

C. F. LEDERER.
METHOD OF MAKING ANIMATED CARTOON MOTION PICTURE FILMS.
APPLICATION FILED JUNE 3, 1918.

1,375,918.

Patented Apr. 26, 1921.

4 SHEETS—SHEET 1.

Fig. 1.

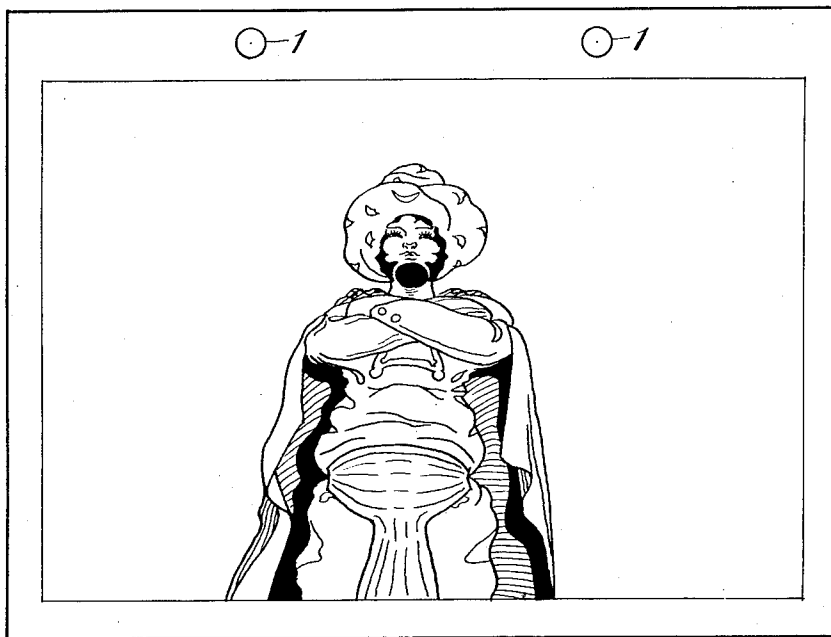
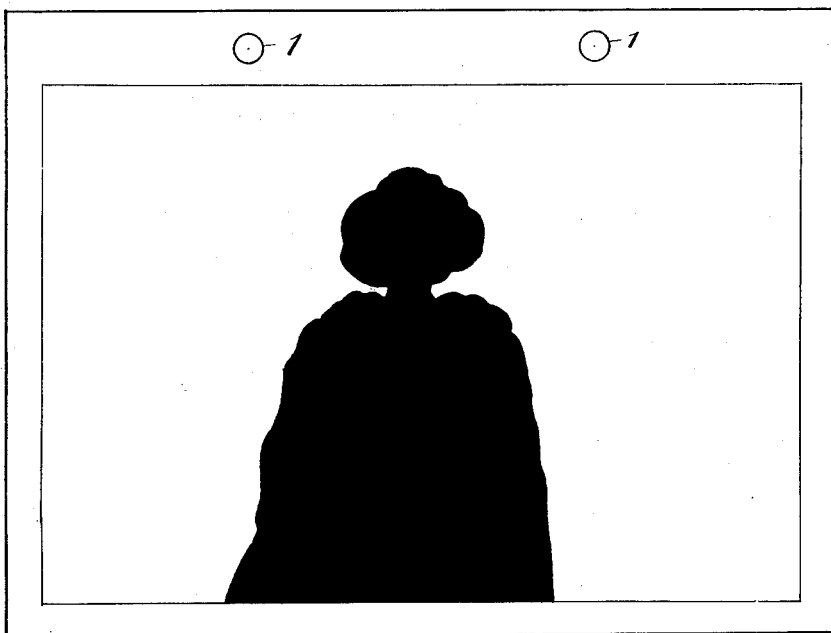


Fig. 2.



INVENTOR
Carl F. Lederer
BY
Church & Rich
ATTORNEY

C. F. LEDERER.
METHOD OF MAKING ANIMATED CARTOON MOTION PICTURE FILMS.
APPLICATION FILED JUNE 3, 1918.

1,375,918.

Patented Apr. 26, 1921.

4 SHEETS—SHEET 2.

Fig. 3.

