Nov. 10, 1970 R. M. STEBBINS 3,539,268

APPARATUS FOR COVERING A SURFACE WITH COATING MATERIAL

Filed Sept. 11, 1968 2 Sheets-Sheet 1

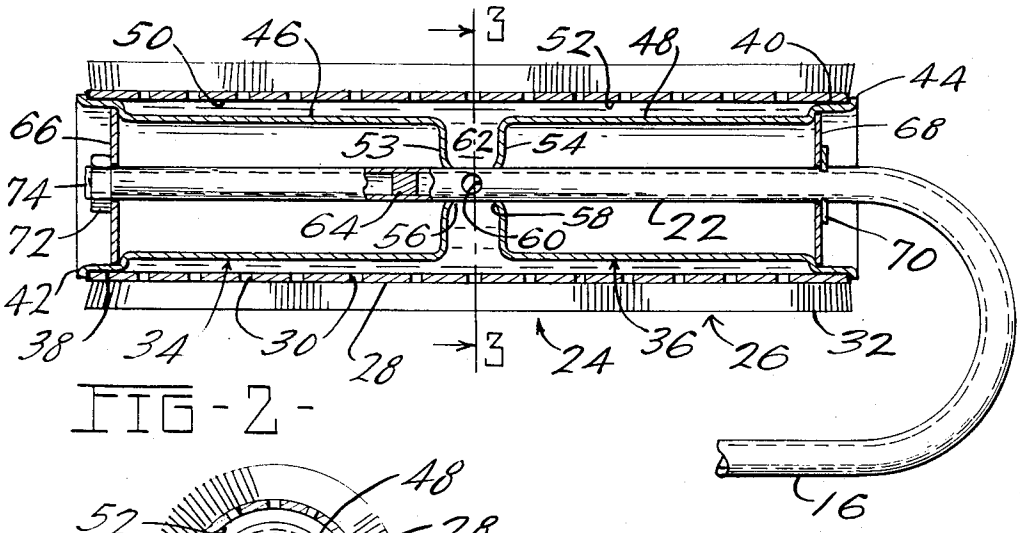


FIG-2-

