No. 861,472. PATENTED JULY 30, 1907.

G. MACAIRE.

PHOTOGRAPHIC FILM.

APPLICATION FILED JAN. 9, 1900.

SPECIMENS.

Fig. 1.

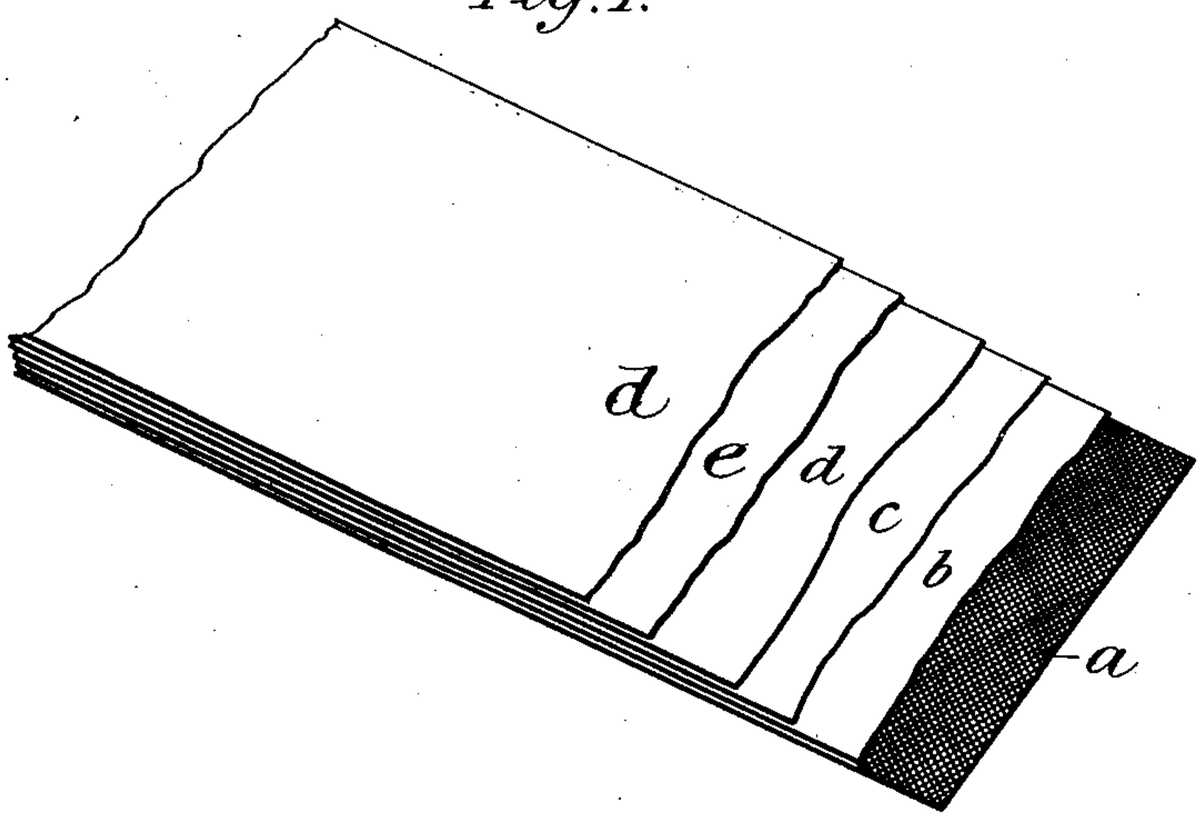
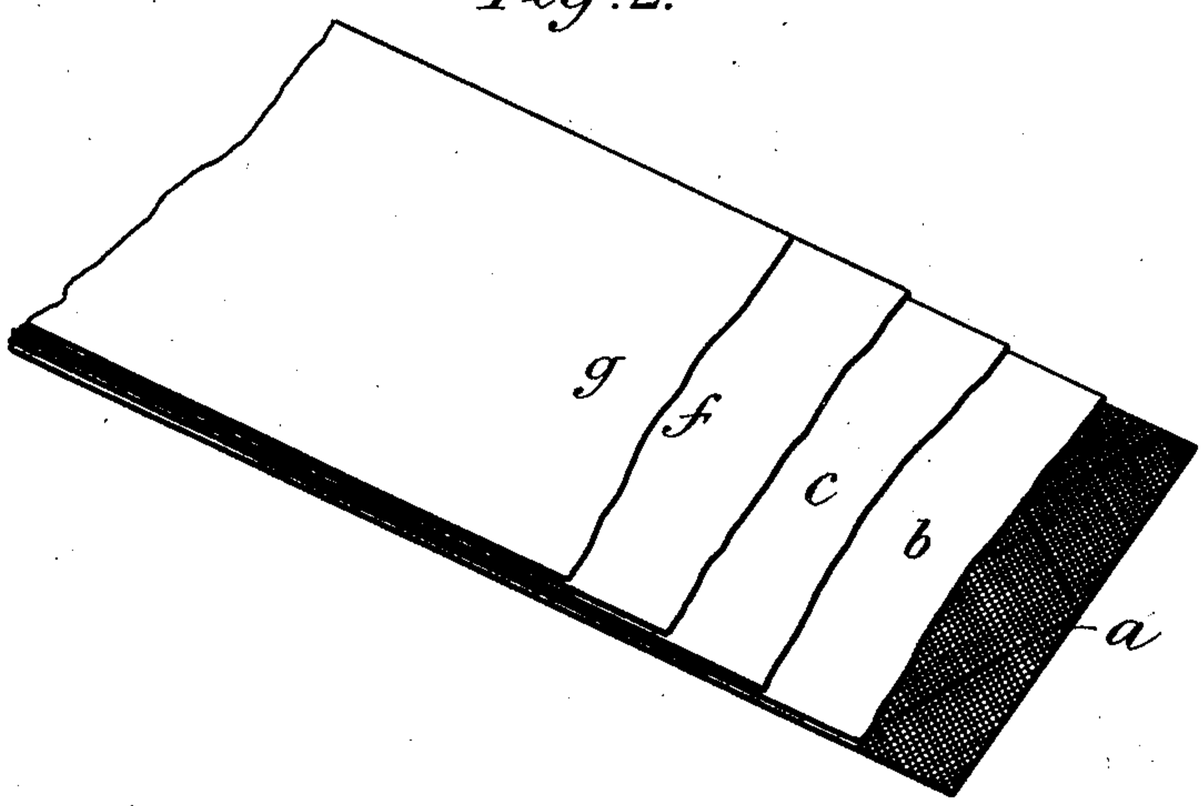


