

FIG. 1A

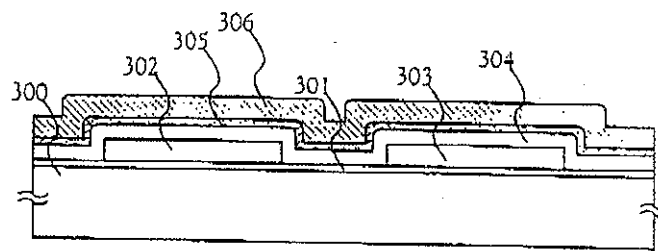


FIG. 1B

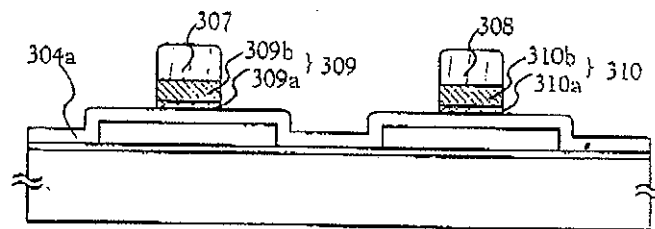


FIG. 1C

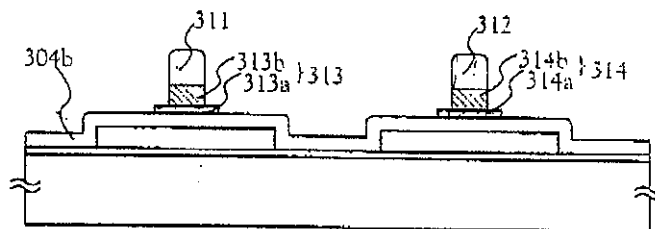


FIG. 1D

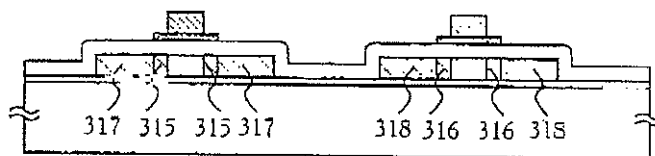


FIG. 1E

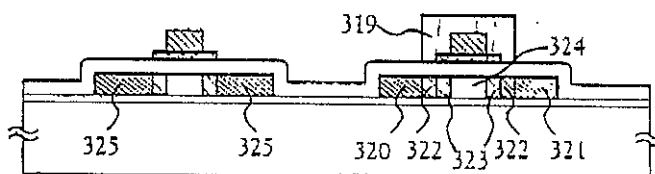
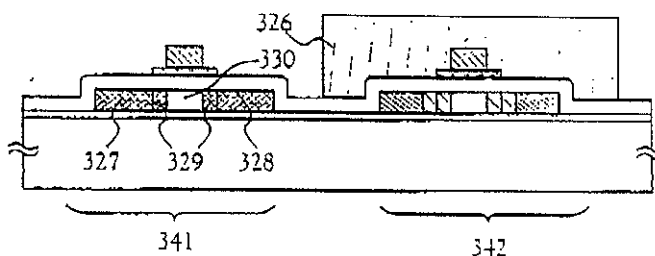


