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BLANK FEEDING MEANS FOR RECEPTACLE BODY FORMING APPARATUS

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2 Sheets-Sheet 1

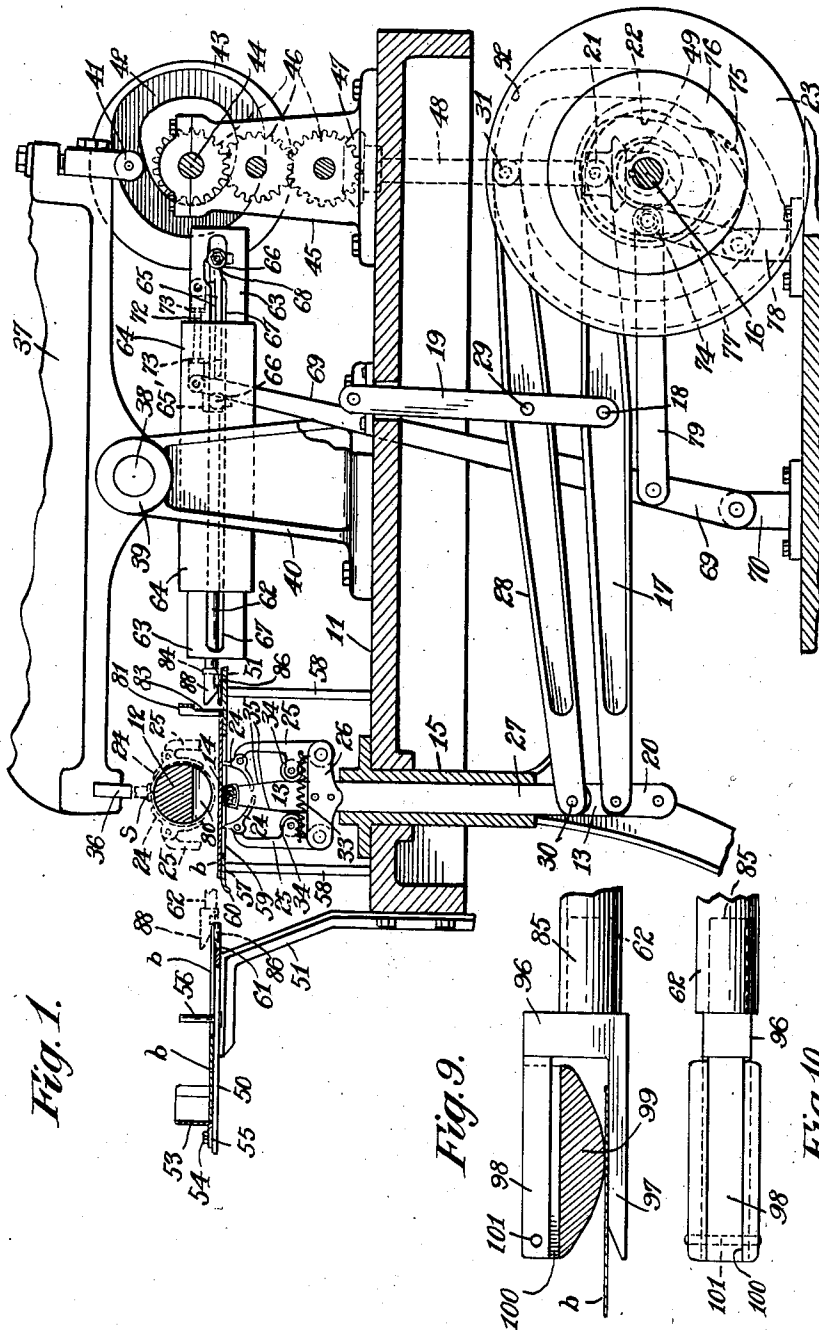


Fig. 1.

Fig. 9.

Fig. 10.

