Jan. 18, 1927. 1,614,960

C. E. JOHNSON ET AL

RECEPTACLE FORMING AND FILLING MACHINE

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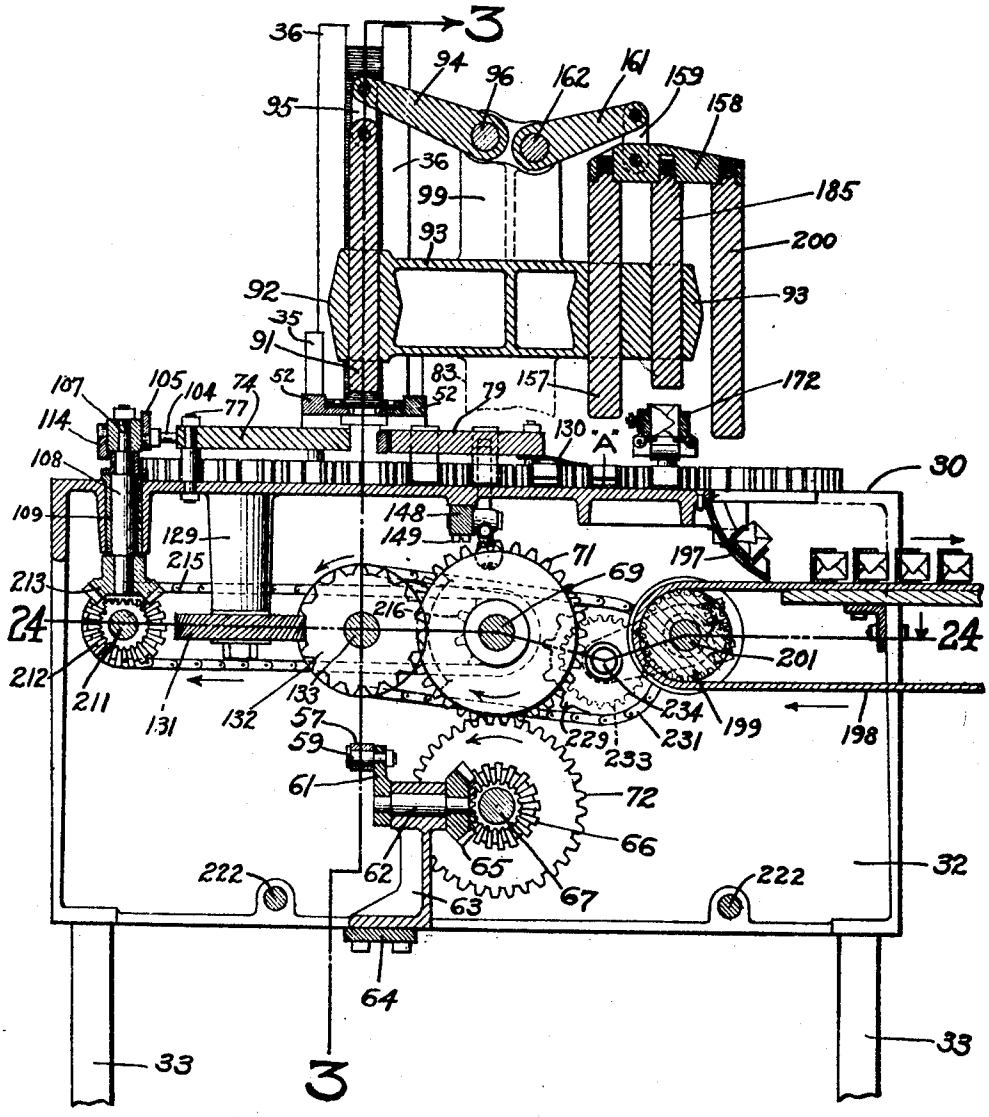


FIG. 1

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RECEPTACLE FORMING AND FILLING MACHINE

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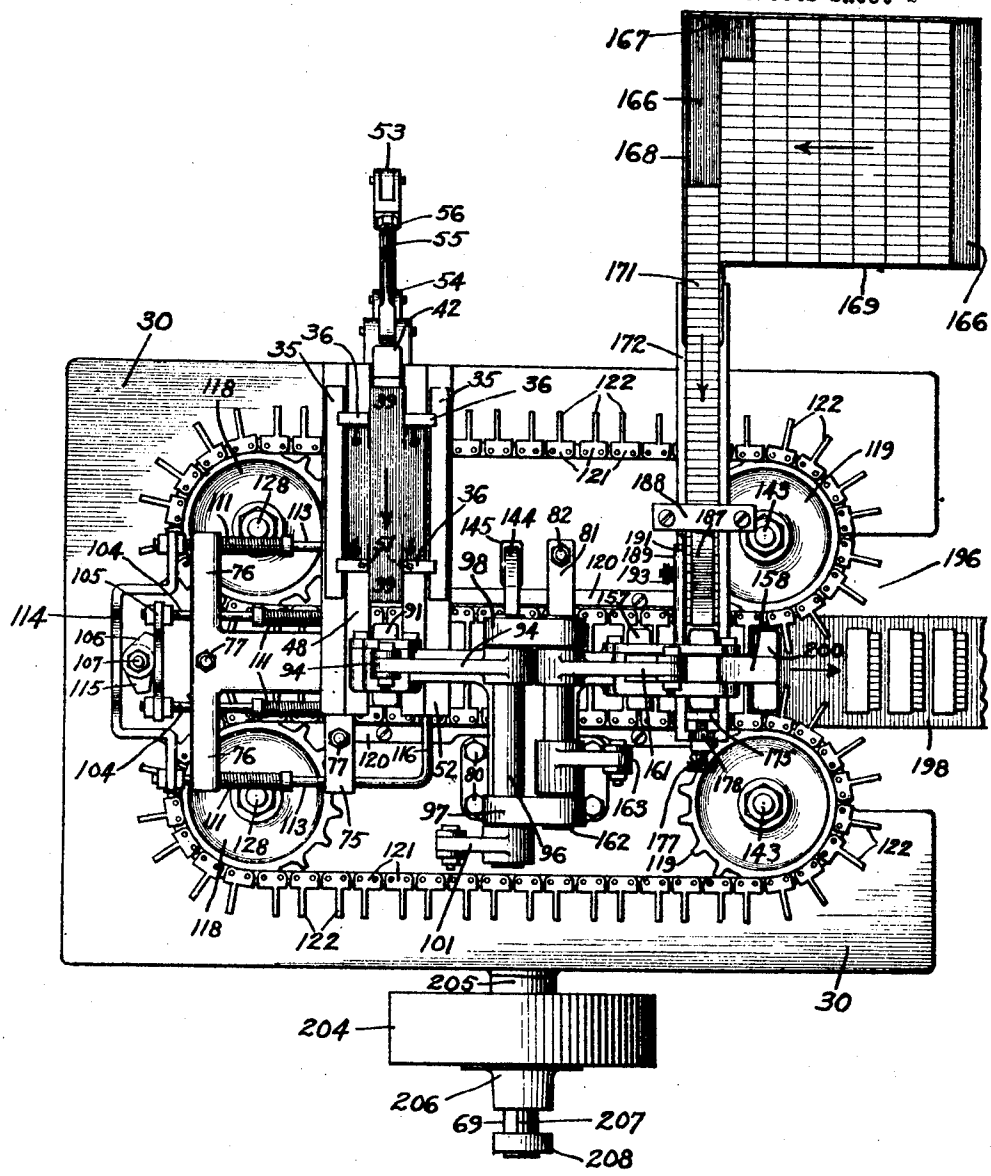


FIG. 2

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RECEPTACLE FORMING AND FILLING MACHINE

Filed Dec. 18, 1924 11 Sheets-Sheet 3

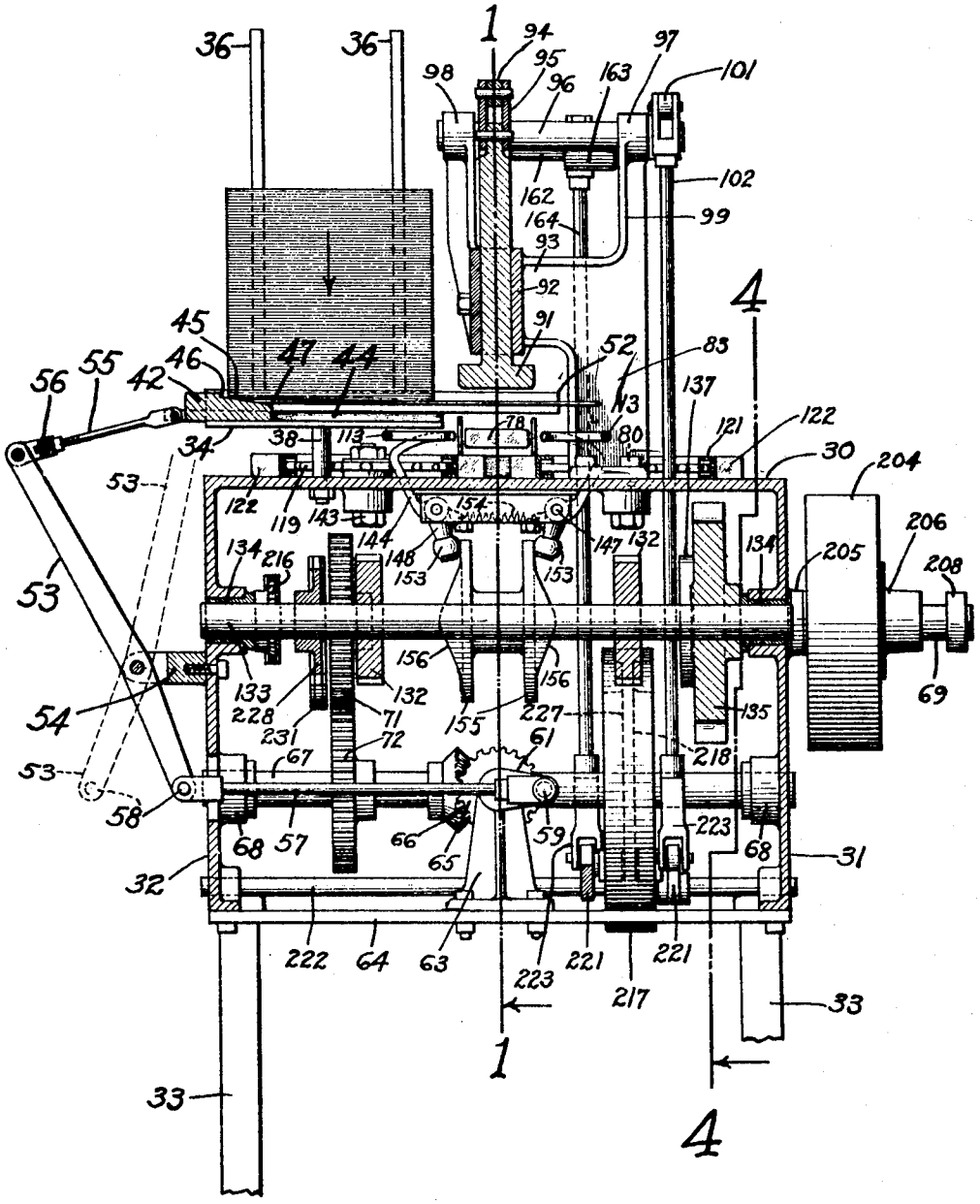


FIG. 3

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RECEPTACLE FORMING AND FILLING MACHINE

