

No. 619,002.

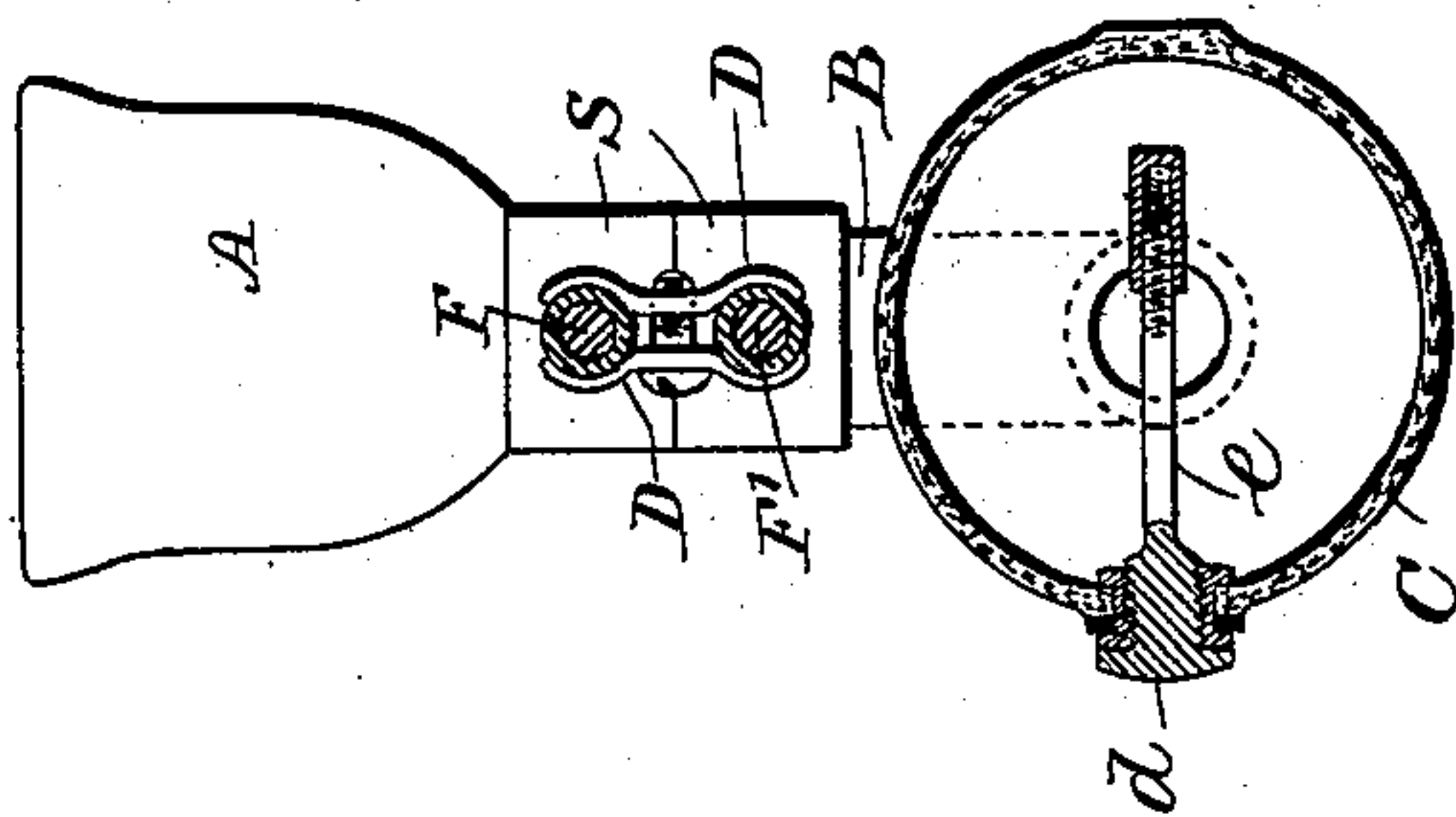
Patented Feb. 7, 1899.

