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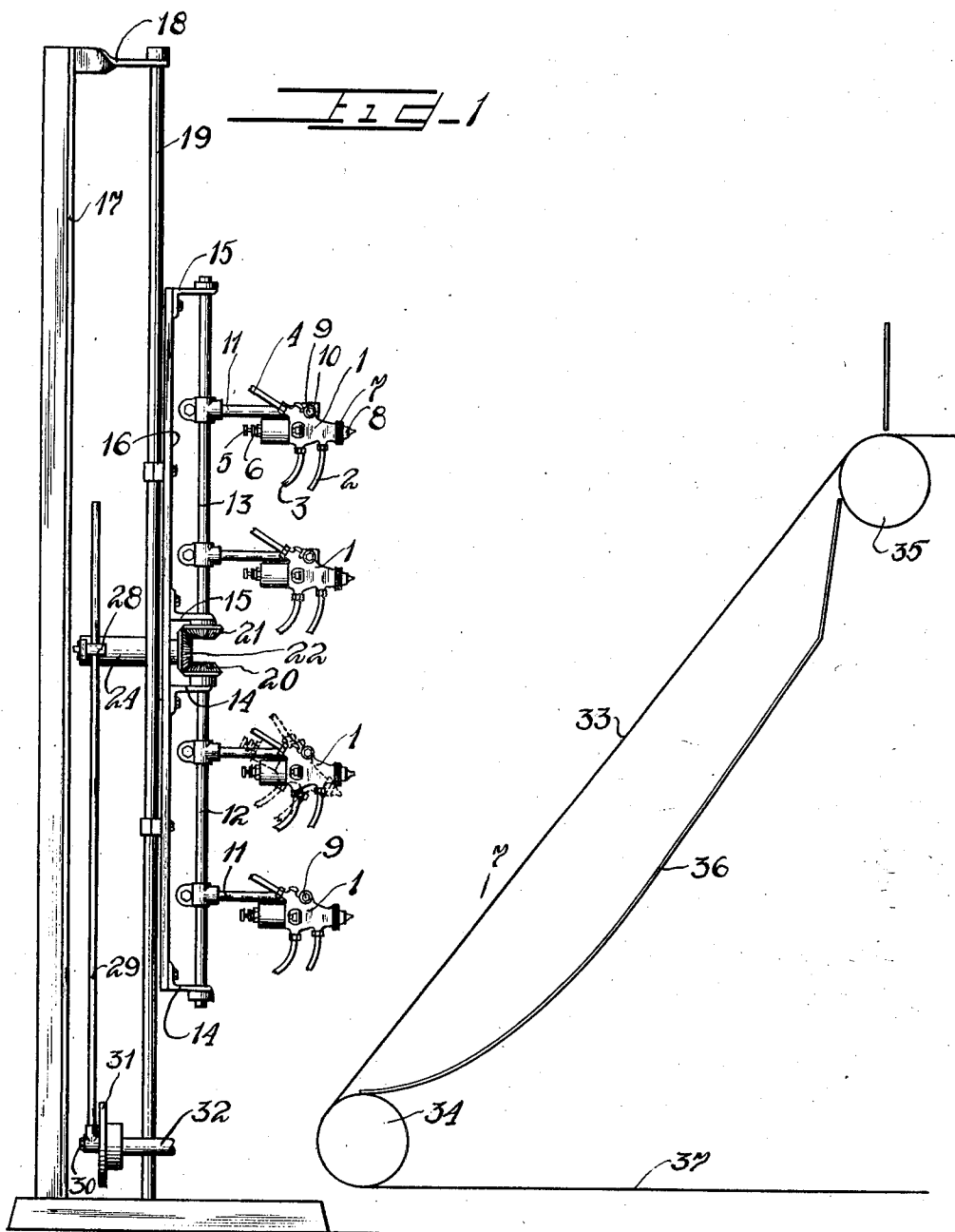
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APPARATUS FOR COLORING AND DECORATING PAPER

