My invention is an improvement in distributing conveyors for containers such as bottles, cans, or the like. It is particularly adapted to the art of conveying cylindrical units, as milk bottles, from a single supply source to a plurality, as two, delivery destinations or stations, by distributing a single row or stream of such units by plural supply or delivery conveyors.

The invention has in view to accomplish such distribution automatically by means of a single, or substantially single, main conveyor and one or more laterally disposed branch conveyors communicating therewith, whereby a main conveyor extension and a lateral conveyor, are both operative to carry to two final delivery receiving stations portions only of the primary or initial supply row or stream, or by selected diversion, the full load to either of such stations.

The invention provides for distribution by and from a main conveyor to a plurality, as two, of delivery conveyors leading to corresponding receiving stations.

I accomplish these objects by so combining with the main conveyor one, or a plurality, of branch distributing or delivery conveyors, having junction relation with the main conveyor, with transfer assisting and guiding means effecting appropriate and desired selectivity of the units from the main row, for movement along either or both of the delivery paths.

In the construction of my invention I utilize main and supplemental conveyors of the general type of those disclosed in my prior Patents No. 2,103,107 and 2,108,522, but dispensing with the star wheels of the latter, or as shown in Patent No. 2,168,191.

The particular object in view is to provide, in connection with directing guide rails, supplemental adjustable guides adapted to direct or switch the units of a single oncoming column towards one or the other of a plurality, as two, delivery conveyors, one or both of which may be lateral of the main conveyor.

The present invention is an improvement on the construction of my said Patent No. 2,168,191.

In the drawings illustrating different embodiments of the invention, in somewhat diagrammatic form:

Fig. 1 is a plan view showing the junction with a longitudinal main conveyor, of a lateral conveyor, and controlling deflecting or switching means for both straight and lateral distribution, of maximum size units;

Fig. 2 is a vertical sectional view on the line II—II of Fig. 1;

Figs. 3 and 4 are fragmentary detail edge views of alternative forms of resilient deflecting arms;

Fig. 5 is a diagrammatic plan view of the main and lateral conveyors showing the main and switching sections adjusted for medium size units;

Fig. 6 is a similar view for minimum size units;

Fig. 7 is a central vertical section on the line VII—VII of Fig. 1 illustrating the adjustable dividing horn or switch point fender extended for minimum size units;

Fig. 8 is a plan view like Fig. 1 showing a modified construction;

Fig. 9 is a diagrammatic reduced size vertical section on the line IX—IX of Fig. 8;

Fig. 10 is a plan view of a modified construction of central dividing switch point;

Fig. 11 is a view of same in side elevation.

The drawings illustrate constructions which may be utilized for solution of the problem of distributing the normal output of a single element, as a washing machine, to a plurality of subsequent stations and operations, as in filling the bottles or containers.

In the construction of Fig. 1 I provide for continuous successive movement of all of the conveyed units of a main column from a main conveyor or trackway to an extension thereof or a diverging branch conveyor, or of a portion of the total units to each acting as a delivery conveyor.

In such arrangement the main conveyor of conventional form, consists of a continuous line of flat top conveyor flights 2 having the usual flexibly connected supporting links, carried and driven by standard sprockets 3 and power imparting means, not necessarily herein described.

A continuous extension of the main conveyor may deliver a controlled portion of the load, the other separately driven delivery conveyor B diverging laterally therefrom at the switching junction with the main conveyor, as hereinafter described.

The flights of both conveyors, running at any selected speed, are adapted to support bottles or other cylindrical units 4 along and through the several conveyors.

The lateral conveyor B, of similar conveyor flights 2, has its receiving end terminating as closely adjacent the side of the main conveyor as practicable, with an intervening bridge plate 4 of suitable construction, on a common level with both.

The main conveyor is defined between flanking
guide rails 5 at each side, extending sufficiently above the flights for maintaining the units in line of progress, with suitable clearance and free movement, and allowance for necessary slippage arising from incidental retardation.

Likewise the conveyor B has similar guide rails 5 in outer embracing and guiding relation to the units and at each side of the flights 3 thereof, as shown.

Extending inwardly from the main conveyor guides 5 of the feeding section toward the switching junction are a pair of laterally adjustable guide rails 6 flexibly connected to guides 5 by thin plates 7, for lateral adjustment. To the inner end portions of guides 6 are secured resilient guide bars 8 having deflected terminals 9 for imparting guiding assistance to units a in their approach towards the switching junction. The normal resilient tendency of bars 8 is backwardly towards rails 6, except as limited by adjusting temper screws 10 and 11, having lock nut 12 connection with the rails.

