

June 9, 1942.

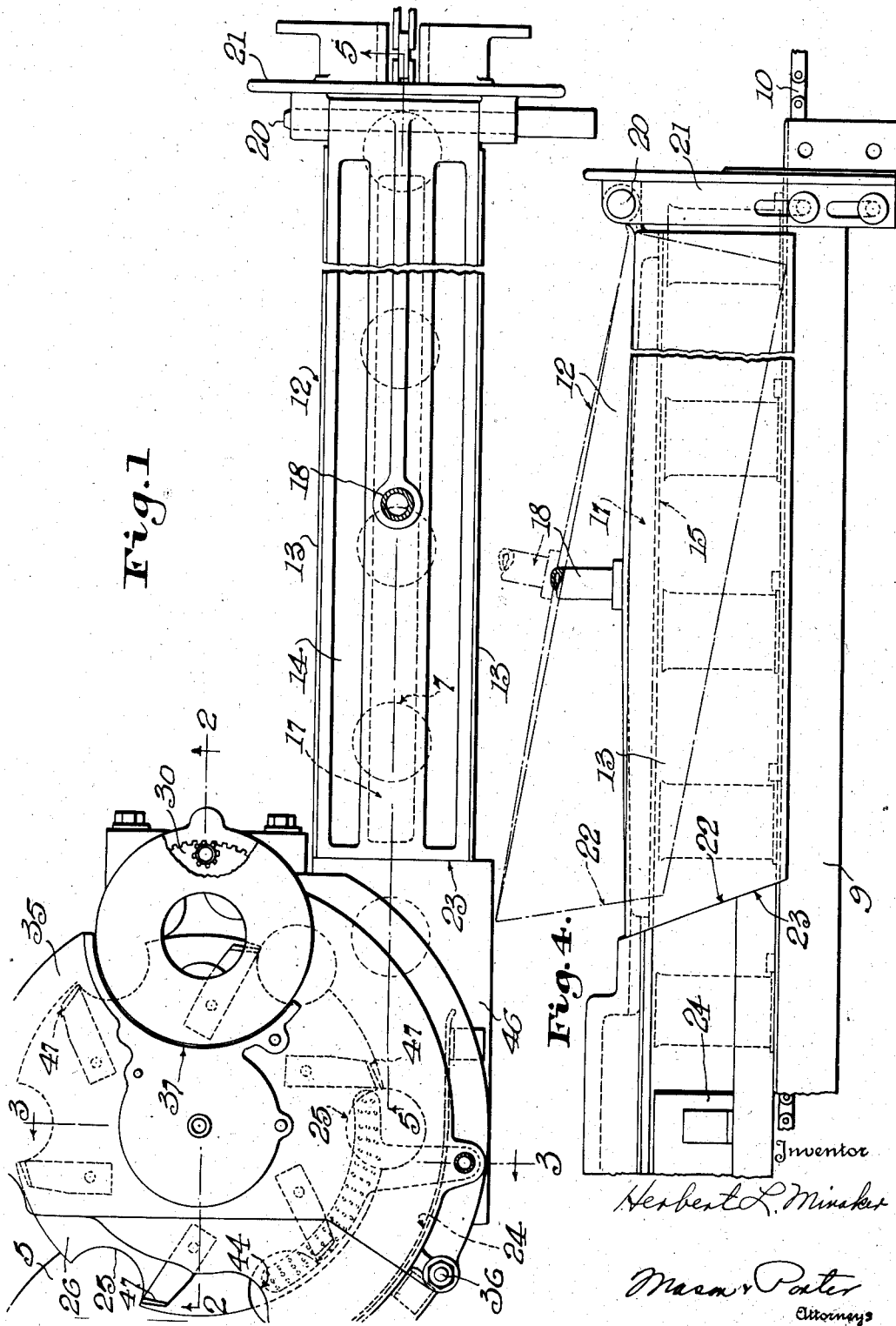
H. L. MINAKER

2,285,867

FILLED CONTAINER STEAMING APPARATUS

Filed March 15, 1941

4 Sheets-Sheet 1



June 9, 1942.

