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FEED VALVE FOR COOKERS

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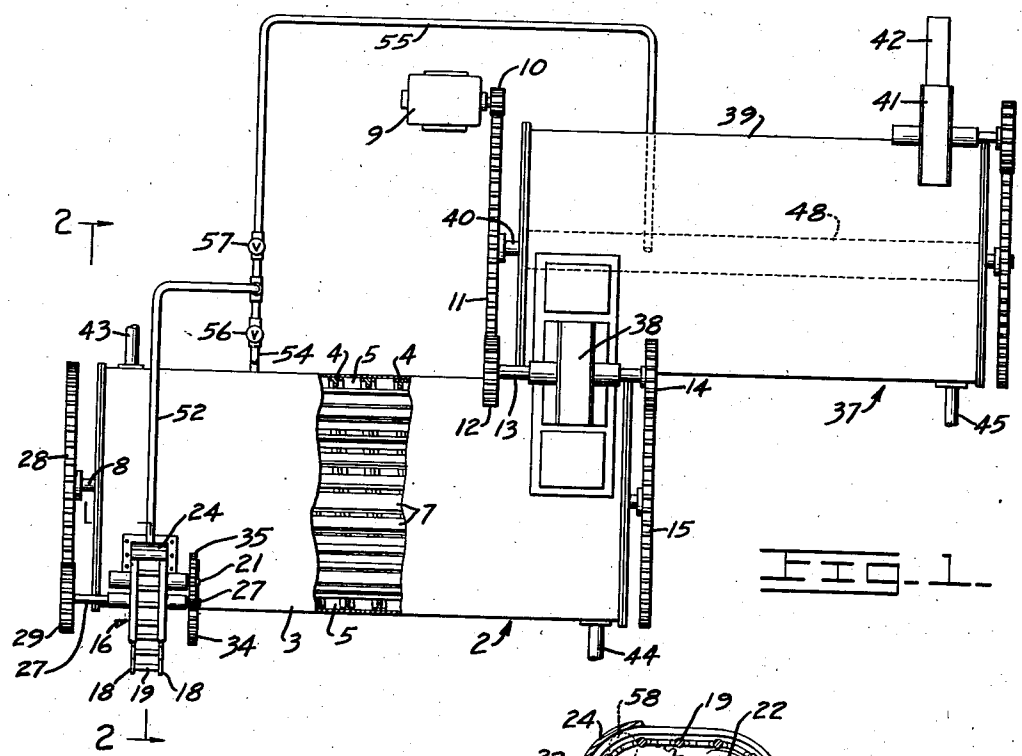


FIG. 1.

