Dec. 28, 1965 J. W. CARPENTER 3,225,372

PAINT DISTRIBUTOR ATTACHMENTS FOR ROTARY-POWERED PAINT BRUSHES

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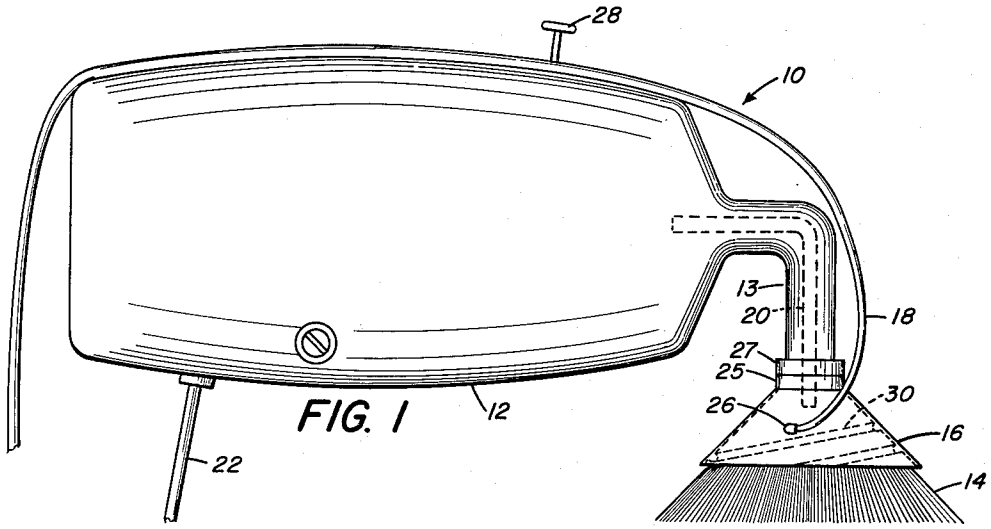

FIG. 1

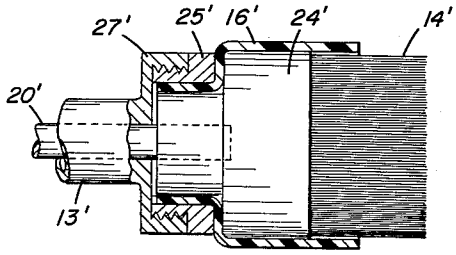

FIG. 4

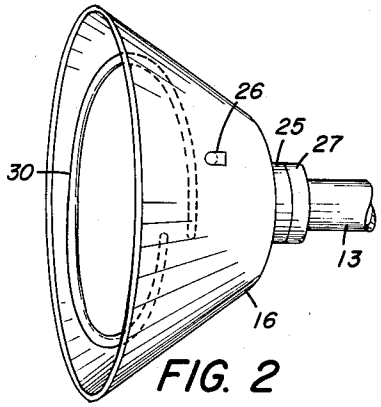

FIG. 2

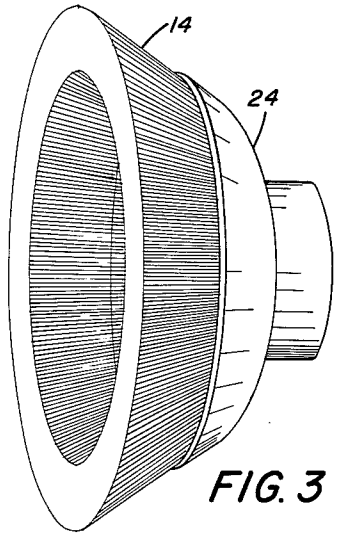

FIG. 3

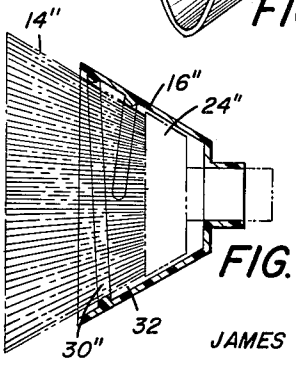

FIG. 5

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PAINT DISTRIBUTOR ATTACHMENTS FOR ROTARY-POWERED PAINT BRUSHES

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This invention relates to rotary-powered paint brushes and similar liquid-applying implements for work surfaces, and is directed particularly to: improved, manually controlled liquid distributor attachments for such rotary-powered brushes; and the combination of rotary-powered brushes and liquid distributor attachments.

