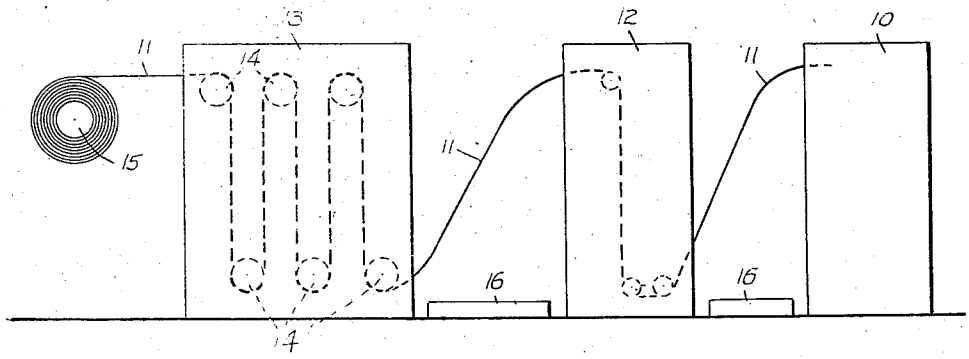
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ART OF TREATING PHOTOGRAPHIC SURFACES

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Victor A. Stewart
INVENTOR
BY Otto Munk
his ATTORNEY.

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## ART OF TREATING PHOTOGRAPHIC SURFACES

Victor A. Stewart, New York, N. Y., assignor to Louis A. Solomon, New York, N. Y., as trustee

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7 Claims. (Cl. 91—69)

My invention relates to a solution for treating photographic surfaces, more specifically cinematographic films, and to the process of treating the films with such solution.

The principal object of the invention is to harden and toughen the film, thereby improving its properties and lengthening its useful life greatly beyond what is at present considered normal.

High speed projection of cinematographic films, which is common practice, tends to injure and wear the film in a short time, necessitating frequent repair and replacement at relatively short intervals. As a consequence, the cost of films is increased and much labor and other inconveniences follow in train.

In my prior Patent 1,569,151 granted January 12, 1926, I disclose a method of rendering the colloid substance or emulsion of the film insoluble by first winding the exposed and developed film together with a porous spacing material into a composite roll and then subjecting the film to the action of chemical vapors in a gas tight chamber. This method is highly effective for its intended purpose; however, it involves winding the film onto a reel with a porous material interposed between the film convolutions, placing the assembly in a gas tight chamber for the vapor treatment, removing the assembly and rewinding the film, without the interposed material, onto a new reel. These several steps are time consuming and also involve expense. The use of the interposed fibrous material is necessary to keep the surfaces of the film convolutions from adhering to each other and to permit the vapors to have ready access to the gelatinous surface of the film.

My present invention reduces the number of the steps involved in the foregoing method by eliminating the need for using the fibrous spacing material, the first reeling and the unreeling operation and the introduction of the assembly and its removal from a gas chamber.

In accordance with my present invention, the film as it issues from the developing bath is conducted directly to and through the new solution, as hereinafter fully described, and passes thence to the drying chamber for further usual treatment. It will be apparent from this brief outline of operation that the treatment with the new solution is a step which requires no substantial time or labor in addition to those required in the usual production of films and has the added advantage that it may be performed as an incident to the normal course of film manufacture.

The solution which I employ for treating the film contains three principal ingredients, namely, formaldehyde, tannic acid and glycerine, in addition to certain others. I am aware that these three ingredients have been used heretofore in the treatment of photographic surfaces, but I believe that these substances have been used either separately, each for itself, or two together and that I am the first to use all three in one solution. By treating films with a solution containing the three ingredients I obtain a product greatly superior in clarity, toughness with flexibility, absence of streakiness and length of useful life, to any film which has been treated with only one or with any two of the three ingredients.

The following example is given to illustrate a practical embodiment of the solution of my invention, but is not to be taken as limitative of the scope thereof.

Mix together in the order named at room temperature and with constant stirring, one quart of water, one quart formaldehyde, one ounce tannic acid, three ounces glycerine, two quarts turpentine, one quart eucalyptus oil, three quarts carbon tetrachloride and sufficient alcohol for the miscibility of the oil and water. The quantities of the ingredients used may be varied within suitable limits and certain of the ingredients, other than those indicated above as being essential, may be entirely omitted. The formaldehyde acts to harden the emulsion, preserve it from decay and render it more permanent and resistant to mechanical disintegration; the tannic acid toughens the emulsion as distinguished from hardening it; the glycerine is a tempering or softening agent and aids in rendering the emulsion hygroscopic; the turpentine has an oily and binding effect to prevent disintegration of the film; the eucalyptus oil is a lubricant and the carbon tetrachloride serves as a solvent for the oil; the alcohol, as stated above, is to promote the miscibility of the oil and water and it also hastens drying of the film.

In the accompanying drawing, I show purely diagrammatically an installation which may be used in treating films with the new solution. 10 denotes the chamber in which the film 11 is developed by any of the usual wet developers. As the film issues, in undried condition, from the chamber 10 it is passed into and through the vessel 12 containing the new treating solution. From the vessel 12 the film is passed into and through the drier 13 in which the film is festooned on rolls 14. The film, as it issues from the

drier 13, is wound on a reel 15 and is then ready for use. Drip pans 16 may be placed between the developer chamber 10 and the solution vessel 12 and between the latter and the drier 13. The operation is very simple and it will be apparent that the solution treatment of the film is effected in the ordinary course of manufacture of the latter.

I claim:

1. A composition of matter for treating photographic films, comprising formaldehyde, tannic acid and glycerine, in solution.

2. A composition of matter for treating photographic films, comprising a solution of formaldehyde, tannic acid, glycerine, a lubricant for the film and a solvent for the lubricant.

3. A composition of matter for treating photographic films, comprising a solution of formaldehyde, tannic acid, glycerine, turpentine, eucalyptus oil, carbon tetrachloride and alcohol.

4. A composition of matter for treating photographic films, comprising a solution containing a film hardening substance, a film toughening substance and a substance for softening the film and rendering it hygroscopic.

5. The method of treating photographic films, comprising submitting the film to a bath for toughening, hardening and softening the undried developed film and rendering it hygroscopic.

6. The method of treating photographic films to render them tough and hard while maintaining their flexibility, which comprises submitting the film to a bath containing formaldehyde, tannic acid and glycerine in solution.

7. The method of treating photographic films to render them tough and hard while maintaining their flexibility, which comprises submitting the films to a solution containing a film hardening substance, a film toughening substance and a substance for softening the film and rendering it hygroscopic.

VICTOR A. STEWART.