C. D. SEEBERGER.

CONVEYER.

APPLICATION FILED JAN. 11, 1905. RENEWED MAR. 17, 1910.

973,079.

Patented Oct. 18, 1910.

2 SHEETS—SHEET 1.

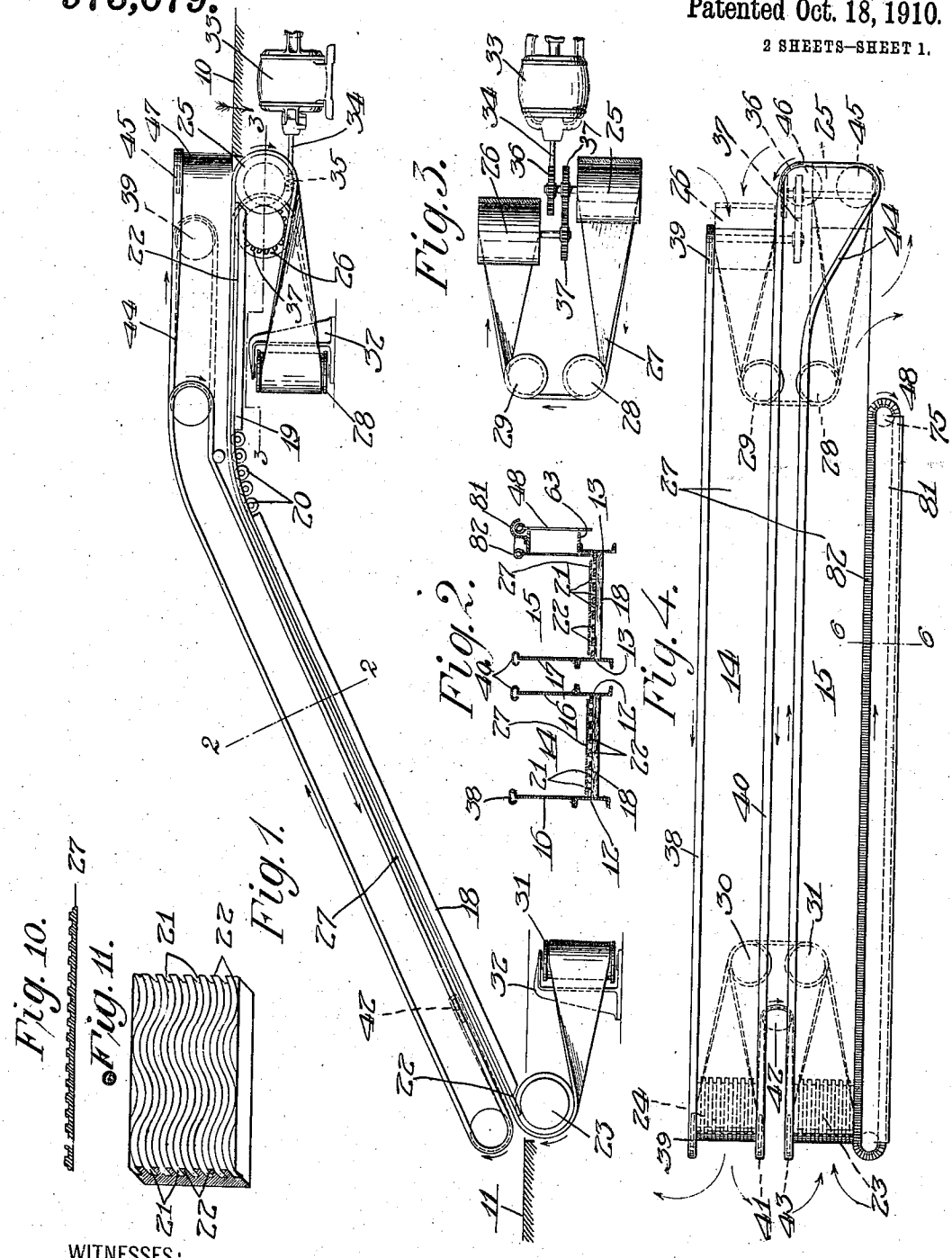

Fig. 1.

