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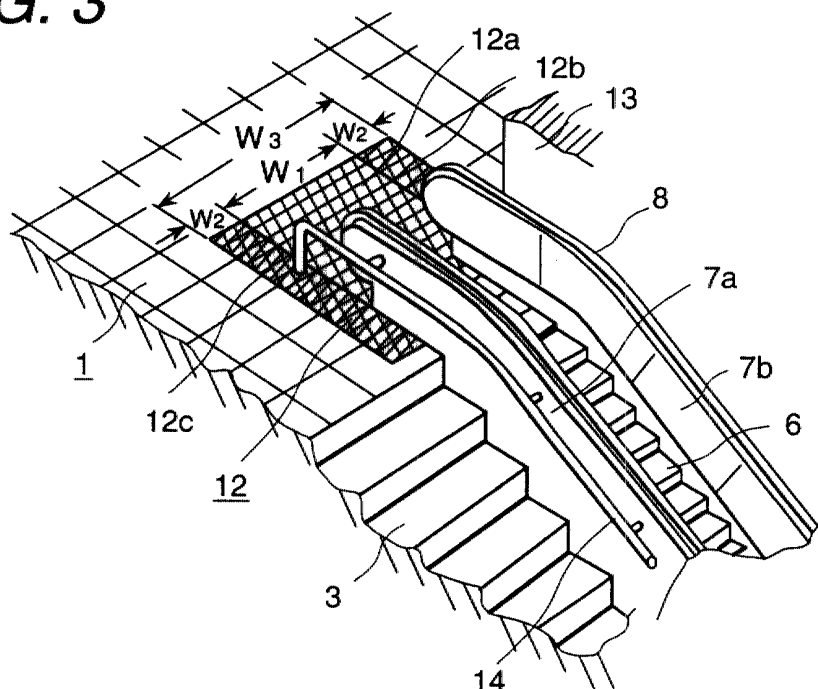
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(54) **Step passage handrail afixed on the balustrade of a parallel running escalator**

(57) In order to provide a step passage facilities which does not degrade safety of a walker by providing a passenger conveyer in parallel with the step passage facilities, a handrail 14, 17, 18 for a walker supported to the outside of the balustrade 7a of the passenger con-

veyer 4 is installed to be longer than the balustrade 7a of the passenger conveyer, and a start and an end edges of the handrail for the walker is supported on the horizontal parts 9, 10 of the main frame 5 of the passenger conveyer

**FIG. 3**



## Description

### BACKGROUND OF THE INVENTION

[0001] The present invention relates to a step passage facilities installing a passenger conveyer such as an escalator or an electric moving walk in parallel with a step passage as a walker passage.

[0002] The step passage facilities installing the passenger conveyer in parallel with the step passage is already disclosed by Japanese Patent Laid-open Nos. 4-343860 and 7-189449 bulletins for example.

[0003] In the above conventional technology, as the handrail for a walker is installed from a start edge to an end edge of the steps in total, the walker is sometimes transmitted along a moving handrail installed on a balustrade of said passenger conveyer, while the walker who utilizes the steps walks up to the steps or while the walker who goes down the steps goes up to the end edge of the balustrade of the passenger conveyer. In this case, in the above conventional step passage facilities, there is a possibility for a step waker to catch the moving handrail on the balustrade of the passenger conveyer, and a consideration for the step walker was short.

### SUMMARY OF THE INVENTION

[0004] An object of this invention is to provide a step passage facilities which is safe for the step waker when walking the steps installing the passenger conveyer in parallel.

[0005] In order to achieve the object in the present invention, the start or end edge of the handrail for the walker which is provided along the balustrade of the passenger conveyer, is respectively installed at a same location with the start or end edge of the balustrade of the passenger conveyer, or is respectively installed in a location preceeding the start or end edge of the balustrade of the passenger conveyer, and if needed, the start or end edge of the handrail for the walker is supported on a horizontal part formed by a main frame of the passenger conveyer.

