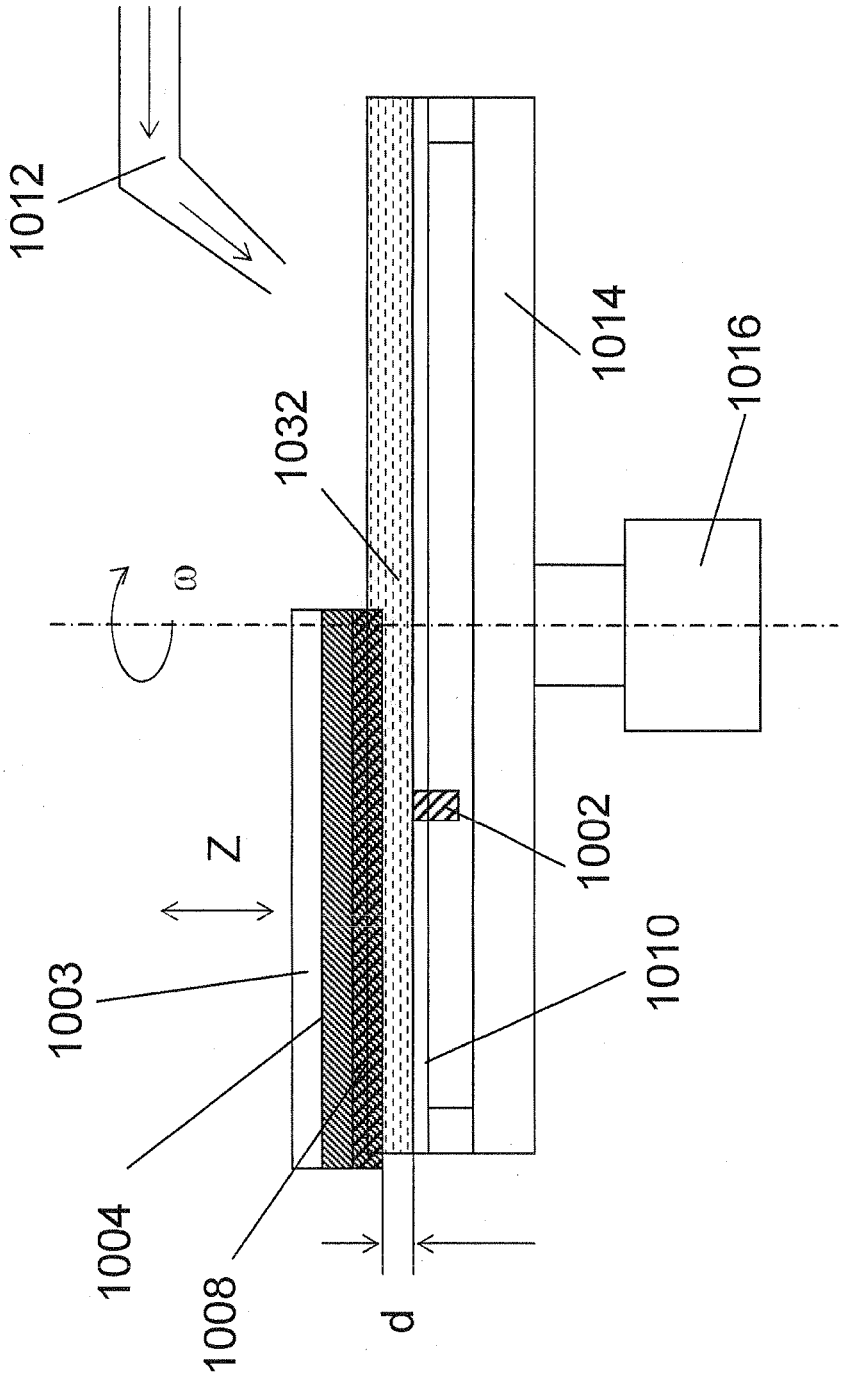


Fig. 1 A

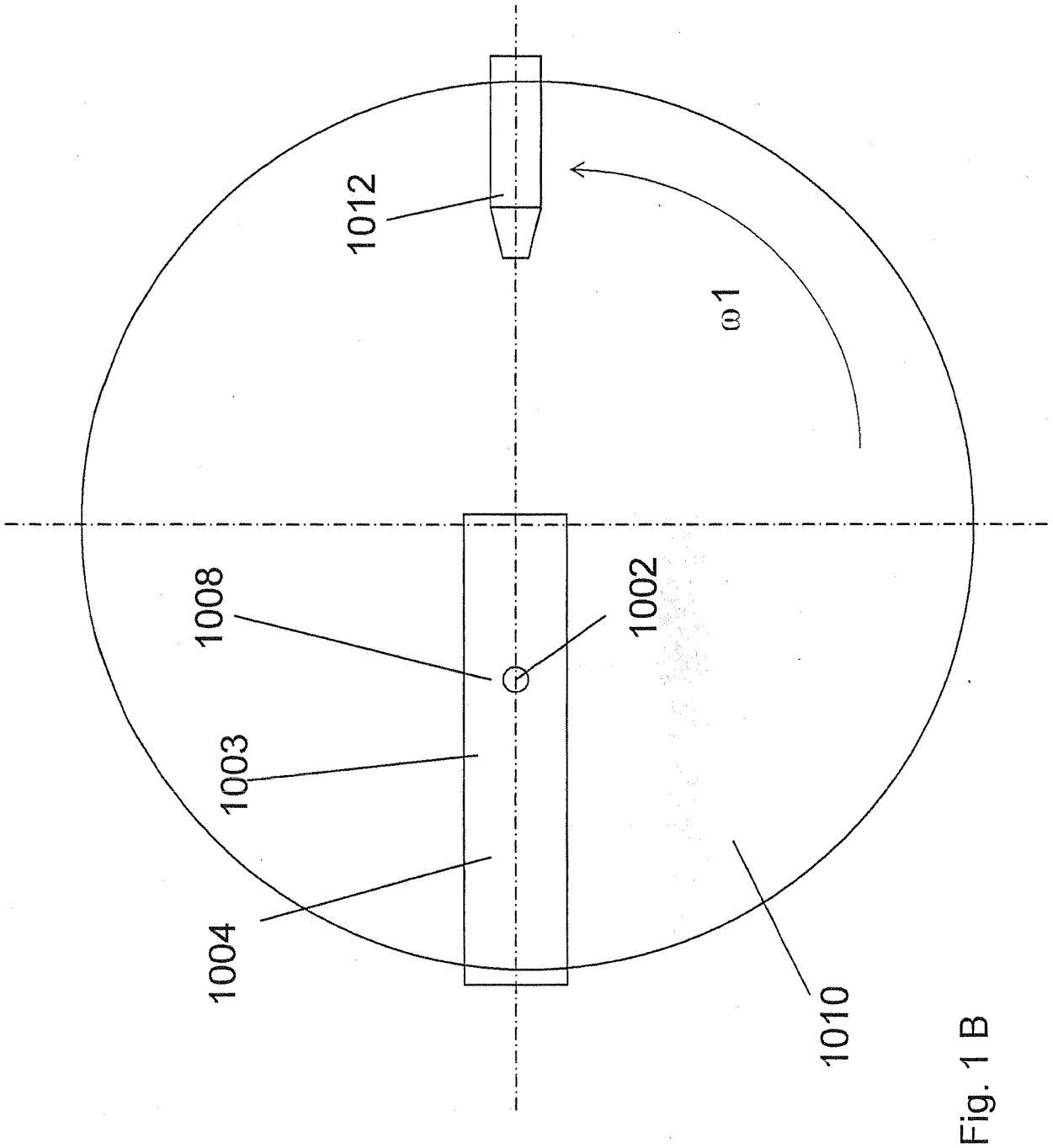
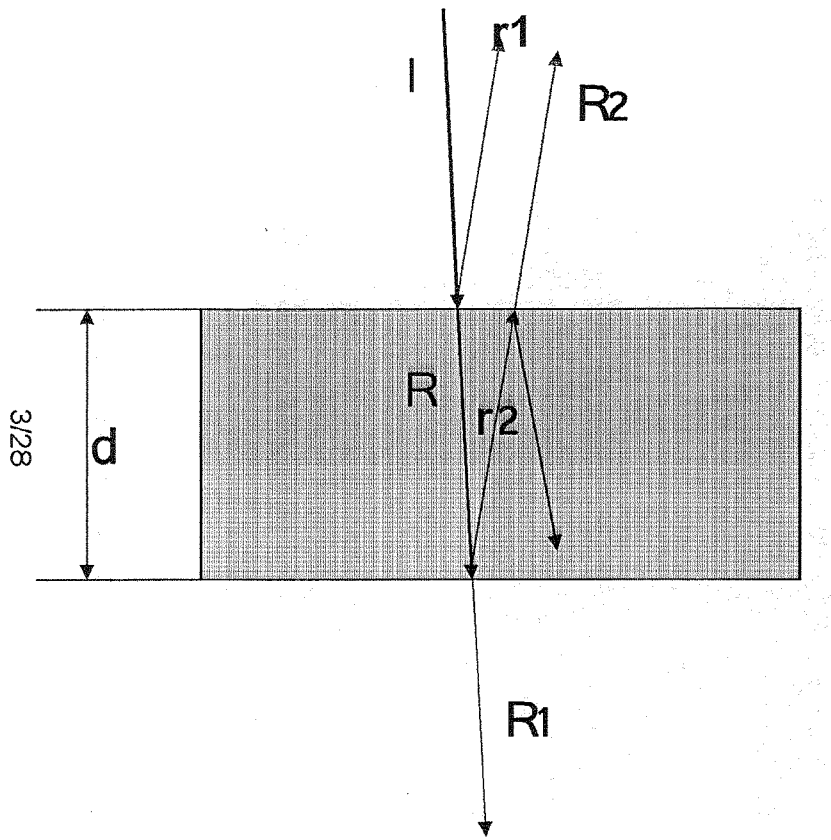


Fig. 1 B

Wave reflection



When the phase of r1 is opposite to R2, there is the least reflection energy E(r1) + E(R2):

for vertical incidence

$$d = n \cdot \lambda/2 \text{ , } n = 1, 2, 3 \ldots\ldots$$

So when water film thickness d equals 0.8mm, 1.6mm, 2.4mm……, the reflection of megasonic which frequency is 937.5 kHz can be highly reduced.

Fig. 1C

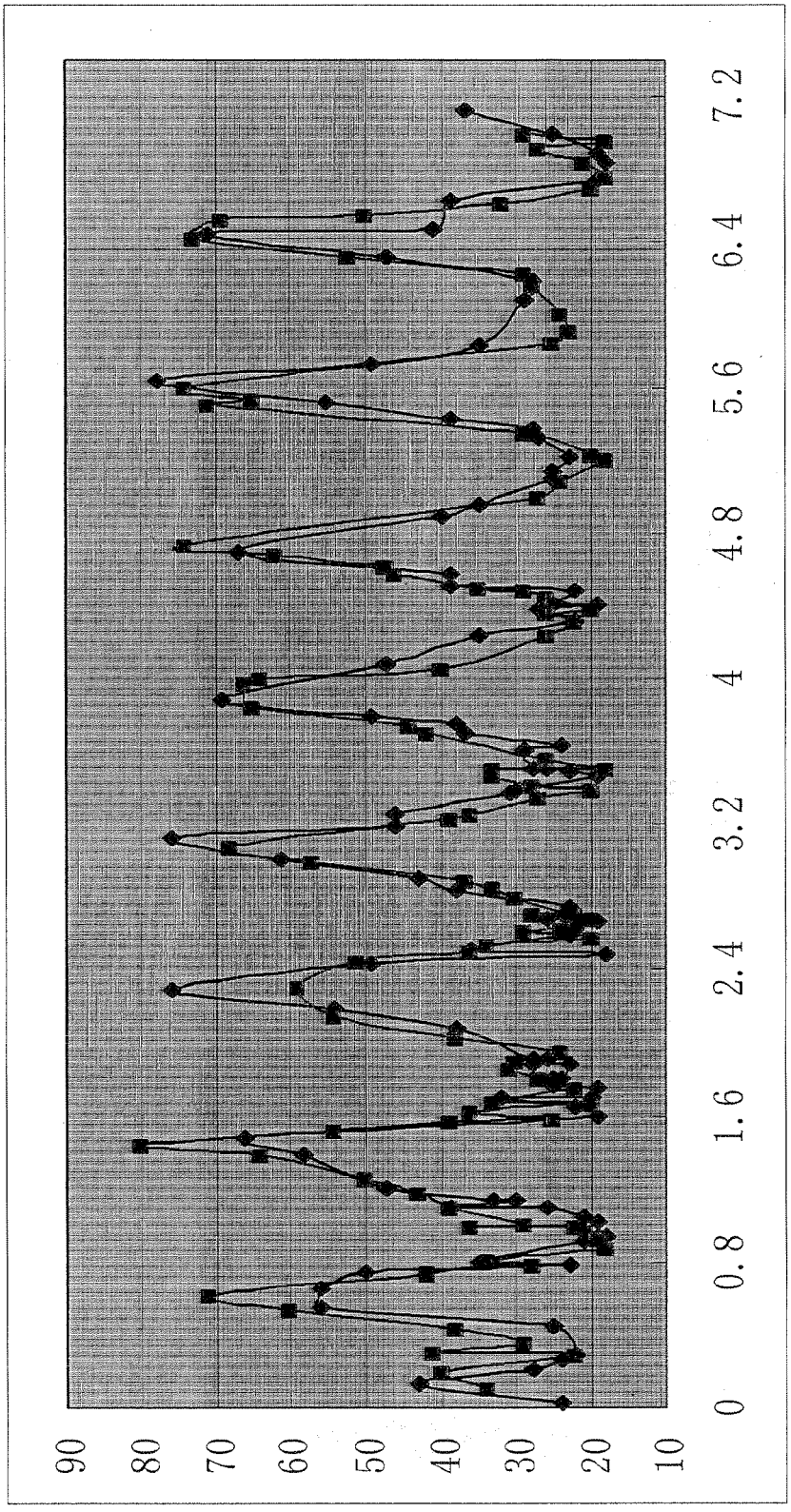

Mega Sonic Power Density (watt/cm2)
90
80
70
60
50
40
30
20
10
0
0.8
1.6
2.4
3.2
4
4.8
5.6
6.4
7.2
Gap (mm)

