May 21, 1940. H. E. KNAUST 2,201,402

AUTOMATIC SANDWICH-MAKING MACHINE

Filed Oct. 7, 1938 4 Sheets-Sheet 1

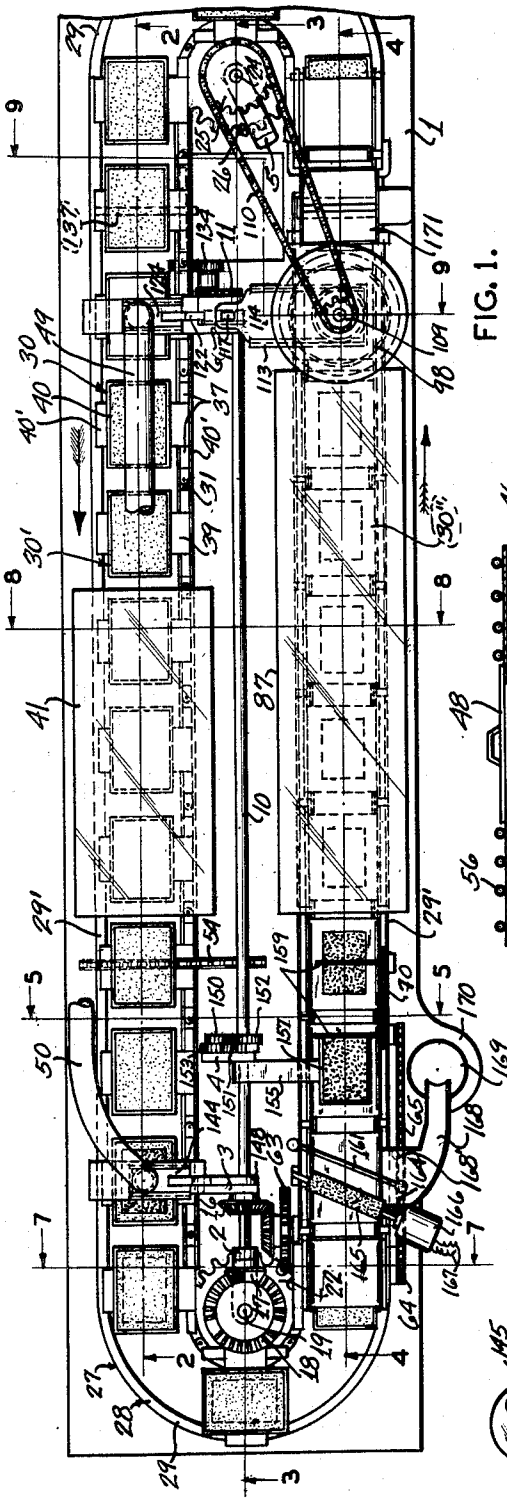


FIG. 1.

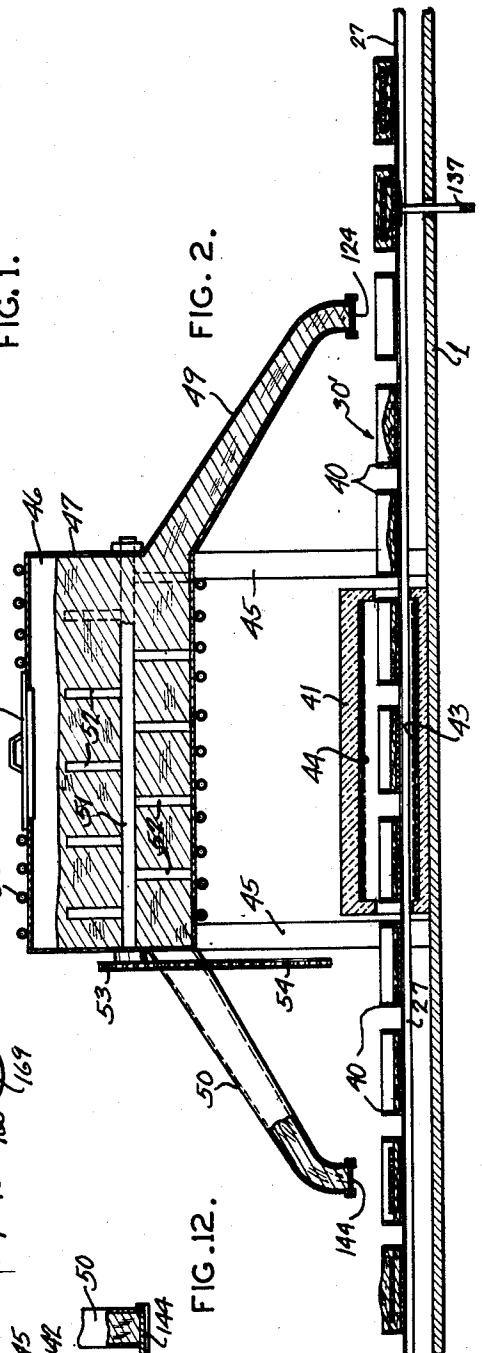


FIG. 2.

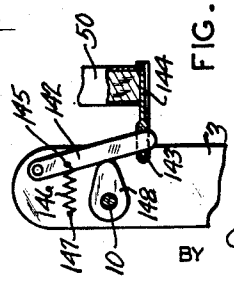


FIG. 12.

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AUTOMATIC SANDWICH-MAKING MACHINE

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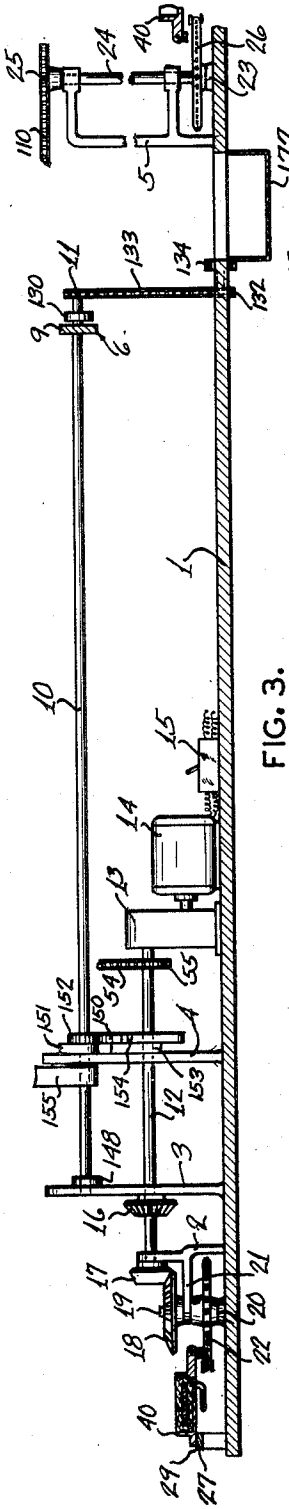


FIG. 3.

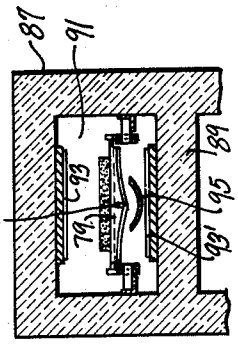


FIG. 11.

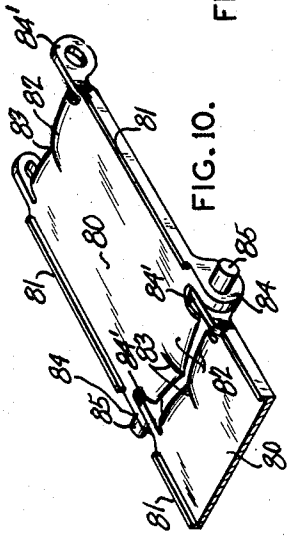


FIG. 10.