[0006] By constituting it as above, the step walker can catch a handrail for a walker at least over an entire section of the passenger conveyer and the step walker does not touch a moving handrail of the passenger conveyer, thereby safety of the walker can be maintained. In addition, all the handrails for a walker can be supported with the main frame of the passenger conveyer, a complexity to construct the handrail for the walker on a step passage side can be got rid of.

### BRIEF DESCRIPTION OF THE DRAWINGS

[0007] Figure 1 is a schematic side view of an embodiment of a step passage facilities in the present invention

[0008] Figure 2 is an enlarged plan view to show an upper floor neighborhood in figure 1.

[0009] Figure 3 is a perspective view of figure 2.

[0010] Figure 4 is an enlarged sectional view showing one side of the balustrade along a IV-IV line of figure 1.

[0011] Figure 5 is a perspective view which shows the main frame of the escalator shown by figure 1.

[0012] Figure 6 is a side view showing other embodiments being equivalent to figure 3 in the present invention.

[0013] Figure 7 is a view showing further other embodiments being equivalent to figure 6 in the present invention

### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0014] Based on figure 1 to figure 5, an embodiment of the present invention will be explained as follows. An escalator 4 being a passenger conveyer which is installed in parallel with steps 3 to communicate a upper rank floor 1 and a lower floor 2 of a building, has a main frame 5, plurality of foot steps 6 which are guided in the main frame 5, are connected in an endless state and circulate, a pair of balustrade 7a, 7b installed on the main frame 5 at both sides of the foot steps 6, and moving handrails 8 to respectively move around peripheries of the balustrades 7a, 7b in synchronism with the foot steps 6.

[0015] The above stated main frame 5 is constructed with an upper horizontal part 9 and a lower horizontal level 10 formed at both edges of a longitudinal direction of the main frame 5, and an intermediate part 11 to connect both the upper horizontal part 9 and the lower horizontal part 10. Width dimension W0 of the intermediate part 11 is formed narrower than that W of the upper horizontal part 9 and the lower horizontal part 10.

[0016] Such construction that the width dimension W0 of the intermediate part 11 is narrower, is determined based on a consideration not to make the width of the steps 3 narrower when setting the escalator 4. In addition to above,

[0017] The upper horizontal part 9 and the lower horizontal part 10 should not be narrower because a driving machine or a driving mechanism for the foot step 6 and the moving handrail 8 (not shown in the figure) or a control machinery thereof is provided therein, however as an upper part getting on and off floor 12 or a lower getting on and off floor (not shown in the figure) respectively forms a flat floor with an upper floor 1 or a lower floor 2, it does not become barrier for a walker without making it narrower. In addition, tops of the upper horizontal part 9 and the lower horizontal part 10 is covered with an upper part getting on and off floor 12 and a lower part getting on and off floor, and the passenger gets on and off to said foot step 6 from this place. These getting on and off floor has a same width dimension W3 almost the same as a width dimension W of said the upper horizontal part 9 and the lower horizontal part 10. These getting on and off floor has a central getting on and off floor part

12a having a width dimension W1 almost the same as a width dimension W0 of the intermediate part 11 of the main frame 5 and side getting on and off floor parts 12b, 12c having width dimension W2 at both side of the central getting on and off floor part 12a, and at least the central getting on and off floor part 12a is fixed on the top of the upper horizontal part 9 and the lower horizontal part 10 to be able to be put on and be taken off, and it is divided into plural pieces so as to be easy to be put on and be taken off.

[0018] The escalator 4 being constituted like the above, is disposed to be approached to a wall 13 being one side in a width direction of the steps 3, and it is Then, the balustrade 7a in opposite side of the wall 13 among pair of the balustrades 7a, 7b of the escalator 4 has a function of a wall for partitioning off the escalator 4 from the steps 3.

