

Feb. 3, 1942.

R. W. VON SYDOW ET AL

2,272,073

CONTAINER MANUFACTURE

Filed May 26, 1939

3 Sheets-Sheet 1

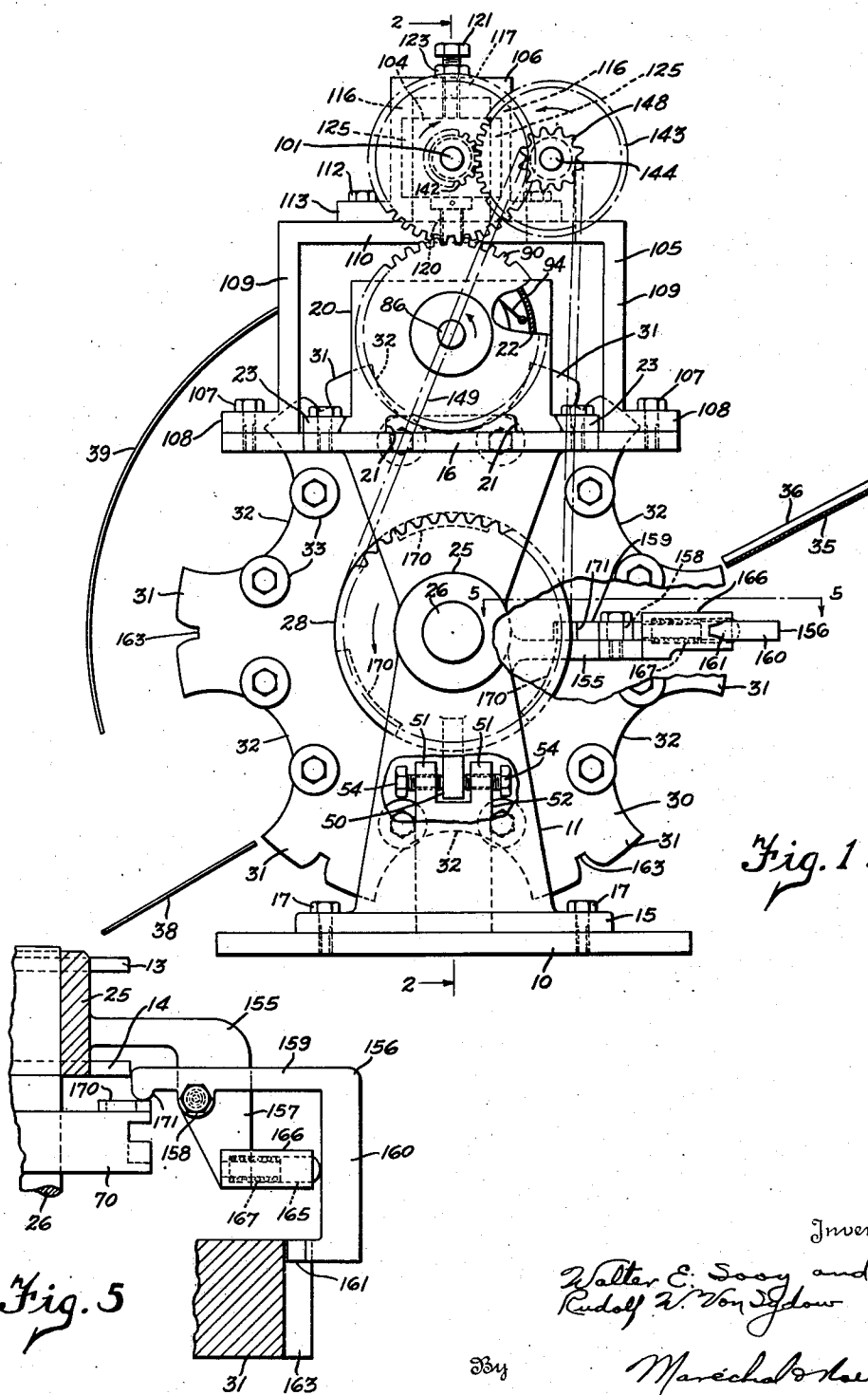


Fig. 1.

