

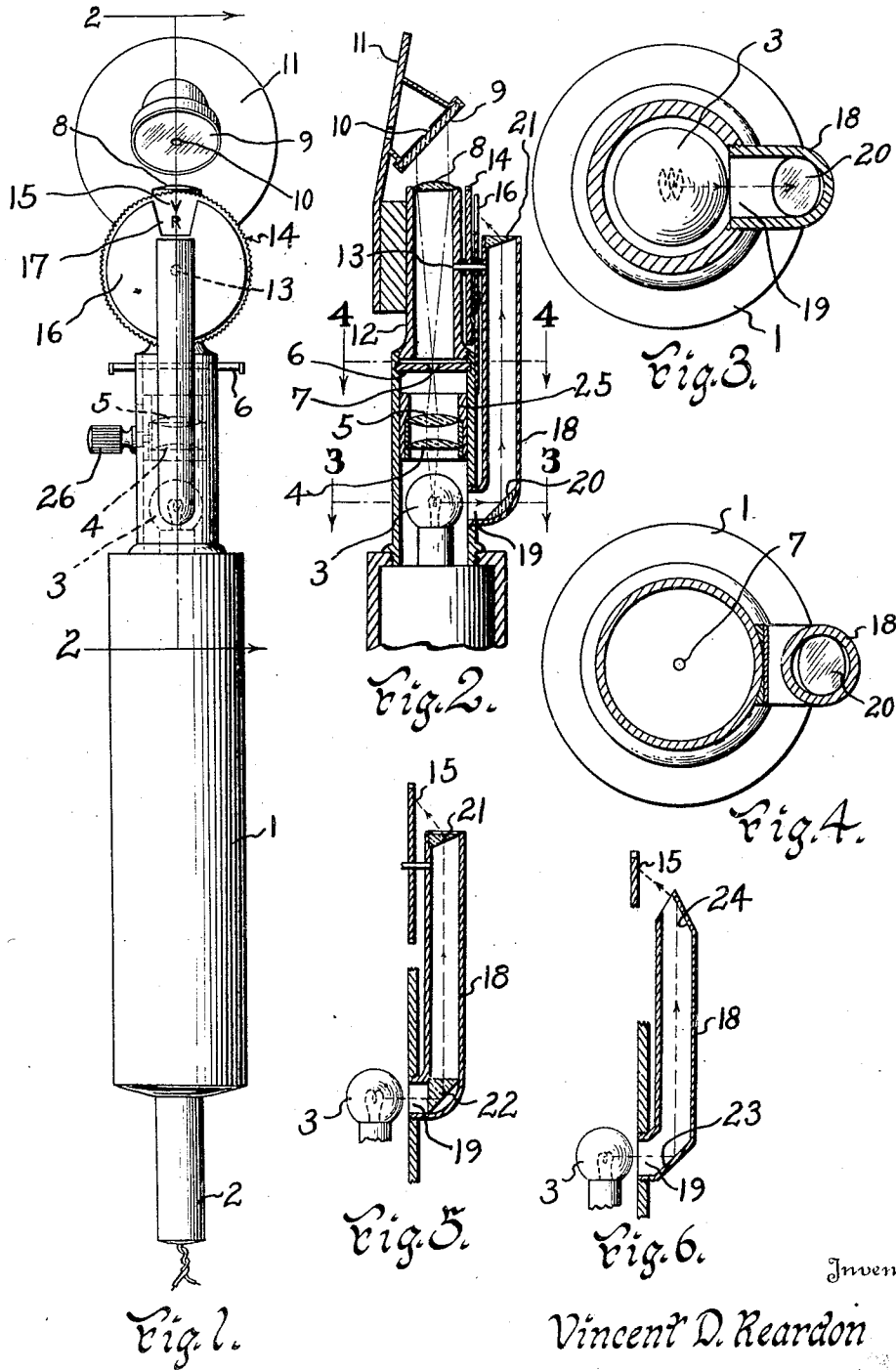
Feb. 10, 1931.

V. D. REARDON

1,791,604

DIAGNOSTIC INSTRUMENT

Original Filed May 28, 1927



Inventor

Vincent D. Reardon

By Harry H. Styll.

Attorney

UNITED STATES PATENT OFFICE

VINCENT D. REARDON, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO AMERICAN OPTICAL COMPANY, OF SOUTHBRIDGE, MASSACHUSETTS, A VOLUNTARY ASSOCIATION OF MASSACHUSETTS

DIAGNOSTIC INSTRUMENT

Application filed May 28, 1927, Serial No. 195,001. Renewed March 1, 1930.

This invention relates to improvements in diagnostic instruments and has particular reference to an illuminated diagnostic instrument having a chart or other fixation object on the face thereof.

The principal object of the invention is to provide improved means for obtaining additional illumination for the fixation object on the instrument.

