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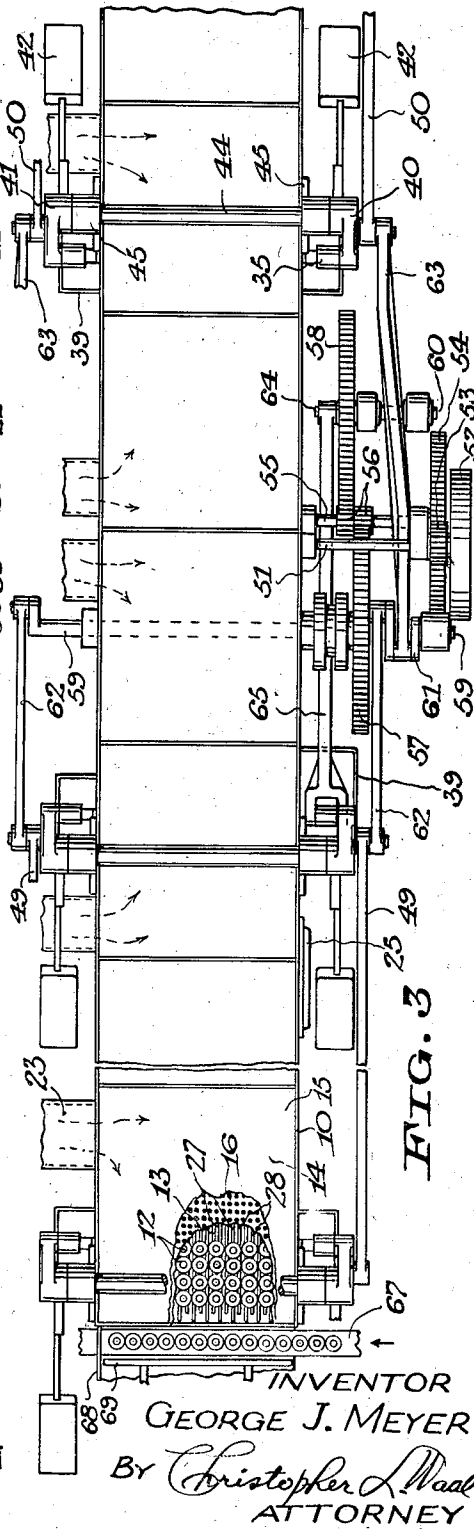
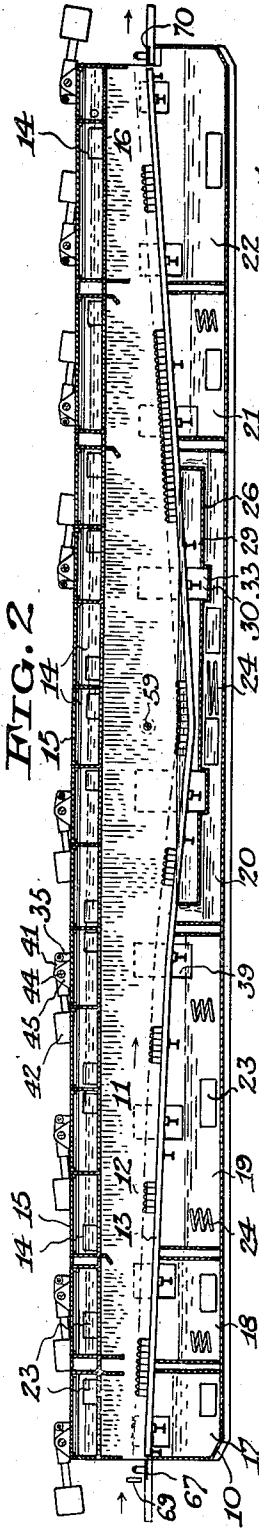
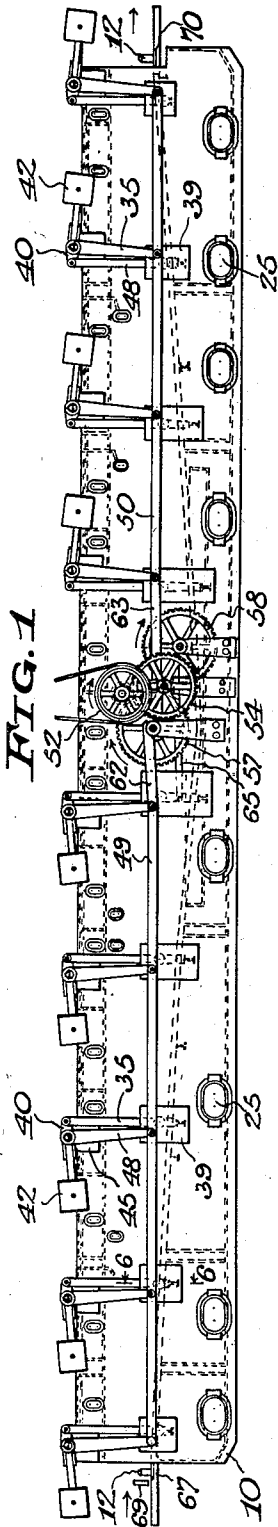
G. J. MEYER

