Sept. 12, 1944. J. E. BAECHLE ET AL 2,357,802

APPARATUS FOR PACKING PRODUCTS

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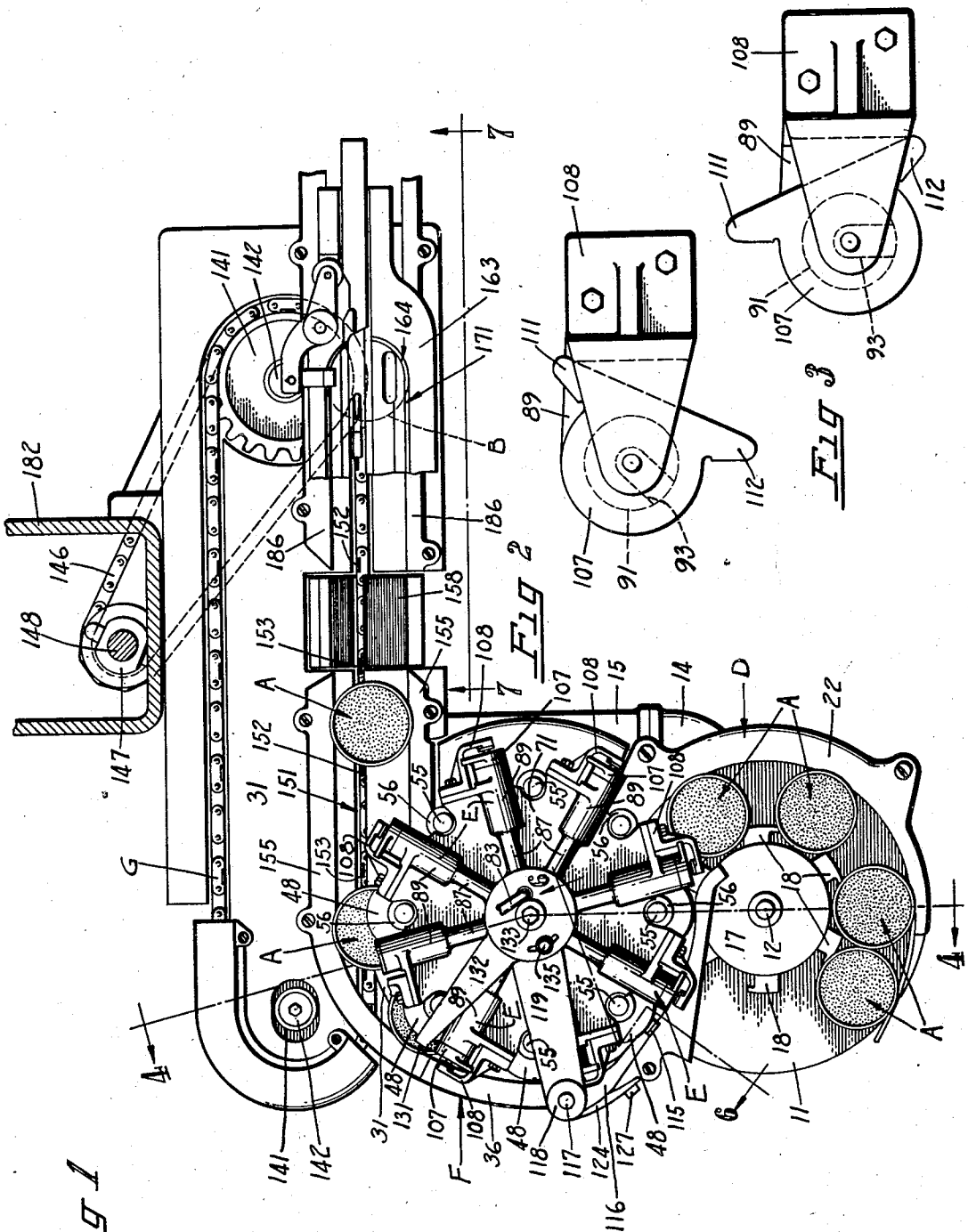


