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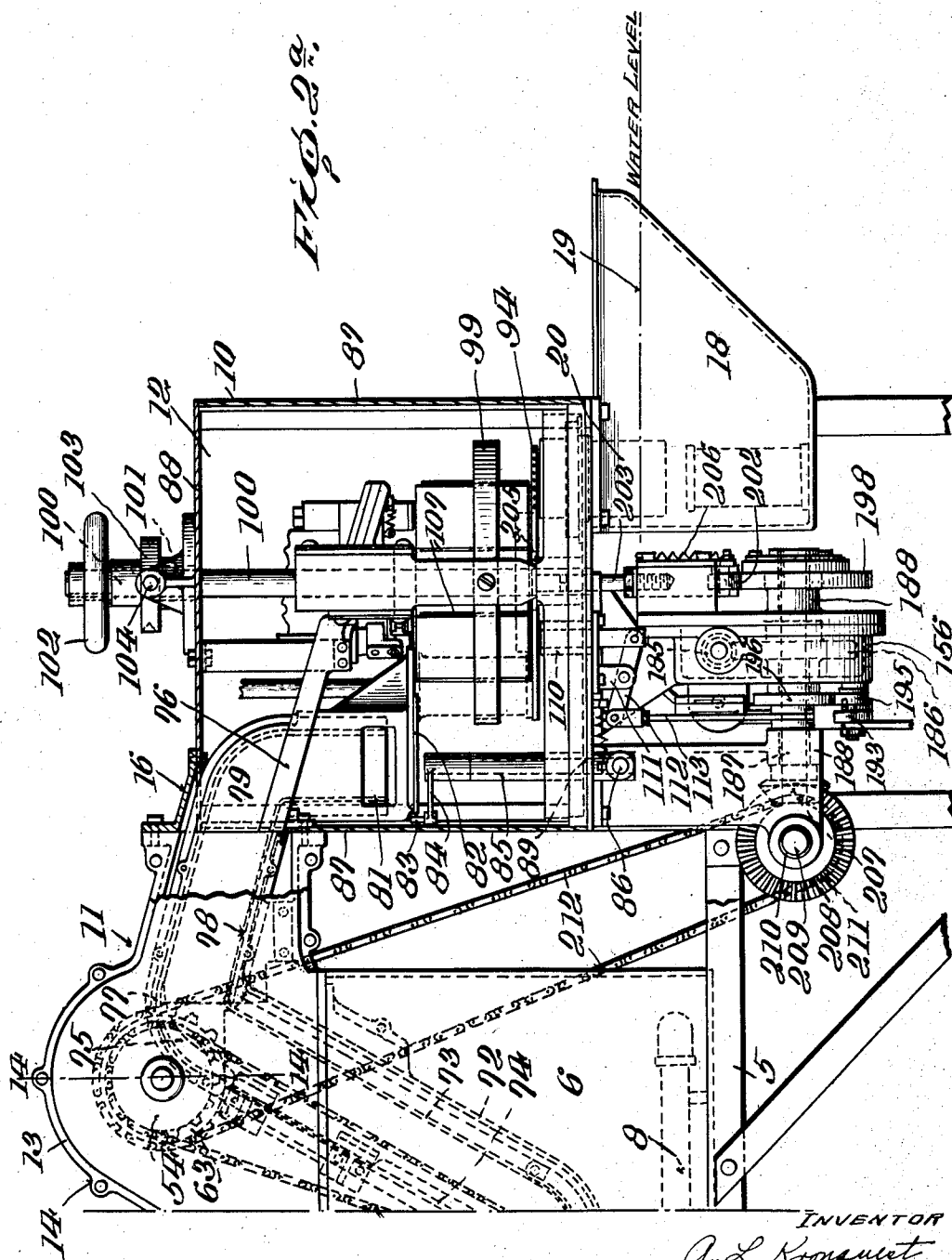
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2,268,289

APPARATUS FOR PACKAGING FRUIT JUICES

Filed July 18, 1939

11 Sheets-Sheet 3



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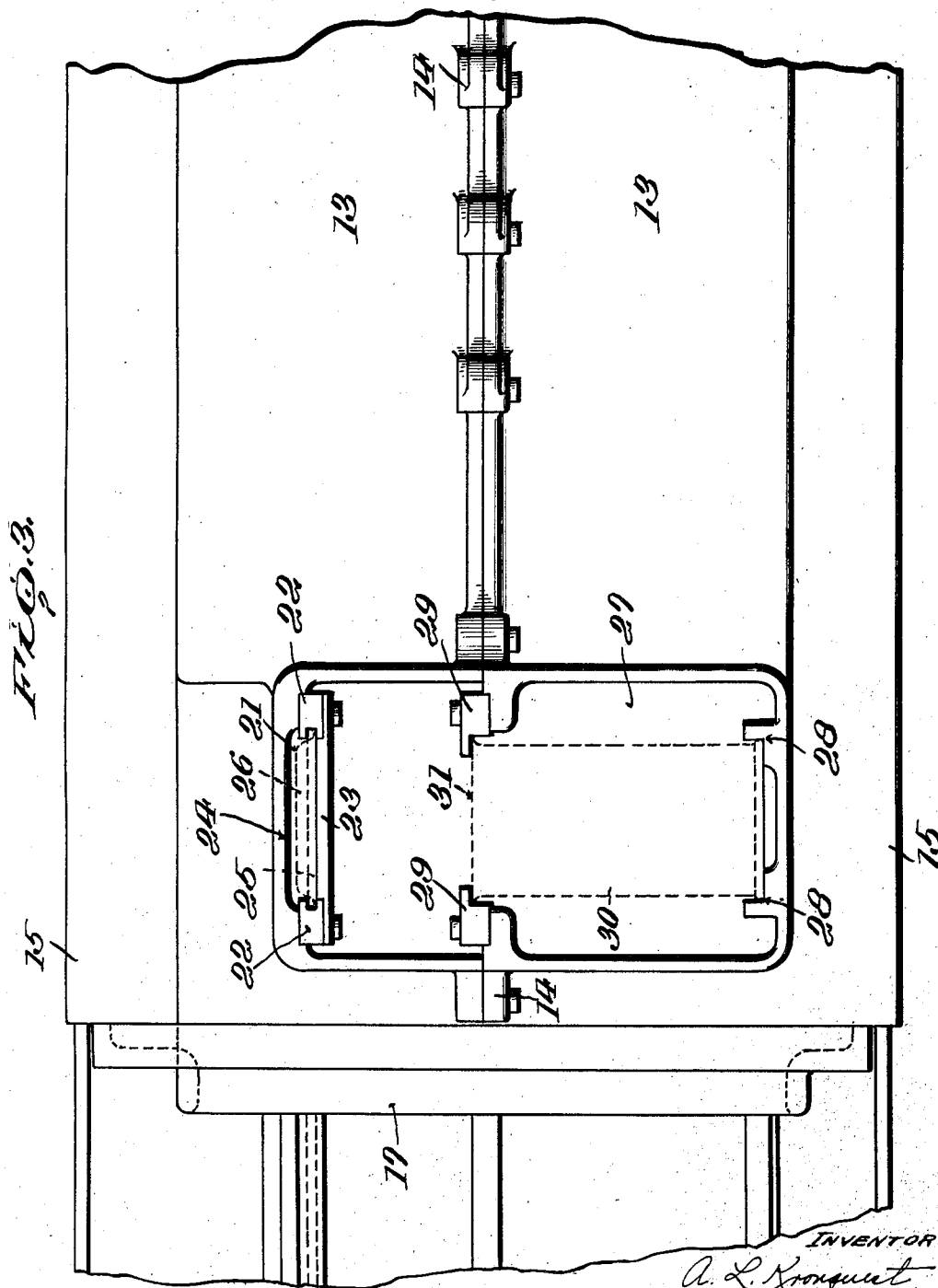
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APPARATUS FOR PACKAGING FRUIT JUICES

