Fig. 1A

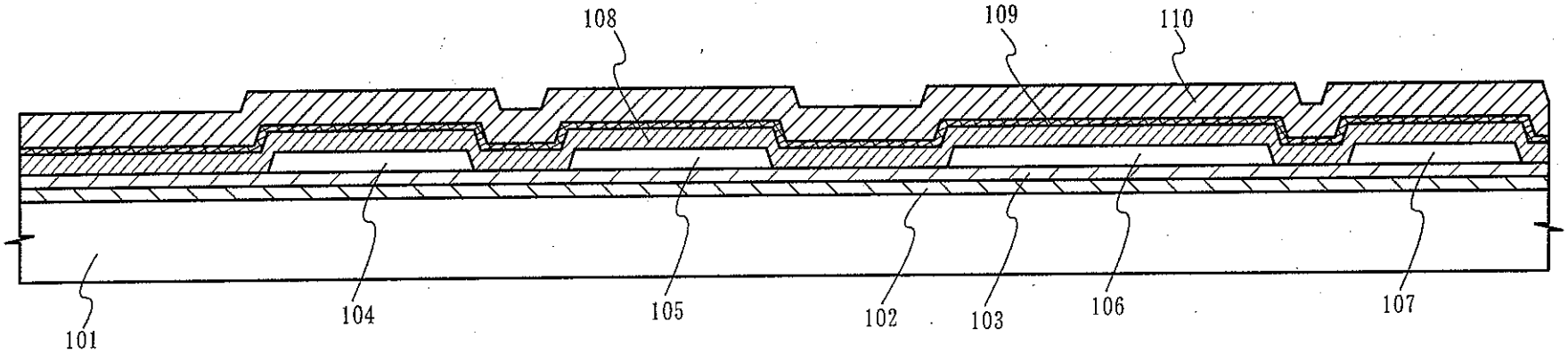
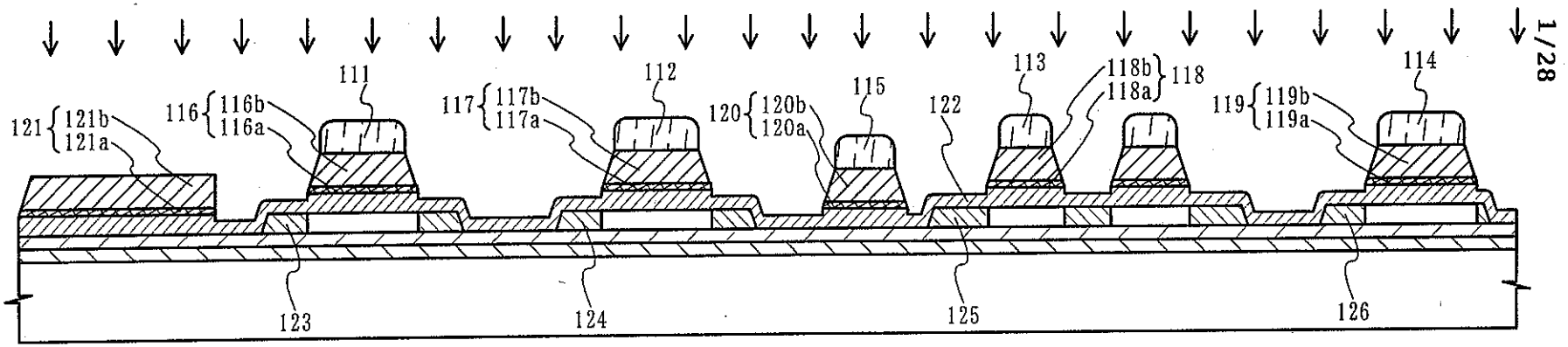

108
109
110
101
104
105
102
103
106
107

Fig. 1B


1/28
111
112
113
114
115
121
121b
121a
116
116b
116a
117
117b
117a
120
120b
120a
122
118b
118a
118
119
119b
119a
123
124
125
126

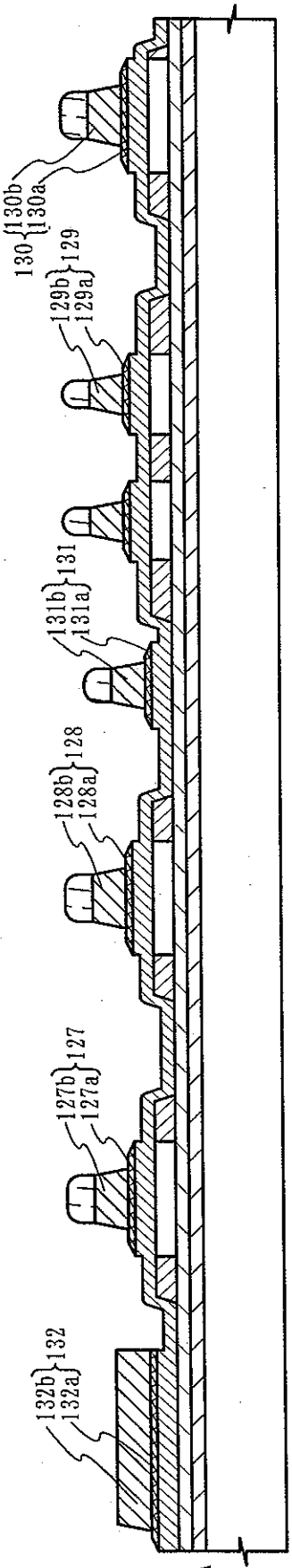

130
130b
130a
129
129b
129a
131
131b
131a
128
128b
128a
127
127b
127a
132
132b
132a

