Aug. 4, 1942. C. A. STOKES 2,292,172

PROCESS AND APPARATUS FOR PRODUCING MUSICAL RHYTHM IN COLOR

Filed May 24, 1940 2 Sheets-Sheet 1

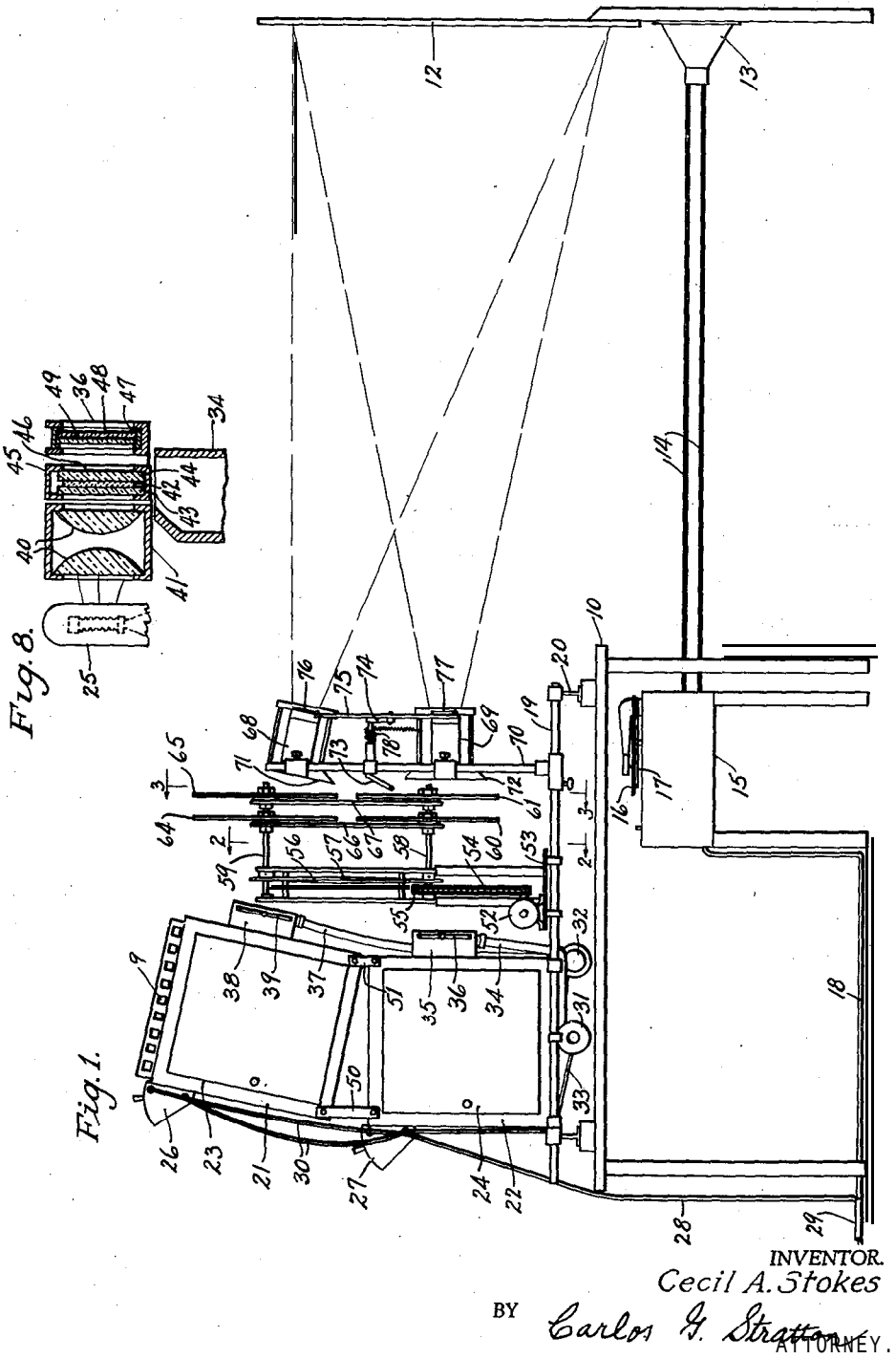

Fig. 8.

Fig. 1.

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Fig. 2.

