A. B. STARR.

BOTTOMING MACHINE.

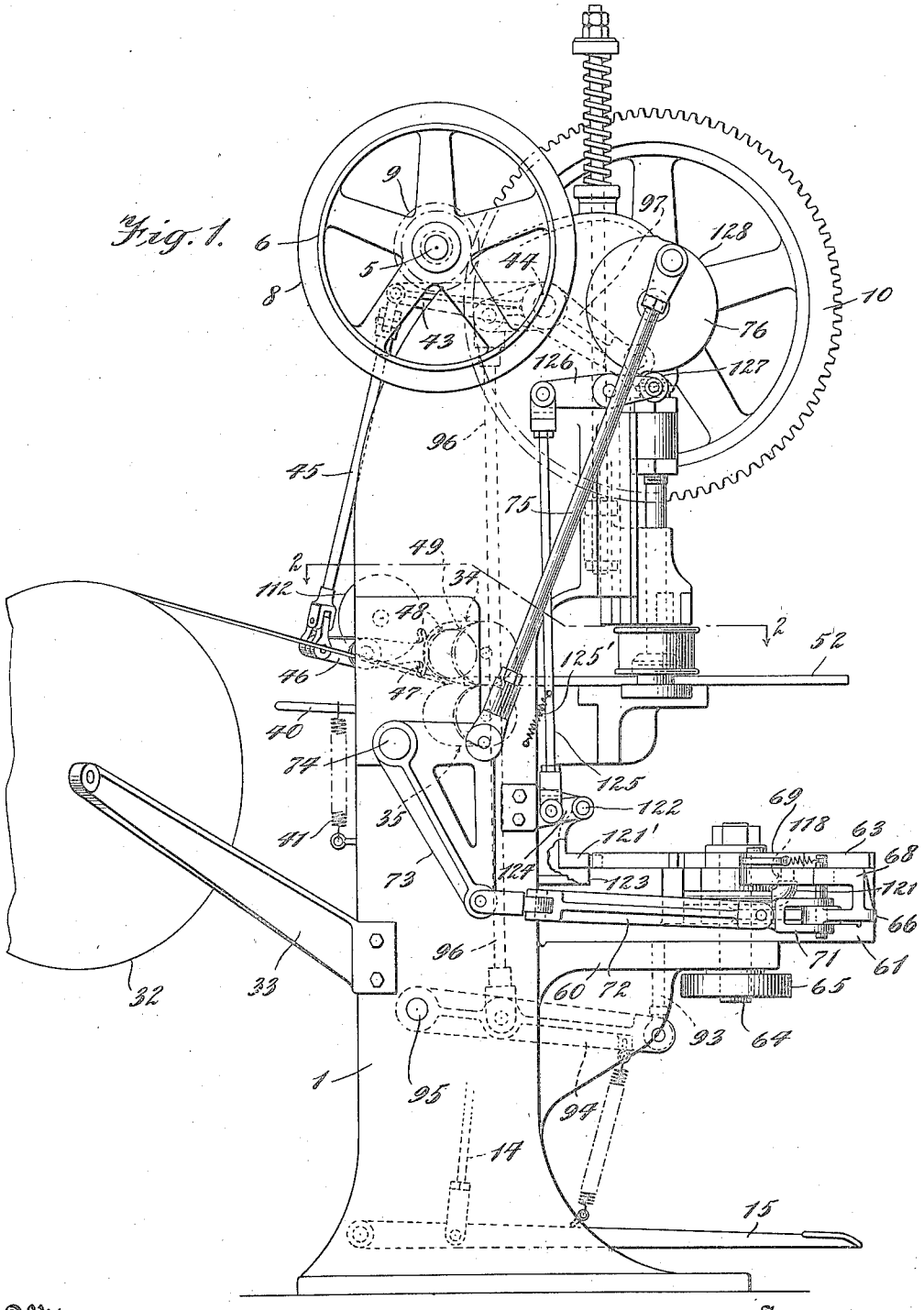
APPLICATION FILED OCT. 8, 1913.

1,161,544.

Patented Nov. 23, 1915.

4 SHEETS—SHEET 1.

Fig. 1.



Witnesses:

