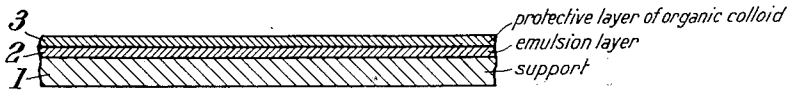
Sept. 19, 1939. A. JUNG 2,173,480

MANUFACTURE OF PHOTOGRAPHIC MATERIALS

Filed Aug. 18, 1936



Adolf Jung Inventor

By his Attorneys

Hutz and Joslin

Patented Sept. 19, 1939 2,173,480

UNITED STATES PATENT OFFICE

2,173,480

MANUFACTURE OF PHOTOGRAPHIC MATERIALS

Adolf Jung, Dessau, Germany, assignor, by mesne assignments, to Agfa Ansco Corporation, Binghamton, N. Y., a corporation of Delaware

Application August 18, 1936, Serial No. 96,575
In Germany August 22, 1935

11 Claims. (Cl. 88—19.5)

My present invention relates to the manufacture of photographic materials and more particularly to the manufacture of a photographic material provided with a protective layer.

One of its objects is an improved process of providing a photographic material with a protective layer. Another object is the photographic materials provided with a protective layer in accordance with the invention. Further objects will be seen from the detailed specification following hereafter.

For avoiding scratches and other damage to the emulsion side or the rear side of photographic plates or films protective layers have been applied to the respective faces. This has been done either in the production of the film before it is sensitized or, particularly in the case of cinematograph films, after the development to the finished dry film. Gelatin or substances of the nature of varnish have been used for these coatings.

This invention is based on the observation that protective layers can be applied with advantage on the undried, moist film by dipping the latter into, or otherwise coating it with, an aqueous dispersion of an organic natural or artificial colloid, for example polyacrylic acid esters such as polyacrylic acid-methyl ester, polyvinyl ethers, polyvinyl alcohols, phenol-formaldehyde resins, albumin, casein or the like. The technical progress of this method of applying the protective layer is as follows: Before the film is wound to form the roll, during which operation the first damage is likely to occur, the protective layers are applied at the conclusion of the final washing. The film is then dried, whereby the protective layer is simultaneously dried, and when the film is wound up it is protected by the layer from being scratched. This mode of operation involves an essential simplification and greater security as compared with treatments of dry film hitherto in use which necessitated a further step thereby increasing the expenses and the opportunities of deleteriously affecting the film. The layer may be applied by drawing the film through the dispersion or solution or coating it with the latter. The bath may simultaneously contain a hardening agent, a softening agent, a smoothing agent or a wetting agent.

Such protective layers are of more importance for the emulsion side of cinematograph films; they make the sensitive layer insensitive to moisture, prevent by their smooth surface the settlement of dust and by the hardness of their own surface protect the picture from scratches and consequent dirtying of the picture window. Such a layer may, however, also be provided, particularly in the case of cinematograph films, on the rear side of the film; for this purpose the dispersion or colloid solution should contain an organic solvent or wetting agent in such proportion that the surface of the film will be uniformly wetted by the liquid. The addition of wetting agent may generally amount to 0.5 to 2 per cent calculated on the colloid, however, the invention is not limited to these quantities, the addition may be greater or smaller. The solution or dispersion applied to the emulsion layer may also contain a wetting agent, so that the same liquid will serve for simultaneously applying the protective layer to the two sides of the film. The invention is particularly useful for cinematograph films but is not limited thereto. It may also be applied with advantage to photographic plates or papers, particularly to the emulsion side thereof.

By treating a developed, fixed and partially dried paper picture with the dispersion or solution according to this invention, the brilliance of the picture is improved. In the case of photographic papers with matt surface no lustre is produced if the drying of the paper is suitably conducted, the matt appearance being retained. Already dried paper pictures may be treated in one of the prescribed baths if, for example, the surface is brushed with a wad of cotton-wool, wash leather or sponge saturated with the solution.

The following examples illustrate the invention:

Example 1.—The film is immersed in a bath consisting of
6.5 parts by volume of a dispersion of 25 per cent strength of polyacrylic acid-methyl ester in water,
13.5 parts by volume of water.
The excess of liquid is squeezed from the back of the film, which is then allowed to dry.

Example 2.—6.5 parts by volume of a dispersion of 25 per cent strength of a mixed polymerizate from polyvinyl-chloride and polyacrylic acid-methyl ester in water,
13.5 parts by volume of water.
Treatment is as described in Example 1.

Example 3.—120 parts of casein, swollen in
400 cc. of water
200 cc. of saturated solution of borax
1200 cc. of water
30 cc. of formaldehyde
150 cc. of water.
Treatment is as described in Example 1.

Example 4.—6.5 parts by volume of a dispersion of 25 per cent strength of polyacrylic acid-methyl ester in water
13.5 parts by volume of water
0.8 part by volume of glycerin.
Treatment is as described in Example 1.

