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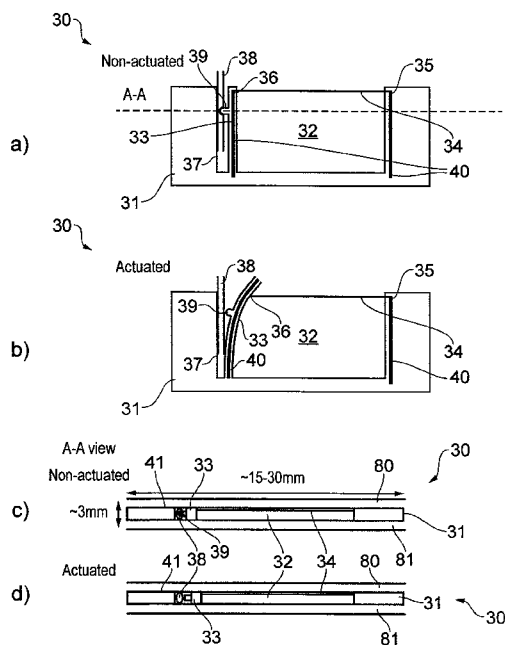


FIG. 2

(57) Abstract: A microvalve assembly (30) is integrated into a
printed circuit board (PCB) substrate (31). An aperture (32) in the
PCB substrate includes a closure member (33) extending into the
aperture. A flexible fluid pipe (38) is disposed between the closure
member and a closure edge (37) of the aperture. A displacement
member (34) is coupled to the PCB and is configured for thermal
actuation to displace the closure member so as to vary the cross-
sectional profile of the flexible fluid pipe. The closure member may
be a cantilever section of the PCB substrate. Displacement of the
closure member to vary the cross-sectional profile of the flexible
fluid pipe can occur entirely within the plane of the PCB substrate
and movement of the displacement member to displace the closure
member can also occur entirely within the plane of the PCB sub-
strate, providing a very low profile of microvalve particularly
suited for integration into a fuel cell stack (1).



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