

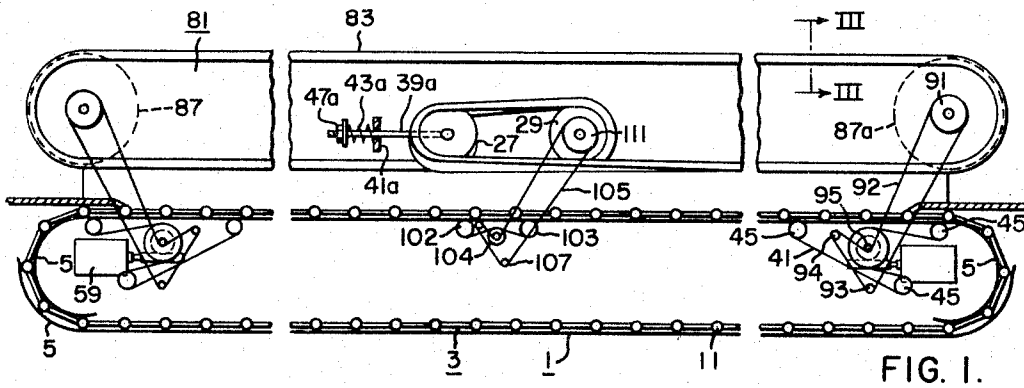
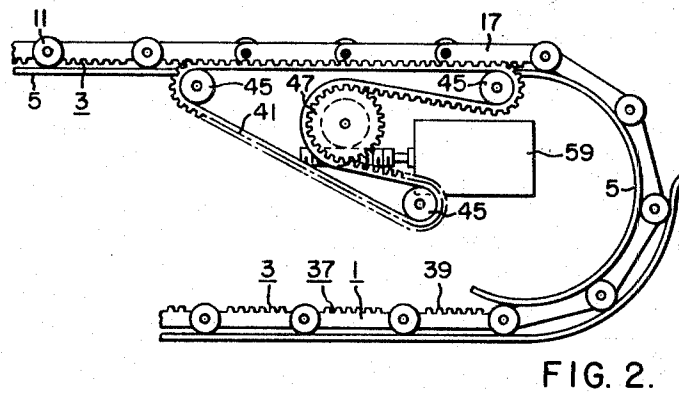
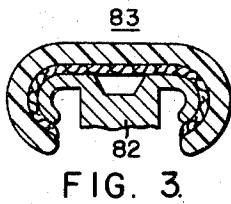
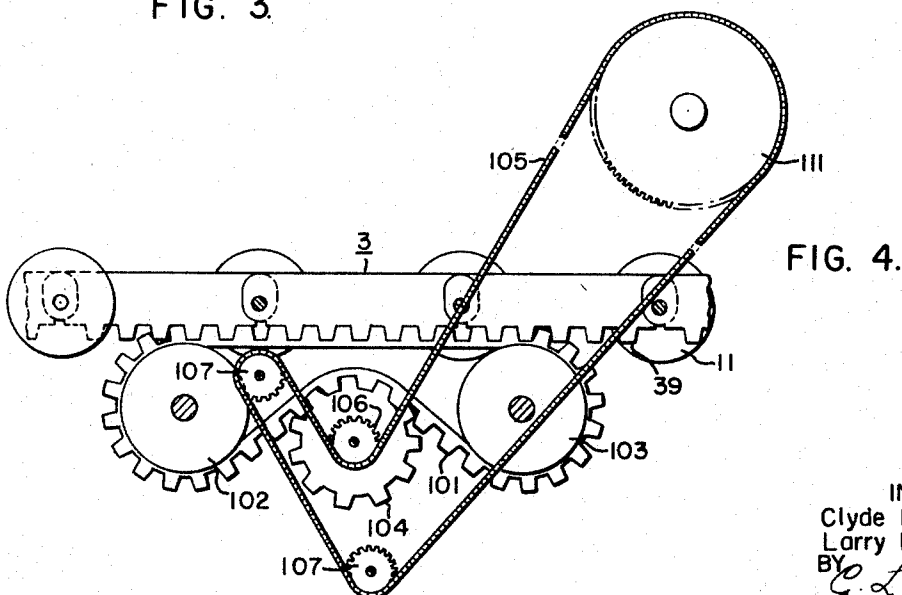
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C. M. MULLIS ET AL

