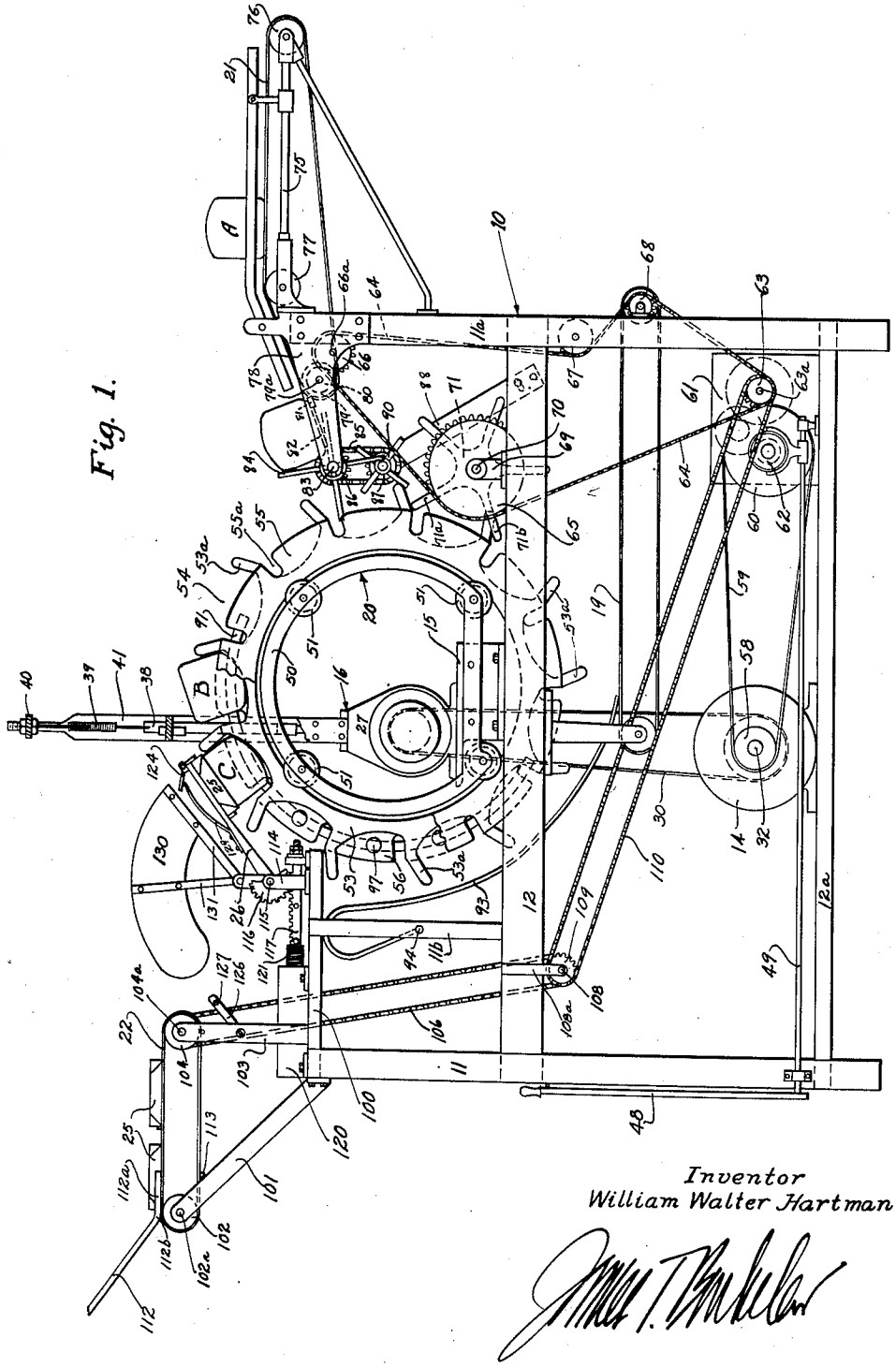
Sept. 12, 1933. W. W. HARTMAN 1,926,281

MECHANISM TO PLACE TRAY ON SLICED BREAD

Filed Aug. 15, 1930 4 Sheets-Sheet 1

Fig. 1.



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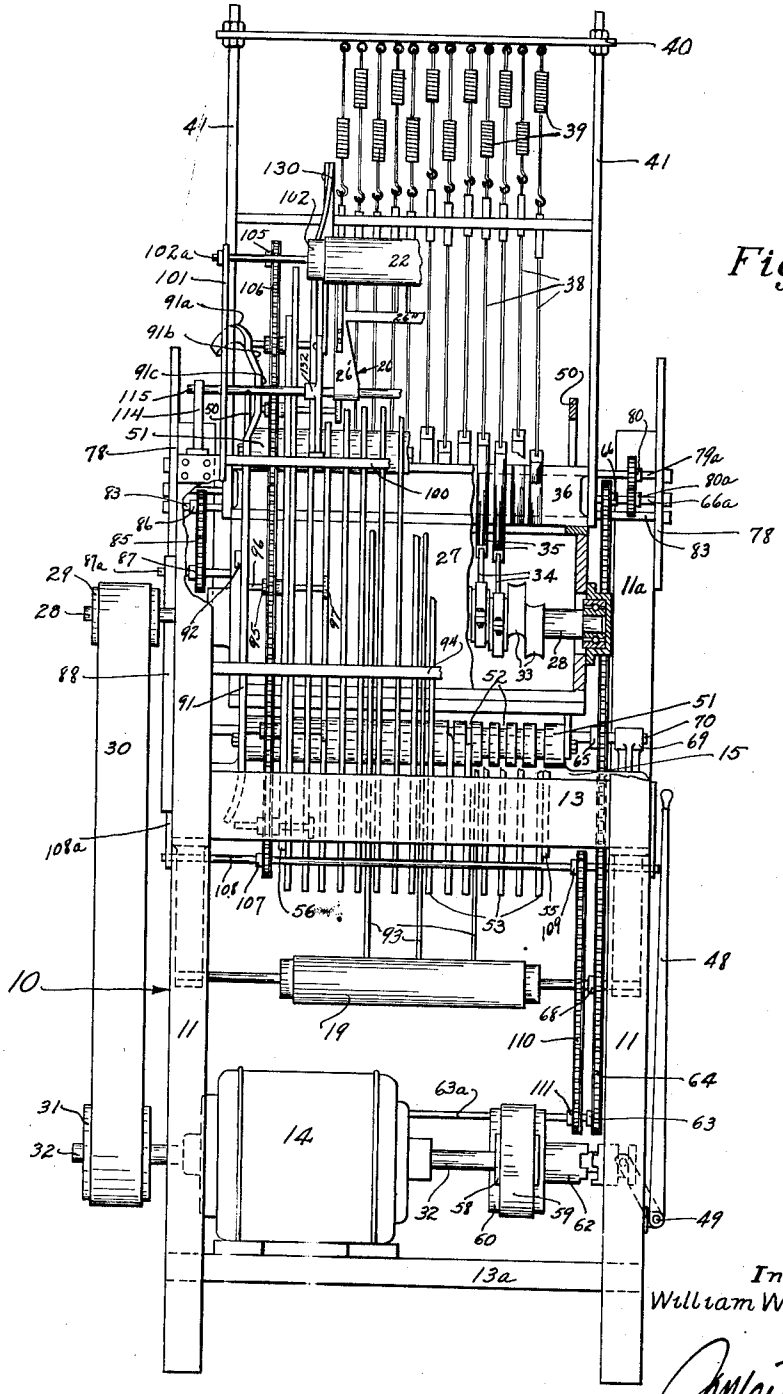

Fig. 2.

