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No. 631,550. Patented Aug. 22, 1899.

G. WALE.

KALEIDOSCOPE.

Application filed Feb. 17, 1899.

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

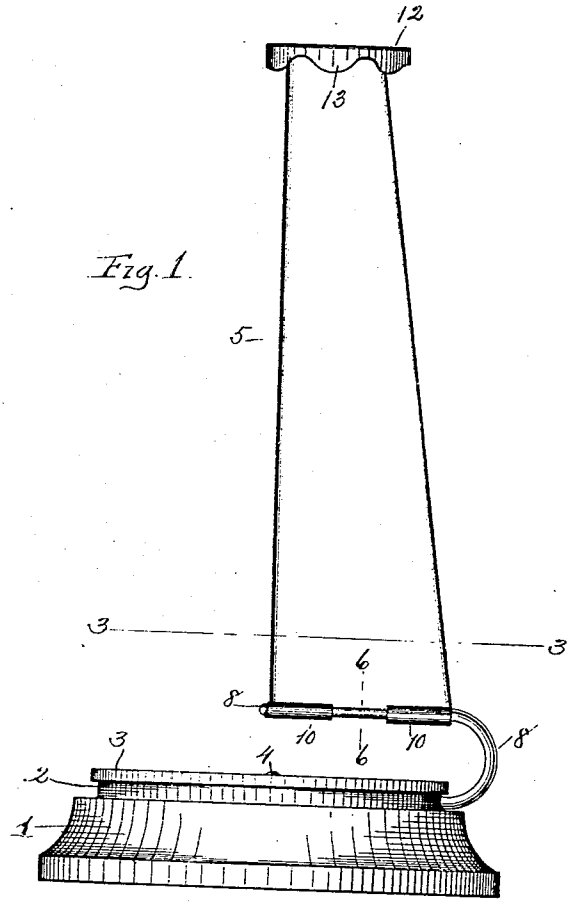
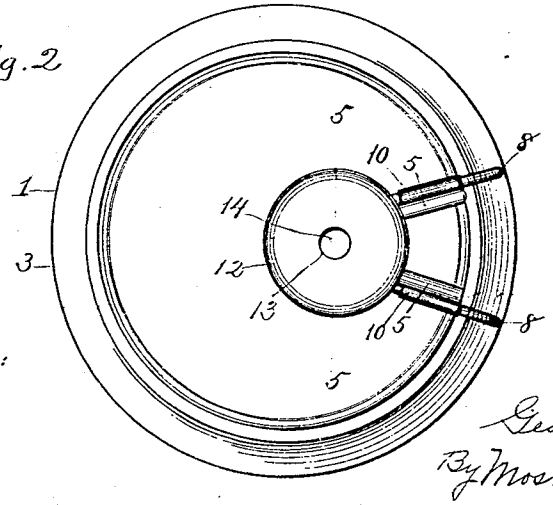


Fig. 2.



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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Fig. 5.

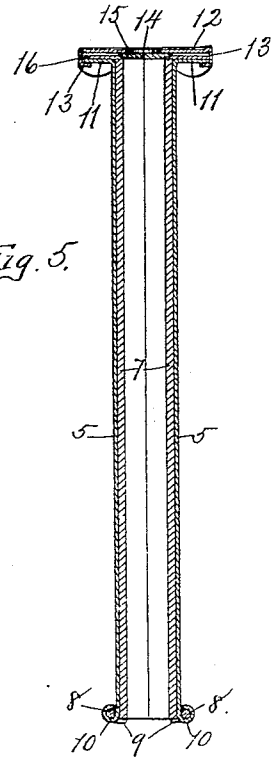


Fig. 6.

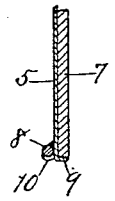


Fig. 4.

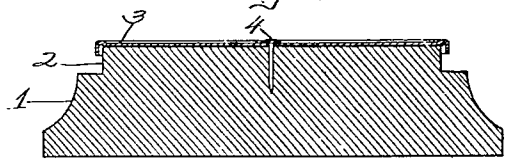
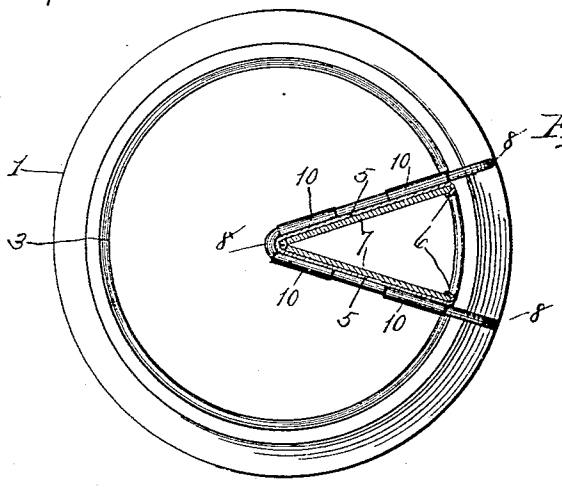


Fig. 3.



