United States Patent [19]

Westlake et al.

[11] **3,851,736**

[45] **Dec. 3, 1974**

[54] **APPARATUS AND METHOD FOR INSTALLING ELEVATOR HOISTWAY EQUIPMENT**

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[22] Filed: **Mar. 20, 1973**

[21] Appl. No.: **343,069**

[52] **U.S. Cl.** **187/95,** 52/745, 187/2

[51] **Int. Cl.** **B66b 7/02**

[58] **Field of Search** 187/95, 2, 1, 6, 20; 52/30, 236, 637, 741, 745; 29/429

[56] **References Cited**

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1,905,248	4/1933	Skaife	187/95
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Primary Examiner—Evon C. Blunk
Assistant Examiner—James L. Rowland
Attorney, Agent, or Firm—D. R. Lackey

[57] **ABSTRACT**

An elevator system has a hoistway in which guide rail sections are mounted end-to-end to form guide rails for an elevator car frame or sling and for a couterweight. To install the guide rails a rig is lowered by a hoist towards the lower end of the hoistway. An end of a guide rail section is connected to the rig for each guide rail desired. The rig is raised in steps and each step is equal to the length of a guide rail section. At the end of each step an end of an additional guide rail section is connected to the lower end of each row of suspended guide rail sections until the desired guide rail length is achieved. The points of connection of the guide rail sections to the rig are adjusted to locate each row of guide rail sections in the desired position and the rig is blocked in position. The lowest section of each row is next secured to the building structure housing the hoistway and a car frame or sling is mounted on the lowest sections of guide rails. The sling is raised upwardly in steps. At each stop of the sling workmen operating from the sling secure the adjacent parts of the guide rail sections to the building structure and/or install hoistway apparatus on adjacent parts of the hoistway.

17 Claims, 8 Drawing Figures

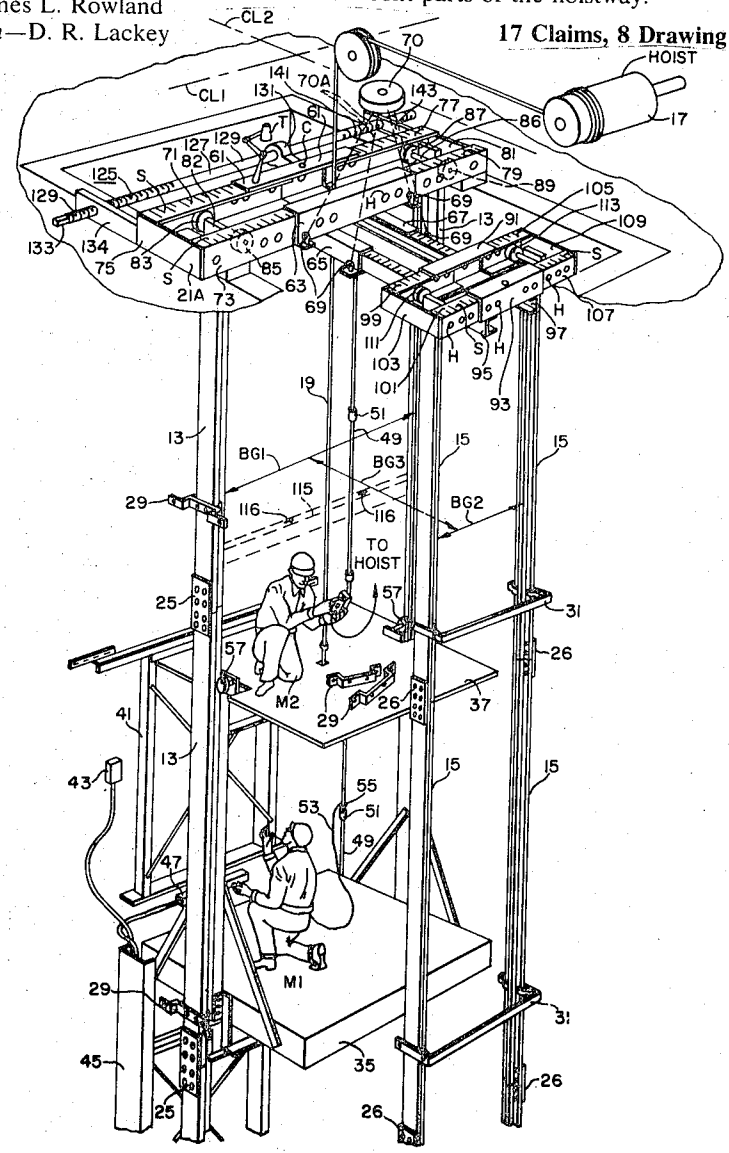


FIG. 1.

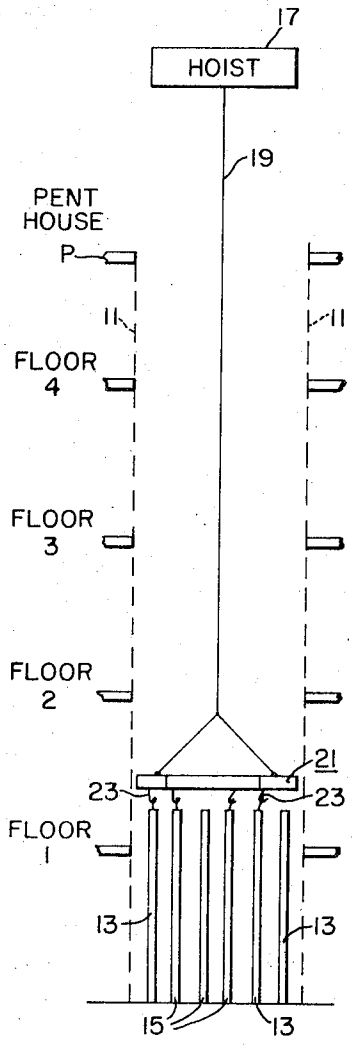


FIG. 2.

