

Aug. 16, 1966

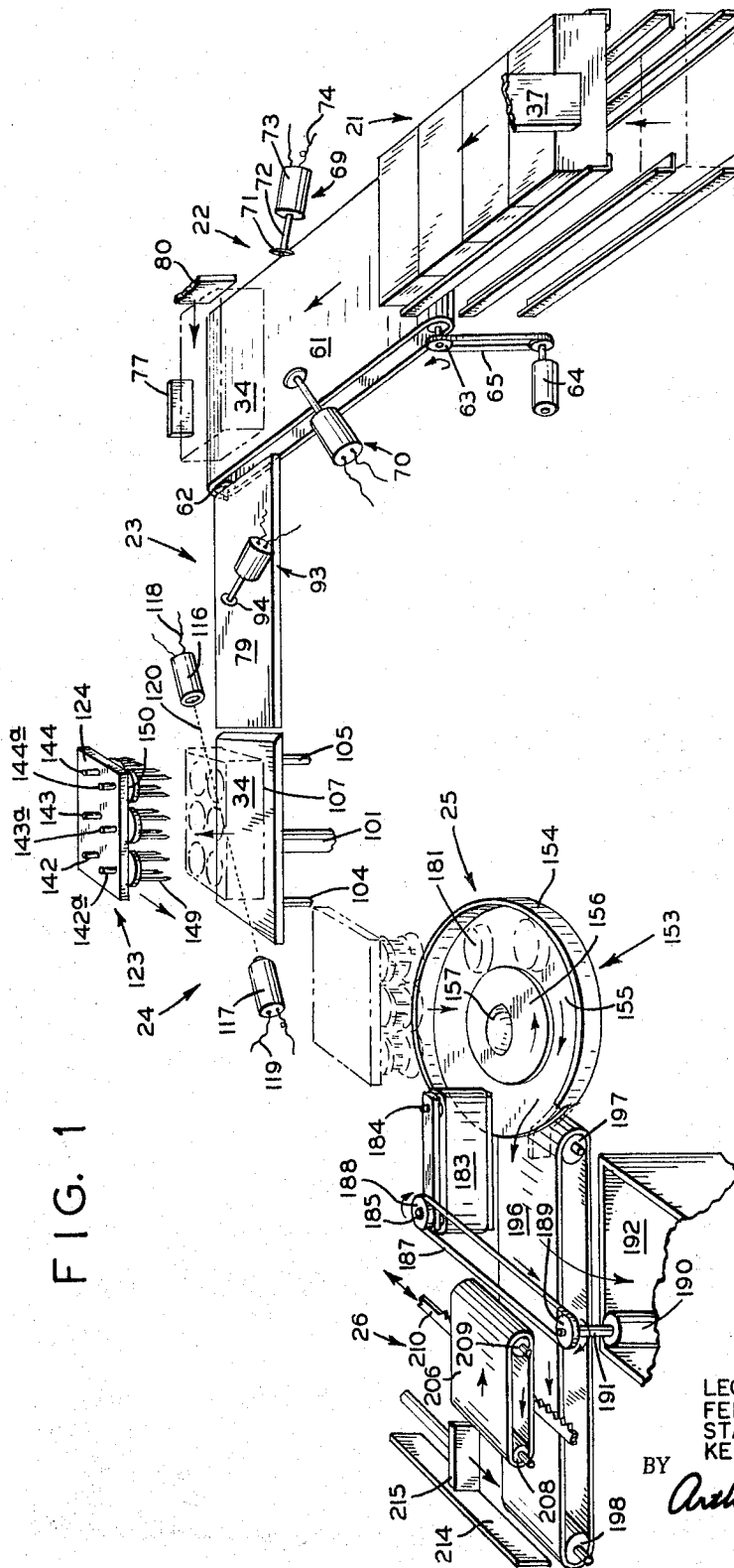
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3,266,541