Fig. 5

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3 Sheets-Sheet 2

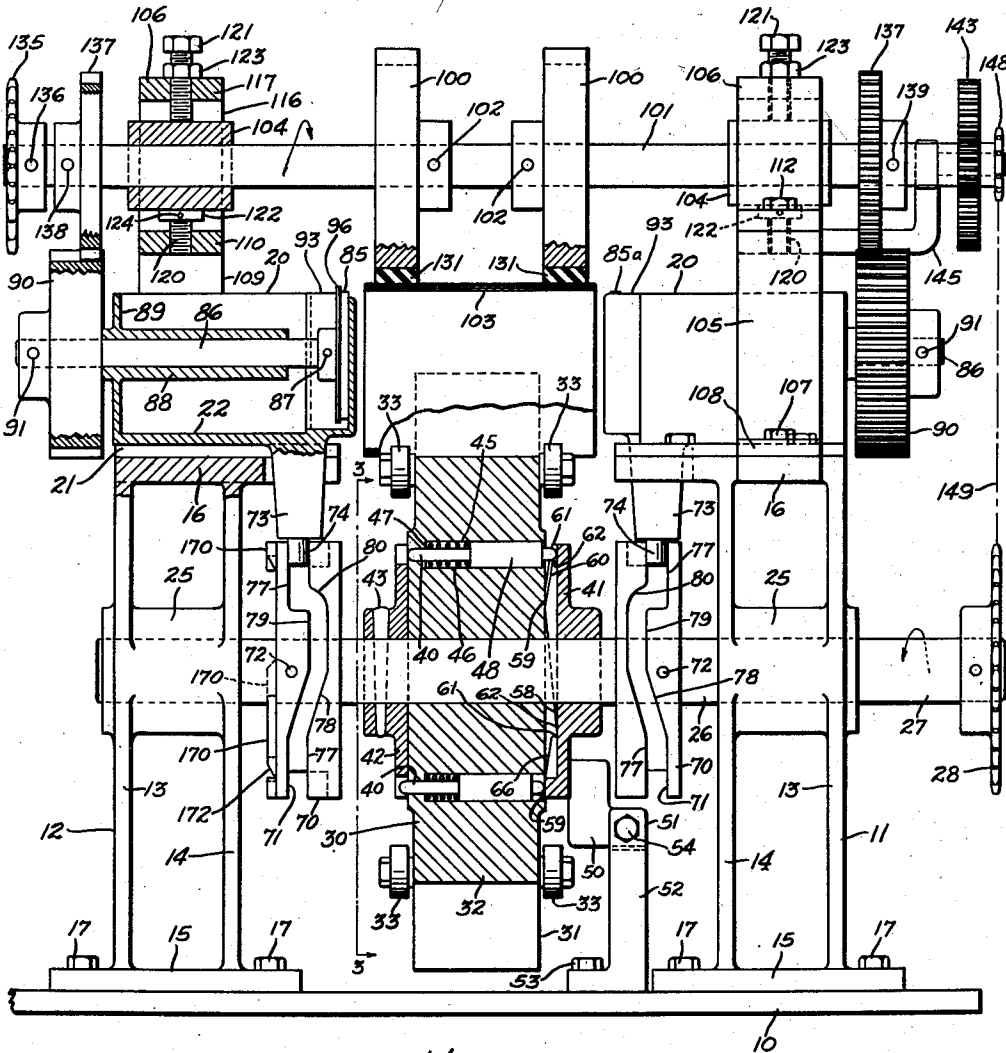


Fig. 2

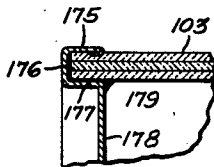


Fig. 6

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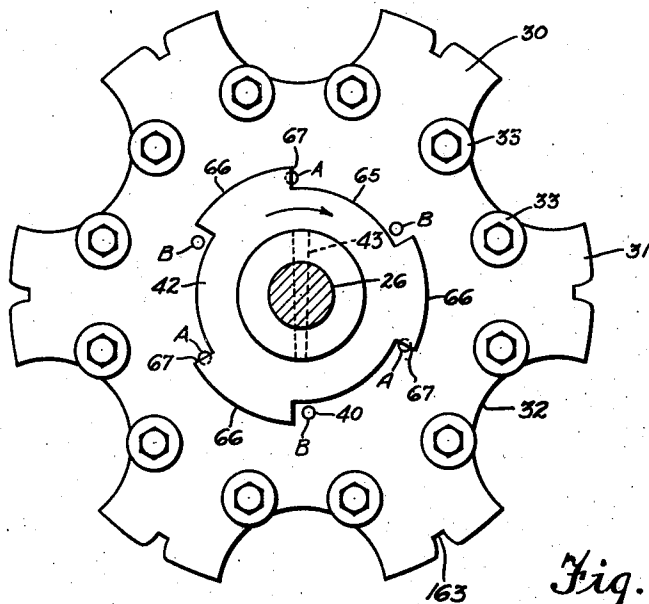
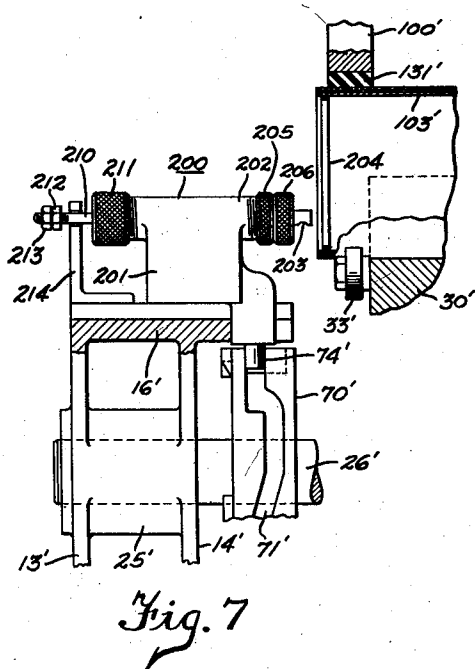
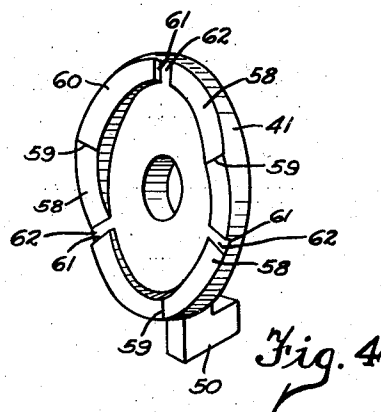
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CONTAINER MANUFACTURE

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3 Sheets-Sheet 3



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2,272,073

CONTAINER MANUFACTURE

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Application May 26, 1939, Serial No. 275,838

21 Claims. (Cl. 91—12)

This invention relates to the manufacture of containers from paper or like material and more particularly to the application of end closures thereto in fluid sealed relation.

In the packaging of foods, oils, paints, greases and the like in accordance with this invention a container is provided that is inexpensive and yet sufficiently strong and impervious to the passage of the contents, such a container comprising a wall or body portion wound from paper material having an inner protective surfacing of suitable character and having end closures on the ends thereof. Where the container is to be utilized for the packaging of oily or greasy materials it is provided interiorly with a suitable greaseproof coating or laminated surfacing forming an inner surface that is entirely impervious to the contents of the container. And in order to maintain the entire contents completely impervious against leakage or wicking of the container contents into the body wall through the ends thereof or against ingress of air or moisture from outside the container, the end closure members are applied with the provision of a sealing material which will establish a proper fluid sealed joint and provide for maintaining an impervious condition in the completed container.

It is, accordingly, a principal object of the invention to provide for the manufacture of containers from paper or like material in which the end closures are imperviously sealed to the wall of the container body in a manner preventing any leakage or wicking of the contents and protecting the contents against deterioration from air or moisture on the exterior thereof.

A further object is to provide for the manufacture of containers from paper material having an inner greaseproof surfacing in which sealing material applied to predetermined areas of the ends of the container body provides for sealing the end closure upon the wall of the body in greaseproof and impervious relationship.

A further object is the provision of relatively simple and inexpensive apparatus for applying such sealing material to the ends of container bodies in a rapid and continuous manner.

A further object is the provision of apparatus of this character which provides for applying the sealing material to both ends of the container body simultaneously.

A further object is the provision of apparatus of this character which incorporates a novel and relatively simple control mechanism operating in coordinated sequence for feeding container bodies, applying sealing material thereto and

thereafter automatically discharging the bodies.

A still further object is the provision of a simple and effective process for the rapid application to container bodies of a material for sealing the end closures thereon.

Other objects and advantages of the invention will be apparent from the following description, the appended claims, and the accompanying drawings, in which:

Fig. 1 is an end elevation of a machine for applying sealing material to the ends of container bodies in accordance with the present invention;

Fig. 2 is a side view showing the machine of Fig. 1 partly in elevation and partly in section, the sections being taken substantially along the longitudinal center line of the machine as indicated by the arrows 2—2 in Fig. 1;

Fig. 3 is a detail view taken on the line 3—3 of Fig. 2 and shows the carrier for receiving and advancing the container bodies and a portion of the drive mechanism therefor;

Fig. 4 is a perspective detail showing the cam which forms another portion of the drive mechanism for the body carrier;

Fig. 5 is a fragmentary detail view taken on the line 5—5 of Fig. 1 and shows the mechanism for latching the carrier in each indexed position;

Fig. 6 is a fragmentary sectional detail view taken through one end of a container body with an end closure attached and illustrates the manner in which the sealing material is applied to the container body and effects a seal between the body wall and the closure; and

Fig. 7 is a fragmentary view showing a modified form of apparatus for applying sealing material to the ends of the container bodies.

Referring to the drawings which illustrate a preferred embodiment of the invention in which like reference numerals designate like parts in the several views, the machine is shown as comprising a bed plate 10 and a pair of end frames 11 and 12 which provide a support for the various operating parts of the machine. Each of the end frames 11 and 12 comprises a pair of spaced-apart legs 13 and 14 which rise upwardly from a base plate 15 and are joined at their upper ends to flat horizontally extending tables 16, one such table 16 being supported by each end frame adjacent each of the opposite ends of the machine. The base plates 15 are rigidly attached to the bed plate 10 by means of bolts 17 and the spaced-apart legs 13 and 14 of the end frames provide a rigid support for the table 16 and other operative parts of the machine.

The tables 16 provide supports for a pair of

applicators 20 that are mounted on the tops of the tables and are adapted to slide into and out of the opposite ends of a container body supported therebetween to provide for the application of a band of sealing material to the inner surface of the container body in predetermined positioning adjacent each end thereof. The applicators 20 are slidably mounted on the tops of the tables 16 by means of feet 21 which depend downwardly from the tank portion 22 of the applicators adjacent opposite sides thereof and rest upon the tops of the tables. The applicators are guided in their sliding movement towards and away from the end of the container body by means of a pair of guide bars 23 which are bolted to the top of the table 16 and engage the outer sides of the feet 21. As shown in Fig. 1 the cooperating surfaces of the feet 21 and the guide bars 23 are mutually inclined in such manner that the guide bars overlies portions of the feet and prevent the applicator from lifting off the table while providing for free sliding movement of the applicators on the tops of the tables.

