My invention relates to improvements in machines used in the preparation of macaroni or similar articles, and the like paste products.

3 Heretofore in machines of this class two separate containers have been used, connected by a crosspiece which turns about a vertical axis. While one container is under the plunger for packing in the dough, the other is under the plunger for expressing the dough through the die plate in the form of strings. Because of this construction of separate containers, usually circular in cross-section, an enormous machine and frame is required. One of the objects of my invention is to so construct the container as to permit of a comparatively small and compact machine. Instead of two separate containers, I use one container with two compartments separated by a wall. My compartments are preferably rectangular in cross section, resulting in a container, having both packing and expressing compartments which is no larger than one of the two containers used on the present types of machines. Because of this great reduction in weight and size my frame work is lighter and the machine occupies less floor space and is easier to operate.

Another object of my invention is the provision of automatic means for turning the container so as to bring the compartments into packing and expressing position, whenever the expressing plunger has emptied a compartment and returned to its upper position.

Machines in use at the present time are divided into two general types. In one type the container has the die plate attached to it in both packing and expressing positions, while in the second type, the container is removable from the die plate being in register with it only when in expressing position. In packing position, the container rests on a solid plate. In passing from packing to expressing position, the bottom of the container is open, often resulting in loss of dough. To overcome this, as my device is of the second type, I provide a crossbar over the center of the bottom of each compartment. The die plate is arranged with two sets of perforations, said bar coming over the land between the perforations when a compartment is in expressing position. I also provide a special flexible gasket construction to make a tight joint between the container and the die plate.

A further object of my invention is to provide means whereby one of the compartments can be efficiently cleaned while the other is being used under the expressing plunger. In order to accomplish this, the solid portion of the separable bottom is so constructed as to be moved independently of the die portion whereby it can be removed from the compartment in packing position.

A still further object of my invention is to provide improved means for automatically mounting the expressed dough in loops on a series of rods, automatically to cut the dough from the die plate and remove same to racks as well as to trim the loops to uniform length. One of the advantages of this automatic handling is that it eliminates the touching of the finished product by the hands of the operator.

Further objects and advantages will become evident upon a study of the description and the drawings in which:

Fig. 1 is an elevation of the machine;

Fig. 2 is a cross-section of the machine taken along the line 2—2 of Figs. 1 and 3;

Fig. 3 is a plan of the machine omitting the rod and conveyor mechanism at the bottom;

Fig. 4 is a horizontal section through the container; Fig. 5 is a partial section showing the gasket at the bottom of the container; Fig. 6 is a partial section taken along the line 6—6 of Fig. 3, showing the reversing mechanism for the packing plunger;

Fig. 7 is a cross-section taken along the line 7—7 of Fig. 3, Fig. 8, is an elevation taken along the line 8—8 of Fig. 3, Fig. 9 is a plan view of the control levers for reversing the expressing plunger taken along the line 9—9 of Fig. 10, and Fig. 10 is a section along the line 10—10 of Fig. 9.

The machine is supported on a base or frame 9 in which are mounted four vertical rods 10. Rods 10 support an upper frame 11 at their top.

The main drive shaft 15 is held in suitable bearings in brackets 12, 13 and 14 which in turn are supported by upper frame 11. Shaft 15 carries fixed upon it pulley 16 which is adapted to be driven by a belt from a source of power (not shown). Adjacent to
pulley 16 and loose upon shaft 15 is idler pulley 17 adapted to carry the belt when it is desired to stop the rotation of shaft 15.

Shaft 15, through mechanism to be described hereinafter, effects the reciprocation of packing plunger 18 and expressing plunger 19. Plungers 18 and 19 are adapted to operate in the compartments 20 and 21 of the container 22. Container 22 is preferably rectangular in cross section. Compartments 20 and 21 are also preferably rectangular. Container 22 is pivotally mounted on a vertical pivot 23, which is free to have vertical reciprocation. Pivot 23 operates at its lower end in a recess 24 in frame 11 while its upper end operates in hole 25 in frame 11. The lower end of pivot 23 has an enlarged diameter, so that when pivot 23 is raised, the shoulder formed by the enlargement raises container 22 with it. Pivot 23 carries fixed to it near its upper end an adjustable collar 26. Between the top of container 22 and the bottom of collar 26 a sleeve 27 loosely encircles pivot 23. Links 28 are pivotally fastened to sleeve 27 at their lower ends. The upper ends of links 28 are pivotally fastened to bell cranks 29. The upper ends of bell cranks 29 are pivotally mounted on a pin 30 mounted in frame 11. The other ends of bell cranks 29 are pivotally connected to links 31 which are in turn pivotally connected to lever 32. (One link 31 only is shown in Fig. 1.) The rotation of lever 32 about its pivot 33, which is mounted in frame 11 produces the raising and lowering of pivot 23 and with it container 22. When the bottom of lever 32 moves to the left (Fig. 1) bell cranks 29 and links 28 assume the dotted position shown, lifting up container 22. When the bottom of lever 32 moves out, container 22 drops down against the die plate 34. The bottom of compartments 20 and 21 are provided with a flexible gasket 35 of rubber or rubberized fabric or the like (Fig. 5) which is adapted to make a tight joint with die plate 34 when container 22 presses down against it.