Fig. 1D

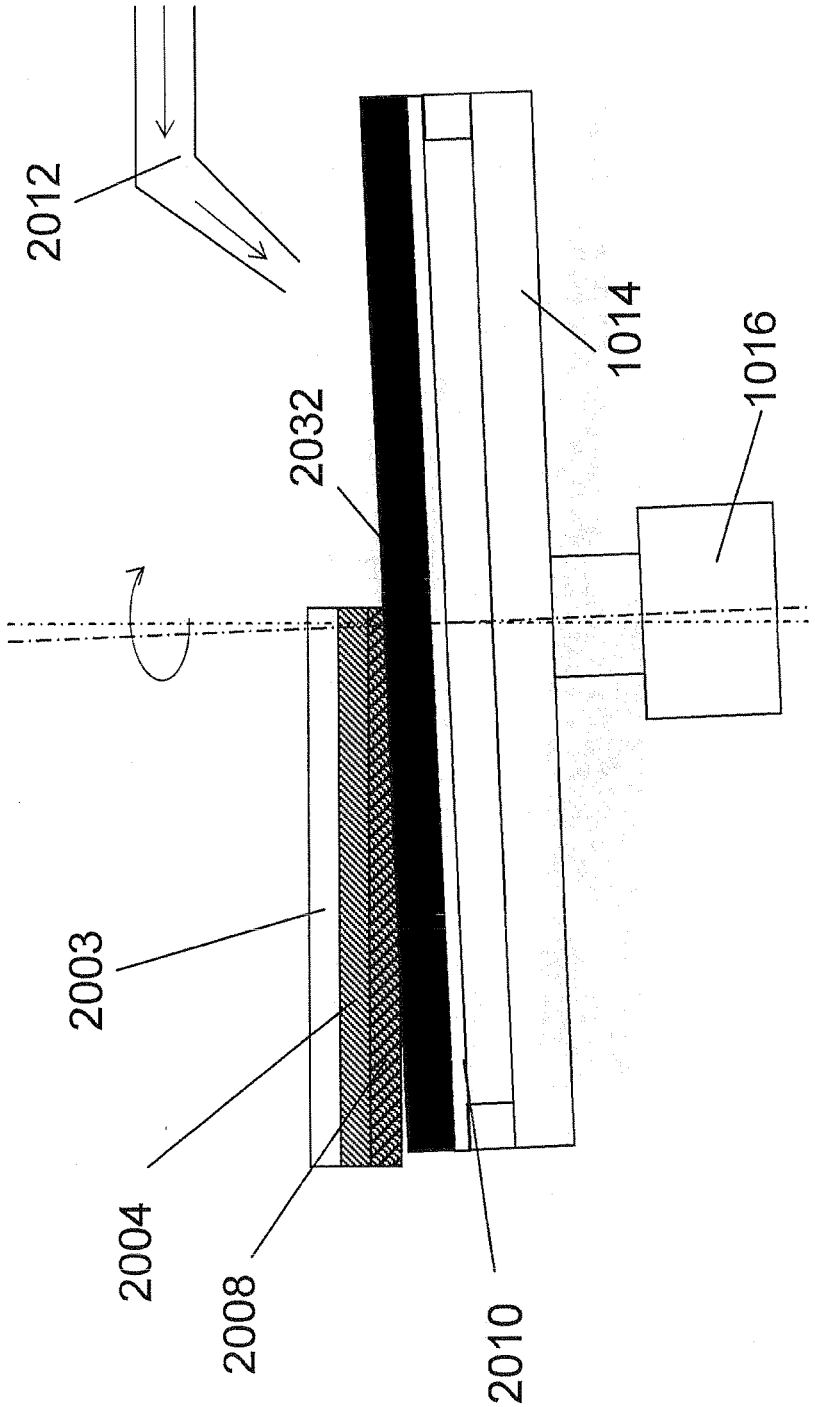


Fig. 2

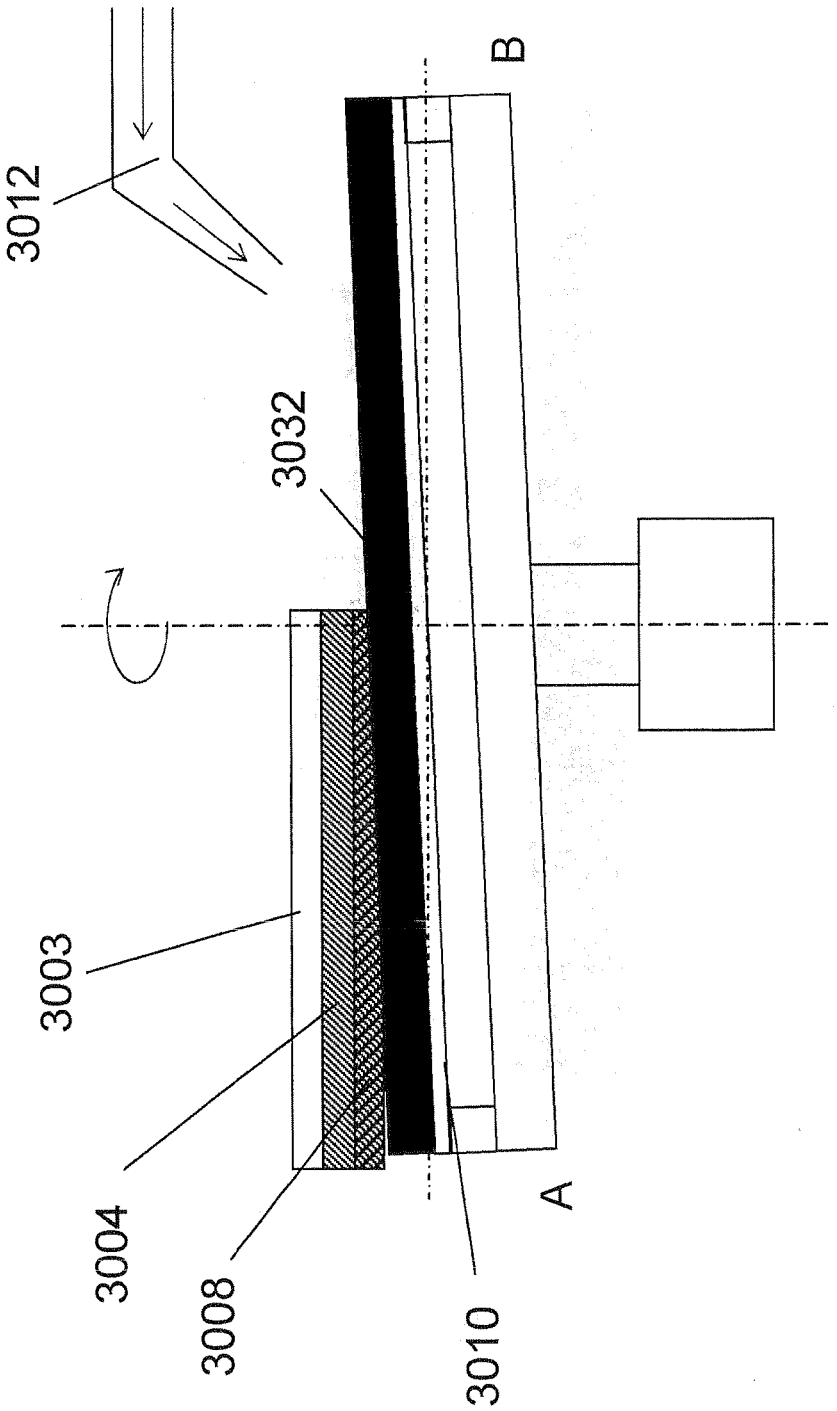


Fig. 3A

