Pressure-resistant Piston Media Separator, Linear Drive for a Ship's Steering Gear and Submarine

The invention concerns a pressure-resistant piston media separator. For example, in a linear drive for a ship's steering gear, a mechanical movement takes place against the external pressure. In order to avoid working against the external pressure, the hydraulic fluid in a pressure-resistant piston media separator is brought to approximately the external pressure by subjecting the hydraulic fluid in the pressure-resistant piston media separator to the external pressure through the ambient medium. A corresponding linear actuator for a ship's steering gear is known from DE 10 2016 204 248 A1. There, the term pressure compensation container is used as an alternative term for the pressure-resistant piston media separator. The piston of the pressure-resistant piston media separator is moved in one direction by incoming hydraulic fluid, in the other by the ambient medium. However, since this piston must also have a very good seal, the piston has a corresponding frictional resistance. As a result, at low external pressure, i.e. very shallow diving depth (including the surfaced state), the pressure on the piston due to the ambient medium, the ambient water, is not sufficient to move it. This can lead to a negative pressure on the side of the hydraulic fluid and thus to outgassing and consequently to bubble formation. This leads to two problems. On the one hand, the dissolution of the bubbles by dissolving them in the hydraulic fluid is very slow. On the other hand, the bubbles lead to unpredictable behaviour. In particular, locking of the rudder position, which is carried out by shutting off the hydraulics, is made more difficult. However, if there are gas bubbles in this region, the rudder position can change unintentionally.

The object of the invention is to create a pressure-resistant piston media separator, which works reliably at high ambient pressures (deep diving depth) but above all at low ambient pressures (shallow diving depth to surface travel).

This object is achieved by the pressure-resistant piston media separator having the features specified in Claim 1, by a linear drive having the features specified in Claim 13 and by a submarine having the features specified in Claim 14. Advantageous developments result from the subclaims, the following description and the drawing.