The packing plunger 18 is operated by means of two screws 36 and 37 mounted in nuts 38 one of which is shown in Fig. 1. Nuts 38 are rotatably mounted in frame 11 but are fixed against axial motion. Nut 38 for screw 36 carries gear 39 fixed to it, while nut 38 for screw 37 carries gear 40 fixed to it. Gear 41 meshes with both gears 39 and 40. Gear 41 is fixed to shaft 42, which carries idler gear 43 and 44. Bevel gear 45, loose on shaft 47, meshes with bevel gear 44 and bevel gear 46 also loose on shaft 47, meshes with bevel gear 43. Bevel gears 45 and 46 are provided with clutch teeth on the inner faces of their hubs with which the clutch 48 feathered to shaft 47 is adapted to engage. Fork 49, which is fixed to rod 50, engages clutch 48. Rod 50 is slidably mounted in brackets 51 and 52 supported by frame 11. Rod 53 is also slidably mounted in brackets 51 and 52. Upright pieces 54 and 55 are fixed to rod 70 and are loosely mounted on rod 53. The upper ends of pieces 54 and 55 are adapted to engage with trip levers 56 and 57 which are pivotally mounted in brackets 51 and 52. Rod 53 carries dog 58 fixed to it. Between dog 58 and piece 54 on rod 53 is located spring 60. Similarly spring 59 lies between piece 55 and dog 58. The upper surface of dog 58 is beveled and adapted to contact with corresponding bevels on trip levers 56 and 57.

The function of the packing plunger mechanism just described is to drive at a fairly slow speed, the packing plunger 18 into the compartment beneath it, when clutch 48 is in engagement with bevel gear 45. Upon the throwing of clutch 48 into engagement with bevel gear 45, the rotation of screws 36 and 37 is reversed lifting the plunger 18 from the compartment, the lifting taking place at rapid speed. The difference in speed between the upstroke and downstroke of packing plunger 18 is obtained because the gear ratio between bevel gears 46 and 43 is different from the gear ratio between bevel gears 45 and 44. The location of clutch 48 is controlled by the position of lever 61 which is pivotally mounted on frame 11. A chain 63 connects lever 61 with the top of plunger 18. Cam rod 62 is pivotally connected to lever 61. Cam rod 62 passes through a friction bearing 64 which is adapted to hold cam rod 62 in various positions by friction, due to the pressure of spring 66. The upper end of cam rod 62 passes through cam follower 65 fixed to rod 53.

In order to start the downward stroke of packing plunger 18, lever 61 is raised, causing the bevel on cam rod 62 to push rod 53 (Fig. 6) to the right. This moves dog 58 against the beveled end of trip lever 56 thereby raising said lever and releasing piece 55 from lodgement against its shoulder, permitting the movement of rod 50 to the right. Before tripping trip lever 56, in its motion to the right dog 58 had compressed spring 59 against piece 55, so that upon the release of piece 55 from the shoulder of trip lever 56, piece 55 and with it rod 50 is shot to the right causing the engagement of clutch 48 with bevel gear 45. After at its upper end, bevel gear 45 has been in engagement with bevel gear 45 for a sufficient length of time, packing plunger 18 will cause chain 63 to be stretched taut, pulling down on lever 61. This causes the downward motion of cam rod 62, pulling dog 58 to the left, tripping trip lever 57 and releasing piece 54. Before the release of piece 54,
however, spring 60 had been compressed, so that upon said release, clutch 48 is shot into engagement with bevel gear 46, bringing up packing plunger 18 at a quick rate. Just before reaching the top of its stroke, packing plunger 18 comes into contact with lever 61, lifting cam rod 62. This returns dog 58 to its central position setting the trip levers 56 and 57 with pieces 54 and 55 against their shoulders and moving rod 50 so as to bring clutch 48 into its neutral position. With clutch 48 in its neutral position, packing plunger 18 is brought to rest. In order to start packing plunger 18 on its downward stroke again, rod 61 must be lifted.

Shaft 47 is driven by shaft 15 by means of the following mechanism. Fixed to shaft 15 is bevel gear 67 which meshes with bevel gear 68 loose on shaft 47. Shaft 47 carries collar 69 fixed upon it and sleeve 70 feathered upon it next to the hub of bevel gear 68. Between sleeve 69 and washer 70, spring 71 is compressed. The friction developed between sleeve 70 and the hub of bevel gear 68, drives shaft 47. The purpose of this friction drive is to prevent undue pressure being brought upon the dough by packing plunger 18. When this pressure exceeds a predetermined amount, bevel gear 68 rotates without turning shaft 47.

