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(56) Documents Cited

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GB 0591513 A GB 0424619 A GB 0289822 A
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(58) Field of Search

UK CL (Edition O) F4R RCAA RCK RFM RFN RL, G2J
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Online : WPI, CLAIMS

(54) Colour display device

(57) A colour display device for advertising or theatre use comprises a first disc 1 having a plurality of regions 5 of different colours and a second opaque disc 7 having apertures 11. The discs are on the same axis and independently rotated at variable speeds and possibly in opposite directions via motors 2,8 and rheostats 4,10. The coloured disc may be reflective or transmissive; in the latter case light is projected through both discs via a lens (Figs 2,3). Numerous patterns for the coloured regions are disclosed (Figs 4-12).

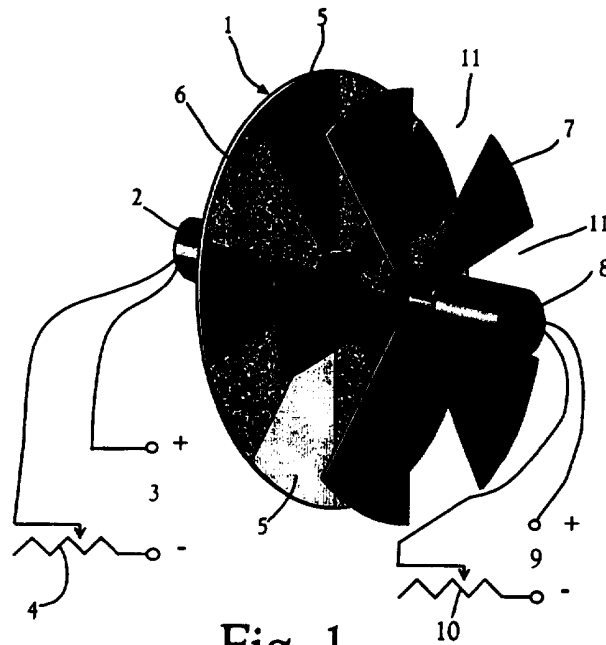


Fig 1

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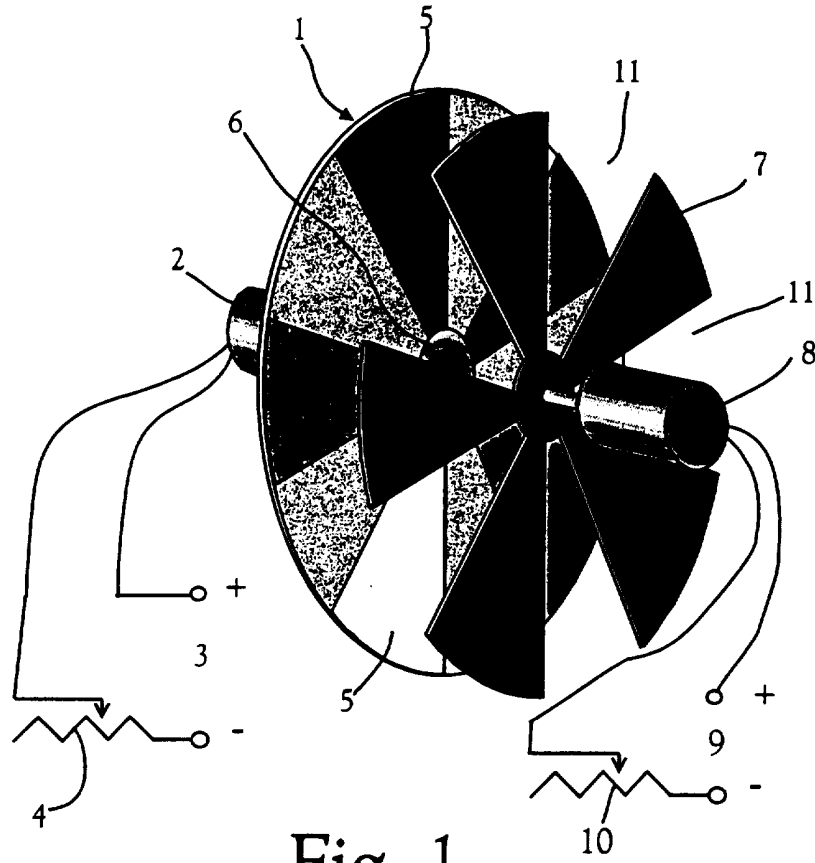


