

FIG. 1A

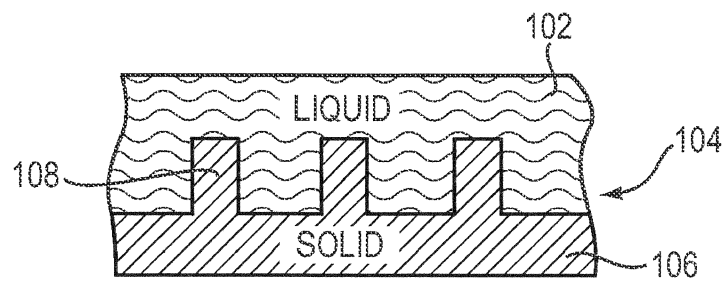


FIG. 1B

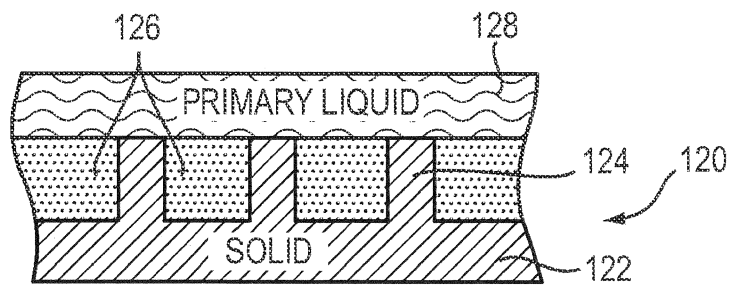


FIG. 1C

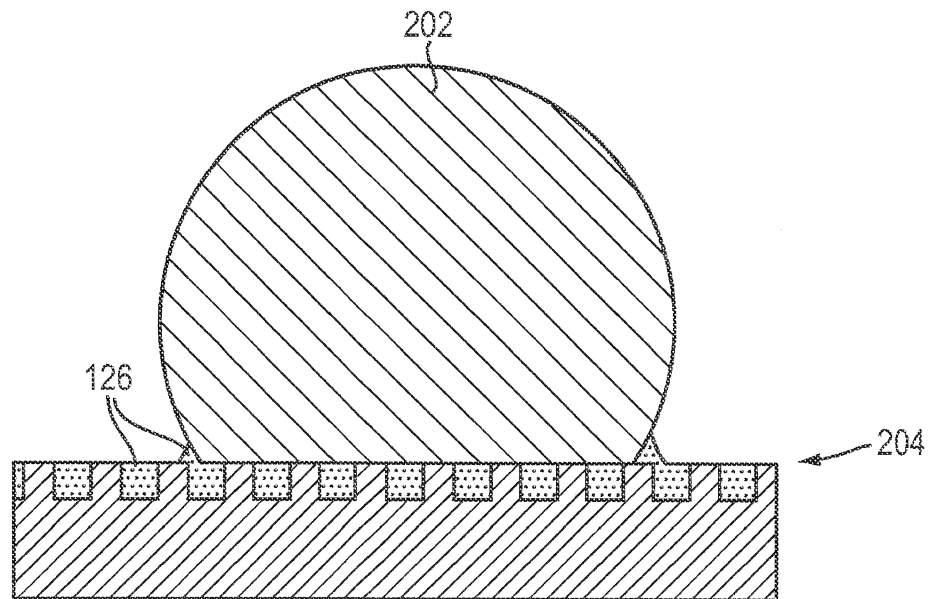


FIG. 2A

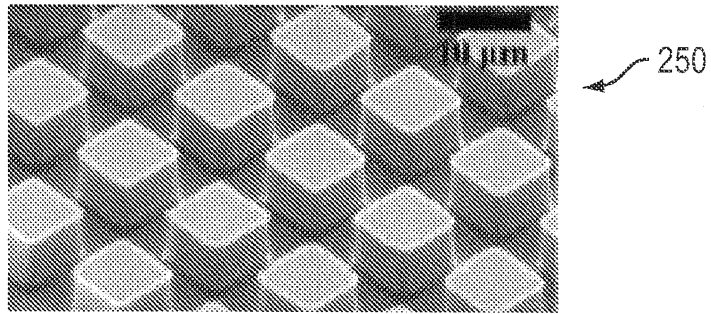
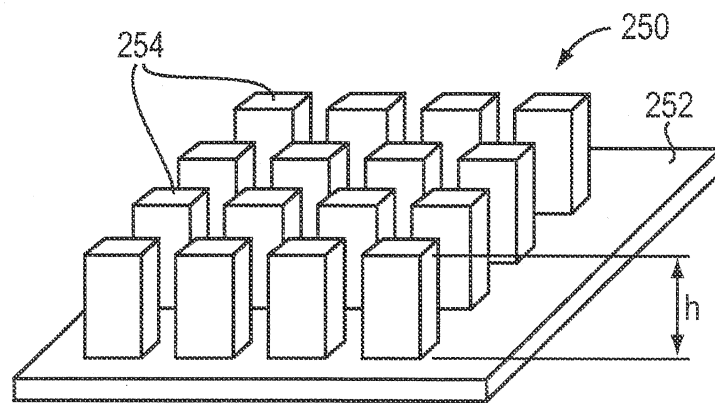
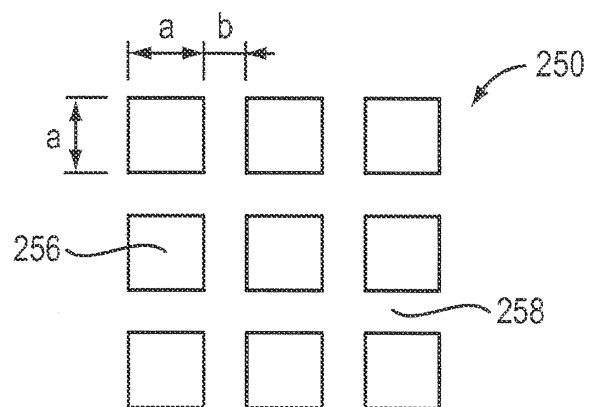


