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2,925,269 2/1960 Hensgen et al. 146/94UX
 3,183,642 5/1965 Tindall 53/123X
 3,470,668 10/1969 Lindstrom et al. 53/23

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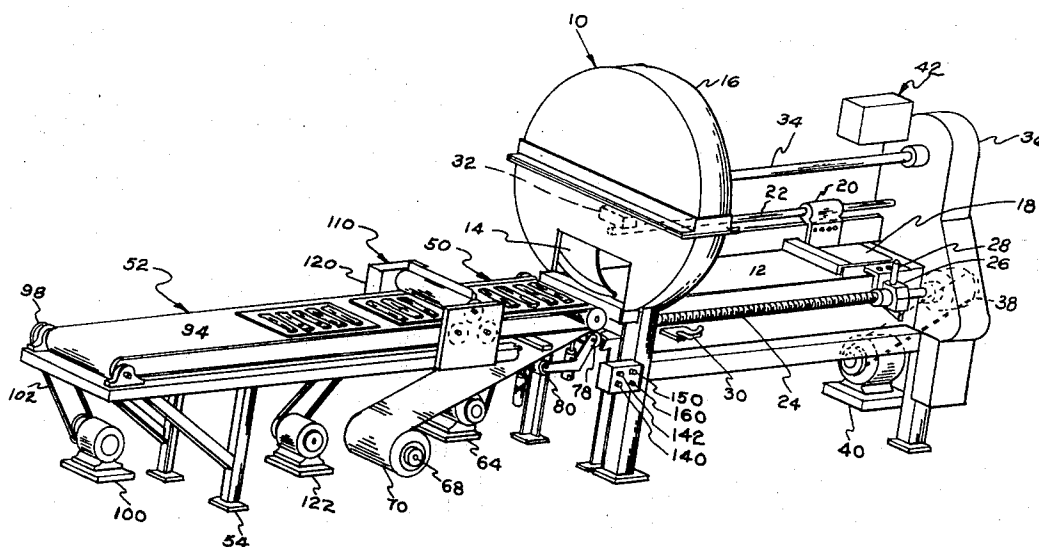
[54] **METHOD AND APPARATUS FOR ASSEMBLING
 DRAFTS OF SLICED PRODUCT**
 9 Claims, 4 Drawing Figs.

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 B26d 4/46, B65b 63/00
 [50] Field of Search 146/94,
 94.2, 95, 222; 53/123, 23

[56] **References Cited**
UNITED STATES PATENTS

1,310,261	7/1919	Van Berkel.....	146/94
1,519,354	12/1924	Brown	146/94
2,126,458	8/1938	Englen	146/94
2,898,962	8/1959	Burnett	146/94
3,015,350	1/1962	Reichel et al.	146/94
3,145,828	8/1964	Hawley.....	146/94X

ABSTRACT: Bacon is sliced and laid out substantially flat on a continuous web of material such as paper. The bacon feed into the slicing blade is interrupted periodically to denote the end of one draft and the beginning of another by a space on the web of material which is moved continuously. Interruption of the bacon feed initiates a timed countdown upon the completion of which a knife is energized to cut the web of material, at a downstream location, across the space between two drafts of slices. An apparatus comprising a substantially conventional slicer and specially devised takeoff synchronizing devices are utilized. The slicer includes a continuously rotating blade and intermittently operated pusher for advancing product into the former. The takeoff equipment comprises an endless belt trained about a pair of pulleys located adjacent the slicer blade and at a distance therefrom greater than the length of a draft of slices. A continuous web of paper, or the like, is passed about the pulley adjacent the slicer so as to receive slices upon the upper run thereof. Beyond the belt is located a second conveyor, and an intermittently operable knife is positioned between the two. The knife is actuated by an adjustable timer which, in turn, is actuated at the time that the feed screw is halted.