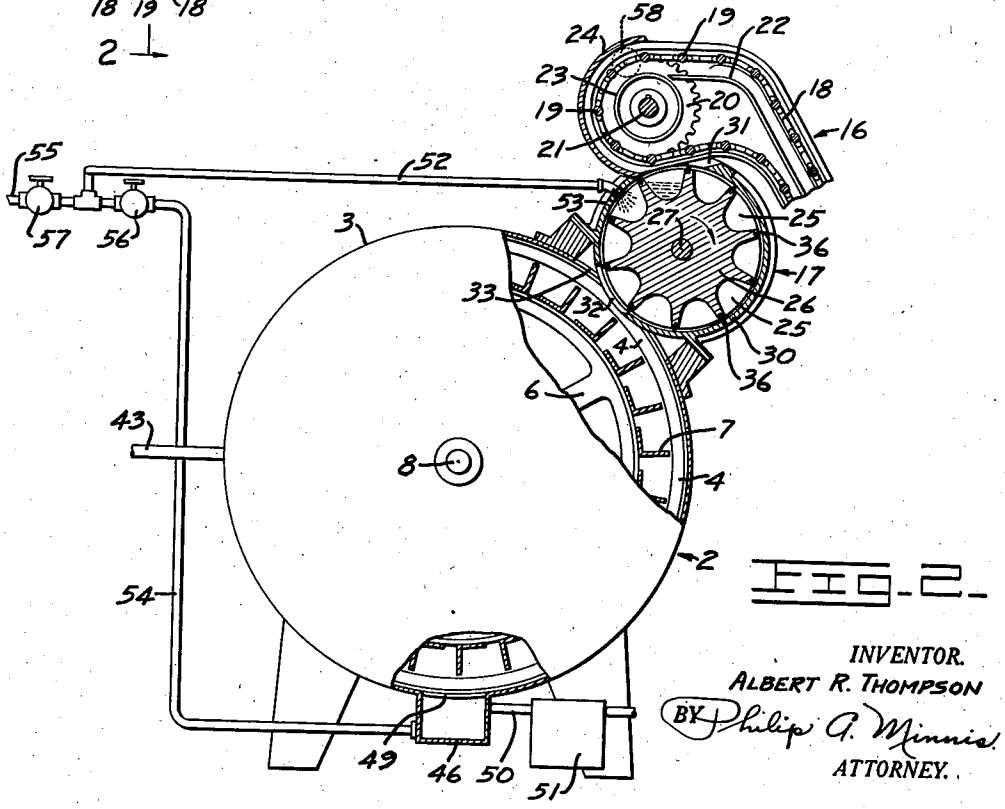


FIG. 2.

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FEED VALVE FOR COOKERS

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20 Claims. (Cl. 126—272)

This invention appertains in general to the canning art, and is more particularly concerned with the provision of an improved feed mechanism for continuous canned goods cookers to better adapt the same for handling frangible containers such as glass jars or the like.

Cookers of the type referred to are well known in the art, an illustrative example being disclosed in my prior U. S. Letters Patent No. 1,385,594 dated July 26, 1921. In this cooker, the cans are introduced into the cooking chamber by means of a rotary pocketed turret valve to which they are delivered by means of an endless conveyor operable to drop the cans, one at a time, into successive valve pockets as the valve is rotated. This dropping of the cans into the valve pockets is necessarily attended by a certain amount of shock, which although inconsequential when ordinary metal cans are handled, is undesirable where it is desired to handle glass containers, in which many products are canned, due to danger of breakage.

It is therefore the primary object of the present invention to provide an improved feed mechanism for continuous cookers which is adapted to handle the containers with greater gentleness, whereby glass containers may be run without danger of breakage.

Another object is to provide a rotary feeding device provided with means for minimizing the shock incident to the delivery of containers thereto.

A further object is to provide a simple and effective mechanism for applying a suitable liquid cushioning medium to the feed device of a cooker.

Other and further objects and advantages of the present invention, in addition to those specifically enumerated, will best be understood from the following description taken in connection with the accompanying drawing illustrating an embodiment of the present invention. It is, however, to be understood that the present invention is not limited to the specific construction disclosed herein as many modifications may be made within the purview of the appended claims.

In the drawing:

Fig. 1 illustrates a top plan view of a continuous cooking and cooling apparatus embodying the present invention, certain parts being broken away to disclose the interior construction of the cooking chamber.

Fig. 2 shows a vertical sectional view through the cooking chamber and feed mechanism therefor, the view being taken on the line 2—2 of Fig. 1, certain parts being shown in elevation.

Referring now to Fig. 1, 2 indicates a conventional form of cooker of the type referred to above, comprising a cooking chamber 3 consisting of a hollow cylindrical shell, the interior wall of which is provided with a continuous spirally arranged guide rail 4 of T-like configuration in cross section, which forms a spiral or helical pathway 5 for guiding the containers from the inlet to the outlet of the cooker. A reel made up of a plurality of spider wheels 6 provided with L shaped rails 7 is mounted upon a rotatable shaft 8 longitudinally extending through the chamber 3.

A motor 9 operatively connected by gears 10, 11, 12, shaft 13 and gears 14 and 15 to shaft 8 is adapted to drive the cooker in a known manner.

