

Sept. 19, 1967

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3,342,008

SUSPENDED MODULE BUILDINGS

Filed Dec. 22, 1965

3 Sheets-Sheet 1

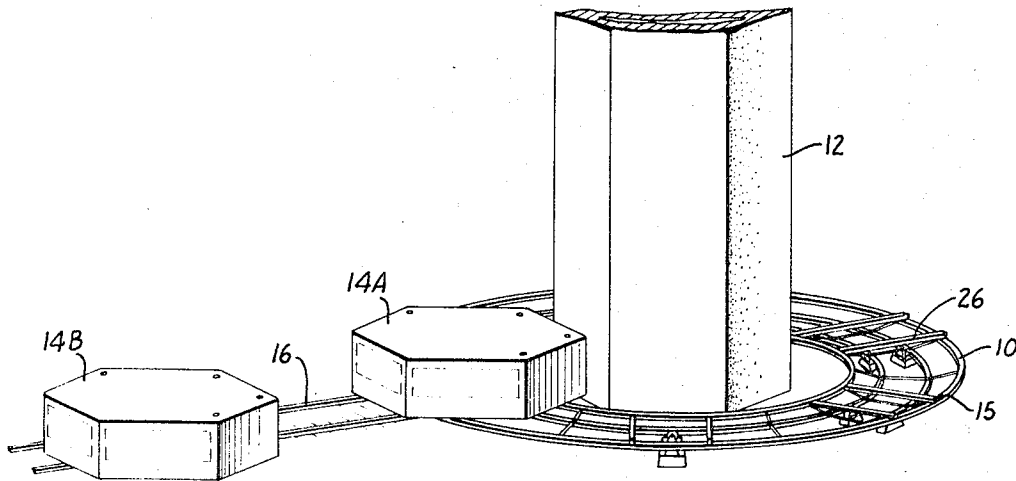


FIG. 1.

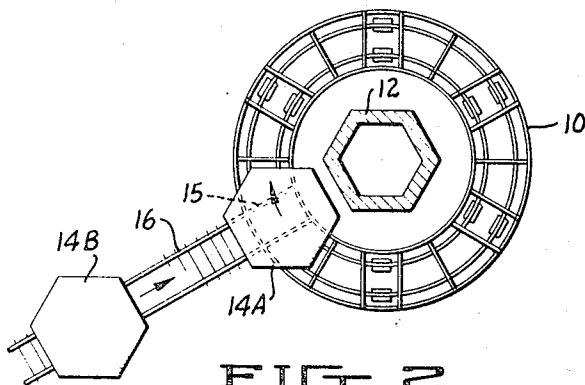


FIG. 2.

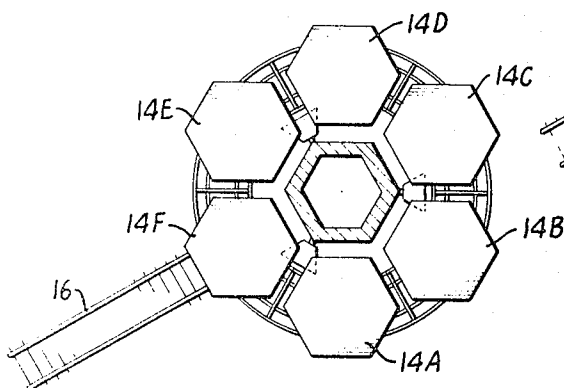


FIG. 4.

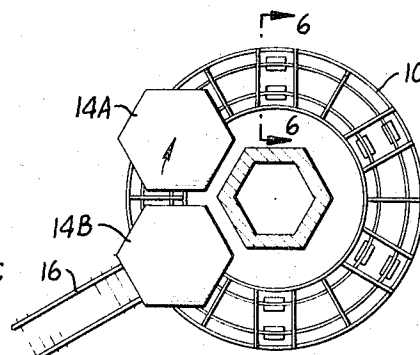


FIG. 3.