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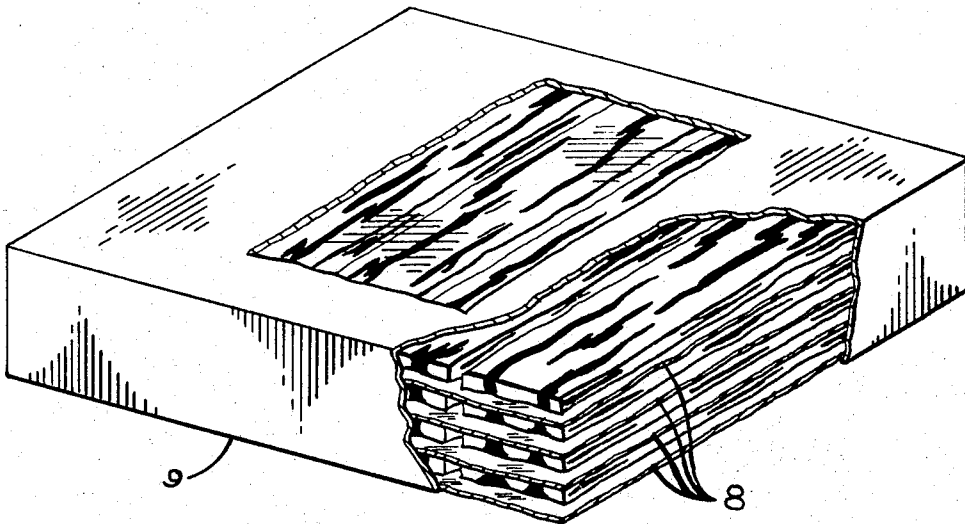


Fig. 1

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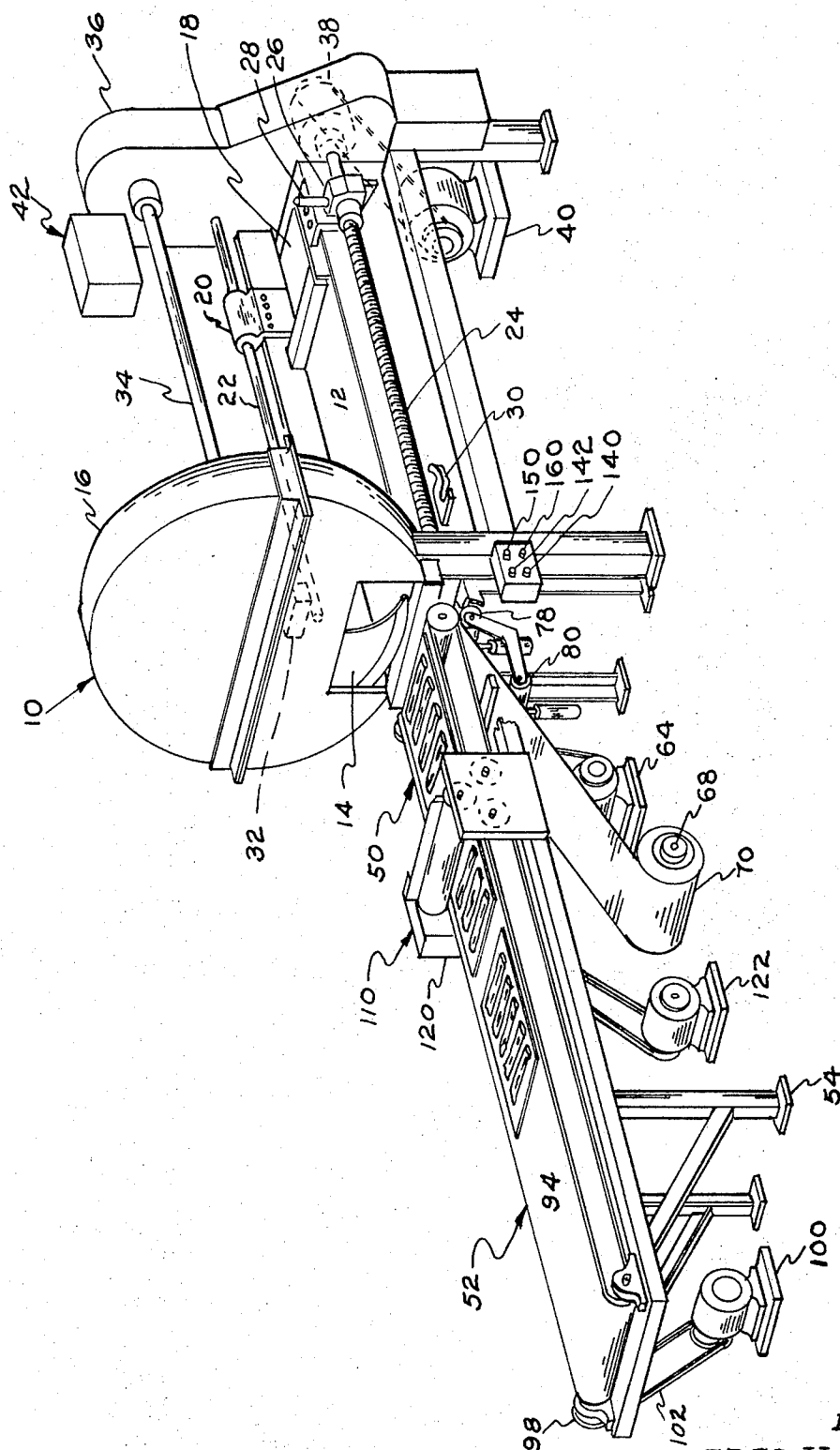


