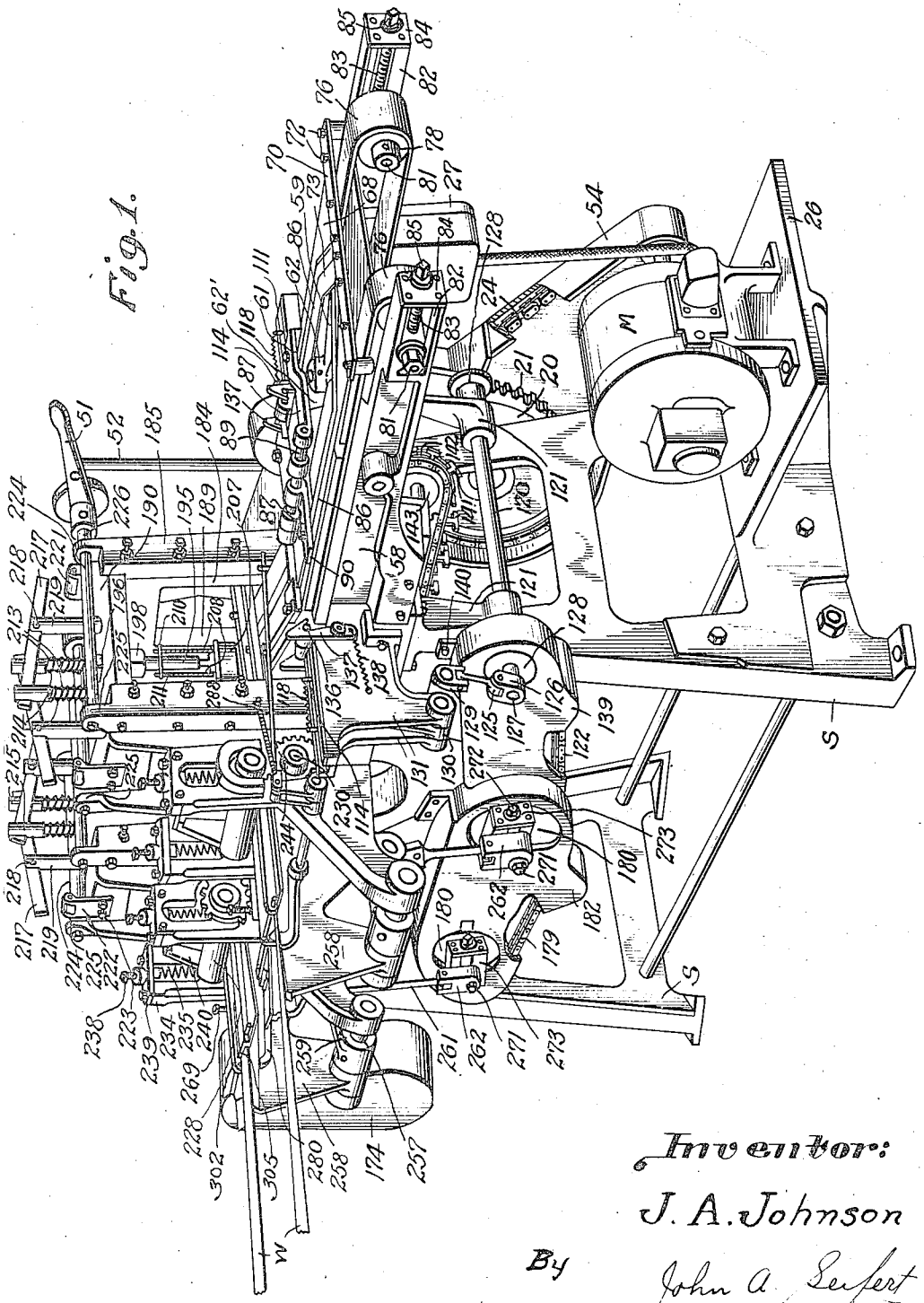
Oct. 15, 1935. J. A. JOHNSON 2,017,124

APPARATUS FOR ASSEMBLING RECEPTACLE CLOSURE CAPS

Filed Jan. 19, 1934 9 Sheets-Sheet 1

Fig. 1.