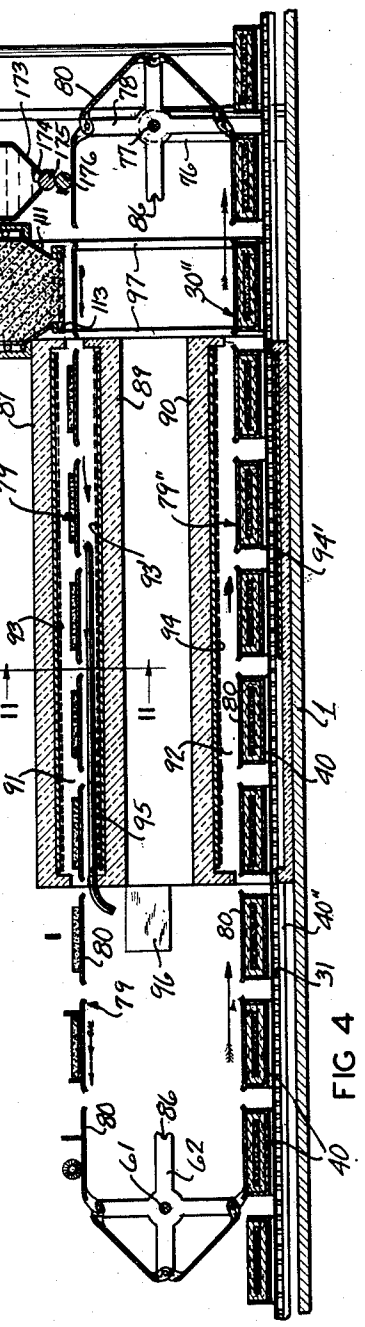


FIG 4

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AUTOMATIC SANDWICH-MAKING MACHINE

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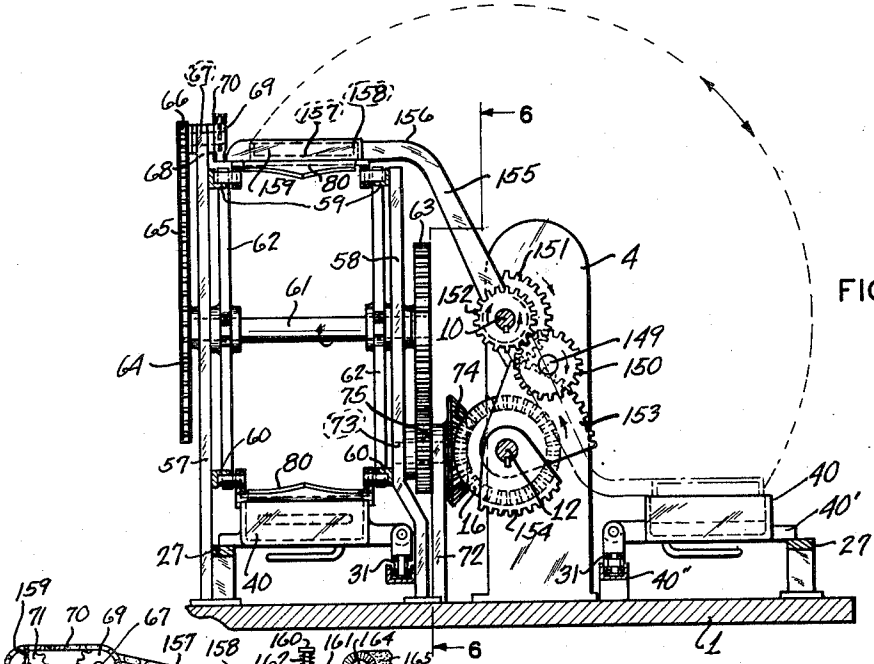


FIG. 5.

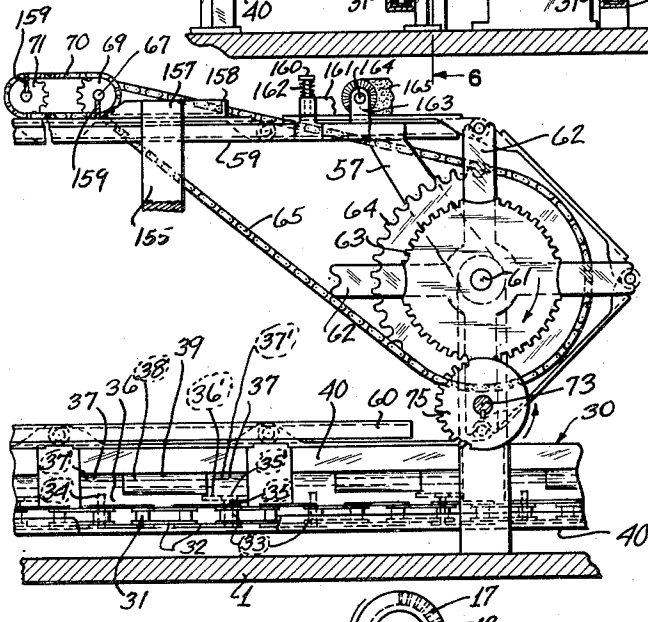


FIG. 6.

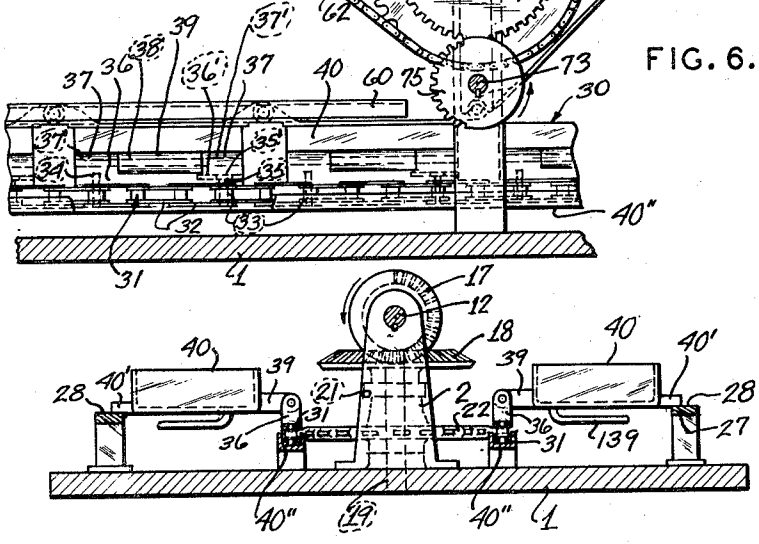


FIG. 7.

