United States Patent [19]

Richterkessing

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[54] CONVEYOR RAIL

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[73] Assignee: **W. M. Cissell Manufacturing Company,** Louisville, Ky.

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[52] **U.S. Cl.**.....**198/181,** 211/1.5

[51] **Int. Cl.**.....**B65g 1/12,** A47f 3/08

[58] **Field of Search**.....198/177, 181, 129, 198/131; 211/1.5; 16/168, 169; 287/96

[56] **References Cited**

UNITED STATES PATENTS

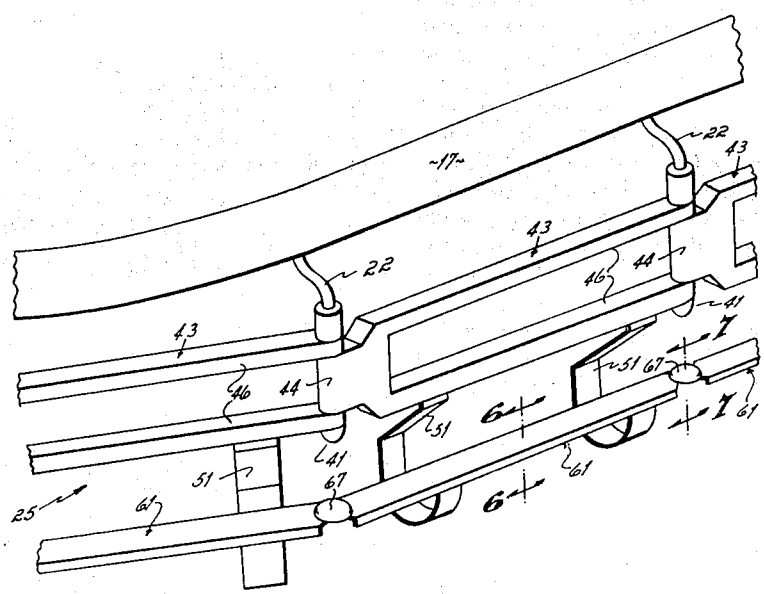
2,899,072 8/1959 Weiss.....198/181 X

Primary Examiner—Evon C. Blunk
Assistant Examiner—H. S. Lane
Attorney—James S. Hight et al.

[57] **ABSTRACT**

A garment conveyor rack having an endless garment hanger receiving conveyor which is power driven to move around curves or corners to form a closed path, the conveyor having an uninterrupted rail to allow free sliding movement of the garment hangers in either direction. The rail is constructed of straight metal sections which are pivotally linked together at structural joints formed by a slippery pivot pin having a curved raised head which operates as a camming surface to lift a sliding hanger a slight distance out of contact with the metal rail sections before the hanger reaches the end of the rail section so that the hanger will pass over the joints smoothly to permit continuous movement of the hangers along the rail. The joints are symmetrically shaped so that hangers can be moved with equal freedom in either direction along the rail. One of the surfaces of either the rail sections or the links is preferably split on both sides of the other of the surfaces to aid in a smooth transfer of a sliding hanger from one of the surfaces to the other.

