

[72]	Inventor	Morrison John Broun Flushing, N.Y.
[21]	Appl. No.	54,781
[22]	Filed	July 14, 1970
[45]	Patented	Jan. 4, 1972
[73]	Assignee	Otis Elevator Company New York, N.Y.

Primary Examiner—Harvey C. Hornsby
Attorneys—Joseph L. Sharon and Robert T. Mayer

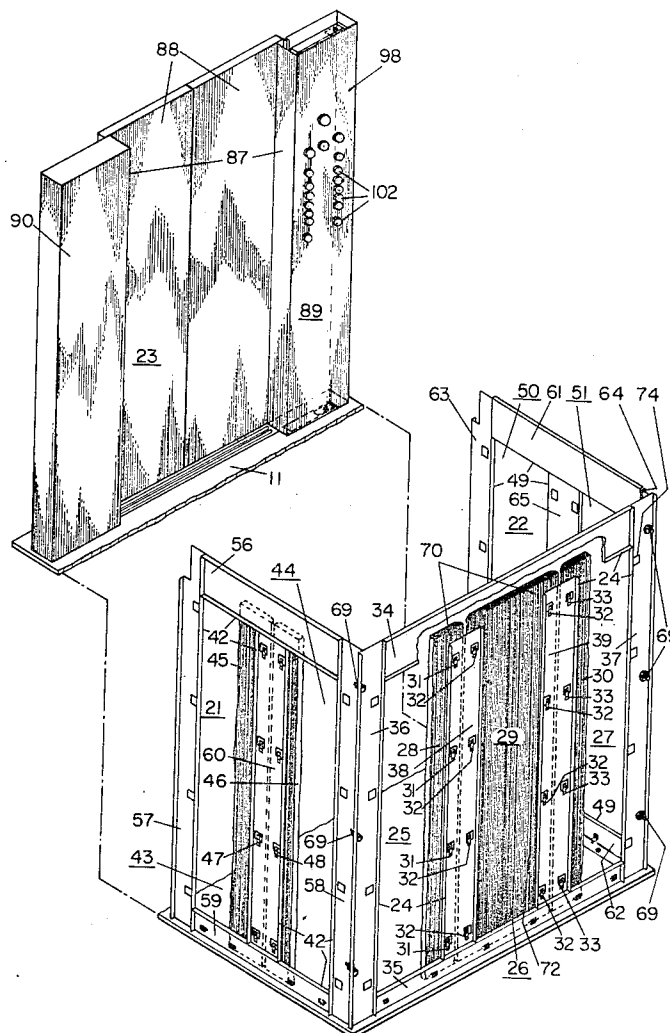
[54] ELEVATOR CAB STRUCTURE
12 Claims, 5 Drawing Figs.

