

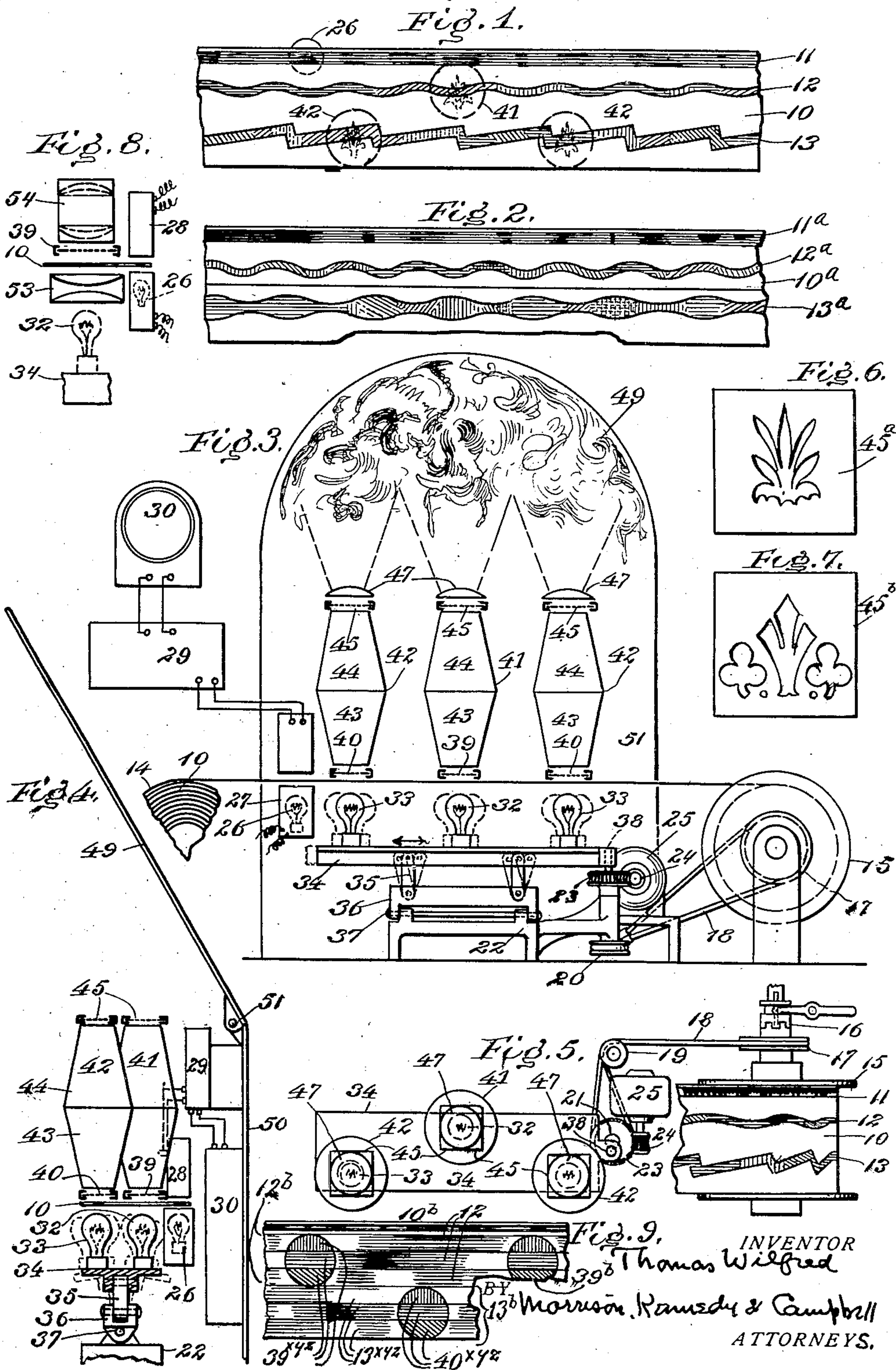
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LIGHT DISPLAY APPARATUS

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## LIGHT DISPLAY APPARATUS

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This invention relates to sound and light display apparatus, and has reference to the combined production of sound or music and light or color effects, under the control of a single means or record, in a manner for example wherein each part of the performance, the sound and the light, constitutes an accompaniment for the other part, the two preferably being coordinated or arranged in synchronism. Certain parts of apparatus shown or available for use in the present invention have been disclosed in prior patents of mine, for example, No. 1,758,589 of May 13, 1930, to which reference may be had for details.

