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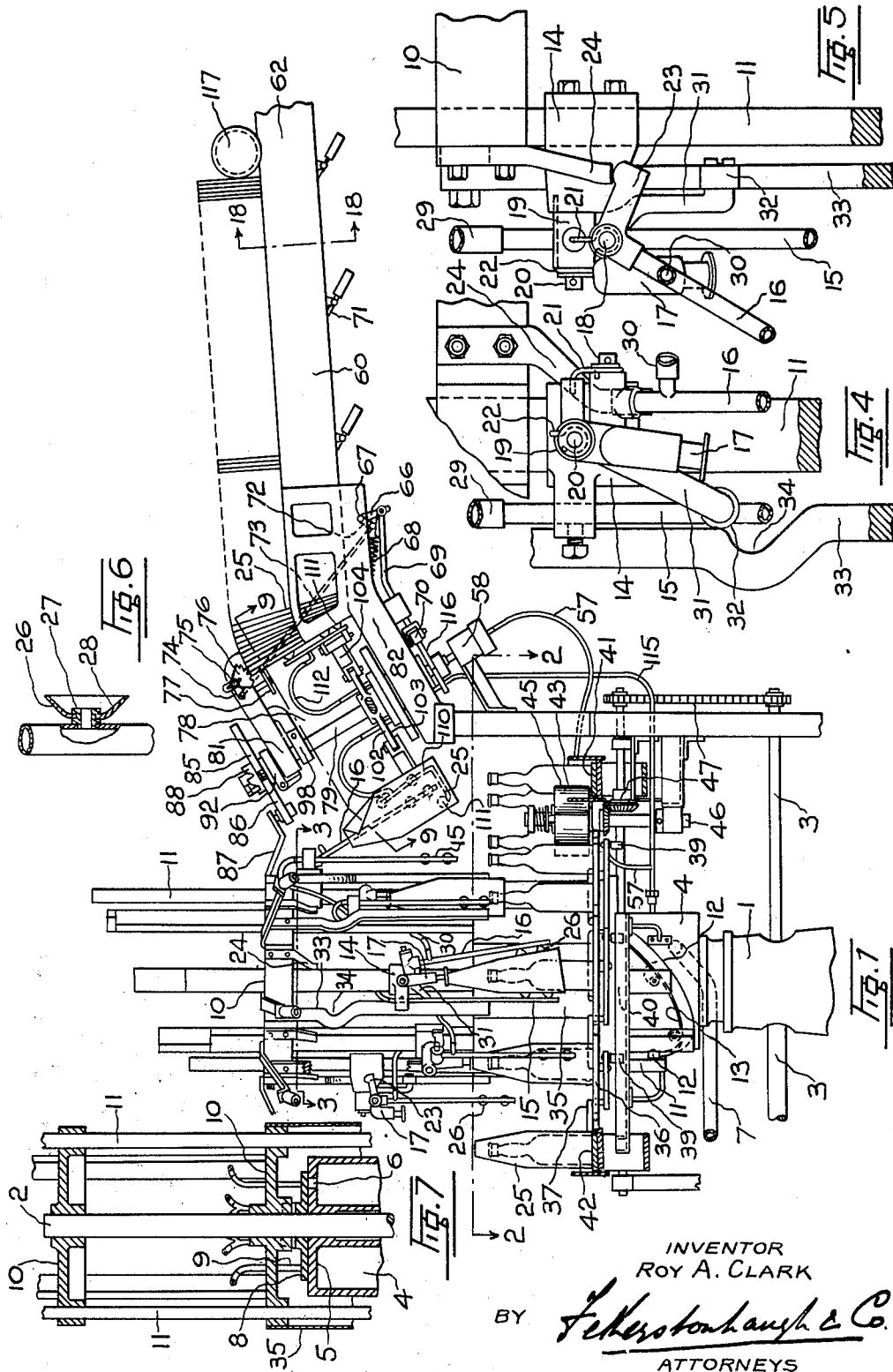
R. A. CLARK

