surface than when operating on the defrost cycle.

In the cooling unit, the freezing shelves 17 and 19 are operated at temperatures below 32 degrees Fahrenheit whereby quick freezing is always provided. This operation is possible because of the spaced semi-insulated mounting of the freezing shelves 17 and 19 within the enclosure 9 whereby the direct conduction of heat therebetween is avoided. The outer surfaces of the casing 9 are thereby maintained at such temperatures that the air circulating in the refrigerator cabinet is cooled without frost collecting on said surfaces at least part of the time.

In this arrangement the side walls of the enclosure 9 are cooled by the refrigerant evaporating conduit 25 through the convention air currents circulating in the enclosure, rather than by the conductive transmission of heat therebetween. The cold chamber 13 spaced and semi-insulated from the outer enclosure and directly associated with the refrigerant evaporating conduit 25 encloses a space which is protected from the warm air convection currents of the refrigerator cabinet and which is thereby cooled to a low temperature to provide for quick freezing of meats, desserts and the like.

Aside from the specific embodiment of the invention herein shown and described, it will be understood that numerous details of the construction may be altered or omitted, without departing from the spirit and scope of the invention as described and claimed, and that I do not desire to limit the invention to the exact construction herein set forth.

I claim:

1. A non-frosting two-temperature cooling unit comprising an outer metallic enclosure, a plurality of freezing plate shelves, insulating means for mounting said freezing plate shelves in said enclosure in spaced relation to each other and to the side walls of the enclosure, a smaller cold compartment chamber of which one of said freezing shelves comprises a wall, insulating means for supporting said chamber in said enclosure in spaced relation thereto, and a refrigerant evaporating conduit disposed in said cold chamber and extending in thermally engaging relation with each of the freezing shelves in said outer enclosure.

2. A non-frosting two-temperature cooling unit comprising an outer metallic enclosure, a plurality of freezing plate shelves, insulating means for mounting said freezing plates in said enclosure in spaced relation to each other and to the side walls of said enclosure, a storage compartment thermally associated with one of said freezing shelves, insulating means for supporting said compartment in spaced relation within said enclosure, and a refrigerant evaporating conduit secured to said freezing shelves.

3. A non-frosting two-temperature refrigerator, comprising a heat insulating cabinet, a cooling unit therein comprising an outer enclosure, a plurality of freezing plate shelves mounted in said enclosure in spaced semi-insulated relation to the side walls thereof, a cold compartment chamber mounted within said enclosure in spaced semi-insulated relation to the side walls, a refrigerant evaporating conduit disposed in said cold chamber and extending in thermally coupled relation adjacent said freezing shelves in said outer enclosure, a refrigerant compressor for drawing refrigerant vapor from said conduit and returning liquid refrigerant thereto, thermostatic control means comprising a temperature responsive element mounted on the outer surface of said outer enclosure for controlling the operation of said compressor.

4. A non-frosting two-temperature refrigerator comprising a heat insulating cabinet, a cooling unit therein comprising an outer enclosure, a plurality of freezing plate shelves mounted in said enclosure in spaced semi-insulated relation to the side walls thereof, a cold compartment chamber mounted within said enclosure in spaced semi-insulated relation to the side walls, a refrigerant evaporating conduit disposed in said cold chamber and extending in thermally coupled relation adjacent said freezing shelves in said outer enclosure, a refrigerant compressor for drawing refrigerant vapor from said conduit and returning liquid refrigerant thereto, thermostatic control means comprising a temperature responsive element mounted on the outer surfaces of said outer enclosure for controlling the operation of said compressor to vaporize sufficient refrigerant in said conduit for cooling said shelves below the freezing temperature of water.

5. A cooling unit for freezing substances and for cooling circulating air within a refrigerator cabinet comprising an outer enclosure member, shelf means disposed within said enclosure member, insulating members for mounting said shelf means in spaced relation to the side walls of said outer enclosure member, a cold compartment chamber, insulating members for supporting said chamber in said outer enclosure in spaced relation thereto, and refrigerant evaporating means entirely spaced from the side walls of said outer enclosure member and thermally associated with said cold chamber and with said shelf means for maintaining freezing temperatures within said outer enclosure member.