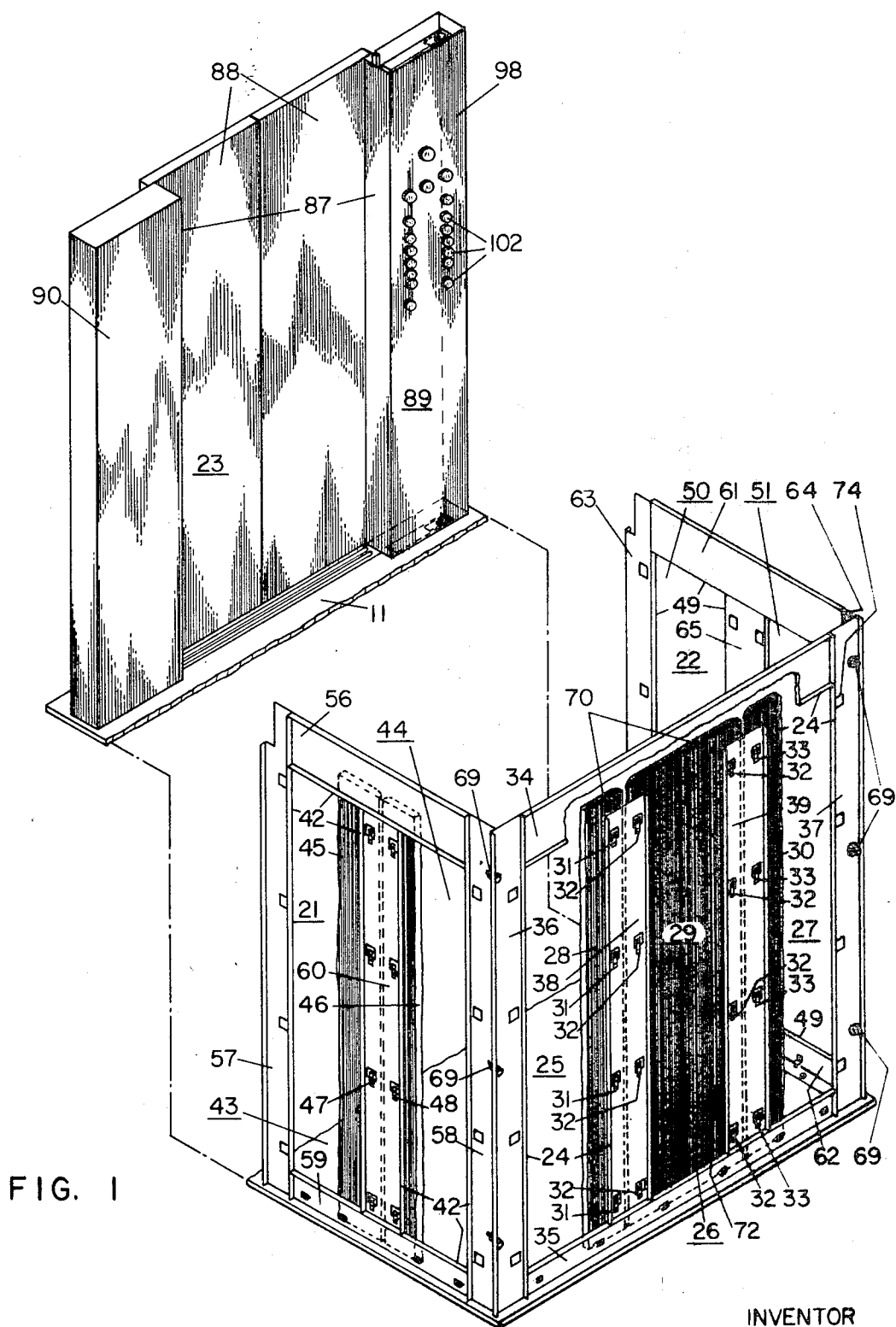
[52]	U.S. Cl.....	187/1, 52/476
[51]	Int. Cl.....	B66b 9/00
[50]	Field of Search.....	187/1, 52, 56: 52/476, 506

[56] **References Cited**
UNITED STATES PATENTS

2,133,621	10/1938	Klein.....	187/1
3,359,697	12/1967	Smith.....	52/476
3,377,756	4/1968	Polhamus.....	52/476

ABSTRACT: A cab structure for an elevator car having a supporting floor portion including, a front wall, a rear wall and a pair of sidewalls, wherein the rear wall and each of the sidewalls includes a rigid frame structure, a plurality of removable decorative wall panels, and a plurality of spring members, which clamp the panels to the rigid frame structure. Each rigid frame structure has a substantially flat inner surface, and the panels connected thereto have substantially flat coplanar, outer surfaces, which bear against the frame inner surface. Each spring member has a fixed portion, which is fixedly connected to a panel at the outer surface thereof, and has a resilient portion, which is received in an aperture portion in the rigid frame structure adjacent thereto. The resilient portion overlaps and bears against the frame at the outer surface of the edge of the aperture portion. The front wall has an overhead lintel member and an operating return panel. The overhead lintel member has opposite ends rigidly connected to the sidewall rigid frame structures and is arranged to support a sliding door. The operating return panel, which is adjacent one side of the door opening, has an interior swingable door plate, which supports control elements and encloses a wiring conduit.