Fig. 2A

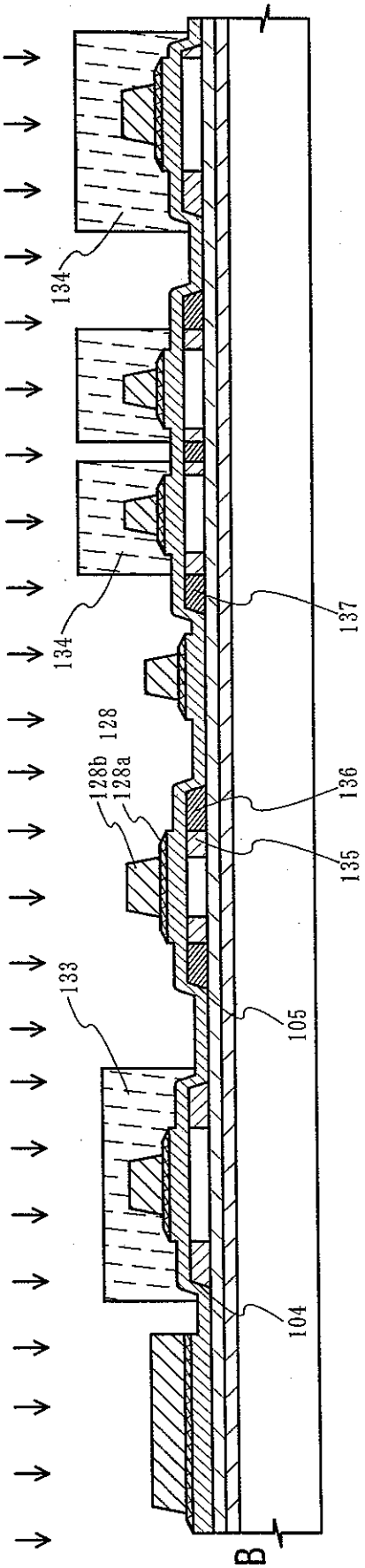

134
134
137
128
128b
128a
136
135
133
105
104

Fig. 2B

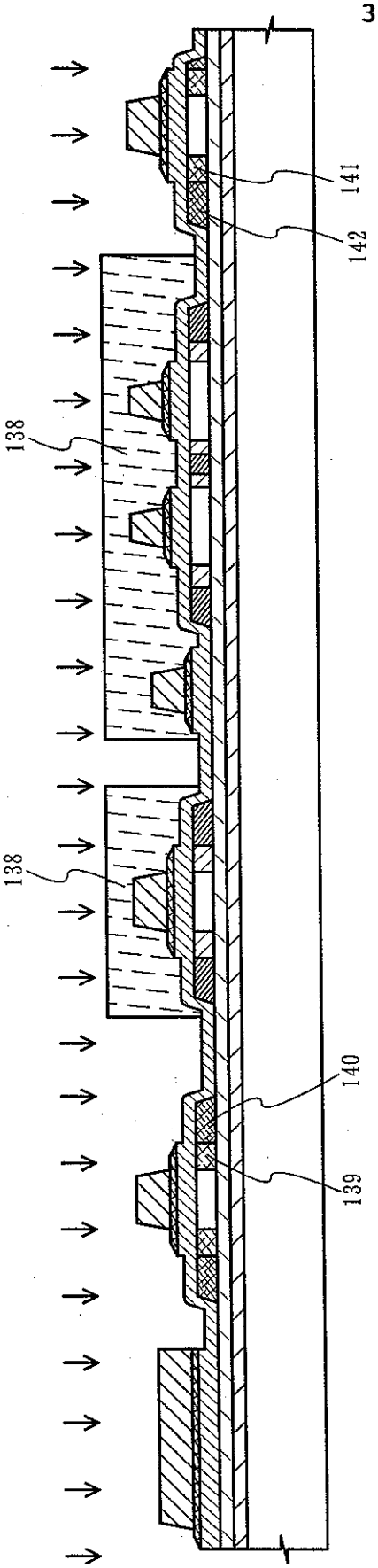


Fig. 3A

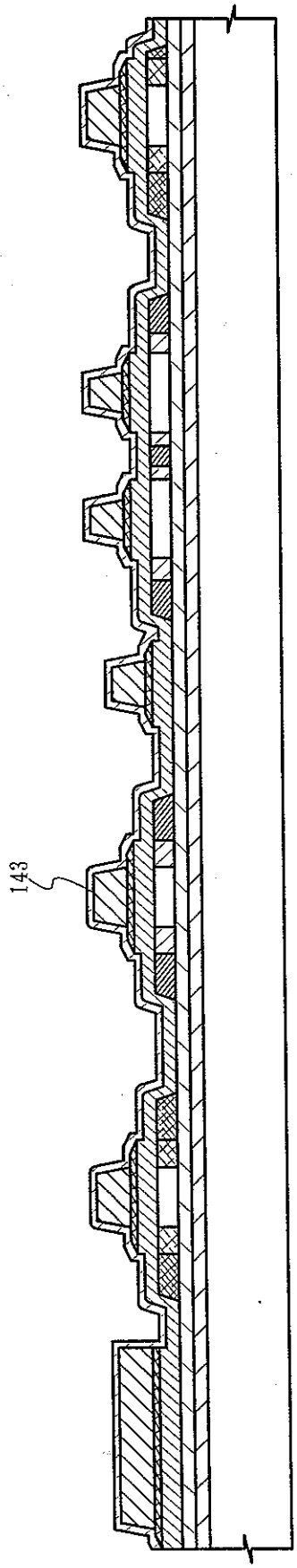


Fig. 3B

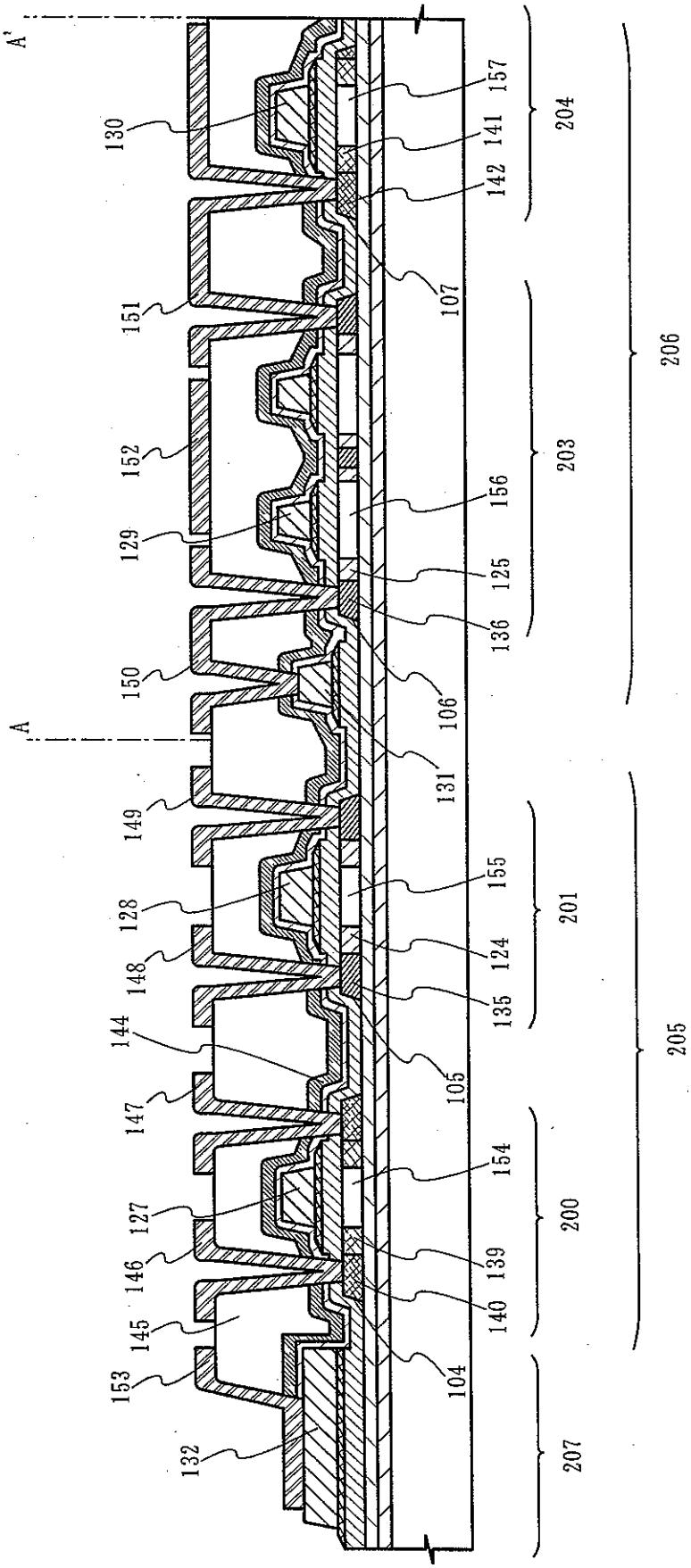

A'
A
130
151
152
129
150
149
128
148
144
147
127
146
145
153
132
157
141
142
107
156
125
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124
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154
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204
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200
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Fig. 4