7 Claims, 11 Drawing Figures



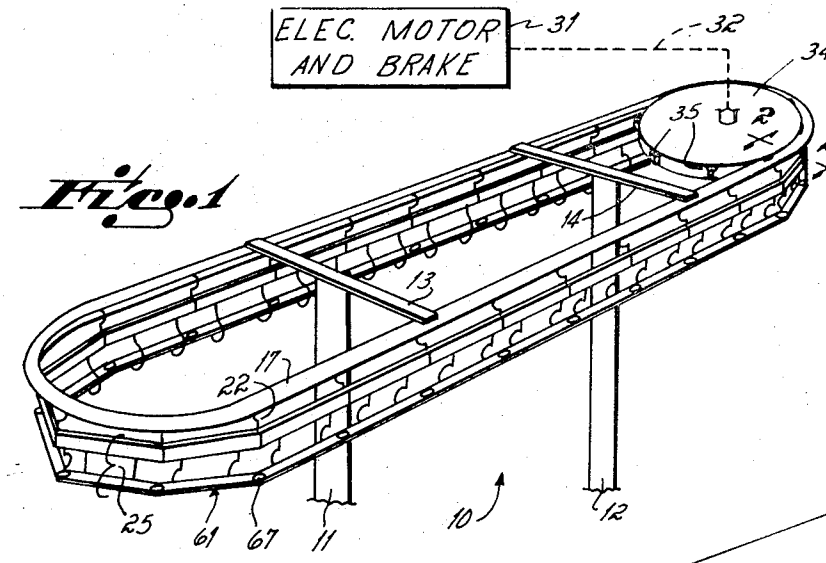


Fig. 1

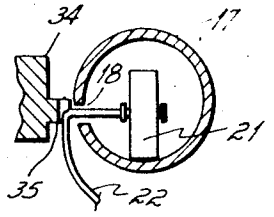


Fig. 2

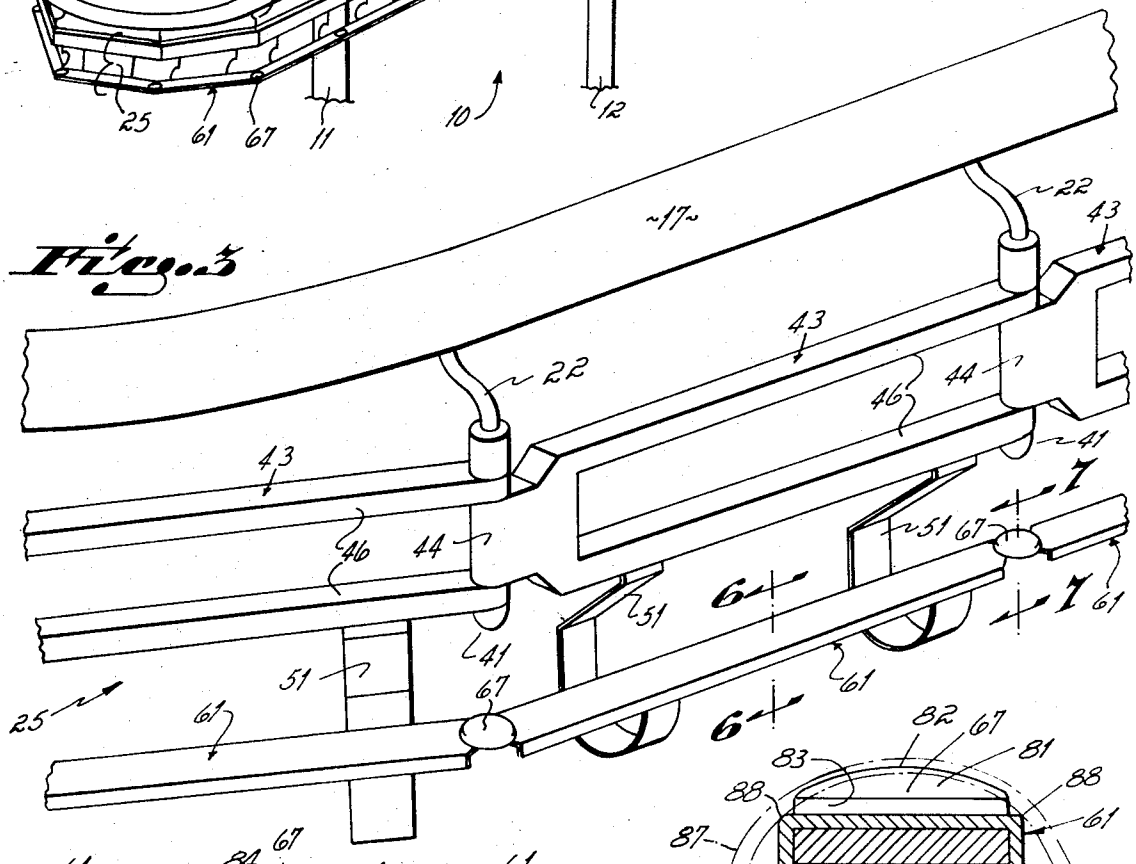


Fig. 3

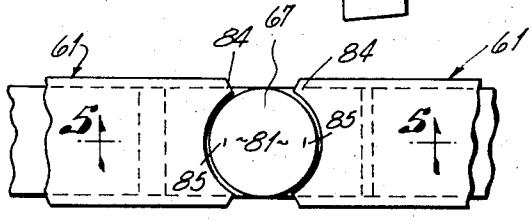


Fig. 4

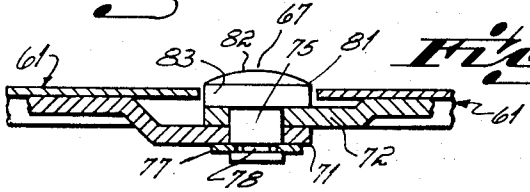


Fig. 5

Fig. 6

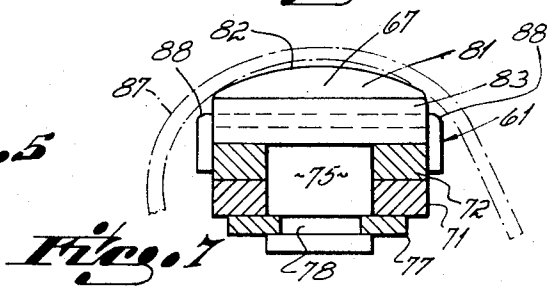


Fig. 7

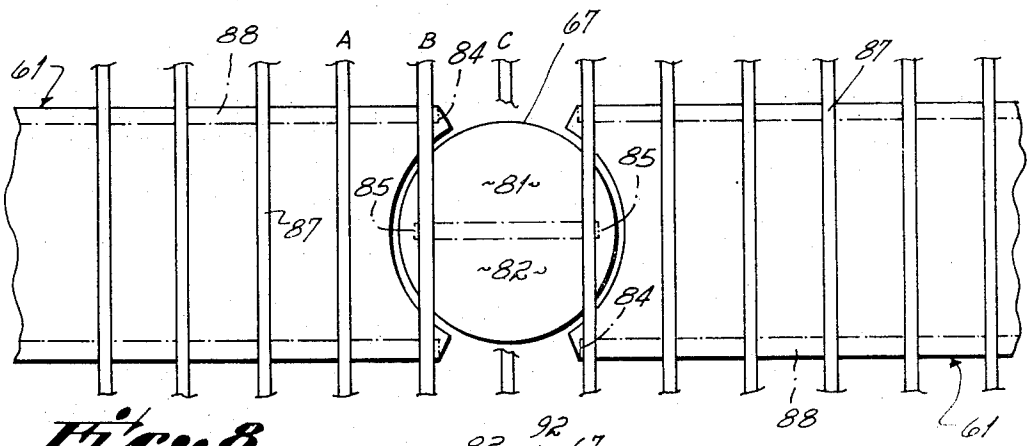


Fig. 8

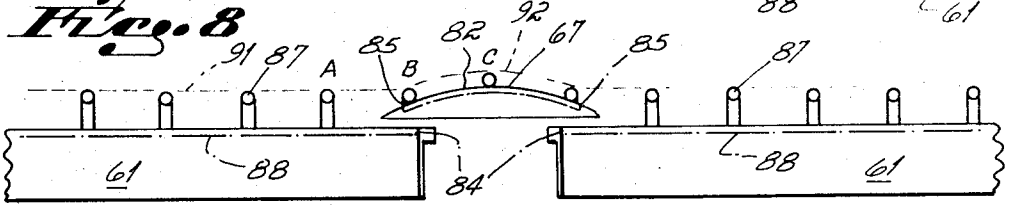


Fig. 9

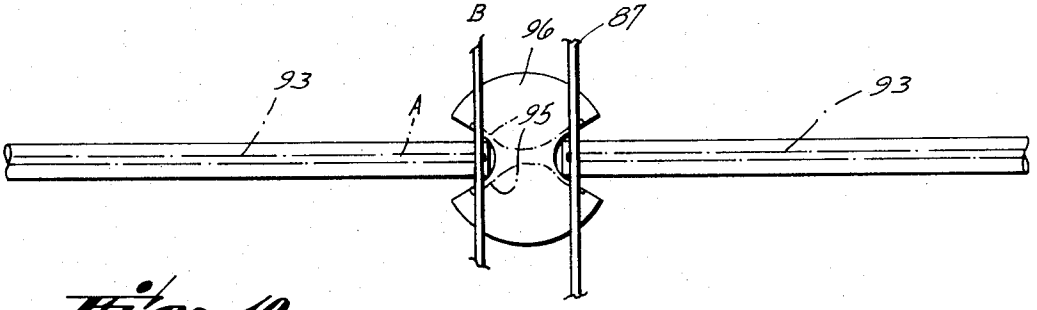


Fig. 10

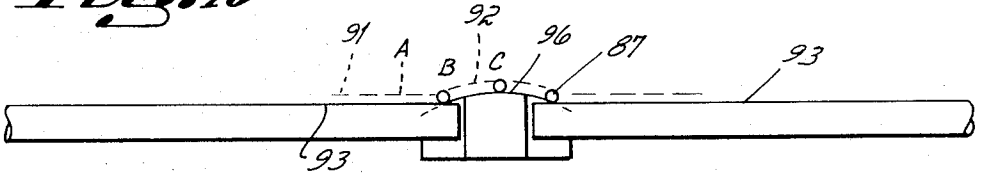


Fig. 11

CONVEYOR RAIL

The present invention relates to garment conveyor racks and more particularly to an endless conveyor therefor having an improved slide rail structure of the type formed by pivotally connected rail sections.

Power driven conveyors for transporting hanger supported garments have for some time been in widespread use in the dry cleaning services industry.