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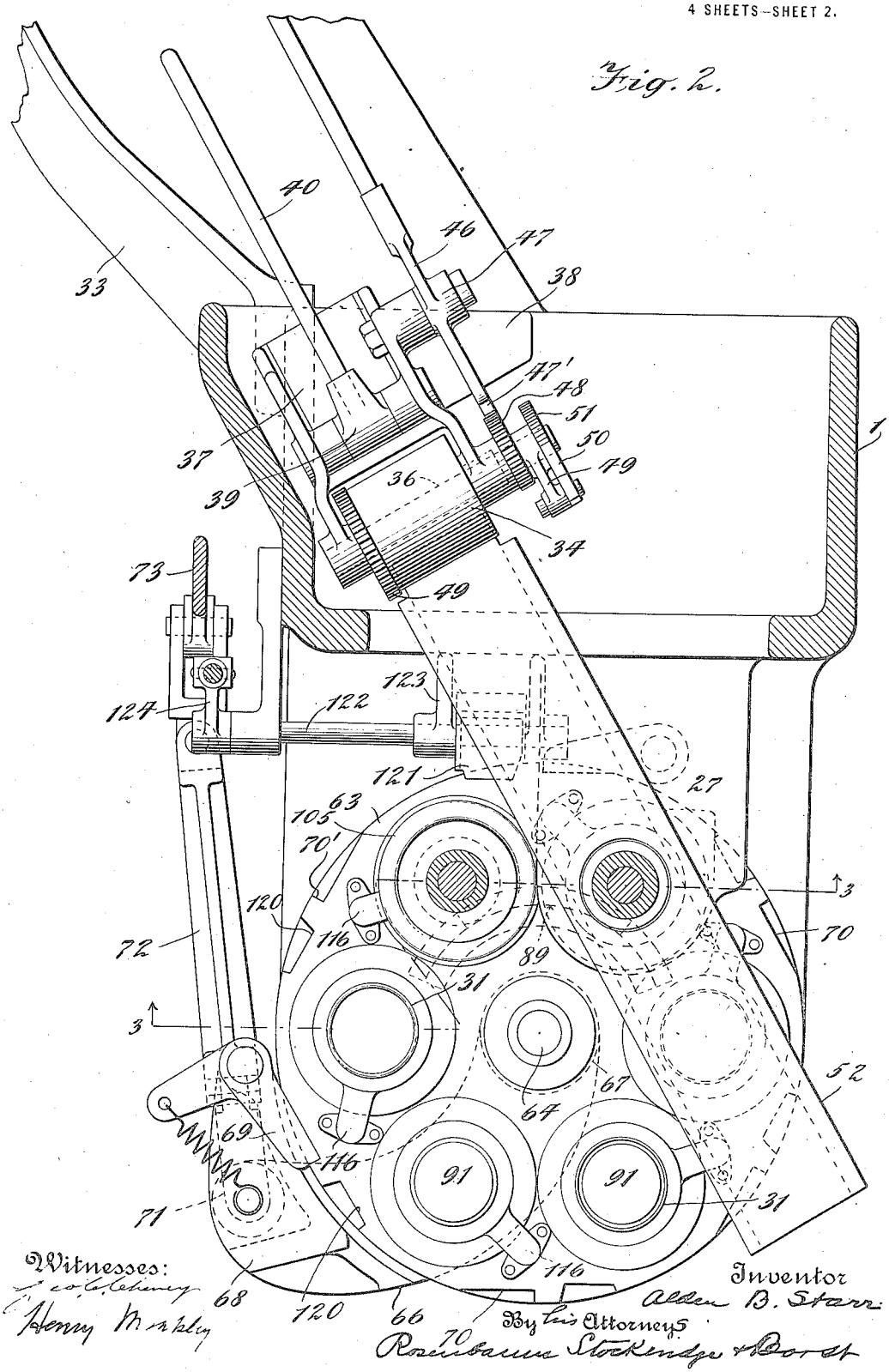
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4 SHEETS—SHEET 2.

Fig. 2.



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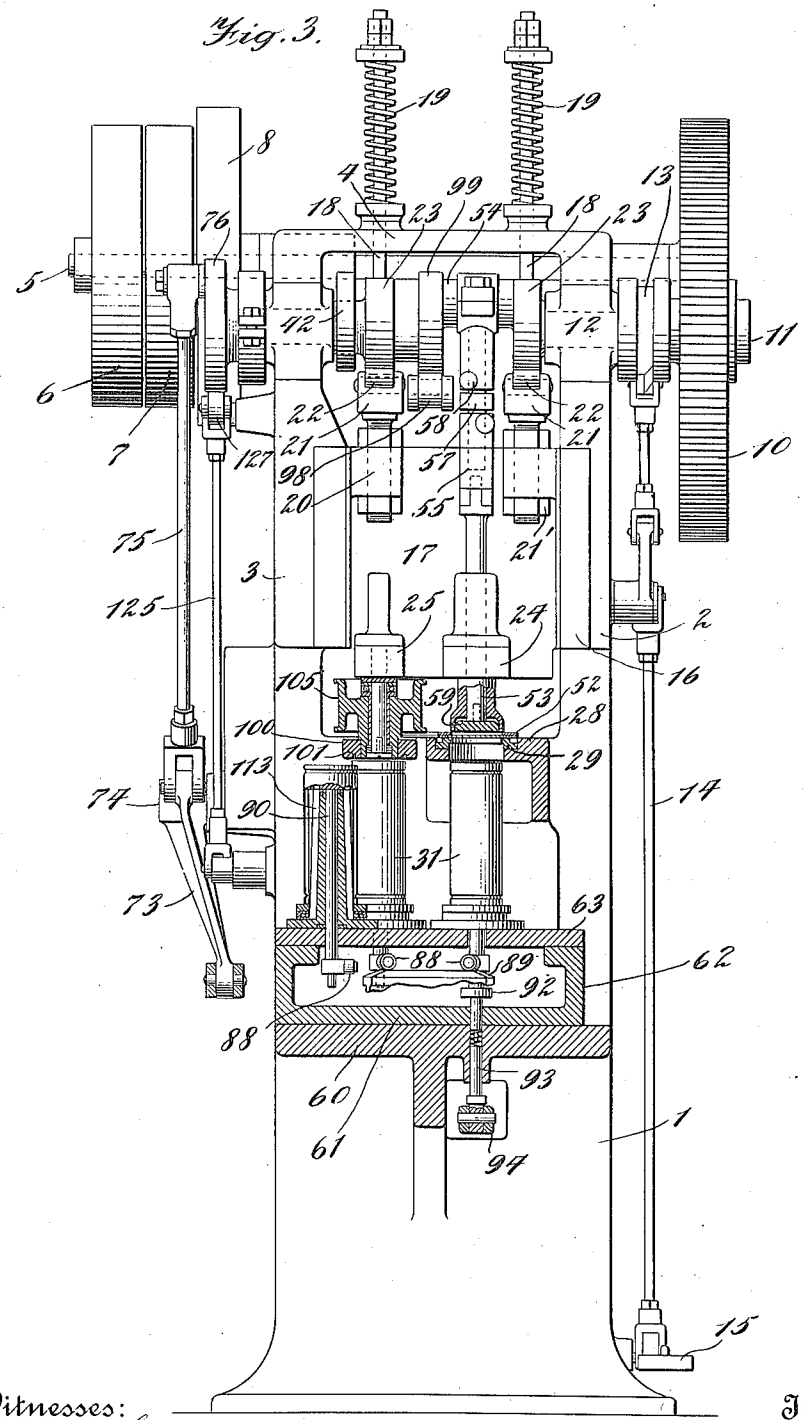
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4 SHEETS—SHEET 3.

Fig. 3.



