

UNITED STATES PATENT OFFICE.

MAURICE N. AISEN, OF CHICAGO, ILLINOIS.

METHOD OF SIZING AND DYEING.

1,181,202.

Specification of Letters Patent.

Patented May 2, 1916.

No Drawing.

Application filed May 15, 1914. Serial No. 838,691.

To all whom it may concern:

Be it known that I, MAURICE N. AISEN, a subject of the King of Roumania, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Methods of Sizing and Dyeing, of which the following is a specification.

My invention relates to a method of sizing and dyeing and has been used by me in the manufacture of hats and will be described in connection with that industry.

In the manufacture of hats and particularly those of straw and hemp braids, the stock comes to the manufacturer in its natural color, unbleached and unsized. According to the usual practice, when an order is received, the manufacturer takes from his stock a sufficient number of pieces of braid required to fill the order. This he has dyed to the desired colors and shades and the stock is then put through the regular operations of stitching, sizing, blocking and pressing, known to those familiar with the art. Among the disadvantages to the manufacturer of such practice, are the following. The dyeing of the stock in lots and in the piece in amounts to fill a customer's order requires considerable time, and as very few hat manufacturers operate a dyeing plant in connection with their works, the dyeing must be done outside. It usually takes from ten days to two weeks to send the braid from the hat manufacturer to the dyer and for its return, and in the meantime the fashions as to the color or shade ordered may change, and if the order is canceled or reduced the hat manufacturer must stand the loss of the braid which has been dyed, or it must be re-dyed in black. In the original packages or pieces the braid is evenly laid back and forth flat and the edges straight. When dyed in the piece the package must be opened and made loose so that the dye may reach all parts of the package and when it dries there is more or less distortion of the braid and the edges are more or less curled. Also the braid loses some of the stiffness which it possessed when in the original package or piece, and thus renders the stitching a little more uneven and difficult to accomplish. Additionally it renders necessary the re-

winding of the braid on reels before it goes to the stitching room.

The hat braid comes in packages running from forty to eighty yards each and the making of a hat usually requires more braid than is contained in a single piece, so that in practice when the operator has stitched one package or piece of the dyed braid care must be exercised in the selection of the next piece in order that the hat shall have a uniform color or shade throughout, as otherwise it may be rejected by the customer. The same care must be exercised in the selection of the thread with which the sewing is done, as it must match as near as possible the color and shade of the dyed braid. This requires the manufacturer to carry in stock a large number of tubes or spools of thread of various colors and shades many of which may not be used or may not be called for during the season. It is the experience of the trade that thread manufacturers will not sell supplies in small quantities and hence the hat manufacturer is required to purchase a certain amount of each color of thread far in advance of the season, and if the fashion in colors changes, the unused or uncalled for colors are a loss. From the standpoint of the jobber he must keep on hand a comparatively large stock of hats of various colors to supply a possible demand from retailers, and at the close of the season may find himself with many colors unsold. These hats are a loss to the jobber and are usually sold by him at much less than the actual cost.

The above statements are sufficient to show that in the hat industry the caprices of fashion may, and they often do, entail a considerable loss upon the manufacturer because of the conditions under which he is compelled to manufacture. My purpose, therefore, has been to lessen, to some extent at least, the liability of such losses, and I have succeeded in doing so by a method which includes the dyeing of the hats after they have been sewed instead of first dyeing the braid and then sewing the dyed braid as has been done heretofore. In practising such method I utilize as the dye bath a non-shrinking sizing solution such as described in my applications Serial Nos. 834,884 and

834,885 filed April 28, 1914. The sizing solution is prepared by modifying the properties of glue by hydrolysis thereby rendering it soluble in an organic solvent such as methyl or ethyl alcohol. As hydrolyzing agents I have used mineral acids, such as nitric acid, hydrochloric acid and sulfuric acid. Organic acids may be used in connection with a mineral acid such as formic acid, acetic acid and lactic acid. Or I may use an alkaline hydrolyzing agent such as potassium or sodium hydroxid. Among the methods used by me for preparing the solution, which in the present case is used for sizing as well as a dye bath, the following may be cited.