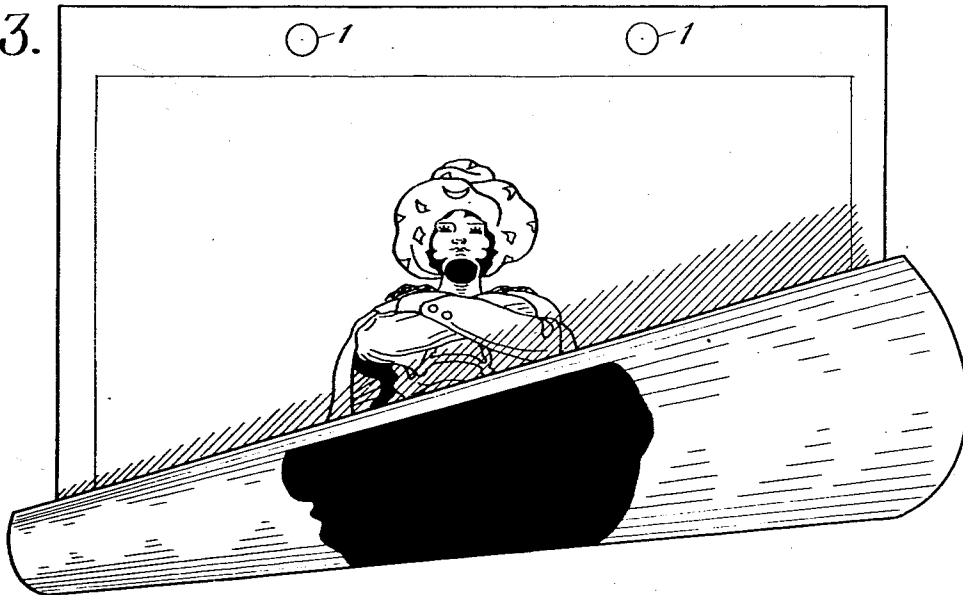
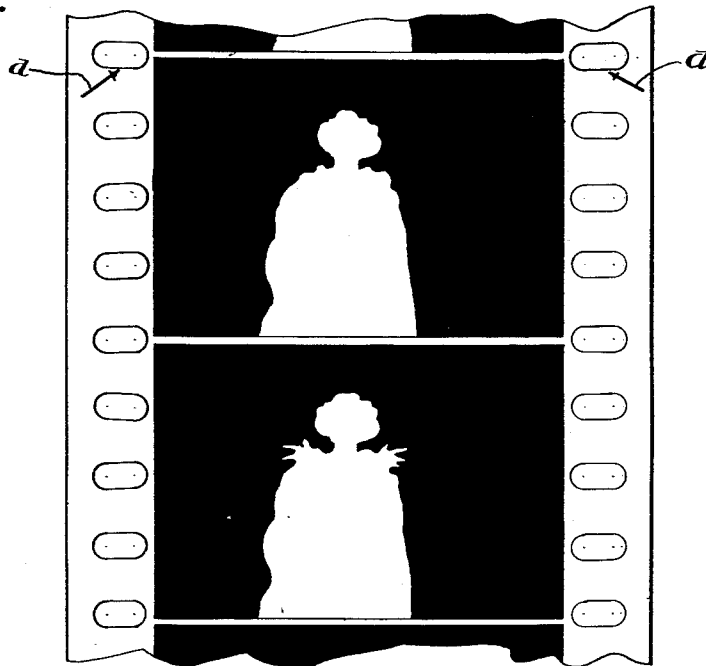


Fig. 6.



INVENTOR
Carl F. Lederer
BY
Church & Risk
ATTORNEY

C. F. LEDERER.
METHOD OF MAKING ANIMATED CARTOON MOTION PICTURE FILMS.
APPLICATION FILED JUNE 3, 1918.

1,375,918.

Patented Apr. 26, 1921.

4 SHEETS—SHEET 3.

Fig. 4.