Fig 1

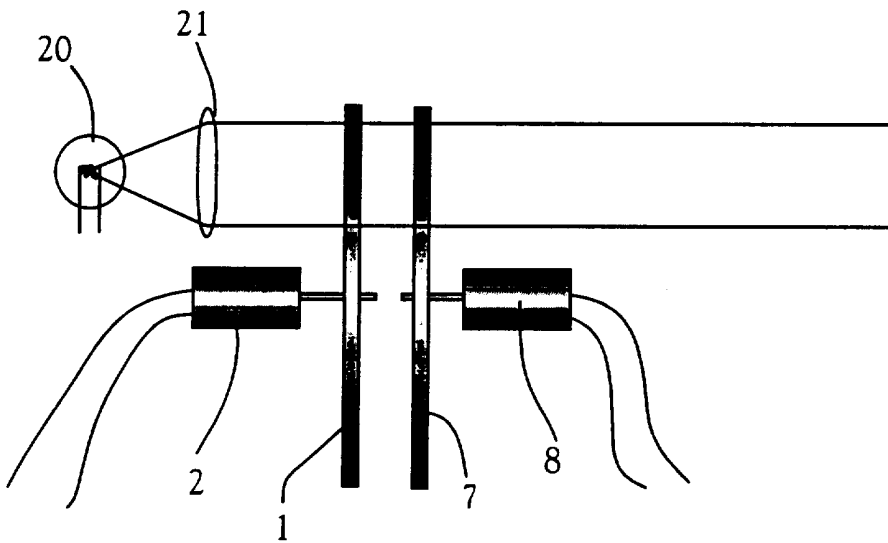


Fig 2

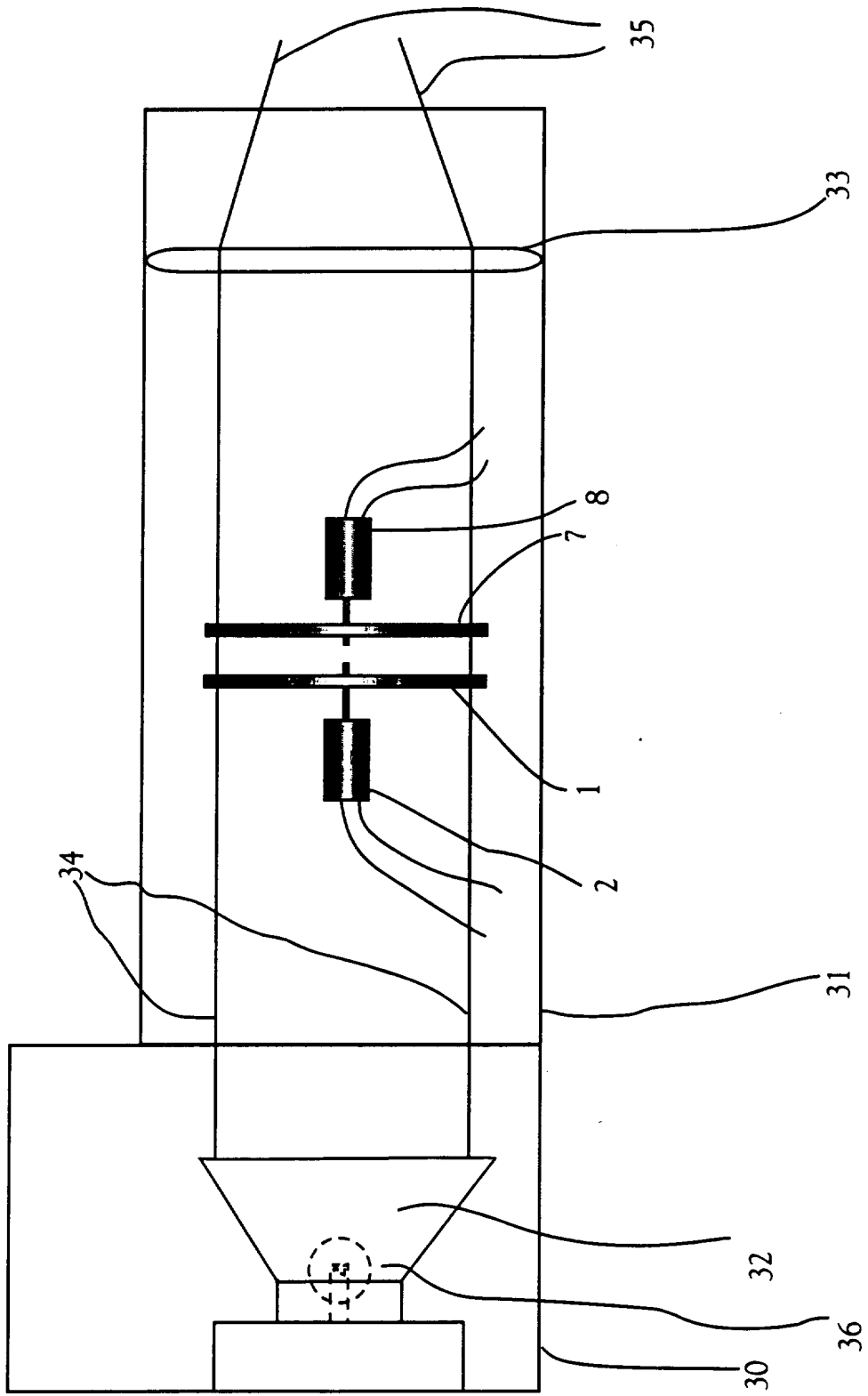


Fig 3



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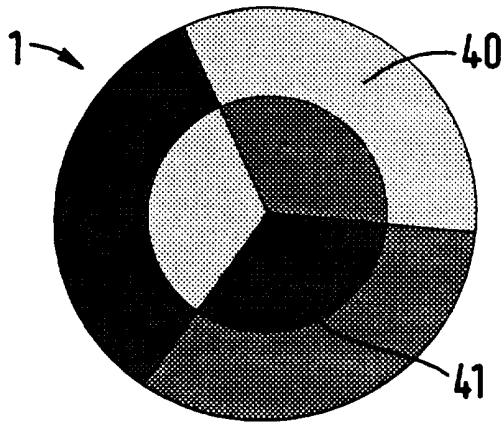