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Nov. 17, 1942. J. F. PRICE 2,302,053

CONTAINER COATING MACHINE

Filed July 26, 1939 4 Sheets-Sheet 1

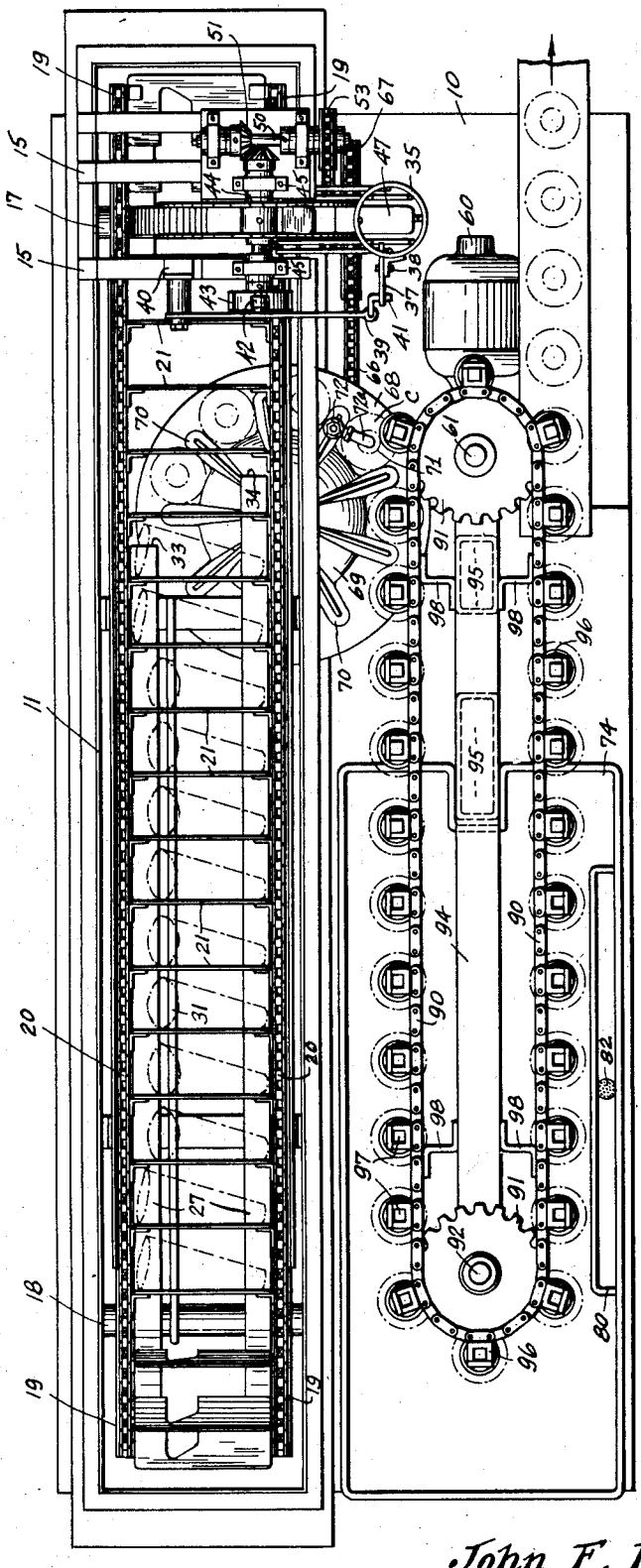


Fig. 1.

