SYSTEM FOR THE PRECISE AND ERROR-FREE DETERMINATION FOR MEASURING DIOPTRES OF AN ASTIGMATIC LENS

DESCRIPTION OF THE TECHNOLOGY

A lensmeter is an essential instrument in ophthalmic optics as it enables dioptre lens power to be measured, a fundamental factor in compensating ametropias. Its basic function is to determine back surface lens power to compensate refractive error as well as marking the correct position of the lens.

In conventional manual lensmeters a T test is used to guide the back surface lens power measurement process by means of manually focusing thanks to the user working a variable dioptre power wheel.

When the lens inserted is spherical (no astigmatism), the whole T test goes out of focus equally in all directions and may be refocused by working the lensmeter power wheel. This way the spherical power of the lens can be read on the circular dial by looking through the lensmeter eyepiece. However, when the lens to be measured is astigmatic (has astigmatism), the T test image goes out of focus differently depending on the power of each meridian, leading to the likelihood of mistakes with inverse measurements in the principal meridians. In this case, measurement of the lens power is made by focusing on each meridian separately and taking note of the powers with which these consecutive approaches are conducted. Subsequently, powers noted are addressed using a series of steps that generate problems caused by length of time associated with the standard measurement procedure and ambiguities in the lens power note taking process. This leads to an increase in probability of error when entering results and, therefore, to errors in lens measurement. This mistake is crucial in a refraction measurement process, since the glasses delivered to the client do not match the refraction obtained in-office. Unfortunately, this happens on a regular basis in opticians where mistakes are made when making note of the axis rather than in power measurements. And the only way to solve it is by ordering another lens from the manufacturer to measure and position it properly to then be able to fit it to the glasses' frame.

This invention is the solution to the problems that arise in the standard measuring procedure by means of a new method to measure the back surface lens power of an astigmatic lens. Besides considerably improving its performance, both in terms of speed and simplicity, it also reduces that probability of error in measurement.

A researcher from the University of Valencia has developed a new method for measuring the back surface lens power of an astigmatic. The new invention is based on a modified phoropter that incorporates a Stokes lens with a rotational axis aligned with the optical axis of the phoropter and which is common both for a relative rotation as well as a complete rotation of the whole Stokes lens.

MARKET APPLICATION SECTORS

The main applications of the technology are the following:

- The measurement of ophthalmic lenses with a manual lensmeter, intended both for manual lensmeter manufacturers as well as for ophthalmic lens manufacturers.
- The measurement of ophthalmic lenses in a new generation of lensmeters based on technology developed with automatic parts intended both for manufacturers of ophthalmic equipment as well as for ophthalmic lens manufacturers.
- The in-office subjective refraction process measurement, by means of adapting the invention to phoropters to guide it more efficiently and accurately.

TECHNICAL ADVANTAGES AND BUSINESS BENEFITS

The main advantages provided by the invention are:

- Measurement time is reduced as opposed to the standard measurement procedure; since both meridians do not have to be checked (everything is clearly defined at once).
- Positioning error is reduced to zero when compared to conventional methods, as there is no likelihood of errors with inverse measurements in the principle meridians.

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CURRENT STATE OF DEVELOPMENT

The inventors have validated their invention in the lab at the basic prototype level. New developments pend resolution of funding the proof of concept programme “Valoritza i Transfereix” by the University of Valencia.

INTELLECTUAL PROPERTY RIGHTS

The technology is protected by Industrial Property Rights through the following patent application: P201731384, entitled “Method, system and computer programme to measure the dioptric power of rear vertex of an astigmatic lens”

COLABORATION SOUGHT

- License agreement for use, manufacture or marketing.
- R+D project to complete development or apply technology to other sectors.

RELATED IMAGES

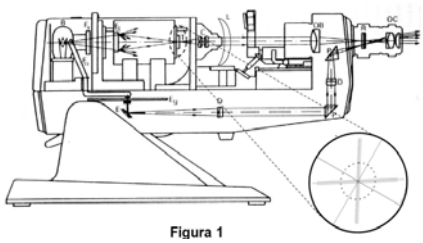

Image 1: Lensmeter scheme where the proposed invention is adapted.

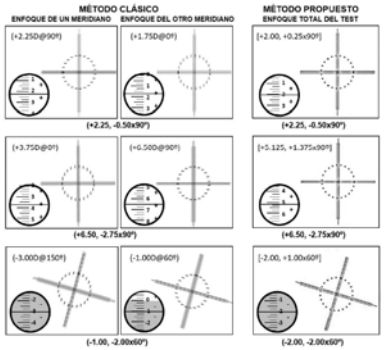

Image 2: Images obtained when measuring different astigmatic lenses: classic dioptric power measurement procedure (left and central columns) and the proposed method (right column).

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