The mechanism for operating the expressing plunger 19 will now be described:—Shaft 15 carries clutch 72 feathered upon it. Clutch 72 has teeth only on its side facing the hub of gear 73 which is loose on shaft 15. The hub of gear 73 also has teeth upon it. Gear 73 meshes with gear 74 fixed upon shaft 75. Gear 76 is fixed to the end of shaft 15. Gear 77 meshes with gear 76 and gear 78 loose on shaft 75. Clutch 80 is feathered to shaft 75 and has teeth only on its side facing the hub of gear 78 which is also provided with teeth.

Worm 81 is fixed to shaft 75 and meshes with wormwheel 82 carried by vertical shaft 83. Pinion 84 is also fixed to vertical shaft 83 and meshes with gears 85 and 86. Gears 85 and 86 are fixed to nuts (not shown) rotatably mounted in frame 11 similar to nut 38 for screw 36 (Fig. 1). Gear 85 is fixed to the nut engaging screw 87 while gear 86 is fixed to the nut engaging screw 88. The rotation of these nuts is adapted to raise and lower screws 87 and 88 which carry expressing plunger 19 on their lower ends.

When clutch 80 is in engagement with gear 78 expressing plunger 19 is moved down at a comparatively slow rate, while with clutch 72 in engagement with gear 73 said plunger is raised at a rapid rate. This difference in speed is brought about by the difference in gear ratios between gears 73 and 74, and 76 and 78. The engagements of clutches 72 and 80 are automatically controlled by the motion of expressing plunger 19. In the position shown for expressing plunger 19 in Fig. 7, it is nearing the upper end of its stroke. Further motion upward causes it to push up on lever 89 which is pivoted to projecting piece 91 of frame 11. Pivotedly connected to the end of lever 89 is rack 90 adapted to slide up and down in guide 92 carried by frame 11. Rack 90 meshes with pinion 93 loose on short shaft 94. Shaft 94 also carries loose upon it a forked member 95 which is fixed to pinion 93. Pin 96 is mounted in the left prong (Fig. 7) of fork 95 and is normally held inward by plate spring 99. Pin 97 is mounted in the right prong of fork 95 and is normally held inward by plate spring 98. Pins 96 and 97 are adapted to bear against the sides of gear sector 100 fixed upon short shaft 94. Gear sector 100 meshes with gear sector 101 fixed to short shaft 102 suitably mounted in bracket 14. Short shaft 102 carries an arm 103 fixed at its end, which arm engages with pin 104 of clutch 72.

Short shaft 94 carries an arm 105 fixed at its end, which arm engages with pin 106 on clutch 80. As lever 89 is raised, rack 90 rotates pinion 93 causing pin 97 to press against the side of gear sector 100. When the pressure is great enough, sector 100 is turned to the left (Fig. 7) throwing clutch 80 into engagement with gear 78, at the same time releasing clutch 72 from gear 73, through its engagement with gear sector 101. The engagement of clutch 80 with gear 78 through the train of connections previously described, sends expressing plunger 19 down. When expressing plunger 19 nears the bottom of its stroke, it pulls chain 107 taut, pulling down lever 89. This causes rack 90 to rotate pinion 93 so as to throw the forked members 100 and 101 to the right (Fig. 7) disengaging clutch 80 and engaging clutch 72 with gear 78, whereupon expressing plunger 19 is caused to move up again until it strikes lever 89, when the cycle of operation is repeated again.

The action of the expressing plunger 19 can be stopped manually if desired so that it is brought to rest at the upper end of its stroke. Gear sector carries a projection 108 from its lower end. A spring catch 109 is mounted in projection 108. Spring catch 109 normally presses inward towards plate 110 carried by frame 11. The hole in projection 108 in which spring catch 109 is mounted is provided with a slot (not shown) into which lug 111 on spring catch 109 is adapted to fit. When spring catch 109 is pulled outward and rotated so that lug 111 does not come opposite said slot, the catch is held in its outward position against its normal spring pressure inward. As gear sector 100 and with it projection 109 are
rotated, spring catch 109 is carried past hole 112 in plate 110 without engaging it. If when expressing plunger 19 is on its upward stroke, spring catch 109 is so rotated manually that lug 111 slips into said slot in the hole of projection 105, spring catch 109 will press against plate 110. When spring catch 109 arrives opposite hole 112 as gear sector 100 is turned to the left, it will snap into hole 112, locking gear sector 100 and with it gear sector 101. Hole 112 is so located that this locking takes place when both clutches 73 and 80 are in neutral position, thus stopping the movement of expressing plunger 19 at the upper end of its stroke.

