May 8, 1923. 1,454,362

L. P. WINCHENBAUGH ET AL

PAPER TREATING MACHINE

Filed Aug. 8, 1919

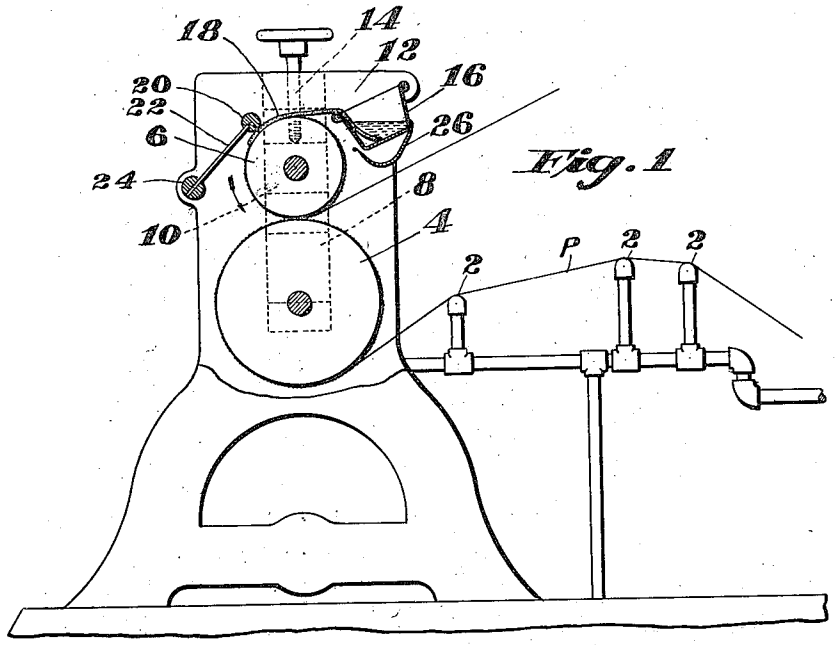


Fig. 1

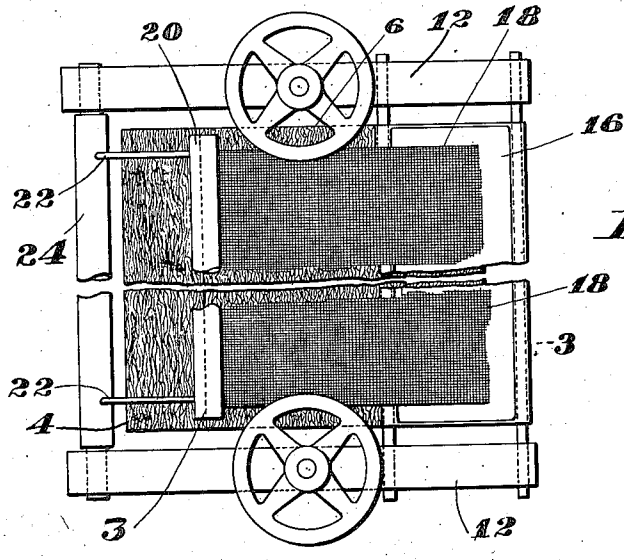


Fig. 2

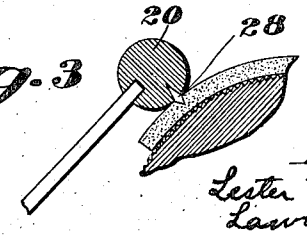


Fig. 3

Witness

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UNITED STATES PATENT OFFICE.

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PAPER-TREATING MACHINE.

Application filed August 8, 1919. Serial No. 316,233.

To all whom it may concern:

Be it known that we, LESTER P. WINCHENBAUGH and LAWRENCE GENTILE, citizens of the United States, residing, respectively, at Hyde Park and Melrose, in the counties of Suffolk and Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Paper-Treating Machines; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same

This invention relates to paper treating machines, and more particularly to machines for applying dye, stain or other coloring liquid to paper or similar material

The primary object of the invention is to improve the construction and mode of operation of machines for applying coloring liquid to paper and to devise a machine of this class upon which novel designs and artistic effects may be produced in an efficient and reliable manner

With the above object in view an important feature of the invention contemplates the provision, in combination with a receptacle for the coloring liquid, of a section of sheet fabric dipping into the coloring liquid in the receptacle through which the liquid is withdrawn by capillary action for application to the paper. The coloring liquid may be applied to the paper by the contact of the fabric directly with the paper. In the present embodiment of the invention, however, the fabric is arranged to transfer the coloring liquid to the surface of a roll, and the liquid deposited on the roll is thereafter applied to the paper through the engagement of the roll therewith.

The coloring liquid is thus withdrawn by the fabric from the container in a regulated amount as required for application to the paper so that there is no excess liquid to form blots or imperfections in the designs. The provision of this feature also enables wide variations in the designs and color combinations to be produced in an efficient manner.

