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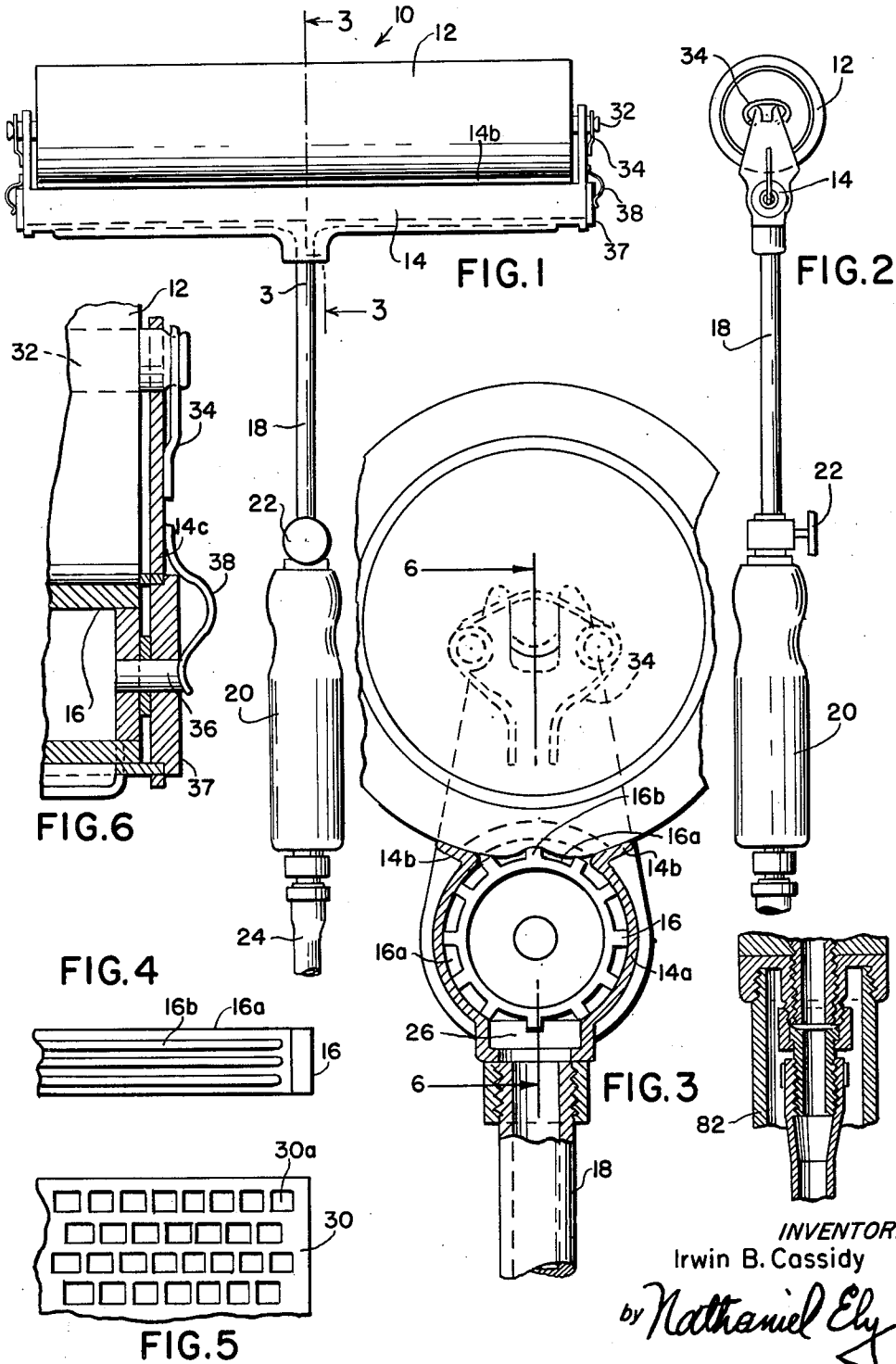
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3,193,868

