

Dec. 9, 1930.

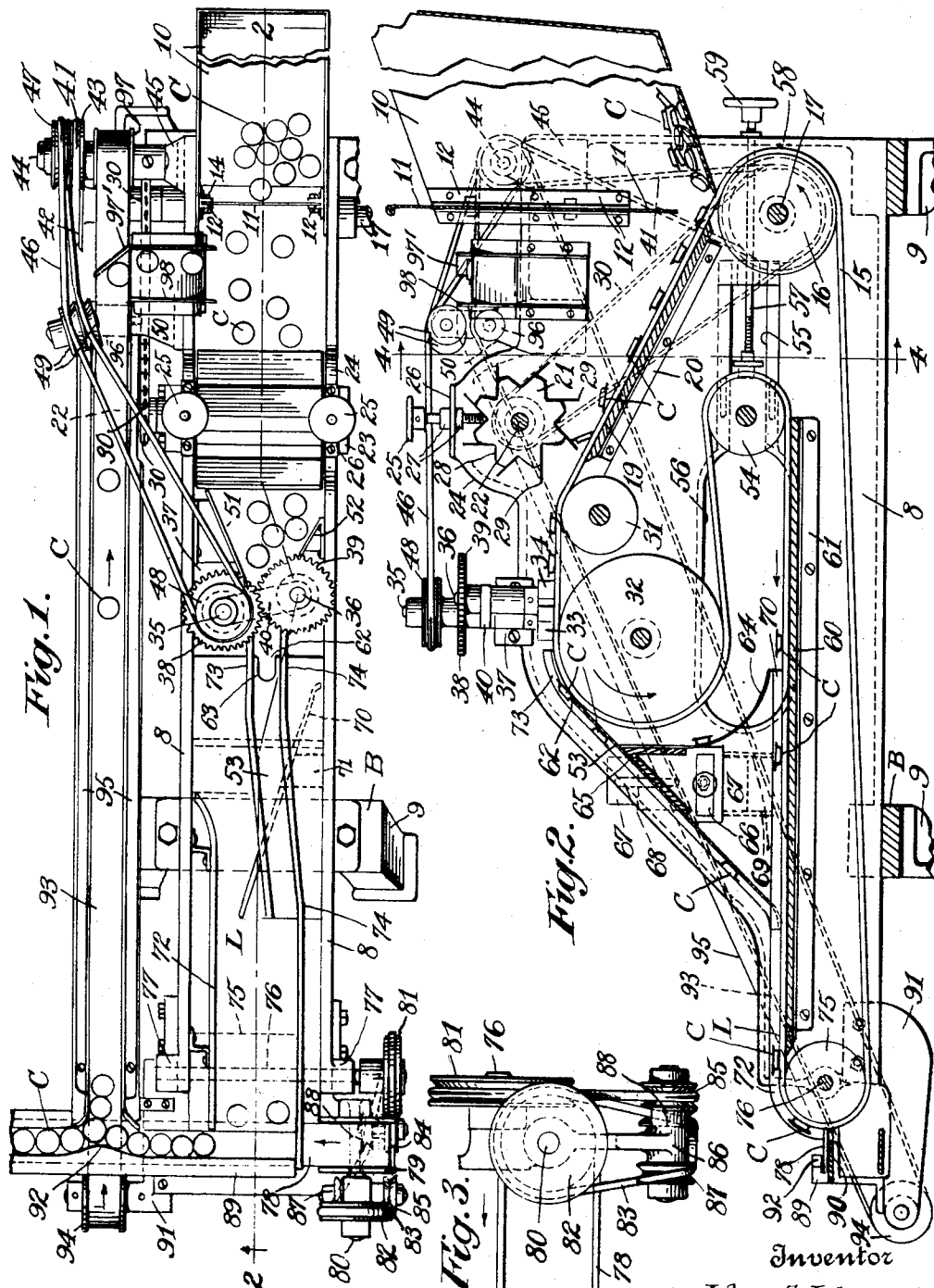
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1,784,010

APPARATUS FOR FEEDING CLOSURE CAPS

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2 Sheets-Sheet 1



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Fig. 5.

