Oct. 20, 1964 H. K. WIEDER 3,153,470

TREADPLATE CONSTRUCTION FOR MOVING SIDEWALKS

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FIG. 1

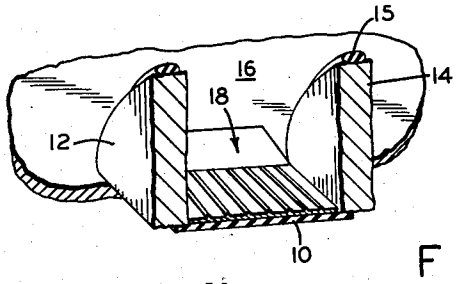


FIG. 6

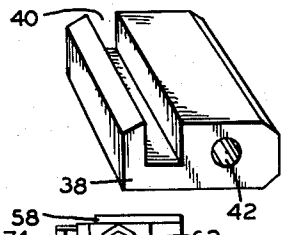


FIG. 2

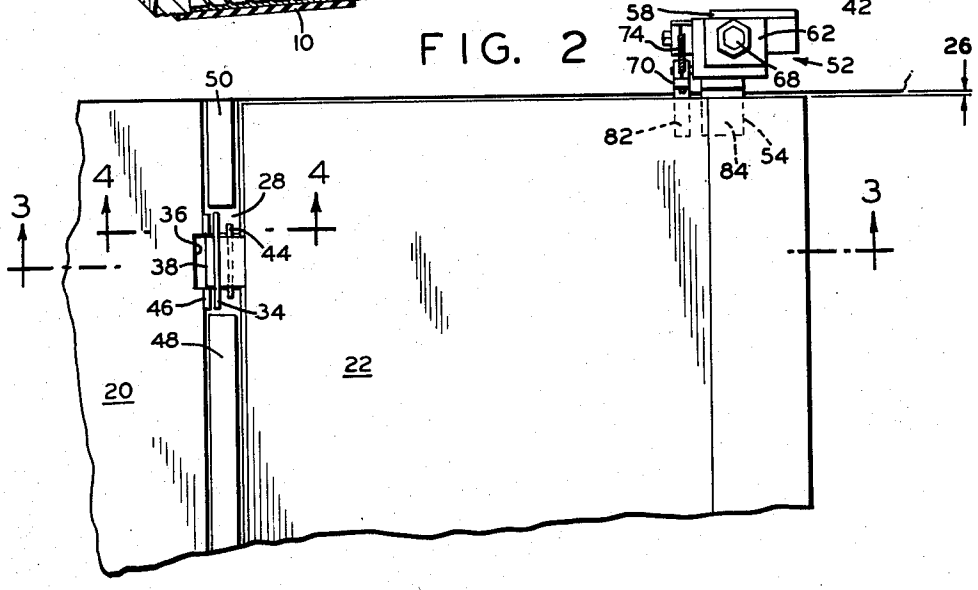


FIG. 3

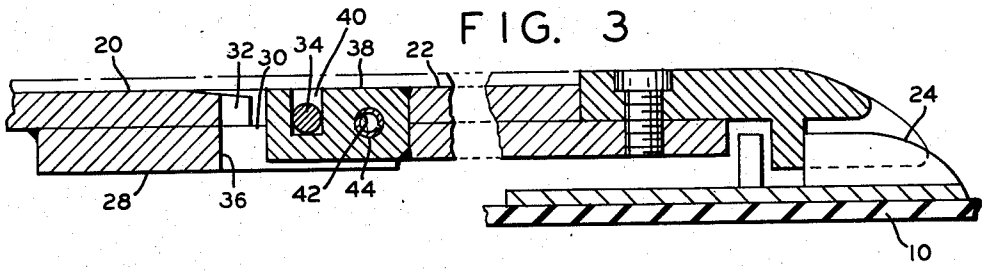
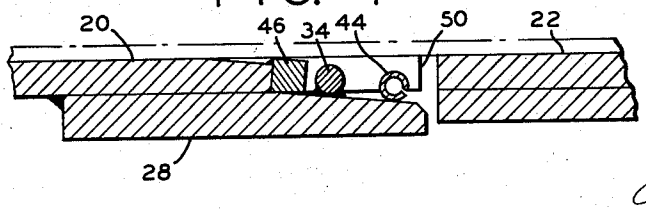


