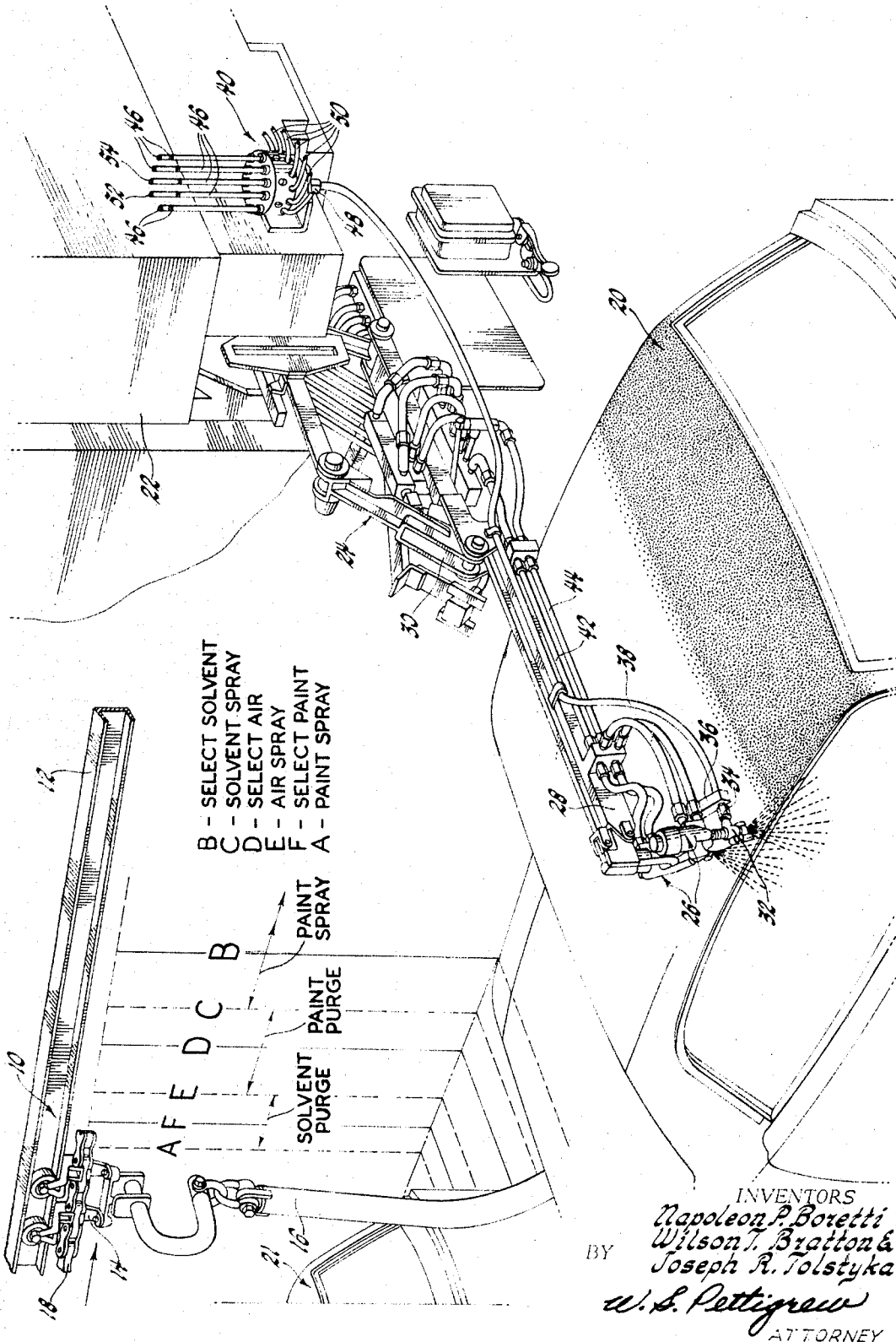


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APPLICATION OF DIFFERENT COLORS TO DIFFERENT ARTICLES
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METHOD OF SPRAY COATING A SERIES OF ARTICLES INCLUDING THE APPLICATION OF DIFFERENT COLORS TO DIFFERENT ARTICLES

