Nov. 13, 1945. H. A. FINK 2,388,911

APPARATUS FOR APPLYING ADHESIVE TO CONTAINER BODY ENDS

Filed Jan. 27, 1944 4 Sheets-Sheet 1

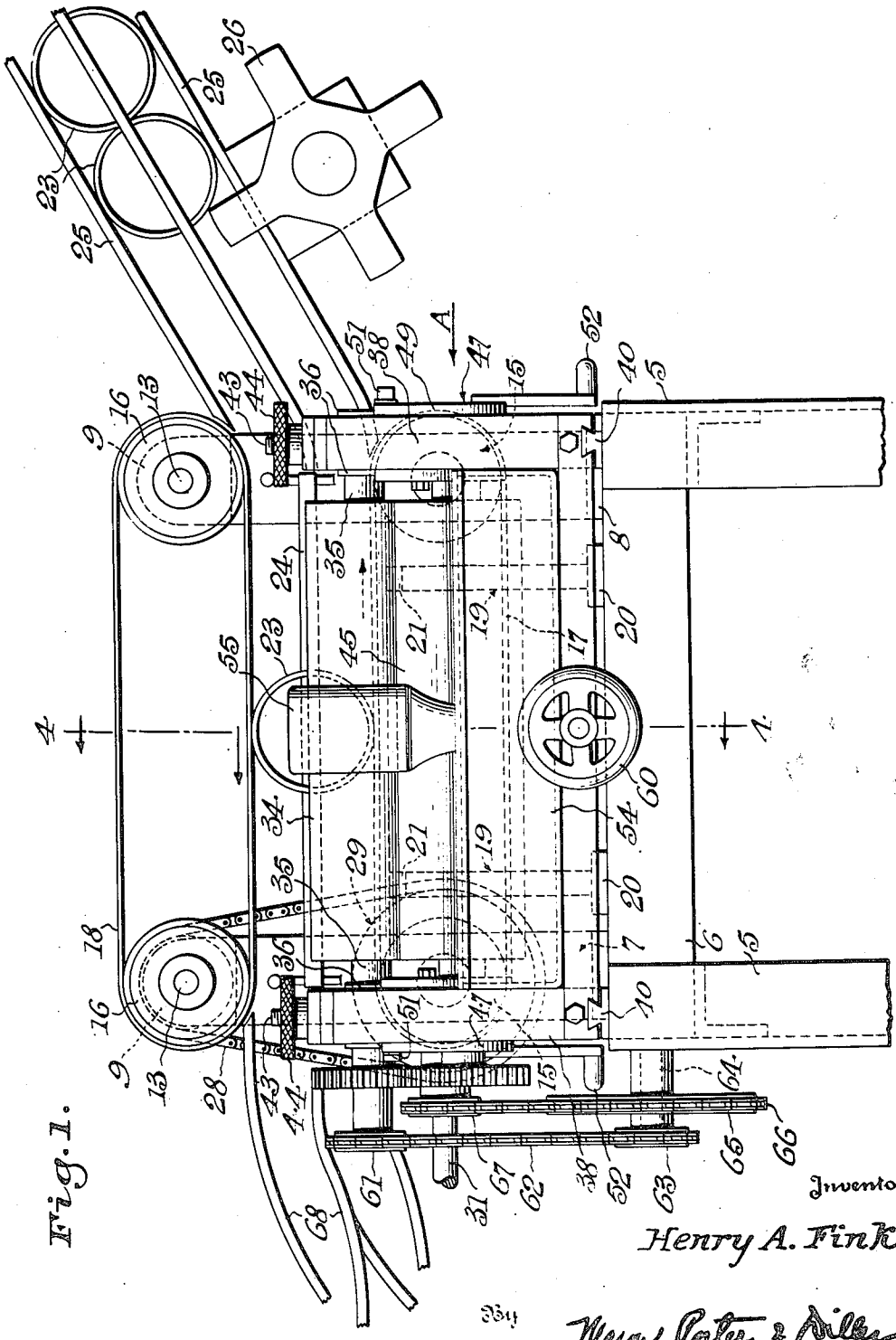


Fig. 1.

