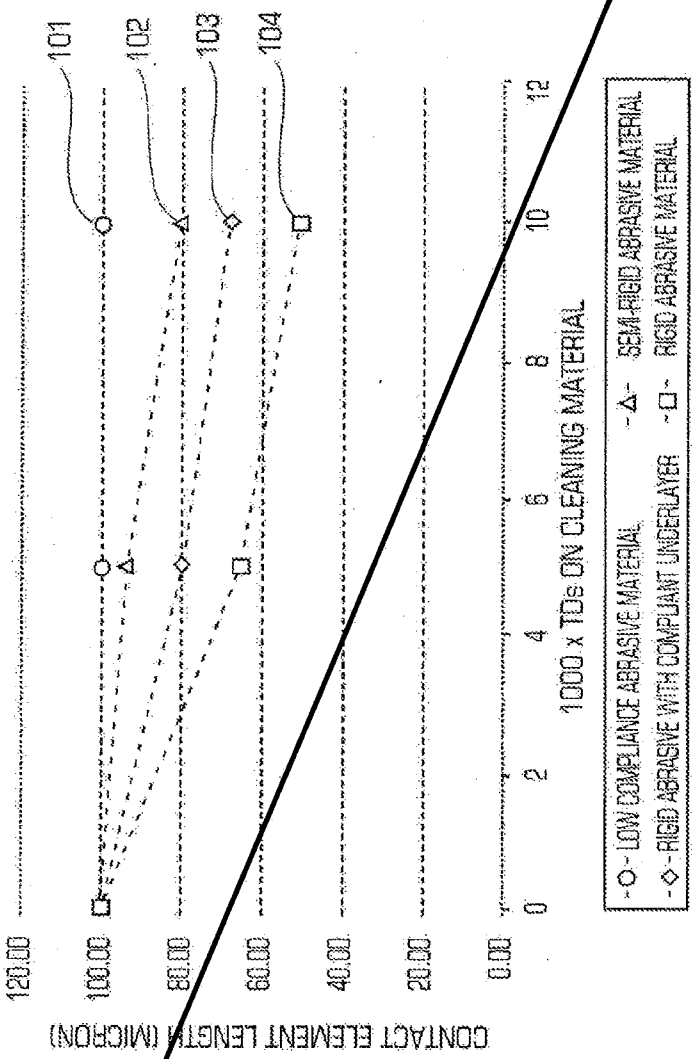

101
102
103
104
120.00
100.00
80.00
60.00
40.00
20.00
0.00
CONTACT ELEMENT LENGTH (MICRON)
0
2
4
6
8
10
12
1000 x TDs ON CLEANING MATERIAL
-O- LOW COMPLIANCE ABRASIVE MATERIAL
-Δ- SEMI-RIGID ABRASIVE MATERIAL
-◇- RIGID ABRASIVE WITH COMPLIANT UNDERLAYER
-□- RIGID ABRASIVE MATERIAL

FIG. 1

FIG. 2A

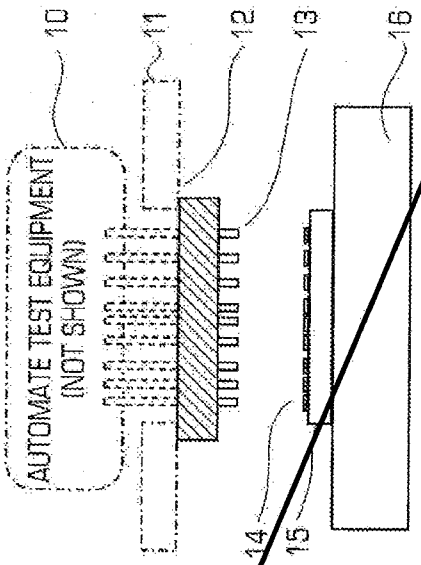

AUTOMATE TEST EQUIPMENT
(NOT SHOWN)
10
11
12
13
14
15
16

FIG. 2B

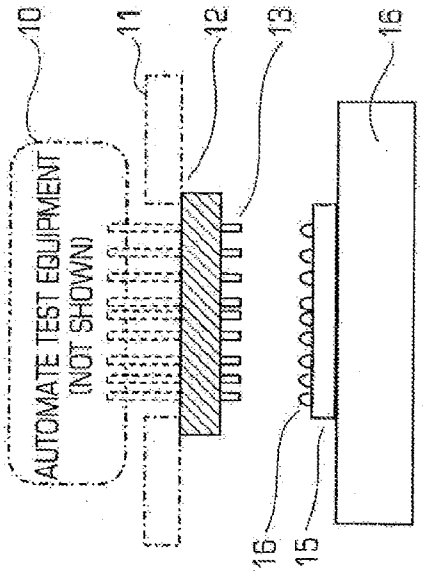

AUTOMATE TEST EQUIPMENT
(NOT SHOWN)
10
11
12
13
15
16
16

FIG. 3A

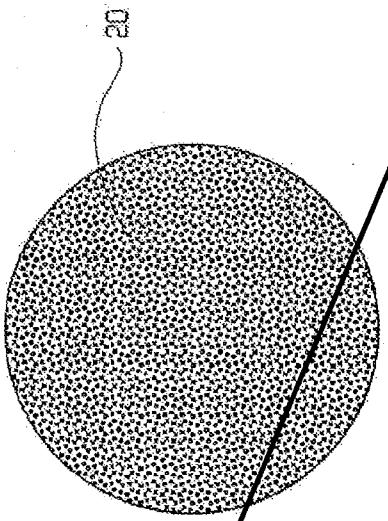


FIG. 3B

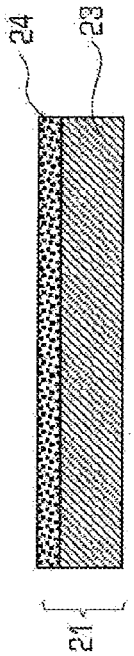
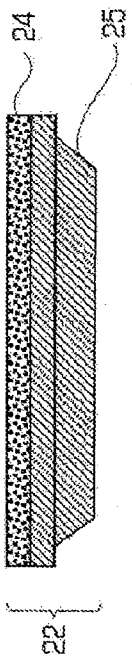


FIG. 3C



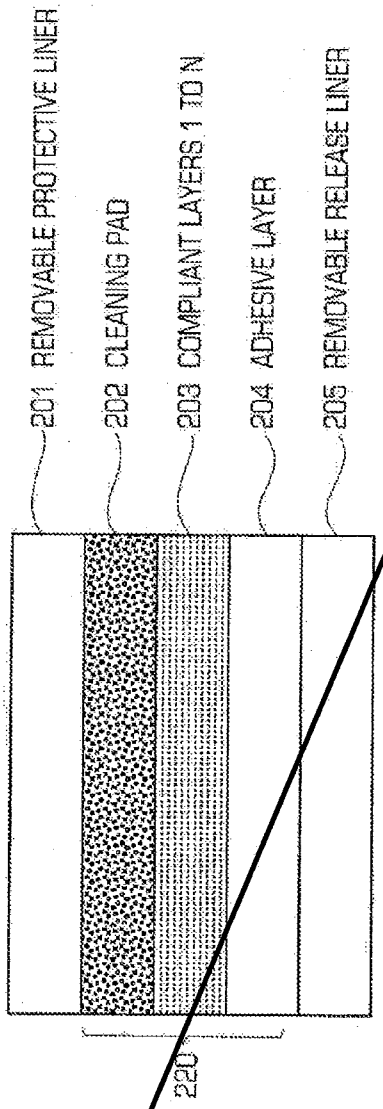

201 REMOVABLE PROTECTIVE LINER
202 CLEANING PAD
203 COMPLIANT LAYERS 1 TO N
204 ADHESIVE LAYER
205 REMOVABLE RELEASE LINER
220

FIG. 4A

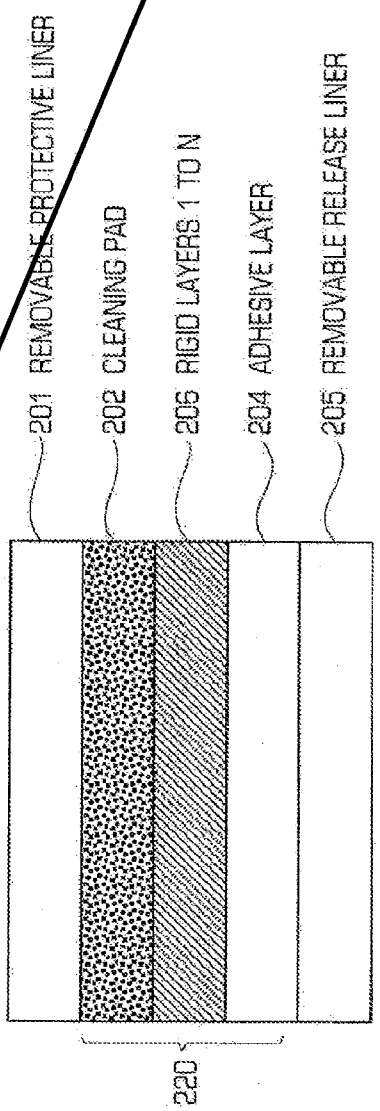

201 REMOVABLE PROTECTIVE LINER
202 CLEANING PAD
206 RIGID LAYERS 1 TO N
204 ADHESIVE LAYER
205 REMOVABLE RELEASE LINER
220