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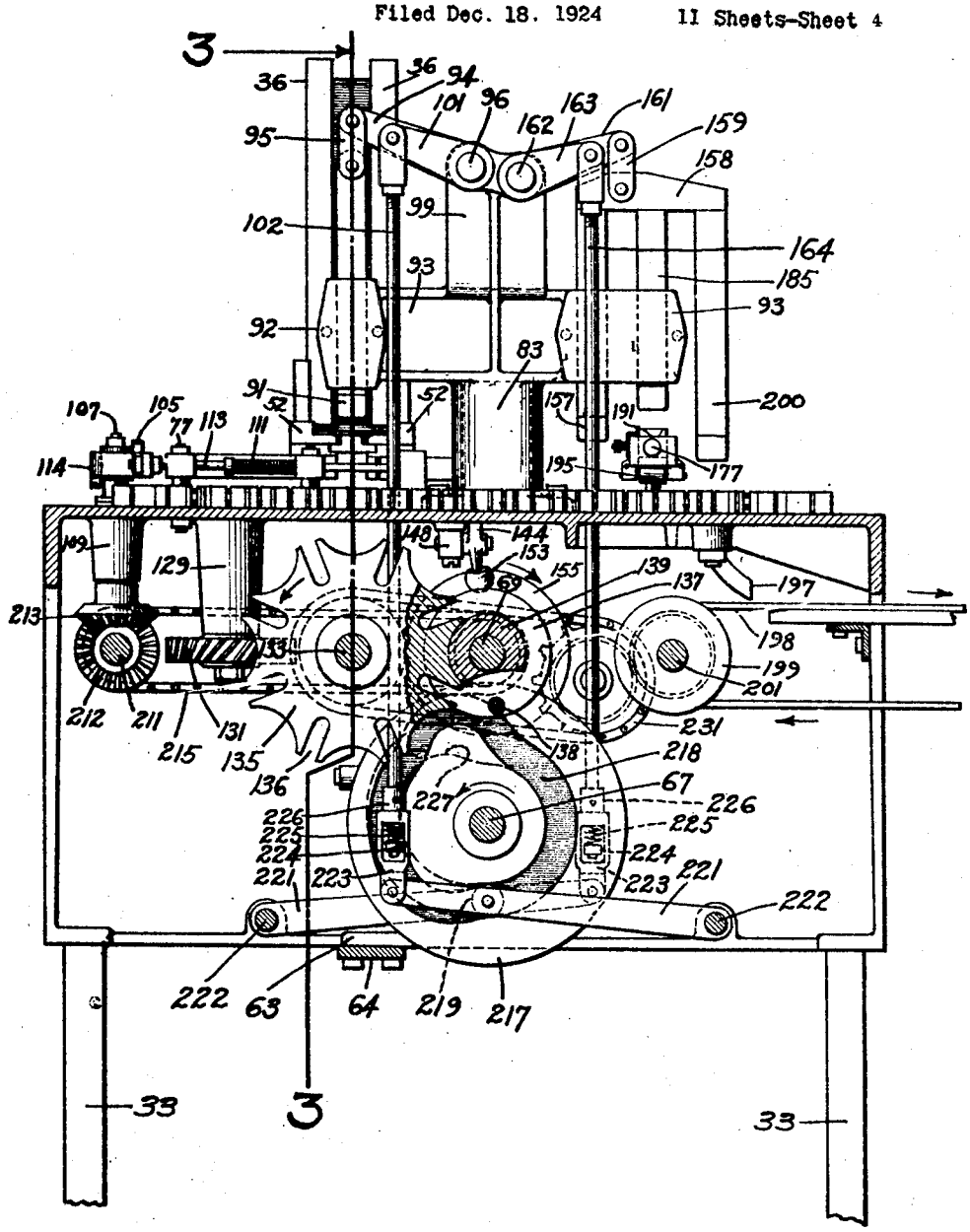


FIG. 4

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RECEPTACLE FORMING AND FILLING MACHINE

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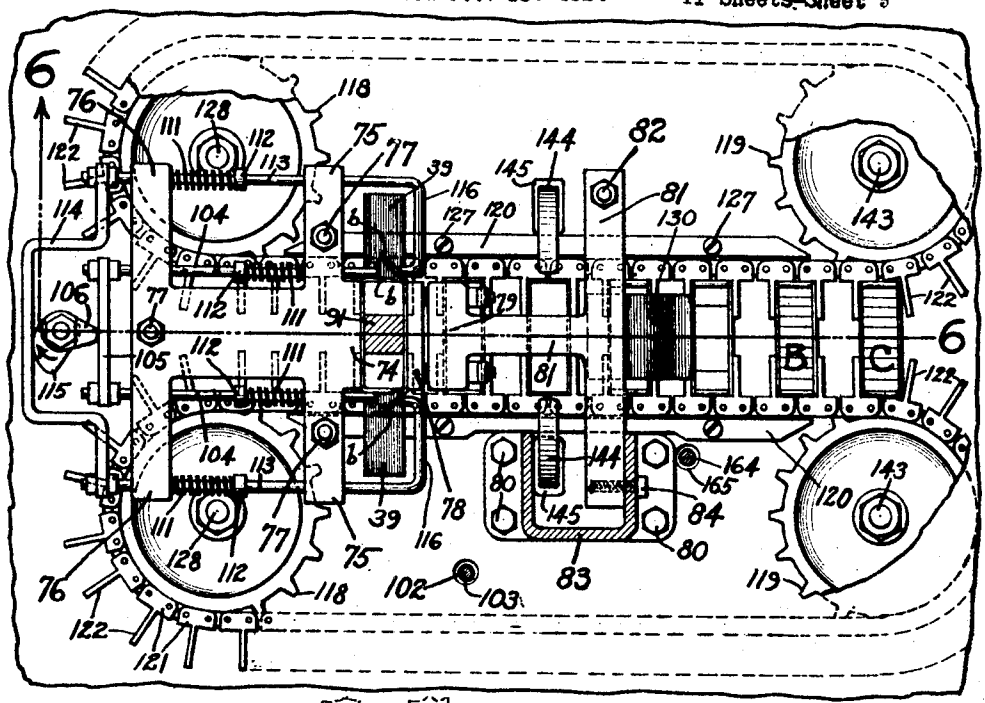


FIG. 5

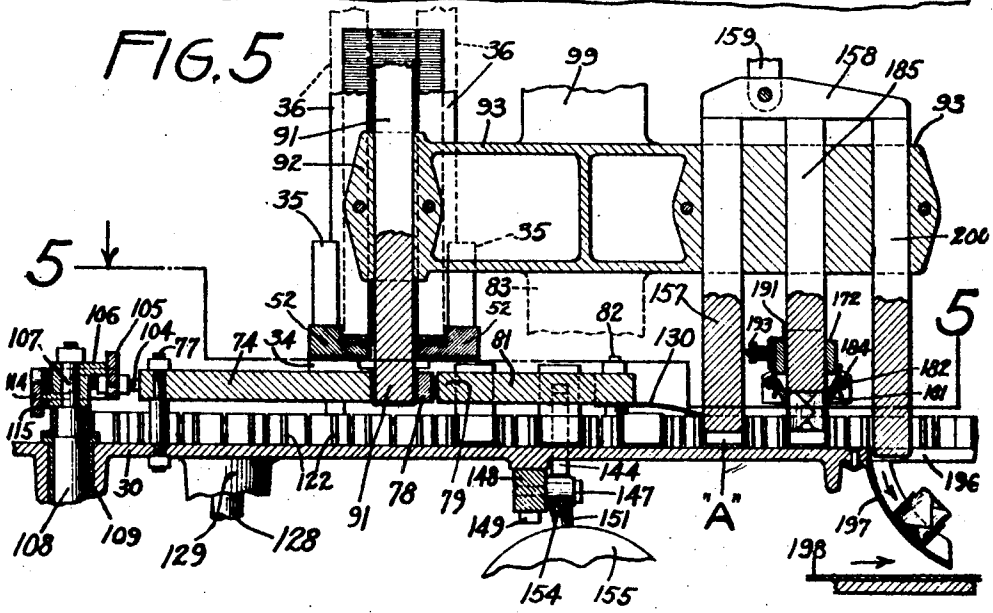


FIG. 6

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RECEPTACLE FORMING AND FILLING MACHINE

Filed Dec. 18. 1924 11 Sheets-Sheet 6

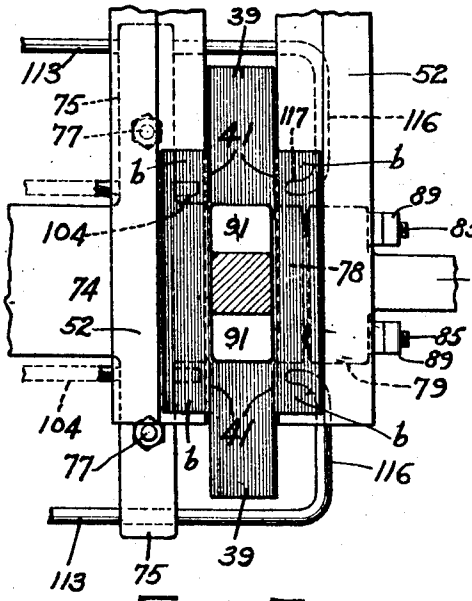


FIG. 7

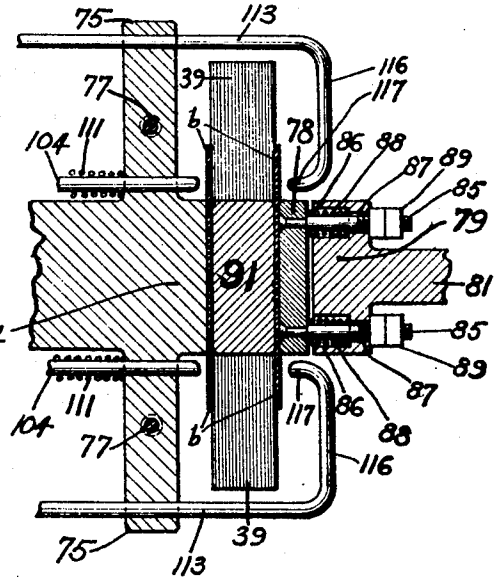


FIG. 8

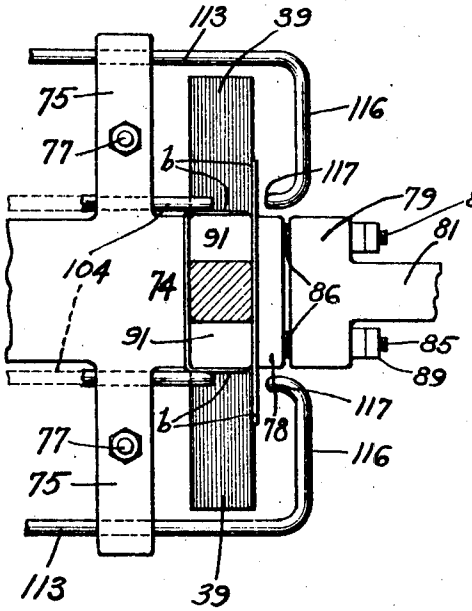


FIG. 9

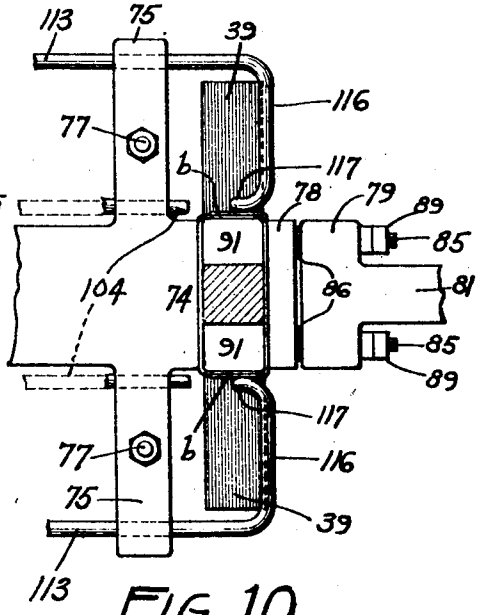


FIG. 10

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RECEPTACLE FORMING AND FILLING MACHINE

