Feb. 1, 1938. J. G. BEST 2,106,699

ILLUMINATED SIGN

Filed Jan. 14, 1936

Fig. 1.

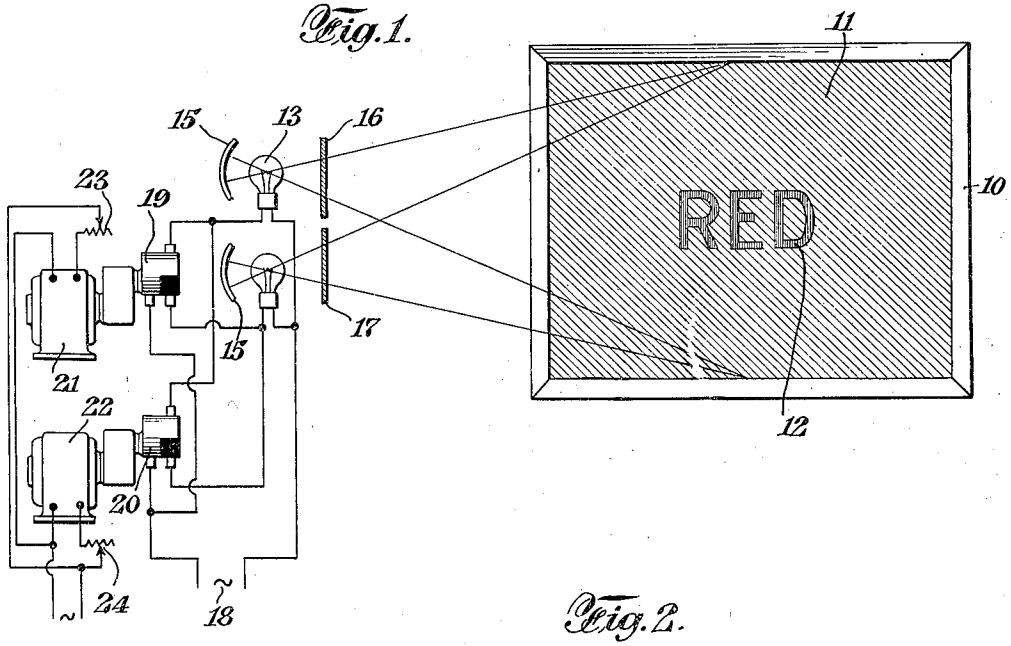
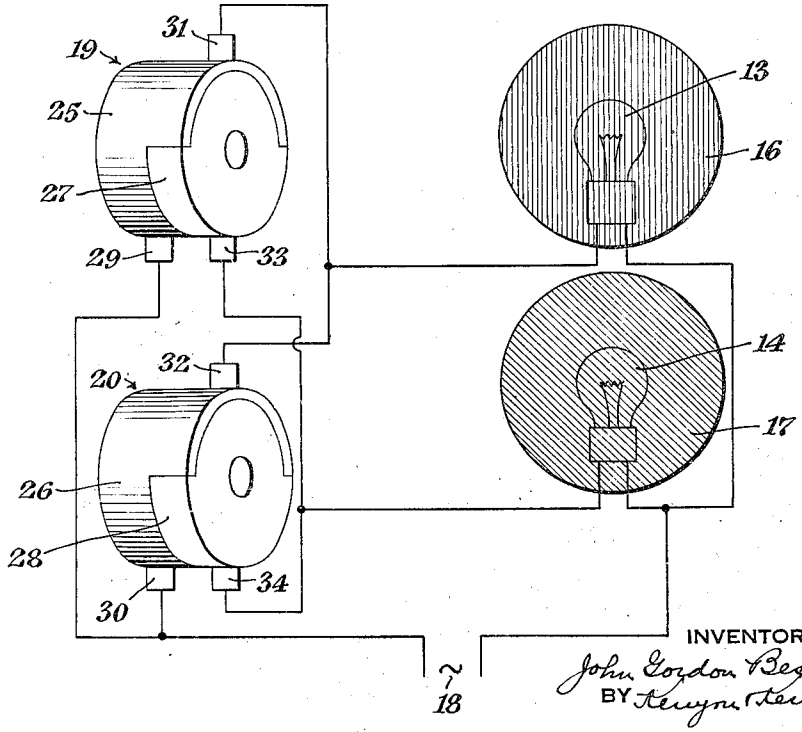



Fig. 2.