The containers are supplied to the cooker by means of an elevating conveyor 16 and a feed valve mechanism 17. The conveyor 16 is made up of a pair of endless conveyor chains 18 carrying spaced cross rods 19 and travelling around sprockets 20 keyed to a shaft 21 by which the conveyor is driven in such manner that cans placed between the rods are advanced over a supporting table 22. Upon reaching the top of the conveyor, the cans are carried around a drum 23 into a curved chute 24, and upon reaching the bottom of the chute, are dropped into one of the can compartments or pockets 25 of a rotary turret valve 26 supported by a shaft 27 operated by gears 28 and 29 and rotating within a housing 30, comprising inlet and outlet ports 31 and 32, respectively, and secured to the cooking chamber 3 adjacent an inlet opening 33 therein. The shaft 27 is further provided with a gear 34 cooperating with a pinion 35 secured to shaft 21 for operating the conveyor 16 in timed relation with respect to the feed turret 26.

The rotary feed valve or turret 26 is arranged within the housing 30 with its ends in air and water tight contact with the side walls of the valve housing while transversely extending sealing members 36 establish a seal between adjacent pockets 25 of the valve and the inner peripheral surface of the valve housing.

Upon operation of the feed valve in the direction of the arrow in Fig. 2, the cans, which are dropped into the pockets 25, will be carried around by the rotation of the valve and deposited one at a time between successively presented L shaped rails 7 and will be partially received within the spiral pathway 5. Since the spider

wheels 6 and rails 7 are constantly revolving, it is manifest that the cans will be carried around the inside periphery of the cooking compartment while being advanced therethrough along the continuous helical pathway 5.

Upon reaching the discharge end of the cooking chamber, the cans are transferred therefrom to a cooler 37 by means of a sealed transfer valve generally indicated at 38, and driven by shaft 13. This valve may be of a construction as shown in my Patent No. 1,467,960 of September 11, 1923, and as it forms no part of the present invention it is believed that a detailed description thereof is unnecessary.

The cooler 37 is similar in construction and operation to the cooker 2 in that it comprises a pressure tight shell or casing 39, a spiral guide, and longitudinal rails attached to spider wheels, not shown, rotatably supported by a shaft 40 operated by the motor 9, by means of the gears 10 and 11.

The cans are fed through the cooler in the same manner as through the cooker and are finally discharged through a valve 41 and conducted to a conveyor 42.

Suitable means 43 are provided for injecting steam under pressure into the cooking chamber 3 as well as means 44 and 45 for supplying air pressure to the cooking and cooling chambers respectively. It will be understood that a body of cooling liquid is maintained in the cooler, and the cooker may be partially filled with liquid as well, or, as in the particular embodiment illustrated, the cooking chamber may be filled entirely with steam in which case the only liquid in it is that of condensation.

The cooking chamber 3, as well as the cooling chamber 39, may be provided with longitudinally extending troughs 46 and 48, respectively, for providing a recess for collecting condensation and foreign matter which may fall into the trough through openings 49 between the convolutions of the rail 4. A pipe 50 having a steam trap 51 therein serves to conduct excess liquid from the cooker.

All of the foregoing is conventional construction well known in the art and further details with which the present invention is not concerned may be had by reference to the prior patents hereinabove referred to.

To adapt apparatus of the type referred to herein more particularly for the handling of frangible containers and to minimize the possibility of breakage of the same, the present invention comprehends the provision of a liquid cushion within the pockets 25 adjacent the discharge end of the conveyor 16 to cushion the gravitative fall of the containers from the conveyor into the pockets of the rotary feed valve 26.

To this end, a conduit 52 attached to the valve casing 30 and communicating with the interior of the same is provided for admitting a supply of water to the valve pockets 25 as they approach the lower end of the chute 24 during rotation of the rotary feed valve. For this purpose, the conduit 52 is in communication with the feed valve through the casing 30 at a point just below the end of the conveyor chute 24, so that liquid may be discharged from the pipe 52 into each pocket 25 as the particular pocket approaches the end of the chute to receive a container. A port or opening 53 in the casing 30 adjacent the conduit 52 permits the escape of air or steam displaced by the liquid from the pockets 25. This port will further allow the escape of any steam produced in the valve pockets or introduced into the same and will further permit excess water to drain out, should too much be injected into a particular pocket 25 as it is opposite the discharge end of the conduit 52.