Inventor:
J. A. Johnson
By John A. Seifert
Attorney

Oct. 15, 1935. J. A. JOHNSON 2,017,124

APPARATUS FOR ASSEMBLING RECEPTACLE CLOSURE CAPS

Filed Jan. 19, 1934 9 Sheets-Sheet 2

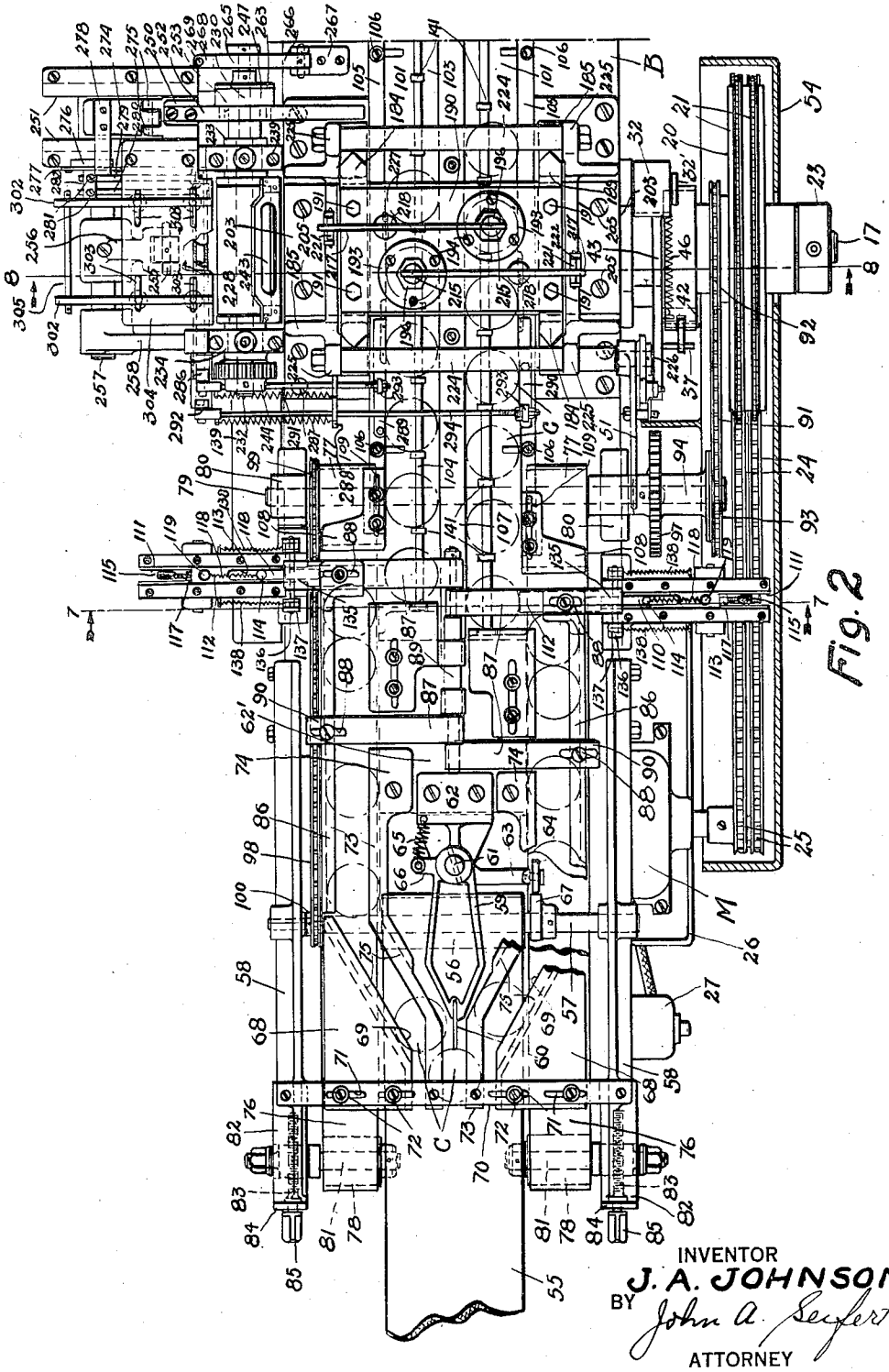


FIG. 2

INVENTOR
J. A. JOHNSON
BY John A. Seufert
ATTORNEY

Oct. 15, 1935. J. A. JOHNSON 2,017,124

APPARATUS FOR ASSEMBLING RECEPTACLE CLOSURE CAPS

Filed Jan. 19, 1934 9 Sheets-Sheet 3

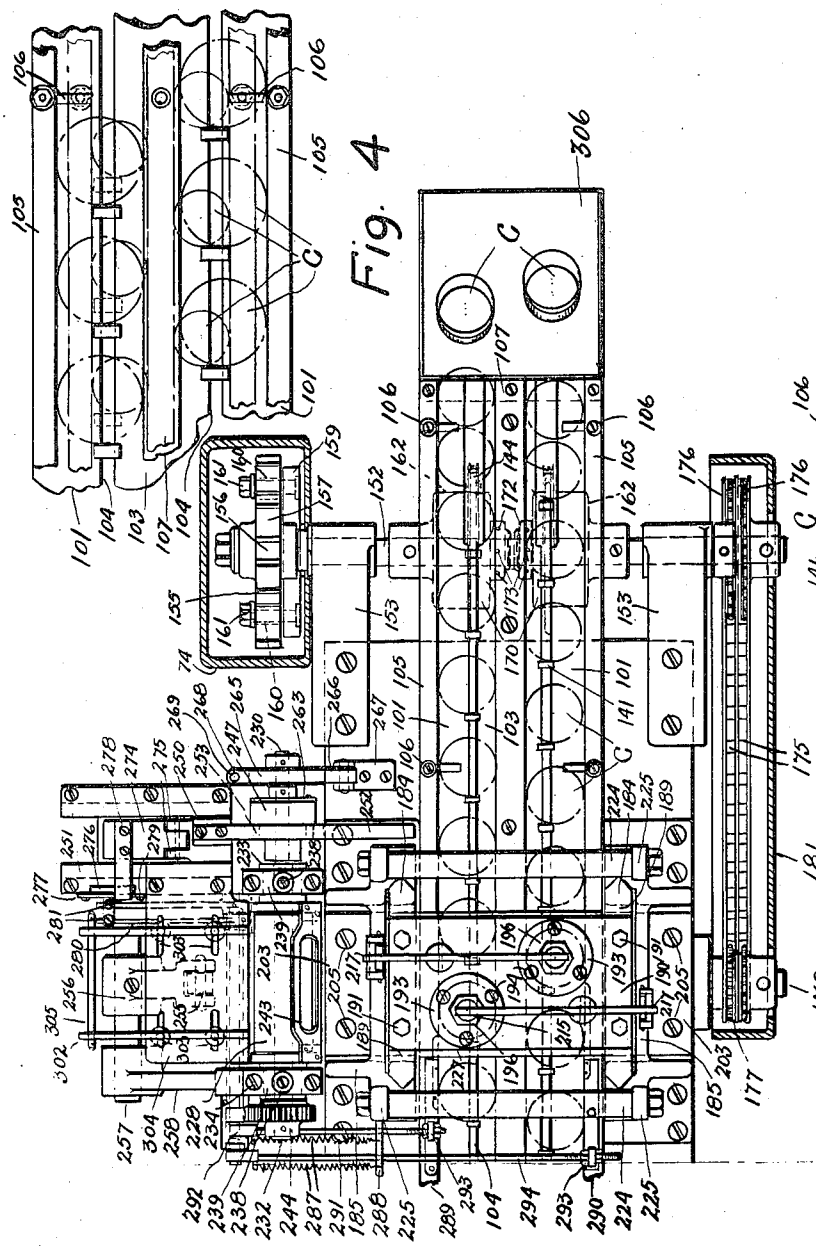


Fig. 4

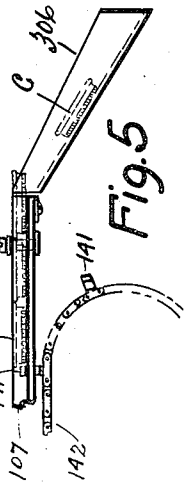


Fig. 5

Fig. 3

INVENTOR
J. A. JOHNSON
BY John A. Seifert
ATTORNEY

Oct. 15, 1935. J. A. JOHNSON 2,017,124

APPARATUS FOR ASSEMBLING RECEPTACLE CLOSURE CAPS

Filed Jan. 19, 1934 9 Sheets-Sheet 4

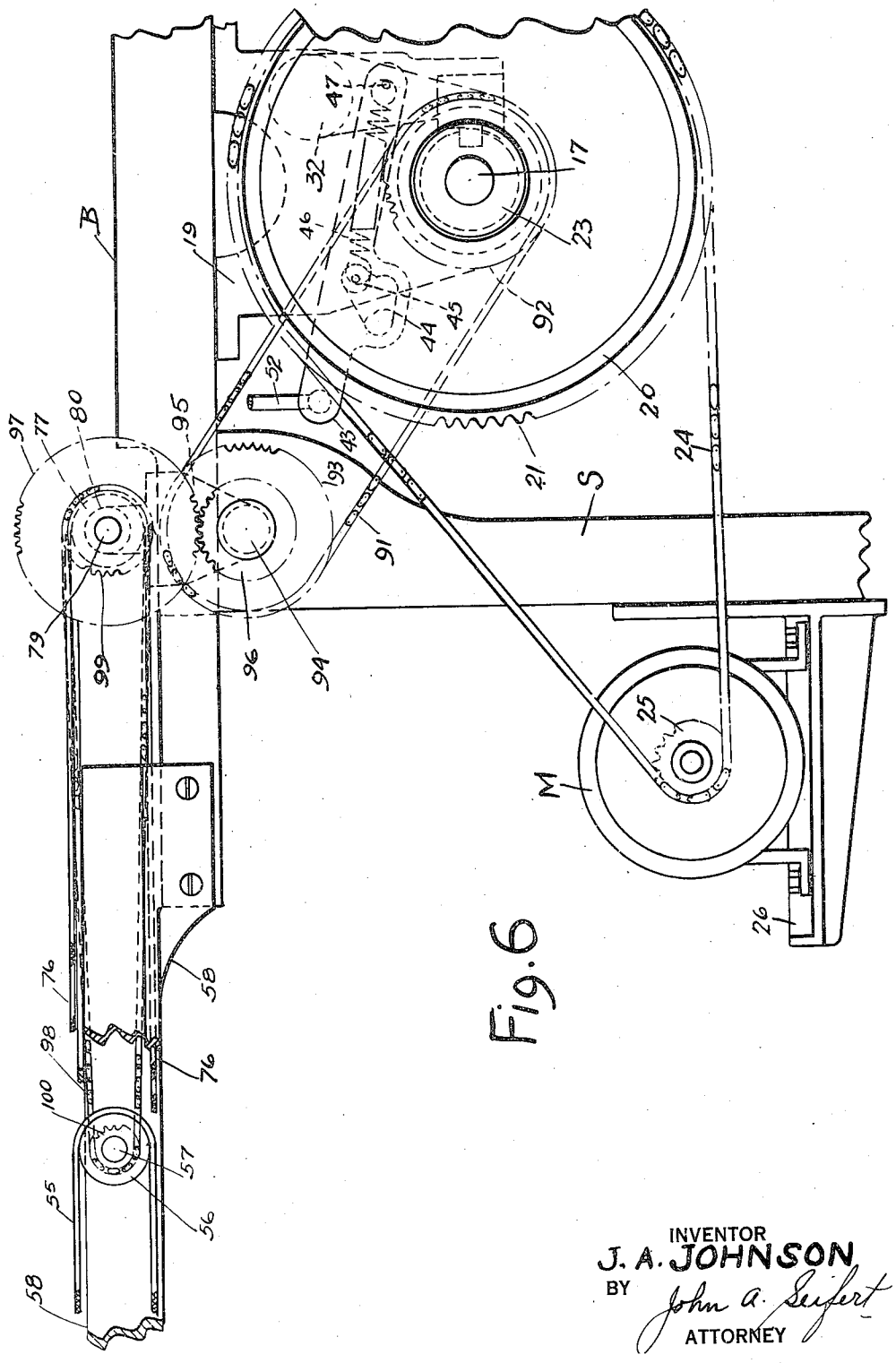


Fig. 6

INVENTOR
J. A. JOHNSON
BY John A. Seifert
ATTORNEY

Oct. 15, 1935. J. A. JOHNSON 2,017,124

APPARATUS FOR ASSEMBLING RECEPTACLE CLOSURE CAPS

Filed Jan. 19, 1934 9 Sheets-Sheet 5

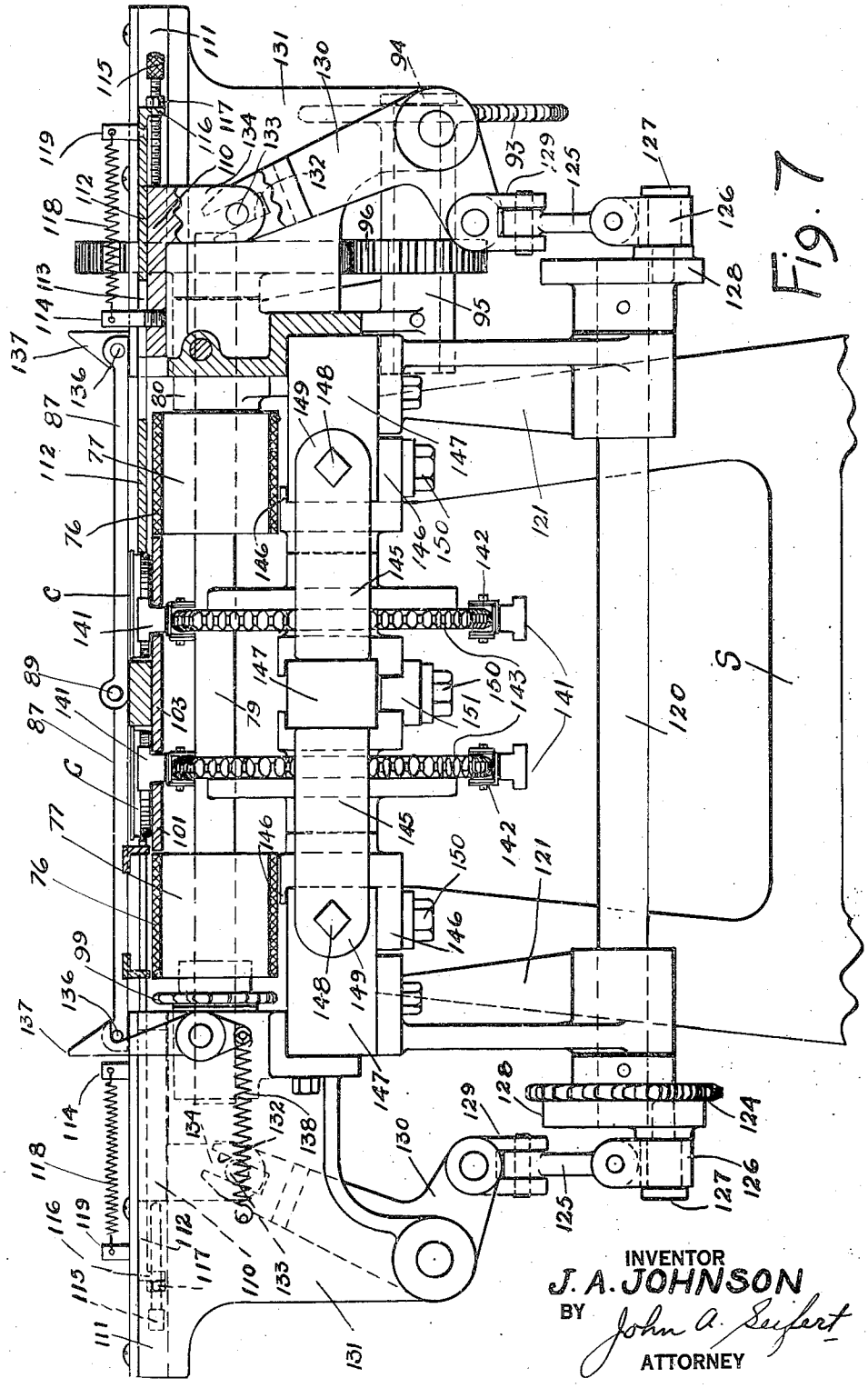


Fig. 7

INVENTOR
J. A. JOHNSON
BY John A. Seifert
ATTORNEY

Oct. 15, 1935. J. A. JOHNSON 2,017,124

APPARATUS FOR ASSEMBLING RECEPTACLE CLOSURE CAPS

Filed Jan. 19, 1934 9 Sheets-Sheet 6

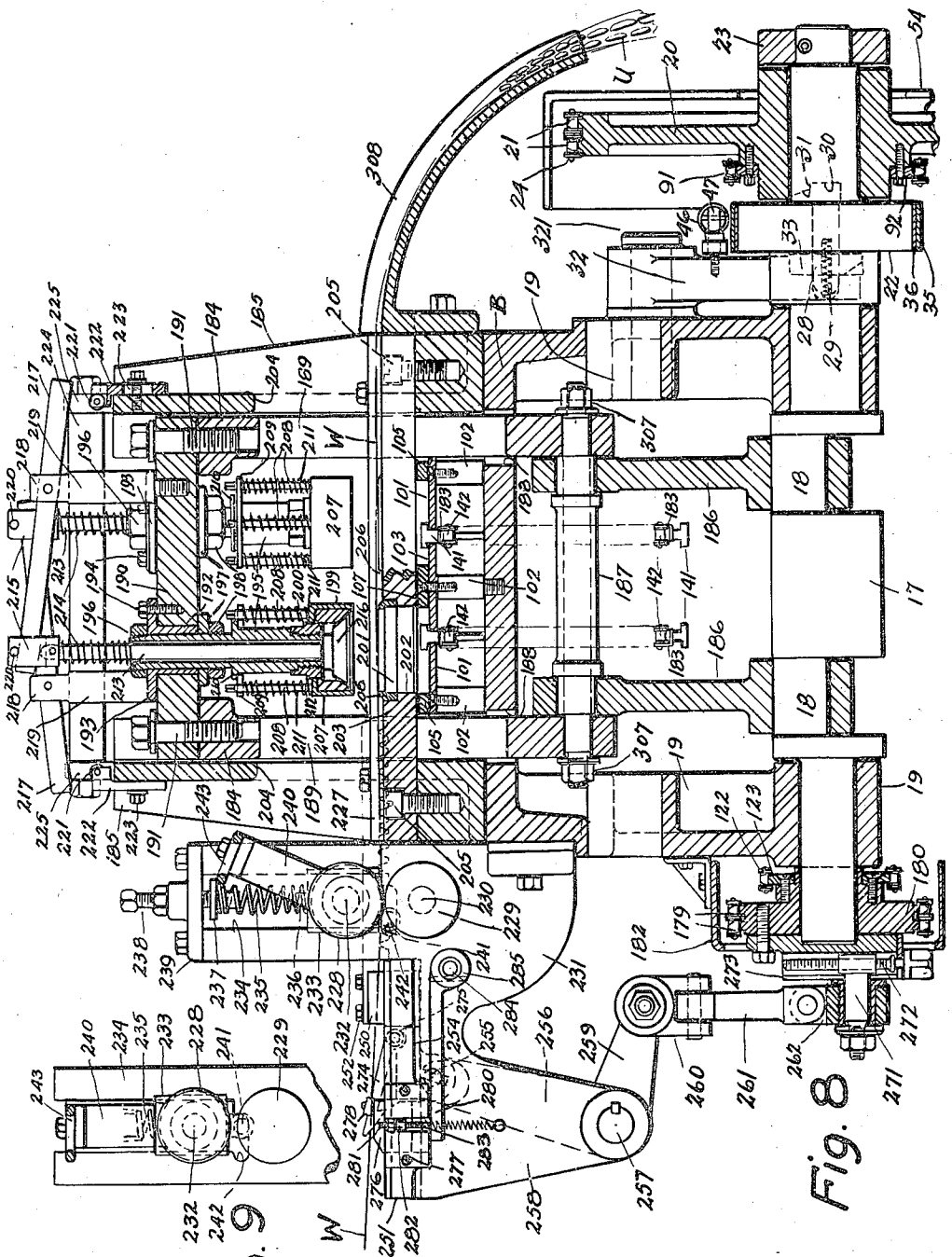


Fig. 8

Fig. 9

INVENTOR
J. A. JOHNSON
BY John A. Seifert
ATTORNEY

Oct. 15, 1935. J. A. JOHNSON 2,017,124

APPARATUS FOR ASSEMBLING RECEPTACLE CLOSURE CAPS

Filed Jan. 19, 1934 9 Sheets-Sheet 7

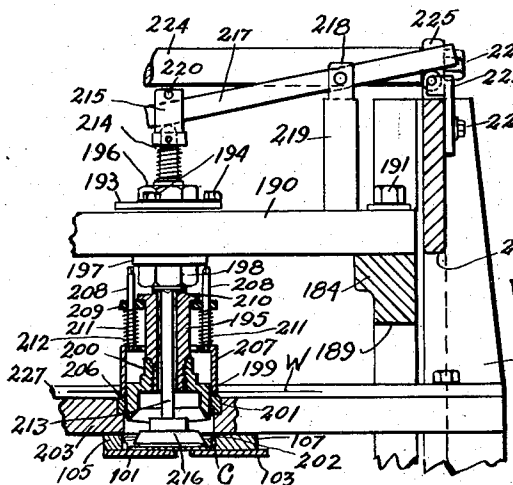


Fig. 10

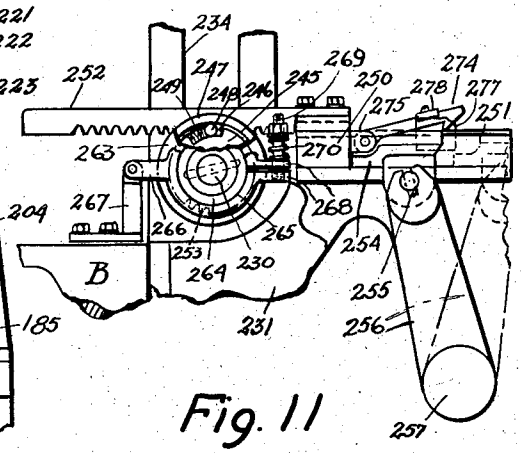


Fig. 11

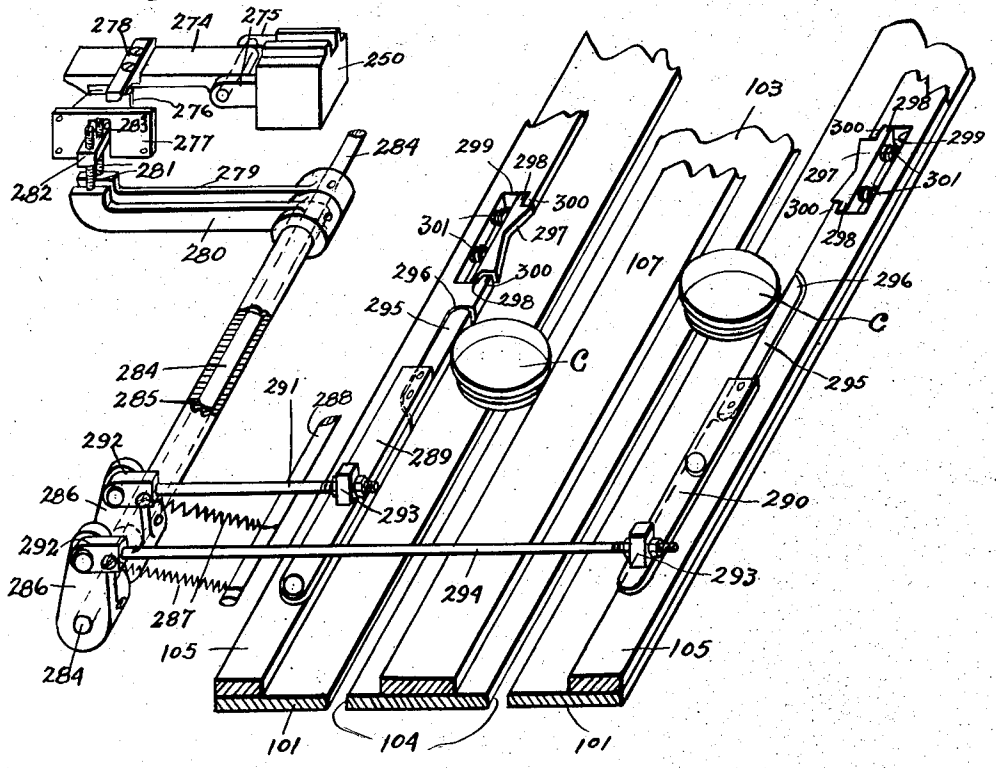


Fig. 12

INVENTOR
J. A. JOHNSON
BY John A. Seifert
ATTORNEY

Oct. 15, 1935. J. A. JOHNSON 2,017,124

APPARATUS FOR ASSEMBLING RECEPTACLE CLOSURE CAPS

Filed Jan. 19, 1934 9 Sheets-Sheet 8

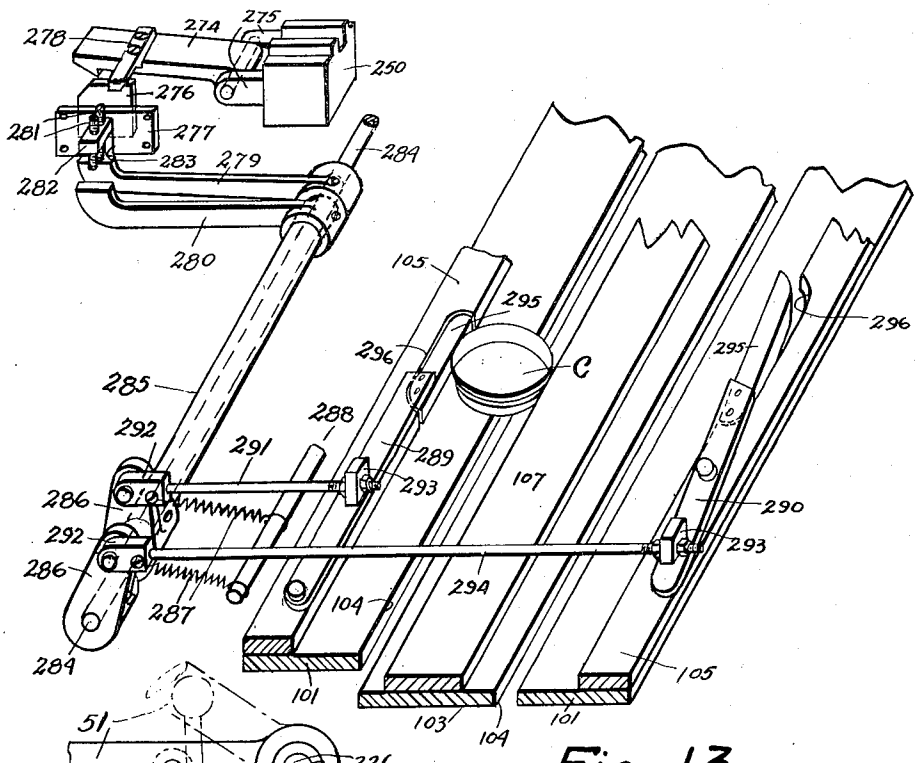


Fig. 13

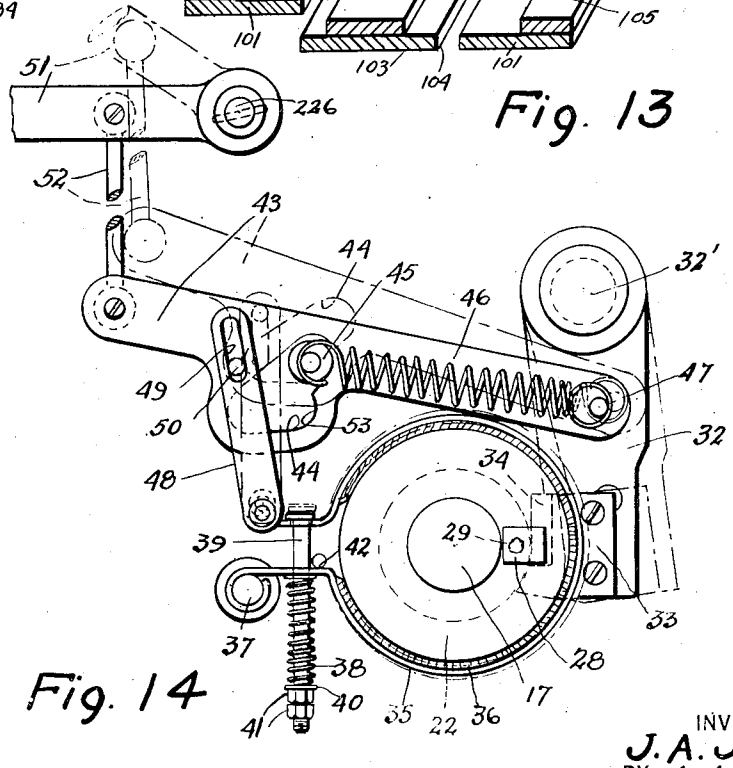


Fig. 14

INVENTOR
J. A. JOHNSON
BY John A. Seufert
