Fig. 1A

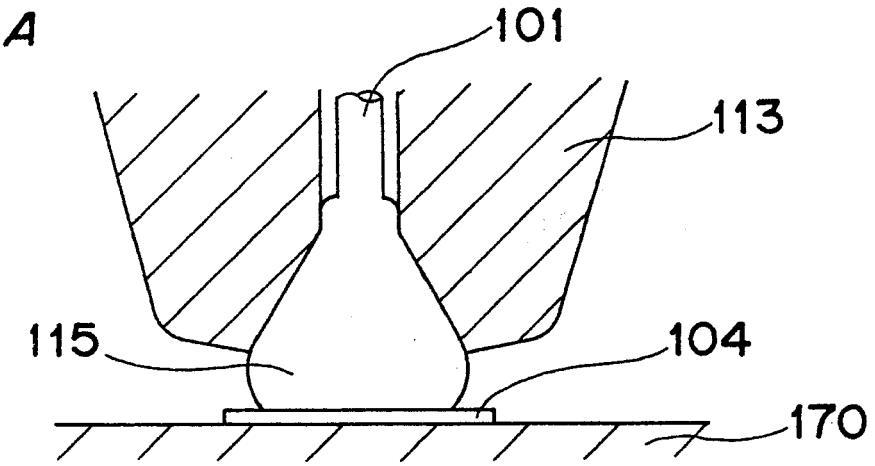


Fig. 1B

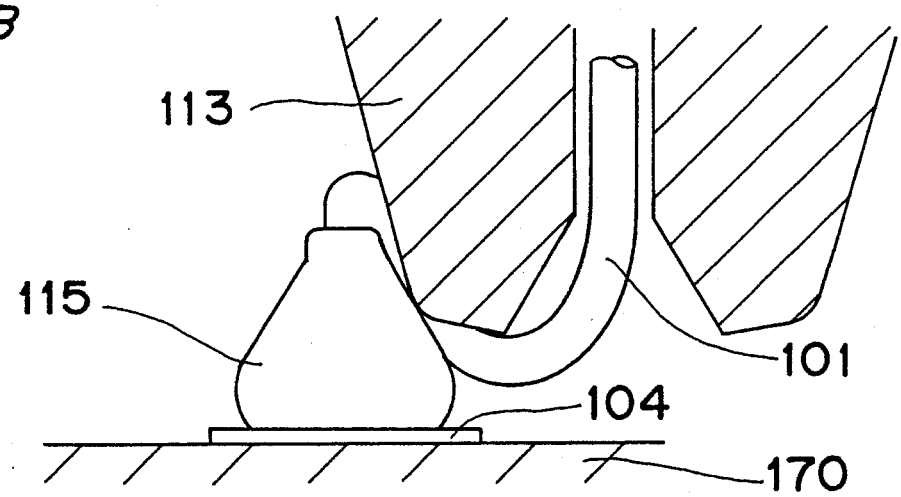
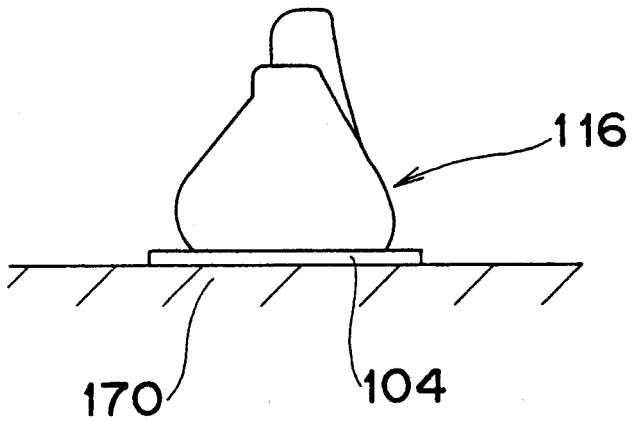