INVENTOR

MORRISON JOHN BROWN
BY *Robert T. May* ATTORNEY

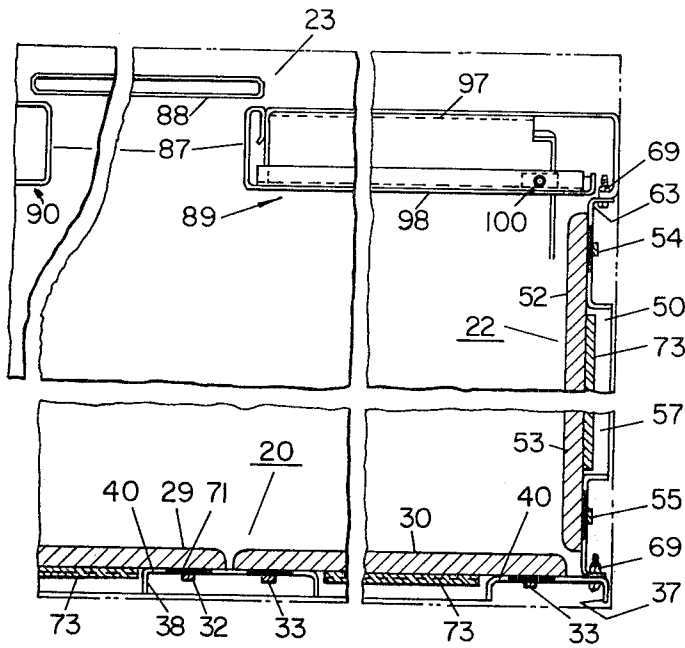


FIG. 2

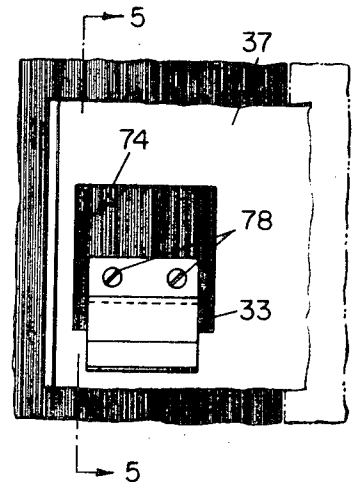


FIG. 4

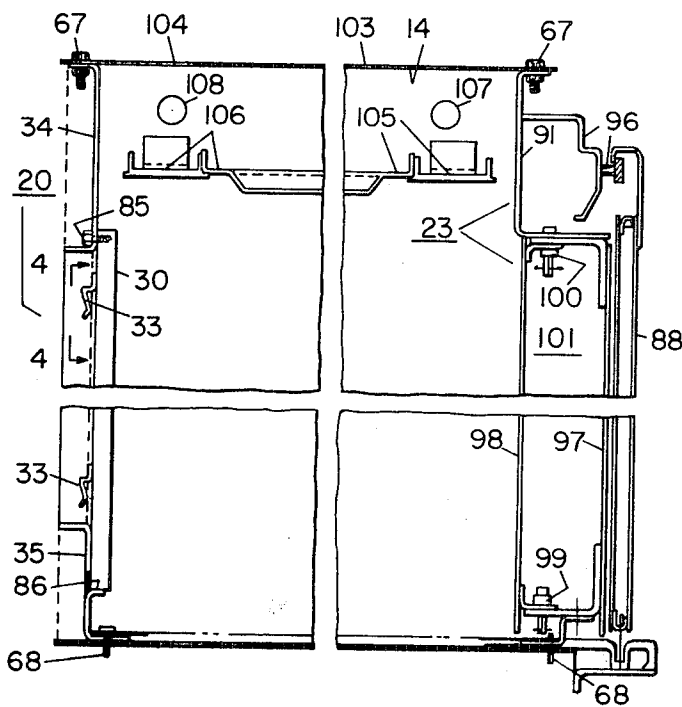


FIG. 3

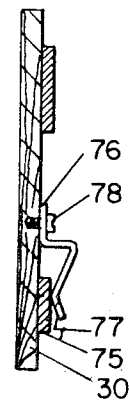


FIG. 5

INVENTOR

MORRISON JOHN BROUNN

BY *Robert T. Maye* ATTORNEY

ELEVATOR CAB STRUCTURE

The present invention relates to elevator cars, and particularly to an elevator car having a cab structure with removable wall panels.

A conventional elevator car includes a floor portion and a cab structure or car enclosure, which is mounted on the floor portion. The cab structure includes a ceiling portion and a wall portion which supports the ceiling portion. The wall portion includes a rear wall, a pair of sidewalls and a front wall. The front wall includes a door opening with a sliding door for providing access to the elevator car. Each wall is made of structural steel sheet which may have decorative wall panels attached thereto and projecting therefrom to provide a decorative finish. With this type of conventional construction, it is difficult to make a cab which is lightweight and yet rigid and which is easily assembled in its hoistway.

