Nov. 23, 1948. D. E. SMITH 2,454,577

KALEIDOSCOPE

Filed March 15, 1946

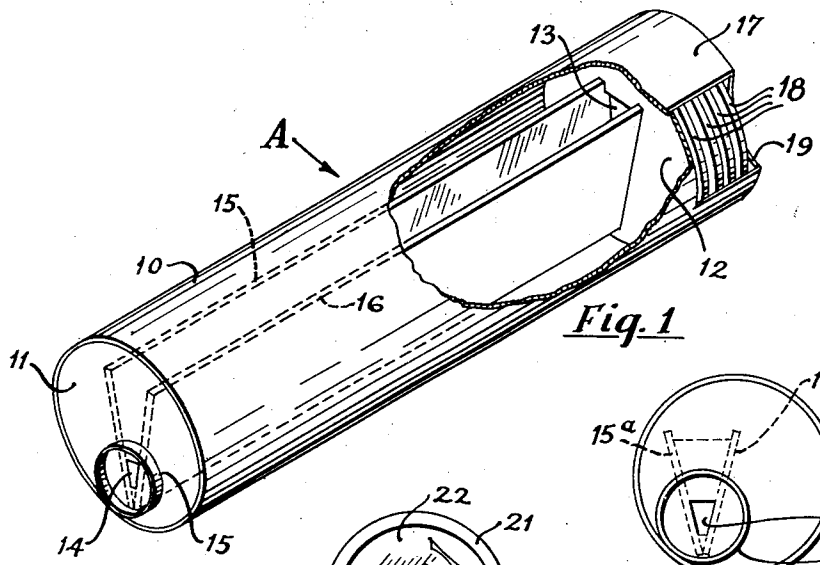



Fig. 1




Fig. 5

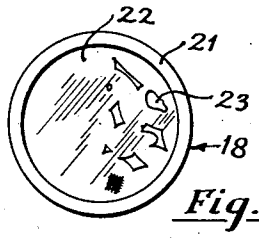



Fig. 4

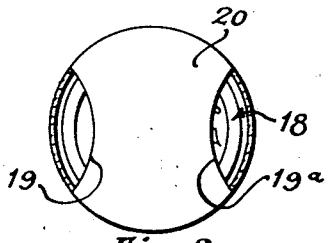



Fig. 2

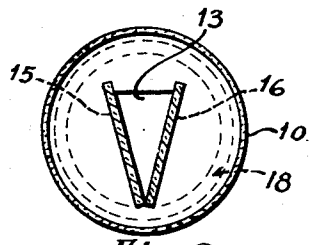



Fig. 3

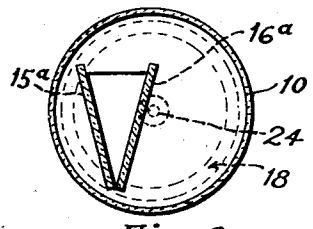



Fig. 6

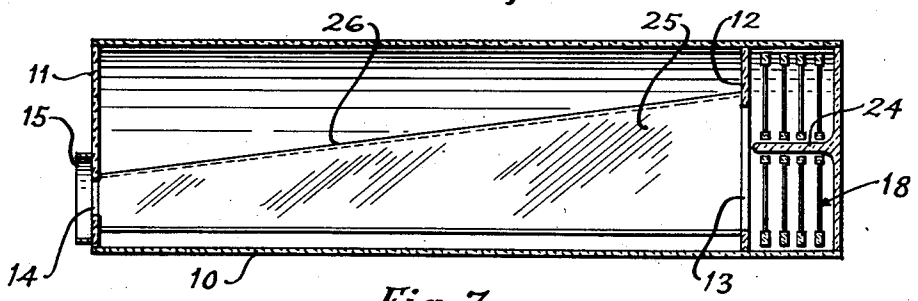



Fig. 7

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## KALEIDOSCOPE

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1 Claim. (Cl. 88—15)

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This invention relates to kaleidoscopes.