Fig. 3.

Fig. 2.

Fig. 4.

Fig. 10.

Fig. 11.

WITNESSES:

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2 SHEETS—SHEET 2.

Fig. 5.

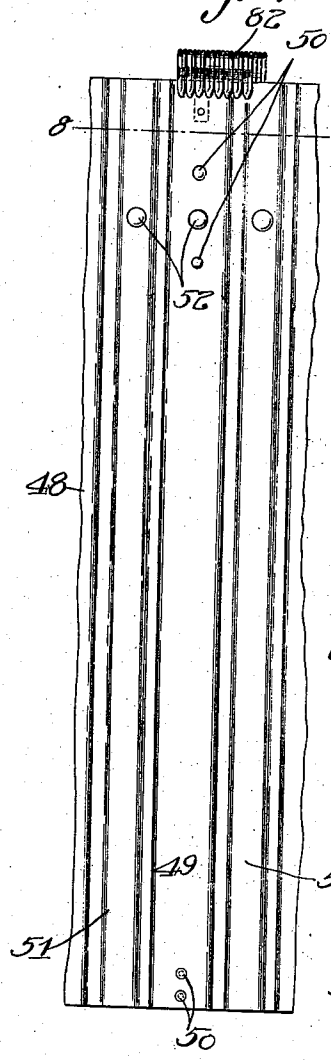


Fig. 6.

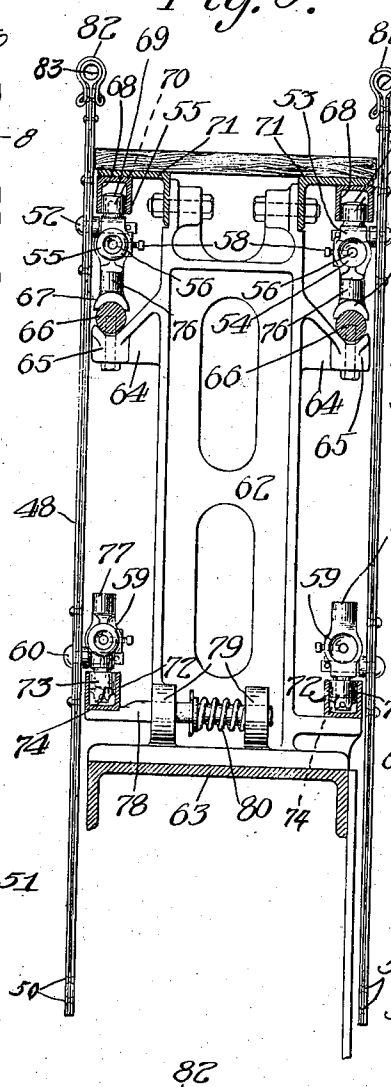


Fig. 7.

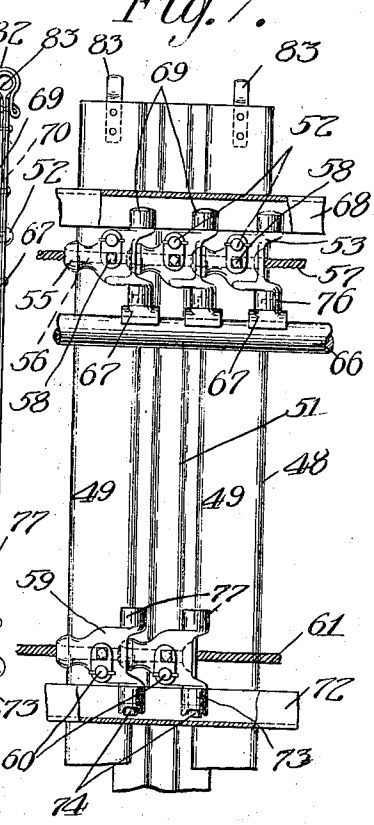


Fig. 8.