One common use of such conveyors in this industry is in the assistance of counter clerks in presenting the finished garments to customers. For this purpose, garments are arranged on the conveyor either numerically by order number or alphabetically by customer name. Selection of the proper garments is achieved by operation of the power drive means to index the conveyor to the proper position to present the garments of a particular customer adjacent a counter station.

Other uses of such conveyors in this industry is in the transporting of garments throughout a dry cleaning plant between various processing stages, such as, for example, from the cleaning machine area over to the pressing machine area and from the pressing machine area to the batching and bagging area where the garments are grouped by orders and covered with garment bags.

These conveyors usually comprise either a floor standing or ceiling mounted support to which is attached a trackway defining a closed path. From the trackway is supported an endless conveyor which is movable along the trackway under the influence of some form of power drive. The conveyor is provided with means which are adapted to support the hooks of garment hangers to carry the garments along the path.

Most of the conveyors of the prior art are provided with separate notches or hooks to receive and support the garment hangers. This structure is normally satisfactory when the positions of the garments placed upon the conveyors need not be changed. Frequently, however, it is highly desirable if not necessary to rearrange garments after they are placed upon the conveyor and to hang additional garments between others which may have been previously placed adjacent each other on the conveyor. Thus it may be necessary to move large numbers of garments either backward or forward on the conveyor and for this the hook or notch structure is quite inconvenient in that motion of garments thereon can only be achieved by manually removing the garments from a hook or notch and then returning the garments to a different hook or notch elsewhere on the conveyor.