Fig 1



Fig 3



Fig 2

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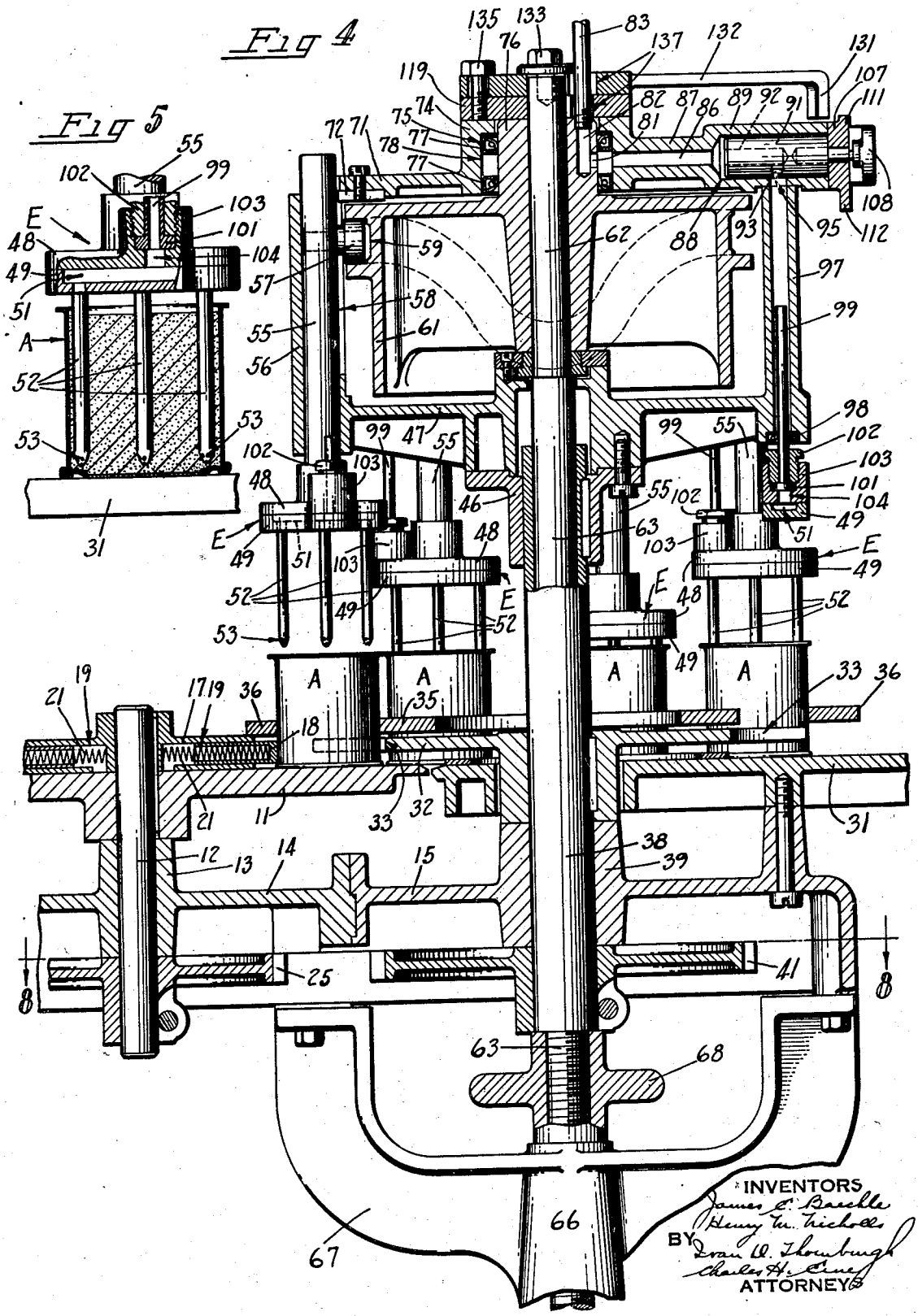
Sept. 12, 1944. J. E. BAECHLE ET AL 2,357,802

APPARATUS FOR PACKING PRODUCTS

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Fig 4

Fig 5




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APPARATUS FOR PACKING PRODUCTS

