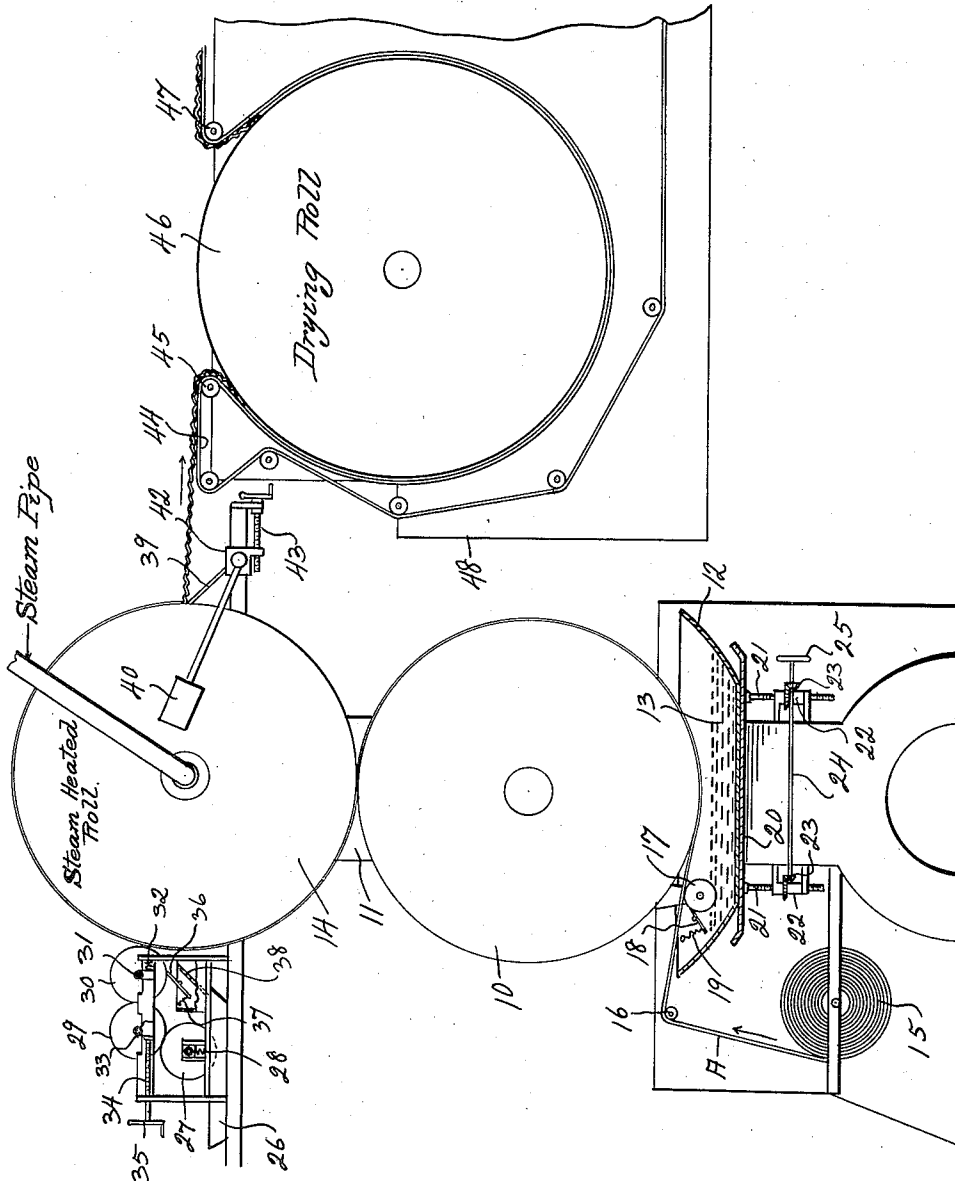


F. M. SCHULER.
 COATED TISSUE PAPER AND METHOD OF AND MEANS FOR COATING IT.
 APPLICATION FILED DEC. 6, 1920.

1,428,064.

Patented Sept. 5, 1922.