The kaleidoscope has been known for a long period of years but during this period very little improvement has been produced in it, with the exception perhaps of certain suggestions for reducing cost of manufacture. In such an instrument, by means of a plurality of small loose particles of glass, etc., carried within a housing defined by transparent and translucent spaced apart plates, various unique patterns are produced by the aid of angularly disposed mirrors when the kaleidoscope body is rotated in order to cause displacement of the said loose particles. These varied patterns cannot be repeated because they are arbitrarily formed due to the continued displacement of the particles upon rotation of the body. Thus, it is difficult to retain a pattern formed since in transferring the body to the hand of some one else the particles are liable to be dislodged from their previous arrangement. Thus, the aesthetic value of the pattern formed is lost in many cases to the second person, whereas the value of the pattern as a means of suggestion for reproduction in other fields is also lost.

The present invention avoids this particular disadvantage of the known kaleidoscope and also provides other advantages among which is economic to manufacture.

It is therefore an object of the present invention to provide a kaleidoscope wherein the patterns produced may be predetermined and can be reproduced.

A further object of the invention is to provide a device of this kind wherein the pattern produced at any given time may be retained even though the instrument is transferred from hand to hand.

A further object of the invention is to provide a device of this kind wherein pattern changes are effected without rotation of the body of the device.

A still further object of the invention is to provide an instrument of this character wherein the patterns are carried by discs of transparent or translucent character which may be manufactured readily and mounted easily so as to produce an instrument of low cost.

A still further object of the invention is to provide a device of this kind wherein the viewing opening may be positioned at various points on the end of the body of the instrument and wherein the body of the instrument is not rotated to produce the changing effect of the patterns.

A still further object of the invention is to provide an instrument of this kind wherein the

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mirrors employed may be reduced to a minimum size, thus to save material and lower the cost of production.

With these and other objects in view, the invention generally comprises a preferably cylindrical body having a viewing opening at the forward end and a larger opening at the opposite or rearward end with angularly arranged mirrors disposed between the openings, and pattern producing means in the form of a plurality of discs rotatably carried beyond the opening at the rearward end, the said discs having transparent or translucent characteristics and carrying pattern pieces mounted on the transparent or translucent portions thereof, in any predetermined array, whereby to produce, when viewing the discs through the instrument collectively, patterns formed and changed by the rotation of the discs relatively to one another.

The invention will be clearly understood by reference to the following detailed specification taken in conjunction with the accompanying drawings.

In the drawings—

Fig. 1 is a perspective view of a form which the kaleidoscope of the present invention may take and having part of the wall of the body broken away in order more clearly to illustrate parts of the construction.

Fig. 2 is a rear end view of the body shown in Fig. 1.

Fig. 3 is a transverse section taken through the body between its ends.

Fig. 4 is a front elevation of one of the discs employed to illustrate the manner in which the pattern forming pieces are associated with the discs.

Fig. 5 is a front end elevation of a modified form of instrument showing the viewing opening offset to one side of the body of the instrument.

Fig. 6 is a transverse section taken through an instrument constructed as in the case of Fig. 5, and

Fig. 7 is a longitudinal section taken through an instrument to illustrate a modified type of mirror and also a modified form of mounting a disc in the end of an instrument.

Referring to the drawing, A indicates a kaleidoscope as a whole constructed according to the present invention formed with a cylindrical body 10, an opaque front end 11 and an opaque rear end 12 having opening 13. The front end 11 is formed with a viewing opening 14 which may be encircled by the light confining flange 15 when the instrument is held up to the eye. The open-

ing 14 preferably has angular characteristics to conform with the angular disposition of a pair of mirrors 15 and 16 disposed in known manner between the end 11 and the end 12 so that the user may view through the opening 13 patterns formed beyond it and which are reproduced in multiple by the mirrors to give a completely symmetrical pattern on what appears to be a disc-like screen.

Disposed in a mounting beyond the rear end 12 of the body and which preferably takes the form of an auxiliary housing 17 are a plurality of discs 18 designed to be rotated relatively to one another. The edges of the discs are preferably exposed through the side opening 19 so that they may be engaged and rotated by a digit of the hand. Preferably the second side opening 19a is provided so that the discs 18 are exposed on each side of the body as shown in Fig. 2, so that the discs may be engaged by digits of the operator's hand on each side in order to facilitate relative rotation thereof. Alternatively, a top opening might be used instead.

The end of the auxiliary housing 17 is formed by a translucent plate or the like 20 so that light may be diffused through the transparent portions of the discs 18 permitting a clear view of the patterns formed by the discs through the rear opening 13 and through multiple reflection by the mirrors as viewed through the viewing opening 14.