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Fig 7

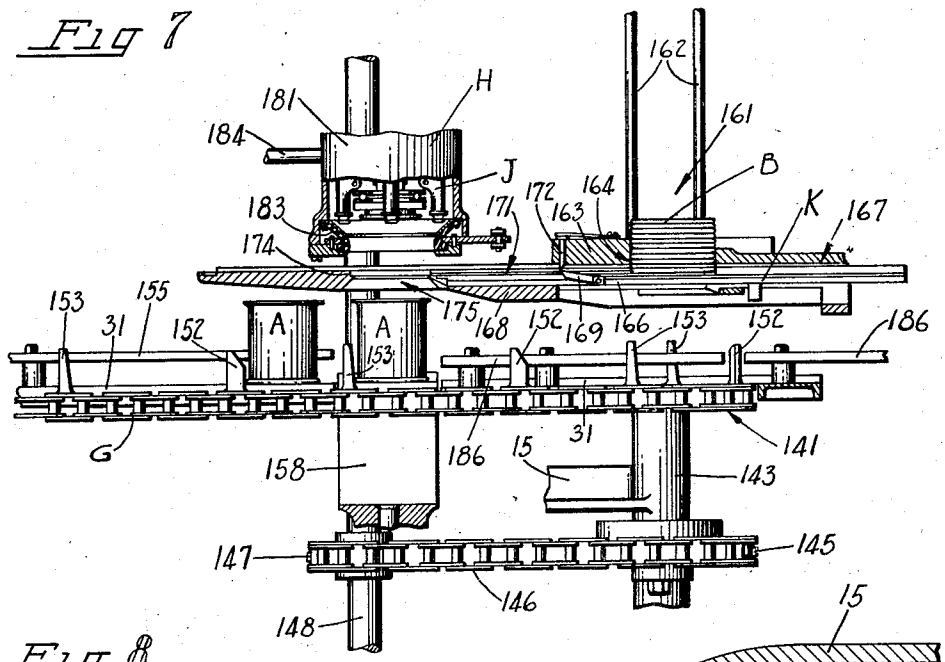
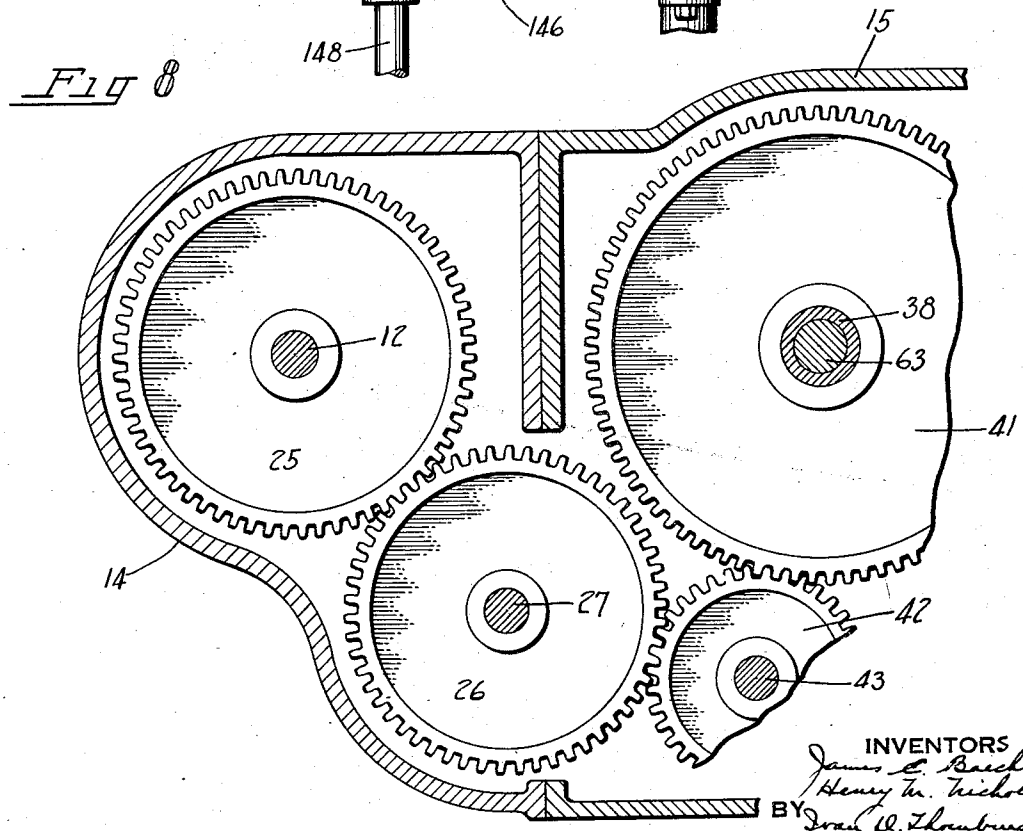



