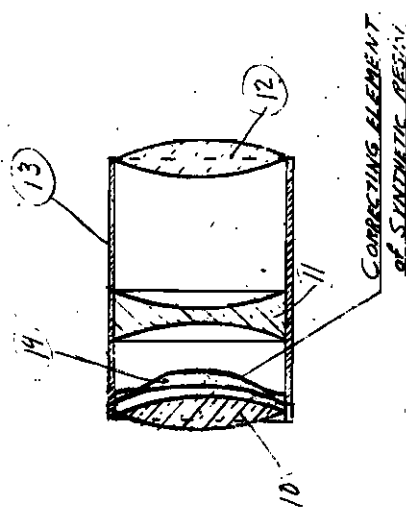


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OPTICAL SYSTEM

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Lenses made as spectacle-glasses and consisting of moulding material, such as polystyrol, are known. It has been found, however, that this kind of lenses is rather inaccurate. This kind of lenses therefore has hitherto been used exclusively in optical systems wherein great accuracy was not required. Lenses of moulding material have not been successfully used hitherto in cases wherein great accuracy is required of the system in which they are used and wherein the quality of the system plays a determinative part, as is the case, for example, with telescopes, cameras, projectors, spectrographs, microscopes or suchlike instruments.

Applicant has found that in definite instances lenses of the said kind can nevertheless be successfully used for the said and similar precision instruments, i. e. for correcting purposes.

The optical system according to the invention comprises a correcting element having an aspherically refracting surface for the correction of spherical aberration, said element consisting of an artificial material or a synthetic resin, more particularly those artificial materials or synthetic resins which are capable of being moulded, capable of being die-cast or capable of being extruded. As an example of such an optical system wherein the correcting element may be made in this manner, we may mention the optical system of Schmidt, as described in the "Zentralzeitung für Mechanik und Optik", Volume 52, 1932, number 2.

It was customary to make this kind of correcting elements from glass or quartz. The grinding of these elements, which is necessary to give the surface of the element the desired very complicated profile, is very expensive, however, due to the aspherical shape of the surface.

If the correcting elements are made according to the invention this drawback is completely suppressed. Any desired number of correcting elements may be manufactured with the aid of a single matrix, for example by moulding, casting, die-casting, extrusion, and suchlike processes, said elements being ready for use either without or after a very insignificant after-treatment, such as polishing of the surface. Such a manufacturing method is considerably less expensive and takes considerably less time than the method

hitherto used. A very large number of materials enters into consideration for the correcting element used in the optical system according to the invention.

As examples of materials which can be given the desired shape by moulding or die-casting, we may mention definite benzyl-cellulose moulding materials, pheno-plastics, amino-plastics and suchlike materials. A nitro-cellulose moulding material wherein definite materials are added to nitro-cellulose as a solvent, so that the product known under the registered trade-mark "trolleyte F" is obtained, enters also into consideration.

Some of the said materials can also be given the desired shape by extrusion. As further examples of materials which can be worked by die-casting to form the correcting element according to the invention, we may also mention synthetic resins consisting of polymerised vinyl-compounds, such as polystyrol, mixed polymerisates, resins capable of being die-cast, for example phenol-resins capable of being die-cast or suchlike materials. Further, use may also be made of metacryl-acid esters for the purpose set.

It appears that the above-stated drawback involved by these materials, i. e. that lenses of this kind of materials are inaccurate, does not occur with correcting elements as above, which is probably due to the fact that these correcting elements exhibit only slight differences in thickness, for example of the order of magnitude of a few tenths of millimetres.

As a matter of fact, the correcting element used in the optical system according to the invention will generally also exhibit a definite, though weak optical strength in the paraxial region. The correcting element therefore does not work exclusively as such, though the correcting function is the reason why use is made of such an element.

In one advantageous form of construction of the system according to the invention the correcting element is arranged between two other existing optical elements of the system, such as, for example, two lenses, a mirror and a lens or a similar combination. This construction offers the advantage that the correcting element is protected from injuries.

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