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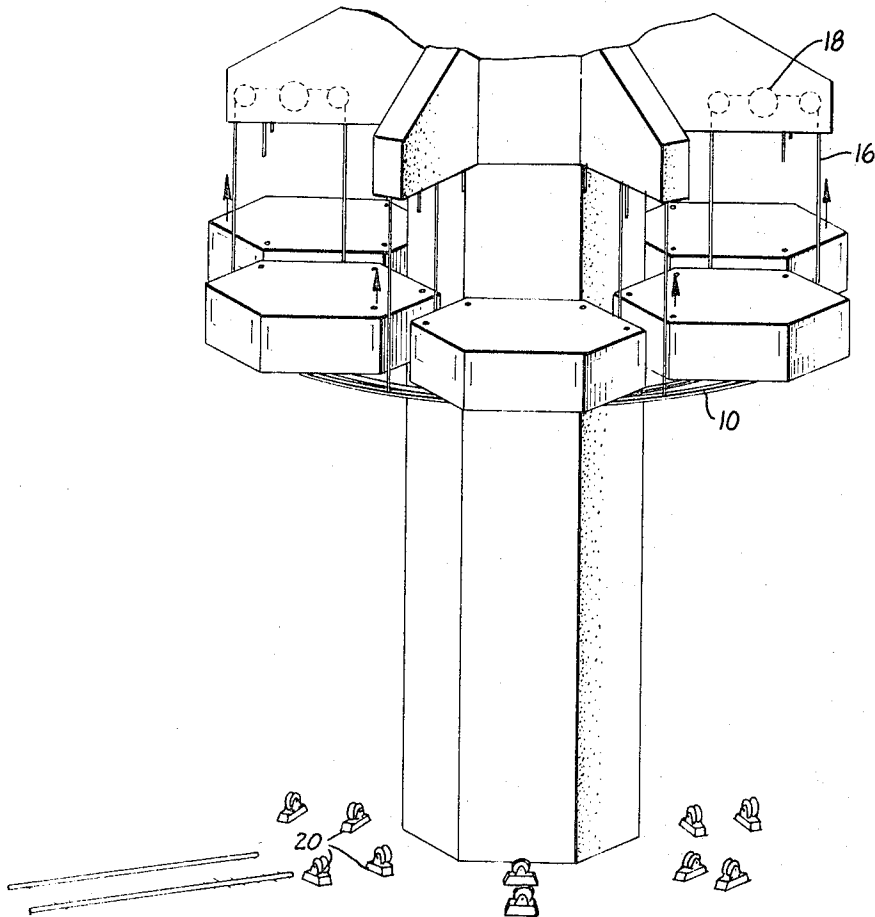


FIG. 5.

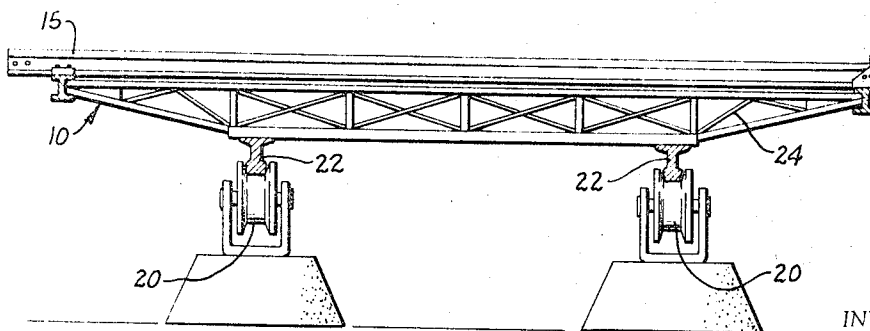


FIG. 6.