FIG. 1F



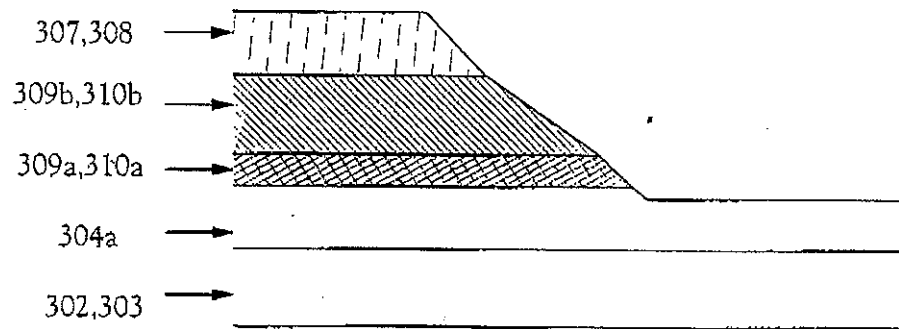


FIG. 2A

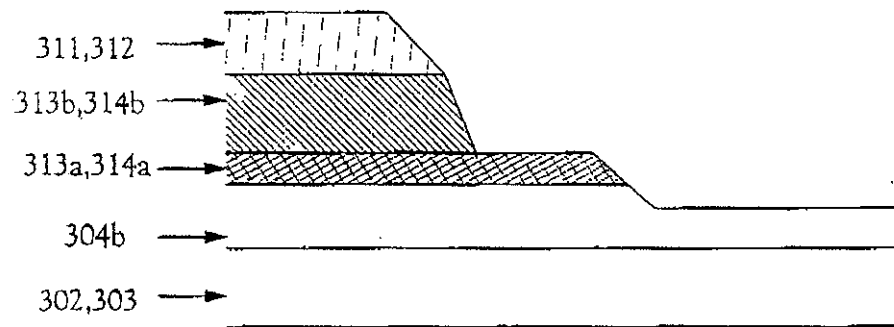


FIG. 2B

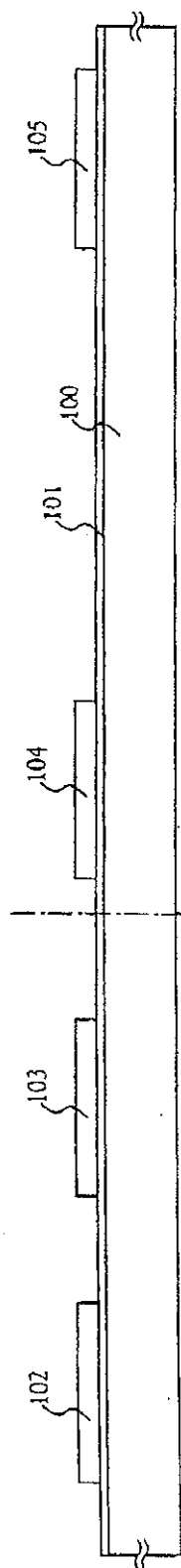


FIG. 3A

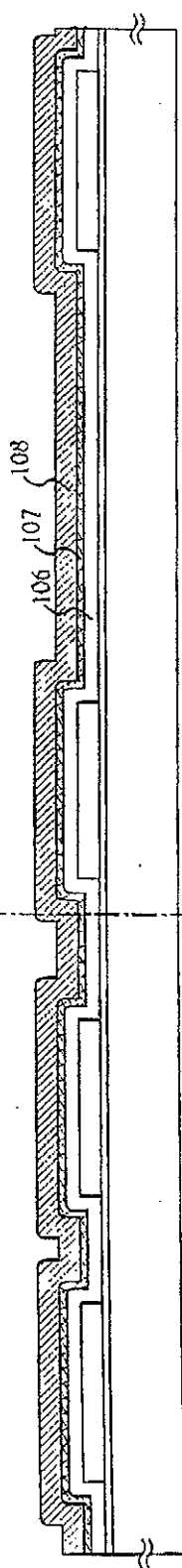


FIG. 3B

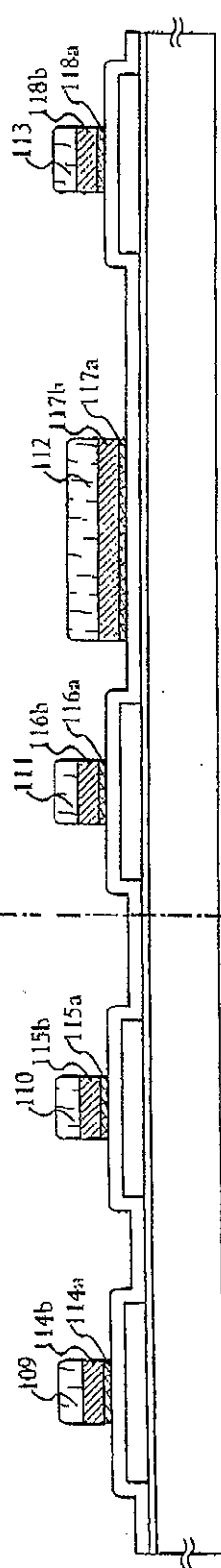


FIG. 3C

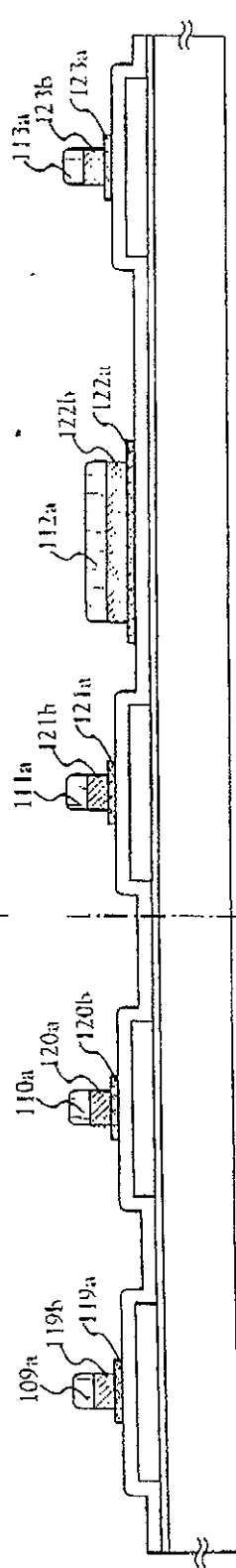


FIG. 3D

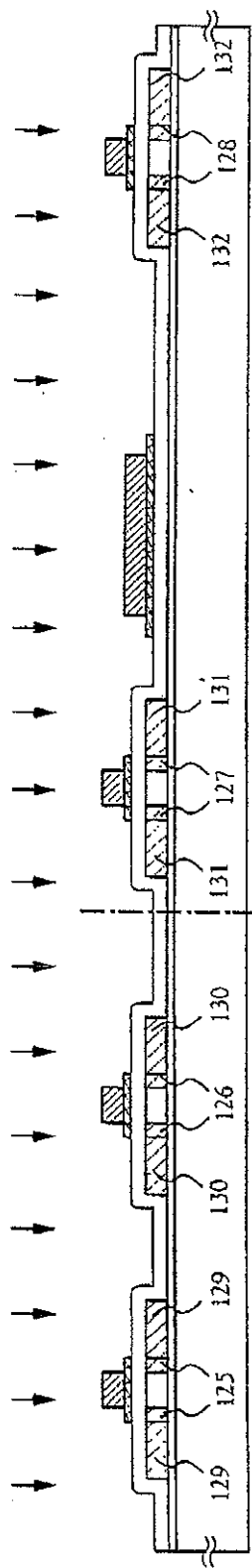


FIG. 4A

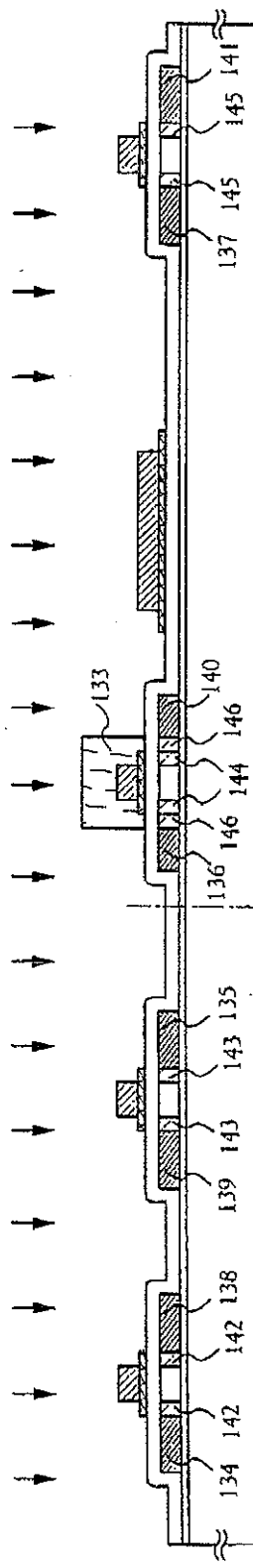


FIG. 4B

