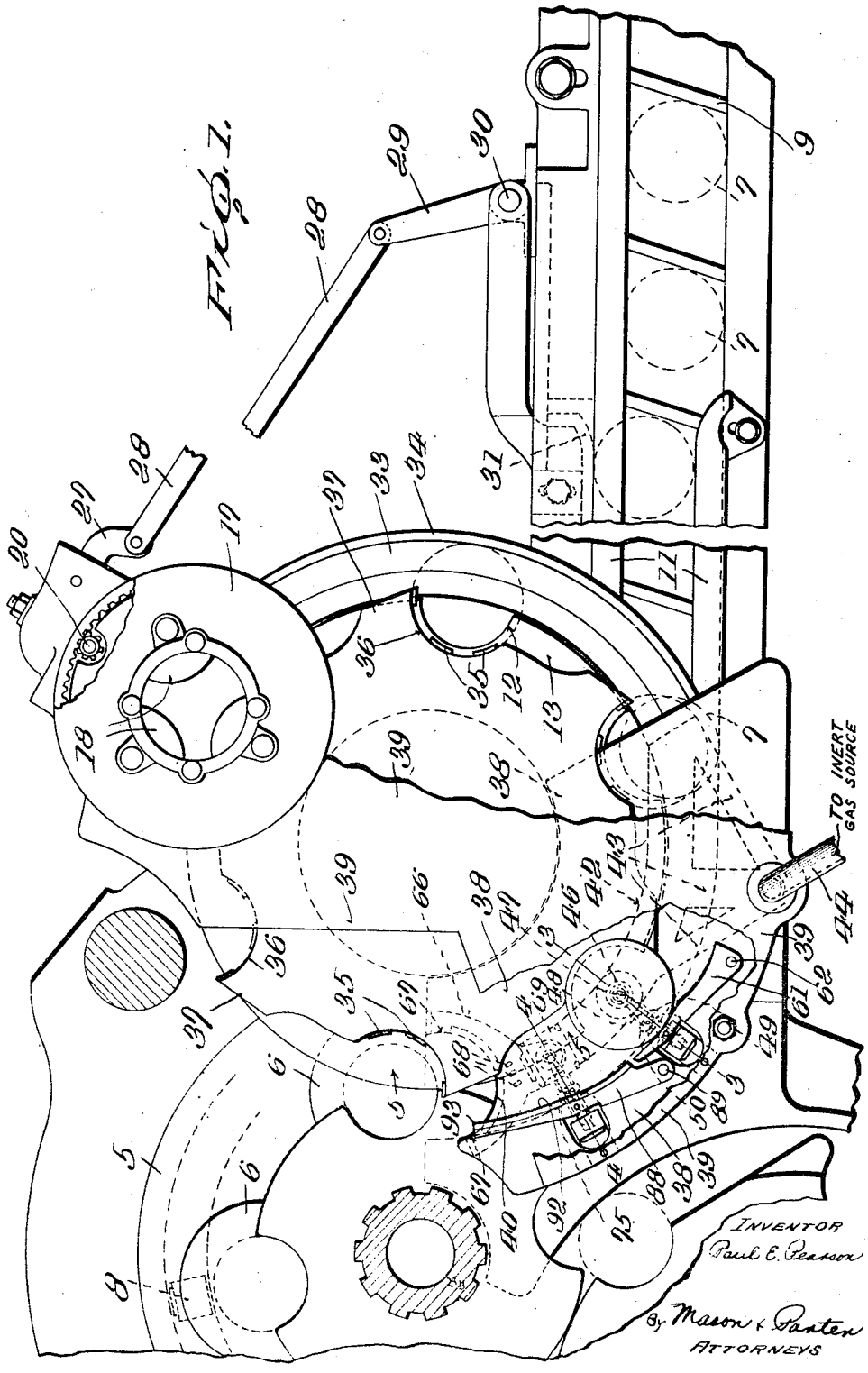
Oct. 3, 1944. P. E. PEARSON 2,359,671

FILLED CONTAINER GASSING APPARATUS

Filed Sept. 26, 1941 4 Sheets-Sheet 1

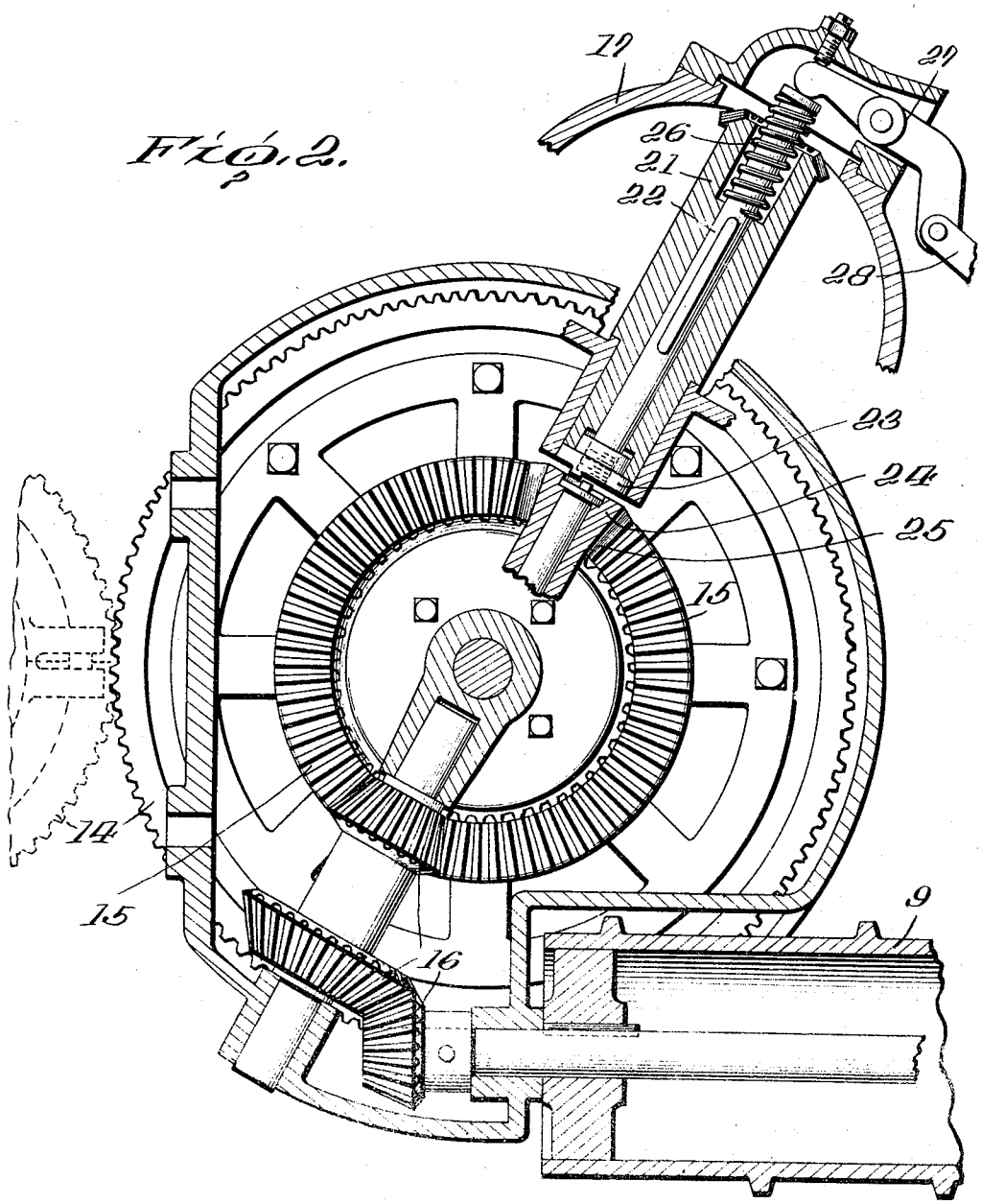


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FILLED CONTAINER GASSING APPARATUS

