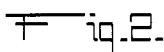
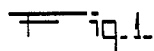


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2 Sheets-Sheet 1



Richard W. Stanley
BY
Warfield & Brown
ATTORNEYS

March 6, 1934.

R. W. STANLEY

1,949,980

METHOD AND APPARATUS FOR SPREADING POWDERED MATERIALS

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Fig. 3.

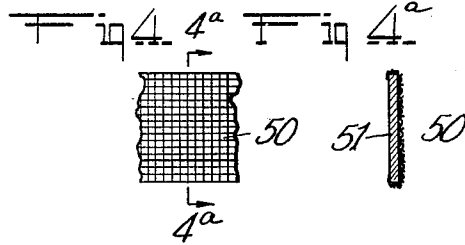


Fig. 5.

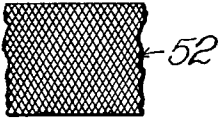


Fig. 6.



Fig. 7.

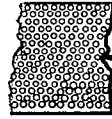


Fig. 8.

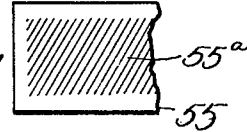
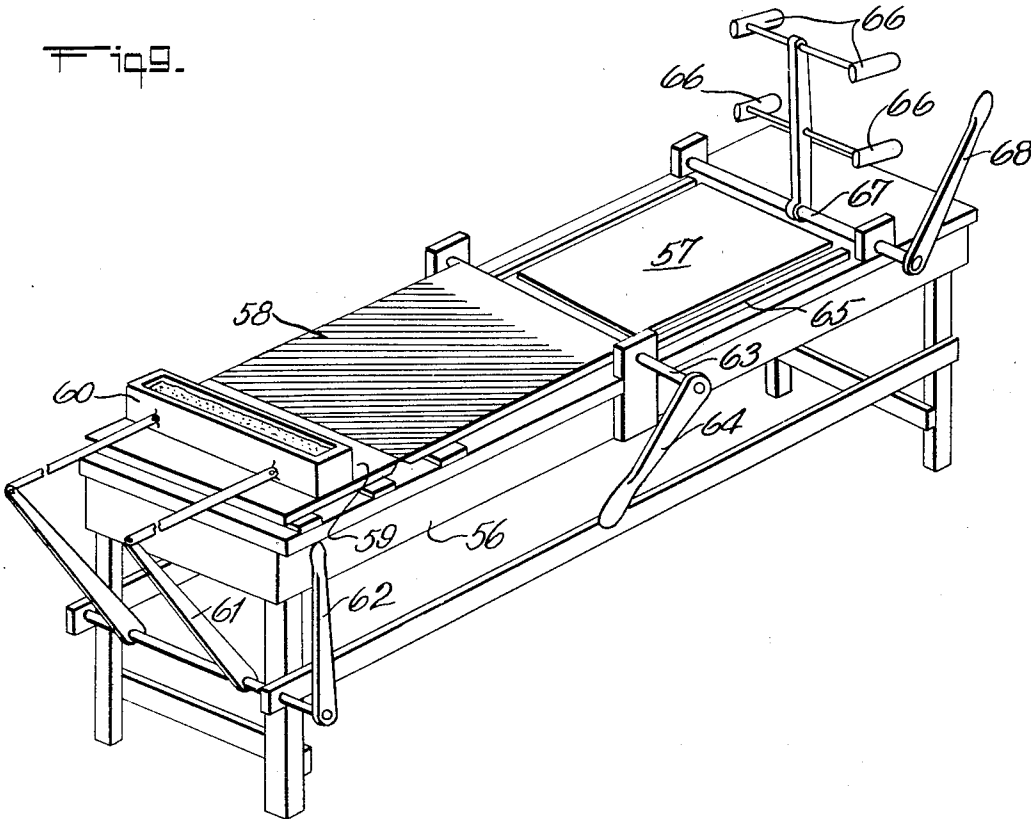


Fig. 9.



INVENTOR

Richard W. Stanley

Warfield & Brown
ATTORNEYS

UNITED STATES PATENT OFFICE

1,949,980

METHOD AND APPARATUS FOR SPREADING
POWDERED MATERIALS

Richard W. Stanley, Lockport, N. Y., assignor, by
mesne assignments, to Laminating Patents
Corporation, Seattle, Wash., a corporation of
Delaware

Application August 26, 1932, Serial No. 630,551

18 Claims. (Cl. 91—59)

This invention relates to methods and apparatus for the application of powdered material to surfaces.

An object of the invention is the provision of an improved method and improved apparatus for the application of powdered material to surfaces.

A further object is to provide a particularly simple and effective method for uniformly applying powdered material to surfaces.

A further object is the provision of simple and effective apparatus whereby powdered material may be readily applied to surfaces in a uniform manner.

