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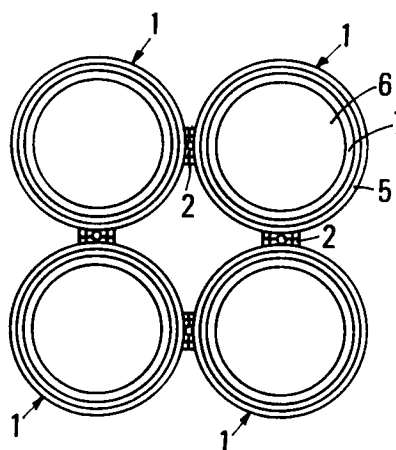
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I-20123 Milano(IT)(54) **Multiple-cap package for a group of containers, e.g. cans.**

(57) Multiple-cap packaging for cans, cups and the like, which comprises a plurality of caps which are mutually interconnected by means of at least two breakable connecting portions and can be applied in a snap-together manner at the top of a respective container. The caps can be individually removed by tearing, together with their respective container, from the rest of the package and can act as removable cover for the container so as to ensure hygienic protection against dust and dirt. The package can be applied by means of a packaging machine which comprises a supporting structure, a sliding pathway along which the filled and sealed cans move in sequence so that their opening end is directed upwards, and pressure applicator means suitable for applying in a snap-together manner, on each can moving underneath, a cap included in a planar modular web or in a continuous strip fed between the applicator means and the cans.

*FIG. 1***EP 0 493 743 A2**

The present invention relates to a multiple-cap package particularly for containers, such as cans, cups and the like.

A wide variety of packaging structures made of plastic material is currently used to clasp and hold together a plurality of cans, boxes or the like which contain products, either food products, such as beverages and solid or semisolid food, or other kinds of products, such as lubricating oils and/or greases.

However, there is the need, especially in the foodstuff sector, of protecting the upper part of a can or cup in order to make it possible both to protect its upper part against depositions of impurities following long storage times, transport and the like handling operations, and to preserve the hygienic and organoleptic characteristics of the product contained in the cans or cups even after the cans or cups have been opened.

Packaging structures of plastic material for containers of products to be marketed are generally aimed exclusively at solving strictly packaging-related problems, i.e. at holding together a certain number of containers, which are thus packaged, that is they constitute a single pack or group for handling and transport purposes. When no use is made of full wrapping by means of sheets made of welded polyethylene or the like, one resorts sometimes to cellular or honeycomb coverings designed to be placed over, and to engage with the top of cans and the like, so as to hold them packaged together. This type of package is frequently adopted especially for cans of non-alcoholic beverages.

Such a package, however, ensures no protection against dirt on the upper surface of the can once the latter has been removed from the pack or group in which it has been packaged.

A real problem also exists in securing hygienic protection to the contents of the can once it has been opened. This is particularly important in the case of edible products or even of non-edible easily perishable products.

Finally, the market increasingly demands cheaper packaging structures which are as compact as possible, i.e. make it possible to save plastic material and contribute to mitigate the ecological problems connected to waste disposal and possible recycling.

The aim of the present invention is to eliminate or substantially reduce the disadvantages described above by providing a multiple-cap packaging structure for containers, such as cans, cups and the like, which protects said packaged cans and/or cups against external agents both during storage and transport and after the removal or separation of each individual can from a packaged pack or group of containers and even after said can

and/or carton have been opened.

Another object of the present invention is to provide a packaging structure which has characteristics of practicality and efficiency features far superior than those of currently used packages and is relatively simple to manufacture at competitive costs.

A further object of the present invention is to provide a packaging machine for automatically applying a multiple-cap structure to groups of cans or of other sealed containers which are sequentially moved stepwise at the operating speed of a filling and packaging apparatus.

Another object of the present invention is to provide a particularly simple and reliable packaging machine, suitable to be included in a plant for filling and packaging cans and can be obtained at low manufacturing costs.

According to a first aspect of the present invention, there is provided a packaging structure, particularly for containers such as cans, cups and the like, characterized in that it comprises a plurality of caps which are connected to one another by means of at least two breakable connecting portions and can be applied in a snap-together manner at the top of a respective container, so that the structure is suitable for clasp and holding together a plurality of containers for their transport and storage, whereas said caps can be individually removed by tearing them off the structure together with their respective container and are suitable for acting as removable cover for the top of said container.

