

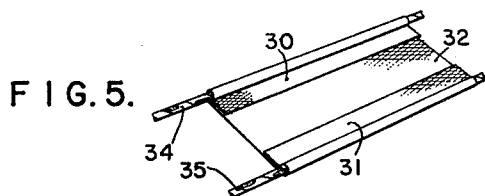
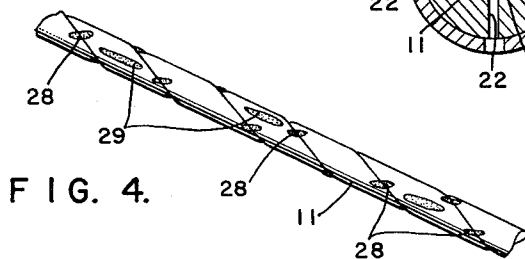
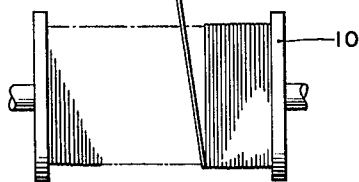
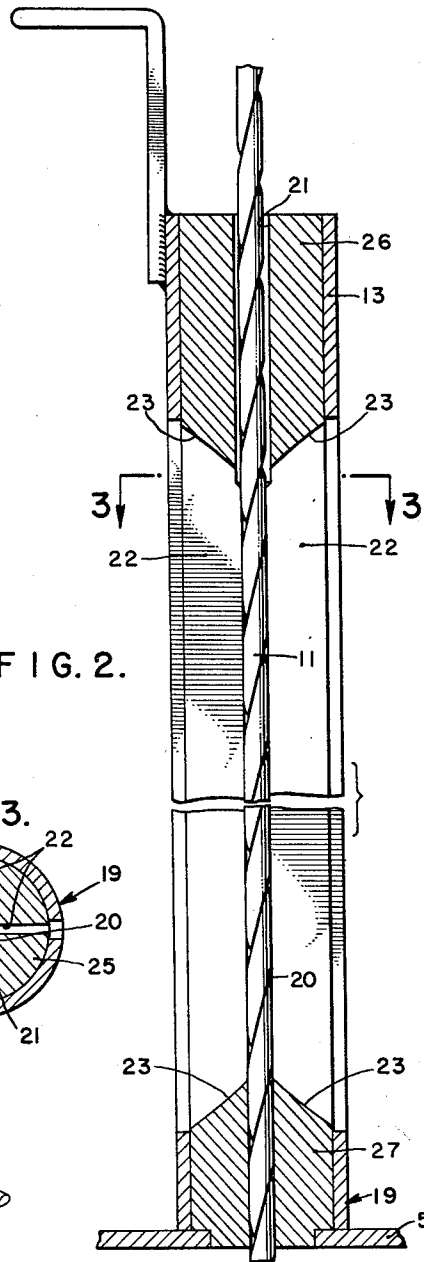
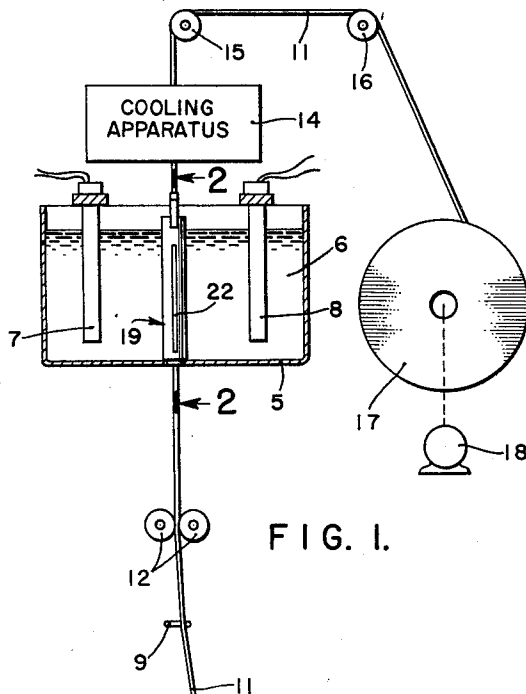
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METHOD OF AND APPARATUS FOR PREPARING ADHESIVE-COVERED CORD

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3,135,620

METHOD OF AND APPARATUS FOR PREPARING ADHESIVE-COVERED CORD

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10 Claims. (Cl. 117—7)

This invention relates to the preparation of cord material of the twisted or braided type used for welting or boxing of cushions or other forms of upholstery.

In the preparation of boxing for cushions and furniture, it is well known that a cord is first attached to one or more of the edge portions of the boxing after which it is sewed to the front and back surfaces of the cushion or other portions of the upholstered furniture. In the past, it was common practice to stitch or sew a cord at one edge of a boxing strip, the strip being subsequently sewed to other portions of the cushion or piece of furniture. In many instances, two cords were used, one at each edge of the strip, the strip being sewn around the edges of the cushion or around the back and/or front of a piece of furniture.

