Jan. 28, 1964 H. A. SCHUELER 3,119,137

PAINTING ROLLER

Filed Feb. 23, 1961

FIG. 1

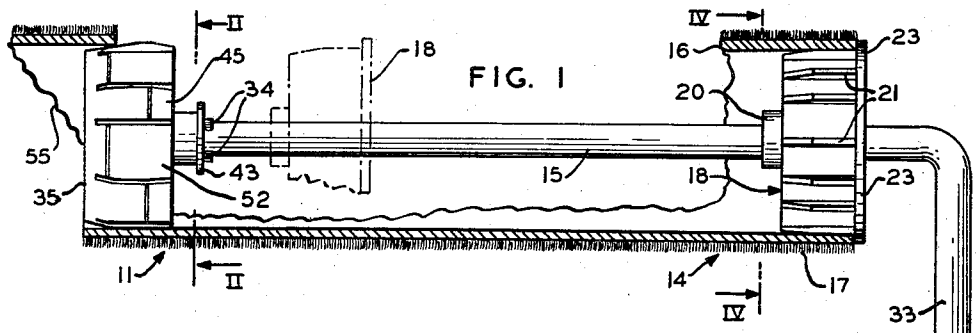
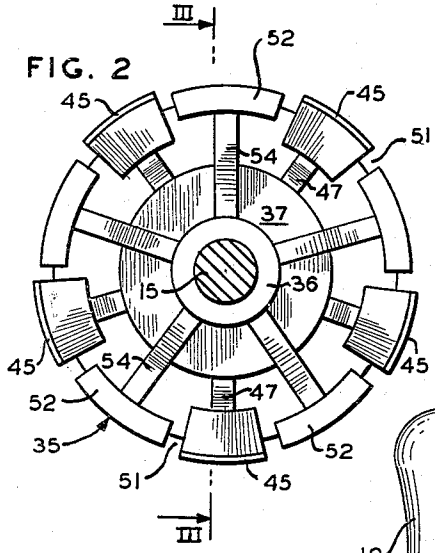


FIG. 2



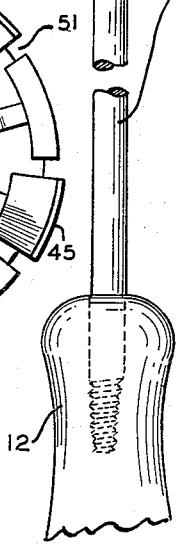


FIG. 3

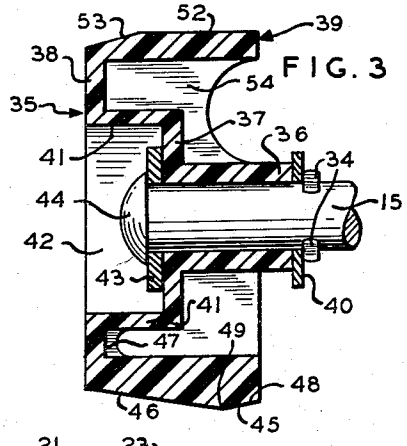


FIG. 4

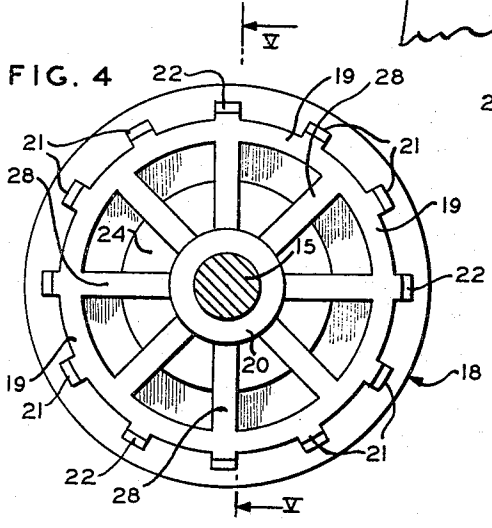
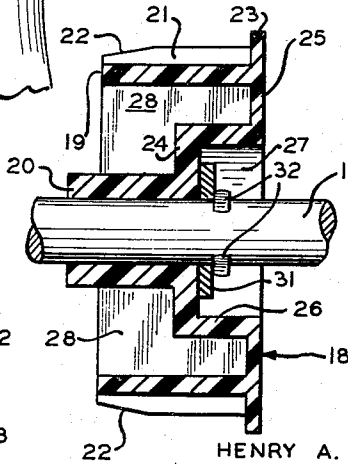


FIG. 5



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PAINTING ROLLER

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This invention relates to applicators for paint and the like and, more particularly, to such as the roller type for applying paint and other coating materials to walls, ceilings and other surfaces.

An object of my invention is to simplify and reduce the cost of the usual painting applicator by making the painting sleeve simple to remove, easier to clean and eliminating the cost of the conventional expansible roller.

