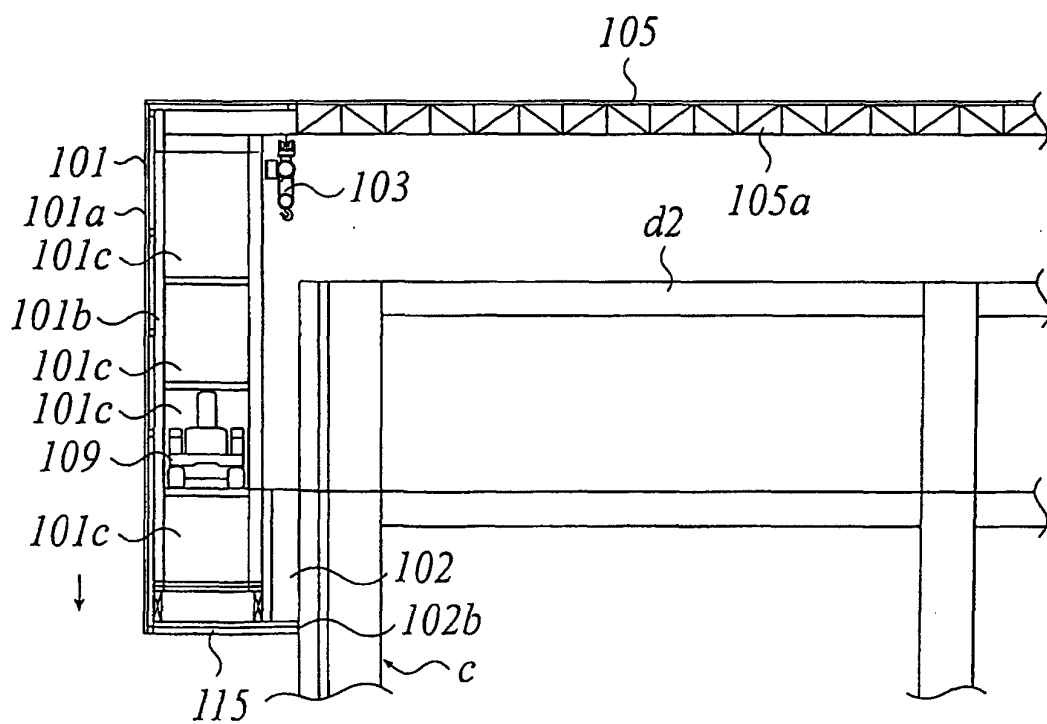


FIG. 22A

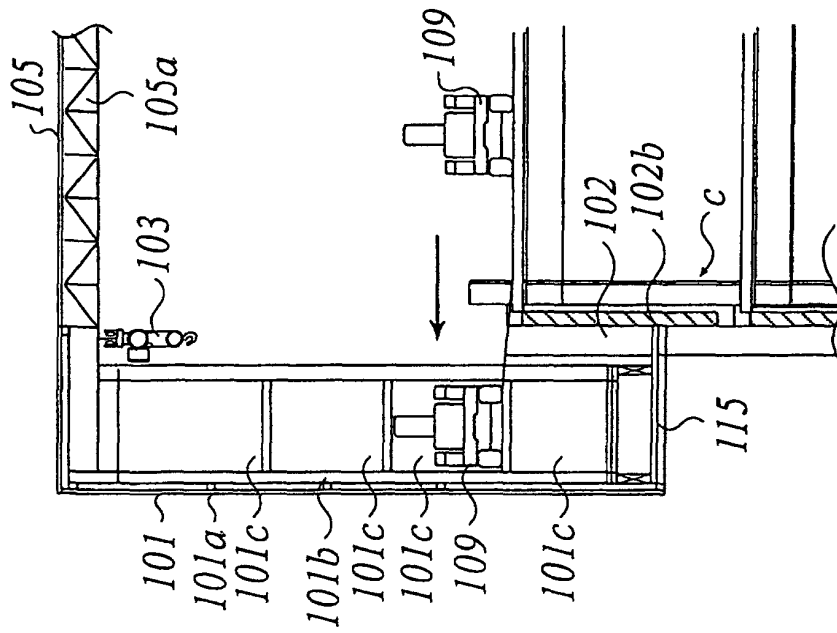
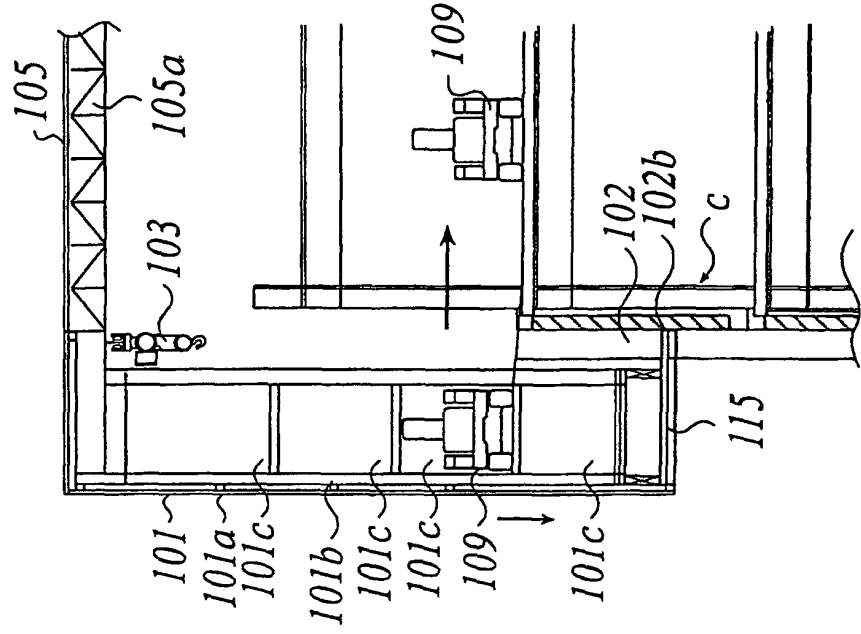


FIG. 22B



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP02/04918

A. CLASSIFICATION OF SUBJECT MATTER Int.Cl ⁷ E04G23/08		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) Int.Cl ⁷ E04G23/08, E04G21/28, E04G21/32, E04G3/10		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2002 Kokai Jitsuyo Shinan Koho 1971-2002 Toroku Jitsuyo Shinan Koho 1994-2002		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 11-30038 A (Shimizu Corp.), 02 February, 1999 (02.02.99), Full text; Figs. 1 to 7 (Family: none)	1-13
A	JP 10-331432 A (Shimizu Corp.), 15 December, 1998 (15.12.98), Full text; Figs. 1 to 8 (Family: none)	3, 8-10, 13
A	JP 8-144534 A (Kajima Corp.), 04 June, 1996 (04.06.96), Page 2, right column, lines 24 to 34; Fig. 1 (Family: none)	4
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search 12 July, 2002 (12.07.02)		Date of mailing of the international search report 30 July, 2002 (30.07.02)
Name and mailing address of the ISA/ Japanese Patent Office		Authorized officer
Facsimile No.		Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP02/04918

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 60-35509 B2 (Obara Kaitai Doboku Kabushiki Kaisha), 15 August, 1985 (15.08.85), Page 2, right column, lines 8 to 12; Fig. 2 (Family: none)	6
A	JP 6-167123 A (Takenaka Corp.), 14 June, 1994 (14.06.94), Page 3, left column, lines 21 to 27; Fig. 3 (Family: none)	7
A	JP 11-256833 A (Shimizu Corp., Kabushiki Kaisha Mirukkusu, Okabe Co., Ltd.), 21 September, 1999 (21.09.99), Page 6, right column, lines 9 to 22; Fig. 10 (Family: none)	9,10
A	JP 6-101367 A (Tatsuo KIMURA, Yoichi KIMURA, Toru KIMURA), 12 April, 1994 (12.04.94), Page 2, right column, lines 40 to 46; Fig. 1 (Family: none)	11,12

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