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Fig. 2.



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FILLED CONTAINER GASSING APPARATUS

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FIG. 3.

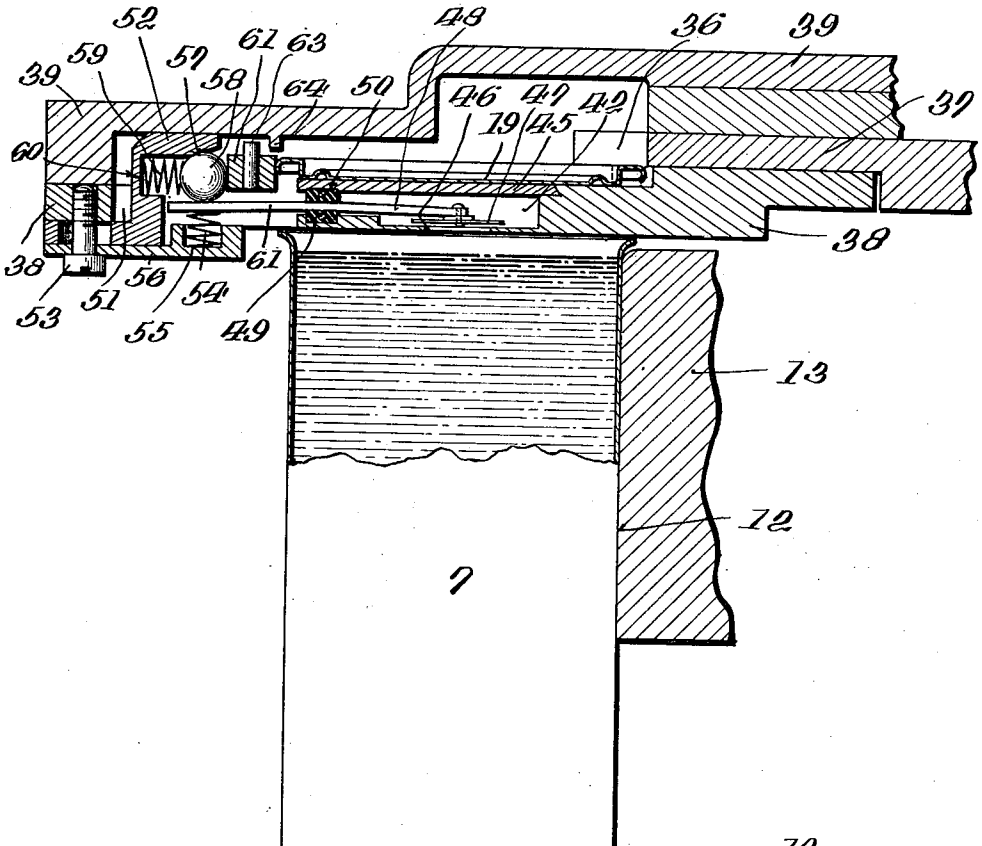
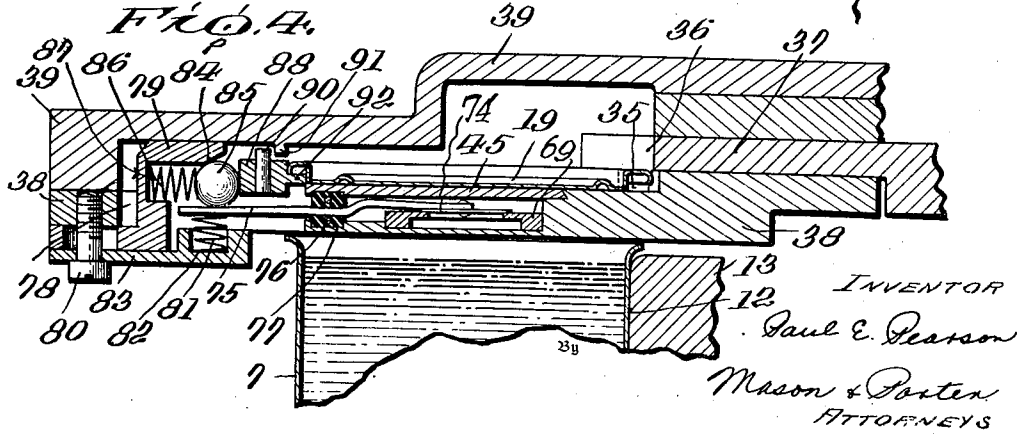