Other features of the invention consist in certain novel and improved constructions, arrangements and combinations of parts hereinafter described and particularly pointed out in the claims the advantages of which will be readily understood and appreciated by those skilled in the art.

The features of the invention will be clearly understood from the accompanying drawings illustrating the invention in its preferred form and the following detailed description of the constructions therein shown.

In the drawings Figure 1 is a view partly in side elevation and partly in section of a portion of a machine embodying the invention; Fig. 2 is a plan view illustrating part of the mechanism shown in Fig. 1; and Fig. 3 is a detail sectional view taken substantially on the line 3—3 of Fig. 2.

The machine illustrated in the drawing has the same general construction and organization of parts as the machine illustrated and described in the pending application of Lawrence Gentile, Serial No. 251,384, filed August 26, 1918. The machine is provided with a roll for the paper supply, with a pair of drawing rolls for drawing the paper from the supply roll, and with a tension device through which the paper passes after leaving the first set of drawing rolls, all as clearly illustrated and described in said application. After leaving the tension device the paper, which is indicated at P in the drawing, passes over a series of cross bars 2 to a pair of rolls 4 and 6, which cooperate to apply the coloring liquid to the paper. The rolls 4 and 6 are provided with trunnions journaled respectively in bearing blocks 8 and 10, mounted to slide in vertical guide-ways in uprights 12 and the bearing blocks 10 are engaged by adjusting screws 14 by which the pressure of the roll 6 on the roll 4 may be regulated. The paper, as clearly shown in the drawing, passes under the roll 4 and then between the rolls. The coloring liquid is first applied to the roll 6 and is transferred therefrom to the paper as the paper passes between the rolls.

The coloring liquid is contained in a re-receptacle 16 mounted between the uprights 12 and is transferred from the receptacle to the roll 6 by means of a section of sheet fabric 18, one end of which dips into the coloring liquid in the receptacle 16 and the other end of which rests on the roll 6. The fabric 18 is made of such material and is so constructed that the coloring liquid will be drawn relatively rapidly therethrough by

capillary action. Woven wool felt has been found, in practice, to be suitable for this purpose. The coloring liquid is drawn by capillary action from the end of the section of fabric 18 which dips into the coloring liquid in the receptacle to the end thereof which bears on the roll 6 and is thereby applied to the roll.

In order to cause the fabric to bear firmly against the roll 6 so that the coloring liquid will be transferred to the roll in a reliable manner, a heavy cross bar 20 is arranged to bear through gravitational action on the fabric. The bar 20 is mounted on the outer ends of rods 22 secured at their inner ends in a rotatable support 24 the ends of which engage in bearings in the uprights 12. The bar 20 is thus pivotally movable toward and from the roll 6 and is held with considerable pressure against the fabric 18 by gravity during the operation of the machine.

To prevent the fabric 18 from being drawn from the receptacle 16 by the rotation of the roll 6, the bar 20 carries a series of projections or points 28 which are arranged to be embedded in the fabric. The receptacle 16 is provided with a trough 26 to catch the liquid which drips down the outer face of the inner wall thereof.

The surface of the roll 6 as shown in the drawings is formed with elevations and depressions having any suitable form and arrangement to draw the liquid as required from the fabric, and the fabric 18 thus contacts with and deposits the coloring liquid upon the high points on the surface of the roll. The coloring liquid is then transferred by the roll onto the paper in a design corresponding with the design formed on the surface of the roll. It will be noted from Figs. 2 and 3 that roll 6 as illustrated is provided with a series of sharp pointed elevations extending in a general direction longitudinally of the roll or transverse to the direction of movement of the peripheral surface of the roll. Thus the projections on the roll receive not merely a thin surface film of the coloring liquid, but the liquid is drawn from the fabric in quantity sufficient to penetrate the paper and to spread from the point of application, giving a design without hard edges and producing very artistic effects. The roll 4 may have a smooth periphery if desired. In the illustrated construction, however, the surface of the roll 4 is also provided with elevations and depressions corresponding with those on the roll 6 so that the paper is embossed in passing between the rolls. In actual practice steel embossing rolls such as are ordinarily employed in embossing paper have been used.

With the above construction a regulated quantity of liquid is withdrawn from the receptacle 16 and deposited on the roll 6 by the fabric 18 and is then transferred from the roll to the paper. The liquid is withdrawn from the receptacle by the fabric only as rapidly as it is deposited on the roll so that there is never any excess of liquid to form blots or other imperfections in the designs.

Where it is desired to apply the coloring liquid to the paper only at certain points in the width of a strip the fabric 18 may be cut so that it engages the roll 6 only at certain points in the length of the roll. Two or more colors may be applied to the paper at the same time by providing two receptacles for coloring liquids of different colors, and two sets of devices for transferring the respective coloring liquids to the paper arranged so that the paper is carried successively past the same. The amount of the coloring liquid deposited on the paper may be varied by varying the speed of the rolls 6 and 10. The greater the speed at which these rolls are rotated the less will be the amount of coloring liquid deposited on the roll 6 by the fabric.

