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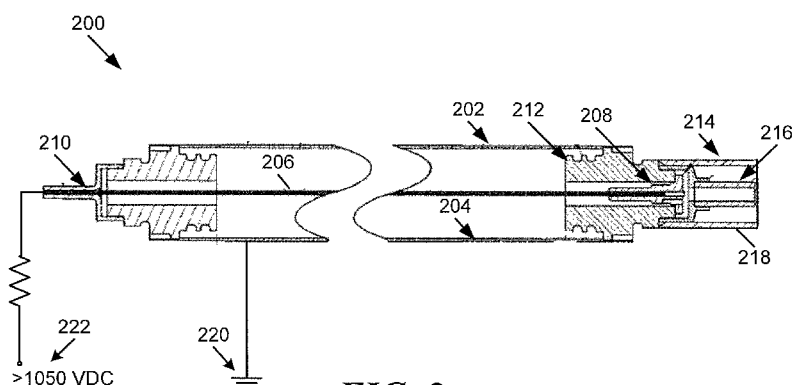


FIG. 2

(57) Abstract: An ionizing radiation detection system can include a self-quenching sensing element having a substantially sealed enclosure containing a plurality of gases. The plurality of gases can include an ionizing gas to ionize in response to receiving a particle of ionizing radiation. The plurality of gases can also include a halogen quenching gas. In a particular embodiment, the plurality of gases can include an oxygen-containing gas in an amount of at least approximately 5 % by pressure of a total pressure of the plurality of gases. In another particular embodiment, the partial pressure of the oxygen-containing gas can be from approximately 2666 Pa to approximately 16000 Pa. In another embodiment, the radiation detection system can include an anode having a composition that is more resistant to erosion by gasses within the sensing element.