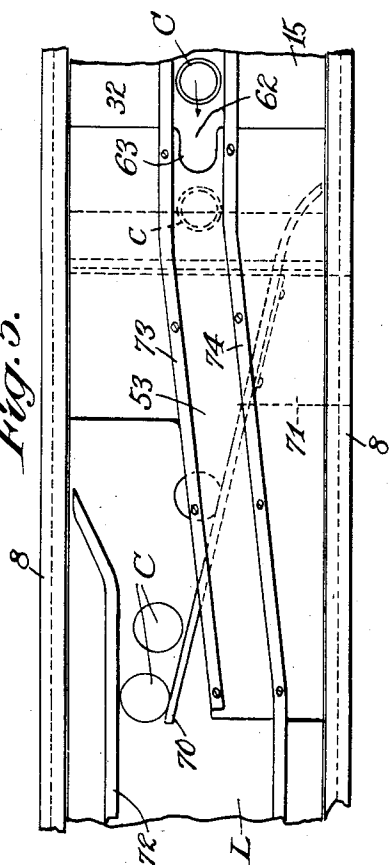


Fig. 7.

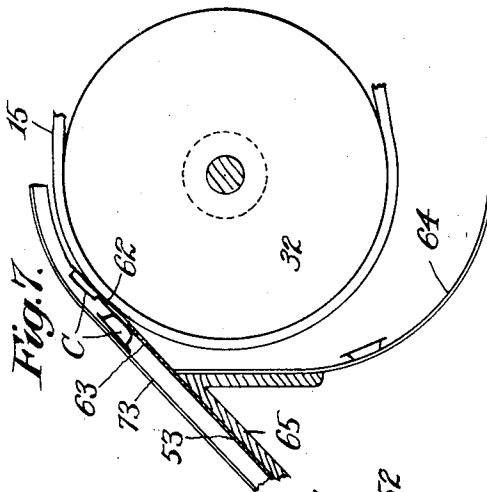


Fig. 6.

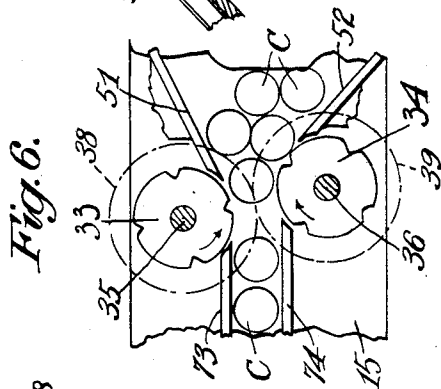
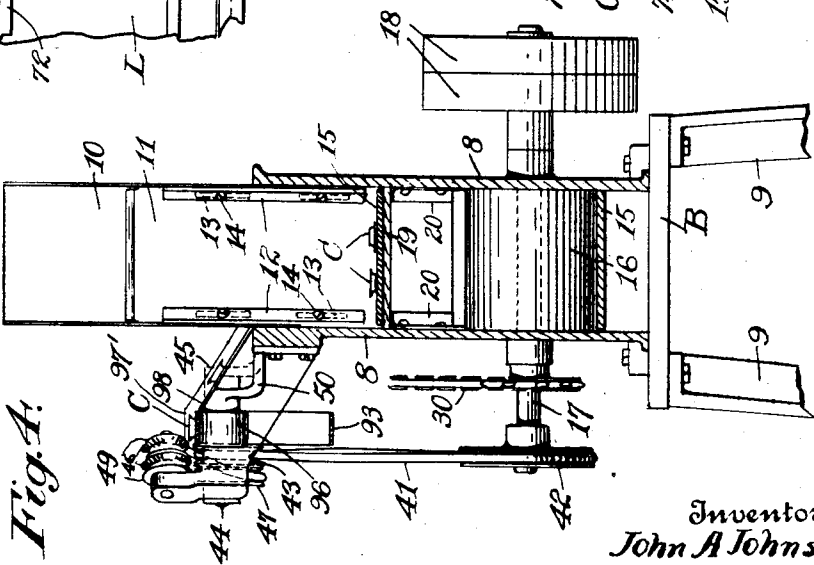


Fig. 4.



