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DRINKING AND SIMILAR TUBE

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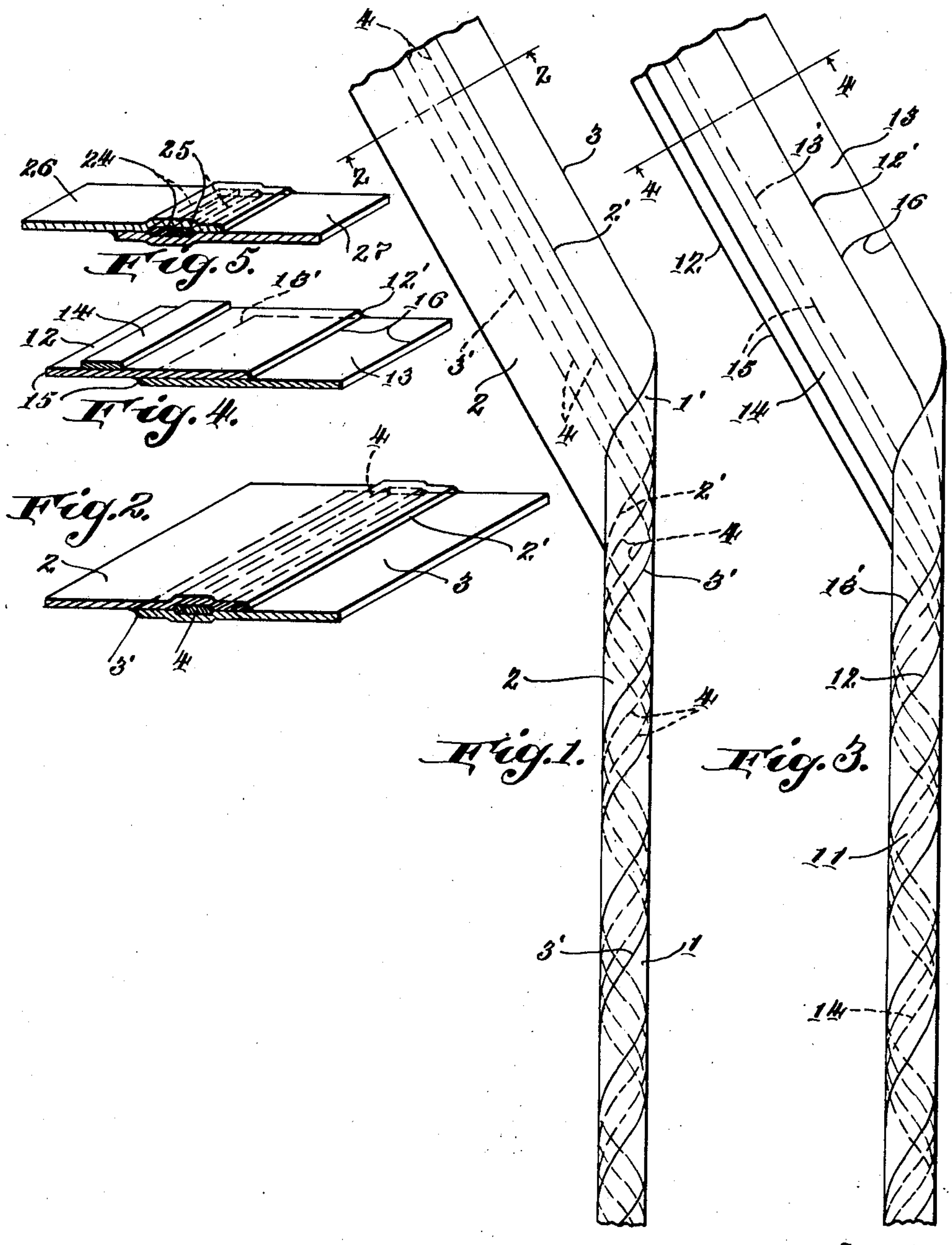

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DRINKING AND SIMILAR TUBE

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The invention relates to drinking tubes also referred to as drinking straws of the type described in my prior United States Patent #2,035,304. These drinking tubes or straws are formed of helically wound strips of transparent sheet cellulose material as cellulose hydrate or cellulose acetate, the preferred material being regenerated cellulose also referred to as regenerated cellulose hydrate, the various cellulose esters being also available for this purpose. These straws or tubes are preferably and to the best advantage produced by the heat sealing of the overlapping edges as the material is wound. They have also been made by other sealing methods by using cement or solvents which partially dissolve the overlapping surfaces making them tacky and giving them adhesive properties.

