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Glew et al.

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(54) **METHOD FOR HIGH RATE DEPOSITION OF TUNGSTEN**

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(52) **U.S. Cl.** **438/680**; 438/683; 438/685; 438/780; 427/124; 427/126.1; 427/126.2

(58) **Field of Search** 427/124, 126.1, 427/126.2; 438/780, 680, 683, 685

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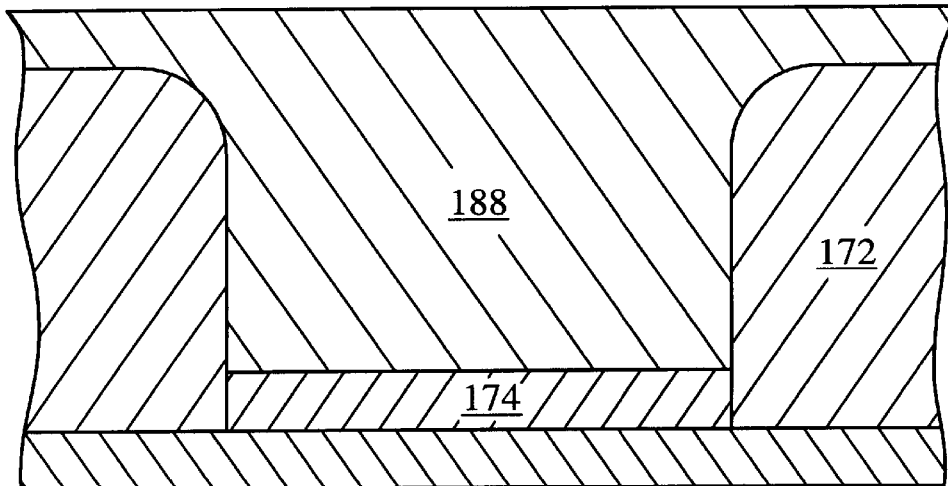
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(57) **ABSTRACT**

A method and apparatus to control the deposition rate of a refractory metal film in a semiconductor fabrication process by controlling a quantity of ethylene present. The method includes placing a substrate in a deposition zone, of a semiconductor process chamber, flowing, into the deposition zone, a process gas including a refractory metal source, an inert carrier gas, and a hydrocarbon. Typically, the refractory metal source is tungsten hexafluoride, WF₆, and the inert gas is argon, Ar. The ethylene may be premixed with either the argon or the tungsten hexafluoride to form a homogenous mixture. However, an in situ mixing apparatus may also be employed.

