July 21, 1959 W. L. JOHNSON 2,895,851

MAGNETIC APPLICATION OF PARAMAGNETIC SPRAY PAINT

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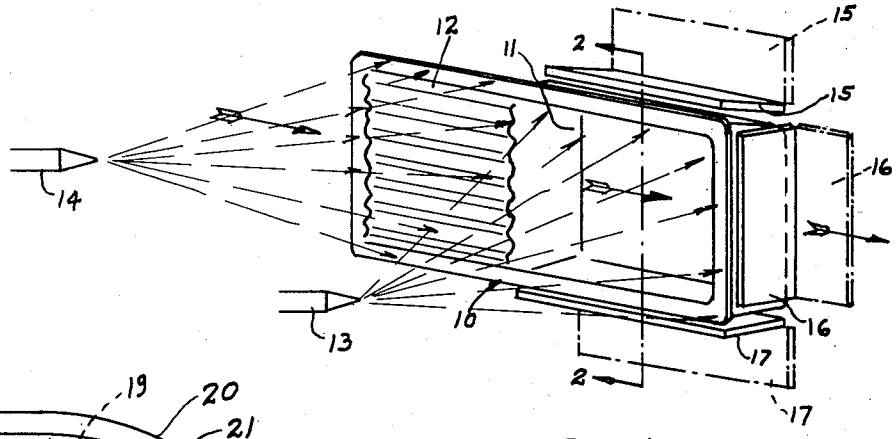


FIG. 1.

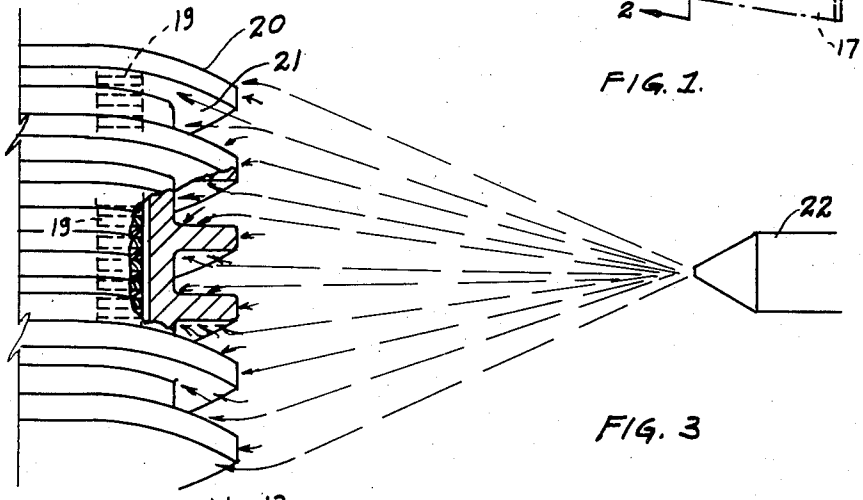


FIG. 3

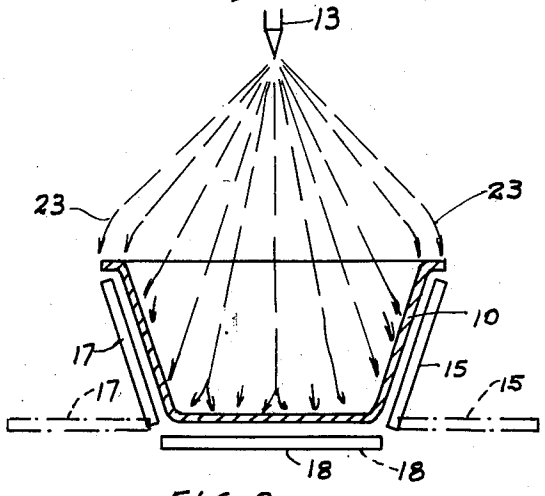


FIG. 2.

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MAGNETIC APPLICATION OF PARAMAGNETIC SPRAY PAINT

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This invention relates to the magnetic application of spray paint, and is particularly useful in the spray painting of ferrous and nonferrous material and the utilization therein of magnetic lines of force.

In the spraying of paint, lacquers, etc. upon surfaces, it is found that faults or flaws and pits, cracks, etc. are not thoroughly covered because the particles tend to pass over such surfaces. Even when the electrostatic precipitation method is employed, there is a tendency for the electrified particles to skip over the surface and fail to enter such cracks, pits, indentations, etc. Further, there is considerable waste or loss of the paint material, particularly along the edges of the article being sprayed. In order to insure the application of the paint to the entire surface, the pattern of the paint must actually exceed the size of the article and there is a substantial loss of material passing about the edges of the article.