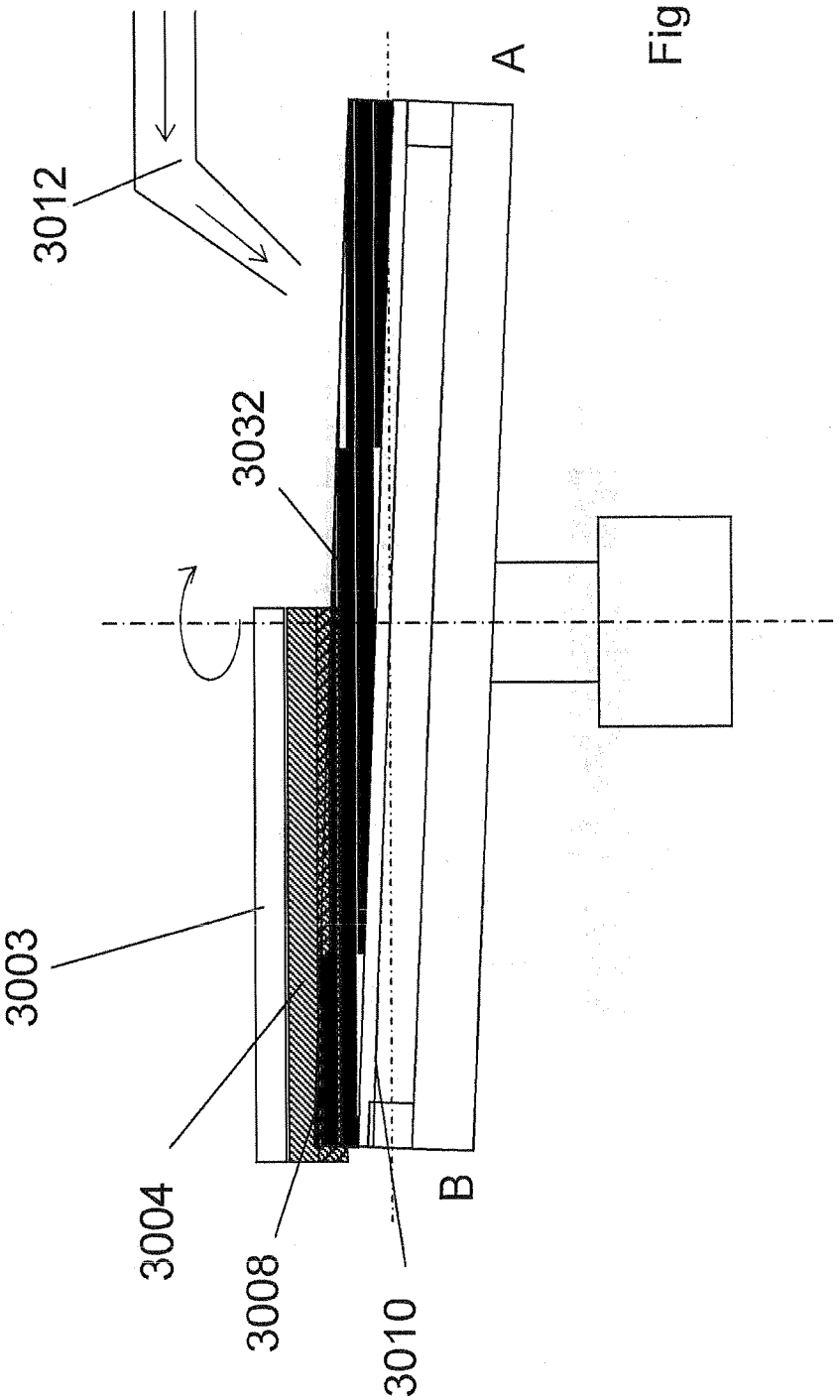


Fig. 3B

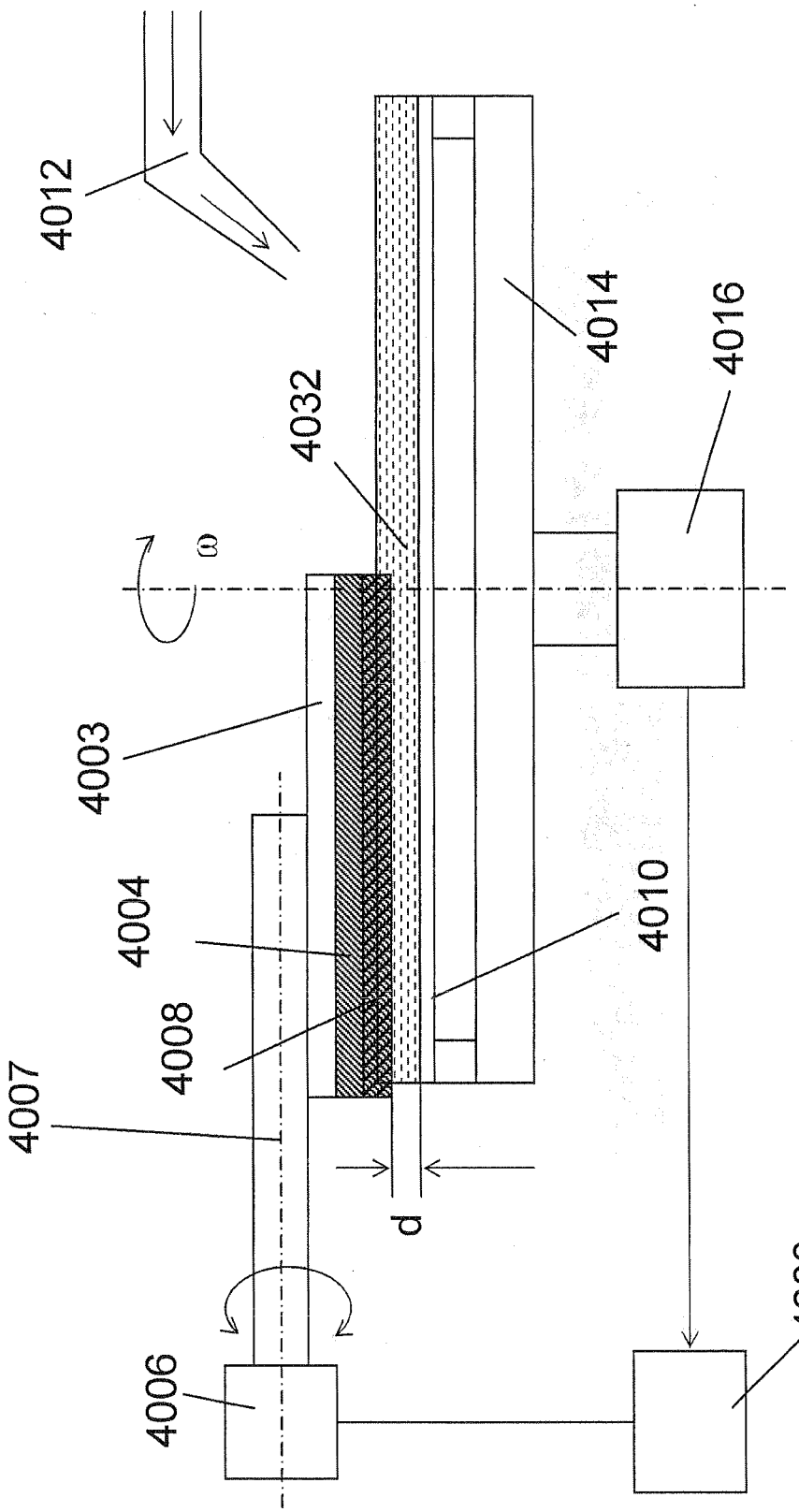
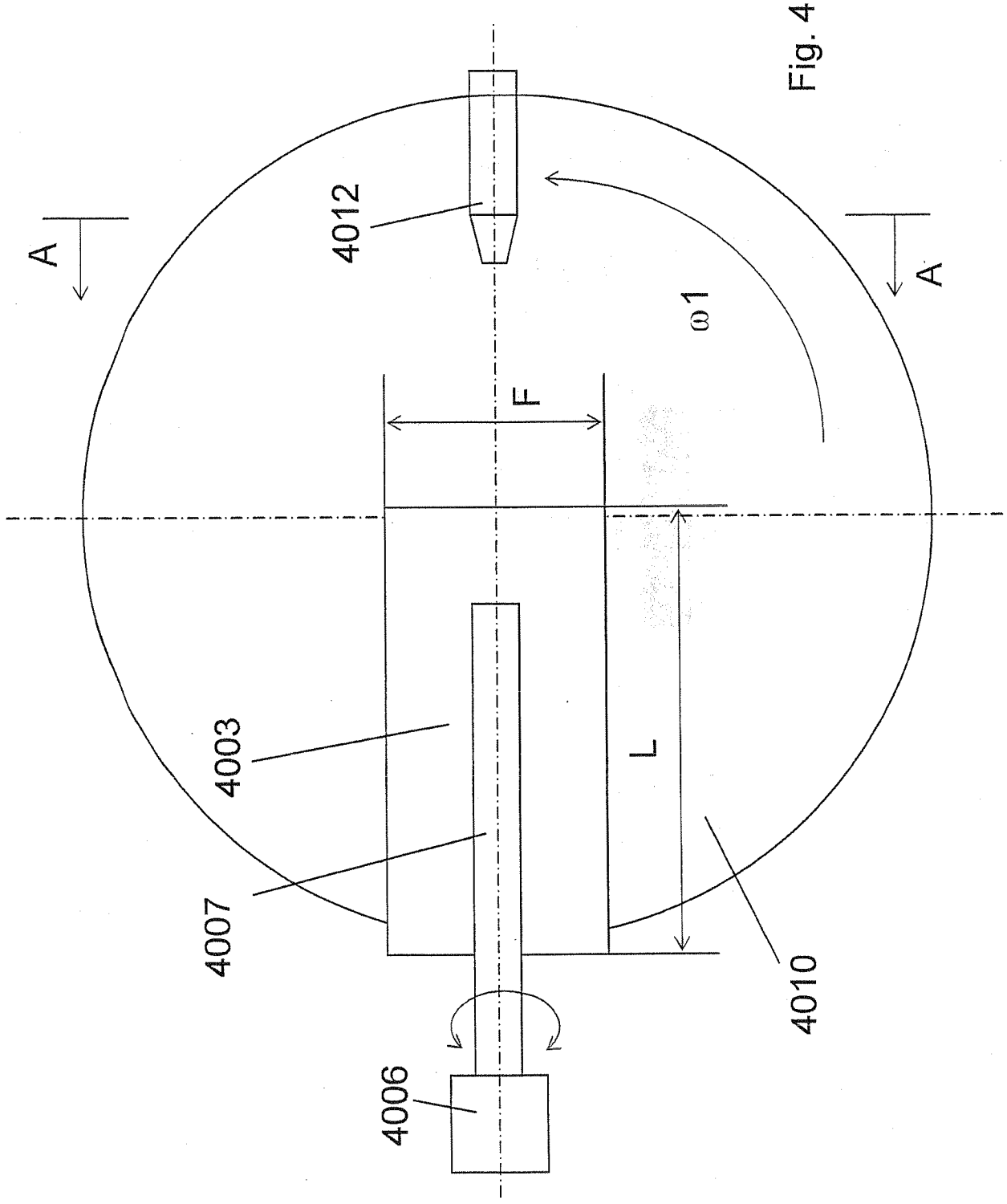