CONTINUOUS FEED PAINT ROLLER

Filed Aug. 14, 1962

2 Sheets-Sheet 1



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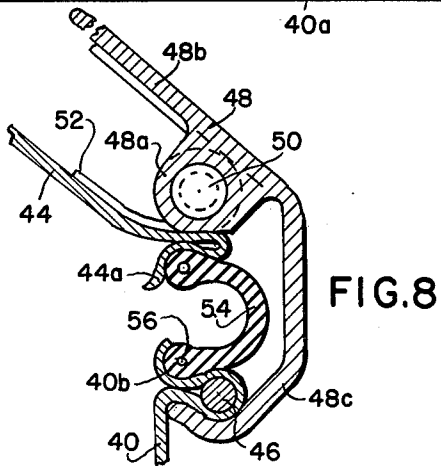
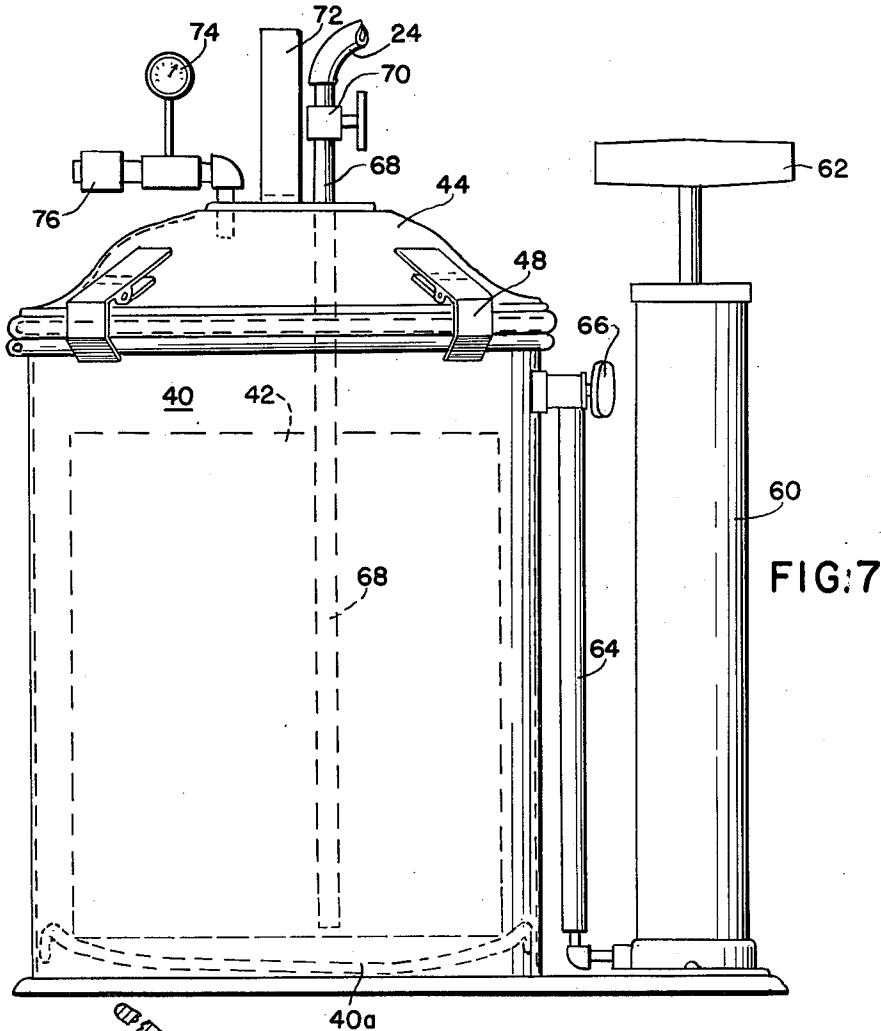


FIG. 7

FIG. 8

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1

3,193,868

CONTINUOUS FEED PAINT ROLLER

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13 Claims. (Cl. 15-553)

This invention relates to improvements in a continuous feed paint roller and similar liquid distributing devices.