B. F. STEPHENS.  
EYE CUP.

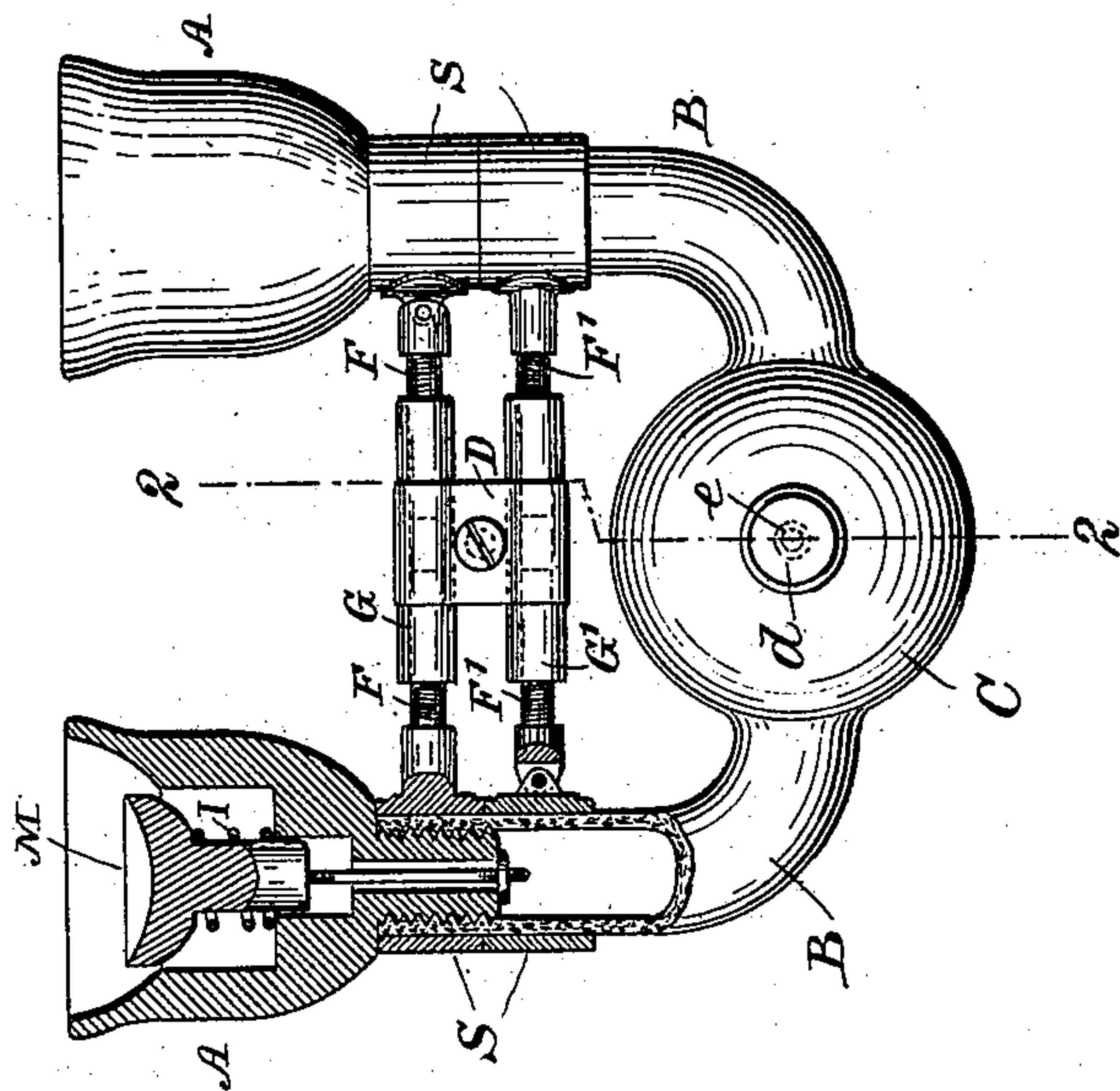
(Application filed Jan. 6, 1898.)

(No Model.)

*Fig. 2.*



*Fig. 1.*



Witnesses

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# UNITED STATES PATENT OFFICE.

BENJAMIN F. STEPHENS, OF NEW YORK, N. Y.

## EYE-CUP.

SPECIFICATION forming part of Letters Patent No. 619,002, dated February 7, 1899.

Application filed January 6, 1898. Serial No. 665,785. (No model.)

*To all whom it may concern:*

Be it known that I, BENJAMIN F. STEPHENS, a citizen of the United States, residing at New York, (Brooklyn,) in the county of Kings and State of New York, have invented a Device for Improving Eyesight, of which the following is a specification.

