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FILM PROCESSING

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4 Claims. (Cl. 95—1)

The present invention relates to the treatment of motion picture film, particularly to the treatment of exposed and developed negative film to recondition it for printing the positive which is projected onto a screen in the usual manner.

As is well known, such negative film comprises a light sensitive gelatine emulsion upon a nitrocellulose or acetate base. Even after exposure and development the emulsion contains moisture while the base contains volatile plasticizers. When initially dried and made ready for use in an automatic printing machine such film ordinarily shrinks by as much as .3 of 1%. But this initial shrinkage is compensated by the fact that in an automatic continuous contact printer the negative and a strip of fresh positive travel over a large sprocket approximately four inches in diameter whereon the negative is nearest to the sprocket and is overlaid by the positive. Thus the arc of contact of the negative is shorter than that of the overlying positive and the normal shrinkage of the negative is thereby compensated.

Under normal conditions of storage the negative film continues to shrink and when this shrinkage exceeds .6 of 1% to 1% difficulties are encountered in printing fresh positives from the abnormally shrunken negative. In such cases the negative film tends to creep in proportion to the amount of shrinkage, producing a lack of perfect focus and possible mechanical injury to the negative film itself. Under some circumstances it is possible to produce acceptable positives from negatives wherein the shrinkage amounts to as much as 1% but any negative with a shrinkage of over 1% may not only produce prints of poor quality but there is also great danger that the negative may be damaged by ripping out perforations on the sprocket teeth.

It is an object of the present invention to recondition negative film by reducing the shrinkage, that is to say, by expanding the film so that it will be considerably nearer to its original dimensions and thereby again become suitable for use in an automatic printing machine.

It is a further object of the invention to provide a film-treating mixture containing in proper proportions, suitable ingredients which will act upon the emulsion and the base, respectively, to reduce the shrinkage uniformly therein so that base and emulsion may be expanded in the direction of their original dimensions without separation.

The objects of the present invention are secured by treating the rolled film under reduced pressure with the vapors given off by the evaporation of a mixture of water, glycerine, alcohol and camphor. The treatment of motion picture film under vacuum for other purposes is disclosed in my Patents Nos. 2,067,933 and 2,106,751. Therein apparatus is disclosed which may be utilized in

carrying out the present invention. Such apparatus includes a tank wherein the film is placed, means for exhausting air from the tank, and means for introducing suitable vapors into the tank while still maintaining a reduced pressure therein.

When carrying out the present invention with such apparatus the vapors given off by a mixture of two quarts of water, one pint of glycerine, one-half pint of alcohol and one ounce of camphor are utilized. The vaporized water and glycerine react upon and swell the emulsion of the film while the vaporized camphor and alcohol tend to soften slightly and swell the base.

Specifically one or more rolled films are placed in a tank such as that disclosed in my aforesaid patents and a vacuum of about 29 inches is drawn thereon. The film is then treated with the vapors given off inside the tank by heating a mixture of the aforesaid substances. The film remains in this atmosphere for 12 hours, or more if necessary, with the result that the shrinkage in the film is reduced or, in other words, the film and the emulsion are expanded as above explained.

In actual practice it has been observed that the shrinkage in the film is reduced by as much as 25% to 40%. For example, it has been observed that a shrinkage of 1.15% has been reduced to .82% by one such treatment over a period of 12 hours. Sometimes it is advisable to repeat the treatment above described and in such cases the shrinkage in film which had taken place to the extent of 1.15% was reduced to .77% by two successive 12 hour treatments, and a film which had shrunk 1.39% was treated for three successive 12 hour periods and thereafter measurements showed that the shrinkage had been reduced to 1%.

To the extent that the same or similar problems arise in connection with other types of film such as duplicating fine grains, kodachrome or other color originals and projection prints, the foregoing procedure may be followed with advantageous results. Therefore such other films, to the extent that they comprise a gelatine emulsion upon a nitrocellulose or acetate base, are included along with negative films having a gelatine emulsion upon a nitrocellulose or acetate base, in the expression exposed and developed motion picture film as used in the following claims.

I claim as my invention:

1. The method of treating exposed and developed motion picture film to reduce the shrinkage therein which comprises subjecting said film while maintained under reduced pressure to the vapor given off by a heated mixture of water, glycerine, ethyl alcohol and camphor for an appreciable length of time.

2. The method of treating exposed and developed motion picture film according to claim 1 in which the vaporized mixture consists of water, glycerine, alcohol and camphor in the proportions of two quarts of water, one pint of glycerine, one-half pint of ethyl alcohol and one ounce of camphor.

3. A vaporizable mixture for the treatment under reduced pressure of exposed and developed motion picture film to reduce the shrinkage therein which consists, in its liquid phase, of water, glycerine, ethyl alcohol and camphor.

4. A vaporizable mixture according to claim 3 wherein the vaporizable mixture in its liquid phase consists of water, glycerine, alcohol and camphor in the proportions

of two quarts of water, one pint of glycerine, one-half pint of ethyl alcohol and one ounce of camphor.

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