Jan. 8, 1935. D. G. LANTZ 1,987,198

COATING APPARATUS

Filed Nov. 14, 1932 3 Sheets-Sheet 1

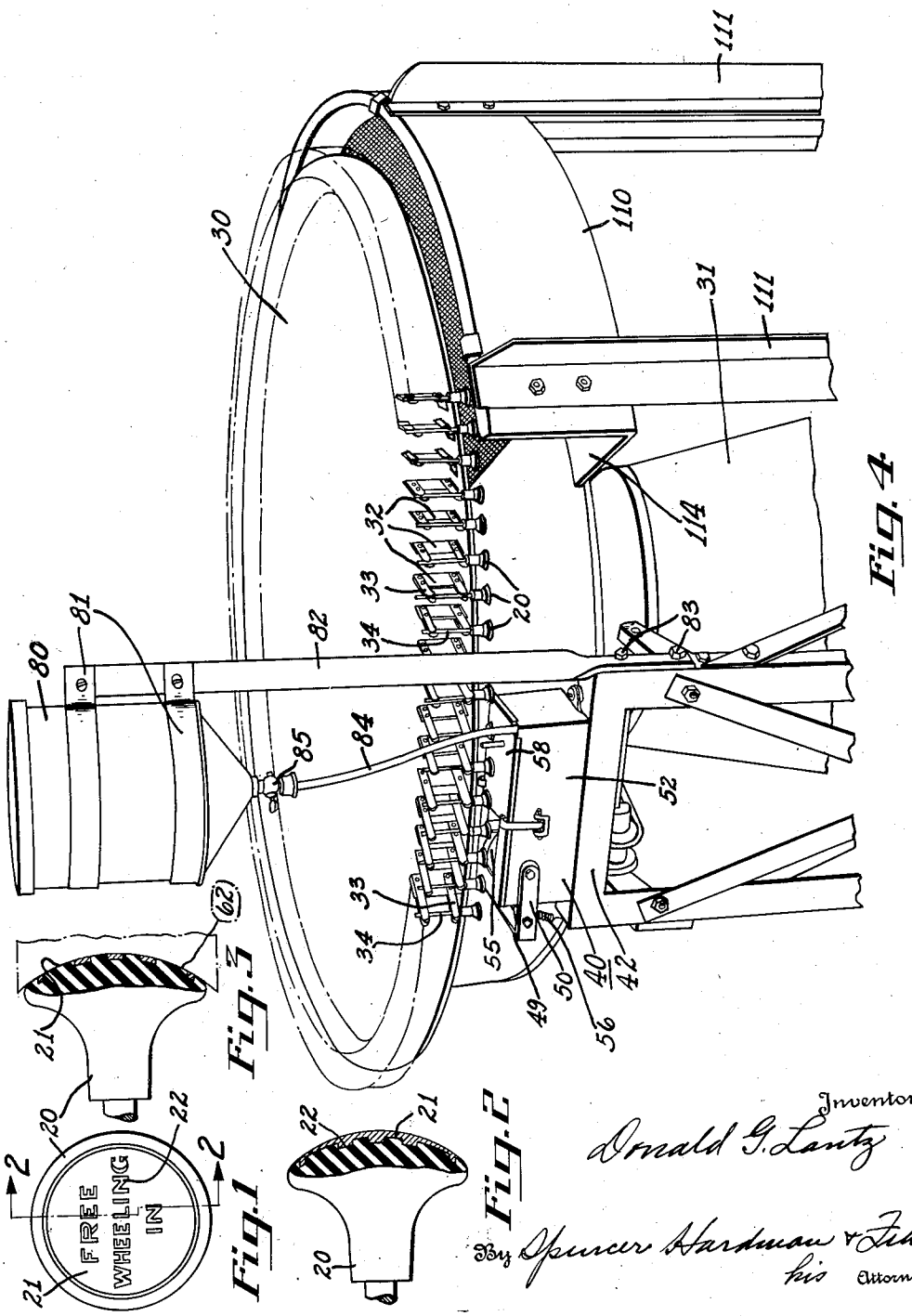


Fig. 4

Fig. 3

Fig. 1

Fig. 2