1,962,481

BOTTLE WRAPPING MACHINE

Filed April 24, 1933

3 Sheets-Sheet 1



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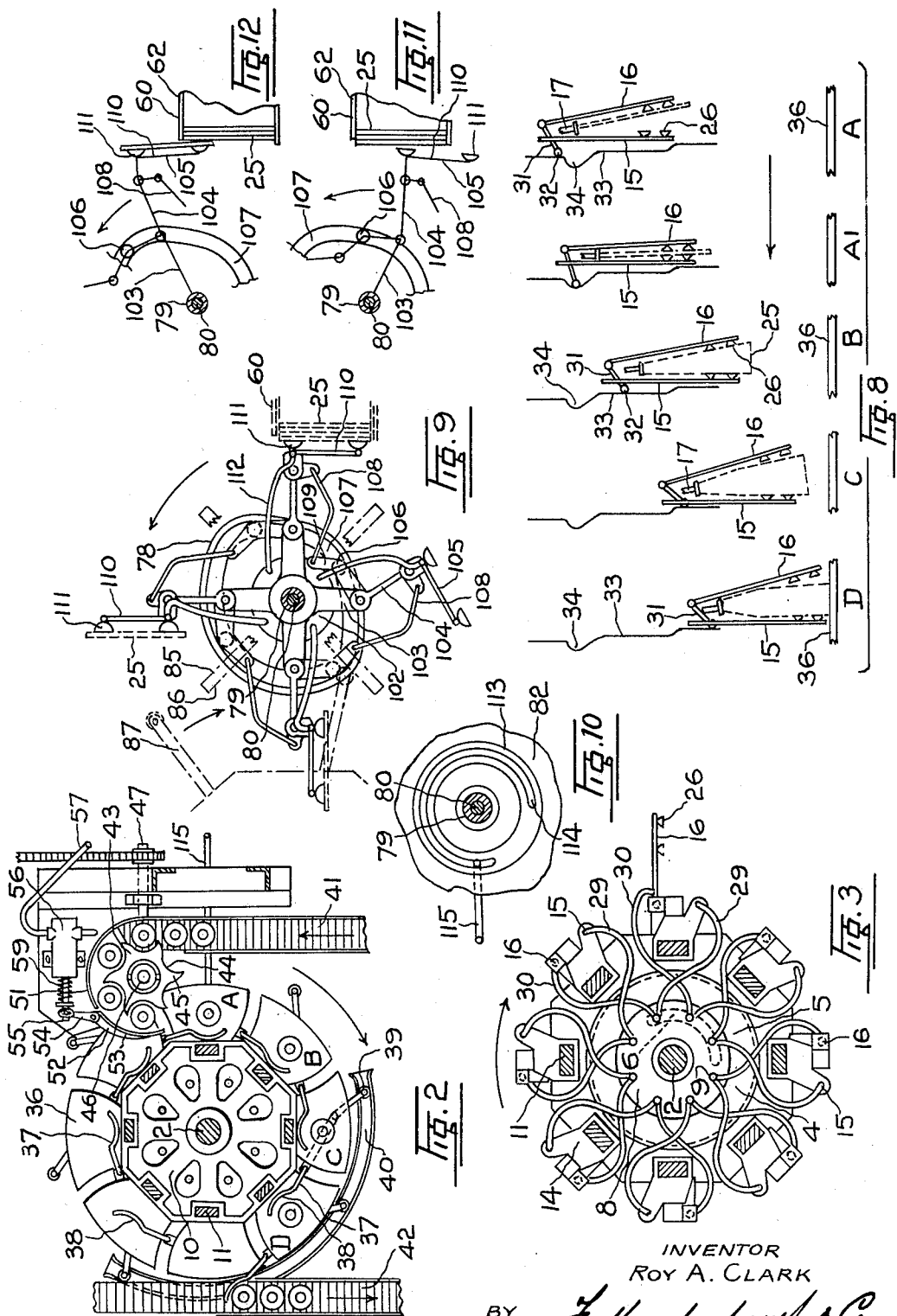
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3 Sheets-Sheet 2