2,333,544

PASTEURIZING APPARATUS

Filed April 23, 1941

2 Sheets-Sheet 1



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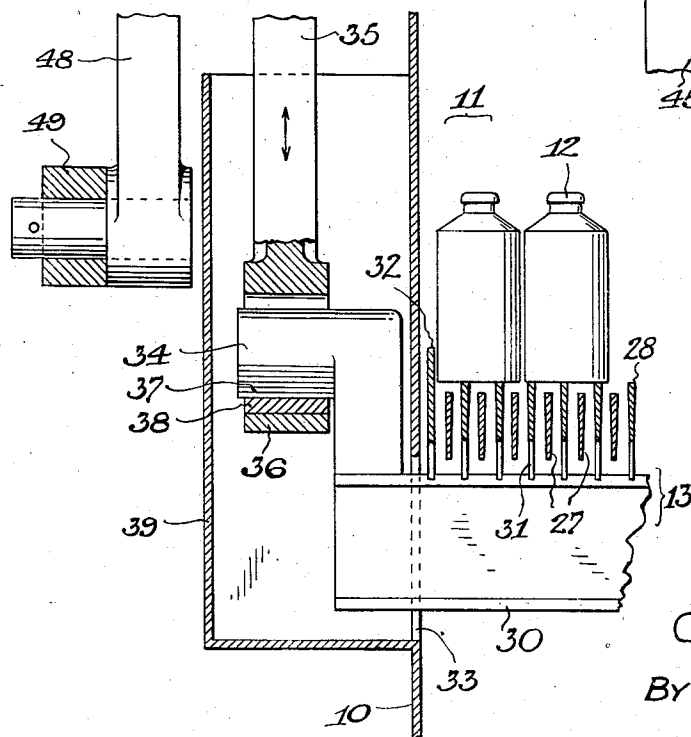
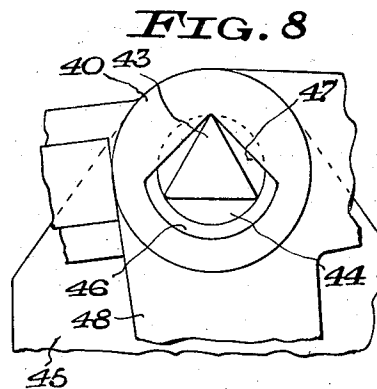
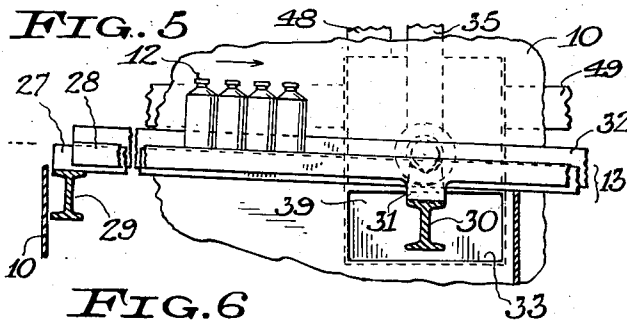
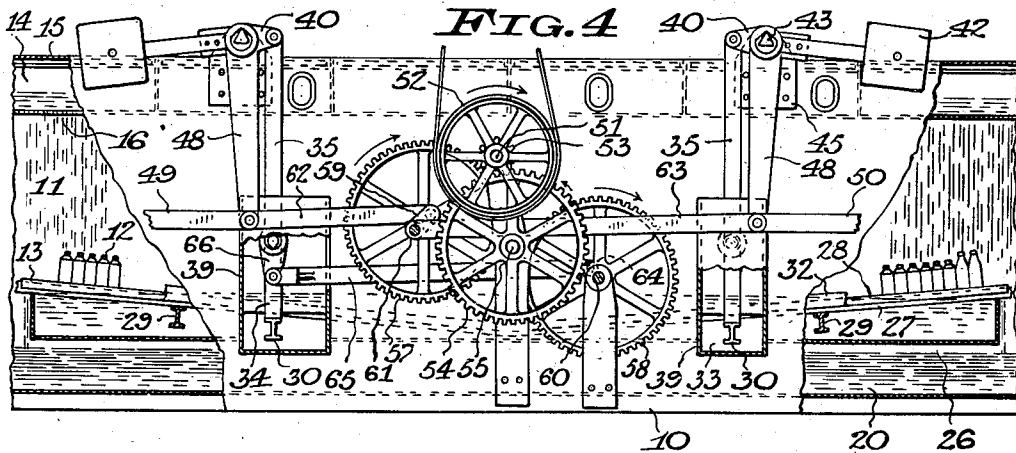
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PASTEURIZING APPARATUS

