Oct. 8, 1957 F. W. KNOWLES 2,808,921

PACKAGE FEEDER

Filed June 9, 1954 2 Sheets-Sheet 1

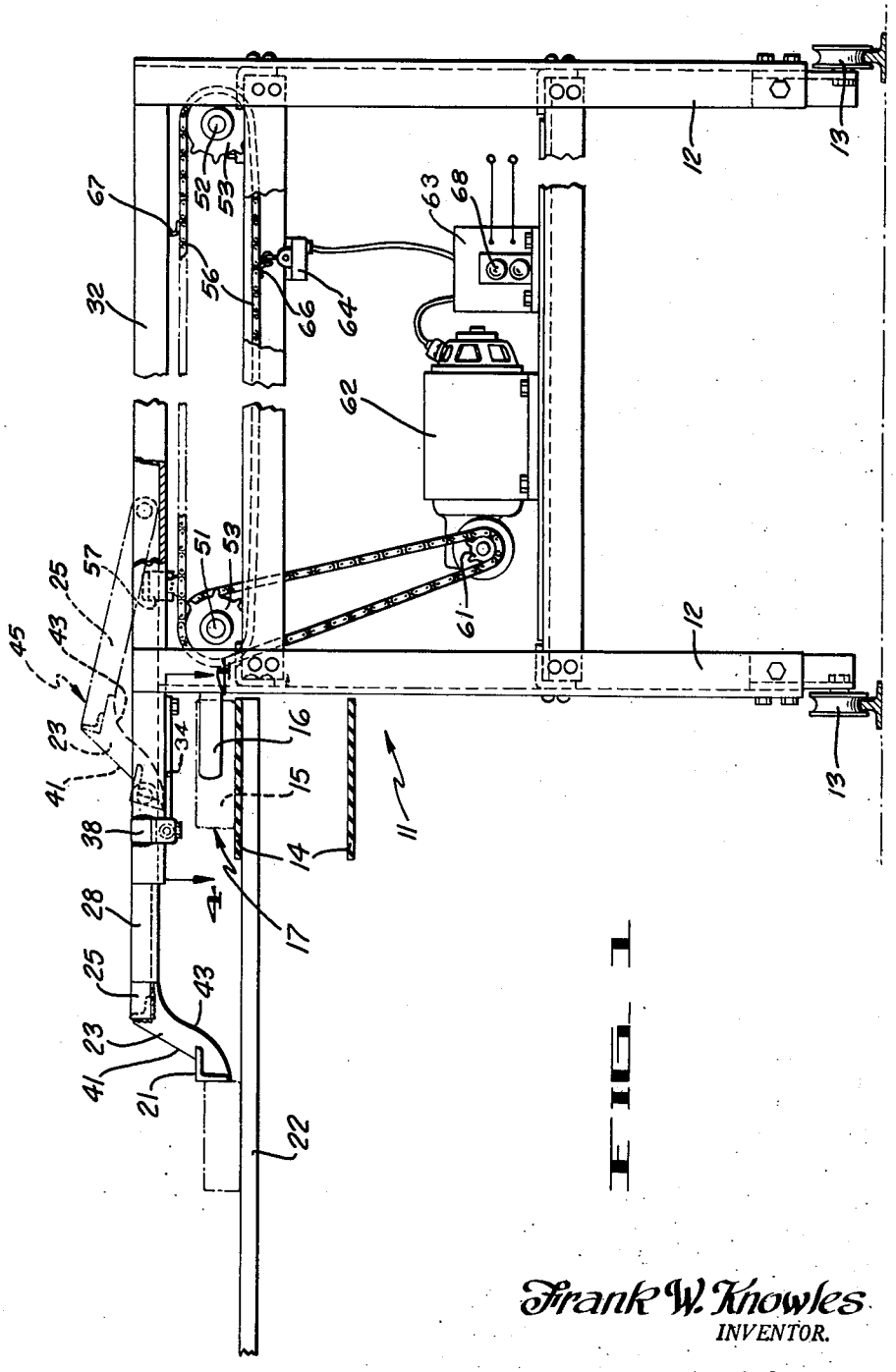


FIG. 1

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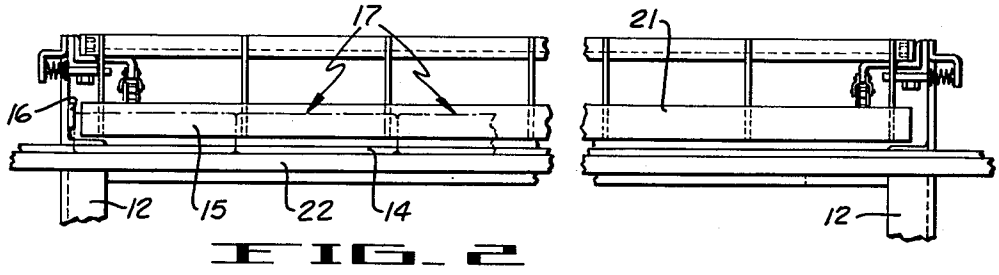


FIG. 2

