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Sekiguchi et al.

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[54] **SEMICONDUCTOR APPARATUS WITH TUNGSTEIN NITRIDE**

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[21] Appl. No.: **751,810**

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Related U.S. Application Data

[62] Division of Ser. No. 646,535, May 8, 1996.

[30] Foreign Application Priority Data

May 9, 1995	[JP]	Japan	7-110433
Aug. 3, 1995	[JP]	Japan	7-198502

[51] Int. Cl.⁶ **H01L 23/02**

[52] U.S. Cl. **257/383; 257/412; 257/751; 257/763; 257/924**

[58] Field of Search **257/924, 751, 257/412, 382, 383, 763, 767, 770**

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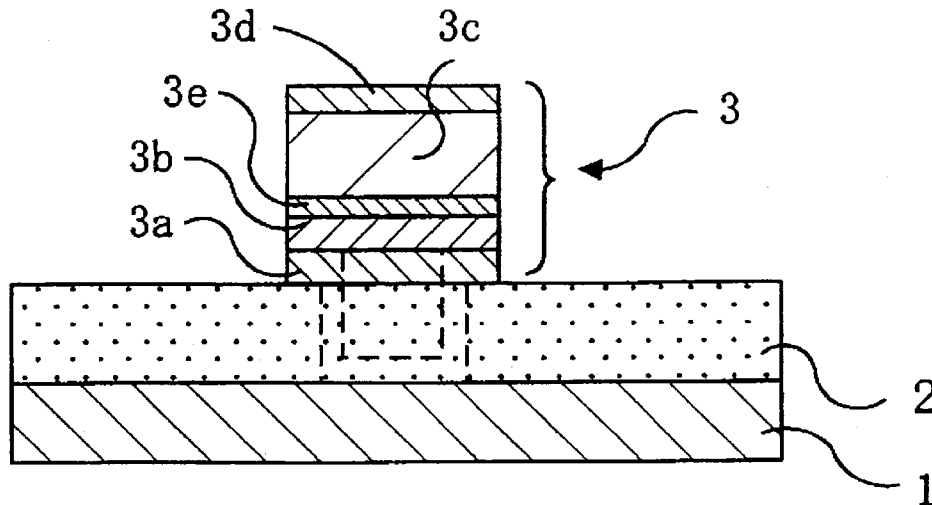
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[57] ABSTRACT

Through exposure of the top surface of a tungsten film to plasma of a gas including nitrogen at a temperature of 550° C. or less, a tungsten nitride layer having a structure in which nitrogen atoms and tungsten atoms are bonded is formed in an area in the vicinity of the surface of the tungsten film. Then, an aluminum alloy film is deposited on the tungsten film, thereby forming a metallic interconnection. Since the nitrogen atoms and the tungsten atoms are bonded in the tungsten nitride layer formed by such plasma nitridation, the tungsten nitric layer not only has a good barrier function to prevent the diffusion of other metal atoms but also can be formed in a small thickness. Accordingly, formation of an alloy layer with a high resistance otherwise caused due to counter diffusion during an annealing process and a junction leakage can be avoided.

