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BOTTLE CONVEYER

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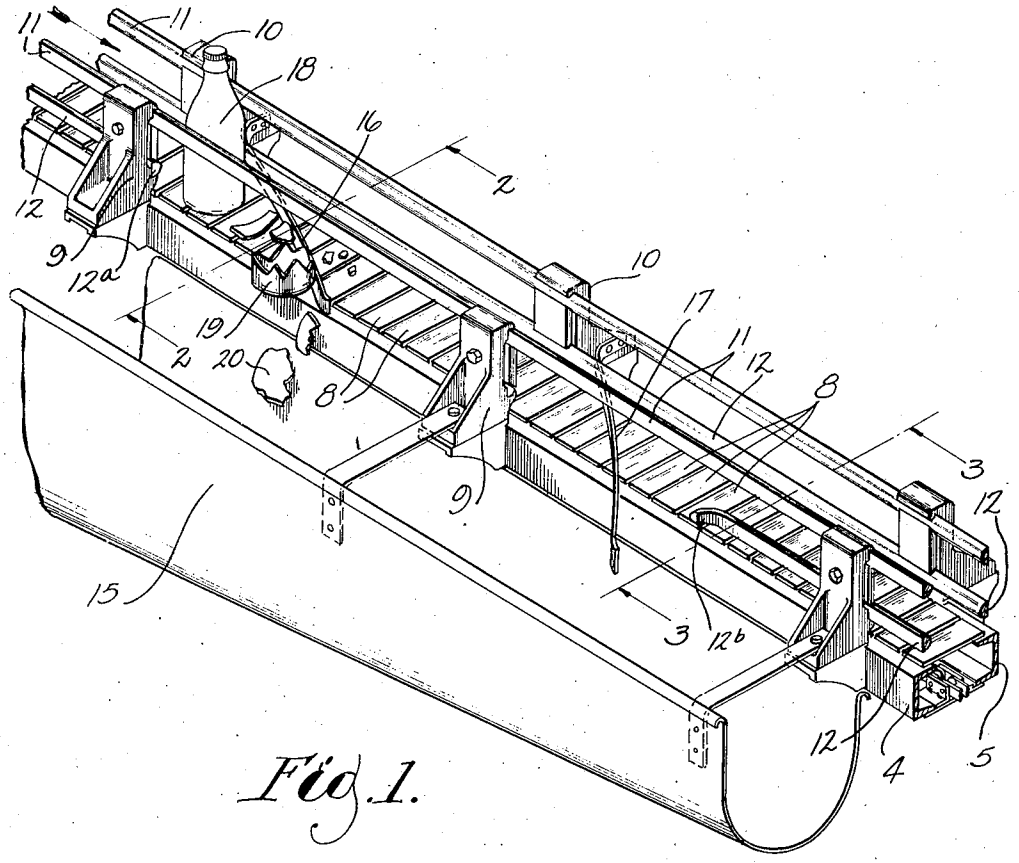


Fig. 1.

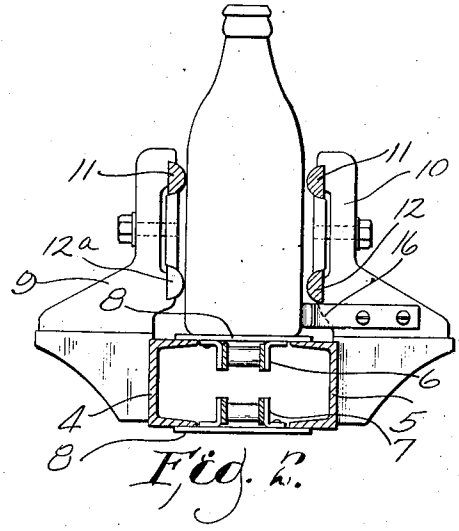


Fig. 2.

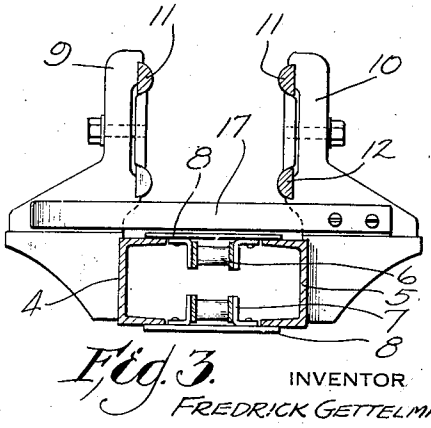


Fig. 3.