FIG. 4



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FIG. 8

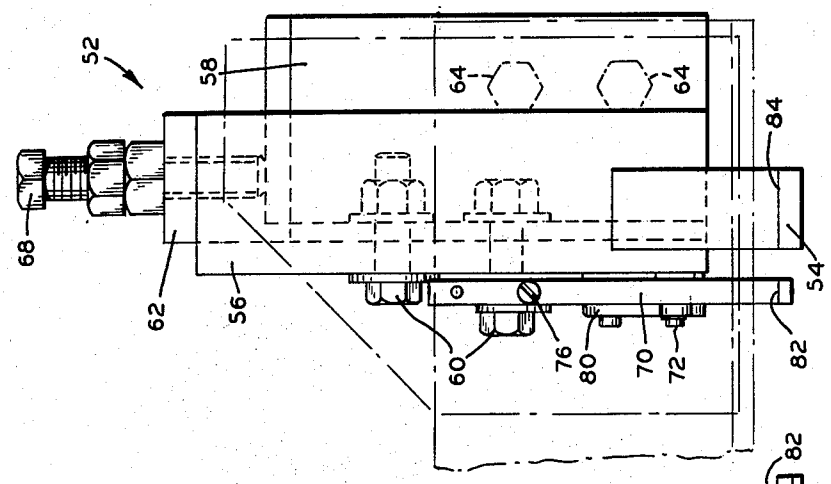


FIG. 7

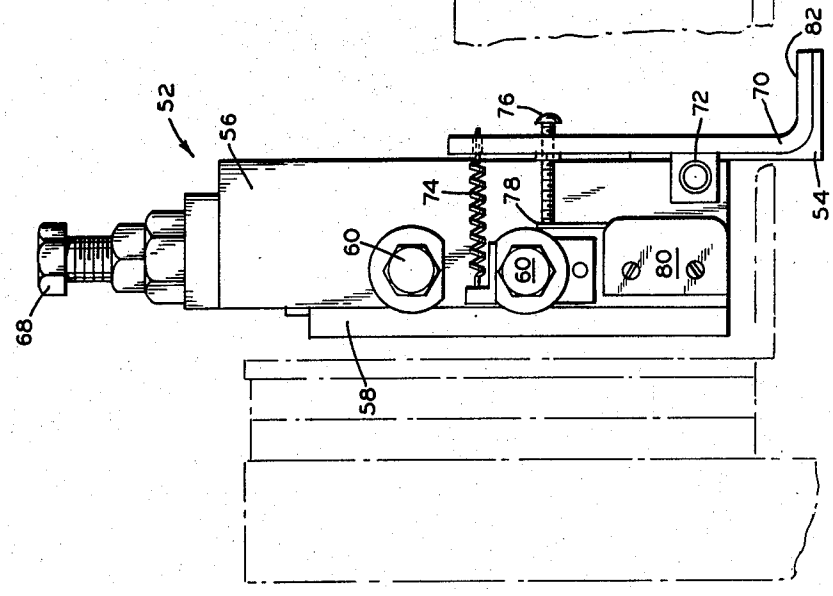
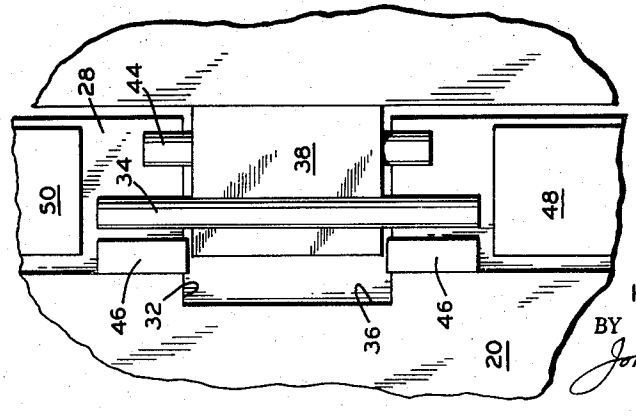