A pair of bearings 25 are carried by the end frames 11 and 12 intermediate the base plates 15 and tables 16 and provide for rotatably supporting a shaft 26. Shaft 26 extends through the entire length of the machine and is provided with an overhanging portion 27 that projects beyond the bearing at the right hand side of the machine as viewed in Fig. 2. A sprocket 28 is pinned to the overhanging end 27 of the shaft and provides for continuously rotating the shaft in a manner to be hereinafter more fully described.

The shaft 26 provides a support and drive for a rotatable carrier 30 that is mounted on the shaft and provides for receiving and supporting the container bodies and for advancing the same through the position in which the sealing material is applied to the ends of the bodies by the applicators 20. The carrier 30 is loosely mounted on the shaft 26 and comprises a spider-shaped member having a plurality of radially extending arms 31 defining a plurality of segmental recesses 32 equally spaced around the periphery of the carrier. Each of the recesses 32 is adapted to receive and support a container body and the carrier as a whole is adapted to be intermittently rotated to successively move each of the recesses into and out of the position where the sealing material is applied by the applicators. In the illustrated embodiment of the invention the carrier is provided with six equally spaced recesses 32 and the spider-shaped member 30 thus moves through $\frac{1}{6}$ of a revolution or 60° for each indexing movement and then dwells for a predetermined period of time providing for the application of the sealing material to the ends of the container body. As will be evident from the following description the preferred arrangement is such that the carrier indexes and dwells in equal periods of time.

As the carrier 30 is intermittently indexed it successively moves each of the segmental recesses 32 through each of the six dwell positions shown in Fig. 1. One of these positions is at the top of the carrier as shown in Fig. 1 and it is at this position that the container body lies between the applicators 20 and receives the application of the sealing material. The container body is rotatably supported at this position by means of rollers 33 that are journaled on opposite sides of the spider-shaped carrier adjacent each of the

recesses 32 to provide for free rotation of the container bodies at this station. The proportioning of the parts is such that the rollers support the bodies with a slight clearance between the outer surface of the bodies and the wall of the segmental opening or recess.

As indicated by the arrows the shaft 26 and the carrier 30 of the illustrated machine are rotated in a counterclockwise direction as seen in Fig. 1 and the container bodies are fed to the recesses of the carrier at the dwell position which next precedes the top dwell position at which the sealing material is applied. A downwardly inclined feed table 35 is arranged adjacent the carrier at this dwell position and provides for feeding a container body to each of the segmental recesses as they are successively advanced into the dwell position. Side walls 36 on the table 35 provide for guiding the container bodies into proper positioning on the carrier 30 as they move downwardly on the feed table. The feed table 35 is adapted to receive a plurality of container bodies arranged in side by side relation and as each recess 32 moves into the dwell position adjacent the table the lowermost body rolls into its position on the carrier. During the next indexing movement which moves the container body into the seal applying station the end portion of one of the radially extending arms 31 engages the next lowermost container body and maintains the bodies in proper positioning on the table. To provide for free sliding movement of the arm 31 past the container body engaged thereby the ends of the arms are made substantially arcuate as shown.

As the carrier continues to be intermittently rotated the container body is carried with it until the recess supporting the body reaches the dwell station adjacent a delivery table 38 where the body rolls downwardly on the table and is automatically discharged from the carrier. An arcuate guard 39 suitably mounted on the machine frame provides for maintaining the container bodies in position on the carrier until the recess supporting the body reaches the dwell position adjacent the table 38. The entire operation of the machine is thus automatic and continuous.

As mentioned above the carrier 30 is adapted to be driven by the continuously rotating shaft 26 and a means is accordingly provided for translating the continuous rotation of the shaft into the desired predetermined intermittent rotation of the carrier. Referring to Figs. 2, 3 and 4 this means is shown as comprising a plurality of pins 40 that are slidably mounted in the carrier member 30 for movement outwardly from one of the faces thereof, a stationary cam member 41 positioned adjacent one face of the carrier and providing for controlling the positioning of the pins, and a driving member 42 pinned to the shaft adjacent the opposite face of the carrier as indicated at 43 and adapted to engage the pins in predetermined sequence to effect intermittent rotation of the carrier member. The pins 40 are equally spaced around the axis of the carrier member and are arranged at equal radial distances from this axis. The pins are received within suitable openings 45 provided in the carrier member and are urged towards the cam member 41 by means of springs 46 that are compressed between a shoulder 47 provided in the opening 45 and an enlarged portion 48 provided on the pins. One pin is provided for each of the recessed portions 32 of the carrier, and according-

ly, in the present embodiment six such pins are provided and the spacing between any two of the pins subtends an angle of 60° at the axis of the carrier.

The cam member 41 is loosely received upon the shaft 26 and is provided with a tail portion 50 that extends downwardly and is received between the bifurcated arms 51 of a bracket 52 which extends upwardly from the bed plate 10 and is rigidly attached to the bed plate by bolts 53. A pair of set screws 54 threaded through the bifurcated arms 51 of the bracket 52 engage against the opposite sides of the cam tail 50 and provide for adjustably retaining it in a fixed position between the arms 51. The screws 54 thus provide for adjustably maintaining the cam member 41 in a fixed predetermined angular positioning relative to the axis of the shaft 26.

The face of the cam member 41 that lies adjacent the carrier 30 is provided with a cam means adapted to engage the ends of the pins 40 and selectively move the pins in predetermined timed sequence into and out of the path of movement of the drive member 42. As shown in Figs. 2 and 4 this means comprises three similarly shaped cam portions each comprising a portion 58 which rises gradually from the face of the cam member to a high point 59 and a portion 60 which tapers slightly towards the face of the cam member and terminates in a shoulder 61 which drops abruptly to the face of the cam member. The shoulders 61 are accurately positioned at exactly 120° apart and the high points 59 of the cam member are positioned at approximately midway therebetween. A spacing is provided between each of the shoulders 61 and the beginning of the succeeding inclined portion 58 and this spacing provides recessed or retracted portions 62 on the cam member adapted to receive the ends of alternate pins 40 as the carrier is rotated relative to the cam member. The angular position of the cam member relative to the axis of shaft 26 is such that when the carrier 30 occupies any of its dwell positions a set of three alternate pins 40 will be received within the recessed or retracted portions 62 of the cam member while the other set of alternate pins will be engaged by the high portions 59 of the cam member.

The drive member 42 comprises a cylindrical body portion 65 and a plurality of spaced arms 66 which extends radially outward from the body portion and provide radially extending driving faces 67. The driving faces 67 are spaced exactly 120° apart so that each of the driving faces is adapted to simultaneously engage a pin 40 when an alternate set of pins is extended into the path of movement of the arms 67 by the cam member 41. The diameter of the body portion 65 and the width of the arms 66 is such that when the drive member is engaging one set of alternate pins to effect rotation of the carrier the other set of pins may be extended by the cam member 41 to lie in the path of movement of the arms to be subsequently engaged thereby.