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BOTTLE CONVEYER

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4 Claims. (Cl. 209—90)

This invention relates to improvements in bottle conveyers.

It is a primary object of the invention to provide means for sweeping from the treads of a bottle conveyer broken glass which may be moving thereon. When a bottle breaks, the fragments regularly are carried on the bottle conveyer along with the bottles. The tread portions of the conveyer, being broad and flat to support individual bottles, tend to retain the glass fragments. Such fragments must be removed, and it is the object of the present invention to save the expense and danger of such removal by automatically sweeping broken fragments of glass from the conveyer while permitting the bottles to continue unimpeded movement with the conveyer treads.

Other objects will be apparent to those skilled in the art upon analysis of the following disclosure of my invention.

In the drawing:

Fig. 1 is a fragmentary view in perspective of a bottle conveyer equipped with my invention.

Fig. 2 is a transverse section through the conveyer of Fig. 1 in the approximate plane indicated at 2—2.

Fig. 3 is a transverse section through the device of Fig. 1 in the approximate plane indicated at 3—3.

Like parts are identified by the same reference characters throughout the several views.

An otherwise conventional conveyer in which my invention is incorporated may comprise a frame made up of channels 4 and 5 constituting a box-like guideway within which the outwardly bound and return flights 6 and 7 of a conveyer chain are operable to propel the platform treads 8 upon which the work is conveyed.

The particular device chosen to exemplify the invention is a bottle conveyer such as commonly leads from a bottle capper mechanism. To assure the retention of the bottles on the conveyer, brackets 9 and 10 fastened to the channel shaped frame members 4 and 5 carry upper and lower rails 11 and 12 at both sides of the path of bottle movement on the conveyer. Heretofore such rails have been continuous. In accordance with the present invention the lower rail 12 is discontinued at least at one side of the conveyer at 12*a*, leaving an open space beneath rail 11 between two or more consecutive brackets 9. Beyond this discharge opening for small objects, the rail 12 resumes at 12*b*.

In the device exemplifying the invention in Fig. 1, the gap between 12*a* and 12*b* is sufficient to provide, in effect, two discharge openings at opposite sides of the intervening bracket 9.

Immediately adjacent the path of movement of the conveyer is a receiving member 15 for the small objects to be ejected from the conveyer. In the particular device exemplifying the invention, the small objects constitute undesired pieces of broken glass and hence the receiver 15 constitutes a trough into which the broken glass is dumped for subsequent disposal.

Ejection of broken glass from the conveyer onto the receiver is achieved by resiliently yieldable members so biased as normally to lie obliquely across the path of conveyer movement. The yieldable devices may, in their simplest form, comprise simply pieces of clock spring 16 and 17 fastened to consecutive brackets 10 at the side of the conveyer opposite the ejection openings afforded by the break in the lower guide rail 12. For the particular purposes of the present device the yieldable ejecting members 16 and 17 are set at different levels, as best shown by comparison of Fig. 2 and Fig. 3, the spring 16 being slightly higher above the conveyer treads 8 than is the spring 17. Thus the spring 16 will move larger pieces of glass, and any smaller pieces which may escape the operation of the spring 16 will be acted upon by the spring 17. For other purposes the number of ejecting devices may be varied according to the requirements. One may serve in most structures, but any desired number may be used.

The ejecting devices operate differently according to the conditions obtaining on the conveyer. As shown in Fig. 1, there is nothing ahead of the bottle 18 on the conveyer except the broken glass fragments 19, 20, etc. Under such circumstances the strength or bias of the ejecting member 16 will be such that such member will not ordinarily yield appreciably but will simply lie unyieldingly across the conveyer with sufficient strength to eject the articles 19, 20, with a camming action during the continued movement of the conveyer. The ejection will, however, be facilitated by slight vibratory yielding movement of the spring 16 against its bias, such as will normally occur by the intermittent sliding of the articles 19 and 20 laterally. This slight vibration made possible by the fact that the member 16 is resiliently yieldable from its normal position, will facilitate the displacement of the articles from the conveyer onto the receiver 15.

