

FIG. 1

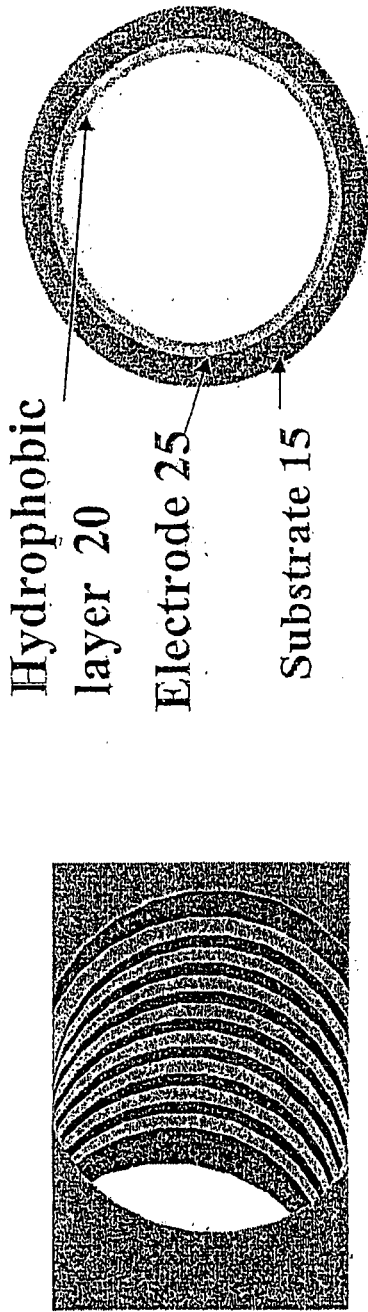


FIG. 1a: Inside wall of the pump channel 10

FIG. 1b: Cross section at the