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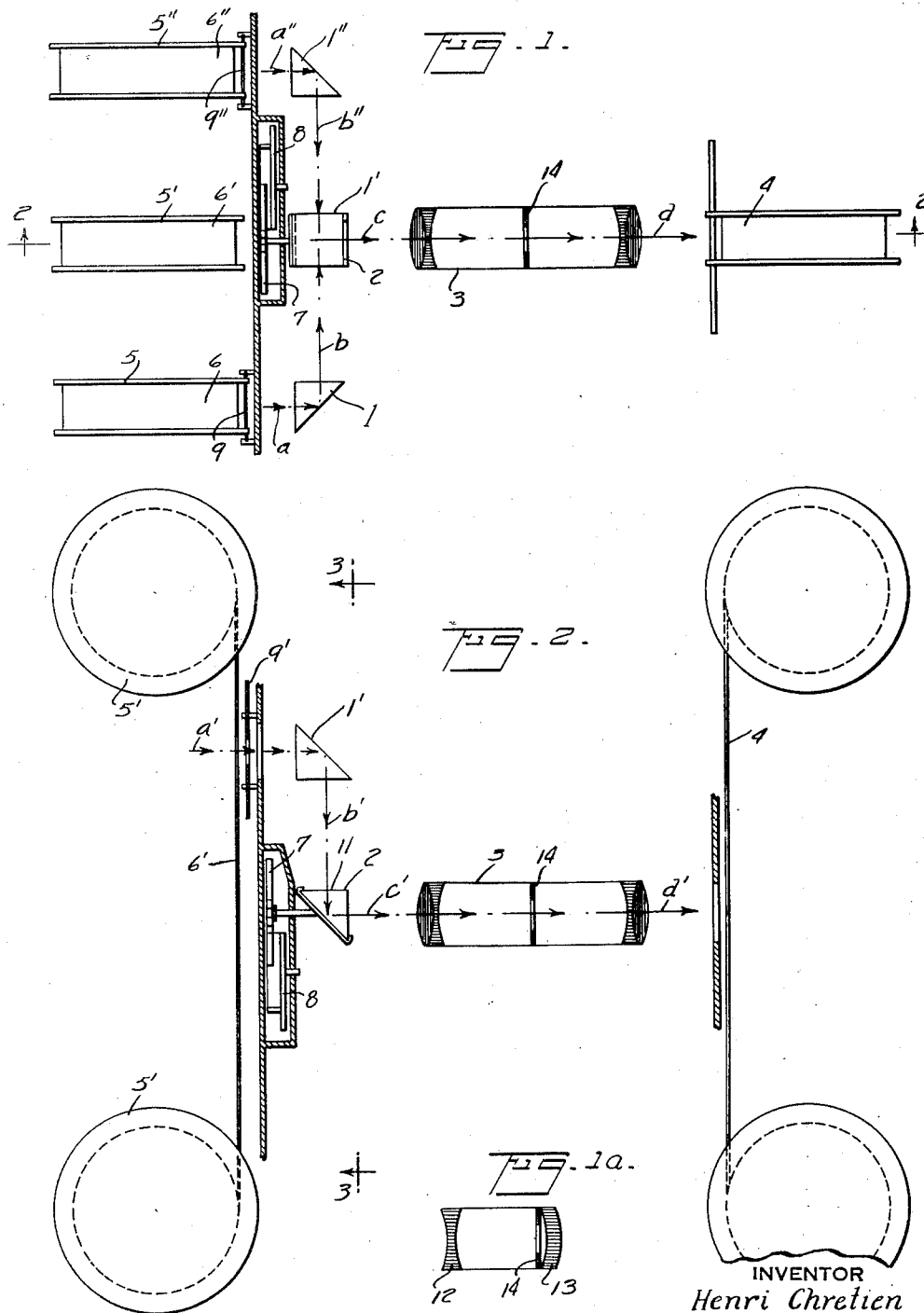
H. CHRETIEN

1,894,264

APPARATUS FOR PRINTING SYNTHETIC FILMS

Filed Sept. 7, 1929

2 Sheets-Sheet 1



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FIG. 3.

