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MEANS FOR EXERCISING THE OCULAR MUSCLES

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2 Sheets-Sheet 1

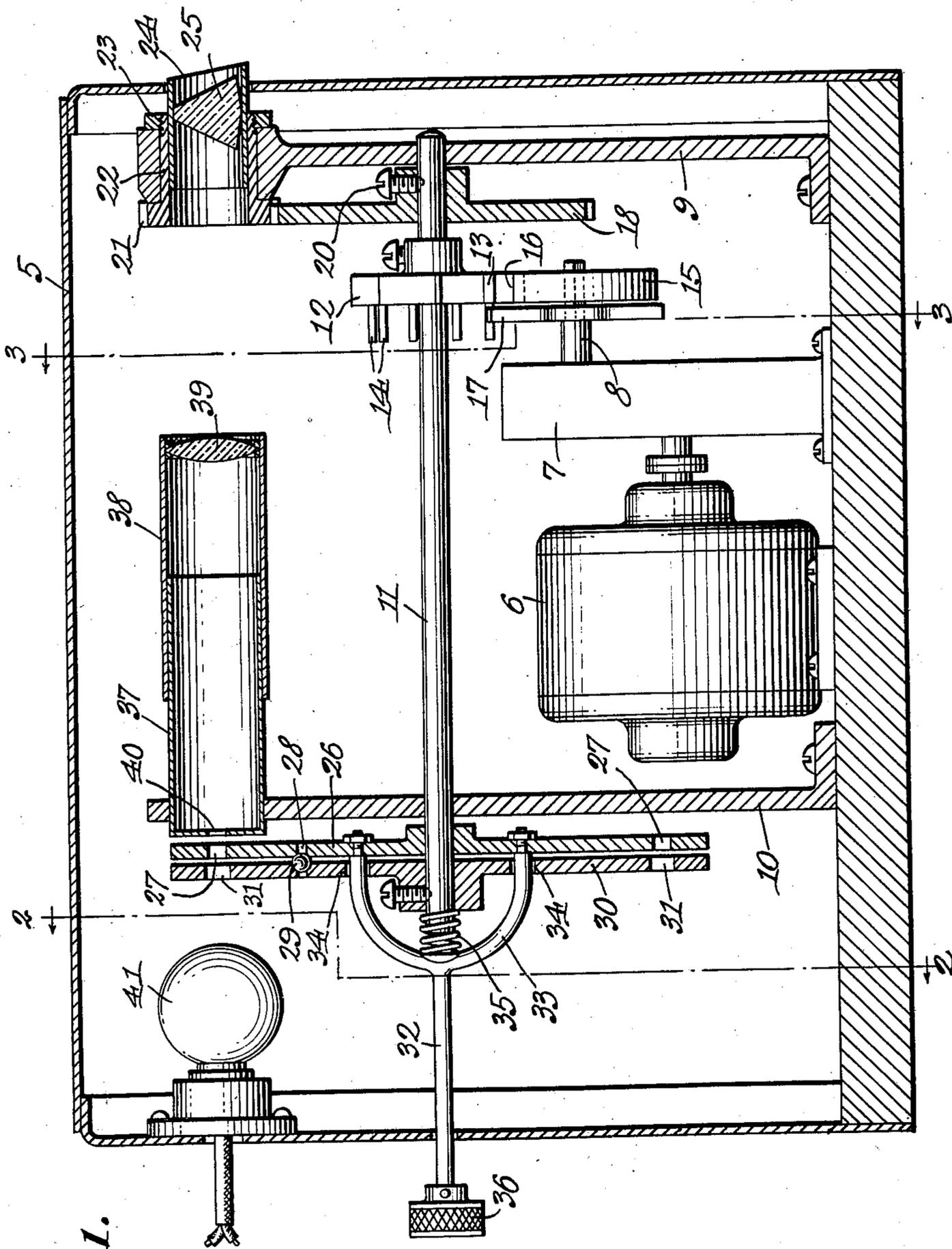


Fig. 1.

