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SPRAY COATING SYSTEM

3,077,422

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FIG. 1.

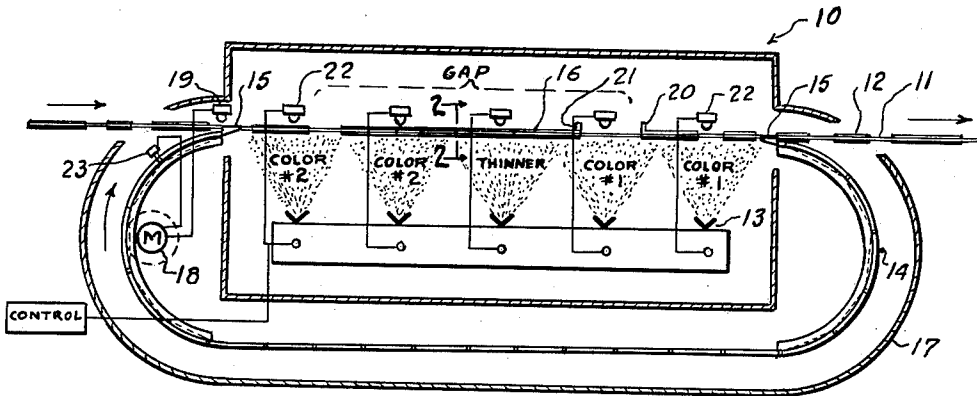


FIG. 2.

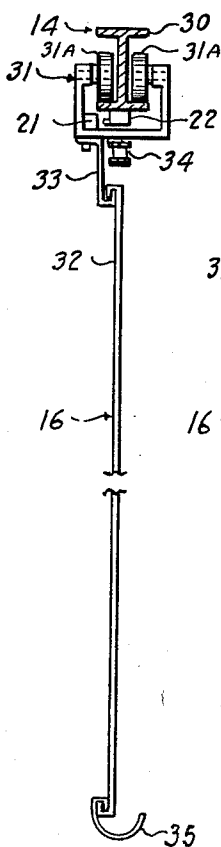


FIG. 3.

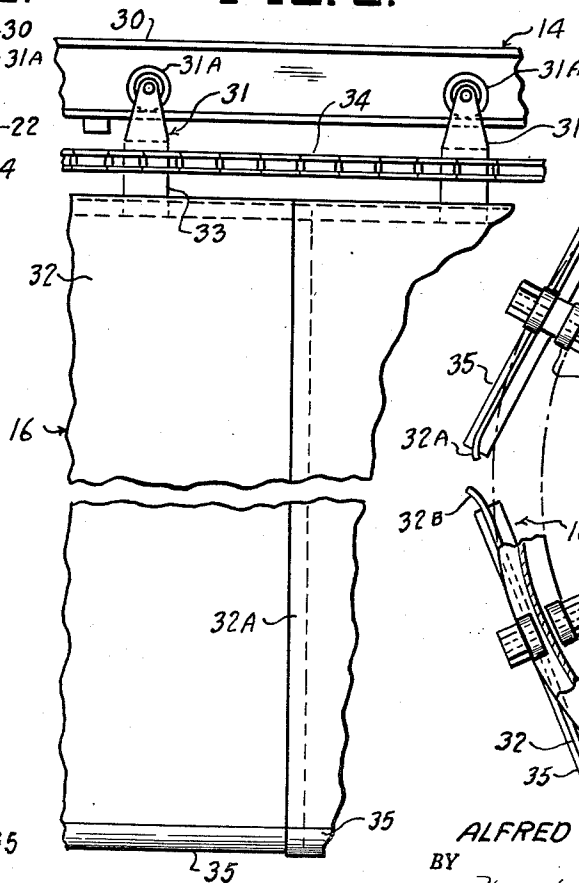
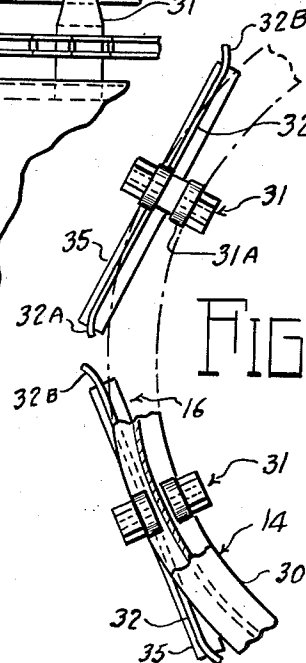


FIG. 4.



