Aug. 18, 1959 P. S. NEWTON 2,899,956

EYE STIMULATOR

Filed July 23, 1956 4 Sheets-Sheet 1

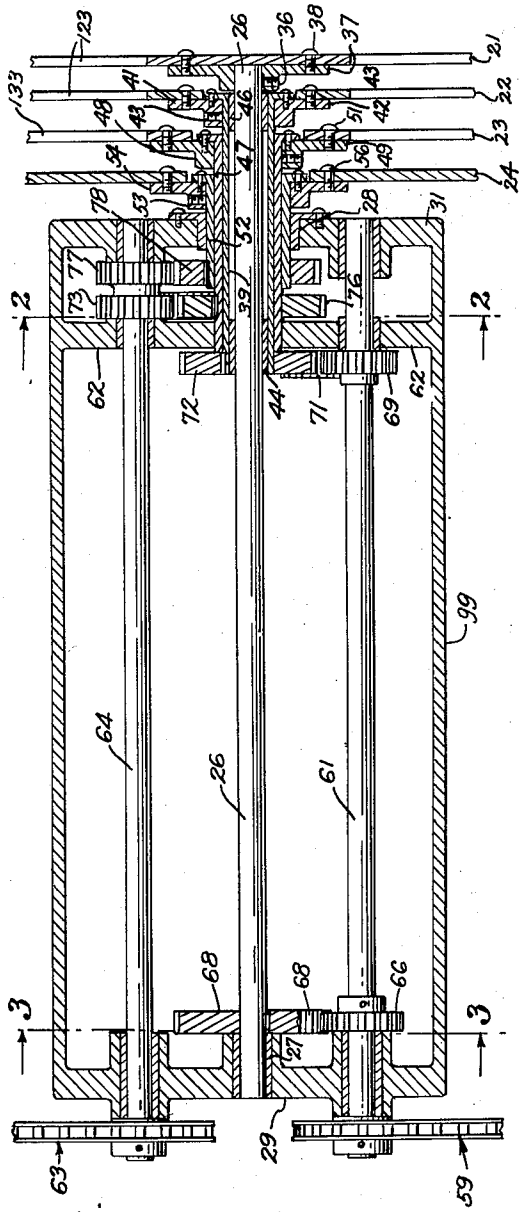


Fig. 1.

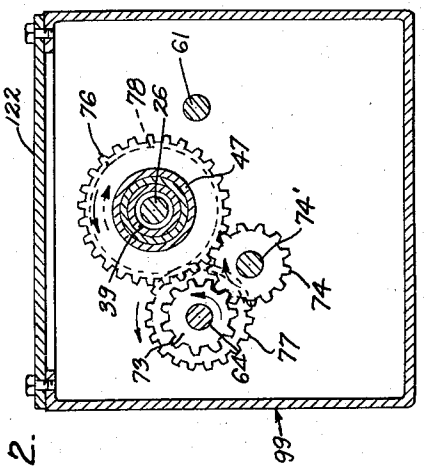


Fig. 2.

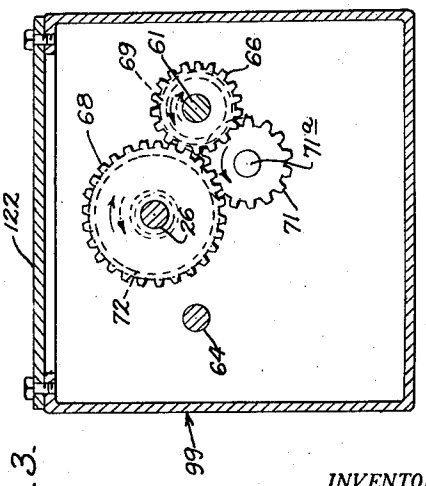


Fig. 3.

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EYE STIMULATOR

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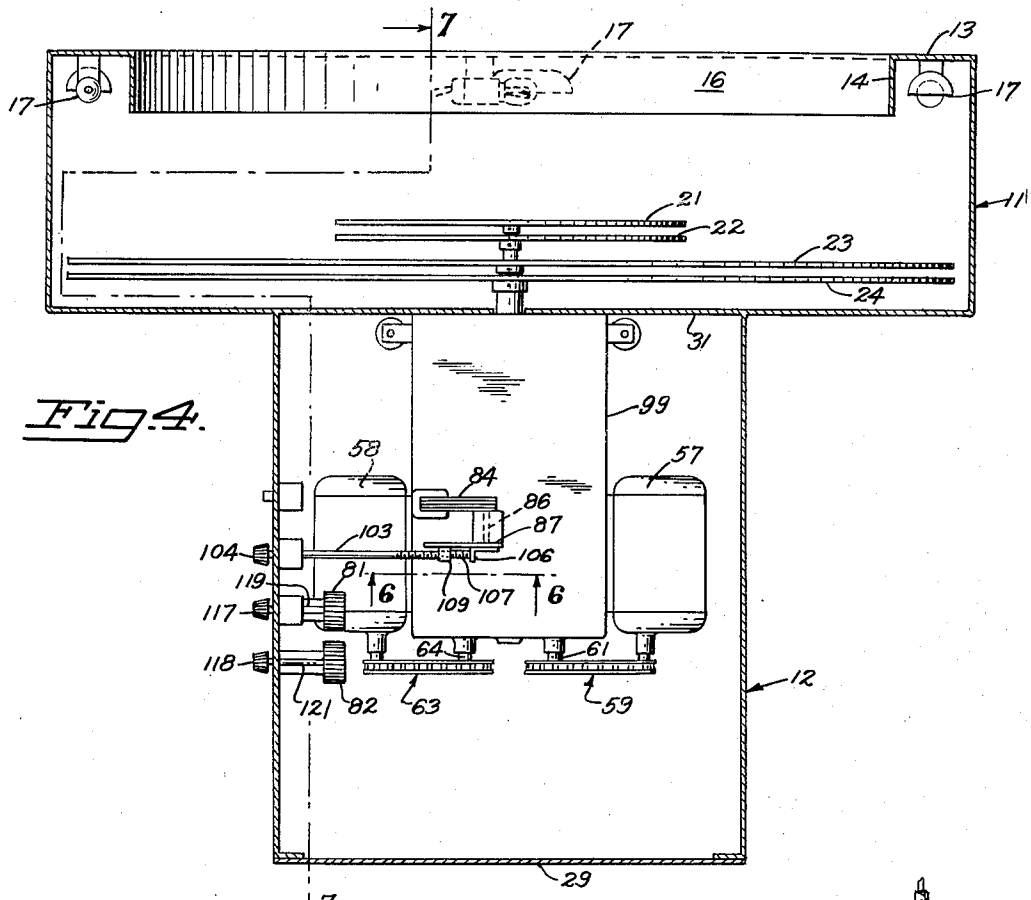