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CONTAINER COATING MACHINE

Filed July 26, 1939 4 Sheets-Sheet 2

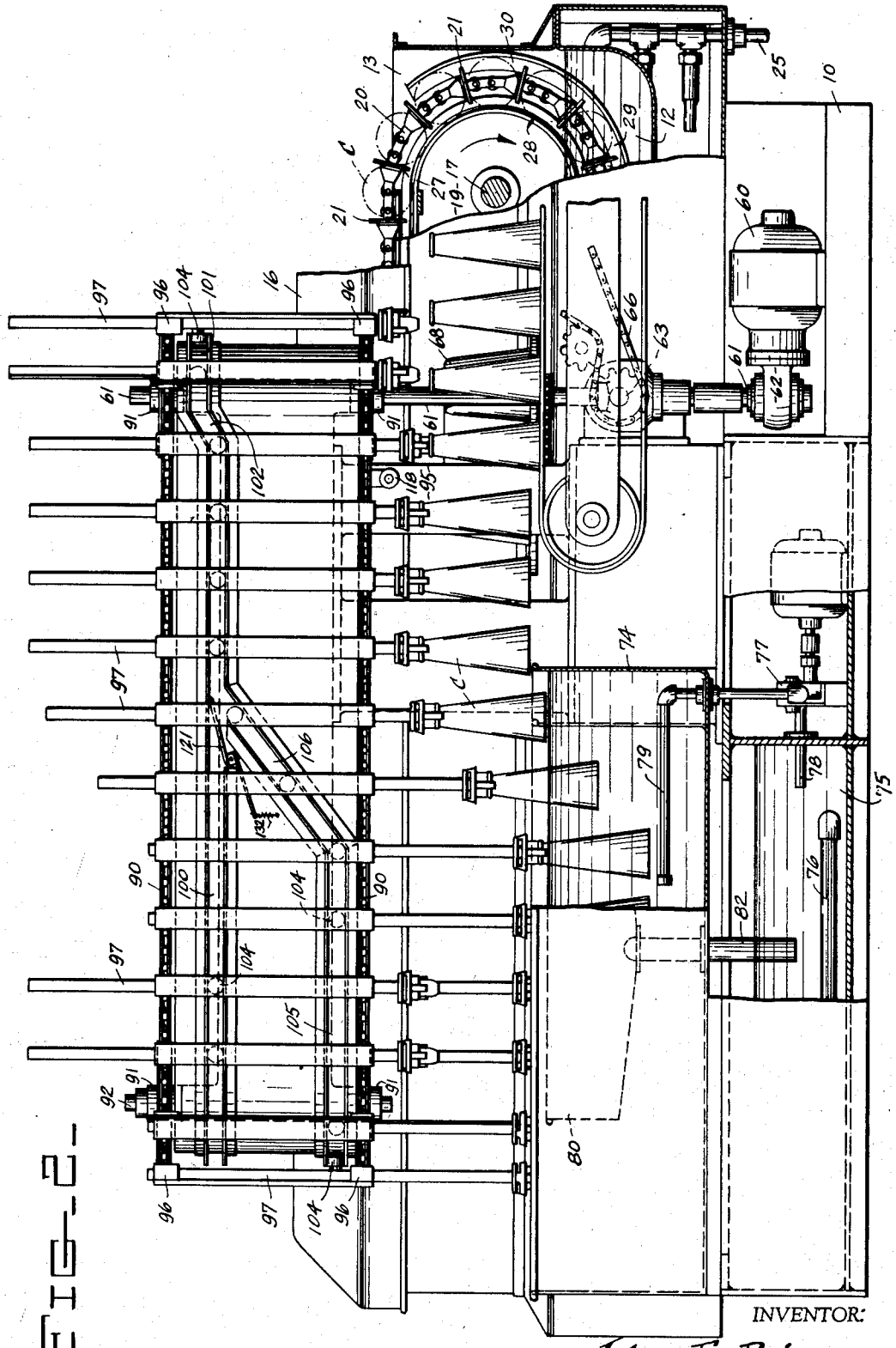


FIG. 2.

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CONTAINER COATING MACHINE

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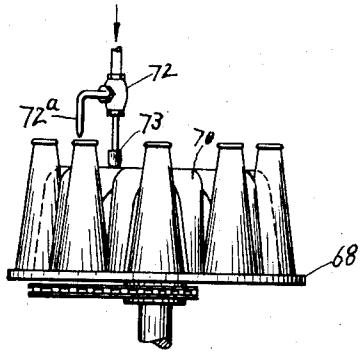


FIG. 7

FIG. 8

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CONTAINER COATING MACHINE

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FIG. 4.