Fig. 2.



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GUSTAVE MACAIRE, OF RICKMANSWORTH, ENGLAND.

PHOTOGRAPHIC FILM.

No. 861,472. Specification of Letters Patent. Patented July 30, 1907.

Application filed January 9, 1900. Serial No. 878.

To all whom it may concern:

Be it known that I, GUSTAVE MACAIRE, of Nightingale Road, Rickmansworth, in the county of Herts, England, consulting chemist, have invented certain new and useful Improvements in Photographic Films, of which the following is a specification.

This invention has reference to photographic films, and its object is to produce a film which, without the employment of a glass plate or carrier, shall be free from grain and possess other advantages as hereinafter explained. Films of this class have hitherto, as is known, been mounted upon glass or upon carriers or backings of paper or other material, and when backings of the latter class are employed it is impossible to produce satisfactory enlargements of photographs taken upon the films, or pictures suitable for projection, on account of the transference of the grain of the backing to the gelatin of the film, which on enlargement or projection has the effect of spoiling the picture.

Now by my invention I am able, while still retaining the advantages of the paper backing, to produce a film entirely free from grain, and from which satisfactory enlargements to any desired size or pictures entirely suitable for kinematographic or lantern projection can be obtained.

The improved films are particularly useful for film cameras and for kinematograph negatives and positives, since they can be made in any length, and in the preferred construction are cheaper than celluloid, (though celluloid may be employed in their manufacture if desired, as hereinafter described). Further the improved films in their preferred construction are entirely uninflammable, and thus render kinematographic projection perfectly safe.

It is possible to obtain equally sharp impressions from either side of the film, which will be found useful for carbon and process work.

Referring to the accompanying drawings, which illustrate on an exaggerated scale two films made in accordance with my invention,—Figure 1 is a perspective view of the preferred form of film, and Fig. 2 is a similar view of a modification.

According to my invention I take a sheet, band or reel of backing paper *a*, which should be of good manufacture and made from pure rag pulp. Upon this I spread by any convenient means or apparatus (such, for example, as the machines employed in the manufacture of fancy papers, which are so well known as to require no further description), a coating *b*, or it may be two or more coatings, of a mixture of barium sulfate and a colloid substance, capable of being rendered insoluble, such as gelatin, this being rendered insoluble by chrome alum or other suitable agent. Or I may first apply a coating or coatings of a mixture of soluble gelatin or other colloid substance, and barium sulfate, and when this is dry, superpose thereon a coating of insoluble gelatin or other insoluble colloid substance. After allowing the coating last applied to dry, I apply an impermeable coating *c* of rubber, wax, gum, resin, or the like, dissolved in benzin or other solvent, and after allowing the solvent to evaporate, I apply a coating of collodion *d*, or by preference alternate coats of collodion and a proteid, such as gelatin or casein or other proteid *e* until the desired thickness has been obtained, the outermost coat of this series being preferably collodion, as shown. By this arrangement I avoid the stretching or expanding of the film lengthwise or transversely which would otherwise occur by the hygroscopic gelatin taking up large quantities of water during the fixing and developing operations. A suitable solution of the gelatin, casein, or other proteid, may be made by dissolving it in alcohol. The gelatin or casein should be rendered insoluble in water by the addition of a suitable agent, such as formalin.

The outermost coating should contain the sensitive material, or serve as a carrier therefor. In Fig. 1 I have shown a sensitive coating *h* which may be of any suitable emulsion, such coating being applied to the outermost layer of collodion *d*. It is obvious that such sensitive coating may be applied at any point above the impermeable coating *c*.

