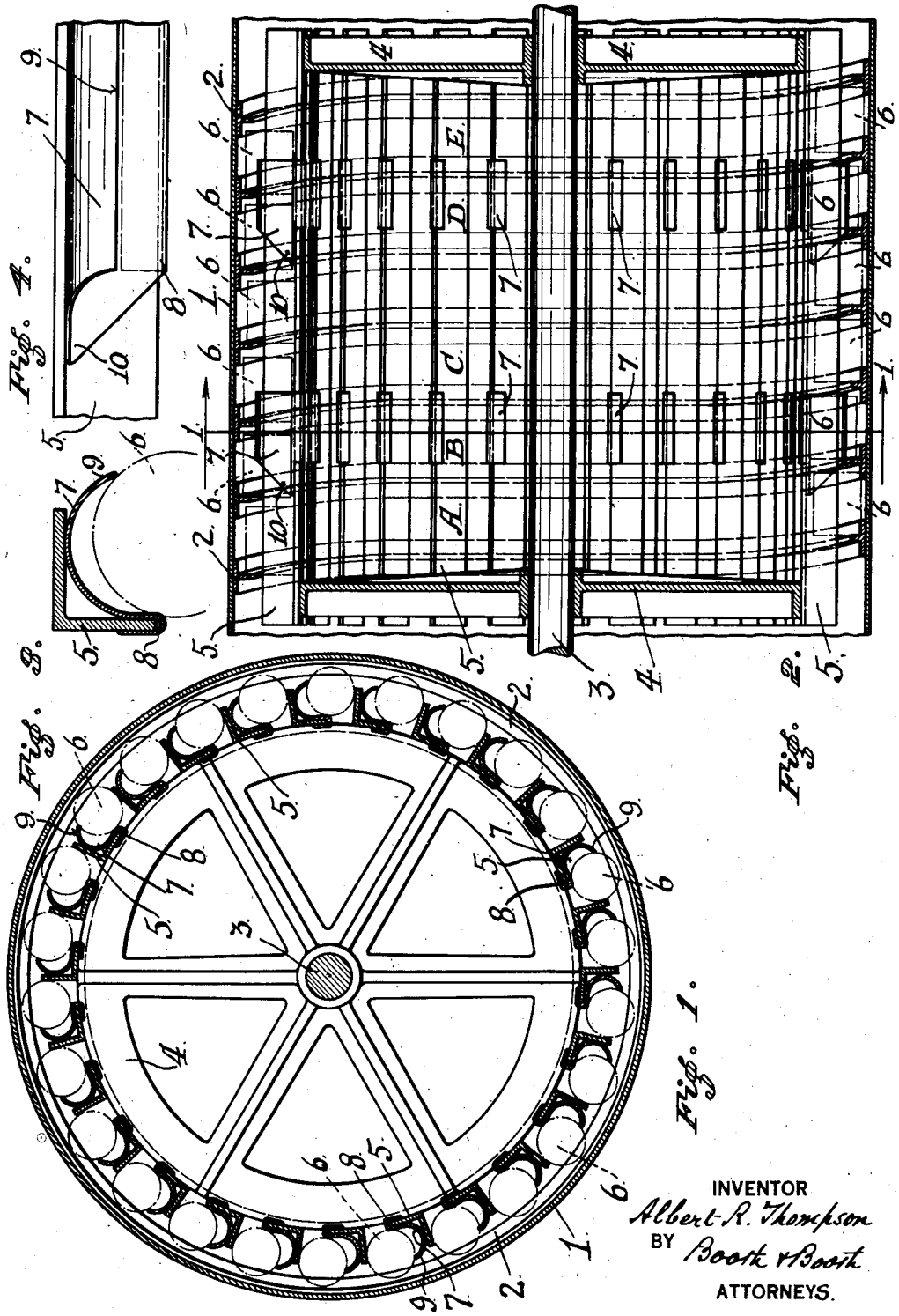
April 6, 1926. 1,579,676

A. R. THOMPSON

STERILIZING PACKAGED GOODS

Filed Sept. 16, 1925



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Patented Apr. 6, 1926. 1,579,676

UNITED STATES PATENT OFFICE.

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STERILIZING PACKAGED GOODS.

Application filed September 16, 1925. Serial No. 56,645.

To all whom it may concern:

Be it known that I, ALBERT R. THOMPSON, a citizen of the United States, residing at San Jose, in the county of Santa Clara and State of California, have invented certain new and useful Improvements in Sterilizing Packaged Goods, of which the following is a specification.

My invention relates to the art of sterilizing goods contained in packages, and particularly to the cooking or processing under heat of comestibles in hermetically sealed containers.

