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2,628,757

STEAM CHEST FOR SEALING MACHINES

Filed March 25, 1948

2 SHEETS—SHEET 1

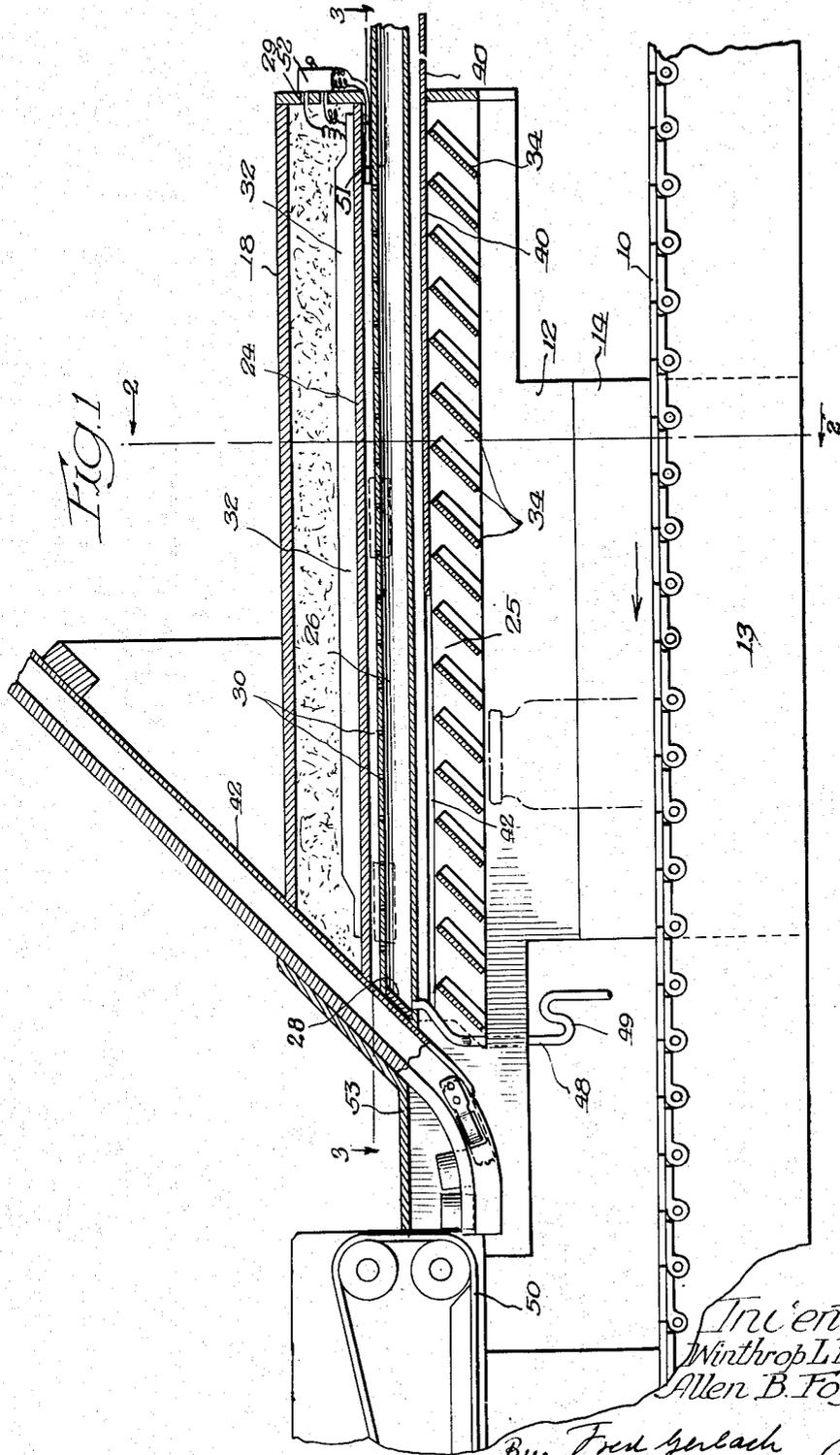


FIG. 1

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2 SHEETS—SHEET 2

FIG. 2

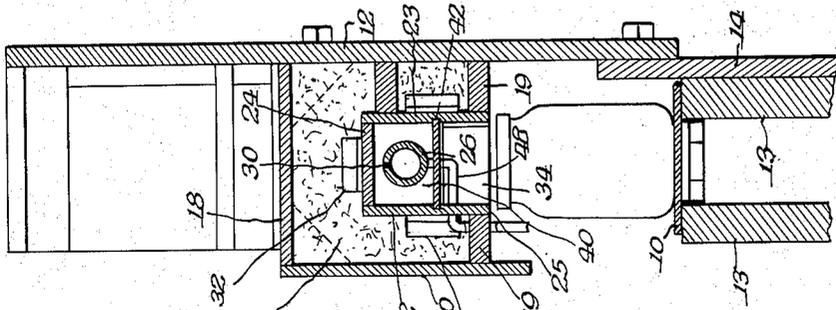
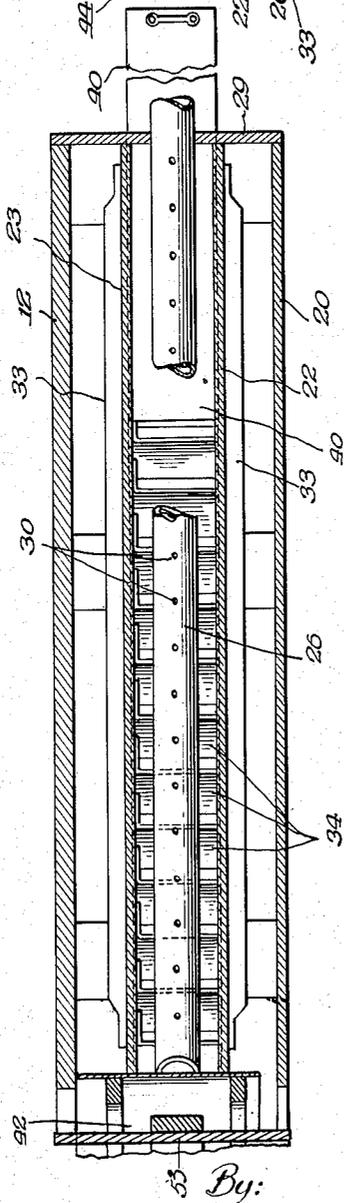


FIG. 3



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STEAM CHEST FOR SEALING MACHINES

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4 Claims. (Cl. 226—82)

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The invention relates to sealing containers filled with food, and more particularly to means for subjecting the head spaces and upper portions of the containers to an atmosphere of dry, high temperature steam preparatory to sealing the caps on the containers for producing a sub-atmospheric pressure or vacuum in the sealed containers.

One object of the invention is to provide improved means for reducing the amount of steam necessary to produce the desired sub-atmospheric pressures in the sealed containers, and thereby reducing the residual moisture to a minimum.

Another object of the invention is to provide means for producing high temperature steam and a time cycle adapted to insure the thermal destruction of the mold and yeast spores in the head space of the containers.

Another object of the invention is to provide a steam chest for producing a steam atmosphere in and around the head spaces of the container, which requires low pressure and which effectively distributes dry steam in the head space at an elevated temperature and around the upper portions of the containers.

Another object of the invention is to provide a steam chamber which is equipped with a series of vanes for definitely directing high temperature steam at substantially atmospheric pressure into the continuously moving containers.

Another object of the invention is to provide a steam chamber with vanes for directing dry steam into the containers, and means for regulating the flow of steam to continuously moving containers for cold or hot packed foods.

Other objects of the invention will appear from the detail description.

The invention consists in the several features hereinafter set forth, and more particularly defined by claims at the conclusion hereof.

In the drawings:

Figure 1 is a longitudinal section of an apparatus embodying the invention;

Figure 2 is a transverse section taken on line 2—2 of Figure 1; and

Figure 3 is a longitudinal section taken on line 3—3 of Figure 1.

The invention is exemplified in an apparatus which includes an endless conveyor 10 on the upper reach of which the filled containers are progressively carried under the steam chamber to the sealing mechanism. The conveyor 10 is guided on beams 13 and continuously driven by mechanism well understood in the art, and the filled containers are placed in succession on the

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conveyor in any suitable manner or by any suitable means for movement through the apparatus.

