

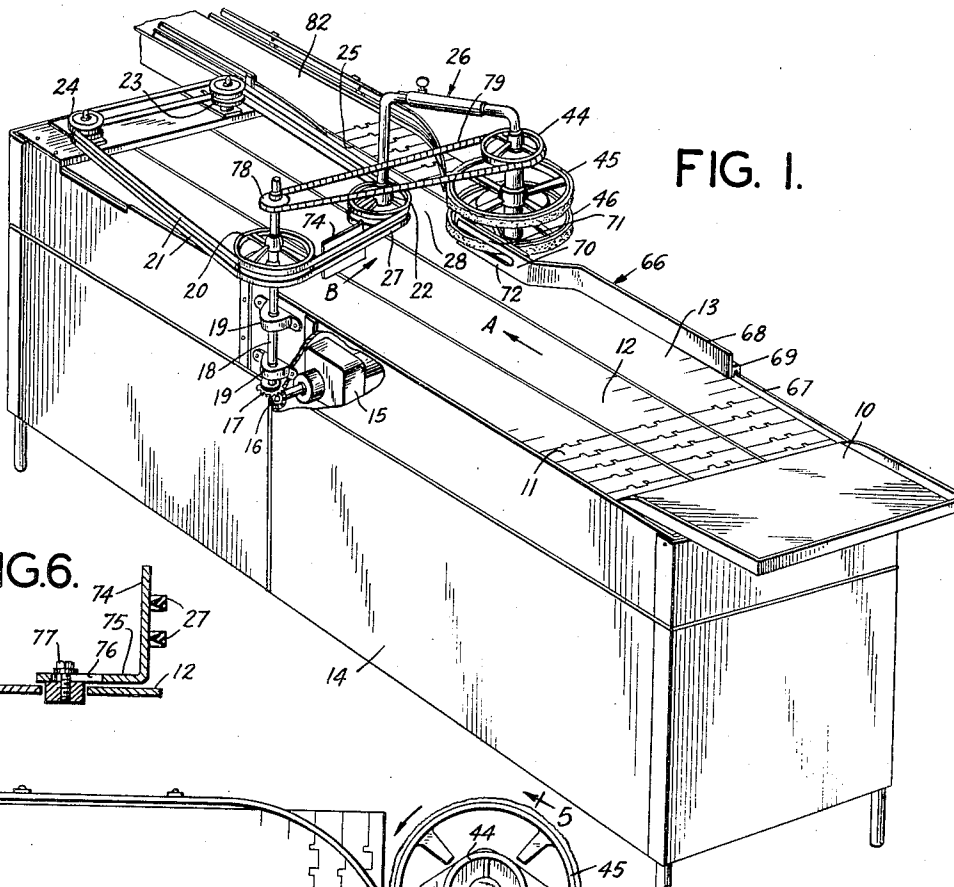
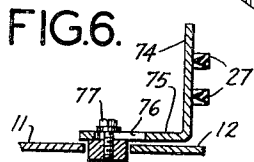
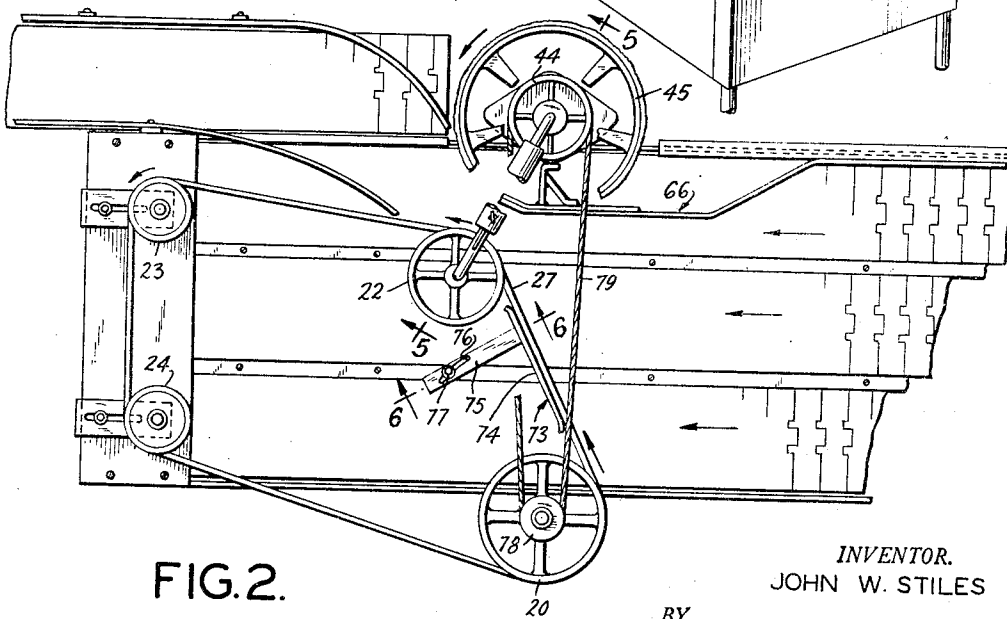
July 17, 1951

