# EXHIBIT 8

US006140023A

# United States Patent [19]

## Levinson et al.

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[45] **Date of Patent:** Oct. 31, 2000

[54] **METHOD FOR TRANSFERRING PATTERNS CREATED BY LITHOGRAPHY**

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[21] Appl. No.: **09/203,447**

[22] Filed: **Dec. 1, 1998**

[51] **Int. Cl.**[7] ........................................................ **G03F 9/00**

[52] **U.S. Cl.** ................................. **430/313**; 216/41; 216/51

[58] **Field of Search** .................................... 430/313, 317, 430/318, 322, 323, 325, 966, 967; 216/41, 51

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[57] **ABSTRACT**

A lithographic process for fabricating sub-micron features is provided. A silicon containing ultra-thin photoresist is formed on an underlayer surface to be etched. The ultra-thin photoresist layer is patterned with short wavelength radiation to define a pattern. The ultra-thin photoresist is oxidized so as to convert the silicon therein to silicon dioxide. The oxidized ultra-thin photoresist layer is used as a hard mask during an etch step to transfer the pattern to the underlayer. The etch step includes an etch chemistry that is highly selective to the underlayer over the oxidized ultra-thin photoresist layer.
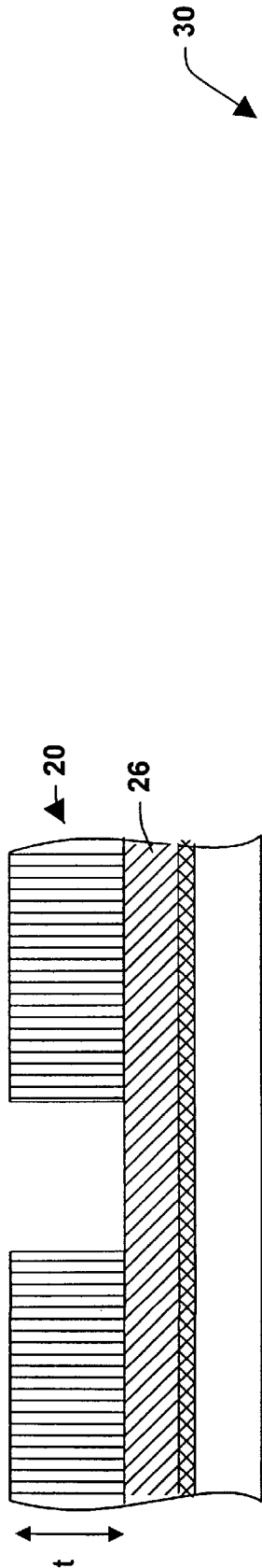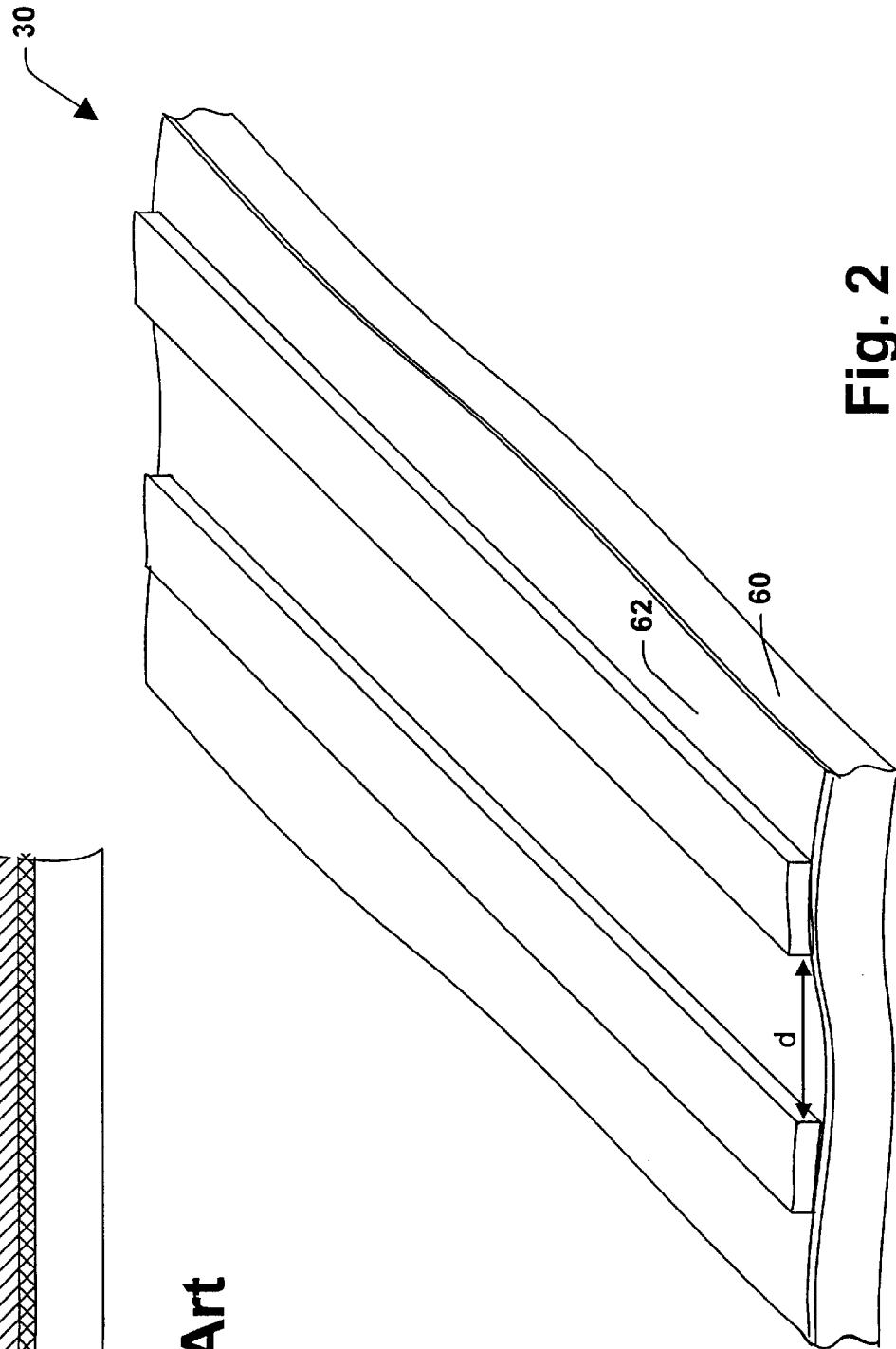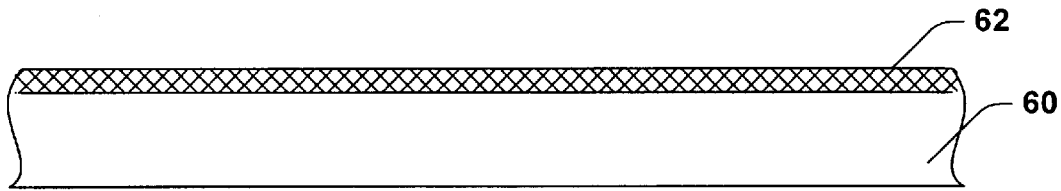
**30 Claims, 11 Drawing Sheets**
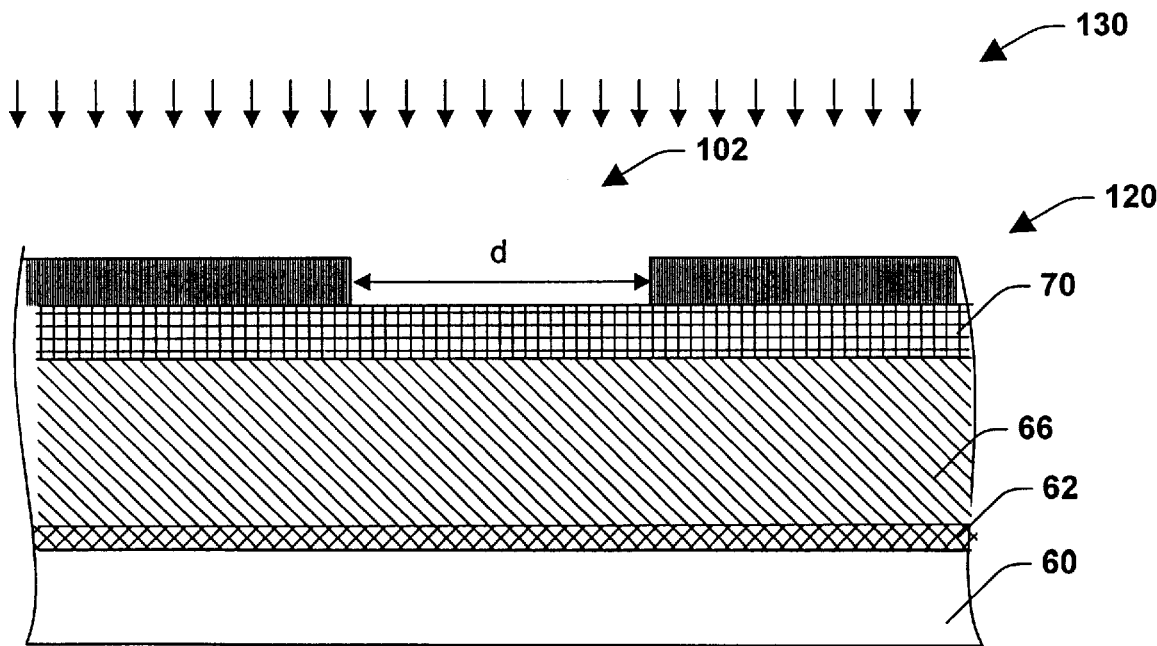
Fig. 2

