Sept. 28, 1971 E. N. SEILER 3,608,120

PAINT ROLLER CLEANING APPARATUS

Filed Oct. 17, 1969 2 Sheets-Sheet 1

FIG. 1

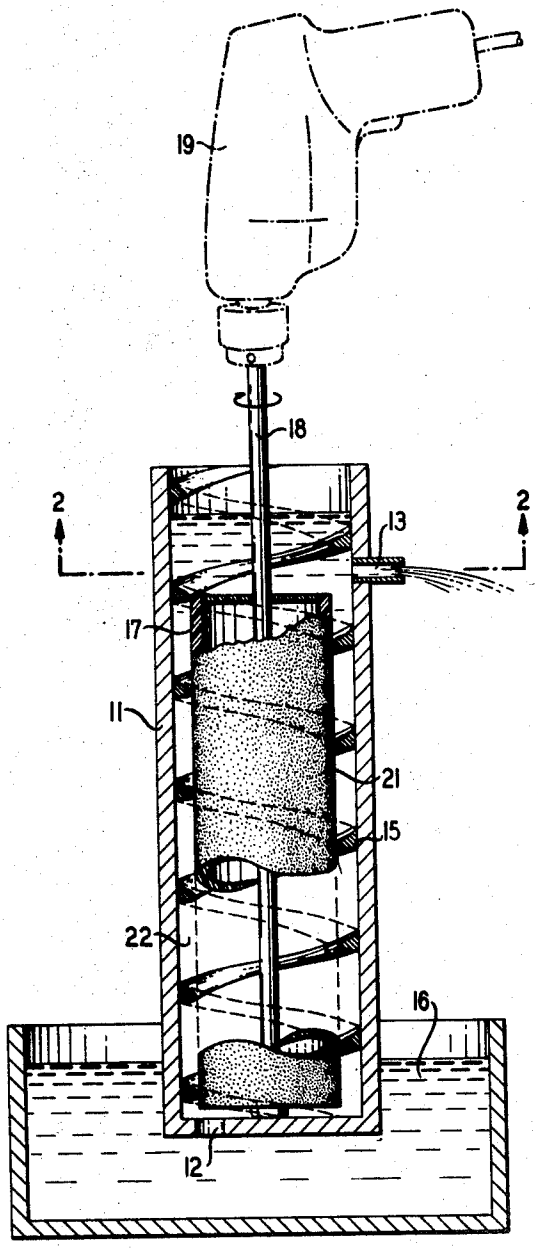


FIG. 2

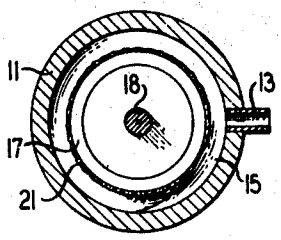
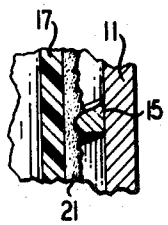


