May 19, 1942. W. A. THUM 2,283,298

BISCUIT MACHINE

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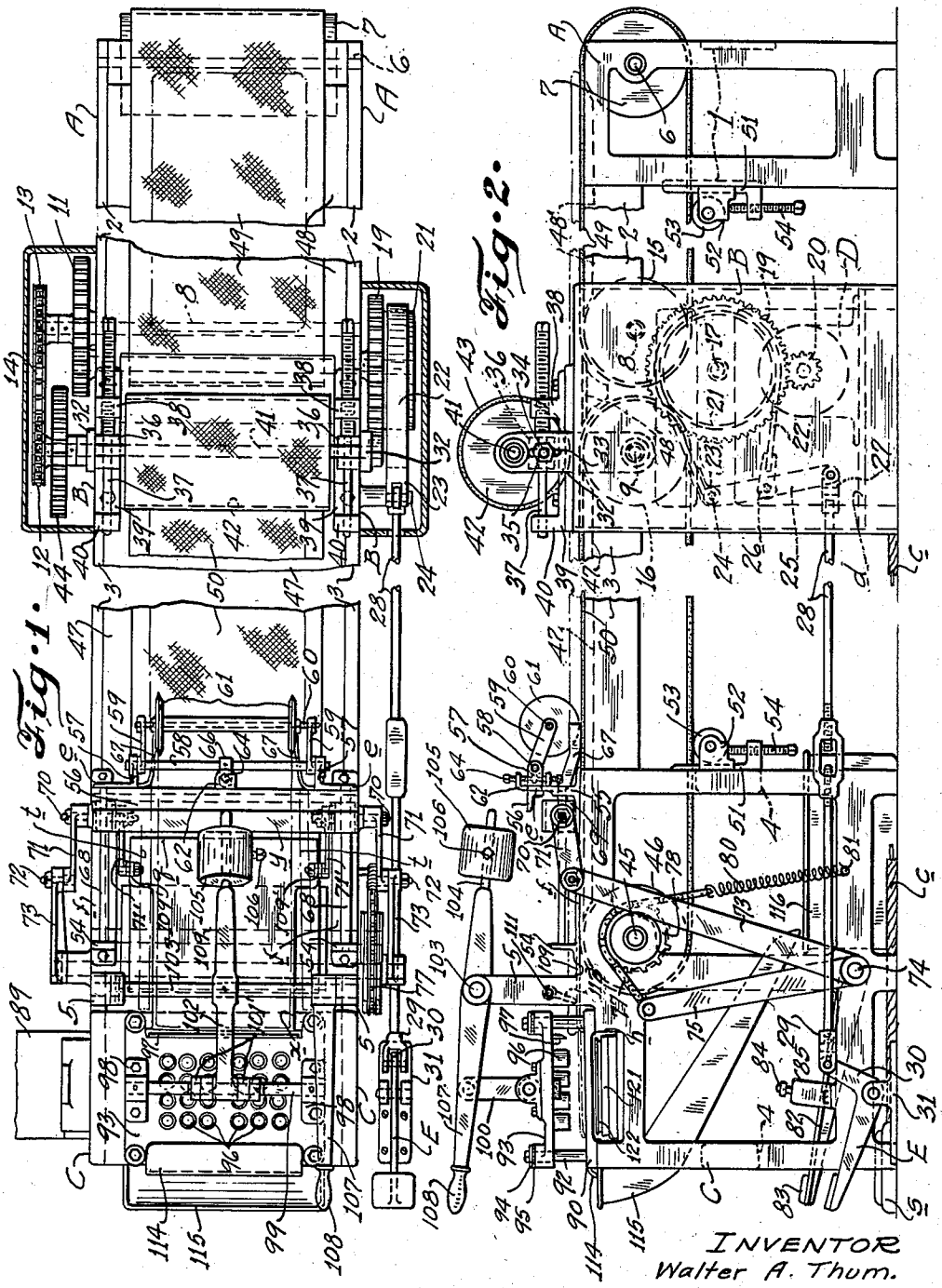


Fig. 1.

Fig. 2.