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MECHANISM TO PLACE TRAY ON SLICED BREAD

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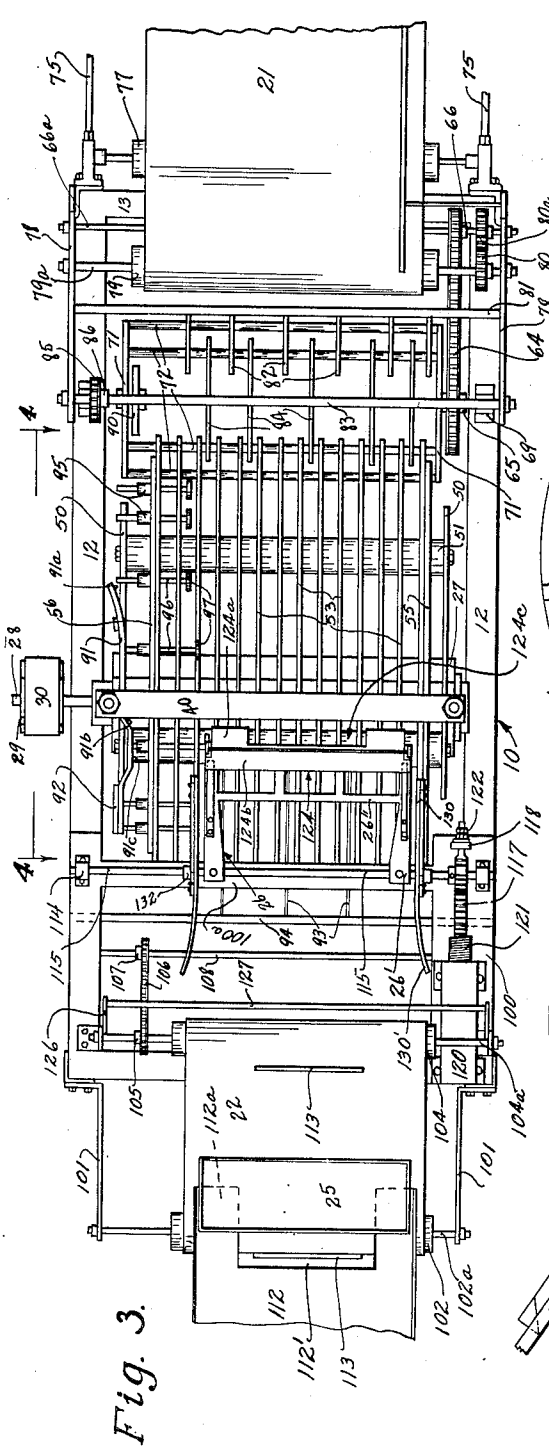

Fig. 3.

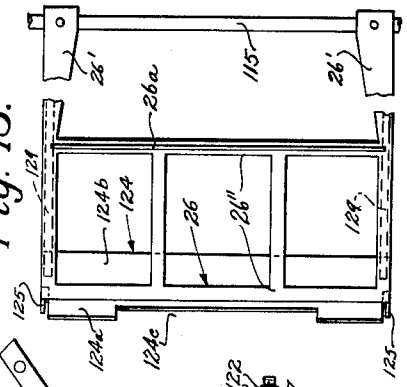

Fig. 13.

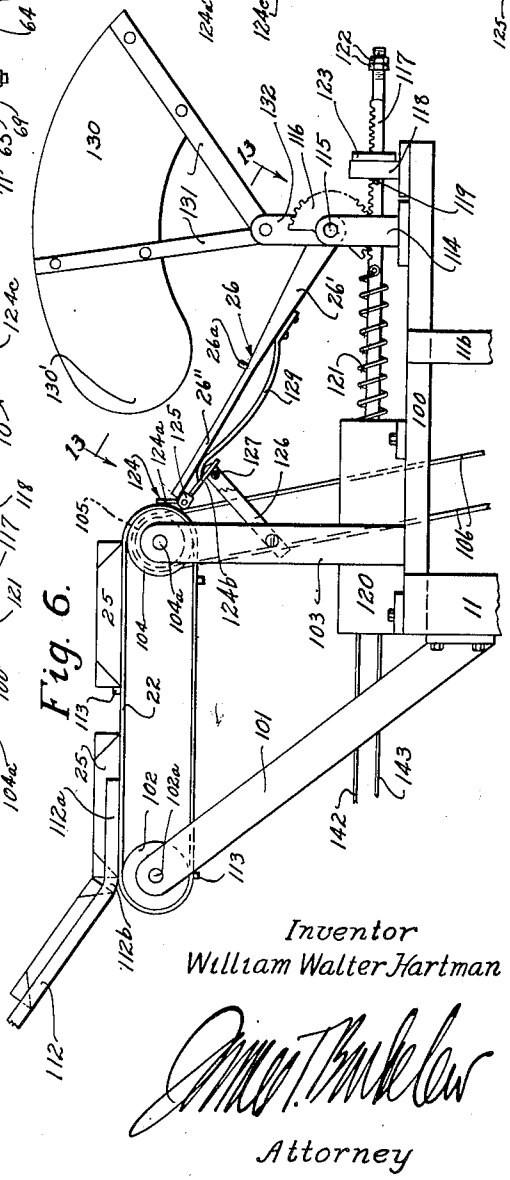

Fig. 6.

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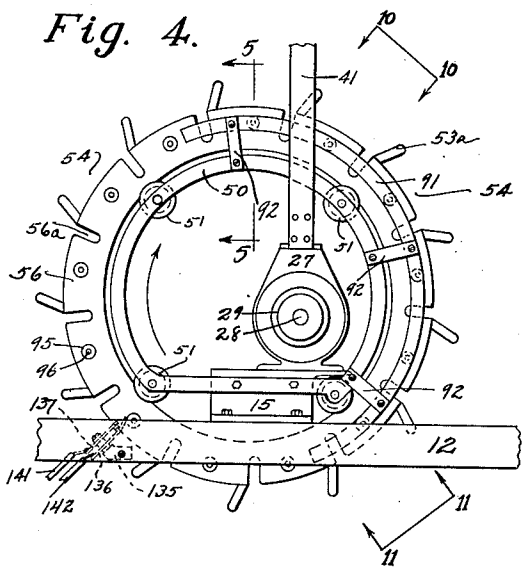
Fig. 4.