Accordingly, it is one object of the invention to provide an elevator car having a cab structure with removable wall panels which is lightweight and yet rigid.

It is another object of the invention to provide an elevator car having a cab structure with removable wall panels according to the above mentioned object, in which the assembly of the cab structure within a hoistway is facilitated, in which the cab structure is substantially fire resistive, and in which the removable wall panels can be made from a lightweight, decorative material.

According to the present invention, there is provided a cab structure for an elevator car having a supporting floor portion, said cab structure including a ceiling portion and a wall portion, said ceiling portion being supported by said wall portion, said wall portion being supported on said floor portion, said wall portion including a rear wall, a front wall and a pair of sidewalls, wherein each said rear wall and pair of sidewalls comprises, a rigid frame structure mounted on said floor portion and having an opening extending therethrough, a wall panel assembly mounted on said rigid frame structure and arranged to close said opening, and spring means connected to said wall panel assembly for urging said wall panel assembly against said rigid frame structure, and wherein said rigid frame structure has a substantially flat inner surface, and said wall panel assembly has a substantially flat outer surface, and said spring means is adapted to urge said wall panel outer surface in bearing against said rigid frame inner surface.

According to the illustrated embodiment of the present invention, a rigid, lightweight cab structure is obtained and the field assembly thereof is facilitated by using rigid frame wall structures to form a rigid skeleton chassis, lightweight decorative panels to form the cab walls and friction clips to clamp the panels to the chassis.

Other objects of the invention will become apparent from the following description and accompanying drawing, wherein like parts are designated by like numerals throughout the several views, and wherein:

FIG. 1 is an exploded view of the elevator cab structure of the present invention with parts broken away and parts not shown;

FIG. 2 is a plan view of the elevator cab structure of FIG. 1 with parts broken away and parts not shown;

FIG. 3 is a side elevation of the elevator cab structure of FIG. 1 with parts broken away and parts not shown;

FIG. 4 is an enlarged sectional view taken along the line 4—4 of FIG. 3;

FIG. 5 is a sectional view taken along the line 5—5 of FIG. 4.

Referring to FIG. 1, one embodiment of the present invention is a cab structure, or car enclosure, for an elevator car having a floor portion or platform 11. The car enclosure or cab structure is mounted on floor portion 11 and includes a ceiling portion 14 (FIG. 3) and a wall portion which supports ceiling portion 14. The wall portion includes a rear wall 20 (FIGS. 2 and 3), a pair of sidewalls 21 and 22 (FIGS. 1 and 2), and a front wall 23 (FIGS. 1 and 3).

Rear wall 20 has a rear rigid frame structure 24, which has a plurality of openings 25, 26 and 27 that extend therethrough. Rear wall 20 also has a plurality of wall panels 28, 29 and 30, which form a wall panel assembly and which cover respective openings 25, 26 and 27. Rear wall 20 also has a plurality of spring members or units 31, 32 and 33 which urge respective panels 28, 29 and 30 against frame 24.

Rear frame 24 includes a top beam member 34, a bottom beam member 35, a pair of end column members 36 and 37, and a pair of intermediate column members 38 and 39. Rear frame 24 has a substantially flat inner surface 40 (FIG. 2), which is formed by the substantially flat, coplanar, inner surfaces of beams 34 and 35 and columns 36, 37, 38 and 39. End columns 36 and 37, at the upper and lower ends thereof, are rigidly connected to beams 34 and 35, such as by butt weld connections. End columns 36 and 37 and beams 34 and 35 form a four-sided rigid frame structure. Intermediate columns 38 and 39 are similarly rigidly connected to beams 34 and 35. Rear frame 24 transmits loads from ceiling portion 14 to floor portion 11 and minimizes horizontal displacement and vibration of ceiling portion 14 relative to floor portion 11.

Sidewall 21 has a rigid frame structure 42 (FIG. 1), which has a plurality of openings 43 and 44 that extend therethrough. Sidewall 21 also has a plurality of wall panels 45 and 46, which form a wall panel assembly and which cover respective openings 43 and 44. Sidewall 21 also has a plurality of spring members 47 and 48, which connect panels 45 and 46 to frame 42.