Fig. 4A

Fig. 4 B



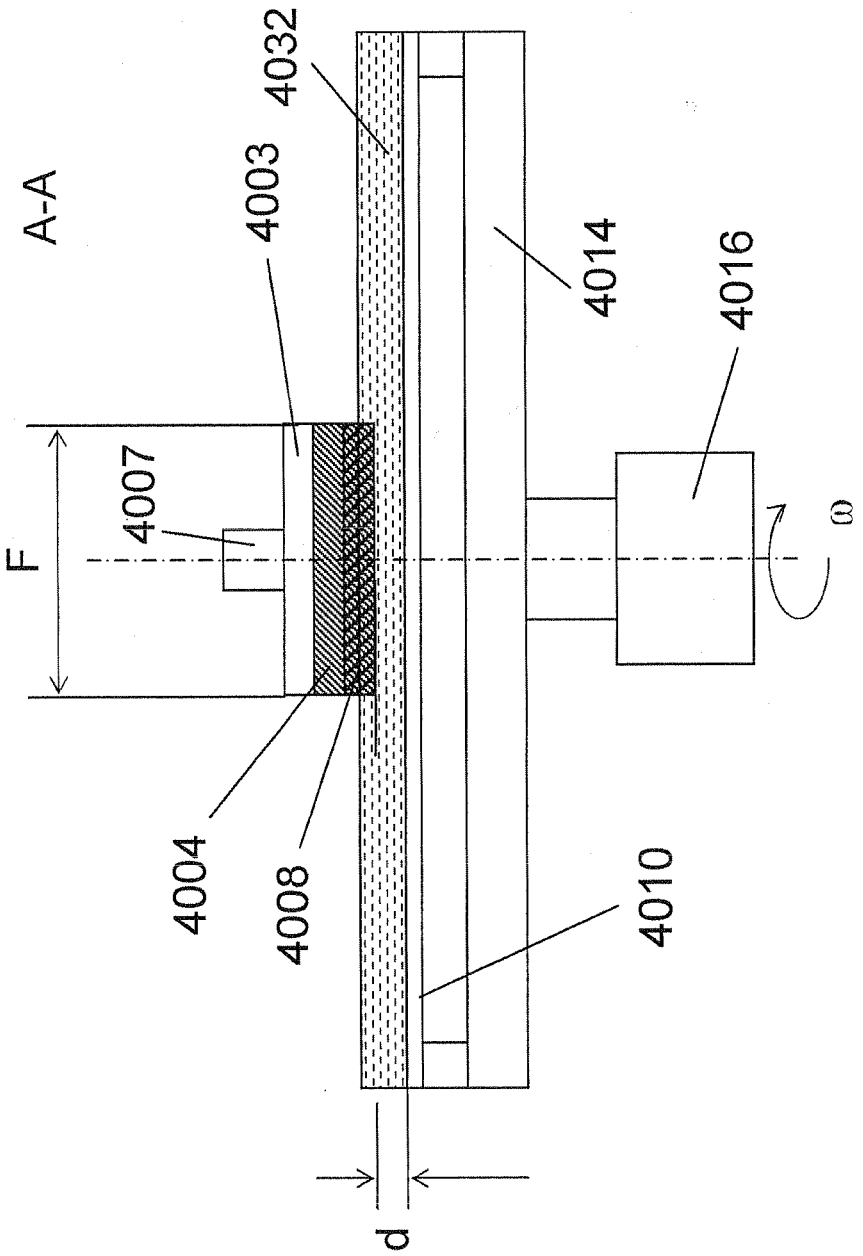


Fig. 4C

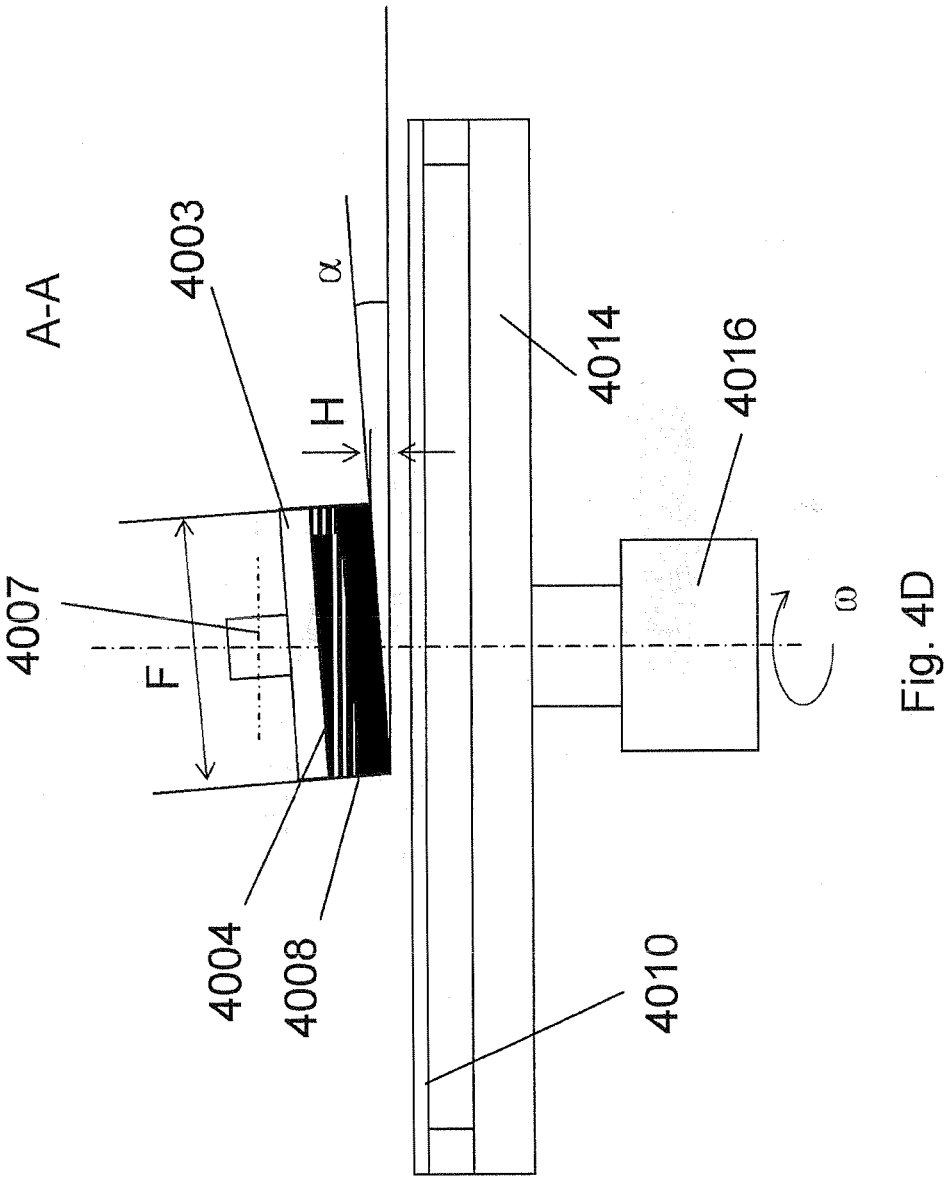


Fig. 4D

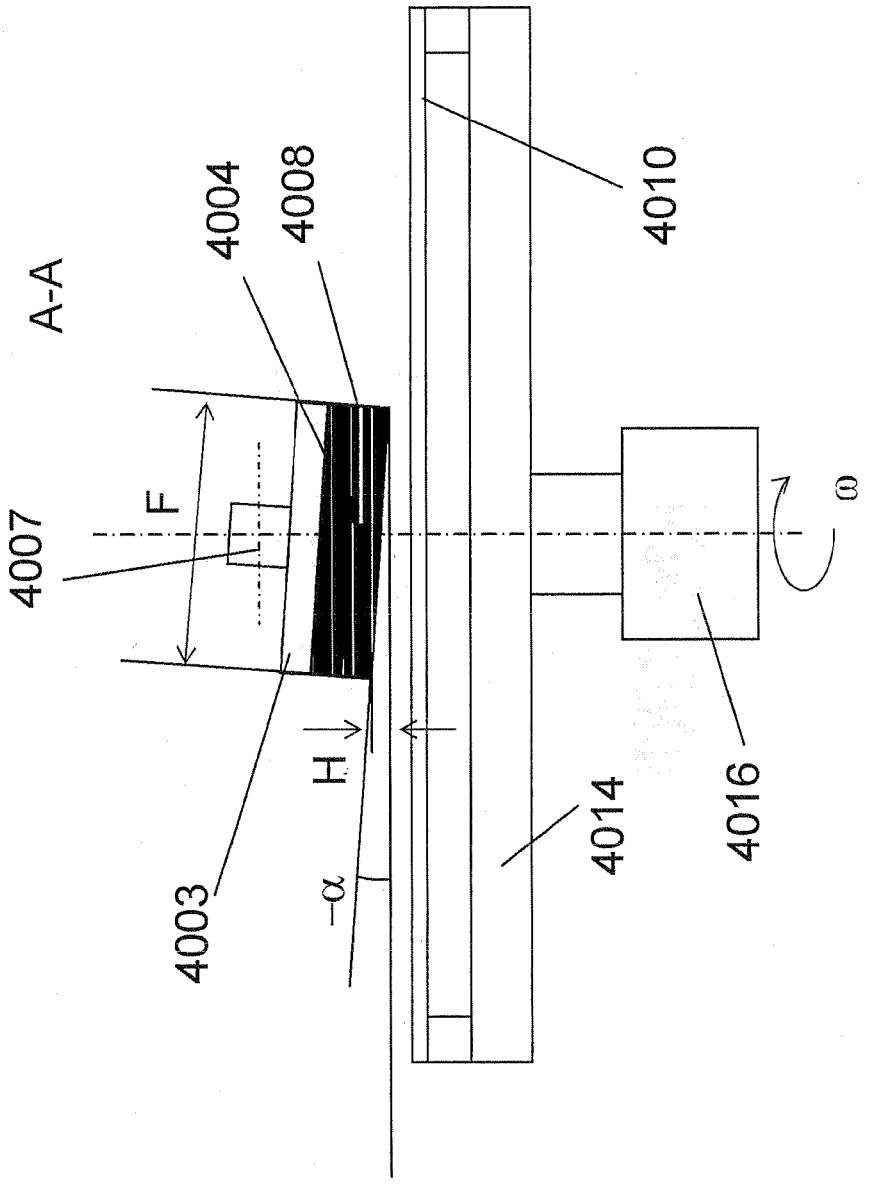


Fig. 4E

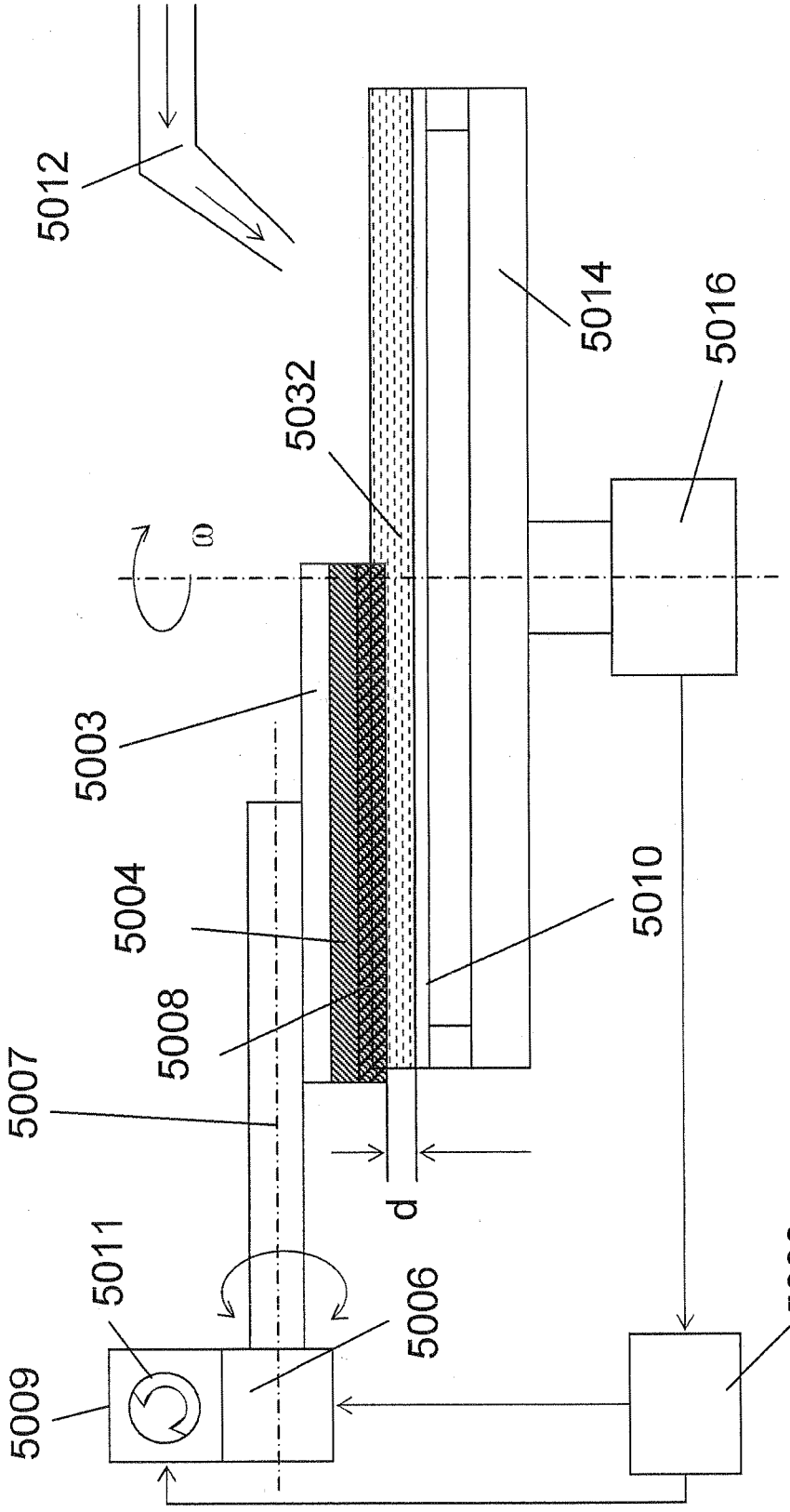

5012
5014
5016
5032
ω
5003
5004
5010
5008
5007
d
5011
5006
5088
5009

Fig. 5A