FIG. 4.



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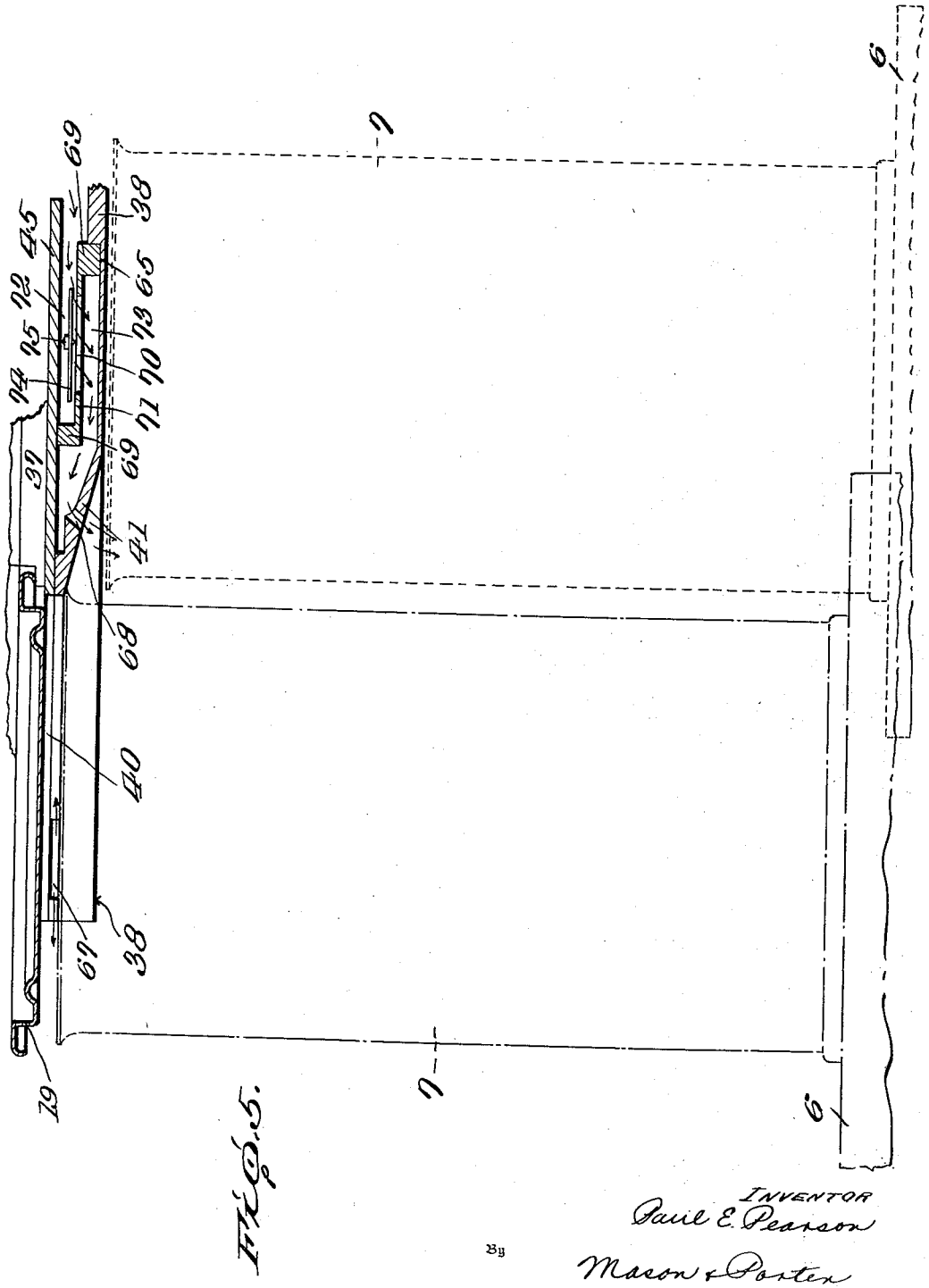


FIG. 5.