Sidewall 22 (FIGS. 1 and 2) also has a rigid frame structure 49 (FIG. 1), which has a plurality of openings 50 and 51. Sidewall 22 also has a plurality of wall panels 52 and 53 (FIG. 2), which cover respective openings 50 and 51, and a plurality of spring members 54 and 55 which connect panels 52 and 53 to frame 49. With this construction, rigid frames 42 and 49 resist loads, which act on ceiling portion 14, and transmit such loads to floor portion 11.

Side frame 42 (FIG. 1) has a top beam 56, a pair of end columns 57 and 58, a bottom beam 59 and an intermediate column 60. Side frame 49, which is substantially identical to side frame 42 in construction, includes a top beam 61, a bottom beam 62, a pair of end columns 63 and 64 and an intermediate column 65.

Sidewall frames 42 and 49 also have substantially flat inner surfaces, which are formed by the substantially flat inner faces of beams 56, 59, 61 and 62 and columns 57, 58, 60, 63, 64 and 65. The columns of each side frame are rigidly connected at the upper and lower ends thereof to their respective top and bottom beams, such as by butt welds.

Ceiling portion 14 is removably connected to frames 24, 42 and 49 by top fasteners, such as bolts 67 or the like (FIG. 3). Frames 24, 42 and 49 are removably connected to floor portion 11 by bottom fasteners, such as bolts 68, or the like (FIG. 3). Rear frame end columns 36 and 37 are also connected to respective columns 58 and 64 by corner fasteners, such as bolts 69 (FIGS. 1 and 2).

With such construction, frames 24, 42 and 49 provide a cab structure of substantial rigidity. When assembled they provide a skeleton-type chassis, which is rigid and yet lightweight as compared to conventional cab structures. In addition, because of the ease of access to fasteners 67, 68 and 69 by constructors supported on floor portion 11, the effort of assembling cab structure 12 is minimized.

Rear wall panel 29 (FIG. 1), which is a typical panel that is substantially identical in construction to wall panels 28, 30, 45, 46, 52 and 53, has a peripheral portion 70 that has a substantially flat outer surface 71 (FIG. 2). Wall panel 29 is also preferably composed of a decorative material, such as a lightweight, moldable material, or the like.

Outer surface 71 is urged in bearing against frame inner surface 40 by a plurality of spring members 32. Wall panel 29 also has a center portion 72 (FIG. 1), which is surrounded by peripheral portion 70. Center portion 72 has an exterior finish layer or cover member 73 (FIG. 2), which is joined thereto by

joining means, such as a plurality of nails, or an adhesive. Cover member 73 is a substantially flat member composed of a fireproof material, such as a flat sheet of metal, or the like. Each of the wall panels being similarly constructed, the cab structure in this way is provided with substantially fire-resistant walls.

Spring member or clip 33 (FIGS. 3, 4 and 5) is substantially identical in construction to spring members 31, 32, 47, 48, 54 and 55. A plurality of spring members 33 are mounted on panel 30. Each is received in and coacts with an aperture 74 in the web portion 75 (FIG. 5) of rear frame column 37 or 39. Each aperture 74 has a rectangular profile as does each clip 33, each of which is smaller in size than its associated aperture 74 for assembly therein.

Each clip 33, which may be a bent plate member, such as a formed, spring-steel member, includes a fixed portion 76 (FIG. 5) and a resilient or movable portion 77. Clip fixed portion 76 has a pair of connectors 78 (FIG. 4), such as a pair of machine screws, which connect their respective clip 33 to panel 30. Clip movable portion 77, which is a resilient portion that is displaceable relative to fixed portion 76, bears against the outer surface of column web 75. In this way, clips 33 urge the outer surface of panel 30 in bearing against frame inner surface 40. This arrangement provides a substantial seal between frame 24 and panel 30 which enhances the substantially fire-resistant construction of the cab structure.

Clip movable portion 77 of each clip 33 also applies a friction force against web 75. In this way, clips 33 resist loads on panel 30, minimize vibration of the panel and help to support it. Each clip fixed portion 76 at the periphery thereof is separated from the edges of its associated aperture 74 and does not rest upon or apply a compression force to the edge of its associated aperture. Clip movable portion 77 of each clip overlaps the lower edge of its associated aperture 74. With this arrangement, panel 30 is mounted on frame 24 by inserting clips 33 in apertures 74 and then lowering the panel until clips 33 overlap column web 75. Each of the other wall panels is similarly mounted.