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AUTOMATIC SANDWICH-MAKING MACHINE

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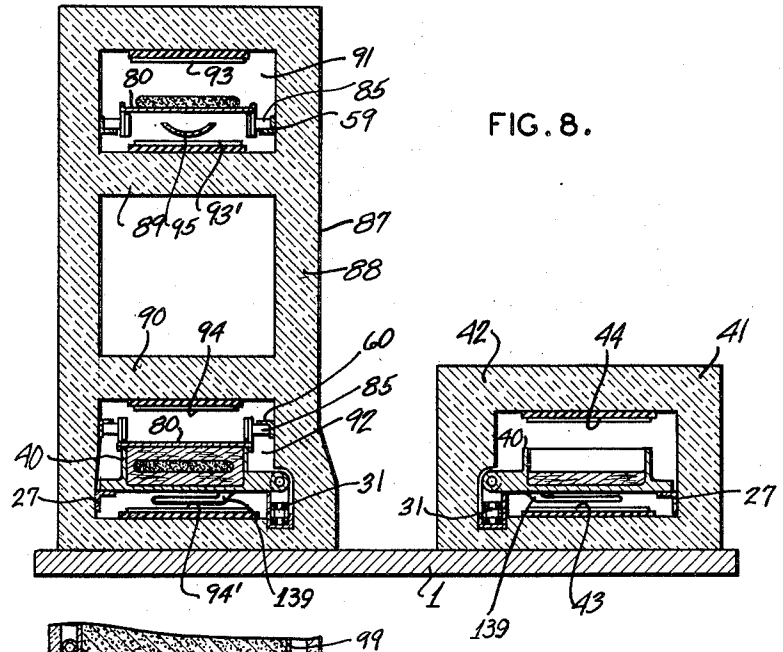


FIG. 8.

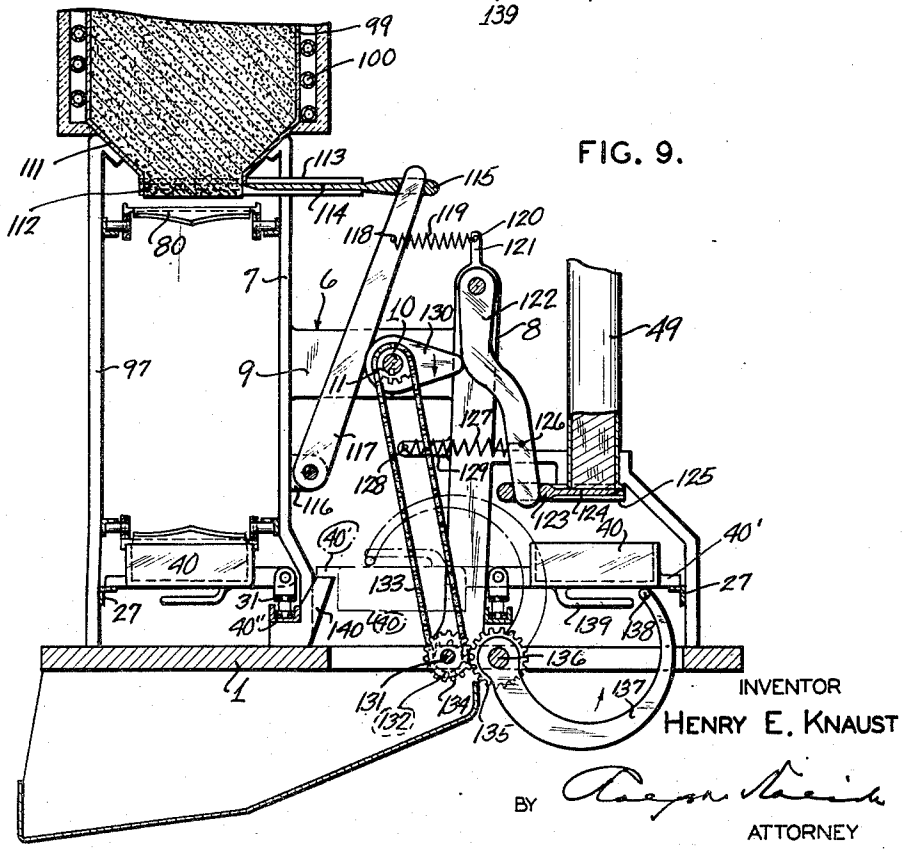


FIG. 9.

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Patented May 21, 1940 2,201,402

UNITED STATES PATENT OFFICE

2,201,402

AUTOMATIC SANDWICH-MAKING MACHINE

Henry E. Knaust, St. Louis, Mo., assignor to Vita Sales Corporation, St. Louis, Mo., a corporation of Missouri

Application October 7, 1938, Serial No. 233,759

21 Claims. (Cl. 107—1)

This invention relates in general to automatic sandwich-making machines and has for its primary objects the provision of a machine of the type stated which is economical in cost of construction and operation, which will produce sandwiches of excellent taste, appetizing appearance, and with a cooked filler which is completely and properly prepared for ready consumption, which is entirely automatic in operation and requires no appreciable attention or control during operation, and which is efficient and satisfactory in the performance of its intended functions.

And with the above and other objects in view, my invention resides in the novel features of form, construction, arrangement, and combination of parts presently described and pointed out in the claims.

In the accompanying drawings (4 sheets),

Figure 1 is a partly broken top plan view of a sandwich-machine embodying my present invention;

Figures 2, 3, and 4 are fragmentary vertical sectional views of the machine, taken approximately along the lines 2—2, 3—3, and 4—4, respectively, Figure 1;

Figure 5 is a sectional view of the machine, taken approximately along the line 5—5, Figure 1;

Figure 6 is a fragmentary sectional view of the machine, taken approximately along the line 6—6, Figure 5;

Figures 7, 8, and 9 are sectional views of the machine, taken approximately along the lines 7—7, 8—8, and 9—9, respectively, Figure 1;

Figure 10 is a fragmentary perspective view of the cooking plates of the machine;

Figure 11 is a fragmentary view of the machine, taken approximately along the line 11—11, Figure 4; and

Figure 12 is a fragmentary side elevational view of one of the cut-off spout-actuating mechanisms of the machine.

Referring now in more detail and by reference characters to the drawings, which illustrate a preferred embodiment of the present invention, 1 designates a flat oblong rectangular preferably cast-iron base member having rigidly mounted along the center line thereof a plurality of upstanding bracket members 2, 3, 4, 5, and a somewhat H-shaped cross-brace member 6 having two upright leg members 7, 8, and a central cross-strut 9. Journaled in, and extending horizontally between, the brackets 3, 4, and projecting rotatively through and beyond the cross-strut 9, is a shaft 10 having a sprocket wheel 11 rigidly mounted on its extended end. Also journaled in and extending through the brackets 2, 3, 4, parallel to and spaced downwardly from the shaft 10, is a main drive shaft 12 connected at its one end to a conventional gear reduction mechanism 13, which is, in turn, operatively connected to a prime mover, such as the electric motor 14, the latter being electrically connected through a conventional control switch 15 to a source of electric power (not shown).

Pinned or otherwise rigidly connected to the shaft 12 for rotation therewith intermediate the brackets 2, 3, is a bevel gear 16. Also pinned to the shaft 12 on its extended end adjacent the bracket 2, is a mutilated bevel gear 17 having a segmental toothed section around a portion of its periphery and a smooth or idle section around the remainder of its periphery for meshing engagement with a horizontal Geneva type bevel gear 18 pinned on the upper end of the stub shaft 19 journaled at its one end in the upstanding journal boss 20 of the base member 1 and extending through the horizontal extension 21 of the bracket arm 2. Pinned to the stub shaft 19 for rotation therewith intermediate the journal boss 20 and the horizontal bracket arm 21 is a sprocket 22. Similarly journaled at its lower end in a journal boss 23 formed in the upper face of the base 1 and intermediate its ends being supportingly journaled in the bracket 5, is a relatively long stub shaft 24 provided at its upper extremity with a sprocket 25 rigidly mounted thereon. Keyed to the shaft 24 for rotation in the same horizontal plane as the sprocket 22, is a companion sprocket 26, all as best seen in Figure 2.