FIG. 3



INVENTOR
EDWIN NAIL SEILER
BY
Robert B. Anderson
ATTORNEY

Sept. 28, 1971 E. N. SEILER 3,608,120

PAINT ROLLER CLEANING APPARATUS

Filed Oct. 17, 1969 2 Sheets-Sheet 2

FIG. 5

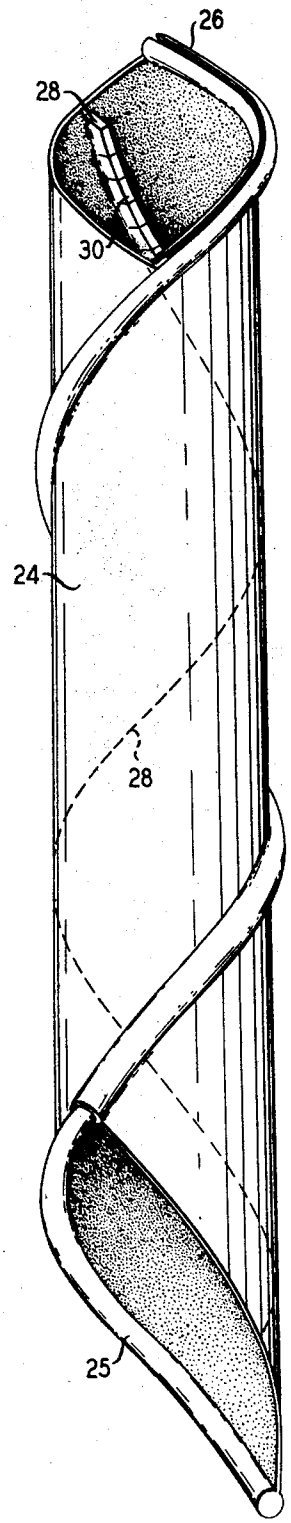


FIG. 4

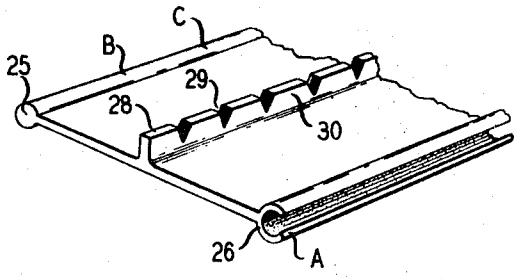


FIG. 6

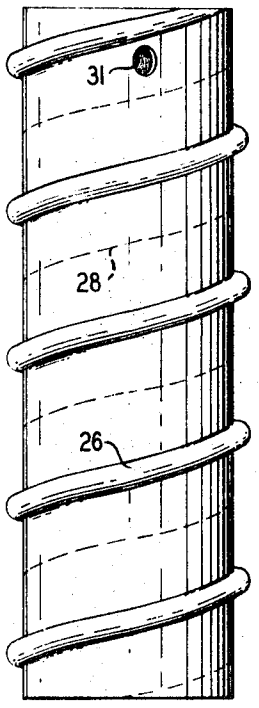
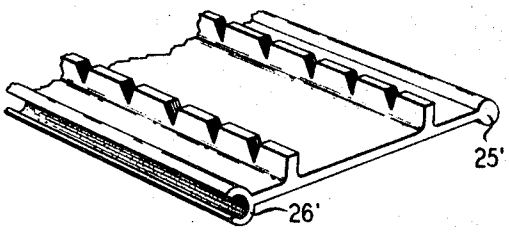


FIG. 7



United States Patent Office 3,608,120 Patented Sept. 28, 1971

3,608,120

PAINT ROLLER CLEANING APPARATUS

Edwin N. Seiler, 80 Hunterdon Blvd.,
Murray Hill, N.J. 07974

Continuation-in-part of application Ser. No. 813,424, Apr. 4, 1969. This application Oct. 17, 1969, Ser. No. 868,290

Int. Cl. A46b *17/06*

U.S. Cl. 15—1 12 Claims

ABSTRACT OF THE DISCLOSURE

A paint roller cleaning device comprises a hollow cylinder having a helical projection extending from the inner surface of the cylinder. A paint roller to be cleaned is contained within the cylinder and is rotated by an electric motor or the like. One end of the cylinder extends into a pool of cleaning fluid, and as the roller is rotated, fluid is sucked into the device through one aperture and expelled through another aperture at the opposite end. As the roller rotates, the helical projection compresses it to squeeze residual paint from it as it is being washed by the cleaning fluid. Methods for making such apparatus are described.

This is a continuation-in-part of patent application Ser. No. 813,424, filed Apr. 4, 1969, now abandoned.

BACKGROUND OF THE INVENTION

This invention relates to apparatus for cleaning paint rollers, and more particularly, to apparatus for squeezing residual paint from a paint roller as the roller is being flushed with cleaning fluid, normally a paint solvent.

Numerous devices have been proposed for cleaning residual paint from paint rollers as is normally required after a conventional paint roller has been used. Virtually all such devices include apparatus for flushing the paint roller with liquid cleaning fluid, and many of them include means for applying some sort of force to the roller as it is being flushed. It can be appreciated that the fiberous nap of a paint roller is most efficiently cleaned by applying a steadily advancing compressive force to the roller as it is being soaked or flushed with cleaning fluid. This mode of cleaning is popularly known as a "squeegee" operation, and producing such a continuously advancing squeezing force on the roller may be known as "squeegeeing."

It is also, of course, desirable that efficient use be made of the cleaning fluid and that the cleaning fluid and residual paint be expelled from the paint roller with a minimum of mess and inconvenience. Since paint rollers are typically relatively inexpensive devices in themselves, any apparatus used for cleaning them should likewise be inexpensive and easy to use.

SUMMARY OF THE INVENTION

In accordance with an illustrative embodiment of my invention, a hollow cylindrical member includes a helical projection of flexible material axially extending along its inner surface. The paint roller to be cleaned has a slightly larger outer diameter than the helix diameter so that, when the roller is placed within the cleaning device, the flexible helical projection compresses and bears against it. Means are included for rotating the roller as it is compressed within the device.

