

[54] **TREATING OF DISCRETE CONTAINERS**

[76] Inventor: **Hans Beckers**, Bismarckstrasse 26,
406 Viersen, Germany

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[58] **Field of Search**..... **168/47, 80;**
242/77.1; 269/37; 34/239

[56] **References Cited**

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Primary Examiner—Charles Sukalo

Attorney—Michael S. Striker

[57] **ABSTRACT**

A method and an arrangement for treating of discrete containers are disclosed. A flexible band is provided with a plurality of recesses each of which is so dimensioned that it can receive one of the containers to be treated and retain it against movement. The band is then wound up together with the containers, to form a coil and in this condition subjected to the action of the treating medium whereupon the coil is unwound and the containers are removed from their respective recesses.

11 Claims, 6 Drawing Figures

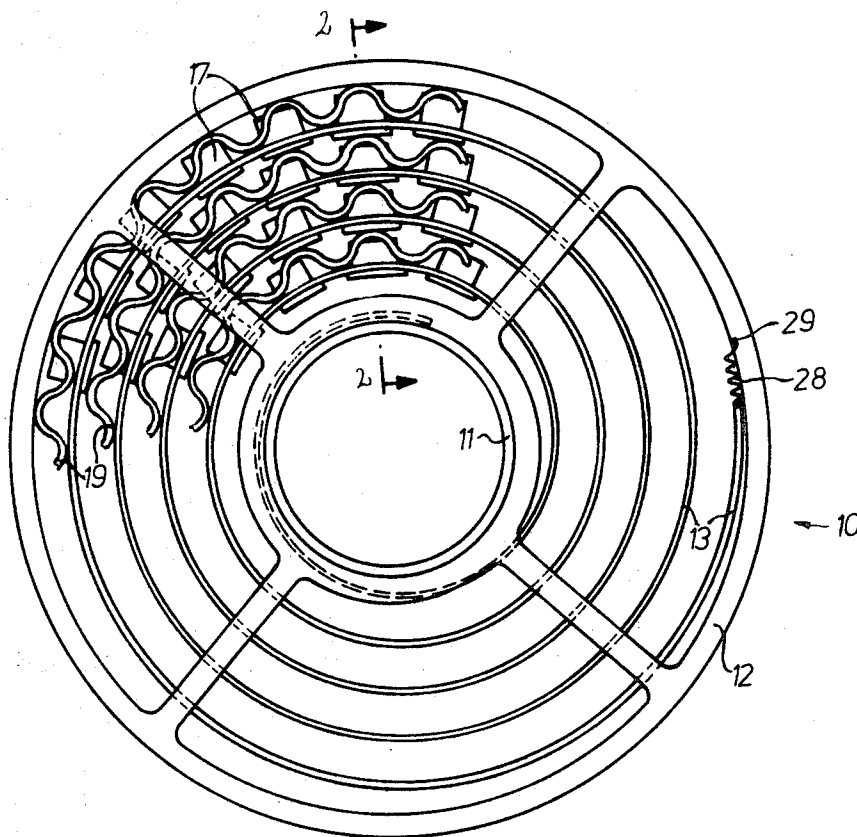


Fig. 1

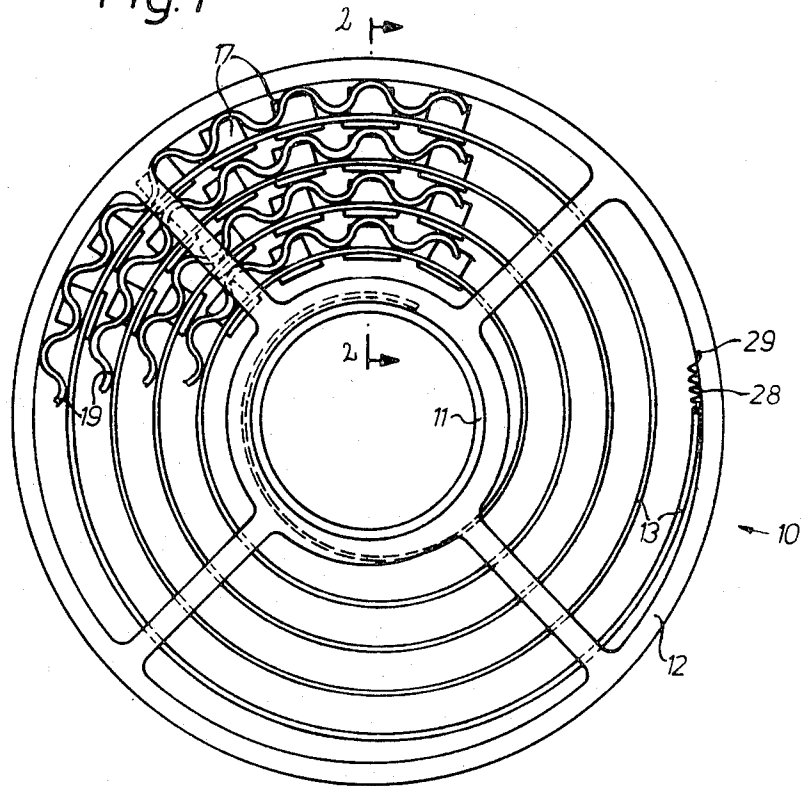


Fig. 2

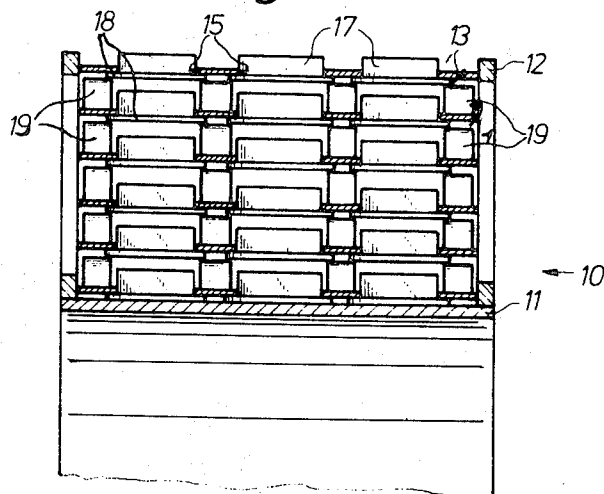


Fig. 3

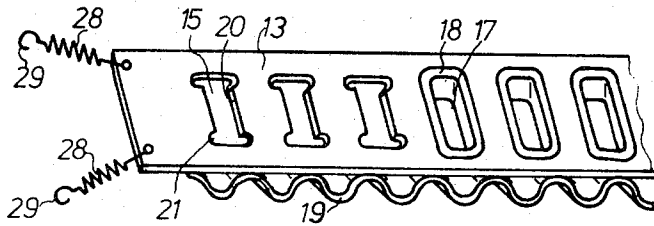


Fig. 4

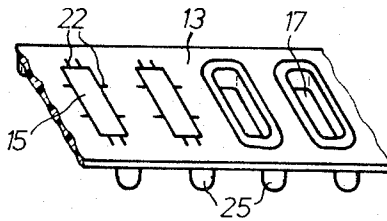


Fig. 5

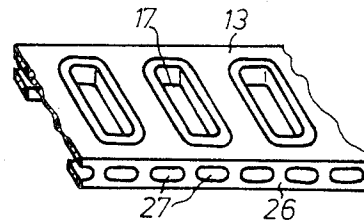
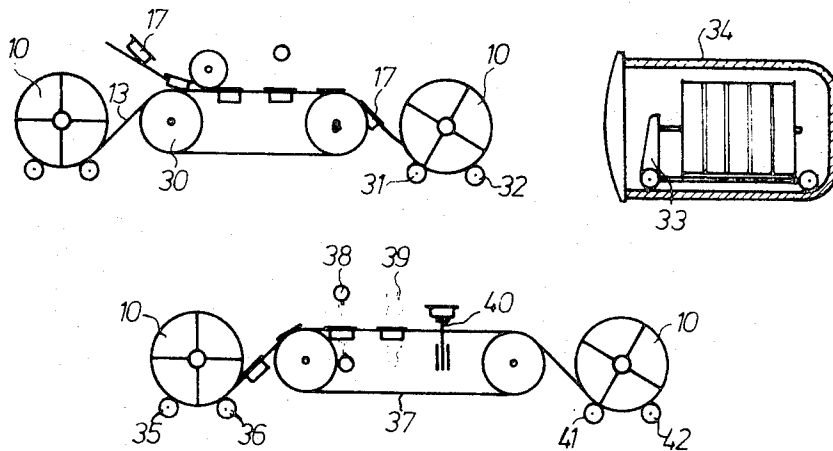


Fig. 6



TREATING OF DISCRETE CONTAINERS

BACKGROUND OF THE INVENTION

The present invention relates generally to the treating of containers, and more particularly to the thermal treatment of a plurality of individual containers simultaneously.

In certain branches of industry, particularly in the food-processing industry, it is common to dispose such goods as food in containers in which the food is to be sold. This is true, for instance in so-called "television dinners" or similar packages. Such food is of course readily spoilable and must therefore be protected against this danger. This protection is usually achieved by air tightly sealing the respective container and subjecting it to freezing or to heating, that is to a thermal treatment. If heat treatment is involved, then the containers are introduced into an autoclave where they are heated for a certain period of time at a certain temperature.

