No. 896,098. PATENTED AUG. 18, 1908.

E. L. GALE, Sr.

ESCALATOR LANDING.

APPLICATION FILED DEC. 22, 1905.

3 SHEETS—SHEET 1.

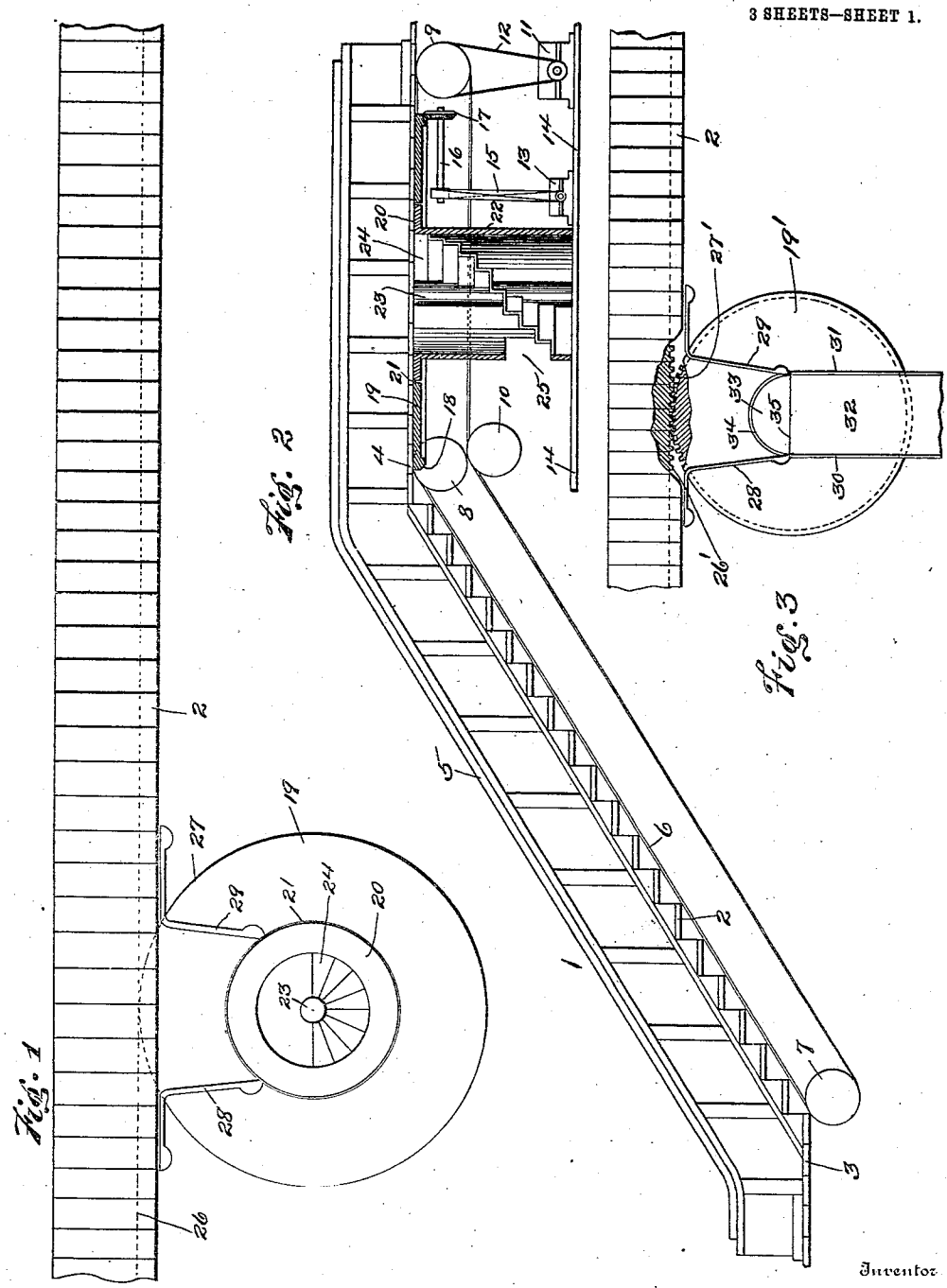


Fig. 1

Fig. 2

Fig. 3

Witnesses

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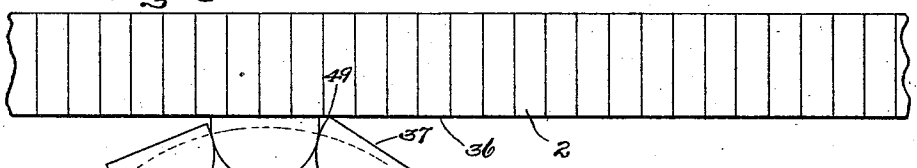
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3 SHEETS—SHEET 2.

