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METHOD OF HARDENING OF PHOTOGRAPHIC FILMS.

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To all whom it may concern:

Be it known that I, JENS HERMAN CHRISTENSEN, a subject of the King of Denmark, residing at Holte, Denmark, have invented a new and useful Improvement in Methods of Hardening of Photographic Films; and I do hereby declare the following to be a full, clear, and exact description of the same.

It is well known that through development of an exposed photographic film, containing silver halide and gelatine, by certain developers, for instance such containing pyrogallol, pyrocatechin, hydrochinon, etc., a relief can be obtained which is due to the fact that the gelatine is hardened in such places in which the development has taken place. For most practical purposes this hardening, however, is too slight and very much inferior to the known hardening by exposure of chromate containing gelatine.

It has now been proved that this hardening through development can be augmented in an exceedingly high degree so that it can be compared to the chromate hardening and thus can substitute the same in photographic as well as in photomechanical processes, if such provisions are made that the gelatine during the development is prevented from attracting liquid and swelling to any important degree. This is obtained by adding to the developer a suitable very great quantity of such substance which will counteract the swelling of the gelatine, for instance alcohol or greater quantities of salts of poly-basic acids, for instance carbonates, silicates, etc. Such substances singly or in mixtures, are used as components of generally known developers, but in far smaller quantities. The desired effect, however, will only appear if the gelatine during the development remains solid and leathery and permits slow penetration by the developer solution. According to this invention these substances therefore are added in such large quantities that the said solid, leathery consistency of the gelatine is preserved during the development.

The following is an example of the carrying out of the invention:

The exposed plate is developed in a dark room with a developer consisting of 75 parts of alcohol, 25 parts of water, 2 parts of potassium carbonate, ½ part of pyrocatechin, or alcohol may be left out of the above named formula when in return the quantity of potassium carbonate is exceedingly augmented so that the developer for instance will consist of 100 parts of water, 40–50 parts of potassium carbonate, ½ part of pyrocatechin.

The development should preferably last several minutes and can be retarded if desired for instance by adding potassium bromide or boric acid.

A good composition of a developer for finely grained silver bromide plates is for instance the following 180 parts of water, 50 parts of potassium carbonate, 3 parts of potassium bromide, 1 part of pyrocatechin, 20 parts of alcohol.

When the development is finished, the plate is rinsed and may if wanted be fixed, and thereafter it behaves like a chromate hardened gelatine plate, which is to say for instance that the non-hardened part may be washed away with hot water or be brought to absorb dye solutions so that the plate can be used as a printing plate.

Specially adapted for this treatment are the socalled silver-chloride-bromide plates which further have the advantage of being sensitive to light of different colors and easily controllable during the development as the sensitiveness is not very great.

Such silver chloride-bromide plates therefore are adapted for the production of printing plates for three color prints.

The said printing plates may be flexible, the film being arranged on a carrier of celluloid or metal and they may have a suitable perforation in order to facilitate the registering during the exposure and printing.

Having thus fully described my invention I claim as new and desire to secure by Letters Patent:

1. The method of developing photographic plates or films to provide a picture of hardened gelatine which consists in treating the exposed and undeveloped plate or film with a liquid containing a developing substance the oxidation products of which are able to harden gelatine, as well as at least one hardening substance which in solution is known to counteract the swelling of the gelatine, said substance, or substances, constituting at least 20% of the developing liquid and sufficient to maintain the gelatine in a solid and leathery condition during the development.

2. The method of developing photo-

graphic plates or films to provide a picture of hardened gelatine which consists in treating the exposed and undeveloped plate or film with pyrocatechin and a mixture of alcohol and a substance selected from the group consisting of potassium carbonate and potassium bromide.

In testimony whereof I have affixed my signature in presence of two witnesses.

JENS HERMAN CHRISTENSEN.

Witnesses:

CECIL V. SCHON,

VIGGO BLOM.