Fig. 4.

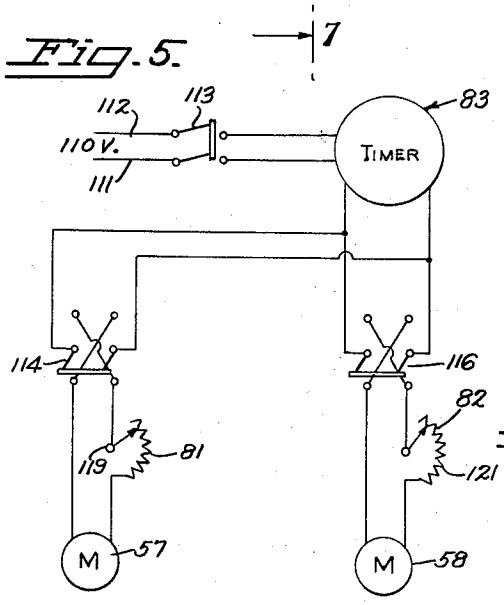


Fig. 5.

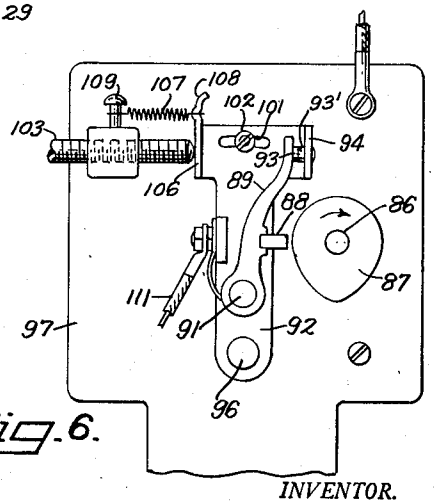


Fig. 6.

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EYE STIMULATOR

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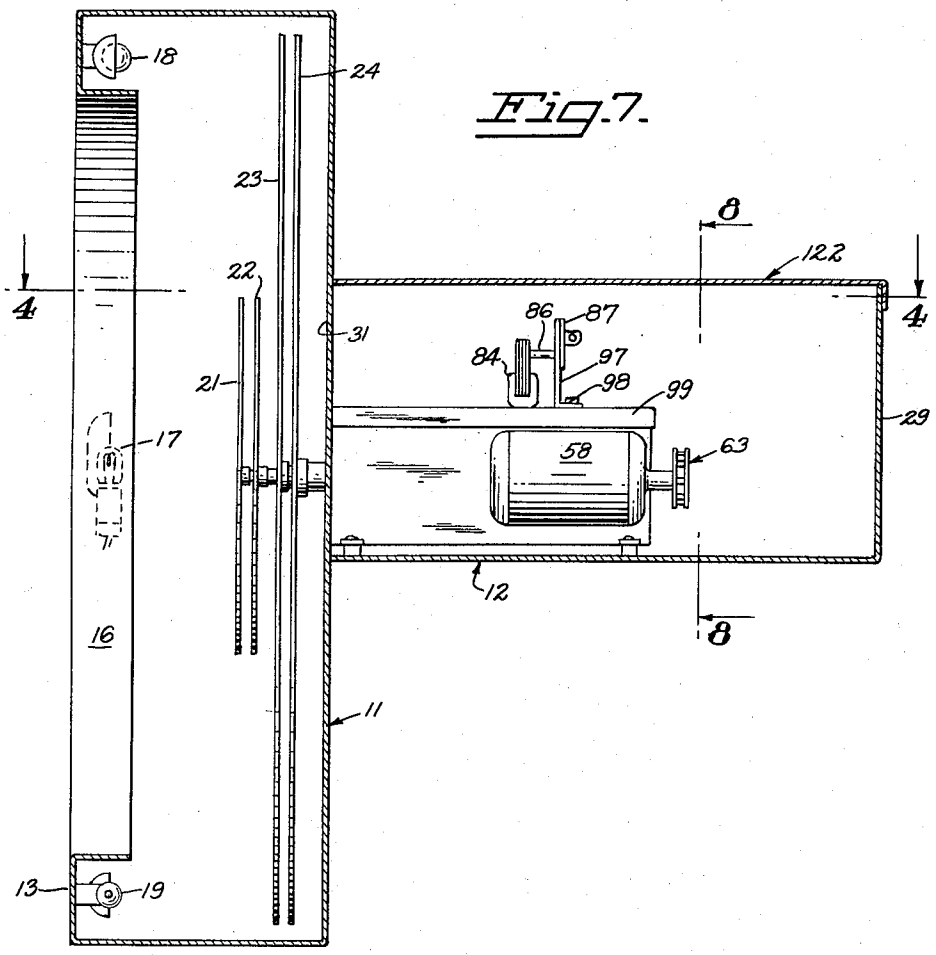


Fig. 7.