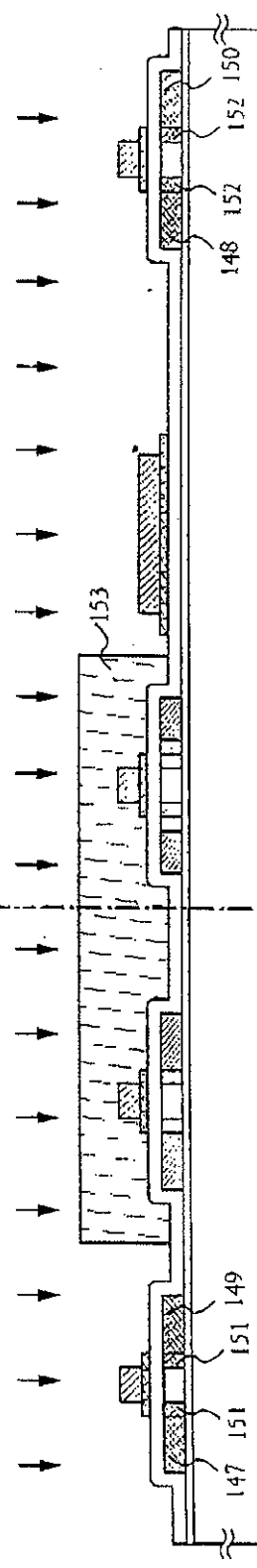


FIG. 4C

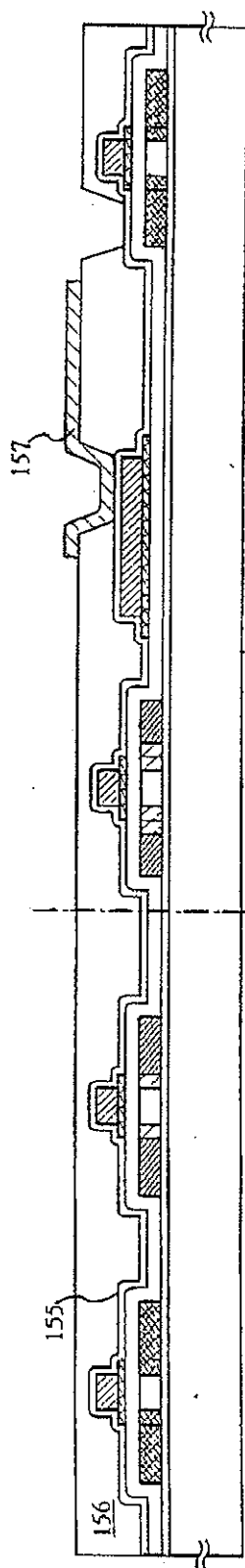


FIG. 5A

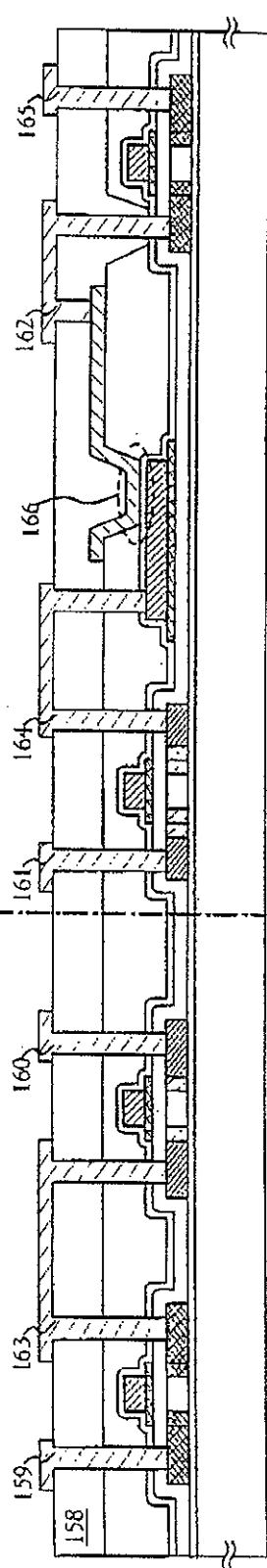


FIG. 5B

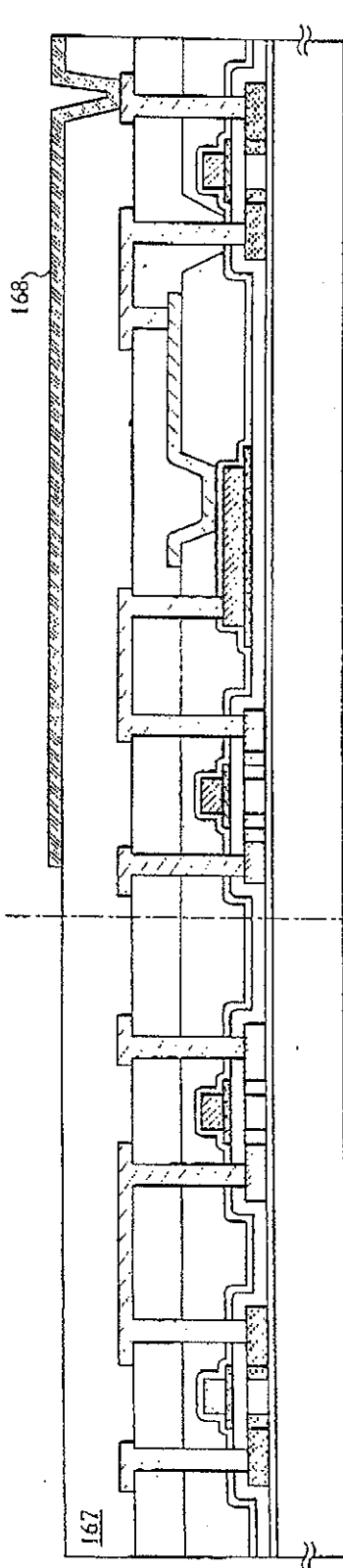


FIG. 5C

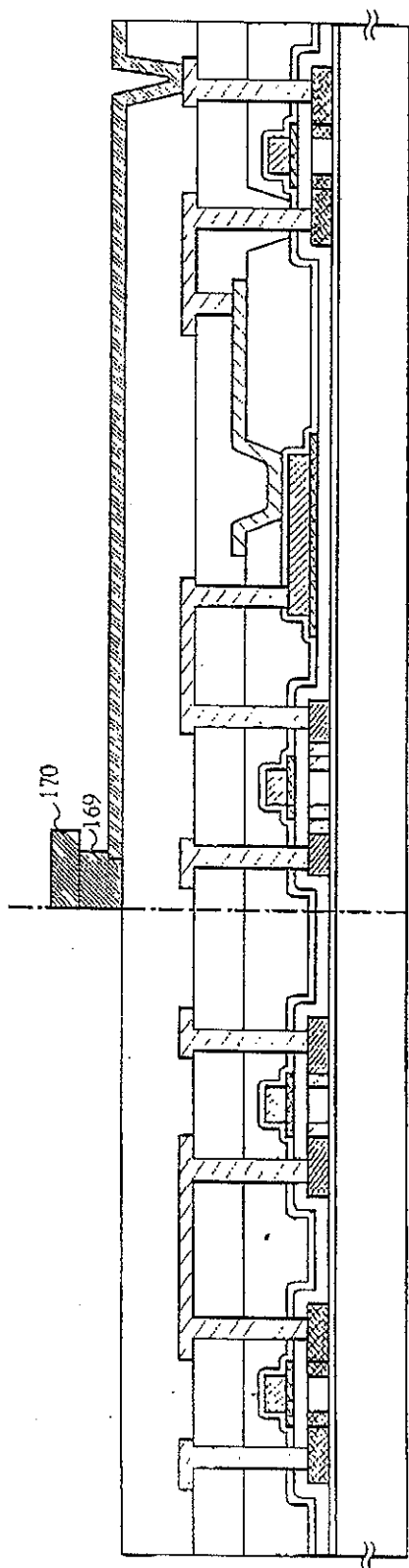


FIG. 6A

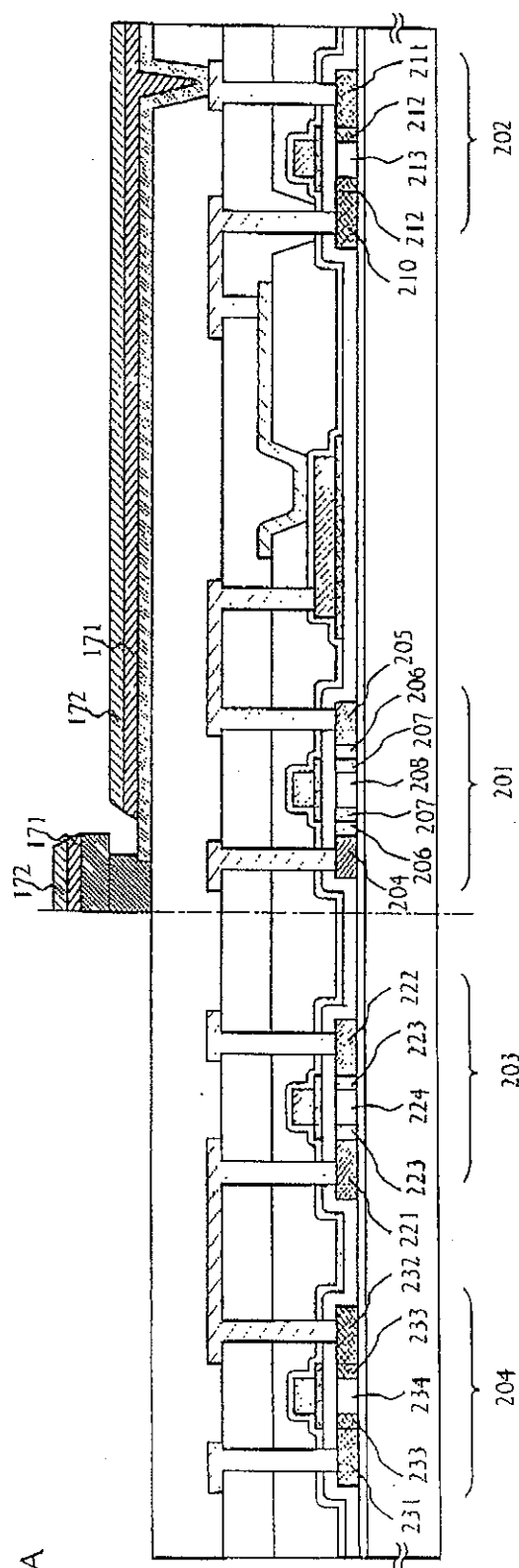


FIG. 6B

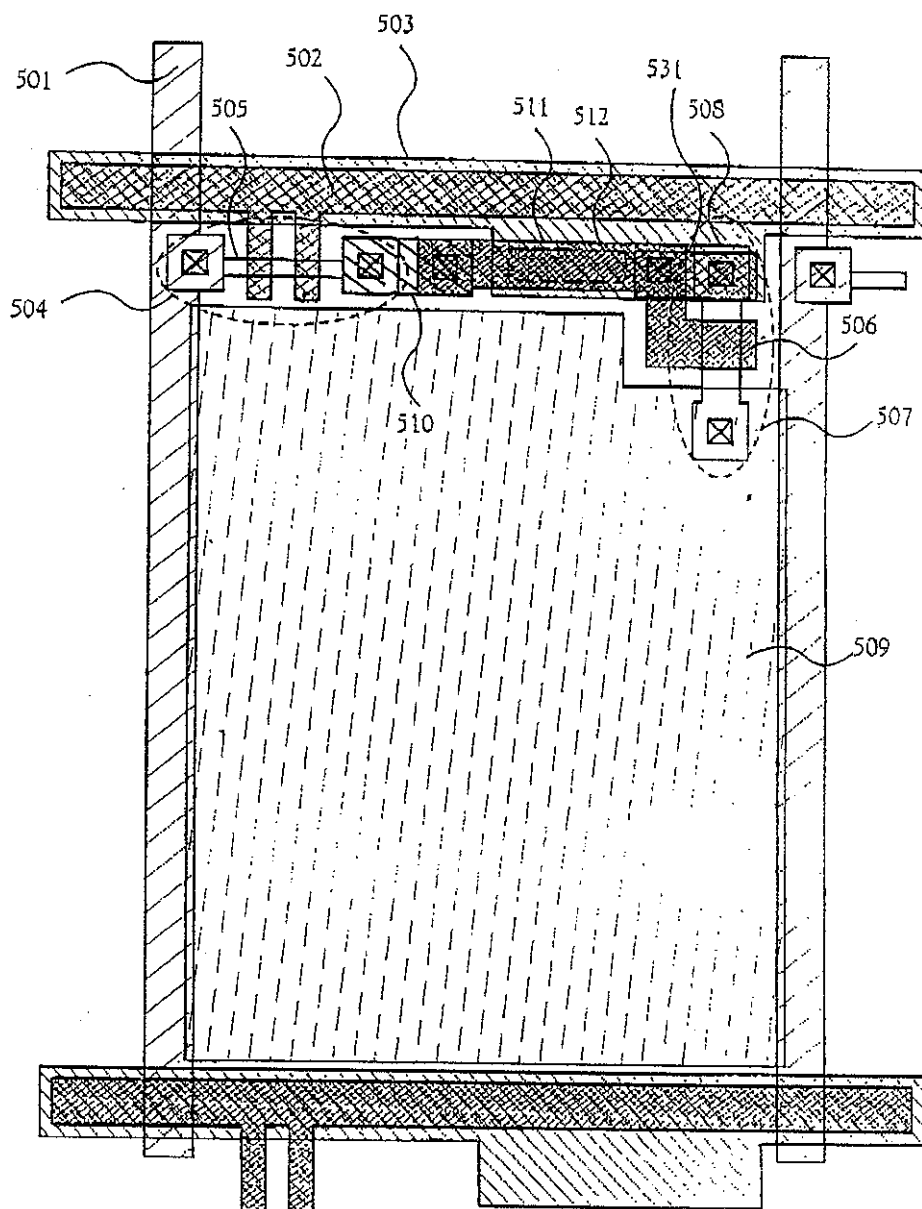


FIG. 7A

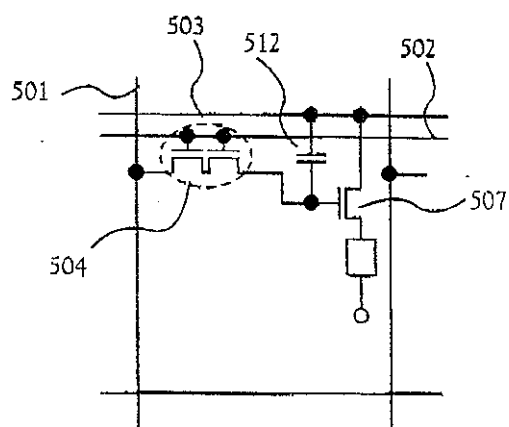


FIG. 7B

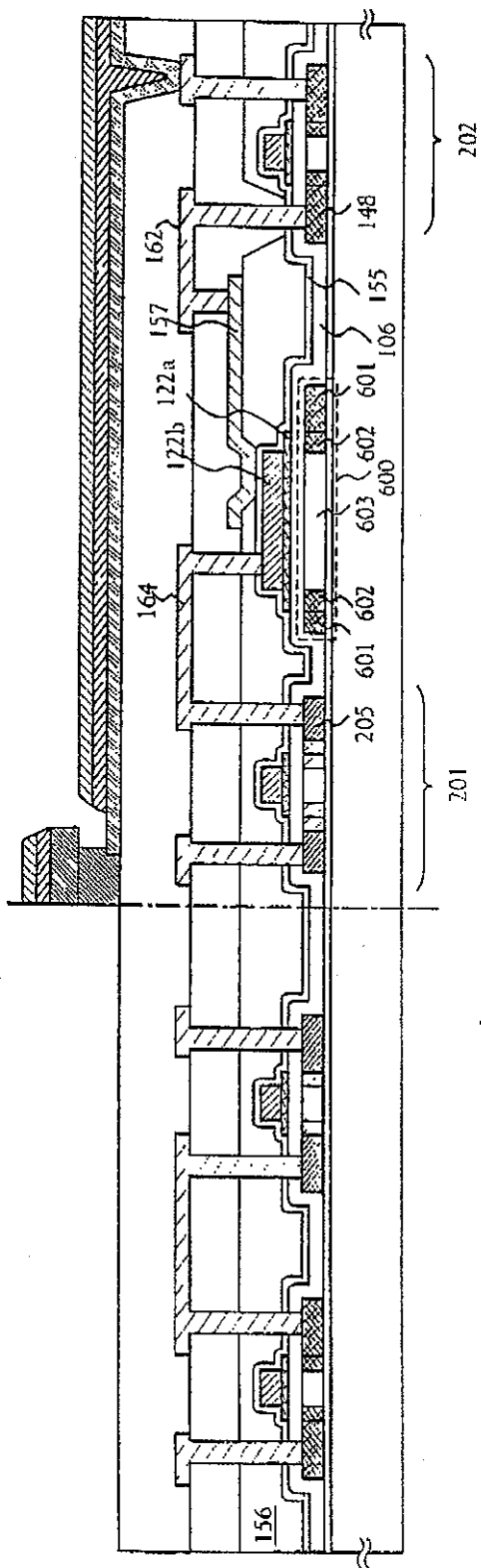