Various well-known implements are employed for applying paint and other liquids to work surfaces. The manually held paint brush and paint roller are manually moved back and forth in applying paint while a spray gun applies paint in an air spray action, just to mention conventional examples. The rotary movement of the paint roller for transferring paint to a work surface depends on a rolling frictional engagement with the work surface as the roller is manually pushed. The paint brush transmits its load of paint to the work surface by back-and-forth or sidewise sweeping strokes, the direction of such strokes varying in accordance with the character of the paint used and the character of the work surface. The spray gun depends on high pressure to force a diluted material through the air onto a work surface.

The brush may be more advantageously used at times, rather than the roller, because the brush bristles can reach into corners, crevices, pock marks and the like. The roller may be more advantageous in the hands of the nonprofessional painter for avoiding unsightly brush strokes, or may be used for rapid coverage of an area of work surface conducive to such application irrespective of the professional or nonprofessional ability of the operator. The spray gun may be more advantageous at times rather than either a roller or a hand brush for certain types of work, but it requires for its use, generally, a diluted material and an extremely high pressure.

In the case of the brush or roller, the physical exertion of the operator is substantial, and tends to be more so, especially when a brush is employed for use with a coarse or irregular work surface. The time necessary for covering a given area of work surface is also dependent upon the type of implement, whether brush, roller or spray gun, the character of the paint or liquid being applied, and the character of the work surface. In the case of the spray gun, a certain amount of over-spray is unavoidable and the paint cannot be confined to small areas or within narrow limits. Furthermore, spray tends to travel and to contaminate the surrounding atmosphere.

Increased speed, accuracy and, accordingly, reduced time and better control in the application of full-bodied paints or other liquids to work surfaces can be obtained by employing a rotary-powered brush. Also, less physical exertion is required by the use of this type of brush as compared to a hand brush or roller because the paint or liquid is spread and applied by the powered rotary motion of the brush. The only physical exertion required is that of holding and guiding the rotary-powered brush, much like guiding a spray gun, and bearing the brush against the work surface with sufficient force to hold the brush in engagement with such work surface. The use of this brush is especially effective with rough and coarse work surfaces and with narrow and confined areas. It is also effective on any other type of surface that is normally painted.

One of the objects of the present invention is to provide a simple but effective means for delivering paint or other liquids in manually controlled continuous flow to the rotary-powered type of brush described in the preceding paragraph.

Another object of the invention is to provide a rotary-powered brush and a liquid distributor attachment as a combination.

Other objects inherent in the nature and character of the present invention will become readily apparent to those skilled in the art from the drawings and description which follow.

In the drawings, which form a part of the disclosure of the invention:

FIG. 1 shows in elevation a rotary-powered brush;

FIG. 2 shows an enlarged perspective view of the liquid distributor device provided with an integrally formed spiral embossing on the inside surface thereof;

FIG. 3 shows an enlarged perspective view of the cup brush of FIG. 1;

FIG. 4 shows a view partly in section of a further embodiment of a cup brush and a liquid distributor device illustrating a configuration different from that shown in FIGS. 1 to 3; and

FIG. 5 shows a sectional view of a different arrangement of the cup brush and the liquid distributor device of FIGS. 1, 2 and 3.

In reference to the drawings, the rotary-powered brush implement **10** comprises a motorized handle **12**, a cup-shaped brush **14** and a liquid distributor device **16** to and through which a conduit **18** is connected for conducting paint or other types of liquids.