Cups have heretofore been applied to the eyes for exercising the same and giving to the eye-ball a proper shape for rectifying myopia and for rendering the vision of the two eyes equal or for lessening the effect of age upon the eye; but where a single cup is made use of with the aforesaid objects in view one eye may be acted upon more than the other, especially when applied by an inexperienced individual, and the pressure produced by atmospheric action may be varied by the appliance upon the two eyes.

In Letters Patent No. 72,108, granted to me December 10, 1867, two eye-cups are represented with an air-ball connected to them for obtaining uniformity of atmospheric action; but no provision was made for varying the axial lines of the cups to adapt them to different pupillary distances.

The present invention is made with reference to adjusting the relative axial lines of the cups and holding them in the desired relative positions in order that the instrument may be adjusted by an optician or other intelligent person to suit the eyes of the party that is to apply the same to himself, and the two cups can be held with the axes parallel and at the desired distance apart or with the axes converging or diverging, so as to regulate the action of the cups on the eyes according to the particular defect in the sight that is to be cured, and the axes of the cups may be in the same plane or in different planes and secured in their relative positions.

In addition to the foregoing the suction appliance is regulated so that the party using the same cannot obtain too great pressure, and hence the risk of injury is lessened, and a concave myopic mold is applied within the cup to act over the crystalline lens and cornea and aid in giving to the same the proper shape to rectify the particular defect in the sight.

In the drawings, Figure 1 is a side eleva-

tion, partially in section, of the present improvement. Fig. 2 is a cross-section at the line 2 2.

The cups A are of suitable material, preferably smooth and rigid and of celluloid, ivory, or similar material, and the diameter of the cup approximates the diameter of the eye-ball and the internal concave configuration is to correspond with the desired shape of the eye-balls to which the instrument is to be applied.

Each cup is made with a tubular stem to pass into a flexible tube or branch B, extending from the air-ball C, and these branches B are to be sufficiently long to allow the movements hereinafter described to be given to the respective eye-cups, and the bands S, preferably of metal, around the ends of the flexible tubes and the tubular portions of the eye-cups secure the tubular branches and eye-cups together, and they also receive the ends of the adjusting devices that extend from one cup to the other. These adjusting devices are made with reference to varying the distance between the axes of the eye-cups for maintaining said axes parallel to each other or diverging or converging and for holding the axes in the same plane or in different planes, the object being to adjust the distance that the tubes are apart and accommodate the pupillary distance between the eyes and to cause the cups to bear equally all around the eyeball, or to bear more adjacent to the nose or against the outer portions of the eyes when the axes diverge or converge, and when it is desired to apply more pressure below one eye than below the other the axes of the cups are swung out of the same plane and held in that position.

With the foregoing objects in view adjustable connections are made between the bands S, consisting of screws and nuts and clamping devices. I have represented and prefer to employ the screws F F', projecting from the bands S toward each other, and the tubular nuts G G', receiving such screws, and when the screws are right and left handed the rotation of the tubular nut in one direction will draw the eye-cups toward each other, and the reverse when the nut is rotated in the other direction, and by making use of two tubular nuts and right and left hand



screws the axial distance apart of the cups can be regulated, and also the axes can be held parallel to each other or caused to converge or diverge; and it is desirable after the oculist has set the cups for the proper action upon the eyes that the tubular nuts G G' should be held rigid, so that they cannot be accidentally moved, and with this object in view a suitable clamp can be employed, as represented at D, to grasp the two tubular nuts and hold them firmly. The clamp represented is composed of two pieces of sheet metal or similar material, with transverse recesses that are nearly semicircular at the respective ends, so as to grasp and hold the tubular nuts G and G' when the parts of the clamp are forced together by a screw. Ordinarily the axial lines of the cups will be in the same plane, and hence they will be applied horizontally, or nearly so, in front of the eyes and in the usual line of vision; but should it be desired to incline the axial lines of the cups one upward and the other downward the clamp D, if made of metal, may be bent so as to hold the parts in the desired positions.

The bulb C, which connects the flexible branches B, is to be manipulated by hand, so as to give more or less air-pressure in holding the cups to the eyelids, and I find that where a bag is employed, as in my aforesaid patent, the extent of atmospheric pressure cannot be easily regulated, because the bag becomes distorted in shape. I therefore make the air-ball C approximately spherical, the branches B passing out from the same, and in order to prevent too much atmospheric pressure being applied I introduce a limiting-rod *e* within the ball, extending from the press-button *d* toward the other side of the ball, so that the party using the same will only be able to give a definite movement to the press-buttons, and, consequently, a predetermined suction or minus pressure of the cups upon the eyeballs, and it is advantageous to make this limiting-rod removable and provide a screw-cap at the inner end in order that the effective length of the limiting-rod may be varied.

