May 20, 1947. A. E. ALMGREN 2,420,642

TREATING MACHINE FOR OPENING HINGED CLOSURE MEMBERS ON CONTAINERS

Filed July 19, 1944 5 Sheets-Sheet 1

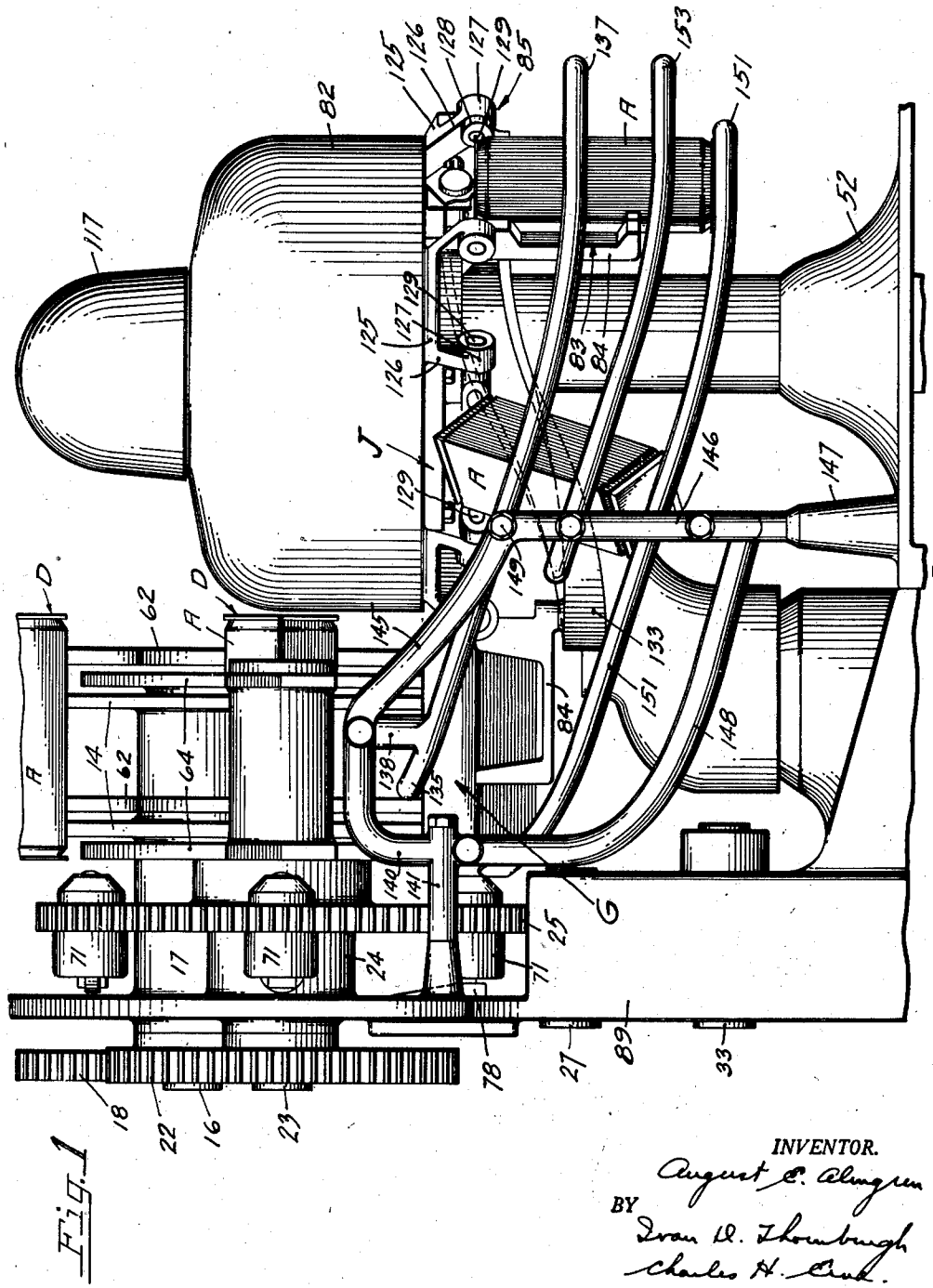


Fig. 1

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