FIG. 8

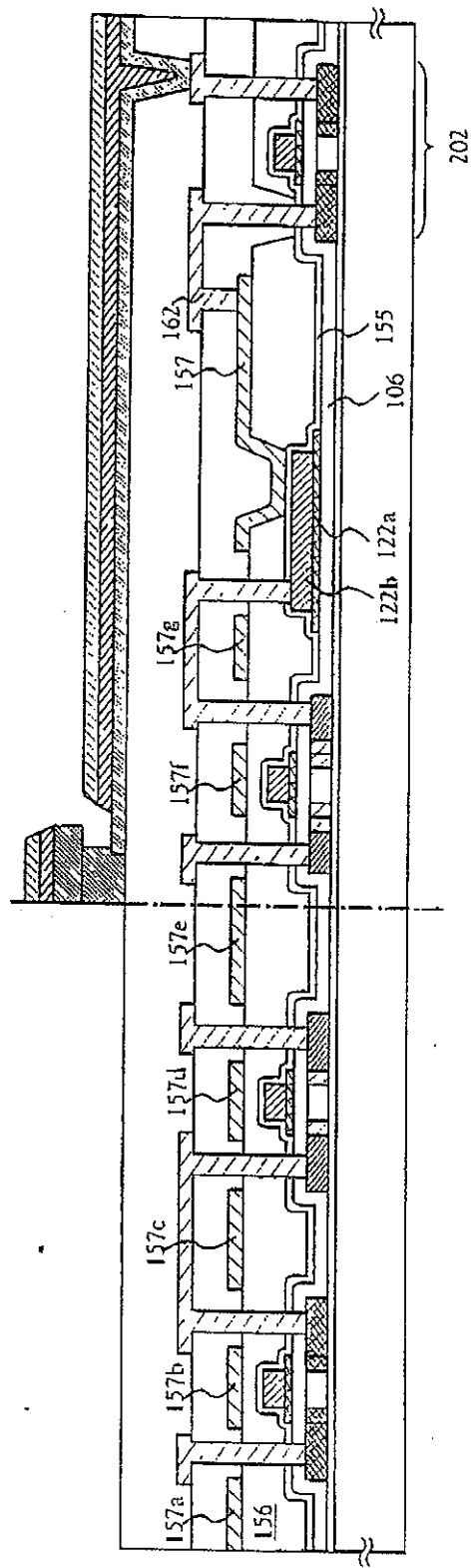


FIG. 9

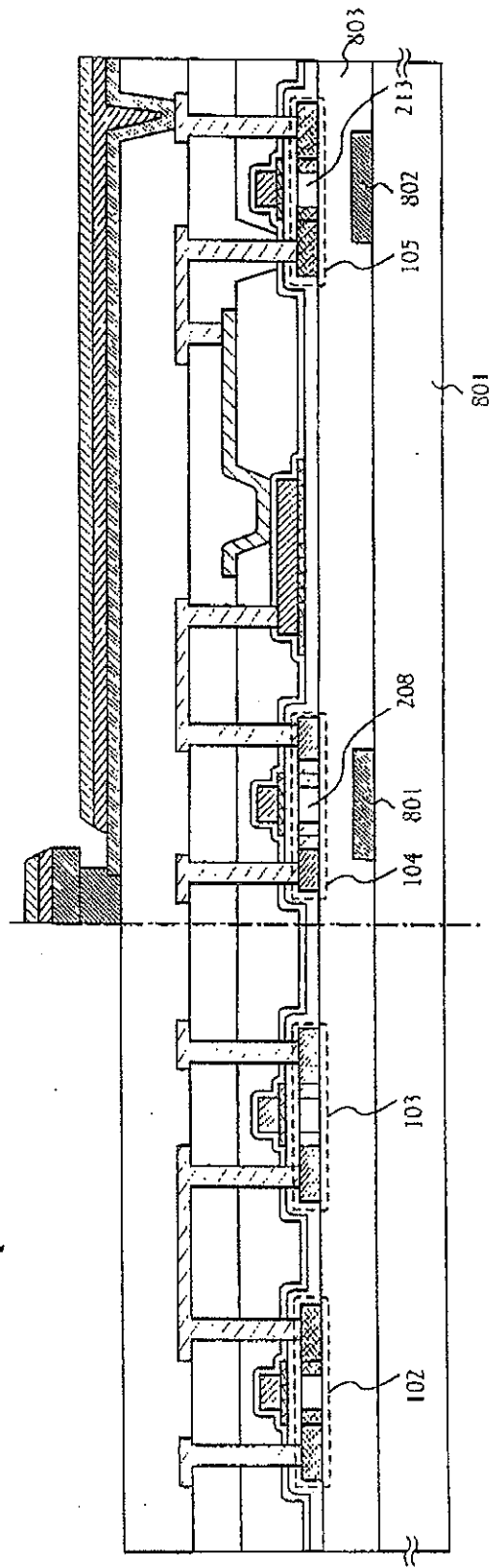


FIG. 10

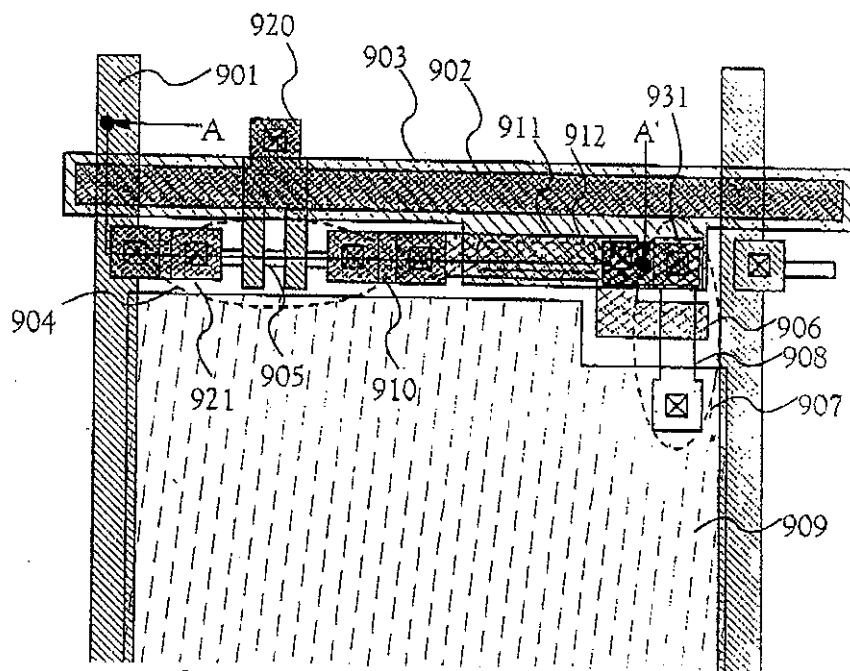


FIG. 11A

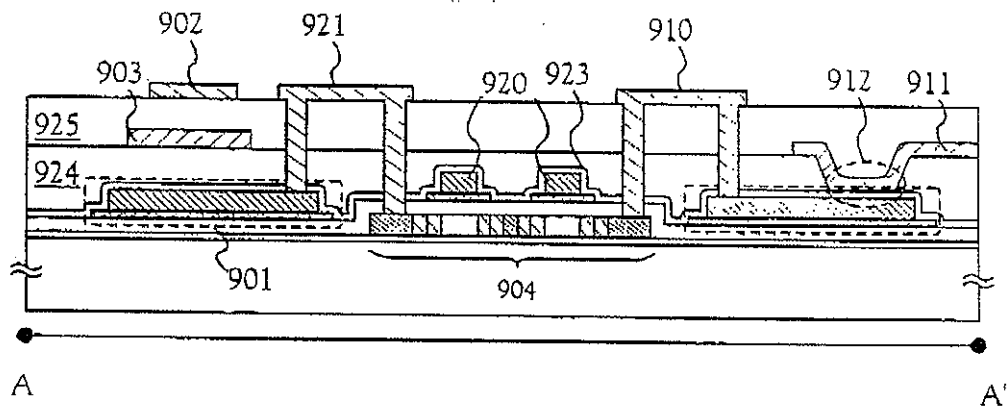


FIG. 11B

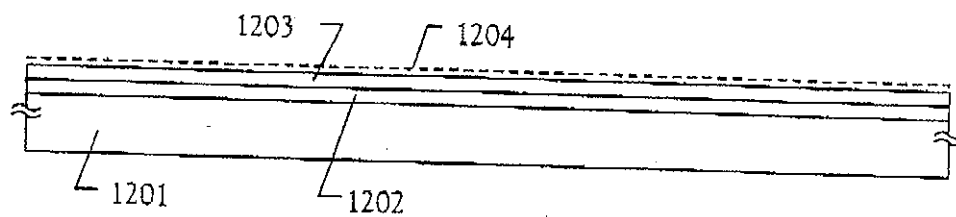


FIG. 12A

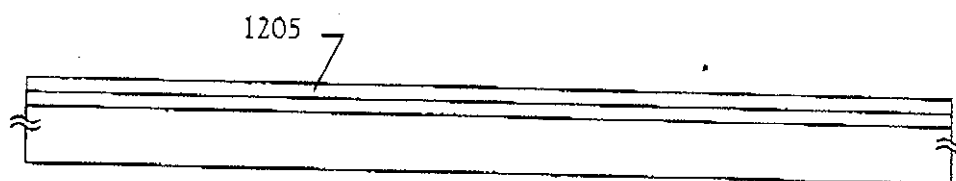


FIG. 12B

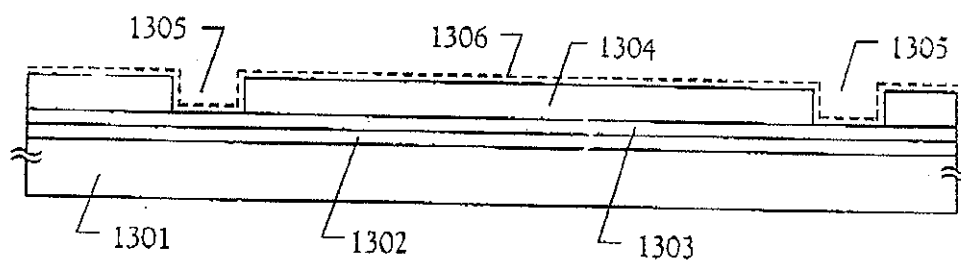


FIG. 13A

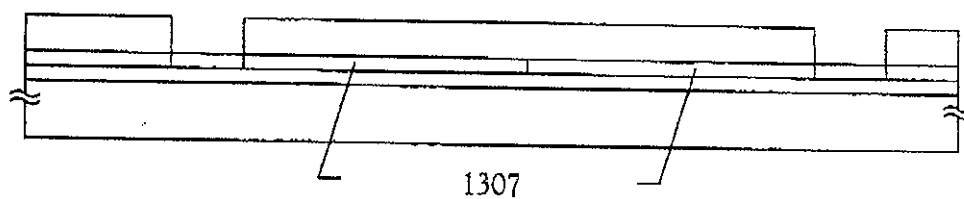


FIG. 13B