According to another aspect of the present invention, there is provided a packaging machine particularly for cans containing beverages, which comprises a supporting structure, a sliding pathway along which filled and sealed cans are fed and move in sequence so that their opening end is accessible from outside said sliding pathway, pressing means which are intended to act on the side of the opening end of the cans moving along the sliding pathway and arranged to apply in a snap-together manner on each of said cans a respective cap integral with a planar modular web or in a continuous strip fed between the pressing means and the cans on the pathway, so that each portion of web or strip keeps a plurality of cans mutually connected and individually capped and protected.

Advantageously, the packaging machine is provided with separator means which are suitable for acting according to a preset timing in order to separate lengths of web or strip, each of which includes a preset number of caps already applied to a respective can.

Further characteristics and advantages of the invention will become better apparent from the

following detailed description of some embodiments thereof, illustrated with reference to the accompanying drawings, wherein:

figure 1 is a plan view of a package structure according to the invention;

figure 2 is a side elevation view of the package structure of figure 1;

figure 3 is a partial sectional view on an enlarged scale taken along the line III-III of figure 1;

figure 4 is a schematic plan view of a first embodiment of a packaging machine according to the invention, operating in a stepwise manner;

figure 5 is a side elevation view of another embodiment of a continuously-operating packaging machine according to the invention;

figure 6 is a top view of a strip of caps which can be fed to the packaging machine of figure 5;

figure 7 is a side or profile view of the length of strip of figure 6;

figure 8 is a front view of a cap-forcing cylinder provided with impressions;

figure 9 is a partly sectional view, taken along the line IX-IX of figure 8;

figure 10 is a schematic front elevation view of a modification of the packaging machine of figure 5;

figure 11 is a plan view of figure 10;

figure 12 shows a detail of a separating cylinder of the machine of figures 10 and 11;

figure 13 shows a detail of a modification of the separating cylinder; and

figure 14 is a side view, with parts in cross-section, of another separating cylinder.

In the figures of the drawings, identical or similar parts or components have been designated by the same reference numerals.

With reference to figures 1 to 3, a packaging structure for containers such as cans, cups and the like comprises a plurality of caps 1, each of which is interconnected to adjacent caps by two or more breakable portions 2. Each portion is arranged in a bridge-like manner between a pair of caps 1 and has a weakened area 3 which is affected for example by the presence of at least one notch, hole or similar weakening means which ensures its being torn off.

Each cap 1 is constituted by an upper lid-like portion 4 and by a lower collar-shaped portion 5. The lid-like portion is provided with a central planar part 6 which is surrounded by an annular depression 7 which is in turn surrounded by a hollow rim 8 arranged to be seated on a raised peripheral rim of the top of a can or tin to be covered. The rim 8 ends peripherally and downwardly with an inwardly directed portion 9 which acts as a partly undercut abutment element for a good grip against the lateral wall of the can or tin to be covered.

The collar-shaped portion 5 constitutes a downward extension of the upper portion and follows a downwardly flared truncated-cone arrangement in its idle position, i.e. when not in engagement with a can, whereas it takes a cylindrical configuration, which adheres tightly to the body of the can or tin in its active position on a can or tin due to the intense clamping action exerted by the inwardly directed portion 9 against the container.

Each collar-shaped portion 5 has, as mentioned above, one or more portions 2 at its lower edge which protrude in a cantilever manner and are integral with a respective adjacent cap.

The annular depression 7 provided in each cap allows a more stable stacking of a plurality of units or groups of packaged cans or tins to be obtained, since the lower edge of each can is able to snugly fit in a corresponding depression of an underlying cap.

It will be seen that a package structure such as that described above can be applied in a snap-together manner, even automatically, to groups of tins or cans while being shipped after the same have been filled with a liquid, such as cans containing non-alcoholic or alcoholic beverages. In such a case, the package structure according to the invention, besides conveniently protecting against deposition of dirt during long storage periods, to transport and weather exposure in general the upper surface used to sip the beverage from the can, since the outlet of the beverage is provided therein, advantageously it also acts as hygienic protection, even after the seal of said can has been removed, to prevent foreign bodies or contaminants from reaching said beverage in it.