Rigidly mounted on the upwardly presented face of the base 1, is a slide track 27 having an upwardly presented horizontal track face 28 and being formed in the shape of an oval having two semi-circular endsections 29 extending in outwardly spaced concentric relation around the sprockets 22, 26, and two intermediate straight sections 29' parallel with and respectively adjacent to the longitudinal margins of the base 1, as best seen in Figure 1 and for purposes presently more fully appearing.

Extending around the sprockets 22, 26, for travel along the track 27, is an endless baking conveyer 30, having a forward run 30' and a rearward run 30'' and comprising a sprocket chain 31 formed of a plurality of conventional links 32 connected by link pins 33. Certain of the link pins 33 are extended upwardly in the formation of pivot post members 34, certain others of the link pins being extended upwardly in the provision of guide posts 35 and provided at their upper

extremities with flat-topped head members 35', the upper face of which lies in the same plane as the upper face of the corresponding pivot posts 34, the pivot posts 34 and guide posts 35 being arranged in a uniformly spaced successive series of identical pairs including one pivot post 34 and one guide post 35. Pivotally mounted on each of the posts 34 and extending along the sprocket chain 31 in a continuous series, is a plurality of supporting blocks 36, each provided with a horizontal slot 36' for slidably receiving the head members 35' of the guide post 35 and being further provided with two longitudinally aligned upstanding shoulder members 37, each provided, in turn, with axially aligned bores 37' for receiving a horizontal hinge pin 38.

Swingably mounted on and extending horizontally outwardly from the intermediate portion of each of the hinge pins 38, is a hinge arm 39 integrally provided at its outer end with an open-topped shallow pan or baking tray 40 having an integral, outwardly extending, horizontal slide-lip 40' for sliding engagement with the track face 28, as best seen in Figures 1, 6, and 7.

Extending longitudinally between the sprocket wheels 22, 26, beneath the straight runs of the sprocket chain 31, are parallel upwardly presented U-shaped guide tracks 40'' in which the lower portion of the sprocket chain links may slide for preventing sagging thereof and also maintaining the supporting blocks 36 and the associated baking trays at a constant level.

As will be understood by reference to Figures 1 and 3, the main drive shaft 12 is connected by means of the Geneva gears 17, 18, so that the baking conveyer 30 will progress around its path preferably in a counter-clockwise direction in intermittent or periodic movement, being advanced a distance equal to the full length of a baking pan unit motion period.

Rigidly mounted on the base member 1 over the forward run 30' of the baking conveyer 30, is an oven tunnel 41 provided on its top, bottom, and sides with substantially heavy diathermanous material 42 and being provided on its inner floor and roof with electrical heating elements 43, 44, as best seen in Figures 2 and 8.

Mounted upon suitable supporting legs 45, which extend upwardly from the base 1, and preferably positioned over the oven 41, is a batter reservoir 46 comprising a preferably cylindrical shell 47 having in its upwardly presented wall a removable lid member 48 and being provided in its opposite end walls with angularly downwardly depending spout members 49, 50.

Journaled in, and extending through, the end walls of the cylindrical shell 47, is a shaft member 51 provided on that portion of its length which is disposed interiorly of the shell with a plurality of radially outwardly extending agitator blades 52 and being provided on one of its outwardly extended ends with a driven sprocket member 53, which is connected by means of a sprocket chain 54 to a driving sprocket 55 rigidly mounted on the main drive shaft 12. Preferably, though not necessarily, the cylindrical shell 47 is further provided around its exterior with a worm-like cooling coil 56 through which may be circulated ice water, cold brine, or any other suitable cooling medium for maintaining the dough at any desired constant temperature, all as best seen in Figure 2 and for reasons presently more fully appearing.

Rigidly mounted on the base 1 and extending upwardly therefrom adjacent one end of the other straight section of the oval path of the baking trays 40, is a pair of laterally spaced upstanding bracket members 57, 58, each being provided adjacent its upper extremity with an inwardly presented L-shaped track member 59 and adjacent their lower extremities with downwardly and inwardly presented L-shaped track members 60. Journaled in, and extending horizontally between, the bracket members 57, 58, and substantially midway between the upper and lower track members 59, 60, is a shaft 61 provided with spaced sprocket members 62, being further provided on its inner extended end with a driving gear 63 and on its outer extended end with a sprocket 64, which is operatively connected by means of a sprocket chain 65 to a smaller sprocket wheel 66, which is, in turn, pinned on a short shaft 67 journaled in an upwardly extending projection 68 of the bracket member 57 and extending therethrough, being provided on its inner end with a chain-supporting sprocket 69 over which is trained a sprocket chain 70, the latter extending horizontally forwardly and being at its other end trained over an idler sprocket 71, all for purposes presently more fully appearing.

Journaled at its one end in the bracket 58 and extending rotatively through an auxiliary journal bracket 72, is a short shaft 73 provided on its extended end with a bevel gear 74 having meshing engagement with the bevel gear 16 of the main drive shaft 12 and being provided intermediate the brackets 58 and 72 with a mutilated gear 75 having a toothed driving segment extending around a portion of its periphery and an untoothed holding segment on the remainder of its periphery for operative engagement with the driving gear 63. In this connection, it should be pointed out that the Geneva gears 63, 75, and the Geneva gears 17, 18, are of such relative ratios and so timed that intermittent drive periods and hold periods thereof respectively will be coincident.

Also rigidly mounted on and extending upwardly from the base 1 adjacent the opposite end thereof and in longitudinal alignment with the bracket members 57, 58, is a pair of bracket members 76 for rotatively supporting an idle shaft 77 journaled at its ends therein and extending transversely therebetween. Pinned to the idle shaft 77 for rotation therewith, is a pair of registering spaced apart sprocket members 78 identical in design with the sprocket members 62.

Trained over the pairs of sprocket members 62, 78, is a plate conveyer 79 consisting of a series of successive flat rectangular metallic plates 80 provided along their longitudinal margins with narrow upstanding flanges 81 and along their forward and rearward transverse margins are provided with downwardly curved lips 82 formed with a central depression or drain channel 83, the plates 80 further being provided with outwardly extending transversely aligned pairs of apertured eye-members 84, 84', the transverse distance between the members 84' being substantially smaller than the distance between the members 84 for interfitting connection in end to end relation in a continuous series by means of short rivet-like hinge pins 85 which project outwardly beyond the margins of the plates 80 for plate-supporting engagement with the pairs of L-shaped track members 59, 60, and the tooth-like end recesses 86 of the sprocket members 62, 78, in the provision of upper and lower horizontal runs 79', 79'', the latter being positioned directly above the rearwardly running reach of the baking tray series, so

that each of the plates 80 will move down into cover-forming relationship over a baking tray 40 for a predetermined distance, all as best seen in Figures 4, 8, and 10.

Since the baking conveyor 30 is driven in a counter-clockwise direction, it will also be necessary that the series of plates 80 likewise be driven in a counter-clockwise direction, that is to say, as shown by the direction-indicating arrows in Figure 4. It will, of course, be evident, by reason of the fact that the drive gear 63 is of Geneva type, that the plates will be moved forwardly in intermittent motion, being progressed during each interval of movement by a distance equal to a full plate length, all for purposes presently more fully appearing.

