

No. 770,645.

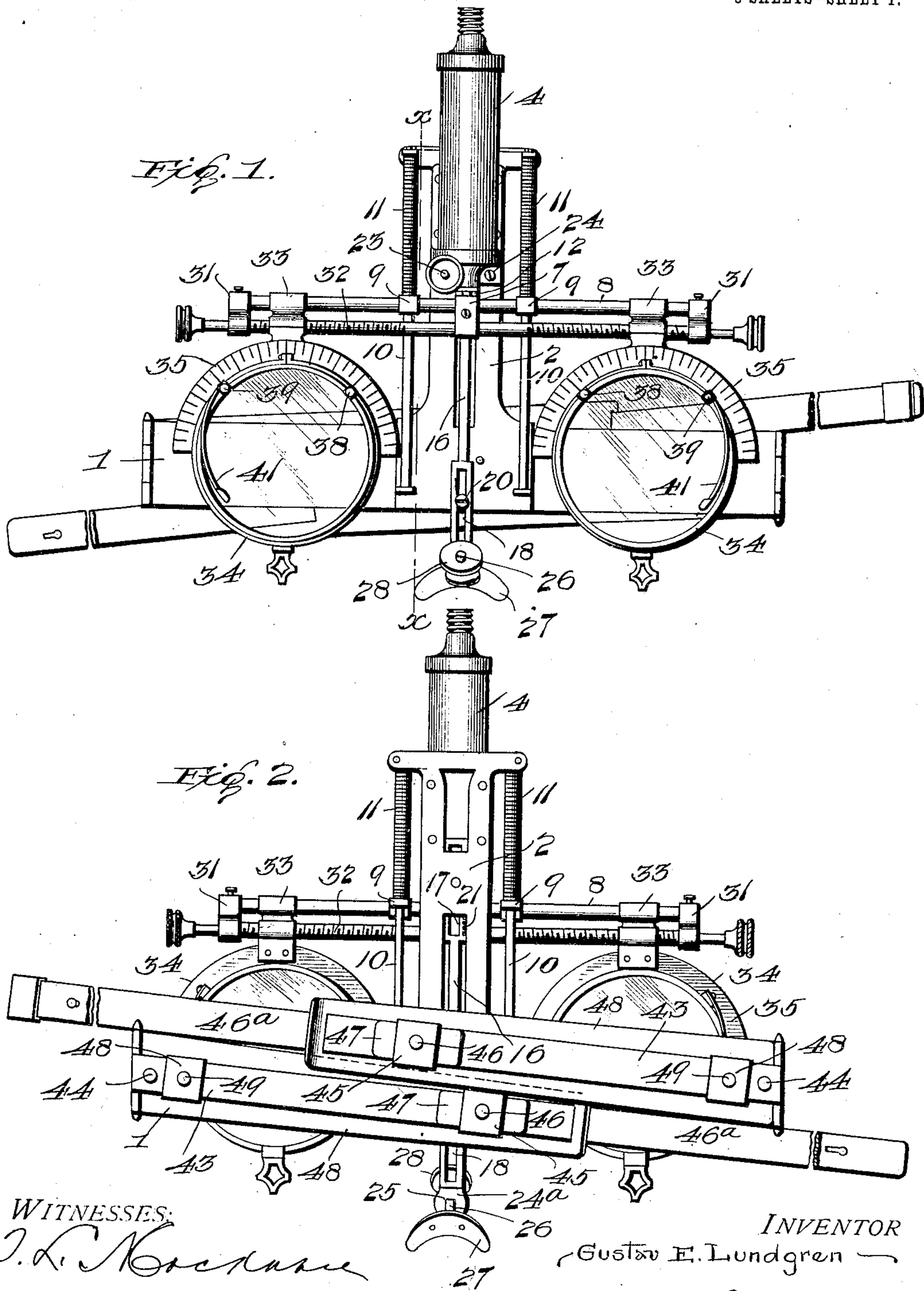
PATENTED SEPT. 20, 1904.

G. E. LUNDGREN.
PNEUMATIC EYE EXERCISER AND TESTER.

APPLICATION FILED MAY 21, 1904.

NO MODEL.

