

TITLE OF THE INVENTION:

PARALLEL ARRANGEMENT PASSENGER CONVEYOR EQUIPMENT
AND METHOD OF INSTALLING THE SAME

5 TECHNICAL FIELD:

The present invention relates to a parallel
arrangement passenger conveyor equipment in which
plural passenger conveyors such as escalators and
moving walks are adjacently arranged and a method of
10 installing the parallel arrangement passenger conveyor
equipment, in particularly to a parallel arrangement
passenger conveyor equipment which is renewed by
reusing a part of a main frame of a superannuated
parallel arrangement passenger conveyor and a method of
15 installing the parallel arrangement passenger conveyor
equipment.

BACKGROUND TECHNIQUE:

Up to now, a manufacturing process for renewing
20 the superannuated passenger conveyor and for attaining
the rejuvenation, namely a so-called renewal or a
modernization manufacturing process is disclosed, for
example in Japanese Laid-open Patent Publication No.
Sho 58-152,782 and Japanese Laid-open Patent
25 Publication No. Sho 58-152,779, etc..

In the above stated conventional techniques, the
technique is limited to only a single line arrangement

passenger conveyor, however, for example, a technique for renewing a parallel arrangement escalator equipment is not referred. Such a parallel arrangement escalator equipment has two escalators which direct from a lower floor to an upper floor and are arranged inclining toward the same direction each other under a little width afford degree in a width direction. Further, the above stated single line conventional passenger conveyor has not the correspondence for the renewal of the parallel arrangement passenger conveyor.

With the above stated reasons, in a case where the renewal for the parallel arrangement passenger conveyor is intended to carry out by adopting the renewal manufacturing process of the single line arrangement passenger conveyor, there causes a problem in which it is impossible to carry out an installation of a newly-established passenger conveyor unless a wide remodeling including a remodeling of a construction building is carried out.

DISCLOSURE OF THE INVENTION:

A first object of the present invention is to provide a parallel arrangement passenger conveyor equipment and a method of installing the same wherein a renewal for the parallel arrangement passenger conveyor equipment can be carried out in a short period.

A second object of the present invention is to provide a parallel arrangement passenger conveyor equipment and a method of installing the same wherein a renewal for the parallel arrangement passenger conveyor equipment can be carried out without a wide remodeling of a construction building.

According to the present invention, so as to attain the above stated objects, a parallel arrangement passenger conveyor equipment comprises a receiving and supporting frame formed by main frames of a parallel arrangement previously-established passenger conveyor and having U cross-section shape, and a newly-established passenger conveyor received and supported by the receiving supporting frame and having a parallel arrangement main frame.

To put it concretely, by removing a side frame adjacently disposed to the main frame which is put side by side to the previously-established conveyor, the receiving and supporting frame having U cross-section shape is formed, and plural main frames of the newly-established passenger conveyor is received in this receiving and supporting frame.

Further, the receiving and supporting frame formed by the main frames of the previously-established passenger conveyor and the main frames of the newly-established passenger conveyor are connected by a connection member each other.

With the above stated construction, since the main frame of the previously-established passenger conveyor is reused, the wide remodeling such as the floor etc. of the construction building, in which the main frame is arranged, becomes unnecessary.

Further, in a case of the installation of the newly-established passenger conveyor, the main frame of the previously-established passenger conveyor can be used as the scaffolding, the establishment working for the supplementary equipment in accompany with the installation construction work and the withdrawal working for the supplementary equipment can be minimized. Accordingly, the renewal for the plural passenger conveyors can be carried out in a short period.

BRIEF DESCRIPTION OF DRAWINGS:

Fig. 1 is a squint view showing a whole construction of a renewal parallel arrangement escalator equipment and a main frame of a previously-established parallel arrangement escalator equipment which can serve as a reuse of a first mode of an embodiment according to the present invention.

Fig. 2 is a cross-sectional view along to a line A-A of Fig. 1.

Fig. 3 is a cross-sectional view showing the renewal parallel arrangement escalator equipment shown

in Fig. 1.

Fig. 4 is a cross-sectional view showing a renewal parallel arrangement escalator equipment of a second mode of an embodiment according to the present invention.