I have discovered that by employing with the paint those pigments which have paramagnetic properties or ferromagnetic properties, and through the development of a magnetic field, an effective and complete painting of a surface can be brought about. In other words, by substituting for those common pigments which are ordinarily diamagnetic or nonmagnetic, a proportion of the above mentioned magnetic materials, an extremely effective application of the paint can be made.

An object of the present invention is to provide a method and means for the magnetic application of paints, including lacquers, and the like. A further object is to provide a simple and effective process for the application of paint in mist or spray form wherein there are combined particles of magnetic material which respond to magnetic lines of force, the arrangement being such that the paint spray or mist is drawn against the article to be painted. A still further object is to provide a combination of elements and steps whereby a greatly improved application of paint in spray or mist form to an article is brought about. Yet a further object is to provide a method whereby "overspray," which results in the loss of paint material about the periphery of the article being painted, is eliminated and a more effective application of the paint in mist form accomplished. Other specific objects and advantages will appear as the specification proceeds.

The invention is shown, in an illustrative embodiment, by the accompanying drawing, in which—

Figure 1 is a perspective view of an article, which, for purposes of illustration, is indicated as a sink, and with which magnets are employed for the production of magnetic lines of force during the spraying of material thereon; Fig. 2, a transverse sectional view, on an enlarged scale, the section being taken as indicated at line 2—2 of Fig. 1; and Fig. 3, a broken perspective view of cooling fins upon which paint is being sprayed, a portion of the fins being shown in section.

In the illustration given in Figs. 1 and 2, **10** designates a sink provided on one side with a basin **11** and on the other side with a drainboard **12**. It will be understood

that this article is merely set out as an illustration, and that any suitable object may be substituted therefor. In the illustration given, paint is being sprayed upon the article by nozzles **13** and **14**, and particularly upon the interior surface of the basin **11**. About the basin area are placed magnets **15**, **16** and **17**, and I prefer to place also magnets **18** at the rear of the basin wall. The magnets **15**, **16**, **17** and **18** may be placed in the position shown in solid lines, or, alternatively, in the position shown in dotted lines, the arrangement of the magnets being such as to produce attractive lines of force about the interior of the sink so as to attract magnetic pigment material toward the interior surfaces of the basin.

The magnets may be permanent magnets or electromagnetic devices, and the same are so arranged as to produce the desired magnetic field attracting the pigments of the mist spray toward the interior surfaces of the basin.

In the practice of my process, I combine with the paint which is to be applied, pigments which have paramagnetic properties, and I prefer to include in the paint mixture at least 10% to 20% by weight of such paramagnetic or magnetically susceptible materials. For example, the admixture or substitution of 10 to 20% by weight of the total pigment with magnetite (Fe_3O_4) gives a very excellent grade of magnetic paint. The balance of the pigments by weight may, for example, be titanium dioxide, zinc oxide, silicas, calcium carbonate, or any other commonly used white pigments.

By the addition of the same black iron oxide to paints of different colors, using the substitution by weight method, various colors or hues of paint pigment can be obtained. Finely rouged paramagnetic iron disulfide or pyrites give a yellow pigment which, when incorporated into white or colored paints, yields shades of light yellow to brown colors. Various cobalt salts may also be used to yield hues of blue, green, etc.

Once the magnetic pigment and paint have been properly and thoroughly mixed, the resultant material may be sprayed upon the basin **11**, and by use of the magnetic lines of force which are set up around, through and in back of the sink, the spray is effectively guided and confined to the basin surface. In the operation, it is important that the magnetic pigment be thoroughly admixed with the paint and kept in admixed condition so that at the time of spraying there is maintained in the mist a uniform proportion of the paramagnetic or magnetically susceptible material so as to influence the paint particles in the application thereof to the surface. By maintaining the particles in mist form, it is found that the individual particles respond more effectively to the lines of force and serve as a guiding medium and as a confining means for the entire volume of paint.

In the electrostatic precipitator method of application, it is found that the charged particles tend to move or skip along the surface of the article, with the result that ineffective application is brought about in the areas of flaws or pits or cracks, while under the present method the paramagnetic pigments become oriented and are attracted directly into the interior of pits, cracks, etc., forming a very even application of the paint thereto and they serve the further purpose of guiding and directing the remaining nonmagnetic pigments into the same area. Further, no electrical charges are involved in my method, in which magnetic forces are used, while in the electrostatic method, danger is involved in the application of paints containing solvents and in which sparking may occur.