PACKAGE OPENING AND DISPENSING MECHANISM

Filed May 24, 1965

6 Sheets-Sheet 1



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6 Sheets-Sheet 2

FIG. 2

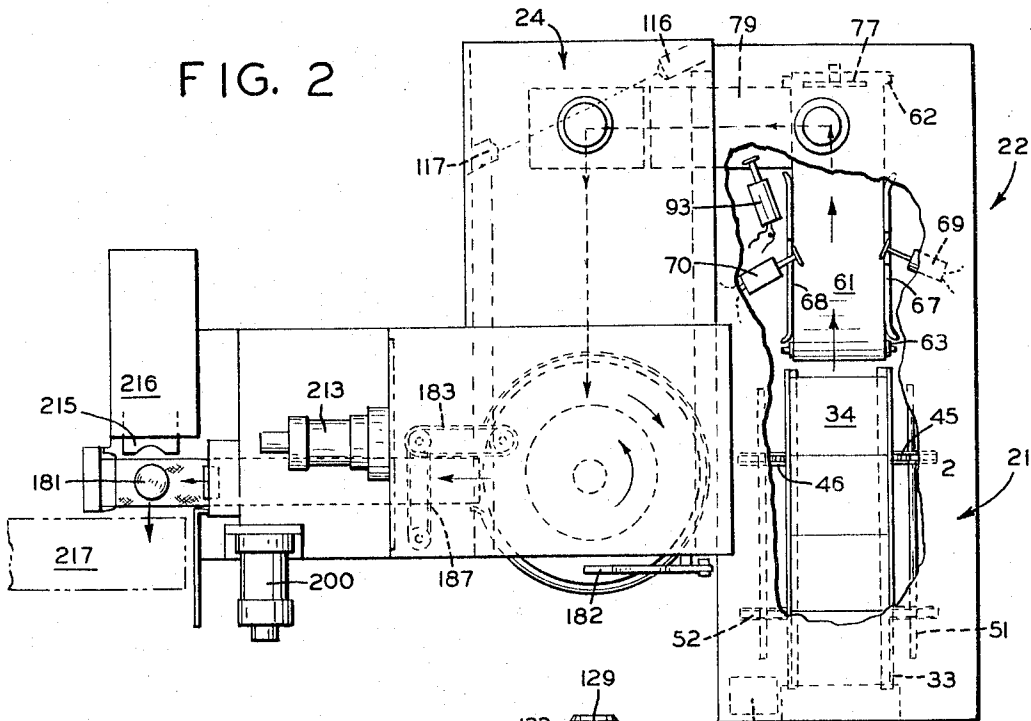


FIG. 3

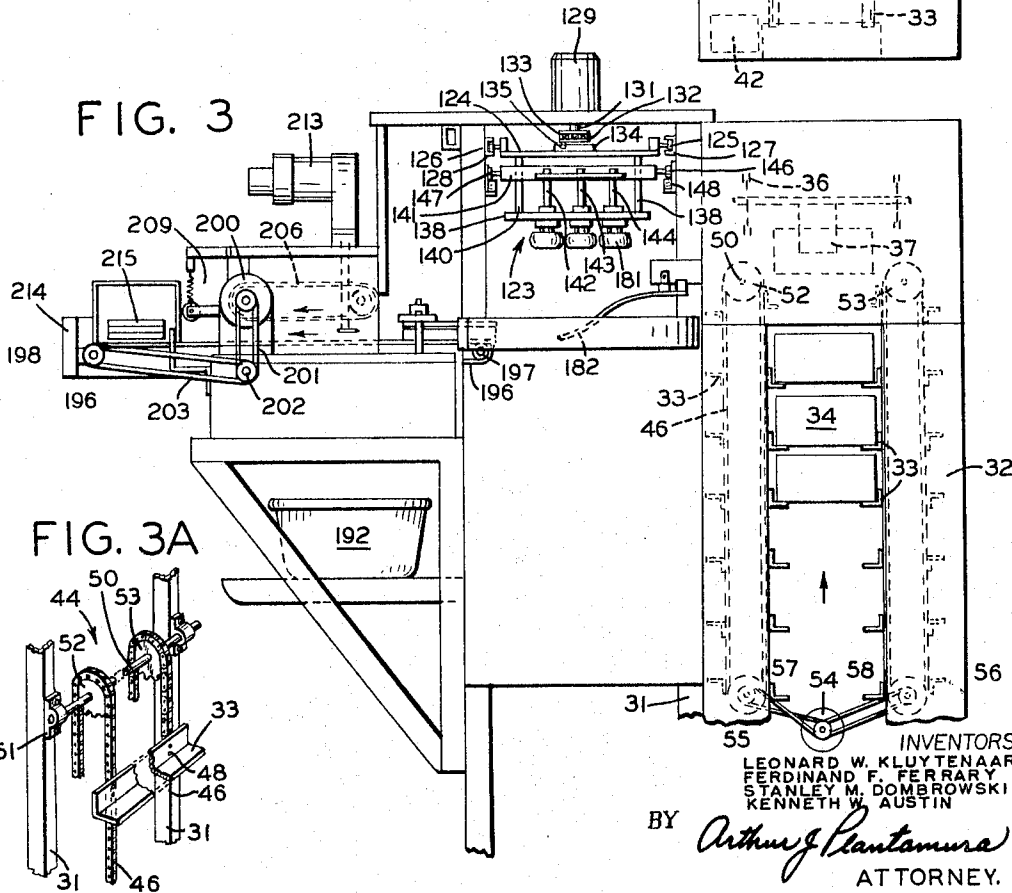
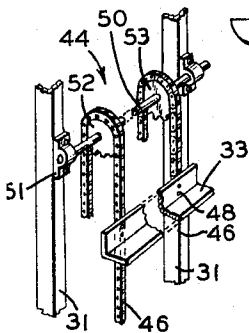


FIG. 3A



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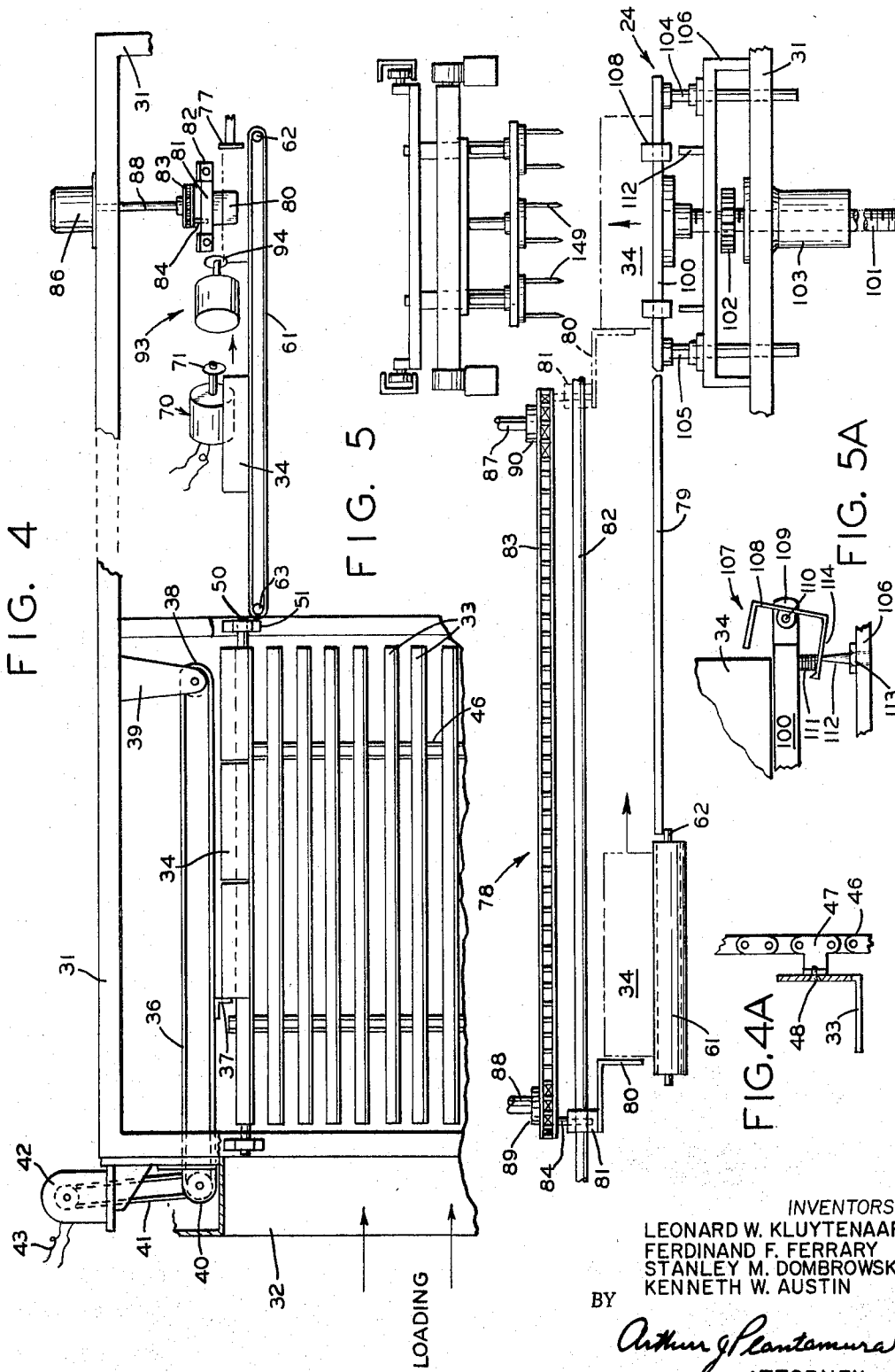
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6 Sheets-Sheet 3