Example 5.—6.5 parts by volume of a dispersion of 25 per cent strength of polyacrylic acid-methyl ester in water
8 parts by volume of methanol.
Treatment is as described in Example 1.

Example 6.—120 grams of casein, swollen in
400 cc. of water,
200 cc. of cold saturated borax solution,
800 cc. of water
400 cc. of acetone
30 cc. of formaldehyde
150 cc. of acetone.
Treatment as described in Example 1.

Example 7.— 650 cc. of a dispersion of 25 per cent strength of polyacrylic acid-methyl ester in water,
1350 cc. of water
2 grams of the sodium salt of N-oleyl-taurine.
Treatment as described in Example 1.

Example 8.—1 part by volume of an aqueous dispersion of 25 per cent strength of a mixed polymerizate from acrylic acid-methyl ester and vinyl acetate
4 parts by volume of water.
The moist picture is immersed in this bath and after draining excess of liquid from it, it is dried. In the case of a dry picture the bath is brushed over the surface with a wad of cotton-wool, sponge or wash leather, and the film allowed to dry.

Example 9.—A developed, fixed and washed photographic plate is treated with one of the liquids prescribed in Examples 1, 2, 3, 4 and 8 and is then dried. The procedure is the same as that described in Example 8 for the paper picture. Already dry plates may be treated in the same manner as the pictures on paper.

The single figure of the accompanying drawing shows a photographic material in accordance with the invention. The support 1 is coated with an emulsion layer 2, and on the emulsion layer 2 there is provided the protective layer 3.

What I claim is:

1. A process of providing a photographic material having a gelatin emulsion layer containing a developed, fixed and washed picture with a protective layer which comprises applying to said photographic material while it is still moist an aqueous dispersion of a highly polymeric compound adapted to form a uniform film with a hard surface and selected from the class consisting of natural and artificial organic colloids, and drying said material.

2. A process of providing a photographic material having a gelatin emulsion layer containing a developed, fixed and washed picture with a protective layer which comprises applying to said photographic material while it is still moist an aqueous dispersion of a highly polymeric compound adapted to form a uniform film with a hard surface and selected from the class consisting of natural and artificial organic colloids, and a wetting agent, and drying said material.

3. A process of providing a photographic material having a gelatin emulsion layer containing a developed, fixed and washed picture with a protective layer which comprises applying to said photographic material while it is still moist an aqueous dispersion of a highly polymeric compound selected from the class consisting of polyacrylic acid esters, polyvinyl ethers, polyvinyl alcohols, phenolformaldehyde resins, albumins, casein and mixtures thereof, and drying said material.

4. A process of providing a photographic material having a gelatin emulsion layer containing a developed, fixed and washed picture with a protective layer which comprises immersing said photographic material while it is still moist into a dispersion of polyacrylic acid methyl ester in water and methanol, stripping the excess of liquid and drying said photographic material.

5. A process of providing a photographic material having a gelatin emulsion layer containing a developed, fixed and washed picture with a protective layer which comprises immersing said photographic material while it is still moist in casein, swollen in an aqueous solution of borax, acetone and formaldehyde, stripping the excess of liquid and drying said photographic material.

6. A process of providing a photographic material having a gelatin emulsion layer containing a developed, fixed and washed picture with a protective layer which comprises immersing said photographic material while it is still moist into a dispersion of polyacrylic acid methyl ester in water to which the sodium salt of N-oleyltaurine has been added, stripping the excess of liquid, and drying said photographic material.

7. A photographic material provided with a gelatin emulsion layer containing a developed, fixed and washed picture and a protective layer of a highly polymeric compound selected from the class consisting of polyacrylic acid esters, polyvinyl ethers, polyvinyl alcohols, phenolformaldehyde resins, albumins, casein and mixtures thereof, said protective layer being applied to said developed, fixed and washed material while it is still moist.

8. A photographic material provided with a gelatin emulsion layer containing a developed, fixed and washed picture and a protective layer of polyacrylic acid methyl ester, said protective layer being applied to said developed, fixed and washed material while it is still moist.

9. A photographic material provided with a gelatin emulsion layer containing a developed, fixed and washed picture and a protective layer of casein, said protective layer being applied to said developed, fixed and washed material while it is still moist.

10. A photographic material provided with a gelatin emulsion layer containing a developed, fixed and washed picture and a protective layer of polyacrylic acid methyl ester and N-oleyltaurine, said protective layer being applied to said developed, fixed and washed material while it is still moist.

11. In a process of forming a protective layer on a cinematographic film having a gelatin emulsion layer containing a developed, fixed and washed picture after the developing, fixing and washing, the step which comprises immersing said film while it is still moist into an aqueous dispersion containing a compound selected from the class consisting of polyacrylic acid esters, polyvinyl ethers, polyvinyl alcohols, phenolformaldehyde resins, albumins, casein and mixtures thereof, and drying said material.

ADOLF JUNG.