Fig 8



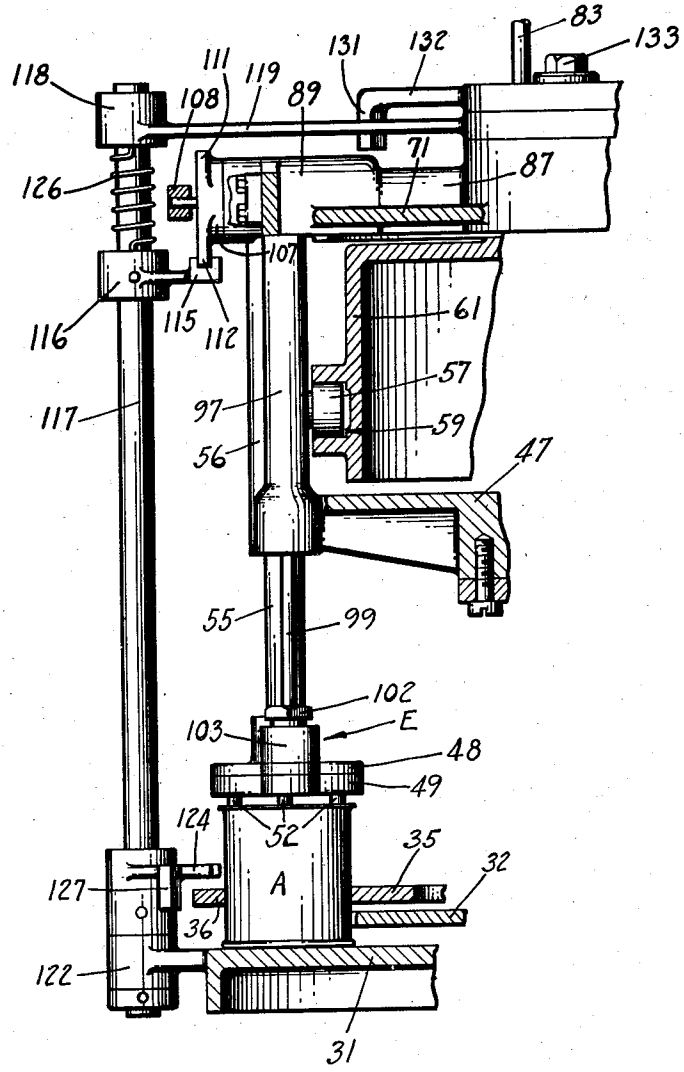

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Fig 6




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# UNITED STATES PATENT OFFICE

2,357,802

## APPARATUS FOR PACKING PRODUCTS

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Application November 16, 1939, Serial No. 304,832

3 Claims. (Cl. 226—68)

The present invention relates to an apparatus for packing products in cans or containers and has particular reference to introducing an inert gas into a filled can to displace as much as possible of the air trapped therein and then vacuumizing the can to withdraw any air which may still remain after gassing.

In the canning industry certain products such as ground coffee and the like are usually filled into cans and then a vacuum is drawn on the filled can to exhaust the air from the head space and from the spaces between the particles in the can before it is closed and sealed. In order to fully exhaust the air from the interior of the product mass within the can very high vacuums are usually resorted to. Producing such high vacuums requires expensive and elaborate machinery and also requires considerable vacuumizing time and effort.

The instant invention contemplates overcoming such difficulties by means of a method and apparatus for exhausting entrained air within cans in a simple and inexpensive manner with results that are comparable to the high vacuums obtained with the use of expensive machinery.

An object therefore of the invention is the provision of a method of and apparatus for packing products in cans wherein an inert gas is first introduced into the cans to displace the bulk of the air trapped therein and then a vacuum is drawn on the can to exhaust any remaining air mixed with some gas thereby obtaining high vacuum results with comparative ease and with the use of a low vacuum, inexpensive machine.

Another object is the provision of such an apparatus wherein the inert gas is jetted into the can from the bottom thereof so that the entrained air will be more completely and easily displaced from the can interior and from around the product particles thereby leaving only the upper end of the can or merely its head space to be exhausted of air by vacuumizing.

Another object is the provision of an apparatus of this character wherein the steps of procedure are carried on in a continuous operation so that the cans may be rapidly handled with a further saving in cost of packing.

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 top plan view of an apparatus for carrying out the steps of the instant method invention, parts being broken away and other parts being shown in section;

Figs. 2 and 3 are enlarged detail views of operating devices for valves used in the apparatus, the views showing the parts in different positions;

Fig. 4 is an enlarged sectional view taken substantially along the broken lines 4—4 in Fig. 1, the view also showing filled cans in place in the apparatus;

Fig. 5 is an enlarged view of a gassing head in place within a filled can, the can and its contents being shown in section;

Fig. 6 is an enlarged fragmentary sectional view taken substantially along the line 6—6 in Fig. 1;

Fig. 7 is a front elevation of a portion of the apparatus as viewed substantially along a plane indicated by the line 7—7 in Fig. 1, with parts broken back and shown in section; and

Fig. 8 is a horizontal section taken substantially along the line 8—8 in Fig. 4.

As a preferred embodiment of the instant invention the drawings illustrate an apparatus in which cans A filled with ground coffee, for example, are adapted to be freed of air and sealed with a cover B. The invention, however, is equally well adapted to the packing of other products than coffee. The filled cans are preferably introduced into the machine in timed order by way of a feed-in device D. The entering cans are immediately brought into alignment with a gas jetting head E of a jetting device F. An inert gas, such as for example, carbon dioxide, is introduced into the can to displace the bulk of the air trapped among the particles of the coffee.

Immediately after this gas jetting step, the gas filled cans are transferred to a conveyor G which advances them into position under a vacuum chamber H containing a conventional sealing head J. While in such position a cover feeding device K feeds a cover B into place over the can. The can is then raised vertically to pick up the cover and carry it up into the vacuum chamber. In the chamber a medium vacuum of approximately 25 inches is drawn on the can and the cover is then sealed in place. The sealed can is now lowered to its original position on the conveyor G and is discharged to any suitable place of deposit.