The operation of the drive mechanism for the carrier is best described in connection with Fig. 3. This view illustrates the parts in the relative positioning which they occupy just after an indexing movement has been completed and a dwell period has started. In this position of the carrier the alternate set of pins 40 which are marked A in the figure have moved into the recessed or retracted portions 62 of the cam member and are withdrawn from the path of movement of the drive arm 66. The drive arms 66 are thus free to

pass over the tops of these pins as indicated in Fig. 3 and the carrier 30 remains stationary while the drive member continues to rotate in the direction of the arrow. The alternate pins marked B, however, now rest against the raised portions 59 of the cam member and are thus extended into the path of movement of the drive arms 66. After the driving arms have rotated through an angle of 60° from the position of the A pins, during which time the carrier 30 remains stationary, the driving faces 67 of the arms engage the B pins and thus cause the carrier to be rotated with the driving member. During the movement of the B pins from the positions illustrated to the positions formerly occupied by the A pins the pins ride upon the raised portions 60 of the cam member and thus maintain a driving connection between the driving member and the carrier. This rotation of the carrier and the pins mounted therein continues until the B pins have been moved through an angle of 60° and occupy the positions formerly occupied by the A pins. In this position the B pins will have dropped off the shoulder 61 of the cam member into the retracted or recessed portion 62 thereof and are thus withdrawn from engagement with the driving faces 67. The driving connection between the driving member and the carrier is thus disconnected and as the driving member continues to rotate the carrier remains stationary. During the indexing movement of the carrier the A pins are likewise moved through an angle of 60° and thus they now occupy the position formerly occupied by the B pins. During this movement the A pins ride upon the upwardly inclined portion 58 of the cam member and are thus caused to extend outwardly from the face of the carrier into the path of movement of the driving arm 66. After a dwell of the carrier during which the driving member rotates through a further angle of 60° following disengagement of the B pins from the driving faces 67 the driving arms engage the now extended A pins and the above described cycle of operation is repeated. The carrier member is thus intermittently rotated by the driving member through an angle of 60° to successively move each of the recesses 62 into each of the dwell positions illustrated and then dwells in each of these positions while the driving member rotates through a further angle of 60° . Since the drive member effects one indexing movement and one dwell period during each 120° of rotation thereof it is evident that there will be three indexing movements and three dwell periods for each complete revolution of the shaft 26. It will also be evident that the indexing movement of the carrier and the dwell thereof following each indexing movement occupy equal periods of time.

The continuously rotating shaft 26 also provides for effecting controlled movement of the applicators 20 into and out of the ends of the container body during the period in which the container body dwells at the seal applying station. As shown in Fig. 2 a barrel cam 70 provided with a slotted cam track 71 is pinned to the shaft 26 adjacent each of the end frames 11 and 12 as indicated at 72 and each of the applicators 20 is provided with an arm 73 which extends downwardly through a suitable slot provided in the table 16 and carries a follower 74 adapted to ride in the cam track 71. The cam track 71 comprises a straight portion 77 which serves to maintain the applicators in the withdrawn position illustrated during the indexing movement of the carrier member, an inclined portion 78 provided for mov-

ing the applicators into a predetermined positioning within the ends of the container body at the seal applying station, a straight portion 79 which retains the applicator in its predetermined positioning within the end of the container body during the application of the sealing material to the container body, and an inclined portion 80 which provides for the rapid withdrawal of the applicator following the application of sealing material on the container body. The angular extent of each of the various portions of the cam track is such that the applicator moves into and out of the end of the container body during the time that the container body dwells at the seal applying station and is retained within the end of the container body for a period of time sufficient to provide for the application of sealing material around the inner periphery of the container body. Since the carrier 30 goes through three complete indexing movements and dwell periods during each revolution of the shaft 26 and the barrel cams 70 the cam tracks 71 of the barrel cams are provided with portions corresponding to the portions 78, 79 and 80 respectively at each of three equally spaced positions around the periphery of the cams to provide for the application of sealing material to a container body during each dwell period of the carrier. These three similar portions of the cam track are joined together by the straight portions 77 and are so positioned on the barrel cams as to provide for the operation of the applicators in proper coordinated timed relation with the indexing movement of the carrier and the dwell of the container bodies at the seal applying station.

Each of the applicators 20 is of generally similar structure and comprises an open top tank 22 adapted to receive a quantity of the sealing material therein and a roller 85 or 85a adapted to rotate within the tank and apply the sealing material to the inner surface of the container body. The rollers 85 and 85a are rotatably supported in the tank by means of a shaft 86 to which the rollers are pinned as indicated at 87 and which takes its bearing in a sleeve 88 provided on the outside end wall 89 of the tank. A spur gear 90 is pinned to the shaft 86 adjacent the exterior of the wall 89 as indicated at 91 and provides for rotating the rollers 85 and 85a to effect a substantially uniform application of the sealing material on the inner surface of the container bodies. The positioning of the shaft 86 is such that the top portion of the rollers 85 and 85a projects slightly above the top of the tank 22 and is adapted to engage the wall of the container body when the applicator is moved into the end thereof to provide for applying the sealing material on the inner surface of the body. The forwardly extending portion 93 of the tank within which the rollers 85 and 85a rotate is of generally cylindrical shape and of a size adapted to be readily received within the interior of the container body. As shown in Fig. 1 a doctor blade 94 is carried by the side wall of the portion 93 of the tank and provides for regulating the quantity of sealing material that is applied to the inner surface of the container body by the rollers 85 and 85a. Suitable means may be provided for adjusting the positioning of the end of the doctor blade relative to the roller to adjust the quantity of sealing material applied to the container body.

If desired a coating of the sealing material may be applied to the end edge of the container body at the same time that the sealing material is being applied to the inner surface of the body. For

this purpose the roller 85 of the applicator positioned at the left-hand side of Fig. 2 is shown as having a radially extending flange 96 that is adapted to engage the end edge of the container body when the applicator is moved into its operative position with respect to the container body and apply a coating of sealing material thereon. The sealing material may be applied as a narrow band only to the inner wall adjacent the outer end of the container body and accordingly the right-hand applicator as seen in Fig. 2 is illustrated as being provided with a roller 85a in which the laterally extending shoulder 96 is omitted.

As mentioned above the container bodies are rotatably supported on the rollers 33 at the seal applying station and to provide for the application of the sealing material in a band that extends continuously around the inner periphery of the container bodies the bodies are caused to rotate on these rollers during the application of the sealing material. This rotation of the container bodies is effected by means of a pair of friction rollers 100 that are pinned to a shaft 101 as indicated at 102 and are positioned to frictionally engage the outer wall of the container body as it is moved into the seal applying position. The shaft 101 is adapted to be continuously rotated at a constant speed and thus as each container body 103 is moved into the seal applying position it is engaged by the continuously rotating rollers 100 as illustrated in Fig. 2 and is caused to rotate through a predetermined number of revolutions during the time that it remains at the seal applying position.

The shaft 101 is rotatably mounted in a pair of bearings 104 which are adjustably carried by suitable brackets provided adjacent each end of the machine and having their support on the end frames 11 and 12. As shown in Figs. 1 and 2 each of these brackets comprises a lower inverted substantially U-shaped strap member 105 which seats upon the table 16 and an upper inverted substantially U-shaped strap member 106 which seats upon the top of the strap member 105. The strap member 105 is rigidly attached to the table 16 by means of screws 107 which extend through laterally projecting feet 108 provided on the strap member and thread into laterally extended portions of the table 16. The vertical legs 109 of the strap member 105 extend upwardly from the table 16 on opposite sides of the applicator 20 and provide for supporting the shaft 101 in proper vertical positioning above the applicators and the container body 103. The strap member 106 rests upon the top portion 110 of the strap member 105 and is secured to the member 105 by means of screws 112 which extend through laterally projecting feet 113 provided on the member 106 and thread into the horizontally extending portion 110 of the strap member 105.

