

April 20, 1926.

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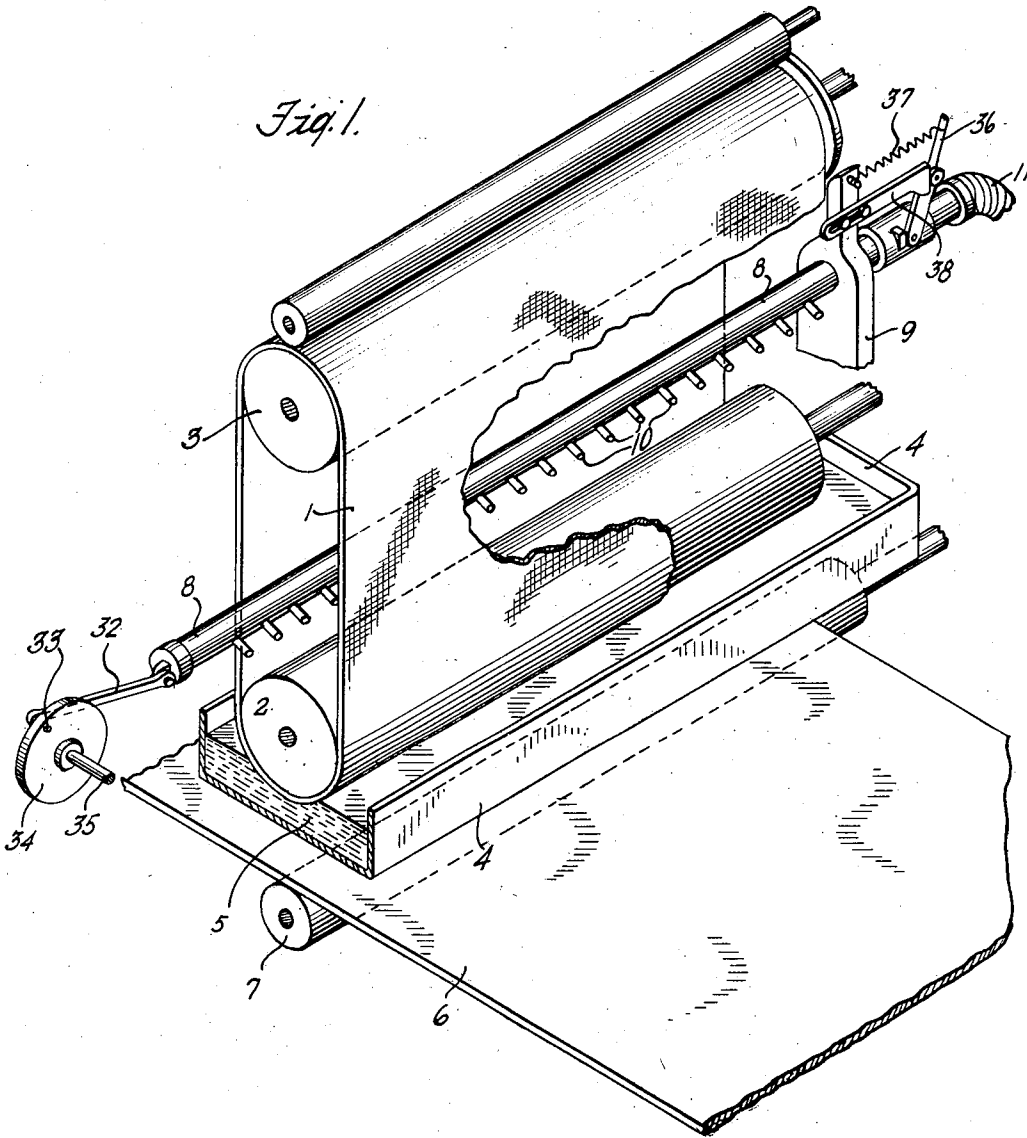
F. P. REED