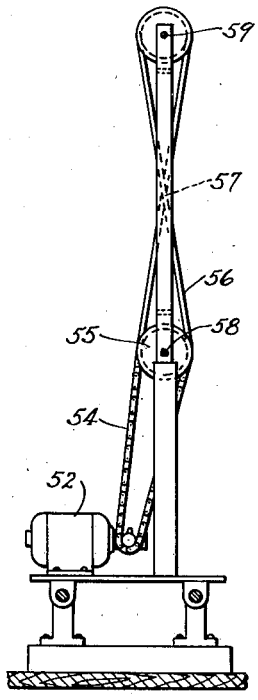


Fig. 3.

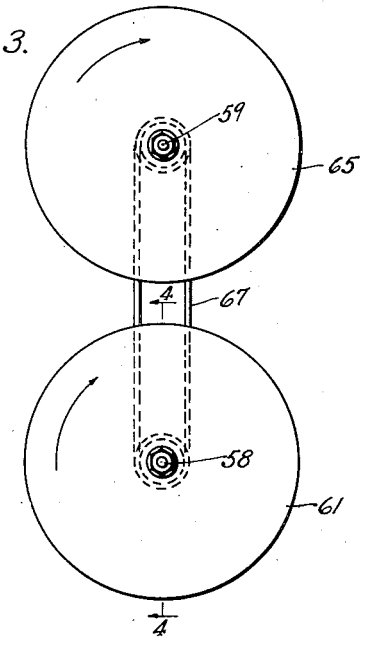


Fig. 4.

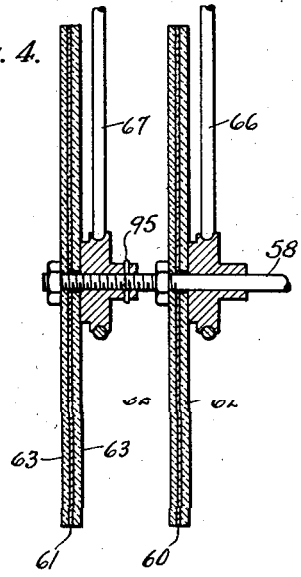


Fig. 5.

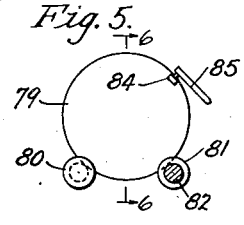


Fig. 6.

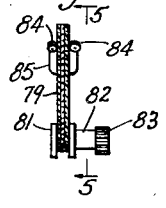
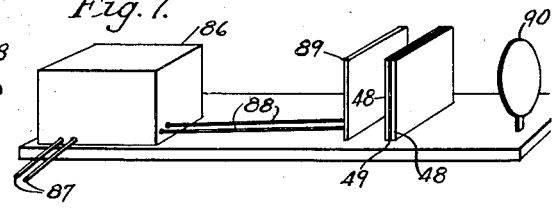


Fig. 7.



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UNITED STATES PATENT OFFICE

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PROCESS AND APPARATUS FOR PRODUCING MUSICAL RHYTHM IN COLOR

Cecil A. Stokes, West Los Angeles, Calif.

Application May 24, 1940, Serial No. 336,955

2 Claims. (Cl. 88—26)

My invention relates to a process and apparatus for producing musical rhythm in color. The principal object is to provide such a process and apparatus by which the effects of musical rhythm may be reproduced in visible colors.

Another object is to produce a flowing rhythm of color synchronized with the rhythm of the music that produced the color medium.

Still another object is to produce light in motion that is synchronized with rhythm of music.

The invention also comprises novel details of construction and novel combinations and arrangements of parts, which will more fully appear in the course of the following description. However, the drawings merely show and the following description merely describes an embodiment of the present invention, which is given by way of illustration or example only.

In the drawings, like reference characters designate similar parts in the- several views:

Figure 1 is an elevation of an embodiment of the invention.

Figure 2 is an enlarged section taken on the line 2-2 of Figure 1.

Figure 3 is an enlarged elevation looking in the direction of the arrows 3-3 of Figure 1.

Figure 4 is a still further enlarged section taken on the line 4-4 of Figure 3.

Figure 5 is a detail, partly in section, of rotating mechanism comprised in the embodiment, taken on the line 5-5 of Figure 6.

Figure 6 is the section taken on the line 8-8 of Figure 5.

Figure 7 is a perspective view of plate-producing mechanism, for use in connection with the mechanism shown in Figure 1.

Figure 8 is an enlarged vertical section of mechanism comprised in the embodiment.

It is to be understood that changes may be made in the details of the construction and arrangement of said embodiment, without departing from the spirit and scope of my invention.