FIG. 4B

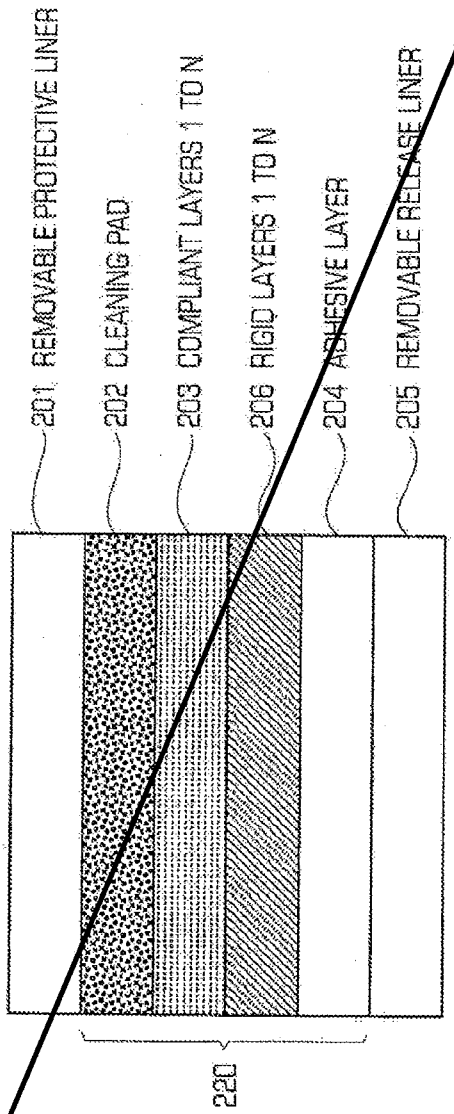

201 REMOVABLE PROTECTIVE LINER
202 CLEANING PAD
203 COMPLIANT LAYERS 1 TO N
206 RIGID LAYERS 1 TO N
204 ADHESIVE LAYER
205 REMOVABLE RELEASE LINER
220

FIG. 4C

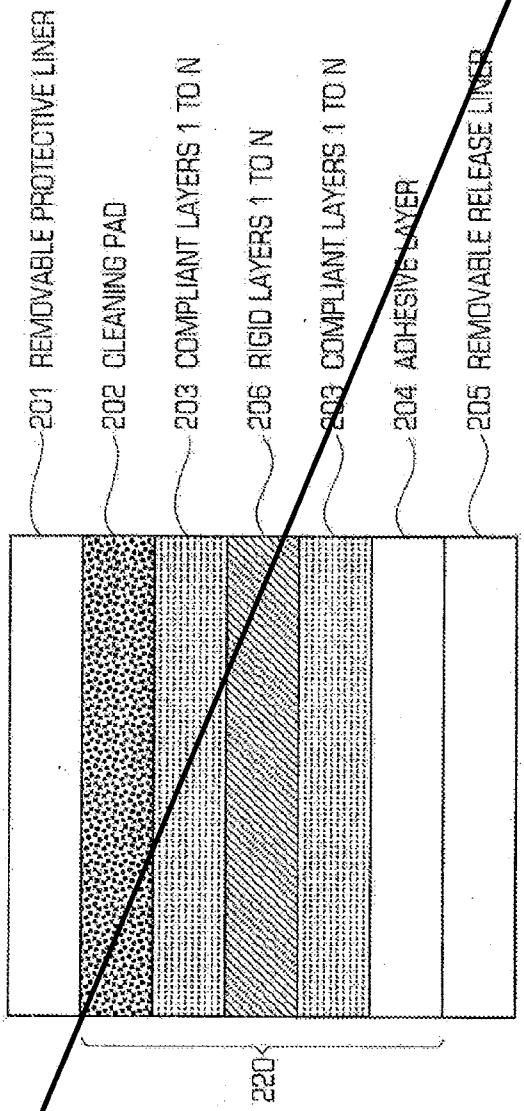

201 REMOVABLE PROTECTIVE LINER
202 CLEANING PAD
203 COMPLIANT LAYERS 1 TO N
206 RIGID LAYERS 1 TO N
203 COMPLIANT LAYERS 1 TO N
204 ADHESIVE LAYER
205 REMOVABLE RELEASE LINER
220

FIG. 4D

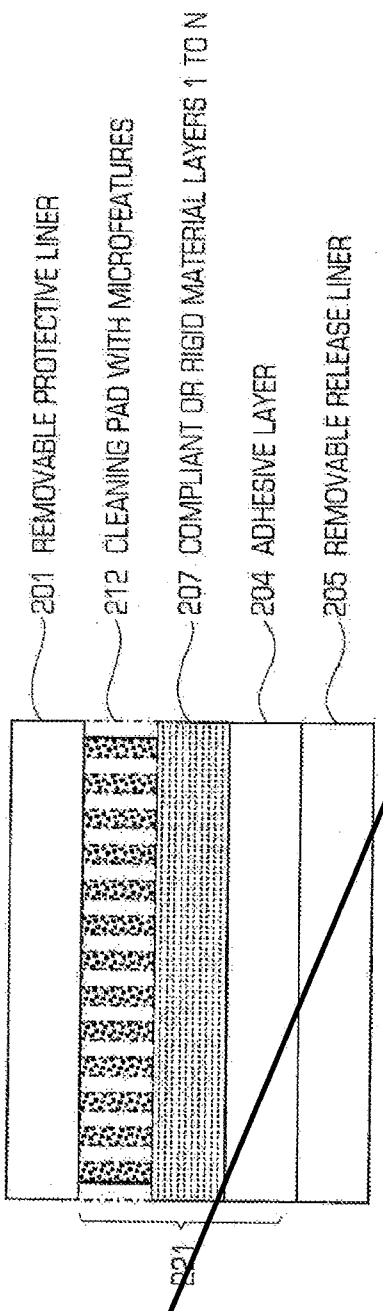

201 REMOVABLE PROTECTIVE LINER
212 CLEANING PAD WITH MICROFEATURES
207 COMPLIANT OR RIGID MATERIAL LAYERS 1 TO N
204 ADHESIVE LAYER
205 REMOVABLE RELEASE LINER
221

FIG. 5A

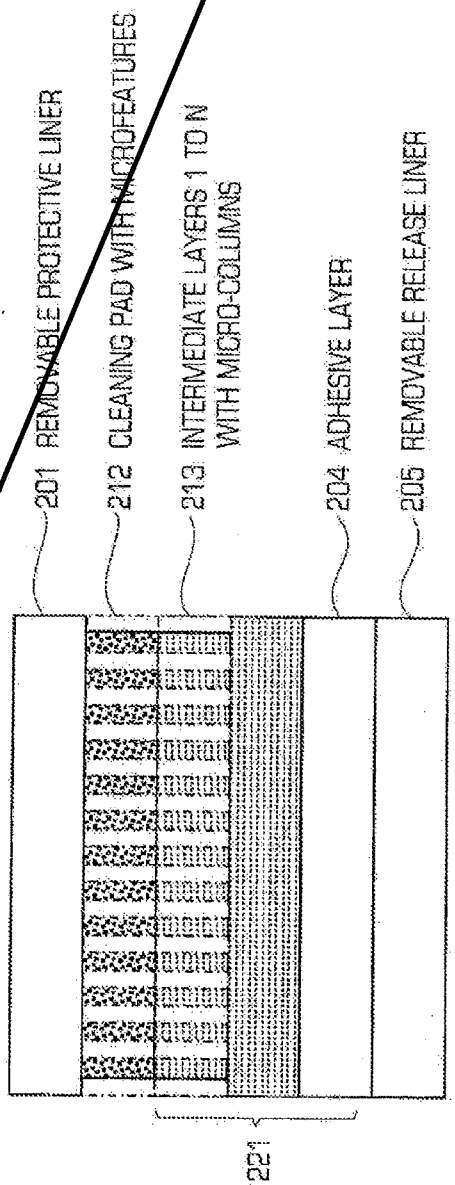

201 REMOVABLE PROTECTIVE LINER
212 CLEANING PAD WITH MICROFEATURES
213 INTERMEDIATE LAYERS 1 TO N
WITH MICRO-COLUMNS
204 ADHESIVE LAYER
205 REMOVABLE RELEASE LINER
221

FIG. 5B

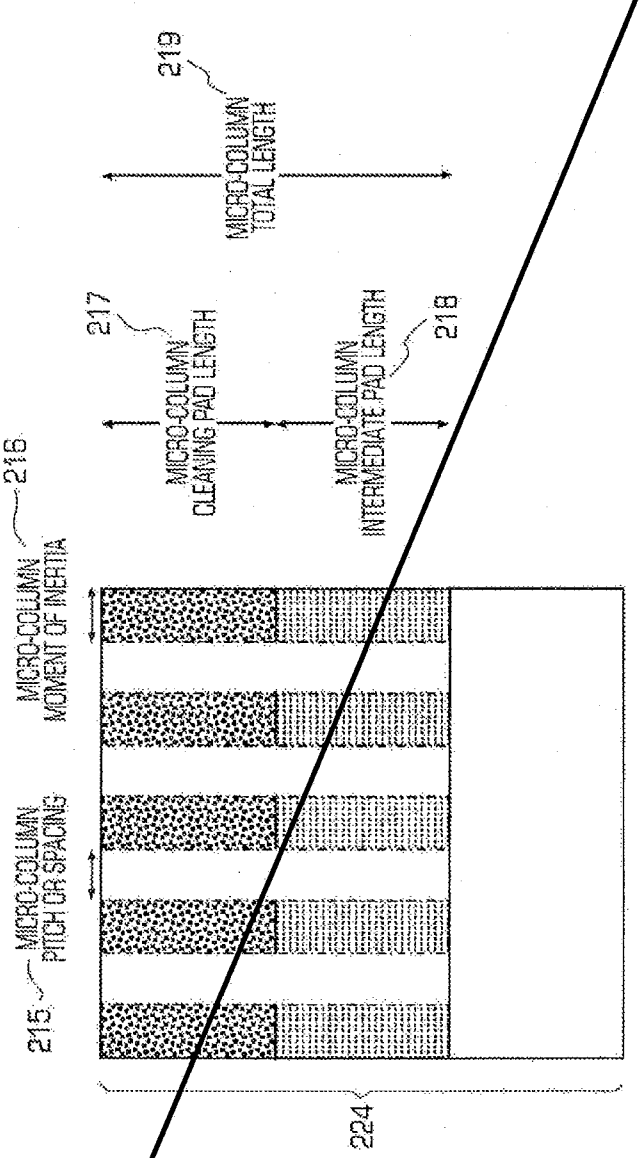

219
MICRO-COLUMN TOTAL LENGTH
217
MICRO-COLUMN CLEANING PAD LENGTH
218
MICRO-COLUMN INTERMEDIATE PAD LENGTH
216
MICRO-COLUMN MOMENT OF INERTIA
MICRO-COLUMN PITCH OR SPACING
215
224

