

Sept. 27, 1938.

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2,131,256

FEED MECHANISM FOR SLICING MACHINES

Filed Aug. 27, 1936

4 Sheets-Sheet 1

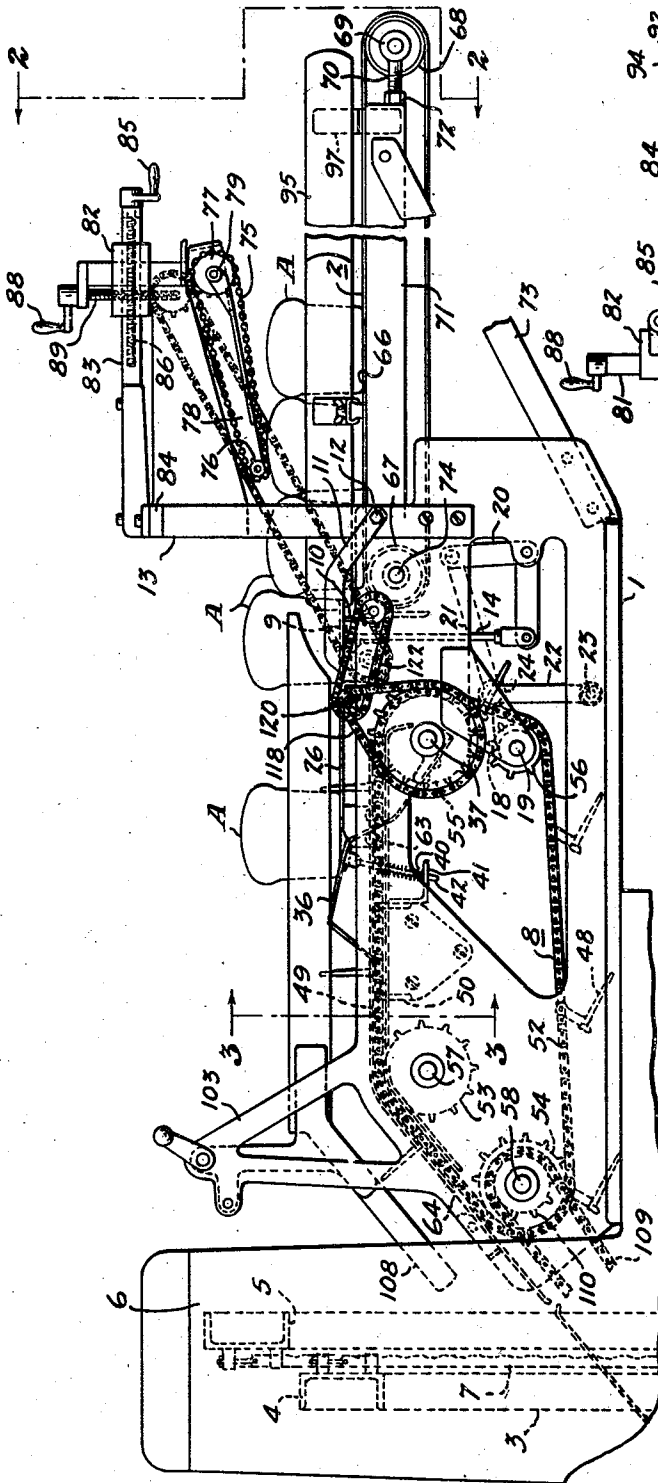


Fig. 1

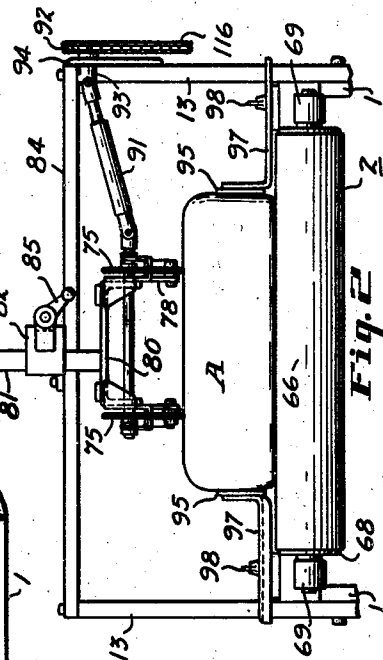


Fig. 2

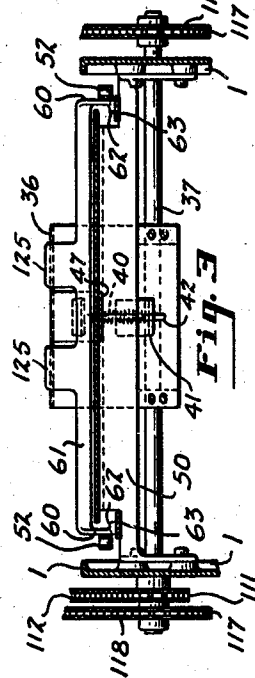


Fig. 3

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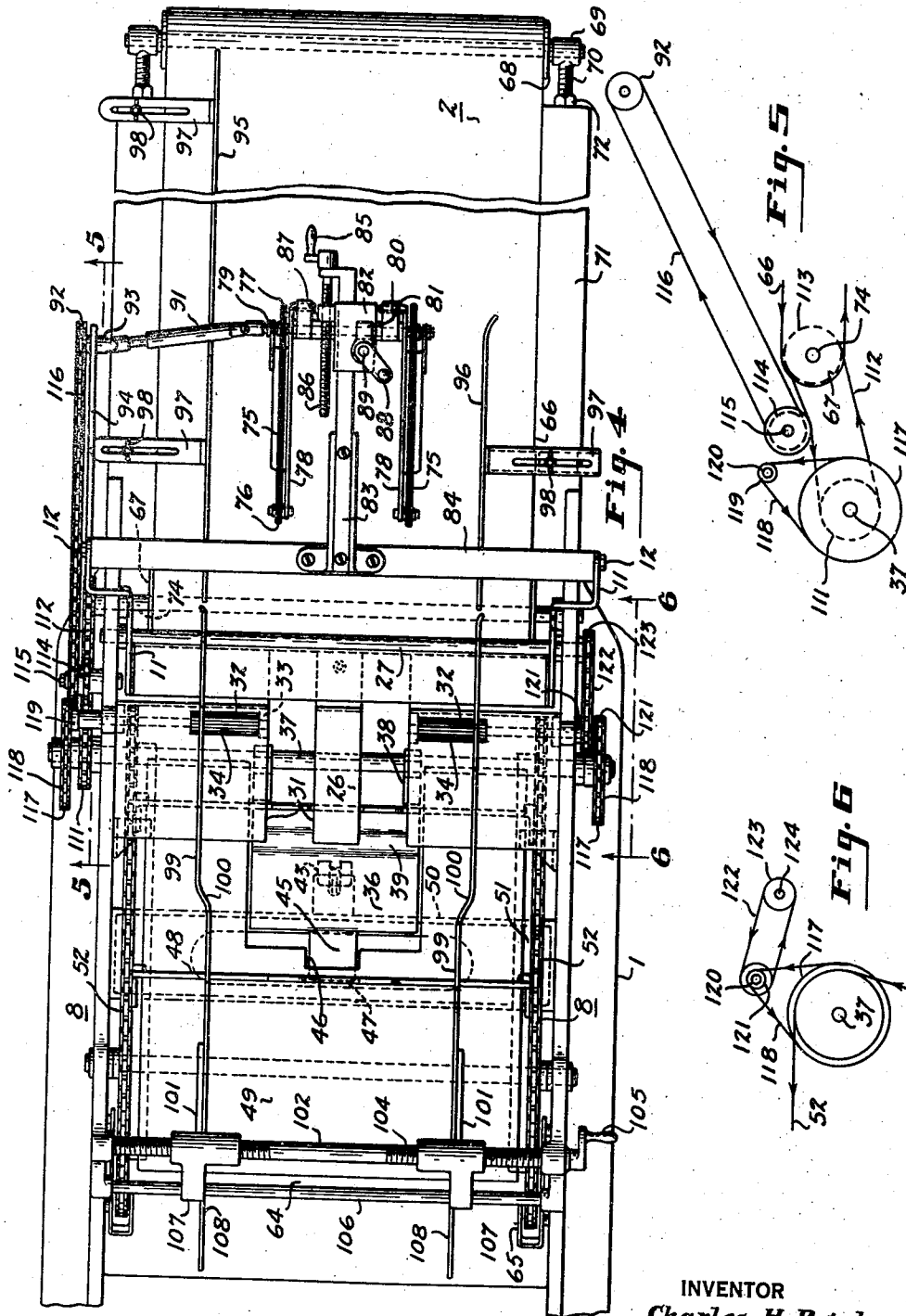
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FEED MECHANISM FOR SLICING MACHINES

