

F. L. DYER & D. HOLDEN.
 METHOD OF PRINTING MOVING PICTURE FILMS.
 APPLICATION FILED NOV. 8, 1905.

970,199.

Patented Sept. 13, 1910.

2 SHEETS—SHEET 1.

FIG. 1.

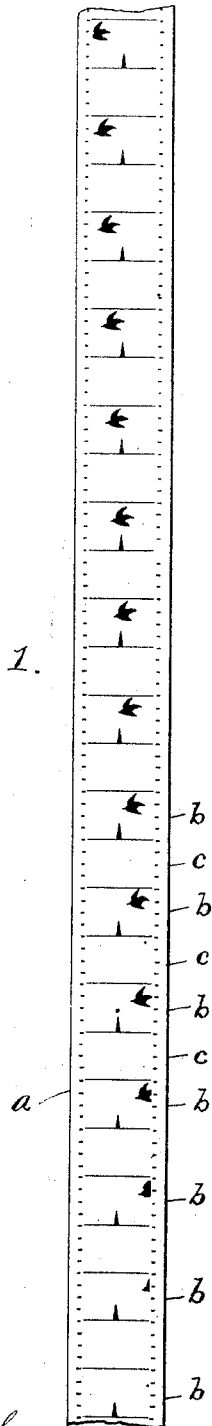
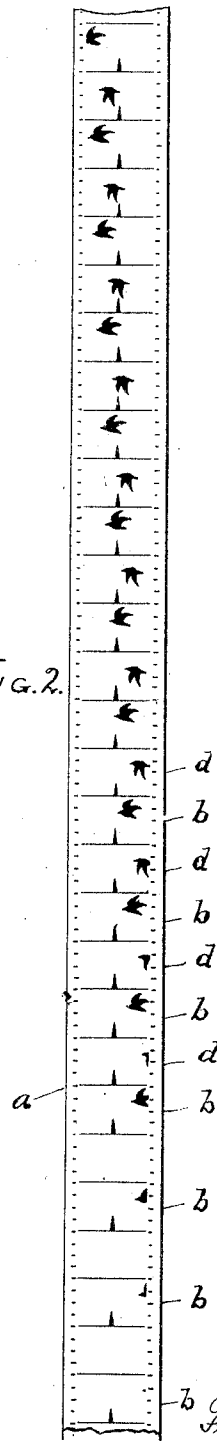


FIG. 2.



Witnesses:

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Frank L. Dyer and
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by Frank L. Dyer
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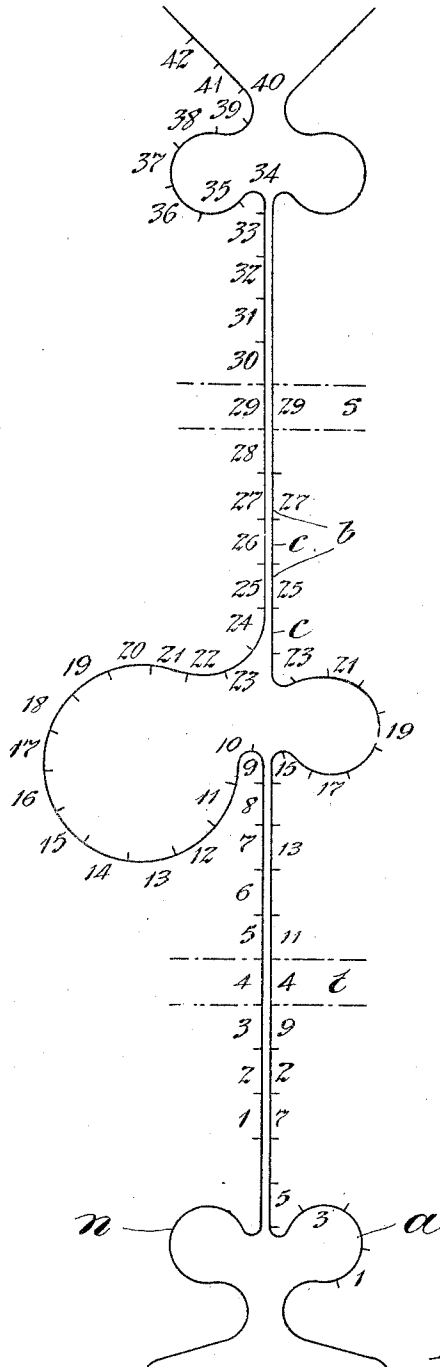
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2 SHEETS—SHEET 2.

Fig. 3



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UNITED STATES PATENT OFFICE.

FRANK L. DYER, OF MONTCLAIR, AND DELOS HOLDEN, OF UPPER MONTCLAIR, NEW JERSEY, ASSIGNORS TO EDISON MANUFACTURING COMPANY, OF WEST ORANGE, NEW JERSEY, A CORPORATION OF NEW JERSEY.

METHOD OF PRINTING MOVING-PICTURE FILMS.

970,199.

Specification of Letters Patent. Patented Sept. 13, 1910.

Application filed November 8, 1905. Serial No. 286,444.