Of course given the large number of containers usually involved it is not possible to do this for each container individually and similarly it must be taken into account that autoclaves operate batchwise that is that they only treat a batch of containers at a time. In order under these circumstances to improve the efficiency of operation, it is essential that the autoclave be loaded and unloaded rapidly so that the time lost during loading and unloading between operating cycles of the autoclave will be as little as possible. For this reason it is already known to insert a plurality of containers after they are closed, into magazines or baskets which are introduced into the autoclave and which are later removed therefrom with their load of containers. The latter are then separated from one another, washed if necessary, provided with labels and/or packed in boxes or the like.

Unfortunately the insertion and removal of the containers into the baskets or magazines has been found to be somewhat less than satisfactory, because it is frequently unavoidable that the individual containers are impacted by other containers by the magazine or the basket. Such impacts frequently lead to permanent deformation of the container and sometimes even to actual destruction thereof. This is particularly true if the container is for instance made of thin aluminium foil or the like and aside from the possibility that the contents of the container might thus be permitted to escape in case of damage the very least result is that the container will appear aesthetically displeasing to the customer.

SUMMARY OF THE INVENTION

It is, accordingly, a general object of the present invention to overcome the disadvantages of the prior art.

More particularly it is an object of the present invention to provide an improved arrangement of the type here under discussion in which the disadvantages of the prior art are avoided.

A concomitant object of the invention is to provide a method of treating such containers utilizing the novel arrangement.

In pursuance of these and other objects which will become apparent hereafter one feature of the invention resides in an arrangement for treating of discrete containers particularly for thermal treatment thereof. The arrangement comprises an elongated flexible band pro-

vided with a plurality of recesses each dimensioned to receive at least one container to be treated and to retain it against movement. Winding means is provided for winding the band with the respective containers into the shape of a coil for exposure to a treating medium.

With this arrangement the containers can be readily inserted and removed from their respective recesses in the band without danger of impacting or with at least significantly reduced danger thereof. Moreover the coil is of course cylindrical configuration and is thus well adapted to the configuration of the usually cylindrical interior chamber of an autoclave in which it can be readily accommodated. The containers are held spaced from one another and without any chance of relative displacement so that no damage to them is to be anticipated.

It is particularly advantageous, according to further concept of the invention if the band is provided with spacing elements whose height in combination with the thickness of the band is greater than the height of the individual containers because in this manner a maximum exposure of the respective container to contact the treating medium for instance steam or hot water is assured so that the contents of the container can be rapidly heated to the necessary sterilization temperature.

