

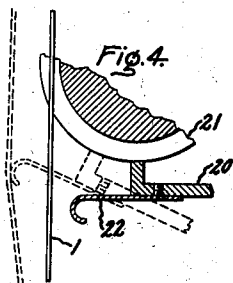
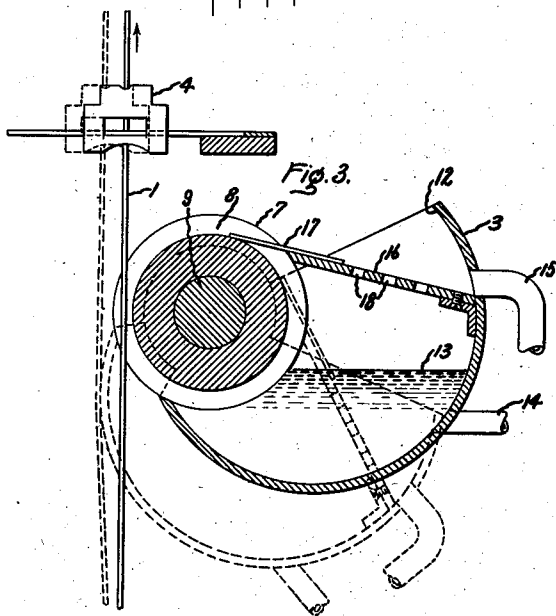
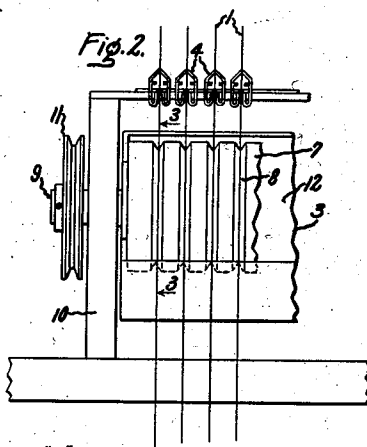
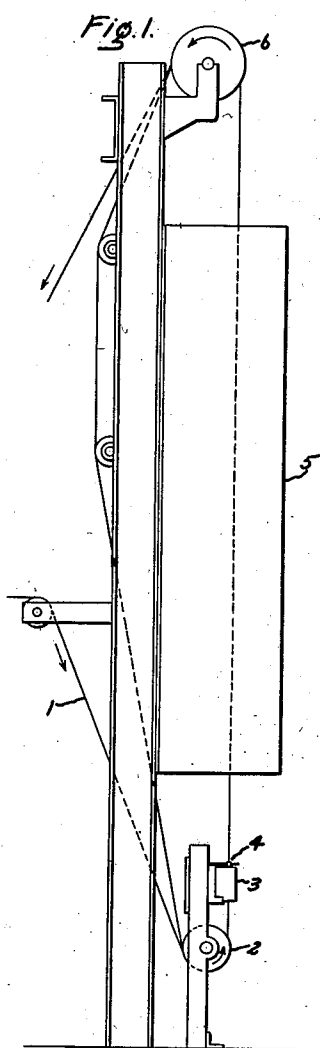
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WIRE COATING DEVICE

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2,269,150

WIRE COATING DEVICE

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8 Claims. (Cl. 91-49)

This invention relates to apparatus for applying liquid coating compositions such as enamel, varnish, lacquer, etc., to metallic conductors, such as wire and the like.

It is an object of the invention to provide a simple and inexpensive wire coating apparatus for applying a predetermined, uniform quantity of liquid coating material to a constantly moving wire characterized by the fact that when the apparatus is not in operation the wire is easily and quickly removed from contact with the coating means.

Another object of the invention is to provide a vertical wire coating device so constructed that the wire to be coated can be quickly inserted in the device or removed therefrom.

A further object of the invention is to provide a coating device to be used in a vertical wire coating apparatus, said device being so constructed and arranged as to provide positive means for carrying coating material from the source of supply to the wire and returning any excess liquid coating to the source of supply.

The novel features of my invention are set forth in the appended claims. The invention itself, however, will be understood more readily from reference to the following more detailed description taken in connection with the accompanying drawing wherein Fig. 1 is a somewhat schematic side elevational view of the vertical wire coating apparatus embodying my invention; Fig. 2 is an enlarged fragmentary view of my wire coating device; Fig. 3 is an enlarged transverse sectional view thereof taken on the line 3-3 of Fig. 2; and Fig. 4 is a transverse fragmentary sectional view of one modification of the device shown in Figs. 2 and 3.

With reference to the drawing, Fig. 1 shows a conventional vertical wire coating apparatus incorporating my improved coating device wherein a wire 1 coming from a payoff reel (not shown) passes under a guide sheave 2 through the enamel applying apparatus 3 forming the principal subject matter of the present invention, a die 4 adapted to remove excess coating material, and a vertical baking oven 5 provided with suitable heating means such as electric heating elements. From the oven 5 the baked enameled wire passes over a pulley 6 and from there either is again directed through the coating device and oven to receive additional layers of enamel or is taken up on a suitable takeup reel (not shown).