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BISCUIT MACHINE

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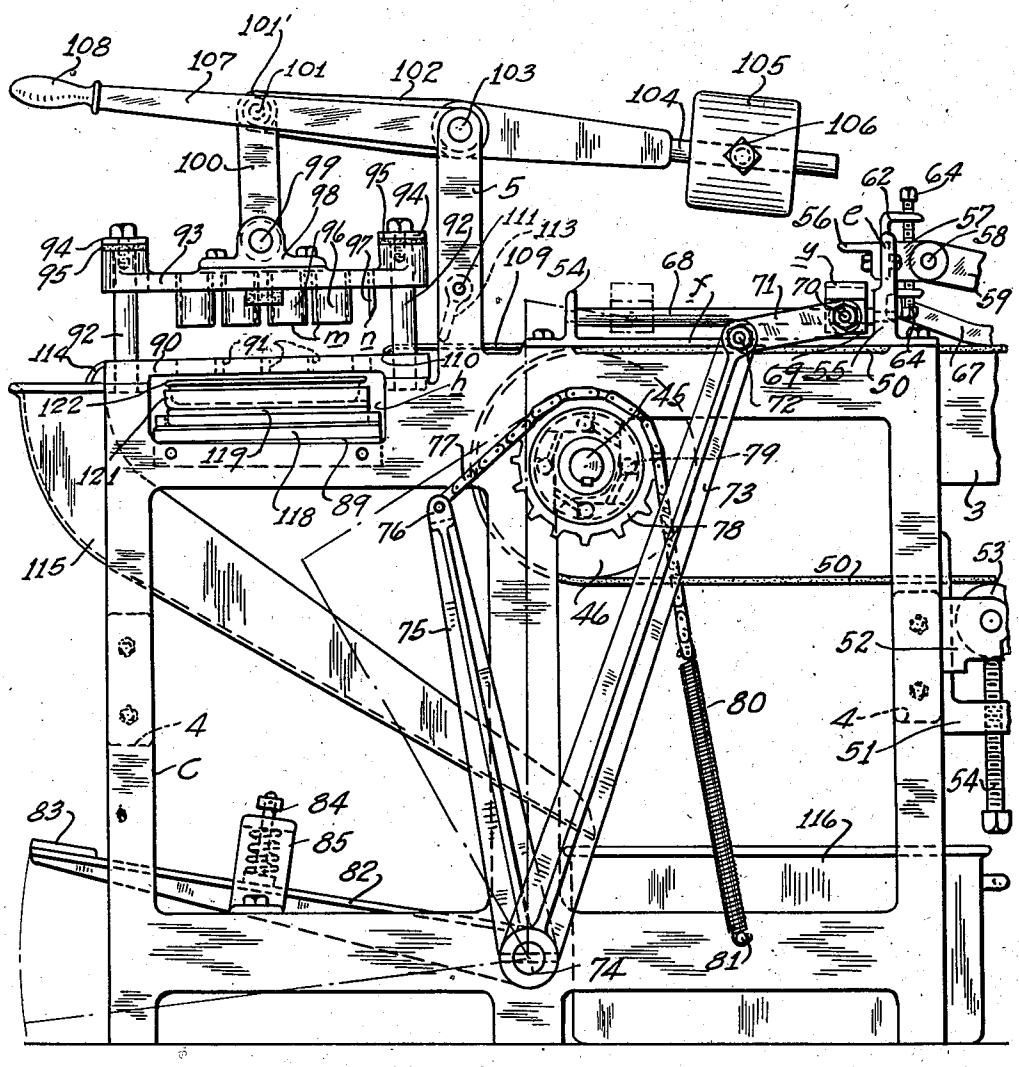


Fig. 3.

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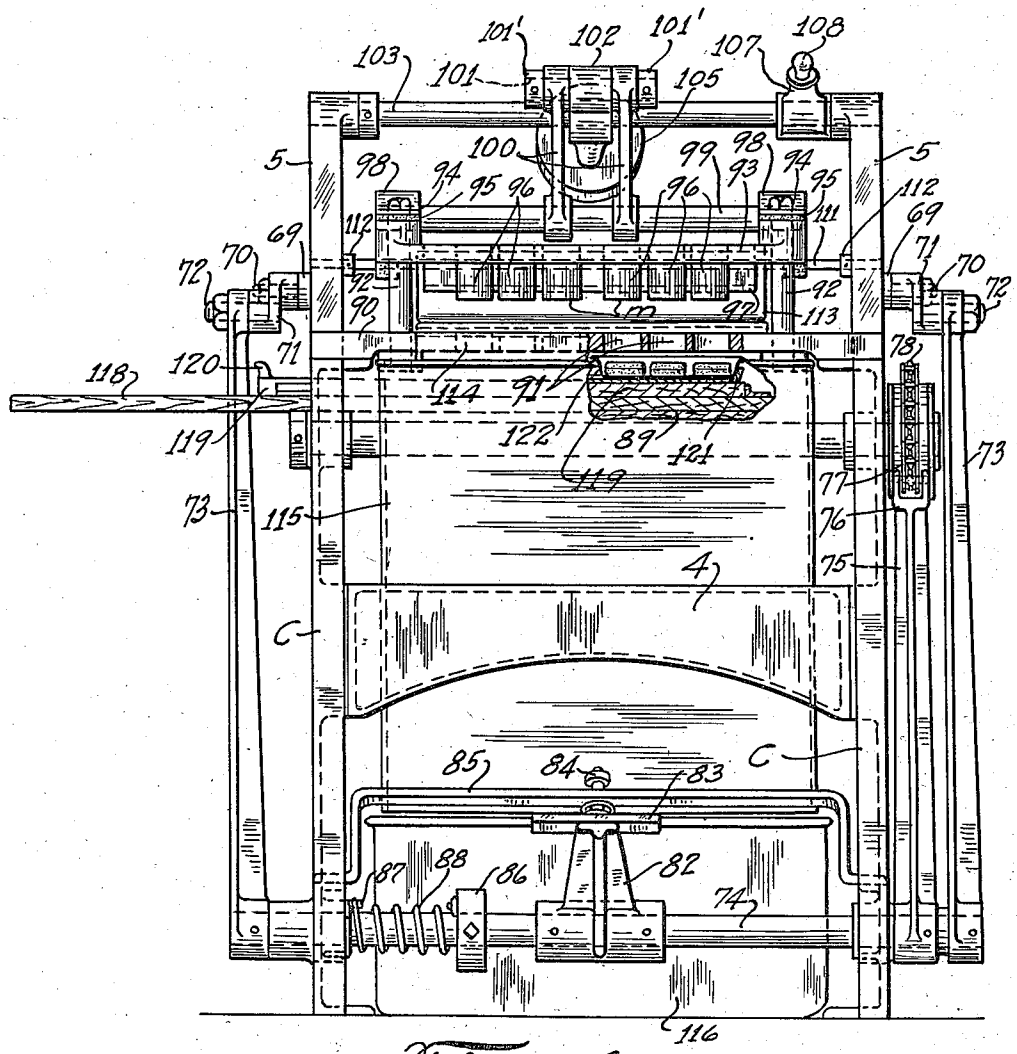


