May 11, 1954 B. L. DEAN 2,677,839

PAINT ROLLER WITH INTERIOR RESERVOIR WITH MEANS FOR SUPPLYING PAINT THERETO

Filed Aug. 29, 1949

3 Sheets-Sheet 1

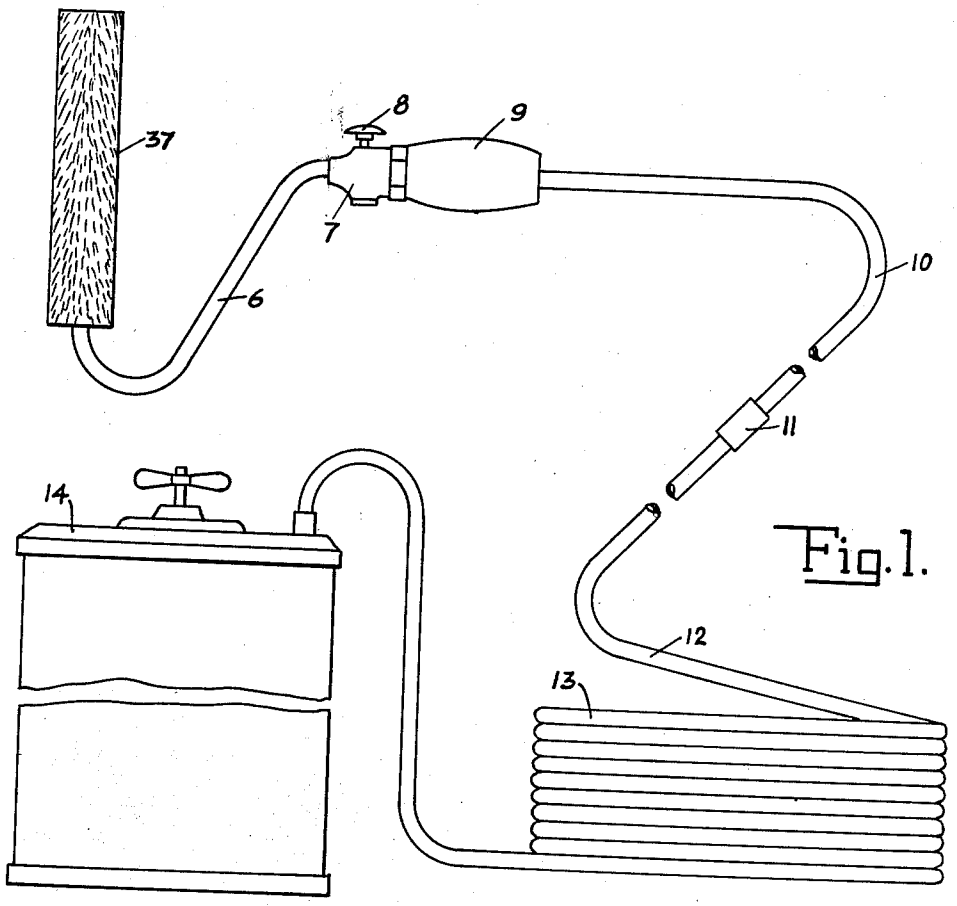


Fig. 1.

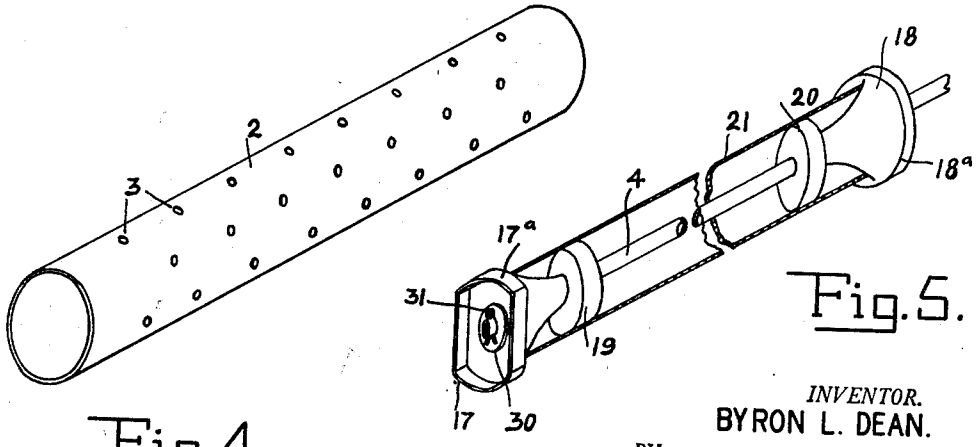


Fig. 4.