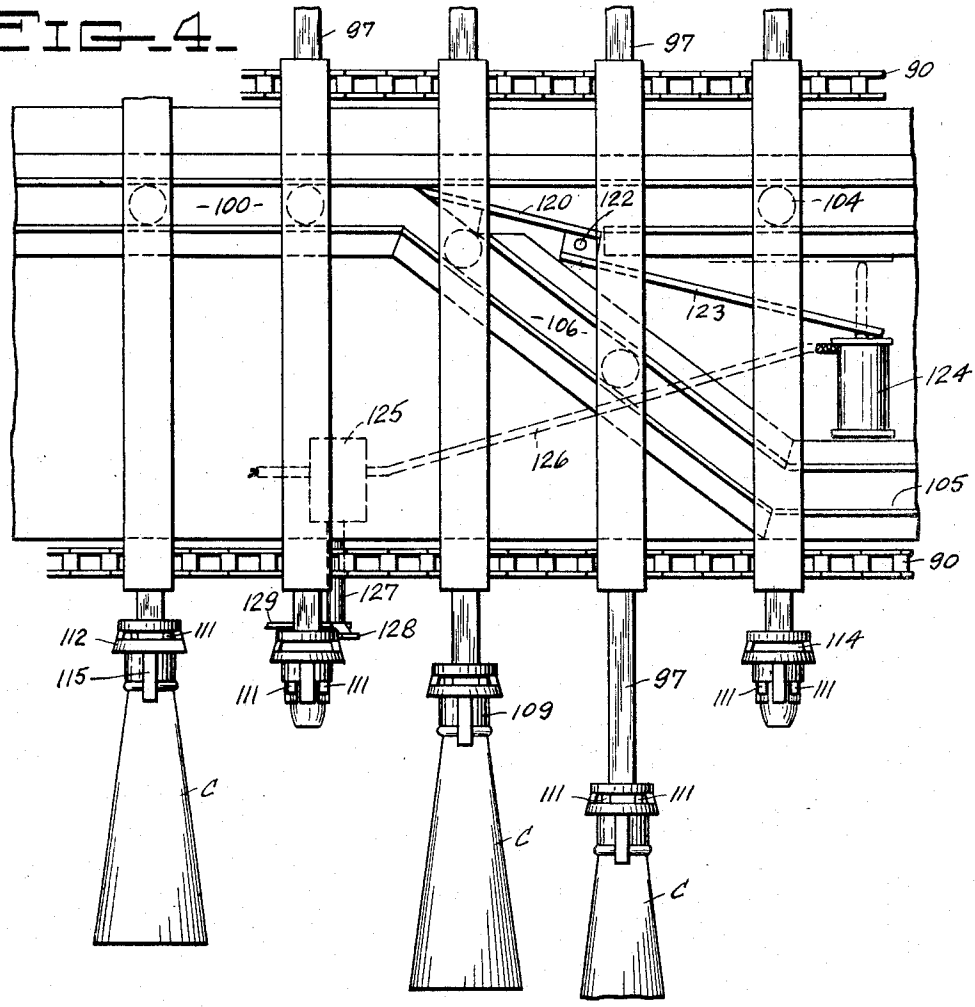


FIG. 5.