The bearing member 104 is received between the vertical legs 116 of the strap member 106 and is adapted to be adjusted vertically within the spacing provided between the top portion 117 of the strap member 106 and the top portion 110 of the strap member 105. The bearing is adjustably supported in its desired vertical positioning by means of a pair of screws 120 and 121. The screw 120 is threadedly mounted in the top portion 110 of the strap member 105 and is provided with a head 122 which engages the bottom of the bearing member and provides a vertical support for the bearing. The screw 121 threads through the top portion 117 of the strap member 106 and

is adapted to engage the upper side of the bearing member 104 to press the bearing member against the supporting head 122 of the bolt 120 and maintain the bearing in its adjusted vertical positioning. A locknut 123 is threaded on the screw 121 and provides for normally maintaining the screw 121 in clamping engagement with the bearing member 104. The screw 121 thus provides for taking the upward thrust on the bearing 104 while the screw 120 provides a vertical support for the bearing and the shaft 101 and takes the downward thrust on the bearing. Adjustment of the vertical positioning of the bearings is readily obtained by loosening the locknuts 123 and the screws 121 and effecting rotation of the screws 120 by means of a suitable tool adapted to be received within sockets 124 provided in the heads 122 of the screws. The bearing members 104 extend outwardly beyond the sides of the strap members 106 and are provided with flanges 125 which project laterally of the bearing member and engage the opposite sides of the vertical legs 116 of the strap member 106 to maintain the bearing members in proper axial positioning within the strap member.

The adjustable mounting for the bearings 104 provides for adjusting the vertical positioning of the shaft 101 to regulate the driving pressure which exists between the rollers 100 and the wall of the container body 103 when the body is moved into engagement with the rollers at the seal applying station. To assure positive driving of the container body this pressure is preferably so regulated that the rollers will effect a slight deformity in the portion of the wall of the body that is in engagement with the rollers. The degree of this deformity also controls the contact pressure that exists between the inner surface of the container body and the top of the applicator rollers 85 and 85a when these rollers are moved into their operative positioning within the ends of the container body. The adjustable mounting for the shaft 101 thus also provides for regulating the contact pressure between the inner surface of the container bodies and the rollers which apply the sealing material thereon. Undesirable slippage between the rollers 100 and the wall of the container body is further avoided by providing the rollers with a facing of rubber or other suitable material having a relatively high coefficient of friction as indicated at 131.

As mentioned above the shaft 101 is adapted to be continuously rotated and it provides a common drive for all of the various operative parts of the machine. Rotation of the shaft is effected by means of a sprocket 135 which is pinned to the shaft adjacent one end thereof as indicated at 136 and is adapted to have an operative connection with an electric motor or other suitable source of power. Rotation of the applicator rollers 85 and 85a is obtained from the shaft 101 by means of a pair of spur gears 137 which are pinned to the shaft 101 as indicated at 138 and 139 and have meshing engagement with the spur gears 90 mounted on the rotatable shafts 86 of the applicators 20. The shaft 101 thus provides for rotating the rollers 85 and 85a in coordinated timed relationship with respect to the rollers 100. This relationship is preferably such that the rollers 100 rotate the container body at a peripheral speed somewhat greater than the peripheral speed of the rollers 85 and 85a to provide a wiping action between the inner surface of the container bodies and the rollers during the application of the seal-

ing material. As shown in Fig. 2 the width of the spur gears 90 is considerably greater than that of the spur gears 137. This width of the gears 90 is such that they will remain in meshing engagement with the gears 137 when the applicators move to their operative position within the ends of a container body supported at the seal applying station.

The drive for the continuously rotating shaft 26 which supports and rotates the carrier member 30 and effects the controlled movement of the applicators into and out of the ends of the container bodies during the dwell thereof at the seal applying station comprises a pinion 142 which is fixedly mounted on one end of the shaft 101 and has meshing engagement with a gear 143 fixedly mounted on a stub shaft 144. The stub shaft 144 is rotatably mounted in a bracket 145 which is attached to one of the bracket strap members 105 and provides for supporting the stub shaft in operative positioning with respect to the shaft 101. A sprocket 148 is fixedly mounted on the stub shaft 144 for rotation therewith and a chain 149 operatively connects the sprocket 148 with the sprocket 28 mounted on the shaft 26. The shaft 26 is thus continuously rotated in coordinated timed relation with the shaft 101. The proportioning of the various gears and the rollers 100 is such that during the time that the applicators are moved into their predetermined operative positioning within the ends of the container body and remain in that positioning the container body will be rotated by the rollers 100 through more than a single revolution, to assure applying a band of material which is complete and overlies the entire periphery. Good results have been obtained where the container bodies are rotated through approximately $1\frac{1}{2}$ revolutions.

A means is also provided for assuring proper registration of the container bodies at the seal applying station and for locking the carrier member 30 in proper registered positioning during each of the dwell periods thereof. Referring to Figs. 1 and 5 a bracket 155 is rigidly attached to the end frame 12 at the left-hand side of the machine as viewed in Fig. 2 and provides for pivotally supporting a latch member 156. As shown the bracket 155 extends laterally outwardly from the bearing 25 between the frame members 13 and 14 and is provided with a portion 157 which extends forwardly of the machine on the outside of the barrel cam 70. The latch 156 is pivotally mounted on the bracket portion 157 as indicated at 158 and comprises a substantially L-shaped member having an arm 159 which extends laterally of the machine from a position adjacent the outside face of the barrel cam 70 to a position exteriorly of the carrier 30 and a leg 160 which extends forwardly from the arm 159 to a position adjacent the carrier member. The leg 160 carries a latching pin 161 which projects inwardly towards the carrier member 30 and is adapted to be received within tapered notches 163 provided in the ends of each of the radially extending arms 31 of the carrier member. As shown in Fig. 1 the latching pin 161 is of a generally tapering construction adapted to cooperate with the curved tapering side walls of the notches 163 to effect an accurate predetermined positioning of the carrier member when the latching pin is received within one of the notches.

The latch 156 is normally moved to a position in which the pin 161 is withdrawn from the notches 163 of the carrier member leaving the

carrier member free to rotate by means of a spring pressed plunger 165 which is slidably received within a suitable housing 166 carried by the bracket portion 157 and is urged into operative engagement with the leg 160 of the latch by a spring 167. The latch 156 is moved to its operative position in which the pin 161 is received within one of the notches 163 and locks the carrier against movement as illustrated in Figs. 1 and 5 by means of cams 170 which are provided on the outside face of the barrel cam 70 and engage a projection 171 provided on the inner end of the latch arm 159. As shown in Fig. 2 the forward face of the cam portions 170 are suitably inclined as indicated at 172 to cause the projection 171 on the latch arm 159 to ride up onto the top of the cam when the cam portions are rotated into engagement therewith. The positioning of the cam portions 170 is such that one of the cam portions will engage the projection 171 at the beginning of each dwell period of the carrier and move the latch into locking engagement with the carrier member against the action of the spring pressed plunger 165. The annular extent of the cam portions 170 is such that the latch will be retained in locking engagement with the carrier member until just slightly before the next indexing movement is ready to begin. The projection 171 of the latch arm 159 then drops off of the trailing end of the cam portion 170 and the plunger 165 moves the latch to its inoperative position providing for free indexing movement of the carrier member. In the present embodiment of the invention the annular extent of the cam is such that the latch is released by the cam at a point in the dwell period wherein the shaft 26 still has approximately 10° of rotation before effecting the next indexing movement of the carrier member. This assures that the latch will be fully disengaged from the carrier under the action of the spring pressed plunger 165 before the indexing movement begins. Since the carrier member goes through three complete dwell periods for each rotation of the shaft 26 the barrel cam 70 is provided with three similar cam portions 170 properly spaced around the barrel cam to provide for operation of the latch in coordinated timed relation with the operation of the carrier member.