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2 Claims

ABSTRACT OF THE DISCLOSURE

Method of spray coating of articles such as automobile vehicle bodies transported through a coating station at substantial speed wherein the successive vehicle bodies on the conveyor are to be coated with a selected one of any of a plurality of color coatings and including the steps of spraying of a selected color coating on a first vehicle body as it traverses the station, the cut-off of coating supply and selection of paint solvent for the coating in such timed relation to the passage of the vehicle body from the station that the coating contained within the coating application apparatus will be forced by the following body of solvent through the apparatus and onto the vehicle body rather than wasted. A subsequent purge of the solvent is accomplished by the selection of high pressure air into the spray apparatus and then the selection of the second color coating for the oncoming vehicle body for application thereto at the time the vehicle body enters the station.

This invention relates to the spray coating of articles and more particularly to methods of spray coating a conveyor transported series of articles.

By the invention, there is provided an improved method of spray coating a conveyor transported closely spaced series of articles wherein each article in the series requires a selected different one of a plurality of available coatings distinguished by color or other quality. In contrast with prior known methods, the instant method accomplishes the coating selection and the actual spraying onto the articles with virtually no coating material waste and within minimum time. The invention has particular utility in spray coating installations wherein a plurality of spray guns or the like are located within the spray coating station to simultaneously coat respective portions of large articles transported therethrough at high speed, with the spray guns being supplied by automatic coating selector means programmed for coordination with the traversal of the various articles through the station.

The above and various other objects, features, and advantages of the invention will be readily apparent from the following description having reference to the drawing in which the sole figure is a fragmentary perspective view of an automobile body production conveyor line including a spray coating station adapted to the method of the present invention.

In prior known methods of spray coating of conveyor transported articles requiring selection of the color or type of coating between succeeding articles, there has been unavoidable substantial waste of the various selected coating materials in making the change of coating color or type in preparation for each oncoming article. Whether the spray gun be operated by individual attendants or by automated equipment, it has been common that once a first article in the series passes through the spray station after being coated, the operator or machine is required to cause an initial spraying of the next selected color coating

through the gun before the oncoming article reaches the station for a period sufficient to purge the gun of the preceding coating material and avoid contamination. Particularly, in cases where the succeeding coating materials are of substantially diverse type or color such as black to white, the amount of material waste for each coating change can be extremely costly in relation to the actual amount of material used to coat the articles.

The instant spray coating method, answers to the above long experienced difficulties, and generally stated, comprises the following steps described with reference to its application to a high speed article transporting conveyor line. Whether by individual attendants or automated machinery, there is first the selection of the supply of the color or type of coating desired for the first article approaching the spray coating station; the spray coating of that article as it traverses the station; the cutoff of the first selected coating supply in timed relation with the passage of the first article out of the station and the simultaneous selection of a supply of solvent for that first coating forced through the spray gun to clear it of all remaining first coating material; the cutoff of the solvent supply and simultaneous selection of a supply of pressurized air forced through the spray gun to clear away remnants of the solvent; and the cutoff of the pressurized air and the simultaneous selection of the desired coating supply for the oncoming article. By the hereinafter described timing of these steps in relation to the passes of the articles through the station, there is neither contamination of one selected coating material by another nor any amount of waste of coating material to avoid such contamination. Further, even with an intervening supply of solvent issued to the gun, no preparatory wasteful spraying of the next color is required to avoid dilution of the next selected coating material on the articles.

This method is herein more particularly described in connection with a conventional automobile body spray coating conveyor line, and while the description will have further particular reference to an automated spray coating station in the line having gun traversing machinery and automatic color selector means programmed for coordinated operation with the passage of the various articles through the station, it is to be understood that the method has general applicability indicated in the preceding discussion.

