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PROCESS OF PREPARING COPIES

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The present invention relates to a process of preparing copies, particularly to a process of preparing positive copies of a negative pattern or vice versa.

It is known that positive copies can be obtained from a negative by treating layers containing the diazo compounds of para-diamines, particularly those of para-aminodiphenylamines, after exposure to light under a negative, with an oxidizing agent, for instance, a bichromate. Fast brown pictures are thus obtained.

We have found that according to the present invention copies which show a substantial improvement or enrichment of the color tones in comparison with the copies produced by the known process are obtained by copying any pattern upon a light-sensitive material containing a diazo compound of an aromatic diamine in mixture with one or more aromatic compounds capable of yielding oxidation dyestuffs when coacting with the light-decomposition products of the diazo compound present. Such aromatic compounds are, for instance, aromatic phenols or amines which may be substituted, for instance, by alkyl, oxalkyl, halogen or the like. As diazo compounds of aromatic diamines there may be employed mono- or dis-azo-compounds of diamines of the benzene series or naphthalene series, also substitution products or derivatives thereof. The diazo compounds can be used as such or in form of double salts with suitable inorganic salts. The light-sensitive material can be prepared by applying a solution of the compounds in question upon a suitable support, such as, for instance, paper, film made of cellulose or a cellulose derivative, glass-plates or the like. This solution may also contain colloidal substances, such as, for instance, gelatin. Furthermore the mixture of the diazo compounds with the said other organic compounds can be immersed in the mass of a suitable carrier such as, for instance, films of regenerated cellulose or cellulose esters and ethers. As aromatic compounds capable of yielding oxidation dyestuffs there may be used, besides the diazo compounds of the aromatic diamine, a diazo compound of another aromatic diamine, also any other aromatic diazo compound yielding when exposed to light a decomposition product capable of coacting with the light-decomposition product of the diazo compound of the aromatic diamine with formation of an oxidation dyestuff, when subjected to the action of an oxidizing agent. Also in this case, the diazo compounds can be used as such or as double salts with suitable inorganic salts.

From the light-sensitive material described and explained above a picture is obtained in the following manner. The light-sensitive material is exposed to light under a pattern of any kind. After exposure the material is treated with an oxidizing agent preferably with an aqueous solution thereof and subsequently washed with water, if required. The pictures can thus be obtained in yellow, yellowish-brown, blue, violet to black color tones, a variety of which is rather important for many purposes, but which could not be obtained by using diazo compounds of aromatic diamines alone, as in the known process.

As oxidizing agents there may be used chromic acid or the salts thereof, hydrogen peroxide, iron chloride, copper oxide ammonia and others which are preferably used in aqueous solution. The light-sensitive material may, of course, contain in the layer additional substances which are usually employed in diazo-type process, such as, for instance, metal salts, stabilizers and dyestuffs.

The following examples illustrate the invention:

(1) 25 parts of the cadmium chloride double salt of para-phenylenediamine, one amino group of which is diazotized, are dissolved together with 9 parts of phenol in 350 parts of water. If this solution is applied on paper and the layer is exposed to light under a negative, a weak positive picture is obtained. By treating the picture thus obtained for a short time with an acidified aqueous solution of potassium bichromate of 1% strength, a blue-black strong picture is produced which can be washed with water without undergoing alteration.

(2) 25 parts of the cadmium chloride double salt of para-phenylenediamine, one amino group of which is diazotized, and 13 parts of aniline hydrochloride are dissolved in 350 parts of water and the solution is applied on paper. By exposing the layer to light under a negative pattern and after-treating with a diluted aqueous solution of potassium bichromate as indicated in Example 1, greenish-black positive pictures are obtained.

(3) 7 parts of the cadmium chloride double salt of para-phenylenediamine, one amino group of which is diazotized, and 5 parts of diazotized 1-amino-7-hydroxynaphthalene are dissolved in 150 parts of water and the solution is applied on paper. The layer thus obtained yields bluish-

red pictures after exposure to light under a pattern and subsequent oxidation by means of an aqueous solution of potassium bichromate.

(4) 7 parts of para-phenylenediamine, one animo group of which is diazotized, and 8 parts of the cadmium chloride double salt of 4-diethylamino-2-hydroxy-1-diazo-benzene are dissolved in 150 parts of water. The solution is applied on paper and the layer thus obtained is exposed to light and then oxidized by means of an aqueous solution of copper oxide ammonia, whereby dark brown pictures of excellent depth of color are obtained. By the addition of 3 parts of napthalene-trisulphonic acid to the sensitizing solution, the brilliancy of the whites is increased.

(5) A solution, made up as described in Example 4, is applied on paper. The pictures produced on this layer are after-treated with an aqueous iron chloride solution of 5% strength. Stable brownish-red pictures are obtained. Pictures of similar tone are produced by oxidizing by means of hydrogen peroxide.