Fig-2

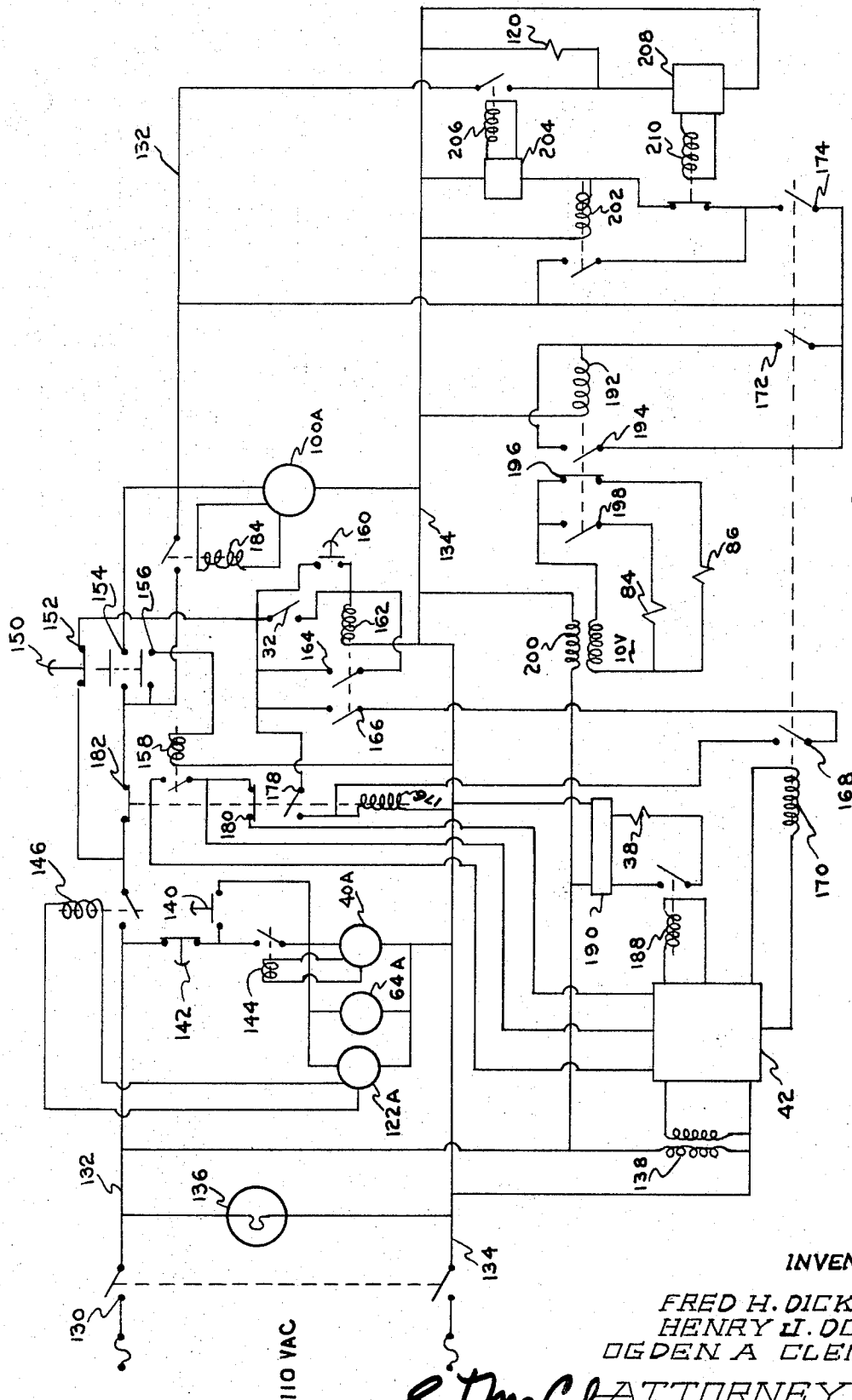
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Fig. 4

METHOD AND APPARATUS FOR ASSEMBLING DRAFTS OF SLICED PRODUCT

This invention relates to the assembling of drafts of slices; and more particularly relates to an improved method and apparatus for assembling drafts of bacon slices laid out substantially flat and adjacent one another, and a package formed therefrom.

