March 21, 1933. C. D. CHASE 1,902,277

PRINTING OF FILMS

Filed July 9, 1930

Fig. 1

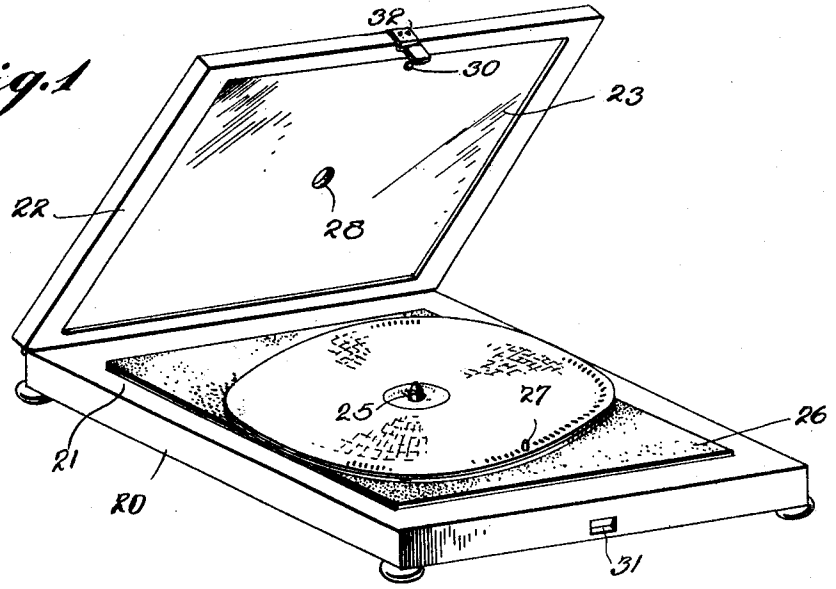


Fig. 2

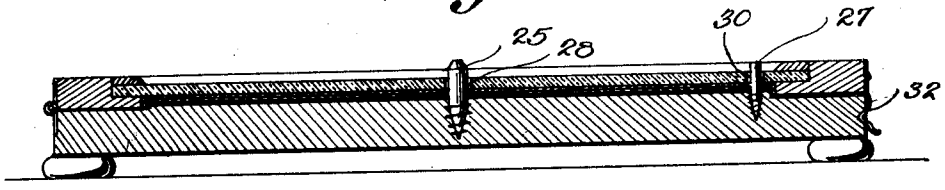
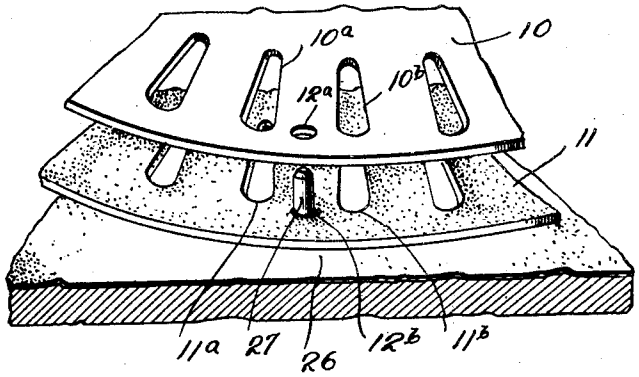


Fig. 3



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Patented Mar. 21, 1933

1,902,277

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PRINTING OF FILMS

Application filed July 9, 1930. Serial No. 466,817.

This invention relates to printing of films having utility in disc camera and projector apparatus.

Disc film, as described in my copending application, Serial No. 466,815, filed July 9, 1930, for disc cameras and projectors, consists of a circular disc transparency adapted to carry a series of pictures or images recorded in sequence along a spiral or helix and disposed in radial rows, of which the medial line of each picture of a radial row is disposed on the same radius from the center of the film. A series of picker slots or openings are arranged about the periphery of the film into which slots or openings a rotating picker passes to engage the sides thereof whereby to give the disc an intermittent or step by step movement about its center, the exposures on the film negative being made on areas of the film brought into exposure relation by each of the picker slots.