Filed Dec. 18, 1924 11 Sheets-Sheet 7

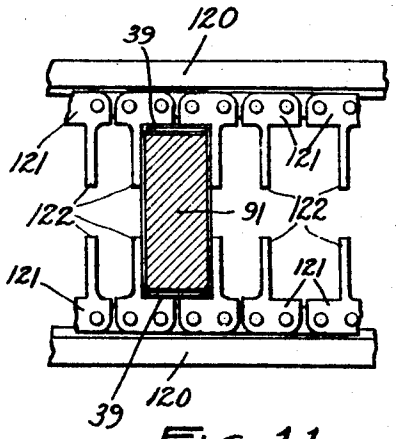


FIG. 11

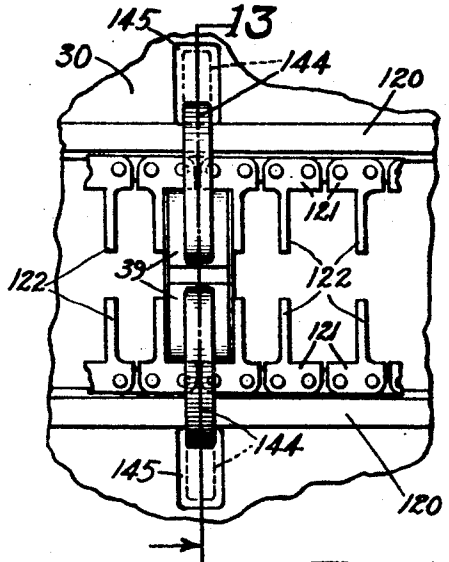


FIG. 12

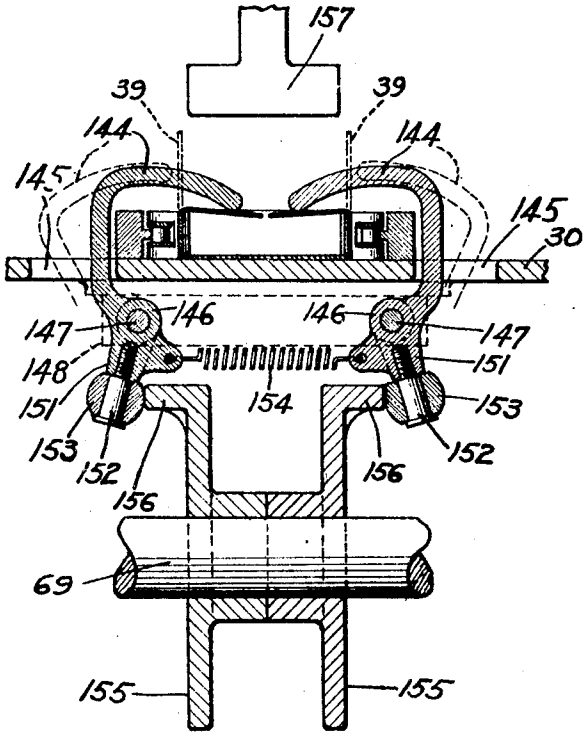


FIG. 13

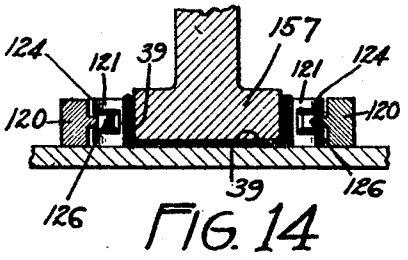


FIG. 14

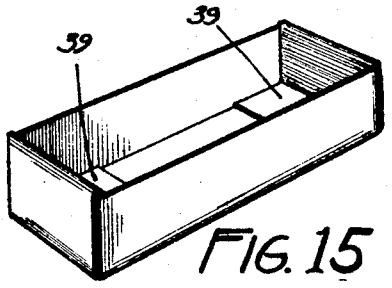


FIG. 15

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RECEPTACLE FORMING AND FILLING MACHINE

Filed Dec. 18. 1924 11 Sheets-Sheet 8

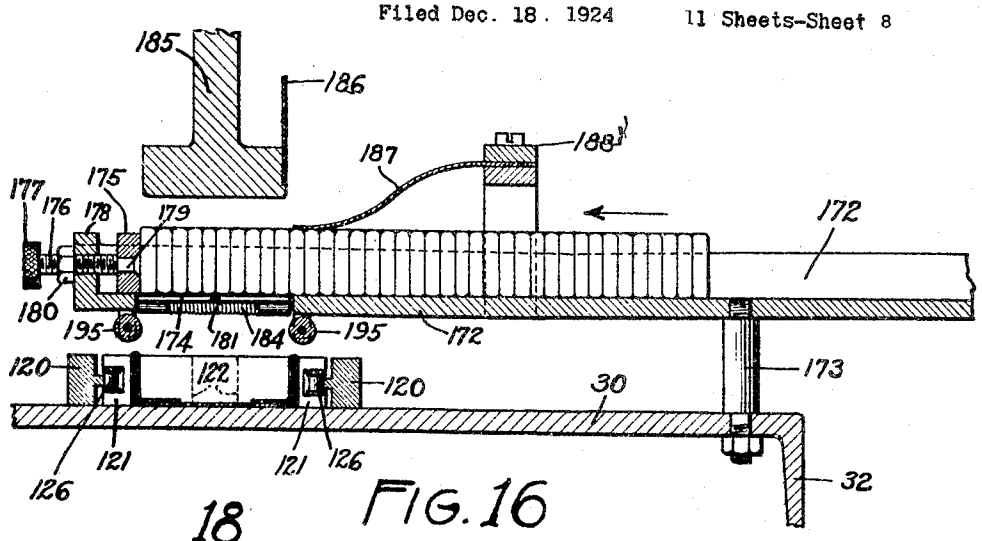


FIG. 16

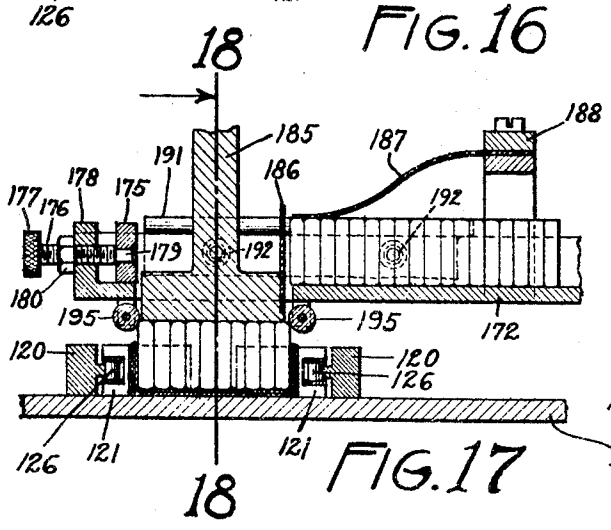


FIG. 17

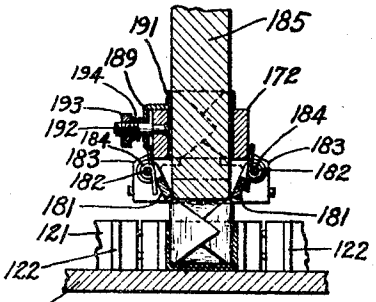


FIG. 18

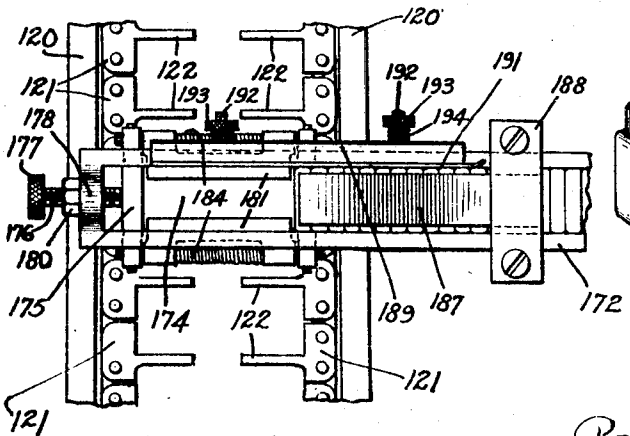


FIG. 19

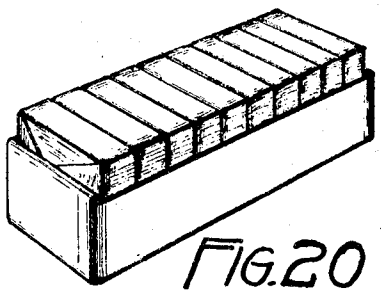


FIG. 20

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C. E. JOHNSON ET AL

RECEPTACLE FORMING AND FILLING MACHINE

Filed Dec. 18, 1924 11 Sheets Sheet 9

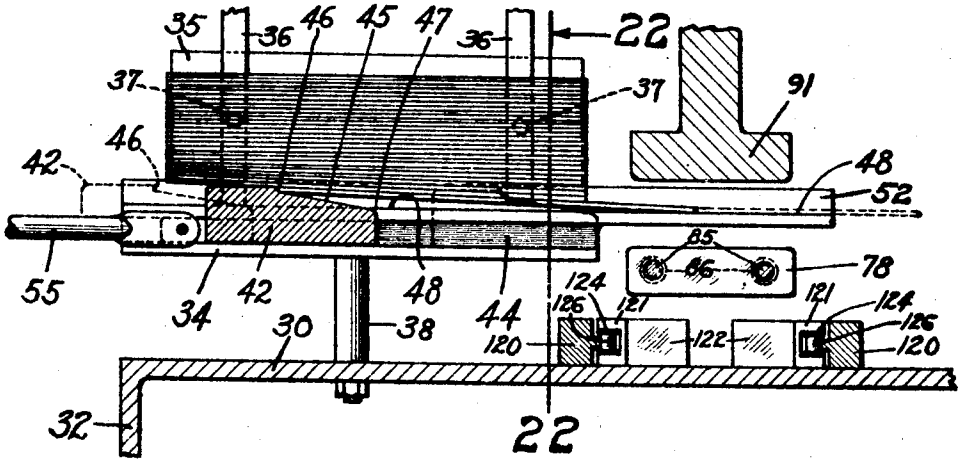


FIG. 21

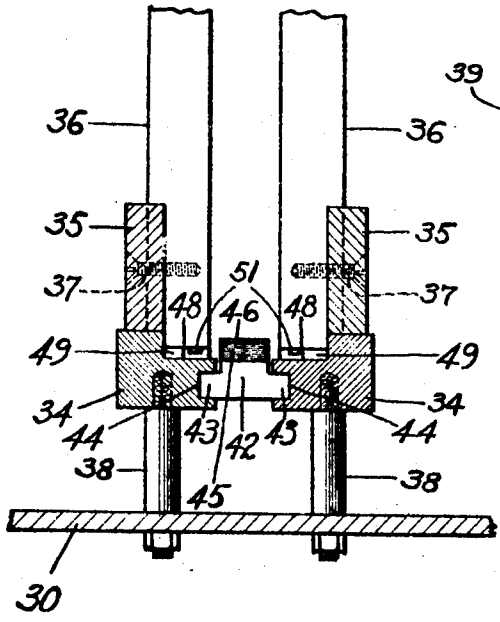


FIG. 22

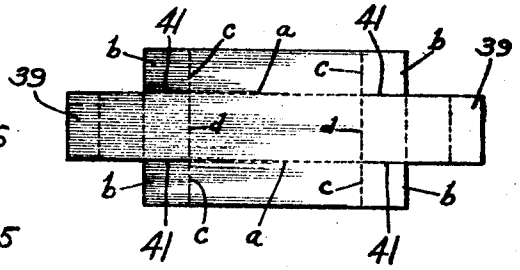


FIG. 23

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RECEPTACLE FORMING AND FILLING MACHINE