J. W. STILES
CONVEYER FEEDING APPARATUS

2,560,995

Filed July 6, 1949

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

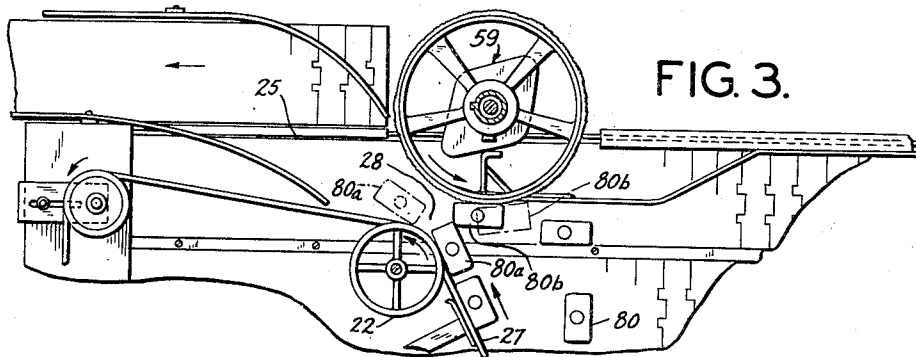


FIG. 3.

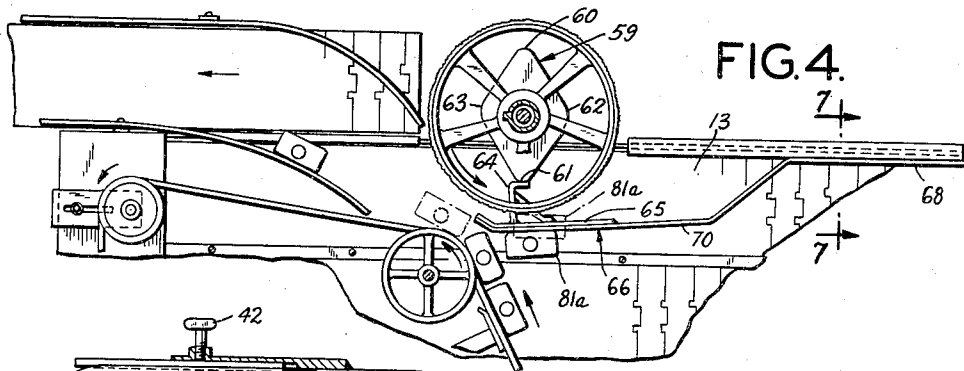


FIG. 4.