Fig. 4

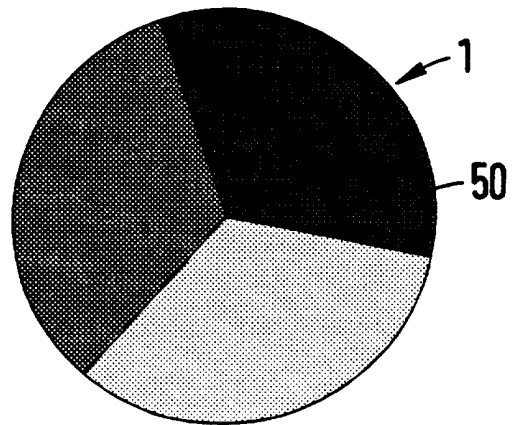


Fig. 5

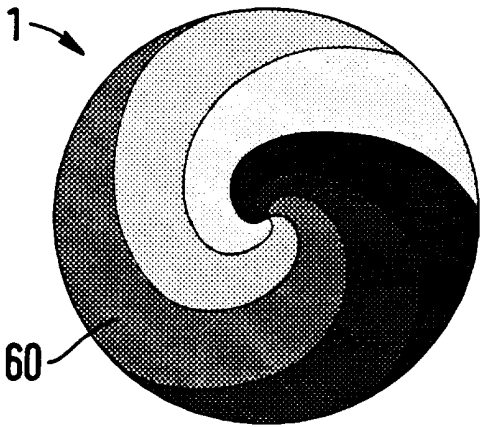


Fig. 6

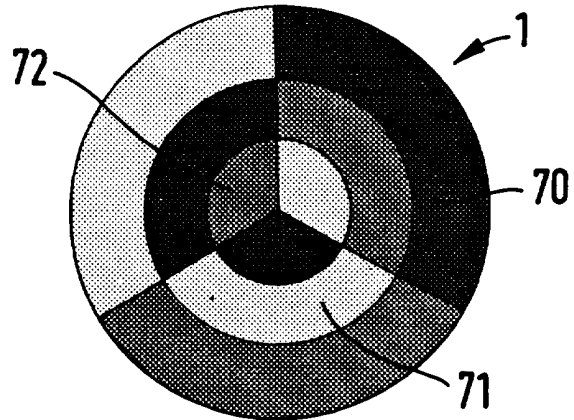


Fig. 7

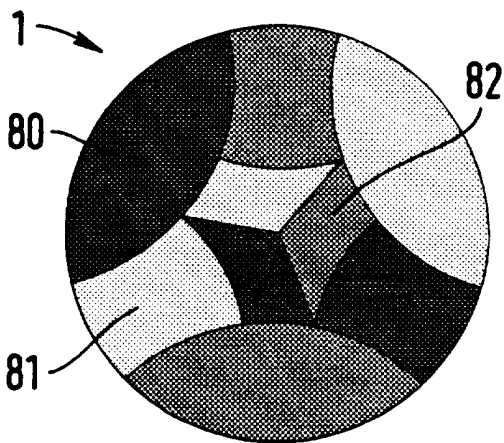


Fig. 8

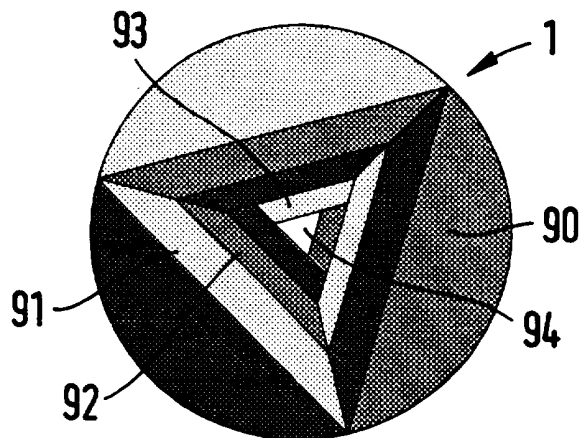


Fig. 9

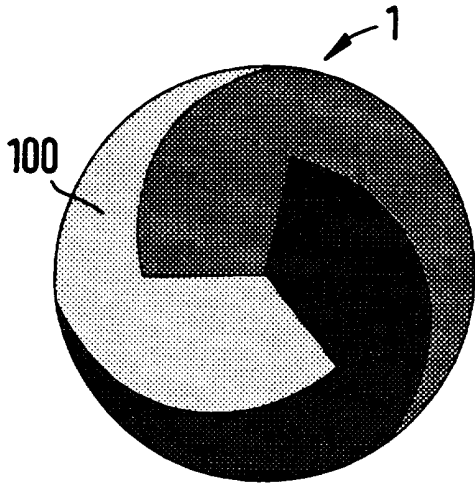


