This invention relates in general to improvements in the art of transporting objects in succession along a definite path, and relates more specifically to improvements in the construction and operation of mechanism for transferring successive packages such as cylindrical tin cans laterally from one conveyor onto another.

Generally defined, an object of the invention is to provide an improved transporting device especially for food laden cans, which is simple and compact in construction, and which is moreover highly efficient in actual use.

It is customary in the canning industry, to transport the successive food laden tin cans through a so called exhaust box comprising a series of substantially parallel conveyors for conducting the cans through an enclosure for a prolonged period of time and along an elongated course. Most of these prior exhaust boxes are undesirably large and bulky primarily because of the complicated and cumbersome mechanisms used for transferring the cans from one conveyor to another; and the prior devices are moreover quite objectionable because these transfer mechanisms frequently become inoperative and cause an accumulation of jammed cans within the enclosure, and also because the structures could not be readily and quickly adjusted to cooperate effectively with various sizes of cans.

The present invention therefore contemplates provision of an improved can transporting device especially applicable to exhaust boxes, for automatically and positively transferring the successive containers laterally from one conveyor and onto another.

Another specific object of the present invention is to provide an improved can transfer device which is readily adjustable so as to cooperate effectively with cans of various sizes and diameters.

Still another specific object of the invention is to provide an automatic can transfer mechanism which is adapted to cooperate with conveyors located closely adjacent each other, and which can be readily actuated by the same driving mechanism which propels the main conveyors.

An additional specific object of the invention is to provide improved transporting mechanism for a succession of objects such as cylindrical cans, which is positive and smooth in action, and which is adapted to reverse the direction of travel of open topped containers without spilling the contents.

A further specific object of the invention is to provide improved mechanism for reversing the direction of travel of successive cans, which occupies minimum space, and which may be manufactured and operated at minimum cost.

These and other specific objects and advantages will be apparent from the following detailed description.

A clear conception of one embodiment of the invention, and of the mode of constructing and of operating can transporting mechanism built in accordance with the present improvement, may be had by referring to the drawing accompanying and forming a part of this specification in which like reference characters designate the same or similar parts in the various views.

Fig. 1 is a somewhat diagrammatic partial plan view of an exhaust box having three conveying lanes for the cans, the enclosing cover having been removed;

Fig. 2 is an enlarged fragmentary plan view of one of the improved can transporting mechanisms, showing details of construction which are omitted from the smaller disclosure of Fig. 1;

Fig. 3 is a vertical section taken through the enlarged assemblage of Fig. 2, along the line 3—3; and

Fig. 4 is a transverse vertical section through the same assemblage, showing the transfer roller in action.

While the improvement has been shown here-in as being specifically applied to an exhaust box assemblage such as is commonly used in the canning industry, it is not the intent to unnecessarily restrict the scope by such specific embodiment, since some of the novel features may obviously be more generally applied.

Referring to the drawing, the exhaust box specifically illustrated comprises in general three parallel endless conveyors 5, 7, 8 having upper runs or stretches movable in substantially the same horizontal plane; driven and idler sprockets 9, 9' mounted upon front and rear drive shafts 10, 11 respectively and cooperable with the links of the conveyors 6, 7, 8 to propel the adjoining endless conveyors in opposite directions; horizontal can transfer rollers 12, 13 disposed between the adjacent ends of the conveyors 5, 7, 8; a counter shaft 14 for transmitting motion from the rear shaft 11 to the front shaft 10; combined spur and chain gearing 15, 16 drivingly connecting the rollers 12, 13 respectively with the counter shaft 14; and structure including outer walls 17, guides 18, and return bends 19 for partially enclosing the cylindrical cans 20 and for guiding the same along the transporting stretches of the conveyors 6, 7, 8 in succession.
The endless conveyors 6, 7, 8 are of well known construction, each comprising a series of pivotally connected carrier links the opposite lower edge portions of which are slidable along stationary guide rails 21, and the medial lower portions of which are positively engageable with the teeth of the sprockets 9, 9' so as to provide positive conveying drives, as shown in Figs. 3 and 4. The guide rails 21 are carried by underframing 22 which also supports the bearings for the shafts 16 and 24 and the driven sprockets 9 are keyed to, and thus positively driven by these shafts, whereas the idler sprockets 9' are freely rotatable about their carrier shafts, thereby providing for opposite driving of adjacent conveyors 6, 7, 8. The transfer rollers 12, 13 are journaled in bearings 23 also carried by the underframing 22, and the top portions of these rollers preferably project slightly above the plane of the top surfaces of the adjacent conveyors 6, 7, 8. One of these rollers 12, 13 is located adjacent to each of the return bends 19 in substantial alignment with the adjacent partition or guide 18, and the rollers and return bends normally cooperate to transfer the successive cans 20 from one conveyor to another around the end of the adjacent partition in a manner which will be hereinafter more specifically described.