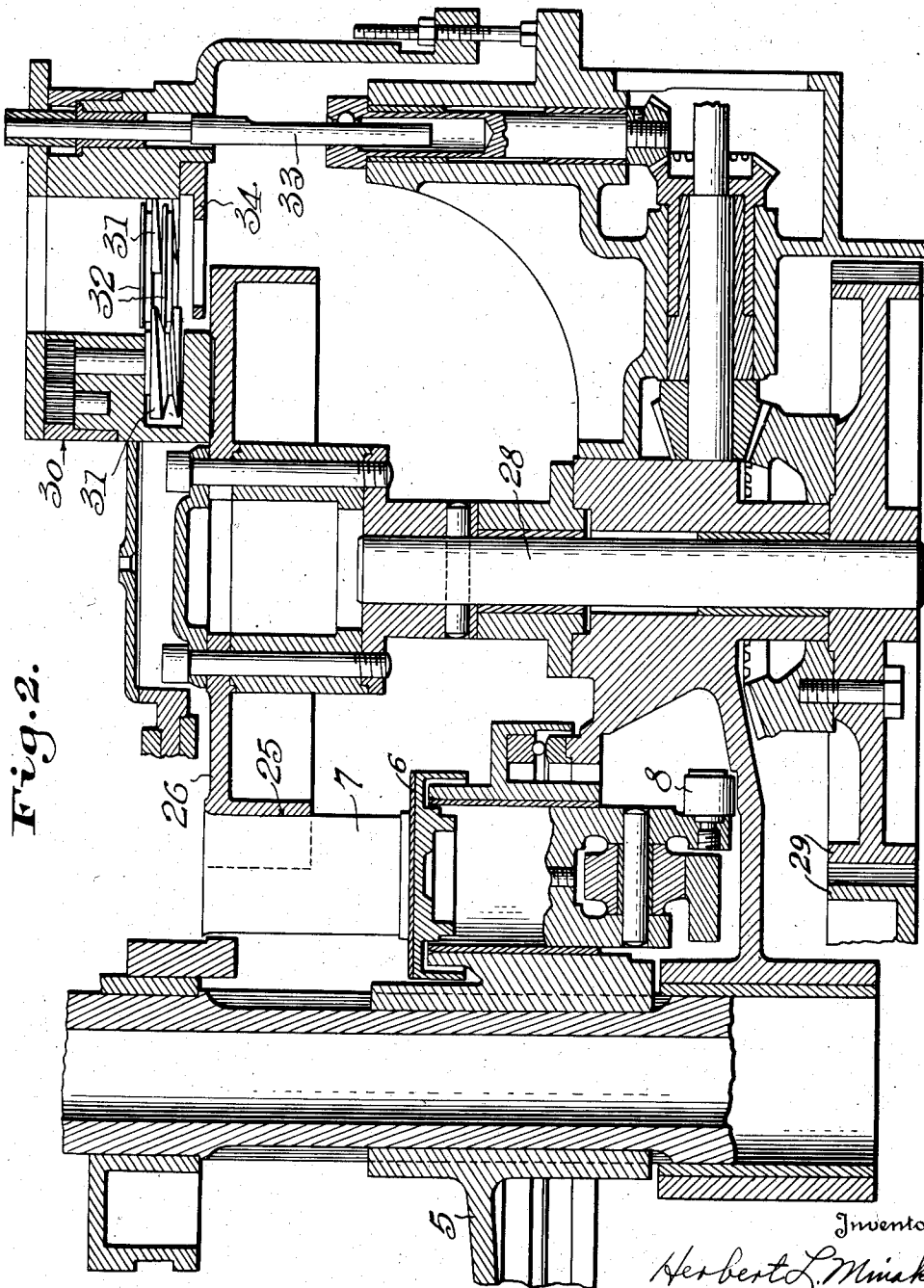
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