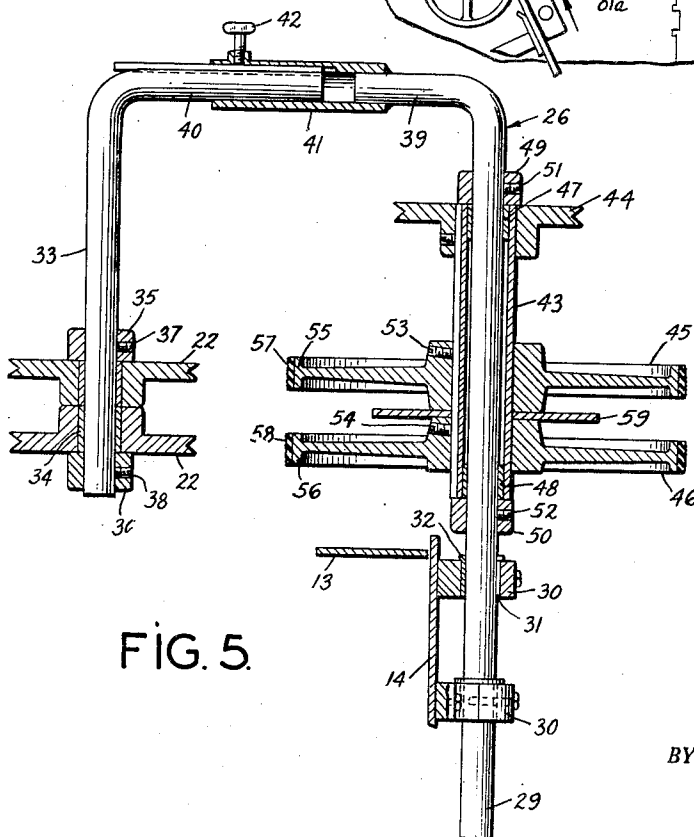


FIG. 5.

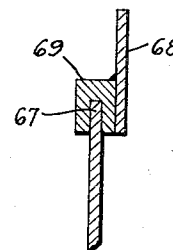


FIG. 7.

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UNITED STATES PATENT OFFICE

2,560,995

CONVEYER FEEDING APPARATUS

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Application July 6, 1949, Serial No. 103,233

15 Claims. (Cl. 198—32)

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This invention relates to a conveyor feeding system for discharging a continuous line of units, the device being of the type conventionally referred to as an "unscrambler," and being in the same general category as the invention described in my prior Patent No. 2,389,696, granted November 27, 1945.

It is an object of this invention to enable the continuous feeding and unscrambling of irregular shaped units as distinguished from the round units for which the conveyor of the above-mentioned patent is particularly suited. More specifically, it is within my contemplation to provide a device adapted to effect the operative feeding into a single-line discharge portion of such units as irregular shaped containers, polygonal shaped cans, catsup bottles, whiskey and wine flasks, pharmaceutical and cosmetic flat and odd shaped bottles, and objects of multipanel configuration.

It is also an important objective of this invention to enable the feeding of a group of irregular units into straight-line formation without jamming at the discharge gate.

It is within the contemplation of this invention, in one aspect thereof, to enable the straight-line unscrambler unit of the patent above-mentioned to be readily transformed into a unit embodying the mechanical aspects of the present invention, whereby presently existing installations made according to the structure of my said prior patent may be enabled to expand their fields of applicability from round units to those of irregular shapes.

Still a further object of this invention is to provide adjusting means whereby the apparatus will be adapted for operative use with units of various proportions.

And it is still a further object of my invention to provide a relatively simple and automatically operable device capable of accomplishing the objectives above-mentioned.

Other objects, features and advantages will appear from the drawings and the description hereinafter given.

Referring to the drawings,

Figure 1 is a perspective view of a multiple belt unscrambler unit, embodying a preferred form of my invention, the unit being shown adjacent a single line conveyor belt.

Figure 2 is a fragmentary plan view of Figure 1, a portion of the sprocket chain being removed for clarity.

Figure 3 is a fragmentary plan view, substantially like a portion of Figure 2, but showing the

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operation of coacting belt and wheel components upon flasks being conveyed by the unit.

Figure 4 is a view like Figure 3, but showing another position of the wheel and the cam device thereon for actuating the spring loaded guide rail of my invention.

Figure 5 is an enlarged section of Figure 2 taken substantially along line 5—5 thereof.

Figure 6 is a fragmentary section taken substantially along line 6—6 of Figure 2, and

Figure 7 is a fragmentary section of Figure 4 taken substantially along line 7—7 thereof.