Fig. 1C



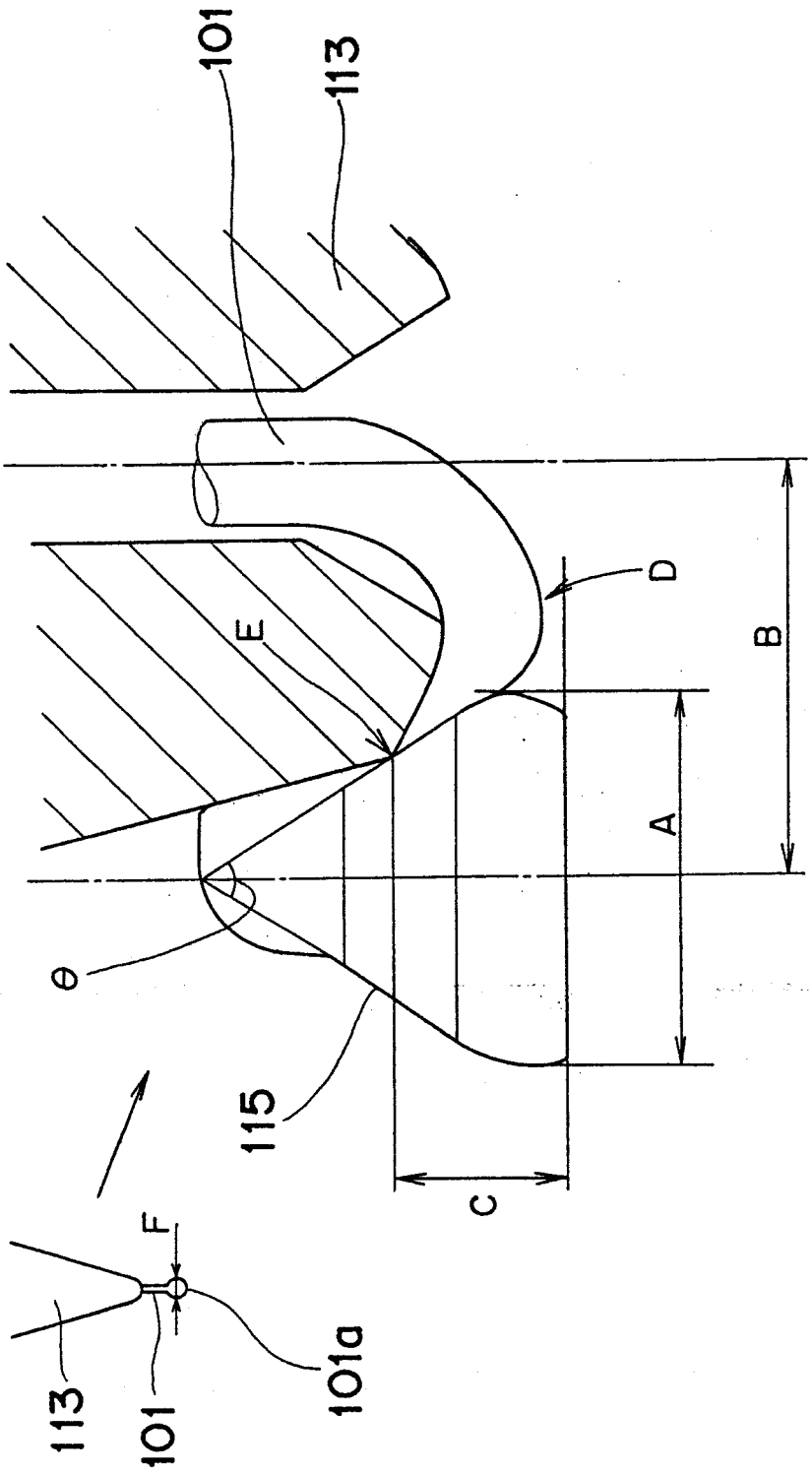


Fig. 1D

Fig. 2

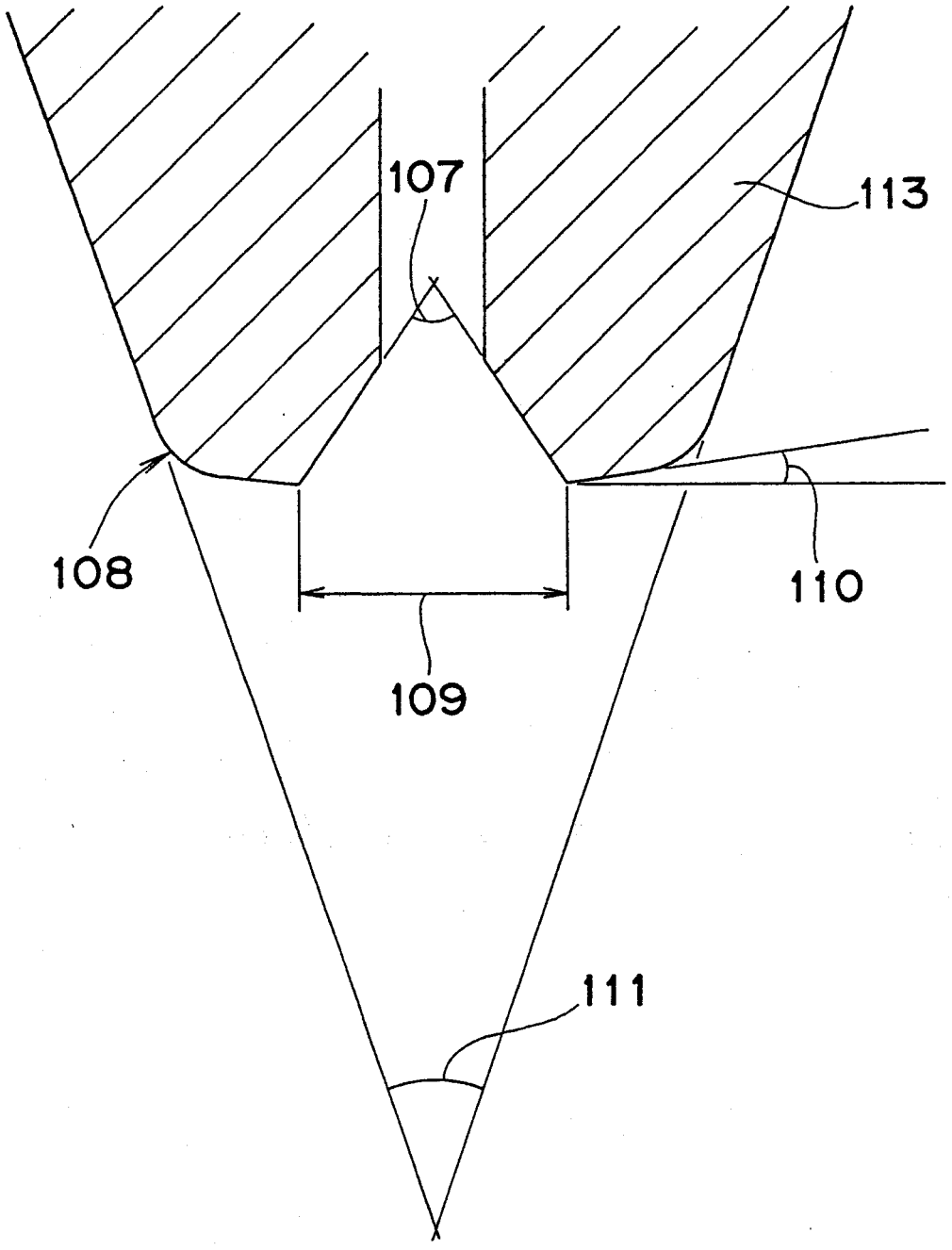


Fig. 3A

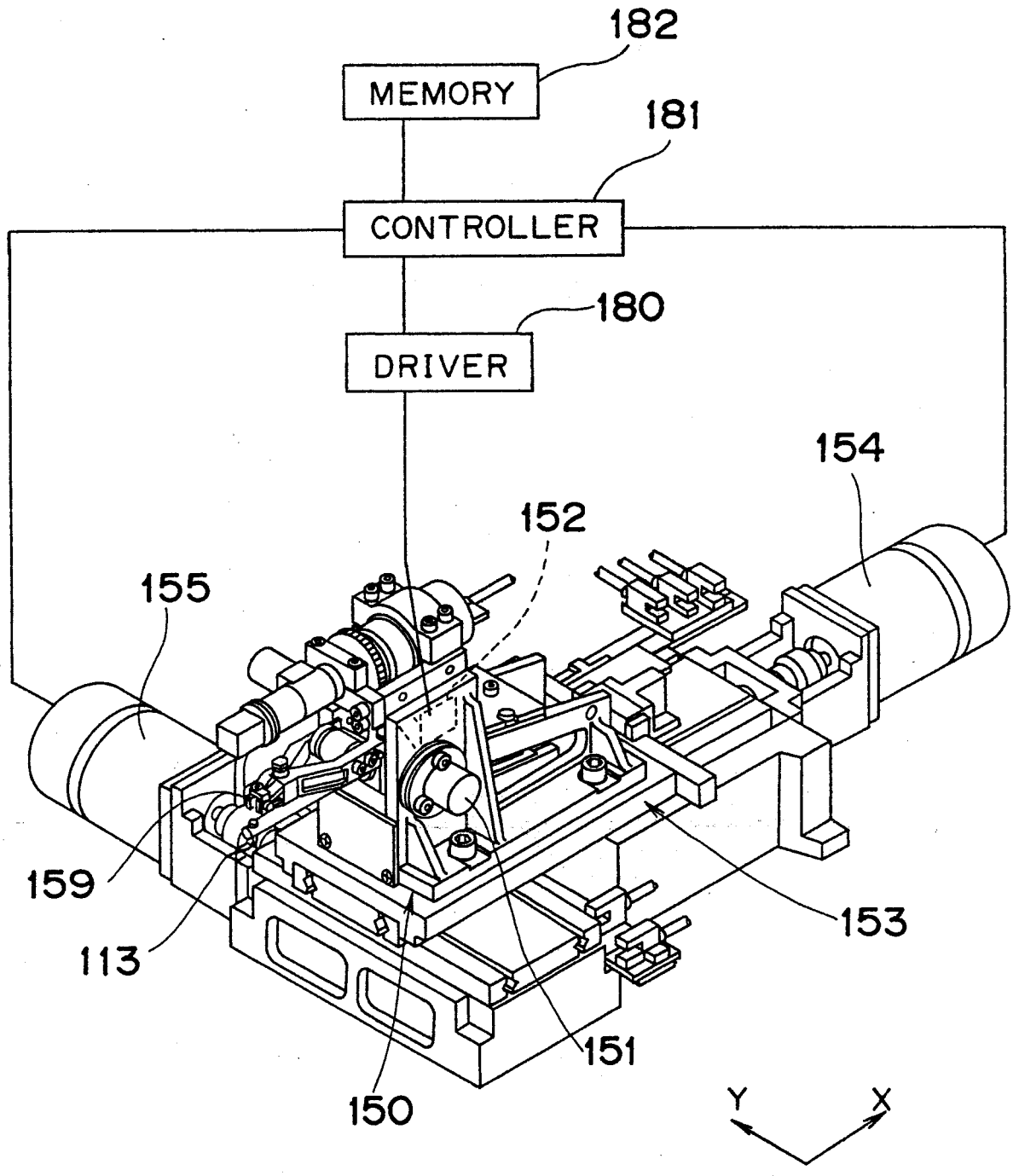

182
MEMORY
181
CONTROLLER
180
DRIVER
154
152
155
159
113
153
151
150
Y
X

Fig. 3B

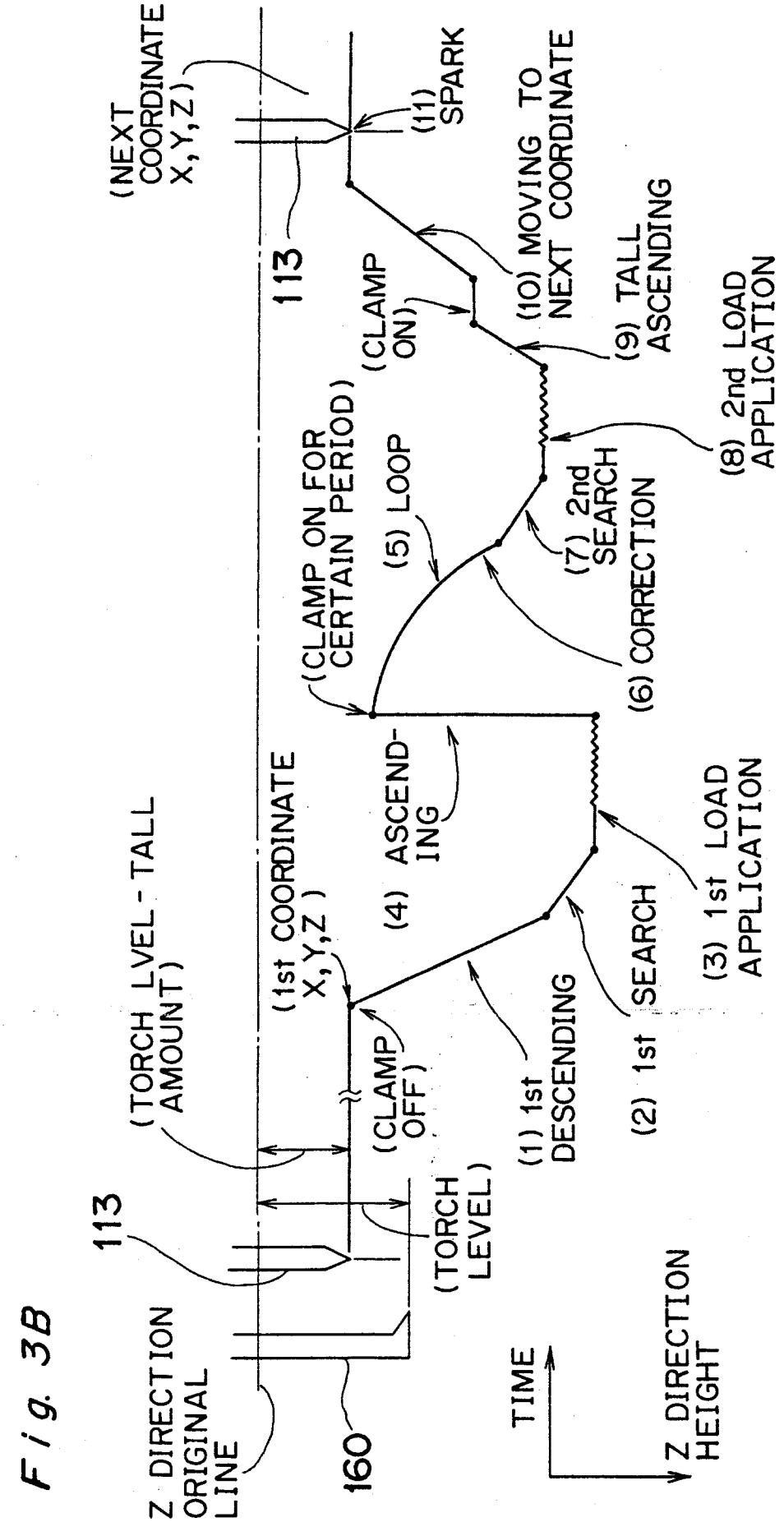

Z DIRECTION ORIGINAL LINE
160
113
(TORCH LEVEL)
(TORCH LVEL - TALL AMOUNT)
(1st COORDINATE X,Y,Z)
(CLAMP OFF)
(1) 1st DESCENDING