FIG. 6A

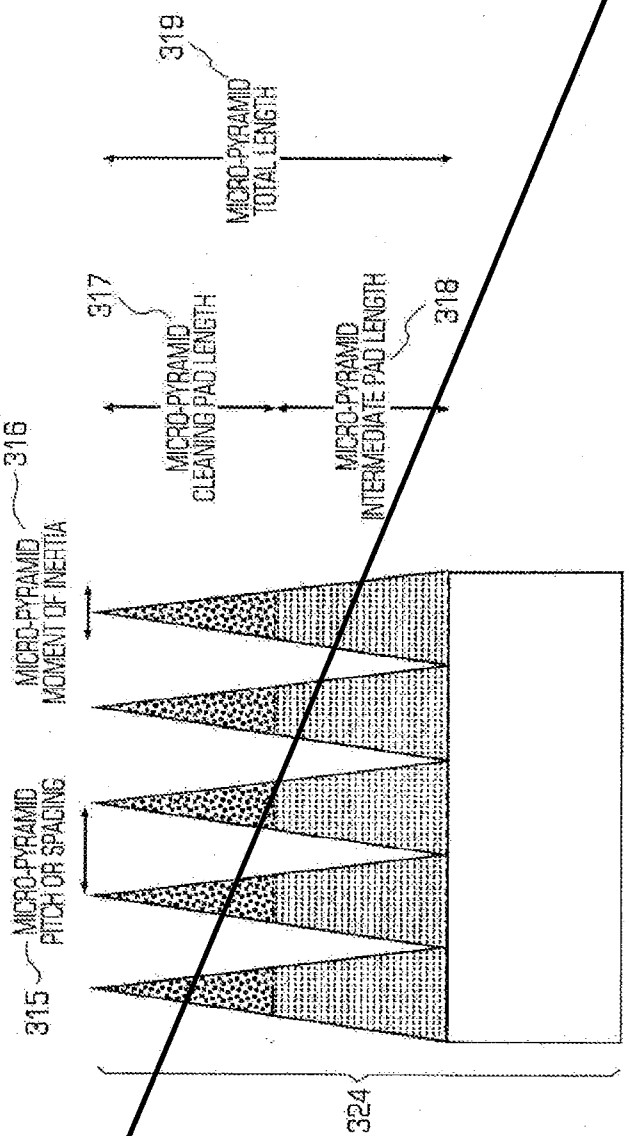

319
MICRO-PYRAMID TOTAL LENGTH
317
MICRO-PYRAMID CLEANING PAD LENGTH
318
MICRO-PYRAMID INTERMEDIATE PAD LENGTH
316
MICRO-PYRAMID MOMENT OF INERTIA
MICRO-PYRAMID PITCH OR SPACING
315
324

