Nov. 27, 1956 W. D. DUBIN ET AL 2,772,005

CANNERY COVER LOADING DEVICE AND METHOD OF USING SAME

Filed Dec. 6, 1954 3 Sheets-Sheet 1

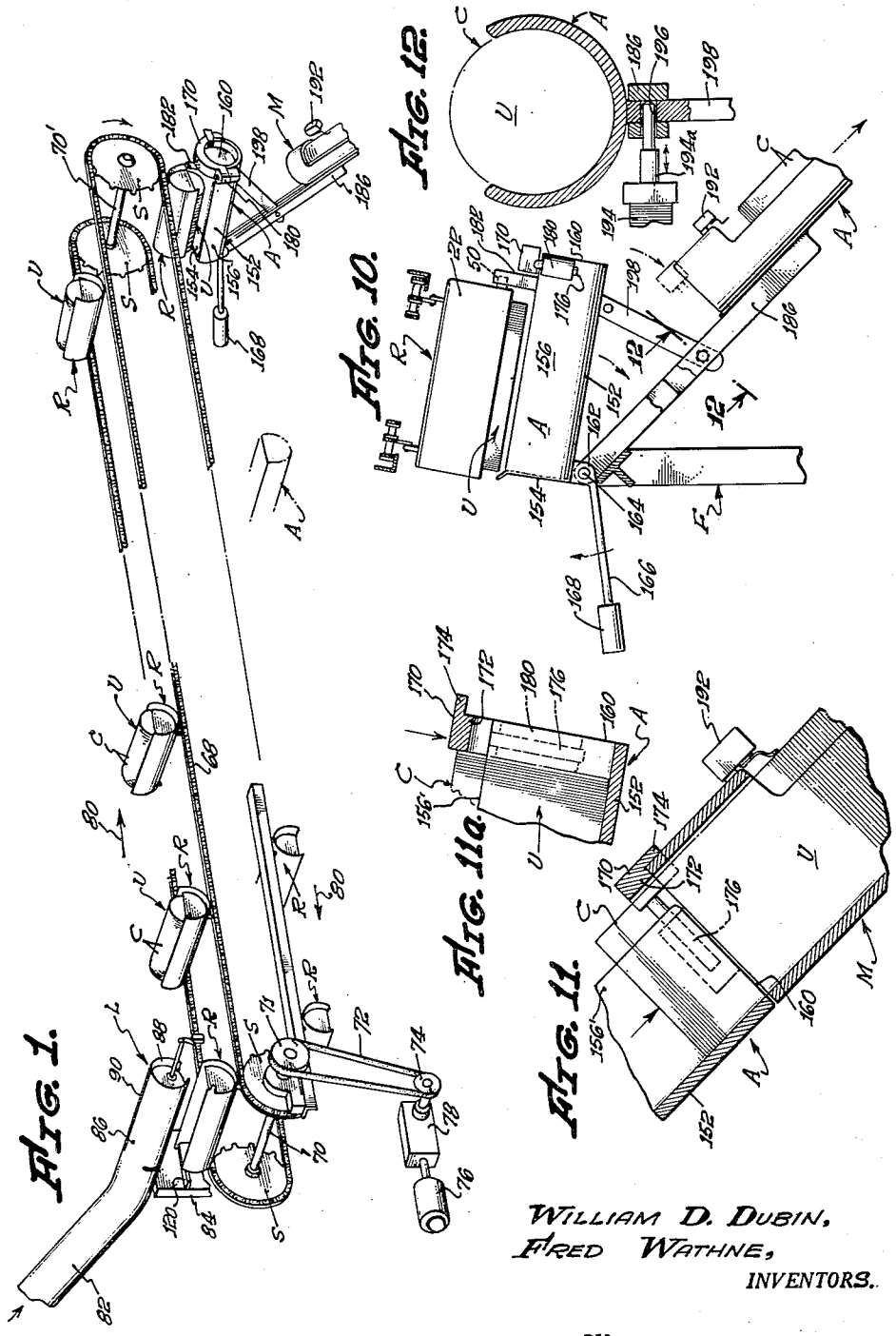

FIG. 1.

FIG. 10.

FIG. 12.

FIG. 11a.

FIG. 11.

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FIG. 2.