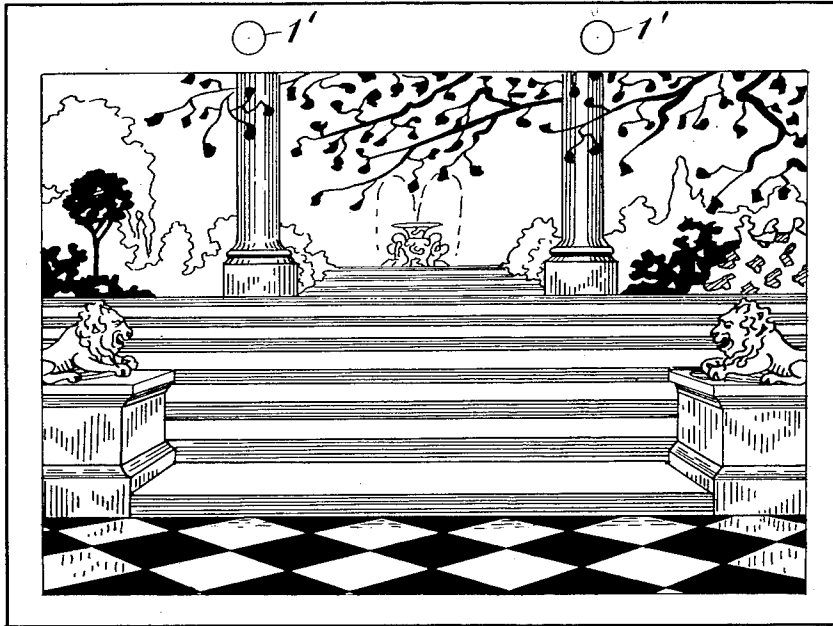
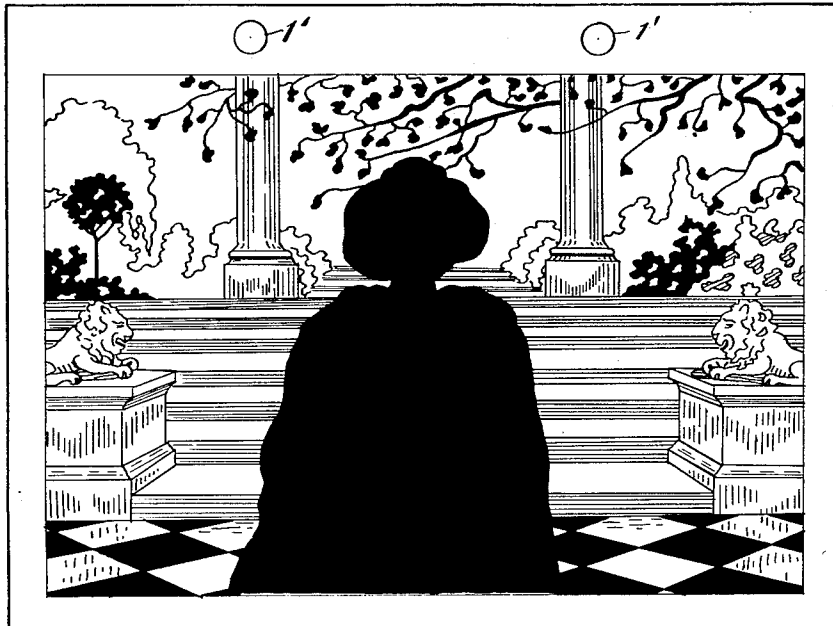


Fig. 5.



INVENTOR
Carl F. Lederer
BY
Church & Rich
ATTORNEY

C. F. LEDERER.
METHOD OF MAKING ANIMATED CARTOON MOTION PICTURE FILMS.
APPLICATION FILED JUNE 3, 1918.

1,375,918.

Patented Apr. 26, 1921.
4 SHEETS—SHEET 4.

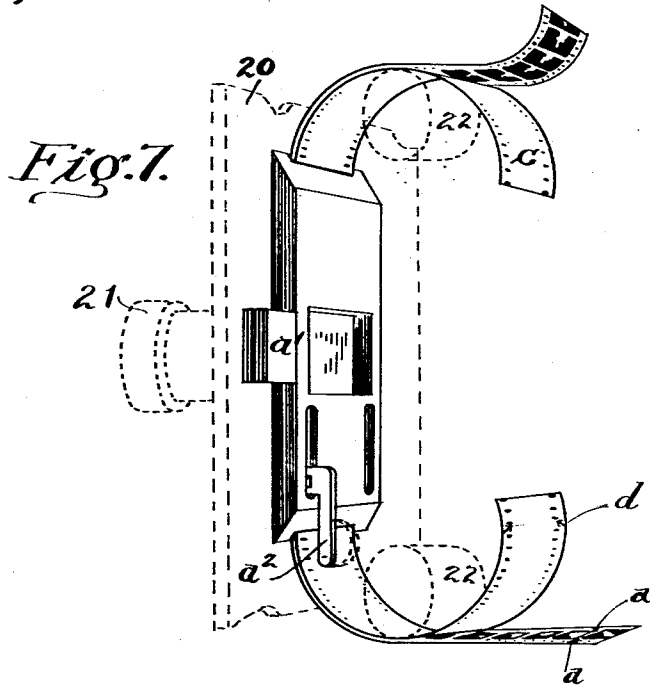
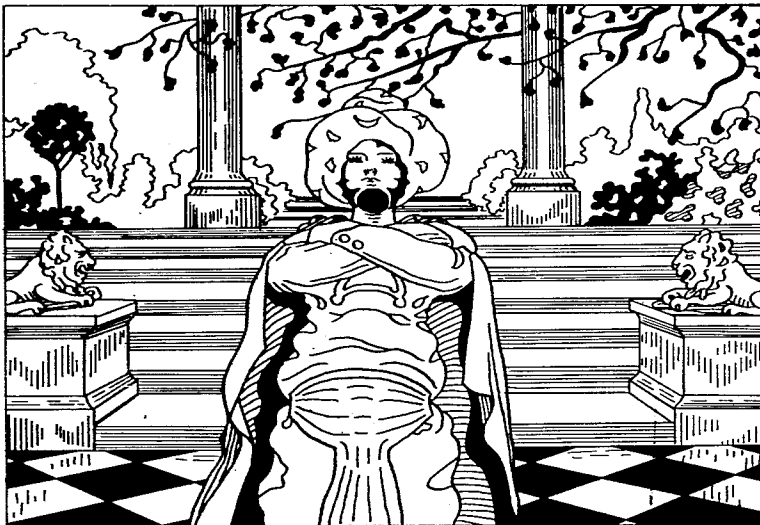