Filed Dec. 18, 1924 11 Sheets-Sheet 10

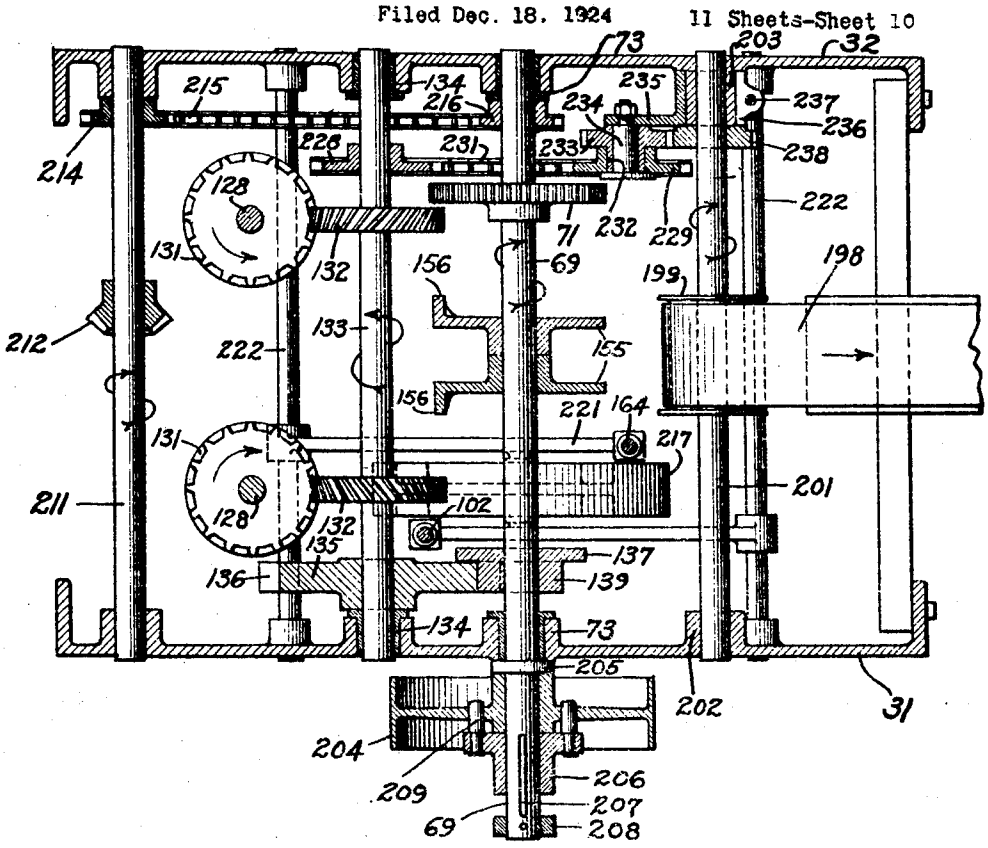


FIG. 24

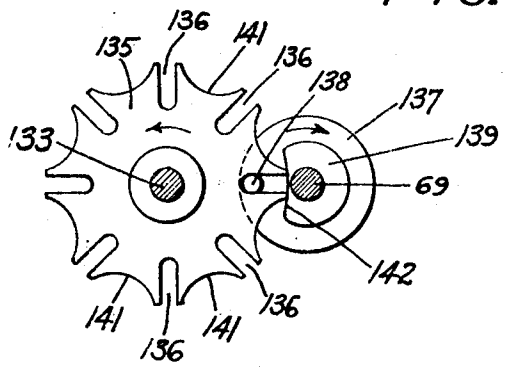


FIG. 25

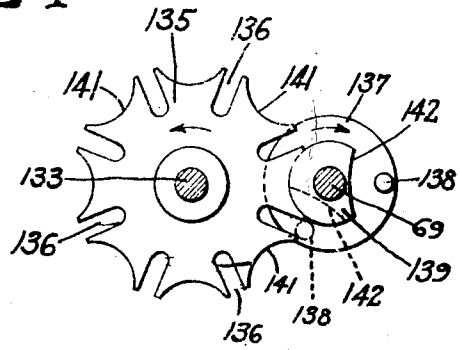


FIG. 26

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RECEPTACLE FORMING AND FILLING MACHINE

Filed Dec. 18. 1924 11 Sheets-Sheet 11

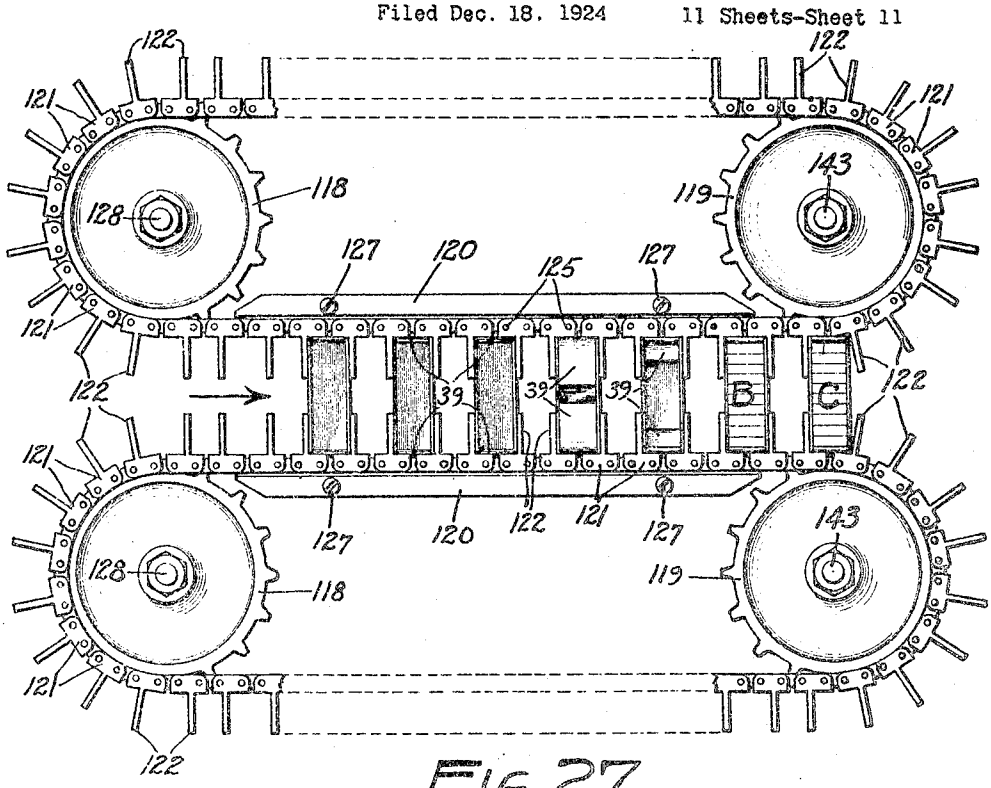


FIG. 27

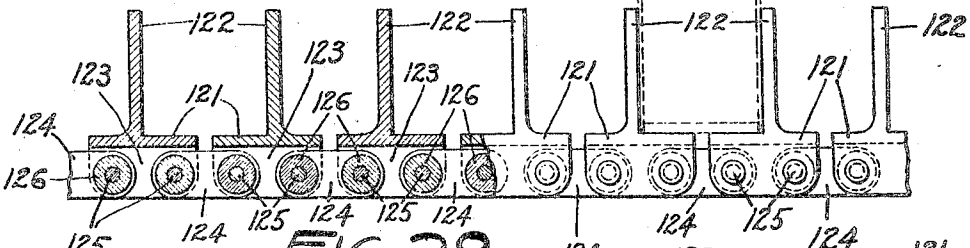


FIG. 28

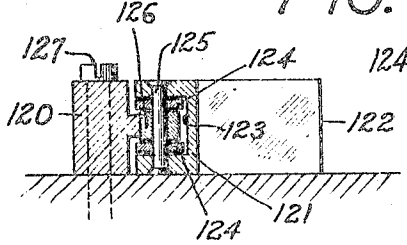


FIG. 29

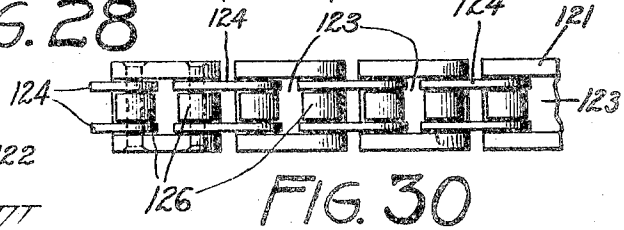


FIG. 30

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Patented Jan. 18, 1927. 1,614,960

UNITED STATES PATENT OFFICE.

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RECEPTACLE FORMING AND FILLING MACHINE.

Application filed December 18, 1924. Serial No. 756,726.

This invention relates to improvements in machines particularly designed for forming, from prepared blanks or sheets of material, open receptacles or cartons, and filling or packing such receptacles with articles. The invention more particularly relates to such machines designed for use in candy factories to produce the receptacles, and to pack a predetermined number of pieces or units of candy therein, such candy usually being wrapped in thin sheets of paper before being delivered to the machine.

In the manufacture of certain kinds of candy it has been found desirable, to facilitate handling in storage, and for display in vending, to pack the candy in small paper receptacles or cartons, a predetermined number of pieces or units being usually packed in each receptacle. The candy to be thus packed is cut in small pieces, preferably rectangular in form, each piece being usually wrapped in a thin sheet of paper to render it sanitary. The cutting and wrapping of the material or candy, as above described, is usually accomplished by automatic machinery and forms no part of the present invention.

By present methods, after the candy has thus been wrapped or prepared for packing, it is distributed upon one or more packing tables where it is manually packed into open receptacles, usually by girls employed for that particular purpose. The receptacles are delivered to the packers in the form of blanks which must be manually folded and formed before the candy or other articles can be placed therein. This method of packing candy repuires considerable time and labor, resulting in an increase in the cost of manufacturing. It is, therefore, desirable that means be provided whereby the receptacles may be mechanically folded and formed and the candy packed therein, thereby dispensing with the manual labor heretofore required in preparing the candy or articles for final distribution, with a resultant decrease in the cost of production.

By the employment of the novel receptacle forming and filling machine of our invention the blanks are mechanically and automatically folded and the receptacles filled or packed with a predetermined number of candy units. The candy filled receptacles are then successively delivered onto a moving belt or conveyor from which they may readily be removed and placed in shipping boxes to facilitate handling in storage and transit.

Broadly, the machine comprises a holder in which a plurality of receptacle blanks are stacked, and from which the blanks are successively fed to forming and intermittently moving chain dies. As the receptacle blank travels through the machine the various operations of folding the sides and ends thereof to form a receptacle are progressively performed, and as the completed receptacle nears the discharge end of the machine it is automatically filled or packed with a plurality of candy pieces or units, and finally discharged onto a traveling belt or conveyor, as hereinbefore stated.

The object of this invention, therefore, is to provide an improved receptacle-forming and filling machine of simple and practical construction, which will be positive and efficient in performance.

Other objects of the invention will appear from the following description taken in connection with the accompanying drawings.

In the drawings we disclose a structure designed to carry out the various objects of the invention, but it is to be understood that the invention is not confined to the exact features shown, as various changes may be made within the scope of the claims which follow.

In the accompanying drawings forming part of this specification—

Figure 1 is a longitudinal sectional view on line 1—1 of Figure 3, showing the receptacle-forming and filling plunger in raised or inoperative position;

Figure 2 is a plan view of Figure 1 showing the preferred method of feeding the material to the packing plunger and die;

Figure 3 is a transverse sectional view on the line 3—3 of Figure 4, illustrating the feeding of the receptacle blanks to the forming dies;

Figure 4 is a view in longitudinal section on the line 4—4 of Figure 3, showing the means provided for intermittently driving the movable chain die;

Figure 5 is a detail sectional plan on the line 5—5 of Figure 6, showing the receptacle-forming plungers and dies;

Figure 6 is a view in longitudinal section

on the line 6—6 of Figure 5, showing the plungers partially depressed to form a receptacle and also showing how the material is packed into the receptacles and subsequently discharged from the machine;

Figures 7, 8, 9 and 10 are enlarged detail views to show the different operations of forming the side and ends of the receptacles;

Figure 11 is a detail plan view of a portion of the movable chain showing how the partially completed receptacle is forced into the movable chain die;

Figure 12 is a similar view but showing the means provided for inwardly folding the ends of the receptacle blank;

Figure 13 is a sectional view on the line 13—13 of Figure 12;

Figure 14 is a sectional view showing the final operation of forming the receptacle;

Figure 15 is a perspective view of a completed receptacle;

Figures 16 and 17 are sectional views showing how the material is fed over the completed receptacle and is downwardly forced thereinto;

Figure 18 is a sectional view on the line 18—18 of Figure 17, showing the yieldable means provided on the discharge end of the material feed chute to retain the material therein until downwardly forced by the packing plunger;

Figure 19 is a detail plan view of Figure 17;

Figure 20 is a perspective view of a filled receptacle;

Figure 21 is an enlarged detail view showing the receptacle blank holder, and also showing the means provided for successively feeding the blanks therefrom to the forming dies;

Figure 22 is a cross-sectional view on the line 22—22 of Figure 21;

Figure 23 is a view showing the form of blank used in the formation of the type of receptacle here shown;

Figure 24 is a sectional plan on the line 24—24 of Figure 1 to show the driving mechanism of the machine;

Figures 25 and 26 are detail views showing the operation of the mechanism provided for intermittently actuating the movable chain dies; and

Figures 27, 28, 29 and 30 are detail views showing the construction of the movable chain dies.

Machine frame.

The frame of this novel receptacle-forming and filling machine is preferably constructed of cast metal, and comprises a top plate 30, and the front and rear walls 31 and 32, respectively, as shown in Figures 1 and 3. The two ends of the frame and also the bottom are preferably open, as shown, so that access may be had to the driving mechanism mounted therein. Suitable legs 33 may also be provided for supporting the frame, or, if desired, these legs may be eliminated and the frame secured to a table or other supporting means.

Receptacle blank feeding mechanism.

The means provided for holding and feeding the blanks from which the receptacles or cartons are formed, preferably consists of a holder or rack secured to the upper surface of the top plate 30 of the frame adjacent one end thereof, as shown in Figures 2 and 3. As shown in Figures 21 and 22, this holder or rack comprises a pair of rails 34 having wall members 35 secured to the upper portions thereof and to which a plurality of upright guides 36 are secured by such means as the screws or bolts 37. The rails 34 are supported upon the frame top 30 by means of shouldered studs 38 as shown.