Another object of my invention is to provide an improved roller type applicator for paint and the like.

A further object of my invention is to provide an inexpensive applicator of the above type, which is of simple construction and which may be economically fabricated.

A still further object of my invention is to provide an applicator of the above type which could be easily and quickly assembled or disassembled for cleaning and changing sleeves.

These and other objects and advantages will become apparent from the following detailed description when taken with the accompanying drawings. It will be understood that the drawings are for the purposes of illustration and do not define the scope or limits of the invention, reference being had for the latter purpose to the appended claims.

In the drawings, wherein like reference characters denote like parts in the several views:

FIGURE 1 is a fragmentary elevational view, with the paint-carrying sleeve in longitudinal section, indicating, by also showing a dotted-line position of the right-hand head, the permitted relative movement of said head with respect to the left-hand head.

FIGURE 2 is a transverse sectional view on the line II—II of FIGURE 1, in the direction of the arrows and to a larger scale.

FIGURE 3 is a longitudinal sectional view of the head at the left-hand end of the supporting shaft of FIGURE 1, on the line III—III, shown mounted on a fragmentary portion of the supporting shaft and to the scale, of FIGURE 2, in the direction of the arrows.

FIGURE 4 is a transverse sectional view on the line IV—IV of FIGURE 1, in the direction of the arrows and to the scale of FIGURE 2.

FIGURE 5 is a longitudinal sectional view of the right-hand head of FIGURE 1, on the line V—V, shown mounted on a fragmentary portion of the supporting shaft and to the scale, of FIGURE 4, in the direction of the arrows.

Referring now to the drawing in detail, the paint applicator, generally designated **11**, comprises a handle **12** which may be formed of wood, plastic, or other suitable material, a shaft **13**, one end of which is secured to said handle, and a roller generally designated **14**. The handle-engaging end portion of the shaft **13** may be threaded for alternative use with a relatively long or extension handle. The handle **12**, which is spaced from the roller **14**, is preferably located opposite the middle of said roller. The other end of the shaft **13**, conveniently formed from a relatively thin, say, for example, ¼" in diameter metal, desirably "Bethanized" or nickel-plated steel, rod, is formed as a straight axle portion **15** normally centrally disposed within the roller **14**. The axle portion **15** is of a length approximately equal to that of the

roller **14**, with sufficient clearance to avoid interfering with its rotary movement.

The roller **14** comprises an elongated hollow cylindrical sleeve **16**, which may conveniently be formed of cardboard of the like, carrying a paint-absorbing cover **17** on the outside thereof. A suitable paint-absorbing covering may be employed such as, for example, lamb's wool, woven fiber pile, or other material suitable or conventional for the purpose. The inner or right-hand end portion of the sleeve **16**, as viewed in FIGURE 1, is frictionally engaged by and carried on an end cap, mandrel or head **18**. The cap **18** may be conveniently formed of plastic material, examples being linear polyethylene and nylon, or the like. It consists of a relatively-thin annular or hollow cylindrical ring or rim portion **19** having an outside diameter less than that of the inside diameter of the sleeve **16** and carrying on its peripheral surface a plurality of outstanding ribs **21**, in this instance twelve.

The outer edges of said ribs are beveled or tapered to the left, as indicated at **22**, and their outer edges merge into an outstanding annular flange **23**. The outer diameter of the flange **23** approximately corresponds with the outer diameter of the sleeve **16**, so as to form a stop for said sleeve against movement therebeyond to the right, as viewed in FIGURE 1.

The diameter of the outer surface of the ribs **21** is slightly larger than the inner diameter of the sleeve **16** so that, in applying said sleeve to the cap **18**, the latter is wedged in place, with the sleeve passing easily over the first portions of the tapered or beveled parts **22** and then frictionally gripping tightly the remainder of the ribs **21**. Then said sleeve **16** is frictionally held in place on the cap **18** and prevented from undesired rotary or longitudinal movement with respect thereto.

The cap **18** is provided with a hub portion **20** which is normally directly carried or journalled on the axle portion **15** with only sufficient tolerance for free turning thereabout. Said hub portion **20** is connected to the ring portion **19** by transverse annular webs **24** and **25**, in turn connected to and by a hollow cylindrical web **26**, leaving a cylindrical aperture or pocket **27**. The structure between the hub **20**, the webs **24**, **25**, **26** and the ring **19** is braced by a plurality of, in this instance light, radial webs **28** extending from the outer surface of the hub **20** to the inner surface of the ring **19** and longitudinally to the inner surfaces of the webs **24**, **25** and **26**, thereby providing a light but rigid end cap **18**.

