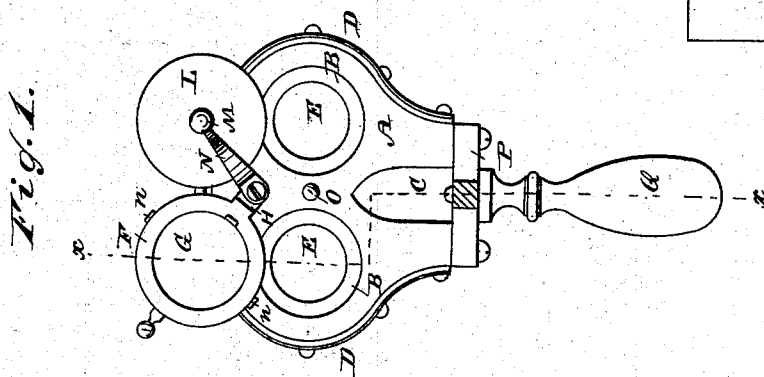
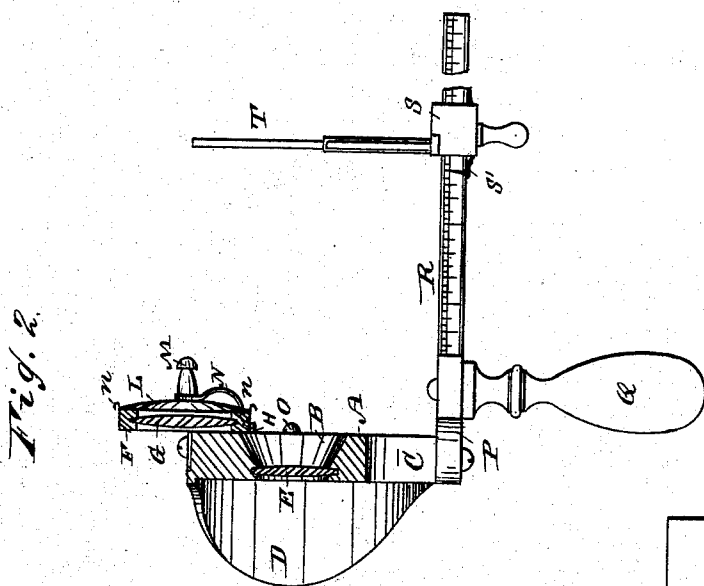


(No Model.)

A. A. TROWBRIDGE.
OPTOMETER.

No. 276,732.

Patented May 1, 1883.



WITNESSES :

Theo. G. Foster
C. Sedgwick

INVENTOR:

A. A. Thowbridge
BY *Munn & Co*
ATTORNEYS.

UNITED STATES PATENT OFFICE.

ALFRED A. TROWBRIDGE, OF DANBURY, CONNECTICUT.

OPTOMETER.

SPECIFICATION forming part of Letters Patent No. 276,732, dated May 1, 1883.

Application filed February 16, 1883. (No model.)

To all whom it may concern:

Be it known that I, ALFRED A. TROWBRIDGE, of Danbury, Fairfield county, and State of Connecticut, have invented a new and Improved
5 Optometer, of which the following is a full, clear, and exact description.

The object of my invention is to provide a new and improved device for ascertaining the proper correction or remedy for those defects
10 of sight which can be remedied by convex or concave spherical lenses.

This invention, which is an improvement on the optometer for which Letters Patent No. 262,151 were issued to me August 1, 1882, consists in various novel parts and combinations
15 of the same, as will be fully described herein-after.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate
20 corresponding parts in all the figures.

Figure 1 is a longitudinal elevation of the outer side of the lens-holding face-plate. Fig. 2 is a cross-sectional elevation of the same on
25 the line *x x*, Fig. 1, the hood and scale-rod being shown in longitudinal elevation. Fig. 3 is a front view of the sight-card.

The face-plate A is provided with two apertures, B B, the centers of which are on a horizontal line, and are of such diameter and such
30 a distance apart that the portion of the plate between the apertures B B will not obstruct the vision of the type or test card when it is nearest the face-plate. The face-plate A is
35 provided with a vertical and grooved nose-opening, C, between and below the apertures B B, thus permitting the plate A to be held closely against the face, the nose passing into the groove and opening C.