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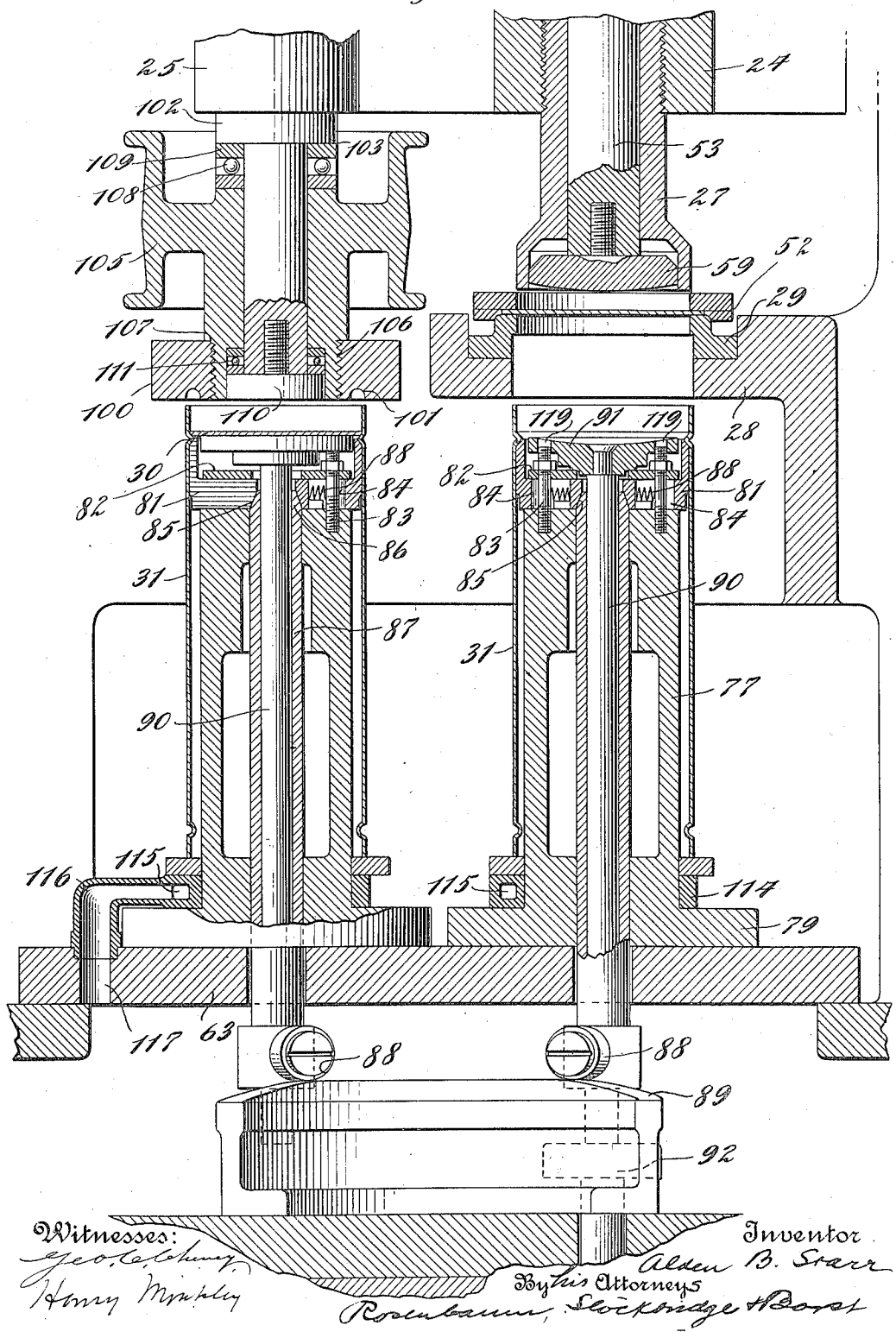
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4 SHEETS—SHEET 4.

Fig. 4.



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UNITED STATES PATENT OFFICE.

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BOTTOMING-MACHINE.

1,161,544. Specification of Letters Patent. Patented Nov. 23, 1915.

Application filed October 8, 1913. Serial No. 793,978.

To all whom it may concern:

Be it known that I, ALDEN B. STARR, a citizen of the United States, residing at the city of New York, borough of Manhattan, and State of New York, have invented certain new and useful Improvements in Bottoming-Machines, of which the following is a full, clear, and exact description.

This invention relates to bottoming machines and more particularly to the type of machine adapted to fix the bottoms in paper receptacles and the like.

One type of machine to which my invention has special application comprises broadly two dies having convex and concave working faces respectively, between which is clamped a flat disk of slightly larger diameter than the inner diameter of the tube which forms the body of the receptacle. The pressure of the dies against the disk will cause the same to be distorted to a somewhat spherical form, thereby decreasing its diameter. While in distorted condition, the disk is inserted into the body of the receptacle and when positioned therein, the pressure on the disk is removed. The tendency of the disk to assume its natural flat shape will cause it to expand and force its periphery into intimate contact with the inner walls of the body portion to form a substantially tight joint therewith. Receptacles or cartons manufactured in this manner possess distinct advantages when a tight joint is indispensable, as when the receptacles are used as containers for liquids. However, since the receptacles are usually constructed of paper and are generally used but once, it is necessary that they shall be produced rapidly and cheaply so that their cost will not make their use prohibitive.

The primary object of my invention is, therefore, to produce a machine for making receptacles of this character which shall be practically wholly automatic in operation, relatively simple in construction and capable of producing a large output of receptacles rapidly and at a small cost.

With this object in view, my invention consists of the constructions and combinations which shall be set forth in the claims and specification appended hereto.

In the accompanying drawing, Figure 1 is a side elevation of my improved machine with the mandrels removed; Fig. 2 is an enlarged horizontal section on the line 2—2 of Fig. 1 looking in the direction of the arrows, only a portion of the bracket for the paper roll being shown, the mandrels omitted from Fig. 1 being shown; Fig. 3 is a front elevation of the machine, a portion of the bed and dial-plates being cut away on the line 3—3 of Fig. 2; the two mandrels being shown in full, and Fig. 4 is an enlarged fragmentary section through the two rear mandrels, bed and dial-plates on the line 3—3 of Fig. 2.