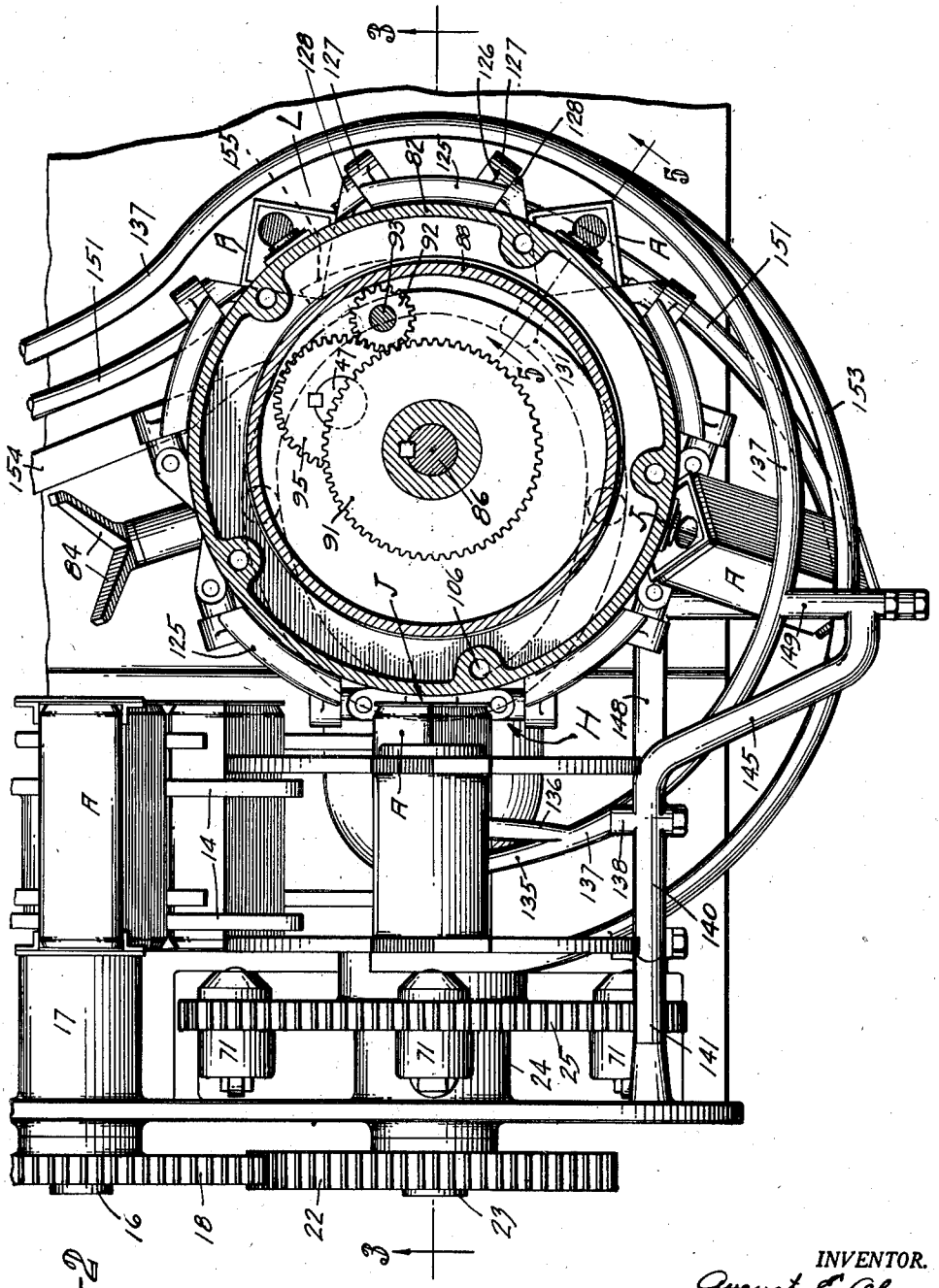


Fig. 2

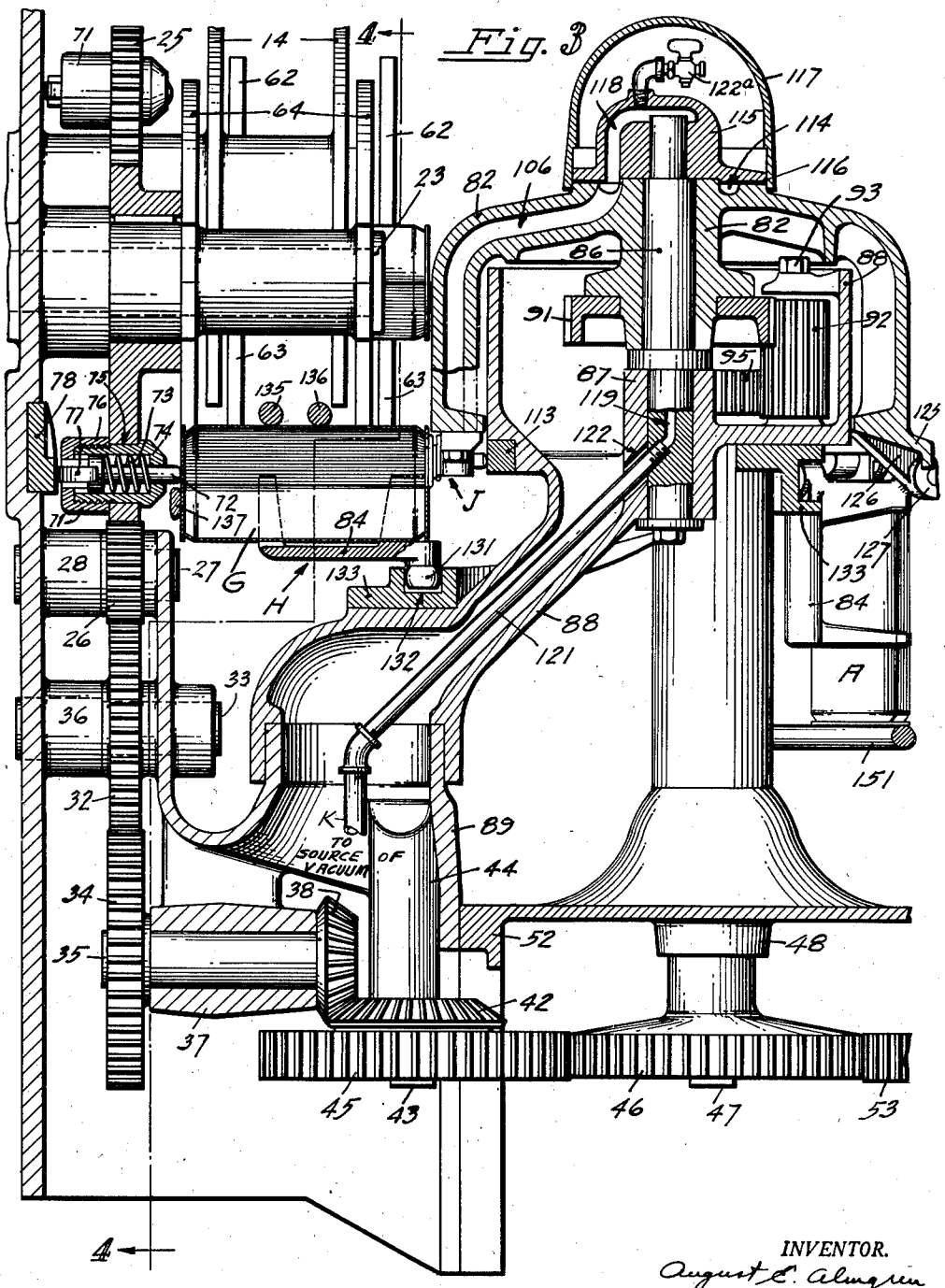
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TREATING MACHINE FOR OPENING HINGED CLOSURE MEMBERS ON CONTAINERS