Example 1: I take two and one-half pounds of nitric acid 70 per cent. pure, and add one and one-quarter pounds of formic acid 25 per cent. pure, and three and one-half pounds of water. These are mixed and shaken or agitated in any convenient manner to produce a homogeneous mixture. I then add ten pounds of powdered glue and mix, taking care that the glue is well covered by the liquid. This is allowed to stand from one to three hours, and then I add alcohol as desired and shake or agitate for about fifteen minutes.

Example 2: I take about eight to ten pounds of hydrochloric acid, calculated as hydrogen chlorid pure, to 100 pounds of glue, and add the acid to one gallon of alcohol. To this liquid, while heated to about 120° to 130° F., the glue is added and the mixture allowed to stand at that temperature, for about one hour with occasional stirring; during this time hydrolysis of the glue ensues and the glue is dissolved in the alcohol. Any suitable means for heating the solution may be provided.

Example 3: Ten per cent. of potassium hydroxid, of the weight of glue to be dissolved, is dissolved in two gallons of alcohol and the mixture heated to about 120° F. The glue is then added, when stirring, and the mixture heated to about 145° to 150° F. in a vessel containing means to recover the alcohol vapors. The mixture is heated at this temperature for about one hour or one hour and a half and then neutralized by the addition of a suitable acid either completely or to any desired degree which is not harmful to the glue or to the material treated.

I have used the term "glue" in the above examples as including gelatin, and as meaning animal albuminoids and glues of gelatinic basis which heretofore, so far as known to me, have been insoluble in alcohol, acetone, ether and other organic solvents.

An undue amount of mineral acid will in time impair the efficiency of the composition as a sizing and if permitted to remain in the solution might hydrolyze the glue to a

degree which will render the composition less effective. Also the acid is apt to be harmful to cellulose braids of which the hats are made. I, therefore, neutralize all of the hydrolyzing agent, or neutralize it to a degree at which its presence is not harmful to the glue or to the hat material. The alcoholic solution of glue being the dye bath the bath may be readily made acid, alkaline or neutral according to the character of the dyestuff used. With a basic coal tar color the bath is made slightly acid and with a substantive color, slightly alkaline. If the dyestuff is insoluble in water I dissolve it in alcohol and add to the bath. If insoluble in alcohol I dissolve it in water or by other suitable solvent, and add to the bath, the proportion of dyestuff depending upon the intensity of color desired on the goods, and varies from one-half ounce to twenty-five ounces for a twenty gallon bath.

I can use and have used the following: Basic colors such as chrysoidins, phosphins, rhodamins, methylene blues, cotton blues, etc. Substantive or direct colors such as diamins, oxamins, etc. Acid colors such as azo colors, chrysoins, rosindulin, alizarins. The amount of coloring matter desired is dissolved in its appropriate solvent and added to the bath and thoroughly stirred therethrough.

I have found that the presence of a certain amount of water, even 25 to 30 per cent., in the solution is not detrimental, the amount depending upon the coefficients of contraction of the braid and the thread.

Having prepared the bath by adding the dyestuff to the alcoholic sizing solution the manufacture of a hat includes the following operations: When an order is received for hats to be of certain colors, the stock in its original unbleached and untreated condition and in the original bundle or piece as it comes from the braid manufacturer, is sent to the sewing room where it is sewed on the block to the forms desired and with little or no allowance for shrinkage. As the stock is used in its natural condition the operator uses ordinary white cotton thread for sewing the braid thereby doing away with the necessity of carrying on hand a supply of various colors of threads as the thread is dyed at the same time and the same color as the braid. When, however, the hat form is to be dyed with a basic coal tar color I prefer to use a cotton thread mordanted by any of the usual and known methods for mordanting cotton. After the hat form is sewed it is sent to the sizing and dyeing room and treated as follows: Any desired number of hats are placed in a wire cage suspended or supported in a vat and the latter closed air and water tight. Into the closed vat is forced the solution made as above described,

that is, a sizing solution which at the same time contains a dyestuff. The solution is preferably introduced under a pressure of from ten to twenty pounds and at a temperature of from 110 to 120° F., and in amount sufficient to submerge the hats or to completely fill the vat as may be desired. The hats are allowed to remain in the solution for three to six minutes or longer as may be necessary in order that the solution may thoroughly penetrate the braid and to uniformly size and dye the braid and thread. The solution is then run off and any excess removed from the hats preferably by admitting air under pressure to the vat. The hats are then removed from the vat, hung up to dry, blocked and pressed in the usual way.

