

May 22, 1928.

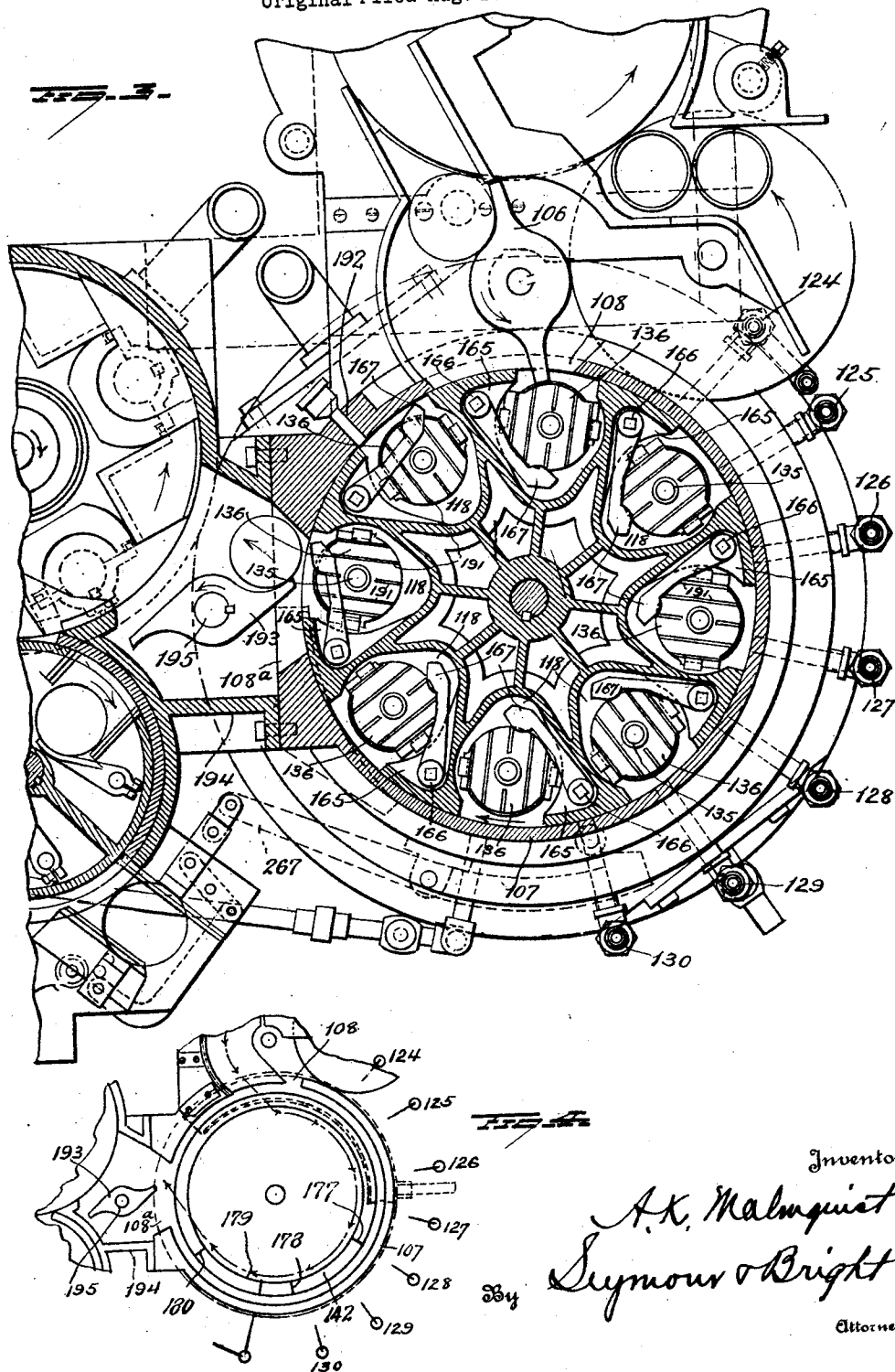
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A. K. MALMQUIST