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PACKAGE OPENING AND DISPENSING MECHANISM

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6 Sheets-Sheet 4

FIG. 6

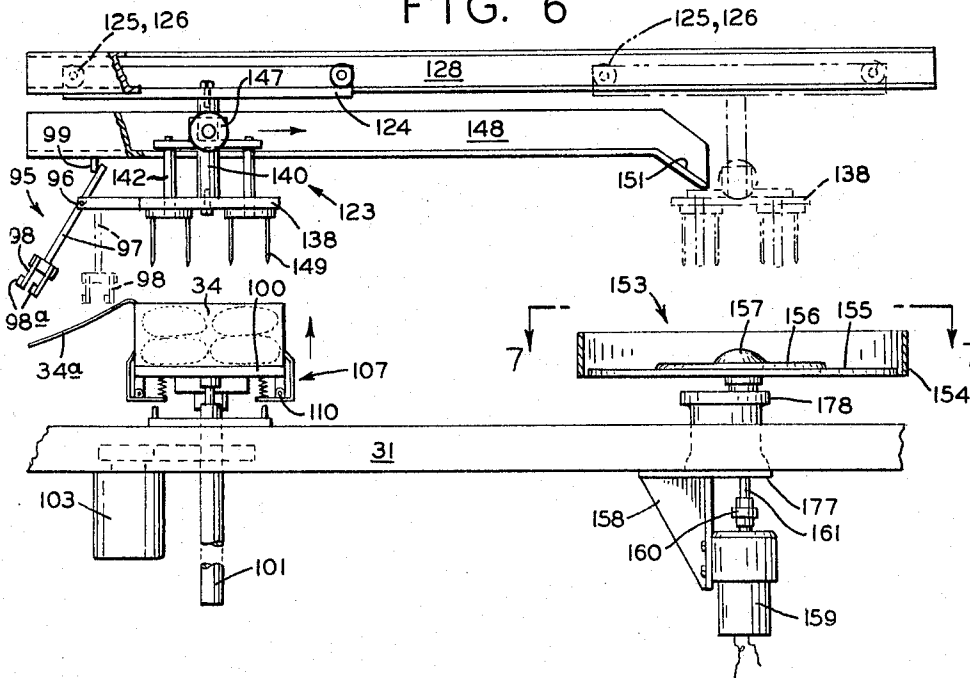


FIG. 7

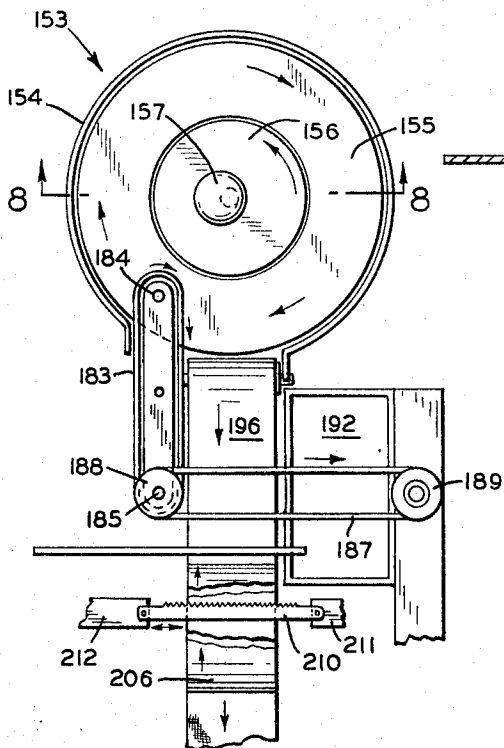
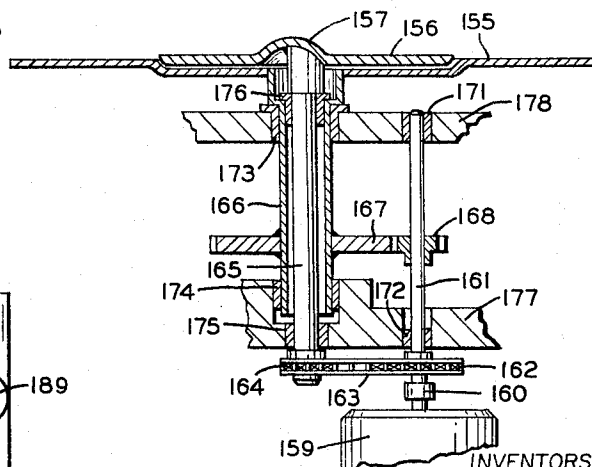


FIG. 8



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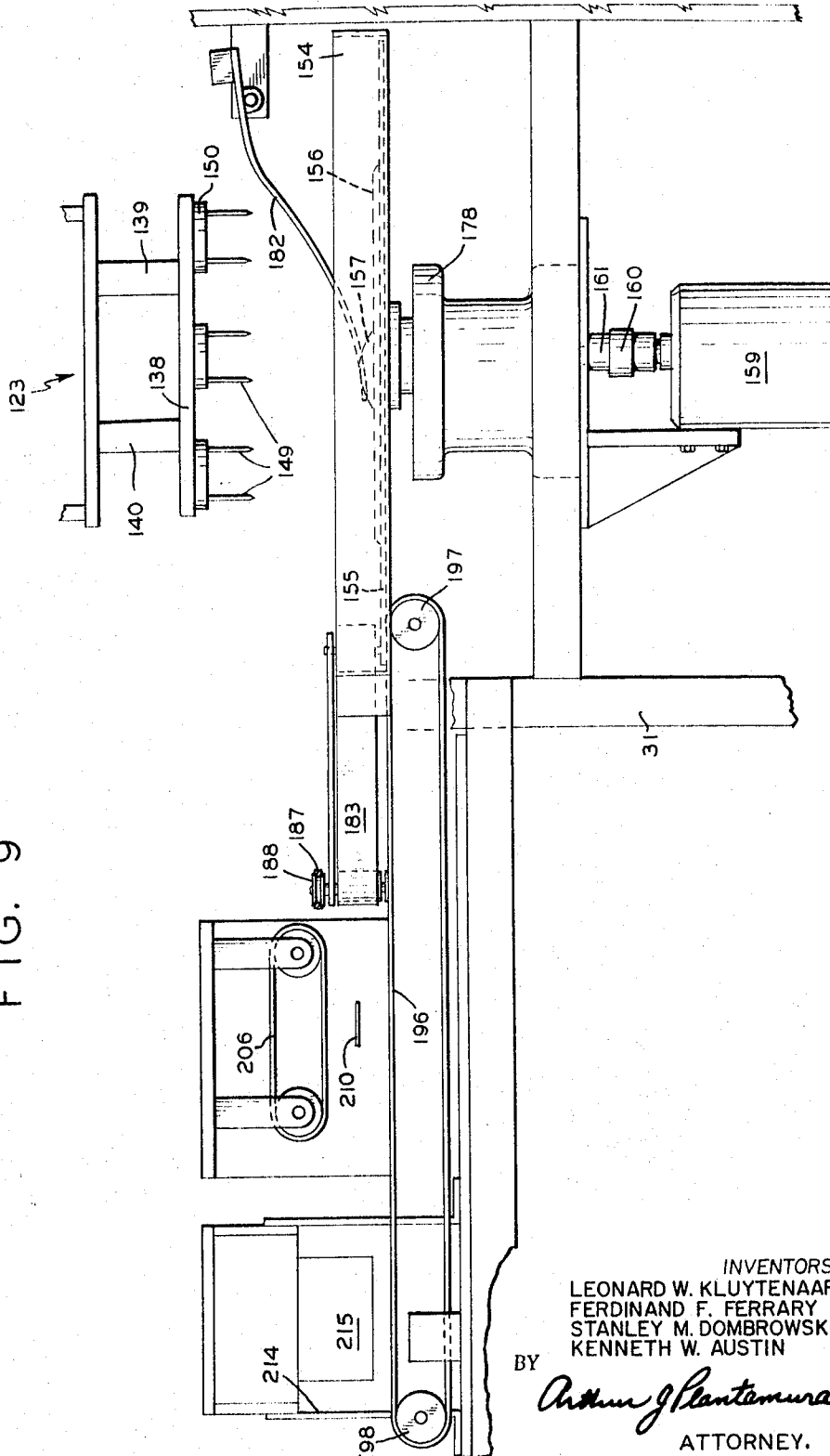
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PACKAGE OPENING AND DISPENSING MECHANISM

