

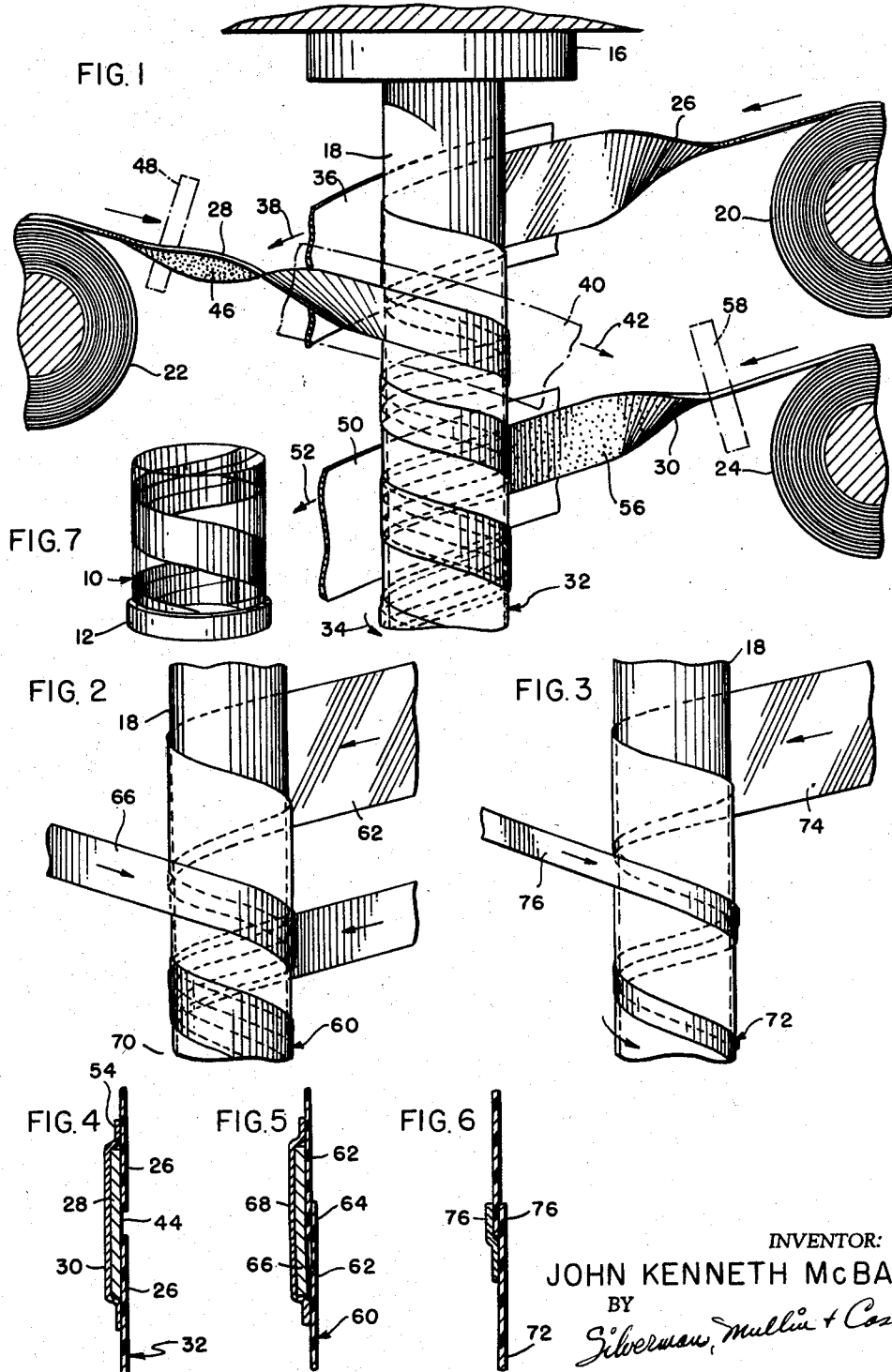
July 5, 1960

J. K. McBAIN

2,943,540

METHOD OF MAKING A SPIRALLY WOUND CONTAINER

Filed Jan. 24, 1958



1

2,943,540

METHOD OF MAKING A SPIRALLY WOUND CONTAINER

John Kenneth McBain, Chicago, Ill., assignor to W. C. Ritchie & Co., Chicago, Ill., a corporation of Illinois

Filed Jan. 24, 1958, Ser. No. 710,939

14 Claims. (Cl. 93—94)

This invention relates generally to the art of winding tubing and more particularly, is concerned with a spirally wound container in which the wall of the container has a substantial portion thereof transparent so as to enable the contents of the container to be seen, and, in addition, with a method of forming the container.