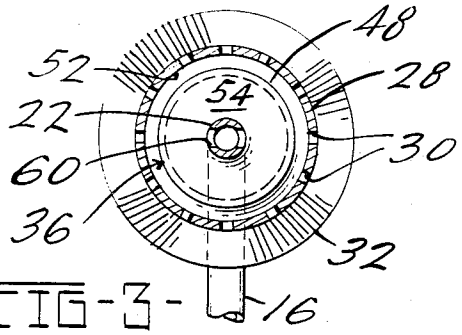


FIG-3-

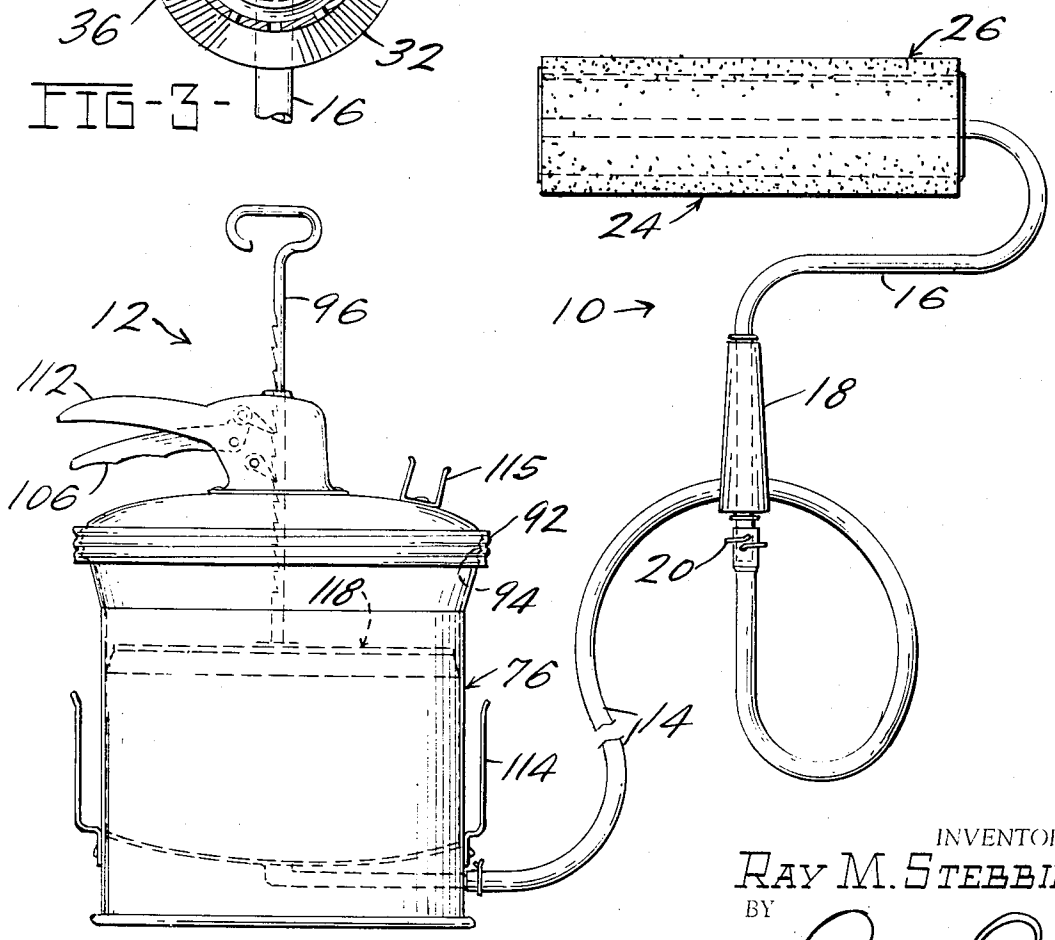


FIG-1-

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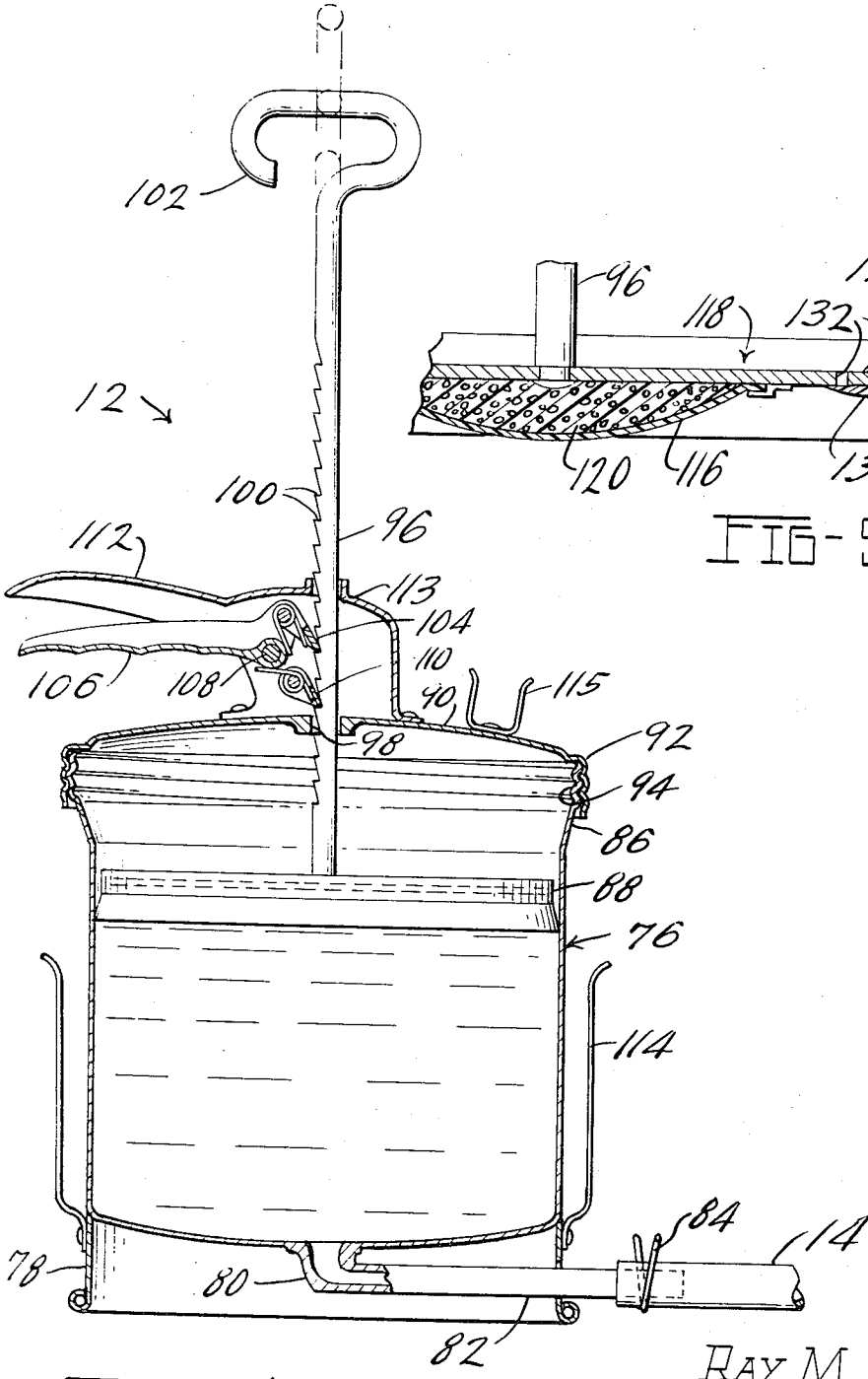