A hood, D, made of leather, pasteboard, fabric, or any other suitable material, and fitting closely to the face, is attached to the face-plate A, and serves to exclude the light from
40 the inner side of the face-plate when the same is set before the eyes and close to the face. The eye-apertures B B are beveled from the inner toward the outer surface of the face-plate A, as shown in Figs. 1 and 2.

In each aperture B there is fixed, near the
50 inner surface of the plate A, a convex spherical lens, E, having a focal length of twelve inches.

A disk or frame, F, made of metal or of other suitable material, and of sufficient size to cover
either of the eye-apertures B B, and holding a
55 convex spherical lens, G, having a focal length of six inches, is fastened to a spring-strip, H, which is pivoted to the outer side of the face-plate A, between and above the apertures B,
60 so that either of the apertures B can be covered by the said lens. The spring-strip H is pivoted to the plate A at such a distance from the centers of the apertures B that when the
lens-holding frame F rests against either side
of a check-pin, O, between the eye-apertures B,
65 the center of the lens G held in the frame F will be opposite the center of one of the lenses E in the face-plate A. Spherical lenses having other focal lengths than those named above
70 may be chosen for the same purpose; but those named will prove the most satisfactory.

An opaque disk or shield, L, of sufficient size to cover the lens-holding frame F, is provided with a handle, M, and is fastened to a
75 spring-strip, N, pivoted on the same pivot as the spring-strip of the frame F. The lens-holding frame F and the opaque shield L are so constructed and arranged that the shield L may be easily raised and turned, so as to cover
80 the frame F, the spring-strip M pressing the shield L against the face of the frame F, which is provided with raised spring clamps or guards
along the periphery for the purpose of holding the shield L on the said frame. When the
85 shield L and the frame or disk F are thus placed they may be turned to cover either eye-aperture B by means of the handle M, as though there were but one disk or shield. The
lens-holding frame F being large enough to cover either of the eye-apertures B, and the
90 opaque shield L being large enough to cover the frame F, they will, when resting against either side of the check-pin O, entirely exclude the light from the front of the eye-aperture
95 over which they rest. When the shield L and the disk F are held above the eye-apertures—that is, in such a manner that they cover
neither—both eyes can be tested by the lens in the apertures at the same time. When the
100 shield L and the frame F are turned so as to cover one of the eye-apertures the eyes may be tested separately by the lens in the apertures B, the light from in front of the face-plate A being prevented from entering the

other eye, which is behind the eye-aperture B that is covered by the frame and shield. The construction and arrangement of the lens-holding frame F and the opaque shield L also allows the lens-holding frame F to be turned so as to cover one of the eye-apertures B and the opaque shield L so as to cover and exclude the light from the front of the other eye-aperture B, thus permitting either eye to be tested by the combined power of the lens in either eye-aperture B and the lens in the lens-holding frame F, all light from the front of the face-plate A being thus prevented from entering the eye behind the eye-aperture covered by the opaque disk or shield. The plate A is attached to a frame, P, provided with a handle, Q, from which frame a rod, R, projects in the direction of the outer side of the plate A, and the said rod is provided with an inch scale, or may be provided with any other suitable scale indicating the number of lens.

A sliding card-carrier, S, provided with a pointer, S', is loosely mounted to slide on the rod R, and carries the type or test card T. (Shown in Fig. 3.) This card is about six by four inches in size, and on the middle line of the card, under the word "both," is placed a series of test types or objects, which cover a space of about one by one and one-fourth inch. Any suitable object or test may be chosen for this purpose, but those given are the most practically useful, as they may be printed from type obtainable in any printing establishment. The smallest test-objects used on the test-card T are words and disconnected letters printed from pearl type. The largest test-objects used on the card are printed with type three times the size of the pearl type. On the back side of the test-card T are two series of test-objects, which are the same in size and arrangement as those on the face of the card, except that instead of being placed in the middle they are at the ends of the card, one being at the right-hand and the other at the left-hand end, and both being marked accordingly. The type on the face of the test-card T under the word "both" are used when both eyes are being tested together, and when the eyes are being tested singly the card is reversed on the card-carrier.