Inventor

F. M. Schuler

By *Watson & Coleman*
 Attorneys

Patented Sept. 5, 1922.

1,428,064

UNITED STATES PATENT OFFICE.

FRANK M. SCHULER, OF ROSELLE PARK, NEW JERSEY, ASSIGNOR TO ALBERT E. DUBEY, OF BROOKLYN, NEW YORK.

COATED TISSUE PAPER AND METHOD OF AND MEANS FOR COATING IT.

Application filed December 6, 1920. Serial No. 428,814.

To all whom it may concern:

Be it known that I, FRANK M. SCHULER, a citizen of the United States, residing at 16 East Colfax Ave., Roselle Park, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Coated Tissue Paper and Methods of and Means for Coating It, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to the art of coating paper, and particularly to the art of coating tissue paper, such as is used for making crepe paper.

It has heretofore been found impossible to coat very thin paper, commonly known as tissue paper, with a color on one side of the sheet so that the sheet would have one color on one side and another color on the opposite side of the sheet for the reason that the color, when it is applied to this thin paper, tends to run through or permeate the paper immediately, thereby rendering the paper either all of one color or blotched on the opposite surface of the paper from that upon which the color was applied.

The object of this invention is to provide a method by which thin paper, commonly known as tissue paper, may be coated upon one or both sides as may be desired, and whereby this coating will remain upon one face of the paper entirely and will not pass through the body of the paper sheet and affect in any way either the body of the paper sheet or the opposite face of the paper to that on which the coating is applied.

A further object is to provide means whereby the paper may be coated on both sides with different colors without these colors in any way affecting each other or running.

Another object is to provide means whereby tissue paper, such as used for forming crepe paper, may be coated on opposite sides with different colors and then creped.

And a still further object is to provide as an article of manufacture a thin paper, commonly known as tissue paper, which has a colored coating on one or both sides.

Other objects will appear in the course of the following description.

My invention is illustrated in the accompanying drawings, wherein:—

The figure is a diagrammatic end elevation of a paper coating and creping machine em-

bodying the principles of my invention.

I will first describe the means whereby the paper is coated, this means being illustrated in the drawings. I have shown an apparatus whereby my method may be carried out to produce the coated tissue paper heretofore adverted to. The illustration is largely diagrammatic, as the specific elements forming the mechanism are well known in the art of paper manufacture. I have illustrated for this purpose a rubber roll, designated 10, which is mounted upon suitable standards 11 and which is disposed immediately above and partially dipping into a color pan 12. This color pan contains in its lower portion the color 13, but the rubber roll 10 does not extend to or dip into the liquid color in this pan. Also mounted in the standards 11 and above the roller 10 and in alignment therewith is a steam heated creping cylinder or roller 14, illustrated as having the same diameter as the rubber roll 10.

The paper A passes from a stock roll 15 mounted adjacent to the standards 11, and passes upward and over a brass roller 16, and from thence passes over the face of a color applying roller 17 mounted in any suitable manner adjacent the entrance end of the color pan 13. This color applying roller 17, which may be of rubber or of any other suitable material, dips into the liquid color in the pan 12 and bears evenly against the under face of the sheet A. The excess liquid color is removed from the face of the rubber roller 17 by means of a scraper 18 urged by a spring 19 into engagement with the face of the roller 17. This roller 17 is mounted in the pan in any suitable manner and may be rotated in any desired way. I do not wish to be limited to a roller as a means of applying the color from the pan 12 to the face of the paper, as any other color applying element might be used for this purpose.

The pan 12 is preferably supported upon a carrier tray 20 having vertically extending screws 21. Operating in connection with these screws are the nuts 22 which are held from vertical movement, and these nuts are formed with beveled teeth engageable by beveled gear wheels 23 on a shaft 24 having a hand wheel 25. By this means, the tray 20 may be raised or lowered and thus the pan 12 adjusted to bring the roller 17 into a proper contact with the paper to apply the

