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STEAM DISTRIBUTOR FOR VACUUMIZING CONTAINERS IN SEALING MACHINES

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2 Sheets—Sheet 1

[Diagram of steam distributor for vacuumizing containers in sealing machines]
STEAM DISTRIBUTOR FOR VACUUMIZING CONTAINERS IN SEALING MACHINES

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10 Claims. (Cl. 226—82)

Our invention relates to machines for closing and sealing jars, bottles or other containers which have been filled with any desired commodities such as fruits, vegetables, or the like, which are packed and sealed while hot. The invention relates particularly to novel means for enveloping the containers or the mouth ends thereof in an atmosphere of steam during the capping and sealing operations.

An object of the invention is to provide novel and improved apparatus for enveloping the ends of the containers which are to be sealed in an atmosphere of steam, for maintaining the steam in a comparatively quiescent condition and for effectively displacing atmospheric air without disturbing the contents of the containers.

A further object of the invention is to provide novel and improved means for expanding the steam and for removing condensed moisture therefrom before it is brought in contact with the containers.

A further object of the invention is to provide a simple and practical construction providing removable protecting devices to overlie the containers during the steam treatment and which may be easily and quickly removed and replaced by other such devices adapted for different sizes or shapes of containers.

Other objects of the invention will appear hereinafter.

Referring to the accompanying drawings:

Fig. 1 is a part-sectional longitudinal elevation of a machine for capping and sealing containers, parts of the machine being broken away.

Fig. 2 is a sectional plan view on a larger scale of a steam distributor, the section being at line 2—2 on Fig. 4.

Fig. 3 is a plan view of the steam distributor.

Fig. 4 is a sectional elevation on the line 4—4 on Fig. 3.

Figs. 5 and 6 are cross sections on a larger scale, taken respectively at the lines 5—5 and 6—6 on Fig. 2.

The invention is herein illustrated as applied to a machine for capping and sealing jars, of the type disclosed in the patent to Hohi, No. 2,357,826, September 12, 1944. Capping machine, to which patent reference may be had for full disclosure of the construction and operation of such a machine.

Referring to Fig. 1 of the accompanying drawings:

The machine comprises an endless belt conveyor 10 driven continuously for conveying containers 11 through the machine. The containers are herein shown as jars to which caps 12 are applied. The jars are filled with any desired commodities such as fruits or vegetables, the filling material being introduced while hot and the jars capped and sealed while the contents are still hot. The jars as they are carried forward with the conveyor pass in succession beneath an inclined chute 13 down which the caps are fed, and each jar as it passes beneath the lower end of the chute draws a cap therewith. The jar as it advances beyond the chute is brought beneath the sealing device comprising a ram 14 which moves downward and forces the cap into sealing position on the jar. Side belts 15 which are driven with the conveyor 10, guide the jars in their forward travel. A casing 16 is provided to enclose the above described mechanism. The parts thus far described and the means for driving and operating the moving parts, may be the same as disclosed in the above mentioned Patent No. 2,357,826.

The means for subjecting the container to an atmosphere of steam during the capping and sealing operation will now be described. Such means includes a steam distributor comprising a steam chest 20 extending lengthwise over the conveyor 10 and spaced thereabove to permit the passage of the containers 11. The forward end of the steam chest is directly behind and close to the cap chute 13. The steam chest is divided into separate chambers 21 and 22 by a vertical partition wall 23 formed with a multiplicity of openings or perforations 24 therethrough, said perforations being uniformly distributed over substantially the entire area of the plate.

The bottom of the steam chest comprises a removable plate 25. The side walls of the steam chest are formed with longitudinal slotted ribs 26 which serve as guideways in which the bottom plate 25 is slidably mounted, permitting it to be readily withdrawn and replaced by other bottom plates interchangeable therewith and adapted for use with different sizes and shapes of containers. The portion of the plate 25 which serves as a bottom for the chamber 21 is impervious, and that portion thereof which overlies the chamber 22 is provided with perforations 27 which are closely spaced and distributed over the major portion of the bottom area of the chamber 22, except a central strip or portion which may be left impervious. A central longitudinal spacer bar 28 is attached to the lower face of the plate 25 directly over the path of the jars 11, said bar being of somewhat greater width than the caps 12. The bar 28 is in close...
proximity to the open tops of the jars traveling therewith, and serves as a protection against disturbance or displacement of the contents of the jars by the action of the circulating steam.

Dry steam from a conveniently located steam separator, enters the steam chest through a conduit 30 which opens into the chamber 21. The latter is divided into separate compartments 22 and 23 by an imperforate baffle plate 31. The length and width of the plate are somewhat less than the cross-sectional area of the chamber 21, to provide a rather narrow passageway 32 surrounding said plate which permits the passage of steam to the compartment 22. The plate 31 serves to arrest any condensed moisture in the steam and also reduces the pressure of the steam entering the compartment 21, which serves as an expansion chamber.

The steam passes from the compartment 21 through the perforated wall 23 or baffle plate into the expansion chamber 22 in which it is further expanded. From the chamber 22 the steam passes downward through the perforations 27 in the bottom plate 25. An atmosphere of steam is thus supplied beneath the steam chest 20, in position to envelope the upper end portions of the jars 14 as they are carried along beneath the steam chest. The perforate portion of the bottom plate 25 with the underlying spacer bar 28 prevents the steam from being blown through the open top of the jar directly against the material therein. The upper portion of the opening and its adjacent contents are thus carried through a quiescent zone while enveloped in the steam.