Referring more in detail to the drawings, the reference numeral 10 generally designates a support upon which the embodiment in Figure 1 is mounted. A screen is shown at 12 upon which the color patterns may be projected. A loud speaker 13, shown adjacent the screen 82, is connected by means of wires 14 with a suitable phonograph 15. A record is shown at 16 on the phonograph turntable 17. Details of the phonograph mechanism and of the loud speaker are well known to those skilled in the art. Suffice to state that an electrical cable 18 provides power for motor mechanism to drive the phonograph 15.

Rods 19, mounted on beams 20, support various elements of the projection mechanism shown in Figure 1. Housings 21 and 22 are arranged with doors 23 and 24 respectively. These housings respectively contain strong sources of light. Strong electric lamps, such as shown at 25, or conventional carbon arc lights, or other suitable means may provide the sources of light. Cooling outlets are shown at 9.

Switches 26 and 27 respectively control the lights in the housings 21 and 22. Branch cable 28 connects a main cable 29 with the switch 27, and cables 39 connect the two switches together in parallel in the main electric circuit 29.

Suitable motor means (not shown) may be used to operate centrifugal pumps 31 and 32. Wiring 33 is shown for connecting the motor that operates the pump 31, with the main circuit. Suitable wiring may also be employed for the motor that drives the pump 32. A pipe 34 conveys air pressure from the pump 31 to a box 35, in which may be reciprocated a slide holder 36.

A pipe 37 conveys air pressure from the pump 32 to a box 38, in which is reciprocated a slide holder 39. Between the source 25 of light and the holder 36 are condensers or condenser lenses 40 that are plano-convex in section, with their convex surfaces facing each other. A housing 41 supports the lenses in position.

Disposed between the condenser lenses and the slide holder 38 is a relatively stationary polarizing element 42, arranged between heat resisting glass plates 43 and 48. The polarizing element may be Polaroid or any other suitable polarizing medium. The polarizing element and its protncting glass plates are mounted in a container 45 having openings 46 for the transmission of light through the polarizing element.

A slide in the holder 38 comprises a frame 47 in which are arranged transparent glass plates 48. between which is disposed a crystallized medium 49. The air pressure pipes 24 and 37 are arranged to project streams of air upon the polarizing elements 42 (one in each box 35 and 38) to cool such elements.

It is to be understood that the arrangement shown in Figure 8 is duplicated for each of the two projection machines 21 and 22. Braces 59 and 51 maintain the projection machine 21 at an angle with respect to the machine 22, in order that their beams of light may coincide on the screen 12.

A motor 52, supported on a platform 53 on the rods 19, drives a chain 54 engaging a pulley 55.

A driving belt 56, which is crossed as shown at 57, connects a shaft 58, driven by the pulley 55, with a counter-shaft 59.

A rotary, disc, tint plate 68 is mounted on the shaft 58 between the pulley 55 and a rotary polarizing plate 6 I. As shown in Figure 4, the tint plate and rotary polarizing plate may be maintained flat and in position by means of glass plates 62 and 63 respectively.

A similar tint plate 64 and a similar rotary polarizing plate 65 are mounted on the counter-shaft 59. The tint plates 60 and 64 may be of Cellophane, translucent plastic, mica, *or* other suitable material. A belt 66 is connected to drive the tint plates synchronously, while belt 61 is connected to drive the rotary polarizing discs synchronously.

The tint plate 64 is keyed or pinned to the shaft 59, while the polarizing plate 65 is loose upon the shaft 59. Tint plate 60 is loose upon the shaft 58. while the polarizing plate 61 is pinned or keyed to the shaft 58, as shown at 95. By reason of the crossing of the belt 56, the shafts 58 and 59 rotate in opposite directions. Both tint plates follow the rotation of the shaft 59, since the belt 66 causes them to rotate together and since the tint plate 64 is fastened to the shaft 59. Both polarizing plates 61 and 65 follow the rotation of the shaft 58 since the plate 61 is fastened to the shaft 58 and since the belt 67 causes the rotary polarizing discs to rotate together.

The discs shown in Figures 1, 3 and 4 are arranged for the beam of light from the source 25 to shine through the discs at the side of the shafts and belts, in order that such driving means may not interfere with the beam of light.

Suitable projection lenses 68 and 69 are mounted on a standard 70. Shields 71 and 72 respectively protect the lenses 68 and 69 from extraneous light. A crank 13 controls a crank arm 14, which in turn operates a rod 75 that is connected at its ends to shutters 76 and 77, opposite the projection lenses 68 and 63 respectively. Spring means 18 is arranged to provide tension upon the crank arm 74, in order to maintain the shutters in adjusted positions. The rod 15 is arranged to simultaneously open one shutter as the other is being closed, in order to blend beams from the respective projection machines.