The improved steam chamber over the moving containers on the endless conveyor 10, includes an outer casing or jacket provided with a side-wall 12 which is secured to a plate 14, which is supported on beams 13, on which the upper reach of the conveyor 10 travels, a top-wall 18, an opposite side-wall 20 which terminates above the conveyor 10 to leave open one side of the space below the steam chest, and an end-wall 29. The chest includes a pair of inner side-walls 22 and 23 and a top-wall 24 which form a longitudinally extending channel 25 corresponding in width approximately to the width of the upper ends of the containers and of sufficient length for a sufficient period to efficiently and thoroughly displace the air in the head spaces of the filled containers and heat the tops thereof while the containers travel under the chest. The bottom of the channel 25 is open throughout its length for the downward outflow of steam to the containers. The space between the side-walls of the jacket and the channel 25 are closed by bottom sections 19.

Steam is delivered into the channel 25 by a pipe 26 which extends through end wall 29 and terminates at the opposite or inner end of said channel. The inner end of pipe 26 is closed by a plug 28. The pipe 26 along its top is provided with a series of small openings 30, through which the steam escapes upwardly from said pipe into the upper portion of channel 25. The total area of openings 30 is less than the total cross-sectional area of the pipe 26 to create a pressure drop for the diffusion and distribution of the steam in channel 25.

An electric superheater 32 is mounted on the top wall 24 and a similar superheater 33 is mounted on the outer side of each of the side-walls 22, 23 of the channel 25. In packaging foods, it is advantageous to provide an atmosphere of dry steam or steam with a minimum moisture content for delivery into the head spaces of the containers. The superheater 32 on the top wall 24 and the superheater 33 on the side-walls 22, 23 regulate the temperature of the steam in the channel 25. The discharge of the steam upwardly through restricted holes 30 produces a pressure drop in the channel 25, and the heating of the steam in channel 25 by the superheaters around the walls of channel 25 causes dry steam to be delivered into the head spaces of the containers. The electrical circuit for the superheaters 32, 33 includes a switch 52

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and a thermostat 51 which is disposed in the upper portion of channel 25. This thermostat controls the switch to maintain the desired predetermined degree of temperature in the steam in the channel 25. The space between the walls of the steam channel and the upper jacket is packed with suitable heat insulating material 44 to confine the heat to the steam channel 25.

The lower portion of steam channel 25 is provided with a series of parallel forwardly and downwardly inclined vanes 34, which direct the dry steam downwardly and forwardly to the head spaces of the filled jars. The series of vanes 34 extends throughout the length of the channel 25 so that steam may be directed forwardly and downwardly into the jars during their entire movement under the steam channel.

Producing the desired vacuum or sub-atmospheric pressure in the sealed jars when the food is packed cold, requires subjecting the head spaces in the containers to an atmosphere of steam for a longer period than when the food is hot-packed, and the invention provides means for varying the duration of the period during which the jars are subjected to the steam atmosphere. For this purpose a baffle or valve 40 extends across the lower portion of steam channel 25 and is slidably mounted in grooves 42 in side-walls 22 and 23 of channel 25. When hot foods are being packaged, the baffle 40 is adjusted to cut off the flow of steam to the desired number of vanes and shorten the steam treatment in the travel of the containers under the steam chest. When cold-packed foods are being sealed, the baffle 40 may be completely or partially withdrawn to increase the length of the steam treatment for the evacuation of air from the head spaces and heating the upper portions of the jars. This exemplifies a steam chest equipped with vanes for directionally controlling the flow of steam downwardly and forwardly into the progressively moving containers and controlling the duration of the steam treatment for hot and cold packs.

Caps are placed on the jars by any suitable cap delivery device such, for example, as an inclined runway 42, upon leaving the steam chest in their progressive forward movement. The runway 42 is disposed across the inner end of steam channel 25. The jacket is extended as at 53 to enclose the lower portion of the runway, so that the caps will be heated by steam from said channel. The cap delivery device holds the lowermost cap into position to be engaged by a container moving forwardly on conveyor 18, and is displaced from the runway by the jar. Next, the jar with the cap loosely placed thereon passes to any suitable sealing device for forcing the cap on the jar and holding the cap thereon for a sufficient period for the vacuum to form in the sealed container. Any suitable means may be used for sealing the cap such, for example, as an endless pressure driven belt 50, as well understood in the art.

A pipe 48 is connected to the inner end of steam delivery pipe 26 adjacent the plug 28 to carry off any condensate which may form in the pipe 26 during the period when the walls of the chest are cold. This pipe is provided with a trap 49 for preventing the escape of steam. When steam is admitted to pipe 26 while the apparatus is cold, condensate may form in the pipe until the temperature has been raised. Pipe 48 is extended to discharge the condensate outside of the steam chest.