Fig. 4



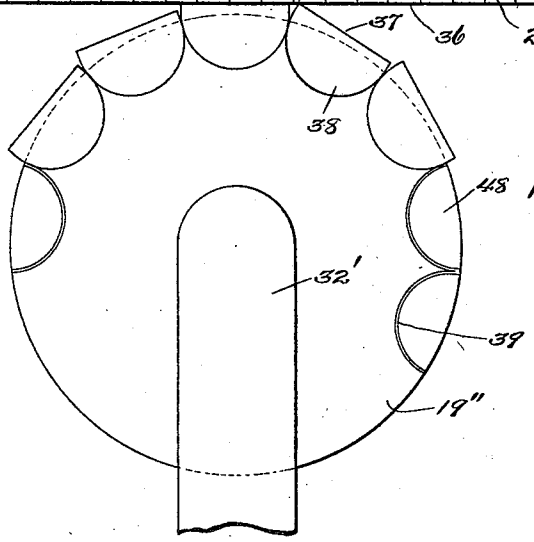


Fig. 5

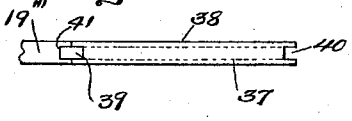


Fig. 6

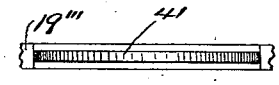


Fig. 7

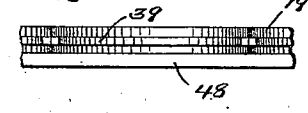
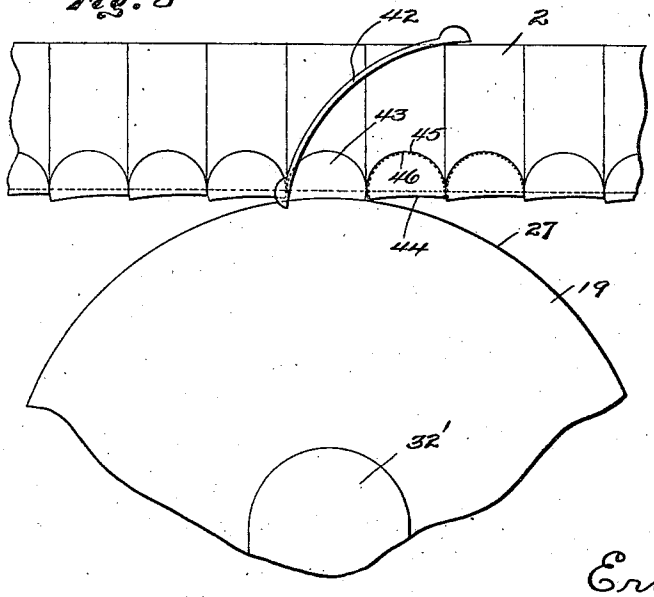


Fig. 8



Witnesses

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3 SHEETS—SHEET 3.