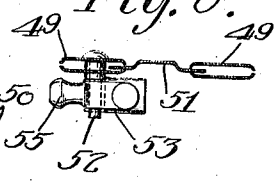
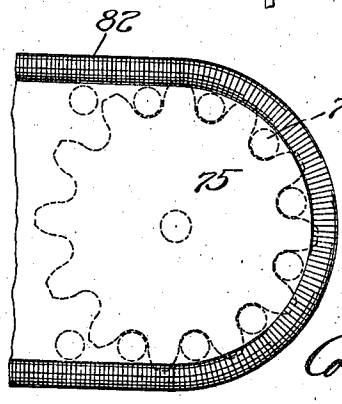


Fig. 9.



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CHARLES D. SEEBERGER, OF YONKERS, NEW YORK.

CONVEYER.

973,079. Specification of Letters Patent. Patented Oct. 18, 1910.

Application filed January 11, 1905, Serial No. 240,556. Renewed March 17, 1910. Serial No. 550,036.

To all whom it may concern:

Be it known that I, CHARLES D. SEEBERGER, a citizen of the United States, residing at Yonkers, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Conveyers, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention relates to an endless conveyer or carrier adapted to transport passengers or freight between different points, as from one level to another.

The features and objects of the invention will be apparent from the accompanying specification, and the invention consists of the combinations, organizations, and arrangements of parts hereinafter pointed out in the appended claims.

Referring to the accompanying drawings, which illustrate embodiments of the several features of the invention:—Figure 1 is a side elevation, diagrammatic in character, of a device exemplifying the invention; Fig. 2 is a section on the line 2—2 of Fig. 1; Fig. 3 is a section on the line 3—3 of Fig. 1 looking in the direction of the arrow; Fig. 4 is a plan view of the construction shown in Fig. 1, the driving motor being omitted; Fig. 5 is a side elevation on an enlarged scale of a fragment of a traveling balustrade that may be employed; Fig. 6 is a section on the line 6—6 of Fig. 4; Fig. 7 is a fragmentary view in elevation of the balustrade looking at the same from the inner side; Fig. 8 is a section on the line 8—8 of Fig. 5; Fig. 9 is a detail plan view of one end of the traveling balustrade; Fig. 10 is a detail sectional view of a corrugated carrying belt; and Fig. 11 is a detail perspective view of a form of grooved platform.

Referring to Fig. 1, the numerals 10 and 11 indicate, respectively, the upper and lower levels between which the goods or passengers are to be transported by the conveyer. In the present instance parallel frames 12 and 13, are mounted between the levels to support the conveyer; in the present embodiment the frame 12 is provided with a base for the descending run 14 and the frame 13 with a similar base for the ascending run 15 of the conveyer, as hereinafter described. The opposite sides of the frame 12 of the descending run 14 and the adjacent side of the frame 13 of the ascending run 15 are provided with balustrades 16 and 17, respectively, of any suitable construction. A platform 18 is secured in any suitable manner to each of the frames 12 and 13, being arranged at an incline and extending from the lower level to a point slightly below the plane of the upper level. At the upper end of each frame a horizontal platform 19 is located a suitable distance below the plane of the upper level 10. A series of transverse rollers 20 is located in the angle between the adjacent ends of the platforms 18 and 19. As shown in Fig. 1, the rollers 20 are so disposed that the upper faces thereof are in a curved line gradually deflecting the line of the upper surface of one platform of each frame into that of the associated platform, thereby avoiding an angle at this point. It is obvious that instead of employing the rollers 20, either one of the associated platforms 18 and 19 may be continued and gradually curved or deflected to the other or the platforms may be replaced by extending the series of rollers. The platforms 18 and 19 have their upper surfaces grooved longitudinally as at 21, as shown in Fig. 2, such grooves being provided in the present instance by longitudinal strips 22, which are preferably made of metal so as to reduce friction and wear. The grooves 21 are designed to contain a suitable lubricant for the purpose of reducing to a minimum the friction between the conveyer and the base, and the strips 22 of each associated inclined and horizontal platform bridge the space between such platforms, extending through suitable grooves in the rollers 20 and having their upper surfaces curved to conform to the curved line of the upper portions of the rollers. By means of the construction described the platforms 18 and 19, rollers 20 and strips 22 form a continuous base for the conveyer throughout its ascending and descending portions or runs, and in the present embodiment the structure provides parallel straightway runs.

