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(54) Title: PRECISION PUMP WITH AUTOMATIC VALVE SWITCHING AND LOW TOLERANCE STACK-UP USING SIDE PORTED CANNULA FOR SMALL VOLUME PUMPING

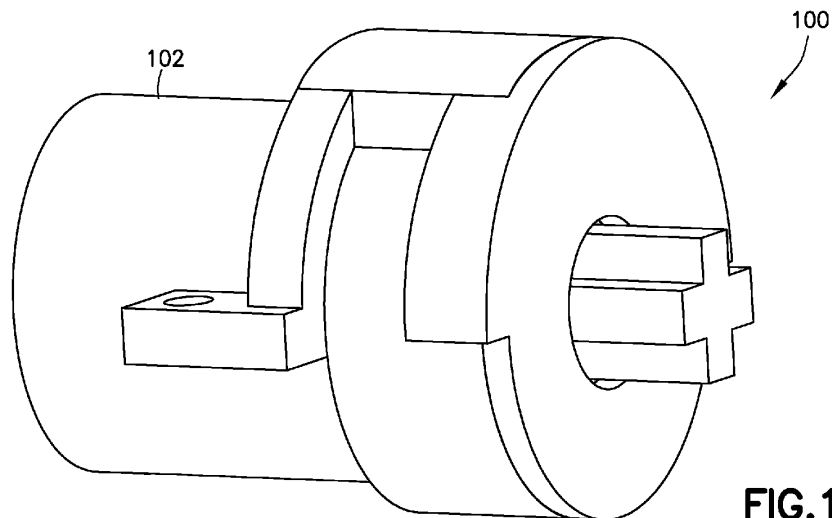


FIG. 1

(57) Abstract: A pump for the pumping small volumes of medical fluid is provided. The pump has a manifold chamber having an inlet port and an outlet port. Within the manifold chamber, a cannula having input and output holes oriented with respect to the inlet and outlet ports is rotated within the manifold chamber, and translated axially in a reciprocating manner. The input opening of the cannula overlaps with the inlet port as the manifold chamber volume is increasing to draw fluid into the manifold chamber from the input port. The output opening of the cannula overlaps with the output port as the manifold chamber volume is decreasing to force fluid out of the manifold chamber to the outlet port. The cannula may be formed from metal needle stock.

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