Rear bottom beam 35 (FIG. 3) has a support member or projecting portion 86 for helping to support panel 30. Support member or projection 86, is an inwardly projecting portion of beam 35, and is an integral part of the web portion of beam 35. Support member 86 helps to resist the total downward force applied by panel 30, including the weight thereof. Preferably a plurality of such support members are longitudinally spaced apart on beam 35 as well as on the other bottom beams 59 and 62. Each such member is formed in its respective beam by a punching operation, or the like.

Panel 30 (FIG. 3) also has a top connector 85, such as a small machine screw or the like, which extends through a hole in beam 34, for connecting panel 30 thereto. Connector 85 is an extra fastener which helps to resist a possible uplift force on panel 30. Each of the other wall panels also has a top connector similar to connector 85. With the above arrangement, transverse deflections and loads in frames 24, 42 and 49 are not normally transmitted to panels 28, 29, 30, 45, 46, 52, 53 and they can be made from a nonmetallic, decorative material, which has a relatively low-structural strength and a relatively low modulus of elasticity, such as a castable mixture composed of wood particles dispersed in a binder of selected composition, or the like.

Front wall 23 (FIGS. 1, 2 and 3) has a door opening 87 and a center-opening sliding door assembly 88 for said door opening 87. Front wall 23 includes an operating return wall portion 89, which is disposed on one side of opening 87, and a fixed return wall portion 90, which is disposed on the other side of opening 87. Fixed return wall portion may be of any suitable construction. Front wall 23 also has an elongate lintel member 91 (FIG. 3), which is disposed above opening 87. Lintel 91 has opposite end portions (not shown) which are rigidly connected, such as by butt welding, or the like to respective columns 57 and 63 (FIG. 1) of sidewall frames 42 and 49. Lintel 91 also has a track and header member 96 (FIG. 3), which

is fixedly connected thereto, for supporting sliding door 88. This arrangement of lintel 91 and frames 24, 42 and 49 provides the cab structure with a four-sided, skeleton-type, rigid chassis.

Operating return wall portion 89 (FIGS. 2 and 3) includes an exterior wallplate 97 and an interior wallplate 98. Exterior plate 97 is connected to floor portion 11 by bottom fasteners 68 to column 63 by corner fasteners 69, and to lintel 91 by welds. Interior plate 98 has lower and upper hinge units 99 and 100, which connect it to exterior plate 97. In this way, interior plate 98 can swing or rotate about hinges 99 and 100 relative to exterior plate 97 for use of interior plate 98 as an operating panel door. Exterior and interior plates 97 and 98 are spaced apart and form a wiring conduit or space 101 therebetween for locating control wiring therein.

Interior door plate 98, which is a swingable door plate, has a plurality of control or operating elements 102 (FIG. 1), which are mounted thereon. These elements are connected to the control wiring in wiring conduit 101.

Ceiling portion 14 suitably includes a plurality of structural plates 103 and 104 (FIG. 3), which are removably connected to the rear and sidewall top beams 34, 56 and 61 and to the front wall lintel 91 by top fasteners 67. Ceiling portion 14 also includes a plurality of suspended ceiling units 105 and 106, which are supported by and spaced from the structural plates 103 and 104 in any suitable manner. Ceiling portion 14 also includes a plurality of lighting devices 107 and 108, which are disposed between structural plates 103 and 104 and suspended ceiling units 105 and 106. Ceiling portion 14 may also contain an emergency exit door (not shown) for emergency use by passengers or such emergency exit may be contained in one of the sidewalls.

In the assembly of the elevator car, the following preferred sequence of assembly operations can be used.

1. Floor portion 11 is first supported and arranged within its hoistway in the conventional manner.

2. Rigid frames 24, 42 and 49 each of which is shipped as a one-piece subassembly for ease of handling is then connected to floor portion 11 by bottom fasteners 68.

3. Corner columns 36 and 58 and 37 and 64 are connected together by fasteners 69.

4. Ceiling plates 103 and 104 are thereafter connected to frames 24, 42 and 49 by top fasteners 67. Front wall lintel 91 is rigidly connected to sidewall frames 42 and 49 and also fastened to plate 103.