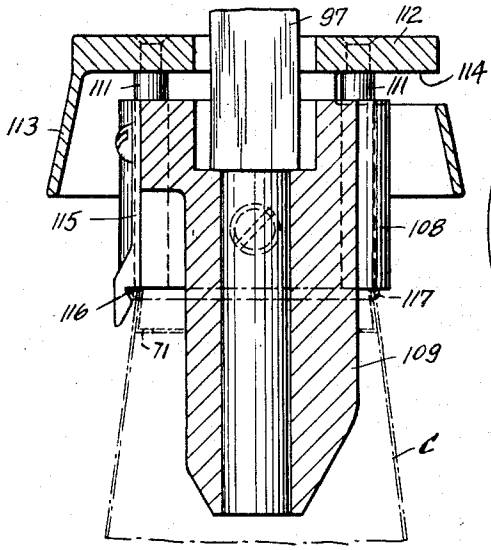
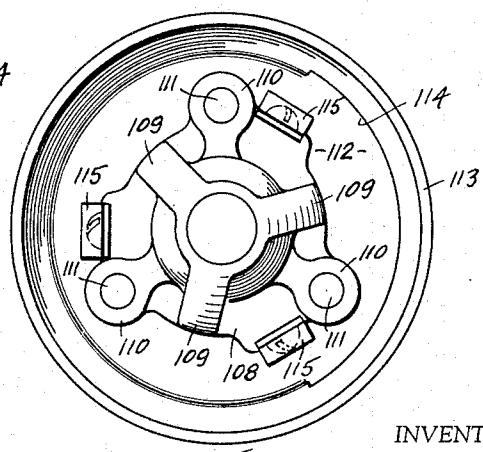


FIG. 6.



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UNITED STATES PATENT OFFICE

2,302,053

CONTAINER COATING MACHINE

John F. Price, Fulton, N. Y., assignor to Oswego Falls Corporation, Fulton, N. Y., a corporation of New York

Application July 26, 1939, Serial No. 286,637

4 Claims. (Cl. 91—46)

This invention relates to a machine for coating containers. Often, to render a container formed of a particular material fit for a particular purpose, it is necessary to apply a coating to the container. For example, a metallic container may be coated with a particular lacquer in order to make the container suitable for certain products. Containers formed of fibrous materials, such as paperboard, are generally coated with a material to make the container liquid tight. This coating may consist of a wax, such as paraffin, or a lacquer formed of various materials, for example, resinous materials.

If the container is coated with wax, the coating is usually applied by immersing the container in a receptacle containing the wax in melted form. In order to obtain the desired finish, and to hasten the setting of the wax to permit volume production, the containers are usually immersed in a cooling vat containing, in addition to the cooling medium, materials effective to sterilize the coating applied to the container.

This invention has to do more in particular with a machine for coating a fibrous container with a wax coating and subsequently conveying the coated container through a cooling solution or medium.

The invention has as an object a container coating machine of the type referred to embodying a structure whereby an even coating is applied effectively to a continuous procession of containers traveling at a comparatively fast rate.

The invention has as a further object a machine of the type referred to embodying, in combination with the coating mechanism, a mechanism for effectively cooling the coated containers as they are discharged from the coating mechanism.

The invention has as a further object a particularly efficient mechanism operable to transfer the coated containers from the coating mechanism to the cooling mechanism. The cooling mechanism embodies a particularly simple structure operable to convey the containers through the cooling medium and preventing the cooling medium from entering the interior of the containers.

The invention further includes a particularly simple and efficient means associated with the cooling mechanism for automatically engaging the tops of the coated containers, supporting the same during conveyance through the cooling medium, and subsequently releasing the containers after the coating has become set thereon.

The general object of the invention is a machine embodying the above features which result in a particularly compact unit particularly well suited for use in combination with a container making machine, and which operates to efficiently and rapidly coat the containers as they are discharged from the container making machine. In other words, the compact arrangement of the machine permits its use in the plant of the container user. For example, the machine may be operated in a dairy to coat paper milk bottles manufactured in the dairy.

The invention consists in the novel features and in the combinations and constructions hereinafter set forth and claimed.

In describing this invention, reference is had to the accompanying drawings in which like characters designate corresponding parts in all the views.

Figure 1 is a top plan view of a machine embodying my invention in its entirety, with the top of the casing of the coating mechanism removed.

Figure 2 is a side elevational view, looking to the left of the machine shown in Figure 1, with parts removed and parts shown in section.

Figure 3 is an end elevational view of the machine with parts broken away and parts in section.

Figure 4 is an enlarged fragmentary elevational view of a portion of the inner side of the conveyor associated with the cooling mechanism.

Figure 5 is a vertical sectional view of one of the container carrying members.

