

"PASSENGER CONVEYOR FRAMES".

2190890

The present invention relates to a passenger conveyor such as an escalator, electrically-driven passageway and so forth. More particularly, the present invention is concerned with the structure of a main frame of a passenger conveyor which can be divided into a plurality of sections along the length thereof.

In general, the main frame of a passenger conveyor is so constructed as to be divided into a plurality of sections along the length thereof in order to facilitate transportation to an installation site. Each section is provided with joint portions at which adjacent sections are connected simply by means of bolts in a manner disclosed in Japanese Utility Model Laid-Open Publication No. 61169/1984.

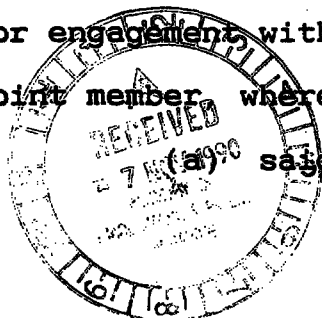
The work for connecting the sections of the main frame of a passenger conveyor requires complicated steps such as adjustment of relative positions between adjacent frame sections. However, the frame sections cannot be assembled with a high degree of precision; namely, it is quite difficult to reassemble the frame sections exactly in the same state as obtained in the factory. In consequence, it is required to re-adjust at the installation site various parts and instruments which have been attached to the frame sections and

adjusted in the factory.

It is an object of the present invention to provide a main frame of a passenger conveyor which comprises a plurality of frame sections divided along the length of the main frame and which are provisionally assembled and then disassembled in a factory and, then, re-assembled in an installation site into the same state as has been obtained in the factory.

According to one aspect of the present invention there is provided a main frame for a passenger conveyor extending between floors of a building and having a quadrilateral cross-section defined by opposite side structures and connecting members interconnecting said side structures, each of said side structures including a plurality of frame sections, said side structures being divided along the length thereof and having joint portions at which said sections are connected together, each of said frame section including upper and lower frame members, the joint portions of each adjacent pair of frame sections including substantially parallel joint members respectively extending substantially transversely of the length of the side structure and having upper and lower end portions connected together by fastening means, one of said joint members being provided therein with a positioning hole and the other joint member carrying thereon a positioning pin for engagement with said positioning hole in said first joint member wherein:-

(a) said positioning pin includes an engaging



portion engaged with said positioning hole and a threaded portion adjacent to said engaging portion, and is located at a level below a middle point of the height of the side structure; and

- 5 (b) said joint portions further include a lock nut threaded onto said threaded portion of said positioning pin.

According to another aspect of the present invention there is provided a method of making a main frame for a passenger conveyor designed to be so installed as to
10 extend between floors of a building, said main frame having opposite side structures and connecting members interconnecting said side structures, each side structure being divided along the length thereof into a plurality of
15 frame sections having joint portions at which said sections are connected together to form the side structure, the method including the steps of:-

- (a) preparing frame sections;
- (b) providing the joint portions of each adjacent
20 pair of frame sections of each side structure with a pair of substantially parallel joint members respectively extending substantially transversely of the length of the side structure;
- (c) forming a positioning hole in one of said
25 pair of joint members at a level below a middle point of the height of the one joint member;
- (d) preparing a positioning pin including an engaging portion for engagement with said positioning hole

and a threaded portion between said engaging portion and one end of said positioning pin;

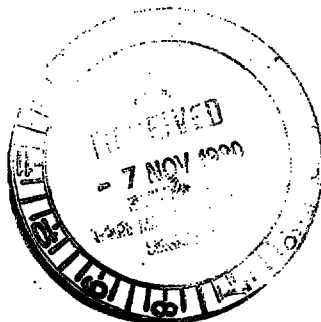
(e) provisionally assembling each adjacent pair of frame sections with the joint portions of the frame sections positioned one to the other, by inserting said
5 engaging portion of said positioning pin into said positioning hole in said one joint member and securing the other end of said positioning pin to the other of said adjacent pair of joint members;

10 (f) disassembling the frame sections for transport to the site;

(g) when the frame sections are assembled at a site, engaging said engaging portion of said positioning pin with said positioning hole to position the joint portions of
15 the adjacent frame sections one to the other;

(h) then, securing upper and lower portions of the adjacent pair of frame sections by fastening means; and

(i) screwing a lock nut onto said threaded portion of said positioning pin.