For the sake of simplicity, I shall herein refer to such containers, as cans, though it will be understood that other forms of vessels as for example bottles, are included in my inventive idea. Also in referring herein to the "canning art" I am to be understood as meaning any form or practise of sterilizing or cooking, whether strictly falling under the head of canning or not.

In the canning art, as at present practised, what may safely be regarded as the highest development of the sterilizing step, contemplates a "cooker" having a can-path through which a procession of cans is continuously passed at a uniform rate of speed, said can-path comprising a rotatable annular series or reel of can-supporting rails and a circumscribing, fixed, helically directed rail for advancing the cans in the supporting rails.

Since the cans lie freely between adjacent supporting rails, any peripheral contact of said cans with a surface or member fixed relatively to the rotation of the can-supporting rails, especially such contact as happens during the travel of rails through their lower arc of revolution, causes the cans to rotate on their own axes which is a movement in addition to their major revolution bodily with the rail series about the axis of the reel. Such additional individual rotation of the cans though it has heretofore, and in many cases with good reason, been deemed beneficial in producing an agitation of the can contents, tending amongst other things, to avoid burning by effecting a more equal presentation to the heat, has been found in other cases undesirable, in that it produces an excess of agitation tending to injuriously affect the can contents. A concrete example of what may be regarded as extremes in this regard may be cited in the case of corn, on the one hand, which requires all the agitation possible from both the bodily major revolution of the can about the axis of the rail series, and the additional or individual rotation of the can on its own axis; and the case of peas, on the other hand which are best treated by preventing the individual rotation, as I have disclosed in my Patent No. 1,546,045, July 14, 1925.

Between these extreme examples, there lie many products, however, which are best treated by one or more recurrences of non-agitation periods between agitation periods, that is to say alternating agitations and non-agitations. Tender berries and fruits, such as raspberries and tomatoes, may be cited in this connection, but the best illustration may be had in the case of processing milk.

In sterilizing milk it is known that viscosity, or as it is commonly called "body", is in inverse ratio to the degree of agitation. Fully agitated milk results in thinness, that is, lighter body or reduced viscosity. Less agitation results in increased body. In practise, since the required agitation varies with the seasons and with particular batches of milk, it is usual to make a preliminary test by running what are called pilot cans, and observing the result. Then having determined how much agitation is best, the desired result is reached, where the common types of batch sterilizers are in use, by an intermittent rotation, or by changing the rate of rotative speed of the sterilizer.

But such expedients are not practicable in the use of a sterilizer involving a continuous procession of cans, such, for example, as the continuous cooker, I have hereinabove outlined, for many reasons which will readily occur to one skilled in the art. They would be uneconomical, wasteful of time, and tend to complication and possible injury to both machine and product.

From the foregoing, my invention will now be readily understood.

In brief, it contemplates the adaptation and adjustment of the preferred methods and means to secure the desired results of alternating the agitating and non-agitating periods; also in varying the times of said periods and varying their lengths and their positions.

In the accompanying drawings, I show

one form of a cooker or sterilizer adapted for a file or procession of continuously traveling cans, and to which my invention is applied, it being understood however that in the broader aspects of my invention, I am not to be confined to this form, since various changes may be made without departing from my idea as defined by my claims.

In the drawings—

Fig. 1 is cross-section of the sterilizer on the line 1—1 of Fig. 2.

Fig. 2 is a longitudinal section of the sterilizer, the length, for the sake of room on the sheet, being somewhat disproportionate to the diameter, and both ends being broken away.

Fig. 3 is a cross section through one of the can-supporting rails comprised in the can-path, showing the fitting thereto of one of the can-holding plates indicating a period of non-agitation, the can shown in dotted lines being engaged by said plate.

Fig. 4 is a face elevation of the assembly shown in Fig. 3.

1 is the shell or casing of the cooker having fixed to its inner surface a helically directed rail 2 extending therein from end to end. This rail, in practise, is best formed of T-section, with its leg flange extending inwardly and its foot flanges lying parallel with the shell wall, as seen in Fig. 2.

3 is a rotatable shaft extending through the shell in its axis, and upon this shaft are fixed the heads 4.

Carried by the periphery of the heads 4 are the can-supporting rails 5. These are best formed of angle section, as seen in Fig. 1, with one flange extending radially outwardly and the other lying upon the head periphery. There is an annular series of these rails 5 spaced apart and extending parallel with the axis of revolution.

