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3,226,799

PAINT ROLLER AND METHOD OF MAKING SAME

Filed June 1, 1965

3 Sheets-Sheet 1

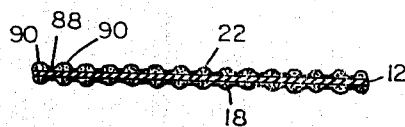
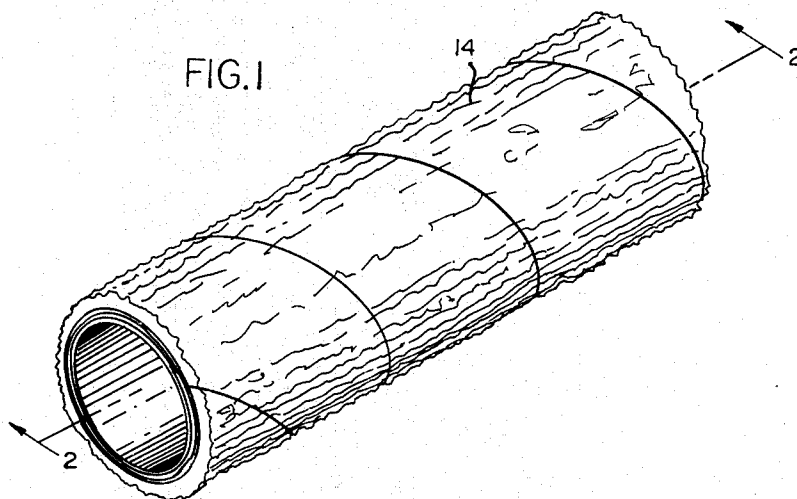