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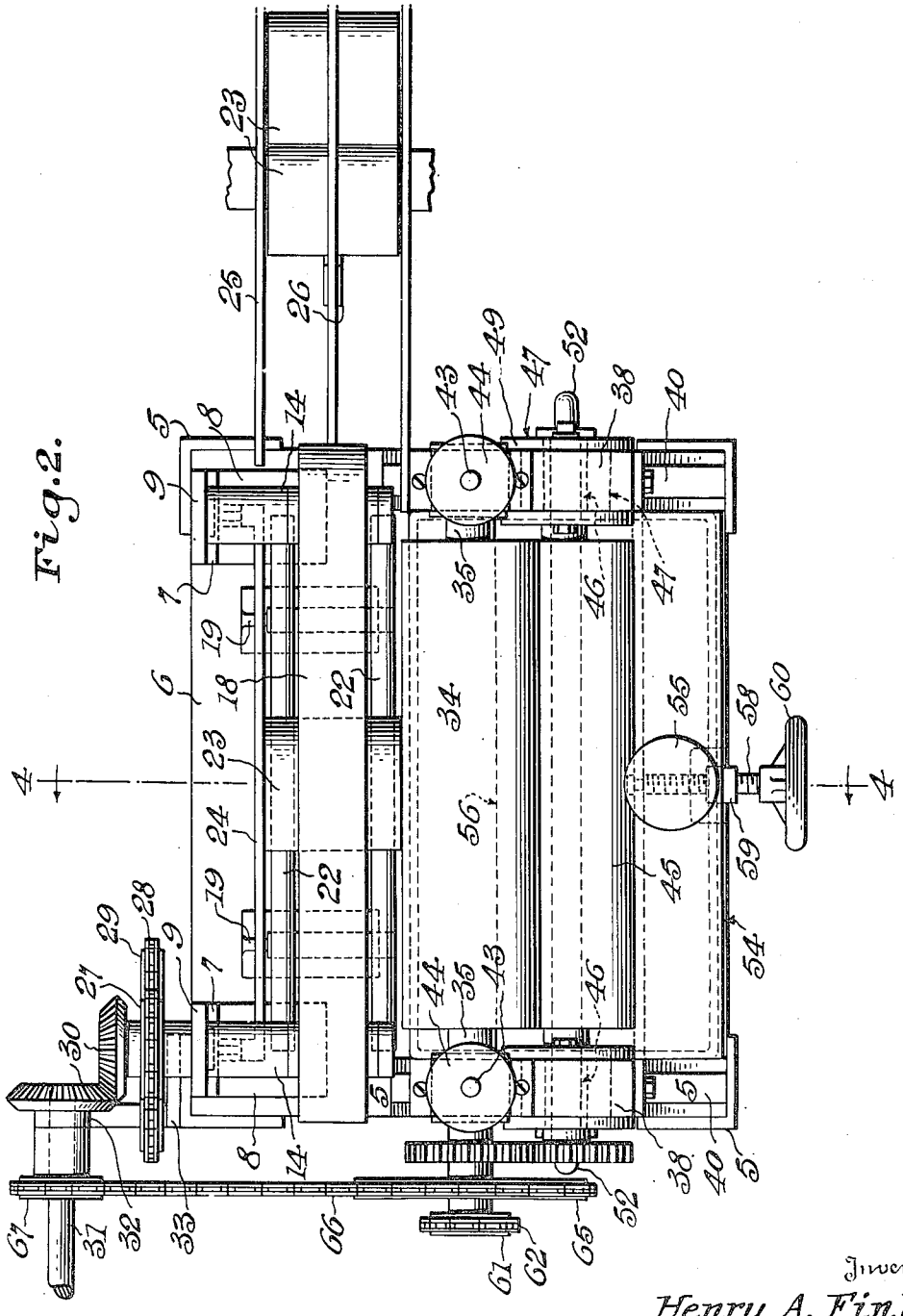
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Filed Jan. 27, 1944 4 Sheets-Sheet 2

Fig. 2.



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APPARATUS FOR APPLYING ADHESIVE TO CONTAINER BODY ENDS

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Fig. 6.

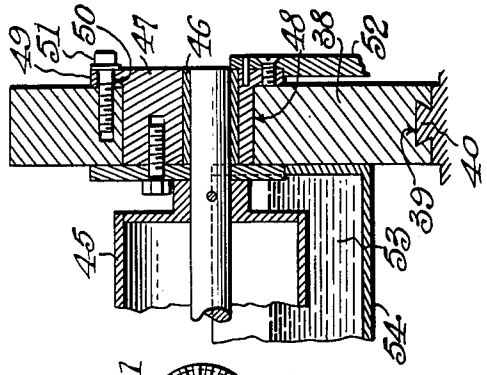


Fig. 3.