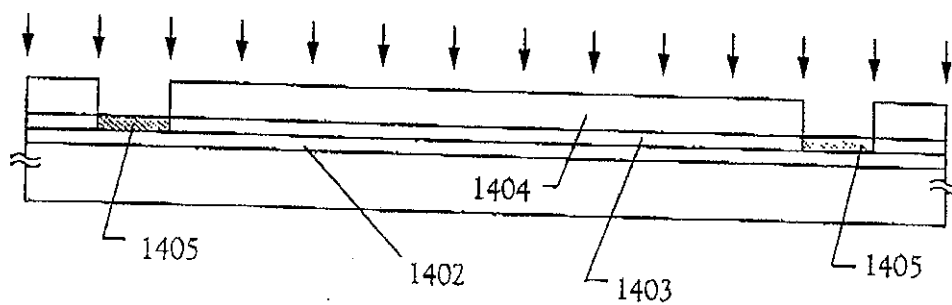


FIG. 14A

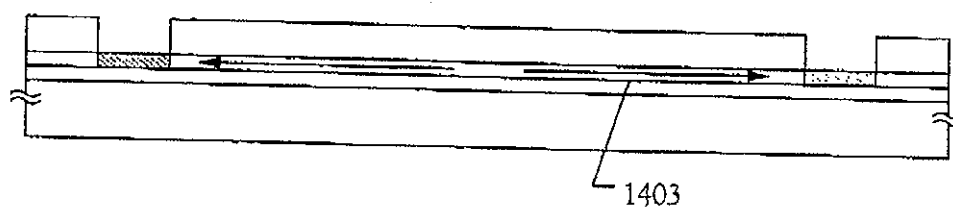


FIG. 14B

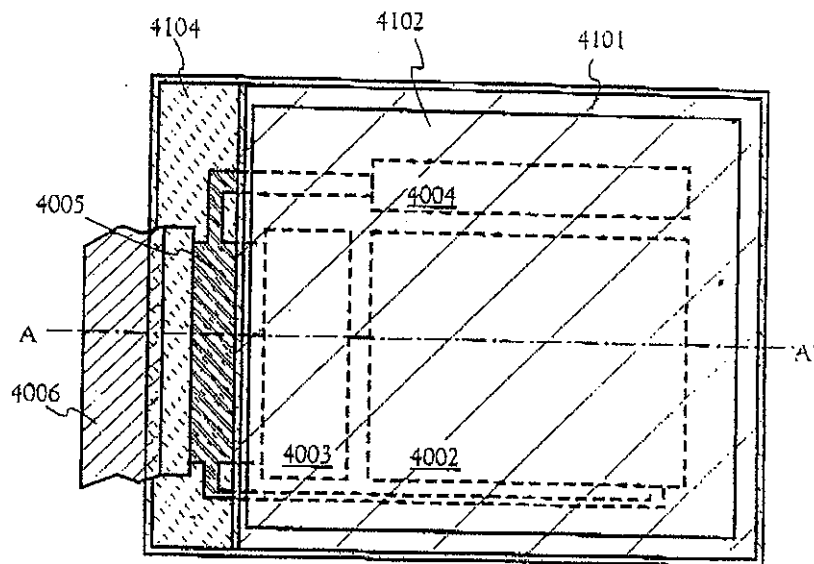


FIG. 15A

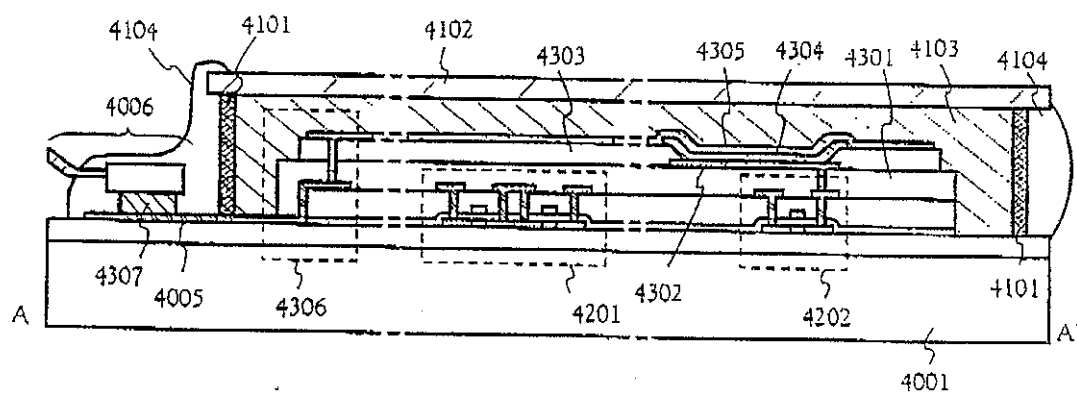


FIG. 15B

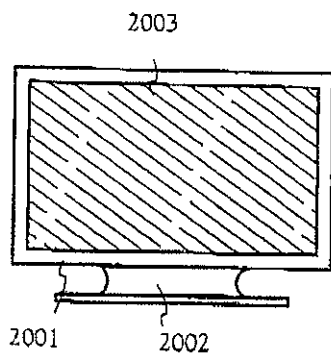


FIG. 16A

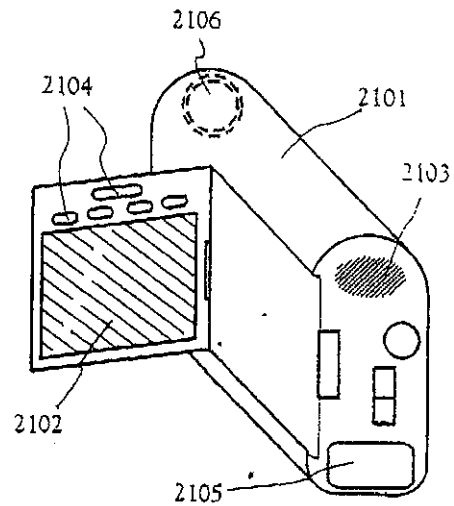


FIG. 16B

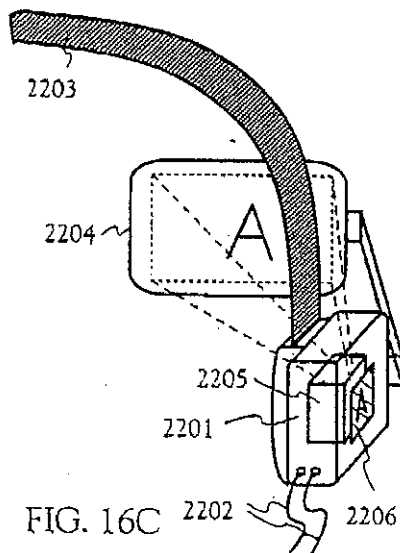


FIG. 16C

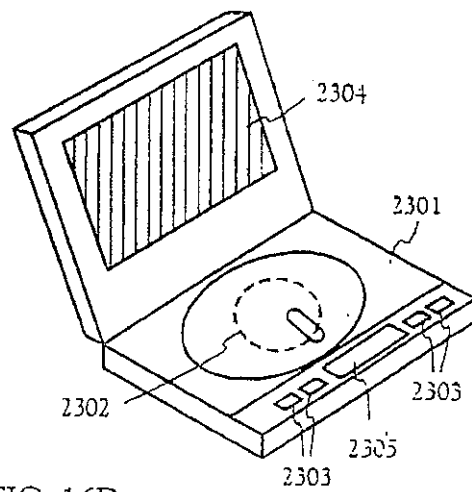


FIG. 16D

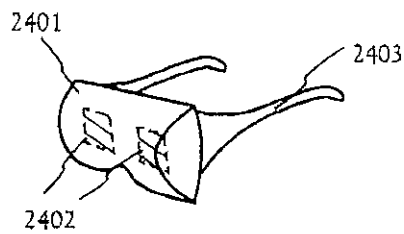


