Sept. 2, 1952 A. MERKLE 2,608,914

APPARATUS FOR SECURING A CLOSURE SUPPORTING RING IN THE END OF A RECEPTACLE BODY

Filed July 28, 1949 3 Sheets-Sheet 1

Fig. 1.

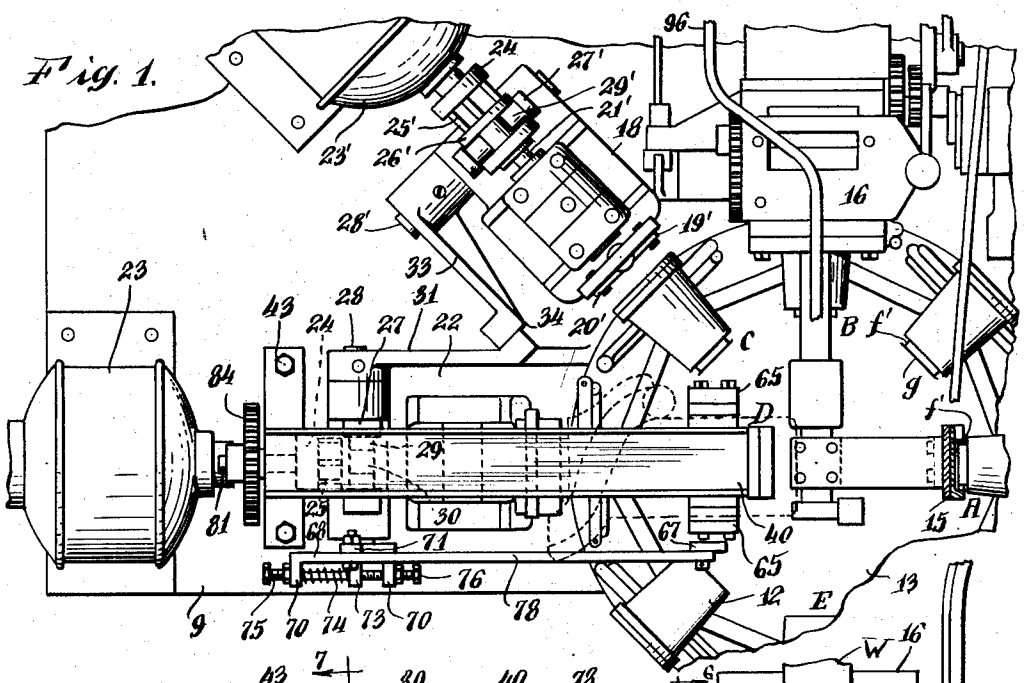
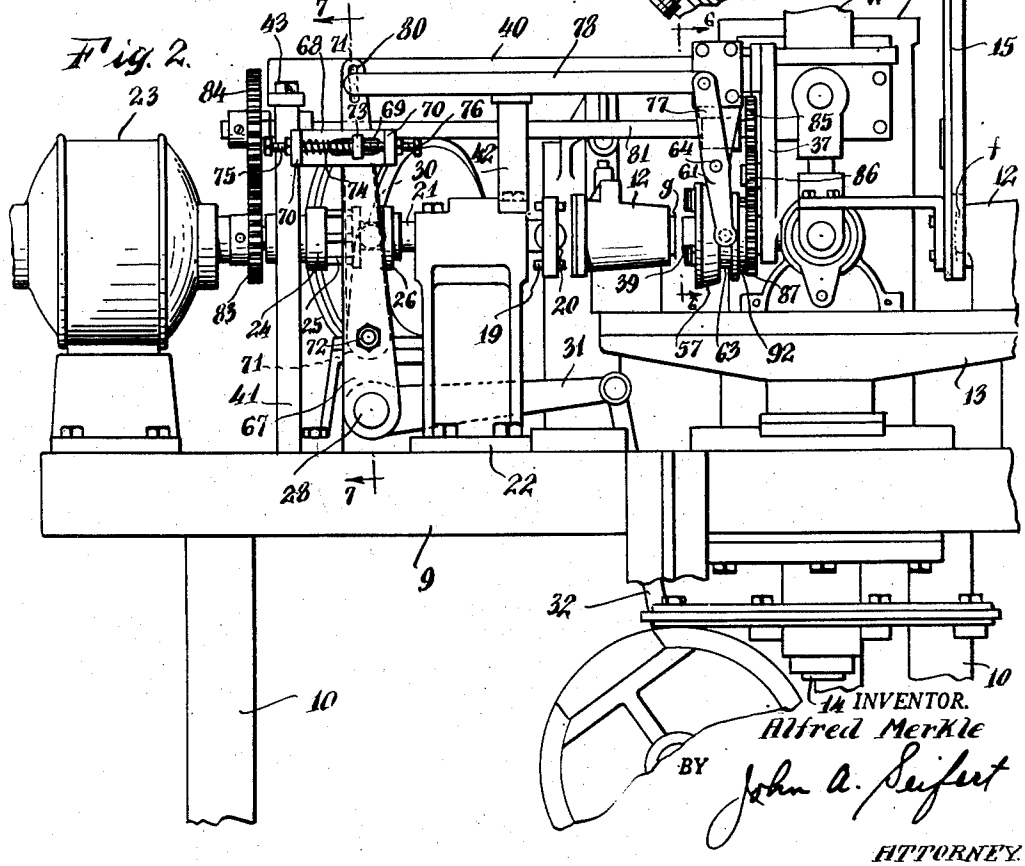