The form of blank used to make the type of receptacle shown in the drawings is represented in Figure 23. As here shown the main body of the blank is preferably rectangular in form and each end is provided with an outwardly extending central end-portion 39. A slit or cut 41 is preferably provided on each side of the central end-portions 39 and these slits extend into the body of the blank a distance substantially equal to the height of the walls of the receptacle when finished. The blanks may also be scored as indicated by the dotted lines in Figure 23 so that the material may more readily be bent in the formation of the receptacle, as will hereinafter be described. In the actual operation of the machine, however, it has been found unnecessary to score the blanks to facilitate bending, it being necessary only to provide the slits 41 as shown.

Before starting the machine, the blank holder is filled with blanks as shown in Figures 2, 3 and 21. When the blanks are thus placed in the holder, it will be seen, by reference to Figure 2 that the central end-portions 39 of the blanks will be fitted between the opposed edges of the upright guides 36 and will outwardly project therebeyond. When thus positioned, the ends or corners of the main body of the blank will also be fitted between the sides of the guides 36 thereby preventing the blanks from longitudinal or transverse movement, but allowing them to downwardly travel, as indicated by the arrow in Figure 3, to the feed slide as they are successively fed from the bottom of the stack to the receptacle-forming plungers and dies. The feed slide preferably consists of a block 42 having oppositely extending tongues 43 provided thereon which are adapted to slide in grooved guides 44 formed in the inner

faces of the two opposed rails 34, as particularly shown in Figure 22. The upper portion of the feed block 42 is provided with an inclined face 45 terminating in a shoulder 46 adjacent the central upper portion thereof. The lower corner 47 of the inclined face 45 preferably extends slightly below the recessed faces 48 of the rails 34, which faces form the lower support for the blanks when the feed slide 42 is in its inoperative position, as shown in full lines in Figure 3 and dotted lines in Figure 21 (left hand side of the figure).

The two upright guides 36, adjacent the discharge end of the blank holder, preferably terminate short of the recessed faces 48 of the rails 34 so as to provide a gap 49 between the lower ends thereof and the faces 48 through which the blanks may be fed, one at a time, to the forming dies. The gap 49 must necessarily be slightly wider than the thickness of the material from which the blanks are made in order that but one blank may be fed therethrough at a time. In order that this gap may be varied or adjusted to suit the thickness of the blanks, pins 51 are preferably provided in the lower faces of the two upright guides 36 adjacent the discharge end of the blank holder as shown in Figure 22. By varying the length of these pins, the gap between the ends thereof and the faces 48 may be adjusted to allow but one blank to be fed therebetween, and over the forming dies at each forward movement of the feed slide or block 42. If the pins 51 are eliminated, the lower ends of the guides 36 must be so adjusted and spaced from the faces 48 as to allow but one blank to pass therebetween. If desired means may be provided for adjusting the width of the gap 49 to the thickness of the blank material. Such an adjustment may be provided by vertically moving the guides 36 in the wall members 35 of the blank holders. The lower ends of the upright guides 36 at the opposite end of the blank holder are preferably seated upon the faces 48 of the rails 34 so as to prevent any one of the blanks from being backwardly drawn with the feed block 42 on its return stroke. The rails 34 are preferably provided with forwardly extending end-portions 52, as shown in Figure 21, to furnish a support for the blanks when fed over the forming dies, as indicated by the dotted lines in the same figure.

The means provided for reciprocally actuating feed block 42 preferably consists in the provision of an oscillating arm 53, pivotally mounted in a forked bracket 54 secured to the rear wall 32 of the frame. (Figures 2 and 3). A connecting rod 55 connects the upper end of the oscillating arm 53 with the feed block 42 so that oscillation of the arm will impart a reciprocal movement to the feed block 42. The connecting rod 55 is preferably provided with means for adjusting its length, as indicated at 56, so as to properly position the feed block 42 with relation to the blanks. A connecting rod 57 has one end connected, by means of a pin 58, to the lower end of the arm 53 and the other end of the connecting rod is mounted upon a crank pin 59 carried by a crank arm 61 secured to one end of a short shaft 62 which is mounted in a bracket 63 secured to a suitable cross member 64 of the machine frame, clearly shown in Figure 1. A bevel pinion 65 is secured to the other end of the shaft 62 and meshes with a similar pinion 66 mounted upon a shaft 67 rotatably mounted in suitable bearings 68 provided in the front and rear walls of the machine frame. (See Figure 3). The shaft 67 is driven from the main drive shaft 69 by means of a pair of gears 71 and 72, as shown in Figures 1 and 3. The drive shaft 69 is mounted in similar bearings 73 provided in the frame as shown in Figure 24.

In the operation of the feed block 42, the lower corner 47 of the inclined face 45 of the slide will project beneath the stack of blanks, when the feed block 42 is in normal or resting position, as shown in full lines in Figure 3 and dotted lines in Figure 21. When thus positioned, one end of the stack of blanks will be resting upon the inclined face 45 of the feed block thereby slightly lifting or raising the lower blank out of contact with the blank supporting faces 48. It will also be noted, by reference to Figure 3, that the shoulder 46, the height of which is slightly less than the thickness of the blank material, will be out of contact with the lowermost blank. As soon, however, as the feed block starts its forward movement, the shoulder 46 will engage the adjacent central end-portion 39 of the blank and will thereby forwardly move it, as indicated in Figure 21. When thus being fed forwardly by the feed block, the opposite end of the blank will pass beneath the pins 51, and the blank will thus slide along upon the blank supporting faces 48 to the dotted line position shown in Figure 21, and will remain in such position while the feed block returns to its normal or starting position. As a result of the use of the inclined face 45 of the feed block, the stack of blanks will be compressed at one end thereof before the shoulder 46 engages the lowermost blank, while the opposite end of the stack will be relatively less compressed, thereby permitting the lower blank to be fed from beneath the stack without danger of buckling or bending. If desired, means may also be provided for limiting the forward movement of the blank to prevent it from moving too far when fed

over the die blocks 74 and 78 by the feed block 42, thereby positively locating the blank over the die blocks.

Receptacle forming mechanism.

The means provided for folding the blanks to form the receptacles or cartons preferably consists in the provision of a forming die 74 mounted above the top plate 30 of the machine in spaced relation thereto. As shown in Figures 5, 6, 7, 8, 9 and 10, this die is provided with oppositely extending lugs 75, 75, and 76, 76, and it is preferably secured to the top of the machine by means of shouldered studs 77. As shown in the drawings the die block 74 in reality constitutes but one side of the forming die as the other side thereof is constructed by means of a complementary die block 78, which is yieldably mounted in the head 79 of a T-shaped bracket 81, having one end secured to the top plate 30 of the machine by means of a shouldered stud 82, and the other end secured to a bracket 83 by a bolt 84. The bracket 81 is similarly arranged in spaced relation to the top plate 30. It will be noted by referring to Figure 5 that the bracket 83 is securely bolted to the top plate 30 by means of bolts 80.

As shown in Figure 8, the die block 78 is preferably yieldably secured to the head 79 by means of threaded studs 85 having one end secured thereto and the other end passing through sockets 86 and apertures 87 provided in the head 79. Compression springs 88 are mounted in the sockets 86 and threaded nuts 89 are mounted on the threaded end portions of the studs 85 thereby providing means for adjusting the die block 78 with relation to its complementary die 74. By thus yieldingly mounting the die block 78, the carton blank, when downwardly forced between the die blocks 74 and 78 by means of the reciprocally mounted plunger 91, will be firmly held in place as shown in Figure 8.

The forming plunger 91 is mounted in an upright bearing 92 provided in the horizontal portion 93 of the bracket 83, and has its upper end pivotally connected to an oscillating arm 94 by means of links 95. The oscillating arm 94 is mounted upon a rock shaft 96 supported in bearings 97 and 98 provided in the upper portion 99 of the bracket 83. A relatively short arm 101 is mounted on the opposite end of the shaft 96 and has a connecting rod 102 pivotally connected thereto which downwardly extends therefrom through an opening 103 in the top plate 30 of the machine and has its lower end operatively connected to a driving mechanism which will hereinafter be described.

In the operation of the receptacle forming dies 74 and 78 and the plunger 91, the blanks are fed from the blank holder to the dotted line position, indicated in Figure 21, and the full line position indicated in Figures 1 and 7, in which position the blank will be interposed between the die blocks 74 and 78, and the lower face of the plunger 91, and will be supported upon the end portions 52 of the rails 34. As the plunger 91 is moved downwardly, by the oscillating arm 94, the blank will be forced between the two die blocks, to the position shown in Figure 6. When the plunger 91 moves from the position shown in Figures 1, 3, 4 and 21, the blank will be longitudinally bent or folded along the dotted lines "*a*", "*a*" (Figure 23), thereby forming the opposed side walls of the receptacle, and thus completing the first operation in its formation. As soon as the side walls have thus been formed, and the plunger 91 reaches the position shown in Figure 6, the downward movement of the plunger will be temporarily interrupted until the second forming operation has been completed. The second forming operation consists in inwardly bending the corners "*b*" of the side walls, along the dotted lines "*c*" to partially form the ends of the cartons. (Figure 23).

The means provided for inwardly bending the corners, or ends "*b*" of one of the side walls, to partially form the ends of the receptacle, preferably consists in a pair of rods 104, reciprocally mounted in bearings in the opposed lugs 75 and 76 of the die block 74. These rods are connected together at one end by a cross bar 105 as shown in Figures 2 and 5. This cross bar is engaged by a cam 106 upon the upper reduced end portion 107 of a vertical shaft 108, (Figure 1) mounted in a suitable bearing 109 provided in the top of the machine frame. Compression springs 111 are coiled about the rods 104 and function to yieldably hold the bar 108 against the face of the cam 106, collars 112 preferably being secured to the rods 104 to engage one end of each spring while the opposite ends of the springs are adapted to bear against the lugs 75 of the die block 74, as shown in Figure 5. The rods 104 function to inwardly bend two of the corners or ends "*b*" of one of the side walls as hereinafter described.

A pair of L-shaped rods 113 are also mounted in the opposed lugs 75 and 76 of the die block 74, adjacent the outer ends thereof, as shown in Figure 5. These rods are similarly connected together at their outer ends by means of a yoke 114, which is adapted to engage a cam 115, also mounted on the upper reduced end-portion 107 of the upright shaft 108. Similarly, the yoke 114 is yieldably held in contact with the cam 115 by means of springs 111 and collars 112. The rods 113 are provided with inwardly projecting end portions 116, having curved

ends 117 adapted to engage the ends "b" of the other side wall when the rods are actuated by the rotation of the cam 115.

In the operation of the rods 104 and 113 the upright shaft 108, which is operatively connected to the driving mechanism mounted beneath the machine top 30, will be rotated, causing the cams 106 and 115, mounted on the upper end thereof, to be rotated also with the resultant actuation of the rods 104 and 113. Referring to Figures 5 and 9, it will be noted that as the cam 106 is rotated, as indicated by the arrow in Figure 5, the rod 104 will be moved towards the partially completed receptacle positioned between the die blocks 74 and 78. Such movement of the rods will cause the ends thereof to engage the corners "b" of one of the receptacle side walls with the result that the ends will be bent along the dotted lines "c", shown in Figure 23, and around the ends of the plunger 91 as shown in Figures 5 and 9. Before the rods 104 start their return movement the rods 113 will commence to move forwardly so that the curved ends 117 thereof will engage the ends "b" of the other receptacle side wall and will bend them inwardly as shown in Figures 5 and 10. As soon as the corners "b", engaged by the curved ends 117 of the rods 113, reach substantially the position shown in Figure 5, the rods 104 will be retracted, thereby allowing the curved ends 117 to fold the opposite or outer corners "b" over the inner corners, as clearly shown in Figure 10. As soon as the corners "b" have thus been folded or bent to overlap one another the plunger 91 will resume its downward movement and will thereby force the partially completed carton or receptacle downwardly from the position shown in Figures 5 and 6 into one of the pocket dies of a movable chain die (see Figure 11), which will next be described. When the receptacle is thus forced into the movable chain die the oppositely extending end-portions 39 of the blank will be upwardly bent along the dotted lines "d" (Figure 23) to the position shown in full lines, Figure 11, and dotted lines, Figure 13.

Movable chain dies.