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Fig. 3



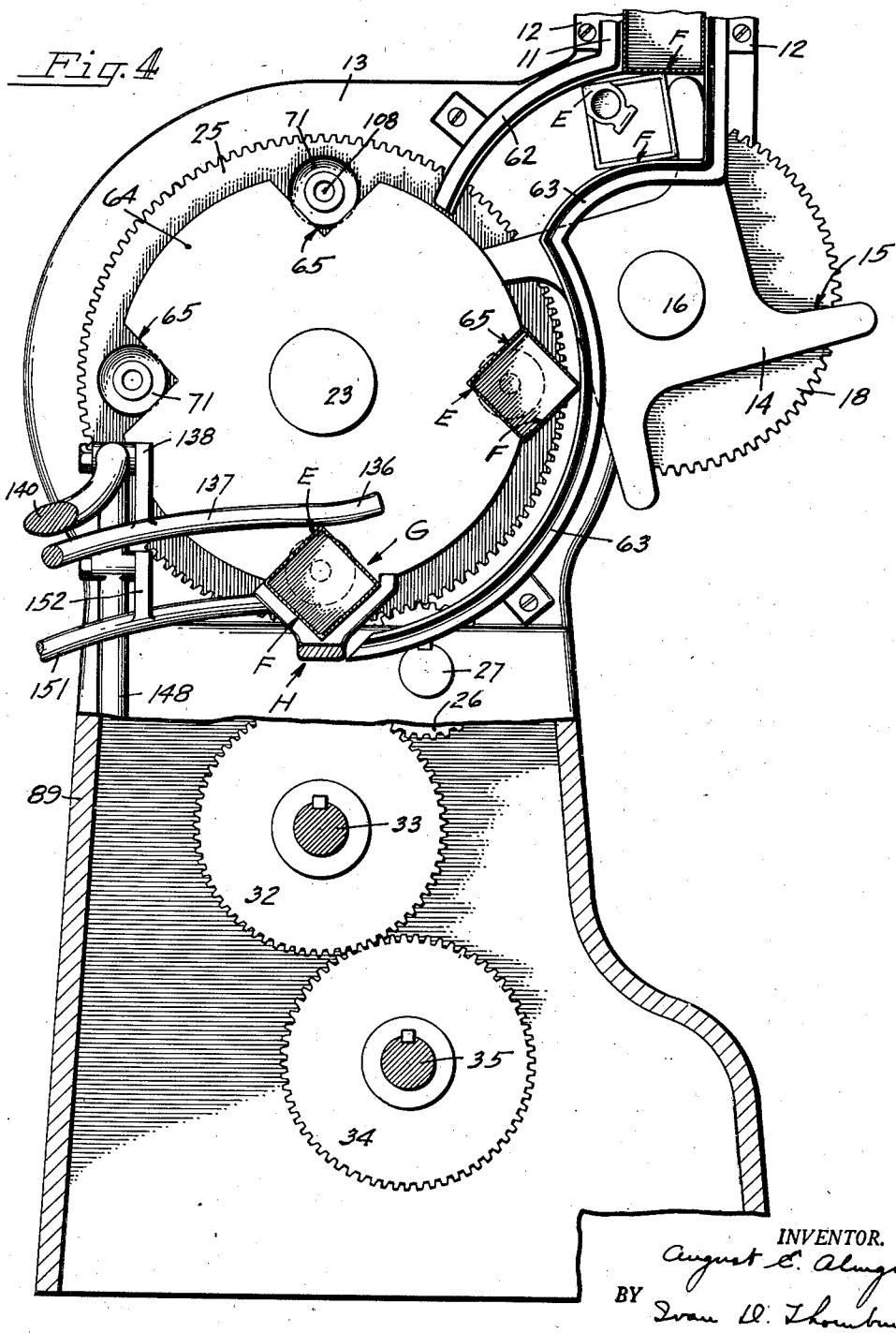
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TREATING MACHINE FOR OPENING HINGED CLOSURE MEMBERS ON CONTAINERS

