Oct. 19, 1937. R. B. JOHNS 2,096,044

TUBE AND METHOD OF FORMING THE SAME

Filed Sept. 25, 1936

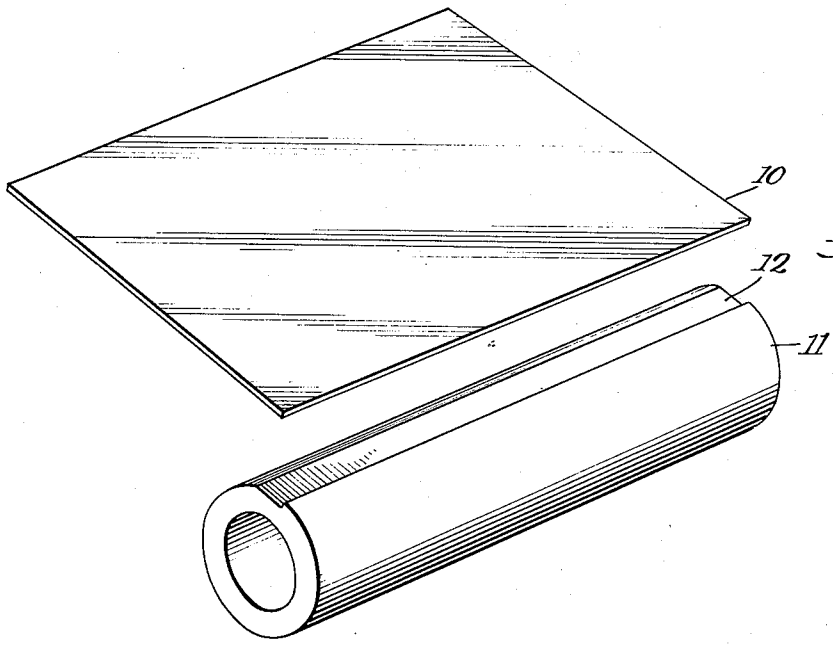



Fig. 1

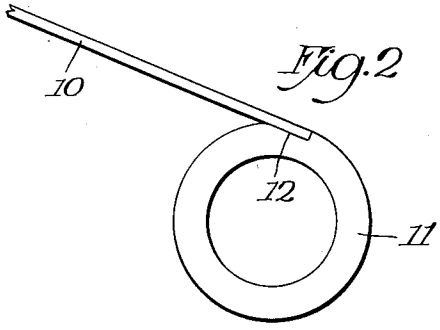



Fig. 2

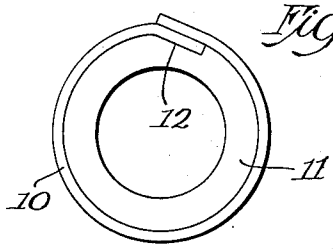



Fig. 3

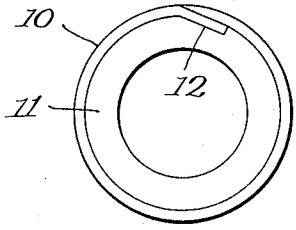



Fig. 4

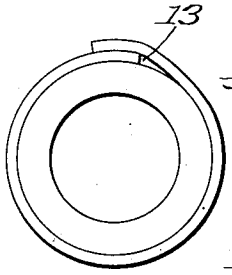



Fig. 5

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# UNITED STATES PATENT OFFICE

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## TUBE AND METHOD OF FORMING THE SAME

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Application September 25, 1936, Serial No. 102,483

1 Claim. (Cl. 154—2)

My invention relates to a process of wrapping sheet Celluloid or other like plastic materials to form tubing stock such as is used in the less expensive grades of fountain pens. The primary method used is old in the art and contemplates the wrapping of a thin celluloid or like plastic sheet about a preformed cylindrical tube of inexpensive extruded stock.

As explained above, the principal use to which such stock is put is in the manufacture of fountain pens which, because of the public demand, require the use of expensive mottled or other designs containing pearl which is quite expensive.