color thereto. The sheet A passes partly around the rubber roll 10 and onto the steam heated roller 14 which constitutes the creping cylinder. Steam may be conducted into the interior of this roll in any suitable and obvious manner, such as commonly used for heating creping rolls. As the sheet of paper passes around the roll 14, that face of the sheet to which color has been applied is disposed against the face of the roller 14 and another coating of a different color may be applied to the outside face of the paper. The means for this purpose consists of a color pan 26, into which a rubber roller 27 dips, this rubber roller being supported by springs 28. Contacting with the rubber roller 27 is a rubber roller 29, and contacting with the rubber roller 29 is a rubber roller 30, which in turn contacts with the face of the paper, the shaft of the rubber roller 30 being mounted in sliding bearings 31 urged outward and away from the roller 14 by means of springs 32. The shaft of the rubber roller 29 is also mounted in sliding bearings 33, and these are shifted by means of adjusting screws 34 having handles 35 whereby the screws may be rotated, these screws engaging with a suitable nut on the bearing for the rubber roller 29 or with a fixed nut through which the screws pass, in any case providing for an adjustment of the roller 29 toward or from the roller 30.

It will be obvious that when the roller 29 is shifted toward the roller 30, it will force this roller 30, against the action of the spring 32, toward the face of the paper which passes over the steam heated creping roller 14. The spring 28 will act to force the roller 27 up against the roller 29. A scraper 36 bears against the roller 30 and is urged into contact therewith by a spring 37 so as to scrape off excess color, and this excess color drops onto a drip trough or drip plate 38 which returns the excess liquid to the color pan 26.

The paper which has been dampened by the application of color thereto is carried around the steam heated creping roll to a point, as illustrated, diametrically opposite to the roll 30 and is creped by the usual doctor blade 39 which bears against the face of the roller 14 and is urged thereagainst by a weight 40 mounted upon an arm 41 attached to the shaft of the doctor. This shaft of the doctor 39 is mounted in slidable bearings 42 adjusted by means of an adjusting screw 43. The action of the doctor blade 39 is exactly the same as in all creping machines. It acts to obstruct the forward passage of the dampened paper, which adheres to the face of the steam heated creping roller 14, and thus acts to fold or wrinkle this paper transversely of its path of movement. This wrinkled paper, after it passes from the doctor blade, is carried over

onto an endless carrier 44 mounted upon rollers 45 driven in any suitable manner, and from the endless carrier it passes onto a drying drum 46, on which it is dried, and then is carried off over a roller 47 by any suitable means, as by the endless carrier 44. The drying drum may be mounted and driven in any suitable manner.

The mechanism which I have described will coat one face of a sheet of tissue paper with one color and then coat the opposite face of the sheet with another color, but this is accomplished only by using a particular size mixed with the color and by the use of heat in the steam heated creping roller. I have discovered that in order to coat tissue paper on one or both sides without this coating running through the paper web and covering the opposite face of the web to that on which the coating is applied, it is necessary that the color to be applied should be mixed with gelatin and that this coating shall be quickly dried, and with the colors and gelatin there should be mixed a certain amount of salt and that if this be done, very thin paper such as is commonly called tissue paper may be readily coated without the color running through the web of paper.

In order to form the sizing with which the color is mixed, I dissolve a certain amount of gelatin in a certain amount of water. I do not wish to be limited to any exact proportions, but in actual practice I mix approximately 10 pounds of gelatin with approximately 20 gallons of water. This is boiled in a jacketed tank until the gelatin is thoroughly dissolved. The mixture should not come in direct contact with the steam, as the steam would take all the strength from the gelatin. The dyes or colors are mixed with water and boiled until the dye or color is thoroughly dissolved in the water and, of course, the various colors or dyes require different proportions. The mixing of the solution of gelatin and the solution of the dye is accomplished as follows: A certain amount of water, as for instance 30 gallons of warm water, is placed in a vessel or tank. To this is added four gallons of the dissolved gelatin mixture and three gallons of dissolved color or dye. The solutions of the dye and sizing are then thoroughly mixed, and to this mixture is added one pound more or less of table salt. The amount of salt which is to be dissolved with the color and the sizing depends upon the color used, the different colors requiring different amounts of salt. The solution of gelatin, color and salt is used in the color pans 12 and 26 heretofore referred to.