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SPRAY COATING SYSTEM

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10 Claims. (Cl. 117-104)

My invention relates to production line spray coating systems and more particularly to a method and means for rapidly and readily changing the substances being sprayed with relatively little interruption of production.

Heretofore, in spray coating systems adapted for coating articles successively conveyed past a series of ejection devices such as automatic spray guns, a serious difficulty is presented when it is desired to effect a changeover in the spraying substance. Conveyance of articles must be totally suspended for a period of time sufficient to clean the guns and start spraying the other substance. Moreover, the problem of eliminating the first substance in the cleaning fluid from the spray area before production resumes has not been effectively solved heretofore.

This general problem is particularly found in the high volume production painting of parts in the automotive industry, and often production runs must be scheduled so that a single color is used in a given spray booth for the greatest possible time.

Changes in color are made with difficulty causing delays, other production irregularities and considerable expense.

An object of the present invention is to facilitate spray changeover by providing a means for interposing a moving curtain in the conveyor line on which cleaning fluid and impure substances from guns in successive changeover is sprayed.

Another object of the invention is to simplify changeover by providing an automatically actuated curtain to move into a conveyor gap and automatically operate the spray changeover process for each spray device in succession.

Further objects and advantages of the system will be apparent from the following description thereof and by reference to the accompanying drawing illustrating a preferred embodiment of the invention in which like reference characters refer to like parts throughout the several views and in which

FIG. 1 is a diagrammatic plan view of a preferred system embodying the invention.

FIG. 2 is a cross-sectional view taken substantially on the line 2-2 of FIG. 1.

FIG. 3 is a fragmentary elevational view of a preferred curtain and conveyor construction incorporated in the invention.

FIG. 4 is a fragmentary top view of the aforesaid curtain and conveyor, shown partially in section.

As illustrated in FIG. 1, a spray booth 10 is provided through which extends a production conveyor 11 carrying a series of articles or objects 12 to be spray coated as with paint or the like from a series of substantially continuously operating ejection devices 13. In practice, the present system is readily adapted and has certain advantages for electrostatic spray painting systems in which the paint is sprayed in an electron flux field, the paint particles being carried to the objects 12 which are connected to ground.

A second conveyor 14 is tied in with the first conveyor 11 by any transfer device such as switches 15 to selectively transfer a curtain structure 16 from the conveyor 14 to the conveyor 11 into a predetermined gap in the series of objects 12. As the curtain 16 moves through the booth 10, it is positioned substantially the same distance from the spray devices 13 as the objects 12, which is necessary in an electrostatic system. As the curtain 16

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moves in front of successive spray devices, the substance or color fluid being sprayed is shut off, some cleaning fluid or agent such as a paint thinner is directed through the devices 13, after which another substance or color fluid is directed therethrough so that, when the curtain 16 has passed by, the following objects 12 are sprayed with the second substance or color.

The curtain 16 in this fashion functions to prevent contamination of differently sprayed series of objects 12 with the wrong substance or color or with the cleaning fluid, which enables different production runs to follow one another more closely than has heretofore been the case. The curtain 16 collects the contaminating substance and carries it immediately out of the booth 10, switching back onto the conveyor 14 where it is carried around into position preparatory to being inserted into the next gap between production runs. A secondary enclosure 17 may be provided as shown around the conveyor 14.

The system is preferably arranged for automatic or semi-automatic operation. For this purpose, the curtain conveyor 16 may be run by a motor 18 which is started by a microswitch 19 tripped or actuated by an element 20 carried immediately behind a series of objects 12 and at the beginning of the gap, as shown in FIG. 1. At the leading edge of the curtain 16 may be carried another actuating element 21 which operates to successively trip microswitches 22 which are connected to the respectively successive spray devices 13. The microswitches 22 operate to initiate the sequence of cleaning and changeover to the other spray substance or color. Preselection of color or substance may be controlled by an operator from a control box as indicated in FIG. 1.

