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Portney

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(54) **SWITCHABLE DIFFRACTIVE ACCOMMODATING LENS**

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(52) **U.S. Cl.**
USPC **623/6.37**; 623/6.13; 623/6.3; 623/6.31; 351/159.11

(58) **Field of Classification Search**
USPC 623/6.37, 6.13, 6.22, 6.3, 6.31; 351/159.04, 159.18, 159.61, 159.11, 351/159.15, 159.35, 159.44
See application file for complete search history.

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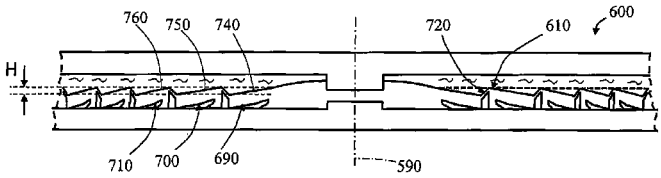
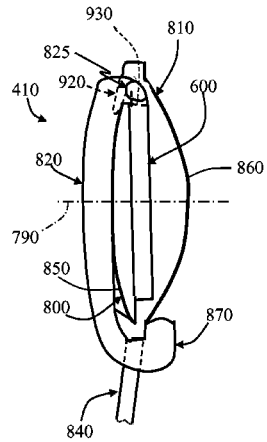
(57) **ABSTRACT**

A lens in accordance with the present invention includes an accommodating cell having two chambers with at least one chamber filled with optical fluid with the refractive index matching the refractive index of the accommodating element separating them. The accommodating element has a diffractive surface with surface relief structure that maintains its period but changes its height due a pressure difference between the chambers to redirect most of light that passes through the lens between different foci of far and near vision. The invention also includes a sensor cell that directly interacts with the ciliary muscle contraction and relaxation to create changes in pressure between the accommodating cell chambers that results in changing surface relief structure height and the lens accommodation.

6 Claims, 13 Drawing Sheets