8 Claims, 14 Drawing Sheets



TSMC Exhibit 1026

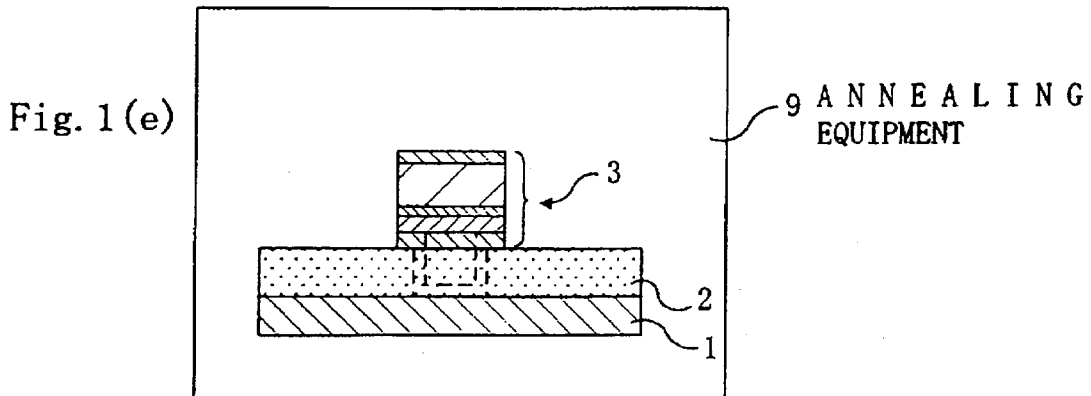
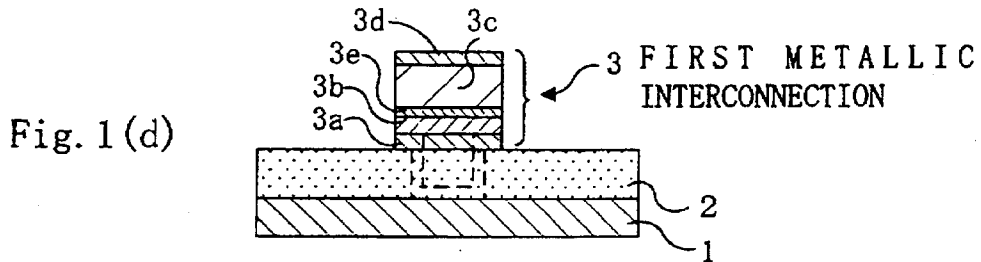
