May 18, 1965 J. M. TINDALL 3,183,642

FOOD PACKAGING MACHINE

Filed Sept. 28, 1962 3 Sheets-Sheet 1

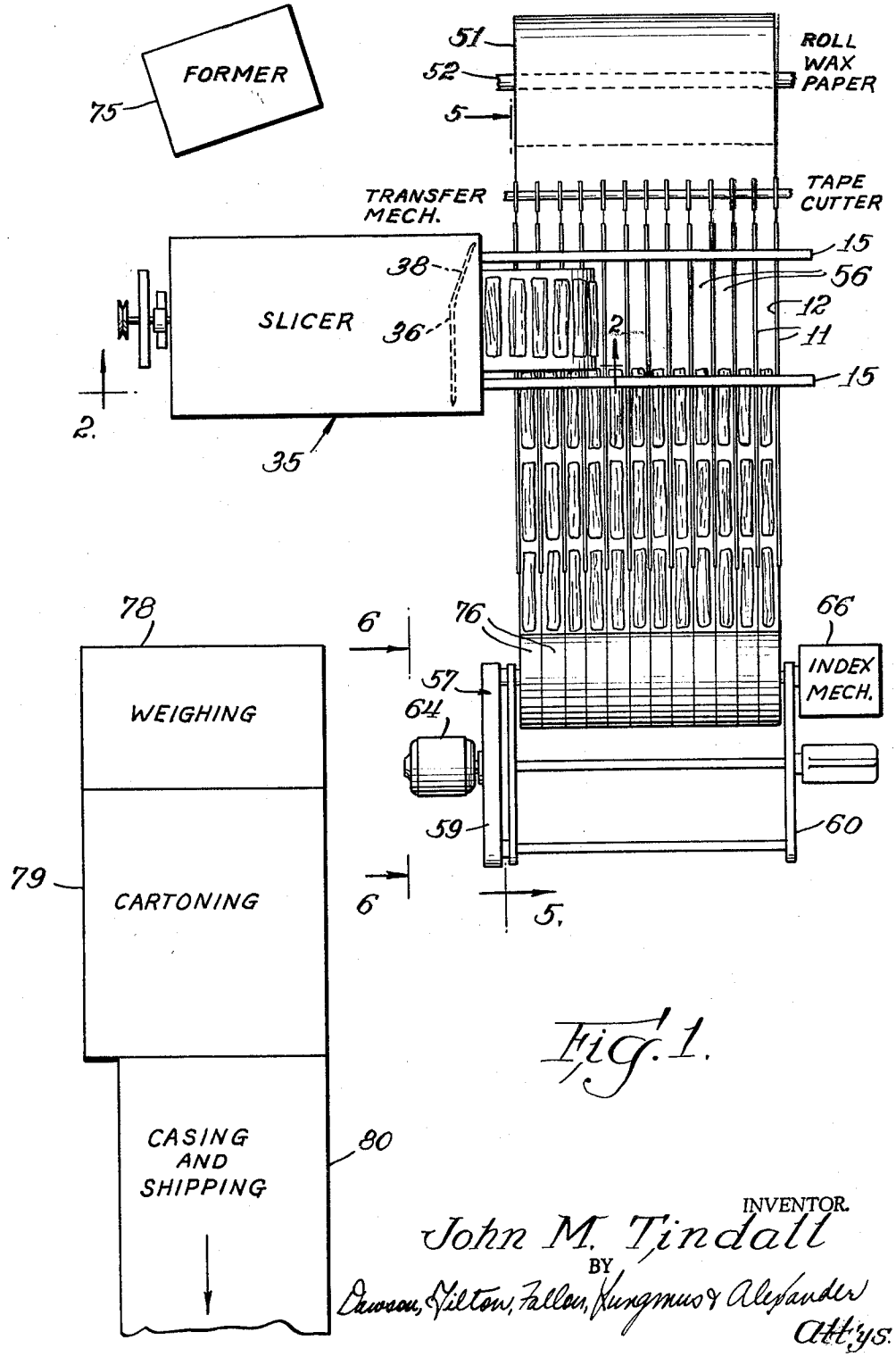


Fig. 1.