5. Return portions 89 and 90 are then mounted in place and connected to floor portion 11, lintel 91 and columns 57 and 63. Track and header member 96 is fixedly connected to lintel 91, and sliding door 88 is mounted on track and header member 96 in any suitable manner for support therefrom.

6. Thereafter, wall panels 28, 29, 30, 45, 46, 52 and 53 are respectively mounted on frames 24, 42 and 49; and suspended ceiling units 105 and 106 are connected to and suspended from ceiling plates 103 and 104.

In the above-listed sequence of assembly operations, there are a number of advantages as indicated hereafter.

1. Floor portion 11 can be furnished by one vendor and the skeleton-type cab structure can be furnished by a second vendor for ease of manufacture and supply.

2. Rigid frames 24, 42 and 49 can be assembled and inspected in the shop using bench equipment and thereafter shipped to the construction site thereby minimizing field labor.

3. Rigid frames 24, 42 and 49 can be field assembled to floor portion 11 within the elevator hoistway. During such assembly operation, the constructors or workmen can stand on floor portion 11. Thus, the constructors avoid the conventional procedure of standing in the narrow spaces between the car and the hoistway walls to complete such assembly operations thereby minimizing field labor and facilitating the assembly of the cab structure.

4. Ceiling portion 14 can also be connected to frames 24, 42 and 49 by the constructors while being supported on floor portion 11.

5. Front wall lintel 91, return portions 89 and 90, track and header member 96, and sliding door 88 can also be assembled in place by the constructors while supported on and working from floor portion 11. Return portions 89, including elements 102, can also be factory assembled and wired and shipped to the site as a one-piece subassembly for ease of field assembly.

6. Wall panels 28, 29, 30, 45, 46, 52 and 53 can also be installed at any time just prior to final completion of the building construction. In this way, the wall panels can be manufactured by a separate vendor for ease of manufacture and supply.

7. Wall panels 28, etc. can also be scheduled for delivery to the field at a much later date than the delivery dates of the remaining portions of the cab structure for ease of scheduling and delivery thereof.

8. Wall panels 28, etc. can also be made of relatively soft, decorative materials, and can be stored in a protected space during the period of building construction to prevent damage thereto. Substitute wall sheets, such as rough plywood sheets, can be temporarily connected to frames 24, 42 and 49 during the period of building construction whereby the car can be used as a construction elevator.

9. Wall panels 28, etc. can also be easily and quickly disassembled and reassembled at a future time for ease of repair, redecoration or replacement thereof after extended use.

In summary, the invention provides a lightweight, easily assembled, fire-resistive, rigid, decorative, novel cab structure for an elevator car.

A preferred embodiment has been described in detail, and many modifications thereto may occur to those skilled in the art. It is intended that the particular embodiment which has been described in detail be typical of all such embodiments. For example, front wall 23 can have a three-sided rigid frame structure having at least one removable wall panel, in place of the lintel 91 and the fixed return portion 90. As another example, ceiling portion 14 can include a four-sided rigid frame structure having removable decorative panels in place of structural plates 103 and 104.

What is claimed is:

1. A cab structure for an elevator car having a supporting floor portion, said cab structure including a ceiling portion and a wall portion, said ceiling portion being supported by said wall portion, said wall portion being supported on said floor portion, said wall portion including a rear wall, a front wall and a pair of sidewalls, wherein each said rear wall and pair of sidewalls comprises, a rigid frame structure mounted on said floor portion and having an opening extending therethrough, a wall panel assembly mounted on said rigid frame structure and arranged to close said opening, and spring means connected to said wall panel assembly for urging said wall panel assembly against said rigid frame structure, and wherein said rigid frame structure has a substantially flat inner surface, and said wall panel assembly has a substantially flat outer surface, and said spring means is adapted to urge said wall panel outer surface in bearing against said rigid frame inner surface.

2. A cab structure as claimed in claim 1, wherein said rigid frame structure comprises, an upper beam removably connected to said ceiling portion, a lower beam for connection to said floor portion, a pair of horizontally spaced end columns, each said end column being rigidly connected to said upper beam and said lower beam.

