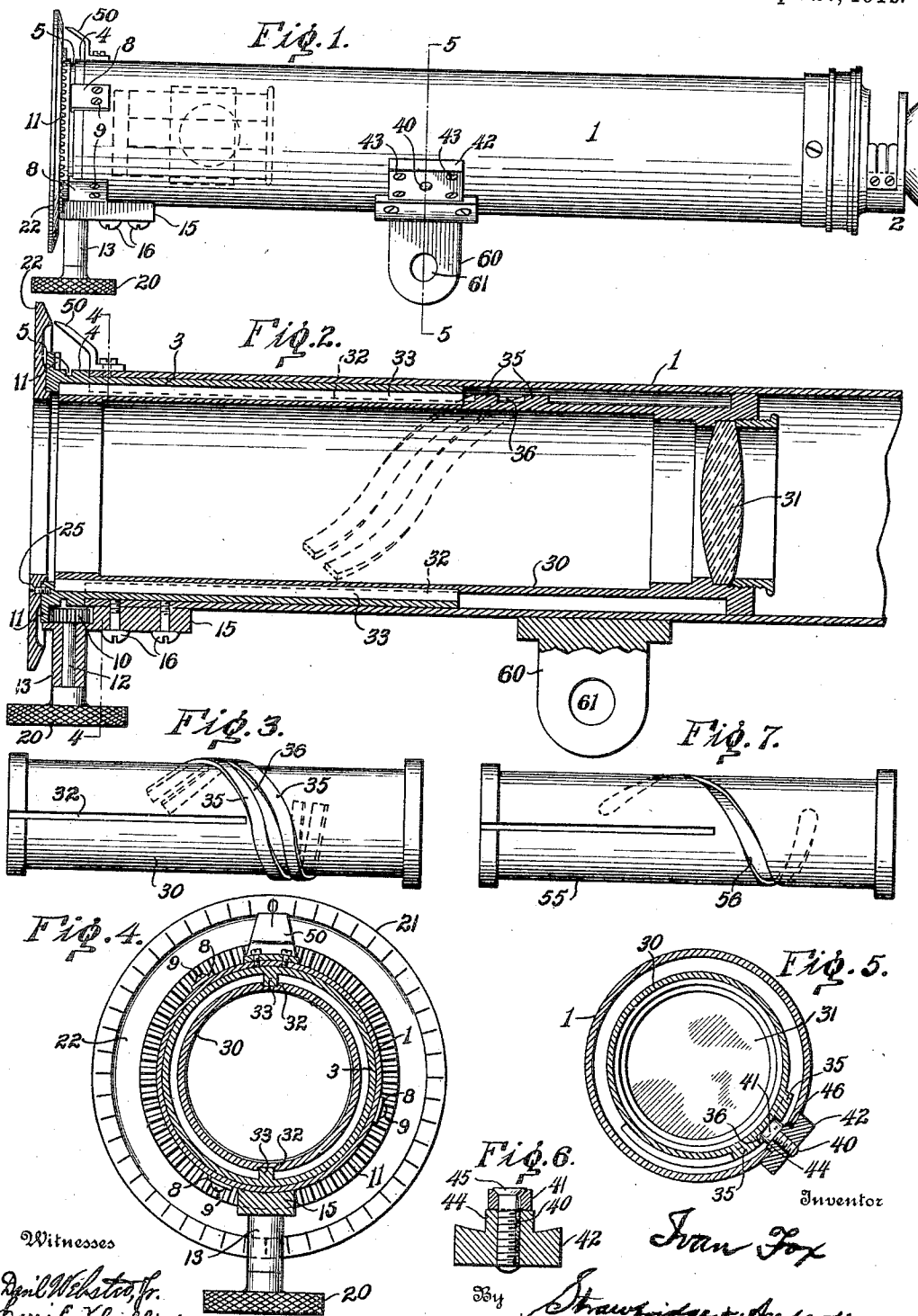


I. FOX.
OPTOMETER.

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971,499.

Patented Sept. 27, 1910.



Witnesses
Daniel Webster, Jr.
Carroll C. Klempner.

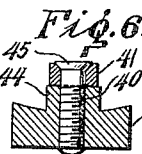


Fig. 6.

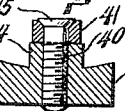


Fig. 7.