Fig. 2.



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Fig. 3.

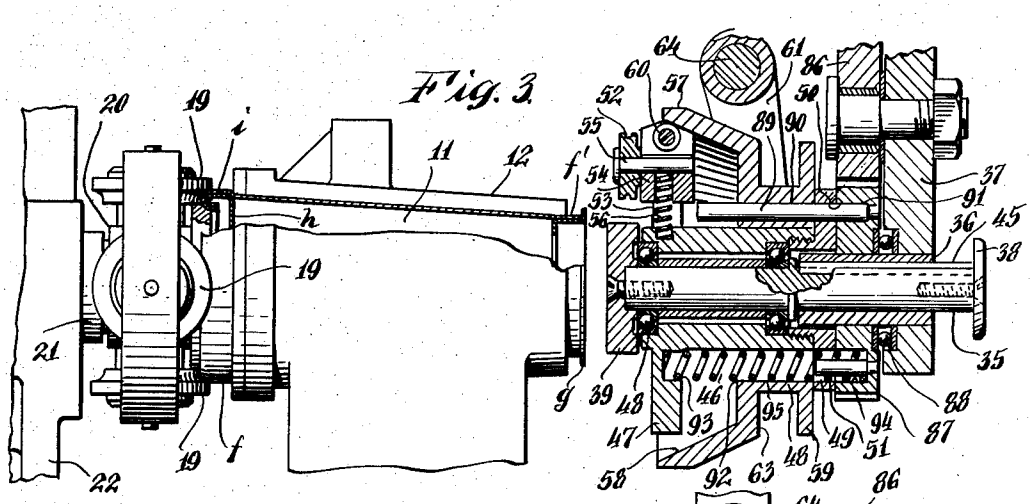


Fig. 4.