FIG. 2B



3D VIEW

FIG. 2C



TOP VIEW

FIG. 2D

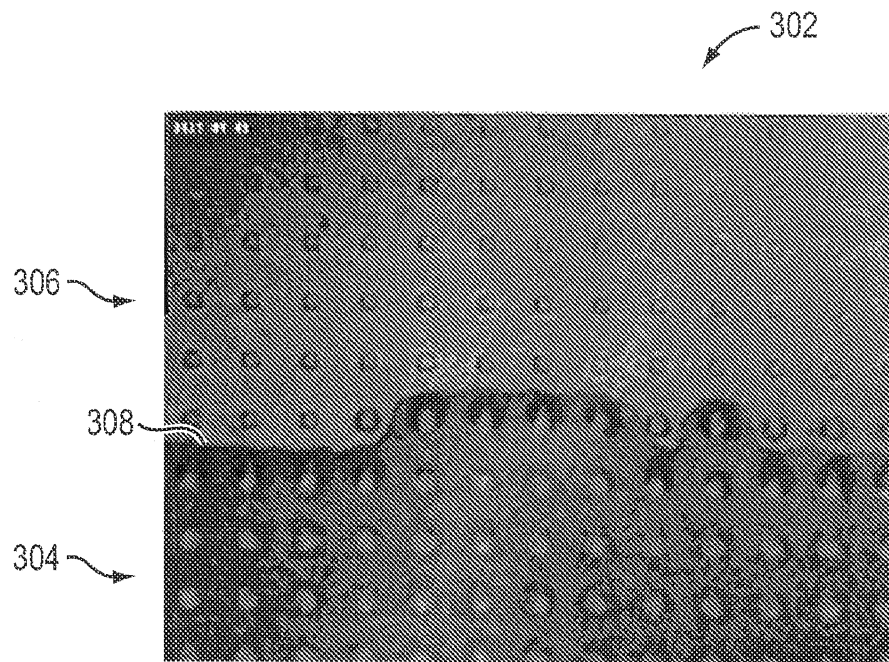


FIG. 3

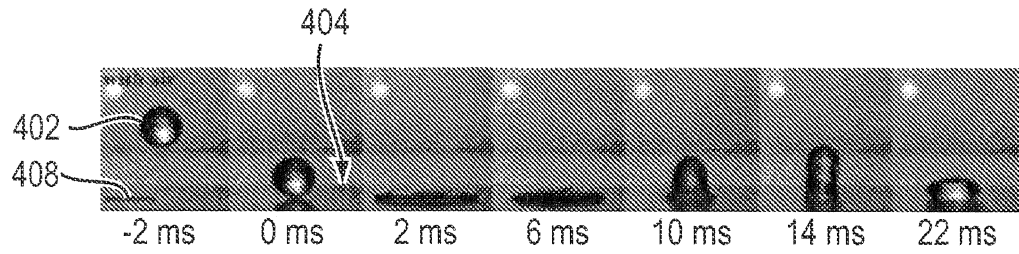


FIG. 4A

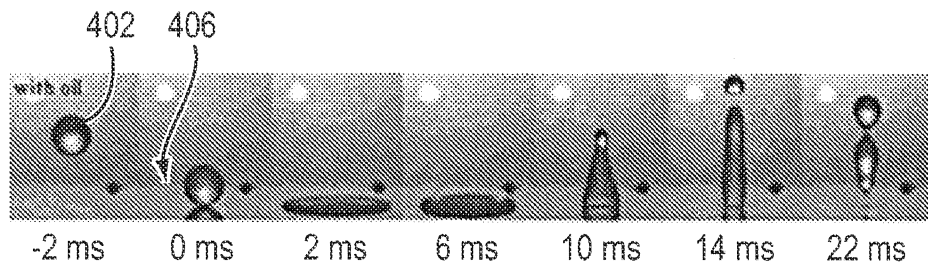


FIG. 4B

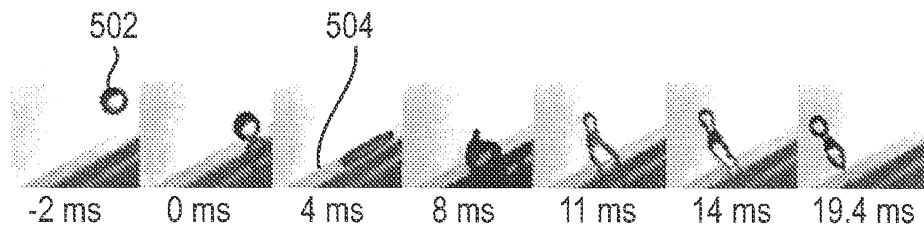