(2) 1st SEARCH
(3) 1st LOAD APPLICATION
(4) ASCEND-ING
(5) LOOP
(6) CORRECTION
(7) 2nd SEARCH
(8) 2nd LOAD APPLICATION
(CLAMP ON FOR CERTAIN PERIOD)
(CLAMP ON)
(9) TALL ASCENDING
(10) MOVING TO NEXT COORDINATE
(11) SPARK
113
(NEXT COORDINATE X,Y,Z)
TIME
Z DIRECTION HEIGHT

Fig. 4

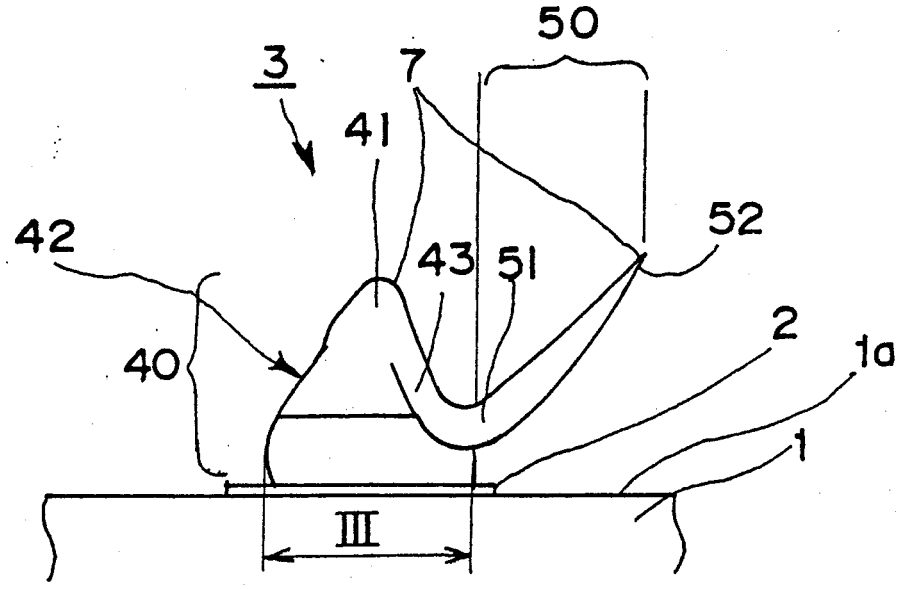


Fig. 5A

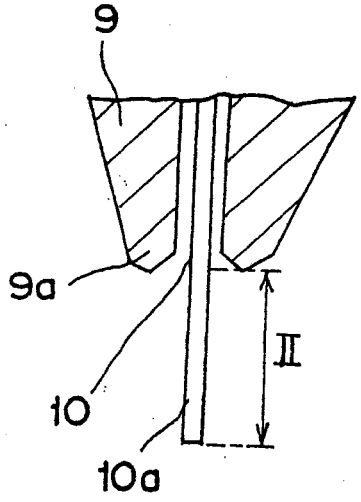
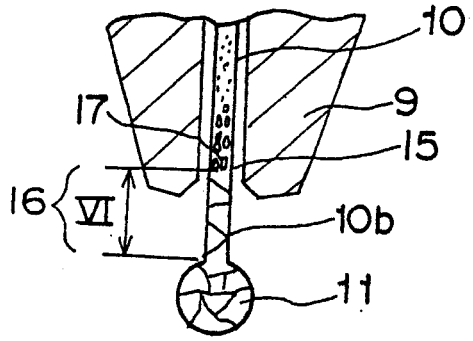