The mechanism for lifting container 22 was previously described. Now this mechanism is automatically actuated by expressing plunger 19 which will now be explained:--

The raising of screws 87 and 88 lifts plunger 19. To the top of screw 88 is fixed cap 113. Lever 32 carries roller 114 at its upper end. Roller 114 is adapted to bear on cap 113. As screw 88 rises, cap 113 pushes upward and sideways on roller 114 thereby rotating lever 32 about its pivot 33 and causing links 31 to be moved to the left (Fig. 1). This operates the toggle mechanism 28 and 29 causing it to lift container 22. When expressing plunger 19 and screw 88 move downward, the weight of container 22 causes it to return to its bottom position. In the position shown compartment 20 is the packing compartment. After it is filled with dough, container 22 must be rotated to bring compartment 20 under expressing plunger 19 and compartment 21 under packing plunger 18. Lever 32 carries at its lower end an electric contact brush 115. Attached to one of rods 10 is a bracket 116 which carries electrical contact pieces 117 and 118 suitably insulated from it. One terminal of motor 119 is connected to contact piece 117 by means of wire 120. The other terminal of said motor is connected by wire 121 to a source of electrical power (not shown). Wire 122 connects contact piece 118 to said source. As lever 32 is moved to lift container 22, brush 115 closes the circuit for an interval between contact pieces 117 and 118 causing motor 119 to run. Motor 119 is arranged to drive shaft 173 which carries worm wheel 175 and worm wheel 175 is arranged to drive shaft 173 which carries worm 174 fixed upon it. The drive connection between motor 119 and shaft 173 is a friction one (not shown) similar to that shown for driving shaft 47 by bevel gear 68, namely parts 60, 70 and 71 Figs. 2 and 3. In other words when there is more than a predetermined amount of resistance to the rotation of shaft 173, there is a slip between it and the rotor of the motor. Worm 174 is adapted to mesh with worm wheel 175 which is mounted on compartment 22 by means of angles 123. Angles 123 are rigidly fixed to worm wheel 175 by means of bolts 124. Bolts 124 are tightly screwed into the vertical legs of angles 123, their ends projecting into slots 126 in the walls of container 22. This construction permits of relative vertical motion between worm wheel 175 and container 22 while at the same time compelling container 22 to be rotated with worm wheel 175. Worm wheel 175 is prevented from having any vertical motion when container 22 is lifted, by means of four brackets 127 carried by rods 10. The space between each pair of brackets 127 is sufficient to permit the rotation of worm wheel 175.

The space between contacts 117 and 118 and the length of brush 115 are so arranged, that in interval motor 119 is kept running, it is sufficient to rotate container 22 approximately ninety degrees. As screw 88 continues to rise, the circuit between contact pieces 117 and 118 is broken, brush 115 being in contact with contact piece 118 only. On the return stroke of expressing plunger 119, lever 32 again causes brush 115 to close the circuit between contact pieces 117 and 118 for a sufficient interval of time to allow motor 119 to turn container 22 approximately another ninety degrees, bringing compartment 20 under expressing plunger 19 and compartment 21 under packing plunger 18. As it is practically impossible to predetermine the running of motor 119 so as to cause exactly ninety degrees of rotation for container 22, the contacts 117 and 118 and brush 115 are so arranged as to cause slightly more than ninety degrees rotation. In order to ensure the registration of container 22 with die plate 24 and packing plate 26, container 22 is provided at its lower end with two stop pins 129 (Fig. 1) adapted to work in slots 130 in frame 9. As container 22 is lowered the stop pins 129 enter slots 130. Stop pins 129 enter slots 130 before container 22 has reached its lowest position and before container 22 has completed its revolution. The slots 130 are of such length (not shown) that when container 22 has rotated one hundred and eighty degrees, stop pins 129 are brought against the end of said slots. As motor 119 continues to rotate it causes further rotation of container 22, the friction described above permits slipping between the rotor of motor 119 and shaft 173 until container 22 has reached its lowest position at which time brush 115 is only in contact with contact piece 117 breaking the circuit through motor 119.

If for any reason motor 119, should not respond to the closing of the circuits just described, expressing plunger 19 would not enter its compartment and might cause serious damage to the apparatus. To obviate this danger, the following mechanism is provided:--A lever 176 is pivotally...
mounted on bracket 178 carried by links 31 (Figs. 1, 3, 9 and 10). Lever 176 is formed with a crook at its end which rests slidably on a bend in lever 89. If container 32 is not turned properly so as to be in register with die plate 34 and packing plate 128, it is kept up from assuming its lowest position. In this condition, links 31 are kept to the left of the position shown in Fig. 1. Lever 176 normally just clears expressing plunger 19 (Fig. 9), but when links 31 are kept to the left, lever 176 comes under the right end of expressing plunger 19. As said plunger travels down, it presses downward upon lever 176 pulling downward on lever 89, which in turn pulls down rack 90 causing clutch 72 to be thrown into engagement with gear 73 and separating clutch 80 from gear 78 (Fig. 7). This causes expressing plunger 19 to be sent upwards, and until the machine is adjusted properly by the operator, every time expressing plunger 19 comes down against lever 176, said plunger is sent up again.