Pulleys 23 and 24 are journaled on horizontal axes near the lower ends of the respective bases, and may be mounted in any suitable manner and are preferably grooved circumferentially, and the strips 22 of the inclined platforms 18 extend beyond the

lower ends of such platforms and into the grooves, as shown in Fig. 1. Transverse pulleys 25 and 26 are located at the upper ends of the respective bases just beyond the horizontal platforms 19.

An endless belt 27 is adapted to travel along the base of each frame. Referring more particularly to Fig. 4, this belt moves over the base of the frame of the ascending run 15 to the pulley 25 at the upper end of such frame and then makes a quarter turn and passes to a vertical idler 28 located under and near the upper end of the ascending run, thence to another vertical idler 29 under and near the upper end of the descending run and thence under and over the pulley 26 at the upper end of the descending run 14. A pair of vertical idlers 30 and 31 is located under and near the lower ends of the descending and ascending runs respectively, and the belt moving along the descending run passes over the pulley 24 at the lower end thereof and around the idlers 30 and 31 and to and over the pulley 23 at the lower end of the ascending run.

Any suitable form of belt may be employed, although I prefer to use a belt having a frictional tread or carrying surface; this may be provided in any suitable manner as by a series of projections or corrugations of any form, transverse, longitudinal, sinuous or oblique. In Fig. 10 I show a sectional view of a portion of a belt having transverse corrugations. The idlers serve to deflect the belt from one flight or run of the conveyer to the other so as to bring the friction surface uppermost on both ascending and descending runs without contacting with the tread surfaces.

The idlers may be suitably supported or journaled in bearings 32 and may be adjustably carried in any well known manner for the purpose of automatically tightening or taking up the slack of the belt. The lower ends of the flights or runs may be extended into horizontal movement or position to form horizontal landing portions with side landings as at the top.

The belt may be driven in any suitable manner, as by means of a motor 33 whose shaft 34 is provided with a worm 35 driving a gear 36 fixed on the shaft of the pulley 25, motion being communicated from such shaft to the shaft of the pulley 26 by companion gears 37 so that the said pulleys are driven in opposite directions and at the same speed.

When the conveyer is employed for transporting passengers it may be desirable to provide traveling hand-rails. In the present exemplification, the descending run of the conveyer is provided with traveling hand-rails, one of which on its descending stretch or portion is associated with the descending run of the conveyer while its ascending portion coöperates with the ascending run. In the present construction the outer balustrade 16 of the frame of the descending run is provided with a traveling hand-rail 38 of any suitable construction traveling over pulleys 39 located at the opposite ends of the descending run. Either of the said pulleys may be driven so as to move the upper stretch of the hand-rail in the same direction as the descending run of the conveyer and at the same speed; it is preferable to drive this hand-rail by its lower pulley as it would be possible for the passenger to hold it back and cause it to buckle if it were driven at the top. The hand-rail 40 is in the form of an endless band and is associated with the inner balustrade 16 of the descending run; it passes around a pulley 41 at the lower end of the run by which it preferably is driven, and is carried about an idler 42 located near the bottom of the incline, whence it passes to a pulley 43 at the lower end of the balustrade 17 at the inner side of the ascending run and then travels upwardly along the said balustrade. At the upper end of the ascending run the hand-rail 40 is deflected across the belt to form a shunt as at 44 to a horizontal pulley 45 located at the outer side of the ascending run, whence it passes to another horizontal pulley 46 at the adjacent side of the descending run, and continues along the inner balustrade 16 of the descending run back to the pulley 41. By reason of this construction a single traveling hand-rail provides a plurality of operating portions and serves for both runs of the conveyer, and also provides a shunt at the point of exit from one of the runs. If desired a suitable housing 47 may be provided at the end of the machine to inclose the pulleys. This hand-rail may be driven by any suitable means at the same speed as the associated conveyer, and preferably will be driven at the lower end of its descending stretch and at the upper end of its ascending stretch in order to prevent the passenger from holding it back.