The present invention will now be described in greater detail by way of example with reference to the accompanying drawings, wherein:-

Fig. 1 is a schematic side elevational view
5 of one embodiment of the main frame of a passenger conveyor in accordance with the present invention;

Fig. 2 is an enlarged side elevational view of joint portions at which adjacent frame sections are connected; and

10 Fig. 3 is an enlarged exploded perspective view of the joint portions shown in Fig. 2.

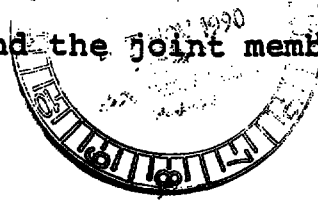
A passenger conveyor has a main frame 1 which extends between two adjacent floors F_1 and F_2 of a building. The main frame 1 is composed of side
15 structures on both lateral sides of the passenger conveyor and connecting members (not shown) by which both side structures are connected to each other. Thus, the main frame as a whole exhibits a quadrilateral cross-section. Each of the side
20 structures includes an upper member 2 and a lower member 3 both extending along the length of the main conveyor and transverse members 4 and slant members
5 through which the upper and lower members are connected to each other. These members are rigidly
25 connected by, for example, welding.

In order to facilitate the transportation to

1 an installation site, the main frame 1 is so constructed
as to be divided into a plurality of sections. In the
illustrated embodiment, the main frame 1 can be
disassembled into three sections 1A, 1B and 1C at
5 points in an inclined portion thereof and these sections
1A ~ 1C are connected at joint portions 6A and 6B.

For instance, the joint portion 6A at which
the frame sections 1A and 1B are connected to each other
has transverse joint members 8A and 8B provided on the
10 opposite ends of these frame sections 1A and 1B and
extending transversely of the main frame. Each of the
joint members is connected rigidly to and extends
between the ends of the upper member 2 and the lower
member 3 of the side structure of the associated frame
15 section.

Considering that the strength of the joint por-
tion 6A largely depends on the strength of the joint mem-
bers 8A and 8B, the connections between each joint member
and the associated upper and lower members 2 and 3 may be
20 reinforced by suitable reinforcement members. The joint
members 8A and 8B are made of L-shaped angle members
and arranged such that one sides of these angle members
8A and 8B on both frame sections 1A and 1B face each
other. Upper and lower portions of the joint members
25 8A and 8B are provided on their opposing surfaces with
mounting seats 9A, 9B and 10A, 10B. Bolt holes H are
formed through the mounting seats 9A, 9B, 10A and 10B
and the joint members 8A and 8B. The joint member 8A



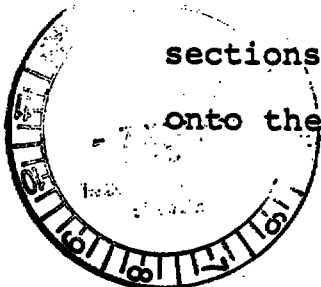
1 is provided with a positioning hole 13 at a point
thereof adjacent to the mounting seat 10A. A positioning
pin 14 adapted to be received in the hole 13 with a
small tolerance has a large-diameter head portion 14a,
5 an intermediate engaging portion 14b for engagement
with the hole 13 and a threaded portion 14c adjacent
to the free end of the engaging portion 14b.

The axial dimension of the large-diameter
portion 14a is equal to or smaller than the size h of
10 the gap which is formed between both joint members 8A
and 8B when these members are brought together with the
mounting seats 9A, 9B and 10A, 10B sandwiched there-
between.

The positioning pin 14 is attached to the joint
15 member 8B in a manner which will be explained hereinunder.
When the main frame of the passenger conveyor is
provisionally assembled in a factory, the frame sections
1A and 1B which are to be connected to each other are
brought together and bolts 11A and 11B are inserted into
20 corresponding bolt holes H. Then, nuts 12A and 12B are
tentatively tightened on these bolts 11A, 11B. At the
same time, the engaging portion 14b of the positioning
pin 14 is inserted into the positioning hole 13 from the
side adjacent to the frame section 1B. The mutual
25 positional relationship between the frame sections 1A and
1B are then adjusted in this state, followed by complete
tightening of the bolts 12A and 12B. Then, various parts
or instruments mounted on the respective frame sections

1 are adjusted of their positions and then fixed. Thus,
the frame sections and the associated parts and instru-
ments are correctly located and fixed with respect to one
another. Subsequently, the end of the large-diameter por-
5 tion 14A of the positioning pin 14 is brought into contact
with the joint member 8B and is welded thereto as at W so
that the locating pin 14 is fixed to the joint member 8B.
In this embodiment, at least one such locating pin 14 is
provided on the joint member at each joint portion of
10 each frame section of each side structure of the main
frame. Thus, the above-described structure of the joint
portion 6A is also true with the other joint portion 6B.

The main frame 1 of a passenger conveyor thus
assembled in the factory is then disassembled into
15 independent frame sections for facilitating transportation
to the site and setting in a building and then re-assembled
at the site. During the re-assembly, the same positional
relationship between the adjacent frame sections as that
attained in the factory is recovered by inserting the posi-
20 tioning pin 14 into the associated positioning hole 13
and then tightening the nuts 12A and 12B on the bolts
11A and 11B. Thus, the main frame of a passenger conveyor
in accordance with the present invention eliminates all the
troublesome works which have heretofore been necessary
25 for the purpose of re-adjustment of the positions of the
frame sections and other parts installed on these frame
sections. Finally, lock nuts 15a and 15b are screwed
onto the threaded portion 14c of the pin 14 so as to serve



1 as stopper nuts.