ATTORNEY

Oct. 15, 1935. J. A. JOHNSON 2,017,124

APPARATUS FOR ASSEMBLING RECEPTACLE CLOSURE CAPS

Filed Jan. 19, 1934 9 Sheets-Sheet 9

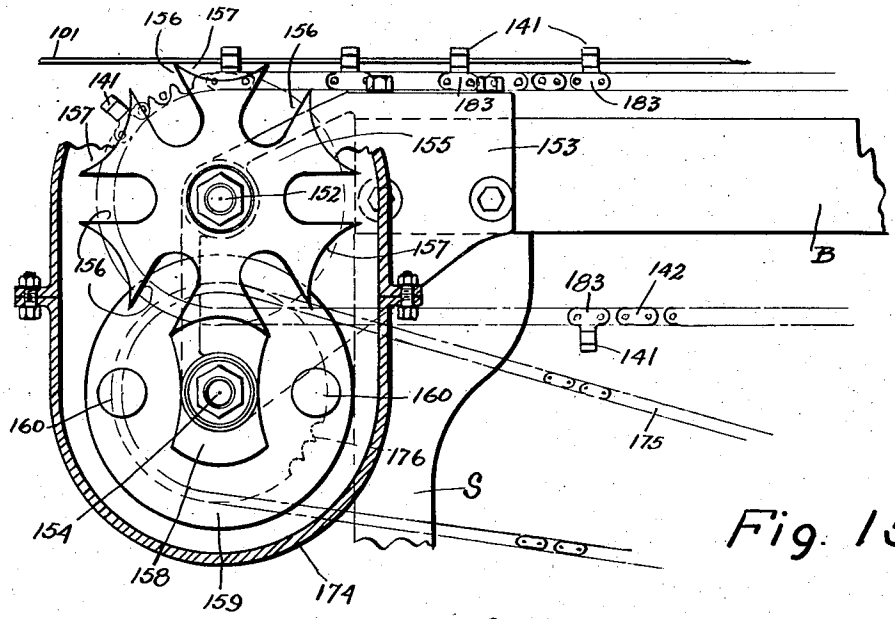


Fig. 15

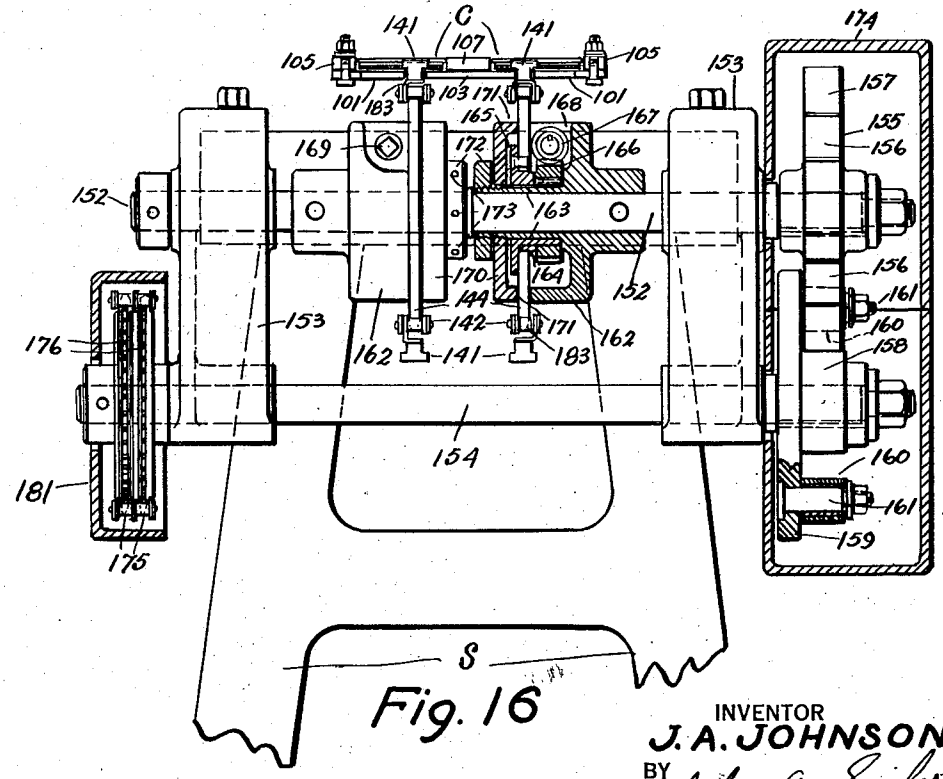


Fig. 16

INVENTOR
J. A. JOHNSON
BY John A. Seifert
ATTORNEY

Patented Oct. 15, 1935 2,017,124

UNITED STATES PATENT OFFICE

2,017,124

APPARATUS FOR ASSEMBLING RECEPTACLE CLOSURE CAPS

John A. Johnson, Woodhaven, N. Y.

Application January 19, 1934, Serial No. 707,425

20 Claims. (Cl. 113—80)

This invention relates to apparatus for assembling a lining or sealing pad, or a plurality of said linings or sealing pads, in receptacle closure caps particularly of the type having the skirt portion arranged with a screw thread to co-operate with the thread about the opening of a receptacle to which the closure is to be applied, the linings or sealing pads being secured in the caps under the tension of the linings themselves and the obstruction of the thread of the caps.

It is the primary object of the invention to provide an apparatus for assembling sealing pads or linings in a plurality of closure caps at the same time without materially increasing the dimensions thereof over the dimensions of the present type of apparatus and increasing the capacity of the apparatus by assembling twice the number of caps within a given period of time.

Another object of the invention is to provide an apparatus wherein a plurality of linings may be simultaneously severed or stamped from a single web of lining material, thereby greatly reducing the amount of waste lining material.

A further object of the invention is to provide means to direct closure caps from a conveyer transporting the caps from the forming or screw threading apparatus to a plurality of conveyers for equally distributing the caps to the assembling devices of the apparatus.