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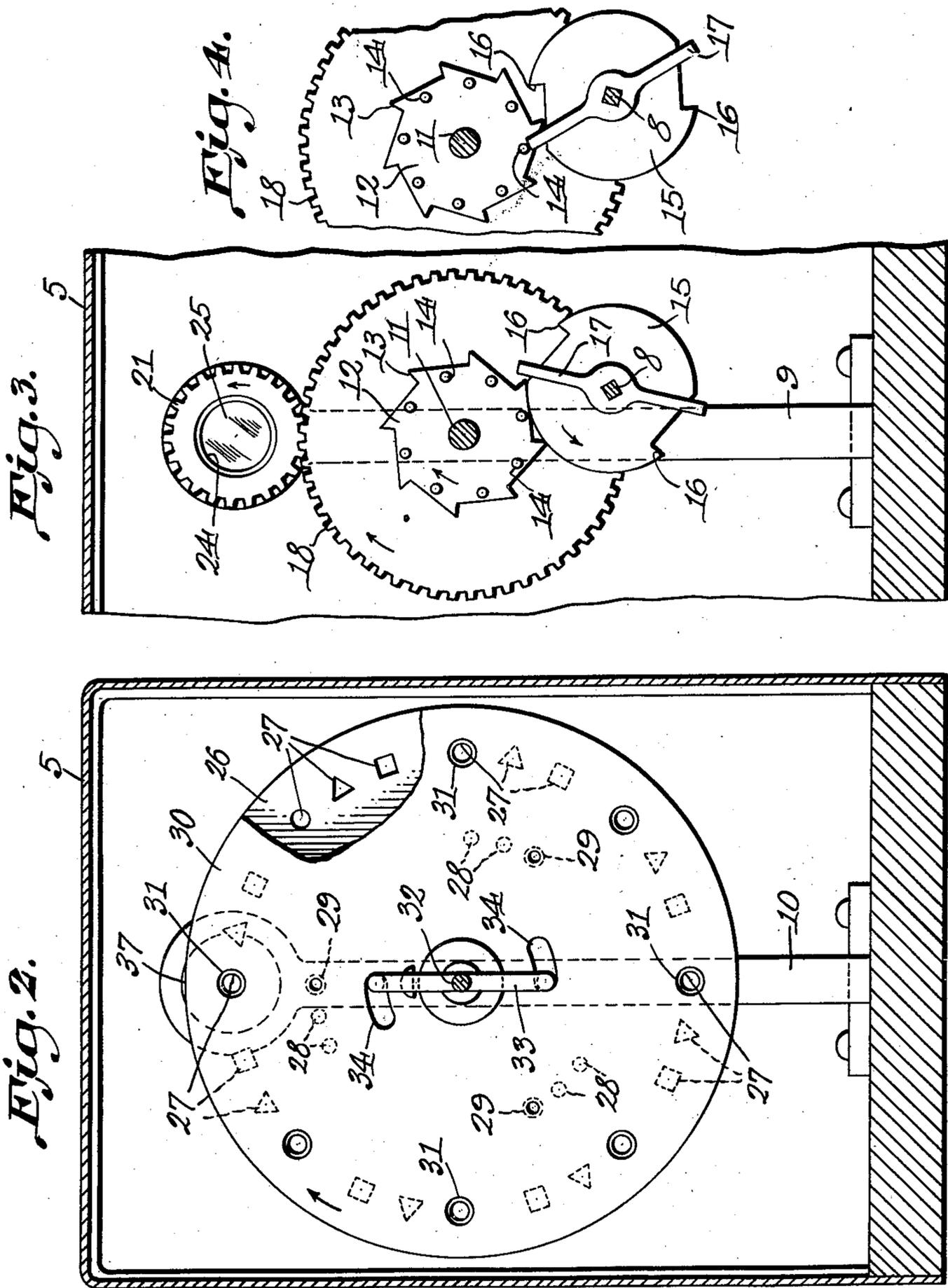
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# UNITED STATES PATENT OFFICE

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## MEANS FOR EXERCISING THE OCULAR MUSCLES

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3 Claims. (Cl. 88—20)

This invention relates to a device designed primarily for use by optometrists, the primary object of the invention being to provide means to assist a patient in exercising and developing the ocular muscles, whereby the extrinsic or ciliary muscles are stimulated resulting in perfect muscular balance and rectification of defective vision.

