Sept. 5, 1967 N. P. MAZZOLA 3,340,087

SPRAYING APPARATUS AND METHOD

Filed July 22, 1963 2 Sheets-Sheet 1

FIG. 1

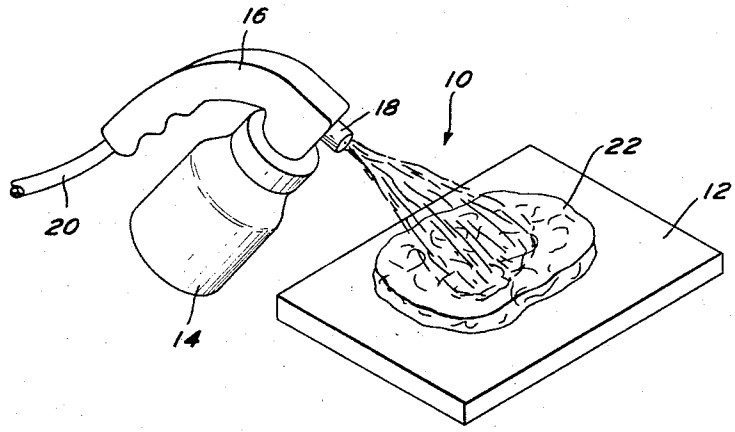
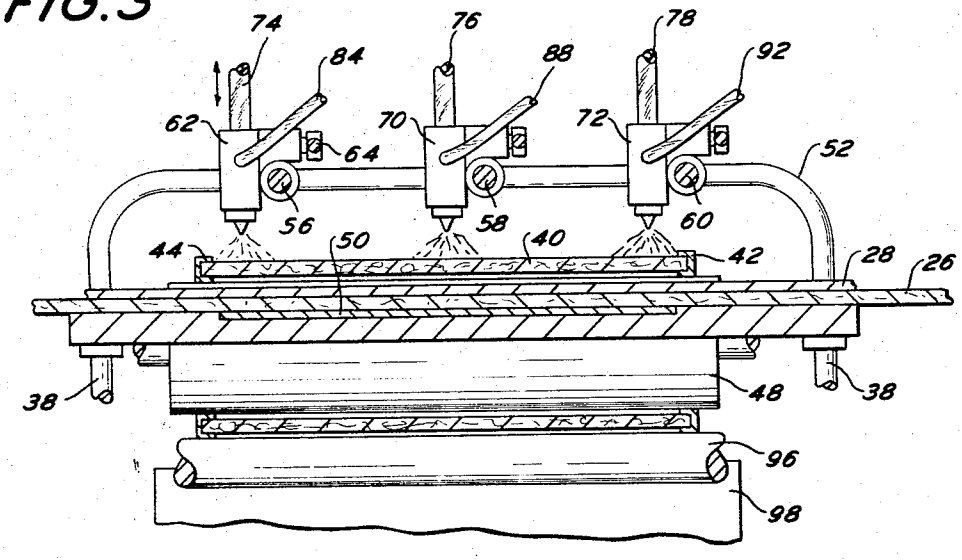