I prefer films having upper coatings of collodion and gelatin or casein as described above the impermeable layer above referred to, but I may employ celluloid in place of the coats of collodion and gelatin or casein. For this purpose I may apply one or more coats of celluloid upon the impermeable layer, according to the thickness desired. The celluloid will be applied in solution in a suitable medium such as amyl acetate and acetone with benzin. The outer layer is sensitized as before. Such a construction is shown in Fig. 2, where *a* is the backing, *b* the coating of insoluble gelatin and barium sulfate, *c* the impermeable coating, and *f* the coating of celluloid. The sensitive coating *g* is applied upon the celluloid coating, and may be of any suitable composition. It is obvious that the sensitized material may be applied in any suitable way above the impermeable coating, as stated in connection with Fig. 1, as, for instance, by sensitizing one of the layers of gelatin or casein, or otherwise.

The paper backings which I employ are by preference black or of non-actinic color. This has the great advantage of enabling rolls of film to be introduced in broad daylight into or removed from film cameras, and in the case of packets of film of preventing the daylight passing through the paper or other backing of a film exposed thereto and injuring the films behind. Hala-

tion, which is so serious a matter in producing photographic images for enlargements and the like as hitherto upon glass backings, is also thus prevented.

Any suitable apparatus may be employed for applying the various coatings to the paper backing, and when these have all been applied the band or sheet may be cut up into sizes suitable for the requirements of the photographic trade.

The film proper which consists of the layer above the impermeable coating is designed to be stripped from its backing while in a dry state, after exposure and before development. Such layer of film proper consists in the construction shown in Fig. 1 of the coatings of collodion and gelatin, and the outer sensitized coating if a separate sensitized coating is used. In the construction shown in Fig. 2 such layer or film comprises the celluloid coating and the sensitized coating *g*.

After being stripped the film is developed, intensified, reduced in intensity, fixed, washed and finished just as if it were upon glass, so that it is possible to readily follow and control the progress of these various operations and thus obtain greatly improved results.

After washing and finishing the exposed film I prefer to pass it into a solution consisting of glycerin 5 per cent formalin, five per cent, water and alcohol. The film is then placed upon the original paper backing, which may be retained for the purpose, and allowed to dry in the air; this will impart perfect rigidity and smoothness to the film. When it is dry it may be again stripped from the backing, and the result is a perfectly bright and rigid film entirely free from grain.

The improved films are particularly adapted for advertising and decorative purposes, since the difficulty experienced hitherto of enlarging transfers such as are required for the purpose, and which difficulty is due to the transference of the grain of the paper backing, is obviated. In employing my improved films for advertising or decorative purposes, it is only necessary to moisten the film and cause it to adhere to the desired surface, say a painted iron tablet, by placing the gelatin face inwards thereon and applying pressure. The paper backing may then be stripped on, leaving the film adhering firmly and evenly to the surface. The film should then be varnished.

My improved film may if desired be strengthened after exposure and finishing, by a surface layer of gelatin applied thereto in the well-known way.

What I claim and desire to secure by Letters Patent is:

1. A stripping photographic film having a backing of fibrous material, a coating composed of an insoluble colloid substance and barium sulfate thereon, an impermeable coating above said first coating, and a sensitized coating above said impermeable coating and adapted to be stripped therefrom.

2. A stripping photographic film having a paper backing, a coating of an insoluble colloid substance and barium sulfate thereon, an impermeable coating upon said first coating, alternate coats of collodion and a proteid superposed on said impermeable coating, said film having a sensitized coat above the impermeable coat, the coatings above the impermeable coat constituting the stripping film proper.

3. A stripping photographic film having a paper backing, a coating of insoluble gelatin and barium sulfate thereon, an impermeable coating above said first coating, and a sensitized coating above said impermeable coating and constituting the stripping film proper.

4. A stripping photographic film having a paper backing, a coating of insoluble gelatin and barium sulfate thereon, an impermeable coating on said first coating, and alternate coats of collodion and a proteid superposed on said impermeable coating, said film having a sensitized coat above the impermeable coat, the coating above the impermeable coat constituting the stripping film proper.

5. A stripping photographic film comprising a paper backing, a coating of an insoluble colloid substance and barium sulfate thereon, an impermeable coating on said first coating, alternate coats of collodion and a proteid superposed on said impermeable coating, and a sensitized coat above said coats of collodion and proteid, the coatings above the impermeable coat constituting the stripping film proper.

6. A photographic stripping film comprising a paper backing, a coating of an insoluble colloid substance and barium sulfate thereon, an impermeable coat or layer on said first coat, and a sensitized layer applied on said impermeable coat and constituting the stripping film proper.

7. A photographic stripping film comprising a paper backing, a coating of an insoluble colloid substance and barium sulfate thereon, a coat or layer of rubber on said first coat, and a sensitized layer applied on said rubber coat and constituting the stripping film proper.

In witness whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

GUSTAVE MACAIRE.

Witnesses:
C. WERCHERIN
G. TIVLETTO.