Fig. 5.

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3 Sheets-Sheet 2

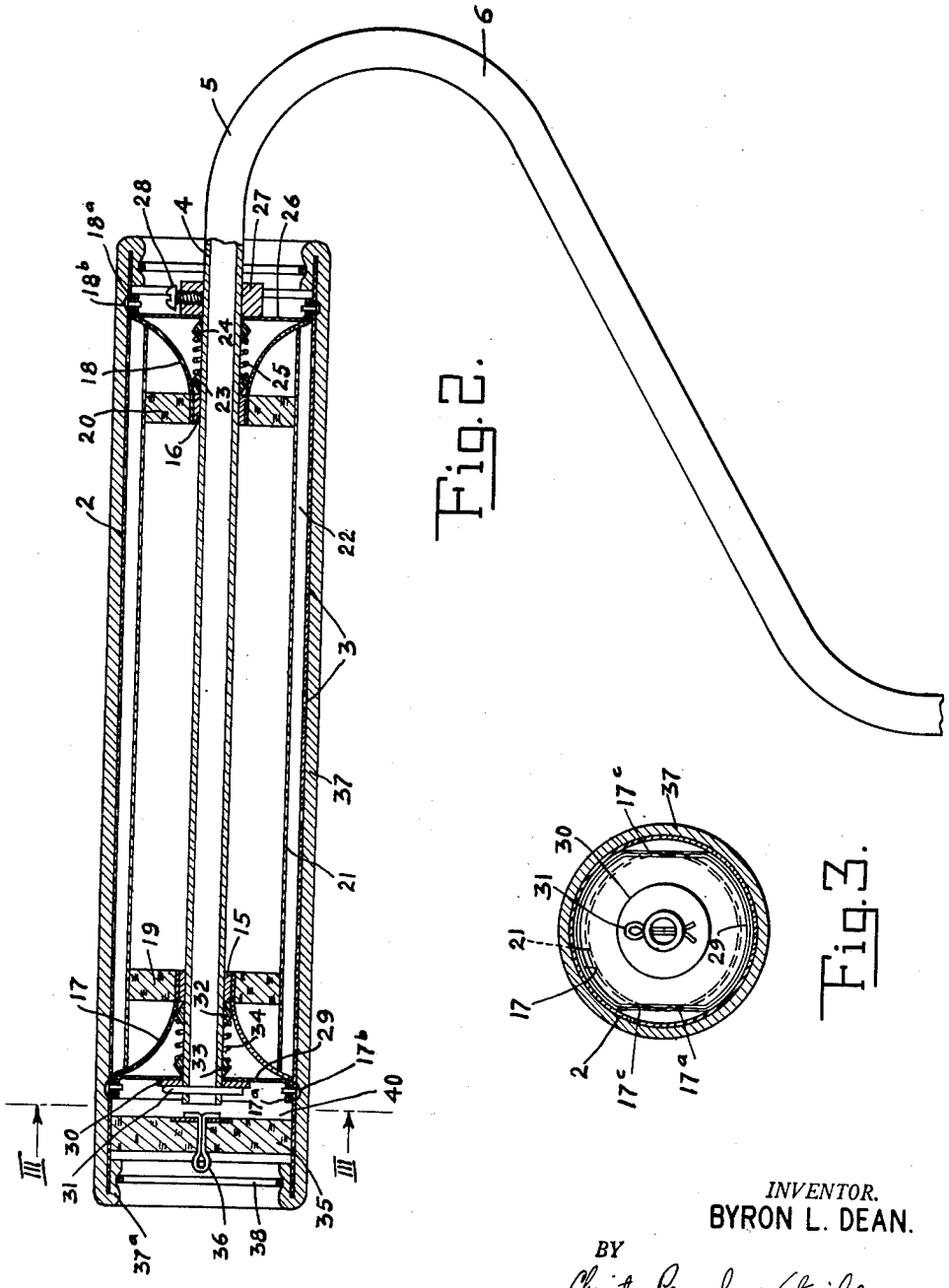


Fig. 2.

Fig. 3.