FIG. 6B

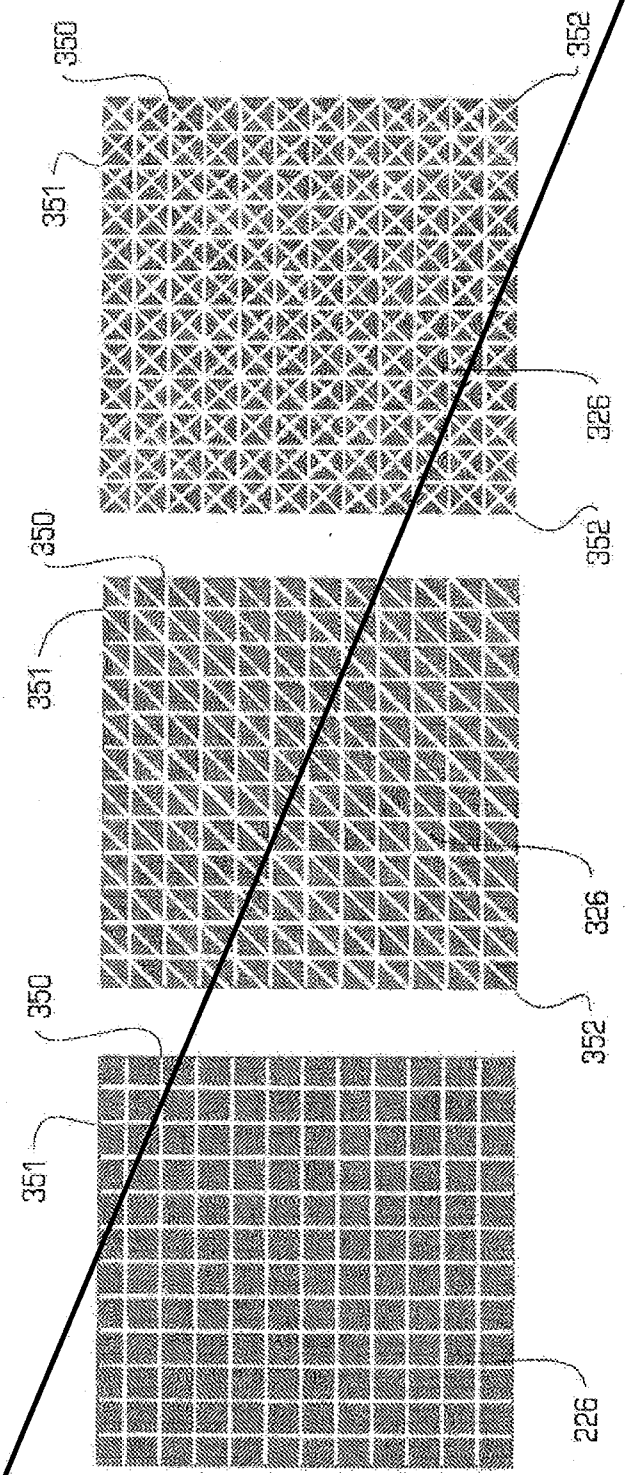


FIG. 7C

FIG. 7B

FIG. 7A

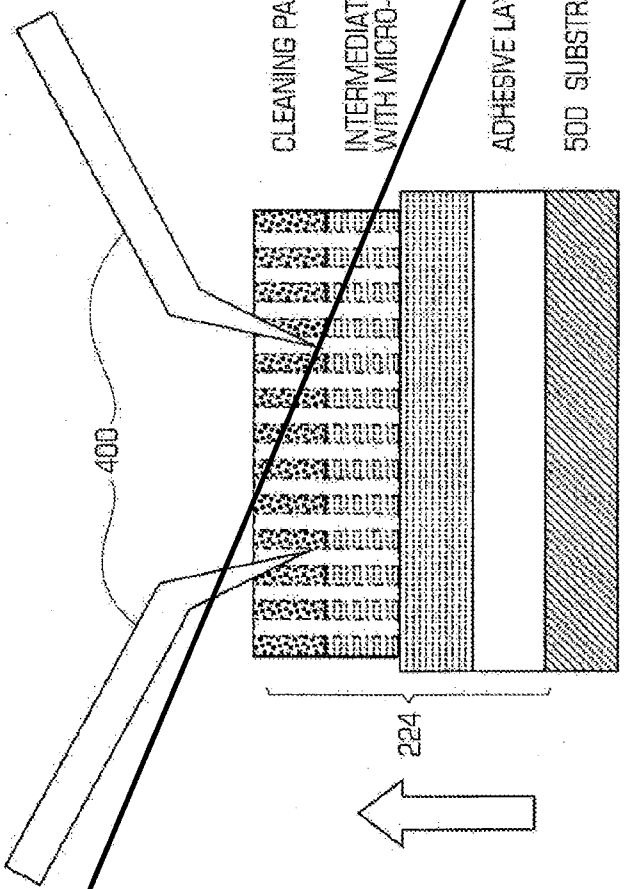

CLEANING PAD WITH MICRO-PYRAMID
INTERMEDIATE LAYERS 1 TO N WITH MICRO-COLUMNS
ADHESIVE LAYER
500 SUBSTRATE
400
224

FIG. 8A

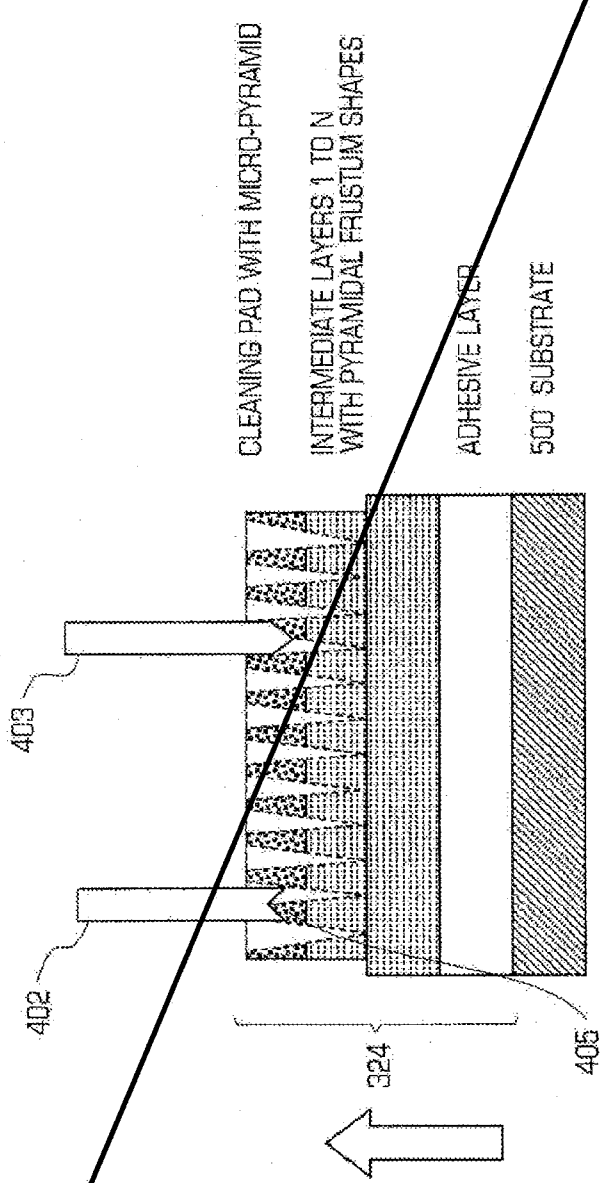

CLEANING PAD WITH MICRO-PYRAMID
INTERMEDIATE LAYERS 1 TO N
WITH PYRAMIDAL FRUSTUM SHAPES
ADHESIVE LAYER
500 SUBSTRATE
403
402
324
405

FIG. 8B

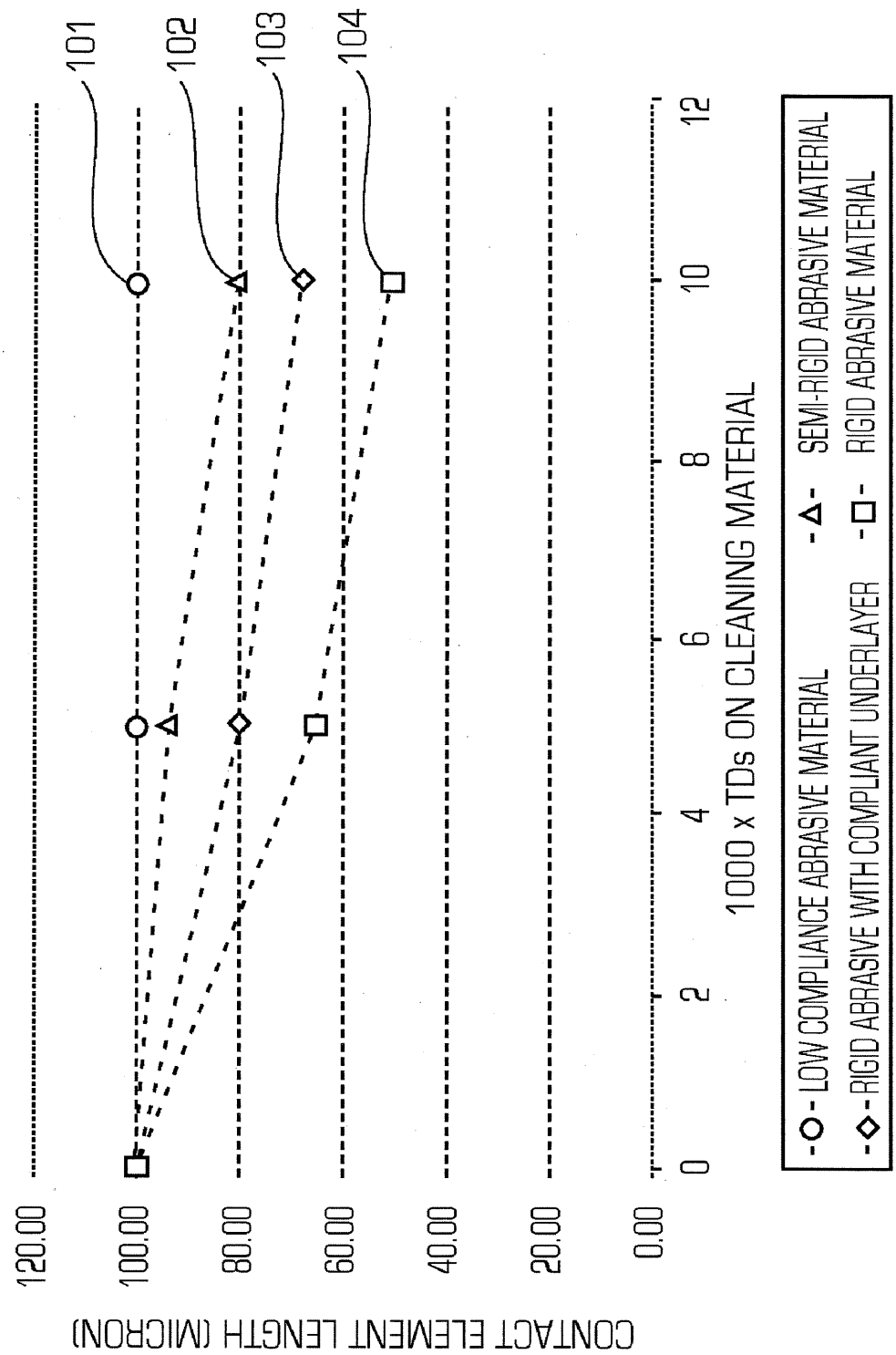

CONTACT ELEMENT LENGTH (MICRON)
120.00
100.00
80.00
60.00
40.00
20.00
0.00
0
2
4
6
8
10
12
1000 x TDs ON CLEANING MATERIAL
101
102
103
104
-O- LOW COMPLIANCE ABRASIVE MATERIAL
-Δ- SEMI-RIGID ABRASIVE MATERIAL
-◇- RIGID ABRASIVE WITH COMPLIANT UNDERLAYER
-□- RIGID ABRASIVE MATERIAL

FIG. 1

FIGURE 2A
Prior Art

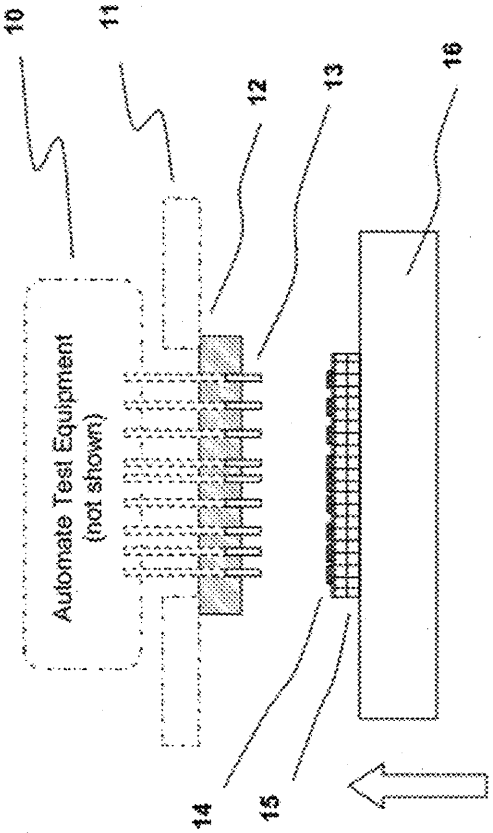


FIGURE 2B
Prior Art

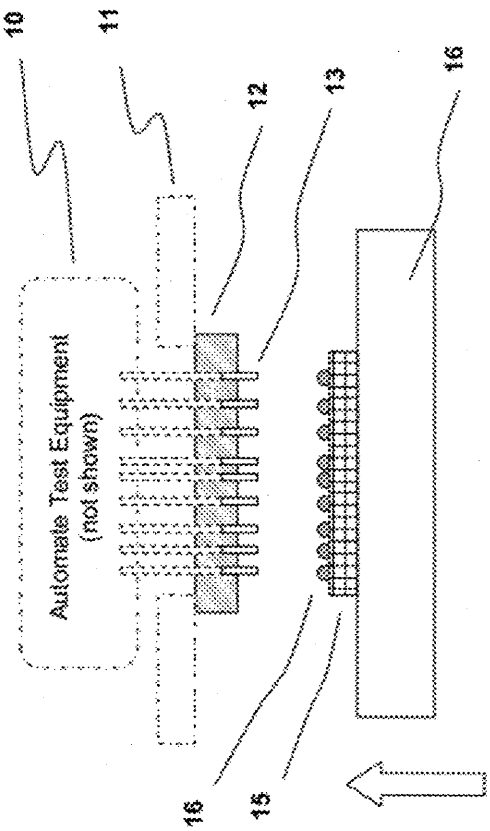


FIG. 3A

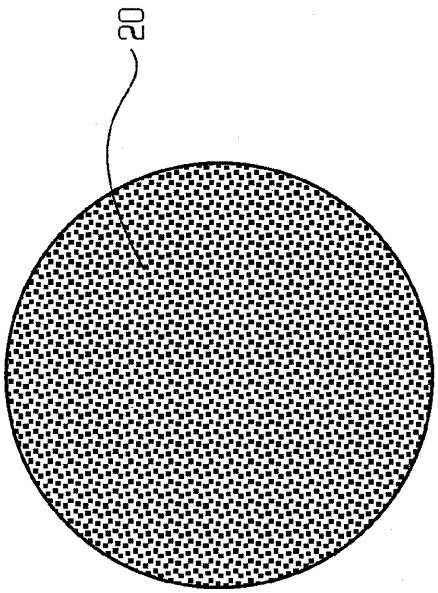


FIG. 3B

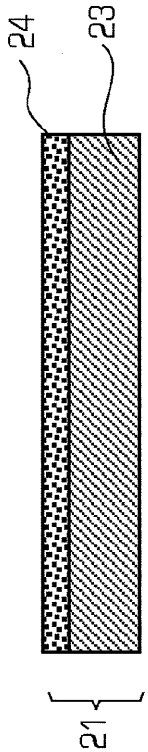
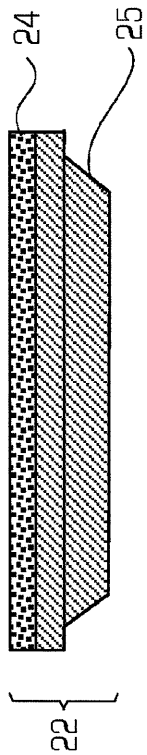