If the roller is rotated in a direction opposite the direction of the helix, paint is squeezed from the roller and forced to a top end of the cleaning cylinder where it is expelled from an aperture. In accordance with another feature of the invention, the bottom end of the cleaning cylinder contains another aperture which is submerged in a pool of cleaning fluid. It can be shown that as the paint roller is rotated, residual paint is not only squeezed from the nap of the roller, but a suction force is created that pulls cleaning fluid in through the input aperture, carries it along a helical channel defined by the flexible helical projection, and expels it from the output aperture near the top of the cleaning cylinder. Thus, the roller is efficiently flushed as it is being progressively compressed from the bottom toward the top in a "squeegee" operation. Moreover, the expelled cleaning fluid containing residual paint from the roller can be conveniently collected as it is projected from the output aperture, either to be disposed of or to be recirculated through the cleaning device for further use.

In accordance with another feature of the invention, the cleaning cylinder and helical projection may be made from a single sheet of extruded plastic. One edge of the sheet forms a continuous cylinder, the opposite edge forms a continuous socket adapted to engage the cylinder, and a wall is formed along the middle of the sheet parallel to the two edges. The flexible plastic sheet is then obliquely rolled and the opposite edges are attached such as to twist the central wall into the form of an internal helix. As will be appreciated hereinafter, this method of making the paint cleaning device substantially reduces the cost of fabrication.

These and other objects, features, and advantages of the invention will be better understood from a consideration of the following detailed description taken in conjunction with the accompanying drawing.

DRAWING DESCRIPTION

FIG. 1 is a schematic sectional view of an illustrative embodiment of the invention;

FIG. 2 is a view taken along lines **2—2** of FIG. 1;

FIG. 3 is an enlarged sectional view of part of the apparatus of FIG. 1;

FIG. 4 is a perspective view of part of an extruded plastic sheet that may be used for making a paint roller cleaning device in accordance with another embodiment of the invention;

FIG. 5 is a perspective view of a paint cleaning device made from the plastic sheet of FIG. 4;

FIG. 6 is a side view of the paint roller cleaning device of FIG. 5 at a subsequent stage of fabrication; and

FIG. 7 is a perspective view of part of an extruded plastic sheet in accordance with another embodiment of the invention.

DETAILED DESCRIPTION

Referring now to FIG. 1, there is shown paint roller cleaning apparatus comprising a hollow cylinder **11** having an intake aperture **12** at a bottom end and an output aperture **13** near an upper end. An axially extending helical projection **15** of flexible material extends along an inner surface of the hollow cylinder. The bottom of the hollow cylinder **11** is located in a pool of appropriate cleaning fluid **16**.

A paint roller **17** to be cleaned is inserted into the hollow cylinder such that the central axle **18** of the roller extends out through an upper end of the cylinder as shown. An appropriate device such as an electric drill motor **19** is coupled to the axle **18** for rotating the roller **17** with respect to the helical projection **15**.

The inner diameter of the helical projection **15** is slightly smaller than the outer diameter of the paint roller **17** to be cleaned. The roller therefore is compressed within the helical projection, and, as shown in FIG. 3, the helical projection protrudes into the nap **21** of the roller **17**.

The purpose of the apparatus is of course to clean residual paint from roller **17**. When the axle **18** is rotated,

the projection **15** produces a localized compressive force on the roller that continuously moves axially, thus "squeegeeing" the roller. If, looking downwardly, the helical direction is counterclockwise as shown in FIGS. 1 and 2, and if the direction of rotation of the roller is clockwise, as shown by the arrow of FIG. 1, then the direction of the continuous compressive force on the roller will be upward, from bottom to top. That is, paint squeezed from the bottom end of the roller will be carried by the helical projection **15** toward the upper end of the hollow cylinder as the roller rotates. The helical projection defines a helical channel **22** that carries the paint squeezed from the roller to the output aperture **13** where it is ejected.

In addition to squeezing residual paint from the roller, rotation of the roller sucks cleaning fluid **16** through input aperture **12** to the interior of cylinder **11** where it too rides up helical channel **22** to the output aperture **13**. As it does so, it soaks and flushes the nap of the roller to aid in the cleaning process. The constituency of cleaning fluid **16** of course depends on the type of paint to be removed; normally it is a solvent with respect to the type of paint to be removed.