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OPTOMETER.

971,499.

Specification of Letters Patent. Patented Sept. 27, 1910.

Application filed January 14, 1908. Serial No. 410,770.

To all whom it may concern:

Be it known that I, IVAN FOX, citizen of the United States, residing at Media, in the county of Delaware, State of Pennsylvania, have invented certain new and useful Improvements in Optometers, of which the following is a specification.

My invention relates to an improvement in optometers and particularly to optometers of the construction shown in the United States patent to William and Archibald G. Thomson, No. 843,503.

One of the objects of my invention is to provide a construction in which the scale and the pointer or indicator are maintained in accurate registration and in which there is practically no likelihood of accidental displacement of one in respect to the other.

Another object of my invention is to provide an improved means for occasioning and effecting relative adjustment between the lenses entering into the construction of an optometer, such for instance as that shown in the Thomson patent to which reference has been made.

Other objects of my invention will more fully appear in the following detailed description of my invention.

A convenient embodiment of my invention is illustrated in the accompanying drawings forming a part of this specification, but it is to be understood that changes may be made in the details of construction without departing from my invention.

In the drawings:—Figure 1 is a side elevation of an optometer embodying my invention, the support or standard therefor being omitted; Fig. 2 is a longitudinal section of a portion of an optometer embodying my invention; Fig. 3 is a side elevation of an inner tube constituting a part of my invention; Fig. 4 is a section on the line 4—4 of Fig. 2; Fig. 5 is a section on the line 5—5 of Fig. 1; Fig. 6 is a section showing a detail of the construction; and Fig. 7 is a view showing a modified construction of the inner tube corresponding to the tube shown in Fig. 3.

Referring to the drawings:—1 designates the outer tube of an optometer and 2 designates a holder for eye pieces or glasses of known construction such for instance as that shown in the patent to Thomson, No. 843,502.

Although not shown it will be understood that an eye lens is secured within the tube or equivalent device 1 at the end adjacent to the holder 2. As my invention relates to other parts of the device, it is deemed unnecessary that such lens be shown in the drawings.

3 designates a revoluble tube or equivalent device located and secured within the outer tube 1 and which is shorter than the said outer tube as shown in Fig. 2 of the drawings.

The inner tube or equivalent device is provided with a shoulder or enlargement at its outer end as indicated at 4, which is provided with a circular groove 5. A projection from holders or clips 8 which are secured by screws 9 to the outer tube 1, extends into the groove 5 so that the inner tube 3 is held revolubly in the tube 1. Revolution of the tube 3 is occasioned by means of a gear wheel 10, in engagement with a circular gear 11, secured to the end of the tube 3. The gear 11 may be formed integrally with the tube 3 or may be constructed separately and afterward secured by soldering or otherwise to the end of the tube 3. The gear wheel 10 is supported at one side of the tube 1 and the outer end of the tube 3, adjacent to the gear 11, upon the end of a shaft 12 which is supported in a bearing 13 projecting laterally from a member or holder 15, secured by screws 16 to the side of the tube 1. The outer end of the holder or member 15 is provided with a recess or hollowed-out portion in which the gear wheel 10 is located, such wheel being protected from dust, etc. by the surrounding walls of the recess.

The shaft 12 is rotated when desired by means of a thumb or finger piece 20, upon its outer end. A scale 21 is located upon the surface of a circular plate 22, which is connected by means of screws, one of which is shown at 25 in Fig. 2, to the gear 11 and thus to the end of the inner tube 3. A lens carrier consisting of a tube or equivalent device 30 carrying a lens 31 is located interiorly of the tube or similar device 3.

In order that there may be longitudinal movement of the tubes 3 and 30 relatively to each other, they are connected by means of guide slots 32, provided in the tube or equivalent device 30, into which the elon-

gated guides 33 secured to the interior of the tube or equivalent device 3, project. From an inspection of Fig. 2 of the drawings, it is obvious that such connection permits the tube or equivalent device 30 to move longitudinally within the tubes or equivalent devices 1 and 3. To effect this longitudinal movement of the tube or equivalent device 30, I have formed integrally therewith or otherwise secured thereto, the curved guides 35, separated a short distance from each other, forming a guide-way 36. Located in this guide-way between the guides 35 is a pin or bolt 40 carrying a revoluble guide ring 41, projecting into the guide-way 36. The pin or bolt 40 is stationarily connected to the tube 1 in any suitable manner as may be desired. In the construction shown the pin or bolt 40 has screw-threaded connection with the block or carrier 42, which is secured by means of screws 43 to the side of the tube or similar device 1.

