June 26, 1923. 1,460,148

E. D. TILLYER

TRANSPOSITION SCALE

Filed Feb. 6, 1922

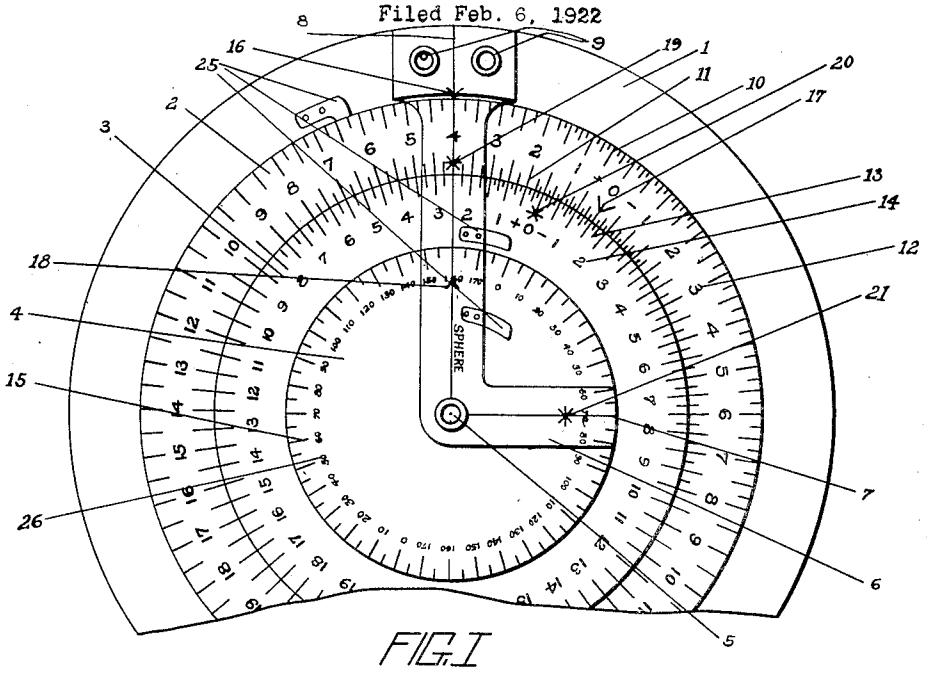


FIG. I

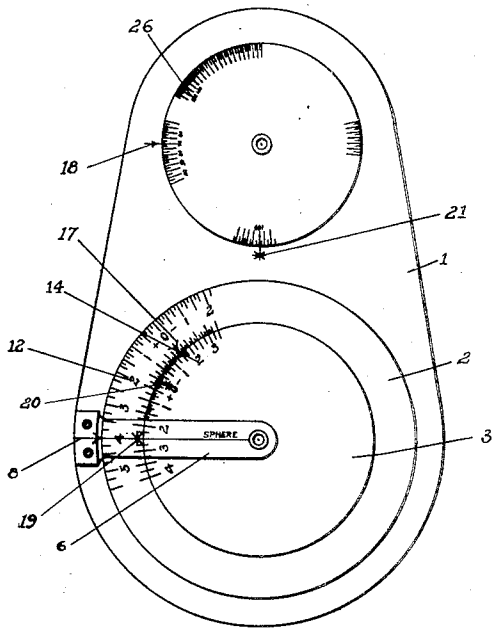


FIG. II

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UNITED STATES PATENT OFFICE.

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TRANSPOSITION SCALE.

Application filed February 6, 1922. Serial No. 534,443.

To all whom it may concern:

Be it known that I, EDGAR D. TILLYER, a citizen of the United States, residing at Southbridge, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Transposition Scales, of which the following is a specification.

This invention relates to improvements in calculating devices, and has particular reference to a novel and improved calculating device particularly adapted for use in transposition of ophthalmic lenses.

The primary object of the present invention is the provision of a purely mechanical construction which will at one time indicate the two ways in which the prescription may be made up saving both mathematical calculations and the possibility of error in changing the axis and corresponding prescription values of a lens required to give the proper correction to the eye.