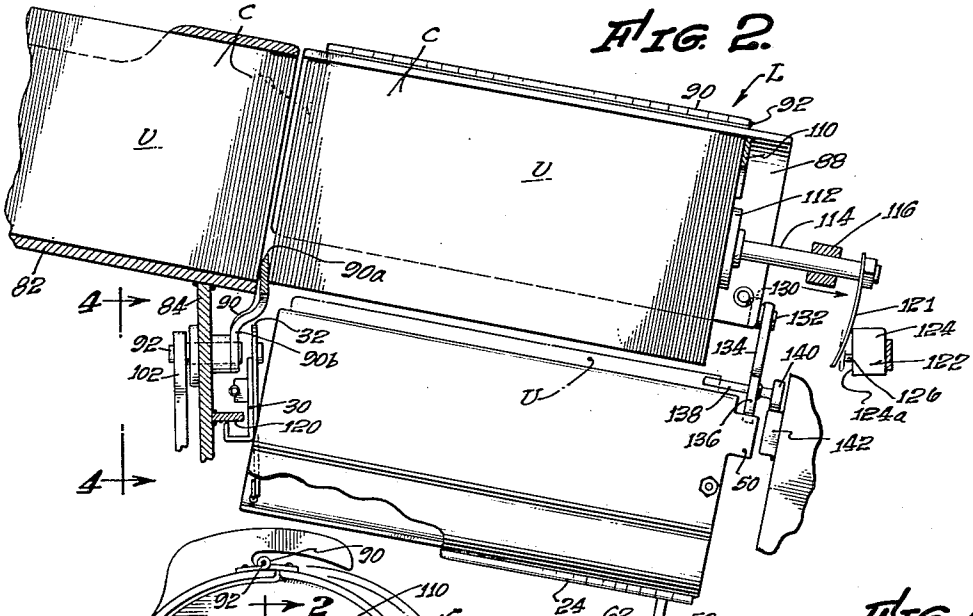

FIG. 3.

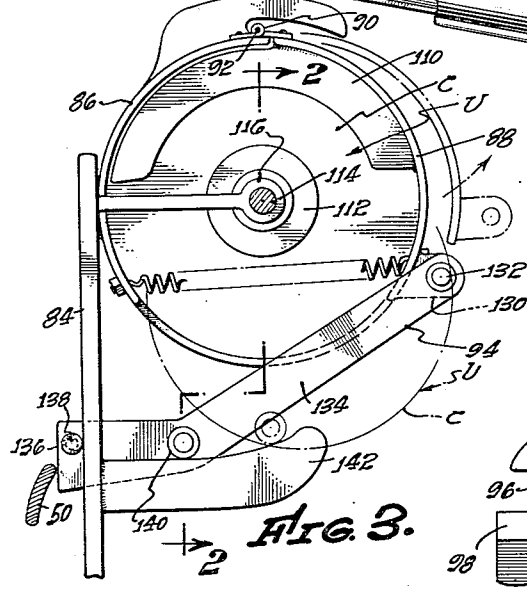

FIG. 4.

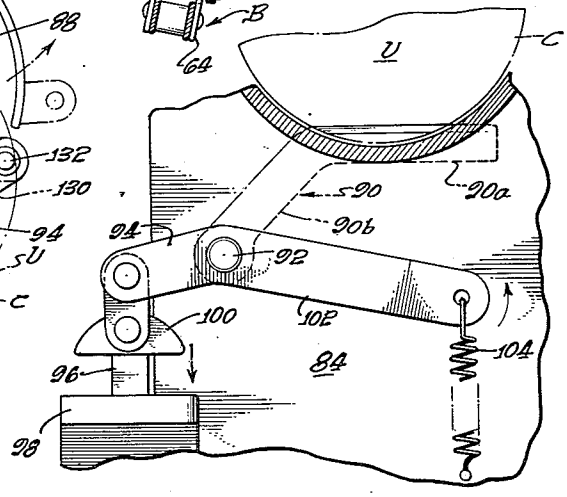

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FIG. 5.