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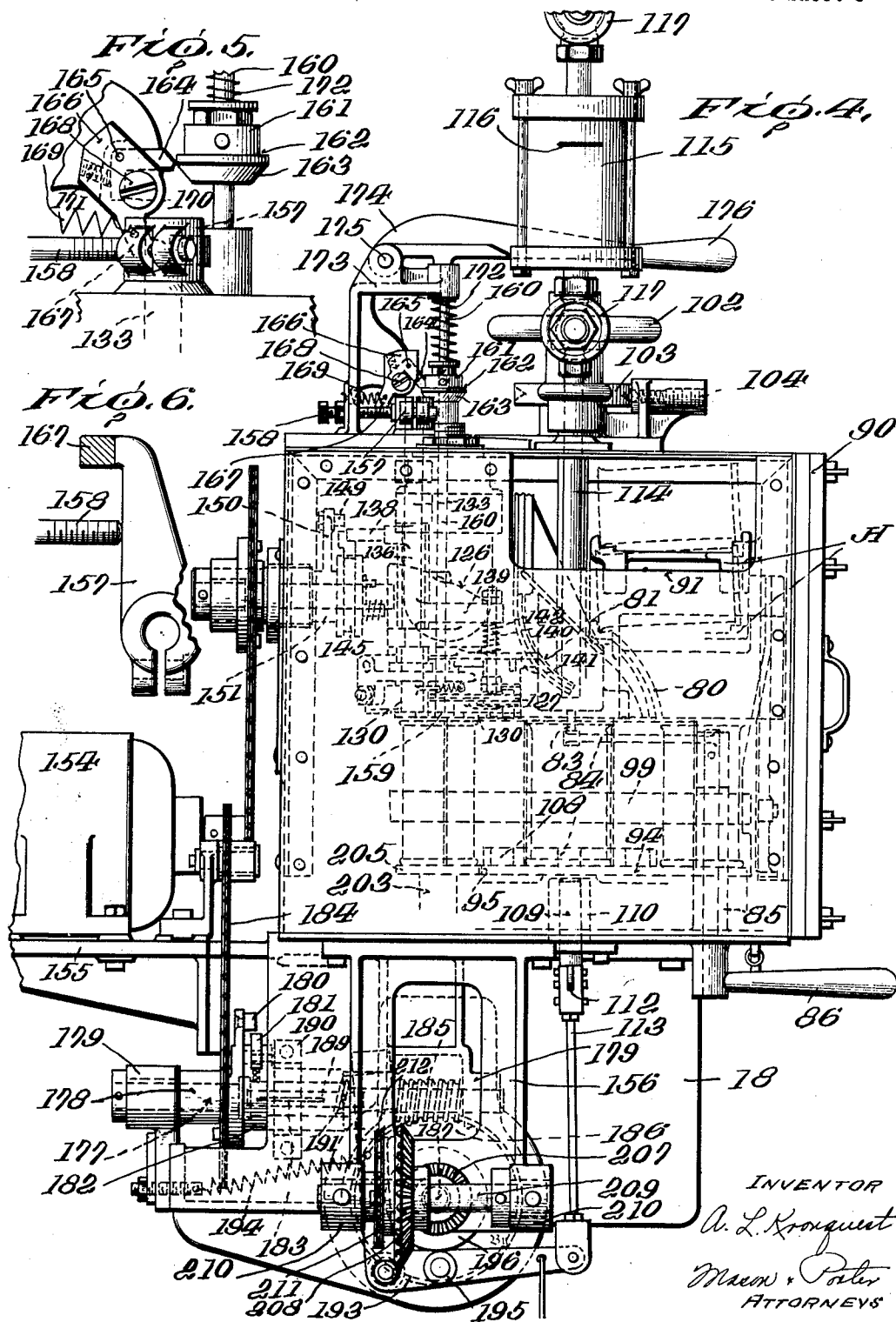
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APPARATUS FOR PACKAGING FRUIT JUICES

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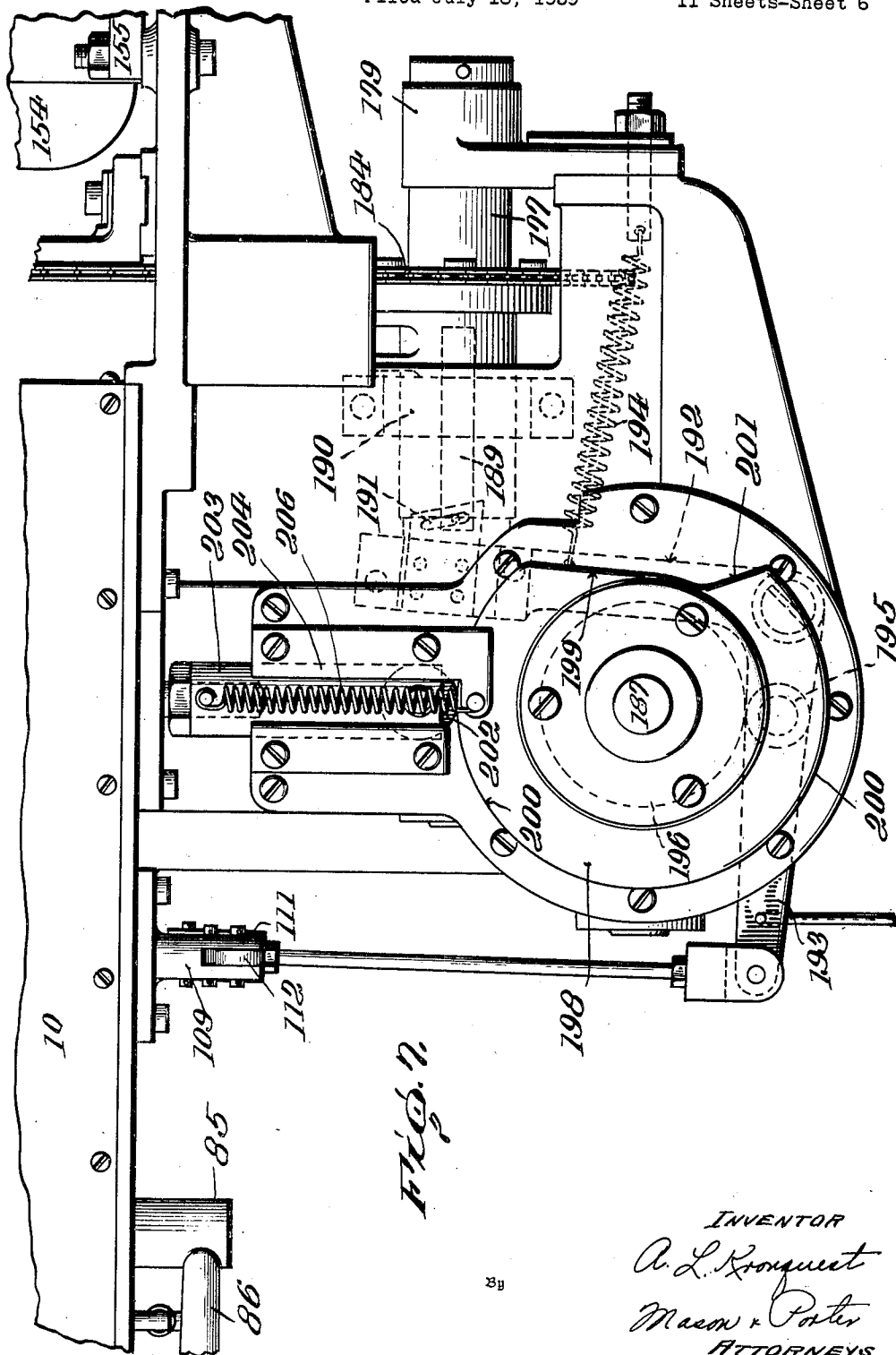
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APPARATUS FOR PACKAGING FRUIT JUICES

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11 Sheets-Sheet 6



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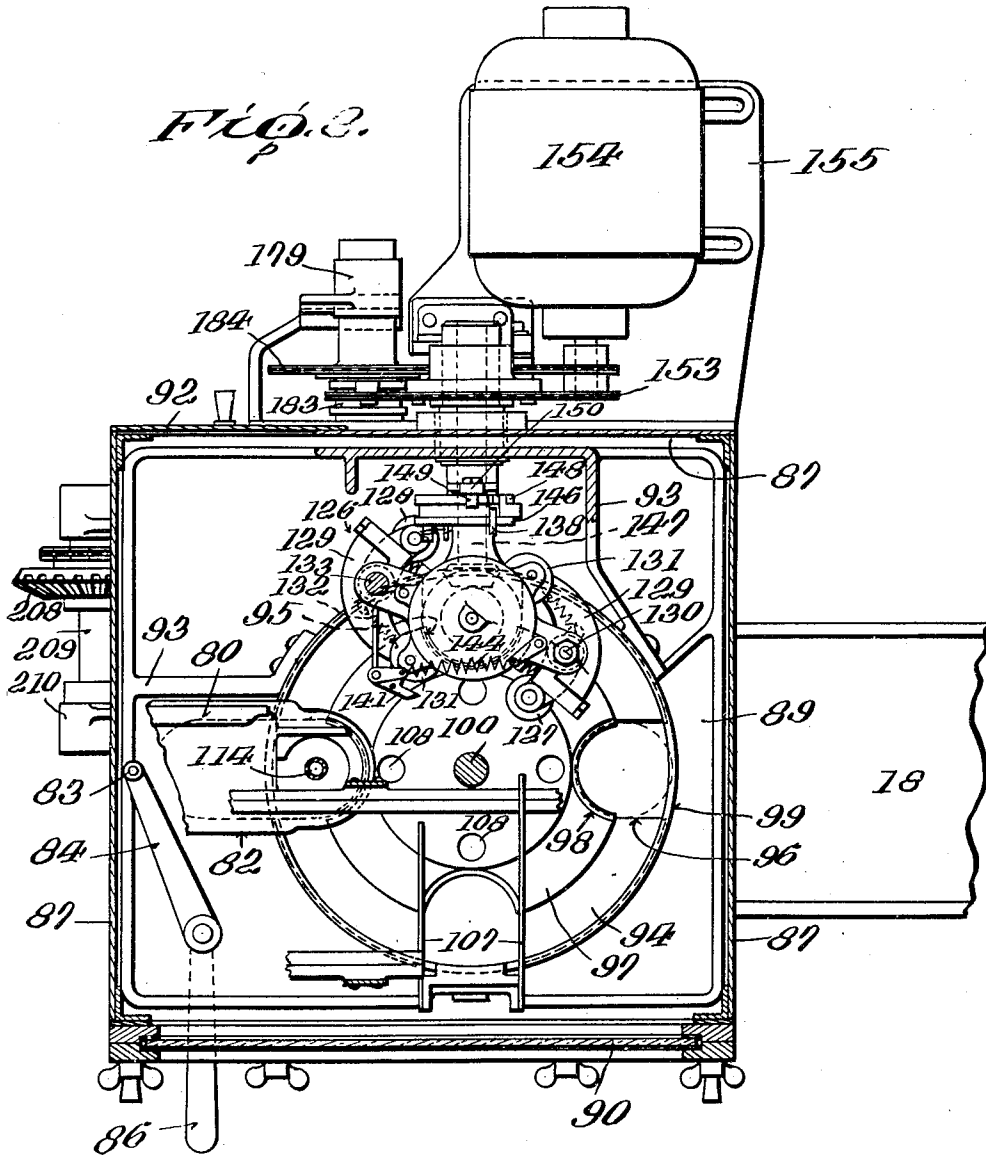
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APPARATUS FOR PACKAGING FRUIT JUICES