Where product is sliced and prepackaged for sale to consumers, it is desirable for the slices to be assembled in a manner that facilitates ultimate handling by the consumer. In the preparation of food products such as bacon and cheese, for example, the slices often tend to stick together and are difficult to separate. In the past this difficulty has been alleviated, to a minor extent, by shingling the slices. That is the slices are partially overlapped so as to expose each edge and a portion of each cut surface. While shingling allows the consumer to distinguish between slices, it often remains difficult to separate the slices.

Further relief of the problem has been obtained, in some cases, by interleaving the slices with separate pieces of paper, or the like. While interleaving facilitates the separation of slices, it is expensive and tends to obscure the purchaser's view of the product.

It has also been proposed that bacon slices, for instance, could be laid out flat on a single sheet or web of packaging material which could then be either rolled or folded upon itself. While this procedure obviates the separation of slices, it tends to obscure the product and tends to result in an unwieldy and inconvenient package. Because of variations in slab, and hence slice dimensions it is difficult to lay out slices perfectly flat. Also, heretofore, when laying out slices in the latter manner it has been difficult and uneconomical to rapidly separate drafts of a desired number of slices.

We have found, however, that the foregoing disadvantages can be overcome where equal numbers of slices are laid out substantially flat on sheets of equal length which can subsequently be stacked in a carton or the like. It is important that the sheets be of equal length and thus the slices may overlap to a minor extent to accommodate variations in dimensions so long as the profile of slice appears relatively flat rather than arched or humped.

Accordingly it is a principal object of this invention to provide an improved method and apparatus for rapidly and economically assembling drafts of a desired number of slices laid out substantially flat upon sheets of packaging material, and to form a package therefrom.

It is another object of the present invention to provide an improved method and apparatus for assembling drafts of a desired number of slices of product laid out substantially flat upon equal lengths of packaging material which may be stacked one upon another so as to expose substantially the entire surface area of one draft of such slices.

A further object of the present invention is to provide a method and apparatus for substantially continuously slicing product onto a continuous web of packaging material so that the slices are laid out flat substantially side by side, and then accurately severing the packaging material at equal intervals so as to segregate drafts of a desired number of slices.

Basically the present method involves the receiving of each slice, as it is severed from a body of product, upon a moving and continuous web of packaging material. The web is moved at a constant speed selected so as to receive successive slices laid out substantially flat and adjacent to one another in nonoverlapping, or only very slightly overlapping, configuration. The production of slices is briefly interrupted periodically as a desired number of slices is completed, thus leaving a vacant space upon the web of material between the last slice of one draft and the first slice of the next draft. Thereafter, at a point downstream of the slicer, the web is severed as each space on the web moves across that point.

An apparatus for performing the foregoing method comprises, in combination with a slicing machine having an intermittently interruptable product feed, a means for continuously

driving a web of packaging material away from the discharge end of the slicing machine, an intermittently operable web cutting means spaced a distance beyond the slicer, and a control means connected to the cutting means and to the slicer feed to actuate the former in a timed relation to interruption of the product feed.

Further objects and advantages of the present invention will become apparent from the following detailed description when taken in conjunction with the drawings of a preferred embodiment of the apparatus wherein:

FIG. 1 is a view of a package of product according to the present invention;

FIG. 2 is a perspective view of the apparatus of the present invention;

FIG. 3 is a side elevation view of a portion of the apparatus of FIG. 2 with the frame removed; and

FIG. 4 is a schematic wiring diagram of the control features of the present apparatus.

It is intended by the present invention to assemble drafts of a selected number of slices upon separate sheets of packaging material which may then be stacked and unwrapped by placing in cartons or another wrapper. Such a package is shown in FIG. 1 wherein slices of bacon on sheets 8 are enclosed in a carton 9. The production of sliced bacon is a revealing illustration. Institutions charged with the feeding of large numbers of people find it extremely convenient to receive the bacon slices laid out substantially flat in groups of 12 or 16 slices per sheet of parchment paper. Such sheets with bacon slices are preferably stacked in a rectangular carton containing a dozen or more such sheets. The chef or cook merely grasps the two ends of the uppermost sheet with his hands and inverts same upon a large griddle. As the slices become heated the parchment paper is easily removed and there is no need to separate the slices from one another. Household consumers find similar convenience with one pound bacon packages comprised of three to five sheets of parchment each having, for example, six to four slices of bacon laid out substantially flat thereon. One or more of such sheets may be easily inverted in a frying pan or the like. Silicone treated parchment paper is preferred.