FIG. 5



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TREADPLATE CONSTRUCTION FOR MOVING SIDEWALKS

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FIG. 9

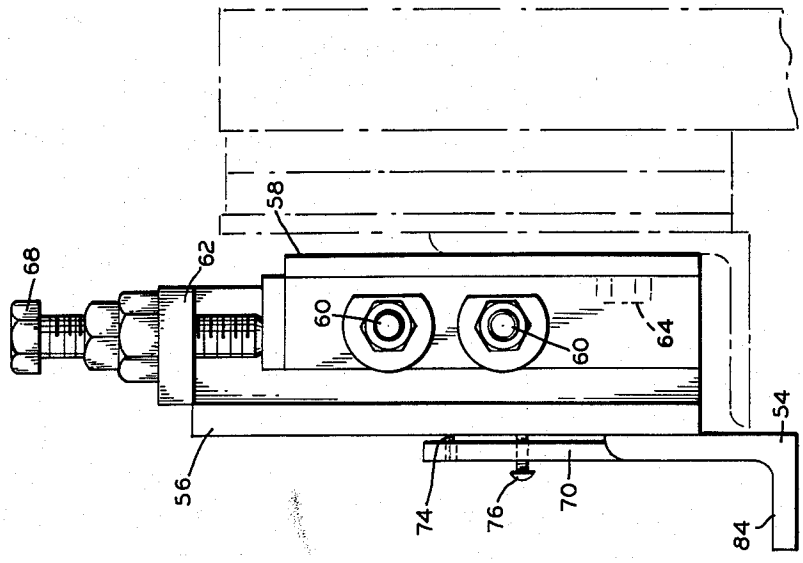


FIG. 10

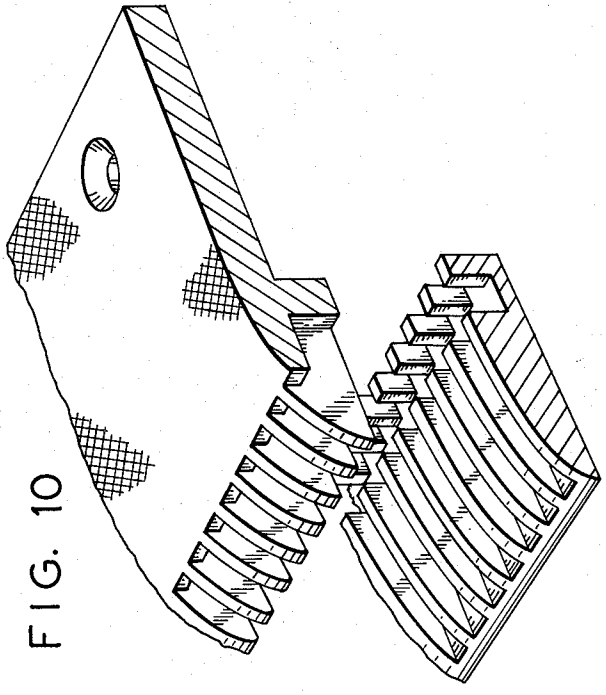
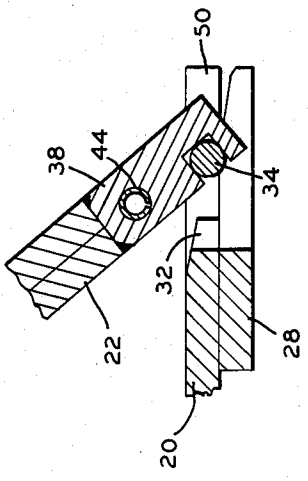