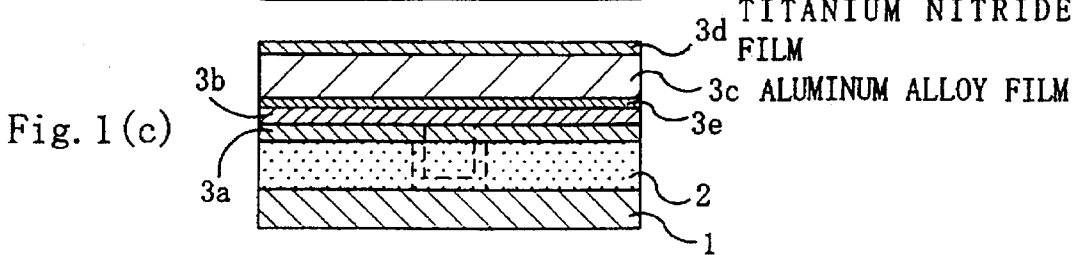
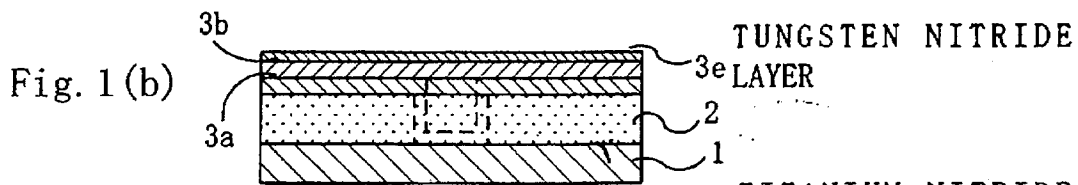
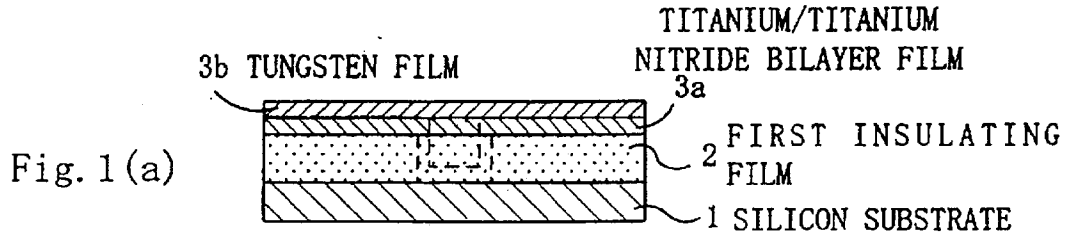
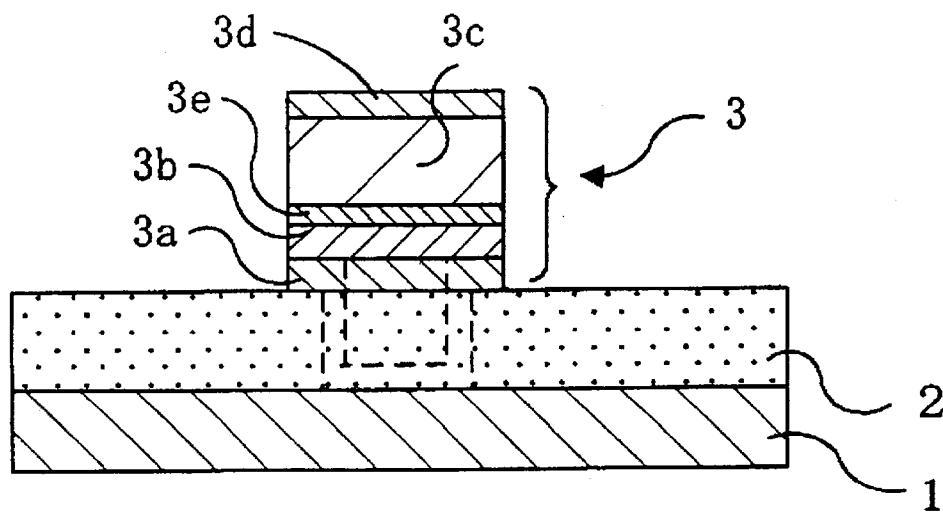