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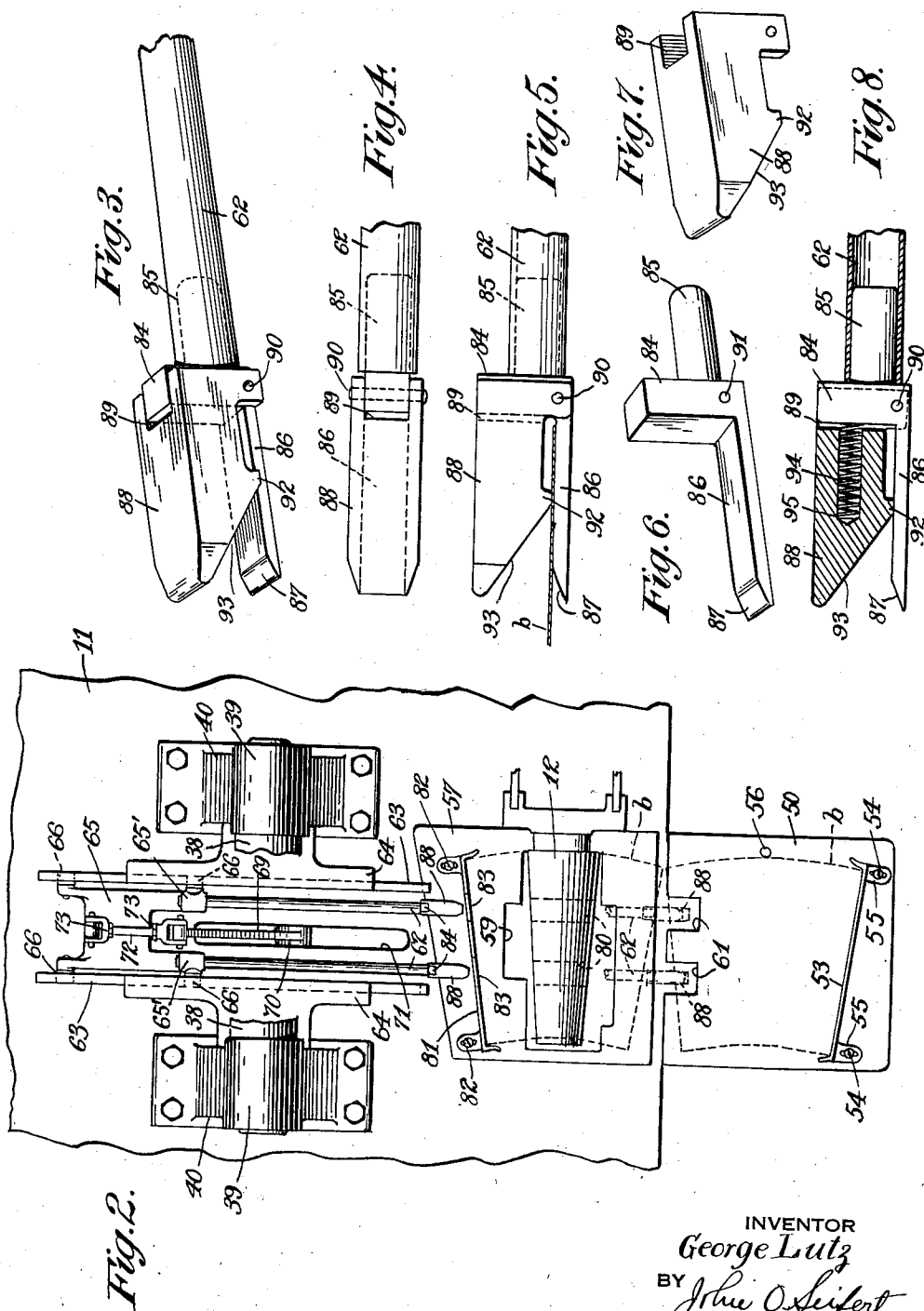
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2 Sheets-Sheet 2



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BLANK FEEDING MEANS FOR RECEPTACLE
BODY FORMING APPARATUS

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10 Claims. (Cl. 271—54)

This invention relates to means for feeding and delivering sheets from a sheet support to operating means, and particularly for delivering blanks of predetermined size and shape relative to means for wrapping the blank about a mandrel in a receptacle body forming apparatus to form the blank to tubular shape, and it is the principal object of the invention to provide means for this purpose which is simple and inexpensive to construct, and highly efficient in operation.

Another object of the invention is to provide sheet gripping jaws in sheet feeding means which are adapted to be actuated to position to permit of the engagement of a sheet between the jaws by a force exerted on the jaws by the resistance to the movement of the jaws toward the sheet support and actuated to sheet clamping position by a force exerted on the jaws by the movement of the jaws away from the sheet support.