Filed Feb. 15, 1930

2. Sheets-Sheet 1



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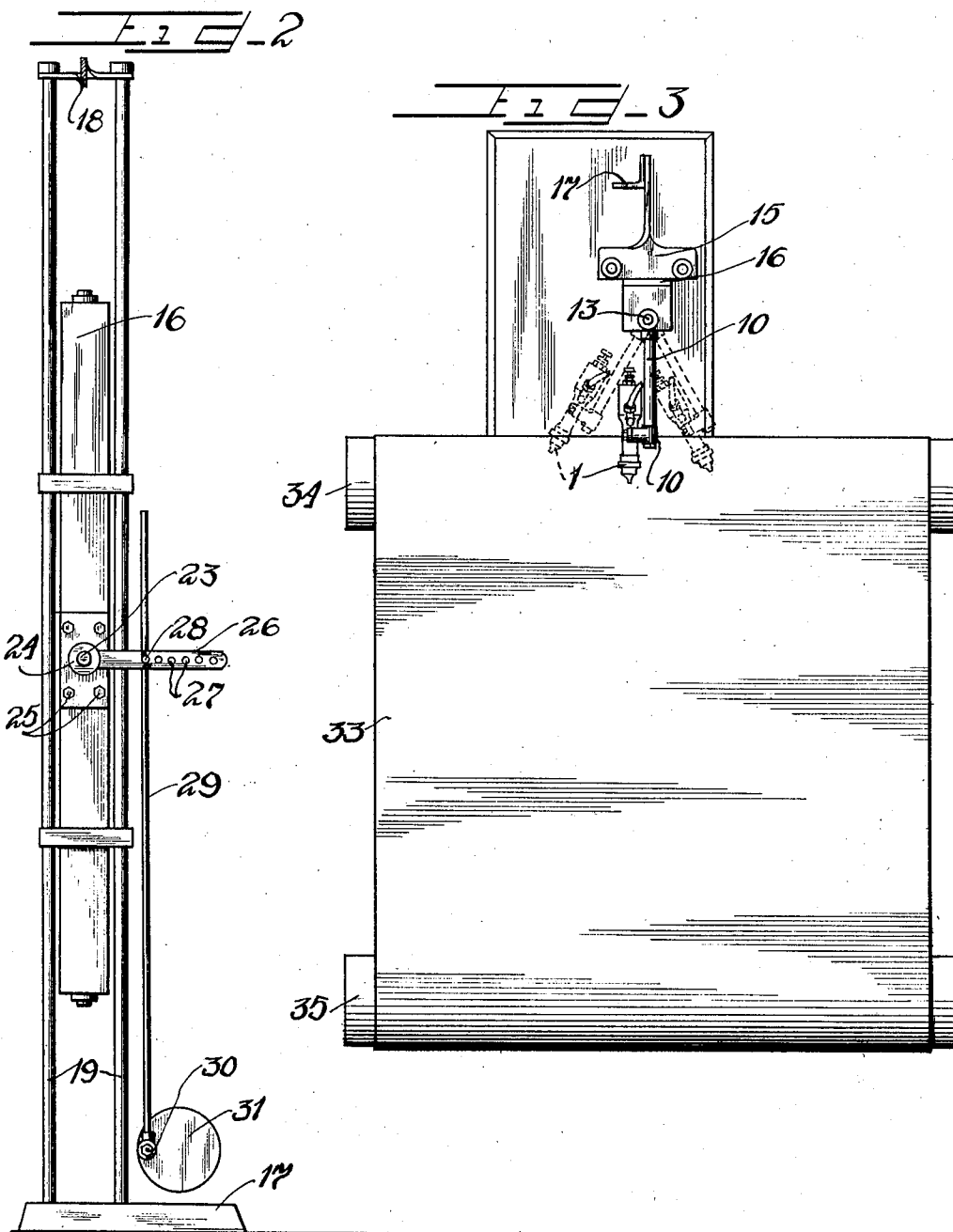
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APPARATUS FOR COLORING AND DECORATING PAPER

Application filed February 15, 1930. Serial No. 428,643.

This invention relates to a method of and apparatus for coloring and decorating paper and like web material, including fabrics and textiles in web form.