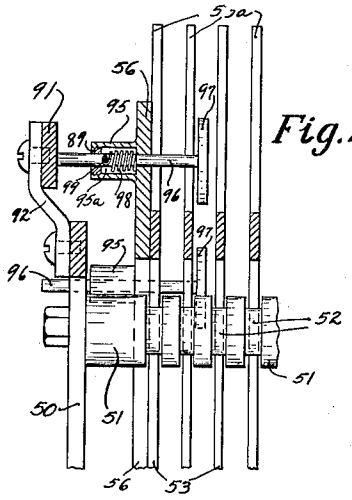


Fig. 5.

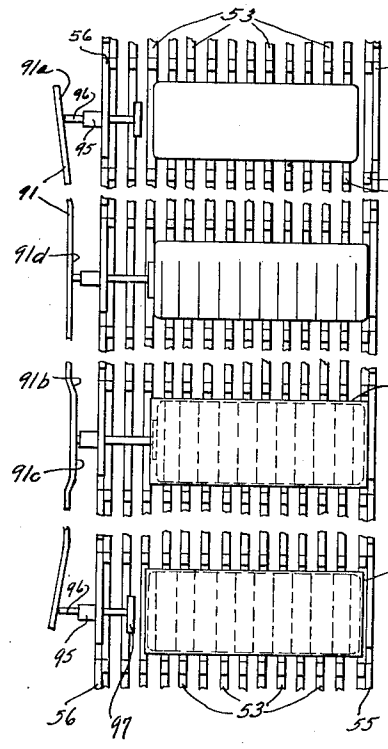


Fig. 8

Fig. 9.

Fig. 10

Fig. 11.

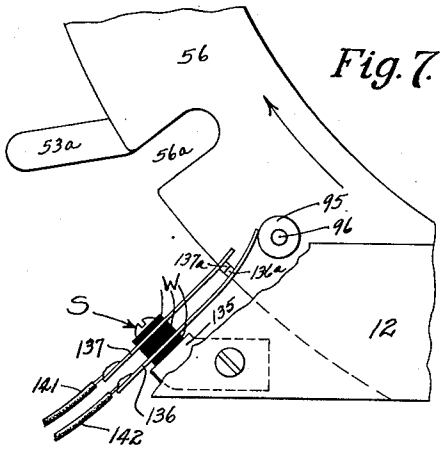


Fig. 7.

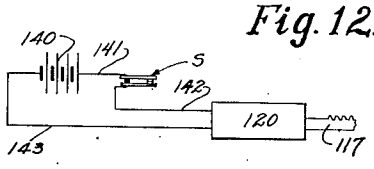


Fig. 12.

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1,926,281

UNITED STATES PATENT OFFICE

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MECHANISM TO PLACE TRAY ON SLICED BREAD

William Walter Hartman, Los Angeles, Calif.

Application August 15, 1930. Serial No. 475,504

23 Claims. (Cl. 93—2)

My invention has to do with means for applying an encircling element to loaf goods and the like, for purposes of handling and packaging. It is in the application of encircling elements, in the form of trays, bands, etc., to sliced bread in combination with a slicing machine that I shall show and describe a preferred form of my invention, though it will be understood that I do not wish to be limited thereto.

Recently, ready-sliced bread has found such favor that a very large part of the total bakery output is sliced at the bakery before the bread is wrapped. However, when a loaf is sliced it ceases to be a unit that can be easily handled and wrapped; and it thus becomes necessary to hold the slices together by the use of some suitable means, of which a paper or cardboard tray is the most easily applied and commonly used. It is an object of my invention to provide an automatic means for applying this tray to a loaf of sliced bread, and to accomplish this more easily and economically than the act can be done manually.

Furthermore, in almost any type of slicing machine the effective output is limited by the speed at which the tray can be applied to the sliced bread; and this, in turn, must be at least as fast as the wrapping machines work, to obtain full use of the latter. If the tray-applying operation is not continuous and not up to this minimum speed, the slicing and wrapping machines are not working to maximum capacity and the cost of preparing the bread rises in accordance. With the present state of development of slicers and wrappers, it is almost impossible for a workman manually applying trays to keep pace with the machines. Hence, I have provided an automatic mechanism intermediate to these two machines for applying the tray; and thereby permit the slicers and wrappers to run continuously at their most efficient rate, with the result that labor costs and fixed overhead costs per loaf are reduced, and the total output per machine is greatly increased.

I accomplish this by providing a tray applier which may be arranged in different forms, although in this application I have elected to illustrate a movable tray applier including an oscillating arm adapted to receive the trays from a suitable source, and, at the proper instant, place them on the exposed underside of the sliced loaf of bread. The means actuating the oscillating arm is synchronized with the bread slicer so that the movement of the tray-carrying arm occurs at the correct time in the slicer cycle of operation. In the embodiment illustrated in this application, I show and describe my improvement in conjunction with a slicer of the type fully disclosed in my copending application Serial Number 429,050, filed February 17, 1930, though it will be understood that any suitable slicer or carrying means for sliced bread may be used therewith.

These and other objects and purposes of my invention may best be understood from the following detailed description, reference being made to the drawings, in which:

Fig. 1 is a front elevation of a slicing machine with my improved tray applying means shown in conjunction therewith;

Fig. 2 is an elevation of Fig. 1, as viewed from the left thereof, with parts of the tray-applying mechanism and of the slicer broken away or omitted to expose underlying elements;

Fig. 3 is a top plan view of Fig. 1;

Fig. 4 is a fragmentary elevation of the rotary bread carrier and a portion of the slicer, as viewed from the position of arrows 4—4 in Fig. 3 showing the applier switch associated therewith;

Fig. 5 is an enlarged fragmentary section taken along the line 5—5 in Fig. 4;

Fig. 6 is an enlarged elevation of the tray-applying mechanism detached from the slicer;

Fig. 7 is an enlarged fragmentary view of the switch contacts for actuating the solenoid operating the tray arm;

Figs. 8, 9, 10 and 11 are successive views of a loaf as held in the rotary bread carrier before and after slicing, and before end after applying the tray. Fig. 8 is taken just before the loaf reaches position B of Fig. 1; Fig. 9 is taken when the loaf is partially through the cutters, and before the position of Fig. 10 (position C of Fig. 1) is reached; Figs. 10 and 11 are taken as indicated by the arrows 10—10 and 11—11 respectively in Fig. 4.

Fig. 12 shows diagrammatically the control circuit of the tray applying means; and

Fig. 13 is a detached plan of the tray placing arm, as viewed from the direction of arrows 13—13 in Fig. 6.

In order that the applier may be comprehensively described in combination with the particular slicer here shown and that the relative timing of the machines may be brought out, I will describe in some detail the illustrated slicer. However, it is to be noted that only such claims as include particularities of the slicer here shown are to be considered as limited to such showing or the mechanical equivalent thereof.

