

(No Model.)

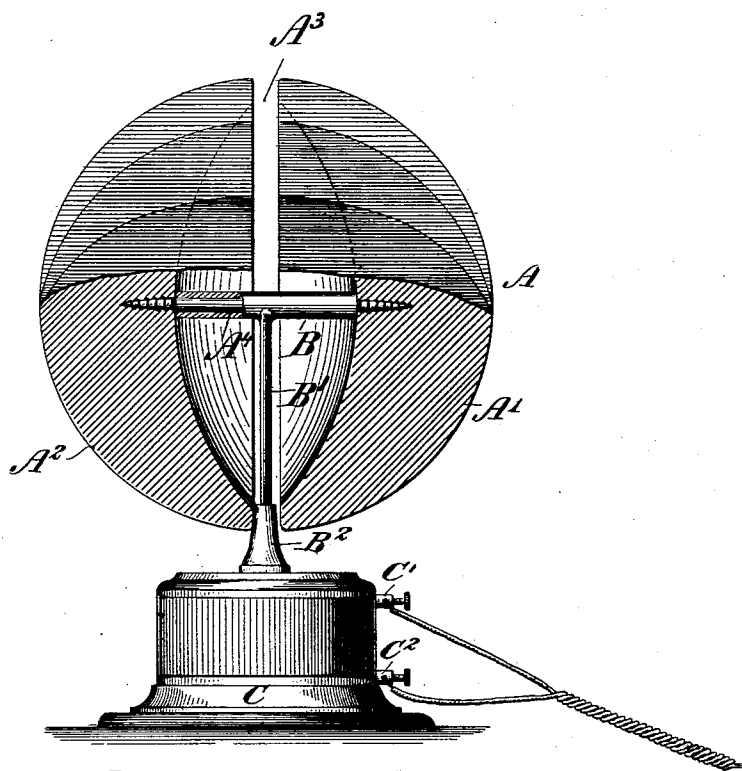
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H. D. WILLIAMS.  
CHANGEABLE COLOR ILLUSION DEVICE.

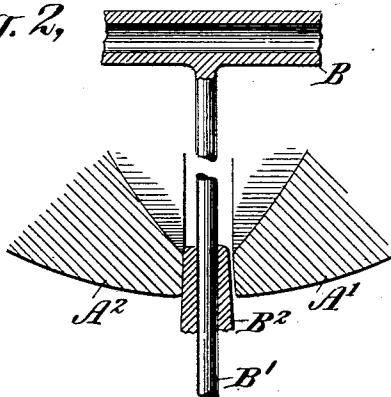
No. 580,101.

Patented Apr. 6, 1897.

*Fig. 1,*



*Fig. 2,*



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INVENTOR

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(No Model.)

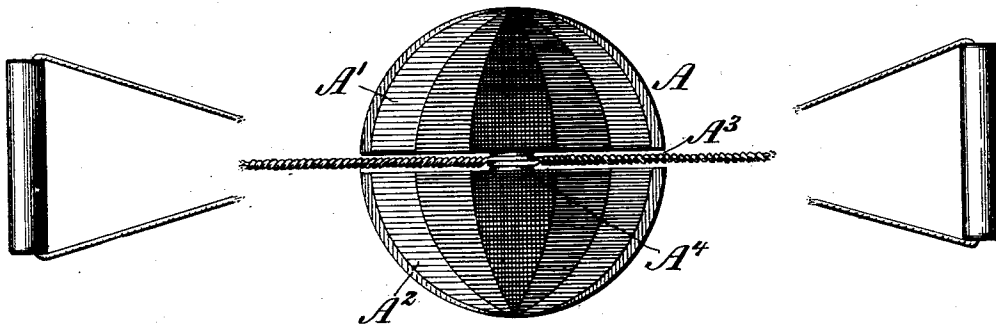
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H. D. WILLIAMS.  
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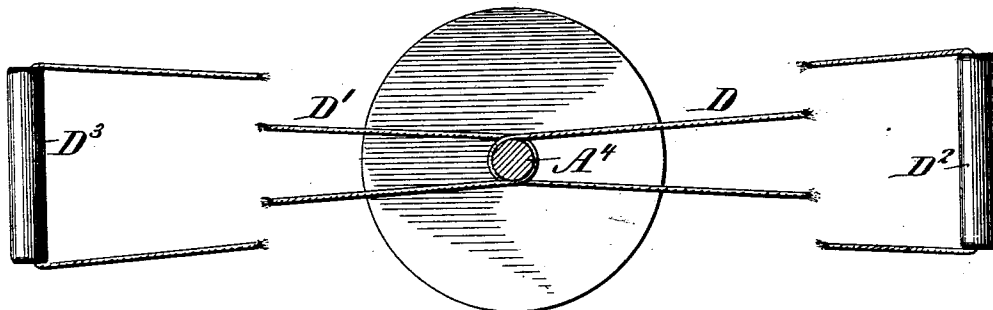
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*Fig. 3.*



