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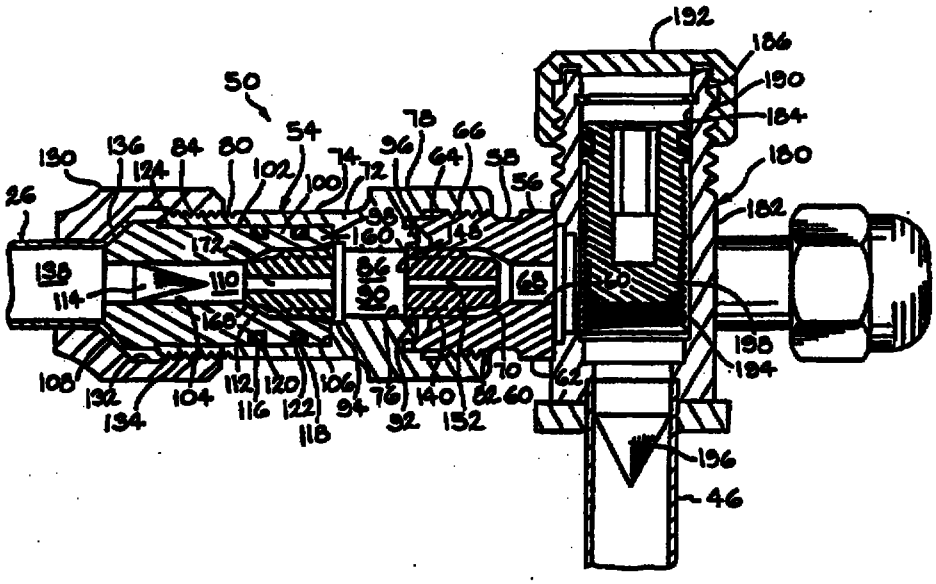
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(54) Title: INTEGRAL BI-DIRECTIONAL FLOW CONTROL VALVE



(57) Abstract

The present invention is directed to an integral bi-directional flow control valve. The valve (50) includes a housing (54) that defines a passageway for the flow of a fluid in a first direction and a second direction. The housing defines a phase change chamber (90) in the passageway. A first restrictor (140) having a first bore (152) is positioned in the passageway adjacent the phase change chamber. A second restrictor (160) having a second bore (172) is positioned in the passageway adjacent the chamber and opposed to the first restrictor. The first and second bores have a volume less than the volume of the chamber. The second bore can be the same size as the first bore or a different size depending on the application. The fluid changes from a liquid to a gas as the fluid flows through the first bore and the chamber in the first direction or through the second bore and the chamber in the second direction.