In the manufacture of expensive pens, usually solid pearl impregnated stock is used with the center cored out to form caps and barrels, and in the medium priced pens sheets of expensive pearl impregnated Celluloid are wrapped on a mandrel, either spirally or by the commonly known butt-weld process, thus eliminating the waste due to the coring of solid stock. In the low priced fountain pen field, exterior appearance is still essential and processes have been evolved whereby thin expensive celluloid sheet stock is wrapped on an inexpensive core stock to form pen barrels and caps.

The tubing formed by the last mentioned sheet wrapping process is unsatisfactory because the seam formed by the jointure of the overlapping edges of the sheathing stock is readily detectable. Also, after grinding the formed tube to make it spherical in cross section, the weld at the joint is so weakened as in many instances to cause the sheet to separate from the core.

It is to these imperfections in the present methods of wrapping sheet stock upon a core that my invention is directed.

Figure 1 is a plan view of a sheet of expensive celluloid stock, approximately ten thousandths thick, suspended over a tube of core material.

Fig. 2 is a cross sectional view disclosing the edge of the sheet affixed to the core material.

Fig. 3 is a cross sectional view disclosing the sheet wrapped on the core.

Fig. 4 is a cross sectional view of the wrapped tubing after the grinding operation, and

Fig. 5 is a cross sectional view of a tube formed by the so-called butt-weld sheet wrapping process.

In the drawing, the numeral 10 will hereafter be used to indicate the sheathing sheet of expensive Celluloid and the numeral 11 to indicate the core on which the sheet is to be wrapped. In my process a groove 12 is formed or milled in the core 11, one plane of said groove being wider than the other to form a base on which one edge of the celluloid sheathing 10 is affixed. The depth of the groove tapers from ten thousandths at that side against which the edge of the sheet is adapted to abut to the periphery of the tube and the edge of the sheet is cemented, through the medium of a solvent, into the said groove and due to the fact that the depth of the groove is the same dimension as the thickness of the sheet the top of the cemented sheet will be flush with the periphery of the core. A solvent is then applied to the under side of the sheet and to the periphery of the core and the sheet wound upon the said core, the length of the sheet being such that the opposite edge from that cemented in the core overlaps that part of the edge lying within the said groove 12. The assembled piece is then permitted to dry and cure to an extent where the sheathing and core will be practically one piece whereupon the wrapped tube is ground and in cross section the said tube becomes uniformly spherical.

It is important to note that because of the grooved construction of the core and the method of assembly of the sheet in the groove, upon wrapping of the sheet upon the said core and the overlapping of the two edges a thickness of pyroxylin is presented at the jointure such that upon grinding off the overlapping edge to form a spherical tube the wall thickness of the sheet at the jointure is greater than at any other place about the tube.

Attention is called to Fig. 5 which discloses the usual method of wrapping sheet stock about a core. It is to be noted that in the process of wrapping, a space 13 is left adjacent the lower edge of the wrapped sheet and upon grinding of the assembled tube to make it spherical in cross section little or no stock is left at the jointure. It is true that in the wrapping process the stock may cave in at the joint to such an extent as to cause the edge to adhere but the resulting ground piece shows a very definite ragged line running longitudinally of the tube and in time that portion of the sheathing that does not adhere directly to the core will cave in and cause a very definite indentation.

By grooving the core and winding the sheet by my process the finished ground tubing discloses little or no seam and thus eliminates the primary objection to either the so-called spiral wrapped or butt-welded stocks produced today.

It is to be understood that the term "Celluloid" used in the foregoing specification and appended claim shall include any equivalent material.

Having described my invention, what I claim and desire to secure by Letters Patent, is:

A process for wrapping sheet Celluloid on core stock comprising the forming of a longitudinally extending seat in the core stock, the affixing of one edge of the sheathing to the seat and wrapping and cementing the sheathing about the core stock with the opposite edge of said sheathing overlapping that edge affixed to the seat.

ROY B. JOHNS.