In the preferred form of my invention illustrated, I employ an unscrambler unit substantially like that shown in my said prior Patent No. 2,389,696. Said unit comprises a swingably mounted loading table 10 at the rear of the three parallel conveyor belts 11, 12 and 13; these being preferably operated at different speeds, belt 11 operating at the lowest speed, belt 13 at the highest, and belt 12 at an intermediate speed. It is, however, to be understood that the speed of said belts is not controlling with respect to the improved structure of the present invention, which will hereinafter be described. Said belts move forwardly in the direction of arrow A, and are operated by an internal mechanism not herein shown, but described in my said prior patent. The said driving mechanism is disposed within the casing 14, and is connected to a gear box 15 which drives the bevel gear 16 in engagement with gear 17 fixedly mounted on vertical shaft 18 extending through the bearings 19. Mounted upon the shaft 18 are the drive pulleys 20 engaging the double V-belt 21, said belt being in engagement with the idler sheaves 22, 23 and 24. The latter two sheaves 23 and 24 are mounted at the rear of the structure, the idler sheave 22 at the rear of the discharge gate 25 being suspended from the overhead bridge yoke 26. Section 27 of belt 21 extends transversely across the conveyor belts 11, 12 and 13 and slopes rearwardly towards the discharge side of the structure, said portion 27 extending only partly across the extreme right of discharge belt 13 so as to provide a discharge entrance 28 below yoke 26 through which the outgoing bottles must pass. The direction of rotation of belt 21 is such that portion 27 thereof moves in the direction of arrow B, that is, towards entrance 28, whereby containers or other units carried by belts 11, 12 and 13, and which engage portion 27 of the belt, will be directed thereby towards said entrance 28 and out through exit 25, substantially in the manner taught in my said prior patent.

The said yoke 26 contains, as one of its elements, an outer vertical post 29 frictionally held in predetermined position relative to the conveyor unit by the clamps 30, said clamps being secured to the casing structure 14 adjacent the discharge belt 13. Said clamps 30 each have a hole 31 for accommodating said post 29, the clamps being further provided with split friction bushings 32 disposed within said holes 30 and in frictional holding engagement with post 29. The yoke also contains an inner short downwardly extending arm 33 rotatively supporting at the lower terminal thereof the idler sheaves 22, said sheaves containing a bushing 34, and being flanked top and bottom by the collars 35 and 36 which are secured to arm 33 by screws 37 and 38. The upper portions of post 29 and arm 33 have horizontal arms 39 and 40 extending towards each other and disposed within the tubular sleeve 41. In the particular arrangement illustrated, the arm 39 is welded on to the sleeve 40, and arm 40 is slidably and adjustably movable within the sleeve, and adapted to be held in a set position by the screw 42. The arrangement is hence such that the position of sheaves 22 can be adjusted, so as to vary the width of discharge entrance 28, and thereby accommodate the device to containers of various widths.

Rotatively positioned over the post 29 is the sleeve 43 which has fixedly secured thereto the sprocket wheel 44 and the friction wheels 45 and 46, to be more specifically hereinafter described. The said sleeve 43 is further provided with bushings 47 and 48, and is held in a predetermined position on post 27 by the collars 49 and 50 fixedly secured to said post 29. Since said collars are provided with set screws 51 and 52, it is apparent that the entire unit, including the wheels 44, 45 and 46 can be adjustably moved up or down, to accommodate containers, or other units being conveyed, of various heights.

The said wheels 44 and 45 are spaced a predetermined distance apart, and their relative spacing can further be adjusted by releasing the screws 53 and 54 and sliding one or both of the wheels along the sleeve 43. Said wheels have preferably flat peripheral faces 55 and 56, which are provided with circumferential facings 57 and 58 of material of a high coefficient of friction, such as gum rubber. It is also preferred that the outer surface of said facings be serrated or otherwise roughened.

Disposed preferably between said friction wheels 45 and 46 is the cam 59, this being fixedly secured to sleeve 43, whereby it will operatively revolve together with wheels 44, 45 and 46. In its preferred form this cam is diamond-shaped, having two laterally disposed high cam surfaces 60 and 61 and two lateral low cam surfaces 62 and 63. In the construction illustrated, surfaces 60 and 61 are diametrically opposed with respect to each other and surfaces 62 and 63 are similarly diametrically opposite, and the opposed surfaces are preferably equidistant with respect to said center. The difference between the said center of rotation of the cam and the said raised and lowered surfaces represent the throw of the cam.