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UNITED STATES PATENT OFFICE

2,359,671

FILLED CONTAINER GASSING APPARATUS

Paul E. Pearson, Chicago, Ill., assignor to Continental Can Company, Inc., New York, N. Y., a corporation of New York

Application September 26, 1941, Serial No. 412,502

15 Claims. (Cl. 226—68)

The invention relates generally to container closing apparatus and primarily seeks to provide novel means for driving out air from the head spaces above the product in filled containers just prior to the closing of said containers and by directing a gaseous medium into said head spaces. More particularly the invention seeks to provide certain new and useful improvements in container head space gassing apparatus of the general nature disclosed in U. S. Letters Patent 2,240,655 issued to Alfred L. Kronquest on May 6, 1941.

In the packaging of beverages and food products, it is desirable to remove air from the container head spaces prior to the applying and affixing of closures on the containers. Attempts have been made to attain this end by various means, as by the drawing of a vacuum or by forced jetting. Such attempts, of which I am at present aware, have proven unsuccessful because of inefficiency in the displacement of the air or for other reasons. It is the purpose of the present invention to provide novel means for efficiently displacing the air from the head spaces of the containers without objectionable wastage of the gaseous air displacing medium, preferably nitrogen.

In the patented structure hereinbefore referred to, there is disclosed means for efficiently driving out air from the head spaces above the product in filled containers, but no means is provided for controlling or timing the flow of the gaseous medium, and therefore a considerable wastage of the gaseous medium is occasioned during the operation of the apparatus. It is, therefore, an object of the present invention to provide a container head space gassing apparatus in which novel means is included for controlling the air expelling gaseous medium so that it will be directed into the path of travel followed by filled containers only when the filled containers are actually present, thereby to avoid wastage of the air expelling gaseous medium.

An object of the invention is to provide an apparatus of the character stated including container head space gassing means controlled by contact of container end closures moving in superposed relation with the filled containers which are to be gassed.

Another object of the invention is to provide in an apparatus of the character stated, means for feeding filled containers to the apparatus, means for feeding end closures to the apparatus and for moving them in superposed relation with the filled containers, means for controlling the feeding of end closures so that no end closure will be fed unless a complementary filled container is being fed into the apparatus to be closed by the particular end closure, and novel means for directing a gaseous medium into the head spaces above the product in the filled containers and controlled by contact of the end closures which are to be applied to said containers so that no gaseous medium will be released when the proper complement of a filled container and an end closure therefor is not passing through the apparatus.

Another object of the invention is to provide an apparatus of the character stated in which the gaseous medium is directed into the traveling containers at a definite station, a gaseous medium manifold being included in the apparatus which is equipped with suitable porting for directing the gaseous medium into the container head spaces for efficiently driving out air therefrom, and novel valve means for controlling the flow of the gaseous medium through said porting being provided and so disposed as to be actuated for opening the valve equipment by contact of an end closure moving in superposed relation with the particular container being treated.

Another object of the invention is to provide an apparatus of the character stated in which the air expelling gaseous medium is directed into the container head spaces at two spaced stations, the outflow of the gaseous medium being controlled at each station by an end closure displaced valve actuating lever.

Another object of the invention is to provide an apparatus of the character stated in which novel means is provided for directing the air expelling gaseous medium into each container head space immediately prior to the placement of the complementary end closure thereon.

Another object of the invention is to provide in an apparatus of the character stated a novel form of gaseous medium flow controlling disk valve, a novel pivotal mounting therefor, and a novel lever operating means for actuating said valve.

Another object of the invention is to provide in an apparatus of the character stated novel means for controlling the amount of opening of the valve.

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

In the drawings:

Figure 1 is a part plan view and a part horizontal section illustrating a portion of a closing machine embodying the invention.

Figure 2 is a horizontal sectional view illustrating the driving connections between the closing turret, the container and end closure feeding turret, the end closure feed, and the means for feeding the containers to the container feeding turret.

Figure 3 is a fragmentary vertical cross section taken on the line 3—3 on Figure 1.

Figure 4 is a fragmentary vertical cross section taken on the line 4—4 on Figure 1.

Figure 5 is a fragmentary cross section taken on the line 5—5 on Figure 1.

In the example of embodiment of the invention herein disclosed, there is illustrated a portion of a container closing machine including a closing turret 5 equipped with the usual equidistantly spaced container supporting pads 6 upon which the filled containers 7 are uspported and moved in said machine. During the affixing of the end closures, the pads 6 are lifted by pad lifting means generally designated 8 so as to bring the containers and the associated covers into assembled relation and into proper cooperative relation with the attaching means. It is to be understood that the invention can be applied to any form of closing machine generally similar in nature and constructure to that disclosed in the U. S. Letters Patent 1,752,912 issued to Alfred L. Kronquest on April 1, 1930.