15 Claims, 8 Drawing Sheets



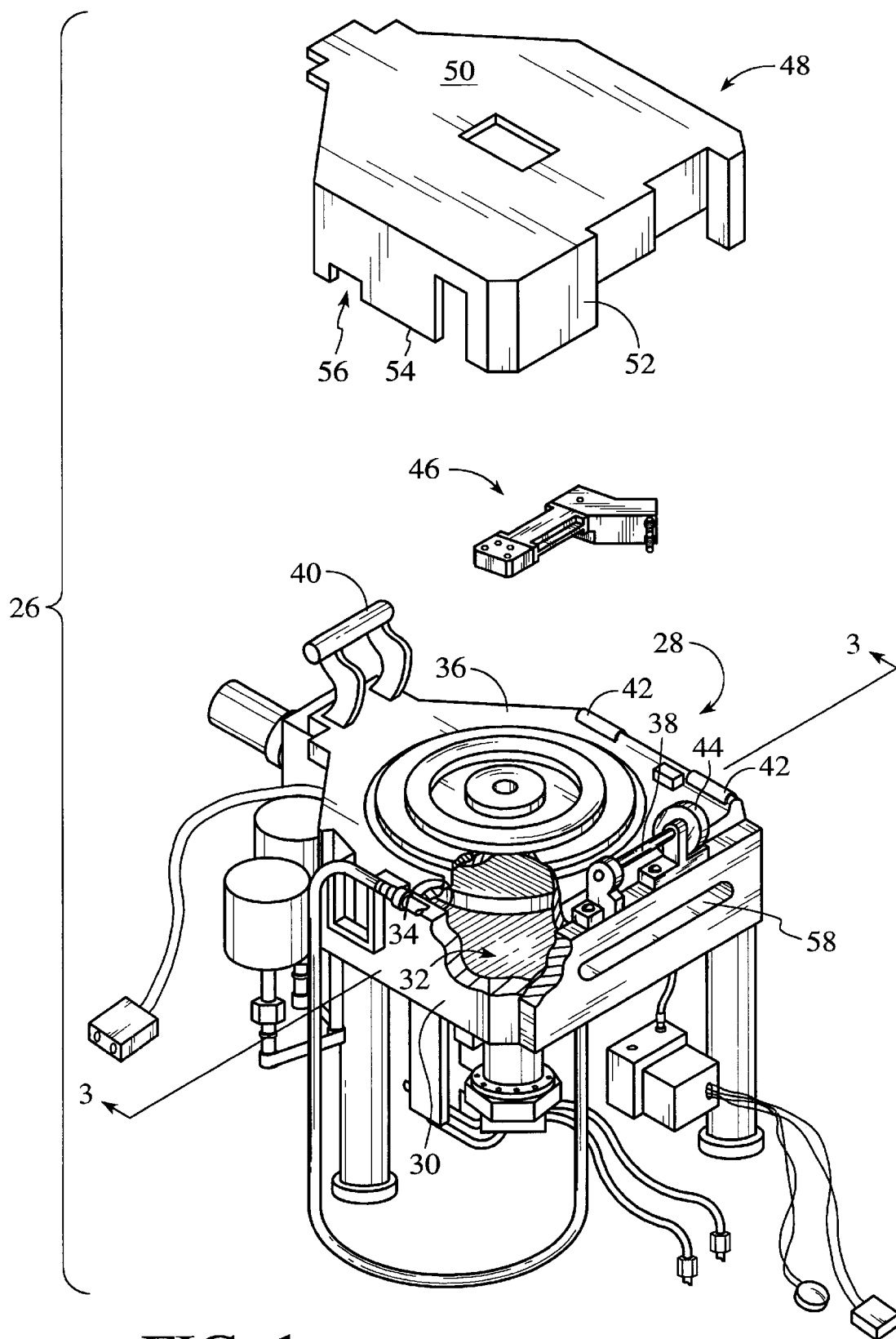


FIG. 1