Fig. 9

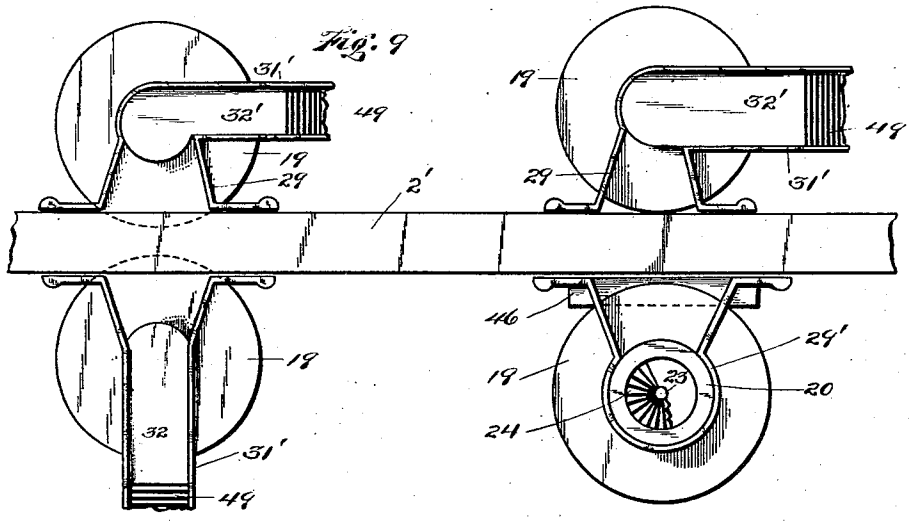


Fig. 10

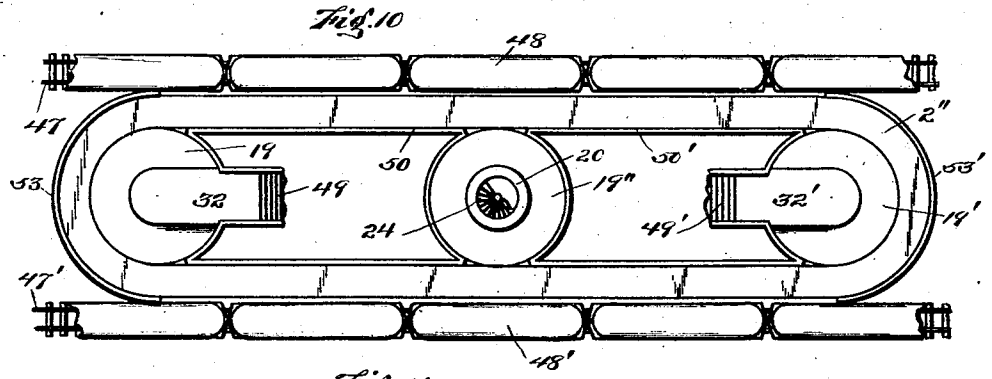
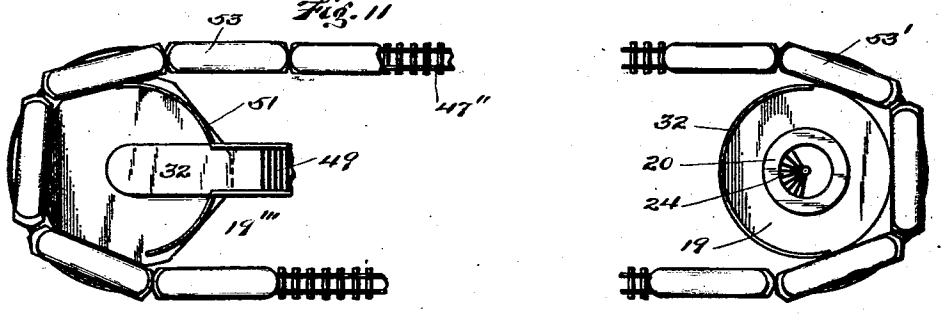


Fig. 11



Attest:

Walter C. Strong

Henry E. Kirby

Inventor:

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by Chas. M. Nissen Atty

UNITED STATES PATENT OFFICE.

ERNEST L. GALE, SR., OF YONKERS, NEW YORK, ASSIGNOR TO OTIS ELEVATOR COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

ESCALATOR-LANDING.

No. 896,098. Specification of Letters Patent. Patented Aug. 18, 1908.

Application filed December 22, 1905. Serial No. 292,894.

To all whom it may concern:

Be it known that I, ERNEST L. GALE, Sr., a citizen of the United States, residing at Yonkers, in the county of Westchester and State of New York, have invented a new and useful Improvement in Escalator-Landings, of which the following is a specification.