It is obvious that the single hand-rail providing a plurality of operating stretches or portions may be associated with any form of duplex conveyer.

In the present embodiment of the invention the ascending run of the conveyer is provided at its outer side with a traveling balustrade 48. This balustrade is illustrated in detail in Figs. 5 to 9, inclusive, and consists of vertical panels adapted to move relatively to each other without allowing any gaps or spaces between the same. The panels 49 constituting the female members are composed of front and rear sections suitably connected by rivets 50 or other means and provided with intervening spacing strips as shown so that the edges are slightly sepa-

rated or spaced apart to receive the edges of the male panels 51. The panels may be of any suitable construction in this respect, such as shown for example in Fig. 8.

The panels are flexibly connected, each panel having near its upper end a rearwardly extending pin 52 upon which a traveler 53 is pivoted. Each traveler is provided on one side with a socket 54 and on its opposite side with a ball 55 adapted to the socket of an adjacent traveler. The travelers have alined openings 56 passing through the ball and socket connections and an endless cable 57 passes through such openings, the travelers being secured to the cable by suitable set-screws 58. Similar travelers 59 are pivotally connected to the panels below the travelers 53 by pins 60 and are similarly connected by a second cable 61. It is obvious that the cables are unnecessary as the ball and socket joints may afford proper connection.

A series of standards 62 are mounted on brackets 63 on the outer side of the frame of the ascending run 15, and each standard 62 is provided with opposite arms 64 having seats 65 in which are suitably secured parallel guides or tracks 66 for the oppositely moving stretches of the balustrade. The travelers 53 are provided at their lower ends with shoes 67 adapted to the guides 66, as clearly shown in Figs. 6 and 7. In order to properly guide and steady the traveling balustrade each standard is preferably provided at its upper end with parallel guides 68 consisting in the present instance of channel bars which receive anti-friction rollers 69 mounted upon suitable studs 70 at the upper ends of the travelers 53, as shown in Fig. 6. The guides 68 may be supported by angle-bars 71 suitably secured to the standards above the guides 66. The lower ends of the panels may be guided and steadied as by suitable parallel guides 72 located at the opposite sides of and supported by the standards near the lower ends, such guides, which may be in the form of channel bars, receiving anti-friction rollers 73 pivoted on studs projecting from the lower ends of the travelers 59.

The shoes 67 and rollers 69 and 73 are preferably removable in order to permit of renewal in case of wear.

The balustrade may be driven in any suitable manner, as by means of a suitable driving sprocket wheel 75 located either at the upper or lower end of the balustrade and engaging the travelers 53 which are provided with suitable stems or engaging surfaces 76 for this purpose. If desired, other sprockets may be provided and adapted to engage studs 77 at the upper ends of the lower travelers, and also the rollers on the upper and lower travelers. As indicated by the arrow in Fig. 1 the inner stretch of the traveling balustrade moves in the same direction as the ascending run of the conveyer, and is driven at the same speed as the conveyer.