Filed May 24, 1965

6 Sheets-Sheet 5

FIG. 9



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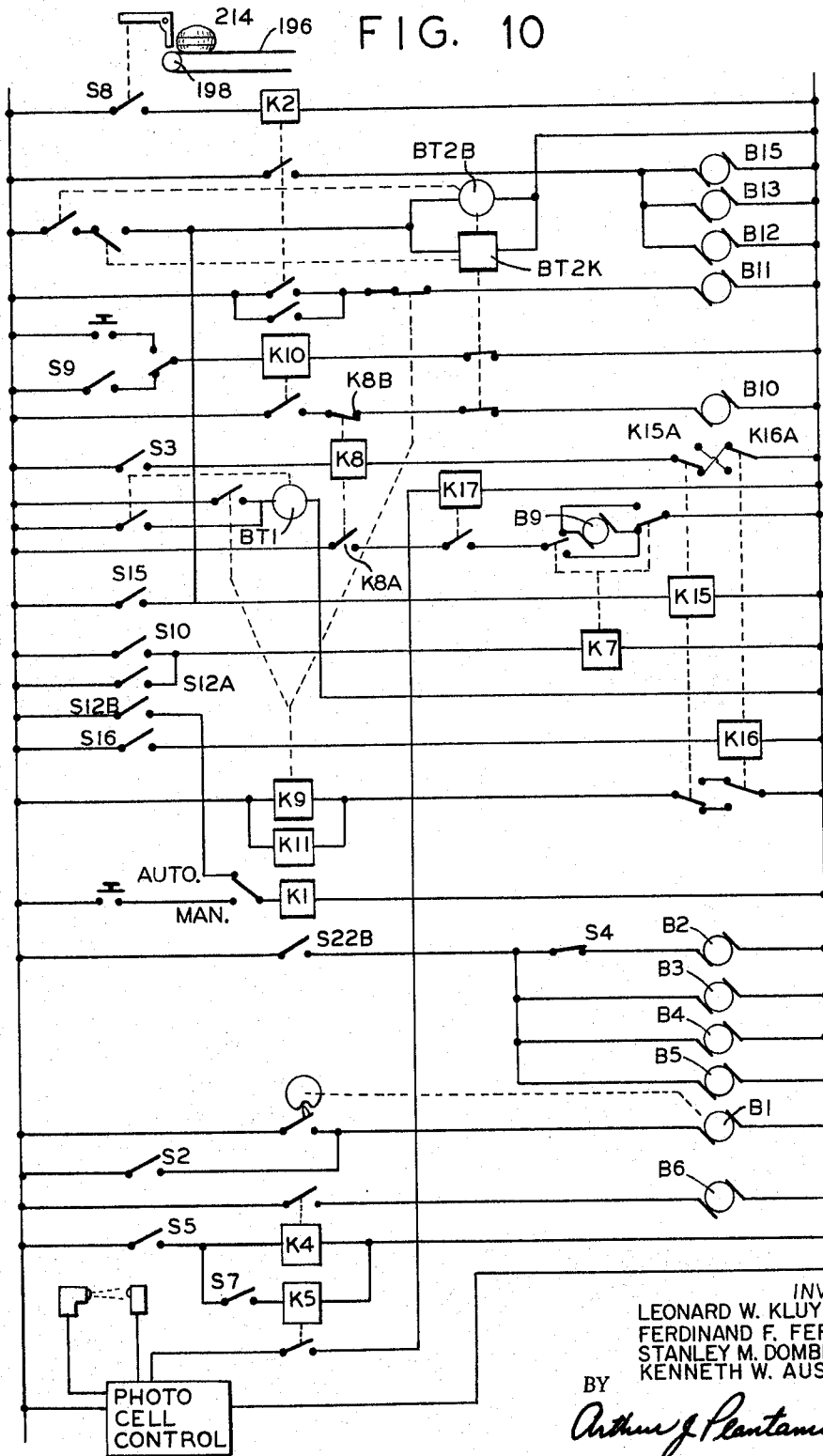
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PACKAGE OPENING AND DISPENSING MECHANISM

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6 Sheets-Sheet 6

FIG. 10



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1

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3,266,541 PACKAGE OPENING AND DISPENSING MECHANISM

Leonard W. Kluytenaar, Stamford, Ferdinand F. Ferrary, Springdale, Stanley M. Dombrowski, Stamford, and Kenneth W. Austin, Milford, Conn.; said Kluytenaar assignor to American Machine & Foundry Company, a corporation of New Jersey
Filed May 24, 1965, Ser. No. 458,249
9 Claims. (Cl. 146—72)

This invention relates to dispensing apparatus and more particularly to a dispenser capable of storing packaged material such as bread rolls and automatically opening the package and dispensing individual items from the package on demand. To facilitate the description, the machine of the invention will be described in its function in connection with package bread rolls, but it will be apparent to one skilled in the art that the apparatus may be usefully adapted to dispense other packaged material.

In a more specific embodiment, the invention relates to an apparatus which may be combined with and from a part of a machine such as that described in the pending U.S. application of H. Udall et al., S.N. 220,615 which machine of the invention will be described in its functions of making a sandwich, i.e. storing, cooking, assembling, wrapping and dispensing. Sandwich forming apparatus of this kind advantageously form a part of an automated system for preparing and dispensing articles of food ready for consumption by a customer. Also, because of its automatic features the apparatus, of which the invention forms a part, is capable of use with an automated restaurant system of the kind, for example, which includes a centrally located attended control station where orders for food items are received directly, or by telephone or microphone, or other voice communication device, such as may be found at drive-in restaurants. An automated restaurant of this kind operates through electronic ordering and billing equipment in conjunction with a variety of different food preparing machines which on demand cook and dispense food items which are then conveyed and assembled at a central location. An illustrative automated ordering and billing system of this kind is disclosed, for example, in the N. Alpert et al. pending U.S. application S.N. 219,222.

The bread roll dispensing apparatus of this invention is characterized by its reliable on-demand capability. The machine comprises an independently operable unit as distinguished from a continuous production machine so that even though one or more hours may elapse since a prior item has been dispensed, upon demand, it functions rapidly and reliably to dispense a single or an indefinite number of bread rolls. The machine is also characterized by its control features which are sequentially operable and perform a function from a single electrical impulse which synchronously triggers later functions.

It is an object of the present invention to provide a novel apparatus for storing packaged material, automatically opening the package and dispensing individual items on demand.

It is a more specific object of the invention to provide a compact unit capable of storing substantially quantities of packaged bread rolls and upon demand automatically opening said packages and slicing and dispensing individual bread rolls.

It is another object of the invention to provide an automatically operable apparatus which automatically delivers from storage and positions a closed package of rolls, opens the package, displaces the wrapper, lifts the rolls from the package and individually slices and dispenses the rolls.

It is still another object of the invention to provide an apparatus which automatically dispenses rolls from a package and which is adapted to accommodate tolerable variations in bread roll size while rejecting rolls which are at a substantial variance in dimensions.

It is still a further and more particular object of the invention to provide a self-contained, automatic bread roll dispensing unit which may readily be incorporated as a part of an electronic ordering and billing system so that upon remote command, the machine feeds individual bread rolls to sandwich assembly machine which in turn delivers the assembled sandwich to a central assembly station.

The above and other objects and features and advantages of the invention will be better understood from the following detailed description thereof when considered in conjunction with the accompanying drawing in which:

FIG. 1 is a general perspective view of the dispenser illustrating partly schematically the various major segments or modules forming the automatic dispenser.

FIG. 2 is a plan view of the dispensing apparatus of the invention.

FIG. 3 is a front elevational view of the dispensing apparatus of the invention.

FIG. 3A is a detail in perspective of the package elevator mechanism.

FIG. 4 is an end elevational view illustrating with parts cut away illustrating the package goods storage area and the package cutting section and conveyor.

FIG. 4A is a detail of the elevator conveyor chain.

FIG. 5 is a side elevational view of the destacking and transfer section.