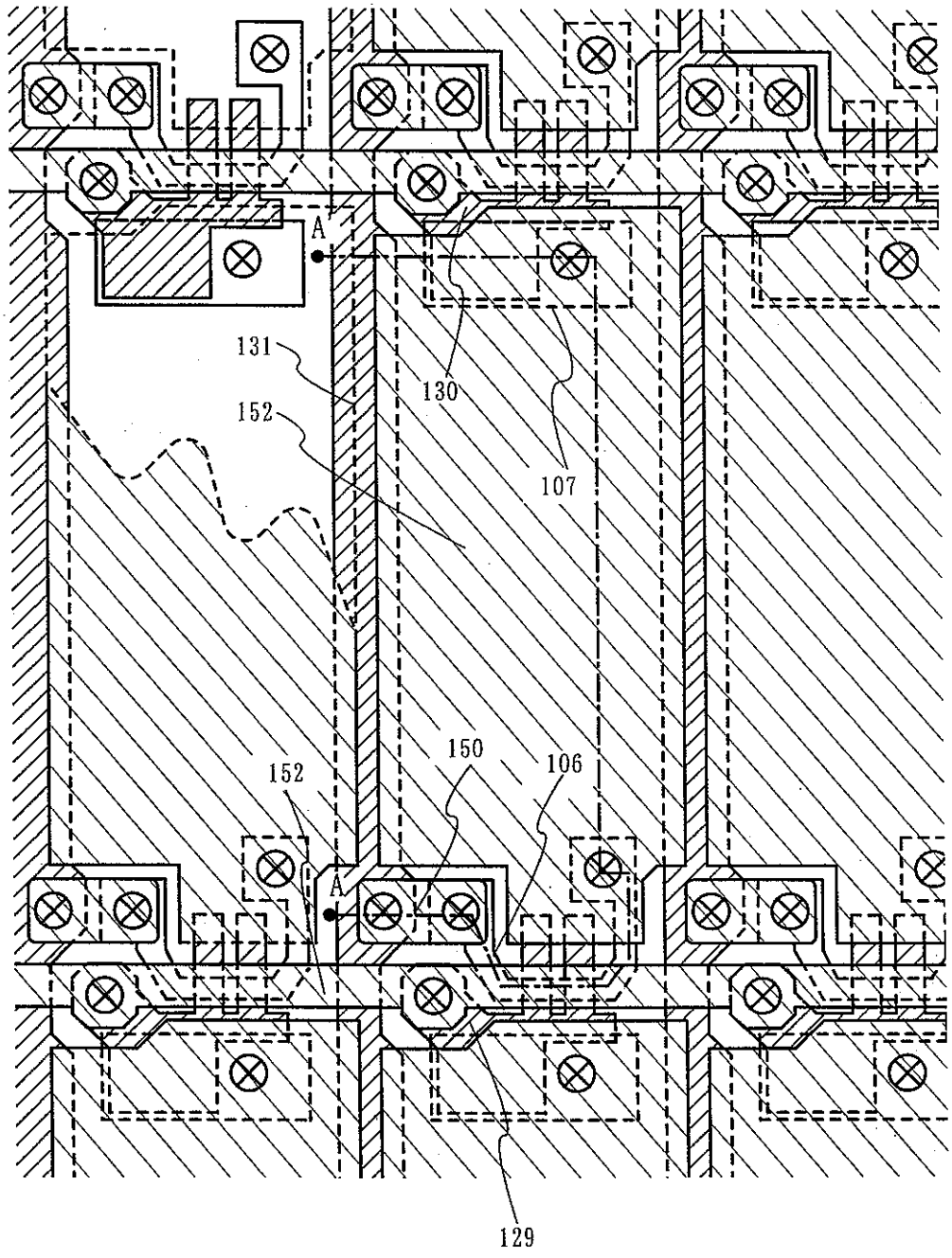


Fig. 5

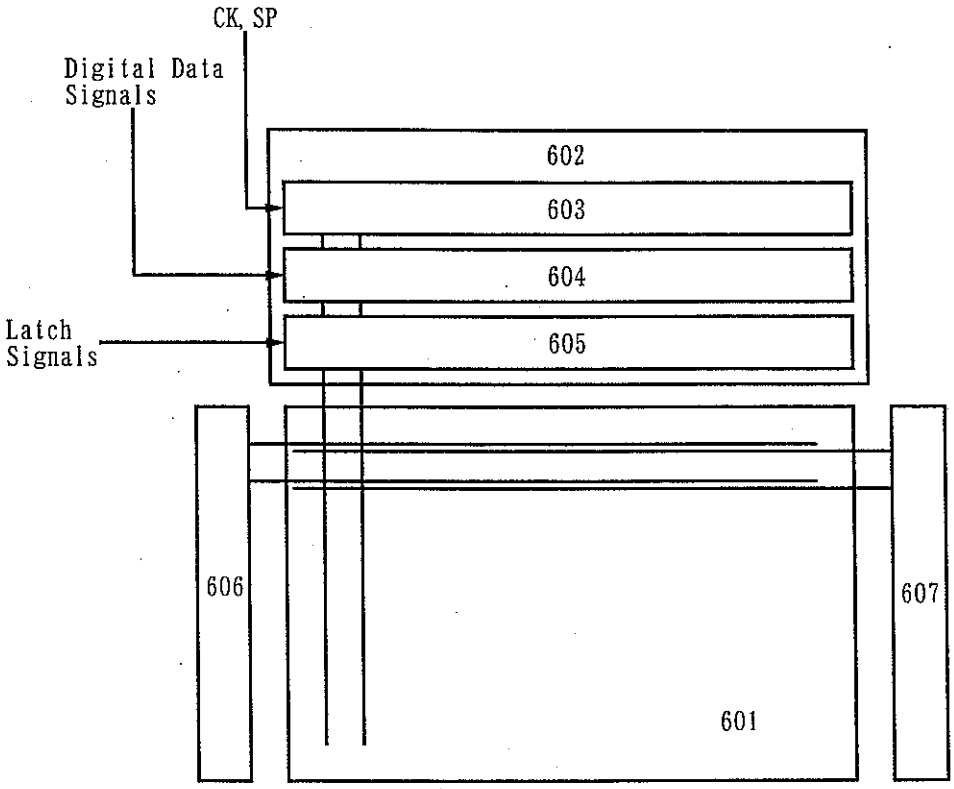

CK, SP
Digital Data Signals
602
603
604
605
Latch Signals
606
607
601

Fig. 6

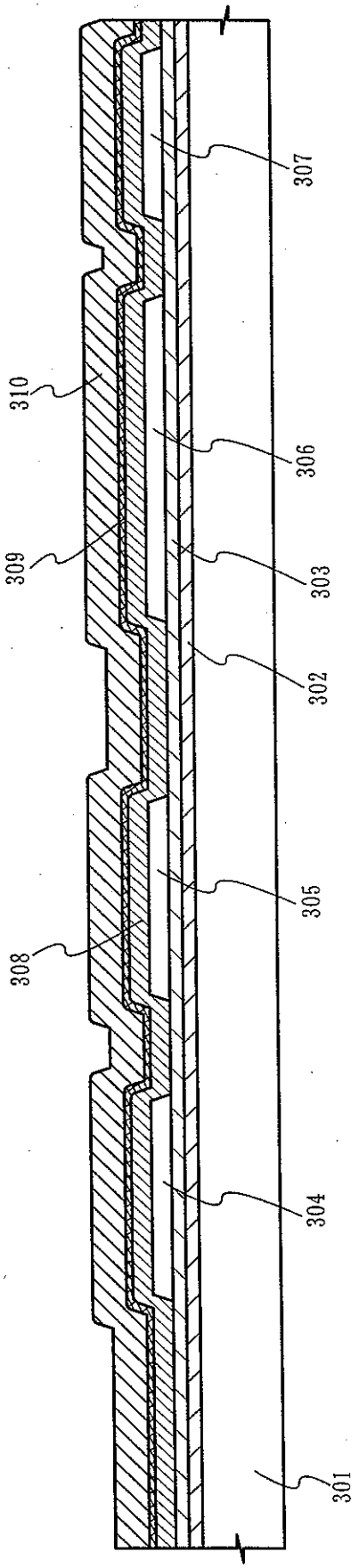

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Fig. 7A

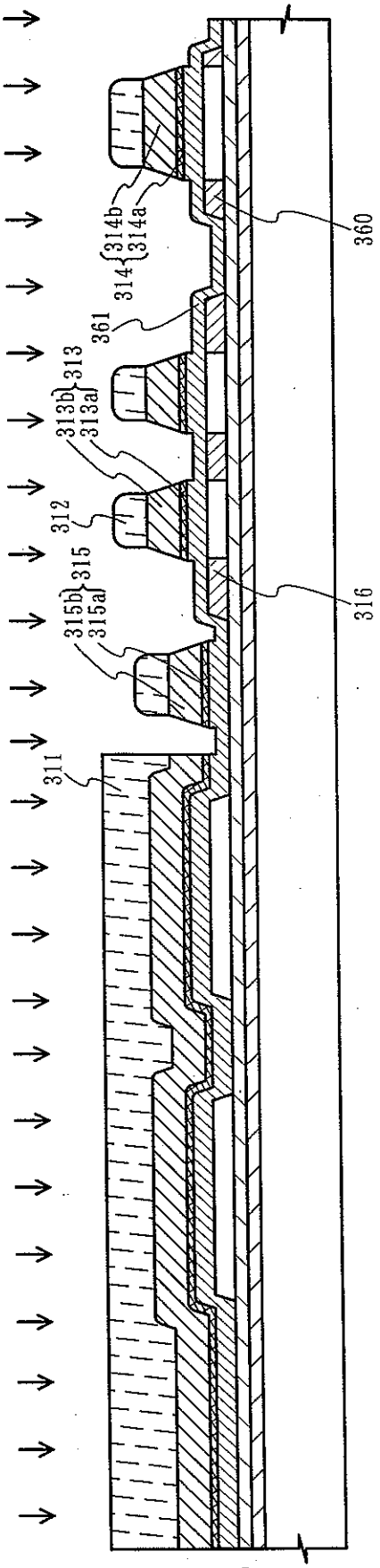

314b
314a
314
360
361
313
313b
313a
312
315
315b
315a
316
311

Fig. 7B

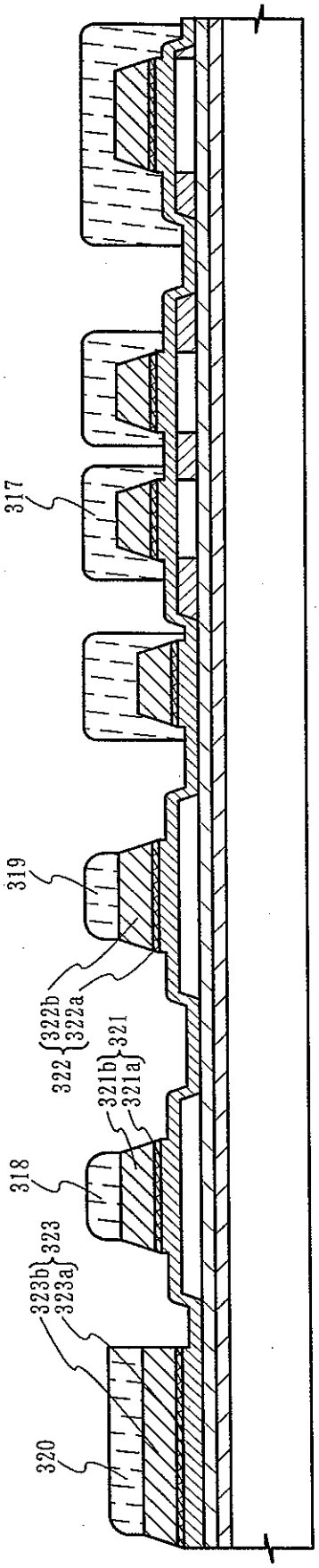

317
319
322b
322a
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321
321b
321a
318
323
323b
323a
320

Fig. 8A

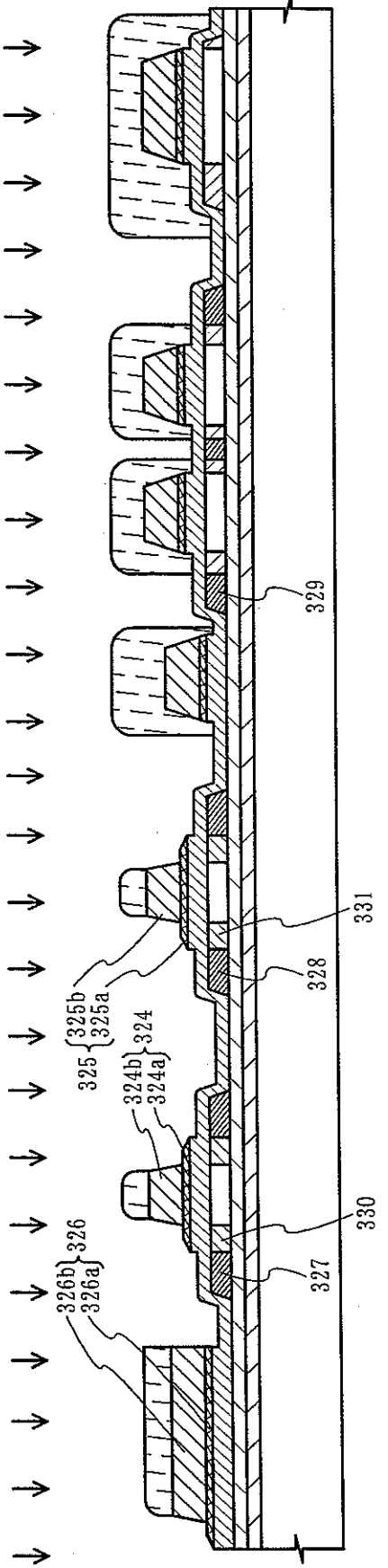

329
331
328
325b
325a
325
324
324b
324a
330
327
326
326b
326a

Fig. 8B

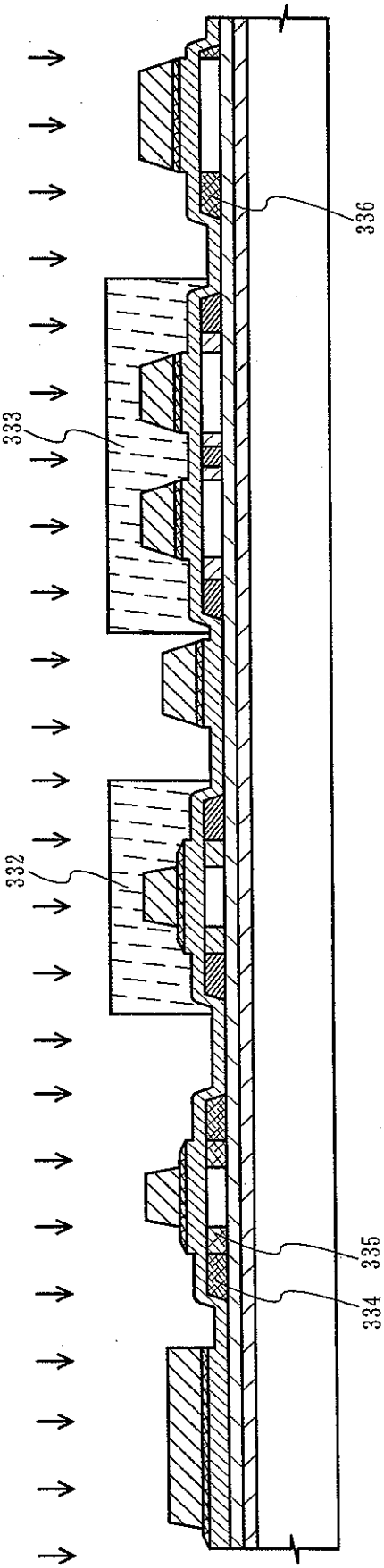


Fig. 9A

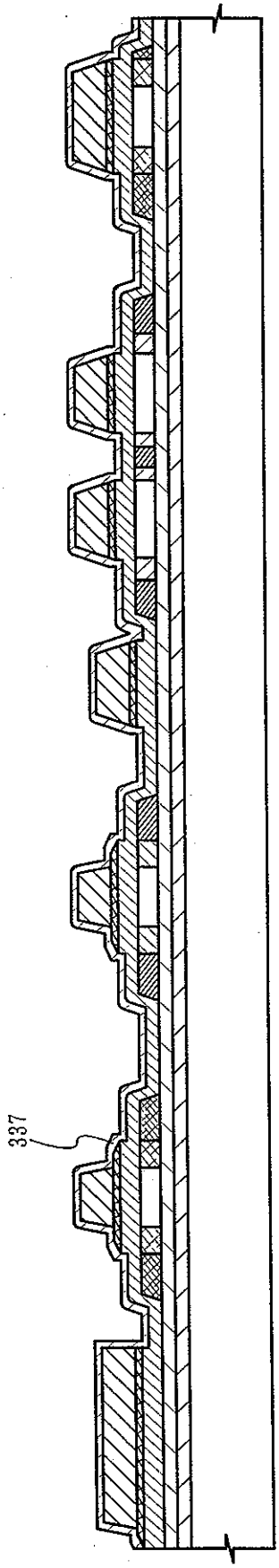


Fig. 9B

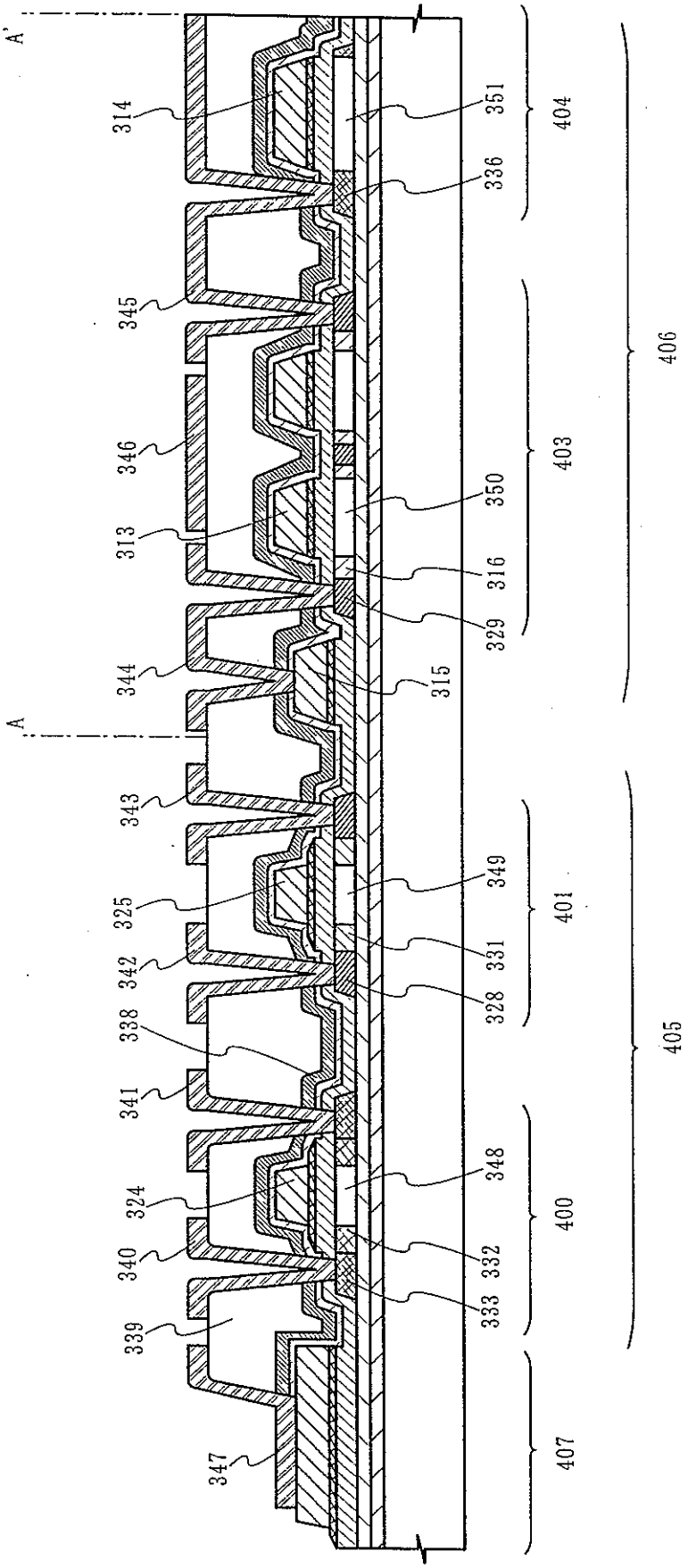

A'
A
314
345
346
313
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343
325
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Fig. 10