This is also true, of course if (instead of heating) the containers and their contents are subjected to cooling, for instance of the contents are to be deep-frozen.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself however, both as to its objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawing.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 illustrates an arrangement according to one embodiment of the present invention in end-elevational view;

FIG. 2 is a fragmentary section of FIG. 1, taken on line 2—2 of FIG. 1;

FIG. 3 is a fragmentary perspective detail view of a portion of a band utilized in the embodiment of FIG. 1;

FIG. 4 is similar to FIG. 3 but illustrating a further embodiment of the present invention;

FIG. 5 is similar to FIG. 4, illustrating yet another embodiment of the invention; and

FIG. 6 is a simplified diagrammatic view of an installation for carrying out method according to the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Discussing the drawing now in detail, and firstly FIGS. 1—3, it will be seen that a drum or takeup 10 is provided which in the illustrated embodiment is composed of a tubular shaft 11 and two flanges 12 spaced axially of the shaft 11 and secured thereto. The flanges 12 are provided with a large-dimensioned cut-Outs for two reasons, namely in order to facilitate access of the treating medium to a coil wound onto the takeup 10 and to reduce the weight of the latter.

Wound onto the shaft 11 intermediate the flanges 12 is a flexible band 13 the width of which in this distance

corresponds to the spacing between the two flanges 12. Band 13 is provided with recesses, for instance cut-outs 15, in each of which there is inserted an already closed container 17 containing food or some other substance to be treated. In this particular embodiment the containers 17 have a laterally projecting flange 18 which engages one major surface of the band 13. At the other major surface the band 13 is provided in its marginal regions and in the regions intermediate the cut-outs 15 with spacing means in the illustrated embodiment in the form of corrugated strips 19 which extend over the entire length of the band 13. The crests of the corrugations of the strips 19 are connected to the band 13 in suitable manner for instance by welding or in any other desired manner obvious to those skilled in the art. The height of the corrugations of strips 19, in conjunction with the thickness of the band 13 itself is greater than the height of the containers 17, with the result that the individual containers do not contact one another and are exposed to the maximum extent to contact with the treating medium. The length of the individual corrugations is smaller than the on-center spacing between the successive cut-outs 15.

It will be seen that the configuration of the strips 19 is such or that the strips 19 are so arranged on the band 13 that they engage that side of the respective flange 18 which faces away from the band 13 so that the containers 17 are held in the cut-outs 15 without any freedom of displacement.

The band 13 is provided with three laterally adjacent rows of cut-outs 15 each of which can accommodate one of the containers 17. The spacing between the cut-outs 15 is so selected that in longitudinal direction of the band 13 there will be a sufficiently large flow-through cross section for a treating medium between the containers 18 and also between the flanges 18 thereof. The distance between the three rows of cut-outs 15 is selected with similar considerations in mind. The treating medium may for instance be steam or water if high temperature thermal treatment is required.

As the drawing shows, the outline of the cut-outs 15 corresponds essentially to the outline of containers 17 in the region of their flange 18. In FIG. 3 the outline is shown as being a rectangle 20 with receding corner portions 21 but the configuration could be different for instance in FIG. 4 the cut-outs 15 are of slightly smaller outline than the cross-section of the containers 17 in the region of the flange 18 and here the band is provided with incisions 22 extending from the boundaries of the cut-outs 15 into the band so that insertion of the respective containers 17 into an associated recess or cut-out 15 results in bending of the band 13 in the region of the cut-out 15, so that the container is clampingly retained therein by the flexible resistance of the band. FIG. 3 shows that the end of the band 13 is provided with springs 28 and hooks 29 which can be engaged in holes provided in the take-up 10 for this purpose.

In FIG. 4 the spacing means are shown to be different than in the preceding Figures namely in form of projections or feet 25 provided in rows on one major surface of the band 13 and having a spacing from one another which is smaller than the on-center spacing of successive cut-outs 15.