3,321,060

PASSENGER CONVEYORS EMPLOYING HANDRAILS

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3,321,060 PASSENGER CONVEYORS EMPLOYING HANDRAILS

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2 Claims. (Cl. 198—16)

This invention relates to passenger conveyors employing handrails and has particular relation to arrangements for driving such handrails.

Although aspects of the invention are applicable to various passenger conveyors employing handrails such as moving stairways the invention is particularly suitable for moving walks. For this reason the invention will be described as applied to such walks. A moving walk of the type in which the invention desirably may be incorporated is shown in the Rissler et al. Patent 3,191,743 which issued June 29, 1965.

In a typical installation the handrail of a moving walk may be driven by suitable motor means at one or both of its ends. The present invention provides arrangements by which such a handrail may be driven at any desired number of points from the treadway of the moving walk.

One object of our invention is accordingly to provide an improved moving walk having a moving handrail which is provided at a plurality of points with means for driving the handrail in synchronism with the treadway of the moving walk.

Another object is to provide for driving the handrail of a moving walk with arrangements positioned at any desired number of points along its length.

Other objects of the invention will become evident to those skilled in the art upon reading the following description taken in connection with the drawings in which:

FIGURE 1 is a schematic elevational view of a moving walk provided with arrangements for driving a handrail at one or more points from the treadway of the moving walk;

FIG. 2 is a view, partly schematic, of one end drive for the treadway of the moving walk;

FIG. 3 is a view in section on the line III—III of FIG. 2 showing the handrail and a portion of its stationary guide; and

FIG. 4 is a view in elevation showing details of a handrail drive located at a point intermediate the ends of the moving walk in accordance with this invention.

Referring in detail to FIGS. 1 and 2 reference numeral 1 represents schematically the treadway of a moving walk constructed of pallets or platforms 3 hinged together and disposed to be moved along guides or tracks 5 supported by a suitable truss (not shown) all as more fully described in the above mentioned Rissler et al. patent. While FIG. 1 herein shows the treadway as horizontal it is to be understood that any desired portions of it may be slanted upward or downward by employing the construction shown in the Rissler et al. patent.

FIG. 2 herein shows details of one end drive for a treadway similar to that shown in FIG. 2 of the aforesaid Rissler et al. patent. The hinge pins between each pair of pallets or platforms 3 are provided with outwardly disposed rollers 11 which run on tracks 5 and guide the platforms 3 in the desired path. Each of the platforms 3 has a pair of side links 17 in the ends of which the rollers 11 are journaled. One edge of each link is provided with teeth 39 to form racks 37 which may be engaged by suitable flexible drive belts 41 having teeth on their surfaces. Each drive belt 41 is trained over three idler pulleys 45 and a toothed wheel or gear 47 which may

be journaled in the supporting structure for the moving walk. The toothed wheel or gear 47 is rotated by means of a worm wheel and a worm coupling on the shaft of a motor 59. As pointed out in the aforesaid Rissler et al. patent the motor 59 is energized to rotate the toothed wheel or gear 47 and this in turn meshes with the teeth of the belt 41. The teeth of the belt 41 in turn mesh with the teeth 39 of the racks 37 to produce treadway motion.

As well understood in the art a moving walk may be provided with one or more balustrades. Thus in FIG. 1 a balustrade 81 is disposed at the side of the load-trans-
porting run of the moving walk. Associated with this balustrade is an endless handrail 83 which is moved in
synchronism with the pallets or platforms 3 of the tread-
way in a manner well understood in the art.

The handrail 83 is shown in section in FIG. 3. The handrail is constructed of an elastomer which may have reinforcing material embedded therein and has a C-shaped cross section. A metal track 82 having a T-shaped cross section is attached to the upper border of the balustrade 81 for the purpose of guiding the handrail therealong.