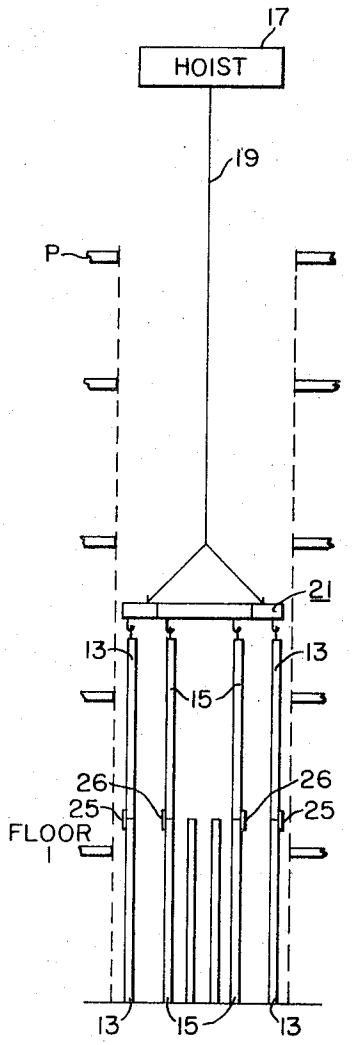
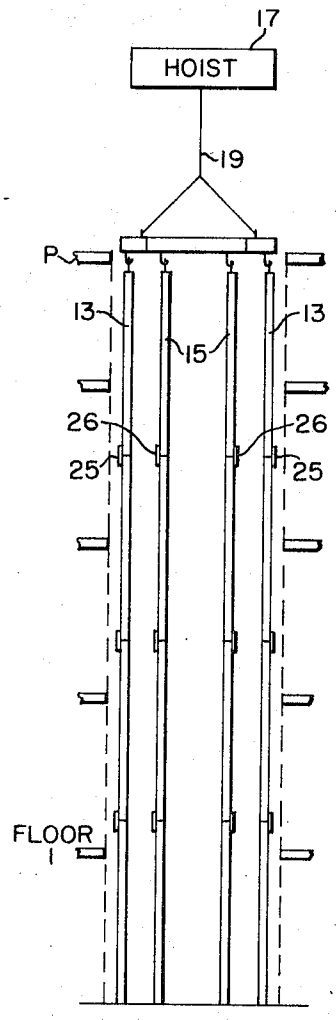


FIG. 3.



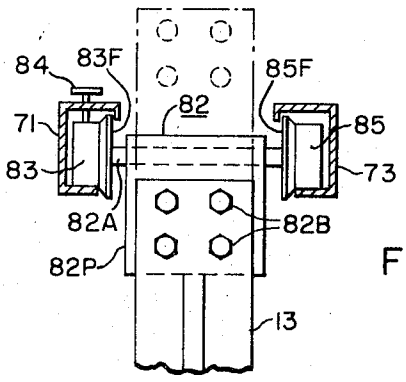


FIG. 8.

FIG. 4.

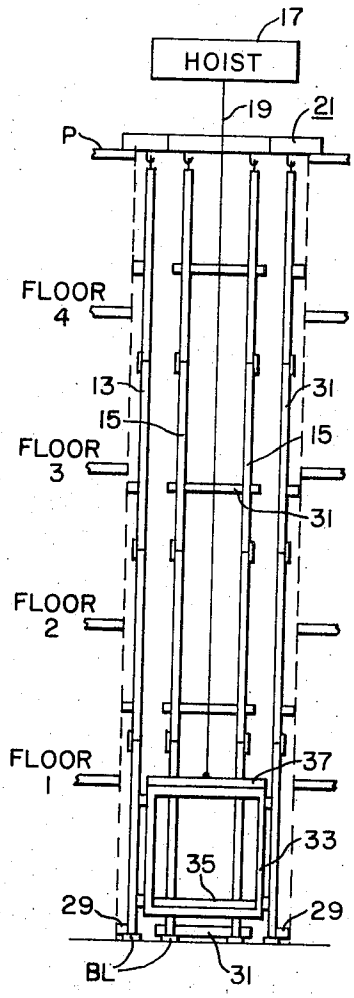


FIG. 5.