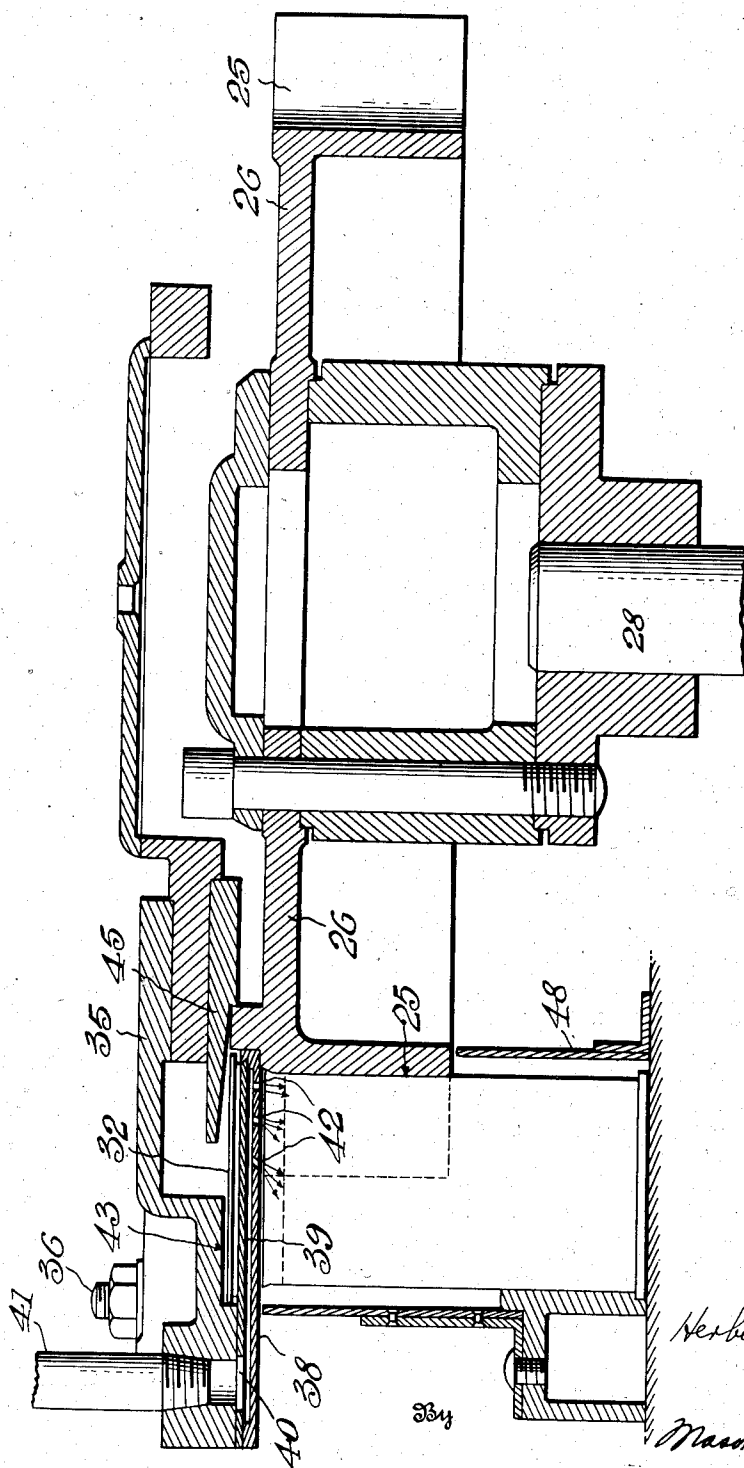
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Fig. 3.



