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PIEZOELECTRIC/ELECTROSTRICTIVE ACTUATOR HAVING INTEGRAL CERAMIC BASE MEMBER AND FILM-TYPE PIEZOELECTRIC/ELECTROSTRICTIVE ELEMENT(S)

ABSTRACT

A piezoelectric/electrostrictive actuator including a base member (44) having a pressure chamber or chambers (46), and a piezoelectric/electrostrictive element or elements (78) is disclosed. The base member includes a spacer plate (70) having at least one window (76) which provides the pressure chamber(s), and which is closed by a closure plate (66) and a connecting plate (68) disposed on the opposite surfaces of the spacer plate. These spacer plate, closure plate and connecting plate are formed from respective ceramic green sheets which are laminated on each other and fired into an integral ceramic structure as the base member. Each piezoelectric/electrostrictive element is disposed on a wall partially defining the corresponding pressure chamber, for deforming the wall so as to change a pressure of the corresponding chamber. The element has a piezoelectric/ electrostrictive unit consisting of a pair of electrodes (75, 77) and a piezoelectric/ electrostrictive layer (79), which are formed by a film-forming method on an outer surface of the closure plate of the base member.

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