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11 Sheets-Sheet 7



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APPARATUS FOR PACKAGING FRUIT JUICES

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11 Sheets--Sheet 8



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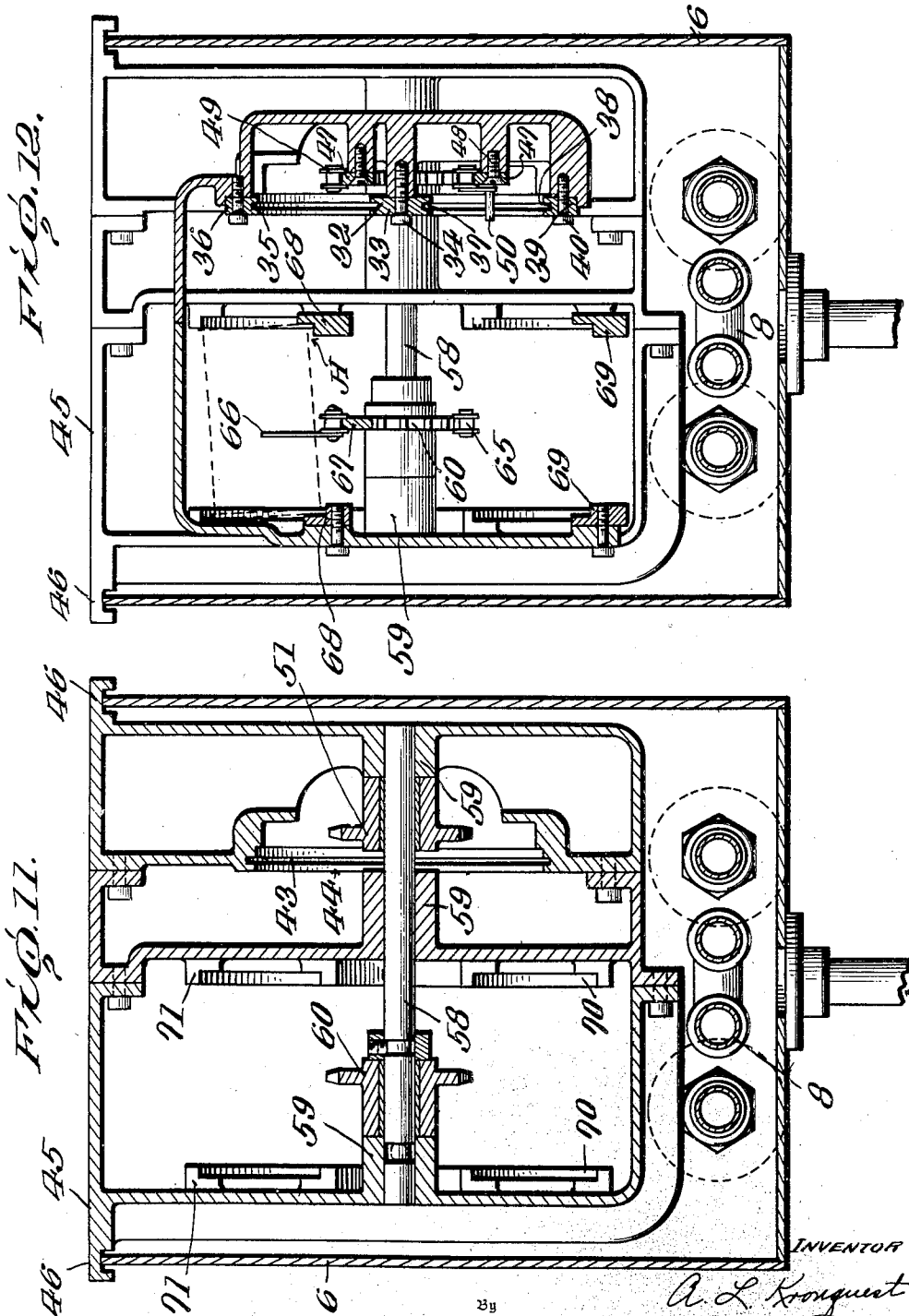
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APPARATUS FOR PACKAGING FRUIT JUICES

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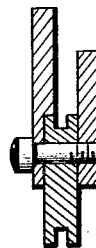
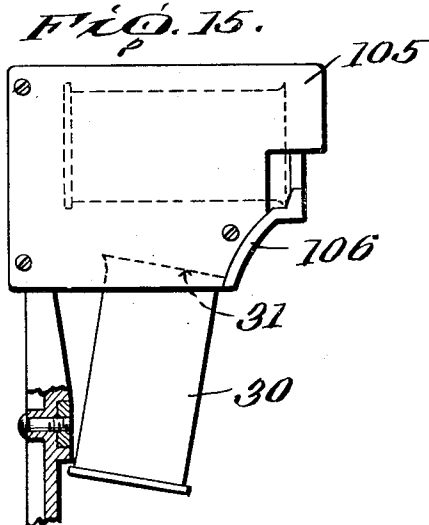
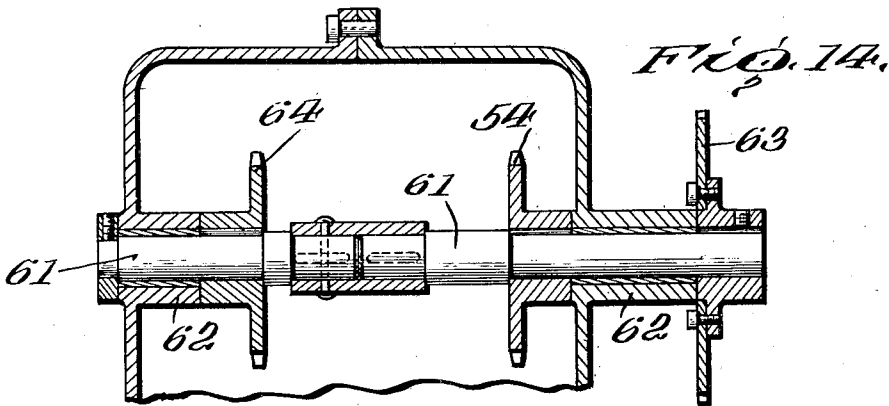
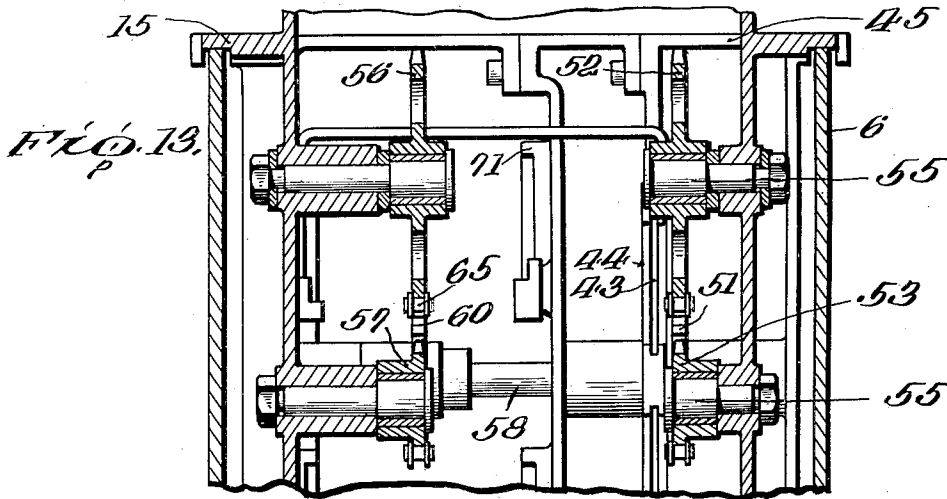
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APPARATUS FOR PACKAGING FRUIT JUICES