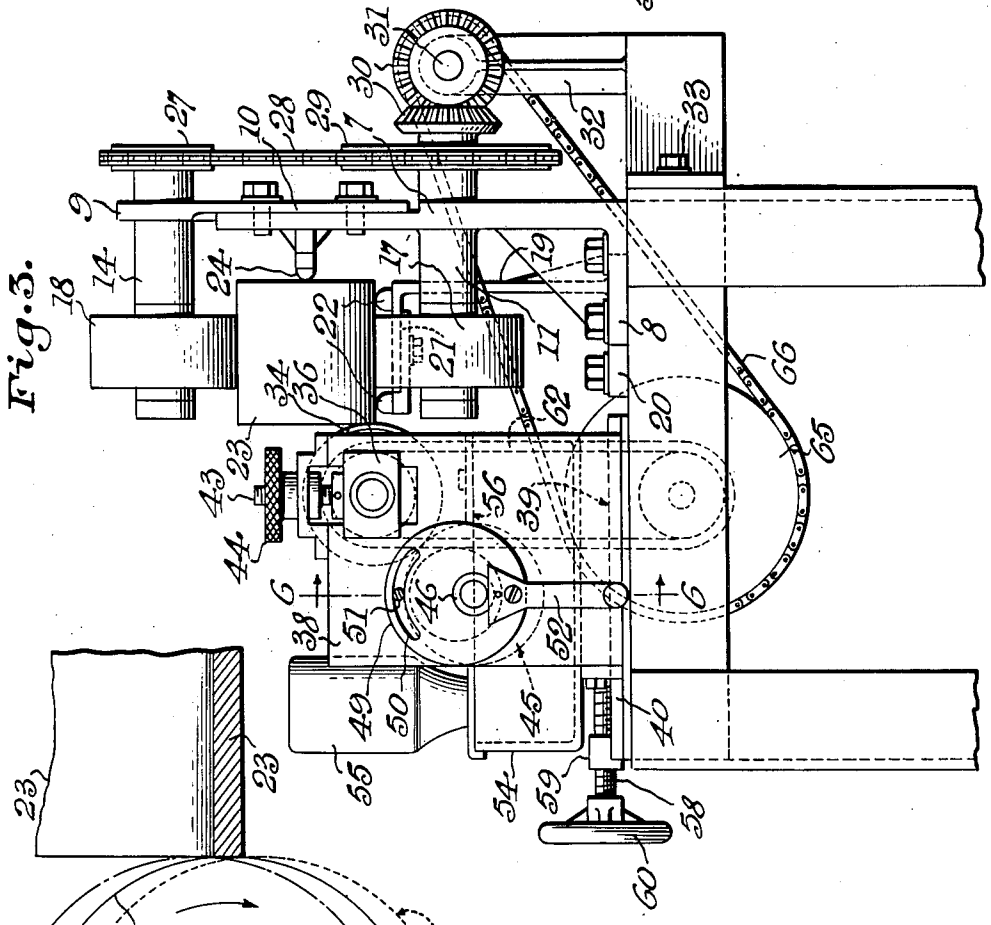
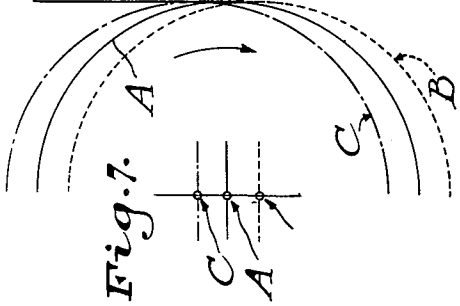


Fig. 7.



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APPARATUS FOR APPLYING ADHESIVE TO CONTAINER BODY ENDS

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Fig. 4.