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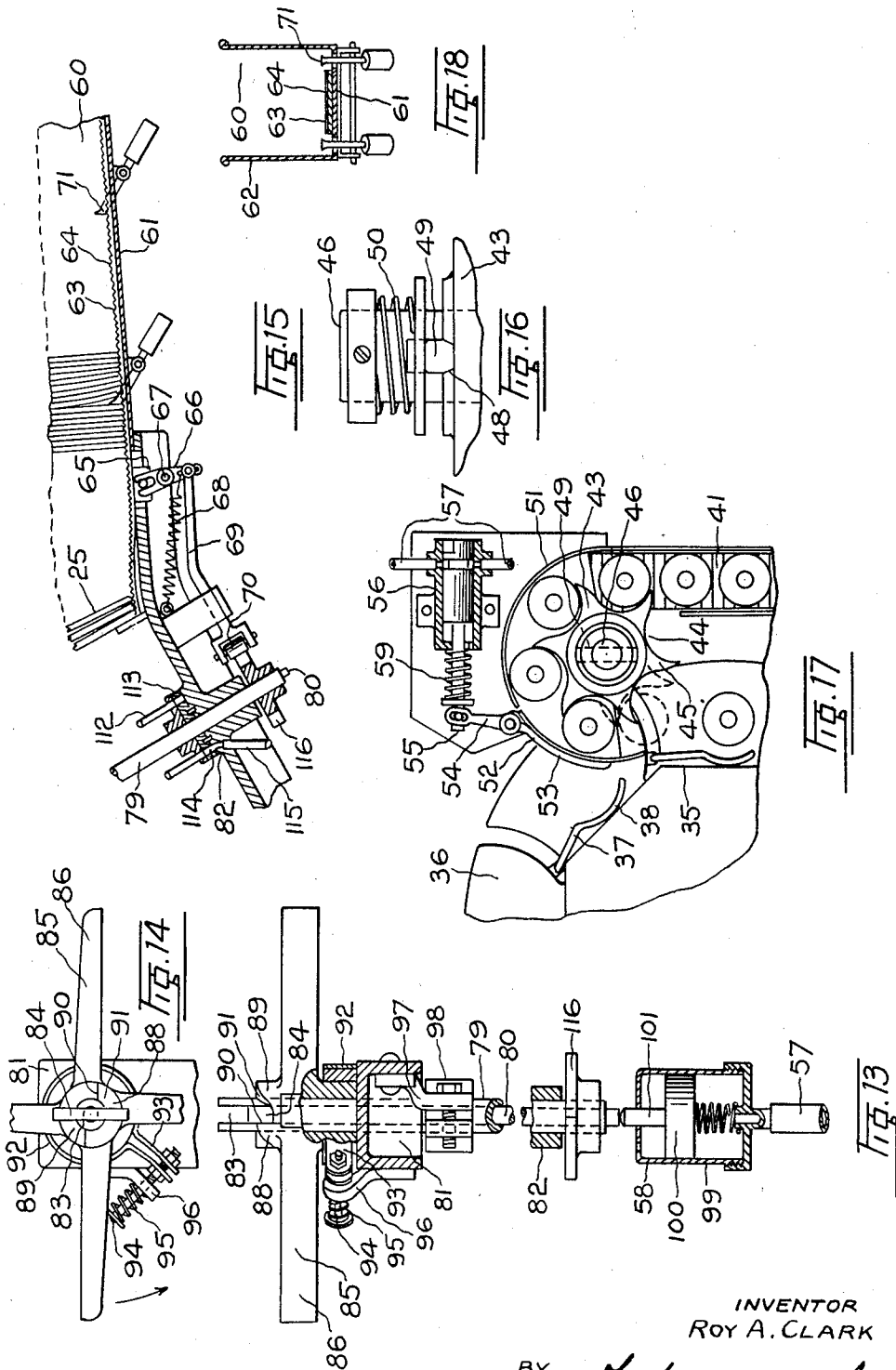
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

1,962,481

BOTTLE WRAPPING MACHINE

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Application April 24, 1933, Serial No. 667,630

12 Claims. (Cl. 93—7)

My invention relates to improvements in bottle wrapping machines, which are particularly adapted for applying folded wrappers of the cylindrical type to bottles. The objects of the invention are to provide means whereby the wrappers are progressively moved along a chute and are picked up one by one, opened and placed onto a bottle as it passes the end of the chute, a wrapper pick up head, a rotatory table

bottle.
The invention consists essentially of a wrapper chute, a wrapper pick up head, a rotatory table onto which bottles are progressively delivered, means for receiving the wrappers progressively from the pick up and for applying them to the bottles as they are carried around upon the table, as will be more fully described in the following specification and shown in the accompanying drawings, in which:—

Fig. 1 is a general view of the invention.

Fig. 2 is a plan view taken on the line 2—2 of Figure 1.

Fig. 3 is a diagrammatic view taken on the line 3—3 of Figure 1 to show the vacuum connections.

Fig. 4 is a detail front view of the mounting of the wrapper holding arms.

Fig. 5 is a detail side view of same.

Fig. 6 is a sectional view of one of the vacuum cups.

Fig. 7 is a sectional view of the vacuum tank and disc valve.