An important object of the invention is to provide a device of this character which will project light rays onto a screen, in the form of an object having a definite contour, means being provided whereby the object projected by the device and viewed by the patient will have an intermittent movement, causing the patient's eyes to move in a similar manner in following the movements of the object.

Another object of the invention is the provision of an exercising device for exercising the muscles of the eye, which when used by the patient will result in a constant contraction and relaxation of the eye muscles, eliminating constant strain caused when a patient views an evenly and regularly moving object.

With the foregoing and other objects in view, which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed, may be made within the scope of what is claimed without departing from the spirit of the invention.

Referring to the drawings:

Figure 1 is a longitudinal sectional view through a device constructed in accordance with the invention.

Figure 2 is a sectional view taken on line 2—2 of Figure 1.

Figure 3 is a sectional view taken on line 3—3 of Figure 1.

Figure 4 is a fragmental detail view illustrating the relation of the teeth of the operating gear and teeth of the gear cooperating with the operating gear.

Referring to the drawings in detail, the device comprises a cabinet or body portion indicated generally by the reference character 5. Supported within the cabinet is a motor indicated by the reference character 6, which motor transmits motion to the reduction gears operating within the gear housing 7 transmitting movement to the shaft 8.

Secured within the cabinet 5, are uprights 9 and 10, which are formed with bearing openings to accommodate the main shaft 11 to which the

gear 12 is secured. This gear 12 is formed with teeth 13, disposed in the periphery thereof, and also has laterally extended pins 14 disposed at points intermediate the teeth, for purposes to be hereinafter more fully described.

Secured on the shaft 8, is a gear 15 which is formed with teeth 16 disposed directly opposite to each other, as clearly shown by Figure 4 of the drawings. An arm indicated by the reference character 17, is also secured on the shaft 8, to rotate therewith, the arm 17 being of a length so that the ends thereof extend slightly beyond the periphery of the gear 15. This arm is so arranged with respect to the teeth 16 that the ends of the arm will contact with the pins 14, prior to the engagement of the teeth 16 with the teeth 13, so that as the shaft 8 is rotated, an intermittent movement will be transmitted to the shaft 11.

The reference character 18 designates a gear that is mounted on the shaft 11, and secured to the shaft by means of the set screw 20, the gear being in mesh with the gear 21 formed on the inner end of the hollow shaft 22, which hollow shaft is mounted in a bearing opening formed in the upper end of the upright 9. One end of the hollow shaft 22 is threaded to receive the ring 23, that holds the hollow shaft in its bearing.

Mounted within the hollow shaft 22, to move therewith, is a projector tube 24 in which the lens 25 is mounted, the lens being in the form of a prism, so that as light rays are projected through the lens, the point of focus of the prism on a screen, not shown, will be varied, with each rotation of the projector tube.

The shaft 11 provides a support for the disc 26, which is loosely mounted thereon, the disc being provided with sets of openings 27, the openings of each set being of various shapes or designs, to meet the requirements of usage.

Openings 28 are also formed in the disc 26, and are adapted to accommodate the ball 29, held within an opening formed in the disc 30 which is also secured to the shaft 11, so that movement of the shaft 11 and disc 30, will result in relative movement of the disc 26.

Openings 31 are formed in the disc 30, and are so disposed that the openings 31 will fall opposite to certain of the openings of the disc 26. Extending through an opening in the rear wall of the cabinet 5 is a setting shaft 32, which has a substantially U-shaped end 33 that extends through openings formed in the disc 26, the U-shaped end 33 also extending through curved openings 34 of the disc 30, so that by rotating shaft 32, the disc 26 may be moved with respect to the disc 30.

The reference character 35 designates a spring that bears against the U-shaped end of the shaft 32, normally urging the shaft 32 outwardly, and drawing the discs close together so that a frictional contact between the discs and ball 29, will be insured. In order that the shaft 32 may be readily operated, a nurlled head 36 is formed on one end of the shaft, to be gripped by the fingers of the operator, when it is desired to set the device.