A still further object is the provision of apparatus whereby powdered material may be applied to long narrow surfaces with particular ease and efficiency.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

The invention accordingly comprises the several steps and the relation and order of one or more of such steps with respect to each of the others, and the apparatus embodying features of construction, combinations of elements and arrangement of parts which are adapted to effect such steps, all as exemplified in the following detailed disclosure, and the scope of the application of which will be indicated in the claims.

For a fuller understanding of the nature and objects of the invention reference should be had to the following detailed description taken in connection with the accompanying drawings, in which:

Figure 1 is a perspective view of one type of apparatus embodying the invention and illustrating the manner in which the same may be carried out;

Fig. 2 is a sectional view along the lines 2—2 in Fig. 1;

Fig. 3 is an enlarged detail view of the edge of the spreader bar shown in Fig. 1;

Figs. 4 to 8 inclusive are detail views illustrating spreader members which are provided with a roughened surface in a variety of ways, Fig. 4a being a sectional view along the line a—a of Fig. 4; and

Fig. 9 is a perspective view of another form of apparatus embodying the invention and illustrating the manner in which the same may be carried out.

There are a wide variety of procedures in which it is of importance that a powdered material be uniformly applied to a surface. Among such

procedures are the application of coating and adhesive materials in powder form.

The present invention contemplates the provision of simple and efficacious methods and apparatus to this end. It further contemplates the provision of methods and means whereby powdered material may be applied to a narrow surface with particular efficiency.

In carrying out the invention powder is distributed on a surface of a spreader member such as a bar or plate. This is preferably accomplished by pushing a mass of powder by a scraper member over the uniformly roughened upper surface of the spreader member. The surface on which the powder is distributed may comprise the entire surface of the bar or plate or only a portion of it, depending on the extent of the surface to be spread and on other factors. The powder-carrying surface and the surface to be spread are then juxtaposed, as by reversing the bar or plate and causing it to overlies the surface to be spread; and the discharge of the powder effected, as by jarring the bar or plate. This jarring may be accomplished by tapping the bar or plate, preferably on its back surface,—by allowing the bar or plate to fall upon stop members, by a combination of these actions, or by other suitable action.

In Figs. 1 and 2 the invention is illustrated as embodied in a mechanism for applying powdered adhesive material to the edges of sections of lumber which are to be glued edge to edge.

The exemplified apparatus comprises a rest having a smooth upper surface upon which there is disposed a slidable open-bottomed powder container 11 having rubber supporting members 12 and 13 at its lower side edges. The rest 10 is supported on a frame-work 14 which also carries a transverse rod 15 to which brackets 16 and 17 are secured. A shaft 18 is rotatably supported by the brackets 16 and 17, and carries, by means of arms 19 and 20, a spreader bar 21. The bar 21 has a grooved front surface 22 which may be aligned with the upper surface of the rest 10 by the rotation of the shaft 18.

The edge surface of the board to which powder is to be applied is disposed on the opposite side of the shaft 18 from the rest 10. For this purpose there is provided a board-positioning member 23. This member may be arranged to be moved into position as on a track 23a at suitable periods in the operation of the machine and to be subsequently withdrawn. The board is held in position so that when the bar 21 is swung to about 180° from a position adjacent the rest

10, it will reach a position where its grooved surface overlies the upper end of the board.

The powder-container 11 is operated by mechanism including arms 24, a bracket 25, a bell-crank lever 26 and a connecting rod 27. The further end of the connecting rod carries a roller 28 resting on a cam 29 mounted on a suitably power-driven shaft 30. The shaft 18 is operated through mechanism including a pinion 31 on the shaft and an arm 32 having a rack 33 meshing with the pinion 31, and a roller 34 on the further end of the shaft, which rides on a cam 35 carried by the power shaft. Springs are provided, in the present instance, to hold the rollers on their cams. Suitable means, which may be of like nature, may be provided for automatically operating a board-positioning member.

The exemplified apparatus operates in the following manner: Assuming that the parts are in the position shown in full lines in Figs. 1 and 2, the powder container 11 slides from the smooth upper surface of the rest 10 over the grooved front surface of the spreader bar 21, and then slides back to a position on the rest. During the latter movement the rubber support 13 acts as a scraper member to doctor the powder into the grooves of the spreader bar. As will be observed, the portion of the spreader bar furthest from the rest 10 will not be covered with powder, and it is only the portion of the bar adjacent the rest 10 which provides the active surface. The width of this active surface may be readily varied, for the spreading of surfaces of different widths, by varying the extent of movement of the powder container 11, and the length of the spread may be likewise varied by blocking off an end position of the container 11.