It has heretofore been proposed to color paper either while in its form of a wet web on the paper making machine or in its dry finished state but, in general, such proposed methods of coloring paper have had as their object to provide a blended, or clouded color effect. In such previous methods, ordinary air guns have been used for spraying the color either in water or other solution, with the necessary result that a considerable portion of the surface of the paper is colored to give either a blotchy effect, a solid color or where more than one color is used, a blended effect.

The present invention has a quite different object in that it seeks to provide a method of and apparatus for coloring paper and like web material to produce a webbing or vailing effect which may be best described as a net work of fine, thread-like lines of color of a well defined nature spread in a generally irregular fashion over the surface of the paper.

It is a further and important object of this invention to provide a method of and apparatus for spraying colored lacquers onto paper and like web material so as to produce thereon haphazard lines of color of a substantially continuous thread-like nature, whereby novel and pleasing wrapping papers and the like may be produced.

Other and further important objects of this invention will be apparent from the disclosures in the specification and the accompanying drawings.

This invention (in a preferred form) is illustrated in the drawings and hereinafter more fully described.

On the drawings:

Figure 1 is an end elevational view of apparatus embodying the principles of my invention and suitable for use in carrying out the method herein described.

Figure 2 is a rear elevational view of the same.

Figure 3 is a top plan view.

As shown on the drawings:

In carrying out my method, I suitably employ automatic spray guns, indicated by the reference numeral 1, of a known type of construction, such spray guns being provided with the usual inlet, such as the inlet 2 for the fluid or color solution, the inlet 3 for unregulated air pressure and the inlet 4 for regulated air pressure. Each of the air guns 1 is likewise provided with a fluid needle adjusting screw 5, a lock nut 6 therefor and a spreader adjustment valve 7 for controlling the air passing to the supplemental spreader jet on the air cap 8. Inasmuch as all of this construction is well known to those skilled in this art and moreover does not form a part of the present invention, it is believed unnecessary to give a more detailed description of the air guns or of the connections between the air guns and the source of air under pressure and of the color fluid.

Each of the air guns 1 is adjustably mounted upon a pin 9 forming a part of a sleeve 10, the latter in turn being adjustably mounted upon an arm 11. Each of the arms 11 is supported upon one or the other of a pair of vertical supporting members 12 and 13 and is vertically adjustable thereon. The vertical members 12 and 13 are themselves swivelly mounted in pairs of supporting brackets 14 and 15 secured to a backing plate 16 that is mounted upon a main support comprising a stand 17, upright rod members 19 and a bracket 18.

Bevelled gears 20 and 21 are mounted upon the upper and lower ends, respectively, of the vertical members or rods 12 and 13 so as to mesh with a third bevel gear 22 mounted upon a horizontal stub shaft 23 extending horizontally through a bearing bushing 24, the latter being secured to the plate 16 by means of bolts 25 or the like. On the rear extended end of the stub shaft 23 is mounted an arm 26 having along its free end a plurality of spaced apertures 27. Said apertures 27 are adapted to receive a pin 28 carried by a rod 29 which is secured at its lower end to an eccentric pin 30 of a disk 31. Said disk 31 is rigidly secured to

and mounted upon the end of a rotatable shaft 32, adapted to be driven by a motor (not shown) or other suitable source of power.

5 It will be apparent from the above description that the spray guns 1 may be oscillated upon the vertical rods 12 and 13, as shown in dotted lines in Figure 3, and that the amount of oscillation may be varied
10 by varying the effective length of the arm 26, as provided for by the spaced apertures 27. It should also be noted that the angle of inclination of each of the spray guns 1 may likewise be varied by adjusting the position of the gun upon the pins 9, as shown
15 in dotted lines in Figure 1, so that the spray guns may point horizontally or at any angle thereto.