BEST MODE FOR CARRYING OUT THE PRESENT INVENTION:

A first mode for carrying out an embodiment according to the present invention will be explained referring to escalators shown in from Fig. 1 to Fig. 3.

In Fig. 1(b) and Fig. 2, two previously-established escalators, which are arranged in parallel by inclining toward the same direction, comprise a main frame 1A and a main frame 2A, and each of the main frames 1A and 1B has formed with U shape cross-section.

Each of these main frames 1A and 2A is constituted by side frames 1a and 1b and side frames 2a and 2b disposed at both sides, bottom plate portions 1c and 2c for connecting the side frames 1a and 1b and the side frames 2a and 2b, and a lateral frame portion 1d and a lateral frame portion 2d.

Further, a receiving beam portion 1e and a receiving beam portion 2e engaged with beams of a construction building are provided at both end portions toward the longitudinal directions of the main frames 1A and 2A.

These main frames 1A and 2A are adjacently arranged and has a total lateral wide WA between the main frames 1A and 2A as shown in Fig. 1(b) and Fig. 2.

5 In Fig. 1(a) and Fig. 3, each of newly-established two escalators 3 and 4 comprises a main frame 5A and a main frame 6A, and each of the main frames 5A and 6A is formed with U shape cross-section.

Each of these main frames 5A and 6A is constituted by side frames 5a and 5b and side frames 6a and 6b
10 disposed at both sides, a lateral frame portion 5c and a lateral frame portion 6c for connecting the side frames 5a and 5b, the side frames 6a and 6b and a bottom portion frame 5d and a bottom portion frame 6d.

As shown in Fig. 3, a bottom portion frame 9
15 connects to between lower portions of the side frames 1a and 1b of the main frames 1A and 2A.

As shown in Fig. 3, a constituting component 7A is arranged in the main frame 5A of the newly-established escalator 3 and a constituting components 8A is
20 arranged in the main frame 6A of the newly-established escalator 4, respectively.

Each of the above constituting components 7A and 8A is constituted by a step 7a and a step 8a, each of the steps 7a and 8a is arranged with an endless shape
25 and can circulate and can move to a side of a forward passage side and at a backward passage side, balustrades 7c and balustrades 8c, each of the

balustrades 7c and 8c is supported by the above stated side frames 5a, 5b and 6a, 6b and can stand upright along to the moving directions at both sides of the steps 7a and 8a, hand rails 7b and hand rails 8b, each
5 of the handrails 7b and 8b is guided by peripheral edges of the above stated balustrades 7c and 8c and can move periodically with the steps 7a and 8c.

Each of the above constituting components 7A and 8A is constituted further by an inner deck cover 7d and
10 an inner deck cover 8d, each the inner deck covers 7d and 8d can cover an inside of a base portions of the balustrades 7c and 8c, an outer deck cover 7e and an outer deck cover 8e, each of the outer deck covers 7e and 8e can cover an outside of base portions of the
15 balustrades 7c and 8c, skirt guards 7f which are vertically arranged and can partition between the inner deck cover 7d and the outer deck cover 7e and the step 7a to the forward passage side, skirt guards 8f which are vertically arranged and can partition between the
20 inner deck cover 8d and the outer deck cover 8e and the step 8a to the backward passage side, and rails for guiding the above stated steps 7a and 8a, etc..

The side frames 5a and 6a of the above stated newly-established escalators 3 and 4 are fixed to the
25 side frames 1a and 2a of the previously-established escalators through connection members 10 as shown in Fig. 3. Further, the bottom portion frames 5d and 6d

of the newly-established escalator 3 and 4 are fixed to the bottom portion frame 9 of the previously-established escalators through other connection members 11.

5 The outer surface portions of the main frames 1A and 1B of the previously-established escalators are covered by the side portion exterior plates 12 and 13 and the bottom portion exterior plate 14. The side
10 portion exterior plates 12 and 13 are fixed to the side frames 1a and 2a and are provided to extend over from the above stated deck covers 7e and 8e to lower portions of the side frames 1a and 2a. The bottom
15 portion exterior plate 14 is fixed to the bottom portion frame 9 and covers between the lower ends of the above stated side portion exterior plate 12 and 13.