Reference will now be had in particular to the machine for carrying out these method steps. Certain parts of the machine are similar to those disclosed in United States Patent 1,429,231, issued September 19, 1922 to P. W. Fleischer on Can

closing machine and reference should be had to this patent for a more detailed description than that given in this specification. The can feed-in device D is one of these parts and includes a rotatable feed disc 11 (Figs. 1 and 4) on which the incoming filled cans A are received. This disc is carried on a vertically disposed disc shaft 12 which is journaled in a bearing 13 formed in a gear housing 14 secured to a frame 15 which constitutes the main frame of the machine.

At its upper end the disc shaft 12 carries a timing plate 17 which rotates with the disc and in which are located a plurality of spaced radial timing fingers 18. The fingers are disposed in rectangular radial recesses 19 formed in the timing plate, the fingers being backed-up by compression springs 21 which force them outwardly while at the same time rendering them yieldable. These fingers engage between the incoming cans and separate them into predetermined spaced or timed relation for further advancement through the machine. A guide rail 22, secured in place adjacent the periphery of the disc 11, directs the spaced cans into the machine as the disc rotates.

The feed-in disc 11 is continuously rotated by a gear 25 (see Fig. 8) which is secured to the lower end of the disc shaft 12. This gear meshes with an idler gear 26 mounted on a vertically disposed idler shaft 27 journaled in suitable bearings formed in the gear housing 14. The idler gear is rotated in any suitable manner in time with the other moving parts of the machine. The rotating feed-in disc 11 feeds the cans A directly into the gas jetting device F hereinbefore mentioned.

In the gas jetting device F the cans A are received on a stationary table 31 (Figs. 1 and 4) which is secured to the machine main frame 15. While on the table the cans are propelled along a curved path of travel by a rotatable turret 32 having spaced pockets 33 in which the cans are received from the feed-in device above mentioned. The moving cans are guided by an inner curved rail 35 and an outer guide rail 36, these rails being secured to the table.

The turret 32 is mounted on a vertical rotatable sleeve 38 which is journaled in a bearing 39 formed in the main frame 15. At its lower end the sleeve carries a driving gear 41 which meshes with an intermediate gear 42 (see Fig. 8) mounted on a short shaft 43 journaled in suitable bearings formed in the main frame 15. The intermediate gear meshes with the idler gear 26. Thus the sleeve 38 and the parts carried thereon rotate in time with the feed-in device D.

At its upper end the rotating sleeve carries a hub 46 which is keyed in place and which supports a round head plate 47 on which the gas jetting heads E hereinbefore mentioned are carried. There are a plurality of these jetting heads, one for each pocket 33 of the turret 32 and each head is carried above its pocket in alignment therewith.

A head E includes a flanged collar 48 which is secured to a head housing 49 having an interior recess 51. The head housing carries a plurality of depending and hollow gassing needles or tubular gassing elements 52 which at their upper ends communicate with the housing recess 51. The lower ends are preferably pointed and perforated with a plurality of small holes 53. The drawings show three of these gassing elements secured to each head.

The flanged collar 48 of each of the gassing heads E is secured to the lower end of a vertically disposed movable rod 55 which is carried in a long bearing 56 formed on the head plate 47 adjacent its outer edge. At the upper end, each rod 55 carries a cam roller 57 which projects out beyond the side of its bearing 56 through a long slot 58 formed in the inner sidewall thereof. These cam rollers operate in a cam groove 59 of a stationary barrel cam 61 disposed above the head plate 47.

The cam 61 is supported on a shouldered upper end portion 62 of a vertical stationary shaft 63 which extends down through the sleeve 38. The lower end of the shaft is carried in a bearing 66 formed in a leg section 67 which supports the machine main frame 15. This lower end of the shaft is threaded and carries a threaded hand wheel 68 which is interposed between the lower end of the sleeve 38 and the top of the bearing 66 so that by turning the hand wheel, the stationary shaft and the machine parts carried thereon may be raised or lowered for vertical adjustment and also to accommodate the jetting heads E to different heights of cans. This construction of gas jetting device permits the heads E to rotate around the stationary cam 61 in time with the can turret 32.

Thus when a can A moves into a pocket 33 of the turret, it is received in position directly under a raised gas jetting head E and moves with the turret in this alignment. During its movement around the curved path of travel the head E moves down and inserts the gas jetting elements 52 into the contents of the can as shown in Fig. 5. This is brought about by the shape of the cam groove 59 as it is traversed by the cam roller 57 associated with the particular head under consideration. This inserting movement terminates when the pointed ends of the jetting elements reach a position just short of the bottom of the can.