CANNING APPARATUS

Original Filed Aug. 18, 1922

6 Sheets-Sheet 3



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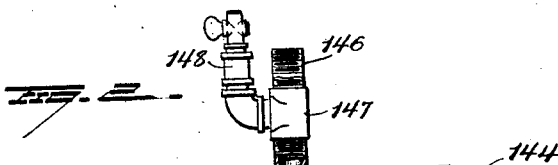
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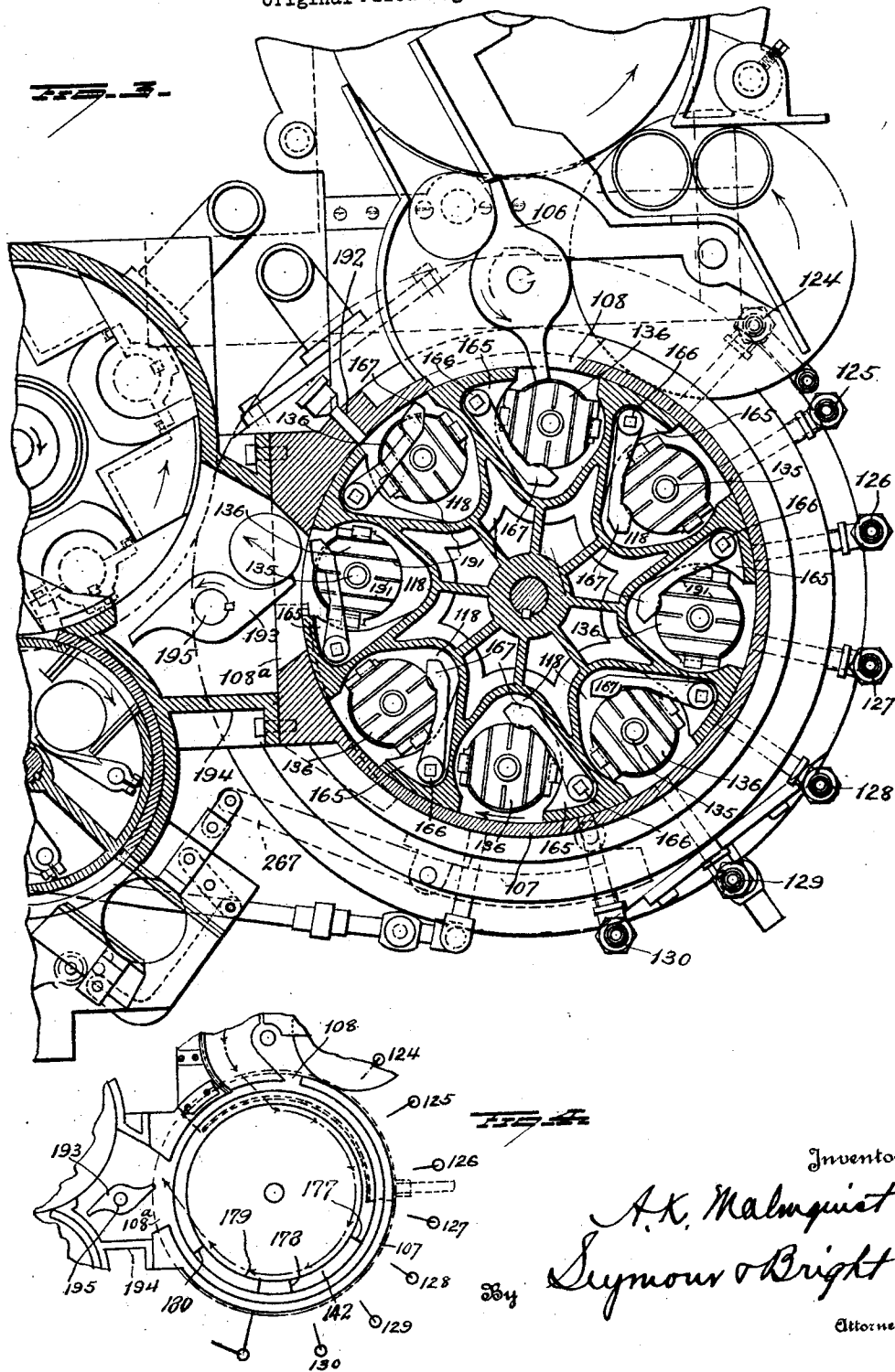