FIG. 5

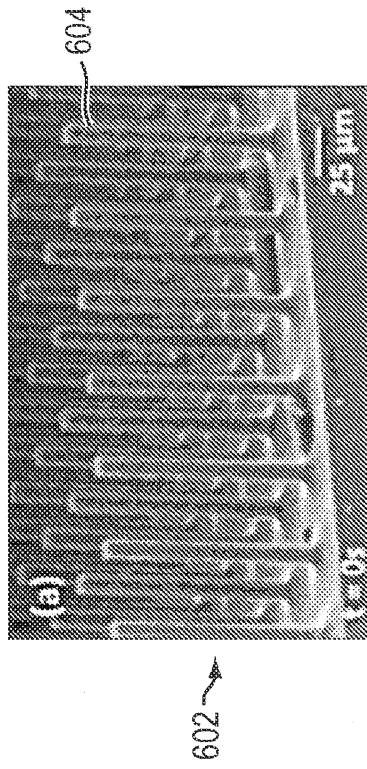


FIG. 6A

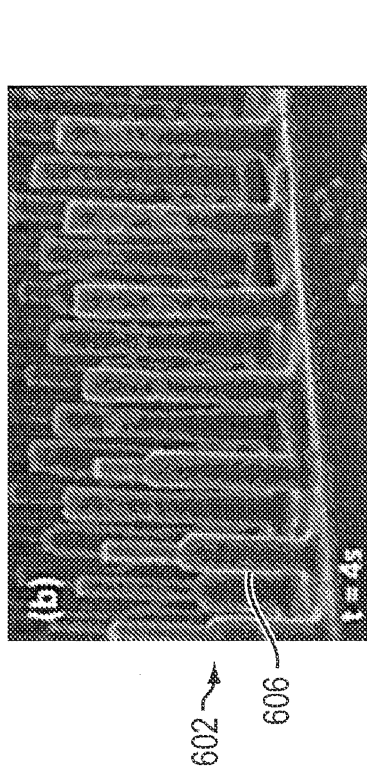


FIG. 6B

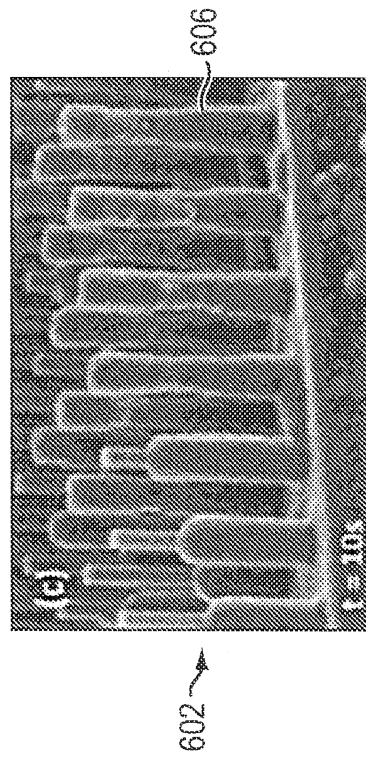


FIG. 6C

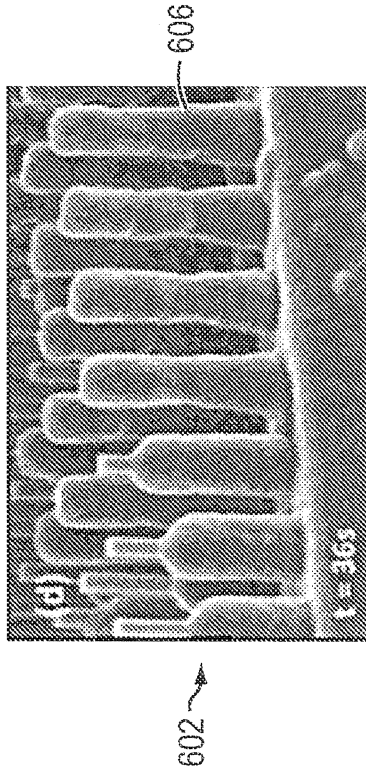


FIG. 6D