In the modification shown in Figures 5 and 6, a rotary disc 79 (which represents a modified form of both the tint plate and the rotary polarizing plate) is rotatably supported on flanged wheels 80 and 81 and driven by a shaft 82, which is connected to the flanged wheel 81. Suitable gear means 83 may be connected to the motor 52 by any skilled mechanic. Guide rollers 84 on a bracket 85 prevent tipping of the disc 79.

When this modification, shown in Figures 5 and 6, is used, the light may shine through any portion of the disc 19 that is not obstructed. This is the reason for driving the disc from the periphery thereof. A different effect is produced by shining the beam through different portions of the disc. A swirling effect is produced when the beam is projected through the center of the disc, and upward and downward effects are produced by projecting the beam through downward moving and upward moving portions of the disc.

In Figure 7 a short wave broadcasting set is suggested at 86. Audio input wires 87 transmit the sound to the set 86. Audio output wires 88 connect the set 88 with a copper plate antenna 89. Spaced from the antenna 89 is a conductive disc 90 of relatively smaller diameter than the width of the antenna plate 89.

In between the antenna 89 and the disc are the glass plates 48. Disposed between these plates is a crystallizing material 49.

In the carrying out of the present process and in the operation of the present apparatus, material that is adapted to crystallize upon hardening is disposed between the plates 48. Rhythmic or other sounds, either produced by a record or by the original instrument or artist, is received by the broadcasting set 86 through the wires 81. Mechanism for transmitting to the set 86 is well known to those skilled in the art.

During the crystallization of the material between the plates 48, the sound is projected from the antenna 89 to the plate 90, the radio frequency waves passing through the plates 48 and producing a definite pattern in the plastic material 49 that is crystallizing. As soon as the crystallization is complete, the pattern is set.

In practice, different time periods of broadcasting are used upon successive plates or slides. Thus, for instance, when the input into the broadcasting set 86 is by means of a record, a certain period of time is used to make each of a series of slides, so that each slide will represent a portion of the record.

In the use of the embodiment shown in Figure 1, the records are played back by means of the phonograph 15 and simultaneously therewith polarized light is passed through the slides and projected upon the screen 12. The slides that respectively represent portions of the records are shown on the screen simultaneously with the playing of the respective portion of the record. Thus, the audience is seeing the pattern produced by the portion of the phonograph record that is being heard. The slides are manually inserted in the holders 36 and 39.

The relatively stationary polarizing medium 42 and the relatively rotary polarizing medium 67 polarize the light beams from the respective projecting machines. The rotating tint discs 60 and 64 color the polarized beams of light, and together with the other mechanism described, project rhythmic, ever-changing color pattrrns upon the screen, in a kaleidoscopic effect.

Due to the connections of the tint plates and rotary polarizing plates, with the shafts 58 and 59, the tint plates rotate in opposite directions from the rotary polarizing plates 61 and 65.

The slides are alternately projected by the upper and lower projection machines and the blending from one to another is effected by means of the shutters 76 and 77, which are actuated by the crank 13. Thus, there is no break in the continuity of the color designs, but they progress synchronously with the playing of the music that produced the patterns that are shown upon the screen.

In the hereunto appended claims, the word "configuration" is to be interpreted as meaning a form, design, pattern, photograph of a scene, of one or more persons, or a series of such configurations, or any other representation, pattern, form, design, or picture of any nature whatsoever.

While I have illustrated and described what I now regard as the preferred embodiment of my invention, the construction is, of course, subject to modifications without departing from the spirit and scope of my invention. I, therefore, do not wish to restrict myself to the particular

form of construction illustrated and described, but desire to avail myself of all modifications which may fall within the scope of the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. In a projection means, the combination of a screen, two sources of light, lens means arranged to project light from the sources in beams upon the screen, translucent elements disposed in said beams and containing configurations to be projected on the screen the configurations on said plate conforming to the radio frequency waves of a broadcast, shafts connected to be rotated in opposite directions, rotary light-polarizing elements and rotary tint plates arranged in said beams, the polarizing elements being arranged to be rotated by one of the shafts in one direction and the tint plates being arranged to be rotated by the other shaft in the other direction, and shutter means to blend one beam into another.

2. In a projection means, the combination of a screen, two sources of light, lens means arranged to project light from the sources in beams upon the screen, translucent elements disposed in said beams and containing configurations to be projected on the screen the configurations on said plate conforming to the radio frequency waves of a broadcast, rotary light-polarizing elements and rotary tint plates arranged in said beams, means to rotate the polarizing elements and the tint plates in opposite directions, and shutter means to blend one beam into another.

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