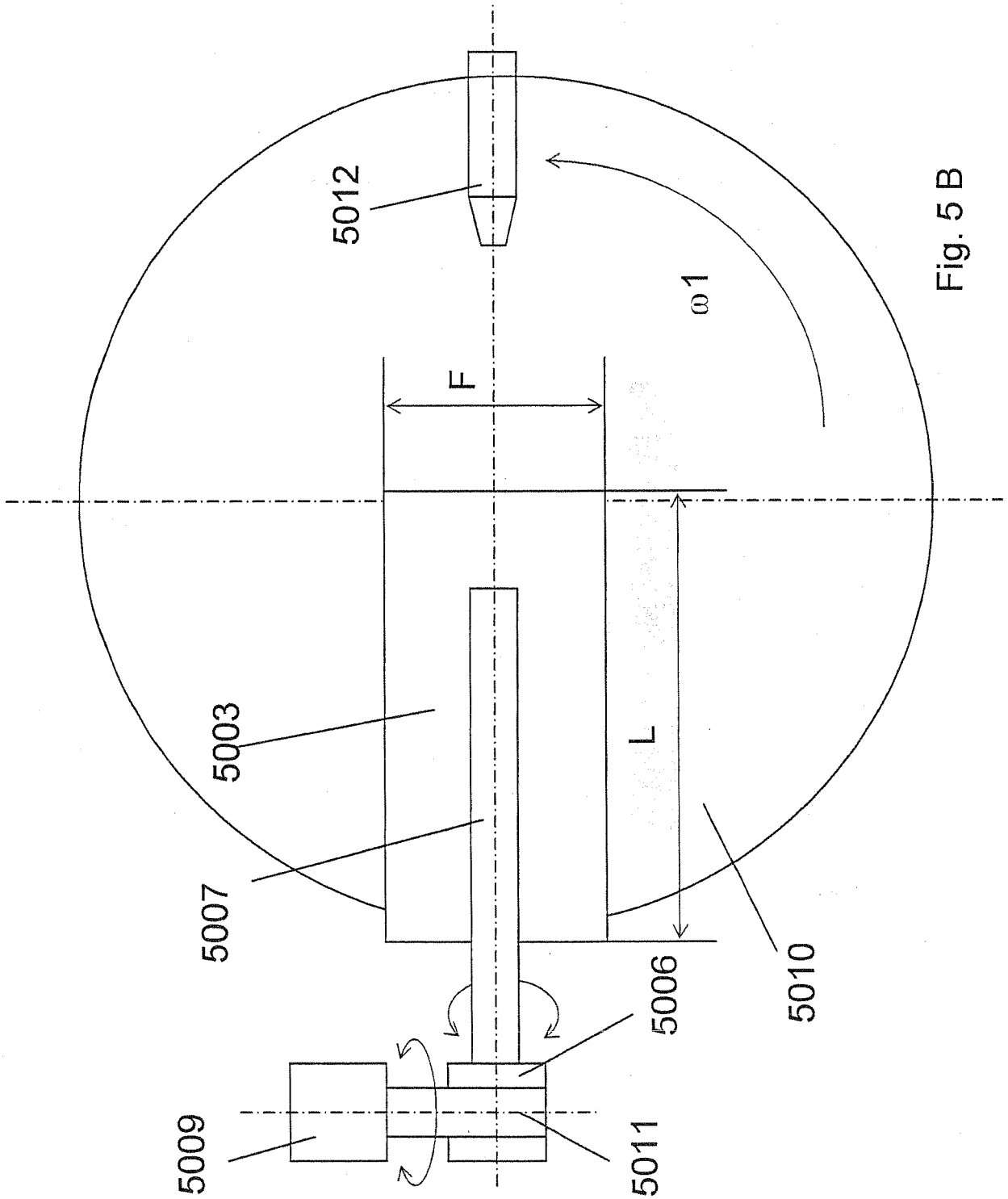


Fig. 5 B

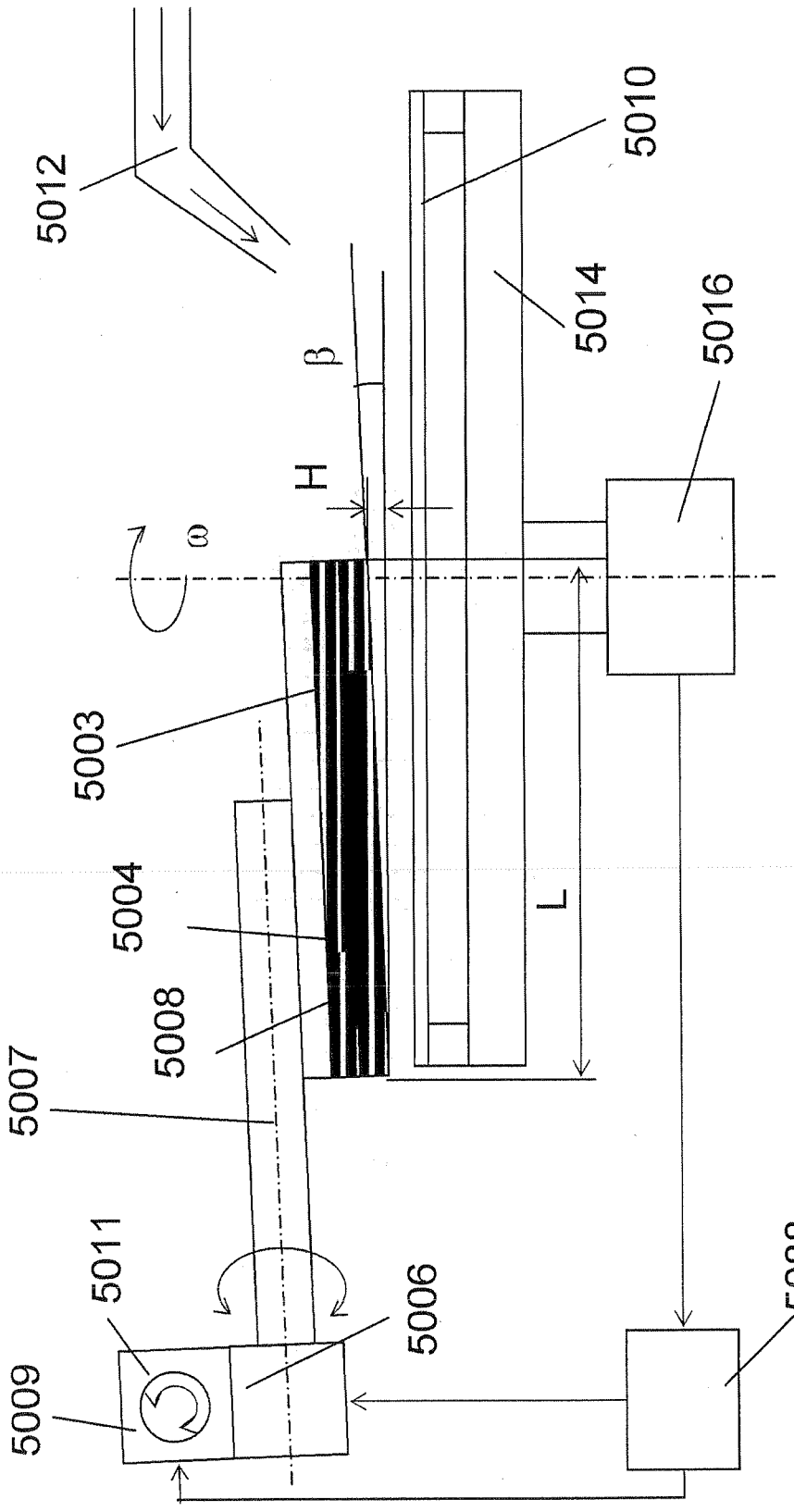

5012
5010
5014
5016
β
H
ω
5003
5004
5008
5007
L
5011
5006
5088
5009

Fig. 5C

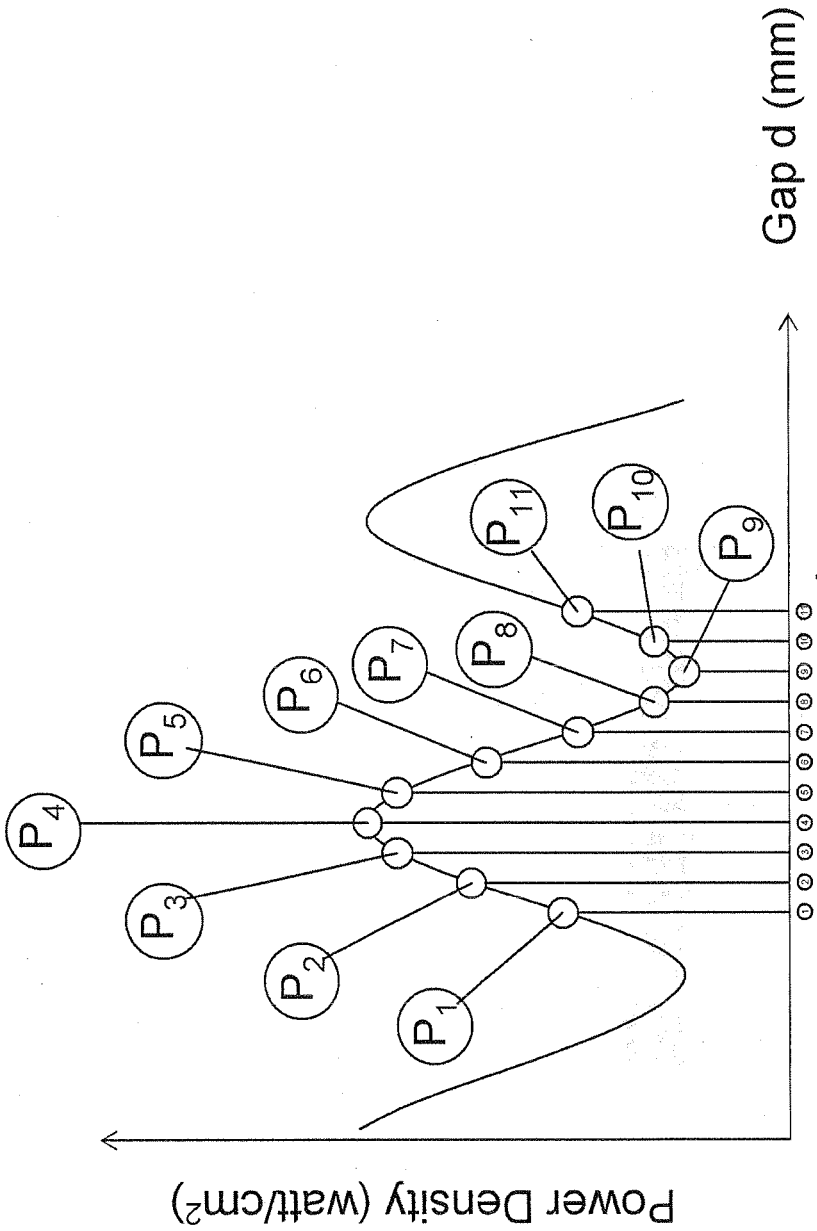

Gap d (mm)
Increase
Reduce
Power Density (watt/cm²)
P1
P2
P3
P4
P5
P6
P7
P8
P9
P10
P11