The gelatin has a tendency to set very quickly when heat is applied to it and, furthermore, it is of such consistency that it cannot readily pass through very thin or tissue paper provided it is dried or set quick-

ly. I have found by experiment that other sizing materials, such as animal glue, casein, dextrine, and gum arabic require a longer time to set, even with the application of heat, and that where other sizings than gelatin are used, even with heat and the use of salt, the color will go through the paper. By using a combination of gelatin, salt and color and submitting the coated paper to the action of heat, I set the color before it can possibly pass through the paper.

While I have alluded to the use of gelatin and prefer to use gelatin for this purpose, it will be understood that I do not wish to be limited to the use of gelatin under all circumstances, as my invention lies broadly in the use of any sizing which is of such a character that when applied to thin or tissue paper, it will not pass through the same and will dry or set relatively quickly under the application of heat to the paper. The gelatin, however, I have found to be the best sizing to be used, as it sets very quickly under the application of heat.

I have referred throughout the specification to the fact that this process is to be used in coating tissue paper, and by tissue paper I mean any paper so thin or of such character that the application of color by the ordinary processes heretofore known to one side of the paper would cause the color to permeate the paper to a greater or less extent. I do not wish to be limited to the step of creping the paper illustrated, but it will be noted that where the paper is creped, the dampness remaining in the paper, after the color has been applied thereto, is sufficient to cause the paper to be creped properly by the doctor blade 29 without the necessity of damping the paper by other means. I have found that by my process and apparatus, it is possible to color very thin paper such as tissue paper without the color striking through the paper, and it is possible to apply one color to one side of the sheet and another color to the other side of the sheet without the colors being in any way blended or affecting each other. It will be understood that this process might also be applied to the coating of paper only moderately thin but of such character that the color applied to one side of the paper, under ordinary methods of printing, would strike through the other side of the paper.

While I have illustrated means for creping the paper, which means coats with the steam heated roll 14. I wish it understood that the paper which has been coated with different colors is not necessarily coated on the roll 14 but that the creping might be done on a separate roll to which the paper was carried from the roll 14.

I claim:—

1. As an article of manufacture, tissue

paper of a single thickness having one face of a different color from the opposite face.

2. As an article of manufacture, tissue paper of a single thickness having one face coated with a colored coating, the opposite face being of a different color from the coated face.

3. As an article of manufacture, a tissue paper web of a single thickness having differently colored coatings upon its opposite faces.

4. A method of coating the surfaces of tissue paper which consists in applying to one face of the paper a solution of color and a colloidal sizing, and immediately setting the coating by the application of heat thereto.

5. A process of coating tissue paper with color consisting in applying a solution of dye and gelatin to one face of the sheet of tissue paper and applying heat to the tissue paper to set the coating.

6. A method of applying a color coating to one face of a sheet of tissue paper consisting in applying a solution of coloring matter, colloidal sizing and salt to one face of the paper and then heating the paper to thereby set the coating.

7. A method of applying a coating of color to a face of a sheet of tissue paper consisting in applying a solution of gelatin, coloring matter and salt to one face of the sheet and then heating the paper to set the coating.

8. A method of applying a colored coating to one face of a sheet of tissue paper consisting in applying a solution of colloidal sizing, coloring matter and salt to one face of the sheet and then passing the sheet around a heated roll.

9. A method of applying color to one face of a sheet of tissue paper and creping the tissue paper which consists in applying a solution of coloring matter, colloidal sizing and salt to one face of the sheet of tissue paper, carrying the tissue paper around a heated roll and creping the paper as it leaves the roll and before the paper has been completely dried out.

10. A method of coating opposite faces of a sheet of tissue paper consisting in applying a solution including coloring matter and a colloidal sizing to one face of the sheet of tissue paper, carrying the sheet into contact with a heated roll and while it is passing over said roll applying a solution of colloidal sizing and coloring matter to the opposite face of the sheet.