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2 Sheets-Sheet 2



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PASTEURIZING APPARATUS

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8 Claims. (Cl. 99—361)

The present invention relates to apparatus for sterilizing or pasteurizing packaged goods, such as canned and bottled beer.

Pasteurizers have heretofore been devised in which packaged goods are subjected to the action of hot water or other liquid, as by means of sprays and baths. It has been customary to conduct the goods through a pasteurizer of this type by means of an endless chain conveyer. Such construction, in addition to being relatively expensive, includes numerous moving parts and bearing surfaces which are subject to the destructive or corrosive action of the water and which are difficult to lubricate, and neglect of the attendant may cause injury or damage to the mechanism.

It is an object of the invention to provide an improved and efficient pasteurizer which is of simple and inexpensive construction with relatively few moving parts, and which is so arranged that the bearing surfaces or pivots of the mechanism are free from the corrosive action of the water and are disposed in readily accessible position.

Another object is to provide a pasteurizer which requires but little power for operation, which is capable of easy lubrication, and which will avoid transfer of lubricant to the pasteurizing water.

A further object is to provide a simplified pasteurizer which will permit both spraying and immersion of the goods in their passage through the machine.

The invention further consists in the several features hereinafter described and claimed.

In the accompanying drawings,

Fig. 1 is a side elevation of a pasteurizer constructed in accordance with the invention;

Fig. 2 is a longitudinal sectional elevation of the pasteurizer;

Fig. 3 is a fragmentary top view, parts being broken away;

Fig. 4 is a side elevation of an intermediate portion of the pasteurizer, parts being broken away and parts being shown in section;

Fig. 5 is a longitudinal sectional elevation of a portion of the pasteurizer, showing a conveyer thereof;

Fig. 6 is a transverse sectional elevation taken generally along the line 6—6 of Fig. 1;

Fig. 7 is a detail elevation of suspension or lifting means for the conveyer, and

Fig. 8 is a detail elevation of a lifting lever mounting.