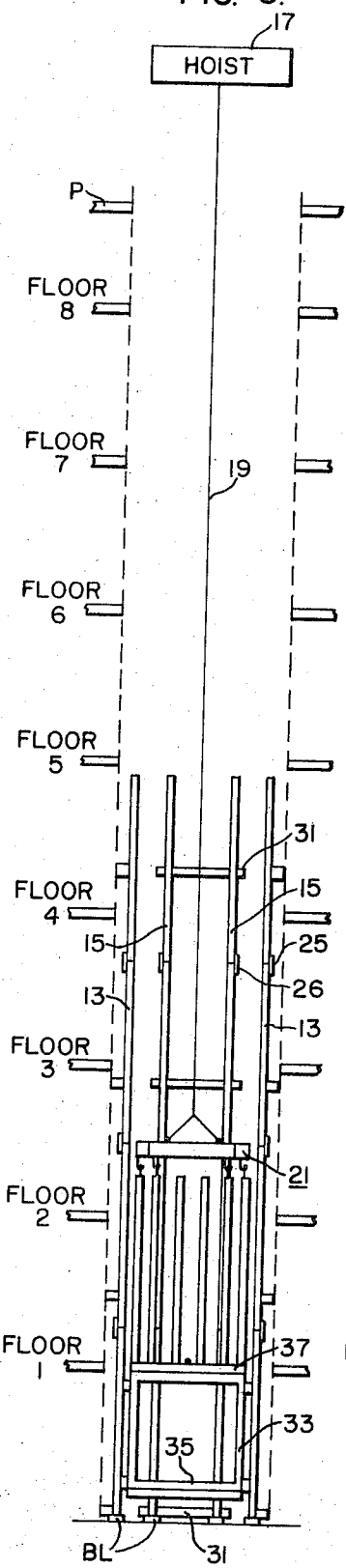
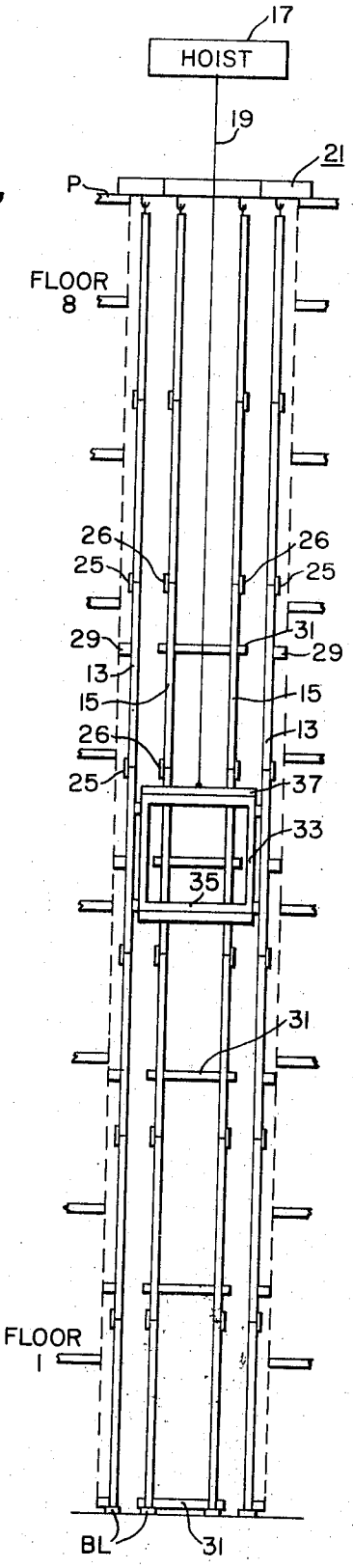
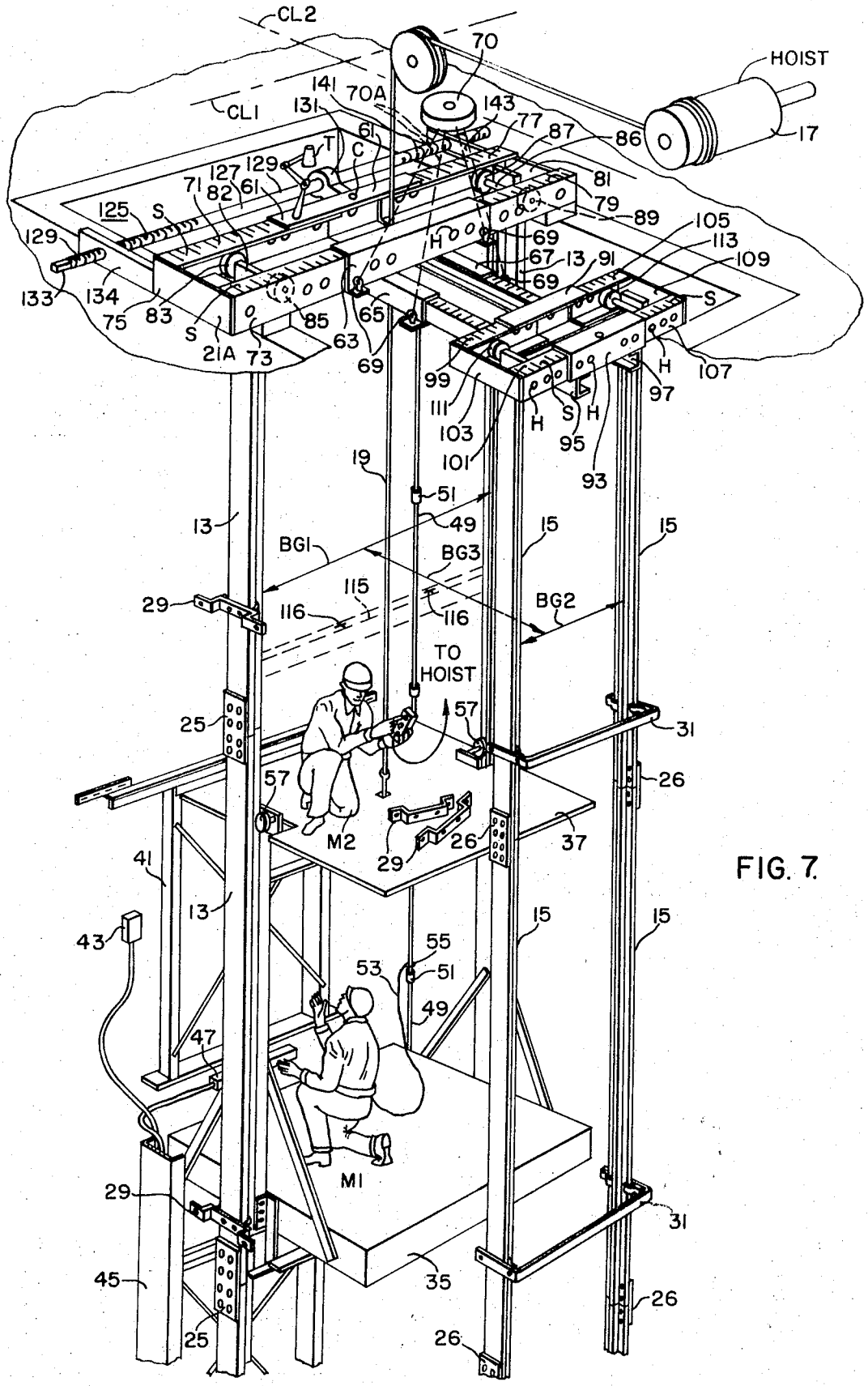


FIG. 6.