Fig. 8 is a diagrammatic view showing progressively the positions of the wrapper holding arms.

Fig. 9 is a plan view of the pick up head taken on the line 9—9 of Figure 1.

Fig. 10 is a plan view of the disc valve of the pick up head.

Figs. 11 and 12 are diagrammatic views showing the position of a pick up arm on approaching and leaving the wrapper chute.

Fig. 13 is a part sectional view of the drive to the pick up head.

Fig. 14 is a plan view of same.

Fig. 15 is a sectional view of the end of the wrapper chute.

Fig. 16 is a general view of the spider clutch.

Fig. 17 is a detail plan view of the spider and vacuum valve control.

Fig. 18 is a sectional view of the chute on the line 18—18 of Figure 1.

In the drawings like characters of reference indicate corresponding parts in each figure.

The numeral 1 indicates a vertical base in

which is suitably journaled a vertical shaft 2, see Figures 2, 3 and 7, driven by appropriate means from a horizontal shaft 3. Surmounting the base is a cylindrical vacuum tank 4 having a head 5 provided with an arcuate port 6, see Figures 3 and 7, concentric with the shaft 2, which tank is exhausted by a suitable pump, not shown, through a pipe 7. The head 5 of the tank 4 is faced off and contacts with a flange 8 secured to the shaft 2, the flange being fitted with a plurality of pipes 9 which progressively register with the arcuate port, thus forming a valve for the control of the suction to the several wrapper holding arms to be hereinafter described.

Secured to the shaft 2, above the vacuum tank 4 is a pair of spiders 10, see Figures 1 and 2, which support a plurality of vertical slides 11, each having at its base a roller 12, which rides upon a cam rail 13 mounted upon the periphery of the vacuum tank 4, causing the slides to reciprocate vertically as the shaft 2 is rotated.

Each of the slides 11 is fitted with a head 14, see details in Figures 4 and 5, on which are mounted wrapper holding arms 15 and 16 and a ram 17, the arm 15 is fixed in a substantially vertical position, but the arm 16 is mounted to swing upon a stub shaft 18, which permits it to swing radially outwards from the shaft 2, and the stub shaft 18 is attached to a fitting 19 which in turn is secured upon a stub shaft 20 extending from the head 14 radially from the shaft 2, so that the arm 16 is capable of swinging away from the arm 15 and tangential to the periphery of the spiders 10. The arm 16 is provided with a spring 21 and the fitting 19 is provided with a spring 22 both of which serve to urge the arm into vertical position parallel to the arm 15. The arm 16 is fitted adjacent the stub shaft 18 with a crank 23 which is adapted to engage a stop 24 extending downwards from the upper spider 10, so that as the head 14 reaches its uppermost position the arm 16 is swung outwardly as shown in Figure 5 to receive a wrapper 25 to be applied to a bottle. The ram 17 is mounted on the fitting 19 and is adapted to engage the top of a wrapper and force it down onto the bottle to be wrapped. While the ram is shown as having a slight rocking movement it will be obvious that it may be immovably secured to the head 14.

The arms 15 and 16 are each provided with opposing vacuum cups 26 consisting of a nipple 27 fitted with a rubber cup 28 as shown in Figure

6, the nipples 27 communicating with the arms which are tubular and are in turn connected with the pipes 9 by tubes 29 and 30 respectively.

It will be noticed that connection with the vacuum tank will be made to the arm 16 of each pair, before it is made with the arm 15 of that pair when the machine is in operation by virtue of the fact that the tube 30 communicating with a pipe 9 which registers with the arcuate port 6 before a second pipe 9 reaches said port.

The fitting 19 is provided with a depending arm 31 having a roller 32 at its free end which is held in engagement with a vertical cam track 33 by the spring 22, this cam has an offset 34 intermediate its length which permits the arm 16 to swing towards the arm 15 so that the suction cups of said arms will engage both sides of a wrapper placed between them.

The lower spider 10 is fitted with a skirt 35 which supports at its base a plurality of circumferentially arranged shelves 36, see Figures 1 and 2. These shelves are adapted to support bottles to be wrapped and are each provided with a wiper arm or bell crank 37 having a curved portion 38 at its free end which is adapted to engage the bottle to remove it from its shelf, the opposite end of the wiper arm is provided with a roller 39 which is adapted to enter a cam groove 40 to swing the curved portion through its entire cycle of operation to remove a bottle and to restore said curved portion to its normal position adjacent the skirt 35.