FIG. 11



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3,153,470

TREADPLATE CONSTRUCTION FOR MOVING SIDEWALKS

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3 Claims. (Cl. 198—16)

This invention relates to improvements in passenger carrying conveyors and in particular to a safety treadplate construction for passenger carrying conveyors having movable belts as the passenger supporting means. Conveyors of this type have come into use in recent years. Their purpose is similar to that of escalators; i.e., to transport people for varying distances, and they can be employed for vertical rises where the slope is not steep enough to require the familiar step forming escalators. Each portion of the belt, like the escalator step, eventually reaches the end of the run or walk and a step-off plate or tread plate means must be provided as in escalator devices.

According to the instant invention and in fulfillment of one object thereof, there is provided a safety tread plate or step-off plate construction which will automatically release any objects which may be caught between the treadplate and the moving belt. Further, the invention contemplates that the step-off plate structure will include means for automatically stopping the conveyor when an object becomes lodged between the treadplate and the belt. Another object of the invention is to provide a treadplate construction which will perform adequately the normal function of providing the step-off or landing for passengers who are riding on the conveyor.

A further object is to provide such a step-off or landing which will have a plate or comb device in contact with the belt in the usual manenr so as to skim or lift off from the belt most objects or materials that may have fallen thereon during the passage of the belt in the passenger carrying run.

Another object of the invention is to provide a treadplate assembly as set forth above which will be movable to release objects by relatively insignificant forces as compared to those normally applied by persons standing on the belt; i.e., by forces such as those applied by a package or garment lodged beneath the comb plate and the belt and being in frictional contact with the moving belt.

Yet another object of the invention is to provide a rigid, strong treadplate or step-off plate assembly which functions quite satisfactorily as the needed step-off is landing at the end of the conveyor, yet which is movable upon lodgement of foreign substances between the plate and the belt to automatically stop the conveyor.

Another object of the invention is to provide a treadplate assembly which has a relatively simple connection with the fixed structure and which will be fool-proof in operation. Still another object of the invention is to provide a treadplate assembly which will completely move out of contact with the fixed structure of the conveyor, both to provide means for access and to provide instant and complete release of any material caught between the treadplate assembly and the belt. Still another object of the invention is to provide a treadplate safety device which does not have obstructions on which clothing can be caught, which will not detract from the appearance of the conveyor, and which will not serve as a means for collection of dirt and other foreign material.

Another object is to provide a structure having a safety shut-off and release which can be easily tested at any time by attendants without the need for employment of high degrees of skills or complicated methods of testing.

These and other objects and advantages will become apparent from the following description and the accompanying drawings, wherein:

FIGURE 1 is a fragmentary perspective view of a sidewalk embodying a safety treadplate constructed according to the invention.

FIGURE 2 is a fragmentary top plan view.

FIGURE 3 is a sectional view taken along line 3—3 of FIGURE 2.

FIGURE 4 is a sectional view taken along line 4—4 of FIGURE 2.

FIGURE 5 is an enlarged fragmentary detail illustrating a rod, roll pin and stop block, together with a hinge block structure.

FIGURE 6 is a perspective view of a hinge block.

FIGURE 7 is a front elevation of a tread plate support.

FIGURE 8 is a side elevation.

FIGURE 9 is a rear elevation.

FIGURE 10 is a fragmentary perspective view showing a comb plate.

FIGURE 11 is a fragmentary, sectional, side elevation showing a different relative position for some of the elements than illustrated in FIGURE 3.