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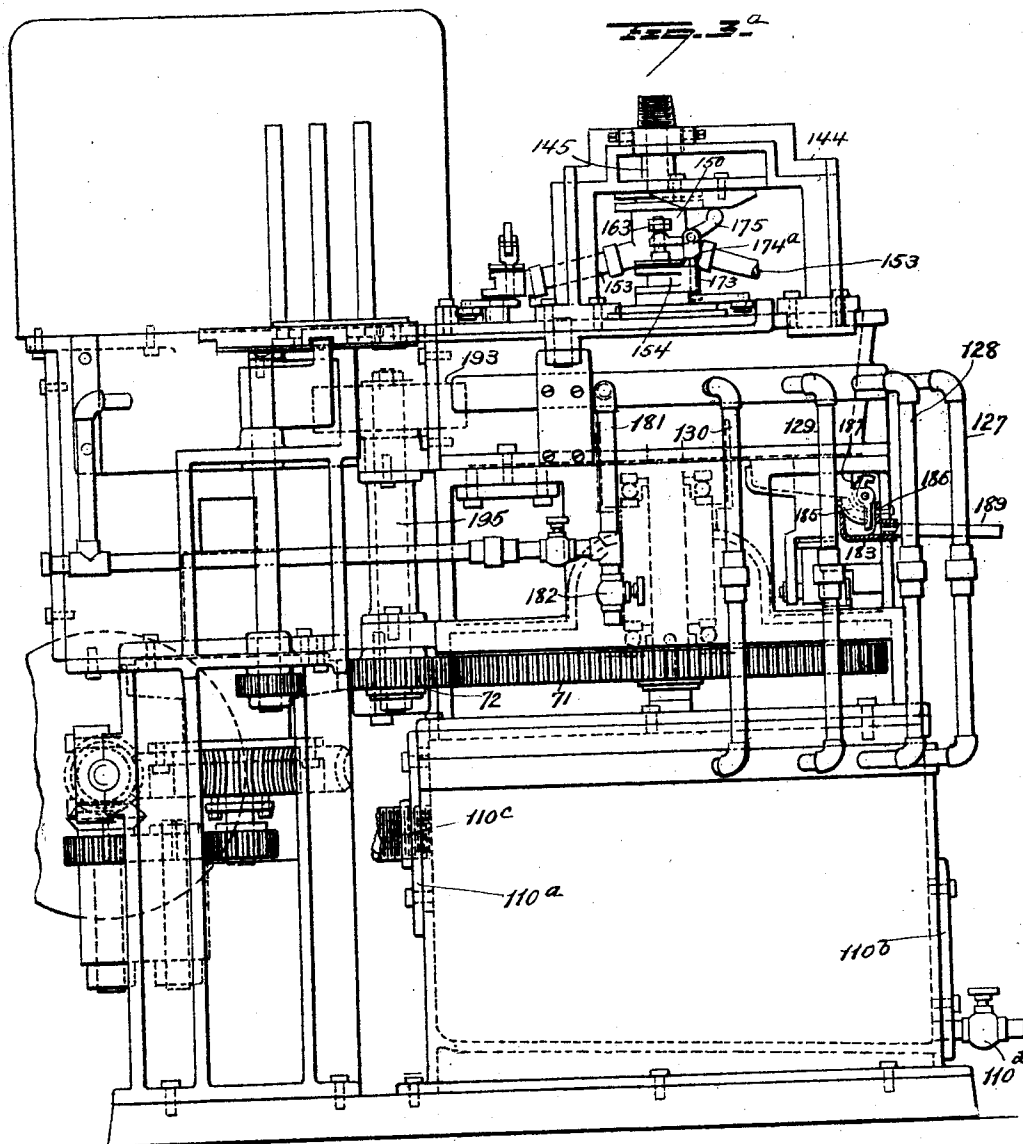
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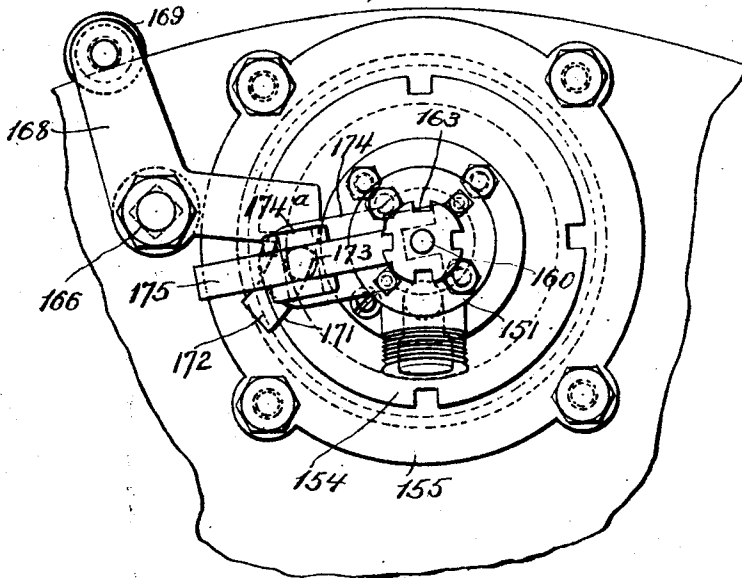
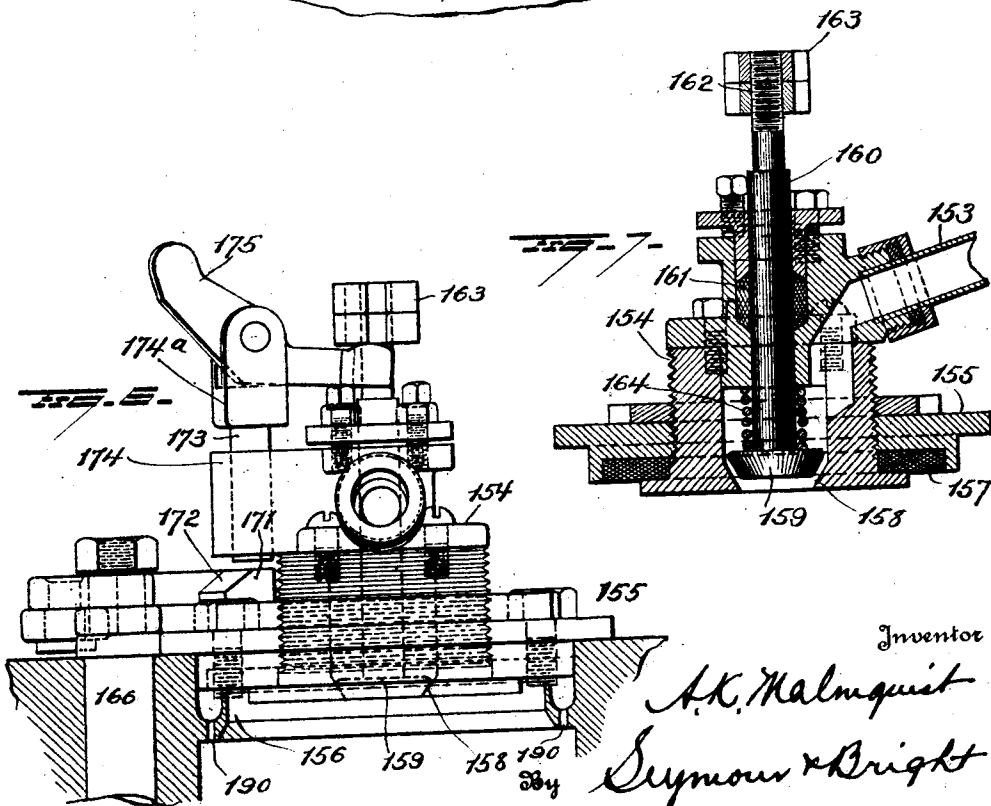
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Fig. 5.