To produce such drafts of slices upon separate sheets it is preferred to substantially continuously lay out the slices on a continuous web of parchment paper, or the like, and thereafter to divide by cutting the parchment paper between drafts of selected numbers of slices.

Those steps can be combined with the usual method of bacon slicing which is to continuously feed a bacon belly into the path of a continuously rotating blade and to briefly interrupt the bacon feed after a number of blade revolutions corresponding to the selected number of slices per draft. The interruption need be only for one or a few revolutions of the blade to cause a detectable distinction between successive drafts. Where previously slices have been shingled an interruption for several blade revolutions was necessary to obtain a spacing between drafts. However, according to the present method where each slice is laid out flat, or with only very slight overlap, a single blade revolution will result in a spacing substantially equal to or greater than the width of a slice.

The layout and spacing is dependent upon the speed at which the slice receiving and takeoff apparatus is operated. According to the present method, the latter is operated at a speed to move forward about one slice width or more during the time it takes the slicer blade to make one revolution. Preferably the slices are received upon a continuous web of packaging material, such as paper, that is moved away from the slicer at the aforementioned speed. Thus where the product feed of the slicing machine is interrupted, a vacant space will be obtained on the web of paper. According to a preferred embodiment of the invention, immediately upon the bacon feed being interrupted a time count is commenced. During the time count the web will move a determinable distance and at the completion thereof the web is severed at a point downstream of the slicer. Preferably the latter point is

spaced from the slicer a distance greater than the length of the longest expected draft and preferably a distance that is a mixed number multiple of such length. That is, the distance to the web cut off point should be a whole multiple plus a fraction of the draft length. The time count is then adjusted to equal the period necessary for the web to move the fractional portion of that distance and the result is that the web will always be cut transversely in a vacant space between slices one or more drafts removed from the slicing machine.

Thereafter the separated drafts are moved at a faster speed to separate the severed portions of the web. Finally, the drafts may be packaged and handled in any convenient manner.

A preferred apparatus for performing the foregoing method is shown in FIGS. 2 through 4. An essentially conventional slicer machine generally 10 may be seen in FIG. 2. The slicer includes a bed 12 and a blade 14, at one end thereof, rotatable in a vertical plane. For purposes of safety the blade 14 is enclosed within a housing 16. A bacon belly, or other product, is forced into the path of the rotating blade 14 by a pusher 18 reciprocable upon the horizontal bed 12. The pusher 18 includes a follower 20 that is slidable on a guide rod 22 and is propelled through its path by a power screw 24. The pusher 18 may be engaged with and disengaged from the power screw 24, at the option of an operator, by a split nut assembly 26 having an operating lever 28. The latter will be automatically operated to disengage the split nut upon the pusher 18 reaching the end of its stroke by a safety arm 30 mounted upon the side of the bed 12 near the blade housing 16. Just before reaching that point the follower 20 will trip a limit switch 32 mounted on housing 16.

The slicer blade 14 is driven through a knife shaft 34 extending from a drive housing 36 at the rear of the slicer generally 10. The power screw 24 is also driven through a clutch 38 mounted within the drive housing 36. Both clutch 38 and knife shaft 34 may be powered from a single electric motor 40 mounted beneath the bed of the machine.

Conventional operation of this type of slicer involves advancing the pusher 18 for a certain number of blade revolutions and then halting the pusher for an additional number of blade revolutions. Motion of the pusher 18 is controlled by engaging and disengaging the clutch 38 which, in turn, is actuated from a control unit generally 42 mounted above the blade shaft 34 and driven in relation thereto. There are several conventional control units available on the market and all are essentially revolution counters. The apparatus of the present invention involves the combination of the foregoing conventional apparatus with the elements hereinafter described.

At the blade, or discharge, end of the slicer generally 10, is positioned a slice receiving conveyor generally 50. The latter extends a relatively short distance and is followed by a packaging conveyor generally 52, both conveyors 50 and 52 being mounted upon a frame 54.