3 SHEETS—SHEET 1.



WITNESSES:
J. L. Kockman
E. L. Rowzee

INVENTOR
Gustav E. Lundgren

BY *Edwin Bros.*
Attorneys

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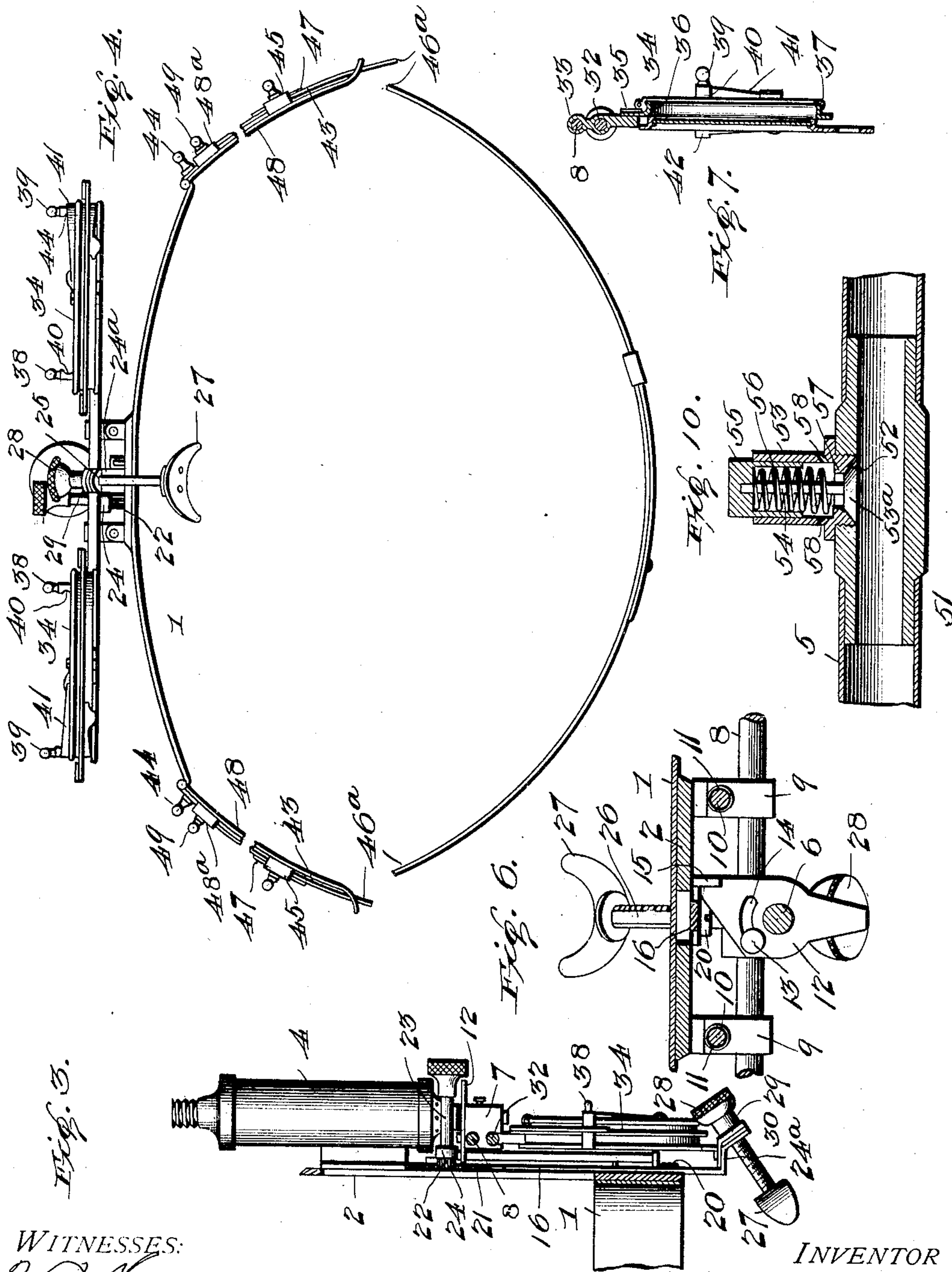
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3 SHEETS—SHEET 2.



WITNESSES:
H. K. Kordane
C. L. Rowzer

INVENTOR
Gustav E. Lundgren
BY *Edron Bros.*
Attorneys

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3 SHEETS—SHEET 3.

Fig. 5.

