Nov. 23, 1954 S. B. COOLIDGE, JR., ET AL 2,694,874

APPLICATOR ROLL

Filed Sept. 3, 1953

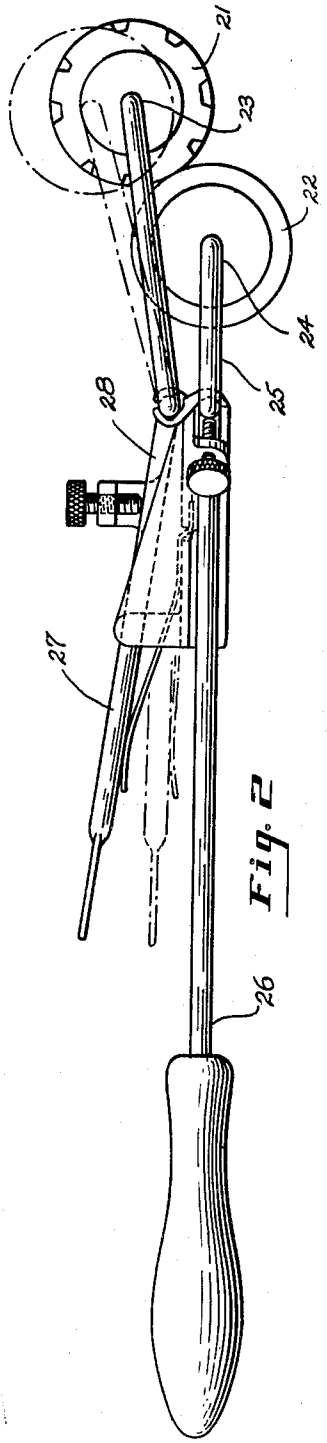


Fig. 2

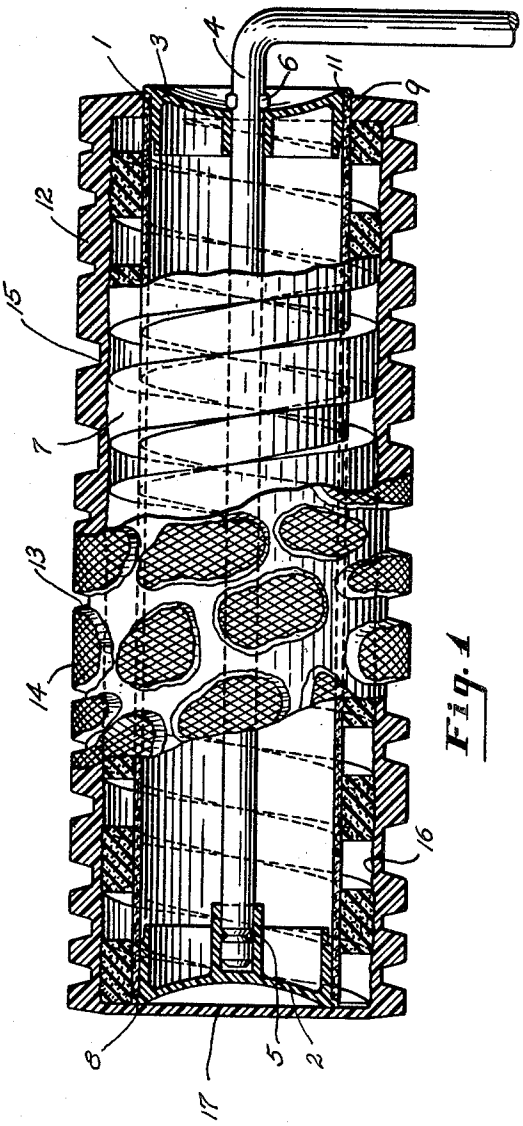


Fig. 4

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United States Patent Office 2,694,874
Patented Nov. 23, 1954

2,694,874

APPLICATOR ROLL

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Application September 3, 1953, Serial No. 378,364

2 Claims. (Cl. 41—5.5)

This invention relates as indicated to an improved applicator roll, and more particularly to the structure of the applicator roll normally used as one of a pair of normally contacting rollers for the casting of a design or other image on a surface.

