June 16, 1936. C. R. KEERAN 2,044,356

METHOD OF MAKING CELLULOID ARTICLES

Original Filed June 29, 1932

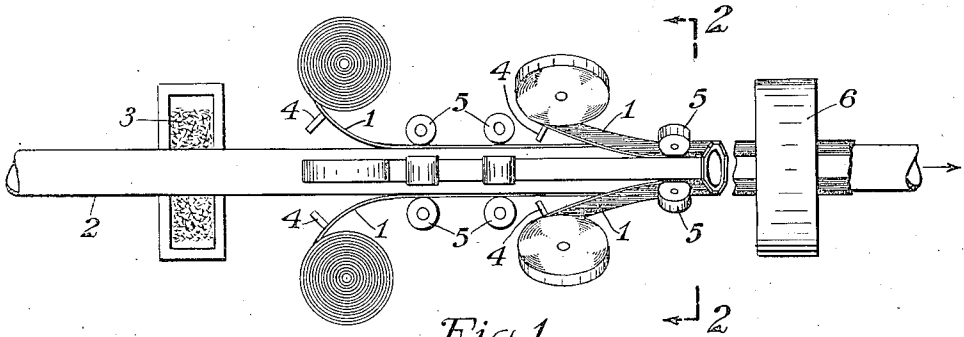


Fig. 1

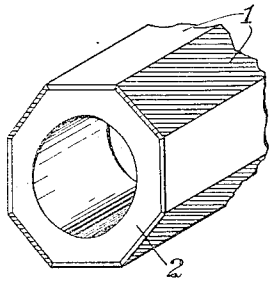


Fig. 3

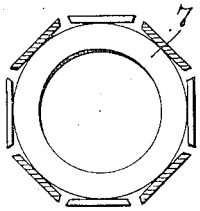


Fig. 5

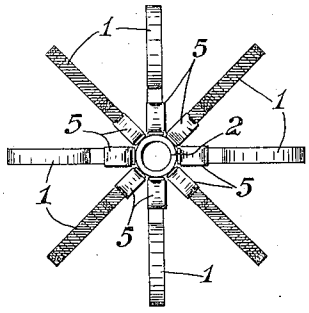


Fig. 2

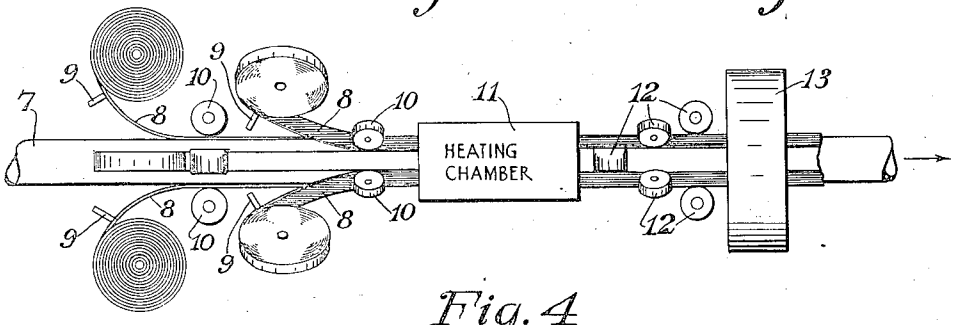


Fig. 4

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Patented June 16, 1936

2,044,356

UNITED STATES PATENT OFFICE

2,044,356

METHOD OF MAKING CELLULOID ARTICLES

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Original application June 29, 1932, Serial No. 619,868. Divided and this application November 14, 1934, Serial No. 752,936

2 Claims. (Cl. 18—51)

This invention relates to tubular objects of polygonal cross-section and having a substantially integral tubular casing of celluloid or like material, formed from such material in strip form. One object of the invention is to provide a method for the production of such tubular objects, and a further object of the invention is to provide tubular objects of the character indicated. Other objects of the invention will appear hereinafter.

Without restriction of the invention thereto, reference is made to the accompanying drawing wherein:

Figure 1 illustrates somewhat diagrammatically an apparatus for carrying out the method, the celluloid strips being secured longitudinally to the mounting member.

Figure 2 is a transverse section through the apparatus taken substantially on the line 2—2 of Figure 1.

Figure 3 is a fragmentary perspective view of a finished tubular member produced by the method employing either the apparatus shown in Figure 1 or that shown in Figure 4.

Figure 4 illustrates an apparatus for carrying out a modification of the process.

Figure 5 is a diagrammatic sectional view illustrating the relation of the strips of celluloid to the mounting member just prior to the entry into the heating chamber of the apparatus shown in Figure 4.

Referring to Figures 1 and 2, the strips of celluloid 1 are applied longitudinally to a mounting member 2 to form a polyhedral or multi-faced casing which is illustrated as octagonal. The mounting member 2 is originally in the form of a cylindrical tube preferably of celluloid or other material susceptible of deformation. It may be understood that suitable means, not shown, are furnished for feeding the tube longitudinally. A coating apparatus indicated at 3 applies acetone or other solvent to the outer face of the member 2 as it moves in axial direction. This solvent softens the outer surface of the mounting member, rendering it gummy, adhesive and in condition to be deformed by the application of pressure.

