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ELECTRO SPRAY APPARATUS AND METHOD

Original Filed Feb. 9, 1959

2 Sheets-Sheet 1

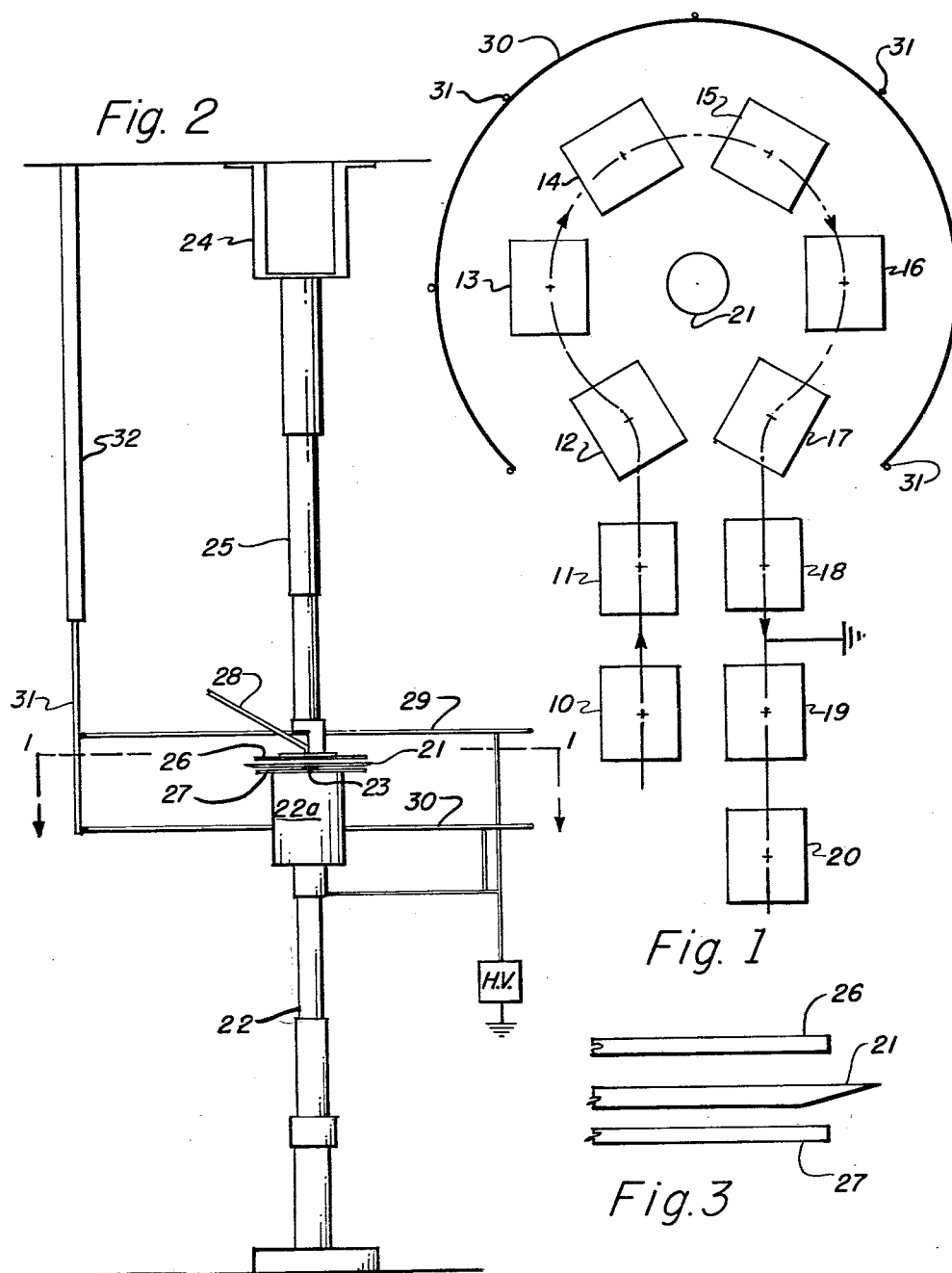


Fig. 1

Fig. 3

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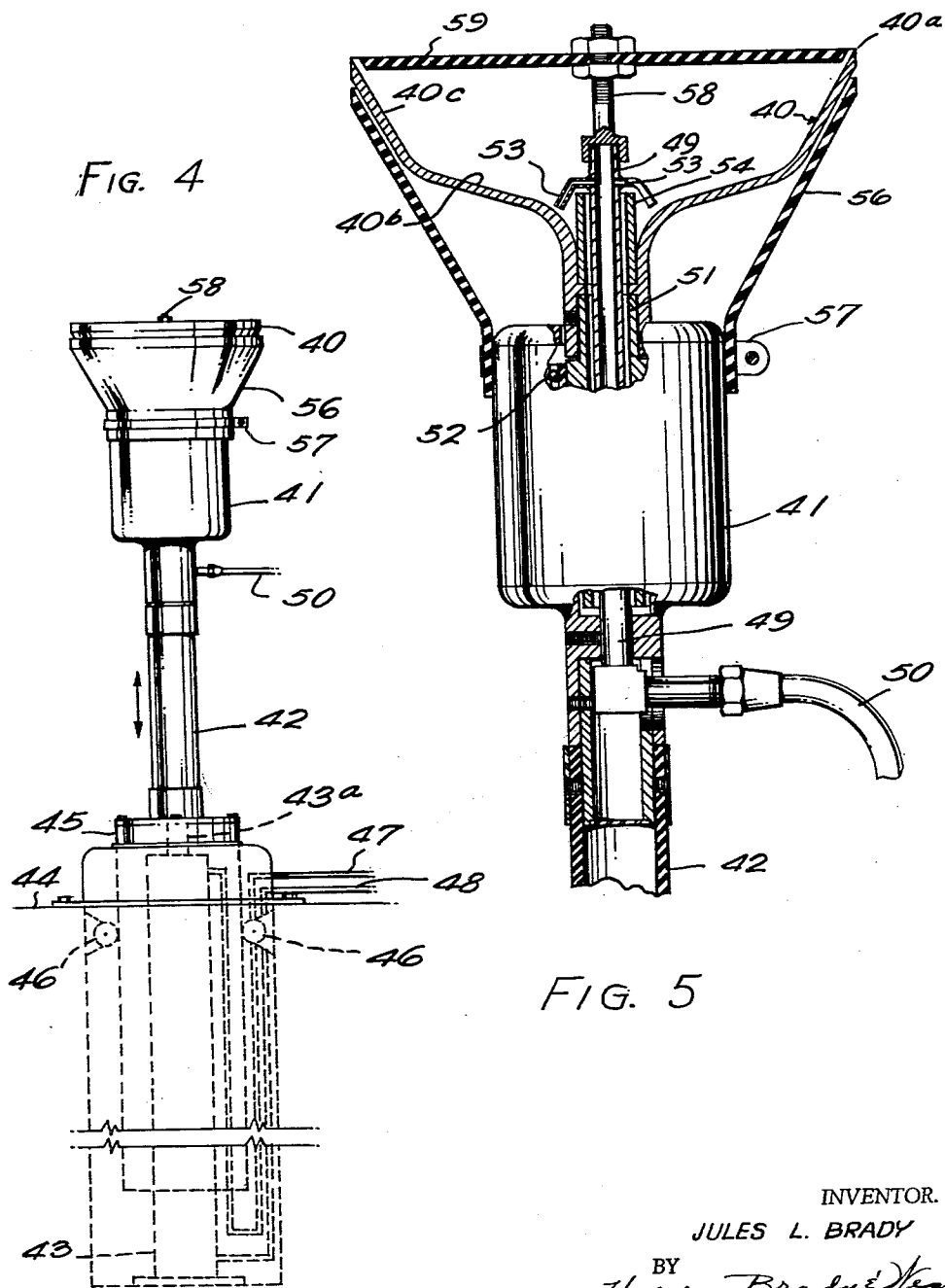


FIG. 5

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ELECTRO SPRAY APPARATUS AND METHOD

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Continuation of application Ser. No. 792,222, Feb. 9, 1959. This application Oct. 9, 1961, Ser. No. 143,980
19 Claims. (Cl. 117-93.43)

This invention relates to electro spray apparatus and method, and more particularly to the deposition on article surfaces of liquid coating materials which are rather difficult to atomize electrostatically.

This application is a continuation of my application 792,222, which was a continuation-in-part of my application Serial No. 539,999, filed October 12, 1955, now abandoned.