Next, the procedure of installing the newly-established escalators 3 and 4 using a part of the main frames 1A and 2A of the previously-established escalators will be explained.

20 First of all, as shown in Fig. 1(b) and Fig. 2, each of the constituting components of the two previously-established escalators is withdrawn. After that, within the previously-established main frames 1A and 2A, leaving the side frames 1a and 2a positioned at
25 the most outer portions to the opposite sides and the receiving beam portions 1e and 2e positioned at the opposite sides, all of the constituting components such

as the adjacent side frames 1b and 2b each other, the bottom portions 1c and 2c, and the lateral frame portions 1d and 2d, etc. are withdrawn.

5 Namely, in the previously-established escalators, all constituting components and all constituting members in the a region X performed by meshes (Fig. 1(b)) and a region Y (Fig. 2) are withdrawn. Only the side frames 1a and 2a and the receiving beam frame portions 1e and 2e of the most outside portion of the
10 left portion and the right portion of the main frames 1A and 2A are left to remain and then a receiving space for receiving the newly-established escalators 3 and 4 is secured.

15 Next, as shown in Fig. 1(a), Fig. 1(b) and Fig. 3, since the bottom portion frame 9 is arranged by spanning between the bottom portion of the side frames 1a and 2a of the main frames 1A and 2A of the remaining previously-established escalators, a receiving and supporting frame is formed. This receiving and
20 supporting frame receives and supports the main frames 5A and 6A of the newly-established escalators 3 and 4. The receiving and supporting frame has a total lateral width WA as shown in Fig. 3 and has U shape cross-section.

25 At this time point, since the withdrawal of the constituting components and the constituting members of the previously-established escalators and further a

partial remodeling of the main frames 1A and 2A are merely carried out, a wide remodeling construction work of the construction building where the escalators are installed is not carried out.

5 Next, the newly-established escalators 3 and 4 being put side by side are installed in the receiving and supporting frame which is formed with U cross-sectional shape having the lateral width of WA. First of all, the newly-established main frames 5A and 6A
10 having a whole lateral wide WB of two escalators part of the newly-established escalators 3 and 4 are fallen down to the above stated receiving and supporting frame along to the perpendicular lines m-n-o-p shown in Fig. 1 and the newly-established main frames 5A and 6A are
15 fixed through the connection members 10 and the connection members 11.

 In this time, the steps 7a and 8a can put in to the main frames 5A and 6A in advance, however it is desirable to receive and support the main frames 5A and
20 6A being existed before a condition of the put-in of the steps 7a and 8a to the receiving and supporting frame, under the consideration of the fixture working according to the connection members 10 and the connection members 11 of the main frames 5A and 6A to
25 the receiving and supporting frame.

 After the newly-established main frames 5A and 6A have received in the receiving and supporting frame

which has been remodeled the previously-established main frames and have carried out the centering working, the above stated steps 7a and 8a have put into (however, in a case where the steps 7a and 8a have put into the main frames 5A and 6A in advance, the above stated put-in working is unnecessary). The balustrades 7c and 8c are arranged to each of the side frames 5a, 5b and 6a, 6b, and the hand rails 7a and 8b are guided through the balustrades 7c and 8c. Further, by the installation of the side portion exterior plates 12 and 13 and the bottom portion exterior plate 14, the installation about the two newly-established escalators 3 and 4 has completed.

Herein, the reasons why the withdrawal of the side frames 1b and 2d, the bottom portions 1c and 2c and the lateral frame portions 1d and 2d which are adjacently to the previously-established main frames 1A and 2A is performed will be explained.

As shown in Fig. 2, each of an inner side lateral width WC formed between the both side frames 1a and 2a and an inner side lateral width WC formed between both side frames 2a and 2b of the previously-established main frames 1A and 2A is about $1/2$ width length of the whole lateral width WA. In a case where the main frames 5A and 6A of the newly-established escalators 3 and 4 are intended to receive in each of the inner side lateral widths WC as shown in Fig. 1(a), the above

stated case will be explained.