FIG. 3



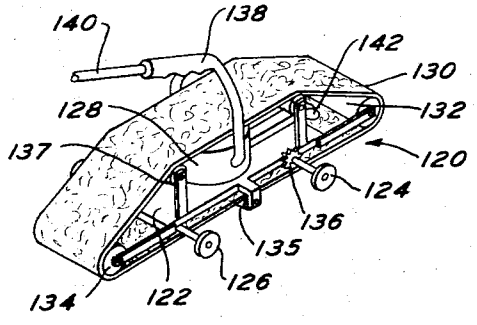


FIG. 4

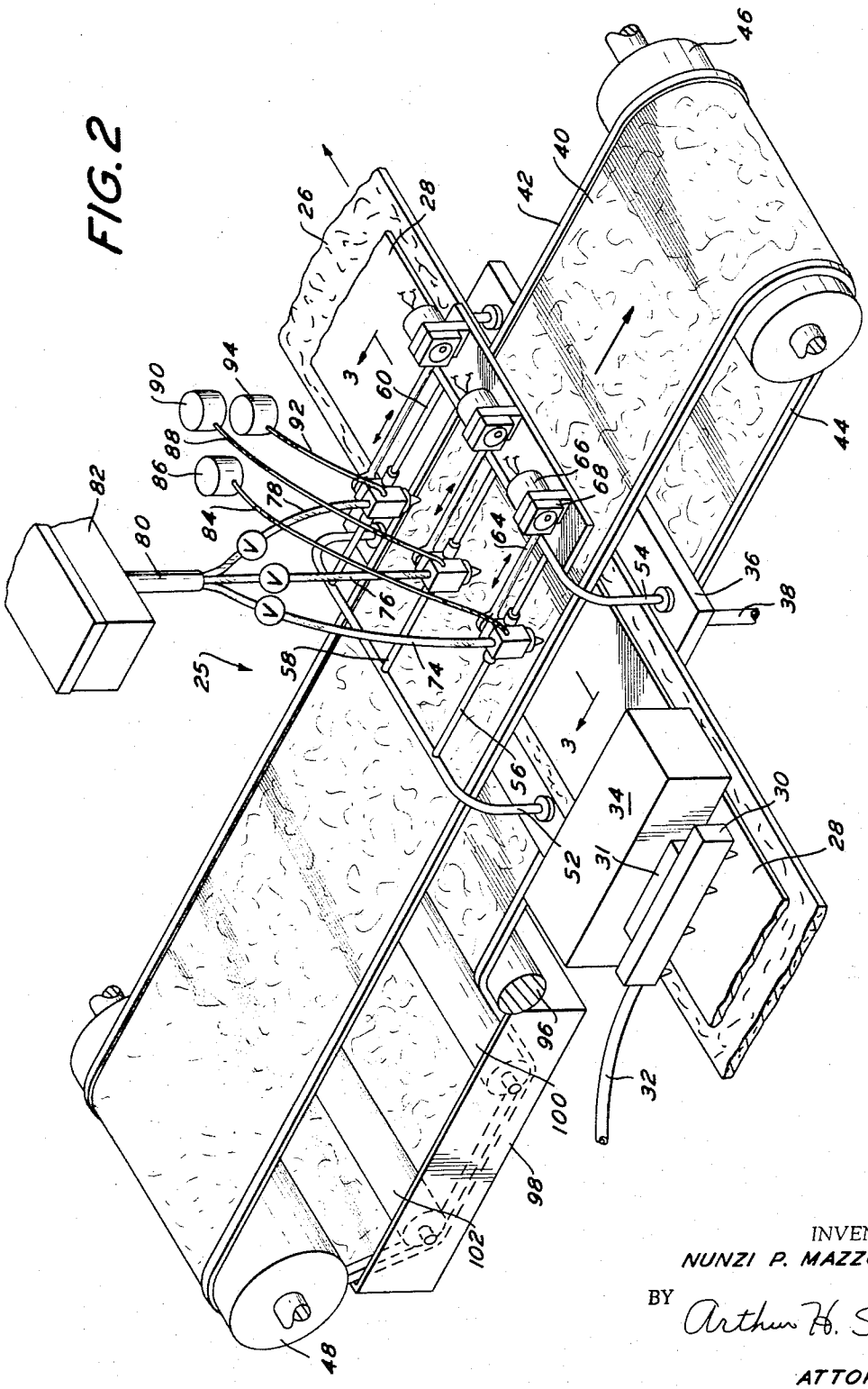
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FIG. 2



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SPRAYING APPARATUS AND METHOD

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13 Claims. (Cl. 117—38)

This invention relates generally to a spraying apparatus and method. More particularly, the present invention is directed to apparatus and method for artificially simulating a marble effect on substantially any material.

The apparatus and method of the present invention may artificially provide any substrate material such as stone, brick, metal, plastic, glass, wood, masonite, china, fabric, canvas, leather, etc. with a simulated marble effect.

Generally, the apparatus and method of the present invention is directed toward simulating a marble effect on a substrate by spraying diluted material, such as lacquer, through a layer of disorientated material such as steel wool. The sprayable material, such as diluted lacquer, dries immediately. Thus, the substrate may be handled and the sprayed area touched within a period of two seconds. The substrate on which the simulated marble effect will be provided may be stationary or moving, upright, horizontal or angularly disposed.

The substrate should preferably be a clean surface and may be provided with a pigmented base coat to accentuate the simulated marble effect which may be of a different pigment. While steel wool may be utilized as the disoriented fibrous layer, other materials such as brass wool may be utilized. Materials having an orientated fibrous structure have been found to be unacceptable. When using steel wool as the disorientated fibrous layer, a magnet may be utilized with the substrate therebetween so that the fibrous layer will assume a position juxtaposed to the substrate.

It is an object of the present invention to provide a novel apparatus and method for simulating a marble effect on a substrate.

It is another object of the present invention to provide novel apparatus and method for effecting a simulated marble appearance on a substrate in a manner which is faster and cheaper than any apparatus or method proposed heretofore.

It is another object of the present invention to provide apparatus and method for applying a simulated marble effect on a stationary substrate.