The present invention relates to a method of preparing the cord so that it may be adhesively attached to the edge portions of a strip of fabric, either cloth or plastic, and which will remain attached until the strip is sewed in its final position or separated by hand for splicing. The invention thus provides an adhesive-covered cord which can resist temperatures up to approximately 200 degrees F. to withstand storage and shipping but which will become tacky or workable at approximately 250 degrees F., a temperature which will not harm cloth or plastic. The working range of the adhesive is between 250 and 400 degrees F. In this range, the material may be heated in several manners, such as by contact with electrically heated shoes or by hot air. The adhesive is also one which will not bleed through the material and whose adhesiveness can only be destroyed by extremely high heat or solvent. It is a thermoplastic which is flexible, slick, non-tacky, and dry at normal temperatures, and is commercially available.

Although this adhesive has these desirable characteristics, it may be applied to the cord in a special manner. That is, a limited amount must be applied to prevent brittleness of the cord, since the cord must be flexible to make bends around corners of upholstery. It also must be applied in sufficient amounts and in the proper manner to insure the attachment of the fabric to the cord. Furthermore, it is desirable that the ends of the fabric be easily removable from the cord by hand to permit splices to be made between the ends of the strips of fabric materials.

The present invention is directed to a mechanism for applying adhesive to cord so that it may be eventually satisfactorily attached to fabric or plastic.

The principal object of the invention, therefore, is to facilitate the application of an adhesive to a boxing cord.

Another object of the invention is to provide an improved method of and means for applying a thermoplastic adhesive to a cord to be eventually attached to a fabric.

A further object of the invention is to provide an improved method of and apparatus for producing an adhesive-covered cord which will not adhere to contacting portions thereof but may be readily processed to adhere to fabrics and plastics.

A better understanding of this invention may be had

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from the following detailed description when read in connection with the accompanying drawings, in which:

FIG. 1 is a diagrammatic elevational view of a mechanism embodying the invention;

FIG. 2 is a cross-sectional view taken along the line 2—2 of FIG. 1;

FIG. 3 is a cross-sectional view taken along the line 3—3 of FIG. 2;

FIG. 4 is a perspective view of a portion of cord produced with the invention; and

FIG. 5 is a perspective view showing the cord attached to a strip of fabric.

Referring, now, to the drawings in which the same numerals refer to like elements, a tank 5 contains a thermoplastic adhesive 6, such as mentioned above, in which are two commercial electrical heating units 7 and 8. These heating units may be controlled by commercial thermostats.

From a supply reel 10, a twisted or braided cellulose or similar type of boxing cord 11 is guided by a guide 9 and rollers 12 into a tube 19, the cord exiting from the tube into a cooling unit 14 from which it is fed over pulleys 15 and 16 to a takeup reel 17 driven by a motor 18 which pulls the cord through the tank 5 and unit 14. As shown in FIGS. 2 and 3, the tube 19 has a wall 13 within which are quadrant sections 25 with end sections 26 and 27. Passing through the quadrant and end sections is a lower centrally positioned longitudinal bore 20 of one diameter and an upper centrally positioned longitudinal bore 21 of a slightly larger diameter connecting with the bore 20. Four equally-spaced slots 22 having tapered ends 23 permit the thermoplastic 6 to reach the cord 11 passing through the bore 20 and the lower end of bore 21. To further describe this unit, the insert in tube 19 is made up of bored end sections 26 and 27 which are integral with the intermediate quadrant sections 25 produced by slots 22 which permit the adhesive to enter the slots in the tube 19 and slots 22 to contact the cord 11. If desired, the tube 19 can be rotated to vary the openings between slots therein and the slots 22 between quadrants 25.

As mentioned above, a predetermined excessive amount of adhesive cannot be applied to the cord, as it destroys its flexibility, but a sufficient amount must be applied to insure the desired bond between the cord and the material with which it is used, the bond to be maintained until the boxing is sewn to other fabric with which it is used. Since the cord used in upholstery boxing is not of constant or uniform diameter throughout, the application of the adhesive must be applied in a manner to make certain of a proper bond without rigidity. The adhesive mentioned above is one which will bond to a fabric or plastic in a manner similar to the attachment of a moist warm element to cold metal, and is one which will not deposit on the guides through which the cord is directed during the attachment of the cord to the fabric. The proper amount of adhesive and the special manner in which it is deposited on the cord is accomplished by the apparatus above described.

As shown in FIG. 4, the cord 11 is of a spiral configuration and when pulled through the bore 20, the internal diameter of which is very slightly greater than the diameter of the cord 11, will twist by contact with the wall of the bore. Thus, the adhesive passing through the slots 22 to the cord 11 in bore 20 is applied intermittently in spiral rows or lines on the low spots of the cord as shown at 28. It has been found, however, that applying the adhesive only at the low spots on the cord is generally insufficient to provide the proper bond between the cord and boxing material when the adhesive is heated and brought in contact with the material as

disclosed and claimed in our copending application, Serial No. 88,923, filed Feb. 13, 1961.