The shaft 3, heads 4 and rails 5 thus constitute a reel rotatable about a horizontal axis, and lying within the fixed helically directed rail 2. All these parts are those usual to this type of cooker, and they are so related as to form the usual helical can path, the cans indicated by 6, shown dotted throughout, lying between the reel rails 5 and the fixed rail 2, the periphery of the cans being surrounded by said rails and the outer portions of the ends of the cans being flanked by the inwardly extending flanges of the coils of the fixed rail.

In a can-path of this nature, it will be seen that the cans have a major revolution about the reel axis, and they also have, ordinarily, individual rotation on their own axes, due to contact during their lower arc of revolution with a surface fixed with relation to the revolution of the reel rails, which surface may be the inner surface of the shell itself in case the helically directed rail 2 be a single inwardly extending member, or, as here shown, with a T-section of said rail. The fixed surface comprises the foot flanges of said rail. This is clearly shown in Fig. 2 with those cans which are passing through the agitating zones, as will presently appear.

If, however, means be present to hold the cans, during their major revolution, but without interruption thereof, out of peripheral contact with such relatively fixed surface they will not rotate on their own axes, as I have disclosed in my Patent No. 1,546,045 above referred to. In said patent the non-rotating effect extends, for the objects therein sought, throughout the entire length of the can-path. Thus, (for the sake of contrasting and explaining my present invention) the prior art may be said to be represented by the customary cooker in which the agitation, due to the rolling of the cans on their own axes, is substantially continuous throughout the travel of the can procession through the machine, and a cooker of the type disclosed by my said patent, in which such agitation is wholly absent.

According to my present improvement, I alternate these rolling agitating and non-rolling non-agitating effects, by means having definite characteristics, namely, such means must not interrupt the travel of the can-procession; nor require a modification or arrest of the speed thereof; they should, in their best form, be adapted to be readily fitted to and to be removed from the can-path; and they should be readily adjustable to selective positions along the length of said path.

The alternation of these periods or zones of agitation and non-agitation may be single or plural. For the sake of illustration, I have shown in Fig. 2 a sequence comprising a leading agitating zone A, a non-agitating zone B, a second agitating zone C, a second non-agitating zone D, and finally a third agitating zone E.

The non-agitating zones are due to the presence in the can path of the can holding members 7. These members are springy plates which lie lengthwise in the angled can-supporting reel rails 5. The length of the plate is determined by the length which by testing it has been found the non-agitation should be. One side edge of the plate is freely and slidably looped or bent over the edge of the non-radial leg of the rail 5, as shown at 8. The other side edge of said plate is free and extends inwardly, as shown at 9, from the face of the radial leg of said rail, while the body of the plate is arcuate and resilient in cross section and plays freely in the rail 5 in which it lies.

The forward end of the plate is pointed, as shown at 10, and lies close in the angle of the rail 5 (Fig. 4), so that the cans may enter the plate along the inclines of the pointed end without appreciable obstruction

and may be directed to and upon the free edge 9 of the plate and be pressed by said edge against the radial leg of the adjacent rail 5 and held between said edge and leg, but with a lightness of contact permitting it to slide along without any interruption of its advancing movement in the can-path. See Fig. 1. The can in rising to and upon the extended edge 9 of the plate 7 is lifted from the peripheral contact with the foot flange of the fixed rail 2 which prevailed heretofore, as in zones A, C and E, of Fig. 2, and had occasioned its period of agitation, and is resiliently held up by said edge out of such contact, as in Fig. 1 and in zones B and D of Fig. 2, so that as it slides along said plate, it passes through a zone defining its period of non-agitation, said period terminating as the can leaves the plate and enters upon the zone defining its next period of agitation due to again being free to roll upon the fixed rail 2.

The length of the period or zone of non-agitation may be varied as determined by test, by fitting to the rails 5 the proper length of plate 7 and it is to facilitate this that the plate is looped at 8 over the rail 5, such expedient being a good example of a connection adapted for ready fitting and removal and the substitution of other plates.

Of course, if preferred the plate may be bolted or set to the rail by a screw or pin, but in practise the pressure of the cans on the yielding plate will be sufficient to hold the latter in place. Again, the plate 7 is adapted for ready sliding adjustment upon the rail 5, so that the relative positions in the path of the zones of agitation and non-agitation may be varied to suit the test, and consequently the times when said period shall begin and end. Thus it is possible to fully adapt the customary cooker of the continuous type to all the conditions of treatment required.

I claim:

1. A sterilizer for packaged goods having a package path; means for passing the packages continuously through said path; and means in said path, operative in successive zones thereof, for subjecting said packages in one zone to movement independent of and without interruption to their movement through the path, and holding them in another zone against said independent movement without interruption to their movement through the path.