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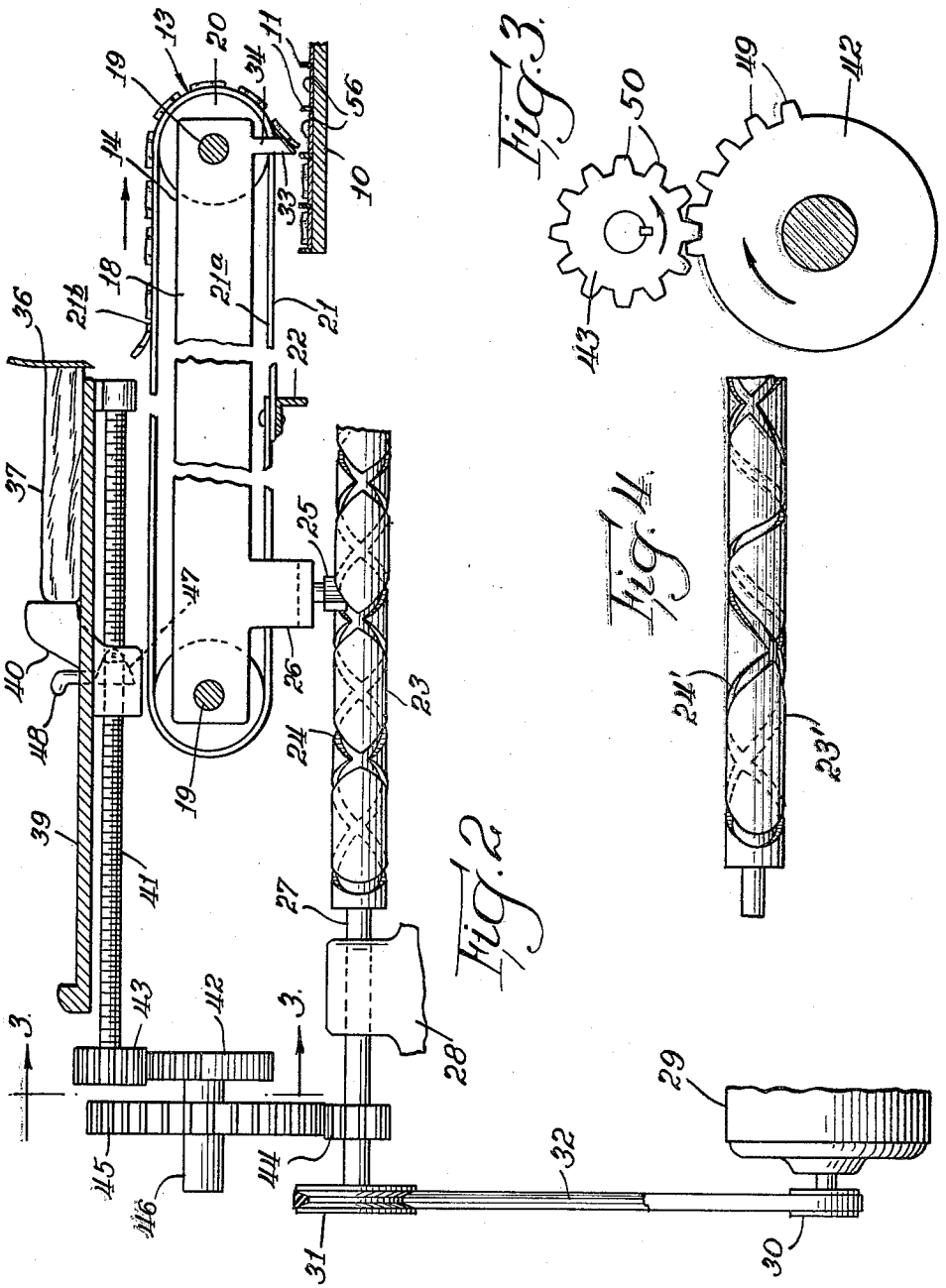


Fig. 2

Fig. 3.

