Fig.1A.

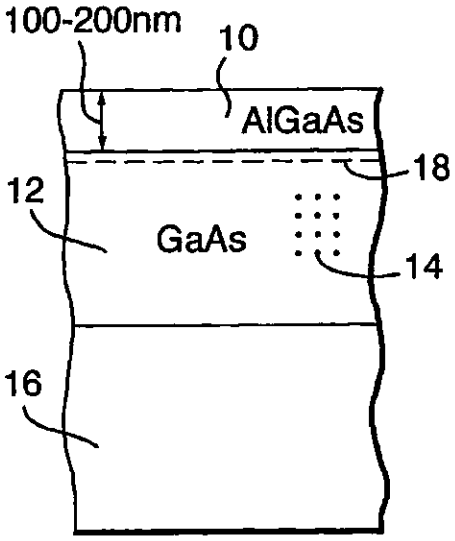


Fig.1B.

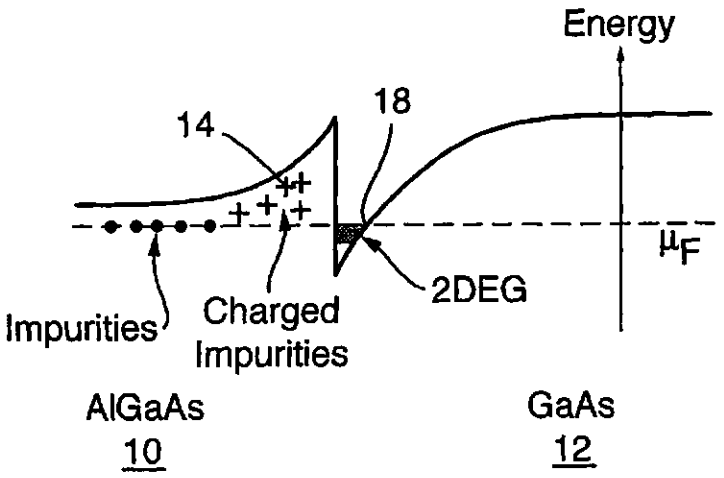


Fig.2A.

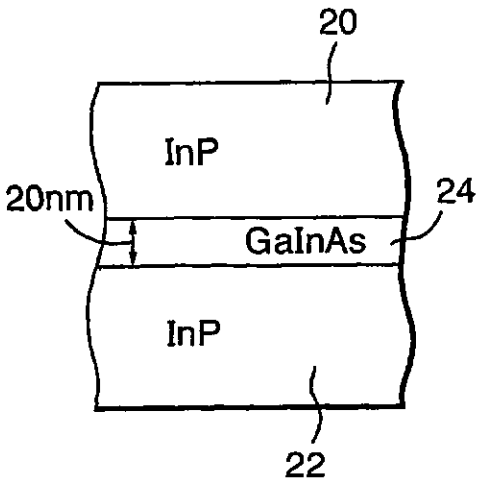


Fig.2B.

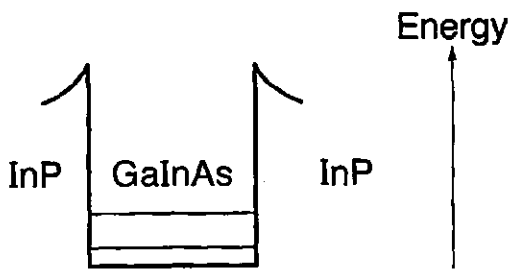


Fig.3A.

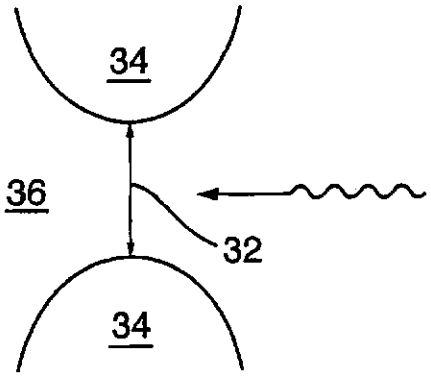


Fig.3B.