The filled containers, which are to be closed in the closing machine and have air removed from the head spaces above the product therein by the means forming the subject matter of the present invention, are fed toward the machine by any suitable container feeding mechanism generally designated 9. In this particular illustration, the feeding means 9 takes the form of a feeder screw but it is to be understood that other forms of feeding means such as block chains or a chain belt might be employed.

The feed-in mechanism generally designated 9 delivers the filled containers 7 onto a supporting table portion 10 between suitable guide rails 11 and into the receiving pockets 12 formed in equidistantly spaced relation about the periphery of the container feeding turret 13. Rotation is imparted to the turret 13 through suitable gearing connections 14 with the main or closing turret 5, the latter being power driven by any approved means (not shown).

The container feed-in means may be driven through the bevel gear 15 secured to rotate with the turret 13, and through the bevel gear drive connections generally designated 16.

Any approved form of end closure feed means generally designated 17 may be employed, and it is preferred that this end closure feed means be combined with a suitable control means which will prevent the feeding of end closures whenever no complementary can bodies are being fed to receive said end closures. An example of an acceptable form of end closure feeding means and a no container, no end closure feed control is to be found in the U. S. Letters Patent 1,610,862 issued to Alfred L. Kronquest on December 14, 1926. This end closure feed and feed control means includes end closure supporting screws 18 on which the end closure units 19 rest and which are rotated in suitably timed relation with the turret movements by driving connections generally designated 20 and including a driver sleeve 21 in which a clutch rod 22 is reciprocably mounted. The clutch rod carries a clutch head 23 which is opposed to a clutch head 24 carried by a bevel gear 25 to which rotation is imparted by the bevel gear 15 hereinbefore referred to. A spring equipment 26 serves to normally hold the clutch head 23 out of contact with the driving clutch head 24, and when these driving heads are thus separated no movement will be imparted to the end closure supporting and feeding screws 18. A rocker arm 27 pivoted intermediately of its ends is disposed with one end thereof in engagement with the end of the rod 22 opposite the end which carries the clutch head 23. The other end of the rocker arm 27 is link-connected, as at 28, with an actuator lever 29 which is fixed on a rock shaft 30 which also carries an actuator cam or ramp 31 disposed beside the feed-in means 9 so as to be engaged and laterally displaced by containers 7 being moved toward the turret 13.

From the foregoing, it will be obvious that each time a container 7 engages and displaces the member 31, the arm 27 will be rocked so as to move the rod 22 longitudinally and bring about a clutching engagement between the heads 23 and 24, thereby connecting the driving parts in driving relation so as to bring about the feeding of an end closure 19 to be subsequently deposited upon the particular container. Thus if no containers are moving into the apparatus, the control element 31 will not be laterally displaced, the clutch heads 23 and 24 will remain out of driving contact and no end closures 19 will be fed from the feed means generally designated 17.

As the end closures 19 are dropped one by one from the feed means 17, they are supported at an outer edge by an arcuate track 33. The track 33 may be equipped with an outer edge portion or upstanding flange 34 for providing a guideway for the outer edges of the end closures. The end closures are supported at their inner edges on lugs 35 carried in the pockets 36 formed in equidistantly spaced relation in the peripheral edge portion of the end closure feeding turret 37, said turret being rotatable with and spaced above the container feeding turret 13 hereinbefore referred to, and the pockets therein being aligned with the underlying pockets in the turret 13 so that when filled containers and complementary end closures are being conveyed by the turrets 13 and 37 they will be disposed in axial alignment with the end closures spaced above the open tops of the containers.

The supporting function of the trackway 33, 34 is given over at a suitable point to the upper surface of a gassing manifold plate 38 which is supported in any approved manner on the apparatus framing, as by being suspended from the overall cover plate 39 which is rigidly supported in any approved manner on said framing. The plate 38 is termed a gassing manifold plate because it is suitably cored out or recessed to provide a gas manifold therein, and this plate terminates over the path of travel of the turret closing pad 6 in an arcuate, cover drop edge 40, said edge being undercut gradually, as at 41, in the manner best illustrated in Figure 5 of the drawings so as to accommodate lifting movement of the upper extremity or top edge portions of the containers. It is to be understood that the pad lifting movements are so timed that the upper limits of the filled containers are lifted substantially into contact with the end closures just after they are released or dropped from the plate 38 onto said containers, and continued lift-

ing of the pads serves to move the thus loosely assembled containers and end closures into contact with the end closure attaching means in a manner well known in the art.

The manifold plate 38 is equipped with a manifold gas duct 42 fed by a plurality of inlet ducts 43 forming a supply duct 44 which is connected with a source of gaseous medium (not shown), preferably nitrogen gas. The manifold duct is covered by a cover plate 45.

The gassing of the filled containers, that is, the introduction of the gaseous medium into the head spaces above the product therein for the purpose of driving air out of said head spaces is accomplished at two separate stations, one immediately ahead of that point at which the filled containers and end closures come into loosely assembled contact, and the other at a point spaced a distance ahead of this loose assembly station.