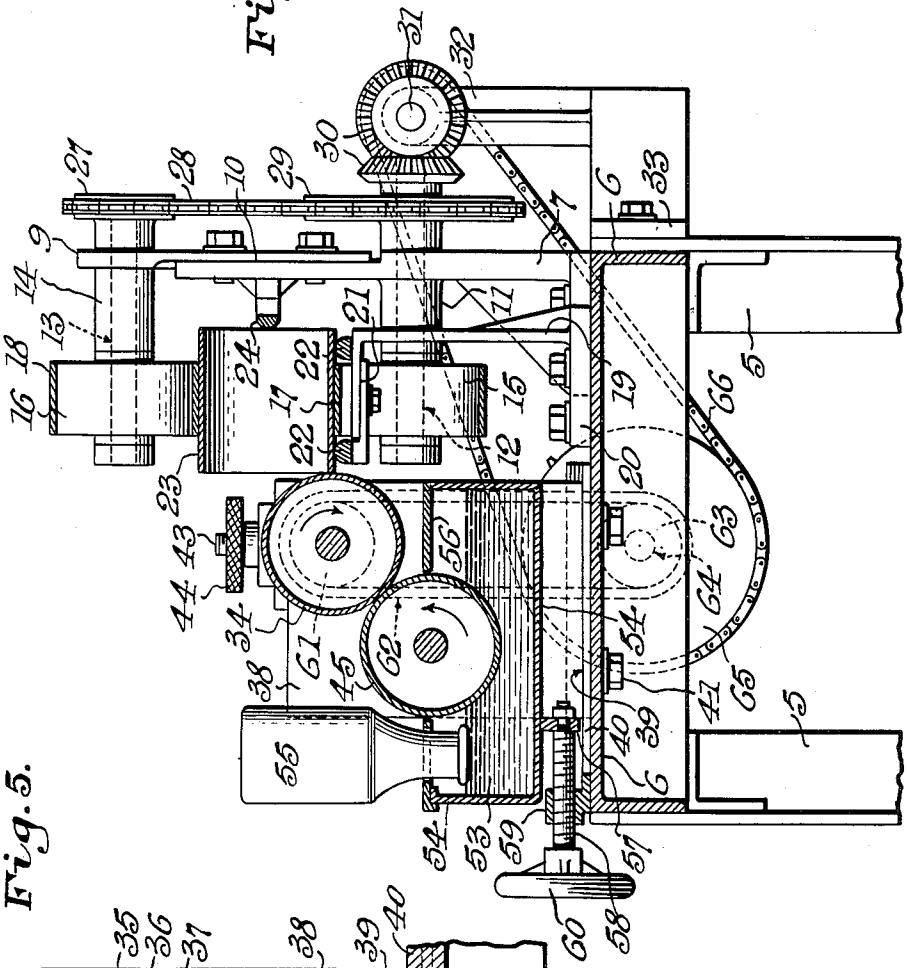
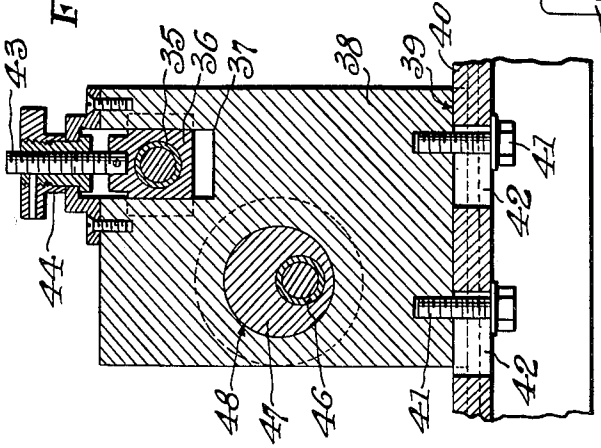


Fig. 5.



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Patented Nov. 13, 1945

2,388,911

UNITED STATES PATENT OFFICE

2,388,911

APPARATUS FOR APPLYING ADHESIVE TO CONTAINER BODY ENDS

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Application January 27, 1944, Serial No. 519,947

15 Claims. (Cl. 91—50)

The invention relates generally to the art of manufacturing containers formed in whole or in part of paper, and it primarily seeks to provide a novel apparatus for applying to the ends of the container bodies the adhesive employed to form an adhesive union or seal between the body ends and the end closures which are attached thereto in completing the containers.

In the manufacture of paper containers, the cylindriform paper shells or container bodies have their ends closed by paper or metal end closures usually shaped to include an annular channel in which to receive an end of the container body. It is customary to effect an adhesive union between the container bodies and the applied end closures, this union or seal being effected in some cases by an adhesive applied at the end edge only on the container body, in other cases by an adhesive applied at said end edge and also over a limited distance on the adjacent inner wall of the container body, in other cases by an adhesive applied at said end edge and also over a limited distance on the adjacent outer wall of the container body, and in some cases by an adhesive applied at said end edge and also over a limited distance along both the inner and outer wall portions of the container body adjacent said end. It is an object of the present invention to provide a novel apparatus for rapidly and efficiently applying adhesive to container bodies of various heights and diameters in any of the positions aforesaid.

In its more detailed nature the invention seeks to provide a novel apparatus of the character stated in which the can bodies are rolled along between two endless belts while the adhesive is applied to the ends thereof by contact with a rotating applicator roll.

Another object of the invention is to provide an apparatus of the character stated in which there are included tracks for supporting and guiding the container bodies as they are rolled along by the belts, said tracks and said belts being mounted for adjustment so that the apparatus can be adapted for handling bodies of varied heights and diameters.