In the drawings, 10 designates an elongated

housing having therein a longitudinally extending sterilizing chamber or passage 11 through which are conducted the goods 12 to be pasteurized, such as bottles or cans of beer, the chamber being open at opposite ends for the admission and discharge of the goods. The goods are carried through the chamber by a conveyer or carrier designated generally by 13 and hereinafter more fully described. The upper portion of the housing is provided with a series of water compartments or pans 14 which are closed by cover plates 15 and have perforated bottom plates 16 for spraying or showering water downwardly through the sterilizing chamber, the water sprays impinging on the bottles or other containers traveling through the chamber. The lower portion of the housing is provided with a series of collecting tanks or reservoirs 17, 18, 19, 20, 21, and 22 to catch the sprayed water. As usual in spray-type pasteurizers, the water is circulated through the housing, being pumped from the collecting tanks to the spray pans through suitable ducts 23. Some of the tanks are provided with steam coils 24 for heating the water, and the several tanks are provided with lateral clean-out closures 25. The entrance portion of the sterilizing chamber 11 forms a tempering or preheating zone for the incoming beer containers, and the exit portion of the chamber forms a cooling zone. The circulation of the water is preferably so arranged as to provide a regenerative action for reducing heat loss, as is well understood in this art.

An immersion tank 26 is formed in the housing between the ends of the intermediate collecting tank 20 and has a bottom wall spaced above the bottom wall of the housing. The hot water collecting in the immersion tank overflows at the front and rear end walls of this tank into the collecting tank 20. The conveyer 13 has a depressed intermediate portion which extends or dips into the immersion tank 26 so as to wholly or partially immerse the beer containers during their travel.

The conveyer 13 comprises two sets of laterally spaced bars or rails 27 and 28 which extend longitudinally of the sterilizing chamber 11 to form gratings for supporting thereon the upright cans or bottles 12. The rails 27 are stationary and are rigidly supported at intervals by subjacent cross beams 29 secured at opposite ends to the side walls of the housing 10. The rails 28 are longitudinally and vertically movable and are arranged alternately with the stationary rails 27. The movable rails 28 are supported at intervals on subjacent cross beams 30 which are actuated as hereinafter

described, the bars having downwardly projecting ears 31 secured to the cross beams 30. Each of the rails 27 and 28 is preferably of wedge-shaped cross-section with the longer dimension of the cross-section arranged vertically and with the wider edge at the top, as seen in Fig. 6. The cross beams 30 for the movable grating rails also carry guard bars 32 near the side walls of the housing 10, these guard bars extending higher than the grating rails so as to space the beer containers from the housing side walls. The opposite ends of the movable cross beams 30 extend through openings 33 formed in the side walls of the housing 10 and are provided with bearing members or trunnions 34 which are fulcrumed on the lower ends of suspension or lifting links 35. Each trunnion extends loosely into an eye 36 of the corresponding link and has a wedge-shaped bearing edge 37 rockably resting on a hardened metal block 38, Figs. 6 and 7, set into the link. Upwardly opening pockets 39 are formed on the side walls of the housing in communication with the respective openings 33 to prevent loss of water from the housing. The openings 33, which permit the water from the tanks to enter the pockets, are preferably small so as to minimize spraying of water into the pockets, and the pockets extend well above the openings. The cross-beam bearings are spaced above the water levels in the tanks so as to be free from the action of the water. Two of the movable cross beams 30 extend across the immersion tank 26, and the housing pockets for the ends of these cross beams communicate with this tank. When the several tanks are emptied the water drains from the pockets through the openings 33.

The upper ends of the lifting links 35 are pivotally carried by the horizontal arms of levers 40 and 41 at opposite sides of the housing, each lever carrying a counterweight 42 to assist in balancing the weight of the movable grating. The levers 40 and 41 in each pair are supported on the upper edges of wedge-like fulcrums 43 formed on the ends of a horizontal shaft 44 which extends transversely above the housing, each shaft being carried by brackets 45 fastened to the opposite side walls of the housing, and each lever having an opening 46 with upwardly converging walls 47 to receive the corresponding fulcrum. The bearing surfaces are suitably hardened to reduce wear. The levers 40 at one side of the housing are in the form of bell-cranks and have respective downwardly projecting arms 48 spaced outwardly from the plane of the lifting links to clear the pockets 39. The pairs of levers 40 and 41 are divided into two groups extending from the opposite ends of the housing. The downwardly projecting arms of the two groups of levers 40 are pivotally secured to respective rods 49 and 50, one for each group. If desired, the levers 41 at the other side of the machine may be similarly arranged.