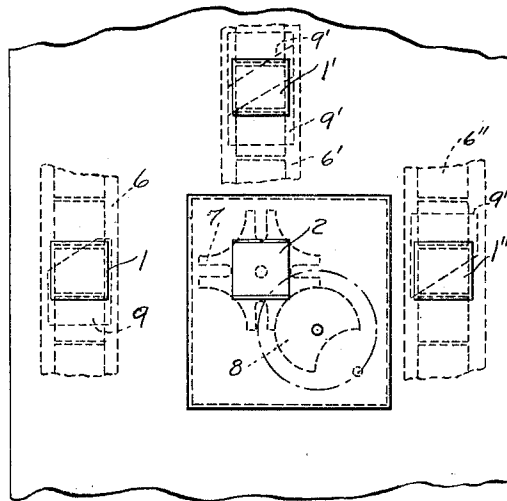
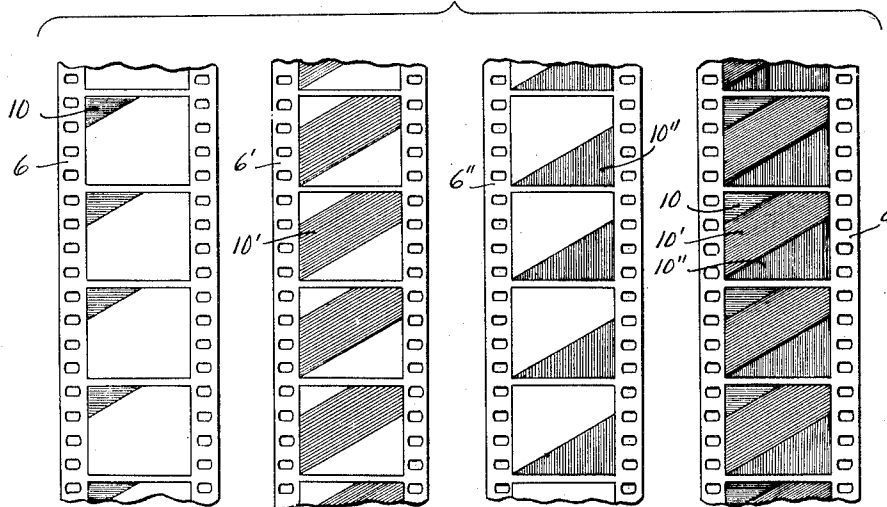


FIG. 4.



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APPARATUS FOR PRINTING SYNTHETIC FILMS

Application filed September 7, 1929, Serial No. 390,373, and in France October 6, 1929.

The present invention relates to the art of photography and comprises a machine particularly adapted to conveniently and rapidly print on one and the same film a number of juxtaposed or superposed images from a number of different original negatives. The new machine is also adapted to print on films of standard size images from a single negative of other than standard size.

The new printing machine is particularly useful for printing synthetic cinematographic films, that is, films intended for the simultaneous projection of several images. Heretofore the production of a synthetic film necessitated the successive taking of the pictures on the film; portions of the film being reserved by means of screens during the successive exposures. By means of the present invention, images on independently developed negatives which may or may not have been originally intended to be combined may be reproduced on a single film during a single passage of that film through the machine.

The machine may also be advantageously employed in combination with the anamorphoser disclosed in the pending United States application S. N. 245,558, filed January 9, 1928, which has matured into Patent No. 1,829,633 of October 27, 1931, for the printing on a single film of standard dimensions of juxtaposed compressed views from a plurality of negatives or for the printing on a film of standard dimensions of compressed views from a single negative of larger dimensions taken with a wide angle lens according to the method disclosed in United States application S. N. 335,564, filed January 28, 1929 which has matured into Patent No. 1,829,634 of October 27, 1931. The images on the films of standard dimensions may then be projected by the use of the anamorphoser to obtain in the first case a plurality of juxtaposed images, each restored to standard dimensions, or in the latter case, panoramic views corresponding to the original large

negative. The process employed in this latter application of the machine is of particular advantage in that it permits of the use of standard size projecting apparatus while retaining the apparent size of the granulation the same as if the projection had been directly from the film of larger dimensions. This is due to the well known fact that the granulation of the positive emulsion is much finer than that of the negative emulsion.

For a better understanding of the invention reference should be had to the accompanying drawings of which:

Fig. 1 is a plan view of a printing machine embodying the invention;

Fig. 1a is a view of the anamorphoser adapted to be used with the machine of Fig. 1;

Fig. 2 is a sectional view of the machine taken along the line 2—2 of Fig. 1;

Fig. 3 is a view taken along the line 3—3 of Fig. 2, and

Fig. 4 is a diagrammatic illustration of one method whereby three different images may be distributed on the exposed sensitive coating of the same film.

The machine illustrated as embodying the invention comprises three stationary prisms 1, 1' and 1'' arranged around a prism 2 which is adapted to be intermittently rotated to successively direct the light from the stationary prisms to an objective 3 of any suitable type. A film 4 upon which the images are to be combined travels in the path of the light from objective 3. Feeding devices 5, 5' and 5'' carrying the original negatives 6, 6' and 6'' respectively are associated with the respective prisms 1, 1' and 1'' and are driven synchronously with the movement of prism 2. Preferably the position of the feeding devices are adjustable to enable any point on the films 6, 6' or 6'' to be brought into the center of the area of the film 4 which is to be printed from the films 6, 6' and 6'' and to

enable these points to be focussed on said area.