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COATING APPARATUS

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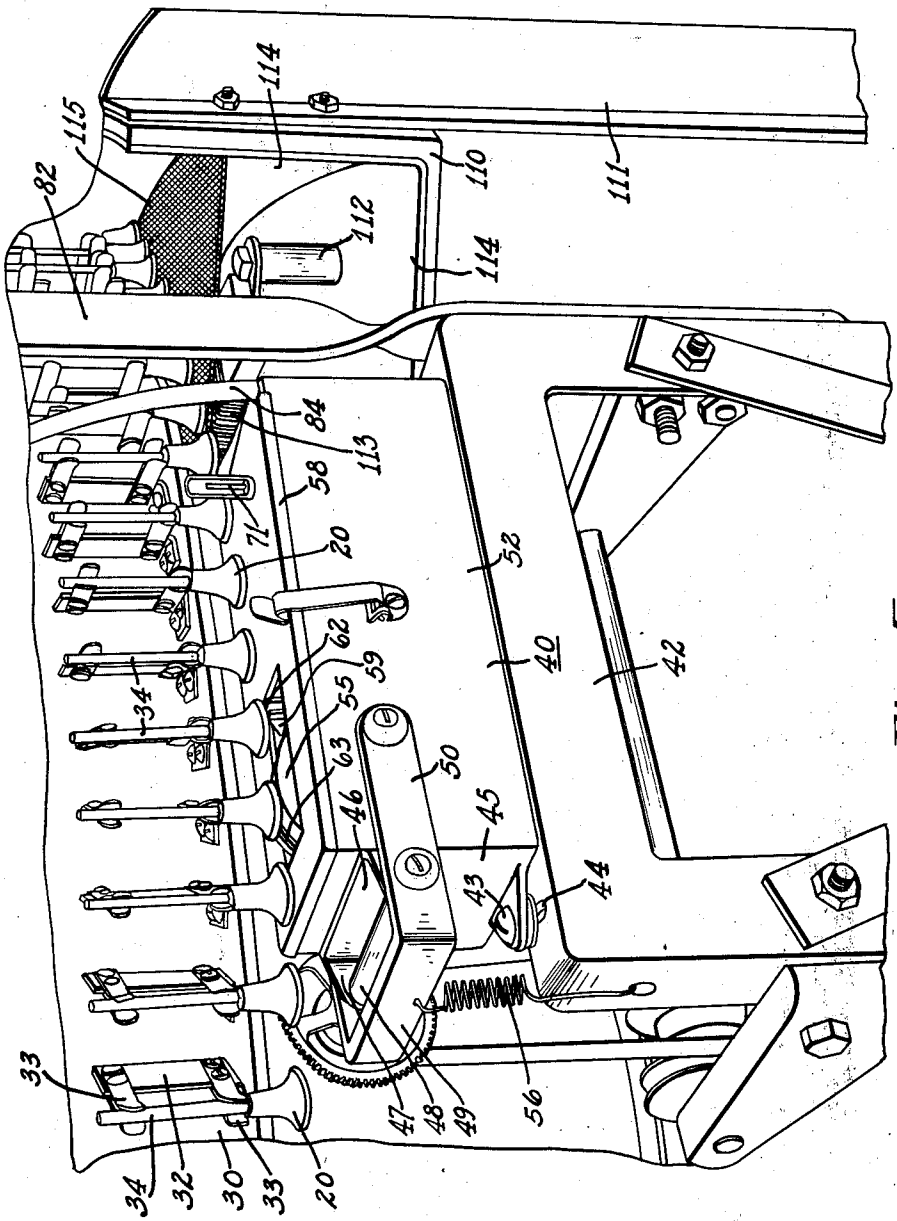