Fig. 8.



INVENTOR
Carl F. Lederer
BY *Church & Rich*
ATTORNEY

UNITED STATES PATENT OFFICE.

CARL F. LEDERER, OF ROCHESTER, NEW YORK, ASSIGNOR TO G. WILLARD RICH, TRUSTEE, OF ROCHESTER, NEW YORK.

METHOD OF MAKING ANIMATED-CARTOON MOTION-PICTURE FILMS.

1,375,918.

Specification of Letters Patent. Patented Apr. 26, 1921.

Application filed June 3, 1918. Serial No. 238,030.

To all whom it may concern:

Be it known that I, CARL F. LEDERER, of Rochester, in the county of Monroe and State of New York, have invented certain
5 new and useful Improvements in Methods of Making Animated-Cartoon Motion-Picture Films; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the
10 accompanying drawings, forming a part of this specification, and to the reference-numerals marked thereon.

My present invention relates to the production of picture films of the class generally termed in the trade as "cartoon pictures," in which objects are animated to produce a screen subject carrying out an artist's conception of a picture that may be either instructive or amusing, or both, and it has
15 for its object to provide an improved method for producing motion pictures by means of which an object or objects may be shown in the finished picture as moving in or upon a background, or with reference to similar stationary objects, without the necessity of laboriously reproducing such background or
20 stationary objects for each drawing of the series required to show the object in its successive stages of movement.

My invention has for its further object to provide a means whereby greater elaboration of scenes may be undertaken in the field of animated cartoon pictures than has heretofore been effected, thus enabling scenic
35 effects to be produced by the use of backgrounds, in which the lines of the background picture cover the entire area or field of movement of the figures or objects, this result being accomplished by employing
40 means for cutting out the lines of the background which cross the lines depicting the objects, when the drawings of said objects and background are superposed.

My invention further relates to the provision of a stencil for use in producing certain photographic effects and one that is also adapted to motion picture photography, and in such use is employed with the sensitized film strip or support and passes therewith
50 through the motion picture camera for preventing the exposure of portions of the sensitized surface during certain periods of the picture taking operation. To these and other ends the invention resides in certain
55 improvements and combinations of parts, all

as will be hereinafter more fully described, the novel features being pointed out in the claims at the end of the specification.

In the drawings:

Figure 1 is a plan view of one of a series
60 of drawings of a figure or object which shows the latter in one position of movement;

Fig. 2 is a silhouette thereof, prepared on a separate sheet or support; 65

Fig. 3 is a view illustrating the outline drawing of a figure on one surface of a support and the counterpart silhouette on the reverse side of the support;

Fig. 4 is a view of a conventional back-
70 ground;

Fig. 5 illustrates the superposing of the background and one of the silhouettes as used in one stage of the picture taking operation; 75

Fig. 6 is a view of a portion of a motion picture film enlarged, illustrating the stencil;

Fig. 7 is a fragmentary perspective view showing a portion of the film feeding mechanism of a motion picture camera illustrating the manner of threading the stencil film and the raw stock or sensitized film therein, and

Fig. 8 shows the ultimate screen subject
85 formed by superposing the photographic reproductions of the animated objects on the background.