Fig. 4.

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Fig. 5.

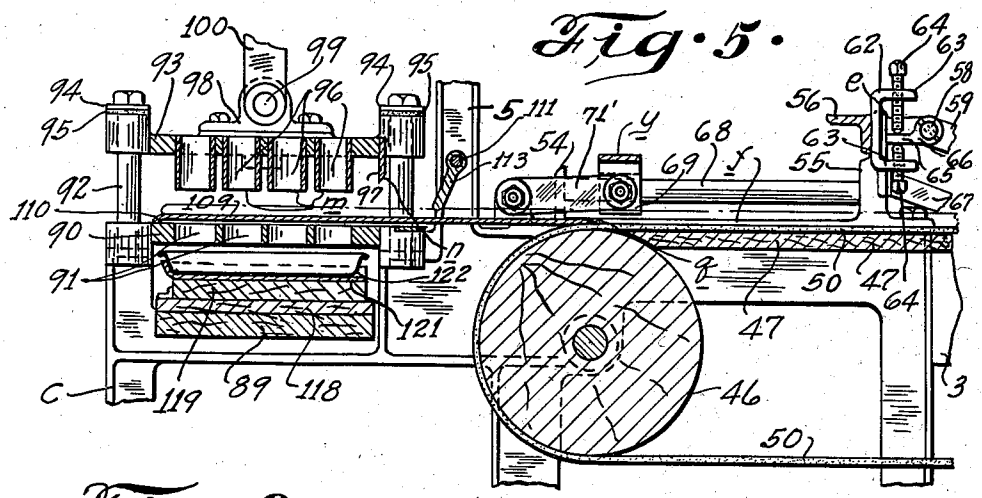
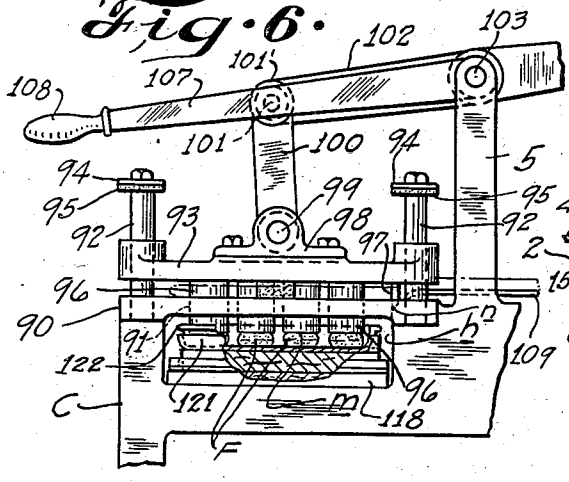


Fig. 6.



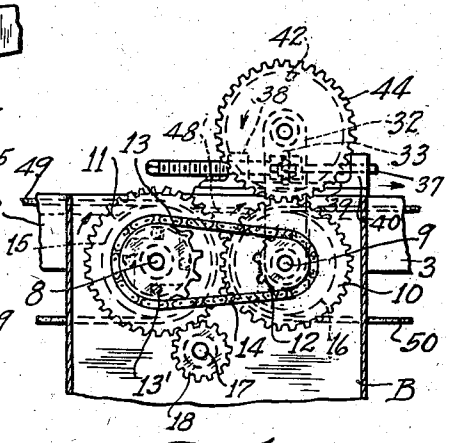


Fig. 7.

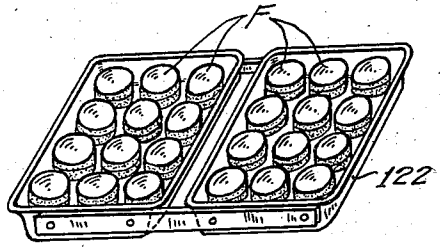


Fig. 8.