hydrophobic-electrode ring

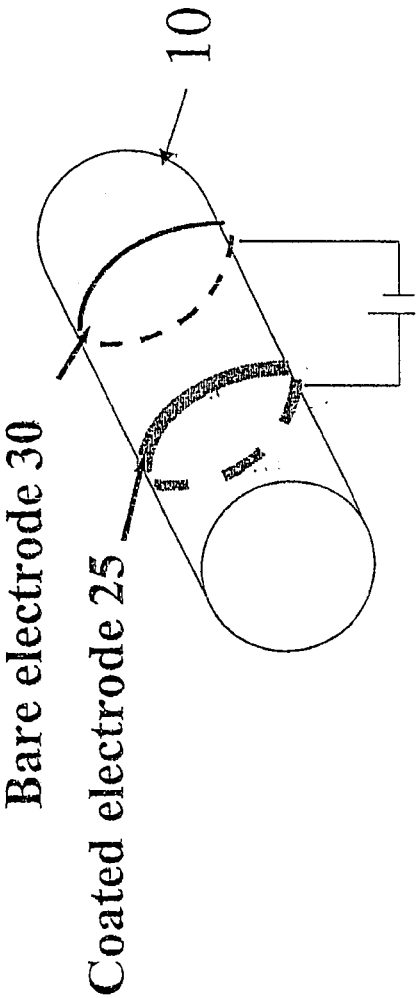


FIG. 1c: Typical arrangement of electrodes

FIG. 2a