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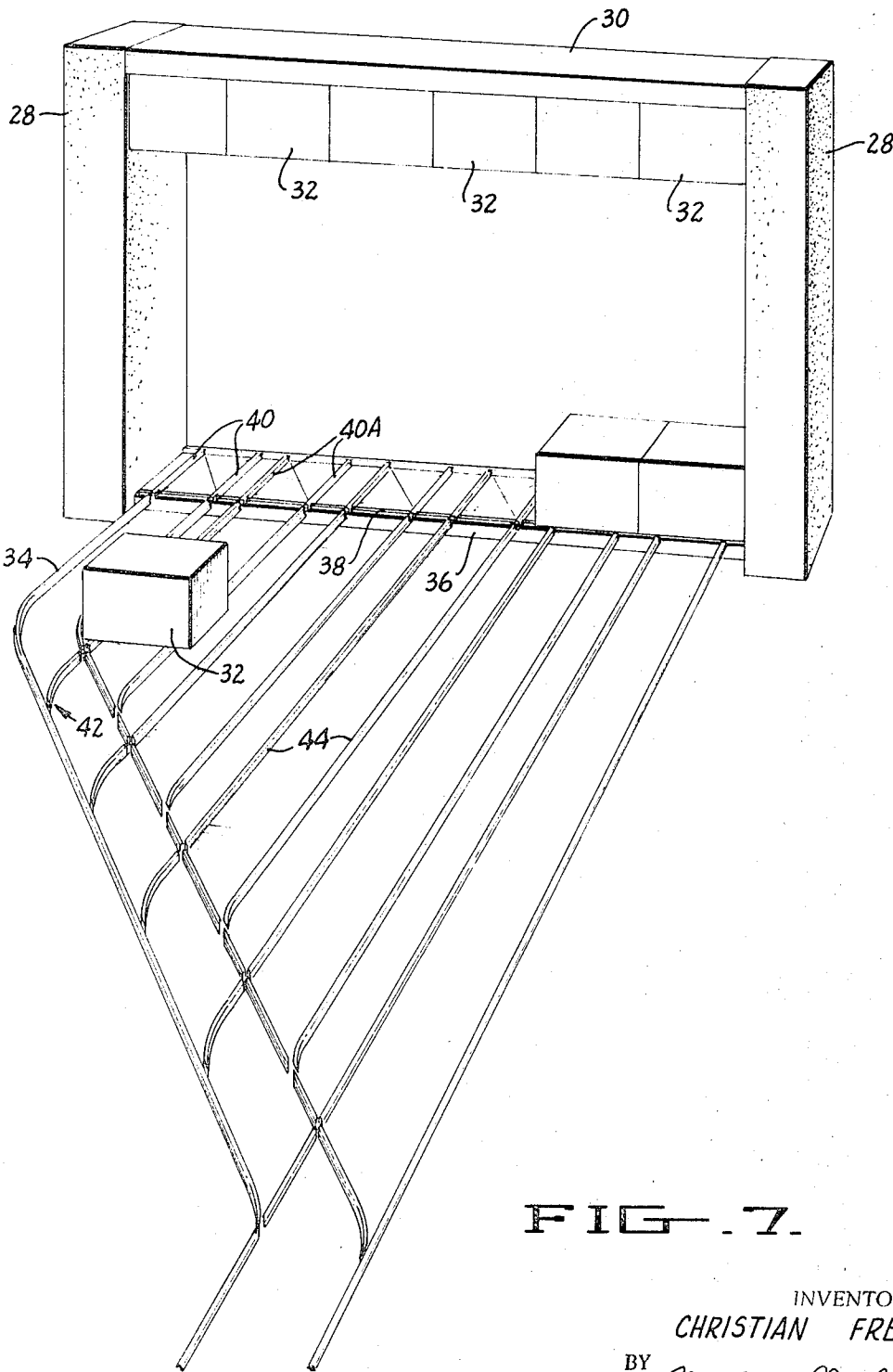


FIG. 7.

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3,342,008

SUSPENDED MODULE BUILDINGS

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4 Claims. (Cl. 52-745)

This application is a continuation in part of my co-pending application No. 229,421 filed October 9, 1962, for "Suspended Module Building" now Patent No. 3,226,727 and also a continuation in part of my co-pending application No. 413,211, filed November 23, 1964, now U.S. Patent No. 3,302,363.

In the above mentioned co-pending applications, I have disclosed a method for erecting buildings by suspending a plurality of prefabricated modules from a cantilever support portion on a service tower. Each prefabricated module may be a single apartment unit or the like, or it may be a three dimensional component including connected wall and floor panels which are joined to other modules to make a single apartment or the like. The erection of buildings in accordance with this method affords substantial cost savings by permitting each construction operation to be carried out under ideal conditions and independently of weather conditions while also permitting the use of new building materials and the most efficient use of old materials.

The present invention relates to an apparatus for lifting modules into position in constructing a suspended module building.

The inventive device provides a quick and convenient means for lifting the completed modules into position. It is particularly applicable to an assembly line concept since a platform is provided which receives more than one module at a time. Consequently an entire tier of modules may be lifted into position and secured in one operation.

Another advantage of the inventive device is the fact that the platform may be loaded without moving a track or skid which supplies the modules to the platform.

Other features and advantages of the invention will become apparent from the following description read in conjunction with the attached drawings in which:

FIG. 1 is a perspective view of one embodiment of the invention with the vertical column broken off;

FIG. 2 is a top plan view showing how the modules are transported and loaded onto the indexing platform in one embodiment of the invention;

FIG. 3 is a top plan view showing how the platform is indexed to receive another module in one embodiment of the invention;

FIG. 4 is a top plan view showing the platform loaded with a tier of received modules in one embodiment of the invention;

FIG. 5 is a perspective view of one embodiment of the invention showing the platform loaded with a tier of received modules being lifted into position;

FIG. 6 is a cross-sectional view of the platform taken along lines 6-6 of FIG. 3;

FIG. 7 is a perspective view of another embodiment of the invention showing modules being loaded into the indexing platform with one tier of modules already in position.

Referring now in detail to the drawings and particularly to FIG. 1, a platform is indicated in general by numeral 10. In the center of the platform 10 is a vertical column 12 (shown broken off) which acts as a service column for the entire building. The modules 14 are moved along the transporting track 16 to the platform 10 on carts or skids (not shown). The platform is built in the form of an open network of braces which support radially extending sets of tracks or skids 15.