Referring more especially to Figures 1 and 2, the frame work generally indicated at 10 consists of the end upright members 11 and 11*a* carrying the longitudinal horizontal members 12 and 12*a* and transverse horizontal members 13 and 13*a*. On the members 12*a* may be mounted a motor 14 which serves as a power source, as will be described. Supported on and between the horizontal members 12 is a transverse base 15 which in turn supports the cutter assembly generally indicated at 16. The base 15 also supports the rotary bread carrier generally indicated at 20 which forms the preferred means for passing the loaves through the cutters. The bread is placed on the conveyor belt 21 which carries it to a suitable mechanism, later described, which inverts the loaves as they are placed in the carrier 20. Carried by the uprights 11 and 11*b*, is the mechanism for placing the trays on the sliced bread. This mechanism includes a belt conveyor 22 adapted to discharge the trays 25 onto the arm 26 which thereafter oscillates through a short arc to place and leave the trays on the loaves of bread in the rotary carrier in a manner to be later described.

Mounted on top of the transverse base 15 is crankcase 27, within which is crankshaft 28 journaled in suitable bearings in the ends of the crankcase, as may be seen in Fig. 2. A pulley 29 mounted on an extension of crankshaft 28 has belt 30 passing over it which transmits power to the crankshaft from pulley 31 on shaft 32 of motor 14. Formed integrally with crankshaft 28 is a series of cranks or eccentrics 33. To these are attached eccentric straps 34 that, in turn, reciprocate the push rods 35 through push rod guide 36 which serves as a top for the crankcase.

Bread cutting knives or cutters 38 are attached by suitable means to the heads of the push rods 35 and reciprocate therewith. Tension springs 39 are attached to the upper end of the cutters 38 in order to keep the cutters straight and vertical at all times, said springs being attached at their upper ends to a cross bar 40, which is supported by suitable upright members 41 attached to the ends of the push rod guide 36.

Mounted one at each end of the base 15 and extending upwardly therefrom, are two rings 50, having rotatably mounted between them a plurality of grooved rollers 51, here shown as four in number. Each roller has a plurality of equally spaced peripheral grooves 52 (see Fig. 5); and in these grooves are supported the ringlike disks 53, forming the rotary bread carrier 20. These disk rings 53 have radial projections 53*a* extending from their periphery that define the sides of bread carrying compartments 54. The two outside rings 53 have attached to them end plates 55 and 56 which close the ends of the bread carrying compartments 54 as shown in Figs. 1 and 4. The disk rings 53 are separate and have no interconnection so that the cutters 38 may freely reciprocate between them at any position of the carrier 20.

The method of driving the bread carrier may best be explained by reference to Figs. 1 and 3. One end of motor shaft 32 carries pulley 58 which, by means of belt 59, drives pulley 60 of the speed-reduction box 61 which may be of any conventional type. A clutch indicated at 62 is interposed between pulley 60 and the drive shaft of the speed reduction box 61 so that this part of the slicer may be stopped without stopping motor 14 and also, necessarily, cutters 38. Handle 48, conveniently located for the operator, operates rock-shaft 49 to engage or disengage clutch 62. On the power take-off shaft of the gear box 61 is sprocket 63 that drives chain 64 which passes over sprockets 65, 66, 67 and 68 in succession, thence back to sprocket 63, for purposes to be discussed. Journaled in suitable bearing brackets 69 mounted on the horizontal members 12, is shaft 70, to which are attached sprocket 65 and a pair of star wheels 71, one such star wheel being near each end of the shaft 70. Rotatably mounted on and between the radial arms of the two star wheels 71, are horizontal rollers 72 (Fig. 3) which are adapted to engage the underside of the arms 53*a* of the disk rings 53, suitable openings 55*a* and 56*a* being made in the end plates 55 and 56 respectively to prevent interference therewith. The star wheels 71 are rotated clockwise, as viewed in Fig. 1, by the driving chain 64 and sprocket 65, and hence bread carrier 20 is driven counterclockwise in a manner to pass the bread through cutters 38, as will be understood.

It will be appreciated that each ring 53 is independently free to rotate in grooves 52 and that horizontal rollers 72 serve the dual purpose of rotating the rings individually and also aligning them continuously so that they rotate as a unit, thus preserving the formation of bread carrying compartments 54.

The means for feeding the bread and placing it bottom-side-up into the carrier compartments 54 will now be described briefly, referring mainly to Figs. 1 and 3. Plates 78 extend forwardly from the top of the members 11*a* and rotatably carried between these plates is shaft 79*a* of roller 79. A gear 80 on shaft 79*a* meshes with gear 80*a* fastened on the same shaft 66*a* as the sprocket 66, said shaft 66*a* also being supported between the plates 78. It will be seen that the clockwise motion of sprocket 66 received from the driving chain 64 thus drives roller 79 in a counterclockwise direction. Extending rearwardly from the top of the vertical members 11*a*, are two horizontal members 75 which carry suitable bearings to support the rollers 76 and 77 between them. The conveyor belt 21 passes over the three rollers 76, 77 and 79, and its upper surface is driven toward rotary carrier 20 by the motion of roller 79. While passing between rollers 77 and 79, belt 21 is downwardly inclined, and just in front of roller 79 is a stationary bar 81 having a plurality of short wires 82 extending forward and slightly down in a continuation of the direction of belt 21. These wires provide a platform upon which the bread is placed by belt 21. The loaf remains stationary thereon until it is picked up by the inverting stile, to be described, and placed on the carrier 20.

At the extreme forward end of plates 78 is journaled a shaft 83 which has four sets of pins or wires 84 spaced 90° apart and positioned to pass between wires 82. This forms the inverting stile that picks up the loaf from the wires 82, inverts it, and places it in the compartments 54. The shaft 83 is rotated by the chain 85 passing over sprockets 86 and 87, sprocket 86 being fastened to shaft 83 and sprocket 87 being fastened on stud shaft 87*a* carried by the adjustable supporting member 88. Also fastened to shaft 87*a* is a star wheel 90 with four arms, 90° apart, adapted to be engaged intermittently by the rollers 72. It is thus seen that the engagement of rollers 72 with the arms of the star wheel 90 rotates it intermittently through 90° and shaft 83 is also

rotated through the same arc. The loaf of bread, having been placed right side up on the belt 21, is carried forwardly to a position on the wires 82 where it is stopped against a vertical set of the wires 84. At the proper time, the shaft 83 is rotated through 90°; another set of wires 84 picks up the loaf from wires 82 and carries the loaf through an arc, placing it in a registering compartment 54, the bottom surface of the loaf then facing upwardly and outwardly.