The numerals 41 and 42 indicate a pair of endless conveyors, the former 41 being to deliver bottles to the machine and the latter 42 being a discharge conveyor to receive the bottles as they are discharged by the wiper arms 37 from the shelves 36 and to convey them to a suitable position for packing or shipment. Interposed between the conveyor 41 and the shelves 36 is a transfer spider 43 having pockets 44 defined between its spokes 45. This spider is mounted upon a vertical shaft 46 which is driven by a suitable train of gears, shafts, sprockets and the like generally indicated by the numeral 47 from the drive shaft 3.

The spider 43 is provided upon its upper face with a shallow transverse keyway 48 and the vertical shaft 46 is transversely bored to freely accommodate a pin 49, which pin is normally held down within the keyway by a spring 50, so that while under normal load the pin will impart the drive from the shaft 46 to the spider, in the event of a bottle falling on the belt 41 and not being delivered properly into one of the pockets 44 so as to jamb between a spoke 45 and the guard rail 51, the resistance to rotation will cause the pin 49 to rise against the action of the spring 50 and prevent damage from occurring to any part of the machine.

A bell crank 52, see detail in Figure 17, having a curved leg 53 which normally forms a continuation of the curve of the guard rail 51 and having a straight leg 54, is so mounted as to permit its curved leg to swing towards the spokes of the spider 43 at any time that an adjacent pocket 44 is not filled with a bottle. The straight leg 54 of the bell crank is connected with the piston rod 55 of a vacuum valve 56, which valve is on a vacuum line 57 leading from the vacuum tank 4 and communicating with a dash pot 58 to be hereinafter described. The valve 56 may be of any desired type and is adapted to be held open to the line 57 by the bell crank 52 when bottles are in contact therewith

and to be opened to the atmosphere by pressure from a spring 59 to break the vacuum to the dash pot when no bottle is passing and holding the curved leg 53 in normal position.

Mounted above and to one side of the shelves 36 is a wrapper chute 60 which consists of a bottom wall 61 and side walls 62. Slidably mounted upon the bottom wall is a jig strip 63 which is transversely serrated on its upper side as at 64 to support and engage the lower edges of the wrappers which are carried in substantially vertical position within the chute, the strip is provided with a lug 65 which projects through the bottom wall and connects with a rocker 66 secured to a transverse shaft 67 to which rocker movement is imparted in one direction by a spring 68 and in the opposite direction by a push rod 69 having a roller 70 at its lower end. To the sides of the chute a plurality of weighted pawls 71 are pivotally mounted which engage the lower edges of some of the wrappers to prevent them moving upwardly along the chute when the strip 63 is being carried on its return stroke by the spring 68.

Secured to one end of the shaft 67 is a crank 72 which operates a connecting rod 73, shown in dotted line in Figure 1, the rod in turn being connected to a crank 74 secured to a small shaft 75 upon which a serrated quadrant 76 is mounted. This quadrant lightly bears upon the top edges of the adjacent wrappers and urges them first in a forward direction until the upper edge of the foremost wrapper is clear of the pack and then urges the following few wrappers in a rearward direction. The object of this movement is that as with one type of wrapper in popular demand, the folded thickness is greater at its upper extremity than at its base the upper part of the pack tends to project unduly beyond the delivery end of the chute which makes it difficult to pick off one wrapper at a time from the pack, whereas if the upper extremity of the foremost wrapper is freed from the following by some similar mechanism to that herein described, the said foremost wrapper can be removed without disturbing the next adjoining one. The delivery end of the chute is provided with suitable stops, such as the disc wheel 77, which prevent the foremost wrapper from being removed except sidewise.

The pick up head generally indicated by the numeral 78 consists of a suitably mounted hollow shaft 79 in which an inner shaft 80 is slidably movable which is journaled as at 81 and 82. The shaft 79 is slotted at its upper extremity as at 83, see Figures 13 and 14, and the shaft 80 is provided with a key or T-head 84 which resides in the slot and is endwise movable therein. The shafts 79 and 80 are intermittently rotated 90 degrees of rotation followed by a short period of rest through a spider 85 journaled on the upper end of the hollow shaft 79, the spider having four spokes 86 which are driven from arms 87 which extend radially from the upper spider 10 of the wrapper applying head, see Figures 1 and 9. The radius of the arms 87 and the peripheral travel of their free ends is greater than that of the spokes 86, therefore, each arm 87 in swinging will contact a spoke 86 and swing it through an arc of 90 degrees and then break contact, leaving the spoke and its spider 85 at rest until said arm has turned through an arc of 90 degrees, when the following arm will be advanced into engagement with the following spoke 86 and another