Fig. 5

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COATING APPARATUS

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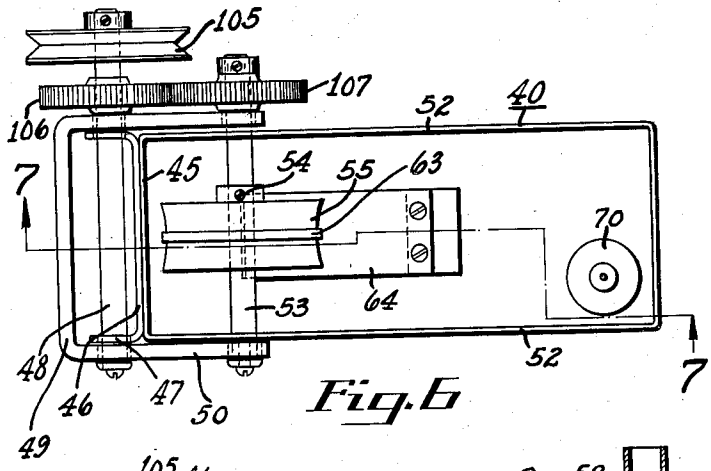


Fig. 6

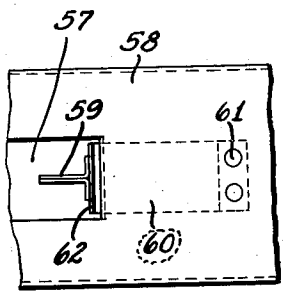


Fig. 8

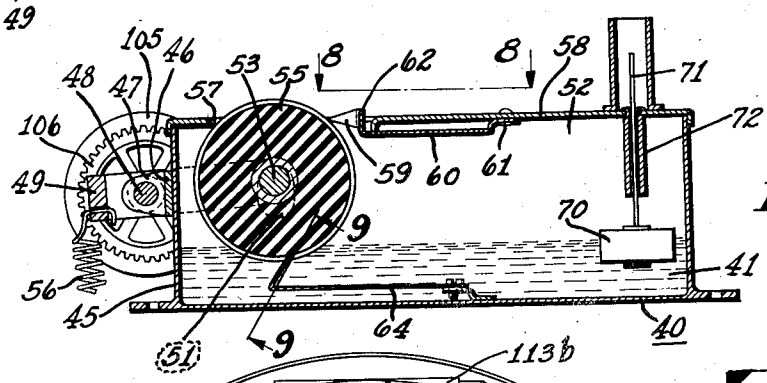


Fig. 7

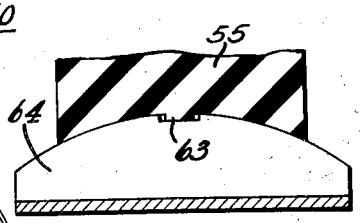


Fig. 9

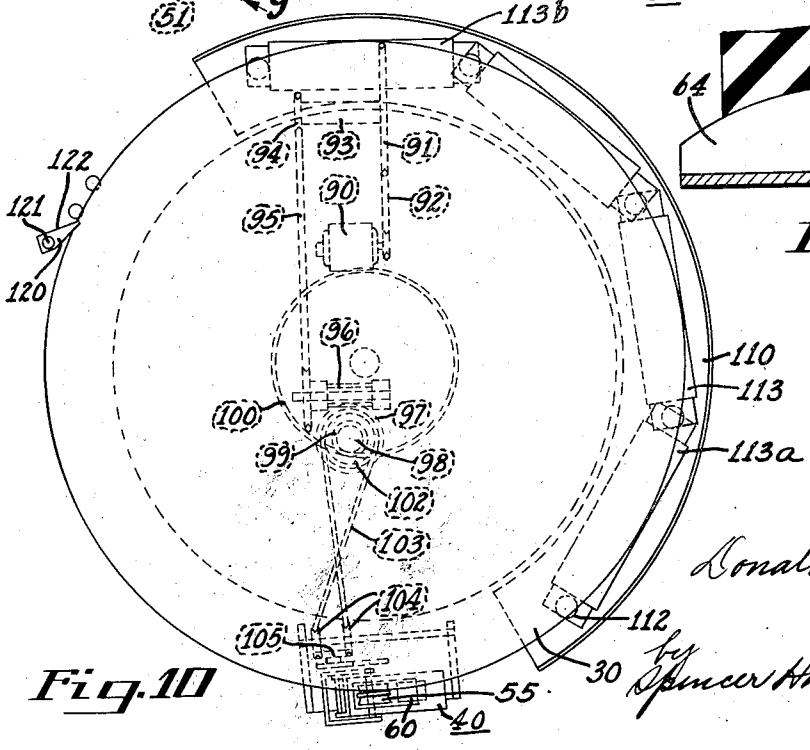


Fig. 10

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Patented Jan. 8, 1935 1,987,198

UNITED STATES PATENT OFFICE

1,987,198

COATING APPARATUS

Donald G. Lantz, Anderson, Ind., assignor, by mesne assignments, to General Motors Corporation, Detroit, Mich., a corporation of Delaware

Application November 14, 1932, Serial No. 642,543

2 Claims. (Cl. 91—51)

This invention relates to coating apparatus and more particularly to apparatus for coating the recesses or impressions of a design or legend or both in control knobs, with a contrasting substance such as paint in order visibly to distinguish the impressions from the back ground of the control knobs.

One object of the present invention is to provide improvements in apparatus for applying a limited amount of contrasting substance to that surface of each control knob which contains the impressions, and for subsequently removing the substance from the surface only so that the substance in the recesses of the impressions remains.

A further object of the present invention is to dry the substance in the impressions so as to form a substantially hard coat.

Another object of the present invention is to provide a coating apparatus in which the various mentioned operations take place automatically while the control knobs are carried by a continuously moving conveyor.

Another object of the present invention is to provide means for automatically removing the finished control knobs from the conveyor so that the services of an operator are required for workholder loading purposes only.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings wherein a preferred embodiment of one form of the present invention is clearly shown.

In the drawings:

Fig. 1 is a front view of a control knob showing the impressed legend and design to be contrastingly coated by the present apparatus.