Axially spaced along the mounting member, forwardly of the coating apparatus 3, are two batteries of four reels each, of the celluloid strip material 1. As shown in the drawing the reels of one battery are positioned 90 degrees apart, and the reels of the other battery are also spaced 90 degrees apart, but offset 45 degrees with respect to the reels of the first battery, so that the strip celluloid may thus be fed onto the mounting member 2 in eight equi-angularly spaced planes, as shown in Figure 2, so as to form an octagonal casing. The celluloid strips may be of any colors or combinations of colors, and, as herein shown, and merely by way of illustration, the strip celluloid of the battery of reels positioned further forward in the direction of movement of the tube 2 is lined to indicate blue. Any suitable design or pattern may be formed in the strip material and will be retained unimpaired in the finished product.

A brush or pad 4 is positioned for contact with the under surface of each strip as it feeds off the reel, so that these surfaces are coated with acetone to insure adhesion of the strips to the mounting member 2, the acetone also assisting in rendering the member 2 deformable. Associated with each set of reels are provided pressure rollers 5, which not only operate to press the strip material against the mounting member 2, but also exert sufficient pressure to slightly deform the outer surface of the cylindrical tube, flattening it to give the mounting member octagonal cross section, and to permit the several strips of celluloid to be fitted snugly thereon. When thus fitted, the edges of the strips abut each other, as shown in Figure 3, and the softened surfaces of these strips adjacent these edges are forced together, fusing the strips into an integral casing for the part 2. The assembled structure is then drawn through the final forming die 6 to rectify any inaccuracies in its shape. Preferably, for this type of assembly, the lateral edges of the strips may be slightly bevelled, so that they shall fit better in their assembled abutting relation and form a closed sharp corner, as seen in Figure 3. This integral tubular member may be made up in any convenient length and then cut into shorter lengths if desired. Ordinarily, it will require no further finishing of the exterior or interior surface.

Figure 4 illustrates a slight modification of the process described in connection with Figures 1 and 2 in that heat is employed for softening the mounting member to permit its deformation. This member is indicated at 7 as being fed longitudinally by any suitable means not shown, while strip celluloid 8 is applied to the surface to form any desired number of polygonally related faces.

As shown, two batteries of four reels each are provided for supplying the celluloid strips 8 and these batteries are arranged substantially as in Figure 1 to produce an eight-sided surface. A brush or pad 9 may be arranged to coat the

inner surface of each strip with acetone, or similar solvent, as the material approaches the tubular mounting member 7, this solvent also aiding in rendering the member 7 deformable, and pressure rollers 10 are positioned to insure initial adhesion of the strips. Beyond the rollers 10, the mounting member with the stripping applied is fed through a heat chamber 11 which softens the material, rendering the cylindrical member 7 sufficiently ductile so that as it emerges from the heating chamber a set of pressure rollers 12, arranged in diametrically disposed pairs, will serve to force the strips more firmly onto the mounting member, and at the same time deform the celluloid of the latter to produce a shape similar to that shown in Figure 3. This step is completed by passing the material through the final forming die 13 of Figure 4.

It will be evident that in some instances where the mounting member is of tubular stock, as shown in all the examples illustrated herein, it may be desirable to support such tubular member on a mandrel in order to increase its stability during the application of the strip material to its surface. The provision of such a mandrel and a means for supporting it are matters well understood by those skilled in the art, and need not be shown or described in detail.

It will be understood that the celluloid strip material employed in this process is cut from sheets of celluloid and may be formed with certain multi-colored patterns or mottled effects, which serve a decorative purpose and which are retained unimpaired in forming the strip material into a tubular casing by the present method. This celluloid strip material may be quite thin, as there is practically no portion of it to be cut away as waste, except in the final finishing cut and this is particularly true where a mounting member is employed as the structural support for the decorative celluloid casing.

This application is a division of my co-pending application Serial Number 619,868, filed June 29, 1932, for Celluloid article and method of making same, Patent 1,985,997, issued January 1, 1935.

It is apparent that many widely different embodiments of this invention may be made without departing from the spirit and scope thereof and, therefore, it is not intended to be limited except as indicated in the appended claims.

I claim:

1. The method of mounting a plurality of strips of celluloid material on a tubular celluloid member which comprises coating the outer surface of said member with a chemical solvent for softening the celluloid, then applying such strips to the member under pressure, the solvent-treated surface of said tubular member being rendered ductile, whereby the addition of pressure to the strips deforms said member to give it a polygonal cross section providing faces upon which the several strips are flatly secured.

2. The method of mounting a plurality of strips of celluloid material on a tubular celluloid member which comprises rendering said strips adhesive, applying them to the outer surface of the tubular member, then applying heat to the assembly and exerting pressure thereon to alter the shape of the tubular member, providing flat surfaces thereon under the respective strips, and finally passing the assembly through a shaping die to produce a tubular structure of polygonal cross section, the application of heat serving to soften the strip material so that under pressure the edges thereof are united to form a substantially integral casing for the inner member.

CHARLES R. KEERAN.