

APPARATUS FOR APPLYING A COATING

This invention relates to apparatus for applying a coating and more particularly but not exclusively to apparatus for applying a stripe of lacquer to the side seam of a can body.

In German Offenlegungsschrift 2,728,741 one such apparatus is described for applying a stripe of lacquer to the welded side seam of a can body. In this prior art apparatus an applicator roll is driven to rotate while a lower portion of the periphery of the applicator roll is immersed in lacquer contained in a feeder trough. Each can body is conveyed with the side uppermost to surround the applicator wheel and trough so that as the side seam progressively contacts the uppermost part of the periphery of the applicator wheel lacquer, lifted from the trough by the applicator wheel, is applied to the inside of the seam.

When a stripe of lacquer is to be applied to the outside of the side seam a similar apparatus may be used but the can body has first to be inverted so that the exterior of the side seam is presented to an applicator roll beneath the can body. The act of inverting the can body gives rise to a risk that the orientation of the side seam in relation to the applicator rolls will be lost so that lacquer is not applied correctly to the side seam and margins adjacent.

This invention provides apparatus for applying a coating material to a surface said apparatus comprising an applicator roll which applies material to the surface, a transfer roll which applies the material to the applicator roll, a hollow axle on which the transfer roll rotates and means to lead the material from the hollow axle in a radial direction through the transfer roll to the periphery of the applicator roll characterised in that either the transfer roll or the applicator roll is mounted on a stub axle having an axle portion on which the transfer roll or applicator roll rotates and a pivot portion pivotable in a mounting, the axis of said axle portion being parallel to and spaced apart from the axis of the pivot portion so that rotation of the axle axis about the pivot axis may bring about relative motion as between the applicator roll and the transfer roll to achieve a working relationship of the transfer roll with the applicator roll.

Preferably the applicator roll and transfer roll rotate on the mounting, the same mounting being moveable in a direction perpendicular to the surface to be coated to control the coating contact pressure.

In one embodiment the mounting is supported on a platform having a column moveable within an upright stand to permit adjustment of coating contact pressure.

In another embodiment the mounting is supported for pivotal movement in a plane perpendicular to the surface to be coated, this embodiment being particularly suitable for applying a stripe of lacquer to the inside of a can body.

It is desirable the applicator roll is supported in

a mounting moveable in a direction lateral to the surface to permit alignment of the applicator wheel with the surface to be coated.

The moveable mounting may be slideably supported on a platform and includes means to fix the moveable mounting to the platform.

Alternatively the moveable mounting may have a pivot means to permit movement of the applicator roll in a direction lateral to the can body, this arrangement being particularly suitable for applying a stripe to the inside of a can

The apparatus is preferably provided with a drip tray arranged to collect surplus lacquer from the applicator roll. The surplus lacquer may be passed to a receiver.

Various embodiments of the invention will now be described by way of example and with reference to the accompanying drawings in which:-

Fig.1 is a front view of a first embodiment of apparatus for applying an external stripe of lacquer to a can body;

Fig.2 is a like view of the apparatus of Fig. 1 sectioned on line II-II in Fig. 4;

Fig.3 is a side view of the apparatus;

Fig.4 is a plan view of the apparatus;

Fig.5 is an elevation of the apparatus sectioned on line V-V in Fig. 4;

Fig.6 is an elevation of the apparatus sectioned on line VI-VI in Fig.5;

Fig.7 is a side elevation of a second embodiment of the apparatus part being shown sectioned on line VII in Fig.8; and

Fig.8 is a plan view of the apparatus of Fig.7.

In Fig.1, a can body 1 is supported on a conveyor 2 with the exterior of a side seam 3 in contact with an applicator roll 4. The applicator roll 4 is mounted on a spindle 5 which rotates in a mounting 6. The spindle 5 has a pulley 7 which is driven to rotate by a belt 8 which is driven by a variable speed motor 9 which permits matching of the speed of rotation of the applicator roll 4 to the linear speed of a can body engaged with it. Belts 10 hold the motor on a stand 11 so that tension in the belt may be adjusted by moving the motor 9 on the stand 11. However, any other convenient belt tensioning means may be used

In Fig.2 the mounting 6 can be seen to be mounted on a platform 12 which is supported on a threaded column 13 which fits telescopically in a collar 13A on the stand 11. The column 13 is prevented from rotating in the stand 11 by a key 14. The pressure exerted by the applicator roll 4 on the can body 1 may be finely controlled by adjusting the position of the column 13 in the stand 11. However, when much smaller can bodies, such as that denoted 1A in Fig.2 are to be coated coarse adjustment of the position of the can body 1A in relation to the applicator roll 4 may be achieved by raising the conveyor to the position indicated at 2A.