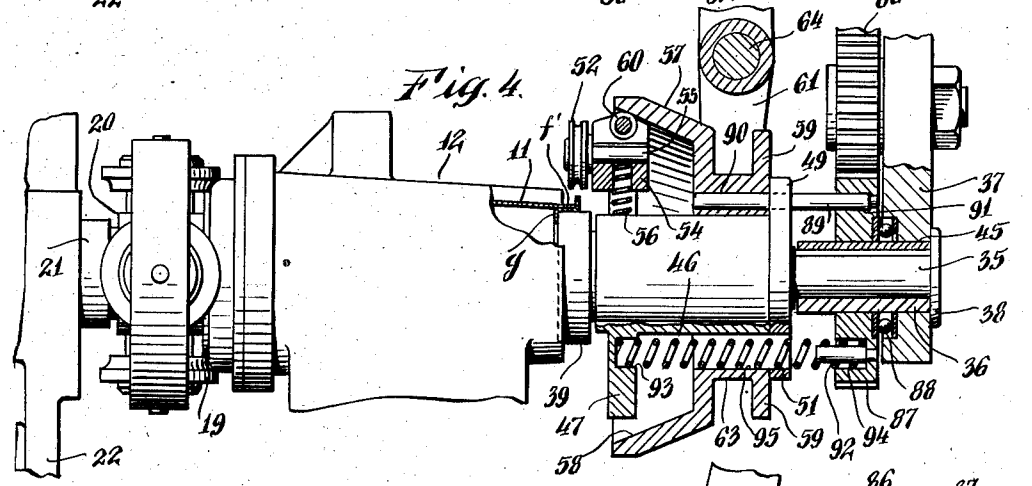
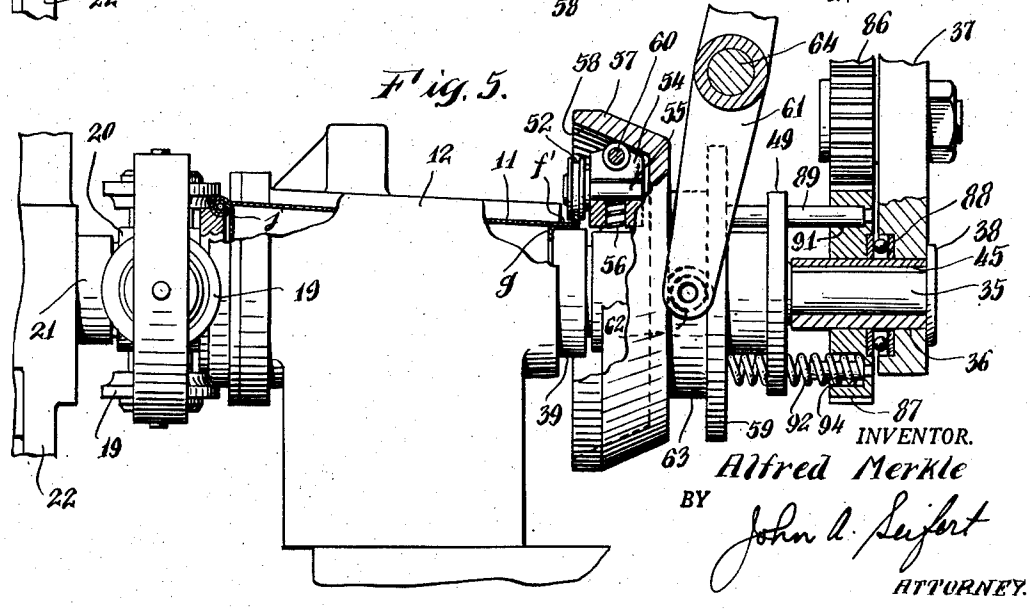


Fig. 5.



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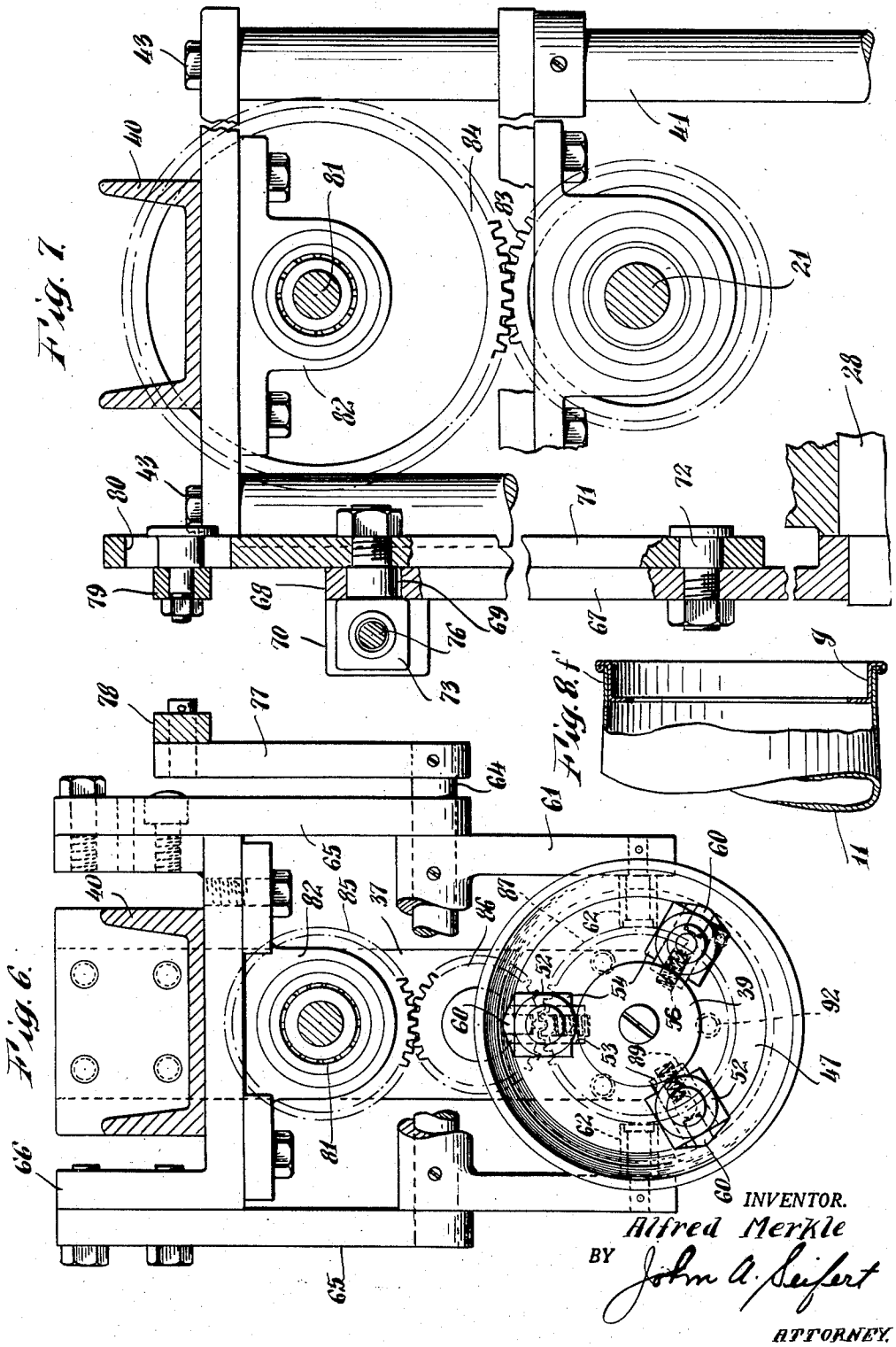


