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METHOD OF AND APPARATUS FOR ILLUMINATING DISPLAYS

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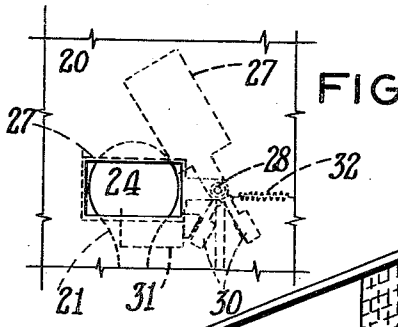


FIG. 3

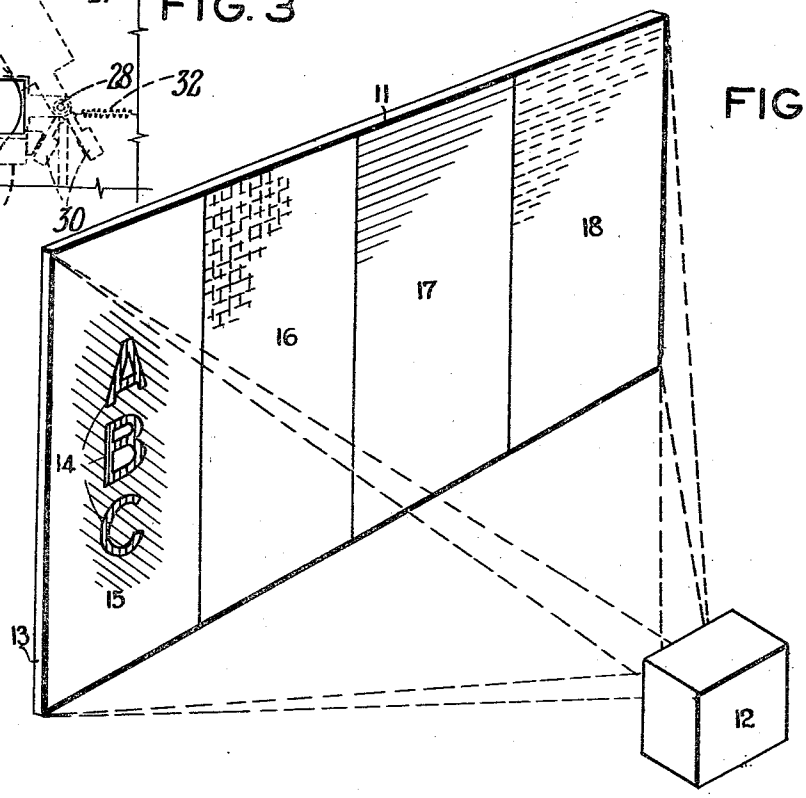


FIG. 1

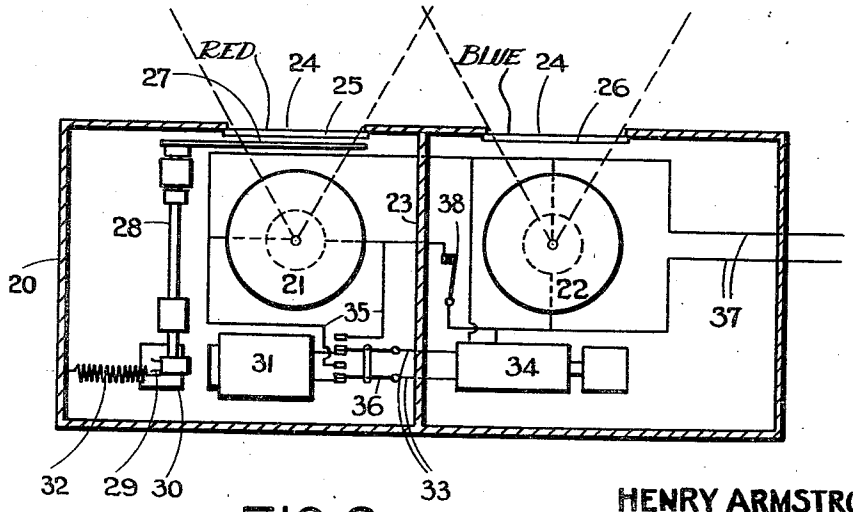


FIG. 2.