[0019] Therefore, in the opposite side of balustrade 7a to the wall 13, a handrail 14 for a walker is arranged, and the walker utilizing steps 3 is facilitated.

[0020] In this place, the handrail 14 for the walker in this embodiment is provided as that the length of the handrail 14 is formed to be longer than the length of the balustrade 7a, and the start or end edge of the handrail 14 for the walker is installed so as to be respectively exceed a dimension L from the start or end edge of the balustrade 7a of the passenger conveyer. This handrail 14 for the walker is installed outside of the width dimension W0 of the intermediate part 11 constituting the main frame 5 and inside of the width dimension W of the both of the upper horizontal part 9 and the lower horizontal part 10, thereby the width of the steps 3 offered to the walk is provided not to be reduced.

[0021] The handrail 14 for the walker is supported through support member 16 in balustrade pillar 15 fixed on an upper chord 11a constituting the main frame 5, on the balustrade 7a as shown in figure 4, and the edge of the handrail 14 for the walker which exceeds the dimension L from the start or end edge of the balustrade 7a is supported in the main frame 5 located under the side getting on and off floor part 12c and constituting the upper horizontal part 9 as shown in figure 3.

[0022] According to the above embodiment, as the edges of the handrail 14 for the walker respectively exceeds the dimension L from the start or end edge of the balustrade 7a of the passenger conveyer towards a longitudinal direction of the step 3 or the escalator 4, while the walker using the steps walks from start edge of the balustrade 7a to the steps 3 and from the step 3 to the end edge of the balustrade 7a, the walker can walk without touching the balustrade 7a and catching the handrail 14 for the walker so as to be safe. If when the balustrade for the walker is installed in only a range of an inclined part of the steps 3, the handrail for the walker cannot be caught without having walked on the steps 3, and the handrail for the walker must be kept apart just before finishing to walk the steps 3, it becomes dangerous till the handrail for the walker is caught especially when uti-

lizing to go down the steps.

[0023] In addition, the walker using the steps is prevented from getting hold of the moving handrail 8 of the escalator 4 side in the wrong, and the safety of the step passage facilities is improved, by letting the edges of the handrail 14 for the walker respectively exceed the dimension L from the start or end edge of the balustrade 7a. That is to say, when the start or end edge of the handrail 14 for the walker is located in the steps 3 side than the start or end edge of the balustrade 7a, the step user is going to go up and down from this side of the steps along the escalator 4 installed along the steps and along the wall, and even if after going down the steps 3, the step user is going to go along the escalator 4 and the wall. As a result, there arises a danger to get hold of the moving handrail 8 provided around the balustrade of the escalator which exists this side than the start edge of the handrail 14 for the walker and exists further than end edge of the handrail 14 for the walker. When the step user gets hold of moving handrail 8, he is pulled to a moving direction of the moving handrail 8 at a moment to get and his walking attitude is changed and the attitude is going to be stood up again so that he gets hold of the moving handrail 8 moreover powerfully so as to fall down. However, according to this embodiment, because the step user does not get hold of the moving handrail 8 of the escalator 4, the above danger is avoided.

[0024] Referring to a support framing of the handrail 14 for the walker from a viewpoint of construction works of the steps 3 of the escalator 4, the handrail 14 for the walker is directly or indirectly supported on the main frame 5 entirely.

[0025] Therefore, it is not necessary to work on an upper floor 1 and a lower floor 2 in the passage side in order to fix the start or end edge of the handrail 14 for the walker. It is very effective to be able to cancel such complexity especially in construction works to install the escalator in parallel with the steps which is already constructed.

[0026] Moreover, by having installed the handrail 14 for the walker longer than the start or end edge of balustrade 7a, crossing in the getting on and off floor 12 by the general walker who does not utilize the escalator 4 can be prevented, the escalator 4 can be utilized to smoothly get on and off.

[0027] By the way, in the above-mentioned embodiment, the handrail 14 for the walker is installed over the start or end edge of the balustrade 7a along the balustrade 7a of the escalator 4.