Fig. 6

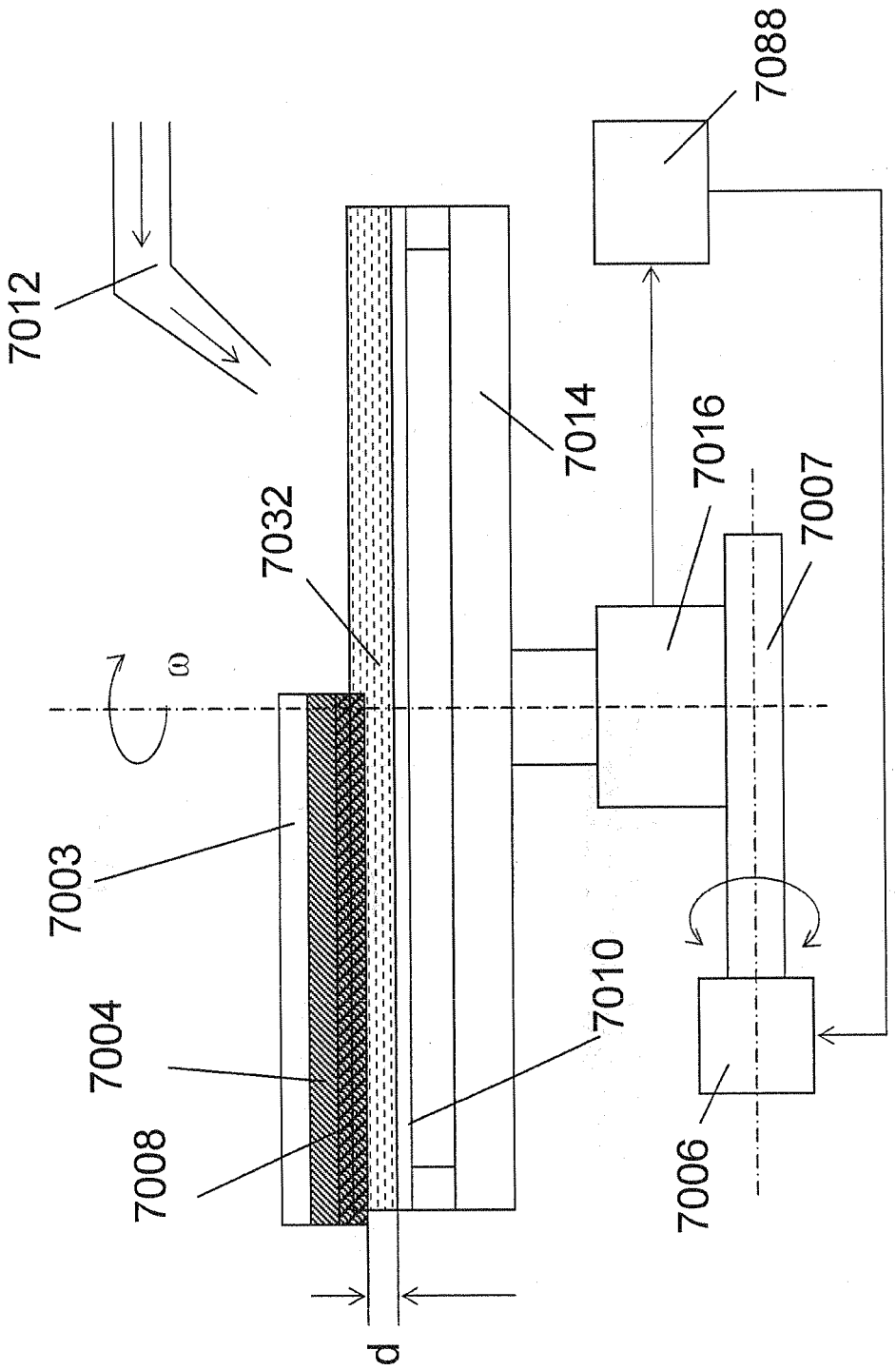


Fig. 7

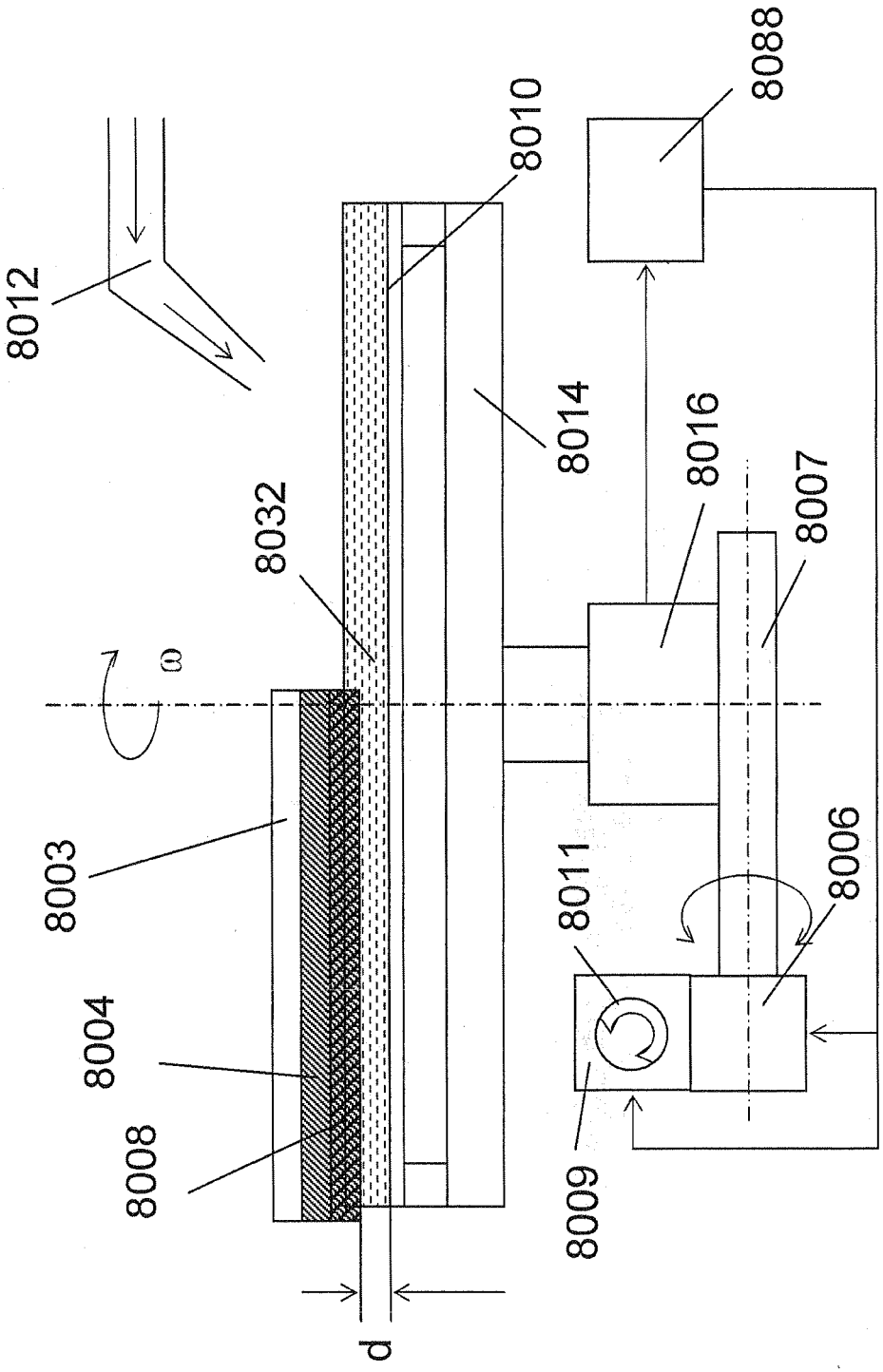

8088
8010
8012
8014
8016
8007
8032
ω
8003
8011
8006
8004
8008
8009
d

Fig. 8

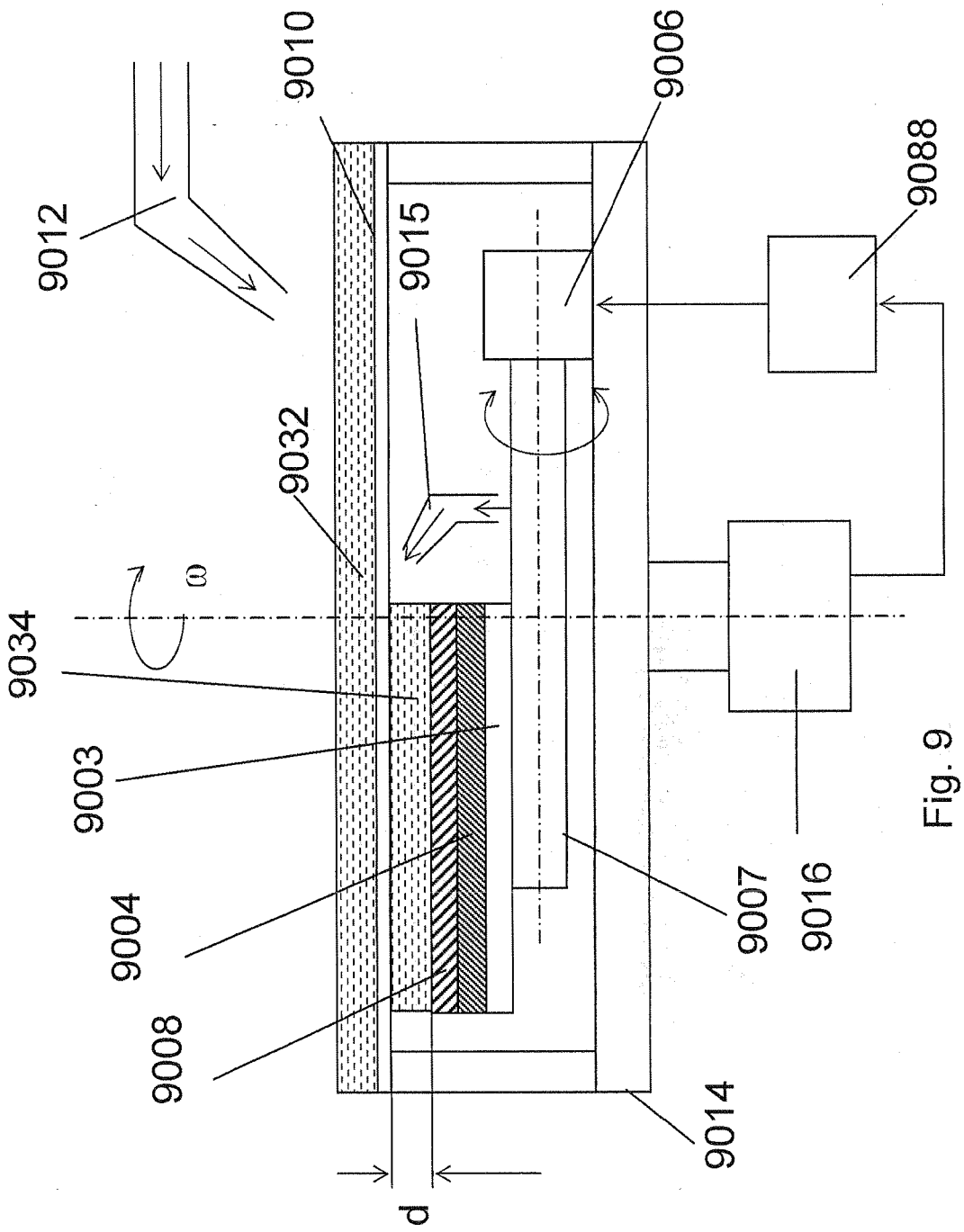

9010
9006
9088
9012
9015
9032
ω
9034
9003
9004
9007
9016
9008
9014
d

Fig. 9

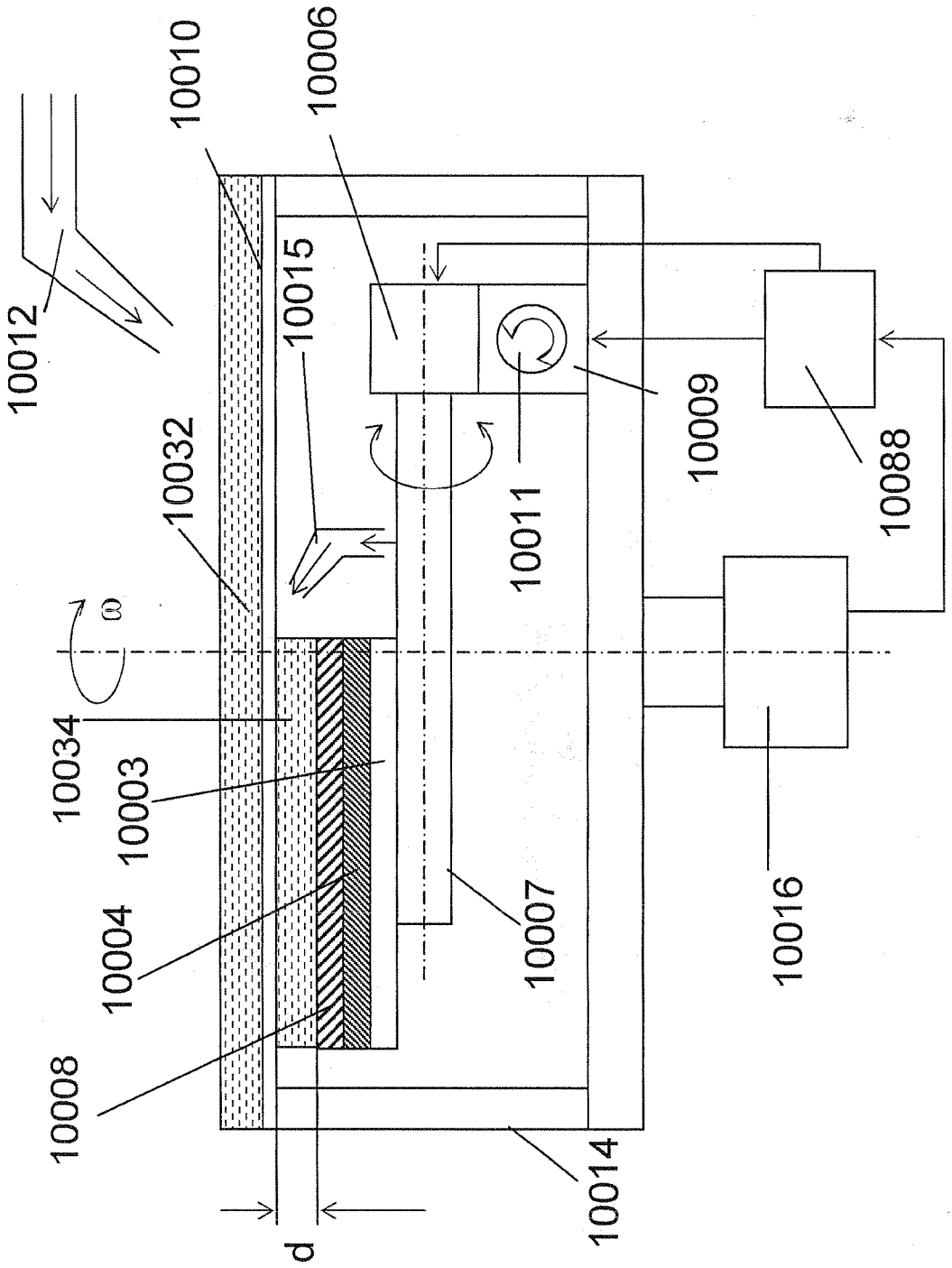

10010
10006
10012
10015
10032
10009
10088
10011
ω
10034
10003
10004
10007
10016
10008
10014
d