Said cap **18** desirably normally abuts a washer **31** which, like the shaft **13**, may be formed of nickel-plated steel or other suitable material. The washer **31** in turn normally engages stop means which may be projections **32** on the axle portion **15** and with the washer **31** normally housed or enclosed in the pocket **27**. The projections **32** may be formed in any desired manner as by upsetitng or pinching out portions of the metal of the axle **15**, as viewed most clearly in FIGURE 5. This limits movement of said cap **18** to the right or toward the angular or axle-supporting portion **33** of the shaft **13**, while not interfering with the movement of said cap **18** to the left, as represented by the dotted-line showing thereof, or even on to where it would engage corresponding stop means, such as crimped out or upset portions or projectings **34** near the free or left-hand end portion of the axle **15**, as viewed in FIGURE 1.

The left-hand end portion of the sleeve **16** is normally supported on an end cap, mandrel or head **35**, which may be formed of plastic or other suitable material like the cap **18**, but which is of somewhat different construction. Like the cap **18**, however, it has a hub portion **36** normally directly carried or journalled on the axle **15** with only sufficient clearance to allow for free rotation. From the hub portion **36** outstands transversely an annular web

37, at the outer or lefthand end portion thereof. The web 37 is connected to another annular transverse web 38, which extends inwardly from the rim or peripheral portions 39, by means of a hollow cylindrical web 41 leaving, as in the case of the cap 18, a cylindrical aperture or pocket 42 into which the free end of the axle 15 protrudes, as shown most clearly in FIGURE 3.

The cap 35, while being permitted to turn freely on the axle 15, is prevented from any appreciable longitudinal movement thereon by stop means. Said stop means may be projections 34 and associated washer 40, which may be like the washer 31, on the one hand, and a similar washer 32 at the free end of said axle and held in place by suitable securing means. The securing means may take the form of a pin 44 force-fitted in a corresponding aperture in the end of the axle 15, or a screw threaded into place in said end, as may be desired. In any event, the cap 35 is normally functionally immovable longitudinally along the axle 15, as will be evident from a consideration of FIGURE 3.

The cap 35 is, like the cap 18, provided with means for gripping the inner surface of the sleeve 16 to prevent undesired longitudinal movement or turning with respect thereto. In this case, however, the means take the form of a plurality, in this instance five, spring fingers 45, as parts of the peripheral portion 39, the outer ends of which are beveled or tapered, as indicated at 46. These fingers 45 are braced against undesired flexing by webs 47 in the hollow or annular space between the web 41 and said fingers 45. The inner portions of the fingers 45, or to the right of the beveling 46, are reversely beveled or tapered to a slight extent, as indicated at 48, so that the maximum diameter of said fingers 45 is at the intersection between these bevels, as indicated at 49, thereby providing for maximum gripping action between said fingers and the sleeve 16, intermediate the ends of said cap 35 to frictionally hold the sleeve in place thereon.

In order to insure against the bending of some of the fingers 45 to a greater extent than others and to provide for centering the sleeve 16 on the cap 35, I provide between the fingers 45, but circumferentially spaced therefrom as indicated at 51, a corresponding series of sleeve-support members 52. The outer ends of said members 52 are tapered or beveled, as indicated at 53. These members 52 are braced and rigidified, with respect to the hub 36 and the webs 37, 38 and 41, by means of radial webs 54, one under each of the five members 52, as shown most clearly in FIGURES 2 and 3.

From the foregoing disclosure it will be seen that, in assembling the sleeve 16 with respect to the caps 35 and 18, said sleeve is applied over the cap 35, starting from about the position indicated at 55 in FIGURE 1. The sleeve 16 is then moved along the beveled portions 53 and 46, reaching the cylindrical portions of the elements 52 beyond said beveled portions 53, while still continuing to move along the beveled portions 46 of the spring fingers 45.

Finally, the peaks 49 of said spring fingers 45 are reached and the maximum gripping effect thereby obtained. The sleeve 16, however, is continued along the cap 35 until it also slides over the cap 18 to the final position, indicated fragmentarily by the reference character 16 in FIGURE 1, where it engages the stop flange 23 on the cap 18. In moving the sleeve to this final position, the ribs 21 firmly grip the inner surface of the sleeve 16 after said sleeve is slid beyond the beveled portions 22 of said ribs, where said sleeve then bridges the distance between the caps 18 and 35, covering them both.

To remove the sleeve 16 from the caps 35 and 18, the same may be pulled therefrom, or to the left as viewed in FIGURE 1. This action starts sliding the sleeve 16 from the spring fingers 45, but the head 18 will follow the sleeve, through the dotted-line portion of FIGURE 1, until said head is finally stopped by the projections 34. The sleeve may then be removed from both heads by further pulling beyond the position designated by the reference character 55.