3. A cab structure as claimed in claim 2, wherein said rigid frame structure has an intermediate column disposed between said end columns forming a pair of openings, and wherein said wall panel assembly includes a pair of wall panels respectively closing said openings.

4. A cab structure as claimed in claim 3, wherein said beams and columns have respective inner surfaces, said inner surfaces being substantially flat and coplanar for forming said substantially flat inner surface of said rigid frame structure.

5. A cab structure as claimed in claim 4, wherein each said panel has a peripheral portion and a center portion, said peripheral portion having a substantially flat outer surface for bearing against said frame inner surface, said center portion being surrounded by said peripheral portion, said center por-

tion having an outer layer, said outer layer being composed of a fireproof material.

6. A cab structure as claimed in claim 5, wherein each said rear wall end column has a plurality of fasteners removably connected to the sidewall end column adjacent thereto.

7. A cab structure as claimed in claim 2, wherein said spring means includes a plurality of spring members, each said spring member being received in an aperture portion in said frame structure, each said spring member having a fixed portion and a resilient portion, said fixed portion being fixedly connected to said wall panel outer surface, said resilient portion being arranged to extend through said aperture portion and to overlap said frame at the outer surface of the edge of the aperture portion for applying a bearing force thereto.

8. A cab structure as claimed in claim 7, wherein said frame lower beam has a projecting portion, said projecting portion being disposed below said panel assembly and being arranged to bear against said panel assembly at the lower edge thereof.

9. A cab structure as claimed in claim 2, wherein said front wall has a door opening and a sliding door for said door opening, said front wall including, an operating return portion disposed on one side of said opening, a fixed return portion disposed on the other side of said opening, and an elongate lintel member disposed above said opening and said return portions, wherein said lintel member has opposite end portions, each said lintel end portion being rigidly connected to the sidewall rigid frame structure disposed adjacent thereto, and said lintel member has a track and header portion extending therefrom for supporting said sliding door.

10. A cab structure as claimed in claim 9, wherein said operating return portion includes an exterior wallplate and an interior wallplate, said exterior wallplate being arranged for mounting on said floor portion, said interior wallplate having hinge means and being movable relative to said exterior wallplate forming an interior wallplate door, said exterior wallplate and said interior wallplate door being spaced apart to form a conduit therebetween for housing control wiring, said interior wallplate door having a plurality of control elements mounted thereon.

11. A cab structure as claimed in claim 9, wherein said ceiling portion includes a plurality of structural plates removably connected to said rear and sidewall upper beams and to said front wall lintel member and includes a plurality of suspended ceiling units suspended from and spaced below said structural plates, said suspended ceiling units including a plurality of lighting devices mounted thereon and disposed between said structural plates and said suspended ceiling units.

12. A cab structure as claimed in claim 6, wherein said spring means includes a plurality of spring members, each said spring member being received in an aperture portion in said frame structure, each said spring member having a fixed portion and a resilient portion, said fixed portion being fixedly connected to said panel peripheral outer face, said resilient portion being arranged to extend through said aperture portion and to overlap said frame at the outer surface of the edge of the aperture portion, and wherein said frame lower beam has a projecting portion, said projecting portion being disposed below said wall panels and being arranged to bear against said wall panels at the lower edges thereof, and wherein said wall portion includes a front wall, said front wall having a door opening and having a sliding door for said door opening, said front wall including an operating return portion and a fixed return portion disposed on opposite sides of said door opening and an elongate overhead lintel member disposed above said opening and said return portions, said lintel member having opposite end portions, each said lintel end portion being rigidly connected to the sidewall rigid frame structure adjacent thereto, and said lintel member having a track and header portion extending therefrom for supporting said sliding door, and wherein said operating return portion has an exterior wallplate arranged for mounting on said floor portion and has an interior wallplate door having hinge means connected to said exterior wallplate forming a conduit

7

8

therebetween for control wiring, said interior wallplate door having a plurality of control elements mounted thereon, and wherein said ceiling portion includes a plurality of structural plates removably connected to said rear and sidewall upper beams and to said front wall lintel member and includes a plu-

5

ality of suspended ceiling units suspended from and spaced below said structural plates, said ceiling units having a plurality of lighting devices mounted thereon and disposed between said structural plates and said suspended ceiling units.

* * * * *

10

15

20

25

30

35

40

45

50

55

60

65

70

75