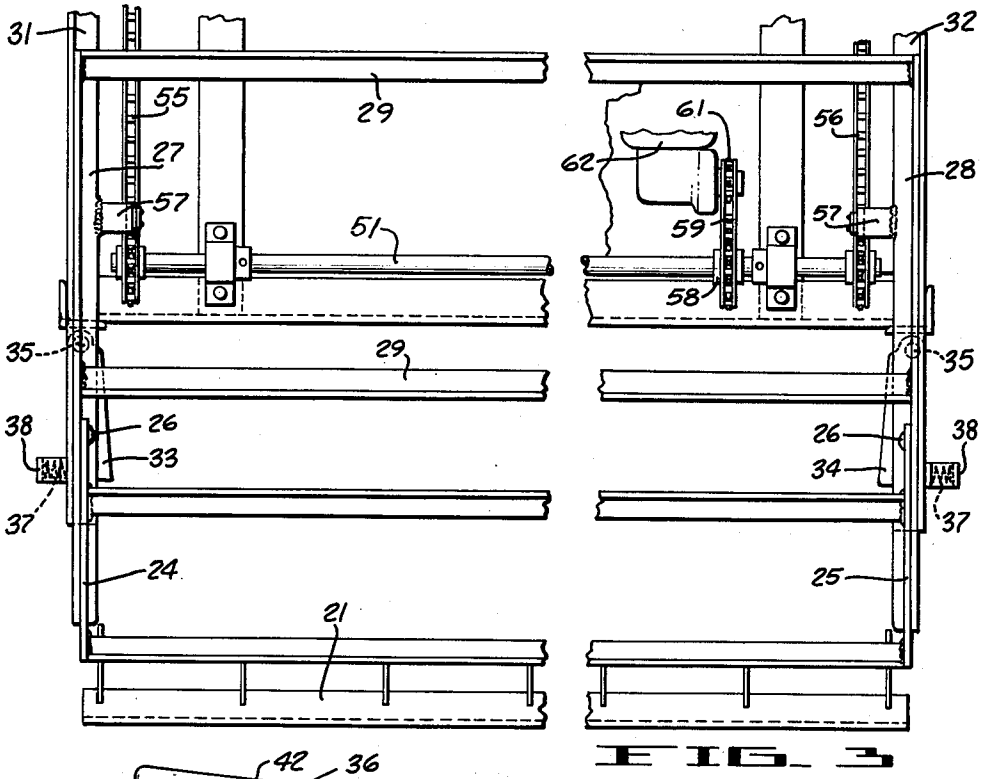


FIG. 3

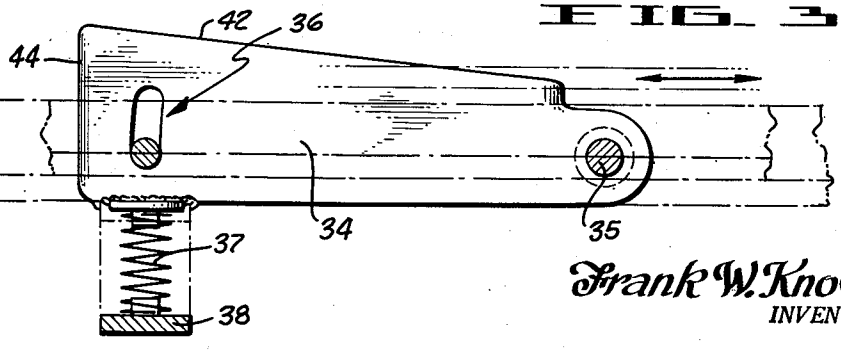


FIG. 4

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PACKAGE FEEDER

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Application June 9, 1954, Serial No. 435,471