FIG. 6

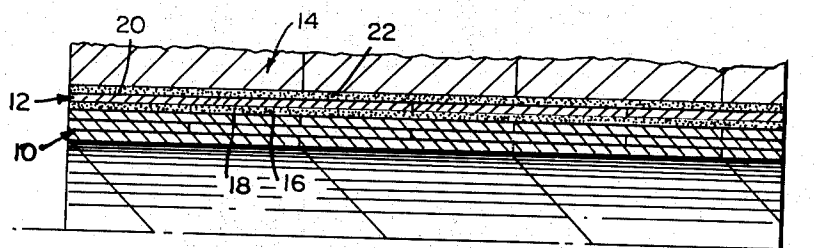


FIG. 2

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3 Sheets-Sheet 2

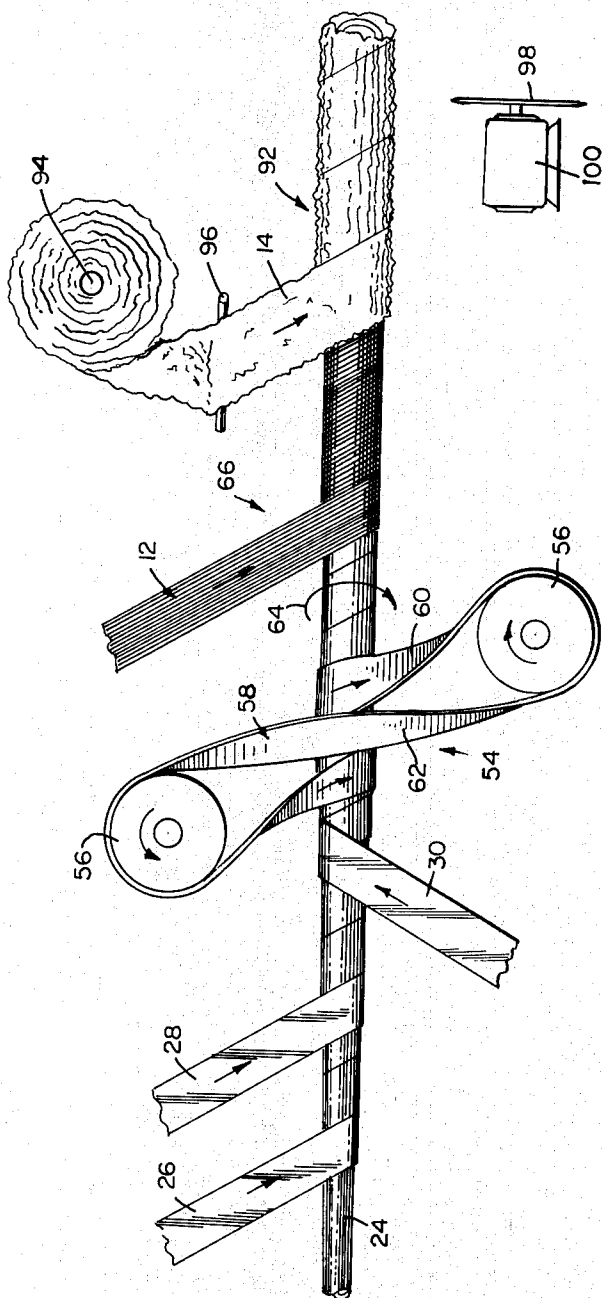


FIG. 3

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3 Sheets-Sheet 3

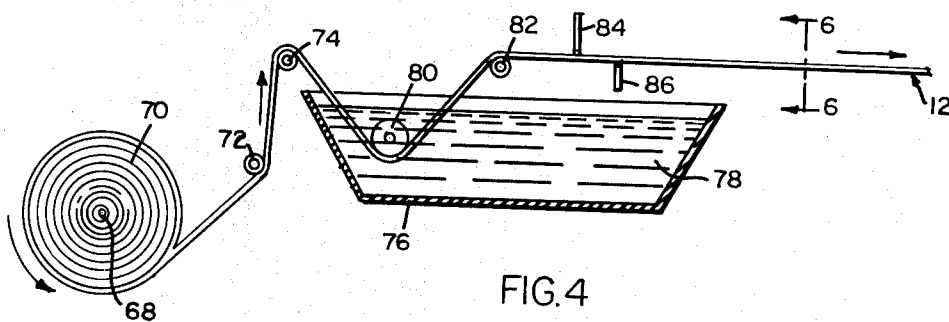


FIG. 4

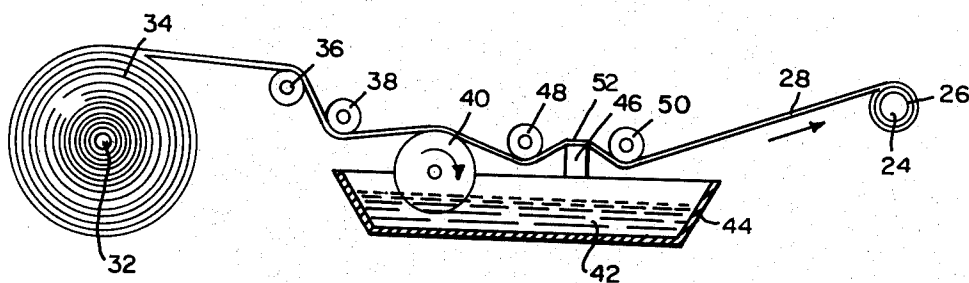


FIG. 5

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PAINT ROLLER AND METHOD OF MAKING SAME

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Filed June 1, 1965, Ser. No. 460,147
6 Claims. (Cl. 29-120)

This invention relates to paint rollers and more particularly comprises a new and improved disposable paint roller and a method of making the same.

In the manufacture of paint rollers it is essential that the outer fabric used as the paint applicator be perfectly smooth upon its supporting core if the paint roller is to serve satisfactorily in applying paint to a surface. If any bumps or ridges are formed beneath the fabric their images will be cast in the surface being painted and consequently the painting will not be satisfactory.

One important object of this invention is to provide a paint roller which is free of bumps and ridges beneath the fabric paint applying layer.

Another important object of this invention is to provide a method of manufacturing paint rollers very inexpensively so that the product in turn may truly be disposable.

In accordance with the prior art an adhesive coating is applied to the core of the roller and subsequently a sleeve made of a high pile fabric is slipped over the core and held in place by the adhesive. Difficulties arise in this mode of manufacture due to the tendency to use either too little or too much adhesive between the fabric and the core. If too little adhesive is used the fabric will not properly adhere to the core and may shift during use, and if too much adhesive is used, the adhesive will tend to form ridges and bumps beneath the fabric which results in a roller having other than a smooth surface for the application of paint.