A continuously operating and fully automatic machine is thus provided which takes container bodies from the feed table 35 and discharges the bodies upon the delivery table 38 with bands of sealing material applied in predetermined positioning on the inner surface of the bodies in preparation for receiving end closures thereon. The end edges of the discharged container bodies may also have sealing material applied thereto as described above, but the outer surface of the bodies is substantially free from any sealing material. The container bodies as thus discharged from the machine are adapted to receive end closures having an inwardly depressed portion adjacent the periphery thereof and the positioning of the bands of sealing material on the inner surface of the bodies is such that when an end closure having such inwardly recessed portion adjacent the periphery thereof is applied to the end of the container body and crimped thereon the sealing material will provide a completely impervious seal between the recessed portion of the end closure and the wall of the container body as illustrated in Fig. 6. A portion of a container body 103 having an end closure 175 applied thereon is shown in this figure and

the sealing material is illustrated as having been applied to the end edge of the container body as indicated at 176 as well as in a band extending around the inner surface thereof as indicated at 177. The container body as illustrated is of a multi-wall construction and is preferably formed by winding the body from a sheet of paper material having a surfacing thereon adapted to provide a completely impervious surface on the interior of the wound body.

As shown in Fig. 6 the positioning of the band 177 of sealing material is such that it extends slightly inside of the recessed portion 178 of the end closure 175 and completely seals the joint between the recessed portion 178 and the inner wall of the container body. The character of the sealing material is such that it remains semi-fluid over a limited period of time and will flow somewhat under the action of applying the end closure to form a bead or fillet around the wall of the container body at its junction with the recessed portion 178 of the end closure as indicated at 179. The character of the sealing material is also such that it readily adheres to the impervious surfacing on the inner wall of the container body and to the material of the end closure as indicated by the shape of the fillet 179 and provides a strong union or bond between the end closure and the body wall when the sealing material has completely set. The fillet 179 and the sealing material 177 which remains between the inwardly extending portion of the end closure and the body wall thus not only provide an effective seal which prevents any seepage of the contents of the container past the recessed portion 178 of the end closure but also provides for adhesively securing or cementing the end closure to the body wall.

In Fig. 7 there is shown a modified form of applicator for applying the band of sealing material in predetermined positioning on the inner surface of a container body. In this view only a portion of the operating structure of the machine is shown since this structure except for the applicator is the same as that illustrated in Figs. 1 through 5 of the drawings. In this figure the parts of the machine which correspond with the machine previously described are given like reference numerals with a prime added thereto.

Referring to Fig. 7 the applicator which is designated generally by the reference numeral 200 is shown as comprising a tank portion 201, a barrel-shaped portion 202 and a spray nozzle 203 extending outwardly from the barrel portion 202 and adapted to be received within the interior of a container body 103' at the seal applying station to provide for applying a band 204 of sealing material in predetermined positioning on the interior of the body wall. The tank portion 201 is slidably supported on the top of a table 16' and the applicator is moved into and out of the end of the container body in coordinated timed relation with the dwell of the body at the seal applying station by means of a barrel cam 70' corresponding to the barrel cam 70 and having a cam track 71' which cooperates with a follower 74'. The container body is adapted to be rotated at the seal applying station in the manner above described to effect the application of the sealing material in a band which extends entirely around the inner periphery of the container body. Only a portion of one of the rollers 100' for effecting this rotation of the container

body is shown. A pair of thumb screws 205 and 206 are mounted on the end of the barrel portion 202 adjacent the nozzle 203 and provide for moving the nozzle axially inwardly or outwardly to position the band of sealing material in predetermined relation to the inner surface of the container body.

A quantity of sealing material is provided in the tank portion 201 and is adapted to be sprayed from the nozzle 203 by the application of compressed air which may be introduced into the applicator by any suitable means such as a flexible hose or the like. The operation of the spray under the action of the compressed air is controlled by a suitable throttling valve which is mounted within the barrel portion 202 of the applicator and provides for controlling the discharge of the spray fluid from the nozzle 203. This valve is adapted to be automatically opened as the spray nozzle 203 moves into the desired predetermined positioning within the end of the container body and to be automatically closed to terminate the application of the sealing material when the applicator is moved to withdraw the spray nozzle from its positioning within the container body. As shown a plunger 210 extends outwardly through a thumb screw 211 mounted on the end of the applicator and has a pair of nuts 212 and 213 threaded on the outer end thereof. An arm 214 is fixedly mounted on the table 16' and extends into a position to engage the nut 212 and effect the operation of the plunger 210 to open the fluid control valve as the applicator moves into its positioning within the end of the container body. The position of the nut 212 with respect to the arm 214 is adjusted to give the desired throttling control over the discharge of the sealing fluid from the spray nozzle and the nut 213 provides for locking the nut 212 in the desired adjusted positioning. When the applicator is moved to withdraw the nozzle 203 from the interior of the container body a suitable spring or the like positioned in the thumb screw 214 operates the plunger 210 to automatically close the control valve for the fluid supply.

The fluid control valve is thus operated in response to the movement of the applicator into and out of the end of the container body and its operation is coordinated with the movement of the applicator to provide for the application of a controlled quantity of sealing material when the spray nozzle has been moved to the desired predetermined positioning within the interior of the container body. This positioning of the spray nozzle may be varied within predetermined limits by adjusting the thumb screws 205 and 206, and thus in this embodiment of the invention the band of sealing material 204 may be spaced inwardly from the end of the container body as is illustrated in Fig. 7.

While the method herein described, and the forms of apparatus for carrying this method into effect, constitute preferred embodiments of the invention, it is to be understood that the invention is not limited to this precise method and these forms of apparatus, and that changes may be made in either without departing from the scope of the invention which is defined in the appended claims.

What is claimed is:

1. A machine of the character described for applying a band of sealing material to the ends of container bodies in preparation for receiving

end closures thereon comprising means for receiving and rotatably supporting a container body, means including a rotary applicator member carrying sealing material thereon and adapted to be received within an end of said container body, means for supporting said applicator member for rotary and axial movement about an axis generally parallel with the axis of rotation of the container body, means for moving said applicator member axially into contact with the interior of said container body for applying sealing material in predetermined positioning on the interior of said container body while maintaining the outer surface of the body substantially free from sealing material, and means for effecting relative rotation of said container body with respect to said applying means to provide for uniform application of said sealing material in a band extending entirely around the inner periphery of the container body.

2. A machine of the character described for applying a band of sealing material to the ends of container bodies in preparation for receiving end closures thereon comprising a reservoir for holding a quantity of said sealing material in liquid state, rotatable applicator means dipping into said reservoir and movable into an end of a container body providing for applying a band of sealing material on the inner surface thereof, a movable carrier provided with means for receiving and supporting container bodies, means for intermittently moving said carrier to successively move said container bodies into predetermined positioning relative to said applicator means, and means operable during dwell of the container bodies in said predetermined positioning for effecting coordinated controlled movement of said applicator means into and out of the end of the container body to provide for the application of said band of sealing material in predetermined positioning adjacent the end of the container body.