The bottoms of compartments 20 and 21 are provided with cross bars 131 (Fig. 2) extending from side to side of said compartments to prevent the dough from falling out while said compartments are lifted from packing plate 128 and turned into position over die plate 34.

In order to provide for the ready cleaning of compartments 20 and 21 while in packing position, packing plate 128 is made removable from container 22. Packing plate 128 is supported by links 132 which are pivotally connected to it. Links 132 are also pivotally connected to links 133 which in turn are pivotally mounted at their lower ends on frame 9. Pins 138 which connect links 132 and 133 project back into slots (not shown) in nuts 134 located on the threaded portions of shaft 135. Shaft 135 is mounted in frame 9 and its end carries handwheel 136.

This mounting permits rotation of shaft 135 but prevents any axial motion. When handwheel 136 is rotated, nuts 134 cause pins 138 to move in a substantially lateral direction causing links 132 and 133 to be at an angle with each other thereby pulling down packing plate 128 away from container 22.

Packing plate 128 is adapted to be guided in its up and down motion between frame 9 and guides 137 (Fig. 1).

Die plate 34 has its holes for the expression of the dough arranged in staggered order much the same as shown in Patent No. 608,373 to Mueller, so that the strings of dough when forced out by the action of expressing plunger 19, enter slots 139 and 140 in such manner that when they strike the inclined surfaces of said slots the strings will lay in a plane one touching the other. Further pressing by expressing plunger 19 causes the strings of dough to hang in vertical planes, one plane of strings hanging from slot 139 and the other from slot 140.

Die plate 34 can be removed and another die plate substituted therefor depending on the character and across section of the dough strings desired.

The mechanism for automatically mounting the dough strings on rods and for cutting them off from slots 139 and 140 and trimming said strings will now be described.

Fig. 2 shows one half of the mechanism, the other half it will be understood is similar. A number of rods 141 are mounted in a hopper consisting of channels 146 mounted on opposite sides of frame 9. One such channel 146 is shown in Figs. 1 and 2. Shaft 149 suitably mounted in bearings in frame 9, carries fixed near its outer end a pulley 161. Next to pulley 161 on shaft 149 is located idler pulley 162. The pulleys are adapted to be engaged by a belt (not shown) from a source of power. Sprocket wheels 147 are fixed to opposite sides of shaft 149. Chains 144 are carried by sprocket wheels 147. The other end of chains 144 mesh with sprocket wheels 153, one of which is seen in Fig. 2. Sprocket wheels 153 are fixed on short shafts 163 which in turn are suitably mounted in bearings in frames 160, one of which is seen in Fig. 2. Chains 144 carry dogs 145 at intervals along their length. Each short shaft 163 in addition to carrying a sprocket wheel 153 carries another sprocket wheel fixed upon it (not shown) with which chains 155 mesh. The other end of chains 155 mesh with sprocket wheels 164 which are fixed to short shafts 165 suitably mounted in frames 160. Each short shaft 165 carries fixed upon it a star wheel 157. In addition to the sprocket wheels already mentioned each short shaft 163 carries another sprocket wheel fixed upon it (not shown) with which chains 166 mesh. The other end of chains 166 mesh with sprocket wheels 167 fixed upon shaft 168 suitably supported in frames 160. Shaft 168 carries fixed to it, arms 169 on either side. A shear blade 158 is carried between arms 169 and is adapted to cooperate with the fixed shear blade 159 for trimming the dough strings.

Shaft 149 carries fixed upon it cam 148 adapted to engage with rollers 170 carried by bell cranks 150. Links 171 connect bell cranks 150 with levers 172. Springs 151 return bell cranks 150 and levers 172 after their stroke. Bell cranks 150 and links 172 carry shear blades 152 adapted to cooperate with fixed shear blades 153, carried by frame 9, to cut off the strings of dough from slots 139 and 140.

As chains 144 move, dogs 145 pick a rod 141 from hopper channels 146. As the dough strings issue from slots 139 and 140, 139...
they hang vertically at first. As rods 141 travel along, they engage the dough strings as shown by rods 142 and 143. At a predetermined moment, cam 148 lifts rollers 170 causing shear blades 152 and 153 to cut off the dough strings, causing them to hang in a loop over the rods as shown for rod 177. As rods 141 travel along, they reach star wheel 157. Such a rod is shown at 143 about 10 to be lifted by star wheel 157. As the rod is lifted its ends travel in curved guides 154. Rod 177 is such a rod having reached its topmost position on racks 156. When the rod is in the position shown for rod 172, the dough string is trimmed off as shear blade 158 is rotated past fixed shear blade 159.