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11 Sheets-Sheet 10



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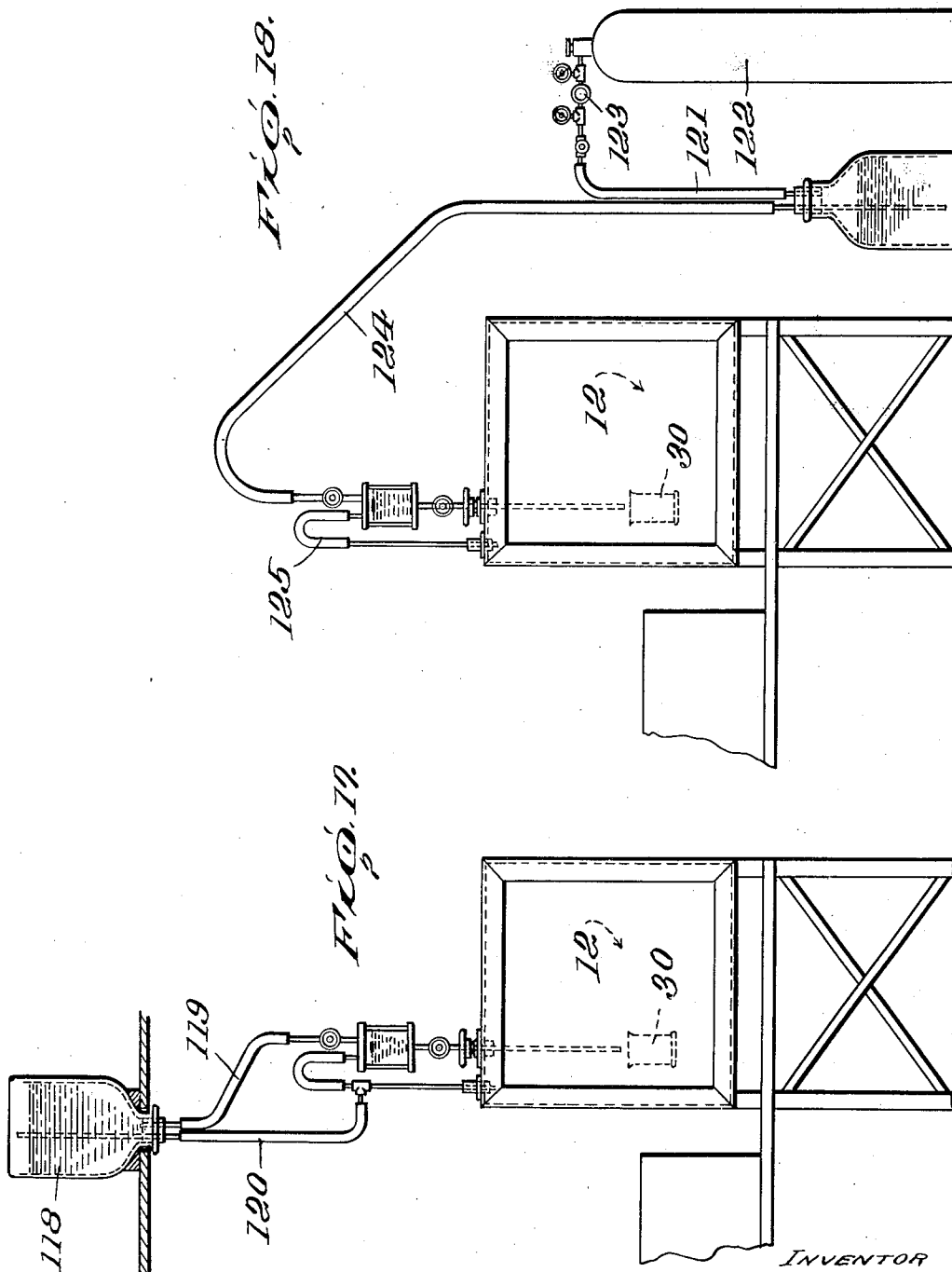
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APPARATUS FOR PACKAGING FRUIT JUICES

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11 Sheets-Sheet 11



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## UNITED STATES PATENT OFFICE

2,268,289

## APPARATUS FOR PACKAGING FRUIT JUICES

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Application July 18, 1939, Serial No. 285,137

20 Claims. (Cl. 226-68)

The invention relates generally to the packaging of fruit juices, and more particularly to the packaging of such juices under sterile conditions so that the flavor or vitamin content of the juices will not be modified.

The juices of various fruits are recognized as food stuffs containing substances beneficial to health. Oranges, lemons, tomatoes, etc. contain among other substances the anti-scorbutic vitamin known as vitamin C. It is, however, necessary that neither the flavor nor the vitamin content be injured in the processes of preparation and delivery. Very short exposure of such juices to the action of bacteria and/or oxidizing gases causes marked deterioration which is not abated by later sterilization or exclusion of such gases. Further, it is found that chemical preservatives and heat operate deleteriously upon the juices while the use of refrigeration restricts distribution of the juices to points near storage refrigerators.

The whole fruit with unbroken capsule or skin preserves the vitamin content substantially unchanged. Various agencies are markedly destructive of the quality of such juices, comprising (1) oxidation by atmospheric oxygen; (2) the action of enzymes normally present in the fruit but remaining inactive so long as the skin is unbroken; and (3) the life process of yeasts, molds and bacteria. Since the pulp and juices of citrus and other fruits are bacteriologically sterile as long as the fruit skin is unbroken, it is essential on the one hand to maintain this sterility by preventing contamination, and on the other hand to sterilize the fruit skin itself and to maintain a sterile and oxygen-free atmosphere during the disintegration of the fruit for the purpose of juicing. The juice obtained during disintegration is then transferred aseptically into a sterile container and this container is hermetically sealed to prevent contamination. The method of obtaining the juices in their natural, non-modified condition is covered in U. S. Letters Patent 2,047,935, issued to George D. Beal and Ronald B. McKinnis on July 21, 1936, and the present invention seeks to provide a novel method of and apparatus for packaging said juices under sterile conditions for the purposes above stated.

An object of the invention is to provide a novel fruit juice packaging apparatus including means for sterilizing the containers and covers therefor and passing them directly and without outside air contact into a sterile non-oxidizing atmosphere, means for filling the juice into the containers in the sterile atmosphere, and means for

applying and sealing the covers in said atmosphere.

Another object of the invention is to provide an apparatus of the character stated in which the sterilizing of the containers preferably is carried out in a hot acid bath, and in which the sealed containers are passed through a washing bath so as to remove acid from the exteriors of the containers.

Another object of the invention is to provide a novel apparatus of the character stated, including a housing providing a first or sterilizing chamber having a sterilizing bath therein and a second or filling and sealing chamber having a sterile, non-oxidizing atmosphere therein, means for supporting containers in said second chamber, means for guiding containers through the sterilizing bath and depositing them on said supporting means, means for filling said containers on said supporting means, means for feeding covers through the sterilizing bath and assembling them on the filled containers, means for sealing the containers in said second chamber, and liquid seal means for protecting the chambers from atmospheric communication.

Another object of the invention is to provide an apparatus of the character stated in which the sealed containers are discharged from the apparatus through a washing bath and in which the washing bath forms a liquid seal for excluding air at the discharge end of the apparatus and the sterilizing bath forms a liquid seal at the entrance end of the apparatus.

Another object of the invention is to provide an apparatus of the character stated in which the container and cover positioning and assembling means, the filling means, and the closing or sealing means all are operable from without so that atmospheric communication with the chambers of the apparatus is avoided.

Another object of the invention is to provide an apparatus of the character stated in which the container and cover directing equipments include receiving portions shaped to receive the containers and covers in one position only, namely the position in which they will be properly related for proper assembly within the filling and closing chamber.

Another object of the invention is to provide an apparatus of the character stated in which the container and cover directing guides have a long, and preferably tortuous passage through the sterilizing bath so as to assure proper sterilization of the containers and covers.

Another object of the invention is to provide

novel means for assuring the filling of properly measured, uncontaminated juice charges into each container before the cover is applied thereto.

Another object of the invention is to provide an apparatus of the character stated in which the container supporting means comprises a turntable which is manually indexed from station-to-station from a container receiving station to a container filling and cover receiving station, to a closing station, and to a discharging station, and to provide novel means for initiating operation of the closing devices and for accurately registering the turret pocket presented container with said devices.

Another object of the invention is to provide an apparatus of the character stated including power actuated cover seaming means, manually actuated means for chucking the container to be closed, and means actuated by the chucking operation for initiating operation of the seaming means.

Another object of the invention is to provide an apparatus of the character stated including manually controlled means, power operated through single cycles for chucking filled and loosely assembled containers and for feeding covers and containers into the filling and closing chamber.

Another object of the invention is to provide an apparatus of the character stated in which the seaming mechanism control devices actuated by the chucking of the containers will not be operated in any instance in which the chucked container is devoid of a cover.

Another object of the invention is to provide means for preventing entrapment of air in the containers as they are being fed through the sterilizing bath, and means for assuring drainage of all sterilizing liquid from the containers prior to introduction of the juices thereinto.

With the above and other objects in view that will hereinafter appear, the nature of the invention will be more fully understood by following the detailed description, the appended claims, and the several views illustrated in the accompanying drawings.

In the drawings:

Figure 1 is a side elevation illustrating the invention.

Figures 2 and 2a together comprise an enlarged side elevation of the apparatus, parts being broken away and in section.

Figure 3 is a detail fragmentary plan view illustrating the receiving ways for the covers and the containers.

Figure 4 is an enlarged end elevation of the filling and closing housing looking in the direction in which the containers are fed thereinto.

Figure 5 is an enlarged fragmentary face view illustrating the knock-out pad carrying rod in its elevated position.

Figure 6 is a fragmentary horizontal section illustrating the seaming mechanism clutch control actuating crank arm.

Figure 7 is an enlarged fragmentary right end elevation illustrating the chucking pad actuating mechanism.

Figure 8 is a horizontal sectional view taken through the filling and closing housing.

Figure 9 is a fragmentary horizontal sectional view illustrating the container closing or seaming mechanism, the inactive condition of the mechanism being shown.

Figure 10 is a detail vertical sectional view taken on the line 10—10 on Figure 9.

Figure 11 is a detail vertical cross section taken on the line 11—11 on Figure 2.

Figure 12 is a detail vertical cross section taken on the line 12—12 on Figure 2.

Figure 13 is a fragmentary vertical cross section taken on the line 13—13 on Figure 2.

Figure 14 is a fragmentary vertical section taken on the line 14—14 on Figure 2a.

Figure 15 is a detail right end elevation and partial vertical section illustrating the container righting means.

Figure 16 is a detail vertical section of the cover supporting trackway structure taken on the line 16—16 on Figure 2.

Figure 17 is a diagrammatic side elevation illustrating a manner of delivering the product by gravity action.

Figure 18 is a diagrammatic side elevation illustrating the manner of delivering the product by pressure action.