In an experimental model of the apparatus made, the hollow cylinder **11** was made from 28 gauge metal about two and a half inches in diameter. The helical projection **15** was made by gluing, to the inner surface of the cylinder, plastic material commercially known as Sears, Roebuck & Company No. 7464 plastic weather strip material. The axle of the roller was fitted into the chuck of a commercially available variable speed electric drill and it was found that best operation was obtained when the roller was turned at a relatively slow speed.

Referring now to FIG. 4 there is shown an integral sheet **24** of extruded plastic from which a paint roller cleaning device can easily be made. The sheet comprises a continuous cylinder **25** along one edge and a continuous socket **26** along the opposite edge which is adapted to engage the cylinder **25**. Extending along the middle of the sheet is a wall **28** from which a series of slots or notches **29** have been cut to form an array of segments **30**. The slots **29** are V-shaped and are cut after the sheet **24** including the wall **28** have been formed through a single extrusion process. Extrusion refers to a process by which fluid material, in this case plastic, is formed into a desired configuration by forcing it under high pressure through an aperture of that configuration.

When the sheet **24** is obliquely rolled such that socket **26** engages a displaced part of cylinder **25**, the entire sheet will be twisted and wall **28** will form a helix. For example, the sheet **24** may be rolled and twisted such that point A of socket **26** engages point B of cylinder **25**. The resulting configuration is shown in FIG. 5. Because the segments **30** are on the interior of the structure, the V-shaped slots separating them are closed to give a continuous wall **28** in the form of a helix. Thus, the device of FIG. 5 is capable of being used in a manner portrayed in FIG. 1. If so desired, the ends of the device of FIG. 5 may be trimmed to give the device shown in FIG. 6. Additionally, an aperture **31** may be formed at one end of the device to give a coherent output stream as is depicted in FIG. 1.

It can be appreciated that, since the device of FIGS. 5 and 6 is made from a single sheet of extruded plastic, the expenses of fabrication can be markedly reduced. Another advantage of this method of fabrication is that the diameter of the device can be easily adjusted to accommodate various sizes of rollers to be cleaned. Referring again to FIG. 4, the inner diameter of the device will be reduced if point A is joined to point C, rather than point B.

Referring to FIG. 7, another advantage of this embodiment is that by simply providing two parallel walls to the extruded sheet, one attains two helices of bifilar configuration when the device is assembled. This may be advantageous if relative rotation is to be made manually rather than with the use of the electric motor.

From the foregoing, it can be seen that my paint roller cleaning apparatus combines in a single simple structure the following functions: "squeegeeing" the nap of the roller; flushing the nap with cleaning fluid; and pumping the cleaning fluid from a pool or reservoir. In addition, because the used cleaning fluid emanates from output aperture **13** as a single coherent stream, it can conveniently be collected in a receptacle or directed to an appropriate drain with a minimum of mess and inconvenience.

A simple and inexpensive method of fabricating the device has been described which is also advantageous in that it permits adjustment to accommodate rollers of different sizes.

It is to be understood that an electric drill or electric motor is only one of various means that could be used for rotating the shaft or axle of the paint roller being cleaned. A manually operated crank with an appropriate gear train would also be practical. If desired, the roller can be turned in the same direction as the helical projection, but in this case, fluid and residual paint is forced in the direction of top to bottom. A flexible hose could of course be used to admit cleaning fluid into aperture **13** at the top of the cylinder. It may also be advantageous at the end of the cleaning operation illustrated in FIG. 1 to reverse the direction of rotation after the cylinder has been removed from pool **16** to force residual cleaning fluid out through aperture **12**, and in effect, to dry the nap of the paint roller. The input and output apertures need not take any specific configuration and may merely constitute open opposite ends of the cylinder. On the other hand, it may be desirable to include a cap on the top end of the device of FIG. 1 to insure that all expelled fluid is forced through aperture **13**.

In addition to the extrusion method described, paint roller cleaning devices may be molded from flexible plastics such as polypropylene. The molded device could be of substantially uniform thickness. The flexible body of the device would permit the operator to grip it sufficiently tightly to decrease the effective cylinder diameter to accommodate the nap of various sized rollers. The same method presently used to mold cast plastic bottles could be used for molding devices of this type.

If so desired, the cylinder **11** may be rotated with the paint roller being held stationary. Various other embodiments and modifications may be made by those skilled in the art without departing from the spirit and scope of the invention.