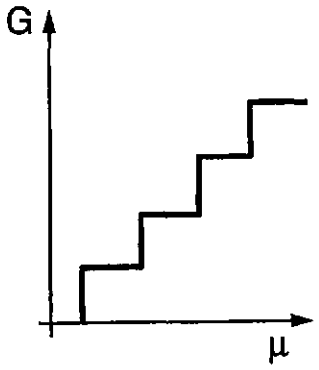


Fig.4.

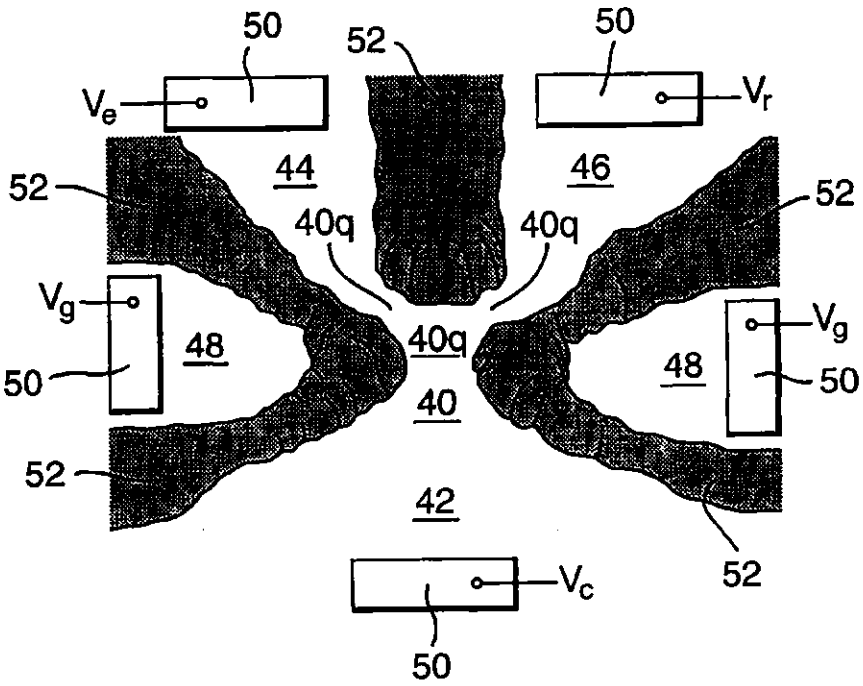


Fig.5.

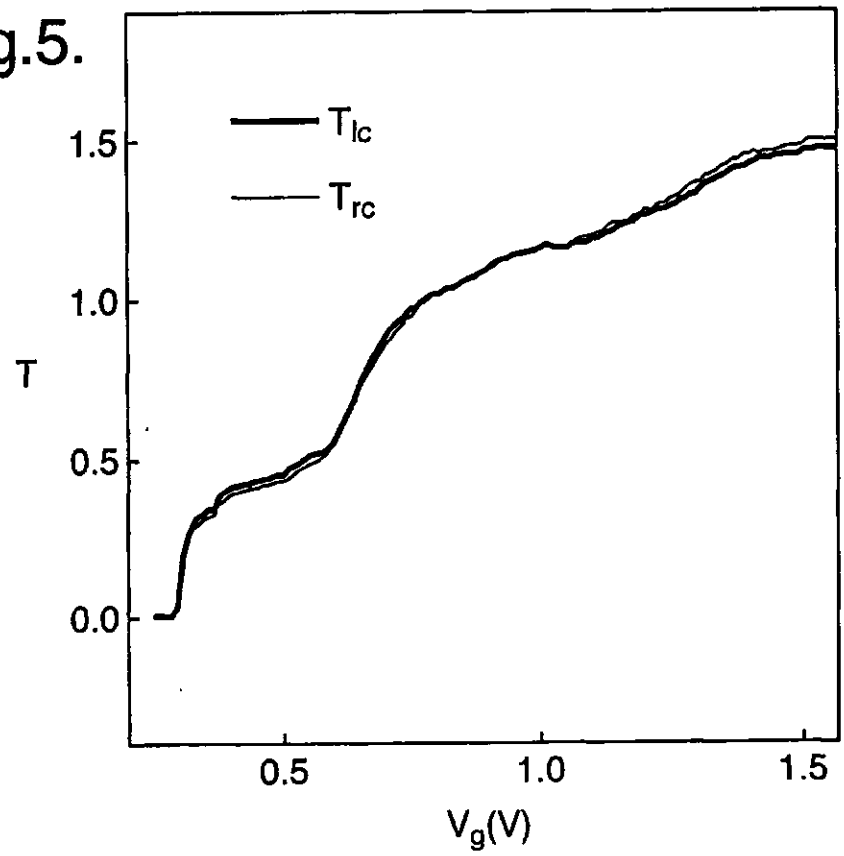

T_{lc}
T_{rc}
1.5
1.0
0.5
0.0
T
0.5
1.0
1.5
V_g(V)

Fig.6.