It has heretofore been the practice in receptacle body forming apparatus of this type to feed the sheets or blanks from a support to a shelf below the mandrel by suction means embodying suction cups carried at the end of tubes reciprocated toward and away from the sheet support and connected by flexible tubing to vacuum creating means. The invention of this application eliminates the use of the vacuum creating means, driving means for said vacuum creating means and the flexible tubing connecting the vacuum creating means to the tubes, thereby not only reducing the cost of material but also the necessary labor for machining and assembling said additional parts.

In carrying out the invention there is provided a reciprocating carrier for pairs of jaws adapted to be actuated toward and away from a sheet or blank support in a direction transversely of a mandrel and relative to a sheet engaging abutment for stripping the sheets from the jaws upon the return movement of the carrier and registering the sheets relative to the mandrel, one jaw of each pair of jaws being fixed and adapted to engage and support a sheet and the other jaw movable toward and away from the fixed jaw and normally assuming a position in engagement with said fixed jaw and actuated away from said jaw by the forward movement of the carrier toward the sheet support to permit the ready engagement of a sheet on the support between the jaws by a force exerted on the movable jaw by resistance of the jaw to such movement, and the sheet being clamped between the jaws at the terminus of the forward movement by the movable

jaw assuming its normal position, and the movable jaw adapted to clamp the sheet between the jaws by a force exerted on said jaw by the resistance to the return movement thereof with the carrier away from the sheet support.

In the drawings accompanying and forming a part of this application Figure 1 is a side elevational view partly in section of a receptacle body forming apparatus having the present invention embodied therein.

Figure 2 is a view looking at the top of Figure 1 with a portion of the apparatus removed to show the sheet feeding mechanism.

Figure 3 is a perspective view of a pair clamping jaws in normal position.

Figure 4 is a view looking at the top of Figure 3. Figure 5 is a side elevation looking at the bottom of Figure 4 and showing a sheet clamped between the jaws.

Figure 6 is a perspective view of the fixed jaw. Figure 7 is a perspective view of the movable jaw.

Figure 8 is a view similar to Figure 5, partly in section, to show the mounting of the fixed jaw and a spring carried by the movable jaw to urge the jaw to sheet clamping position.

Figure 9 is a view similar to Figure 8 showing in section a modified form of movable jaw; and Figure 10 is a view looking at the top of Figure 9.

The invention is illustrated in the drawings as being embodied in an apparatus for making truncated conical receptacle bodies, comprising a bed 11 adapted to support in elevated position a truncated conical mandrel 12 about which mandrel a sheet or blank *b* of suitable size and shape is wrapped with the marginal portions thereof in overlapping relation by first clamping the blank to the mandrel through the upward movement of a plunger 13 carrying a pad 14 of yielding material at the upper end thereof, the plunger being slidably mounted in a guide member 15 supported by and extended through the bed 11 and reciprocated from a shaft 16 through a lever 17 pivotally supported intermediate its ends, as at 18, by a bracket 19 suspended from the bed 11 with one end of the lever pivotally connected to the plunger 13 through links 20 and the opposite end carrying a roller 21 engaging a cam groove 22 in a disk 23 fixed on the shaft 16. After the blank is clamped to the mandrel it is wrapped about the same with the marginal portions overlapped by a pair of flaps 24 of arcuate shape in cross section corresponding to the shape of the mandrel 12 pivotally carried by arms 25 pivotally sup-

ported in the bifurcated ends of a head 26 mounted on the ends of a pair of plungers 27 slidably mounted in the guide member 15 on opposite sides of the blank clamping plunger 13, as shown in Figure 1, and actuated toward the mandrel when the blank has been clamped thereto by a lever 28 pivotally mounted on the bracket 19 above the lever 17, as at 29, with one end bifurcated and pivotally connected to the lower ends of said plungers 27, as at 30, the opposite end of lever 28 carrying a roller 31 engaging and following a cam groove 32 in disk 23. The flaps 24 are yieldingly urged toward each other by a spring 33 connected to the arms 25 and in their normal position are maintained in spaced relation by rollers 34 mounted on the opposed sides of the arms 25 engaging the side edges of plunger 13 and during the movement of the plungers 27 toward the mandrel the rollers 34 ride along converging edge portions 35 of the plunger 13 permitting the flaps under the force of spring 33 to engage and wrap the blank about the mandrel, as shown in dotted lines in Figure 1.

