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(54) Title: IMPROVING ROBUSTNESS OF FLAPPER VALVE OPEN/CLOSE

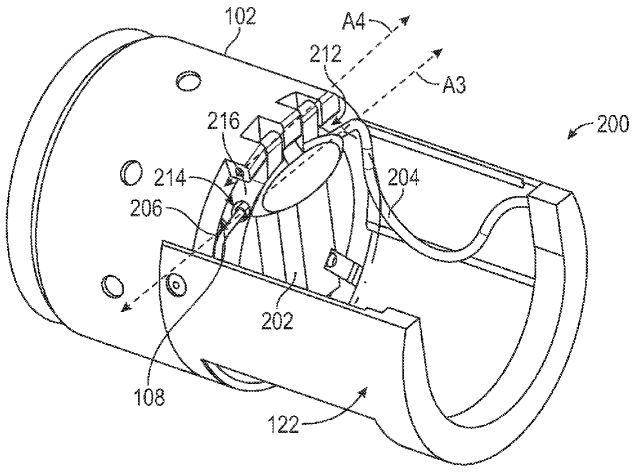

FIG. 5A

(57) Abstract: A valve assembly employed in subterranean wellbore systems includes a flapper member biased to a closed position by a pair of opposed wire springs. The wire springs provide sufficient torque to ensure robust operation of the flapper member and permit sufficient fluid flow through the limited space available in the valve assembly. A pair of symmetrical pair of wire springs may be robustly manufactured and individually installed without unnecessary accumulation of manufacturing tolerances or errors, thereby providing predictable torque levels to the flapper member. The wire springs may be secured in blind holes or other features defined in a circumferential surface of the flapper member to ensure the springs remain engaged with the flapper member throughout the operation of the valve assembly.

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