Figs. 2 and 3 are fragmentary cross-sectional views of a control knob showing the different steps of operation in applying paint or like substance to the impressions.

Fig. 4 is a perspective view of an apparatus embodying the present invention.

Fig. 5 is an enlarged fragmentary perspective view of said apparatus.

Fig. 6 is a detail plan view of a paint containing vat showing also various implements therein such as the paint conveying and applying roll, etc.

Fig. 7 is a sectional view of the vat taken along the line 7—7 of Fig. 6.

Fig. 8 is a fragmentary top view of the vat cover showing that part thereof which is defined by arrows 8—8 in Fig. 7.

Fig. 9 is an enlarged fragmentary sectional view taken along the line 9—9 of Fig. 7.

Fig. 10 is a diagrammatic plan view of the apparatus showing the drive for the turntable and for the paint applying roll and also disclosing the relative positions of various devices of the apparatus.

Referring particularly to Figs. 1 to 3 inclusive, the reference numeral 20 designates a control knob which is one of various similarly shaped and sized control knobs used in automotive vehicles, all of which may be successfully operated upon by the present apparatus. The process performed by the said apparatus is subdivided into different steps. The first of these steps is to apply a coat of paint or like substance to the front surface 21 of a control knob 20 to such an extent that the coat of paint completely covers the impressions 22 therein. This step is illustrated in Fig. 2. The next step is to remove or scrape off the paint from the smooth surface 21 of the knob so that only the paint in the impressions remains. This step is illustrated in Fig. 3. The next and final step is to dry the paint which remained in the impressions 21.

The apparatus performing these various steps will now be described beginning with the

Turntable and workholder

Referring to Figs. 4 and 5, a turntable 30 is shown which is rotatably supported in bearings (not shown), located in a frame 31. Riveted or otherwise secured to the periphery of the turntable 30 is a plurality of equally spaced L-shaped bars 32, each of which is provided with two pairs of clips 33 adapted yieldingly to hold the stem 34 of a control knob 20 in inverted position.