FIG. 3C



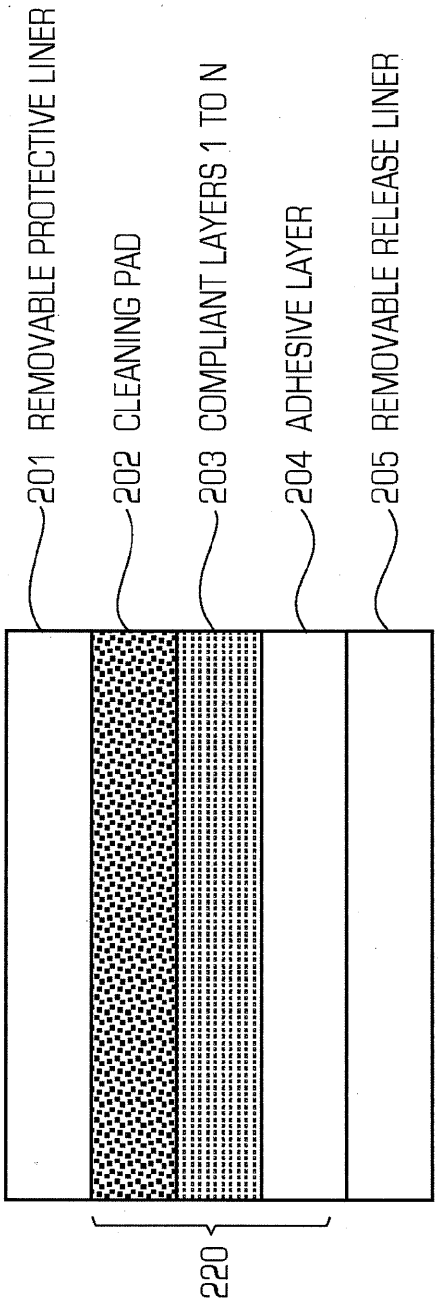

201 REMOVABLE PROTECTIVE LINER
202 CLEANING PAD
203 COMPLIANT LAYERS 1 TO N
204 ADHESIVE LAYER
205 REMOVABLE RELEASE LINER
220

FIG. 4A

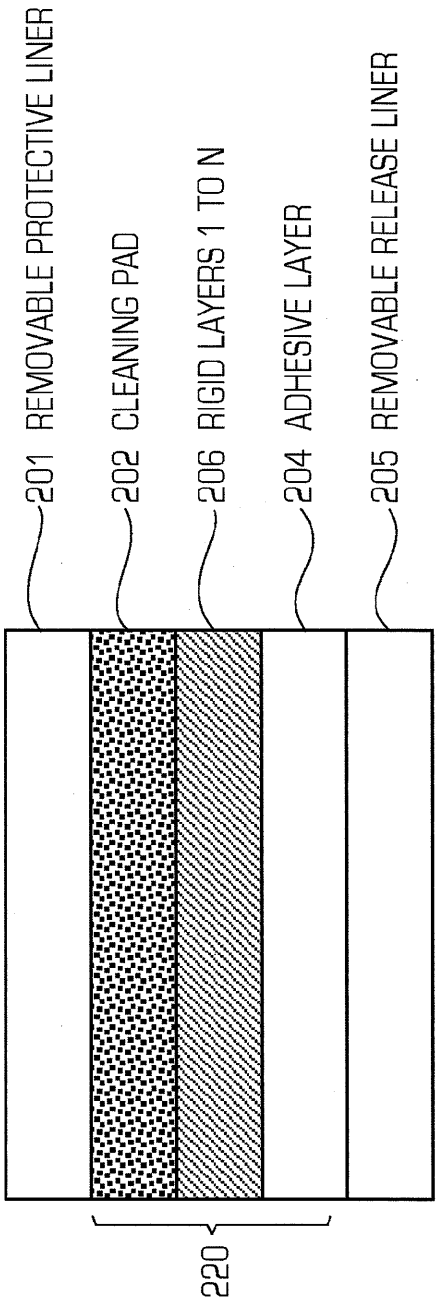

201 REMOVABLE PROTECTIVE LINER
202 CLEANING PAD
206 RIGID LAYERS 1 TO N
204 ADHESIVE LAYER
205 REMOVABLE RELEASE LINER
220

FIG. 4B

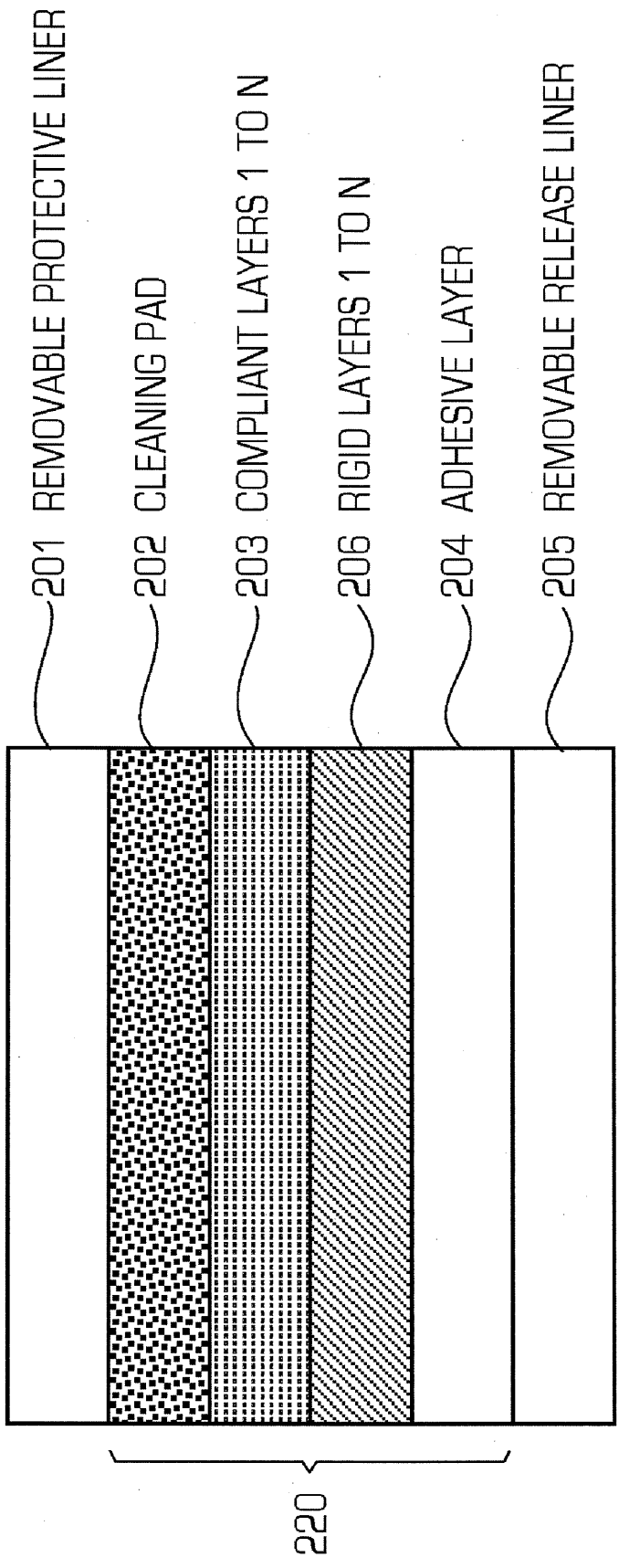

201 REMOVABLE PROTECTIVE LINER
202 CLEANING PAD
203 COMPLIANT LAYERS 1 TO N
206 RIGID LAYERS 1 TO N
204 ADHESIVE LAYER
205 REMOVABLE RELEASE LINER
220