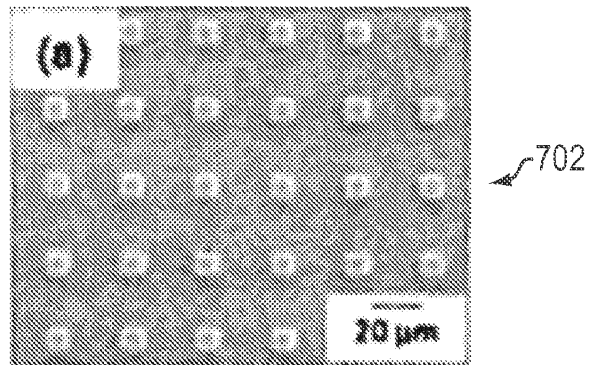


FIG. 7A

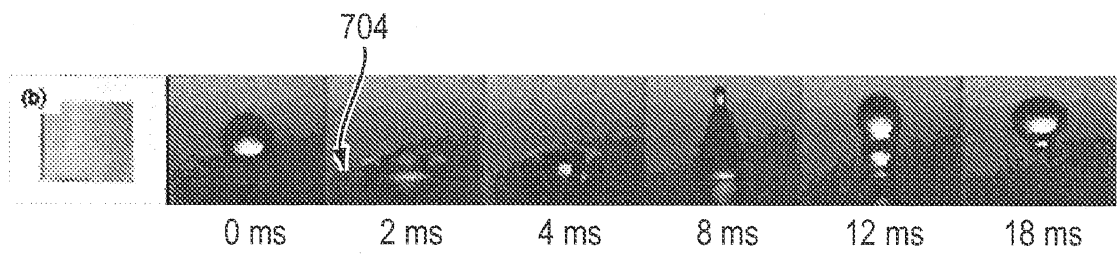


FIG. 7B

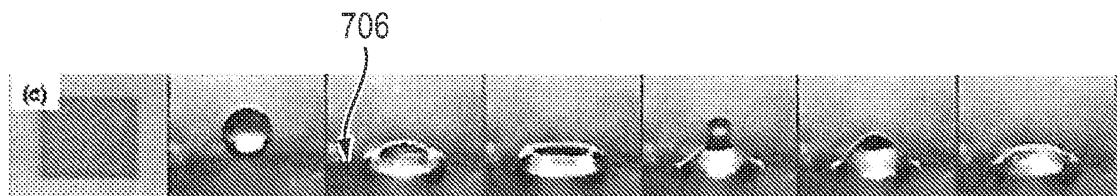


FIG. 7B

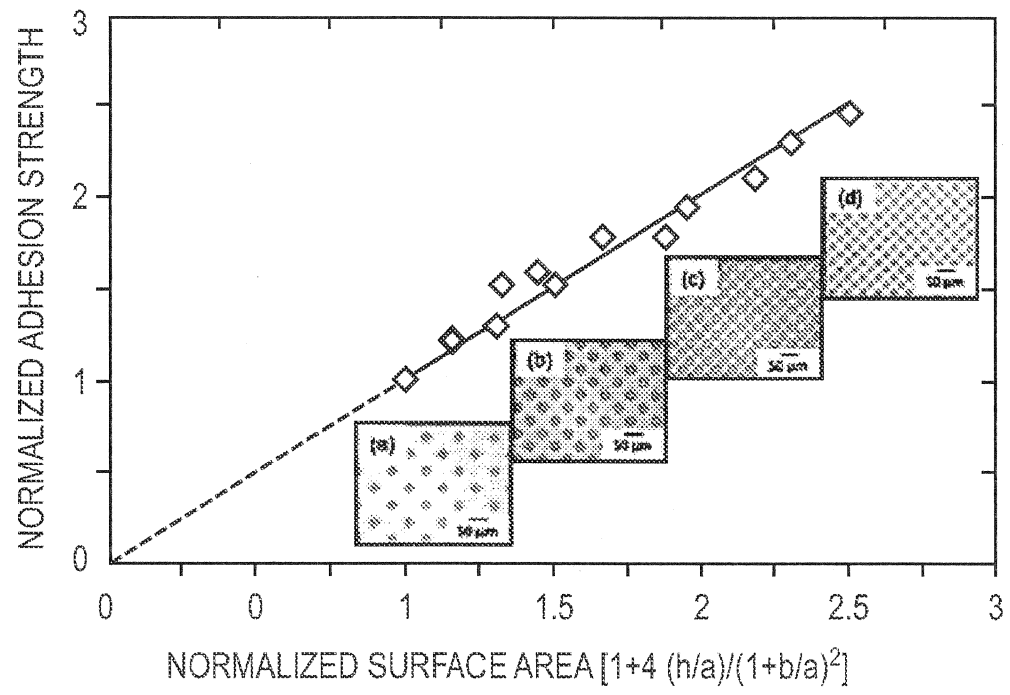


FIG.8

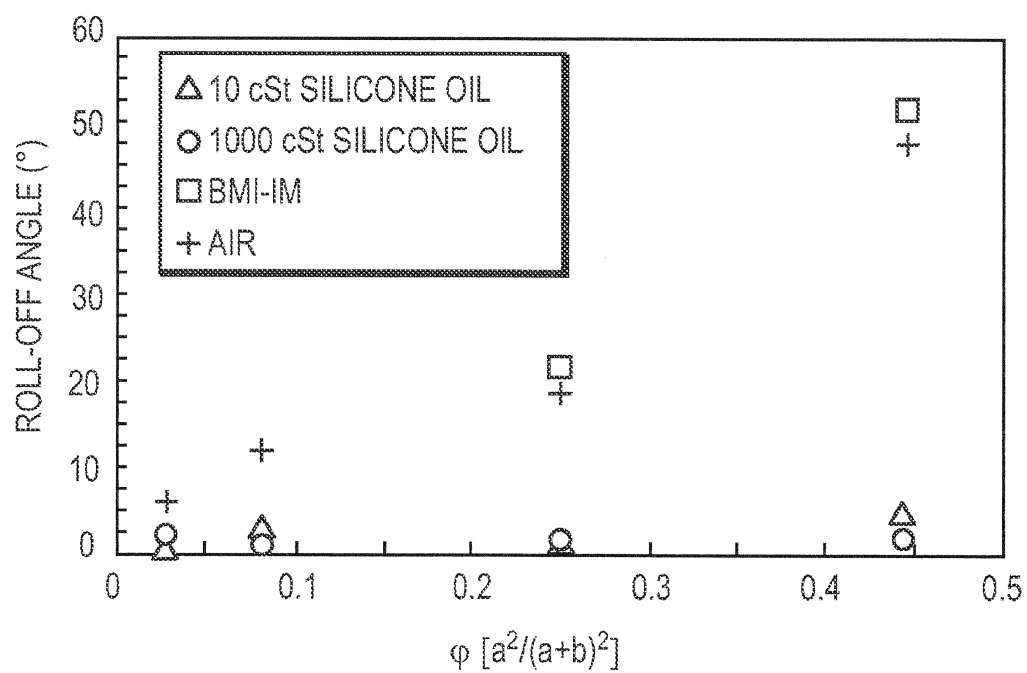


FIG.9