It is another object of the present invention to provide apparatus and method for simulating a marble effect in a continuous manner on a moving substrate.

It is another object of the present invention to provide apparatus and method for simulating a marble effect by spraying through a layer of steel wool or its equivalent.

Other objects will appear hereinafter.

For the purpose of illustrating the invention, there are shown in the drawings forms which are presently preferred; it being understood, however, that this invention is not limited to the precise arrangement and instrumentalities shown.

FIGURE 1 is a perspective view of apparatus in accordance with the present invention.

FIGURE 2 is a partial perspective view of apparatus in accordance with the present invention.

FIGURE 3 is a sectional view taken along the line 3—3 in FIGURE 2.

FIGURE 4 is a perspective view of another embodiment.

Referring to the drawing in detail, wherein like numerals indicate like elements, there is shown in FIGURE 1

apparatus in accordance with the present invention designated generally as **10** for providing a simulated marble effect on a substrate **12**.

The substrate **12** may be stationary or moving, upright, horizontal, or angularly disposed. The substrate **12** may be any one of a wide variety of materials as referred to hereinbefore.

The apparatus **10** includes a container **14** closed at its upper end by a closure coupled to a handle **16**. A mixing nozzle **18** is supported by the handle **16** and is in communication with the liquid in container **14** as well as a source of air under pressure by way of hose **20**. The liquid in container **14** is preferably a diluted pigmented lacquer. To provide such a diluted lacquer, the proportions of the lacquer and thinner should be at least one to one by volume. The source of air under pressure is preferably a source providing air at about 40 p.s.i. When the pressure of the air approaches about 55 p.s.i., poor results were attained.

A layer of disorientated fibrous material **22** will be juxtaposed to the substrate and between the nozzle **18** and substrate **12** when practicing the present invention. The material **22** is preferably a metallic wool such as commercially available steel wool, No. 1 medium. Other grades of steel wool which have performed satisfactorily are fine and double zero. Material **22** is naturally or otherwise coated so as not to absorb the lacquer.

The operation of the apparatus **10** is as follows. With hose **20** coupled up to a source of air under pressure such as a compressor having an output pressure of 40 p.s.i., the nozzle **18** will be positioned approximately 1–12 inches away from the juxtaposed surface of the substrate **12** with the material **22** disposed therebetween and touching the substrate **12**. The air passing through the mixing nozzle will create a suction which draws the diluted pigmented lacquer from the container **14** into the air stream and is dispensed through the nozzle **18**. The mixture of air at the aforesaid pressure and the diluted lacquer pass through the material **22** and provide a coating on a portion of the substrate **12** which simulates a marble effect. Preferably, the nozzle is moved with respect to the substrate **12** and the material **22** at an angle, thereby simulating a marble effect having a more genuine appearance. The reason why the marble effect is simulated by the apparatus described above is not known to the applicant. It is believed that the simulation of a marble effect which dries immediately and can be touched within two seconds after spraying from the nozzle **18** is a result of a combination of various factors including the air pressure, the thinness of the pigmented lacquer, and the combined effect thereof with the material **22** which is preferably a No. 1 medium steel wool as referred to above. Greater accentuation of the marble effect is obtained when the color of the pigmented lacquer is a contrasting color with respect to the substrate **12**.

Since the simulated marble effect dries immediately, the material **22** may be manually pushed to another portion of the substrate **12** and the process repeated. Repetition of this process enables an unskilled person with minimum training to provide a substrate 8′ x 12′ with a simulated marble effect on almost any material in a period of one-half hour. In order to protect the simulated marble effect, the substrate **12** is then preferably sprayed or otherwise coated with a coating of clear lacquer. Suitable water repellent clear lacquers which are also scratch and heat resistant are commercially available. Such clear lacquer coatings will thereafter protect the simulated marble effect against scratches and the like. Apparatus and methods have been proposed heretofore for simulating a marble effect on various materials. However, such prior attempts have not been successful due to the cost, time consumed, and/or unrealistic effect produced. The simulated marble

effect of the present invention has the appearance of being genuine marble.

In FIGURES 2 and 3, there is illustrated apparatus for automatically and continuously applying a simulated marble effect to a substrate designated as **25**. The apparatus **25** includes a conveyor **26** which may take the form of an endless belt. Conveyor **26** supports a substrate **28** which may be an elongated sheet or other configuration, or a plurality of small sheets or other configurations juxtaposed to one another on the conveyor **26**.