Concerning the slice receiving conveyor generally 50, an endless belt 58 is trained about a drive pulley 60, adjacent the slicer 10, and an idler pulley 62. A motor 64 is connected to pulley 60 by means of a drive chain 66.

Rotatably mounted beneath the frame 54 on a spindle 68 is a roll of web material 70. The web is trained about the belt 58 and drive pulley 60 so as to be carried upon the upper run of the former and to receive directly thereon bacon slices 72 thrown from the slicer generally 10.

Means are also provided to frictionally engage the web of material with the endless belt 58 so as to cause it to be moved at the belt speed, and alternately to brake the web of material when the slicing machine operation is shut down, as for instance when the slicing of a bacon belly is completed and the pusher 18 is being retracted for the insertion of a new belly. Such means may be best seen in FIG. 3 and comprises a pivotable carriage 76 supporting at one side a clutch roll 78, which is parallel to the slice receiving conveyor drive pulley 60, and at the other side supporting a brake roll 80. The carriage 76 is mounted upon a pivot shaft 82 suspended from the frame 54; and a pair of solenoids 84 and 86 are connected to

the two respective ends of the carriage to alternatively raise and engage the clutch and brake rolls 78, 80. The brake roll 80, when lifted by solenoid 86, will press the web of material against a ridged brake bar 88 to halt movement of the web.

Further concerning the packing conveyor generally 52, it is shown in FIGS. 2 and 3 to comprise an endless belt 94 trained about a pair of pulleys 96, 98. Preferably pulley 96 is an idler pulley and is spaced a short distance from the idler pulley 62 of the slice receiving conveyor generally 50. The downstream pulley 98 is a drive pulley and is connected to a motor 100, mounted beneath the frame 54, by a drive chain 102.

A web cutting means generally 110 is located between the two idler pulleys 62 and 96 of the slice receiving conveyor 50 and the packing conveyor 52, respectively. Such cutting means preferably includes a spring-loaded shear plate 112 mounted between the aforementioned pulleys with the upper edge thereof at about the level of the endless belts 58 and 94. A rotatable knife 114 is cooperatively mounted above and parallel the shear plate 112. The knife 114 is fixed longitudinally of a sleeve 116 which in turn is secured to a shaft 118 that is rotated through a clutch 120 by a separate drive motor 122. The clutch 120 is of a type that, when energized, will make only a single revolution.

It is critical that the length of the slice receiving conveyor generally 50 be at least equal to the length of the longest expected draft of slices, and preferably greater than such length by a fraction thereof. Stated differently the receiving conveyor should be a mixed number (whole number plus a fraction) multiple of the maximum expected draft length. Otherwise it is essentially impossible to accurately synchronize operation of the web cutting means generally 110 with the slicer generally 10. The means by which the apparatus is synchronized may be best seen in FIG. 4. While the wiring circuit shown therein is utilized to control the aforementioned motors operating various parts of the apparatus, the system illustrated does not actually power such motors. However, motor-control relays are shown, such relays controlling the power circuits to the motors in a manner well known to those skilled in the electrical arts, and are denoted herein by corresponding reference numbers bearing the subscript "a".

The control means shown in FIG. 4 is connected across a 110 volt alternating current source and is disconnectable therefrom by appropriate fuses and a master switch 130. Two main lines 132 and 134 are provided. When the master switch 130 is closed a signal lamp 136, placed across lines 132, 134 will indicate a power-on condition. The slicer control unit generally 42 is also connected across lines 132, 134 and will be energized when the master switch 130 is closed. However, it is preferred that the control unit 42 be indirectly connected through a constant voltage transformer 138 to guard against the possibility of voltage surges in the power supply.

The remainder of the apparatus, while connected across lines 132, 134, will be energized only upon the closing of certain manual switches such as a motor start switch 140 which is connected in series with a bank of motor control relays 40A, 64A and 122A which energize respectively the slicer motor 40, slice receiving conveyor motor 64 and the web severing knife motor 122. A manual stop switch 142 is connected in series with switch 140 and a self-holding relay 144, energizable from the motor control relay 40A, the latter being connected in parallel to the manual start switch 140. Similarly all components down line from the aforementioned motor circuit can be subsequently energized only if the aforementioned motors are operative, by reason of a relay 146 positioned to close a pair of contacts in main line 132 only upon actuation from the motor control relay 122A. It is to be understood that when the slicer motor 40 is running the control unit 42 will be mechanically responding to the revolutions of the slicer blade 14 and thus will be mechanically functioning.