The apparatus herein disclosed as an example of embodiment of the invention includes a support framing generally designated 5, a sterilizing bath housing or tank 6 having a sterilizing bath 7 therein which is retained at an elevated or sterilizing, temperature of approximately 180° by a suitable heater element such as a steam pipe 8 or the like. The tank 6 preferably is provided with a suitable drain off equipment 9. The framing also serves to support a filling and closing housing generally designated 10 and which is connected with the housing or tank 6 by a conduit generally designated 11, and in the conduit and the chamber 12 formed within the housing 13 there is retained a sterile, non-oxidizing atmosphere. An inert gas such as carbon dioxide, hydrogen, or nitrogen, will serve to provide the sterile atmosphere, and this atmosphere is retained in the conduit and chamber by novel liquid seal equipments later to be described.

While the present invention is particularly directed to the packaging of orange or citrous fruit juices, it is to be understood that the principles of the invention may be applied as well in the packaging of juices from tomatoes, apples, pineapples, and the like. It is preferred that an acid bath be utilized in sterilizing the container parts within the housing or tank 5, and citric acid has been found suitable because it will have no injurious effect upon the juices being packaged.

The conduit 11 preferably is composed of two casing units 13 flange-assembled as at 14 to form the conduit structure and present rest flange or cover portions 15 which engage and close an end portion of the tank in the manner illustrated in Figures 1 and 3 of the drawings. The conduit is flange-secured as at 16 to the filling and closing housing 10.

It will be observed by reference to Figure 2 of the drawings that the flange 17 defining the opening into the conduit casting portions depending in the tank 6 is immersed below the level of the sterilizing bath so as to form a liquid seal, thereby to entrap and retain the sterile atmosphere within the conduit 11. At the discharge end of the machine, there is provided a filled and closed retainer receiving trough 18 having a washing bath 19 of water therein into which the containers are discharged through a delivery tube 20, the lower end of which is immersed in the bath so as to form a liquid seal likewise serving to entrap and retain the sterile

atmosphere within the housing 10 and the conduit 11.

It will be observed by reference to Figures 2 and 3 of the drawings that the conduit forming casting equipment is provided with a cover receiving opening 21 defined by vertical edge guides 22 for receiving the opposite edge portions of covers introduced into the apparatus. A cover plate 23 closes the space intervening the cover edge receiving grooves and is opposed by a recess 24, and the cover plate 23 and recess 24 permit introduction of container covers in one position only, thereby to avoid improper assembly of covers and containers in the apparatus. The covers are indicated at 25 and include the usual centrally depressed portions 26. These covers can be introduced only with the depressed portions 26 presented toward the clearance or recess 24. It will be obvious that attempts to otherwise introduce the covers would be prevented by contact of the cover portions 26 with the closure plate 23.

The conduit forming casting equipment also includes a container receiving opening 27 having container bottom guideways 28 and flanged top guides 29. The containers to be filled and closed in the apparatus herein disclosed are of the conventional flat top can type and in their empty state include the usual cylindrical body portions 30 and the open tops terminating in outwardly directed flanges. It will be observed by reference to Figure 3 of the drawings that the flanged tops 31 are too large to be received between the bottom guideways 28 and consequently it is impossible to improperly introduce the containers into the apparatus.

The cover guides 22 deliver vertically into an upper raceway 32 formed in a rail 33 secured as at 34 to the casting equipment. The upper raceway 32 is opposed by a raceway formed in a rail 35 secured as at 36 to the casting, and the lower raceway 37 in the rail 33 is opposed by a raceway 38 in a rail 39 secured as at 40 to said casting. The raceways 32 and 37 of the rail 33 merge as at 41 at the end of the rail in a continuation raceway disposed concentrically about the axis 42, and this continuation raceway is opposed by a keeper raceway 43 formed in an end portion 44 of a casting member 45 flange-supported as at 46 upon the tank in the manner best illustrated in Figures 1 and 12 of the drawings. The casting member 45 also serves as a support for the end of the rails 33, 35 and 39.

Upper and lower chain rails 47 are provided and are secured as at 48 to the casting equipments. These rails support and guide the upper and lower flights of a conveyor chain 49 having cover pushing pins 50 projecting therefrom in the manner illustrated in Figure 12 of the drawings and which serve to push the containers along the supporting and guiding raceways. The chain 49 passes over an end idler sprocket 51, has its upper flight passed under an intermediate idler sprocket 52, its lower flights under an intermediate idler sprocket 53, and the loop thereof extending beyond said intermediate idler sprockets passed over a driver sprocket 54. The idler sprockets 52 and 53 are mounted on studs 55 secured to the conduit casting equipment and are spaced laterally from similarly mounted idler sprockets 56 and 57, the purpose of which will presently appear.

The idler sprocket 51 is mounted on a cross shaft 58 secured in bearings 59 in the casting

equipment, and this shaft also supports a laterally spaced idler sprocket 60 aligned with the idler sprockets 56 and 57 previously referred to. The driver sprocket 54 is mounted upon a cross shaft 61 which is supported in bearings 62 formed in the casting equipments and which is driven through a sprocket 63 disposed outside the housing 10. The shaft 61 carries another, laterally spaced, drive sprocket 64 and a container conveying chain 65 passes about this driver sprocket, under the intermediate idler sprockets 56 and 57 and about the idler sprocket 60. See Figures 11 to 14. The chain 65 is equipped with suitable container engaging and conveying lugs 66 as illustrated in Figures 2 and 12 of the drawings. The upper flight of the chain 65 is supported on a rail 67 suitably supported on the casting equipment.

The container conveying chain 65 serves to push the containers in one direction along upper supporting rails 68 and lower supporting rails 69 suitably supported upon the casting equipments and which merge with end guides 70 formed in the casting extensions 71, and in the opposite direction over lower supporting rails 72 onto which the end guides 70 deliver.

The lower set of opposed cover raceways 37 and 38 deliver into upwardly inclined raceways 73 and 74 and the container supporting rails 69 deliver the containers onto similarly inclined supporting rail structures. At the upper ends of the inclined guideways the containers are diverted by a guide wall 75 onto downwardly inclined supporting ways 76, and the upwardly traveling covers are diverted by a guide portion 77 into downwardly inclined ways 78 to a casting 79 including a lateral enlargement 80 within which the covers are altered in position from vertical to horizontal by curved track guides 81. As the covers leave the track guides 81 they are deposited onto a longitudinal supporting and centering shelf 82.

When a container cover is deposited on the shelf 82 it is disposed horizontally but, as will later appear, is not registered over the container onto which it is to be affixed. At the proper time each cover is shifted into position for registering with and falling upon its associated container by a shifter pin 83 projecting upwardly from a crank arm 84 oscillatably mounted in a vertical bearing 85 supported in the housing 10 and operated manually by a crank handle 86 disposed without said housing.

The filling and closing housing includes sides 87, a top 88, and a bottom 89. The front side, as viewed in Figure 1, is closed by a removable glass panel 90, and the side toward the tank or housing 6 has an opening or window 91 therein through which the container and cover guideways extend into the chamber 12 of the housing 10. The rear wall is provided with a removable door 92 through which access may be had into the housing chamber. The housing 10 also includes an internal frame structure 93 which serves as a support for various portions of mechanisms later to be described.

A stationary platform 94 is provided within the housing chamber 12, and this platform is apertured as at 95 at the container closing station, and at 96 at the container discharging station. A rotary turret 97 having a plurality (four being shown) of peripheral pockets 98 formed therein is rotatable over the platform 94 and is surrounded by a guard rail 99 which serves to retain containers in the turret pockets as the

turret is indexed station by station from the container receiving station to the container filling station, to the container closing station, and to the container discharging station. The indexing of the turret is effected manually through the medium of a shaft 100, which extends vertically from the turret through a bearing 101 provided therefor on the housing top, and a hand wheel 102 secured upon the upper end of the shaft. A registering disk 103 is secured upon the upper end of the shaft 100 and has a peripheral notch or recess formed therein to correspond with each of the pockets 98 so that when each recess is yieldably engaged by the spring detent equipment 104 stationarily supported upon the top of the housing, the operator will know that the pockets are positioned at the respective stations.

The downwardly inclined portions of the container supporting rails within the housing chamber 12 deliver containers against an abutment wall 105 in the manner illustrated in Figures 2a and 15 of the drawings, and the rail which supports the bottom portion of the containers is discontinued at this point so that the containers can fall by gravity, bottom first, over the up-ending guide portion 106 in the manner illustrated in Figure 15. As each container is righted or turned bottom down, it falls between receiving guides 107 into the turret pocket presented at that particular time at the receiving station. See Figures 2a and 8.

It will be observed by reference to Figure 12 of the drawings that the container supporting rail which supports the open end of the container during its initial movement through the sterilizing bath is disposed at a higher level than its companion rail in the manner illustrated at H.

It will also be observed by reference to Figure 4 of the drawings that the container guiding rail portion which supports the bottoms of the containers is disposed at a slightly higher elevation than the companion rail as indicated at H. By thus disposing the open ends of the containers at an upward tilt while starting through the sterilizing bath and a downward tilt after leaving the bath, provision is made for assuring against entrapment of contaminating air in the containers while passing through the bath and also for assuring that all sterilizing liquid will be drained out of the containers before they are presented for filling.

In order to assure proper registry of the turntable at the respective stations, the turntable is provided with a plurality of registering recesses 108, one thereof being associated with each turret pocket. These recesses are successively presented for receiving a vertically reciprocable registering pin 109 slidable in a bearing 100 supported on the housing bottom and connected at its lower end to one end of a rocker beam 111 which is pivotally supported intermediate its ends as at 112 and has its other end connected to a depending actuator rod 113 which is reciprocated for the purpose of projecting the pin 109 into or withdrawing it from the registering recesses in a manner later to be described. The registering engagement of the pin 109 with one of the recesses 108 is effected prior to each container closing function and serves to assure proper centering or registering of the containers with the closing mechanisms later to be described.