A boss or projection 44 formed integrally with or otherwise secured to the block or carrier 42, is located between the said block or carrier and revoluble ring 41. The latter is held upon the pin or rod 40 by the up-set portion 45 of the latter. The boss or projection 44 is located in an opening 46 in the side of the tube or equivalent device 1.

By reason of the connection described between the tube or equivalent device 3 and the tube or equivalent device 30, rotation or revolution of the former occasions revolution of the latter. Revolution of the latter occasions longitudinal movement thereof, by reason of the projection of the pin or rod 40 into the curved guide-way 36, between the guides 35. It will be understood that the direction of longitudinal movement of the tube or equivalent device 30, will depend upon the direction of its revolution.

In the use of the optometer the person whose eyes are being tested looks through the instrument from the end provided with the eye-piece holding frame 2, and by turning the gear wheel 10 occasions revolution of the interior tubes or equivalent devices 3 and 30 and thus occasions a longitudinal adjustment of the tube or equivalent device 30. When an adjustment is reached which produces the clearest vision for the person looking through the instrument, the point of such clearest vision is noted by examining the scale 21 and noting the position of the pointer or indicator 50 in relation thereto. Such pointer and scale indicate whether a positive or negative lens will be required to correct the defect of vision and will also indicate to one skilled in the art, the amount of correction necessary.

In Fig. 7 I have shown a modified construction of tube 30, in which the guides 35 are omitted and a curved guide slot 56 is provided in the tube 55, by cutting out the

material thereof. When a tube of this construction is employed, the operation is exactly the same as has been described in connection with my preferred form of construction shown in Figs. 1 to 6 inclusive.

The device may be connected to any suitable support in any convenient and desirable manner. I have shown a projection 60 from one side of the tube or equivalent device 1, provided with a hole 61, by means of which the device may be connected to its support.

Having thus described my invention I claim:—

1. In an optometer, the combination of a tube, a lens carrier movably supported in the said tube, means supported upon the said tube and having connection with the said lens carrier and being adapted to occasion revoluble movement thereof, a gear connected to the said means, a gear-wheel supported independently of the said means in engagement with the said gear, and means for causing longitudinal movement of said lens carrier.

2. In an optometer, the combination of a tube, a lens carrier revolubly mounted in the said tube, means for occasioning longitudinal movement between the said lens carrier and the said tube when the said carrier is given a movement of revolution, means supported upon the said tube and having connection with the said lens carrier for occasioning revolution of the latter, a gear connected to the said means, and a gear-wheel supported independently of the said means in engagement with the said gear.

3. In an optometer the combination of an outer tube or similar device, a tube or similar device located interiorly of the said outer tube or similar device, a lens carrier operatively connected to the second named tube or similar device, the said lens carrier being provided with a guide-way extending spirally thereof, means for occasioning revolution of the interior tube or similar device and the lens carrier, and means projecting from the outer tube or similar device into the said guide-way to occasion longitudinal movement of the lens carrier simultaneously with its movement of revolution.

4. In combination, an outer tube or similar device, an inner tube or similar device having a guide located upon its inner surface, a lens carrying tube or similar device having a guide-way into which the said guide projects, means for occasioning revolution of the inner and lens carrier tubes or similar devices, and the lens carrying tube being provided with a guide-way extending spirally thereof, and means projecting from the outer tube or similar device into the said spiral guide-way to occasion longitudinal movement of the said lens carrying tube or similar device simultaneously with its movement of revolution.

5. In combination, an outer tube or similar device, an inner tube or similar device having guides located upon its inner surface, a lens carrying tube or similar device having guide-ways into which the said guides project, means for occasioning revolution of the inner and lens carrier tubes or similar devices, and the lens carrying tube being provided with a guide-way extending spirally thereof, and means projecting from the outer tube or similar device into the said spiral guide-way to occasion longitudinal movement of the said lens carrying tube or similar device with its movement of revolution.