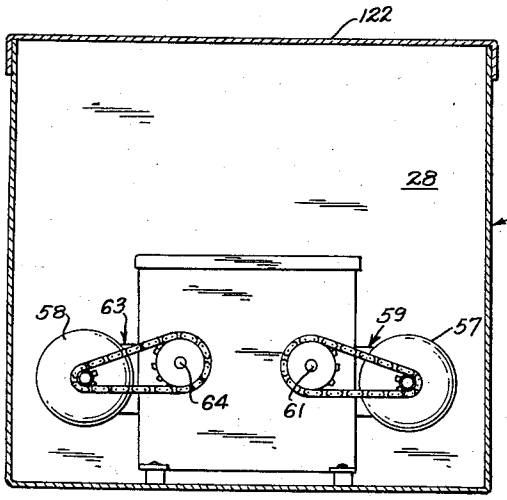


Fig. 8.

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EYE STIMULATOR

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Fig. 9.

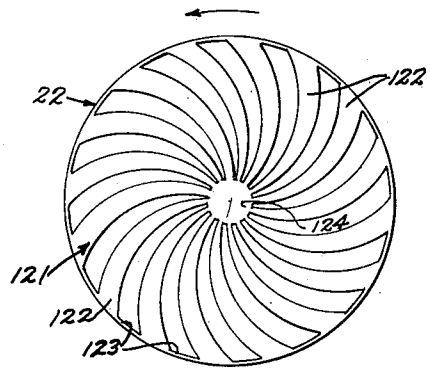


Fig. 11.

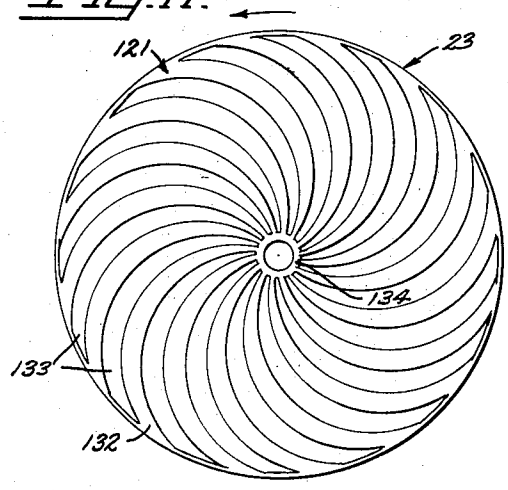


Fig. 10

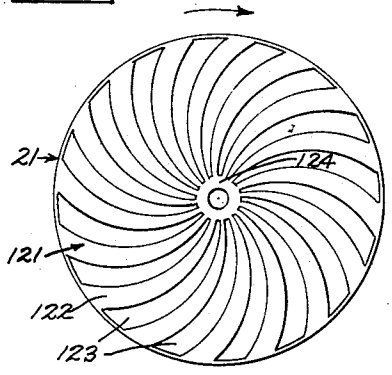


Fig. 12.

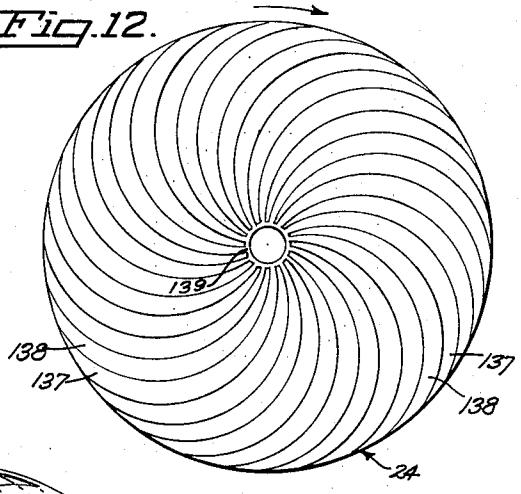
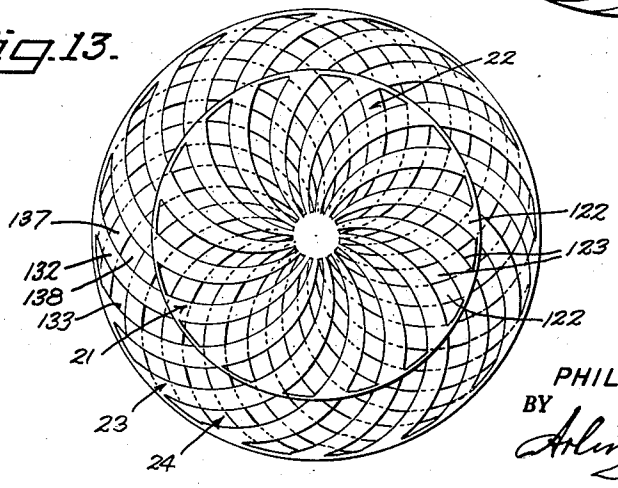


Fig. 13.