Similar reference numerals in the several figures indicate similar parts. 90

In the art of film production of motion pictures, especially those showing scenes originating in the imagination of an artist, it is necessary to first create a series of drawings on separate supports, or sheets of paper, showing the object or figure in different
95 stages of movement, and in order that the picture projected may appear smooth without breaks in the action, the change shown in successive pictures must necessarily be
100 slight. Consequently, a comparatively large number of pictures are required to show an action of any considerable movement. It will be understood therefore that in making cartoon pictures by the methods heretofore
105 practised, the stationary objects, comprising a background, must be reproduced in each picture of the series. This is a very expensive part of the work because of the labor involved, and it is also objectionable because 110

the time consumed in making the backgrounds lengthens the period required for the production of a given screen subject. In making backgrounds in this way, it is also necessary that care be exercised to have them all alike; otherwise, movement will be shown in the finished picture, in parts of the background because of the inaccuracy in copying the lines due to difficulty in obtaining accurate registration of the lines of drawing on the several pictures.

In carrying out my invention, the parts of the scene depicted appear in the same position in each separate picture of a series, remain the same throughout the series and constitute the stationary lines or elements. The latter are photographically reproduced from a single background drawing, the lines, or parts of which intersect the lines of the pictures of the series, being prevented from showing through said pictures by means, which I have adopted for rendering such lines, in the areas of the pictures, invisible.

In illustrating one embodiment of my invention and the present preferred method of carrying it into effect, I first prepare a series of pictures (Fig. 1) showing the objects or figures which are to appear animated in their successive stages of movement and number each of the sheets or supports carrying said pictures serially. These pictures may be successive photographs, or they may be line drawings, such as are usually made in the production of cartoon pictures. A silhouette or counter-part of each of said pictures is then prepared, which may be made either by tracing the picture on a separate sheet, as shown in Fig. 2, or reversing the sheet on which the principal drawing occurs and filling in the outline of the figure as shown in Fig. 3, in solid black or other non-actinic color, such as red.

The silhouettes, in whatever way they are prepared, occupy during the picture taking operation, a position in the focal plane of the lens of the motion picture camera identical with the position of the corresponding pictures of which they are the counterparts, so that subsequent exposures of the silhouettes and pictures will be superposed if photographed successively. This exact registration of the images formed by the lens is obtained by exercising care in placing the drawings when photographed. To insure this, each of the sheets or supports are provided with perforations 1-1 at one of their edges, as shown, which will slip over projections on a suitable supporting platform placed at a fixed distance in front of the motion picture camera.

Preliminary to photographing the picture proper, I prepare a stencil of the picture which is to be subsequently used with the sensitized film strip. This stencil is

preferably made photographically on a strip of motion picture film by photographing successively the silhouettes in the order in which the pictures, or the outline drawings, such as is shown in Fig. 1, are to be subsequently photographed. In making the stencil film strip, I preferably use what is known in the trade as positive raw stock, for the purpose of obtaining a strong contrast and I preferably thread it in the camera with its emulsified, or sensitized, surface inward, so that the light acting thereon passes through the film or support. Successive exposures of this film are made of the successive silhouettes by proper timing of the exposures, so that the stencil is formed with a clear transparent area of the figure, and a dark opaque field entirely surrounding the outline of the picture. This film strip is then developed in the usual manner, giving the resulting stencil shown in Fig. 6.

It will now appear that if a second film strip is exposed in the rear of the stencil strip, its sensitized surface will be affected only by the light rays passing through the clear areas of the stencil figures, thus preserving and rendering the marginal portion of the sensitized surface susceptible of photographically recording additional objects when exposed a second time without the stencil. Therefore, if the original pictures or line drawings are photographed through the stencil, they will be recorded. In certain classes of pictures, where it is not desired to produce background effects and to have the figures stand in bold relief upon a perfectly clear background, the second film strip or negative may be developed, and thus there will appear on the film strip only a reproduction of the picture photographed without any marginal clouding effect, and when the usual positive print is made from the negative, and pictures from such print are projected on a screen, the field of the latter will appear perfectly white.

Before the negative of the motion picture is completed, the background is prepared and positioned for use with the silhouettes which are again brought into service, being used this time to prevent the over-exposure of the areas on which the animated figures were recorded. The silhouettes now cut out the lines or those portions of the background which intercept said figures and prevent the making of a composite photograph in said areas.