Each of compound guide rail members 6—8 and 6a—8a is provided with an adjusting plate or bar 13 secured by its flange 14 to the outer side of rail 6 and 6a, the plate 13 having a series of holes 15 for a holding pin 16.

Extending laterally from the conveyor framing 17 at each side of each conveyor section are supporting plates 18 provided with similar holes 19 suitably arranged and inwardly stepped to register with one selected hole 15 as plate 13 is adjusted inwardly, for pin engagement, to hold the guide rail members 6—8 and 6a—8a in desired position. By such means the conveyor widths, inwardly beyond hinge plates 7, may be successively narrowed to suitably accommodate units of varying reduced diameter, members 6—8 and 6a—8a being fixedly held at each such adjustment.

The outer guide rails 5 for the delivery sections are each provided with similar compound guide rail members 6a—8a and corresponding adjustment means, but oppositely disposed toward and at each outer side of the widened throat of the switching junction. As shown, the terminals 8a are substantially straight, for cooperation with terminals 9 for clearance and to assist in directing the units, especially when adjusted inwardly for the smaller sizes.

The inner guide rails 5a of the delivery conveyor sections converge towards a terminal 20 in the manner of a deflecting switch horn, confronting approaching unit movement, and operating in connection with the guide rail equipment, to normally deflect bottles to both the main and diverging trackways.

For maximum size units the location of terminal 20 is as shown in Fig. 1, but for smaller sizes, as in Figs. 5 and 6, I provide an extension attachment bar 21 having a dividing terminal edge 22 adapted to be extended further into the throat of the junction. Bar 21 is provided with plural sockets 23 (Fig. 7) each engageable with a cross bar 24 of guides 8a for proper adjustment longitudinally, and whereby the extension may be swung over backwardly to the inoperative position of Fig. 1. Otherwise the construction and operation, including means 15—18 for holding members 8 and 8a normally rigid, is the same as in Fig. 1.

As in Fig. 1, the bridge plate 4 intervenes between the main conveyor A and lateral conveyor B, on the same plane therewith, over which the units are progressed with certain frictional resistance, by oncoming units.

In the construction shown in Fig. 8 the main conveyor A terminates opposite or adjacent to the dividing throat, and movement of units a is continued therebeyond by an independent delivery conveyor A' with A'' with an intervening bridge plate 26, like plate 4.

Such section A may be driven from the terminal shaft of section A'A' by sprocket or other gearing as in Fig. 9, at the desired speed.

Figs. 3 and 4 illustrate modified constructions of engagement which may be also used with the resilient strips 8a, as by inwardly extending abutments 25 a or spring arms 25 b. Such an abutment or spring arm, by extending slightly inwardly from the resilient guide bars 8a tends to partially retard or check movement of individual units along either delivery trackway beyond the junction.

By the construction shown it will be seen that cylindrical units, such as milk bottles, may be progressively advanced by the main conveyor towards the dividing switch throat, and there deflected as subject to various conditions existing in operation, as for instance temporary delay in either delivery section.

Assuming each delivery conveyor is freely receiving any 50% of the load of the main conveyor, bottles will be delivered alternately and proportionally to each. With the guides set as adjusted in Fig. 1 the initial bottle will be directed from the main conveyor laterally towards conveyor B but with its major portion or base area inside of horn terminal 20, being deflected thereby, camming the bottle back onto the main conveyor extension, as pushed forwardly by the next rearmost bottle.

Assuming the next bottle is cammed over to the right by the preceding one and has passed onto bridge plate 4 of lateral conveyor B, the next oncoming bottle, being for the most part carried by the main conveyor, will be deflected over towards the delivery section of the main conveyor by resistance against such second bottle, which is frictionally retarded by bridge plate 4, and by such resistance passing around the opposite left hand resilient terminal to the straight line continuation of the main conveyor.

The next following bottle will then follow the alternative course towards section B, and so on, as long as bottles are normally delivered by the first main conveyor section, without stoppage from any cause, such as temporary accumulation or other delayed progress. In case of stoppage of either delivery section, all bottles will be received by the other, until any congestion is relieved.

If however either delivery conveyor is thus interrupted so as to arrest or slow up the movement of the rearmost one of either delivering column, then all bottles will pass continuously to the other conveyor so long as it is freely receptive of the main load.