The motorized handle **12** is of such size as to be normally grasped in one hand and may contain or be connected to an electric motor (not specifically shown), or may be pneumatically or hydraulically powered (not shown) to power a drive shaft **20**. The primary functions served by the handle, obviously, are those of providing a support for the drive shaft **20** and shaft-connected brush **14** and for enabling the operator to manipulate the brush in applying paint or other types of liquids to a work surface, and the manner by which the drive shaft is powered is of no inventive consequence in the present invention. Inasmuch as it is preferable, for purposes of illustration, to refer to an electric motor as being contained within the handle, the electric cable or cord for such electric motor is shown at **22** in FIG. 1.

The rotary brush **14** is preferably cup-shaped in configuration and has a hollow center and is preferably known in the art as a cup brush. The term cup brush will be employed herein to refer generically to a hollow-centered brush having bristles flared radially outwardly to various extents in projection from the cup-shaped back or hub **24**, as well as to a hollow-centered brush **14'** having bristles projecting from the hub at right angles to the hub in cylindrical configuration along with a distributor device **16'** with matching configuration (shown in FIG. 4). In the flared bristle type of cup brush, paint and/or other types of liquids are swirled onto the work surface by the bristle ends and the sides of the bristles closely adjacent the bristle ends. In the straight bristle projection type of cup brush, paint and/or other types of liquid are swirled onto the work surface primarily by the bristle ends, although, depending on the pressure employed to bear the brush against the work surface, there may be some engagement of the bristle sides.

The cup-shaped back or hub **24** (or **24'** of brush **14'** in FIG. 4) of the rotary brush **14** may be joined to the handle drive shaft **20** in any suitable manner which would enable brushes to be readily operatively connected to and disconnected from the handle. The length of the bristles projecting from the hub will usually depend on the character of the work surface and the paint or liquid to be applied.

The liquid distributor device **16** is suitably non-rotatively connected to the handle **12**, as by collar **25** which is threadingly connected to collar **27** (as illustrated in FIG. 4 and wherein corresponding reference numbers identifying like elements are provided with prime marks to denote the different embodiment) on the projecting end **13** of handle **12**, to encircle and project like a cap over the hub of the rotary brush and part way of the length of the bristles when the brush is operatively connected to the handle. The distributor device is designed to have a configuration similar to the outside configuration of the rotary brush and thus may also be termed cup-shaped. The device may be made of neoprene or equivalent non-porous material compatible with the liquid to be applied and is preferably flexible, although in some instances of application it may be deemed desirable to make the device from a rigid material.

A hollow connector **26** is provided on the exterior side surface of the distributor device for accommodating the attachment of the conduit **18**. The hollow connector opens into the interior of the distributor device.

The conduit **18** is connected to a remote source of paint or other type of liquid supply (not shown) and intervening between the conduit and the liquid supply is a valve means, shut-off device or needle valve arrangement of any suitable character, simply illustrated at **28**, capable of being manually operated by the operator at will as he manipulates the rotary-powered brush implement **10**. The conduit may be frabricated from any suitable material compatible with the liquid to be applied.

The liquid distributor device **16** may also be provided with an integrally formed spiral longitudinally extending embossing **30**, the height and width of such embossing aiding in the distribution of paint or other types of liquid to the rotary brush bristle ends. The function of the embossing will be more fully described in the operation of the rotary-powered brush implement.

Operation

In the operation of the rotary-powered brush implement **10**, paint or another type of liquid is conducted under pressure through the conduit **18** to the interior of the liquid distributor device **16** in straight-line or lineal force into contact with the bristle sidewall of the rotating rotary brush **14**. The rotary motion of the brush generates a centrifugal force which tends to carry the paint around inside the distributor device and whirl the paint outwardly or causes it to "well up" and fill the space between the brush sidewall and the inside wall surface of the distributor device. The distributor wall surface statically opposes the centrifugally whirled paint to an extent less than what the paint would well up if unopposed. The added continuous lineal flow of paint through the conduit, coupled with the generated centrifugal, static aforementioned forces and gravity, causes the paint to flow between the distributor device and the bristle sidewall around and along the length of the bristle sidewall in a film-like path toward the bristle ends for swirling application onto a work surface. The outward flare of the brush and distributor device, and the capillary action resulting from the contact of the brush and paint with a work surface assist "drawing" the paint in the desired direction toward the work surface. In the embodiment shown in FIG. 4, the capillary action resulting from contact of the brush and paint with the work surface is thought to be primarily responsible to assist "drawing" the paint in the direction toward the work surface away from the hub of the brush, along with the added effect of gravity.