Figure 6 is an inverted plan view of a container carrying member.

Figure 7 is a side elevational view of the bottle transfer turret and mechanism for removing excess wax from the top of the container.

The machine comprises a base 10 upon which the coating and cooling mechanisms are arranged in parallel relationship. The coating mechanism includes a casing, the lower portion 11 of which forms a tank for the coating medium 12. The casing further consists of side walls 13, 14, upon which is mounted a framework 15 provided with a sheet metal covering 16, the covering being omitted in Figure 1.

A shaft 17 is journalled in the forward end of the casing extending transversely thereof, and a shaft 18 is likewise journalled in the rear portion of the casing. A pair of sprocket wheels 19 are mounted upon each of the shafts 17, 18.

A conveyor chain 20 is trained over the sprocket wheels 19, with a chain extending in juxtaposition to each side member 13, 14. The chains 20

are provided at regular intervals with transversely extending cleats or cross members 21, the cleats extending transversely of the casing, as shown in Figures 1 and 3.

The tank 11 is provided centrally with a sump 22 to permit the coating medium to be drained from the tank through a conduit 23. The lower portion of the casing is formed with an outer casing 24 forming a steam chamber to maintain the coating medium 12 at proper temperatures, the steam being admitted thereto through the pipe 25.

The containers are deposited intermediate the cleats 21 at a point near the forward sprocket wheels mounted upon the shaft 17. A guide rail 27 is secured to the inner side of each of the side walls 13, 14, and extends lengthwise of the casing below each of the conveyor chains, and extends inwardly to form a support for the top and bottom of the containers C while they are being conveyed by the cleats 21. The forward and rear ends of the rails 27 are curved downwardly, as at 28, about the outer periphery of the sprocket wheels 19, and a lower guide rail 29 is arranged below the lower run of each conveyor chain and is formed with upwardly curved end portions 30 arranged in spaced apart relation from the curved ends 28 of the upper rails.

The shaft 17 is rotated in a clockwise direction (Figure 2). Accordingly, the containers C are conveyed downwardly between the curved end portions 28, 30 of the guide rails and conveyed lengthwise of the casing through the coating medium 12, and upwardly through the curved rear ends of the guide rails and along the upper rail 27 toward the forward end of the machine.

While the containers are being conveyed, a rolling or planetary action is imparted thereto, with the result that the coating medium is evenly applied to the inner and outer surfaces of the container. In order that the excess wax within the containers may be drained therefrom, the containers are maintained in an inclined position while they are advanced toward the front of the machine by the upper run of the conveyor. This is accomplished by a third upper rail 31 extending adjacent the outer top rail 27. The upper edge of the rail 31 is arranged above the outer rail 27, and the bottom end of the container is accordingly elevated causing the excess coating material to drain out of the top end of the container. The coating remaining on both the inner and outer surfaces of the container is evenly distributed by the rolling action as the containers pass forwardly along the upper rails 27, 31. The cleats 21 are provided with a notch or cut-out portion 32 to accommodate the rail 31.

The outer upper rail 27 terminates as at 33, the inner rail terminating a short distance forwardly of the outer rail, as at 34. Accordingly, as the containers are advanced forwardly, the bottom of the container falls as it passes off from the rail 31 and outer rail 27, during which time the top of the container is still supported by the inner rail 27. Accordingly, the containers drop from within the cleats 21 in a vertical position top uppermost. The containers are dropped upon a transfer member hereinafter described.

Preferably, the coating and cooling machine is arranged in proximity to the container making machine, and the containers are transferred from the container making machine to the coating machine through a chute 35 provided with a lower curved end portion 36 arranged to deposit the containers transversely of the coating mechanism. The container making machine is usually not timed with the coating machine, and for this reason the chute is provided with a movable stop member 37 pivoted to the chute, as at 38. The stop member 37 is connected to a lever 39 pivoted at one end to a bracket 40 carried by the framework 15. The opposite end of the lever is connected to a link 41 extending upwardly and connected at its upper end to the stop member 37. The lever 39 is provided intermediate its ends with a roller 42 engaging the surface of a cam disk 43 provided with a plurality of lobes. The disk 43 is mounted upon a shaft 44 journalled in bearings 45 mounted upon the framework 15. The lever 39 is elevated periodically upon rotation of the cam disk 43 and, when elevated, actuates the stop member 37 out of container engaging position permitting a container previously engaged to drop downwardly toward the curved portion 36 of the chute.