The material used in the production of these tubes on account of its availability at a comparatively low cost is the better quality of transparent sheet cellulose wrapping which is moisture proof to a high degree and non-absorbent, resisting for a considerable period not only the action of water but all of the various liquids and gases contained in the drinks to be dispensed. These tubes have, however, been used to a considerable extent for ornamental purposes as rosettes, artificial foliage and portières in which the water resisting feature is of less importance so that materials of lower quality may be employed for these special purposes.

In order to utilize these commercial wrapping materials and at the same time produce a tube or straw of sufficient strength to avoid collapse of the tube in use, the tube or straw has been formed of two helically wound strips, and tubes or straws thus produced have been highly satisfactory in use but for some classes of trade it is found desirable to make a straw of a more substantial character which will afford greater resistance to the tendency to collapse in use and to lateral stresses in general but on account of the increased expense and the tendency to loss of transparency on account of increased thickness, the importance of transparency having been stressed in the previous patent, it is not found desirable to employ additional thicknesses of sheet cellulose. In fact, the number of tubes produced per pound of cellulose is an important item in the production of tubes on a commercial basis to compete with the less desirable but cheaper product in the form of paraffin paper straws or tubes.

The present invention meets this requirement without any considerable increase in the weight of the straw, i. e., in the amount of sheet cellulose used without any increased complication in manufacture and hence without any important increase in the cost of the product.

The preferred product of the previous patent is formed by feeding two overlapping strips to the mandrel on which they are helically wound, the edges of each strip beyond the overlap overlapping the next turn of the helix in such a way as to produce a tube or straw of two thicknesses. In accordance with the improvement of the present invention, one or more relatively narrow strips of sheet cellulose material or other suitable flexible material adapted to be embodied in the walls of the tube are fed to the mandrel between the overlapping edges of the strips. These reinforcing strips being relatively narrow involve the use of comparatively little additional material but they increase to a corresponding degree the thickness of the walls along a helical line wound about the circumference of the tube and extending along the tube in correspondence with the winding of the main strips and thus increase the lateral strength and stability of the tube in its relation to the strength of the non-reinforced tube in greater proportion than that represented by the mere addition to the weight of the material embodied in the tube. In the preferred form it is of advantage that the reinforcing strips being located between the overlapping portions of the main strips do not mar the inner or outer surfaces of the tube by the presentation of projecting edges and have no tendency to become detached in use.

While the reinforce is preferably located between the overlapping edges of the two main strips as fed, these reinforcing strips may also be located outside this overlap so that in the finished tube they are between the overlapping portions of the adjacent turns of the helix. While reinforcement without appreciable increase of weight is the primary object of the invention, it is also of interest that the ornamental features of the tube both as a drinking straw and for decorative purposes being of importance the reinforcing strips and the main strips may be of different tints and colors affording an opportunity for a wide variation of color combinations.

In the accompanying drawing, I have illustrated tubes or drinking straws made in accordance with both forms of the invention as above suggested.

In the drawing:

Figure 1 is a plan of a drinking tube or straw partly unrolled showing arrangement of the main strips and the reinforcing strip.

Figure 2 is a perspective view showing a fragment of the main strips and the reinforcing strip, the figure including a section on the line 2—2 in Figure 1 which intersects the combined strips as unrolled from the finished straw.

Figure 3 is a view corresponding to Figure 1 illustrating a modified form of the straw or tube.

Figure 4 is a section on the line 4—4 in Figure 3, the portions of the strips back of the section being shown in perspective.

Figure 5 is a view corresponding to Figure 2 showing a plurality of reinforcing strips.

Referring to the drawing by numerals each of which is used to indicate the same or similar parts in the different figures, the tube construction, Figure 1 comprises a helically wound tubular portion 1 the end 1′ of which is partially unwound to illustrate the formation by the helical winding of two overlapping main strips of non-fibrous substantially transparent sheet cellulose material indicated by reference characters 2 and 3, the overlapping edge of the strip 2 being indicated by reference character 2′ and the overlapping edges of strip 3 by 3′. In the form shown the strip 2 is on top and a reinforcing strip 4 which is preferably of similar material is located between the overlapped portions of the strips 2 and 3 as best illustrated in Figure 2. The reinforcing strip 4 as shown is about one quarter the width of either main strips 2 and 3. While the drawing shows these straws partially unwound, the manner of winding these straws in accordance with the preferred practice is well illustrated by the drawing, the main difference being that in winding the main strips 2 and 3 and the corresponding strips in the other forms illustrated are substantially flat and not deflected about the reinforcing strip until wound on the mandrel and sealed.