In order to prevent the presence of a gap between the adjacent edge of the belt 27 and the inner stretch of the balustrade means are provided for holding the inner stretch of the balustrade in contact with the edge of the conveyer. To this end the inner lower guide 72 is preferably adjustable, being carried by brackets 78 each of which is slidably mounted in bearing lugs 79 on a standard 62 and provided with a spring 80 which reacts against one of the lugs so as to thrust the bracket outwardly. Inasmuch as the travelers 59 at the lower end of the ascending stretch of the balustrade engage the adjustable guide 72 the lower end of the balustrade is pressed outwardly toward and in contact with the belt.

By reason of the construction described the endless balustrade is firmly supported and guided and readily adapts itself to change in direction at the points where it is deflected from the inclined to the horizontal on the run and at the ends where the direction of the oppositely moving stretches is changed. The flexible connection between the balustrade panels permits of the independent vertical movement of the panels in passing from the inclined to the horizontal and the necessary movement edgewise at this point, without permitting the panels to separate at their edges. This flexible connection also enables the balustrades to make the proper deflection necessitated by the turns at the ends owing to the loose connection between the adjacent panels which allows the slight necessary rocking or flexing movement of the panels with relation to each other. Also, by reason of the construction described any tendency of the panels to wedge or bind is avoided.

As shown in Figs. 2 and 4 a guard 81 suitably carried by the standards 62 and extending substantially the length of the balustrade projects outwardly from the conveyer over the descending stretch of the balustrade, thereby preventing the hand of the passenger coming in contact with such stretch.

The traveling balustrade is provided with a suitable hand-rail 82 which may consist of a continuous wire coil. In the present instance this coil comprises a length of wire wound back and forth in rounded or arch-shape as shown in Figs. 5 and 6, being seated upon and suitably secured to buttons 83 secured to the upper ends of the panels. In the present instance these buttons are attached to alternate panels. This wire hand-rail provides a continual grip surface possessed of the flexibility requisite to permit of the change of direction when the balustrade passes from the incline to the

horizontal and makes the turns at the ends of the balustrade, while not straining the coil of which the hand-rail is composed. A hand-rail of the character described is particularly adaptable for use with conveyers in out of door situations where the conveyer is exposed to the weather.

While the traveling balustrade has been described as associated with a belt conveyer it is obvious that it may be employed with a conveyer of any other character; it is also obvious that a traveling balustrade of the character described may be located at either or both sides of a conveyer whether moving on an incline or in any other direction and that it may travel either upward or downward according as the conveyer ascends or descends.

Instead of employing a pair of vertical idlers to deflect the belt from one run to the other, as in the construction described, a single idler, or any other suitable means for accomplishing the same result, may be employed. I do not, therefore, limit myself to the details of construction described, as the invention may be variously modified without departing from the spirit thereof.

The platform may be provided with grooves in any suitable manner, and preferably they are curved or sinuous as shown in Fig. 11 as such grooves form a support for the belt under practically all points of application of the load.

Having described my invention what I claim is—

1. A conveyer comprising an endless belt providing runs in which the entrance of each run is adjacent the exit of another run, and idlers to present the same surface of the belt on all runs.

2. An endless belt providing parallel ascending and descending runs, and means to change the direction of movement of the belt while presenting the same surface thereof uppermost on the runs.

3. A conveyer comprising an endless belt having a corrugated surface and providing ascending and descending runs whose entrance and exit portions are respectively adjacent, and idlers over which the belt passes at the ends of the runs to present the corrugated surface uppermost on both runs.

4. A conveyer comprising an endless belt having its tread surface corrugated and providing parallel ascending and descending runs in which the entrance of each run is adjacent the exit of the other, and idlers engaged by the opposite surface of the belt and presenting the corrugated surface uppermost on both runs.

5. In a device of the class described, parallel supports arranged substantially side by side between different levels, a pulley at each end of each support, vertical idlers located adjacent the ends of each support, and an endless belt passing over the pulleys and around the idlers to provide ascending and descending runs.

6. In a device of the class described, parallel supports arranged substantially side by side between different levels, a pulley at each end of each support, a vertical idler located under and adjacent each end of the supports, and an endless belt passing over the pulleys and around the idlers to provide ascending and descending runs.