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United States Patent Office 2,899,956 Patented Aug. 18, 1959

2,899,956

EYE STIMULATOR

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Application July 23, 1956, Serial No. 599,549

9 Claims. (Cl. 128—76.5)

The invention, in general, relates to ocular demonstration and more particularly relates to devices and methods for inducing the exercise of the eye muscles in order to correct and strengthen the same as well as to improve the nerve system of the eye.

There have been heretofore a number of different devices developed and methods utilized in an endeavor to correct or treat ametropia and other ocular defects all of which, in the main, have not substantially accomplished the desired results due primarily to the lack of appreciation of the particular problems involved and, consequently, the incapability of these prior devices and methods to resolve such problems.

As is perhaps well known, ametropia includes such ocular defects as myopia, hypermetropia, presbyopia and physiologic astigmatism, all resulting from a condition of the eye which is abnormal with respect to refraction, and directly traceable to the crystalline lens and its operating mechanism including the ciliary muscle and suspensory ligaments which are attached to and which support the crystalline lens. Usually, abnormal refraction is correctible by changing the focal length of the crystalline lens by varying its curvature and such method and process is known as accommodation. The accommodative power of the eye ordinarily decreases with age making it gradually more and more difficult for a person voluntarily to focus his eyes on near objects, such loss of accommodative power being known as presbyopia. Normally, in such cases, good images of distant objects may be produced on the retina but the focal plane of near objects will be behind the retina and, consequently, to produce a distant image of a near object the focus must be brought forward to the retina. This is accomplished in an ordinary case by the use of spectacles which effect a proper corrective convergence of the light into the eye.

An opposite ocular defect, known as hypermetropia or far-sightedness, occurs when the lens has an abnormally great curvature in which case the eye, when at rest, converges light from a distant point to a focus in front of the retina, known as myopia, or near-sightedness since sharp images are produced on the retina of a myopic eye by light from near objects only. This is also correctible by spectacles which have diverging lenses of such curvature that substantially parallel rays of light, such as from distant objects, after traversing the spectacle lens and the lens of the eye are brought to a focus on the retina.

Physiologic astigmatism occurs when the curvature of the crystalline lens of the eye is not the same in different meridians, the image of a point source of light is focused on the retina as a line rather than a point; such astigmatism resulting from an effort of the crystalline lens enervating mechanism to overcome such anatomical corneal astigmatic condition causing a refractive eye strain not relieved or corrected by spectacles.

It is thus observed that most of the foregoing ocular defects generally have been attempted to be corrected by

spectacles or other devices, and in some cases some good results have been accomplished but largely these devices and methods are ineffective because the internal condition of the eye has not been affected. The present invention is directed to the provision of apparatus and methods capable of so exercising the ciliary muscle of the eye and associated mechanism as to effect the curvature of the crystalline lens of the eye whereby such curvature may be either increased or decreased and whereby the accommodative power of the eye may be substantially improved.

A primary object of the present invention is to provide an improved eye stimulator capable of exercising an appreciably increased retinal area for developing a larger and more acute field of vision within the eye.

Another important object of my invention is to provide an improved eye stimulator of the indicated nature which is additionally characterized by its usefulness monocularly, partially or wholly to correct different ametropic conditions in the individual eyes of a person.

A still further object of the invention is to provide an improved eye stimulator of the aforementioned character which possesses the feature of greatly assisting in the adaptation of a patient's visual system to a weaker set of spectacle lens.

Another object of my present invention is to provide an improved eye stimulation method which is adaptable to a wide variation of application for inducing the stimulation of the combined focusing mechanisms of the eye.

A still further object of the invention is to provide an improved eye stimulator which is adaptable to a wide variation of application for inducing variable exercises of one or both eyes of a person to vary the accommodative powers of the eyes.

Other objects of the invention, together with some of the advantages and features thereof, will appear from the following description of a preferred embodiment of the invention which is illustrated in the accompanying drawings. It is to be understood, however, that I am not to be limited to the precise embodiment shown, nor to the precise arrangement of the various parts thereof, as my invention, as defined in the appended claims, can be embodied in a plurality and variety of forms.

Referring to the drawings:

Fig. 1 is a longitudinal cross-sectional view of a preferred embodiment of the invention.

Fig. 2 is another view of the preferred embodiment of the invention taken on the line 2—2 of Fig. 1.

Fig. 3 is a still further view of the preferred embodiment of the invention taken on the line 3—3 of Fig. 1.

Fig. 4 is a plan view of the preferred embodiment of the invention, taken on the line 4—4 of Fig. 7.

Fig. 5 is a wiring diagram of the rotary disc control and timer mechanism.

Fig. 6 is an enlarged view of the timer, taken on the line 6—6 of Fig. 4.

Fig. 7 is a view taken on the line 7—7 of Fig. 4.

Fig. 8 is a view taken on the line 8—8 of Fig. 7.

Fig. 9 is a front elevational view of one of the smaller discs employed in a preferred embodiment of the invention.

Fig. 10 is a front elevation of another of the smaller discs employed in a preferred embodiment of the invention showing the different curvatures of the segmental portions thereof.

Fig. 11 is a front elevational view of one of the larger discs employed in the preferred embodiment of the invention.

Fig. 12 is a front elevational view of another of the larger discs employed in the preferred embodiment of the invention, this larger disc being solid with pained segmental portions.

Fig. 13 is a front elevational composite view of all of

the discs employed in the preferred embodiment of the invention and looking into the faces thereof.