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METHOD OF AND APPARATUS FOR ILLUMINATING DISPLAYS

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21 Claims. (Cl. 40—130)

This invention has to do with an improved method of and apparatus for illuminating displays intended to be used for advertising, educational, amusement or other purposes.

The primary object of the invention is to produce an appearance of movement or animation in a stationary portion or portions of a display.

Another object is to prevent substantially all appearance of flickering in the illumination of those portions of the display where no appearance of animation or movement is desired.

A further object is to provide a method of illuminating a display which, while it will attract the gaze of the beholder by an appearance of animation or movement, will not cause eye strain or fatigue by reason of the appearance of movement or otherwise, so that it may be observed for prolonged periods of time without discomfort to the beholder.

A still further object is to obtain a high degree of brilliancy, vividness and contrast in the apparently motionless portions of the display, without detracting from the brilliancy and attention arresting character of the apparently animately display portions.

An additional object is to realize the last preceding object without having resort to excessive intensity of illumination which contributes largely to eye strain.

Other objects and the advantages of the invention may be ascertained from the following description and the accompanying drawing.

This invention is particularly applicable to the illumination of displays in which a portion to which it is desired to attract attention by imparting thereto an appearance of animation and pulsating movement, hereinafter termed the indicia, is coloured in a non-neutral colour deficient in the distinguishing hue of the background, which is also coloured immediately adjacent the indicia in a preferably non-neutral colour, deficient in the distinguishing hue of the indicia. For example, the indicia may be coloured red against a green or blue background.

The term "background" is to be understood as indicating primarily those portions of the display immediately in contact with or appearing to be in contact with the edges of the indicia and may extend to as much else of the display, other than the indicia, as desired.

In its broadest aspect, the invention consists as to the method in illuminating a vari-coloured display of the aforementioned character continuously with light deficient in the distinguishing hue of the indicia, and intermittently with light of a colour deficient in the distinguishing hue of the background and preferably corresponding in colour to the colour of the indicia. For example, a display having red indicia on a green background may be continuously illuminated with blue or green light and intermittently illuminated with red light.

In order to obtain the aforesaid effect of animation and pulsating movement, the successive illuminations of the display with the intermittent light occur at frequency such that the eye does not register clearly defined periods of non-illumination therewith but, owing to persistence of vision the indicia appear to be substantially continuously and brilliantly illuminated. The appearance of pulsating movement may or may not be accompanied by directional effect depending on the form, size and arrangement of the indicia.

As regards apparatus, novel characteristics of the invention reside in the combination with a display as aforesaid of means, including a source or sources of light, to illuminate the display with light of two colours simultaneously; means to periodically interrupt the illumination of the display with light of one of said colours and means to govern operation of the said illumination interrupting means.

In greater detail, novel aspects of the invention reside in the provision of an illuminated display of the aforesaid character, embodying a display including a coloured background and coloured indicia which appears to be in contiguous relation with the said background, the colours of the said background and the said indicia being contrastingly different and each deficient in the distinguishing hue of the other, and means to illuminate the said display and to govern illumination thereof, including apparatus arranged for intermittent electrical energization and adapted to effect projection of light of different colours towards the said display, each of said light colours being deficient in the extinguishing hue of the other, one at least of which is different in the distinguishing hue of the display background, the aforesaid means including apparatus to govern electrical energization of part of the aforesaid means in such wise that light of one of said colours is caused to flood the said display indicia in recurring cycles, at such frequency that, due to persistency of vision, the repeated images of the indicia do not entirely disappear and yet do not appear to merge and become continuous.

The invention consists of the features and combinations of features as hereinbefore and

hereinafter described and/or illustrated in the accompanying drawing together with all such equivalents therefor and modifications thereof as lie within the scope of the appended claims.

In the accompanying drawing which illustrates one of many possible embodiments of the invention, but to the details of which the invention is not confined:

Fig. 1 is a diagrammatic perspective view illustrating a display and illuminating means in operative relation thereto,

Fig. 2 is a plan view of one form of illuminating means, the casing being cut away to disclose the contained apparatus.