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Patented May 19, 1942 2,283,298

UNITED STATES PATENT OFFICE

2,283,298

BISCUIT MACHINE

Walter A. Thum, St. Louis, Mo., assignor to Papendick, Inc., St. Louis, Mo., a corporation of Missouri

Application January 29, 1940, Serial No. 316,140

3 Claims. (Cl. 107—25)

This invention relates generally to baking machines and, more particularly, to a certain new and useful improvement in machines adapted especially for the automatic cutting and panning of biscuit dough-bodies and the like.

My invention has for its primary objects the provision of a machine uniquely constructed for automatically progressing or feeding a dough-sheet of predetermined or adjustably selected thickness and width, subdividing the sheet into a plurality of dough-bodies having the desired biscuit, roll, or bun shape, and then panning such dough-bodies in spaced arrangement for baking.

My invention has for a further object the provision of a machine of the type and for the purpose stated which will perform such operations in a continuous and timed sequence with a minimum of labor and at a relatively high speed, thereby effecting material economies in bakery costs, which eliminates the employment of human hands in the forming and panning of the biscuit or other dough-bodies, thereby greatly increasing the sanitary characteristics of biscuit production, and which is highly efficient in the performance of its stated 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 (four sheets)—

Figures 1 and 2 are broken plan and side elevational views, respectively, of a biscuit-dough cutting and panning machine embodying my invention;

Figure 3 is an enlarged fragmental side elevational view of the machine;

Figure 4 is an enlarged end elevational view of the machine, partly broken away and in section, the brake-pedal being omitted;

Figure 5 is a fragmentary longitudinal sectional view of the machine, showing the dough-cutting dies in normal, raised or elevated position and the dough-feed or lay-over plate in forward position;

Figure 6 is a fragmentary side elevational view, partially broken away and in section of the machine, showing the dough-cutting dies in depressed or lowered dough-engaging and panning position;

Figure 7 is a fragmentary vertical sectional view of the belt-timing and driving mechanism of the machine; and

Figure 8 illustrates perspectively a plurality of biscuit dough-bodies mechanically cut and neatly panned by the machine for baking.

Referring now in more detail and by reference characters to the drawings, which illustrate a preferred embodiment of my present invention, the body of the machine preferably includes a pair of upstanding rear frames A rigidly connected together in spaced parallel relation by suitable cross-members or braces 1. Suitably rigidly secured upon the forwardly presented faces, and having their respective upper faces flush with the upper faces, of the frames A, are forwardly presented side rails 2 suitably rigidly secured, in turn, to second or intermediate upstanding side frames B also forming part of the body of the machine and likewise suitably rigidly joined in spaced parallel aligning relation with respect to the frames A.

Bolted or otherwise secured upon the frames B, are second or intermediate side rails 3 again, in turn, bolted or otherwise suitably secured to upstanding front frames C also forming part of the body of the machine and similarly joined by suitable cross-members 4 in spaced parallel aligning relation with the intermediate frames B and rear frames A, the front frames C being provided, for purposes presently appearing, with upwardly projecting supports 5, all as best seen in Figure 2.

Journaled at its ends in, and extending horizontally between, the frames A, is an idle shaft 6, mounted upon which intermediate the frames A is a preferably wooden drum 7.

Similarly journaled in, and extending transversely between, the intermediate frames B and disposed horizontally in alignment with the shaft 6, are spaced parallel shafts 8, 9, which project outwardly at one end for mounting gears 10, 11, and sprockets 12, 13, the latter being connected by means of a suitable chain 14.

Intermediate the frames B, the shafts 8, 9, support suitable drums 15, 16, preferably similar in structure and dimension to the drum 7. It should be noted that the shafts 8, 9, are sufficiently spaced longitudinally of the machine so that the drums 15, 16, will be suitably spaced circumferentially for purposes presently appearing.

Also journaled at its ends in, and projecting through, the intermediate frames B, is a shaft 17, mounted upon one projecting end of which is a pinion 18 for meshing engagement with the gear 11. Mounted upon the other end of the shaft 17, is a gear 19 for meshing engagement with the drive pinion 20 of a conventional elec-

tric motor or other prime mover D preferably mounted upon a supporting platform *d* suspended between the frames B and conventionally connected to any suitable source of power (not shown) by means of an electric conduit *c* and a foot-switch *s*, the latter being suitably accessibly located adjacent the front end of the machine, as best seen in Figure 2.

The gear 19 is provided concentrically upon a side face with a brake-drum 21 for operative disposition within a strap-type brake-band 22 suitably attached at one end in an eye-block 23, in turn, pivotally mounted upon a pintle 24 set into and projecting inwardly from the adjacent frame B for swingably supporting a depending link 25, the band 22 having its other end mounted in an eye-block 26 pivotally mounted upon, and intermediate the ends of, the link 25, as shown in Figure 2.