In commercial installations made by the assignee of this application, liquid coating material supplied to a rotating atomizing device has been subjected to the action of an electrostatic field and atomized into fine electrically charged spray particles which move to and become deposited on the article under the influence of electrostatic forces. Rotation of an atomizing device to spread the liquid coating material into a thin film at a circular edge is disclosed, for example, in E. M. Ransburg Patent 2,893,894, issued July 7, 1959, and rotation of the atomizing device at high speeds in connection with coating materials which are difficult to atomize electrostatically is known.

One example of a material which is rather difficult to atomize electrostatically, and yet which is used extensively commercially, is the liquid material for providing porcelain enamel finishes, known in the field as a slip. This material usually comprises as its principal element porcelain enamel frit combined with clay and other additives, suspended in water to which may be added small quantities of other liquids to modify certain characteristics of the slip, the bisque resulting from its deposition on the article being coated, or the ultimate fired finish comprising the porcelain enamel. Other examples of relatively difficult material to atomize electrostatically are some metallic pigment paints, and some water-in-oil emulsion paints. When a rotating bell or disc supplied with such difficult-to-atomize materials has its speed of rotation increased from the 900 r.p.m. heretofore normally used commercially to speeds of several thousands of revolutions per minute, providing lineal velocities at the atomization zone of edge of more than 10,000 feet per minute, for example, deposition efficiencies have in many cases dropped off instead of improving.

A rotating atomizing device having the above-mentioned edge velocities of 10,000 feet per minute or more creates such a strong wind or air stream that under certain circumstances the air stream overcomes the electrostatic forces which would otherwise deposit certain spray particles on the article and carries those particles away to be lost. I have found that by properly baffling or blocking air flow adjacent the rotating atomizing device, improved deposition efficiencies can be obtained with high speeds of rotation are used in connection with coating materials which are difficult to atomize.

Other features and advantages of the invention will be apparent from the following specification and drawings in which:

FIGURE 1 is a schematic plan view of an installation embodying this invention, along the line 1-1 of FIGURE 2;

FIGURE 2 is a side elevation of an atomizing disc and its associated air baffles and supports, with the spacings between the disc and baffles being somewhat exaggerated

for clarity of illustration, and of the outer electrodes, the articles being eliminated from the view for clarity;

FIGURE 3 is an enlarged fragmentary view of the edge portions of the baffles and disc, in a preferred proportion as to size and spacing;

FIGURE 4 is a side elevational view of another embodiment of my invention adapted for vertical reciprocation; and

FIGURE 5 is an enlarged view partly in vertical section of the upper portion of the device shown in FIGURE 4.

Referring now more particularly to the specific embodiment of the invention illustrated in FIGURES 1 to 3 of the drawings, the articles being coated (illustrated as refrigerator cabinets identified as 10 to 20 inclusive) are carried by a suitable conveyor in a loop around a rotating atomizing device, here shown as a disc 21. At least a portion of the surface of each article being coated lies in the plane of the disc in the particular embodiment here illustrated; and the annular spray discharged from the edge of the disc provides a band of coating deposition on the article surface facing the disc. It will be understood that the entire vertical extent of the surface may be coated (if it is of greater extent than the width of the annular spray band) by moving the articles in a helical path around the disc, or by other suitable expedients also known in the art, as by tilting or reciprocating the disc. It will also be understood that if the article is of a rectangular character, as illustrated, the other sides not facing the disc in the accompanying illustration could be suitably coated either by indexing the articles during their movement around the disc or by utilizing other similar coating arrangements or loops at other points in their movement along the conveyor.

A commercial installation of the character illustrated has been used, for example, in applying porcelain enamel to washer and dryer cabinet parts by the use of a rotating disc-type atomizer. The installation employs a disc 20" in diameter, with the inwardly facing surfaces of the cabinet panels spaced approximately 2 feet from the circular edge of the disc as they pass around the disc during coating. The disc is supplied with the liquid coating material, the slip for providing the porcelain enamel finish, and rotated at high speed. Rotation of the 20" disc at approximately 3600 r.p.m., for instance, provides a lineal edge speed of close to 19,000 feet per minute. The articles being coated are grounded through the conveyor; and a high voltage differential is created between the grounded articles and the rotating atomizing member, as by a high voltage power supply shown schematically only. The voltage commercially used is normally 100,000 volts, and in any event should be sufficient to provide at least several thousand volts per inch average gradient in the electrostatic field between the atomizing device and the article surface spaced therefrom.

