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(54) Title: DETECTING HAZARDOUS MATERIALS IN CONTAINERS UTILIZING NUCLEAR MAGNETIC RESONANCE
BASED MEASUREMENTS

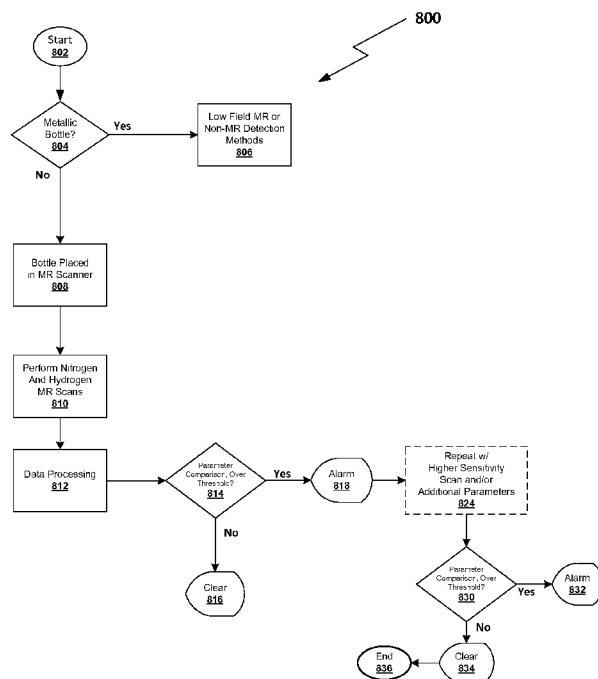


FIG. 8

(57) Abstract: A method of detecting hazardous materials in containers utilizing nuclear magnetic resonance (NMR) technology. The presence of precursors (e.g., H₂O₂) and/or nitrogen in the liquid in the container is determined by placing the container in a static magnetic field, exciting the container with electromagnetic pulses having a frequency corresponding to proton NMR and ¹⁴N NMR, and receiving radio frequency (RF) signals through a probe. The excitation pulses are configured to enable detection of the presence of precursors and nitrogen in the container, and may comprise a sequence of short RF pulses. The presence of nitrogen and/or explosive precursors is determined by detecting and evaluating NMR measurement signal amplitudes and relaxation times from the received RF signals. An apparatus comprising a magnet that generates a magnetic field and a probe that generates RF pulses and receives NMR measurement signals from the sampled container in accordance with the aforementioned method.



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