At its lower end, the link 25 is pivotally mounted in a clevis-block 27 fixed upon the rearwardly presented end of a conventional turn-buckle rod 28 provided at its other end with a similar clevis block 29 for pivotal connection with the angularly projecting leg 30 of a bell-crank pedal E pivotally mounted adjacent the front end of the machine, as shown in Figure 2, in a conventional floor fitting 31.

Swingably mounted on the opposite ends of the shaft 9 and projecting upwardly a suitable distance above the upper end of the frames B, is a pair of links 32 slotted longitudinally intermediate their ends, as at 33, for shiftably receiving respective studs 34 each having a respective lock-nut assembly 35 at its outer end. At its inner end, each stud 34 is rigidly fixed in a slide-block 36 suitably bored for shiftably accommodating an adjustment-rod 37 extending longitudinally of the machine and diametrally enlarged and threaded at an end, as shown, for engaging an upstanding leg 38 of a U-shaped bracket 39 bolted at its bight upon the upper face of a side frame B and having a second upwardly presented leg 40 spaced a substantial distance forwardly from the leg 38 and likewise suitably bored for rotatively and shiftably accommodating the forwardly presented end of the adjustment-rod 37.

Journaled in and extending transversely of the machine between the links 32, is a shaft 41 supporting a preferably wooden drum 42, adhesively fixed upon the periphery of which is a preferably smooth canvas covering 43. At its one end, the shaft 41 projects outwardly through a link 32 and has fixed thereto a gear 44 for meshing engagement with the gear 10.

Journaled in, and extending transversely of the machine between, the forward side frames C, is a shaft 45 supporting an also preferably wooden drum 46 in horizontal alignment with, and of the same diameter as, the drums 7, 15, and 16. Marginally secured upon, and extending horizontally between, the frames C, is a preferably wooden table-board 47 having its upper face in a plane tangential to the drums 16, 46, and terminating at its rear and front ends in concaved marginal faces adjacent and complementary to the respective drums 16, 46.

Similarly mounted along its longitudinal margins upon, and extending horizontally between, the intermediate frames B, is a preferably wooden table-board 48 also having an upper face disposed in the same plane as the table-board 47 and likewise terminating at its rear and front ends in concaved marginal faces adjacent and complementary to the drums 7, 15, respectively.

Traveling over and around the drums 7, 15, and riding freely over the upper face of the table-board 48, is an endless rear or primary belt-conveyor 49 fabricated preferably of canvas or other suitable material. Similarly trained for traveling over and around the drums 16, 46, and riding freely over the upper face of the table-board 47, is an endless front or secondary belt-conveyor 50 also fabricated preferably of canvas or other suitable material.

Welded or otherwise suitably fixed upon the respective forwardly presented faces of the rear frames A and the respective rearwardly presented faces of the front frames C, are oppositely L-shaped brackets 51 for slidably accommodating journal blocks 52 rotatively supporting conventional belt tightening idler rolls 53. Threaded on the brackets 51, are vertically disposed screws 54 for adjustably shifting the blocks 52 and their supported rolls 53 and tightening or loosening the conveyor-belts 49, 50, as may be required.

Bolted or otherwise suitably secured upon the upper marginal faces of the forward frames C, are transversely aligned U-shaped brackets *f* having relatively widely spaced upstanding front and rear ears 54, 55. The rear ears 55 are formed with upwardly projecting extensions *e* connected transversely of the machine by a re-enforcing beam 56 equipped with rearwardly presented horizontally aligned journal-ears 57 for rotatively supporting a transversely disposed rod 58 rigidly provided with rearwardly presented arms 59 for, in turn, rotatively supporting a transversely extending free rolling shaft 60 provided with a pair of cutter-disks or wheels 61 suitably spaced transversely of the machine, as best seen in Figure 1.

Centrally upon the rearwardly presented face of the beam 56, is a U-shaped bracket 62 having vertically spaced parallel legs 63 provided with suitably threaded aligning apertures for accommodating opposed adjustment screws 64 for positioning engagement with the forwardly extending tail-piece 65 of an adjustment-dog 66 suitably pinned or otherwise fixed upon the rod 58. Also suitably mounted upon and extending rearwardly from the ears 55 in suitable operative juxtaposition to the cutter wheels 61, are conventional so-called deflection blades 67, all as best seen in Figures 1 and 2 and for purposes presently fully appearing.

Mounted at their ends in, and extending transversely between, each of the pairs or sets of bracket-ears 54, 55, are parallel horizontally aligned rods 68 for shiftably supporting slide blocks 69 each provided with outwardly projecting pintles 70 for rocking engagement with forwardly presented arms 71, in turn, at their forward ends pivotally connected, as at 72, to links 73 keyed or fixed at their lower end upon the outwardly extending ends of a transverse rock shaft 74 journaled for axial oscillatory movement in the frames C, as best seen in Figures 3 and 4.