Production of high quality finishes require that all of the spray particles be rather fine, preferably small enough that on deposition they do not make spot sizes more than 15- to 20-thousandths of an inch in diameter. Fine spray particles of this type, deposited on an article surface while still in liquid state, flow together in a manner providing a smooth finish of high quality. Field strengths of the character described, when concentrated at the edge of the atomizing device, are sufficient in and of themselves to provide such desired fine atomization with synthetic enamels or most other conventionally used paints. When the material is difficult to atomize electrostatically, however, as is the case with the slip used for providing porcelain enamel finishes, the high lineal edge velocity of the rotating atomizing device materially aids the

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atomization and enables provision of spray particles of the desired fineness.

However, utilization of edge velocities in excess of 10,000 feet per minute would under many circumstances, in the absence of utilization of my improvement herein disclosed, create a blast or strong stream of air of such velocity at the article surface as to materially reduce the deposition efficiency. In the specific example described above, an unshielded disc creates air velocities of the order of 350 feet per minute at the article surface. Optimum results from electrostatic spray coating systems require that the air adjacent the article surface be quiescent. The air need not be completely still and unmoving, but should be quiescent in the sense that there should be no strong blasts or air movements of a velocity such as to carry away a substantial number of the spray particles which would otherwise have been electrostatically deposited on the article; and air velocities of the order of 350 feet per minute carry away a number of spray particles.

Referring now more particularly to FIGURE 2, a pedestal 22 houses in its upper enlarged portion 22a a motor having a shaft 23 carrying the disc 21. Above the disc, carried in the illustrated embodiment by a ceiling bracket 24, is a support member 25. At the lower end of this member is a circular baffle or guard 26 of dielectric or non-conducting material, as Bakelite; and immediately beneath the disc 21, and carried by the upper portion of the pedestal 22, is another similar guard or baffle disc 27. During operation of the device the liquid coating material is pumped through the tube 28 and supplied to the upper surface of the disc 21, and rotation of the disc spreads the material into a thin expanding film and distributes the liquid uniformly around the circular edge of the disc. Atomization takes place at this edge and the resultant spray particles are both mechanically projected toward and electrostatically attracted to the surfaces of the articles being coated.

The installation being described also includes an arrangement for minimizing overspray, or loss of spray particles passing between and beyond the articles being coated. In the embodiment illustrated this comprises an outer or backing electrode arrangement comprising a pair of arcuate electrode members 29 and 30 surrounding the articles on the conveyor loop. These arcuate electrode members, preferably of metal tubing of an appreciable diameter (as $\frac{3}{8}$ "') to minimize ionizing current losses, are carried by insulating supports 31 in turn mounted in a suitable manner, as by the pipe 32 shown in FIGURE 2, as supported from the ceiling or roof of the structure housing the installation. As may be best seen in this same figure, the arcuate electrode members 29 and 30 are located in planes above and below the plane of the disc, as 4 inches above and 8 inches below, and are both electrically connected to the "hot" terminal of the high voltage power supply. The tendency of spray particles passing between the articles to deposit on the rear surfaces thereof is materially increased by this arrangement and assists the other features heretofore described in achieving porcelain frit deposition at high efficiencies.

Referring now more particularly to FIGURE 3, it will be seen that a preferred embodiment spaces the lower baffle disc 27 as close to the lower surface of the rotating disc 21 as is commercially practical, as $\frac{1}{8}$ ". In order to obviate any disturbance of the film of liquid coating material on the upper surface of the disc, it is preferable to space the upper baffle disc 26 slightly further, a $\frac{1}{4}$ " spacing from the upper surface of the disc 21 having proved very satisfactory in practice. Even though the baffle discs are preferably of dielectric or non-conducting material, optimum concentration of the electrostatic field at the atomizing edge of the disc is obtained by having the baffle edges lie slightly within or to the inside of the atomizing disc edge, as $\frac{1}{4}$ of an inch to the inside thereof.

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The air blocking or baffle means is preferably unbroken or uninterrupted in order to completely close over and protect each side of the rotating disc; and baffle means on each side of the rotating disc is of importance in achieving the desired results.