6. In an optometer, the combination of a tube or similar device, a lens carrying tube or similar device situated in the said tube or similar device, and the said lens carrying tube or similar device being provided with guides extending spirally thereof to form a spiral guide-way, means for occasioning revolution of the said lens carrying tube or similar device, and means projecting from the first named tube or similar device into the said guide-way to occasion longitudinal movement of the said lens carrying tube or similar device.

7. In an optometer, the combination of a tube, a tube located interiorly of the first named tube, means for securing the last named tube within the first named tube, the said means permitting revolution of the said second named tube, means supported upon the first named tube and cooperating with means upon the second named tube to occasion revolution of the latter, a lens carrying tube operatively connected to the second named tube, the said lens carrying tube being provided with a guide-way extending spirally thereof and stationary means engaging the said guide-way to occasion longitudinal movement of the said lens carrying tube.

8. In an optometer, the combination of a revoluble tube, a lens carrying tube operatively connected to the said revoluble tube and revolving therewith, the said lens carrying tube being provided with a guide-way extending spirally thereof, means for occasioning revolution of the said tubes, and relatively stationary means projecting into the said guide-way to occasion longitudinal movement of the said lens carrying tube.

9. In an optometer, the combination of a tube, a revoluble tube located interiorly of the first named tube, a lens carrying tube operatively connected to the second named tube and adapted to revolve therewith and to move longitudinally thereof, a gear wheel supported upon the first named tube, a gear operatively connected to the second named tube and which has engagement with the said gear wheel whereby revolution of the said second named tube may be occasioned, and relatively stationary means located in

the said guide-way to occasion longitudinal movement of the said lens carrying tube when it is revolved.

10. In an optometer, the combination of a supporting carrier, a lens carrier situated in the said supporting carrier, the said lens carrier being provided with a guide-way, means operatively connected to the said lens carrier to occasion revolution thereof, a scale operatively connected to the said lens carrier and revolving therewith, an indicator cooperating with the said scale, and means projecting into the said guide-way to occasion longitudinal movement of the said lens carrier simultaneously with its movement of revolution.

11. In an optometer, the combination of a hollow supporting member, a lens carrier movably supported in the said member, means having connection with the said lens carrier and adapted to occasion movement thereof, a gear connected to the said means, and a gear-wheel supported upon the said supporting member in engagement with the said gear to occasion rotation thereof.

12. In an optometer, the combination of a supporting member, a revoluble lens carrier supported by the said supporting member, a gear operatively connected to the said revoluble lens carrier, a bracket-like member supported upon the said supporting member, a gear wheel supported upon the said bracket-like member and being in engagement with the said gear and adapted to occasion revolution thereof whereby revolution of the said lens carrying member is occasioned, and means interposed between the said lens carrier and the said supporting member to occasion longitudinal movement of the said lens carrier simultaneously with its movement of revolution.

13. In an optometer, the combination of an outer supporting tube, an inner rotatable tube having a gear operatively connected thereto, a gear wheel supported upon the outer supporting tube and being in engagement with the said gear, means for occasioning rotation of the said gear wheel whereby rotation of the said gear and the inner tube connected thereto may be occasioned, a lens carrying tube connected to the said inner tube so as to rotate therewith, the said lens carrying tube being provided with a spiral guide-way, a guide projecting from the said outer supporting tube into the said guide-way, the said guide-way and the said guide cooperating to occasion longitudinal movement of the lens carrying tube simultaneously with its movement of rotation.

14. In an optometer, the combination of an outer supporting tube, an inner rotatable tube having a gear connected to its outer end and also having a groove extending around its outer end portion, a device secured to the outer tube and having a pro-

jection extending into the said groove to
secure the outer and inner tubes together, a
pinion supported upon the outer tube and
having engagement with the gear upon the
5 inner tube, means for occasioning rotation
of the said pinion whereby rotation of the
said gear and the inner tube connected
thereto may be occasioned, a lens carrying
member connected to the said inner tube
10 and being provided with a spiral guide-way,
a guide projecting from the outer support-
ing tube into the said guide-way, the said

guide-way and the said guide coöperating
to occasion longitudinal movement of the
lens carrying member.

In testimony that I claim the foregoing
as my invention, I have hereunto signed my
name this eleventh day of January A. D.
1908.

IVAN FOX.

In the presence of—

S. SALOME BROOKE,
CARRIE E. KLEINFELDER