Paint applying means

Referring more particularly to Figs. 5 to 7 inclusive, a vat 40 containing a supply of paint or like substance 41 is mounted on a frame work 42 adjacent the periphery of the turntable 21. As will be best seen in Fig. 5, vat 40 is adjustable on said frame work radially with respect to the turntable 30 and held in adjusted position by screws 43 extending through slots 44 in the frame work. Secured to the side wall 45 of the vat is a yoke 46 through the flanges 47 of which extends a shaft 48 which rotatably supports another yoke 49 having comparatively long flanges 50. Journaled in the end portions of said flanges and extending through oblong slots 51 in the parallel vat walls 52 is a shaft 53 on which is mounted by means of a set screw 54 a roll 55 of rubber or like

material. A spring 56, anchored with one end in the yoke 49 and with the other end in frame work 42 has a tendency to rock the yoke 49 counter-clockwise as viewed in Figs. 5 and 7. As appears from Fig. 7, roll 55 under any circumstances projects through an aperture 57 in a vat cover 58 and above said cover.

It may be stated in advance that through mechanism to be described later, roll 55 is rotated in response to rotation of the turntable 30 in such manner that the rotative speed of the control knobs carried by the turntable and their general direction of movement is the same as that of the periphery of the roll 55. As will be noticed in Fig. 5 the knob stems 34 have been so inserted into the clips 33 by an operator that the knobs 20 abut the lower pair of clips thereby prohibiting any further upward movement of the stems in the clips. As a knob approaches the periphery of the roll 55, it slightly depresses said roll due to the mentioned inability of the knob to yield upwardly. In this manner a bodily engagement of each knob with the roll 55 is assured. Roll 55, while rotating always carries a certain amount of paint from the supply on its periphery, due to the fact that the roll under all circumstances dips into the paint supply, and upon substantial engagement between the surface 21 of a control knob and the periphery of the roll, paint will be applied to the former to such an extent that at least the area thereof which contains the impressions is completely painted. As the knob moves away from the roll, the painted surface thereof engages a cam-shaped vane 59 which is part of a scratcher 60 riveted at 61 to the vat cover 58 and made preferably in the form of a leaf spring. As the painted surface of the knob 20 rides along the vane 59, the scratcher is slightly bent until the painted surface comes into contact with the scratching surface 62 of the scratcher 60, at which time the latter has been bent to such an extent that enough yielding force is stored in the scratcher to remove the entire paint from the smooth surface 21 of said knob, whereby only the paint in the impressions 22 remains. As appears from Fig. 9 the main part of the peripheral cross-section of the roll is like that of the surface 21 of a knob and is interrupted only by an annular ridge 63 the function of which will be presently described. It is of primary importance that the surface 21 of a knob bodily contacts with the paint carried by the roll and if that surface would bodily contact with the periphery of the roll, the paint would be squeezed out between these two engaging surfaces and the paint job would be very unsatisfactory. In order to overcome this disadvantage, the annular ridge 63 has been provided which is of such height that the surface 21 of the knob is contacting with the body of paint carried on the periphery of roll 55 but not with the periphery itself. Secured to the bottom of the vat is another scraper 64 which yieldingly engages the periphery of the roll 55 and removes previously conveyed paint and foreign substance therefrom so that only fresh paint is conveyed by the roll.

In order to prevent the hidden paint level from dropping below the periphery of roll 55 without the operator's notice a floating device 70 has been provided whose stem 71 extends through a bushing 72 in the vat cover 58 and outside the vat thus visibly indicating the height of the paint level in the vat.

As shown in Fig. 4, a paint tank 80 in inverted position is secured by metal bands 81 to an upright bar 82 which is secured by screws 83 to the frame work 42. The tank communicates with the interior of the vat through a tube or hose connection 84. A cock 85 on the tank may be actuated by the operator in order to admit more paint to the vat.