A filler tube or nozzle 114 extends downwardly

into the gas filled, sterile chamber 12 in the manner illustrated in Figures 1 and 8 of the drawings, and it will be observed that this nozzle terminates just above the containers at the filling station. It will be noted also that the casing 80 and the cover supporting and centering shelf are disposed at this station and include an opening through which the product can flow from the nozzle into the container positioned at said station. See Figure 8. The filler tube 114 passes upwardly out of the housing 10 through a suitable gland to a measuring cup 115 preferably equipped with a transparent casing portion having a level marker 116 thereon. Control valves 117 are provided above and below the measuring cup and serve to control the introduction of measured quantities of juice into the measuring cup and the delivery of said measured quantities to the individual containers.

The sterile juice to be filled into the containers can be supplied in any suitable manner and I have illustrated two examples of acceptable equipment adaptable for the purpose in Figures 17 and 18 of the drawings. In the apparatus of Figure 17, the sterile product flows by gravity from a container 118 through a flow tube 119 to the measuring cup, a suitable venting tube equipment 120 being provided for communicating with the interior of the sterile chamber 12 and above the product in the container 118 and the measuring cup.

In the form of apparatus illustrated in Figure 18, the sterile product container is connected by a pressure tube 121 with a pressure source 122 of CO<sub>2</sub> gas through suitable control equipment 123 and by a flow tube 124 leading from the container to the measuring cup, a suitable vent tube 125 being provided for connecting the interior of the chamber 12 with the upper portion of the measuring cup.

It is to be understood, of course, that the juices fed from the containers to the measuring cups are filled into said containers under sterile condition in any suitable manner, an example of which is to be found in the disclosure in U. S. Letters Patent 2,047,935 hereinbefore referred to.

It is to be understood, of course, that any approved form of container closing mechanism may be employed within the sterile chamber 12. It is preferred that a suitable form of double roll seaming equipment be employed for closing the containers, and the equipment herein disclosed and generally designated 126 is disclosed in detail in the Kronquest Patent 2,023,598, of December 10, 1935, and in the Fowler Patent 2,141,976, of December 27, 1938. Since these patents fully disclose the details of construction and operation of these seaming mechanisms and the control equipments therefor, these equipments will be referred to but briefly herein.

In the apparatus herein disclosed, the container advancing turret is manually indexed, but the feeding of the containers into the turret pockets and the closing of the filled containers is effected by manually controlled, power operated mechanisms. The operation of these mechanisms is initiated by manually actuated devices, and the power operated mechanisms cause them to function through single cycles in a manner later to be described.

The seaming equipment includes first and second operation rolls 127 and 128, and 129 designates the carrying and actuating arm equipments upon which said rolls are mounted. These arm equipments are pivotally supported as at 130 and

are moved under the control of rotary cam equipments in the manner described in detail in the Kronquest patent hereinbefore referred to. The actuating rollers 131 carried by said arm equipments are held against the actuating cam equipments by springs 132.

One of the arm equipments 129 is mounted on a shaft 133 which is oscillatable within a sleeve 134 and is pin connected as at 135 to a clutch control sleeve 136 surrounding the sleeve 134, an arcuate slot 137 being provided in the sleeve 134 for permitting the necessary relative movement between the parts 133, 136 and the sleeve 134. The sleeve 136 carries a clutch releasing pin 138 and a trigger arm 139. A mounting pin 140 depends from the arm 139 and pivotally supports a notched trigger 141 which is constantly urged by an anchored spring 142 toward a holding abutment 143. It will also be observed, by reference to Figure 8 of the drawings, that the arm 139 is constantly urged, by an anchored spring 144, toward the position illustrated in Figure 9 of the drawings.

The clutch releasing pin 138 overlies a clutch sector 145 pivotally supported on the rotor 146 which is secured to the seaming mechanism drive shaft 147. As in the clutch equipment disclosed in detail in the Fowler patent hereinbefore referred to, the sector 145 is spring urged outwardly and carries an abutment head 148 which is presented for driving engagement by a driving pin 149 projecting from a crank 150 carried by a sleeve 151 rotatably supported as at 152 on the housing 10 and constantly driven by sprocket and chain connections 153 from the motor 154. The motor is supported on a shelf 155 projecting rearwardly from a bracket 156 secured to and depending from the bottom of the housing 10.

The shaft 133 extends upwardly through the top of the housing 10 and carries a crank member 157 which is secured thereon in position for engaging a movement limiting stop 158. The seaming head includes a knock-out pad 159 which is supported on a stem or rod 160 projecting upwardly through the housing top where it is equipped with a vertically adjustable clutch control sleeve actuating head 161. The head 161 includes an abutment shoulder 162 and a conical face 163 which is engageable with a dog 164 pivotally supported as at 165 on a crank lever 166 having a crank arm 167 which engages the crank member 157, said lever 166 being pivotally supported as at 168. The lever 166 is held in its normal position, illustrated in Figure 4 of the drawings, by an anchored spring 169, and the dog 164 is held against a stop shoulder 170 on the lever 166 by a compression spring 171.

The rod 160 is yieldably depressed by a compression spring 172 interposed between the head 161 and a bracket 173 supported on the housing top and through which the upper end of the rod passes so that it can be engaged by a lever 174 pivoted at 175 on the bracket and including an actuating handle portion 176.

The motor also drives a sleeve 177 which is freely rotatable about a shaft 178 having bearing as at 179 in the bracket 156. The sleeve 177 carries a driver pin 180 for cooperating with the spring projected clutch sector 181 pivotally mounted on the rotor 182 which is keyed at 183 to the shaft 178, and said sleeve is constantly rotated through the medium of sprocket and chain connections 184. The shaft 178 also carries a worm gear 185 which meshes with a

worm wheel 186 secured upon a shaft 187 which is rotatable in bearings 188 provided in the depending bracket structure.

A clutch control pin 189 is reciprocable in a bearing 190 supported on the bracket structure, and this control pin is slot and pin connected as at 191 to one arm of a bell crank lever 192 which is pivotally supported as at 193 on the bracket structure. An anchored spring 194 is connected to the pin carrying arm of the bell crank lever 192 and tends to hold the lever in the pin projected, declutching position with the roller 195 which is carried by the other arm of the bell crank lever against the periphery of the stop disk 196 mounted on the shaft 187. The said other arm of the bell crank lever is connected at its free end to the actuator rod 113 hereinbefore referred to and is also connected by a depending rod with a treadle structure 197 by depression of which the bell crank lever can be shifted about its pivot against the tension of the spring 194.

A cam disk 198 is secured upon the shaft 187 and is provided at its peripheral edge with a gradual lift portion 199, a long dwell portion 200, and an abrupt drop portion 201 engageable with a roller 202 secured to the lower end of a plunger member 203 vertically reciprocable in guides 204 provided therefor in the depending bracket structure. The plunger 203 carries a container chucking pad 205 which normally rests flush with the upper surface of the stationary table 94 within the accommodating recess 95 formed therein at the container closing station so that when the turntable is brought to rest at the closing station, it will position a container to be closed on said pad. The plunger equipment 203, 202 is held against the periphery of the cam disk 198 by an anchored spring 206.

The shaft 187 also carries a beveled gear 207 which meshes with a larger beveled gear 208 secured upon a shaft 209 which is rotatable in bearings 210 provided therefor in the depending bracket structure. The rotation imparted to the shaft 209 through the gear connections 207, 208 is transmitted, through a sprocket 211 secured upon the shaft 209 and a chain 212 passing over that sprocket and over the driver sprocket 63, to the container and cover feeding chain equipments hereinbefore described.

#### Operation

When the apparatus is being employed for sterilizing containers and covers, for filling the sterile juices into the containers, and for closing the containers in a sterile atmosphere, the containers and covers are individually introduced into the apparatus through the feed-in equipments illustrated in detail in Figures 1 and 3 of the drawings and which serve to assure against improper assembly of the cover and container units at the point in the apparatus at which assembly occurs. The containers fed through the openings first referred to enter the receiving guideways and are conveyed by the chain equipments hereinbefore described in detail first in one direction and then in the opposite direction in the hot acid sterilizing bath 7. As viewed in Figure 2 of the drawings, the containers and covers are first fed to the left over the upper trackways and then toward the right over the lower trackways. By causing the containers to travel in opposite directions through the sterilizing bath a long sterilizing interval is

provided for which is ample to assure the desired sterilization without consumption of unnecessarily large apparatus space. As has been previously stated while passing through the initial stages of the sterilizing travel the containers are held tilted as indicated in Figure 13 so as to prevent entrapment of contaminating air in the lower portions of said containers.

As the containers and covers reach the right hand end of their respective guideways, as viewed in Figure 2, the chains carry them upwardly over the upwardly inclined guideways, as illustrated in Figure 2a of the drawings, and deliver them onto the downwardly inclined guideways leading into the sterile atmosphere container filling and closing housing where the covers pass into the casting enlargement 80 wherein they are changed from the vertical to the horizontal position and deposited on the receiving shelf 82, and wherein the containers are turned to the bottom up position by the equipments 105, 106 and are individually deposited in the receiving pocket of the turntable between the guides 107 at the receiving station. As has been previously described, the containers are tilted open end downwardly before they reach the turntable so that any sterilizing liquid contained therein will be drained out before the containers are up-ended. See Figure 4.