Yet another important object of this invention is to provide means for uniformly applying an adhesive coating of the desired thickness on the core of a paint roller, which will secure the fabric to the core.

To accomplish these and other objects, the paint roller of this invention includes a multi-ply cardboard tube as the core of the roller. A paper carrier is helically wound about the tube and carries a coating of adhesive on its outer surface, which has been run through a comb to remove surplus adhesive from the carrier and spread the glue evenly on the carrier. A high pile fabric is helically wound on the carrier and is adhered to the tube by the adhesive.

In accordance with the method of this invention, the roller is made by continuously winding multiple layers of cardboard ribbon onto a mandrel to form a continuous cardboard roll. A ribbon of paper is helically wound over the tube, which paper serves as an adhesive carrier. The adhesive is applied to the paper ribbon before it is wound on the tube, and the coating of adhesive on the lower surface of the paper serves to secure the paper to the tube, and the coating on the upper surface of the paper serves to secure the pile fabric to the tube. Subsequently the pile fabric cut in ribbon form is helically wound on the carrier.

These and other objects and features of this invention along with its incident advantages will be better understood and appreciated from the following detailed description of one embodiment thereof, selected for purposes of illustration and shown in the accompanying drawing, in which:

FIG. 1 is a perspective view of a paint roller constructed in accordance with this invention;

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

FIG. 3 is a plan view, partially diagrammatic, showing the method of making the roller shown in FIGS. 1 and 2;

FIG. 4 is a diagrammatic view showing the application of adhesive to the carrier in accordance with the method of FIG. 3;

FIG. 5 is a diagrammatic view showing the application of adhesive to one of the cardboard plies in accordance with the method of FIG. 3; and

FIG. 6 is a cross-sectional view taken along the corresponding section line in FIG. 4.

The paint roller shown in FIGS. 1 and 2 is composed of a core 10, a carrier 12 and a paint applicator in the form of a cover 14. In order for the roller to be truly disposable, it must necessarily be made of inexpensive materials. The roller shown in FIGS. 1 and 2 is in fact disposable. In the preferred embodiment shown, the core 10 is a conventional triple-ply cardboard tube having a total wall thickness of approximately $\frac{1}{16}$ " and having an outer diameter of approximately $1\frac{5}{8}$ ". The carrier 12 is glued to the outer surface 16 of the core tube 10 by a film of adhesive 18. Preferably the carrier 12 is made of a kraft-type paper in the form of a ribbon spirally wound about the core as a continuous process. The carrier 12 on its outer surface 20 carries an adhesive coating 22 which is preferably made up of a series of ribs and channels as shown in FIG. 6. The advantage of this configuration for the adhesive coating 22 will be described in detail below. The high pile fabric 14 which serves as the paint carrier and applicator, like the paper carrier 12, is applied as a continuous ribbon spirally wound about the tube onto the adhesive layer 22. As the roller is intended to be disposable, the fabric covering layer 14 may be an inexpensive material such as a high pile rayon fabric.

It is essential that no ridges or bumps be formed on the core beneath the fabric covering layer 14 which may project into the fabric layer and distort its otherwise smooth base surface. It will be appreciated that if bumps or ridges of any significant size are formed between the carrier 12 and the fabric cover 14, they will impair the smooth surface of the fabric cover, and when the roll is rolled over a surface during the application of paint or other decorative coating, a different pressure will be applied at the location of the bumps or ridges to the coating than at the remaining areas of the roller. Consequently, an impression or image will be cast into the decorative coating applied by the roller, which will render the job unsatisfactory. In order to achieve a smooth surface for supporting the fabric 14, it is particularly essential that the adhesive coating 22 on the carrier 12 which lies immediately beneath the fabric be free of all pronounced ridges and bumps. Consequently, an even distribution of the coating 22 is essential. In order to do this, the coating 22 is not applied directly to the core 10 but rather is applied in a special manner to carrier 12 as is described below in connection with the method of manufacturing the roller.