Fig. 10

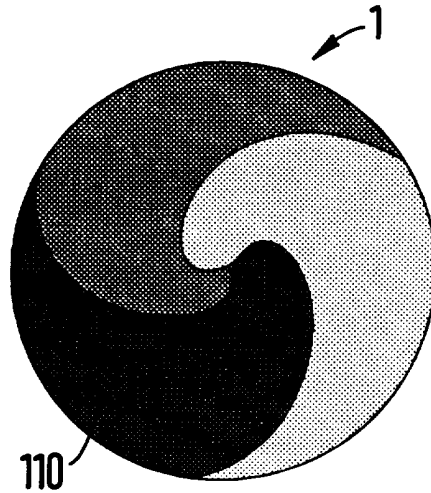


Fig. 11

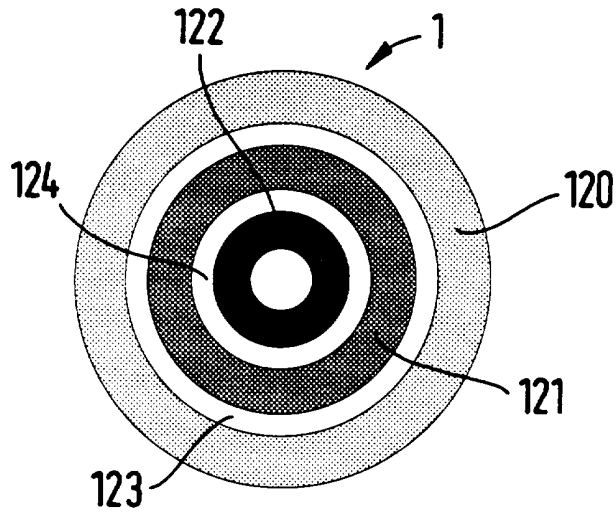


Fig. 12

COLOUR DISPLAY DEVICE

Field of the Invention

This invention relates to a colour display device, for example for use in shop window displays, theatre lighting and the like.