Fig. 3 is a detail view of the light projection controlling shutter mechanism.

Referring more particularly to the drawing, 11 designates a display to be illuminated and 12 designates as a whole apparatus for illuminating the display and located in any suitable relation to the display. In the drawing the apparatus 12 is shown as being in front of the display but it will be understood this relation has been arbitrarily selected for purposes of illustration and that the invention is not confined to this arrangement as the apparatus 12 may be in any suitable relation to the display to effect illumination thereof, that is, below, above, at either or both sides of or in front or behind the display, as may be desired or necessitated by the nature of the display. It will also be understood that while only one apparatus 12 has been shown, the number thereof may be increased and that the several units may be each in a different relation to the display.

The display 11 which has been illustrated for explanatory purposes is an advertising sign and comprises a supporting element 13 such as a bulletin board, wall or sheet of opaque or translucent material upon which is displayed the indicia 14 contrastingly coloured with respect to the background 15. In addition to the indicia there may be any other matter which it is desired to present and which is represented by panels 16, 17 and 18. The indicia may consist only of letters as shown, or may be arbitrary designs, marks indicating movement, representations of objects or parts of objects or even objects themselves affixed to or standing in front of the background, either alone or in combination with letters. For the purposes of this invention it is essential that the indicia be coloured in a non-neutral colour, the predominating hue of which is deficient or absent in the colour of the immediately adjacent background and that the background immediately adjacent the indicia be coloured in a colour preferably non-neutral, the predominating hue of which is deficient or absent in the colour of the indicia. Colours which are most suitable for the indicia are those in which red predominates while colours most suitable for the background immediately adjacent the indicia are those in which green or blue predominates. In order to obtain the aforesaid effect of animation or pulsating movement in the indicia when illuminated as described, it is essential that no neutral or nearly neutral colour intervene between the indicia colour and the immediately adjacent substantially non-neutral background colour. In other words, the non-neutral indicia colour and the significant background colour, which is substantially non-neutral and preferably complementary to the indicia colour, must be or appear to be in contact as edges of the indicia. The term "background colour" is therefore to be understood as indicating primarily the colour immediately adjacent the edges of the indicia.

In order to illustrate the method of my invention I have shown only the most simple form of display illuminating apparatus and it is to be understood the method is not limited to use of the apparatus hereinafter described but extends to use of all such other apparatus as will produce the effects described.

The apparatus illustrated comprises a casing 20 containing a source of light which for simplicity has been shown as being two electric lamps 21 and 22 which may be of equal or unequal illuminating capacity depending upon the illuminating effect desired, which lamps are separated by a partition 23 so that the light from the source is divided into two independently controllable parts. In front of each lamp, the casing is provided with a light egress orifice 24 and light colouring media 25 and 26 are placed in the path of the light rays escaping through the orifices 24. Any suitable form of shutter 27 is associated with one of the lamps and is operatively connected with a motive element. The shutter illustrated is of the oscillating type and is connected to a rock shaft 28 carrying an arm 29 to which is fixed the armature 30 of an electro-magnet 31. A retracting spring 32 is connected between the arm 29 and a fixed point to return the shutter to its original position when the magnet is de-energized. The size of the shutter and the amplitude of its movement are such that it alternately covers and uncovers the orifice 24 to produce an occulting effect. The magnet is supplied with current through a circuit 33 including a motor driven circuit maker and breaker such as a sign flasher, indicated at 34.

Instead of using the shutter and magnet above referred to I may intermittently supply current to the lamp 21 through the flasher 34 and the circuit 35. A double throw switch 36 may be provided to connect either the lamp 21 or magnet 31 in circuit with the flasher 34. The lamps are normally arranged in a circuit 37 in which the flasher 34 and the magnet 31 are arranged in parallel with the lamps. A switch 38 is provided to cut the lamp 21 out of the direct circuit when the said lamp is supplied with current through the flasher 34.