7. In a device of the class described, an endless belt providing oppositely moving runs, a horizontal pulley associated with each run, and means for driving the pulleys at the same speed and in opposite directions.

8. In a device of the class described, an endless belt providing oppositely moving runs, a horizontal pulley over which the belt travels and located at the end of each run, means for driving one of such pulleys, and gears connecting the pulleys whereby the latter are driven at the same speed and in opposite directions.

9. In a device of the class described, the combination with runs moving in different directions, of an endless hand-rail associated with the runs and having a portion moving in the same direction as each run and forming a shunt for one of them.

10. In a device of the class described, the combination with an endless conveyer providing a plurality of runs, of a moving hand-rail coöperating with the runs and forming a shunt for one of them.

11. A conveyer having ascending and descending runs, and a continuous hand-rail having a portion thereof associated with and moving in the same direction as each run and having a portion thereof forming a shunt for one of the runs.

12. A conveyer having ascending and descending runs, and a continuous hand-rail having a portion thereof associated with and moving in the same direction as each run and having a portion thereof crossing one of the runs.

13. In a conveyer having oppositely moving runs, pulleys located at one end of and at adjacent sides of the runs, a horizontal pulley located at the opposite end of the runs, and an endless hand-rail adapted to the pulleys and moving in the same direction as each run.

14. In a conveyer having oppositely moving runs, an endless hand-rail arranged on adjacent sides of the runs, and a horizontal pulley at the outer side of one run about which the hand-rail passes from one run to the other.

15. In combination with a conveyer having oppositely moving runs, an endless traveling hand-rail, pulleys located at one end of and at adjacent sides of the runs, an idler intermediate said pulleys by which the hand-

rail is reversed, and a pair of horizontal pulleys at the opposite ends and at corresponding sides of the runs around which the handrail passes.

16. In a device of the class described, a traveling balustrade consisting of male and female panels movable longitudinally and laterally independently of each other.

17. In a device of the class described, a traveling balustrade consisting of panels, travelers pivotally mounted on the panels and provided with ball and socket joints, and a flexible connection between the travelers.

18. In a device of the class described, a traveling balustrade consisting of panels, travelers pivotally mounted on the panels and provided with ball and socket joints having alined openings, and a cable passing through the openings and to which the travelers are secured.

19. In a device of the class described, a traveling balustrade composed of panels, travelers pivotally connected to the panels and having ball and socket joints, and a cable connecting the travelers.

20. In a device of the class described, a traveling balustrade provided with travelers pivoted thereon, a track, and shoes on the travelers adapted to the track.

21. In a device of the class described, a traveling balustrade consisting of overlapping panels, travelers pivoted on the panels and provided with removable shoes, a flexible connection between the travelers, and a track on which the shoes travel.

22. In a device of the class described, an endless traveling balustrade consisting of panels, travelers pivoted on the panels and loosely engaging each other and having upper rollers and lower shoes, a cable connecting the travelers, and a track and a channel bar to which the shoes and rollers are respectively adapted.

23. In a device of the class described, an endless traveling balustrade consisting of panels, upper and lower travelers pivotally mounted on the panels, cables connecting the travelers, and guides for the travelers.

24. In a device of the class described, a traveling balustrade composed of panels, travelers mounted near the ends of said panels, and standards provided with upper and lower guides for the travelers.

25. In a device of the class described, a traveling balustrade composed of overlapping panels, travelers mounted near the ends of said panels and provided with anti-friction rollers, shoes on one set of travelers, and standards provided with a track for the shoes and guides for the rollers.

26. In a device of the class described, an endless traveling balustrade consisting of panels, upper and lower travelers pivotally mounted on the panels, and the former of which are provided with shoes, cables connecting the travelers, standards having parallel guide tracks to which the shoes are adapted, upper and lower channel guides, and rollers on the upper and lower travelers engaging the respective channel guides.