Fig. 7.

Fig. 8.

Fig. 6.

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Patented Sept. 2, 1952

2,608,914

UNITED STATES PATENT OFFICE

2,608,914

APPARATUS FOR SECURING A CLOSURE SUPPORTING RING IN THE END OF A RECEPTACLE BODY

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Application July 28, 1949, Serial No. 107,196

2 Claims. (Cl. 93—36.5)

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This invention relates to apparatus for making receptable bodies having one end closed and the opposite end arranged with a ring having an inwardly extending shoulder for supporting a closure in said opposite end of the receptacle bodies.

The apparatus is particularly adapted for forming a tubular receptacle body from a flat blank of paper, inserting a metal ring having a closure supporting flange in one end of the receptacle body, forming and inserting a flanged paper disk in the opposite end of the receptacle body to constitute the bottom closure thereof, securing the bottom closure in the receptacle body in two steps, and securing the closure supporting ring in the receptacle body simultaneously with the final step of securing the bottom closure in the receptacle body.

It is an object of the invention to adapt existing apparatus as shown in Patents No. 1,916,981, issued July 4, 1933, and No. 1,917,374, issued July 11, 1933, to Ellis L. Jones, to secure a closure supporting ring in the filling and pouring end of the receptacle body formed in said machines.

It is another object of the invention to provide a spinning head to secure the closure supporting ring in the receptacle body adapted to hold the receptacle body against longitudinal movement in a holder therefor during the final spinning of the bottom closure and the spinning of the closure supporting ring in the opposite ends of the receptacle body.

It is a further object of the invention to provide a spinning head for securing a closure supporting ring in one end of a receptacle body simultaneously with the final spinning of a bottom closure in the opposite end of the receptacle body without interfering with said final spinning of the bottom closure.

Another object of the invention is to operate both spinning heads from the same source of power.

Further objects and advantages of the invention will be disclosed in the detailed description of the invention.

In the drawings accompanying and forming a part of this application:

Figure 1 is a plan view of part of the apparatus for forming receptacle bodies associated with the embodiment of the invention.

Figure 2 is an elevational view of the part of the apparatus shown in Figure 1.

Figure 3 is a side elevational view showing the retrograde positions of the final spinning head for securing the bottom closure and the spinning head for securing the closure supporting ring with the spinning head for the ring in section.

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Figure 4 is a view similar to Figure 3 showing both heads in position prior to the spinning operation with a portion of the spinning head for the ring in position to retain the receptacle body against longitudinal movement in the holder therefor.

Figure 5 is a view showing the spinning heads in spinning position.