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Referring now to FIGS. 2, 3 and 4 modules 14 are shown being positioned on the cross-skids 15 located on the platform 10. One module 14A is advanced onto the platform as shown in FIG. 2. The platform is then rotated around the tower to align a second set of skids 15 with the tracks 16 and a second module 14B is moved onto the platform. The platform is then rotated sequentially and further modules 14C, 14D, 14E and 14F moved onto the platform until the platform supports an entire tier of modules as shown in FIG. 4.

In FIG. 5 the platform 10 is shown being lifted up the vertical column 12 by cables 16. The cables 16 are controlled by an appropriate lift means 18 such as a pulley and electric motor combination, and the cables 16 may or may not be the same tension members that ultimately suspend the modules. When the platform lifts the modules 14 to their ultimate height, the modules are attached to the tower, and the platform is lowered to the ground again for use in lifting the modules of the next lower floor level.

FIG. 6 shows the platform 10 in more detail. Rollers 20 are mounted on the ground and support the platform 10 by means of a pair of circular I beams 22. The body of the platform 24 rests on the I beams 22. Cross-skids 15 cross the body of the platform 10 at selectively located positions (shown more clearly in FIG. 1).

Another embodiment of the inventive device is shown in FIG. 7. Vertical service columns 28 support a cross-member 30. Modules 32 move along skid 34 to an indexing platform 36. The indexing platform 36 has a track 38 upon which the modules are positioned. Lift means (not shown) such as a conventional crane or the apparatus shown in FIG. 6 of my copending application Serial No. 413,211, lift the indexing platform 36 up to the proper position on the service columns 28 once an entire tier has been loaded onto the platform 36. The modules 32 are then either secured to the cross-member 30 or to the preceding tiers of the modules 32 by means of any suitable mechanism such as the mechanism shown in FIG. 3 of my above-mentioned patent. Where extremely heavy modules are employed, the platform may be provided with cross tracks 40A onto which the modules roll from track 34, and the track 34 may be provided with switching means 42 and branch tracks 44 for delivering a module to any desired location along the length of the platform.

The method of using the apparatus of this invention should be apparent from the above description of the apparatus itself. The platform may be used as a staging and indexing area for accumulating one or more floor levels of building modules or a part of such a floor level. The platform is then lifted to raise the modules into position and support the modules while they are being suspended from the building. Then the platform may be lowered a short distance for temporary use as a scaffold and finally returned to the ground to pick up further modules. Where work must be done underneath the modules while the modules are being suspended from the tower, a working scaffold may be built into the platform underneath the modules, or removable scaffold members may be hung on the platform as it is being lifted.

While certain general principles of the invention and two specific embodiments thereof have been illustrated and described above, it should be obvious that many modifications thereof may be made without departing from the sphere and scope of the structure and method of the invention.

I claim:

1. In the method of making a building from modular units by erecting at least one substantially vertical service column on the ground, mounting a support portion on the column at an elevation substantially above the ground, and prefabricating at a location remote from the support portion a plurality of three dimensional modular units from

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which the building is to be made, the improved method of moving the modular units from the remote location and attaching the units to the support portion which comprises:

- (A) mounting a platform adjacent to the column underneath and at a level substantially below the support portion, 5
- (B) moving a plurality of the modular units that constitute substantially a full floor level onto the platform from the remote location, 10
- (C) lifting the platform, with the plurality of modular units thereon, to an elevated position,
- (D) attaching the plurality of modular units to the support portion, 15
- (E) lowering the platform to its initial position, and
- (F) continuing to thus move and suspend full floor levels of modules and raise and lower the platform until a building is substantially complete.

2. The method of claim 1 characterized further in that every time the platform is lifted, it is lifted to a lower level than it had been lifted before. 20

3. The method of claim 1 in which the step of mounting the platform is performed by positioning a circular platform at the bottom of the column surrounding the column, and the step of moving a plurality of modular units onto the platform is performed by conveying a first module through a loading station and onto the platform, moving the platform around the column with respect to the loading station, and continuing to thus move additional ones of said modules and the platform until the platform is substantially covered by a plurality of the modules. 25

4. Apparatus for building structures from suspended modules, the modules being building components for occupancy by human beings, the apparatus comprising: 30

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- (A) a support platform adapted to support in side by side relation a plurality of the modules from which the structure is to be made,
- (B) transport means for transporting a plurality of the modules onto the platform with the transport means being independent from the support platform, said transport means including a main track extending toward the platform for transporting modules toward the platform, a plurality of branch tracks extending from the main track to different portions of the platform for transporting modules from the main track to different portions of the platform, and switch means for connecting the main track to the branch tracks alternately, and
- (C) lifting means for raising the platform with a plurality of modules thereon and lowering the empty platform to receive additional modules.

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