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A. R. THOMPSON

METHOD OF AND APPARATUS FOR SEPARATING LEAKS FROM TIGHT CANS

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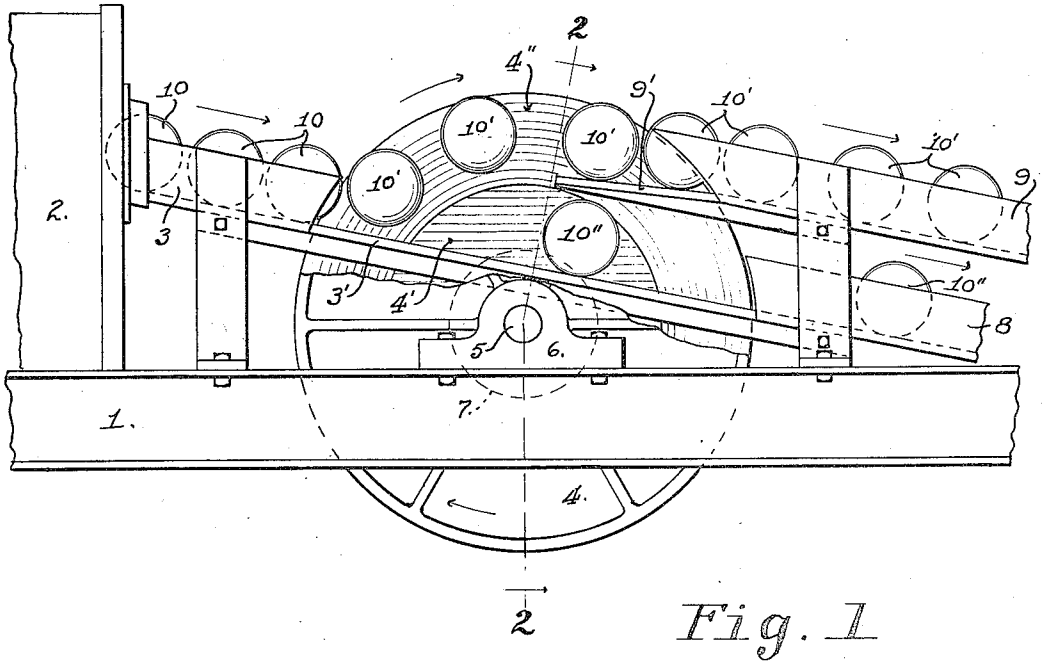


Fig. 1

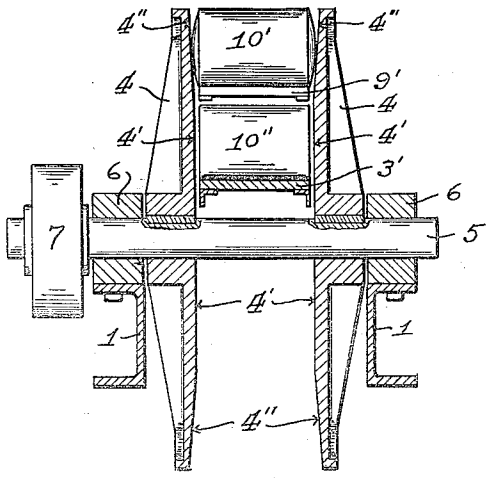


Fig. 2

INVENTOR
Albert R. Thompson
BY
Booth & Booth
ATTORNEY

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ALBERT R. THOMPSON, OF SAN JOSE, CALIFORNIA, ASSIGNOR TO ANDERSON-BARNGROVER MFG. CO., OF SAN JOSE, CALIFORNIA, A CORPORATION OF CALIFORNIA.

METHOD OF AND APPARATUS FOR SEPARATING LEAKS FROM TIGHT CANS.

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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 Methods of and Apparatus for Separating Leaks From Tight Cans, of which the following is a specification.

My invention relates, in general, to the canning art and particularly to a method of and apparatus for separating the "leaks" from the "tight" cans. My method and apparatus while adapted for the detection and separation of defective cans, known in the art as "leaks" from the perfect or "tight" cans, in which products of any nature are hermetically sealed, are especially applicable to comestible filled cans, during the heat treating or sterilizing process. By way of example, I may mention the sterilizing of milk in hermetically sealed cans, the treatment of which comprises the preheating of the cans whereby they are subjected to a gradually increasing temperature ranging from about 40° F. at which they enter the preheating effect to about 200° F. at which they leave it, and are thence conducted to the sterilizing effect. Another example is the common process known in the art as "cooking" in which sealed cans containing any food or other product are subjected to a cooking temperature and are then carried to a cooling effect. To either of these examples my method and apparatus are particularly applicable and are best utilized in the first example between the discharge of the heated cans from the preheating effect and their entrance into the sterilizing effect; and in the second example between the delivery of the heated cans from the cooking effect and their arrival in the cooling effect. These are not, however, the only examples of their application, as others will readily occur to those skilled in the canning art.

In heating product-filled sealed cans it is a fact that the ends of those cans which are preferably tight bulge quite appreciably under the heat treatment, while the ends of those cans which are not tight and which are known as "leaks" do not bulge to the same degree or do not bulge at all according to the extent of the leak. It is this fact that I take advantage of and upon which my invention is based; and which results in the separation of the "leaks" from the tight cans.

