Nov. 28, 1967 C. A. DOETS 3,354,602

METHOD FOR PACKING FOR BOTTLES AND THE LIKE

Filed Aug. 14, 1963

Fig. 1

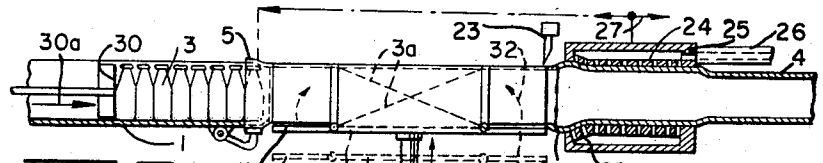


Fig. 2.

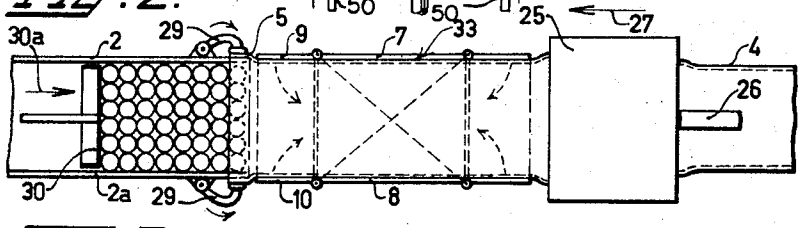


Fig. 3.

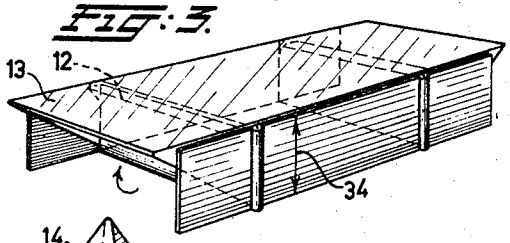


Fig. 4.

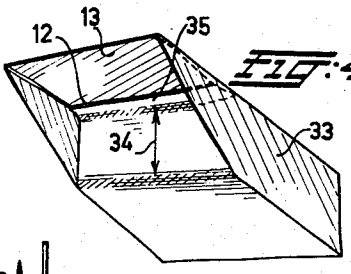


Fig. 5.

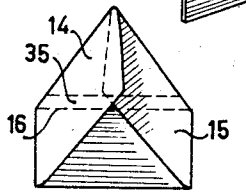


Fig. 6.

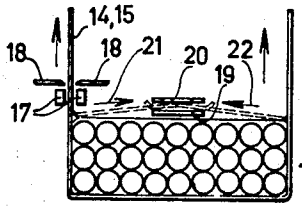


Fig. 8.

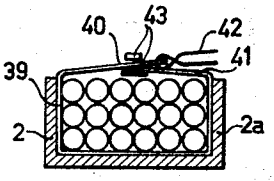


Fig. 7a.

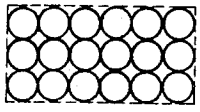


Fig. 7b.

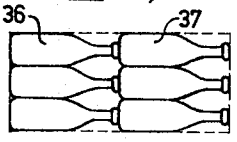


Fig. 9.

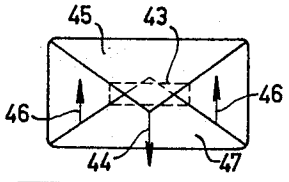
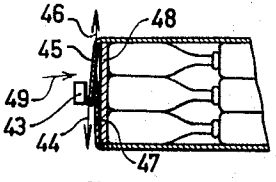


Fig. 10.



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METHOD FOR PACKING FOR BOTTLES AND THE LIKE

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1 Claim. (Cl. 53—30)

The invention relates to a packing for bottles and breakable articles which are to be packed so as to be substantially prevented from striking against each other, wherein the substantially uniform articles are bundlewise arranged in such a way that their parallel sides contact each other and the whole is surrounded by a flexible plastic envelope e.g. of polyethylene.

It is usual to despatch bottles and such breakable articles, as they are manufactured in mass production from glass or ceramic material, in boxes or cases, in which the articles may be separated by elastic intermediate layers. The packing itself and the packaging are proportionally expensive, especially in the event of despatch and storage of empty bottles and the like by the factory. In general the packing is indeed destined for repeated use but the cost of collecting, returning and storing the packing material is too high and this would involve too much storage accommodation and too much clerical work, so that it does not pay to return the package.