2. A sterilizer for packaged goods having a package path; means for passing the packages continuously through said path; means in said path, operative in successive zones thereof, for subjecting said packages in one zone to movement independent of and without interruption to their movement through the path, and holding them in another zone against said independent movement without interruption to their movement through the path; and means for varying the relative length of said zones.

3. A sterilizer for packaged goods having a package path; means for passing the packages continuously through said path; means in said path, operative in successive zones thereof, for subjecting said packages in one zone to movement independent of and without interruption to their movement through the path, and holding them in another zone against said independent movement without interruption to their movement through the path; and means for varying the positions of said zones in said path.

4. A sterilizer for packaged goods having a package path; means for passing the packages continuously through said path; means in said path, operative in successive zones thereof, for subjecting said packages in one zone to movement independent of and without interruption to their movement through the path, and holding them in another zone against said independent movement without interruption to their movement through the path; and means for varying both the length and positions of said zones.

5. A sterilizer for packaged goods having a package path; means for passing the packages continuously through said path; and means in said path, operative in successive zones thereof, for rolling the packages in one zone on their own axes without interruption to their movement through the path, and holding them in another zone against such rolling, without interruption of their movement through the path.

6. A sterilizer for packaged goods having a package path; means for passing the packages continuously through said path; means in said path, operative in successive zones thereof, for rolling the packages in one zone on their own axes without interruption to their movement through the path, and holding them in another zone against such rolling, without interruption of their movement through the path; and means for varying the relative length of said zones.

7. A sterilizer for packaged goods having a package path; means for passing the packages continuously through said path; means in said path, operative in successive zones thereof, for rolling the packages in one zone on their own axes without interruption to their movement through the path, and holding them in another zone against such rolling, without interruption of their movement through the path; and means for varying the positions of said zones in said path.

8. A sterilizer for packaged goods having a package path; means for passing the packages continuously through said path; means in said path, operative in successive

zones thereof, for rolling the packages in one zone on their own axes without interruption to their movement through the path, and holding them in another zone against such rolling, without interruption of their movement through the path; and means for varying both the length and positions of said zones.

9. A sterilizer for packaged goods comprising a shell having a package-advancing path composed of a fixed, helically directed member and an annular series of members concentric within said fixed member and rotatable about the axis thereof, the packages in said path having peripheral contact with a fixed surface thereof whereby they are rotated on their axes independently of their major revolution; and means associated with said path for holding the packages out of said peripheral contact with said fixed surface, in a predetermined fraction of the length of said path to prevent them from rolling on said fixed surface.

10. A sterilizer for packaged goods comprising a shell having a package-advancing path composed of a fixed, helically directed member and an annular series of members concentric within said fixed member and rotatable about the axis thereof, the packages in said path having peripheral contact with a fixed surface thereof whereby they are rotated on their axes independently of their major revolution; means associated with said path for holding the packages out of said peripheral contact with said fixed surface, in a predetermined fraction of the length of said path to prevent them from rolling on said fixed surface; and means for varying the length of said fraction.

11. A sterilizer for packaged goods comprising a shell having a package-advancing path composed of a fixed, helically directed member and an annular series of members concentric within said fixed member and rotatable about the axis thereof, the packages in said path having peripheral contact with a fixed surface thereof whereby they are rotated on their axes independently of their major revolution; means associated with said path for holding the packages out of said peripheral contact with said fixed surface, in a predetermined fraction of the length of said path to prevent them from rolling on said fixed surface; and means for varying the position of said fraction in the path.

12. A sterilizer for packaged goods comprising a shell having a package-advancing path composed of a fixed, helically directed member and an annular series of members concentric within said fixed member and rotatable about the axis thereof, the packages in said path having peripheral contact with a fixed surface thereof whereby they are rotated on their axes independently of their major revolution; means associated with said path for holding the packages out of said peripheral contact with said fixed surface, in a predetermined fraction of the length of said path to prevent them from rolling on said fixed surface; and means for varying both the length and position of said fraction.

13. A sterilizer for packaged goods comprising a shell; an inwardly extending fixed package-advancing rail within the shell and helically directed throughout its length; a reel of horizontally directed outwardly extending package-carrying rails mounted within the shell and rotatable within the fixed rail about the axis thereof, said fixed and rotatable rails constituting means for receiving and advancing the packages in a helical path through the shell; and means for holding the packages in the carrying-rails during their revolution, out of peripheral contact with a fixed surface of said path for a fraction of the length of the path to prevent them from rolling on said fixed surface.