While the jetting elements are in this position, being equally distributed throughout the product mass, a charge of the inert gas is discharged from them into the can. This action displaces the air forcing it up from the bottom as hereinbefore mentioned. The gas being heavier than air, more effectively lifts the air out so that at the end of the gassing operation the product particles of the contents are surrounded with gas instead of air, substantially the only air remaining being near the top of the can.

Introduction of the gas into the jetting elements 52 is effected by way of a plurality of passageways connecting with a source of such gas in a manner which will now be described. For this purpose, a gas distributor plate 71 (Figs. 1 and 4) is located just above the stationary cam 61 and is supported on lugs 72 formed on the head rod bearings 56 adjacent their upper ends so that the plate will rotate with the head plate 47. The distributor plate is formed with a hub 74 having a shouldered recess 75 which surrounds a hub 76 of the stationary cam 61. In the recess space between the distributor plate hub and the cam hub a pair of spaced sealing rings 77 set off an annular gas feeding channel 78.

The gas feeding channel 78 is at all times in communication with a suitable source of supply of the inert gas. This is effected by way of a short horizontal bore 81 formed in the cam hub 76. The outer end of the bore communicates with the gas feeding channel while its inner end leads into the lower end of a vertical bore 82

also formed in the cam hub. A gas supply pipe 83 is threaded into the cam hub and opens into the vertical bore. It is this supply pipe that leads to the supply of gas.

Gas in the feed-in channel 78 is distributed to the several heads F by way of radial passageways 86 in conduits 87 formed integrally with the distributor plate 71. The inner ends of each passageway communicates with the feed-in channel 78. The outer end of each passageway leads into a valve which includes a valve recess 88 in a valve casing 89 formed on the outer end of each of the conduits 87. The valve casing houses a rotatable valve cylinder 91 which is adapted to be rotated or rocked to open and close the valve in a manner which will be hereinafter explained. There is one of these valve for each of the jetting heads E.

The inner end of each valve cylinder 91 is formed with a longiutdinal bore 92 which at all times is in communication with its gas passageway 86. The cylinder is also formed with a radial bore 93 which extends from the outer surface of the valve cylinder into the bore 92. In one position of the valve cylinder the radial bore 93 is in communication with a hole 95 formed in the side wall of the valve casing 89. The hole is at all times in communication with the interior of a vertical tubular member 97 which is formed integrally with the head plate 47 and is located adjacent the head rod bearing 56. There is one of these tubular members for each jetting head E.

The lower end of the tubular member 97 is recessed to retain a sealing ring 98 which surrounds a vertically movable tube 99. The lower end of the tube is provided with a head 101 which is secured by a stuffing box nut 102 in a boss 103 formed on the flanged collar 48 of each gassing head E. Such a construction provides for vertical movement of the heads relative to the tubular members 97. The flanged collar boss 103 is formed with an opening 104 which leads from the lower end of the tube 99 into the recess 51 in the head housing 49.

Hence when the valve cylinder 91 is in open position there is a clear passageway from the main gas supply pipe 83 into the gas jetting elements 52 and the cans A into which they are inserted. When the valve cylinder is rocked to shift its radial bore 93 out of alignment with the tubular member 97, communication between these two is cut off and the flow of gas thereby stops.

Rocking of the valve cylinder is brought about by a finger wheel 107 (Figs. 1, 2, 3 and 4) which is secured to the outer end of the cylinder 91. There is one of these finger wheels for each valve. The wheel serves as a cover for the outer end of the valve casing 89 and is held in frictional engagement therewith by a bracket 108 which is secured to the valve casing. The finger wheels 107 are formed with an upper projecting finger 111 and a similar lower finger 112, for rocking the cylinder into open and closed position.

The rocking of the valve cylinder 91 is done in time with the insertion of the gas jetting elements 52 into the cans to be gassed. This is brought about by a pawl 115 (Figs. 1 and 6) which is movable into and out of the path of travel of the wheel finger 112. The pawl is formed on the outer end of a lever 116 mounted on a vertical shaft 117 which at its upper end is carried in a bearing 118 formed on a stationary arm 119 supported on top of the stationary cam 61. The lower end of the shaft is carried in a bearing 122 formed at the outer edge of the table 31.

A detector lever 124 is also keyed to the lower end of the shaft 117. This lever is normally maintained in the path of travel of the cans A carried around with the gas jetting device and is so positioned by a tension spring 126 which is coiled around the upper end of the shaft. One end of the spring is secured in the bearing 118 while the other end is fastened in the lever 116. A stop 127 formed on the lever 124 is provided to engage against the outer guide rail 36 and this limits the inward movement of the lever.