At the first encountered, last mentioned station, the manifold plate 38 is equipped with a gassing port 46 which opens through the bottom thereof and is centered over the path of movement of and very closely spaced from the upper extremities of the moving can bodies. See Figures 1 and 3. This port is controlled by a thin valve disk 47 so as to be opened to bring about an introduction of air expelling gaseous medium into the head space of a container only when such a container and its complementary end closure is passing this station. This opening of the valve is controlled by engagement of the complementary end closure, and for this purpose the valve disk 47 is mounted on one end of a valve lever 48 which is fulcrumed in a rubber block 49 inset in the plate 38, as at 50, the free end of the lever extending into an aperture 51 formed in said plate. An abutment head 52 is mounted in said aperture and is adjustably secured to the outer edge of the plate by a screw 53. The free end of the lever 48 is urged upwardly by a compression spring 54 mounted in a socket 55 in a supporting element 56 which is secured to the under surface of the abutment head 52 and to the plate 38 by the screw 53. The abutment head 52 is provided with a beveled shoulder 57 which is opposed by a ball 58 urged inwardly toward the axis of the turret 13 by a compression spring 59 which is mounted in a socket 60 formed in said head. The inwardly urged ball 58 engages the outer surface at the free end of an actuator lever 61 which is pivotally supported, as at 62, upon the plate 38. It will be obvious by reference to Figures 1 and 3 of the drawings that the free end of the lever 61 projects into the path of movement of the outer edge portion of each end closure 19 which is being moved by the turret 37 so as to be displaced outwardly by each passing end closure. Each such outward displacement of the free end of the lever 61 by end closure contact causes the ball 58 to move outwardly, and the engagement of this ball with the bevel shoulder 57 of the head 52 causes the ball to move downwardly so as to depress the end of the valve lever 48 and cause the valve disk 47 to be lifted away from the gas port 46 and permit the gaseous medium, preferably nitrogen gas, to flow out of the manifold duct 42 into the head space above the product in the then passing container 7 for expelling air from said head space. As soon as the end closure 19 moves out of contact with the actuator lever 61 the spring 54 will return the valve lever 48 to its normal, valve closing position, and the spring 59 will return the ball 58 and the actuator lever 61 inwardly to their normal positions.

It will be observed by reference to Figures 1 and 3 of the drawings that the actuator lever 61 carries a limit pin 63 which projects upwardly beyond the lever and engages a lug or abutment shoulder 64 carried by the overall cover 39 so as to limit inward movement of the lever in position for properly intercepting and being displaced by oncoming end closures 19.

The first encountered air expelling or container head space gassing stage having been described just above, the second stage of this treatment will now be described. At a point spaced a distance beyond the gassing port 46 in the direction of travel of the container end closure, the main gassing duct 42 is provided with a depression or enlargement 65 which merges into a part circular duct portion 66 which is arranged concentrically about the drop edge or plate extremity 40 hereinbefore referred to. The part circular duct 66 is disposed over the drop edge undercut 41 in the manner clearly illustrated in Figures 1 and 5 of the drawings. The duct 66 opens through two horizontal side delivery ports or slits 67 and through three central, downwardly and forwardly directed ports 68 into the space defined by the part circular drop edge 40.

A valve seat 69 is mounted in the duct enlargement 65 and is equipped with a seat port 70 in an intermediate wall 71 which serves to divide the manifold at that point into an upper supply portion 72 and a lower delivery portion 73, the latter communicating with the ports or slits 67 and the ports 68 hereinbefore referred to. Passage of the gaseous medium through the seat port 70 and into the delivery duct portions 73 is controlled by a thin valve disk 74 mounted on one end of a valve lever 75 which is fulcrumed in a rubber block 76 inset in the plate 38, as at 77, the free end of the lever extending into an aperture 78 formed in said plate. An abutment head 79 is mounted in said aperture and is adjustably secured to the outer edge of the plate by a screw 80. The free end of the lever 75 is urged upwardly by a compression spring 81 mounted in a socket 82 in a supporting element 83 which is secured to the under surface of the abutment head 79 and to the plate 38 by the screw 80. See Figures 1 and 4.

The abuement head 79 is provided with a beveled shoulder 84 which is opposed by a ball 85 urged inwardly toward the axis of the turret 13 by a compression spring 86 which is mounted in a socket 87 formed in said head. The inwardly urged ball 85 engages the outer surface at the free end of an actuator lever 88 which is pivotally supported, as at 89, upon the plate 38. It will be obvious by reference to Figures 1 and 4 of the drawings that this lever 88 also projects into the path of movement of the outer edge portion of each end closure 19 which is being moved by the turret 37 so as to be displaced outwardly by each passing end closure. Each such outward displacement of the free end of the lever 88 by end closure contact causes the ball 85 to move outwardly, and the engagement of this ball with the bevel shoulder 84 of the head 79 causes the ball to move downwardly so as to displace the outer end of the valve lever 75 and cause the valve disk 74 to be lifted away from the seat port 70 and permit the gaseous medium to flow from the manifold supply portion 72 into the delivery duct 73, into the part circular duct 66 and out through the slits or ports 67 and the ports 68 into the head space

above the product in the container 7 then passing the plate drop edge portion 40 and about to receive its complementary end closure 19 traveling over the upper surface of the plate 38 for expelling air from said head space. As soon as the end closure 19 moves out of contact with the actuator lever 88 the spring 81 will return the valve lever 75 to its normal, valve closing position, and the spring 86 will return the ball 85 and the actuator lever 88 inwardly to their normal positions.