Bearing against the operative peripheral surface of cam 59 is the follower 64 which is fixedly secured to bar 65 welded or otherwise secured to the spring guide rail 66 mounted upon the rim 67 of the casing. More specifically (see Figures 1 and 7), the spring rail 67 contains a rear flat portion 68 to which is welded or otherwise secured the channel member 69 frictionally dis-

posed over said rim 67. Said rail extends forwardly from said section 68 thereof over the discharge conveyor 13, to a point short of discharge entrance 28, and in the preferred form thereof contains a bifurcated flat front portion 70 comprising an upper leg 71 and a lower leg 72. Leg 71 is in operative engagement with cam 59, and leg 72 is disposed below friction wheel 46, the lower of the wheels, whereby the latter leg will be positioned adjacent discharge belt 13 so that it will operatively engage, as will more clearly hereinafter appear, the conveyed units near their bases. The spring action of rail 66 is such as to be in constant yieldable engagement with the cam 59; and the parts are so disposed and proportioned that when leg 71 is in engagement with the low points 62 and 63 of the cam, the inner portions of friction wheels 45 and 46 will extend inwardly beyond the flat terminal portion 70 of the rail 66, for direct engagement with the units being conveyed.

A back-up plate 73 is adjustably mounted on the structure directly behind portion 27 of the belt, said plate containing a flat horizontal member 74 in engagement with the rear of belt portion 27, to resist a flexing of said belt portion when it is operatively engaged by units moving towards the exit gate. Such flexing might result from a jamming at the discharge entrance, particularly in the feeding of rectangular or odd shaped containers; and it is important for the most effective operation of this unit that under these conditions, belt portion 27 be maintained in a non-flexed condition. The plate 73 is further provided with a bracket 75 containing slot 76 through which extends the screw 77 adjustably holding the bracket to the structure.

In the operation of this device, the belt 21 moves, in the particular embodiment illustrated, in a counter-clockwise direction. Since the shaft 18 carries the fixedly mounted sprocket wheel 78 which is connected by sprocket chain 79 to sprocket wheel 44, it is apparent that the operative rotation of shaft 18 similarly causes a counter-clockwise rotation of friction wheels 45 and 46. Accordingly, the portions of the belt 21 and of the wheels 45 and 46 which are opposed to each other and which form the discharge entrance 28 move in opposite directions; and it is this arrangement which contributes to the prevention of jamming at said discharge entrance, in a manner to be now described.

As flasks 80 move forwardly on conveyor belts 11, 12 and 13, they will be engaged by said portion 27 of the V-belt 21, and directed towards discharge entrance 28, as aforesaid. When the units being conveyed are not circular, as in the case of the flat flasks 80 illustrated, there may not be the spinning effect described in my said Patent No. 2,389,696. Hence, there is possibility of a jamming of two or more jars within said entrance 28. By referring to Figure 3, it will be seen that flasks 80a and 80b are both seeking to enter the entrance 28. However, due to the fact that flask 80b is in engagement with the flat friction surfaces of wheels 45 and 46, the counter-clockwise movement of said wheels will draw flask 80b rearwardly to the dot-dash position indicated. This will leave flask 80a free to move forwardly under the action of belt portion 27.

The spring loaded guide rail 66 serves as further assurance against the jamming, since it removes flasks approaching the exit gate from the path where they will cause a jam. For example, by referring to Figure 4, the dot-dash

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position of flask 81a is such that it is traveling in a direction where it might possibly cause a jam at the discharge entrance. However, due to the action of cam 59, the rail 66 is urged inwardly towards the conveyor structure, causing the flask 81a to move to the full-line position indicated. It has been found that the oscillating movement of spring guide 66, such as is effected by the cam arrangement illustrated, serves to direct jars away from jamming positions. Furthermore, the periodic impulse of the guide rail 66 against jars that are in the discharge entrance 28, produces a retraction or removal of said jamming flasks from the crowded corridor.

The combination of the action of belts 11, 12 and 13, belt portion 27, friction wheels 45 and 46 and the oscillating guide rail 66, constitutes an arrangement for directing groups of odd-shaped units towards the discharge gate without danger of jamming, whereupon a row of such units will be directed uninterruptedly towards the adjacent single line conveyor 32. And it is to be noted that since the oscillating guide 66 is preferably made of spring material, its yieldability will prevent any damage to fragile units being conveyed.

It will further be observed, by comparing the structure above-described with that of my said prior patent, that the unscrambler of the patent can readily be modified to accommodate the improvements constituting the present invention.

In the above description, the invention has been disclosed merely by way of example and in preferred manner; but obviously many variations and modifications may be made therein which will still be comprised within its spirit. It is to be understood, therefore, that the invention is not limited to any specific form or manner of practicing same, except insofar as such limitations are specified in the appended claims.