To all whom it may concern:

Be it known that we, FRANK L. DYER, a citizen of the United States, residing at Montclair, county of Essex, and State of New Jersey, and DELOS HOLDEN, a citizen of the United States, residing at Upper Montclair, county of Essex, and State of New Jersey, have invented a certain new and useful Method of Printing Moving-Picture Films, of which the following is a description.

In the present commercial moving picture art the negative of the moving picture is secured by means of a camera of the type disclosed in Edison Reissue Patent No. 12,037, dated September 30th, 1902, and results in the production of a long film containing negative photographic impressions of the object or objects in motion, arranged in a single straight line sequence, and representing successively the corresponding successive phases of movement. The positive pictures are printed from such a negative (after the latter has been suitably developed and fixed) in an apparatus somewhat analogous to a camera, and arranged so that the negative, and a sensitive film on which the negative is superimposed, may be simultaneously and intermittently fed past a light opening, a shutter being employed to admit light during the periods of rest, so as to result in the printing of the negative images upon the sensitive film, which when developed and fixed will carry the positive impressions. A printing machine of this general type is disclosed in the patent to Lumiere, No. 579,882 dated March 30, 1897.

In Patent No. 875,333, granted to us December 31, 1907, we describe a moving picture film in which the photographs, instead of being arranged in a single straight line sequence, are arranged in two separate arithmetical series alternating with each other, and one series being shifted longitudinally of the film with respect to the other. With such a film, it becomes possible to exhibit the pictures of the two series in alternation at different exposure openings, whereby during the time that one picture is being exhibited, the following picture of the other series may be moved into position to be subsequently exhibited, so as to thereby permit a continuous exhibition of the pictures on the

screen without varying the amount of light used, and consequently doing away with the objectionable flickering at present experienced.

Our present invention relates to an improved method by which a film of the type referred to may be printed from an ordinary moving picture negative obtained as at present, and in an apparatus corresponding substantially with printing machines now used in this art except that it has two exposure openings and means whereby the negative film is shifted longitudinally with respect to the positive between the two openings.

In order that the invention may be better understood, attention is directed to the accompanying drawing forming part of this specification, and in which—

Figure 1 represents the film as the same would appear if developed and fixed after passing only one exposure opening; Fig. 2, is a corresponding view, showing the film as finally produced. In both of these views, we illustrate a flying bird as the moving object, and a steeple as the stationary background. Fig. 3 is a diagrammatic view showing the relative arrangement of the positive and negative films, the photographs of the negative being numbered and the photographic impressions of the positive bearing the same numbers as the photographs of the negatives which produce said impressions.

In carrying our invention into effect, we proceed as follows: A suitable moving picture negative *n* of the usual type in which the photographs appear in regular numerical sequence is first secured. A sensitive film *a* is then placed in juxtaposition to said negative and the two films are together passed across a suitable exposure opening *s* and pictures *b* separated by unexposed blank spaces *c* are printed on the sensitive film preferably by arranging the shutter so as to admit light only when alternate pictures are brought to rest at said openings. Thus in Fig. 3 assuming the path of the two films to be downward, the odd numbered pictures will all be printed at the exposure opening *s*, blank spaces *c* appearing upon the sensitive film *a* after leaving said opening. The negative film is then shifted longitudinally with respect to the positive by caus-

ing the two films to follow paths of unequal length to a second exposure opening t , loops of unequal length being formed in the two films, as shown in Fig. 3. At the opening t the even numbered pictures will be printed in the blank spaces c but not in their proper numerical positions on account of the shifting of the negative with respect to the positive; thus in the example illustrated in Fig. 3 the 4th photograph of the negative will be printed on the positive between the 9th and 11th pictures and the 6th between the 11th and 13th, and so on.

Having now described our invention, what we claim as new and desire to secure by Letters Patent, is as follows:

1. The method of printing a moving picture film from a negative containing a continuous straight line sequence of photographic impressions in regular order of successive positions of a moving object or objects, which consists in superimposing the negative upon the sensitive film, passing the two films together across a suitable exposure opening, printing upon the sensitive film at said opening an arithmetical series of positive pictures separated by blank spaces, in then causing the two films to follow paths of unequal length to a second exposure opening whereby the negative film is shifted longitudinally with respect to the positive, and in then printing at said second opening upon the blank spaces of said posi-

tive the pictures not printed at the first operation, substantially as set forth.

2. The method of printing a moving picture film from a negative containing a continuous straight line sequence of photographic impressions in regular order of successive positions of a moving object or objects, which consists in superimposing the negative upon the sensitive film, passing the two films together across a suitable exposure opening, printing upon the sensitive film at said opening an arithmetical series of positive pictures separated by blank spaces, in then causing a relative longitudinal shift between the two films equal to an integral even number of pictures, and passing the two films together across a second exposure opening, and in then printing at said second opening upon the blank spaces of said sensitive film the pictures not printed at the first operation, in an arithmetical series, displaced from their proper numerical positions with respect to the first named series, an amount equal to the relative shifting of the films, substantially as set forth.

This specification signed and witnessed this 6th day of November, 1905.

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Witnesses:

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