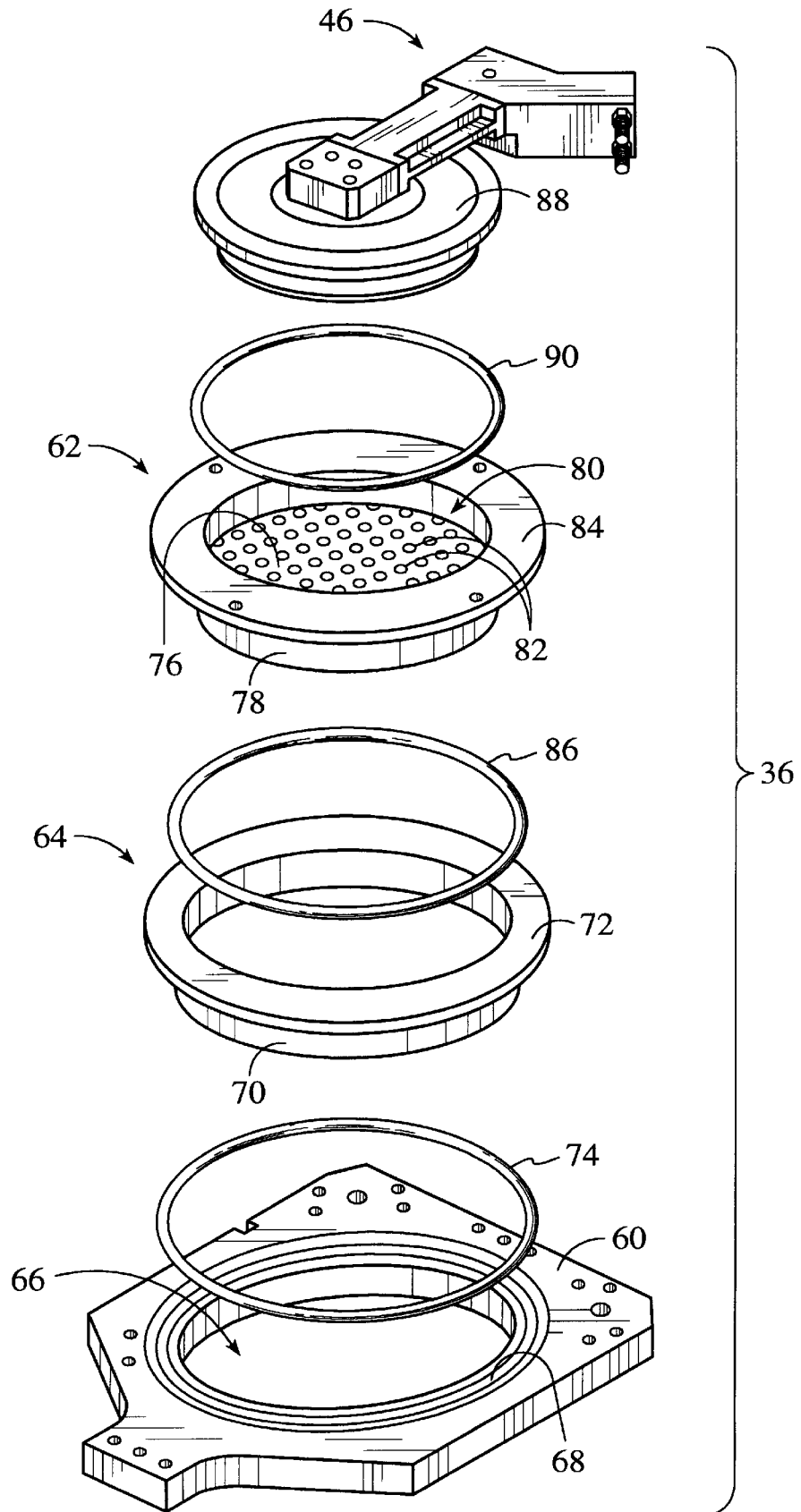


FIG. 2

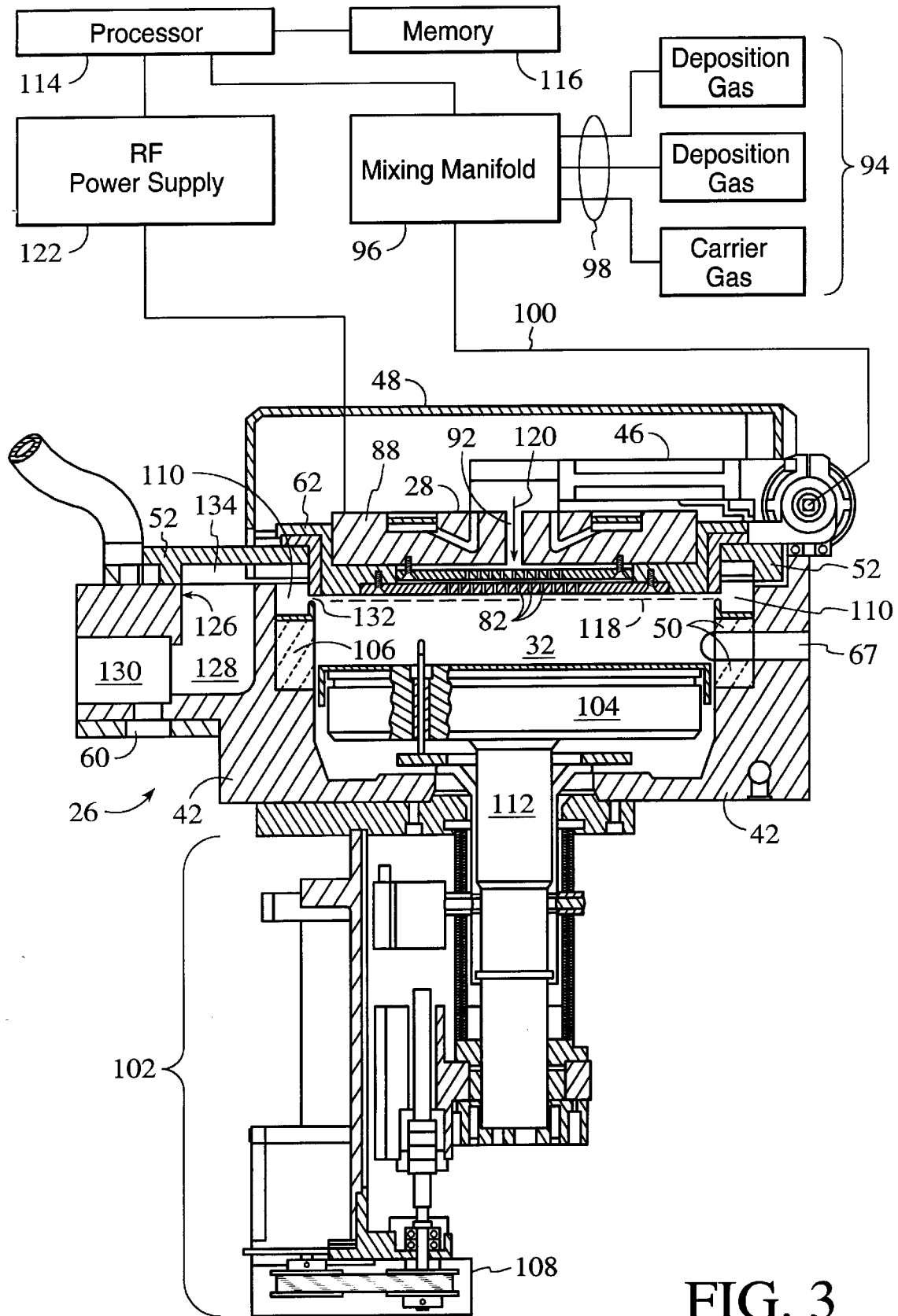