UNITED STATES PATENT OFFICE

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APPARATUS FOR FEEDING CLOSURE CAPS

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This invention relates to apparatus for the feeding and delivering of closure caps, particularly crown caps, from a hopper or other depository to another apparatus for assembling liners in the closures, and it is an object of the invention to provide an apparatus that will deliver a greater number of caps than has heretofore been possible.

Another object of the invention is to provide means in apparatus of this character to prevent the accumulating and jamming of the closure caps during the transferring of caps from the feeding means to the apparatus to which the caps are being transferred due to the incapability of said apparatus to receive such caps.

A further object of the invention is to provide means to return the surplus caps created by an accumulation during the transferring of caps to the source of supply.

A still further object of the invention is to provide a system of power transmitting means through which the apparatus is operated from a single drive shaft.

Further objects of the invention will hereinafter appear.

In the drawings accompanying and forming a part of this application, Figure 1 is a plan view of the apparatus.

Figure 2 is a longitudinal sectional view taken on the line 2—2 of Figure 1, looking in the direction of the arrow.

Figure 3 is an enlarged end elevation of the power transmission system of the apparatus shown in the lower left hand corner of Figure 1 to drive the second conveyor from the first conveyor.

Figure 4 is a cross sectional view taken on line 4—4 of Figure 2, looking in the direction of the arrows.

Figure 5 is a fragmentary plan view of a section of the first conveyor and showing the relation of the feeding means thereto.

Figure 6 is a plan view of a portion of the cap separating and guiding means; and

Figure 7 is a fragmentary view in side elevation of the cap feeding mechanism shown in Figure 5.

Like characters designate like parts throughout the drawings and specification.

In carrying out the invention there is provided a frame of spaced parallel side members 8 supported on a base B secured to standards 9 fastened or resting on a suitable foundation and arranged for connection with one end of a hopper 10 (fragmentarily shown in Figures 1 and 2) between the sides and at one end of the frame to carry receptacle closure caps C, said hopper having an inclined bottom and arranged with a gate 11 for the outlet slidably mounted between a pair of spaced angle pieces 12 fixed to the sides of the hopper and having aligned elongated slots 13 for the slidable engagement of clamping screws 14 carried by the gate to secure the gate in adjusted position relative to the bottom of the hopper to vary the area of the hopper outlet. The bottom of the hopper overhangs a portion of an endless conveyor belt 15 inclined upward in a direction opposite to the bottom of the hopper and traveling in a direction away from the hopper to receive caps from the hopper.

The conveyor belt 15 is carried and propelled by a drum 16 fixed below the bottom of the hopper to a drive shaft 17 rotatably mounted in bearings in the sides 8 and carrying a pair of pulleys 18, one fixed to the shaft and the other loose thereon for the engagement of a belt (not shown) to be driven from a source of power and adapted to be shifted from one pulley to the other to render the conveyor active and inactive. The portion of the conveyor 15 riding off the drum 16 is supported by an inclined platform 19 mounted on and extending between the sides 8 by angle brackets 20 and arranged with separating mechanism superposed to and adjacent the top of the inclined portion of the conveyor and comprising a rotatable wiper in the form of a wheel 21 fixed to a shaft 22 rotatable in bearing blocks 23 slidably and adjustably mounted in a slideway of a projection 24 extending above each frame side 8 by headed lead screws 25 having threaded engagement in said blocks and carried by plates 26 mounted to span the tops of the slideways, the screws being held against vertical movement by collars 27 fixed to the screws abutting both sides of the plates. The

periphery of the wheel 21 is arranged with radial V-shaped recesses 28. Secured on one side of each recess is a strip 29 of flexible material, such as leather or rubber, of a length to form a space between the end thereof and the conveyor equal to the thickness of a cap to permit the passage of caps in a single plane but separate the caps that are delivered from the hopper in a jumbled mass and one superposed to the other, as shown in Figure 2, by the rotation of the wheel. The wiper is operated from the drive shaft 17 by a sprocket chain 30 passing around sprocket wheels fixed to the shafts 17 and 22.