It will be understood that such action is largely dependent on the presence of a major portion of horn terminal in connection with the independent adjustment of the resilient guides 8 and 8a with relation to their relatively stationary supporting guide bars 6.

Thus by screw 10 the guides 8 and 8a may be accurately set inwardly as desired, with their terminals free to move backwardly by bottle pressure, limited only in ultimate movement by the adjustable abutment screws 11.
The positive adjustment of the rigid bars 6 by the means described provides for setting the resilient arms inwardly to successive positions, forming conformably narrower guiding and deflecting passages for the smaller diameter size units.

Such adjusted positions are illustrated somewhat diagrammatically in Figs. 5 and 6, the resilient guides effecting the switching in the same manner as with the large size units, in connection with the conformably advanced or receded terminal of the switching horn, for any particular size of unit under the maximum size.

I show in Figs. 10 and 11 a modified construction of the dividing switch for advancing or receding the terminal edge 22a by longitudinal instead of swinging adjustment. In such case the main bar 21a is comparatively short and is slidably mounted between the converging terminals 27 of guide bars 5a. These are firmly connected and braced apart by cross plates 28 and 29, and plate 28 is provided with a series of holes 19 for selective insertion of pin 16a through one of holes 15a of an adjusting plate 13a, as before described.

Such plate 13a is rigidly connected with the sliding plate 21a and with a lower cross plate 30 which slidably engages the lower edges of bars 5a and assists in maintaining the central switch point in its varying adjusted positions.

I claim:

1. In combination, a main actively propelling conveyer having communicating junction with a branch actively propelling conveyer, both providing a pair of diverging distributing trackways beyond said junction, a middle deflecting switch point, a bridge plate between the main and branch conveyers, flanking guides for directing and maintaining units in transfer along said trackways having flexibly connected rigid extensions provided with inner resilient guide rails, said extensions and their resilient rails being adjustable laterally of the trackways.

2. In combination, a main actively propelling conveyer having communicating junction with a branch actively propelling conveyer, both providing a pair of diverging distributing trackways beyond said junction, a middle deflecting switch point, a unit supporting and arresting bridge plate between the main and branch conveyers, flanking guides for directing and maintaining units in transfer along said trackways having flexibly connected rigid extensions provided with inner resilient guide rails, adjusting means for the resilient guide rails mounted on the extensions, and means for holding the extensions in varying fixed positions laterally of the trackways.

3. In combination, a main actively propelling conveyer having communicating junction with a branch actively propelling conveyer, both providing a pair of diverging distributing trackways beyond said junction, a middle deflecting switch point, a unit supporting and arresting bridge plate between the main and branch conveyers, flanking guides for directing and maintaining units in transfer along said trackways having flexibly connected rigid extensions provided with inner resilient guide rails, adjusting means for the resilient guide rails mounted on the extensions, and means for holding the extensions in varying fixed positions laterally of the trackways.

4. In combination, a main conveyer having communicating junction with a branch conveyer, both providing a pair of diverging distributing trackways beyond said junction, said pair of diverging distributing trackways each having an outer guide rail provided with a flexibly connected rigid extension, means for holding it in adjusted position together with an inner resilient guide bar, means on the rigid extension for adjusting the resilient bar, each of said trackways having an inner guide rail converging towards the other and forming a terminal switch point, the main conveyer having at each side adjacent the junction fixed guide rails each having a flexibly connected laterally adjustable rigid guide rail extension, means for holding each of said guide rail extensions in adjusted position, a resilient guide bar adjustably secured on the inner side of each guide rail extension and having a deflected terminal, and means on each guide rail extension for adjusting its resilient guide bar.

5. In combination, a main conveyer having communicating junction with a branch conveyer, both providing a pair of diverging distributing trackways beyond said junction, said pair of diverging distributing trackways each having an outer guide rail provided with a flexibly connected rigid extension, means for holding it in adjusted position together with an inner resilient guide bar, means on the rigid extension for adjusting the resilient bar, each of said trackways having an inner guide rail converging towards the other and forming a terminal switch point, said switch point having a middle opening and a longitudinal extension bar engageable with said opening providing for elongation beyond said switch point, the main conveyer having at each side fixed guide rails each having a flexibly connected laterally adjustable rigid guide rail extension, means for holding each of said guide rail extensions in adjusted position, a resilient guide bar adjustably secured on the inner side of each guide rail extension and having a deflected terminal, and means on each guide rail extension for adjusting its resilient guide bar.

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