In the distribution and spreading of liquids on extended surfaces by contact, various types of rollers have been used, most common of which is the immersion type hand operated roller not only for domestic (home) use, but also for the many industrial applications such as buildings, tanks, and other extended wall surfaces.

The method for coating the surface of the roller with the paint, which in turn is applied to the wall surface, is as follows: the operator opens a commercial can of the liquid; pours part of it into an open tray and then rolls the roller through the reservoir of liquid. The operator then squeezes excess liquid from the roller by running it along an inclined apron in the tray adjacent to the liquid reservoir, and he is then ready to apply the roller to the surface to be coated.

Experience has shown the desirability of limiting the amount of liquid that is applied to the roller, not only to limit drip and spray, but as a practical matter, to aid in forming a thin uniform coating on the surface being treated. As a result, due to the small amount of paint on the roller, the operator may cover only a relatively small area before it is necessary to re-dip and re-squeeze the roller.

In endeavoring to simplify the supply of liquid to a roller, consideration has been given to the many prior types of portable reservoirs affixed to the roller and to pressure feed devices. For the most part, the reservoir types heretofore available have been unsuited for overhead liquid applications and in many cases even for vertical surfaces, and invariably they have carried so much liquid and been so heavy as to make them impractical to operate. Other devices such as used on fixed machines can not be adapted to liquid distributors suitable for paint coverage.

The particular object of my invention is to provide a light weight, portable and universal paint distributor having a substantially continuous uniform and controllable supply of paint whereby extended surfaces can be covered in a continuous operation.

A further object of my invention is to provide not only an integrated continuous feed paint spreader but one which simplifies the removal of the entire amount of paint from the container in a clean efficient manner without handling by the operator.

Further objects and advantages of my invention will appear from the following description of a preferred form of embodiment of my invention when taken with the drawings attached hereto which are illustrative thereof and in which:

FIG. 1 is a front elevation of the paint roller.

FIG. 2 is an end elevation of the paint roller shown in FIG. 1.

FIG. 3 is an enlarged transverse section substantially on the line 3-3 of FIG. 1.

FIG. 4 is a plan view of a part of the paint distributing roller.

FIG. 5 is a plan view of a part of an alternate surface for a paint distributing roller.

FIG. 6 is an enlarged sectional view taken along line 6-6 of FIG. 3.

FIG. 7 is an elevation of the associated pressure tank.

FIG. 8 is a detailed cross section of the gasket construction between the tank and its cover.

2

The liquid applicator or paint roller generally shown at 10 in FIGS. 1 to 6 consists primarily of three parts, i.e., the surface contacting roller 12, the supporting frame 14 and the liquid feed roller 16. Accessory members include the handle-tube 18, the hand grip member 20 and the control valve 22. The handle-tube 18, through the valve 22 communicates liquid under pressure from the source through tube 24 to a shallow channel-like reservoir 26 in the supporting frame 14. The rotation of the surface contacting roller 12 in turn drives the liquid feed roller 16, which carries the liquid from the reservoir 26 to the surface contacting roller 12 from which the liquid is then deposited on the surface to be coated.

It is the principal feature of my invention that the liquid applicator 10 is normally under pressure through tube 24, which as hereinafter described, extends to a suitable pressurized liquid tank. The utilization of pressure, even of a relatively small amount such as 1-2 p.s.i.g. in the reservoir 26 will assure a uniform flow of liquid no matter at what lineal speed the roller is moved over a surface. Furthermore, with the pressure feed on my improved roller, it makes no difference to the operator whether the surface contacting roller is vertical, horizontal, or in any other alignment for I provide a simplified liquid choke to prevent any liquid flow without rotary movement of the surface contacting roller 12.

With reference to FIG. 3, it will be noted that the liquid feed roller 16 is journaled in a rigid housing which is an extension of the frame 14 and wherein the sides 14a of the housing contact a substantial part of the superficial surface of the liquid feed roller 16. At least two grooves 16a are so covered.