In FIG. 3 a mandrel 24 is suggested about which the various layers of the paint roller are wound. On the left end of the drawing, three ribbons of cardboard are shown being helically wound about the mandrel to form the triple-ply cardboard roller that serves as the core of the device. As is conventional in the manufacture of triple-ply rollers, the inner ply formed by the cardboard ribbon 26 does not carry any adhesive. However, the inner (lower) surface of the second ply forming ribbon 28 is precoated with an adhesive material as is the inner (upper) surface of the third ply of ribbon 30.

In FIG. 5 a typical installation for the application of adhesive to the cardboard ribbon is shown. In that figure, a spindle 32 supports a large roll 34 of cardboard ribbon. The ribbon runs between a pair of guide rollers

36 and 38 and over the upper surface of a transfer roller 40 which is partially submerged in the adhesive 42 within the glue pot 44. The transfer roller 40 applies a coating of adhesive to the lower surface of the ribbon, and the coating is controlled by a spreader bar 46 over which it runs above the pot 44. A pair of guide rollers 48 and 50 runs the lower surface of the ribbon firmly over the upper edge 52 of the spreader bar 46 so as to distribute the adhesive on the lower surface and remove any excess which may have been applied to that surface by the transfer roller 40. From that point the ribbon is directly wound upon the mandrel as one of the two upper plies which make up the core tube. In FIG. 5 it will be appreciated that the configuration of the parts is suitable for applying the adhesive to the ribbon 28. This same arrangement may be used to apply adhesive to the upper surface of the ribbon 30 by inverting the ribbon after it leaves the guide roller 50.

In the embodiment shown in FIG. 3 the mandrel 24 is not rotated but rather the three-ply core tube 10 defined by the ribbons 26, 28 and 30 is rotated as the tube grows to the right as viewed in FIG. 3. That is, as the tube rotates, the turns of each of the ribbons move to the right as additional turns of ribbon are deposited on the left as each of the ribbons is wound upon or about the mandrel. Rotation of the tube is achieved by the belt and pulley arrangement suggested at 54 just beyond the location where the ribbons 26, 28 and 30 are applied. The assembly 54 includes a pair of pulleys 56, one of which is ordinarily driven by a motor, and a belt 58 which has one run 60 looped about the roller on the mandrel and the other run 62 which passes above the roller directly from one pulley to the other. It is evident that when the pulleys 56 rotate in the direction suggested by their arrows, the belt 58 moves in the direction suggested by arrow 64. The belt 58 not only serves to rotate the tube but also serves to press each turn of the tube firmly in place.

As the roller core grows to the right as viewed in FIG. 3, it reaches the station 66 where the carrier ribbon 12 is applied to its surface. The carrier 12 preferably is made of kraft paper approximately 2 3/4" wide, and the carrier is precoated with adhesive both on its upper and lower surfaces before it is wound upon the roller. The adhesive coating on the lower surface of the carrier 12 secures the carrier to the roller core while the adhesive coating on its upper surface secures the fabric cover 14 to the roller.

In FIG. 4 a typical installation for the application of adhesive to the carrier 12 is shown. In that figure, a spindle 68 is shown to carry a large roll 70 of kraft paper, and the kraft paper is directed by guide rollers 72 and 74 into the glue pot 76 where the carrier is fully submerged into the adhesive 78. Emergence of the carrier is achieved by passing it below the roller 80 which itself lies below the level of the adhesive in the pot. The carrier 12 is subsequently guided about the roller 82 and between the combs 84 and 86 that spread the adhesive picked up by the carrier when submerged in the pot and form the adhesive into narrow ribs and channels as suggested in FIG. 6. It will be noted that in that figure the comb 84 forms the coating 22 of adhesive on the upper surface of the carrier 12 into closely spaced ribs 90 with valleys 88 between adjacent ribs. Precisely the same configuration is imparted to the coating 18 of adhesive on the lower surface of the carrier. The viscosity of the adhesive causes it to remain in the ribbed configuration created by the combs 84 and 86.