The normal position of the pawl 115 is out of the path of travel of the wheel fingers 112 as they move around with the jetting device so that if no can is in position to be gassed when a jetting head E passes the detector lever 124 the valve 91 will remain closed. This prevents loss of gas. However, when a can A comes into position adjacent the detector lever 124 the can pushes the lever outwardly and this rotates the shaft 117 and the pawl lever 116 mounted thereon.

Accordingly the pawl 115 moves out into the path of the finger 112 associated with the approaching jetting head for the particular can under consideration and just after the head moves down into the can the finger wipes against the pawl and is rocked through a partial rotation. This rocking of the finger rotates the valve cylinder 91 into open position and thereby permits gas to flow through the various passageways and through the gassing elements 52 from which it discharges into the can.

The valve remains open long enough for the can to move through a predetermined distance along its curved path of travel and this permits the can to receive a predetermined volume of gas. Then the valve is closed. Closing of the valve is brought about by the wheel upper finger 111 wiping against a stationary lug 131 as the jetting head under consideration moves past. This turns the valve cylinder 91 in the opposite direction to that just explained and thus closes the valve. This cuts off further flow of the gas into the jetting head and the can.

The lug 131 is formed on an arm 132 which is mounted on top of the arm 119. Both of these arms are held in position by the head of a clamping stud 133 which is threadedly secured in the upper end of the stationary shaft 62 (see Fig. 4). The hub of the upper arm 132 is adjustably bolted to the lower arm 119 by a cap screw 135 so that the upper arm may be shifted through an arc to change the distance between its lug 131 and the pawl 115. With this construction the period of gassing, or in other words, the length of time that the gas valve remains open, may be altered or adjusted to suit desired requirements. Openings 137 are also provided in the hubs of both arms 119, 132 to permit the gas supply pipe 83 to extend up out of the hub 76 of the stationary cam 61.

With the gassing of the can completed, the jetting head E is withdrawn and the can moves out of the jetting device D and onto the endless chain conveyor G (Figs. 1 and 7). The conveyor takes over a pair of spaced horizontally disposed sprockets 141 which are mounted on vertical shafts 142 carried in bearings 143 formed in the machine main frame 15. One of the sprockets (shown at the right in Fig. 1) serves as a driving sprocket and this in turn is rotated by a sprocket 145 which is mounted on the lower end of the shaft.

Sprocket 145 is driven by a chain 146 which operates over a driving sprocket 147 mounted on a main drive shaft 148 journaled in suitable bearings formed in the main frame. It is this drive shaft that also drives the jetting device F and the can feed-in device D. This conveyor construction and the devices associated with it, which will be hereinafter explained, are usual closing machine devices which are disclosed in the above mentioned Fleischer patent.

The conveyor G operates in a groove 151 formed in the table 31 and carries a plurality of spaced short dogs 152 and long dogs 153 which project up above the top of the table. A gassed can is placed on the conveyor at the proper time so that a passing short dog 152 engages behind it and thus propels the can in a straight line along the table. The can is guided between a pair of guide rails 155, one of which is a continuation of the curved outer guide rail 36 of the jetting device F.

The guided can is conveyed into position on top of a lifter pad 158 which is disposed in the path of travel of the moving can. The lifter pad is vertically movable and is lifted at the proper time by any suitable means operating in time with the other moving parts of the machine, the pad being vertically slotted to clear the conveyor during this movement.

The rising lifter pad lifts the gassed can above and out of engagement with the short dog 152. This permits the dog to pass under the can leaving the latter resting on the pad in a predetermined location. It is on this upward travel that the can picks up its cover B as will now be explained.

The covers B are preferably fed individually from the bottom of a stack of such covers retained in a magazine 161 (Fig. 7) which is disposed over the top of the table 31. The magazine includes a plurality of vertically disposed rods 162 which hold the covers in place and these rods are secured in a base plate 163, which may be supported on the table 31, and the main frame 15 in any suitable manner. The covers in the magazine extend down through an opening 164 formed in the base plate, the lowermost cover in the stack being adjacent the cover feed device K.

The cover feed device K includes a reciprocating feed bar 166 which slides in a slideway 167 formed in a feed housing 168 secured to the bottom of the magazine base plate. The feed bar is reciprocated in any suitable manner in time with the other moving parts of the machine. This feed bar is provided intermediate its length with a spring held depressible feed dog 169.

Hence on a forward stroke of the feed bar 166 the lowermost cover B of the stack is pushed out from under the stack by the feed dog 169 and is advanced along a guide groove 171 in the feed housing 168. The cover is advanced to a position midway between the magazine and the lifter pad station and is there brought to rest while the feed bar returns on a backward stroke. A spring held pin 172 in the magazine base plate engages in back of the advanced cover and prevents its return with the feed bar.