Figures 27, 28, 29 and 30, show in detail the construction of the movable chain die employed in conjunction with this novel machine to progressively and intermittently move the cartons or receptacles through the machine, as the various operations in the formation thereof are performed. As shown in Figure 27 this movable chain die consists of two endless chain belts mounted on drive sprockets 118 and idler sprockets 119, on top of the machine frame, and arranged substantially in spaced parallel relation. Each chain is also preferably mounted so as to be in direct contact with the upper surface of the machine top 30, (Figure 29), so that the weight of the two chains will be carried directly by the top plate 30, and not by the sprockets. Also, by this arrangement the plate 30 will form the bottoms of the die pockets formed between the adjacent parallel sections of the two chains, as will subsequently be described.

Each belt or chain preferably comprises a plurality of similar die-forming members or blocks 121, alternately arranged in the chains, and each such member having an outwardly extending blade 122 adapted to cooperate with the blades of adjacent blocks to form the side walls of the die pockets, as particularly shown in Figure 27. In this figure it will be noted that a series of such die pockets are formed between the adjacent sections of the two chains, the blades 122 froming the side walls of the die pockets and the blocks 121 the ends thereof. As shown in Figures 28, 29 and 30 the central portion of each die-forming member or block 121 is preferably cut away to provide a channel or groove 123 adapted to receive the connecting means provided for pivotally connecting or linking together the blocks 121. The blocks 121 of the chains are connected together by means of spaced parallel links 124 and pins 125 preferably having their ends headed over and seated in countersunk seats, as shown in Figure 29. Anti-friction rollers 126 are preferably interposed between the spaced connecting links 124 adapted to engage the opposed bars or rails 120 to prevent the adjacent sections of the two chains from spreading when the receptacles are being formed in the die pockets provided therebetween by the blocks 121 and blades 122. The rails 120 may be secured to the top plate 30 of the machine by such means as the bolts or screws 127. In Figure 27 there is shown in the movable chain die pockets, the relative positions of the receptacles, and the result of each forming operation as the receptacles progressively and intermittently advance through the machine in the formation thereof.

For intermittently actuating the movable chain dies we preferably provide an intermittent driving mechanism commonly known in mechanics as a "Geneva stop movement". As shown in Figure 27 the drive sprockets 118 are secured to the upper side of a pair of upright shafts 128 rotatably mounted in suitable bearings provided in the top plate 30 of the machine frame (Figures 2, 5 and 24). The bearings 129 are here shown as formed integral with the top plate 30, but it is to be understood that, if desired, these bearings may be constructed independently of the machine frame and secured thereto by suitable means. Spiral gears 131 are secured to the lower ends of the upright

shafts 128 adapted to intermesh with a pair of similar complementary gears 132 mounted upon a transverse shaft 133, which is mounted in bearings 134 provided in the side walls 31 and 32 of the machine frame. The intermittent drive mechanism or Geneva stop movement comprises a toothed wheel 135 having a plurality of equi-distant radial slots 136 provided in the periphery thereof as shown in Figures 4, 25, 26 and a complementary drive disk 137 mounted on the drive shaft 69. A drive pin 138 is secured to the disk 137 adapted to engage the radial slots 136 to rotate the wheel 135 when the disk 137 is rotated. (See Figure 25). A hub 139 is provided on one side of the disk 137 in alinement with the face of the slotted wheel 135. The hub is adapted to engage correspondingly curved faces 141 provided between the radial slots in the wheel, to lock said wheel against rotation when the drive pin 138 is out of engagement with the slots 136 as shown in Figure 26. A portion of the hub 139 is cut away to provide a face 142 shown in Figures 25 and 26, to provide clearance for the slotted wheel 135, when being rotated by the pin 138 (Figure 25).

In the operation of the intermittent drive mechanism above described, the slotted wheel 135 and therefore the shaft 133 will be rotated one-eighth of a revolution for each revolution of the drive shaft 69. When the wheel 135 is in locked position, it will be positioned as shown in Figure 26, with the peripheral surface of the hub 139 in engagement with one of the curved faces 141 of the wheel. As the disk 137, and therefore the pin 138 and hub 139, continue to rotate, the pin will engage the next slot in the wheel, as indicated by the dotted lines in Figure 26, and will thus commence to rotate the wheel. It is to be uderstood, of course, that when the pin 138 engages the next slot 136, the clearance face 142 of the hub 139 will be moved to the dotted line position in Figure 26, in which position the wheel may be rotated by the pin as shown in Figure 25. In the drawings we have shown the wheel 135 as having eight driving slots, but it is to be understood that the number of slots may be varied as desired, to increase or decrease the intermittent travel of the movable chain dies.

Referring to Figure 27 it will be noted that the idler sprockets 119, supporting one end of each chain, are rotatably mounted upon studs 143 secured to the top plate 30 of the machine frame. If desired, these studs may be adjustably mounted in the frame so as to provide means for taking up slack in the chains, caused by wear, etc., and they may be also so arranged as to be adjustable to and from each other to provide means for slightly varying the lengths of the die pockets, composed of the adjacent sections of the two chains.

After the partially completed carton or receptacle has been downwardly moved from the position shown in Figure 6, into one of the movable die pockets, composed of adjacent sections of the two chains, as shown in Figure 11, it will advance to the position shown in Figure 12, where it will be engaged by means for inwardly and downwardly folding or bending the upstanding central end-portions 39 thereof to complete the forming operation of the carton. The means provided for inwardly and downwardly bending the end-portion 39 of the incompleted carton is clearly shown in Figures 12, 13 and 14. As here shown such means preferably consists in the provision of a pair of pivotally mounted curved fingers 144 upwardly projecting through elongated apertures 145 provided in the machine top 30, and adapted to have their ends swing over the incompleted carton as shown in Figures 12 and 13. Each finger 144 has an integral hub 146 which is apertured to receive a stud 147 to provide a pivotal mounting therefor. The studs 147 are preferably secured to a block 148 secured to the underside of the machine top 30, by suitable screws 149 (Figure 6). Each hub 146 has a depending boss 151 adapted to receive a shouldered stud 152 upon which a roller 153 is mounted. A tension spring 154 has its ends secured to lugs or ears provided on the depending bosses 151, and this spring functions to yieldably hold the rollers 153 in contact with the opposed faces of a pair of cam disks 155, mounted on the drive shaft 69. (See Figure 13). Each cam disk 155 has a raised portion 156 adapted to engage the rollers 153 and outwardly move them to the position shown in Figure 13, when the disks 155 are rotated. Such outward movement of the rollers 153 will cause the upper curved ends of the fingers 144 to be moved from the dotted to the full line position shown in Figure 13, which action will cause the terminals of the fingers to engage the upstanding end-portions 39 of the carton and inwardly and downwardly fold or bend them from the dotted line position shown in Figure 13, to the full line position shown in Figures 12 and 13. After the ends 39 have thus been inwardly folded, the incompleted carton will be automatically and progresively advanced in the machine from the position shown in Figures 12 and 13, to the position indicated at "A" in Figures 1 and 6, in which position the movement of the carton will be temporarily interrupted until the final carton-forming operation has been performed.

A tension plate 130 is preferably secured to the T-shaped bracket 81 adapted to en-

gage the upper portion of the die chains, as shown in Figures 5 and 6. This plate functions to retain the end-portions 39 of the cartons in folded position, while the carton is being moved from the position shown in Figures 11, 12 and 13 to that shown in Figures 6 and 14.

The means provided for effecting the final carton-forming operation preferably resides in the provision of a forming plunger 157, reciprocally mounted in a bearing provided in the horizontal portion 93 of the bracket 83. This plunger normally is in the raised position shown in Figures 1, 4 and 13, and when actuated will be downwardly moved to the position shown in Figure 14. The function of the plunger 157 is to downwardly fold the inwardly extending end-portions 39 from the position shown in Figure 13, to that shown in Figure 14. This punch also functions to square the walls of the carton so that when completed it will resemble the receptacle shown in Figure 15.

The upper end of the die shank is secured to a suitable cross head 158, which is pivotally connected, by means of links 159, to an oscillatory arm 161, similar in construction and function to the arm 94, previously described. The arm 161 is mounted on a rock-shaft 162 mounted in the upper portion 99 of the bracket 83. A relatively shorter arm 165 is mounted on the opposite end of the shaft 162 and has a connecting rod 164 pivotally connected thereto which depends therefrom through an aperture 165 in the frame top 30. The lower end of the rod 164 is operatively connected to a suitable driving means which will be described later.

Receptacle filling mechanism.

The means provided for filling the receptacles or cartons with candy or other material, and also the means provided for feeding the candy to the filling mechanism, is plainly shown in Figures 1, 2, 4 and 9, and in Figures 16 to 20, inclusive. As shown in Figure 2, the candy or other material, after having been cut into small pieces or units of substantially uniform size and preferably rectangular in shape, is placed upon a suitable feed tray 166, mounted adjacent one side of the machine, upon a suitable supporting means, not shown. This feed tray is preferably provided on three sides with marginal upturned flanges 167, 168 and 169, which function to retain the candy units thereon as they are manually fed over the surface of the tray. Each candy unit, before being placed on the feed tray 166, is usually wrapped in waxed paper for sanitary purposes, as the form of receptacle here used is of the open type, as shown in Figure 15, and therefore does not offer any protection to the candy when packed therein, as shown in Figure 20. After the candy has thus been cut into small units and preferably wrapped, as above stated, which is usually done by automatic machinery, it is placed upon the tray 166 and arranged in rows, as shown in Figure 2. The operator will then place the tray upon a supporting means adjacent the machine and manually feed the candy across the surface thereof, in the direction of the arrow, until the leading row is brought into contact with the upturned flange 168, after which it is fed transversely across the tray through an opening 171 and into a feed chute 172, as indicated by the arrow. The feed chute 172 extends over the top of the machine and has its discharge end terminating at a point directly above the completed receptacle, seated in one of the die pockets, composed of the two chains. (See Figures 16, 17, 18 and 19).

As shown in Figure 16, the feed chute 172 is preferably supported upon the machine top 30 by means of a shouldered stud 173, and is arranged in spaced parallel relation thereto so as to overhang the die pockets. An elongated discharge opening 174 is provided adjacent the end of the chute, and this opening is in vertical alinement with the empty receptacle positioned therebeneath in one of the die pockets. (Figure 16). An adjustable stop plate 175 is mounted adjacent the end of the chute. An adjusting screw 176, having a knurled head 177, is mounted in a threaded aperture provided in the end wall 178 of the chute. One end of the screw 176 is preferably turned down, as shown, to provide a reduced end portion 179 which is rotatably mounted in an aperture provided in the stop plate 175, and is slightly headed over so as to prevent it from becoming disconnected therefrom. A lock nut 180 is mounted on the screw 176 to lock it in adjusted position. The stop plate 175 functions to provide a stop for the candy as it is fed into the chute so that it will be in direct alinement with the discharge opening 174 and the empty receptacle positioned therebeneath.

Referring to Figures 16, 18 and 19, it will be noted that the candy units, when positioned in the chute over the discharge opening 174 and against the stop plate 175, will be prevented from dropping therethrough by means of a pair of yieldably mounted gates 181 which are adapted normally to partially close the discharge opening 174, as indicated by the dotted lines in Figure 18 and by full lines in Figure 19. These gates are mounted upon pins 182 having their ends secured to lugs 183, which are here shown as being integrally formed with the chute. Torsion springs 184 are coiled about the pins 182 to yieldably hold the gates 181 in closed or horizontal position, as shown in dotted lines, Figure 18, and full lines Figure 19.

The means provided for downwardly

forcing the candy units through the discharge openeng 174 of the chute, and packing them into the carton, preferably consists of a packer plunger or ram 185 mounted in a vertical guide bearing provided in the bracket 93, directly above the chute 172. The upper end of this plunger is secured to the cross-head 158, as shown in Figure 1, so that it will be operated each time the cross-head is actuated by the timed oscillation of the arm 161. Thus it will be seen that each time the cross-head 158 is actuated, the packer plunger 185 will be downwardly moved from the position shown in Figure 16, into contact with the candy units positioned in the chute directly beneath. (Figure 17). As the plunger continues in its downward movement it will force the units through the discharge opening 174 and against the yieldably mounted gates 181, which gates will thereby be opened to the full line position in Figure 18, and allow the candy to be inserted or packed into the receptacle as shown in Figures 17 and 18. When the candy pieces or units have thus been packed into the receptacle, the packer plunger 185 will be returned to normal position as shown in Figure 16. A guide plate 186 is preferably secured to one end of the packer plunger to prevent the candy, remaining in the chute, from falling over onto the plunger when in the position shown in Figures 17 and 18. A flat spring 187 is also provided to frictionally hold the candy unit in an upright position in the chute when the units at the end of the chute are being packed into a carton. This spring is preferably secured to a bridge bar 188 mounted over the chute (see Figures 16 and 17).