As stated heretofore, the relative illuminating capacities of the lamps 21 and 22 may be of equal or unequal value, depending upon the effect desired, and these relative capacities, in certain instances, may be governed to a considerable extent by attendant factors, such as incidental illumination from other sources, for example, by spill light from an adjoining display. While it is essential, in order to attract attention to the display, that the indicia be brilliantly illuminated, it is frequently desirable, especially for advertising purposes, that other portions of the display be brilliantly illuminated also, so that all features and colours will be pronounced. The illumination value of the light deficient in the distinguishing hue of the indicia is therefore governed by the necessary illumination value of the light in which the distinguishing hue of the indicia predominates and the illumination values of the two lights may be arranged with reference to one another and to the intensity of any incidental illumination to produce the desired brilliancy of illumination of the background and indicia.

In operation, light from the lamp 22 is filtered by the screen 26, and the entire display is il-

luminated continuously with a blue or with a green light, while light from the lamp 21 is filtered by the screen 25 and the entire display is illuminated with red light, the light emanating from lamp 21 and projected toward the display being intermittent by reason of operation of the shutter 27, or the intermittent operation of the lamp 21. Between the periods of illumination of the display with light transmitted through the screen 25 the display is illuminated exclusively with light transmitted through the screen 26.

Assuming for purposes of explanation that the indicia 14 are coloured red, the background 15 is coloured green and other portions of the display represented by the panels 16, 17 and 18 are coloured respectively yellow, blue and a neutral colour such as brown or gray and that the display is continuously illuminated with blue light and intermittently illuminated with red light, the colours of the background 15 of the display portions represented by the panels 16, 17 and 18 appear continuously and brilliantly illuminated and each in substantially its own colour without motion or eye fatiguing, flickering effect, while the indicia appear brilliantly illuminated in red and appear to have a pulsating, throbbing, darting, vibrating, fluttering, flickering or waving movement with or without an appearance of directional movement, the whole according to the frequency of recurrence of the red illumination and according to the shape and size of the indicia. The frequency of recurrence of the periods of illumination with the red light should be such that by reason of the persistence of vision the observer is not conscious of definite intervening periods of non-illumination with red light. Owing to continuous illumination of the display with light of one colour (blue) the colour of the background 15 and the colours of the display portions represented by the panels 16, 17 and 18 do not appear to be affected or altered by the intermittent illumination with light of the other colour (red). Each of these parts of the display appears in substantially its own colour, that is, substantially as it would appear when illuminated by noon-light of the solar spectrum and is brilliantly illuminated without perceptible variation in intensity, that is, without flickering.

The aforesaid effects may be obtained, if there is no undue interference by illumination with incidental light, by illuminating the display in the manner described and using sources of so-called white light of equal candle power, behind the differently coloured screens; or in the case of lights inherently coloured, using sources of such relative candle power as will correspond to the relative intensities of light from equal sources after passage through the colour screens. Considering that, for equal intensities at the source, the intensity of light as transmitted through the red screen is materially greater than that of light transmitted through the blue screen, it is noteworthy that pale colours in the display, such as yellows, pinks and pale blues and greens should remain substantially unchanged in appearance by the intermittent illumination with red light.

While it appears that the best effects are obtained by continuous illumination with blue light, good effects are obtained by continuous illumination with light of some other colour, for example green. In order to obtain the effect of animation of the best indicia it appears necessary that red predominate in the colour of the indicia and that the indicia be intermittently illuminated with light in which red predominates.

The term "continuous" as herein used with reference to blue or equivalent coloured light is to be interpreted as including absolutely uninterrupted illumination, and illumination interrupted for such periods and at such frequency that by reason of persistence of vision the interruptions are not perceptible to the eye and the sensation is that of uninterrupted illumination of substantially constant intensity.

I claim:

1. The method of illuminating a display including stationary indicia and background portions which are contrastingly coloured, to produce an optical illusion of movement in the indicia of the display, and whereby the colour or colours of the background continuously appear vivid and brilliant and appear to be illuminated with substantially non-flickering effect, which method comprises intermittently flooding the display with light of a colour deficient in one distinguishing hue of the background, and continuously flooding the display with light of colour deficient in the distinguishing hue of the indicia, the frequency of the intermittent periods of illumination being such that a retinal impression of the colour of the indicia as illuminated by the intermittent light is retained from each period of intermittent illumination to the next succeeding period of intermittent illumination.