FIG. 16E

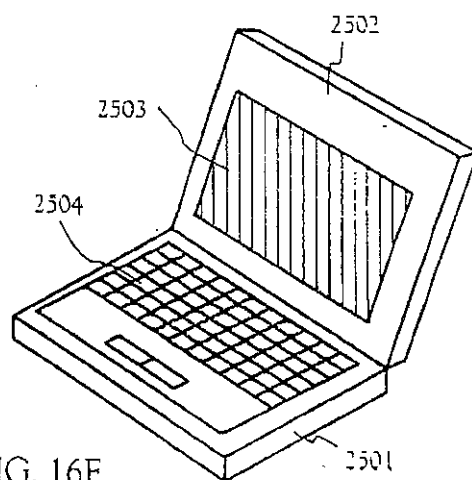


FIG. 16F

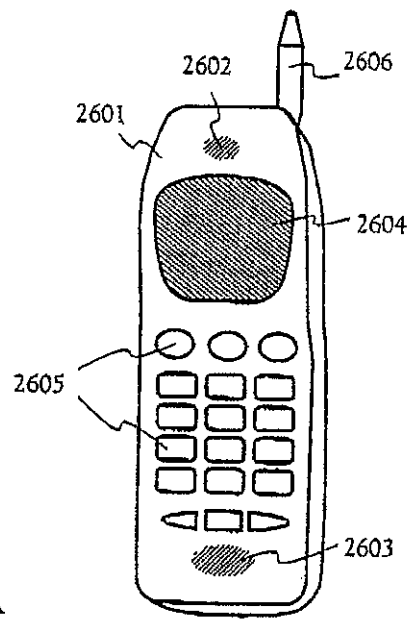


FIG. 17A

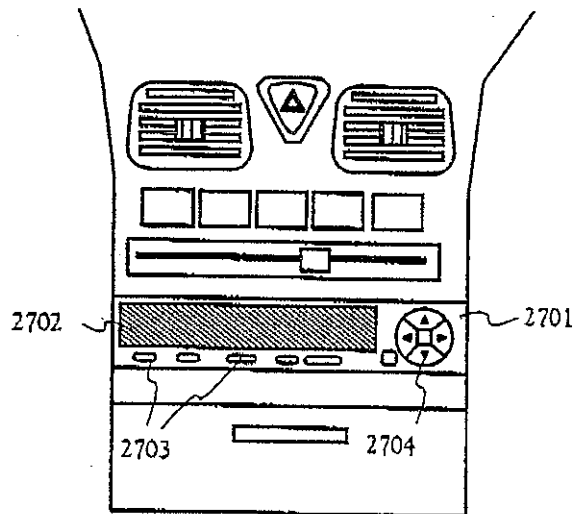


FIG. 17B

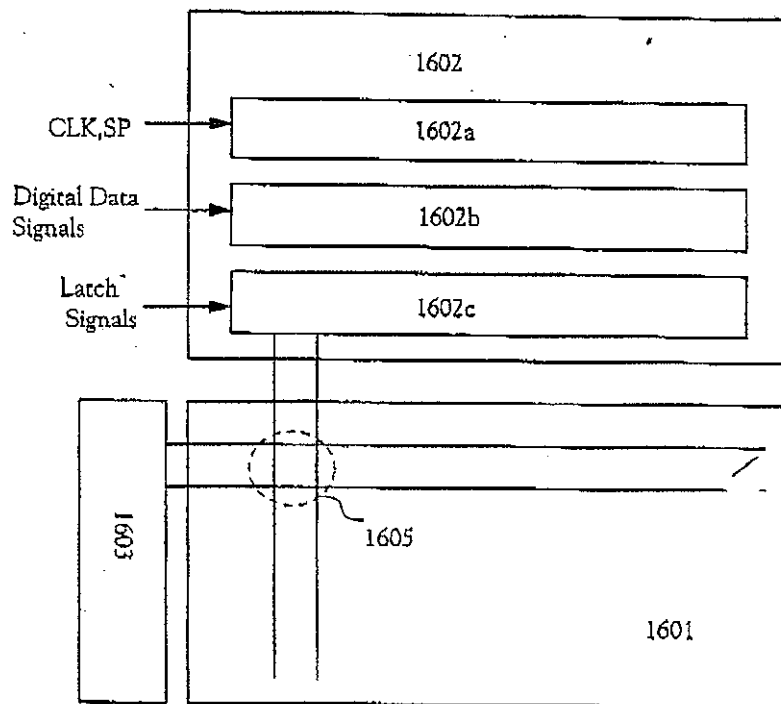


FIG. 18

FIG. 19A

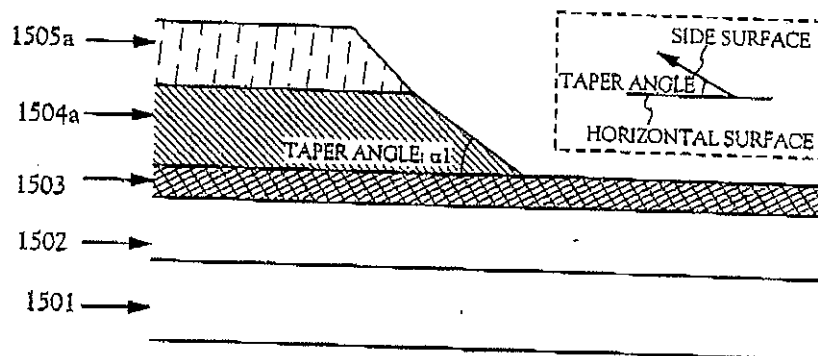


FIG. 19B

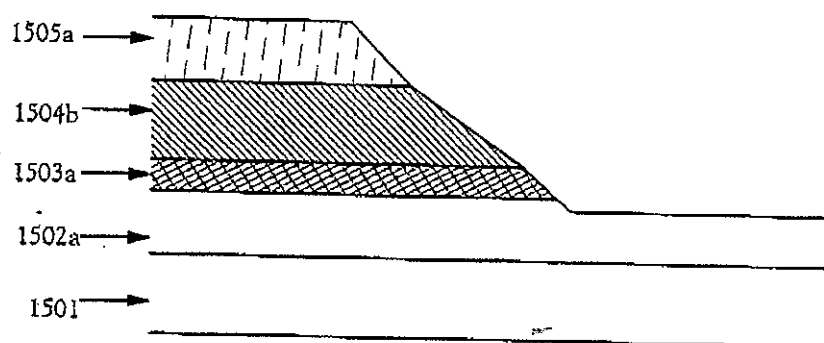


FIG. 19C

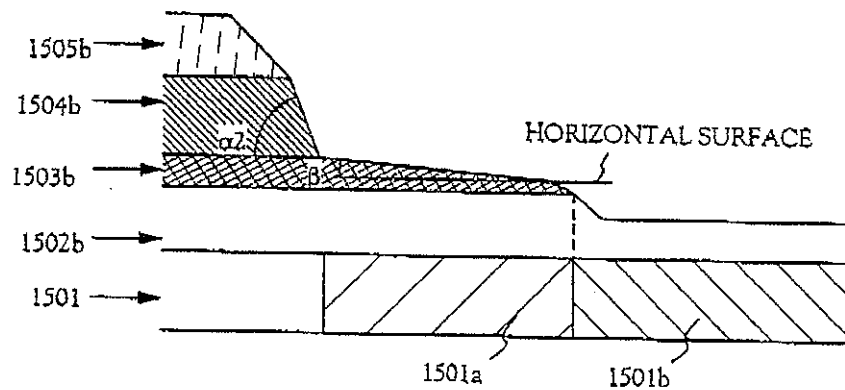
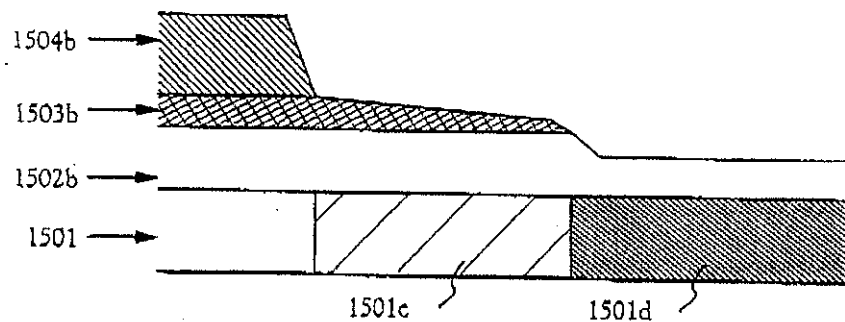