The overlapped marginal portions of the blank wrapped about the mandrel are secured together by an adhesive strip *s* applied to the overlapped marginal portions of the blank under pressure of an anvil 36 carried at one end of a ram in the form of a lever 37 supported by trunnions 38 extending from the sides intermediate the ends of the lever engaging bearings 39 in a pair of spaced standards 40 fixed upon the bed 11, the opposite end of the ram lever carrying a roller 41 engaging in and following a cam groove 42 in a disk 43 fixed to a shaft 44 journaled in standards 45 supported by the bed 11 and driven from a suitable source of power such as an electric motor, not shown. Shaft 44 is operatively connected to shaft 16 by a gear train 46, one gear of which meshes with a bevel pinion 47 fixed to a shaft 48 having a gear connection 49 with shaft 16, as shown in Figure 1. The cam groove 42 in disk 43 is arranged to actuate the anvil end of the ram toward the mandrel in timed sequence with the wrapping of the blank *b* about the mandrel.

The invention of this application is to provide an inexpensive and efficiently operating mechanism for feeding or delivering the blank *b* from a suitable support in the form of a shelf 50 supported from the bed 11 by a bracket 51 on the side of the mandrel opposite to the mounting of the ram 37 and extending in a plane between the mandrel and the normal position of the plunger pad 14. To engage a blank on the shelf by the operator of the apparatus the shelf is provided with a gauge 53 adjustably mounted on the shelf adjacent the outer end thereof by screws 54 threaded into the platform and engaged in slots of ears 55 extending laterally of the gauge, as shown in Figure 2, and a pin 56 fixed in and extended perpendicularly from the shelf for the engagement of an edge of the blank. The blank is delivered from the support 50 to a shelf 57 supported from the bed 11 below the mandrel by posts 58 to extend between the mandrel and the normal positions of the plunger pad 14 and blank wrapping flaps 24, as shown in Figure 1, said shelf having an opening 59 therein to permit movement of the pad and flaps toward and from the mandrel. The shelf 57 extends in a horizontal plane at a lower level than the support 50 with the margin of the shelf adjacent said support 50 curved downwardly, as at 60 in Figure 1, to facilitate the delivery of the blank *b* from the support 50 to shelf 57. A pair of spaced recesses

61 are extended into the edge of the support 50 opposite to the curved margin 60 of the shelf 57 which recesses are bridged by the blank to facilitate the engagement of the blank by the blank transferring or feeding means.

The means for transferring a blank *b* from the support 50 to the shelf 57 comprises a pair of rods 62, shown as tubes, mounted to be longitudinally reciprocated between a pair of spaced plates 63 supported by arms 64 extended laterally from standards 40. The rods are mounted on the plates 63 by a carriage 65 having a pair of spaced sockets 65' at the forward end for the engagement of the tubes and rollers 66 mounted on the sides at both ends thereof to rotatably engage parallel slots 67 extending longitudinally in the plates 63 and terminating adjacent the ends of the plates with a portion of each slot adjacent the rear end offset in an upwardly direction, as at 68, whereby the carriage is retained in its rear-most or inactive position and prevented from moving forward accidentally by the rear rollers 66 abutting the raised portion of the lower wall of the slots forming part of the offset portion 68, as shown in Figure 1. The carriage 65 is reciprocated by an arm 69 pivotally mounted at one end on a bracket 70 fixed to the surface supporting the bed 11, the opposite end extending through an elongated opening 71 in the bed 11 and pivotally connected to the carriage by a link 72 adjustably connected to the arm and carriage, as at 73, to vary the position of the carriage relative to its actuating arm 69. The arm 69 is actuated from the shaft 16 by a roller 74 engaging in and following a cam groove 75 in a disk 76 fixed on the shaft 16, the roller 74 being carried by an arm 77 pivotally supported by a bracket 78 on the bed support, the arm 77 being pivotally connected to arm 69 by a link 79.

The mandrel 12 is arranged on the underside with a pair of parallel channels 80 extending transversely thereof for the passage of the rods 62 in their travel toward and away from the blank support 50.