The machine illustrated in the accompanying drawing has an up-standing frame 1 which is shaped to form three sides of a hollow rectangular body, the upper middle portion of the front face of the frame being cut away forming standards 2, 3, integral with the side pieces of the frame, the side pieces of the frame being connected at the top of the machine by a connecting web 4.

Journaled in suitable bearing-blocks fastened to the rear and adjacent the top of the side pieces of the frame is a driving shaft 5 which is provided at one end thereof with tight and loose pulleys 6 and 7, respectively, and a fly-wheel 8. A pinion 9 is rigidly secured to the other end of the shaft 5 which projects beyond the side pieces of the frame 1 and engages with a large gear-wheel 10 mounted on a shaft 11. Arranged in axial alinement with the shaft 11 is a main crank-shaft 12, which shaft is suitably journaled to bearings provided in the standards 2 and 3. The shafts 11 and 12 are connected by a clutch 13 which is controlled by a system of linkage 14 connected to a foot-treadle 15 arranged at the base of the frame and to one side thereof. As is the ordinary construction of a foot-controlled mechanism of this character, momentary pressure upon the treadle permits but one revolution of the crank-shafts 11 and 12, but if continuous operation of the machine is desired, the treadle may be held in its depressed position by any form of latch, (not shown). Arranged between the standards 2, 3, which are provided with suitable slide-ways or guides 16, is a sliding head 17 consisting of a substantially flat rectangular plate having its side edges engaging in the slide-ways 16.

The sliding head 17 is supported by rods 18 secured to the rear faces of the head, which rods extend up through openings in the connecting web 4 of the frame 1. Arranged between the upper ends of these rods and the web 4 are springs 19, which support the weight of the head 17 and normally maintain it in its upper position. The head 17 is provided with substantially cylindrical projections or blocks 20 near the upper ends and adjacent to the sides thereof. The projections 20 have vertical cylindrical openings therein into which fit the cylindrical stems of forks 21, which forks carry rollers 22 at their upper ends, the stems thereof being secured to the projections 20 by the nuts 21'. Positioned directly above the rollers 22 are cams 23 mounted on the crank-shaft 12, the rollers 22 being held in contact with the cams 23 by the tension of the springs 19. During a part of the rotation of the shaft 9, the sliding head 17 will be forced downwardly by the cams 23, the head 17 returning to its normal position by the action of the springs 19 giving to the head 17 a reciprocating motion dependent upon the rotation of the crank-shaft 12.

Extending forwardly from the lower front portions of the sliding head 17 are substantially cylindrically-shaped blocks 24 and 25 which are preferably made separately therefrom and bolted thereto. The block 24 is provided with a vertical cylindrical opening into which a hollow sleeve formed integral with a hollow punch 27, is secured, either by threading the sleeve-like portion of the punch into this opening, or in any other desirable manner. Extending inwardly and forwardly from the standard 2 is a bracket 28, which is provided with a flat horizontal surface; which is recessed to receive a die 29 co-acting with the cutting punch 27 to cut a disk 30 from a strip of paper or other material of a suitable diameter to form a bottom 30 for a tube 31 which forms the side walls or body of the receptacle.

The strip of material from which the disks 30 are cut is supplied from a roll of paper cardboard 32 supported in suitable brackets 33 extending rearwardly from the frame of the machine. This strip of material is fed between a pair of feed rolls 34, 35, the roll 34 being mounted (see Fig. 2) on a shaft 36 supported in U-shaped bracket 37, which is in turn supported by a shelf or web 38 extending inwardly from one of the side pieces of the frame 1. The other roll 35 is supported in a yoke 39, which is pivotally supported in the bracket 37 and has extending therefrom an arm 40. Attached to the free end of the arm 40 is a spring 41, the other end of the spring being fastened to the frame 1, whereby tension will be continually exerted upon the roll 35 to maintain it in contact with the strip of material which is fed between it and the fixed roll 34. The feed roll 34 receives a partial rotation for each revolution of the main crank-shaft 12 through the instrumentality of a cam 42 mounted thereon (see Fig. 3).

One arm of a bell-crank 43 which is pivotally mounted in the frame, as at 44, carries a roller which engages with the cam 42 and the other arm of the bell-crank 43 is connected to a rod 45 by a universal joint connection. The rod 45 is in turn connected at its other end through a second universal joint connection to one end of a lever arm 46 which is pivotally mounted as at 47 in the bracket 37. The other end of the lever arm 46 carries a sector gear 47' which meshes with a pinion 48 carried loosely on the shaft 36 of the feed roll 34 and fastened to the pinion 48 is an arm 49 also loosely mounted on the shaft 36, which arm carries a spring-pressed pawl 50. The pawl 50 engages with a ratchet wheel 51 firmly secured to the end of the shaft 36. It will therefore be seen that on rotation of the main crank-shaft 12, the rod 45 will reciprocate, the reciprocation of this rod partially rotating pinion 48 through the sector-like gear 47, which pinion 48 will transmit its motion to the ratchet wheel 51 through the one-way pawl connection shown and thereby rotate the roll 34 in one direction. The rolls 34 and 35 are connected together by gears 49 so that both feed rolls 34 and 35 may be positively driven by the mechanism in order to insure the proper advancing of the strip of material from which the disks are formed.

Extending forwardly from the feed rolls 34 and 35 and obliquely through the openings in the front face of the frame 1, is a combined stripper-plate and feed-table 52, consisting of two flat plates, the bottom plate being grooved to a sufficient width and depth to receive a strip of material from which the bottoms are cut, the upper plate fitting thereover and maintaining the strip in the groove. Directly below the cutting punch 27, these plates have alining openings, the opening in the bottom plate being shaped to allow the plate to slip over the top edge of the cutting die so that the strip of material will lie flat on the top surface of the die 29 (see Fig. 4). The opening in the upper plate is of just sufficient size to permit the punch 27 to pass therethrough this plate stripping the material from the punch 27 on its return movement. After the strip of material has been fed to the cutting dies and the flat disk 30 which forms the bottom of the receptacle cut in the manner described, this flat disk is emplaced within the open end of the tube 31 by means of reciprocating dies which will now be described.