From the foregoing it will be seen that I have provided a paint roller consisting of a cover member or sleeve 16 which is installed by sliding over an outer end cap 35 and onto an inner end cap 18 until it is stopped by an end flange 23 thereon. The outer cap 35 is constructed to provide adequate pressure on the inside of the cover 16, preventing the latter from slipping longitudinally or turning thereon, which pressure is provided, in the present embodiment, by five contact fingers. This feature is an improvement in that the pressure is provided by integral portions of the plastic cap 35 without the necessity for separately formed resilient means.

The inner end cap 18 is slidable close to the outer cap 35 for easier application and removal, as well as to facilitate cleaning in a minimum amount of liquid.

Said cap 35 is constructed to provide maximum gripping force consistent with strength, which force may be even greater than that provided by the spring fingers 45 as it may be tolerated because of the relatively short distance the sleeve 16 has to be moved thereover to the final position. However, the device is operative without the desirable gripping action of the cap 18 by virtue of the sleeve 16 being gripped by the cap 35 and holding the cap 18 in place by engaging its flange 23. The ribs 21 of the head 18 provide both strength for the unit and means for making it accept covers of varying inside diameters within manufacturing limits. These ribs will tend to flatten as well as bite into the inner surface of the cover 16 as the latter is installed. By having as many as twelve ribs 21, the distoring action of the associated parts as they are fitted together is distributed and there thus occurs no appreciable variation from the cylindrical.

Having now described the invention in detail in accordance with the requirements of the patent statutes, those skilled in this art will have no difficulty in making changes and modifications in the individual parts or their relative assembly in order to meet specific requirements or conditions. Such changes and modifications may be made without departing from the scope and spirit of the invention, as set forth in the following claims.

I claim:

1. A mandrel for the rotatable mounting on a paint roller axle of the cover sleeve of the paint roller, said mandrel having a hub formed to directly journal on said axle, a rim formed as spring fingers and support members integral with the mandrel, said spring fingers being longitudinally beveled both ways from intermediate portions thereof, lying around the periphery, an annular web perpendicular to the mandrel axis and extending inwardly from an outer end of each of said fingers and said support members, webs bracing the connections of said fingers to said annular web and extending radially therebetween, said fingers being formed to resiliently engage the inner surface of said sleeve to frictionally hold it in place on the mandrel, said support members for said sleeve extending longitudinally from said annular web, alternating peripherally with said fingers, and webs rigidly bracing said support members with respect to said annular web and radiating inwardly to said hub.

2. A mandrel as recited in claim 1, wherein there is another annular web, disposed in a transverse plane intermediate the ends of said rim, united to an end portion of said hub, a hollow cylindrical web connecting the outer edge of said other annular web to the inner edge of said first-mentioned annular web, the radiating webs for said support members are united to said other annular web and said hollow cylindrical web, and the radiating webs for said spring fingers are united to said first-mentioned annular web and said cylindrical web.

3. A roller device adapted for the application of paint or the like, comprising a shaft shaped to form a handle portion and an axle portion disposed at an angle to said handle portion, a pair of plastic caps rotatably mounted

on said axle portion, a covering sleeve adapted to be carried by said caps and to hold paint for application as it is rolled over a surface to be painted, the cap nearer the free end of said axle portion being held against longitudinal movement therealong, means on said axle portion to prevent the other cap from moving more than a predetermined distance away from, while allowing it to slide to a position close to, the first mentioned cap, the first mentioned cap having a hub directly journaled on said axle, a rim formed as spring fingers and support members integral with the cap, said spring fingers being longitudinally beveled both ways from intermediate portions thereof, lying around the periphery, an annular web perpendicular to the cap axis and extending inwardly from an end of each of said fingers and said support members, web bracing the connections of said fingers to said annular web and extending radially therebetween, said fingers being formed to resiliently engage the inner surface of said sleeve to frictionally hold it in place on the cap, said support members for said sleeve extending longitudinally from said annular web, alternating peripherally with said fingers, and webs rigidly bracing said support members with respect to said annular web and radiating inwardly to said hub, the other cap having outstanding ribs extending generally parallel to its axis, to slide along and frictionally engage the inner surface of said sleeve to hold it in place, and an annular flange lying in a plane perpendicular to said axis and adapted to be engaged by the adjacent end of said sleeve to limit sliding thereon.

4. A roller device as recited in claim 3, wherein said other cap also has a hub of a size to directly journal on said axle, a hollow cylindrical rim, bracing webs radiating between said rim and hub, said outstanding ribs are tapered from their outer ends, so as to first freely slide along and then frictionally engage the inner surface of said sleeve to hold it in place, said annular flange being extended inwardly as an annular web to which the inner end of said rim connects, another annular web disposed intermediate the first annular web and the end of said rim away from said first annular web, united to an end portion of said hub, and a hollow cylindrical web connecting the outer edge of said other annular web to the inner edge of said first-mentioned annular web, and the radiating bracing webs being united to said other annular web and said hollow cylindrical web.

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