While a fixed curvature at the return bends 19 will suffice for cans 20 of uniform and predetermined diameter, this curvature or the location of the guiding edge of the return bend relative to the conveyors 6, 7, 8 and to the adjacent roller 12, 13, should be varied when cans 20 of different diameter are to be transferred. The mechanism for transporting cans shown generally in Fig. 1, is adapted to cooperate most effectively only with one size of cans 20, for example #3 cans, but in Figs. 2, 3, and 4 is shown an adjustable attachment for converting to other sizes of cans such as #1 and #2 cans. This attachment comprises an adjustable guiding plate 24 having a curved guiding edge 25 and being provided with spaced slots 26, 28 which are adjustably cooperator with fixed clamping bolts 28, 29 respectively. The guiding plate 24 is preferably adjustably disposed within a slot or recess in the adjacent return bend 19 near the corresponding transfer roller 12, 13, and all of the plates 24 should be adjusted in like manner when a change is made. The plate 24 can be locked in any desired position of adjustment by wing nuts coaxing with the bolts 28, 29, and when the plate is disposed as illustrated in solid lines in Fig. 2, the guiding edge 25 thereof is ineffective and #3 cans can be most effectively transferred. The dot-and-dash line setting of the plate 24' is appropriate for #2 cans, whereas the setting of the plate 24'' is proper for #1 cans. In actual practice, the plate 24 is marked to indicate the proper settings thereof for different sizes of cans 20.

The driving mechanism for propelling the conveyors 6, 7, 8 and the transfer rollers 12, 13, may be actuated from any suitable source of power through a clutch 30 and gearing 31 as disclosed in Fig. 1, in which external walls 17, partition guides 18, and return bends 19 which are also supported upon the underframing 22, cooperate with a removable top 32 to provide a complete enclosure for the cans 20 while they are being transported through the exhaust box. The initial conveyer 6 has an inlet end 33 for initially admitting the successive cans 20 to the exhaust box; and the final conveyor 8 cooperates with fixed guides 34 and with a discharge disc 35 operable from the counter shaft 14, to deliver the treated cans 20 from the machine. While the exhaust box specifically illustrated, has only three conveyor lanes operating in series, there may be two or more of these lanes, and the successive cans may be conveyed therelone in either open or sealed condition.