The operation of the steam chest will be as follows: the filled container will be continuously

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conveyed by belt 19, under the open bottom of the channel 25. The steam delivered by pipe 26 will be restricted by openings 30, so that there will be a reduced pressure in the upper portion of said channel. From openings 30, the steam impinges against the top-wall 24 of the channel 25, and then flows downwardly between the side-walls 22, 23 to the vanes 34. The superheaters 32, 33 will keep the walls of the channel 25 heated so that the steam will be kept at the desired predetermined temperature in transit to the vanes 34. The thermostat 51 controls the actuation of the superheaters. As a result, the hot vapor discharged into the head spaces of the containers will be dry and have a minimum moisture content. In passing between the vanes 34, the hot vapor will be directionally controlled forwardly and downwardly to direct it into the head spaces in the progressively moving jars. On reaching the inner end of the channel 25, the air will be fully flushed from the head spaces of the jars and contain a hot, dry vapor preparatory to the deposit of the closure caps on the jars. The duration of the steam treatment may be varied by setting the slidable baffle 40 into position to close the spaces between any desired number of vanes 34, according to whether foods are being packaged hot or cold. After leaving the steam channel, the closure caps are engaged by the containers and sealed thereon. The caps are held in sealed engagement with the containers for a sufficient period for the formation of the vacuum or sub-atmospheric pressure in the sealed container for holding the closure caps sealed on the containers.

The invention exemplifies a steam chest for subjecting filled containers to an atmosphere of steam which utilizes dry steam to minimize the moisture left in the sealed containers filled with the food. It also exemplifies a steam chest in which the supply of steam is restricted to avoid excessive moisture in the ambient atmosphere. The invention also exemplifies a steam chest with a series of vanes extending throughout the length of the chest for giving direction to the steam into the moving containers. The invention also exemplifies means for varying the duration of the steam treatment according to the conditions under which the foods are packed.

The invention is not to be understood as limited to the details described, since these may be modified within the scope of the appended claims without departing from the spirit and scope of the invention.

Having thus described the invention, what we claim as new and desire to secure by Letters Patent is:

1. A steam chest for subjecting the head spaces of filled containers to an atmosphere of steam while they are being conveyed in progression, for sealing caps on the containers, comprising: walls forming a steam channel having sides, a top, and an open bottom, and extending longitudinally of the movement of, and over, the containers, a steam pipe in the channel extending longitudinally thereof and provided with openings for discharging hot vapor into the channel, a superheater for the steam, on the outside of one of the walls of the channel, a jacket enclosing the superheater and the walls of the channel, and heat insulating means in said jacket and around the superheater.

2. A steam chest for subjecting the head spaces of filled containers to an atmosphere of steam while they are being conveyed in progression for

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use in sealing caps on the containers, comprising: walls forming a steam channel having sides, a top, and an open bottom, and extending longitudinally of the movement of, and over, the containers, a steam pipe in the channel extending longitudinally thereof and provided with openings for discharging hot vapor into the channel, superheaters for the steam on the outside of the sides and top walls of the channel, a jacket enclosing the superheaters and the walls of the channel, and heat insulating means around the superheaters and in the jacket.

3. A steam chest for subjecting the head spaces of filled containers to an atmosphere of hot vapor while they are being conveyed in progression, for sealing caps on the containers, comprising: walls forming a steam channel having closed sides, a top, and an open bottom, and extending longitudinally of the movement of, and over, the containers, a steam delivery pipe extending longitudinally in the channel and provided with openings for discharging steam upwardly in the channel, a series of transverse, substantially parallel, longitudinally spaced, downwardly and forwardly inclined vanes overlying the mouths of the containers and extending transversely across the channel for directing the hot vapor from the bottom of the channel into the head spaces of the containers, and a baffle positioned between said steam delivery pipe and said vanes to control the flow of hot vapor through said vanes.

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4. A steam chest for subjecting the head spaces of filled containers to a hot vapor while they are being conveyed in progression for sealing caps on the containers, comprising: walls forming a steam channel having closed sides, a top, and an open bottom, and extending longitudinally of the movement of, and over, the containers, a steam delivery pipe extending longitudinally in the channel and provided with flow-restricting openings for discharging steam upwardly in the channel, a series of transverse substantially parallel longitudinally spaced downwardly and forwardly inclined vanes overlying the mouths of the containers and extending transversely across the channel for directing the vapor from the bottom of the channel into the head spaces of the containers, and means for selectively cutting off the outflow of vapor between any desired number of the vanes and the head spaces of the containers.

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