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3 Sheets-Sheet 3

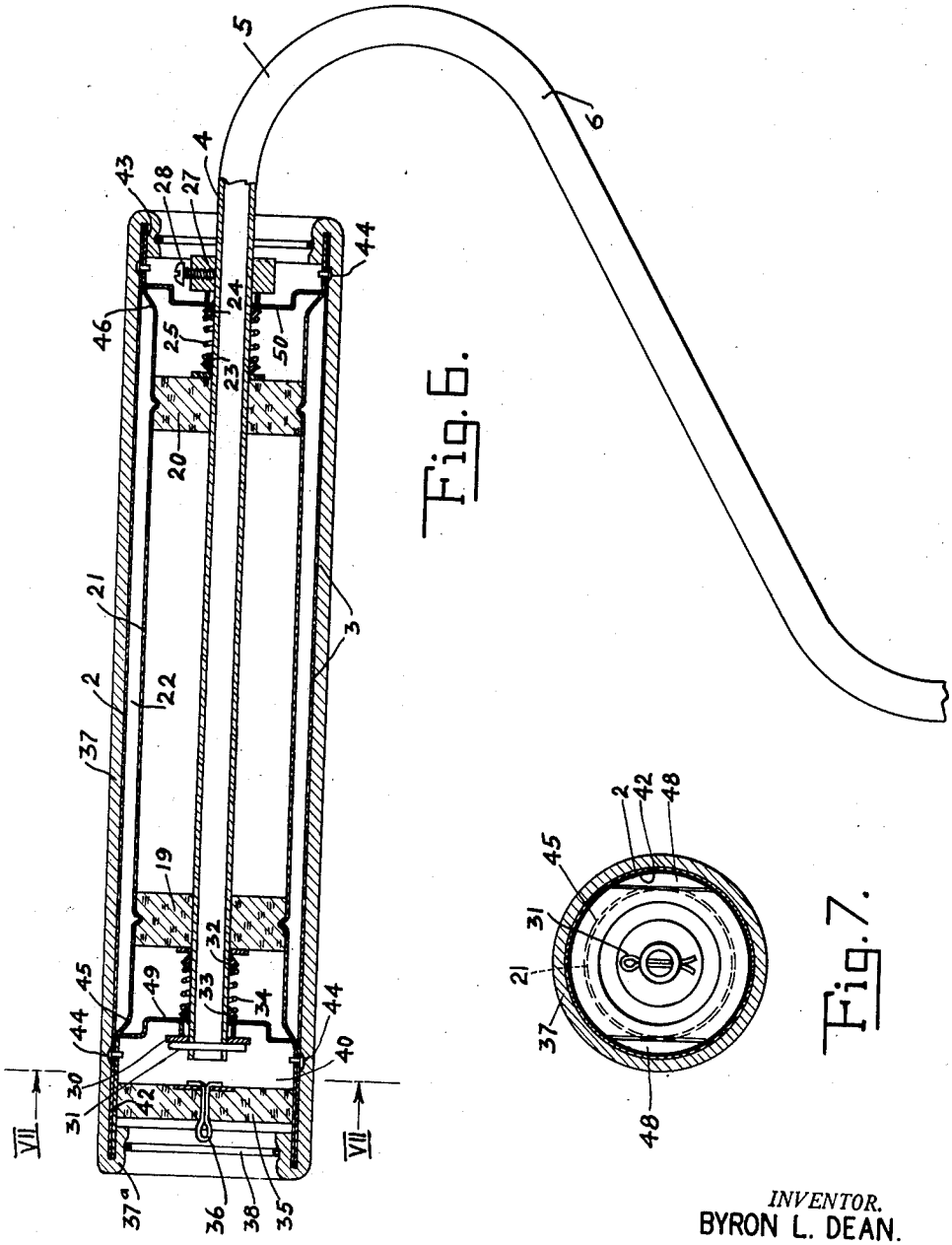


Fig. 6.

Fig. 7.

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PAINT ROLLER WITH INTERIOR RESERVOIR WITH MEANS FOR SUPPLYING PAINT THERETO

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3 Claims. (Cl. 15—128)

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This invention is for a paint applicator, and is for an improvement in paint applicators of the type in which the paint is applied to the surface to be covered by means of a roller which is moved over the surface, and the surface of the roller being covered with a soft fabric or wool hide that is kept saturated with paint.