When the fabric 18 becomes worn by long continued use, or when it is desired to change the coloring liquid to be applied to the paper, it is necessary to remove the fabric which is in use and to substitute therefor another section of fabric. In changing the fabric it is necessary merely to swing the bar 20 away from the roll 6, thereby disengaging the projections 26 from the fabric, and to lift the fabric from the machine. The substituted section of fabric is then placed in position with one end within the receptacle 16 and with the other end resting on the roll 6, and the bar 20 is then swung back into the position shown in the drawings to hold the fabric in position.

In an application, Ser. No. 316,235, filed on the same date as the present application, applicants have disclosed a process of making colored paper which may be advantageously carried out by an apparatus such as that disclosed in the present application. In an application Serial No. 316,234, filed on the same date as the present application, applicants have disclosed a process related in certain aspects to the process disclosed in said application Serial No. 316,235.

Having explained the nature and object of the invention, and having specifically described a machine embodying the invention in its preferred form, what is claimed is:

1. A machine for applying coloring liquid to paper having, in combination, a receptacle for the coloring liquid, a roll for applying the coloring liquid to the paper, a section of capillary liquid conducting material dipping into the coloring liquid and resting on the periphery of the roll through which the liquid is drawn by capillary action, a weight for holding the fabric against the roll, and means for movably supporting

the weight to permit the removal of the fabric.

2. A machine for applying coloring liquid to paper having, in combination, a receptacle for the coloring liquid, a roll for applying the coloring liquid to the paper, a section of capillary liquid conducting material dipping into the liquid and resting on the periphery of the roll through which the liquid is drawn by capillary action, a weight for holding the fabric against the roll, devices carried by the weight for holding the fabric in position, and means for movably supporting the weight to permit the removal of the fabric.

3. A machine for applying coloring liquid to paper, having in combination a receptacle for the coloring liquid, a roll for applying the coloring liquid to the paper, and a section of capillary liquid conducting material dipping into the coloring liquid, extending partially about the roll and held yieldingly against the roll, through which the liquid is transmitted solely by capillary action.

4. A machine for applying coloring liquid to paper, having in combination a receptacle for the coloring liquid, a roll for applying the coloring liquid to the paper, and a section of capillary liquid conducting material dipping into the coloring liquid, lying on the periphery of the roll and held by gravity against the roll, through which the liquid is drawn solely by capillary action.

5. A machine for applying coloring liquid to paper having in combination a receptacle for the coloring liquid, a roll for applying the coloring liquid to the paper having relatively sharp elevations extending longitudinally of the roll, and a section of capillary liquid conducting material dipping into the coloring liquid and engaging the periphery of the roll, through which the liquid is drawn by capillary action.

6. A machine for applying coloring liquid to paper having in combination a receptable for the coloring liquid, a roll for applying the coloring liquid to the paper having relatively sharp elevations extending longitudinally of the roll, and a section of sheet fabric dipping into the coloring liquid and having one of its lateral faces extending about the periphery of the roll in contact therewith, through which the liquid is drawn by capillary action.

7. A machine for applying coloring liquid to paper having, in combination, a receptacle for the coloring liquid, a roll for applying the coloring liquid to the paper having relatively sharp elevations on its periphery, and a section of sheet fabric dipping into the coloring liquid, having one of its lateral faces extending about the periphery of the roll and held by gravity in contact therewith, through which the liquid is drawn by capillary action.

8. A machine for applying coloring liquid to paper having, in combination, a pair of embossing rolls between which the paper is passed arranged to emboss the paper as it is passed between the rolls and means for applying coloring liquid to one of the rolls in excess of that required to form a surface film on the paper so that the coloring liquid may penetrate the paper.

9. A machine for applying coloring liquid to paper having, in combination, an embossing roll, means controlled by capillary action for depositing coloring liquid upon the elevations on the embossing roll, and means for causing the paper to contact with the roll so that the paper is embossed and the coloring liquid is applied thereto by the roll.

10. A machine for applying coloring liquid to paper having, in combination, a pair of embossing rolls, one of which is formed on its surface with a series of elevations for indenting the paper as it is passed between the rolls, a receptacle for the coloring liquid, and a section of sheet fabric dipping into the coloring liquid and contacting with the surface of the latter roll through which the liquid is drawn by capillary action and deposited on the elevations on said roll, the roll transferring the coloring liquid to the paper during the passage of the paper between the rolls.

11. A machine for applying coloring liquid to paper having, in combination, a receptacle for the coloring liquid, a rotary roll for applying the coloring liquid to the paper having relatively sharp elevations on the periphery thereof, the forward faces of which extend transversely of the direction of movement of the periphery of the roll and a section of capillary liquid conducting material dipping into the coloring liquid and engaging the periphery of the roll through which the liquid is drawn by capillary action.

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