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Kirschner

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[54] **FLOW CONTROL SYSTEM HAVING ACTUATED ELASTOMERIC MEMBRANE**

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[58] **Field of Search** ..... 114/67 R; 244/130, 244/204, 203; 137/487.5

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[57] **ABSTRACT**

A flow control system is used to control fluid flow at the boundary layer of an object or body about or within which the fluid flows relative to the body. The flow control system includes an actuated membrane that is displaced in a direction substantially tangential to the actuated membrane, thereby causing a disturbance or modified shear stress distribution in the boundary layer fluid flow. One or more sensor elements are disposed proximate a top region of the actuated membrane for sensing fluid conditions at the boundary layer flow. A membrane actuator provides the displacement, for example, by extending or contracting the actuated membrane in a direction substantially tangential to the actuated membrane. A feedback device is responsive to a system of sensor elements and is coupled to a system of membrane actuators to cause the displacement in one or more regions of the actuated membrane in response to the sensed fluid conditions. The flow control system controls the fluid flow by providing turbulence modification and reducing drag, radiated noise, and other undesirable effects caused by fluid flow relative to an object.

20 Claims, 3 Drawing Sheets