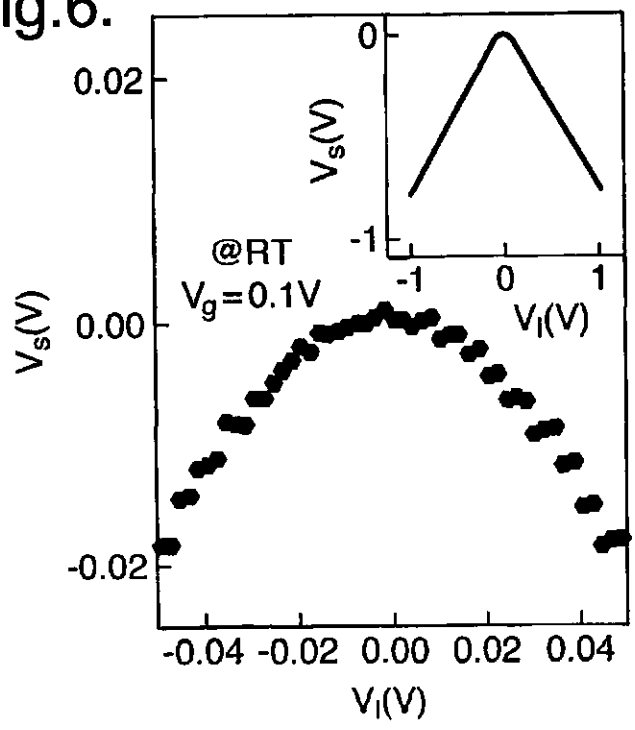

0.02
0.00
-0.02
V_s(V)
@RT
V_g=0.1V
-0.04 -0.02 0.00 0.02 0.04
V_l(V)
0
-1
V_s(V)
-1 0 1
V_l(V)

Fig.7.

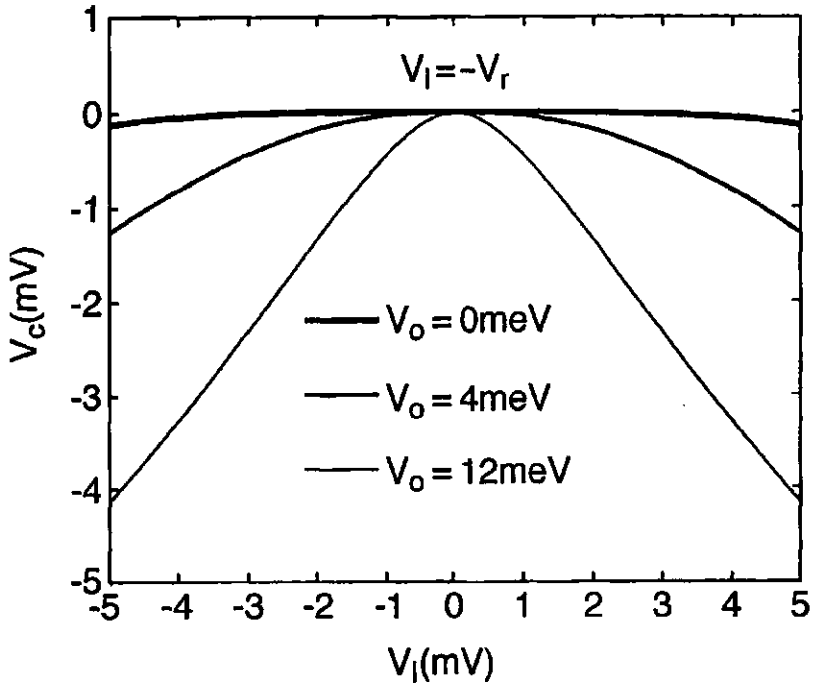

$V_l=-V_r$
$V_o=0meV$
$V_o=4meV$
$V_o=12meV$
$V_c(mV)$
$V_l(mV)$
1
0
-1
-2
-3
-4
-5
-5 -4 -3 -2 -1 0 1 2 3 4 5

Fig.8.