[0028] However, as shown in figure 6, the handrail 14 for the walker may be constructed with a main handrail 17 for the walker being shortened than total length of the balustrade 7a so that the start or end edge thereof does not reach to the start or end edge of balustrade 7a and a supplementary handrail for a walker 18 that is installed along an extension line top of the handrail 17 for the walker, and an effect same as in the embodiment stated the above may be attained.

**[0029]** One side of the supplementary handrail 18 for the waker which approaches the balustrade 7a is supported in the main frame 5 through the balustrade pillar 15 and the support member 16, and the edge being over L dimension from the start or end edge of the balustrade 7a is supported on the main frame 5, in the same way as the embodiment stated the above .

**[0030]** In each above embodiment, the edge of the handrail 14 for the walker or an edge 18e of the supplementary handrail 18 for the waker to constitute the handrail 14 for the walker is protoruded a dimension L from the start or end edge of the balustrade 7a, however, in a case to only prevent to get hold of the moving handrail 8 of the step walker, the balustrade for the walker is installed over entire section of the balustrade 7a, that is, the edge of the handrail 14 for the walker or the edge 18e of the supplementary handrail 18 for the waker may be installed in a same location as the start or end edge of the balustrade 7a.

**[0031]** Moreover as shown in figure 7, when the handrail 19 for the walker does not reach to the start or end edge of the balustrade 7a, the supplementary handrail for the waker 20 which one end thereof overlaps with the handrail 19 in a longitudinal direction thereof and another end thereof is located in the same location as the start or end edge of the balustrade 7a or exceeds it, may be fixed in the main frame (not illustrated in the figure) under the getting on and off floor 12.

**[0032]** Moreover when safety of the step walker is given a priority to, the edge of the handrail 14 for the walker or the supplementary handrail for the waker 18, 20 may be fixed on the upper floor 1 and the lower floor 2.

**[0033]** In each above embodiment, although the escalator is explained as a passenger conveyer installed on the steps, even if an electric road is applied replacing with the escalator, effect same as each embodiment may be expected.

**[0034]** In addition, in each embodiment to mention above, although a passenger conveyer is installed in parallel with one side of the steps in a width direction thereof, however in case of steps having a wide width, the passenger conveyer may be installed in a center of the steps in a width direction thereof, and the handrails for the walker may be installed in both sides of the passenger conveyer.

**[0035]** According to the present invention explained as above, when the passenger conveyer is installed in parallel, a step passage facilities without letting safety of a walker fall can be got.

## Claims

1. A step passage facilities having a passenger conveyer installed in a step passage and a handrail for a walker installed on a balustrade of said passenger conveyer, wherein  
a start or an end edge of said handrail for the

walker is respectively installed on a same location with a start or an end edge of said balustrade of said passenger conveyer.

2. A step passage facilities having a passenger conveyer installed in a step passage and a handrail for a walker installed on a balustrade of said passenger conveyer, wherein

a start or an end edge of said handrail for the walker are respectively installed at a location exceeding a start or an end edge of said balustrade of said passenger conveyer to an advance direction.

3. A step passage facilities installing a passenger conveyer having a handrail for a walker in a step passage, said handrail for said walker being installed on a balustrade of said passenger conveyer, wherein

said handrail for said walker has a length to exceed and a start or an end edge of said balustrade of said passenger conveyer.

4. A step passage facilities as defined in claim 1, 2 or 3, wherein

a main frame of said passenger conveyer has horizontal parts installed on both edges in longitudinal direction of said main frame and an intermediate part formed to have a narrower width than that of said horizontal parts, said balustrade is provided along said intermediate part of the said main frame, an intermediate part of said handrail for said walker is supported in said balustrade, and a start or an end edge of said handrail is supported on said horizontal part of said main frame.

5. A step passage facilities as defined in claim 1, 2, 3 or 4, wherein

said handrail for said walker is installed outside of a width dimension of said intermediate part of said main frame and is installed inside of a width dimension of said horizontal part.

