(No Model.) 4 Sheets—Sheet 1.

B. GREEN.

COIN OPERATED OPTOMETER.

No. 416,599. Patented Dec. 3, 1889.

FIG: 1.

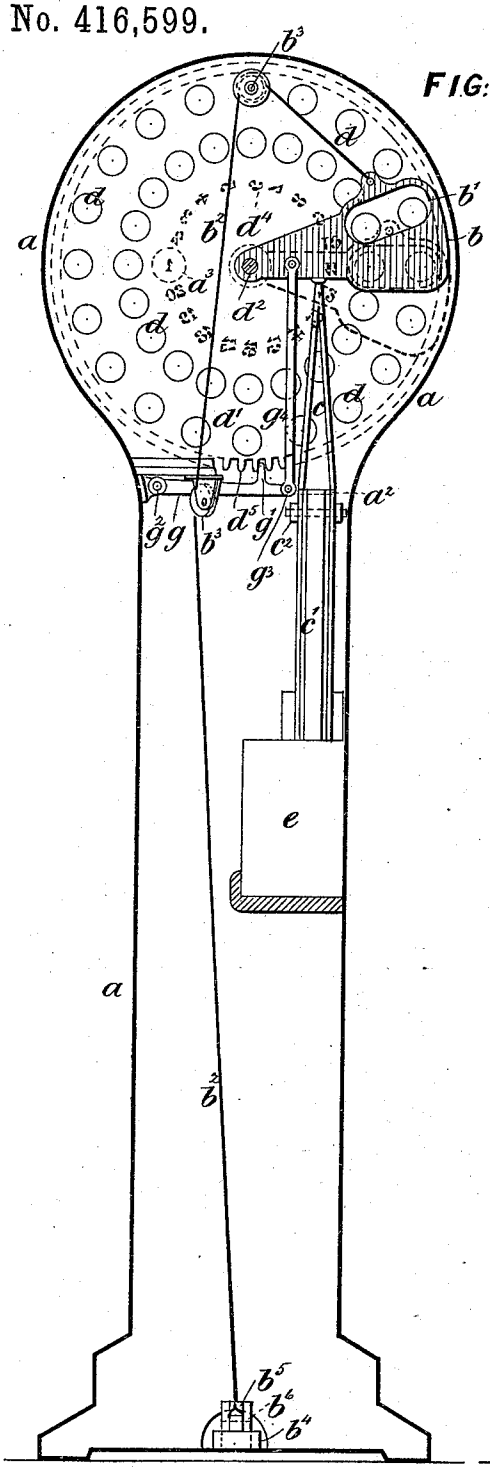
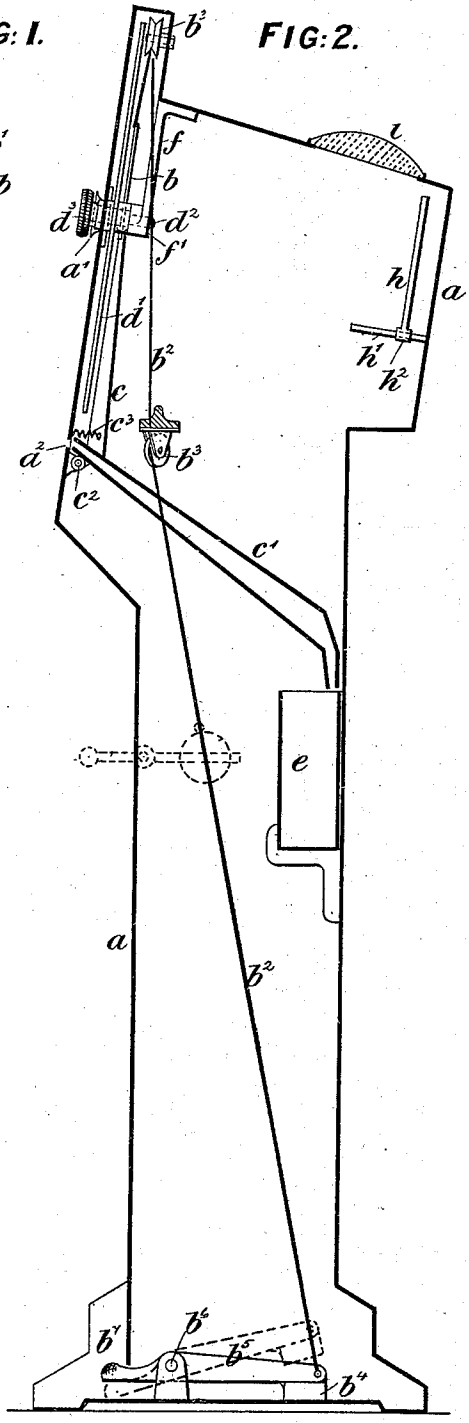


FIG: 2.