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4 Sheets-Sheet 2



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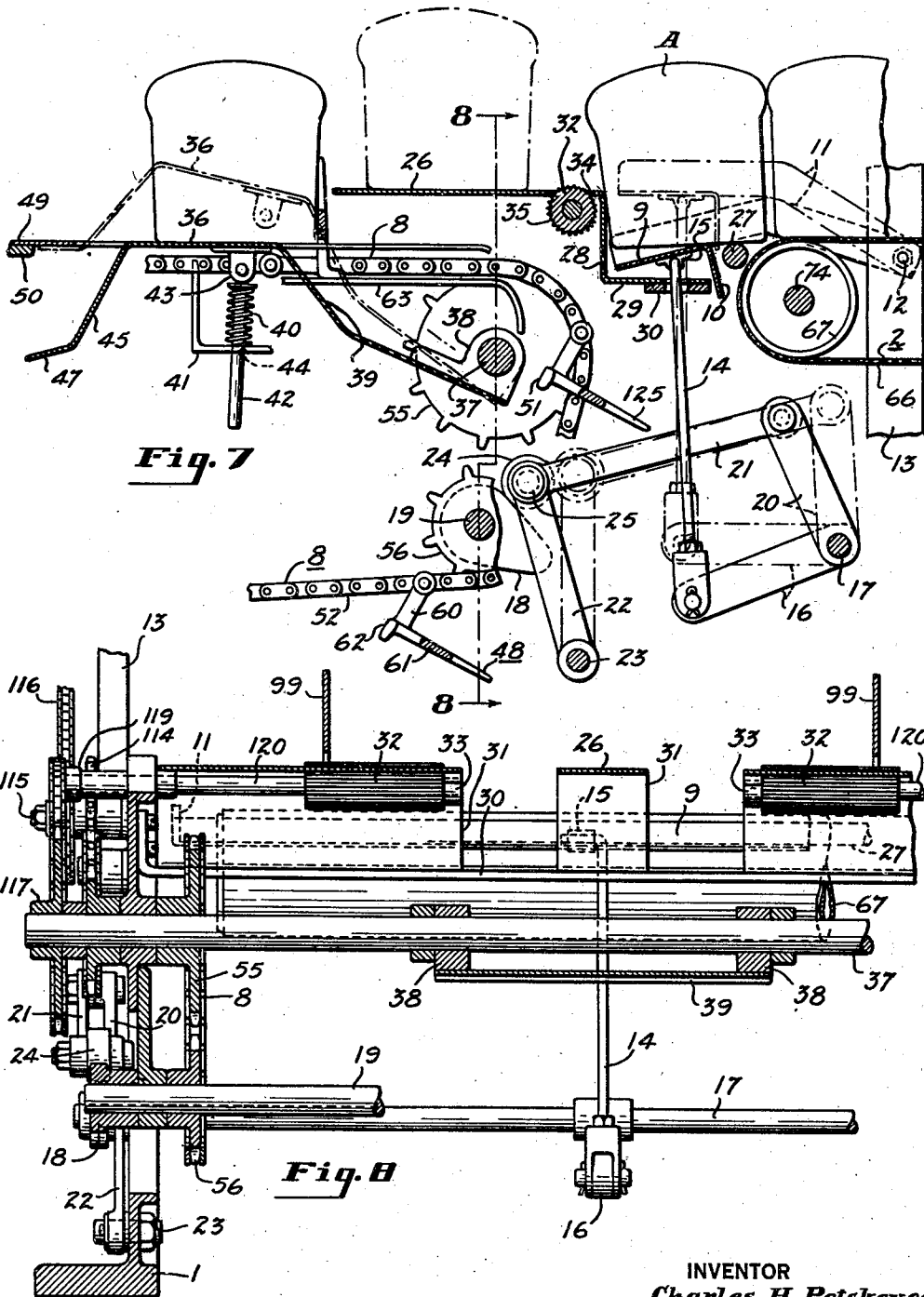
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FEED MECHANISM FOR SLICING MACHINES

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4 Sheets-Sheet 3



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FEED MECHANISM FOR SLICING MACHINES

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4 Sheets-Sheet 4

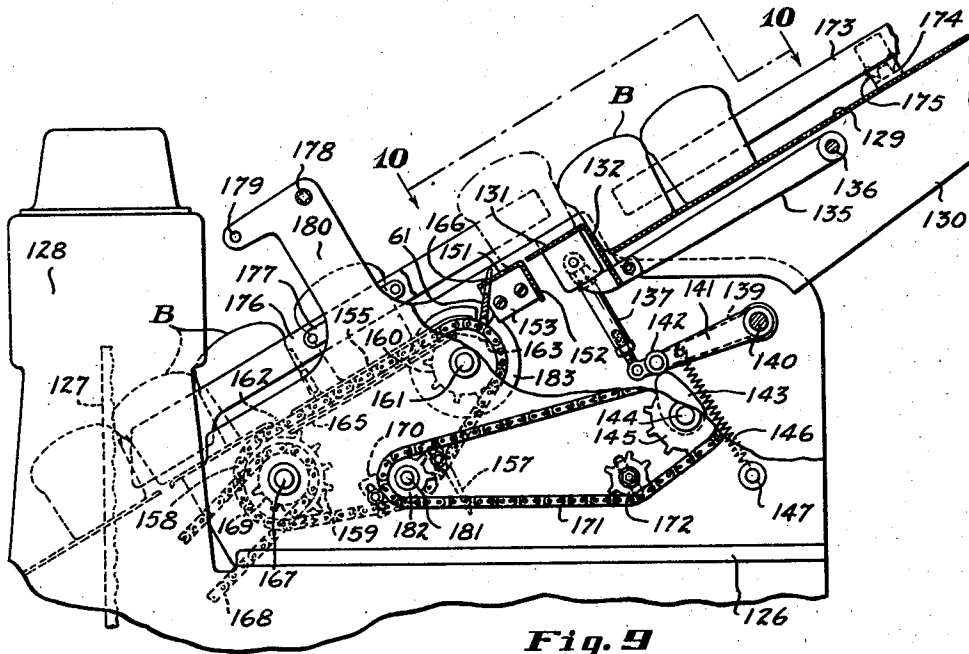


Fig. 9

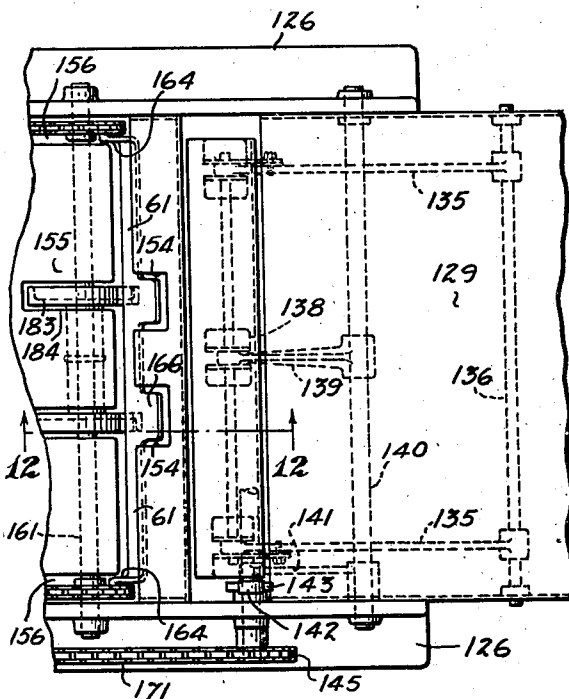


Fig. 10

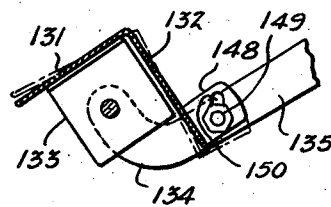


Fig. 11

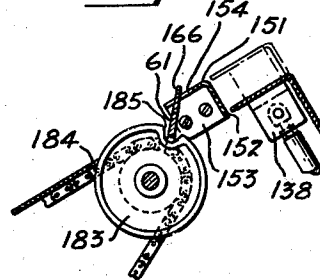


Fig. 12

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FEED MECHANISM FOR SLICING MACHINES

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Application August 27, 1936, Serial No. 98,212

30 Claims. (Cl. 198—20)

This invention relates to slicing machines and has particular reference to the feed of such machines.