The applicator roll surface is shaped to conform with the exterior shape of the can to be coated.

The housing 6 is guided to slide on the platform 12 by studs 18, 18A which project from the housing into a groove 19 of the platform 12. The stud 18A has an upper portion which includes a threaded bore through which extends a threaded rod 16. The threaded rod 16 is mounted for rotation in a bracket 17 of the platform 12. A pinned nut 15 prevents the rod travelling axially in relation to the bracket: A second nut 15A permits locking of the rod 16 to the bracket 17. To adjust the lateral position of applicator roll 4, the locking nut 15A is slackened and the rod 16 is rotated to move the housing laterally in relation to the platform 12.

Referring to Figs. 3 and 4 the apparatus can be seen to be arranged so that the applicator roll 4 is engaged with a transfer roll 20. The transfer roll is surrounded by a drip tray 21 which has a drain pipe 22 (best seen in Fig.3).

Lacquer is fed to the transfer roll 4 from a pressurised source 24 (indicated diagrammatically in Fig.4), through a feed pipe 23 which connects with the hollow stub axle 25 upon which the transfer roll rotates.

Referring to Figs. 5 and 6 it will be understood that the lacquer under pressure passes along the pipe 23 into a bore 26 which extends within the stub axle 25 to a radial bore 27 so that the lacquer is delivered to the interior of the transfer roll 20.

The radial bore 27 terminates in a chordal groove 28 in the surface of the stub axle 25. The chordal groove 28 serves as a reservoir within the transfer roll 20.

The transfer roll 20 has a cylindrical bore to permit rotation on the stub axle 25. The transfer roll 20 also has a plurality of radial holes 29 which extend radially from the cylindrical bore. As the transfer roll is urged to rotate by engagement with the applicator roll 4, which is driven to rotate by the motor 9, the holes 29 pass over the chordal groove 28 to collect lacquer.

The number and size of the radial holes 29 is chosen to meter the quantity of lacquer delivered to the applicator wheel. In the embodiment depicted eight holes are shown each hole having a diameter of 1mm. For example a lacquer having a viscosity of 20 centistrokes may be used to apply a film weight in the range 1.5 to 2.5 mg/m. However, other lacquers may be used. After a short period of rotation the peripheral surfaces of transfer roll 20 and applicator roll 4 become coated with a layer of lacquer.

In Fig.5 the applicator roll rotates anti-clockwise as arrowed so that lacquer is carried by the applicator roll 4 the relatively short arcual distance to be applied as an external stripe to the can body. Any lacquer surplus to the coating of the can body 1 is collected by the edge 21A of the drip tray 21 from whence it runs down drain tube 22 into a suitable receiver (not shown).

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The applicator roll is preferably made of a material having some absorbency to act as a reservoir and an ability to conform to the surface to be coated. In the embodiment described a felt roll is held in shape by clamping plates 4A which are tightened to supporting engagement by a nut.

(denoted 30 in Fig.4) on spindle 5.

The periphery of the felt roll 4 is preferably concave external surface of a can body as shown in Figs. when it is to conform with the convex 1 and 2. It will be noticed that the transfer roll 4 is provided with side flanges to confine the apical edges of the applicator roll 4 and a complimentary curved surface to contact the concave surface of the applicator roll 4.

The transfer roll 20 may be of a wear resistant material such as metal or a plastics material such as nylon. Whilst metering has been mentioned in terms of a plurality of radial holes in the transfer roll the metering may be achieved by use of a transfer roll made of a generally porous material such as sintered metal. The pressurised source 24 of lacquer may be a tank set at a height sufficient to permit gravitational feeding of lacquer to the transfer roll. Alternatively a pumped system may be employed. In both cases the supply of lacquer may be interrupted when no cans are passed across the applicator roll so that lacquer does not run to waste.

It is desirable that means be provided to adjust the pinch pressure between the applicator roll 4 and the transfer roll 20 so that as wear of the felt roll occurs adequate driving engagement may be achieved.