The spacing between the liquid distributor device **16** and the sidewall of the rotary brush **14** may be varied by design in accordance with the flexible or nonflexible character of the distributor devise; the presence or absence of the spiral embossing **30**; the consistency of the paint or liquid employed; the character of the work surface as effected by porosity, coarseness and the like; and the amount of paint or liquid which is desired to be applied on a given area of work surface.

If a given work surface area is of extremely porous character and the paint or liquid to be applied is of rather thin consistency, a more copious quantity of such paint or liquid may be required for application than for a less porous surface or with a thicker paint or liquid consistency. Larger quantities of paint or liquid may be delivered to the bristle ends by providing the embodiment shown in FIG. 5 (wherein corresponding reference numbers previously employed to identify like elements are provided with double prime marks to denot the different embodiment) with spiral embossing **30''** on the inside surface of the distributor device **16''** and spacing the distributor device inside wall from the bristle sidewall of the brush **14''** by the height of the embossing so that only the apex of the embossing engages such bristle sidewall. In such case, the distributor device could be made from a rigid or flexible nonporous material. The pressure of the fluid flow through the conduit could also be increased accordingly so as to continuously feed the space **32** between the bristle sidewall and the distributor device to provide a thicker film-like flow. The provision of an embossing would also serve to reduce the amount of power necessary to rotate the brush because there would be less "drag" between the brush and the distributor device.

The spiral embossing may also be used on a flexible distributor device whereby the device closely hugs the bristle sidewall and leaves little space between the brush sidewall and distributor device, and the paint or liquid is delivered to the bristle ends via the action of the rotating brush and the spiral embossing.

The primary purpose of the distributor device, whether with or without spiral embossing, is to maintain the paint or liquid substantially on the outer circumference of the brush and direct the paint or liquid toward the bristle ends. There may be instances, however, where it would be deemed desirable to "soak" the bristles along the entire length, and, accordingly, a rigid deflector device designed to hug the bristle sidewall of the rotary brush may be in order. Such rigid deflector device may have a tendency to "squeeze" paint or liquid through the sidewall of the brush as well as direct paint or liquid around the outer circumference of the bristle sidewall as the brush rotates. The extent of such penetration obviously would also depend on the thickness of the bristle sidewall; the coarseness or firmness of the bristles and, accordingly, sparseness or density of such bristles; and the lineal pressure flow of the paint or liquid.

The character of each work surface and that of the paint or liquid to be applied thereto will dictate the design of the brush and liquid distributor device to be employed. Experimentation with different combinations of brush, distributor device and the like, as aforedescribed, will show the operator the character of design of rotary-powered brush implement suited for a particular work surface and for a particular paint or liquid.

The brush rotation may be adjustably controlled by any conventional manner so as to rotate in the range of approximately 50 to 300 revolutions per minute, depending on such factors as paint consistency, work surface irregularity and the like. If the rotation is too fast and the paint of a very thin consistency, the paint could be undesirably expelled from the bristle ends. Therefore, the rotation should always be such as to retain the paint at the bristle ends for subsequent swirling motion onto a work surface. The brush rotation may be stopped and the pressure flow stopped to brush-stroke the paint onto the surface if the occasion should dictate such action.

The method of application obviously differs from that shown in the Stefano Patent No. 2,806,236 in at least one manner whereby the paint is sprayed from the center of a rotating brush directly onto a work surface and the brush then spreads the paint already on the work surface more uniformly over such surface.

It should be recognized that although the rotary brush illustrated in the drawings is hollow-centered, the distributor device could also be applied to a brush having a full center; however, in the usual type of painting or liquid applying by a rotating brush, such painting is accomplished mostly by the outer radial edge.