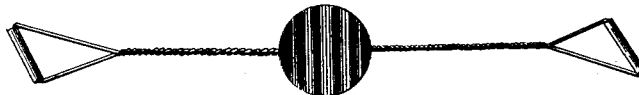
*Fig. 4.*



*Fig. 5.*



*Fig. 6.*



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# UNITED STATES PATENT OFFICE.

HARVEY D. WILLIAMS, OF ITHACA, NEW YORK.

## CHANGEABLE-COLOR-ILLUSION DEVICE.

SPECIFICATION forming part of Letters Patent No. 580,101, dated April 6, 1897.

Application filed March 31, 1896. Serial No. 585,526. (No model.)

*To all whom it may concern:*

Be it known that I, HARVEY D. WILLIAMS, a citizen of the United States, residing at Ithaca, in the county of Tompkins and State of New York, have invented a new and useful Changeable-Color-Illusion Device; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to exhibition devices and toys and to the construction thereof, and particularly to a changeable-color-illusion device consisting of a colored rotating body which as it rotates presents the appearance of having its surface colored in parallel bands of different delicate contrasting colors blending into each other, these colors changing as the rotation of the body continues, so as to produce a very interesting and beautiful change of color over the surface of the rotating body.

My invention consists in the novel coloring of the surface of the rotating body and in the novel means provided for rotating it simultaneously in different planes, whereby the appearance of the change of color is produced, and in the novel combination, construction, and arrangement of the parts of the device.

The objects of my invention are, first, to produce a color-illusion device of the character described which by the delicacy of the tints produced by its rotation and by the change of color which takes place during the operation of the device may produce beautiful and interesting effects; second, to produce a variable-color-illusion device of the character described which may be adapted for use either as an exhibition device or as a toy, and, third, to make the device simple, inexpensive in construction, durable, and easily operated. These objects are attained in the invention herein described, and illustrated in the drawings which accompany and form a part of this application, in which the same reference-letters indicate the same or corresponding parts, and in which—

Figure 1 is an elevation of one form of the color-illusion device of my invention, the form shown being particularly adapted for use as an exhibition device, a portion of the rotating sphere being sectioned centrally and

vertically on a plane parallel to the plane of view to show the method of supporting it. Fig. 2 is an enlarged detail sectional view of the lower portion of the sphere and of the supporting-sleeve which forms the bearing thereof, illustrating the means provided for rotating the sphere in a direction parallel to the plane of the supporting-shaft. Fig. 3 is an elevation of another form of the color-illusion device particularly adapted for use as a toy. Fig. 4 is a central section of the sphere of Fig. 3, taken at right angles to the connecting-spindle, illustrating particularly the arrangement of the cords by which the sphere is rotated; and Figs. 5 and 6 are elevations of the device shown in Fig. 3, on a smaller scale, illustrating the change in position of the handles of the cords by which the change in color of the surface of the rotating sphere is accomplished.