Slidably mounted within the hollow punch 27 is a plunger 53 which is connected to the crank-pin 54 of the main crank-shaft

12 by a connecting-rod 55 which is pivotally connected thereto. The connecting-rod 55 comprises two sections which are provided with vertically-alining openings threaded for the reception of a right- and left-handed threaded bolt 57, which bolt is provided with a nut for turning the same. By turning the bolt 57, it is evident that the sections forming the connecting-rods 53 may be drawn together or separated to adjust the length of the connecting-rod. The end of the sections of the rod 55 are split and may be tightened to lock the bolts 57 by bolts 58. Attached to the lower end of the plunger 53 is a die 59 having a convex working surface, the purpose of which will be hereinafter referred to.

Extending forwardly from the front face of the frame 1 at a point somewhat below the middle thereof, is a bracket 60 having a horizontal bearing surface upon which is fastened a circular bed-plate 61, which plate is provided with up-standing flanges 62, upon which revolves dial-plate 63. The dial-plate 63 is fastened to the bed-plate 61 by a spindle 64 which passes through the center of the dial-plate 63, bed-plate 61, and bracket 60. A nut on the upper end of the spindle 64 secures the dial-plate 63 to the base 61 and the lower end of the spindle carries a brake-wheel 65 for coöperation with a brake-band (not shown), it being understood that the dial-plate 63 is fastened to the spindle 64 so that it will revolve therewith.

The dial-plate 63 is automatically revolved intermittently by the following mechanism. The flange 62 of the circular bed-plate 61 is cut away to form a slot therein on the side thereof shown in Fig. 1. A curved arm 66 having a hub 67 which fits around the spindle 64 passes through the slot thus formed, and the other end of the arm 66 has a raised projection 68 which carries a pawl 69, which pawl is spring-pressed into engagement with teeth 70 cut in the periphery of the dial-plate 63. Pivotally connected to the arm 66 below the projection 68, is a link 71, which is connected, preferably through a universal joint connection, to a reciprocating rod 72. The other end of the rod 72 is connected to one arm of the triangularly-shaped bell-crank lever 73 which is pivoted in the frame as at 74. The other arm of the bell-crank 73 has connected thereto a connecting-rod 75 which is reciprocated through a crank-disk 76 mounted on the extremity of the shaft 12. Upon rotation of the crank-shaft 12, the arm 66 is rocked or oscillated from the position shown in Fig. 2 to a position where the pawl 69 will engage with a tooth 70′ immediately to the rear of the one with which it is shown in engagement, and upon the forward movement of the arm 66, the dial-plate 63 will receive a partial rotation. The dial-plate 63 will, therefore, be moved to successive positions, each position thereof corresponding to one revolution of the main crank-shaft 12.

Mounted on the dial-plate 63 are a plurality of hollow cylindrical mandrels 77, over which mandrels are placed the tubes 31, which form the side walls or body of the receptacle. Each of the mandrels 77 is of a similar construction and is fastened to the dial-plate 63 by a flange 79 formed on the lower end thereof. Mounted on the top of the mandrel 77, is an expanding die or chuck for gripping the interior walls of the body of the tubes 31 to force the same to conform to a true cylinder and to hold the same in rigid relation to the mandrel. This expanding die or chuck comprises a plurality of sector-shaped jaws 81 which are slidably mounted on the top of the mandrel and are held in position thereon by a plate 82 fastened to the mandrel by bolts 83, said bolts being passed through elongated slots 84 in the jaws 81. The inner ends of the jaws 81 are cut away to form a conical recess 85 into which fits the conically-shaped end 86 of a sleeve 87. The sleeve 87 is slidably mounted in the hollow mandrel 77 which forms a bearing therefor and in its upper position forces the jaws 81 apart due to the inter-engagement of the surfaces of the jaws which form the conical recess 85 with the coned end 86 of the sleeve 87. Springs 88 arranged in the elongated slots 84 of the jaws 81 return the jaws to their normal position when the sleeve 87 drops to its lower position. The means for moving the sleeve to its upper position comprises a roller 88 which rides over the cam face of a segment-shaped cam 89 mounted on the bed-plate 61, the cam 89 being so designed and arranged that the sleeve 87 will be held in its upper position and the jaws 81 in gripping relation to the inner walls of the tube 30 while the mandrel 77 upon which the tube is mounted, is in the successive positions in which the bottom is placed within the tube and thereafter the edges of the tube are crimped as clearly shown in Fig. 4.

Slidably mounted within the sleeve 87 is a plunger 90 and attached to the top thereof is a die 91 having a concave working face which is adapted to co-act with the die 59 having a convex working face. The curvature of the working faces of the two dies 59 and 91 are so designed that when the disk 30 is clamped between them, the shape of the disk is changed or distorted from its natural flat shape to a somewhat spherical form and the diameter of the disk thereby decreased, so that it may readily be passed within the open end of the tube 31. The bottom of the plunger 89 is provided with a disk-like position or head 92. As each of the mandrels reaches a position beneath the punch 27, its plunger 93 which passes through the bracket

60 and the bed-plate 62 engages with the head 92 of the plunger 89. The plunger 93 has attached thereto at its lower end a lever-arm 94 mounted on the frame, as at 95.

Connected to the lever-arm 94 intermediate its pivotal connection 95 and its connection to the plunger 93, is a vertically-arranged connecting-rod 96 which passes up behind the front face of the frame 1 and is connected to one arm of a bell-crank 97 mounted in the upper portion of the frame. The other end of the bell-crank 97 carries a roller 98 (see Fig. 3), which engages with a cam 99 mounted on the main crank-shaft 12. It will therefore be evident that when the mandrel reaches the position shown in the right-hand side of Fig. 4, or, in other words, when a mandrel reaches the position directly below the punch 27 and die 29, the plunger 90, which is slidably mounted on the mandrel 77, will be raised to bring the die 91 into co-acting relation with the upper die 59 by the mechanism described. The two dies 59 and 91 will therefore clamp the disk forming the bottom of the receptacle between them and will then move downwardly to a position in which the disk 30 has entered the tube of the receptacle. The upper die 59 is then moved upwardly to its normal position and the disk 30 expands to form a substantially tight joint with the walls of the receptacle as will be more fully set out in the operation of the machine. It may here be noted that the dies 59 and 91 are arranged one on each side of the punch 27 and the die 29, so that after the disk has been cut from the strip of material, these dies are in a position to be automatically reciprocated to receive the disk between them.