cycle of 90 degree rotation and rest of the spider 85 will be commenced. The hub of the spider 85 is provided with a dog clutch 88 having four teeth 89 each having a vertical side 5 90 and an inclined side 91, the vertical sides of opposite teeth being adapted to bear against the key 84 to drive the hollow and inner shafts 79 and 80. Fitted on the under side of the hub of the spider 85 is a band brake 92 having a 10 projecting arm 93, which arm is fitted with a bolt 94 passing through a compression spring 95 which abuts a bracket 96 extending from the bearing 81, so that the spider in rotating must slip within the brake and exert compression 15 upon the spring 95.

Extending below the bearing 81 is a further arm 97 to which a further band brake 98 is connected. This band brake is applied to the hollow shaft 79 and is tensioned to a greater degree than the brake 92, so as to hold the shaft 79 against rotation when the key of the inner shaft is raised out of contact with the dog clutch of the spider 85 and said spider is being rotated.

Mounted in axial alignment below the shaft 80 is the dash pot 58 consisting of a cylinder 99 having a spring raised piston 100 which is fitted with a plunger 101 extending upwardly towards the inner shaft 80. Connected to the base of the cylinder 99 is the vacuum line 57, so that the failure of the spider 43 to deliver a bottle to one of the shelves 36 will result in the vacuum being broken in the line 57 and the cylinder 99 and the spring pressed piston 100 being raised, thus 30 raising the inner shaft 80 and disrupting the drive from the spider 85 to the hollow shaft 79. The shaft 79 is fitted with a pick up spider 102 having four arms 103, or as many as there are spokes to the spider 85. At the free end of each of the arms 103 a bell crank 104 is pivotally connected, each of which supports on its outer leg a bell cranked wrapper pick up 105 and has below its inner leg a roller 106, indicated by dotted line, which rides in a cam 107, 45 which is of such contour that the outer legs of the two bell cranks 104, which are in pick up and delivery position respectively, are substantially radial to the shaft 79. A rod 108 connects the inner leg of each bell cranked wrapper pick up 105 with an extension 109 of the inner leg of the following bell crank 104, so that the bell crank 104 of one arm 103 coacts with the bell cranked wrapper pick up of the preceding one to dispose said pick up parallel to the face 50 of the foremost wrapper in the chute 60 at the point of pick up and to simultaneously dispose the diametrically opposite one radial to the shaft 79 as shown in Figure 9. The bell cranked wrapper pick ups are provided with a tubular structure 110, fitted with vacuum cups 111, which is connected by a flexible tube 112 to a port in the boss of the spider 102. The boss of the spider is faced off on its under side and bears upon a port ring 113 carried upon the bearing 82, which ring has an arcuate port 114 65 connected with the vacuum tank 4 through a pipe 115.

The pick up head 78 when at its point of rest is as shown in Figure 9. Figure 11 shows the vacuum cups 111 approaching in a substantially 70 parallel motion to a wrapper to be picked up, as soon as the cups are in pick up position they are urged forward into forceful contact with the wrapper by the swinging of the various bell cranks due to the contour of the cam and the

corelated movement of the rods 108, the subsequent movement slightly withdraws the cups from the end of the chute 60 and withdraws the foremost wrapper sideways therefrom as shown in Figure 12.

At the lower end of the shaft 79 a four point cam 116 is fitted, which progressively urges the roller 70 and the rod 69 forwardly to impart movement to the serrated jig strip 63 and urge the wrappers towards the delivery end of the chute. 85