The main object of the present invention is to afford an automatic system or apparatus whereby compositions or other performances involving the simultaneous production of sound and the projection of light may be afforded. The results are not only productive of enjoyment, but are useful as interpretations, accompaniments to dancing or other performances, or the like. Other and further objects and advantages of the invention will be explained in the hereinafter following description of an illustrative embodiment, or will be apparent to those conversant with the subject.

In the accompanying drawing Figure 1 is a face view of a record member, strip or band having a plurality of tracks, paths or zones controlling the production respectively of sound and light effects. Fig. 2 is a similar view of a modified form of record strip. In these two views the light or color tracks are indicated as of changing colors, with illustrative color designations shown in accordance with the Patent Office rules of practise.

Fig. 3 is a front elevation view, largely diagrammatic, of a complete apparatus embodying the cooperative features of the present invention. Fig. 4 is an end elevation view of certain parts of Fig. 3, with certain modifications. Fig. 5 is a top plan view of certain parts of Figs. 3 and 4.

Figs. 6 and 7 are face views of different forms of mask or cut-out screens for use in the apparatus.

Fig. 8 shows a modification of a portion of the apparatus, in a view similar to Fig. 4.

Fig. 9 indicates a modified character of record strip and certain screens cooperating therewith.

Referring first to the embodiment shown in Figs. 1, 3, 4 and 5, the record or film 10 is shown as having a sound track or lane 11 and first and second light or color tracks 12 and 13. For example the color track 12 may represent and

produce by its changes of form and color an accompaniment coordinated with the sound composition of track 11, while the color track 13 may produce a supplemental or solo color performance. Each of the color tracks is shown as changing in width, form and color from point to point, the selection and arrangement being in accordance with the judgment of the artist.

The sound track may be of the type which varies in density as in Figs. 1 and 2, or the type which is of uniform density but varies in width, as in Fig. 5, according to the system used.

The actuation of the strip is indicated in Figs. 3 and 5. It passes from a convenient supply spool 14 to a take-up spool 15 driven through a clutch 16 by a pulley 17 engaged by a belt 18 passing over idler pulleys 19 and driven by a pulley 20. The pulley 20 is shown mounted at the lower end of a shaft 21 turning in a bearing formed on a frame base 22. At the top end of the shaft is shown a worm wheel 23 driven by a worm 24 on the shaft of a motor 25. By this arrangement the film is steadily progressively advanced through the apparatus. Both the sound production and light projection are by or from the record, strip or film continuously controlled, and no step-by-step actuation is necessary.

The sound reproduction part of the apparatus, along lines per se already known, comprises a lamp 26 mounted in a box 27 having a top slit coordinated with the record track 11. Above the record strip is indicated a pick-up device 28 which may be of the photoelectric type, the same having electric connections to an amplifying apparatus indicated at 29, which in turn operates a loud speaker 30, conveniently located, for example concealed as in Fig. 4. The music or other sound performance represented by the track 11 of the record strip is thus delivered by the loud speaker 30 to the audience.

The light or color projecting part of the apparatus may be of various types and details, including those indicated in prior patents. Thus the projecting apparatus may comprise a system of one or more filamentary light sources or lamps projecting through suitable optical devices and eventually received upon a curtain, wall or other surface. For example, there may be a plurality of filamentary lamps projecting cooperatively upon a curtain or surface of relatively small size so that the entire apparatus may be fitted into the fire place of a room for viewing from a nearby point; although the per-



formance might equally be projected to a distant point, ceiling or wall.

In Figs. 1, 3, 4 and 5 are indicated a plurality of filamentary lamps 32 and 33. For example the lamp 32 may be below the color track 12, while the lamps 33 are below the color track 13. All the lamps are shown mounted in proper position upon a table 34 adapted to be moved methodically, as in a horizontal manner, to give predetermined movements to the filaments during the performance. Thus the table 34 may be mounted upon links 35 affording longitudinal movement, the links being pivoted to a carriage 36 which in turn is connected for lateral shifting by a pivot shaft 37 mounted on the base 22.