While some advantage is derived in providing this configuration to the coating 18, very substantial advantage is derived from applying this configuration to the coating 22 which adheres the fabric covering 14 to the roller. Tests indicate that when the adhesive coating 22 is not spread in the configuration shown, there is a marked tendency for the adhesive to be too heavily applied, which

causes the adhesive to puddle and subsequently form bumps over the surface of the carrier which in turn reflect through the fabric covering. With the particular configuration shown for the coating 22 there is no excess of adhesive, and a smooth uniform bond is created between the fabric cover and the carrier. The coating 18 in turn provides a firm bond between the carrier and the core in the end that the fabric covering is secured in place with a smooth supporting base.

Continued rotation of the roll with the carrier imparted by the assembly 54 causes the carrier to effectively grow to the right as viewed in FIG. 3. At station 92 the fabric covering 14 is applied in a spiral configuration parallel to the carrier 12. Typically, the fabric ribbon 14 may be the same width as the carrier 12 that is, approximately 2 3/4", and it is wound upon the adhesive coating 22 with the edges of the fabric ribbon substantially abutting one another. It is important to avoid overlapping of the edges of the fabric from turn to turn, which would cause ridges to form in the fabric surface, and it is also important that the edges lie very close to one another to avoid the formation of any substantial gaps between adjacent turns. Because the fabric covering is applied adjacent the carrier, the adhesive coating 22 on the carrier is in a tacky state, and therefore the fabric adheres firmly to the carrier.

In FIG. 3 the fabric ribbon 14 is shown wound horizontally about the vertical spindle 94, and the fabric is turned 90° about the guide post 96 and placed in a horizontal plane in a position to be wound upon the roller. It is to be understood that the fabric ribbon may be stored in any convenient manner and fed to the station 92.

In accordance with the method thus far described, the fabric covered roller is "grown" in a continuous operation, and it is essential that the continuous roller be cut into usable lengths. In order to accomplish this, a rotary cutting blade 98 driven by motor 100 is shown positioned adjacent the roller beyond the station 92. By means not shown the blade may be moved across the path of the tube intermittently to cut the roller into selected lengths as it grows beyond the rotary blade 98.

It will be evident from the foregoing description that modifications may be made either in the roller or in the method of fabrication without departing from the spirit of this invention. The particular types of adhesive used may vary widely and it is only essential that the adhesive coating 22 be such that it will not dissolve in the solvents and spirits found in water base and oil base paints. A typical acceptable adhesive is made by Morningstar Paisley, Inc. identified as Paint Roller Adhesive 72-7247. The particular character of the fabric itself may vary widely also.

Because numerous modifications may be made of this invention without departing from its spirit, it is not intended to limit the breadth of this invention to the specific embodiments illustrated and described. Rather, it is intended that the scope be determined by the appended claims and their equivalents.

What is claimed is:

1. A paint roller comprising a triple-ply cardboard tube, a paper carrier helically wound about and cemented to the tube, a coating of adhesive carried on the outer surface of the carrier and shaped into narrow parallel ribs running helically about the roll, and a high pile fabric helically wound on and adhered to the carrier.
2. A paint roller as defined in claim 1 further characterized by said carrier being a kraft paper.
3. A paint roller as defined in claim 1 further characterized by said high pile fabric being a rayon fabric.

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4. A method of making disposable paint rollers comprising the steps of

continuously winding multiple layers of cardboard ribbon onto a mandrel to form a continuous cardboard roll,

continuously rotating the roll as the cardboard is wound on the mandrel,

providing a roll of paper and continuously coating both sides of said paper with an adhesive and controlling

distribution of said adhesive on said paper to provide for substantially uniform adhesion of said paper

to said cardboard roll and to a later applied fabric,

continuously winding the coated paper onto the rotating roll,

continuously winding said fabric capable of carrying paint onto the coated paper,

and cutting the roll intermittently into selected lengths whereby a paint roller is provided which is substantially free of bumps and ridges beneath a fabric layer.

5. A method in accordance with the method of claim 4 wherein said roll of paper is continuously coated by

continuously running the paper in strip form through a bath of adhesive.

6. A method of making a disposable paint roller as defined in claim 5 further characterized by

running a comb over the surface of the paper after it

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emerges from the bath to form the adhesive coating into ribs running lengthwise of the strip.

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