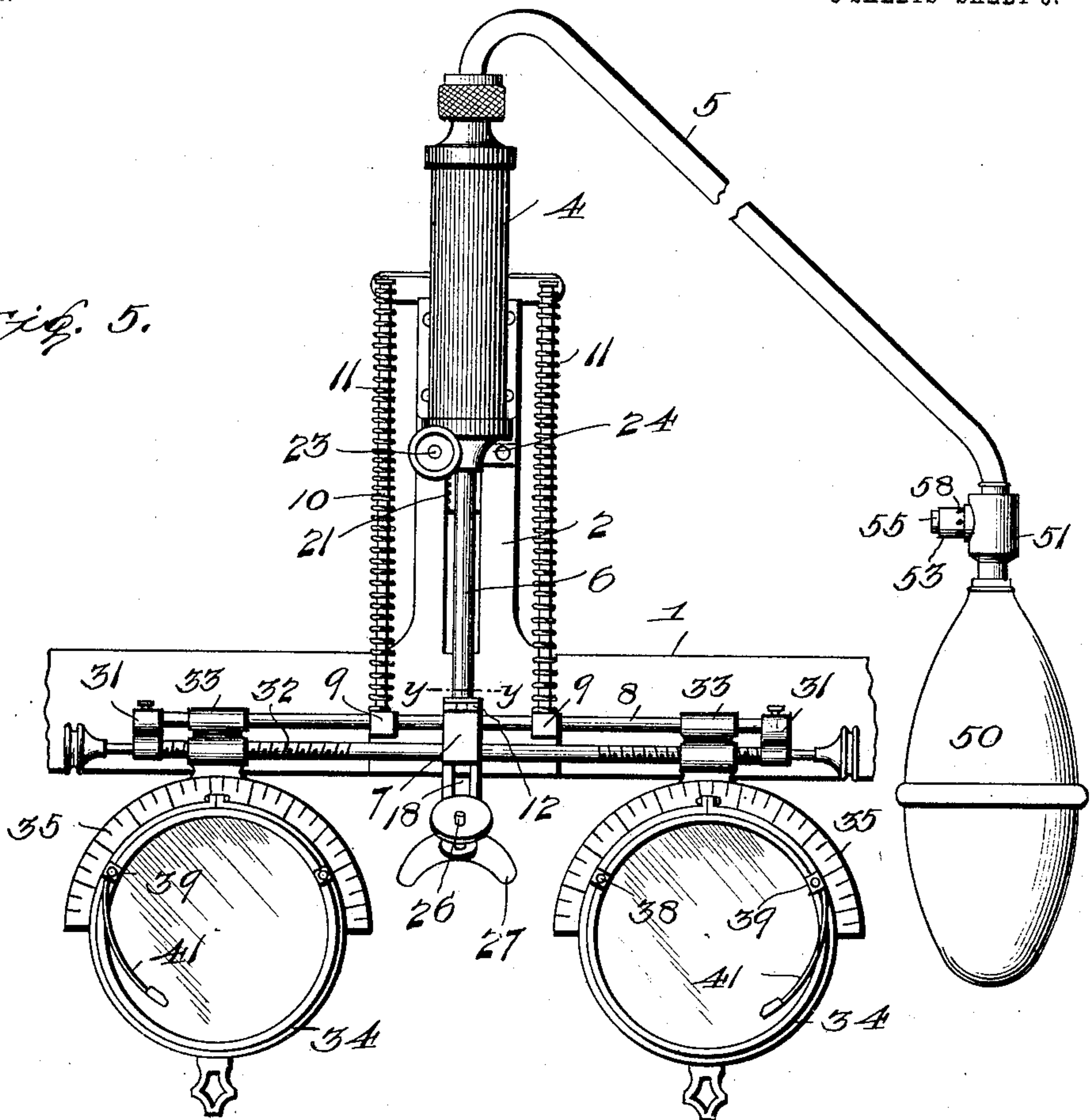


Fig. 8.