The frame 14 which may be made of molded plastic or a light weight metal such as by die casting has a relatively shallow space 26 extending nearly to the ends of the liquid feed roller 16. This space is connected to the tube 18 supplying liquid to the rollers and thus becomes a reservoir assuring full distribution of liquid along the length of the liquid feed roller 16. This, in turn, assures uniform distribution of liquid on the surface contacting roller 12 due to its rolling contact on the liquid feed roller 16.

On the side of the frame opposite the reservoir 26, the sides 14a of the housing terminate in spaced shields or flanges 14b which engage the periphery of the surface contacting roller 12 and tend to confine the liquid to that roller. With the resulting construction, including the contact of the frame 14 spanning at least two grooves 16a in roller 16, blow through of liquid is completely prevented and only a regulated deposit of liquid on the surface contacting roller 12 will be accomplished as the latter moves due to contact with the surface on which liquid is deposited. Leakage of the liquid (paint) away from the roller surface is thus prevented.

The liquid feed roller 16 may be of the type shown in FIG. 4 in which longitudinal slots or grooves 16a are made in the surface, such grooves 16a thus forming ridges 16b which, in turn, engage the perimeter of the roller 12 and cause the roller 16 to rotate in a semi-g geared fashion as will be noted in FIG. 3. Usually, the surface contacting roller 12 is of some soft material such as lambs wool, cotton, or other spongy material which absorbs and expels the liquid (paint) to be applied to the surface.

With the construction as shown in FIG. 4, the slots 16a may extend to the extremity of the roller and then be sealed as by suitable washers at the end. Preferably, however, the slots 16a may be discontinuous at the ends as by suitable milling so that the respective ends of the roller become self sealing against the surface contacting roller 12. The roller 16 may be molded from plastic or other suitable material.

3

An alternative surface construction for a liquid feed roller is shown in FIG. 5 in which the surface of the roller 30 is provided with a plurality of pockets 30a which may be square or other closed shape and not interconnected to limit the pickup of liquid. In such case, alternate rows may be staggered to assure complete coverage of the perimeter of the surface contacting roller 12. This surface may be integral with the roller or a perforated sleeve separate from an imperforate under roller.

The relative diameter of the roller 12 with respect to the roller 16 is about $2\frac{1}{4}$ to 1 and, in any event, is preferably not in exact multiples one of the other to assure complete coverage with the liquid to be distributed.

The details of mounting of the respective rollers in the frame 14 are shown in FIG. 6, it being appreciated that quick assembly and disassembly of the rollers is essential for cleaning after use. The surface contacting roller 12, for example, may be journaled on a shaft 32 which extends beyond the frame extension 14c and be held in position by spring 34 anchored to extension portion 14c and having an intermediate portion which urges the roller 12 against roller 16. This latter roller is journaled on stub shaft members 36 secured in end plates 37 which are held by springs 38 attached to frame 14c. Other equivalent mechanism will occur to those skilled in the art.

Alternatively, the roller 12 may be biased away from the roller 16 so that unless substantial pressure is applied, roller 12 will not drive roller 16. This may be desirable when a smoothing operation is desired and no further paint feed is required.

With a pressure feed paint roller (or liquid applicator) as heretofore described, it is essential that the liquid supply be uniform. A suitable pressure reservoir unit for this purpose is shown in FIGS. 7 and 8. Primarily it consists of a sealed tank 40 which, for usual commercial units, is of a diameter and height to receive a gallon can 42, or other smaller size of container. The usual gallon can is approximately 7" in diameter by $7\frac{1}{2}$ " in height, and in such case the tank 40 would be about 8" in diameter and 10" in height. Obviously, these dimensions are solely for the purpose of setting forth a preferred embodiment and are not critical. They are limited to convenient coverage of the paint source to reduce the amount of air required for pressurizing the tank.