FIG-4-

FIG-5-

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United States Patent Office 3,539,268
Patented Nov. 10, 1970

3,539,268

APPARATUS FOR COVERING A SURFACE WITH COATING MATERIAL

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Filed Sept. 11, 1968, Ser. No. 759,010
Int. Cl. B44d 3/28
U.S. Cl. 401—197 2 Claims

ABSTRACT OF THE DISCLOSURE

Apparatus for rolling on paint includes an improved roller and an improved supply means for continuously feeding paint to the roller. The roller carries a minimum amount of paint which reduces its weight; the roller also has an improved paint supply design with paint seals which retain the paint in the roller producing less friction, so that the roller has a lesser tendency to slide during painting. The paint source includes a positive-acting piston which is hand operated to feed the paint and is of low-cost design.

This invention relates to apparatus for applying coating materials to surfaces.

Paint rolling apparatus including means for continuously supplying paint to a roller has heretofore been proposed in the art. Paint in such instances has been supplied through a hollow tube to the interior of the roller from which it feeds outwardly through a porous applicator cover. The roller in such instances has been full of paint and, consequently, relatively heavy, particularly when used to paint ceilings or used in any application over a lengthy period of time. In the rollers heretofore known, the paint seals between the rotatable rollers and the stationary axle have also been a problem. A liquid-tight seal must be achieved between the roller and the axle, and yet the roller must be sufficiently free to roll around the axle and along the surface without slippage when paint is being applied. Since the coefficient of friction between the roller and the surface being painted is quite low, the seals must be effective and yet enable the roller to roll freely on the axle. Rollers with internal paint supply means heretofore employed have not achieved both an effective seal and free rolling.

In continuous paint supply means for rollers heretofore known, the pressure used to force the paint from a supply source through a flexible conduit to the roller has usually been achieved through use of compressed air supplied by a compressor. The compressor component, being relatively expensive, resulted in the cost of the overall apparatus also being expensive and rendering the market for such apparatus quite limited. Also, the compressor required a source of power which was not always available.

The paint apparatus in accordance with the invention employs a roller with a central core whereby paint is carried in only a shallow annular chamber of the roller around the core. The paint is supplied through the axle but at a point intermediate of the roller so that no special seals are required at the ends of the roller where it is rotatably mounted on the axle. The only seals employed are adjacent the intermediate part of the roller where the paint is supplied to the annular chamber and these seals produce a minimum amount of friction.

The paint supply apparatus includes a manually fed, positive-displacement piston which supplies the paint from a container through a flexible conduit to the roller. The positive displacement by the piston enables a large amount of pressure to be applied to the paint through the manually operated mechanism to assure an adequate

supply of even thicker latex paint to the roller. At the same time, the pressure applying apparatus is of simple and low-cost construction which enables the entire paint rolling apparatus to be sold at a low enough price that a relatively wide market, including home owners, is achieved. The employment of the piston to achieve pressure also eliminates the need for any valve between the paint supply source and the paint applicator because the piston can be easily manipulated to control pressure. A supply tube with a thinner wall can also be used.

It is, therefore, a principal object of the invention to provide paint rolling apparatus including an improved paint roller and improved paint supply means.

Another object of the invention is to provide paint rolling apparatus including a roller which rolls more easily and yet will not leak paint.

Still another object of the invention is to provide improved paint applying apparatus including a low-cost, manually-operated paint supply means.

A further object of the invention is to provide painting apparatus including paint supply means utilizing a positive-displacement piston in a paint supply source.

Other objects and advantages of the invention will be apparent from the following detailed description of a preferred embodiment thereof, reference being made to the accompanying drawings, in which:

FIG. 1 is an overall view in elevation of painting apparatus according to the invention;

FIG. 2 is a view in longitudinal cross section of a roller constituting part of the apparatus of FIG. 1;

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

FIG. 4 is a view in elevation, with parts broken away and with parts in section, of a paint supply means of the apparatus of FIG. 1; and

FIG. 5 is a fragmentary, sectional view of a slightly modified piston.