Like the actuator lever 61, the actuator lever 88 carries a limit pin 90 which engages a lug or abutment shoulder 91 carried by the overall cover 39 so as to limit inward movement of the lever in position for properly intercepting and being displaced by oncoming end closures 19. It will also be observed by reference to Figures 1 and 4 of the drawings that the actuator lever 88 has its end closure engaging edge portion recessed to provide a supporting ledge 92 which engages under the edge extremity of each end closure 19 in the manner illustrated in Figure 4. It will also be apparent from Figure 1 that the end extremity 93 of the actuator lever 89 normally extends over or slightly beyond the drop edge portion 40 of the manifold plate 38 so as to act as an edge support for each end closure 19 as it is being moved into loosely assembled relation with the complementary or underlying container so as to aid in causing each end closure to drop flat or horizontally onto the upwardly rising complementary container.

From the foregoing description it will be obvious that when no filled containers are being fed into the apparatus by the means generally designated 9, no complementary end closures 19 will be fed from the closure feeding means 17. For each filled container being fed into the apparatus, however, a complementary end closure 19 will be delivered by the feeding means generally designated 17 for assembly with and attachment to that container. The containers and end closures are moved in vertically spaced and axially aligned relation by the turret structure 13, 37 in the manner clearly illustrated in Figures 1 and 3 of the drawings, and as each container reaches the first stage treating station hereinbefore referred to, namely, the position of the gassing port 46, the gaseous medium, preferably nitrogen gas, will be delivered through that port into the head space in the container for expelling air therefrom, this momentary introduction of gas taking place only during the actual passing of the container under control of engagement of the complementary, overlying end closure and the actuator lever 61.

As each container next approaches the drop edge portion 40 of the manifold plate 38 and the point at which loose assembly of the container and the complementary end closure takes place, another air expelling treatment or gassing of the container will be effected through the horizontal ports or slits 67 and the downwardly and forwardly directed ports 68 hereinbefore referred to similarly under control of the engagement between the complementary end closure 19 and the actuator lever 88, the arrangement of the ports or slits 67 being such that two, relatively flat and fan-shaped discharges of the gaseous medium will be directed into the head space of the passing container. The fan-shaped discharges of the gaseous medium are directed between the overlying end closure 19 and the upwardly and forwardly moving container head space, the action taking place both before and as the container is rising to engage the horizontally disposed end closure. Before the container engages the end closure, the end closure has cleared the end of the actuator lever 88, thus shutting off the gaseous medium, but within a negligible amount of time, engagement between the container and complementary end closure takes place. The progressive movement of a container during and at the completion of the treating function of the second stage is indicated by dot and dash line container positions in Figure 5.

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 the invention.

I claim:

1. In apparatus of the character described, a manifold plate having a duct therein supplied with a gaseous medium, means for conveying filled containers toward a closing means with the open tops thereof in close proximity beneath said plate, said plate having a gassing port therein opening from the duct through the plate bottom in position for directing a gaseous medium from the duct directly into head spaces in containers passing beneath the plate, a valve engaging over and controlling passage of gaseous medium through said port, and means for actuating said valve to permit an outflowing of gaseous medium from said port only when a filled container is passing beneath the port thereby to displace air from head spaces in containers passing toward the closing means without unnecessary wastage of the gaseous medium.

2. In apparatus of the character described, a manifold plate having a duct therein supplied with a gaseous medium, means for conveying filled containers toward a closing means with the open tops thereof in close proximity beneath said plate, means for feeding end closures for attachment to the open tops of said containers with each end closure moving above the plate and centered over the container which it is destined to close, said plate having an arcuately recessed end terminus through which recess the complementary containers and end closures come into loosely assembled relation and porting disposed about the arcuate recess in the end terminus of said plate through which gaseous medium from the duct is directed into container head spaces immediately prior to said loose assembly.

3. In apparatus of the character described, a manifold plate having a duct therein supplied with a gaseous medium, means for conveying filled containers toward a closing means with the open tops thereof in close proximity beneath said plate, means for feeding end closures for attachment to the open tops of said containers with each end closure moving about the plate and centered over the container which it is destined to close, said plate having an arcuately recessed end terminus through which recess the complementary containers and end closures come into loosely assembled relation and porting through which gaseous medium from the duct is directed into container head spaces immediately prior to said loose assembly and also including supply and delivery duct portions separated by a wall having a port therethrough, a valve mounted on said plate and engageable over the port controlling passage of gaseous medium through said port, and means for actuating said valve to permit an outflowing of gaseous medium from said porting only when a filled container is passing there-

by to displace air from head spaces in containers and replace it with the gaseous medium immediately prior to the loose assembly of containers and end closures without unnecessary wastage of the gaseous medium.

4. In apparatus of the character described, a manifold plate having a duct therein supplied with a gaseous medium, means for conveying filled containers toward a closing means with the open tops thereof in close proximity beneath said plate, means for feeding end closures for attachment to the open tops of said containers with each end closure moving above the plate and centered over the container which it is destined to close, said plate having a gassing port therein opening from the duct through the plate bottom in position for directing a gaseous medium from the duct into head spaces in containers passing beneath the plate, a valve mounted on said plate and controlling passage of gaseous medium through said port, and means operated by direct mechanical contact of passing end closures for actuating said valve to permit an outflowing of gaseous medium from said port only when a filled container is passing beneath the port thereby to displace air from head spaces in containers passing toward the closing means without unnecessary wastage of the gaseous medium.