It is another object of the invention to provide controllable power or driving means for the apparatus whereby the closure caps are fed to the apparatus before the assembling devices are placed in operation, thereby not only reducing the amount of power consumed in operating the apparatus, but also assuring the presence of closure caps at the assembling devices when set in operation.

It is a further object of the invention to adapt the apparatus for assembling different size caps by removably mounting parts of the assembling devices on the apparatus to permit the ready replacement of said parts by parts of the desired size and by having the remaining parts readily adjustable to accommodate different size caps.

It is a still further object of the invention to provide means to disconnect the assembling devices from the power means and simultaneously stop the actuation of said devices.

A still further object of the invention is to provide means to stop the actuation of the assembling devices should there not be a cap in front of an assembling device.

Other objects and advantages will hereinafter appear.

In carrying out the invention there is provided pairs of parallel rails for supporting the caps relative to the assembling devices and to which rails the caps are delivered from a cap forming or threading apparatus by a conveyer belt traveling in longitudinal alinement with the rails and continuously transporting caps relative to means reciprocatory transversely of said belt to direct the caps from the belt to a pair of conveyer belts traveling along the opposite longitudinal edges of the first conveyer and the outer edges of the supporting rails. The pair of conveyers continuously transport the caps thereon relative to slides mounted at the outer marginal portions of the pair of conveyers and reciprocatory transversely across said conveyers to the outer marginal portions of the cap supporting rails to transfer the caps from the conveyers to the rails relative to projections extended above the rails from a pair of chains traveling below and in alinement with the pairs of supporting rails and intermittently actuated to permit the positioning of caps by the slides in front of a pair of projections to be engaged and moved by said projections along the supporting rails through the actuation of the chains. The caps are transported along the rails by the chain fingers relative to pairs of punch and die mechanisms mounted above the supporting rails, one pair of punch and die mechanisms being arranged in sequence to the other relative to the movement of the caps along the supporting rails with a punch and die of each pair of such mechanisms positioned above a pair of the supporting rails. The punches are actuated during the periods of rest of the chains to sever lining disks from a web of lining material fed to each pair of punch and die mechanisms and the severed disks assembled in the caps by a plunger carried by each of the punches and actuated in successive sequence to the severing of the disks. The feeding of the web to each pair of punch and die mechanisms is controlled by the caps on the rails before the caps are positioned in alinement with the punch and die mechanisms, the absence of a cap on either pair of supporting rails rendering the web feeding means inactive to feed the web to the pair of punch and die mechanisms in front of which punch and die there is no cap, and therefore no linings will be cut from the web by said punch and die. The lining webs fed to the different pairs of punch and die mechanisms may be of the same material or of different materials to form a sealing pad and a protective lining for the pad. The caps having the assembled linings therein are discharged from the ap-

paratus by the travel of the caps along the supporting rails, the cap engaging projections of the chains being disengaged from the caps through the travel of the chains in an arcuate path adjacent the discharge ends of the supporting rails.

In the drawings accompanying and forming a part of this application, Figure 1 is a perspective view of the apparatus looking at the cap feeding end thereof.

Figure 2 is a view looking at the top of the apparatus at the cap feeding end and showing the cap feeding means, the front end of the cap supporting rails and the first pair of punch and die mechanisms with their associated web feeding means.

Figure 3 is a view looking at the top of the apparatus showing the discharge end opposite to the end shown in Figure 2 with another pair of punch and die mechanisms and associated web feeding means, and means to impart intermittent movement to the cap feeding chains.

Figure 4 is a fragmentary view looking at the top of the cap supporting rails and showing in dot and dash lines the adjustment of cap guiding rails for guiding different size caps along the cap supporting rails.

Figure 5 is a side elevational view showing the discharge of the assembled caps from the apparatus in relation to the plan view of the same shown in Figure 3.

Figure 6 is a perspective view of a portion of the feeding end of the apparatus showing the driving means therefor and the direct connection of said means with the cap feeding conveyers.

Figure 7 is a cross sectional view taken substantially on the line 7—7 of Figure 2, looking in the direction of the arrows, and showing the reciprocatory slides for transferring the caps from the pair of conveyers to the cap supporting rails and means for actuating said slides.

Figure 8 is a cross sectional view, on an enlarged scale, taken substantially on the line 8—8 of Figure 2 looking in the direction of the arrows and showing partly in section a pair of punch and die mechanisms, actuating means therefor, a drive wheel for the actuating means, clutch and brake mechanism for connecting the drive wheel with the actuating means, and means for feeding a web to the punch and die mechanisms.

Figure 9 is a view showing the adjustable mounting of a roller of a pair of web feeding rollers of the web feeding means with said roller positioned in spaced and non-web feeding relation to the other roller.

Figure 10 is a view, partly in section, of a punch and die mechanism showing the punch in position subsequent to the severing of a lining disk and the plunger assembling the severed disk in a cap.

Figure 11 is a fragmentary view of actuating means for the web feeding rollers shown in Figures 8 and 9 and showing in detail an over-riding clutch to impart web feeding movement in one direction only to the rollers.

Figure 12 is a perspective view of the cap supporting rails showing in connection therewith means actuated by caps traveling along the rails and a latch actuated by said means to position to connect the web feeding roller actuating means with the rollers.

Figure 13 is a view similar to Figure 12 but showing no cap positioned on one of the cap supporting rails and the latch actuated out of connecting position to prevent the actuation of the web feeding rollers.

Figure 14 is an elevational view of braking means, clutch actuating means, and means to simultaneously operate the brake and clutch to control the movement of a drive shaft and connect and disconnect the shaft from the drive wheel.

Figure 15 is an elevational view of actuating means to impart intermittent movement to the chains for feeding the caps along the supporting rails; and

Figure 16 is a view, partly in section, looking at the left of Figure 15 showing means to releasably connect the cap feeding chains to a shaft of the actuating means.

In the embodiment of the invention illustrated in the drawings the operative parts are mounted upon a suitable framework comprising a bed or table B supported at the opposite ends upon standards S, and are actuated from a drive shaft 17 having two crank portions 18 intermediate the ends, for a purpose to be hereinafter described, and at the ends rotatably mounted in hangers 19 suspended from the opposite sides of the bed B. One of the shaft ends extends beyond its hanger and has loosely mounted thereon a power or drive wheel 20 having two rows of sprocket teeth 21 on the periphery thereof, said wheel being retained on the shaft against lateral movement by an annular enlargement 22 of the shaft in spaced relation to the end thereof and a collar 23 releasably secured on the end of the shaft at the outer side of the wheel. The drive wheel is positively actuated from an electric motor M by a pair of sprocket chains 24 engaged by the sprocket teeth 21 of the drive wheel and passing around a pair of sprocket wheels 25 fixed on the shaft of motor M. The motor is mounted on a shelf 26 extending laterally from a standard S and the motor is connected to a source of electricity through a rheostat enclosed in a box 27 by which the speed of the motor may be regulated.

The drive wheel 20 is releasably connected to the drive shaft 17 by a key 28 slidably mounted in a keyway in the shaft and yieldingly urged through an opening in the annular enlargement 22 toward the hub of drive wheel 20 by a spring 29 engaged in a recess in the key and abutting the end of the keyway in the shaft, as shown in Figure 8, the free end of the key engaging a notch 30 in the end of the hub of the drive wheel having a declined portion 31 leading to said notch to facilitate the engagement of the key with the notch during the rotation of the drive wheel. It will readily be seen that the drive wheel is normally connected to the drive shaft by the yielding force of the spring 29, and the shaft 17 is disconnected from the drive wheel 20 by an arm 32 pivotally mounted at one end on a pintle 32' fixed in a hanger 19 and the opposite end movable toward and away from the key 28 and arranged with a block 33 fixed to said end having a longitudinal cam edge extending from one face to the opposite face, as at 34 in Figure 14, to engage a recess in the free lateral edge of key 28 and adapted to move said key away from the drive wheel against the force of spring 29 by the movement of the arm toward the key so that at the end of said movement of the arm the key will be fully disengaged from the wheel notch 30.

Upon the release of the drive wheel from the drive shaft, the drive shaft will continue to rotate through its own momentum with the result

that the operative parts of the apparatus will continue to function contrary to the intent of the operator and cause damage to the receptacle closure caps and waste of the lining material. To prevent this the drive shaft is normally held against rotation by brake means, consisting of a band 35 of flexible material having a lining on the inner surface, as at 36 in Figure 14, the band being engaged about the annular enlargement 22 which serves as a brake drum, the opposite end portions of the band being extended laterally and in parallel relation to each other with one end attached to a post 37 fixed in and projecting from the adjacent hanger 19 and the opposite end free and yieldingly urged toward the fixed end by a spring 38 coiled about a headed rod 39 loosely engaged in alined perforations in both end portions of the band with the head abutting the free end and the spring confined between the fixed end and a washer 40 adjustably retained on the rod by lock nuts 41. The portion of the band extending from the fixed end is prevented from being moved by the spring beyond a predetermined point by a pin 42 extended from the hanger abutting the band on the side of rod 39 opposite the post 37, so that the force of the spring will only move the free end toward the fixed end, the movement of the free end away from the fixed end swinging the entire band about the post 37 away from pin 42 and free the band from the drum 22, thereby permitting the free rotation of the shaft 17.

Means are provided to simultaneously actuate the brake band to releasing position and arm 32 away from key 28 to permit said key to connect the drive shaft to the drive wheel, and comprises a lever 43 having a triangular opening 44 in an enlarged portion intermediate the ends thereof extending in an axis oblique to the vertical and engaged upon a roller 45 carried by a stud fixed in a hanger 19, the roller being maintained in predetermined positions in the opening by a coiled spring 46 attached at one end to the stud carrying roller and the opposite end attached to a pin 47 projecting laterally from the arm 32, so that the side of the opening nearest the pin 47 will be yieldingly engaged by the roller 45. The end of lever 43 carrying the pin 47 is connected, as by said pin, to the arm 32 intermediate the ends of said arm, and the lever 43 being loosely connected to the free or movable end of the brake band by a link 48 pivoted at one end to the brake band and having a slot 49 in the opposite end portion loosely engaged on a pin 50 fixed in and extended laterally from the lever adjacent the side of the opening opposite to the side normally engaged by the roller 45. The lever 43 is actuated by a manipulating lever 51 connected to the end of the lever opposite to the end connected to arm 32 by a rod 52 pivotally connected to the respective levers whereby the levers will have corresponding movements in an upward and downward direction. In the downward movement of the levers the roller 45 will engage the uppermost portion of the opening 44 thereby moving the lever 43 in a lateral direction and causing the pin 50 to move from the upper end to the opposite end of the slot 49 in and move link 48 about its pivotal connection with the brake band without imparting movement to the brake band, said brake band remaining in its braking position under the force of spring 38, said downward movement of the levers moving the arm 32 toward and actuating the key 28 out of engagement with the wheel notch 30, as clearly shown in Figure 14. The movement of levers 43, 51 in an upward direction will swing lever 43 in a direction opposite to that imparted thereto by the downward movement of the levers, which movement will actuate the arm 32 away from the key 28 and permit the key to move toward and engage the wheel notch 30 and connect the drive wheel to the drive shaft under the influence of spring 29. The upward movement of the lever 43 simultaneously with said latter movement of the arm 32 will move the pin 50 along slot 49 into engagement with the upper end of the slot, the continued upward movement of lever 43 lifting the link 48 and moving the brake band 35 away from the brake drum, as shown in dot and dash lines in Figure 14, thereby permitting the free rotation of the shaft 17 and the actuation of said shaft by the drive wheel 20. The lower end portion of the side of the opening 44 has an offset, as at 53, forming an indent in which the roller 45 is normally retained against accidental movement during the operation of the apparatus.

To prevent injury to the operator of the apparatus, the drive wheel 20, chains 24 and the sprockets 25 of the motor shaft, are covered by a shield 54 carried by the framework.

Caps C are fed to the apparatus from an apparatus, not shown, where the caps are formed or arranged with screw threads, by an endless conveyer belt 55 of a width to support a plurality of rows of caps, partially shown in Figures 2 and 6 to be supported and driven at one end by a drum 56 fixed on a shaft 57 rotatably supported in bearings in brackets 58 fixed to and extended from the end of the bed B adjacent the drive shaft 17. The caps fed by the belt 55 are separated into two parallel rows in which position they are transported through the apparatus to the various assembling devices. This operation is accomplished by providing vibrating means to engage and direct the caps laterally of the conveyer 55, said vibrating means being in the form of an arm 59 having a tapered end arranged with a straight edge of flexible material, as at 60, and at the opposite end fixedly mounted on a shaft 61 rotatable in a bracket 62 supported on a raised portion 62' of the bed B in spaced relation to the drum 56, said shaft 61 being reciprocated to move the end 60 of the arm 59 transversely of the belt 55 by an arm 63 fixed at one end on shaft 61 below the bracket 62, the opposite end carrying a roller 64 yieldingly urged to engage a cam disk 67 fixed to the shaft 57 of the drum 56, by a spring 65 attached at the opposite ends to a projection 66 of arm 59 and the bracket 62, as clearly shown in Figure 2. The reciprocation of the arm 59 will direct the caps through the continuous travel of the conveyer 55 between pairs of guiding rails diverging toward and past the marginal portions of the conveyer, said rails comprising plates 68 having one end tapered with a straight side and a diverging side meeting a straight portion adjacent the opposite end, as at 69, said opposite end portions of the plate being adjustably mounted on a cross member 70 fixed at the ends on the brackets 58 in horizontal spaced relation to the conveyer and arranged with pairs of spaced slots 71 for the adjustable engagement of screws 72 threaded in the plates 68 to permit adjustment of the plates laterally of the conveyer and toward and away from each other to position the inner sides of the plates including the diverging side portions 69 in spaced relation to rails 73 having at one end straight portions fixedly supported by the cross member 70 in opposed relation to the straight inner sides of the plates 68 with the intermediate

portions of the rails diverging in parallel relation with the diverging side portions of the plates, the end portions of the rails opposite to the ends fixed to the cross member extending in substantial alinement with the sides of the conveyer belt 55 and fixedly mounted on the raised portion 62' of the bed B, as at 74. The diverging portions of the plates 68 and the rails 73 are arranged with an overhanging portion to extend over the peripheral portion of the caps, as shown at 75 in Figure 2, to maintain the caps flat on the conveyer 55.