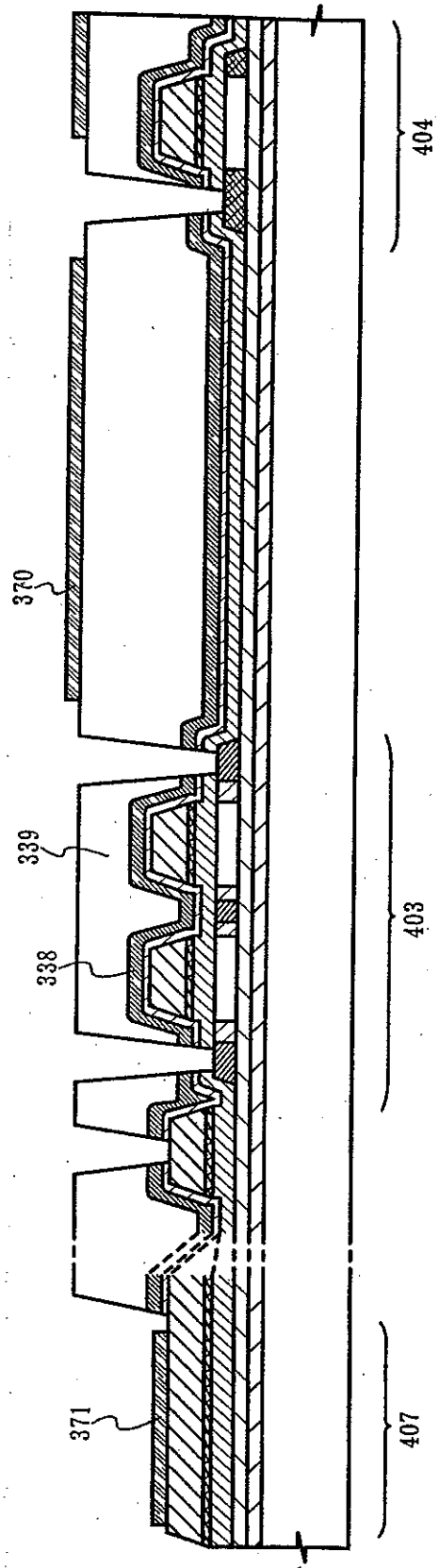


Fig. 11A

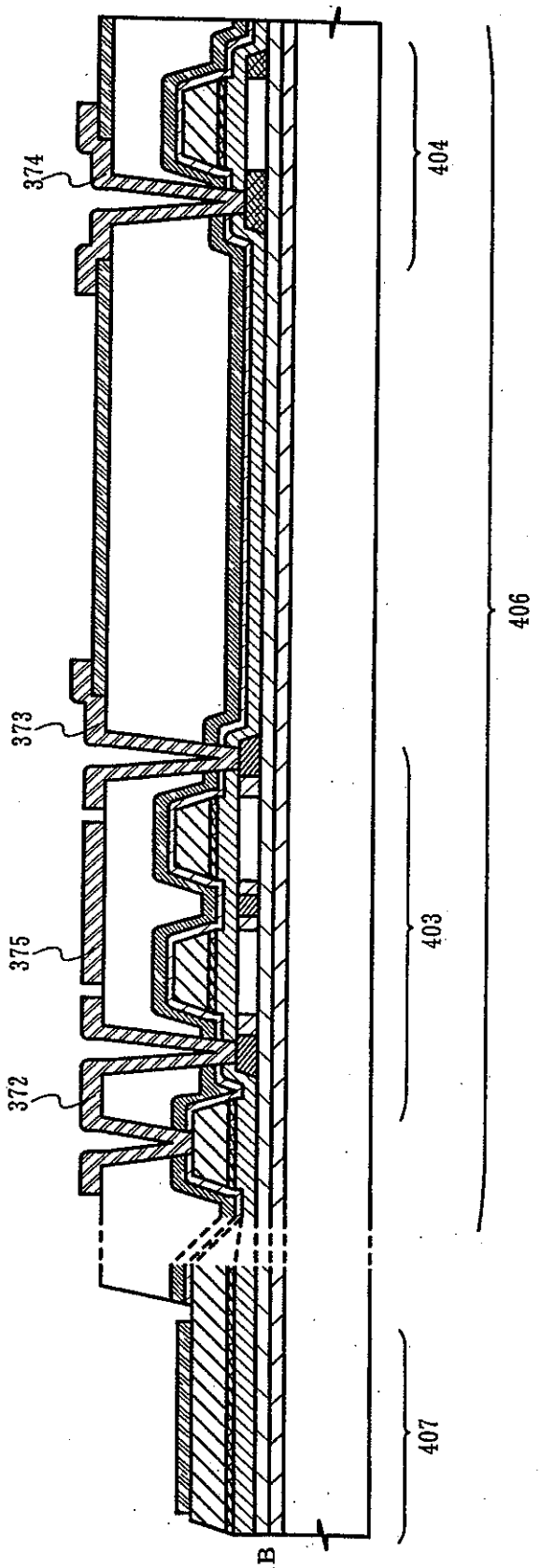


Fig. 11B

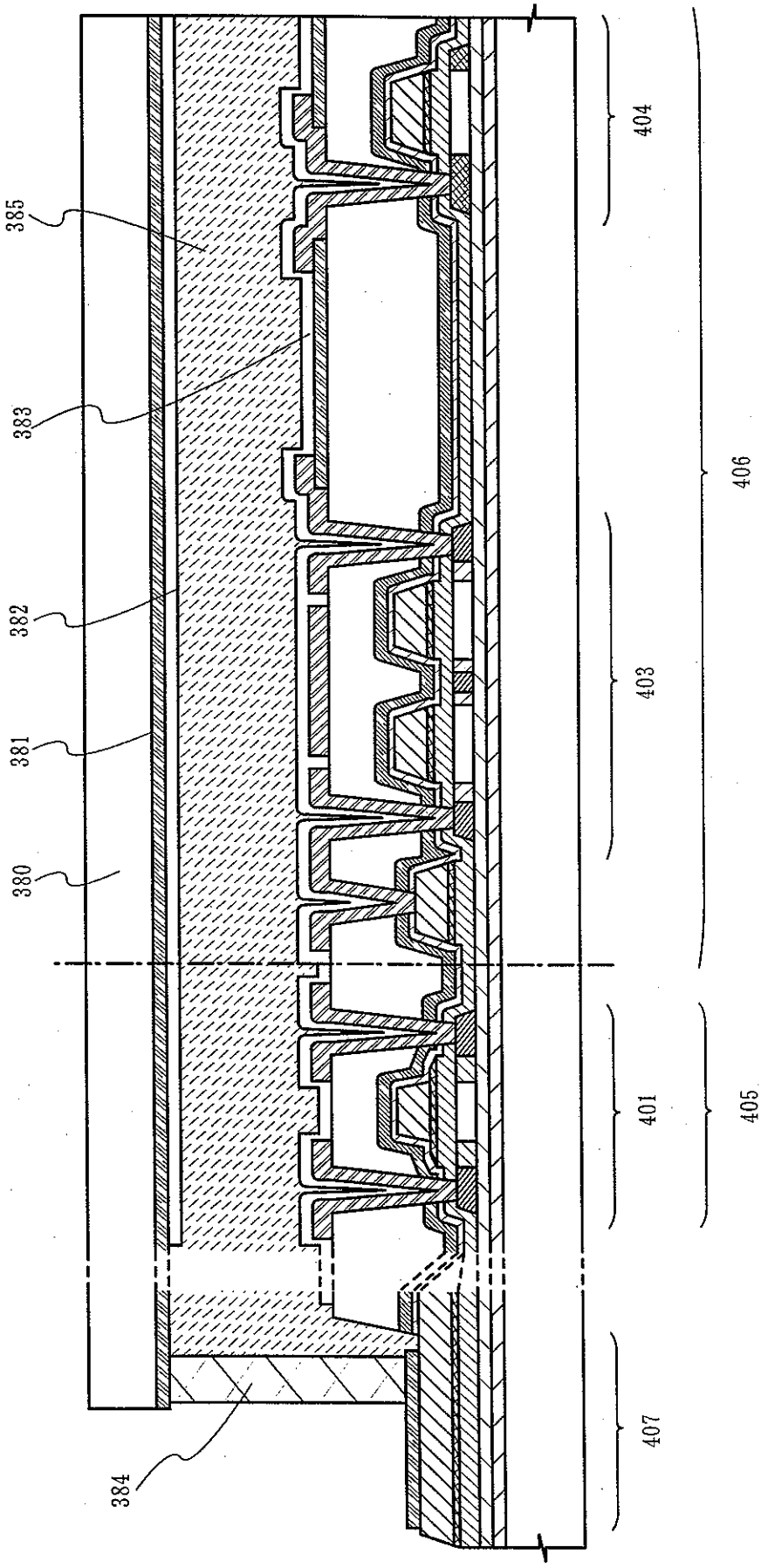


Fig. 12

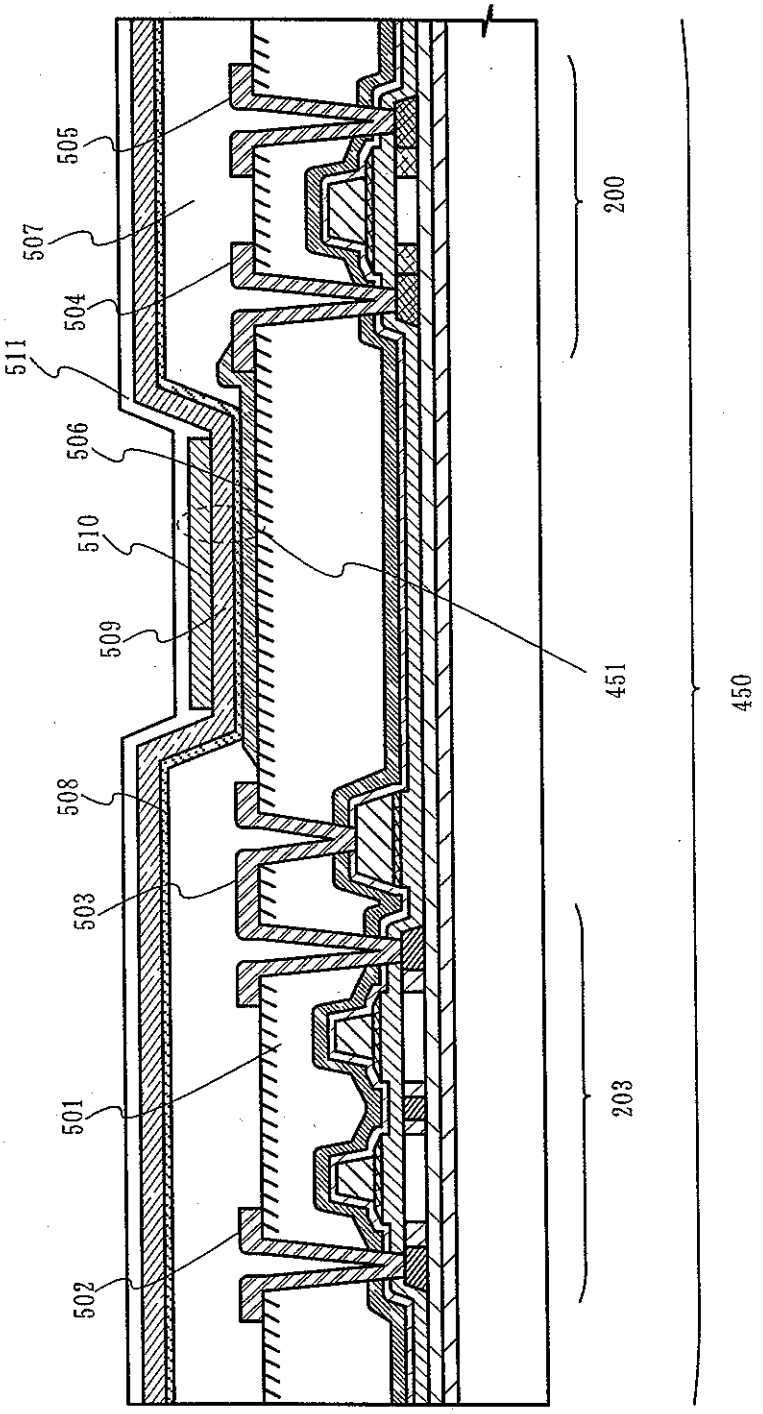


Fig. 13

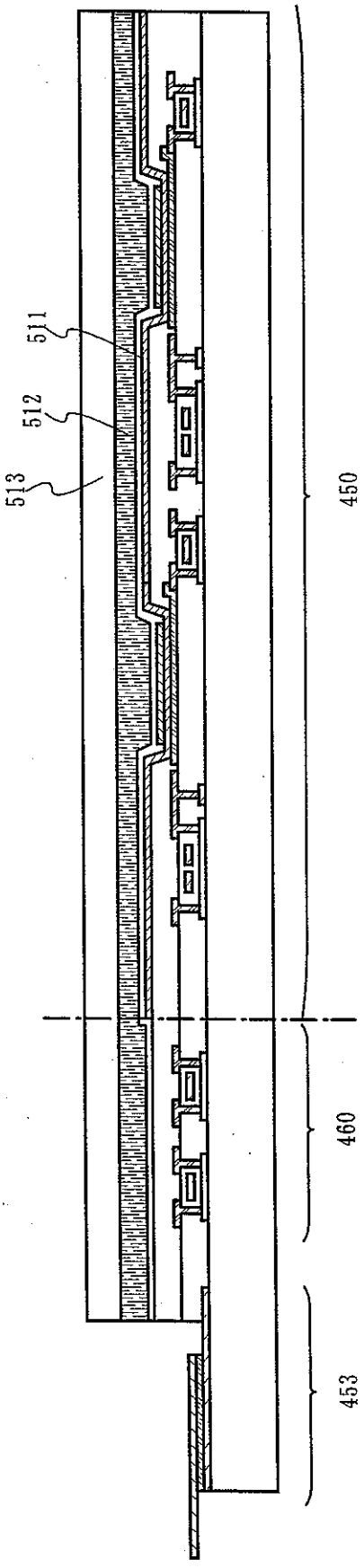


Fig. 14

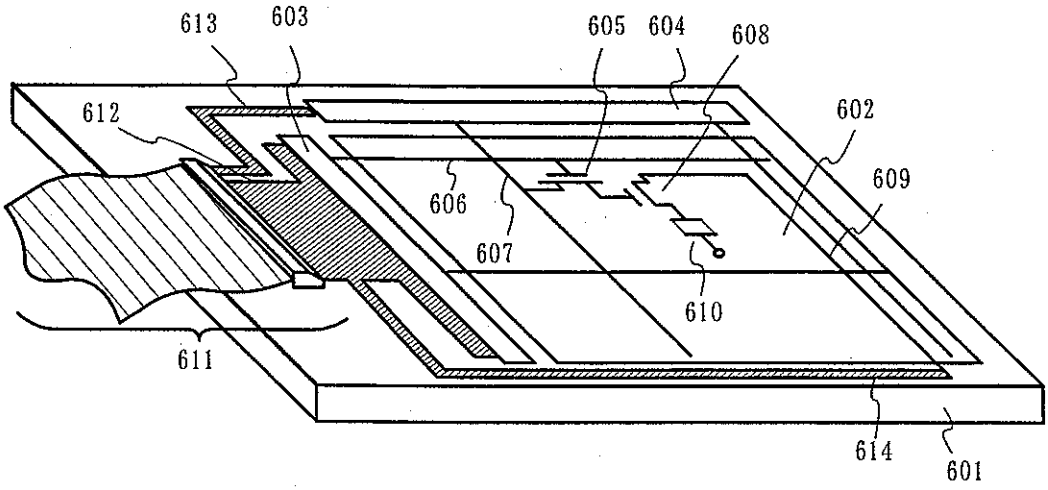


Fig. 15

Fig. 16A

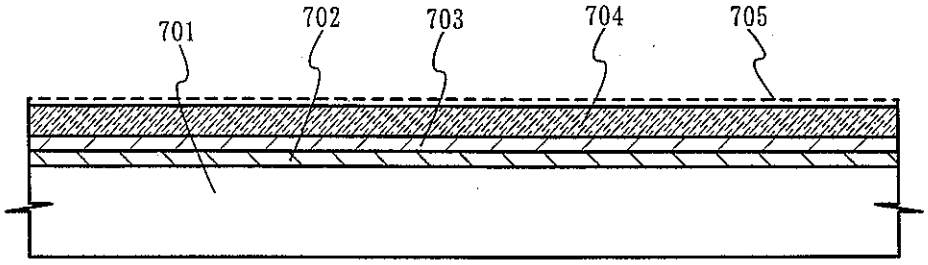


Fig. 16B

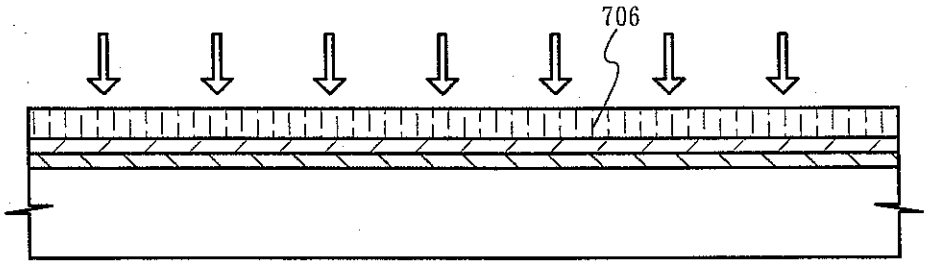


Fig. 16C

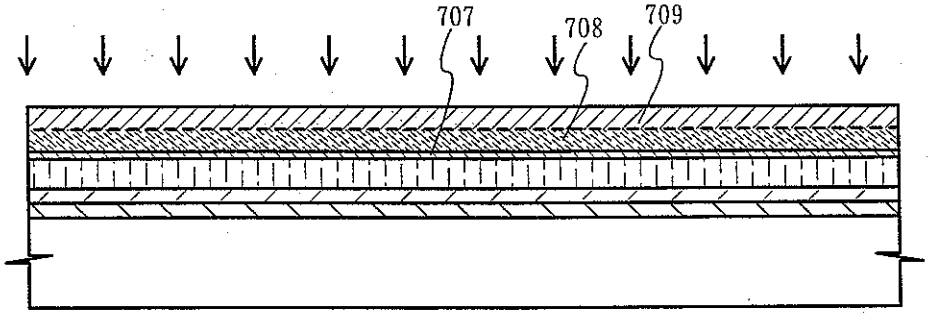


Fig. 16D