Fig. 5B



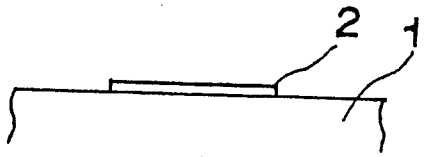


Fig. 5C

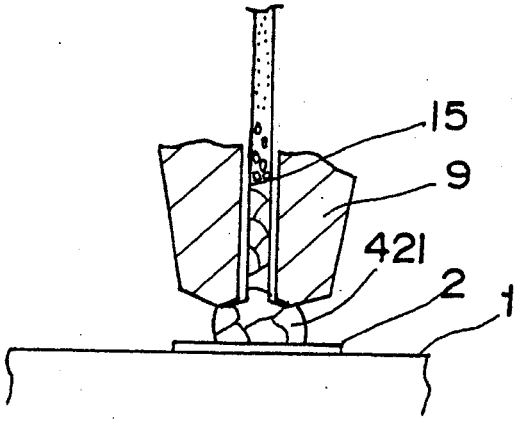


Fig. 5D

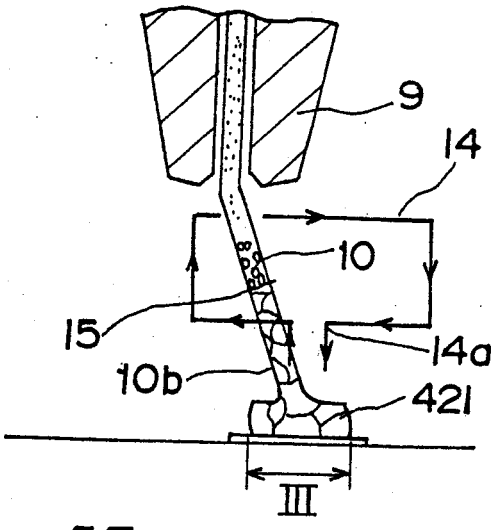


Fig. 5E

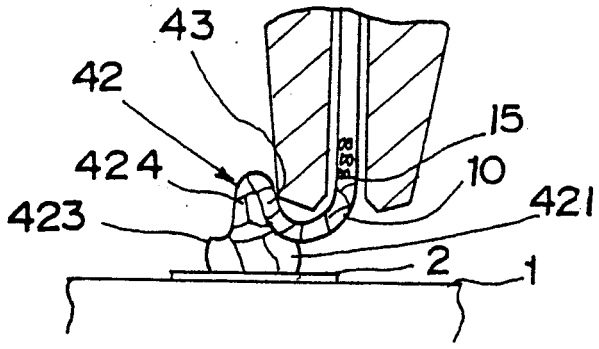


Fig. 5F

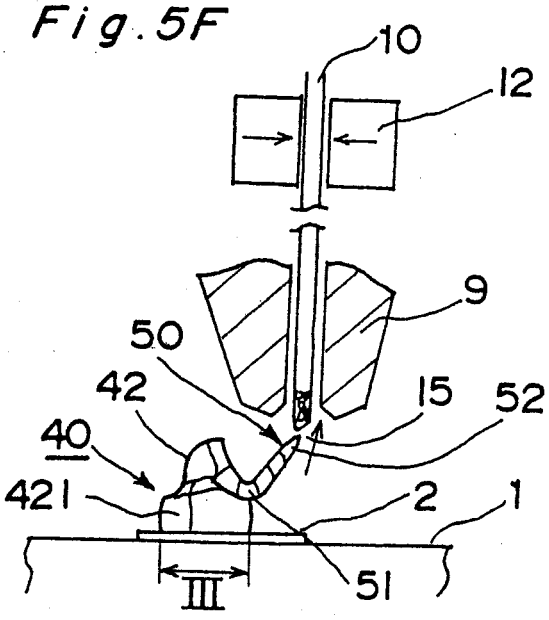


Fig.6

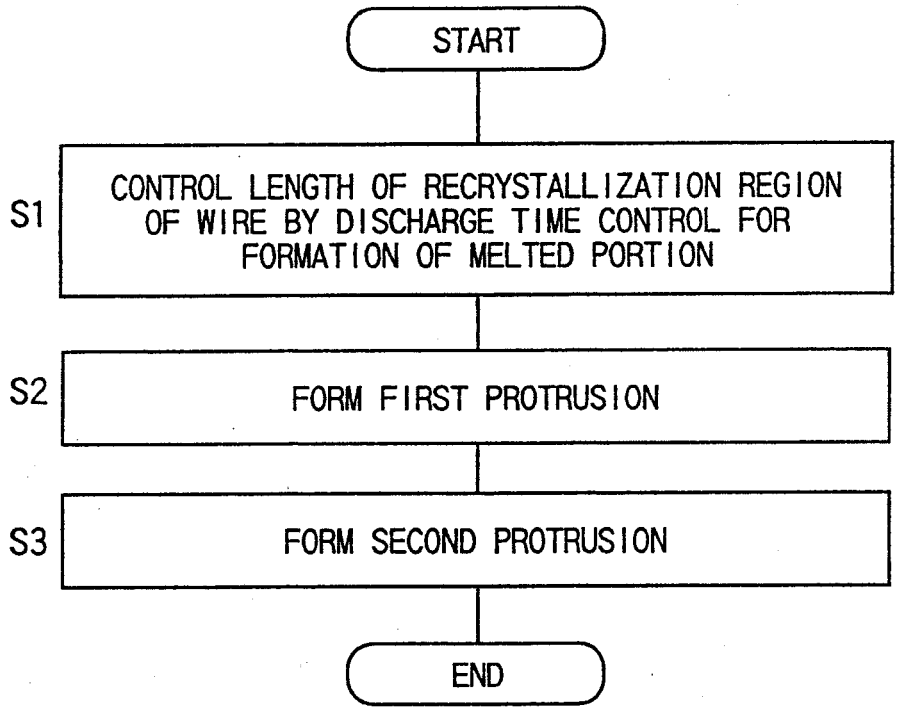

START
S1
CONTROL LENGTH OF RECRYSTALLIZATION REGION OF WIRE BY DISCHARGE TIME CONTROL FOR FORMATION OF MELTED PORTION
S2
FORM FIRST PROTRUSION
S3
FORM SECOND PROTRUSION
END