To overcome this inconvenience, it has been proposed that rails be attached to the conveyors instead of hooks or notches so that the garments can slide forward or backward along the conveyor without having to remove and rehang the garments. Such a device is disclosed in Weiss U.S. Pat. No. 2,899,072.

The incorporation of a sliding rail into such a conveyor while solving one problem presents another. This problem arises from the fact that an endless conveyor traveling about a closed path must turn corners. To do this, the Weiss device uses a rail provided with plural straight link sections arranged end to end so that the rail may move around curves or corners along with the conveyor. But these link sections present at their junctures, discontinuities which interrupt the smooth gliding movement of hangers moving along the rails. To overcome this problem, the device disclosed in the Weiss patent employs overlapping rail sections which have the ends of the upper overlapping section of rail champered to present a smoother transition from one rail section on to the next.

The solution proposed by Weiss, however, still has certain disadvantages. First, the rail sections do not present a strong structural connection at the link between the sections, the sections being individually supported entirely by the conveyor structure and not interconnected at all. Second, the juncture of the links in the Weiss device lack symmetry which causes a difference in the sliding resistance between a hanger moving in one direction as opposed to the other. Third, the rail sections between the junctures are slightly inclined to accommodate for the thickness of the rail in their overlapping relationship.

It is the primary objectives of the present invention to provide an improved solution to the problem of incorporating a sliding rail into a movable garment conveyor which is made up of linked sections which must move around the corners of a closed path. It is more particularly an objective of the present invention to provide such a rail which will enable the smooth sliding of the hanger along the length of the rail, and more particularly, to provide such a feature in a rail which will permit sliding resistance to be the same in both directions. Other more particular objectives of the present invention are to provide such an improvement utilizing strong structural links between the sections, and present sections which have essentially a normally flat horizontal upper surface.

Accordingly, the present invention is predicted in part upon the concept of proving a plurality of rail sections joined end to end with a structural joint therebetween constructed so as to permit a smooth transfer of a sliding hanger across the discontinuities of the junctions between the joined rail sections. The present invention is further predicted in part upon the concept of providing a rail which is symmetrical about the joint assembly.

Specifically, the joints comprise pivot pins having convex camming surfaces on their tops which lift the hooks of sliding hangers off the rail sections before the hooks reach the rail section ends and release the hooks setting them onto the next rail section after they have passed the end of that section. The camming surface has a lower portion between the ends of the sections and a raised portion near the ends of the sections to cause this smooth transfer. Preferably, the rail sections are adapted to contact the hanger hook at two spaced points while the camming surface is positioned to contact the hook intermediate the spaced points. This provides a more stable hanger support for transfer across the junctures. Alternatively, this stability may be provided, if desired, by employing a single point of contact rail section and bifurcating the camming surface to contact the hanger hooks at two points on opposite sides of the rail section. The camming surface is preferably made of a slippery or smooth substance such as polished metal or a polymer such as nylon, teflon or polyethylene.

These and other objectives and advantages of the present invention will be more readily apparent from

the following detailed description of the drawings illustrating a continuous sliding rail in a movable garment conveyor involving principles of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. 1 is a perspective view of the top portion of a floor mounted garment conveyor rack embodying principles of the present invention;

FIG. 2 is a cross-sectional view along line 2—2 of FIG. 1;

FIG. 3 is a perspective view showing in more detail a portion of the rail of the conveyor rack of FIG. 1;

FIG. 4 is a top view of one of the pivotal joints in the rail of FIG. 3;

FIG. 5 is a cross-sectional view taken along line 5—5 of FIG. 4 showing the details of construction of the rail at the pivotal joints;

FIG. 6 is a cross-sectional view taken along line 6—6 of FIG. 3 showing a conventional hanger hook supported on the upper surface of a rail section;

FIG. 7 is a cross-sectional view taken along line 7—7 of FIG. 3 showing a garment hanger hook supported by the camming surface of a link pin at a rail section joint;

FIGS. 8 and 9 are top and elevational diagrams respectively illustrating the hanger contacting surfaces of a preferred embodiment of the present invention;

FIGS. 10 and 11 are diagrams similar to FIGS. 8 and 9 illustrating the hanger contacting surfaces of an alternative embodiment of the present invention.