Fig. 10

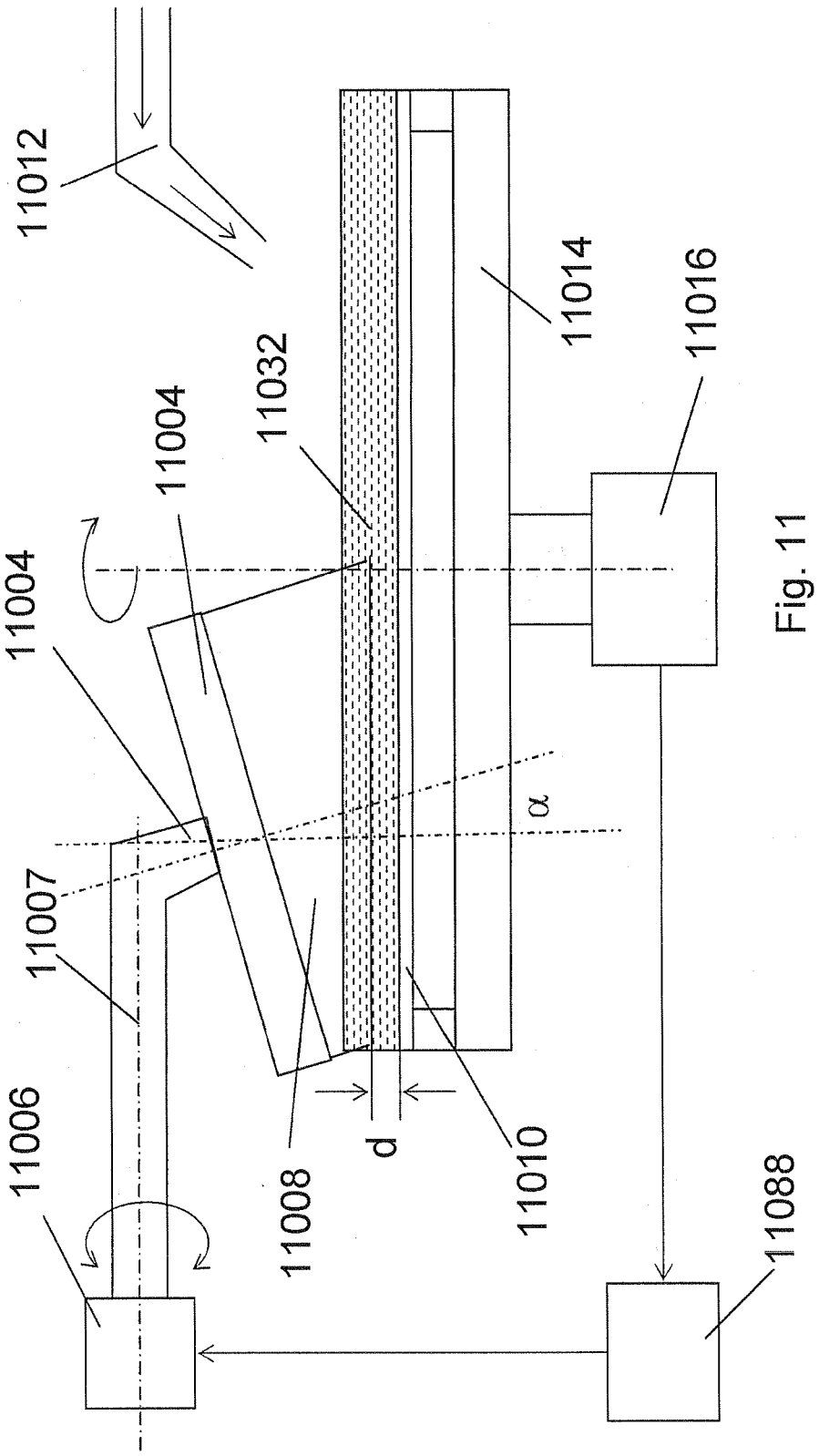

11012
11014
11016
11032
11004
11004
α
11007
11006
11008
d
11010
11088

Fig. 11

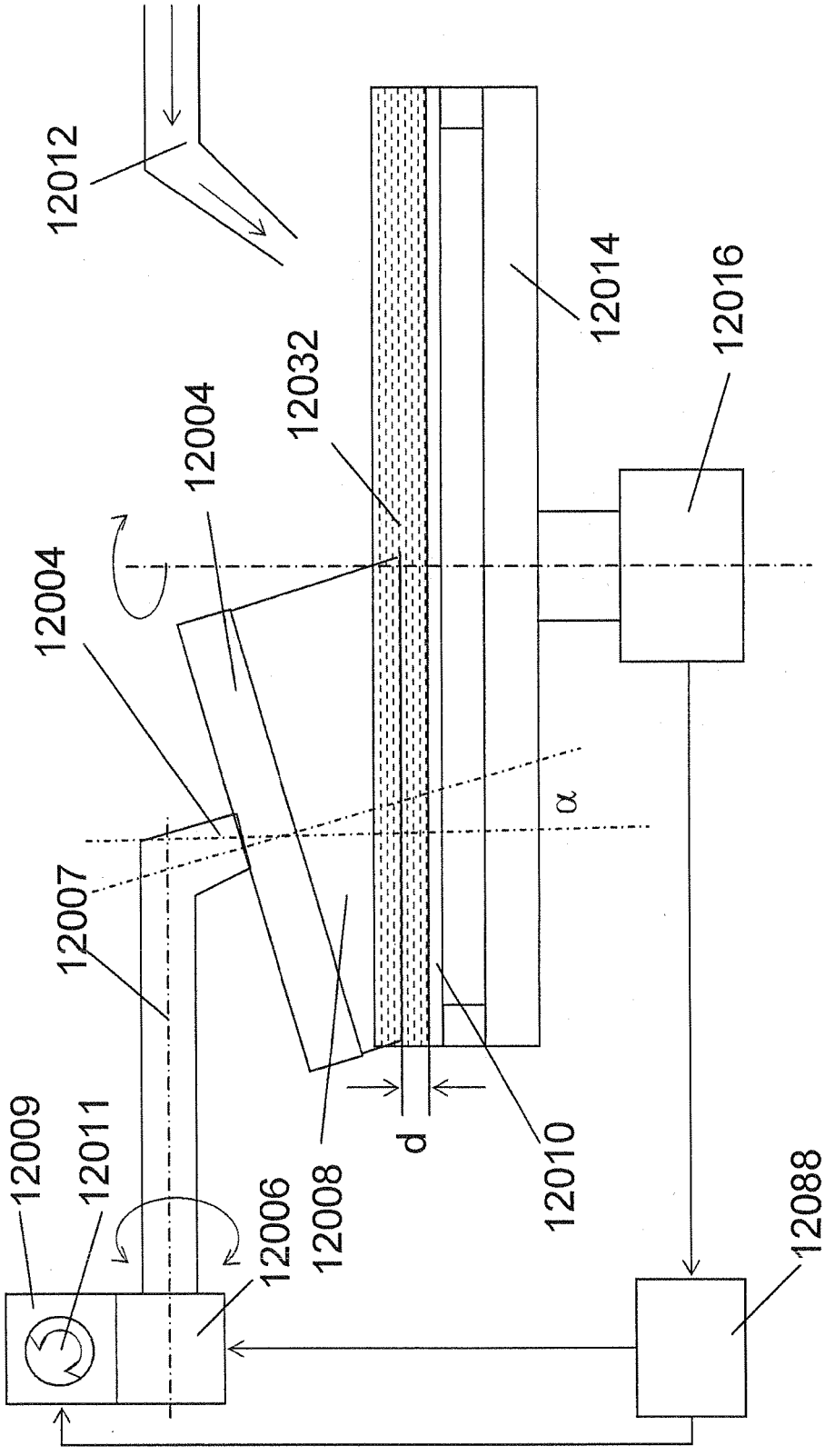

12012
12014
12016
12032
12004
12004
12007
α
12009
12011
12006
12008
d
12010
12088

Fig. 12

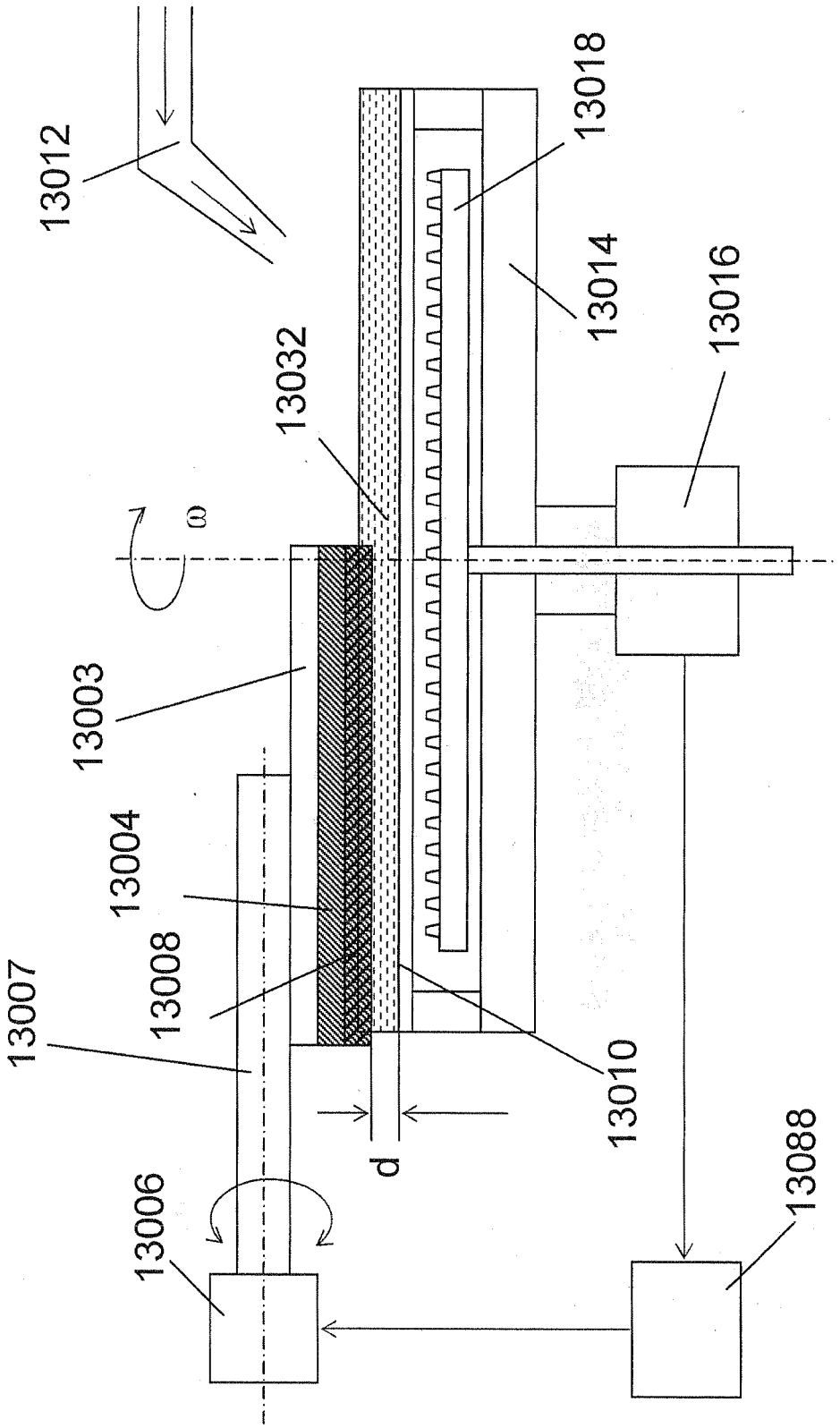

13012
13018
13014
13016
13032
ω
13003
13004
13008
13007
13010
d
13006
13088

Fig. 13

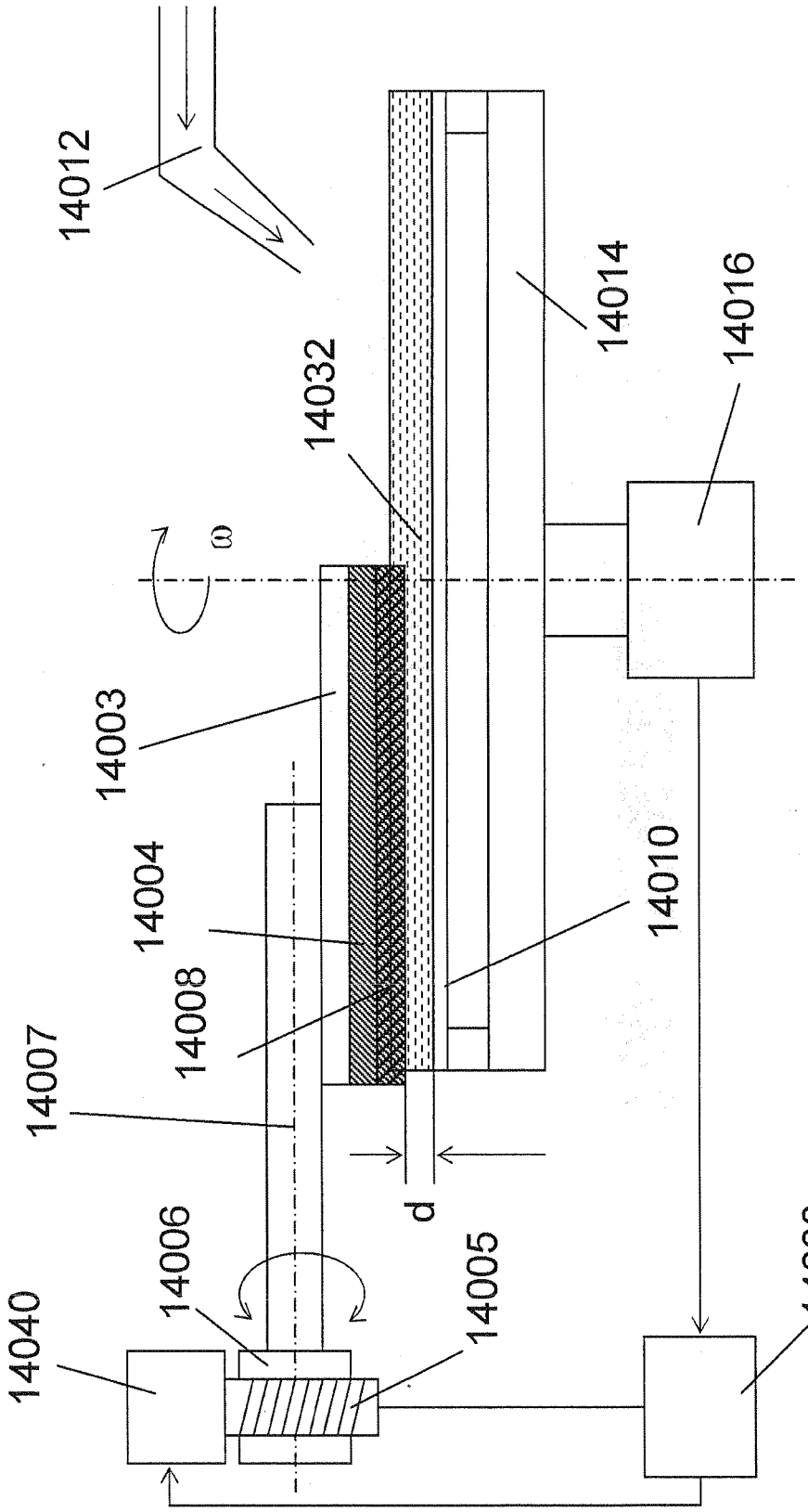

14012
14014
14016
14032
ω
14003
14004
14010
14008
14007
d
14006
14005
14088
14040