In operating the machine, dough is loosely placed by hand in compartment 20 after which lever 62 is lifted, causing packing piston 18 to compress the dough in the compartment. When packing piston 18 has made its return stroke, due to the action of chain 63 pulling down lever 61 when packer 19 has reached its lowermost position, and is cleared of container 22, it comes to rest. In the position of the mechanism shown in Fig. 7, expressing plunger 19 is on its way up after having expressed the dough from compartment 21 from a previous packing. Further upward travel of plunger 19, lifts up on lever 89, causing clutch 80 to engage with gear 78. On its way up, expressing plunger 19 and its screw 88 with cap 113 fixed to its top, caused lever 32 to be rotated, operating the toggle mechanism, 28, 29 and 31 which raised container 22 clear of die plate 34 and packing plate 128. The circuit through motor 119 was closed by brush 115 contacting with contact pieces 117 and 118 causing container 22 to be revolved one-quarter turn. With clutch 80 in engagement with gear 78, expressing plunger 19 kept on its downward stroke. Cap 113 is lowered permitting lever 32 to be rotated, the circuit is again closed through motor 119 causing another quarter revolution to be given to container 22, bringing compartment 20 now under expressing plunger 19. In rotating from packing to expressing position, the dough in compartment 20 was kept from falling out by cross bar 131 at its bottom. Compartment 21 is provided with a similar bar 131. Further lowering of expressing plunger 19 releases the toggle mechanism 28, 29 and 31 permitting container 22 to settle by gravity on its bed. As expressing plunger 19 travels downward, the dough is expressed in strings through slots 139 and 140, and caught by rods 141 of the conveying mechanism, cut off and trimmed and finally mounted on rack 166. As expressing plunger 19 neared the bottom of its stroke it pulled down chain 107, throwing in the reverse mechanism, whereupon it was sent up on its return stroke. As the time required for expressing the dough is longer than that required for packing, the packing takes place in one compartment while the dough is being expressed from the other. There is always a new packed compartment ready and in position when expressing plunger 19 enters container 22 on its down stroke.

Whereas in my preferred form I use in connection with my automatic operating features, a unitary container having a pair of compartments for receiving the dough, I wish it to be understood that these features can be used also where two separate and distinct receptacles or containers connected by a cross piece are used, the latter construction being that of machines in use at present as noted on page 1 of this specification.

I claim:

1. In a mechanism of the character described, a unitary container having a plurality of compartments adapted to receive dough, a supporting frame within which said container is rotatably mounted, said frame comprising a plurality of uprights between which said compartments are adapted to remain for all their positions, a detachable bottom for said container comprising a die portion adapted to serve as a bottom for a compartment, means for successively bringing the compartments over said die portion and means for compressing the dough in the compartments when over said die portion for forcing the dough through the die.

2. In a mechanism of the character described, a unitary container having a pair of substantially oblong compartments, a long side of one compartment being parallel and substantially adjacent to a long side of the other compartment, a supporting frame within which said container is rotatably mounted, said frame comprising a plurality of uprights between which said compartments are adapted to remain for all their positions, a detachable bottom for said container comprising a die portion adapted to serve as a bottom for a compartment, means for successively bringing the compartments over said die portion, means for compressing the dough in the compartments when over said die portion for forcing the dough through the die, and mechanism for packing the dough in said compartments when in a position away from the die portion.

3. In a mechanism of the character described, a container having a plurality of compartments adapted to receive the dough, said container being suitably mounted to permit its rotation about an axis falling between said compartments, a detachable bottom for said container having a portion adapted to assist in packing the dough in a compartment and a die portion adapted to
1,627,397

have the dough pressed through it, said mounting further permitting said container to be reciprocated into contact with and away from said bottom, means for effecting said reciprocation, and means for effecting said rotation for interchanging the positions of the compartments relatively to the bottom, said reciprocating means being adapted automatically to actuate the rotational means when the container is away from said bottom.

4. In a mechanism of the character described, means for delivering dough strings simultaneously in substantially parallel hanging spaced rows, a plurality of rods, and an endless conveyor adapted to carry said rods in corresponding spaced relation against said strings, said rods being carried at a predetermined rate to the delivery of said strings.

5. In a mechanism of the character described, a die member having staggered perforations adapted to have the dough forced through them, guides arranged below the die member for receiving the resulting strings and directing same from some of said perforations into one hanging position and from other perforations into another hanging position, the strings from each group of perforations being arranged in a substantially straight row, the row from one group hanging substantially parallel to the row from the other group, a plurality of rods, a separate rod for each row, an endless conveyor adapted to carry said rods against said rows, the spacing of the rods bearing a predetermined relation to the spacing of said rows.

6. A mechanism as claimed in claim 5 in which the guides comprise oppositely inclined surfaces, a surface leading down from just below each group of perforations.

7. In a mechanism of the character described, a unitary container having a plurality of compartments adapted to receive dough, a supporting frame within which said container is rotatably mounted, said frame comprising a plurality of uprights between which said compartments are adapted to remain for all their positions, a detachable bottom for said container comprising a die portion adapted to serve as a bottom for a compartment, a wheel surrounding said container for successively bringing the compartments over said die portion, and means for compressing the dough in the compartments when over said die portion for forcing the dough through the die.