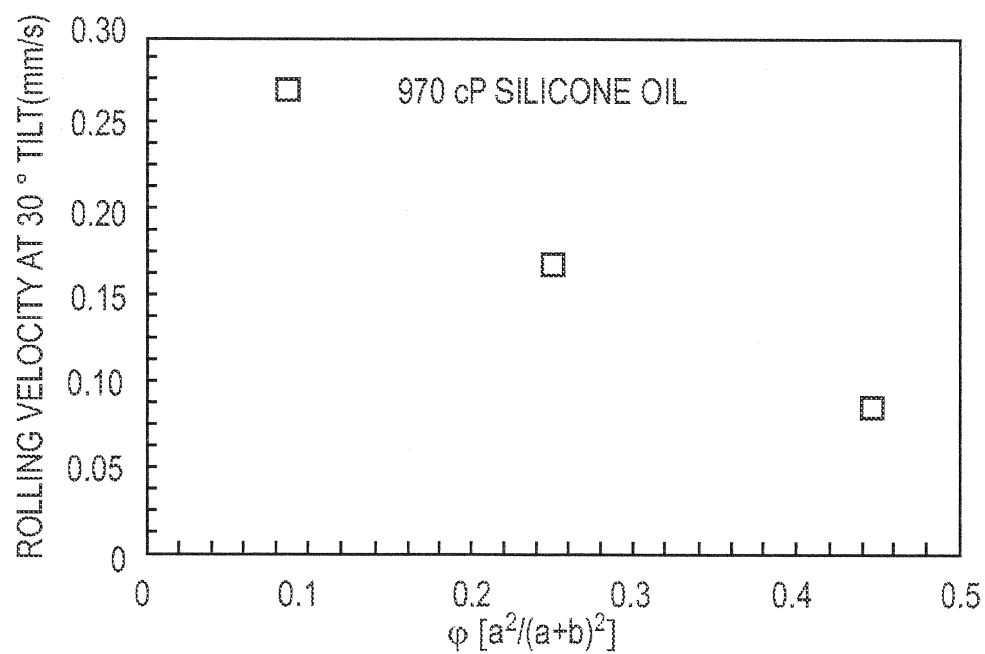


FIG.10

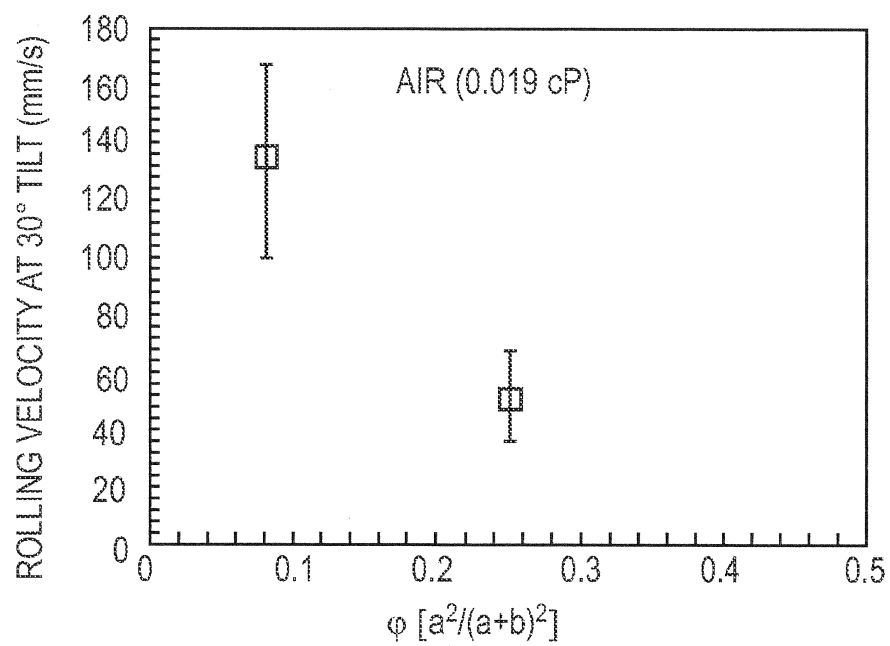


FIG.11

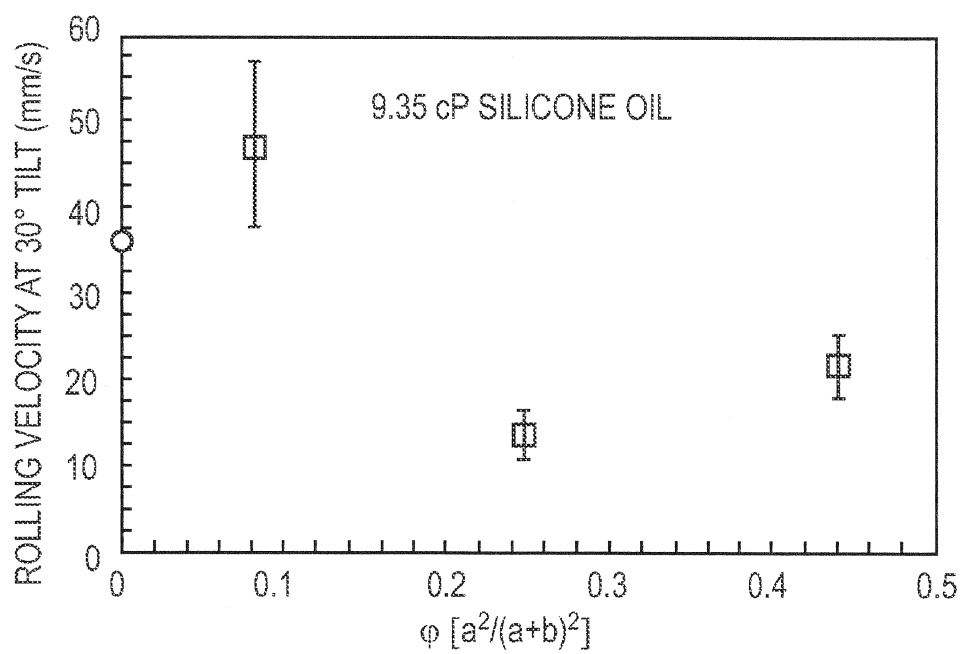


FIG.12

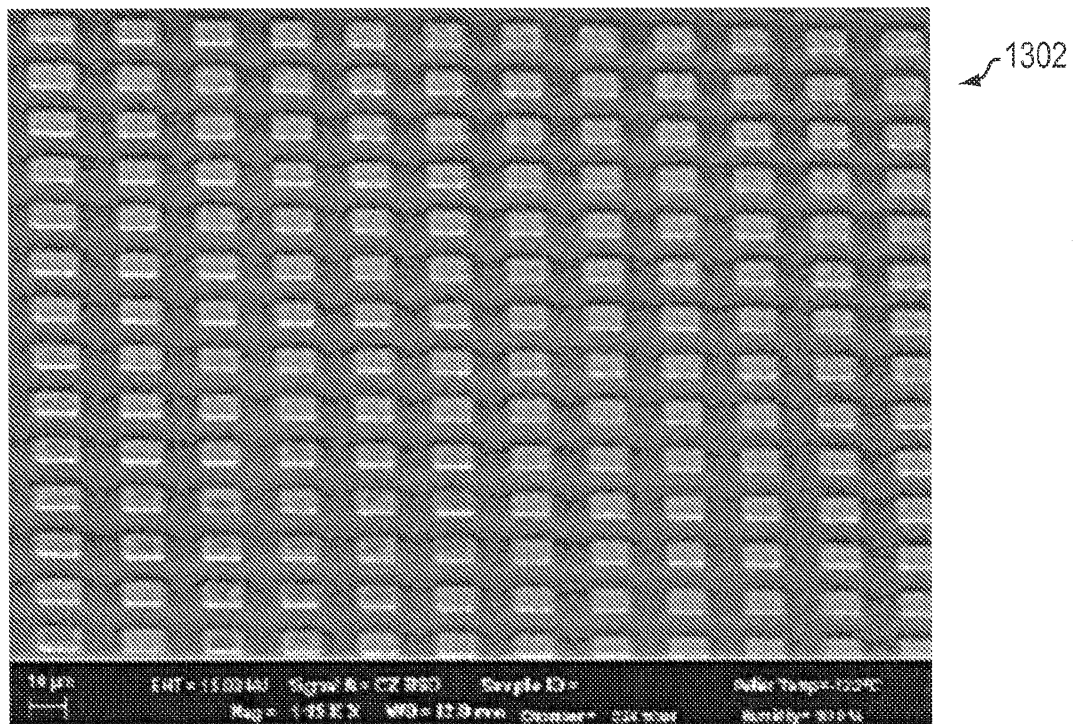


FIG. 13

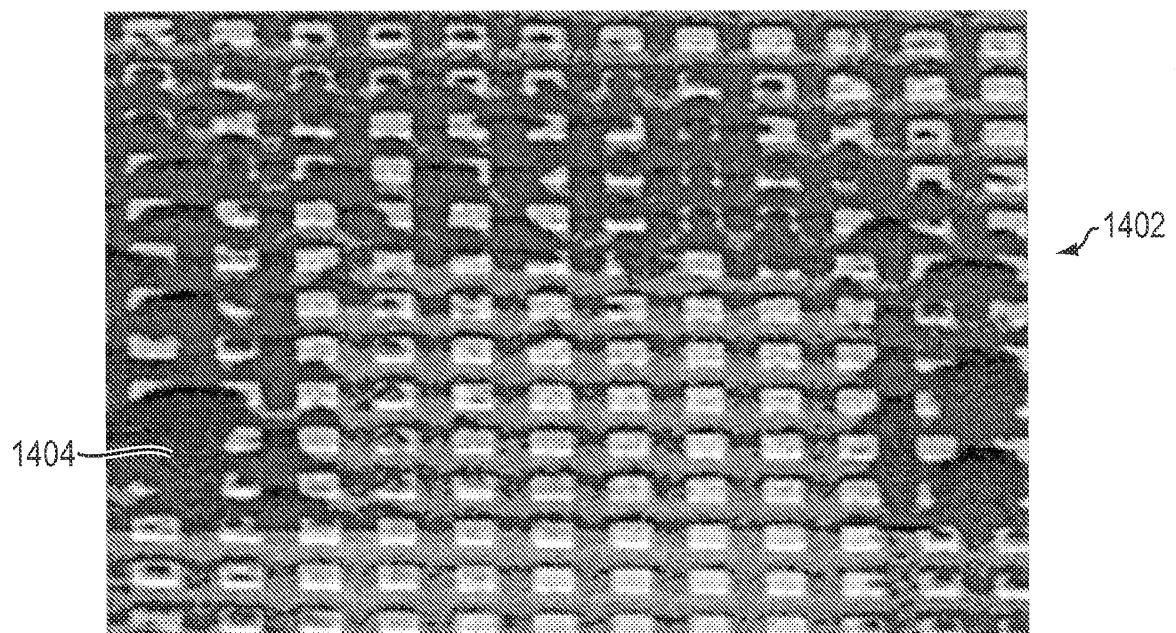