The discs 18 may be formed with an outer ring 21 and a main body of transparent material 22 such as "Cellophane" or other suitable transparent plastic material or glass. On the transparent portion thereof particles or pattern forming pieces 23 of any suitable kind are secured by gluing or the like, or by applying translucent paints, dyes or varnishes to selected areas thereof, and disposed in any desired relationship so as to produce changing, unique and pleasing patterns when the discs are rotated relatively to one another.

Where a simple structure is particularly desired and which will sell at a low cost, the discs 18 are only mounted in the auxiliary housing 17 and may bear against upper and lower end walls thereof in freely movable relation thereto. However, if desired and as shown in Fig. 7, a suitable mounting spindle 24 may be provided and the central portion of each disc is orificed so that they can be freely rotatably mounted upon the spindle.

In view of the fact that the structure, through its rotatably discs, avoids the necessity of rotating the body of the kaleidoscope as is necessary in conventional constructions, it is not necessary that the mirrors and the viewing opening 14 be disposed operatively to coincide with the central longitudinal axis of the body. Therefore, as shown in Figs. 5 and 6, the mirrors 15a and 16a may be disposed in a position offset from the central longitudinal axis of the body and the viewing opening 14a is disposed accordingly. Moreover, also by reason of the fact that it is not necessary to dispose the viewing opening and mirrors in operative relationship to the central longitudinal axis of the body, a special form of mirror may be provided such as indicated by the numeral 25 as shown in Fig. 7. Here the mirrors are formed with a downwardly and forwardly sloping upper edge 26 sloping from a maximum width at the rear opening 13 to a minimum width at the viewing opening 14. This results in a substantial saving of material which thus makes



it possible further to reduce the cost of the kaleidoscope.

The present invention also permits the disposition of the viewing opening towards the outer periphery of the circumference of the forward end of the body and at the apex of the adjoining edges of the mirrors. This presents two advantages. On the one hand, where the viewing opening is along the centre axial line of the body and spaced upwardly from the apex of the point of juncture of the mirrors, a slight distortion of the pattern is produced. This is eliminated where the opening is disposed adjacent the apex. On the other hand, by positioning the opening in this manner, the end of the body, which makes it fit more closely the super-orbital arch of the eye, will eliminate the interference caused by parts of the nose engaging the end of the body when the opening is disposed in alignment with the central longitudinal axis of the body.

The foregoing will illustrate the practical advance which I have made in this field. The elimination of the necessity for rotating the body constitutes one desirable advance. On the other hand, of more importance is the fact that the pattern forming pieces are carried in a predetermined fixed relation on discs and consequently the instrument is easier to operate while the pattern formed can be again reduced where this is desired. In this connection, when a pattern has been formed which is of particular interest and it is desired again to reproduce such pattern, the edges of the discs 18 may be marked so that the discs can again be returned to that particular relationship with one another and thus reproduce the same pattern. Furthermore, the use of the discs makes it possible to retain a pattern formed even while handling the instrument, since the discs will not tend to become dislodged from their set position by casual handling of the body. Moreover, any suitable degree of frictional resistance to rotation of the discs may be provided for, having regard to varying contacts that the discs are caused to make with the walls of the auxiliary housing 17. Finally, it is obvious that under the proposal the construction may be produced at low cost.

It will be obvious in considering the appended claims that where the expression "pattern pieces" is employed, this is designed to indicate either pieces fastened to the transparent portion of the discs or applied thereto in any manner such as by painting, etc.

What I claim as my invention is:

In a kaleidoscope of the class described, a body adapted to remain stationary during use, said body having a viewing opening at its forward end and an aligned object opening adjacent its rearward end, inclined reflecting surfaces extending along said body between said aligned openings and adapted to cause multiple reflections of objects beyond the rearward opening when viewed through said aligned openings, whereby to create a symmetrical pattern, said viewing opening being located adjacent the apex of said inclined reflecting surfaces, transparent means rearwardly of said rearward opening carrying pattern pieces and movable relative to the body to display through said rearward opening a part of a pattern, said transparent pattern piece carrying means being exposable to the light to create said reflection in said inclined reflecting surfaces, said body being held stationary and said transparent means being rotatable to create pattern changes,

said transparent means comprising discs rotatable relatively to each other and each having an exposed edge engageable by a digit of the hand for frictionally rotating said discs, said reflecting surfaces having an inclined upper edge extending forwardly and downwardly from the top of the rearward opening to the top of the forward opening.

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