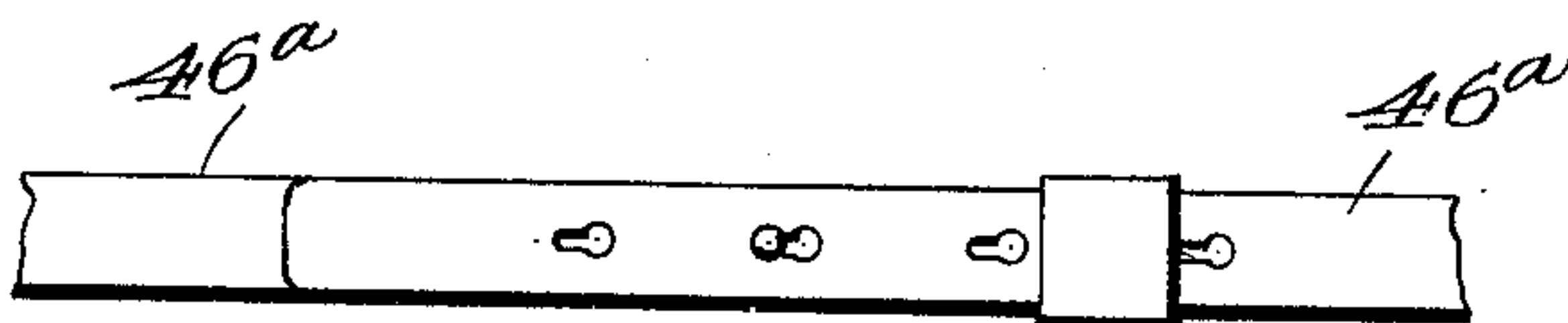
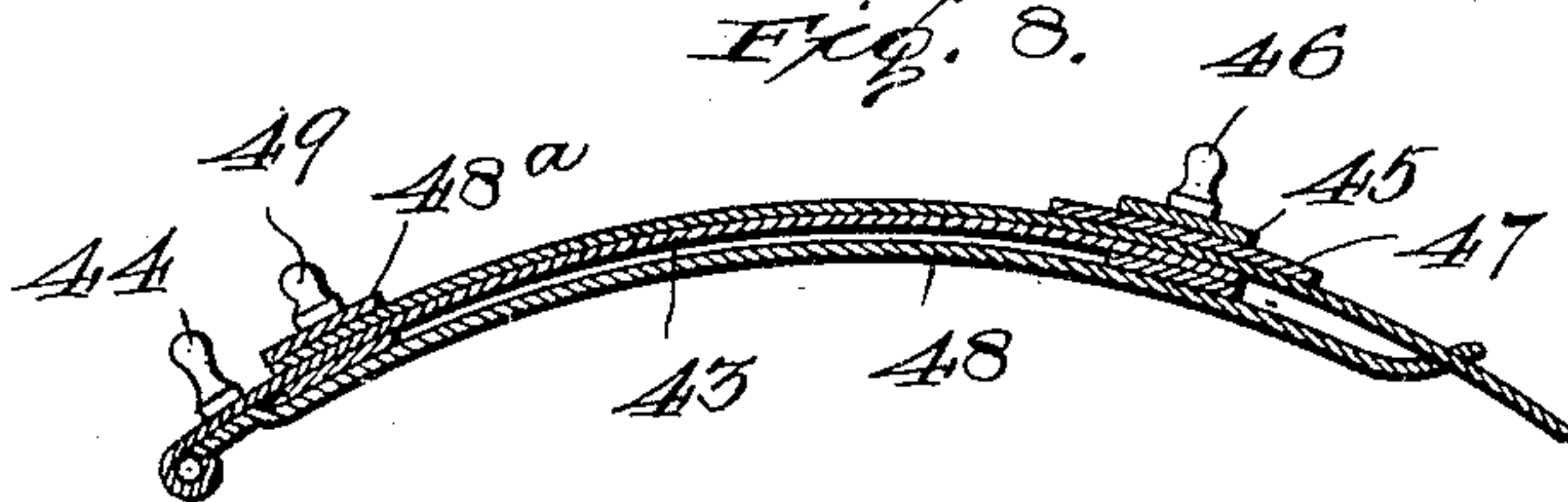


Fig. 9.

WITNESSES:
J. L. Mochamer
E. L. Rowzee

INVENTOR
—Gustav E. Lundgren—

BY *Edwin Brophy*
Attorneys

UNITED STATES PATENT OFFICE.

GUSTAV E. LUNDGREN, OF ELGIN, ILLINOIS.

PNEUMATIC EYE EXERCISER AND TESTER.

SPECIFICATION forming part of Letters Patent No. 770,645, dated September 20, 1904.

Application filed May 21, 1904. Serial No. 209,107. (No model.)

To all whom it may concern:

Be it known that I, GUSTAV E. LUNDGREN, a citizen of the United States, residing at Elgin, in the county of Kane and State of Illinois, have invented certain new and useful Improvements in Pneumatic Eye Exercisers and Testers; 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 improvements in frames for testing the eyes and exercising the muscles thereof.