Changeover may be rapidly accomplished since the curtain 16 will receive the cleaning fluids and the initial spray of the next substance or color, so that the spraying of the next series of objects 12 can be started even before the preceding objects 12 have been carried from the spray booth. In electrostatic systems, the curtain being grounded, such changeover is particularly speeded since contaminants must move to the curtain and will not hang in the air.

When the curtain is carried around by the conveyor 14 into position for re-use, the actuating element 21 operates to trip a microswitch 23 connected to the driving motor 18 to stop same until started by the next actuating element 20 on the trailing end of the following production run.

FIGS. 2-4 illustrate a preferred curtain construction. As shown, the conveyor 14 preferably comprises a track 30 on which ride spaced carriages 31 having wheels 31A. The curtain 16 preferably comprises a plurality of adjacent metal panel sections 32 separately removably carried by brackets 33 or the like mounted on the carriages 31.

A conveyor chain 34 is connected to the carriages 31 and pulls them with the associated panel sections on the circuitous travels through the booth 10.

A trough 35 is preferably removably hung on the lower edge of each panel section 32 and serves to catch the contaminating substances which are sprayed onto and run off of the panel sections 32. The troughs 35 are readily removed from the panel sections 32 for cleaning, as are the panel sections 32 readily removed from the conveyor carriages 32.

The panel sections 32 preferably overlap at their edges as indicated, and the edges may be bent as shown at 32A and 32B to avoid hanging up after separation which would occur in moving over the curved sections of track 30 as shown in FIG. 4.

The microswitches 19, 22 and 23 described previously may be mounted on the trap 30 to facilitate tripping by

the aforementioned actuating elements 20 and 21 carried by carriages 31.

Although I have described only one preferred embodiment of my invention, it will be apparent to one skilled in the art to which the invention pertains that various changes and modifications may be made therein without departing from the spirit of the invention or the scope of the appended claims.

I claim:

1. In a spray coating system, a plurality of spaced 10 spray ejection devices, a first conveyor means successively conducting objects to be coated past each of said spaced spray ejection devices, a second conveyor means, operably connected with said first conveyor means a curtain carried by said second conveyor means past each of said 15 spaced spray ejection devices, and means selectively actuating said second conveyor means.

2. The system as defined in claim 1 and in which said spray ejection devices are adapted to selectively spray a plurality of coating substances, said curtain being operable to pass by successive spray ejection devices during 20 changeover from one substance to another.

3. The system as defined in claim 2 and having separate means operable to control changeover of substances in each of said spray ejection devices, said curtain having means successively actuating said separate control means as said curtain passes said devices. 25

4. The system as defined in claim 1 and in which said curtain is provided with a trough at its lower edge adapted to collect runoff of material sprayed on said curtain. 30

5. The system as defined in claim 1 and in which said second conveyor means is operable to return said curtain after passing the final spray device to a position preparatory to being conducted past the first passed spray device.

6. The system as defined in claim 1 and in which said curtain comprises a plurality of adjacent panels having overlapping edges. 35

7. The system as defined in claim 1 and in which said first conveyor carries means operating said second conveyor actuating means.

8. A method of spray coating objects from a plurality 5 of spaced spray ejecting devices adapted to selectively spray a plurality of coating substances; comprising positioning a series of objects along a conveyor to provide a gap at selected intervals, moving said conveyor to parade said objects past said devices as said devices are ejected 10 a spray of coating material, moving a curtain into the aforesaid gap to be carried past said devices, changing the substance being sprayed from each only during the interval when said curtain passes into a position to be sprayed from the device, and removing said curtain from 15 the aforesaid gap after it passes by the final device.

9. The method as defined in claim 8 and including subsequently moving said curtain into a position preparatory to being moved into the next gap provided on the conveyor.

10. In a spray coating system, a spray ejection device, 20 a first conveyor means successively conducting objects to be coated past said spray ejection device, a second conveyor means having a curtain and operable to conduct said curtain past said spray ejection device, means selectively actuating said second conveyor means, and means 25 changing the substance being sprayed only when said curtain is conducted past said spray ejection device.

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