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Fig. 4



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Fig. 5

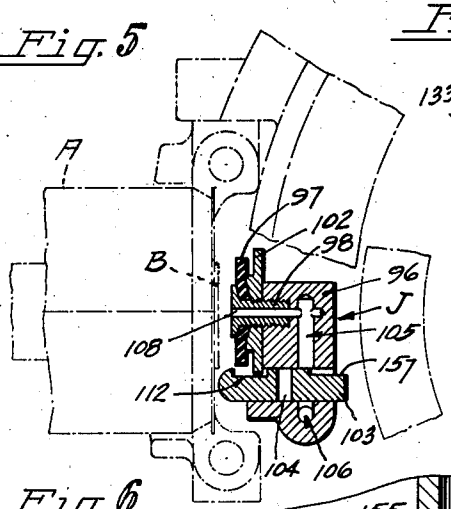


Fig. 7

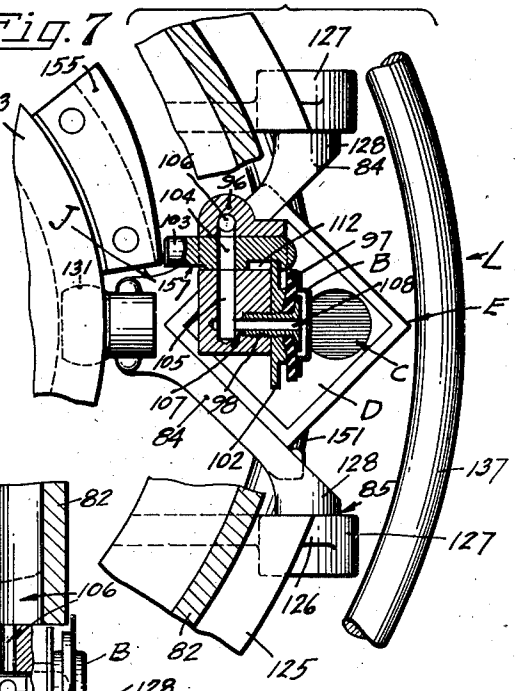
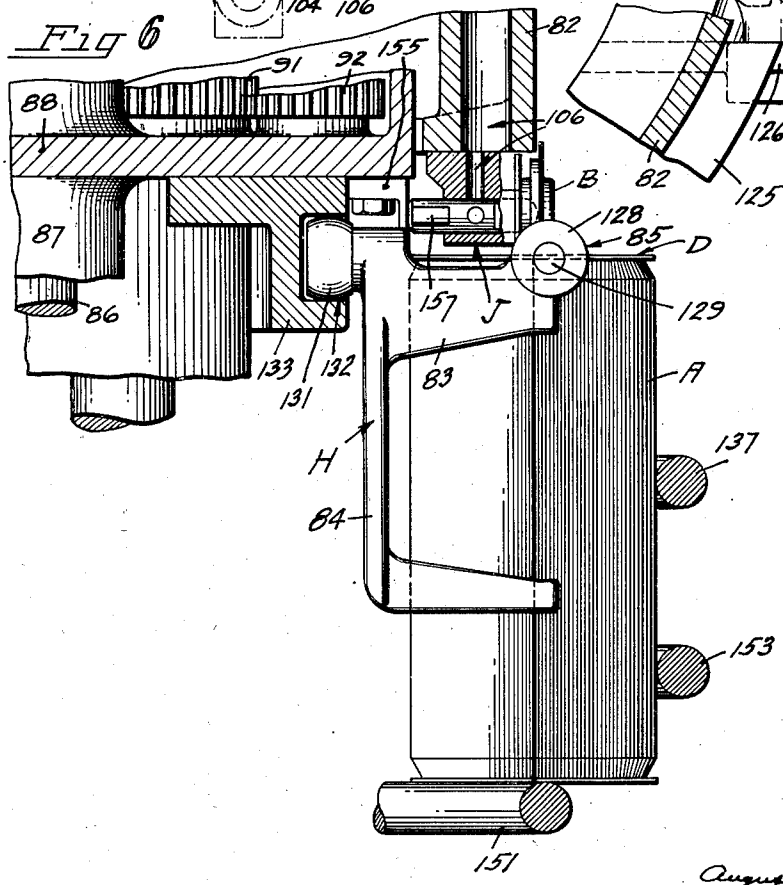


Fig 6



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2,420,642

UNITED STATES PATENT OFFICE

2,420,642

TREATING MACHINE FOR OPENING HINGED CLOSURE MEMBERS ON CONTAINERS

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Application July 19, 1944, Serial No. 545,703

7 Claims. (Cl. 226—129)

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This invention relates to a container treating machine and has particular reference to devices fro opening a sealed container having an attached hinge closure element, by swinging the container on its closure hinge while it is being advanced along a path of travel to uncover the filling opening.