METHOD OF AND APPARATUS FOR APPLYING COLOR

Filed April 8, 1925

3 Sheets-Sheet 1

*Fig. 1.*



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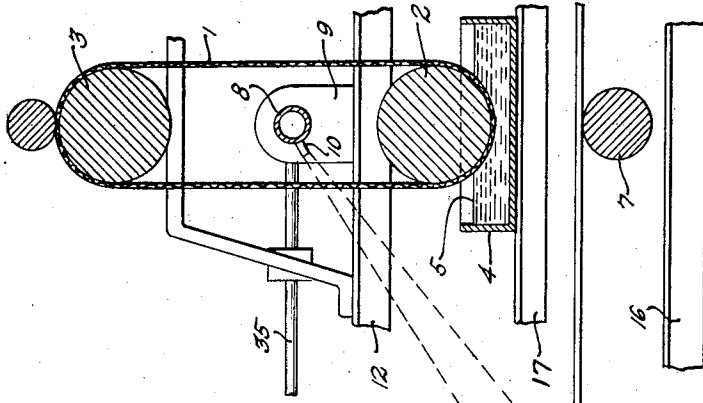
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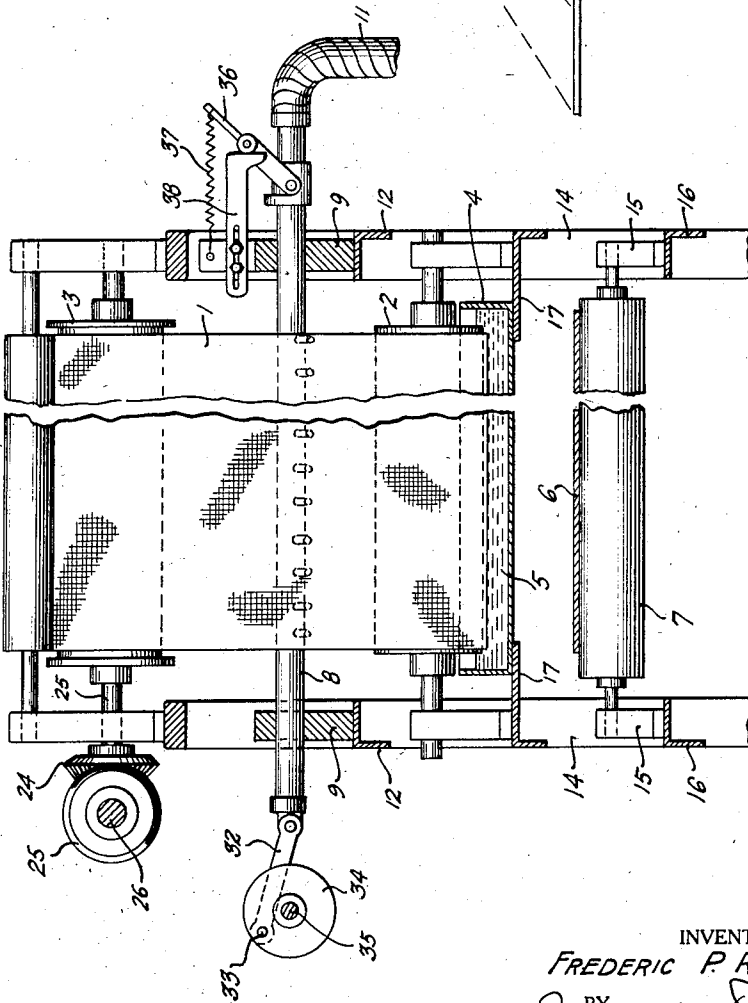
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*Fig. 3.*