Roller devices comprising two or more contacting rolls have long been used for applying coatings to flat surfaces either as an overall coating or a patterned coating. Recently there has been a great deal of interest in developing a "do-it-yourself" market and one of the phases of this market development has been to make available to the home owner equipment which will enable him to decorate wall surfaces conveniently. Hence, a number of problems have arisen in connection with such equipment. The solution of these problems was not as necessary where highly skilled personnel were doing the work, but they must be solved to enable the unskilled individual to do a comparable job.

One of such problems is the weight of the device. The pattern roller shown in Patent 2,118,719, for example, when filled with paint weighs about 8 pounds. Perhaps a professional painter could wield such a device with ease, but the week-end painter would quickly tire. Other devices of the reservoir type containing up to 1 pint or more of liquid also cause rapid tiring after short use.

It is one of the objects of this invention to produce an improved, sturdy, but relatively light applicator roll device for use in imprinting a pattern on a flat surface.

Another problem arises in the ability of the roller to reproduce the design or pattern faithfully. A skilled artisan may be able to apply uniformly the correct pressure found by experience to prevent slipping of the pattern roll over the surface without consequent smearing of the design. However, the inexperienced "do-it-yourself" painter cannot be expected to take the time to learn the technique required.

Thus, it is another object of this invention to provide a device which will yield improved reproduction of a design having a minimum of slippage over a range of contact pressures such as normally encountered when the roller is carried across the surface in contact therewith by the unskilled painter.

Another object of this invention is to provide an applicator roll which is provided with means for preventing the liquid being applied from getting into the interior of the roll where it may cause damage to the parts as by causing swelling or disintegration of supporting members or the design sleeve itself.

Other objects of this invention appear as the description proceeds.

To the accomplishment of the foregoing and related ends, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the appended claims, the following description and annexed drawing setting forth in detail certain illustrative embodiments of the invention, such disclosed means constituting, however, but a few of the various forms in which the principle of this invention may be employed.

In the annexed drawings:

Fig. 1 is a longitudinal cross-sectional view of an improved roller structure of this invention.

Fig. 2 shows a side elevation of a complete design applicator device including an applicator roll of this invention.

Broadly stated, therefore, this invention is in an applicator roll comprising a physically rigid hollow core having an axle disposed through its center about which said core is free to rotate, a sponge rubber (or other highly resilient—less than 25 Durometer) spacer wrapped about said core as an open helix and a design bearing sleeve of resilient (i. e., 30–60 Durometer) elastomeric material having a cover portion for the free end of said roller integrally cast therewith, the open end of said roll being provided with fluid sealing means for preventing entrance of fluid to the interior thereof.

Referring now more particularly to Fig. 1, showing one embodiment of this invention, there is provided a hollow core **1** which may be made of any rigid material, such as, fiber board, metal, resin impregnated fiber board, etc. The hollow core **1** is conveniently of cylindrical shape and fitted with suitable end caps **2** and **3**, adapted to receive an axle **4** about which the core-end cap assembly is free to rotate. Suitable detent means **5** is provided in end-cap **2** and, to prevent lateral motion along the axle **4**, detent means **6** are provided on the axle **4**. The end caps **2** and **3** may be made of any suitable material, but in the interests of low weight, are conveniently made of polyethylene. Polyethylene, or other such plastic material, has the advantage that it is not attacked by solvents normally employed in the paints applied by such design rollers.

Surrounding the core **1** there is provided a winding **7** composed of a spongy resilient material, such as sponge rubber, or other such foamed elastomer and conveniently adhered to the core **1** by a suitable adhesive material. These sponge rubber elastomers before "sponging" usually have a Durometer rating or number of from about 30–60 and after sponging is, of course, much less. Commercial sponge rubbers come as "soft," "medium," or "firm." The "soft" to "medium" grades from 50–60 Durometer stock may be employed herein. The winding **7** is wound about the core **1** as an open helix such that there is a space between successive turns amounting to somewhat less than the width of the spongy material used in making the winding **7**. The reason for this will appear hereinafter. The helical winding **7** may begin flush with the remote or free end **8** of the hollow core **1**. However, because of the flange **9** on the plastic sleeve **12**, the helical winding **7** ends short of the closed end **11** of the core **1**. In the embodiment shown in Fig. 1, the sponge rubber material used for forming the winding **7** is about ½ inch wide, and the spacings between successive turns is about ⅜ of an inch and the thickness of the spongy material is somewhat less than the space between the windings. The sponge rubber winding can have any convenient thickness, such as, for example, ¼ of an inch. The reason for selection of these dimensions or those approximating them is that the tendency to twisting is minimized and should a rib or turn undergo twisting, it will fall short of the adjacent turn and hence not distort that turn and the sleeve portion immediately above it.