In its preferred form, the improved eye stimulator of the present invention preferably comprises a plurality of movable members constituting a target, means for rotating said members at variable speeds and in both directions of rotation, and means providing a plurality of spaced ocular objectives on each of said members which simulate movement outwardly and inwardly relative to the centers of said members upon rotation thereof thereby effecting the exercise of the ciliary muscles of an eye trained on the rotary members and affecting the curvature of the crystalline lens of such eye.

As illustrated particularly in Figs. 1 to 4 inclusive of the annexed drawings, I provide a two-section casing which may be integrally formed and which includes a front section 11 and a rear section 12. The two casing sections conveniently are arranged in right angle relationship with the rear section 12 joining the front section at its approximate longitudinal center. The front section 11 is formed with an open front wall 13 defining a relatively wide annular opening 14 through which the hereinafter described target may be viewed, and also is formed with an inwardly directed annular flange 16 at the opening 14 to define an annular front chamber 16 in which target illuminating means 17, such as a series of electrical bulbs arranged in spaced relationship, are mounted for directing light rays onto the target; the bulbs being connected in the usual manner to a supply of electrical energy, not shown. If desired, a fluorescent tube may be utilized in lieu of the series of bulbs 17. By providing the annular mounting of the illuminating means, light rays are directed onto the target from every angle of view and thus the uniformity of light dispersion is had upon the target.

In accordance with the present invention, I provide a plurality of rotatably mounted discs 21, 22, 23 and 24 in the front casing section 11, which discs constitute the target to be viewed by a patient undergoing eye treatment. To this end, a shaft 26 is journaled in suitable bearings 27 and 28 which are arranged in alignment and supported, respectively, on the back wall 29 of a drive casing 99 and on the front wall 31 of such drive casing; the shaft 26 extending forwardly of the back wall 31 of the drive casing 99 a sufficient distance to effect the mounting of the discs 21–24, inclusive, one behind the other as viewed from the opening 14 of the front casing. It is to be observed that I provide two smaller discs 21—22 of equal diameters at the front of the target and two larger discs 23 and 24 at the rear of the target; such larger discs being also of equal diameter but of greater diameters than the diameters of the smaller discs.

While any suitable means can be utilized for driving the discs 21–24, I have successfully operated the preferred embodiment of the invention with disc drive connections as shown particularly in Fig. 1 of the annexed drawings whereby the two smaller discs 21 and 22 of the target are rotated as a pair in both directions of rotation independently of the rotation of the two larger discs 23 and 24. As illustrated, the outer or front smaller disc 21 is mounted on the forward end of shaft 26 by means of a hub plate 36 which is keyed to the shaft 26 and which is apertured to pass the shaft; the hub plate 36 being formed with an annular flange 37 thereon to which the disc 21 is firmly secured by means of suitable screws 38. The second smaller disc 22 conveniently is connected to the forward end of a relatively long sleeve 39 to lay directly behind but in spaced relation to the other smaller disc 21; the sleeve 39 surrounding shaft 26 and extending through the front wall 31 of the drive casing 99 and being provided with a hub plate 41 which is keyed to the sleeve 39 and which is apertured to pass both the sleeve 39 and the shaft 26. The hub plate 41 is formed with an annular flange 42 to which the disc 22 is firmly secured by means of screws 43. As indicated, the sleeve 39 is rotatably supported on bushings 44 and 46 secured on the shaft 26 and is rotated by means hereinafter described. The forward or front larger disc 23 is conveniently connected to a short sleeve 47 which surrounds the sleeve 39 and extends through the back wall of the front casing 11, and as in the case of the sleeve 39 the sleeve 47 is provided with a hub plate 48 which is keyed to the sleeve 47 and which is apertured to pass the sleeve 47 as well as the sleeve 39 and the shaft 26. The hub 48 is formed with an annular flange 49 thereon to which the disc 23 is secured by means of suitable screws 51. As hereinafter described, the sleeve 47 is suitably rotated much in the same manner as the rotation of sleeve 39 is effected. The second larger disc 24 at the rear of the target is placed in driving connection with a shorter sleeve 52 which surrounds the sleeve 47 and extends a short distance in front of the front wall 31 of the drive casing 99; the driving connection including a hub plate 53 which is keyed to the sleeve 52 and which is apertured to pass the sleeve 52, the sleeve 47 as well as the sleeve 39 and the shaft 26. The hub 53 also is formed with an annular flange 54 thereon to which the larger disc 24 is secured by means of suitable screws 56.

With particular reference to Figs. 1, 4 and 5 of the annexed drawings, I provide a pair of reversible motors 57 and 58, together with driving connections and driven shafts for effecting the rotation of the discs 21–24, inclusive, in both directions of rotation; the driving connections being such that the two smaller discs 21 and 22 will be driven as a pair and the two larger discs 23 and 24 also will be driven as a pair in both directions of rotation. The driving connections include a belt and pulley drive, designated generally by the reference numeral 59, between the shaft of motor 57 and a driven shaft 61; the shaft 61 extending longitudinally of the drive casing 99 parallel to the shaft 26 and being journaled in suitable bearings mounted, respectively, in the rear wall 29 of drive casing 99 and a transverse wall 62 within such casing section as well as in the rear wall 51 of the front casing section 11. I also provide a belt and pulley drive, designated by the reference numeral 63, between the shaft of motor 58 and a driven shaft 64; the shaft 64, likewise, extending longitudinally of the drive casing 99 parallel to the shafts 26 and 61 and being journaled in suitable bearings similarly mounted in the rear wall 29 of casing 99 as well as in the transverse wall 62 and in the front wall 31 of the drive casing section 99. Because the motors 57 and 58 are reversible, the shafts 61 and 64 are driven in both directions of rotation, when desired.