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## ILLUMINATED SIGN

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3 Claims. (Cl. 40—130)

This invention relates to improvements in illuminated signs of the type disclosed in the patent to John Gordon Best No. 2,014,271 of September 10, 1935. In this patent is disclosed an arrangement for obtaining an optical illusion of movement or animation in stationary portions of a sign or the like, by coloring the background and indicia portions of the sign with colors, the distinguishing hues of which are contrasting, mutually exclusive and preferably complementary and alternately illuminating the sign with light of the same colors in such rapid sequence that persistence of vision is effective to the extent that retinal impressions of the colors of the sign indicia and background, as illuminated by light of corresponding color, are retained until the next recurring illumination of the sign with light of that color, so that the indicia and background each appears continuously in its own color irrespective of the color of light to which it is exposed. When the colors of light are alternated at proper frequencies, the indicia portion appears to be animated and to make the natural movements of the objects represented thereby.

An object of this invention is to intensify the effect of animation by alternately illuminating the sign with light of said two colors at two different frequencies of alternation, thus obtaining an intensified effect at the best frequency.

Other objects, novel features and advantages of this invention will be apparent from the following specification and accompanying drawing, wherein:

Fig. 1 is a diagrammatic perspective view of apparatus for practicing the invention, and

Fig. 2 is a wiring diagram of the light sources.

A sign 10 is composed of opaque or translucent material according to which side it is intended to be viewed from, and on the sign is painted, printed or otherwise affixed a background portion 11 and an indicia portion 12. The background 11 and indicia 12 are of different colors, each of which is deficient in the predominating or distinguishing hue of the other. In the present instance, the background 11 is colored green and the indicia is colored red. Although the indicia portion 12 has been disclosed in the drawing in the form of letters, it is to be understood that the indicia may be representations of objects having well-known forms of movement and that the background constitutes that part of the sign immediately adjacent to the indicia and extending outwardly therefrom for an indeterminate period.

Illumination of the sign is accomplished by means of two electrical incandescent lamps 13 and 14 respectively, each of which is provided with a suitable reflector 15. The lamp 13 also is supplied with a light filter or screen 16, which permits green rays to pass from the light source 13, to the sign while intercepting or excluding the red rays and the lamp 14 is provided with a light filter or screen 17, which permits red rays to pass from the light source 14 to the sign while intercepting or excluding the green rays. Energizing current is fed to the incandescent lamps 13 and 14 from a suitable supply line 18 through a circuit including two interrupters 19 and 20, rotated at different constant speeds by the motors 21 and 22, the speed of which is controlled by the rheostats 23 and 24 respectively. Each of the interrupters 19 and 20 is such that during half of its revolution current flows through one lamp and during the other half of the revolution, flows through the other lamp.

In Fig. 2 is illustrated one form of interrupter suitable for the purpose, but it is to be understood that the invention contemplates the use of any form of interrupter which will accomplish the desired result. Each interrupter consists essentially of a rotatable member on the periphery of which is provided a metal annulus 25 and 26 respectively, which is cut away for about half its width over an arc of 180 degrees, the cut-out portion being filled in with suitable insulation 27 and 28 respectively. The brushes 29 and 30 are connected to one side of the line 18, while the brushes 31 and 32 are connected through the lamp 13 with the opposite side of the line, and the brushes 33 and 34 are connected through the lamp 14, with the opposite side of the line 17. With this arrangement, current is caused to flow through the lamp 13 during one-half revolution of each interrupter and through the lamp 14 during the other half revolution of each interrupter. During the period the current is flowing through the lamp 13 the sign will be illuminated with red light and the indicia 12 will reflect the light but the background 11 being green will absorb the red light and appear dark. While current is flowing through the lamp 14, the sign will be illuminated with green light and the background 11 will reflect the light, but the indicia 12 being red will absorb the green light and appear dark. The periods of illumination by the two lights will vary in length according to the relative angular position of the two interrupters and the angular relation between the two interrupters will continually vary by reason of their different rotational speeds.

When the frequency of alternation of illumination is varied in a range of from two to twenty color cycles per second, an illusion of animation is imparted to the indicia means, such illusion as fully explained in Best Patent No. 2,014,271 being partly due to the phenomenon of irradiation. Also, a stereoptical effect is noticeable which may partly be ascribed to chromatic aberration. The frequency of alternation of illumination will vary for different kinds of indicia which may be letters, characters, figures, arbitrary designs or pictorial

representations. The animation produced is an illusion of alternative expansion and contraction of the borders of the indicia where they are adjacent to the background and may be an illusion of directional motion imparted to an object pictorially portrayed by the indicia.