It has been known to form containers of paper and chipboard or cardboard, in which the wall of the container is in the form of spirals, but so far as I have been able to determine, the structure and method described and claimed herein have never been accomplished.

The primary object of the invention is to provide a container in which the wall of the container is formed of spirals including a spiral of transparent material, so that the resulting container is partially transparent to enable the merchandise packaged therein to be visible. Additionally, an object of the invention is to provide a novel method of forming such container.

Still a further object of the invention is to provide a spirally wound container which has a partially transparent wall which is very economical and has unusual strength.

Other objects will appear as the description of the invention is set forth, in which several different modifications of the invention are described as illustrative of the preferred embodiment.

In the drawings:

Fig. 1 is a fragmentary top plan view of apparatus showing the manner in which one form of the invention is made, the illustration being diagrammatic in order to enable a discussion of the method and resulting product.

Figs. 2 and 3 are views similar to that of Fig. 1 but showing the manufacture of two different forms of the container.

Figs. 4, 5 and 6 are sectional views through the walls of the containers of Figs. 1, 2 and 3 respectively to show the construction at the joints between spirals.

Fig. 7 is a perspective view of a completed container.

At the outset, it is desired to point out that the container of the invention comprises a cylindrical wall which is designated generally 10 in Fig. 7 and a bottom cup-like closure 12 which is glued or cemented to the bottom of the cylindrical wall in any well-known manner, or which may be held on frictionally or by self-adhering tape or the like. The structure which is of importance herein is the wall 10, and the method of forming the same, it being usual in the art to form the walls of containers of this type as continuous lengths of tubing, providing means for cutting the tubing to the desired lengths for the particular container.

Because of this, the description will be detailed as to the construction and formation of the walls of the various types of tubings described, although obviously, the advantages of the invention accrue when these lengths of tubing are formed into containers.

In Fig. 1 there is illustrated a machine which is used to form ordinary paper tubing, but which in this case is used to form the special tubing of the invention. There is a base or framework 16 which has an elongate metal mandrel 18 fixedly secured thereto, usually extending horizon-

2

tally, which would mean that Fig. 1 is a view in top plan. This mandrel is very smooth and it extends to a machine for cutting the tubing into lengths, which is not shown here.

As will be seen, there are three reels of relatively narrow strip material shown at 20, 22 and 24 and from each reel a narrow strip or ribbon of material is led to helically engage about the mandrel 18. The particular materials in this view comprise, first, a strip 26 of flexible, transparent acetate cellulose which is unwound from the reel 20; a strip of relatively stiff paper or chipboard 28 which is unwound from the reel 22; and finally a narrow strip of calendared or smooth surface paper 30 which preferably has surface ornamentation in the form of color or some design, which is unwound from the reel 24.

Each of the strips is laid upon the mandrel in a spiral or helix of identical pitch so that all strips will eventually combine to form the tubing member 32 which is shown moving along the mandrel 18 in the direction indicated by the arrow 34. It is to be understood that each of the strips 26, 28 and 30 is unreel under sufficient tension to prevent wrinkling, backlash and the like, and there will be little or no twist in the respective strips between the reels and the mandrel 18. The twists shown in the drawing are merely to illustrate more clearly the manner in which the tubing is formed and the appearance of the bottom surfaces of the different strips.

The twisting and axial movement represented by arrow 34 is achieved by driving the strips to provide this movement as they are laid upon the mandrel. The strip 26 engages the bottom of the mandrel 18 from the right and is directed across the top from the left. As it passes over the bottom it is frictionally engaged by a belt 36, a section of which is shown in the view, the belt partially wrapping the strip about the mandrel 18 and driving the strip by virtue of movement of the belt 36 in the direction indicated by the arrow 38. The next strip 28 is led from reel 22 which is located to the left of the mandrel 18 and hence when the strip 28 is laid upon the mandrel 18, it engages the top thereof moving from left to right. Another belt 40 engages this strip 28 and presses the same against the mandrel 18, this belt moving in the direction indicated by the arrow 42. The belt 40 is shown in broken lines so that the formation of the tubing member 32 may be seen more readily.

Note that the width of the strip 26 and the pitch of the helix with which it is laid upon the mandrel 18 is chosen so that the side-by-side turns of the transparent strip are slightly spaced apart. This is best shown in Fig. 4 wherein a sectional view of two side-by-side turns of the transparent strip 26 is illustrated spaced apart at 44. The chipboard or stiff paper strip 28 is laid upon the previously laid down formation centered over the space 44 so that it forms lap joints with adjacent turns of the strip 26.