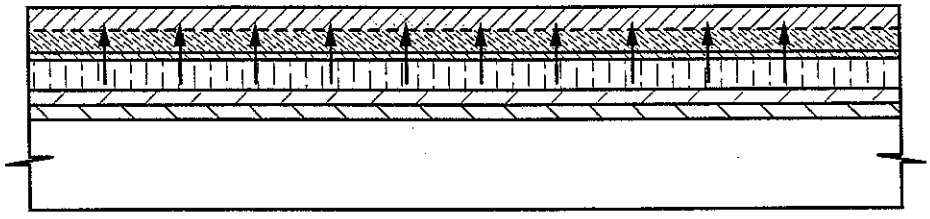


Fig. 16E

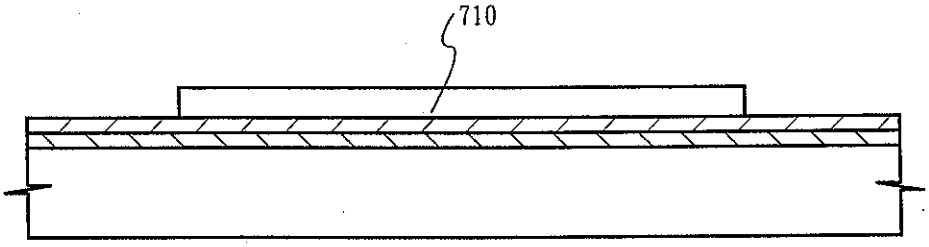


Fig. 17A

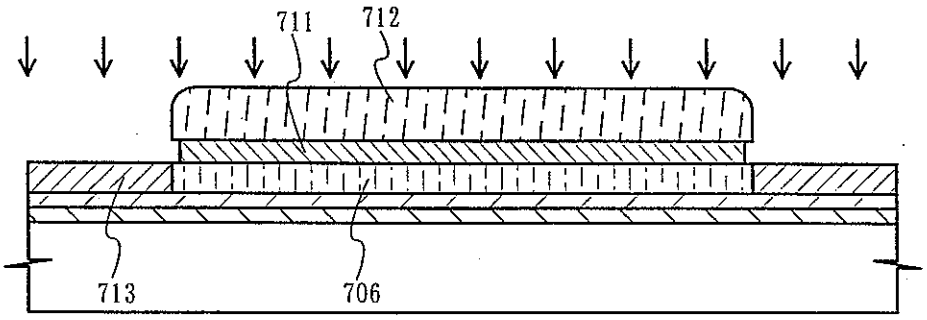
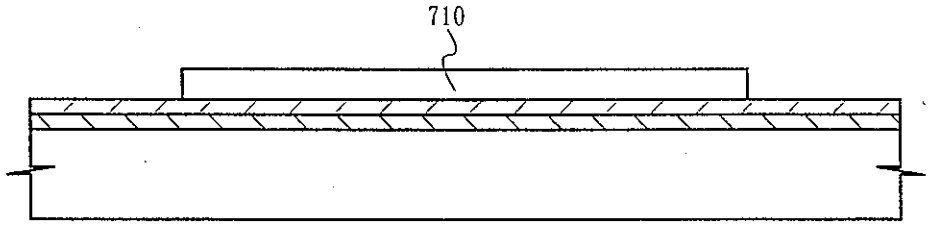


Fig. 17B



Fig. 17C



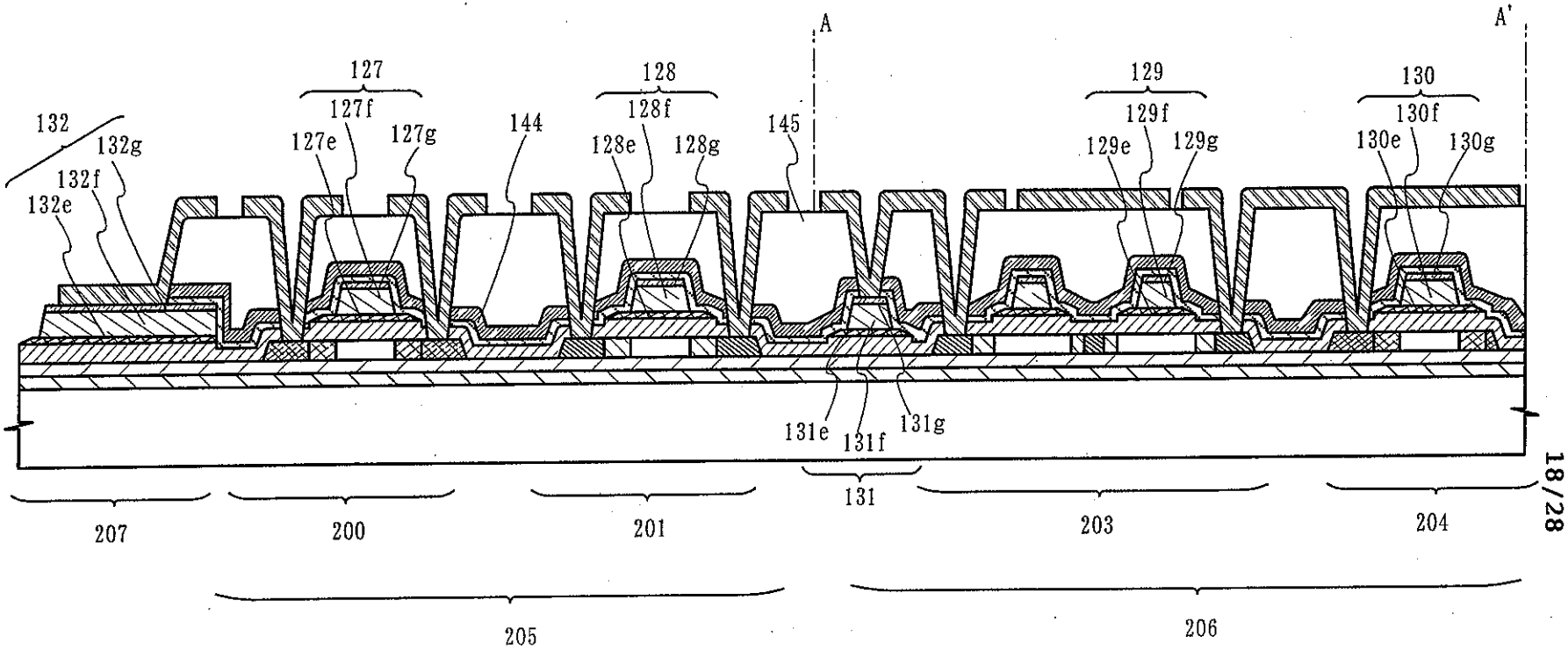

A
A'
127
128
129
130
132
132g
132f
132e
127f
127e
127g
144
128f
128e
128g
145
129f
129e
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130g
131e
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203
204
205
206

