Aug. 13, 1929. A. GEISEN 1,724,572

METHOD OF AND APPARATUS FOR PRODUCING PHOTOLUMINESCENT PICTURES

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Fig. 1.

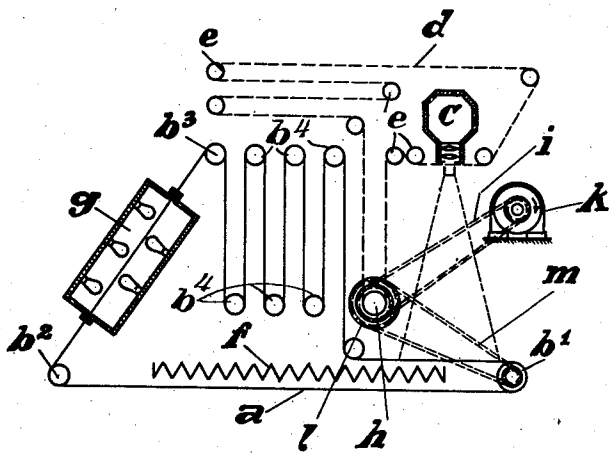
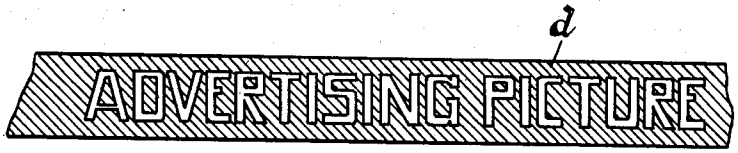



Fig. 2.




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# UNITED STATES PATENT OFFICE.

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## METHOD OF AND APPARATUS FOR PRODUCING PHOTOLUMINESCENT PICTURES.

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This invention relates to a method of and apparatus for producing photo-luminescent pictures or the like which are caused to appear and disappear in succession, especially for purposes of advertising. Methods of and apparatus for producing pictures or the like which appear and disappear in succession are extensively employed in the art of advertising by light. The known procedures for producing such pictures require a considerable amount of apparatus and in addition to this a great quantity of incandescent lamps. Furthermore, with the known apparatus of this kind it is impossible to have the luminous pictures or signs appear and disappear gradually, the pictures of known apparatus appearing and disappearing at once, if the source of light is put into and out of operation respectively. According to my invention these disadvantages are avoided. In the first place the apparatus according to my invention will be essentially simplified as compared with known apparatus by reason of the fact that I employ only a single source of light, which, however, should be sufficiently powerful. In addition to this, the form of pictures, signs, inscriptions or the like which may be produced with the apparatus and method according to my invention may be chosen as desired.

According to my invention a projection surface is illuminated by means of a source of light having a movable template in the form of a ribbon or film interposed which consists partly of transparent and partly of opaque elements, so that the light rays issuing from said source will pass through the transparent places of said template and act upon said projection surface and produce a luminous picture thereon. The projection surface in the present case consists likewise of a movable ribbon which is provided with a coating of luminous color, which is illuminated from said source of light through said template. The speed of motion of both ribbons, viz, the movable luminous ribbon and the movable template is so chosen that the projection of the transparent elements of the template will be at rest relatively to the projection surface, that is relatively to the ribbon with a coating of luminous color.

An example of an apparatus according to my invention is shown in the accompanying drawing, in which Fig. 1 is a diagrammatic view showing the arrangement of the apparatus, while Fig. 2 is a representation of the movable template together with the transparent picture, sign, inscription or the like which is provided thereon.

Referring now more particularly to the drawing, an endless ribbon $a$ which is provided with a coating of luminous color is carried over the rollers $b_1$, $b_2$, $b_3$ and a further series of rollers $b_4$. This ribbon $a$ is illuminated by a source of light $c$ as indicated in Fig. 1 of the drawing. A further endless movable ribbon $d$ is arranged to pass in juxtaposition to the source of light $c$ and is properly guided by means of a plurality of rollers $e$. The ribbon $d$ is composed of transparent and opaque elements, the transparent elements corresponding to the projection which shall be produced upon the ribbon $a$. As an example, the ribbon $d$ may be composed of transparent and opaque elements in such a manner, that the transparent elements represent an inscription or picture. The ribbon $d$ is represented in Fig. 2 in about natural size, bearing the advertising picture, sign or inscription. The rays of light issuing from the source $c$ will penetrate through the transparent places of the ribbon $d$ and fall upon the projection ribbon $a$, a picture or inscription being thus produced upon the latter in accordance with the picture or inscription which is represented by the transparent places of the ribbon or film $d$. The speed of motion of either ribbon $a$ and $d$ is so chosen, that the projections produced by the transparent elements of the ribbon or film $d$ on the ribbon $a$ will remain at rest relatively to the latter, so that always the same places of this ribbon will be exposed to the rays of the source of light $c$. Thus, the driving pulley $h$ of the band $d$ is driven from the motor $k$ by means of the belt $i$. On the shaft of the pulley $h$ there is mounted a second pulley $l$ which operates, by means of a belt $m$, the pulley $b_1$ over which the band $a$ passes. In order that the projections of the light rays upon the band $a$ shall move at the same speeds as the latter, the speeds of the two bands must have the same ratio to one another as the distances of the bands from the source of light $c$. The belt transmission ratios are to be chosen accordingly. The ribbon $a$ after having been exposed to the source of light $c$ is moved over