During normal operation of the improved can transporting mechanism 9, and for a predetermined setting of the plates 24, the conveyors 6, 7, 8, the rollers 12, 13, and the disc 35 are driven through the clutch 30, and the successive cans 20 are admitted to the enclosure through the inlet end 33. The cans 20 admitted through the inlet end 33 are carried along the upper stretch of the initial conveyor 6 until they engage the first reverse bend 15, whereupon the curved edge of this bend engages each can 20 and causes the same to travel laterally across the conveying surface of the conveyor 6. The edge of the can upon striking the upwardly projecting transfer roller 12 is slightly elevated, and the can is drawn by this roller away from the transporting surface of the conveyor 6, and is ultimately delivered upon the transporting surface of the adjacent end of the intermediate conveyor 7. The revolving roller 12 continues to urge each can 20 thereacross and to gently deposit the can upon the conveyor 7, whereupon the container is conveyed through the central lane of the exhaust box. Upon reaching the opposite end of the conveyor 7, each can 20 is again transferred by the roller 13 onto the adjacent end of the discharge conveyor 8, and the successive cans are ultimately delivered from the opposite end of the conveyor 8 against the stationary guides 34 which transfer the containers to the discharge disc 35. In this manner, the successive cans 20 are positively, rapidly, and gently transferred from one conveyor 6, 7, 8 to the adjacent end of the other, without shock and without danger of damaging the containers.

It is apparent that the improved can transporting mechanism is extremely simple and compact in construction and is moreover highly efficient in operation. The simplicity of the mechanism precludes possibility of having the same become inoperative, and the compactness thereof permits production of an exhaust box occupying minimum space and having maximum capacity. The adjustable plate 24 permits ready conversion of the conveyor assembly for cooperation with various sizes of cans 20, without spilling the contents thereof in case the cans are open, and the rollers may be effectively driven from the main power source with the aid of gearing 15, 16 such as shown.

From the foregoing description it will be apparent that the improved can transferring mechanism is extremely simple and compact in construction and is moreover highly efficient in operation. The simplicity of the mechanism precludes possibility of having the same become inoperative, and the compactness thereof permits production of an exhaust box occupying minimum space and having maximum capacity. The adjustable plate 24 permits ready conversion of the conveyor assembly for cooperation with various sizes of cans 20, without spilling the contents thereof in case the cans are open, and the rollers may be effectively driven from the main power source with the aid of gearing 15, 16 such as shown.
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manufactured and operated at extremely moderate cost.

It should be understood that it is not desired to limit the present invention to the exact details of construction and to the precise mode of use herein shown and described, for various modifications within the scope of the claims may occur to persons skilled in the art.

I claim:

1. A transfer device, comprising, a pair of elongated conveyors having adjacent relatively movable portions, a gradually curved guide extending laterally from one of said conveyor portions over the other, and a roller rotatable about a substantially horizontal axis and disposed between said conveyor portions near said guide, the opposite ends of said guide being directed along the adjacent conveyors and the medial portion of said guide extending across said roller.

2. A transfer device, comprising, a pair of oppositely movable endless conveyors, a substantially semi-circular pivotally adjustable guide cooperable with cans of different diameters for transferring successive cans from one conveyor onto the other and for completely reversing the direction of travel of the cans, and a rotary roller disposed between said conveyors adjacent to said guide and cooperating with the latter to effect said transfer of the cans.

3. A can transfer, comprising, a pair of oppositely traveling laterally adjacent conveyors, a substantially semi-circular swingably adjustable guide cooperable with cans of different sizes for transferring successive cans from one conveyor onto the other and for completely reversing the direction of travel of the cans, and a positively rotated roller interposed between said conveyors at said guide and cooperating with the latter to transfer the cans over the adjacent conveyor edges.

4. A can transfer, comprising, a pair of elongated conveyors having adjacent oppositely movable portions, a guide having a substantially semi-circular guiding edge extending laterally from one of said conveyor portions over the other, and a roller rotatable about a substantially horizontal axis between said conveyor portions and beneath said guiding edge, the opposite ends of said guiding edge being directed along the adjacent conveyors and the medial portion of said edge extending across said roller axis.

5. A can transfer, comprising, a pair of oppositely traveling laterally adjacent conveyors, a guide having a substantially semi-circular guiding edge extending laterally from one side of one of said conveyors across both conveyors to the opposite side of the other, and a positively rotated roller interposed between said conveyors beneath said guide and cooperating with the latter to transfer successive objects over the adjacent conveyor edges.

FRANK D. CHAPMAN.