Another object of the invention is to provide in an apparatus of the character stated an adhesive applying means comprising the applicator roll and means for supplying adhesive to the surface of the roll, and means to move the roll toward or from the path of travel of the bodies to position it for cooperation with bodies of various heights.

Another object of the invention is to provide in an apparatus of the character stated means for adjustably mounting the applicator roll with its axis parallel the path of travel of the bodies and so that said axis can be adjusted as to position to lie at, above or below the center of the wall thickness end extremity contacted by the roll.

Another object of the invention is to provide in an apparatus of the character stated a pick-up roll for picking up the adhesive and applying it to the applicator roll, and novel means for adjusting the position of the pick-up roll so as to vary its spaced relation to the applicator roll.

With the above and other objects in view that will hereinafter appear, the nature of the invention will be more fully understood by following the detailed description, the appended claims and the several views illustrated in the accompanying drawings.

In the drawings,

Figure 1 is a front elevation illustrating an apparatus embodying the invention.

Figure 2 is a plan view illustrating the apparatus shown in Figure 1.

Figure 3 is a right hand elevation illustrating the apparatus shown in Figure 1.

Figure 4 is a vertical cross section taken on the line 4—4 as indicated on Figure 1 and on Figure 2.

Figure 5 is a fragmentary vertical cross section taken through the bearings for the pick-up and applicator rolls at one side of the apparatus.

Figure 6 is a fragmentary vertical longitudinal section taken on the line 6—6 on Figure 3.

Figure 7 is a diagrammatic cross sectional view illustrating the cooperative relation between an end of a container body to which adhesive is being applied and the applicator roll, three positions of adjustment of said roll being illustrated.

The apparatus herein illustrated as an example of embodiment of the invention, includes a supporting frame 5 whereon is mounted a table 6. End uprights 7 are secured as at 8 on the table 6, and each thereof carries an upper extension piece 9 which is vertically-adjustably secured thereon as at 10.

The uprights 7 are equipped with bearings 11 in which two shafts 12 are rotatably mounted, and two shafts 13 are similarly mounted in bearings 14 carried by the extension piece 9. Pulleys 15 are fixed on the two shafts 12, and similar pulleys 16 are fixed on the two shafts 13. An endless belt 17 passes over the two pulleys 15, and an endless belt 18 passes over the two pulleys 16. See Figures 1, 2 and 4 of the drawings.

Intermediate brackets 19 are secured as at 20 on the table 6 between the uprights 7, and each thereof has an adjustable horizontal supporting leg portion 21 for supporting a pair of parallel spaced tracks 22. It will be obvious by reference to Figures 1, 3 and 4 of the drawings that the upper surfaces of the tracks serve as support guides for the cylindriform container bodies 23 which are given a progressive rolling movement by the upper and lower engaging flights of the belts 17 and 18 which move relatively, in the manner indicated by the arrows on Figure 1, and at differential speeds by reason of driving devices later to be described. The standard 7 also serves to support a track or guide 24 disposed to engage the ends of the rolling container bodies 23 in the manner clearly illustrated in Figures 2, 3 and 4 of the drawings.

The cylindriform container bodies 23 are fed into the apparatus by inclined guideways 25 under control of a single delivery or spacer star 26 which may be driven by any suitable means (not shown). It will be obvious that each time a finger of the wheel 26 moves to release the lowermost container body 23, the next succeeding finger will intercept the gravitating line of container bodies and hold them for an interval sufficient to allow the released container body to move between the cooperating flights of the belts 17 and 18 in properly spaced relation to the last released container body and the container bodies in the feed-in runway 25.

A small sprocket 27 is mounted on one of the upper shafts 13 and is driven by a chain 28 which also passes over a large sprocket 29 mounted on the underlying lower shaft 12. The shaft 12 is driven through a bevel gear couple 30 by a power shaft 31 which has rotative bearing in the standard 32 which is secured as at 33 on the table 6. It will thus be apparent that the belts 17 and 18 are positively driven by the power shaft 31, the upper belt 18 being driven more rapidly than the lower belt 17. By reason of the fact that the container body engaging flight of the belt 18 moves more rapidly toward the left, as viewed in Figure 1, than the cooperating flight of the lower belt 17 moves toward the right, progressive rolling movement toward the left will be imparted to the container bodies 23 as hereinabove stated.