The conduit 52 may of course be connected with any source of liquid supply for injecting liquid in the valve pockets in the manner referred to above. The cushioning liquid, which is ultimately discharged with the containers into the cooking chamber during the rotation of the feed valve 26, is, however, preferably preheated to minimize steam condensation within the cooker and to preheat the containers before they enter the same.

To accomplish the above in a simple and effective manner, the conduit 52 is provided with branches 54 and 55. The branch pipe 54 leads from and is in open communication with the trough 46 of the cooker 2, while the branch pipe 55 is in communication with the corresponding trough 48 of the cooler 37. Interposed between the conduit 52 and the branch pipes 54 and 55 are control valves 56 and 57 respectively.

It will, therefore, be seen that hot water from the cooker 2 may be admitted through pipe 54, valve 56 and conduit 52 into the valve pockets 25 by utilizing the pressure within the cooker to force liquid therefrom into the valve pockets 25, while the flow of liquid may be regulated by manipulation of the control valve 56.

If the pressure cooker is operated at temperatures above 212° F., there might be a tendency for the water delivered through conduits 54 and 52 to flash into steam when injected into the feed valve, and it will, therefore, generally be desirable to conduct to the feed valve along with the hot water from the cooking chamber a quantity of relatively cool water, which may be preferably obtained from the cooler 37 which in practice is maintained under the same or substantially the same pressure as the cooker 3. By opening the control valve 57 to any desired degree, cool water may be admitted from the cooler 37 into conduit 52 and mixed with the hot water supplied thereto to maintain the water injected into the feed valve at a proper temperature, which, of course, may be varied in accordance with the requirements of practice by proper manipulation of the valves 56 and 57.

No pumping or other pressure providing equipment is necessary for elevating and injecting the cushioning liquid into the feed valve since both of the compartments of the cooker 2 and cooler 37 are constantly maintained under a substantial pressure. This pressure will always be sufficient to force the necessary water through the pipes 54, 55 and 52 into the valve compartments 25.

In operation, the feed valve 26 rotates in the direction of the arrow in Fig. 2, and each pocket 25 is partially filled with hot or warm water as it registers with the discharge end of pipe 52. It then carries this water upwardly as it comes into appropriate alignment with the lower end of chute 24, whereupon one of the containers 58 drops into the water containing pocket and is thereby effectively cushioned against any damaging shock. The container is then carried on around by rotation of the feed valve until the particular pocket 25 registers with the opening 32 where the valve communicates with the interior of the cooking chamber. The cushioning liquid will now be discharged into the cooking chamber while the container will slide out of

the valve pocket and be received by one of the longitudinally extending angle rails 7 and advanced through the cooking chamber in the manner as previously described.

From the above it will be seen that by filling the valve pockets only partially with liquid the free gravitative fall of the container is not impeded sufficiently to interfere with the rapid and complete admission of the cans into the pockets, and jamming of the cans between the feed valve 26 and the valve casing 30 is therefore prevented.

While in the drawing, by way of example, the feed mechanism of the present invention has been shown as adapted for cooperation with a continuous pressure cooker, it will be apparent that the same may equally well be utilized in connection with other types of continuous cookers as will be obvious to those versed in the art.

I claim:

1. In combination with a cooking chamber adapted to contain a body of liquid in its lower portion, and provided with means for maintaining the interior of said cooking chamber at an elevated temperature and pressure, said chamber having an inlet opening above the level of liquid therein: a valve associated with said inlet opening for feeding containers into said chamber, said valve comprising a valve casing having a rotary pocketed feed valve member therein; means for supplying liquid to the pockets of said valve member comprising a conduit leading from said chamber below the level of the liquid therein and communicating with said valve casing for conducting liquid from said chamber to the pockets of said valve member to provide a hydraulic cushion in said pockets, and means for regulating the quantity of liquid so supplied to said pockets.

2. In combination with a cooking chamber adapted to contain a body of liquid in its lower portion and provided with means for maintaining the interior of said cooking chamber at an elevated temperature and pressure, said chamber having an inlet opening above the level of the liquid therein: a valve associated with said inlet opening for feeding containers into said chamber, said valve comprising a valve casing having a rotary pocketed feed valve member therein; means for supplying liquid to the pockets of said valve member comprising a conduit leading from said chamber below the level of the liquid therein and communicating with said valve casing for conducting liquid from said chamber to the pockets of said valve member to provide a hydraulic cushion in said pockets, and means for varying the temperature of liquid supplied to said valve member independently of the temperature maintained within said cooking chamber.