Fig.7

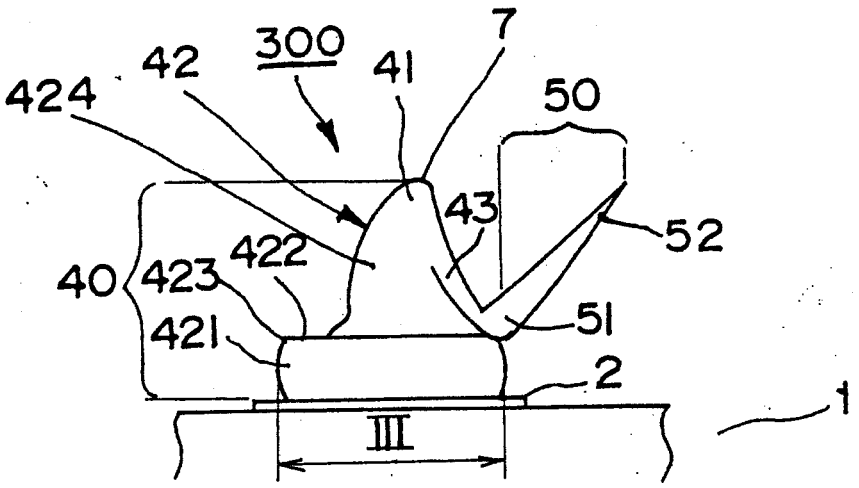


Fig. 8A

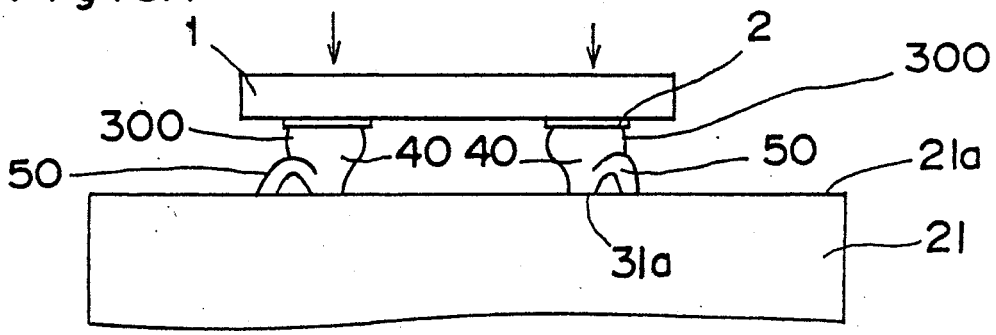


Fig. 8B

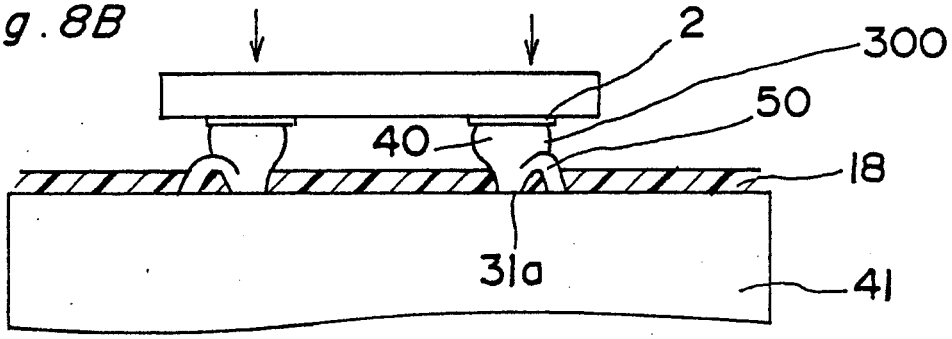


Fig. 8C

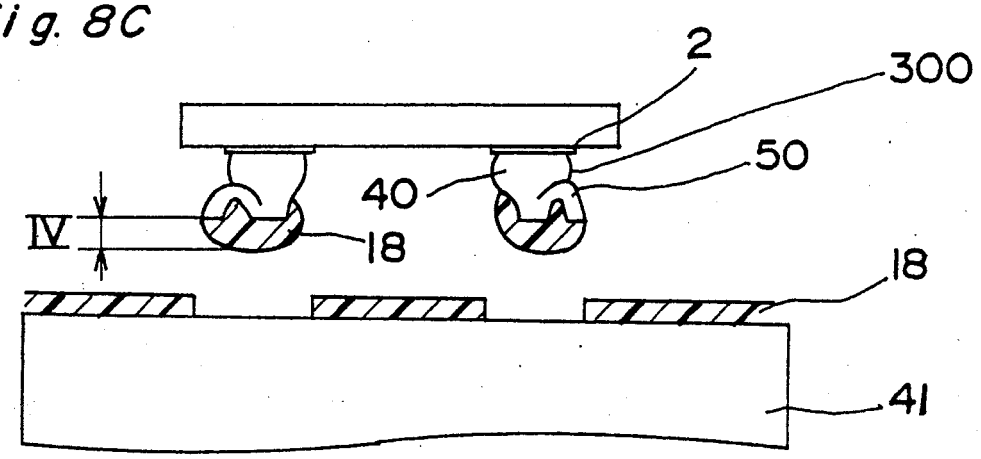


Fig. 8D

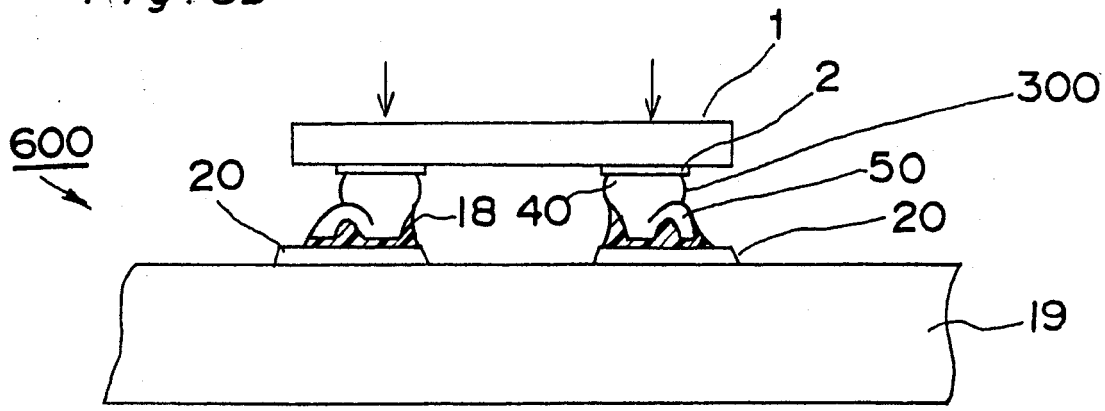


Fig.9

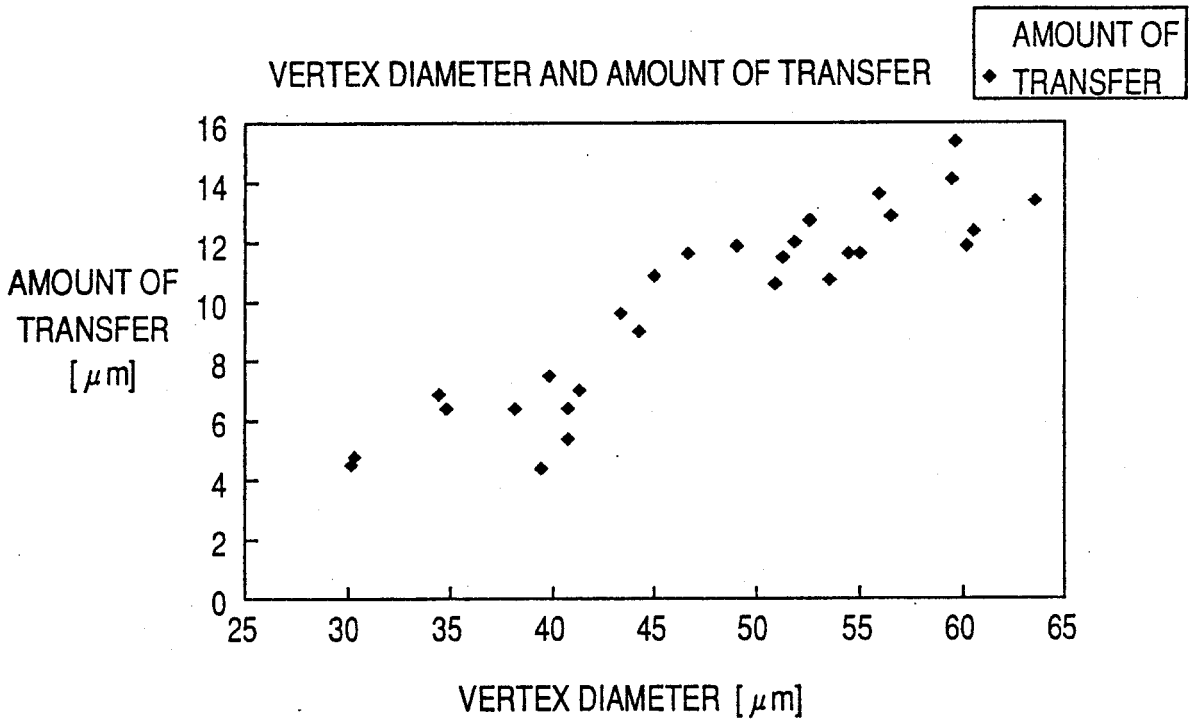

VERTEX DIAMETER AND AMOUNT OF TRANSFER
AMOUNT OF TRANSFER
AMOUNT OF TRANSFER [μm]
16
14
12
10
8
6
4
2
0
25
30
35
40
45
50
55
60
65
VERTEX DIAMETER [μm]