According to FIG. 1, a conveyor rack 10 is shown having a pair of vertically upstanding supports 11 and 12. Attached to the tops of the supports 11 and 12 are a pair of lateral supports 13 and 14, respectively. Rigidly attached to the ends of the lateral supports 13 and 14 is a closed tubular track 17. The track 17 is in the form of a C-shaped tube having a slit 18 on the internal side there of as can be seen better with reference to FIG. 2. Within the track 17 are provided a plurality of rollers 21 each of which is mounted on the end of a hook 22 which serves as the shaft for the roller 21, and which extends from the tube through the slit 18 and descends vertically downward to support a conveyor assembly 25 (FIG. 1). The conveyor assembly 25 is movable with respect to the track 17 and is driven about the track by a motor and brake assembly 31. The assembly 31 has a mechanical connection 32 to the shaft of a cog wheel 34. The cog wheel 34 has a plurality of cogs 35 spaced about its circumference a distance equal to the spacing of the hooks 22 of the conveyor 25.

Referring to FIG. 3, the details of construction of the conveyor 25 are more clearly shown. The tubular track 17 has descending from it the hooks 22 as described above. The lower ends 41 of the hooks 22 form vertical pivot shafts to which are attached adjacent links 43 of the conveyor 25. The links 43 are fork-shaped having a central leg 44 with a hole therein which slips over the end 41 of the hook 22. The prongs 46 of the fork 43 extend about the leg 44 of the next adjacent link 43. These prongs 46 are also provided with holes therethrough which slips over the end 41 of hook 22 on opposite sides of the leg 44 of the adjacent link. Descending downwardly from the lowermost prong 46 of the fork 43 are a pair of hook members 51. These hook members are rigidly connected to rail link portions 61 from the undersurface thereof to hold the rail links 61 in an essentially horizontal orientation.

The adjacent links 61 are joined at their ends by a structural pivot pin 67. This pin 67 is preferably made of nylon or some other slippery or highly polished material which will allow easy sliding of a hanger along the upper surface of the rail.

FIGS. 4 and 5 more clearly show the construction of the link joints. As can be seen in these figures, the adjacent links 61 have attached to the undersides thereof link brackets 71 and 72 which are constructed so that they will lap over each other while maintaining the upper surface of the links 61 essentially aligned in the same horizontal plane. The link brackets 71 and 72 have aligned holes therein through which the shaft 75 of the link pins 67 may be inserted. The pin 67 has at the lower end of the shaft 75 an annular groove 78 into which a suitable snap ring or E-ring 77 is fitted, so as to retain the respective parts in the pivotal relationship described for FIGS. 5 and 7. However, it is to be understood that other retaining means can be employed, such as a cotter pin in a suitable cross drilling in the lower extremity of the shaft 75, or a retaining screw construction.

The upper surface of the pin 67, in the preferred embodiment, has a shallow dome shaped head 81 with a smooth convex upper surface 82. The surface 82 is shaped and positioned such that it operates as a camming surface to lift the hook of a sliding hanger from the rail 61. This surface 82 has rim 83 which is positioned low with respect to the rail section 61 so that it will not contact a hanger hook supported on the rail section. In the longitudinal rail direction, this presents a lowered camming surface portion intermediate the opposite ends 84 of each of the adjacent rail sections 61. The camming surface 82, however, has a raised portion at its center which will contact and support the hook of a hanger when the hanger is adjacent the rail section ends 84, and also when the hook is positioned on the rail sections at some point just adjacent and between the rail section ends 84 as represented by points 85.