In the feeding of baked loaves to a slicing mechanism they are often deposited upon a conveyor and carried in continuous succession to and through the slicing blades without regulation of the feed and slicing rate and without any space between successive loaves so that each loaf as it approaches and passes through the slicing mechanism is urged forward by a number of succeeding loaves. This results in a certain deformation of the loaves, which are usually sliced soon after baking and while in a warm, somewhat plastic or spongy condition. Consequently, the slicing operation is not carried out in the most efficient manner and crooked or wavy slices often result. Furthermore, when a slicing machine is used in connection with a wrapping machine it is desirable that the sliced loaves emerge from the slicing mechanism in a uniform, timed procession, so that they may be readily deposited individually on successive flights of the infeed conveyor of the wrapping machine. It will be apparent that if the sliced loaves emerge from the slicing mechanism in a continuous succession with each loaf being urged forward only by the succeeding loaves exerting a variable, unregulated force, such depositing of individual loaves on successive flights of the infeed conveyor to the wrapping machine is not accomplished with maximum efficiency and precision.

It is, therefore, an object of the present invention to provide a feed for a loaf slicing mechanism which will regulate the feeding of unsliced loaves to the slicing mechanism so that a plurality of loaves may be simultaneously transferred to the machine and conveyed to the slicing mechanism at predetermined and regulated intervals.

Another object of the present invention is to provide such a device which will enable baked loaves to be deposited en masse upon the infeed conveyor of a slicing machine and which will align and straighten such loaves and feed them individually to the slicing mechanism.

A further object of the invention is to provide a feed mechanism for straightening and aligning loaves deposited on the infeed side of a slicing machine and individually feed such loaves to a slicing mechanism, which feed mechanism can be adapted for use with belt feed conveyors and the like or gravity feed conveyors to the slicing blades.

A still further object of this invention is to

provide such a device which is simple in construction, inexpensive to manufacture, and which efficiently feeds baked loaves to and through a slicing mechanism with a minimum deformation of the loaves and promotes a uniform, even slicing operation.

With the above and other objects in view, which will be apparent from the following detailed description, the invention consists of certain features of construction and combinations of parts which will be apparent to those skilled in the art.

In the drawings, which illustrate suitable embodiments of the present invention,

Figure 1 is a fragmentary side elevation of the infeed end of a slicing machine which embodies the present invention;

Fig. 2 is a view on the line 2—2 of Fig. 1;

Fig. 3 is a view on the line 3—3 of Fig. 1;

Fig. 4 is a plan view of the infeed mechanism shown in Fig. 1;

Fig. 5 is a diagrammatic representation of one of the belt drives for the feed mechanism, taken on the line 5—5 of the drawing of Fig. 4;

Fig. 6 is a diagrammatic representation of another of the belt drives for the mechanism, taken on the line 6—6 of Fig. 4;

Fig. 7 is an enlarged fragmentary side elevation, partly in section and with parts broken away, of the infeed timing mechanism shown in Fig. 1;

Fig. 8 is a section on the line 8—8 of Fig. 7;

Fig. 9 is a fragmentary side elevation, partly in section and with parts broken away, of a modification of my invention for use in connection with slicing machines having gravity infeed.

Fig. 10 is a fragmentary plan view on the line 10—10 of Fig. 9;

Fig. 11 is an enlarged detail view, in section, of the elevator of Fig. 9, showing the manner in which its slope is adjusted; and

Fig. 12 is a detail, in section, of portions of the flight conveyor and elevator of Fig. 9.

Referring to the accompanying drawings, in which like parts are indicated throughout by the same numerals, a mechanism embodying my invention and for use in connection with slicing machines having power feed, is illustrated in Figs. 1 to 8. The feed mechanism is carried by suitable side frames 1 of the slicing machine and includes a loading or belt feed conveyor 2 and a slicing mechanism 3. The slicing mechanism consists of a pair of alternately reciprocable blade frames 4 and 5, which are mounted on spaced guide members supported in extension

of the side frames 1. Each blade frame is provided with a plurality of uniformly spaced cutter blades 7 which lie between the cutter blades of the other blade frame in order that all the blades will substantially simultaneously engage the loaf to be sliced at the beginning of the slicing operation. The blade frames are alternately reciprocated in opposite directions by well known means.

The baked loaves "A", deposited upon the belt feed conveyor 2 in convenient quantities by the operator, are carried to the infeed timing device, or be hereinafter described, and individually transferred to the flight feed conveyor 8. This conveyor carries each loaf individually to the slicing mechanism 3 in such a manner that there is a minimum crushing of the loaf and an efficient and economical slicing operation results. Furthermore, the sliced loaves emerge from the slicing mechanism at predetermined and regulated intervals, so that they may be properly positioned between flights of an outfeed conveyor (not shown) of the slicing machine, which flight outfeed conveyor may also be the infeed conveyor of a wrapping machine or may feed the infeed conveyor of a wrapping machine. There may be thus provided an orderly procession of baked loaves through a slicing mechanism and into a wrapping machine.

The infeed timer is positioned adjacent the discharge end of the loading or belt conveyor 2, and includes an elevator having a flat loaf-receiving platform 9 and an apron 10 depending from the rearward edge of the platform to engage the side of loaves at the end of the belt conveyor. The elevator is carried by arms 11 pivoted by bolts 12 to the vertical supports 13 secured to the side frames 1. Alternate raising and lowering of the elevator is accomplished by means of rod 14 journaled in bracket 15 on the underside of the platform 9 of the elevator and actuated by lever 16, rigidly carried on shaft 17 journaled in the side frames 1. A cam 18, keyed on driven shaft 19 of the flight feed conveyor 8, imparts an oscillating motion to the shaft 17 and the lever 16 by means of lever 20 secured on the shaft 17, link 21 and link 22 carried on stub shaft 23 supported in the side frame 1. Cam follower 24 carried by pin 25 in links 21 and 22 rides smoothly on cam 18.

In its lowest position the elevator platform 9 is even with, or somewhat below, the level of the infeed belt conveyor 2, as indicated by the full lines of Fig. 7. In its raised position the elevator platform is level with or slightly above the level of a receiving table 26, as indicated by the broken lines of Fig. 7. It is to be noted that the receiving platform 9 of the elevator is somewhat narrower than the width of the baked loaves "A", so that when a loaf is positioned on the elevator it will be urged forward by succeeding loaves, to facilitate its transfer to the table 26, as will be hereinafter pointed out.

In order that baked loaves being transferred from the belt conveyor 2 to the elevator will not tilt sideways into the triangular space between the end of the conveyor 2 and apron 10 of the elevator, an auxiliary driven roller 27 is provided. This roller is journaled in the side frames 1 and, as shown in Fig. 7, is positioned just below the level of the belt conveyor 2 and in the space between the depending apron portion 10 of the elevator and the loading conveyor.

The table 26 extends over and above the level of the flight feed conveyor 8, so that the flights thereof can pass under the table at the beginning

of their loaf-conveying operation. At the rearward edge of the table 26 is a depending apron 28 positioned adjacent the path of the forward edge of the elevator. The apron 28 terminates in a shelf 29 carried on the cross member 30 secured to the side frames 1, thus serving as a support for the table and a stop for arresting a loaf being transferred from the belt conveyor 2 to the elevator. Longitudinal slots 31, extending in the direction of travel of the baked loaves "A", are provided in the table 26 to permit extensions on the flights of the conveyor 8 to engage a baked loaf resting upon the table and move it onto the conveyor 8 in a manner to be hereinafter described.