2. The method of illuminating a display including stationary indicia and a background portion contrastingly coloured, to produce the appearance of pulsating movement in the indicia and a motionless appearance of illumination at substantially constant intensity in the background portion, which method comprises intermittently illuminating the display with light of a colour deficient in the distinguishing hue of one of the display portion colours, and continuously illuminating the display with light of colour deficient in the distinguishing hue of the intermittently projected light, the frequency of the intermittent periods of illumination being such that a retinal impression of the colour of the indicia as illuminated by the intermittent light is retained from each period of intermittent illumination to the next succeeding period of intermittent illumination.

3. The method of illuminating a display including coloured indicia and coloured background, the colour of the indicia being non-neutral and deficient in the hue which distinguishes the background colour from it, which method comprises continuously illuminating the display with light of one colour and intermittently illuminating the display with light of two colours, each of which two colours, relatively to the other is deficient in the distinguishing hue of one of the coloured display portions, the frequency of the intermittent illuminating cycles being not less than the frequency at which a retinal impression of the colour of the indicia and background begins to be retained.

4. The method of illuminating a display having coloured indicia and background portions, the colour of each of said portions being deficient in the distinguishing hue of the other, which method comprises projecting light of different colours onto the display, each of said colours being deficient in the distinguishing hue of the other and deficient in the distinguishing hue of one of said display colours, and intermittently impeding projections of light of one of the aforementioned colours to effect intermittent periods of relative non-illumination of the display with light of that

particular colour, the frequency of the intermittent periods of light projections being such that retinal impressions of the colours of the indicia as thereby intermittently illuminated are retained until the next recurrence of intermittent illumination.

5. The method of illuminating a display in which indicia of the display is coloured a non-neutral colour deficient in the distinguishing hue of the display background colour and the background is coloured in a colour deficient in the distinguishing hue of the indicia colour, which method comprises illuminating the display with light of different colours, each of which colours of light, relatively to the remainder of the light colours, is deficient in the distinguishing hue of one of the display portions, and causing light of one only of the aforesaid colours to impinge the display during rapidly succeeding spaced periods alternated with periods of non impingement, the frequency of said periods of impingement being such that a retinal impression of the indicia during each said impingement period is retained until the next succeeding impingement period.

6. The method of illuminating a vari-coloured display including indicia and background portions, in which the indicia is coloured a non-neutral colour deficient in the distinguishing hue of the background, and in which the background is coloured a non-neutral colour deficient in the distinguishing hue of the indicia, which method comprises flooding the display with light of different colours, each of which colours of light, relatively to the remainder of the light colours, is deficient in the distinguishing hue of one of the display portions, and periodically interrupting illumination of the display with light of one only of the said colours, the periodicity and duration of illumination interruption being such that, owing to persistence of vision, the indicia has imparted to it the appearance of movement.

7. The method of illuminating a display including stationary indicia and background portions, and in which the indicia is coloured a non-neutral colour deficient in the distinguishing hue of the background colour and the background is coloured in a colour deficient in the distinguishing hue of the indicia, to produce an optical illusion of movement in the indicia and whereby the colour or colours of the background continuously appear vivid and appear to be illuminated at substantially constant intensity, which method comprises intermittently flooding the display with light of one colour deficient in the distinguishing hue of the display background, and continuously flooding the display with light of a colour deficient in the distinguishing hue of the intermittently projected light, the periodicity of intermittent projection of said first-mentioned light being such that retinal impressions of the colour of the indicia as thereby illuminated are retained until the next recurrence of that light colour.