Another object of the invention is to provide improved means by which a single source of illumination may be made to illuminate the patient's eye and also the fixation object on the instrument.

Other objects and advantages of the invention will become apparent from the following description taken in connection with the accompanying drawings, and it will be apparent that I may make many modifications in the arrangement and construction of parts without departing from the spirit of the invention as expressed in the accompanying claims. I, therefore, do not wish to be limited to the exact details and arrangements shown, the preferred forms only having been shown by way of illustration.

Referring to the drawings:

Fig. 1 is an elevation of a retinoscope embodying the invention.

Fig. 2 is a cross section on line 2—2 of Fig. 1.

Fig. 3 is a cross section on line 3—3 of Fig. 2.

Fig. 4 is a cross section on line 4—4 of Fig. 2.

Fig. 5 is a partial section similar to Fig. 2 showing a modification of the supplemental illuminating arrangement.

Fig. 6 is a partial cross section similar to Fig. 5 showing another modification of the supplemental illuminating means.

In the use of many illuminated diagnostic instruments, such as retinoscopes and ophthalmoscopes for examining the human eye, it has been found that there is a tendency on the part of the patient to move his eyes. It is one of the objects, therefore, of this invention to provide a fixation object on the instrument itself so that the patient may observe his particular point while his eyes are

being examined and prevent his eyes from moving about, thus enabling the practitioner to make a more thorough and accurate examination. To guarantee the efficiency of such a fixation object on the instrument it is necessary to obtain more illumination than that which is directed into the patient's eye by the instrument, it being understood that these instruments are usually used in a dark room and the fixation object would not be visible to the patient unless it were well illuminated.

Referring to the drawings in which similar characters of reference are used to denote corresponding parts throughout, I have shown my invention applied to the usual illuminated type of retinoscope having a handle 1 which is provided with a source of electric energy 2, being either an attachment to a regular electric circuit or provided with an electric battery in the handle. Secured in line with the handle and in electric contact therewith is the illuminating bulb or lamp 3 which may be lighted or turned off by a suitable switch, not shown, on the handle 1. In longitudinal alignment with the lamp 3 are the projection lenses 4 and 5 and a diaphragm plate 6 having a light opening 7. Beyond the diaphragm plate 6 is the condensing lens 8 which focuses the light on the reflector 9, which reflects the light into the eye of the patient. In the reflector 9 is a peep or sight hole 10 through which the operator looks into the patient's eye. The reflector or mirror 9 is carried by the supporting plate 11 secured to the light tube 12 which contains the condensing lens 8. Pivoted on the tube 12 by the pivot 13 is a disk plate 14 having knurled edges by which it may be turned. On this disk 14 are placed my fixation objects 15 which may be letters or other insignia which may be turned into view by means of the knurled edges of the disk 14. Over the disk 14 is placed a non-rotating disk 16 having a portion cut out at 17 to allow the fixation objects to be visible when rotated into the cut out opening.

The diaphragm plate 6 may have a plurality of openings 7. The plate 6 as shown in Fig. 1 is in the form of a slide so that any de-

sired one of the openings 7 may be aligned with the rays from the lamp.

It will be apparent that the rays of light from the lamp 3 passing through the hole 7 in the diaphragm 6 onto the reflector 9 and into the eye of the patient will not be of sufficient volume to illuminate the fixation object 15. I, therefore, provide a light passage-way member 18 opening into the lamp chamber at 19 provided with an angled reflector 20 at the bottom and with a prism reflector 21 at the top. It will be seen from Fig. 2 that a portion of the light from the bulb 3 will strike the reflector 20, be reflected up the tube member 18, will strike the prism 21 and be deflected onto the fixation object 15 and that, therefore, the one source of illumination, the lamp 3, will illuminate both the patient's eye by means of the reflector 9 and the fixation object by means of the tube 18 and the prism 21.

In Fig. 5, I have shown a modified form of reflecting means in the member 18. Instead of the reflecting mirror 20 I have used a prism 22 at the bottom. It will be seen that in this device the portion of the light from the member 3 will be deflected by the prism 22 up through the tube of the member 18 to the prism 21 and onto the fixation object 15.

In Fig. 6, I have shown still another modification wherein the member 18 has the inside walls of its tube lined with reflecting material, such as porcelain, or the like. The bottom of the member 18 is angled at 23 and the top is angled at 24. In this modification a portion of the light from the lamp 3 will strike the reflective face 23 on the inside of the tube member 18, will be reflected along the tube to the face 24 thereof and from thence to the fixation object 15.

The lenses 4 and 5 are mounted in a slide 25 which may be moved up and down in the lamp chamber by the handle 26 as is usual in instruments of this character.