5 Background to the Invention

Colour displays for advertising and coloured lighting for theatres and the like typically use movable different coloured background materials or, especially in the case of theatre lighting, different coloured filters to achieve changes in colour. This limits the range of colours which may be displayed or, with a wide range of
10 colours, necessitates displaying the colours in a predetermined sequence.

In order to achieve colour effects in advertising displays which will catch the eye of a passer-by, variation according to a predictable sequence is undesirable. In theatre lighting, the ability to obtain a more precise control of colour effects would be advantageous.

15 Summary of the Invention

According to the invention, there is provided a colour display device comprising a first disc comprising a plurality of regions of different colours, a second disc positioned adjacent to and parallel to the first disc and being coextensive therewith, the second disc being formed of an opaque material having at least one aper-
20 ture or other light transmissive region therein, each disc being provided with respective independent drive means to spin the disc around the centre thereof, and control means being provided for selectively varying the speed of rotation of at least one of the discs.

The first disc may be opaque, with reflective colour regions on the face
25 thereof directed towards the second disc, whereby the colours perceived when viewing the rotating first disc through the rotating second disc vary according to the

absolute and relative rotational speeds of the discs. Alternatively, the first disc may be transparent or translucent, with the regions of colour being formed of colour filter material, and a light source may be provided to direct a beam of light through the device, the colour of the beam after passage through the device varying according to the absolute and relative speeds of rotation of the discs.

The discs may be rotated in the same direction or in opposite directions, the resultant colours and effects being different depending upon the relative directions of rotation. One of the drive means may therefore be reversible to give a wider range of colours and effects than with a disc that can only be rotated in one direction. In addition to changes in colour, colour pattern effects may be obtained.

The colour regions on the first disc may be randomly arranged or sequentially, and preferably comprise primary colours. Where primary colours are used, the areas occupied by the colours on the disc are preferably equal to one another. Each region may extend generally radially from a centre portion of the disc. Alternatively, the regions may be of a spiral form or in triangular or other shaped segments. In one embodiment the regions are segments are formed by concentric circles and lines extending radially from the centre of the disc, and intersecting the said concentric circles. The number of concentric circles, and the number of lines extending radially from the centre of the said concentric circles may be chosen to provide the any number of regions. Colour regions of different shapes provide for different effects, such as colour moving from the centre outward, or vice versa, or for a disc having an outer colour range differing from the inner colour range.

The first disc is most suitably circular, but the invention is not limited to the use of circular discs, and other shapes may be employed, e.g. a polygon.

The apertures in the second disc, or the light transmissive regions, suitably number two to six, equally-spaced and extending radially, and are formed as slots

extending from a core to define a segment of a circle. Thus, a rotary shutter mechanism may be defined by the slots. The slots may correspond in shape and number with the colour regions, or they may be different.

The drive means suitably comprise separate electric motors for each disc, 5 controllable by means of a rheostat or other speed control means. At least one of the motors may be reversible, so that the discs may rotate in the same direction or in opposite directions. The motor speeds may be from a few hundred to several thousand revolutions per minute, for example up to three thousand revolutions per minute. The speed control means are suitably controlled by a processing means, 10 such as a microprocessor to give precise control over the speeds in accordance with a predetermined or manually selectable colour sequence. It has been found that, by careful control of the speeds and relative directions, not only can the primary colours be selected individually, but other colours not individually represented on the stationary first disc can also be selected. Thus, the colours can be infinitely and 15 rapidly variable, which makes the device especially suitable for advertising displays, for example for shop windows, where the device provides background colour for an advertising message, for example, or for coloured lighting effects, for example for theatres and film and television studios.

The colour display device of the invention may form part of a lighting unit, 20 and preferably the lighting unit comprises a housing, a light source, the colour display device of the invention, and a lens, coloured light emanating from the colour display device preferably passes through the said lens. Preferably, the light source and lens are mounted within the housing, and more preferably at either side of the colour display device. Advantageously, a beam of light from the light source passes 25 through, or is reflected off the first disc of the colour display device and subsequently passes through the second disc, and then through the lens which focuses

the said beam of light. The output of the lamp and/or the strength of the lens can be selected to produce coloured light which is of the desired brightness, and/or focused at the desired point. The housing is preferably tubular, and more preferably is provided with a an opening which provides access to the inside of the tube. Advantageously, a closing member is provided to close the said opening. Suitable means for attaching the closing member to the housing may be provided, and such means may comprise hinges, nuts and bolts, screws, or other fastening means, or the closing member may be slidably attached to the housing. Power for the said light source may be provided by either an AC or a DC supply.