When the user removes a can or tin from a group packaged with the structure according to the invention, he tears in fact the connecting portion or portions 2 of the cap. The cap, however, remains inserted in position on the can to act as removable cap for the can. Thus, the user will thus find a clean upper can surface from which he can drink, and can keep it clean by placing the cap back on the can for the sipping if, as often occurs, not all the content has been consumed.

Figure 4 illustrates an embodiment of a packaging machine according to the invention, generally designated by the reference numeral 10, which comprises two parallel pathways 12 and 13 above which a rotatable structure with four arms or with a platform-like structure 14 extends. Said platform 14 can be preset to rotate by steps of a quarter turn each and to lower and raise every time in order to take from a pathway, for example the pathway 12, a web or strip of caps which can have the configuration illustrated in figures 6 and 7, transfer it above the other pathway 13 and force-fit all the caps present in the web or strip onto the opening end of

the same number of cans located on the pathway 13 below the platform 14.

To this end, the platform 14 is provided with grip and retention means, generally designated by the reference numeral 15, for the webs or strips, which are arranged so as to be angularly offset by 90 or 180 degrees with respect to one another below the platform. The grip and retention means can for example comprise a plurality of suckers.

As will be seen, along the pathway 13, ahead of the platform 14, it is advantageously possible to provide a gather station, generally designated by a barrier 16, against which the cans gather or pack in an orderly manner before being forwarded below the platform 14 to be capped. Each of the pathways 12 and 13 can, if required, be constituted by a stepping conveyor belt which respectively supplies a web or strip or an ordered pack or group of cans below the platform 14 according to a preset timing which is correlated to the partial rotation steps of said platform.

With reference to figures 5 to 9, a supporting structure 17 is illustrated wherein a sliding pathway 13 is supported; said pathway is constituted for example by a belt conveyor. The conveyor belt 13 can slide along a fixed planar bed or on rollers 18 and is designed to supply in sequence a plurality of filled and sealed cans 19 whose opening end is directed for example upward and can be reached from above.

An applicator roller 20 is rotatably mounted above the conveyor 13 and its rotation axis is parallel to the lying plane of the belt 13 and perpendicular to the advancement direction of said belt. The roller 20 is supported at such a level that its peripheral surface makes, or almost makes, contact with the opening top or end of the cans 19 passing below it on the conveyor belt 13.

One or more, for example three, continuous side-by-side strips 22 are fed between the roller 20 and the cans 19 on the conveyor belt 13, and each strip is formed by an orderly sequence of caps 23 which are arranged mutually side by side and are held together by tapered and weakened portions 24 or 24a. The or each strip 12, by passing between the cans 19 and the roller 20, is pressed against said cans, so that each cap 17 inserts itself in a snap-together manner on the opening top or end of a respective underlying can and thus the strip remains rigidly associated with the cans which in turn are grouped and held together by the strip.

As shown in figure 5, the applicator roller 20 can be advantageously mounted on a supporting frame 25 so that it can yield, for example because the frame 25 has an end pivoted at 26 to the supporting structure 17 and its other end rigidly associated (with the possibility of performing small sliding movements) with sleeves 27 which can slide

on uprights 28 and are loaded by supporting springs 29, in order to prevent the strip or strips 16 from being damaged in case of failed or incorrect mating or centering between the caps 19 and the cans.

If required, the strip 22 can be guided toward the roller 20 by a guiding cylinder 30 which can be an idle roller.

A short supporting plane 31 can be advantageously provided at the applicator roller 20 and below the conveyor belt 13 if said conveyor belt runs on rollers 18; said supporting plane can be fixed, for example if the roller 20 is supported in a yielding manner so as to move upwards, or can be supported so that it can resiliently yield downwards.

As illustrated in figures 8 and 9, the lateral surface of the applicator roller 20 can be machined and have a plurality of recesses or seats 33 and 34 for temporary accommodation of the caps 23 and of the weakened portions 24, respectively, before and during their application to the cans, so as to ensure a controlled and centered feeding movement of the strip or strips 22.

According to a preferred modification, the applicator roller 20 can have a plurality of lateral centering pins 21 which are angularly distributed in a uniform manner at its ends and, if required, in one or more intermediate positions thereof; said pins are designed to engage respective rows of holes in the or each strip 22 for centering and correct traction of said strip (figure 12).