The portion of the conveyor beyond the cap separating mechanism, and transferring the caps in a single plane rides over a roller 31 rotatably supported between the sides 8, and travels in a horizontal plane to and about a drum 32 also rotatably supported between said frame sides.

To change the irregular formation in a single plane of the caps on the conveyor into a single row separating and guiding means is superposed relative to the horizontal section of the conveyor comprising a pair of wheels 33, 34 with notched peripheries fixed on shafts 35, 36 rotatable on a vertical axis, said wheels being spaced apart a distance to permit the passage between the wheels of a single cap. The shaft 35 is rotatably mounted in a bearing of a bracket 37 fixed to an ear projecting above one of the sides 8, and said shaft is adapted to carry a gear 38 to mesh with a gear 39 fixed to the shaft 36, which is rotatably mounted in a bearing of an arm 40 extending horizontally and obliquely from and carried by a bearing integral therewith engaging the shaft 35 between the bearing of the bracket 37 and the gear 38. The caps are separated and guided between the wheels 33, 34 by the rotation thereof in a direction opposite to the direction of travel of the conveyor. The wheels are driven from the shaft 17 by a belt 41 passing around a wheel or pulley 42 fixed on said shaft 17 and a pulley or wheel 43 fixed on a shaft 44 rotatable in a bracket 45 extending from the frame side 8 carrying the bracket 37 and a belt 46 passing around a pulley wheel 47 fixed on the shaft 44 and a wheel 48 fixed above the gear 38 on the shaft 35 and guided to and from said wheel 48 by a pair of pulleys 49 rotatably carried by a bracket 50 extending from the frame side 8 supporting the bracket 45. The caps are forced between the rotating wheels 33, 34 by the movement of the conveyor 15 and the colliding of the caps against guide rails 51, 52 supported by the frame sides 8 in superposed relation to the conveyor and converging from adjacent the ends of the separating mechanism toward the space between the wheels. The guide rail 51 is longer than the rail 52 due to the wheel

33 being farther away from the separating mechanism than the wheel 34.

The caps after passing between the wheels 33, 34, are in different positions, that is, taking a crown type of cap as an example, some of the caps have the crown portion lowermost, resting on the conveyor, while others have the skirt portion resting on the conveyor with the crown portion uppermost. It is desirable that all the caps be in one position, with the crown portion on the conveyor and the skirt portion extending upward to deliver the caps to an apparatus for assembling liners in the caps, such as cork disks or the like.

After the caps have passed between the wheels 33, 34 the conveyor delivers them to a chute 53 superposed partly relative to the section of the conveyor passing over the drum 32 and declining to a lower level section L of the upper stretch of the conveyor formed by the passing of the conveyor about a roller 54 rotatably supported in bearing blocks adjustably mounted below and rearward of the supports of the drum 32, in slideways 55 extending horizontally in the frame sides 8, said slideways opening into enlargements 56 of the frame sides for the dismantling or replacement of the conveyor parts. To adjust the bearing blocks they are connected to screw rods 57 threaded in an end wall 58 of the frame and manipulated by a hand wheel 59 fixed to the rods. The conveyor upon leaving the roller 54 is supported by a horizontally extending platform 60 mounted on and extending between the frame sides by angle brackets 61, constituting the lower level L of the upper stretch of the conveyor. To deliver the caps in the desired position the entrance end to the chute 53 is arranged tangential to the periphery of the drum 32 and has a U-shaped recess 62 in the bottom of the chute at the upper end thereof with the edges of the bottom of the chute at the entrance to the recess being bevelled to engage under the skirt portion of the caps having the skirt portion lowermost and direct said caps so they will travel along the recess and out of the recess by the crown portion of the caps engaging a bevelled edge at the U-portion of the recess, as at 63, onto the chute to slide down the same onto the upper stretch of the conveyor at the lower level L. The caps with the skirt portion lowermost are engaged by the bevelled entrance to the recess so that the skirt portion will be below the sides of the recess whereby the caps will be directed through the recess onto the section of the conveyor riding about the drum 32 from which they drop with the crown portion lowermost into a second chute 64 curved in a direction opposite to the direction of extension of the chute 53 and terminating over a portion of the lower conveyor section L in alinement and in the rear of the lower end of the chute