Assuming that an empty container has been positioned at the filling station, centrally beneath the filling nozzle 114 and the cover supporting shelf 82 at the filling station by proper manual indexing of the turntable, the operator manipulates the control valve equipments 117 to allow a measured charge of juice to flow down out of the measuring cup 115 and into the container at the filling station. After this measured filling of the container has been completed, the operator manipulates the handle 86 to cause the pin 83 to engage the cover resting upon the shelf 82 and slide it over into centered relation over the filled container. As soon as the cover reaches the end of the centering guide it will drop from the shelf onto the filled container. The operator now manipulates the hand wheel 102 to index the turntable and position the filled and loosely assembled container and cover at the closing station and on the chucking pad 205.

By now stepping upon and depressing the treadle 197 the operator imparts a rocking motion to the bell crank lever 192 to simultaneously elevate the registering pin 109 and project it into the aligned receiving recess 108 in the turntable, for assuring proper registry of the turntable pocket and the container therein with the seaming mechanisms, and withdraw the clutch controlling pin 189. Withdrawal of the pin 189 allows the clutch sector 181 to move out into the orbital path of the driving pin 180 so that the moving pin 180 will impart rotation to the rotor 182 and the shaft 178 to which it is fixed. The shaft 178 imparts rotation, through the gearing connections 185, 186, to the shaft 187, and rotation of the previously stationary cam 198 serves to lift the plunger 203 and chucking pad 205 to press the filled and covered container against the chuck of the seaming mechanism generally designated 126.

Rotation of the shaft 187 also imparts rotation, through the power transmitting connection 207, 208, 209, 211 and 212, to the cover and container conveying equipments so that during the single cycle of power application initiated by depression

of the treadle, one cover and one container will be fed onto the receiving guideways in the sterile atmosphere containing chamber 12 of the housing 10 in the manner previously described. It should be understood that the operator's foot is removed after each depression of the treadle and the pin 189 is returned to its normal position for retracting the sector 181 out of the path of movement of the driving pin 180 and discontinuing rotation of the sleeve 182 after a single cycle of rotation has been completed. The driving connections are so proportioned that only one container and one cover is fed into the housing 10 during each cycle of operation of the container chucking mechanism.

As each filled and loosely assembled container is chucked in the manner above described, the cover thereof engages the knock-out pad 159 and moves the rod 160 upwardly through the bracket 173. This upward movement of the rod 160 causes the abutment face 162 of the head 161 to engage the dog 164 and rock the crank lever 166 about its pivot 168 to thereby cause the arm 167 to move the crank member 157 and impart a rocking movement to the shaft 133. The rocking of the shaft 133 removes the clutch pin 138 and permits the clutch sector 145 to move out into the path of travel of the driving pin 149 thereby causing the sleeve 151 to impart rotation to the driving shaft 147 of the seaming mechanism. As the trigger arm 139 is moved to the left as viewed in Figure 10 of the drawings the trigger 141 will engage the abutment 143 and hold the clutch pin 138 out of the path of movement of the sector 145. The seaming mechanism will function as described in detail in the Kronquest and Fowler patents hereinbefore referred to until the double seaming function has been completed, at which time the adjacent actuator roller 131 will engage and release the trigger 141 so as to permit the clutch pin 138 to move to the position illustrated in Figure 9 and effect a declutching of the continuously rotating driving sleeve 151 and thereby discontinue rotation of the seam mechanism drive shaft 147.

The knock-out pad 159 which is engaged by the cover of each container as it is being chucked is smaller than the internal diameter of the containers, and it will be obvious that should a container be moved toward the chuck of the seaming mechanism without a cover thereon, the rod 160 would not be moved upwardly, and initiation of seaming mechanism operation would not be effected.

By now depressing the handle 176 the operator can depress the knock-out pad 159 and return the head 161 to its normal, lowered position. The lowering of the head permits the crank members 167 and 157 to return to their normal positions and during the lowering of the head the coniform surface 163 thereof will freely deflect the spring pressed dog 164 and permit it to return to the normal position illustrated in Figure 4 of the drawings.

The now filled and closed contained can now be manually indexed to the discharging station where it will fall through the table aperture 96 and the discharge tube 20 into the bath 19 in which acid remaining on the exterior of the container will be removed.

By repeating the operations hereinbefore described, containers and covers will be successively fed into the sterile atmosphere containing chamber 10, the containers filled, the covers applied to the containers, and the loosely assembled con-

tainers double seam closed and then discharged in the manner described.

In this disclosure a particular patented method of obtaining juices in a natural, non-modified condition has been referred to, but it is to be understood that the invention is not limited to the use of juices obtained by this method alone. While it is preferred that the juices to be packaged in accordance with the invention herein disclosed be obtained by the patented method herein referred to, other methods may be utilized for producing sterile juices for packaging, such for example as flash pasteurizing where the fruit juice is subjected to heat only for a very short interval, so that neither the color nor the flavor thereof is injured, and then immediately cooled and aseptically sealed in sterile containers, until it is transferred to commercial containers for marketing.

It is of course to be understood that the details of structure and arrangement of parts may be variously changed and modified without departing from the spirit and scope of my invention.

I claim:

1. In apparatus of the character described, a sterilizing tank having a sterilizing bath therein, a filling and closing housing, spaced tracks for guiding open-topped containers in a generally horizontal position through the tank and into the housing for deposition therein, said tracks including portions relatively positioned to hold the containers with their open tops tilted higher than their closed bottoms in a portion of the bath and reversely positioned with relation one to the other in approach to the housing to hold the containers with their open tops tilted downwardly whereby to avoid entrapment of air in the container bottoms in the bath and to assure draining out of sterilizing liquid before the containers are deposited in said housing.

2. In apparatus of the character described, a sterilizing tank having a sterilizing bath therein, container and cover supporting trackage in said tank disposed in upper and lower flights immersed in the bath, and means for conveying the covers and containers over the trackage flights in one direction over the upper flight and in the opposite direction over the lower flight.

3. In apparatus of the character described, a filling and closing housing having a sterile non-oxidizing atmosphere therein, means for introducing and positioning containers and covers therefor in sterile condition in said housing with each cover disposed above and to one side of its associated container, means for directing a juice in sterile condition into each container, and means operable from without the housing for shifting each cover into centered relation over and dropping it upon its associated filled container.

4. In apparatus of the character described, a filling and closing housing having a sterile non-oxidizing atmosphere therein, means for introducing and positioning containers and covers therefor in sterile condition in said housing with each cover disposed above and to one side of its associated container, means for directing a juice in sterile condition into each container, means operable from without the housing for shifting each cover into centered relation over and dropping it upon its associated filled container, and power operated means manually controlled from without the housing for sealing the covers on the filled containers.

5. In apparatus of the character described, a housing structure providing a sterilizing chamber and a filling and closing chamber having a sterile non-oxidizing atmosphere therein, container and cover supporting means in the filling and closing chamber, sterilizing means in said sterilizing chamber, means for individually directing containers and covers therefor through the sterilizing means and to said supporting means, means for filling the supported containers, means for applying the covers to the filled containers, means for sealing said containers in said sterile atmosphere, said supporting means including a turret movable station-by-station from a container receiving station to a container filling station, to a container sealing station and to a container discharging station, manually controlled means actuated through single complete cycles for actuating the sealing means for sealing individual containers, and means operable upon each actuation of said manually controlled means for positioning the turret with a container perfectly registered at the closing station.

6. In apparatus of the character described, a housing structure providing a sterilizing chamber and a filling and closing chamber having a sterile non-oxidizing atmosphere therein, container and cover supporting means in the filling and closing chamber, sterilizing means in said sterilizing chamber, means for individually directing containers and covers therefor through the sterilizing means and to said supporting means, means for filling the supported containers, means for applying the covers to the filled containers, means for sealing said containers in said sterile atmosphere, said supporting means including a turret movable station-by-station from a container receiving station to a container filling station, to a container sealing station and to a container discharging station, said sealing means comprising a cover seaming head mounted in the filling and closing chamber and including a chuck, and manually controlled power actuated means operable through single complete cycles for chucking individual containers.

7. In apparatus of the character described, a housing structure providing a sterilizing chamber and a filling and closing chamber having a sterile non-oxidizing atmosphere therein, container and cover supporting means in the filling and closing chamber, sterilizing means in said sterilizing chamber, means for individually directing containers and covers therefor through the sterilizing means and to said supporting means, means for filling the supported containers, means for applying the covers to the filled containers, means for sealing said containers in said sterile atmosphere, said supporting means including a turret movable station-by-station from a container receiving station to a container filling station, to a container sealing station and to a container discharging station, said sealing means comprising a cover seaming head mounted in the filling and closing chamber and including a chuck, manually controlled power actuated means operable through single complete cycles for chucking individual containers, and means automatically actuated during each container chucking operation for positioning the turret with a container perfectly registered with said chuck.

8. In apparatus of the character described, a housing structure providing a sterilizing chamber and a filling and closing chamber having a sterile non-oxidizing atmosphere therein, con-

tainer and cover supporting means in the filling and closing chamber, sterilizing means in said sterilizing chamber, means for individually directing containers and covers therefor through the sterilizing means and to said supporting means, means for filling the supported containers, means for applying the covers to the filled containers, means for sealing said containers in said sterile atmosphere, said supporting means including a turret movable station-by-station from a container receiving station to a container filling station, to a container sealing station and to a container discharging station, said sealing means comprising a cover seaming head mounted in the filling and closing chamber and including a chuck, manually controlled power actuated means operable through single complete cycles for chucking individual containers, and power operated means automatically actuated by each chucking movement of a container for effecting operation of the seaming head through a single cycle.