It has for its object, among others, to provide a frame of extreme lightness and adapted to be accurately adjusted to fit the nose, eyes, and head and in which the lens-holders are adapted to be conveyed from before the eyes to change the lenses, said holders adapted to be operated in bringing them to and from a position in front of the eyes automatically without bringing the hands near the face.

To this end the invention consists of a frame comprising a flexible metal forehead-piece having adjustable bows attached thereto at each end and extending back, adapted to be connected behind the head, an upright rigid bar or plate extending upward from said forehead-piece and carrying a cylinder provided with a piston having its rod connected to a frame carrying the lens-holders, and a vertically and horizontally adjustable nose-piece carried by said rigid plate.

The invention also consists of means for operating said piston and lens-holders, comprising, preferably, a tube and air-pressure bulb having an improved valve for inflating the same, and means for securing the lens-holder-carrying frame in position before the eyes and means for automatically withdrawing the same.

In the accompanying drawings, illustrating the preferred embodiment of my invention, Figure 1 is a front elevation of the frame with the tube detached, the temple folded, and lens-holder raised. Fig. 2 is a rear view thereof. Fig. 3 is a vertical sectional view taken on line *x x* of Fig. 1. Fig. 4 is a plan view looking upward with the temples extended and their

ends connected. Fig. 5 is a front elevation with lens-holders depressed and secured in position with the tube and bulb attached. Fig. 6 is a broken sectional view on line *y y* of Fig. 5, showing the arrangement of the catch for securing the lens-holders in their depressed position. Fig. 7 is a central vertical sectional view of one of the lens-holders. Fig. 8 is a broken longitudinal sectional view of one of the temples with its end broken away. Fig. 9 is a broken view of the ends of the temples connected, and Fig. 10 is a broken central sectional view taken longitudinally of an inlet carried by the bulb.

Referring more particularly to the drawings, the frame is composed of a flexible forehead-piece 1, preferably of light metal, and an upright rigid piece 2, secured about midway of said forehead-piece and extending upward therefrom. Secured to the upper end of the piece 2 by means of a bracket 3 is a piston-cylinder 4, preferably provided with screw-threaded connections for the tube 5. The piston-rod 6 has a bracket 7 adjustably secured near its end, said bracket carrying a rod 8, extending horizontally therefrom in both directions and to which the lens-holders are slidably mounted. Said rod 8 also has brackets 9, adapted to work up and down on vertically-arranged rods 10, carried by said upright piece 2, and around which are wound coiled springs 11, having their upper ends secured to the upper brackets or supports of said rods 10 and their lower ends fastened to said brackets 9, whereby the rod 8, with the lens-holders, are normally held in a raised position above the eyes about opposite the forehead-piece, while the piston-rod is recovered within the cylinder, so that the piston is located at the upper end of said cylinder.

A catch-lever 12 is pivoted around the piston-rod against the face of the bracket 7, to which it is secured by means of a screw 13, passing through an arcuate slot 14 in said lever, whereby the latter may be turned, so that it will engage a lug 15, secured to the upright piece 2 near its base to hold said piston-rod in an extended position with the lens-holders opposite the eyes.

Arranged about centrally and longitudinally of the face of the upright piece 2 is a strip 16, having upper and lower slots 17 18 working on screws 19 20. One edge of this strip is provided with a rack-surface 21, which is engaged by a pinion 22 on the end of a short standard 23, arranged in a bracket 24, carried by said upright piece 2, said standard having a suitable milled knob at its upper end for operating the same. The lower end of said strip is bent outwardly and downwardly, as at 24, and is provided with an angular aperture 25, through which passes a screw-threaded shank 26, having its opposite sides flattened, and a nose-piece 27 secured to its extremity. A milled nut 28 is adapted to operate said shank, and is held in position against the end of the strip 16 by means of a small angular piece 29, passing around and over a flange 30 on said nut. By means of this nut and shank and the sliding strip 16 the nose-piece can be accurately adjusted to fit any nose. The angle of said shank is such that the nose-piece is in line with the line of the nose.