Means is provided for positively depositing the containers between the cleats 21 in timed relation with the operation of the coating conveyor. This means consists of a disk 46 secured on the shaft 44 intermediate the bearings 45. The disk is provided with a plurality of radially extending pleats 47 which, upon rotation of the disk 46, travels through the arcuate portion 36 of the chute 35. The shaft 44 is connected to a transversely extending shaft 50 through beveled gears 51. The shaft 50 is journalled in suitable bearings also mounted upon the framework 15, and the shaft is operatively connected with the shaft 17 through a chain 53 trained over sprockets mounted on the shafts 17, 50. The arrangement is such that when the stop member 37 is moved out of container engaging position, one of the pleats 47 is positioned in the arcuate portion of the chute, whereby the released container drops onto the plate. The disk 46 is rotated in synchronism with movement of the conveyor by the motion transmitting mechanism just described. Accordingly, the containers are deposited between the cleats 21.

The coating conveyor described, and the cooling conveyor hereinafter described, together with the mechanism for transferring the coated containers to the conveyor of the cooling mechanism, are operated by a motor 60 mounted upon the base 10 and operatively connected to a vertically extending shaft 61 through reduction gearing 62. The lower end of the shaft 61 is operatively connected to a jack shaft 63 through beveled gearing 64. The outer end of the shaft 63 is provided with a sprocket wheel 65, and a chain 66 is trained thereover, and over a sprocket wheel 67 also mounted upon the shaft 17.

As the containers are released from the coating conveyor, they are deposited upon a transfer member in the nature of a turret 68 mounted upon a vertical axis and having a substantial arcuate portion extending outside of the casing of the coating mechanism. The turret 68 consists of an outer table portion and an inner dome shaped portion 69. The dome shaped portion is formed with a plurality of radially extending ribs 70. As the bottom end of the containers pass off from the end 33 of the outer top guide rail, the container falls downwardly with the bottom arranged on the table portion of the turret, as indicated in dotted outline Figure 1. The turret rotates clockwise Figure 1, and the containers are accordingly transferred out of the coating mechanism in an upright position.

It will be understood that the containers C are

provided at their upper ends with an annular metallic member having an inwardly extending ledge 71. The ledge 71 has a tendency to accumulate a surplus of coating material which interferes with the capping of the container inasmuch as it does not permit the cap to properly seat upon the ledge 71. To effect removal of this surplus coating, the machine is provided with an air valve 72 provided with a discharge nozzle 72a and having an operating stem 73. The nozzle 72a is so arranged that the tops of the containers pass thereunder during movement upon the turret 68 and the stem 73 is periodically actuated to open the valve 72 by engagement with the ribs 70. The arrangement is such that a blast of air is directed in the top of each container as it is moving on the turret 68. This apparatus is shown in Figure 7.

The cooling mechanism consists generally of a tank containing the cooling medium, and a conveyor system for automatically conveying the containers through the tank.

As here shown, the cooling tank 74 is superimposed upon a sump 75. Means is provided for maintaining the cooling solution at the proper temperature. This means may consist of a conduit 76 connected with a refrigerating machine and containing a cooling medium. The cooling solution, which may consist of chlorinated water, is circulated through the cooling tank 74 and the sump 75 by a motor driven pump 77 mounted in the base 10 and having an inlet pipe 78 and an outlet pipe 79 arranged in the tank 74. The cooling solution is maintained at the proper level in the tank 74 by an overflow trough 80 having a discharge 82 into the sump 75.