Shortly after the member 13 has moved off the spreader bar the rack arm 32 is operated to swing the spreader bar upwardly, forwardly, and downwardly, to the position indicated in dotted lines in Figs. 1 and 2. Some suitable time before the spreader bar reaches this position a board 36 will have been placed, as, for instance, in and by the board retainer 33, in the position indicated in the drawings with its upper surface a short distance, for instance, one-sixteenth to one-eighth of an inch below the dotted line position of the spreader bar. It is to be noted that the rod 15 serves as a definite stop for the spreader bar.

In order to effectively jar the powder from the spreader bar there is provided in the present instance a hammer member 37 carried on an arm 38 swingingly mounted on a rod 39 and normally resting on a rod 40 in the position indicated in full lines. The shaft 18 carries a transverse arm 41 which contacts with the hammer arm during the downward swing of the spreader bar and throws the hammer to a position whence it will fall on the back of the spreader bar to positively jar the powder therefrom. On the return movement of the spreader bar, which is effectuated by the cam 35 through the medium of the rack arm 32, the hammer is swung back to its original position.

The front surface of the spreader bar may be roughened in any of a variety of manners. Preferably, the same is grooved diagonally, as indicated in Fig. 1, the grooving desirably being in the form of saw teeth at an angle of about 30°, with about forty grooves to the inch, as shown in Fig. 3. A roughened surface may be otherwise provided, however, as, for instance, by fastening a fine screen 50 of wire mesh over the

surface of the bar 51, as indicated in Figs. 4 and 4a, or any of a variety of types of grooving, such as the two-way diagonal grooving shown in the bar 52 in Fig. 5, the longitudinal grooving shown in the bar 53 of Fig. 6, or the indentations 54 shown in the bar in Fig. 7. The entire front surface of the spreader bar need not be roughened, it being desirable in certain cases to roughen only that portion of the surface of the bar which corresponds to the surface to be spread. There is disclosed in Fig. 8 a spreader bar 55 with only the central portion 55a of the front surface roughened.

As will be apparent, the invention may be embodied in a wide variety of types of mechanism which may be variously operated and used for a wide variety of purposes. One modified form of apparatus is exemplified in Fig. 9 as adapted for use in spreading sheet material manually. The apparatus comprises a support 56 or a sheet 57 of material to be coated, a spreader plate 58 having a grooved front surface, a smooth surface rest 59, and a powder-holding and scraping member 60. By means of lever mechanism 61 operated from a handle 62 the powder container may be moved over the grooved surface of the spreader plate 58 and back upon the rest 59. The plate 58 is carried on a shaft 63 which may be turned by a handle 64 to a position wherein the front surface of the plate overlies the sheet 57. Stops 65 for the plate are provided on the support 56. In order effectively to discharge the powder from the plate there are provided a plurality of hammers 66 carried on a shaft 67. By means of a handle 68 these are swung against the back surface of the plate. The spreader plate may then be returned to its original position by the handle 64, the coated sheet 57 removed, another sheet placed on the support, and the operation repeated.

It will thus be seen that by the uniform distribution of powder on a spreader member, the juxtaposition of the spreader member with a surface to be spread, and the discharge of powder from the spreader member toward the surface to be spread, a uniform coating of powder upon the latter surface may be effected in a particularly easy and satisfactory manner, and that particularly simple means are provided to this end. It is furthermore to be noted that by the juxtaposition of the surface of the spreader member to the surface to be spread, the tendency for casual air currents to affect the course of movement of the particles from the former surface to the latter is reduced to a negligible extent.

Since certain changes in carrying out the above process and in the constructions set forth, which embody the invention, may be made without departing from its scope, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

Having described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. The method of applying powdered material to surfaces, which comprises distributing powdered material on the surface of a spreader member, scraping said surface to remove excess pow-

der therefrom, transferring the spreader member with the powder thereon to a position wherein the powder-carrying surface thereof overlies a surface to be spread and discharging the powder from the surface of the spreader member upon the surface to be spread.

2. The method of applying powdered material to surfaces which comprises causing a temporary sliding action of a powder-holding and scraping member and the uniformly roughened surface of a spread member, whereby a mass of powder is moved over said surface and scraped therefrom, and thereafter causing said surface to overlie a surface to be spread and discharging the powder from the surface of the spreader member upon the surface to be spread.

3. The method of applying powdered material to surfaces, which comprises distributing powder on the upper surface of a spreader member, scraping said surface to remove excess powder therefrom, transferring the spreader member and reversing the surface to overlie a surface to be spread, and discharging the powder from the surface of the spreader member upon the surface to be spread.

4. The method of applying powdered material to surfaces which comprises causing a temporary sliding action of a powder-holding and scraping member and the uniformly roughened upper surface of a spreader member, whereby a mass of powder is moved over said surface and scraped therefrom, and thereafter reversing the spreader member and causing said surface to overlie a surface to be spread, and discharging the powder from the surface of the spreader member upon the surface to be spread.