After the operation of emplacing the bottom of the receptacle, the edges of the tube 31 which project there-beyond (see Fig. 4) are curled or crimped inwardly to prevent displacement of the bottom, by means of a crimping die comprising an annular collar 100 which has an annular groove 101 cut in the bottom face thereof so that when the collar is lowered into engagement with the edge of the tube and is rotated the crimping action will take place. The annular collar 100 is mounted on the end of a spindle or stud-shaft 102 secured in the block 25 fastened to the sliding head 17. Mounted on a reduced portion of the stud-shaft and against a shoulder 103 formed by the reduced portion, is a pulley 105. The hub of the pulley 105 is extended at a reduced diameter and is threaded as at 106. The annular collar or die 100 is threaded upon the portion 106 and fits against the shoulder 107, whereby it is securely retained in place. The vertical thrust of the pulley is taken up by the ball-bearings 108 which bear against a hardened washer 109 resting against the shoulder 103 which provides a solid bearing for the same. The pulley 105 is maintained in position on the shaft 102 by a set-screw 110 having a head of larger diameter than the end of the shaft 102 and between the head of screw 110 and hub of the pulley 105 is arranged a second set of ball-bearings 111. Motion is transmitted to the pulley 105 by an endless belt (not shown) which is carried over the idle pulley 112 mounted on the frame 1 adjacent the feed rolls 34 and 35.

After the receptacle is finished, it is removed from the mandrel 77 by means of a compressed fluid medium directed against the inner surface of the bottom of the receptacle. The specific manner and means whereby this is accomplished is described in detail and claimed in my companion application, Serial No. 792,927. Broadly, this means comprises two tubes 113, closed at their lower ends and having open upper ends, which tubes are arranged in grooves cut in the periphery of the mandrel 77 at diametrically-opposed points (see Fig. 3). The tubes 113 are suitably connected together at their upper ends, and at their lower ends are connected to a ring 114 (see Fig. 4) which ring is enlarged for substantially half of its periphery, and has a conduit 115 formed therewith, which conduit communicates with the lower closed ends of the tube 113. Preferably integral with the enlarged portion of the ring 113 is a pipe 116 which is rigidly connected to a hole 117 in the dial-plate 63. Arranged below the dial-plate is a second pipe 118 (see Fig. 1), which pipe is so located that when the mandrel has moved to a position following the one in which the crimping operation is performed, the pipe 118 will be in direct connection with the hole 117 in the dial-plate and the compressed fluid medium will be admitted to the tubes 113. The compressed fluid then passes between the jaws of the expander, or, through recesses therein (not shown) to the under face of the plunger die 91 which is provided with holes 119 through which the compressed air fluid is distributed and directed against the inner surface of the bottom of the receptacle to blow the same off the mandrel in a simple and expeditious manner. It may here be stated that the pipe 118 which carries the supply of compressed fluid to the hole 117 in the dial-plate is provided with a short elbow 121 and the pipe connected thereto extends rearward, just below the dial-plate to prevent it obstructing the oscillatory movement of the curved arm 66.

To prevent inadvertent movement of the dial-plate 63, I have provided a locking device which will maintain the dial-plate 63 in fixed relation to the dies carried by the head 17 during substantially half of each

revolution of the main crank-shaft 12 and it may here be stated that the cams mounted on the main crank-shaft 12 are so arranged that the bottom or disk is placed within the tube and the edges of the tube crimped during this portion of the revolution of the crank-shaft. Arranged around the periphery of the dial-plate 63 is a series of notches 120 corresponding in number to the number of the teeth 70 of the dial-plate. A latch 121′ mounted on a shaft 122 is supported in a yoke-shaped bracket 123 fastened to the front face of the frame 1. The latch 121′ is moved out of engagement with the notch 120 by an arm 124 fastened to the other end of the shaft 122, which arm 124 is connected to one end of a connecting rod 125, the other end of this rod being connected to lever arm 126 pivotally mounted on a boss 127′ extending from the side-piece of the frame 1. The other end of the lever 126 carries a roller 127 which rides on a cam surface 128 formed on the crank-disk 76. The latch 121′ is continually urged into rocking position by a spring 125′ fastened to the rod 125 and the frame 1, respectively. The cam face 128 is so proportioned that during the half of the revolution which corresponds to the forward movement of the curved arm 66, that is, while the dial-plate is being positively rotated through the engagement of the pawl 69 and one of the teeth 70, the latch 121′ will be out of engagement with the corresponding notch in the dial-plate. However, during the portion of the revolution which corresponds to the rearward movement of the curved arm 66, that is, while the dial-plate is stationary and the pawl is slipping over the periphery of the dial-plate, the locking latch 121′ will drop into the notch 122 in the periphery of the dial and prevent inadvertent movement of the dial-plate.