6. A step passage facilities as defined in claim 1, 2, 3, 4 or 5, wherein

said handrail for said walker has a main handrail for said walker and an Supplementary handrail for said walker connecting directly or indirectly to said start or said end edge of said main handrail for said walker.

7. A step passage facilities having a passenger conveyer installed in a step passage and a handrail for a walker installed on a balustrade of said passenger conveyer, wherein

said handrail for said walker is provided over entire section of said balustrade of said passenger conveyer.

8. A step passage facilities having a passenger conveyer installed in a step passage and a handrail for a walker installed on a side of said passenger conveyer, wherein
- a start or end edge of said handrail for said walker is provided on a location to exceed entire section of said balustrade of said passenger conveyer.

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FIG. 1

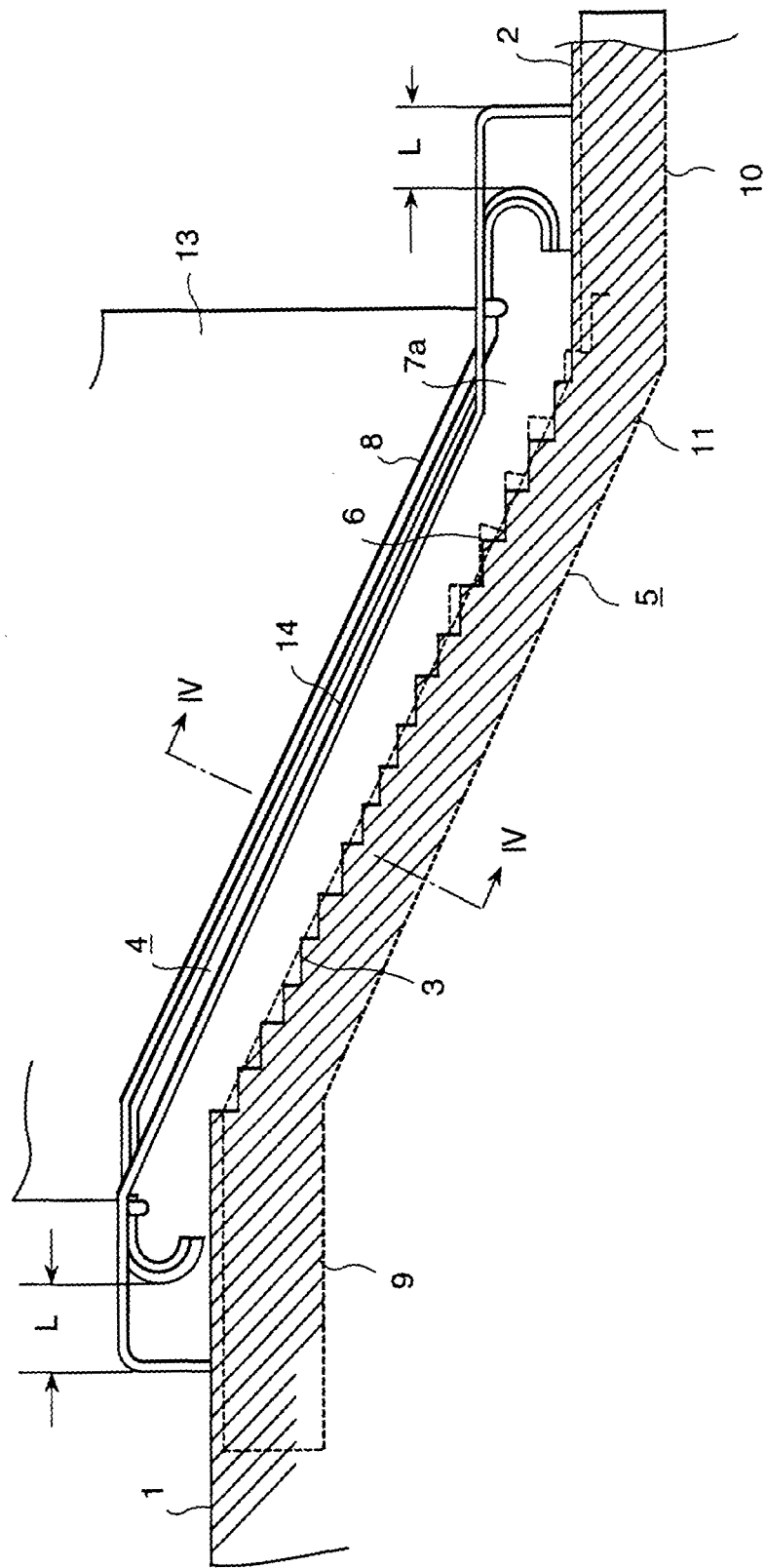


FIG. 2

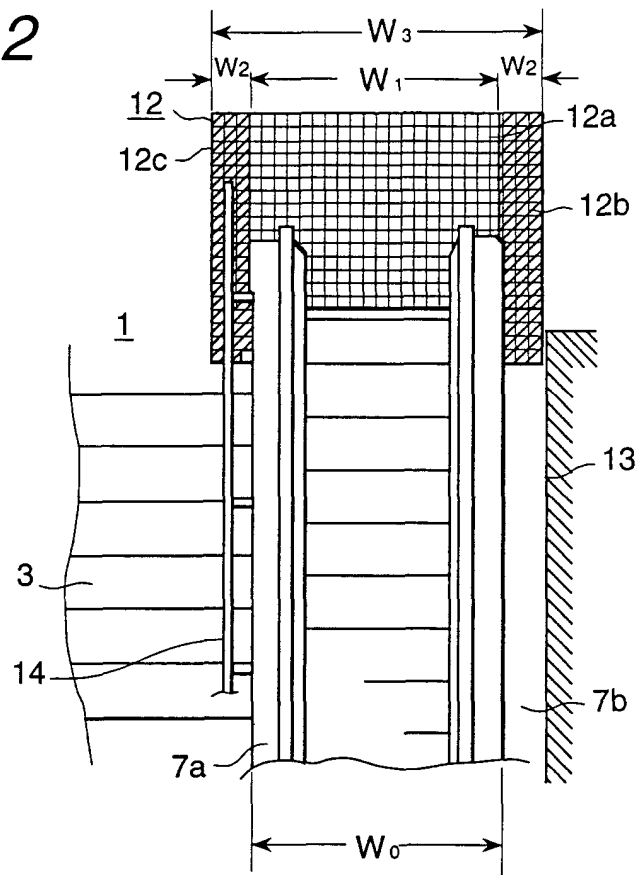


FIG. 3

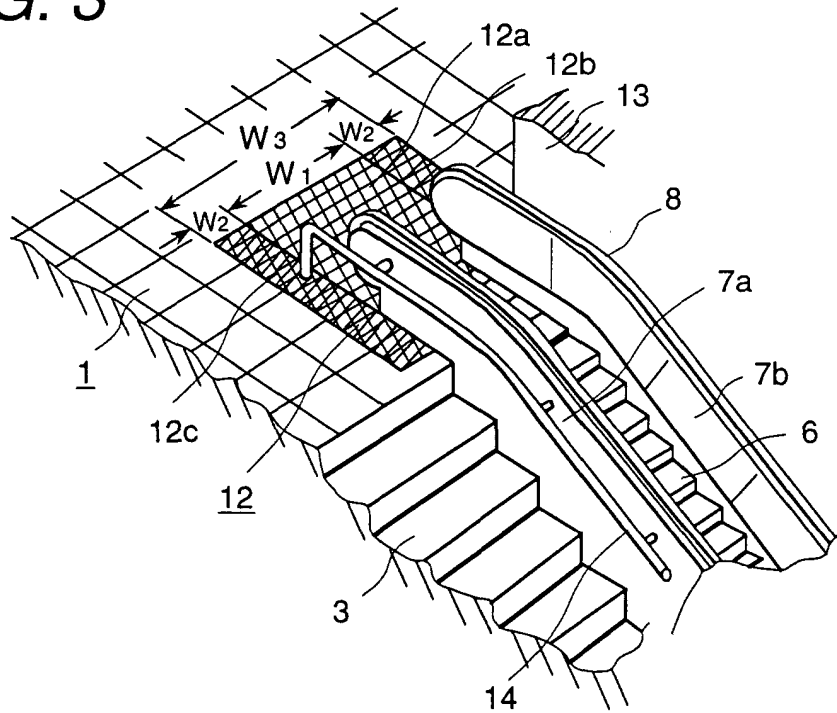


FIG. 4

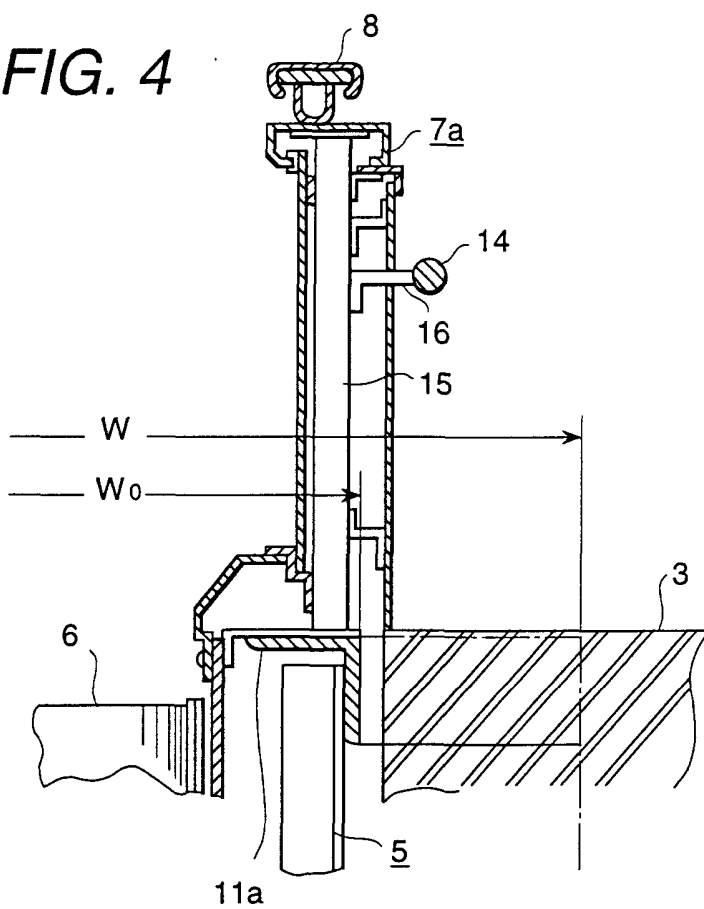
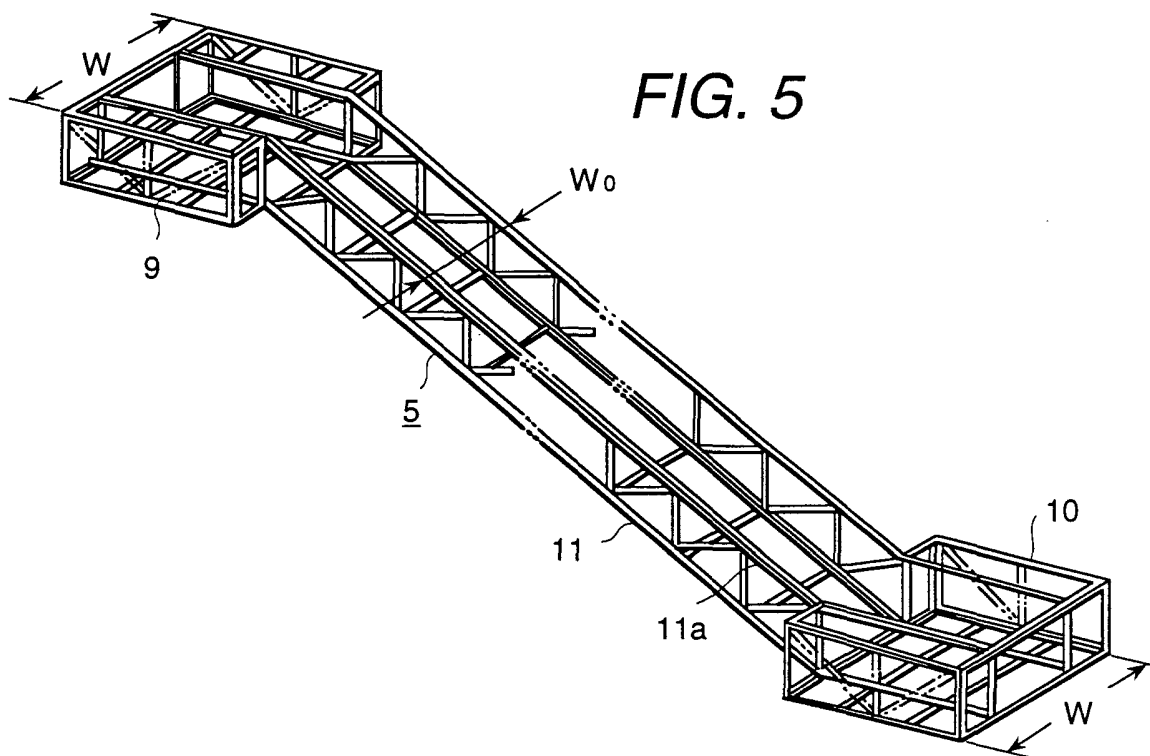
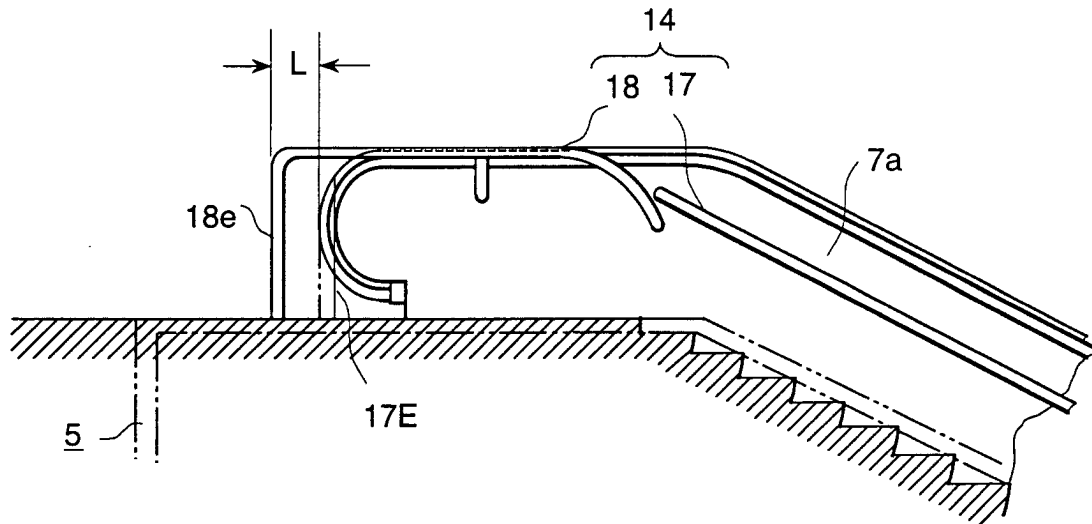


FIG. 5





**FIG. 6**



**FIG. 7**