I claim:

1. In a conveyor feeding unit, forwardly moving belt conveyor means, a discharge gate at a predetermined discharge side of the conveyor means, a guide belt, a plurality of pulleys operatively supporting said guide belt and including a discharge pulley adjacent the said discharge side, said guide belt having a rear operative portion disposed generally transversely across a portion of the said belt conveyor means and movable towards its discharge side, a friction wheel over said discharge side rearwardly of the discharge gate and spaced from the discharge pulley to form therebetween a discharge entrance, the facing portions of the discharge pulley and friction wheel which flank the discharge entrance rotating in opposite directions, said discharge entrance comprising a relatively narrow throat region flanked rearwardly and forwardly by respective converging and diverging paths, said throat region being defined by the most proximate portions of the friction wheel and discharge pulley, and said paths being defined by the respective portions of the friction wheel and discharge pulley on opposite sides of said throat region.

2. In a conveyor feeding unit, forwardly moving belt conveyor means, a discharge gate at a predetermined discharge side of the conveyor means, a guide belt, a plurality of pulleys operatively supporting said guide belt and including a discharge pulley adjacent the said discharge

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side, said guide belt having a rear operative portion disposed generally transversely across a portion of the said belt conveyor means and movable towards its discharge side, a friction wheel over said discharge side rearwardly of the discharge gate and spaced from the discharge pulley to form therebetween a discharge entrance, the facing portions of the discharge pulley and friction wheel which flank the discharge entrance rotating in opposite directions, and a bridge yoke member comprising a post upon which the friction wheel is rotatably supported, an intermediate bridge portion extending across and spaced above the discharge entrance, and a downwardly extending arm rotatably supporting the said discharge pulley.

3. In a conveyor feeding unit, the combination according to claim 2, the bridge portion of the yoke member being horizontally extensible, for varying the width of the discharge entrance.

4. In a conveyor feeding unit, forwardly moving belt conveyor means, a discharge gate at a predetermined discharge side of the conveyor means, a guide belt, a plurality of pulleys operatively supporting said guide belt and including a discharge pulley adjacent the said discharge side, said guide belt having a rear operative portion disposed generally transversely across a portion of the said belt conveyor means and movable towards its discharge side, a friction wheel over said discharge side rearwardly of the discharge gate and spaced from the discharge pulley to form therebetween a discharge entrance, the facing portions of the discharge pulley and friction wheel which flank the discharge entrance rotating in opposite directions, a rotatably mounted cam adjacent the friction wheel, and a guide rail over the said discharge side of the belt conveyor means and in operative engagement with the cam, whereby the guide rail will be oscillated by the cam during the rotation thereof.

5. In a conveyor feeding unit, the combination according to claim 4, said guide rail being in yieldable pressing engagement with the cam.

6. In a conveyor feeding unit, the combination according to claim 4, said cam having a high cam surface thereon proportioned operatively to move the guide rail outwardly beyond the periphery of the wheel.

7. In a conveyor feeding unit, the combination according to claim 4, said guide rail being in yieldable pressing engagement with the cam, said cam having a high and a low cam surface thereon, the high surface being proportioned operatively to move the guide rail outwardly beyond the periphery of the wheel, the low surface being proportioned to hold the guide rail at a position where the operative periphery of the wheel extends beyond the rail.

8. In a conveyor feeding unit, forwardly moving belt conveyor means, a discharge gate at a predetermined discharge side of the conveyor means, a guide belt, a plurality of pulleys operatively supporting said guide belt and including a discharge pulley adjacent the said discharge side, said guide belt having a rear operative portion disposed generally transversely across a portion of the said belt conveyor means and movable towards its discharge side, two spaced rotatable friction wheels over said discharge side rearwardly of the discharge gate and spaced from the discharge pulley to form therebetween a discharge entrance, both wheels being mounted for simultaneous rotation in the same direction, the facing portions of the discharge pulley and the friction

wheels which flank the discharge entrance rotating in opposite directions, a cam disposed between the two said wheels and rotatable therewith, and a guide rail over the said discharge side of the belt conveyor means and in operative engagement with the cam, whereby the guide rail will be oscillated by the cam during the rotation thereof.

9. In a conveyor feeding unit, the combination according to claim 8, said guide rail being in yieldable pressing engagement with the cam, the operative terminal of the rail being bifurcated and straddling one of said wheels.