Referring particularly to FIG. 1, painting apparatus according to the invention includes a paint applicator indicated at **10** and a paint supply source indicated at **12**. A flexible conduit or tube **14** is connected between the applicator and the paint supply and, since the paint source **12** is relatively portable and can be easily moved by the painter to a point near the surface being painted, the flexible tube **14** can be relatively short, in the order of six feet, for many applications.

The paint applicator **10** includes a rigid, formed tube **16**, one end of which extends through a handle **18** and is connected by a suitable clamp **20**, which can be a hose clamp, to the tube **14**. The tube **16** has a straight portion **22** serving as an axle which extends through a paint roller **24**. The roller **24** has a cover **26** which is preferably disposable and includes a perforate rigid sleeve or cardboard tube **28** having suitable openings **30** therein and on which fibers **32** are affixed in a conventional manner.

A pair of core members **34** and **36** are located within the roller **24**, the members being preferably identical so as to be made from a single mold. The core members have outer ends **38** and **40** slightly enlarged to fit closely with the sleeve **28** and have end flanges **42** and **44** cooperating with the ends of the sleeve **28** to position the core members in predetermined positions on the axle **22**. Intermediate cylindrical portions **46** and **48** of the core members form annular chambers **50** and **52** with the sleeve **28** for receiving paint and distributing it to the openings **30**. Annular inner walls **53** and **54** extend inwardly from the inner ends of the cylindrical portions **46** and **48** to an intermediate portion of the axle **22** where the walls terminate in short flanges or lips **56** and **58** extending toward one another. These contact an inter-

mediate portion of the axle **22** on outer sides of a transverse opening **60** which supplies paint from the tube **16** to an intermediate supply chamber **62** communicating with the shallow annular chambers **50** and **52**. A suitable plug or stop **64** in the axle **22** prevents passage of the paint through the tube beyond the transverse opening **60**.

Outer annular metal discs or walls **66** and **68** are affixed in the ends of the roller and specifically in the enlarged ends **40** and **42** of the core members **34** and **36**. The discs **66** and **68** have openings centrally thereof which are received on the axle **22** and are relatively free to rotate thereon. A split ring **70** limits axial movement of the roller **24** on the axle **22** in one direction, and a stop nut **72** is mounted on a threaded portion **74** of the axle **22** at the other end to limit movement of the roller in the opposite direction on the axle.

From the above, it will be seen that the paint in the tube **16** enters the opening **60** under pressure and passes through the intermediate supply chamber **62** to the outer shallow chambers **50** and **52**. From here, the paint passes through the openings **30** in the sleeve **28** to the fibers **32** of the cover **26**. Because the paint is supplied centrally to the sleeve **28**, it flows more uniformly to the openings **30** over the length of the sleeve. If flow of paint to the center of the cover **26** is slightly heavier, it is easily distributed as the roller rolls on a surface. Further, this minimizes paint build-up at the ends of the cover **26**, as tends to occur with conventional rollers.

The pressure of the paint in the intermediate chamber **62** also tends to urge the lips **56** and **58** into contact with the axle **22** to provide an effective seal for the paint. At the same time, there is relatively little friction between the lips **56** and **58** and the axle **22** so that rotation of the roller on the axle **22** is impeded to a minimum degree. Since paint does not enter the interior of the core members **34** and **36** around the axle **22**, no special seals are required between the end walls **66** and **68** and the axle **22** and friction at these points is minimal. Hence, a substantially drip- and leak-free roller is achieved with the only friction being at the small central portion of the axle **22** adjacent the transverse opening **60**. The relatively free rotation of the roller on the axle thereby enables the roller to roll along the wall or surface being coated with minimum slipping.

Referring now particularly to FIGS. 4 and 5, the paint source **12** includes a container **76** which preferably has a capacity of one gallon so as to carry and dispense up to one gallon of paint in one application, if desired. The container **76** is supported on a suitable base or legs **78** which raise the bottom of the container from the supporting surface to provide space for an outlet elbow **80** communicating with a central bottom portion of the container **76**. A rigid conduit **82** communicates with the elbow **80** and extends outwardly beyond the container where it is connected with the flexible tube **14** by a hose clamp **84** or other suitable connection. An upper edge portion **86** of the container **76** is flared to facilitate entry of a piston **88** into the container after paint is poured therein. A domed lid **90** closes off the container **76** and can be fastened by rolled threads **92** and **94**. Other suitable means can be used to fasten the lid to the container, particularly since the space in the container **76** between the piston **88** and the lid **90** is not air-tight.