In operating the machine a supply of wrappers is placed in the chute 60 and a follower roll 117 placed behind them to urge them in a downwardly inclined direction. Bottles to be wrapped 90 are placed onto the conveyor 41, the machine is set in motion and the bottles are carried towards the spider 43 which takes them progressively from the conveyor and transfers them onto the shelves 36. As each bottle passes in contact with the curved arm 53 of the bell crank 52, said bottle retains the arm in normal position and holds the vacuum valve 56 open, so that the dash pot 58 remains exhausted and the drive 100 between the spider 85 and the shaft 79 of the pick up head 78 is operatively connected. The head will continue to rotate and the vacuum cups 111 on passing the end of the chute 60 will progressively remove a wrapper therefrom and swing it through an arc of 180 degrees holding 105 it momentarily in a stationary position above the last bottle delivered, onto the shelves 36. The spiders 10 and their associated parts are being continuously rotated and while the one wrapper is being held stationary by the pick up head 110 above the shelves, a wrapper holding arm 16, radially extended, approaches said wrapper from the rear and forces it off its vacuum cups 111. The vacuum pull is exerted at this time to the vacuum cups 26 of the arm 16 which is above 115 the shelf at position A, so that the wrapper is transferred from the pick up head to a position over a bottle. The rotating movement of these parts over a distance equal to the length of one shelf causes the arm 16 to be brought 120 parallel to the other holding arm 15, which is a movement as from A to A1 in Figure 8, and on reaching this position a vacuum pull is exerted upon the cups of the arm 15 so that both sides of the wrapper are gripped. When the bottle is carried on its shelf to the position B, the arm 16 will have been outwardly swung, thus opening the wrapper and simultaneously lowering it onto the bottle. On assuming the position C, the arms 15 and 16 will be approaching 130 their maximum lateral separation and the suction will be broken to the cups of the arm 16 and on assuming the position D the suction will be broken to the vacuum cups of the arm 15 also, leaving the final lowering of the wrapper 135 to be accomplished by the ram 17, the arms and moving parts of the wrapper depositing structure are returned to starting position as the slides 11 are raised by the incline of the cam rail 13, during which each bottle wrapped 140 is transferred to the conveyor 42 by its wiper arm 37.

Should any pocket 44 in the transfer spider 43 be unfilled from the conveyor 41, the curved leg 53 of the bell crank 52 will be urged towards the axis of said spider, the vacuum will be broken to the dash pot 58 and the shaft 80 will be raised, thus interrupting the drive between the spider 85 and the pick up head, therefore the head will remain stationary and will cease to transfer 145

any wrapper to the arm 16 which swings over or registers with the empty pocket. As soon as the shaft 80 and its key 84 is raised the brake 98 will stop the rotation of the shaft 79, but the spider 85 will continue to be rotated intermittently as its spokes are engaged by the arms 87. It has been previously stated that one arm 87 imparts a 90 degree rotation to the spider 85 and that the spider then remains at rest for a period during the approach of the following arm 87 to the following spoke of the spider. Immediately following the disengagement of the first arm from the spoke of the spider, said spider will be turned in a return direction to the extent of the limited expansion of the compression spring 95 on the brake band 92, so that the vertical side 90 of a dog tooth 89 of the clutch 88 will be backed off quite clear of the side of the key 84 of the inner shaft 80. This being so, when the key has been raised and the pick up head brought to rest on account of non-delivery of a bottle to its shelf 36, when next a bottle is so placed as to cause, through the disk pot 58, the shaft 80 to be dropped, the key will drop clear into the root of the teeth of the clutch, thus ensuring an instantaneous reinstatement of the drive to the pick up head and the delivery of a wrapper to the first bottle delivered to a shelf 36 following a break in such delivery.

What I claim as my invention is:

1. A bottle wrapping machine comprising a wrapper delivery, a wrapper pick up and a rotary head having a plurality of bottle supports and a bottle wrapping device to each support, means for feeding bottles to be wrapped onto the bottle supports, the pickup being adapted to progressively remove wrappers from the delivery as bottles are received on the bottle supports, and the bottle wrapping devices being adapted to progressively receive the wrappers from the pick up and apply them to the bottles.

2. A bottle wrapping machine comprising a wrapper delivery, a wrapper pick up, a rotary head having a plurality of bottle supports and a bottle wrapping device for each support, means for feeding a bottle to each support successively, the pick up being adapted to progressively remove wrappers from the delivery as bottles are placed upon the supports, and the bottle wrapping devices being adapted to receive the wrappers from the pick up and apply them to the bottles, and means for preventing delivery of a wrapper to a wrapping device except when the bottle support for said wrapping device is supplied with a bottle.

3. In a bottle wrapping machine having a rotary head equipped with a plurality of bottle supports and a wrapper applying device to each support, a rotary wrapper pick up head having arms, a wrapper delivery, said arms being provided with suction cups, one of said arms being adapted to grip a wrapper in the wrapper delivery and remove it therefrom, and another arm being adapted to simultaneously extend another wrapper to be received by a wrapper applying device.