Rigidly mounted over the path of movement of the baking conveyer 30 and on the opposite side of the machine with respect to the oven tunnel 41, is a second oven 87, having top, bottom, and vertical side walls formed of a relatively thick diathermanous material 88 and being interiorly provided with two horizontal vertically spaced diathermanous partition members 89, 90, thus dividing the oven 87 into separate and distinct upper and lower tunnels 91, 92, each of which is suitably provided on its roof and floor with electric heating elements 93, 93', 94, and 94', all as best seen in Figure 9. The oven tunnels 91, 92, are furthermore so arranged that the upper forwardly traveling run 79' of the plate conveyer 79 will pass centrally through the upper tunnel 91 while the lower rearwardly traveling return run 79'' of the plate conveyer 79 and the rearwardly moving run 30'' of the baking trays will move simultaneously through the lower oven tunnel 92, as best seen in Figure 4 and for purposes presently more fully appearing.

Rigidly mounted in, and extending centrally through, the oven tunnel 91 for substantially half the length thereof beneath the drain channels 83 of the plates 80, is a drain trough 95 projecting beyond the exit end of the tunnel 91 and terminating over a catch basin 96 suitably mounted on the outer face of the oven for disposal of the excess grease and fat which will fry out of the filling-patty, all as best seen in Figures 4 and 11.

Supported in superadjacent relationship to the upper reach of the plate conveyer 79 and rearwardly of the entrance end of the upper oven tunnel 91 by means of suitable leg members 97, is a preferably cylindrical hopper 98 including an open-ended shell 99 exteriorly surrounded by a worm-like cooling coil 100 and provided with a removable top member 101 secured in place by means of the wing nuts 102 or other suitable securing members. The top member 101 is provided with a centrally positioned internally threaded aperture 103 and a preferably integrally formed auxiliary bracket 104 having a horizontal leg 105 spaced upwardly from the top member 101 and provided with an internally threaded aperture 106 in registration with the top aperture 103. Threadedly mounted in and extending through the apertures 103, 106, is a long longitudinally slotted lead screw 105 provided at its lower extremity interiorly of the shell 99 with a piston-like plunger head 108 diametrally sized for snug-fitting engagement with the inner vertical side walls of the shell 99. Rotatively mounted between the upper face of the top member 101 and the under face of the bracket leg 105 and held therebetween against vertical translation, is a sprocket member 109 which is slidably keyed to the longitudinally slotted lead screw 107 and is drivingly connected by means of the sprocket chain 110 to the sprocket wheel 25, as best seen in Figure 4. It will, of course, be evident in this connection that the sprocket 25, the shaft 24, and the sprocket 109 will be rotated during the active movement periods of the baking conveyor 30 and the plate-conveyer 79, thereby producing an intermittent downwardly translative rotational movement of the lead screw 107.

The lower end of the cylindrical shall 29 is provided with a frustro-conical section 111 which is shaped at its lower end to provide a rectangular spout aperture 112 of such shape as to form a filling-patty of desired peripheral size for sandwich formation, a pair of opposed parallel slideways 113 being rigidly mounted adjacent the side margins of the spout aperture 112 for slidably accommodating a cut-off plate 114 having at its outer extremity a ring-like eye-member 115. It should be furthermore pointed out in this connection that the spout aperature 114 is so positioned with respect to the plate conveyer 79 that it will be directly above in one of the plates 80 when the plate conveyor 79 is stationary, so that a particular filling-patty will fall in well centered position upon the plate during such stationary period.

Pivotally mounted at its lower extremity in an outwardly projecting boss 116 formed on the lower portion of the bracket leg 7, is a rock-arm 117 extending, at its upper end, through the eye 115 of the cut-off plate 114 and being provided intermediate its ends with an outwardly extending pin 118 for engagement with one end of a tension spring 119, which, at its other end, is retentively disposed through an aperture 120 formed in a preferably integral projection 121 extending upwardy from the upper extremity of the bracket leg 8. Also pivotally mounted at its upper extremity upon the upper end of the bracket leg 8, is a bent arm 122 extending at its lower end through the ring-like eye 123 of a cut-off plate 124 slidably mounted in guideways 125 mounted rigidly on the lower extremity of the batter-spout 49, the bent arm 122 being provided intermediate its ends with an outwardly projecting pin 126 for engagement with one end of a tension spring 127, which is, in turn, at its other end retentively mounted in an aperture 128 formed in an outwardly extending integral extension 129 of the bracket leg 8.

Pinned on the shaft 10 in substantially the same plane as the arms 117 and 122, is a quick-action cam 130 for actuating engagement both with the arm 117 and the bent arm 122.

Journaled horizontally in the base 1 and extending longitudinally thereof substantially beneath the sprocket 11 of the shaft 10, is an idle shaft 131 provided with a sprocket 132 which is operatively connected by means of a sprocket chain 133 to the sprocket 11 for rotatory actuation thereby. Also pinned to the idle shaft 131 for rotation therewith, is a pinion 134 having meshing engagement with a pinion 135 operatively mounted on a parallel idle shaft 136 similarly journaled in the base 1 and rigidly provided with a crescent-shaped throw-over arm 137 having at its upper end a roller pin 138 for operative engagement with the under face of any one of the baking trays 40 and being so positioned that during any stationary interval of the baking conveyer 30, one of the baking trays 40 will be positioned directly above the roller pin 138 of the throw-over arm 137. Each

of the baking-trays 40 is further provided on its under face with a downwardly spaced preferably integral horizontal arm 139. Thus, when the idle shaft 136 is rotated, the throw-over arm will be swung upwardly from the position shown in full lines to the position shown in dotted lines in Figure 9, causing the baking tray 40 to swing about the hinge pin 38 over into inverted position, coming to rest with its projection or slide-lip 40' upon the upper face of the stop projection 140 mounted in suitable position on the base 1. When the idle shaft 136 is reversely rotated, swinging the throw-over arm 137 back to original position, the horizontal arm 139 will engage the roller pin 138, so that the particular baking tray 40 will also be swung reversely to original upright position, the arm 139 being of such length that when the baking tray 40 and the throw-over arm 137 have been returned to original position, the roller pin 138 will be disengaged, allowing the baking tray 40 to move freely forwardly along the track during the successive intermittent motion period.

Pivotally mounted at its upper end on the bracket 3, is a downwardly depending swinging arm member 142 extending at its lower end through the ring-like eye 143 of a cut-off plate 144 slidably mounted in and extending across the batter spout 50. Intermediate its ends, the link 142 is provided with an outwardly extending pin 145 for engagement with one end of a tension spring 146, which, at its other end, is retentively mounted in an aperture 147 formed in the bracket extension 141. Rigidly pinned to the shaft 10 for rotation therewith, is a quick-action cam 148 of substantially the same shape as the quick-action cam 130 for actuating engagement with the link 142, as best seen in Figure 12.

Journaled in the bracket member 4 and extending horizontally forwardly therefrom, is a freely rotating stub shaft 149 provided with an idler pinion 150, which is spaced substantially away from the rearwardly presented face of the bracket 4. Pinned to the shaft 10, is a segmental gear 151 positioned for rotation in a plane spaced rearwardly from the plane of movement of the idler pinion 150. Also pinned to the shaft 10, is a pinion 152 positioned in a plane for meshing engagement with the idler pinion 150. Similarly pinned to the main shaft 12, is a pair of axially spaced segmental gears 153, 154, the gear 153 being positioned for meshing engagement with the segmental gear 151, and the gear 154 being positioned for meshing engagement with the idler pinion 150. The gears 153 and 154 are furthermore angularly spaced with respect to each other, so that upon continuous rotation of the main drive shaft 12, the gear 153 will engage the segmental gear 151 during approximately 60° of each revolution of the main drive shaft 12, thus producing clockwise rotation of the shaft 10 during such period. Meanwhile the pinion 152, being engaged with the idler pinion 150, will produce idle movement thereof. As the segmental gear 153 leaves engagement with the segmental gear 151, the segmental gear 154 will come into engagement with the idler pinion 150, producing clockwise rotation thereof, the pinion 152 being accordingly rotated in a counter-clockwise direction, thus producing reverse rotation of the shaft 10, returning it to its initial position. It will further be noted that after the shaft 10 has been returned to its initial position, the segmental gear 154 will move out of engagement with the idler pinion 150. Thus, the shaft 10 will remain stationary in its initial position during the remainder of the revolution of the main drive shaft 10. The several segmental gears are so arranged angularly upon their respective shafts in relation to each other, so that the shaft 10 will be stationary in its initial position during the intermittent movement periods of the baking trays 40 and plate conveyer 79 and, on the other hand, will perform a to-and-fro rocking movement through an angle of approximately 180° during the stationary phase of the baking trays 40 and the plate conveyer 79.