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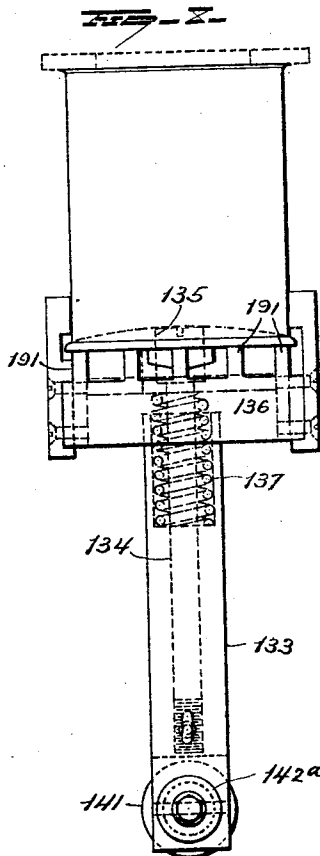
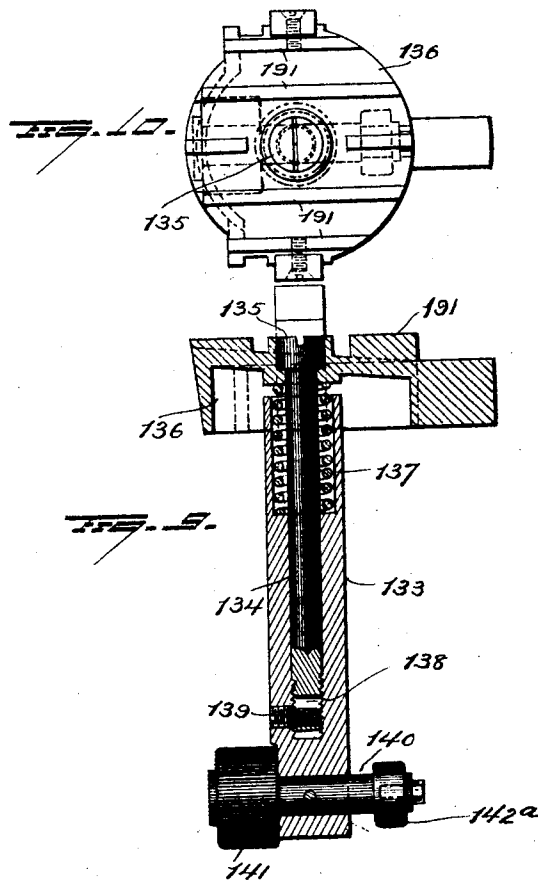
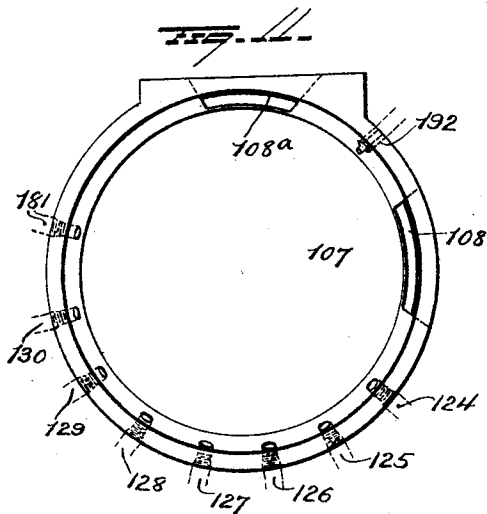
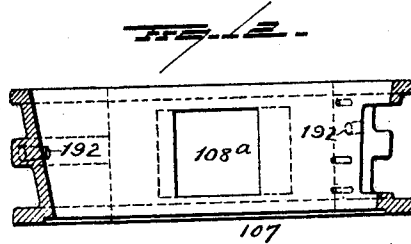
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UNITED STATES PATENT OFFICE.