8. In a mechanism of the character described, means for producing a row of hanging strings of food paste, a plurality of rods, an endless conveyor for carrying along said rods, in spaced relation, substantially in a horizontal motion against the strings, and cutting off mechanism for cutting off the strings above the rods adapted to be actuated automatically when said rods have been moved a predetermined distance against said strings whereby the strings fall in loop-like form upon the rods.

9. In a mechanism as claimed in claim 8, a rack for holding said rods after they have received the strings, means for removing the rods from the conveyor and depositing them upon said rack, and trimming off means adapted to even off both the lower ends of the loops as said rows rest upon the rack.

10. In a mechanism of the character described, a container for receiving the dough, a detachable bottom for said container having a plurality of holes to serve as dies, mechanism for separating said container from said bottom and bringing them together again, a flexible gasket adapted to be compressed between the container and said bottom and means for compressing the dough in said container.

11. In a mechanism of the character described, a unitary container having a plurality of compartments adapted to receive the dough, a detachable bottom for said container, mechanism for lifting the container from said bottom, turning said container end to end while in lifted position and resting said container on said bottom when turned, a flexible gasket surrounding the lower edges of each compartment adapted to be compressed between said edges and said bottom and means for compressing the dough in said container.

12. In a mechanism of the character described, a container having a plurality of compartments adapted to receive the dough, means for compressing the dough in said compartments, a detachable bottom for said container having a solid portion to serve for packing and a portion provided with a plurality of holes to serve as dies, the solid portion adapted to serve as the bottom of one compartment while the die portion serves as the bottom of the other, means for interchanging the positions of said compartments over said portions and a flexible gasket surrounding the lower edges of each compartment, said bottom and said gasket being suitably constructed whereby only that gasket for the compartment over the die portion at any time is compressed between the container and said bottom.

13. In a mechanism of the character described, a container open at the bottom for receiving the dough, means for compressing the dough in said container, a detachable bottom for said container having a plurality of holes to serve as dies, another detachable bottom adapted to serve for packing, mechanism for separating said container from said bottom and changing its position relatively to them, a transverse member at the bottom of said container adapted to pre-
vent the packed in dough from falling out while being carried from the packing bottom to the die bottom, said member adapted when brought over the die bottom to come over a land portion provided between said die holes.

14. In a mechanism of the character described, a container having a plurality of compartments open at the bottom, a transverse member at the bottom of each compartment, a detachable bottom for said container having a portion constructed to serve for packing and a portion constructed to serve as a die, the packing portion serving as the bottom of one compartment while the die portion serves as the bottom of the other, means for compressing the dough in said compartments, and means for moving said container whereby the positions of its compartments are interchanged, the transverse member under the packed in dough at any time preventing said dough from falling out during the interchange.

15. In a mechanism of the character described, a container open at the bottom for receiving the dough, means for compressing the dough in said container, a detachable bottom for said container having a pair of sets of holes with a land portion between the sets, said bottom adapted to serve as a die, another detachable bottom adapted to serve for packing, mechanism for separating said container and changing its position relatively to them, a cross bar at the bottom of said container adapted to prevent the packed in dough from falling out while being carried from the packing bottom to the die bottom, said bar adapted when brought over the die bottom to come over the land portion provided between said sets of holes.

16. In a mechanism of the character described, a container having a plurality of compartments adapted to receive the dough, means for compressing the dough in said compartments, a detachable end for said container having a portion to serve for packing and a perforated portion to serve as a die, the packing portion adapted to come opposite one compartment while the die portion comes opposite the other compartment, means for reciprocating said container whereby the container is separated at intervals from said end and means for rotating said container adapted to interchange the position of the compartment with respect to said packing and die portions, said rotating means adapted automatically to be actuated when said container is separated from said end.

17. In a mechanism of the character described, a plurality of receptacles for receiving the dough, a packing plunger, an expressing plunger, one of said receptacles being adapted to be in line with the packing plunger while another is in line with the expressing plunger, means for rotating said receptacles under said plungers, mechanism for reciprocating the packing plunger and mechanism for reciprocating the expressing plunger, said rotating means being actuated in accordance with the motion of the expressing plunger, whereby said receptacles are caused to be rotated so as to interchange their positions under said plunger when said expressing plunger is in the withdrawn region of its stroke.

18. In a mechanism of the character described, a plurality of receptacles for receiving the dough, detachable ends for said receptacles, a packing plunger, an expressing plunger, one of said receptacles being adapted to be in line with the packing plunger while another is in line with the expressing plunger, mechanism for reciprocating the packing plunger, mechanism for reciprocating the expressing plunger and means for reciprocating said receptacles whereby they can be separated from said detachable ends, said means being actuated in accordance with the motion of the expressing plunger whereby said receptacles are separated from said ends when the expressing plunger is in the withdrawn region of its stroke.