Figure 6 is a sectional view, on an enlarged scale, taken on the line 6—6 of Figure 2 looking in the direction of the arrows to show the front face of the spinning head for the ring and the operating means therefor.

Figure 7 is a sectional view, on an enlarged scale, taken on the line 7—7 of Figure 2 looking in the direction of the arrows to show operating means for the spinning head for the closure disk and the connection thereof with the operating means for the spinning head for the ring.

Figure 8 is a fragmentary view of the filling and pouring end of a receptacle body showing in section the ring secured in said end.

The embodiment of the invention is shown with an apparatus for making paper containers partly shown in Figures 1 and 2 as comprising a table 9 supported in elevated position by legs partly shown at 10 in Figure 2. A tubular body 11 is formed from a flat paper blank in the manner shown in the aforementioned Jones patents and inserted in a holder 12 of a series of tubular holders mounted on a conveyer in the form of a disk 13 secured to a shaft 14 rotatably mounted in the table 9 and intermittently actuated by suitable means disclosed in the Jones patents to present the holders to different predetermined positions or stations.

Looking at Figure 1, the holder 12 at station A receives a receptacle body 11 from the body forming mechanism of the apparatus shown in the Jones patents. The holders 12 and the receptacle bodies 11 are of such size and shape that the opposite end portions of the receptacle bodies will extend from the corresponding ends of the holders, as shown at f and f' in Figure 3.

During the positioning of a receptacle body 11 in a holder 12 at station A, the end portion f' of the receptacle body is engaged with a closure supporting ring g positioned at the corresponding end of the holder by the lower end of a chute 15 having the upper end connected to a hopper (not shown) for a supply of said rings. The ring g has laterally extending flanges at the opposite ends, one flange extending inwardly to support a closure member and the other flange extending outwardly to engage the edge of the receptacle end portion f' and be curled or rolled with the

receptacle end portion *f'*, as hereinafter described.

At station B, a holder **12** presents the end portion *f* of the receptacle body therein to means, indicated in a general way at **16**, to form a peripherally flanged disk *h* from a web *w* shown in Figure 2, and insert said flanged disk in the receptacle body end portion *f*. The mechanism **16** is fully illustrated and described in the aforementioned Jones patents. The flanged disk *h* constitutes the bottom closure of the receptacle body **11**.

At station C, the flange of the bottom closure disk *h* is partially secured to the end portion *f* of the receptacle body by a primary spinning mechanism indicated in a general way at **18** in Figure 1. The primary spinning mechanism **18** is of the same construction and arrangement of parts as the final spinning head for securing the bottom closure disk *h* in the receptacle end portion *f*, and description of both is not deemed necessary. The partial securing of the bottom closure disk is shown at *i* in Figure 3.

At the succeeding station D, the bottom closure disk *h* is finally secured to the receptacle end *f* simultaneously with the securing of the closure supporting ring *g* to the receptacle body end portion *f'*. The securing of the bottom closure disk *h* to the receptacle body end portion *f* is accomplished by a spinning mechanism comprising a series of spinning rollers **19** rotatable carried in equidistantly spaced relation to each other by a head **20** secured on one end of a shaft **21** rotatably and slidably mounted in a standard **22** supported by the table **9**. The head **20** is rotated from a suitable source of power shown as an electric motor **23** supported by the table **9** and operatively connected to the shaft **21** by a longitudinally adjustable coupling comprising a head **24** secured to the motor shaft and having a series of openings therethrough for the slidable engagement of pins **25** fixed to and extended from a head **26** secured to the end of the shaft **21** opposite the end secured to the spinning head **20**, as shown in Figures 1 and 2. The coupling **24—26** permits the spinning head **20** and rollers **19** to be actuated into engagement with the partially secured portion *i* of the flange of the bottom closure disk *h* and the receptacle body end portion *f* to spin the portion *i* into a tight roll or bead, as shown at *j* in Figure 5, and to be actuated out of engagement with the bead *j*. This longitudinal adjustment of the spinning rollers **19** and head **20** is accomplished by a rock arm **27** secured at one end to a shaft **28** rotatably supported on the table **9** the opposite end of the arm **27** being bifurcated and the bifurcation leg portions carrying rollers **29** to engage an annular groove **30** in the shaft head **26**, whereby the rocking of the shaft **28** will be transmitted to the spinning rollers **19** and head **20** through the arm **27** and shaft **21** without interfering with the rotation of said spinning rollers and head by the motor **23**. The shaft **28** is rocked by an arm **31** secured at one end to the shaft **28** and having the opposite end connected by a link **32**, as shown in Figure 2, to the actuating means for the conveyer disk **13**, as shown in Jones Patent No. 1,916,981, whereby the spinning rollers **19** and head **20** are actuated toward and away from the holder **12** at station D in synchronism with the intermittent actuation of the conveyer disk **13**.