Downstream of the applicator roller 20 a separator unit, generally designated by the reference numeral 35 (figures 10 to 13) can be provided, which is designed to divide the or each strip 22, once applied and firmly anchored to the cans, into a plurality of "packs" with two or more cans capped by the same number of caps 23 mutually connected by one or more tapered portions 24 which can be broken by tearing. The separator unit 35 can comprise a drum 31 from whose cylindrical surface a plurality of cutting elements 36 protrude which are mutually angularly spaced according to a preset pitch. The cutting elements 36 are intended to press downward and tear or cut tapered portions 34 so as to divide each strip 22 into segments comprising a preset number of caps 23 which, together with the respective cans, form a pack.

If required, the drum 35 can also be provided with longitudinal cutting elements (not illustrated), i.e. with cutting elements arranged annularly and/or according to a preset pitch around its peripheral region in order to cut weakened portions 24 like the elements 36.

Figure 14 is a view of a specific example of separator drum 35 with cutting elements 37 which can be retracted into the drum, for example be-

cause they can be actuated by a respective solenoid 38 which is energized by positioning contacts provided on a fixed internal cylinder 40.

The drum 35 is actuated for example by means of a gear actuated by the same source of motion (not illustrated), for example a gearmotor, which causes the belt 10 to move forward and the applicator roller 20 to rotate. Furthermore, the drum 35 can be advantageously supported so that its height can be adjusted (figure 10) by means of handwheels 42 which are designed to actuate a screw-and-nut device 43 for supporting said drum.

By means of a packaging machine such as those described above it is thus possible to automatically apply a plurality of mutually connected caps to the same number of cans or other similar containers which advance along a packaging apparatus or line, so that said cans remain grouped and held together until they are used. The caps are applied to the cans in a controlled manner in step with the advancement of said cans without creating problems.

Detection means can be provided, i.g. micro-switches, which can stop the packaging machine in case of jam and redirect the incoming cans elsewhere, or can stop the entire packaging apparatus. Thus, it is possible to provide sensors near the sleeves 27, which generate an alarm signal or stop the machine if the roller 20 is raised above a certain preset level as a consequence of the caps in the strips 22 not being centered on the cans.

The machine described above is susceptible to numerous modifications and variations within the scope as defined by the following claims.

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the scope of each element identified by way of example by such reference signs.

Claims

1. Package structure particularly for containers, such as cans and the like, characterized in that it comprises a plurality of caps which are connected to one another by means of at least two breakable connecting portions and can be applied in a snap-together manner at the top of a respective container, so that the structure is suitable for grouping and holding together a plurality of containers for their transport and storage, whereas said caps can be individually removed by tearing them off the structure together with their respective container and are suitable for acting as removable cover for the

top of said container.

2. Package structure according to claim 1, characterized in that said breakable portions are affected by at least one hole, notch or similar weakening means in order to allow their separation by tearing.
3. Package structure according to claim 1 or 2, characterized in that each cap comprises an upper lid-like portion which has a central flat surface surrounded by a depression which is in turn surrounded by a hollow rim for receiving and engaging the raised rim of the container and terminates below said raised rim with an undercut portion, and a collar-shaped portion which constitutes an extension of the undercut portion and has, at its free edge, at least two breakable portions for connection to adjacent caps.
4. Machine for packaging cans and the like by means of a package structure according to any one of the preceding claims, comprising a support, a sliding pathway along which the filled and sealed cans are fed and move in sequence so that their opening end can be accessed from outside the sliding pathway, pressure applicator means designed to act on the side of the opening end of the cans which move along the sliding pathway and are suitable for applying in a snap-together manner, on each of said cans, a respective cap included in a planar modular web or in a continuous strip fed between the applicator means and the cans on the pathway, so that each portion of web or strip keeps a plurality of cans mutually connected and individually capped and protected.
5. Packaging machine according to claim 4, characterized in that it comprises separator means which are arranged downstream of said applicator means and are suitable for acting according to a preset timing in order to separate web or strip portions, each of which includes a preset number of caps already applied to a respective can.
6. Packaging machine according to claim 4 or 5, characterized in that said pressure applicator means comprise a structure which can rotate and be raised and lowered and is provided with arms or with a cantilever platform, grip and retention means carried by said rotatable structure and distributed thereon in at least two angularly spaced positions, means for feeding strips or webs of caps arranged on the side

opposite to the can sliding pathway, so that the grip and retention means are suitable for removing at least one sheet or web delivered by the feeder means, for transferring it above a plurality of cans on the sliding pathway and for applying it thereon by pressure, so that each can is forced onto a respective can. 5