The conveyor system of the cooling mechanism consists of a pair of vertically spaced apart chains 90 trained about sprocket wheels 91. One pair of sprocket wheels is mounted upon the shaft 61, and the other pair of sprockets mounted upon a vertically extending shaft 92. The upper end of the shaft 61 and the shaft 92 are journalled in a frame member 94 supported by columns 95 extending upwardly from the base 10. The sprocket wheels, mounted upon the shaft 61, are secured thereto and rotatable therewith. Each of the chains 90 is provided at predetermined intervals with brackets 96 provided with square apertures to slidably receive vertically arranged spindles 97. The inner run of the chains 90 is arranged to pass over the table portion of the turret 68, and the tank 64 is of sufficient width to permit containers, secured to the lower ends of the spindles 97, to be conveyed through the cooling medium, see Figure 1.

The conveyor further includes a track coextensive with the chains 90 and supported by a plurality of brackets 98 extending from the frame member 94. The track is channel shaped in cross section, and consists of an upper section 100 extending along the inner and outer sides of the conveyor and about the rear end thereof in a plane in proximity to the upper chain member. The forward portion 101, of the upper track section 100, is elevated slightly about the remainder of said section and is connected therewith by short inclined portions 102 arranged on the inner and outer side of the conveyor.

Each of the spindles 97 is provided with a roller 104 arranged to travel in the track. Accordingly, as the chains 90 move about the sprocket wheels 91, the spindles are elevated slightly while passing around the forward sprockets on shaft 61.

The track also includes a lower section 105 extending about substantially the rear half of the conveyor and being connected to the upper section 100 through inclined sections 106, there being one inclined section 106 arranged on the inner and outer side of the conveyor. The purpose of the inclined sections 106 and the rear lower section 105 is to permit the spindles 97 to descend an appreciable distance while being conveyed about the rear half of the conveyor, or while being conveyed over the cooling tank 64.

Normally, that is while containers are attached to the lower ends of the spindles 97, the rollers 104 do not pass through the rear half portion of the upper section 100, but travel down the inner inclined track section 106 about the lower section 105 and upwardly on the outer inclined track section 106 and thence about the forward half of the upper section 100.

Means is provided, at the lower end of each of the spindles 97, for automatically securing a coated container to the spindle. This means comprises a container engaging member or chuck formed with a body portion 108 having depending circumferentially spaced apart ribs 109. The body section is formed with radially extending bosses 110 provided with apertures to slidably receive pins 111. The upper ends of the pins 111 are secured to a disk 112 having a depending flange 113 provided on one side with a substantial cut-out portion or slot 114. The container carrying chucks are also provided with a plurality of spring fingers 115 provided at their lower ends with notches 116 to yieldingly engage the bead 117 at the top of the container C.

As the spindles pass about the forward sprockets 91, they descend toward the turret 68, this descent being effected by the inner inclined track section 102. The arrangement is such that the lower end 109 of the chuck body enters the top of the container and the chuck body is pressed against the top edge of the container with the fingers 115 engaging the bead on the container, as illustrated in Figure 5.

The lower ends of the pins 111 rest against the top edge of the container and accordingly, the disk 112 is elevated slightly from the body 108. The containers are thus detachably, but firmly secured to the lower ends of the spindles and as the spindles move rearwardly, the rollers 104 pass downwardly on the inner inclined track section 106, causing the containers to be immersed substantially their entire length into the cooling solution. The rollers continue to run in the lower track section 105, and the containers are accordingly maintained in the cooling solution while the spindles are traveling rearwardly and forwardly about the rear portion of the conveyor. The inner and outer inclined track section 106 is arranged to effect downward movement of the containers into the cooling solution when the containers have passed the forward edge of tank 74 and to elevate the containers out of the cooling solution before reaching the forward edge of the tank 74 on the outer run of the conveyor. The rollers 104 now continue through the outer run of the forward portion of the upper track section 106 until they engage the outer inclined section 102, whereupon the spindles are elevated moving the disk 112 into engagement with a roller 118 mounted upon the frame of the machine, whereupon the container is ejected from the spring fingers 115 by the pins 111.

As previously described, the cooling conveyor is operated in synchronism with the coating con-