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Fig. 5.

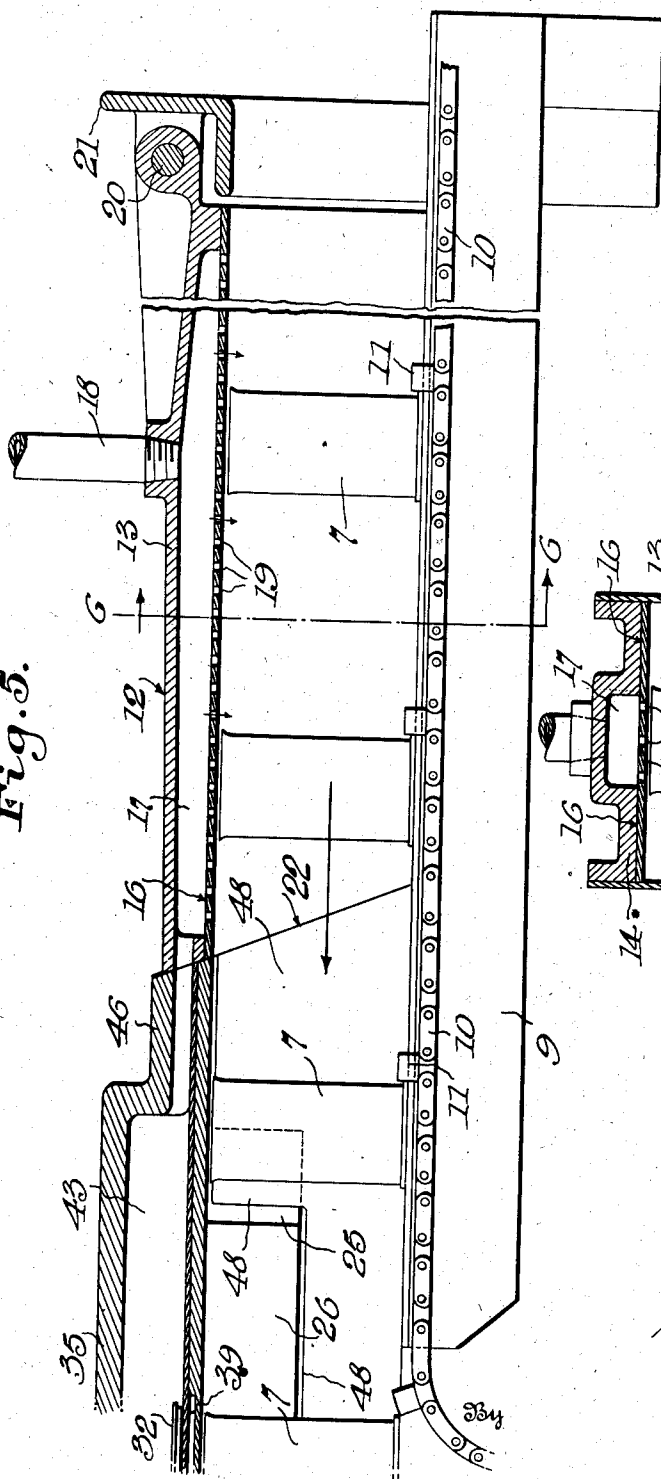
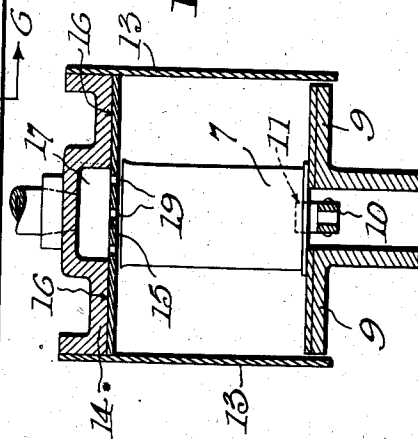


Fig. 6.



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UNITED STATES PATENT OFFICE

2,285,867

FILLED CONTAINER STEAMING APPARATUS

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11 Claims. (Cl. 226—82)

The invention relates generally to container closing apparatus and primarily seeks to provide, a combination with high speed closing apparatus, novel means for displacing air from the head spaces above products in filled containers and replacing the same with steam immediately prior to the closing of the containers, thereby to not only eliminate air from the sealed head spaces and by this means better preserve contained products, but also to seal steam in said containers so that upon subsequent cooling of the containers and condensation of the steam a vacuum will be provided in the containers effective to additionally assure preservation of said products.

An object of the invention is to provide in apparatus of the character stated, means for continuously moving filled containers to the closing apparatus and while they are being closed, means for subjecting the filled containers to steam treatment during a considerable length of travel thereof toward the closing apparatus to render the containers and products hot and sterile and fill container head spaces with steam, means for causing covers to travel in centered relation over the steam treated containers, and means for directing jets of steam into the head spaces of the steam treated containers to expel therefrom any air yet remaining therein and replace the same with steam immediately prior to final assembly of the containers and covers whereby said air replacing steam will be sealed in the containers subsequently to condense and create a vacuum.

Another object of the invention is to provide apparatus of the character stated in which the first mentioned steam treating means comprises a tunnel of considerable length through which the containers are moved rapidly and continuously and which has a steam chamber in the top thereof and defined at its lower limit by perforated plate through which the steam issues downwardly into and around the traveling containers.

Another object of the invention is to provide apparatus of the character stated in which the steam tunnel and the steam jetting equipment communicate so that the containers continuously travel through a container and covering and sterilizing and air excluding steam atmosphere.

Another object of the invention is to provide apparatus of the character stated in which the steam for the tunnel and the steam for the jetting equipment are supplied from independent sources subject to individual control.

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

In the drawings:

Figure 1 is a plan view illustrating the invention.

Figure 2 is a fragmentary vertical cross section taken on the line 2—2 on Figure 1.

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

Figure 4 is a side elevation illustrating the invention, the tunnel being partially lifted about its pivotal mounting in dot and dash lines.

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

Figure 6 is a vertical cross section taken on the line 6—6 on Figure 5.

