Sept. 3, 1940. I. J. NOVAK 2,213,253

TUBULAR CONSTRUCTION

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Fig. 1.

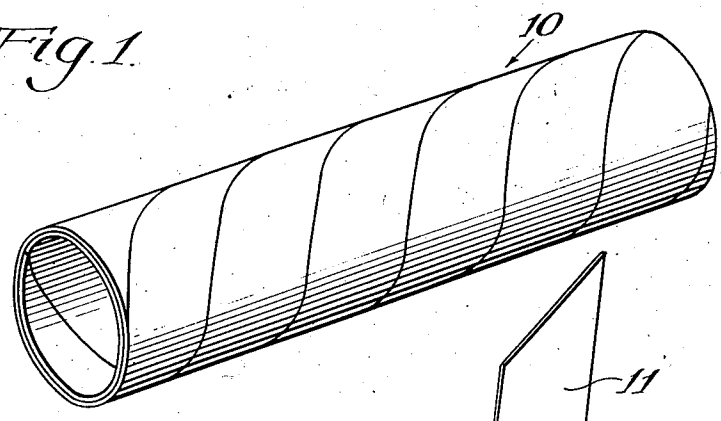


Fig. 2.

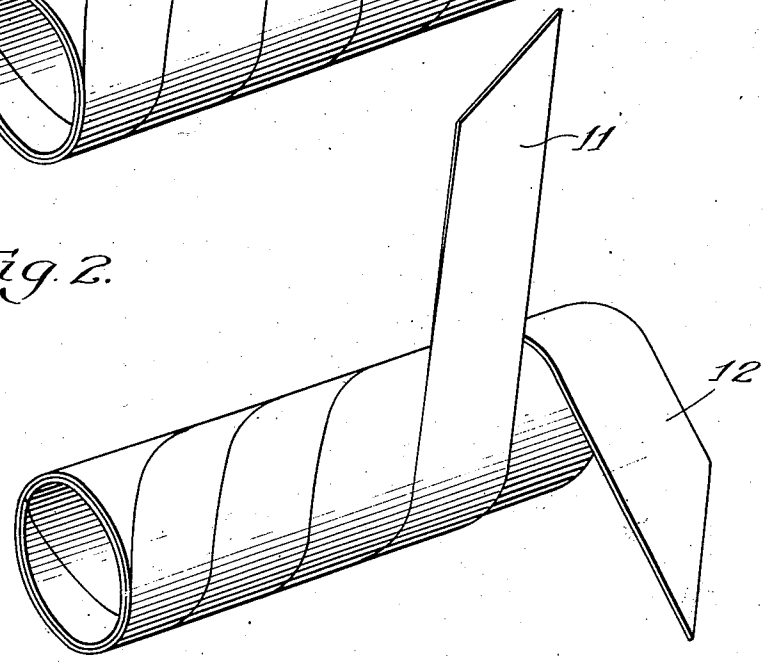
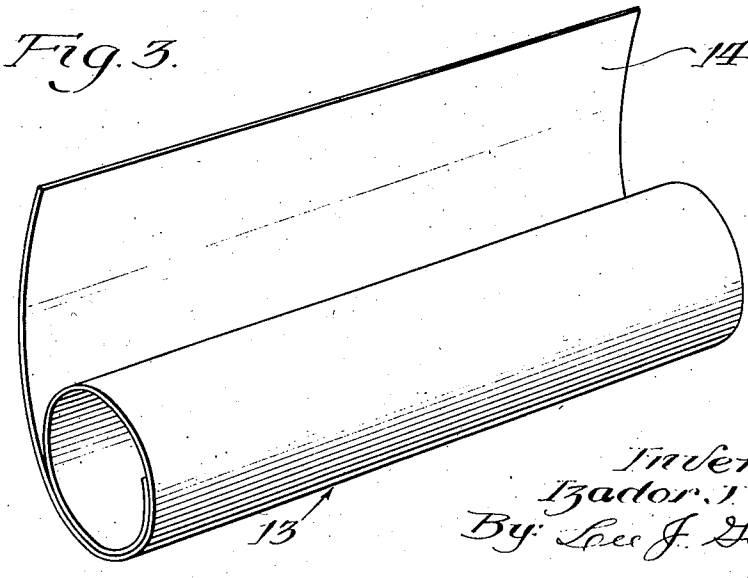


Fig. 3.



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TUBULAR CONSTRUCTION

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4 Claims. (Cl. 154—40)

This invention pertains to an improved fibre board tube construction or composition suitable for such use.

The object of this invention is to form an improved fibre board construction from which containers such as mailing or packing tubes may be formed and which will have great rigidity and a high crushing strength.

Another object is to produce a fibre board composition suitable for the formation of mailing and shipping tubes and covers for carrying fabrics and paper, can bodies, and the like, of cheap and low grade materials which have hitherto not been deemed satisfactory for such construction as not having the ability to provide strength and rigidity necessary for such constructions.