Means are also provided for retaining the end candy units in an upright position in the chute each time the candy is manually fed along in the chute after the pieces or units at the end of the chute have been packed into a receptacle. Such means preferably consist of a tension plate 189 secured to one side of the chute and extending substantially from the end thereof to a point adjacent the bridge bar 188. This tension plate is of angular cross-section and is so formed as to overhang the wall of the chute. An upturned flange 191 is provided on the plate adapted to bear against the edges of the candy units, positioned in the end of the chute, and thus hold them in frictional contact with the opposite wall of the chute. Thus it will readily be seen that by the use of this tension plate the candy units will be frictionally held in an upright position while being fed along the chute over the discharge opening 174. The tension plate 189 is adjustably and yieldably mounted on the wall of the chute by means of threaded studs 192, secured to the wall, and having knurled adjusting nuts 193 mounted thereon. A compression spring 194 is mounted on each stud between the plate and the adjusting nuts so that the pressure of the plate against the candy may be varied or adjusted to the proper degree. Guide rollers 195 are also provided at each end of the discharge opening 174 to guide the units into the empty receptacle (see Figures 16 and 17).

After the candy has been packed into the receptacle, as above described, and as shown in Figure 20, the intermittent drive mechanism will cause the die chains to be actuated which will move the filled receptacle from the position shown at "B" in Figures 5 and 27, to the position shown at "C" in the same figures. When in the latter position the receptacle will be moved into registration with an opening 196 provided at the end of the machine top 30, as shown in Figures 1, 2, 4 and 6, and will thence drop into a curved discharge spout 197 and be discharged onto a suitable conveyor belt 198, having one end mounted on a drive roller 199, carried by a shaft 201 which is rotatably mounted in bearings 202 and 203, provided in the side walls 31 and 32, respectively, of the machine frame. The other end of the conveyor belt 198 may be supported by suitable means, not shown. In the operation of the machine the filled receptacles will be discharged onto the conveyor belt 198, as shown in Figure 1, and may then be removed therefrom and packed into larger cartons or shipping boxes to facilitate handling in storage or transit.

A plunger or ejector 200 is preferably provided adjacent the packer plunger 185 to positively eject the filled receptacles from the chain die pockets into the curved chute 197. This ejector is mounted on the cross head 158 and depends therefrom in spaced parallel relation to the packer plunger 185, as shown in Figure 1.

Driving mechanism.

The driving mechanism of this novel receptacle-making and filling machine is shown in Figures 1, 3, 4 and 24. As shown in Figure 24 a pulley 204 is rotatably mounted on the drive shaft 69 between a collar 205, secured to the shaft, and a flanged coupling member 206 slidably mounted on the shaft and prevented from rotation thereon by a feather key 207, secured to the shaft. A collar 208 is secured to the outer end of the shaft to provide a stop for the coupling member 206 when moved out of engagement with the pulley 204. Pins 209 are provided on the coupling member adapted to be received in suitable apertures provided in the web of the pulley, thereby to transmit power from the pulley to the shaft when the coupling member is positioned as shown in Figure 24. When the coupling

member is outwardly moved to the stop collar 208 the pins 29 will be out of engagement with the pulley and the latter will be free to rotate or idle on the shaft.

The cams 106 and 115, actuating the carton end-folding fingers 104 and 113, are driven from a cross shaft 211 mounted in bearings provided in the front and rear walls of the frame. (Figures 1, 4 and 24) A bevel pinion 212 is secured to this shaft and meshes with a similar pinion 213, terminally mounted on the vertical shaft 108 as shown in Figure 1. A sprocket 214 is mounted on the shaft 211 adjacent the rear frame wall 32 and has a chain belt 215 operatively connecting it with a similar sprocket 216, mounted on the drive shaft 69 (Figure 24). Thus it will be seen that whenever the drive shaft 69 is rotated the cross shaft 211 will also be rotated with the resultant actuation of the cams 106 and 115, and therefore the end-folding fingers 104 and 113. Referring to Figure 6 it will be noted that the cams, and also the cross bars 105 and yoke 114, are preferably arranged in staggered relation, so that the cam 106 will engage only the cross bar 105 and will clear or swing over the yoke 114, and, similarly the cam 115 will engage only the yoke 114. The cams 105 and 115 are also so arranged on the shaft 108 that the fingers 104 and 113 will be actuated in timed relation to the movement of the die chains and the rest of the mechanism.

The mechanism provided for operating the connecting rods 102 and 164 to actuate the rock shafts 96 and 162, and therefore the plungers 91, 157, 185 and 200, preferably consists of a grooved cam member or wheel 217 mounted on the lower transverse shaft 67 (see Figures 3 and 4). This cam wheel has a cam groove 218 formed in one side or face thereof adapted to provide a track for an anti-friction roller 219, mounted on an oscillating arm 221, which is mounted on a rod 222 journaled in the side walls of the frame. A forked bracket 223 is pivotally connected to the end of the arm, and this bracket has the lower end of the connecting rod 102 slidably mounted therein. A collar 224 is terminally secured to the rod, and a compression spring 225 is interposed between this collar and the upper portion of the bracket so that the rod will have a yieldable connection with the arm 221. A stop collar 266 is also secured to the rod 102 above the bracket 222 to limit the movement of the rod with reference to the bracket. Thus when the cam wheel 217 is rotated, the grooved cam 218 will cause the arm 221 to be oscillated, which will transmit a rocking movement to the rock shaft 96 as a result of it being operatively connected thereto by means of the connecting rod 102 and arm 101. Such rocking of the shaft will cause the forming plunger 91 to be actuated in the initial forming operation of a receptacle, as has hereinbefore been described. The cam groove 218 is so shaped as to cause the downward movement of the forming plunger 91 to be interrupted when it reaches the position shown in Figure 6, thereby allowing the receptacle end-forming fingers 104 and 113 time to inwardly fold the ends of the carton blank, after which the cam will complete the downward movement of the plunger, moving it from the position shown in Figures 6, 8, 9 and 10 to that shown in Figure 11, wherein it will be noted that the partially completed carton will be seated in one of the die pockets of the die chains.

A cam groove 227, of a relatively different shape than the groove 218, is provided on the opposite face of the cam wheel 217, and functions to actuate the connecting rod 164. The means provided for operatively connecting the rod 164 with the cam groove 227 is similar in construction to that shown and described with reference to the other rod 102 and cam groove 218, and like parts will therefore be indicated by like numerals. As shown in Figure 4, the cam groove 227 and operating mechanism functions to operate the connecting rod 164, which will cause the rock shaft 162 to be oscillated with the resultant actuation of the cross-head 158, and therefore the punches 157, 185 and 200, as has been previously described. It is to be understood that the operation of the punches 91, 157, 185 and 200, by the cam grooves 218 and 227 must be in timed relation to the intermittent movement of the die pockets, formed by the two endless chains, in which the cartons are positioned as they advance through the machine in the formation thereof. The lower transverse shaft 67 is driven from the drive shaft 69 by the intermeshing gears 71 and 72, as hereinbefore described. (See Figures 1 and 3).

The means provided for operating the conveyor belt 198 is shown in Figures 1 and 4, and particularly in Figure 24. Referring to the latter figure, a sprocket wheel 228 is operatively connected to a similar sprocket 229 by means of a chain belt 231. The sprocket 229 is preferably mounted upon and secured to a hub 232 of a pinion 233, rotatably mounted on a stud 234 secured to an arm or bracket 235. The bracket 235 has a split hub 236 which is adjustably mounted upon the hub of the bearing 203, supporting one end of the shaft 201. A bolt or cap-screw 237 is provided in the split hub 236 to lock it in adjusted position. A pinion 238 is mounted on the conveyor shaft 201 and meshes with the pinion 233, mounted on the stud 234. Thus it will be seen that when the shaft 133 is intermittently operated by the intermittent drive mechanism,

shown in Figures 25 and 26, the conveyor belt 198 will be similarly operated. It will also be noted that by mounting the sprocket wheel 232 and pinion 233 on the bracket 235, as above described, the chain or belt 231 may readily be adjusted to the proper tension so that there will be no slack therein.

Operation.

In the operation of this novel receptacle-making and filling machine the carton blanks (shown in Figure 23) are packed into the carton holder composed of the upright posts 36 at one end of the machine. From this holder the blanks are fed from the bottom of the stack laterally across the machine to a position directly above the forming blocks 74 and 78, by the reciprocal movement of the feed slide or block 42, as shown in Figures 3 and 21. When the blank reaches the position shown in Figures 3 and 7 it will be downwardly forced between the forming blocks 74 and 78 by the downward movement of the forming punch 91 until it reaches the position shown in Figures 6 and 8. As soon as the punch 91 reaches the position shown in these two figures its downward movement will be temporarily interrupted, during which period of time the receptacle end-forming fingers 104 and 113 will be actuated to inwardly fold the corners "*b*" of the blank as shown in Figures 5, 9 and 10. As soon as the end portions or corners "*b*" of the blank have been folded to the position shown in Figure 10, the downward movement of the punch 91 will be resumed, thereby forcing the partially completed receptacle or carton down into one of the die pockets formed by the blades 122 and blocks 121 of the two endless die chains, shown particularly in Figure 11. When the receptacle is thus forced into the die pocket as shown in Figure 11 the central end portion 39 of the blank will be upwardly turned or folded from the horizontal position shown in Figures 5, 7, 8, 9 and 10, to the upright position shown in Figure 11, and also shown in dotted lines in Figure 13.

As soon as the partially completed receptacle has thus been seated in one of the die pockets as shown in Figure 11, the die chains, and therefore the die pockets, in one of which the receptacle is seated, will be intermittently actuated or moved by the operation of the intermittent driving mechanism mounted beneath the top plate 30 of the machine frame. As the incompleted receptacle is thus progressively moved through the machine,—the various operations required to complete the formation thereof will be performed as hereinbefore described until it reaches the position shown at "A" in Figures 1 and 6, in which position the receptacle will have been completed and will appear as shown in Figure 15, but will be seated in the die pocket.

It is to be understood that during each intermittent movement of the die pockets, formed by the two chains, a receptacle blank will be successively fed from the bottom of the stack to the forming blocks 74 and 78 and the punch 91. Thus during the operation of the machine the various operations necessary in the formation of the cartons or receptacles will be simultaneously performed until the receptacles reach the position shown at "A" in Figures 1 and 6. It will also be seen that the various operations of forming and filling the receptacles are performed during the stop periods of the die chains.

The completed receptacle is next advanced to a position directly beneath the candy or material feed chute 172 as shown in Figures 1, 6, 16, 17 and 18. The packer punch 185 is then actuated, which will cause it to be downwardly moved against the candy units positioned in the chute as shown in Figure 16. Continued downward movement of the packer die will force the candy units through the discharge opening 174 in the bottom of the chute, and into the empty receptacle positioned therebeneath as shown in Figures 17 and 18. As the candy units are downwardly forced through the opening 174 the yieldably mounted gates 181 will be opened thereby, as shown in full lines, Figure 18, and as soon as the punch is again upwardly moved the gates will be automatically closed to the position shown in dotted lines in Figure 18 and full lines in Figure 19. The operator will then again manually feed the candy into the chute until the leading piece or unit engages the stop plate 175 as shown in Figure 16. The next movement of the die pockets will cause the filled receptacle to be moved from the position beneath the chute 172 and from that shown at "B" in Figures 5 and 27, to the position shown at "C" in these two latter figures. When it reaches this position it will drop through the opening 196 at the discharge end of the table and into a curved chute 197, from whence it will be discharged onto a conveyor belt 198, as shown in Figure 1.

Should the filled receptacle fail to drop by gravity into the curved chute 197 it will be downwardly forced thereinto by the ejector punch 200 shown in Figures 1, 4 and 6. During each cycle of operation of the punches 91, 157, 185 and 200 a new blank will be fed over the receptacle forming blocks 74 and 78, and the die chains will also be actuated or moved a distance equal to the distance beneath the die pockets formed by the two chains, so that for each intermit-

tent movement of the die pockets a folded receptacle will be discharged on to the conveyor belt 198.

In the above description we have referred to the apparatus as being a receptacle-making and filling machine, but it is to be understood, that, if desired, the machine may be used as a receptacle-making machine only, in which case the filling mechanism, such as the chute 172 and the packer punch 185, and associated parts, will be dispensed with. The receptacles will then be completely formed and discharged onto the conveyor belt 198 in the form shown in Figure 15. It may also be used as a receptacle-filling machine only, by omitting the receptacle-forming mechanism and placing the completed receptacles in the die-pockets, after which they will be fed under the filling mechanism and filled, as hereinbefore described. It is also to be understood that various changes and modifications may be made in the form of blank used, from that shown in Figure 23, and also that we do not limit ourse ves to the details of construction of the machine herein disclosed, as the same may be varied or modified in many ways without departing from the invention.