The wire coating device 3 is more fully shown in Figs. 2 and 3 as comprising a rotatable roller

7 provided with one or more circumferential grooves 8 through which wire 1 passes in its upward travel and from which it receives a predetermined quantity of coating material. The roller 7 is fixedly mounted on a shaft or axis 9 rotatably supported on support 10. Pulley 11, mounted on one end of the shaft and connected to a suitable source of power (not shown), provides rotational movement to the shaft and hence roller 7.

The roller 7 is mounted above sheave 2 in such a position that wire 1 passing in an upwardly direction from sheave 2 moves tangentially through grooves 8 of the roller. The clockwise rotation of roller 7, as shown in Fig. 3, applies a quantity of enamel to the wire from a source of supply comprising a receptacle or container 12 fitted to the periphery of the roller on the opposite side of the roller from the wire 1.

In operating position, the container 12 is on substantially the same horizontal plane as roller 7 and in this position the roller cooperates with the container 12 to close at least partially the open side thereof to form a reservoir or enclosure for a body of enamel 13. It will be seen that by this arrangement in which the roller closes the opening in the container to form an enamel reservoir, the roller or at least that portion thereof lying below the surface of the body of enamel 13, constitutes at least part of one side of the enamel reservoir. The edge of the open side of the container adjacent roller 7 closely fits the surface of the roller leaving only the grooves 8 through which the enamel can escape. As the ordinary wire enamels are rather viscous materials, they tend to cling to the grooves 8 of rotating roller 7 and are carried therein to wire 1.

The container 12 is pivotally mounted in any suitable manner on shaft 9 for limited rotational movement about the shaft and is held in the substantially horizontal operating or coating position by any suitable locking device (not shown). When for any reason the operation of the entire coating device is stopped, the container 12, loosely mounted on the shaft, may be released from the latched horizontal position and dropped to a position below the plane of the roller, as shown by the dotted lines of Fig. 3. In this latter position, the container, having pivotally moved about the shaft 9 and roller 7, contacts wire 1 and removes it from the grooves 8. In this lower non-coating position, the container with the edge of its open side still closely fitting the surface of the roller, also serves to catch any

enamel draining from the roller grooves. When the coating operation is resumed, the enamel container is again returned to its operating position where it feeds the enamel to the wire due to the rotation of the roller. It is obvious that when the container is in its lower position, passage of enamel through grooves 8 is effectively prevented.

The enamel container is also provided with a suitable enamel inlet 14 through which fresh enamel may be introduced and an outlet 15 positioned above the enamel inlet 14 which outlet serves to prevent overflow of enamel from the container 12 both in the operating and the lowered positions. The outlet is connected through suitable flexible connections to a filter pump and other equipment ordinarily used in connection with such wire coating devices wherein waste enamel is freed from air, dirt or other impurities so that it may be reintroduced into the coating device.

Advantageously, but not necessarily, my coating device may be provided with a doctor blade 16 bearing on the surface of the roller 7. This doctor blade is suitably connected to the side of container 12 and is provided with a number of fingers 17 dipping into the grooves 8 and adapted to remove excess enamel from these grooves. As many coating compositions, due to their high viscosity, may contain considerable entrapped air in the form of foam and the like due to the agitation of the enamel as it is applied to the wire by the roller 7 or as it returned from beneath die 4, it may be desirable that this foam be directed through outlet 15 to the filter wherein it can be broken up and any foreign particles such as dust, dirt or the like removed therefrom. The liquid portion of the excess enamel may be returned directly to the container 12 through openings 18 provided in the doctor blade for this purpose. It will be seen that by this arrangement the doctor blade 16 in bearing against the upper surface of roller 7 serves to close the container 12 except for the holes or openings 18. In applying many viscous coating compositions to wire, the fingers 17 are particularly useful in that they remove small bubbles from the bottom of the grooves 8 which otherwise should be recirculated to the wire thus preventing satisfactory coating of the wire as it passes through the die 4.

The die 4, which removes excess coating material from the freshly coated wire and provides a thin uniform layer of enamel on the wire, may advantageously, but not necessarily, be of the floating self-centering types described in my co-pending application, Serial No. 153,612, filed July 14, 1937, now Patent No. 2,238,687, and in the application of Adelbert Alexay, Serial No. 266,384, filed April 6, 1939, now Patent No. 2,238,575. With either type of die, excess coating material collecting below the die flows back down along wire 1 until it reaches roller 7 where due to the clockwise rotational movement of roller 7, it is carried to the doctor blade 16 and then through outlet 15 or holes 18 to the enamel container 12.