Also pinned or otherwise fixed at an end upon one of the outwardly presented ends of the rock-shaft 74, as best seen in Figure 3, is an auxiliary or supplemental rock-arm 75 bifurcated or yoked at its upper end, as at 76, for convenient attachment to one end of a sprocket chain section 77 trained over a sprocket 78, in turn, mounted by means of a conventional roller-type friction clutch 79 upon the extended end of the shaft 45, the chain 77 at its other end being connected to one end of a tension spring 80 attached, in turn, at its other end to a pin or the like 81 fixed in,

and projecting laterally outwardly from a side face of, a frame C, as best seen in Figure 3.

Also pinned or otherwise fixed upon the rock-shaft 74 preferably midway between the side frames C, is an actuating lever 82 provided at its outer or free extremity with a foot pedal 83 and adapted intermediate its ends for shock-absorbing abutment with a conventional spring-pressed cushioning plunger 84 mounted in a U-shaped cross brace 85 extending transversely between, and rigidly secured at its ends upon, the side frames C, as best seen in Figures 3 and 4.

Spirally coiled on the shaft 74 and attached at one end to an abutment 86 fixed on the shaft 74 and at its opposite end to a stud 87 upon the inner face of the adjacent side frame C, for purposes presently appearing, is a torsion spring 88.

The side frames C are cut away or slotted along their upper margins, as at *h*, for seating a transversely extending slide-board 89, and suitably fixed upon the frames C and extending transversely of the machine over the board 89, is a rectangular die-plate 90 provided with a plurality of suitably shaped, spaced, and arranged punch-accommodating openings 91, the plate 90 being also so positioned that its upper face is disposed in a horizontal plane slightly below the plane of the upper face of the secondary belt 50.

Upstanding from the four corners of the apertured die-plate 90, are four posts 92, and shiftable on the posts 92 over the apertured plate 90, is a horizontally disposed head-plate 93, the upward movement of the plate 93 being limited by stop-washers 94 and cushioned by washers 95 suitably secured on the posts 92, as best seen in Figures 3 and 4.

Fixed to, and depending from the under face of, the head-plate 93, is a plurality of open-bottomed cylindrical punch-members 96 positioned and diametrally sized for co-operation with the openings 91 and each formed at its lower end with a so-called blunt shearing peripheral face or margin, as at *m*, the plate 93 being also provided with a depending knife-blade 97 extending transversely of the machine and having its cutting edge *n* disposed in a plane substantially above the plane of the respective shearing margins of the punches 96 and rearwardly of the shearing-edge of the die-plate 90, as best seen in Figure 5.

Provided upon the upper face of the plate 93 centrally of its longitudinal margins, are transversely aligned lugs 98 for supporting a transversely disposed rod 99, pivotally attached to which, is a pair of spaced parallel links 100, in turn, suitably pivotally connected to a pintle 101 retained in place by set-collars 101' and intermediate the links 100 rockably supporting the forward end of a suitably elongated link 102 pinned or otherwise fixed adjacent its rear end upon a rock-shaft 103 journaled in, and extending transversely of the machine between, the arms 5, the link 102 having a preferably rod-like rearwardly presented extension 104 for shiftably supporting a counter-weight 105 retained in adjusted position by means of a set screw or the like 106.

Also pinned or otherwise fixed at or adjacent an end upon the rock-shaft 103 preferably adjacent one of the arms 5, is a forwardly presented actuating lever 107 provided at its outer or free end with a suitably shaped hand-grip 108 preferably positioned for convenient manipulation by an operator standing in front of the machine.

Mounted on, and extending transversely of the machine between, the slide-blocks 69, is a horizontally disposed so-called lay-over plate 109 having its under face substantially in the plane of the upper face of the conveyor 50, the plate 109 having preferably a sharply beveled rear margin, as at *q*, and being provided at its forward margin with an arcuate downwardly presented lip 110 terminating approximately in the plane of the upper face of the die-plate 90, as best seen in Figure 5. As also seen in Figure 1, the plate 109, at its front end *x*, is slightly wider than the trimmed dough-sheet and at its rear portion is provided with upturned ears 109' pivotally connected to links 71', 71', in turn, pivoted to studs extending from the slide-blocks 69 for allowing the plate 109 to lay flat on the conveyor-belt 50, the blocks 69 being connected for alignment for a V-shaped strip *y*.

Journaled in the arms 5 and extending transversely of the machine in downwardly spaced relation to the rock-shaft 103, is a horizontally disposed hinge-shaft 111 held from axial movement by a pair of conventional set-collars 112 disposed in abutting engagement with the arms 5, and pinned or otherwise fixed upon the shaft 111, is an obliquely downwardly presented catch-flap 113 resting lightly along its lower margin upon the upper face of the lay-over plate 109, all as best seen in Figures 4 and 5 and for purposes presently fully appearing.