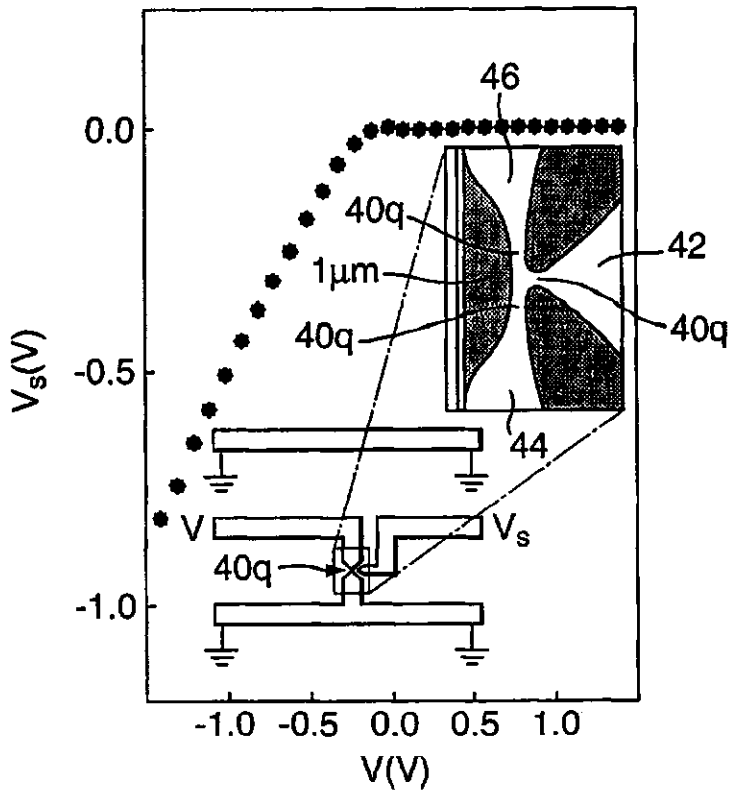

46
40q
1μm
40q
42
40q
44
V
V_s
40q
$V_s(V)$
0.0
-0.5
-1.0
-1.0 -0.5 0.0 0.5 1.0
V(V)

Fig.9.

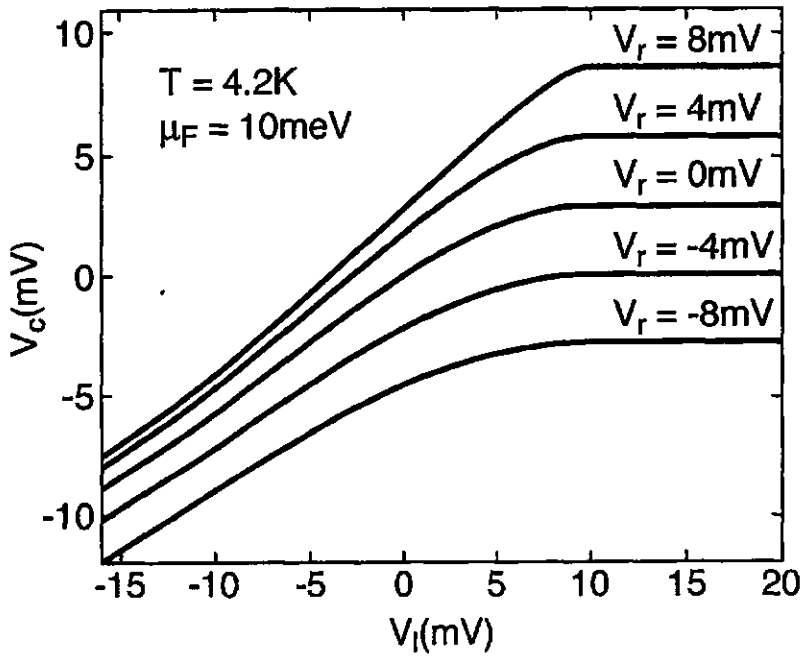

T = 4.2K
μF = 10meV
Vr = 8mV
Vr = 4mV
Vr = 0mV
Vr = -4mV
Vr = -8mV
Vc(mV)
Vl(mV)
10
5
0
-5
-10
-15
-10
-5
0
5
10
15
20

Fig.10.

