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SPRAY COATING MACHINE

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FIG. 1

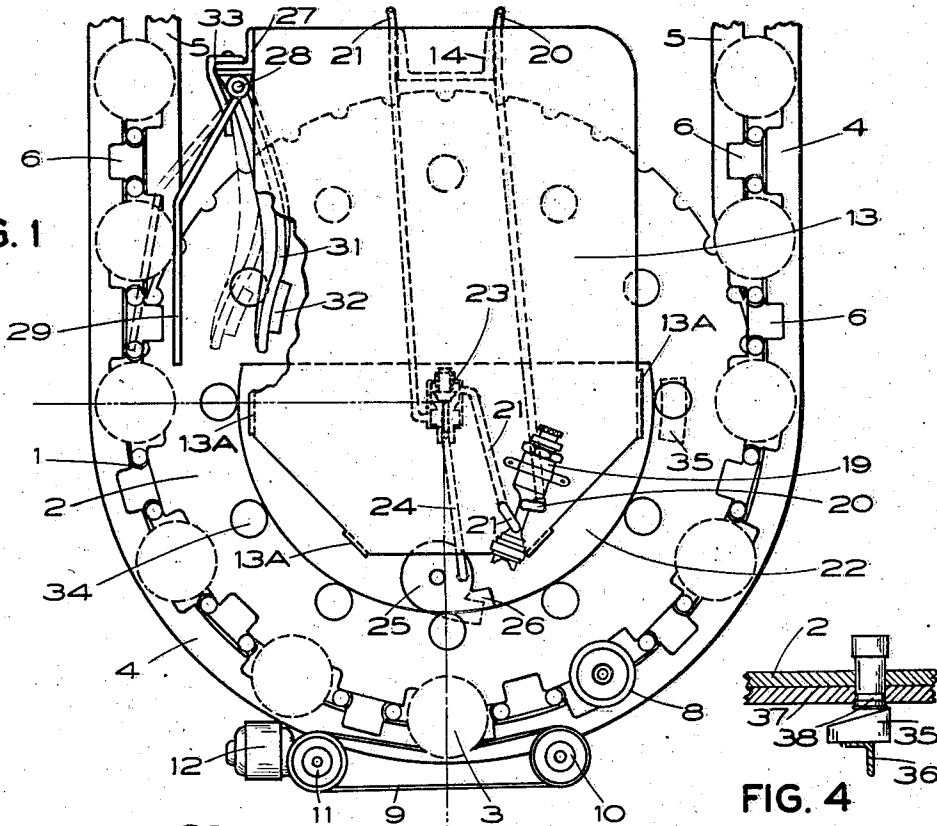


FIG. 4

FIG. 2

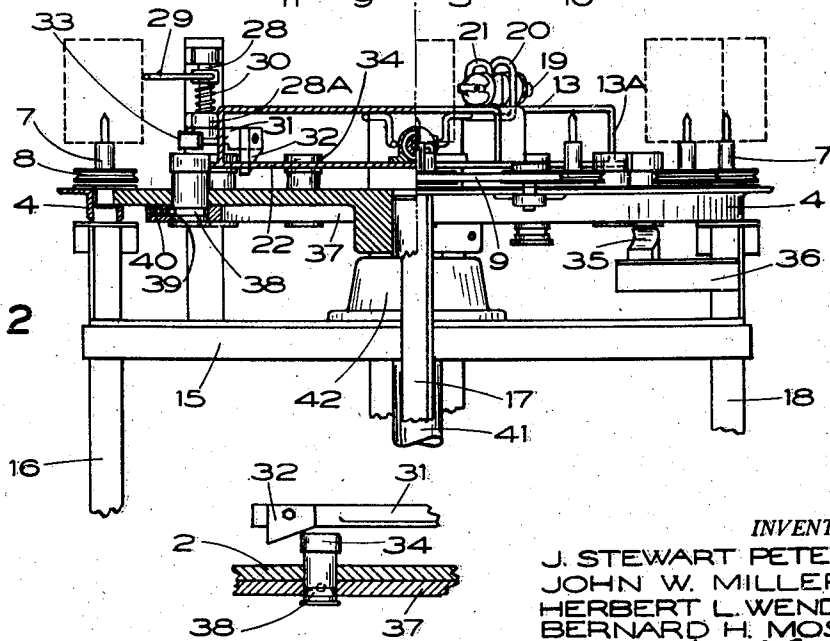


FIG. 3

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SPRAY COATING MACHINE

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6 Claims. (Cl. 91-45)