In the example of embodiment of the invention herein illustrated, there is shown a portion of a container closing machine in which is included a turret 5 equipped with the usual equidistantly spaced container supporting pads 6 upon which the filled containers 7 are supported while the end closures or covers are being affixed thereto. During the affixing of the end closures, the pads 6 are lifted by pad lifting means generally designated 8 so as to move the containers and the associated covers into proper cooperative relation with the attaching means. It is preferred that the herein illustrated invention should be applied to a closing machine of the type illustrated in the U. S. Letters Patent to Kronquest 1,752,912, issued April 1, 1930, because in this machine the turret on which the containers are supported while they are being closed moves continuously, and the closing of containers is effected at a very rapid rate, that is to say, at the rate of 300 or more containers per minute. It will be appreciated that apparatus for displacing air from, and steam treating containers being moved continuously to a machine capable of operating at this speed must be exceedingly efficient in order to meet the demands resulting from the necessity of moving the containers at the rate of 300 or more per minute. It is the purpose of the present invention to provide an apparatus which will meet these requirements.

In this apparatus, filled containers which are to be closed in the closing machine and have air excluded from the head spaces above the product therein and replaced by steam, are fed toward the closing machine over a supporting

bed or bed rails 9, by a chain 10 having suitably spaced driving lugs 11 thereon, or by any other suitable container feeding equipment. The filled containers thus fed travel through a steam tunnel of considerable length and generally designated 12.

The tunnel 12 is substantially U-shaped in form and includes sides 13 which extend close to and preferably slightly below the upper surfaces of the bed rails 9, and a top wall portion 14. A division wall or plate 15 is secured in spaced relation beneath the top wall 14 against an abutment shoulder equipment 16, and this plate forms the lower limit of a steam chest or chamber 17 in the top of the tunnel. This chamber or chest 17 is supplied with from four to six pounds of steam through a supply pipe 18, and the plate 15 is provided with apertures 19 through which steam from the chamber 17 is directed downwardly into and around the filled containers 7 traveling rapidly through the tunnel. The tunnel 12 is hinge-connected, as at 20, to any suitable frame piece or support 21 at the receiving end thereof, and has its other or delivery end beveled or under cut, as at 22, to oppose the meeting edge 23 of a tunnel wall extension 24 which continues under the steam jetting means, soon to be described, and around to the place at which the treated containers with covers thereabove are fed onto the supporting pads 6 of the closing machine. See Figures 1 and 4 of the drawings. The beveling or undercutting of the tunnel end at 22 facilitates upward swinging of the tunnel 12 about its pivotal support 20 in order to render accessible the feed bed beneath said tunnel.

It should be understood, of course, that the apparatus herein disclosed can be used in connection with any continuously and rapidly operating closing machine, and when used in combination with the particular form of closing machine disclosed in the patent hereinbefore referred to, the filled containers are delivered over the bed rails 9 and by the chain lugs 11 into the receiving peripheral pockets 25 of a feeding turret 26 which is secured, as at 27, upon the upper end of a turret shaft 28 to which continuous movement is imparted, through suitable gearing 29, in timed relation with the movement of the closing machine turret 5, by suitable power applying means (not shown).

Closing machines of the type referred to usually include filled container feeding turrets 26, as referred to, and also suitable cover feeding means. In this illustration the cover feeding means is generally designated 30 and includes a plurality of supporting and feeding screws 31 upon which the cover units 32 rest in the manner illustrated in Figure 2 of the drawings, and which, upon being rotated in suitably timed relation with the other mechanisms of the machine through driving connections generally illustrated 33, serve to deposit the cover units one by one onto a receiving track 34 rigidly supported beneath the cover feeding mechanism in the position illustrated in Figure 2 of the drawings.

A supporting or frame plate 35 is secured in any approved manner, as by stud bolting 36 or the like, upon the closing machine frame in position for overlying the turret 26 in the manner best illustrated in Figures 1 and 3 of the drawings. The plate 35 includes a recess or cutout portion 37 for accommodating the positioning of the cover feeding mechanism generally designated 30. See Figure 1.