The table and lamps thus can be put through longitudinal and lateral movements and have, for example, a circular movement, so that images of the filaments will undergo evolutionary shiftings. The progressive operation of the table 34 may be effected by any desired mechanism, for example by a crank pin 38 upstanding from the worm wheel 23 and engaging in a portion of the table, thus compelling the table to move circularly.

The optical means above the lamps 32 and 33, and above the tracks of the record strip, may be variously arranged, for example as follows. Above each lamp 32 is indicated a screen 39, and above each lamp 33 a color screen 40, these serving to modify if desired the colors appearing on the record strip; or instead of color screens the screens 39 and 40 might contain designs in shadow, such as quadrilles, spirals and the like.

Above each lamp 32 and screen 39 is shown a projecting tube 41 and above each lamp 33 and screen 40 is shown a projecting tube 42. Each of these projecting tubes may for example be a tubular internal reflector of double conical form, having a flared lower portion 43 and a tapered upper portion 44. In said prior patent I have described the effect produced by the projection of filamentary light through such an instrument.

Above the several projecting tubes are shown cutout screens or masks 45 which may for example resemble those shown in Figs. 6 and 7. Above the screens 45 are shown plano-convex lenses 47. These however may be omitted as indicated in Fig. 4.

From the lenses the projected effects pass to the receiving surface or curtain 49. This is indicated as an inclined surface extending down and back, and continued as a back wall 50, and if desired the two may be hinged at 51 for ease of assembly or mounting.

In the modification shown in Fig. 8 the light source or lamp 32 is shown as placed beneath a lens 53 of the double plano-convex form, this in turn being placed beneath the record member or strip 10, above which, as before may be arranged a screen 39, and thereabove, in Fig. 8, in place of the flared-tapered tubes 41 a special lens 54 of the double concavo-convex form, from which the light or color may project directly or indirectly to the receiving surface.

Referring further to the record member 10 as shown in Fig. 1, this is preferably in the form of a strip or band, adapted to be advanced as already described or otherwise; but broadly the record member may comprise other physical forms, for example, where a given performance is desired to be repeated over and over again, the record may be in the form of a transparent

disk with the several tracks arranged concentrically near the periphery.

The track 11 is indicated as having portions of greater density than others, thus diagrammatically representing a known system of controlling the production of sound through an electrical pick-up and connected apparatus. The track 12 is shown as having a wavy form, in color, and the color changing periodically from red to blue or green, or otherwise. The wavy form brings about lateral shiftings or vibrations of the projected effect, and these movements, or the color changes from point to point, or both, may be predetermined in synchronism or harmony with the sound production which is to result from the sound record track 11. The second light or color track 13 is shown of arbitrary character, with changes of form, direction and color, representing an endless variety of possible effects and arrangements. Preferably the record spaces between the three tracks are opaque so that the passage of light is confined to the tracks themselves, although in some cases the intermediate spaces might be transparent or partly so to admit a certain amount of white or colored light for projection. Fig. 2 shows a variation from Fig. 1, wherein the first light track 12<sup>a</sup> of the record 10<sup>a</sup> is maintained in coordination with the sound track 11<sup>a</sup>, whereas the light track 13<sup>a</sup> is distinctively different in character from the track 13 in Fig. 1, but also embodies changes of form, position and color.

Records of the general character as shown in Figs. 1 and 2 may be produced for example as follows. The sound track may be produced by photoelectric means, in a manner already known in connection with talking motion picture films. During the production of the sound record, for example music, the performer may play one or more beams of light upon part of the sensitive surface, screened off from the sound track, in sympathy with the music, so as to give results which upon development will produce the light tracks 12 and 13. The development of positive films or records will leave transparent tracks 12 and 13, which may thereafter be colored, for example by spraying liquid color, changed from time to time, upon the transparent track. This may be done either by judgment, or under mechanical control, as by a perforated paper roll, for manufacture purposes.