My invention relates to landings for moving stairways and one of its objects is the provision of simple and efficient means for varying the rate of movement of a passenger between the moving stairway and a stationary landing.

More particularly, it is the object of the present invention to provide a revolving platform adjacent the lower or upper landing of a moving stairway, so that the periphery of the landing shall have substantially the same speed as that of the stairway, while the center of the platform adjacent a fixed platform shall have comparatively a much slower speed.

Other objects of my invention will appear hereinafter, the novel combinations of elements being pointed out in the claims.

In the accompanying drawings, Figure 1 represents a plan view of my improved revolving platform in connection with a portion of the moving stairway; Fig. 2 represents in elevation a moving stairway and my invention in elevational sectional view applied to the upper landing thereof; Fig. 3 is a plan view of the modified form of the apparatus showing certain parts in section; Fig. 4 is a modification of Fig. 3; Figs. 5, 6, and 7 are detailed views of Fig. 4; and Figs. 8, 9, 10 and 11 show further modifications of my invention.

Referring now to Fig. 2 it will be seen that 1 designates in general a moving stairway or what is commonly known as an escalator which may be of any type, the Otis escalator being preferred. 2 designates the movable steps which are shown in horizontal alinement at 3 to form the movable lower landing; the steps 2 are shown at 4 in horizontal alinement to form the upper movable landing of the escalator. 6 designates diagrammatically an endless belt or chain for moving the stairway, said belt running over sheaves 7, 8, 9, and 10 and being connected by the belt 12 to the electric driving motor 11, which is mounted on the base 14. Mounted also on the base 14 is an auxiliary electric motor 13 which is connected by the belt 15 to a countershaft 16. To the outer end of said countershaft is connected a bevel pinion 17 which meshes with the bevel gear 18 on the under side of the movable platform 19 which in this instance is shown of annular form.

In width the annular portion of the platform 19 is preferably several steps. In Fig. 1, I have shown by dotted lines the periphery 27 of the revolving platform 19 in frictional engagement with downward projections 26 on the under side of the steps 2. It is now evident that when the stairway is moved upwardly, say, the platform 19 will be revolved in a clockwise direction by reason of the frictional engagement of the downward projections 26 with the periphery 27 of the revolving platform 19.

It should be noted that that portion of the platform 19 which is adjacent the steps 2 revolves substantially at the same speed as said steps are moving in a straight line. When a passenger, therefore, steps from the escalator to the revolving platform he is not likely to be thrown as he would be if he stepped immediately to a stationary landing. As the passenger approaches the center of the platform the rate of speed at which he is moved will be gradually reduced so that he may step onto the fixed landing 20 with ease. Guard rails 28 and 29 may be provided to prevent the passenger from being moved too far around by the platform.

In Fig. 2 I have illustrated a spiral stairway inclosed by the tubular casing 22. The stairs 24 is interposed between the casing 22 and the post or core 23 and leads from the stationary, annular, upper landing 20 to the doorway 25 adjacent a lower floor landing 14; if desired, the stairs 24 may lead to an upper landing.

Although an auxiliary motor 13 is shown for positively driving the platform 19, the latter may still be left in frictional contact with the downward projections 26 to insure a peripheral speed of the platform 19 substantially equal to that of the straight line movement of the steps 2.

In Fig. 3 I have shown in sectional plan view racks 26′ in place of the projections 26 of Fig. 1, said racks being adapted to mesh with the gear teeth 27′ on the under side of

the peripheral portion of the revolving landing 19'. In this instance the movement of the stairs may be depended upon entirely for revolving the landing 19' and maintaining its peripheral speed equal to that of the straight line movement of the steps 2. Inasmuch as the landing 19' may at times be called upon to carry heavy loads, it is preferable that the auxiliary motor 13 and connections shown in Fig. 2 be also used.

As in Fig. 1, so also in Fig. 3 I have shown guard rails 28 and 29 which meet additional guard rails 30 and 31 which are secured to the stationary platform 32. Preferably the stationary semi-circular portion 33 of the landing 32 is flush with the landing 19' and may be so constructed as to approach the horizontal portion 32 on an incline. Or, there may be a stationary platform 33 of semi-circular form and arranged horizontally so as to be flush at 34 with the platform 19'. In such case a step 35 would have to be provided of a height a little greater than the height of the plane passing through the upper surface of the platform 32 above the plane passing through the upper surface of the platform 19'.