The chipboard or stiff paper strip 28 is provided on its underside with an adhesive designated 46 which may be of any suitable type, such as, for example, a pressure adhesive, water-soluble cement, or the like, and the strip 28 may have been prepared with this adhesive before being secured to the reel 22. Other techniques would be included, such as passing the strip through a paste or glue machine or into contact with some form of adhesive fountain positioned between the reel 22 and the mandrel 18. This is designated generally at 48 in broken lines, no particular form of such means being intended, it being desired merely to diagram the same.

The effect of the securing of the strip 28 is to stiffen and support the tubing member 32 being formed. The adhesive 46 may be applied on the entire undersurface of the strip 28 to provide maximum strength. The presence of the space 44 will not be disadvantageous because the exposed bottom surface of the strip 28 will not usually

3

contact the mandrel 18, but if it does, it is a simple matter to apply the adhesive 46 in areas along the edges of the strip 28 so as not to interfere with the ready sliding of the formed tubing 32 along the mandrel 18.

The last strip 30 is shown of width slightly greater than the strip 28 and is applied by means of a similar belt 50 pressing same against the bottom of the mandrel 18 centered over the already laid down strip 28 so as to cover and overlap the same on the edges thereof as shown at 54 in Fig. 4. Adhesive 56 is provided on the bottom surface of the strip 30 by any suitable means such as, for example, a fountain 58 shown diagrammatically in broken lines.

Although reference has been had to three belts 36, 40 and 50 for driving the respective strips during the formation of the tubing, usual techniques provide for the use of pulley systems which enable the same belt member driven by a single rotary source to be directed back and forth into engagement with all of the strips as described so that the linear movement of the belt against all strips is identical.

The resulting tubing 32 has great strength and utility. The wall thereof is formed as a spiral of some ornamental paper and a spiral of transparent material side by side. The crushing and collapsing strength of the resulting tubing, as well as the containers 10 formed therefrom, is substantially greater than the crushing and collapsing strength which one would conceive possible through the use of the flexible transparent material alone. Furthermore, the likelihood of the adjacent turns of the transparent material separating is considerably decreased, it being known that it is exceedingly difficult to bond such materials together at the great speeds required in this art. The container which is formed from this tubing has a substantial portion thereof transparent which enables the merchandise placed therein to be readily seen and examined by the purchaser. In addition this container is extremely economical to manufacture in mass-production quantities and with the equipment already present in most factories manufacturing paper and cardboard tubing of this kind. Thus, in the container the flexible, transparent material has been stiffened to an unexpected degree providing unusual strength for such a material.

Two other forms of tubing are illustrated. In Figs. 2 and 5 there is illustrated a length of tubing 60 similarly formed on the mandrel 18 in which there are also three strips. The first strip which is laid upon the mandrel 18 is a transparent strip 62 whose width and pitch are chosen so that there is a slight overlap at 64. While adhesive may be applied to the edges of the strip 62 in an attempt to adhere the overlapped portions 64, the necessity therefor is not too great. The result of the overlapped portions 64 is to slightly stiffen the resulting spiral so that a wider transparent strip may be used without loss of strength. The next strip laid down is a cardboard or chipboard stiffening member 66 followed by an ornamental or colored strip 68 which overlaps both edges of the stiffening strip 66. It is desired to point out that the outer strip 68 which is laid down directly along the path of the stiffening strip 66 also adds to the strength of the resulting tubing formation 60. The direction of movement of the member 60 is as shown at 70.

The structure which is shown in Figs. 3 and 6 comprises a relatively economical tubing member 72 formed of two strips 74 and 76. The strip 74 is a transparent member of acetate cellulose or the like, which is laid down in overlapped spiral formation upon the mandrel 18 in substantially the same manner as the transparent strip 62 of the formation 70. The overlapped portions 78 may or may not be cemented together, and provide stiffness to the resulting formation. The second strip 76 is laid down in a spiral upon the overlapped junctures, and as will be seen it is quite narrow so that the resulting tubing formation 72 as well as the container 10 into which it

4

will be formed will have a much greater relative transparent area than either of the formations 32 or 60.

This formation 72 is highly economical because the second strip member 76 may comprise ordinary commercially available industrial pressure-sensitive tape of any suitable color. Such industrial tape is now available on cellophane or other transparent media in color or with ornamental designs already applied. The usual spiral winding techniques are in nowise interfered with by the use of this tape, and hence it is quite economical to set up the machine for the manufacture of this tubing 72 and the resulting product is strong, useful, and has large transparent areas.

As stated above, the containers 10 are formed by cutting the tubing members to any desired length and applying a bottom closure 12 thereto. Top closures of the same structure are also applied after the goods have been placed inside the containers.

It is believed that the invention has been fully set forth herein such as to enable those skilled in this art to understand how to manufacture the containers of the invention, and to understand the construction and operation thereof.