Although the light sources have been disclosed as incandescent lamps and filters have been shown for the purpose of obtaining light of the desired colors, it is to be understood that any suitable light sources may be used which will provide light of the desired color. Moreover, the colors of the background and indicia need not be spectrally pure in character but may be a shade or tint of the pure spectral color or may be polychromatic in their components so long as their predominant spectral hues are clearly distinguishable and identifiable to an observer. Whichever color is used for the indicia or background portion, it is lacking or deficient in the predominating hue of the background or indicia portions respectively. The frequency of current change of illumination is between a minimum at which the retinal impressions of the colors of the indicia and background as illuminated by light of the same color begin to be retained until the next succeeding illumination with light of that color and a maximum at which persistency of vision becomes wholly effective and the image appears motionless, i. e. there is no appearance of movement or animation of the indicia or background. The minimum frequency of color change in the illumination may be said to be such that a retinal impression of each of the colors of the sign is illuminated by light of the same color as retained for a period of time equal to or greater than the duration of the immediately succeeding period of illumination. In other words, considering for example, the case of a sign with red indicia on a green background and illuminated alternately with green and red light, the frequency of color change is such that a retinal impression of the red indicia as illuminated with red light is retained during the immediately succeeding illumination of the sign with green light, that is, until the next occurrence of the illumination with red light. It has been found that the optimum frequencies for obtaining the effective animation range from 2 to 20 color cycles per second.

When a sign is illuminated with different colored lights at different frequencies in the range above defined, the animation rises to a peak when the interrupters are precisely in step and drops to zero when the interrupters are exactly out of step, as in the latter circumstances the sign will be continuously illuminated with light of both colors. When the interrupters are exactly out of step, the sign will be continuously illuminated with both red and green light and both background and indicia will be illuminated in their own color and there will be no illusion of animation. If, for example, the frequency of interruption of one interrupter is six per second and the frequency of the interruption of the other interrupter is 6.2 per second, the frequency of the animation and lack of animation will be at the rate of .2 per second, that is to say, every five seconds. The animation when it appears is emphasized due to the fact that just previously to the animation there has been a condition of no animation.

The interrupters are shown in Fig. 2 in the relation which causes alternate energization of the two lamps. In the particular positions in which the interrupters are shown, only the lamp **13** is energized, but upon rotation of both interrupters through 90° arcs, the lamp **13** will be de-energized and the lamp **14** will be energized through rotation of the two interrupters by way of contacts **33** and **34** during additional 180° arcs. Alternate energization of the two lamps is obtained only when the interrupters are precisely in step. By reason of the different speeds of operation, the interrupters gradually move out of step and the energization periods of the two lamps overlap each other in increasing degree until both lamps are simultaneously energized when the interrupters are precisely out of step. Only one lamp will be energized with the interrupters in the phase relation shown in Fig. 2 as either the contacts **33** and **34** as shown, or contacts **31** and **32** will engage the insulation sections. Both lamps will be energized when the two insulation sections **27** and **28** are exactly out of phase relation, for example, with the interrupter **25** in the position shown and the interrupter **26** rotated 180° from the position shown. Then current will flow to lamp **13** through interrupter **25** as shown and current will flow to lamp **14** through interrupter **26** by way of contact **34**.

Although only one source of light of each color has been disclosed, it is to be understood that the invention contemplates the use of two sources of light of each color, one source of each color being controlled by one interrupter and the other source of the same color being controlled by the other interrupter.

I claim:

1. A sign comprising contacting indicia and background portions of different colors, the color of one of said portions being deficient in the distinguishing hues of the other portion which is deficient in the distinguishing hue of said first portion, means for illuminating said sign with light of the color of the background and with light of the color of the indicia, said means comprising an electrically energized source of light of each color, a pair of interrupters, circuit connections between both light sources and one interrupter for effecting periodic alternate energization of said light source by means of said interrupter, circuit connections between both light sources and the remaining interrupter for effecting periodic alternate energization of said light sources by means of said remaining interrupter and means to operate said interrupters at different speeds.

2. A sign device according to claim 1 in which the interrupters are operated at such speed as alternately to energize said light sources at frequencies lying within the range defined on the one hand by the minimum frequency at which a continuously retained retinal impression of the color of the indicia begins, and on the other hand by the frequency at which persistency of vision becomes wholly effective.

3. A sign device according to claim 1 in which the interrupters are operated at such speed as alternately to energize the light sources at frequencies lying in the range between two and twenty cycles of energization per second.

JOHN GORDON BEST.