A construction of the character illustrated provides very substantial reductions in the air velocities which would otherwise exist, and does it without disturbing the film and without reducing the desired concentration of the electrostatic field at the edge of the rotating atomizing member. This arrangement reduces air velocities at the article surface to not in excess of about 1% of the lineal velocity of the rotating edge, and generally to something materially less than this. In the specific embodiment particularly described above, for example, air velocities at the article surface are reduced to considerably less than one-half of what they otherwise would have been, and are of the order of 100 feet per minute. With slightly reduced edge velocities (as with a 15" disc resulting in an edge velocity of about 13,000 feet per minute), air velocities at the article surfaces which would otherwise be in excess of 100 feet per minute are reduced to about 40 feet per minute; and yet the centrifugal force provided by this edge velocity, being in excess of 10,000 feet per minute, is sufficient to result in atomization of the desired fineness.

It will be understood that the baffling or air blocking disclosed here is not concerned with eddy currents, with changes of direction of air movement, or other effects at or near the edge of the rapidly rotating atomizing device. Instead the action desired is reduction of air velocities at a substantial distance from the atomizing zone, as for example, a couple of feet, and immediately adjacent the surface of the article being coated. Particularly with a disc-type rotating atomizing device, the initial direction and forces of air in the absence of blocking or baffling means is such as to assist projection of the spray particles in the desired direction; but it is the action of high velocity air streams at and near the article surface which is undesired and which this air baffling or blocking arrangement obviates. Moreover, this is accomplished without reducing the desirable high concentration of field forces at the atomizing edge, and without disturbing the liquid film on the rotating surface.

In the embodiment of my invention heretofore described the upper baffle 26 has been illustrated as fixedly supported from the ceiling. However, when the atomizing device is mounted on a reciprocator for vertical movement during the coating operation as is desirable in certain installations, the mounting arrangement for the upper baffle must be different; and an arrangement particularly designed for reciprocation is illustrated in FIGURES 4 and 5.

Referring now more particularly to these latter figures, the rotatable atomizing member is in this case illustrated as a bell 40 having a circular atomizing edge 40a. The bell has a first or inner annular portion 40b which diverges at a relatively small angle to the horizontal and an outer portion 40c which is at a greater angle and which comprises a conical section in the embodiment illustrated. Such a bell, when located in the center of the looped portion of a conveyor path (i.e., in place of the disc 21 illustrated in FIGURE 1) will electrostatically coat the articles passing around it on a conveyor when it is rotated, supplied with liquid coating material, and suitable electrostatic field conditions are created between the bell edge and the articles. It will also be understood that a bell may be used in conjunction with a straight conveyor path, in which case the axis of the bell will be so arranged as to intersect articles on the conveyor.

Referring now more particularly to the use of a bell within a loop, however, it will be understood that articles having considerable vertical extent, as refrigerator cabinets, can be carried in a conveyor loop which lies in a single plane, and yet be coated from top to bottom by

reciprocating the rotary atomizer during movement of the articles about the loop.

The arrangement shown in FIGURES 4 and 5 is suitable for such a situation. Referring first to FIGURE 4, the bell 40 and drive motor 41 are shown as carried on a column 42 adapted to be reciprocated vertically by a hydraulic cylinder 43. As illustrated, this hydraulic cylinder may be mounted in a pit beneath the floor 44 of a factory, with the piston rod 43a adapted to be reciprocated vertically and to carry with it the column 42 and a housing 45, vertical movement of this latter part being guided by rollers 46. It will be understood that hydraulic fluid may be suitably supplied through the pipes 47 and 48 to effect the desired reciprocation, which may be as much as several feet.

Referring now more particularly to FIGURE 5, it will be seen that column 42 carried not only motor 41 but also a central stationary feed tube 49 adapted to be supplied with paint or other liquid coating material through a flexible conduit, as the hose 50. The rotor of the motor is provided with a hollow shaft 51 through which the paint feed tube 49 extends. This shaft 51 is suitably supported, as by ball-bearing arrangements identified as 52, and is attached to the rotor of the motor so that energization of the motor effects rotation of the shaft 51 at a suitable speed, as for example 3600 r.p.m. The paint feed tube 49 is provided at its upper end with a pair of outwardly and downwardly extending nozzle tubes 53, these being adapted to deliver the paint to the surface of the bell near its axis. A tubular insert member 54 acts to prevent undesired running of the paint back down the hollow motor shaft during operation; and rotation of the bell member causes paint delivered from the nozzles 53 to form into a film on the bell surface and to be delivered to the atomizing edge 40a in a uniform thin film entirely around the periphery of the bell.

