Nov. 27, 1951 R. I. PRITIKIN 2,576,358

PORTABLE TANGENT SCREEN

Filed Nov. 4, 1949

Fig. 1.

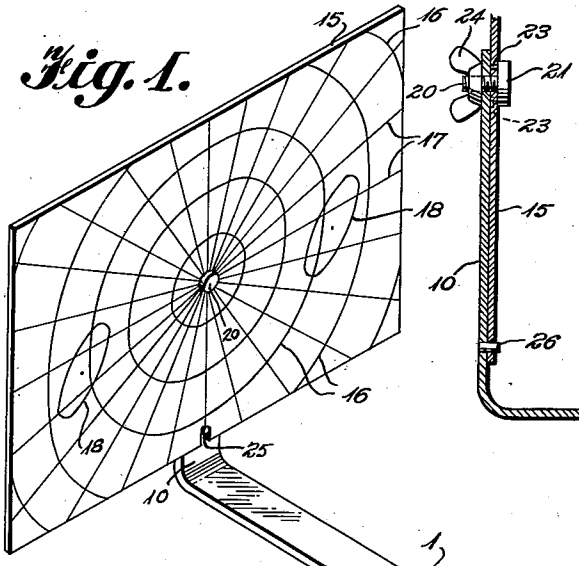


Fig. 2.

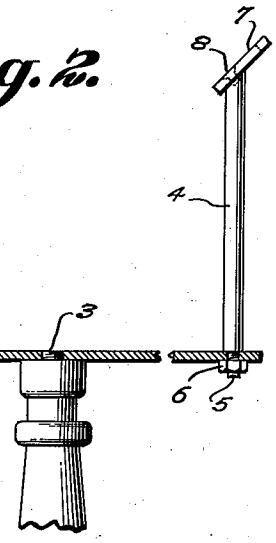


Fig. 3.

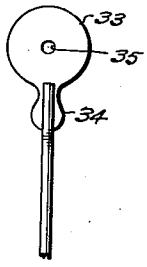


Fig. 4.

Fig. 5.

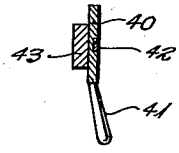
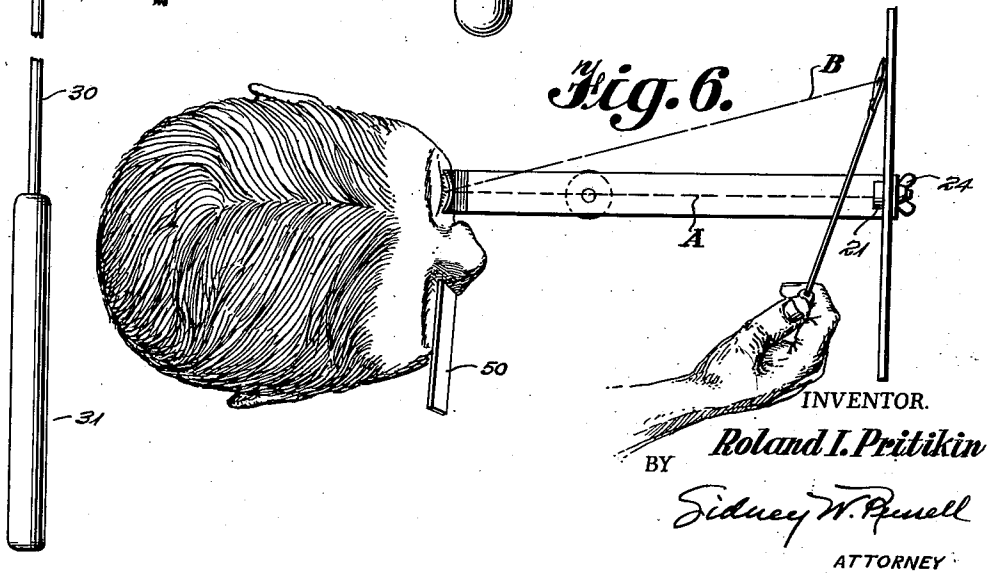


Fig. 6.



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Patented Nov. 27, 1951

2,576,358

UNITED STATES PATENT OFFICE

2,576,358

PORTABLE TANGENT SCREEN

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Application November 4, 1949, Serial No. 125,476

1 Claim. (Cl. 88—20)

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This invention relates to a device for the measurement and recording of the central portion of the visual field of the human eye. In more particular it is directed to an apparatus and method whereby an examining physician may chart with facility the center of the peripheral fields of vision with respect to both form and color.

