UNITED STATES PATENT OFFICE.

ARTHUR TRAUBE, OF CHARLOTTENBURG, GERMANY, ASSIGNOR TO ACTIEN GESELLSCHAFT FÜR ANILIN FABRIKATION, OF BERLIN, GERMANY.

PROCESS OF CONVERTING PHOTOGRAPHIC SILVER-PRINTS INTO COLORED PRINTS.

1,093,503. Specification of Letters Patent. Patented Apr. 14, 1914.

No Drawing. Application filed May 15, 1907. Serial No. 373,773.

To all whom it may concern:

Be it known that I, ARTHUR TRAUBE, doctor of philosophy, chemist, a subject of the King of Prussia, German Emperor, residing at 16 Wielandstrasse, Charlottenburg, Kingdom of Prussia, German Empire, have invented new and useful Improvements in Processes of Converting Photographic Silver-Prints into Colored Prints, of which the following is a specification.

It is known that in the optical sensitizing of halogen silver layers the desired effect only occurs when the color employed directly colors the silver haloid. This phenomenon may be utilized for the conversion of silver prints into pure color prints by transforming the metallic silver prints into prints composed of silver compounds, coloring the prints of silver compounds so formed and eliminating the silver compounds from these prints, by means of fixing compounds. 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 synthesis of pictures in natural colors 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 color the surprising fact appeared that silver iodid, which hitherto could not be sensitized at all, presents so great an affinity for especially basic colors, that in aqueous solutions of such colors it becomes colored with great intensity within a few minutes and retains the color in such a manner that no color is given off 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 colors than silver iodid.

The pictures composed of silver iodid and basic colors have the property that fixing compounds eliminate the silver iodid without attacking the basic colors. The treatment of the said colored print by means of fixing compounds dissolves therefore the silver iodid whereas the basic colors remain. One obtains finally a picture free of silver-compounds and only composed of basic colors.

In accordance with what has been stated the conversion of a silver print into a colored 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 iodid or other compounds capable of being colored directly, whereupon the coloring is effected in suitable coloring baths. After a short time the deposit of the color on the silver compound will have taken place, whereupon the excess of color is removed from the gelatin film by a short soaking. The silver iodid 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.

Any of the known fixing processes may be employed; for example, the fixing may be carried out by immersing the print in a solution of sodium thiosulfate and washing the print. The concentration of the thiosulfate solution may be 1 part by weight thiosulfate in 100 parts by weight water.

Coloring materials of any kind may be used if the precipitation of the coloring material in the form of an insoluble lake or salt is effected by the addition of appropriate substances to the fixing solution for example, a solution of sodium thiosulfate. This addition depends upon the nature of the coloring material. When the coloring is effected by means of a basic coloring material, for instance quinolin red of a concentration 1:1000 tannin is added to the fixing bath; when coloring with acid colorants, for instance alizarin of a concentration 1:400 metallic salt solutions are added. Other colorants form insoluble or difficultly soluble hydriodic salts, so that an addition of iodid of potassium to the fixing solution leaves behind a color picture. In any case it is merely a question of adding to the fixing bath (solvent for silver iodid or other

silver compounds) those substances which with the coloring material give insoluble colored compounds.

What I claim as my invention, and desire to secure by Letters Patent, is:—

The process of converting silver prints into pure color pictures, which consists in converting the material of which the picture is composed into substances capable of being colored directly and soluble in fixing compounds, then coloring the pictures with basic dyes and treating the colored pictures with a mixture including substances which dissolve the silver salts and also containing substances which produce insoluble lakes with the dyes used for coloring the prints.

In witness whereof I have hereunto signed my name this 30th day of April 1907, in the presence of two subscribing witnesses.

DR. ARTHUR TRAUBE.

Witnesses:
HENRY HASPER,
WOLDEMAR HAUPT.