

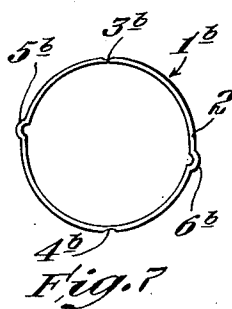
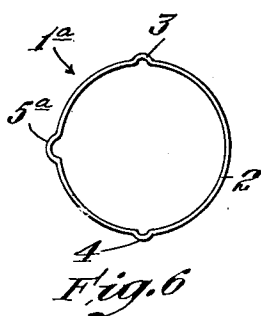
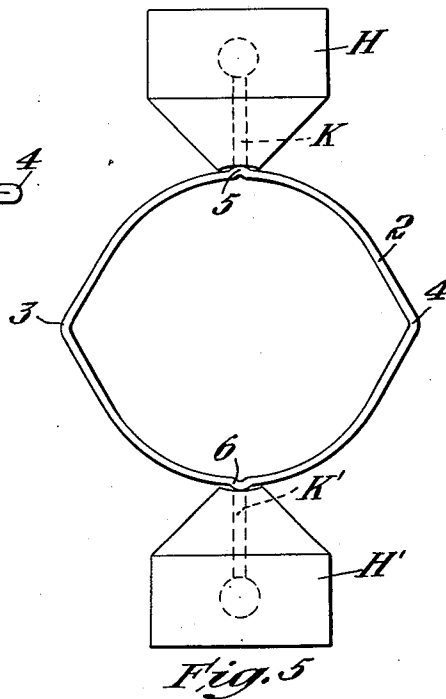
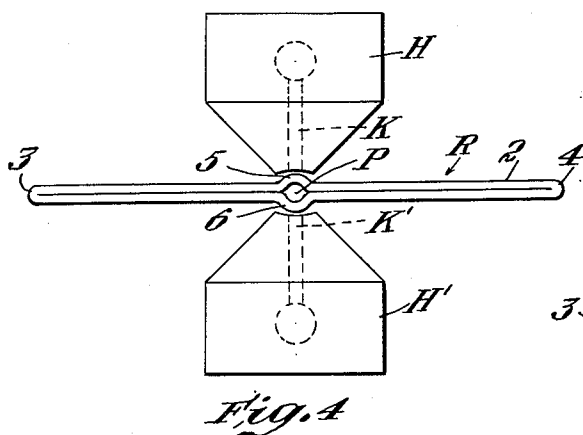
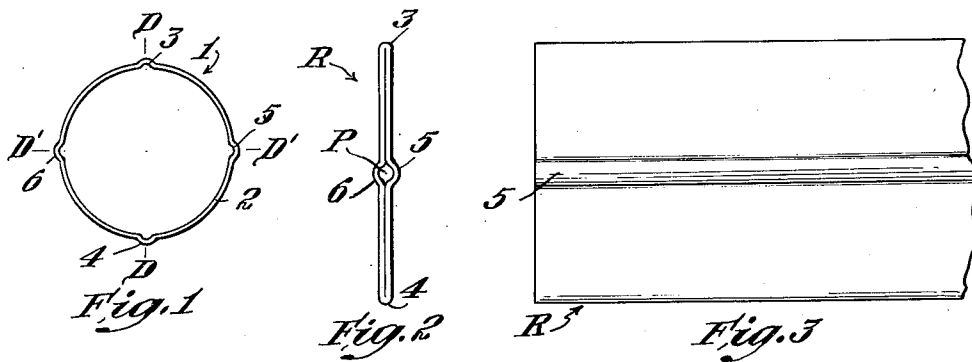
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TUBULAR MATERIAL FOR BANDING BOTTLE NECKS

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2,758,735

TUBULAR MATERIAL FOR BANDING BOTTLE NECKS

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4 Claims. (Cl. 215—38)

This invention pertains to the art of banding the necks of bottles and relates more especially to a novel banding material.