After placing the bread in compartment 54 it becomes necessary to accurately position the loaves with regard to the cutters 38 so that the slices may be properly located in the loaf. To accomplish this the following means are provided, particular reference being had to Figs. 4 and 5: on the outside surface of the plate 56 is cast a plurality of cylindrical bosses 95 which serve as mountings for plungers 96 that have attached to their inner ends bread-holding disks 97. These bosses are located centrally with regard to bread carrying compartments 54, there being one such boss and plunger with a disk for each compartment. The plate 56 is bored to receive the plunger rod 96 and a larger bore 95*a* is provided in the boss 95 to receive the compression spring 98 which is attached at one end to the plunger 96 by means of the pin 99 and at the other end presses against the inner wall of the bore 95*a*. A plug 89 is threaded into the outer end of large bore 95*a* to hold in the plunger. Spring 98 tends to withdraw plunger 96 and disk 97 from engagement with the loaves of bread (as in Figs. 8 and 11) and normally holds them in this retracted position. To advance bread holding disk 97 against the loaves, there is provided a semi-circular cam ring 91 supported by brackets 92 attached to the ring 50.

At the time that the loaf is placed in a given compartment 54 the associated plunger 96 is fully retracted. As the rotary bread carrier 20 advances, the outside end of the plunger 96 comes in contact with the rise 91*a* of cam ring 91 (Fig. 8) and by the time the carrier has advanced the loaf until the leading edge has come in contact with knives 38, as shown at B in Fig. 1, the disk 97 has been advanced until it firmly holds the loaf by end pressure between itself and the end plate 55. The loaf is not only thus positioned so it will be accurately sliced but it is also firmly held so it will be properly presented to the cutters 38. This is shown in Fig. 9 where a loaf is shown partially through the knives.

It is customary to apply the tray to the loaf just after it has passed through the knives, and it is found to be more easily accomplished if the loaf is slightly compressed as the tray is applied. For this purpose a short further advancement of the cam ring 91, as may be seen in Figs. 2 and 10 brings rise 91*b* into effect and causes the plunger and disk to press against the bread more firmly and thus compress the loaf slightly to a dimension that makes the applying of the tray more easily accomplished. While the plunger is on dwell 91*c* thus holding the loaf under compression, the tray is applied as will be described. After this applying operation cam ring 91 recedes to its first position and allows the loaf to expand to its normal size within the tray. As the rotary carrier advances there is a tendency for the trayed loaf to fall out of compartment 54, and to prevent this, a series of wires 93, supported by cross bar 94 carried between the uprights 11*b*, is provided. These wires 93 resiliently engage the bottom of tray 25 and keep the loaf within compartment 54 until carrier 20 has rotated far enough to deposit the loaf right side up on discharge conveyor belt 19. At this point cam ring 91 still further recedes, as shown in Fig. 11, spring 98 withdraws plunger 96 to its normally retracted position, and the loaf is allowed to fall freely off wires 93 onto discharge conveyor belt 19, which forms a means for removing it from the slicer to a wrapper or any other desired place.

Fig. 6 shows in detail a mechanism adapted to place the trays 25 on the loaves of bread. Suitably attached to the upper end of the uprights 11 and 11*b* is a horizontal base member 100 which carries the tray applying means. While it lies within the scope of my broader claims to utilize any suitable type of applier and to give this applier any suitable type of movement, I have shown a preferred applier in the form of an oscillatory arm. Mounted in suitable bearing brackets 114 supported on the base 100, is a rock-shaft 115 carrying rigidly attached to it the gear segment 116 and tray applying arm 26. While any suitable means may be employed for moving arm 26 to and from applying position and any suitable control means for such moving means may be utilized, I have shown preferred moving and control means in the form of a rack-and-segment and solenoid, respectively. This showing, however, is not to be construed as limitative on my broader claims. Cooperating with the gear segment 116 is a rack 117 adapted, by its reciprocation, to oscillate the gear segment. Rack 117 is supported at one end in guide 118 and at the other in the conventionally illustrated solenoid 120 which forms a preferred means for reciprocating said rack. A compression spring 121 is attached to rack 117 and tends to withdraw it from solenoid 120, as shown in Fig. 6 so arm 26 is normally in the position of rest as shown. A pin 119 in rack 117 strikes guide 118 to limit the motion imparted to the rack by spring 121. At the proper instant the solenoid is energized, the rack 117 acting as a movable solenoid core, is drawn into it by magnetic force, and arm 26 is rotated to the position shown in Fig. 1 in which a tray 25 is being placed upon the bottom of a loaf of bread carried in a registering bread carrying compartment 54 of carrier 20. The end of the rack 117 is threaded and nuts 122 are placed thereon adjustably to limit the extent of retractive movement of the rack and hence the forward motion of the arm 26. A pad 123 of rubber or other resilient material is interposed between the guide 118 and the adjustable stop nuts 122 to reduce the shock of impact.

Since the tray is of comparatively small dimension in the height of the side walls, but of relatively greater extent in its length and width, the dimensions of the tray bottom, the tray as a whole may be considered as lying in a plane passing through the longitudinal tray axis and parallel to the tray bottom and open top. This plane is hereinafter termed the "plane" of the tray. The open top of the tray lying parallel to said plane, the applying movement of the tray is necessarily transverse or at right angles to the plane of the open top and to the plane of the tray. This applying movement being in a vertical plane may also be considered as in the plane of rotation of the loaf carrier; and, consequently the plane of the tray is tangential to the loaf carrier at the moment of tray application to a loaf.

It will be seen that bread carrier 20 thus performs the function of a loaf support in relation

to the tray-applying means. In the broader aspects of the invention it is not essential that the means for supporting the loaves be associated with a slicing means, nor be rotary as described in my preferred embodiment, but said supporting means may be either stationary or movable, and if movable, it may have variable or uniform velocity in a rectilinear or curvilinear path.

At the upper end of the brackets 101, which are attached to the vertical members 11, is shaft 102*a* of the roller 102, while at the top of uprights 103 is mounted shaft 104*a* of a similar roller 104. Around these rollers passes conveyor belt 22. The belt is given clockwise movement (as viewed in Fig. 6) by means of power from shaft 63*a* transmitted as follows: On the shaft 104*a* (Fig. 3) carrying the roller 104 is mounted sprocket 105 which is connected by chain 106 to sprocket 107 on countershaft 108, said countershaft being supported from the frame members 12 by suitable bearing bracket 108*a*. (See Fig. 1.) Also mounted on countershaft 108 is a sprocket 109 driven by chain 110 passing around the driving sprocket 111 on the power take-off shaft 63*a* of the gear box 61.

At 112 is indicated a chute which provides a means for delivering trays 25 to belt 22. Said chute may be connected to a tray making machine, a hopper, or any other suitable source of tray supply. The trays, sliding down the chute, come to rest on horizontal extension 112*a* thereof. Laterally extending cleats 113 are attached to belt 22, and the chute is deeply notched at 112' to a point above the bend at 112*b* to accommodate the cleats and allow them to come up behind a tray on extension 112*a* and then move said tray off said extension and onto belt 22, which belt carries them to the right and delivers them onto arm 26. Arm 26 is made up of lever portions 26' spaced apart along, and non-rotatably held to, rock shaft 115, with a cut-away plate portion 26'' connecting the free ends of the lever portions, as shown in Fig. 13.