The free ends of the rods 62 opposite to the ends engaged in the carriage sockets 65' are arranged with means to engage and grip the portions of blank *b* spanning or bridging the recesses 61 in the support 50 and transfer and position said blank on the shelf 57 in abutting relation to a gauge 81 mounted on the shelf 57, as at 82 in Figure 2, to have adjustment toward and away from the mandrel to accommodate different size blanks and having a pair of spaced openings 83 therein in alignment with the channels 80 in the mandrel for the passage of the rods 62, the gauge 81 positioning the blank in register with the mandrel so that the blank will be properly wrapped about the mandrel by the flaps 24.

The blank gripping means, as shown in Figures 1 to 8, inclusive, comprises a fixed jaw in the form of angle member, one angle or leg portion 84 having a stem 85 projecting from the rear thereof to be engaged in the bore of the rods 62 should the rods be of tubular structure as disclosed in the drawings or a recess in the ends or rods should the rods be of solid structure. The other angle portion 86 of the angle member extends forwardly of the free ends of the rods and is of flat cross sectional shape to form a support for the blank, the outer end being beveled, as at 87, to assure the engagement of said jaw below the blank on the support 50, as shown in dotted lines in Figure 1. The blank *b* is clamped to the jaw 86 by a movable jaw comprising a block 88

of greater width and thickness than the jaw 86 to provide weight and to facilitate the operation and clamping action thereof on the blank *b* supported by the fixed jaw 86. One end of the block is bifurcated, as at 89, adapted to straddle the angle portion 84 of the fixed jaw and pivotally mounted thereon by a pin 90 engaged in a bore 91 extending transversely through the angle portion 84 at the juncture thereof with jaw 86, with the ends projecting from the opposite sides engaging perforations in the legs of the bifurcation 89 at the bottom section of the block 88 with the body of said jaw block extending over and caused to engage the jaw 86 by the weight thereof. By this arrangement of the jaw 88 said jaw by the movement of the rods 62 toward the blank support 50 will have movement on the pin 90 in a direction away from the fixed jaw 86 by a force exerted on the movable jaw by the resistance to the movement of the jaws with the rods. The jaw 88 is mounted on the portion 84 of jaw 86 with the portion between the bifurcation 89 in spaced relation to the angle portion 84 to permit of the pivotal movement of the jaw 88 and also limit the movement of the jaw 88 away from the jaw 86 by said portion between the bifurcation legs abutting the portion 84. Prior to the termination of the movement of the jaw carrying rods 62 toward the blank support 50 the jaws are positioned within the recesses 61 with each jaw on opposite sides of the blank on said support, and at the termination of said movement of the rods the jaw 88 will move toward the jaw 86 by gravity and clamp the blank to said jaw 86. During the retrograde movement of the rods 62 away from the blank support 50 the jaw 88 is urged into blank clamping position by the force exerted on said jaw to the resistance of said retrograde movement of the jaws. To prevent the blank from being withdrawn from the jaws by the drag of the blank during the blank feeding movement the under or clamping face of the jaw 88 is arranged with a ridge 92 extended transversely and in the approximate center of the weight of said jaw, and the underface of the jaw 88 extends from the ridge to the free end in an inclined direction, as at 93, to facilitate the engaging of the blank *b* between the jaws. To further assure the clamping of the blank between the jaws and should the weight of the jaw 88 be insufficient to firmly hold the blank to the jaw 86, the jaw 88 may be yieldingly urged toward jaw 86. For this purpose a coiled spring 94 is engaged in a recess 95 extended into the wall between the legs of the bifurcation 89 of the jaw 88, as shown in Figure 8, the spring being of a length to extend from the recess and abut the inner side of the angle portion 84 of jaw 86 but not of sufficient strength to prevent the movement of the jaw 88 away from the jaw 86 by the coercive force exerted on said jaw by the movement thereof with the rods toward the blank support 50.