This invention relates to a machine for automatically spray coating or otherwise treating a series of articles brought to a station for spraying or other treatment upon a conveyor having individual supports for the articles.

The principal object of the invention is the provision of a machine having control means for actuating the treating means only when an article is on the article support at the treating station. This is particularly advantageous in a spray coating machine as otherwise the spray material will not only be wasted but the article support on the conveyor will become coated and will require cleaning.

Another important object is the provision in such a machine of control means placed some distance from the treating station. This prevents the treating operation such as spray coating from affecting, by the deposit of stray spray particles, the proper operation of the control means.

A further object of the invention is to provide a machine having control means which includes a fingering device along the conveyor ahead of the treating station to determine the presence or absence of an article upon each article support on the conveyor and a mechanism associated with the determining device for recording the presence or absence of an article and later using the record in actuating the treating means when each support holding an article reaches the treating station and in preventing actuation when each support upon which there is no article, reaches the station.

Other objects and advantages of the invention will be apparent as it is better understood from the following description and the accompanying drawing which disclose a preferred embodiment in the form of an automatic spray coating machine.

Referring to the drawing:

Figure 1 is a top plan view of a spray coating machine embodying our invention, with parts broken away;

Figure 2 is a front elevation of the machine with the left side in section and with lower portions broken away; and

Figures 3 and 4 show the setting means for the spray gun actuating pins.

In Figures 1 and 2 the chain conveyor 1 is shown carrying articles around the sprocket 2 past the spraying station 3. The sprocket is mounted on shaft 41 through which it may be driven and is supported on bearing 42. The conveyor has an exterior angle iron supporting guide 4 and similar interior guides 5. These are ter-

minated as the chain reaches the sprocket as the sprocket itself supports the chain on the inner side during its contact with it.

The chain has laterally extending link members 6 which slide along the upper surfaces of the guides 4 and 5 and ride upon the edge of the sprocket 2. Every third pin of the chain conveyor has an article supporting extension 7 revolvable with the pin. On each extension 7 is mounted a V pulley 8. As the article draws near the spraying station 3 (in this case from the left as the chain conveyor moves with the sprocket in a counter-clockwise direction) a moving V belt 9 contacts the pulley 8 rotating it and the article as the latter reaches the spraying station. The belt 9 is mounted on pulleys 10 and 11, the second of which is driven by electric motor 12. Above the sprocket 2 is a horizontal platform 13 supported at its rear by the vertical U beam 14 which is part of the general supporting assembly including other members 15, 16, 17 and 18.

On the forward end of the platform 13 is mounted an air operated spray gun 19 of conventional design (having an air piston attached to the liquid discharge valve). A tube 20 supplies coating liquid to the spray gun while tubing 21 furnishes air to the gun for atomization and to move the air piston attached to the liquid coating valve within the gun. A secondary platform 22 is supported below the forward portion of platform 13 by being fastened to the ends of strap-like downward extension 13a from platform 13. Upon this secondary platform is mounted an air valve assembly 23 controlling the passage of air through the tube 21.

To the stem of the air valve 23 is connected a link rod 24 which is fastened at its other end to a reciprocable crank plate 25 with a protruding nose section 26 which normally extends over the edge of platform 22, as shown in dotted lines, held there by the force of the spring of the valve 23.