ADOLPH K. MALMQUIST, OF SOUTH BELLINGHAM, WASHINGTON, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THERMOKEPT CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

CANNING APPARATUS.

Original application filed August 18, 1922, Serial No. 582,712. Divided and this application filed August 26, 1924. Serial No. 734,224.

This invention relates to improvements in canning apparatus and more particularly to improved apparatus for filling cans with liquid,—this application being a division of my application filed August 18th, 1922, and designated by Serial No. 582,712.

An object of my present invention is to provide an efficient apparatus which will operate automatically to fill cans (which may contain solid food) with liquid (such as syrup, for example) in vacuum.

A further object is to provide means whereby spilled liquid will be saved.

A further object is to provide simple and efficient means which will operate to prevent the opening of a liquid supply valve when no can is in position to receive the liquid.

With these and other objects in view, the invention consists in certain novel features of construction and combinations of parts as hereinafter set forth and pointed out in the claims.

In the accompanying drawings—

Figure 1 is a plan view showing a filling apparatus embodying my improvements;

Figure 2 is a vertical sectional view;

Figure 3 is a horizontal sectional view;

Figure 3^a is a view in elevation;

Figure 4 is a diagrammatical view;

Figures 5, 6 and 7 are views illustrating the valve mechanism, and

Figures 8, 9, 10, 11 and 12 are views showing details.

The filling mechanism includes in its structure, a casing 107 having an entrance opening 108 and an exit opening 108^a for cans and, interiorly, this casing is preferably made somewhat tapering as shown in Figure 12. The casing 107 is superimposed upon and bolted to a cylindrical bracket 109 supported upon and bolted to a vacuum tank 110. The vacuum tank may be provided with suitably located manholes closed by covers such as indicated at 110^a and 110^b, Figure 3^a and with one of said covers a pipe 110^c leading to a pump (not shown) may be connected and said tank may be provided with a valved drain 110^d in the lower man-hole cover 110^b. The bracket 109 is provided above the vacuum tank 110 with a horizontal portion 111 and the latter is provided with a dome-shaped portion 112, with which latter, a vertical bearing sleeve 113 is made integral. A ver-

tical shaft 114 passes through the sleeve 113 and is provided intermediate of its ends with an annular flange 115, between which and the upper portion of the bearing sleeve 113, anti-friction bearing devices 116 are interposed. To the upper portion of the shaft 114, the hub portion of a spider or carrier 117 is slidably keyed and said spider is constructed to provide an annular series of pockets 118 as shown in Figures 2 and 3 and has a freely moving but air-tight fit within the tapering casing 107.

A spring 119, disposed between the hub portion of said spider or carrier 117 and the annular flange 115 on the shaft 114 as shown in Figure 2, serves to hold the spider or carrier in proper position in the casing 107 and this spring as well as the annular flange 115 and the anti-friction bearing devices 116, are enclosed by a lubricant cup 120 mounted on the upper portion of the bearing sleeve 113, a tube 121 passing through the hub portion of the spider being provided to supply said cup with lubricant. To the lower end portion of the shaft 114, a gear 71 is keyed and carries a lubricant cup 122 which encloses anti-friction bearing devices 123 disposed between said gear and the lower end of the bearing sleeve 113. The gear 71 receives motion from a suitable source, as fully shown and described in my application hereinbefore identified.

In the embodiment of the invention shown in the drawings, the spider or carrier is constructed to form eight pockets 118 and each of these pockets constitutes a separate vacuum chamber, and the chambers are exhausted through pipe connections 124, 125, 126, 127, 128, 129 and 130, connected with the exhaust tank 110. A gage 130^a will indicate the degree of vacuum in the pockets.

Brackets 131 are bolted to the lower ends of the pocketed carrier 117,—one such bracket being located directly under each of the eight pockets or chambers 118, and each of said brackets is made with a vertical bearing sleeve 132, through which a plunger 133 is movable, suitable packing 134 being provided for said plunger.