The background and silhouettes are superposed successively. Consequently, either the background or the silhouettes may be made on transparent material, but for practical purposes, I prefer to make the background transparent and place it over the silhouettes. The background may be a line drawing on

a sheet of celluloid, or it may be a photograph of a line or wash-drawing, or a print produced by some other mechanical process on a transparent support. The scene or stationary objects depicted for a background may be any picture made from still life, such as a landscape, street scene or building. For the purposes of illustration, a conventional background is shown in Fig. 4 which is provided at one of its marginal edges with suitable apertures 1'-1' for coöperation with the pins or projections on the support on which the previously mentioned sheets of drawing are placed when photographed.

It will be seen that when the background thus prepared is placed over a silhouette, or if a silhouette on transparent material is placed over the background, the lines of the latter intersecting the boundary lines of the silhouette are rendered invisible and for all practical purposes, photographically considered, are cut out of view. Therefore, by this method of manipulation, I have made it possible to photograph a background in conjunction with the pictures or lines drawings, and to make such pictures appear in a finished film strip as standing wholly in front of the stationary background elements (Fig. 8) and without having any of the lines of such elements appearing skeletonized in or showing through the animated object itself. Thus, a single background can be used and photographed successively with each picture of the series, representing an object in motion, without the necessity of reproducing on said pictures any portion of said background.

In Fig. 6, I have shown a fragmentary view of the stencil film strip enlarged, which it will be understood, is developed, after the successive photographs of the silhouettes have been made. At the beginning of the stencil making operation, the film strip is provided with suitable marks or indications a , so that in its subsequent use in the motion picture camera, the stencil strip can be started in conjunction with the sensitized film strip with which it is used, and the subsequent exposures made upon the latter caused to occur in their proper relationship. These indices a will, for instance, mark certain of the apertures at the edge of the film strip which show its initial position at the gate a' of the camera, or they may mark the apertures with which the reciprocating feeding pawl a^2 of the motion picture camera first coöperates.

In Fig. 7, a conventional fragmentary view of a motion picture camera is shown, comprising the casing 20, having a lens 21, and the usual film carrying rollers 22. The lens 21 is provided, as will be understood, with a suitable shutter mechanism which is tripped for each exposure, after the film strip has been advanced into the picture tak-

ing position by means of the pawl a^2 . The camera also comprises supply and rewind reels and mechanism for controlling the advance and rewinding of the film strip, all of which operate in conjunction with the shutter operating mechanism, but as these parts may be of the usual or any preferred construction, illustration thereof is not necessary for a comprehensive understanding of my invention, which relates to the method of making a picture film strip and may be practised by the use of any of the well known types of motion picture machines.

In Fig. 7, the sensitized motion picture film strip or negative raw stock is indicated by c , which at convenient points is also provided with index characters or marks d , which are preferably placed thereon by the operator coincident with the characters a on the stencil strip at the time the two strips are superposed and connected with the feeding mechanism of the camera.

In placing the two film strips in the camera, the stencil strip (Fig. 6) overlies the unexposed sensitized film strip c , so as to occupy a position in front of it, the feeding apertures in the edge of the two strips coinciding so that they are advanced simultaneously after each exposure. With the two film strips arranged in this manner in the camera, the photographing operation of the picture proper may be commenced, the first exposure being made of the first or number one drawing, or picture, of the series (Fig. 1) with the first or number one stencil in the axis of the camera lens. The two films are then advanced to bring the second or number two stencil in position behind the lens, when the second or number two picture, or line drawing, of the series is photographed. This operation progresses throughout the series, until the photographing of the animated figures of a particular scene has been completed. There then exists on the sensitized surface of the negative or raw stock of the film c , successive photographs of the pictures representing the object or animated figure in its various positions of movement, which will appear upon subsequent development of the strip c . The stencil strip has now performed its service and is discarded in the subsequent operation.

The next step in the process involves the photographing of the background which is to form part of the complete screen subject. This step is accomplished by reëxposing the film strip to record the background on the unexposed sensitized portion of its emulsified surface, which was protected by the opaque portion of the stencil strip.

Preparatory to this operation, the film strip c is rewound onto the supply reel of the camera and its forward end again threaded into the camera, care being exercised at this time to have the indices d in the

proper predetermined position with reference to the feeding devices of the camera, and in the same position which they occupied when the first exposure was made in conjunction with the stencil strip. The positioning of the index marks or characters *d* insure the previously exposed area of this film strip occupying, during the period of the second exposure, the precise and exact location, which said areas originally assumed. From this, it will be seen that if the series of silhouettes are now again placed necessarily in their original positions with reference to the exposures which have been made on the film strip *c*, said silhouettes, by reason of their being in a solid non-actinic color, will prevent the light rays emanating from their areas from causing an over-exposure, or composite photographing on the corresponding areas of the sensitized film when the background photographs are made.