11. A method of coating the opposite faces of a sheet of tissue paper with coloring matter consisting in passing the sheet of paper around a roll and simultaneously applying to the outside face thereof a solution of coloring matter, a colloidal sizing and salt,

carrying the coated tissue paper around a heated roll with the coated face in contact with the roll and applying a solution of coloring matter, colloidal sizing and salt to the outside face of the sheet as it passes over and around said heated roll.

12. A method of coating the opposite faces of a sheet of tissue paper with a color and creping the sheet consisting in passing the sheet around a roll and simultaneously applying to the outer face thereof a solution of coloring matter, colloidal sizing and salt, carrying said paper into contact with a heated roll, the coated face of the paper being in contact with the roll, applying a solution of coloring matter, salt and colloidal sizing to the outer face of the paper as it passes around said heated roll, and creping the paper as it passes from said heated roll at a point where the paper is still damp.

13. Means for coating tissue paper with color comprising an upper and a lower roll, the upper roll being heated and the lower roll being in contact with the upper roll, means for guiding the sheet of paper onto the lower roll and around the upper roll in a reverse direction, a color pan disposed below the lower roll having means therein for applying the coloring composition to the outer face of the paper, a second color pan disposed in connection with the upper roll, and means for applying color in said last named pan to the outside face of the paper as it passes over said heated roll.

14. Means for coating tissue paper with color comprising an upper and a lower roll, the upper roll being heated and the lower roll being in contact with the upper roll, means for guiding the sheet of paper onto the lower roll and around the upper roll in a reverse direction, a color pan disposed below the lower roll, a color applying roller associated with said pan and bearing against the paper as it passes onto said lower roll, an upper pan associated with the heated roll, a color applying roller mounted in the upper pan and adapted to bear against the paper as it passes over the upper roll, and means for conveying color from the pan to said color applying roller.

15. Means for coating tissue paper with color comprising an upper and a lower roll, the upper roll being heated and the lower roll being in contact with the upper roll, means for guiding the sheet of paper onto the lower roll and around the upper roll in a reverse direction, a color pan mounted upon the lower roll and vertically adjustable with relation thereto, a roller dipping into the color pan and bearing against the paper as it passes onto the lower roll and resiliently urged toward the paper, an upper color pan associated with the upper roller, a roller dip-

ping into the color in said pan, a pair of rollers, one bearing against the paper passing over said heated roll and the other bearing against the last named roller and against the first named roller, and means for adjusting the rollers toward or from the paper.

16. An apparatus for simultaneously coating a sheet of paper with color and creping the paper including a heated roll over which the paper passes, means for applying a coating composition to one face of the paper, and means for creping the paper consisting of a doctor blade obstructing the passage of the paper around said roll and causing the wrinkling or creping of said paper, the doctor blade being disposed in spaced relation to the means for applying the coating to the paper.

17. An apparatus for coating tissue paper on its opposite faces with different colored coatings and creping the paper consisting in means for applying a coating to one face of the tissue paper, means for applying heat to the tissue paper to set the coating, means for applying a second coating of coloring matter and sizing to the opposite face of the paper, means for heating the paper to dry the coating, and means then acting to crepe the paper while the paper is still damp.

18. Means for coating tissue paper with color comprising two rolls, one of said rolls being heated, means for guiding the sheet of paper onto the other roll and around the heated roll in a reverse direction to its direction of movement around the unheated roll, a color pan disposed below the unheated roll having means thereon for transferring the color composition to the outer face of the paper, a second color pan disposed in connection with the heated roll, and means for applying color in said last named pan to the outside face of the paper as it passes over said heated roll.

19. Means for coating tissue paper with color comprising two rolls, one of said rolls being heated, the sheet of paper passing over said rolls, means for applying color to one face of the sheet of paper before it passes onto one of said rolls, and means for applying color to the opposite side of the paper while the paper is passing over the heated roll.

20. Means for coating tissue paper with color comprising a heated roll over which the paper passes, means for applying color to one surface of the paper and then carrying the paper to the heated roll with the colored face of the paper against the heated roll, and means for applying color to the opposite surface of the paper while the paper is in contact with the heated roll.

In testimony whereof I hereunto affix my signature.

FRANK M. SCHULER.