Fig. 4

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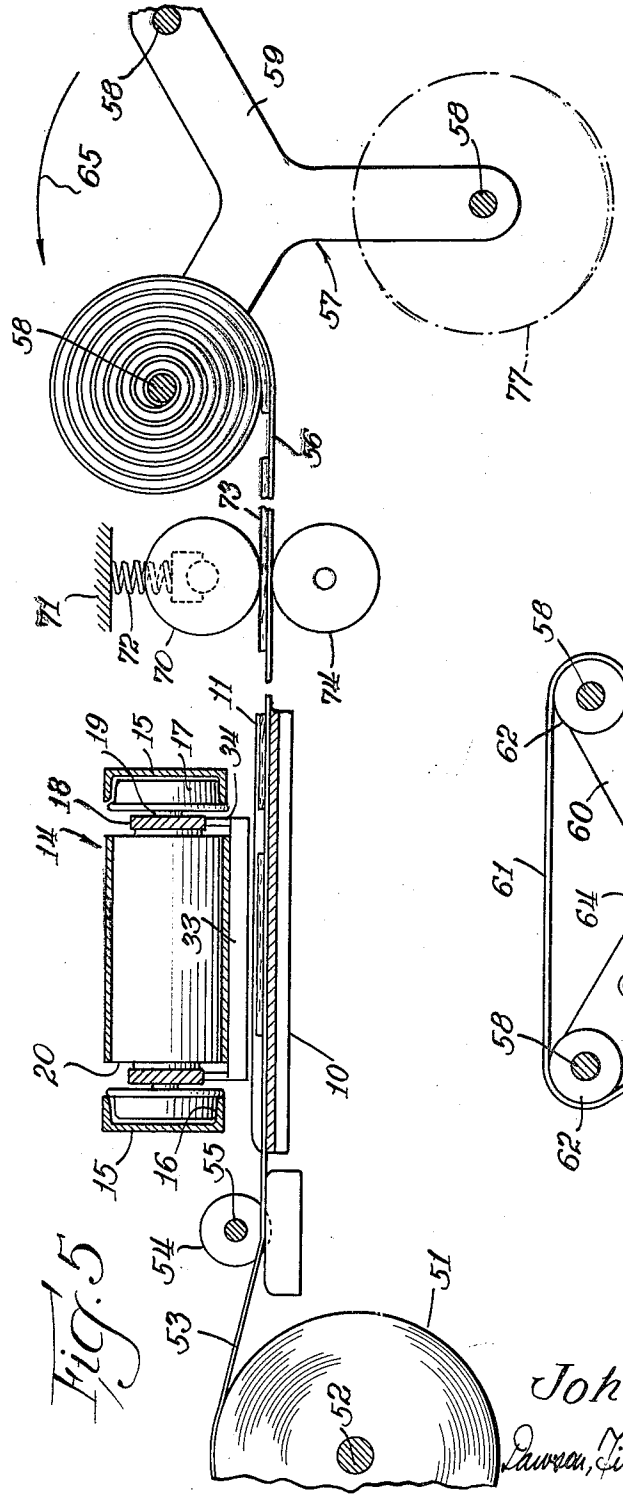


Fig. 5

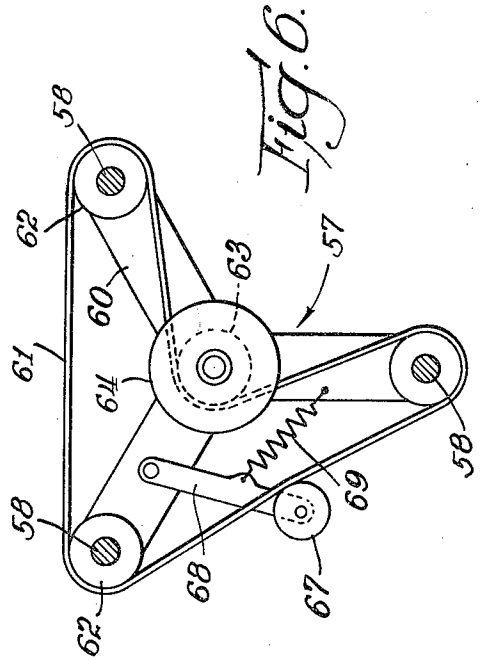


Fig. 6

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FOOD PACKAGING MACHINE

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11 Claims. (Cl. 53—251)

This invention relates to a food packaging machine, and more specifically, to a machine particularly suited for use in connection with the packaging of sliced food products such as bacon, luncheon meats, cheese and the like.

In my Patent No. 3,015,583, issued August 28, 1962, I disclose a roll-type bacon package in which a plurality of bacon slices are carried by a spirally-wound web of grease-resistant paper or plastic material, the roll being disposed within a carton and being rotatably supported upon a spindle provided therein. As the web is pulled outwardly through a side opening in the container, the roll unwinds and the bacon slices are extracted one-by-one upon the web. Since the portion of the web being withdrawn from the container at any given time extends tangentially with respect to the roll, a peeling action occurs between the undersurface of that portion and the outermost slices remaining on the roll and, therefore, bacon slices may be readily withdrawn from the package even though the slices have become hardened from refrigeration.

