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12/512,732 30 July 2009 (30.07.2009) US(71) Applicant (for all designated States except US): **PRAXAIR TECHNOLOGY, INC.** [US/US]; 39 Old Ridgebury Road, Danbury, CT 06810 (US).

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Declarations under Rule 4.17:

— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))

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(54) Title: METHODS AND SYSTEMS FOR BULK ULTRA-HIGH PURITY HELIUM SUPPLY AND USAGE

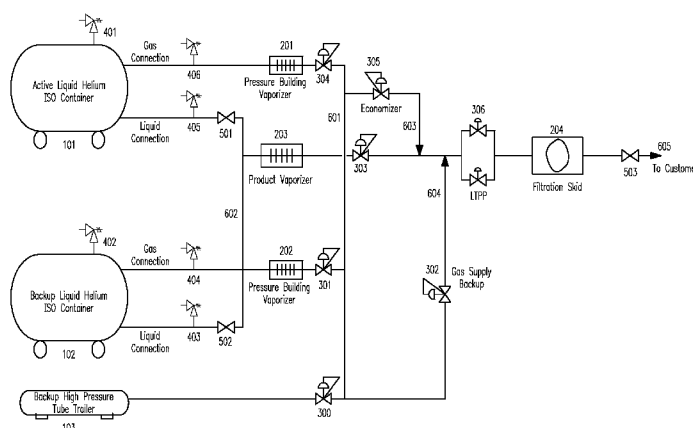


FIG. 1

(57) **Abstract:** This invention relates to methods and systems for reliable ultra-high purity (UHP) helium gas supply and maintaining dedicated onsite inventory. Specifically, the invention employs multiple ISO containers whereby vaporized UHP helium in the standby ISO container(s) is used to build-up pressure in the online ISO container. The thermal shields of the ISO containers can be used to decrease heat leaks into the backup ISO container thereby decreasing helium vaporation rate and the amount of gas needed to be withdrawn in order to maintain the maximum allowable working pressure (MAWP) of the vessel. An even lower supply rate is possible by drawing UHP helium gas using an economizer valve but maintaining liquid in the ISO container. This makes it possible to efficiently manage the supply rate, from low flows to higher flow requirements, and to optimize UHP helium draw rate from the storage vessels. A further advantage is that UHP helium gas sent to the customer is of higher purity since it comes directly from a liquid source. The UHP helium gas can be used in semiconductor manufacturing, e.g., as a carrier gas to introduce precursors into deposition chambers during thin film deposition on the wafers.



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- *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*
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