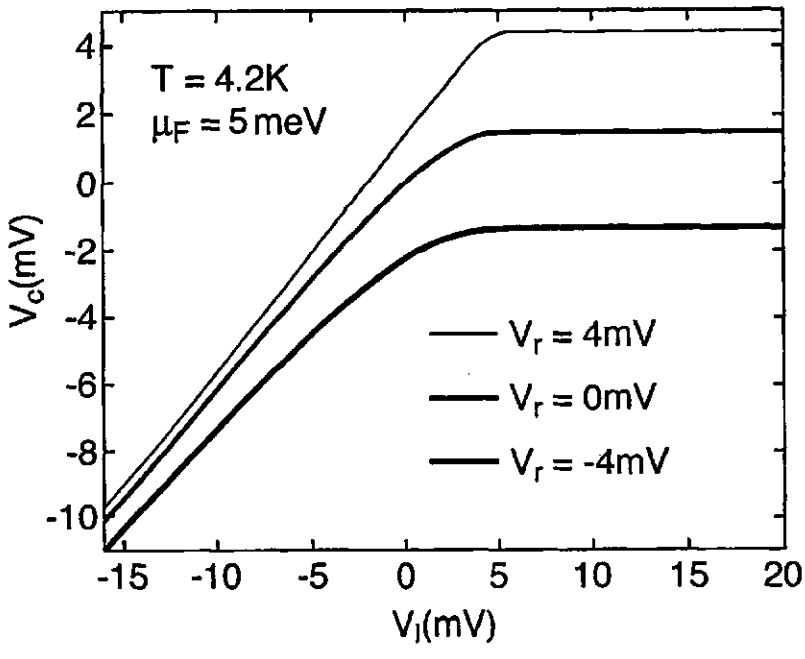

T = 4.2K
μF = 5meV
Vr = 4mV
Vr = 0mV
Vr = -4mV
Vc(mV)
Vl(mV)
4
2
0
-2
-4
-6
-8
-10
-15
-10
-5
0
5
10
15
20

Fig.11.

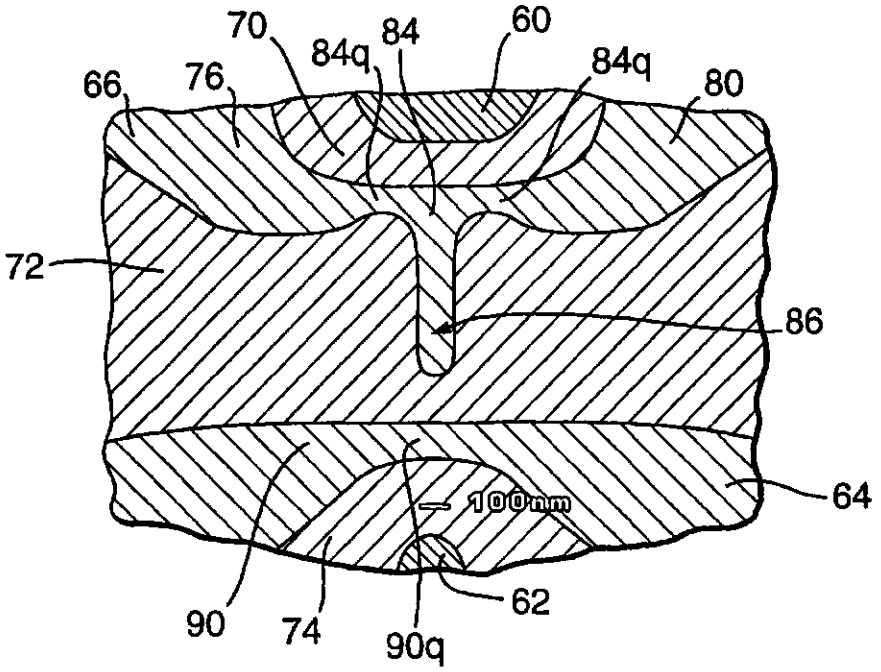

70
84q
84
60
84q
80
66
76
72
86
64
100nm
62
90
74
90q

Fig.14.