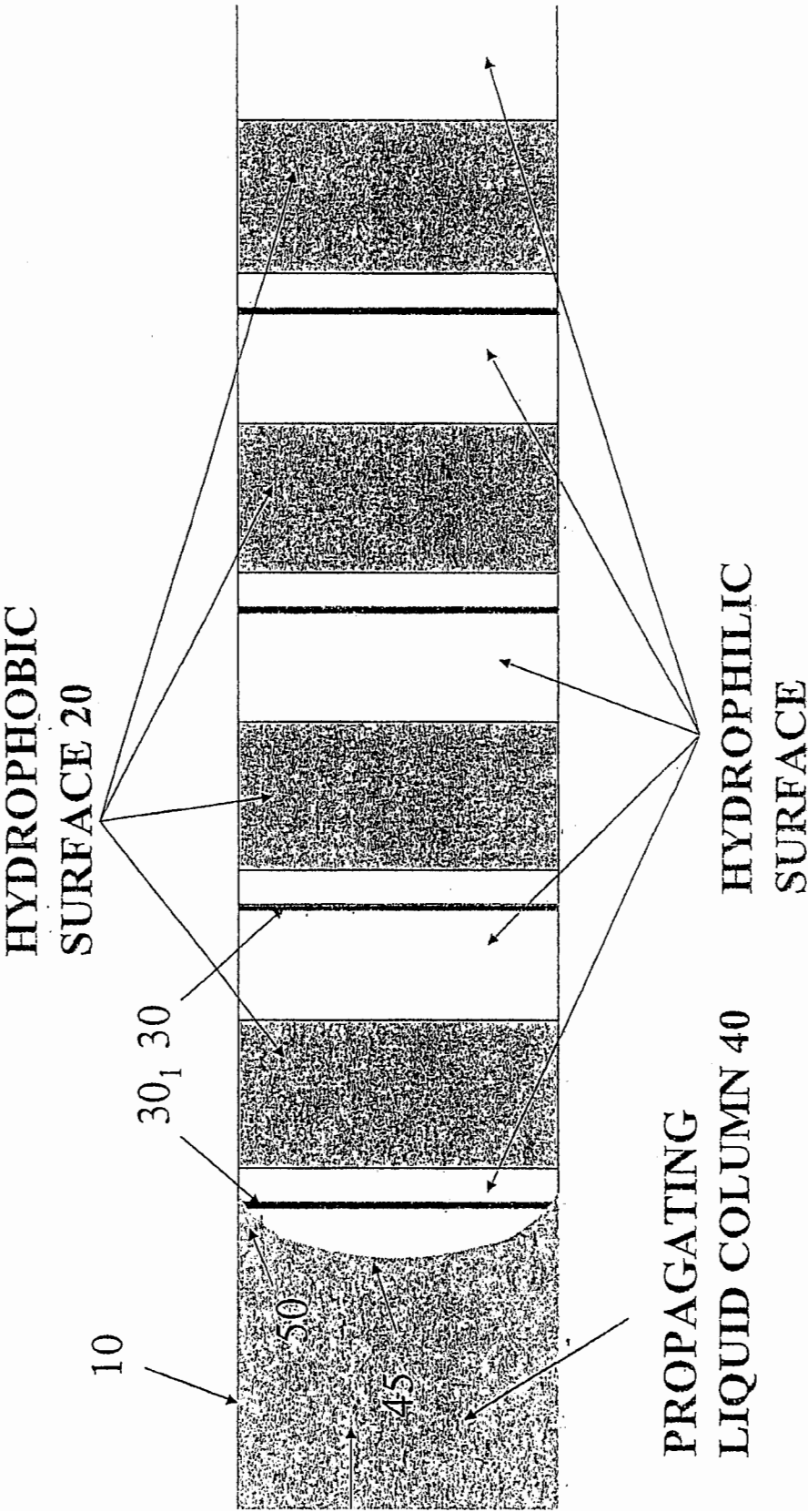


FIG. 2b

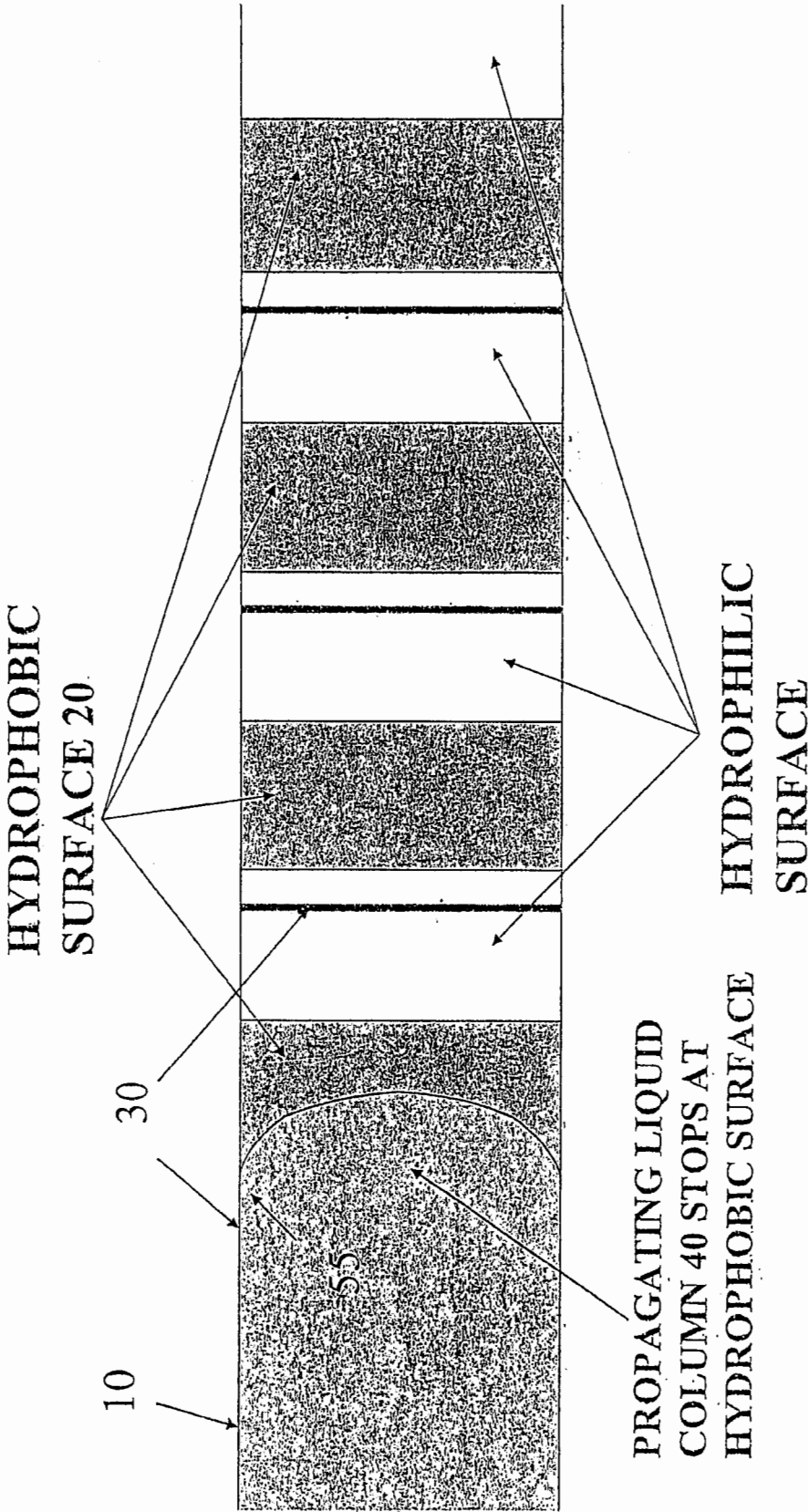
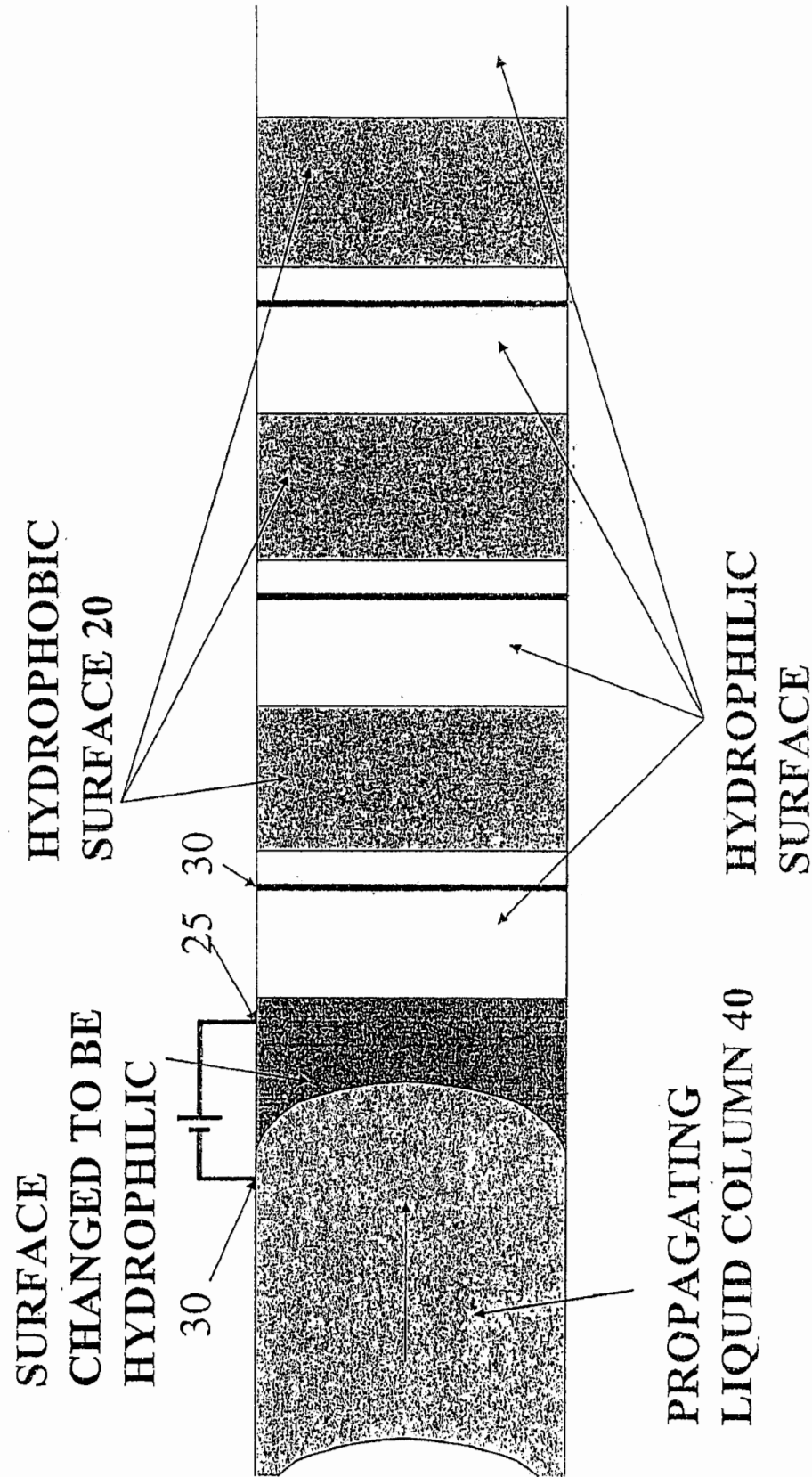