FIG. 5A is a detailed view of a suitable package gripping mechanism.

FIG. 6 is an alternate view of the destacking and transfer section, wherein the rolls are lifted from the package container and transferred to an orienting section.

FIG. 7 is a plan view illustrating the individual roll orienting section taken along line 7—7 of FIG. 6.

FIG. 8 is a sectional view taken along line 8—8 of FIG. 7.

FIG. 9 is a side elevational view illustrating the roll or bun slicing mechanism which is shown also in relationship to the roll or bun transfer mechanism and orienting section.

FIG. 10 illustrates an electrical diagram for automated sequence of the dispenser.

Referring to the drawing, the several major segments which may be modular in construction comprise:

(a) A boxed roll storage section 21 wherein a quantity of packaged rolls are stored in an elevator compartment which is arranged to feed the individual packages to

(b) The first stage paper cutting section 22 which includes a conveyor arranged to carry the package into an engagement with cutting elements which sever the wrapper of the package and thence to

(c) A second stage cutting section 23, which includes a cross conveyor or pusher wherein during this transfer the wrapper of the package which is already partially cut in its passage through section 22, is further severed

so as to allow folding back of the wrapper, and the package is delivered to

(d) A destacking and transfer section 24 where the rolls in the package are exposed and the rolls are lifted from the package and transferred to

(e) An orienting receiver section 25 where the buns are aligned for delivery to

(f) A discriminator and slicer section 26 where oversized or distorted rolls are rejected and the acceptable rolls are sliced and delivered for use at this point or alternately transferred to a take-away conveyor for toasting and assembly as in the hereinabove mentioned application of H. Udall et al., S.N. 220,615.

Reference is now made with greater particularity to FIGS. 2-4 of the drawing. As shown therein a cabinet 32 forms a storage compartment for a plurality of packages 34. The cabinet is suitably mounted on frame 31 which in turn is secured to, or otherwise rests on, a base or floor. Cabinet 32 comprises a plurality of shelves 33 mounted on pairs of endless movable chains 45 and 46 which carry shelf adapters 47. These chains move in opposite directions so that packages held for storage between the chain pairs are moved upward and, after delivery of packages at the top, the chains move downward as they reverse directions, see FIG. 3. The detail of the boxed bun elevator conveyor is illustrated by the fragmentary detail of FIG. 3A. The elevator arrangement comprises a plurality of shafts 50 suitably mounted on bearings 51 secured to frame 31. The shafts 50 carry the chain sprockets 52 and 53 on which chains 46 are mounted for movement. Forming part of the chain linkage as shown in the detail of FIG. 4A are angle chain adapters 47 on which the shelf elements 33 are secured, preferably by means of flush rivets 48 so as not to interfere with the movement of packages carried thereon. Chains 46 are mounted so as to be operable on the lower chain sprockets 55 and 56 which are comparable to the upper sprockets 52 and 53. The lower sprockets are appropriately driven by a motor 54 which preferably comprises a common drive for both sides of the box conveyor. The driving function may be suitably effected by means of belt connections 57 and 58 to sprockets 55 and 56, respectively.

The packages elevated at the upper most position in the storage cabinet 32 by the elevator conveyor 44 are incrementally fed to a take-away conveyor 61. This conveyor is suitably mounted for rotation at one end on a free or idler roller 62, and on the other end on a driven roller 63 to which a motor power supply by a motor 64 through a suitable connection 65 is attached. The package 34 pushed onto the conveyor 61 is transferred onto a conveyor 61 by a pusher arrangement shown in broken lines in FIG. 3 and again in the side view of FIG. 4. The package pusher comprises an endless conveyor belt chain 36 to which is secured a box engaging pusher element 37. Conveyor 36 is conveniently mounted on frame 31 as by bracket 39 which carries a freely rotating sprocket 38 on which the chain 36 is mounted. At the other end, chain 36 is mounted on a sprocket 40 suitably driven as by electric motor 42 through a belt connection 41. Electric leads for the motor 42 are shown at 43.

As the package 34 is delivered by a pusher 37 onto the conveyor 61, it is carried through guides 67 and 68 contiguous to conveyor 61 and under a pair of cutter elements 69 and 70 whereby the two opposite ends of the upper face (top) of the wrapper of package 34 is slit. Any suitable cutting device may be employed. As shown, elements 69 and 70 comprise self-contained units which include electric motor and housing 73 provided with electric leads 74 and a shaft 72 rotated by the motor and on which is mounted a rotary cutter blade 71. After passing under the cutters, the package 34 is carried into engagement with the actuator of a stop switch 77 where through suitable synchronized sequencing it is picked up

and transferred in a path at substantially right angle by means of a cross conveyor 78. Cross conveyor 78 carries the package 34 through a second slitting operation and delivers it to the destacking and transfer position 24.

As shown more clearly in FIG. 5, the conveyor 78 may be similar in configuration function to the conveyor 36 described hereinabove. Conveyor 78 is suitably driven as by motor 86 (see FIG. 4) through shaft 88 upon which a conveyor chain sprocket 89 is mounted. At the other end of the chain conveyor the sprocket 90 is mounted on a shaft 87. A pusher block 81 is secured by pin 84 to the chain 83. The block 81 carries the package engaging pusher element 80; block 81 being guided on rails or rods 82 in its movement. The bed 79, in section 23, comprises a smooth plate which offers no substantial resistance to the movement of the package as it is slid thereover by pusher 80.

Slitting element 93 is substantially a self-contained unit similar to that described for elements 69 and 70 and is provided with cutter element 94 which cuts the package transversely to the previous slits made in the package. When the cutting operations on the package are completed, the package has been cut on three sides so that the top of the wrapper which has been severed forms a flap which may be folded back by an element 95 as shown more clearly in FIG. 6.

The package 34 delivered to the destacking and transfer section 24 by pusher 80 is positioned on the elevator platform 100. Elevator platform 100 is supported on brackets 36 mounted on frame 31 and is arranged to accommodate boxes of packages having considerable variations in depth as occurs conventionally in commercial packages. The elevation of the platform 100 to the proper level is controlled by a photo electric sensing device of a conventional kind which comprises a photo-electric cell 116 and a light source 117 suitably equipped with electrical leads 118 and 119, respectively. In functioning the package 34 is elevated until the light beam 120 is interrupted whereupon the package is then positioned at the proper level for the transfer mechanism 123 to function appropriately in the process of the removal of the rolls from the package.

Elevation of the platform is effected by any convenient arrangement such as through a motor 103 which functions to elevate the platform 100 through a non-rotating screw 101, although other suitable alternate means such as a chain elevator (not shown) may be employed. The arrangement shown utilizes a gear 102 in conjunction with a fixed block (not shown) which, with the aid of guides 104 and 105, raises and lowers the platform 100 to the desired level as controlled by the photo electric devices 116 and 117. To hold the package 34 securely in alignment, a suitable clamping arrangement 107 (shown in detail in FIG. 5A) is used. The clamping device 107 includes clamp elements or fingers 108 (four being preferably employed) to grip the package 34 at its base, a bracket 109 in which the clamp element 108 pivots 110 and a spring 111 which is arranged in its at-rest position to hold the clamp 108 securely against the package 34. Release of the clamps is effected as the elevator platform 100, which carries adjustable stops 112 secured thereto at 113, is lowered toward support 106. In this down movement, the lower portion 114 of the clamp element 108 engages these stops and the clamp is pivoted away from the package 34 thereby releasing it.