27. In a device of the class described, an endless traveling balustrade provided with travelers having bearing surfaces, a track for the travelers, and a sprocket wheel engaging the bearing surfaces to drive the balustrade.

28. In a device of the class described, an endless traveling balustrade consisting of overlapping panels, travelers pivoted on the panels and having stems, a cable connecting the travelers, a track for the travelers, and a sprocket wheel engaging the stems to drive the balustrade.

29. In a device of the class described, an endless traveling balustrade consisting of panels, upper and lower travelers on the panels, stems on the upper travelers, shoes on the stems, a track for the shoes, a guide for the lower travelers, and a driving sprocket engaging the stems.

30. In a device of the class described, an endless traveling balustrade consisting of panels, upper and lower travelers on the panels, stems on the upper travelers, shoes on the stems, a track for the shoes, rollers on the travelers, guides for the rollers, and a driving sprocket engaging the stems.

31. In a device of the class described, an endless traveling balustrade consisting of panels, travelers pivoted on the panels and provided with upper rollers and lower shoes and stems, a cable connecting the travelers, guides to which the rollers and shoes respectively are adapted, and a sprocket wheel engaging the stems to drive the balustrade.

32. A traveling balustrade consisting of panels, a flexible connection therefor comprising travelers pivoted thereon and loosely engaging each other and a cable connecting the travelers, and a track to which the travelers are adapted.

33. In a device of the class described, a conveyer, a traveling balustrade located at the side of the conveyer, and means for holding the balustrade in contact with the conveyer.

34. In a device of the class described, a conveyer, a traveling balustrade provided with travelers, and a yielding guide to which the travelers are adapted.

35. In a device of the class described, a conveyer, a traveling balustrade consisting of panels provided with travelers, a flexible connection between the travelers, and a spring-pressed guide for the travelers.

36. In a device of the class described, a conveyer, an endless balustrade located at the side of the conveyer and having a portion traveling with the conveyer, travelers

connected to the balustrade, a standard having guides for the travelers, one of such guides being spring-controlled so as to press the said portion into contact with the conveyer.

37. In a device of the class described, a conveyer, an endless balustrade located at the side of the conveyer and having a portion thereof traveling in the same direction and at the same speed as the conveyer, travelers connected to the balustrade, a standard within the balustrade and having upper and lower guides for the travelers, a bracket carrying the lower guide, and a spring for moving the bracket toward the conveyer.

38. A traveling hand-rail consisting of a continuous wire coil.

39. A traveling hand-rail whose grip surface is a wire coil.

40. A traveling hand-rail whose grip surface is a wire coil open on the bottom.

41. A traveling balustrade provided with a hand-rail consisting of a wire coil.

42. A traveling balustrade consisting of panels flexibly connected together, and a hand-rail connected to the panels and made of a continuous wire coil.

43. A traveling balustrade consisting of panels flexibly connected together and provided with buttons, and a hand-rail consisting of a continuous wire coil attached to the buttons.

44. A conveyer comprising an endless flexible belt operating in opposite directions and presenting the same tread surface uppermost on both runs.

45. A conveyer providing a plurality of flights and comprising an endless belt having a frictional tread surface and means to deflect the belt from one flight to another without contact with the tread surface.

46. A conveyer providing a plurality of reversed flights and comprising an endless belt having a frictional tread surface presented on all flights and means for driving on the opposite side of the belt.

47. In a conveyer, a platform having curved grooves, and a belt moving over the platform.

48. A conveyer providing a plurality of runs and comprising an endless belt having a frictional tread surface, means for driving the belt, and a traveling hand-rail forming a shunt for a side landing.

49. In a conveyer having oppositely moving runs, pulleys located in parallel planes, a hand-rail moving over the pulleys, and means to deflect the rail from one pulley to another.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES D. SEEBERGER.

Witnesses:
W. H. BRADY,
W. H. LEMON.