To translate the rotation of shaft 61 for driving outer smaller disc 21 in both directions of rotation, a gear 66 is keyed to shaft 61 adjacent to the rear wall 29 of drive casing 99 and is arranged thereon for meshing engagement with a larger gear 68 which is keyed to the shaft 26 on the outer end of which the target disc 21 is mounted. Thus, when shaft 61 is rotated in a clockwise direction the main or larger gear 68 on shaft 26 as well as the shaft 26 itself will rotate in a counterclockwise direction thereby effecting counterclockwise rotation of disc 21. By reversing the motor 57, it is clear that the disc 21 can be rotated in a clockwise direction. For driving the smaller disc 22 in a clockwise direction, I provide a second gear 69 on the shaft 61, which is keyed thereto adjacent to the transverse wall 62 in drive casing 99, and arrange the same on the shaft 61 for meshing engagement with an intermediate gear 71 which is idly mounted for rotation on a stub shaft 71′ and which is arranged for meshing engagement with a larger gear 72 fixedly secured to the sleeve 39 surrounding shaft 26 and on which the inner smaller disc 22 is mounted. Thus, when shaft 61 is rotated in a clockwise direction not only will the outer smaller disc 21 be rotated in a counterclockwise direction through the medium of shaft 26 in the above-mentioned gearing but inner disc 22 will be rotated in a clockwise direction or in an opposite direction to the

direction of rotation of outer disc 21 since the gear 69 on shaft 61 will effect rotation of the intermediate gear 71 in a counterclockwise direction which, in turn, will effect rotation of large gear 72 on sleeve 39, as well as the sleeve 39 itself and the disc 22 mounted thereon in a clockwise direction. By reversing the direction of rotation of the motor 57, the shaft 61 will rotate in a counterclockwise direction and through the gearing just described the smaller discs 21 and 22 will be rotated in opposite directions of rotation than hereinabove discussed. That is to say the outer smaller disc 21 will be rotated in a clockwise direction and the other smaller disc 22 will be rotated in a counterclockwise direction of rotation.

In order to translate the rotation of shaft 64 to the driving of the larger discs 23 and 24, a small gear 73 is keyed to the shaft 64 adjacent to the transverse wall 62 of the drive casing 99 and is arranged thereon for meshing engagement with an intermediate gear 74 which is idly mounted for rotation on a stub shaft 74'; the gear 74 being arranged for meshing engagement with a gear 76 fixedly secured to the sleeve 47 surrounding sleeve 39 and on which the front larger disc 23 is mounted. When shaft 64 is driven by the motor 58 in a counterclockwise direction of rotation, the intermediate gear 74 will be rotated in a clockwise direction to effect, in turn, a counterclockwise rotation of sleeve 47 as well as the front or outer disc 23 of the larger discs. I also provide on shaft 64 a second gear 77 which is arranged for meshing engagement with a larger gear 78 secured to the sleeve 52 on which the inner larger target disc 24 is mounted. Thus, with the shaft 64 rotating in a counterclockwise direction the gear 77 will effect clockwise rotation of gear 78 as well as of the sleeve 52 and also of the target disc 24. Reversing the motor 58 which drives shaft 64 will change the direction of rotation of shaft 64 to a clockwise rotation which will, in turn, effect clockwise rotation of the outer larger disc 23 and counterclockwise rotation of the inner larger disc 24 through the medium of the gears and sleeves just described. In other words, the two discs 23 and 24 are driven in opposite directions of rotation relative to one another and their directions of rotation are governed by the direction of rotation of the motor 58 in the same manner as the outer smaller discs 21 and 22 are driven in opposite directions of rotation relative to one another while their directions of rotation are governed by the direction of rotation of the motor 57.

In accordance with my present invention, I provide means for varying the speeds of both of the motors 57 and 58 to effect, in turn, variations in the speeds of rotations of the discs 21–24, inclusive, and I also provide means for limiting the duration of rotations of the several discs to any predetermined time interval. To this end, and as illustrated particularly in Fig. 5 of the annexed drawings, I provide a rheostat 81 in the electrical circuit containing the motor 57 and in series therewith, and I also provide a rheostat 82 in the electrical circuit containing the motor 58 and in series therewith, in order that additional resistance may be introduced into the circuit or taken out of the circuit at the will of the operator thereby effecting the variation of the speed of rotation of each of the motors 57 and 58, as desired. To limit the duration of the operation of each of the motors 57 and 58 and, consequently, the duration of rotation of the several discs 21–24 inclusive, I provide in the electrical circuit a timing device, designated generally by the reference numeral 83, across which each of the motors 57 and 58 are connected. As illustrated in Figs. 4 and 6 of the accompanying drawings, the timer 83 includes a clock motor 84 on the shaft 86 of which a cam element 87 is mounted for rotation with the shaft. The cam 87 is so arranged that it engages a pin 88 in the path of its rotation; the pin 88 being fitted into a socket of a lever 89 which is pivotally mounted by means of a pin 91 on a bracket 92 supported adjacent to the shaft 86 of the motor 84. As indicated in Fig. 6 of