Other objects and advantages will be apparent from the following specification and drawing, wherein,

Fig. 1 is a perspective view of a conventional mailing tube, and

Fig. 2 is a perspective view of a tube such as that shown in Fig. 1, the helical windings thereof being partially separated.

Fig. 3 is a perspective view of a straight wound tube.

Referring to the drawing, 10 indicates a conventional mailing tube formed in the usual manner, that is, of strips of fibre-board wound helically. For example, as shown in Fig. 2, two strips of fibre board are wound helically in opposite directions, the strip 12 forming the inner helix and the strip 11 wound over it helically in the opposite direction. As the fibres of the strip lie longitudinally thereof in the usual formation of paper, by forming helical windings, the fibres are caused to lie obliquely to the longitudinal axis of the tube and by superimposing oppositely wound helices the fibres are caused to cross so that the construction of the tube is given a maximum strength and rigidity against deformation of the tube or crushing. Straight wound tubes 14 as shown in Fig. 3 also may be made where the sheet is wound upon a mandrel with a suitable adhesive between the layers or convolutions. Another form of conventional tube winding is to wind strips helically in the same direction, with, however, superimposed layers being in staggered relation, so that each successive layers is formed with the strip overlying the abutting edges of the convolutions of a lower strip layer.

Heretofore, in order to obtain maximum or required strength in a fibre board subjected to uses such as the mailing tube construction herein contemplated, use has been made of fibres, stiff and rigid in themselves, as for example, kraft, chestnut chip (tan bark) and the like, to form kraft or chestnut board which now goes into the construction of the stiffest and strongest grade of tubes for the purposes mentioned. While this construction or other fibre use is satisfactory, it results in an expensive construction.

As a feature of this invention, I have found that, by incorporating sodium silicate with a board or sheet made of short or low grade fibres such as news, ground wood, straw, sulphite screenings, tan bark or other mechanical or chemical wood pulps, all of which are known as inexpensive or cheap fibres, I am able to form a board suitable for use in tubes which has a crushing strength higher than tubes made from kraft, chestnut or tan bark board.

The sodium silicate may be introduced directly into the pulp mix from which the board is to be formed, or added by the wet web or dry web saturation processes or in any other suitable or conventional manner so that a residual solids content of 10% to 15% of sodium silicate by weight relative to the fibre is obtained, and which I have found to be the most satisfactory composition. In finishing the sheet or board a small amount of moisture may be retained to facilitate the handling, shaping or winding. The silicated board thus formed in addition to being waterproof has great strength and rigidity which renders it highly desirable for the construction of containers, and especially containers in tubular form wherein the greatest requirement is that a stiff tube be maintained which will resist deformation and crushing.

While I have shown and described the construction of a helically wound tube made of selected fibre-board, it will readily be seen that due to the strong bond or matrix formed between the fibres by means of the sodium silicate, tubes can be formed of one or more layers of my silicated board without winding strips in helical form. That is, the tubes can be formed by bringing together the edges of a suitable width of board and sealing them in the form of a tube, or, the tube can be formed by forming several convolutions in a straight wound manner. It will also be seen that due to the great rigidity and crushing strength obtained by using silicated fibres as herein set forth, the composition will readily adapt itself to the forming of various shapes such as bottles, bowls, vases, etc., or other articles by a fibre-molding process, and it will therefore be seen that my composition will readily adapt itself for use in many fields and arts wherein mate-

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rials heretofore constructed of expensive fibres can now be produced by cheap and economical methods by the use of inexpensive fibres wherein there has been incorporated sodium silicate, to produce products having crushing strength and form retention properties to an extent which has hitherto been unattainable with similar substances.

I claim as my invention:

1. A tubular body having a relatively high crushing strength and adapted to retain its tubular form and being substantially waterproof, the said body being formed of sheeted fiber boards comprising low grade fibres and a binding agent therefor comprising 10% to 15% sodium silicate by dry weight of said fibres.

2. An annular elongated body having walls formed of relatively thin felted fibrous material adapted to retain its form being substantially waterproof and having a high crushing strength, the said felted fibrous material comprising sheeted low grade pulp, and a binder therefor comprising sodium silicate having a residual solid content of 10% to 15% by dry weight of said fibres.

3. The method of forming a waterproof tubular construction having a high crushing strength which comprises forming a fibrous board of low grade pulp material, incorporating therewith sodium silicate to yield a residual sodium silicate content of 10% to 15% by weight of the dry fibre content of said board, and convolutely winding the resultant board in the form of tubes.

4. The method of forming a tubular construction having stiffness and a high deformation resistant crushing strength which comprises forming a board of low grade fibrous pulp material, incorporating therewith sodium silicate to yield a residual sodium silicate content of 10% to 15% by dry weight of fibres, cutting said boards into elongated strips and winding said strips in superimposed opposite helical convolutions to form an elongated tube.

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