Common drive for turntable and paint conveying roll

Referring particularly to Figs. 6, 7 and 10 there is shown an electric motor 90 driving a pulley 91 through a belt connection 92. Pulley 91 is mounted on a shaft 93 rotatably supported in a bearing (not shown). Mounted on the same shaft 93 is another pulley 94 which through a belt connection 95 drives a worm 96, in turn driving a worm gear 97 which is mounted on the shaft 98. Mounted on the same shaft is a small gear 99 meshing with an internal gear 100 which is concentrically mounted on the turntable. Further mounted on shaft 98 is a pulley 102 which through a shrunk belt connection 103 guided over idlers 104 drives a pulley 105 which is mounted on shaft 48, as best shown in Fig. 6. Also mounted on shaft 48 is a gear 106 which meshes with another gear 107 mounted on the roll carrying shaft 53. The ratios between gears 99 and 100 and between pulleys 102 and 105 have been so selected that the previously mentioned condition prevails to wit, the rotative speed of the control knob carried by the turntable has to be the same as that of the periphery of the roll 55. The drive is furthermore so constructed that the control knobs carried by the conveyor move in the same general direction as that portion of the periphery of the paint roll engaging a control knob.

Paint drying device

Referring particularly to Figs. 4, 5 and 10, an arcuate L-shaped bracket 110 is shown supported by upright angle bars 111. Secured in any suitable manner on upright stems 112, attached to the bracket 110 are a plurality of electric heating units 113 which may be of any conventional type and are in the present instant ribbon wound resistance units connected in series parallel. No further comment on the electrical part of these heaters is deemed necessary because they do not form part of this invention. In order to prevent a burning of the interior wall of the arcuate bracket 110, the same is lined with asbestos 114. It appears from Fig. 10 that shortly after a knob passes the paint roll 55 and scraper 60, the same will move into vertical alignment with the first heating unit 113*a* and by the time said knob passes the last heating unit 113*b* the paint in the impressions in knob surface 21 is dry and hard. If during the drying process a knob stem should for one reason or another drop from its clips it cannot fall upon the heating units but will fall upon a wire screen 115 which is located above the heating units 113.

Automatic removal of knob stems from clips

Referring particularly to Fig. 10, a stationary finger 120 is mounted on a vertical bar 121 which is held stationary in any suitable manner. Finger 120 projects between the passing clips 33 and the surface 122 thereof shifts the knob stems laterally out from between the clips whereupon they descend into any suitable receptacle (not shown).

Since the operation of the apparatus is obvious from the foregoing description no detailed

description of the operation is deemed necessary and is therefore omitted.

While the form of embodiment of the present invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. Apparatus for coating the depressions of a mark in the surface of an article comprising, in combination, a vat containing a supply of coating substance; a rotatable roll dipping into the substance supply, said roll upon rotation conveying a limited amount of substance and applying it to the marked surface including the depressions of an article when passing the roll; a spring for bodily moving the roll toward the article; means for holding the article and for moving it transverse to the direction of bodily movement of the roll whereby the marked surface of the article depresses the roll against the tendency of the spring; and a scraper of flexible metal whose scraping contour is substantially the same as the contour of the marked surface of the article, said scraper being slightly flexed against its tendency by the passing marked surface of the article whereby the substance on the marked surface is removed and the substance in the depressions remains.

2. Apparatus for coating the depressions of a mark in the surface of an article comprising, in combination, a vat containing a supply of coating substance; a rotatable roll dipping into the substance supply, said roll upon rotation conveying a limited amount of substance and applying it to the marked surface including the depressions of an article when passing the roll; a spring for bodily moving the roll toward the article; means for holding the article and for moving it transverse to the direction of bodily movement of the roll whereby the marked surface of the article depresses the roll against the tendency of the spring; and a scraper of flexible metal whose scraping contour is substantially the same as the contour of the marked surface of the article, said scraper having a protruding cam lug which when engaged by the marked surface of the passing article causes the scraper to flex slightly against its tendency so that the marked surface of the article is yieldingly engaged by the scraper for removing the substance from the said marked surface whereby the substance in the depressions remains.

DONALD G. LANTZ.