In practice, a series of picker slots is punched simultaneously by means of a punching die, of which the individual punches are designed to be spaced apart an equal angular distance. However, it has been found difficult to obtain this desired accurate spacing of the punches and therefore the slots, due to imperfect spacing of the individual punches, are unequally spaced. Since every image or exposure of the radial rows and consequently of the picture series bears a definite relation to an individual slot which causes that image to be made on the film, it will be seen that where the slots are unequally spaced from each other and a positive film printed from a negative having the noted imperfections, the positive record is generally not accurately matched with the negative record. Consequently, an image of the positive record may fail to bear a true angular relation to its picker slot and flickering of the projected picture results.

It is accordingly an object of my invention to precisely match the positive and negative record with regard to the picker slots, in such manner that the picker slots of each which have been punched by the same individual punch of the punching die are in absolute registry.

A further object is to provide a means and method of definitely matching a positive with a negative film during the printing of the positive film from the negative.

Other objects will be in part obvious from the annexed drawing and in part hereinafter indicated in connection therewith by the following analysis of this invention.

This invention accordingly consists in the features of construction, combination of parts and in the unique relation of the members and in the relative proportioning and disposition thereof, all as more completely outlined herein.

To enable others skilled in the art to fully comprehend the underlying features thereof that they may embody the same by the numerous modifications in structure and relation contemplated by this invention, a drawing depicting a preferred form of the invention has been annexed as a part of this disclosure, and in such drawing like characters of reference denote corresponding parts throughout all of the views, in which—

Fig. 1 is a printing frame provided with means for positively and accurately matching the positive with a negative record during printing of the positive record;

Fig. 2 is a section through my improved printing frame with the parts maintained in printing relation;

Fig. 3 is a partial perspective view which shows diagrammatically my improved arrangement of accurately matching a positive with a negative film for printing purposes.

In the drawing, and referring first to Fig. 3, the reference character 10 may designate a negative disc film provided with a series of peripheral picker slots, of which any two adjacent slots are indicated at 10*a*, 10*b*. Similarly, the reference character 11 may designate a positive film or transparency provided with a like series of picker slots, two adjacent slots being indicated at 11*a*, 11*b*. It will be understood that the series of slots inclusive of slots 10*a*, 10*b*, have been formed in the disc 10 by a series of individual punches of a punching die. In order to secure an absolute matching of the film 10 with the film 11, I superimpose the film 10 on the film 11 in such

manner that the picker slots 11*a*, 11*b*, which have been punched by the same individual punches of the same die punch forming the slots 10*a*, 10*b*, are in registry with said slots 10*a*, 10*b*. Consequently, the image transferred from the negative 10 to the positive 11 bears exactly the same relation to the slots 11*a*, 11*b*, as the corresponding images of the negative 10 bear to the slots 10*a*, 10*b*.

Where the peripheral slots of the disc 10 have been punched with the emulsion or sensitizing surface thereof facing downwardly, the disc 11 will be punched with its emulsion or sensitizing surface facing upwardly, this by reason of the fact that during printing, the emulsion surface of the respective films are in facing relation.

In order to permit a printing operator, to definitely match the negative and positive films 10, 11, respectively, as above described, I also punch in each of the films 10, 11 a matching hole 12*a*, 12*b*, with a punch bearing a definite relation to the individual punches which have, for instance, punched the picker apertures 10*a* and 10*b* of the record 10 and the slots 11*a* and 11*b* of the film record 11.

Referring now to my improved printing frame, the reference character 20 describes a base section of the frame which may be of a solid panel having an undercut edge 21 throughout. Hinged to the base section 20 is a panel frame 22 providing a mounting for a glass panel 23. By reference to Fig. 2, when the hinged section is brought down on the base section 20, the lower surfaces of the frame 22 are prevented from bearing on the base by reason of the undercut edge 21 thereof.

The base 20 is provided with a centering pin 25 which may be screwed or otherwise secured therein to provide a rigid mounting, and its operative upper face is covered with a pad 26 which may be of felt or other soft cushioning material.

Spaced from the centering pin 25, I provide a matching pin 27, which may be disposed along any radius of the films to be printed, but is preferably spaced from the center pin 25 on a radius of the films beyond the picture record thereon.

The glass panel 23 is provided with openings 28 and 30 through which the said pins 25 and 27 extend when the hinged section 22 is brought into engagement with the base section 20.