At the lefthand end of the apparatus **25**, there is provided a manifold having a plurality of dispensing nozzles communicating with a source **31** of a base coat lacquer and a source of air under pressure by way of conduit **32**. If the substrate **28** has been provided with a base coat color which will provide a good contrast with the color of the pigmented diluted lacquer, elements **30–32** and drier **34** may be eliminated. The drier **34** may be electrical or hot air for drying the base coat applied to the substrate **28**.

The apparatus **25** includes a table or the like **36** supported in any convenient manner such as by legs **38**. An endless belt **40** has portions above and below the table **36** and extends around driven roller **46** and idler roller **48**. Belt **40** is the same material as material **22** described above which is preferably a metallic wool such as steel wool. Due to the loose fibrous nature of the steel wool, the belt is provided with webbing **42** and **44** on side edges thereof to provide surfaces which may be driven by the roller **46** to cause the belt **40** to move in the direction of the arrow thereon. When the belt **40** is made from steel wool, the upper surface of table **36** may be provided with a magnet **50**. Magnet **50** may be a series of strip bar magnets or an electro-magnet positioned to attract the juxtaposed portion of the belt **40** toward the table **36**.

U-shaped frame side members **52** and **54** are supported on the upper surface on opposite sides of the table **36**. Cross members **56**, **58** and **60** extend between the members **52** and **54** at spaced points therealong as illustrated. Identical mixing nozzles are supported by the cross members **56–60**. Thus, mixing nozzle **62** is reciprocally supported by cross member **56**, mixing nozzle **70** is reciprocally supported by cross member **58**, and mixing nozzle **72** is reciprocally supported by cross member **60**. Since these nozzles are identical and their relationship to their respective cross members are also identical, only mixing nozzle **62** will be described in detail.

Mixing nozzle **62**, per se of conventional construction, is reciprocally supported by the cross member **56** in a position so as to be above the belt **40** for spraying therethrough onto the substrate **28**. As will be obvious from FIGURE 3, the nozzles **62**, **70** and **72** are longitudinally spaced along their cross members to spray through different portions of the belt **40** across the width of the belt **40**. Reciprocation of nozzle **62** is effected by a crank arm **64** eccentrically coupled to a disc on the output shaft of a motor **66**. Crank arm **64** effects reciprocation of nozzle **62** at the same speed of movement as the substrate **28** or slightly slower than such movement as effected by a timer **68**. Timer **68** may be a conventional manually adjustable timer for periodically effecting operation of motor **66** in timed relation with respect to the motors for the reciprocation of nozzles **70** and **72**.

The length of reciprocatory travel for the nozzles need not be more than one-third the width of the belt **40**. Each of the nozzles **62**, **70** and **72** is capable of adjustment toward and away from the belt **40**. The motor and timers for the nozzles may be supported in any convenient manner such as by a bracket secured to the member **54**. Nozzle **62** is in communication with a manifold **80** of a compressor **82** by way of flexible conduit **74** having a manually operable valve therein. Nozzle **62** is also in communication with a source **86** of diluted lacquer as described above by way of flexible conduit **84**. Nozzles **70** and **72** communicate with the manifold **80** by way of valved conduits **76** and **78**, respectively, which correspond identically with conduit **74**.

Nozzle **70** communicates with a source **90** of diluted lacquer by way of flexible conduit **88**. Nozzle **72** communicates with a source **94** of diluted lacquer by way of flexible conduit **92**. The sources **86**, **90** and **92** may be pigmented lacquer of the same or different colors as desired. Genuine marble is frequently a multicolored material which may be simulated by the apparatus **25**. It will be understood that the air under pressure from the manifold **80** is at the same pressure as described above and, by a suction effect in the nozzles, a mixture of pressurized air and dilute pigmented lacquer is dispensed as described above.

To facilitate a clean simulation of marble, the belt **40** may pass over a roller **96** and below rollers **100** and **102** disposed within a solvent bath **98**. Such solvent bath will facilitate the removal of any dried pigmented lacquer on the belt **40** before such portion may be permitted to be juxtaposed to a clean portion of the substrate **28**. Accordingly, the apparatus **25** will continuously and automatically provide a simulated marble effect on substrate **28** across its full width. By conventional spraying apparatus, not shown, the simulated marble effect may be protected by applying a clear lacquer coating thereover as described above.

In view of the description of operation with respect to apparatus **10**, it is believed that the method of operation of apparatus **25** is obvious. Accordingly, a detailed explanation of the method of operation of apparatus **25** is not deemed necessary. As a result of the air pressure, the material **22** and belt **40**, and the diluted pigmented lacquer, each embodiment of the present invention is capable of providing a simulated marble effect which is rapid, inexpensive, and totally unexpected in genuineness of simulation.