FIG. 19D



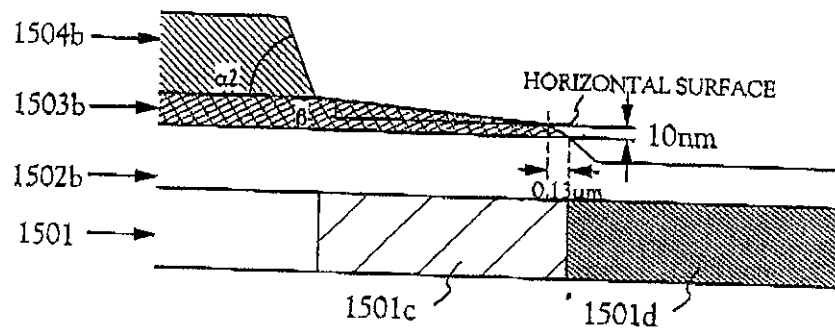


FIG. 20A

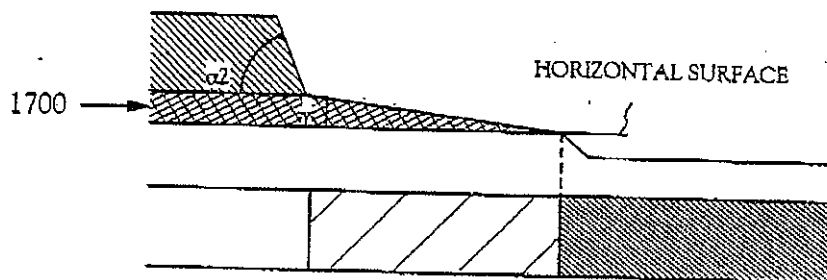


FIG. 20B

RELATIONSHIP OF TaN FILM THICKNESS, LOW LENGTH AND
ELECTRON TEMPERATURE (SHAPE A)

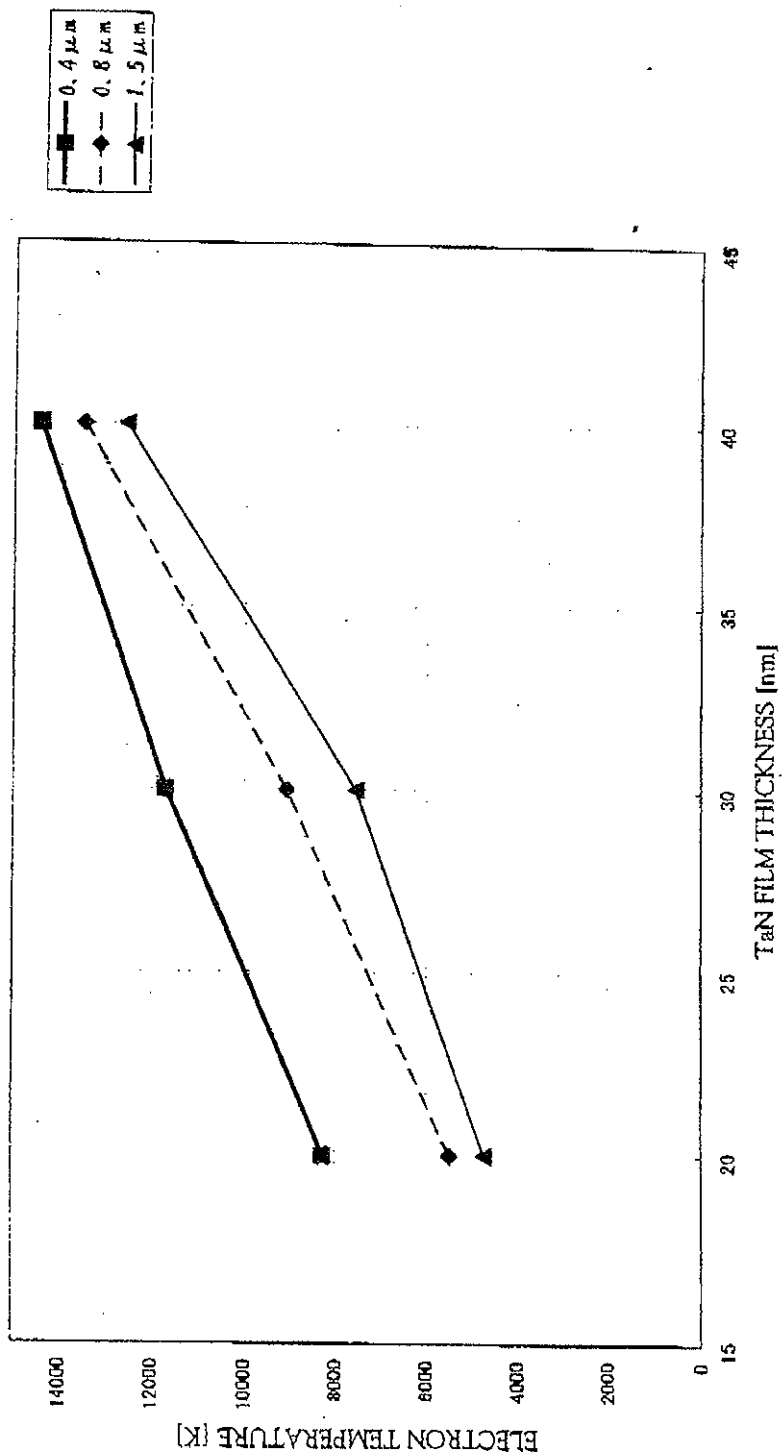


FIG. 21

RELATIONSHIP OF TaN FILM THICKNESS, LOW LENGTH AND
ELECTRON TEMPERATURE (SHAPE B)

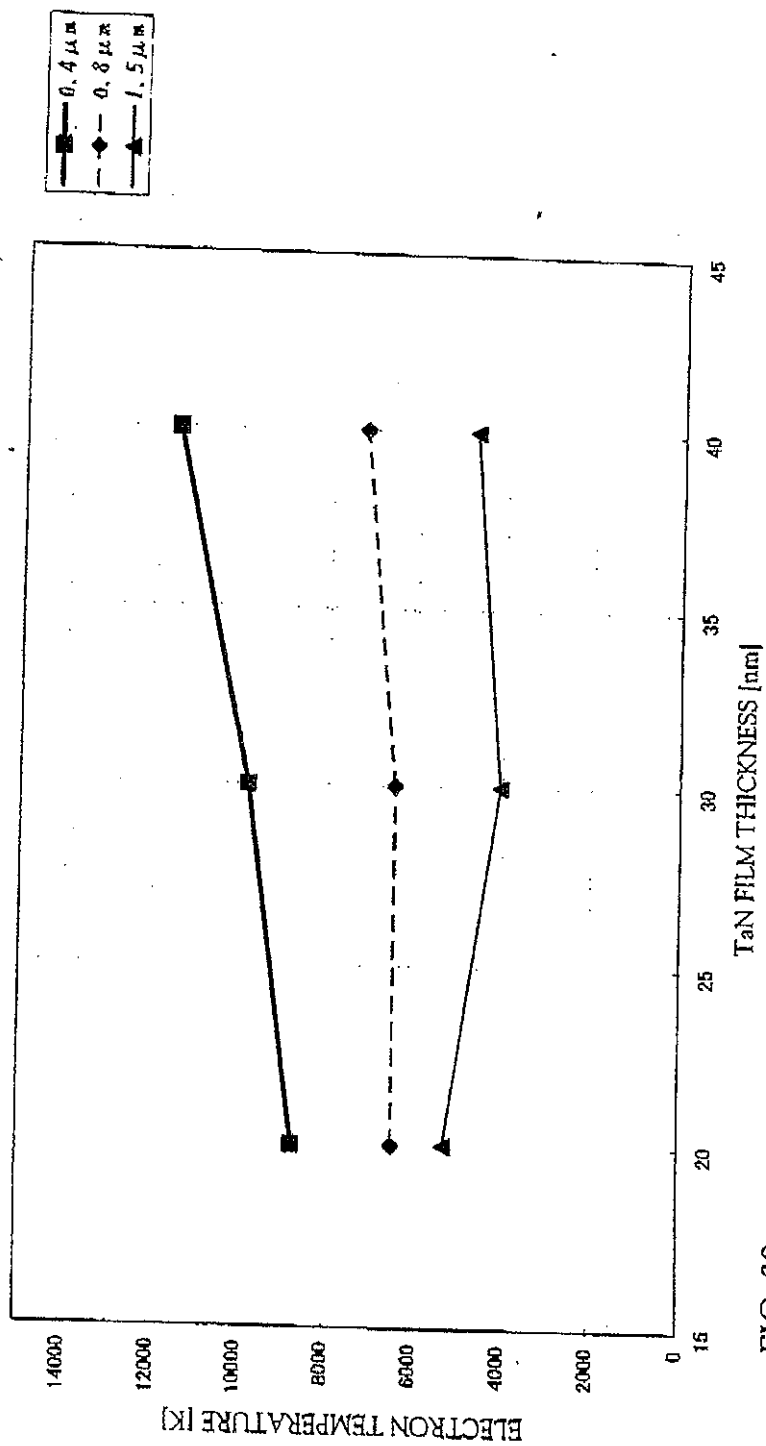


FIG. 22

COMPARISON OF ELECTRON TEMPERATURE AND ELECTRIC FIELD STRENGTH
IN CHANNEL LONGITUDINAL DIRECTION IN SHAPE B (TaN FILM THICKNESS 30 nm)