To facilitate the transfer of loaves from the elevator to the table 26, small rollers 32 are provided at the corner formed by the junction of the loaf receiving table 26 and the depending apron 28. There are two such rollers, each of which is journaled in the side frames 1 and in bearings 33 adjacent the margin of the slots in the table 26, so that extended portions of the flights may pass between the ends of the rollers at the commencement of the loaf pushing operation, thus insuring that the flight engages the rear side of the loaf, which has been carried over the rolls, and prevent tipping of the loaf by the flight engaging the underside of the loaf. Each of the rollers has a portion adjacent the slots in the table 26 of larger diameter than the remainder of the roller which extends underneath the table. The enlarged portion of each of the rollers protrudes above the surface of the table through openings 34 and is provided with a knurled or corrugated surface 35 to give a greater frictional force on the bottom of the loaf and more efficiently transfer the loaves from the elevator to the table.

In order that the baked loaves will be transferred in an upright position from the table 26 to the conveyor 8 a depressible table 36 is provided. This table has an angularly disposed, rearwardly extending apron 39 held by sleeves 38 carried on shaft 37 journaled in the side frame 1. Thus the shaft 37 serves to support the table 36 as well as to carry sprockets of the flight feed conveyor, as will be hereinafter pointed out. A coil spring 40, resting on a support 41 which is supported by a suitable cross member resiliently urges the table 36 upward. The spring 40 surrounds and is guided by rod 42 carried in bracket 43 on the bottom of the table 36 and guided in an aperture 44 in the angle iron 41.

The forward edge or portion disposed toward the slicing mechanism of the depressible table 36 has a depending, angularly disposed tongue 45 which fits in a notch 46 in the flight feed conveyor apron 49 and which terminates in a stop portion 47 engageable with the under side of the above mentioned apron to limit upward motion of table 36. The angularity of the tongue 45 and the apron 39 with respect to the table 36 is such that the up and down motion of the table is relatively gradual, due to the action of the flights of the conveyor 8 riding over the tongue and apron as will be hereinafter described and preventing a snapping up of the table because of a sudden release.

In its elevated position shown by the broken lines in Fig. 7 the portion of the depressible table 36 adjacent the table 26 is positioned just below or even with the level of the table 26, in order that loaves may be slid easily from the table 26 onto the depressible table. In its lowered

position, shown by the full lines of Fig. 7, the depressible table is even with a flight feed conveyor apron, so that loaves may be readily slid from the table onto the apron. The raising and lowering of the depressible table 36 is accomplished by means of the flights 48 which engage the extended apron 39 and gradually lower the table with a loaf "A" deposited thereon. It is to be understood that the spring 40 is of sufficient strength so that with a loaf on the depressible table 36 the extended apron 39 is urged against the flights 48, the weight of the loaf alone being insufficient to depress the table 36 below the level of the conveyor apron.

The flight feed conveyor 8, as previously mentioned, is positioned forward of the infeed timer and individually conducts loaves at regulated intervals from the timer to the slicing mechanism 3. As best seen in Fig. 1 it comprises a level portion positioned partially under and ahead of the table 26 and the depressible table 36 and a sloping portion adjacent the slicing mechanism. The loaves are supported on a conveyor apron 49 which is carried on and rigidly secured to raised portions 51 of cross members 50 that extend between the side frames 1. The apron 49 is thus supported above the cross members 50 so as to accommodate side chains of the conveyor 8 as will be hereinafter pointed out. Also, it is to be noted that there is a space between the marginal portions of the conveyor apron 49 and the side frames 1, which also is to accommodate the flight mechanism.

The flights 48 are carried on synchronously driven endless side chains or belts 52 running on forward sprockets 53 and 54 and rearward sprockets 55 and 56 carried respectively on shafts 57, 58, 37, and 19 journaled in the side frames and connected thereto by suitable means, such as keys.

Each of the flights 48, which are uniformly spaced about the belts 52, comprises a pair of angle-shaped brackets 60 pivoted directly to the links of belts 52, and which lie outwardly of the marginal edges of the conveyor apron 49 in the space between the apron and the side frames 1, as shown in Fig. 4. The angle-shaped brackets 60 are connected by flat strap portions 61, which, when they are in their feeding position, are spaced slightly above the conveyor apron 49, and which are the portions of the flight that engage the extended apron 39 of the depressible table 36, as mentioned above. The end of each of the angle-shaped brackets 60, which is not pivoted to the belt 52, is provided with a lug or shoe 62 that is arranged during the feeding portion of the flight movement to ride upon horizontal portions of guide bars or tracks 63 carried by the cross member 50 and disposed below the flight feed apron 49. During the operation of the flight feed conveyor the strap-like portions 61 of the flights are disposed in a vertical position above the apron 49, and are held in such position by means of the contact between the lugs or shoes 62 of the flight brackets 60 and the horizontal portion of the guide tracks 63. As each flight, hanging in a suspended position from the side chains 52, approaches the upper rearward sprockets 55 the shoes 62 thereof engage the rear ends of the horizontal portions of the guide tracks 63, which are curved over the shaft 37 that supports the upper rear sprockets, and gradually move the flights into vertical pushing position through the slots 31 in the table 26, where they engage the corner of a loaf positioned on the table 26 (as shown by

the broken lines of Fig. 1) and move it forward onto the apron 49 over the depressible table 36. In this manner the loaves are individually pushed over the apron 49 toward the slicing mechanism 3. As the chain links which carry the flights pass around the lower forward sprockets, the shoes 62 of the flight brackets 60 disengage from the guide tracks 63 adjacent a transverse opening or slot 64 in the apron 49 and the flights then gradually drop down through such opening because of their pivoted connection to the side chains or link belt 52. Stirrups 65 through the slots 64 guide the lowering of the flights so that the flights disengage from the article being advanced and disappear. Also, the stirrups 65 are secured to the side frames and serves as a supporting means for the portion of the apron 49 positioned between the slot 64 and the slicing mechanism. During their return movement the flights hang downwardly, suspended from the side chains 52.

The loading or belt feed conveyor 2 comprises an endless flexible belt 66 carried on cylindrical rollers 67 and 68. The roller 68 is journaled in bearings 69 carried on bolts 70 supported in the extension members 71 of the side frames 1. The tension in the belt 66 may be adjusted by tightening or releasing the nut 72 threadedly engaging the bolt 70 and bearing against the end of the extension members 71. The extension members are additionally supported by means of the diagonally disposed strut members 73 secured near the lower portions of the side frames 1 and the extremity of the extension members. The roller 67 is driven and carried by a shaft 74 journaled in the side frames 1.

Supported over the belt feed conveyor near the forward end thereof and adjacent the infeed timer mechanism is a pair of traction means such as chains 75 running on idler sprockets 76 and driven sprockets 77. The idler sprockets 76 are carried on spindles supported at the ends of arms 78, the opposite ends of which are pivoted on driven shaft 79, which carries the driven sprocket 77. The shaft 79 is journaled in a yoke 80 carried by an upwardly extending post 81 having a sliding fit with a guide block 82, carried on a supporting arm 83 extending over the belt feed conveyor 2 and supported by a cross member 84 extending between the vertical supports 13. The guide block 82 has sliding engagement with the arm 83 and horizontal adjustment of the yoke 80 is provided by means of the crank 85 which actuates a threaded shaft 86 carried in the end of the arm 83 and having threaded engagement with the guide block 82. Extensible drive shaft 91, having double universal joints, connects driven shaft 79 with driven sprocket 92 carried on short shaft 93 journaled in the end of supporting member 94 extending from and carried by vertical member 13. Thus traction chains 75, when in various positions of adjustment, may be driven from sprocket 92.

The loaves are centered on the belt feed or loading conveyor 2 by means of side guides 95 and 96. It will be seen from Fig. 4 that side guide 95 extends substantially the entire length of the conveyor while side guide 96 is somewhat shorter to facilitate the placing of baked loaves on the conveyor by the operator. These side guides are preferably made of spring-like resilient material 70 and are held in position by angle brackets 97 adjustably secured on the extension members 71 by means of wing nuts and bolts 98. As will be seen best in Fig. 1, the side guides extend a sufficient distance above the surface of the loading con-

veyor so as to effectively guide the baked articles "A" as they travel toward the timing mechanism, the forward end of the guides terminating just short of the elevator so as not to interfere with its operation. By means of the adjustable brackets 97 the guide rails may be positioned at various distances apart to accommodate loaves of various lengths.