A steaming member or manifold 38, generally arcuate in shape, is secured in any approved manner beneath the frame plate 35 and is cored out or hollow, as at 39, to form a steam chamber, said chamber being arcuate and bearing concentric relation to the turret axis and being of a length for extending about a considerable portion of the circumference of said turret in the manner illustrated in Figure 1. The steam chamber 39 connects through an inlet leg 40 with a steam supply pipe 41. Steam is supplied to the pipes 18 and 41 from separate sources. It will be observed by reference to Figures 1 and 3 of the drawings that the bottom portion of the member 38 is provided directly beneath the arcuate steam chamber 39 with three parallel rows of steam feeding apertures 42. The apertures of the innermost row are directed outwardly and downwardly at an angle to the vertical, and the apertures of the outermost row are directed outwardly and downwardly at a greater angle to the vertical, and these apertures are placed with relation to the filled container receiving pockets 25 of the turret 26 so that steam directed downwardly in jet form through the apertures 42 will be directed downwardly into and outwardly across the container head spaces closely underlying the steaming member 38 in the manner illustrated in Figure 3 of the drawings, thereby to effectively sweep out any air remaining in said head spaces after the filled containers have passed through the elongated tunnel structure 12 hereinbefore referred to. The cover receiving track 34 is disposed at the same level with and delivers onto the upper surface of the steaming member 38, and the steaming member serves as a support for the covers 32 as they are being conveyed toward the closing machine in superposed relation to and in vertical alignment with the filled containers which they are intended to cover in the ultimate assembly effected in the closing machine.

At its under surface, the plate 35 is equipped with an arcuate clearance or cover guideway 43 through which the covers are conveyed, and the steaming member 38 is cut out, as at 44, at its delivery end extremity so as to facilitate dropping of the covers onto the underlying, aligned containers. An arcuate cover guide element 45 also is carried by the plate 35 in position for overlying and forming a guide for the inner edge portions of the traveling covers 32. See Figure 3.

It will be observed by reference to Figures 1, 4 and 5 of the drawings that the supporting or frame plate 35 is extended, as at 46, to meet the delivery end extremity of the tunnel 12, and it will be observed by reference to Figure 5 of the drawings that the steam space within the tunnel 12 communicates freely with the cover guideway 43 beneath the supporting or frame plate 35 so that the covers being conveyed through said guideway will be subjected not only to heat transfer from the steaming member 38, but also to direct steam contact, and delivery of the covers onto the containers in a hot sterile condition is thus assured.

The cover units 32 are conveyed over the upper surface of the steaming member 38 and along the guideway 43 by pusher fingers 47, one of which projects from the upper surface of the turret 26 at the position of each turret pocket 25 as indicated in Figure 1 of the drawings. By this means the covers and the filled containers

are moved continuously in vertical alignment but separated by the steaming member 38.

In operation, the filled containers are moved continuously through the steaming tunnel 12, and steam entering the interior of the tunnel through the apertures 19 passes downwardly into the head spaces of the containers and about the exterior portions thereof tending to exclude air from said head spaces and to heat and render sterile said containers and the product therein. As the containers pass out of the tunnel 12 and beneath the frame plate extension 46, they are received individually in the pockets 25 of the continuously rotating turret 26, and, as before stated, a cover 32 will be moved along over the upper surface of the steaming member 38 in vertical alignment with each said container. The open upper portions of the filled containers are spaced but slightly below the steaming member 38, and thus said head spaces may be said to be partially confined by said steaming member, just sufficient space being left between the upper extremities of the containers and the under surface of the steaming member 38 to enable an efficient sweeping out of air from said head spaces by the steam directed into said head spaces in jet form through the apertures 42 in the manner hereinbefore described. The tunnel wall extension 24 tends to confine steam about the traveling containers so that the continuously traveling containers move in a steam atmosphere which retains the heated and sterile condition of the containers until the final closing thereof is effected. If found desirable, the outer wall extension 24 may be supplemented by an inner wall 48.

As has been previously stated, the rows of apertures 42 overlie only the inner half of the path of travel of the filled containers and because of this fact, and by reason of the direction of projection of said apertures, the steam is directed into and across the head spaces in the containers and sweeps any air existing therein out through the space intervening the bottom surface of the steaming member 38 and the upper extremities of the containers without creating a turbulent condition in the containers or in anywise disrupting the registered relation of the respective overlying cover units. While the cover units are completely separated from the containers by the steaming member 38, they are nevertheless subjected to heat and direct steam treatment in the manner hereinbefore described.

From the foregoing description it will be apparent that the rapidly traveling containers travel through steam from the time they enter the tunnel 12 until they are deposited on the closing machine turret pads 6, or, in other words, until just a moment before the final closing of the containers is effected. By reason of the continuous heat and steam treatment of the containers and covers in the manner hereinbefore described, no opportunity is provided for cooling of parts which might be effective to cause the steam to condense and bring about a drawing in of air into the head spaces prior to the closing of the containers.

By thus assuring closing of the containers with steam trapped therein, air is excluded from the closed containers, and upon subsequent cooling of the containers and the condensation of the steam therein, an efficient vacuum will be provided in the containers which will augment the initial exclusion of the air in assuring the desired preservation of the food products.