The instant invention contemplates a step in the presentation and treatment of sterile or germ free hermetically sealed single service fibre containers which have been produced at a fibre can manufacturing plant and which remain in sterile condition as sealed empty cans until they are opened and without fear of contamination, irrespective of subsequent handling, shipping to a dairy or customer's plant and storage at such plants.

An object of the present invention is the provision of a container treating machine for preparing sterilely closed but empty milk containers or the like for filling, by shifting the containers from a horizontal to a vertical position while advancing them through a circular path of travel to the filling machine and simultaneously unsealing the containers by uncovering the filling openings.

Another object is the provision of such a can treating machine adapted to open empty fibre milk containers or the like which are in closed or sealed condition when received within the machine, by confining the containers in an advancing member having a plurality of suction cups which engage hinged closure elements of the containers and which hold them while the containers are swung on their hinged connection away from the closure elements to upright the containers during this advancement and simultaneously to unseal the containers by uncovering the filling openings.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which, taken in connection with the accompanying drawings, discloses a preferred embodiment thereof.

Referring to the drawings:

Figure 1 is a front elevation of a container treating machine embodying the present invention with parts broken away;

Fig. 2 is a top plan view of the machine shown in Fig. 1 with parts broken away and with parts in section;

Fig. 3 is a vertical sectional view taken substantially along the line 3—3 in Fig. 2;

Fig. 4 is a vertical sectional view taken substantially along the broken lines 4—4 in Fig. 3 with parts broken away and with parts in section;

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Fig. 5 is an enlarged sectional view of a suction valve showing in plan a sealed container disposed in a can carrier prior to being shifted endwise against the suction valve, the container and can carrier being indicated by dot and dash lines;

Fig. 6 is an enlarged fragmentary vertical sectional detail drawn to the same scale as Fig. 5, showing an opened container in vertical position within its can carrier; and

Fig. 7 is a view similar to Fig. 5 showing the parts of the suction valve in another position together with additional parts of the mechanism illustrated in Fig. 6.

As a preferred embodiment of the present invention the drawings illustrate a container treating machine for preparing sterilely closed but empty fibre milk containers or the like for subsequent filling. Such a container is designated herein by the letter A and may be of the type described fully in the United States Patent 2,085,979, issued July 6, 1937, to John M. Hothersall, on Container.

The instant machine includes devices for swinging the containers while they are being advanced through a circular path of travel and simultaneously unsealing individual containers by unseating a hinge plug or closure element B from a filling opening C cut in a top end D of the container (Fig. 7). For this purpose the hinge plug or closure element B is held, while the container A is being advanced and simultaneously the container is swung down from its horizontal position into a vertical position where it is in an unsealed condition.

The containers A are fed into the present machine from a magazine 11 (Fig. 4). These containers are in horizontal position with each hinge plug B at an upper left corner E. Magazine 11 comprises a plurality of stack rails 12 supported on a machine main frame 13, one end of each rail being secured to the frame. The containers are delivered from the magazine while still resting on one side wall, such a wall being designated by the letter F.

Individual containers A are separated from the magazine 11 by a feed-in starwheel 14 which has a plurality of pockets 15, four being shown. Such a starwheel comprises spaced discs which engage the body of each container near its opposite ends. Starwheel 15 is mounted on a horizontal shaft 16 journaled in a bearing 17 of the main frame. The starwheel is rotated in proper time with other

parts of the machine by a gear 18 mounted on the shaft 16 (Figs. 1 and 2).

The gear 18 is driven by a drive gear 22 mounted on a horizontal shaft 23 journaled in a bearing 24 in the main frame. Shaft 23 carries a gear 25 which receives rotation from a pinion gear 26 mounted on a stub shaft 27 in a bearing 28 of the main frame. An intermediate gear 32 mounted on a horizontal shaft 33 also meshes with the pinion gear 26 and is driven by a gear 34 mounted on a horizontal shaft 35. Shafts 33, 35 are mounted in bearings 36, 37 of the main frame.

The shaft 35 (Fig. 3) also carries a bevel gear 38 which is driven by a bevel gear 42 mounted near the lower end of a vertical shaft 43 journaled in a bearing 44 of the main frame. Shaft 43 also carries a spur gear 45 which meshes with and is driven from a spur gear 46 mounted on the lower end of a vertical shaft 47. Shaft 47 is journaled in a bearing 48 formed in a side frame 52 connected with the main frame. Gear 46 is driven by a main drive gear 53 in any suitable manner.

As the individual containers A are separated by the starwheel 14, each container A enters one of the starwheel pockets 15 and is fed in a counter-clockwise path, as viewed in Fig. 4. The separated container passes during this feeding action between spaced concentric guides 62, 63 mounted on the main frame.

A feed turret 64 is mounted on the horizontal shaft 23 to the left of the starwheel 14. This feed turret is formed with V-shaped container receiving pockets 65. Turret 64 like the starwheel 14 is formed of spaced discs. The turret discs are outside of the path of travel of the starwheel discs, as viewed in Fig. 3. This provides for easy transfer of the individual containers from an arm of the starwheel into a pocket of the turret.