A suitably driven Geneva driver, shown at 7 and 8, periodically rotates the prism 2 through an angle of 90° to enable it to reflect and transmit the light successively from each film 6, 6' and 6'' and associated stationary prism toward film 4. The synchronization of the movement of films 6, 6' and 6'' with the rotation of prism 2 may be effected in any well known manner. When the prisms 1, 1' and 1'' are arranged concentrically, as shown, the planes of the films 6, 6' and 6'' may be made to coincide and the mechanical operation of the devices 5, 5' and 5'' thereby simplified.

Removable opaque screens 9, 9' and 9'', provided with openings cut in any arbitrary fashion, are placed in the lighting apertures of the images on films 6, 6' and 6'' so as to select in each negative the region to be reproduced. If it is desired to reproduce on film 4 such sections of films 6, 6' and 6'' as are designated respectively on the said film 4 (see Fig. 4) by 10, 10' and 10'' then the opening in the removable screen 9 associated with film 6 is cut in the shape of section 10, the opening in the screen 9' associated with film 6' is cut in the shape of section 10' and similarly the opening in the screen 9'' associated with film 6'' is cut in the shape of section 10''. Surface 10, is printed when face 11 of prism 2 is exposed to the incident light from prism 1; the beam of light following the path *a*, *b*, *c* and *d*. The Geneva driver then turns prism 2 through 90° to bring face 11 into the path of the incident light from prism 1'; the beam of light now following the path *a'*, *b'*, *c* and *d* and causing section 10' to be printed upon film 4. Similarly, upon rotation of prism 2 through 90° , light passing through the exposed portion of film 6'' travels in the path *a''*, *b''*, *c* and *d* to print section 10'' upon film 4. During the further rotation of prism 2, film 4 is advanced through the distance required to bring an unexposed portion into view; negatives 6, 6' and 6'' each being advanced through a distance corresponding to one image either simultaneously with the movement of film 4 or at any time during the periods when prism 2 is in inoperative relation with the associated stationary prism.

Suitable means are of course provided for correlating the lighting to the rotation of prism 2. These means are not illustrated as they are well known in the art. For example, a rotating shutter could be arranged to screen the light except when prism 2 is stationary, or the electric circuit of the light could be arranged for closure only during such periods.

If it is desired to print all of the images from films 6, 6' and 6'' on film 4 in order to thereafter project the three pictures in juxtaposition, the anamorphoser illustrated in Fig.

1a is inserted between the parts of the objective 3 of Fig. 1. The anamorphoser comprises two cylindrical lenses 12 and 13 with their generating lines parallel. The cylindrical lenses 12 and 13 may be disposed one on either side of the diaphragm 14 of the objective 3 as shown. The use of the anamorphoser permits of the three images one from each of films 6, 6' and 6'' being reproduced in compressed form as a single image of standard dimensions on film 4, which image may then be projected onto a screen through another anamorphoser to show the three pictures simultaneously; each being restored to standard dimensions.

When it is desired to use the machine for reproducing on a film of standard dimensions views taken with a wide angle lens on a larger size negative, as disclosed in the above-mentioned United States Patent No. 1,829,634, the anamorphoser of Fig. 1a is also inserted between the parts of the objective 3 of Fig. 1 and the over size negative film is fed by one or the other of devices 5, 5' or 5''; the other devices being rendered inoperative, as by closure of the removable screens associated therewith. The film 4 will then have printed thereon images of standard dimensions but with laterally or horizontally compressed views, which may be projected through another anamorphoser to give panoramic pictures of granulation of the order of that of the original large size negative.

Instead of reducing the images from a large negative, or from a plurality of negatives, to produce images of standard dimensions on the film 4, the machine may be used with the anamorphoser of Fig. 1a to compress images from a film of standard dimensions to thereby reserve space on film 4 for the acoustic elements of a sound film.

The invention has now been described in connection with one particular embodiment thereof. Obviously various modifications could be made in the machine without departing from the spirit of the invention. It is not essential that the borders of the regions cut out by the removable screens meet. They may even overlap to superpose several images if desired. Obviously the shape of these sections is immaterial, as is also the number of subjects combined on a single film. In place of the prism 2, an Amici prism, known as a roof shaped prism, may be advantageously employed. This prism, by reproducing on film 4 images that are not inverted, permits of the simplification of the driving mechanism of the films; film 4 being driven in the same direction as are the original negatives, when the images thereon are not inverted. It is possible also to substitute mirrors for any or all of the prisms.

The following is claimed:

A machine for obtaining synthetic films from a plurality of original films, said ma-

chine comprising in combination a mask placed behind each of the original films each of said masks covering on each film the part not to be reproduced, a stationary prism placed behind each of said masks, a prism adapted to be intermittently rotated into positions to receive light transmitted through said original films, through said masks and through said stationary prisms and to transmit said light in one direction and an objective adapted to receive the light transmitted by said rotatable prism and to transmit said light unto different unexposed portions of a film.

In testimony whereof, I have signed my name to this specification.

HENRI CHRÉTIEN.

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