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(No Model.) 4 Sheets—Sheet 2.

B. GREEN.

COIN OPERATED OPTOMETER.

No. 416,599. Patented Dec. 3, 1889.

FIG: 3.

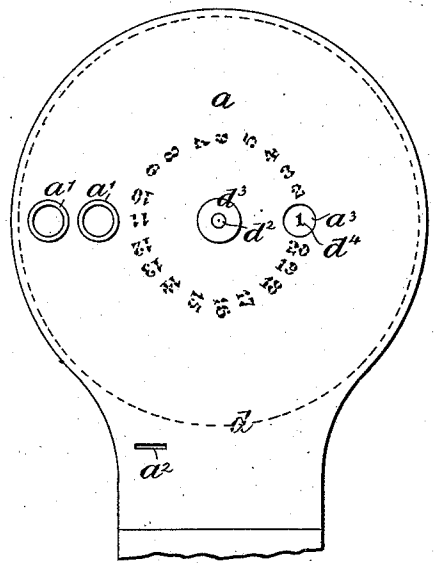


FIG: 4.

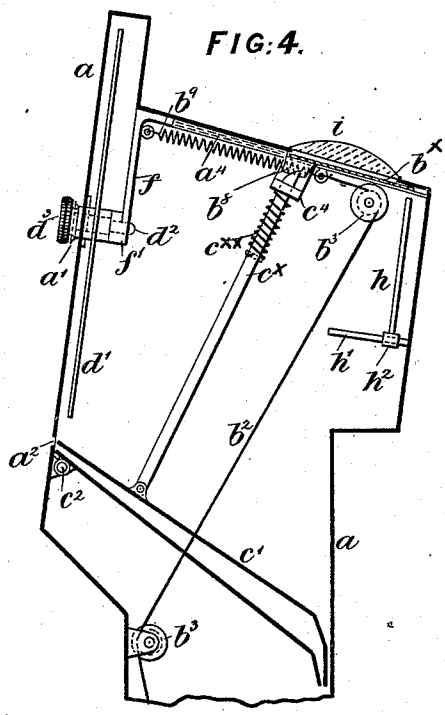
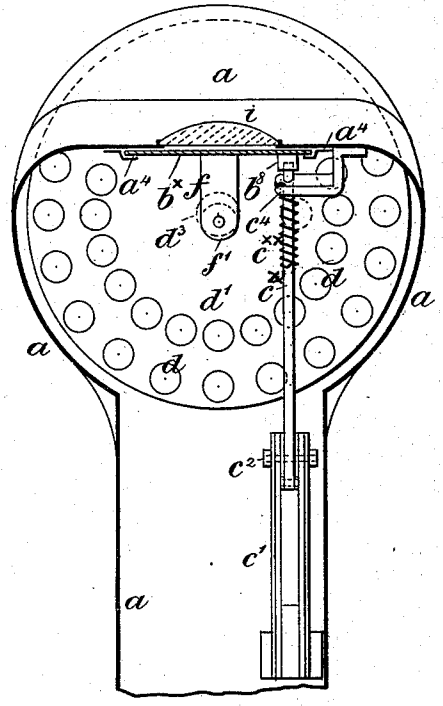


FIG: 5.