As illustrated in Figures 2, 8 and 9, each plunger 133 is made with a central bore for the accommodation of a rod 134, the headed upper end 135 of which enters a socket in a

can platform 136 on to which a can will be fed by the operation of a lever 106, which is driven by a gear 72'. Each platform is vertically movable in one of the pockets or vacuum chambers 118. Each platform 136 which is vertically movable in one of the pockets or chambers, is yieldingly supported by the plunger 133 with which it is connected, through the medium of a coiled spring 137. The lower end portion of the rod 134 is made with a slot 138 which receives the end of a pin 139 threaded in the lower portion of the plunger 133. A pin 140 passes transversely through the lower portion of each plunger 133 and projects at both ends beyond the same. On one end portion of the pin 140, a roller 141 is mounted and is disposed between circular cams 142-143 secured to the bracket 109 and these cams are so formed as to effect the raising of the plungers and the cans carried on the platforms to present the cans to liquid filling means and for lowering the plungers and platforms to remove the cans from said filling means,—the plungers being guided in their actual movements and prevented from turning by rollers 142^a carried by the transverse pins 140 and movable in slotted arms 143^a depending from the bracket 131.

In constructing the means for supplying the cans with syrup or other fluid, a bracket 144 is bolted upon the casing 107 and in its central portion, supports a pipe 145, with which latter, a pipe 146 leading to a source of syrup or liquid supply, is connected, and the coupling 147 which connects said pipes may have a gage 148 and a pet cock connected therewith, as shown in Figure 2.

The lower end of the pipe 145 enters a hollow casting 150 mounted to rotate on the contracted upper end of the shaft 114, suitable packing means between said pipe and casting being provided as shown at 151, and this casting is made with a plurality of nipples 152 as shown in Figure 2. In the embodiment of the invention shown in the drawings, eight such nipples are provided and these are connected, by radiating pipes 153, with valve casings 154, disposed over the several pockets or vacuous chambers 118 of the rotating spider 117. Each valve casing is threaded through a base member 155 secured to the spider or carrier 117 over a pocket 118 of said spider or carrier, so that the outlet of said valve casing may discharge into a can in said pocket and in the upper portion of each pocket 118, a circular horizontal gutter 156 is located. Each base member 155 is recessed to receive a pad 157 surrounding the valve casing 154 and held in place by the flanged lower end of said casing,—said pad constituting a yielding seat for the open end of a can to close the same when it is raised to receive syrup. The discharge portion of the valve casing 154 is contracted, forming a seat 158 for a valve 159. This valve is carried at the lower end of a stem 160 which is vertically movable through the casing and through a suitable packing 161 therein and the upper end of said stem is provided with a threaded shank 162 on which nuts 163 are adjustable. A spring 164 encircles the valve stem 160 and bears at its respective ends against a portion of the valve casing and the valve 159.

Each pocket 118 is provided with a recessed portion 165 in which a shaft 166 is located and carries at its lower end, a can ejecting lever 167. Each shaft 166 terminates at its upper end above the rotary pocketed spider or carrier 117, where it has secured thereto, an approximately L-shaped lever 168 carrying a roller 169 to cooperate with a fixed cam 170 as shown in Figure 1, for the purpose of turning the shaft 166 and operating the ejecting lever 167. One member of the lever 168 is provided at its free end with a curved arm 171 (Fig. 5) having a beveled or cam portion 172, as shown in Figure 6. A post 173 is vertically movable through a hole in a lateral extension 174 of each valve casing 154 and is normally over the base member through which said casing passes. Each post 173 is provided with a bifurcated head 174^a, in which a lever 175 is pivotally mounted. One arm of each lever 175 is bifurcated to embrace the adjacent valve stem shank 162 (below the threaded portion of the latter) and engage one of the nuts 163 on said shank. A cam 176 is secured to the top bracket 144 to be engaged by one arm of each lever 175 to effect the opening of the syrup valve.

When during the operation of the pocketed spider or carrier 117, a pocket containing a can shall have passed the inlet opening 108 in the casing 109 and the opening of the pocket through which the can had entered becomes closed by the casing, said pocket will first communicate with the two successive pipe connections 124 and 125 as indicated in Figure 3. During the continued travel of the pocket, it will be caused to communicate successively with the several suction pipe connections 126 to 130. When the pocket 117 shall have passed the seven suction pipe connections 124 to 130 inclusive, the exhausting of the chamber of the pocket will have been completed. During the travel of the pocket 118, the roller 141 at the lower portion of the plunger 133 will travel on the cam 142 and when the point 177 (Fig. 4) on said cam is reached, the plunger 133 and platform will begin to rise and when the point 178 on said cam 142 shall have been reached, the can will be fully raised with its open upper end pressing against the cushioned seat 157 and the can in position to receive syrup from the

valve mechanism. When the can is raised and its upper open end presented to the cushion seat 157, the can will be pressed against seat with yielding pressure, the can-supporting platform 136 yielding slightly against the resistance of the spring 137 as indicated at the left of Figure 2, and the head 135 at the upper end of the rod 134 will then project slightly above the top of the platform and serve to support the can bottom (Fig. 8) and prevent the same from being bulged outwardly as the can is being filled with syrup. There will be quite a pressure on the liquid, and if the can bottom be not directly supported it would bulge and when the liquid valve is closed the can bottom would spring back inwardly and a portion of the liquid would be forced out of the can.