3. A machine of the character described for applying a band of sealing material to the ends of container bodies in preparation for receiving end closures thereon comprising stripping applicator means adapted to be received within an end of a container body in contact with the inner surface thereof and providing for applying a band of sealing material on the inner surface thereof, a movable carrier provided with means for receiving and rotatably supporting a container body, means for intermittently moving said carrier to move said container body into predetermined positioning relative to said applicator means, means operable during dwell of said container body in said predetermined positioning for effecting relative axial movement of said container body with respect to said applicator means to cause the applicator means to be received in predetermined axial positioning within the end of the container body and in fluid-transferring contact therewith, and means for effecting relative rotation of said container body with respect to the applicator means received therein to cause application of sealing material from said applicator means to said container body.

4. A machine of the character described for applying a band of sealing material to the ends of container bodies in preparation for receiving end closures thereon comprising stripping a movable carrier provided with means for receiving and rotatably supporting container bodies, means for continuously feeding container bodies to said

carrier, means for intermittently moving said carrier to successively advance said container bodies through a plurality of stations including a seal applying station and a discharge station, rotary applicator means at said seal applying station and adapted to be received within the opposite ends of the container bodies in contact therewith for applying a band of sealing material to the inner surface of the bodies adjacent each end thereof while maintaining the outer surface of the bodies substantially free from said sealing material, means for simultaneously moving both said rotary applicator means into contact with the opposite ends of said container body at the seal applying station, and means for rotating said container body at said seal applying station to effect the application of said sealing material in continuous bands extending entirely around the inner periphery thereof.

5. A machine of the character described for applying a band of sealing material to the ends of container bodies in preparation for receiving end closures thereon comprising a pair of applicator means, means for supplying sealing material to each of said applicator means, means for moving said applicator means into opposite ends of a container body supported therebetween for applying bands of sealing material on the inner surface thereof, means for supporting a container body between said applicator means and in predetermined positioning with respect thereto, means for effecting simultaneous controlled movement of said applicator means into and out of the ends of said container body to provide for applying said bands of sealing material in predetermined positioning on the interior of the body, and means for effecting coordinated relative rotation of said container body with respect to the applicator means received therein.

6. A machine of the character described for applying a band of sealing material to the ends of container bodies in preparation for receiving end closures thereon comprising means for receiving and rotatably supporting a container body, applicator means, means for applying sealing material to said applicator means to be applied thereby on the interior of said container body, means supporting said applicator means for movement into and out of the end of said container body, means for effecting controlled movement of said applicator means to cause the applicator means to move to a predetermined position within the end of the container body into liquid-transferring contact therewith and to be withdrawn from the container body after a predetermined dwell at said position, and means for effecting coordinated rotation of said container body during the dwell of said applicator means at said predetermined position within the end of the container body to provide for the application of said sealing material in a band extending entirely around the inner periphery of the container body.

7. A machine of the character described for applying a band of sealing material to the ends of container bodies in preparation for receiving end closures thereon comprising means for receiving and rotatably supporting a container body, applicator means movable into and out of an end of said container body and including a roller having its axis substantially parallel with the axis of said container body and having an outer surface adapted to engage the inner surface of said container body to apply a transverse band of sealing material thereon, means for

moving said roller to a predetermined position within the end of said container body, and means for rotating said container body to effect the application of said band of sealing material entirely around the inner periphery of the container body.

8. A machine of the character described for applying a band of sealing material to the ends of container bodies in preparation for receiving end closures thereon comprising means for receiving and rotatably supporting a container body, applicator means movable into and out of an end of said container body and including a roller having its axis substantially parallel with the axis of said container body and having an outer surface adapted to engage the inner surface of said container body to apply a transverse band of sealing material thereon, means for moving said roller to a predetermined position within the end of said container body, means for rotating said container body to effect the application of said band of sealing material entirely around the inner periphery of the container body, and means on said roller for simultaneously applying sealing material to the end edge of said container body.

9. A machine of the character described for applying a band of sealing material to the ends of tubular container bodies formed of paper material in preparation for receiving end closures thereon comprising means for receiving and supporting a container body, a pair of spray means adapted to be received each within an end of said container body to effect the spraying of sealing material on the inner surface thereof, means for effecting relative axial movement of said container body with respect to said spray means to cause said spray means to be simultaneously received in predetermined axial positioning within the end of the container body, means coordinated with said relative movement between said container body and said spray means for controlling the operation of the spray means, and means for effecting coordinated relative rotation of said container body with respect to said spray means to provide for the application of said sealing material in a band having predetermined relatively narrow width and extending transversely of the container body and continuously around the inner periphery thereof in predetermined spaced relation with respect to the end of the container body.

10. A machine of the character described for applying a band of sealing material to the ends of container bodies in preparation for receiving end closures thereon comprising means for receiving and supporting a container body, spray means having a nozzle for directing a spray of said sealing material upon the surface of said container in a plane substantially normal to the container axis, means for moving said spray means inwardly and outwardly of an end of said container body over a limited travel relative to the length of said container and providing for spraying sealing material in a narrow band on the inner surface thereof, means for effecting controlled movement of said spray means into and out of the end of said container body, valve controlled means carried by said spray means and operable to open and closed position, respectively, directly in response to its movement into and out of the container body for controlling the operation of the spray means, and means for effecting coordinated relative rotation of said container body with respect to said

spray means to provide for the application of said sealing material in a band having predetermined relatively narrow width and extending transversely of the container body and continuously around the inner periphery thereof.

11. In a machine of the character described for applying a band of sealing material to the ends of container bodies of paper material in preparation for receiving end closures thereon, a rotatable carrier comprising a spider-shaped member having a plurality of outwardly opening recesses arranged around its periphery, each of said recesses being adapted to receive a container body, means for rotatably supporting the container bodies in said recesses with a portion of the body wall extending outwardly beyond the periphery of said carrier, means for intermittently rotating said carrier to successively move each of said recesses and the container body supported therein into a seal applying station, a roller positioned to frictionally engage said outwardly extending wall of the container body at said seal applying station, means for applying sufficient pressure to the outside of said container body to deform the wall thereof, means for rotating said roller to effect rotation of the container body, and means for applying a band of sealing material in predetermined positioning on the interior of the rotating container body during dwell of said recesses at said seal applying station.

12. A machine of the character described for applying a band of sealing material to the ends of container bodies in preparation for receiving end closures thereon comprising a supporting frame, a shaft rotatably supported in said frame, means for continuously rotating said shaft, a rotatable carrier loosely mounted on said shaft, said rotatable carrier being provided with means adapted to receive and support a container body, drive means for effecting intermittent rotation of said carrier from said continuously rotating shaft to successively move said container supporting means through a plurality of stations including a station at which a container body is fed to said carrier, a station at which a band of sealing material is applied to the inner surface of the container body, and a station at which the container body is discharged from said carrier, means movable into an end of the container body at said band applying station for applying said band of sealing material in predetermined positioning on the inner surface of the body adjacent an end thereof, and means including a cam member mounted on said continuously rotating shaft for moving said band applying means into and out of the end of said container body in coordinated timed relation with the operation of said intermittently rotating carrier.