In the drawings, A is the sphere, composed of two half-spheres A' and A<sup>2</sup>, separated by a narrow slot A<sup>3</sup>, connected by a central axial pin or spindle A<sup>4</sup>. In the form shown in Fig. 1 this pin or spindle is a screw threaded upon both ends to hold the hemispheres together and mounted within a bearing-sleeve B, from which projects at right angles a shaft B', by which the sphere is supported and which is itself rotatably supported in a base C, within which is placed a motor connected to the shaft and by which the shaft may be rotated.

In Fig. 1 the presence of the motor within the base C is indicated by the electric conductors leading from binding-posts C' and C<sup>2</sup>. The adjacent surfaces of the hemispheres A' and A<sup>2</sup> are hollowed out so as to form chambers to receive the ends of the sleeve B, so that a sleeve long enough to give considerable bearing-surface may be used with a slot A<sup>3</sup> no wider than is necessary to permit the free passage of the shaft B' and the collar B<sup>2</sup>, hereinafter mentioned.

A collar B<sup>2</sup> is mounted upon and secured to the shaft B' and is in contact with the base of the hemisphere A<sup>2</sup>, but not with the hemisphere A'. When the shaft B' is rotated by the motor within the base C, the sphere rotates about the shaft as an axis. At the same time, since the sleeve B<sup>2</sup> is in contact with the hemisphere A<sup>2</sup>, but not with the hemisphere A', the sphere is rotated by this fric-

tional contact about the spindle  $A^4$  as an axis and in a direction at right angles to its other direction of rotation. There is therefore a double rotation of the sphere A. The rotation about the shaft  $B'$  is much more rapid than about the spindle  $A^4$ .

The surface of the sphere is divided into lunes which intersect at a common axis, which is the axis of the spindle  $A^4$ . These lunes are colored with different contrasting colors. When the sphere is rotated rapidly, the lune which is at the equator of the sphere, and which is before the eye continuously, produces the appearance of a continuous colored band of the color of said lune. The same is true of the lune at the poles of the sphere, the color at the poles being that of the lune which is at the poles. Between the equator and the poles, however, lunes of different colors are continuously passing before the eye, and the appearance of color there produced is due to the combination of the various colors which pass before the eye. There is therefore produced a gradual blending of color from the poles to the equator.

The rotation of the sphere about the spindle  $A^4$  has the effect of continuously changing the equatorial lune, one lune after the other being brought to the equator of the sphere. The effect of this is to produce a continuous change of color over the surface of the sphere, first one color and then another being seen at the equator, with corresponding changes at the poles and between the poles and the equator. This change of color and the dividing of the surface of the sphere into differently-colored lunes and rotating the sphere about the shaft  $B'$  at right angles to the axis of the lunes and also at the same time about the axis of the lunes, by which the change in color is produced, are important and characteristic features of my invention.

In Fig. 3 and the subsequent figures there is illustrated a simpler form of my invention designed to be used for smaller sizes of the device, particularly those where the device is to be used as a toy. In this case the sphere is arranged to be rotated by cords D and  $D'$ , passing around the spindle  $A^4$  and having at their ends, for convenience, handles  $D^2$  and  $D^3$ . By twisting these cords in opposite directions and then by alternately pulling upon and relaxing the handles  $D^2$  and  $D^3$  the cords may be made to unwind and rewind, thus revolving the sphere very rapidly about an axis at right angles to the spindle  $A^4$ . At the same time the sphere may be rotated about the spindle  $A^4$ —that is, about the axis of the lunes—by turning the handles  $D^2$  and  $D^3$  in the manner illustrated in Figs. 5 and 6 if the cords be arranged as shown in Fig. 4, turning the handles from the position of Fig. 5 to the position of Fig. 6, and vice versa. The same changes in color over the surface of the sphere are produced by this movement of the handles  $D^2$  and  $D^3$  as are produced by the operation of the device shown in Fig. 1.