Reverting to the horizontal rod 8, downwardly-extending brackets or arms 31 are secured to each end thereof. The lower ends of these arms are provided with passages for a second rod 32, parallel to the rod 8 and having portions thereof within said arms screw-threaded with right and left hand threads, respectively. Mounted to slide on the rod 8 and having screw-threaded passages engaging the threaded portions of the rod 32 the brackets 33 extend downwardly and support the lens-holders 34. Said lens-holders by means of the right and left hand threads on the rod 32, which engage the supporting-bracket, are simultaneously adjustable toward or away from each other, as is common. Said lens-holders are preferably formed of a back plate 35, having an extending flange around its upper portion, which may be graduated, as shown, to show the axis of the cylinder of the lens and has a forwardly-projecting rim 36, preferably with its outer surface rounded or convex to receive the correspondingly-concaved ring 37, which has adjusting finger-pieces 38 39, interiorly grooved, as at 40, to retain the lenses. The finger-piece 39 has an ordinary spring-retainer 41 secured thereto. A similar spring-retainer may be secured to the back of the plate 35, which may also be provided with interiorly-grooved posts 42, whereby a lens may be adjusted in a predetermined position in the rear of the holder, while prism or other lens may be adjusted to the ring 37 and turned with said ring with relation to the plate 35 in testing the eyes.

In Figs. 8 and 9 I have illustrated my form of adjustable temples or bows, which are preferably made of flexible metal, like the forehead-piece. Each bow comprises a strip 43, hinged at one end to one end of the forehead-piece and having a finger-piece or post 44

fixed thereto and its other end carrying a loop-piece 45, also having a post 46 and a plate 47 fastened to the inner face of said loop-piece. A somewhat wider plate 48 is secured to the strip 43 at the hinge and extends past the loop-piece 45, where it is slitted and turned outward, leaving a passage-way for a strip 46, preferably of the same width as the strip 43, extending through the loop-piece 44 below the plate 46 and carrying at its inner end a loop-piece 48, having a post 49 and passing around the strip 43. By this means it will be seen that by pressing the post 49 and either of the posts 44 or 46 together with the thumb and finger the strip 46 can be readily projected or withdrawn with relation to the plate 48, whereby the bows can be adjusted to fit the patient's head. The outer extremities of the strips 46 pass around behind the head and are adapted to be adjustably connected in any suitable manner—as, for example, as shown in Fig. 9.

In Fig. 10 I have shown a sectional view of my improved valve for use in connection with the air-pressure bulb 50. Said valve is arranged in a short section of tube 51, adapted to be inserted between the bulb and the tube 51, extending to the piston-cylinder. A thimble 53 screws into an opening in the tube 51, its inner edge being beveled, as at 52, to seat the head 53 of the piston-valve proper. From said head a rod 54 connects with the button 55, fitting within the outer end of said thimble upon a coiled spring 56, which abuts against an inner flange 57 of said thimble, which is provided with perforations 58, through which when said button is pressed opening the valve air passes to inflate the bulb.

I am aware that changes may be made in the construction of parts of my invention without departing from the spirit or sacrificing the advantages thereof. I therefore reserve the right to make such changes as fairly fall within the scope of my invention.

My device is particularly desirable and convenient for testing and exercising eyes of children and nervous people, as it permits of an absolute accuracy in adjustment to the face, the ease in operating the same, and avoids any danger of disturbing the adjustment when exercising weak muscles of the eyes. It also may be successfully used in the practice of retinoscopy, &c.

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

1. In a device of the character described, a frame, lens-holders carried by said frame, and means for passing said holders before the eyes and automatically withdrawing them to a position in front of the forehead.

2. In a device of the character described, a frame, lens-holders carried by said frame, and pneumatic means for automatically passing said holders before the eyes and withdrawing them to a position in front of the forehead.

3. In a device of the character described, a frame, a piston-cylinder mounted on said frame, lens-holders secured to the piston-rod, and means for actuating the piston to pass said

5 holders before the eyes.

4. In a device of the character described, a frame, a piston-cylinder mounted on said frame, lens-holders secured to the piston-rod, means for actuating the piston to pass said

10 lens-holders before the eyes and means for automatically withdrawing them.

5. In a device of the character described, a frame comprising a forehead-piece and an upright piece secured thereto carrying a piston-cylinder, lens-holders attached to the piston-rod and means for actuating the piston to pass the lens-holders before the eyes.

6. In a device of the character described, a frame, lens-holders carried by said frame, means for automatically passing said holders before the eyes, means for securing holders in that position and means for automatically withdrawing them.