A modified form of jaws is shown in Figures 9 and 10 which are also adapted to be actuated by a coercive force exerted thereon by the movement thereof with the jaw carrying rods 62 toward and away from the blank support 50. In said arrangement the fixed jaw comprises a bifurcated or U shaped member 96 having a stem projecting from the rear of the connecting portion of the legs of the bifurcation, similar to the stem 85 of the fixed jaw shown in Figures 3 to 6 and 8, for connection with the rods 62, as shown in Figures 9 and 10. A leg 97 of the U member 96 corresponds to the jaw 86 and constitutes the

fixed blank supporting jaw. The movable jaw is pivotally supported by the other leg portion 98 of member 96 and comprises a block 99 the face of which is of convex form in longitudinal section. The rear or face opposed to the convex face is arranged with a channel 100 extending longitudinally of the block 99. The leg portion 98 engages in the block channel 100 and the block is pivotally mounted on said leg 98 by a pin 101 engaged in a bore extending transversely through the leg 98 adjacent the free end thereof with the ends of the pin extended from the opposite sides of said leg engaging perforations in the sides of the channel 100, so that the convex face of the block 99 will normally engage the fixed jaw 97 by gravity. It will readily be seen from Figure 9 that a force exerted on the block by the resistance to the movement thereof with its carrying rod 62 toward the blank support 50 will impart movement to the jaw block 99 on the pin 101 in a direction away from the jaw 97, the channel 100 being of greater depth than the thickness of the leg portion 98 permitting movement of the jaw 99 away from jaw 97 sufficient to permit of the ready engagement of a blank between the jaws. At the terminus of the forward movement of the jaw carrying rods toward the blank support 50 the jaw 99 will clamp the blank against the jaw 97 by gravity and the force exerted on the jaw 99 during the retrograde movement of the rods 62 away from the blank support 50 will urge the jaw 99 into clamping position. The blank *b* is securely retained between the jaws 97, 99 during the retrograde movement of the rods by providing a point of contact between the movable jaw 99 and the blank due to the convex formation of the gripping face of said jaw.

In both forms of jaws illustrated in the drawings the blank is released from the jaws by the travel of the jaws past the gauge 81 and the abutting of the leading edges of the blank against the gauge will strip the blank from the jaws and position the blank on the shelf 57 in register with the mandrel.

Having thus described my invention, I claim:

1. In means for feeding sheets relative to a mandrel in receptacle body forming apparatus, a pair of jaws adapted to be reciprocated in a plane parallel to the plane and transversely of the mandrel, one jaw of each pair of said jaws fixed and the other jaw pivotally carried by the fixed jaw to have movement toward and away from and normally urged to engage the fixed jaw, said pivoted jaw being adapted by the resistance of the jaw to the forward movement thereof to be moved away from the fixed jaw to permit engagement of a sheet between the jaws, and at the terminus of said forward movement moving by gravity to clamp the sheet engaged between the jaws, and said pivoted jaw by the resistance to the return movement of the jaw urged to sheet clamping position, and an abutment fixed in predetermined relation to the mandrel adapted to be engaged by and strip the sheet from the jaws and register the sheet relative to the mandrel during the return movement of the jaws.

2. In means for feeding sheets relative to a mandrel in receptacle body forming apparatus, rods reciprocatory transversely of the mandrel, a jaw fixed to and projecting forwardly of each rod, another jaw carried by each rod to have movement toward and away from and normally urged into engagement with the fixed jaw and adapted to be urged away from the fixed jaw by the resistance of said jaw to the forward movement there-

of with the rods to permit of the ready engagement of a sheet between the jaws and at the terminus of the forward movement assuming its normal position with the sheet clamped between the jaws, and the movable jaw urged to sheet clamping position during the return movement of the rods by the resistance thereof to said return movement, and an abutment positioned in predetermined relation to the mandrel to be engaged by and strip the sheet from the jaws and register the sheet relative to the mandrel.

3. Sheet feeding means as claimed in claim 2, wherein the fixed jaw is provided with a flat horizontal gripping face and the forward end inclined from the back toward the face of the jaw to facilitate the engagement of said jaw below the sheet, and the movable jaw is pivotally mounted at the rear lower portion thereof at the rear end of the fixed jaw to adapt the pivoted jaw to be normally urged to engage the fixed jaw by gravity.

4. Sheet feeding means as claimed in claim 2, wherein the fixed jaw comprises one leg of a bifurcated member fixed to the rods with the bifurcation legs arranged in superposed relation, and the movable jaw is pivotally mounted at the outer end of the upper leg of and within the bifurcated member, whereby the movable jaw by gravity and the resistance to the reciprocal movement thereof with the rods is urged toward and away from the fixed jaws.