5 The receiving space will be limited according to
the above stated each of the inner side lateral widths
WC. However, since each of the outer side lateral
widths of the newly-established frames 5A and 6A is
substantially to same or slightly larger than the inner
side lateral width WC of the previously-established
main frames 1A and 2A, from the aspect of the working,
the receiving for the newly-established main frames 5A
10 and 6A into each of the inner side lateral widths WC of
the previously-established main frames 1A and 2A
becomes difficult.

15 In the first mode of the embodiment according to
the present invention, the adjacent side frames 1b and
2b, the bottom portions 1c and 2c, and the lateral
frame portions 1d and 2d are withdrawn. In the
previously-established escalators, a width Wb having
100-200 mm can be secured, such a width Wb is a sum
width in which a width formed between the side frames
1b and 2b is added to an adjacent interval Wa between
20 each of the escalators being existed originally.

25 The above stated width Wb is utilized as a
receiving afford degree of the newly-established
escalators 3 and 4 against the previously-established
main frames 1A and 2A. The afford degree having the
width Wb is convenient to attain the receiving working
and the renewal working for the renewal escalator.

A deep width Ha of the main frames 1A and 2A of the previously-established escalators as shown in Fig. 2 is unnecessary to enlarge and can adopt as it is, namely the steps having the same kind shape as usual can use as the steps of the newly-established escalators.

The construction of the newly-established escalators 3 and 4 will be explained referring to Fig. 3.

Within a range of the inner width WA of two previously-established escalators, the main frames 5A and 6A of the two newly-established escalators 3 and 4 having a total lateral width WB is received. The newly-established escalators 3 and 4 comprise the main frames 5A and 6A and the constituting components 7A and 8A.

Namely, the above stated main frames 5A and 6A comprise the outer portion frames 5a, 6a and 5b, 6b, the lateral frames 5c and 6c, and the bottom portions 5d and 6d, etc. Further, the above stated constituting components 7A and 8A comprise the steps 7a and 8a, the hand rails 7b and 8b, and the balustrades 7c and 8c, etc., but omit a driving machine and a safety apparatus in this figure and this constituting components 7A and 8A are necessary to carry out the passenger transportation.

The important portions are jointed according to the short length connection members 10 and the short length connection members 11 and the outer side frame portions 1a and 2a are jointed to the outer side portion frames 5a and 6a and the bottom plate 9 is jointed to the inner portion frames 5b and 6b, accordingly a necessary strength for constituting as the main frame of the escalator is secured.

On the other hands, the outer deck covers 7e and 8e which are arranged on the base portion of the balustrades 7c and 8c are constituted to have a relationship $M_o > M_i$, wherein M_o is a width formed between the outer deck covers 7e and 8e which are positioned toward the opposite sides and M_i is a width formed between the outer deck covers 7e and 8e which are positioned toward the center sides.

The two widths M_o and M_i has the relationship of $M_o > M_i$. The reason why the width M_o is larger than the width M_i is to cover the upper ends of the side portion exterior plates 12 and 13 which are attached to the outer side of the previously-established main 1A and 2A.

As stated in the above, according to the first mode of the embodiment according to the present invention, in accordance with the withdrawal of each of the constituting components of the parallel arrangement previously-established escalators and the side frames

1b and 2b which adjacently positioned to the main frames 1A and 2A, etc., the receiving and supporting frame having U cross-section shape is formed.

5 This receiving and supporting frame can secure a newly enlarged inner portion space in the remained main frames 1A and 2A. As a result, the two newly-established escalators 3 and 4 can receive in the receiving and supporting frame with the afford degree.

10 Further, by the new enlargement according to the withdrawal of each of the constituting components of the parallel arrangement previously-established escalators and the adjacent side frames 1b and 2b of the main frames 1A and 2A, the installation work for the two newly-established escalators 3 and 4 can carry
15 out easily in a short time.

Further, in a case of the installation working of the two newly-established escalators 3 and 4, since the main frames 1A and 2A of the previously-established escalators can be utilized as the scaffolding, as a
20 result the installation of a monopoly scaffolding and the withdrawal of the monopoly scaffolding are unnecessary, thereby the shortening of the construction period can be attained.