In Fig. 4 the revolving landing 19'' is provided with a series of movable segments 38, the concentric portion of each of said segments being provided with a semi-circular groove or rabbet 40 which is adapted to fit over a corresponding semi-circular projection or tongue 39 secured to the platform 19''' as shown in Fig. 5. Obviously the projection or tongue 39 may be integral with the platform 19''' but preferably I insert a semi-circular strip in the groove 41 (Figs. 5 and 6) so that the strip may be made of different material than that of the platform, if desired.

In Fig. 7 I have illustrated in detail the construction of the platform 19'' shown in Fig. 4 in that the portion 48 of the platform 19'' is not cut away so that said portion may serve as a substantial support for the weight of any passengers that step upon the segments 38 in leaving the escalator and approaching the stationary landing 32'. In the constructions illustrated in Figs. 5 and 6 the tongue 39 is depended upon to support the segments and any weight which may be placed thereon but such a support may not prove sufficient.

When the apparatus illustrated in Fig. 4 is employed the platform 19'' may be suitably geared to the escalator as shown in Fig. 3, or said platform may be provided with independent driving mechanism suitably regulated so as to have the proper peripheral speed. Assuming that the steps 2 are moving to the left in Fig. 4 it will be seen that the flat face 37 of one of the segments 38 is in full engagement with the steps 2, the surface of said segment being arranged so as to be flush or in the same plane with the surface of the steps 2 as well as with the surface of the platform 19''. That the planes passing through the upper surfaces of the segments 38 and the platform 19'' or 19''' coincide is illustrated in Fig. 5. Furthermore, the platform 19'' and segments 38 are so designed that when the segment 38 approaches the escalator and strikes against the edge of one of the steps it will be gradually oscillated or moved on the tongue 39 until its flat face 37 contacts throughout its length with the edges of a plurality of steps, which of course at this time are in horizontal alinement either at the lower landing as indicated at 3 in Fig. 2 or at the upper landing as indicated at 4 in the same figure. It is evident that for a short time the segment 38 may have a speed of movement exactly equal and similar to that of the steps 2 and during this time a passenger may step onto the adjacent segment with perfect safety and walk toward the stationary landing 32' without any liability of being thrown due to a sudden change of movement of his own body. That is, the rate of speed at which a passenger is moved in attempting to step off from a moving stairway is gradually reduced from the peripheral speed of the platform to that near the center thereof which obviously is very much less. What is true in regard to a passenger attempting to leave a moving platform is also true in regard to a passenger approaching such a platform. That is, the passenger may with equal facility approach and step onto a moving stairway or platform when my invention is employed.

In Fig. 8 I have shown a further modification in that the segments 43 which correspond to those designated 38 in Fig. 4, are placed in the steps 2 of the stairway. The concentric portions 45 may be connected with tongues 46 as indicated in dotted lines, the construction in detail being that shown in Figs. 4 and 7. The segments 43 instead of having flat faces have arc-shaped faces to correspond with the periphery 27 of the revolving landing 19. The upper surfaces of the segments 43 when the steps 2 are in horizontal alinement with each other are in the same plane as the surfaces of the steps 2 and of the platform 19. The arrangement of the parts is such that as a segment approaches the landing 19 it strikes against the same and is slightly oscillated thereby until its face 44 is in contact throughout its length with a portion of periphery 27. At this time the segment in such position is about to pass under the guard rail 42, this being the most convenient arrangement for a passenger about to step on or to leave the movable platform comprising the steps 2 in horizontal alinement.

If the guard rails 28 and 29 and the guard

rails 30 and 31 of Fig. 3 are not used the edges of the stationary platform 32′ may be beveled to a thin edge where it is in close contiguity with the platform 19. So also if the construction shown in Fig. 3 at 33 and 34 is not employed, a semi-circular portion of the stationary platform 32′ of Fig. 4 may also be thus beveled.