Among the advantages of the method herein described the following may be named: The hats are sewed with the braid in its natural color and condition making it easier for the operator to handle and sew. As the dyeing is done after sewing, the coloring of the hat is uniform and does away with the necessity of matching the pieces of braid as when the braid, as heretofore, has been dyed before sewing. It also does away with the necessity of carrying in stock a large number of tubes or spools of various colors of thread, as white thread may be used which is dyed a uniform color with the braid. By prior methods the sizing sometimes affects the color and causes it to run or appear streaky. By the present method the sizing being colored penetrates the fiber and makes a uniform color over the hat. The alcohol of the bath penetrates the fiber readily, carrying both the sizing and the color and produces a more uniform result both as to the sizing and as to the dyeing. Carrying on the operation in a closed vat with the solution under pressure assists in causing the bath to penetrate the fiber, and the use of compressed air to drive out the surplus solution gives better and more uniform results than heretofore. There is no substantial shrinkage of the hats because of the use of alcohol as the carrying medium for the size and for the dyestuff. As alcohol evaporates readily the time required for drying the hats is reduced to a minimum. The sewed hat is sized and dyed in one operation requiring but a few minutes instead of, as heretofore, waiting upon the dyer to dye the braid. If a customer should change his order as to the color of the hats, the hat manufacturer can dye to the changed color without loss, or without holding in stock the hats which one customer does not want in the hope that another will order what a previous one had refused. The manufacturer is enabled to make and deliver the finished hats within two or three days after the order is

received because he saves the time heretofore required for dyeing the braid. By so lessening the time the chances of a change in, or a cancellation of, an order are lessened. By being able to have an order filled in a comparatively short time it is not necessary for the jobber to keep on hand a large supply. If there should be a sudden demand for a particular color, or particular shape of hat, the order can be filled and delivered by the manufacturer in about one-fourth the time heretofore required.

What I claim and desire to secure by Letters Patent of the United States is:—

1. A method of sizing and dyeing which consists in subjecting the material to be treated to a bath having non-shrinking tendencies and containing a stiffening substance and a dyestuff.

2. A method of sizing and dyeing which consists in subjecting the material to be treated to a bath containing a stiffening substance in solution in an organic solvent, and a dyestuff.

3. A method of sizing and dyeing which consists in subjecting the material to be treated to a bath containing glue in solution in an organic solvent, and a dyestuff.

4. A method of sizing and dyeing which consists in subjecting the material to be treated to a bath containing glue in solution in alcohol, and a dyestuff.

5. A method of sizing and dyeing which consists in subjecting the material to be treated to a bath containing hydrolyzed glue in solution in an organic solvent, and a dyestuff.

6. A method of sizing and dyeing which consists in subjecting the material to be treated to a bath containing glue in solution and a basic coal tar color.

7. A method of sizing and dyeing which consists in subjecting the material to be treated to a solution containing glue and a dyestuff.

8. A method of sizing and dyeing which consists in subjecting the material to be treated to a solution containing a stiffening substance dissolved in alcohol, and a dyestuff.

9. A method of sizing and dyeing which consists in subjecting the material to be treated to a solution containing glue dissolved in alcohol, and a dyestuff.

10. The method consisting in dyeing, in sewed form, a hat made of braid.

11. The method consisting in simultaneously sizing and dyeing, in sewed form, a hat made of braid.

12. The method consisting in dyeing in a bath containing a basic coal tar color, in sewed form, a hat made of braid sewed with a mordanted cotton thread.

13. The method consisting in dyeing, in

sewed form, a hat made of unbleached and untreated braid in its natural color.

14. The method consisting in simultaneously sizing and dyeing, in sewed form, a
5 hat made of unbleached and untreated braid in its natural color.

In testimony whereof I have hereunto

signed my name in the presence of two subscribing witnesses.

MAURICE N. AISEN.

Witnesses:

E. CALDWELL,

E. PASCHKE.