As shown in the drawing, the automobile body spray coating conveyor line includes a conveyor apparatus, designated generally as 10, extending through the spray coating station or booth and including an overhead rail 12 mounting a series of bogies 14 provided with depending hanger members 16 for supporting the automobile bodies, two of which are designated as 20 and 21. Suitable chain loop drive or similar means 18 interconnect the various bogies for programmed traversal of the bodies through the spray booth and various other stations.

The spray booth may include any form of spray equipment adapted for complete coating of the body but typically, for articles of such size as an automobile body, there will be provided a plurality of air atomization spray gun units each respective to a certain portion of the body, as for example, one for each complete side portion including front cowl, rear quarter and door or doors, one for the top portion including the roof panel and rear compartment lid, and others. Each of the various guns may be manipulated by individual attendants or operated by suitable automatic gun mounting and traversing apparatus such as that shown in the drawing wherein a fixed overhead support 22 in the booth mounts a reciprocable overhead spray gun mounting boom assembly 24 carrying a unit of two or more spray guns 26. For the details, reference may be had to Blenman, U.S. Ser. No. 296,572 filed July 22, 1963, and

assigned to the assignee of the present invention. Generally, however, the boom assembly 24 includes a gun carrying boom 28 transversely reciprocable relative to the support 22 by compound motion linkage indicated at 30 and driven by suitable electric motor or other power means, the linkage 30 being further operable to lower the spray guns 26 in timed relation with the passage of the front cowl and rear compartment lid portions of the vehicle body under the support 22 and raise the spray guns for the intervening higher roof portion. The spray guns 26 themselves are of conventional type and include a spray head 32 adapted for connection with a source of coating fluid and with an atomizing high pressure air source. Further conventional means may be embodied in each spray gun 26 for controlling passage of the coating fluid and the atomizing air through the spray head, such as solenoid or air pressure operated valving. The actual coating supply connection to each head 32 is indicated at 34 and communicates with a manifold 36 interconnecting the spray guns 26. From manifold 36, a coating supply conduit 38 extends in the manner shown over the boom 28 to a stationary color selecting apparatus 40 spaced from spray guns 26, with a portion of the length of conduit 38 being left somewhat free to accommodate the motion of the boom assembly 24. Further conduits 42 and 44 may be mounted to the boom 28 to connect pressurized air sources to the spray guns 26 for air atomization of the coating fluid and for air pressure control of the valving in the spray guns.

The color selecting apparatus 40 may be of any design suitable to the functions hereinafter set forth, but preferably accords with that disclosed in Patent No. 3,201,048 Gibbs, issued Aug. 17, 1965, and assigned to the assignee of the present invention. Reference may be had to the patent for details, but generally apparatus 40 is adapted for automatic selection and supply from any one of a plurality of coating fluid reservoirs, not shown, connected to the apparatus by respective fluid conduits 46. Further attached to the apparatus are a number of air conduits 50 for controlling a series of valves in the body of the apparatus for the various fluid coating supplies, each valve being responsive to a programmed air pressure input to allow passage of the respective coating fluid from its reservoir and conduit 46 to the outlet 48 of the apparatus 40, which outlet as presently disclosed is connected to one end of the conduit 38.

By the present invention, there is also connected to the apparatus 40 by suitable conduits 52 and 54, a source of solvent for the various coating fluids and a source of high pressure air, neither being shown. Again, the solvent and high pressure air supplies are selected for communication to conduit 38 by respective air controlled valves in apparatus 40 similar to those for the coating supplies.

Proceeding now more particularly to the method of the invention, it is assumed that bodies 20 and 21 are arbitrarily selected as the first and second in a series mounted upon the conveyor 10 to pass through the spray station at a programmed speed and in the indicated direction. As the leading portion of the first body 20 approaches the spray guns 26, the apparatus 40 is caused to permit passage of a selected one of the various coatings connected thereto through the conduit 38 and to the spray heads 32.