53. The chutes are mounted on the frame sides 8 by brackets having a V-shape upper portion 65 to engage the under surface of both chutes and a horizontal extending slot 66 for the engagement of a bolt projecting from brackets 67 arranged with a vertical slot 68 for the engagement of a bolt projecting from the frame sides 8 to have vertical adjustment in slides 69 formed on the inner portion of the frame sides upon the loosening and tightening of the bolts to adjust the chutes simultaneously either in a vertical or horizontal direction to accommodate different size caps and variations in the arrangement of the conveyor.

The caps that drop through the slot 62 engage the conveyor with the shirt portion lowermost and the chute 64 with the crown portion lowermost so that they are delivered to the lower conveyor level L with the crown portion lowermost.

To advance the caps delivered from the chute 64 in the direction of travel of the lower conveyor level and out of the path of travel of the caps delivered by chute 53, a guide member 70 is supported from one of the frame sides 8 by an inwardly extending bracket 71 and advancing from said bracket in an oblique direction below the chute 53 in superposed relation to the lower conveyor level and terminating near the lower end of said chute 53 and in spaced relation with a guide rail 72 extending from a side of the conveyor at an angle and then parallel with said side to the end of said conveyor level to permit the passage of caps therebetween to form a single row of caps against said parallel portion of the guide rail. The caps delivered by the chute 53 are prevented from leaving the sides of the chute by rails 73, 74 fixed to marginal portions of the chute, rail 74 being continued parallel and in spaced relation to the side of the lower conveyor level opposite to the side arranged with the guide rail 72 to form a guide for the caps delivered by the chute 53 and a row of caps parallel and in spaced relation to the row of caps delivered by the chute 64.

The conveyor after leaving the platform 60 passes about a roller 75 fixed on a shaft 76 rotatably mounted in bearings 77 fixed to the frame sides 8 and thence to the drum 16. The caps being transferred by said conveyor upon reaching the section passing about the roller 75 are discharged from said conveyor, dropping with the crown portion lowermost on a second conveyor belt 78 traveling in a direction transversely of and in a plane below the lower level of the conveyor 15, said conveyor passing around a flanged drum 79 fixed on a shaft 80 rotatable in a bracket 86 extending longitudinally from one of the frame sides 8 and driven from the drum shaft 76 through a pulley 81 fixed on said shaft 76 and a pulley 82 fixed on the