It has been proposed already to bundle bottles by means of a metal wire which was wound around the bundle and tightened, as breakage in transit is substantially due to the fact that the bottles strike against each other.

It has further been suggested already to accommodate such a bundle tightened by means of wire in a plastic bag e.g. polyethylene bag.

It is an object of the invention to obviate the disadvantages which are experienced in that bundling by wire and subsequently enveloping the bundle by a bag is still rather cumbersome, while moreover when a wire would break the bundle would disintegrate owing to which the protection against breakage for the other bottles would practically be lost.

It is a further object of the invention to bound up the bundle by the plastic foil itself in such a way, that it replaces bounding wire and prevents the articles from sliding from the bundle in a longitudinal direction.

The invention is partially based on the understanding that foils made of a plastic, like polyethylene, due to their flexibility, elastical properties and tensile strength, are not only fit to provide a protective envelope but moreover are capable of constituting a substitute for the conventional hard packings for loose breakable articles like bottles, since a packing made thereof and fitting tightly around the bundle holds the bundlewise arranged articles together in a way sufficient to constitute portable and especially stacking parcels, the risk of breakage being avoided. Although the possibility of a minor mutual sliding of the articles and the appearance of a certain clearance at varying locations between the articles and in a cross direction of the bundle is often not to be avoided in transit, it is an important object of the invention to provide for a packing made of flexible material, wherein however the shape of the bundle is essentially maintained due to the fitting shape of the parcel and that to such an extent that the parcels can be lifted by both ends and conveyed and stacked one upon the other.

These and other objects of the invention and the manner in which they are obtained will follow from the specification hereinafter referring to the drawing.

In the drawing:

FIG. 1 represents diagrammatically a side elevation of a packing device for bottles;

FIG. 2 represents a plan view of the device according to FIG. 1;

FIG. 3 shows a perspective view of a package which is being closed, and a part of the table;

FIG. 4 is a perspective bottom view of the package;

FIG. 5 is an end view after the continued folding process for closing the open ends of the package;

FIG. 6 is a side elevation in which the welding of the closure is clarified;

FIG. 7*a* and 7*b* show in end view and in side elevation, respectively, another possibility for arranging the bottles bundlewise;

FIG. 8 is a cross section through a bundle of bottles according to which a modified manner of closing the package for such a bundle is clarified;

FIG. 9 shows an end view of a modification of this package, and

FIG. 10 is a longitudinal section of the package according to FIG. 9 in which the sealing means is indicated.

According to FIG. 1 a number of bottles **3** is disposed on the bottom of a trough **1**, the side walls of which are denoted by **2** and **2***a* in FIG. 2. In this example this number consists of 48 bottles, arranged in a quadrangular configuration, which are to be bundled, the width of the trough corresponding with the width of the bundle. The end of a plastic tube **4** is slid over a short distance along the mouth of the trough. In front of the mouth of the trough is the endless tube **4** which is guided by a likewise trough shaped table having a bottom **6** and upright walls **7** and **8**. The tube together with means to be described hereinafter is moved forward to the trough **1**, **2**, **2***a*. On comparing the cross section at the right in the figures with the cross section of the tube portion **5** slidden along the mouth, it will be seen that the tube has been stretched so as to permit same of spanning round the mouth of the trough. When now the array of bottles **3** by means of the piston **30** is slid on the table in the direction of the arrow **30***a* and into the tube **4**, the latter will span round the group of bottles, so that these bottles, in a direction perpendicular to the contacting parallel sides of the bottles, will laterally press one against another, the pressure also being exerted in a longitudinal direction between the upper and lower face of the group. This group is placed in the central part of the table **6** and is indicated in this position by the dotted diagonal **3***a*. The tube end in front of the mouth of the trough can be cut through prior to or during the insertion of the group by means of the knife **23**. An abutment for the final position of the bottle group **3***a* can be provided in the way that the bottom end **31** of the table **6** is capable of being folded upwardly through 90° in the direction of the arrow **32**, for instance by means of a thrust element **50**. The same movement initiates the folding of the tube ends for the closure of the package.