Further, in the application of the paint from the nozzles **13** and **14** upon the sink **10**, it is found that the mist of paint around the edges of the article tend to curve inwardly and "overspraying" is thus avoided to a substantial degree.

In the modification shown in Fig. 3, I place a series of

magnets **19**, with the ends facing the inner side of the cooling fins **20**, the arrangement of the spaced magnets being such as to provide an attractive magnetic field within the inner spaces **21** between the fins **20**. The spray is discharged from the nozzle **22** and directed toward the article, and by means of the magnetic field, the paramagnetic pigments are effective in influencing the flow of the paint mist into the inner areas **21** between the fins.

Operation

In the operation of the apparatus and method, the ordinary paint, consisting substantially of nonmagnetic pigments, is mixed with paramagnetic or magnetically susceptible pigments such as, for example, magnetite, iron disulfide, etc., and the resulting mixture is thoroughly agitated to provide a uniform mixture. The resulting magnetic pigment and paint mixture is discharged in a mist form toward the article about which the magnetic lines of force are maintained through the use of magnets, and the influence of the lines of force in the magnetically responsive pigments are found to be effective in drawing the entire body of paint particles into a uniform application along the surface of the article. By maintaining the material in a mist or spray form, it is found that the particles respond more uniformly to the magnetic lines of force and, as illustrated in Fig. 2, the outermost material is drawn inwardly, as indicated at **23**, toward the edges of the article and the loss of paint through "overspray" is largely avoided.

It will be understood that the results can be modified by the positioning of the magnets at different angles, sometimes with the magnets arranged parallel with the side walls and at other times with the magnets having certain ends thereof directed toward the walls to which the paint is to be applied. Those skilled in the art are able to so position the magnets as to produce the desired magnetic field for the attraction of the magnet-responsive particles within the paint. The rectangular structures indicated as **15, 16, 17** and **18** preferably represent in each block a long series of parallel small magnets which provide an attraction for the magnetic mist, the particles of which are substantially microscopic in size.

The process herein is practical on materials that are ionic in character, in contrast with the electrostatic field method which is not effective with such materials, or with materials that are conductive in nature. By the magnetic process herein set forth, the effective spraying operation is carried on regardless of whether the material being sprayed is ionic or non-ionic in nature.

While I have set forth the process in considerable detail for the purpose of illustrating an embodiment of the invention, it will be understood that such details may be varied widely by those skilled in the art without departing from the spirit of my invention.

I claim:

1. In a method for the application of paint to an article, the steps of placing about the article magnets for forming magnetic lines of force about the same, and thereafter spraying upon the article a paint containing pigments consisting of magnetically susceptible material which is attracted by the lines of force of the magnets toward the surface to be treated.

2. The process of claim 1, in which the magnetically responsive pigments constitute from 10% to 20% of the total pigment by weight of the paint.

3. In a method for the application of spray paint to ferrous and nonferrous materials, the steps of maintaining about the material to be painted a magnetic field, mixing with the paint a pigment which is paramagnetic, agitating the mixture to maintain said paramagnetic pigment uniformly distributed throughout the paint, and thereafter spraying the resulting mixture upon the article, whereby the paramagnetic pigments are effective in guiding the paint particles toward the article.

4. In apparatus for the application of spray paint to an article, a spray device adapted to discharge and direct in spray form a paint containing paramagnetic pigment upon an article, and magnets arranged around the article to be sprayed to provide lines of force which draw the paramagnetic pigment upon the article as the same is sprayed with said paint.

5. In a method for the application of paint to an article, the steps of mixing a proportion of pigment having paramagnetic properties with a paint capable of being sprayed, maintaining an artifical magnetic field about an article to be sprayed, and spraying the paint mixture upon said article while the magnetic field is maintained about the same, whereby, the magnetic field about the article attracts the pigment of the paint and guides the particles of sprayed paint upon the surface of the article.

References Cited in the file of this patent

UNITED STATES PATENTS

2,276,328	Melton	Mar. 17, 1942
2,318,571	Carlton	May 4, 1943
2,334,827	Lyons	Nov. 23, 1943
2,376,343	Carlton	May 22, 1945
2,418,479	Pratt	Apr. 8, 1947
2,432,786	Newman	Dec. 16, 1947
2,446,873	Fitch	Apr. 10, 1948
2,570,856	Pratt	Oct. 9, 1951
2,584,441	Fredendall	Feb. 5, 1952
2,680,079	Huebner	June 1, 1954