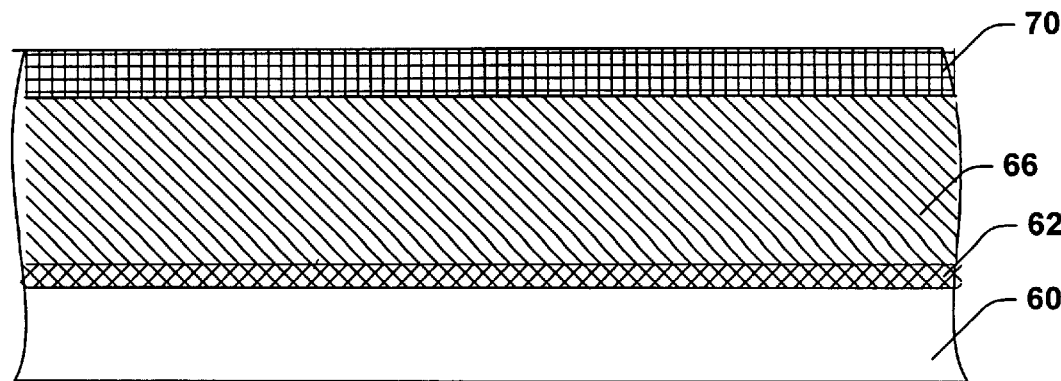Fig. 1
Prior Art

Fig. 3
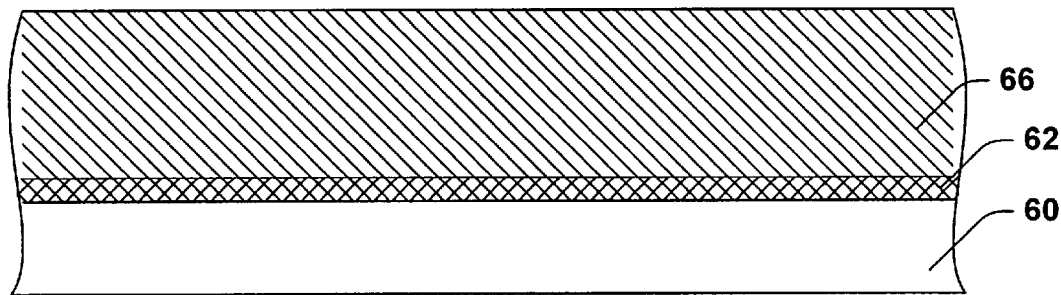


Fig. 4



Fig. 5

Fig. 6



Fig. 7

# DOCKET ALARM
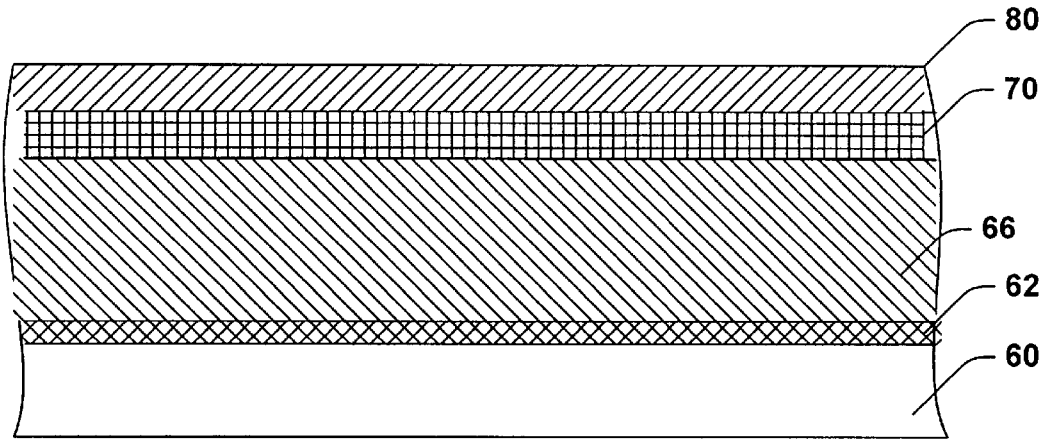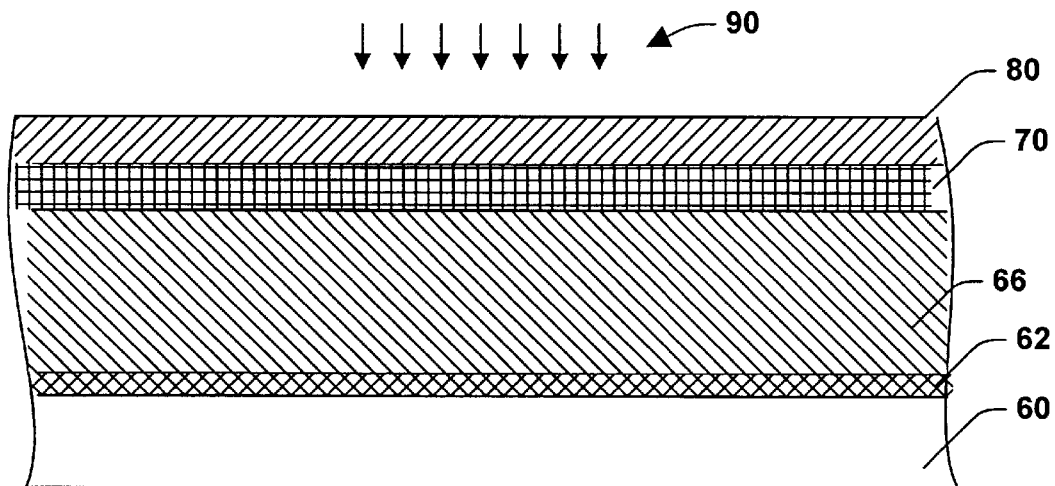
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