In accordance with Fig. 1 there is also provided a plastic sleeve **12** which fits over the winding **7** and although not adhered thereto by adhesive means, is in contact therewith so that a slight pressure is exerted by the sponge material winding against the sleeve **12**. The reason for this is to prevent slippage of the internal members of the application roller within the sleeve **12**. The sleeve **12** contains on its outer face any desired design **13** or form to be printed. It is also desirable that the raised surface **14** which will carry the paint from the feeder roll **22** shown in Fig. 2 to the surface being decorated should have a very slightly roughened surface in order to minimize slippage of the roll over the surface being decorated and to improve the pickup of paint from the feeder roll. Such roughened surface may be cast initially into the sleeve **12** or imparted by sanding the raised portions **13** lightly with a coarse sandpaper after casting.

The thickness of the sleeve **12** in the valley portions **15** should be sufficient to impart enough rigidity to the

sleeve member **12** to enable the device to stand unsupported except from one end thereof without collapsing of its own weight. In practice, it has been found that a satisfactory thickness of the sleeve **12** at the points of minimum thickness **15** is about 1/16 of an inch. The inner surface **16** of the sleeve **12** need not be smooth in the sense of having a uniform internal diameter since the resiliency of the sponge rubber winding **7** will be sufficient to account for minor unevenness in the internal surface **16** of the sleeve **12**.

With respect to the design areas or embossed portions **13** of the sleeve, best results have been obtained when the height thereof is from about 3/16" to about 5/16" since in this range the tendency of the paint to bridge between raised areas is minimized.

The plastic sleeve **12** is cast in such a way that it is provided with a closed end **17** which serves not only as a seal to prevent entry of paint-containing solvents, which are deleterious to both the winding and the sleeve, into the interior of the roller, but also to permit carrying the design surface out to the end of the roller whereby one is enabled to impart the design closely to the corners of angularly related adjacent surfaces. If it is desired to improve the rigidity of the end portion of the sleeve **12**, a metal insert, not shown, may be cast integrally with the sleeve.

The sleeve **12** in the illustrated embodiment of this invention is provided at its open end with an inwardly directed flange **9**, the internal diameter of which is equal to or slightly less than the external diameter of the core **1** such that when the sleeve **12** is placed over the winding **7** on the core **1**, the flange portion **9** frictionally engages the core **1** forming a substantially fluid-tight seal therewith. The inner edge of the flange **9** may, if desired, be provided with a longitudinally inwardly extending lip, not shown, to increase the contact area with the core **1**, thereby improving the seal against the passage of fluids from the outside to the interior of the roll.

This is a convenient means of sealing the inner end of the roll to the passage of fluid to the interior. Any suitable means, however, may be employed such as a separate sealing ring, or the like.

It has been found that a most satisfactory method of casting the design carrying sleeve **12** is by the hollow rotational casting method such as described in either the patent to Delacoste and Cornic, 2,624,072, or the patent to Molitor, 2,629,134. The material used for the fabrication of the core **12** is desirably a polyvinyl halide or a co-polymer of a polyvinyl halide such as vinyl chloride-vinyl acetate co-polymer. Particularly satisfactory resins are disclosed in the patent to Semon, 2,188,396. This composition is blended with suitable plasticizers well known in the art, and, if desired, fillers and pigments may also be employed to give color and body to the finished product. The resiliency of the plastic sleeve should be in the range of about 30 to about 60 Durometer.

A suitable mold is provided determining the exterior contour of the article and such portions of the interior contour as are critical. The balance of the interior surface is determined simply by the flowing and congealing of the plastic material. The molds are usually shaped in two sections of a material such as aluminum, easily separable and closing with a fluid-tight seal. A pre-determined amount of the fluid plastic material is deposited within the mold, the mold sections closed and clamped and thereafter rotated through a plurality of planes whereby the entire interior surface of the mold becomes coated with the plastic. The amount of fluid plastic material introduced determines the minimum wall thickness of the finished article. During the rotational operation, the mold is subjected to controlled heat cycles for congealing and finally fusing the plastic within the mold. After fusion of the plastic, the mold and contents are cooled, the mold opened and the finished article removed therefrom by hand with or without the aid of a compressed air jet for separating the plastic from the mold surface.