shaft 80, the pulleys being connected by a belt 83 passing around a guide pulley 84 rotatably mounted on a shaft carried by the bracket 86 and under and around a pulley 85 rotatable on a second shaft mounted in the bracket 86 and advancing in an upward direction over the pulley 82, thence to and under a pulley 87 rotatable on the shaft of the pulley 85 and under a pulley 88 rotatable on the shaft of pulley 84 to the pulley 81. The opposite end of the conveyor 78, not shown, passes around a drum similar to drum 79 adjacent an apparatus to which the caps are to be delivered. To prevent the caps coming from the conveyor 15 from dropping off the outer marginal portions of the second conveyor 78 a guide rail 89 extends above and over a platform 90 upon which the conveyor 78 rides carried by a bracket 91 fixed to the frame side and extending forward of the frame. One end of the guide rail lies adjacent the end of the extension of the rail 74 and is arranged beyond the conveyor 15 with an abutment 92 projecting into the path of travel of the caps on the conveyor 78 forcing the caps to the opposite marginal portion of said conveyor and if the caps are not being taken off of the conveyor at the delivery end thereof and causing a jamming of caps, the caps at said abutment are forced by the advancing rear caps onto a third conveyor 93 extending parallelly of the first conveyor 15 in an upwardly inclined plane, said conveyor passing around a flanged drum 94 rotatable on a stud fixed in an extension of the bracket 91 below the second conveyor 78 and adjacent the inner marginal portion thereof. Guide rails 95 extend along and above the marginal portions of the conveyor 93, said rails being mounted on and extending laterally from the adjacent frame side 8. The conveyor belt passes over a supporting drum 96 rotatably carried by the bracket 50 for the pulleys 49 and around a flanged drum 97 returning to the drum 94, said drum 97 being fixed on the shaft 44 and rotated by the rotating of the pulley 43 and in the same plane as the drum 96 causing the conveyor to travel in a horizontal plane. An abutment 97' extends transversely of the conveyor belt 93 and comprises an extension of one of the sides of a chute, the other side of which is shown at 98, inclining from said horizontal portion of the conveyor to above the inclined section of the conveyor 15 in the rear of the separating mechanism to deliver the caps from the conveyor 93 to the conveyor 15.

Having thus described my invention I claim:

1. In closure cap feeding apparatus, an endless conveyor to transfer caps from a source of supply, cap separating and guiding means interposed in the line of travel of the conveyor comprising a pair of spaced wheels

superposed to the conveyor and rotatable simultaneously in the plane of and in a direction toward each other and opposite to the direction of travel of the conveyor, and a pair of chutes extending from said means, each chute to deliver differently positioned caps to a further advanced portion of the conveyor in a predetermined position.

2. In closure cap feeding apparatus, an endless conveyor to transfer caps from a source of supply, cap separating and guiding means interposed in the line of travel of the conveyor, a pair of chutes extending from said means, each chute to deliver differently positioned caps to a further advanced portion of the conveyor in a predetermined position, a second conveyor to receive the sorted caps from the first conveyor, a guide rail extending above the outer marginal portion of the second conveyor and arranged with an abutment projecting laterally therefrom into the path of travel of the caps on said conveyor, and a third conveyor extending parallel of the first conveyor and below the second conveyor in line with the rail abutment to relieve said second conveyor of an accumulation of caps and return such caps to the first conveyor in the rear of the cap separating means.

3. In closure cap feeding apparatus, as claimed in claim 2, a guide rail extending above the outer marginal portion of the second conveyor and arranged with an abutment projecting laterally therefrom into the path of travel of the caps on said conveyor and operative to eject the caps fed by the conveyor laterally therefrom when there is an accumulation on the conveyor forward of the abutment.

4. In crown cap feeding apparatus, an endless conveyor to receive and transfer caps from a source of supply, cap separating and guiding means interposed in the line of travel of the conveyor, a chute mounted to connect one section of the conveyor adjacent the separating means with another section of the conveyor and arranged with guiding means to receive and direct caps with the crown portion uppermost from the first section to the second section of the conveyor, and a second chute arranged below the first chute to receive caps from said guiding means and deliver the caps to an advanced section of the conveyor with the crown portion thereof lowermost, said chute guiding means comprising a recess in the bottom of one end of the chute arranged at the entrance thereto with bevelled edges to engage below the skirt of the caps having the crown portion lowermost and direct said caps along the first chute to deliver them in such position onto a portion of the conveyor and said bevelled edges engaging above the skirt of the caps having the crown portion uppermost whereby said caps will drop onto the second chute.

5. Crown cap feeding apparatus, as claimed in claim 4, wherein the chutes are mounted to have simultaneous adjustment in a longitudinal and vertical direction relative to the conveyor to accommodate the apparatus for different size caps.