The parts of the primary spinning mechanism **18** are the same as the corresponding parts hereinbefore described of the final spinning mechanism and are indicated by corresponding primed reference numerals. Said spinning mechanism is reciprocated by the arm **31** through an arm **33** secured at one end to the rock shaft **28'** of said spinning mechanism **18** and the opposite end of the arm **33** connected to the arm **31** by an universal joint connection **34**, as shown in Figure 1.

Simultaneously with the final spinning operation of securing the bottom closure disk *h* in the receptacle body end portion *f*, the closure supporting ring *g* is secured in the receptacle body end portion *f'* by a spinning mechanism actuated by and in coordination with the actuation of the final spinning mechanism **19—28**. This spinning mechanism comprises an axial support or spindle **35** slidably mounted in a bearing sleeve **36** secured in the lower portion of a plate **37**. One end of the support **35** is arranged with a head **38** to abut the outer face of the plate **37** and limit longitudinal or axial movement of the support in a direction from said plate **37**. The opposite end of the support **35** is provided with a head **39** to engage in the closure supporting ring *g* and abut the closure supporting flange thereof to prevent longitudinal movement of the receptacle body **11** in the holder **12**, as fully described hereinafter. The plate **37** is suspended from one end of a beam **40** supported at the opposite end portion by hollow standards or spacers **41** and **42** secured to laterally extending ears of the beam and the table and standard **22** by rods and nuts screw threaded on the projecting ends of the rods, as shown at **43**, in Figures 1 and 2. The support **35** is keyed to the bearing **36**, as shown at **45**, to prevent the support from rotating in said bearing but permitting longitudinal movement of the support in the bearing limited in one direction by the head **38**. A tubular member **46** having an integral annular head or flange **47** at one end is mounted to rotate on and participate in the longitudinal movement of the support **35** by roller bearings engaged in annular recesses in the opposite ends of the tubular member **46**, as shown at **48** in Figure 3. The end of the tubular member **46** opposite the end having the integral head **47** is also provided with an annular head or flange **49** screw threaded in an enlarged bore portion at said end of the tubular member and having two series of equidistantly spaced openings **50** and **51** for a purpose to be hereinafter described.

The head **47** is arranged to carry equidistantly spaced rollers **52** to roll or spin together the securing flange of the ring *g* and the end portion *f'* of the receptacle body **11**. For this purpose, the head **47** is provided with equidistantly spaced recesses **53** extending inwardly from the outer periphery of the head and radially of the head for the slidable mounting of carrier blocks **54**. Each block has a headed shaft **55** fixed at the free end portion in said block with a projecting portion between the block and shaft head rotatably supporting a roller **52**. The blocks **54** and their associated rollers **52** are yieldingly urged outwardly from the outer periphery of the head **47** by springs **56** compressed between the blocks **54** and the bottom of the recesses **53**.

This outward movement of the blocks **54** and associated rollers **52** is controlled by a hood member **57** having a conical or inwardly tapering face **58** and a tubular portion **59** slidably mounted on the tubular member **46** between the heads **47** and **49** of said tubular member. The conical face **58** of the hood member **57** is engaged by rollers **60** carried in a bifurcated outer end portion of the blocks **54** and forced against said conical face **58**

by the springs 56. The rollers 52 are mounted on the shafts 55 to extend in the plane of the head 39 and the rollers 52 are adjusted toward and away from the head 39 by sliding the hood member 57 on the tubular member 46 to position different portions of the conical face 58 relative to the rollers 60. The removable mounting of the head 49 on the tubular member 46 facilitates the mounting of the hood member on the tubular member 46.