In Fig.6 the stub axle 25 can be seen to have an axle portion 25A, upon which the transfer roll 20 rotates, and a cylindrical pivot portion 25B by means of which the axle

is held in the mounting 6. The axis denoted "C" of the axle portion 25A is laterally offset from the axis of the pivot portion 25B so that the rotation of the pivot portion 25A brings about an arcuate movement of the axis "C" of the axle portion about the pivotal axis "PV",

Referring to Fig.5 it will be understood that the arcuate movement of axis "C" can be used to move the transfer roll towards or away from the applicator roll 4 as required for adequate driving engagement.

Clearly the same pivoting principle could have been used to support the applicator roll so simplifying the stub axle which supports the transfer roll and in the second embodiment of the invention, depicted in Figs.7 and 8, it is the applicator roll which is pivotally mounted.

However the embodiment of Figs. 7 and 8 is particularly designed to apply a stripe of lacquer to an internal surface of the side seam 33 of a can body 31 supported on a conveyor (not shown). The lacquer is delivered to the transfer wheel 32 and applicator wheel 34 substantially as already described. However, in this embodiment the applicator wheel 34 is driven to rotate by frictional rolling engagement with the can body 31 passing across it; in turn the transfer roll 32 is driven to rotate by engagement with the applicator roll 34. If however it is thought desirable, either the applicator roll 34 or the transfer roll 32 may be driven by a worm and pinion drive (not shown), for it will be understood that, as this embodiment has to fit within the cross-section of the can body, there is not much room.

The apparatus of Figs. 7 and 8 is attached to the horn of a can body maker, such as produces welded or locked side seams, so that the cylindrical body 31 travels from left to right in the Figures 7 and 8 to surround the apparatus. As the can body leaves the body maker with the side seam uppermost there is little need for much lateral adjustment. However, lateral adjustment is provided by means of a swivel block 35 which may be swivelled in a fork 36 to align the applicator roll with the side seam 33. The block 35 is locked in position by studs 37.

The contact pressure between the applicator roll 34 and side seam 33 is adjusted by an elevator screw 38 in threaded engagement with the fork 36 so that the end of the screw bears upon a forked portion 39 of the coating apparatus. As screw 38 is screwed up the fork portion pivots about pivot 40 on the swivel block 35 so that the applicator roll is raised into greater engagement with the can body 31.

In Fig. 8 it will be seen that the peripheral surface of the applicator roll is convex to conform with the material surface of the can body 31 and that the peripheral surface of transfer roll 32 has a concave shape complimentary to the convex surface 34A of the applicator roll 34.

The apparatus of Figs. 7 and 8 may, if desired, include a scraper blade to remove surplus lacquer from the applicator roll 34. Surplus lacquer is collected in the ~~drain tray~~ ^{drain tray} splash cover 40 for removal to a suitable receiver.

CLAIMS

1. Apparatus for applying a coating material to a surface said apparatus comprising an applicator roll which applies material to the surface, a transfer roll which applies the material to the applicator roll, a hollow axle on which the transfer roll rotates and means to lead the material from the hollow axle in a radial direction through the transfer roll to the periphery of the applicator roll characterised in that either the transfer roll or the applicator roll is mounted on a stub axle having an axle portion on which the transfer roll or applicator roll rotates and a pivot portion pivotable in a mounting, the axis of the said axle portion being parallel to and spaced apart from the axis of the pivot portion so that rotation of the axle axis about the pivot axis may bring about relative motion as between the applicator roll and the transfer roll to achieve a working relationship of the transfer roll with the applicator roll.
2. Apparatus according to claim 1 wherein the applicator roll and transfer roll rotate on the mounting, the mounting being movable in a direction perpendicular to the surface to be coated.
3. Apparatus according to claim 2 wherein the mounting is supported on a platform having a column movable within an upright stand.
4. Apparatus according to claim 2 wherein the mounting is supported for pivotal movement in a plane perpendicular to the surface to be coated.
5. Apparatus according to any preceding claim wherein the applicator roll is supported in a mounting for movement in



direction lateral to the surface.

6. Apparatus according to claim 5 wherein the mounting is slideably supported on a platform and includes means to fix the mounting to the platform.

7. Apparatus according to claim 5 wherein the mounting has a pivot means to permit movement of the applicator roll in a direction lateral to the can body.

8. Apparatus according to any preceding claim having a drip tray arranged to collect surplus lacquer from the applicator roll.

9. Apparatus substantially as hereinbefore described with reference to Figures 1 to 6 of the accompanying drawings.

10. Apparatus substantially as hereinbefore described with reference to Figs. 7 and 8 of the accompanying drawings.

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