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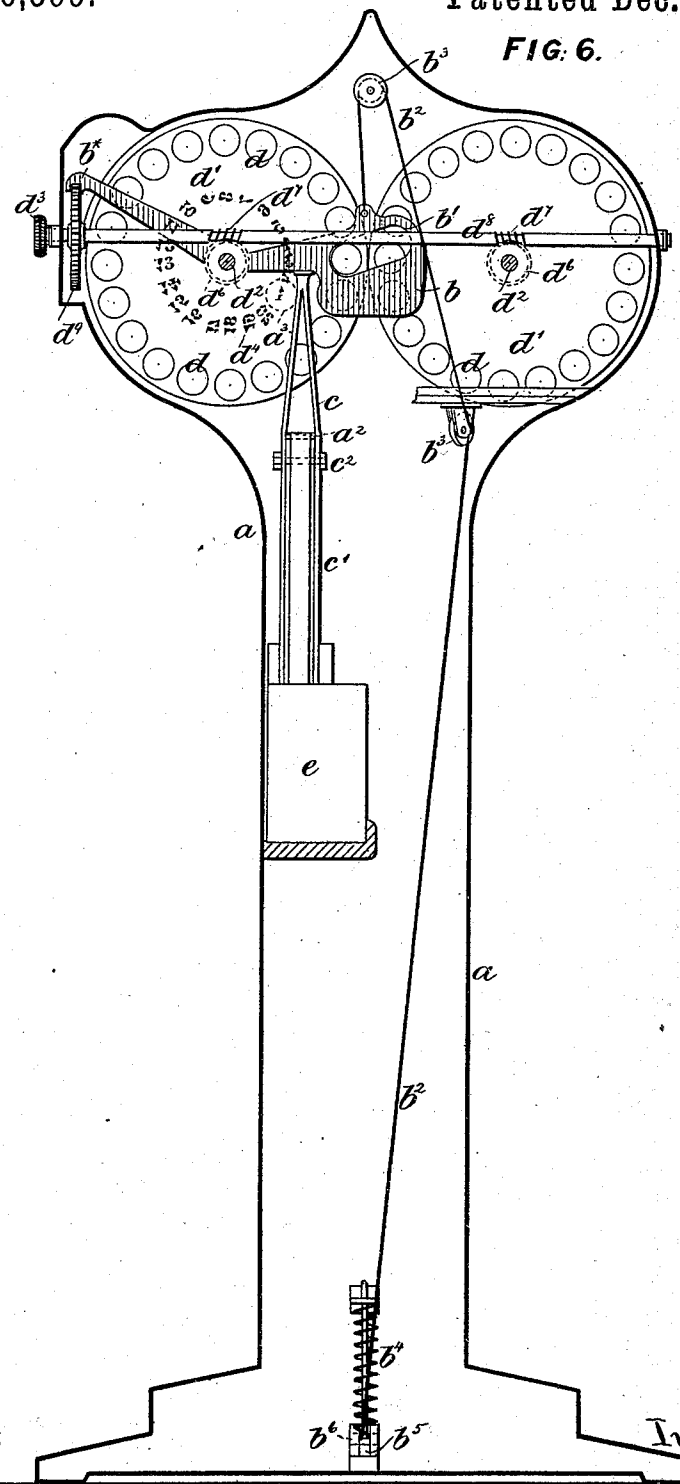
(No Model.) 4 Sheets—Sheet 3.

B. GREEN.

COIN OPERATED OPTOMETER.

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FIG. 6.



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(No Model.) 4 Sheets—Sheet 4.

B. GREEN.

COIN OPERATED OPTOMETER.

No. 416,599. Patented Dec. 3, 1889.

FIG. 7.

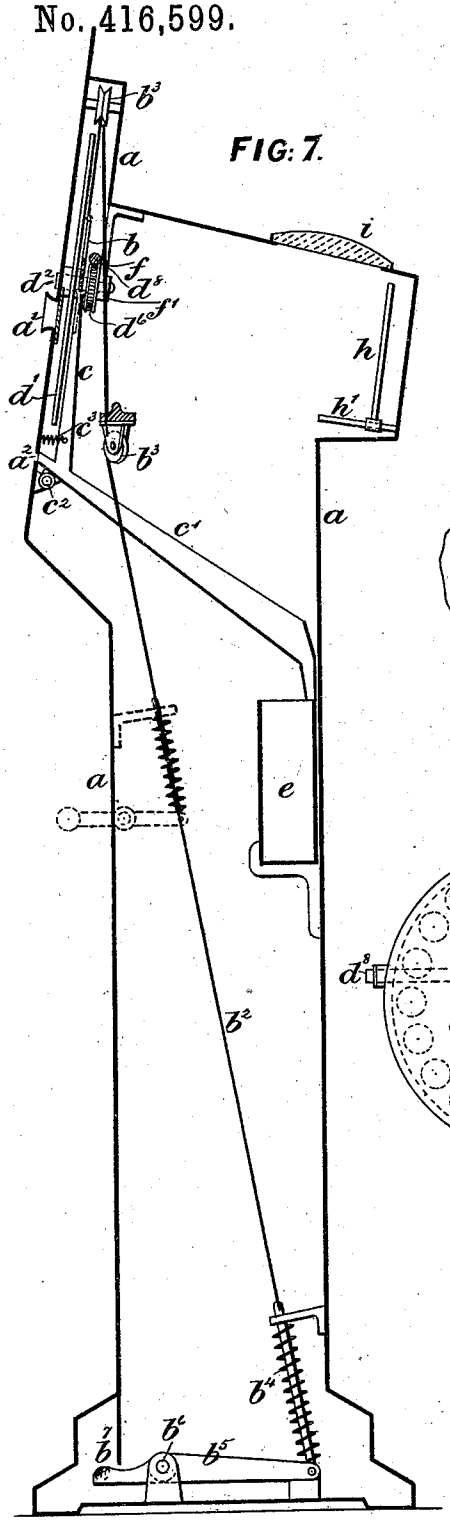


FIG. 9.