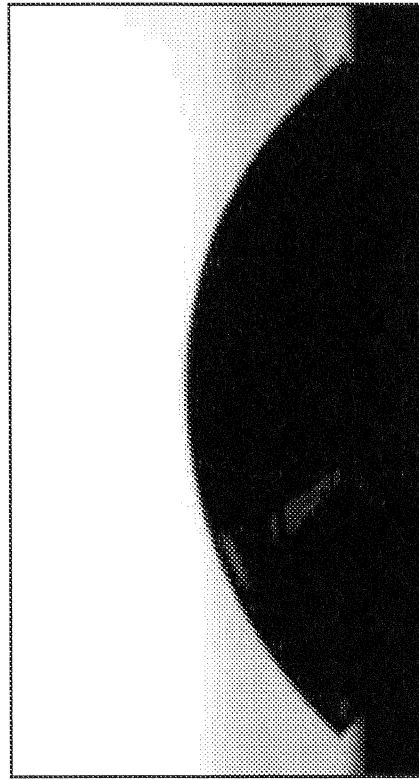


FIG. 14

EXAMPLES OF DIFFERENT STATES

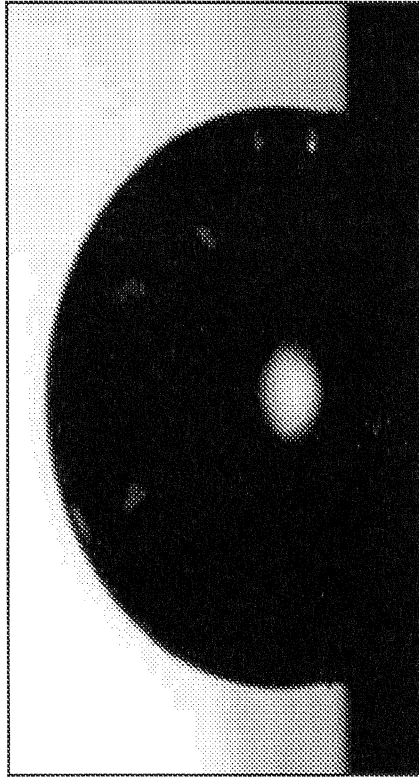
DROPLET IS WATER
IMPREGNATED LIQUID IS SILICONE OIL
SURFACE IS UNTREATED SILICON WITH
10 μ m SQUARE POSTS WITH 10 μ m SPACING



$$\theta_{OS(W)} = 150^\circ$$

IMPALED STATE 1 - LIQUID
DOES NOT ROLL OFF OF SURFACE

DROPLET IS WATER
IMPREGNATED LIQUID IS SILICONE OIL
SURFACE IS SILICON TREATED WITH OTC
HAVING 10 μ m SQUARE POSTS WITH 10 μ m SPACING