Should it happen that one of the cords was crossed before the twisting of the cords was begun, then it may be necessary to turn the handles  $D^2$  and  $D^3$  in opposite directions in order to produce the change of color upon the surface of the ball instead of turning them in the same direction, as illustrated in Figs. 5 and 6.

To produce the colors upon the sphere, the sphere may be painted, or it may be covered with strips of colored paper after the manner adopted for covering geographical globes. Since the surface of a sphere is not developable, other bodies having flat or developable surfaces, but which because of the number of their surfaces approximate to the spherical form, may be used instead. I prefer that the sphere should be so covered that the colors at the equator and at the poles shall be complementary. The polar and equatorial colors will then be separated by colors of neutral or intermediate tint, and this arrangement produces the best contrast of color and tends to increase the brilliancy of the colors.

Any convenient type of motor, such as electrical, water, or clockwork motors, may be employed for rotating the motor-driven device shown in Fig. 1.

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

1. In a variable-color-illusion device, the combination, with a body rotatably supported and adapted to be rotated about two axes at right angles to each other, and having on its surface a plurality of differently-colored bands intersecting each other upon one of said axes of rotation, of a driving device adapted to rotate said body rapidly about the other of said axes, thereby causing an apparent blending of the colors of said bands into each other, and means for rotating said body about the axis of said bands while it is being rotated by the driving device, thereby causing apparent changes in the arrangement of colors upon the surface of said body, substantially as described.

2. In a variable-color-illusion device, the combination, with a sphere rotatably supported and adapted to be rotated about two axes at right angles to each other, and having its surface divided into differently-colored lunes having a common axis which is one of said axes of rotation, of a driving device adapted to rotate said sphere about the other of said axes, thereby causing an apparent blending of the colors of said lunes into each other, and means for rotating said sphere about the axis of said lunes while it is being rotated by the driving device, thereby causing apparent changes in the arrangement of colors upon the surface of this sphere, substantially as described.

3. In a variable-color-illusion device, the combination, with a rotatable sphere composed of two hemispheres connected by a central spindle, by which the sphere may be rota-

tably supported, said hemispheres being separated by a slot through which the supporting device may pass, and said sphere having its surface divided into differently-colored lunes having a common axis coincident with the axis of said spindle, of means for supporting said sphere and for rotating the same about said spindle and about an axis at right angles thereto, substantially as described.

4. In a revolving exhibition device, the combination, with a rotatable body formed of two half-sections connected by a central spindle, of a bearing for said spindle in which the same may rotate, a shaft connected to said bearing at right angles to the spindle, means for rotating the shaft, thereby rotating the body about the axis of said shaft, and means for rotating the body about the axis of the central spindle, substantially as described.

5. In a revolving exhibition device, the combination, with a rotatable body formed of two half-sections connected by a central spindle and separated by a slot, of a shaft lying within said slot and carrying a bearing for the spindle, and having a driving connection with one of the sections of the rotatable body,

whereby the body is rotated about the axis of the spindle when the shaft is rotated, and means for rotating the shaft, thereby rotating the body about the axis of the shaft and also about the axis of the spindle, substantially as described.

6. In a variable-color-illusion device, the combination, with a sphere composed of two hemispheres connected by a central spindle and separated by a slot, said sphere having its surface divided into differently-colored lunes having a common axis coincident with the spindle, of a shaft, suitably supported and lying within said slot, carrying a bearing for said spindle by which the sphere is supported, and having a frictional connection with one of said hemispheres, and means for rotating the shaft, thereby rotating the sphere about the axis of the shaft and about the axis of the spindle, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

HARVEY D. WILLIAMS.

Witnesses:

W. A. CHURCH,  
O. F. EMERSON.