When a given tray is discharged from belt 22, it is necessary to position it properly and accurately on the arm, and to accomplish this, I provide a stop 26*a* extending transversely clear across plate portion 26''. The lower or inner edge of the tray comes to rest against this ridge stop 26*a*, and is thus straightened up transversely of the applying arm. It is necessary in the act of swinging the arm from the position of rest to the position of applying the tray over the loaf, that the tray be held on the arm against centrifugal force yet such retention means must not interfere with the discharge of the tray onto the arm 26, nor with the freeing of the tray from the arm after application to the loaf. To care for this I provide an angular keeper or grip plate 124 pivotally mounted on the brackets 125 at the upper or outer end of the arm 26. One portion 124*a* of this plate extends upwardly above the free end of arm 26, while the other portion 124*b* extends beneath said arm. Carried between arms 126, which are mounted for angular and longitudinal adjustment on uprights 103, is a rod 127 which engages the lower inclined part 124*b* of the plate 124 when the arm 26 is in the position of rest as shown in Fig. 6. This engagement of the lower part of the plate with the rod 127 causes the portion 124*a* to assume a vertical position, in which position it is spaced from the end of arm 26 and is adjacent to the roller 104 thus permitting the tray to pass uninterruptedly from belt 22 to the arm 26 and stop 26*a*. It will be noticed that plate portion 124*a* is notched at 124*c* in a manner similar to the notching of the chute 112 to permit the passage of the cleats 113 without interference.

When the arm 26 begins to rotate toward the right in Fig. 6, the spring leaf 129, mounted on the arm and pressing against the lower plate portion 124*b* rotates keeper 124 in a clockwise direction (as viewed in Fig. 6) thus moving portion 124*a* towards the end of arm 26 and lightly gripping the trap (Fig. 1) between said portion and said stop 26*a*, this grip being sufficient to hold the tray from material displacement during applying movement of arm 26. Plate 124 and stop 26*a* may thus be considered as gripping elements. When the arm 26 returns to the left, in Fig. 6, to its position of rest, the rod 127 will again engage the portion 124*b* of the grip plate and in so doing compress spring 129 so that the portion 124*a* is again spaced from the end of arm 26 as before described.

To obtain an accurate lateral positioning of the tray 25 so that it will register with the loaf of bread, guide plates 130 with flaring ends 130' are provided, said guides being supported by arms 131 upon suitable supports 132 which in turn are carried by a cross piece 100*a*, so positioned as not to interfere with the rotary carrier 20. Inasmuch as the function of the guide plates is to position the trays relative to the loaves of bread, said guides should be in alinement with loaf-positioning means on carrier 20. Thus, one plate 130 should be in alinement with the ring 53 carrying on it end plate 55 while the other plate 130 should be in alinement with the bread engaging disks 97 when advanced to the position shown in Fig. 9. The grip 124*a* and the stop 26*a* should not be higher nor closer together than is essential to position the tray and hold it with sufficient tightness for purposes given above. On the other hand, the grip of these elements should be sufficiently light to allow the tray to slide endwise due to pressure of the guides 130, and to insure that the tray be not held by arm 26 when its return stroke starts. After the tray is applied to the loaf the friction between it and the loaf together with the inertia of the tray are relied upon to free the tray from the arm by withdrawal from the gripping elements.

When the tray is initially placed on conveyor belt 22, the plane of the tray is horizontal and the open side of the tray is the top horizontal face. As the tray is applied to the loaf, the tray is rotated about a horizontal axis in an extension of the plane. The registering movement of the tray, resulting from contact with guides 130, is along this axis and in the plane of the tray, while the motion of the applying arm moves the tray transversely of said axis and plane.

Fig. 7 shows an enlarged elevation of a switch S adapted to control the aforementioned solenoid. This switch is operated in synchronism with carrier 20 since it is necessary that the tray applying movement of arm 26 take place at a definite point in the bread travel, as will be more particularly pointed out. Although other types of switches may be used, I show a simple type operated by bosses 95 upon end plate 56, since it is convenient, though not necessary, to utilize these bosses. Especially is this true in view of the fact that there is one boss associated with each compartment 54 thus providing a ready means for operating the switch S in connection with the passage of a compartment past any point. Bosses 95 are here adapted to cause intermittent contact between the circuit closing

elements of the switch S, as will be explained, and therefore may be considered as switch elements or as switch controlling elements.

The switch S is mounted on a small arm 135 carried by the horizontal member 12 and consists of two resilient metallic strips 136 and 137 attached to the arm 135 and insulated from each other and other metal parts by suitable washers W. The switch is in the following circuit illustrated in Fig. 12: a power source illustrated by the battery 140, wire 141 leading therefrom to switch S, wire 142 leading from switch S to solenoid 120, and wire 143 leading therefrom to the battery 140. Attached to strips 136 and 137 are suitable contact points 136*a* and 137*a* which are normally spaced apart, thus leaving the circuit in open condition. The lower of these two strips, 136, is adapted to be engaged by each boss 95 as it moves upwardly with plate 56, and, as shown in Fig. 7, in so doing raises contact point 136*a* into contact with point 137*a*, thus closing the circuit and energizing the solenoid. When a given boss 95 moves far enough the strip 136 will slide off and spring back to its original position thus breaking contact between points 136*a* and 137*a* and reopening the circuit to allow de-energization of the solenoid. The duration of the closed circuit condition can be controlled by varying the length of the arm 136; for instance, a longer arm increases the length of time that it is in contact with the boss 95, and thus leaves the switch closed longer. The switch elements are so located that the solenoid is energized each time a compartment 54 brings a sliced loaf into the proper position for the arm 26 to apply a tray thereto.

The cooperation of the various parts can probably be best understood by following a single loaf of bread through a complete typical cycle. The loaves are first placed bottom side down on the belt conveyor 21 as shown by the typical loaf at the position A of Fig. 1. The loaf moves to the left on belt 21 until it is placed on wires 82 and stopped against a vertical set of the wires 84. At the proper time in the rotation of bread carrier 20, rollers 72 engage an arm of star wheel 90 and rotate said wheel through a quarter-revolution. This motion is transmitted by the means above described to the inverting stile on the shaft 83, thus placing the loaf in an empty bread carrying compartment 54. When in the compartment 54, the bottom surface of the bread faces outwardly so that in the position B when the loaf engages cutters 38, a bottom corner is the point of first contact.