Fig. 10

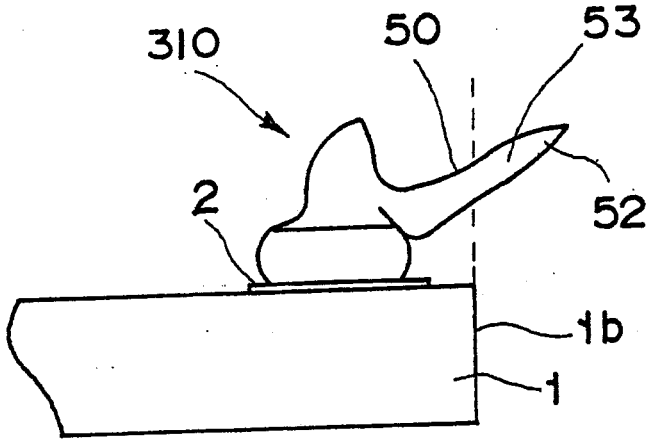


Fig.11

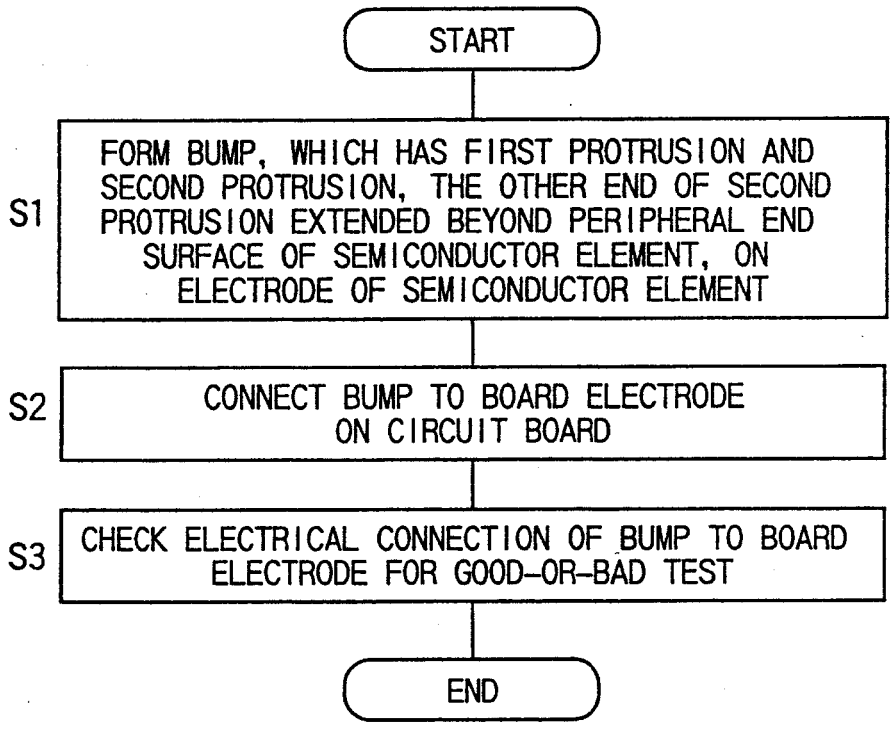
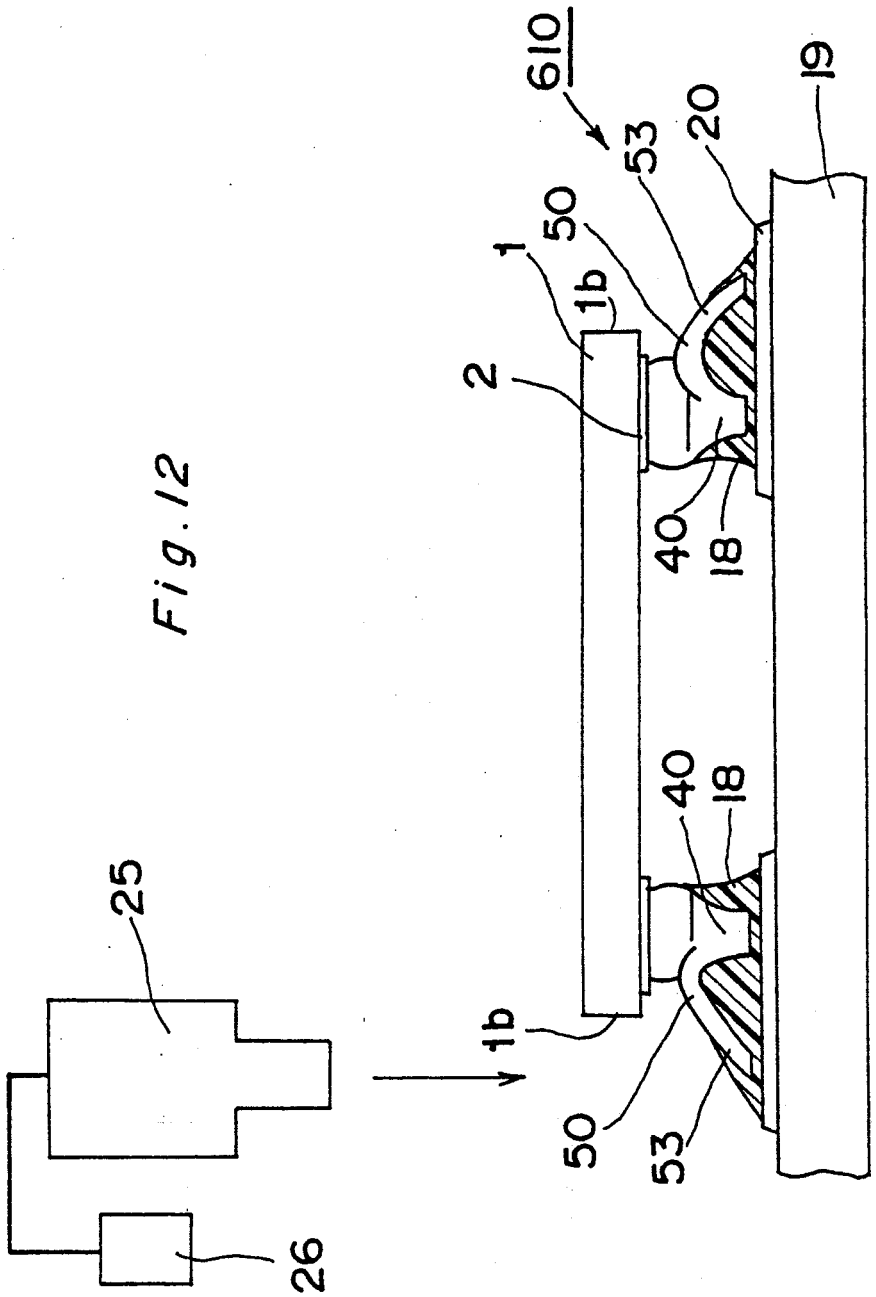

START
S1
FORM BUMP, WHICH HAS FIRST PROTRUSION AND SECOND PROTRUSION, THE OTHER END OF SECOND PROTRUSION EXTENDED BEYOND PERIPHERAL END SURFACE OF SEMICONDUCTOR ELEMENT, ON ELECTRODE OF SEMICONDUCTOR ELEMENT
S2
CONNECT BUMP TO BOARD ELECTRODE ON CIRCUIT BOARD
S3
CHECK ELECTRICAL CONNECTION OF BUMP TO BOARD ELECTRODE FOR GOOD-OR-BAD TEST
END