6 Claims. (Cl. 198—31)

The present invention relates to package feeder; and, in more particular, to a feeder which will move a pusher bar and a first row of packages transversely of the row from an original position to a subsequent package position, and which feeder will allow reestablishment of a second row in the original position while the first row is in movement and while the pusher bar is returning to original position.

One of the defects of prior devices has been that after feeding a row of packages, it was necessary to wait until the pusher bar had returned to its original position before a succeeding row could be moved into position for feeding. This has meant a long rest period for the feeder between each feeding cycle, and it has meant that the rate of travel of the feeder had to be very high to maintain a desired rate, in fact, the rate of feed has been much below that desired.

Having in mind these defects of the prior art it is an object of the present invention to design a package feeder in which there would be no rest period for the feeding mechanism between cycles.

Another object of the invention is the devising of a feeding mechanism in which the feed distance could be easily adjusted.

The above mentioned objects are achieved and defects remedied by a construction in which a pusher bar contacts one side of and moves a first row of packages horizontally and transversely of the row from an original position to a subsequent position parallel to the first position, in which the bar then lifts while it returns so as to pass over a second row of packages forming in the original place of the first row, and then the bar drops into its original position ready to repeat the cycle.

A package feeder constructed in accordance with the above outline is hereinafter described in detail and shown in the accompanying drawings, in which:

Figure 1 is an elevational view of the left side of the feeder.

Figure 2 is a front view of the upper portion of the feeder, the legs of the stand and the motor being broken away.

Figure 3 is a plan view of the feeder.

Figure 4 is a detail plan view of a live point used in the feeder.

In the drawings there is shown a stand 11, or package feeder structure, having four legs 12. The lower end of each leg is provided with a flanged wheel 13 so that the stand may travel along tracks parallel to a package feeder conveyor 14. Packages 15 are guided in their travel along the conveyor so that when they come against a stop 16 adjacent one side of the frame they will form a row 17 of packages. This stop 16 may be secured to the stand 11 or to the frame of the conveyor. The drawings show only a portion of the top and bottom runs of an endless belt conveyor. The form of the conveyor is immaterial. The result desired is that a row of packages be formed adjacent the stand and that as soon as one row is removed from this position another row

begins to form in the same position and is so formed when a pusher bar 21 has returned to its original position from that shown in Figure 1 ready for another cycle.

The pusher bar 21, in its home, or original, position is between the row of packages and the stand 11, parallel to the row, and close to the row. The pusher bar has movement in two degrees, but is always parallel to its original position and the row of packages. The movement of the pusher bar is divided into two parts, the simple forward movement away from the stand when it moves the packages off the conveyor and across a table 22 when there is only one degree of movement, horizontal; and the second part, movement toward the stand, when the bar raises to clear a newly forming row 17 as the bar moves toward its original position, and during which second part it has movement in two degrees, horizontal and vertical.

The pusher bar is fixedly secured adjacent each of its ends by means of an upwardly extending gusset 23, or cam follower, to the end of an arm 24, 25. The other end of each of these arms is secured by a pivot pin 26 to a slide rail 27, 28, and these slide rails are joined together by cross members 29 to form a complete slide. The arms and slide rails are normal to the pusher bar. The slide rails are formed of angle irons with an inward flange, and extend forward toward the pusher bar far enough so that when the pusher bar is in its original position the arms will rest on the inward flange of the rails. Each slide rail 27, 28 rests in and moves in a guide 31, 32 in the form of an angle iron secured to the stand 11. These guides extend forward beyond the stand legs and over the conveyor 14.

