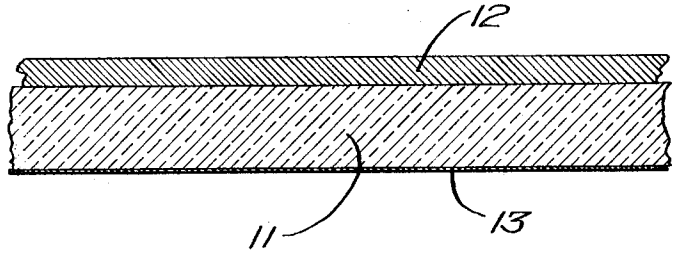
May 15, 1923. 1,455,428

C. J. COBERLY

MOTION PICTURE FILM

Filed Feb. 8, 1917



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Patented May 15, 1923. 1,455,428

UNITED STATES PATENT OFFICE.

CLARENCE J. COBERLY, OF LOS ANGELES, CALIFORNIA.

MOTION-PICTURE FILM.

Application filed February 8, 1917. Serial No. 147,505.

To all whom it may concern:

Be it known that I, CLARENCE J. COBERLY, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Motion-Picture Film, of which the following is a specification.

My invention relates to the art of producing motion pictures. In that art a great deal of expense is caused by the necessity of retaking scenes due to the appearance of static markings on the film after development. These static markings are due to disruptive discharges of static electricity which collect on the film due to friction or induction during the process of manufacture of the film or in the camera. Celluloid, of which the majority of motion picture film is made, is naturally an insulator and is capable of generating electric charges by friction and of isolating such charges until they come into the neighborhood of a grounded body, at which time the charges are discharged. The property of isolating charges, which depends on the high insulating characteristics of the film, is modified by surrounding atmospheric conditions. The greater the degree of humidity in the air the less likelihood there is of the charges accumulating, as leakage through the air and leakage over the surface of the film is greatly facilitated by the presence of moisture.

The principal object of my invention is to prevent the formation of charges of static electricity on the film. This I accomplish by greatly increasing the electrical conductivity of the film either by placing a conducting coating on the film itself or by adding to the film a material which will render it an electrical conductor. I prefer to add a coating, as in this way the chemical and physical characteristics of the film proper are unaltered. There are several methods of adding such electrical conducting coatings, but many of them are open to the objection that they affect the transparency of the film or otherwise interfere with its ordinary functions, or make it hard to handle. I prefer to add as a coating a body of hygroscopic material which will take up sufficient moisture even at very low humidities to form a thin layer of water over the surface of the film, which, due to the presence of metallic salts therein, will immediately serve to conduct away any electrical charges which may tend to collect. I further find that lithium chloride is an excellent substance to use for this purpose.

Further objects and advantages will be set forth more in detail hereinafter.

The drawing shows a film embodying my invention.

In the film shown, 11 is a celluloid support or body having a light sensitive coating formed of a body of emulsion 12 fixed to one side thereof. The celluloid being a poor conductor of electricity, it is possible to accumulate electric charges thereon, these charges being either frictionally produced or produced by induction from other charged bodies.

Broadly considered, my invention consists in rendering the film a better conductor, or in providing the ordinary celluloid film with a conductive backing, this backing being applied to the opposite side of the celluloid from the emulsion.

In practice, I prefer to provide such a backing rather than to try to embody my invention in the celluloid itself. I have found that if the back of the film, that is to say the side opposite the emulsion, has a hygroscopic salt deposited thereon this salt will collect and retain moisture and the film of water, with the salt in solution, will form a conducting surface through which electric charges can be readily dissipated, thus preventing the accumulation of electric charges.

I coat the back of the film with a thin layer of a hygroscopic salt which may be carried in a solvent which is afterwards evaporated. Apparatus for coating film being old in the art, I have not illustrated same. In practice, I prefer to use lithium chloride as the salt, and alcohol as the solvent, and I have found that one ounce of lithium chloride is sufficient to treat 5000 linear feet of ordinary motion picture film which is one and three-eighths inches wide.