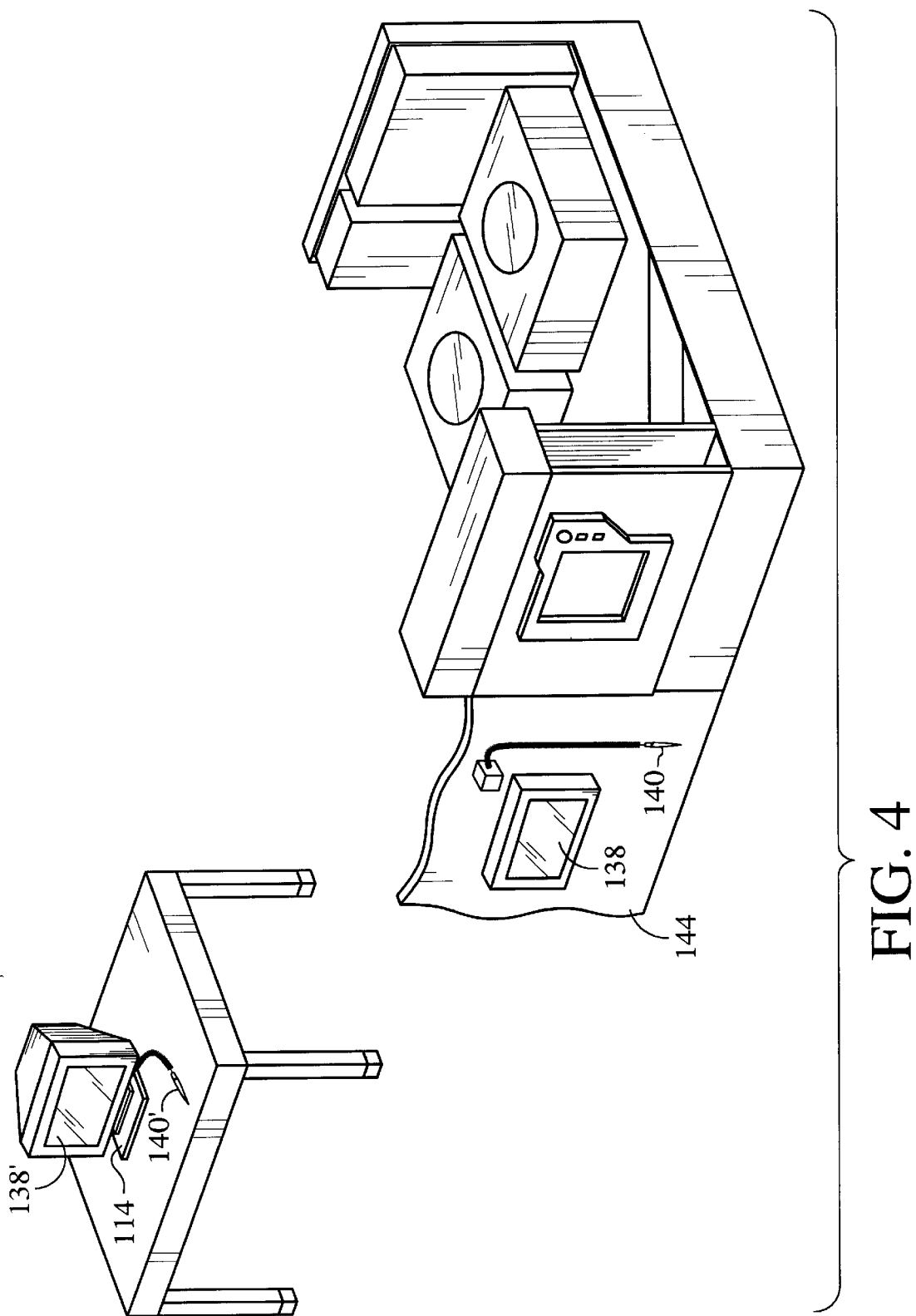


FIG. 3



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