Secured beneath and to each guide where it extends over the conveyor is a live point 33, 34. These live points in their action may be called pass-by-pawls, or one-way-cams. Each live point is in the form of a wedge shaped flat plate with the faces thereof arranged in the horizontal. The narrow, or pointed, end of each is pivotally secured to the contiguous guide by a pin 35, and this end points toward the rear of the stand and guide. A pin and slot arrangement 36 between the live point and its supporting guide, limits the pivotal movement of the live point. Each of the live points is spring urged inward of the stand, toward each other, by a spring 37 held in compression between the outer edge of the live point and a bracket 38 secured to the stand.

The live points are so arranged and constructed that as the pusher bar moves outward, the front edge 41 of each of the gussets 23, which secure the bar to its pivotal arms 24, 25, contacts the inside edge 42 of a live point 33, 34, and as the pusher bar advances the live points will be moved aside. As the pusher moves back from its foremost position, the back edge 43 of each gusset contacts the end edge 44 of a live point and thereby the gussets and the pusher bar are raised to an upward position 45 so that the bar rides on and across the top surfaces of the live points until the bar drops off the live points near their pivots to its original position. The back edge 43 of each gusset is formed with a reverse curve so that the upward acceleration of the pusher bar will be low. It would seem obvious that other forms of the live point might be used. The result desired is that the bar raise above the line of packages during its return to its original position.

The slide 27, 28, 29 is moved back and forth in its guides by a simple straight line reversible direction chain drive which has its limits of movement set by stops secured to the chain which stops contact a limit switch connected to and controlling a reversing motor. The drive for the chain comprises a pair of shafts 51, 52 journaled in bearings secured to the stand 11, and jour-

naled with their axes transverse the direction of travel of the slide; and a sprocket wheel **53** secured near the end of each shaft and the side of the stand for coaxial rotation with the shaft. The two sprockets adjacent each side of the stand are aligned, and on each side a continuous chain **55, 56** passes from one to the other and thereabout. A bracket **57** is secured between each chain and the slide so that the slide will move with the chains. The forward shaft **51** has secured thereon and inboard of the sprocket **53** a driven sprocket **58** which is driven by a motor chain **59** passing over the driven sprocket and a drive sprocket **61** secured on the drive shaft of a reversing motor **62**. Controls for the motor are mounted in a box **63** and the direction of rotation of the motor is controlled by a reversing switch **64** mounted on the stand adjacent the lower run of one of the drive chains **55, 56** where its switch arm may be contacted by spaced apart switch operating lugs **66, 67** secured to the drive chain. These lugs are spaced apart and the switch is so located that the motor will be reversed in its direction of rotation as the slide reaches each end of its desired movement. The length of the slide movement and its points of reversing direction are adjustable by the selection of the positions of these lugs and the switch. A manual switch **68** will stop the motor from cycling when so desired. Further, feelers or devices may be installed in the motor control circuit to stop the operation of the motor when a full row of packages is not aligned on the conveyor before the feeder pusher bar.

With the conveyor **14** in operation and delivering packages **15** against the step **16** to form a row **17** thereof, the feeder is ready for operation which may be initiated by manual actuation of the control switch **68**. If the feeder is in home position with the pusher bar **21** to the right, Figure 1, and between the row of packages and the stand **11**, starting of a cycle of operation of the feeder will cause the motor to drive the slide drive chains **55, 56** in a direction to move the slide **27, 28, 29** outward, and therewith the pusher bar arms **24, 25** and pusher bar **21**. As the pusher bar moves outward, the row of packages **17** will move transversely of the conveyor **14** and onto the table **22**, the forward edge **41** of the gusset **23** will contact the inclined edge **42** of each of the live points **33, 34** to pivot them out of the way, and the motion of the pusher bar will be in a straight line. While the present disclosure shows the packages being fed to a table, this feeder was invented particularly to feed packages to a plate freezer of the type shown in applicant's copending application S. N. 289,638, filed May 23, 1952. When the pusher bar reaches the desired outward limit of movement, the lug **66** secured to the left side slide drive chain **56** will contact the reversing switch **64** to reverse the rotational sense of the motor **62** and the directional sense of the slide. The pusher bar will then travel inward to the stand in a straight line until the rear edge **43** of each of the gussets **23** contacts the short edge **44** of a live point **34**. The live points will then force the pusher bar and its arms **24, 25** upward as the curved gusset edge **42** rides on the short edge of the live point until each end of the pusher bar will ride on and travel across the top face of a live point until it reaches the rear of the live point when the bar will then drop into home position. When in this position the lug **67** will contact the reversing switch to again reverse the motor and drive the pusher forward and outward.