The transfer mechanism 103 comprises a platform 124 which carries a plurality of bun pick-up and stripping elements 149. Other arrangements to effectuate this purpose where different items are involved and of course depending on the items to be lifted, will become apparent to one skilled in the art utilizing the machine of the present invention. The transfer mechanism 123 is equipped with sets of rollers 125 and 126 and is arranged by means of motive power provided by motor 129 to traverse a track 127 and 128 between the destacking and

transfer section 24, where the buns are picked up from the package, and the orienting section 25, where the buns are deposited onto the table 153. The bread rolls 181 are picked up from package 34 by impaling on pins 149 which, in order to afford a more secure grip, are preferably disposed at a slight angle from vertical and are stripped therefrom by the action of stripper rods 142, 143, 144, 142a, 143a and 144a. Additionally the individual pin clusters 149 may be arranged to have relative rotary movement so as to separate rolls which may be joined as often occurs in baking rolls closely together.

Rollers 125 and 126 are guided in the track 127 and 128 in their back and forth movement. Motive power is supplied through motor shaft 131 connected through sprocket 132 and chain 133. Chain 133 carries a pin 135 which engages in a block 134 secured to a platform 124. The arrangement is such that as the endless chain 133 rotates, the transfer mechanism is carried to and fro reversing direction as the pin 135 reverses direction around the sprockets on which the chain 133 is wound. The action of the pick-up pins 149 and stripper rods is effected by a cam track 148 which cam rollers 146 and 147, carrying stripper rod bars 141, engage.

By reference to FIG. 6 it is seen that as the boxed rolls are elevated, rolls 181 are impaled on pins 149. Upon being transferred along track 128, the action of the cam rollers in cam 148 moves the stripper rod 142 down between the pin holder 150 stripping the buns from the pins 149 as the roller 147 moves downward as a consequence of the cam direction at 151.

Shown mounted on the transfer mechanism (FIG. 6) is a wrapper fold back element 95. Element 95 comprises a support 97 arranged to pivot at 96 as the upper part of support 97 engages a fixed stop 99 attached to track member 148. Flexible wiper elements such as a row of rubber fingers 98, preferably as shown in a double row, function to fold back the slit wrapper from the package 34 as the transfer mechanism 123 moves (from right to left as shown in FIG. 6) over the package 34, with the severed wrapper, positioned on the platform 100. Protuberances 98a of a material such as rubber on elements 98 aid in increasing the frictional engagement of the wiper elements 98 with the slit wrapper 34a.

Rolls delivered to table 153 by mechanism 123 are oriented for delivery through the slicer conveyor 196 by a rotating table 153 in the orienting section 25. Table 153 includes rails 154, an outer rotating disc 155 and an inner rotating disc 156. The function of the rotating disc is to position the roll 181 contiguous to rail 154 so that they may be aligned and suitably guided individually onto the conveyor 196. Guidance of the roll onto conveyor 196 is aided by the turn conveyor 183. Disc 155 rotates so as to centrifugally move rolls deposited thereon onto the outer feed disc 155. Preferably disc 156 is arranged to rotate in a direction opposite to disc 155. A central hub 157 preferably eccentrically formed with respect to the center of the table aids in displacing rolls 181 from a dead center position on the table.

A suitable table disc driving arrangement is shown in greater detail in FIG. 8 and comprises a motor 159 coupled at 160 and arranged to drive a main shaft 161.

Shaft 161 is journaled at 171 in the mounting 178 and through a sprocket and chain arrangement 162, 163 and 164 drives an inner shaft 165 which is connected to the table inner disc 156. Shaft 165 is mounted in bearings 175 and 176. Connected to shaft 161 is the gear 168 which engages a gear 167 on an outer shaft 166 which is concentrically positioned over shaft 165. Shaft 166 is mounted in bearings 173 and 174 and furnishes the drive for the outer table disc 155 which preferably rotates in a direction opposite to that of inner table disc 156.

Positioned in table 153 so as to engage bread rolls 181 is a sensing switch 182 which signals the depletion of rolls and calls for a further supply. It is apparent that

various other arrangements to effect this purpose may be used to provide the signal calling for more rolls such as for example a counting type device (not shown) whereby an order signal is given after a predetermined number of rolls have been displaced.

As rolls 181 are carried to disc 155, they are directed onto the conveyor belt 196 aided by turn conveyor 183. Conveyor 183 is mounted on idler roller 184 and on a drive roller 185. Roller 185 is driven by a belt 187 connected to pulley 189 which in turn is driven by a motor 190 connected via shaft 191. Belt 187 is suitably positioned so that it functions also as a discriminator to discard into the receptacle 192 oversized or distorted rolls allowing only suitably sized and proportioned rolls to pass through the slicing area 26.

The slicing area comprises an upper conveyor 206 and a lower conveyor 196 suitably spaced so as to permit a roll to be passed therethrough and come into engagement with a slicer blade 210 positioned between the conveyors. An arrangement of this kind is described in greater detail in the pending U.S. patent application of D. Holden, S.N. 273,065. The lower conveyor 196 is suitably mounted on rollers 197 and 198 and is arranged to be driven by a motor 200 (see FIG. 3) connected by means of a belt 203 through the slicer conveyor pulley 198. Motor 200 functions through a jack shaft 202 as in driving the lower conveyor belt 196. This motor functions as well as the direct drive for the upper conveyor 206. Conveyor 206 is suitably mounted on roller arrangements 207 and 208. Illustrated at 209 is a suitable hold-down mechanism to add suitable tension to the belt 206. It is seen that sliced buns as they exit through the slicer may be delivered directly for use as for example onto the bread roll conveyor 98 of the sandwich making machine described in the hereinabove noted Udall et al., U.S. patent application S.N. 220,615. Alternately as shown in FIG. 1, the sliced roll may be delivered against the stop 214 and conveniently delivered into other processing apparatus by a pusher element 215 suitably driven by a motor 213 onto an accepting conveyor 217 (see FIG. 2). Various other mechanisms for receiving and handling the dispensed bun depending on its subsequent use will be apparent to one skilled in the art.

Summarizing the function of the apparatus of the invention it is seen that the dispenser provided comprises a plurality of modular elements in cooperative combination including a box storage cabinet wherein an endless vertical chain elevator consisting of a pair of double vertical chain loops is provided with a series of flights which move in a vertical plane. The shelves accommodate boxes of packaged goods, e.g., hamburger rolls such as the kind commercially produced and packed in open top boxes and overwrapped with cellophane, wax paper, or other commercial wrapper. These boxes are inserted so that they span the space between opposite conveyor chains which are provided with package support elements and comprise the shelves of the storage cabinet 21. Mounted directly above the point where the shelf conveyor reverse direction is a take-away conveyor 61 which carries away one box at a time from the top shelf.

The signal for the box to be fed is transmitted from the destacker unit when the elevating mechanism in section 24 reaches the upper limit and cams a switch, thereby starting the box pusher 80.

When only one shelf load of boxes remain in the storage unit 21, a signal is transmitted as soon as the first box of this last shelf is dispensed to indicate near depletion of supply. The cabinet may of course be arranged to have any appropriate capacity. A convenient storage capacity for example is 36-48 boxes. Loading time of the storage unit is minimal, i.e. in the order of about 2 minutes for 40 boxes.

The box is dispensed from the storage cabinet and carried by conveyor 61, passes under cutters 164 and 170 which slit the wrapper on the top of the box ends.