My invention, therefore, consists essentially in automatically separating the two kinds of previously heated product-filled sealed cans according to their difference due to their property of end-bulging under heat. It also consists in the successive steps of and means for first heating the cans sufficiently to provide for a normal end bulge and then automatically separating according to their difference of end bulge those cans which fully respond to a normal bulge from those which do not, the former being the tight cans and the latter the "leaks." In the accompanying drawings I show a simple apparatus for separating the "leaks" from the tight cans according to my method. It will be understood, however, that the method is not dependent upon nor confined to this apparatus, as other forms which are adapted for taking advantage of differences in size or shape may be used.

Fig. 1 of the drawings is a side elevation partly broken in the upper portion of the can-selecting member.

Fig. 2 is a section on the line 2—2 of Fig. 1.

The numeral 1 indicates supporting beams. 2, in Fig. 1, is a box or shell through which the cans pass and in which they are heated. The can advancing means within the shell and the means for applying heat are not herein shown as these may be of any character, and are well known in the canning art.

3 is a chute leading from the discharge of the shell 2.

4 is a can selecting member mounted for rotation by means of a shaft 5 journaled in boxes 6 and driven by a pulley 7, Fig. 2. The selecting member 4 comprises spaced disks, the inner opposing faces of which are parallel at their inner zones as shown at 4′ and are flared or relatively divergent at their outer zones, as shown at 4″. The floor 3′ of the chute 3 leads through between the disks, traverses their parallel-walled inner region 4′, and forms beyond said disks the floor of of the lower delivery chute 8.

An upper delivery chute 9 has its floor 9′ passing in between the disks in their flaring-walled region 4″ and terminates on a line at the base of said region about at the beginning of its upper descending quadrant. 10,

in Fig. 1, indicates the cans without distinction, as they pass from the heating shell 2 into the chute 3.

10′ are the cans which are tight and have therefore fully responded to the temperature effect by bulging their ends, as shown in Fig. 2.

10″ are the cans known as "leaks" and which have not fully responded or have not responded at all to the end bulging effect of the heat, so that their ends are not fully bulged or are not bulged at all, as shown in Fig. 2. The method carried out in this apparatus is as follows. The product-filled sealed cans are carried in continuous procession through the box 2, and are therein heated. The temperature to which they are subjected varies according to the character of the product and to the object of the treatment. For example, in processing milk, as hereinbefore stated, the cans enter the box at about 40° F. and are gradually raised to about 200° F. Under this heat, or under a temperature in excess of this, as for example, in "cooking", the ends of the tight cans appreciably bulge, while the ends of the "leaks", according to the amount of the leak, bulge to a less extent or do not bulge at all. In Fig. 1 the cans marked 10 shown coming from the heating box, may comprise all tight cans or all "leaks", or some of both kinds. When a tight can 10′ reaches the disks of the selecting member 4 it passes into the flaring outer region 4″ and on account of its bulging ends it becomes lightly wedged in said region as seen in Fig. 2 and cannot pass down therein below the functional level of the floor of the upper delivery chute 9, so that when by the rotation of the disks it reaches said floor it will pass out into said chute, as is shown in Fig. 1.

But when a "leak" 10″ reaches the disks of the selecting member 4 it will, on account of its lesser-bulging or non-bulging ends pass freely across the flaring region 4″ of the disks and will continue along the floor 3′, across the parallel inner region 4′ of the disks and across the opposite side of the flaring region and into the lower delivery chute 8, as seen in Fig. 1.

The "leaks" are thus detected and separated from the tight cans, and the latter are continuously passed to their intended destination, according to the treatment in progress.

I claim:

1. The method of separating the "leaks" from the tight, product-filled, sealed cans, comprising first exposing the cans in a heated region adapted to bulge the ends of some cans, leaving others non end-bulged; and then automatically presenting all the cans to a space closed to the passage of the end-bulged cans but open to the passage of the non end-bulged cans.

2. In the heat treatment of products confined in hermetically sealed cans, the method of separating the "leaks" from the tight cans comprising first passing a procession of cans through a heated region adapted to bulge the ends of some cans, leaving others non end-bulged; discharging the procession of cans from said heated region; and then presenting the procession of cans to a space closed to the passage of the end-bulged, cans, but open to the passage of the non end-bulged cans.

3. An apparatus for separating the "leaks" from the tight, product-filled, sealed cans, comprising means for subjecting the cans to heat adapted to bulge the ends of some cans, leaving others non-end bulged; and means coacting with the can ends adapted to form a space closed to the passage of the end-bulged cans, but open to the passage of the non end-bulged cans.

4. An apparatus for separating the "leaks" from the tight, product-filled, sealed cans, comprising means for subjecting the cans to heat adapted to bulge the ends of some cans, leaving others non-end-bulged; means for advancing the cans in procession through said heating means; means for discharging the procession of cans; and means associated with said discharging means, coacting with the can ends, adapted to form a space closed to the passage of the end bulged cans but open to the passage of the non-end bulged cans, said space automatically dividing the can procession into separate lines; and means for separately delivering said divided lines.

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

ALBERT R. THOMPSON.