13. A machine of the character described for applying a band of sealing material to the ends of container bodies in preparation for receiving end closures thereon comprising a supporting frame, a shaft rotatably supported in said frame, means for continuously rotating said shaft, a rotatable carrier loosely mounted on said shaft, said rotatable carrier being provided with a plurality of means each adapted to receive and rotatably support container bodies, drive means for effecting intermittent rotation of said carrier from said continuously rotating shaft to successively move said container supporting means through a plurality of stations including a station at which container bodies are fed to said carrier, a station at which bands of sealing ma-

terial are applied to the inner surface of the container bodies, and a station at which the container bodies are discharged from said carrier, means movable into each end of the container bodies at said band applying station for

applying sealing material to the inner surface of the bodies in predetermined positioning adjacent each end thereof, means for causing rotation of the container bodies at said band applying station to effect substantially uniform application of said sealing material in bands extending entirely around the inner peripheries of the container bodies, and means including a pair of cams mounted on said continuously rotating shaft on opposite sides of said carrier for moving said band applying means into and out of the ends of said container bodies in coordinated timed relation with the operation of said intermittently rotated carrier.

14. A machine of the character described for applying a band of sealing material to the ends of container bodies in preparation for receiving end closures thereon comprising a supporting frame, a shaft rotatably supported in said frame and adapted to be continuously rotated, a rotatable carrier member loosely mounted on said shaft, means on said carrier member for receiving and supporting container bodies, and means for intermittently rotating said carrier member to successively move said container bodies into an operative station including a driving member mounted on said shaft for rotation therewith, a plurality of arcuately spaced driven members mounted in said carrier member for movement into and out of the path of movement of said driving member and adapted to be engaged thereby when moved into said path, and means for moving each of said driven members into and out of said path of movement of said driving member in predetermined timed sequence providing for engagement of the driving member with each of the driven members in succession and during a predetermined portion of its rotating movement.

15. A machine of the character described for applying a band of sealing material to the ends of container bodies in preparation for receiving end closures thereon comprising a supporting frame, a shaft rotatably supported in said frame and adapted to be continuously rotated, a rotatable carrier member loosely mounted on said shaft, means on said carrier member for receiving and supporting container bodies, and means for intermittently rotating said carrier member to successively move said container bodies into an operative station including a driving member mounted on said shaft for rotation therewith, a plurality of arcuately spaced pins mounted in said carrier member for sliding movement into and out of the path of movement of said driving member and adapted to be engaged thereby when moved into said path, a stationary cam member arranged to engage an end of each of said pins, and means including said cam member for moving successive pins into and out of said path of movement of the driving member in alternation with respect to each other.

16. A machine of the character described for applying a band of sealing material to the ends of container bodies in preparation for receiving end closures thereon comprising a supporting frame, a shaft rotatably supported in said frame and adapted to be continuously rotated, a rotatable carrier member loosely mounted on said shaft, means on said carrier member for receiv-

ing and supporting container bodies, means for intermittently rotating said carrier member to move said member into a plurality of successive dwell positions around the axis of said shaft including a driving member mounted on said shaft for rotation therewith, a plurality of arcuately spaced driven members mounted in said carrier member for movement into and out of the path of movement of said driving member and adapted to be engaged thereby when moved into said path, means for moving each of said driven members into and out of said path of movement of said driving member in predetermined timed sequence providing for engagement of the driving member with each of the driven members in succession and during a predetermined portion of its rotary movement, and means for locking said carrier member against rotation during the dwell thereof in each of said dwell positions.

17. A machine of the character described for applying a band of sealing material to the ends of container bodies in preparation for receiving end closures thereon comprising a supporting frame, a shaft rotatably supported in said frame and adapted to be continuously rotated, a rotatable carrier member loosely mounted on said shaft, means on said carrier member for receiving and supporting container bodies, and means for intermittently rotating said carrier member to successively move said container bodies into a seal applying station including a driving member mounted on said shaft for rotation therewith, a plurality of arcuately spaced driven members mounted in said carrier member for movement into and out of the path of movement of said driving member and adapted to be engaged thereby when moved into said path, and means for moving each of said driven members into and out of said path of movement of said driving member in predetermined timed sequence providing for engagement of the driving member with each of the driven members in succession and during a predetermined portion of its rotary movement, means movable into an end of said container bodies at said seal applying station for effecting application of a band of sealing material on the inner surface of the container bodies, means for effecting predetermined controlled movement of said band applying means into and out of an end of the container bodies during dwell thereof at said seal applying station, and means for effecting positive predetermined positioning of said container bodies at said seal applying station and for locking said carrier member against rotation during dwell of the container bodies thereat.

18. A machine of the character described for applying a band of sealing material to the end of a container body in preparation for receiving an end closure thereon comprising a reservoir having a generally cylindrical end portion for holding a quantity of liquid sealing material and adapted to be received within the container body, an applicator roller rotatably mounted in said cylindrical portion of the reservoir and having its upper surface projecting above the top of said reservoir, a movable carrier provided with means for receiving and supporting container bodies, means for intermittently moving said carrier to successively move said container bodies into predetermined positioning relative to said applicator roller, and means operable during

dwell of the container bodies in said predetermined positioning for effecting movement of said reservoir relative to said container body to bring said upper surface of the roller into liquid-transferring contact with the inner surface of the container body to provide for the application of a band of sealing material in predetermined positioning adjacent the end of the container body.

19. A machine of the character described for applying a band of sealing material to the end of a container body in preparation for receiving an end closure thereon comprising a reservoir having a generally cylindrical end portion for holding a quantity of liquid sealing material and adapted to be received within the container body, an applicator roller rotatably mounted in said cylindrical portion of the reservoir and having its upper surface projecting above the top of said reservoir, means for controlling the quantity of liquid sealing material carried on the surface of said roller as it rotates in said reservoir, a movable carrier provided with means for receiving and supporting container bodies, means for intermittently moving said carrier to successively move said container bodies into predetermined positioning relative to said applicator roller, and means operable during dwell of the container bodies in said predetermined positioning for effecting movement of said reservoir relative to said container body to bring said upper surface of the roller into liquid-transferring contact with the inner surface of the container body to provide for the application of a band of sealing material in predetermined positioning adjacent the end of the container body.

20. A machine of the character described for applying a band of sealing material to the ends of a container body of paper material comprising means for receiving and rotatably supporting the container body, means for applying sealing material in predetermined positioning on the interior surface of said container body including an applicator member carrying sealing material thereon, means for moving said applicator member into contact with the interior wall of said container body, and rotary friction driving means adapted to engage the outer surface of the container body substantially opposite the zone of application of said applicator member to support said body in predetermined position during the application of sealing material to the interior surface thereof.

21. A machine of the character described for applying a band of sealing material to the ends of a container body of paper material comprising means for receiving and rotatably supporting the container body, means for applying sealing material in predetermined positioning on the interior surface of said container body including an applicator member, means for supplying sealing material to said applicator member to be applied thereby to said interior surface, rotary friction driving means adapted to engage the outer surface of the container body substantially opposite the zone of application of said applicator member, and means for adjusting the position of said driving means to cause predetermined deformation of said container body to bring the inner surface thereof into predetermined operative relation with respect to said applicator means.

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CERTIFICATE OF CORRECTION.

Patent No. 2,272,073.

February 3, 1942.

RUDOLF WILLIAM von SYDOW, ET AL.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 3, second column, line 75, for the word "provided" read --providing--; page 7, second column, line 72, claim 4, strike out "striping"; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 24th day of March, A. D. 1942.

Henry Van Arsdale,
Acting Commissioner of Patents.

(Seal)