In accordance with one method of providing bottle necks, for instance the necks of beverage bottles, with endless bands, the banding material which may, for example, be a plastic such as a cellulose derivative and which has a very high coefficient of shrinkage, is first formed, for instance by extrusion, as a seamless tube of substantially circular transverse section, but usually with longitudinal fold-defining lines at opposite ends of a diameter. After the material of this tube has set so that it is no longer tacky, the tube is folded at the fold lines so as to form a two-ply flat ribbon for convenience in handling and storage.

When this very flexible and substantially non-resilient material is to be applied to a bottle neck, it is first soaked for a substantial length of time in a solution which penetrates the wall of the tube and makes the material of the tube limp or flaccid. The wet material is then fed into the banding machine in this ribbon-like, two-ply form and, after a section of proper length has been cut off it is opened out approximately to its initial circular shape and slipped down over the neck of the waiting bottle, the band then shrinking, in response to physical conditions appropriate to the selected band material and thus tightly grips the bottle neck.

To open out the folded ribbon-like strip it has been proposed to provide suction heads arranged to engage the ribbon at opposite sides respectively at points substantially midway between the fold lines and then to separate the suction heads. Theoretically, this should open the tube as desired. However, it has been found in practice that the tube is not always opened properly in this way for the reason that the two plies of the wet, limp ribbon-like material are in close contact so that atmospheric pressure, acting on the outer surfaces of these plies, opposes their separation, it being noted that the material is impervious so that air cannot pass through the material itself. Since the areas engaged by the suction heads are relatively small, one of the suction heads may pull away from the material leaving the tube unopened.

One object of the present invention is to provide novel banding material such that when subjected to the action of suction heads, as above described, it will be opened without difficulty. A further object is to provide folded, tubular banding material so designed as to provide ready access of air to its interior. A further object is to provide tubular banding material having fold lines at opposite ends of a given diameter and having longitudinally extending grooves or channels in its inner surface at opposite ends of a diameter at right angles to the first-named diameter, such grooves, when the tube is folded, collectively forming a longitudinal passage through which air may freely enter between the plies of the folded material. Other and further objects and advantages of

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the invention will be pointed out in the following more detailed description and by reference to the accompanying drawings wherein

Fig. 1 is a transverse section through a tube of banding material embodying the present invention, the thickness of the material being exaggerated;

Fig. 2 is a similar section but showing the tube as having been folded to form a flat ribbon;

Fig. 3 is a fragmentary plan view of the folded tube or ribbon of Fig. 2;

Fig. 4 is a diagrammatic plan view illustrating the suction heads of a banding machine, showing the upper end of a length of the two-ply ribbon of Figs. 2 and 3 which is to be applied to the neck of a bottle;

Fig. 5 is a view similar to Fig. 4, but showing the result of the retreat of the suction heads, whereby the two-ply ribbon has been opened out to form an approximately cylindrical tube; and

Figs. 6 and 7 are views similar to Fig. 1, but illustrating modifications.

Referring to the drawings, the numeral 1 designates a tube of neck banding material embodying the present invention. This tube has a wall 2 of substantially uniform thickness, the wall consisting of a plastic material, impervious to air, for example a cellulose derivative such as cellophane or some other synthetic plastic appropriate to form a neck band. This tube may conveniently be formed by extrusion, by the employment of suitable dies in a manner well known to those skilled in the art of making articles from plastic materials whereby it is made seamless, although the exact process employed in making the tube is immaterial to the present invention.

As shown in Fig. 1 this tube has fold lines at diametrically opposite points, for example where it is intersected by a diametrical plane represented by the line D—D. In accordance with the present invention and as also illustrated in Fig. 1, the wall of the tube is also provided at diametrically opposite points, for example at the points where a second diametrical plane represented by the D'—D' intersects the tube wall, with a set of outwardly directed, hollow beads or ribs 5 and 6 which may be similar to fold lines 3 or 4. In the arrangement illustrated in Fig. 1 the diametrical planes indicated at D—D and D'—D' are at right angles to each other.

After the plastic material forming the tube has set so that it is no longer tacky, the tube is so flattened for example by passing it between rollers that, as illustrated in Figs. 2 and 3, it forms a two-ply ribbon R. When the tube is in this flattened condition, the hollow ribs 5 and 6 which, as shown in Figs. 1 to 6 inclusive, are midway between the fold lines 3 and 4, are opposed to each other with their hollow or concave sides in registry, thus collectively forming a passage P extending longitudinally of the ribbon and which is open at the opposite ends of the ribbon. The tube is thus folded for convenience in packaging and in feeding it to the neck banding machine.