The caps by the travel of conveyer 55 are transferred to a pair of endless conveyer belts 76 passed around and supported by pairs of drums 77, 78, the drums 77 being fixedly mounted on the opposite end portions of a shaft 79 rotatable in bearings 80 on the top and at the opposite sides of the bed B, and the drums 78 rotatably mounted on studs 81 slidably engaged in slideways 82 in the outer ends of the brackets 58 and adjustably carried by lead screws 83 loosely mounted in plates 84 fixed to the ends of the brackets 58 spanning the open ends of the slideways, said lead screws having threaded connection with the studs, the ends of the screws extending beyond the plates 84 being arranged for the engagement of an actuating tool, as at 85, to take up any slack in the belts 76. By this mounting it will be obvious that the belts 76 will extend parallelly of the opposite marginal portions of and in the same plane as the conveyer 55, and that the guide plates 68 and rails 73 extend over said pair of conveyers to guide the caps ontc said conveyers 76. The caps are further guided on the conveyers 76 by rails 86 of angular form in cross section adjustably carried by arms 87 by slot and screw connections 88 to permit adjustment of the rails toward and away from the rails 73 for the guiding of different size caps, the arms 87 being loosely mounted on a rod 89 fixed to the raised portion 62' of the bed B, so that the rails 86 may be raised away from the conveyers 76 to permit of inspection and removal of caps jammed on said conveyers, the rails being positioned in spaced relation to the conveyers in the lowered position by the ends of the arms 87 extended beyond the rails engaging raised portions of the bed B, as at 90 in Figure 2.

The conveyer belts 55, 76 are simultaneously and continuously actuated directly from the drive wheel 20, independent of its relationship with the drive shaft 17, by a sprocket chain 91 passed about an annular sprocket wheel 92 fixed to the hub of the drive wheel, as clearly shown in Figure 8, and a sprocket wheel 93 fixed to an end of a stud shaft 94 rotatable in a hanger 95 suspended from the bed B in alinement with a bearing 80, and having a pinion 96 fixed thereto in spaced relation to the sprocket wheel meshing with a pinion 97 fixed to an end of the shaft 79 extended beyond bearing 80, as shown in Figure 6, whereby rotation is imparted to the drums 77 carrying the belts 76, this rotation being imparted to shaft 57 of conveyer 55 by a sprocket chain 98 engaged about sprocket wheel 99 fixed to the shaft 79 between a bearing 80 and drum 77, and a sprocket wheel 100 fixed to the shaft 57, as shown in Figures 2 and 6.

The conveyers 76 transport the caps relative to means to transfer the caps to pairs of supporting rails, comprising a pair of laterally spaced strips 101 supported in horizontally spaced relation from and centrally of the top of the bed B by a series of posts 102, and a middle or center strip 103 supported between the strips 101 and from the bed by posts similar to the posts 102 and of a width to form with the strips 101 two longitudinal slots or passageways 104, for a purpose to be hereinafter described. The caps are supported by the rails in two rows relative to the slots 104 during the entire assembling of linings or pads therein, and said rows of caps are guided between guide rails or strips 105 adjustably mounted on the outer marginal portions of the rails 101 by screws threaded in the rails 105 engaging slots extended transversely of the rails 101, as shown at 106, and a rail 107 releasably mounted centrally on the center rail 103 by screws, so that the rails 101, 103 may support different size caps by adjusting the guide rails 105 laterally by loosening the screws in the slot connections 106 and replacing the center guide rail 107 with a rail of proper width. The cap supporting rails 101, 103 extend from one end of the bed B adjacent the raised portion 62' thereof to a point beyond the opposite end of the bed, as shown in Figure 3, with the rails 101 juxtaposed to the conveyers 76, as shown in Figure 2. The guide rails 105 terminate adjacent the means for transferring the caps from the conveyers 76 to the supporting rails 101, 103 and said terminating portions of the guide rails are arranged for the adjustable mounting of abutment plates 108 of angular form having a slot 109 in one angle portion for the loose engagement of headed screws threaded into the rails 105, whereby the other angle portions may have adjustment longitudinally of the conveyers 76 to properly position different size caps on the conveyers 76 relative to the transferring means.

The means to transfer the caps from the conveyers 76 to the supporting rails 101, 103, comprises a pair of carrier blocks 110 (Figures 2 and 7), each slidably mounted in a slideway of a pair of slideways 111 supported on opposite sides of the bed B out of alinement with each other, as shown in Figure 2, and each block slidably supporting an ejector slide 112 having a slot 113 engaged by a pin 114 fixed in and extended from the block 110 to permit of a limited longitudinal movement of the slide relative to the block and impart movement of the block to said slide toward and transversely of the adjacent conveyer 76, the return movement of the block away from the conveyer being adjustably imparted to the slide through a set screw 115 threaded in a perforated lip 116 of the slide to engage the block and secured in adjusted position by a lock nut 117, as clearly shown in cross section in Figure 7. The set screw 115 is yieldingly urged into engagement with the block by a spring 118 attached at the ends to the pin 114 and a pin 119 fixed in and extended from the slide 112 between the slot 113 and lip 116. The blocks 110 are reciprocated simultaneously towards their respective conveyers 76 to engage the slides 112 with the caps abutting the plates 108 and transfer said caps to the supporting rails 101, 103, from a shaft 120 rotatably supported in hangers 121 suspended from the bed B, and said shaft driven from the drive shaft 17 by a sprocket chain 122 engaged about an annular sprocket wheel 123 fixed to drive shaft 17 and a sprocket wheel 124 fixed to the end of the shaft 120 extended beyond hanger 121. The rotary movement of the shaft 120 is transformed into reciprocatory movement of the blocks 110 by a pair of crank arms 125, each of said arms being pivotally connected at one end to a collar 126 loosely engaged on a pin 127 projecting from the peripheral portion of a disk 128 of a pair of disks fixed

on the opposite ends of the shaft 120 extending beyond the hangers 121, the opposite ends of the crank arms pivotally engaging in bifurcated connecting members 129 pivotally connected to an arm of bell levers 130 rotatably supported between hangers 131 suspended from the slideways 111, the other arms of the levers having the free ends bifurcated, as at 132 in Figure 7, and the bifurcations engaging pins 133 fixed in the legs of bifurcated portions 134 depending from the carrier blocks 110. By adjusting the set screws 115 the forward movement of the ejector slides 112 is varied to properly position caps having different diameters on the supporting rails 101, 103. The mounting of the slides 112 are offset relative to each other so that the slides will travel in a path directly below a guide rail supporting arm 87, whereby said arms 87 form horizontal guides for the ejector slides and the caps as they are transferred from the conveyers 76 to the supporting rails 101, 103, as shown in Figure 2, and for another purpose hereinafter set forth. The arms 87 superposed to the slides 112, extend over the inner ends of the slideways 111, as at 135 in Figure 2, and have pins 136 projecting laterally from the opposite sides for the releasable engagement of hook portions of latches 137 pivotally mounted on the opposite sides of the slideways 111 and yieldingly maintained in engagement with the pins 136 by springs 138 anchored at one end to the hangers 131 and at the opposite ends to the latches opposite to the hook portions thereof, as clearly shown in Figure 7. The latches 137 when engaging the pins 136 retain the guide rails 86 and arms 87 in their normal guiding position. It will be noted that the ejector slides are only reciprocated when drive shaft 17 is connected to the drive wheel 20 and the independent operation of the cap delivering conveyers 55 and 76 from the drive wheel will not cause any trouble as the conveyers 76 will merely travel relative to the caps without transporting the caps when the portions of said conveyers 76 between the conveyer 55 and abutments 108 are filled with caps ready to be transferred to the supporting rails 101, 103 by the slides 112 upon the actuation of said slides.

The sprocket chain 122 and sprocket wheels 123 and 124 are enclosed by a protective shield 139 supported by the hangers 19 and 121, as at 140 in Figure 1, to prevent accumulation of dirt on said operating parts and injury to the operator.

The caps C transferred from conveyers 76 to the supporting rails 101, 103 by ejector slides 112 are positioned relative to means for intermittently moving the caps along the supporting rails in position relative to the assembling devices, and comprises projections or fingers 141 fixed in spaced relation to each other and extended vertically from the links of a pair of sprocket chains 142 extending in alinement with the slots 104 with the fingers projecting therethrough, and engaged about pairs of laterally spaced sprocket wheels 143, 144 the sprocket wheels 143 being loosely mounted in separate rectangular brackets 145 having a side portion of channel form, as at 146 in Figure 7, to slidably engage longitudinally extending blocks 147 fixedly supported below the bed B, two of said blocks extending along the marginal portions of the bed and a third block intermediate said two blocks, whereby each sprocket wheel 143 may be independently adjusted longitudinally of the bed to take up slack in the chains by set screws 148 threaded into ears 149 extending laterally of each bracket so that the inner ends of the set screws abut the ends of the outer blocks 147 and move the bracket toward the adjacent end of the bed B. The brackets 145 are retained in adjusted position by clamping screws 150 engaged in the lower channel wall of the outer channeled sides of the brackets 145 and the outer blocks 147, and a T shaped clamping member 151 engaged between the opposed channeled sides of the brackets with the T portion thereof clamped against said channeled sides by a screw similar to screws 150. The other pair of sprocket wheels 144 comprises the driving means for said cap feeding chains and are releasably and adjustably mounted on a shaft 152 (Figure 3) rotatably mounted in brackets 153 fixed to the opposite sides of the bed B at the end thereof opposite to the end arranged with the conveyers 55 and 76, and intermittently actuated from a continuously rotating shaft 154 rotatably carried by said brackets 153 below shaft 152 through a Geneva mechanism (Figures 3, 15 and 16), comprising a disk 155 fixed on an end of the shaft 152 extended beyond a bracket 153 and having recesses 156 equidistantly spaced about and extended radially inward from the periphery with the peripheral portions of the disk between the recesses of curved or concave form, as at 157, for the engagement of convex surfaces at the opposite ends of an elongated block 158 fixed axially of a disk 159 mounted on an end of shaft 154 extending beyond a bracket 153, said engagement being for the purpose of holding disk 155 in such position. The disk 159 has rollers 160 mounted on pins 161 fixed in and projecting from the disk adjacent the periphery and at diametrically opposite sides of the block 158, so that the rollers by the rotation of the shaft 154 will engage the recesses 156 and impart two intermittent movements to the disk 155 and shaft 152 upon each revolution of shaft 154.

The shaft 154 is continuously and simultaneously rotated with the actuation of the cap transferring slides 112 and the assembling devices by a pair of sprocket chains 175 engaged about a wheel 176 having a double row of sprocket teeth and fixed on the end of shaft 154 opposite to the disk 159, and a wheel 177 having a double row of sprocket teeth and fixed to an end of a crank shaft 178, similar to the drive shaft 17, mounted below the bed B in spaced relation to the shaft 17 and driven from said drive shaft through a pair of sprocket chains 179 engaged over wheels 180 having a double row of sprocket teeth fixed on the ends of shafts 17 and 178 opposite to the drive wheel 20 and sprocket wheel 177, respectively. The sprocket chains 175 and sprocket wheels 176, 177 are enclosed by a sheet metal cover 181 and the sprocket chains 179 and sprocket wheels 180 are also enclosed by a cover 182 mounted on the supporting structure.