Paint can be rapidly and economically applied to interior walls and other surfaces by the use of a roller in lieu of a conventional brush, the roller being a rigid roller having a fabric or other absorbent coating on its surface. Paint is applied to this surface from the interior of the roller, and as the roller is rolled over the surface of the wall, a film of paint is deposited. In many instances, the roller is connected through a flexible tubing to a pressure tank, and adjacent the roller there is a control valve by means of which paint may be intermittently supplied under pressure to the interior of the roller. The present invention is for an improvement in devices of this kind, and is particularly for the roller construction of such a device.

The invention has for its object to provide a roller construction of improved design which is relatively cheap to manufacture, and which is designed to apply the paint more evenly in any position in which the roller is used, and in which there is present at any time only a relatively small volume of paint as compared to the total capacity of the roller. The invention further provides a roller of improved construction wherein the bearings on which the roller turns are protected from contact with the paint, and which is effectively sealed against leakage, although the roller turns freely.

According to the present invention, the device is provided with an outer cylindrical roller over which the absorbent covering is placed, this roller being perforated to permit the passage of paint from the interior thereof to the under surface of the surrounding sleeve of absorbent material. Within this roller is a second cylinder preferably of only slightly smaller diameter, and a paint chamber is provided within the roller around the cylinder. The volume of this paint chamber is determined by the relative diameters of the two cylinders and the length of the cylinders. In general, however, the capacity of the paint chamber is relatively small. The inner cylinder in turn is provided at each end with a combined sealing and spacing element arranged to exclude paint from the interior of the inner cylinder, and which are carried on an axially-extending metal tube about which the entire

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assembly rotates. The metal tube opens into the outer cylinder adjacent one end of the roller, while the other end of this metal tube extends beyond the end of the roller and is preferably bent in the form of a goose neck to provide a handle.

A valve controls the flow of paint through this tube into the interior of the device, and when the paint is discharged from the tube into the end of the roller, it fills the space between the interior of the roller and the exterior of the inner cylinder. Because of the fact that the tube extends throughout substantially the length of the roller and discharges the paint into one end of the roller, the paint chamber may be kept full of paint at any angle to which the roller is held. At the same time the total volume of paint inside the roller at any time is so small that the weight of the device is not excessive when it is being used.

The construction and advantages of the invention may be more fully understood by reference to the accompanying drawings, in which:

Fig. 1 is a general view of the device, the view being a front elevation showing the roller in position to be moved horizontally with its axis vertically over the surface of the wall;

Fig. 2 is a longitudinal section through the roller applicator, part of the absorbent covering being broken away;

Fig. 3 is a sectional view taken substantially along the line III—III of Fig. 2;

Fig. 4 is a perspective view of the roller cylinder with the absorbent material removed;

Fig. 5 is a perspective view of the interior parts removed from the roller cylinder;

Fig. 6 is a view similar to Fig. 2 of a modified form of the invention; and

Fig. 7 is a sectional view taken substantially along the line VII—VII of Fig. 6.

In the drawings, 2 designates the roller cylinder which may be of metal or plastic. It may be of any convenient diameter and length. A convenient size for general use requires a roller to be about 1½ inches in diameter, and about 7 inches long. These, however, are only typical dimensions for a convenient sized tool for use in painting in the home, and much larger and longer rollers may be used in other applications, and shorter and smaller rollers may also be used. The surface of the roller is perforated between the ends thereof. The size and location of these perforations are not critical, but preferably small holes 3 are used. The holes 3 are scattered, as

shown in Fig. 4, over the entire surface of the roller, except the marginal portions at the ends.

Extending axially of the roller throughout the greater portion of its length is a metal tube 4 of relatively small diameter. One end of this tube 5 projects beyond the end of the cylinder and preferably is bent into a goose neck 6. It leads to a valve 7 of the push button type, 8 being the depressible element of the valve which is pushed down with the thumb. Adjacent the valve is a conveniently located handle 9. A flexible rubber tube 10 leads from the handle 9 to the source of paint supply. Preferably the flexible rubber tube 10 is joined at 11 to a less flexible coiled plastic tube 12, the plastic tube preferably being sufficiently resilient so that it normally coils itself like a spring into a coil 13. As the tool is moved away from the coil, the convolutions of the coil stretch, thus providing a convenient arrangement for enabling the tool to be moved about in the room while the supply hose tends to coil up as slack develops in the supply hose. The other end of the plastic tube is connected with a conventional pressure tank 14 into which paint is charged, and into which air may be pumped. Tanks of the type commonly used in small portable farm spraying equipment are well adapted for this purpose.