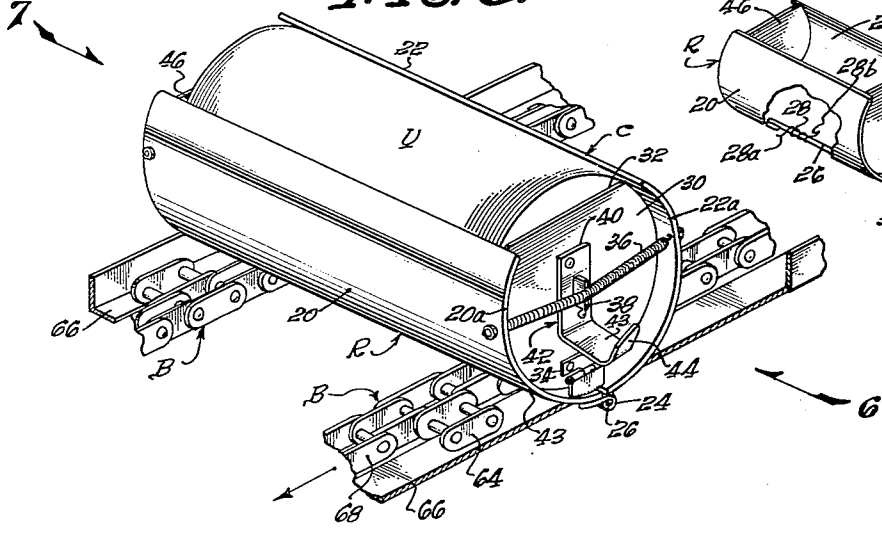


FIG. 9.

FIG. 6.

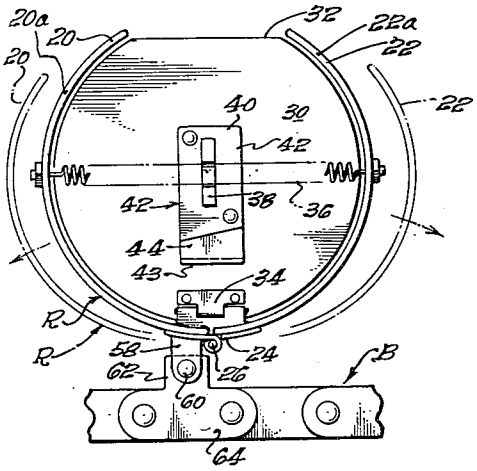


FIG. 7.

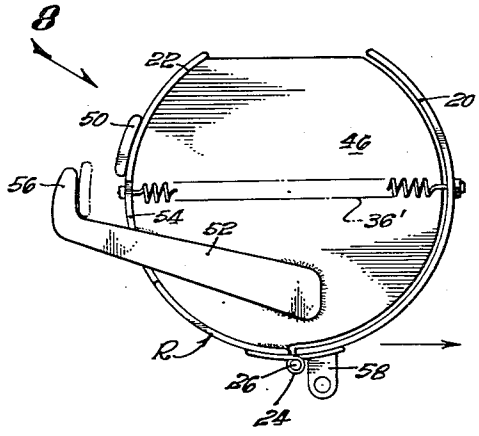
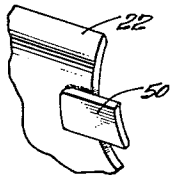


FIG. 8.



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CANNERY COVER LOADING DEVICE AND METHOD OF USING SAME

William D. Dubin and Fred Wathne, Long Beach, Calif.

Application December 6, 1954, Serial No. 473,116

16 Claims. (Cl. 214—16)

The present invention relates to the field of canning equipment, and more particularly to a device that automatically maintains the magazines of a battery of cover applying machines with an adequate supply of covers which are applied as required to cans passing through the applying machines.

The arrangement of cover applying machines in batteries in canneries and other food processing plants, as well as other plants in which both edible and non-edible products are placed in cans, is by no means new. However, in the past, it has been common practice to arrange cover applying machines in such a configuration, with covers being manually supplied thereto as required. In numerous instances, due to human error, as well as carelessness on the part of employees, the magazines of the cover applying machines have not always been adequtely supplied with covers, resulting in production delays and needless operating expense.

A distinct disadvantage in maintaining an adequate supply of covers in the magazines by means of manual labor resides in the fact that it is economically unsound, for the same operation may be carried out mechanically with certainty at but a fraction of the cost of the hand operation.

A major object of the present invention is to provide a mechanical device that automatically fills the magazines of a battery of cover applying machines with covers, which requires a minimum of attention from the plant operating personnel.