Fig. 2



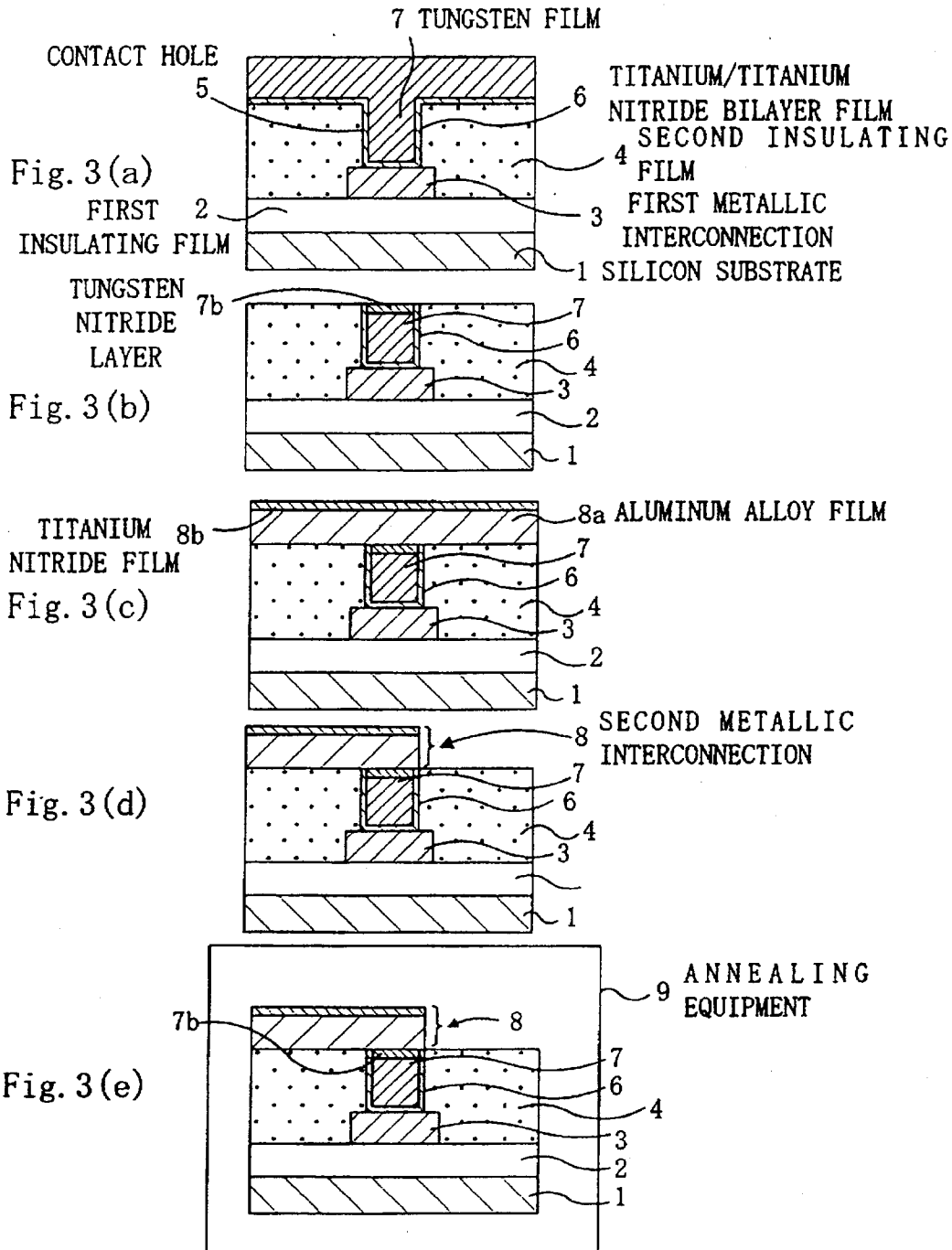
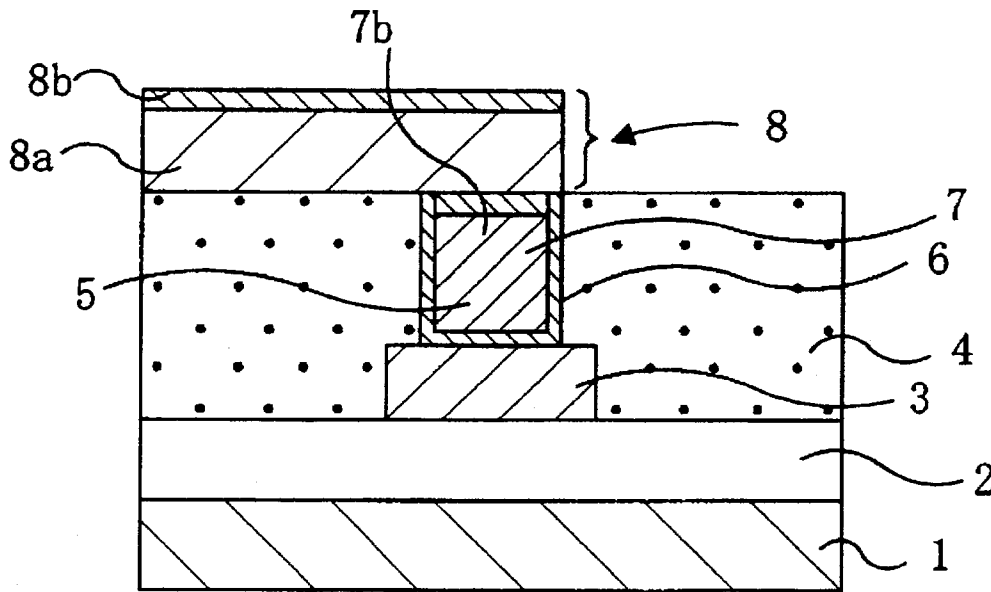


Fig. 4



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