Fig. 12



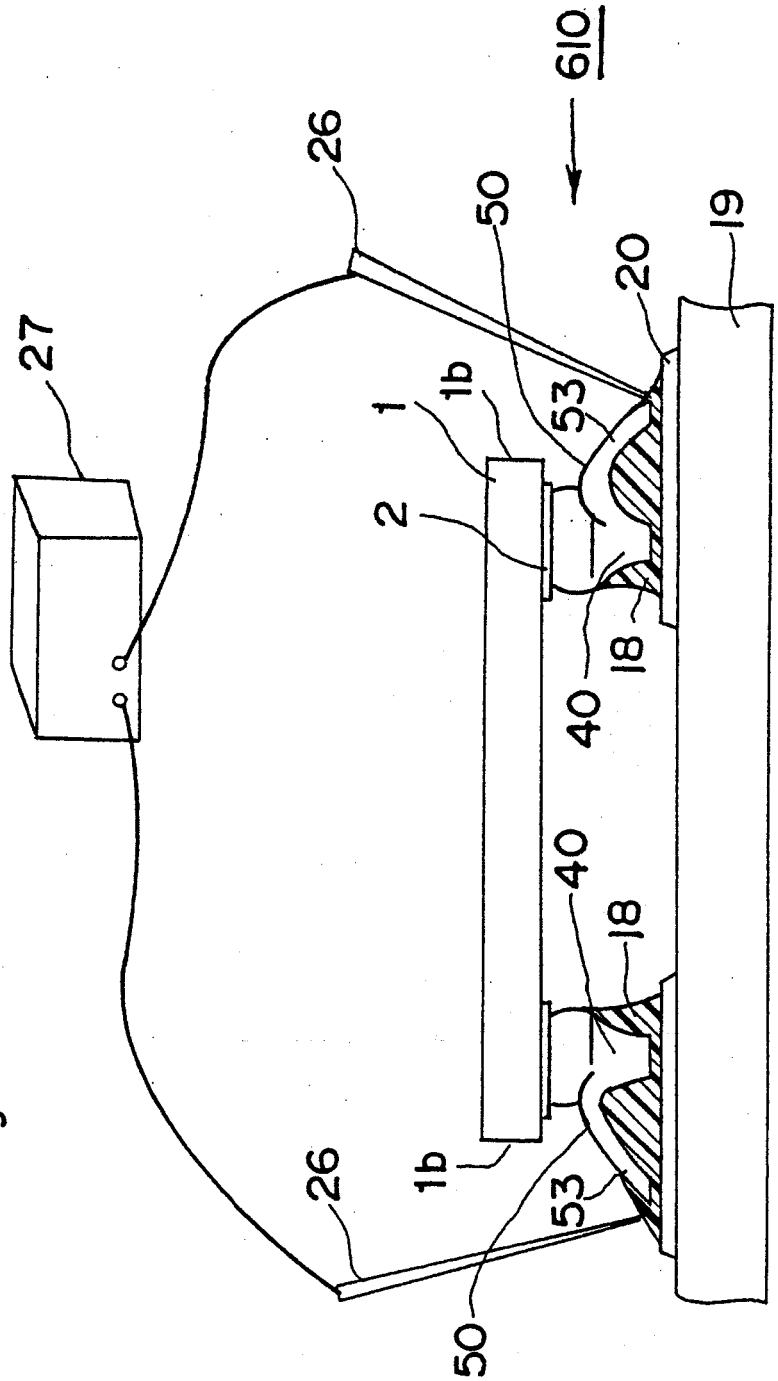


Fig. 13

Fig. 14A

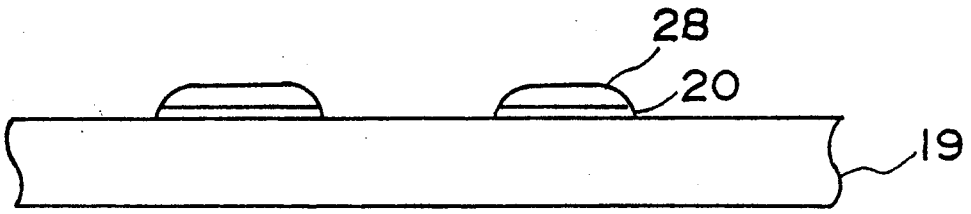


Fig. 14B

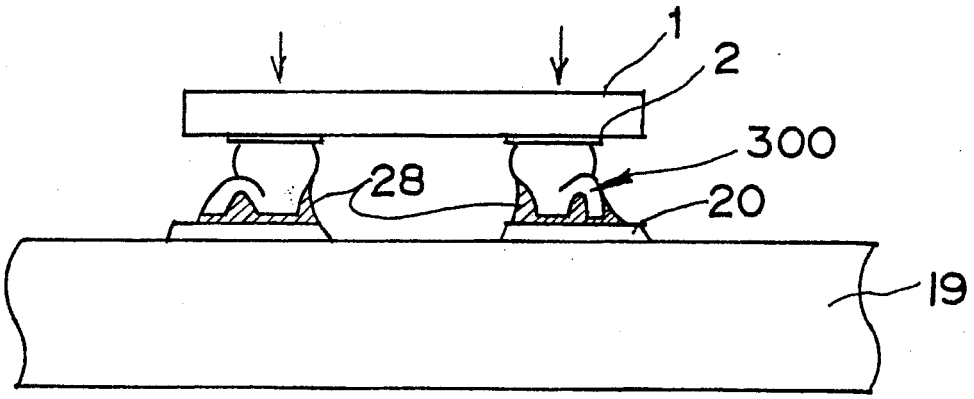


Fig. 15

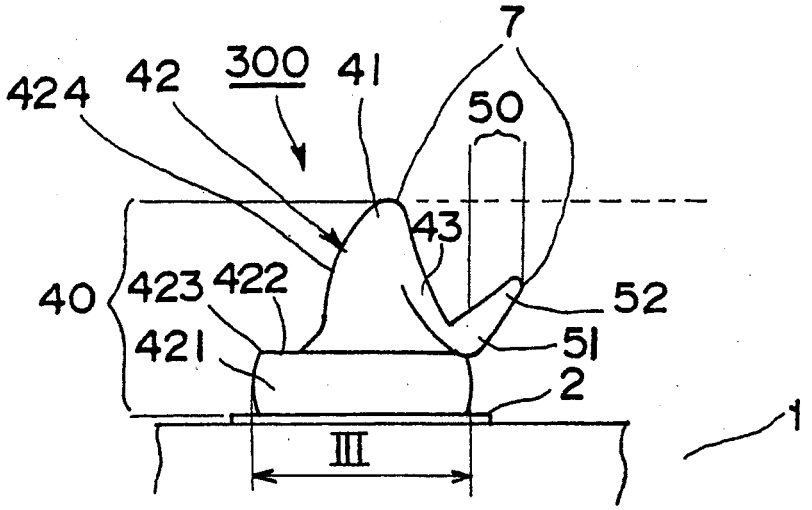

7
424
42
300
41
50
43
40
423
422
52
421
51
2
1
III

Fig. 16

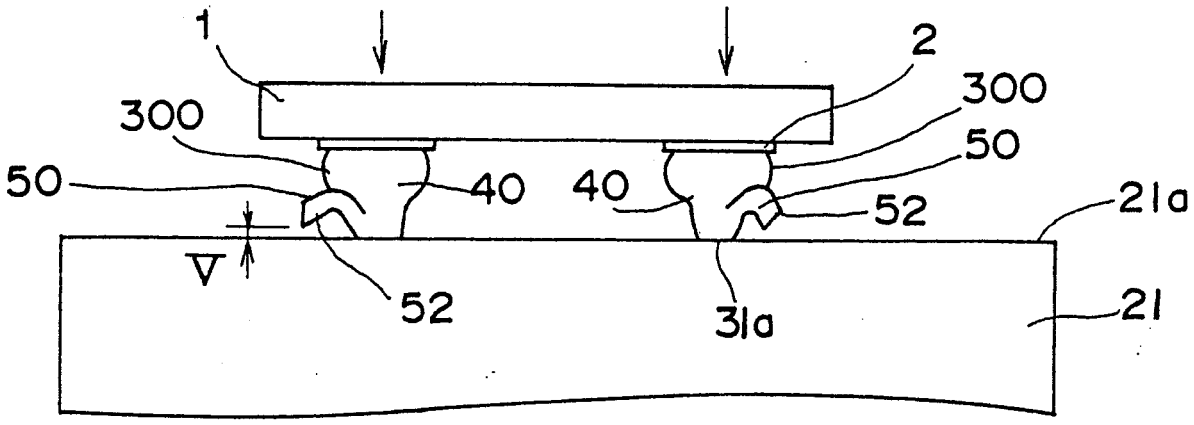

1
2
300
300
50
50
40
40
52
21a
V
52
31a
21

Fig. 17A

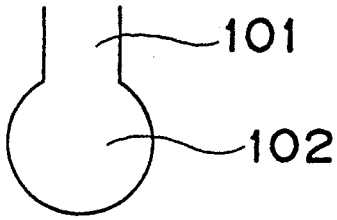


Fig. 17B

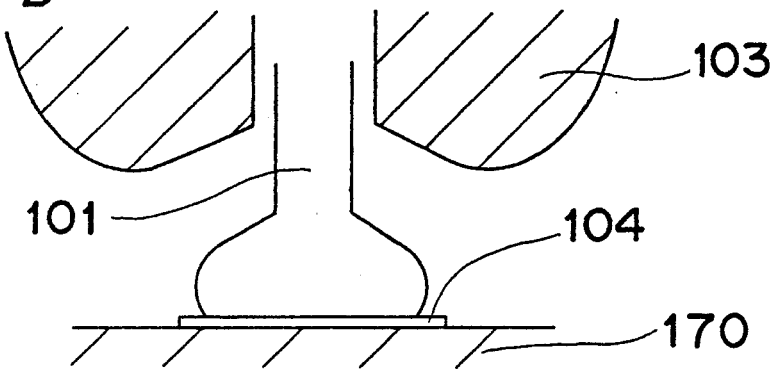


Fig. 17C

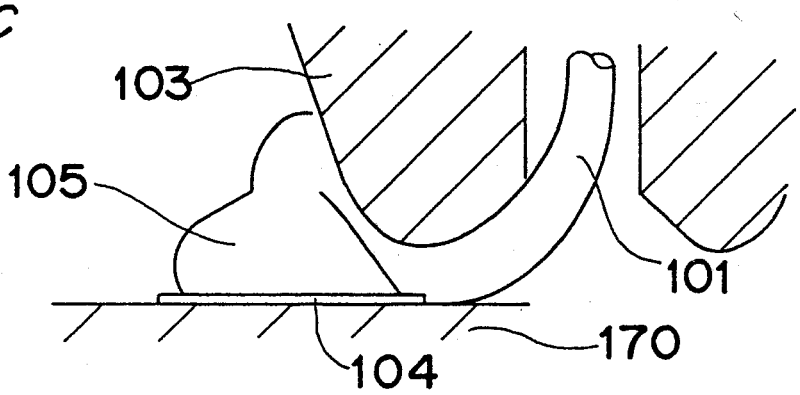


Fig. 17D