Referring now in particular to the drawing: The passenger carrying conveyor comprises a movable belt 10 and balustrades 12 and 14. The belt provides the moving surface which transports the passengers. The balustrades enclose the walk and support the moving handrails 15. The belt edges extend beneath the balustrades 12 and 14. A step-off or landing at the discharge end of the conveyor is so associated with the rigid flooring 16 and the belt 10 that the passengers can step off at a quite natural gait and without any large variations in elevations, etc. This is accomplished by a step-off plate structure 18. This structure is often referred to as a tread plate. According to the invention this comprises a fixed plate 20 and a movable extension 22. This extension comprises a plate-like member which can have a rib-top or otherwise have a frictional surface or design to reduce slipperiness. The movable extension, as illustrated in FIGURE 3, is designed to normally be substantially in alignment with the fixed section 20.

At its forward end the movable extension carrys a comb plate 24 which, in this instance, is of the type shown in FIGURE 10. Preferably the movable extension comprises a rigid member formed of a single piece, although it may obviously be formed of several pieces. As illustrated in FIGURE 2, a slight clearance 26 is provided between the sides of the extension and the balustrade. The fixed section 20 is provided with a hinge support plate 28. Plate 28 has recesses or cut-outs 30. It will also be noted that the fixed section 20 has cut-outs or recesses 32 aligned with the recesses 30 in plate 28. The hinge support plate 28 extends laterally beneath the edge of the fixed section 20. While only one set of recesses is shown, it will be obvious that two or more are used.

At each recess 30 there is a hinge pin 34 secured to support plates 28 and extending across each recess 30 in spaced relation to the rear wall 36 of the recess. The pins 34 cooperate with hinge blocks 38 which are secured to the rear edge of the movable extension 22 in such a manner as to project into the recesses 30. The hinge blocks have upwardly facing slots 40 which receive the adjacent hinge pins 34. The hinge blocks also have a laterally extending opening 42 in which there is fixedly mounted a roll pin 44. The roll pin projects outwardly to the sides of the hinge blocks. The geometry is such that the roll pins will rest on the hinge support plates 28 adjacent the recesses 30 and the hinge pins 34 which are fixed to the hinge support plates will be received within the openings 40 when the extension is in the position illustrated in FIGURES 2–5. This is the normal position of the extension 22 during operation of the walk. Filler blocks 46 are utilized to fill in some of what would otherwise be open space. Additional plates 48 and 50 are used

to fill in spaces above the hinge support plate in order to maintain step-off plate level between the hinges.

The hinge structure permits the plates 22 to be readily removed from association with the plate 20. This is accomplished by simply swinging the movable section 22 upwardly about the pins 34 to a point at which it can be removed by sliding the extension and associated hinge blocks forwardly out of contact with the pins 34. This is illustrated in FIGURE 11. The clearances between the belt and the hinge pins and blocks are such that the necessary movement to effect disengagement can readily be accomplished without interference with the belt.

At the forward end of extension 22, adjacent each side, there are provided tread plate support members 52. These support members comprise angles 54 secured to adjustment blocks 56. Adjustment blocks 56 are secured to attachment blocks 58 by means of bolts 60. Blocks 56 each have an upper lip 62 which extends over the attachment block 58. Attachment blocks 58 are attached rigidly to the balustrades by means of bolts 64. It will be apparent that the relative vertical position of the blocks 56 and thus the angle 54 can be adjusted by loosening of screws 60 and then the operation of the adjustment screw device 68.

A sensing lever 70 is pivotally mounted on the block 56 by means of a pin 72. Lever 70 is normally urged inwardly at its upper end, counter-clockwise about the pin as viewed in FIGURE 7, by a spring 74 which is secured to a fixed member on the block and to the upper end of the lever 70. The lever has an operating arm comprising the screw 76 which is adapted to bear against the operating lever 78 of a micro-switch 80. Screw 76 can be adjusted so as to effect a switch operation when a selected movement of the sensing lever has occurred. Thus, for example, the screw could be adjusted so that when the lever is in position illustrated in FIGURE 7 the slightest movement counter-clockwise will operate the lever 78 and the switch 80. Also it is apparent that the sensitivity of the latter switch 80 can be chosen for the desired sensitivity of the circuit of which it is part. The switch 80 is wired to the control circuit of the conveyor drive and conveyor braking system so as to effect instant disconnect of the conveyor drive and application of the braking system upon actuation of the switch 80. The conveyor system brakes and electrical circuitry and actuation means thereof are known in the art. The switch 80 is in parallel with the other stopping switches which are employed on such equipment. It is considered that it is unnecessary to illustrate the wiring in view of the obvious simplicity.