Observation of the driving gear of bread carrier 20 as seen in Fig. 1, shows that as the loaf engages the cutters at the position B, the roller on the arm 71*a* has just passed out of the radial slot 55*a* and is engaging the inclined portion of the arms 53*a*. It is also seen that the roller on the arm 71*b* has not as yet engaged the next successive arms 53*a*. The inclined engaging surface of the first mentioned arms 53*a* is now nearly tangential to the star wheel 71, i. e. parallel to the path of motion of the arm 71*a*. Hence, though the angular velocity of the wheel 71 is constant, the angular velocity of the carrier 20 will decrease as the roller 72 on the arm 71*a* moves along the inclined part of the arms 53*a*. This slower speed is maintained until the roller on the arm 71*b* engages the carrier when, the conformation of the parts being such, the angular velocity of the carrier 20 is increased as the load is removed from the arm 71*a*. This hesitation in the motion is timed to occur as the knives 38 enter the loaf to permit sufficient time to elapse for entry of the knives into the crust without deformation of the loaf.

It will be noted, that as the carrier rotates, the plunger 96 engages the cam ring 91 and is advanced thereby as shown in Fig. 8. This engagement occurs after the loaf is placed in the compartment 54, but by the time the loaf reaches the knives, the plunger has been advanced to the dwell 91*d* of the cam and the disk 97 is holding the loaf firmly against the opposite end plate 55. This is illustrated in Fig. 9 where the loaf is shown partially through the cutters.

By the time the loaf is completely sliced it has reached the position C illustrated in Fig. 10, where the loaf is shown after the tray 25 has been applied to it. It will be noticed that in this position, the plunger 86 has been further advanced by the configuration of the cam ring 91 and is compressing the loaf slightly between it and the end ring 55 so that the length of the loaf is in this position less than normal. This is done in order that the tray 25 may be more easily applied to the sliced loaf.

As the loaf has been advancing into the position C, the arm 26 has been in the position of rest as shown in Fig. 6, while the relative timing of carrier 20 and conveyor 22 (as established by their respective drive connections with the common power shafts 63*a*) is such that a tray 25 has been discharged onto said arm 26 by the conveyor belt 22. As the loaf advances into the proper position for the application of the tray, the particular boss 95, associated with that particular loaf compartment, moves into engagement with switch element 136 (Fig. 7) closing switch S and hence the circuit through solenoid 120. The consequent energization of the solenoid retracts rack 117 which, in turn, through the medium of the gear segment 116, moves arm 26 to applying position.

By the time the loaf has well cleared the knives 38 and has reached the position C, the succeeding loaf has reached the position B where it is just making contact with the cutters. Consequently, advantage may be taken of the hesitation in the motion of the carrier 20 at this latter point, as noted above, to place the tray 25 upon the sliced loaf at C. With this in mind, the switch assembly is so located on the frame 12 that the boss 95 closes the switch at the proper time to swing arm 26 so the tray carried thereby reaches and is placed upon the loaf during the aforementioned period of hesitation.

It will be noted that neither the plate 124 nor the stop 26*a* project very far up on the sides of the tray, thus allowing said tray sides, near their tops to belly out slightly thus giving an oversize opening to take the loaf, to obvious advantage. As the arm 26 moves towards the loaf, guides 130 position the tray endwise so that it is properly placed to go over the loaf in the position C. It will be remembered that the loaf in this position is compressed by the action of the disk 97 against it and is consequently shorter than its normal length and shorter than the carton to be placed over it. The nuts 122 are so adjusted on the threaded end of the rack 117 that they stop the forward movement of the arm 26 preferably just short of contact with the loaf of bread. Hence the tray is pushed onto the loaf practically its entire depth. The length of arm 136 of the switch is such that just at the instant the tray is placed over the loaf, the contact points separate and the solenoid is deenergized. The spring

121 then expands and in so doing moves rack 117 to the right, returning arm 26 to its position of rest.

The loaf of bread with the tray upon it, is carried on further by rotary carrier 20 until it is restrained within compartments 54 against the action of gravity by wires 93 which resiliently hold it in place. Because of this pressure applied to the tray, it will be pushed onto the loaf its entire depth if arm 26 has not already done so, and for this reason it is not necessary that the arm 26 be entirely relied upon fully to effect the complete application. When the variation in loaves is great, the motion of the arm 26 should be set for the larger loaves and the smaller ones will have the tray fully placed on when the loaf passes by the wires 93.

As the loaf is carried around on the wires to its lowermost position, the cam ring 91 recedes and allows the spring 98 to withdraw the plunger 96 and the disk 97 from engagement with the bread, all of which is illustrated in Fig. 11. Having been released from the carrier 20, the loaf then falls by the action of gravity onto the wires 93 and is moved onto the conveyor belt 19 which discharges the sliced loaf in a suitable tray 25, from the slicing machine.

It will be understood that the drawings and description are to be considered merely as illustrative of and not restrictive on the broader claims appended hereto, for various changes in design, structure and arrangement may be made without departing from the spirit and scope of said claims.

I claim:—

1. In combination, a movable loaf support, means disposed in the path of the support for slicing a loaf on said support, means for holding said sliced loaf under compression, and means associated with said support for applying an encircling element to said loaf after it has been sliced and while it is under compression, said applying means embodying an encircling element carrying and applying member movable towards and away from the support, and means for so moving the applying member, said applying member being adapted to receive the encircling element when it is away from said support and then to carry said element toward said support and apply it about said compressed sliced loaf.

2. In combination, a movable loaf support, a plurality of cutters disposed in the path of a supported loaf and adapted to slice the loaf as it passes said cutters, and means for applying an encircling element to said loaf after it has been sliced, said applying means embodying an applying member movable towards and away from the support and adapted to receive the encircling element when it is away from said support, and means controlled by movement of said loaf support for moving said applying member towards said loaf and for applying it thereto after said loaf has been sliced.

3. In combination, a movable loaf support, a plurality of cutters disposed in the path of a supported loaf and adapted to slice the loaf as it passes said cutters, means for holding said sliced loaf under compression, and means for applying an encircling element to said loaf after it has been sliced and while it is under compression, said applying means embodying an applying member movable towards and away from the support and adapted to receive the encircling element when it is away from said support, and means controlled by movement of said loaf support for moving said applying member towards said loaf and for applying it thereto after said loaf has been sliced and while it is under compression, said loaf thereafter being released from compression to expand into said encircling element.

4. In a device for applying an encircling element to a loaf, a loaf support, an applying member movable towards and away from the support, and means for so moving said member; said applying member being adapted to receive the encircling element when it is away from said support and then to carry said element toward said support and apply it about said loaf; said moving means embodying a reciprocatory member operatively connected to said applying member to impart its reciprocatory movement thereto, electro-magnetic means associated with said reciprocatory member and adapted, when energized, to draw said reciprocatory member in one direction, means for intermittently energizing said magnet, and means tending to move said reciprocatory member in the opposite direction after said magnet is deenergized.

5. In a device for applying a preformed encircling element to a loaf, a loaf support, an applying member movable towards and away from the support, said applying member being adapted to receive the encircling element when it is away from said support, means for alining said element and loaf with respect to one another as the applying member moves toward the loaf, and said applying member being adapted then to carry said element toward said support and apply it about said loaf.