On a vertical supporting angle 27 at the rear of the platform 13 is mounted a vertical shaft 28 and adapted to swing with it is a horizontally extending finger 29. Spring 30 is mounted on the shaft with one end fastened to the shaft bearing support 28A and the other to the finger so that the latter is inclined to move outwardly partly across and slightly above the conveyor chain. Below the finger member 29 and also rigidly fixed to shaft 28 is an arm 31. Fastened at the end of this arm 31 is a downwardly facing inclined guide piece 32. The arm 31 swings to

the left with the shaft 28 and finger 29 but such movement is limited by the stop member 33 mounted on the angle 27 against which arm 31 strikes. In a circle about the center of and through the sprocket 2 are mounted a series of vertical pins 34. These are near the outer edge of the sprocket and each pin is located on the sprocket along the side of an article supporting member on the chain and lying between the support and the center of the sprocket. When the finger member 29 is held away from the chain by contact with an article being carried by it the arm 31 and the inclined piece 32 are moved out of the path of the pins 33. However, when an article is not on an article support of the conveyor the finger 29 moves partially over the conveyor as shown in the dotted lines in Figure 1 and the arm 31 moves with it to bring piece 32 in the path of pins 33.

The pin 33 lying between the center of the sprocket and the particular article support upon which there is no article, advances against the inclined guide piece 32 and is moved downwardly by it through the sprocket as indicated in Figure 3, bringing the top of the pin down below the level of the platform 22. When therefore the particular article support involved reaches the spraying station 3, the nose 26 of the crank member 25 will not be contacted by the pin and accordingly remains extended over the edge of platform 22. The valve 23 thus remains closed and the spray gun is not operated. As may be understood, the pin 22 in its upper position contacts the nose member 26 of the crank plate 25 pushing it back and through the link member 24 opens the valve 23 permitting actuating and atomizing air to reach the spray gun 20 and thus causes it to discharge a spray against an article at spray station 3.

As the pins continue their travel with the sprocket 2 they pass over an upwardly inclined guide member 35 supported on horizontal angle iron 36 which is fastened to the upright member 18 of the supporting structure. This inclined guide piece 35 forces any pins which have been moved down into their lower position by the arm 31, back into their upper and valve actuating position.

Fastened to the underside of the sprocket 2 is a flat ring 37. This is positioned at the same radial distance from the center of the sprocket as the pins 33, and acts with its supplemental parts to support the pins and maintain them in actuating or non-actuating position. On the lower end of each pin is an annular groove 38. When the pin is in its upper or valve actuating position a metal ball 39 is thrust into the groove by a horizontally disposed spring 30. This spring tension resists any tendency of the pin to drop downwardly because of its weight or the effect of its contact with the crank nose 26. The tension of spring 30 of course is not sufficient to interfere with the downward movement of the pin caused by contact with depressor piece 32. The weight of the pins seems to suffice to keep them in their lower or non-actuating positions.

It may be seen therefore that the invention comprises a simple but efficient arrangement to actuate the spray gun when and only when an article is at the spray station ready to be coated.

As may be apparent, various changes may be made in the form, construction, and arrangement of the parts, particularly in respect to the setting means for the spray gun actuating devices as well as the actuating mechanism itself, without

departing from the spirit and scope of the invention.

We claim as our invention:

1. In an automatic spray coating machine, a spray station, a conveyor for carrying to the spray station a series of articles to be coated, holders for the articles regularly spaced along the conveyor, a spray nozzle at the spray station for coating each article, a control valve for the spray nozzle, a series of actuator pins for the control valve, a carrier to successively bring the pins into actuating contact with the control valve, the pins being reciprocally mounted in regularly spaced relation upon the carrier and being operative when reaching the control valve in one position of their reciprocal movement and non-operative in another, means for synchronizing the movements of the article conveyor and the pin carrier so that a pin reaches the control valve at the same time as an article holder reaches the spray station, a finger positioned a predetermined distance ahead of the spray station along the path of the conveyor, a swingable mounting for the finger, means for yieldingly swinging the finger across the path of the articles carried by the conveyor when there is no article to hold the finger away, and a pin setting cam associated with the finger and responsive to its position to pre-set the pin which will reach the control valve at the same time as the article holder, currently passing the finger, reaches the spray station.