It is possible to work the invention with salts that are not thoroughly hygroscopic. These salts must, however, have the property of collecting and retaining some vapor carried in the air thus forming an electrically conducting solution or electrolyte. This vapor may be alcohol vapor, or the

vapor of some other substance which is liquid at ordinary temperatures and pressures, and which is either a conductor itself or has the property of forming an electrically conducting solution or electrolyte.

It is of course necessary in such cases to saturate the air in the neighborhood of the film while it is being exposed or otherwise handled with alcohol or similar vapor. This can be conveniently done by placing an open vessel containing alcohol or the like in the camera.

In the practical operation of my invention the lithium chloride, or other salt, is deposited on the film after the emulsion has been fixed thereon and before the film has been exposed. Under ordinary conditions of humidity, there is sufficient moisture in the air to keep the back of the film moist, so that it will at all times be a good conductor of electricity. In some cases it is desirable to place a supply of water or alcohol in the camera or film container for the purpose of supplying vapor. I find that by keeping the film moist it retains its original characteristics and shape much better than where free evaporation can take place.

It will thus be seen that my invention consists broadly in the conception of rendering the film a conductor, so that the electro-static charges will be carried away.

It consists further in the conception of coating an ordinary celluloid film with such a conducting backing. This, of course, could be accomplished by other means than the hygroscopic material outlined above.

The invention consists further in applying to the back of a standard film a body of hygroscopic material, or material which has an affinity for hygroscopic vapors, for the purpose of collecting and retaining a film of water on the back of the motion picture film.

My invention further consists in the use of lithium chloride for the above purposes.

While my invention is entitled motion picture film, it is evident that I have invented a new and useful improvement in the motion picture art which may well be called a method of preventing static.

All of these embodiments of my invention are new and useful, and my conception thereof is embodied in the following claims.

I am aware that other inventors have proposed to use photographic films which contain a metallic layer. These films are, of course, opaque and cannot be used in the place of the standard transparent motion picture film now in common use. Such films, however, contain an electrically conducting layer and it is not my intention to claim broadly any film containing an electrically conducting layer.

My invention differs from films containing a metallic layer in that it utilizes electrolytic conduction to carry off the electric charge rather than metallic electrical conduction which might occur in the case of a film having a metal layer.

By electrolytic conduction I mean such electrical conduction as occurs through solutions either in water or other substances. I have already indicated that alcohol or other substances may be used in the place of water and a skilled chemist could substitute many other substances which would form conducting electrolytes with lithium chloride or its equivalents.

In electrolytic conduction the substance in solution is ionized and acts as a carrier of electricity, positive ions appearing at one end of the conducting path and negative ions appearing at the other. Such electrolytic conduction is, of course, accompanied by a decomposition of the electrolyte, the amount of such decomposition being proportional to the amount of energy transmitted. In the practice of my invention, the amount of energy is small and the amount of material decomposed is negligible, and therefore unobjectionable.

While the alcohols and other substances, as already pointed out, may be used in the place of water to form the electrolyte it is obvious that water is the most convenient substance to use for this purpose.

Also while I have specified lithium chloride as a preferred material it will be obvious to a skilled chemist that many other substances are capable of going into solution, becoming ionized, and supporting electrolytic conduction.

I claim as my invention:

1. A motion picture film comprising a transparent support; a layer of sensitized emulsion; and a layer of lithium chloride, said layer of lithium chloride being on the opposite side of said support from the layer of emulsion.

2. A motion picture film having a layer of material which is hygroscopic in atmospheres of seventy percent relative humidity or below.

3. A motion picture film having a light sensitive coating; a support for said coating, said coating and support being so constituted, if used alone, that static markings may be produced in said coating, and a layer of material, on said film, which is sufficiently hygroscopic to prevent said markings from occurring in an atmosphere of seventy percent humidity or below.

4. A motion picture film having a support; a light sensitive coating carried by said support, said support and said coating being of such a nature, if used alone, that static markings may be produced in said coating, under ordinary conditions of use of said motion picture film; and a layer on said

film containing hygroscopic material, said layer being sufficiently electrically conducting to prevent said markings.

5. A motion picture film having a layer containing a solution, said solution being sufficiently electrically conducting to prevent, under the usual conditions of use of said film, the static markings which might otherwise be produced by said use.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 29th day of January, 1917.

CLARENCE J. COBERLY.