10 The device of the invention is simple in construction and can provide a full spectrum of bright colours by reflected or transmitted light, according to configuration.

Brief Description of the Drawings

In the drawings, which illustrate diagrammatically two exemplary embodiments of the invention:

Figure 1 is a perspective view of a first embodiment operating by reflected light;

Figure 2 is a side elevation of a second embodiment operating by transmitted light;

20 Figure 3 is a side elevation of a third embodiment operating by transmitted light;

Figure 4 is a front elevation of a coloured disc for use in the colour display device of the invention;

25 Figure 5 is a front elevation of a coloured disc for use in the colour display device of the invention;

Figure 6 is a front elevation of a coloured disc for use in the colour display device of the invention;

Figure 7 is a front elevation of a coloured disc for use in the colour display device of the invention;

5 Figure 8 is a front elevation of a coloured disc for use in the colour display device of the invention;

Figure 9 is a front elevation of a coloured disc for use in the colour display device of the invention;

10 Figure 9 is a front elevation of a coloured disc for use in the colour display device of the invention;

Figure 10 is a front elevation of a coloured disc for use in the colour display device of the invention;

Figure 11 is a front elevation of a coloured disc for use in the colour display device of the invention; and

15 Figure 12 is a front elevation of a coloured disc for use in the colour display device of the invention.

Detailed Description of the Illustrated Embodiments

Referring first to Figure 1, the device comprises a first disc 1 mounted for rotation on the shaft of a first electric motor 2 supplied with electrical power from a power supply 3 via a rheostat 4. On one face of the first disc 1 a series of reflective regions 5 of primary colours are formed. The regions 5 may be glossy or matt in finish, and extend from a centre portion 6 radially outwardly to the circumference of the disc. While the regions 5 are represented as segments of a circle, it may be advantageous to form them with curved edges so as to spiral outwards as shown in
25 Figures 6 and 11.

A second disc 7 is similarly mounted on the shaft of a second motor 8 supplied with power from a power supply 9 via a separate rheostat 10. The second disc 7 is opaque and has radial segments cut out to provide a plurality of evenly spaced slots 11. The second disc is mounted so as to face the first disc 1 parallel to and in alignment with it, and spaced from it by a short distance. While the spacing is not critical, parallax errors in viewing the device are avoided if the discs are close together. With the discs 1 and 7 preferably rotating in opposite directions, the speed of one can be kept constant while the other is varied to change the perceived colours when the first disc 1 is viewed through the second disc 7.

Referring now to Figure 2, the arrangement illustrated is similar to that of Figure 1, and corresponding components are numbered with the same reference numerals. In this embodiment, the first disc 1 is transparent, and the coloured regions are formed as colour transmission filters. A lamp 20 whose light is collimated by a lens 21 into a parallel beam is located at one side of the first disc so that the beam is directed through the disc, and from there to a target, for example a theatrical set or other object or person requiring to be selectively illuminated in different colours. Rotation of the discs 1 and 7 at speed and then varying the speed of one disc will cause the transmitted colours to change, and by selecting speeds precisely, exact hues can be projected on to the target and rapidly changed at will, or in accordance with a predetermined sequence, for example under the control of a computer program.

Referring now to Figure 3, discs 1 and 7 are mounted in a housing 31 in the form of a tube, preferably a plastics tube. To one end of tube there is attached a housing 30 suitably manufactured from a plastics material, in which there is mounted a lamp 36 and a lamp shade 32, suitably manufactured from metal. Light 34 is emitted from the lamp and directed along tube 31, through the first disc 1

which is transparent, the coloured regions of which are formed as colour transmission filters. Light 34, the colour of which has been altered then passes through lens 33 emerging as focused light 35 which is directed to a target, for example a theatrical set or other object or person requiring to be selectively illuminated in different
5 colours. Rotation of the discs 1 and 7 at speed and then varying the speed of one disc will cause the transmitted colours to change, and by selecting speeds precisely, exact hues can be projected on to the target and rapidly changed at will, or in accordance with a predetermined sequence, for example under the control of a computer program.