The fingers 141 of one chain may be adjusted independently of and relative to the fingers of the other chain for the purpose of accommodating the apparatus for different sizes of closure caps and to position caps of different sizes in alinement with the sealing pad or lining assembling devices to assure proper assembling of sealing pads and linings in the closure caps. This adjustment is accomplished in a simple and rapid manner by adjustably mounting the sprocket wheels 144 on the shaft 152 by cup members 162 (Figure 16) fixed on the shaft 152 with the open ends in opposed and spaced relation to each other, the cup members having a sleeve-like hub portion 163 with the free

ends thereof externally screw threaded. The sprocket wheels 144 are fixed to a flange of sleeves 164 loosely engaged on the hub portions 163 and adjustably connected with the cup members through worm wheels 166 fixed on the sleeves 164 meshing with worms 167, rotatably mounted in the walls of the cup members 162 to extend transversely of a peripheral open portion 168 of said members to permit ready actuation of the worms by a tool applied to squared ends 169 of the worm shafts exterior of the cup members. By rotating the worms the sprocket wheels 144 are adjusted about the shaft 152 to any predetermined position to properly position the cap engaging fingers 141 along the supporting rails 101, 103, and relative to the assembling devices. The sprocket wheels 144 are releasably secured in adjusted position to permit the intermittent actuation of the chains 142 by plates 170 loosely engaged on the hub portions 163 of the cup members and peripherally flanged to correspond with the edges of the cup members, as at 171, and clamping the sprocket wheels to the cup members by annular nuts 172 threaded onto the screw threaded end of the hub portions 163, said nuts having a series of sockets 173 about the exterior walls for the engagement of a spanner wrench to tighten the nuts against the plates and impinge the sprocket wheels to the cup members. When it is desired to assemble sealing pads or lining disks in caps of a size different than the caps being assembled, the nuts 172 are loosened to release the plates 170 and permit the adjusting of the sprocket wheels 144 to the desired position about the shaft 152 by the actuation of the worms 167.

The Geneva mechanism comprising the disks 155 and 159 is protected from dirt accumulating thereon by an enclosure 174 formed of separable sections, as clearly disclosed in Figure 15, supported by a bracket 153.

The cap engaging fingers 141 are of T form fixed at the bottom or foot portions thereof to angle portions of angle members 183, the other angle portions constituting links of the chains 142, as clearly shown in Figure 15, with the leg portions of the fingers extending through the slots 104 while the chains are traveling relative to said slots with the cross portions of the fingers above the supporting rails 101, 103 presenting broad cap engaging surfaces and assuring positive engagement with the caps.

The reciprocation of the ejector slides 112 and the intermittent movement of the shaft 152 are synchronized so that during the movement of said slides away from the supporting rails 101, 103, said shaft will be rotated to move the fingers 141 along the slots 104 and feed the caps engaged by said fingers along the supporting rails, and during the actuation of the ejector slides to position a cap on the supporting rails the shaft 152 will be idle with fingers 141 positioned on both sides of the advancing ejector slides to form spaces into which the caps being transferred from the conveyers 76 are positioned by the ejector slides and moved along the supporting rails upon the next rotation of the shaft 152.

The caps are intermittently moved by the fingers 141 along the supporting rails from the ejector slides to a series of devices adapted to assemble sealing pads of single or multiple ply paper or other suitable material, or linings of moisture proof or acid resisting material, and comprising separate and independent pairs of punch and die mechanisms adapted to sever disks from webs of suitable material. It is believed a description of one pair of punch and die mechanisms will be sufficient as both pairs are identical in structure and operation. It is also to be understood that either pair of punch and die mechanisms are adapted to assemble solely sealing pads or impervious linings, but in commercial practice it is customary to first assemble sealing pads and then the impervious linings superposed to the pads to protect the pads from the deteriorating action of the contents of the receptacles to which the caps are applied.

A pair of punch and die mechanisms comprises a pair of slides 184 movably mounted in vertical slideways arranged in standards 185 supported on and extended upwardly from the opposite sides of the bed B, the slides being reciprocated from either the drive shaft 17 or shaft 178, depending upon the location of the punch and die mechanisms, through a pair of crank arms 186 at one end loosely engaged on the crank portions 18 of said shafts with the opposite ends loosely engaged on a shaft 187, the ends of which shaft extend laterally from the crank arms and rotatably engage openings in the lower ends of the slides 184 retained on the shaft by nuts, as at 307, the slides passing through openings 188 in the bed B, as clearly shown in Figure 8. The intermediate portions of the slides 184 are arranged with alined rectangular openings 189, for a purpose to be hereinafter described. On the upper ends of the slides there is supported a plate 190 releasably connected thereto by screws 191. The plate 190 has a pair of circular openings, each opening being adjacent the opposite sides and ends of the plate, and therefore, diagonally opposed to each other to be engaged by bushings 192 having a flange 193 abutting the upper surface of the plate and secured in the plate openings by screws 194. The bushings 192 carry tubular members 195 retained therein by nuts 196 threaded on end portions of the tubular members extended above the bushing flanges 193 to abut washers 197 against the under surface of the plate 190, said washers being retained in abutting position by nuts 198 threaded onto the tubular members below the plate 190. By this mounting of the tubular members, the members may have longitudinal adjustment in the plate 190. The tubular members 195 carry at the lower ends cup shaped punches or cutting heads 199 having tubular portions to be attached to the tubular members, as by screw threading, as shown at 200 in Figures 8 and 10. The edges at the open ends of the punches are beveled to form cutting edges to co-operate with annular dies 201 mounted in seats in openings 202 in a plate 203. The plate 203 is releasably mounted on the sill portions of openings 204 in the standards 185 by screws engaged in openings in plate 203 with the heads countersunk therein, as shown at 205 in Figure 8.

The sealing pads or linings are severed by the punches and dies from a web W of suitable material fed through the openings 189 of the slides 184 and openings 204 in the standards 185 over the die plate 203 in interposed relation between the dies and the punches. To assure the severing of the pads or linings with a clear cut edge, the web about the peripheries of the dies are engaged and held against a beveled portion of the dies extended above the plate 203, as at 206, by a corresponding beveled edge of holding members of cup form 207 slidably mounted to encircle the cutting heads 199 with the beveled

edge projecting beyond the heads by rods 208 fixed at one end in the holding members and slidably engaged in perforations circumferentially arranged in rings 209 engaged on the tubular members 195 below shoulders 210 on said tubular members, the holding members being yieldingly maintained in position with the beveled edge extending beyond the cutting edge of the heads by springs 211 coiled about the rods between the holding members and the rings 209, whereby the beveled edge will clamp the web against the beveled edge 206 of the dies and maintain the web in such position during the severing of the web by the cutting heads or punches, the tubular punch carrier 195 passing through an opening 212 in the bottom of the holding members 207 against the force of the springs 211, as shown in Figure 10.

To assure the positioning or assembling of the pads or linings centrally in caps positioned below the openings 202 in plate 203, the pads or linings immediately after being severed by the cutting heads 199 are engaged in the caps and stripped from the cutting heads by plungers comprising a rod 213 slidably mounted in the bore of the tubular members 195 with the upper end extending above plate 190 and engaged by coiled springs 214 compressed between the tubular members 195 and bifurcated members 215 pivoted to the said projecting end of the rods whereby heads 216 at the lower end of the rods having an inclined lateral wall are yieldingly maintained within the cutting heads 199, the inclined wall coinciding with the cutting face of said heads, as shown in Figure 8. After the cutting heads have passed the dies 201 and severed pads or linings from the web W the plunger heads 216 are positively and forcibly actuated out of the cutting heads to strip the severed pads or linings from the cutting heads and position the severed pads or linings centrally in the caps by levers 217 pivoted intermediate their ends in bifurcations 218 in the upper end of posts 219 fixed in the plate 190 adjacent the punch mounting, as by screw threading as shown in Figure 8, one end of the levers 217 loosely engaging the bifurcated members 215 carrying rods 213 below pins 220 fixed in said bifurcation legs to extend transversely of the levers to permit of longitudinal movement of the levers 217 relative to the plunger rods 213 and the opposite ends of said levers engaging rollers 221 loosely carried by brackets 222 adjustably mounted on the upper ends of the standards 185, as by a screw and slot connection 223, to vary the movement of the levers. The abutting of the levers with the rollers by the downward movement of the slides 184 will rock the levers and move the plunger rods 213 in a downward direction against the force of the springs 214 and actuate the plunger heads 216 out of the cutting heads 199, thereby stripping and engaging the pads or linings in the caps, as shown in Figure 10. During the return upward movement of the slides 184 the web holding members 207 will assume their position about the cutting heads 199 under the influence of springs 211, and the plunger heads 216 will assume their normal position within the cutting heads 199 under the influence of springs 214.

By the mounting of the punches and dies as hereinbefore described, they may readily be replaced by punches and dies of different diameters to sever pads or linings for caps of different sizes, by simply removing the retaining screws 191, 205 for the plates 190 and 203, respectively, and permit the removal and replacement of said plates 190 and 203.

The opposed standards 185 arranged with the slideways for the slides 184 are maintained in uniform spaced relation by spacing members in the form of rods 224 having the opposite ends reduced in diameter and engaged in perforations in ears 225 projecting from the top of standards 185, an end of one of said rods being extended beyond an ear for loosely mounting thereon the manipulating lever 51 for the clutch and brake mechanism of the drive shaft 17, as at 226 in Figures 1 and 2.

The crank portions 18 of the shaft 17 and similar crank portions of the shaft 178 are arranged in relation to the Geneva actuating mechanism for the chains 142, so that the punches 199 will sever and position the pads or linings in the caps during the periods of rest of the chains, and during the actuation of the chains the slides 184 will move the punches out of severing position, as shown in Figure 8.

A single web W of suitable pad or lining material is fed simultaneously to each pair of punch and die mechanisms and is of a width substantially equal to the width of the plates 190, 203 and sufficient to permit the severing of two parallel rows of pads or linings from said webs, as shown in the waste portion of web at U in Figure 8, and whereby the maximum amount of the material of the web is utilized in the forming of pads or linings.

The web W is fed over the die plate 203 of each pair of punch and die mechanisms between a pair of guide flanges 227 extended above the face of the plate at the opposite sides thereof, by a pair of superposed feed rollers 228, 229, the lower roller 229 being fixed on a shaft 230 rotatably supported in a pair of opposed brackets 231 fixed to the side of the bed B, as clearly shown in Figure 8, and the upper roller 228 being supported by a shaft 232 engaged at the opposite ends in blocks 233 slidably mounted in opposed slideways 234 extended upwardly from the brackets 231. The roller 228 is yieldingly urged into engagement with roller 229 to feed the web toward the punch and die mechanisms by coiled springs 235 engaging at one end protuberances 236 extended from the blocks 233 with the opposite ends coiled about and abutting annular enlargements 237 of set screws 238 adjustably mounted in cap members 239 secured to and extended transversely of the top of the slideways 234, whereby the tension of the springs and the force of engagement between the rollers 228, 229 may be varied. To facilitate the engaging or threading of the web between the feed rollers, roller 228 is readily positioned away from the roller 229 against the tension of springs 235 by arms 240 loosely mounted on the shaft 232 at the opposite ends of the roller 228 and arranged with ears extending centrally from the lower ends thereof carrying rollers, as shown at 241 in Figures 8 and 9, to engage horizontal recesses at the lower ends of the slideways 234, one end of the recesses extending into a side of the slideways, as at 242, which end the rollers 241 engage when the feeding rollers 228, 229 are in engagement with each other under the influence of the springs 235, as shown in Figure 8. When it is desired to adjust the roller 228 away from roller 229, the arms 240 are moved about the shaft 232 into vertical alinement with the slideways 234 positioning the rollers 241 in the horizontal recesses in alinement with the axes of the rollers 228, 229, said position of the rollers

241 moving the roller 228 away from roller 229, as shown in Figure 9. To facilitate the simultaneous actuation of the arms 240 of each pair of rollers to their adjusted positions, the upper ends of the arm are arranged with manipulating means in the form of a cross piece attached at the opposite ends to the upper ends of each pair of arms and having an elongated opening therein, as clearly shown at 243 in Figures 2 and 3, for the ready engagement of the fingers of the hand of the operator of the apparatus.

The rollers 228, 229 are intermittently rotated during the travel of the cap feeding chains 142 and with the punches in spaced relation to the dies to feed successive predetermined lengths of the web to the punch and die mechanisms to be severed into pads or linings, by gears 244 fixed on projecting ends of the shafts 230, 232 of said rollers meshing with each other to positively drive roller 228 from roller 229, the shaft 230 of roller 229 being intermittently rotated through an overriding clutch mechanism (Figure 11), comprising a disk 245 fixed on the end of shaft 230 opposite the end carrying the gear 244 and having a series of equidistantly spaced wedge shaped recesses about the periphery thereof to form tapered chambers 246 with the flange of a cup shaped member 247 loosely mounted on the shaft 230, for the free engagement of balls 248 yieldingly urged toward the reduced ends of said chambers 246 by springs 249 confined between the balls and the opposite ends of the chambers, whereby movement of the cup member toward the punch and die mechanisms or in an anticlockwise direction, looking at Figure 11, will through friction impinge the balls 248 between the flange and the disk and impart rotation to the disk and shaft 230 in the same direction. Movement of the cup member 247 in clockwise direction will actuate the balls against the force of the springs 249 toward the larger end of the chambers 246 and out of engagement with the flange and disk whereby said movement of the cup member will not be imparted to the disk and its shaft. The balls 248 are retained in the tapered chambers by a plate 263 secured to and covering the open end of the cup member 247, as shown in Figures 2, 3 and 11. The shaft 230 is yieldingly retained against rotation by an annular enlargement 264 on the end of the shaft at the outer side of the clutch mechanism, as shown in Figure 11, the periphery of said disk being engaged by a split ring 265 having a lateral projection 266 pivotally connected to a bracket 267 fixed to the bed B, the split ends of the ring having lateral ears 268 with one ear carrying a stud 269 passing through a perforation in the other ear with the portion thereof extending beyond said other ear engaged by a coiled spring 270 adjustably compressed against said other ear by a nut threaded onto the free end of the stud, whereby the ears are yieldingly forced together but may be separated by the rotation of the shaft 230 in anticlockwise direction, as viewed in Figure 11, to permit rotation of the shaft by the movement of the cup member 247 in said direction.