At the upper end of the upright 10 are telescoping tubes 37 and 38 respectively, the tube 37 being held within an opening formed in the upright, as clearly shown by Figure 1. The tube 38 provides a support for the lens 39, which is mounted within the outer end thereof. Thus it will be seen that due to this construction, the tube 38 may be moved longitudinally of the tube 37, in order to focus the lens 39.

The inner end of the tube 37 is formed with an opening 40 through which the light rays from the lamp 41 are projected, when the device is in operation.

The operation of the device is as follows:

A screen, not shown, is, of course, used with the projecting device, and the outline of an object, which is projected on the screen, is viewed by the patient under treatment.

The disc 30 is adjusted so that the openings thereof will fall opposite to certain openings of the disc 26, whereupon the motor 6 is rotated. Rotary movement of the motor is transmitted to the gear 12 intermittently, as described, causing a rotary, but intermittent movement of the shaft 11.

It follows that with each rotary movement of the shaft 11, openings of the discs 26 and 30 are moved to positions intercepting the light rays passing from the lamp 41, with the result that the light rays will be projected through the projector tube 24 and prism-like lens 25, mounted therein.

Due to the construction of the lens 25, it will be obvious that the focus point of the lens will be moved constantly and intermittently, causing a jerky movement of the patient's eyes in following movements of the projected object.

It might be further stated that intermittent movement is transmitted to the projector tube 24, through the gear 18 that meshes with gear 21, that in turn rotates the projector tube 24.

After the patient has viewed this particular design or object, the operator may, by rotating shaft 32, move the disc 26 to bring openings of a different shape, before the openings of the disc 30, so that a change in the design of the object projected is made.

When the arm 17, as shown by Figure 4, engages pin 14 and moves the gear 12, discs 26 and 30 are also moved slightly, bringing the openings thereof out of the path of light rays, leaving the screen entirely dark. The patient's eyes will now relax. As the gear continues to rotate, a tooth 16 en-

gages one of the teeth 13 moving the discs 26 and 30 to their open positions, whereby the light image is shown on the screen, in another position.

As the eyes focus on the new image, the eye muscles will automatically contract, thereby insuring constant contraction and relaxation of the eye muscles, in viewing the image projected by the device.

Having thus described the invention, what I claim is:

1. A device for the exercise of the ocular muscles, comprising a cabinet, a rotatable projector tube mounted within the cabinet, a prism-shaped lens within the projector tube, a power shaft mounted within the cabinet, a disk having a plurality of spaced circular openings secured to the shaft, a disk loosely mounted on the shaft adjacent to the first-mentioned shaft and having a plurality of openings of various shapes, adapted to be brought into registry with the openings of the first-mentioned disk, means for urging the disks towards each other, means for normally preventing rotary movement of one disk with respect to the adjacent disk, means for projecting light rays through the registering openings and prism-shaped lens of the projector tube, and means for rotating the shaft.

2. A device for the exercise of the ocular muscles, comprising a cabinet, a rotatable projector tube, a prism-shaped lens mounted within the cabinet, a pair of disks of equal dimensions, mounted on one end of the shaft and arranged face to face, one of the disks having a plurality of openings of various shapes, the adjacent disks having a plurality of circular openings, means for adjusting one disk with respect to the other disk, whereby the openings of one disk register with predetermined openings of the adjacent disk, means for holding the disks in their positions of adjustment, means for directing light rays through registering openings of the disks, and means for rotating the shaft, disks and projector tubes simultaneously and at predetermined intervals.

3. A device for the exercise of the ocular muscles, comprising a cabinet, a projector tube mounted for rotary movement within the cabinet, a prism-shaped lens mounted in the projector tube, a horizontal shaft in the cabinet, a disk on one end of the shaft and having spaced openings, another disk on the shaft and arranged adjacent to the first-mentioned shaft and having openings of various shapes, means for adjusting the second-mentioned disk with respect to the first-mentioned disk whereby certain openings of the disks are brought into registry, means for projecting light rays through the registering openings and projector tube, and means for rotating the shaft intermittently whereby the disks and projector tube are rotated intermittently.

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