As indicated above, if it is desired to improve the rigidity of the enclosed end of the sleeve **12**, a metal ring insert may be placed within the mold prior to the casting operation and will become completely embedded within the plastic during the rotational casting operation and thereby firmly held in place. Any suitable plastic material having sufficient elasticity either inherently or through the addition of plasticizers to permit deformation of the sleeve **12** for mounting on the core-winding combination yet stiff enough to effectively transfer a design or pattern will be useful for making sleeves in accordance with this invention. It has been found that for best results, the plastic in final cast form should have a Durometer rating of from 30 to about 60. The Durometer rating in a given plastic material is inversely proportional to the amount of plasticizer used. Because of its resistance to solvents and the low leaching rate of plasticizers therefrom, a most convenient plastic material for use in accordance herewith is a polyvinyl chloride polymer or co-polymer with vinyl acetate or other such vinyl alcohol ester.

Fig. 2 shows the applicator rolls of this invention in place on a design casting device of the type more specifically described and claimed in the application of Axel E. Ogren, Ser. No. 329,323 filed January 2, 1953. There is provided, as shown in Fig. 2, the applicator roll **21**, a supply or feeder roll **22**, each mounted on separate axles **23** and **24**, one end of axle **24** being shaped to form an offset portion **25** terminating in a handle portion **26**. The axle **23** of the design roll **21** is rearwardly, laterally and then again rearwardly extended to form a lever portion **27** which in combination with the clamp means **28** allows a scissors-like motion whereby the applicator roll **21** of this invention may be moved out of contact with the paint supply roll **22** during such time as the paint supply roll **22** is being resupplied with paint from a suitable tray.

The device of the present invention is particularly useful in utilizing a minimum of sponge rubber or the like material, (i. e., about 60% of the amount of sponge rubber compared with that which would be required to completely cover the roll) while at the same time affording sufficient rigidity to the sleeve **12** to permit satisfactory reproduction of the design. The practice of helically winding the sponge rubber about the core **1** is also advantageous in terms of the results which are obtained. Normally the design roller is used in one direction to decorate, for example, a wall surface; that is, it may be moved across the surface vertically or it may be moved across the surface horizontally. The spiral winding method prevents "holidays" in a straight line from top to bottom and, if such holidays do occur, such as after prolonged use of the device where the plastic sleeve **12** has become weakened by exposure to solvents and leaching out of the plasticizer, such holidays will occur in broken areas diagonally with respect to the direction of application and hence be less noticeable than would occur should weakening of the sleeve occur where the spaced sponge rubber material is in the form of annular sponge rubber rings spaced apart. Moreover, by using a minimum of support means such as the sponge rubber winding, the devices of this invention are better able to follow irregularities in the surface being decorated since the resistance offered by air to indentations caused by projections from the surface is less than the resistance offered by the sponge rubber. At the same time, the sponge rubber is not so resistant to deformation that it will not follow curves or slight irregularities in a surface being decorated.

Other modes of applying the principle of this invention may be employed instead of those specifically set forth above, changes being made as regards the details herein disclosed, provided the elements set forth in any of the following claims, or the equivalent of such be employed.

We therefore particularly point out and distinctly claim as our invention:

1. An applicator roll comprising a physically rigid hollow core having an axle disposed through its center about which said core is free to rotate, a sponge rubber spacer wrapped about said core as an open helix, and a design bearing sleeve of resilient elastomeric material having a cover portion for the free end of said roll integrally cast therewith, the open end of said roll being provided with fluid sealing means for preventing entrance of fluid to the interior thereof.

2. An applicator roll comprising a physically rigid hollow core having an axle disposed through its center about which said core is free to rotate, a sponge rubber spacer wrapped about said core as an open helix and

adhered thereto, and a design bearing sleeve of resilient elastomeric material having a cover portion for the free end of said roll integrally cast therewith, the open end of said sleeve being provided with an inwardly directed flange adapted to contact the hollow core in fluid sealing engagement therewith.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,903,152	Watson et al.	Mar. 28, 1933
2,485,428	Bleier et al.	Oct. 18, 1949
2,605,488	Bugg	Aug. 5, 1952