As hereinbefore stated, the tube 4 extends throughout the greater portion of the length of the roller 2, and as shown in Fig. 2, terminates short of the left-hand end of the roller. The tube passes through bushings 15 and 16 located in the necks of reversely-arranged funnel-shaped members 17 and 18 respectively. The small end of these funnel-shaped members are passed through cork or other appropriate sealing or fiber disks or plugs 19 and 20 respectively. These disks in turn are fitted within an inner cylinder 21 which is formed of relatively thin sheet metal, and which is imperforate. The diameter of the inner cylinder 21 is only slightly less than the internal diameter of the roller 2, so that a shallow paint chamber 22 is provided between the interior surface of the roller and the exterior of the cylinder 21. The ends of the cylinder 21 abut against the flared ends of the cone-shaped members 17 and 18.

The member 18 at the right-hand end of the assembly as viewed in Fig. 2 has a flange 18*a* that tightly fits against the interior of the roller 2, and there may be small pins or rivets 18*b* through the roller and through this flange for fixing the tapered member to the roller. The tapered member 18 is positioned inwardly from the extreme right-hand end of the roller. It provides a closure for the right-hand end of the roller.

Surrounding the tube 4 and within the remote end of the member 18 is a tapered metal annulus 23. There is also a similar annulus 24 around the tube 4, and there is a compression spring 25 between the two annuli 23 and 24. Both annuli have a sliding fit on the tube. A disk 26 is fitted into the open end of the tapered member, and serves to close such end. The disk 26 also confines the annulus 24 against endwise movement. The spring 25 thus serves to press the sealing annulus 23 against the bushing 16, and to press the sealing annulus 24 against the disk 26. A collar 27 surrounds the tube 4, and is held in place by a set screw 28.

The tube 4 terminates within the cylinder 2 inside the opposite end. The flared member 17 likewise has a flange portion 17*a* that contacts

the interior of the cylinder 2, and is secured thereto by pins or other fastening means 17*b*. The end of the flared member 17 is closed by a disk 29 similar to the disk 26 at the opposite end. There is a washer 30 against the outer face of this disk, and a cotter pin 31 passing through the tube holds the disk in place. A doubly-tapered annulus 32 is located in the throat of the flare member 17, and there is a similar annulus 33 against the disk 29, and there is a compression spring 34 between the two annuli, the arrangement of the annuli 32 and 33 with the spring 34 being the counterpart of the annuli assembly comprising the annuli 23 and 24 and spring 25 at the opposite end of the assembly.

The flared member 17, instead of completely closing the end of the cylinder as does the flared member 18, has two flattened sides indicated at 17*c* in Fig. 3. The purpose of so flattening the sides of this member is to permit paint which is discharged from the central tube to pass back into the annular space 22 and to fill such space. The end of the cylinder 2 is closed by a removable friction plug or cork 35, which is inserted into the end of the roller, and which is spaced from the end of the tube 4. It may be provided with an eyelet 36 at the center thereof to enable it to be removed when necessary.

The roller 2 is surrounded by an absorbent paint applying medium. It may be a soft fabric, a pile fabric, or a piece of sheepskin with the wool thereon. This absorbent covering is designated 37. It is of cylindrical form which fits easily over the roller 2 and is pervious to the squeezing of paint therethrough. Its ends project beyond the end of the roller and it is folded in at each end as indicated at 37*a*. A self-expanding resilient ring 38 is inserted into each end of the roller for releasably holding this paint applying covering in place. Where a wool hide is used, small, closely spaced holes are pricked through the hide to enable the paint to pass through it.

In use, paint is charged into the tank 14 and air is pumped into the tank to the desired pressure. The air forces the paint up to the valve 7, and when the button 8 is pressed, the paint enters the metal tube. It discharges from the end of the tube into the inside of the roller 2, filling the space at the end of the tube, and travels back through the openings formed by the flattened sides 17*c* into the annular paint chamber 22 between the inside of the roller and the outside of the cylinder 21. The paint escapes through the small holes in the roller 2, and spreads out under the paint applying coating 37. The coating 37 is only loosely fitted over the roller so that the paint can distribute itself under the covering material and work through the pores or holes in the covering material and thoroughly saturate the nap or fibers or wool. As the roller is moved over the surface of the wall or other object to be painted with a light pressure, the paint is forced out onto the surface and the roll, since it continuously revolves, always presents a paint carrying surface to the wall. The pressure of the paint applying roller against the wall is the primary means for causing the paint to work through the covering. The hydrostatic pressure of the paint is of relatively less importance because the valve 7 is only intermittently operated and the pressure is quickly dissipated. As the paint applying material uses the paint from the paint chamber in the roller, the valve button 8 is operated from time to time to keep the chamber 22 reasonably full.