In photographing the background, the latter is superposed on each of the silhouettes in succession. The first exposure of the background (which is in reality a second exposure of the sensitized surface of the negative film strip *c*) is made with the background (Fig. 4) superposed on the first, or number one stencil, (Fig. 5). Film strip *c* is then advanced, the background superposed on the second, or number two stencil, and a second picture recorded on said film strip. Upon the completion of the second series of exposures on the film strip, it is developed in the usual way, and a negative procured from which the usual positive prints for screen exhibitions are obtained.

The process which I have devised, possesses several distinct advantages, in that it renders possible the use of elaborately prepared backgrounds and completely eliminates the tracing of any portion of such a background on the original series of drawings of the picture conceived. It also obviates the necessity of printing either in whole or part such backgrounds in conjunction with the pictures used for indicating the object or figure in various stages of movement. Other advantages found in the use of my process reside in the fact that an artist is enabled to apply more details with finer technique in his work and provide artistic effects and tone additions. Further, by reason of the fact that I have devised a means for preventing the lines of a background from showing through a line drawing of an object, it becomes immediately possible to depict a cartoon figure, or characters in action, in a scene photographed from natural life.

I claim as my invention:

1. The method of making pictures consisting in first preparing two pictures, one in outline, the other silhouetted, then photographing the latter upon a transparent sup-

port and developing said photograph, to obtain a stencil of the picture and subsequently photographing the outline picture through said stencil.

2. The method of making pictures consisting in first preparing a picture of an object and a silhouette thereof in solid color, then photographing the latter upon a transparent support and developing said photograph to obtain a stencil of the picture and subsequently photographing through the stencil upon another sensitized surface the picture proper.

3. The method of making pictures consisting in first preparing a picture of an object and silhouette thereof, then producing photographically from the latter a stencil of the picture and subsequently photographing the picture through the stencil.

4. The method of making stencils for photographic reproduction of pictures, consisting in first making a picture of an object upon one side of a sheet of translucent material, then filling in the outline of the picture upon the reverse side of the sheet in a solid non-actinic color to produce a silhouette and photographing the latter on said reverse side of the sheet.

5. The method of making motion pictures consisting in first preparing a picture of an object and a silhouette thereof, then producing photographically from the latter a stencil of the picture on a moving picture film and subsequently photographing through said film upon a second moving picture film the picture itself.

6. The method of making pictures consisting in preparing a picture of an object, producing a stencil thereof photographically, and photographing said picture through the stencil to prevent exposure of the marginal areas of the photographically sensitized surface bounding the picture.

7. The method of making moving pictures, consisting in preparing pictures of an object in successive stages of movement, producing stencils of said pictures photographically and photographing said pictures successively through the corresponding stencils.

8. The method of making moving pictures, consisting in preparing pictures of an object in successive stages of movement, producing on a moving picture film successive stencils of said pictures photographically and making exposures through the stencil film onto a moving picture film of the pictures in succession and corresponding to the stencils.

9. The method of making photographs of an object on a background, consisting in producing a picture of the object and a silhouette thereof, producing upon transparent material said background, preparing a stencil of the picture, making an exposure on a

photographically sensitized surface of the picture through the stencil and subsequently making a second exposure to photograph the background with the silhouette placed thereunder in the position previously occupied by the picture when first photographed.

10. The method of making photographs of an object on a background, consisting in producing a picture of an object and a silhouette drawing of said object, producing upon transparent material a desired background, photographing the picture upon a photographically sensitized surface only within the outline of the object, and preventing an exposure of said surface in the area surrounding the margin of the picture, and subsequently photographing the background with the silhouette placed beneath the transparent background in position to cause the image of said silhouette to register with the previously exposed area in which the picture was photographed.

11. The method of producing photographic reproduction of pictures consisting in first producing a picture of an object on one side of a suitable support, then filling in the outline of the picture to produce a silhouette, photographically producing a stencil from the silhouette, and subsequently photographing the first picture through the stencil.

12. The method of producing photographic reproduction of pictures, consisting in first producing a plurality of pictures of an object in successive stages of motion on one side of separate supporting sheets, then filling in the outlines of said pictures on the reverse sides of said supports to produce silhouettes, photographically producing stencils from said silhouettes, and subsequently photographing the pictures successively through their respective stencils.