Fig. 18

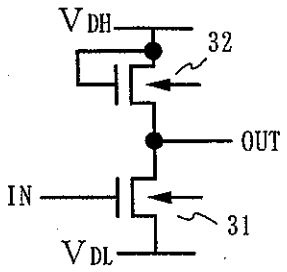


Fig. 19A

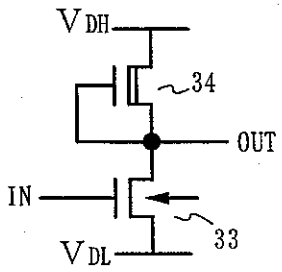


Fig. 19B

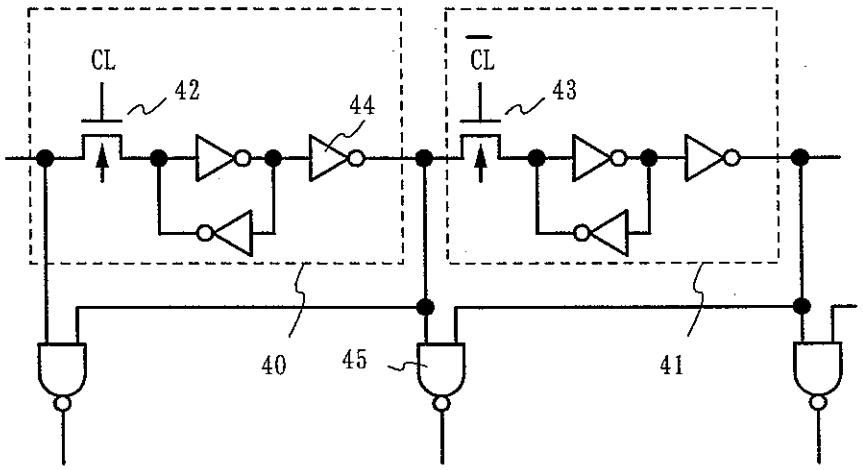


Fig. 20A

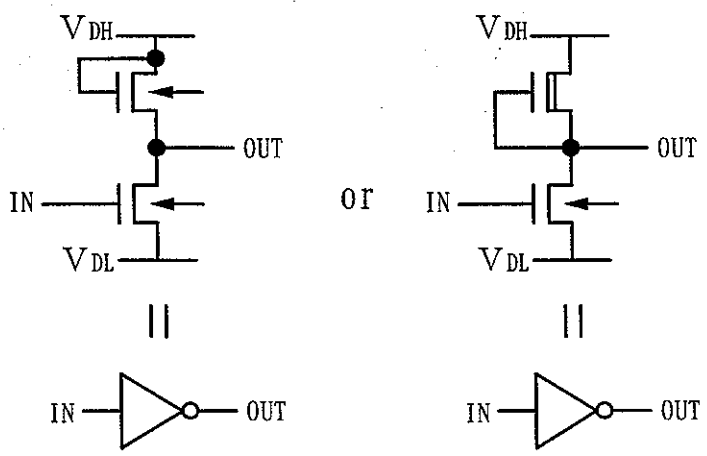


Fig. 20B

Fig. 21

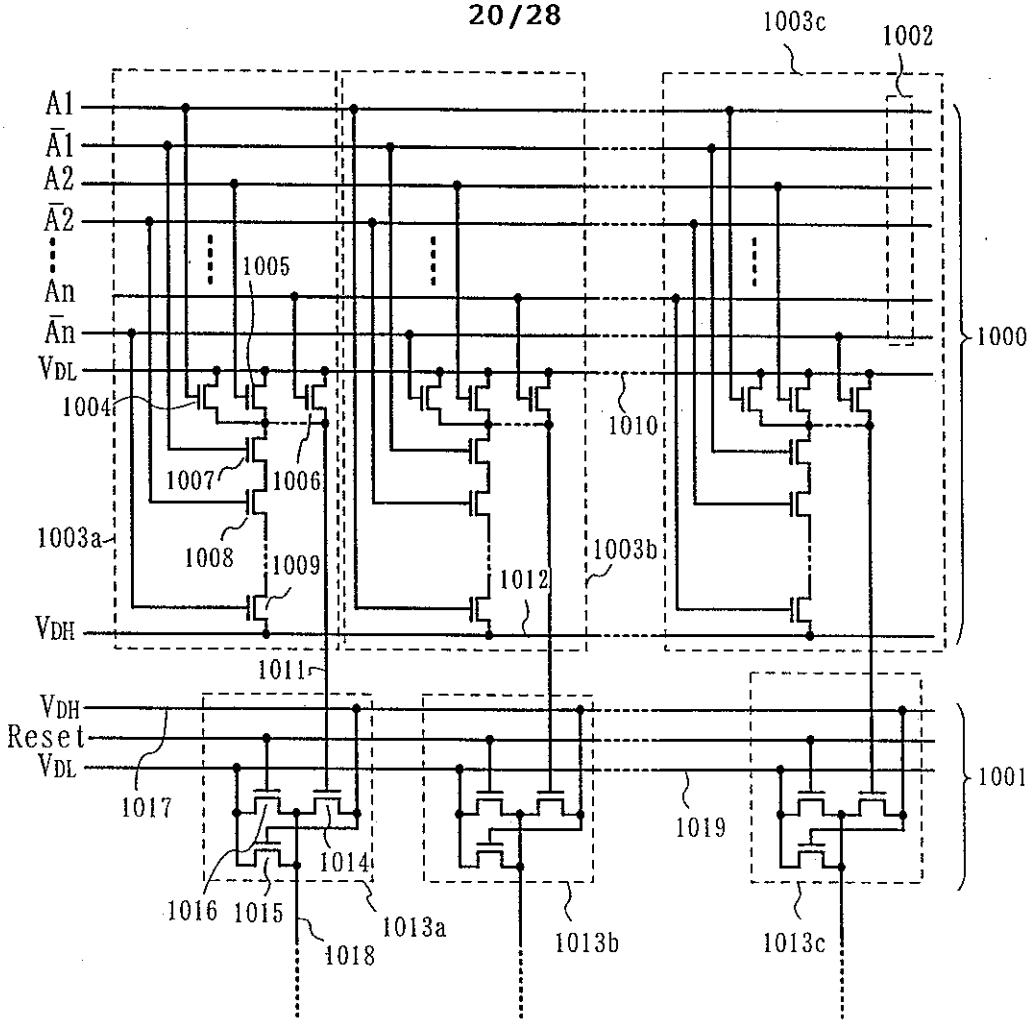
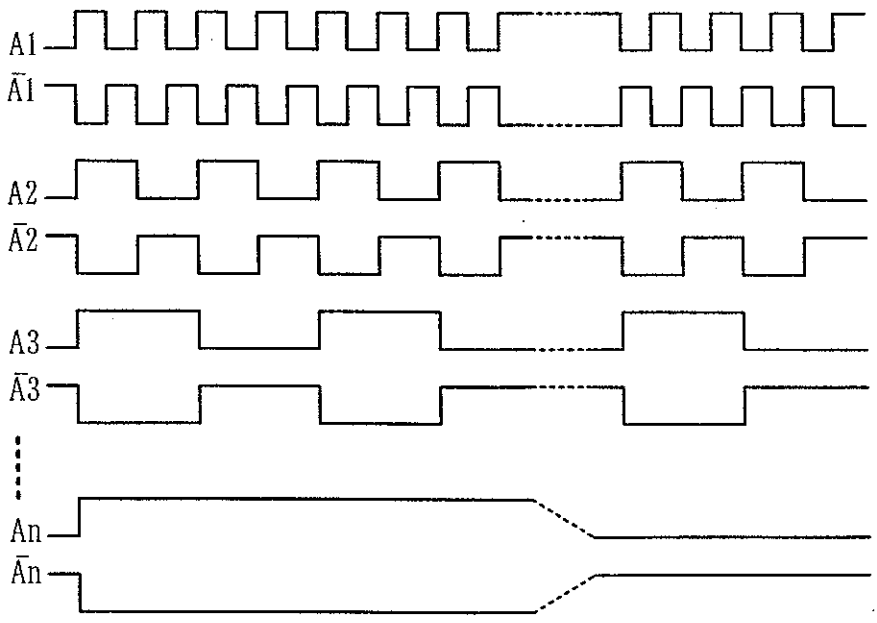

A1
Ā1
A2
Ā2
An
Ān
VDL
1004
1005
1007
1006
1008
1009
1003a
1010
1012
1003b
1003c
1002
1000
VDH
1011
VDH
Reset
VDL
1017
1016
1015
1014
1018
1013a
1013b
1019
1013c
1001

Fig. 22


A1
Ā1
A2
Ā2
A3
Ā3
An
Ān

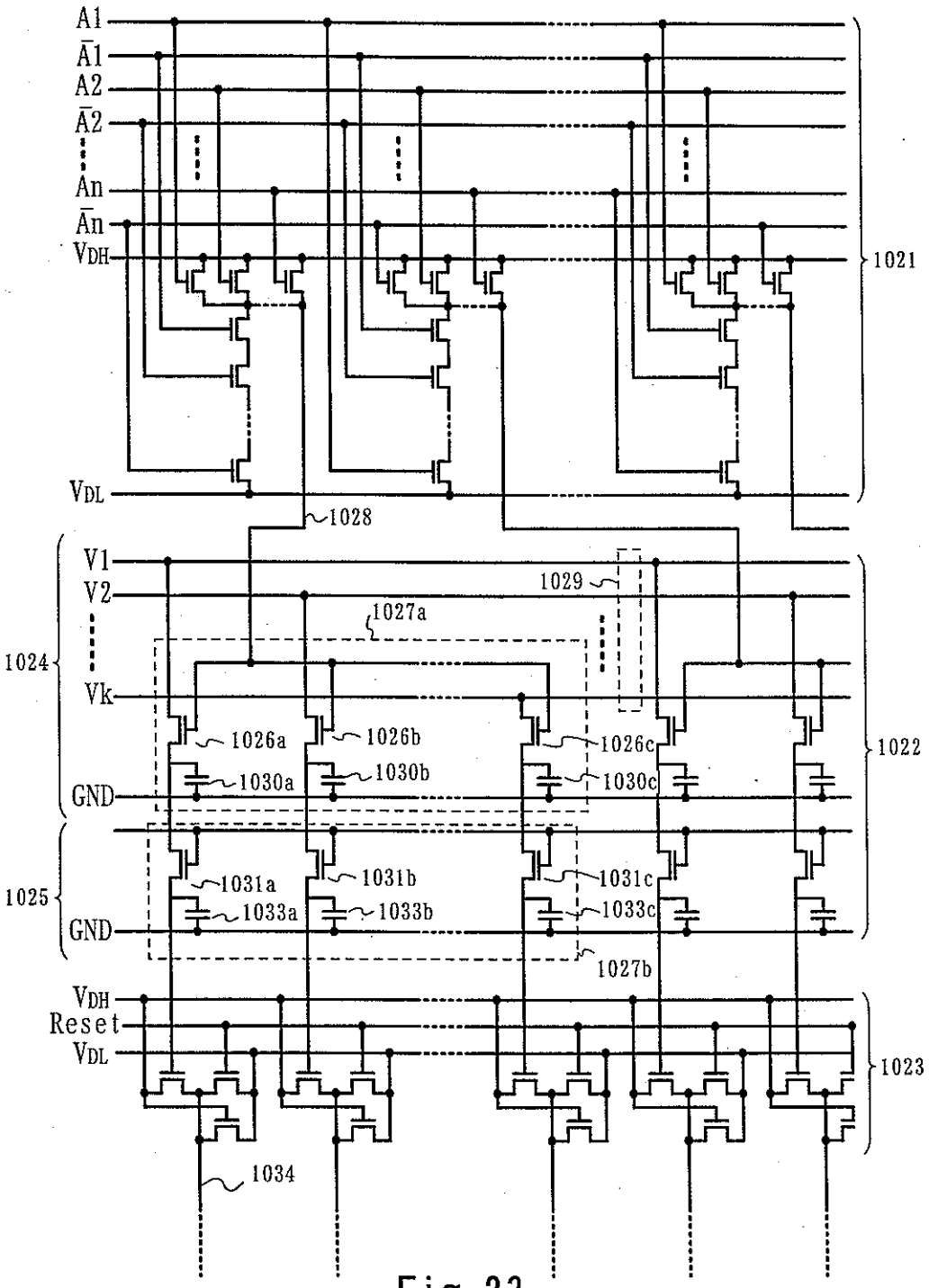

A1
$\bar{A}1$
A2
$\bar{A}2$
An
$\bar{A}n$
V_{DH}
V_{DL}
1021
1028
V1
V2
Vk
1024
1029
1027a
1026a
1026b
1026c
1030a
1030b
1030c
GND
1022
1025
1031a
1031b
1031c
1033a
1033b
1033c
GND
1027b
V_{DH}
Reset
V_{DL}
1023
1034