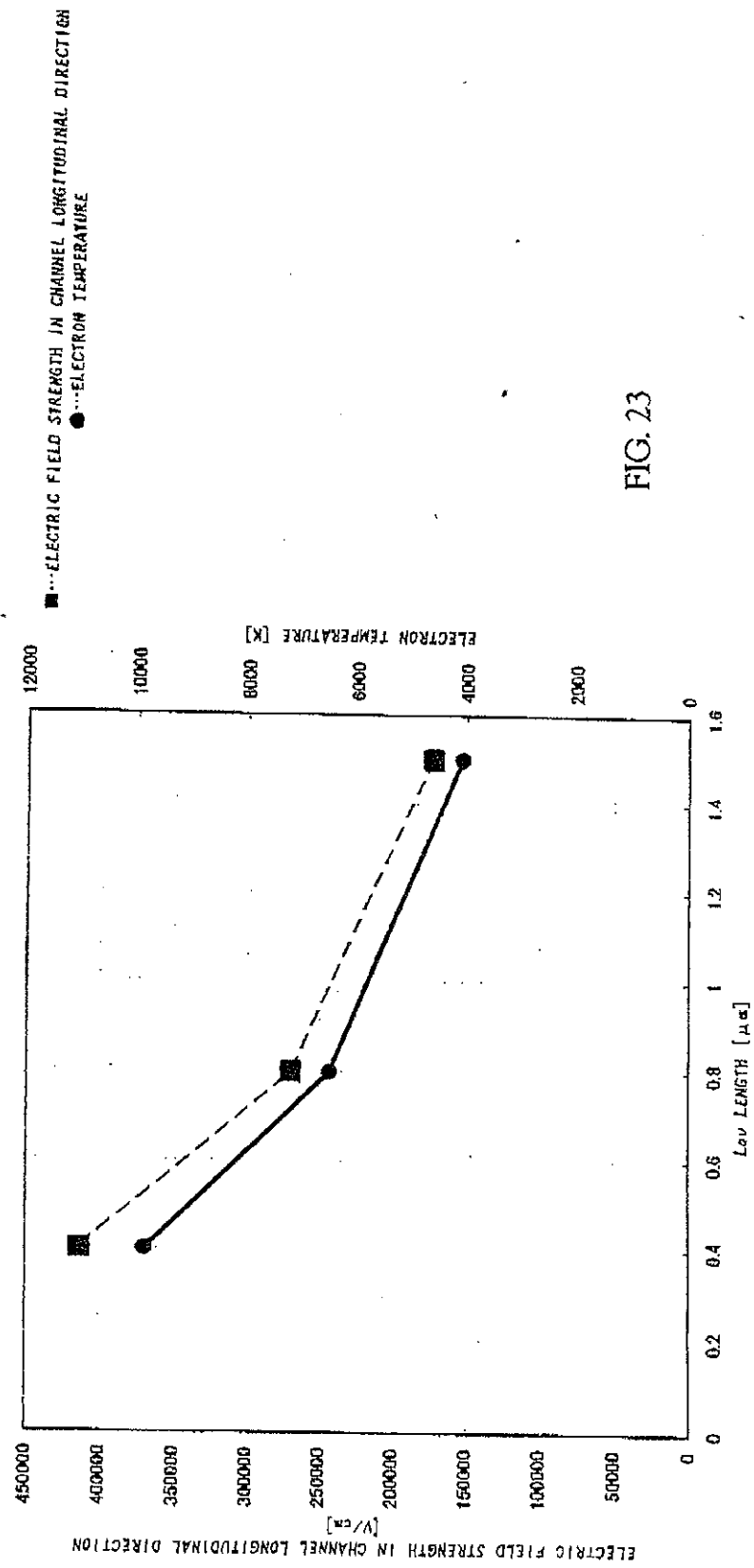
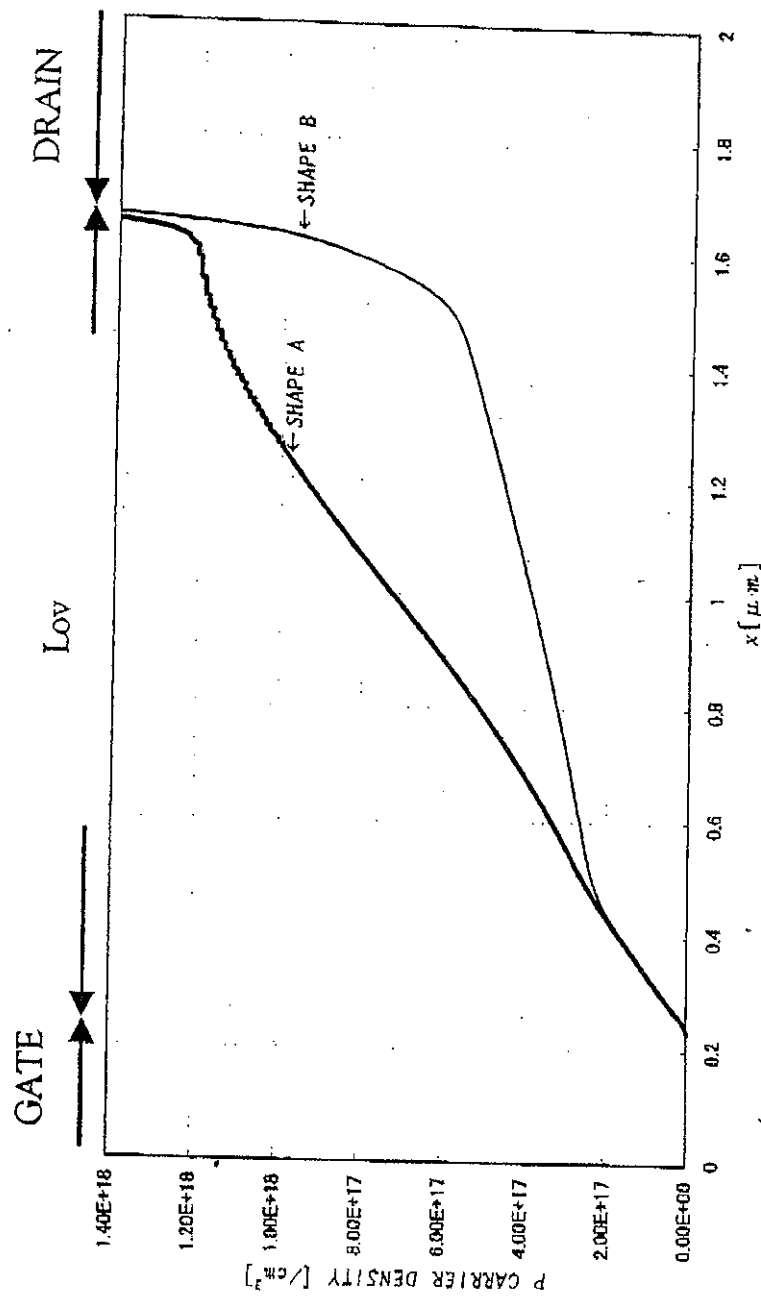


FIG. 23



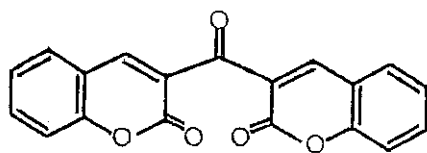
RELATIONSHIP OF TaN SHAPE AND CARRIER DENSITY DISTRIBUTION

(P LIGHT DOPE $6.7 \times 10^{13} \text{ cm}^{-2}$)

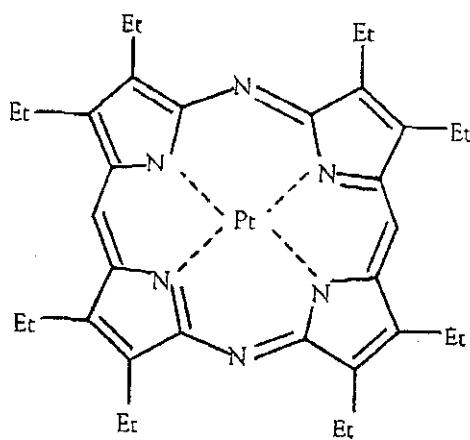
Si DEPTH 10 nm POINT

FIG. 24

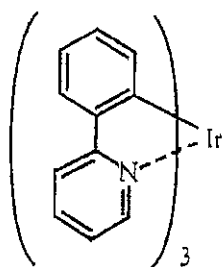
[CHEM 1]



[CHEM 2]



[CHEM 3]



[Table]

CONDITION	ICP [W]	BIAS [W]	PRESSURE [Pa]	CF ₄			Cl ₂			O ₂ [sccm]	W.E.R. (1) [nm/min]	Ta.N.E.R. (2) [nm/min]	SELECTIVITY OF W/TaN (1)/(2)	W TAPER ANGLE [deg]
				30	30	30	25	25	25					
1	500	20	1.0	30	30	30	25	25	25	0	58.97	66.43	0.899	80
2	500	60	1.0	30	30	30	25	25	25	0	88.71	118.46	0.750	25
3	500	100	1.0	30	30	30	25	25	25	0	111.66	168.03	0.667	18
4	500	20	1.0	25	25	25	25	25	25	10	124.62	20.67	6.049	70
5	500	60	1.0	25	25	25	25	25	25	10	161.72	35.81	4.518	35
6	500	100	1.0	25	25	25	25	25	25	10	176.90	56.32	3.008	32
7	500	150	1.0	25	25	25	25	25	25	10	200.39	80.32	2.495	26
8	500	200	1.0	25	25	25	25	25	25	10	218.20	102.87	2.124	22
9	500	250	1.0	25	25	25	25	25	25	10	232.12	124.97	1.860	19
10	500	20	1.0	20	20	20	20	20	20	20	-	14.83	-	-
11	500	60	1.0	20	20	20	20	20	20	20	191.02	14.23	13.695	37
12	500	100	1.0	20	20	20	20	20	20	20	235.27	21.81	10.856	29
13	500	150	1.0	20	20	20	20	20	20	20	276.74	38.61	7.219	26
14	500	200	1.0	20	20	20	20	20	20	20	290.10	45.30	6.422	24
15	500	250	1.0	20	20	20	20	20	20	20	304.34	50.25	6.091	22

ETCHING RATE (E.R.) OF W AND TaN AND W TAPER ANGLE

*) "-" in cell indicates that the measurement was not possible because the W surface was deteriorated at the etching.