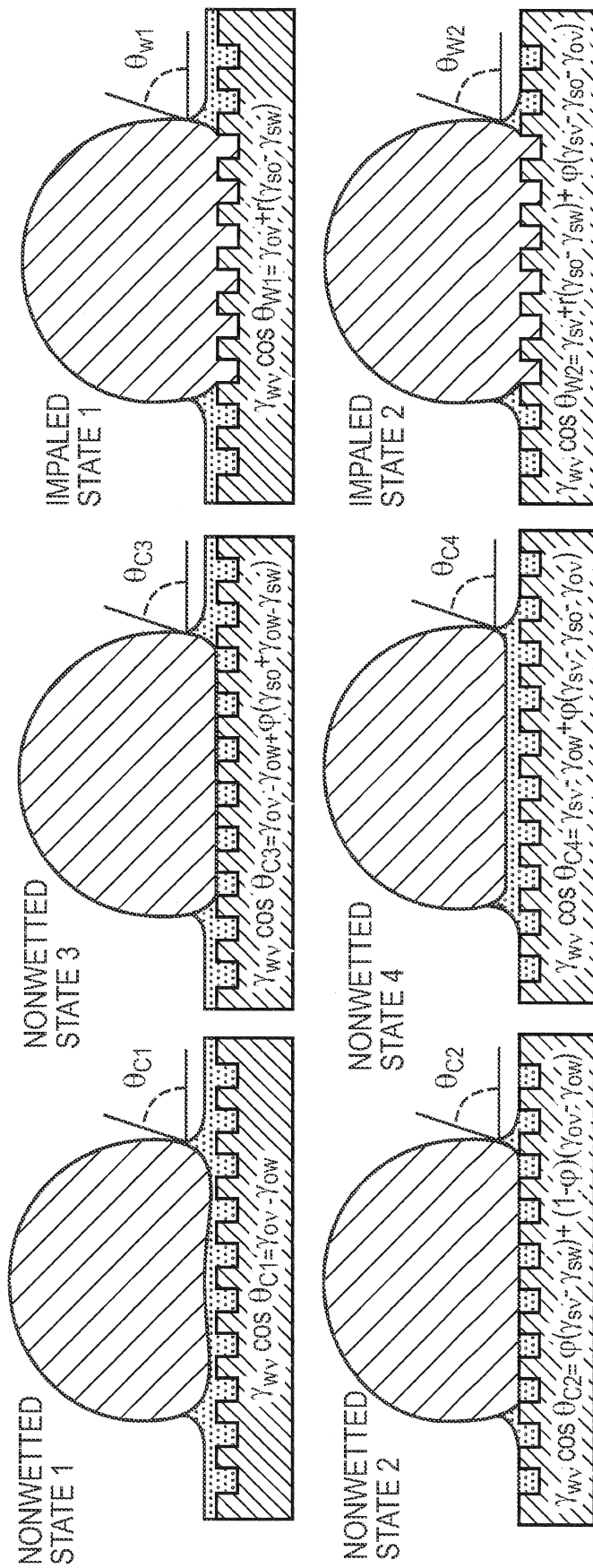


$$\theta_{OS(W)} = 0^\circ$$

NONWETTED STATE 1 - ROLL-OFF ANGLE $\sim 1^\circ$

FIG. 15

LIQUID-IMPREGNATED SURFACE WETTING STATES



STABLE WETTING STATE DETERMINED BY 4 WETTING CONDITIONS

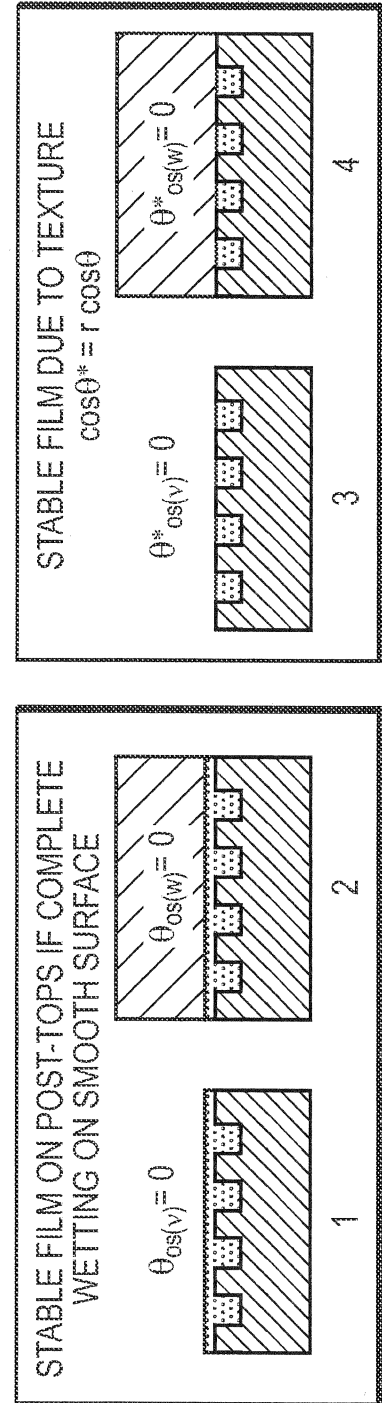


FIG. 16

EQUATIONS ENLARGED FOR CLARITY

NONWETTED
STATE 1

$$\theta_{os(v)}^* = 0$$

$$\theta_{os(w)}^* = 0$$

$$\theta_{os(v)} = 0$$

$$\theta_{os(w)} = 0$$

NONWETTED
STATE 3

$$\theta_{os(v)}^* = 0$$

$$\theta_{os(w)}^* = 0$$

$$\theta_{os(v)} = 0$$

$$\theta_{os(w)} > 0$$

IMPALED
STATE 1

$$\theta_{os(v)}^* = 0$$

$$\theta_{os(w)}^* > 0$$

$$\theta_{os(v)} = 0$$

$$\theta_{os(w)} > 0$$

NONWETTED
STATE 2

$$\theta_{os(v)}^* = 0$$

$$\theta_{os(w)}^* = 0$$

$$\theta_{os(v)} > 0$$

$$\theta_{os(w)} > 0$$

NONWETTED
STATE 4

$$\theta_{os(v)}^* = 0$$

$$\theta_{os(v)} > 0$$

$$\theta_{os(w)}^* = 0$$

$$\theta_{os(w)} = 0$$

IMPALED
STATE 2

$$\theta_{os(v)}^* = 0$$

$$\theta_{os(v)} > 0$$

$$\theta_{os(w)}^* > 0$$

$$\theta_{os(w)} > 0$$

FIG. 17