FIG. 2c



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FIG. 2d

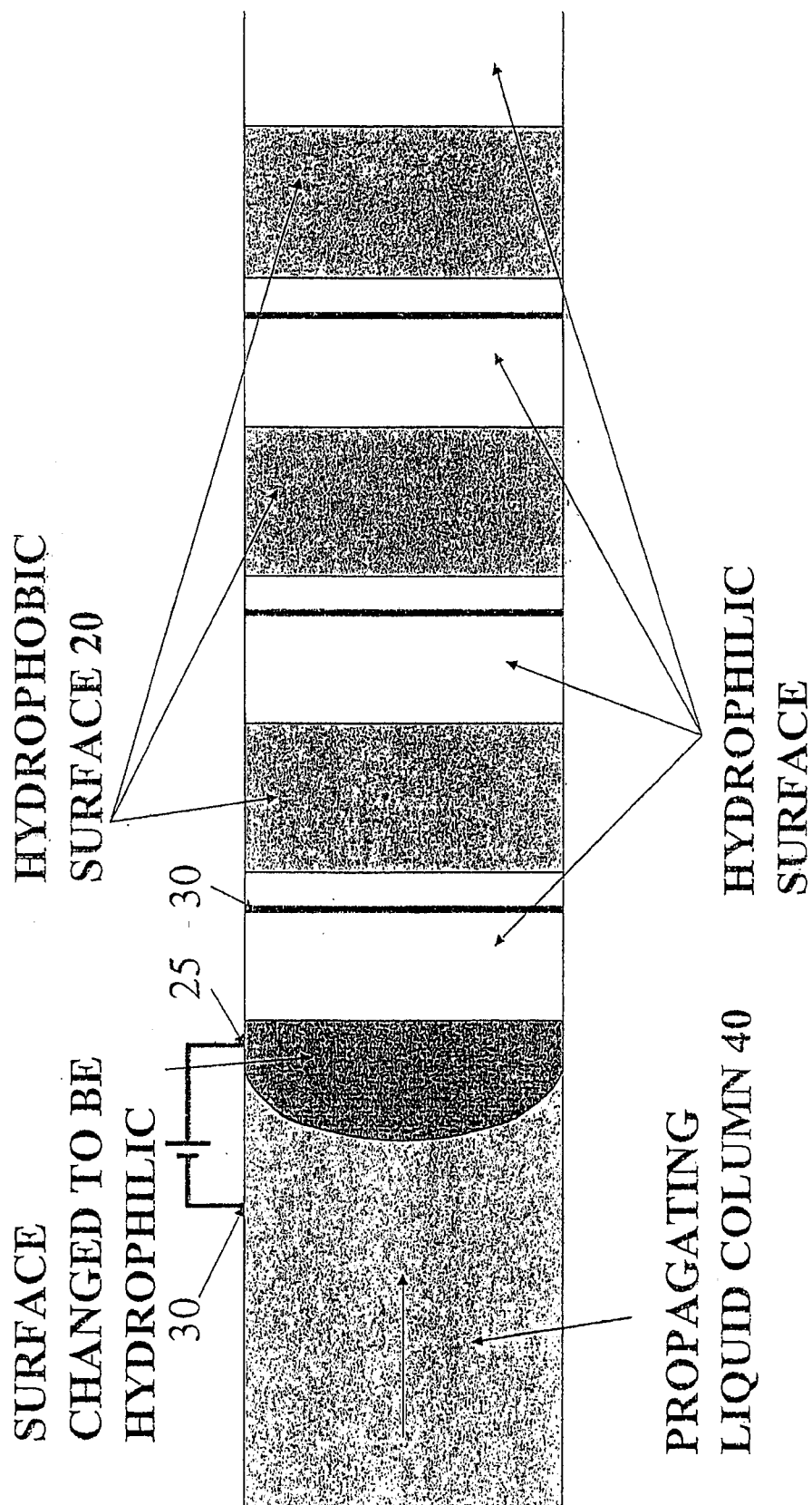


FIG. 2e

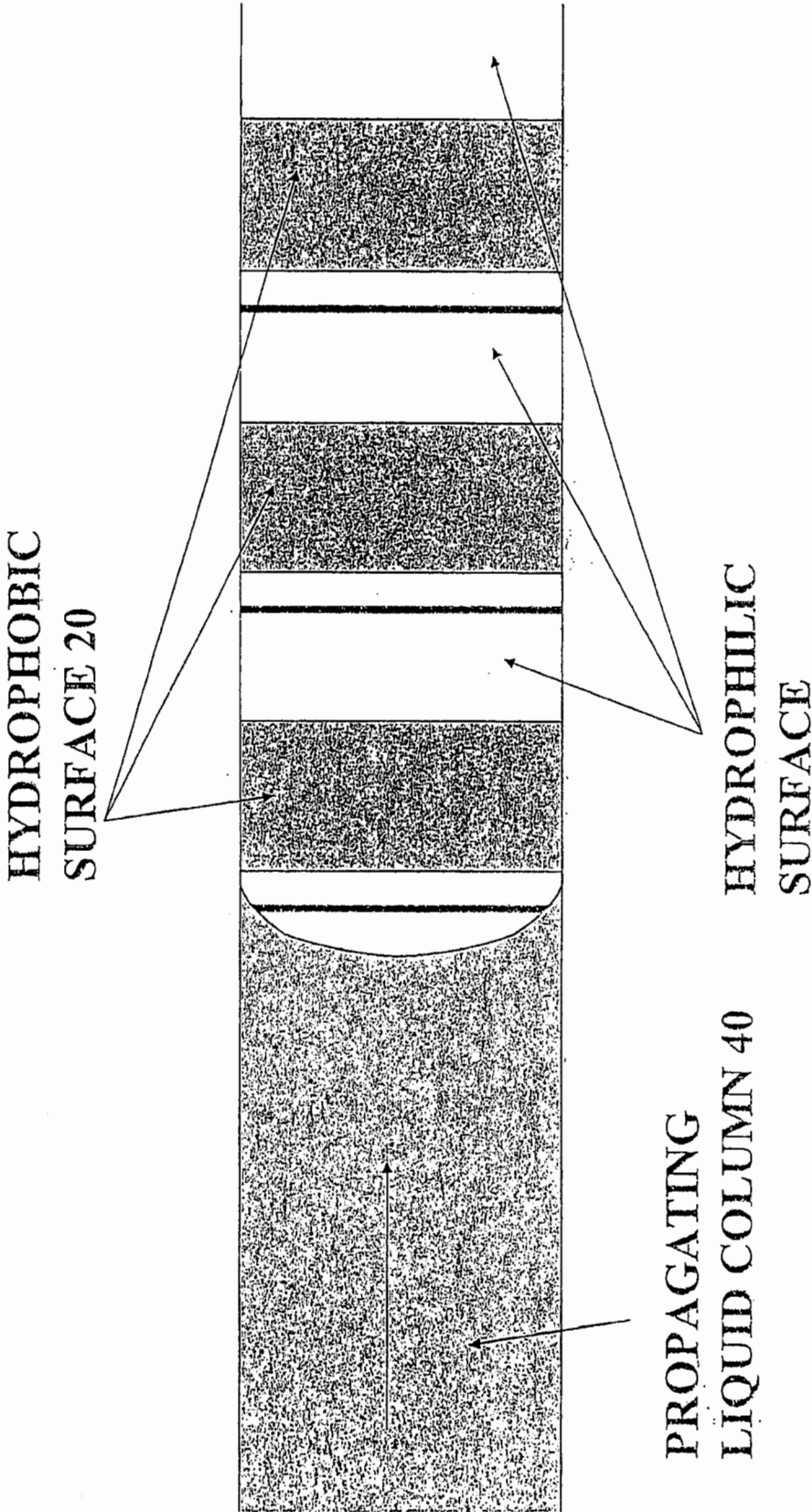


FIG. 2f