5. In apparatus of the character described, a manifold plate having a duct therein supplied with a gaseous medium, means for conveying filled containers toward a closing means with the open tops thereof in close proximity beneath said plate, means for feeding end closures for attachment to the open tops of said containers with each end closure moving above the plate and centered over the container which it is destined to close, said plate having a gassing port therein opening from the duct through the plate bottom in position for directing a gaseous medium from the duct into head spaces in containers passing beneath the plate, a valve controlling passage of gaseous medium through said port, said plate also having an arcuately recessed end terminus through which recess the complementary containers and end closures come into loosely assembled relation and porting through which gaseous medium from the dust is directed into container head spaces immediately prior to said loose assembly, a valve means controlling passage of gaseous medium through each of said port and porting, and means operated by contact of passing end closures for actuating each said valve means to permit an outpouring of gaseous medium from said port and porting only when filled containers are actually passing.

6. An apparatus as defined in claim 2 in which said porting includes a central port centered over the path of travel of the containers and directed downwardly and in the direction of said travel, and a narrow longitudinal side port at each side of said path of travel for directing opposed fan-shaped discharges of the gaseous medium across said path of travel.

7. In apparatus of the character described, means for conveying filled containers toward a closing machine, means including a valve disposed closely over the path of travel of the containers in position for directing a gaseous medium directly into the head spaces of containers moving toward said closing machine thereby to feed the gaseous medium directly into the container head spaces to displace air from said head spaces before the containers are received in the closing machine to be closed therein, and means for holding said valve closed and preventing the directing of the gaseous medium into said head spaces except when filled containers actually are moving past said valve.

8. In apparatus of the character described, means for conveying filled containers toward a closing means, a stationary filled container treating station, and means including a valve disposed directly over the path of travel of the filled containers at said station and effective at said station and only while a filled container is passing said station for directing a gaseous medium directly into the head space of the passing container for displacing air therefrom.

9. In apparatus of the character described, means for conveying filled containers toward a closing means, a plurality of stationary filled container treating stations spaced a distance apart along the path of travel of the containers, and means including two valves disposed closely over the path of travel of the containers one at each said station in position for being effective only while a filled container is passing the particular station for directing a gaseous medium directly into the head space of the passing container for displacing air therefrom.

10. In apparatus of the character described, means for conveying filled container units toward a closing means, means for feeding complementary end closure units for attachment on said containers, and means controlled by movement of one of the units of each complementary container and closure unit set for directing a gaseous medium into the container head spaces for displacing air therefrom, said last named means including a control valve closely overlying the path of travel of the containers and a valve actuating means directly engaging the valve and disposed to be mechanically actuated for opening the valve by direct engagement of a passing unit.

11. In apparatus of the character described, means for conveying filled containers toward a closing means, means for feeding complementary end closures for attachment on said containers, a valve closely overlying the path of travel of the containers for directing a gaseous medium into the container head spaces for displacing air therefrom, valve operating means actuated by direct contact of a travelling closure for opening the valve while the container to be closed by said closure is passing said valve, and means for preventing the feeding of an end closure when no container to receive it is being fed into the apparatus.

12. In apparatus of the character described, means for simultaneously conveying filled containers and end closures therefor with the end closures spaced above and aligned with said containers, and valve means disposed closely over the path of travel of the filled containers and beneath the complementary closures, and actuating devices therefor actuated mechanically by direct contact by passing end closures for directing a gaseous medium directly into the container head spaces for displacing air therefrom.

13. In apparatus of the character described, a turret structure for simultaneously conveying filled containers and end closures therefor with the end closures spaced above and aligned with the said containers, valve means disposed closely over the containers and beneath said closures and controlled by movement of the end closures on said turret structure for directing a gaseous medium into the container head spaces for displacing air therefrom, and valve actuating de-

vices disposed to be mechanically actuated for opening the valve by direct engagement of a passing end closure, means for feeding filled containers one by one to the turret structure, means for feeding end closures one by one to the turret structure, and means for preventing the feeding of an end closure to the turret structure when no complementary container is being fed thereto.

14. An apparatus as defined in claim 10 in which the movement controlled means includes a seatable and displaceable valve element, a lever carrying said element, a spring means normally holding the lever in the valve element seating position, an actuator ball engaging the lever, an actuator lever engaging said ball and displaceable by engagement thereof by a moving unit of each complementary container and closure unit set, and an abutment head having a cam surface engaged by the ball when the actuator lever is displaced for forcing the ball into valve element unseating contact with the carrying lever.

15. An apparatus as defined in claim 10 in which the valve means includes a seatable and displaceable valve element, a lever carrying said element, spring means normally holding the lever in the valve element seating position, an actuator ball engaging the lever, an actuator lever engaging said ball and displaceable by engagement thereof by a moving unit of each complementary container and closure unit set, and an abutment head having a cam surface engaged by the ball when the actuator lever is displaced for forcing the ball into valve element unseating contact with the carrying lever, and in which is included means for adjustably supporting the abutment head so that the position of the cam surface can be varied to vary the degree of valve opening to be effected.

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