FIG. 4C

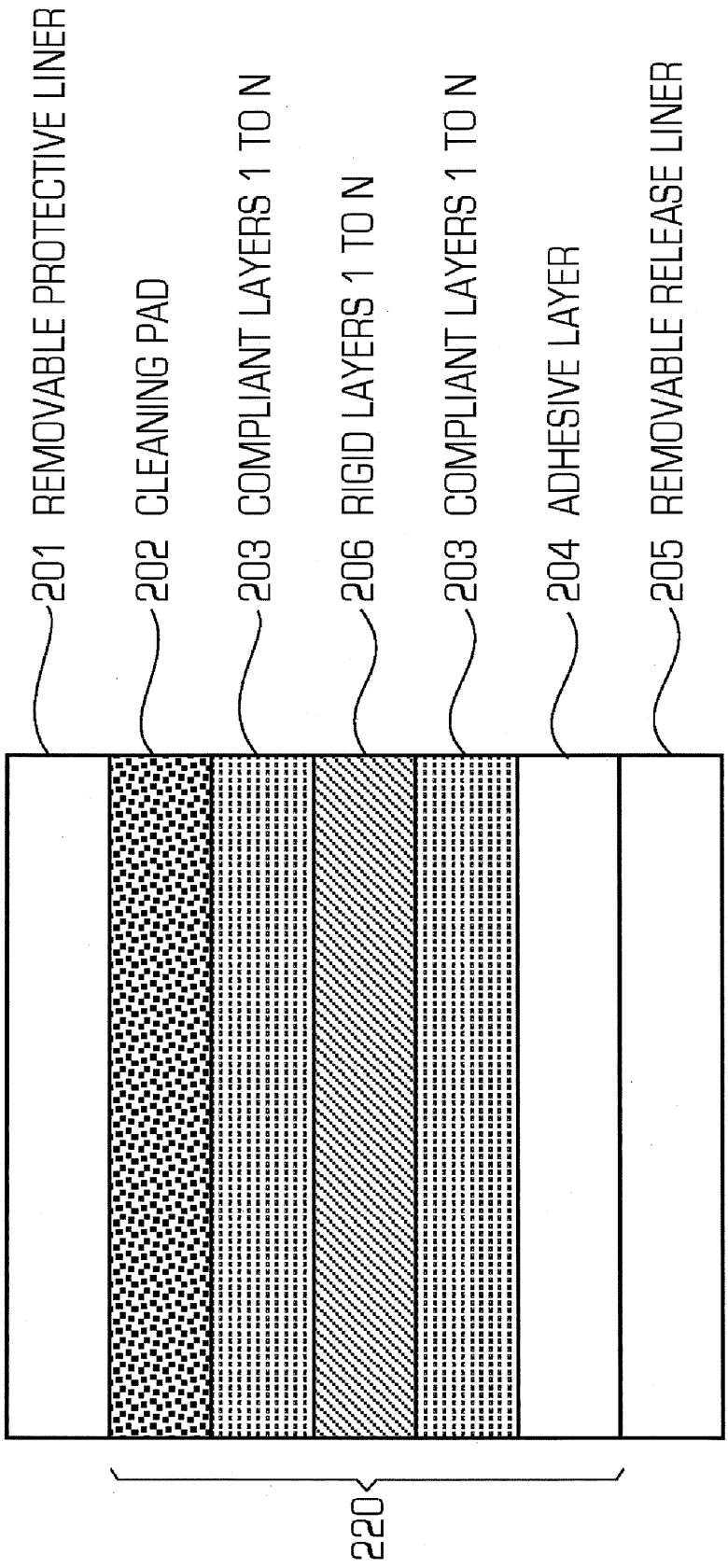

201 REMOVABLE PROTECTIVE LINER
202 CLEANING PAD
203 COMPLIANT LAYERS 1 TO N
206 RIGID LAYERS 1 TO N
203 COMPLIANT LAYERS 1 TO N
204 ADHESIVE LAYER
205 REMOVABLE RELEASE LINER
220

FIG. 4D

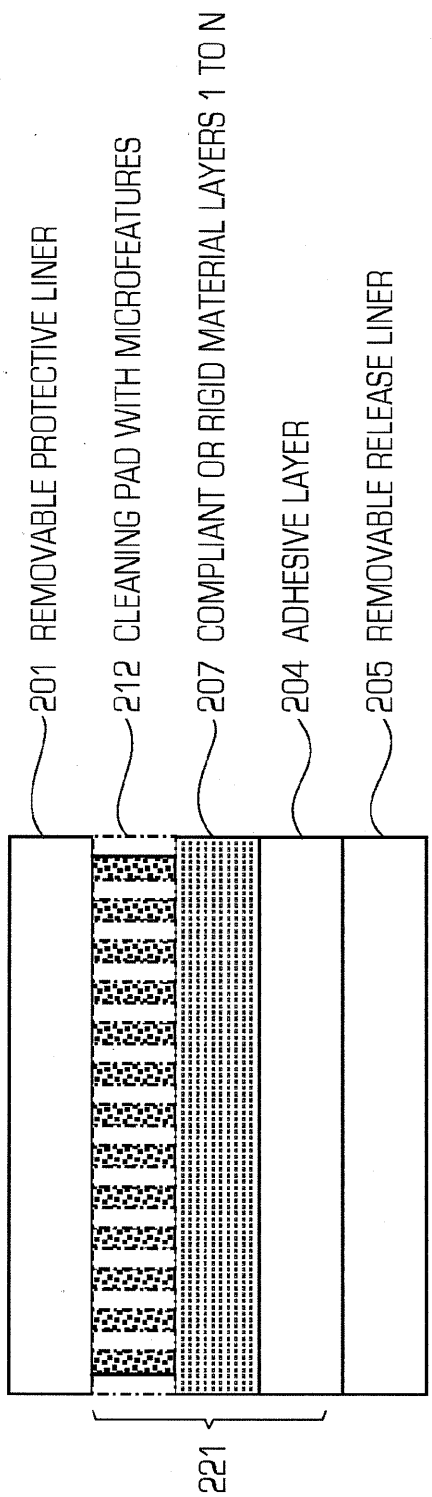

201 REMOVABLE PROTECTIVE LINER
212 CLEANING PAD WITH MICROFEATURES
207 COMPLIANT OR RIGID MATERIAL LAYERS 1 TO N
204 ADHESIVE LAYER
205 REMOVABLE RELEASE LINER
221

FIG. 5A

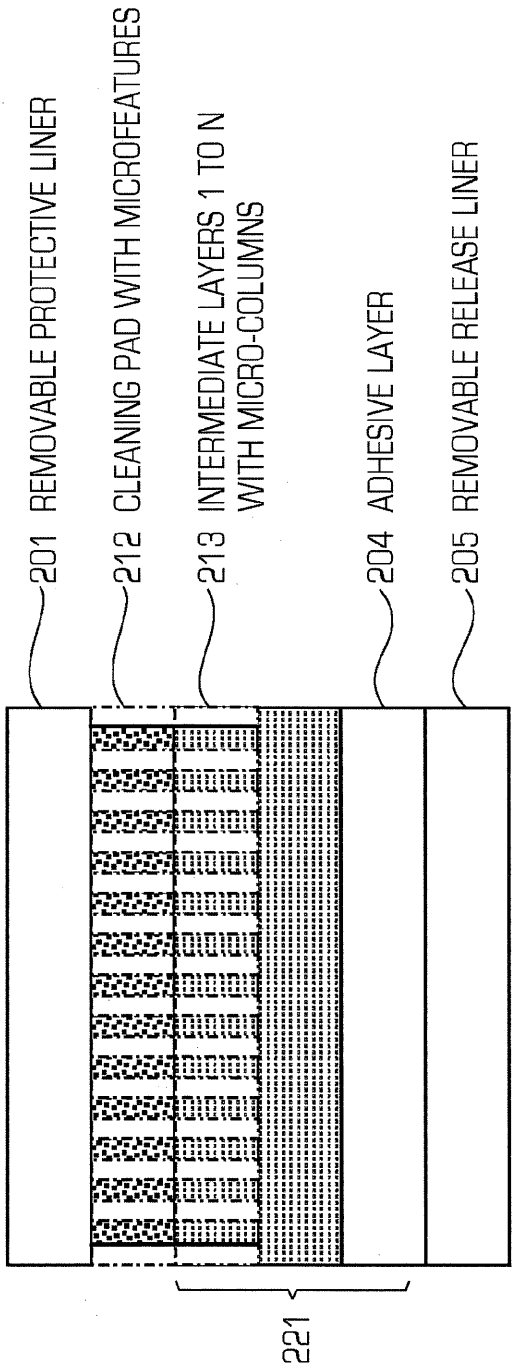
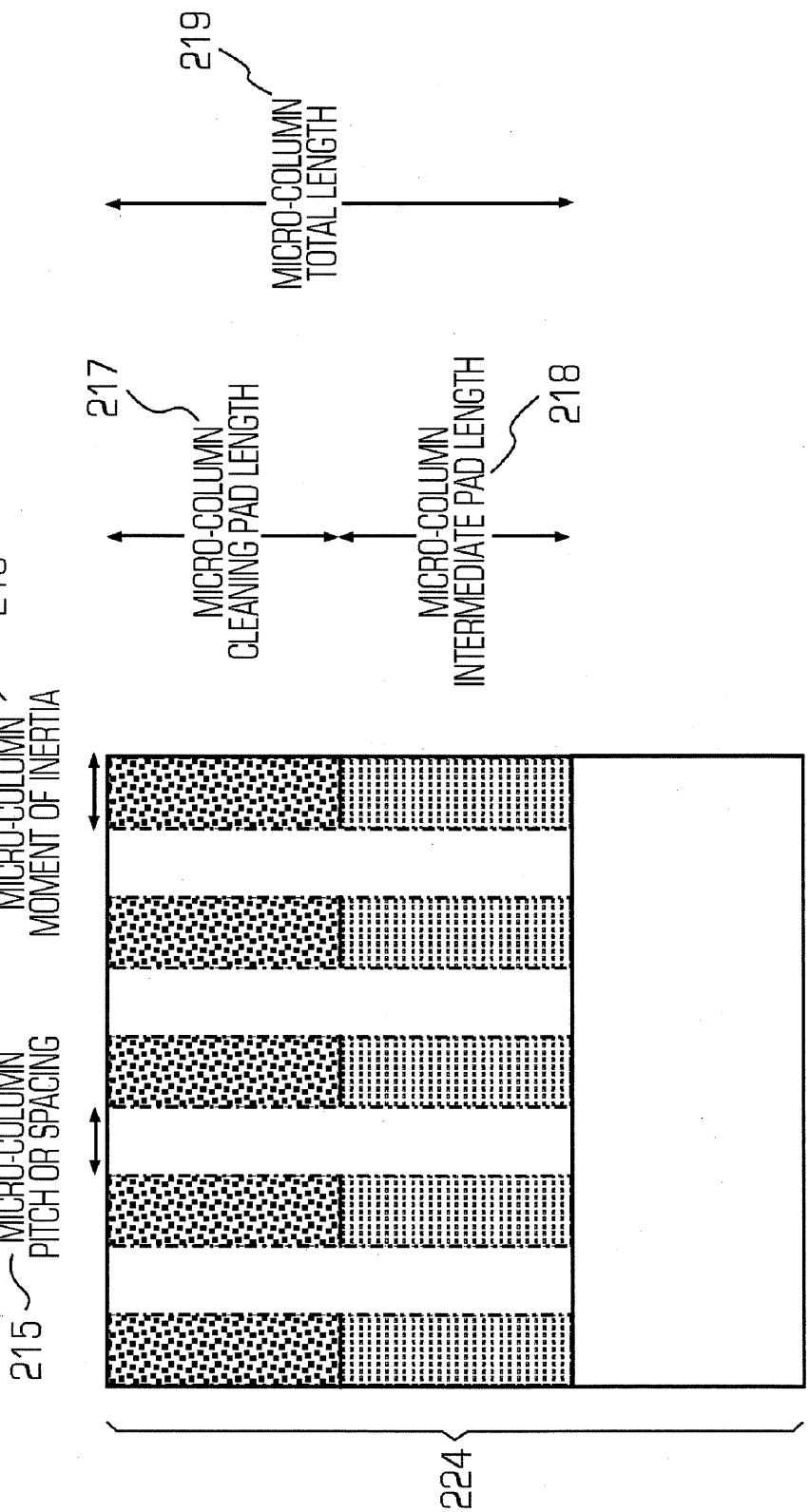