4. In a bottle wrapping machine having a rotary head adapted for continuous rotation and equipped with a plurality of bottle supports and a wrapping device to each support, a rotary wrapper pick up head, vacuum cups on each wrapping device for receiving a wrapper from the pick up head, said pick up having arms provided with vacuum gripping means, means for rotating the pick up head, means for projecting

each of said arms progressively into forceful contact with a wrapper to pick it up and for simultaneously retracting another arm and its wrapper in position to be picked up by the vacuum cups of a wrapping device.

5. In a bottle wrapping machine having a rotary head adapted for continuous rotation and equipped with a plurality of bottle supports and a wrapping device to each support, a rotary wrapper pick up head, means on each wrapping device for receiving a wrapper from the pick up head, said pick up having arms provided with vacuum gripping means, means for rotating the pick up head, means for projecting each of said arms progressively into forceful contact with a wrapper to pick it up and for simultaneously retracting another arm and its wrapper in position to be picked up by a wrapping device, said means for rotating the pick up head being arranged to stop rotation momentarily following the initial contact of the vacuum gripping means.

6. In a bottle wrapping machine having a rotary head adapted for continuous rotation and equipped with a plurality of bottle supports and a wrapping device to each support, a rotary wrapper pick up head, means on each wrapping device for receiving a wrapper from the pick up head, said pick up having arms provided with vacuum gripping means, means for rotating the pick up head, means for projecting each of said arms progressively into forceful contact with a wrapper to pick it up and for retracting and subsequently disposing said wrapper in a stationary position to be picked up by a wrapping device.

7. In a bottle wrapping machine having a rotary head equipped with a bottle support, means for delivering bottles progressively onto the support, means for receiving a wrapper and depositing it onto each of said bottles, said receiving means comprising a vertically reciprocable slide, a pair of pivotally mounted arms carried by the slide and movable lengthwise of the bottle, vacuum cups on said arms for gripping the wrapper, one of said arms being adapted to swing radially outwardly to pick up a wrapper thence circumferentially to bring it into contact with the other arm, and subsequently to separate from said second mentioned arm whereby the wrapper is opened during the downward stroke of the slide to deposit said wrapper upon a bottle.

8. In a bottle wrapping machine having a rotary head equipped with a bottle support, means for delivering bottles progressively onto the support, means for receiving a wrapper and depositing it onto each of said bottles, said receiving means comprising a vertically reciprocable slide, a pair of pivotally mounted arms carried by the slide and movable lengthwise of the bottle, vacuum cups on said arms for gripping the wrapper, one of said arms being adapted to swing radially outwardly to pick up a wrapper thence circumferentially to bring it into contact with the other arm, and subsequently to separate from said second mentioned arm whereby the wrapper is opened during the downward stroke of the slide to deposit said wrapper upon a bottle, and means for sustaining a suction to the vacuum cups from the time of receiving a wrapper until it is deposited upon the bottle.

9. In a bottle wrapping machine, a rotatable member having a plurality of bottle supports, a vertically reciprocable slide to each support, a head carried by said slide, a fixed and a swinging

wrapper holding arm mounted on said head, said swing arm being adapted to swing radially and tangentially to the vertical axis of the member and to pick up a wrapper and bring it into contact with the fixed arm and to subsequently swing away from the fixed arm to open said wrapper, and means for moving the arm downwards to deposit the wrapper when opened onto a bottle upon the support.

10 10. In a bottle wrapping machine as claimed in claim 9 wherein the radial movement of the swinging arm is effected at the end of the up stroke of the slide and the swinging of said arm towards and away from the fixed arm, when said
15 swinging arm is carrying a wrapper is effected on the down stroke of the slide.

11. In a bottle wrapping machine, a bottle support, a plurality of bottle wrapping devices above the support, a bottle conveyor and a rotating spider mounted upon a shaft for transferring bottles from the conveyor to the bottle

support, and a clutch interposed between the shaft and the spider whereby abnormal resistance to the rotation of the spider will disconnect the drive between said spider and its shaft and stop the rotation of said spider, said clutch
80 comprising a member upon the spider having radial slots each provided with one inclined side wall, a spring pressed member secured to the shaft and normally in engagement with the inclined side wall of the slot.

12. A bottle wrapping machine comprising a wrapper delivery, a wrapper pick up, a head having a plurality of bottle supports radially disposed about the head and a wrapping device adapted for reciprocable movement above each
90 of the bottle supports, said head being adapted for continuous rotation, and means for progressively placing bottles on each of said supports in position to receive wrappers as the head is rotated.

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