This sliding movement of the hood member is derived from and coordinated with the adjustment of the spinning rollers 19 and head 20 toward and away from the partially rolled seam *i*. This operation is accomplished by a bifurcated lever arm 61 having rollers 62 extending inwardly toward each other from the opposed faces of the leg portions of said lever arm to engage an annular groove 63 in the tubular portion 59 of the hood member 57. The bifurcated lever arm 61 is secured to an intermediate portion of a shaft 64 rotatably supported at the end portions in depending members 65 of a bracket 66 secured to the beam 40, as shown in Figure 6. The shaft 64 is rocked by and in synchronism with the rocking of the shaft 28 of the final spinning mechanism 19—28 by a rock arm 67 secured at the lower end portion to the shaft 28 and having at the upper end portion a laterally extending head 68 arranged with an arcuate slot 69 and ears 70 extending from the outer face at the opposite ends thereof, as shown in Figure 7. A second rock arm 71 is pivotally mounted on a portion of the arm 67 adjacent to the shaft 28 on the inner face of said arm 67, as indicated at 72 in Figures 2 and 7, and the upper end portion of the arm 71 is arranged with an opening in horizontal alinement with the slot 69 for the engagement of a bolt in said slot and opening, said bolt having a head extending from the outer face of the arm head 68 in horizontal alinement with the ears 70 and secured in the arms by a nut engaged on the end portion extending from the arm 71, as indicated at 73 in Figures 1, 2 and 7. The upper end portion of arm 71 is adjustably and yieldingly connected to the arm 67 to participate in the rocking movement of the arm 67 and compensate for any undue resistance to the forward movement of the hood member 57 and rollers 52 to prevent damage to said parts. This is accomplished by a spring 74 compressed between one side of the head of bolt 73 and an abutment screw 75 adjustably mounted in one of the ears 70 and a set screw 76 adjustably mounted in the other ear 70 to abut the opposite side of the head of bolt 73, whereby the arm 71 is adjusted to the desired angular position relative to the arm 67 by the adjustment of the screws 75 and 76, and should the forward movement of the rollers 52 and hood member 57 toward the receptacle body end *f'* meet with resistance, such as by an extra long receptacle body, the spring 74 will take up said resistance and will shorten the actuating stroke of the arm 71 without affecting the actuating stroke of the arm 67. The arm 71 is operatively connected to the bifurcated lever arm 61 through a lever arm 77 secured at one end to an extending end portion of the shaft 64 and the opposite end portion of the lever arm 77 pivotally connected to one end of a link 78 having the opposite end pivotally and adjustably mounted in a slot 80 in the upper free end of the arm 71, as shown in Figures 2 and 7.

The rollers 52 and hood member 57 are simultaneously rotated about the support 35 in synchronism with the rotation of the spinning rollers 19 and head 20 by operatively connecting the tubular member 46 and hood member 57 to the shaft of motor 23. This is accomplished by a shaft 81 rotatably supported in bearings 82 suspended from the beam 40 and operatively connected to the motor shaft by a gear 83 secured on the motor shaft and meshing with a gear 84 secured to one end portion of the shaft 81. The opposite end of the shaft 81 is operatively connected to the tubular member 46 and hood member 57 by a gear 85 secured on the shaft 81 and meshing with a gear 86 rotatably mounted on the plate 37 and meshing with a gear 87 rotatably supported by ball bearings 88 on the bearing sleeve 36. The gear 87 is operatively connected to the tubular member 46 and hood member 57 without interfering with the movements of the rollers 52 and hood member longitudinally of the support 35 by a series of rods 89, three in number being shown in the present illustration of the invention, having an intermediate portion slidable in the openings 50 in the tubular member flange 49 and the end portions slidable in corresponding openings 90 in the tubular portion 59 of the hood member 57 and recesses 91 in the gear 87.

To facilitate the transmission of the longitudinal movement of the hood member to the tubular member 46 and support 35, the support 35 and tubular member 46 are yieldingly urged away from the gear 87 by springs 92 having an end portion engaged in a recess 93 in the flange 47 of the tubular member 46 and the opposite end portions engaged in corresponding recesses 94 in the gear 87 and the intermediate portions of the springs extending through the openings 51 in the flange 49 of the tubular member 46 and corresponding openings 95 in the tubular portion 59 of the hood member 57, as shown in Figure 3. As shown in Figure 6, there are three rods 89 and three springs 92 equidistantly disposed alternately of each other.