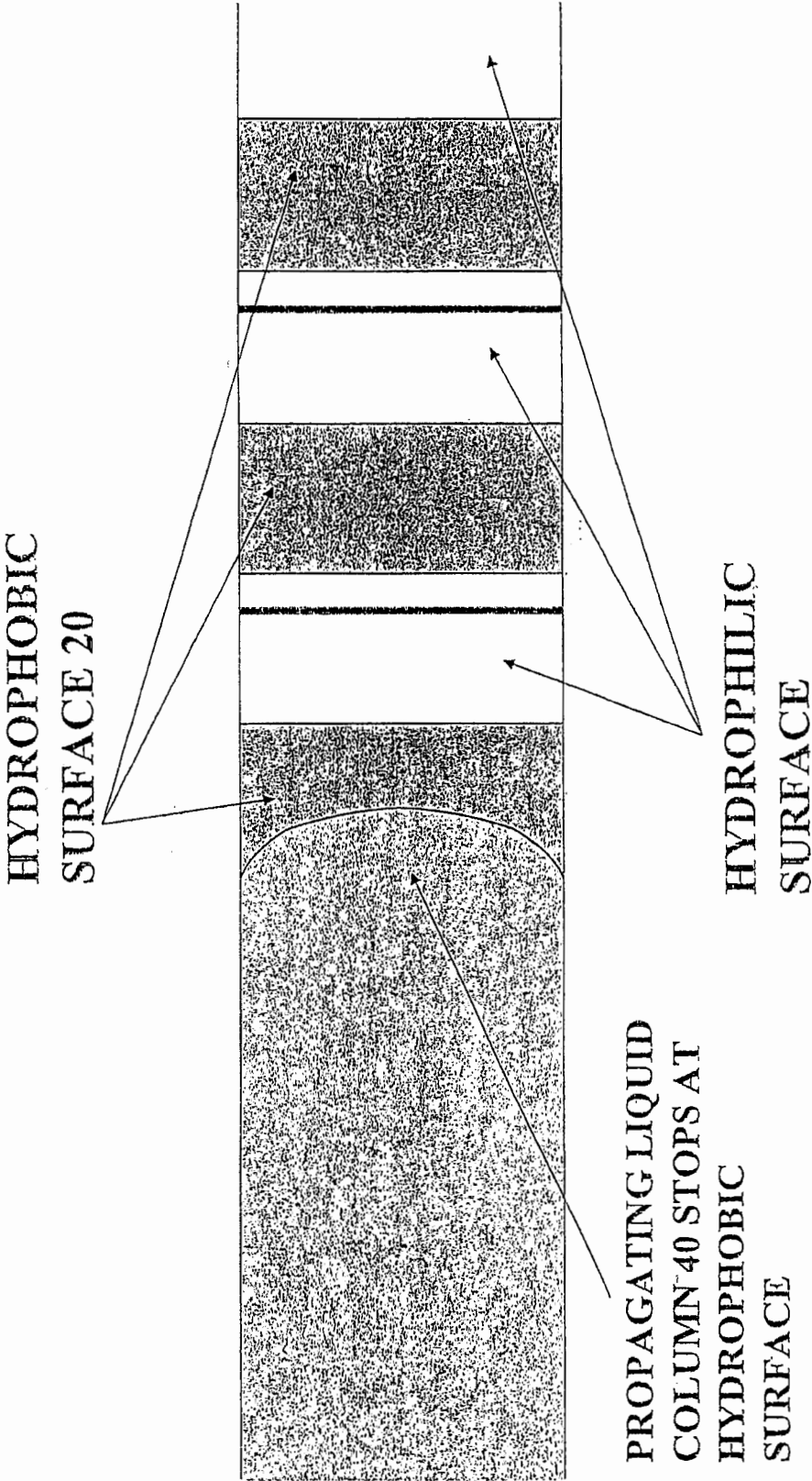
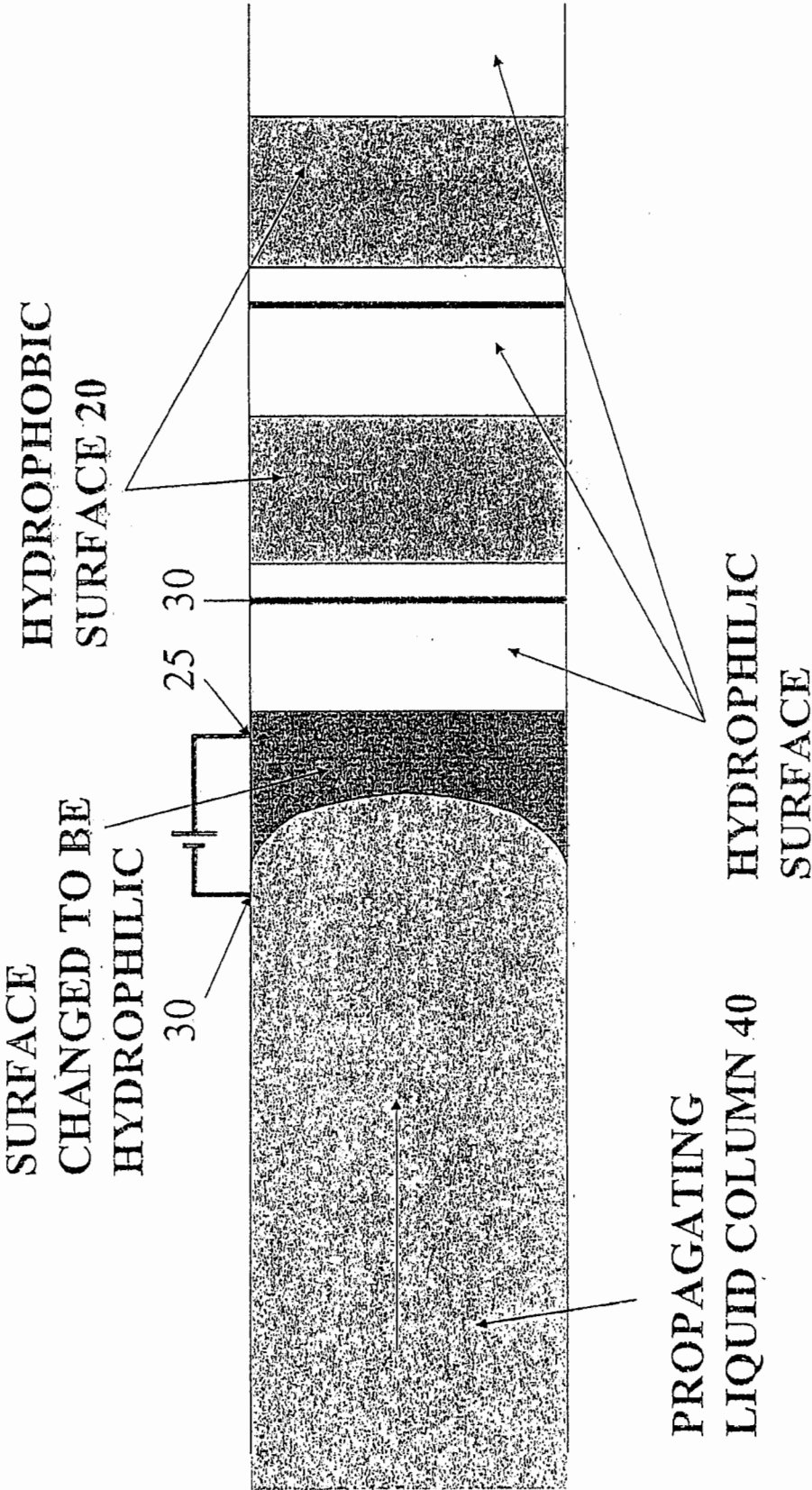