Fixed upon the die-plate 90 along its forwardly presented transverse margin, is an apron 114 extending arcuately forwardly and downwardly for discharge into a chute 115 supported between the side frames C for discharging, in turn, into a conventional catch-box 116 removably disposed upon the floor intermediate the side frames C, as shown.

Fixed to or upon the board 89 and projecting laterally outwardly of the machine beyond one of the side frames C through the opening or slot *h*, is a supplemental board 118, slidable upon the upper face of which is a tray-board 119 having a manipulating handle 120 and supporting a shallow tray-like receptacle 121 for positioning successive baking pans 122 suitably beneath or under the die-plate openings 91 for receiving the punched dough-bodies F, all as best seen in Figure 6.

In use and operation, the baker prepares a suitable dough-batch, depending upon the particular type of rolls or biscuits which are to be baked. A suitably rolled and subdivided sheet of the dough-batch is placed upon the conveyor-belt 49. Thereupon, the operator depresses the foot switch *s*, thereby energizing the motor D, which, in turn, rotates the gear 19, shaft 17, pinion 18, and gear 11. Then, as the gear 11 is rotarily driven in the direction of the arrow, in Figure 7, the sprocket 13 is similarly rotated and, through the chain 14, drives the sprocket 12, the gear 10 meshing with the gear 44. Hence the primary conveyor 49, the secondary conveyor 50, and the sheeting roll or drum 42 are simultaneously or conjointly driven, it being noted, however, that the conveyor 49 will be driven at a slightly slower forward speed than the secondary conveyor 50 and the sheeting roll 42, as a result of the speed reduction ratio between the sprockets 12 and 13.

The portion of the dough-sheet, which as been deposited upon the primary conveyor 49, is accordingly fed over the plate or board 48' and between the secondary conveyor 50 and the sheeting roll 42. By reason of the fact that the sheeting roll 42 and the secondary conveyor 50 are travel-

ing at a somewhat more rapid rate of speed, the dough-sheet is practically pulled beneath the sheeting roll 42, resulting in the formation of a substantially uniform dough-sheet and preventing any tendency of the dough-sheet to "pile up" in back of the sheeting roll 42. It will be understood that the thickness of the dough-sheet may be selectively varied by altering the space between the periphery of the sheeting roll or drum 42 and the upper face of the secondary conveyor 50 by threadedly shifting the adjustment rods or screws 37 and the associated slide blocks 36 horizontally forwardly or rearwardly, as may be desired. Depending upon the direction in which the slide blocks 36 are so shifted, the supporting links 32 will be swung forwardly or rearwardly, as the case may be, thereby shifting the studs 34 within the slots 33 and accordingly swinging the sheeting roll 42 toward or away from the upper face of the secondary conveyor 50.

As the dough-sheet progresses forwardly, the same passes beneath the cutting disks 61 and is marginally trimmed to a predetermined width, and the trimmed strips *t* are obliquely deflected by the blades 67 to the sides of the conveyor 50, as shown in dot-dash lines in Figure 1, so as to clear the forwardly presented portion of the lay-over plate 109 and be carried around by the conveyor 50 for discharge through the chute 115 into the catch-box 116 for removal.

The trimmed dough-sheet continues its forward progressive movement until its forward portion aligns with the lip 110 of the lay-over plate 109. The operator then releases the switch *s*, which, in turn, opens the operating circuit, the operator then, by depressing the pedal E, tightening the brake band 22 upon the drum 21 and bringing the conveyors 49, 50, to rest. It may here be stated that the portion or section of the dough-sheet initially placed upon the primary conveyor 49 should preferably, though not necessarily, be sufficient in relation to the particular thickness adjustment of the sheeting roll 42 and the length of the secondary conveyor 50, so that the sheeted dough-body will, when the conveyors 49, 50, have been brought to rest, extend from the lay-over plate lip 110 rearwardly across the secondary conveyor 50 and terminate slightly forwardly of the sheeting roll 42.

Thereupon, the operator, under foot-pressure upon the pedal 83, depresses the actuating lever 82, axially oscillating the rock-shaft 74 and swinging the links 73 and arm 75 forwardly. Then, as the links 73 swing forwardly, the slide blocks 69 are shifted forwardly along the slide rods 68, thereby shifting the lay-over plate 109 forwardly over the die-plate openings 91, so that the lay-over plate lip 110 will extend slightly beyond the most forwardly advanced row of the openings 91 in the position shown in dot-dash lines in Figure 2.

Similarly, the forward swinging movement of the arm 75 will draw the sprocket chain 77 forwardly against the pull or tension of the spring 80, thus rotating the sprocket 74, such rotary movement thereof being transmitted through the roller friction clutch 79 to the drum 46, thereby shifting the secondary conveyor 50 forwardly a distance substantially equal to the distance which the lay-over plate 109 is shifted.