I claim:

1. The method of producing a spirally wound container from at least two strips of flexible material in a substantially continuous process and the container is characterized by a cylindrical wall having major portions thereof transparent; unwinding one of said strips under tension and at uniform speed from a reel supported laterally spaced from the axis of a mandrel arranged horizontally and engaging the strip on a surface of the mandrel in a spiral movement, unwinding the second strip under tension and at a uniform speed from a reel supported laterally spaced from the axis of the mandrel on a side thereof opposite to that of the first mentioned reel and engaging the second strip on the exterior of the first strip overlapping the marginal edges of adjacent turns of the first strip, said one strip being of a flexible transparent material greater in width than the second strip and the second strip having the surface thereof next adjacent the first strip adhesive coated, said strips being engaged upon the mandrel respectively from below and above the same in a spiral of substantially identical pitch.

2. The method as described in claim 1 in which the pitch of spiral movement of the transparent strip and the width of said transparent strip is selected so that marginal edges of adjacent turns of the transparent strip overlap.

3. The method as described in claim 1 in which the pitch of spiral movement of the transparent strip is selected so that the marginal edges of adjacent turns of the transparent strip are axially spaced apart, and a third strip is secured across said spaced apart edges ahead of the second strip whereby the second strip is superimposed on said third strip, said third strip being peeled from a reel laterally spaced from the axis of the mandrel on the same side as the reel carrying the transparent strip.

4. The method as described in claim 1 in which the pitch of the spiral movement of said transparent strip is selected so that the transparent strip has the marginal edges of adjacent turns thereof overlapped, and a third strip of strengthening material is adhesively secured around said overlapped marginal edges ahead of the second strip so as to be sandwiched between said other two strips.

5. The method as described in claim 4 in which the third strip is unwound from a reel located laterally from and spaced on the same side of the mandrel axis as the reel carrying said transparent strip.

6. The method as described in claim 2 in which each of said strips is frictionally driven into engagement with the mandrel.

7. The method as described in claim 3 in which each of the strips is frictionally driven into engagement with the mandrel.

8. The method as described in claim 4 in which each

5

of the strips is frictionally driven into engagement with the mandrel.

9. The method as described in claim 3 in which said third strip is wrapped on the mandrel from the same direction of movement as the transparent strip.

10. The method as described in claim 4 in which said third strip is helically wound on the mandrel from the same direction of movement as the transparent strip.

11. A method of producing a spirally wound container having a substantial portion of the body thereof transparent, by winding a plurality of strips of flexible material into a continuous bonded tube, which comprises: spirally winding a first transparent strip onto a tube-forming mandrel to form an interior layer for said container and spirally winding thereon a second strip having at least its interior surface provided with adhesive and being of a width substantially less than that of said first strip, the said second strip being wound upon the first strip in overlapping relation to adjacent edges of said first strip to cover the same and bond the resulting continuous tube into an integral body.

12. A method as claimed in claim 11 in which said second strip comprises a tape member having pressure sensitive adhesive on the inner face thereof and is applied under tension as to cause adherence thereof.

13. A method as claimed in claim 11 in which there is a third flexible strip spirally wound upon said first strip prior to the winding of said second strip, said third flexible strip being narrower than said second strip and of a stiffening material to strengthen the resulting tube.

14. A method of forming a continuous spiral wound tube upon a tube-forming mandrel which comprises wind-

6

ing a first strip of transparent flexible material upon said tube with the edges adjacent one another, winding a second strip of flexible material having a relatively stiffer character upon said first strip in overlapping relation to said edges, and winding a third strip upon the second, the third strip having an ornamental exterior surface and being adhesive-coated on its interior surface whereby to maintain the resulting continuous tube in bonded assembly, the first strip having a width substantially greater than the other two whereby a substantial spiral of said transparent strip is arranged along the length of said tube to expose the interior thereof.

References Cited in the file of this patent

UNITED STATES PATENTS

278,957	Heft	June 5, 1883
409,171	Coas	Aug. 20, 1889
470,738	Bayles	Mar. 15, 1892
986,960	Anderson	Mar. 14, 1911
1,156,332	Vaughn	Oct. 12, 1915
1,740,828	Morrison	Dec. 24, 1929
1,894,295	Scandore	Jan. 17, 1933
1,932,169	Allen	Oct. 24, 1933
1,985,997	Keeran	Jan. 1, 1935
2,046,138	Tucker	June 30, 1936
2,130,355	Magill	Sept. 20, 1938
2,176,955	Clow	Oct. 24, 1939
2,192,923	Magill	Mar. 12, 1940
2,262,242	Lenox	Nov. 11, 1941
2,623,445	Robinson	Dec. 30, 1952
2,751,936	Dunlap et al.	June 26, 1956