A further object of the present invention is the provision of a device of this character which may be employed either in the form of a separate scale or calculating device or may be used as a dial member on a lens measuring instrument, or the like, and which will in that event give the value of the lens in its two possible transpositions with the cylinder axis corresponding to each.

Other objects and advantages of my improved construction should be readily apparent by reference to the following specification taken in connection with the accompanying drawings, and it will be understood that I may make any modifications in the specific details of construction shown and described within the scope of the appended claims without departing from or exceeding the spirit of my invention.

Figure I represents a plan view of one embodiment of my invention.

Figure II represents a similar smaller view of a different form thereof.

In the drawings, the numeral 1 designates the body or carrying member of my improved device having rotatably mounted thereon the large disc 2, intermediate disc 3, and central disc 4, all rotatably secured by the common central pivot 5 and being concentrically arranged. This pivot 5 also serves to retain in position the transparent guide or indicator member 6 bearing the index marks or lines 7 and 8 disposed at right angles one to the other, the outer end of the member 6 being secured to the body portion 1 as by the fastening devices 9, one of which at least is preferably perforated to provide an aperture for use in hanging up the device. It is to be noted that the several discs are each provided with a number of graduations, one of the discs, in this instance the disc 2, being shown as having an outer set of graduations as at 10, and an inner set as at 11, while disposed intermediate said graduations are the index numerals 12, denoting the value of the graduations. Similarly the disc 3 is provided with the graduations 13 and indicating numerals 14 and the disc 4 with the degree graduations 15 and degree indicating numerals 26.

It will thus be noted that the three discs may be independently rotated with respect to each other so that any desired graduation on any of the three discs may be brought into alinement with the index mark or line 8 on the transparent member 6, while if desired friction locking devices, as shown at 25, may be employed to hold the individual discs against accidental rotation and lock the same in desired position.

One of the important features of the present invention resides in the fact that a double set of indications are employed related one to the other in such manner as to facilitate the obtaining of proper readings of different types from the instrument. In explanation of this I would call attention to the fact that the index mark 8 just outside the periphery of the disc 2 bears an arrow, as at 16, pointing toward the outer edge of the disc, while the inner edge of the disc 2 is provided with the arrow as at 17 and the index line 8 interiorly of the periphery of the disc 4 is provided with a second arrow as at 18. In addition adjacent the outer edge of the disc 3 on the same index mark will be found the star or similar designation 19 on the transparent member 6, while adjacent the zero point graduation of the disc 3 will be found a second star as at 20, and a third star is located on the short index line 7 as at 21. For convenience in understanding the instrument has been shown as set at an arbitrary reading which if read in con-

nection with the arrows is found to indicate a plus 4 graduation at the outer edge of the outer disc 2. Proceeding thence to the arrow at the inner edge of the disc 2 we find indicated a minus 1.50, while following to the third arrow 18 we find indicated that the cylinder axis for the prescription plus 4 sphere combined with a minus 1.50 cylinder is axis 160, it being understood that the central disc 4 is a protractor member reading in degrees the axis of the lens, while the reading along the index mark 8 is the spherical power and the reading found by choosing the corresponding designation on the spherical power disc and taking the adjacent configurations of the opposed scale giving the cylinder combination reading.

To find, therefore, the proper transposition of the foregoing prescription, we may take the readings indicated by the stars; taking first the star on the index line 8 we find indicated a plus 2.50 sphere; following then to the star on the disc 3 we find indicated that there is combined with this plus 2.50 sphere a plus 1.50 cylinder, and referring then to the star 21 on the index line or mark 7 we find the axis of this combination would be axis 70. By reference to this example it will thus be seen that if the powers and axis of the lens to be prescribed are known, the instrument may for instance be set with the several stars pointing to the known powers and axis, when the stars will give the transposition reading, or vice versa. On the other hand, the same principles may be made use of in connection with a lens testing instrument having shiftable parts provided with indicating dials, or the like, in which event the members 2 and 3 will form the dials and will be so disposed that their graduations will be related in the same manner, as shown in the drawings, when the dials will be turned to adjust the instrument to which they are applied to measure the lens and the power may then be read off in either form desired, the arrow and star designations or their equivalent being made use of in the same manner and a protractor, such as 4, being preferably employed in conjunction therewith to indicate the 90 degrees difference in angle of axis of the two.