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UNITED STATES PATENT OFFICE.

GEORGE WALE, OF TROY, NEW YORK, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO THE AMERICAN SYMMETROSCOPE COMPANY, OF PORTLAND, MAINE, AND BOSTON, MASSACHUSETTS.

KALEIDOSCOPE.

SPECIFICATION forming part of Letters Patent No. 631,550, dated August 22, 1899.

Application filed February 17, 1899. Serial No. 705,811. (No model.)

To all whom it may concern:

Be it known that I, GEORGE WALE, a citizen of the United States, residing at Troy, county of Rensselaer, and State of New York, have invented certain new and useful Improvements in Kaleidoscopes, of which the following is a specification.

The invention relates to such improvements; and it consists of the novel construction and combination of parts hereinafter described and subsequently claimed.

Reference may be had to the accompanying drawings and the numerals of reference marked thereon, which form a part of this specification.

Similar numerals refer to similar parts in the several figures.

This invention relates to that class of kaleidoscopes used for viewing objects by light reflected therefrom.

Figure 1 of the drawings is a view in side elevation of my improved kaleidoscope. Fig. 2 is a top plan view of the same. Fig. 3 is a horizontal section of the same, taken on the broken line 3 3 in Fig. 1. Fig. 4 is a vertical section taken centrally through the base and object-support. Fig. 5 is a vertical section of the mirrors, mirror-holder, eyepiece, and lens, taken on the broken line 5 5 in Fig. 2. Fig. 6 is a similar view of the lower portion of one side of the mirror-holder and one of the mirrors, taken on the broken line 6 6 in Fig. 1.

Referring to the drawings, 1 is the base, which may be formed of wood or other desired material and of any desired form. The upper end 2 of the base is preferably circular in form and supports the circular object-supporting disk 3, which is rotary upon the central pivot or pin 4.

5 is the mirror-holder, which is preferably formed of sheet metal bent to V form in cross-section, as shown in Fig. 3, and having its side edges introverted to form flanges 6.

The mirrors 7 7, having their reflecting-surfaces at a suitable angle for producing kaleidoscopic effects, are located within the mirror-holder and have their inner edges adjacent to each other in the angle of the holder and their outer edges inclosed by the introverted edge-flanges 6, respectively, which flanges cover and protect the outer edges of the mirrors.

The mirror-holder is supported by a bracket 8, formed of wire erected from the base and extending around the bottom edge of the holder, forming an ornamental bead thereon and reinforcing the lower end of the holder against angular displacement.

Portions of the lower edge of the mirror-holder are bent, as at 9, to underlie and support the respective mirrors, and other portions of such lower edge are bent, as at 10, to engage the bracket 8, to which they are secured by soldering or in any known manner.

The mirror-holder is preferably located a short distance above the object-support and in vertical alinement with a sector of the object-supporting disk, with the apicillary line of the mirrors approximately at right angles to the plane of the object-support and in line with the axis of rotation of the disk.

The upper ends of the walls of the mirror-holder are bent outwardly approximately at right angles, as shown at 11, to form horizontal flanges adapted to support the superposed eyepiece or cap 12. The cap is formed of sheet metal, preferably having an ornamental depending edge-flange 13, portions of which are introverted beneath the edges of the horizontal flanges 11 on the mirror-holder, whereby the cap is secured in position upon the end of the holder.

Interposed between the cap and the ends of the mirrors is a lens 14, preferably plano-convex in form and having its axis parallel with the mirrors and approximately in line with the apicillary line of the mirrors, and its focal length approximately equal to the distance between the lens and object-support and less than the distance of normal distinct vision. The cap is provided with a central aperture 15, and the packing ring or washer 16 is similarly apertured, the lens being located in line with said apertures.

In using the device the same may be held in the hand or placed upon a table or other support, and objects placed upon the rotary disk 3 and brought by rotation of the disk beneath the open lower end of the mirror-

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holder can be viewed through the lens, previewing to the eye a plurality of images symmetrically arranged around a common center, each being similar in appearance to the sectoral field exposed to the eyepiece.

By the use of the lens in combination with the mirrors and mirror-holder I am able to reduce the length of the latter materially, to magnify the objects viewed, and also to give an increased appearance of relief to the reflected images of the object.