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

I claim:

1. In filled container closing apparatus, the combination with the rapidly and continuously moving turret of a container closing machine, an elongated tunnel leading toward said turret, means for rapidly and continuously moving filled containers through said tunnel, means for directing steam into and around containers moving through said tunnel, a second means for receiving the filled containers from the tunnel and rapidly and continuously moving them onto the turret to be thereon immediately closed; means for directing steam into container head spaces to sweep air therefrom while the containers are being moved by said second means, and means for feeding covers onto the containers immediately after the air has been swept from the head spaces thereof and immediately prior to ultimate closing of the containers thereby to trap steam in the container head spaces subsequently to cool and condense and create a vacuum therein.

2. In filled container closing apparatus, the combination with the rapidly and continuously moving turret of a container closing machine, an elongated tunnel leading toward said turret, means for rapidly and continuously moving filled containers through said tunnel, means for directing steam into and around containers moving through said tunnel, a second means for receiving the filled containers from the tunnel and rapidly and continuously moving them onto the turret to be thereon immediately closed; means for directing steam into container head spaces to sweep air therefrom while the containers are being moved by said second means, means for feeding covers onto the containers immediately after the air has been swept from the head spaces thereof and immediately prior to ultimate closing of the containers thereby to trap steam in the container head spaces subsequently to cool and condense and create a vacuum therein, and means for swingably mounting said tunnel so that it can be swung clear of said first mentioned container moving means.

3. In filled container closing apparatus, the combination with the rapidly and continuously moving turret of a container closing machine, an elongated tunnel leading toward said turret, means for rapidly and continuously moving filled containers through said tunnel, means for directing steam into and around containers moving through said tunnel, a second means for receiving the filled containers from the tunnel and rapidly and continuously moving them onto the turret to be thereon immediately closed; means for directing steam into container head spaces to sweep air therefrom while the containers are being moved by said second means, means for feeding covers onto the containers immediately after the air has been swept from the head spaces thereof and immediately prior to ultimate closing of the containers thereby to trap steam in the container head spaces subsequently to cool and condense and create a vacuum therein, and means for maintaining the containers in an atmosphere of steam as they are being moved by said second moving means.

4. In filled container closing apparatus, the combination with the rapidly and continuously

moving turret of a container closing machine, an elongated tunnel leading toward said turret, means for rapidly and continuously moving filled containers through said tunnel, means for directing steam into and around containers moving through said tunnel, a second means for receiving the filled containers from the tunnel and rapidly and continuously moving them onto the turret to be thereon immediately closed, means for directing steam into container head spaces to sweep air therefrom while the containers are being moved by said second means, means for feeding covers onto the containers immediately after the air has been swept from the head spaces thereof and immediately prior to ultimate closing of the containers thereby to trap steam in the container head spaces subsequently to cool and condense and create a vacuum therein, and means for supplying steam from separate sources to said first and second mentioned steam directing means.

5. In filled container closing apparatus, the combination with the rapidly and continuously moving turret of a container closing machine, an elongated tunnel leading toward said turret, means for rapidly and continuously moving filled containers through said tunnel, means for directing steam into and around containers moving through said tunnel, a second means for receiving the filled containers from the tunnel and rapidly and continuously moving them onto the turret to be thereon immediately closed, means for directing steam into container head spaces to sweep air therefrom while the containers are being moved by said second means, means for feeding covers onto the containers immediately after the air has been swept from the head spaces thereof and immediately prior to ultimate closing of the containers thereby to trap steam in the container head spaces subsequently to cool and condense and create a vacuum therein, and means for directing steam in direct contact with the covers prior to deposition thereof onto the containers.

6. In filled container closing apparatus, the combination with the rapidly and continuously moving turret of a container closing machine, an elongated tunnel leading toward said turret, means for rapidly and continuously moving filled containers through said tunnel, means for directing steam into and around containers moving through said tunnel, a second means for receiving the filled containers from the tunnel and rapidly and continuously moving them onto the turret to be thereon immediately closed, means for directing steam into container head spaces to sweep air therefrom while the containers are being moved by said second means, means for feeding covers onto the containers immediately after the air has been swept from the head spaces thereof and immediately prior to ultimate closing of the containers thereby to trap steam in the container head spaces subsequently to cool and condense and create a vacuum therein, and means for directing steam from said tunnel into direct contact with the covers prior to deposition thereof onto the container.