9. In apparatus of the character described, a housing structure providing a sterilizing chamber and a filling and closing chamber having a sterile non-oxidizing atmosphere therein, container and cover supporting means in the filling and closing chamber, sterilizing means in said sterilizing chamber, means for individually directing containers and covers therefor through the sterilizing means and to said supporting means, means for filling the supported containers, means for applying the covers to the filled containers, means for sealing said containers in said sterile atmosphere, said supporting means including a turret movable station-by-station from a container receiving station to a container filling station, to a container sealing station and to a container discharging station, said sealing means comprising a cover seaming head mounted in the filling and closing chamber and including a chuck, manually controlled power actuated means operable through single complete cycles for chucking individual containers, power operated means automatically actuated by each chucking movement of a container for effecting operation of the seaming head through a single cycle, and means automatically actuated during each container chucking operation for positioning the turret with a container perfectly registered with said chuck.

10. In apparatus of the character described, a housing structure providing a sterilizing chamber and a filling and closing chamber having a sterile non-oxidizing atmosphere therein, container and cover supporting means in the filling and closing chamber, sterilizing means in said sterilizing chamber, means for individually directing containers and covers therefor through the sterilizing means and to said supporting means, means for filling the supported containers, means for applying the covers to the filled containers, means for sealing said containers in said sterile atmosphere, said supporting means including a turret movable station-by-station from a container receiving station to a container filling station, to a container sealing station and to a container discharging station, said sealing means comprising a cover seaming head mounted in the filling and closing chamber and including a chuck, and a vertically reciprocable knockout pad engaged by containers being chucked, manually controlled power actuated means operable through single complete cycles for chucking individual containers, and power operated means

automatically controlled by knockout pad movement during each chucking movement of a container for effecting operation of the seaming head through a single cycle.

11. In apparatus of the character described, a housing structure providing a sterilizing chamber and a filling and closing chamber having a sterile non-oxidizing atmosphere therein, container and cover supporting means in the filling and closing chamber, sterilizing means in said sterilizing chamber, means for individually directing containers and covers therefor through the sterilizing means and to said supporting means, means for filling the supported containers, means for applying the covers to the filled containers, means for sealing said containers in said sterile atmosphere, said supporting means including a turret movable station-by-station from a container receiving station to a container filling station, to a container sealing station and to a container discharging station, said sealing means comprising a cover seaming head mounted in the filling and closing chamber and including a chuck, and manually controlled power actuated means operable through single complete cycles for chucking individual containers and for feeding one container and cover complement into the filling and closing chamber.

12. In apparatus of the character described, a housing structure providing a sterilizing chamber and a filling and closing chamber having a sterile non-oxidizing atmosphere therein, container and cover supporting means in the filling and closing chamber, sterilizing means in said sterilizing chamber, means for individually directing containers and covers therefor through the sterilizing means and to said supporting means, means for filling the supported containers, means for applying the covers to the filled containers, means for sealing said containers in said sterile atmosphere, said supporting means including a turret movable station-by-station from a container receiving station to a container filling station, to a container sealing station and to a container discharging station, said sealing means comprising a cover seaming head mounted in the filling and closing chamber and including a chuck, manually controlled power actuated means operable through single complete cycles for chucking individual containers, and means automatically actuated during each container chucking operation for positioning the turret with a container perfectly registered with said chuck.

13. In apparatus of the character described, a housing structure providing a sterilizing chamber and a filling and closing chamber having a sterile non-oxidizing atmosphere therein, container and cover supporting means in the filling and closing chamber, sterilizing means in said sterilizing chamber, means for individually directing containers and covers therefor through the sterilizing means and to said supporting means, means for filling the supported containers, means for applying the covers to the filled containers, means for sealing said containers in said sterile atmosphere, said supporting means including a turret movable station-by-station from a container receiving station to a container filling station, to a container sealing station and to a container discharging station, said sealing means comprising a cover seaming head mounted in the filling and closing chamber and including a chuck, and a vertically reciprocable knockout pad engaged by containers being chucked, man-

ually controlled power actuated means operable through single complete cycles for chucking individual containers, and power operated means automatically controlled by knockout pad movement during each chucking movement of a covered container for effecting operation of the seaming head through a single cycle, said knockout pad being of a diameter for entering an uncovered container whereby seaming head actuation will not be effected by chucking movement of an uncovered container.

14. In apparatus of the character described, a housing structure providing a sterilizing chamber and a filling and closing chamber having a sterile non-oxidizing atmosphere therein, container and cover supporting means in the filling and closing chamber, an acid liquid sterilizing bath in said sterilizing chamber, means for directing containers and covers therefor through said acid liquid sterilizing bath and to said supporting means, means for filling the supported containers, means for applying the covers to the filled containers, means for sealing said containers in said sterile atmosphere, a liquid washing bath through which the sealed containers are discharged, and means cooperating with said baths to form liquid seals preventing ingress of outside air.

15. In apparatus of the character described, a housing structure providing a sterilizing chamber and a filling and closing chamber having a sterile non-oxidizing atmosphere therein, container and cover supporting means in the filling and closing chamber, sterilizing means in said sterilizing chamber, means for individually directing containers and covers therefor through the sterilizing means and to said supporting means, means for filling the supported containers, means for applying the covers to the filled containers, and means for sealing said containers in said sterile atmosphere, said sterilizing means comprising an acid liquid bath, and said container and cover directing means including individual guideways immersed in the liquid bath and merging into individual guideways extending out of the bath and disposed to deliver onto the supporting means.

16. In apparatus of the character described, a housing structure providing a sterilizing chamber and a filling and closing chamber having a sterile non-oxidizing atmosphere therein, container and cover supporting means in the filling and closing chamber, sterilizing means in said sterilizing chamber, means for individually directing containers and covers therefor through the sterilizing means and to said supporting means, means for filling the supported containers, means for applying the covers to the filled containers, means for sealing said containers in said sterile atmosphere, said supporting means including a turret movable station-by-station from a container receiving station to a container filling station and to a container discharging station, and a guideway portion for the covers disposed horizontally above containers presented at the filling station and having cover centering and discharging parts centered over a container at said filling station, and manually operable means operable from without the housing structure for shifting covers serially to fall from the centering and discharging parts onto a filled container centered therebeneath, for indexing said turret, and for initiating operation of said sealing means.

17. In apparatus of the character described, 75

a housing structure providing a sterilizing chamber and a filling and closing chamber having a sterile non-oxidizing atmosphere therein, container and cover supporting means in the filling and closing chamber, sterilizing means in said sterilizing chamber, means for individually directing containers and covers therefor through the sterilizing means and to said supporting means, means for filling the supported containers, means for applying the covers to the filled containers, means for sealing said containers in said sterile atmosphere, said sterilizing means comprising a liquid bath, said container and cover directing means including individual guideways immersed in the bath and merging into individual guideways extending out of the bath and disposed to deliver onto supporting means, said supporting means including a turret movable station-by-station from a container receiving station to a container filling station, to a container sealing station and to a container discharging station, and a guideway portion for the covers disposed horizontally above containers presented at the filling station and having cover centering and discharging parts centered over a container at said filling station; and manually operable means operable from without the housing structure for shifting covers serially to fall from the centering and discharging parts onto a filled container centered therebeneath, for indexing said turret, and for initiating operation of said sealing means.

18. In apparatus of the character described, a housing structure providing a sterilizing chamber and a filling and closing chamber having a sterile non-oxidizing atmosphere therein, container and cover supporting means in the filling and closing chamber, sterilizing means in said sterilizing chamber, means for individually directing containers and covers therefor through the sterilizing means and to said supporting means, means for filling the supported containers, means for applying the covers to the filled containers, means for sealing said containers in said sterile atmosphere, said sterilizing means comprising a single acid bath, said container and cover directing means including individual guideways immersed in the bath and merging into individual guideways extending out of the bath and disposed to deliver onto supporting means, said supporting means including a turret movable station-by-station from a container receiving station to a container filling station, to a container sealing station and to a container discharging station, and a guideway portion for the covers disposed horizontally above containers presented at the filling station and having cover centering and discharging parts centered over a container at said filling station; a washing bath through which the sealed containers are discharged, and means cooperating with said baths to form liquid seals preventing ingress of outside air.

19. In apparatus of the character described, a housing structure providing a sterilizing chamber and a filling and closing chamber having a sterile non-oxidizing atmosphere therein, container and cover supporting means in the filling and closing chamber, sterilizing means in said sterilizing chamber, means for individually directing containers and covers therefor through the sterilizing means and to said supporting means, means for filling the supported containers, means for applying the covers to the filled containers, means for sealing said containers in said sterile atmosphere, said sterilizing means comprising a

single acid bath, said container and cover directing means including individual guideways immersed in the bath and merging into individual guideways extending out of the bath and disposed to deliver onto supporting means, said supporting means including a turret movable station-by-station from a container receiving station to a container filling station, to a container sealing station and to a container discharging station, and a guideway portion for the covers disposed horizontally above containers presented at the filling station and having cover centering and discharging parts centered over a container at said filling station; a washing bath through which the sealed containers are discharged, means cooperating with said baths to form liquid seals preventing ingress of outside air; and manually operable means operable from without the housing structure for shifting covers serially to fall from the centering and discharging parts onto a filled container centered therebeneath, for indexing said turret, and for initiating operation of said sealing means.

20. In apparatus of the character described, a housing structure providing a sterilizing chamber and a filling and closing chamber having a sterile non-oxidizing atmosphere therein, container and cover supporting means in the filling and closing chamber, sterilizing means in said sterilizing chamber, means for individually directing containers and covers therefor through the sterilizing means and to said supporting means, means for filling the supported containers, means for applying the covers to the filled containers, means for sealing said containers in said sterile atmosphere, said means for sealing the containers including a double roll seaming mechanism mounted in the housing, constantly operating power applying means for said seaming mechanism located outside the housing structure, and manually operable means operable from without said housing structure for causing said seaming mechanism to function through individual cycles.

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