The form of construction shown in Figure II is another form of my device, the only difference being that the protractor disc 4 is shown as separately fastened on the frame or holder 1 in place of the several discs being all concentrically located, but the operation being identical with those forms which have previously been described.

It is, of course, to be understood that the foregoing results can be accomplished by either rotary or straight scales properly designated so long as the two slide one past the other in the proper manner so that the exact shape of the dial, disc, or scale bearing member is relatively immaterial, the form here shown having been adopted as most convenient in practical use.

I claim:

1. An index member having different designations for selective indication of points on the different scales, each of the scales having a designation corresponding to the adjacent designation on the index member for cooperation with the readings of the adjacent dial whereby different readings of equal value may be obtained by selection of the figures indicated by corresponding designations.

2. A device of the character described comprising a pair of adjacent rotatable scale bearing members, an indicator cooperating at one point with said members but bearing different designations adjacent each member and each of said members bearing a fixed designation corresponding to the nearest designation on the indicator, substantially as and for the purpose described.

3. Means for mechanically transposing optical prescriptions, including a pair of relatively shiftable lens power scales, means for indicating a reading on one of the scales, means on said indicated scale for selecting the complementary reading on the opposite scale, a protractor and 90 degree separated indications cooperating with the protractor and corresponding to the lens power scale designations for selectively determining the proper axis of a given power combination.

4. A device of the character described including a pair of relatively movable scales each having a distinctive designation mark cooperating with the opposed scale, and an indicating member in the form of an index mark having at different points therealong designations corresponding to those on the scales, said designations being disposed for cooperation with the scale member having the corresponding designation.

5. A device of the character described including a pair of relatively movable scales each having a distinctive designation mark cooperating with the opposed scale, an indicating member in the form of an index mark having at different points therealong designations corresponding to those on the scales, said designations being disposed for cooperation with the scale member having the corresponding designation, a protractor, and a right angle indicating member having on each arm a designation corresponding to one of the designations associated with the index mark.

6. A device of the character described including a pair of adjacent rotatable dial members graduated to read in lens powers, frictional means for locking said dial members against accidental relative rotation, a stationary index mark bearing different distinctive designations pointing toward op-

posite dials and corresponding designations at the zero point at the dials pointed toward, substantially as and for the purpose described.

7. A device of the character described including a pair of adjacent rotatable dial members graduated to read in lens powers, frictional means for locking said dial members against accidental relative rotation, a stationary index mark bearing different distinctive designations pointing toward their respective dials, and corresponding designations at the zero point at the dials pointed toward the stationary index marks, a protractor, and relatively shiftable right angle pointer, and designations carried by the two arms of the pointer and corresponding to the designations of the dials, substantially as and for the purpose described.

8. A lens transposition scale including a pair of relatively movable members reading in lens powers, means for indicating a common reading point for both scales, selective means at this point for indicating the reading to be taken from one of the scales, and means on the scale from which the reading is taken to indicate the point at which a complementary reading on the opposite scale is to be taken.

9. A lens transposition scale including a pair of relatively movable members reading in lens powers, means for indicating a common reading point for both scales, selective means at this point for indicating the reading to be taken from one of the scales, means on the scale from which the reading is taken to indicate the point at which a complementary reading on the opposite scale is to be taken, a protractor, and a double reading indicator for the protractor, and corresponding means to those of the scales for indicating the particular reading of the protractor to correspond to the combined reading taken from the scales.

In testimony whereof I have affixed my signature, in presence of two witnesses.

EDGAR D. TILLYER.

Witnesses:

SUSAN CASAZZA,

ESTHER M. LAFLER.