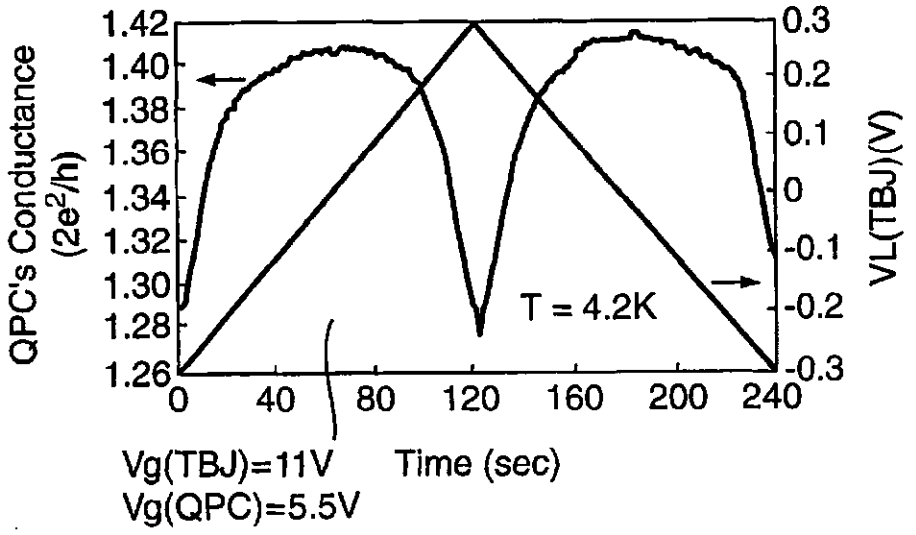

QPC's Conductance
(2e²/h)
1.42
1.40
1.38
1.36
1.34
1.32
1.30
1.28
1.26
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
VL(TBJ)(V)
T = 4.2K
0
40
80
120
160
200
240
Time (sec)
Vg(TBJ)=11V
Vg(QPC)=5.5V

Fig.12.

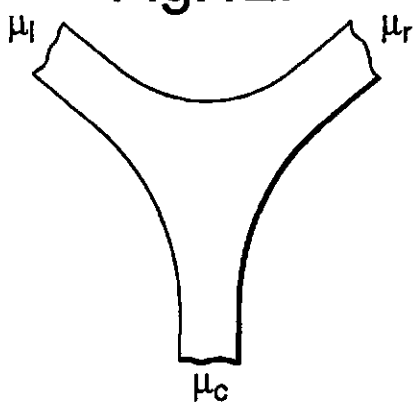
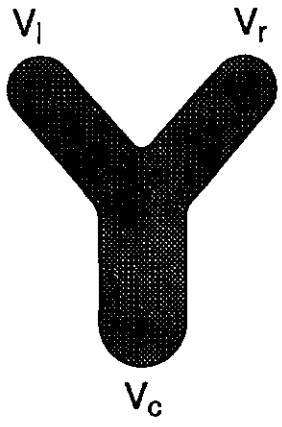


Fig.13A.

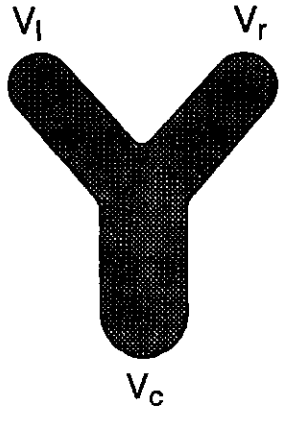


With V<0 defined as "1", the logic truth-table is:

Input		Output
V_l	V_r	V_c
1	1	1
1	0	1
0	1	1
0	0	0

"OR"

Fig.13B.

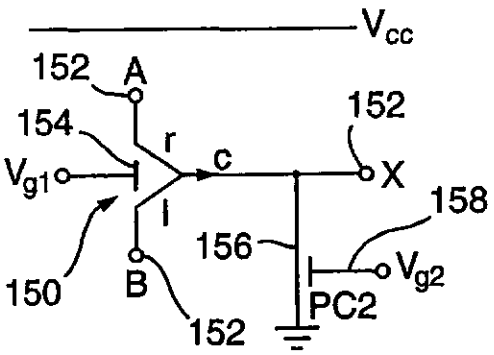


With V<0 defined as "1", the logic truth-table is:

Input		Output
V_l	V_r	V_c
1	1	1
1	0	0
0	1	0
0	0	0

"AND"

Fig.15.