5. The method of applying powdered material to surfaces, which comprises uniformly distributing powder on the upper surface of a spreader member, reversing the spreader member and causing the surface to overlie a surface to be spread, and jarring the spreader member to cause the powder to fall from its surface.

6. The method of applying powdered material to surfaces, which comprises passing a powder-holding and scraping member over the uniformly roughened upper surface of a spreader member, reversing the spreader member and causing said surface to overlie a surface to be spread, and jarring the spreader member to cause the powder to fall from its surface.

7. Apparatus for applying powdered material to surfaces, which comprises a spreader member, means to distribute powder on a surface of the spreader member, and means for juxtaposing said surface and a surface to be spread and for jarring the spreader member to discharge the powder from the surface of the spreader member upon the surface to be spread.

8. Apparatus for applying powdered material to surfaces, which comprises a spreader member having a uniformly roughened surface, means to distribute powder on said surface, means to scrape excess powder from said surface, and means operative after the operation of said scraping means for causing said surface to overlie a surface to be spread and for discharging the powder from the surface of the spreader member upon the surface to be spread.

9. Apparatus for applying powdered material to surfaces, which comprises a spreader member having a uniformly roughened surface, means to move a mass of powder over said surface and to scrape said surface behind said mass, means for causing said surface to overlie a surface to

be spread, and for discharging the powder from the surface of the spreader member upon the surface to be spread.

10. Apparatus for applying powdered material to surfaces, which comprises a spreader member having a uniformly roughened front surface, a container having an open bottom, a smooth-surfaced rest for said container, means to dispose said spreader member with its uniformly roughened surface in alignment with the upper surface of said rest, means to slide said container from a position upon said rest to a position over said uniformly roughened surface and to return the same, and means to move said spreader member to a position wherein its front surface overlies a surface to be spread and to cause the discharge of the powder carried thereby.

11. Apparatus for applying powdered material to surfaces, which comprises a spreader member having a uniformly roughened upper surface, means to distribute powder on said surface, means to scrape excess powder from said surface, means to reverse the spreader member to cause said surface to overlie a surface to be spread, and means to cause the powdered material carried on the surface of the spreader member to be discharged on the surface to be spread.

12. Apparatus for applying powdered material to surfaces, which comprises a spreader member having a uniformly roughened surface, means to distribute powder uniformly on said surface, means to cause said surface to overlie a surface to be spread, and means to jar said spreader member to cause the powder carried thereby to be discharged upon the surface to be spread.

13. Apparatus for applying powdered material to surfaces, which comprises a spreader member having a uniformly roughened surface, means to distribute powder uniformly on said surface, means to cause said surface to overlie a surface to be spread, and means responsive to the reversing movement for jarring said spreader member to discharge upon a surface to be spread the powder carried by the spreader member.

14. Apparatus for applying powdered material to surfaces, which comprises a spreader member having a uniformly roughened front surface, means to swing said member from a position in which said surface is uppermost to a position in which said surface is lowermost, means to distribute a powdered material on said surface when the member is in the first mentioned position, means movable over said surface when in the first-mentioned position to scrape excess powder therefrom, and means to present a surface to be spread at a point beneath the last mentioned position and slightly spaced therefrom.

15. Apparatus for applying powdered material to surfaces, which comprises a spreader member having a uniformly roughened front surface, means to swing said member from a position in which said surface is uppermost to a position in which said surface is lowermost, means to distribute a powdered material on said surface when the member is in the first mentioned position, means to present a surface to be spread at a point beneath the last mentioned position and slightly spaced therefrom, and means to tap the back surface of said member when the latter is in said second mentioned position, the last mentioned means being operated by the swinging movement of the spreader member.

16. Apparatus for applying powdered material to surfaces, which comprises a spreader member

having a grooved flat surface, means to move a mass of powder over said surface and to scrape said surface behind said mass, and means for causing said surface to overlie a surface to be spread and for discharging the powder from the surface of the spreader member upon the surface to be spread.

17. Apparatus for applying powdered material to surfaces, which comprises a spreader member having a diagonally grooved surface, a container having an open bottom, a smooth-surfaced rest for said container, means to dispose said spreader member with its grooved surface in alignment with the upper surface of said rest, means to slide said container from a position upon said rest to a position upon said grooved surface and

to return the same, means to move said spreader member to a position wherein its grooved surface overlies a surface to be spread, and to cause the discharge of the powder received thereby.

18. Apparatus for applying powdered material to surfaces, which comprises a spreader member having a uniformly roughened surface, means to cause a temporary sliding association of a mass of powder over said surface and to scrape said surface behind said mass, means thereafter to reverse the spreader member to cause said surface to overlie a surface to be spread, and means to cause the powdered material carried on the surface of the spreader member to be discharged on the surface to be spread.

RICHARD W. STANLEY.

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