At one side wall of the housing, and between the two groups of levers, is mounted an actuating mechanism for the movable grating. A horizontal shaft 51 is rotatably supported by the housing and carries a pulley 52 belt-driven by any suitable source of power. A pinion 53 on the pulley shaft meshes with a gear 54 on a horizontal intermediate shaft 55, and pinions 56 on the intermediate shaft mesh with gears 57 and 58 on respective horizontal crank shafts 59 and 60. The crank shaft 59 has opposed cranks 61, one of which is connected to the adjacent bell-crank

lever 40 of the front group of lifting levers by a connecting rod 62, and the other of which is connected to the adjacent bell-crank lever of the rear group of lifting levers by a connecting rod 63. This opposed crank motion serves to reduce driving stresses on the mechanism and insures smooth and easy operation. The crank shaft 60 has a crank 64 which is connected by a connecting rod 65 with a downward extension 66, Fig. 4, of the nearest lifting link of the front group of levers. The pocket 39 for this lifting link is suitably apertured to provide clearance for the connecting rod 65. The crank shafts 59 and 60 have the same slow speed of rotation and their cranks have a phase angle spacing of approximately 90° and are so related as to provide an elliptical path of travel for the movable grating rails, these rails moving forwardly at a time when their upper edges are higher than the stationary grating rails and moving rearwardly at a time when they are lower than the upper edges of the stationary rails. The vertical travel of the movable grating rails is small compared with their longitudinal travel. On their forward travel the then elevated movable grating rails support the containers and advance them a short distance, and on their rearward travel these rails are depressed, the advanced containers then resting on the stationary grating rails. It will be obvious that the feeding action of the gratings could be provided in other ways, as by longitudinally reciprocating one set of grating rails and vertically reciprocating the other set, or by imparting an elliptical motion to both sets of rails in opposite phase relation, but these modifications would require a more complicated construction.

The beer containers are loaded onto the conveyer 13 either manually or by any suitable loading mechanism. In one form of mechanism the containers are carried by a feeding belt 67 which extends transversely of the housing adjacent to the open end of the sterilizing chamber, the file of containers on the belt being limited in their travel by a stop 68 and being transferred onto the receiving end of the conveyer 13 by a reciprocatory pusher bar 69. At the discharge end of the conveyer the containers are transferred to a cross belt 70 or other suitable support.

In operation, the containers 12 are loaded onto the receiving end of the conveyer 13 at the open end of the housing 10. The containers are advanced slowly through the chamber 11 and, after being gradually heated to pasteurizing temperature by the water sprays, are maintained at pasteurizing temperature for a suitable period and then gradually cooled and discharged from the chamber. At the intermediate portion of the chamber 11 the containers are immersed in the hot water tank 26 so as to provide thorough and uniform heating. The slope of the container-supporting rails of the conveyer is sufficiently small to prevent tipping of the containers or interference with feeding, while still providing for adequate immersion of the containers in the heating tank 26. It will be understood that in normal operation the containers are packed closely throughout the length and width of the chamber or passage 11, thus providing a relatively large capacity. If desired, the containers may be of assorted sizes and types.

It will be apparent from the foregoing description that the present invention provides a simple and inexpensive pasteurizer of high capacity which will operate efficiently and with very little attention, and which is so arranged as to avoid

damage to the conveyer mechanism by the pasteurizing water.

What I claim as new and desire to secure by Letters Patent is:

1. In a pasteurizer, the combination of a housing having a heating chamber adapted to receive a heated liquid therein and having side walls with apertures, conveying means for advancing articles to be pasteurized through said chamber including longitudinally extending reciprocary feeding rails adapted to support and lift the articles, movable cross members for supporting said rails and having end portions extending through said side wall apertures, means at the outer sides of said side walls for suspending said cross members, means for longitudinally reciprocating said rails, and means at the outer sides of said apertured side walls for preventing loss of liquid from said chamber through said apertures.