FIG. 2g



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FIG. 2h

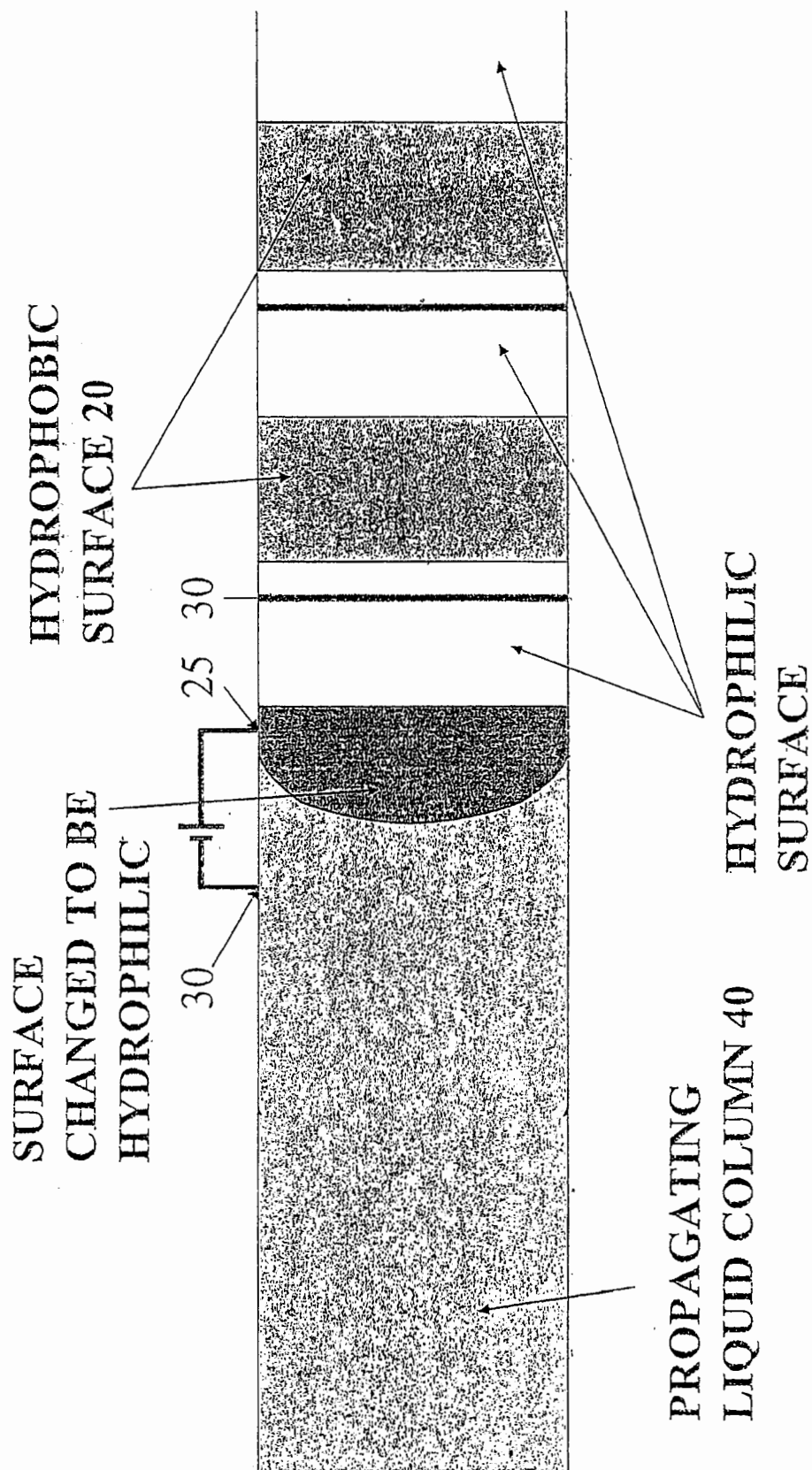
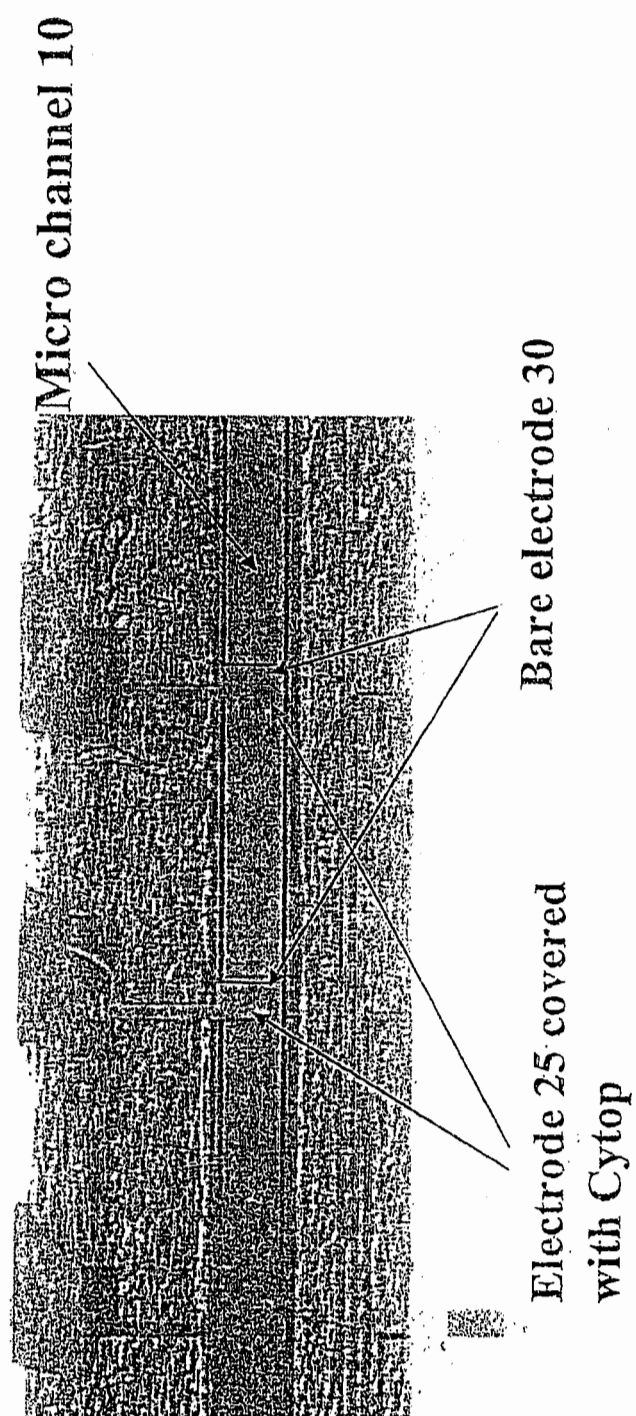