An applicator roll 34 is provided and is disposed in the manner clearly illustrated in Figures 2 and 4 of the drawings with its axis disposed approximately at the level of the upper surfaces of the tracks 22 and paralleling said tracks. The roll 34 has trunnion bearing as at 35 in slide blocks 36 which are vertically slidable in guideways 37 provided in the bearing blocks 38. See Figures 1, 2, 3, 5 and 6. The bearing blocks 38 are adjustably slidable as at 39 on dove tail rails 40 on which said blocks are adjustably secured by clamp screws 41 in the manner best illustrated in Figure 5. It will be noted that the screws 41 pass through longitudinal slots 42 in the rails 40.

A screw 43 is secured to and projects upwardly from each slide block 36, and each screw is threadably engaged by a captive sleeve 44. It will be obvious that by rotating a sleeve 44, the corresponding slide block 36 may be lifted or lowered so as to vertically adjust the relation of the axis of the applicator 34 to the container body supporting upper surfaces of the rails 22 and the effective flight of the lower conveyor belt 17.

A pickup roll 45 cooperates with the applicator roll 34 in the manner best illustrated in Figure 4 of the drawings, and this pickup roll has trunnion bearing as at 46 in two eccentrics 47 which are rotatably-adjustably mounted as at 48 in the bearing blocks 38. The outer flange extension 49 of each eccentric is provided with an arcuate slot 50 in the manner best illustrated in Figure 3. A securing screw 51 passes through each slot 50 and is threaded into the respective block 38 so that it can be utilized to secure adjustment of the respective eccentric bearing member 47. A crank 52 is secured to each eccentric bearing member 47, and it will be obvious that by loosening the screws 51 and manipulating the crank 52, the eccentric bearing members 47 can be rotated about their common axis so as to effect an adjustment of the position in space of the pickup roll 45, thereby to adjust the spaced relation between the axis of the pickup and applicator rolls. It will be obvious that the pickup roll will be suitably adjusted after each adjustment of the applicator roll, but the position of the pickup roll may also be adjusted to vary the spacing between the rolls and the amount of adhesive which will be applied by the pickup roll to the applicator roll.

The bottom portion of the pickup roll 45 rotates in a suitable adhesive 53 in a reservoir or tank 54 which is supported on the bearing blocks 38 in the manner clearly illustrated in Figures 1 and 2 of the drawings. A proper level of adhesive is maintained in the reservoir 54 by the usual inverted bottle equipment 55. It will also be apparent by reference to Figures 3 and 4 of the drawings that a scraper 56 is adjustably mounted in position for having an edge portion thereof lying close to the outer surface of the pickup roll 45 in a manner for controlling the amount of adhesive to be carried upward by said roll surface into position for contacting with the applicator roll 34.

A lug 57 depends from the tank or reservoir 54, and a captive screw 58 is secured to said lug and is threaded through a bracket 59 which is secured to the table 6. A hand wheel 60 is mounted on the outer end of the screw 58, and it will be obvious that by rotating the wheel 60, movement of the reservoir 54 and the rolls 45 and 34 supported thereon toward and from the container body supporting trackways 22 can be effected. It will be apparent by reference to Figure 4 that the upper and lower belts 18, 17, the supporting trackways 22, the guide rail 24 and the surface of the applicator roll 34 engage the container bodies 23 peripherally and at the ends so as to accurately guide them as they are being progressively rolled along by conveyor belt flight contact in the manner clearly illustrated in Figure 1. By adjusting the hand wheel 60, the spaced relation of the guide rail 24 and the adjacent surface of the applicator roll 34 can be varied so as to adapt the machine for operating upon container bodies of various heights. The spacing of the supporting rails 22 can be altered for the same purpose. It will also be obvious that by vertically adjusting the extension pieces 9 the spaced relation of the conveyor belts 17 and 18 can be altered so as to adapt the apparatus for work upon container bodies of various diameters.

A small sprocket 61 is mounted upon the applicator roll shaft 35 and has rotation imparted thereto by a chain 62 which also passes over a small sprocket 63 which is rotatable about a stud shaft 64 secured to the table, said sprocket 63 being secured to and rotatable with a large sprocket 65 also rotatable about the stud shaft 64 and driven by a chain 66 which passes thereover

and over a small sprocket 67 mounted on the power shaft 31.

As each container body is released by operation of the star wheel 26, it rolls down the inclined guideways 25 and is received between the cooperating flights of the endless conveyor belts 17, 18. The container bodies are progressively rolled in spaced relation in the manner hereinbefore described, and while being so rolled have adhesive applied to the ends thereof by the applicator roll 34. After each container has had adhesive applied to the end thereof, in the desired manner, it passes out from between the conveyor belts 17, 18 into the receiving end of an inclined feedway guide 68. The guide 68 may take the form of the well known twist guide which is effective to turn the container a quarter turn, or a greater amount, and deliver the same to a storage place or to other apparatus.