10. In a conveyor feeding unit, forwardly moving belt conveyor means, a discharge gate at a predetermined discharge side of the conveyor means, a guide belt, a plurality of pulleys operatively supporting said guide belt and including a discharge pulley adjacent the said discharge side, said guide belt having a rear operative portion disposed generally transversely across a portion of the said belt conveyor means and movable towards its discharge side, a friction wheel over said discharge side rearwardly of the discharge gate and spaced from the discharge pulley to form therebetween a discharge entrance, the facing portions of the discharge pulley and friction wheel which flank the discharge entrance rotating in opposite directions, a guide rail over said discharge side of the belt conveyor means, supporting means for mounting the guide rail for movement in a horizontal plane over the belt conveyor means, and means for oscillating the guide rail in said horizontal plane.

11. In a conveyor feeding unit, forwardly moving belt conveyor means, a discharge gate at a predetermined discharge side of the conveyor means, a guide belt, a plurality of pulleys operatively supporting said guide belt and including a discharge pulley adjacent the said discharge side, said guide belt having a rear operative portion disposed generally transversely across a portion of the said belt conveyor means and movable towards its discharge side, a friction wheel over said discharge side rearwardly of the discharge gate and spaced from the discharge pulley to form therebetween a discharge entrance, the facing portions of the discharge pulley and friction wheel which flank the discharge entrance rotating in opposite directions, a guide member extending approximately in the direction of movement of said conveyor belt means, means for mounting said guide member for movement in a horizontal plane over the belt conveyor means from a position outwardly of the innermost portion of the periphery of said friction wheel to a position substantially between the friction wheel and the discharge pulley, and actuating means for moving said guide member between said two positions.

12. In a conveyor feeding unit, forwardly moving belt conveyor means, a discharge gate at a predetermined discharge side of the conveyor means, a guide belt, a plurality of pulleys operatively supporting said guide belt and including a discharge pulley adjacent the said discharge side, said guide belt having a rear operative portion disposed generally transversely across a portion of the said belt conveyor means and movable towards its discharge side, a friction wheel over said discharge side rearwardly of the discharge gate and spaced from the discharge pulley to form therebetween a discharge entrance, the facing portions of the discharge pulley and friction

wheel which flank the discharge entrance rotating in opposite directions, a guide member, means for mounting said guide member for movement over the belt conveyor means from a first position between the axis of rotation and periphery of the friction wheel to a second position beyond the periphery of the friction wheel, spring means biasing said guide member toward one of said positions, and actuating means for periodically moving said guide member to the other of said positions.

13. In a conveyor feeding unit, forwardly moving belt conveyor means, a discharge gate at a predetermined discharge side of the conveyor means, a guide belt, a plurality of pulleys operatively supporting said guide belt and including a discharge pulley adjacent the said discharge side, said guide belt having a rear operative portion disposed generally transversely across a portion of the said belt conveyor means and movable towards its discharge side, a rotatably mounted cam, a guide rail over the discharge end of the belt conveyor means and in operative engagement with the cam, whereby the guide rail will be oscillated by the cam during the rotation thereof.

14. In a conveyor feeding unit, forwardly moving belt conveyor means, a discharge gate at a predetermined discharge side of the conveyor means, a guide belt, a plurality of pulleys operatively supporting said guide belt and including a discharge pulley adjacent the said discharge side, said guide belt having a rear operative portion disposed generally transversely across a portion of the said belt conveyor means and movable towards its discharge side, a guide rail over said discharge side of the belt conveyor means, supporting means for mounting the guide rail for movement in a horizontal plane over the belt conveyor means, and means for oscillating the guide rail in said horizontal plane.

15. In a conveyor feeding unit, forwardly moving belt conveyor means, a discharge gate at a predetermined discharge side of the conveyor means, a guide belt, a plurality of pulleys operatively supporting said guide belt and including a discharge pulley adjacent the said discharge side, said guide belt having a rear operative portion disposed generally transversely across a portion of the said belt conveyor means and movable towards its discharge side, a friction wheel over said discharge side rearwardly of the discharge gate and spaced from the discharge pulley to form therebetween a discharge entrance, the facing portions of the discharge pulley and friction wheel which flank the discharge entrance rotating in opposite directions, the outer peripheral surface of said friction wheel being circular so as to move objects in contact therewith along a path substantially opposite to the direction of movement of said conveyor belt means.

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