25 Next, a second mode of the embodiment according to the present invention will be explained referring to Fig. 4.

In Fig. 4, the different constructions in comparison with the mode of the first mode embodiment shown in Fig. 3 are that each of the side frames 5a, 5b of the newly-established main frame 5A and the side frames 6a, 6b and the newly-established main frame 6A is connected by a common long length connection member 15 and also each of the side frame 1a of the previously-established main frame 1A and the side frame 2a of the previously-established main frame 2A is connected by extending of the same common long length connection member 15, thereby the strength for constituting as the main frame of the escalator can be secured. With the above stated structure, the short length connection member 10 which is required by the second mode embodiment can be unnecessary.

Further, in the second mode embodiment according to the present invention, the common long length connection member 15 supports to cross over the abdominal region of the newly-established escalators 3 and 4 and the right and left both end portions of the common long length connection member 15 are connected to the side frame 1a of the previously-established main frame 1A and the side frame 2a of the previously-established main frame 2A. Accordingly, in comparison with the first mode embodiment, the second mode embodiment has superior stability for supporting the newly-established escalators 3 and 4.

Further, in each of the first mode embodiment and the second mode embodiment according to the present invention, since the receiving beam frame portions 1e and 2e of the main frames 1A and 2A of the previously-
5 established escalators are diverted as they are, the wide remodeling such as the shaving of the floor of the construction building is unnecessary. Accordingly, it can dispense with the re-cover of the tiles of the floor surface and no construction building work is
10 necessary.

Further, in each of the first mode embodiment and the second mode embodiment according to the present invention, the two newly-established escalators are arranged in the lateral width of the two previously-
15 established escalators. However, according to demand, in the lateral width of the two previously-established escalators, it is possible to arrange a three newly-established escalators. Further, in the lateral width of a three previously-established escalators, it is
20 possible to install a three newly-established escalators.

In each of the first mode embodiment and the second mode embodiment according to the present invention, the escalators arranging in parallel and
25 further inclining to the same direction and the method of installing the same are stated. However, it is possible to adopt the present invention to the moving

walks arranging in parallel and further inclining to the same direction and further a case where the moving walks arranging in parallel and toward the same direction in the horizontal.

- 5 As stated in the above, according to the present invention, without the wide remodeling the space for receiving the plural newly-established passenger conveyors can be secured easily and the renewal of the previously-established passenger conveyor equipment can
- 10 be carried out in a short time.



CLAIMS:

1. A parallel arrangement passenger conveyor equipment comprises:

5 a receiving and supporting frame formed by main frames of a parallel arrangement previously-established passenger conveyor and having U cross-section shape; and

10 a newly-established passenger conveyor received and supported by said receiving supporting frame and having a parallel arrangement main frame.

2. A parallel arrangement passenger conveyor equipment comprises:

15 a receiving and supporting frame comprised of side frames being positioned the most outer side of main frames of a parallel arrangement previously-established passenger conveyor and a connection member for connecting said side frames, and said receiving and supporting frame having U cross-section shape; and

20 main frames received and fixed in said receiving and supporting frame and for putting side by side a newly-established passenger conveyor.

25 3. A parallel arrangement passenger conveyor equipment according to any one of claims 1 and 2, characterized in that,

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said main frame of said previously-established passenger conveyor and said main frame of said newly-established passenger conveyor are connected through a connection member each other.

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4. A parallel arrangement passenger conveyor equipment according to any one of claims 1, 2 and 3, characterized in that,

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said main frame of said previously-established passenger conveyor and said main frame of said newly-established passenger conveyor are connected through a common connection member.

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5. A method of installing a parallel arrangement passenger conveyor, characterized in that

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in a case of an installation of a newly-established parallel arrangement passenger conveyor utilizing a previously-established main frame of a previously-established parallel arrangement passenger conveyor,

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forming a receiving and supporting frame having U cross-section shape by withdrawing each of constituting components of said previously-established passenger conveyor and an adjacent side frame among side frames for constituting said previously-established main frames; and

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next, receiving plural newly-established main frames of said newly-established passenger conveyor in a receiving space enclosed by said receiving and supporting frame and fixing said plural newly-

5 established main frames to said previously-established main frames; and

after that putting each of constituting components of said newly-established passenger conveyor into each of said newly-established main frames.