When the can first entered the pocket 118, it engaged the lever 167 (Figure 3) therein and caused said lever to move back, turning the shaft 166 and causing the arm 171 to become disposed under and therefore to raise the post 173 on which the lever 175 is mounted, as shown in Figures 5 and 6.

The can in the exhausted chamber of one of the pockets 118 having been raised and temporarily closed by engagement with the cushion seat 157, the lever 175 will engage the cam 176 (Fig. 3^a) and cause movement of said lever to raise the syrup valve from its seat and thus permit syrup to flow into the exhausted can to fill the latter as well as the pores of the solid food contained in the can, such pores having been exhausted of air when the chamber of the pocket containing the can was exhausted. As the spider or pocketed carrier 117 continues to move, the lever 175 will pass the cam 176 and the syrup valve will close.

In the event that a can failed to enter a pocket 118, the lever 167 in such pocket would not be moved back and the post 173 which supports lever 175 would not be raised. Under such conditions, the lever 175 over such pocket would not be within reach of the cam 176 when the pocket reaches the syrup valve devices and hence the syrup valve will not be opened, there being no can in the pocket to receive the syrup.

The can in one of the pockets 118 will be filled with syrup while the roller 141 at the lower end of plunger 133 (Fig. 9) is traveling from the point 178 to the point 179 (Fig. 4) of cam 142. As the roller 141 travels over the portion of the cam 142 from the point 179 (Fig. 4) to the point 180, the can platform and can thereon, will be lowered and the pocket 118 will arrive at the opening 108^a of the casing 107, ready to be transferred to a sealing mechanism.

In order that spilling of syrup from the can may be avoided when it leaves the pad

or cushioned seat 157 which serves to temporarily close the open end of the can during the syrup filling operation, it is important that the degree of vacuum in the pocket 118 containing said filled can shall be reduced. Thus, at about the time that the filled can begins to descend from the pad or seat 157 and therefore becomes open, the said pocket will arrive at a port in the casing 107 with which a vacuum reducing or release pipe 181 is connected, said pipe being provided with a vacuum reducing valve 182 as shown in Figure 3^a.

It is desirable, in the event of spilling of syrup during the operations of filling and manipulating the cans in the exhausted pockets 118, that any spilled syrup shall be saved for future use. To this end, a circular trough 183 is secured to the vertical wall of the bracket 109, and each bracket 131 is provided with an outlet 184 communicating with a spout 185 secured to each bracket 131. A valve 186 is provided for each spout 185 and is normally closed by the action of a spring 187 to prevent disturbance of the vacuum condition of the overlying pocket 118 of the carrier 117, to which latter the brackets 131 are secured as previously explained. A cam 188 (Fig. 2) is provided on the bracket 109 to open each valve 186 when the superimposed pocket 118 reaches a position during its travel where the maintenance of a high vacuum condition in the pocket is not essential. When the valve 186 is opened, any syrup which may have accumulated above the same, will be discharged into the trough 183 and from the latter it will be discharged through a pipe 189 (Fig. 3^a) and permitted to flow into a suitable receptacle (not shown) or conducted back to the syrup tank. The gutter 156 adjacent to the syrup valve structure will serve to receive syrup which might escape from a can when it leaves the cushion seat or pad 157 and this gutter is provided with openings 190 (Fig. 6) through which syrup may escape, and to facilitate the escape of syrup from each platform 136, the latter may be provided with ribs 191 (Figs. 8-10) to support the can, the syrup escaping from the can and from the platform 136 entering bracket 131, the bottom of which latter is inclined to direct the syrup to the outlet 184 with which the spout 185 communicates.

The cam 188 is so located that it will not open the valve 186 until a can has been discharged from a pocket 118 and said pocket shall have passed the discharge outlet 108^a in the casing 107. After the empty pocket 118 (with its chamber still in a vacuum condition) shall have passed the can discharge outlet 108^a, the vacuum in the pocket will be broken as said pocket registers with a port 192 open to the atmosphere and thus prevent an inrush of air into the chamber

of the pocket when the valve 186 is subsequently opened to permit the discharge of syrup into the trough 183, which inrush of air would tend to impede the proper discharge of the syrup.

When, during the rotation of the pocketed carrier 117, a pocket 118 containing a filled can approaches the can discharge outlet 108^a, the roller 169 on lever 168 will engage the fixed cam 170 (Fig. 1) whereby said lever will be caused to move and to turn the shaft 166 and thus cause the ejecting lever in the pocket to push the can out of the pocket as indicated in Figure 3 and into the path of the double-armed transfer lever 193, which latter will operate to move the can through a chamber or passage formed by a casing 194 and in a sealing chamber 4. The transfer lever 193 is located within the compartment formed by the casing 194 and is carried by a shaft 195 to which the gear 72 is secured.

The purpose of the lever 267 indicated in Figures 1 and 3 is to control the operation of cap feeding mechanism and its operation is controlled by the rollers 169 of the can filling mechanism, as fully explained in my application Serial No. 582,712, of which this application is a division.