*Fig. 2.*



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3 Sheets-Sheet 3

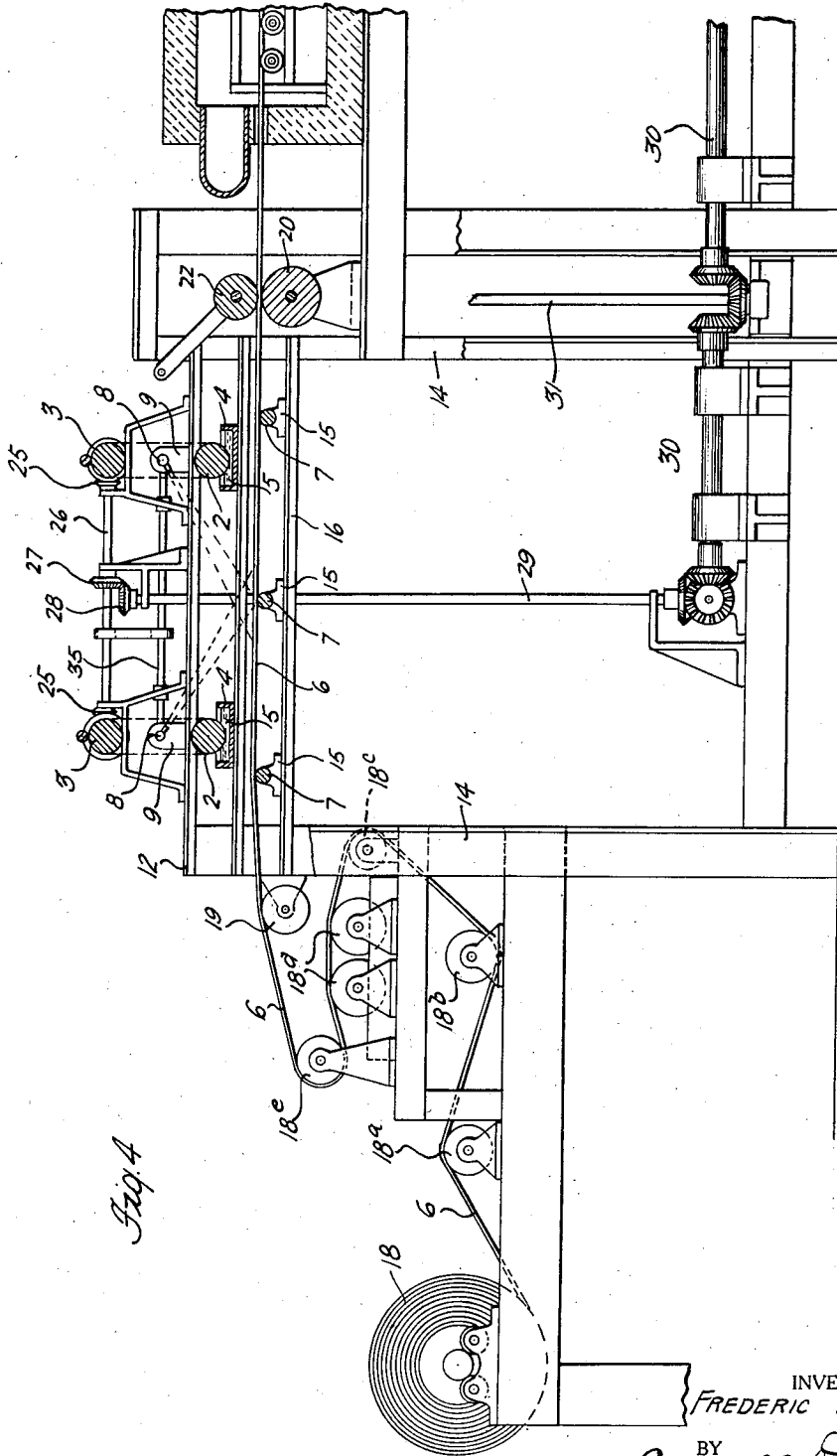


Fig. 4

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1,581,322

# UNITED STATES PATENT OFFICE.

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## METHOD OF AND APPARATUS FOR APPLYING COLOR.

Application filed April 8, 1925. Serial No. 21,474.

To all whom it may concern:

Be it known that I, FREDERIC P. REED, a citizen of the United States, residing at 79 Washington Street, East Orange, county of Essex, State of New Jersey, have invented a certain new and useful Improvement in Methods of and Apparatus for Applying Color, of which the following is a clear, full, and exact description.

This invention relates to a process and apparatus whereby colors may be applied to paper, board or other surface for producing varied effects such, for instance, as mottling.

The present application is an improvement on the process and apparatus made the subject of my application Serial No. 680,619, filed December 14, 1923 and is a continuation thereof as to common subject matter.

The invention in its broad aspects consists in applying color to the upper surface of the paper or board to be colored by supplying color to a medium and then blowing the color from the medium onto the surface to be colored. Preferably I produce a water film on the surface to which the color is to be applied before applying the color thereto, as by so doing a better blend of colors is produced where such blending is desirable.

The present invention has numerous advantages over methods heretofore employed and particularly those where brushes or similar media for applying the color are used. In these devices difficulty is often experienced in applying the amount of color desired and regulating it with accuracy.