CL2
CL1
70
HOIST
17
141
70A
131
143
77
87
86
61
T
C
127
129
71
82
81
79
89
105
113
109
125
S
129
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134
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83
85
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69
67
13
91
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111
103
101
107
97
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93
H
19
51
49
13
15
BG1
BG3
BG2
115
116
29
TO
HOIST
57
25
31
26
M2
37
41
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55
53
47
M1
35
45

FIG. 7.

APPARATUS AND METHOD FOR INSTALLING ELEVATOR HOISTWAY EQUIPMENT

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to an elevator system and it has particular relation to an elevator system wherein an elevator car operates in a hoistway having vertical guide rails.

2. Description of the Prior Art

In an elevator system it is conventional practice to provide in an elevator hoistway one or more vertical guide rails and various hoistway apparatus such as hoistway door frames, pushbutton switches, ducts and position indicators at various levels.

In a typical electric power elevator system two car guide rails and two counterweight guide rails are provided. Each guide rail is constructed of sections connected end-to-end by fish plates. Each guide rail is positioned on the building structure housing the hoistway at spaced intervals by clips and brackets. Standards for components of an elevator system are set forth in the American Standard Safety Code for Elevators, Seventh Edition, published in 1965 by the American Society of Mechanical Engineers, New York City. An example of a prior art system is shown in the U.S. Pat. No. 1,905,248, issued Apr. 25, 1933.

In accordance with a typical prior-art procedure a plumb line is located in the hoistway along a vertical line which is intended to locate the faces of the brackets for a guide rail. The brackets are distributed at the approximate levels at which they are to be installed. A workman then proceeds along the hoistway to install each bracket. Each bracket is secured to a supporting member of the building structure, as by bolting. If necessary, the workman installs shims between the bracket and the bracket support to locate the face of the bracket against the plumb line.

Due to vagaries of building construction, the bracket supports may not be uniformly spaced from the plumb line, and in some cases may be so close to the plumb line that room is not available for the brackets. Time-consuming modification of the bracket supports or relocation of the plumb line may be necessary.

After the brackets are installed the guide rail sections are installed individually, and are connected by fish plates. Sometimes a bracket may interfere with the correct location of a bracket, and may necessitate a time-consuming relocation of the bracket.

Movement of the heavy guide rail sections to their mounting levels has required time-consuming and tiring work.

The guide rails and the hoistway apparatus have been installed by a crew of four or more men and the installation has been slow and costly.

BRIEF SUMMARY OF THE INVENTION

In order to decrease the time and cost for installing hoistway apparatus guide rail sections are stored vertically in the lower end of the hoistway. A hoist located at the upper end of the hoistway then lowers a guide-rail-section-lifting rig until it is adjacent to the upper ends of the guide rail sections. For each guide rail to be installed, one guide rail section is connected at its upper end to the rig. Thus for two car guide rails and two counterweight guide rails four guide rail sections have their upper ends connected to the rig.

The hoist then is operated to raise the rig until the lower ends of the guide rail sections suspended from the rig are adjacent to the upper ends of the remaining stored guide rail sections. A fish plate is then utilized for loosely connecting the lower end of each suspended guide rail section to the upper end of a separate stored guide rail section.

The hoist is again operated to raise the rig until the lower ends of the lower suspended guide rail sections are adjacent the upper ends of the remaining stored guide rail sections. A fish plate is utilized for loosely connecting the lower end of each lower suspended guide rail section to the upper end of a separate one of the remaining stored guide rail sections.

In this manner successive guide rail sections are added to those suspended from the rig until the desired guide rail lengths are reached. The points of connection of the guide rail sections to the rig are moved until each vertical line or row of guide rail sections is substantially in the position desired for a guide rail and the rig is secured in position. Inasmuch as the fish plates are properly positioned before the brackets are installed, any problems of interference between a bracket and a fish plate is avoided before the bracket is initially installed. The lowest suspended guide rail section in each row is then secured by brackets and clips to the building structure housing the hoistway. The lowest guide rail section in each row may be pinned or blocked to prevent it from sliding in its clips at a later stage when the rig is removed.

A conventional car frame or sling is next installed between the secured guide rail sections and the hoist rope is transferred from the rig to the sling. The sling is now raised in steps. At the end of each step a workman on the sling tightens the fish plates nearest to him, secures the guide rail sections by clips and brackets at points nearest to him and installs various hoistway apparatus, such as hoistway door frames, duct work, pushbutton boxes and position indicators, required at the various levels at which the sling stops.

If the hoistway requires guide rails longer than the length tolerated by the hoist equipment, the foregoing sequence may be repeated to suspend by the same rig an upper vertical row of guide rail sections above each of the lower secured rows of guide rail sections. The sling then may be raised in steps above the lower secured rows of guide rail sections to permit workmen on the sling to complete the installation of the upper rows of guide rail sections and various hoistway apparatus required at the various levels at which the sling stops.

It is therefore an object of the invention to provide improved equipment for installing apparatus in the hoistway of an elevator system.

It is another object of the invention to provide an improved method for installing apparatus in the hoistway of an elevator system.