10 Tube 31 may be provided with an access lid(not shown) which provides for access to the discs 1 and 7, and their respective motors and control means 2 and 8.

It will be appreciated that, although Figure 1 illustrates the first disc as having ten coloured regions and the second disc as having five slots, the numbers need not be related, and more or fewer regions and slots may be employed, according to
15 the effects to be achieved.

Figures 4 to 12 illustrate discs 1 having different patterns of colouring on their surfaces. Each pattern produces a different effect. The "second disc" referred to throughout the description of Figures 4 to 12 is disc 7 shown in Figures 1 to 3.

Figure 4 shows one face of disc 1 which is split into coloured regions 40, 41.
20 Each adjacent coloured region is coloured with a different primary colour. The effect of the pattern shown in Figure 4 is to produce two different colours at any one instant. This is because the series of colours 41 at the centre of the disc 1 is out of step with the series of colours 40 in the outer band. As the disc 1 rotates the colours change through the full spectrum of colours. Figure 7 shows a similar pattern,
25 but disc 1 has three concentric circles rather than two, and as such at any one instant three different coloured rings will be produced.

The face of the disc 1 shown in Figure 5 is divided into coloured segments 50 similarly to the disc shown in Figure 1. The effect of rotating the disc as shown in Figure 5 in the same direction as the second disc is to produce a spectrum of colours in sequence.

5 Figure 6 shows a plurality of coloured segments 60 arranged to form a spiral. With the second disc turning in the same direction as disc 1, the effect is one of a spectrum of colours emanating in rings from or too the centre of the disc, depending on the direction of rotation of disc 1. A similar effect is produced by the pattern shown on disc 1 in Figure 11, the segments 110 being larger and fewer than the segments 60 of Figure 6.

 Segments 80, 81 and 82 as shown in Figure 8 are filled with primary colours. Rotating disc 1 as shown in Figure 8 in the same direction as the second disc produces an effect similar to that produced by the disc shown in Figure 4. The colours produced is particularly vivid.

15 In Figure 9, the disc 1 has segments 91 to 94 which form coloured triangles in the centre of the disc, the segments 90 around the triangles being coloured. When disc 1 is spun in the same direction as the second disc, the effect is one of changing colours at the centre, and a ring of changing colours to the outer edge of the image, the colours changing sequentially. The colours on the inside of the circle

20 due to the triangular shapes, and the outside of the circle change at different rates.

 Referring to Figure 10, when disc 1 is rotated in the same direction as the second disc, the shape of segments 100 causes a pattern of changing whole colours at the centre of the disc, and colours moving outwards in rings (or inwards, depending on the direction of rotation of the disc 1). This pattern is effectively a combination of the patterns shown in Figures 5 and 11.

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In Figure 12, the disc 1 has three rings 120 to 122, spaced apart by rings 123, 124 which are not coloured. This produces an image having a series of rings.

The effect of rotating the discs 1 shown in Figures 4 to 12 in a direction opposite to the direction rotation of the second disc is to produce an image similar to
5 the pattern on the disc 1, but with a greater number of segments.

It should be noted that patterns shown in Figures 4 and 7, can be modified by incorporating the spacings as shown in Figure 12, to produce rings which are spaced apart having changing colours. Also, other parts of the face of a disc 1 can be left without colour, e.g. the centre, and other modifications can be made to the
10 patterns shown in order to produce images combining the features of one pattern with those of another.

In one embodiment of the invention, the disc 1 has a space in its centre so that a further disc can be inserted therein. This enables discs having a combination of patterns to be made up.

Claims

1) A colour display device comprising a first disc comprising a plurality of regions of different colours, a second disc positioned adjacent to and parallel to the first disc and being coextensive therewith, the second disc being formed of an
5 opaque material having at least one aperture or other light transmissive region therein, each disc being provided with respective independent drive means to spin the disc around the centre thereof, and control means being provided for selectively varying the speed of rotation of at least one of the discs.

2) A device according to Claim 1, wherein the first disc is opaque, with re-
10 flective colour regions on the face thereof directed towards the second disc, whereby the colours perceived when viewing the rotating first disc through the rotating second disc vary according to the absolute and relative rotational speeds of the discs.

3) A device according to Claim 1, wherein the first disc is transparent or
15 translucent, with the regions of colour being formed of colour filter material, and a light source is provided to direct a beam of light through the device, the colour of the beam after passage through the device varying according to the absolute and relative speeds of rotation of the discs.