A	B	X
1	1	1
1	0	0
0	1	0
0	0	0

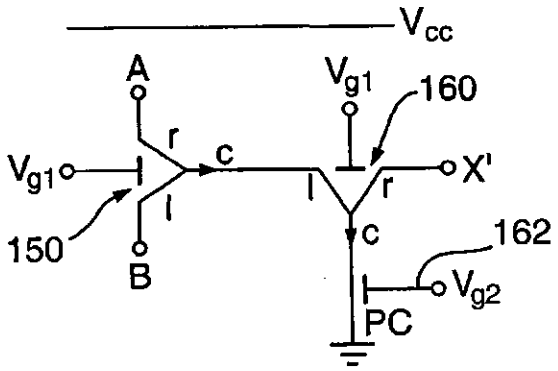
For $R_{PC} \sim M\Omega$

A TBJ AND Gate



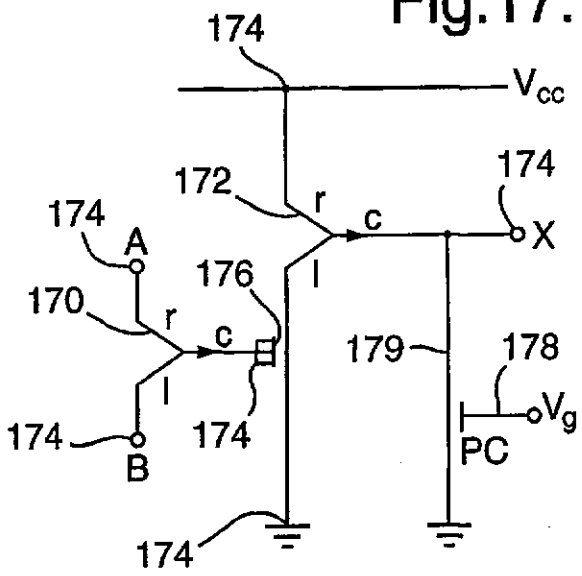
Logic Levels	
In	Out
$V_{IL}=0$	$V_{OL}=0(\sim mV)$
$V_{IH}=V_{cc}$	$V_{OH}=V_{cc}$

Fig.16.



A Double TBJ AND Gate

Fig.17.



A	B	X
1	1	0
1	0	1
0	1	1
0	0	1

A Double TBJ NAND Gate

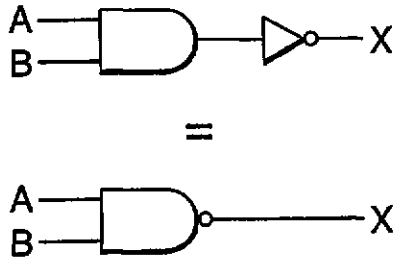
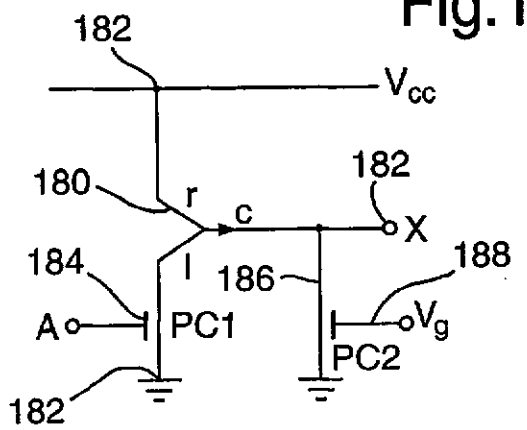


Fig.18.



A	X
1	0
0	1

For $R_{PC1} = \infty \sim$ Open (Full)

For $R_{PC2} \sim M\Omega$

Logic Levels	
In	Out
$V_{IL} \sim 0$	$V_{OL} \sim 0 (\sim mV)$
$V_{IH} \sim V_{cc}$	$V_{OH} \sim V_{cc}$

Inverter