Fig. 23

Fig. 24

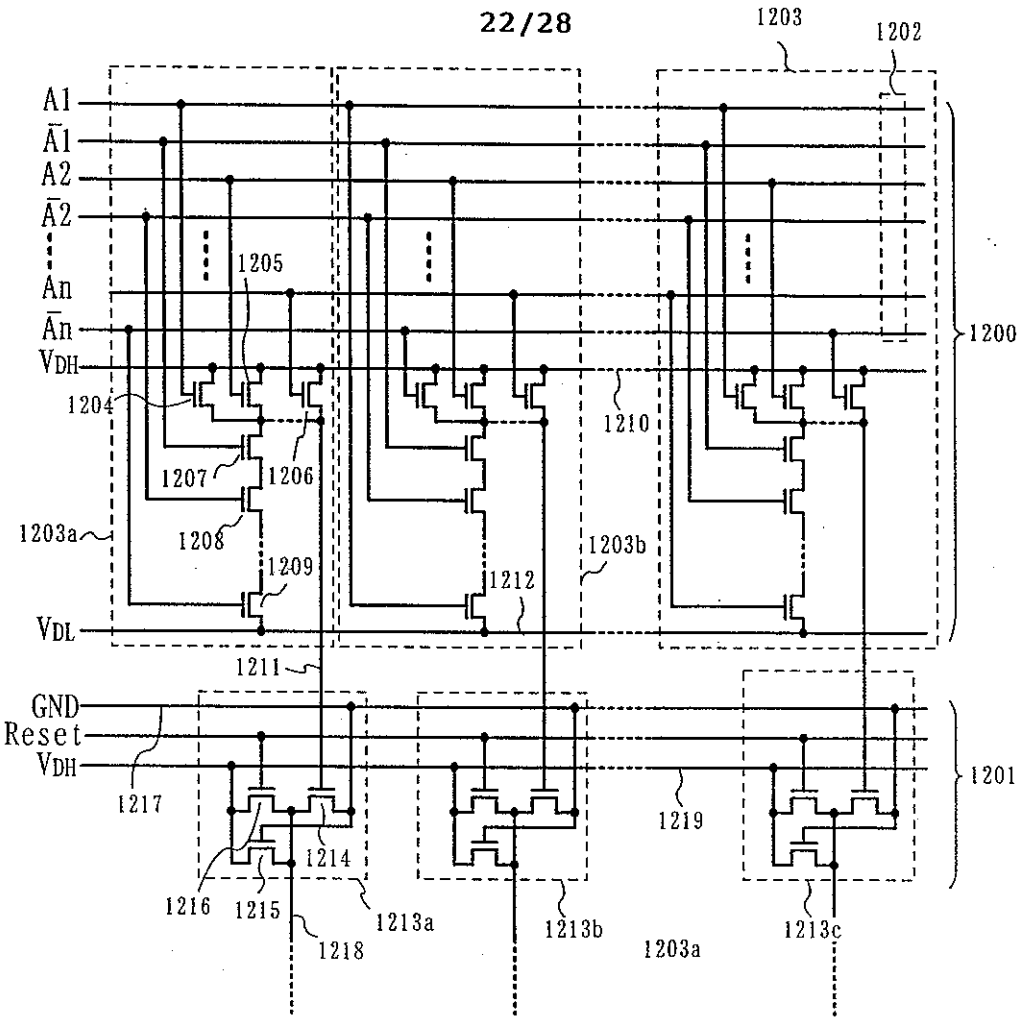
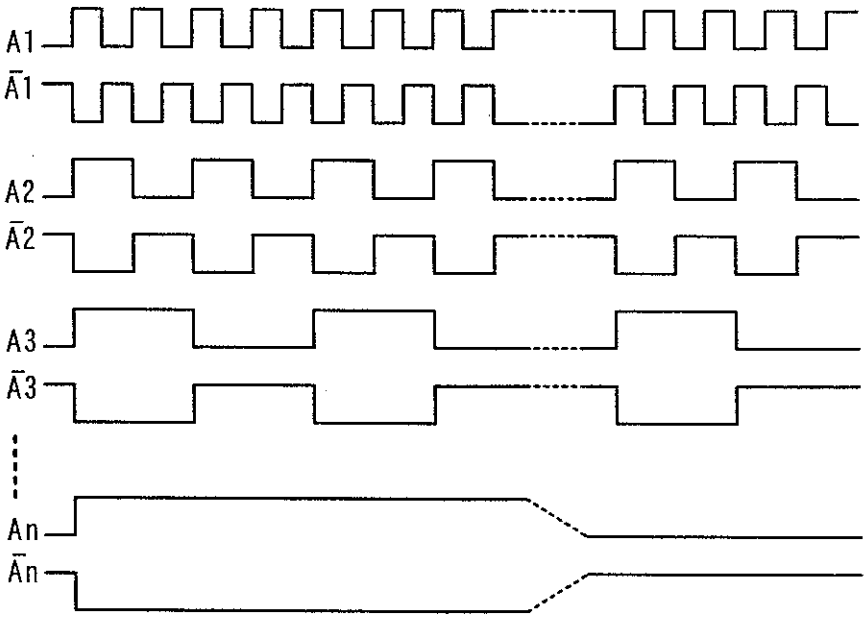

1203
1202
A1
$\bar{A}1$
A2
$\bar{A}2$
An
$\bar{A}n$
VDH
1205
1204
1207
1206
1208
1209
1203a
VDL
1211
GND
Reset
VDH
1217
1216
1215
1214
1218
1213a
1210
1212
1203b
1219
1213b
1203a
1213c
1200
1201

Fig. 25


A1
$\bar{A}1$
A2
$\bar{A}2$
A3
$\bar{A}3$
An
$\bar{A}n$

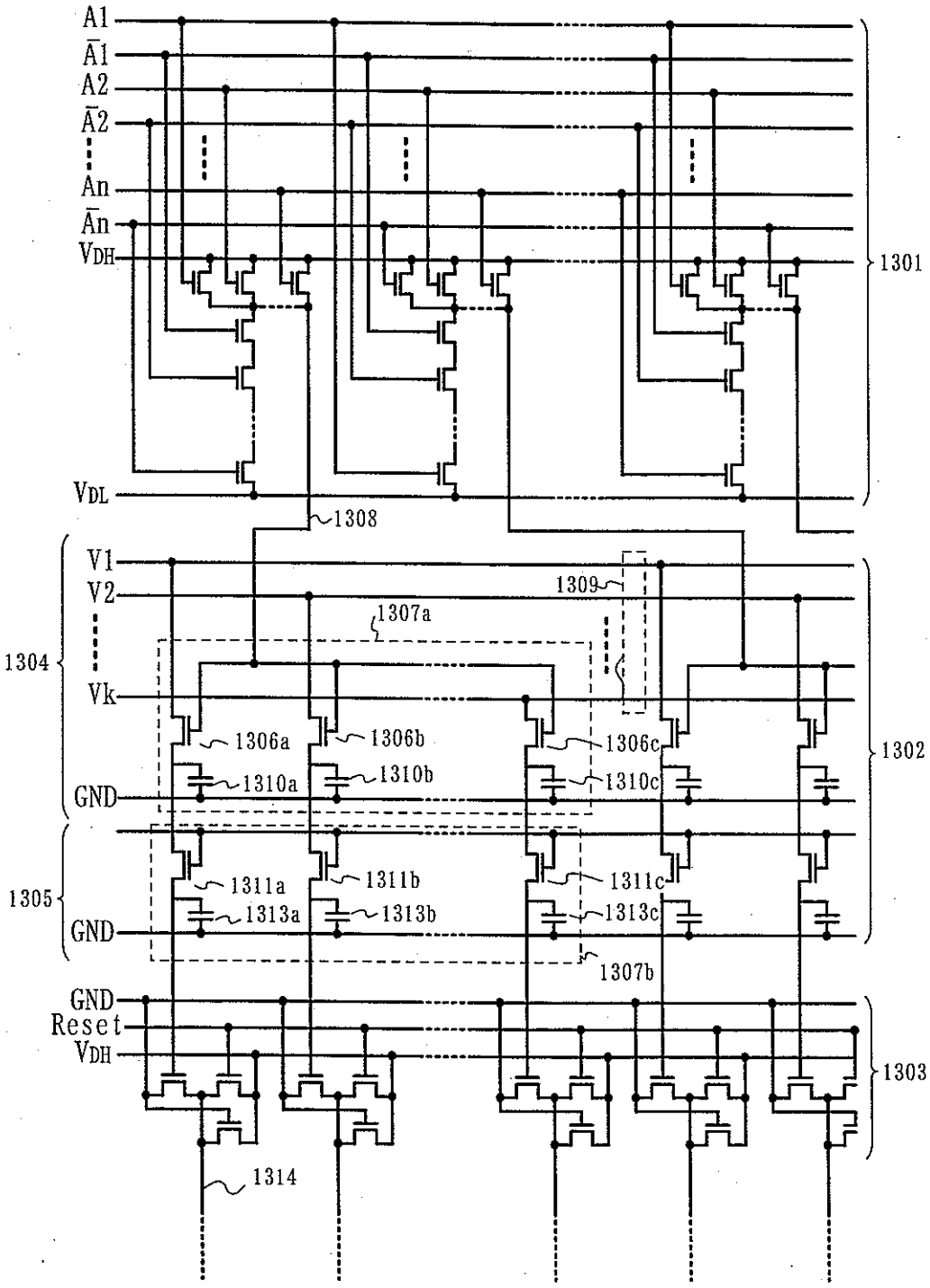

A1
Ā1
A2
Ā2
An
Ān
VDH
VDL
1301
1308
V1
V2
Vk
1304
1309
1307a
1306a
1306b
1306c
1310a
1310b
1310c
GND
1302
1305
1311a
1311b
1311c
1313a
1313b
1313c
GND
1307b
GND
Reset
VDH
1303
1314