In order to prevent undesirably high air velocities at the surfaces of the articles during the coating operation, air movement which would otherwise be caused by the high speed of rotation of the bell member is again blocked or baffled. A generally conical baffle member 56 is attached to the housing of the motor 41 by a clamp 57, and has at least its upper portion closely adjacent to the outside surface of the generally conical portion 40c of the bell member. The paint tube 49 has suitably mounted on the top thereof, as by the stud 58, another baffle here shown as a disc member 59 having its periphery terminating closely adjacent the inner surface of the bell close to the atomizing edge 40a. This arrangement provides baffle or blocking action immediately adjacent both the inside and outside of the rotating bell member near the periphery thereof, so that regardless of any air movement existing adjacent surfaces of the bell within the closure provided by the baffle arrangements, no appreciable "blower" effect takes place. This is, despite edge velocities well in excess of 10,000 feet per minute, air velocities adjacent the article surface are kept well within the limits heretofore described in this specification. Moreover, it will be noted that in the arrangement shown in FIGURES 4 and 5, both baffles are carried by and fixedly mounted with respect to the pedestal 42, so that they maintain their desired relationship with the rotating atomizing member during vertical reciprocation thereof.

While I have shown and described certain embodiments of my invention, it is to be understood that it is capable of many modifications. Changes, therefore, in the construction and arrangement may be made without departing from the spirit and scope of the invention as disclosed in the appended claims.

I claim:

1. An electrostatic coating system for distributing liquid as a coating on articles, a rotatable member having a circular edge providing an atomizing zone, means for rotating said member at a rate such that said edge has a lineal speed in excess of ten thousand feet per minute,

means for feeding liquid coating material to a surface of said member for spreading as a film to said edge and atomization therefrom into an annular spray of coating material particles, means for moving said articles about said member in said annular spray and sufficiently spaced from said member to permit substantial dispersion of the spray particles as they proceed toward the articles, means for creating between the articles and said member and concentrated at the atomizing zone thereof an electrostatic field of sufficient strength to affect the atomization, dispersion and deposition on the article surfaces while still in liquid state of said spray particles, and baffle members on both sides of said rotating member and closely adjacent thereto for reducing air velocities adjacent said article surfaces to less than one percent of the lineal velocity of said circular edge.

2. Apparatus of the character claimed in claim 1 wherein said baffle members are of dielectric material and terminate within said circular edge for concentration of the field at the coating material on said circular edge.

3. Apparatus of the character claimed in claim 1 including electrode means on the opposite side of said articles from said rotating atomizing member, and means for charging said electrode means to the same polarity as the rotating atomizing member for creating an electrostatic field between the articles and said electrode means.

4. In a system for electrostatically distributing liquid as a coating on articles wherein a rotatable member having an atomizing zone is fed liquid coating material for atomization therefrom into a spray of coating material particles therearound, articles are moved in said spray sufficiently spaced from said member to permit substantial dispersion of the spray particles as they proceed toward the articles, and an electrostatic field exists between the articles and said particles of sufficient strength to affect the dispersion and deposition on the article surfaces while still in liquid state of said spray particles, the combination of means for rotating said member so rapidly as to tend to create air velocities of such magnitude as to cause particles which would otherwise be electrostatically deposited on the article surface to be carried away from said article surface, and baffle means closely adjacent said rotating member on both sides thereof throughout substantially its entire periphery for reducing air velocities adjacent said article surfaces whereby particles which would otherwise be carried away from the article surfaces are electrostatically deposited thereon.

5. Apparatus of the character claimed in claim 4, wherein the rotating means drives said rotatable member with a lineal velocity adjacent the atomizing zone in excess of 10,000 feet per minute, and wherein the baffle means are within a small fraction of an inch of the rotatable member and extend entirely therearound closely adjacent said atomizing zone, whereby air velocities at the article surfaces are only of the order of 100 feet per minute.

6. In a method of electrostatically distributing liquid as a coating on articles wherein a stream of liquid coating material from a supply source is flowed onto a supporting surface rotated for transforming said material into a thin film and advancing it along said surface to an atomizing zone to provide a thin circular film edge having the coating material uniformly distributed therealong, a plurality of articles are located about such circular film edge with a portion of each article in the plane of such film edge, and an electrostatic field is created between the articles and film edge and concentrated thereat of sufficient strength to affect the atomization, dispersion and deposition on the article surfaces while still in liquid state of fine spray particles atomized from said film edge, the distance between the articles and the atomizing zone being great enough to permit substantial dispersion of the spray particles as they proceed toward the articles, the method of improving quality of atomization and efficiency of deposition of coating materials difficult to atomize elec-

trostatically, comprising rotating said film supporting surface sufficiently rapidly to make mechanical forces appreciably affect the quality of atomization, and preventing air flow against said rapidly rotating surface substantially entirely thereover to thereby prevent the creation of air velocities by said rotation and at the article surfaces of sufficient velocity as to cause particles which would otherwise be electrostatically deposited on the article surfaces to be carried away from said article surfaces.

