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UNITED STATES PATENT OFFICE

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PRODUCTION OF FAST DYEINGS AND PRINTINGS WITH MORDANT DYESTUFFS

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Certain mordant dyestuffs cannot be sufficiently fixed, in printing, on vegetable fibres with metal mordants. If such fabrics are washed, a part of the dyestuff is removed from the fibre; this represents a loss of dyestuff. In some cases the insufficiently fixed dyestuff bleeds into the whites, a drawback which adversely affects the use of such dyestuffs.

A mere increasing of the quantity of mordant in the printing formula is not sufficient for obtaining better fixation. It has been found that a better fixation is, however, achieved if urea is added to the printing colour, and if, at the same time, the quantity of mordant is eventually increased. This process can also be applied in padding.

Thus, not only the fastness to washing, but also the fastness to soaping is considerably improved. The addition of urea to the printing colour or padding liquor has also the advantage of rendering the finished dyeings and printings much fuller.

The same effect can certainly also be obtained if the required quantity of urea is not added to the printing paste or padding liquor, but to the dyestuff (powder or paste) as it comes on the market.

It has already been suggested to use urea as a standardizing agent for basic colours. In the present process, urea is used for quite a different purpose, not in connection with basic colours but with mordant dyestuffs. The technical effect of the improvement of the fastness to washing and soaping, and the increasing of the intensity of shade in the case of dyeings and printings obtained with mordant colours with the help of urea, according to the present process, could not be concluded from the facts known up to today. In addition, in certain cases the highest effect is not achieved with urea alone, but only together with an increased quantity of mordant. The present process also differs from the one described in the German Patent No. 433152. While in the present process urea is used for the better fixation of mordant colours, in particular chromium colours, in the process of the above named patent the fixation on the fibre of colour lakes, insoluble dyestuffs, pigments, metals, etc. is carried out by means of resinous condensation products from urea with formaldehyde.

The improved process is illustrated by the following examples:

I. The following printing paste is made up:

20 grs.	of chromazurine E (see Colour Index No. 879)
50 grs.	of urea
230 grs.	of hot water
600 grs.	of neutral starch and gum dragon thickening let cool down and add:
100 grs.	of chromium acetate solution (20° Bé.).
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In place of chromazurine E, the same quantity of another dyestuff, such as f. i. chromazurine G, chromazurine GR (see Colour Index No. 879), can be used with similar results.

In use there is printed on cotton, dried, steamed for 1 hour and washed.

The thus obtained printings are fast to washing. If the fabric is hung up in moist state, no bleeding will take place; this would, however, happen if no urea had been used. The shades are considerably stronger than in the case of corresponding printings obtained without urea.

The present process can also be applied to colours which resist discharging agents, such as for example new chromazurine HB (manufactured by Durand & Huguenin S. A. Basel, Switzerland), in order to obtain coloured discharge effects.

II. The following printing paste is made up:

20 grs. of azol printing red R extra (manufactured by I. G. Farbenindustrie, Aktiengesellschaft, Frankfort-on-Main, Germany)
50 grs. of urea
230 grs. of hot water
600 grs. of acid starch and gum dragon thickening let cool down and add:
100 grs. of chromium acetate solution (20° Bé.).

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The printing on cotton is performed as usual. The result will be the same in all cases, viz: improvement of the fastness to washing and soaping, and increasing of the strength, as compared to printings which have been obtained without urea.

III. The following printing paste is prepared:

20 grs. of Rhine blue TC (see Colour Index No. 888)
50 grs. of urea
50 grs. of acetic acid (6° Bé.); dissolve and add:
180 grs. of hot water
600 grs. of acid starch and gum dragon thickening
100 grs. of chromium acetate solution (20° Bé.).

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There is then printed on cotton, dried, steamed for 1 hour, washed and soaped. The print is faster to washing and soaping and stronger than one which has been obtained without urea.

The quantity of urea indicated in the above examples can vary within certain limits.

What I claim is:—

A process for producing on vegetable fibres dyeings and prints of an improved fastness to washing and soaps by means of mordant dyeing dyestuffs, said process consisting in applying to the material a padding solution or printing paste containing free urea, whereupon the usual further operations for the purpose specified may follow.

In witness whereof I have hereunto signed my name this 25th day of July, 1929.

HEINRICH WERDENBERG.