7. Machine according to claim 6, characterized in that said grip and retention means comprise a plurality of suckers. 10

8. Machine according to claim 4 or 5, characterized in that said pressure applicator means comprise at least one roller which is mounted so as to be able to rotate and is elastically loaded above said sliding pathway in order to press onto said cans caps which are included in at least one continuous strip. 15

9. Machine according to claim 8, characterized in that said roller has a plurality of recesses on its outer surface for accommodating and centering the caps during application to the cans. 20

10. Machine according to any one of the preceding claims 5 to 9, characterized in that said separator means comprise a drum or roller which is rotatably mounted above the sliding pathway and is provided with longitudinal and/or radial protruding cutting elements which are suitable for acting according to preset pitches on the weakening, regions provided between one cap and the other. 25 30

11. Machine according to claim 10, characterized in that said protruding elements are retractable and can be actuated by actuation means. 35

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FIG. 2

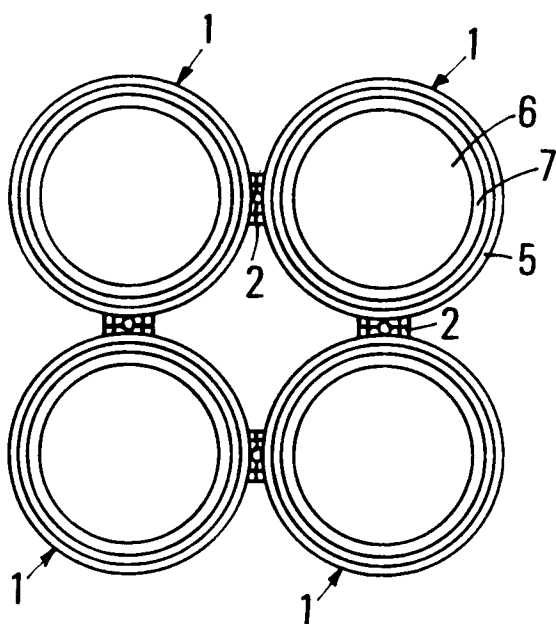
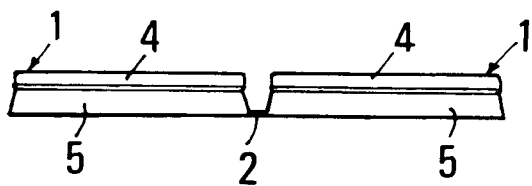


FIG. 1

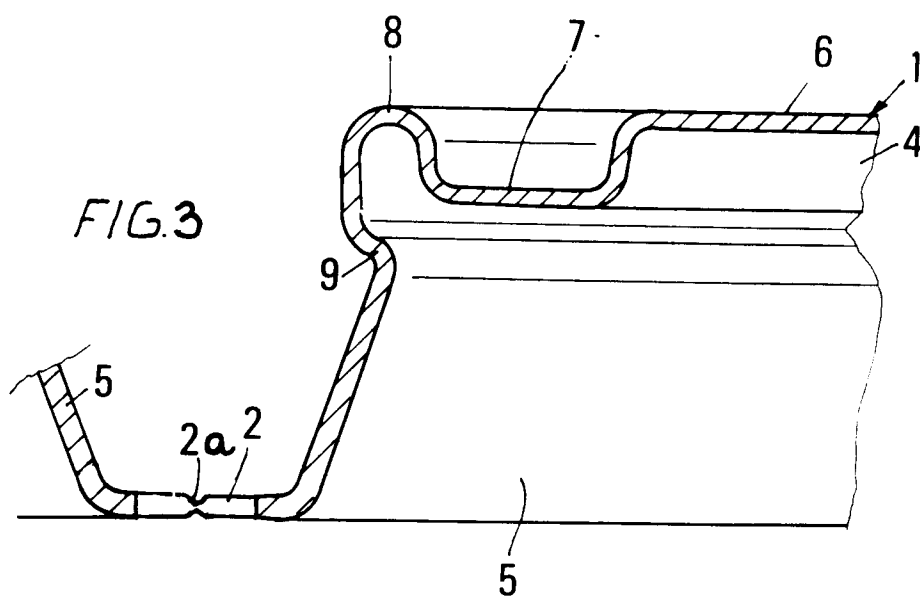


FIG. 3