8. The method of illuminating a vari-coloured display including indicia and background portions, in which the indicia is coloured a non-neutral colour deficient in the distinguishing hue of the background, the latter being coloured in a non-neutral colour deficient in the distinguishing hue of the indicia, which method resides in continuously illuminating the display with light of a colour deficient in the distinguishing hue of the indicia, and intermittently illuminating the display with light of a colour deficient in the distinguishing hue of the background and corresponding in colour to the indicia, the successive illuminations of the display with coloured light occuring at frequency such that, owing to persistence of vision, the indicia appear continuously and brilliantly illuminated.

9. In display apparatus of the character described, in combination, a display including coloured indicia and a coloured background, the colour of the indicia being non-neutral and deficient in the hue which distinguishes the background colour from it; and means to illuminate the said display to produce an optical illusion of movement in the said indicia, said means including means to continuously illuminate the said display with light of one colour only which is deficient in the distinguishing hue of an indicia colour and means to intermittently illuminate the said display with light of two colours, each of which colours, relatively to the remainder, is deficient in the distinguishing hue of one of the said display portion colours and in one of which the distinguishing hue of an indicia colour predominates; the last said means being arranged to operate in such wise that the frequency of the intermittent illuminating cycles are not less than the frequency at which a retinal impression of the colour of the said indicia and the colour of the said background begins to be retained.

10. In display apparatus of the character described, in combination, a display having coloured indicia and background portions, the colour of each of said portions being deficient in the distinguishing hue of the other, and means to illuminate the said display to produce an optical illusion of movement in the said indicia, said means comprising apparatus arranged to project light of different colours onto the said display, each of said colours being deficient in the distinguishing hue of the other, and apparatus arranged to impede projections of light of one only of said colours to effect intermittent periods of non-illumination of the display with light of that said particular colour, the said light projection impeding apparatus being formed and arranged to operate at such frequency that retinal impressions of the colours of the indicia as intermittently illuminated are retained until the next recurrence of intermittent illumination.

11. Apparatus of the character described comprising a display including coloured indicia and coloured background portions, the colour of an indicia portion being non-neutral and deficient in the hue which distinguishes a background portion colour from it; means for intermittently illuminating the display with light of a colour deficient in the distinguishing hue of a background colour portion; means for illuminating the display with light of a colour deficient in the distinguishing hue of the aforesaid light colour, during periods of illumination and non-illumination by the first said light colour; means to govern the periodicity of intermittent illumination with light of the first said colour whereby light of the first said colour is projected at such frequency that, due to persistence of vision, an indicia portion of the display partakes of an appearance of pulsating movement; and means to govern the operation of the said intermittent illuminating means.

12. Apparatus of the character described including a display embodying indicia and background portions, which indicia and background portions are coloured in non-neutral colours, each of the said colours being deficient in the

predominating hue of the other, and means for producing an appearance of alternate enlargement and contraction in the said indicia of the said display, which means include apparatus for rapidly intermittently flooding the said display with light of a colour deficient in the distinguishing hue of the display background colour; apparatus for effecting illumination of the said display with light deficient in the distinguishing hue of the aforesaid intermittently flooded light, during periods of illumination and non-illumination by the latter; and means arranged to govern the periodicity of illumination by the aforesaid intermittent light flooding apparatus, the rapidity of the intermittent floodings being such that, due to persistence of vision, the indicia portion appears as continuously illuminated by the intermittent light.

13. Apparatus of the character described comprising a display including indicia and background portions, which indicia and background portions are coloured in non-neutral colours, each of said colours being deficient in the predominating hue of the other, and means for producing an appearance of rapid alternate enlargement and contraction in indicia portions of the said display; said means including apparatus arranged to intermittently flood the said display with light of a colour deficient in the distinguishing hue of the display background colour, apparatus arranged to flood the display with light of a colour deficient in the distinguishing hue of the display indicia colour during periods of illumination and non-illumination by light of the first said colour whereby the flickering effect of the intermittently flooded light is at least partially neutralized by light of the second said colour and the display background partakes of the appearance of substantially non-flickering illuminating effect, and apparatus arranged to control the frequency of illumination of said display by the first said light flooding apparatus.