Other objects of the invention will be apparent from the following description taken in conjunction with the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGS. 1 to 4 are schematic views in front elevation of a low-rise elevator hoistway and equipment facilitating installation of apparatus in the hoistway;

FIGS. 5 and 6 are schematic views in front elevation of a high-rise elevator hoistway and equipment facilitating installation of apparatus in the hoistway;

FIG. 7 is a view in perspective of a portion of an elevator hoistway showing preferred equipment for installing apparatus in the hoistway; and

FIG. 8 is a detail view in elevation with parts broken away of a carriage for mounting a guide rail on an overhead rig.

DESCRIPTION OF THE PREFERRED EMBODIMENTS OF THE INVENTION

Referring to the drawings, FIG. 1 shows a low-rise elevator hoistway 11 outlined by dotted lines for serving landings or floors, 1, 2, 3 and 4 of a building structure. The hoistway has a pit extending below the first floor and terminates at its upper end in a penthouse having a penthouse floor P.

Two vertical car guide rails and two vertical counterweight guide rails are to be installed in the hoistway. For illustrative purposes each guide rail is assumed to comprise four guide-rail sections mounted end-to-end, each section being sixteen feet long.

At the outset, all sixteen guide rail sections are placed vertically in the lower end of the hoistway, three car guide rail sections 13 and three counterweight guide rail sections 15 being visible in FIG. 1.

A hoist 17 is located in the penthouse and has the free end of its hoist rope 19 connected to a guide rail section lifting rig 21. This rig carries four swivel hooks or supports 23, one for each guide rail. These hooks are horizontally adjustable on the rig. The rig is lowered by the hoist 17 to a position slightly above the stored guide rail sections. The two outer hooks are loosely connected to the upper ends of two of the stored car guide rail sections 13. The two inner hooks are loosely connected to the upper ends of two of the stored counterweight guide rail sections 15.

The rig 21 is next lifted approximately sixteen feet (the length of a guide rail section) to the position shown in FIG. 2, thus suspending the four guide rail sections connected to it immediately above the remaining stored guide rail sections. The rig is maintained substantially horizontal. The lower end of each of the suspended car guide rail sections is connected by a fish plate 25 and bolts to the upper end of a separate one of the remaining stored car guide rail sections 13 which may be raised slightly or tilted if necessary to achieve registry of its holes with the fish plate holes. The lower end of each of the suspended counterweight guide rail sections 15 similarly is connected by a fish plate 26 and bolts to the upper end of a separate one of the remaining stored counterweight guide rail sections 15. The fish plate bolts are not fully tightened at this time.

The rig is again raised approximately sixteen feet and four more of the stored guide rail sections are added in a similar way to the lower ends of the four rows of suspended guide rail sections.

The rig is finally raised approximately another sixteen feet and the four remaining stored guide rail sections are added in a similar manner to the lower ends of the four rows of suspended guide rail sections as shown in FIG. 3. The rig 21 now may be moved upwards to assure location of the supporting framework immediately above the plane of the penthouse floor P. The lowest rail sections in FIG. 4 are spaced above the pit floor. Each of the rows of guide rail sections hangs from the rig 21 effectively as a vertical plumb line after the final upward movement of the rig 21. The loose connections of the fish plates facilitates the hanging of each row in a vertical plumb line.

The rig 21 is expanded and blocked in position on the penthouse floor as shown in FIG. 4. Each of the rows of guide rail sections is adjusted by moving its supporting hook laterally on the rig to lie precisely along the line of the desired guide rail as shown in FIG. 4.

The location of the hooks may be ascertained with reference to a bench mark furnished by the architect of the building structure or with reference to building center lines. Sights may be taken from the top to the bottom by a device such as a transit or theodolite mounted on the rig to establish the correct bottom points.

Although the guide rail sections now may be secured to the building structure in any suitable manner, preferably brackets 29 and 31 for the lowest guide rail sections are secured to the building structure housing the hoistway. The lowest guide rail section in each row is secured by conventional clips to the brackets 29 for the car guide rail sections and 31 for the counterweight guide rail sections. Also the lowest guide rail section in each row may be pinned or blocked at this time to prevent sliding of the section through its clips when the rig later is removed. This is represented by a block BL located below each guide rail.

A sling 33 is now installed between the secured lowest pair of car guide rail sections 13. If desired this sling may be the permanent car frame of the elevator car to be installed in the hoistway. However, for present purposes it will be assumed that the sling 33 is a temporary sling which is employed only for construction purposes. The sling has a lower work platform 35 and an upper work platform 37. Inasmuch as the rig 21 is blocked on the penthouse floor P, the hoist rope 19 can have its end removed from the rig and transferred to the sling 33.

The sling 33 is lifted in steps by the hoist 17. At each stop of the sling a workman on the upper platform 37 securely tightens the fish plates 25, as he reaches them, to the associated ends of the guide rail sections. He also secures the brackets 29 and 31 to the building structure and secures the guide rail sections by clips to the brackets 29 and 31 as he reaches the successive securing points.

A workman on the lower platform 35 at each stop installs various hoistway apparatus such as hoistway door frames, pushbuttom boxes, position indicator and ducts specific to the level of such stop. Thus by the time the sling reaches the top of the hoistway a substantial part of the hoistway work is completed.

If the sling 33 is a temporary construction sling it may be removed and transferred to the next job. The permanent car frame may be installed.

Preferably the elevator machine and control are installed in the penthouse before work on the guide rails is started. If this had been done, the machine may be lined up and the permanent roping may be installed between the machine, the car frame and the counterweight to permit normal operation of the car frame.