A principal object of the present invention is to provide a machine suitable for use in loading and winding bacon slices and the like upon webs to form rolls of slices for use in such packages. Another object is to provide a machine capable of loading the webs for a plurality of rolls in quick sucession, the machine operating automatically to carry such slices from a slicer to the webs. A still further object is to provide a high-speed loading machine which is adapted to cooperate with a conventional slicer and which therefore is useable with much of the existing equipment in present-day packing plants.

Other objects will appear from the specification and drawings in which:

FIGURE 1 is a top plan view of a machine embodying the present invention, the machine being shown partially diagrammatically and in conjunction with diagrammatically-represented related equipment for purposes of illustration;

FIGURE 2 is an enlarged sectional view taken along line 2—2 of FIGURE 1;

FIGURE 3 is a sectional view taken along line 3—3 of FIGURE 2;

FIGURE 4 is an elevational view of an alternative roller cam useable in the machine of the present invention;

FIGURE 5 is an enlarged cross sectional view taken along line 5—5 of FIGURE 1;

FIGURE 6 is an elevational view taken along line 6—6 of FIGURE 1.

In the embodiment of the invention illustrated in the drawings, the numeral 10 designates a horizontal platform or frame having a plurality of longitudinally-extending and uniformly-spaced parallel partitions 11 along the top surface thereof, the partitions defining a plurality of parallel troughs or channels 12. In the illustration given, 12 such channels are provided although it is to be understood that a greater or smaller number may be used depending upon the intended capacity of the unit.

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Above the platform and extending transversely with respect to the channels thereof is a feed assembly generally designated by the numeral 13 and comprising a carriage 14 mounted for horizontal reciprocatory movement upon a pair of transversely extending tracks 15. As shown in FIGURE 5, the tracks are generally C-shaped in cross section and are arranged in spaced concave opposing relation, the generally horizontal lower stretches 16 of the tracks supporting the side wheels 17 of the carriage 14. Tracks 15 are stationary and are rigidly secured to a floor or suitable stationary supporting structure by any suitable means.

Carriage 14 comprises a pair of side members 18 provided with openings at opposite ends thereof for rotatably receiving horizontal axles or shafts 19. Wheels 17 are fixed to opposite ends of the shafts so that the shafts are set in rotation as the carriage advances and retracts along tracks 15.

Between the side members or plates 18 and fixed to the shafts 19 are a pair of cylindrical drums 20. A transfer belt 21 extends about the spaced drums or rollers 20 and, since the rollers are secured to shafts 19, the belt rotates with respect to the carriage as the carriage moves along its tracks. It is important and should be noted, however, that the lower stretch 21*a* of the belt will remain stationary with respect to the tracks; that is, the lower stretch will not shift longitudinally with respect to the tracks or transversely with respect to the channels of platform support 10. If desired, the belt's lower stretch may be fixed by bracket 22 to the side tracks 15.

The carriage is reciprocated by means of a cylindrical cam shaft 23 which has an endless spiral groove 24 therein. A rider 25 travels along the groove and is pivotally secured to a depending strap portion 26 provided by the side plates 18 of the carriage. As shown in FIGURE 2, the cylindrical cam is carried by a shaft 27 which is journaled in frame portion 28 and which is driven by an electric motor 29, or any other suitable driving means. Pulleys 30 and 31, and belt 32, operatively connect the motor and the shaft for the cylindrical cam. It will be observed that the cam has its horizontal axis parallel with the direction of movement of the carriage and at right angles to the direction of channels 12 and partitions 11.

At the forward end of the carriage and traversing the underside of endless belt 21 is a stripper element 33. The stripper element essentially comprises a horizontally elongated plate which extends across the carriage and which slopes upwardly and forwardly with respect thereto. The upper edge of the plate contacts, or is disposed in extremely close proximity to, the outer surface of belt 21 as it passes beneath the front roller 20 of the carriage. As shown in FIGURES 2 and 5, the stripper element may be supported from the side members 18 by depending support arms 34.