the roller $b_1$ and will now be exposed to the eye of the observer. The luminosity of the picture or inscription will now gradually decrease and the luminous surface will leave its position at which it is exposed to the eye of the observer, at the place where the ribbon $a$ moves around the roller $b_2$. The ribbon $a$ thereupon is moved around a plurality of further rollers $b_3$, as indicated in Fig. 1. The luminosity of the ribbon $a$, which had previously been caused by the light-rays, has completely disappeared when the ribbon $a$ again enters the field of action of the source of light $c$ in order to be again illuminated by the latter. Preferably for the ribbon $a$ a coating of luminous color is chosen which reacts upon an exposure to light of very short duration, so that immediately after said exposure the coating of luminous color will be rendered luminescent for several seconds, and thereupon again lose its luminescence. After the lapse of about from 20 to 30 seconds another picture or inscription may be projected upon the same places of the ribbon $a$ without producing any after-effects which may be due to the previous exposure.

The procedure of bringing about the luminescence of the luminous coating provided on the ribbon $a$ may be accelerated by subjecting said ribbon, after being exposed to the light-rays of the source of light $c$, to a treatment by heat which may, for instance, be accomplished by carrying the ribbon $a$ past the heating resistances $f$, or after having passed the roller $b_2$, through the box $g$ which is provided in its interior with red incandescent lamps. The heat which is thus imparted to the ribbon $a$ by the heating resistances $f$ will have the effect that the chemical process which takes place in the luminous coating of the ribbon $a$ will be performed more quickly, so that in consequence thereof the luminescence of the ribbon will be caused to take place more intensively. By subjecting the ribbon $a$ to a heat treatment by passing the same through the heating-box $g$ the effect will be obtained that the luminescence of the ribbon $a$ will disappear more quickly. By inserting a heating device at the place shown in the drawing, it will be possible to use a luminous ribbon $a$ of considerably shorter length, because in this manner the ribbon will be enabled to become again luminescent after a considerably smaller time, than would be possible if the heating device is absent.

As may be seen from the diagrammatic representation according to Fig. 1, the apparatus for carrying my invention into effect is of extreme simplicity. Preferably the ribbon $d$ which serves as a template for the picture or inscription to be projected on the luminous ribbon $a$, may be provided with the respective letters, pictures, signs, inscriptions or the like. This may be done in various ways. For instance, the pictures, signs, letters, inscriptions or the like may be applied to the ribbon or template $d$ by a photographic process or they may be applied by drawing or writing the same upon the ribbon or also by pasting. Furthermore the ribbon $d$ which serves as a template for the advertising picture, inscription or the like may preferably be arranged immediately in front of the source of light $c$, while the luminous ribbon $a$ which serves as the projection surface for said picture or the like is preferably provided at some distance from the source of light $c$. In this case the ribbon or template $d$ may be made of very small width, whereby the costs of manufacture will be essentially reduced. Moreover a film or ribbon $d$ of small width may be more conveniently handled yet permitting to produce on the ribbon $a$ a projecting surface of considerable extension.

The source of light $c$ which serves for projecting the picture, sign or the like may be blue (ultra-violet) and the projection will therefore appear in blue color as long as the source of light is not screened, while the color of the projection may be suddenly changed by screening the source of light. In this manner a further surprising and novel effect may be obtained with the apparatus according to my invention.

The number of the pictures, signs, inscriptions or the like which may be projected according to my invention is almost unlimited. In addition to this, the films or ribbons which bear the several pictures, inscriptions or the like may be easily manufactured and exchanged in a simple manner, without causing any inconveniences, delays or the like.

I claim:

1. Apparatus for producing photo-luminescent pictures, signs, inscriptions or the like, consisting of a continuously movable ribbon having a coating of luminous color, a second continuously movable ribbon composed partly of transparent and partly of opaque elements, said transparent elements representing the picture, sign or inscription to be produced on said first ribbon, a source of light positioned relatively to said ribbons so as to cause the pictures, signs or inscriptions on said second ribbon to be projected on said first ribbon, and means for imparting different continuous speeds of motion to said ribbons, whereby the projection of said transparent elements of said second ribbon will remain at rest relatively to said first ribbon.

2. Apparatus as specified by claim 1, having heating means adapted to heat the first movable ribbon after said ribbon had been exposed to the source of light through the second movable ribbon, for the purpose set forth.

3. Method of producing photo-luminescent pictures, signs, inscriptions or the like, which consists in continuously moving a ribbon with a coating of luminous color in front of a source of light, interposing a second ribbon between said source of light and said first ribbon, said second ribbon being provided with transparent elements defining the picture sign or inscription to be projected on said first ribbon, and imparting proper speeds of motion to said ribbons so that the projections of said transparent elements of said second ribbon will remain at rest relatively to said first ribbon.

4. Method as specified by claim 3, which is characterized by the fact, that the first ribbon after having been exposed to the source of light through the transparent elements of the second ribbon is subjected to heat, for the purpose set forth.

5. Apparatus for providing photo-luminescent pictures and the like including a movable ribbon having thereon a coating of luminous color, a source of light, a stencil ribbon through which the rays from said source of light are projected directly onto said luminous ribbon, said stencil ribbon being interposed between the first named ribbon and said source of light in juxtaposition to the latter, and means to move said ribbons in synchronism.

In testimony whereof I have affixed my signature.

ALOIS GEISEN.