The automatic gun traversing apparatus including the boom assembly 24 then undergoes the programmed sweep of the spray guns required to thoroughly coat body 20 in proper timed relation with the speed of the conveyor 10. As the body 20 begins to pass out of the station, apparatus 40 is caused to cutoff the supply of the selected coating fluid and to select the solvent supplied by conduit 52. The actual point in the passage of the body 20 at which apparatus 40 selects the solvent most preferably occurs just prior to the passage of the deck panel or trailing portion of the body from under the boom assembly 24, such point being indicated in the drawings as the moving point or plane B

of the body 20. In this way, the amount of fluid coating contained within conduit 38 when the apparatus 40 selects the solvent may be discharged onto the body, rather than wasted in the booth. The actual time period involved depends on the length of conduit 38 among other factors, and care is taken that the body is not under spray guns 26 at the point in time when the incoming solvent reaches heads 32, which point is indicated as C. The passage of the solvent purges the conduit 38 and spray guns 26 of all coating material selected for body 20, the actual period of time required being a function of the nature of that particular coating material. This period is indicated by the interval B-D, the latter reference character being that point at which apparatus 40 is caused to cut off solvent and select the high pressure air source connected to apparatus 40. When this incoming air reaches heads 32 at point E, there has been an interval C-E of actual paint purge. A point F is then programmed for apparatus 40 whereat high pressure air is cut off and the coating fluid desired for the oncoming body 21 is selected. The time interval D-F is made sufficiently long as to thoroughly purge conduit 38 and spray guns 26 of all remnants of solvent. The oncoming body coating fluid reaches heads 32 at point A, which point defines a time interval E-A of actual solvent purge. Thus, it is believed clear that body 21 will be located on conveyor 10 behind body 20 by a distance accommodating the time interval B-A according to the speed of conveyor 10. The steps according to the intervals A-B, etc., are then repeated for body 21.

Having thus described the invention, what is claimed is:

1. A method of multiple coating selection coating application to a series of conveyor transported closely spaced articles moving relative to a coating station, said station having coating application means connected by a length of conduit means to stationary coating selection means spaced from said application means, and said coating selection means being communicated with a plurality of coating supplies, a supply of coating solvent, and a supply of purging gas, comprising, the first selection of one of said plurality of coatings for supply to said application means in timed relation with the entry of a first article in said series into said station, the application of said one coating to said first article as it traverses said station, the selection of solvent for said one coating supplied to said conduit means prior to and in timed relation with the passage of said first article out of said station and prior to the entry of a succeeding second article in said series into said station and defining a period intervening between said solvent selection and the passage of said first article from said station wherein said first article is further coated with the quantity of said one coating contained within said conduit means, the supply to said application means of said solvent for a period sufficient to purge said conduit means and said application means of said one coating, the selection of purging gas for supply to said application means prior to the entry of said second article into said station for a period sufficient to purge said conduit and said application means of said solvent, and the second selection of one of said plurality of coatings for supply to said application means in timed relation with the entry of said second article into said station for subsequent coating of said second article.

2. A method of multiple coating selection coating application to a series of conveyor transported closely spaced articles moving relative to a coating station, said station having coating application means connected by a length of conduit means to stationary coating selection means spaced from said application means, and said coating selection means being communicated with a plurality of coating supplies, a supply of coating solvent, and a supply of purging gas, comprising, the first selection of one of said plurality of coatings for supply to said application means in timed relation with the entry of

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a first article in said series into said station, the application of said one coating to said first article as it traverses said station, the selection of solvent for said one coating supplied to said conduit means prior to and in timed relation with the passage of said first article out of said station and prior to the entry of a succeeding second article in said series into said station and defining a period intervening between said solvent selection and the passage of said first article from said station wherein said first article is further coated with the quantity of said one coating contained within said conduit means, the supply to said application means of said solvent for a period sufficient to purge said conduit means and said application means of said one coating, the selection of purging gas for supply to said application means prior to the entry of said second article into said station for a period sufficient to purge said conduit and said application means of said solvent, and the cutoff of said purging gas and the selection of another of said plurality of coatings

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for supply through said conduit means to said application means and issuance of said another coating from said application means coincidentally with the entry of said second article into said station.

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