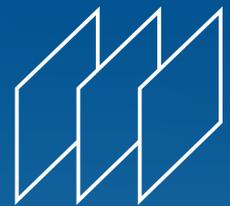


Optical element Clamping System

Reference No: B77024



BayPAT

CHALLENGE

The production of optics is a highly iterative process. In this process chain, not only are several machines involved and loaded one after the other, but there is also a switch back and forth between them. Components with two functional surfaces, i.e. lenses, must be processed on their top and bottom surface, which increases the processing time and complexity. Moreover, the workpiece undergoes additional thermal and mechanical stress, caused by blocking and releasing during side change, which impairs the workpiece quality. The position and orientation of the workpiece must be ensured every time it is newly clamped. With the currently in optical manufacturing used technology this step can be done only with finite precision, which limits the achievable quality of the workpiece¹.

INNOVATION

The invention makes it possible to manufacture workpieces such as lenses in one clamping. This means that as soon as the **workpiece** is clamped, it is **not released until the manufacturing process of both surfaces has been completed**. This has the advantages:

- A **constant zero-point** is provided, **avoiding the need for realignment**;
- The **clamping system** guarantees, like a conventional zero-point clamping system, the **highest possible accuracy** in manufacturing process chains with a high number of if iterative steps.
- The clamping system is also **suitable for vacuum**, as the clamping mechanism is self-locking. This makes the invention suitable **for production machinery such as FIB systems**;
- Optionally, an **integrated hydraulic control system** can be installed, in order to **compensate for deformations**, which can be caused by the production itself and by gravity as well.

COMMERCIAL OPPORTUNITIES

The invention can be used for the manufacture and **handling of optical elements** such as optical lenses and filters. It is also possible to process circular components of all materials. Due to the mechanical clamping and the **self-locking function**, the entire structure can also be used in a **vacuum**.

DEVELOPMENT STATUS

Preliminary measurements of the deformation caused by mechanical pressure exerted on the workpiece were carried out and published^{2,3}. **A complete prototype is in preparation.**

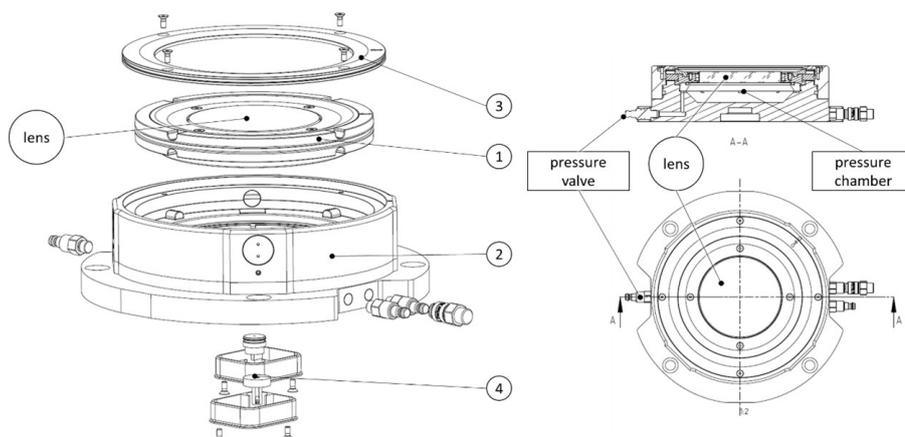


Figure: (left) blow-up drawing of the holder object of the invention. Pictured are the four main building-parts: (1) workpiece holder, (2) clamping component, (3) system closure, (4) sensors and actuators for deformations measurement and compensation. (right) sectional view of the complete system.

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- [4] DE 10 2017 117 037; WO 2019/020420.

TECHNISCHE HOCHSCHULE DEGGENDORF THD

Technology from
Technische Hochschule
Deggendorf

IP rights:

WO, filed 2018

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