6. In closure cap feeding apparatus, an endless conveyor to receive and transfer caps from a source of supply, wiper mechanism arranged above the conveyor to distribute the caps in a single plane on said conveyor comprising a rotatable wheel having vanes of flexible material fixed to and extending longitudinally of and radially from the wheel, means interposed in the line of travel of the conveyor beyond the wiper mechanism to separate and guide the caps in a single row, and means to sort and deliver the caps in a predetermined position from said cap separating means to an advanced section of the conveyor.

7. Closure cap feeding apparatus as claimed in claim 6, wherein the wiper mechanism is rotated in a direction opposite to the direction of travel of the conveyor, and the conveyor adjacent the wiper mechanism rides over and is supported by a platform inclining towards said mechanism.

8. Closure cap feeding mechanism as claimed in claim 6, wherein the wheel of the wiper mechanism is arranged with V recesses extending longitudinally of and circumferentially disposed about the same and to a wall of which recesses the vanes are secured, and the wheel is mounted to have adjustment in a vertical direction toward and away from the conveyor.

9. In closure cap feeding apparatus, an endless conveyor arranged with the upper stretch to travel in different levels, cap separating and guiding means interposed in the upper conveyor level, a pair of chutes extending in opposite directions from said upper conveyor level beyond the separating means to the lower conveyor level, one chute terminating in the rear of the other on the longitudinal axis of the lower conveyor level, and a guide member superposed to said lower conveyor level and extending obliquely of the conveyor from the lower end of the rearwardly terminating chute to a position in spaced relation to the lower end of the other chute to direct the caps delivered by the former chute in a row parallel to a row of caps delivered by the latter chute.

10. Closure cap feeding apparatus, as claimed in claim 9, wherein the outer side wall of the forwardly terminating chute is extended forwardly of the chute and parallel of the marginal portion and beyond the end of the lower conveyor level, and a guide rail superposed to and extending longitudinally of the opposite marginal portion of said lower conveyor level and extending from the end of the oblique guide member to the

end of said lower conveyor level to maintain the caps delivered by the rearwardly terminating chute in parallel relation to the caps delivered by the forwardly terminating chute.

11. In closure cap feeding apparatus, an endless conveyor arranged with wiper mechanism rotatably mounted above a section of the conveyor to distribute the caps in a single plane on the conveyor, cap separating and guiding means superposed to the conveyor beyond the wiper mechanism to forward the caps in a single row, means to deliver the caps in a predetermined position from said cap separating means to an advanced section of the conveyor in a double row, a second conveyor to receive the caps from the first conveyor, guide rails extending above the marginal portions of the second conveyor, one rail being arranged with an abutment projecting into the path of travel of the caps on said conveyor, and the other rail having a cut out portion opposite the abutment, a third conveyor extending parallelly of the first conveyor comprising an endless belt inclining upward and extended from below the inner marginal portion of the second conveyor in alinement with the rail abutment and cut out to a horizontal section above the first conveyor, and a chute extending from said horizontal section to a position above a section of the first conveyor in the rear of the wiper mechanism arranged with an abutment intersecting the path of travel of caps on the third conveyor to guide the caps to said chute and delivery thereof to the first conveyor.

12. In closure cap feeding apparatus, as claimed in claim 6, a pair of guide rails mounted in superposed relation to the conveyor and converging from the wiper mechanism toward the cap separating and guiding means forming a channel to guide and present a cap to said separating and guiding means.

13. Closure cap feeding apparatus as claimed in claim 1, wherein the cap guiding and separating means comprises a pair of spaced wheels arranged with notches in the periphery and superposed relative to a portion of the conveyor traveling in a horizontal plane, said wheels being rotatable in the plane of and in a direction toward each other and opposite to the direction of travel of the conveyor, and guide rails extending from the opposite marginal portion of the conveyor and converging toward the space between the wheels.

Signed at the city of New York, in the county of New York and State of New York this 7th day of February, 1929.

JOHN A. JOHNSON.