Another object of the invention is to supply covers to magazines of applying machines in such a manner that the possibility of one or more of the machines being shut down for lack of adequate cover supply is virtually eliminated.

A further object of the invention is to provide a device that accomplishes its intended function with certainty, at a relatively low operating cost, and requires a minimum of maintenance attention.

A still further object of the invention is to provide a cover supplying device by means of which predetermined relatively large quantities of covers may be delivered to cover magazines in sequence, yet with the conveyor belt forming a part of the invention operating at a relatively low rate of speed.

Still another object of the invention is to supply a cover conveying device that requires a minimum of floor space for installation, is quite versatile relative to installation conditions and floor plan, in that it may be easily and simply adapted to the existing spacing arrangement of cover applying machines already installed.

These and other objects of the invention will become apparent from the following description of a preferred form in which:

Figure 1 is a perspective view of the invention showing the manner in which each of a number of cartridges are filled with covers for delivery to the magazines as required;

Figure 2 is a vertical cross-sectional view of one of

one of the cartridges shown receiving a charge of covers;

Figure 3 is an end elevational view of the device that deposits a predetermined charge of covers into the cartridge;

Figure 4 is an end view of one of the cartridges shown in position to receive a charge of covers, taken on line 4—4 of Figure 2;

Figure 5 is a perspective view of one of the cartridges shown transporting a charge of covers;

Figure 6 is an end view of the cartridge shown in Figure 5 as seen from the direction of the arrow 6 shown therein;

Figure 7 is an end view of the cartridge shown in Figure 5 as seen from the direction of the arrow 7 shown therein;

Figure 8 is a fragmentary perspective view of the tripping log shown on the cartridge in Figure 7;

Figure 9 is a perspective view of one of the cartridges with a portion thereof broken away to show the spring means utilized in maintaining the cartridge in a cover-holding position;

Figure 10 is a side elevational view of a pivotally mounted and counter-weighted cradle that transfers a charge of covers from a cartridge to a magazine;

Figure 11 is a fragmentary vertical cross-sectional view of a cradle and magazine showing the end portions thereof adjacently situated to permit slidable transfer of the covers from the cradle to the magazine;

Figure 11*a* is a fragmentary vertical cross-sectional view of the outwardly disposed end portion of the cradle; and,

Figure 12 is a vertical cross-sectional view of the device shown in Figure 10 taken on line 12—12 thereof.

Referring now to Figures 1, 5 and 10 for the general arrangement of the invention, it will be seen that a constant supply of lids or covers C is maintained and delivered as required to a cylindrical loader L from which they are discharged as unit charges U of a predetermined number into cartridges R. A number of cartridges R are provided that are transversely disposed and longitudinally spaced on two laterally separated endless chain belts B which are rotatably mounted on sprockets S.

A number of pivotally mounted cradles A are positioned below belts B. Each cradle is adapted to receive a charge U of covers from one of the cartridges R and deliver same to an angularly disposed magazine M wherein the covers are stored prior to use in a particular one of a battery of cover applying machines (not shown).

In detail, each of the cartridges as may best be seen in Figures 5 and 9, includes two longitudinal segments 20 and 22 of a cylindrical shell of sufficient circumferential length to prevent the displacement of a unit charge U of covers when disposed within the confines thereof. Segments 20 and 22 are provided with a plurality of aligned eyes 24 in the adjacent edges thereof, which eyes are engaged by a rod 26 on which the segments may pivot relative to one another. A helical spring 28 (Figure 9) encircles rod 26, with the outwardly extending portions 28*a* and 28*b* of the spring tending at all times to pivot the segments inwardly towards one another.

A first circular plate 30 from which a segment is removed therefrom to define a horizontal edge 32, is transversely disposed within the confines of segments 20 and 22, inwardly from end edges 20*a* and 22*a* thereof. A hinge 34 pivotally connects the lower central portion of plate 30 to the interior lower surface of either one of segments 20 and 22. A tensioned helical spring 36 transversely extends between segments 20 and 22. The central portion of spring 36 is situated in an opening formed in a rigid member 38 that projects outwardly from a vertical first leg 40 of an L-shaped member 42. Member

42 also includes a horizontal outwardly extending second leg 43 on the upper extremity of where an upwardly disposed cam 44 is formed.