At the respective ends of the moving walk 1 the hand-
rail 83 passes around newel wheels 87 and 87a and then
runs except for a takeup portion approximately parallel
to the treadway. The takeup portion of the handrail is
trained around a pair of pulleys 27 and 29. The pulley
27 is biased away from the pulley 29 by means of a bias
spring 43a which acts on a rod 39a. The spring acts be-
tween a portion 41a of the truss of the moving walk and
a nut 47a which is threaded on the rod 39a. The return
run of the handrail may be traced from the wheel 87
to the lower edge of the pulley 29, around half the cir-
cumference of the pulley 27 and finally to the wheel 87a. The
axis of the pulley 27 is tilted enough relative to the hori-
zontal so that the handrail 83 clears the pulley 29 in
passing from the pulley 27 to the wheel 87a.

The upper run of the handrail 83 is moved in the same
direction as the treadway by providing a sprocket wheel
91 which is secured to the shaft of the wheel for rotation
therewith. The sprocket wheel 91 is coupled to the
motor 59 through a sprocket chain 92 which runs over
idler pulleys 93 and 94 and a sprocket wheel 95 which
is mounted on the shaft of the toothed wheel 47. For
a relatively short moving walk a single motor 59 at only
one end of the moving walk may provide a sufficient
drive. For a longer moving walk a second motor 59
coupled to the treadway and to the wheel 87 in a similar
manner may be provided at the other end of the moving
walk.

For a very long moving walk one or more intermediate
drives for the handrail may be desirable. Such an in-
termediate drive may take the form illustrated in FIGS.
1 and 4. An endless toothed drive belt 101, which may
be of the same general type as the drive belt 41 in FIG. 2,
is trained over a pair of idler pulleys 102 and 103 and a
toothed wheel 104 which is journaled in the support truss
for the moving walk 1. The teeth of the belt 101 face
outwardly and mesh with the teeth of the toothed wheel
104. The teeth of the belt 101 also mesh with the teeth
39 on the pallets or platforms 3 directly above the belt.

The toothed wheel 104 is coupled to the handrail 83 in
any suitable manner. As shown in FIGS. 1 and 4 an en-
dless chain 105 is trained about a sprocket wheel 106 which
is mounted on the same shaft as the toothed wheel 104.
The chain also is trained around suitably positioned idler
sprocket wheels 107 and a sprocket wheel 111 which is
mounted on the same shaft with the pulley 29. In effect
the pulley 29 is coupled to the treadway for rotation in ac-
cordance with movement of the treadway. The parts are
so proportioned that such rotation of the pulley 111

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moves the handrail in synchronism with movement of the treadway.

While FIG. 1 shows only a single intermediate point handrail drive it is to be understood that any desired number of such drives may be provided.

We claim as our invention:

1. In a passenger conveyor having a moving treadway and a moving endless handrail, said moving treadway comprising a plurality of pallets hinged together to form an endless loop, each of said pallets having a rack extending in the direction of motion of the pallet, propulsion means for imparting movement to the handrail comprising a toothed endless flexible belt having teeth simultaneously meshing with plural teeth of at least one of the racks, a driven gear coupled to said flexible belt whereby said driven gear is operated in accordance with motion of the flexible belt, second means in driving relation to said handrail, and means for driving said second means from said driven gear, said propulsion means comprising pulley means having a pair of spaced pulleys located within said

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endless belt for guiding said belt with the teeth of said belt engaging at least one of the racks, said driven gear having teeth meshing with the teeth of the belt, said pulley means guiding said belt arcuately about the driven gear to effect simultaneously meshing engagement of a plurality of the teeth of the gear with teeth of the belt.

2. The arrangement described in claim 1 wherein said conveyor includes spaced means for reversing the direction of travel of the handrail, and take-up means comprising a pair of spaced pulleys located between the spaced means and guiding a portion of the handrail, said second means comprising one of said pulleys last named.

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