6. In a device for applying an encircling element to a loaf, a movable loaf support, an applying member movable towards and away from said support, means for constantly moving the support, and means for moving the applying member, said applying member being adapted to receive the encircling element when it is away from said support, said two moving means being in timed relation whereby, when said loaf is moved by the support to predetermined position, said applying member reaches the support and applies the element about the loaf.

7. In a device for applying an encircling element to a loaf, a rotary loaf support, an applying member movable pivotally towards and away from said support, means for constantly rotating the support, and means for so pivotally moving the applying member, said applying member being adapted to receive the encircling element when it is away from said support, said rotating and moving means being in timed relation whereby, when said loaf is rotated by the support to predetermined position, said applying member reaches the support and applies the element about the loaf.

8. In a device for applying an encircling element to a loaf, a movable loaf support, an applying member movable towards and away from said support, means for constantly moving the support, means for moving the applying member, and control means actuated by movement of said support for controlling the movement of said applying member.

9. In a device for applying a pre-formed encircling element to a loaf, an element applying means comprising a carrying and applying member movable between an element receiving and an element applying position, means to deposit on the applying member a pre-formed encircling

element when the member is in the receiving position, said applying member being movable toward the support to apply the received encircling element to the loaf thereon, and stationary registering means engaged by the encircling element during and by virtue of its movement toward the loaf support and causing the registration of the element with the loaf thereon.

10. In a device for applying a pre-formed encircling element to a loaf, a loaf support, means for compressing a loaf on the support, means for applying an encircling element to the compressed loaf on the support, said applying means comprising a carrying and applying member moving between an element receiving and an element applying position, and means to deposit upon the applying member a pre-formed encircling element when the member is in the receiving position, said applying member being movable toward the support to apply the received encircling element to the loaf while compressed.

11. In a device for applying a pre-formed encircling element to a loaf, a loaf support, means for compressing a loaf on the support, means for applying an encircling element to the compressed loaf on the support, said applying means comprising a carrying and applying member movable between an element receiving and an element applying position, means to deposit upon the applying member a pre-formed encircling element when the member is in the receiving position, said applying member being movable toward the support to apply the received encircling element to the loaf while compressed, and registering means engaged by the encircling element during and by virtue of its movement toward the loaf support and causing the registration of the element with the loaf thereon.

12. In a device for applying a pre-formed encircling element to a loaf, a loaf support adapted to support a loaf in registered position, a carrying and applying member movable toward and away from the support, and means to feed a pre-formed loaf encircling element to the applying member when in position away from the support, the applying member holding the encircling element and moving it toward and onto the loaf in a direction of movement substantially at right angles to the plane of the encircling element.

13. In a device for applying a pre-formed encircling element to a loaf, a loaf support adapted to support a loaf in registered position, a carrying and applying member movable toward and away from the support, means to feed a pre-formed loaf encircling element to the applying member when in position away from the support, the applying member holding the encircling element and moving it toward and onto the loaf in a direction of movement substantially at right angles to the plane of the encircling element, and registration means engaged by the encircling element during and by virtue of its movement toward the loaf support and causing registration of the element with the loaf thereon.

14. In a device for applying a pre-formed encircling element to a loaf, a loaf support adapted to support a loaf in registered position, a carrying and applying member movable toward and away from the support, means to feed a pre-formed loaf encircling element to the applying member when in position away from the support, the applying member holding the encircling element and moving it toward and onto the loaf in a direction of movement substantially at right angles to the plane of the encircling element; and registration means engaged by the encircling element during and by virtue of its movement toward the loaf support and causing registration of the element with the loaf thereon by movement of the encircling element in the plane of the element.

15. In a device for applying a pre-formed encircling element to a loaf, a movable loaf support, means for constantly moving the support with alternating periods of relatively increased velocity and periods of relatively decreased velocity, an applying member movable towards and away from the support and receiving a pre-formed encircling element when away from the support, and interconnecting means between the support and the applying member causing the applying member to act in timed relation with the support and apply the encircling element to a loaf on the support during a period of decreased velocity.

16. In combination, slicing means for slicing a loaf of bread, a loaf carrier for moving the loaf through and onward away from the slicing means, and movable means for applying a pre-formed loaf encircling element to a loaf on the carrier during the movement of the loaf away from the slicing means.

17. In combination, slicing means for slicing a loaf of bread, a loaf carrier for moving the loaf through and onward away from the slicing means, compressing means actuated by the movement of the carrier to compress the sliced loaf while being moved away from the slicing means, and movable means for applying a pre-formed loaf encircling element to a loaf while compressed on the carrier during the movement of the loaf away from the slicing means.

18. In combination, slicing means for slicing a loaf of bread, a loaf carrier for moving the loaf through and onward away from the slicing means, and movable means for applying a pre-formed loaf encircling element to a loaf on the carrier during the movement of the loaf away from the slicing means, and registering means engaged by the encircling element during and by virtue of its movement toward the loaf support and causing the registration of the element with the loaf thereon.

19. In combination, slicing means for slicing a loaf of bread, a loaf carrier for moving the loaf through and onward away from the slicing means, and movable means for applying a pre-formed loaf encircling element to a loaf on the carrier during the movement of the loaf away from the slicing means, and interconnecting means between the carrier and applying means causing the applying means to be actuated by movement of the carrier.

20. In combination, slicing means for slicing a loaf of bread, a loaf carrier for moving the loaf through and onward away from the slicing means, compressing means actuated by the movement of the carrier to compress the sliced loaf while being moved away from the slicing means, and movable means for applying a pre-formed loaf encircling element to a loaf while compressed on the carrier during the movement of the loaf away from the slicing means, and interconnecting means between the carrier and applying means causing the applying means to be actuated by movement of the carrier.

21. In a device for applying a pre-formed encircling element to a loaf of bread, a rotary loaf carrier having laterally extending loaf carrying compartments on its periphery, and an encircling

element applying member swingingly movable toward a loaf on the carrier into an applying position in which the plane of the carried encircling element is substantially tangential to the path of the loaf, said applying member being movable away from the carrier to receive an encircling element.

22. In a device for applying a pre-formed encircling element to a loaf of bread, a rotary loaf carrier having laterally extending loaf carrying compartments on its periphery, and an encircling element applying member swingingly movable toward and away from the rotary carrier, and means to feed an encircling element to the applying member when away from the carrier, the applying member holding the encircling element and moving it toward a loaf on the carrier in a direction of movement transverse to the plane of the carried encircling element and applying it to the loaf in a position in which the plane of the element is substantially tangential to the path of the loaf.

23. In a device for applying a pre-formed encircling element to a loaf, a rotary loaf support adapted to support a loaf in registered position, a carrying and applying member movable toward and away from the support, and means to feed a pre-formed loaf encircling element to the applying member when in position away from the support, the applying member holding the encircling element and moving it toward and onto the loaf in a direction of movement in the plane of rotation of said loaf support.

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