Fig. 9 indicates an arrangement wherein the manual coloring of the light tracks may be dispensed with. In this form the record 10<sup>b</sup> is shown as having a sound track 11<sup>b</sup> and light tracks 12<sup>b</sup> and 13<sup>b</sup>. Each of the light tracks may be subdivided into color zones. For example the track 12<sup>b</sup> is shown divided into three longitudinal zones 12<sup>x</sup>, 12<sup>y</sup> and 12<sup>z</sup>, and the track 13<sup>b</sup> similarly into three zones 13<sup>x</sup>, 13<sup>y</sup> and 13<sup>z</sup>. Each of the zones of each of the light tracks may control the projection of a certain color, for example the zones 12<sup>x</sup> and 13<sup>x</sup> the color red, the zones 12<sup>y</sup> and 13<sup>y</sup> the color blue, and the zones 12<sup>z</sup> and 13<sup>z</sup> the color green. The coloring may then be provided by means of screens 39<sup>b</sup> and 40<sup>b</sup>, corresponding with the screens 39 and 40 as seen in Figs. 3 and 4. Each of these screens may be a color screen divided into three color zones, for example the screen 39 may be divided into longitudinal zones 39<sup>x</sup>, 39<sup>y</sup> and 39<sup>z</sup> actually colored red, blue and green respectively, and the same with the zones 40<sup>x</sup>, 40<sup>y</sup> and 40<sup>z</sup> of the screens 40<sup>b</sup>. By this arrangement any particular color or combination of colors may be pro-



jected to a more or less degree of intensity. If at any given point the zones are opaque all color will be shut off, whereas if one zone is transparent it will pass for example blue light, and the degree of transparency may change gradually, so that the colors may be combined in various proportions, giving practically universal control of the color projection effects.

The general character of the operation of, and effects produced by, the present invention have been indicated in the above description. A more specific statement of the projected effects is not made, since the effects are infinitely changeable according to the requirements and desires of the artist. In Fig. 3 is roughly shown a possible projected effect wherein it will be understood that patterns and colors appear on the screen, and may progressively undergo changes of form, evolutions of movement, and alterations of color and intensity of light from moment to moment. A complete performance in light and color may be predetermined, and may be such as per se to give pleasure or useful effects, and in this aspect certain parts of the light and color apparatus may be useful apart from the production of sound. In the complete preferred embodiment however the music or sound performance accompanies or is accompanied by the light or color performance, giving a combined result.

There has thus been described a sound and light display apparatus embodying the principles and attaining the objects of the present invention. Various matters of combination, arrangement, operation, coordination, design and detail may be modified without departing from the principles; therefore the invention is not limited to such matters except to the extent set forth in the appended claims.

What is claimed is:

1. In a light projection display apparatus the combination of a light source, and beyond the light source the following: a traveling film adjacent the light source and comprising separate lanes each having progressive variations in density to control intensity of projection, a color screen subdivided longitudinally into two or more zones of different color whereby each color

is separately controlled by the corresponding lane of the film, and beyond such screen a projection means, as a reflector or lens, adapted to control and blend the several portions of colored light traversing the film and color screen; whereby a color display projection is afforded wherein elements of design and color are in varied evolution of intensity, color and movement.

2. In a light projection display apparatus the combination of a light source, and beyond the light source the following: a traveling film adjacent the light source and comprising separate lanes each having progressive variations in density to control intensity of projection, means for imposing color effects upon the portions of light traversing the respective lanes of the traveling film, and a projection means, as a reflector or lens, adapted to control and blend the several portions of colored light traversing the film and color screens; whereby a color display projection is afforded wherein elements of design and color are in varied evolution of intensity, color and movement.

3. Apparatus as in claim 2 and wherein the light source comprises filamentary lamps, with means maintaining them in relative movement lateral to the film travel during projection.

4. In a light projection display apparatus the combination of a light source, and beyond the light source the following: a traveling film adjacent the light source and comprising a plurality of series of separate lanes each having progressive variations in density to control intensity of projection, a plurality of color screens each subdivided longitudinally into two or more zones of different color whereby each color is separately controlled by the corresponding film lane of one lane series, and there being at least one such screen in line with each such series of lanes, and beyond each such screen a projection means, as a reflector or lens, adapted to control and blend the several portions of colored light traversing the film and color screens; whereby a combination color display projection is afforded wherein overlapping elements of design and color are in varied evolution of intensity, color and movement.

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