201 REMOVABLE PROTECTIVE LINER
212 CLEANING PAD WITH MICROFEATURES
213 INTERMEDIATE LAYERS 1 TO N
WITH MICRO-COLUMNS
204 ADHESIVE LAYER
205 REMOVABLE RELEASE LINER
221

FIG. 5B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MICRO-COLUMN
TOTAL LENGTH
217
MICRO-COLUMN
CLEANING PAD LENGTH
218
MICRO-COLUMN
INTERMEDIATE PAD LENGTH
216
MICRO-COLUMN
MOMENT OF INERTIA
215
MICRO-COLUMN
PITCH OR SPACING
224

FIG. 6A

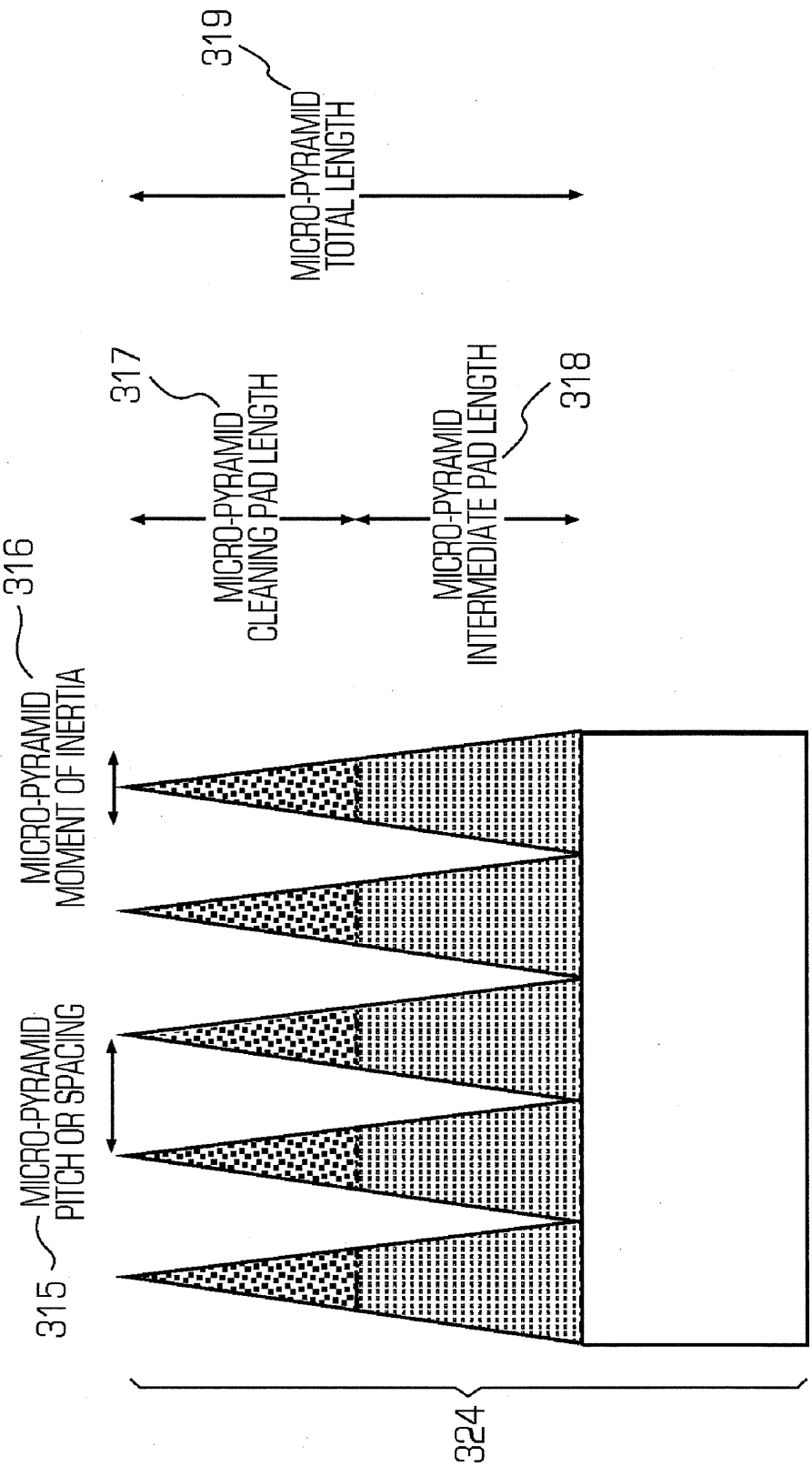
319
MICRO-PYRAMID
TOTAL LENGTH
317
MICRO-PYRAMID
CLEANING PAD LENGTH
318
MICRO-PYRAMID
INTERMEDIATE PAD LENGTH
316
MICRO-PYRAMID
MOMENT OF INERTIA
315
MICRO-PYRAMID
PITCH OR SPACING
324