From a practical aspect there is a limit to the amount of rail guide sections which may be carried by the hoist. For illustrative purposes it may be assumed that the rig and hoist are designed to carry an amount sufficient for a ten story building or for a rise of say 120 feet. For a taller building the above-described operation for in-

stalling the guide rails and other hoistway apparatus would be performed for the first ten stories and would be repeated for each additional ten stories or portions thereof.

To illustrate this aspect of the invention and to simplify the drawings, it will be assumed that the rig and hoist are limited in capacity to the loading shown in FIGS. 1–4. The use of the rig and hoist when so limited, for a building having floors 1–8 and a penthouse floor P will now be considered in connection with FIGS. 5 and 6.

In FIGS. 5 and 6 the guide rails below the fifth floor are installed exactly in the same way as those discussed in FIGS. 1–4. In FIG. 5 the sling 33 has been returned to a position below the fifth floor (shown near the bottom of the hoistway) and all guide rail sections for floors above the fifth floor are stored vertically on the upper platform 37. The sling has been blocked in position and the hoist rope 19 has been returned to the rig 21 which has been contracted in size and dropped to a position slightly above the stored guide rail sections.

Four of the stored guide rail sections are connected to the rig in the same manner discussed with respect to FIG. 1. The rig is next lifted in two steps of about sixteen feet each and at each stop four guide rail sections are added to the suspended rows of guide rail sections until each row contains three guide rail sections. The rig is now lifted until the framework of the rig 21 is above the level of the penthouse floor. The rig is expanded to overlie the penthouse floor and each of the suspended rows of guide rail sections is moved into alignment with the corresponding one of the lower secured rows of guide rail sections as shown in FIG. 6. The rig 21 is blocked in position and the hoist rope 19 is transferred to the sling 33.

The sling 33 is moved by the hoist 17 to a position slightly below the fifth floor as shown in FIG. 6. A workman on the upper platform applies four fish plates 25, 26 to connect the adjacent ends of the fourth and fifth guide rail sections in each row counting upwardly from the bottom of the hoistway. Such four fish plates 25 and 26 are shown in position. The workman also applies clips and brackets to secure adjacent rail points to the building structure. A workman on the lower platform installs hoistway apparatus in the adjacent portion of the hoistway.

The sling is lifted in steps to the top of the hoistway. At each stop the workman tightens fish plates as they are reached, install brackets and clips and other hoistway apparatus on adjacent parts of the hoistway.

Conventional buffer channels and a counterweight frame (not shown) may be set in the lower end of the hoistway.

After the sling reaches the upper end of the hoistway it may be removed together with the rig. The permanent sling or car frame now may be installed.

In FIG. 7 the sling 33 is shown adjacent a floor of the building structure represented in FIGS. 1–4. A workman M1 on the lower platform 35 has installed a hoistway door frame 41 for the floor, and a pushbutton box 43 for the floor and has extended a duct 45 for electric conductors which runs up the hoistway. He also installs position indicators 47 for the floors or corridors served by the hoistway which will indicate the position of the car to intending passengers on the floors who are awaiting service. A second workman M2 is on the platform 37 prepared to operate a hoist switch for lifting the sling to its next working position. This workman had been on the platform 37 in order to tighten the fish plates 25 and 26 shown just above the platform and to install the brackets 29 and 31 shown above the platform and the associated clips.

As previously noted the guide rails may be located with respect to a bench mark or with reference to centerlines CL1 and CL2 of the building. Important dimensions include the dimension BG1 between the car guide rails, the dimension BG2 between the counterweight guide rails and the dimension BG3 between the plane of the car guide rails and the plane of the counterweight guide rails.

It will be noted that a safety line 49 extends alongside the path of the sling for the full length of the hoistway. This line has stops 51 at intervals. Each workman has a flexible line 53 with one end attached to the workman's belt. The other end of the flexible line 53 carries a snap hook 55 which snaps on the safety line 49 between a pair of the stops 51.

The sling has conventional guide shoes 57 for guiding the sling along the car guide rail sections 13. These are illustrated as roller guide shoes. All guide rails are shown as having a conventional T-section.

The rig 21A corresponds to the rig 21 of FIGS. 1–6 and has a mounting structure including a central framework constructed of two parallel metal channels 61 and 63 having their flanges extending towards each other. The parts may be constructed of a metal such as steel or aluminum. These channels rest on, and are welded to, two similar parallel channels 65 and 67 extending at right angles to the channels 61 and 63. Four eyes 69 are attached to this framework at spaced points. The hoist rope 19 may be attached to these eyes by a suitable hitch for the purpose of lifting the framework. The hitch is represented by a metal disk 70 attached by ropes or chains (shown dotted) to the eyes 69. When the rig is to be lifted or lowered, the rope 19 is attached to the center of the disk (shown displaced from the normal lift line). Two slightly smaller metal parallel channels 71 and 73 are snuggly, and slidably received within the channels 61 and 63. The channels 71 and 73 have flanges extending towards each other and project from the left hand ends of the channels 61 and 63 as viewed in FIG. 7. The exposed ends of the channels 71 and 73 are welded to a metal plate 75. Two channels 77 and 79 and a plate 81 correspond to the channels 71 and 73 and plate 75, but project from the right-hand ends of the channels 61 and 63.

A carriage 82 has two rollers 83 and 85 which are respectively within the channels 71 and 73 and which roll on the lower flanges of the channels. The carriages have an axle 82A (FIG. 8) mounting the rollers and welded to a metal mounting plate 82P which is arranged to be connected to the upper end of one of the guide rail sections 13 as by bolts 82B. The rollers may have flanges 83F and 85F adjacent the edges of the lower flanges of the channels. The plates 82P may be secured to the associated guide rail section below the top of the section as shown by broken lines. Thus, if it is found advisable to permit the guide rail section to project substantially above the penthouse floor, holes may be drilled on the job at the desired positions in the section 13 to receive the bolts 82B. Similarly a carriage 86 has two rollers 87 and 89 which are similarly associated with the channels 77 and 79 for connection to another guide rail section 13.