7. A method of the character claimed in claim 6, wherein the lineal velocity of the edge of said rapidly rotating surface is in excess of 10,000 feet per minute and the air velocities at the article surface are not more than about 1% of such lineal velocities.

8. A method of electrostatically distributing liquid as a coating on articles, comprising the steps of flowing a stream of liquid coating material from a supply source onto a supporting surface, rotating said surface to provide a lineal velocity of the edge of said surface in excess of ten thousand feet per minute for deforming said material into a thin film and advancing it along said surface to an atomizing zone to provide a thin circular film edge having the material uniformly distributed therealong, providing a plurality of articles about such circular film edge with a portion of each article in the plane of such film edge, creating between the articles and film edge and concentrated thereat an electrostatic field of sufficient strength to affect the atomization, dispersion and deposition on the article surfaces while still in liquid state of fine spray particles atomized from said film edge, the distance between the articles and the atomizing zone being great enough to permit substantial dispersion of the spray particles as they proceed toward the articles, and blocking air flow adjacent and substantially entirely over said rapidly rotating surface but within said circular edge to reduce air velocities at the article surfaces to velocities of the order of one hundred feet per minute.

9. A method of electrostatically distributing liquid as a coating on articles, comprising the steps of flowing a stream of liquid coating material from a supply source onto a supporting surface, rotating said surface to provide a lineal velocity of the edge of said surface in excess of ten thousand feet per minute for deforming said material into a thin film and advancing it along said surface to an atomizing zone to provide a thin circular film edge having the material distributed therealong, providing a plurality of articles spaced from such circular film edge, creating between the articles and film edge and concentrated thereat an electrostatic field of sufficient strength to affect the atomization, dispersion and deposition on the article surfaces while still in liquid state of fine spray particles atomized from said film edge, the distance between the articles and the atomizing zone being great enough to permit substantial dispersion of the spray particles as they proceed toward the articles, and blocking air flow adjacent said rapidly rotating surface to reduce air velocities adjacent said article surfaces to velocities of the order of one hundred feet per minute.

10. In an electrostatic coating system for distributing liquid as a coating on articles, a rotatable member having an atomizing zone, means for rotating said member to provide a lineal speed of the atomizing zone in excess of ten thousand feet per minute, means for feeding liquid coating material to said member for atomization therefrom into a spray of coating material particles therearound, means for moving said articles in said spray and sufficiently spaced from said member to permit substantial dispersion of the spray particles as they proceed toward the articles, means for creating between the articles and said particles an electrostatic field of sufficient strength to affect the dispersion and deposition on the article surfaces while still in liquid state of said spray particles, and baffle means closely adjacent said rotating member for reducing air velocities adjacent said article surfaces to velocities of the order of one hundred feet per minute.

11. An electrostatic coating system for distributing liquid as a coating on articles, a rotatable member having a circular edge providing an atomizing zone, means for rotating said member at a rate such that said edge has a lineal speed in excess of ten thousand feet per minute, means for feeding liquid coating material to a surface of said member for spreading as a film to said edge and atomization therefrom into an annular spray of coating material particles, means for moving said articles about said member in said annular spray and sufficiently spaced from said member to permit substantial dispersion of the spray particles as they proceed toward the articles, means for creating between the articles and said member and concentrated at the atomizing zone thereof an electrostatic field of sufficient strength to affect the atomization, dispersion and deposition on the article surfaces while still in liquid state of said spray particles, means for reciprocating said rotatable member along the axis of rotation thereof, and baffle members on both sides of said rotating member and closely adjacent thereto at least near said circular edge for reducing air velocities adjacent said article surfaces to less than one percent of the lineal velocity of said circular edge.