While the above are some of the features and advantages of the present invention, others will become apparent from the following detailed description and claims when considered in connection with the accompanying drawings.

In said drawings—

Fig. 1 is a somewhat diagrammatic perspective view showing an embodiment of my invention in a simple apparatus;

Fig. 2 is a front elevation of the apparatus shown diagrammatically in Figure 1;

Fig. 3 is a side elevation thereof; and

Fig. 4 is a longitudinal section showing a more elaborate form that my invention may take and in which are included two of the elements shown in Figures 1, 2 and 3, and their relation to the feeding and drying sections of an organized machine.

My invention may be practised by the use of a very simple apparatus which may include a color carrying medium, means for depositing a water film on the surface to be colored, and means for blowing color from the medium onto the surface. That my invention may be practised in a commercial way I have shown its embodiment in a machine having various parts so arranged and coordinated that the process may be carried on continuously but while the machine described and illustrated is the best manner so far devised for practising the invention, such invention however, is not limited to the embodiment shown, as it may be carried out in various ways and by different arrangements of mechanism and some steps of the process may be used without others, all within the scope of the invention and without departing from the spirit thereof.

Referring to the drawings, 1 represents a medium to which color is first supplied and preferably this medium consists of a woven wire belt which passes around a lower roller 2 and an upper roller 3. The lower roller is so supported that its under surface lies within a pan 4 containing the coloring material indicated at 5. Suitable means, hereafter described more in detail, are provided for rotating the rollers. The surface to be coated is shown at 6 and preferably this is fed along at a uniform rate and properly supported by rollers, one of which is shown at 7, Figure 1. As the paper is moved along, the coloring matter is picked up by the belt as it dips into the liquid color and is carried upwardly. At a suitable point a blast of air is directed through the meshes or interstices of the belt and toward the upper surface of the paper, carrying with it some of the color. The air blast is supplied by a tube 8 which is mounted for reciprocation in brackets, one of which is shown at 9. This tube is located between the runs of the belt and carries a series of nipples 10 directed as shown in Figure 3. Air, supplied from any suitable source, passes through a supply pipe 11 connected to the tube, and the amount is regulated by a valve situated in the tube.

With the apparatus so far described it will be apparent that the color is supplied to a suitable medium and then blown therefrom onto the surface to be colored.

In producing a number of color effects

such as mottling I have found that the colors blend more satisfactorily if the color is thrown upon a water film instead of a dry surface. I therefore provide means for producing such a water film on the upper surface before the color is received thereby.

In Figure 4 I have shown an organized machine including means for wetting the surface of the paper which is to receive the color and also a machine having two color units together with paper feeding means and drying means. In said figure the brackets 9 are carried by a pair of frame pieces 12 (see also Fig. 2). These are preferably angle bars having their ends riveted or otherwise secured to uprights 14 rising from a suitable base. The rollers 7 for supporting the paper web are carried by brackets 15 supported on a frame including members 16 of angle iron similar to the frame pieces 12 and similarly secured. Between these two frames is a third frame having side members 17. The upper portions of these members extend further inwardly than do the upper portions of the angle members 12 and 16 and upon them rest the color pans 4.

The paper is drawn from a roll 18 and over roller 18<sup>a</sup> under roller 18<sup>b</sup> and around roller 18<sup>c</sup> and in contact with rolls 18<sup>d</sup>. These latter dip into a water pan 18<sup>e</sup> so that as the web passes in contact with them its surface is wetted and this surface becomes the upper surface 6 as the web passes around another roller 18<sup>f</sup> and over the roller 19 from which it passes horizontally through the area wherein it receives its color coating. The amount of water applied to the surface subsequently to be coated with color is more than enough to fill the pores of the paper so that a film of water is produced and it is to this film that the color is preferably applied. Thence it passes between two rollers 20 and 22, the latter being merely a pressure roller, and thereafter enters a drying chamber of any suitable type but preferably such as is disclosed in my prior Patent No. 1,500,592, dated July 8, 1924.