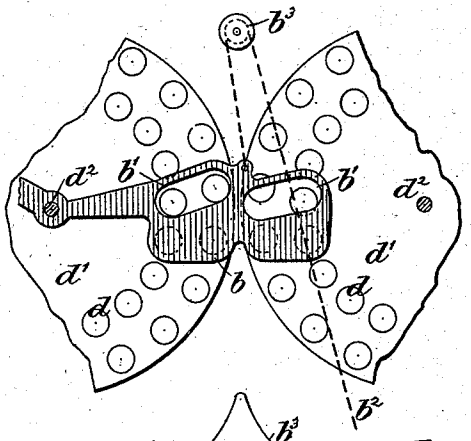
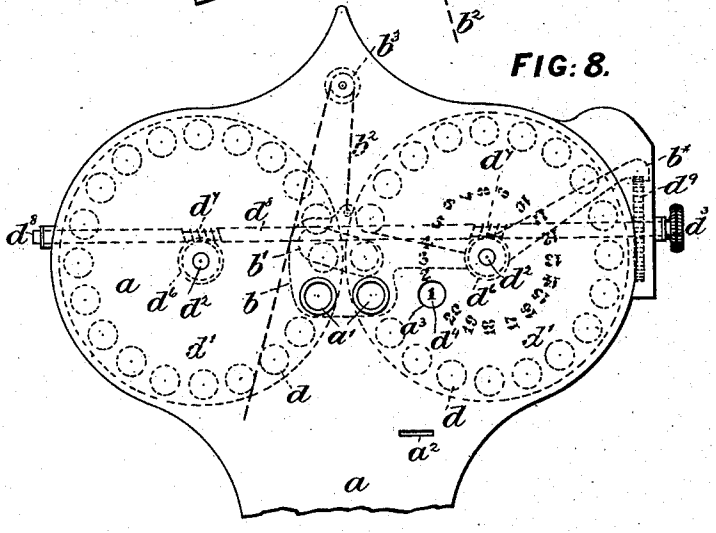


FIG. 8.



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UNITED STATES PATENT OFFICE.

BRUCE GREEN, OF HIGH HOLBORN, COUNTY OF MIDDLESEX, ENGLAND.

COIN-OPERATED OPTOMETER.

SPECIFICATION forming part of Letters Patent No. 416,599, dated December 3, 1889.

Application filed February 21, 1889. Serial No. 300,696. (No model.)

To all whom it may concern:

Be it known that I, BRUCE GREEN, optician, a subject of the Queen of Great Britain, residing at No. 326 High Holborn, in the county of Middlesex, England, have invented new and useful Improvements in or Connected with Sight-Testing Apparatus, of which the following is a specification.

This invention relates to certain improvements in sight-testing apparatus; and it has for its objects whereby a person by depositing a coin of a given denomination in the apparatus may cause the internal devices to be operated thereby to enable the operator to uncover any of a series of lenses and to adjust the same with reference to a suitable object in the apparatus, by the aid of which he can test the strength of his sight and ascertain the power or focus of the glasses or lenses best suited thereto.

In the drawings, Figure 1 is a sectional rear elevation of a sight-testing apparatus constructed according to my invention and provided with a number of movable lenses. Fig. 2 is a vertical transverse section, and Fig. 3 is a front elevation, of part thereof. Fig. 4 is a vertical section of part of a similar instrument of modified construction, and Fig. 5 is a sectional rear elevation thereof. Fig. 6 is a sectional rear elevation of an instrument similar to that represented at Figs. 1, 2, and 3, but of more symmetrical and convenient arrangement. Fig. 7 is a vertical transverse section, and Fig. 8 is a front elevation, of part thereof. Fig. 9 is a sectional rear elevation of parts of an apparatus similar to that represented at Figs. 6 and 7.

In the several figures of the drawings like parts are indicated by similar letters of reference.