Pinned to the shaft 10 for rocking movement in a vertical plane spaced substantially forwardly of the forward or exit end of the oven tunnel 41, is a bent carry-over arm 155 having an angularly bent section 156 provided at its end with a flat scoop-like receptacle 157, which is so positioned as to lie flatwise upon one of the plates 80 during the stationary cycle of the plate conveyer 79. The scoop 157 is beveled at its forward edge and provided around its other three margins with upstanding retaining walls 158.

The small sprocket chain 70, as has been previously pointed out, extends horizontally along the upper run 79' of the plate conveyer 79 adjacent one longitudinal margin thereof and is provided with a plurality of pusher flights 159 spaced by a distance equal to the over-all length of one of the plates 80, and extending horizontally outwardly at right angles to the chain for a length preferably equal to the width of the plates 80. The chains 70 and pusher flights 159 are so timed that a pusher flight will be moved down and around into overlying registration with the rearward edge of each one of the plates 80 and, as it is progressed forwardly, such pusher flight 159 moving forwardly with such plate 80 until the latter has passed beneath the scoop 157, thus forming a back for each of the plates 80 for urging the filling-patty upon the scoop, all as best seen in Figures 5 and 6.

Mounted in obliquely opposed relationship upon suitable portions of the machine framework, is a pair of upstanding flat-headed posts 160 for shiftably supporting a horizontally extending scraper blade 161 which extends diagonally across the path of movement of the plates 80 and is resiliently urged downwardly into scraping engagement along its lower margin with the upwardly presented faces thereof by means of compression springs 162 disposed around the posts 160 intermediate the under face of the post head and the upper face of the blade 161, as best seen in Figure 6.

Suitably journaled at its ends in and extending through a pair of angularly opposed supporting ears 163, also rigidly mounted on any convenient or accessible portion of the machine framework, is a rotating shaft 164 provided intermediate its journaled portions with a cylindrical brush 165 of such size and thickness as to have constant brushing engagement along a line extending obliquely across the entire width of each of the plates 80 as it progresses forwardly along the prescribed path of its movement. At its outwardly extended end, the shaft 164 is operatively connected to a small high-speed electric motor 166, which is connected through the conventional lead wires 167 to the main switch 15, so that the brush will be driven continuously at a high rate of speed and in such direction as to sweep the residual particles rearwardly and sidewardly off the plates 80 whenever the machine is in operation.

Also rigidly mounted on suitably convenient portions of the machine framework, is a chute 168 having an upper enlarged end portion 168' positioned along the outer side margin of the plate conveyer 79 and beneath the brush 165 and scraper 161, being at its lower end positioned over the open-topped receptacle 169 removably mounted in a suitable bracket 170 formed on the side margin of the machine base 1, all as best seen in Figure 1 and for purposes presently more fully appearing.

Rearwardly of the shell 99, is a small tank 171 provided with a removable top 172 and a conical bottom 173 provided at its lower extremity with a transversely extending elongated aperture 174 positioned directly above an idler roll 175, which is, in turn, on its under face in contacting engagement with an oppositely rotating contact roll 176, the latter on its under side being in contacting engagement with the upper face of each plate 80 as its passes therebeneath.

In use, a suitable free-flowing so-called "self-greasing" dough or batter is placed in the batter tank 46. Similarly, a suitable uncooked filling-patty material, such as, for instance, ground meat or hamburger, is charged into the storage hopper 98 beneath the piston 103. Finally, a suitable, preferably liquid, cooking oil or grease, such as corn oil, melted lard, or melted butter, is charged into the tank 171. The main switch is thereupon closed, completing the electrical circuit to the driving motor 14, which, in turn, takes up rotary driving movement which is transmitted through the gear reduction mechanism to the shaft 12. The rotary movement of the shaft 12 is continuously transmitted through the sprocket 55 and the chain 54 to the sprocket 53, producing rotation of the shaft and agitator blades 52 in the batter tank 46, providing continuous agitation thereof, so that the batter will retain its uniformity. Through the bevel gears 16 and the Geneva gears 63, 75, the sprocket 62 and its supported plate conveyer 79 is moved forwardly in the direction of the arrow shown in Figure 4 with an intermittent or stepwise movement by which each one of the plates 80 is progressed for a distance equal to its own length and stopped for a predetermined interval. Similarly, through the Geneva gears 17, 18, the sprocket 22 and its associated chain 31 will be moved in the direction indicated by the arrows in Figure 1 in an intermittent movement whereby the baking trays 40 will each be progressed to a distance equal to its own length and then brought to rest for a predetermined time in synchronized timed relation to the movement of the plates 80, so that, as the baking trays 40 move rearwardly beneath the plate conveyor 79, one of the plates 80 will move downwardly or into closure-forming relationship over each of the baking trays 80 and move with it rearwardly through the oven tunnel 92, all as best seen in Figure 4.

As has been above pointed out, the batter spouts 49, 50, are positioned directly above one of the baking trays 40 when the latter are stationary. Similarly, the patty spout 112 is positioned directly above one of the plates 80 when the plate chain is stationary.

The segmental gear 153 is timed for engagement with the segmental gear 151 as the baking conveyer 30 and the plate conveyer 79 come to rest. Thus, during the stationary period of the baking conveyer 30 and the plate conveyer 79, the shaft 10 will be rotated through an angle of approximately 180°, as above described, at which instant the gear 153 will move out of contact with the gear 151 and the gear 154 will come into contact with the idler gear 150, which is, in turn, in meshing engagement with the gear 152 for reversely swinging the shaft 10 to its initial position. This rocking movement of the shaft simultaneously swings the cam 130 downwardly in a clockwise direction, allowing the rock arm 122 to be drawn backwardly under the influence of the spring 172 and withdrawing the cut-off plate 124 from beneath the spout 49, thereby allowing a charge of batter to flow downwardly into the particular tray 40 which happens to have come to rest from beneath. At the same time, the cam 130, in rotating through 180°, urges the rock arm 117 in the direction of the hopper 98, thereby moving the cut-off plate 114 beneath the patty spout 112 and shearing off the downwardly depending portion of filling material in the formation of a single patty, which will drop downwardly upon the particular plate 80 which has come to rest therebeneath. At the same time, the small sprocket 11 will be rotated through a half turn, which movement will be communicated through the chain 133 and the gears 134, 135, to the crescent-shaped arm 137 which will move upwardly and throw over the particular baking tray 40 which has come to rest above it from the position shown in full lines to the position shown in dotted lines in Figure 9, as above described. Simultaneously, at the forward end of the machine, the rocking movement of the shaft 10 will cause the carry-over arm 155 to swing from the position shown in full lines to the position shown in dotted lines in Figure 5.