The color carrying belt 1 of each element is driven from the roller 3 and for this purpose the axis 23 of each of these rollers is provided at one end with a bevelled pinion 24 in mesh with a similar bevelled pinion 25, one carried at each end of a shaft 26, as shown in Fig. 4. Near its center this shaft carries another bevelled pinion 27 in gear with a bevelled pinion 28 upon a vertical shaft 29, suitably connected by bevelled gearing with a power shaft 30. The roller 20 is also driven from the same power shaft through means of bevelled gearing connected to a vertical shaft 31.

For spreading the color, it is desirable to reciprocate the tube supplying the air blast. Such movement is imparted to the tube 8 by

means of a link 32 engaging a pin 33, eccentrically positioned on a disk 34 secured to a shaft 35, the latter suitably supported in the frame of the machine and connected to the power shaft 30.

Reference has been made to the fact that the air supplied by the pipe 11 is controlled by a valve situated in the tube 8. This valve may, if desired, be arranged to be intermittently and automatically opened and closed as the tube is reciprocated and the amount of opening at each reciprocation may be adjusted to produce variations in the deposition of the color. The valve is of the ordinary stop cock variety and is provided with a lever arm 36. A spring 37 is attached at one end to the arm 36 and at its end to the bracket 9. It may be so arranged that the spring normally tends to keep it either in open position or in closed position. Also mounted on the bracket 9 is an arm 38 having a slot therein and a set screw by which it may be adjusted so that its nose may contact with the lever 36 at an early or a later period in the reciprocation of the tube 8 according to the adjustment of said arm 38. By this means the precise amount of air admitted may be varied.

Any suitable means, not shown, may be provided for varying the feed of the paper, the feed of the color carrying belt and the speed of reciprocation of the tube 8.

What I claim as new is:—

1. The process of producing color effects on a fabric in web form which consists in dipping a medium into the color to be applied and thereafter blowing the color from the medium onto the surface of the web to be coated.

2. The process of producing color effects on a fabric in web form which consists in dipping a loosely woven medium into the color to be applied and thereafter blowing air through the meshes of the medium in the direction of the surface of the material to be coated to thereby detach color from the medium and deposit it on said surface.

3. The process of applying color to the material to be coated, which consists in dipping a loosely woven medium into the color to be applied and thereafter intermittently blowing air through the meshes of the medium in the direction of the surface of the material to be coated to thereby detach color from the medium and deposit it on said surface.

4. In an apparatus of the character described, in combination, a wire belt, rollers supporting said belt, a color pan into which said belt reaches, an air tube situated between the runs of the belt, said tube having nipples arranged longitudinally therein, means for supplying air to the tube and means for reciprocating the same.

5. In an apparatus of the character de-

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scribed, in combination, a wire belt, rollers supporting said belt, a color pan into which said belt reaches, an air tube situated between the runs of the belt, said tube having  
 5 nipples arranged longitudinally therein, and means for intermittently supplying air to the tube.

6. In an apparatus of the character described, in combination, a wire belt, rollers  
 10 supporting said belt, a color pan into which said belt reaches, an air tube situated between the runs of the belt, said tube having nipples arranged longitudinally therein,  
 15 means for intermittently supplying air to the tube, and means for reciprocating the same.

7. The process of producing color effects on the surface of a fabric of web form which consists in supplying color to a medium and  
 20 thereafter blowing the color from the medium onto the surface of the web.

8. The process of producing color effects on a fabric of web form which consists in supplying color to a medium, blowing the  
 25 color from the medium onto the surface and thereafter drying the surface.

9. The process of producing color effects on a fabric which consists in producing on

the surface of the fabric a water film, supplying color to a medium and thereafter  
 30 blowing the color from the medium onto the film.

10. The process of producing color effects on a material to be coated which consists in producing a water film on the surface to be  
 35 coated, supplying color to a woven medium, and thereafter blowing air through the meshes of the medium in the direction of the surface of the material to be coated to there-  
 40 by detach color from the medium and deposit it on the water film.

11. In an apparatus of the character described, the combination with means for giving a continuous motion to a web of  
 45 paper or other material upon which color effects are to be produced, means for producing a water film on the surface, a source of color supply, a medium to which the color will adhere, means for bringing the medium  
 50 and the color into contact, and means for blowing the color from the medium onto the water film.

Signed at 11 Broadway, New York city  
 this seventh day of April 1925.

FREDERIC P. REED.