After the insertion of the bottle group **3***a*, the bottom flap **11** on the other end of the table **6** is moved upwardly into the position as represented in FIG. 3. The dimensions can be chosen in such manner that on moving the flap upwardly the plastic foil is simultaneously pulled and stretched. If need be, the flap **11** can be replaced by a rising sliding member, the latter can be additionally provided.

In FIG. 4 the shape of the package as produced now is perspectively viewed from below and on the left end, since the progress of the process on the right end takes place in the same way and does not need any further explanation. The free length of the envelope **33** which protrudes beyond the ends of the bundle **3***a* of bottles,

the said envelope being formed by cutting off a part of the endless tube **4**, is chosen in such a way that same is greater than the height **34** of the bundle. Thus the edge **12** of the free length, which will be folded upwardly along said height of the bundle, on the entire width of the bundle rests against the portion **13** of the envelope which is left by a small strip **35**. When now the end flaps **9** and **10**, which are visible in FIG. 2 and 3, are swung inwardly through 90°, the form as depicted in end view in FIG. 5 appears. In this connection it is to be noted (see also FIG. 6) that the layers of the foil closure which in this way are folded one on the other, for the sake of simplicity, are shown with the wings, **14**, **15** resting on each other and in a vertically upward position. In this position the strip defined by the folding line **16** of the package and the foil edge **12**, can be heat sealed through suitable means. This means is diagrammatically represented in FIG. 6 by a welding block with a counter bearing **17**, so that an air tight closure is produced. From the figures it can be seen that only closed folds of foil from the end face run into this strip **35** and that in this end face there are no open edges of foils.

It is possible to dispose of the wings **14**, **15** in various ways. It is further indicated in FIGURE 6 by the arrow P, that the wings **14**, **15** before being welded are tautened.

In order to maintain this stress during the welding operation, it should be provided for that marginal parts of the welding block and counterbearing, which are not heated, which consequently do not soften the material situated thereunder, pinch the material. In this way the envelope remains in a stretched condition, also in the longitudinal direction, against the bundle of bottles. It is also possible to cut off the wings above the weld by means of scissors **18** after the welding operation, so that lips are formed in which a hole can be made in order to form lugs. Due to the flexibility of the plastic foil these lips or lugs do not hinder when the packages are placed against one another or stretched.

In FIG. 6 it is shown by dotted lines that the wings **14**, **15** according to another embodiment can be folded inwardly in the direction of the arrows **21** and **22** whilst applying tension, so that the overlapping ends are bearing on a temporarily inserted pad **19** for the heatseal stamp **20**. This striplike pad **19** can later be laterally removed. In this case a horizontal carrying yoke is formed.

The FIGURES *7a* and *7b* show that in such a package it is also possible to arrange bottles and like articles in a horizontal position and for that purpose the same trough **1**, **2**, *2a* can be utilized. The insertion in the envelope by means of the piston **30** can also be effected in the same way although it appears from FIG. *7b*, that a bundle can be composed of two or more layers of bottles as indicated by **36** and **37**.

Before explaining further embodiments of the package and the closure thereof, there will now be described how the tube **4** of flexible plastic is led to the trough **1**, **2**, *2a*. For that purpose an enveloping perforated tube **24** is provided. In this tube the flexible tubular plastic foil is retained by suction, which is indicated by a casing **25** with a suction pipe **26**. The conveyor tube **24** is capable of reciprocation in the direction of the arrow **27** as far as the trough **1**, **2**, *2a*. In this way the backward movement starts, after the tubular piece **33** has been cut off by the knife **23** and the table **6** has been laterally removed, i.e. in this case downwardly moved away from the mouth of the trough. This possibility of movement of the table **6** is indicated by an intermediate position, represented in dash dot lines, and by the double arrow **38**. The mouth **28** of the conveyor tube **24** has a widened cross section and after severance the protruding end of the tube **4** of the foil will be stretched, due to the suction effected in the mouth **28**, whereby the cross section will become still wider, so that this end can be pushed on the mouth of the trough in the position shown at **5**.