2. In an automatic coating machine, a spray station, a spray gun at the station, a valve for actuating the spray gun, a series of trippers for the valve, a carrier for the trippers upon which they are regularly spaced, a mounting for reciprocally holding each tripper, means for moving the carrier along a path past the valve, and cam means at a point along the path ahead of the valve for engaging each tripper and moving it from one position to a second predetermined position in the mounting in which it is reciprocally held, in one of such positions the tripper being effective when reaching the valve to trip it and thus actuate the spray gun and in the other of such positions the tripper being non-effective to trip the valve.

3. In an automatic spray coating machine, a spray station, a conveyor for bringing a succession of articles to the spray station, individual article supports regularly spaced upon the conveyor, a spray gun for discharging coating material upon each article brought to the spray station, a valve outside of the spray station for operating the spray gun, a series of regularly spaced valve tripping members, a carrier for the tripping members travelling in a path running from a point along the conveyor and spaced ahead of the spray station to the valve location, each tripping member having a valve tripping and a valve non-tripping position on the carrier, cam means along the path of the carrier ahead of the valve location for setting each tripping member in tripping or non-tripping position, and interengaging means between the conveyor and the carrier to synchronize their travel so that an article holder reaches the spray station at the same time that a tripping member reaches the valve location.

4. In an automatic coating machine, a spray station, a conveyor for bringing a succession of articles to the spray station, individual article supports on the conveyor, a spray gun for discharging coating material upon each article brought to the spray station, a feeler finger positioned along the path of the conveyor for deter-

mining the presence or absence of an article on each article support at a point ahead of the spray station, means for swingingly supporting the feeler finger, means tending to swing the finger across the conveyor in the path of the articles carried by the conveyor, a valve outside of the spray station controlling the spray gun discharge, a valve tripping member, carrier means for transporting the tripping member from the position of the finger to the valve, the tripping member having a valve tripping position on the carrier and a valve non-tripping position on the carrier, and cam means associated with the finger for setting the tripping member in its non-tripping position when the finger swings freely across the path of the articles on the conveyor and setting the tripping member in its tripping position when the finger is prevented from so swinging by an article on the conveyor.

5. In an automatic spray coating machine, a spray station, a spray gun at the station, a spray gun actuating valve outside of the station, a conveyor for successively bringing articles to the spray station to be spraycoated, regularly spaced article supports on the conveyor, a feeler finger at a point along the conveyor ahead of the spray station, means for swingingly supporting the finger, means lightly inclining the finger to swing across each article support on the conveyor whenever there is no article on the support to prevent such swinging movement, a valve tripping member, a carrier for the member travelling in a regular path from the feeler finger to the spray gun actuating valve, an effective and a non-effective position on the carrier for the valve tripping member, cam means associated with the finger and engaging the valve tripping member to set it into its non-effective position when the finger

moves across an empty article support, and inter-engaging means synchronizing the conveyor and carrier movement so that the valve tripping member travels from the finger to the spray gun actuating valve in the same time that an article support travels from the finger to the spray station.

6. In an automatic spray coating machine, a spray station, a chain conveyor, regularly spaced supports on the conveyor for articles to be sprayed at the station, a spray gun at the station, a sprocket around which the chain conveyor travels, a valve for operating the spray gun, a series of valve trippers reciprocatably mounted equidistant from each other in a concentric circle upon the sprocket, the spacing of the article supports upon the conveyor and the spacing of the trippers on the sprocket being predetermined to provide the same number of supports and trippers in the sector of the sprocket including the portion of the chain conveyor contacting the sprocket, means to move each tripper in its individual mounting into a position where it is effective to trip the valve when the sprocket carries it to the valve location, a finger for determining the presence or absence of an article on each article support, means for swingingly supporting the finger, means for tending to swing the finger across each article support when no article is in the support and cam means connected with the finger and swinging therewith to contact and move one of the valve trippers out of its effective position when the finger swings across an empty article support.

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