3. In combination with a pressure cooking and cooling apparatus including a cooking chamber containing liquid under pressure, a cooling chamber containing liquid under pressure, and a rotary pocketed valve for feeding articles into said cooking chamber: means for conducting liquid from each of said chambers to the pockets of said valve, and means for controlling the quantity of said liquid conducted from each of said chambers to said valve pockets.

4. In combination with a pressure cooking and cooling apparatus including a cooking chamber containing liquid under pressure, and a cooling chamber containing liquid under pressure: a valve for feeding containers to said cooking chamber including a casing and a rotary pocketed feed valve member within said casing, and means for supplying liquid to the pockets of said feed valve member comprising a pipe communicating with the pockets of said valve member through said casing, said pipe having valved branches communicating with the interiors of the cooking and cooling chambers for conducting liquid from either or both of said chambers to said feed valve to provide a hydraulic cushion in the pockets of said feed valve.

5. In combination with a pressure cooking and cooling apparatus including a cooking chamber containing heated fluid under pressure, and a cooling chamber containing a cooling liquid under pressure: a rotary pocketed feed valve for feeding containers to the cooking chamber, means for supplying cooling liquid from said cooling chamber to the pockets of said feed valve, and means for introducing heated fluid from said cooking chamber into said first named means for heating the liquid supplied to said feed valve.

6. A feed valve, comprising a valve casing, a movable valve body therein having pockets arranged to receive articles dropped therein, and means for delivering liquid to said pockets to partially fill the same to form a body of liquid therein for cushioning the shock to articles dropped into said pockets.

7. A feed valve, comprising a valve casing, a movable valve body therein having pockets arranged to receive articles dropped therein, means for delivering liquid to said pockets, and means for controlling the admission of the liquid into said pockets to partially fill the same to form a body of liquid therein for cushioning the shock to articles dropped into said pockets.

8. A feed valve comprising a valve casing, a rotary valve body within said casing and provided with article receiving pockets, said casing being provided with an inlet port through which articles may be deposited into said pockets and an outlet port for the discharge of the articles from said pockets, said article receiving pockets being registrable with said ports and open to the atmosphere upon registry with the inlet port, and means for supplying liquid to said pockets for partially filling the same to form a body of liquid in each pocket as it approaches said inlet port to cushion the shock to articles deposited therein.

9. A feed valve comprising a valve casing, a movable valve body positioned within said casing and provided with article receiving pockets, said casing being provided with an inlet port through which articles may be deposited into said pockets and an outlet port for the discharge of the articles from said pockets, said article receiving pockets being registrable with said ports for the reception of articles delivered therethrough, and means for delivering liquid to each pocket after it passes out of registration with the outlet port to provide a body of liquid in each pocket to cushion the shock to articles dropped therein.

10. A feed valve comprising a valve casing having an inlet port and an outlet port, a movable valve body positioned within said casing and provided with article receiving pockets registrable with said ports for the reception of articles delivered thereto, and means for delivering a quantity of liquid to each pocket for partially filling the same after it passes out of registry with the outlet port to form a body of liquid in each pocket, said body of liquid being sufficient to cushion the shock to articles dropped into said

pockets but insufficient to reduce the speed of admission of the articles into said pockets.

11. A feed valve comprising a rotary valve body having article receiving pockets therein, means for rotating said valve body to position said pockets into position to retain liquid and receive articles dropped therein, and means for delivering liquid to said pockets while in liquid retaining position for forming a liquid cushion within said pockets for cushioning the shock to articles dropped therein.

12. A feed valve comprising a casing having an inlet port through which articles may be dropped and an outlet port through which articles may be discharged, a pocketed movable part within said casing for receiving the articles dropped through said inlet port to transfer the same from the inlet to the outlet port, and means for delivering liquid to the pocket of the movable part intermediate said outlet and inlet ports to form a body of liquid within the pocket to cushion the shock to articles dropped into said pocket.