Referring to Figs. 1, 2, and 3, a represents the case of the apparatus, which is provided with two glazed apertures in the upper part of the front thereof fitted with eye-pieces a', through which the printed matter or other object h may be seen.

b is a shutter or plate, which may be provided with an aperture b', and is hinged or loosely mounted upon a spindle d^2 at the other end, and this shutter or plate b is so arranged that when in its normal or closed position it will intersect the line of sight between the eye-pieces a' and the printed matter or other object h, such as is ordinarily employed for testing the sight.

The shutter or plate b is, through a flexible connection b^2, passing over guide-pulleys b^3, normally held in its closed or raised position by means of a weight b^4 (or it might be a spring, as represented at Figs. 6 and 7) upon one end of a pedal-lever b^5, mounted upon an axis of motion b^6, and the other end of which lever is provided with a foot-plate or pedal b^7.

The shutter or plate b is normally held locked in its closed or raised position by means of a spring catch or support c, which is fixed to and actuated by a tubular lever or guide c', mounted upon a center of motion c^2, carried by the front of the case a, and held in its normal position by means of a spring c^3. One end of this tubular lever c' is open to the slot a^2, provided for the insertion of the coin in the front of the case a, and the other end thereof is open too, and so formed as to guide the coin into the money-box e.

Upon a person standing on or depressing the pedal b^7, the weight b^4 will be thereby raised, (or the spring compressed,) leaving the shutter b solely retained in its raised or closed position by the spring catch or support c. The influence of the weight or spring b^4 being now removed, the shutter b is subject to the influence of a lesser (its own) weight or, it might be, a spring which tends to remove it from the line of sight, so that a coin inserted into the slot a^2 and guided along the tubular lever c' to the money-box e, will, through the lever c', act upon the spring catch or support c and remove it from beneath the shutter b, which is thereby released, and by its own gravity or, it might be, by the influence of a spring, immediately moves away from the line of sight from the eye-pieces a' to the objective printing, thus giving access to the apparatus. The coin having now passed from the tubular lever c' into the money-box e, the spring c^3 will act to return the lever c' and catch or support c to their normal position until the catch or support c is arrested by the side of the shutter or plate b, and upon the person stepping off the pedal b^7 the more

powerful weight (or spring) b^4 will be freed and, overcoming the weaker one, (the weight of the shutter b,) will bring back the shutter b to its normal or closed position, allowing the catch or support c to take up its normal position beneath the shutter b, and thereby locking it until another coin is inserted into the slot a^2.

In lieu of the pedal b^7, I may, if desired, employ a handle-bar to act upon the lever b^5, as shown by the dotted lines in Figs. 2 and 7.

The lenses d, employed for ascertaining the strength of the sight, are carried by a disk d', which is fixed upon a spindle d^2, one end of which passes through and is supported by the front of the case a and the other end of which is supported with capability of revolution in a bearing f', carried by a bracket f from the case a.

The lenses d are mounted in apertures formed in the disk d' in such manner that a number of pairs of lenses d are arranged radially around the spindle d^2 and the front of such spindle, which projects through the case a, is provided with a milled button d^3, (or, it might be, with an arrangement similar to that represented at Figs. 6 and 7,) so that the disk may be revolved, bringing the several pairs of lenses one by one into alignment with the eye-pieces a' until one of a strength suitable to the eyesight of the person operating the instrument is brought into position.

The strength of each lens d, as it arrives in position for use, is indicated by a corresponding number or, it might be, any other symbol, and such numbers d^4 are arranged in a circle upon the disk d', so that each number is in turn brought into position to be visible through an aperture a^3 in the front of the case a; or the lenses d and numbers might be mounted upon or carried by arms radiating from the spindle d^2 or upon a frame carried thereby.

In lieu of or in addition to locking the shutter, as hereinbefore described, I sometimes lock the disk d' or spindle d^2 as an additional security against fraud. For this purpose, according to the arrangement shown at Fig. 1, I provide the disk d' at its periphery with a ring of teeth d^5, and, acting in connection with such ring, I employ a tooth or projection g', carried by a bar or lever g, which is at one end hinged at g^2 to the case a, and at the other end pin-jointed at g^3 to one end of a link or connecting-rod g^4, the other end of which is pin-jointed to the shutter b, so that the movements thereof are imparted to the lever g and tooth or projection g', thus locking the disk d' and spindle d^2 against revolution when the shutter b is raised or closed.

The objective printing or other test is arranged upon a screen h, which is carried with capability of adjustment upon a bar h', in order that the distance thereof from the lenses may be regulated to a given standard.