In the described embodiment, the positioning hole 13 and the positioning pin 14 are positioned closer to the lower mounting seats 10A and 10B than to the upper mounting seats 9A and 9B and lock nuts 15a and 15b are screwed onto the threaded portion 14c of the positioning pin 14. With this arrangement, the positioning pin 14 and the lock nuts 15a and 15b can serve also as an auxiliary connecting means which keeps both frame sections firmly connected each other in the event that the bolts 11B in the lower mounting seats 10A and 10B are accidentally broken to allow the adjacent frame sections to be spaced apart at their lower sides, thus preventing accidental collapse and falling down of the main frame 1.

As has been described, according to the present invention, it is possible to re-assemble frame sections of a passenger conveyor at an installation site easily and with a high degree of reproducibility. This remarkable merit can be attained solely by providing one additional element, i.e., the positioning pin, on one of the joint members of each joint portion and forming a hole in the other joint member.

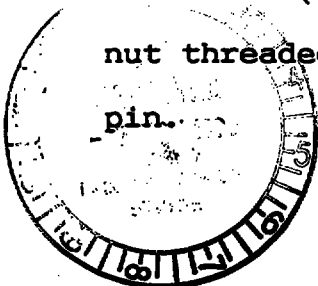
CLAIMS:-

1. A main frame for a passenger conveyor extending between floors of a building and having a quadrilateral cross-section defined by opposite side structures and connecting members interconnecting said side structures, each of said side structures including a plurality of frame sections, said side structures being divided along the length thereof and having joint portions at which said sections are connected together, each of said frame section including upper and lower frame members, the joint portions of each adjacent pair of frame sections including substantially parallel joint members respectively extending substantially transversely of the length of the side structure and having upper and lower end portions connected together by fastening means, one of said joint members being provided therein with a positioning hole and the other joint member carrying thereon a positioning pin for engagement with said positioning hole in said first joint member, wherein:-

(a) said positioning pin includes an engaging portion engaged with said positioning hole and a threaded portion adjacent to said engaging portion, and is located at a level below a middle point of the height of the side structure; and

(b) said joint portions further include a lock nut threaded onto said threaded portion of said positioning

pin.



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2. A main frame for a passenger conveyor according to claim 1, wherein each of said side structures includes upper and lower members and transverse and slant members which
5 interconnect said upper and lower members.

3. A main frame for a passenger conveyor according to claim 2, wherein the joint members of joint portions of adjacent pair of frame sections have opposed upper and lower
10 portions provided with mounting seats, said joint members and said mounting seats being formed therein with bolt holes extending therethrough and receiving bolts.

4. A main frame for a passenger conveyor according to claim 3, wherein said positioning pin includes a large-
15 diameter head portion of an axial dimension less than a space defined between an adjacent pair of joint members and determined by the mounting seats thereof, an engaging portion engaged with said positioning hole and a threaded
20 portion adjacent to a free end of said positioning pin, said threaded portion being adapted to receive a lock nut thereon.

5. A main frame for a passenger conveyor according to any one of the preceding claims, including an inclined
25 portion, wherein said joint portions are all located in said inclined portion.

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6. A method of making a main frame for a passenger conveyor designed to be so installed as to extend between floors of a building, said main frame having opposite side structures and connecting members interconnecting said side
5 structures, each side structure being divided along the length thereof into a plurality of frame sections having joint portions at which said sections are connected together to form the side structure, the method including the steps
10 of:-

(a) preparing frame sections;

(b) providing the joint portions of each adjacent pair of frame sections of each side structure with a pair of substantially parallel joint members respectively extending
15 substantially transversely of the length of the side structure;

(c) forming a positioning hole in one of said pair of joint members at a level below a middle point of the height of the one joint member;

(d) preparing a positioning pin including an engaging portion for engagement with said positioning hole and a threaded portion between said engaging portion and one end of said positioning pin;

(e) provisionally assembling each adjacent pair
25 of frame sections with the joint portions of the frame sections positioned one to the other, by inserting said engaging portion of said positioning pin into said positioning hole in said one joint member and securing the

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other end of said positioning pin to the other of said adjacent pair of joint members;

(f) disassembling the frame sections for transport to the site;

5 (g) when the frame sections are assembled at a site, engaging said engaging portion of said positioning pin with said positioning hole to position the joint portions of the adjacent frame sections one to the other;

(h) then, securing upper and lower portions of
10 the adjacent pair of frame sections by fastening means; and

(i) screwing a lock nut onto said threaded portion of said positioning pin.

7. A main frame for a passenger conveyor constructed
15 substantially as herein described with reference to and as illustrated in the accompanying drawings.

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