13. The method of producing motion pictures, consisting in making a plurality of pictures of an object in successive stages of motion, preparing stencils for said pictures successively disposed on a moving picture film strip and photographing on a second sensitized moving picture film strip each picture through its respective stencil, the sensitized strip being located beneath and moving with the stencil strip during said photographic operation.

14. The method of producing motion pictures, consisting in making a plurality of pictures of an object in successive stages of motion, preparing silhouettes of said pictures, and photographing said silhouettes in succession on a film strip in a motion picture camera and developing said film to form stencils of the pictures, and subsequently making exposures with the motion picture camera of the successive pictures on a sensitized film strip positioned beneath and moving with the stencil strip.

15. The method of producing motion pictures, consisting in making a plurality of pictures of an object in successive stages of motion, preparing silhouettes of said pictures, and then making stencils of the pictures by successively photographing the silhouettes on a film strip in a motion picture camera and developing said film strip, and subsequently making successive exposures in the camera on a sensitized film strip of the pictures in the order in which the stencils appear on the stencil film strip, said sensitized strip being located behind the stencil strip and passed therewith through the motion picture camera.

16. The method of making pictures of objects in motion upon a background consisting in producing a background on transparent material, preparing a plurality of pictures of an object in successive stages of movement, and a silhouette of each of such pictures, producing on a motion picture film stencils of such pictures, photographing each of said pictures on a sensitized film by exposing the latter through the stencils, and subsequently re-exposing the sensitized film directly to make successive photographs of the background, and for each last mentioned exposure, placing the silhouettes successively beneath the background in position to register with the exposures made of the pictures when first photographed.

17. The method of making pictures of objects in motion upon a background consisting in producing a background on transparent material, preparing a plurality of pictures of an object in successive stages of movement, and a silhouette of each of such pictures, producing stencils of said silhouettes by photographing them on a moving picture film and developing the film, then photographing each of said pictures on a sensitized film exposed behind the stencil film and subsequently making a second exposure of said film to successively photograph the background in a superposed position on each silhouette.

18. The method of making a picture of an object to appear in prepared backgrounds, consisting in producing line drawings of a desired background on transparent material, preparing an outline drawing of an object, preparing a silhouette thereof, preparing a stencil of the drawn picture, photographing through the stencil upon a sensitized surface the line drawing, and subsequently photographing the backing in a superposed position on the silhouette, the latter then being placed to coincide with the position occupied by the line drawing when first photographed.

19. The method of making animated cartoon motion pictures with backgrounds, consisting in preparing a desired background on transparent material, preparing outline

drawings of an object in successive positions of movement, preparing corresponding silhouettes of such object in its various positions, preparing stencils of the drawn pictures, photographing through the stencils upon a sensitized surface the outline drawings corresponding to the stencils, and thereafter making successive photographic exposures of the background in superposed positions on the silhouettes.

20. The method of making animated cartoon motion pictures with backgrounds, consisting in preparing a background, preparing on separate supports a series of pictures of an object in successive stages of movement, and a series of corresponding silhouettes, and photographically producing a series of corresponding stencils on a motion picture film, making photographic exposures on a second sensitized motion picture film located behind the stencil film of each picture in succession, and subsequently making successive exposures on the sensitized film of the background and silhouettes, the latter being successively located to coincide on said film with the previous exposures of the corresponding pictures.

21. The method of making animated cartoon motion pictures with backgrounds, consisting in providing on separate supports a series of pictures of an object in successive positions of movement, preparing a series of corresponding silhouettes and providing a background, said background and silhou-

ettes being on separate supports, one of which is transparent, and producing a series of stencils corresponding to each picture adapted for use in a motion picture camera to mask the areas of the sensitized film strip outside the margins of the pictures, making photographic exposures on a film strip behind the stencils of each picture and subsequently making successive exposures on the film strip of the superposed background and silhouettes.

22. The method of making motion pictures consisting in producing a series of pictures of an object in successive stages of movement, producing successive silhouettes and stencils of said pictures, photographing the pictures successively on a sensitized film strip through said stencil by means of a motion picture camera, said film strip being provided with suitable indices coöperating with a part of the feeding mechanism of the camera, whereby it may be reinserted therein in the exact location previously occupied by it with reference to the exposure aperture of the camera, preparing a background and locating it in a superposed position with the successive silhouettes, one of said two last mentioned elements being transparent, and finally reëxposing the sensitized film strip to record thereon the background in the areas surrounding the exposures previously made of the successive pictures of the object.

CARL F. LEDERER.