To all whom it may concern,

Be it known that I, Thomas Manly, a subject of the King of Great Britain, residing at London, England, have invented new and useful Improvements in Photographic-Printing Baths, of which the following is a specification.

The object of my invention is to produce a photographic printing bath by means of which pictures in insoluble colloids such as gelatine or mucilaginous substances may be obtained from photographic images consisting of metallic silver produced by development. Such pictures may be produced upon the silver print itself in pigment-coated colloid or by causing a pigmented gelatine film to be acted upon by the silver print and then transferring the gelatine film thus affected to another support. Collootype printing surfaces may also be produced by the same bath.

The method of carrying out my invention is as follows:—I make up a solution, which I shall hereafter refer to as the pigmenting bath, consisting of: potassium or other alkali bichromate about 4 parts, potassium or other alkali ferrocyanide about 4 parts, a soluble haloid salt such as potassium or other alkali bromide about 4 parts, alumina, alum about 2 parts, citric acid about 0.6 parts, water to make 600 parts. I then add to this a small quantity of album and citric acid to the other materials gives improved results although it is not absolutely necessary.

Instead of employing the bromide of potassium or other alkali I may naturally employ one or more of the other soluble haloid salts such as the chloride or iodide of potassium or other alkali.

The bath is used in the following manner: I soak a piece of paper coated with pigmented gelatine otherwise called carbon tissue or pigment plaster in the above pigmentation bath until it becomes saturated. In the meantime I place a bromide print or other image consisting of metallic silver in a dish of cold water. As soon as the pigment plaster in the pigmentation bath has become limp or saturated I withdraw it from the bath and place it face upwards upon a glass plate. I now take the bromide print or other image consisting of metallic silver from the dish of water and place it carefully upon the pigment plaster lying upon the glass plate and squeegee the two papers into contact. I then place the combined papers upon blotting paper until ready for development. I then move this method of placing the carbon tissue and metallic silver print in contact to give good results although they may be placed in contact by other methods. Upon to this point the method of producing a pigmented picture upon the original silver print and an impression for transfer upon another support is the same.

After the squeegeed papers have been in contact about 20 or 30 minutes the image of the silver print will have acted upon the film of the pigmented gelatine and the two papers will require to be separated. There are two methods of separating these papers: according to the first method when the original silver print is intended to be the support of the picture, the adhering papers are soaked in hot water and separated and the development then takes place by washing away from the silver print all the pigmented gelatine adhering thereto that has not been rendered insoluble by the action of the metallic silver. According to the second method when it is desired to transfer the gelatine impression to another support then the two adhering papers are plunged into cold water and separated by slowly and firmly pulling them asunder. In this case the pigmented gelatine film remains on its support and holds an impression of the silver image and may be squeegeed down upon a fresh support and developed by removing the original support, washing away the soluble gelatine and leaving the picture on the fresh support. The black silver of the print which will have become a faint brown in the operation may then be washed and redeveloped by any of the usual developers for bromide prints and again washed when it will serve for the production of another pigment print by being treated according to the second method above described. In this manner several transfer prints can be obtained from one metallic silver print produced by development. Of course a redeveloped silver print can be treated as described in the first method and a pigmented picture produced upon the said redeveloped silver print.

Photographic negatives may be intensified and lantern slides may be colored by means of the hereinbefore described pigmentation bath by adopting the first method hereinbefore described.

Another application of my invention re-
lates to colotype printing. If a colotype plate prepared in the usual way is soaked in the above mentioned pigmenting bath and a bromide silver print is squeegeed into contact with the surface and allowed to remain in contact for about half an hour, on stripping off the bromide silver print, an impression of the bromide silver print in insoluble gelatine will remain on the surface of the colotype plate which is then washed. The colotype plate is then treated as usual to produce a colotype printing surface but as such treatment forms no part of the present invention it is not described. The impression is reversed as regards right and left and therefore suitable for mechanical printing.

Pictures in a pigmented colloid such as gum can be produced by mixing a concentrated solution of the above mentioned bath with a solution of pigmented gum which is spread on the metallic silver print with a brush or otherwise. After the silver print has acted on the pigmented colloid the soluble portions are washed away.

A combination of potassium ferricyanide and alkali bromide is well known as a bleaching agent for silver prints with the object of chemically toning or re-developing the same but the addition to these two salts of an alkali bichromate for the purpose of transforming silver prints into insoluble colloid pictures was not known so far as I am aware prior to my invention thereof.

The results obtained by my invention are not due to any catalytic action but can be traced to chemical decomposition thus:

\[ 2\text{Ag} + 2(\text{K}_2\text{Fe(CN)}_6) + 3\text{H}_2\text{O} = (\text{Ag}_2\text{Fe(CN)}_6) + 3\text{KNO}_2 + 3\text{H} \]

\[ \text{Ag} + \text{KBr} + \text{H}_2\text{O} = \text{AgBr} + \text{KNO}_2 + \text{H} \]

The \( \text{H} \) and \( \text{K}_2\text{Fe(CN)}_6 \) reduce the bichromate salt producing insolubility of the gelatine.

Having fully described my invention what I claim and desire to secure by Letters Patent is:

1. A bath for carrying out the herein described process, said bath, consisting of (1) a bi-chromate of an alkali, (2) a ferricyanide of an alkali (3) a soluble haloid salt of an alkali, (4) water.

2. A bath for carrying out the herein described process, said bath consisting of (1) a bi-chromate of an alkali, (2) a ferricyanide of an alkali (3) a soluble haloid salt of an alkali (4) alum, (5) citric acid (6) water.

In witness whereof I have hereunto set my hand in presence of two witnesses.

THOMAS MANLY.

Witnesses:

Wm. GIRLING,

H. D. JAMESON.