The battery of spray guns as shown is adapted to be positioned in front of a traveling web of paper 33, suitably trained over supporting rolls 34 and 35 to travel in a generally upwardly inclined direction as indicated by the arrow in Figure 1. A guard
20 36 is conveniently positioned behind the traveling web of paper 33 in order to prevent the paper, in the event of a break occurring, from falling down onto the lower horizontal portion 37 of the traveling web and thus becoming entangled about the roll
25 34. It will be understood that the particular position of the portion of the traveling web 33 to be sprayed is unimportant, that is, whether it be horizontal, inclined or vertical, provided that the relative position with respect to the spray guns is such that the spray guns may cover the portion of the web desired to be sprayed with the coloring solution. It will likewise be understood
30 that it may under some conditions be desirable to produce a straight line or streaked color effect upon the paper, in which case the eccentric rod 29 would be disconnected from the arm 26 to leave the spray guns stationary and the relative distance between the spray guns and the surface of the traveling web 33 would be varied to suit the requirements.

The particular composition of color solution or lacquer that I prefer to use with the apparatus and method herein disclosed comprises as a base, nitrocellulose or other cellulose ester in a suitable solvent, with a dye-stuff, pigment and/or filler or the like dissolved or suspended therein. In order to give body to the lacquer, a resinous substance is added, such as batu gum, caoutchouc or a fossil gum of any suitable nature. It will be understood that by the term pigment, it is meant to include not only coloring matters in a finely divided form but also metallic powders, such as gold, bronze and the like, and enamels. Fillers, such as china clay, may be used in any suitable proportion. Also it is possible to incorporate vary-

ing amounts of casein in the veiling lacquer, say up to 35 to 40%. The casein gives an embossed effect that is particularly striking and furthermore serves as a cheaper substitute for a part of the cellulose ester and
70 resinous substances of the lacquer.

In accordance with my process, the veiling lacquer, together with compressed air, is supplied to the spray guns 1 through the proper connections, as above described, and
75 the spray guns oscillated from side to side as indicated in dotted lines in Figure 3. The veiling lacquer is thus sprayed from the guns 1 in a continuous thread, owing to the incorporation into the lacquer of the
80 resinous substances and/or casein, but more particularly to presence of caoutchouc or rubber latex in the lacquer. The thread of lacquer is thus deposited upon the moving web 33, due to the combination of the oscillating movement of the gun 1, the straight line movement of the web 33 and intervening irregular air currents between the nozzle of the gun 1 and the web 33, to form an irregular pattern on the sheet. By proper
85 regulation of the fineness of the thread, number of guns used, colors of lacquer used, speed of paper and speed of oscillation of the guns, the desired veiling effect may be obtained. After the application of the lacquer to the web 33, the web is run through a drier (not shown), which may take the form of a hot air tunnel drier or of a festoon type of drier.

A sheet of paper colored in accordance
100 with my process presents a pleasing and distinctive appearance due to the unusual and novel veiling effect produced on the surface of the sheet. Due to the nature of the lacquer composition, fine, thread-like lines
105 of color of a definite and distinct nature are produced.

In general, the color threads are more or less uniform in width when a nitrocellulose lacquer contains only resinous substances
110 and color is used, but when casein is incorporated into such lacquer, the resulting threads of color as produced upon the web material are rather more irregular as to width and the embossed effect previously
115 referred to is more pronounced.

It will be understood that the veiling effect may be produced upon an uncolored, white or colored sheet of paper, or may be combined with a spattered color effect, the
120 latter being produced by spraying a solution of a color in an organic solvent without the use of ingredients such as nitrocellulose and resinous substances for giving the stringy effect of a lacquer. Many varied
125 and beautiful color effects may thus be produced by use of my veiling method, either alone or in combination with other methods of coloring paper.

I am aware that many changes may be 130

made and numerous details of construction may be varied through a wide range without departing from the principles of this invention, and I, therefore, do not purpose
5 limiting the patent granted hereon otherwise than necessitated by the prior art.

I claim as my invention:

1. In an apparatus for producing designs
on paper, a plurality of shafts extending
10 in the direction of motion of a travelling
web, a series of spray guns mounted thereon
for universal adjustment with respect to
said shafts, and a source of power for pro-
ducing a rotary oscillatory motion in said
shafts, said shafts not being parallel with
either the direction of motion or the plane
of said travelling web. 70
2. An apparatus for producing designs
on paper, comprising vertical oscillatable
shafts, nozzles mounted thereon, and means
for carrying paper past said shafts in an
upwardly inclined direction and means for
producing a rotary oscillation in said shafts. 75

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