There are two spaced guides 62 which are at the top of the path of travel of a container while in the starwheel 14. There are also two spaced guides 63 for the lower pass of the containers in the starwheel and these extend down in lower sections which are concentric to the turret axis. These extended guide sections retain the containers in the turret pockets 65 as they are moved by the turret in a clockwise direction (as viewed in Fig. 4).

When a container A is brought into a position at the bottom of the turret (indicated by the letter G, Fig. 4) it is ready for the swinging movement from the horizontal to the vertical position while advancing through a circular path of travel. Preparatory to such travel and in fact while approaching the position G the container undergoes a slight longitudinal shifting within the pocket of the turret 64 at the same time the container is coming into a can carrier H, Fig. 2. This longitudinal shifting is for the purpose of bringing the closure element B of the container into a held position within the can carrier. This can carrier will be described in some detail hereinafter.

The devices for shifting the containers longitudinally will first be mentioned. These devices (designated by the numeral 71) are carried in the turret gear 25, there being a separate device for each pocket of the turret 64. Each shifting device includes a shifting pin 72 (Fig. 3) which is slidable endwise, a head of the pin engaging against a spring 73 disposed in a shouldered sleeve 74 mounted in an opening 75 cut through

the gear 25. The sleeve is secured in position with its shoulder against the inner face of the gear by a perforate screw cap element 76 clamping against the outer face of the gear. The pin 72 has a rounded inner end which extends inwardly of the machine through an opening in the end of the sleeve. This pin presses against the adjacent bottom end of the container A carried in the associated turret pocket. The opposite end of this pin has a slotted forked portion where it extends into the perforated cap element. A roller 77 located in the slotted fork loosely rotates on an axis pin extending across the slot.

Each shifting device 71 is cam actuated. When a particular shifting device with its associated container approaches the position G (Figs. 1, 3 and 4) in the rotation of the turret 64, the roller 77 engages against and rides along a stationary cam segment 78 which is secured to the main frame of the machine. This moves the pin 72 longitudinally against the container A and shifts the latter to the right (as viewed in Fig. 3).

The can carrier H (Figs. 1, 2, 3 and 6) comprises a horizontally rotatable turret-like member 82 having a plurality of swinging container receiving cradles 83. Five cradles are shown in the drawings and each cradle is formed with spaced V-shaped prongs 84. Each cradle is hingedly connected with the turret member as at 85. A more detailed description of the cradle parts as well as the mechanism for swinging the cradle will be given later in this specification.

The turret member 82 rotates on a stationary vertical shaft 86 held in a bearing 87 formed as an integral part of a housing 88. This housing is secured to a pedestal 89 of the main frame. The turret member is rotated in a counter-clockwise direction (as viewed in Fig. 2) by a gear 91 mounted on a hub section of the turret member. Gear 91 meshes with and is operated by an elongated pinion 92 which has free rotation on a vertical shaft 93 which is anchored in the housing 88. Pinion 92 is sufficiently long to also mesh with a drive gear 95 mounted on the upper end of the shaft 47, this drive gear being below the gear 91.

One of the swinging cradles 83 of the can carrier H comes into position to receive a container A as it moves into the position G. Furthermore the container A is in its turret pocket 65 and is shifting longitudinally under the action of the shifting pin 72.

The container A is shifted by the pin 72 in order to bring its sealed hinge closure element B into contact with a suction valve J (Figs. 2, 3 and 5) also carried on the turret member 82. It should be stated at this time that the container travel under the action of the starwheel 14 and the turret 64 has brought the closure element B of the container when in the position G just above the center of the container. This closure element then aligns with and is on the same horizontal center as an associated valve J.

There are five suction valves J arranged in spaced relation, one for each swinging cradle 83. Each suction valve comprises a body member 96 and a suction cup 97. Such a cup preferably is made of rubber or other similar material and is held in position by a hollow screw 98 threaded into the body member 96. This screw is locked in place by a threaded disc 102 which also clamps against the suction cup.

As the container shifts longitudinally toward the suction cup, it also engages and moves a valve pin 103 which projects slightly in advance of the

face of the suction cup. This opens the valve J and makes a vacuum effective at the suction cup 97. In other words, the cup holds on to the closure element B.

In this valve opening operation a transverse bore 104 extending through the pin 103 connects a port 105 with a port or passageway 106, both formed in the valve body 96. Port 105 cuts across and connects with aligned ports 107, 108, the former being in the valve body and port 108 extending centrally of the hollow screw 98 and opening out in the suction cup.

Figure 5 shows the position of the transverse bore 104 relative to the port and passageway when the valve is closed and Fig. 7 shows the open valve after the valve pin 103 has been moved as just described.

A slot 112 is provided in the pin 103 and an edge of the disc 102 extends into the slot. This prevents the pin 103 from turning in the body member 96 and keeps its bore 104 in proper position for alignment with the ports 105, 106 as the pin opens the valve. An insert member 113 secured in the housing 88 (Fig. 3) serves as a limit stop for the pin 103 in its valve opening position.

Each of the passageways 106 (Figs. 2 and 3), there being five for the five suction valves J, extends into the upper part of the rotatable turret member 82 and terminates in an annular groove 114 cut in the top of the turret member. This groove is closed off at the top by the lower slide face of a stationary housing cap 115. This cap is mounted on the upper end of the stationary shaft 86 and thus provides an upper air tight joint for the rotating turret member. An annular gasket 116 interposed between the stationary cap and the turret member insures against leakage. A removable cover 117 seated on the cap extends down around the gasket.