It is frequently advantageous to apply a pressure to the crystalline lens and cornea to aid in bringing the same into the proper convex shape, and with this object in view a concave myopic mold M is introduced into one or both of the cups, such mold having the proper concave surface at the bottom of the cup and a stem extending down into the tubular portion of the cup, there being a spring I around the stem of the myopic mold, tending to project such mold at the base of the cup, and a head or nut upon the stem of the mold prevents the same becoming detached.

When this instrument is applied to the eyes, the party using the same has simply to press upon the air-ball and rest the edges of the cups against the closed eyelids and over the eyeball, and by relieving the pressure upon the air-ball the suction action will cause the

cups to set closely against the eyeball and hold the same in the shape of the cup, and in so doing the muscles surrounding the eyeball will be acted upon more or less by the edges and inner surfaces of the cups, and according to the position of such edge the pressure will tend to rectify any unequal action of such muscles, and the myopic mold pressing upon the eyelid will tend to produce the proper convexity of the crystalline lens and cornea.

By the present improvement an exercise is given to the eyes, tending to strengthen them and at the same time lessen or remove defects in the sight, and the instrument is adapted to being properly adjusted by the oculist or other intelligent person from time to time, so that the patient in applying the same to his own eyes will effect the desired operations.

In eye instruments heretofore made in which there is a cup and a spring-button within the cup the spring-button does not form a continuation of the curvature of the bottom of the cup when pressed against the eye and it is liable to slip to one side or the other of the cup.

In the present invention, the surface of the mold being a concave continuation of the concave bottom of the cup when pressed against the eye and sliding within the cylindrical recess in the bottom of the cup, there is no risk of lateral displacement and there is only a gentle pressure from the spring I, acting in addition to the minus atmospheric action to press the cup upon the eye.

I claim as my invention—

1. The combination with the two eye-cups and their tubes, of an expansible air-ball and two flexible branches extending out from the air-ball, one at each side thereof, and having quarter-circle bends for connecting the air-ball with the tubular stems of the eye-cups, substantially as set forth.

2. The combination with the air-ball and its flexible tubular branches, of two eye-cups, one attached to each of the tubular branches and adjusting and holding devices applied between the bases of the eye-cups for adjusting and holding the same at the proper distances apart and with the axial lines of the cups parallel or diverging, substantially as set forth.

3. The combination with the two eye-cups, the air-ball and the flexible tubular connections, of a limiting-stop within the air-ball for regulating the extent of compression which the ball may receive, substantially as set forth.

4. The combination with the two eye-cups, the air-ball and the flexible tubular connections, of a limiting-stop within the air-ball for regulating the extent of compression which the ball may receive, and means for adjusting the length of the limiting-stop, substantially as set forth.

5. The combination with the eye-cups, air-ball and tubular branches from the air-ball to the eye-cups, of screws and tubular nuts



for adjusting the axial distances apart of the eye-cups, substantially as set forth.

5 6. The combination with the eye-cups, the air-ball and the flexible branches extending from the air-ball to the eye-cups, of bands surrounding the tubular bases of the eye-cups, screws connected with the same, tubular nuts extending across from one screw to the other for varying the distances between  
10 the eye-cups and their relative positions, substantially as set forth.

15 7. The combination with the eye-cups, the air-ball and flexible connections, of bands around the bases of the eye-cups, pairs of screws connected with such bands and two tubular nuts for adjusting the distances apart of the eye-cups and a clamp for preventing

the tubular nuts being revolved after the instrument has been adjusted, substantially as set forth.

20 8. The eye instrument having an air-ball and a cup with a cylindrical recess in the center of the concave bottom in combination with a mold fitted to slide in the said recess and having a concave surface corresponding to  
25 the concavity of the interior of the eye-cup, and a spring for pressing the mold forward, substantially as specified.

Signed by me this 5th day of January, 1898.

BENJ. F. STEPHENS.

Witnesses:

GEO. T. PINCKNEY,  
S. T. HAVILAND.