A second plate 46, identical in shape to plate 30, is transversely positioned between segments 20 and 22, and affixed to the interior surface of segment 20. A tensioned helical spring 36' that is horizontally disposed when cartridge R is in the position shown in Figure 5, extends between segments 20 and 22, adjacent to the plate 46. In Figures 7 and 8 it will be seen that a tripping lug 50 projects outwardly from cartridge segment 20. An elongate arm 52 extends upwardly and outwardly from plate 46, and through an opening 54 formed in segment 20 to terminate in a vertical stop 56.

The cartridge segments 20 and 22 are provided with centrally situated ears 58 depending downwardly therefrom, which ears are connected by pins 60 to the outer side walls 62 of a chain link 64. The chain links 64 are laterally offset from the balance of the chain links forming the belts B. In addition, links 64 are slidably mounted on the upper surfaces of two rigid elongate parallel members 66, and serve to hold the upper run 68 of belt B in a fixed horizontal plane. Sprockets S are parallel shafts 70 and 70' that are rotatably supported by conventional bearings. A rotatably driven member 71 is mounted on one end of shaft 70, which member engages an endless belt 72 that in turn engages a rotatable driving member 74. A motor 76, or other prime mover, drives a gear box 78 which in turn imparts rotary motion to driving member 74.

In Figure 1 the direction of movement of belts B is indicated by the arrow 80, and it will be seen that the cartridges R pass in succession under loader L to receive a cover charge U. For reasons that will be explained in detail hereinafter, only those cartridges R that are empty actuate the loader to discharge a cover unit U.

Loader L, as may best be seen in Figures 2, 3 and 4, includes a downwardly sloping chute 82 in which a succession of covers C are disposed side-by-side relationship. Chute 82 is rigidly supported in the desired position on the upper portion of a vertically positioned plate 84. Two elongate cylindrical segments 86 and 88 are provided having eyes 90 formed in the adjacent edge portions thereof through which a rod 92 extends to pivotally support segment 88 relative to segment 86, which segments are in alignment with chute 82. When in the closed position shown in Figure 3, segments 86 and 88 are capable of receiving and removably holding a charge U of covers C. Movement of covers C into loader L is controlled by blade 90 of angular configuration that has an offset first portion 90*a* (Figure 2) which may be disposed to contact the lower exterior surface of the outermost cover C in chute 82. A second portion 90*b* of the blade is rigidly affixed to a shaft 92 and is supported in a bore formed in plate 84.

A first arm 94 extends outwardly from shaft 92, which arm is pivotally connected to a plunger 96 that is slidably movable in a solenoid 98. Plunger 96 is provided with a stop 100 that limits the maximum inward movement thereof. A second arm 102 extends outwardly from shaft 92, and a tensioned spring 104 is connected on the outer end of arm 102 which at all times tends to rotate shaft 92 in a clockwise direction and move blade portion 90*a* downwardly to permit covers to slide into loader L.

Blade 90 is actuated to assume the position shown in Figure 4 in which position it blocks movement of covers C to loader L, only after the loader has dumped a charge of covers into one of the cartridges R. A semi-circular lug 110 rigidly affixed to the loader interior (Figure 2) determines the number of covers C constituting each unit U charge thereof. Detecting whether the loader L contains a charge U is accomplished by means of a pressure plate 112, transversely disposed in the loader and supported on the inner extremity of a rod 114 projecting into the lower end of the loader, which rod is slidably supported in a collar 116. A stiff resilient spring 121 extends downwardly over an electrical switch 122 which is enclosed in a small, substantially square housing 124 the face 124*a* of which is in vertical alignment with the outer face of spring 120. Switch 122 is normally open, but is closed when a button 126 projecting from face 124*a* is moved outwardly away from the covers C in loader L. Switch 122 forms a part of the solenoid energizing electrical circuit (not shown).