The tank 40 will conveniently have a dished bottom 40a and a dished head 44 both of which are adapted to withstand a fluid pressure necessary to raise the liquid to the desired height and provide a pressure of 1-2 p.s.i.g. at the roller. For the anticipated domestic unit, the maximum pressure would be about 10 p.s.i.g. The head 44 is secured to the chine 46 of the tank 40 by a plurality of quick acting self-locking clamps generally designated at 48. These are clearly shown in FIG. 8 and are provided with ear portions 48a having bearing openings to receive the trunnions 50. The handle portion 48b is opposite the clamp engaging portion 48c, the extremity of which engages under the chine 46. The trunnions 50 are suitably carried by upturned parts attached to the cover. Spring 52 normally forces the clamps into tank engaging position. Gasket 54 is a preformed annular ring made of rubber or similar material having reinforcing fabric in the walls and steel inserts 56 in the beads, the edges of the gasket being normally urged into sealing position with the adjacent surfaces 44a on the cover and 40b at the top of the tank due initially to the spring in the walls and later to the air pressure in the container.

Pressure is built up in the tank by any suitable means including power driven pumps, etc. However, I find that a complete commercial unit is conveniently and practically built with an attached hand operated pump generally designated at 60. This will have the typical cylinder in which a piston is reciprocated in the usual manner as by pump handle 62. The piston is designed with the usual valve (or gasket washer) to draw in air on the upstroke and to discharge air to the container on the downstroke.

4

The air passes by way of a flexible tube 64 to the upper part of tank 40. A valve 66 will be opened as the tank 40 is pressurized and closed as adequate pressure is developed.

Liquids carried in container 42 in tank 40 are dispensed by the effect of the air pressure through the discharge pipe 68 which is mounted on the cover and is of such length that it extends substantially to the bottom of the liquid container 42. This discharge pipe 68 may have a valve 70 to permit pressurizing the tank without danger of premature discharge of liquid. The tube 24 hereinbefore mentioned is connected to the outlet pipe from valve 70.

The entire unit is conveniently provided with a carrying handle 72 and, if desired, the tank may be provided with a pressure gauge 74 and a relief valve 76. It will be appreciated that for the usual do-it-yourself worker, it is essential that the unit be complete, self-contained, inexpensive, foolproof, easily cleaned, readily serviced, easily refilled, light in weight for portability and above all, positive in operation.

With the customary roller of 9" length and with the usual pan containing paint to a depth of preferably less than $\frac{1}{2}$ the diameter of the roller and lowering, with each dip of the roller the operator covers only a few square feet before it is necessary to replenish the roller. By the time the tray needs replenishment, there has been expended nearly as much time loading (and wringing out) the roller as there has been in spreading, for, after each loading there is such an excess of liquid on the roller that has to be squeezed out on the apron of the tray before using.

In accordance with my invention, the entire can of paint is inserted in the tank, the tank cover clamped on, the tank pressurized and from then on the flow is entirely uniform and constant, and the rate of flow is always under the control of the operator. By using my invention, the average operator can cover many times as much surface in the same time with a more uniform coating and will use less paint for a given area than with the usual hand dipping operation.

It will be understood that the paint roller as shown has a relatively short handle tube 18 but that a hollow tube extension 82, FIG. 2, of a desired length can be screwed into the hand grip 20 with the liquid tube 24 passing through it. Such a construction facilitates operating at relatively long range but makes the unit simple to construct and store.

While I have shown and described a preferred form of embodiment of my invention, I am aware that modifications will occur to those familiar with this art and I consider my invention to be limited only by the scope and spirit of the description herein and of the claims appended hereinafter.

I claim:

1. A pressure feed liquid distributor adapted to be connected to a source of liquid under superatmospheric pressure, which comprises a frame, a handle for said frame, a surface contacting roller mounted for rotation in said frame, a liquid feed roller mounted for rotation in said frame and in contact with said surface contacting roller, said frame having a rigid housing partially surrounding and in liquid tight contact with the arcuate surface of said liquid feed roller, said liquid feed roller having grooves in the surface extending along the length of the surface, and means to supply the liquid under pressure to the surface of the liquid feed roller on the surface opposite the surface in contact with the surface contacting roller whereby on rotation of the surface contacting roller the liquid on the liquid feed roller is deposited on the surface contacting roller, said liquid feed roller serving as a liquid choke when not rotating.