the annexed drawings, the lever 89 carries one contact 93 of a pair of breaker-point contacts connected into the electrical circuit; the other contact 93' of which being mounted on a flange 94 of the bracket 92 which, in turn, is pivotally mounted by means of a pivot pin 96 on a frame 97 secured by means of bolts 98 to the motor casing 99, see Fig. 7. The engagement of the cam 87 with pin 88 of lever 89 will effect the pivotal movement of the lever 89 to open the breaker-points 93 and 93' thus opening the circuit to the motors 57 and 58. The pivotal movement of the bracket 92 is limited by means of a pin and slot arrangement including a slot 101 formed in the bracket adjacent one end thereof and a pin 102 which passes through the slot and is fixed to the frame so that as the bracket 92 swings in opposite directions it is limited by the engagement of the end walls of the slot 101 with the fixed pin 102. I also provide in the timer device an adjustable rod 103 which extends out of the side wall of the rear casing section 12 and which is provided with a turning knob 104 for convenient manipulation thereof; the rod 103 bearing against a flange 106 of bracket 92. A spring 107 is associated with the rod 103 and is confined between an extension 108 of the flange 106 of the bracket 92 and a slidable or adjustable stop element 109, as clearly shown in Fig. 6 of the drawings. Turning of the rod 103 in one direction of rotation will urge the bracket 92 in one direction against the influence of the spring 107 and thus limit the pivotal movement of the bracket 92 to a predetermined extent, while turning of the rod 103 in the opposite direction will increase the pivotal movement of the bracket 92 of the timer mechanism and thus vary the position of the pin 88 of lever 89 to regulate the timing cycle. In operation, the motor 84 rotates very slowly so that the cam 87 likewise rotates very slowly and the cam will only engage the pin 88 to effect a breaking of the circuit of the motor 84 when the bracket 92 is held within certain limits of its pivotal movement.

The electrical circuit containing the motors 57 and 58 as well as timer 83 is diagrammatically illustrated in Fig. 5 of the annexed drawings and includes a pair of conductors 111 and 112 leading from a source of 110 volt alternating current, not shown. The circuit includes a main switch 113 for closing and opening the circuit at will and also includes a pair of double pole, double-throw switches 114 and 116 between the timer 83 and each of the motors 57 and 58, respectively, so that reversal of current to the motors 57 and 58 can be made as desired in order to reverse the direction of rotation of the motors. As shown in Figs. 4 and 5, the shafts of the rheostats 81 and 82 are extended through a side wall of the rear casing section 12 and provided with knobs 117 and 118 which, as shown, are fitted to the rheostat shafts 119 and 121, respectively, and which afford means for ready turning of such shafts in order to increase or decrease the resistance in the electrical circuit containing the motors 57 and 58. As shown in Fig. 8, I provide a removal cover 122 for the rear casing section 12 in order that access may be had to the mechanism including gearing and other working parts which are mounted within the section 12.

Whenever it is desired to exercise the ciliary muscles of a patient's eye, the patient is seated in front of the front casing section 11 so that he may view the target constituting the discs 21, 22, 23 and 24 through the opening 14 of the front casing section 11. The main switch 113 of the electrical circuit is then closed to start the motors 57 and 58, as well as the timer mechanism 83 after, of course, the reversing switches 114 and 116 have been closed so that the motors 57 and 58 are rotated in one direction of rotation which, as above described, effects the rotation of the smaller discs 21 and 22 in opposite directions of rotation relative to one another and also effects the rotation of the larger discs 23 and 24 in opposite directions of rotation relative to one another. While not shown in Fig. 5 of the annexed drawings, the illuminating means 17 are

connected to the electrical circuit so that upon the closing of the main switch **113** the illuminating means **17** are energized to flood light rays onto all of the discs of the target. The operator may manipulate the turning knobs **117** and **118** controlling the rheostats **81** and **82** in order to increase or decrease the speed of rotation of the discs **21** to **24** inclusive. If the operator desires the target to move continuously for an indefinite period of time, the knob **104** of the rod **103** can be manipulated to take the small pin **88** of the lever **89** entirely out of the path of the cam **87** which rotates on the shaft **86** of the clock motor **84**, thus eliminating any possibility of interrupting the main electrical circuit and stopping of the motors **57** and **58**. On the other hand, if the operator desires to limit the duration of rotation of the discs of the target, the rod **103** may be moved by turning the knob **104** to a predetermined distance and thus bring the pin **88** of lever **89** into the path of the cam **87** so that the motors **57** and **58** will be stopped after the duration of a predetermined time interval.

In accordance with my present invention, I provide on each of the discs **21–24** inclusive an ocular objective which comprises a uniform pattern, designated generally by the reference numeral **121** on each of the views of Figs. 9–12 inclusive; it being understood that the patterns of the discs may be varied as to different discs and that the patterns may be delineated on the discs by any suitable means, such as by applying the pattern to a transparent disc by means of paint, lacquer, enamel or the like, or the pattern **121** may be formed on the disc by cutting out sections of a disc to define the pattern. Each of the circular discs **21–24** inclusive can be constructed of wood, metal or of a plastic material and the pattern formed thereon or therein may be made by any of the modes suggested. As shown in Figs. 9 and 10, I provide the pattern **121** in each of the smaller diameter discs **21** and **22** by die-cutting segmental sections from each disc to leave segmental disc portions, thus affording alternate solid segments **122** and alternate segmental openings **123**. The segmental disc sections **122** as well as the segmental openings **123** provided in the inner and outer smaller discs **21** and **22** preferably are half-crescent in shape with one terminus of each half-crescent at the center **124** of the disc and with the midpoint of each half-crescent at the periphery of the disc. It is to be observed that the disc segments **122** and the segmental openings **123** of the disc **21** are turned in the opposite direction from the similar portions of disc **22**, i.e., with the curves of the half-crescents oppositely directed.