When the loader L fills with a charge U of covers C, the covers slide outwardly therein until they encounter the semi-circular stop, and in so doing, move the rod 114 outwardly. Outward movement of rod 114 causes the spring affixed thereto to first push button 128 outwardly and complete an electrical circuit (not shown) to the solenoid, that moves first blade portion 90*a* to the position shown in Figure 2 to block further movement of covers C from the chute to the loader. Due to the weight of the covers C in loader L, sufficient additional force is applied to the resilient spring to cause the lower portion thereof to cause the lower portion thereof to pivot inwardly on the upper edge of face 124*a* of the switch (Figure 2). This pivotal movement of the spring relieves all pressure on the switch button 126 whereby the electrical circuit to the solenoid is broken. However, blade portion 90*a* is then frictionally held between the covers in the chute and loader L, and is so maintained until the covers are dumped from the loader whereupon the spring affixed to arm 102 moves blade 90 downwardly to permit entry of another cover charge U into the loader from the chute. Movement of the covers C from the chute into the loader causes repetition of the above described operation.

In Figure 2 it will be noted that a horizontally disposed trip lug 120 projects from the chute-supporting plate 84. When a cartridge R moves into position under the loader to receive a charge U of covers, the cam 44 slidably engages the lug 120 and pivots plate 30 in a counter clockwise direction to enlarge the space within the cartridge into which the charge may drop. After such deposition of covers, and the cartridge moves away from the loader, the cam 44 is disengaged from the lug 120 whereby spring 36 causes plate 30 to return to the position shown in Figure 5 where it tightly engages the covers.

When the segment 88 is moved outward sufficiently relative to segment 86 the charge U will fall downwardly from the loader. Automatic charging of each empty cartridge R during its passage under loader L is accomplished by providing an eye 130 on segment 88 in which pin 132 is disposed that pivotally supports a dumping bar 134 of angular shape. Bar 134 has a vertical rear edge 136 that is contacted by the lug 50 shown in Figure 8, when the cartridge passing under the loader is empty. When a loaded cartridge R passes under the loader, the lug 50 does not contact edge 136, for a pin 138 mounted on the bar adjacent edge 136 is contacted by the upper surface of the covers C in the cartridge whereby the bar is raised sufficiently to prevent activation of the dumping bar.

However, when an empty cartridge R passes under loader L, the lug 50 contacts edge 136 and the bar 134 is advanced in the same direction as that of belts B. Bar 134 is provided with a roller 140 that travels along the slightly curved upper edge of a track 142. This travel of roller 140 gradually elevates edge 136, with this elevation of the edge finally resulting in disengagement of bar 134 from its contact with lug 50, but only after the bar has been moved sufficiently to open segment 88 relative to segment 86 whereby the covers disposed therebetween drop into an empty cartridge R.

From the above description it will be seen that a constantly moving sequence of cartridges R filled with charges U of covers C are provided with each charge being available for discharge into one of the magazines

M when required. Discharge of covers C from one of the cartridges R into one of the magazines M is effected when the cartridges are disposed on the under side of the belts B. A frame F is provided that pivotally supports a number of the transversely disposed cradles A under the belts B, and in vertical alignment with the magazines M.

Each of the cradles A comprises a flat rectangular bottom **152**, an end wall **154**, and two side walls **156** and **156'**. The end edges of bottom **152**, and side walls **156** and **156'** cooperatively define an open end **160** through which covers C may slide from a cradle A when it is angularly disposed, into the particular magazine M associated therewith, as may best be seen in Figure 10.

Each of the cradles A is provided with a bearing **162** that pivotally engages a rod **164** rigidly mounted on the frame F. A rigid member **166** extends outwardly from the cradle, and has a counterweight **168** mounted on the end thereof. The length of member **166** and the magnitude of the counter weight **168** are so selected that the cradle will, when not restrained from so doing, pivot to the position shown in Figure 10.

Covers C disposed in cradle A are prevented from falling from the open end **160** thereof by a semicircular ring **170**, the inner circumference **172** of which is of such size that covers C may pass therethrough. The ring **170** has a lip **174** extending outwardly therefrom, and has elongate straight extensions **176** on the ends thereof that slidably engage straight bore-defining means **180** mounted on the cradle. Due to its slidable support on the cradle, and the weight of the ring **170**, this ring normally assumes the low position shown in Figure 11*a* where it blocks movement of the covers C from the open end **160** of the cradle. A rigid member **182** extends upwardly from one of the cradle side walls, which member is adapted to engage lug **50** to cause a cartridge R to open and dump a unit U of the covers into the cartridge when in a cover-receiving position.