2. A pressure feed liquid distributor as claimed in claim 1 wherein the housing of the frame embraces at least two grooves on each side of a diameter of the arcu-

5

ate surface of the liquid feed roller to prevent blow through with a positive liquid pressure on the side opposite the surface roller contacting surface.

3. A pressure feed liquid distributor as claimed in claim 1 wherein the grooves in the liquid feed roller are discontinuous at the ends of the roller and the surface contacting roller overlaps the ends of the liquid feed roller.

4. A pressure feed liquid distributor as claimed in claim 3 wherein the grooves are discontinuous along their length.

5. A pressure feed liquid distributor as claimed in claim 4 wherein the grooves are discontinuous around the periphery and in different planes are offset from the grooves in adjacent planes.

6. In a combination with a pressure feed liquid distributor comprising a frame, a surface contacting roller mounted for rotation in said frame, a liquid feed roller mounted for rotation in said frame and in contact with said surface contacting roller, said frame having a rigid housing partially surrounding and in liquid tight contact with the arcuate surface of said liquid feed roller, said liquid feed roller having grooves in the surface extending along its length, a pressurized liquid source, tubular means to connect said source with the liquid feed roller, said pressurized liquid source including an air compressing means, a pressure limiting device, a tank and a removable cover therefor, said tank being adapted to receive a liquid containing receptacle, said tubular means being adapted, when the tank is closed to extend substantially to the bottom of a liquid containing receptacle positioned therein, whereby when the pressurized liquid source is pressurized the liquid will be discharged through said tubular means, said liquid feed roller, when not rotating, choking the flow of liquid from the pressurized liquid source.

7. The combination of pressure feed liquid distributor as claimed in claim 6 wherein the removable cover and the adjacent surface of the tank have cooperating fluid sealing surfaces and a gasket adapted to be placed between and exerting pressure due to inherent spring in contact with the respective surfaces, said gasket having a C shape cross section subjected to internal pressure from within the tank to increase the surface contact with increases in internal pressure.

8. The combination of pressure feed liquid distributor as claimed in claim 6 wherein the cover is provided with a plurality of clamp members, the extremities of which are adapted to engage the tank.

9. The combination of pressure feed liquid distributor as claimed in claim 7 wherein the cover is provided with a plurality of clamp members, the extremities of which are adapted to engage the tank.

10. An integrated continuous feed paint spreader comprising:

(a) a tank having a removable cover and of a size to receive a commercial size liquid paint package;
(b) a pump and valves interconnected to and commonly mounted with the tank to permit pressuring the tank;

(c) a fluid communicating tube extending into the tank and to the bottom of the paint package;

(d) a hand manipulated paint roller assembly including a surface contacting roller, a rigid supporting frame having a handle, and a liquid feed roller in driven connection with said surface contacting roller, both rollers being rotatably mounted in the frame, the liquid feed roller having grooves in the surface extending along its length, said assembly being adapted to be connected to said fluid connecting tube to transfer paint from the tank to the surface contacting roller, a portion of the surface of said liquid feed roller being surrounded by the rigid frame and in liquid tight contact therewith thus preventing flow of paint except on rotation.

11. An integrated continuous feed paint spreader as claimed in claim 10 wherein the liquid feed roller is provided with a multiple series of indentations.

12. An integrated continuous feed paint spreader as claimed in claim 10 wherein the surface contacting roller and the liquid feed roller are removably mounted in the frame.

13. An integrated continuous feed paint spreader as claimed in claim 10 wherein the frame adjacent the liquid feed roller on the side opposite the surface contacting roller is formed into a shallow longitudinally extending paint receiving reservoir to distribute paint under pressure along substantially the entire length of the liquid feed distributing roller.

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