Strips 33 of sheet material are attached to the lower surface of the plate 25 and extend along its side margins. The strips extend downwardly and are curved inwardly beneath, the perforated areas of the plate 25 and serve as steam deflectors to direct and confine the steam to the zone through which the jars, or the upper end portions thereof, are passing. The width of the spacer bar 28 and the position of the deflectors 33 are adapted to the size of the jars or diameter of mouths of the jars. When a change is made in the size of the jars or containers being processed, the bottom plate 25 can be quickly removed and replaced by another in which the spacer bar and deflectors are adapted to maintain an atmosphere of steam after the caps have been loosely applied, the distributor is provided with an extension member 35 which forms a steam duct. The member 35 is attached to the forward end portion of the distributor. The duct extends forwardly and downwardly from a port 36 in a side wall of the chamber 25, and is formed with an elongated discharge opening 37 extending along the path of the upper end portions of the jars at one side thereof. Part of the steam admitted through the discharge opening 37 is directed against the top portions of the jars and the caps thereon, enveloping them in an atmosphere of steam which extends forward substantially to the sealing zone.

The exhaust steam may be withdrawn from the housing 40 by means of a steam fan (not shown). The exhaust steam and air are discharged through a duct 38.

Modifications may be resorted to within the spirit and scope of our invention.

We claim:

1. The combination of a horizontally-traveling conveyor, a steam distributor comprising a steam chest extending lengthwise of the conveyor and spaced thereabove to provide a passage for open top containers supported on and traveling with the conveyor, the floor of said chest being substantially flat and horizontal and having a multiplicity of perforations therethrough distributed over areas extending lengthwise thereof, said floor having a central imperforate section extending lengthwise thereof between said perforated areas in passage, said chest being vertically spaced over the conveyor by means of vertical supports, said perforated areas being symmetrically disposed on opposite sides of and defining the margins of said imperforate section.

2. The combination of a horizontally-traveling conveyor, a steam distributor comprising a steam chest extending lengthwise of the conveyor and spaced thereabove to provide a passage for open top containers supported on and traveling with the conveyor, the floor of said chest being substantially flat and horizontal and having a multiplicity of perforations therethrough distributed over areas extending lengthwise thereof, and a spacing bar underlying the said floor and extending lengthwise of the floor and conveyor in position to overlie the upper open ends of the containers, said perforated areas being parallel with said spacing bar and symmetrically arranged on opposite sides of said bar.

3. The combination of a horizontally-traveling conveyor, a steam distributor comprising a steam chest extending lengthwise of the conveyor and spaced thereabove to provide a passage for open top containers supported on and traveling with the conveyor, said steam chest comprising a bottom plate forming a floor for the chest, said plate being slidable movably for movement lengthwise of the chest for removal therefrom, said plate having an intermediate imperforate section extending lengthwise of said steam chest, said plate being supported on said chest by means of supports, and said supports being movably arranged for movement lengthwise of said chest.

4. The combination of a horizontally-traveling conveyor, a steam distributor comprising a steam chest extending lengthwise of the conveyor and spaced thereabove to provide a passage for open top containers supported on and traveling with the conveyor, the floor of said chest having a multiplicity of perforations therethrough distributed over areas extending lengthwise thereof, said floor having a central imperforate section extending lengthwise thereof between said perforated areas in passage, said chest being vertically spaced over the conveyor by means of vertical supports, said perforated areas being symmetrically disposed on opposite sides of and defining the margins of said imperforate section, means for applying caps loosely to the traveling containers when they reach a point adjacent to the said floor and of said steam chest, said means spaced forwardly of the steam chest for sealing the caps on the containers, and means for enveloping the upper ends of the containers with the caps thereon in an atmosphere of steam during their forward travel to the sealing means.

5. A steam distributor comprising a steam chest extending horizontally, a baffle wall separating said chest into separate chambers, said wall
being formed with a multiplicity of perforations distributed over its area for the passage thereof through of steam, means for introducing steam into said receiving chamber, the floor of said discharge chamber being formed with a multiplicity of perforations therethrough for the passage of steam, said floor perforations being distributed over areas extending lengthwise along the path of the containers at opposite sides of said path, and a conduit having one end in communication with said discharge chamber and extending forwardly therefrom, said conduit having an outlet opening extending lengthwise of the path of said containers and directed toward said path for directing steam against the upper end portions of the containers.

5. A steam distributor comprising a steam chest extending horizontally and having a floor in a substantially horizontal plane and of greater length than width, said chest being of approximately uniform cross-sectional area throughout its length, a vertically disposed baffle wall extending transversely of the chest and dividing it into two separate chambers, said wall being formed with a multiplicity of perforations distributed over a major portion of its area for the passage therethrough of steam, and means for introducing steam into one of said chambers at one end of the chest, the floor of the other chamber having an imperforate section extending lengthwise of the chest and positioned centrally intermediate the side walls of the chest, said last mentioned floor being formed with a multiplicity of perforations extending therethrough and distributed over areas of the floor extending along the opposite sides of said imperforate section.

10. The combination of a horizontally-traveling conveyor, a steam distributor comprising a steam chest extending lengthwise of the conveyor and spaced thereabove to provide a passage for open top containers supported on and traveling with the conveyor, said steam chest comprising a bottom plate forming a floor for the chest, said plate being slidably mounted for movement lengthwise of the chest for removal therefrom, said plate having an intermediate imperforate section extending lengthwise thereof over the path of the containers and perforated areas extending lengthwise thereof at opposite sides of said imperforate section, said areas each including a multiplicity of perforations distributed thereover.

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