The necessary light to the instrument is admitted through the glass panel i, provided at the upper part or sides of the case a.

In the modification represented at Figs. 4 and 5, in lieu of causing the shutter b to intersect the line of sight, I cause it to cover the glass panel i and thus intercept the passage of light to the interior of the instrument. In this arrangement the shutter $b^\times$ slides in guides or grooves a^4 upon the inside of the case a, and is normally held closed by the weight or spring b^4, through the flexible connection b^2, which passes around guide-pulleys b^3, and is locked in its closed position by means of a rod $c^\times$, which is pin-jointed to the lever c' at one end and passes through a guide c^4 at the other end, where it is acted upon by a spring $c^{\times\times}$, to normally hold it and the lever c' raised when the inclined or toothed end of the rod c will snap over a ratchet-tooth b^8 upon the under side of the shutter b, thus securely locking it against movement until the pedal or handle bar b^7 is again depressed and the lever c' is acted upon by a coin inserted in the slot a^2, when the tooth of the rod $c^\times$ will be withdrawn from the ratchet-tooth b^8, and the shutter will be opened by the action of the spring b^9 or, it might be, by the action of a weight.

The arrangement represented at Figs. 6, 7, and 8 is very similar to that shown and described with respect to Figs. 1, 2, and 3; but in this case, in order to secure a more symmetrical appearance to the instrument, two disks d' are employed, each carrying a single circle of lenses d, the corresponding ones of which are brought together in pairs behind the eye-pieces a', which are situated in the center of the case a. In this arrangement, in lieu of giving motion to the spindle d^2 by means of milled buttons d^3, fixed upon the spindles d^2 outside the case, right and left handed worm-wheels d^6 are fixed upon the spindles d^2 within the case a, and receive motion from corresponding worms d^7, formed upon a transverse shaft d^8, carried at each end thereof, by the case a, and furnished at one end with a milled wheel or button d^3, by means of which the disks d' may be caused to revolve in unison. In order to lock this cross-shaft d^8 and the disks d' against revolution until the required conditions have been fulfilled, a notched or toothed wheel d^9 is fixed upon the cross-shaft d^8, and a tail b^* of the shutter b is caused to engage therewith when the shutter is in its raised or closed position. The pedal-lever (or the hand-bar lever) b^5, together with the shutter b and connected parts, are retained in their normal position by means of a spring b^4 or, it might be, a weight, as shown with respect to Figs. 1 and 2, except when otherwise acted upon, as hereinbefore described.

In the modification represented at Fig. 9 the disks d' are each provided with two circles of lenses d, covered by a double shutter b. The lenses of one disk may be concave, and those of the other convex, and the front of the case a (not shown) must, in this example, be provided with a corresponding double set

of eye-pieces a'. Otherwise the arrangement of parts is similar to that shown with respect to Figs. 6, 7, and 8.

I would here remark that I have herein shown and described the best means that I am at present acquainted with for carrying my invention into effect; but I would have it understood that I do not confine myself thereto, as it will be evident that the details and arrangement thereof may be considerably varied without departing from the peculiar character of my invention.

It will be evident that when desired the sight-testing apparatus hereinbefore mentioned, having the lenses mounted in rotary disks or arms, can be advantageously employed independently of the coin-freed or coin-operating mechanism.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. A sight-testing apparatus consisting of a case a, provided with eye-apertures a', a light-inlet i, a shutter b, one of which eye-apertures is normally closed by said shutter, a weight or spring adapted to automatically open the shutter, coin freed or operating mechanism, a connection b^2, a lever b^5, and a weight or spring to normally hold the shutter in its closed position, said shutter being adapted to be solely retained by the coin freed or operating mechanism, substantially as set forth.

2. A coin freed or operating sight-testing apparatus consisting of a case a, provided with a shutter, eye-apertures a', and a light-inlet i, one of which is normally closed by the shutter, the shutter-opening weight or spring, a connection b^2, a lever b^5, the weight or spring normally holding the shutter closed, a spring catch or support c, the money-box, and a lever or guide c', along which the coin passes to the money-box, substantially as set forth.

3. A sight-testing apparatus consisting of a case a, provided with eye-apertures a', a disk or disks d', provided with lenses d and numbers d^4, and a spindle or spindles d^2, carrying said disk or disks, and adapted to bring the lenses d and numbers d^4, respectively, into alignment with the sight-apertures a' and number-apertures a^3, substantially as specified.

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