The structure so far described is adapted for use in conjunction with conventional rotary bacon slicers which are capable of being synchronized with the reciprocatory operation of the carriage. As is well known, a conventional rotary slicer of the type designated generally by the numeral 35 is provided with a driven cutting blade 36 which is shaped to cut a slice of bacon (or other food product) from a slab 37 with each rotation of the blade. A deflecting skirt portion 38 provided by the

blade directs the cut slices in a desired direction, normally downwardly and away from the blade, after the slices are cut. Since the construction and operation of such a slicer is entirely conventional, further description of the slicer, except as to those features which relate to its synchronization with the reciprocable carriage, is believed unnecessary herein.

Referring to FIGURE 2, it will be noted that the slicer is provided with a slab-supporting plate 39. A pusher element 40 advances a formed slab along the support and into contact with the slicing blade 36. In the illustration given, this pusher element is advanced by rotation of a threaded shaft 41 extending therethrough, the shaft being supported against axial and transverse movement with respect to the support 39 but being rotatably driven by drive gear 42 and pinion 43, the drive gear being part of a gear train comprising gears 44 and 45 which connect the cam shaft 27, intermediate shaft 46 and the shaft of motor 29 for simultaneous rotation. The pusher element 40 is equipped with a sectioned and pivotally mounted nut 47 which normally engages the threads of shaft 41 but which may be pivoted away from the shaft by movement of release lever 48. Thus, by manipulating the release lever, an operator may release the pusher elements from operative engagement with threaded shaft 41 and may retract the pusher into a starting position for the placement of a new slab or slabs 37 upon support 39.

In FIGURE 3 it will be observed that drive gear 42 is provided with teeth 49 over only a portion of its circumference, whereas the teeth 50 of pinion 43 extend about the entire circumference thereof. For reasons which will be apparent from the description hereinafter, the arc of the toothed portion of gear 42 is of an extent sufficient to rotate pinion 43 only so long as carriage 14 advances towards and over the platform or bed 10.

Referring to FIGURES 1 and 5, a feed roll 51 is carried by transverse shaft 52 at one end of the bed or platform 10, the roll providing a supply of grease-resistant paper or other suitable sheet material. The unwound portion 53 of the sheet extends beneath a plurality of circular cutting knives 54 arranged in spaced relation along horizontal shaft 55 and in parallel relation with respect to the partitions 11 of the bed. The cutters 54 thereby slice the unwound sheet 53 into a plurality of webs or strips 56 which extend along channels 12 beneath the transverse path of movement of the reciprocable carriage.

At the opposite end of the bed or platform is a rewind mechanism illustrated somewhat diagrammatically in FIGURES 1, 5 and 6. The rewinder 57 is conventional in construction and general operation and comprises a plurality of shafts 58 carried by turret members 59 and 60 and rotatably driven by a belt 61 entrained about driven pulleys 62 connected to the shafts and about drive pulley 63 affixed to the shaft of motor 64. The rotatable turrets are rotated at selected intervals in the direction indicated by arrow 65 in FIGURE 5, thereby indexing shafts 58 into web-receiving and winding positions. A suitable indexing mechanism 66 is provided for energizing motor 64 and thereby automatically indexing the webs 56 forwardly or longitudinally a predetermined distance as the carriage retracts. Proper tension of belt 61 is maintained by an idler wheel 67 carried by an arm 68 connected to spring 69, the spring urging the wheel into contact with the belt as shown in FIGURE 6. Since the rewind mechanism is conventional and since such mechanisms are well known in the art, further description is believed unnecessary herein except insofar as such mechanism relates specifically to the operation of the other components of the apparatus.

If desired, a spring loaded flattening roller 70, mounted upon overhead frame portion 71 and carried by springs 72 may be provided between the feed or transfer mechanism 13 and the rewinder 57 to insure that bacon or food slices 73 lie flat upon the upper surfaces of webs or strips 56. In the illustration given, the force of the flattening roller is opposed by a backing roller 74 mounted for rotation about a stationary axis directly beneath the flattening roller and webs 56. If considered necessary or desirable, the flattening roller may be warmed by any suitable heating means to prevent slices from clinging thereto.

In the operation of the apparatus, a slab of bacon, before being placed upon support 39, is shaped in a former as diagrammatically represented in FIGURE 1 and designated by the numeral 75. This "forming" step is conventional and is mentioned in connection with the apparatus of the present invention only because it is important to form the slab so that the slices to be cut therefrom will have a width no greater than the width of channels 12 of the platform or of the webs received within those channels.