14. A method of illuminating a display including coloured indicia and coloured background portions, the colour of an indicia portion being non-neutral and deficient in the hue which distinguishes a background portion colour from it, which method includes intermittently illuminating the display with light of a colour deficient in the distinguishing hue of a background portion colour, and illuminating the display with light of a colour deficient in the distinguishing hue of the aforesaid light colour, during periods of illumination and non-illumination by the first said light colour, the periodicity of intermittent illumination with light of the first said colour being such that, due to persistence of vision, an indicia portion of the display partakes of an appearance of pulsating movement.

15. A method of producing an appearance of rapid alternate enlargement and contraction in the dimensionally unchanging indicia of a display, which indicia is coloured in non-neutral colour against a background coloured in another non-neutral colour, each of said colours being deficient in the predominating hue of the other, which method comprises rapidly intermittently illuminating the display with light of a colour deficient in the distinguishing hue of the background colour, and illuminating the display with light of a colour deficient in the distinguishing hue of the indicia colour during periods of illumination and non-illumination by light of the first said colour whereby due to the persistence of vision, the observer is not conscious of definite intervening periods of non-illumination with light of the first said colour.

16. The method of illuminating a display, including coloured indicia and coloured indicia background, the said indicia being formed in shares of non-neutral colour and deficient in the hue which distinguishes the background colour with respect thereto, which method includes continuously illuminating the display with light of shades of one colour which is deficient in the distinguishing hue of an indicia colour and intermittently illuminating the display with light of shades of two colours, each of which two colours, relatively to each of the other, is deficient in the distinguishing hue of one of the coloured display portions and in one of which the distinguishing hue of an indicia colour predominates, the frequency of the intermittent illuminating cycles being such that, due to persistence of vision, the repeated images of the indicia do not entirely disappear, and yet do not appear to merge and become continuous.

17. The method of illuminating a display, including a background and indicia formed on the said background, the said indicia and the said background being formed in contrastingly different shades of non-neutral colour, one of which shades of colour is deficient in the distinguishing hue of the other, to produce an appearance of animation in the said indicia, which method includes flooding the said display with light emitted from a light source whereby the said display background is continuously illuminated with substantially non-varying colour hue effect, and flooding the display with light emitted from a light source, which emitted light is coloured in shades of colour substantially corresponding to the colour of the said indicia, and effecting intermittent energization of the last said light source, whereby light emitted therefrom is caused to flood the said display indicia at frequency up to where, due to persistence of vision, repeated images of the said indicia do not entirely disappear, and below the speed at which the repeated images appear to become continuous.

18. The method of operating a sign, the indicia and background portions of which are colored each in a non-neutral color deficient in the hue which distinguishes the other color, which method comprises continuously illuminating the sign with a light of one color, and at the same time illuminating the sign intermittently with light of a color the distinguishing hue of which is deficient in the distinguishing hue of said continuous light, the said intermittent illumination being at such frequency that a continuous retinal impression thereof is obtained and below a frequency at which persistence of vision produces a motionless appearance of the sign.

19. The method of operating a sign, the indicia portion and the background portion of which are colored each in a non-neutral color deficient in the hue which distinguishes the other color, which method comprises illuminating the sign with a constant light of a color which is substantially the same as the color of one of said sign portions, and at the same time illuminating the sign intermittently at a frequency not less than four cycles per second with a light of a color which is substantially the same as the color of the other sign portion.

20. Display apparatus of the character described embodying a display surface including portions which differ in selective spectral absorption or selective spectral reflection; and appara-

tus for illuminating the said display surface with coloured light, arranged to recurrently vary the spectral characteristics of the light rays directed toward the said display surface, thereby producing an optical illusion of movement in at least one portion of the display surface, which apparatus includes an illuminating unit embodying light radiating means, colour filtering means and light occulting means, one of said means being movable to disintegrate and reassociate radiation, and motivating means for the movable means.

21. Display apparatus of the character described including, in combination, a light source; a reflector arranged circumjacent to the said light source; and light filtering and light transmission governing means arranged in the path of the light beam emitted by the said light source and in part reflected by the said reflector, the said light filtering and transmission governing means being formed and arranged to intermittently transmit light of one color and constantly transmit light of a contrasting color.

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