The cup member 247 is actuated in the opposite directions by a block 250 slidably mounted in a slideway arranged at one side of the brackets 231, as at 251 in Figures 2 and 3, carrying a rack bar 252 meshing with a pinion 253 fixed to the cup member, the slide block being reciprocated by an actuator slide 254 slidable in the slideway 251 at the outer end of the slide block 250 and having a pin and slot connection 255 with an arm 256 fixed to an end of a shaft 257 journaled in hangers 258 extended from the brackets 231 (Figures 1 and 8) with an arm 259 fixed to the shaft 257 between the hangers 258 pivotally carrying a bifurcated member 260 pivotally connected to one end of a crank arm 261 pivoted at the opposite end to a collar 262 loose on a pintle 271 adjustably mounted on a lead screw 272 rotatable in a bifurcation of a block 273 fixed concentrically to the sprocket wheel 180, whereby the movement of the crank arm may be varied and thereby vary the length of web fed to the punch and die mechanisms for the purpose of severing different size pads or linings.

The slide block 250 is releasably connected to the actuator slide 254 to participate in the reciprocations of the actuator slide through a latch 274 pivotally mounted at one end between a pair of ears 275 extended from the outer end of the slide block juxtaposed to the actuator slide when the slide block is coupled with the actuator slide, as shown in Figure 11, the free end of the latch being of hook form to engage the outer end of the actuator slide by gravity. To prevent the feeding of the web to the punch and die mechanisms should there be no caps positioned on either pair of cap supporting rails 101, 103, to be moved by the chain fingers 141 to position in alinement with the punch and die mechanisms during the feeding of the web, and thereby prevent the waste of web that would be severed if the web was fed without a cap being positioned to receive the severed web portion, the latch 274 is normally positioned out of engagement with and uncoupled from the actuator slide by a slide 276 mounted in a vertical slideway formed by a plate 277 fixed to and covering a recess in the exterior of the slideway 251, in which recess the slide is engaged, as shown in Figures 2, 3 and 8, to engage a bar 278 fixed to and extending transversely of the latch with a portion extended into the path of movement of the slide 276. The slide 276 is normally urged upwardly to engage the bar 278 and position the latch out of engagement with the actuator slide 254 and uncouple the slide block 250 from the actuator slide, by a pair of levers 279, 280 having ear portions at one end for the engagement of set screws 281 threaded into a lateral extension 282 of the slide 276 projecting through a slot 283 in the slide plate 277 extending from the bottom edge to adjacent the upper edge thereof to limit upward movement of the slide. The end of lever 279 opposite the ear is fixed on a shaft 284 rotatably supported at one end in one of the brackets 231 (Figure 1) and engaged in a hollow shaft 285 rotatably supported at the end opposite to the end at which the shaft 284 is supported in the one bracket 231 by the other bracket 231 with the ends of the shafts extending beyond said bracket, and said end of the shaft 284 projecting beyond the shaft 285, with cranks 286 fixed on said extending ends, as clearly shown in Figures 1, 12 and 13. The lever 280 is fixed on the hollow shaft 285 in juxtaposed relation to the lever 279, the ear portions of both levers being yieldingly urged upward to engage the set screws 281 and actuate the slide 276 by springs 287 attached at the opposite ends to the cranks 286 and a pin 288 fixed in and extended from the standard 185, as shown in Figure 1.

The ear portions of levers 279, 280 are positively actuated away from the set screws 281 independently of each other to permit the slide 276 to move downwardly by gravity and the hook portion of the latch 274 to engage the actuating slide

254, but it will be noted that both levers must be actuated in a downward direction before the latch 274 engages the actuating slide, so as to prevent the feeding of the predetermined length of web and the waste of even a single pad or lining should there be only one cap below the punch and die mechanism instead of the usual two caps. The levers 279, 280 are actuated through shafts 284, 285 by arms 289, 290 pivotally mounted on the outer guide rails 105, arm 289 being pivoted at one end and connected to the crank 286 fixed on hollow shaft 285 by a rod 291 having a block 292 at one end pivotally connected to the crank 286 and having one end of spring 287 anchored thereon, as shown in Figures 12 and 13, the opposite end of rod 291 being adjustably connected to a vertical projection 293 fixed to the face and intermediate the ends of arm 289, so that the length of the rod between the crank 286 and projection 293 may be varied to vary movement of the lever 280. The arm 290 is pivoted intermediate its ends and connected to the crank 286 on shaft 284 by a rod 294 having a block at one end similar to the block 292 pivoted to the crank 286 and adjustably connected at the opposite end to a projection similar to projection 293 but fixed to the arm 290 adjacent one end thereof to facilitate the mounting of the arms 289, 290 in opposed relation to each other, as clearly shown in Figures 12 and 13. The free ends of the arms 289, 290 are arranged with fingers 295 of greater thickness than the arms and fixed in juxtaposed relation to the undersurface of the arms to be positioned in elongated recesses 296 in the outer guide rails 105 corresponding in size and shape to the fingers, whereby the outer sides of the fingers will be flush with the guiding edges of the rails 105 when the fingers are fully engaged in said recesses. The arms 289, 290 are normally actuated by the springs 287 to position the fingers 295 out of the recesses 296 and in the path of travel of the caps being transported by the chains 142 to the punch and die mechanisms, the caps first engaging the portions of the fingers nearest the pivots of the arms and during their travel to the punch and die mechanisms progressively move the fingers into the recesses 296. The chains are synchronously actuated to position the caps during the periods of rest of said chains where the caps will engage the fingers 295 fully within the recesses 296, as shown in Figures 12 and 13, in which position of the arms 289, 290, the levers 279, 280 will be positioned away from the set screws 281, thereby permitting the latch 274 to engage the actuator slide 254 and couple said slide to the slide block 250, and the feeding of a predetermined length of web to the punch and die mechanisms to be severed into pads or linings and said pads or linings being assembled in the caps that are in engagement with and have actuated the fingers 295. Should there be no cap on either one of the pairs of cap supporting rails, as illustrated in Figure 13, the web will not be fed to the punch and die mechanisms as the lever 279 by the position of arm 290 will maintain the slide 276 in engagement with the latch 274 and said latch in elevated position out of engagement with the actuator slide.

It will be noted from Figures 2 and 3 that the cap engaging fingers 141 of one chain 142 are not in alinement with the fingers of the other chain but are in staggered relation to each other to properly position the caps in alinement with the respective punch and die mechanisms, and the fingers of each chain are properly adjusted relative to each other by loosening the plates 170 and adjusting the worms 167 carried by the chain actuating shaft 152, as hereinbefore set forth. The staggered arrangement of the fingers 141 is another reason why the cap transferring slides 112 are offset relative to each other, as shown in Figure 2, to properly position the caps relative to the fingers 141.

To maintain the caps in alinement with the punches and dies during the assembling of the linings therein, said caps are yieldingly engaged by jaws in the form of rectangular blocks (Figure 12) having a V-shaped cut out in one side thereof, as at 297, with ears 298 extended from the opposite ends at the side of the blocks opposite the V-shaped cut out adapted to slidably engage the ends of rectangular recesses 299 in the outer cap guide rails 105 in alinement with the respective punch and die of each pair of punch and die mechanisms, said recesses having at the entrances thereto inwardly extending projections 300 corresponding to the ears 298 and normally engaged by said ears by springs 301 confined between the jaw blocks and the bottom of the recesses with the V sides of the blocks projecting into the path of travel of the caps to the punch and die mechanisms, the forward movement of the caps moving the jaw blocks into the recesses 299 and in the position of the caps in alinement with the punch and die mechanisms the V face of the blocks will engage and impinge the caps against the center guide rail 107 under the influence of the springs 301. The ears 298 and projections 300 limit the outward movement of the jaw blocks into the path of travel of the caps so that the blocks will not impede the travel of the caps along the rails 101, 103.

The webs W travel from the rolls of said webs, not shown, to the feeding rollers in a plane substantially level with the bits of the rollers to facilitate the feeding of the webs and prevent breakage thereof by guiding the webs between a pair of vertical rails 302 adjustably mounted in slots 303 extended transversely of plates 304 secured to one side of the slideways 251, as shown in Figures 2 and 3, and upon which plates the webs are supported. The webs are maintained upon the supporting plates 304 in alinement with the bits of the rollers by rods 305 carried at the outer ends of the rails 302 to extend transversely of the plates above the webs, as shown in Figure 1. By the mounting of the rails 302 on the plates 304 the rails may be adjusted toward or away from each other to permit the feeding of webs of different widths for severing pads or linings of different sizes with a minimum of waste of the web. The lengths of the rollers 228, 229 are sufficient to feed webs for pads or linings of maximum size the apparatus is capable of assembling, and therefore, they need not be changed when the apparatus is adjusted for different size caps, as hereinbefore described relative to the different devices of the apparatus.

After the sealing pads are assembled in the caps by the first pair of punch and die mechanisms shown in Figure 2, they are intermittently fed and positioned relative to the second pair of punch and die mechanisms shown in Figure 3, where another sealing pad of ordinary absorbent material may be severed and assembled in the caps but usually a web of paper having a varnished surface is fed to the second pair of punch and die mechanisms for the assembling of impervious linings superposed to the sealing pads to protect the pads and the caps from the deteriorating ac-

tion of the contents of receptacles to which the caps are applied. The second pair of punch and die mechanisms are of the same structure and arrangement of parts as the first pair of mechanisms, as heretofore pointed out, and description of the same is deemed to be superfluous.

Either pair of the punch and die mechanisms may be rendered inoperative independently of the other by not feeding a web to the pair of punch and die mechanisms to be rendered inoperative, by adjusting the pintle **271** on the lead screw **272** in alinement with the shaft **17** or **178**, whereby no reciprocatory movement will be imparted to the actuator slide **254** and the web feeding rollers **228**, **229** will not be actuated, or no web may be engaged between the rollers **228**, **229** to be fed by said rollers to the punch and die mechanisms.

The waste portions U of the webs W are guided and supported from the side of the apparatus opposite to the side arranged with the web feeding rollers **228**, **229**, by chutes **308** mounted on the standard **185** with the upper ends flush with the web supporting surfaces of the die plates **203**, so that the webs will lie flat on said plates **203** and assure the proper severing of the webs.

After the impervious linings have been assembled in the caps, the caps are intermittently moved along the cap supporting rails **101**, **103**, away from the second pair of punch and die mechanisms by the chains **142** until they reach a point slightly beyond the shafts **152**, **154**, where the chains travel about the sprocket wheels **144** on the shaft **152**, and from said point to the adjacent ends of the rails **101**, **103** the caps are moved toward said ends and discharged from the rails by the continued movement of the subsequent caps by the chains **142** along the rails. The caps are delivered from the rails to a chute **306** declining from the end of the rails to a suitable depository, not shown.

It will be obvious that various modifications may be made in construction and arrangement of parts without departing from the scope of the invention, and that portions of the invention may be used without others and come within the scope of the invention.

Having thus described my invention, I claim:

1. In apparatus for assembling linings in receptacle closure caps, pairs of parallel cap supporting rails, a conveyer in alinement with and terminating in spaced relation to an end of the cap supporting rails and adapted to transport caps toward said rails, a pair of conveyers traveling in the direction of travel of the first conveyer and adjacent the marginal portions of said first conveyer and cap supporting rails, guide rails extending from the first conveyer to the pair of conveyers, vibrating means to engage and direct the caps on the first conveyer relative to the guide rails, the caps being positioned by said guide rails to be transferred from the first conveyer to the pair of conveyers by the travel of the conveyers, and means to transfer the caps from the pair of conveyers to the cap supporting rails.

2. In apparatus for assembling linings in receptacle closure caps, pairs of closure cap supporting rails, punch and die mechanism superposed to each pair of rails, means to engage and intermittently move caps along each pair of rails relative to the punch and die mechanisms, means to feed a single web of lining material to the punch and die mechanisms for the severing of disks from the web and deliver a disk to a cap positioned on each pair of rails relative to the punch and die mechanisms, and means normally rendering the web feeding means inactive and adapted to be actuated by caps positioned in stepped relation to each other on the opposite rails proportionally in advance of the punch and die mechanisms to render the web feeding means active.

3. Apparatus for assembling linings in receptacle closure caps as claimed in claim 1, wherein the vibrating means comprises an arm pivotally mounted at one end and the opposite end reciprocal transversely of the direction of travel of the first conveyer.

4. In apparatus for assembling linings in receptacle closure caps, pairs of spaced closure cap supporting rails, punch and die mechanism superposed to each pair of rails, a pair of endless chains arranged with the upper stretches to travel adjacent and in alinement with the space between each pair of rails, equidistantly spaced fingers extended from the chains and through the spaces between the rails to engage and move the caps along and position the same on the rails relative to the punch and die mechanisms, a drive shaft from which the chains are driven, means interposed between the drive shaft and chains adapted to independently disconnect either chain from the drive shaft to permit individual adjustment of the chains and the cap engaging fingers thereof to assure the proper positioning of the caps by the fingers relative to a punch and die mechanism, and means to feed a web of lining material to the punch and die mechanisms to be severed into lining disks and assembled in the caps by said mechanisms.

