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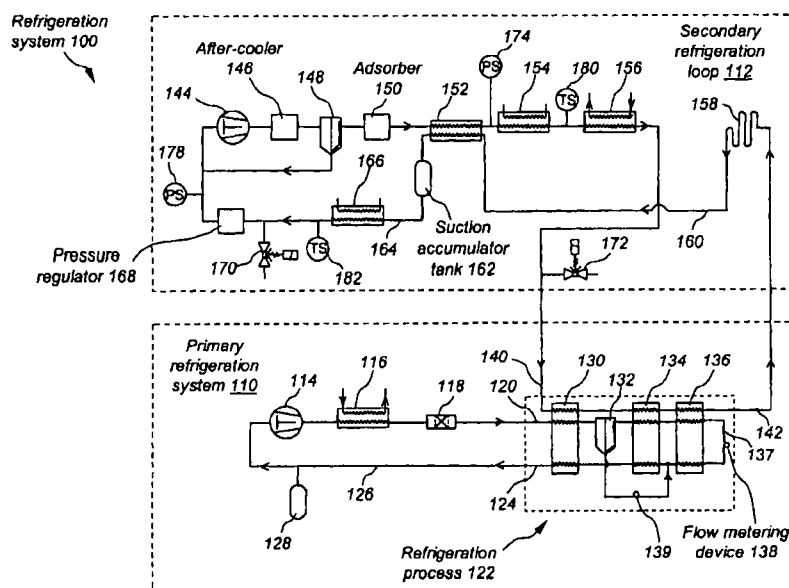
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[Continued on next page]

(54) Title: **ULTRA-LOW TEMPERATURE CLOSED-LOOP RECIRCULATING GAS CHILLING SYSTEM**



(57) Abstract: Disclosed is an ultra-low temperature, dual-compressor (114,144), recirculating gas chilling system that includes a closed-loop mixed-refrigerant primary refrigeration system (110) in combination with a closed-loop gas secondary refrigeration loop (112). The ultra-low temperature, dual-compressor (114,144), recirculating gas chilling system disclosed is capable of providing continuous long term chilled gas and fast cooling of a high or ambient temperature object (158), such as a chuck used in processing semiconductor wafers or any such device. The gas chilling system is characterized by three modes of operation: a normal cooling mode, a bakeout mode, and a post-bake cooling mode.

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