Operation of the machine: It will be evident from the description of the machine that the bottoming, crimping and removing operations occur in three successive positions of the dial-plate 63. However, I have found it convenient to provide six mandrels, so that for any one of three successive positions of each mandrel, the tube which forms the body or side walls of the receptacle may be placed thereon, insuring that each mandrel will be covered before it is moved to a position where the bottoming operation is performed. Let us assume that the tight pulley 7 is driving the main crank-shaft 12 continuously and that the mandrel occupying the middle right-hand position as shown in Fig. 2 is covered with a body portion 31 of a receptacle. The crank-disk 76 rotating with the shaft 12 will reciprocate the connecting-rod 75, bell-crank 73, rod 72, and curved arm 66, which will be moved until the pawl 69 carried thereby snaps into engagement with the tooth 70′. The crank-disk 76 will then have completed a half revolution, and the connecting-rod 75 will move in the opposite direction, and through the connections described move the arm 66 forwardly. The engagement of the pawl 69 with the tooth 70′ will rotate the dial-plate to bring the mandrel carrying the body portion 31 of the receptacle to a position where the bottoming operation is performed. This completes one revolution of the shaft 12. As the dial-plate is revolved to bring a mandrel and body of the receptacle carried thereby into position for the bottoming operation, the rolls 88 mounted on the end of the sleeve 87 engage with the end of the cam 89 and force the sleeve 87 upwardly. The jaws 81 of the expanding die or chuck are therefore forced apart into gripping relation with the upper inner surface of the body 31 of the receptacle to hold the same rigidly to the mandrel during the bottoming and crimping operations, the cam 89 being so designed that the roller 88 remains in engagement with the same during these two successive positions of each mandrel. During the first half of the second revolution, the curved arm 66 will again be moved rearwardly but the dial-plate 63 remains stationary, the pawl 69 slipping over the periphery of the dial-plate 63. The dial 63 is locked in its stationary position by the latch 121′ engaging in the notch 120, the cam face 128 of the crank-disk 76 being so designed that during this half of the revolution of the shaft 12, the roller 127 rides over the low portion of the cam, the spring 125′ forcing the rod 125 downwardly and throwing the latch 121′ into the notch 120. It may here be stated that on the other half revolution of the shaft 12, the roller 127 is riding over the high portion of the cam face 128 and through the lever 126, the rod 125 will be moved upwardly to withdraw the latch 121′ from the notch 120 in the dial-plate 63. The strip of material from the paper roll 32 has been advanced by the positive rotation of the feed rolls 34 and 35 in the slot in the stripper-plate 52, so that the end portion of the strip will lie between the punch 27 and its co-acting die 29. The dial-plate is then locked as described, and the reciprocating head 17 is moved downwardly, by the engagement of the cam 23 with the roller 22, carrying the punch 27 through the circular openings in the plate 52 into contact with the co-acting edge of the die 29, cutting a disk 30 from the strip of material of slightly larger diameter than the inner diameter of the body of the receptacle.

During the operation of cutting the disk 30, the lower reciprocable die 91 is moved upwardly through the plungers 90 and 93, which are in co-axial alinement, the plunger 93 receiving its upward movement by the

movement of the lever 94, rod 96, and bell-crank 97, which coöperates with the cam 99 mounted on the crank-shaft 12. When the die 91 reaches a position just beneath the die 29, the disk 30 is cut and the upper die 59 then moves downwardly to clamp the disk between it and the lower die 91, the die 59 receiving its downward movement independently of the punch 27 through the connecting-rod 55 and the crank-pin 54 of the shaft 12. The clamping action or pressure of the two dies 59 and 91 on the flat disk 30 will force the same into contact with the curved working faces of these dies to distort the disk into a somewhat spherical form, decreasing the diameter of the same so that it may be readily inserted in the open end of the body of the receptacle. The die 91 is then moved downwardly by the continued downward movement of the die 59, the disk 30 remaining clamped between the two dies, until the disk 30 rests on a bead formed on the inner periphery of the body portion 31 of the receptacle. The continued rotation of the shaft 12 will then carry the die 59 upwardly through the connection described and the pressure on the disk 30 is removed. The tendency for this disk to assume its natural flat shape will force its periphery into intimate contact with the inner walls of the body of the receptacle to form therewith a substantially tight joint. On the next revolution of the shaft 12, the dial-plate receives its third partial rotation, which carries the mandrel and the receptacle with the bottom positioned therein beneath the crimping die 100 which is lowered into contact with the edge of the tube by downward movement of the reciprocating head 17. The crimping die is rotated by the pulley 105 and the edge of the receptacle which projects beyond the bottom curled inwardly to prevent the displacement of the bottom without severe effort. The dial-plate 63 again receives a partial rotation, carrying the finished receptacle clear of the reciprocating head 17. In this position of the plate, the hole 117 in the dial-plate communicates with the pipe 118 connected to a source of compressed fluid (not shown) which fluid then passes through the pipe 116 into the tubes 113, out through the open upper ends of the same and through the recesses between the jaws 81 of the expander to the lower face of the die 91. The fluid is then distributed through the openings 119 in the die 91 and directed against the inner surface of the bottom of the receptacle, the pressure created by the compressed fluid removing the receptacle in a simple and expeditious manner.

While I have described the operation of forming a single receptacle, it is evident that when the machine is in actual operation, the crimping operation on one receptacle will be simultaneously performed with the bottoming operation on another for each reciprocation of the sliding head 17.

Having described my invention, I claim:—

1. In a bottoming machine, a mandrel over which is positioned the open ended body of the receptacle, reciprocable dies operatively associated therewith, and means for reciprocating said dies to clamp the disk forming the bottom of the receptacle between them and for inserting the disk within the open end of the body of the receptacle.

2. In a bottoming machine, a mandrel over which is positioned the open-ended body of the receptacle, reciprocable dies having working faces of reverse curvature operatively associated with said mandrel, and means for reciprocating said dies to clamp the disk forming the bottom of the receptacle between them and for inserting the disk within the open end of the body of the receptacle.

3. In a bottoming machine, a mandrel over which is positioned the open-ended body of the receptacle, means for cutting a disk from a strip of material to form the bottom of the receptacle, reciprocable dies, one mounted on each side of said cutting means and operatively associated with said mandrel, and means for reciprocating said dies to clamp the disk cut from said strip of material between them and for inserting the disk within the open end of the body of the receptacle.

4. In a bottoming machine, a mandrel over which is positioned the open ended body of the receptacle, means for cutting a disk from a strip of material of slightly larger diameter than the inner diameter of the body of the receptacle to form a bottom for the same, a reciprocable die carried on each side of said cutting means and operatively associated with said mandrel, said dies having working faces of reverse curvature, and means for reciprocating said dies to clamp the disk between them and for inserting the same within the open end of the body of the receptacle.