The construction and arrangement of my optometer, as explained and set forth above, may be modified in the following manner: Instead of the single lens-holding frame F, pivoted to the face-plate A, so as to be swung over either of the eye-apertures B, two lens-holding frames of the same kind and form as the frame F may be used, but so pivoted to the face-plate A that one of the lens-holding frames may be turned or swung so as to cover one of the eye-apertures B, and the other lens-holding frame turned so as to cover the other eye-aperture, thus allowing both eyes to be tested at the same time by the combined power of the lenses in the eye-apertures B and the lenses in the frames F. Instead of pivoting the lens-holding frame to the face-plate, as described above, they may each be attached to

the face-plate by a joint or hinge, which will allow them to be turned down upon the face-plate, so as to cover the eye-apertures, or to be turned back out of the way, as desired.

The instrument is used in the following manner: The person whose eyes are to be tested holds the optometer by the handle Q, close to the face, the nose passing into the opening C. If both eyes are to be tested together by means of the lenses E fixed in the face-plate A, the shield L is turned so as to cover the disk F, and both the shield and frame are turned so as to rest above and between the eye-apertures B. If each eye is to be tested separately by means of the lens E, the shield L and frame F are together turned down, so as to cover either aperture, as desired. If each eye is to be tested separately by means of the combined power of one lens E and the lens in the frame F, the said frame is turned so as to cover either aperture B, as desired, and the shield L is turned so as to cover the other aperture B.

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

1. In an optometer, the combination, with an eye-apertured face-plate adapted to hold lenses, of a lens held in a frame pivoted to the face-plate in such a manner that the said lens can be swung over either of the eye-apertures, substantially as herein shown and described, and for the purpose set forth.

2. In an optometer, the combination, with the eye-apertured face-plate A, of the frame F, carrying a lens, G, and pivoted to the face-plate, and of the stud O, between the eye-apertures of the face-plate, substantially as herein shown and described, and for the purpose set forth.

3. In an optometer, the combination, with an eye-apertured face-plate, of a frame holding a lens and pivoted to the face-plate, and of an opaque disk pivoted to the face-plate, and adapted to swing over either eye-aperture and over the lens held in the pivoted frame, substantially as herein shown and described, and for the purpose set forth.

4. In an optometer, the combination, with the eye-apertured face-plate A, of the frame F, holding the lens G, and pivoted to the face-plate A, and of the disk L, pivoted to the face-plate A, and provided with the handle M, substantially as herein shown and described, and for the purpose set forth.

5. In an optometer, the combination, with the eye-apertured face-plate A, of the frame F, pivoted to the face-plate holding a lens, G, and provided with spring-clamps *n*, and of the disk L, pivoted to the face-plate, substantially as herein shown and described, and for the purpose set forth.

6. In an optometer, the combination, with the eye-apertured face-plate A, of the frame F, holding a lens, G, the spring H, attached to the frame F, and pivoted to the face-plate A, the disk L and the spring N, attached to the disk L and pivoted to the face-plate, substan-

tially as herein shown and described, and for the purpose set forth.

7. In an optometer, the combination, with the eye-apertured face-plate A, having the
5 lenses E, the grooved nose-opening C, and the hood D, of the shield or disk L, the frame P, scale-rod R, and card-carrier S, substantially as herein shown and described, and for the purpose set forth.

10 8. In an optometer, the combination, with the eye-apertured face-plate A, having the lenses E, the grooved nose-opening C, and the hood D, of the frame P, the scale-rod R, and

the sliding card-carrier S, substantially as herein shown and described, and for the purpose 15 set forth.

9. In an optometer, the combination, with the eye-apertured face-plate A, having the lenses E, and the grooved nose-opening C, of the frame P, the scale-rod R, and the sliding 20 card-carrier S, substantially as herein shown and described, and for the purpose set forth.

ALFRED A. TROWBRIDGE.

Witnesses:

EDWIN G. ANDREWS,
WINFIELD C. BARRY.