The constructions described above and illustrated in the drawings, permit of a higher speed escalator being put in use than where there is no approach moving at variable rates of speed.

It is obvious that those skilled in the art may make modifications in the details of the parts herein shown and described or vary the arrangement of the same without departing from the spirit and scope of my invention. I, therefore, desire it to be understood that I do not wish to be limited to the exact construction herein disclosed.

In order to show the various applications of the principle and breadth of my invention, I have illustrated certain modifications in Figs. 9, 10 and 11. It is shown in Fig. 9 that the rotatable landings may be opposite each other, either at the upper or lower landings of moving stairways or in connection with moving sidewalks.

My invention may also be used in facilitating the handling of passengers entering or leaving railway trains. In Fig. 9, 2′ designates a moving side-walk, adjacent which is placed the rotatable landing 19, and opposite the same at the left-hand portion of the figure, an additional rotatable landing 19. This arrangement may be used as well at the upper or lower landing of an escalator or moving stairway, so that passengers could approach the lower stairway landings from either side, or leave the upper stairway landing from either side if the stairway is one which is moving upwardly.

If the moving side-walk 2′ is placed at an elevation from the ground or a floor, the rotatable landing 19 may be reached by means of a stair 49 which is connected to the stationary landing 32′ just above the rotatable landing 19. The stationary platform 32′ may be provided with guard-rails 31′ which connect with additional guard-rails 29 for directing the passengers to the rotatable landing adjacent the moving side-walk 2′. I do not desire to be limited to a rotatable landing having a peripheral speed the same as the longitudinal speed of the side-walk 2′. For example, the peripheral speed of the rotatable landing may be made somewhat less than the longitudinal speed of the side-walk, thus allowing a higher speed for said side-walk. The rotatable landing may either extend under the side-walk 2′ as shown at the left of Fig. 9, or it may be in contact therewith as shown in the upper right-hand portion of Fig. 9, or it may be placed at a short distance therefrom as shown in the lower right-hand portion of Fig. 9. In the latter case, a fixed or movable auxiliary platform 46 may be used to close the gap between the landing 19 and the traveling side-walk. The lower right-hand portion of Fig. 9 otherwise shows the construction similar to Figs. 1 and 2 as regards the spiral stair-way 24 and stationary annular landing 20, but the guard-rail 29 of Fig. 1 is here extended as shown at 29′ to surround said annular landing 20.

In Fig. 10, I have shown my invention applied to a platform for passengers entering or leaving cars of a railway train. 2″ designates an endless moving side-walk traveling adjacent the railway tracks 47 and 47′. Assuming that trains 48, 48′ travel on an elevated railway, toward the right and left, respectively, it will be seen that the side-walk or moving platform 2″ should be moved in a clockwise direction. The passengers may approach the train 48′ by means of the stair 49′, platform 32′, rotatable landing 19′ and moving platform 2″. Passengers may approach the train 48 by means of the stair 49, platform 32, rotatable landing 19 and moving platform 2″. Either train may be approached from the spiral stairway 24 and intermediate rotatable landing 19″. Suitable guard-rails 50, 50′ and 53, 53′ are provided for preventing the passengers from falling from the movable platform 2″. It will be seen that with this arrangement, the passengers may be gradually accelerated from the stationary platforms to the train and that the train may be moving while the passengers are entering or leaving the same. In such case, of course, it would be preferable to have open cars. The rotatable landings need not necessarily have a peripheral speed equal to the speed of the platform 2″, but the latter may be greater and the speed of the train somewhat greater than that of the moving platform 2″. Whether the passengers wish to go to the train from the landings 32, 32′ and 20 or whether they wish to approach said landings from the train, it is evident that there need be no sudden change of bodily movement so as to throw down a passenger, that is, the train could be safely filled with passengers or emptied, in a much shorter space of time than when the train must come to a stand-still and allow these passengers to go out from the end doors onto the stationary platform.