Upon the reverse swinging movement of the shaft 10, each of the above described operations will be carried out in the reverse direction, so that the cut-off plate 114 is withdrawn from beneath the patty spout 112, the cut-off plate 124 is moved forwardly beneath the spout 49, cutting off the further flow of batter, the crescent-shaped arm 137 is retrogressively moved to original position, returning the particular baking tray 40 to initial upright position, and the carry-over arm 156 is also swung backwardly to original position.

Subsequent to the completion of the backward and forward rotation of the shaft 10, together with the associated movements controlled thereby, the Geneva movement drive gears 17, 18, and 63, 75, will again come into operative driving engagement, respectively, and move the baking conveyer 30 and the plate conveyer 79 forwardly one position, whereupon they will again come to rest and the above described operations will be repeated.

It will thus be evident that as each plate 80 stops beneath the patty spout 112, it will receive a patty. Similarly, as each baking tray 40 stops beneath the spout 49, it will receive a charge of batter. It should furthermore be specifically pointed out in this connection that the size of the spout 49 must be such as to allow only enough batter to flow out as will approximately half fill the baking tray 40 in the time allotted for this phase of operation.

As the patty-holding plates 80 move forwardly they will enter the cooking oven 91 and the patty carried thereby will be thoroughly cooked during the course of travel therethrough. The degree of cooking, of course, may be controlled by adjusting the temperature of the electric heating units 93, 94. At the same time, the dough

charged into the baking trays will spread out under the influence of gravity in a uniformly thick smooth layer and the baking tray will then be progressed into the oven tunnel 41, in which the dough will be partially baked so as to be of substantially self-supporting non-fluid consistency.

As the cooking plates 80 leave the forward end of the oven tunnel 91, one of the pusher members 159 of the chain 70 will move downwardly along the rear edge so as to prevent accidental rearward displacement of the patty thereon and will move forward with the cooking plate 80 as the latter passes beneath the sharpened transverse edge of the scoop portion 157 of the carry-over arm 156. The cooked patty will thereupon be forced upwardly into the scoop portion 157. Meanwhile, one of the baking trays 40 with its partially baked dough-body will move outwardly from the oven tunnel 41.

Now, as the baking conveyer 30 and the plate conveyer 79 come to rest, a cooked patty will be carried over and deposited in centrally positioned relationship upon the partially baked dough-body in the baking tray 40. Since the dough-body therein is of self-supporting non-fluid consistency, the patty will be substantially supported thereby.

As the baking conveyer 30 moves forwardly, the plates 80 will next come to rest beneath the batter spout 50, at which point a second charge of batter will be deposited therein sufficient to completely cover and encase the meat patty with a top covering of substantially the same thickness as the bottom formed by the already partially baked dough-body in the completion of a sandwich. The thus filled baking trays 40 will now move around the end of the machine along the reversely extending reach of the sprocket chain 24 and be moved beneath the reversely moving run 79'' of the plate conveyer 79.

Each plate 80 of the plate conveyer 79, after discharging its meat patty into the scoop 157, will move beneath the scraper 161 and the brush 165, being thereby cleaned of all excess grease or adhering particles as it moves downwardly and into overlying or closure-forming position over the particular baking tray 40 with which it is associated. The now completely filled and covered baking trays 40 will thence progress rearwardly through the lower baking tunnel 92, the plates 80 serving to prevent overflow of the dough as it raises and also to insure more uniform and complete baking of the entire sandwich. It will be noted, by reference to Figure 4, that the electrical heating element 95 extends entirely along the entire length of the baking tunnel 92, whereas the heating element 96 extends only over the rearward half of the bottom thereof in order that the entirely unbaked top portion of the sandwich may be heated and baked more rapidly so as to be quickly brought to the same state or condition as the bottom half, whereupon both the top and bottom of the sandwich will be exposed to heat and the cooking thereof completed. As the baking trays 40 and the plates 80 move outwardly from the oven tunnel 92, the plates 80 will move upwardly away from the baking trays and the latter will move around the rear end of the machine along the forwardly extending reach of the sprocket chain 23, as best seen in Figure 4.

As the baking tray 40, containing a completely finished and baked sandwich, comes to rest over the crescent-shaped arm 137, it will be swung over into upside-down position and brought to rest abruptly against the stop projection 140, whereby the sandwich will be jarred out of the baking tray and will be dropped into the bin or discharge receptacle 177, which may be of any conventional design and which preferably extends forwardly beneath the cooking tunnels 91, 92, so that the excess heat therefrom will serve to keep the sandwiches warm for an appreciable period of time.

It will, of course, be understood that in starting up the machine a substantial period of time will elapse until the first completed sandwich is discharged, since it is necessary to charge and fill up all the various baking plates and baking trays as they pass forwardly through the various stations or positions in the machine. However, after the first sandwich is discharged into the receptacle 177, another sandwich will be discharged at every cycle of the machine in a continuous and uninterrupted manner. It will, of course, be understood that the machine may be speeded up or slowed down, depending upon the volume of sandwiches required in any unit of time, in which case the length or temperature of the various cooking tunnels must be adjusted, so that the dough and patty will be properly baked and cooked. In the case of an extremely high-speed machine, it will be necessary to provide relatively long baking tunnels. On the other hand, in the case of a relatively low-speed machine, the baking tunnels may be materially shorter in length, since the dough and patty will move therethrough at a slower rate.

I have found that the sandwiches made in accordance with my present invention are extremely delectable, being of uniform texture and quality, and having an outer light-brown crust which is appealing both in appearance and taste. In addition to this, it is possible by my present invention to provide sandwiches at exceptionally low cost, since the relatively large item of labor cost is almost entirely eliminated. Finally, it is possible, by my present invention, to provide sandwiches at an unusually rapid rate in a sanitary hygienic manner, since the sandwich itself during the entire course of its manufacture is not touched by human hands.

It should be understood that changes and modifications in the form, construction, arrangement, and combination of the several parts of the sandwich machine may be made and substituted for those herein shown and described without departing from the nature and principle of my invention.

Having thus described my invention, what I claim and desire to secure by Letters Patent is,

1. A sandwich machine comprising a first oven, a second oven, means for receiving a predetermined quantity of dough and progressing the same through the first oven at a predetermined speed in relation to the temperature of the oven, means for disposing an edible sandwich filler upon the dough after the same leaves the first oven, means for disposing a second predetermined quantity of dough in overlying relationship upon the sandwich filler in the formation of a sandwich, and means for progressing the thus formed sandwich through the second oven for complete baking.

2. A sandwich machine comprising a plurality of open-top baking trays connected in a continuous series, means for moving said trays along an endless path, means positioned at a predetermined point along the path for partially filling said trays with a predetermined quantity of

dough, means positioned at a successive point along the path for baking said dough, means positioned at a further successive point for introducing a sandwich filling patty upon said dough, means positioned at a further point along said path for introducing a second quantity of dough in the formation of a sandwich, and means for completely baking the thus formed sandwich.

3. A sandwich machine comprising a plurality of open-top baking trays connected in a continuous series, means for moving said trays along an endless path, means positioned at a predetermined point along the path for partially filling said trays with a predetermined quantity of dough, means positioned at a successive point along the path for baking said dough, means positioned at a further successive point for introducing a sandwich filling patty upon said dough, means positioned at a further point along said path for introducing a second quantity of dough in the formation of a sandwich, means for completely baking the thus formed sandwich, and means for removing the completed sandwiches from the respective trays.