7. In filled container closing apparatus, the combination with the rapidly and continuously moving turret of a container closing machine, an elongated tunnel leading toward said turret, means for rapidly and continuously moving filled containers through said tunnel, means for directing steam into and around containers moving through said tunnel, a second means for receiving

the filled containers from the tunnel and rapidly and continuously moving them onto the turret to be thereon immediately closed, means for directing steam into container head spaces to sweep air therefrom while the containers are being moved by said second means, and means for feeding covers onto the containers immediately after the air has been swept from the head spaces thereof and immediately prior to ultimate closing of the containers thereby to trap steam in the container head spaces subsequently to cool and condense and create a vacuum therein, said second mentioned steam directing means including a hollow plate-like body having apertures in its under surface through which the air sweeping steam is directed into the container head spaces and which body forms a support for the covers while they are being fed.

8. In filled container closing apparatus, the combination with the rapidly and continuously moving turret of a container closing machine, an elongated tunnel leading toward said turret, means for rapidly and continuously moving filled containers through said tunnel, means for directing steam into and around containers moving through said tunnel, a second means for receiving the filled containers from the tunnel and rapidly and continuously moving them onto the turret to be thereon immediately closed, means for directing steam into container head spaces to sweep air therefrom while the containers are being moved by said second means, means for feeding covers onto the containers immediately after the air has been swept from the head spaces thereof and immediately prior to ultimate closing of the containers thereby to trap steam in the container head spaces subsequently to cool and condense and create a vacuum therein, said second mentioned steam directing means including a hollow plate-like body having apertures in its under surface through which the air sweeping steam is directed into the container head spaces and which body forms a support for the covers while they are being fed, and means for directing steam from said tunnel over said plate-like body thereby to subject the covers moving thereover to steam treatment and also to heat transfer from said plate-like body.

9. In filled container closing apparatus, the combination with the rapidly and continuously moving turret of a container closing machine, an elongated tunnel leading toward said turret, means for rapidly and continuously moving filled containers through said tunnel, means for directing steam into and around containers moving through said tunnel, a second means for receiving the filled containers from the tunnel and rapidly and continuously moving them onto the turret to be thereon immediately closed, means for directing steam into container head spaces to sweep air therefrom while the containers are being moved by said second means, means for feeding covers onto the containers immediately after the air has been swept from the head spaces thereof and immediately prior to ultimate closing of the containers thereby to trap steam in the container head spaces subsequently to cool and condense and create a vacuum therein, said second mentioned steam directing means including a hollow plate-like body having apertures in its under surface through which the air sweeping steam is directed into the container head spaces and which body forms a support for the covers while they are being fed, means for directing steam from said tunnel over said plate-like body thereby to sub-

ject the covers moving thereover to steam treatment and also to heat transfer from said plate-like body, and means for maintaining the containers in an atmosphere of steam as they are being moved by said second moving means.

10. In filled container closing apparatus, the combination with the rapidly and continuously moving turret of a container closing machine, an elongated tunnel leading toward said turret, means for rapidly and continuously moving filled containers through said tunnel, said tunnel being a U-shaped body having parallel sides and a top, a perforated plate spaced slightly below said top to form a steam space thereabove from which steam passes downwardly through the plate apertures into and around containers moving through said tunnel, a second means for receiving the filled containers from the tunnel and rapidly and continuously moving them onto the turret to be thereon immediately closed, means for directing steam into container head spaces to sweep air therefrom while the containers are being moved by said second means, and means for feeding covers onto the containers immediately after the air has been swept from the head spaces thereof and immediately prior to ultimate closing of the containers thereby to trap steam in the container head spaces subsequently to cool and condense and create a vacuum therein.

11. In filled container closing apparatus, the 30

combination with the rapidly and continuously moving turret of a container closing machine, means forming a steam confining tunneling extending at great length directly to said turret, means for rapidly and continuously moving filled containers through said tunneling and to said turret to be thereon immediately closed, means for directing steam into and around containers while traveling through a first major portion of the tunneling, means for directing steam into container head spaces to sweep air therefrom while they are traveling through a second minor portion of the tunneling, means for feeding covers onto the containers immediately after the air has been swept from the head spaces thereof and immediately prior to ultimate closing of the containers thereby to trap steam in the container head spaces subsequently to cool and condense and create a vacuum therein, said second mentioned steam directing means including a hollow plate-like body having apertures in its under surface through which the air sweeping steam is directed into the container head spaces and which body forms a support for the covers while they are being fed, and means for directing steam from the tunneling over said plate-like body thereby to subject the covers moving thereover to steam treatment and also to heat transfer from said plate-like body.

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