The enlargement of the cross section by stretching is slightly exaggerated in the figure and in general the desired stretch will be effectuated by heating the tube **24**.

Slewing clamping strips **29** are provided on the side walls **2** and *2a* on the bottom **1** of the trough, which strips on raising the flap **11** for folding, on the downward movement of the table **6**, respectively, are lifted, but which after another move-on are again swung in a downward direction so as to hold the ends **5** of the plastic foil. Atmospheric pressure is then admitted again in the suction tube **26** and the conveyor tube **24** is returned to its initial position, a piece of plastic tube **33** being left in the depicted position. The table **6**, too, is then moved to the position represented, after in the downward position the finished package for the bundled bottles have been removed.

It is obvious that the trough **1**, **2**, *2a* and the table **6** can be used in an analogous way if separate bags, which consequently have already been closed on the bottom, are pushed by their open end on the mouth. The conveyor tube **24** in that case will not be actuated.

FIG. 8 shows that a bundle packing according to the invention can also be made in the way that a plastic foil **39** is put into the trough **1**, **2**, *2a*, whereupon the bottles are arranged or laid down therein. The portions **40** and **41** of the foil can then be folded inwardly so as to overlap one another. On pulling the portion **40** by means of pinching and pulling means a weld can be made with the aid of the conventional welding means **43**, the counter bearing afterwards being pulled out in a longitudinal direction. The final closure can be effected in the way described hereinbefore, but the FIG. 9 and 10 show yet another possibility which may receive consideration for packages made of endless tube, bag material, respectively or of a tubular material which on feeding same is formed in the way that a longitudinal weld is made by continuous welding.

Shown in FIGURE 9 is a conventional final closure. In this figure the welding stamp is denoted by **43**, the arrows **44** and **45** indicating for the wings **45** respectively, that prior to welding the foil can be stretched by clamping jaws and pulling means, the stress being maintained during welding in the way that, as described hereinbefore, cold portions of the welding stamp serve as retaining means or that a separate clamping stamp is actuated.

It appears from FIGURE 10 that the counter part for welding and clamping in this case is constituted by a sheet **48** of heat insulating material, for instance cardboard, which has been enclosed in the package. The heated welding block **43** can consequently be moved forward in the direction of the arrows **49** in order to perform welding. This sheet **48** constituting the counter part is also important for stiffening the bundle. In this way it is also possible, if desired, to manufacture an air tight package at the possibly smallest consumption of plastic foil, the said package ensuring the bundling of the bottles and like articles.

It is obvious that in this case the consumption of plastic foil is less because the protruding ends can be kept shorter for the manufacture of the final closure.

In all embodiments measures have been taken to ensure that the tensile force applied for bundling and such forces which are produced in the foils when the parcel is carried inasmuch as they directly apply a load to the welds, never are produced in the weld in a direction which is perpendicular to the foil portion, but always in a plane of the foil edges welded together. Due to this circumstance there is always obtained a favourable load of the welds, whereby ripping in possibly appearing weak places is avoided and the heatsealing process is simplified, while, if need be, also adhesive layers can be applied instead of heatsealing which is advantageous in that it is no longer necessary to wait a rather long time for the setting before transport can take place. It is therefore also possible to employ self-adhesive layers.

What I claim is:

A method of containing a number of uniform articles each having rounded cross-sections so as to form a package having the shape of a rectangular parallelpiped, comprising the steps of

supporting the articles from below on a substantially horizontal support surface while arranging the articles in several rows between spaced vertical guide walls so as to form a bundle of articles having a generally rectangular parallelpiped configuration,

extending an open ended tube of flexible plastic foil horizontally from one end of said support surface, said tube having a normal cross-section less than that of said bundle of articles and a length greater than the corresponding dimension of the bundle,

supporting said tube from below and at the opposite sides thereof,

displacing said bundle longitudinally into the supported tube so that the latter is elastically stretched around said bundle to press together and prevent relative displacement of the individual articles with the ends

of said tube projecting beyond the adjacent ends of the bundle, and

folding and heat sealing the projecting ends of the plastic tube so as to completely envelop said bundle.

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