5. In receptacle body forming apparatus, a mandrel, a support for receptacle blanks, a shelf below the mandrel, an abutment on said shelf, for the engagement and registering of a blank on the shelf with the mandrel, pairs of sheet feeding jaws, and a reciprocatory carrier for the jaws adapted to move the jaws transversely of and between the mandrel and shelf in a direction toward and away from the blank support, one jaw of each pair of jaws being fixed on the carrier and the other jaw pivotally carried by the fixed jaw to have movement toward and away from the fixed jaw and adapted to normally engage the fixed jaw and to be urged away from the fixed jaw by the resistance of the jaw to the movement thereof toward the blank support to facilitate the engagement of an edge portion of a blank on the support between the jaws, and at the terminus of said movement toward the support assume its normal position to clamp the blank between the jaws and urged to blank clamping position by the resistance of the jaw to the return movement thereof away from the blank support and the blank during the feeding movement thereof engaging the abutment and thereby is released from the jaws and positioned on the shelf in predetermined registry with the mandrel.

6. Receptacle forming apparatus as claimed in claim 5, wherein the fixed jaws comprise a member of right angle form in longitudinal section, one angle portion constituting the jaw and fixed by the other angle portion on the carrier with the face of the jaw extending in a horizontal plane, and the pivoted jaws are of block form having one end bifurcated and pivotally connected at said bifurcated end below the longitudinal center of the block to the fixed jaws at the juncture of the angle portions thereof with the legs of the bifurcation embracing the opposite sides of the angle portion of the jaws fixed on the carrier whereby the pivoted jaws are adapted to normally assume a position in engagement with the fixed jaws.

7. In sheet feeding means, a pair of sheet grip-

ping jaws, a reciprocatory carrier for the jaws adapted to longitudinally reciprocate the jaws, one of said jaws being fixed on the carrier and the other jaw pivotally carried by the fixed jaw to have movement toward and away from the fixed jaw and normally assuming a position in engagement with the fixed jaw, and said pivoted jaw arranged whereby it is adapted to be urged in a direction away from the fixed jaw during the movement of the jaws in one direction by the resistance of said pivoted jaw to said movement thereof, and said pivoted jaw urged toward the fixed jaw by the resistance of said pivoted jaw to the movement thereof in the opposite direction.

8. In sheet feeding means, a reciprocatory support, a pair of sheet gripping jaws, one of the jaws being fixed on and extended from the support and the other jaw pivotally carried by the fixed jaw to extend parallelly of and adapted to normally assume a position in engagement with the fixed jaw, said pivoted jaw comprising a rectangular block having a bifurcation at the rear end adapted to embrace a part of the fixed jaw and pivotally connected therewith by the bifurcation legs below the longitudinal center of the block, and the face of the pivoted jaw opposed to the face of the fixed jaw diverging from a point intermediate the ends toward the front end and back of the jaw adapted to resist the forward movement of the jaw and thereby urged away from the fixed jaw during the forward movement thereof and facilitate the engaging of an edge portion of a sheet between the jaws, and urged toward the fixed jaw during the retrograde movement by the resistance of the pivoted jaw to such movement.

9. In sheet feeding means, sheet gripping jaws, one jaw being of right angle form in longitudinal section and one angle portion thereof constituting the sheet engaging portion thereof, and the other jaw movably carried by and extending parallelly of the sheet engaging portion of the first jaw, comprising a rectangular member having a bifurcation at one end to embrace the angle portion of the first jaw extending at a right angle to the sheet engaging portion and pivotally connected at the rear end below the longitudinal center to the juncture of the angle portions of said first jaw and having a reduced sheet engaging face, and the ends of the sheet engaging faces of the jaws declining from the face toward the end and back to facilitate engaging a sheet between the jaws.

10. In sheet feeding means, a reciprocatory carrier, a jaw having a flat sheet engaging surface fixed at one end to and extending forward of the carrier, and a jaw pivotally mounted at the rear end below the longitudinal center thereof on the rear end of the fixed jaw to extend parallelly of and have movement toward and away from and normally engage the sheet engaging face of the fixed jaw and participate with the fixed jaw in the reciprocatory movements of the carrier, said pivoted jaw having a ridge extending transversely of and projecting from intermediate the ends of the face thereof to constitute the sheet engaging portion of the jaw and adapted by the resistance of the jaw to the forward movement thereof with the carrier to be urged away from the fixed jaw and by the resistance of the jaw to rearward movement thereof urged toward the fixed jaw.

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