It is known that any break in a holding circuit of the usual controllers will effect the shut-off of the motors and the application of the braking means. It is preferred that the sensing lever have an inwardly projecting ledge 82 which is in horizontal alignment with the ledge 84 of the angle 54. Thus the forward end of the movable extension is in contact with and resists the movement of the sensing lever when the movable extension 22 is in its normal operative position i.e., when it is down as illustrated in FIGURE 3 and its forward edge is supported by the angle 54. It is apparent that upon movement of the movable extension upwardly the lever 78 will swing inwardly and operate the switch 80. Thus when an obstruction goes under the shoe 24 that is of sufficient size to raise the latter upwardly a predetermined amount it will result in the forward edge of the extension moving upwardly, and the stopping of the conveyor. The belt will continue to move until the conveyor is fully stopped. Should the material or object be of sufficient size it will continue to pivot the movable extension upwardly as it goes beneath it. The length of the extension is selected so that the conveyor will stop before an object mounted on the belt will be moved from the forward edge of the extension to the hinge section. Further, even if a large, bulky object should lodge under the plate, the plate will move readily upward to provide continued relatively free movement of the object with the belt until the conveyor stops. The extension 22 is maintained in its normal position by gravity. There is no attachment between it and the fixed part of the landing. Thus complete freedom of movement will not be lost due to corrosion of hinges or like causes. The extension simply rests on its support. However, it rests in such a manner that it will pivot initially about pins 44.

Testing of the safety stop mechanism; i.e., plate movement, switch activation and stopping of the conveyor can be done by simply manually raising the extension 22 as well as by forcefully wedging a tapered stick between the belt and shoe.

While I have shown and described a preferred form of my invention, it will be understood by those skilled in the art that many changes in details and forms may be made within the scope of the appended claims, and accordingly I claim an exclusive right to all which come within the scope of the appended claims.

I claim:

1. In a passenger conveyor, a step-off assembly comprising a relatively fixed member and a relatively movable member extending forwardly therefrom, means adjacent the forward end of said relatively movable member for providing vertical support of said member at the latter end on fixed conveyor structure, means adjacent the rearward end of said relatively movable member comprising a hinge adapted to provide vertical support for the latter member adjacent said rearward end of the latter member, said hinge comprising a first pin secured to the relatively fixed member, means forming an upwardly extending outwardly opening slot in said relatively movable member, said first pin being received in said slot, a second pin spaced longitudinally along said step-off assembly and freely received in said movable member and being supported on said fixed member, said second pin resisting vertical downward displacement of said relatively movable member relative the relatively fixed member adjacent said hinge, said first pin preventing vertical upward movement of said relatively movable member adjacent said hinge relative the fixed member, said pins providing for upward pivotal movement of said relatively movable member of said step-off assembly relative the relatively fixed member, said slot providing for disengagement of said relatively movable member from said relatively fixed member at a selected position of relative pivotal movement of said members.

2. The assembly of claim 1 wherein said pins are arranged such that upon upward pivotal movement of said movable member said movable member pivots about said first pin and said second pin moves upwardly away from said fixed member, said relatively movable member being pivoted upwardly with respect to said relatively fixed member about said first pin to a position such that said slot opens toward said fixed member and said relatively movable member can be detached from said relatively fixed member by movement of said relatively movable member in such a manner that said slot moves off said pin.

3. The assembly of claim 1 including a comb plate adjacent said forward end of said relatively movable member, said comb plate being adapted to cooperate with the passenger carrying surface of the conveyor.

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