When the roller assembly is being used to apply paint in this manner, the whole assembly turns about the shaft 4 as an axis, the actual bearings being the bushings 15 and 16. Paint cannot get to these bushings, first, because the fiber or cork disks 19 and 20 serve to exclude paint from the interior of the cylinder, and secondly, because the spring-press packing glands or annuli 32 and 33, together with the disk 29, serve to seal the paint from the bushing. Likewise, if any paint should, by any chance, happen to get to the bushing 16, it cannot escape, and run out onto the tube 6. The packing provided by the elements 23, 24 and 25 is provided as a safety measure but is less necessary than the similar sealing arrangement provided at the other end by the annuli 32 and 33.

Since the roller assembly turns on the shaft under conditions which keep the paint or any substantial amount of it from bearings at 15 and 16, discoloration cannot occur, at least to any important extent, due to the grinding of the pigment between fixed and moving surfaces.

Assembly of the unit is quite simple. The collar 27 is first put on the tube. The funnel members 17 and 18, with their stoppers 19 and 20, are shoved into the ends of the cylinder 21. The glands comprising the springs and the two annuli at each end of the assembly are then put into the housings provided by the funnel-shaped members and the disks 26 and 29 are pressed into place. The roller 2 is then slipped over the assembly and the securing pins 17b and 18b are fixed into place. The whole assembly is then slipped onto the tube and the washer 30 and cotter pin 31 are put into place. The collar 27 is then adjusted to confine the assembly against endwise movement on the tube. After this the removable stopper 35 is inserted in the end of the roller and the soft covering is applied.

By reference to Fig. 1, it will be seen that if the roller is held in a vertical position, paint which is discharged from the upper end of the tube 4 which is then at the top of the roller, will run down into the annular space 22, and this space may be kept completely full and hence the paint will be evenly distributed throughout the full length of the roller, and a slight reservoir of paint may be retained in the space 40 at the upper end of the roller. Without the cylinder 21 being centrally arranged inside the roller 2, the paint holding capacity would be much greater, making the tool heavier to use, and if it were turned to a vertical position the paint would, if the interior were not always kept completely full, go to the lowermost end of the roller and cause the fabric to be unevenly supplied with paint.

The term "paint" as used herein is intended to include oil paints, lacquers, and water paints.

The present invention provides a roller that turns freely, which is effectively sealed against leakage, although there are no packings of such character as to give rise to any excessive friction. Whereas existing types of roller equipment are quite expensive, the roller of the present application can be cheaply constructed, all of the parts being readily available at the present time. Its light weight, together with the fact that even when it is filled to capacity with paint it weighs very little, are important factors to its usefulness.

The modification shown in Figs. 6 and 7 provides a simplified construction which eliminates the need of the end members 17 and 18. The

structure of this modification is generally similar to that of the embodiment shown in Figs. 1 through 5, and like numerals have been employed to designate like parts which have similar functions. The main difference is in the provision of enlarged integral ends 42 and 43 on the inner cylinder 21 which have a snug fit within the outer roller 2 to which they are rigidly secured as by the rivets 44. The enlarged ends 42 and 43 are connected respectively to the central portion of the cylinder 21 by flange-like parts 45 and 46. The flange 46 forms a closure for one end of the annular chamber 22 while the flange 45 forms a partial closure for the other end of such chamber. Opposite sides of the flange 45 are cut away to provide a pair of openings 48, as best shown in Fig. 7, through which paint may flow from the space 40 to the chamber 22. A disc 49 closes the inner end of the space 40 in a manner similar to the closure provided by the disc 29 described above. A disc 50 similar to the disc 49 is provided in place of the disc 26 described above. The parts 24 and 33 cooperate respectively with the discs 49 and 50 in providing seals against the flow of paint along the tube 40. The operation of this modification is similar to that of the structure shown in Figs. 1 to 5 in that the paint fed to the applicator covering 37 is delivered to the chamber 22 from the tube 4 through the reservoir 40 and openings 48. In this structure, the roller 2 is rotatably supported on the paint supply tube 4 and rotates thereabout as it is moved over a surface on which a layer of paint is to be applied by the applicator covering 37 in the same manner as provided by the embodiment shown in Figs. 1 through 5.