13. In combination with apparatus for treating containers including a treating chamber: a feed valve for delivering containers into said chamber, said feed valve comprising a valve casing having an upper inlet port, and an outlet port communicating with said treating chamber, a movable valve body within said casing and provided with container receiving pockets registrable with said inlet and outlet ports, and means for delivering liquid to said pockets to provide a body of liquid therein for cushioning the shock to containers dropped into said pockets, said casing and movable valve body being so positioned with respect to the treating chamber that the containers and liquid are freely discharged from the pockets into said chamber when said pockets register with the outlet port.

14. In combination with apparatus for treating containers of food including a treating chamber containing a body of liquid therein: a feed valve for delivering containers into said chamber, said feed valve comprising a valve casing having an inlet port and an outlet port communicating with said treating chamber, a movable valve body within said casing and provided with container receiving pockets registrable with said inlet and outlet ports, and means for delivering liquid to said pockets to provide a body of liquid therein for cushioning the shock to containers dropped into said pockets, said movable valve body being positioned above the liquid level of the treating chamber for free discharge of the containers and liquid from the pockets into said chamber.

15. A feed valve comprising a valve casing having an upper inlet port open to the atmosphere and an outlet port, a movable valve body positioned within said casing and provided with article receiving pockets registrable with said ports and open to the atmosphere upon registry with the inlet port, and means for supplying liquid to said pockets for partially filling the same to form a body of liquid in each pocket to cushion the shock to articles deposited therein, said casing provided with an aperture for discharging surplus liquid from said pockets to thereby control the amount of liquid supplied to said pockets.

16. A feed valve mechanism comprising a valve housing having an upper inlet port and an outlet port, a movable valve body within said housing provided with article receiving pockets registrable with said ports, means for actuating said valve body to move said pockets successively into and out of registration with said ports and means for supplying said pockets with liquid to cushion the shocks to articles deposited into said pockets through said inlet port, said inlet port being liquid free to expose the contents of the pockets to the atmosphere as the pockets move into registry therewith.

17. A feed valve mechanism comprising a valve housing having an article inlet port through which articles may be dropped and an outlet port for discharging articles, a rotary valve body within said housing provided with article receiving pockets registrable with said ports, and means for supplying liquid to said pockets as the latter pass from said outlet to said inlet port and at a point where said pockets are out of registration with said outlet port for cushioning articles dropped into said pockets through said inlet port.

18. A feed valve mechanism, comprising a valve casing, a rotatable valve member in the casing provided with article receiving pockets, said casing being provided with an inlet port through which articles may be dropped into said pockets and an outlet port for the discharge of the articles from said pockets, and means adjacent the inlet port for supplying liquid to each pocket of said valve member as it approaches said inlet port to form a body of liquid in each pocket for cushioning the shock to articles dropped therein through said inlet port.

19. In a pressure cooking apparatus for canned goods, a cooking chamber containing liquid, means for supplying steam under pressure thereto, a valve for feeding containers to said chamber including a casing having a rotary pocketed feed valve member therein, said casing having an inlet aperture through which cans may be dropped into the pockets of said valve member and an outlet aperture through which the cans are discharged from said pockets into said chamber, means for supplying liquid to said pockets, said means comprising a conduit leading from said cooking chamber and communicating with said casing intermediate said inlet and outlet apertures for conducting liquid from said chamber to the pockets of said valve member as they approach said inlet port to form a body of liquid within each pocket for cushioning the fall of articles dropped therein through said inlet port.

20. An article feeding mechanism comprising a member rotatable about a horizontal axis, said member having article receiving pockets in the periphery thereof for the reception of articles dropped therein, means to introduce liquid into each pocket as it ascends into upright position, means to permit overflow of a portion of the liquid from each pocket up to a predetermined point in its travel whereby each pocket will contain a predetermined amount of liquid after it passes the point of overflow and arrives at its upright position, said liquid serving to cushion the fall of the article into said pocket and being discharged from said pocket by gravity when said pocket is inverted upon rotation of said member.

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