7. In a device of the character described, a frame comprising, a forehead-piece and an upright piece secured thereto, a piston-cylinder mounted on said upright piece, lens-holders attached to the piston-rod, means for actuating the piston to depress said lens-holders to bring them before the eyes, a pin secured to said upright piece near its base and a latch pivoted on said piston-rod and adapted to engage said pin to retain said lens-holders in their depressed position.

8. In a device of the character described, a frame comprising a forehead-piece and an upright piece secured thereto, a piston-cylinder mounted on said upright piece, lens-holders attached to the piston-rod, means for actuating the piston to depress said lens-holders to bring them before the eyes, a pin secured to said upright piece near its base and a latch pivoted on said piston-rod and adapted to engage said pin to retain said lens-holders in their depressed position and means for automatically withdrawing said lens-holders when said latch is released.

9. In a device of the character described, a frame comprising a forehead-piece carrying bows adapted to be secured at the back of the head, an upright piece secured centrally of said forehead-piece, a piston-cylinder fixed to said upright piece, lens-holders secured to the piston-rod, and means for actuating said piston to depress said lens-holders to bring them before the eyes.

10. In a device of the character described, a frame comprising a forehead-piece and an upright piece secured to said forehead-piece, a piston-cylinder fixed to said upright piece, a rod attached to the piston-rod and carrying lens-holders, an upright rod carried by said upright piece, a spring coiled around said upright rod, said lens-holder-carrying rod having a bracket adapted to work upon said up-

right rod and to which said coiled spring is attached, whereby the lens-holders are normally held above the eyes, and means for actuating the piston to pass the lens-holders before the eyes.

11. In a device of the character described, a frame comprising a forehead-piece and an upright piece secured to said forehead-piece, a piston-cylinder fixed to said upright piece, a rod attached to the piston-rod and carrying lens-holders, upright rods, one arranged on each side of said piston-cylinder carried by said upright piece, springs coiled around said upright rods, said lens-holder-carrying rod having brackets adapted to work upon said upright rods and to which said coiled springs are attached, whereby the lens-holders are normally held above the eyes, and means for actuating the piston to pass the lens-holders before the eyes.

12. In a device of the character described, the combination of a frame comprising a forehead-piece and an upright piece secured thereto, a rod carrying a nose-piece and adapted to slide on retaining-pins on said upright piece, said rod having a rack on one of its edges, a short standard carrying a pinion engaging said rack and a nut whereby said rod may be actuated to adjust said nose-piece.

13. In a device of the character described, the combination of a frame comprising a forehead-piece and an upright piece secured thereto, a rod adapted to slide on the retaining-pins on said upright piece, said rod having a rack on one edge, a pinion engaging said rack, means for operating said pinion to raise and lower said rod, a screw-threaded shank having its opposite sides flattened passing through an angular opening in the lower end of said rod and carrying a nose-piece on its inner end, a screw-threaded nut adapted to operate said shank to adjust it laterally with relation to said forehead-piece, and a bracket secured to said rod to retain said nut.

14. In a device of the character described, a lens-holder comprising a fixed back plate having a forwardly-extending rim having its outer surface rounded or convex and a ring having a correspondingly dished or concave surface fitting on said flange and adapted to revolve thereon, said ring having means for retaining a lens in connection therewith.

15. In a device of the character described, a lens-holder comprising a fixed back plate having an extending graduated flange and a forwardly-extending convex flange, a concave ring fitting upon, and adapted to revolve with relation to, said convex flange, means carried by said back plate to retain a lens behind the same and means carried by said ring for retaining a lens in connection therewith.

16. In a device of the character described, a frame having a forehead-piece of flexible material, bows, one adjustably attached to each end of said forehead-piece, also of flexible ma-

terial, said bows having means for adjustably connecting their extremities to each other.

17. In a device of the character described, the combination with a forehead-piece of a
5 bow attached thereto at one end, said bow comprising a plate having its outer end slotted and turned outwardly, a strip passing through said slot and carrying at its inner end a loop-piece slidably connected to a strip fixed to said
10 plate, said fixed strip having posts at each end thereof, and said loop-piece also carrying a

post whereby said strip may be adjusted by pressing together the post carried by the loop-piece and either of the posts carried by said fixed strip.

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

GUSTAV E. LUNDGREN.

Witnesses:

ALBERT A. HASSELQUIST,
HUGO S. HASSELQUIST.