The groove 114 functions as a collecting manifold for all of the passageways 106 and normally is under vacuum. To provide for this condition a right angled passage or port 118 terminates at its lower end in the lower face of the cap 115 where it is in constant communication with the groove 114. The upper arm of the passage extends to a position above the stationary shaft 86. The top end of a central bore 119 in the upper part of the stationary shaft opens out into this passage. A vacuum pipe 121 which leads from a suitable source of vacuum K passes through an opening 122 cut in the bearing 87 and is threaded in the shaft thus providing for communication with the lower end of the central bore 119.

In this manner a vacuum is maintained on the groove 114 and therefore on the several passageways 106 of the suction valves J for normal operation of the machine. There are times, however, when the machine may be shut down or it may be desirable to break the vacuum while the machine continues to operate. At such a time a release cock 122a connected in the passages 118 of the cap 115, is opened to atmosphere. This release cock being on the top of the machine and inside the cover 117 is accessible only after the cover is removed.

With a container A resting within its prong seat 84 of the rotating turret member 82 and with its closure element B held against the suction cup 97, transfer from the turret 64 is completed as the container passes the position G, heretofore fully discussed. For over 180 degrees of travel with the turret member 82, the swinging cradle 83 moves the container from its horizontal position into its vertical position. Two elements cooperate to produce this result, first the cradle is swung down on its hinged connection 85 and secondly stationary guide rails surrounding the turret member keep the container within its cradle pocket and assist in its change of position. These will now be described in order.

The turret member 82, as best shown in Figs. 1 and 3, is formed as a domed shell-like cylindrical structure, the wall of the shell being spaced outside of and rotating around the cylindrical housing 88. The outer surface of this structure is smooth but at the bottom it merges downwardly and outwardly into the various connections 85 for the hinged cradles 83. The connection for each cradle takes the form of an inclined shelf section 125 at the ends of which are spaced lugs 126. Each lug is enlarged in a bearing 127.

Each hinged cradle 83 has an arm of its V-shaped prong 84 extended on each side into a hinge boss 128 (Figs. 3 and 7) and the two bosses come in between and align with the spaced bearings 127. Hinge studs 129 are held in each bearing of a cradle unit and project into an opening in the adjacent cradle boss. These two aligned studs provide a hinge pintle construction for each cradle connection 85.

The swinging of each cradle 83 from its horizontal can receiving position into its vertical position is brought about through cam action. On the same end with the spaced hinge bosses 128, the forked prong of a cradle carries a cam roller 131 (Fig. 6) which during the rotation of the turret member traverses a cam track 132 of a stationary cam 133.

Cam 133 is circular, having an undulating form and being mounted on the housing 88 (Figs. 3 and 6). The cam track 132 adjacent the position G where the container A is received into the swinging cradle 83 is horizontal as best shown in Fig. 3. The cam track 180 degrees distant, as in Fig. 6, is vertical, this alteration in shape obviously being necessary for the work to be done. In traversing the 180 degrees of travel therefore the cradle 83 with its container is swung on its hinge pintle 129 (Fig. 1) from horizontal into vertical positions.

The stationary guide rails previously mentioned for keeping the containers in their cradle pockets while assisting in their change of positions comprise top, side and bottom rails these being shown for the most part as round bars. A container coming into position G passes under two branches 135, 136 (Figs. 2, 3 and 4) of what may be termed a top rail 137. This top rail in the transfer position G is hung by a lug 138 to a right angled support bar 140 (see also Fig. 1) which is bolted at 141 to the machine frame 13. At the other end, top rail 137 may be supported in any suitable manner not shown on frame posts of the machine. This top rail upon leaving station G curves around in a circular path, best shown in Fig. 2, but the rail changes in its function from a top rail to a side rail as the container shifts its position.

Again referring to Figs. 1 and 2, it will be observed that the support bar 140 is extended downwardly and toward the front of the machine as a support bar 145 which joins with a vertical support bar 146 mounted on a boss 147 of the side frame 52. A connecting tie bar 148 joins the support bar 146 with the bar 140. This construction provides for a rigid support for all of

the guide rails. It will be observed that the top rail 137 is held at 149 on the support bar 146.

Considering the moving of a container into the position G (Fig. 4) it passes alongside of a side rail 151 which is secured by a lug 152 to the tie bar 148. This rail also curves around the turret member 82 and as the container moves from a horizontal to a vertical position, the function of the rail changes so that as the container approaches its vertical position the rail becomes a bottom or support rail. The end of the rail may be supported as required, this feature being omitted in the drawings.

An intermediate rail 153 is also used as a side rail and is located below the rail 137. It is secured to the support bar 146 at one end and then extends parallel to rail 137. Other suitable supports for the rail will be provided as required. An inner side rail 154 (Fig. 2) secured to the frame in any suitable manner may be used to strip the containers from the turret member 83 and guide them to a suitable place of deposit.

After a container A has been brought into its vertical position, its closure member B, which is then in open position, is released by the suction cup 97 preparatory to the container being discharged from the machine. This release is brought about by a shifting of the valve pin 103 so that vacuum on the suction cup is broken.