With the formed slab in place upon support 39, an operator adjusts the position of pusher 40 so that the slab will be urged against the constantly rotating slicing blade 36 as soon as threaded shaft 41 commences rotation. As previously mentioned, shaft 41 starts rotating to advance the pusher 40 only when the carriage 14 advances, that is, when the carriage moves from the left to the right as viewed in FIGURE 2. The rate of advancement of the carriage is governed by the speed of rotation of cylindrical cam 23, and this speed is in turn related to the rotational speed of the cutter so that the upper stretch 21*b* of the carriage belt will move away from the slicing station slightly faster than the rate at which slices are deposited thereon. Thus, a slight gap will be drawn between the slices as they are deposited upon the forwardly moving belt surface 21*b*, and the distance between the centers of adjacent slices disposed upon the belt will be substantially identical to the distance between the centers of adjacent webs 56 supported upon the bed or platform 10.

Drive gear 42 meshes with pinion 43 only until the number of slices deposited upon belt 21 equals the number of webs carried by bed 10. Thereafter, the drive gear disengages from the pinion and the advancement of pusher 40 is discontinued until the next cycle of movement of the carriage.

When the carriage is in its retracted position, and when the first slice of a group of slices is deposited upon the belt 21, carriage 14 is spaced laterally with respect to bed 10. It is not until after a number of slices have been deposited upon the belt that the foremost slice is carried about front roller 20 and engages stripper element 33. The bed and carriage are positioned and arranged so that when the first slice of a group is carrier into contact with the stripper plate, the slice and the plate will be moving into position directly above the first channel (i.e., the first encountered channel) of the bed. Continued advancement of the carriage results in a stripping of the foremost slice from the undersurface of the belt and the depositing of that slice upon the web supported within the first channel. Further advancement of the carriage brings the second slice into contact with the stripper element and results in a depositing of that slice onto the web of the second channel, and this operation is continued until all of the slices carried by the belt 21 are deposited into the web-supporting channels of the bed from one side of the bed to the other.

It will be noted that the slices are deposited upon belt 21 in a transverse direction, and since the carriage travels at right angles with respect to the channels of the bed, the slices deposited upon the webs will extend in parallel relation therewith.

When all of the slices of a single series or group have been deposited upon the webs supported by the bed, carriage 14 is returned to its retracted position by the action of the grooved cylindrical cam 23. During this retraction of the carriage, the indexing mechanism 66 is actuated and all of the webs 56 are advanced along the channels of the bed a distance slightly greater than the

length of the bacon slices being deposited thereon. By the time the webs are indexed forwardly the required distance, carriage **14** again executes its forward sweep and slab **37** is urged into contact with the rotating slicer blade **36** by reason of resumed advancement of pusher **40**. The above operation is then repeated to deposit a second group of slices upon the parallel webs **56**.

To speed retraction of the carriage, it may be desirable to provide a cylindrical cam **23'** of the type represented in FIGURE 4. Cam **23'** is identical to the cam **23** already described except that the slope of the advancing and retracting portions of groove **24'** are different, the angle (with respect to the axis of the cam) being less for the carriage retracting portion of the groove and thereby causing the carriage to retract at a faster rate than it advances.

After rolls **76** of approximately the desired size have been formed upon one of the spindles or shafts **58**, the turret is rotated one third of a revolution and the torn or cut ends of the webs supported by the platform (or by the backing roller **74**) are brought into contact with an unloaded spindle **58** to commence winding of the webs thereon. The loaded spindle, having been lowered into the position illustrated by broken lines **77** in FIGURE 5, is disconnected from the turret and the rolls of bacon are slid therefrom. These rolls are then weighed at a suitable weighing station diagrammatically represented in FIGURE 1 and designated by the numeral **78**, and slices are either added or subtracted therefrom in order to obtain rolls of the desired weight. Thereafter, the rolls are placed within cartons of the type disclosed in Patent 3,015,583, at a station designated by the numeral **79**, and the packaged rolls are then placed within larger containers for shipment at a station designated by the numeral **80**.

An important aspect of the present invention lies in the fact that while the carriage **14** travels horizontally with respect to the bed or platform **10**, the lower stretch **21***a* of the belt is stationary with regard to the bed. This fact is significant in properly stripping slices from the belt and in depositing those slices, without twisting, dislocating, or rolling thereof, upon the webs **56** disposed within the channels of the bed. Since the lower stretch of the belt and the bed are stationary with respect to each other, the problems of properly orienting the slices which might otherwise arise because of the momentum thereof are avoided for all practical purposes.