On the next forward stroke of the feed bar the inner end of the bar engages the advanced cover and further advances it, this time bringing it to rest in a seat 174 surrounding an opening 175 in the feed housing and disposed directly above the rising can A on the lifter pad. It is this seated cover which is picked up by the can as it is lifted up through the opening 175. This is a usual construction and operation in can closing machines.

After the can picks up its cover, the lifter pad 158 continues to rise and inserts the upper end of the can and its loosely superimposed cover into the vacuum chamber H. This chamber is enclosed in a casing 181 which is carried on an upright column 182 of the machine main frame 15, the chamber casing being located in vertical alignment with the lifter pad station. A resilient sealing ring 183 provided in the casing surrounds the inserted can and thus seals the chamber.

While the can is still rising within the chamber a vacuum is drawn on the chamber and the can interior by way of a pipe 184. One end of the pipe is secured in a side wall of the casing while the other end leads to a suitable source of vacuum supply. In this chamber what little air that remains in the can, after the gassing operation, is drawn off. Some small quantity of diffused gas and air may also be withdrawn.

It will be remembered that this residual air is mostly adjacent the top of the can so that it can be easily and quickly exhausted, the greater portion of the can interior around its contents being filled with the inert gas. This vacuumizing step is effected while the can is still rising.

At the top of the upward stroke of the lifter pad 158, the gassed and vacuumized can and its superimposed cover is brought into engagement with the seaming head J. This is a usual type of head used in can closing machines such as that disclosed in the Fleischer patent and is preferably of the character which unites the cover with the can by an interfolding of flange parts formed thereon so that the resulting end seam will be a double seam. The head is rotated in any suitable manner in time with the other movable parts of the machine to effect the sealing or closing operation.

The sealed can is next lowered to its original position on the conveyor G by a downward stroke of the lifted pad 158. During this downward movement of the can, a long dog 153 of the conveyor comes into position adjacent the lifter pad and sweeps the sealed can off the pad onto the table 31. The long dog remains in back of the can and propels it across the table between a pair of spaced and parallel guide rails 186 which are secured to the table 31. These guide rails direct the sealed can toward the discharge end of the machine from which it may be conveyed to any suitable place of deposit.

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 parts of the apparatus mentioned herein and in the steps and their order of accomplishment of the process described herein, without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the apparatus and process hereinbefore described being merely a preferred embodiment thereof.

We claim:

1. In a machine for treating filled containers by the use of inert gas for sweeping out the air in the container and in the interstices of the product incident to vacuumizing and sealing the container, the combination of a gas jetting head movable with a said container in a circular path of travel, said head being also vertically movable relative to said container, a plurality of depending tubular gassing elements carried by said head,

means for lowering said head to insert said gassing elements through the product within the container to a position adjacent the bottom thereof, means for discharging inert gas through said inserted gassing elements into the product to displace the air therein, a horizontally disposed normally closed rotatable valve carried by said head for controlling the admission of gas to the head and to said gassing elements, valve engaging means normally disposed out of the path of travel of said valve, and means disposed in the path of travel of said container and actuated thereby for projecting said valve engaging means into the path of travel of said valve to open the same for gassing the container.

2. In a machine for treating filled containers by the use of inert gas for sweeping out the air in the container and in the interstices of the product incident to vacuumizing and sealing the container, the combination of a gas jetting head movable with a said container in a circular path of travel, said head being also vertically movable relative to said container, a plurality of depending tubular gassing elements carried by said head, means for lowering said head to insert said gassing elements through the product within the container to a position adjacent the bottom thereof, means for discharging inert gas through said inserted gassing elements into the product adjacent the bottom of the container to displace the air therein, a normally closed valve carried by said head for controlling the admission of gas to the head and to said gassing elements, valve engaging means normally disposed out of the path of travel of said valve, means disposed in the path of travel in said container and actuated thereby for projecting said valve engaging means into the path of travel of said valve to open the same for gassing the container, and means disposed later in the path of travel of said valve for engaging and closing said valve.

3. In a machine for treating filled containers by the use of inert gas for sweeping out the air in the container and in the interstices of the product incident to vacuumizing and sealing the container, the combination of a gas jetting head movable with a said container in a circular path of travel, said head being also vertically movable relative to said container, a plurality of depending tubular gassing elements carried by said head, means for lowering said head to insert said gassing elements through the product within the container to a position adjacent the bottom thereof, means for discharging inert gas through said inserted gassing elements into the produce adjacent the bottom of the container to displace the air therein, a normally closed valve carried by said head for controlling the admission of gas to the head and to said gassing elements, valve engaging means normally disposed out of the path of travel of said valve, means disposed in the path of travel of said container and actuated thereby for projecting said valve engaging means into the path of travel of said valve to open the same, means disposed later in the path of travel of said valve for engaging and closing said valve, and means for changing the circumferential distance between said valve opening and closing means to vary the time interval of the gassing operation.

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