14. A sterilizer for packaged goods comprising a shell; an inwardly extending fixed package-advancing rail within the shell and helically directed throughout its length; a reel of horizontally directed outwardly extending package-carrying rails mounted within the shell and rotatable within the fixed rail about the axis thereof, said fixed and rotatable rails constituting means for receiving and advancing the packages in a helical path through the shell; means for holding the packages in the carrying-rails during their revolution, out of peripheral contact with a fixed surface of said path for a fraction of the length of the path to prevent them from rolling on said fixed surface; and means for varying the length of said fraction.

15. A sterilizer for packaged goods comprising a shell; an inwardly extending fixed package-advancing rail within the shell and helically directed throughout its length; a reel of horizontally directed outwardly extending package-carrying rails mounted within the shell and rotatable within the fixed rail about the axis thereof, said fixed and rotatable rails constituting means for receiving and advancing the packages in a helical path through the shell; means for holding the packages in the carrying-rails during their revolution, out of peripheral contact with a fixed surface of said path for a fraction of the length of the path to prevent them from rolling on said fixed surface; and means for varying the position of said fraction in the path.

16. A sterilizer for packaged goods comprising a shell; an inwardly extending fixed package-advancing rail within the shell and helically directed throughout its length; a

reel of horizontally directed outwardly extending package-carrying rails mounted within the shell and rotatable within the fixed rail about the axis thereof, said fixed and rotatable rails constituting means for receiving and advancing the packages in a helical path through the shell; means for holding the packages in the carrying-rails during their revolution, out of peripheral contact with a fixed surface of said path for a fraction of the length of the path to prevent them from rolling on said fixed surface; and means for varying both the length and position of said fraction.

17. A sterilizer for packaged goods comprising a shell; an inwardly extending fixed package-advancing rail within the shell and helically directed throughout its length; a reel of horizontally directed package-carrying rails mounted within the shell and rotatable within the fixed rail about the axis thereof, said fixed and rotatable rails constituting means for receiving and advancing the packages in a helical path through the shell; and means for holding the packages in the carrying rails during their revolution, out of peripheral contact with a fixed surface of said path for a fraction of the length of the path to prevent them from rolling on said surface, said means consisting of a member linearly carried by the package carrying rails and adapted for slidable engagement with said packages.

18. A sterilizer for packaged goods comprising a shell; an inwardly extending fixed package-advancing rail within the shell and helically directed throughout its length; a reel of horizontally directed package-carrying rails mounted within the shell and rotatable within the fixed rail about the axis thereof, said fixed and rotatable rails constituting means for receiving and advancing the packages in a helical path through the shell; and means for holding the packages in the carrying rails during their revolution, out of peripheral contact with a fixed surface of said path for a fraction of the length of the path to prevent them from rolling on said surface, said means consisting of a plate, arcuate and resilient in cross section, linearly carried by the package carrying rails.

19. In a sterilizer of the type set forth and in combination with its fixed inwardly extending helically directed rail and its rotatable reel of horizontally directed angle-rails constituting a package-path, a package-engaging member linearly fitted to the horizontal angle rails.

20. In a sterilizer of the type set forth and in combination with its fixed inwardly extending helically directed rail and its rotatable reel of horizontally directed angle-rails constituting a package-path, a package-engaging plate, resilient in cross section linearly fitted to and lying in the horizontal angle rails.

21. In a sterilizer of the type set forth and in combination with its fixed inwardly extending helically directed rail and its rotatable reel of horizontally directed angle-rails constituting a package-path, a package-engaging plate, resilient in cross section removably and adjustably linearly fitted to and lying in the horizontal angle rails.

22. In a sterilizer of the type set forth and in combination with its fixed inwardly extending helically directed rail and its rotatable reel of horizontally directed angle-rails constituting a package-path, a package-engaging plate, resilient in cross section linearly fitted to and lying in the horizontal angle rails, said plate having one side edge slidably looped upon one leg of said rails and its other side edge free.

23. In a sterilizer of the type set forth and in combination with its fixed inwardly extending helically directed rail and its rotatable reel of horizontally directed angle-rails constituting a package-path, a package-engaging plate, resilient in cross section linearly fitted to and lying in the horizontal angle rails, said plate having a tapering front end with the point thereof lying close in the angle of said rails.

24. In a sterilizer of the type set forth and in combination with its fixed inwardly extending helically directed rail and its rotatable reel of horizontally directed angle-rails constituting a package-path, a package-engaging plate, resilient in cross section linearly fitted to and lying in the horizontal angle rails, said plate having one side edge slidably looped upon one leg of said rails and its other side edge free, and said plate having also a tapering front end with the point thereof lying close in the angle of said rails.

In testimony whereof I have signed my name to this specification.

ALBERT R. THOMPSON.