Guide rails 99 center the baked loaves over the infeed timing mechanism and the flight feed conveyor, and are seen to be positioned as a continuation of guide rails 95 and 96, converging slightly at 100 adjacent the depressible table 36 in order to align the loaves. These guide rails 99 are carried by adjustable brackets 101 threadedly engaging the shaft 102 journaled in extension members 103 of the side frames 1 located adjacent the flight feed conveyor near the top of the inclined portion thereof. Threads 104 on shaft 102 are right and left handed, so that by rotating the shaft by means of the hand crank 105 the distance between the brackets 101 can be adjusted for loaves of different lengths. A stationary auxiliary shaft 106, spaced from and parallel with shaft 102 has its ends secured in the extension members 103. Lever portions 107, extending from the adjustable brackets 101, have sliding engagement with the auxiliary shaft 106 and serve to prevent rotation of the brackets about the shaft 102, thereby maintaining the guide rails 99 in proper position over the infeed timer and flight feed conveyor.

Short guide rails 108, also carried by the adjustable brackets 101, extend over the inclined portion of the flight feed conveyor substantially to the plane of the cutting edge of the blades and center the loaves over the conveyor during this portion of their travel.

As previously mentioned, the feeding mechanism is operated from a main drive shaft, not shown in the drawings, but which rotates shaft 58 carrying lower forward sprockets of the flight feed conveyor by means of chain 109 and sprocket 110 keyed to the shaft. The movement of the side belt chains 52 carried on lower forward sprockets 54 also rotates sprockets 53, 55 and 56 of the flight feed conveyor and their respective shafts.

The cam 18, being carried directly on the shaft 19, is seen to operate the feed timer, or article elevating platform 9, in timed relation with the flight feed conveyor 8.

As diagrammatically illustrated in Fig. 5, the sprocket 111, keyed on shaft 37 of the flight feed conveyor, drives the loading or belt feed conveyor in timed relation with the flight feed conveyor by means of chain belt 112 running on sprocket 113 keyed to the shaft 74 on which the forward roller 67 of the loading conveyor is carried. Double sprocket 114, supported on short shaft 115, secured in the side frame 1 so that one sprocket wheel engages chain belt 112, carries chain 116 on the other sprocket wheel. Chain 116 also rides on and drives sprocket 92, thus actuating the traction chains 75 in synchronization with the loading conveyor 2.

The small article transferring rollers 32 in the table 26 are driven by means of large sprockets 117 carried on the ends of the shaft 37, chains 118 and small sprockets 119 keyed to the shaft 120 on which the rollers 32 are carried, as diagrammatically shown in Figs. 5 and 6.

The small roller 27 positioned between the loading conveyor 2 and loaf platform 9 of the elevator is rotated by means of sprocket 121 on

the roller shaft 120, chain 122 and sprocket 123 on the shaft 124 carrying the small roller 27.

It will thus be seen that the entire infeed mechanism is actuated by a single main drive shaft so that the several parts are synchronized during operation and an efficient, regulated feeding action is secured. Regulating the speed of the main drive shaft by means well known in the art, such as actuating such shaft from a wrapping machine, provides a timed feed of baked loaves to the slicing mechanism, and which feed may be synchronized with a wrapping machine in order to provide a properly timed succession of sliced loaves to the wrapping machine.

With the main drive shaft in motion so that the slicing mechanism, flight infeed conveyor, infeed timer and loading or belt conveyor are in motion the operation of the mechanism is as follows:

A number of articles are placed upon the loading conveyor 2 by an operator. The loading conveyor carries such articles forward toward the infeed timer. Before reaching such timer, however, they are carried under the traction chains 75 which engage the tops of the articles "A". As the leading article reaches the elevator, which may be in a portion of its cycle in which it is elevated above the level of the belt conveyor, the article comes to rest against the depending apron 10 of the elevator, and the second article lines up against the rear of the first article. In the event that either of these articles is out of alignment or askew with respect to the elevator the trailing or rearmost corner will be brought forward into proper alignment by the traction chains 75 and loading conveyor belt 66 working in coordination. This action is continuous during the operation of the machine, with all of the successive articles lining up behind the foremost and the belt of the loading conveyor slipping under them when their motion is arrested by the leading article coming against the depending apron 10 of the elevator.

Upon the lowering of the elevator so that it becomes level with the loading conveyor the leading article is slid thereon by the action of the small roller 27, belt 66 of the loading conveyor and the force of the following articles being urged forward by the belt conveyor and traction chains 75. As the article on the elevator is raised to the level of the table 26 it is pressed against the depending apron 28 by subsequent articles since, as hereinabove mentioned, the articles are wider than the lift platform 9 of the elevator and protrude over the rear corner or edge thereof.

As soon as the elevator platform 9 is level with the table 26 the article thereon is given a forward impetus by the pressure of the following articles which continues until the next article comes to rest against the depending apron 10 of the elevator. This impetus is sufficient to carry the leading article partially onto the table 26 where it is engaged by the rotating rollers 32 and carried entirely onto the table 26. When the cam follower 24 rides over the high point of the cam 18, the elevator is lowered to the level of the loading conveyor and the next article is received to be elevated and the cycle repeated.

Just after the leading article is received on the table 26 extensions 125 of one of the flights 48 emerge through the slots 31 in the table 26 and engage a rear portion of the article to carry it forward onto the depressible table 36 which is gradually lowered with the article thereon to the level of the apron 49 of the flight feed conveyor 75

by the action of the strap portion 61 of the flight riding over the extended apron 39 as mentioned above. As the article leaves the depressible table the latter is gradually released to assume its elevated position by the flight 48 riding over the inclined tongue 45.

The article transferred to the apron 49 is advanced by the flight that pushed it over the depressible table 36 and is carried over the inclined portion of the conveyor to the slicing mechanism. The flight which has been urging the article forward drops through the slot 64 in the apron 49 permitting the next article to advance to the slicing mechanism. Each of the succeeding articles is advanced in the same manner as the leading article just described so that there is a continuous and uninterrupted procession of articles through the machine with an article positioned ahead of each of the flights 48 as they move over the apron 49.

A modification of the present invention used in connection with a slicing machine having a gravity feed is illustrated in Figs. 9, 10, 11 and 12. In this embodiment, the mechanism is mounted on side frames 126 and the reciprocal slicing blades 127 are operated in the upwardly extending portion 128 of the machine framework similar to the mechanism previously described. The articles to be sliced, such as baked loaves "B" may be deposited in convenient numbers on a stationary, inclined feed table 129 supported on the side frames 126 by means of depending side portions 130.

At the lower and forward end of the stationary inclined feed table 129 is the infeed timer similar to that herein above described. This timer comprises an elevator and table. The elevator has a flat, plate-like article-lifting platform 131 and depending from the rearward edge of the lifting platform an apron 132 to engage the forward side of an article positioned on the feed table 129 as a preceding article is being transferred to the flight infeed conveyor. Depending bracket plates 133, secured to the under side of the elevator lift platform 131, are pivotally mounted on upturned ends 134 of supporting arms 135 carried on shaft 136 pivotally mounted in the depending side portions 130 of the inclined feed table. Reciprocating up and down motion is imparted to the elevator by an adjustable length rod 137 having one end pivoted in the bracket 136 centrally disposed on the under side of the lift platform 131 of the elevator and its other end pivotally connected to the lever 139, rigidly mounted on shaft 140 journaled in the side frame members 126. Adjacent one of the side frame members a cam actuated lever 141 is rigidly secured to the shaft 140 and provided as its extremity with a cam follower 142 which rides on cam 143 carried on a stub shaft 144 journaled in side frame 126 with stub shaft also carries a driven sprocket 145. A coil spring 146, tensioned between the lever 141 and a suitable boss 147 in the side frame 126, retains the follower 142 in engagement with the cam 143. By altering the length of the rod 137, a convenient adjustment is provided for regulating the height of the lift platform 131 of the elevator. Furthermore, it may be desired to adjust the relative angle of incline of the platform 131 with respect to the feed table 129. Such an adjustment is illustrated in Fig. 11. As previously mentioned the elevator is pivotally mounted on the supporting arms 135 and has a flanged portion 148 formed on the apron 132 adjacent the supporting arm 135. By means of a

nut and bolt 149 and an elongated slot 150 in the flanged portions 148, the elevator may be locked in a suitable angular position relative to the other parts of the mechanism.