After a unit U of covers is dumped into a cradle by a cartridge, the weight of the covers causes the cradle to immediately pivot downwardly until it encounters an angularly disposed rigid member **186**, at which point member **186** is in alignment with magazine M. The lip **174** of the ring **170** encounters a portion **190** of magazine M as the cradle moves into alignment with the magazine, and as a result, the ring **170** is moved upwardly relative to the cradle to the extent that the inner circumferential ring portion **172** permits covers to move into the magazine.

Each of the magazines M has an electrical switch **192** that is sensitive to the quantity of covers C in the magazine. A solenoid **194** is provided, mounted on the member **186** in such a position that a plunger **194***a* horizontally movable by activation of the solenoid may be caused to engage an opening **196** formed in a rigid member **198** depending downwardly from the outer end of the cradle as shown in Figures 10 and 12.

After pivoting downwardly to deliver covers C to a magazine cradle A is prevented from immediately returning to the position shown in Figure 10, due to the fact that the plunger has assumed the locking position shown in Figure 12 upon completion of an electrical circuit to solenoid **194**. When further covers C are needed for a magazine M, the solenoid-operated pin is withdrawn from its locking position, and the cradle pivots to again receive a charge U of covers.

The invention above described is simple to use after installation. The operator simply maintains an adequate supply of covers C in the chute **82** and the cartridges R thereafter are automatically filled at the loader L as required, with the magazines M likewise receiving a charge U of covers as needed to at all times maintain an adequate suply of covers therein.

Although this apparatus and method of supplying a plurality of magazines with a quantity of covers from a central location has been found to provide the advantages and fulfill the objects outlined hereinabove, it is to be understood that the invention as above described is merely the presently preferred embodiment thereof, and there is no intention to limit same to the details of construction herein shown and described, other than as defined in the appended claims.

The invention claimed is:

1. A device for use in automatically distributing covers from a particular location to a plurality of open-mouthed magazines associated with individual cover applying machines, including: driven belt means located adjacent to and above said magazines; means that continuously supply said covers; loading means adapted to receive said covers, which loading means is positioned above said belt means; means for limiting the quantity of said covers to a predetermined charge thereof; actuating means for said loading means to cause discharge thereby of said cover charge; a plurality of cartridges mounted in spaced relationship on said belt means, each of which cartridges is adapted to removably hold said cover charge; movably mounted loading means adapted to receive one of said charges when in a first position and to transfer same into one of said magazines; means associated with each of said magazines, which means is sensitive to the quantity of said covers contained in said magazines; means that maintain each of said movably mounted means in said second position until said quantity sensitive means signals that a particular one of said magazines requires another one of said charges; means that return said movably mounted means to said first position after said maintaining means receives said signal; means that cause a cartridge to receive one of said charges as it passes under said loading means; means mounted on said cartridges that causes one of said cartridges when empty to actuate said loading means when said empty cartridge passes thereunder; and means for blocking movement of said covers from said supply means to said loading means during the time one of said charges is being transferred from said loading means to one of said cartridges.

2. A device as defined in claim 1 in which said driven belt means are two laterally spaced, parallel, endless chain belts, the upper horizontal portions of which slidably rest on rigid supports and maintain said cartridges in a fixed plane at least during the loading operation, with said belts being rotatably supported by power-driven sprockets.

3. A device as defined in claim 2 in which said supply means is an elongate chute that slopes downwardly toward said loading means at a sufficient angle that said covers will gravitatingly slide thereon when disposed in said chute.

4. A device as defined in claim 3 in which said loading means is formed from first and second semi-cylindrical shells that are transversely disposed above said belt, which shells communicate with the lower end of said chute and receive said covers therefrom, said first shell being stationary with the longitudinal edges thereof in a vertical plane, said second shell being parallel to said first shell to define a cylindrical space in which a plurality of said covers may be placed, with the upper adjoining edge portion of said second shell being pivotally connected to that of said first shell to permit covers contained in said space to drop therefrom when said second shell is pivoted outwardly from said first shell.

5. A device as defined in claim 4 in which said quantity limiting means is a solenoid actuated member capable of moving to a position to obstruct movement of covers from said chute to said loading means.

6. A device as defined in claim 5 in which said solenoid is actuated by a normally open electrical circuit comprising a switch that is momentarily closed when said loading means has received said cover charge, with

said momentarily closed circuit causing said solenoid actuated member to move into a position to obstruct movement of covers from said chute into said space defined by said shells, which member is held in said obstructing position due to pressure exerted thereon by said covers in said chute until after discharge of said covers from said shells.