It is an object of the invention to provide an apparatus of the character described which may be adapted for applying adhesive to container bodies of different heights and diameters, and by reason of the vertical adjustment of the applicator roll 34, it is also possible to apply adhesive to the end of the container body and a portion of the interior adjacent the end, to the end of the container body and a portion of the exterior adjacent said end, or to the end of the container body and to a portion of both the inner and outer walls thereof adjacent said end.

In Figure 7 of the drawings three adjusted positions of the applicator roll are diagrammatically illustrated. When the axis of the roll is positioned at A, the full line position in Figure 7, the viscosity of the liquid adhesive, the surface tension therein, and the dragging thereof off the rotating applicator roll surface will cause the adhesive to be directly applied to the end extremity of the container body and also to run a limited distance along the outer surface of the container body and also to be dragged off the roll and run a limited distance along the inner wall of said body. When the roll 34 is lowered to the dotted line position B, illustrated in Figure 7, the adhesive will be applied to the end extremity of the container body 23 and will run a limited distance along the external surface of said body. When the applicator roll 34 is lifted to the dot and dash line position C, adhesive will be applied to the end extremity of the container body 23 and will run a limited distance along the inner wall portion adjacent said end extremity.

It is to be understood that the details of construction of the cooperating parts can be variously changed without departing from the spirit and scope of the invention as defined in the appended claims.

What is claimed is:

1. In apparatus of the character described, trackways for supporting container bodies in progressive rolling contact, an adhesive applicator roll disposed with its axis paralleling said trackways in position for applying adhesive to end portions of container bodies rolling over the trackways, means for rotating said roll, and means for lifting or lowering said roll relative to the container body supporting surfaces of said trackways.

2. In apparatus of the character described, trackways for supporting container bodies in progressive rolling contact, an adhesive applicator roll disposed with its axis paralleling said trackways in position for applying adhesive to end portons of container bodies rolling over the trackways, means for rotating said roll, means for lifting or lowering said roll relative to the container body supporting surfaces of said trackways, and means for bodily moving said roll toward or from said trackways.

3. In apparatus of the character described, trackways for supporting container bodies in progressive rolling contact, an adhesive applicator roll disposed with its axis paralleling said trackways in position for applying adhesive to end portions of container bodies rolling over the trackways, two endless belts having oppositely travelling flights thereof engaging at opposite sides at the periphery of container bodies for rolling them over said trackways, means for driving said belts with one thereof moving more rapidly than the other, and means for rotating said roll.

4. In apparatus of the character described, trackways for supporting container bodies in progressive rolling contact, an adhesive applicator roll disposed with its axis paralleling said trackways in position for applying adhesive to end portions of container bodies rolling over the trackways, two endless belts having oppositely travelling flights thereof engaging at opposite sides at the periphery of container bodies for rolling them over said trackways, means for driving said belts with one thereof moving more rapidly than the other, means for rotating said roll, and means for bodily moving said roll toward or from said trackways.

5. In apparatus of the character described, two endless belts having oppositely travelling flights thereof engaging at opposite sides at the periphery of container bodies for rotating the same, and means for applying adhesive to the ends of container bodies being rotated by said belts.

6. In apparatus of the character described, two endless belts having oppositely travelling flights thereof moving at differential speeds and engaging at opposite sides at the periphery of container bodies for progressively rolling the same, and means for applying adhesive to the ends of container bodies being rotated by said belts.

7. In apparatus of the character described, two endless belts having oppositely travelling flights thereof moving at differential speeds and engaging at opposite sides at the periphery of container bodies for progressively rolling the same, and means for applying adhesive to the ends of container bodies being rotated by said belts, said last named means including an adhesive applicator roll disposed with its axis paralleling the belt flights and its periphery in adhesive applying relation to the ends of the rolling container bodies.

8. In apparatus of the character described, two endless belts having oppositely travelling flights thereof moving at differential speeds and engaging at opposite sides at the periphery of container bodies for progressively rolling the same, means for applying adhesive to the ends of container bodies being rotated by said belts, said last named means including an adhesive applicator roll disposed with its axis paralleling the belt flights and its periphery in adhesive applying relation to the ends of the rolling container bodies, and means for adjusting the position of the roll toward or from the axis of a container body between said belts.