In FIGURE 4, there is illustrated another embodiment of the present invention designated generally as **120**. The apparatus **120**, in general, is a miniature portable embodiment which combines the features of apparatus **10** and **25**. Thus, apparatus **120** includes a frame **122** having a pair of front wheels **124** and a pair of rear wheels **126**. The frame **122** supports a container **128** corresponding to container **14**.

The frame **122** supports a plurality of idler rollers such as front roller **132**, rear roller **134**, bottom roller **135**, and top roller **137**. A belt **130** extends around the rollers, passing above roller **135**. Sprockets **136** are provided on the axle for the front wheels **124**, with the teeth on the sprockets in meshing engagement with apertures in webbing on the side edges of the belt **130**. A handle **138** extends from the frame upwardly from opposite sides of the belt **130**, and to which a hose **140** is removably mounted. The hose **140** communicates with the dispensing nozzle **142** and is adapted to be coupled to a source of air under pressure in the same manner as described above.

In operation, air under pressure passing through hose **140** exits through the nozzle **142** directed toward a portion of the belt **130**. As air passes through the nozzle, it creates a suction effect to draw lacquer from the container **128** and a mixture of diluted lacquer and pressurized air is discharged through nozzle **142**. In use, the operator will push the apparatus **120** along the surface to be marbleized. As the wheels **124** turn, the sprockets **136** cause the belt **130** to continuously move around the rollers, thereby varying the portion of the belt **130** disposed between the nozzle **142** and the substrate being marbleized. Belt **130** is made from the same material as belt **40**. Otherwise, the operation of the apparatus **120** is identical as described above.

The present invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof and, accordingly, reference should be made to the appended claims, rather than to the fore-

going specification as indicating the scope of the invention.

I claim:

1. Apparatus comprising a source of diluted sprayable coating material, a nozzle communicating with said source and adapted to communicate with a source of air under pressure of approximately 40 p.s.i., a layer of non-absorbent disorientated fibrous material through which the air and coating material may pass to simulate a marble effect on a substrate, said layer of material being in the form of an endless belt, means for moving said belt with respect to said nozzle, a portion of said belt being disposed between said nozzle and the substrate adapted to be provided with a simulated marble effect.

2. Apparatus for providing a simulated marble effect on a moving substrate comprising a conveyor for supporting a substrate, an endless belt of metallic wool material, a nozzle, a source of diluted pigmented lacquer communicating with said nozzle, a source of air communicating with said nozzle, said nozzle being capable of mixing the air and diluted lacquer, and said belt being disposed between said nozzle and said conveyor so that said nozzle may spray the mixture of air and lacquer through said belt onto the substrate to be provided with a simulated marble effect.

3. Apparatus in accordance with claim 2 including a solvent bath through which a portion of said belt extends.

4. Apparatus in accordance with claim 2 including means for applying a base coat to the substrate before the substrate is juxtaposed to a portion of the belt.

5. Apparatus in accordance with claim 2 including means for reciprocating the nozzle in a direction corresponding to the direction of movement of the belt.

6. Apparatus in accordance with claim 5 including means for periodically effecting such reciprocation of the nozzle.

7. A method of providing a substrate with a simulated marble effect comprising the steps of placing a layer of disorientated fibrous material juxtaposed to the surface of a substrate, and spraying through said material onto said substrate a mixture of pressurized air and a diluted coating of sprayable material.

8. A method in accordance with claim 7 wherein the sprayable material is pigmented lacquer diluted with a solvent, with the proportions of solvent and pigmented lacquer being between about one part lacquer and one part solvent by volume and one part lacquer and three parts solvent by volume.

9. A method in accordance with claim 7 wherein said layer of material is a metallic wool, and the pressure of said air being approximately 40 pounds per square inch.

10. A method in accordance with claim 7 wherein said layer of material is steel wool, and the coating material being diluted lacquer in such a proportion as to enable the lacquer to dry on a substrate within a few seconds.

11. A method in accordance with claim 10 including repeating the spraying step in a manner so that the simulated marble effect is applied to an adjacent portion of the surface of the substrate until substantially the entire surface of the substrate has been rendered with a simulated marble effect.

12. A method in accordance with claim 10 including the steps of moving the substrate in one direction and moving the steel wool in a direction at an angle with respect to said first mentioned direction.

13. A method of providing a rigid substrate with a simulated marble effect comprising the steps of placing a layer of steel wool between a substrate and a mixing nozzle, spraying a mixture of dilute pigmented lacquer and pressurized air through said steel wool onto said substrate, providing relative movement between said nozzle and said layer of steel wool, and providing relative movement between said steel wool and said substrate, and then repeating said spraying step to apply pigmented lacquer on another portion of the substrate.

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