5. In apparatus for assembling linings in receptacle closure caps, pairs of spaced closure cap supporting rails, punch and die mechanism superposed to each pair of cap supporting rails, a pair of sprocket wheels mounted adjacent each end of the rails, endless chains engaged about the sprocket wheels with the upper stretches thereof adjacent to and in alinement with the spaces between the rails, fingers fixed to the chains in spaced relation to each other and extended from the chains to project through the spaces between the rails and engage and move the caps along the rails relative to the punch and die mechanisms by the travel of the chains, means to feed a web of lining material to the punch and die mechanisms to be severed into lining disks and said disks assembled in the caps by the punch and die mechanisms, a shaft, one pair of said sprocket wheels being loosely mounted on said shaft, and means to connect said pair of sprocket wheels to the shaft and permit of independent adjustment on said shaft of each of said wheels and associated chain to assure the positioning of the caps by the cap engaging fingers of one chain in alinement with a punch and die mechanism independently of the other chain.

6. In apparatus for assembling linings in receptacle closure caps, pairs of spaced closure cap supporting rails, a punch and die mechanism mounted in alinement with each pair of cap supporting rails, a pair of sprocket wheels mounted adjacent each end of the rails, endless chains engaged about the sprocket wheels with the upper stretches thereof adjacent to and in alinement with the spaces between the rails, fingers fixed to the chains in spaced relation to each other and extended from the chains to project through the spaces between the rails and engage and position the caps on the rails in alinement with the punch and die mechanisms by the travel of the

chains, means to feed a web of lining material to the punch and die mechanisms to be severed into lining disks and said disks assembled in the caps by the punch and die mechanisms, a shaft, one pair of said sprocket wheels being loosely mounted on the shaft, means carried by the shaft connected to each of said pair of sprocket wheels adapted to independently rotatably adjust said sprocket wheels and associated chain when the sprocket wheel is disconnected from the shaft to assure the positioning of the caps by the cap engaging fingers of each chain in alinement with a punch and die mechanism, and means to releasably secure each of said pair of sprocket wheels in adjusted position on the shaft.

7. Apparatus for assembling linings in receptacle closure caps as claimed in claim 5, wherein the means to releasably connect the sprocket wheels in adjusted position comprises a pair of cup shaped members fixed on the shaft, plates loosely mounted on the shaft with a sprocket wheel of said pair of sprocket wheels interposed between a plate and the open end of a cupped member, and means to draw the plates to the cupped members and clamp the sprocket wheels to the cupped members.

8. Apparatus for assembling linings in receptacle closure caps as claimed in claim 6, wherein the means to adjust the sprocket wheels and associated chains and cap engaging fingers comprises a toothed wheel fixed to each sprocket wheel and a pair of gears rotatably carried by the shaft meshing with the toothed wheels and having a shank portion arranged for the application of a tool to rotate the gears and sprocket wheels about the shaft.

9. In apparatus for assembling linings in receptacle closure caps, pairs of parallel cap supporting rails, a pair of vertical slides reciprocatory on the outer opposite sides of the rails, a pair of punches carried by and in alinement with the slides in staggered relation to each other and in alinement with a pair of cap supporting rails, a pair of dies mounted in superposed relation to the cap supporting rails and below and in alinement with the punches, means to feed a single web of lining material transversely of the cap supporting rails and between the punches and dies, and means to engage and move the caps along and position them on the rails in alinement with the punches and dies, the punches by the reciprocation of the slides co-operating with the dies to sever lining disks from the web and assemble the severed disks in the caps positioned in alinement with the punches and dies.

10. Apparatus for assembling linings in receptacle closure caps as claimed in claim 9, wherein the punches comprise a tubular member having an enlarged cutting head, and means yieldingly carried by the tubular member and encircling the cutting head to clamp the web to the dies and maintain the web portions spanning the dies in taut condition during the severing of the lining disks by the punches.

11. In apparatus for assembling linings in receptacle closure caps, pairs of cap supporting rails, punch and die mechanisms superposed to and in alinement with the rails, a roller mounted laterally of the punch and die mechanisms and intermittently rotatable in a direction toward the punch and die mechanisms, a second roller mounted to have movement toward and away from said first roller, resilient means urging the second roller toward and to co-operate with the first roller to feed successive predetermined lengths of a web of lining material to the punch and die mechanisms, a lever pivotally connected intermediate the ends thereof to the second roller and mounted to have movement in a fixed plane intermediate the axes of the rollers whereby the second roller is adapted to be positioned away from first roller against the action of the resilient means when the lever is adjusted to extend in alinement with the axes of the rollers and the second roller to be moved under the influence of the resilient means toward the first roller when the lever is adjusted to extend in an oblique direction out of alinement with the axes of the rollers, means to engage and intermittently move the caps along the rails and position them relative to the punch and die mechanisms simultaneously with the actuation of the web feeding rollers, and means to actuate the punches to sever disks from the web and deliver said disks to the caps on the rails during the periods of rest of the first roller and cap moving means.

12. In apparatus for assembling linings in receptacle closure caps, pairs of cap supporting rails, punch and die mechanisms superposed to and in alinement with the rails, intermittently actuated means to engage and move the caps along the rails relative to the punch and die mechanisms, a pair of rollers mounted laterally of the punch and die mechanisms and one roller positively rotated from the other roller, means to intermittently rotate said rollers to feed successive predetermined lengths of a web of lining material to the punch and die mechanisms to be severed into lining disks and the disks positioned in the caps on the rails, comprising a slide reciprocal toward and away from the rollers, a pinion, means to releasably connect and transmit the movement of the pinion to one roller when rotated in one direction, a rack slidably mounted relative to the slide and meshing with the pinion, a latch pivotally carried by the rack and arranged to engage and connect the slide with the rack, a pair of levers adapted to impart movement to the latch, means connected to and normally actuating the levers to move the latch out of engagement with the slide, and a second pair of levers pivotally mounted adjacent the outer side portions of the cap supporting rails forward of the punch and die mechanisms, each lever of the second pair of levers being connected to a lever of the first pair of levers, and said actuating means for the first pair of levers normally positioning a portion of each lever of the second pair of levers into the path of movement of the caps on the rails to be engaged and moved by a cap on both pairs of supporting rails and said latter movement of the second pair of levers actuating the first pair of levers against the influence of the actuating means therefor out of engagement with the latch and permitting the latch to engage and connect the slide to the rack and impart web feeding movement to the rollers.

13. In apparatus for assembling linings in receptacle closure caps, pairs of cap supporting rails, punch and die mechanisms mounted in vertical alinement with the rails, means to engage and position the caps on the rails relative to the punch and die mechanisms, means to feed a web of lining material to the punch and die mechanisms to be severed into lining disks and the severed disks assembled in the caps, guide rails mounted on the cap supporting rails to engage opposite sections of the skirt portions of the caps during the travel of the same along the supporting rails, and blocks slidably mounted in the

guide rails in opposed relation to the adjacent punch and die mechanism and yieldingly urged from said guide rails toward the opposite guide rail to engage the caps positioned relative to the punch and die mechanisms and impinge said caps against the opposite guide rail to maintain said caps in alinement with the punch and die mechanisms during the severing and assembling of the lining disks in said caps.

14. Apparatus for assembling linings in receptacle closure caps as claimed in claim 13, wherein the guide rails comprise outer guide rails adjustably mounted on the cap supporting rails to have movement toward and away from each other to engage the outer sections of the skirt portions of the caps and a center guide rail interchangeably mounted on the cap supporting rails intermediate the outer guide rails to engage the inner sections of the skirt portions of the caps and permit the guiding of caps of different sizes on the supporting rails by laterally adjusting the outer guide rails and replacing the center guide rail with a rail of different width.

15. In apparatus for assembling linings in receptacle closure caps, cap supporting rails, punch and die mechanism mounted above and in alinement with the rails, means to engage and feed the caps along the rails in position relative to the punch and die mechanism, means to feed a web of lining material to the punch and die mechanism to be served into lining disks and the severed disks assembled in the caps positioned on the rails relative to the punch and die mechanism, a drive shaft adapted to operate the punch and die mechanism, cap feeding means and the web feeding means, power means, and means to connect the power means with the drive shaft adapted when actuated to disconnect the power means from the drive shaft to stop the rotation of the drive shaft to prevent further operation of all of the actuating parts of the apparatus.

16. In apparatus for assembling linings in receptacle closure caps, cap supporting rails, punch and die mechanism mounted above and in alinement with the rails, means to engage and feed the caps along the rails in position relative to the punch and die mechanism, means to feed a web of lining material to the punch and die mechanism to be severed into lining disks and the disks assembled in the caps positioned on the rails relative to the punch and die mechanism, a drive shaft operatively connected with and adapted to actuate the punch and die mechanism, cap feeding means and the web feeding means, a power wheel loosely mounted on the drive shaft, means revoluble with and slidably mounted on the drive shaft and yieldingly urged into engagement with the power wheel to releasably connect the power wheel with the shaft, and an arm having a cam face adapted by the movement of the arm to engage and move said latter means out of engagement with the power wheel and disengage the drive shaft from the power wheel.

17. In apparatus for assembling linings in receptacle closure caps, cap supporting rails, punch and die mechanism mounted above and in alinement with the cap supporting rails, means to engage and feed the caps along the rails in position below the punch and die mechanism, means to feed a web of lining material to the punch and die mechanism to be severed into lining disks and the severed disks assembled in the caps on the rails below the punch and die mechanism, a drive shaft operatively connected with and adapted to actuate the punch and die mechanism, the cap positioning means and the web feeding means, a power wheel loosely mounted on the drive shaft, a member rotatable with and slidably mounted on the drive shaft yieldingly urged toward the power wheel and arranged to releasably engage and connect the power wheel to the drive shaft, an arm movable toward and away from and adapted to move said member out of engagement with the power wheel, a brake drum fixed on the drive shaft, a brake band encircling and normally yieldingly urged to grip the brake drum, and means connected to the arm and brake drum operable to actuate the arm toward and move the slidable member out of engagement with the power wheel and move the brake band to drum gripping position, and move the arm away from and release the slidable member to permit said member to engage and connect the power wheel to the drive shaft and actuate the band out of brake drum gripping position to permit the free rotation of the drive shaft and actuation of the apparatus.

18. In apparatus for assembling linings in receptacle closure caps, cap supporting rails, a conveyer mounted at one end of and in longitudinal alinement with the cap supporting rails to travel and transport caps toward said rails, a pair of conveyers mounted to travel relative to the opposite edges of the first conveyer and the cap supporting rails and in the direction of travel of said first conveyer, means to engage and direct the caps from the first conveyer to the pair of conveyers, horizontally reciprocatory slides mounted at the outer marginal portions of the pair of conveyers and actuated to engage the caps on the pair of conveyers and transfer said caps from said conveyers to the cap supporting rails, punch and die mechanisms mounted above and in alinement with the cap supporting rails, means to feed the caps along the rails relative to the punch and die mechanisms to be severed into lining disks and the disks assembled in the caps on the rails, driving means connected to the first conveyer and pair of conveyers to continuously actuate said conveyers, and clutch means connecting the driving means to the means for feeding the caps along the rails, the punches of the punch and die mechanisms and the web feeding means and adapted to connect and disconnect the driving means from said operating means of the apparatus during the actuation of the conveyers.

19. In apparatus for assembling linings in receptacle closure caps, pairs of spaced cap supporting rails, a conveyer mounted at one end of and in longitudinal alinement with the cap supporting rails and actuated to travel and transport caps toward said rails, a pair of cap conveyers mounted to extend along the marginal portions of the first conveyer and the cap supporting rails and traveling in the direction of travel of the first conveyer, means to engage the caps on the first conveyer and guide said caps to the pair of conveyers, means reciprocatory transversely of each conveyer of the pair of conveyers and each pair of cap supporting rails to engage and transfer caps from said conveyers to the cap supporting rails, pairs of punch and die mechanisms mounted in sequence to each other with a punch and die of each pair of mechanisms being above a pair of rails, means traveling below and in alinement with the space between each pair of cap supporting rails having projections extended through said space to engage and move the caps along the rails relative to the punch and die mechanisms, and means mounted in lateral alinement with each

pair of punch and die mechanisms, each of said latter means adapted to feed a web of different lining materials to each pair of punch and die mechanisms, and the punches being simultaneously operative with each other to sever lining disks from the webs and deliver the disks to the caps positioned below the mechanisms with the disks of different lining materials superposed to each other in the caps.

20. In apparatus for assembling linings in receptacle closure caps as claimed in claim 19, means connected to the web feeding means of each pair of punch and die mechanisms and normally rendering the feeding means inactive, and means extended into the path of travel of the caps on each pair of cap supporting rails forward of each pair of punch and die mechanisms and adapted to actuate said web feeding means when caps are on both pairs of rails forward of a pair of punch and die mechanisms to render the web feeding means active to feed a web to said pair of punch and die mechanisms.

JOHN A. JOHNSON.