4. A sandwich machine comprising, in combination, a plurality of open-top baking trays connected in a continuous series, means for moving said trays along an endless path, means for partially filling said trays with a predetermined quantity of dough, means for baking said dough, means for introducing a sandwich filling patty upon said dough, means for introducing a second quantity of dough in the formation of a sandwich, and means for completely baking the thus formed sandwich.

5. A sandwich machine comprising a plurality of endwise connected cooking plates for preparing a sandwich filling patty, means for progressing said plates in stepwise motion, means operable in timed relation to the movement of the plates for disposing the prepared patty between a partially baked dough-body and an entirely unbaked dough-body, and means for completely baking said dough-bodies.

6. A sandwich machine comprising a plurality of endwise connected cooking plates arranged in the form of a horizontal conveyer having upper and lower runs, means for intermittently progressing the cooking plates, means for placing a meat patty on each of said plates, means disposed over said upper conveyer run for cooking each meat patty, means for baking a dough-body, means for disposing a cooked patty upon the dough-body, means for placing a second dough-body over the meat patty, and means for subsequently baking the assembled meat patty and dough-bodies in the formation of a finished sandwich.

7. A sandwich machine comprising a plurality of endwise connected cooking plates arranged in the form of a horizontal conveyer having upper and lower runs, means for intermittently progressing the cooking plates, means for placing a meat patty on each of said plates, means disposed over said upper conveyer run for cooking each meat patty, a plurality of shallow trays connected in a consecutive series, means for progressing said trays in stepwise motion, means operable in timed relation to the movement of the trays for disposing the cooked patty between a partially baked dough-body and an entirely unbaked dough-body, and means for completely baking said dough-bodies.

8. A sandwish machine comprising, in combination, a plurality of open-top baking trays connected in a continuous series, means for moving said trays along an endless path, means for partially filling said trays with a predetermined quantity of dough, means for baking said dough, means for introducing a sandwich filling patty upon said dough, means for introducing a second quantity of dough in the formation of a sandwich, means for covering said trays after introduction of said second quantity of dough, and means for completely baking the thus formed sandwich.

9. A sandwich machine comprising a plurality of open-topped baking trays arranged in a consecutive series for movement along an endless path substantially in a horizontal plane, and a plurality of cooking plates connected in a consecutive series for movement along an endless path substantially in a vertical plane and having upper and lower horizontal runs, the latter being disposed over the path of the trays and so positioned with respect thereto that, as each tray moves beneath the path of the plates, one of said plates will move into overlying closure-forming registration with such tray and travel with the same for a predetermined distance.

10. A sandwich machine comprising a plurality of open-topped baking trays arranged in a consecutive series for movement along an endless path substantially in a horizontal plane, a plurality of cooking plates connected in a consecutive series for movement along an endless path substantially in a vertical plane and having upper and lower horizontal runs, the latter being disposed over the path of the baking trays and so positioned with respect thereto that, as each tray moves beneath the path of the plates, one of said plates will move into overlying closure-forming registration with such tray and travel with the same for a predetermined distance, and an oven tunnel positioned over the covered trays along that portion of the tray path in which the trays and plates are together.

11. A sandwich machine comprising a base, first, second, and third oven tunnels mounted on the base, first and second conveyor means operatively mounted on the base, said second conveyor means being adapted for the preparation of a sandwich filler, driving means operatively connected to both of said conveyor means for driving said conveyor means in predetermined timed relation, said first conveyor means being adapted to move successively through the first and second ovens, said second conveyor means being adapted to move through the first oven, and means operatively interposed between said first and second conveyor means for transferring the sandwich patty from the second conveyor means to the first conveyor means.

12. A sandwich machine comprising a base, first, second, and third oven tunnels mounted on the base, first and second conveyor means operatively mounted on the base, said second conveyor means being adapted for the preparation of a sandwich filler, driving means operatively connected to both of said conveyor means for driving said conveyor means in predetermined timed relation, said first conveyor means being adapted to move successively through the first and second ovens, said second conveyor means being adapted to move through the first oven, means operatively interposed between said first and second conveyor means for transferring the sandwich patty from the second conveyor means to the first conveyor means, means mounted on the base and actuated by the driving means for depositing a dough-body upon the first conveyor means prior

to entrance into the first oven tunnel, and a second dough-body in overlying relationship upon the first dough-body after the latter has been moved out of the first oven tunnel.

13. A machine for making sandwiches including mechanism comprising a pivotally mounted arm, an open-topped scoop-like tray mounted on the outer end of said arm, and means for pushing a sandwich patty upon the tray for transferring the patty from the point of preparation to a point of assembly in the sandwich.

14. In a sandwich machine, a conveyor chain having a plurality of open-topped baking trays swingably mounted thereon and normally supported in upright horizontal position, and discharge means including a rockable arm adapted upon actuation to move upwardly into engagement with the under side of a tray and swing the same into inverted position for discharging the contents thereof.

15. In a sandwich machine, a conveyor chain having a plurality of open-topped baking trays swingably mounted thereon and normally supported in upright horizontal position; discharge means including a rockable arm adapted upon actuation to move upwardly into engagement with the under side of a tray and swing the same into inverted position for discharging the contents thereof, and means mounted on the tray for engaging the arm upon return movement thereof for reversely swinging the tray back to normal upright position.

16. In a sandwich machine, an endless chain disposed for movement in a horizontal plane, a slide track mounted concentrically around and outwardly of the chain, a plurality of baking trays swingably mounted at spaced points along the chain and having shoulder portions slidably disposed upon the track for normally supporting the tray in substantially horizontal position, and means positioned at a predetermined point adjacent to the chain for overturning the trays.

17. In a sandwich machine, an endless chain disposed for movement in a horizontal plane, a slide track mounted concentrically around and outwardly of the chain, a plurality of baking trays swingably mounted at spaced points along the chain and having shoulder portions slidably disposed upon the track for normally supporting the tray in substantially horizontal position, a stop-abutment positioned at a predetermined point adjacent the track, and means for successively overturning the trays against the abutment with sufficient jarring force to dislodge the contents thereof.

18. In a sandwich machine, a cooking plate having oppositely presented pairs of registering hinge-eyes, and opposed upstanding flanges extending longitudinally between the pairs of eyes, the transverse margins of the plate being deformed downwardly in the provision of drain lips.

19. In a sandwich machine, a cooking plate having oppositely presented pairs of registering hinge-eyes, and opposed upstanding flanges extending longitudinally between the pairs of eyes, the transverse margins of the plate being deformed downwardly in the provision of V-shaped drain lips.

20. A sandwich machine including a plurality of plates connected in a continuous series, driving means for intermittently progressing said plates along an endless path, a sandwich-filling hopper positioned at a predetermined point along said path, means actuable during movement of the plates for extruding from the hopper a predetermined quantity of sandwich-filling, and means actuable during the stationary intervals of the plates for severing and depositing the extruded portion of filling upon said plates in the formation of a patty.

21. A sandwich machine comprising driving means, first intermittently actuable means connected to the driving means for preparing a plurality of successive sandwich-fillings at spaced intervals of time, means disposed in spaced juxtaposition to and movable with the first means for holding a partially baked dough-body, intermittently actuable transfer means also connected to the driving means for disposing the prepared patty upon the partially baked dough-body, and means for depositing an entirely unbaked dough-body upon the associated patty and partially baked dough-body, said transfer means being timed for operation during the space of time between said intervals, and means associated with said last-named means for completely baking said dough-bodies.

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