In the foregoing, I have described the carriage as moving over the bed, although it is to be understood that it is the relative movement between the parts that is essential for operation of the apparatus.

While in the foregoing I have disclosed an embodiment of the invention in considerable detail for purposes of illustration, it will be understood by those skilled in the art that many of these details may be varied without departing from the spirit and scope of the invention.

I claim:

1. In a food slice packaging machine for the packaging of discrete food slices capable of sticking to a supporting surface, a horizontal platform adapted to support a plurality of longitudinally-extending parallel webs of sheet material thereon, a reciprocable carriage movable horizontally and transversely relative to said platform between an advanced position over said platform and a retracted position to one side of said platform, said carriage being provided with a belt extending horizontally and transversely with respect to said platform and carried by a pair of rollers and having their rotation axes extending parallel with reference to said platform, means rotating said belt upon said rollers as said carriage is advanced so that the lower stretch of said belt remains substantially stationary with respect to said platform, means for dispensing food slices at a preselected rate upon the upper stretch of said belt as said carriage is moved between retracted and advanced positions, and stripping means provided by said carriage and movable therewith for peeling food slices from the lower stretch of said belt as said carriage moves from its retracted to its advanced position, whereby, food slices are peeled and transferred from the lower stretch of said belt while said lower stretch is stationary relative to said platform.

2. The structure of claim 1 in which said belt has its lower stretch secured to said platform.

3. The structure of claim 1 in which means are operatively associated with said platform and synchronized with said carriage for indexing webs longitudinally along said platform as said carriage retracts.

4. In a machine for packaging discrete food slices capable of sticking to a supporting surface, a horizontal platform adapted to support a plurality of longitudinally-extending parallel webs of sheet material thereon, a reciprocable carriage provided with a belt extending horizontally and transversely with respect to said platform and carried by a pair of rollers having their rotational axes extending longitudinally of said platform, said carriage and platform being movable relative to each other between a first position wherein said carriage is disposed over said platform and a second position wherein said carriage is disposed to one side of said platform, means for rotating said belt upon said rollers as said carriage is moved from a relative position from one side of said platform to a point over said platform so that the lower stretch of said belt remains substantially stationary with respect to the platform during such movement, and a stripping element mounted upon said carriage for engaging and peeling food slices from the lower stretch of said belt as the relative movement of said carriage is from said second position to said first position, whereby, food slices are peeled and transferred from the lower stretch of said belt while said lower stretch is stationary relative to said platform.

5. The structure of claim 4 in which means are provided for dispensing food slices at a preselected rate upon the upper stretch of said belt as said belt is rotated.

6. The structure of claim 4 in which the lower stretch of said belt is attached to said platform.

7. The structure of claim 4 in which means are operatively associated with said platform and synchronized with the relative movement of said carriage and platform to index longitudinally the webs supported by said platform as said carriage and platform move apart.

8. In a machine for the packaging of discrete bacon slices, a horizontal platform adapted to support a plurality of longitudinally-extending parallel webs of sheet material thereon, a reciprocable carriage movable horizontally and transversely with respect to said platform between an advanced position over said platform and a retracted position to one side thereof, said carriage being provided with a belt extending horizontally and and transversely with respect to said platform and carried by a pair of rollers having their rotational axes extending longitudinally of the platform, means rotating said belt upon said rollers as said carriage is advanced so that the lower stretch of said belt remains substantially stationary with respect to said platform, means for dispensing bacon slices at a selected rate upon the upper stretch of said belt as said carriage is moved between retracted and advanced positions, means for advancing and retracting said carriage, and a stripping element provided by said carriage and movable therewith for engaging and peeling bacon slices from the lower stretch of said belt as said carriage moves from its retracted to its advanced position, whereby, bacon slices are peeled and transferred from the lower stretch of said belt while said lower stretch is stationary relative to said platform.

9. The structure of claim 8 in which said belt is endless and has its lower stretch secured to said platform.

10. The structure of claim 8 in which a pair of parallel horizontal tracks extend over said platform, said carriage being provided with wheels supported by said tracks.

11. The structure of claim 10 in which at least one of

said wheels is fixed to a roller of said carriage for rotating said belt as said carriage is shifted between advanced and retracted positions.

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