When the coating apparatus is not in operation, that is, when it is in the dotted line position shown in Fig. 3, the die 4, if of the self-centering type, will move to the left to its dotted line position along with the wire 1. On the other hand, if the die chosen is of the slotted variety, wire 1 may be free to leave the die through the slot and will reenter the slot only when the container is again raised.

Fig. 4 shows a modification of my coating device wherein the container is in the form of a trough 20 of rectangular cross-section having an open side closed by roller 21. In this modification, where the roller forms substantially all of one side of the reservoir comprising the roller and the container or trough and wherein the edge of the opening of the container bears against the roller surface directly below the shaft, it may be desirable to provide a special wire contacting portion for contacting the wire and removing it from the roller groove 1 when the rectangular container is lowered to the non-coating dotted-line position. A projecting member 22 affixed to the trough will serve this purpose. Otherwise, the structural details of the coating device provided with a rectangular container are the same as those of the device having a container of circular or arcuate cross-section shown in Fig. 3. Other modifications within the scope of my invention will become apparent to those skilled in the art.

It is to be understood that the above described device can be used in coating any wire with any type of liquid coating composition whether said composition is ultimately to be air dried or baked. Furthermore, the apparatus is not limited to any given size of wire and for every given groove dimension wires of a rather broad range of diameters may be effectively coated therewith.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. In a wire coating device, a receptacle provided with an opening and coating material therein, a rotatable grooved roller closing said opening in part and adapted to convey said coating material from said receptacle to a wire, said receptacle being pivotally mounted to permit limited rotation thereof about said roller.

2. An apparatus for coating wire comprising a receptacle for a liquid coating material, at least a portion of an open side of said receptacle being closed by a rotatable grooved roller in contact with said coating material and adapted to supply said coating material to a wire passing tangentially over said roller surface through said groove, said receptacle being pivotally mounted on said roller to permit rotation thereof about the axis of said roller to a position wherein said roller is out of contact with said coating material.

3. In a wire coating device provided with a roller adapted to coat a wire with a coating composition, a receptacle containing coating composition, said roller and receptacle being mounted on an axis, said roller being rotatable on movement of said axis to convey coating material from said receptacle to said wire, said receptacle being loosely mounted on said axis to permit movement thereof about said axis to a position in which said receptacle contacts the wire to disengage said wire from said roller.

4. In a wire coating device provided with a roller adapted to coat a wire with a coating composition, a receptacle containing coating composition and provided with an opening, said opening being closed in part by said roller, said roller and receptacle being mounted on an axis, said roller being rotatable on movement of said axis to convey coating material from said receptacle to said wire, said receptacle being loosely mounted on said axis and adapted to be pivotally moved on said axis to disengage said wire from said roller.

5. A wire coating device comprising a rotatable roller having circumferential grooves there-

in adapted to receive a wire to be coated and a receptacle pivotally mounted on said roller and having two limiting positions, a coating position in which said receptacle cooperates with said roller to form a reservoir for a coating material, and a non-coating position in which a portion of said receptacle contacts said wire to be coated to remove said wire from the grooves of said roller.

6. A wire coating apparatus comprising a circumferentially grooved roller for applying coating material to a vertically moving wire passing tangentially over the surface of said roller and within the grooves thereof, a receptacle mounted for movement about said roller surface and a coating die positioned above said roller and adapted to remove excess coating material from the wire, said receptacle having two limiting operating positions, a coating position in which the receptacle supplies coating material to said roller and receives excess material draining from said roller and said die, and a non-coating position in which position said receptacle receives coating material draining from said rotating roller without supplying additional coating material to said roller, said receptacle being provided with wire contacting means for removing the wire from the grooves of said roller when said receptacle is in the non-coating position.

7. In a wire coating device, a rotatable roller provided with circumferential grooves adapted

to receive a wire to be coated and a receptacle mounted for limited rotational movement about said roller to a coating position in which said receptacle cooperates with said roller to form a reservoir for a liquid coating material in which said roller is at least partially immersed, and to a non-coating position in which said coating material in said receptacle is out of contact with the surface of said roller and wherein said receptacle contacts said wire to remove said wire from contact with said roller.

8. In a wire coating device adapted to apply a liquid coating material to a vertically moving wire, in combination, a roller having circumferential grooves therein adapted to receive said vertically moving wire, said roller being adapted for rotational movement in the direction of said wire travel, a container pivotally mounted on the said roller in frictional engagement with the periphery thereof and adapted for rotational movement about said roller to two positions, a coating position in which said container and said roller together form a reservoir for a liquid coating material on the side of said roller opposite the vertically moving wire, and a non-coating position wherein a portion of said container contacts the wire to remove it from the grooves of said roller, and means contacting said roller for removing excess coating material from the grooves of said roller.

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