The operation of the instrument is as follows: The lamp is lighted by the contact switch. The beam of light from the bulb strikes the mirror 9 and is guided into the eye of the patient by the operator. The operator then revolves the disk 14 until the desired fixation object is aligned with the opening 17 in the disk 16. The light coming from the lamp 3 through the member 18 and reflected onto the fixation object 15, as has been described, will illuminate the fixation object. The patient is directed to hold his eye on the fixation object while the operator is making his examination of the eye.

From the foregoing description it will be seen that I have provided simple, efficient and inexpensive means for carrying out all the objects and advantages of the invention and by these means I am able to illuminate the fixation object on the instrument from a single source of illumination thereof.

Having described my invention, I claim:

1. In a device of the character described, a lamp, a member having a light passage way the longitudinal axis of which is coincident with the longitudinal axis of the lamp and having an opening transversely opposite the lamp, a reflector support on the light passage way member, a reflector on the support aligned with the light passage way, a fixation member on the light passage way member adjacent the end thereof, a second member having a light passage way aligned with the opening in the first light passage way and extending therefrom substantially parallel with the first light passage way, and light deflecting means in the second light passage way adapted to deflect the illumination passing through the opening in the first light passage way along the second light passage way onto the fixation object.

2. In a device of the character described, a lamp, a member having a light passage way the longitudinal axis of which is coincident with the longitudinal axis of the lamp and having an opening transversely opposite the lamp, a reflector support on the light passage way member, a reflector on the support aligned with the light passage way, a fixation member on the light passage way member adjacent the end thereof, a second member having a light passage way transversely aligned with the opening in the first light passage way and extending therefrom substantially parallel to the first light passage way, and prism means in the second light passage way adapted to deflect the illumination passing from the lamp through the opening in the first light passage way along the second light passage way onto the fixation object.

3. In a device of the character described, a source of illumination, a member having a light passage way leading from the source of illumination the longitudinal axis of which is coincident with the longitudinal axis of the light source and having an opening intermediate its ends transversely opposite the light source, a reflector support on the light passage way member, a reflector on the support aligned with the light passage way, a fixation member on the light passage way member adjacent the end thereof, a second member having a light passage way aligned with the opening in the first light passage way and extending transversely thereto and then substantially parallel therewith, a reflector in the second light passage way adapted to bend the illumination from the light source from a direction transverse to the first light passage way to one substantially parallel therewith, and a reflector in the parallel portion to deflect said illumination onto the fixation object.

4. In a device of the character described, a source of illumination, a member having a

light passage way leading from the source of illumination the longitudinal axis of which is coincident with the longitudinal axis of the light source, and having an opening intermediate its ends transversely opposite the light source, a reflector support on the light passage way member, a reflector on the support aligned with the light passage way, a fixation member on the light passage way member adjacent its end, a second member having a light passage way aligned with the opening in the first light passage way and having a portion extending transversely thereto and a portion extending substantially parallel therewith, means to deflect the illumination from the light source from the transverse direction to the parallel direction, and means to deflect the illumination from the parallel portion onto the fixation object.

5. In a device of the character described, a source of illumination, a member having a light passage way leading from the source of illumination the longitudinal axis of which is coincident with the longitudinal axis of the light source and having an opening intermediate its ends transversely opposite the light source, a reflector support on the light passage way member, a reflector on the support aligned with the light passage way, a fixation member on the light passage way member adjacent its end, a second member having a light passage way aligned with the opening in the first light passage way and having a portion extending transversely thereto and a portion extending parallel therewith, a prism in the second light passage way adapted to bend the illumination from the transverse to the parallel direction, and a second prism in the parallel portion of the second light passage way adapted to deflect the bent illumination onto the fixation object.

6. In a device of the character described for viewing a patient's eye, a source of light, a member having a light passageway extending from the source of light, a reflector through which the patient's eye may be viewed aligned with the light source and positioned to reflect light therefrom into the patient's eye, means to fix the illuminated eye of the patient, said fixation means being substantially in the plane of the reflected light, means to direct transverse light from the light source towards the eye fixation means and means to bend the rays of said directed light on to the eye fixation means.

7. In a device of the character described for viewing a patient's eye, a source of light, a member having a light passageway extending from the source of light, a reflector through which the patient's eye may be viewed aligned with the light source and positioned to reflect light therefrom into the patient's eye, means to fix the illuminated eye of the patient, said fixation means being

substantially in the plane of the reflected light, means to direct transverse light from the light source substantially parallel to the axis and externally of the light passageway member and means to bend the external light onto the eye fixation means.

8. In a device of the character described for viewing a patient's eye, a source of light, a member having a light passageway extending from the source of light with an opening therein substantially opposite said source, a reflector through which the patient's eye may be viewed aligned with the light source and positioned to reflect light therefrom into the patient's eye, means to fix the illuminated eye of the patient, said fixation means being substantially in the plane of the reflected light, light deflecting means adjacent the opening in the light passageway member and externally thereof to receive light from the light source and direct it towards the eye fixation means.

VINCENT D. REARDON.