Fig. 14

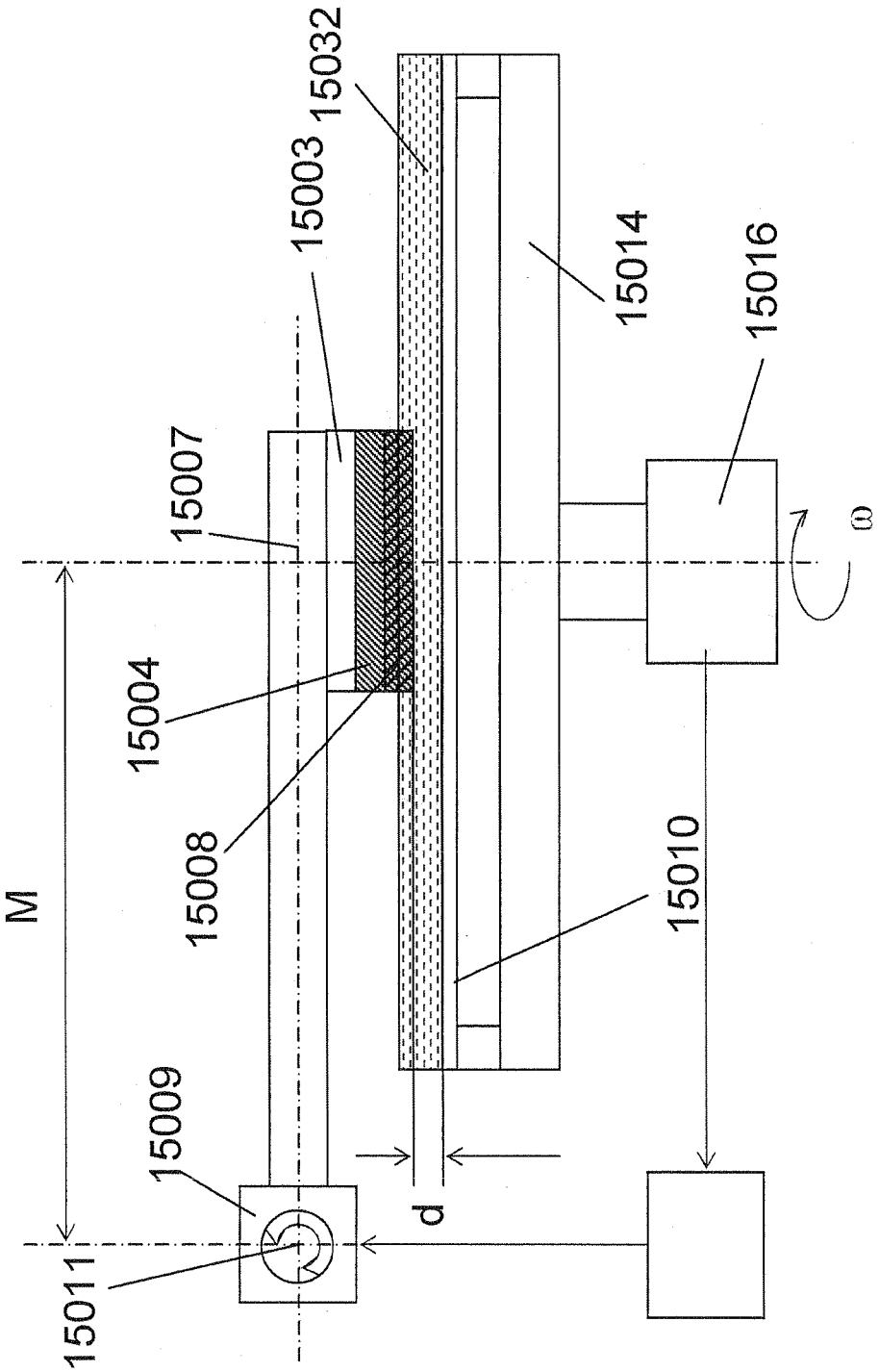

15032
15003
15014
15016
15007
ω
15004
15008
M
15010
15009
d
15011

Fig. 15A

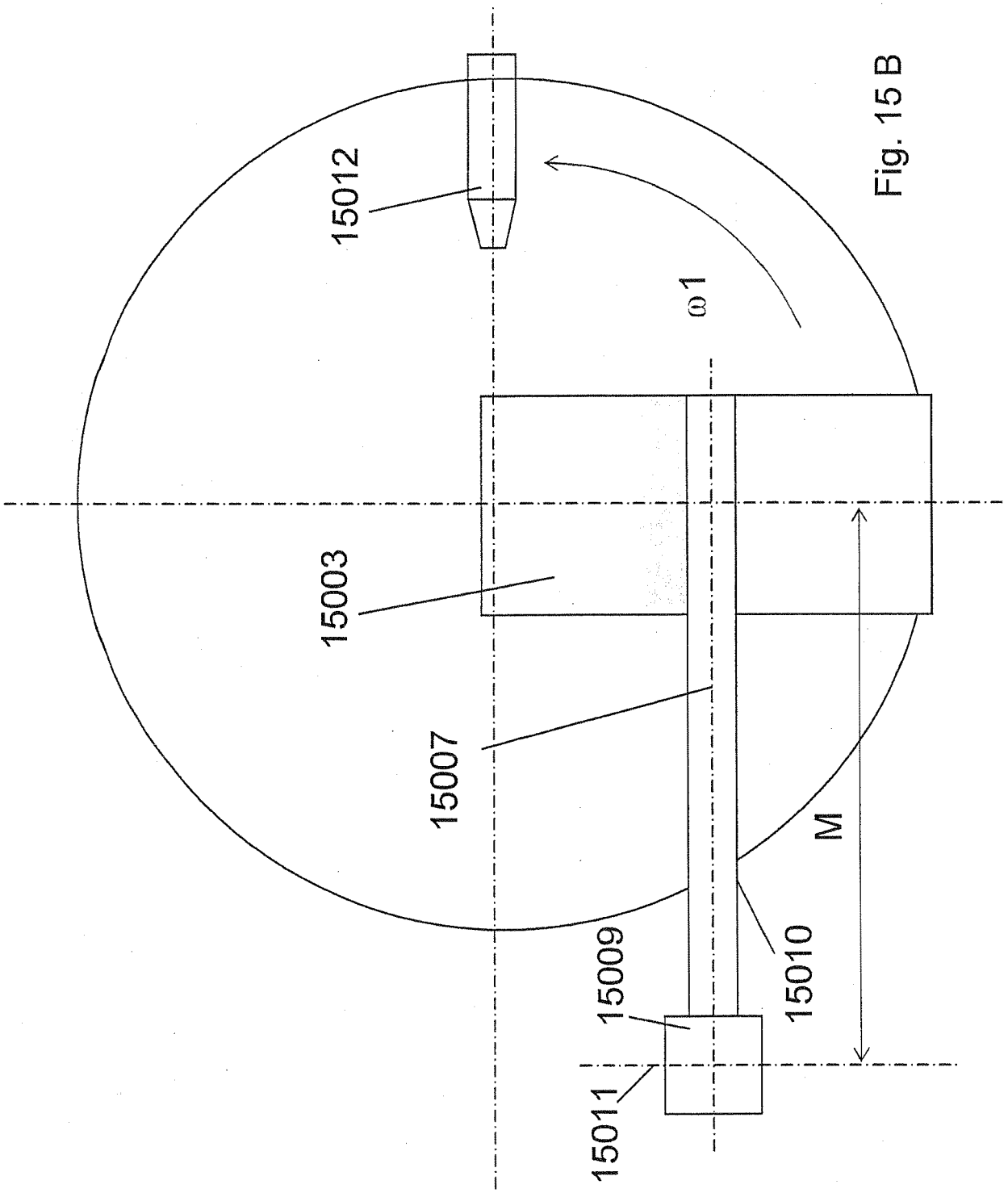


Fig. 15 B

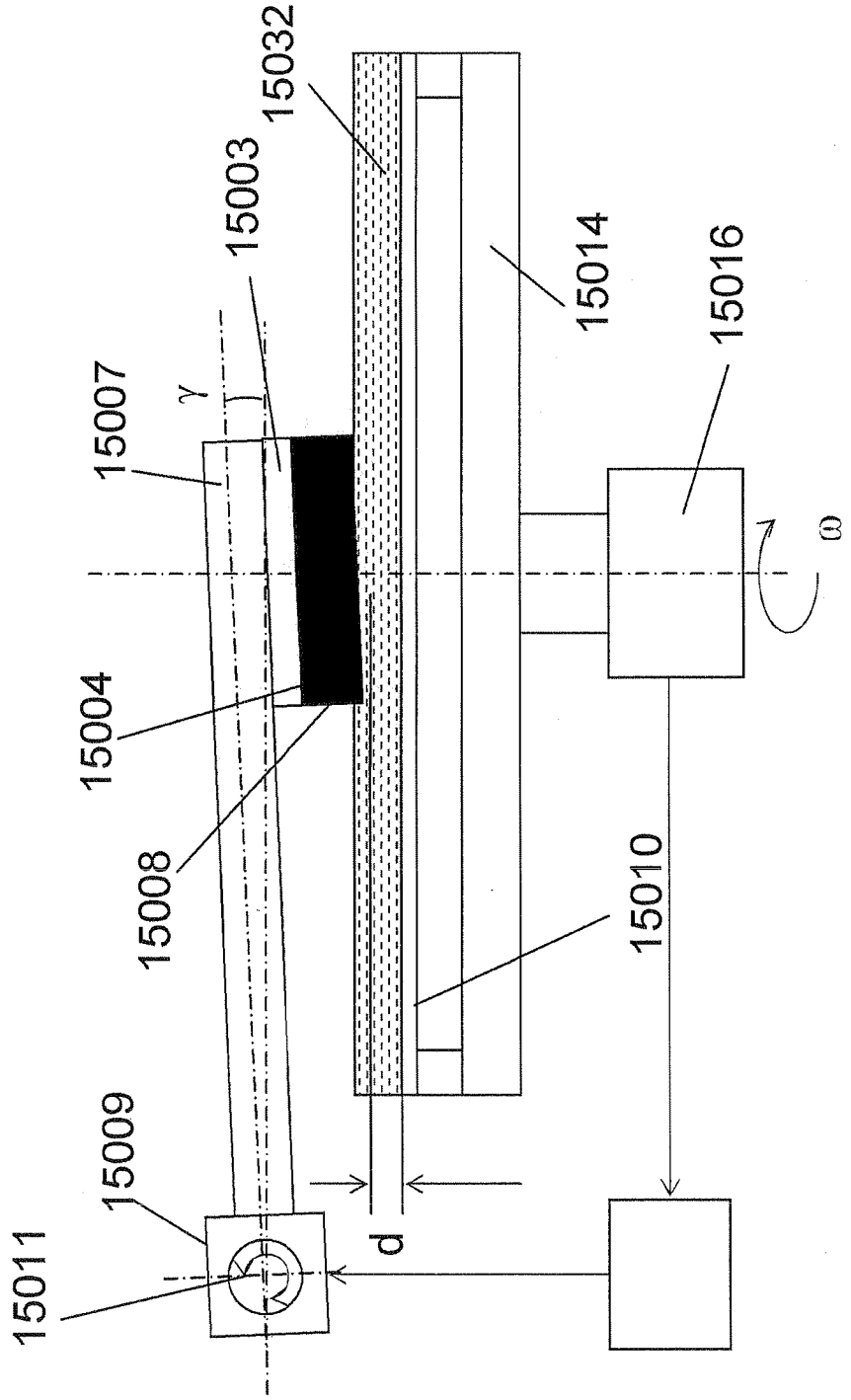

15032
15003
15014
15016
15007
γ
ω
15004
15008
15010
15009
15011
d

Fig. 15C

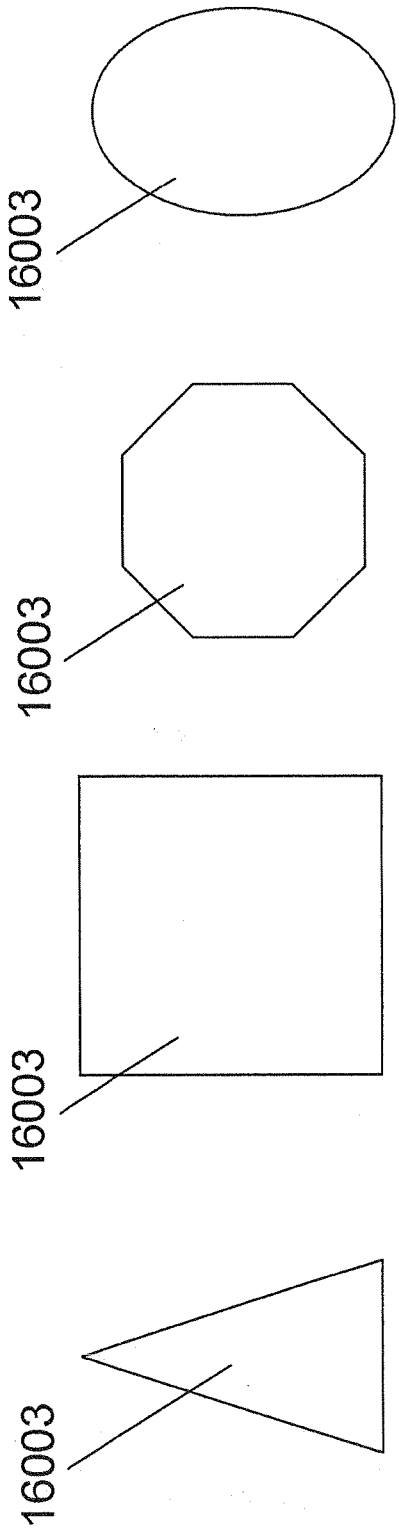


Fig. 14 A

Fig. 16B

Fig. 16 C

Fig. 16D

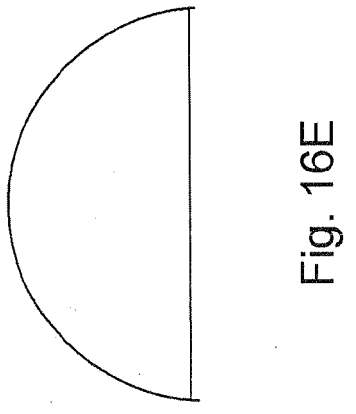


Fig. 16E

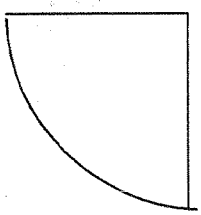


Fig. 16F

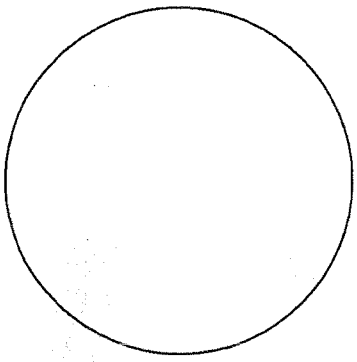


Fig. 16G