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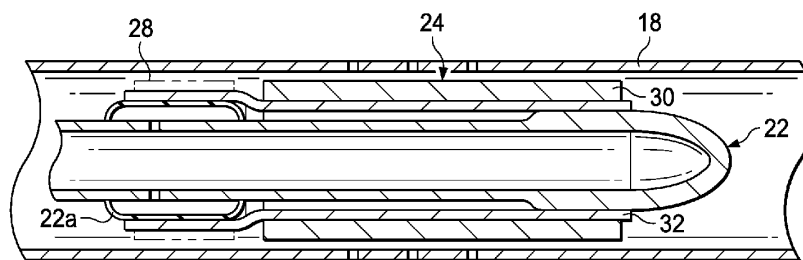


FIG. 2A

(57) Abstract: A metal patch for patching a downhole well casing comprises a metal sealant having a shape congruent with a section of the downhole well casing and transition-able from a first state to a second state. The metal sealant expands and hardens in response to hydrolysis. The metal sealant is one of an alkaline earth metal, a transition metal, and a metal oxide. The metal sealant can be one of an alkaline earth metal, a transition metal, and a metal oxide and at least one alloy, wherein the at least one alloy is selected from a group consisting of Al, Zn, Mn, Zr, Y, Nd, Gd, Ag, Ca, Sn, and RE. The at least one alloy can be alloyed with a dopant that promotes corrosion, such as Ni, Fe, Cu, Co, Ir, Au, and Pd. The at least one alloy can be alloyed with a dopant that inhibits passivation.



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