In this connection it is of interest that the various sections 2, 4 and 5 are drawn on a widely magnified scale for convenience of illustration, the deflection of the sheets due to the presence of the intermediate reinforce between the overlapped edges of the main strips being so slight in fact as to be hardly apparent. In the finished product as illustrated at 1 in Figures 1 and 2 the reinforcing strip 4 is helically arranged between the overlapping edges of the two main strips 2 and 3 as shown in dotted lines at the lower end of said figure, the path of the reinforcing strip being parallel to the edges of the main strips.

In Figures 3 and 4 I have illustrated a second form of the invention in which two main strips 12 and 13 having overlapping edges 12′ and 13′ are combined with a reinforcing strip 14 which instead of being located between the overlapping edges 12′ and 13′ overlies the strip 12 as to the portion thereof at the side of the overlap, the portion of the strip 12 at the side of the overlap being indicated by reference character 15. As the main strips 12 and 13 and the reinforcing strip 14 are helically wound into the completed tube at 11 the reinforcing strip 14 is covered by the edge 16 of the strip 13 outside of the overlap indicated by lines 12′ and 13′ so that in the finished tube it is completely covered and enclosed being exposed on neither the inner nor outer surfaces of the tube, i. e., covered on the inside in the completed tube by the edge portion 16 of the strip 13 of the adjacent turn of the helix.

In Figure 5 I have shown a section with a perspective back of the section corresponding to Figure 2 but showing two reinforcing strips 24 and 25 in place of the single strip 4, the main strips being indicated by reference characters 26 and 27. Strips 24 and 25 are shown as located between the overlapping edges of the main strips 26 and 27 as is the single strip 4 in Figures 1 and 2.

The drinking straw tube while preferably produced by the heat sealing process may also be produced within the scope of the invention by other sealing methods though with increased expense and to a less degree of satisfaction. While the reinforcing strips may within the broad conception of the invention be made of any suitable material which can be embodied in the tube in this way they are to best advantage made of material adapted to be sealed in the same manner as are the main strips so that they can be integrally embodied in the tube without the loss of any of the sealing effect and with a better reinforcing effect.

The tube produced by the practice of the invention is of increased stiffness and adapted to resist lateral stresses and any tendency to collapse to a considerably increased degree without the corresponding increase in cost and the partial loss of transparency incident to the production of a stiffer tube by adding to the number of main strips employed in winding. Further the reinforce is in accordance with the preferred embodiment so applied that it does not present protruding edges on the inner or outer surfaces of the tube to mar the appearance or collect dust and in the preferred form not being exposed on either surface, the reinforce is not subject to detachment in use.

It is a further important advantage that these reinforcing strips may be so utilized by coloration different from the main strips and if desired a plurality of reinforcing strips of different colors may be used thus giving a wide range of color combinations and tints which may be so arranged as to have an important ornamental effect.

I have thus described an improved reinforced drinking tube of transparent, flexible sheet cellulose material having reinforcing strips variously disposed as to the main strips forming the tube and capable of a considerable variation of arrangement, the description being specific and in detail in order that the preferred manner of constructing the tube may be fully understood, however, the specific terms herein are used descriptively rather than in a limiting sense, the scope of the invention being defined in the claims.

What I claim as new and desire to secure by Letters Patent is:

1. A substantially transparent tube for drinking straws and the like, the same comprising flexible sheet cellulose derivative in strip form helically wound and overlapped at the edges and a reinforcing strip wound in a substantially similar helix and located between the overlapping portions, the reinforcing strip being of substantially less width than the overlap the contacting surfaces being sealed.

2. A substantially transparent tube composed of a plurality of main strips of flexible transparent sheet cellulose derivative, the main strips being overlapped as to their respective edges and helically arranged to form the tube, and a reinforcing strip of similar material also helically wound and located between the overlapping edge

portions of the main strips the contacting surfaces being sealed.

3. A tube of substantially transparent flexible non-fibrous sheet material in strip form helically arranged overlapped at the edges and sealed to form the tube and a reinforcing strip therefor consisting of a substantially narrower strip of flexible material superimposed upon said first mentioned strip material and entirely between the edges thereof adhesively secured throughout its length to the first mentioned strip material and wound in a similar helix.

4. A tube for drinking straws and the like, the same being of substantially transparent flexible sheet cellulose derivative composed of two parallel main strips overlapped at the edges helically wound and also overlapped as to the successive turns of the helix and a reinforcing strip between the surfaces of one set of overlapped edges and narrower than said overlap and arranged in a substantially parallel helix, all said materials having heat sealing properties and being heat sealed as to their contacting surfaces.

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