Slicing is commended upon manual operation of a triple bank switch 150. A first set of contacts 152 are momentarily opened, thereby, to disconnect a circuit to the limit switch 32 so as to insure that the slice control unit generally 42 is in con-

dition to be placed in a drafting mode to control both dwell and slicing functions. A second set of contacts 154 are momentarily closed to energize the motor control relay 100A to start the packing conveyor motor 100. A holding circuit for the motor control relay 100A and the remainder of main line 132 comprising a relay 184 is closed thereby and will remain closed when the contacts 154 are again opened. A third set of contacts 156 are momentarily closed thereby energizing a relay 158 to briefly close a circuit in the slicer control unit 42. The latter is thereby placed in the drafting mode and the slicing operation will start first with the space, or no slice, phase of the slicing cycle.

It will be noted that when the first set of contacts 152 of switch 150 were opened the circuit to the limit switch 32 was broken. Initially, upon closing the motor start switch 140, and before actual slicing is to be commenced, a separate controller start switch 160 should also be actuated, either manually or by a mechanical linkage to the start switch 140. Also initially the split nut 26 should be disengaged from the power screw 24. Switch 160 by-passes the limit switch 32 to energize a relay 162 that in turn closes two sets of contacts 164 and 166. Contacts 164 provide a self-holding circuit to maintain the relay 162 energized until the slice switch 150 is actuated to open the contacts 152. Contacts 166 are in series with a first set of contacts 168 of a space controller relay 170. The latter relay is energized when the slicer control unit 42 is in the space phase of a slicing cycle. When both relays 162 and 170 are energized, and contacts 166 and 168 are both closed, another relay 176, to be hereinafter explained, will be energized. However, when the slice switch 150 is actuated, although the control unit 42 is put into space phase by the actuation of relay 158, the relay 162 is deenergized and the circuit to relay 176 cannot be completed again until the slicer feed pusher 18 reaches the end of its path and closes the limit switch 32.

Meanwhile it should be noted that the space phase relay 170 simultaneously closes two additional sets of contacts 172 and 174.

When the conditions are met to energize relay 176 three sets of contacts, 178, 180 and 182 are actuated. Contacts 178 are closed to provide a self-holding circuit for the relay 176. Contacts 180 are opened to thereby cause a change in the slicer control unit 42 circuit to shift the latter to a continuous mode or idle condition. Contacts 182 are opened in the main line 132 to deenergize the motor control relay 100A, and thus stop the packing conveyor 52.

When the slicer control unit generally 42 is thus placed in a continuous mode, or idle, the space phase relay 170 is deenergized, opening the contacts associated therewith, and a slice phase relay 188 is energized, actuating clutch 38. When in continuous mode the power screw 24 will be engaged with the motor through clutch 38 and will turn continuously (hence split nut 26 should be disengaged) and this condition will continue until switch 150 is actuated to close contacts 156 and energize relay 158 to shift the control unit 42 to the drafting mode (by which time the split nut should be engaged).

However, before the slicer pusher 18 closes the limit switch 32 and when relay 158 has placed the slicer control unit generally 42 into a drafting mode, the space phase relay 170 will first be energized for one or a few revolutions of the slicer blade and then the slicer control unit 42 will deenergize relay 170 and energize the slice phase relay 188 for a selected number of slice revolutions. The latter closes one set of contacts to energize the slicer feed clutch 38 through and an AC rectifier 190. Thus the power screw 24 will be turned to advance the pusher 18 so long as the split nut 26 is engaged. At the end of the selected number of slicer blade revolutions the slicer control unit generally 42 will again deenergize relay 188, thereby disengaging clutch 38 to stop the pusher 18, and reenergize the space phase relay 170. So long as limit switch 32 is not closed this will have no effect on the operating mode of the slicer control unit. However, both sets of contacts 172 and 174 are closed during the space phase. Contact 172 energizes a web control relay 192 which has three contacts 194,

196 and 198. Contacts 194 provide a self-holding circuit to maintain the relay 192 energized when contacts 172 are again opened upon the control unit going to the slice phase. Contacts 196 open to deenergize the paper brake solenoid 86; and contacts 198 close to energize the paper clutch solenoid 84. Both solenoids 84 and 86 are operated at a reduced voltage of about 10 volts obtained through a reduction transformer 200. It should be noted that the paper clutch and paper brake will remain in this condition until contacts 182 of relay 176 are opened to disconnect the main line 132.