FIG. 6B

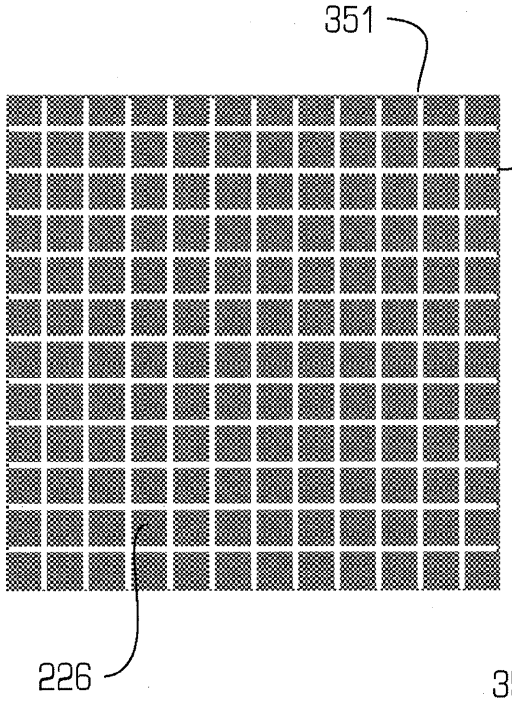

FIG. 7A

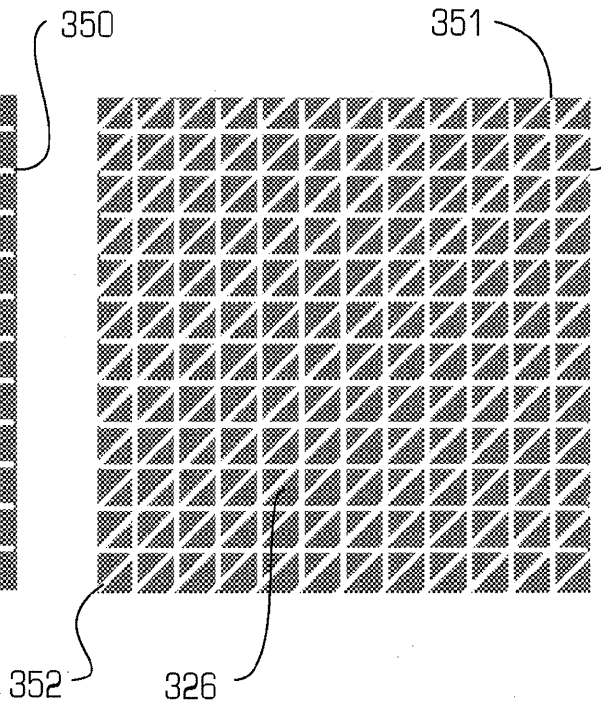

FIG. 7B

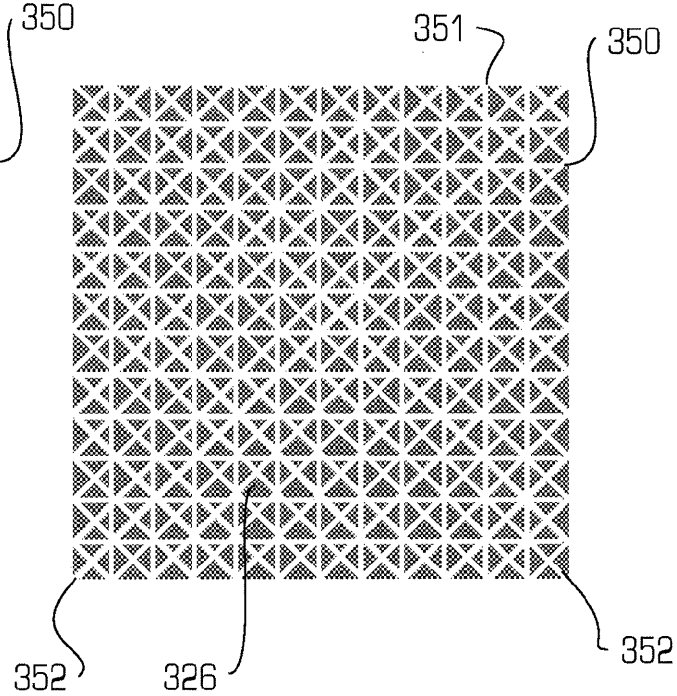

FIG. 7C

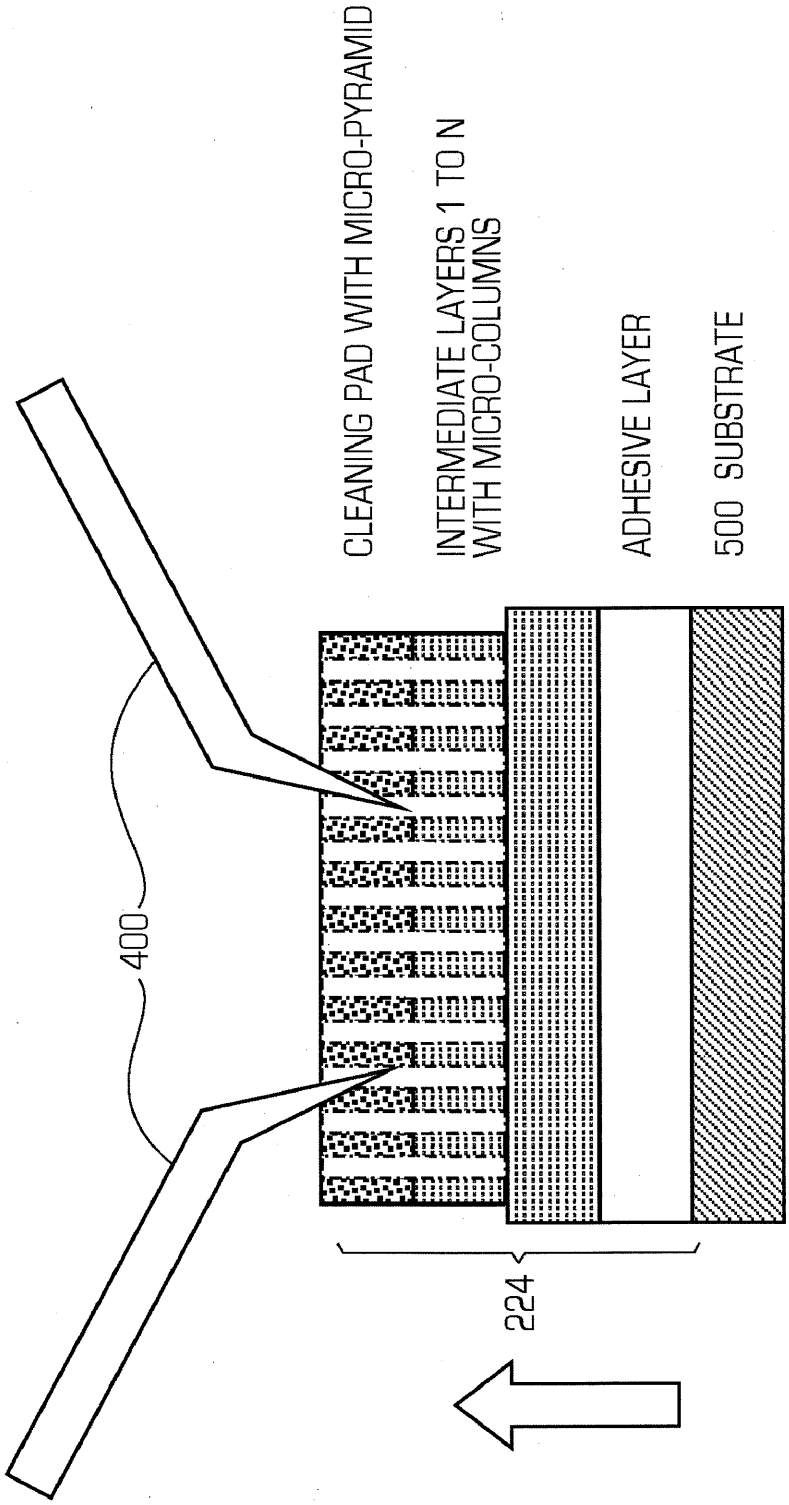
CLEANING PAD WITH MICRO-PYRAMID
INTERMEDIATE LAYERS 1 TO N
WITH MICRO-COLUMNS
ADHESIVE LAYER
500 SUBSTRATE
400
224

FIG. 8A

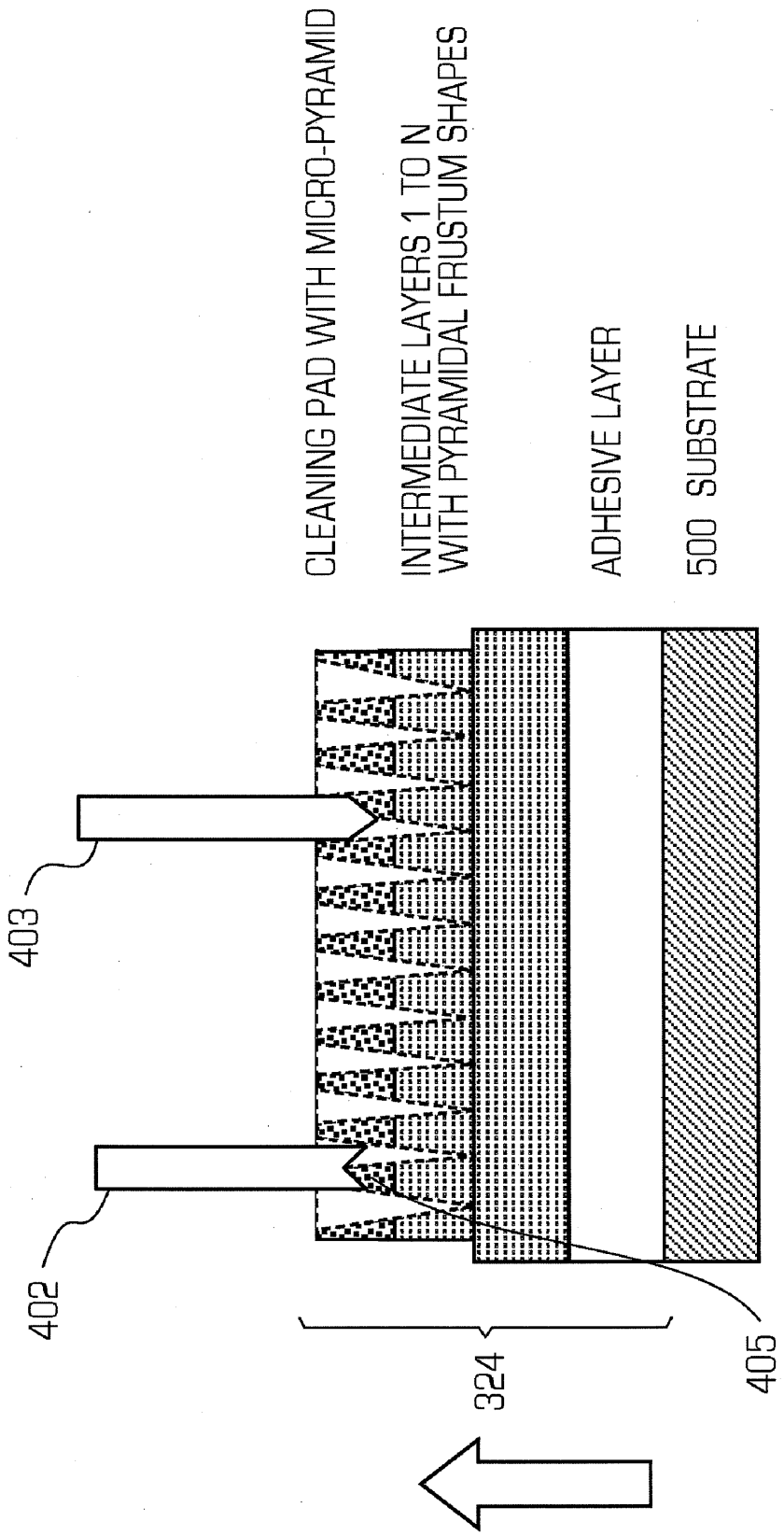
CLEANING PAD WITH MICRO-PYRAMID
INTERMEDIATE LAYERS 1 TO N
WITH PYRAMIDAL FRUSTUM SHAPES
ADHESIVE LAYER
500 SUBSTRATE
403
402
324
405

FIG. 8B