What is claimed is:

1. Paint roller cleaning apparatus comprising:

a hollow cylindrical member;

means defining a substantially helical projection extending from the inner surface of the cylindrical member, the projection being capable of substantially surrounding and compressing the paint roller to be cleaned;

an opening at a bottem end of the cylindrical member adapted to extend into a reservoir of cleaning fluid;

an opening at a bottom end of the cylindrical member

the helical projection extending in a first angular direction, and defining with the paint roller a helical channel;

and means for rotating the roller with respect to the cylindrical member in a direction opposite the first angular direction, whereby said cleaning fluid is pumped from the opening at the bottom of the cylindrical member to the opening at the top of the cylindrical member, while residual paint is squeezed from the roller and transmitted with the cleaning fluid along the helical channel.

2. The paint roller cleaning apparatus of claim **1** wherein:

the opening at the top end of cylindrical member comprises an aperture having a central axis transverse to the central axis of the cylindrical member, whereby,

when the cylindrical member is held in a vertical position and operated, cleaning fluid is ejected in a stream from the aperture.

3. In combination:

a hollow cylindrical member;

a solid cylindrical member contained within and coaxial with the hollow cylindrical member;

means defining a substantially helical projection from the inner surface of the hollow cylindrical member;

the helical projection being made of flexible material and having a slightly smaller inner diameter than the outer diameter of the solid cylindrical member, whereby adjacent turns of the projection, the outer surface of the solid cylindrical member, and the inner surface of the hollow cylindrical member define a helical channel;

an opening at a bottom end of the cylindrical member adapted to extend into a reservoir of fluid;

an opening at the top end of the cylindrical member;

the helical projection extending in a first angular direction;

and means for rotating the solid cylindrical member with respect to the hollow cylindrical member in a direction opposite the first angular direction, whereby said fluid is pumped from the opening at the bottom of the hollow cylindrical member to the opening at the top of the hollow cylindrical member.

4. Paint roller cleaning apparatus comprising:

a hollow cylindrical member comprising a single strip of flexible material having first and second opposite edges and including thereon means for attaching said first and second opposite edges together;

said first and second opposite edges being attached such that points on the first edge are uniformly displaced from corresponding point on the second edge, whereby the juncture of the first and second edges is curved substantially in the shape of a helix;

means defining a substantially helical projection extending from the inner surface of the cylindrical member, the projection being capable of substantially surrounding and compressing the paint roller to be cleaned;

and means for providing relative rotation between the paint roller and the helical projection, thereby to squeeze residual paint from the roller.

5. The improvement of claim 4 wherein:

the first and second edges are mutually parallel and parallel to the helical projection.

6. The improvement of claim 4 wherein:

the strip of flexible material and the projection are integral and made of a single piece of plastic material.

7. The improvement of claim 4 wherein:

the helical projection comprises a series of segments

that form a substantially helical wall when the first and second edges are attached but which are mutually separated by a series of slots and are arranged in substantially a linear array when the first and second edges are not attached.

8. The improvement of claim 4 wherein:

the attaching means comprises a substantially continuous socket along the first edge and a substantially continuous cylinder along the second edge, the cylinder being adapted to engage the socket.

9. The method for making a paint roller cleaning device of the type comprising a helical projection extending along the inner surface of a hollow cylinder comprising the steps of:

forming a strip of flexible material having first and second opposite edges and including a wall therebetween, the wall being parallel to, and substantially coextensive with, the first and second edges;

rolling the strip obliquely to contact the first edge to the second edge such that points on the first edge are uniformly displaced from corresponding points on the second edge;

and attaching the first and second edges to form a cylinder having a helical projection along an inner surface.

10. The method of claim 9 further comprising the step of:

making an aperture near one end of the strip for expulsion of solvent from the cylinder during use.

11. The method of claim 9 wherein:

the step of forming the strip and wall comprises a single step of extruding plastic having that shape.

12. The method of claim 9 further comprising the step of:

cutting V-shaped slots in the wall to prevent the wall from buckling when the strip is rolled.

References Cited

UNITED STATES PATENTS

193,025	7/1877	Newton	15—257.05
208,758	10/1878	Newton	15—257.05
2,807,037	9/1957	Garske	15—21
2,819,483	1/1958	Macaulay	68—213X
2,983,938	5/1961	Veazey	15—257.06
3,284,833	11/1966	Von Tersch et al.	15—236X
3,431,574	3/1969	Mathieu	68—213X

FOREIGN PATENTS

3,041	5/1932	Australia	15—257.05

DANIEL BLUM, Primary Examiner

U.S. Cl. X.R.

15—97, 104.92; 68—213; 100—211; 264—117, 295