A piston rod **96** is connected centrally to the piston **88** and extends upwardly through an opening **98** in the lid **90**. The rod **96** has a plurality of notches **100** uniformly spaced and extending longitudinally along one side of the rod. The rod **96** also terminates in an upper handle **102** which facilitates manipulation of the rod. A spring-loaded pawl **104**, which is pivotally carried on a lever **106**, engages the notches **100** and forces the rod **96** downwardly as the lever **106** is moved in a clockwise direction about a pivot **108**. A resilient stop member **110** prevents retraction of the piston rod

96 as it is moved downwardly by the pawl and lever. A stationary handle **112** constituting part of a support **113** for the lever pivot **108** and the stop member **110** facilitates manipulation of the lever **106** by a one hand operation whereby the painter can hold the applicator **10** in one hand while he operates the lever **106** with the other hand to force the piston rod **96** downwardly. The piston **88** is thereby moved downwardly in increments with a positive displacement. When it is desired to retract the piston **88**, the rod **96** is turned 90° to move the notches **100** out of engagement with the pawl **104** and the stop **110**, at which time the rod **96** can be pulled upwardly by the handle **102**.

Arms **114** extend upwardly from the container **76** and hold the flexible tube **14** when not in use. A bracket **115** on the lid **90** engages the applicator **10** when not used and positions it above the level of paint in the container.

The positive displacement of the piston **88** by the incremental feed forces a given quantity of paint through the flexible tube **14**, the tube **16**, and the roller **24** to the cover **26**, each time the lever **106** is operated. Since the quantity is relatively small, the amount fed to the roller cover is not usually considered excessive. However, if the initial amount of paint forced through the cover is deemed more than desirable, the notches **100** can be spaced closer together or the diameter of the container **76** can be decreased. As another possibility, the tube **14** can be made with a sufficiently thin wall that it will expand somewhat as the piston **88** is initially moved downwardly, to prevent an excessive initial flow of paint to the roller cover. Another means of initially preventing an undue amount of paint from passing through the cover **26** is by means of a convex compressible cushion or cover **116** which is centrally attached to a modified piston **118**, as shown in FIG. 5. The cover **116** is backed by a resilient spongy material **120** which enables the cover **116** to compress as the piston is moved downwardly to prevent an initial excess quantity of paint. The pressure is then maintained on the paint by the compressed spongy material **120** which urges the cover **116** back toward its original convex position.

The piston **118**, as shown, is in two parts, including a central circular plate portion **122** and a resilient outer skirt **124** which has a flange **126** received in a groove **128**. With this arrangement, the piston skirt **124** can be easily replaced as necessary. The piston **118**, as shown, also has a check valve which enables the piston **118** to be retracted and removed from the container more easily when necessary for the purpose of adding new paint. The check valve includes a rubber button or disc **130** having a circular portion overlapping vent openings **132**. The disc **130** enables air to flow downwardly through the openings **132** as the piston is retracted but otherwise effectively blocks the openings when pressure is being applied to paint in the container.

The check valve comprising the disc **130** is not essential to the operation of the apparatus, however. In fact, without the check valve, when the piston **118** is pulled upwardly, at the end of a painting operation, it will reduce suction in the container which is effective to pull paint out of the tube **14** and the applicator **10** back into the container, from which it can be emptied into the original paint can or otherwise disposed of. Consequently, the overall apparatus is easier to clean since the tube **14** and the applicator **10** are substantially empty. To completely clean the tube and applicator, a suitable solvent is placed in the container and forced through the tube and applicator in the same manner as the paint.

From the above, it will be seen that the apparatus embodying the invention has many advantages. Various modifications of the apparatus as shown and described will be apparent to those skilled in the art and are to be considered as within the scope of the invention disclosed herein.

I claim:

1. A paint roller comprising a perforate sleeve, an axle extending substantially through said sleeve, wall means at each end of said sleeve rotatably carrying said sleeve on said axle, said axle being hollow to an intermediate portion of said sleeve and having a transverse passage at the intermediate portion, two core members in said sleeve, each of said core members having a generally cylindrical wall of slightly smaller diameter than said sleeve and occupying a volume slightly smaller than one half the volume of said sleeve to form a shallow annular space with said sleeve and having an outer annular portion engaging an outer portion of said sleeve, an inner end of each of said core members extending inwardly to said axle at a point spaced near but outwardly of said transverse passage to direct flow of liquid from said transverse passage to the annular spaces and to restrict flow of liquid between said core members and said axle.

2. A paint roller according to claim 1 characterized by each of said core members having an annular lip contacting said axle and extending toward one another whereby pressure of liquid between the inner ends of said core members urge said lips into sealing contact with said axle.

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U.S. Cl. X.R.

401—179