I provide means for holding the sections 20, 22 in tight engaging relation, and such means may include an indentation 31 in the base section 20 into which a spring detent 32 carried by the hinged frame section 22 engages. The spring detent thus acts to lock the frame 22 and glass panel 23 into tight engagement with the films centered on the pin 25.

In use, an operator may open the frame to the position of Fig. 1 and mount the positive film 11 over the centering pin 25 with the emulsion surface of the film facing upwardly. The film is then rotated about the pin 25 as a center until the matching hole 12*b* engages over the matching pin 27. Thereupon, the film is pressed down on the pad 26. The negative film, with its emulsion face down, is then placed over the pin 25 whereby it is centered with respect to the positive 11 and similarly is rotated until its matching aperture 12*a* is aligned with the matching pin 27. Thereupon, the film 10 is forced downwardly into engagement with the positive 11, and necessarily in such manner that each of the picker slots of one film is absolutely matched with each of the picker slots of the other film which have been punched by the same individual punches of the punching die. Consequently, every image transferred to the positive 11 bears the same identical relation to the picker slot bringing it into view as the corresponding image exposure of the negative bears to the particular picker slot thereof which has caused that exposure to be photographed. Obviously, when the positive is used for projection purposes, flickering of the projected picture resulting from the incorrect spacing of an image of the series from its individual picker s ot is eliminated.

It will thus be seen that the several objects of the invention are achieved and other advantageous results are obtained.

As many changes could be made in carrying out the above invention, without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

Without further analysis, the foregoing will so fully reveal the gist of this invention that others can by applying current knowledge readily adapt it for various applications without omitting certain features that from the standpoint of the prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention, and therefore such adaptations should and are intended to be comprehended within the meaning and range of equivalency of the following claims.

1. A printing frame comprising a base section, a panel operatively related thereto, and a centering pin extending from the base section for centering disc films relative to each other, the panel being provided with a hole thru which the centering pin extends when the section and panel are disposed in printing relation.

2. A printing frame comprising a base section, a panel operatively related thereto, and a centering pin extending from the base section for centering disc films relative to each other, a matching pin extending from said section and cooperating with matching apertures in the film, the panel being provided

with holes thru which said pins extend when the section and panel are disposed in printing relation.

3. In a disc film printing assembly adapted to receive a negative and a positive film, each of said films being provided with a series of slots disposed about its periphery, each of said slots of both series being cut by individual punches of a series of punches, a base section on which one of said films is disposed, means to center the other film on said section with respect to the first-named film, a panel opertaively related to said base section, and means to match said films in centered relation so that the individual slots of each which were punched by the same individual punches of the punch series are in registry.

4. In a disc film printing assembly adapted to receive a negative and a positive film, each of said films being provided with a series of slots disposed about its periphery, each of said slots of both series being cut by individual punches of a series of punches, said films each having a matching hole definitely related to a slot which has been punched by the same punch of the punch series, means to center said films on said base section relative to each other, a matching pin on said base section permitting and causing matching of the centered films so that the individual slots of each which were punched by the same individual punches of the punch series are in registry, and a panel operatively related to said base section.

5. The method of matching a positive with a negative film for printing of the positive, each of said films having a series of peripherally disposed slots formed therein by a plurality of individual forming means, which consists in centering said films in transfer relation, and disposing one of said films relative to the other in such manner that a slot of its series is in registry with a slot of the other series formed by the same individual forming means.

6. The method of matching a positive with a negative film for printing of the positive, each of said films having a series of peripherally disposed slots formed therein by a plurality of individual forming means, which consists in centering said films in transfer relation, and disposing one of said films relative to the other in such manner that the slots of its series are in registry with the slots of the series of the other film which have been formed by the identical forming means.

7. The method of matching a positive disc film with a negative disc film for printing of the former, which consists in providing a series of picker slots in each with slot forming means individual to each slot of both series, and arranging one of said films in transfer relation in such manner that the slots of each series which were formed by the same individual forming means are in registry.

8. The method of matching a positive disc film with a negative disc film for printing of the former, which consists in providing in one film a series of picker slots with slot forming means individual to each slot, providing in the other film a like series of picker slots with the same slot forming means, disposing said films with their emulsion surfaces in facing relation, and arranging said films so that the slots of each series which were formed by the same individual slot forming means are in registry.

Signed at Washington, District of Columbia, this 18th day of April, 1930.

CURTIS D. CHASE.