To the same effect are the ocular objectives or patterns **121** on one of the larger diameter discs **23** which is disposed ahead of the disc **24** in the assembly of discs on the machine. That is to say, the ocular objective **121** on disc **23** is formed by die-cutting out half-crescent shaped segments from the body of the disc to provide a pattern of alternate disc segments **132** and alternate segmental openings **133** with one terminus of each half-crescent segment at the center **134** of the disc and the other terminus of the half-crescent segments adjacent to but beyond the periphery of the disc. In this pattern on disc **23**, the half-crescents are preferably turned in the same direction as the half-crescent segments on the inner smaller disc **22** and, consequently, opposite to the turned directions of the half-crescents of the disc **21**. The larger diameter disc **24** which is at the rear of all of the assembled discs constituting the target, preferably is a solid disc with the ocular objective **121** delineated thereon by means of any suitable paint, lacquer or enamel; the pattern preferably being similar to that of the disc **21** in that the entire area of the front face of the disc is delineated with alternate opaque half-crescent shaped segments **137** and alternate white or light colored half-crescent shaped segments **138** with one terminus of each half-crescent segment at the center **139** of the disc and the other terminus of each half-crescent segment adjacent to but beyond the periphery of the disc.

While not indicated in the drawings specifically, it is to be understood that the segmental portions **122** of the discs **21** and **22** as well as the segmental portions **132** of the disc **23** may be colored with different colored paints or crayons or the like to provide contrasting colors between all of these discs, and the solid half-crescent segments **137** of the larger disc **24** may be colored with an entirely different color than the colored segmental portions of the discs **21–23** inclusive so that a variegated color effect is presented to the eye of the patient viewing the targets during the rotation of the various discs in their different directions of rotations.

In Fig. 13 of the annexed drawings, I have illustrated the assembled discs **21–24** inclusive as these discs are viewed by a patient sitting at the front of front casing section **11** and looking through the opening **14** thereof. As shown in Fig. 13, a patient viewing the assembled discs through the opening **14** of the front section casing **11** will observe a series of changing patterns which cause the eye, in effect, to follow the patterns from the centers of the discs to the peripheries thereof and then back again to the centers of the discs. Since these discs, as described above, can be rotated at various rates of rotation and can be rotated in opposite directions at the will of the operator, it is clear that the ciliary muscles of the eye can be stimulated and strengthened after a series of sittings or after a series of observations of these moving patterns on discs **21–24** inclusive constituting the target of the machine. Accordingly, I have provided as a basic principle of my present improvement for the instantaneous and automatic control of the directional movement of a multiple number of separated ocular objectives of predetermined patterns thereby affording combined eyesight stimulation.

It is to be understood that the appended claims are to be accorded a range of equivalents commensurate in scope with the advance made over the prior art.

I claim:

1. An eye stimulator comprising a target consisting of a first pair of smaller diameter discs and a second pair of larger diameter discs, an ocular objective on each of said discs, means for mounting said discs in linearly-spaced relation on a common axis, and means for rotating each pair of said discs independently of one another and at different speeds.

2. An eye stimulator comprising a target consisting of a first pair of smaller diameter discs and a second pair of larger diameter discs, an ocular pattern on one of said first pair of smaller discs comprising a plurality of half-crescent shaped segments with one terminus of each half-crescent shaped segments at the center of said disc, an ocular pattern on the other of said first pair of smaller discs consisting of a plurality of half-crescent shaped segments with one terminus of said half-crescent shaped segments at the center of said other disc; said pattern on said other of said first pair of discs being oppositely directed than the pattern on said first named smaller diameter disc, and an ocular pattern on one of said second pair of larger diameter discs consisting of a plurality of half-crescent shaped segments having one terminus of each of said segments at the center of said disc.

3. An eye stimulator as defined in claim 2, and including means delineated on the other of said second pair of larger discs defining a pattern of half-crescent shaped segments with the terminus of each of said segments at the center of said other of said second pair of larger discs; said pattern on said other of said second pair of larger diameter discs being oppositely directed from the pattern on said first named disc of said second pair of larger discs.

4. An eye stimulator as defined in claim 2, and including means for mounting said discs in linearly-spaced relation on a common axis, and means for rotating each

pair of said discs independently of one another and at different speeds.

5. An eye stimulator as defined in claim 3, and including means for mounting said discs in linearly-spaced relation on a common axis, and means for rotating each pair of said discs independently of one another and at different speeds.

6. An eye stimulator as defined in claim 2, and including means for mounting said discs in linearly-spaced relation on a common axis, means for rotating each pair of said discs independently of one another and at different speeds, and means for limiting the time duration of rotation of each pair of said pairs of discs to a predetermined time interval.

7. An eye stimulator as defined in claim 3, and including means for mounting said discs in linearly-spaced relation on a common axis, means for rotating each pair of said discs independently of one another and at different speeds, and means for limiting the time duration of rotation of each pair of said pairs of discs to a predetermined time interval.

8. An eye stimulator comprising a target consisting of a plurality of pairs of rotatable discs all mounted on a common axis and each containing a different ocular objective, means for rotating said discs in pairs in both directions of rotation, means for rotating one disc of each of said pairs in a predetermined direction of rotation, and means for rotating the other disc of each of said pairs in a direction of rotation opposite to said predetermined direction of rotation.

9. An eye stimulator as defined in claim 8, and means for limiting the time duration of rotation of each of said pairs of discs to a predetermined time interval.

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