In its lowermost position the elevator lift platform 131 is adjacent the level of the inclined feed table 129 so that an article can easily slide from the inclined feed table onto the elevator. In its uppermost position the elevator platform 131 is level with the transfer table 151 so that an article carried on the elevator can slide onto the table from the elevator when the latter reaches its uppermost position.

The table 151 has a depending apron 152 adjacent the forward edge of the elevator against which articles may rest during the elevating operation. Flanged portions 153 at the extremities of the table 151 are suitably secured to the side frames 126 and serve to support the table in the machine. Slots 154 are provided in the table to permit the passage of the flights of the infeed conveyor as will be hereinafter described.

The flight infeed conveyor is positioned forward of and just below the discharge edge of the table 151 and may have substantially the same slope as the inclined feed table 129. It comprises a flat table portion 155 suitably supported between the side frames 126 but separated therefrom by marginal spaces 156 to accommodate the flight mechanism. This table portion is seen to support the loaves as they leave the table 151 and are conducted to the slicing mechanism by means of the flights 157 which correspond to the flights 48 described in connection with the flight infeed conveyor in the embodiment of the present invention illustrated in Figs. 1 through 8.

The flights 157 are carried on the endless side chains or belts 158 which run on forward sprockets 159 fixed on shaft 167 journaled in the side frames 126, rearward sprockets 160 fixed on shaft 161 journaled in the side frames, and intermediate or idler sprockets carried on stub shafts 181 journaled in adjustable bracket 170 secured to the side frames. The intermediate or idler sprockets serve to take up slack in the side chains 158 and one of them also acts as a drive for the elevator mechanism, as will be hereinafter pointed out. The forward and rearward sprockets are positioned so that the side chains or belts 158 run adjacent the table portion 155 in the spaces 156, referred to above, between such table and the side frames.

In the loaf or article propelling movement of the flights 157 they are carried above the table portion 155, dropping from this position when they approach the forward sprockets 159 through a transverse slot 162 provided for this purpose in the table portion 155, returning to the start of the pushing position hanging in an inverted position from the side chains 158 as shown in Fig. 9. As the portion of the side chains carrying a flight rounds the rearward sprockets 160, shoes 163 on the angle brackets 164 of the flight engage guide straps 165 carried between the side frames and adjacent the marginal portion of the table 155 of the conveyor, and the flight is thereby elevated into pushing position. In this movement extension portions 166 on the flights 157 emerge through slots 154 in the table 155 and engage the lower corner of an article positioned thereon.

The mechanism is actuated from a powered drive shaft (not shown) which is connected to the shaft 167, on which the forward sprockets 159 are mounted by means of a chain 168 run-

ning on driving sprocket 169. The intermediate or idler sprocket secured to stub shaft 181 journaled in adjustable bracket 170 actuates the small drive sprocket 182 mounted on the stub shaft 181 and is located on the outside of the side frame 126, as seen in Fig. 9. The small drive sprocket 182 carries a chain 171 which also runs over driven sprocket 145, previously mentioned and idling sprocket 172 which takes up the slack in chain 171.

10 In this modification the articles are centered over stationary inclined feed table 129 by means of spaced side guides 173 carried on adjustable angle brackets 174 secured to marginal portions of the inclined feed table by means of wing nuts and bolts 175. The forward ends of these guides terminate just short of the apron 132 of the elevator so as not to interfere with its operation and by means of the adjustable brackets and wing nuts are set a sufficient distance apart to accommodate the article being sliced.

20 Serving as a continuation of the side guides 173 are the guide rails 176 which are carried in a suspended position over the lift platform 131, table 151 and flight feed conveyor by means of the adjustable brackets 177 carried on oppositely threaded ends of shaft 178 and the smooth guide shaft 179, both of which are supported in extensions 180 of the side frames 126. The space between the side rails 176 being adjusted by means of a hand crank (not shown) arranged to turn the shaft 178 which draws together or separates the adjustable brackets 177 by means of its oppositely threaded ends.

35 In order to facilitate the transfer of articles from the table 151 to the conveyor table 155, transfer wheels 183 may be provided. These wheels are mounted on and driven by shaft 161, which also carries the rearward sprockets 160, and are arranged to project through suitable slots 184 in the conveyor table 155, so that they are substantially even with the table 151. Notches 185 in the periphery of the wheels 183 are positioned to receive the strap portions 61 of the flights 157 as the latter are carried around the rear end of the conveyor over the sprockets 160.

45 The wheels 183 are positioned a suitable distance apart along the shaft 161 so that the articles being transferred from the table 151 to the conveyor table 155 will not slip between the wheels or tilt sideways. Similarly, the extensions 166 on the flights 157 are positioned a suitable distance apart in order that they may efficiently engage the rear edge of the article being advanced. As shown in Fig. 10, the space between the wheels 183 and extensions 166 may be substantially the same.

55 The operation of this modification is similar to that of the embodiment employing a driven belt feed conveyor hereinabove described. In this construction the operator places the articles to be sliced on the stationary inclined feed table 129 between the side guide rails 173. The surface of the inclined feed table, preferably being smooth and polished, presents a minimum of friction to the articles, which slide downwardly by the force of gravity and come to rest against the apron 132 of the elevator, which may be in an elevated portion of its cycle. Upon lowering of the elevator so that the platform 131 is even with or below the level of the inclined feed table the first article slides thereon and is lifted to the level of the table 151 as the cam follower 142 rides over the peak of the cam 143. Since each article being elevated is somewhat wider than the elevator platform 131, it is given a forward impetus as the lift platform 131 becomes level with the

table 151 by the following articles, which bear against the rear side of the article overhanging the platform 131. Also, the slope of the platform 131 and table 151 is sufficient so that an article positioned on the elevator tends to slide onto the table by action of the force of gravity alone, and for this reason it is preferable to provide a smooth polished surface which will have a minimum frictional effect.

As will be seen in Fig. 9, the elevator reaches the level of the table 151 just after the extended portions 166 of the flight 157 have emerged through the slots 162 of the table 151 so that the article carried by the elevator will slide onto the table after the passage of such flight and be positioned on the flight feed conveyor ahead of the next flight. Upon lowering of the elevator the next succeeding article slides on the platform 131 and is elevated and transferred to the flight feed conveyor in a similar manner, the cycle thus being repeated to position an article between each pair of flights of the flight feed conveyor and provide a timed regulated procession of articles through the slicing mechanism.

25 As an article slides off the table 151 under the influence of gravity and a flight 157, the forward edge is engaged and supported by the transfer wheels 183. Rotation of the wheels carries the article onto the conveyor table 155 and effects smooth transfer thereof, so that the article does not tip over to be improperly fed to the slicing mechanism.

30 It will thus be seen that the present invention provides an infeed timer for a slicing machine which is arranged to receive a number of articles simultaneously, straighten and align such articles and individually feed them to the slicing mechanism at regulated intervals.

35 Furthermore, it is to be noted that an infeed constructed according to the present invention may be used in connection with slicing machines having a gravity feed or slicing machine having power feed.

40 It is to be understood, however, that the embodiments of the invention described, and illustrated in the accompanying drawings, are for purposes of illustration only and numerous modifications and substitution of parts are contemplated without departing from the spirit of the invention and intended to be included within the scope of the appended claims.

I claim:

45 1. In a bread slicing machine, a feeding mechanism comprising a loading conveyor for receiving loaves, a feed conveyor for conducting the loaves to the slicing mechanism, and an elevator for intermittently transferring loaves from the loading conveyor to the feed conveyor over an obstruction between said conveyors, said elevator having a loaf-receiving portion of less width than a loaf to be transferred whereby subsequent loaves on the loading conveyor may effectively press against the elevated loaf to facilitate its transfer to the feed conveyor.

50 2. In a bread slicing machine, a feeding mechanism comprising a driven loading conveyor for receiving loaves, a driven feed conveyor for conducting the loaves to the slicing mechanism and a timer for intermittently transferring loaves from the loading conveyor to the feed conveyor over an obstruction between said conveyors, said timer including a loaf-supporting table positioned over the feed conveyor and above the level of the loading conveyor, an elevator for intermittently transferring loaves from the loading con-

veyor to the table, and means for transferring loaves from the table to the feed conveyor, said means including a depressible table actuated by the feed conveyor.