In the operation of the spinning mechanism at the station D position of the holders 12, the final spinning head 19, 20 and the ring retaining head 39, rollers 52 and hood member 57 are actuated to the position shown in Figure 3, during the rotation of the conveyer disk 13, by the arm 27 and lever arms 61, 67, whereby the spinning head 19, 20 is moved to its rearmost position from the receptacle holder 12 and the hood member 57 is also moved to its rearmost position from the receptacle holder which will move the head 39 and rollers 52 in the same direction by the end of the tubular portion 59 abutting the head 49 of the tubular member 46 before the hood member reaches its rearmost position and thereby moving the tubular member 46 and the rollers 52 carried by said tubular member 46 and the support 35 which is connected to the tubular member 46 by the ball bearings 48. The rearward movement of the support 35, tubular member 46, rollers 52 and hood member 57 is stopped by the head 49 abutting the gear 87, as shown in Figure 3. During the rearward movement of the hood member 57 prior to the abutment between the tubular portion 59 and tubular member head 49, the conical face 58 is actuated to a position wherein the rollers 60 are engaging the portion of largest diameter of said face whereby the rollers 52 are permitted to assume their expanded position under the force of the springs 56, as shown in Figures 3 and 4.

After the holder 12 is positioned between the

spinning head 19, 20 and hood member 57 and the conveyer disk 13 has stopped rotating, the head 19, 20 and hood member 57 are moved toward the positioned holder 12, and during said movement, the head 39 will engage the closure supporting flange of the ring *g* while the rollers 52 are still in their expanded position, as shown in Figure 4. The forward movement of the support 35 and its associated head 39 is caused by the springs 92 and is arrested by the head 38 abutting the plate 37. Due to the position of the hood member 57 at this point in its forward movement, the rollers 52 are still in expanded position, as shown in Figure 4. The engagement of the head 39 with the ring *g* will firmly seat the ring in the receptacle body end portion *f'* and firmly retain the receptacle body 11 in the holder 12 against longitudinal displacement due to the present use of the holder and receptacle of truncated shape.

The continued forward movements of the spinning heads 19, 20 and hood member 57 will position the spinning head 19, 20 and the rollers 52 into engagement with the partially formed roll *i* and the receptacle engaging flange of the ring *g* and the receptacle end *f'*, whereby the final rolled seam *j* is formed and the receptacle end portion *f'* and receptacle engaging flange of the ring *g* are rolled together to secure the bottom disk *h* and the ring *g* in the respective end portions of the receptacle body, as shown in Figure 5. In the Figure 4 position of the spinning head for the ring *g*, the rollers 52 are positioned in vertical alinement with the receptacle engaging flange of the ring *g* as the axial or longitudinal travel of the support 35 and the tubular member 46 carrying the rollers 52 is in unison, and the continued forward movement of the hood member 57 will position the portion of smallest diameter of the conical face 58 in engagement with the rollers 60 so that the spinning rollers 52 are actuated to full contracted position into spinning engagement with the ring *g* and receptacle body end portion *f'*.

During the movements of the spinning heads 19, 20, the rollers 52 and hood member 57, said elements are continuously rotated, so that the engagement of the head 19, 20 and rollers 52 with the partially formed roll *i* and ring *g* will effect the rolling or crimping of said roll *i* and ring *g*.

After the spinning operation has been completed retrograde movement is imparted to the spinning mechanisms, as shown in Figure 3, whereby the conveyer disk 13 is free to be actuated to move the holder 12 having a completed receptacle body therein from station D.

At station E, the completed receptacle body is ejected from the holder 12 by any suitable means, such as a blast of air delivered to the open end of the receptacle body by a pipe 96 connected in communication to a source of air, such as a compressor, as shown in Jones Patent No. 1,916,981.

Having thus described my invention, I claim:

1. In a spinning head for securing a closure supporting ring engaged in one end of a receptacle body, an axial support slidably mounted, a tubular member having an annular flange at its opposite ends and mounted on the support to rotate on the support and participate in the sliding movement of the support, rotatable rollers slidably supported in a first flange of the tubular member to have movement radially toward and away from the support and yieldingly urged radially from the support, a hood member having an inwardly tapering face and slidably mounted on the tubular member between the flanges with the tapering face controlling the radial movements of the rollers toward and away from the support by the sliding movement of the hood member, means to move the hood member axially on the tubular member, a driven member rotatable about the axis of the support, and rods engaged in alined openings in the hood member, the second flange of the tubular member and the driven member to impart rotation from the driven member to the tubular and hood members without interfering with the sliding movements of the support and the tubular and hood members.

2. In a spinning head for securing a closure supporting ring engaged in one end of a receptacle body as claimed in claim 1, springs compressed between the first head of the tubular member and the driven member to urge the support, tubular member and rollers to one extreme position.

ALFRED MERKLE.

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