Devices of the prior art which have heretofore been designed to accomplish analogous purposes usually have necessitated the use of complex, expensive and permanent or non-portable installations. By my invention the inherent disadvantages of utilizing only heavy and intricate equipment of that type are obviated, since my device comprises an entirely portable unit, designed for hand manipulation, and one which can be easily disassembled for carrying in a suitable medical kit or for shipment.

It is therefore an object of my invention to provide a device of the described nature which is extremely simple in construction and operation and which may be fabricated at an extremely low cost.

It is a further object of the invention to provide an apparatus which will enable a quick and accurate measurement by the examining physician, and which also permits transfer into permanent record form, with great ease, the data recorded by the physician during examination of the patient.

It is another object of my invention to enable the use of a tangential screen which can be so easily disassembled and reassembled that it may be conveniently carried by the examining physician to the patient's bedside. This is extremely important where it is necessary to conduct ocular examinations of non-ambulatory patients who could not be brought to the locality of a permanently installed and complex optometrical examining instrument.

Reference is now made to a more particular description of my invention, wherein the accompanying drawings illustrate one embodiment thereof devised for the practical application of the principles enumerated in the foregoing and in which:

Figure 1 is a perspective view of the apparatus embodying this invention.

Figure 2 is a broken side view of the apparatus illustrated in Figure 1.

Figure 3 is a hand target used in conjunction with the apparatus of Figure 1.

Figure 4 is a partial side view of the device of Figure 3.

Figure 5 is another embodiment of the device of Figure 3, and

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Figure 6 is a top plan view illustrating the use of the invention by a patient.

Reference is now made to the drawings in which like numerals indicate like parts throughout the several views.

A support member 1 has affixed to it a handle 2, intermediate the ends of the said support. The handle can be secured for ease of disassembling merely by the use of a threaded element 3 adapted for insertion in a threaded aperture in the member 1.

At one end of the support 1 is mounted an eye piece which consists of a vertical element 4 attached in a common manner such as by the use of a threaded terminal end 5 through insertion through an appropriate opening in member 1, at one end thereof, and designed to receive a nut 6 for retention of the eye piece in place. The vertical element 4 is provided with a slanted plate or eye piece 7, curved as shown for positioning on the cheek underneath the patient's eye. This plate member may also be suitably affixed to the vertical support 4 by a counter-sunk screw 8.

The opposite end of the member 1 is bent right angularly to the said member to also form an upstanding support 10. The latter is designed to accommodate the sighting screen 15. The screen may be made of aluminum or any other light weight material, although, as will be shown, if the apparatus of Figure 5 is utilized subject to the influence of magnetic field, a material such as iron or steel is necessary. Normally, all elements of the apparatus thus far described are painted or otherwise colored a dull black. This is true especially of the face of the screen 15, which is marked off in certain scaled graduations enabling charting of the patient's field of vision. For instance, a number of concentric circles 16 are intersected by radial markings 17 emanating from the center of the screen. Hence, the screen, by the scaled graduations of 16 and 17, is divided into definite predetermined areas facilitating the accurate positioning of the tangential target as well as the recording of sight with respect to such target. The screen 15 is also provided with opposite elliptical markings 18 located on each side of the screen center. These, as will hereinafter be described, represent the areas within which will fall the normal blind spot of the human eye.

It is essential that this screen be mounted on its complementary support 10 in a secure manner so that when in use it will not be displaced with respect to the other elements hereinbefore described, particularly the eye piece. To this end the screen is apertured at its exact center for

the reception of a threaded bolt 20. The latter is provided with a relatively large and flat-surfaced head 21, the outer face of which is marked with two lines intersecting at right angles, the point of intersection representing the exact center of the screen 15. A wing nut 24, utilized to draw the elements 10 and 15 together and maintain them in the desired position, facilitates a breakdown by hand of the parts just described. In order to further assure the secure positioning of screen 15 to prevent any movement after assembling, and to prevent rotation of bolt 20 during rotation of the aforesaid wing nut, the head of the bolt is also provided with two opposite projections 23 which are adapted for insertion in complementary holes in the screen as indicated in Figure 2. As a further means assuring stability of the screen 15 after it has been mounted in the manner shown and described, an element 26 in form of a projection of the inner side of support 10 is positioned to receive a U-shaped channel 25 on the center line of the bottom edge of the screen.

It will thus be seen that in positioning the screen the aforesaid channel is first slipped over the projection 26, the bolt 20 is inserted through both screen and support 10 with the projection 23 fitted as described and the wing nut tightened to force these several members together.