3. In a bread slicing machine, a feeding mechanism comprising a driven loading conveyor for receiving loaves, a driven feed conveyor for conducting the loaves to the slicing mechanism, and a timer for intermittently transferring loaves from the loading conveyor to the feed conveyor over an obstruction between said conveyors, said loading conveyor comprising an endless belt carried on two or more rollers and said feed conveyor comprising a plurality of flights carried on one or more endless belts, said timer including a loaf-supporting table positioned over the feed conveyor and above the level of the loading conveyor, an elevator for intermittently transferring loaves from the loading conveyor to the table, and means for transferring loaves from the table to the feed conveyor, said means including a depressible table normally positioned level with the supporting table and arranged to be depressed by the flights to the level of the feed conveyor.

4. In a bread slicing machine, a feeding mechanism comprising a driven loading conveyor for receiving loaves, a driven feed conveyor for conducting the loaves to the slicing mechanism and a timer for intermittently transferring loaves from the loading conveyor to the feed conveyor over an obstruction between said conveyors, said timer including a loaf-supporting table positioned over the feed conveyor and above the level of the loading conveyor, an elevator for intermittently transferring loaves from the loading conveyor to the table, means for transferring loaves from the table to the feed conveyor, and means for facilitating the transfer of loaves from the elevator to the table, said means including one or more rollers arranged to engage a loaf partially transferred to the table and propel the loaf onto the table.

5. In a slicing machine, a feeding mechanism for advancing articles to the slicing mechanism comprising a loading conveyor for receiving articles to be fed, an endless feed conveyor having flights for individually conducting articles to the slicing mechanism, a member for obstructing the movement of articles from the loading conveyor to the feed conveyor, and means operating in timed relation with the flights of the feed conveyor for transferring articles over the obstruction member from the loading conveyor to the feed conveyor to position an article on the feed conveyor in advance of each flight thereof.

6. In a slicing machine, a feeding mechanism for advancing articles to the slicing mechanism comprising a loading conveyor for receiving articles to be fed, an endless feed conveyor having flights for individually conducting articles to the slicing mechanism, a member for obstructing the movement of articles from the loading conveyor to the feed conveyor, means for elevating articles over the obstruction member operating in timed relation with the flights of the feed conveyor for transferring articles over the obstruction member from the loading conveyor to the feed conveyor to position an article on the feed conveyor in advance of each flight thereof, and a table disposed between the loading and feed conveyors and adjacent the elevating means for receiving the elevated articles momentarily during their movement from the loading conveyor to the feed conveyor.

7. In a slicing machine, a feeding mechanism for advancing articles to the slicing mechanism comprising a loading conveyor for receiving articles to be fed, an endless feed conveyor having flights for individually conducting articles to the slicing mechanism, a member for obstructing the movement of articles from the loading conveyor to the feed conveyor, an elevator operating in timed relation with the flights of the feed conveyor for intermittently transferring articles from the loading conveyor over the obstruction member to the feed conveyor to position an article on the feed conveyor in advance of each flight thereof, and an apron depending from one edge of the elevator to engage the leading side of an article on the loading conveyor to arrest the movement of such article when the elevator is above the level of said loading conveyor.

8. In a slicing machine, a feeding mechanism for advancing articles to the slicing mechanism comprising a loading conveyor for receiving articles to be fed, an endless feed conveyor having flights for individually conducting articles to the slicing mechanism, a member for obstructing the movement of articles from the loading conveyor to the feed conveyor, means for elevating articles over the obstruction member operating in timed relation with the flights of the feed conveyor for transferring articles over the obstruction member from the loading conveyor to the feed conveyor to position an article on the feed conveyor in advance of each flight thereof, a table disposed between the loading and feed conveyors and adjacent the elevating means for receiving the elevated articles momentarily during their movement from the loading conveyor to the feed conveyor, said obstruction member including an apron depending from one edge of the table for engaging the leading side of an article on the elevating means when the latter is below the level of the table.

9. In a slicing machine, a feeding mechanism for advancing articles to the slicing mechanism comprising a loading conveyor for receiving articles to be fed, an endless feed conveyor having flights for individually conducting articles to the slicing mechanism, a member for obstructing the movement of articles from the loading conveyor to the feed conveyor, an elevator operating in timed relation with the flights of the feed conveyor for intermittently transferring articles from the loading conveyor over the obstruction member to the feed conveyor to position an article on the feed conveyor in advance of each flight thereof, an apron depending from one edge of the elevator to engage the leading side of an article on the loading conveyor to arrest the movement of such article when the elevator is above the level of said loading conveyor, and a support disposed between the loading and feed conveyors and adjoining the elevator for momentarily receiving the articles during their movement from the loading conveyor to the feed conveyor.

10. In a slicing machine, a feeding mechanism for advancing articles to the slicing mechanism comprising a loading conveyor for receiving articles to be fed, an endless feed conveyor having flights for individually conducting articles to the slicing mechanism, a means for obstructing the movement of articles from the loading conveyor to the feed conveyor, an elevator operating in timed relation with the flights of the feed conveyor for intermittently transferring articles from the loading conveyor over the obstruction

member to the feed conveyor to position an article on the feed conveyor in advance of each flight thereof, an apron depending from one edge of the elevator to engage the leading side of an article on the loading conveyor to arrest the movement of such article when the elevator is above the level of said loading conveyor, a support disposed between the loading and feed conveyors and adjoining the elevator for momentarily receiving the articles during their movement from the loading conveyor to the feed conveyor, said obstruction member including an apron depending from one edge of the support, said apron substantially paralleling the path of the elevator for engaging the leading side of an article on the elevator when the latter is below the level of the support.

11. In a slicing machine, a feeding mechanism for advancing articles to the slicing mechanism comprising a loading conveyor for receiving articles to be fed, a driven feed conveyor moving in an endless path around rotatable elements for conducting the articles to the slicing mechanism, an article support positioned at an end and above the level of the feed conveyor, said end thereof being adjacent an article discharge end of the loading conveyor and the support arranged to carry an article moving onto the feed conveyor over the rotatable element at the receiving end of the feed conveyor, an elevator for intermittently transferring articles from the loading conveyor to the support, and means for guiding the lowering of an article from the support to the feed conveyor to deposit the article thereon beyond the rotatable element.

12. In a slicing machine, a feeding mechanism for advancing articles to the slicing mechanism comprising a loading conveyor for receiving articles to be fed, a driven feed conveyor moving in an endless path around rotatable elements for conducting the articles to the slicing mechanism, an article support positioned at an end and above the level of the feed conveyor, said end thereof being adjacent an article discharge end of the loading conveyor, an elevator for intermittently transferring articles from the loading conveyor to the support, and driven rotatable means engageable with an article during the movement onto the support to assist in the transfer.

13. In a slicing machine, a feeding mechanism for advancing articles to the slicing mechanism comprising a loading conveyor for receiving articles to be fed, a driven feed conveyor moving in an endless path around rotatable elements for conducting the articles to the slicing mechanism, an article support positioned at an end and above the level of the feed conveyor, said end thereof being adjacent an article discharge end of the loading conveyor and the support arranged to carry an article moving onto the feed conveyor over the rotatable element at the receiving end of the feed conveyor, an elevator for intermittently transferring articles from the loading conveyor to the support, and a wheel substantially tangent to the plane of the article contacting surface of the table for engaging the underside of an article moving off the support to guide the lowering of the article onto the feed conveyor.

14. In a slicing machine a feeding mechanism for advancing articles to the slicing mechanism comprising a loading conveyor for receiving articles to be fed, a driven feed conveyor having a plurality of substantially uniformly spaced flights moving in an endless path around rotatable elements for conducting the articles to

the slicing mechanism, said feed conveyor having an article receiving end adjacent an article discharge end of the loading conveyor, an article supporting table disposed above the level of the conveyors and at the receiving end of the feed conveyor, a slot in the table and each flight arranged to project through the slot above the level of the article contacting surface of the table at the beginning of its movement over the feed conveyor to advance an article to the slicing mechanism, and means for intermittently transferring articles from the discharge end of the loading conveyor to the table in timed relation with the flight movement of the feed conveyor.