7. A device as defined in claim 6 in which said cartridges are pairs of curved members transversely and pivotally supported from said belts, which members are so supported as to depend downwardly when in the lowermost position on said belts, with said pairs of members being capable of removably supporting said charges within the confines thereof.

8. A device as defined in claim 7 in which each pair of said curved members is provided with spring means that maintains said members in a position to grip and removably hold said covers disposed within the confines thereof.

9. A device as defined in claim 8 in which each of said pairs of curved members has vertically positioned plates disposed within the confines of the end portions thereof, which plates are so held by tensioned spring means that at all times urge said curved members into contact with portions of the edges of said plates, each of said pairs of curved members, plates and spring means cooperatively defining a space in which said cover charge may be transported, with said space being capable of enlargement by outward pivotal movement of said curved members relative to one another to permit disposition of covers therebetween or discharge therefrom.

10. A device as defined in claim 9 in which said movably mounted means is one of a plurality of elongate cradles transversely disposed beneath said belts in a position to receive a charge of said covers from one of said cartridges, each of which movably mounted means is pivotally supported and so weighted as to be horizontally disposed in a charge-receiving position when empty, but with the weight of said cover charge contained in said cradle being sufficient to unbalance said weighted cradle to cause downward movement thereof at such an angle that said covers disposed therein will slide into the one of said magazines associated therewith.

11. A device as defined in claim 10 in which each of said cradles is provided with a movable stop in the end portion thereof through which said covers are discharged into one of said magazines, which stop when said cradle is in a horizontal position prevents discharge of said covers from said cradle, but which stop is concurrently moved into a position to permit transfer of said covers from said magazines as said cradle assumes a communicating position with one of said magazines.

12. A device as defined in claim 11 in which each of said cradles is held in an angular position by means of a solenoid operated lock.

13. A device as defined in claim 12 in which each of said cover sensitive means is an electrical switch that is responsive to the quantity of said covers contained in that magazine with which it is associated, which switch is a component of an electrical circuit of which said solenoid operated lock forms a part, said circuit being closed by said switch when said magazine requires additional covers to cause movement of said lock to a position where said weighted cradle pivots upwardly into a charge receiving position under said belt.

14. A device as defined in claim 13 in which each of said cartridges is provided with an engageable member that is adapted to move said cartridge when sufficient force is exerted thereon against the tension of said springs to cause separation of said curved members to the extent that a cover charge is deposited in or removed from said cartridge, with each of said cradles being provided with a rigid engaging member that is at all times stationary relative to longitudinal belt movement, and each of said cradles when horizontally disposed having said engaging member so positioned as to contact said engageable member to cause said charge therein to drop into said cradle.

15. A device as defined in claim 14 in which said second semi-cylindrical shell of said loading means has a tripping lever pivotally supported therefrom, which when forcibly moved, causes said second shell to move relative to said first shell to permit said cover charge held by said first and second shells to drop downwardly therefrom, which tripping lever has means associated therewith that slidably contact the upper surfaces of said cover charges contained in said cartridges as they pass under said shells to pivot said tripping lever into a position out of contact with said engageable members on said cartridges.

16. A method of distributing can covers from a particular location to a plurality of open-mouthed magazines in accordance with the requirements of machines associated with said magazines, comprising: continuously supplying covers to a particular location; intermittently moving a predetermined quantity of said covers from said location to a first location; continuously moving a plurality of separated cover-transporting means under said first location and through a path that is adjacent to each of said magazines, each of said means being capable of transporting one of said predetermined quantities; maintaining transverse, horizontal, angularly movable confined spaces under said path in positions that each of said confined spaces can receive one of said predetermined quantities from one of said transporting means; pivoting each of said angularly movable confined spaces after it receives one of said predetermined quantities to an angular position where said predetermined quantity of covers is discharged into one of said magazines; filling each of said cover-transporting means that has delivered said covers to one of said confined spaces with one of said predetermined quantities of said covers as it passes under said first location; and returning each of said confined spaces to said horizontally disposed position to receive another predetermined quantity of said covers after the quantity of said covers in one of said magazines falls below a predetermined minimum value.

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