12. In a system for electrostatically distributing liquid as a coating on articles wherein a rotatable member having an annular atomizing zone is fed liquid coating material for atomization therefrom into a spray of coating material particles, articles are moved in said spray sufficiently spaced from said member to permit substantial dispersion of the spray particles as they proceed toward the articles, and an electrostatic field exists between the articles and said particles of sufficient strength to affect the dispersion and deposition on the article surfaces while still in liquid state of said spray particles, the combination of means for rotating said member so rapidly as to tend to create air velocities of such magnitude as to cause particles which would otherwise be electrostatically deposited on the article surface to be carried away from said article surface, and a pair of baffle plates closely adjacent the annular zone of said rotating member one on each side thereof, each plate having an outer edge adjacent said annular atomizing zone, said zone extending at least to the outer edges of the plates, for reducing air velocities adjacent said article surfaces whereby particles which would otherwise be carried away from the article surfaces are electrostatically deposited thereon.

13. A method of electrostatically distributing liquid as a coating on articles, comprising the steps of flowing a stream of liquid coating material from a supply source onto a supporting surface, rotating said surface to provide a lineal velocity of the edge of said surface in excess of ten thousand feet per minute for deforming said material into a thin film and advancing it along said surface to an atomizing zone to provide a thin circular film edge having the material distributed therealong, providing a plurality of articles and moving them in a path spaced from such circular film edge, creating between the articles and film edge and concentrated thereat an electrostatic field of sufficient strength to affect the atomization, dispersion and deposition on the article surfaces while still in liquid state of fine spray particles atomized from said film edge, the distance between the articles and the atomizing zone being great enough to permit substantial dispersion of the spray particles as they proceed toward the articles, and blocking air flow at least adjacent the edge of said rapidly rotating surface to reduce air velocities adjacent said article surfaces to velocities of the order of one hundred feet per minute.

14. A method of electrostatically distributing liquid as a coating on articles, comprising the steps of flowing a stream of liquid coating material from a supply source onto a supporting surface, rotating said surface rapidly for deforming said material into a thin film and advancing it along said surface to an atomizing zone to provide a thin film edge therealong from which it emanates in the form

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of a spray of liquid particles, providing an article spaced from such film edge, creating between the article and film edge and concentrated thereat an electrostatic field of sufficient strength to effect the charging, dispersion and deposition on the article of the spray, the distance between the article and the atomizing zone being great enough to permit substantial dispersion of the spray particles as they proceed toward the article, and blocking air flow adjacent substantially the entire extent of said rapidly rotating surface to reduce air velocities adjacent said article.

15. In an electrostatic coating system for distributing liquid as a coating on an article, a rotatable member having an atomizing zone, means for feeding liquid coating material to said member for atomization therefrom from a surface portion into a spray of coating material particles therearound, means for rotating said member so rapidly as to tend to create air velocities of such magnitude as to cause particles which would otherwise be electrostatically deposited on the article surface to be carried away from said article surface, means for moving said article in said spray and sufficiently spaced from said member to permit substantial dispersion of the spray particles as they proceed toward the article, means for creating between the article and said particles an electrostatic field of sufficient strength to effect the dispersion and deposition on the article while still in liquid state of said spray particles, and baffle means closely adjacent substantially the entire extent of the surface portion of said rotating member for reducing air velocities adjacent said article.

16. In an electrostatic coating system for distributing liquid as a coating on an article, a rotatable member having an atomizing zone, a support for said member including means for rapidly rotating the member, means for feeding liquid coating material to said member for atomization therefrom into a spray of coating material particles therearound, and a pair of baffle plates of nonconducting

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material mounted one on either side of said rotatable member, substantially coextensive with said member and fixed against rotation therewith.

17. The electrostatic coating apparatus of claim 16 wherein one of said baffle plates is mounted on the support for said rotatable member and the other is mounted on a separate and independent support.

18. The electrostatic coating apparatus of claim 16 wherein said member is mounted on a hollow rotatable shaft, a feed tube for liquid coating material extends through said shaft and is fixed against rotation therewith, and one of said baffle plates is mounted on said feed tube.

19. A method of electrostatically distributing liquid as a coating on an article, comprising the steps of supplying a stream of liquid coating material from a supply source to an atomizer, rotating said atomizer rapidly for advancing said coating material to an atomizing zone from which it emanates in the form of a spray of liquid particles, creating between an article spaced from said atomizing zone an electrostatic field of sufficient strength to affect the charging, dispersion and deposition of the liquid spray particles on the article, the distance between the article and the atomizing zone being great enough to permit substantial dispersion of the liquid spray particles as they proceed toward the article, and blocking air flow adjacent substantially the entire extent of said atomizing zone to reduce air velocities adjacent the article.

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