The live points are so placed over the conveyor that the pusher bar upon its return will not contact any packages that may be thereon. The left end of the pusher bar, the end away from the package stop **16**, may be used to hold back packages on the conveyor as the bar crosses the conveyor, but, as soon as the bar clears the conveyor, a new line may start to form and continue to form until the bar has returned to home position and again moves outward. A special stop may be used to hold the feeding of packages while the bar is crossing the conveyor.

With this package feeder, the feeding operation may be continuous until the feeding is finished when the manual switch **68** may be used to stop the feeder. No stopping of the feeder is required while each line of packages is being formed as a new line may be started as soon as the previous one leaves the conveyor.

Having thus described my invention, an embodiment thereof, and its functioning, I claim:

1. A package feeder, comprising: a feeder stand having formed thereon slide frame guides for guiding in reciprocatory movement a slide frame; a slide frame adapted to have reciprocatory movement on said guides; a pusher bar and pusher bar arms forming a pusher, each end of said bar having connected thereto one end of one of said arms; a pivot for the other end of each of said arms pivotally connecting each arm to said frame so that said bar extends transversely of the direction of movement of said frame, and so that said bar may be moved by said frame and may pivot transversely of itself; a pass-by-pawl associated with said stand and said pusher and guiding said pusher so that as said pusher bar moves away from said stand it will move at a lower level than when moving toward said stand whereby said bar will act in the nature of a ratchet pawl to move material away from said stand and to ride over such material as said bar returns toward said stand.

2. A package feeder, comprising: a conveyor adapted to deliver packages in a row, a feeder stand adjacent to such conveyor and alongside such row, said stand having formed thereon slide frame guides for guiding a slide frame in reciprocatory movement transversely of said row, a slide frame adapted to have reciprocatory movement on said guides, a pusher bar and pusher bar arms forming a pusher, arm pivots, said bar being parallel to said row and pivotally supported on said frame by said arms and pivots, a drive for said slide frame whereby said pusher bar will sweep back and forth across said row, and a pass-by-pawl associated with said stand and said pusher and guiding said pusher so that as said bar moves in one direction across said row it will remove packages therefrom and as it moves in the other direction it will rise and pass above said row.

3. A package feeder, comprising: a stand, horizontal guides on said stand, a slide mounted for reciprocatory movement in said guides, a pusher bar, arms secured at one end of each to said bar and pivoted at the other end of each to said slide so that said bar may have movement transversely of said slide, cam means for raising said bar in one directional sense of movement but not in the other sense, a chain secured to said slide, a motor connected to said chain for reciprocatory movement thereof and of said slide and bar.

4. A package feeder adapted to move a row of packages, comprising: a live point cam, a pusher bar arranged along side of and parallel to such row, means for giving said bar movement transversely of said row, and follower means associated with said bar for contact with said live point so that said follower means will pass over said point when said bar moves in one directional sense but not when said bar moves in the opposite sense, and so that said bar will pass over such row when moving in one of such senses but will move such row when it is moving in the other of such senses.

5. A package feeder, adapted to move a row of packages, comprising: a pusher bar arranged along side of and parallel to such row, means for giving said bar movement transversely of said row, and a live point cam and a follower for said cam, interengagement of said cam and follower controlling the position of said bar so that when said bar moves in one direction transversely of such row it will pass over such row but when moving in a direction oppositely to said one direction it will move such row.

6. A package feeder adapted to move a row of packages and comprising: a stand, a pusher bar arranged alongside of and parallel to such row of packages, means

for moving said pusher bar relative to said stand in opposite directions transversely of such row of packages generally horizontally, and cooperating cam and follower members, one of said members being mounted for movement with said pusher bar and the other of said members being mounted on said stand, and one of said members being mounted for movement relative to its mounting structure by interengagement of said members effected by movement of said pusher bar in one direction in which it moves such row of packages, and said cam and follower members being engageable to raise said pusher bar over such row of packages by movement of said pusher bar in the opposite direction.

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