Having fully described my invention what I claim as new and desire to secure by Letters Patent, is:

1. In apparatus of the character described, the combination with a casing, of a continuously rotatable carrier therein having a plurality of pockets, means for feeding cans into said pockets, liquid filling means communicating with said pockets, means for raising cans in said pockets and temporarily closing the same under the filling means and subsequently lowering said cans, and means whereby each of said pockets is adapted to be rendered vacuum after a can has entered the same and during the operation of filling with liquid.

2. In apparatus of the character described, the combination with a casing, of a continuously rotatable carrier therein having a plurality of pockets, means for feeding cans into said pockets, liquid filling means communicating with said pockets, means for raising cans in said pockets and temporarily closing the same under the filling means and subsequently lowering said cans, means whereby each of said pockets is adapted to be rendered vacuum after a can has entered the same and during the operation of filling with liquid, and means for reducing the degree of vacuum in each pocket before the can is lowered from the liquid filling means.

3. In apparatus of the character described, the combination of a casing, a continuously rotatable carrier therein having an annular series of pockets, means whereby cans containing solid food may be fed into said pockets

successively, means whereby said pockets are adapted to be exhausted successively, a valve over each pocket, means for conducting liquid to each valve, a can seat in the upper part of each pocket, means for raising a can in each pocket and temporarily closing the same against said seat and for subsequently lowering the can during the rotation of said carrier, means operable automatically to control the valves, and means for reducing the degree of vacuum in each pocket before a filled can is lowered from its seat and its upper end opened.

4. In apparatus of the character described, the combination of a casing, a continuously rotatable carrier therein having an annular series of can pockets adapted to be closed by the wall of said casing, valve mechanism closing the top of each pocket, means for filling cans in said pockets with liquid, means for raising the cans to said filling means and temporarily closing the cans while being filled, means for controlling the liquid supply to the cans, and means communicating with said casing at a plurality of points through which said pockets are adapted to be exhausted after the cans enter the same and during the liquid filling operation.

5. In apparatus of the character described, the combination of a casing, a carrier continuously rotatable therein and having an annular series of pockets, valved means closing the upper ends of said pockets, means for supplying liquid to said valved means, a vertically movable can support in each pocket, means for raising said can support to present a can to said valved means and for temporarily closing the can and for subsequently lowering said support and can, connections adapted for exhausting said pockets, and means associated with each vertically movable can support to support and prevent outward bulging of the can bottoms when the same are subjected to internal pressure during the operation of filling with liquid under pressure.

6. In apparatus of the character described, the combination of a conical casing, a carrier fitted to rotate therein and having an annular series of can pockets adapted to be closed by the wall of said casing, yielding means sustaining said carrier, valved means closing the upper ends of said pockets, means for conducting liquid to each valved means, means for raising a can in each pocket and presenting the same to the valved means at the top thereof, and means adapted for establishing and maintaining a vacuum condition in each of said pockets before and after the can filling operation in each pocket.

7. In apparatus of the character described, the combination with a casing, of a carrier therein having a can pocket, means adapted for exhausting said pocket, liquid filling means at the top of said pocket, a vertically

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movable can support, means for raising said support to present a can to the liquid filling means and subsequently lower the same, means whereby the vacuous condition in said pocket may be broken, a stationary trough, means for conveying spilled liquid to said trough, a valve normally closing such conveying means, means operable automatically to control the opening of said valve after the vacuous condition in said pocket has been broken, and means whereby liquid collected in said trough may be discharged and saved.

8. In apparatus of the character described, the combination of a casing, a carrier rotatable therein and having an annular series of pockets, means for filling cans with liquid while in said pockets, the filling means for each pocket including a valve having a stem, an engaging member at the upper end portion of said valve, a vertically movable post, a lever pivoted to said post and having an arm to cooperate with the engaging means on said valve stem, a fixed cam with which the other arm of said lever is adapted to cooperate, a shaft entering each pocket and projecting above the same, a lever secured to the upper end of each shaft and having a

part to enter under each post and raise the same to bring the valve operating lever into position for cooperation with said fixed cam, and a lever carried by the lower position of each shaft and movable by a can entering a pocket, whereby failure of a can to enter one of said pockets will prevent operation of the valve when such empty pocket reaches a position where the liquid valve would be opened to discharge liquid if the pocket contained a can.

9. In apparatus of the character described, the combination with a casing, of a rotatable member within said casing, and having a plurality of pockets, liquid valve devices over the pockets of said member, means adapted for exhausting said pockets, means for raising cans in said pockets to the liquid valves and for lowering said cans, a main liquid supply inlet pipe, a hollow member rotatable on said inlet pipe, and pipe connections between said hollow member and the casings of the several liquid valve devices.

In testimony whereof, I have signed this specification.

ADOLPH K. MALMQUIST.