We claim as our invention:

1. In a machine of the class described, the combination, with means for feeding and folding a receptacle blank to form an open topped receptacle, of means arranged to guide a series of flat sided articles of uniform shape and size, such as candy units or pieces, into position opposite the open top of the formed receptacle, and means for positively moving a pre-determined number of said articles into said receptacle.

2. In a machine of the class described, the combination, with means for feeding and folding a blank to form an open topped receptacle, of means arranged to guide a series of candy units of uniform shape and size into position opposite the open top of the formed receptacle and means for positively moving a pre-determined number of said units into said receptacle.

3. In a machine of the class described, the combination, with means for feeding and folding a blank to form a rectangular open topped receptacle, of means arranged to guide a series of rectangular candy units into position opposite the open top of the formed receptacle and means for positively moving a pre-determined number of said units into said receptacle.

4. In a machine of the class described, the combination, with means for intermittently and progressively feeding a carton or receptacle blank, and means for folding said blank, while it is being fed, to form an open topped receptacle, of means adapted to guide a series of articles of uniform shape and size such as candy units, into position opposite the open top of the formed receptacle, and means for positively moving a pre-determined number of said articles into said receptacle.

5. In a machine of the class described, the combination, with means for feeding and folding a blank to form a rectangular open topped receptacle, of means arranged to guide a series of rectangular candy units, held edgewise, into position opposite the open top of the formed receptacle, and means for moving a pre-determined number of said units, retaining their edgewise position, into said receptacle.

6. In a machine of the class described, the combination, with means for feeding and folding a blank to form an open topped receptacle, of means adapted to intermittently and progressively advance the partially formed receptacle through the machine while being formed, means for guiding a series of candy units of uniform shape and size into position opposite the open top of the completed receptacle, and means for positively moving a pre-determined number of said units into said receptacle.

7. In a machine of the class described, the combination, with means for feeding a blank, of means for folding said blank to form an open topped receptacle, endless belts having means arranged thereon forming die pockets adapted to receive and hold the partially formed receptacle while being fed through the machine, and while the folding operation is being completed and the receptacle is being filled.

8. In a machine of the class described, the combination, with means for holding a stack of carton blanks, of means for feeding the lowermost blank from the stack and advancing it into position above forming blocks, means for depressing the central body-portion of the blank, and thereby turning upward its side portions to form receptacle walls, means for turning the corners of the side portions into over-lapping positions at right angles to the side walls to form receptacle ends, means for further depressing the partially folded blank and thereby turning its end flaps into vertical positions, means for turning the end flaps into a horizontal position above the receptacle top, and means for turning said end flaps downward and folding the same over the receptacle ends, and partially against the bottom of the receptacle to form a rectangular open topped receptacle.

9. In a machine of the class described, the combination, with means for feeding and folding a blank to form an open topped receptacle, of endless belts having die-forming members arranged thereon to form die-pockets adapted to receive partially completed receptacles, means for actuating said

belts to feed said receptacles through the machine while being completed, and means for placing a pre-determined number of candy units in the completed receptacle, while the receptacle is held.

10. In a machine of the class described, the combination, with means for feeding and folding a blank to form an open topped receptacle, of endless belts having die-forming members arranged thereon to form die-pockets adapted to receive partially folded blanks, means for intermittently actuating said belts to progressively feed said partially folded blanks through the machine while being formed into completed receptacles, and means for placing a pre-determined number of articles in the completed receptacle.

11. In a machine of the class described, comprising in combination, a blank holder and means for successively feeding the blanks therefrom, means for folding the blanks to form receptacles, intermittently actuated endless belts cooperating with one another to form die-pockets adapted to receive the blanks and to progressively feed them through the machine while being formed into receptacles, and means for filling said receptacles.

12. In a machine of the class described, comprising in combination, a blank holder, means for successively feeding the blanks therefrom to a receptacle-forming device, endless belts having die-forming members arranged thereon to form die-pockets, positioned beneath said device and adapted to receive partially folded blanks therefrom, means for intermittently actuating said endless belts to progressively feed the partially folded blanks through the machine while being formed into receptacles.

13. In a machine of the class described, the combination of a blank holder, means for successively feeding the blanks therefrom and independently positioning each blank over a forming device, means for forcing said blank into said forming device to partially form a receptacle and subsequently to force said partially completed receptacle into one of a series of intermittently operable die-pockets positioned beneath said forming device, said die-pockets being adapted to progressively feed the partially completed receptacles through the machine until completed.

14. In a machine of the class described, comprising in combination, a blank holder, means for successively feeding the blanks therefrom and positioning each blank over a forming device comprising stationary die blocks, means operable to force said blank into said forming device, thereby to fold the sides thereof to form the side walls of a receptacle, means for forcing said partially completed receptacle from said forming device into one of a series of movable die-pockets, and means for filling the receptacles when completed.

15. In a machine of the class described, comprising in combination, a receptacle forming device, a pair of endless belts having projecting members arranged thereon and cooperating with one another to form die-pockets adapted to receive receptacles from said forming device, and means for actuating said endless belts to feed the receptacles through the machine.

16. In a machine of the class described, the combination with a blank holder and means for successively feeding the blanks therefrom and positioning them over a blank folding device adapted to partially fold the blanks of intermittently operable die pockets adapted to receive the partially folded blanks and to progressively feed them through the machine, means operating to complete the folding of the blanks as they are intermittently and progressively fed through the machine, and means for filling the completed receptacle while they are held in said pockets.

17. In a machine of the class described, the combination with a feeding means adapted to successively feed blanks to a forming device adapted to fold the sides of said blanks to form the side walls of a receptacle and also to fold the ends thereof to partially complete the ends of said receptable, of a plurality of intermittently operable die-pockets arranged beneath the forming device and adapted to receive the partially completed receptacles therefrom, means adapted to complete the folding of the blank ends to complete the formation of the receptacles, and means mounted over the movable die pockets adapted to receive a material and to pack a pre-determined quantity thereof into the completed receptacles as they pass therebeneath.

18. In a machine of the class described, the combination with a blank holder adapted to receive a plurality of blanks, of means for successively feeding the blanks therefrom to a receptacle forming device, endless chain members having die-forming elements arranged thereon, mounted beneath the forming device and adapted to receive the partially completed receptacles, means for intermittently actuating said chain members, means arranged adjacent the chain members and cooperable therewith to complete the formation of the receptacles, a material chute arranged over said chain members, and means for feeding a predetermined amount of material from said chute into the completed receptacles as they successively pass therebetween.

19. In a machine of the class described, the combination with a blank holder and feeding means therefor, of a receptacle-

forming device, endless flexible die members arranged beneath said forming device, said die members having die-forming elements arranged thereon to form a plurality of die-pockets adapted to receive partially completed receptacles from said forming device, a supporting means for the flexible die members, a drive mechanism adapted intermittently to actuate said die members to progressively feed the partially completed receptacles through the machine until completed, means for filling the receptacles, and means for receiving the filled receptacles.

20. In a receptacle making machine, the combination with a blank holder and feeding means, of a receptacle forming device, a plurality of movable die-pockets arranged therebeneath and adapted individually to receive partially completed receptacles from said forming device, and means operable to intermittently actuate said die pockets to progressively feed the receptacles through the machine while being formed.

21. In a receptacle forming machine, the combination with a blank holder and a feeding means therefor, of stationary die members adapted to receive the blanks, a reciprocating plunger mounted over said die members adapted to downwardly force a blank therebetween to partially form a receptacle, a plurality of intermittently operable die-pockets arranged beneath said members adapted to receive the partially completed receptacles therefrom and to intermittently and progressively feed them through the machine until completed.

22. In a receptacle forming machine, the combination with a blank holder adapted to receive a plurality of blanks, of a reciprocally mounted feed block adapted to successively feed the blanks from the holder onto a forming device adapted to fold the sides of the blank, a pair of endless belts arranged in substantially spaced parallel relation beneath said forming device, said belts having projecting die-forming elements arranged thereon adapted to form a plurality of die-pockets between the adjacent sections of the belts, said die-pockets being adapted to receive the partially completed receptacles from the forming device and to progressively feed them through the machine until completed, and means for supporting and actuating said endless belts.

23. In a receptacle forming machine, the combination with a pair of stationary die-blocks and a reciprocating plunger adapted to receive blanks of material for the purpose of folding them to form a receptacle, of a pair of endless belts arranged therebeneath, each belt having a plurality of spaced die-forming members arranged thereon adapted to form a plurality of spaced die pockets between the adjacent section of the belts, and means adapted intermittently to actuate said belts to progressively feed the receptacles, seated in said die pockets, through the machine.

24. In a machine of the class described, the combination, with a supporting plate, of a pair of endless chains arranged over said plate, said chains being spaced apart and arranged in the same plane, and provided with projections forming pockets, between said chains, adapted to receive partially folded receptacle blanks, the bottoms of the pockets being closed by the supporting plate, means for placing partially folded receptacles in said pockets, means for completing the folding of the receptacles while held in said pockets, and means for moving said chain is over the surface of the supporting plate.

25. In a machine of the class described, the combination, with a supporting plate, of a pair of endless chains arranged over said plate, said chains being spaced apart, and arranged in the same plane and provided with projections forming pockets adapted to receive partially folded receptacle blanks, the bottoms of the pockets being closed by the supporting plate, means for placing partially folded receptacles in said pockets, means for completing the folding of the receptacles while held in said pockets, means for moving said chains over the surface of the supporting plate, and means for placing material in said receptacles while held by said pockets.

26. In a machine of the class described, the combination, with a holder arranged to hold a stack of blanks, of means for feeding the blanks successively from the bottom of the stack, supporting rails over which the blanks are moved from the stack holder, said rails being spaced apart, forming dies arranged beneath said rails, a plunger arranged above said rails and adapted to pass between the same and to press the supported blank between the forming dies, a die pocket beneath the forming dies, means for reciprocating said plunger and holding it for an interval between the forming dies and thereafter moving it to force the blank from said forming dies into said die pocket, and means for folding portions of the blank against the walls of the plunger while the plunger is in a stationary position between the forming dies.

27. In a machine of the class described, the combination, with a holder arranged to hold a stack of blanks, of means for feeding the blanks successively from the bottom of the stack, supporting rails over which the blanks are moved from the stack holder, said rails being spaced apart, forming dies arranged beneath said rails, a plunger arranged above

said rails and adapted to pass between the same and to press the supported blank between the forming dies, a die pocket beneath the forming dies, means for reciprocating said plunger and holding it for an interval between the forming dies and thereafter moving it to force the blank from said forming dies into said die pocket, means for folding portions of the blank against the walls of the plunger while the plunger is in a stationary position between the forming dies, and means for completing the folding of the blank to form an open topped receptacle while the blank is in the die pocket.

28. In a machine of the class described, the combination, with a holder arranged to hold a stack of blanks, of means for feeding the blanks successively from the bottom of the stack, supporting rails over which the blanks are moved from the stack holder, said rails being spaced apart, forming dies arranged beneath said rails, a plunger arranged above said rails and adapted to pass between the same and to press the supported blank between the forming dies, a die pocket beneath the forming dies, means for reciprocating said plunger and holding it for an interval between the forming dies and thereafter moving it to force the blank from said forming dies into said die pocket, means for folding portions of the blank against the walls of the plunger while the plunger is in a stationary position between the forming dies, and means for placing material in said receptacle while it is held by said die pocket.

29. In a machine of the class described, the combination, with a holder arranged to hold a stack of blanks, of means for feeding the blanks successively from the bottom of the stack, supporting rails over which the blanks are moved from the stack holder, said rails being spaced apart, forming dies arranged beneath said rails, a plunger arranged above said rails and adapted to pass between the same and to press the supported blank between the forming dies, a die pocket beneath the forming dies, means for reciprocating said plunger and holding it for an interval between the forming dies and thereafter moving it to force the blank from said forming dies into said die pocket, means for folding portions of the blank against the walls of the plunger while the plunger is in a stationary position between the forming dies, means for moving said chains and advancing said die pockets by a step by step motion, and means for placing material in the receptacles while they are held stationary in said die pocket.

In witness whereof, we have hereunto set our hands this 12th day of December, 1924.

CARL E. JOHNSON.
SIDNEY PEARCE.