On reaching the end of its travel, the cross conveyor is actuated and pusher 180 pushes the box toward the destacker table. On the way, the box passes under another cutter 94 which slits the wrapper on one long side of the box intersecting the two previously made cuts. This effects a loose flap 34a, which remains in place on the box when it reaches the destacker platform where it remains at rest until an order for removal of the rolls is received by the roll dispenser.

During the positioning phase the platform 100 automatically rises until the interruption of the light beam 120 actuates the photo cell to stop the rise of the table. The upward motion also closes four package gripping clamps 108 which hold the box 134 firmly in place on the platform.

The destacker 123 which carries the stripper 95 operates in conjunction with the box dispenser. On demand, the transfer moves horizontally and the rubber stripper fingers 98 attached to it wipe the paper back, uncovering the top layer of rolls. The transfer mechanism 123 continues to move until the needle clusters 149 are directly above the rolls 181. The destacker head consists of a cluster of four pins and a stripping rod 142 for each of the six rolls. When the transfer unit is in the proper position the jack screw rises, lifting the box of rolls until each of the six top rolls (of the top row of two rows in the package) are impaled on a cluster of pins. This action trips a switch (not shown) which is located in the transfer unit between the pin clusters. The elevator motor then reverses and the platform 100 descends. When the elevator bottoms, the transfer moves horizontally with its six buns. The cam 148 on the transfer track causes the stripper rods to strip the rolls off the pins and drop them onto the alignment or orienting table 153.

On completion of the pick up of the lower layer of the rolls from the package by the pin clusters, the box pusher in the storage unit will push out a fresh box of rolls which displaces the empty container. The empty container falls into a discard receptacle. The pusher is a double chain which carries a vertical blade connected by struts to prevent the blade from turning and is driven by a gear head motor. Electrically, this cycle is started by a switch which is also the upper limit switch for the drive of the destacker elevator in section 24.

When the fourth box of a given shelf has been dispensed, the pusher blade makes a half circuit back to the rear of the new row of four boxes which have been brought into position from below by actuation of a switch S2 (see FIG. 10) located in the top of the storage unit and actuated when the pusher makes its return pass. The chain elevator has a one revolution clutch and a one revolution cam for switch S3 to prevent over-travel.

The conveyor 61 is driven at a speed suitable to separate the dispensed box from the box behind it and to carry it through the cutters to the cross conveyor.

The cross conveyor 78 is an overhead conveyor device similar in design to the transfer conveyor and similarly driven.

The two concentric discs of table 153 rotating in opposite directions at different speeds separates the cluster of rolls and rearranges them in a single row on the periphery of the outer disc 155. Rail 154 encircles the outer disc; fences in the rolls.

The ring of rolls are rotated towards a moving vertical guide belt or turn conveyor 183 which sweeps them off the disc 155 at approximately a 90° angle onto the slicer conveyor belt 196. This belt transports the rolls 181 towards the discriminator 187 which consists of a horizontal belt set about two inches above the conveyor belt and moving perpendicular to the slicer conveyor 196. High rolls and up-ended rolls are swept off the conveyor belt into a catch pan 192. The remaining rolls continue to move into the slicer. These are captured by an upper belt 206 moving parallel with and above the conveyor

belt through a horizontal reciprocating knife which slices them. The sliced roll sections remain together as the rolls leave the slicer.

When the first roll reaches a gate switch at the end of the slicer conveyor, it stops the conveyor slicer. When the device of the invention is used in conjunction with the above noted sandwich cooking and assembling machine of Udall et al., S.N. 220,615, at a signal from that machine, a feeder pushes a roll off onto the conveyor on the sandwich machine where the top half is separated from the lower half, carried through an oven (toasted), assembled as a sandwich, wrapped and dispensed. The feed belt, the sweep arm and the roll stripper may be, and in the case of said application S.N. 220,615, are parts of the sandwich making machine. These complete the transfer and separation of the roll slices from the dispenser of the present invention.

A suitable electrical diagram for interconnecting and controlling the dispenser is illustrated in FIG. 10. As shown, the electrical control system is designed so that a completely automated sequence will insure that a roll is in position for dispensing to the hamburger machine (referred to in application S.N. 220,615) at all times.

Each phase of the box dispenser unit is started by the box or package itself on completion of its motion through each phase. The roll dispenser unit is actuated when certain locations indicate that no roll is present.

Referring to FIG. 10, the key which initially starts the cycle is at the end of the slicer conveyor belt where gate switch S8 will be in a closed position when no roll is present. Switch S8 energizes relay K2 which in turn closes the contacts controlling the slicer conveyor, the slicer, the 90° turn conveyor and the alignment table B13, B12, B15 and B11, respectively. All the corresponding motor drives will then operate simultaneously and move rolls along until a roll contacts switch S8. The drives will then shut down.

If no rolls are present on the alignment table under the lever switch S9, the shoe horn-like lever will be in the "down" position, thereby closing S9, which energizes relay K10 when mode switch S22 is in the "automatic" position.

The K10 contacts when closed will start the transfer drive motor B10, which will cause the transfer mechanism to leave its "at rest" position over the alignment table and move toward the destacking table. At the proper point, a cam on the transfer will depress the lever of switch S3. This causes relay K8 to energize, thereby closing a set of normally open contacts K8A, starting destack motor B9 through the flip-flop relays K15 and K16. This also opens a set of normally closed contacts K8B which stops transfer motor B10.

The destack motor B9 raises the destack platform and causes the rolls to be impaled on the pins which are part of the transfer unit. The platform rises until the roll sensing switch S10 (part of the "spider" mounted between the pin clusters in the center of the transfer unit) is actuated by contact with the rolls, or until the upper limit switch S12 is actuated by a cam mounted on the bottom of the jack screw. This causes relay K7 to energize and reverses the destacker motor B9. The destacker table now moves downward until it contacts the low limit switch S16 thereby energizing relay K16, an impulse latching relay wired in series with K15, another latching relay. These relays have two sets of contacts of which one set is always open, one set closed, interchangeably, and actuated by an impulse to the magnetic coil. Relay K16, therefore, interchanges its contacts, opening the circuit driving the motor B9 through contacts K16A and K15A, and closing the contacts K16B through K15B which energizes coil K9 and K11 to the transfer motor B10. This moves the transfer unit from the destacker to the alignment table 153. At the proper point in travel a cam on the transfer unit 123 contacts switch S15 (located above the alignment table) thereby

energizing relay K15. This interchanges the contacts of K15A and K15B which now opens the circuit of K9 and K11 causing the transfer unit to stop. The roll stripper mechanism by cam rollers 147 on track 148 release the rolls as the pin clusters 149 are withdrawn thereby dropping the rolls onto the table 153. When switch S15 was actuated as described above, it also caused an impulse to timer motor BT2 opening the normally closed contacts BT2-C in the circuit to relay K10, thereby preventing the transfer unit from repeating a cycle until the newly transferred rolls have completed aligning themselves. This time delay is infinitely variable from 0 to 27 seconds by adjustment of the knob on the face of the control panel. At the end of the time delay, if the lever switch has not been deactivated (by resting on a roll) the entire transfer cycle will repeat as described above.

When switch S12 is actuated (as previously described) an impulse is also sent to the box storage unit. This will energize relay K1 provided that switch S22 is in the automatic mode. Relay K1 starts the feed-off drive motor B2, the "take-away" conveyor B3 and the cutter motors B4 and B5.