The closing of contacts 174 upon the energizing of space phase relay 170 (which occurs each time the slicer control unit generally 42 interrupts the bacon feed so as to leave a vacant space on the web of packaging material) completes a circuit to a primary timer 204, and to a holding relay 202. Timer 204 is adjustable by an operator in accordance with the length of a draft of sliced product (which will vary in accordance with the speed of conveyor 50 and the number of slices selected for a draft). Upon being energized when contacts 174 are closed the primary timer 204 begins a count down of the selected time interval. Upon the completion of the interval the timer 204 will energize timer relay 206 which in turn closes its contacts completing a circuit to the knife clutch 120 and also to a secondary timer 208. As previously mentioned the knife clutch causes one revolution of knife 114 to sever the web material. The secondary timer 208 upon completion of a timed period, usually shorter than the period of the primary timer 204, energizes a relay 210 to open contacts in the line serving the primary timer 204. This deenergizes the primary timer causing it to reset and open its relay contacts 206 which consequently deenergizes the secondary timer 208 causing it to reset and to reclose its contacts. Thus the timing elements are ready to repeat their function when the space phase relay 170 again closes contacts 174.

Obviously many modifications and variations of the invention as hereinbefore set forth may be made without departing from the spirit and scope thereof, and, therefore, only such limitations should be imposed as are indicated in the appended claims.

We claim:

1. An improved method for assembling drafts of product slices as said slices are cut from a body of product by a slicer, said method comprising: receiving each slice as it is severed from said body upon a continuous web of material at a first point; continuously moving said web of material in a direction and constant speed away from said point so as to receive successive slices laid out substantially flat and adjacent one another; periodically interrupting the production of slices after a desired number have been severed for a brief interval while continuing to move said web whereby to leave vacant spaces between drafts of slices received thereon; and automatically cutting said web across each of said spaces at a second point at a distance downstream of said first point.

2. The method of claim 1 including the step of commencing a time count upon interrupting said production and then cutting said web across said spaces at a second point at a distance downstream of said first point upon completion of said time count, said distance being the product of a mixed number multiplied by the length said web moves at said speed during the production of a draft of slices, and said time count being adjusted to the intervals necessary for said web to move an amount equal to said length multiplied by the fractional portion of said mixed number at said speed.

3. The method of claim 2 wherein the separated drafts are conveyed beyond said second point at a relatively greater speed so as to further space the separated drafts.

4. An improved apparatus for assembling drafts of sliced product in combination with a slicer wherein a blade is operated continuously and a block of product is advanced thereto for periods to produce a draft of slices and halted briefly for intervals to distinguish said drafts, said improved apparatus comprising: web driving means positioned adjacent the discharge end of said slicer and powered to move a sub-

stantially continuous web of material in a direction away therefrom at a given constant speed sufficient to receive successive slices laid out substantially flat and adjacent one another; an intermittently operable cutting means mounted transversely of said web driving means at a distance from said slicer; and a control means connected to said cutting means and to said slicer, said control means operating to interrupt the slicer feed briefly after a draft of a desired number of slices have been severed and to actuate said cutting means thereafter upon a time count of selected duration following said feed interruption.

5. The apparatus of claim 4 wherein said distance between said slicer and said cutting means is a multiple of the length of the draft of slices and a mixed number, and said time count is the interval required to move at said given speed a distance equal to said length times the fractional portion of said mixed number.

6. The apparatus of claim 5 wherein said control means includes a timer and said web cutting means is driven through a clutch connected to said timer.

7. The apparatus of claim 4 wherein said web driving means comprises an endless belt trained about a pair of pulleys

wherein one pulley is adjacent the discharge end of said slicer; means to drive said belt at said speed; a supply holder for a roll of web material positioned beneath said endless belt wherefrom the web is trained about said one pulley and across the upper run of said belt; and engaging means positioned beneath said belt and operable to press said web against said belt so as to be movable therewith.

8. The apparatus of claim 7 wherein the web cutting means comprises an anvil and cooperating knife, said knife being rotatable about a longitudinal shaft set transversely of said endless belt beyond the other of said pair of pulleys, and a clutch connected between a drive means and said shaft and said clutch being actuated by said control means.

9. The apparatus of claim 8 wherein said control means includes a timer and said clutch is connected to said timer, and the distance between said slicer and said knife is a multiple of the length of a draft of slices and a mixed number, and said time count is the interval required to move at said given speed a distance equal to said length times the fractional portion of said mixed number.

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