Conclusion

The rotary-powered brush, distributor device and conduit are simply and readily attached, detached and cleaned. Little fluid pressure is needed at the brush; only enough to cause a "flow" of the liquid. It should now be apparent that the rotary-powered brush implement, as illustrated in the drawings and described above would be especially effective for irregular or rough surfaces; general maintenance of buildings, bridges, ironwork and the like; and particularly utilizable in application of prime coats of paint. The rotary-powered brush implement is as fast as a conventional paint roller, versatile as a hand brush, easy to handle as a spray gun, and is capable of applying paints or other liquids of varying consistencies.

While this invention has been described in connection with specific embodiments thereof, it will be understood that it is capable of further modifications, and this application is intended to cover any variations, uses, or adaptations of the invention following, in general, the principles of the invention and including such departures from the present disclosure as come within known or customary practice in the art to which the invention pertains and as may be applied to the essential features hereinbefore set forth and as come within the scope of the invention or the limits of the appended claims.

Having thus described my invention, I claim:

1. A rotary-powered painting device comprising:
a motorized handle having a drive shaft;
a cup brush having a hub and bristles of predetermined length extending from said hub, said brush being operatively connected to said drive shaft for rotation thereby;
and a paint distributor device comprising:
a cap non-rotatively connected to said motorized handle and extending in encircling manner over said hub and part way of the length of said bristles in closely spaced relation to the outside periphery of said brush, said cap having an integrally formed spiral longitudinally extending embossing of predetermined width in close contact with the outside periphery of said brush and starting adjacent said hub and terminating adjacent the end edge of said cap;
and conduit means connected to said cap and having an outlet opening within said cap adjacent the bristle sidewall of said brush periphery and adapted to conduct paint from a remote source under pressure therethrough to said outlet opening;
whereby the rotary motion of the brush, and the spaced relation of the cap coupled with the close contact of said spiral embossing cooperate to conduct paint flowing under pressure from said outlet opening evenly around and along the outside periphery of said brush to the bristle ends for application of the paint to a work surface.

2. A rotary-powered painting device as defined in claim 1, wherein said cap and integrally formed spiral embossing are fabricated from non-porous flexible material.

3. A rotary-powered painting device comprising:
a motorized handle having a drive shaft;
a flared cup brush having a hub and bristles of predetermined length extending from said hub, said brush being operatively connected to said drive shaft for rotation thereby;
and a paint distributor device comprising:
a cup-shaped cap non-rotatively connected to said motorized handle and extending in encircling manner over said hub and part way of the length of said bristles in closely spaced relation to the outside periphery of said brush, said cap having an integrally formed spiral longitudinally extending embossing of predetermined width in close contact with the outside periphery of said brush and starting adjacent said hub and terminating adjacent the end edge of said cap;
and conduit means connected to said cup-shaped cap and having an outlet opening within said cap adjacent the bristle sidewall of said brush periphery and adapted to conduct paint from a remote source under pressure therethrough to said outlet opening;
whereby the rotary motion of the brush, the flared cup-shape of the brush and cap, and the spaced relation of the cap coupled with the close contact of said spiral embossing cooperate to conduct paint flowing under pressure from said outlet opening evenly around and along the outside periphery of said brush to the bristle ends for application of the paint to a work surface.

4. A rotary-powered painting device as defined in claim 3 wherein said cup-shaped cap and integrally formed spiral embossing are fabricated from nonporous flexible material.

5. A liquid distributor device for non-rotative attachment to a rotary-powered cup brush comprising:
a cap for extending in encircling manner over, in close configuration to, and part way of the bristle length of said brush so that a portion of the brush bristles project beyond said cap, said cap having positioned on its internal surface an integrally formed spiral longitudinally extending embossing of predetermined width and height;
and conduit means connected to the exterior sidewall of said cap and having an outlet opening inside said cap, said conduit means adapted to conduct fluid therethrough from a remote liquid supply source.

6. A liquid distributor device as defined in claim 5 wherein said cap and said integrally formed spiral embossing are formed of a non-porous flexible material.

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