The neck banding machine may be of any conventional type. Only the suction heads of such a machine are here shown. These two oppositely movable suction heads H and H' (Fig. 4) are connected through appropriate control valve means (not shown) to a source of sub-atmospheric pressure. The machine cuts off a suitable length of the two-ply ribbon R to form a single neck band or receives a pre-cut length from a magazine and places this band between the suction heads H and H' which are then moved toward each other so that their suction ports K and K' are opposed to the outer surfaces of the ribs 5 and 6 respectively. Assuming that suction has been established at the ports K, K', the suction heads

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are now retracted from each other, as shown in Fig. 5, and since the passage P in the ribbon permits the free entrance of air from either end of the ribbon into the space between the plies of the ribbon, the plies are readily separated as the suction heads retreat with the result that the ribbon is restored to the tubular form shown in Fig. 5, and may readily be slipped down over the neck of a bottle properly placed to receive it. Thus the difficulties previously experienced in the use of tubular banding material flattened to ribbon form are avoided.

While it is usually desirable to provide both ribs 5 and 6, in order to insure the provision of a passage P (when the tube has been folded) of sufficient transverse area to insure free entry of air between the plies of the ribbon, it is contemplated that the tube may be provided, as indicated at 1a (Fig. 6) with but a single rib, for example the rib 5a. If but a single rib is to be employed it may be desirable to make this rib somewhat larger than the ribs shown in Fig. 1, although this may not be necessary. When using banding material of the usual thicknesses, for example $\frac{2}{1000}$ to $\frac{3}{1000}$ of an inch, when dry, the ribs 5 and 6 may be of the order of $\frac{1}{16}$ inch in external radius, this having been found sufficient for the purpose. However, as suggested with respect to Fig. 6 the rib or ribs, may be somewhat larger or smaller than this in accordance with the type of material and the thickness of the wall of the tube.

While the fold lines, as above described, are conveniently defined by the provision of hollow beads such as the beads 3 and 4, it is contemplated that the fold lines may be made in some other acceptable way, for example as indicated in Fig. 7 when the wall of the tube is sufficiently thick to permit it, by making the wall of the tube thinner at the points 3b and 4b. In a similar way, assuming a sufficient wall thickness, the channels which form the longitudinal air passage may be mere depressions in the under surface of the wall, the outer surface being devoid of projections.

Furthermore while, as above suggested, the ribs 5 and 6 of Fig. 1 are disposed at diametrically opposite points and in a plane which makes right angles with the plane of the ribs 3 and 4, the ribs which form the air passage

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or passages may be otherwise located, for example as indicated in Fig. 7 wherein the tube 1b is furnished with hollow ribs 5b and 6b which are diametrically opposite but in a plane which is not exactly at right angles with a plane through the fold lines 3b and 4b. With such an arrangement, when the tube is folded to ribbon-like form, the ribs 5b and 6b would not be in register with each other, and thus the tube would have two longitudinally extending air passages.

While certain desirable embodiments of the invention have herein been illustrated by way of example it is to be understood that the invention is broadly inclusive of any and all modifications falling within the terms of the appended claims.

I claim:

1. A plastic neck-banding tube whose wall thickness is of the order from 0.002" to 0.005" and which has a high coefficient of shrinkage and which is limp and substantially devoid of resiliency, said tube being flattened to form a two-ply ribbon, one at least of said plies having a preformed longitudinally extending channel in its inner surface intermediate the edge folds of the ribbon thereby to admit air to enter between the folds from the end of the ribbon.

2. A neck-banding tube according to claim 1, wherein each ply has a preformed channel in its inner surface, said channels being directly opposite to each other.

3. A neck-banding tube according to claim 1, wherein the channel at the inner side of the ply is defined by the inner surface of a hollow bead whose outer surface projects outwardly from the outer surface of the tube proper.

4. A neck-banding tube according to claim 3, wherein the external radius of said bead is of the order of $\frac{1}{16}$ ".

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