19. In a mechanism of the character described, a container having a pair of compartments adapted to receive the dough, a detachable end for said container, a packing plunger, an expressing plunger, one of said compartments being adapted to be in line with the packing plunger while the other compartment is in line with the expressing plunger, mechanism for reciprocating the packing plunger, mechanism for reciprocating the expressing plunger, means for rotating said container under said plungers and means for reciprocating the container whereby it can be separated from said detachable end, said means for rotating and reciprocating the container being actuated in accordance with the motion of the expressing plunger whereby the container is separated from the detachable end and rotated so as to interchange the positions of its compartments under the plungers when the expressing plunger is in the withdrawn region of its stroke.

20. In a mechanism of the character described, a plurality of receptacles for receiving the dough, a packing plunger, an expressing plunger, one of said receptacles being adapted to be in line with the packing plunger while another is in line with the expressing plunger, electrically controlled means for rotating said receptacles under said plunger, mechanism for reciprocating the packing plunger and mechanism for reciprocating the expressing plunger, mechanism, actuated in accordance
with the motion of said expressing plunger, being adapted to control the transmission of electricity through said receptacles rotating means whereby said receptacles are caused to be rotated so as to interchange their positions under said plungers when said expressing plunger is in the withdrawn region of its stroke.

21. In a mechanism of the character described, a plurality of receptacles for receiving the dough, an expressing plunger, mechanism for causing continuous reciprocation of said plunger and mechanism for moving said receptacles suitably constructed whereby as said plunger is caused to reciprocate, said receptacles are successively and repeatedly brought in the line of reciprocation of said plunger.

22. In a mechanism of the character described, a plurality of receptacles for receiving the dough, an expressing plunger, mechanism for causing continuous reciprocation of said plunger, mechanism for moving said receptacles suitably constructed whereby as said plunger is caused to reciprocate, said receptacles are successively and repeatedly brought in the line of reciprocation of said plunger and manually set means for stopping said reciprocation adapted to stop said reciprocation only when said plunger is clear of said receptacles.

23. In a mechanism of the character described, a container having a pair of compartments adapted to receive the dough, an expressing plunger, mechanism for causing continuous reciprocation of said plunger and mechanism for rotating said container whereby as said plunger is caused to reciprocate, said compartments are alternately brought in the line of reciprocation of said plunger.

24. In a mechanism of the character described, a plurality of receptacles for receiving the dough, an expressing plunger adapted to reciprocate in said receptacles, mechanism for moving said receptacles whereby they are automatically brought in turn in the line of reciprocation of said plunger, mechanism for effecting the stroke of said plunger into said receptacles and mechanism for effecting the withdrawal stroke of said plunger, said withdrawal mechanism being actuated when the plunger arrives in the region of the end of its stroke in the receptacles, while the mechanism for the in-stroke becomes actuated when said plunger arrives in the region of the end of its withdrawal stroke, said withdrawal mechanism being suitably constructed to move the plunger at a faster rate than the mechanism for moving the plunger into the receptacles.

25. In a mechanism of the character described, a plurality of receptacles for receiving the dough, an expressing plunger, mechanism for causing continuous reciprocation of said plunger, mechanism for moving said receptacles suitably constructed whereby as said plunger is caused to reciprocate, said receptacles are successively and repeatedly set in the line of reciprocation of said plunger, said setting taking place while said plunger is clear of the receptacles, and mechanism adapted to stop the stroke of said plunger before entering a receptacle, should said receptacle be not properly set in the line of its reciprocation.

26. In a mechanism of the character described, a container suitably mounted to permit its rotation, having a plurality of compartments adapted to receive the dough, an expressing plunger, mechanism for causing continuous reciprocation of said plunger, an electric motor for intermittently rotating said container whereby said compartments are successively set in the line of reciprocation of said plunger and mechanism suitably constructed to cause said motor to be energized when said expressing plunger is out of a compartment.

27. In a mechanism of the character described, means for delivering dough strings simultaneously in substantially parallel hanging spaced rows, a plurality of rods, an endless conveyor adapted to carry said rods against said strings, a rod for each row and means for cutting off said strings as they issue adapted to be actuated in timed relation to the rate of travel of said rods.

28. In a mechanism of the character described, means for delivering dough strings simultaneously in substantially parallel hanging spaced rows, a plurality of rods, an endless conveyor adapted to carry said rods substantially horizontally against said rows at intervals bearing a predetermined relation to the spacing of said rows, said rods being adapted to support said product in loop-like form.

29. In a mechanism of the character described, means for delivering dough strings simultaneously in substantially parallel hanging spaced rows, a plurality of rods, an endless conveyor adapted to carry said rods in spaced relation, said rods as they are carried along, adapted to move substantially horizontally against said strings and support the latter in loop-like form, mechanism for cutting off the upper ends of the strings permitting them to fall in loops over the rods and means for trimming off the loops at intervals bearing a predetermined relation to the motion of said conveyor.

CARMINE SURICO.