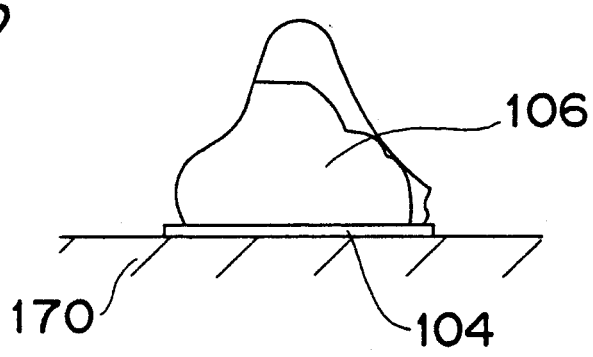


Fig. 18A

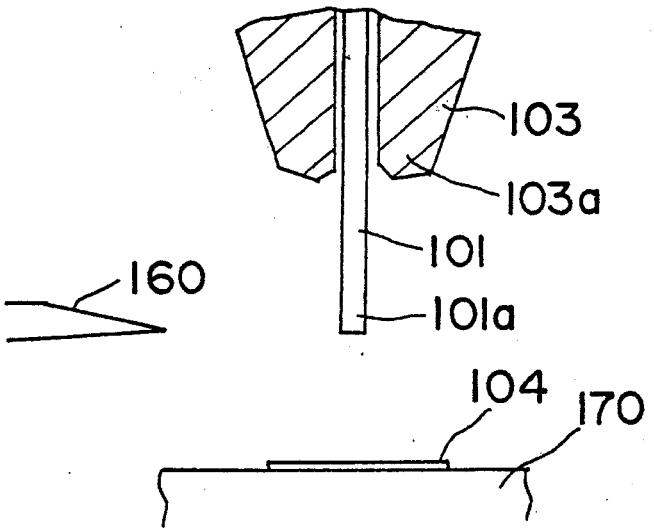


Fig. 18B

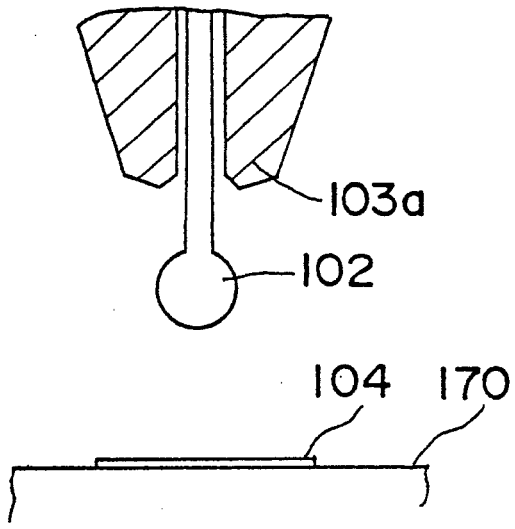


Fig. 18C

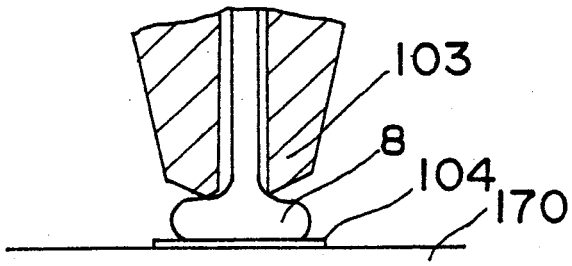


Fig. 18D

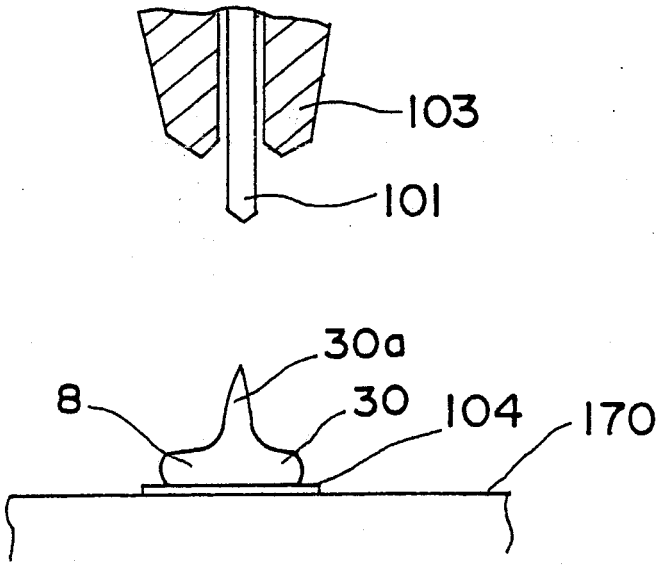


Fig. 19A

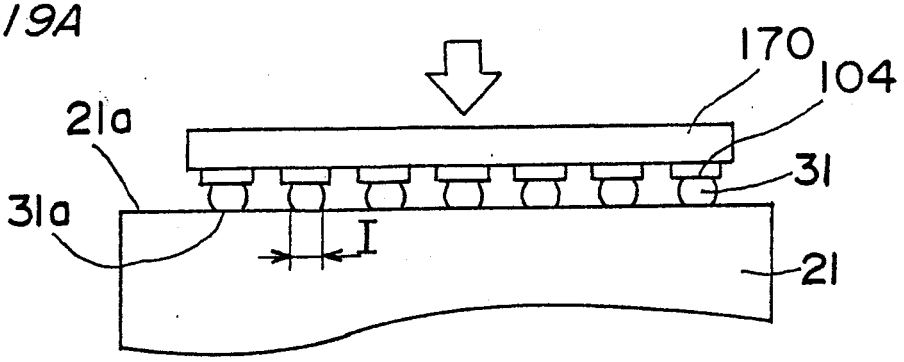


Fig. 19B

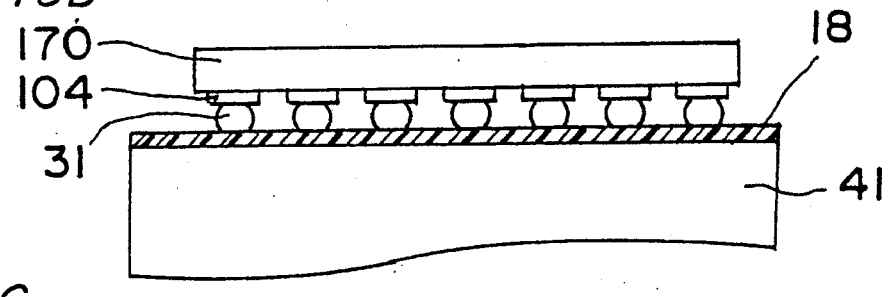


Fig. 19C

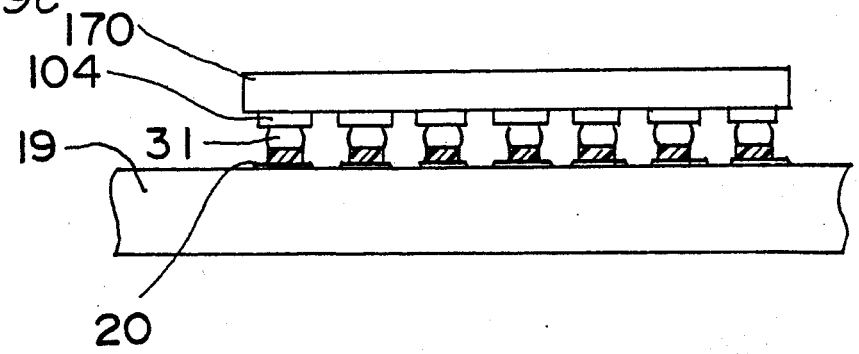


Fig.20A

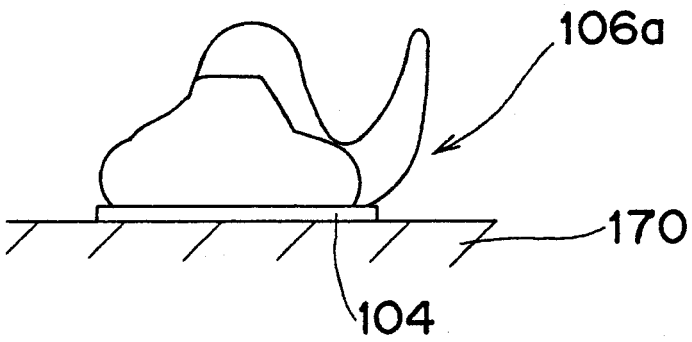


Fig.20B

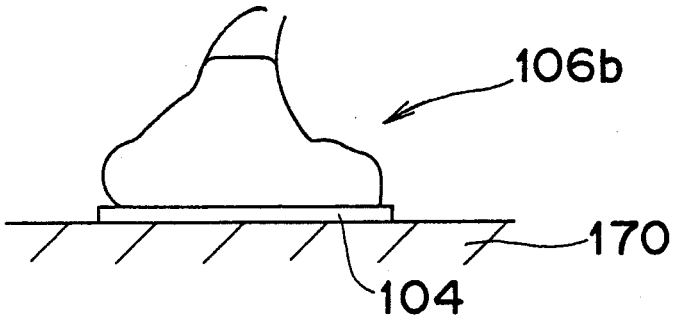


Fig.20C