While I have shown and described one preferred embodiment of my invention, it will be understood that various changes and modifications may be made within the contemplation of the invention and under the scope of the following claims.

I claim:

1. A paint applicator comprising a rigid perforate hollow roller with a soft paint distributing covering thereover, said covering being pervious to the passage of paint therethrough, a tube constituting an axis for rotatably supporting the roller, a cylinder mounted around the tube having a larger diameter than the diameter of the tube and slightly less diameter than the diameter of the roller to form an annular shallow paint-holding chamber between the outside of the cylinder and the inside of the roller, which chamber extends throughout the length of the cylinder, funnel-shaped members secured to the roller near each end of the cylinder having throats turned toward each other, a bushing mounted in each throat engaging the tube to form a bearing for the roller and cylinder on the tube, a packing fitted to the outside of each funnel-shaped member and fitting against the inside of the cylinder for excluding paint from the inside of the cylinder, one end of the tube being open at the end of the cylinder within the roller, the other end of the tube projecting beyond the end of the roller and forming a handle extension for the applicator and also having a connector adapted to be connected with the source of paint supply, the funnel-shaped member at said last-mentioned end of the roller serving to also close the roller against the escape paint therefrom, a plug closing the other end of the roller spaced from said end of the tube which opens into the roller to form a reservoir at the end of the cylinder, a paint passage in

the funnel-shaped member between the reservoir and the annular chamber, sealing means in the funnel-shaped member back of said open end of the tube for protecting the bushing in said funnel-shaped member from contact with paint.

2. A paint applicator comprising a rigid perforate hollow roller with a soft paint distributing covering thereover, said covering being pervious to the passage of paint therethrough, a tube constituting an axis for rotatably supporting the roller, a cylinder mounted around the tube having a larger diameter than the diameter of the tube and slightly less diameter than the diameter of the roller to form an annular shallow paint-holding chamber between the outside of the cylinder and the inside of the roller, which chamber extends throughout the length of the cylinder, funnel-shaped members secured to the rollers near each end of the cylinder having throats turned toward each other, a bushing mounted in each throat engaging the tube to form a bearing for the roller and cylinder on the tube, a packing fitted to the outside of each funnel-shaped member and fitting against the inside of the cylinder for excluding paint from the inside of the cylinder, one end of the tube being open at the end of the cylinder within the roller, the other end of the tube projecting beyond the end of the roller and forming a handle extension for the applicator and also having a connector adapted to be connected with the source of paint supply, the funnel-shaped member at said last-mentioned end of the roller serving to also close the roller against the escape of paint therefrom, a plug closing the other end of the roller spaced from said end of the tube which opens into the roller to form a reservoir at the end of the cylinder, a paint passage in the funnel-shaped member between the reservoir and the annular chamber, sealing means in the funnel-shaped member back of said open end of the tube for protecting the bushing in said funnel-shaped member from contact with paint, said sealing means including a disk closing the mouth of the funnel and having a hole therein through which the tube passes,

a pair of gland members in the form of annuli around the tube and slidable thereon between the disk and the bushing in said funnel-shaped member, a spring between the two glands of the pair tending to urge them apart, one gland member being urged against the disk and the other against the bushing, and means for holding the roller and cylinder from movement longitudinally of the tube.

3. A paint applicator comprising a pervious hollow roller with a soft paint distributing cover thereon pervious to the passage of paint therethrough, a cylinder concentrically positioned within the roller of less diameter than the roller to provide an annular clearance space for paint between the cylinder and the roller, a paint tube entering the roller from one end thereof and extending through the cylinder and terminating within the roller beyond the end of the cylinder, a plug fitted about the tube at each end of the cylinder holding the cylinder concentric with and rotatable on the tube, an end plate on the tube at each end of the cylinder for supporting the roller in concentric relation to the tube, the end plate at the end of the roller through which the tube enters constituting a closure for that end of the roller, a closure in the other end of the roller spaced from the end of the tube and cylinder and forming a paint receiving chamber, the end plate at the paint chamber end of the assembly having an opening that communicates with the said annular space, a pair of sealing annuli on the tube between each plug at each end of the cylinder and the end plate at each end of the roller, and a compression spring between the said annuli of each pair for holding one in sealing relation with the end plate and the other in sealing relation with the plug.

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