15. In a slicing machine a feeding mechanism for advancing articles to the slicing mechanism comprising a loading conveyor for receiving articles to be fed, a driven feed conveyor having a plurality of substantially uniformly spaced flights moving in an endless path around rotatable elements for conducting the articles to the slicing mechanism, said feed conveyor having an article receiving end adjacent an article discharge end of the loading conveyor, an article supporting table disposed above the level of the conveyors and at the receiving end of the feed conveyor, a slot in the table and each flight arranged to project through the slot above the level of the article contacting surface of the table at the beginning of its movement over the feed conveyor to advance an article to the slicing mechanism, means for intermittently transferring articles from the discharge end of the loading conveyor to the table in timed relation with the flight movement of the feed conveyor, and a wheel having a peripheral edge substantially tangent to the plane of the article contacting surface of the table for engaging the underside of an article moving off the table to guide the lowering of the article onto the feed conveyor.

16. A construction substantially as set forth in claim 15 in which the wheel is carried on a common shaft with the rotatable elements at the article receiving end of the feeding conveyor.

17. A construction substantially as set forth in claim 15 in which the wheel is formed with a recess extending radially inward from its periphery to receive a flight moving around the receiving end of the conveyor.

18. A construction substantially as set forth in claim 15 in which the wheel is in alignment with the slot in the article supporting table.

19. In a slicing machine, a feeding mechanism for advancing articles to the slicing mechanism comprising a loading conveyor for receiving articles to be fed, a driven feed conveyor moving in an endless path around rotatable elements for conducting the articles to the slicing mechanism, said feed conveyor having an article receiving end adjacent an article discharge end of the loading conveyor, a member for obstructing the movement of articles from the loading conveyor to the feed conveyor, an elevator for transferring articles from the loading conveyor over the obstructing member to the feeding conveyor, said elevator having an article lifting platform adjustably supported for tilting movement to regulate the relative angularity of the platform with respect to the article supporting surface of the conveyors.

20. A construction substantially as set forth in claim 19 in which the elevator is vertically adjustable to regulate the relative height of the ar-

article lifting platform with respect to the article supporting surface of the loading conveyor and the top of the obstructing member.

21. In a slicing machine a feeding mechanism for advancing articles to the slicing mechanism comprising a loading conveyor for receiving articles to be fed, a driven feed conveyor having a plurality of substantially uniformly spaced flights moving in an endless path around rotatable elements for conducting the articles to the slicing mechanism, said feed conveyor having an article receiving end adjacent an article discharge end of the loading conveyor, an article supporting table disposed above the level of the conveyors and at the receiving end of the feed conveyor, said article supporting table extending above the receiving end of the feed conveyor and overlying one of the rotatable elements of the conveyor to carry an article moving onto the feed conveyor beyond the curved portion of the feed conveyor flight path at the receiving end of the feed conveyor, and an elevator for intermittently transferring articles from the discharge end of the loading conveyor to the table in timed relation with the flight movement of the feed conveyor.

22. In a slicing machine a feeding mechanism for advancing articles to the slicing mechanism comprising a loading conveyor for receiving articles to be fed, a driven feed conveyor having a plurality of substantially uniformly spaced flights moving in an endless path around rotatable elements for conducting the articles to the slicing mechanism, said feed conveyor having an article receiving end adjacent an article discharge end of the loading conveyor, an article supporting table disposed above the level of the conveyors and at the receiving end of the feed conveyor, said article supporting table extending above the receiving end of the feed conveyor and overlying one of the rotatable elements of the conveyor to carry an article moving onto the feed conveyor beyond the curved portion of the feed conveyor flight path at the receiving end of the feed conveyor, an elevator for intermittently transferring articles from the discharge end of the loading conveyor to the table in timed relation with the flight movement of the feed conveyor, and a depressible table having an article supporting surface normally substantially level with that of the first named table, said depressible table arranged to be lowered substantially to the level of the feed conveyor by the flights to gradually lower articles from the first named table to the feed conveyor.

23. A construction such as that set forth in claim 21 in which the article supporting table is formed with one or more slots extending in the direction of article movement and the flights are formed to extend through the slots above the article supporting surface of the table to engage an article positioned thereon and move the article onto the feed conveyor.

24. In a slicing machine a feeding mechanism for advancing articles to the slicing mechanism comprising an endless driven loading conveyor moving on rotatable elements, a driven feed conveyor having a plurality of substantially uniformly spaced flights moving in an endless path around rotatable elements, the loading conveyor having a discharge end adjacent a receiving end of the feed conveyor, an obstructing member disposed between the conveyors to arrest the movement of articles from the loading conveyor to the feed conveyor, means operating intermittently in timed relation with the flights of the feed

conveyor to transfer articles over the obstruction member and position the articles to be individually engaged by the flights, and a rotatable member disposed between the discharge end of the loading conveyor and the transfer means to support an article as the latter moves off the loading conveyor.

25. In a slicing machine a feeding mechanism for advancing articles to the slicing mechanism comprising an endless driven loading conveyor moving on rotatable elements, a driven feed conveyor having a plurality of substantially uniformly spaced flights moving in an endless path around rotatable elements, the loading conveyor having a discharge end adjacent a receiving end of the feed conveyor, an obstructing member disposed between the conveyors to arrest the movement of articles from the loading conveyor to the feed conveyor, means operating intermittently in timed relation with the flights of the feed conveyor to transfer articles over the obstruction member and position the articles to be individually engaged by the flights, and means for actuating the conveyors and transfer means from a common drive shaft to synchronize the operation of the feeding mechanism.

26. A construction such as that set forth in claim 25 in which endless traction means is disposed above the discharge end of the loading conveyor and driven in timed relation therewith, said traction means arranged to have frictional engagement with the tops of articles on the loading conveyor and assist in the advancing of the articles and the conveyor and traction means cooperating to advance the trailing end of a misaligned article having its leading end arrested by the obstructing member.

27. A construction such as that set forth in claim 25 in which endless traction means is disposed above the discharge end of the loading conveyor and driven in timed relation therewith, said traction means arranged to have frictional engagement with the tops of articles on the loading conveyor and assist in the advancing of the articles, the conveyor and traction means cooperating to advance the trailing end of a misaligned article having its leading end arrested by the obstructing member, and one end of said traction means resting by gravity on the leading article moving over the loading conveyor to assist in advancing said article to the transfer means.

28. A construction such as that set forth in claim 25 in which endless traction means is disposed above the discharge end of the loading conveyor and driven in timed relation therewith, said traction means arranged to have frictional engagement with the tops of articles on the loading conveyor and assist in the advancing of the articles, and the conveyor and traction means cooperating to advance the trailing end of a misaligned article having its leading end arrested by the obstructing member, said traction means being adjustable toward and away from the transfer means and toward and away from the loading conveyor to accommodate articles of different size.

29. In a slicing machine, a feeding mechanism for advancing articles to the slicing mechanism, comprising an endless driven loading conveyor moving on rotatable elements, a driven feed conveyor having a plurality of substantially uniformly spaced flights moving in an endless path around rotatable elements, the loading conveyor having a discharge end adjacent a receiving end of the feed conveyor, an obstructing member dis-

posed between the conveyors to arrest the movement of articles from the loading conveyor to the feed conveyor, and means operating intermittently in timed relation with the flights of the feed conveyor to transfer articles over the obstruction member and to position the articles to be individually engaged by the flights.

30. In a slicing machine of the type having a number of substantially vertically movable slicing knives, the combination of a loading conveyor having a downward inclination toward the knives for supporting articles moving to an elevator receiving station, a reciprocating elevator arranged to receive articles one at a time from the loading conveyor and lift each received article to an elevator discharge station above the receiving station, said elevator being movable in a direction

substantially at right angles to the direction at which articles are delivered thereto from the loading conveyor and having a depending apron extending substantially parallel to the direction of elevator movement and engageable with the leading side of an article on the loading conveyor at the receiving station to prevent such article from moving off the lowermost end of the loading conveyor while the elevator is at the discharge station, means for advancing an article, lifted by the elevator from the loading conveyor, through the slicing knives, and means for actuating the advancing means in synchronous timed relation with the elevator so that each article raised by the elevator is individually advanced by the advancing means.

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