Under normal operating conditions of a bottle conveyer, however, the stream of bottles delivered onto the conveyer from the capper is virtually

continuous. When a bottle encounters the resiliently yieldable discharge member 16, such member cannot eject the bottle laterally because the bottle is supported against lateral displacement by contact with the upper rail 11 which is continuous between the brackets 9. Thus, the bottle is held to the conveyer and the ejecting member 16 is forced to yield to permit the passage of the bottle. The resilient bias of the member is such that it can readily be forced aside by a bottle whose frictional engagement with the conveyor is supplemented by the lateral support given by rail 11 as shown in Fig. 2.

Assuming, however, that there is a small object (such as broken glass) intervening between a continuous succession of larger articles (such as bottles) supported by the rail 11, in that event the resiliently biased ejecting member 16, after having been forced aside by the passage of a bottle, will spring back with a snap action into the space occupied by the smaller article (the broken glass). When this occurs, the smaller objects (broken glass) will be swept from the conveyer by the resilient bias of the returning spring member 16, this sweeping action being of a somewhat different order from the camming action which would occur if the member 16 were rigid or which would occur if the member 16 had not previously been forced from its normal position.

The operation of the ejecting member 17 is in no respect different from that already described, except that it operates at a different level and therefore acts upon objects which, even though not retained by the side rails, may be so low in height as not to have been engaged by the first ejector 16.

The weight of the objects is also a factor. The filled bottles, like that shown at 18, are sufficiently heavy so that they tend, even without lateral support from the rail 11, to force the spring 16 aside, while the glass fragments, being not only lighter per se because of their smaller size, but also because they have no liquid content, are insufficiently heavy to cling to the conveyer against the bias of the ejecting arm 16 or 17. Thus, for certain sorting purposes, the bias of the arm may be so chosen with reference to the relative weights of the articles to be sorted, that the arm will be effective solely on the basis of weight without requiring any of the articles to be laterally supported. Since the weight is effective through the coefficient of friction, it will also be apparent that in some instances the sorting may be accomplished as between one class of article which tends to cling to the conveyer, and another class of article which does not, the differential in this respect being attributable either to the surface or conformation of the conveyer or the article or both.

Inasmuch as the resiliently yieldable glass removing arms or sweeps 16 and 17 extend from their respective points of support laterally and rearwardly arcoss the substantially rigid transversely disposed conveyer plates 8 and in the direction of the receiver 15, no opportunity exists for such fragments to become caught or retained on the conveyer in opposition to their sweeping pressures. The use of a supplemental sweeping arm 17 in closer proximity to the conveyer than the arm 16 makes subsantially certain the complete removal of all particles of glass from the surface of the conveyer so that no glass fragments will be delivered with the bottles. Even particles sufficiently minute to drop between the treads 8 will not be so delivered.

I claim:

1. The combination with a bottle conveyer having substantially rigid bottle supports adapted for free lateral release of glass fragments, of a glass receiver laterally adjacent the conveyer at one side thereof and a resiliently yieldable glass ejecting arm mounted at the opposite side of the conveyer and provided with a continuous sweeping edge and extending obliquely across the conveyer toward said receiver, together with guard means between the conveyer and the glass receiver at a sufficient level above the conveyer to provide clearance for glass fragments to be ejected into said receiver while providing lateral support for maintaining bottles on said conveyer against the pressure of the resilient arm.

2. The device of claim 1 in which said arm comprises a piece of clock spring in fragment removing proximity to the conveyer having sufficient strength to eject glass fragments but yieldable to permit the passage of bottles supported by said guard means against lateral displacement.

3. The combination of a bottle conveyer comprising transversely extending substantially rigid plates adapted to support individual bottles, and a resiliently flexible glass ejecting sweep constituting a length of clock spring supported at one side of the conveyer and extending obliquely across the path of conveyer plate movement in proximity to the conveyer plates in a position to push broken bottles and fragments of glass laterally from the conveyer, said sweep being continuously yieldable to the pressure of filled bottles and of insufficient bias to prevent their carriage at conveyer speed.

4. The combination of an endless conveyer having substantially rigid supporting surfaces of predetermined frictional characteristics and a plurality of resiliently flexible sweeps each comprising a length of clock spring having one end mounted at one side of the conveyer and a free end portion extending obliquely over the upper surface of the conveyer, said sweeps being located at successively higher levels and yieldable in planes substantially parallel to the conveyer whereby to be adapted to continuously urge objects on the conveyer in the direction of their free ends and having a constant bias insufficient to overcome the frictional resistance of objects of predetermined weight normally carried by the conveyer, said sweeps being continuously operative to eject from the conveyer objects of less weight and frictional resistance.

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