It is well known that the distance of normal distinct vision is about ten or twelve inches, and to secure distinct images of the object viewed it is necessary to have the eyepiece of the instrument, if not provided with a lens, about this distance above the object-support. With a mirror-holder ten or twelve inches long not only is the expense of the instrument increased, but its large size renders its less pleasing in external appearance, and if the instrument is placed upon a table of usual height the eyepiece will be found too high for convenient use of a person occupying a chair beside the table. Also with a mirror-holder of such dimensions the visual angle is so small that little appearance of relief is given to the reflected images of the object. By reducing the length of the mirror-holder I am able not only to add to the pleasing appearance and convenience of the instrument, but also to give a greater appearance of relief to the reflected images and multiply the intensity and volume of light reflected from the object to the eyepiece. By the use of the lens I am able to compensate for the reduced length, which reduces the distance between the eyepiece and object-support below the normal distance of distinct vision, thus correcting any indistinctness or blurring of the images caused by the nearness of the eyepiece to the object-support. The lens thus serves as a compensating, light-transmitting medium which, when interposed between the kaleidoscope-mirrors and the eyepiece, projects to the apparent distance of normal distinct vision kaleidoscopic images formed by rays of light reflected to the eye from an object located nearer the eye than the distance of normal distinct vision.

The sides of the mirror-holder, as well as the mirrors, are preferably tapered toward the top, the inner edges being approximately vertical and perpendicular to the plane of the object-support and the outer edges inclined upwardly toward each other, so that the lower portions of the mirrors divergently project beyond the vertical lines of the eyepiece 12 and are not covered thereby, thus forming an open or light-admitting side of the mirror-holder, which increases in width from top to bottom and permits the entrance of a large quantity of light for the illumination of the object, the projecting lower portions of the mirrors acting as reflectors of light coming from above the instrument and serving to direct such light upon the sectoral portion of the object-support below the mirror-holder and the objects supported thereby to render the same more distinct.

It is desirable to locate the lens as near the apicillary line of the mirrors as practicable, and by tapering the mirrors and their holder I am able to locate the lens in a position to receive the rays of light at favorable angles from both mirrors, and at the same time to locate the eye-aperture 15 in the center of the superposed cap, as shown.

When desired, the edge portions 10 of the mirror-holder may be extended to entirely inclose the bracket-wire 8, as shown in Fig. 5, and form the sole connection between the bracket and mirror-holder.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a kaleidoscope, the combination with a rotary object-support, and a lens, of a pair of kaleidoscope-mirrors, and means for supporting said mirrors with their apicillary line approximately in line with the lens and axial center of the object-support and perpendicular to the plane of the object-support.

2. In a kaleidoscope, the combination with a rotary object-support, and a lens of a pair of mirrors arranged at an acute angle with relation to each other and with an open side approximately their whole length, and means for supporting said mirrors with their apicillary line approximately in line with the lens and axial center of the object-support and perpendicular to the plane of the object-support.

3. In a kaleidoscope a rotatable object-support having an approximately plane top surface exposed directly to the rays of light and unobstructed for the application thereto of objects to be viewed; a plurality of mirrors and a mirror-holder maintaining the mirrors at an angle with relation to each other; and with their apicillary line approximately perpendicular to the top surface of the object-support and in line with its center of rotation.

4. In an instrument of the class described, a plurality of elongated mirrors; a mirror-holder maintaining the mirrors in an angular position relatively to each other; an eyepiece and compensating lens at the upper end of the holder; a rotatable object-support; and means for sustaining the holder with its lower end at a distance above the object-support, with its upper end at a less distance from the object-support than the distance of normal distinct vision; and the apicillary line of the mirrors approximately in line with the center of rotation of the object-support.

5. In a kaleidoscope, a pair of elongated upright mirrors arranged with their reflecting surfaces at an acute angle with relation to each other; a superposed aperture eyepiece, a subjacent rotatably-pivoted object-support; and means for supporting and maintaining the eyepiece, mirrors and pivotal

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axis of the object-support in fixed relation to each other such that the eye-aperture, the apicillary line of the mirrors and the pivotal axis shall be approximately in the same straight line.

6. In a kaleidoscope, an elongated open-sided mirror-holder, mirrors held in place within said holder at opposite sides its longitudinal opening, a cap or eyepiece applied to the upper end of said holder, and a bracket embracing the lower end of said holder outside the backs of the mirrors, said bracket sustaining said holder and preventing its angular displacement.

7. In a kaleidoscope, a mirror-holder V-shaped in cross-section and tapered from bottom to top; in combination with a pair of kaleidoscope-mirrors similarly tapered from bottom to top and secured in said holder by introverted edge portions of the sides and bottom of the holder.

8. In a kaleidoscope, the combination with a support; of a bracket erected from the support; a pair of mirrors, and a mirror-holder having portions of its bottom edge bent to engage the lower edges of the mirrors, and other portions bent to engage the supporting-bracket.

9. In a kaleidoscope, the combination with the mirror-holder formed of sheet metal and having portions of its upper end bent outwardly at approximately right angles to form flanges, of an eyepiece superposed upon said flanges and having depending portions introverted beneath the edge of said flanges, whereby the cap is secured to the holder.

In testimony whereof I have hereunto set my hand this 11th day of February, 1899.

GEORGE WALE.

Witnesses:
GEO. A. MOSHER,
FRANK C. CURTIS.