Thus, to provide smear points such as shown at 29 on the high points of the cord, the diameter of bore 21 is slightly larger to permit the liquid adhesive to flow to the high points. However, the speed of the cord through the bore 21, and the fact that the cord and adhesive are in contact only during the passage of the cord through the short lower length of the bore 21, only the desired amount of adhesive is applied as smears to the high points of the cord. By applying the adhesive in spirals, there will always be adhesive in contact with the boxing material even when the cord is in contact along a narrow portion of the material, the smear spots insuring proper bonding when the edge portions 30 and 31 of the material 32 are wrapped around cords 34 and 35 as shown in FIG. 5 with the apparatus disclosed and claimed in our copending application mentioned above. The cords are never completely covered by the adhesive to avoid brittleness of the coated cords.

By passing the cord through the cooling apparatus 14 as it leaves the tube 19, the adhesive is immediately hardened and the cord may be wound on the reel 17 without fear of having the contacting turns adhere to one another during storage and shipping.

It is to be understood that other normally liquid types of adhesives may be used, together with a drying step, before winding upon a storage reel.

We claim:

1. The method of applying an adhesive at predetermined points on a twisted cord, said adhesive being adapted to be subsequently heated for attachment to fabric, comprising obtaining an adhesive in liquid form, passing said cord through a tube having a bore of a diameter approximately that of said cord, said cord being rotated as it passes through said bore due to the twist therein, said liquid flowing through a plurality of openings in the walls of said tube adjacent said cord to apply said liquid adhesive to said cord only at a plurality of points longitudinally and circumferentially thereof, passing said cord to a slightly larger diameter portion of said bore for a predetermined time period determined by the speed of passage of said cord through said larger diameter portion for applying adhesive to said cord at other points on said cord, and reducing said adhesive to a solid state.

2. The method in accordance with claim 1 in which said cord is rotated by friction between the surface of said first-mentioned portion of said bore and said cord to apply said adhesive to said cord in spiral rows.

3. The method in accordance with claim 1 in which said twisted cord is rotated during passage through said first-mentioned portion of said bore to apply said adhesive spirally to the low points of said cord while in said first-mentioned portion of said bore, said adhesive being applied to the high points on said cord in said larger portion of said bore.

4. Apparatus for applying a liquid adhesive to a wetting cord comprising means for containing said adhesive in liquid form, a tube mounted in a side of said adhesive-containing means and extending into said adhesive, said tube having longitudinal slots therein and enclosing two axially interconnected internal bores of different diameters, a portion of said tube having the larger diameter bore extending above the surface of said adhesive passages being provided between said slots and said bores

to conduct said liquid adhesive from said adhesive containing means to said bores, means for moving said cord through said bores, said cord moving from said smaller diameter bore to said larger diameter bore, and means for rendering said liquid adhesive solid after passage through said bores.

5. Apparatus in accordance with claim 4 in which quadrant sections are enclosed in said tube and said passages include four circumferentially-positioned longitudinal slots between said sections in alignment with said slots in said tube through which said adhesive is conducted to said bores.

6. Apparatus for applying a normally solid adhesive to a cord of spiral construction comprising means for heating a solid adhesive to liquid form, means for containing said liquid adhesive, a tube attached to a side of said containing means and extending into said liquid, said tube having a portion thereof above the surface of said liquid and having longitudinally positioned slots therein connected with a pair of axially positioned bores of different diameters, quadrant sections enclosed by said tube, said sections having longitudinally positioned slots therein in alignment with said slots in said tube and terminating at said bores, and means for moving said cord through said bores.

7. Apparatus in accordance with claim 6 in which each of said bores has a different diameter, said cord having a diameter substantially that of the smaller bore and being adapted to pass from the smaller diameter bore to the larger diameter bore, adhesive being applied through said aligned slots to certain portions of the surface of said cord when in said bore of smaller diameter and to other portions of the surface of said cord when in said bore of larger diameter.

8. Apparatus in accordance with claim 6 in which means are provided for cooling said adhesive applied to said cord to a solid state.

9. Apparatus in accordance with claim 7 in which the friction between said spirally constructed cord and the surface of said bore of smaller diameter rotates said cord to apply said adhesive on said cord along spiral lines as said cord moving means moves said cord through said smaller diameter bore, cooling means for said adhesive being provided.

10. Apparatus for applying a liquid adhesive to a wetting cord comprising means for containing said adhesive in liquid form, a tube in said liquid adhesive in said containing means and having one end attached to a wall of said containing means and the other end above the surface of said adhesive, spaced quadrant sections in said tube to form a bore therein, said quadrant sections having end portions with bores therein of different diameters, a section of the larger diameter portion being above the surface of said adhesive, said tube having longitudinal slots therein aligned with the spaces between said quadrant sections to permit passage of said liquid adhesive to said bores, and means for moving said cord through said bores.

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