In Fig. 11, I have shown a railway track 47″ which may be such as placed on bridges between two cities. In such case, in order to facilitate the handling of passengers, large rotatable landings 19‴, polygonal or circular in shape, may be placed at the ends of the bridge. A train of cars, 53, while moving toward the left-hand end of the bridge as

viewed in Fig. 11, could automatically operate the rotatable landing 19''' so that the flat sides would be adjacent the respective cars and the passengers could enter or leave the cars while the train was in motion. In this case, there would be little if any relative movement between the rotatable landing and the train, and guard-rails 51 could be provided for directing passengers and preventing injury to them. At the right-hand end of Fig. 11, I have shown a rotatable landing 19 circular in shape, which may be constantly rotating at any desired speed, which may be less than that of the train or equal to the speed thereof. In any event, it should be rotated at a speed to enable passengers to safely enter or leave the train while the train is in motion, and it is evident that the train could have a greater speed with this arrangement than when the passengers would be required to gain an entrance to the train from a stationary landing and the train is in motion. Instead of the rotatable landing having the exact position shown in Fig. 11, at the right or left, such position may be varied as desired, as, for example, the landing may project a certain distance under the car bodies, so that while the train is at a curve there would not be such a large gap between the landing and the platforms of the cars. Of course, if open cars are used, this is not of such importance. In any event, movable auxiliary platforms could be automatically projected from the under side of the platform 19, to close up such gaps.

Having thus described my invention, what I claim and desire to have protected by Letters Patent of the United States is:

1. The combination of a longitudinally moving stairs, and a rotating landing.

2. The combination of a constantly and longitudinally moving carrier, and a single movable unit having varying rates of speed at different portions thereof and serving as an approach to said carrier.

3. The combination of a moving stairs, and an adjacent platform rotatable relatively thereto.

4. The combination of a moving carrier, and a single rotating landing in engagement therewith.

5. The combination of a moving carrier, and a single rotating landing having a peripheral speed substantially equal to the speed of said carrier.

6. The combination with a moving carrier, of a single rotating platform, and means for driving said platform.

7. The combination with a moving carrier, of a single movable platform, a stationary platform, and means for driving said movable platform to effect an acceleration of passengers from said stationary platform to said movable platform.

8. The combination with a moving stairs, of a rotating platform adjacent a landing thereof, and means for effecting the rotation of said platform.

9. The combination with a moving stairs, of a rotating platform adjacent a landing thereof and rotatable with respect thereto, and independent means for moving said platform.

10. The combination with a moving stairs, of a platform connected to one of its moving landings and rotatable relatively to the stairway, and a stationary landing.

11. The combination with a moving platform, of a rotating platform, and means for effecting a peripheral movement of said revolving platform substantially equal to that of the said moving platform.

12. The combination with a moving stairs, of a rotating platform, a stationary landing, and a stationary stairway.

13. The combination with a moving stairs, of a rotating platform for one or both of its moving landings, a stationary landing, and a spiral stairway.

14. The combination with a moving stairs, of a rotating platform adjacent a moving landing of said stairway, a stationary landing, a spiral stairway, and means for positively driving said revolving platform.

15. The combination with a moving carrier, of a revolving platform, and guard-rails above said platform.

16. The combination with a moving stairs, of a rotating annular platform adjacent one of the moving landings of said stairway, a central stationary landing, and a stationary stairway leading from said stationary landing.

17. The combination with a moving carrier, of an annular platform adjacent thereto, and a stationary landing leading from the central portion of said annular platform and over the same.

18. The combination with a moving carrier, of a revolving platform, and a series of segments connected to said platform.

19. The combination with a moving carrier, of a revolving platform, and a series of movable segments connected to the periphery of said platform.

20. The combination with a moving carrier, of a revolving platform, and segments connected to and having an oscillatory movement in the periphery of said platform.

21. The combination with a moving carrier, of a rotatable platform, and movable segments effecting continuous passage between the carrier and platform.

22. The combination with a moving carrier, of a revolving platform, and movable segments carried by said platform and moved thereby into engagement with said carrier to intermittently form continuations thereof.

23. The combination with a moving carrier, of a revolving platform, and movable segments to maintain closed the gap between said platform and said carrier.

24. The combination with a moving carrier, of a revolving platform, and segments carried by one of said parts.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

ERNEST L. GALE, SR.

Witnesses:

CHARLES M. NISSEN,

R. B. HAMILTON.