As a container cradle 83 reaches the position L (Figs. 2 and 7) its valve pin 103 passes the beginning of a cam track segment 155 bolted to the housing 88 (see also Fig. 6). It will be recalled that the valve pin extends out from the suction cup body 96. This cam track flares out as shown in Fig. 7 so that the end of the valve pin rides along the edge of the cam segment and is pushed back into the cup body. This moves the valve bore 104 out of alignment of the ports 105 and 106 and thus cuts off the vacuum connection.

At the same time the port 105 is opened to atmosphere so that the closure member B is released from the suction cup. The outer end of the valve pin is flattened as at 157 so that as the pin is pushed back into the cup body the flattened section passes over the end of the port 105. Air then rushes into the suction cup.

The opened container then continues to a place of discharge and may enter a filling machine or other suitable mechanism which constitutes no part of the present invention.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. In a machine for treating a container having a filling opening and a hinged closure element covering the opening for sealing the container, the combination of a turret member for transferring a sealed container to a place of deposit, a suction cup carried on said turret member for engaging and holding an individual closure element while the container is being transferred, and means partially encircling said turret member for swinging the container on its closure hinge while said hinged closure element is held by said suction cup, to unseal the container by uncovering the filling opening.

2. In a machine for treating containers having a filling opening and a hinged closure element covering the opening for sealing the container while the latter is advanced along a curved path of travel and swung from one position to another position, the combination of a turret member for receiving sealed containers in one position and for delivering them unsealed in another position, suction cups carried on said turret member for respectively engaging and holding each individual closure element while its associated container is being advanced, and means partially encircling said turret member for swinging the containers on their closure hinges while said hinged closure elements are engaged and held by said suction cups, to unseal the containers by thus uncovering the filling openings.

3. In a machine for treating containers having a filling opening and a hinged closure element covering the opening for sealing the container, the combination of a turret member for transferring sealed containers to a place of deposit, can carriers pivotally carried on said turret member for supporting the containers during their transfer, suction cups carried on said turret member for individually engaging and holding a said closure element while a said container is being supported and is being transferred in a said carrier, and means partially encircling said turret member for swinging the containers on their closure hinges while a said hinged closure element is engaged and held by its associated suction cup, to thus unseal the containers by uncovering the filling openings.

4. In a machine for treating containers having a filling opening and a hinged closure element covering the opening for sealing the container, the combination of a turret member for transferring sealed containers to a place of deposit, can carriers pivotally carried on said turret member for supporting the containers during their transfer, means for shifting the containers endwise toward the turret member when being placed in their respective carriers, suction cups carried on said turret member for respectively engaging and holding an individual closure element while a said container is being supported and is being transferred in a said carrier, and means partially encircling said turret member for swinging the containers on their closure hinges while said hinged closure elements are engaged and held by said suction cups, to unseal the containers by exposing the filling openings.

5. In a machine for treating containers having a filling opening and a hinged closure element covering the opening for sealing the container, the combination of a turret member for transferring sealed containers to a place of deposit, a plurality of carriers pivotally carried on said turret member for supporting the containers, a cam track surrounding the turret member for defining the path of travel of the carriers when supporting and transferring the containers, a plurality of suction cups carried on said turret member for respectively engaging and holding an individual closure element while a said container is being transferred in its carrier, and guide rails partially encircling said turret member for holding the containers in their respective moving carriers and for assisting in swinging the containers on their closure hinges while said hinged closure elements are engaged and held by said suction cups, to unseal the containers by uncovering the filling openings.

6. In a machine for treating containers hav-

ing a filling opening and a hinged closure element covering the opening for sealing the container, the combination of a turret member for advancing sealed containers to a place of deposit, can carriers pivotally mounted on said turret member respectively for supporting the containers during their transfer, suction cups carried on said turret member for respectively engaging and holding an individual closure element while a said container is being transferred in a said carrier, a suction valve in said turret member for each suction cup and operable to connect a source of vacuum with its associated cup to hold the closure element while the container is disposed in said carrier, and means partially encircling said turret member and cooperating with said carrier for swinging the containers on their closure hinges while said hinged closure elements are respectively engaged and held by their associated suction cups, to unseal the containers by uncovering the filling openings.

7. In a machine for treating containers each having a filling opening and a hinged closure element covering the opening for sealing the containers while the latter are advanced along a curved path of travel and simultaneously swung from a horizontal position to a vertical position, the combination of a turret member for transferring sealed containers along said path of travel, cam carriers pivotally carried on said turret member for receiving the containers in a horizontal position and for delivering them unsealed in a vertical position, suction cups carried on said turret member for engaging and holding an individual closure element while the container is being advanced, suction valves in said turret member and operable each with a said suction cup, a movable pin in each of said valves engageable with a horizontal container when it is positioned in a said carrier to engage said container with and open the valve for connecting a source of vacuum with its associated suction cup, guide rails partially encircling said turret member and cooperating with said carrier for swinging the containers on their closure hinges into vertical position while said hinged closure elements are respectively engaged and held by their associated suction cups, to unseal the containers by exposing their filling openings, and means for moving said valve pins to close the valves to thereby release the closure elements of the unsealed containers.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,284,660	Hothersall et al.	June 2, 1942