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PROVISIONAL SPECIFICATION.

"Improvements relating to Processes of Toning Silver Prints."

I, Dr. Arthur Traube, of 16, Wieland Strasse, Charlottenburg, in the German Empire do hereby declare the nature of this invention to be as follows:—

It is known that in the optical sensitising of halogen silver layers the desired effect only occurs when the colour employed directly colours the silver haloide. This phenomenon may be utilised for the conversion of silver prints into pure colour prints by applying organic dye-stuffs to the metallic compounds forming the picture in accordance with the present invention by eliminating the metallic compounds by fixing agents after the colouring. To do this it is necessary to transform the metallic compounds of the picture into compounds adapted to be eliminated by such fixing agents. The process which forms the object of the present invention is of importance in polychrome photography inasmuch as in this manner the monochromes required for the subtractive synthesis of pictures in natural colours by the combination of three partial pictures may be obtained directly from silver prints.

In examining the question which silver compound was the best suited for the application of the colour the surprising fact appeared that silver iodide which hitherto could not be sensitised at all, presents so great an affinity for especially basic colours, that in aqueous solutions of such colours it becomes coloured with great intensity within a few minutes and retains the colour in such a manner that no colour is given up however long washing with water may be carried out. A large number of experiments carried out with much silver salts and silver double salts have failed to reveal one which presents a greater affinity to colours than silver iodide.

In accordance with what has been stated the conversion of a silver print into a coloured print is effected in the following manner:—The silver print obtained in the ordinary way on dia-positive emulsions of any suitable origin, is transformed by known means into a print consisting of silver iodide or other compounds capable of being coloured directly, whereupon the colouring is effected in suitable colouring baths. After a short time the deposit of the colour on the silver compound will have taken place, whereupon the excess of colour is removed from the gelatine film by a short soaking. The silver iodide prints thus obtained, which in respect of transparency even of the deepest shadows are especially suited for projection purposes, must be subjected to a fixing process for eliminating the silver compound from the picture when used for polychrome photography which requires completely transparent partial pictures. If appropriate colouring material has been selected for the colouring, after treatment with thio-sulphate of sodium, an insoluble colour picture remains.

Quinoline red may be given as an example of a suitable colouring material which may be used for colouring in a dilution of 1:2000 or weaker, fixing then taking place in an acid fixing bath.

In accordance with the process described above, before the colouring takes place the silver is transformed into compounds which can be removed by the usual fixing medium. In order that no injury to the colour picture may occur

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owing to the employment of such a medium, only certain, that is to say basic, colouring materials should be used.

Colouring materials of any kind may, however, be used if the precipitation of the colouring material in the form of an insoluble lac or salt is effected by the addition of appropriate substances to the fixing solution.

This addition depends upon the nature of the colouring material. When the colouring is effected by means of a basic colouring material, tannin is added to the fixing bath; when colouring with acid colourants, metallic salt solutions are added. Other colourants form insoluble or difficultly soluble hydriodic salts, so that an addition of iodide of potassium to the fixing solution leaves behind a colour picture. In any case it is merely a question of adding to the fixing bath (solvent for silver iodide or other silver compounds) those substances which with the colouring material give insoluble coloured compounds.

Dated this 2nd day of May 1907.

HASELTINE, LAKE & Co.,
7 & 8 Southampton Buildings, London. W.C.
Agents for the Applicant.

COMPLETE SPECIFICATION.

"Improvements relating to Processes of Toning Silver Prints."

I, Dr. Arthur Traube, of 16, Wieland Strasse, Charlottenburg, in the German Empire, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

It is known that in the optical sensitising of halogen silver layers the desired effect only occurs when the colour employed directly colours the silver haloide.

This phenomenon may be utilised for the conversion of silver prints into pure colour prints by applying organic dye-stuffs to the metallic compounds formed by treating the picture in accordance with the present invention and by eliminating the metallic compounds by fixing agents after the colouring. To do this it is necessary to transform the metallic compounds of the picture into compounds adapted to be eliminated by such fixing agents. The process which forms the object of the present invention is of importance in polychrome photography inasmuch as in this manner the monochromes required for the subtractive synthesis of pictures in natural colours by the combination of three partial pictures may be obtained directly from silver prints.

In examining the question which silver compound was the best suited for the application of the colour the surprising fact appeared that silver iodide which hitherto could not be sensitised at all, presents so great an affinity for especially basic colours, that in aqueous solutions of such colours it becomes coloured with great intensity within a few minutes and retains the colour in such a manner that no colour is given up however long washing with water may be carried out. A large number of experiments carried out with many silver salts and silver double salts have failed to reveal one which presents a greater affinity to colours than silver iodide.

In accordance with what has been stated the conversion of a silver print into a coloured print is effected in the following manner:—The silver print obtained in the ordinary way on diapositive emulsions of any suitable origin is trans-

formed by double decomposition with the corresponding salts in the presence of an oxidizing agent into a print consisting of silver iodide or silver bromide, silver chloride silver ferrocyanide (Ag_4FeCy_6) double compounds of silver and copper or of silver and mercury or other compounds capable of being coloured directly, whereupon the colouring is effected in suitable colouring baths. After a short time the deposit of the colour on the silver compound will have taken place, whereupon the excess of colour is removed from the gelatine film by a short soaking. The silver iodide prints thus obtained, which in respect of transparency even of the deepest shadows are especially suited for projection purposes, must be subjected to a fixing process for eliminating the silver compound from the picture when used for polychrome photography which requires completely transparent partial pictures. If appropriate colouring material has been selected for the colouring, after treatment with thio-sulphate of sodium, an insoluble colour picture remains.

Quinoline red may be given as an example of a suitable colouring material which may be used for colouring in a dilution of 1:2000 or weaker, fixing then taking place in an acid fixing bath.

In accordance with the process described above, before the colouring takes place the silver is transformed into compounds which can be removed by the usual fixing medium. In order that no injury to the colour picture may occur owing to the employment of such a medium, only certain, that is to say basic, colouring materials should be used.

Colouring materials of any kind may, however, be used if the precipitation of the colouring material in the form of an insoluble lake or salt is effected by the addition of appropriate substances to the fixing solution.

This addition depends upon the nature of the colouring material. When the colouring is effected by means of a basic colouring material, tannin is added to the fixing bath; when colouring with acid colourants, metallic salt solutions are added. Other colourants form insoluble or difficultly soluble hydriodic salts, so that an addition of iodide of potassium, to the fixing solution leaves behind a colour picture. In any case it is merely a question of adding to the fixing bath (solvent for silver iodide or other silver compounds) those substances which with the colouring material give insoluble coloured compounds.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. The process for converting silver prints into pure colour pictures which consists in converting the silver prints into compounds capable of being coloured, colouring the pictures and treating the coloured pictures with fixing compounds.

2. The process for converting silver prints into pure colour pictures, which consists in converting the silver prints into compounds capable of being coloured, colouring the pictures and treating the coloured pictures with a mixture of fixing compounds and substances producing with the dye-stuffs used for colouring the prints insoluble lakes.

Dated this 29th day of October, 1907.

HASELTINE, LAKE & Co.,
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