FIG. 5 shows still a further possibility for the spacing means namely here the spacing means is provided in

form of thick sheet material strips 26 with openings 27, but here care must be taken that the material 26 is very readily bendable or flexible.

In operation the band 13 is unwound from a reel 10 with a device 30 as shown in FIG. 6. Containers 17 are inserted into the respective cut-outs 15 and the band 13 with the thus inserted containers 17 is wound onto a second reel or take-up 10 which is supported on frictional payoff roller-supports 31 and 32 and is turned by the same. The resulting coil (see also FIG. 1) is then placed either individually or in conjunction with other similar coils, onto a carriage 33 which takes them to an auto-clave 34 as shown in FIG. 6. In the autoclave, the coil or coils undergoes the necessary sterilization, whereupon after cooling in the autoclave, the coil or coils are removed therefrom and deposited individually on another or the same pair or roller supports 35, 36. The free end of the band 13 is now engaged with the reel 10 and the coil is unreeling with the containers 17 still retained in their respective cut-outs of the band 13. Unreeling takes place by the device 37 which passes the band 13 with the containers 17 through a path in which the containers are washed at 38 dried at 39 and ejected by a device 40 from their respective cut-outs 15. The thus "unloaded" band 13 is taken up on a reel 13 which is supported on a pair of roller-supports 41 and 42 and is driven by the same.

It is clearly evident that the present invention is equally suitable not only for autoclaving but also for other treatments for instance deep freezing in which the containers 17 held on the band 13 which is formed into a coil are exposed to a gas at requisite temperature in a cooling chamber so that rapid freezing of the contents of the containers 17 will take place.

It will be understood that each of the elements described above or two or more together may also find a useful application in other types of applications, differing from the types described above.

While the invention has been illustrated and described as embodied in the treating of individual containers, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

Without further analyses, the foregoing will so fully reveal the gist of the present invention that others can be applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What is claimed as new and desired to be protected by Letters Patent is set forth in the appended.

1. In an arrangement for treating of discrete containers particularly for thermal treatment thereof a combination comprising an elongated flexible band provided with a plurality of recesses each dimensioned to receive at least one container to be treated and to retain it against movement; and winding means for winding said band with be respective containers into the shape of a coil for exposure to a treating medium.

2. In an arrangement as defined in claim 1; said containers having a certain height and said band having a certain thickness smaller than said height and further comprising spacing means for interposition between

respective convolutions of said coil and having a thickness at least equal to the difference between the height of said containers and the thickness of said band.

3. In an arrangement as defined in claim 2 said band having two major surfaces; and wherein said spacing means is provided on one of said major surfaces.

4. In an arrangement as defined in claim 2 said spacing means comprises spacing projection.

5. In an arrangement as defined in claim 2 said spacing means comprising corrugated strips of sheet material extended in parallelism with said band and having alternating depressions and crests of which the latter are connected with said band; successive ones of said recesses having on-center spacing of predetermined length and the height of the respective corrugated being smaller than said oncenter spacing.

6. In an arrangement as defined in claim 2, said containers having outwardly extending flanges; and wherein said spacing means engages said flanges at a side thereof which faces away from said band.

7. In an arrangement as defined in claim 1, wherein

said recesses have outers corresponding to those of the containers to be received in them.

8. In an arrangement as defined in claim 1 said containers having outwardly extending flanges and wherein said recesses have outlines corresponding substantially to those of the containers so that the latter are receivable in said recesses with the respective flanges contacting said band.

9. In an arrangement as defined in claim 1, wherein said recesses have outlines which are slightly smaller than those of the containers to be received and further comprising incisions in said band extending outwardly away from the respective recesses.

10. In an arrangement as defined in claim 1, said winding means comprising a rotatable shaft with a pair of axially spaced flanges mounted on said shaft and between which said band is to be convaluted about said shaft.

11. In an arrangement as defined in claim 10 further comprising large-area cut-outs provided in said flanges.

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