In using my invention it is necessary to provide some form of tangential target as distinguished from the direct target comprising the exact center of screen 15, represented by the intersecting lines on the bolthead 21. This may take the form of the hand manipulated target of Figures 3 and 4, consisting of a rod 30 upon which has been mounted a suitable handle 31. The opposite end of the rod is slotted as at 32 for the reception of a disc 33. This disc is provided with a small extension 34 of such thickness that it may be frictionally gripped within the slot 32, thereby being maintained in the desired position. The said disc 33 also has a small depression 35 at its midpoint, sufficient to receive wax or paint or other suitable substances in any one of a number of desired colors. In practice it is usual to provide with member 30 a number of such discs 33 and ordinarily, in addition to one disc having a white center, individual discs having centers of the primary colors are utilized in order to estimate tangential vision with respect to color. These discs are obviously interchangeable, in member 30, at the desire of the examining physician. Such discs may be made in the alternative form of Figure 5 wherein such elements 40 are provided with the described coloring media 42 and as here shown also fitted with a small handle 41. In this modification the disc is attached by any common method to a magnetized element 43, which will then obviously adhere, by magnetism, to the face of the target screen 15 when placed thereon at any desired position. In the use of this variation, a steel or iron screen is of course essential. Thus, in both instances the tangential target, either that of Figures 3 and 4 or that of Figure 5, is a simple hand manipulated object which is placed at different points upon the screen to gain the reaction thereto with respect to the so-called side vision of the patient.

From the foregoing, the following description of the manner of use of my invention should be apparent. The eye testing operation is more particularly illustrated in Figure 6 wherein the patient is shown holding the screen with one

hand in an obvious manner, placing the eye piece immediately underneath the eye to be examined. The opposite eye is of course occluded by any opaque object, 50. The patient focuses his direct vision upon the center marking of the bolthead 21, as indicated by the dotted line A. The tangential or side vision is then represented by the dotted-line B, the latter being directed to the point of location of the tangential target 33. The test target, either white or colored, may thus be moved along the various concentric and radial meridians to make an accurate determination of the extent and limits of the central visual field, both for form and color.

As stated, the oval areas 18 represent the normal physiological blind spots. They are on each side of the screen center to enable the physician to determine visual characteristics of both the right and left eyes, as will be obvious.

As will be understood by those skilled in the art, the central vision is made possible by that portion of the retina called the macula, which is in the very center of the retina. In all individuals the retina has an area of blindness in the field of vision which is known as the normal blind spot. These normal blind spots in most individuals can be ascertained by placing the target screen within the areas 18 and determining the visual response of the patient thereto. Abnormal and physiological blind spots are also known. These would ordinarily be present when the target screen is charted in an area without the elliptical circles 18.

Hence, by moving either the hand element 30 or the magnetized unit 40 to different positions upon the screen 15, and marking those locations on the screen where different reactions of the patient take place with respect to the tangential target, the entire central side vision or the center of the peripheral field of vision both for form and color can be readily ascertained.

In practical use as the tangential target 33 is moved to different positions on the screen 15 these positions are noted in chalk by the examining physician upon the latter. Such markings are then transferred to a paper replica of the intersecting linear markings of the metal screen 15. In this way a permanent record of any visional examination of this sort is easily obtained.

It will thus be seen that I have provided a simple and inexpensive device, which may conveniently be disassembled and rearranged into a compact package, and carried to the bedside of a patient. It enables not only an accurate and rapid testing of the central field of vision, but facilitates permanent recording of the same for future reference.

I claim:

A portable and collapsible ophthalmological eye testing device comprising a support member, a hand support element removably mounted on said member, said member provided with an angularly extending and removable eye-piece at one end thereof, a screen support member provided with a threaded aperture extending right angularly from said member at the opposite end thereof, a rigid, black, markable screen, said screen being of a metal subject to magnetism, means to removably mount said screen on said support member, said means comprising a U-shaped channel on the bottom edge of said screen, a pin on said member for insertion in said channel and a bolt member having a flat,

exposed face in the center of said screen adapted to engage said threaded aperture, said screen being inscribed with a center marking and radial and concentric markings, and means for measuring tangential vision on said screen comprising a tangential target to be superimposed upon said screen in various positions, said tangential target comprising a circular disc provided with a projection for hand manipulation, said disc having magnetic means mounted upon one side thereof, said disc having a colored center marking on the opposite side thereof, whereby said disc may be positioned upon said screen and maintained in fixed position thereon by said magnetic means.

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