FIG. 6 illustrates the relative positions of the rail sections 61, the camming surface 82 and a hanger hook 87 when a hanger is supported on the rail 61. In this embodiment the rail contacts the hook 87 at two points 88 which are the edges of the rail 61.

In FIG. 7 the hook 87 is shown supported by the camming surface 82 when the hook is at or between the points 85 on the pin 67. As shown, the hook 87 will be out of contact with the rail section edges 88.

The transfer of a hanger hook across the links of the rail is found to be better if at least one of the surfaces, the rail section 61 and the camming surface 82 makes a two point contact with the hook while the other makes a one point contact lying between the two contact points of the other. Two embodiments are described below, and of these the one in which the rail section form the two point contact is preferred.

The manner in which the smooth transfer of a sliding hanger across the joints occurs is shown in FIGS. 8 and 9 with respect to the preferred embodiment. Here the hanger hook 87 when supported by a rail section 61 is in contact with the rail edges 88 (position A). This contact is maintained when the hook 87 is at all points between the points 85 between the section ends 84, and

its path of travel as it slides between these points **85** on a rail section **61** is essentially horizontal as shown by line **91** (FIG. **9**). When the hook **87** is at a point **85** (position B), it is in contact with both the rail section edges **84** and the camming surface **82**, and as it approaches and passes the ends of the section **84** (position C), it is lifted over the rail edges **85** along the path shown by line **92**.

Similarly, in the alternative embodiment shown in FIGS. **10** and **11**, the same paths of travel **91** and **92** are followed by the hook **87**. In this embodiment, a single point of contact is maintained with the rail at its center **93** between the points **85** between its end **84**, while two contact points **95** are maintained by the split camming surface **96**.

The specific embodiments of the invention disclosed in detail above provide significant improvements over the prior art in overcoming the disadvantages of the prior art by providing a rail movable with a garment conveyor which permits smooth sliding movement of the hangers about a curved path and which also provides a sturdy structural assembly in doing so. The concepts of the present invention, whether employed in these or other forms, will generally provide these advantages.

Having described the invention, what is claimed is:

1. A garment conveyor rack comprising:

an endless conveyor movable about a closed path, said path including curved portions;

a support for movably supporting said conveyor;

a drive unit for moving said conveyor with respect to said support; and

a rail mounted to said conveyor for movement therewith, said rail being adapted to support the hooks of garment hangers for slidable movement with respect to said rail, said rail including:

a. a plurality of straight rail sections arranged end-to-end along said path, said sections each having an upper hanger contacting surface,

b. a plurality of pivot pins having upper and lower ends and each pivotally joining adjacent rail sections, and

c. the upper end of each of said pins having a convex camming surface thereon, said camming surface having a raised portion adjacent the ends of each of the joined rail sections and lowered portions adjacent some point between the opposite ends of each of the joined rail sections, so that a hanger is supported solely by said camming surface when in the region of a rail section end and is supported solely by said rail surface when in the regions of said points and so that a hanger will transfer smoothly from one of said surfaces to the other when sliding between said regions.

2. A garment conveyor rack according to claim **1** wherein:

said rail, in the neighborhoods of said pivotal joints, is symmetrical about transverse planes through said rail at the axes of said pins.

3. A garment conveyor rack according to claim **1** wherein:

the camming surface of each of said pins includes two parts spaced on opposite sides of said rail surfaces to provide a two point contact with a hanger when supported by a camming surface.

4. A garment conveyor rack according to claim **1** wherein:

the upper surface of each of said rack sections includes two parts spaced on opposite sides of said camming surfaces to provide a two point contact with a hanger when supported by a rail section surface.

5. A garment conveyor rack according to claim **4** wherein:

said rail sections each have a horizontal flat upper surface bordered by two straight hanger hook contacting edges.

6. A garment conveyor rack according to claim **1** wherein:

said camming surface is made of a slippery material.

7. A garment conveyor rack according to claim **6** wherein:

said slippery material is nylon.

* * * * *