Fig. 26

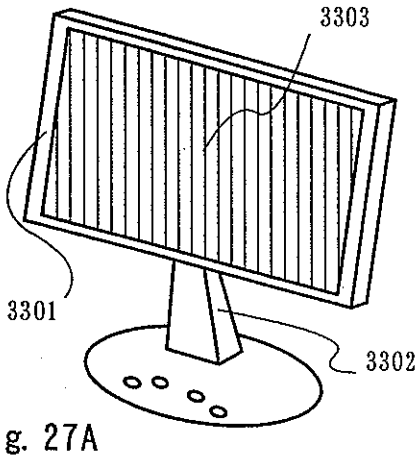


Fig. 27A

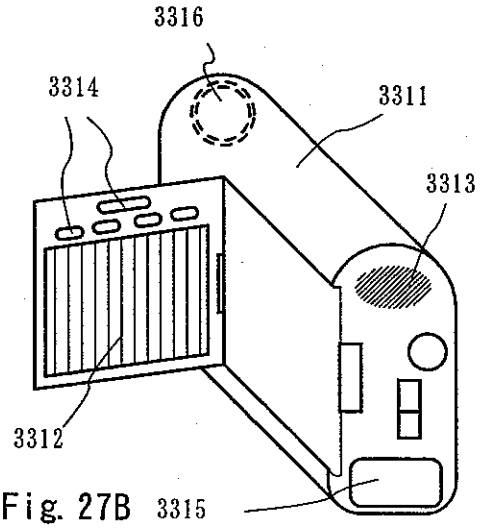


Fig. 27B

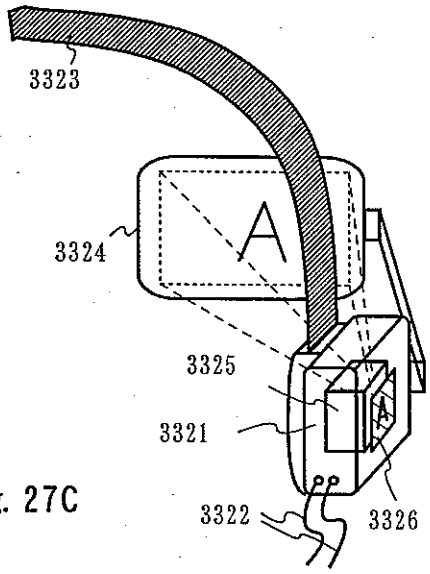


Fig. 27C

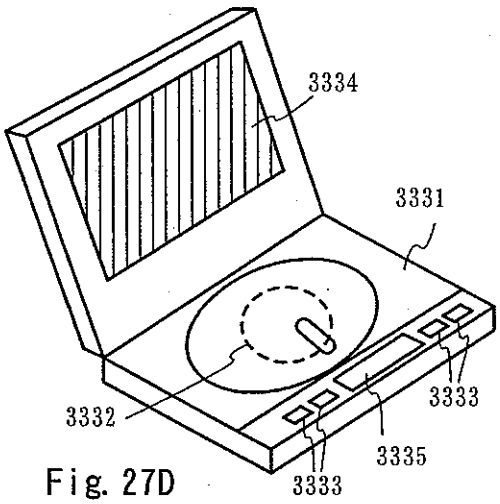


Fig. 27D

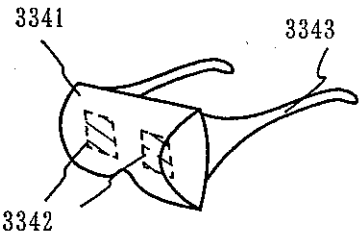


Fig. 27E

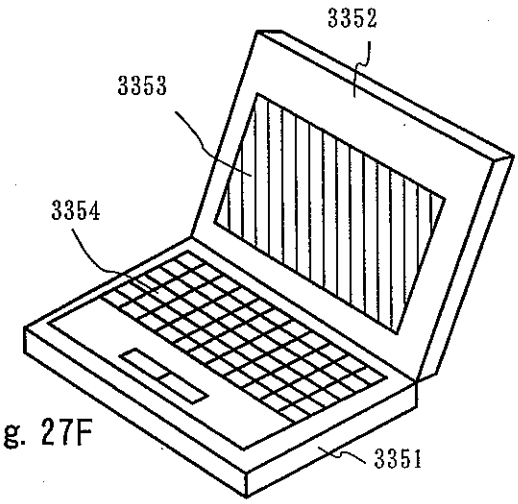


Fig. 27F

Fig. 28A

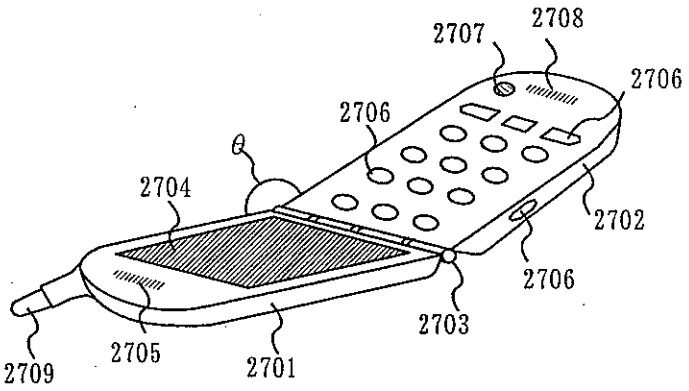
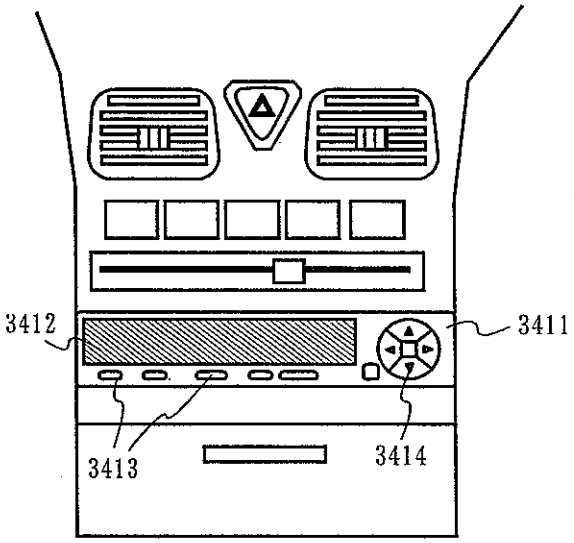


Fig. 28B



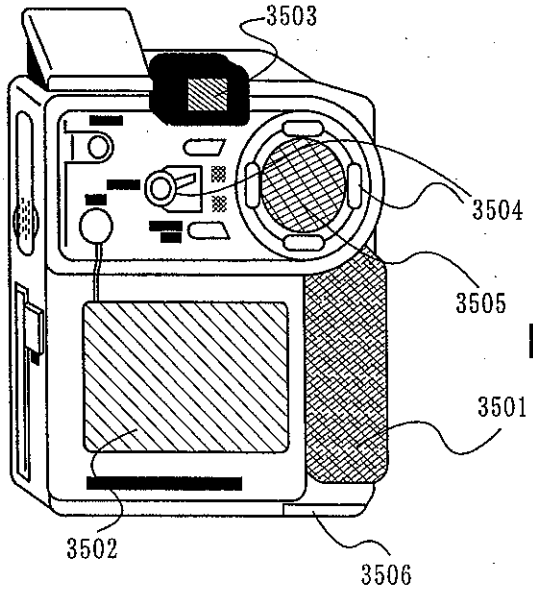


Fig. 28C

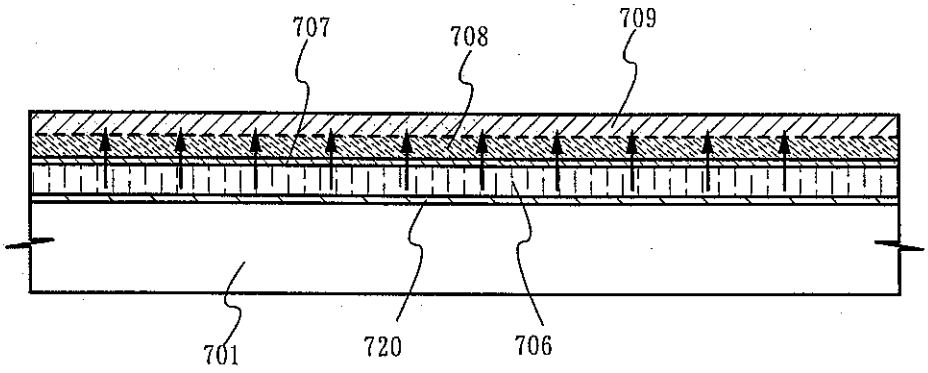


Fig. 29

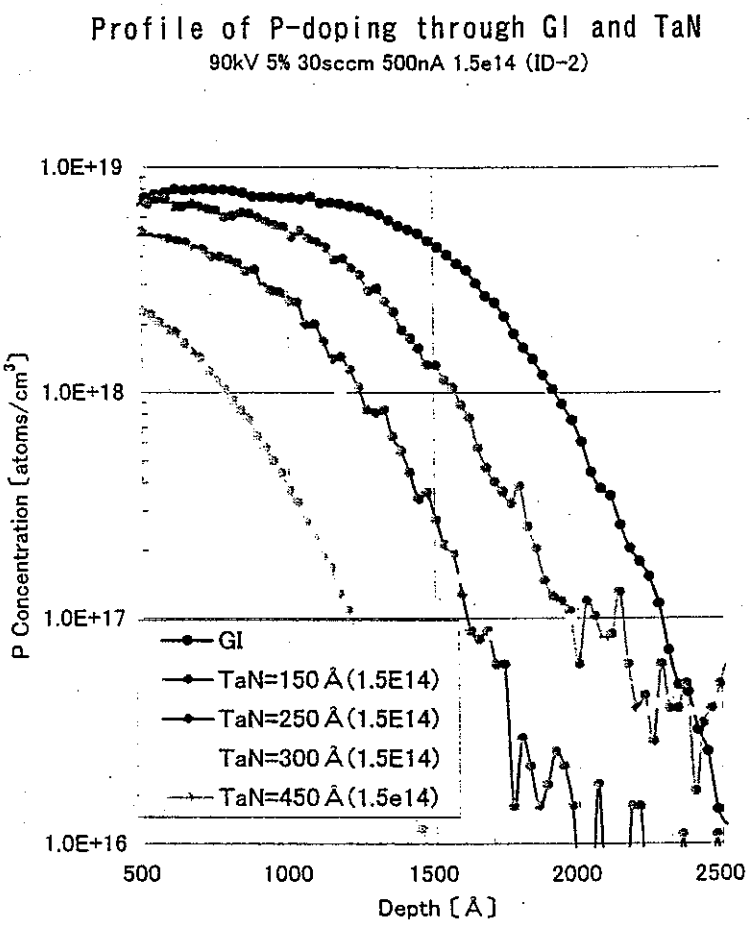

Profile of P-doping through GI and TaN
90kV 5% 30sccm 500nA 1.5e14 (ID-2)
1.0E+19
1.0E+18
1.0E+17
1.0E+16
P Concentration [atoms/cm3]
GI
TaN=150Å(1.5E14)
TaN=250Å(1.5E14)
TaN=300Å(1.5E14)
TaN=450Å(1.5e14)
500
1000
1500
2000
2500
Depth [Å]

Fig. 30

Profile obtained by fitting through conversion of TaN thickness into GI thickness

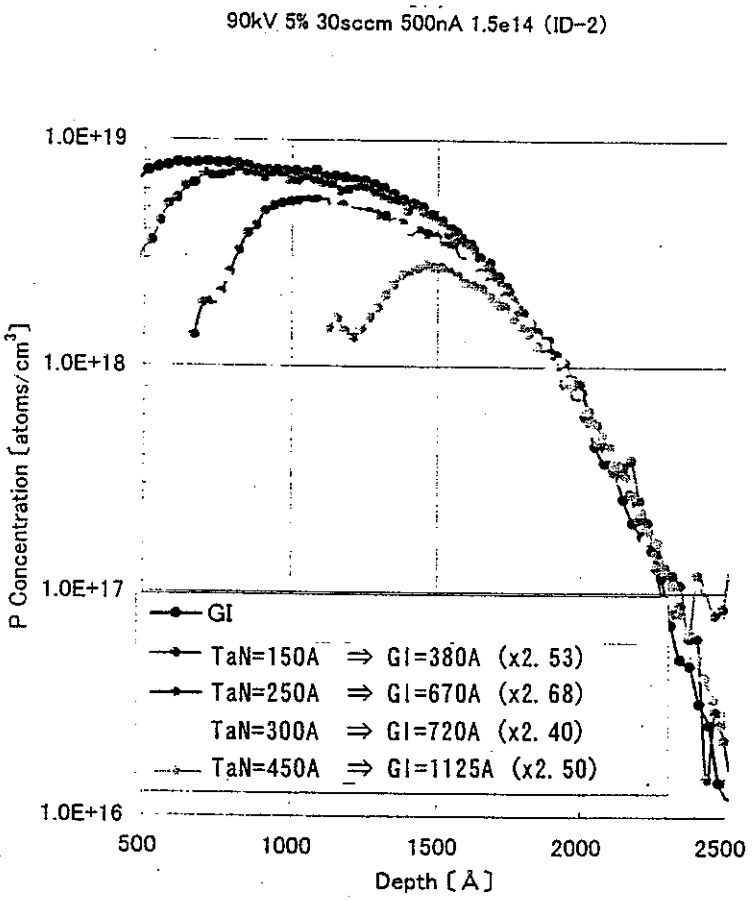


Fig. 31