4) A device according to any preceding claim, wherein the discs are rotated
20 in the same direction or in opposite directions, the resultant colours and effects being different depending upon the relative directions of rotation.

5) A device according to any preceding claim, wherein at least one of the drive means is reversible.

6) A device according to any preceding claim, wherein the colour regions on
25 the first disc are arranged randomly or sequentially.

7) A device according to any preceding claim, wherein the colour regions comprise primary colours.

8) A device according to Claim 7, wherein the areas occupied by different colours on the disc are equal to one another.

5 9) A device according to any preceding claim, wherein each region extends generally radially from a centre portion of the disc.

10) A device according to any of Claims 1 to 8, wherein the regions are of a spiral form or in triangular or other shaped segments.

10 11) A device according to any of Claims 1 to 8, wherein the regions are segments formed by concentric circles, and lines extending radially from the centre of the disc intersecting the said concentric circles.

12) A device according to any preceding claim, wherein the first disc is circular, or polygonal.

15 13) A device according to any preceding claim, wherein the apertures in the second disc, or the light transmissive regions, number two to six, equally-spaced and extending radially, and are formed as slots extending from a core to define a segment of a circle.

14) A device according to Claim 13, wherein a rotary shutter mechanism is defined by the slots.

20 15) A device according to Claim 13 or 14, wherein the slots correspond in shape and number with the colour regions.

16) A device according to any preceding claim, wherein the drive means comprise separate electric motors for each disc, controllable by means of a speed control means.

25 17) A device according to Claim 16, wherein the speed control means is a rheostat.

18) A device according to Claim 16 or 17, wherein at least one of the motors is reversible, so that the discs may rotate in the same direction or in opposite directions.

19) A device according to any of Claims 16 to 18, wherein the motor speeds
5 are from a few hundred to several thousand revolutions per minute.

20) A device according to Claim 19, wherein the motor speeds are up to three thousand revolutions per minute.

21) A device according to any of Claims 16 to 20, wherein the speed control means are controlled by a processing means, to give precise control over the speeds
10 in accordance with a predetermined or manually selectable colour sequence.

22) A device according to Claim 21, wherein the processing means is a microprocessor.

23) A lighting unit comprising a housing, a light source, a colour display device as claimed in any of Claims 1 to 22 mounted within the said housing, and a
15 lens, wherein coloured light emanating from the colour display device passes through the said lens.

24) A lighting unit according to Claim 23, wherein the light source and lens are mounted within the housing.

25) A lighting unit according to Claims 23 or 24, wherein the light source
20 and lens are mounted at either side of the colour display device.

26) A lighting unit according to any of Claim 23 to 25, wherein the housing is tubular.

27) A lighting unit according to any of Claims 23 to 26, further comprising an opening which provides access to the inside of the housing, a closing member to
25 close the said opening, and means for attaching the closing member to the housing.

28) A colour display device substantially as described with reference to, or as shown in, Figures 1, 2 and 4 to 12.

29) A lighting unit substantially as described with reference to, or as shown in, Figure 3.



Application No: GB 9619783.5
Claims searched: ALL

Examiner: R E Hardy
Date of search: 16 December 1996

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:
UK CI (Ed.O): F4R (RCAA, RCK, RFM, RFN, RL); G2J (JLD); G5C (CCJ, CDBP)
Int CI (Ed.6): F21P (3/00, 5/00, 5/02); F21S (1/00, 1/14, 11/00, 17/00); F21V (9/10, 13/00, 13/02, 13/08, 13/10); G02B (27/00); G09F (13/34, 13/36)
Other: Online : WPI, CLAIMS

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB1511770 A TOMY KOGYO : Whole document	1,3-15,23 at least
X	GB1445199 A MONTEAGUDO : Whole document	1,3-15,23 at least
X	GB1333913 A LIGHTING TECHNOLOGY : Note p.2 line 59 onwards	1,3-15,23 atleast
X	GB0591513 A BROTHERTON : Whole document	1-15 at least
X	GB0424619 A JONES : Whole document	1,3-15,23 at least
X	GB0289822 A ZIEHL : Whole document	1-4,23 at least
X	GB0269410 A WAWRA : Whole document	1,3-15,23 at least
X	US4107764 A RILEY : See especially Figure 4	1,3-15,23 at least

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.