5. In a bottoming machine, a mandrel over which is positioned the open ended body of the receptacle, two reciprocable dies operatively associated with said mandrel, a cutting die arranged between said first named dies, a hollow punch surrounding one of said first named dies and adapted to coöperate with said cutting die to cut a disk, and separate means for reciprocating said first named dies and said punch said reciprocable dies clamping the disk between them and inserting it while in clamped condition into the open end of the receptacle.

6. In a bottoming machine, a mandrel over which is positioned the open ended body of the receptacle, two reciprocable dies having working faces of reverse curvature operatively associated with said mandrel, a

cutting die arranged between said first named dies, a punch coöperating with said cutting dies for cutting the bottom of the receptacle, and means for reciprocating said first named dies to clamp the bottom of the receptacle between them and for inserting it in the open bottom end of the receptacle.

7. In a bottoming machine, a mandrel over which is positioned the open ended body of the receptacle, a die reciprocably mounted on said mandrel, a second die operatively associated with said first-named die, means for reciprocating said dies to clamp the disk forming the bottom of the receptacle between them and for inserting the same within the open end of the body of the receptacle.

8. In a bottoming machine, a mandrel over which is positioned the open ended body of the receptacle, a die movably mounted on said mandrel, and means cooperating with said movable die for rigidly holding a disk and emplacing it within the open ended body of the receptacle to form the bottom thereof.

9. In a bottoming machine, a mandrel over which is positioned the open ended body of the receptacle, a plunger die reciprocably mounted on said mandrel, a cutting die, a hollow punch and plunger die arranged in axial alinement with said mandrel, means for reciprocating said punch to cut the bottom of the receptacle from a sheet of material, and separate means for reciprocating said plunger dies to clamp the disk thus formed between them and to insert it within the open end of the body of the receptacle.

10. In a bottoming machine, a revoluble plate, a mandrel mounted on said plate over which the body of the receptacle is positioned, an internal expanding die mounted on said mandrel, a plunger die reciprocably mounted on said mandrel, and means for expanding said expanding die and reciprocating said plunger die during a rotation of the plate.

11. In a bottoming machine, a revoluble plate, a mandrel mounted thereon, over which the open ended body of the receptacle is positioned, and means mounted on said mandrel for gripping the interior surface of the body of the receptacle during a partial rotation of the plate and means for emplacing the bottom in the open end of the body of the receptacle while the body is so held.

12. In a bottoming machine, a revoluble plate, a mandrel mounted on said plate over which is positioned the open ended body of the receptacle, an expanding die mounted on said mandrel, and means for expanding said die during a partial rotation of the plate including a cam mounted on the frame of the machine, a plunger die mounted on said mandrel and means for reciprocating said plunger die.

13. In a bottoming machine, a revoluble plate, a mandrel mounted on said plate over which is positioned the body of the receptacle, and means for gripping the interior surface of the body of the receptacle during a partial rotation of the plate comprising an expanding die mounted on said mandrel having a plurality of jaws, a member engaging with said jaws for forcing the same apart, and a stationary cam for actuating said member, a plunger die mounted on said mandrel and means for reciprocating said plunger die.

14. In a bottoming machine, a revoluble plate, a mandrel mounted thereon over which is positioned the open ended body of the receptacle, reciprocable dies operatively associated with said mandrel, means for cutting the bottom and for reciprocating said dies to clamp the bottom of the receptacle between them and for inserting it in the open end of the body portion of the receptacle in one position of the mandrel, and means for crimping the edge of the tube over said bottom in a second position of said mandrel.

15. In a bottoming machine, a revoluble plate, a mandrel mounted thereon over which is positioned the open-ended body of the receptacle, means mounted on said machine for cutting a disk from a strip of material to form the bottom of the receptacle, feeding mechanism for feeding the strip of material to said cutting means, reciprocable dies operatively associated with said cutting means and mandrel, means for reciprocating the dies to clamp the disk between them and to insert it within the open end of the body of the receptacle, means for revolving said plate to change the position of said mandrel, and means operatively associated with said mandrel in its second position for crimping the edges of the body of the receptacle after the bottom has been placed thereon.

16. In a bottoming machine, a mandrel mounted thereon over which is positioned the body of the receptacle, means for feeding a strip of material to a point over said mandrel, means for cutting a flat disk from said strip, and means operatively associated with said cutting means and mandrel for distorting said disk into a spherical shape to decrease the diameter thereof without destroying its elasticity and to emplace the same while in distorted condition within the open end of the body of the receptacle.

17. In a bottoming machine, a revoluble plate, a plurality of mandrels mounted thereon over which are placed the open-ended bodies of the receptacles means operatively associated with two of said mandrels for emplacing the bottom within one

of said bodies and for simultaneously crimping the edges of a second body in which a bottom has been placed, internal expanding dies mounted on each of said mandrels, and means for expanding said dies to hold the body rigidly positioned on the mandrels during the emplacing and clamping operations.

18. In a bottoming machine, a mandrel over which is adapted to be positioned the body of the receptacle, an internal expanding die mounted on said mandrel adapted to grip the interior surface of said package, two reciprocal plunger dies operatively associated with said mandrel, a cutting die and punch arranged between said plunger dies and means for imparting a separate movement to said plunger dies, expanding die, and punch.

19. In a bottoming machine, a mandrel over which is adapted to be positioned the body of the receptacle, an expanding die mounted on said mandrel, means for expanding said die to rigidly hold the body of the receptacle upon the mandrel, a plunger die mounted on said mandrel and means coöperating with said plunger die for emplacing a bottom within the open end of the body of the receptacle while held rigidly by said expanding die.

20. In a bottoming machine, a mandrel over which is adapted to be positioned, an open ended body of a receptacle, an expanding die mounted on said mandrel, means for expanding said die to hold said body on the mandrel, means for feeding a strip of paper to the machine, means for cutting a disk therefrom, means for emplacing the disk within the body of the receptacle, and means for crimping the edge of the body after the disk has been emplaced therein.

In witness whereof, I subscribe my signature, in the presence of two witnesses.

ALDEN B. STARR.

Witnesses:

IDA M. PATTERSON,

WALDO M. CHAPIN.