Thereupon, the operator removing foot-pressure from the pedal 83, the rock-shaft 74 and the associated links 73 and arm 75 swing back to initial position under the pull of the spring 80. The lay-over plate 109 is thereby shiftably returned to initial position, but, by reason of the fact that the reverse rotary movement of the sprocket 78 is not transmitted through the roller friction clutch 79 to the drum 46, the secondary conveyor 50 remains stationary. Accordingly, the dough-sheet continues to project over the upper face of the die-plate 90, any tendency of the dough-sheet to shift rearwardly upon return movement of the lay-over plate 109 being overcome by the catch-flap 113, which functions in the manner of a ratchet.

The operator then grips the hand-grip 108 and, by swinging the lever 107 downwardly, lowers the head-plate 93 and shifts the punch-members 96 through the so interposed dough-sheet, thereby cutting out correspondingly shaped individual biscuit dough-bodies, pressing the same through the die-plate openings 91, and depositing the dough-bodies in neat row arrangement in the respective recipient underlying baking tray or pan 122 ready for baking, as shown in Figure 8.

At the same time, the transverse cutting blade 97 shears off the punched portion of the dough-sheet from the sheet proper, and then, as the hand-grip 108 is released, the counter-weight 105 swings the link 102 in reverse direction and causes the head-plate 93 to move upwardly to initial position.

Thereupon, the operator again depresses the pedal 83, swinging the lever 82 downwardly and again causing the lay-over plate 109 and the secondary conveyor 50 to move forwardly in the same manner as previously described. Upon this successive operation, however, the forwardly presented arcuate lip 110 of the lay-over plate 109 helps the operator to sweep the waste or residual portions of the previously punched dough portion forwardly over the apron 114 and through the chute 115 into the catch-box 116. When the pedal 83 is released, the lay-over plate 109 returns as before to its initial position, having deposited a successive portion of the dough-sheet upon the upper face of the die-plate 90 for successive biscuit or roll-forming operation.

Meanwhile, the previously successively filled pans or baking trays 122 are shifted from beneath the die-plate 90 by sliding the tray-board 119 outwardly over the extended portion of the auxiliary board 118 and manually removed for successive conventional bakery treatment. An empty baking tray 122 is placed in the positioning tray 121 and the tray board 119 shifted back into initial position, so that the empty baking tray 122 is brought into biscuit-receiving position beneath the die-plate openings 91.

During these successive biscuit or roll cutting and panning operations, the dough-sheet will be progressively moved toward the forward or cutting end of the machine, as previously described, by the successive movements of the secondary conveyor 50. By reason of the fact, however, that the sprocket 13 is connected by means of a roller friction clutch 13', this intermittent movement will not be transmitted to the primary conveyor 49 and the latter will remain stationary to permit the operator to form and place thereon a suitable successive dough portion. When the preceding dough-sheet has been completely cut and the secondary conveyor 50 is empty, the operator may again actuate the switch *s* and, in the manner previously described, feed the next succeeding dough-sheet forwardly onto the secondary conveyor 50. However, inasmuch as the sprocket 78 is connected to the shaft 45 by means of the

roller friction clutch 79, this forward movement of the conveyor 50 will not be transmitted to the links 73 and arm 75, and, therefore, the lay-over plate 109 will remain stationary.

The machine is thus entirely automatic in operation and fulfills in every respect the objects stated, and it should be understood that changes and modifications in the form, construction, arrangement, and combination of the several parts of the 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 biscuit machine including an apertured die-plate for receiving a substantially flat dough-sheet, a head-plate mounted for flatwise reciprocation over the die-plate, a series of spaced cylindrical open-bottom punch-members depending from said head-plate for corresponding removable projection into the apertures of the die-plate and through the interposed dough-sheet, each of said punch-members having adjacent its outer periphery an annular dough-engaging area disposed in a plane perpendicular to the longitudinal axis of said punch-member and means for reciprocating the head-plate and its carried punch-members.

2. A biscuit machine including, in combination, a table for supporting and conveying a dough sheet, a pair of spaced parallel links swingably mounted at their lower ends on the table and extending upwardly therefrom, a sheeting-drum journaled at its ends in and extending horizontally between the link in upwardly spaced relation to the table, and means mounted on the table and engageable with the links for swinging the links to any one of several different positions of adjustment and thereby shifting the drum toward and away from the table for correspondingly increasing and decreasing the distance between the under face of the drum and the upper face of the table and thereby varying the thickness of the dough sheet.

3. A biscuit machine including, in combination, a table for supporting and conveying a dough sheet, a pair of spaced parallel links swingably mounted at their lower ends on the table and extending upwardly therefrom, a sheeting-drum journaled at its ends in and extending horizontally between the link in upwardly spaced relation to the table, a bracket fixed on the table adjacent each of the links and having a pair of upstanding ears disposed respectively on opposite sides of the link, a rod shiftably mounted at one end in one of the ears and threadedly mounted at its other end in the other of said ears, and a swivel block mounted on the rod intermediate said ears and having a laterally extending pin slidably engaged in a slide formed longitudinally in the link for adjusting the position of the link and thereby shifting the roller toward and away from the table for varying the thickness of the dough sheet.

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