A similar but smaller framework is provided for association with the counterweight guide rail sections **15**. Thus two metal channels **91** and **93** correspond to the channels **61** and **63**. Two metal channels **95** and **97** correspond to the channels **65** and **67** and are slidably received respectively in the channels **65** and **67**. The channels **95** and **97** are welded to the channels **91** and **93**.

Two metal channels **99** and **101** correspond to the channels **71** and **73** and are slidably received within the channels **91** and **93**. The projecting ends of the channels **99** and **101** are welded to a metal plate **103**.

Two metal channels **105** and **107** correspond to the channels **77** and **79** and are slidably received within the channels **91** and **93**. The exposed ends of the channels **105** and **107** are welded to a metal plate **109**.

Carriages **111** and **113** having rollers similar to the carriages **82** and **86** are associated with the channels **99, 101, 105** and **107** to be connected to the upper ends of two counterweight guide rail sections **115** in the same manner by which the carriages **82** and **86** are associated with the car guide rail sections **13**.

Dimensional information may be placed on the rig at appropriate places. Thus scales S may be engraved on the upper faces of the channels **71, 73, 77, 79, 95, 97, 99, 101, 105** and **107**. Center points C may be engraved on the upper faces of the channels **61** and **93**. The scales show the distance from each of the guide rails to the associated center point, and the distance between the plane of the car guide rails and the plane of the counterweight guide rails.

Adjustable gauges or scales (not shown) may be placed on the lower faces of the same channels to assist in measuring the distance between pairs of the guide rails and in "squaring" or orienting the faces of the guide rails properly.

Conventional devices T for sighting true centers may be mounted adjustably on the top of the rig. Such a device may be employed for sighting a line extending to a target or mark **116** on a board **115** (shown dotted) extending between a pair of guide rails or to a center mark on the sling or in the pit as desired. The device may take the form of a laser beam device, or a transit or a theodolite. Thus a laser coherent-light beam of small cross-section may be directed vertically down the hoistway along the desired line. The mark **116** then may be adjusted to intercept the beam.

The board **115** is illustrated as having two sighting targets or marks **116**. These marks are spaced horizontally from each other. The device T may comprise a telescope which is oriented successively to sight each of two vertical lines. Each line passes through the correct position of one of the marks **116**. The board has a length equal to the correct spacing BG1 between the car guide rails.

As the sling progresses upwardly through the hoistway, at each of several stops a workman places the board level between two of the guide rail sections **13**. The nearest guide rail brackets then are adjusted or shimmed until the guide rail sections about the board ends and each of the marks **116** falls on one of the sighting lines. The counterweight guide rails are adjusted similarly.

The rig may be expanded or contracted in any suitable manner. Desirably, jacks may be provided, one along each line of expansion or contraction of the rig components. The jacks may be of standard construction, such as screw-operated or hydraulically-operated jacks. Conveniently they may be secured to the rig to be available at all times.

One such screw-operated jack **125** has an element **127** providing a male screw **129** at its left-hand end in FIG. **7**. The remaining end is captured in a holder **131** on the channel **61**. This holder permits rotation of the element about its axis by a wrench (not shown) applied to a square head **133** on the screw **129**, but prevents axial movement of the screw relative to the holder. The screw is threaded into female threads formed in an extension **134** of the plate **75**. Thus rotation of the element **127** forces the plate **75** towards or from the channels **61** and **63** as desired. Similar jacks may be provided for controlling the positions of the plate **81** relative to the channels **61** and **63**, the channels **91** and **93** relative to the channels **61** and **63** and the plates **103** and **109** relative the channels **91** and **93**.

In FIG. **7** the element **127** projects to the right of the holder **131** and has a male screw **141** at its right-hand end. The male screw **141** is threaded into female threads formed in an extension **143** of the plate **81**.

The screws **141** and **129** are respectively right-hand and left-hand screws. Thus rotation of the element **127** about its axis simultaneously forces the plates **75** and **81** towards or from the channels **61** and **63** as desired. A similar jack may be provided for the plates **103** and **109**.

Each of the guide rails has a conventional T-section and the fish plates are bolted to the bases of the guide rail sections. It has been found that when suspended from the rig the sections forming each guide rail are located closely along the desired vertical line, particularly if the fish plates are loosely bolted to the rail sections.

The adjustable parts may be suitably clamped in adjusted positions. Thus holes H are formed in the webs of the various channels as shown so the telescoping channels may be fastened in various positions of adjustment by bolts. A screw **84** is shown for holding the roller **83** in any position of adjustment. A number of closely-spaced tapped holes may be distributed along the channel **71** to receive one or more screws **84** located to hold the roller **83** approximately in any desired position. Each of the rollers from which the guide rails are suspended may be held similarly. It will be noted that such holding does not interfere with the pivoting movement of each guide rail about the axis of the associated pair of rollers.

The invention may be applied to elevator systems having parts in different configurations. Thus, some systems locate the counterweights, and guide rails at one side of a hoistway instead of at the rear of hoistway as shown in FIG. **7**. The side mounted guide rails may be installed in the same manner discussed above as the rear mounted guide rails.

We claim:

1. A rig for installing elevator guide rails comprising a first guide rail support for supporting a first guide rail in substantially vertical position, a second guide rail support for supporting a second guide rail in substantially vertical position, and a mounting structure mounting said supports for adjustments substantially parallel to a plane, said mounting structure including hoist connection means for attachment to hoist rope means, said hoist connection means being constructed for maintaining said plane substantially horizontal

when the hoist connection is attached to vertical hoist rope means, whereby said supports may be utilized to support two vertical guide rails in predetermined horizontally spaced positions, and hoist means connected to said hoist connection means for raising and lowering the mounting structure in substantially vertical directions.