2. In a pasteurizer, the combination of a housing having a heating chamber adapted to receive a heated liquid therein and having side wall apertures, said housing further having an immersion tank with side wall apertures, conveying means for conducting articles to be pasteurized through said chamber including longitudinally extending reciprocary feeding rails adapted to support and lift the articles, said feeding rails extending into said tank, movable cross members for supporting said rails and having end portions extending through said side wall apertures, means at the outer sides of said side walls for suspending said cross members, and means for longitudinally reciprocating said rails, said side walls having pockets at said apertures to prevent loss of liquid from said tank.

3. In a pasteurizer, the combination of a housing having a spray chamber and an immersion tank between the ends of said chamber, said chamber and tank each adapted to receive a heated liquid, movable grating rails extending longitudinally of said chamber to support thereon articles to be pasteurized, said rails sloping downwardly from opposite end portions of the housing into said immersion tank, means for longitudinally reciprocating said grating rails to advance the articles on one stroke of said rails, and other grating rails for supporting said articles on the return stroke of said first-named rails.

4. In a pasteurizer, the combination of a housing having a spray chamber and an immersion tank each adapted to be receive a heated liquid, conveying means for articles to be pasteurized including article-supporting grating rails extending longitudinally in said chamber and having depressed intermediate portions in said tank, said rails sloping downwardly to said depressed portions, and means for imparting relative up and down and longitudinal movement to certain of said rails for advancing the articles along said conveying means.

5. In a pasteurizer, the combination of a housing having a chamber adapted to receive a heated liquid therein, a stationary grating and a movable grating each having rails extending longitudinally in said chamber for supporting articles to be pasteurized, said stationary grating rails being distributed among said movable rails, a

plurality of levers rockably carried by said housing at longitudinally spaced points of said housing, suspension links pivotally connecting said levers and said movable grating, means for longitudinally reciprocating said movable grating to feed said articles on its advancing stroke, a rotatable crank shaft having opposed cranks, and means for actuating different sets of said levers by said opposed cranks to vertically reciprocate said movable grating, said movable grating on its advancing stroke having the upper edges of its rails higher than the upper edges of the stationary grating rails.

6. In a pasteurizer, the combination of a housing having a spray chamber and a lower liquid-receiving tank, article-conveying means in said chamber formed by a plurality of stationary and movable rails extending longitudinally in said chamber for supporting thereon articles to be pasteurized and including transversely extending members for carrying said movable rails, said movable rails being distributed among said stationary rails, suspension means for said movable rails having pivotal connections with the opposite end portions of said transversely extending members exterior to said chamber and above the liquid level in said tank, and means for imparting up and down and reciprocary longitudinal movement to said movable rails to advance the articles along said article-conveying means.

7. In a pasteurizer, the combination of a housing having a heating chamber and a liquid-holding tank at the lower portion of said chamber, conveying means in said chamber formed by a plurality of stationary and movable article-supporting rails extending longitudinally in said chamber, said rails having portions extending into said tank below the liquid level therein, and said movable rails being distributed among said stationary rails, movable cross members for supporting said movable rails, and means for imparting relative up and down and reciprocary longitudinal movement to said movable rails for advancing articles along said conveying means, said last-named means including suspension devices at opposite sides of said housing having pivotal connections with said cross members above the liquid level in said tank.

8. In a pasteurizer, the combination of a housing having a heating chamber and a liquid-holding tank at the lower portion of said chamber, conveying means including a stationary grating and a movable grating each having rails extending longitudinally in said chamber for supporting articles to be pasteurized, said stationary grating rails being distributed among said movable rails, said stationary and movable rails having portions extending into said tank below the liquid level therein, and means for imparting relative up and down and reciprocary longitudinal movement to said movable rails for advancing articles along said conveying means, said rail-moving means including suspension devices at opposite sides of said housing having pivotal connections with said movable grating above the liquid level in said tank.

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