9. In apparatus of the character described, two endless belts having oppositely travelling flights thereof moving at differential speeds and engaging at opposite sides at the periphery of con-

tainer bodies for progressively rolling the same, means for applying adhesive to the ends of container bodies being rotated by said belts, said last named means including an adhesive applicator roll disposed with its axis paralleling the belt flights and its periphery in adhesive applying relation to the ends of the rolling container bodies, a guide rail disposed to be engaged by the ends of rolling container bodies opposite the ends to which adhesive is being applied, and means for adjusting the spaced relation of said roll and rail to adapt the apparatus for work on container bodies of different heights.

10. In apparatus of the character described, two endless belts having oppositely travelling flights thereof moving at differential speeds and engaging at opposite sides at the periphery of container bodies for progressively rolling the same, means for applying adhesive to the ends of container bodies being rotated by said belts, said last named means including an adhesive applicator roll disposed with its axis paralleling the belt flights and its periphery in adhesive applying relation to the ends of the rolling container bodies, a guide rail disposed to be engaged by the ends of rolling container bodies opposite the ends to which adhesive is being applied, means for adjusting the spaced relation of said roll and rail, and means for adjusting the spaced relation of said belts, thereby to adapt the apparatus for work on container bodies of different heights and diameters.

11. In apparatus of the character described, two endless belts having oppositely travelling flights thereof moving at differential speeds and engaging at opposite sides at the periphery of container bodies for progressively rolling the same, means for applying adhesive to the ends of container bodies being rotated by said belts, said last named means including an adhesive applicator roll disposed with its axis paralleling the belt flights and its periphery in adhesive applying relation to the ends of the rolling container bodies, a guide rail disposed to be engaged by the ends of rolling container bodies opposite the ends to which adhesive is being applied, a pair of container body supporting tracks disposed one along each side of one of the container body engaging belt flights, means for varying the spaced relation of the tracks, and means for adjusting the spaced relation of said roll and rail to adapt the apparatus for work on container bodies of different heights.

12. In apparatus of the character described, means for rolling container bodies progressively, an adhesive applicator roll disposed with its axis paralleling the path of travel of the container bodies and being in position for applying adhesive to rolling container body ends, an adhesive reservoir, a pick-up roll disposed to pick up adhesive from said reservoir and apply it on the applicator roll, means for adjusting the applicator roll toward or from the axes of rolling container bodies, and means for adjusting the pick-up roll toward or from the applicator roll.

13. In apparatus of the character described, means for rolling container bodies progressively, an adhesive applicator roll disposed with its axis paralleling the path of travel of the container bodies and being in position for applying adhesive to rolling container body ends, an adhesive reservoir, a pick-up roll disposed to pick up adhesive from said reservoir and apply it on the applicator roll, means for adjusting the applicator roll toward or from the axes of rolling container bodies, means for adjusting the pick-up roll toward or from the applicator roll, and means for moving the reservoir and both rolls bodily toward or from the path of travel of the container bodies to vary the adhesive applying relation between the applicator roll and the rolling container bodies without changing the spaced relation of the axes of the two rolls.

14. In apparatus of the character described, means for rolling container bodies progressively, an adhesive applicator roll disposed with its axis paralleling the path of travel of the container bodies and being in position for applying adhesive to rolling container body ends, an adhesive reservoir, a pick-up roll disposed to pick up adhesive from said reservoir and apply it on the applicator roll, means for adjusting the applicator roll toward or from the axes of rolling container bodies, means for adjusting the pick-up roll toward or from the applicator roll, and means for moving the reservoir and both rolls bodily toward or from the path of travel of the container bodies to vary the adhesive applying relation between the applicator roll and the rolling container bodies without changing the spaced relation of the axes of the two rolls, said last named means including a lug extending from the reservoir, guide means slidably supporting the reservoir, a fixed bracket, and a captive adjuster screw threaded through the bracket and mounted for free rotation in said lug but restrained against endwise movement relative to said lug.

15. In apparatus of the character described, means for rolling container bodies progressively, an adhesive applicator roll disposed with its axis paralleling the path of travel of the container bodies and being in position for applying adhesive to rolling container body ends, an adhesive reservoir, a pick-up roll disposed to pick up adhesive from said reservoir and apply it on the applicator roll, means for adjusting the applicator roll toward or from the axes of rolling container bodies, means for adjusting the pick-up roll toward or from the applicator roll, said first mentioned adjusting means comprising a pair of slidably mounted bearing blocks in which the applicator roll has trunnion bearing and captive screw means for adjusting the positions of said blocks, and said pick-up roll adjusting means comprising a pair of rotatably mounted bearing blocks in which the pick-up roll has off center trunnion bearing and means for turning said rotatable blocks.

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