(6) 3 parts of para-diazodiphenylaminosulfate and 3 parts of the cadmium chloride double salt of 4-diethyl-amino-2-hydroxydiazobenzene are dissolved in 100 parts of water and the solution is applied on paper. By exposing this paper to light under a pattern and subsequently oxidizing by means of an aqueous solution of potassium bichromate, greyish-black pictures are formed.

Instead of the diazo compound of para-phenylene-diamine, derivatives or substitution products thereof, or diamines of other aromatic bodies, such as, for instance, those of the naphthalene series or the like, may also be used.

(7) 6 parts of the cadmium chloride double salt of diazodimethylaniline and 5 parts of the cadmium chloride double salt of 4-diethylamino-2-hydroxy-diazobenzene are dissolved in 100 parts of water and the solution is applied on paper. By exposing to light under a negative pattern and after-treating with an aqueous solution of copper oxide ammonia, violet pictures are obtained.

(8) 4 parts of the cadmium chloride double salt of 4.4'-tetrazodiphenylamine and 5 parts of the zinc chloride double salt of 4-diethylamino-2-hydroxy-diazobenzene are dissolved in 120 parts of water and the solution is applied on paper. The layer thus obtained yields red-brown pictures after exposure to light under a pattern and subsequent oxidation by means of an aqueous solution of iron chloride.

(9) 10 parts of the cadmium chloride double salt of 4-dimethlyamino-3-methyl-diazobenzene and 9 parts of the zinc chloride double salt of 4-diethlyamino-2-hydroxy-diazobenzene are dissolved in 200 parts of water and the solution is applied on paper. The layer thus obtained produces grey-blue pictures after exposing it to light and subsequently treating it with an aqueous solution of copper oxide ammonia.

(10) 7 parts of the cadmium chloride double salt of p-phenylene-diamine, one amino group of which is diazotized, and 8 parts of the sodium salt of 2-diazo-1-hydroxy-naphthalene-4-sulfonic acid are dissolved in 100 parts of water and the solution is applied on paper. By exposing the layer to light under a pattern and subsequent oxidation by means of an aqueous solution of copper oxide ammonia, yellow-brown pictures are obtained.

In the following claims the term "diazo compound" is intended to comprise not only the diazo-compounds as such, but also in the form of double salts with suitable inorganic salts.

We claim:

1. The process of preparing copies which comprises exposing to light under a pattern a light-sensitive material containing a light-sensitive diazo compound of an aromatic diamine in mixture with an aromatic compound capable of yielding when treated with an oxidizing agent oxidation dyestuffs with the light-decomposition product of the said diazo compounds and subjecting the material after exposure to the action of an oxidizing agent.

2. The process of preparing copies which comprises exposing to light under a pattern a light-sensitive material containing a light-sensitive diazo-compound of an aromatic diamine in mixture with an aromatic compound of the group consisting of aromatic phenols and amines and subjecting the material after exposure to the action of an aqueous solution of an oxidizing agent.

3. The process of preparing copies which comprises exposing to light under a pattern a light-sensitive material containing a light-sensitive diazo compound of an aromatic diamine in mixture with another aromatic diazo component of the group consisting of diazotized aromatic diamines and diazotized aromatic amines yielding when exposed to light decomposition products capable of co-acting with the light-decomposition product of the diazotized aromatic diamines with formation of an oxidation dyestuff and subjecting the material after exposure to the action of an aqueous solution of an oxidizing agent.

4. The process of preparing copies which comprises exposing to light under a pattern a light-sensitive material containing a light-sensitive diazo compound of an aromatic diamine in mixture with another diazo compound of the group consisting of diazotized aromatic diamines and diazotized aromatic aminophenols and subjecting the material after exposure to the action of an aqueous solution of an oxidizing agent.

5. The process of preparing copies which comprises exposing to light under a pattern a light-sensitive material containing a monodiazo compound of para-phenylenediamine in mixture with an aromatic compound of the group consisting of aromatic phenols and amines and subjecting the material after exposure to the action of an aqueous solution of an oxidizing agent.

6. The process of preparing copies which comprises exposing to light under a pattern a light-sensitive material containing a monodiazo compound of para-phenylenediamine in mixture with another diazo compound of the group consisting of diazotized aromatic diamines and diazotized aromatic aminophenols and subjecting the material after exposure to the action of an aqueous solution of an oxidizing agent.

7. The process of preparing copies which comprises exposing to light under a pattern a light-sensitive material containing a monodiazo compound of para-phenylenediamine in mixture with aniline chloride and subjecting the material after exposure to the action of an aqueous solution of potassium bichromate.

8. The process of preparing copies which comprises exposing to light under a pattern a light-sensitive material containing a monodiazo com-

pound of para-phenylenediamine in mixture with 4-diethylamino-2-hydroxydiazobenzene and subjecting the material after exposure to the action of an aqueous solution of an oxidizing agent.

9. The process of preparing copies which comprises exposing to light under a pattern a light-sensitive material containing a monodiazo compound of para-phenylenediamine in mixture with 2-diazo-1-hydroxy-naphthalene-4-sulfonic acid and subjecting the material after exposure to the action of an aqueous solution of copper oxide ammonia.

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