The feed-off drive B2 operates a pusher which sweeps the length of the top shelf of the storage unit. It will continue running until it has dispensed one box from the storage unit. Switch S2 is actuated on completion of one sweep and during the return for the next sweep. This energizes motor B1 which turns a one revolution cam and a one revolution clutch to effect an index of the shelves, thereby making a new row of 4 boxes available for dispensing. B2 stops only when the box that is being dispensed activates the sensing switch S4 located just below cutter motor B4. Motors B3, B4, and B5 continue to run until the dispensed box reaches the guide rail of the cross conveyor where it contacts and actuates switch S5. This switch energizes relays K4 and K5 thereby completing the circuits that start the cross conveyor motor B6 (through relay K4) and prepares the positioning circuit for operation when the box reaches the destacking platform (through relay K5). In addition, K5 relay operates the normally closed contacts in the box dispenser circuit thereby stopping the cutters B4 and B5 and the take-away conveyor motor B3.

When the box of rolls reaches the proper position on the destacker platform, a switch S7 is actuated by cross conveyor pusher. This switch completes the circuit for proper positioning of the box for paper removal, and energizes relay K6 through contacts K5C. This causes the destacker drive motor B9 to start and the platform rises until the top of the box interrupts the light beam of the photo cell circuit actuating relay K17 opening contacts K17A thereby stopping the action. During this time, the cross conveyor is returning to its "at rest" position, where it is shut off by actuation of the limit switch S6. This deactivates the circuit of K4 and K5 thereby stopping all operation of the box dispenser unit and also deactivates the photo cell circuit through relay K6 by opening contacts K6C.

The alignment table is driven by motor B11. This motor will operate under either of two conditions.

(1) By actuation of switch S8 to complete the feeding action required to position rolls.

(2) By completion of the transfer cycle to clear the rolls from the drop zone and align in tandem on the periphery of the rotating outer disc.

Operation of the sequence initiated by switch S8 was described hereinabove and will not be repeated here.

Operation of the second condition is initiated by the action of relay K9 which is used to return the transfer to its drop position over the alignment table: When relay K9 is energized, contacts K9A and K9B close. K9A completes the circuit for operation of transfer motor B10; and K9B completes the circuit to timer BT1. When BT1 timer starts, it mechanically closes contacts BT1-1, which maintains the circuit for a set time, and BT1-2 which

permits the starting of motor B11 as soon as relay K9 de-energizes permitting contacts K9C to close. B11 will then run until timer BT1 times out opening contacts BT1-1 and BT1-2.

It will be apparent to those skilled in the art that various modifications may be made in the invention without departing from the scope of the invention. Accordingly, the invention is not to be limited except insofar as necessitated by the appended claims.

We claim:

1. An apparatus for automatically dispensing individually items from packages containing a plurality of said items comprising in combination:

a storage compartment for housing wrapped packages and means for positioning said packages for delivery thereof on demand from said compartment;

means to accept packages dispensed from said compartment and deliver them to a wrapper severing device; cutting means to sever the package wrapper;

transfer means for removing the packaged items from the severed package and transferring them to an orienting section wherein the items are individually dispensed and wherein the feed of additional packages from said storage compartment is initiated when the number of items remaining from previously severed packages is reduced below a predetermined quantity; and

electrically interconnected motive means to dispense said wrapped package, to sever the wrapper thereon, to actuate the transfer means and to actuate the orienting and delivery of individual items.

2. An apparatus for automatically dispensing individually items from packages containing a plurality of said items comprising in combination:

a storage compartment for housing wrapped packages of discrete items and means for positioning said packages for delivery thereof on demand from said compartment;

means to accept packages dispensed from said compartment and deliver them to a wrapper severing device; cutting means to sever the package wrapper;

means for removing the severed wrapper from the package thereby exposing the packaged items;

transfer means for removing the exposed items from the severed package and transferring them to an orienting section, said orienting section comprising means to sense the presence of items and to orient said items for individual dispensing and to initiate on need the feed of additional packages from said storage compartment; and means electrically interconnected to drive the positioning means for said wrapped package from the storage compartment, to drive the wrapper severing device, to sever the wrapper, and to drive the transfer means for removal of said items from the package and to actuate the orienting and delivery of individual items.

3. An apparatus for automatically dispensing individually bread rolls from packages of said rolls comprising in combination:

a storage compartment to house a plurality of bread roll packages and means on said housing for positioning said packages for delivery thereof on demand from said compartment;

means to accept packages dispensed from said compartment and deliver them to a wrapper severing device; cutting means to sever the package wrapper;

means for displacing the severed wrapper from the package and for removing the rolls from the severed package and transferring them to an orienting section;

means to sense the presence of rolls in, and to dispense rolls individually from said orienting section, said orienting section provided with means to sense the presence of rolls and to initiate the feed of additional packages from said storage compartment when the

11

- number of rolls is reduced below a predetermined quantity; and
- electrically interconnected motive means to dispense said wrapped package, to sever the wrapper, to effect removal of said rolls from the package, and to actuate the orienting and delivery of the individual rolls. 5
4. An apparatus for automatically dispensing individual bread rolls from packages containing a plural layer of said rolls comprising in combination:
- a storage compartment for housing a plurality of bread roll packages and means contained in said housing for positioning said packages for delivery thereof on demand from said compartment; 10
- means to accept packages dispensed from said compartment and deliver them to a wrapper severing device; 15
- cutting means to sever the package wrapper;
- means for displacing the severed wrapper from the package thereby exposing the packaged rolls;
- transfer means for removing the exposed rolls from the severed package and transferring them to an orienting section, said orienting section comprising means to sense the presence of rolls and to orient said rolls for individual dispensing and to initiate the feed of additional packages from said storage compartment when the number of rolls in the orienting section is reduced below a predetermined quantity; and 20
- means electrically interconnected to dispense said wrapped package, to sever the wrapper thereon, to actuate the transfer means which effects removal of said rolls from the package and to actuate the orienting and delivery of individual rolls. 25
5. The apparatus of claim 3 provided with a slicer for said roll delivered thereto from said orienting section, means to actuate said slicer and means for dispensing the sliced roll from said apparatus. 30
6. The apparatus of claim 3 wherein the transfer means is coupled with a photo cell package position sensing mechanism arranged to accurately position said package thereby promoting reliability in removal of the rolls from said package. 35
7. The apparatus of claim 4 wherein the transfer means comprise roll impaling pins which penetrate the exposed rolls to allow said rolls to be lifted from the package and deposited in the orienting section. 40

12

8. The apparatus of claim 4 wherein the cutting means to sever the package wrapper comprises a first cutting operation so sever the wrapper at a parallel spaced interval adjacent opposite sides of the package, and a second cutting operation to sever said package transversely to the first cuts made in said package.

9. In an automatic sandwich making machine wherein a sandwich filler and bread roll are separately automatically delivered to and processed by said machine and thereafter assembled and dispensed as a complete sandwich, the movement in the apparatus for delivering bread rolls to said machine comprising:

a storage compartment for housing wrapped packages containing a plurality of bread rolls and means for positioning said packages for deliver thereof on demand from said compartment;

means to accept packages dispensed from said compartment and deliver them to a wrapper severing device;

means for removing the severed wrapper from the package thereby exposing the packaged rolls;

transfer means for removing the exposed rolls from the severed package and transferring them to an orienting section, said orienting section comprising means to sense the presence of rolls and to orient said rolls for individual dispensing and to initiate the feed of additional packages from said storage compartment when the number of rolls in the orienting section is reduced below a predetermined quantity; and

electrically interconnected motive means to dispense said wrapped package, to sever the wrapper thereon, to actuate the transfer means to effect removal of said rolls from the package, and to actuate the orienting and delivery of individual rolls.

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