2. A rig as claimed in claim 1 which includes a third guide rail support for supporting a third guide rail in substantially vertical position and a fourth guide rail support for supporting a fourth guide rail in substantially vertical position, said mounting structure including means mounting the third and fourth guide rail supports for adjustments substantially parallel to said plane, whereby said third and fourth guide rail supports may be utilized to support two vertical guide rails in predetermined horizontally spaced positions.

3. The invention as claimed in claim 2 in combination with a first vertical guide rail section having an upper end connected to said first guide rail support, a second vertical guide rail section having an upper end connected to said second guide rail support, a first depending guide rail section located below and substantially aligned with the first guide rail section, a second depending guide rail section located below and substantially aligned with the second guide rail section, a third vertical guide rail section having an upper end connected to said third guide rail support, a fourth vertical guide rail section having an upper end connected to said fourth guide rail support, a third depending guide rail section located below and substantially aligned with the third guide rail section, and a fourth depending guide rail section located below and substantially aligned with the fourth guide rail section, said first and second guide rail sections forming parts of car guide rails, and the third and fourth guide rail sections forming parts of counterweight guide rails.

4. The invention as claimed in claim 2 wherein said mounting structure comprises means for adjustably mounting the first and second guide rail supports for adjustment along a first line, and means for adjustably mounting the third and fourth guide rail supports for adjustment along a second line parallel to, and horizontally spaced from, the first line.

5. The invention as claimed in claim 1 in combination with a first vertical guide rail section having an upper end connected to said first guide rail support, a second vertical guide rail section having an upper end connected to said second guide rail support, a first depending guide rail section located below and substantially aligned with the first vertical guide rail section, and a second depending guide rail section located below and substantially aligned with the second vertical guide rail section.

6. The invention as claimed in claim 5 in combination with means loosely connecting the lower ends of the vertical guide rail sections to the associated upper ends of the depending guide rail sections.

7. The method of installing with a guide rail support unit in a hoistway of a building structure a plurality of guide rail sections constituting parts of a multi-section guide rail, which comprises raising a unit having a guide rail support from a low level in the hoistway, to a higher level in the hoistway in a plurality of steps each substantially equal to the length of a guide rail section, suspending a guide rail section from the support when the support is adjacent a low level in the hoistway, attaching an end of a separate guide rail section to the lowest end of a guide rail section suspended from said support at the end of each successive step of the unit, whereby the overall length of the suspended guide rail sections is increased by the length of one guide rail section after each of said steps.

8. The method as claimed in claim 7 in combination with the steps of moving the support horizontally to position the suspended guide rail sections along the line of a desired guide rail, and attaching the suspended guide rail sections to the building structure.

9. The method as claimed in claim 8 wherein said attaching comprises attaching to the building structure the lowest suspended guide rail section, mounting a platform for vertical movement under the guidance of the attached guide rail section, and working from the platform to secure to the building structure the guide rail section immediately above the first attached guide rail section.

10. The method as claimed in claim 9 wherein said attaching further comprises raising the platform as guided by the lowest two secured guide rail sections to a higher level, working from the platform to secure to the building structure the guide rail section immediately above the two previously secured guide rail sections, and in like manner raising the platform in steps and working from the platform to secure each higher guide rail section to the building structure until the initially suspended guide rail sections are all secured to the building structure.

11. The method as claimed in claim 10 wherein each pair of adjacent ends of the suspended guide rail sections initially are loosely connected, and firmly attaching each of said pairs of adjacent ends as it is reached by a workman on the platform.

12. The method as claimed in claim 11 in combination with installing other apparatus in the hoistway including hoistway door frames as the installation positions of such components are reached by the platform.

13. A method as claimed in claim 7 wherein said unit has a second guide rail support, said method comprising suspending a guide rail section from the second guide rail support when the unit is adjacent said low level in the hoistway, attaching an end of a separate guide rail section to the lowest end of a guide rail section suspended from said second guide rail support at the end of each of said successive steps of the unit, whereby two parallel vertical rows of guide rail sections are formed.

14. A method as claimed in claim 13 in combination with the steps of moving each of said supports horizontally to position each suspended row of guide rail sections along the line of a separate desired guide rail, and securing the guide rail sections to the building structure.

15. The method as claimed in claim 14 wherein said securing comprises securing to the building structure the lowest of the suspended guide rail sections in each of the rows, mounting a sling between said secured lowest guide rail sections, raising said sling in steps, and working from the sling at each stop to secure to the building structure portions of the guide rail sections near the sling.

16. The method as claimed in claim 13 wherein said unit has a third guide rail support and a fourth guide rail support, said method comprising suspending from

each of the third and fourth guide rail supports when the unit is adjacent said low level in the hoistway a separate guide rail section, attaching an end of a separate guide rail section to the lowest end of a guide rail section suspended from each of said third and fourth guide rail supports at the end of each of said successive steps of the unit, whereby four parallel vertical rows of guide rail sections are formed, moving each of the supports horizontally to position each suspended row of guide rail sections along the line of a separate desired guide rail to form two car guide rails and two counterweight guide rails, and securing the guide rail sections to the building structure.

17. The method as claimed in claim **16** wherein said securing comprises securing to the building structure the lowest of the suspended guide rail sections in each of the rows, mounting a sling between a pair of said secured lowest guide rail sections, raising said sling in steps, working from the sling at each stop to secure to the building structure portions of the guide rail sections near the sling, and working from the sling at each stop to install any hoistway apparatus to be located near the sling.

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