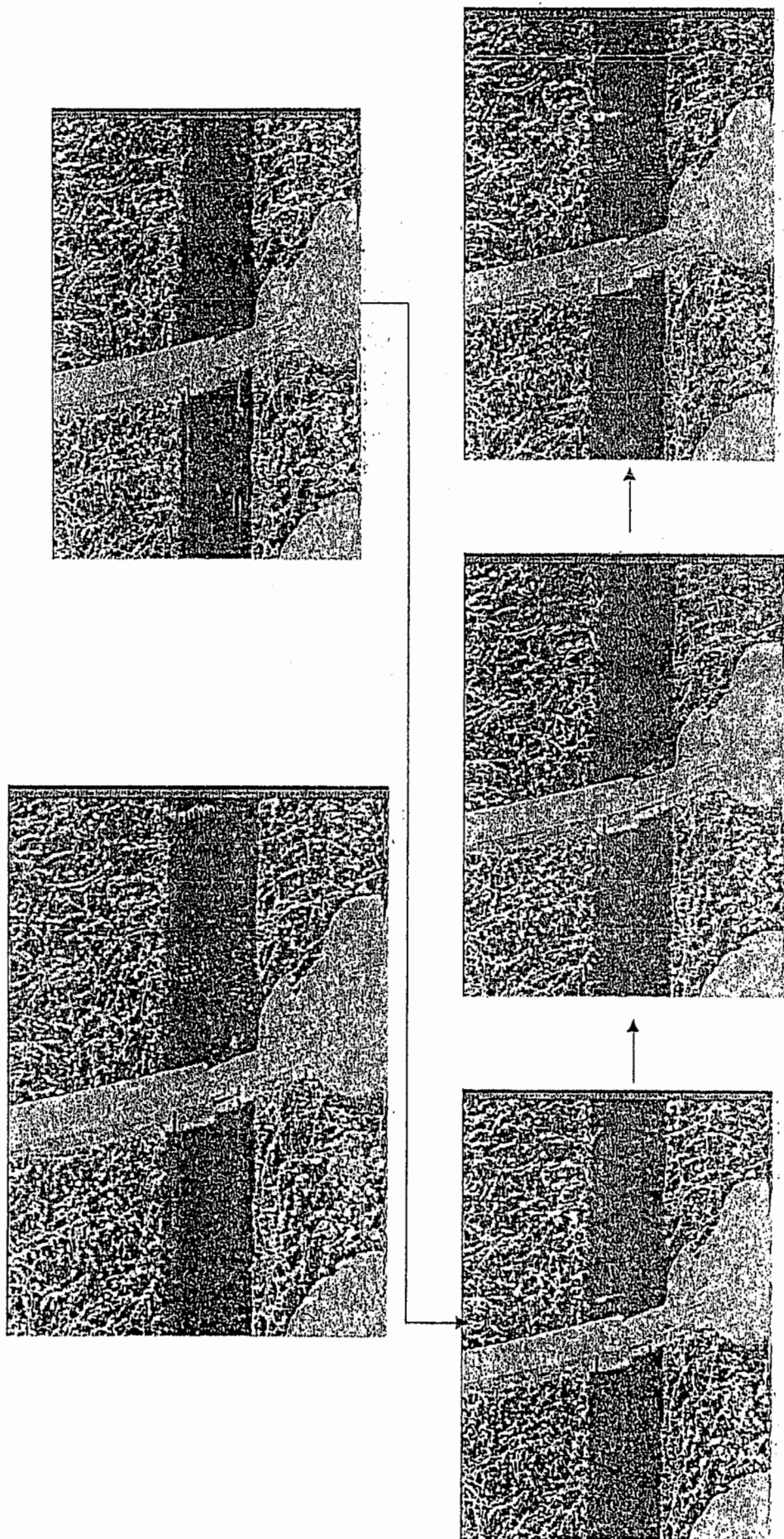


FIG. 3: A fabricated pump



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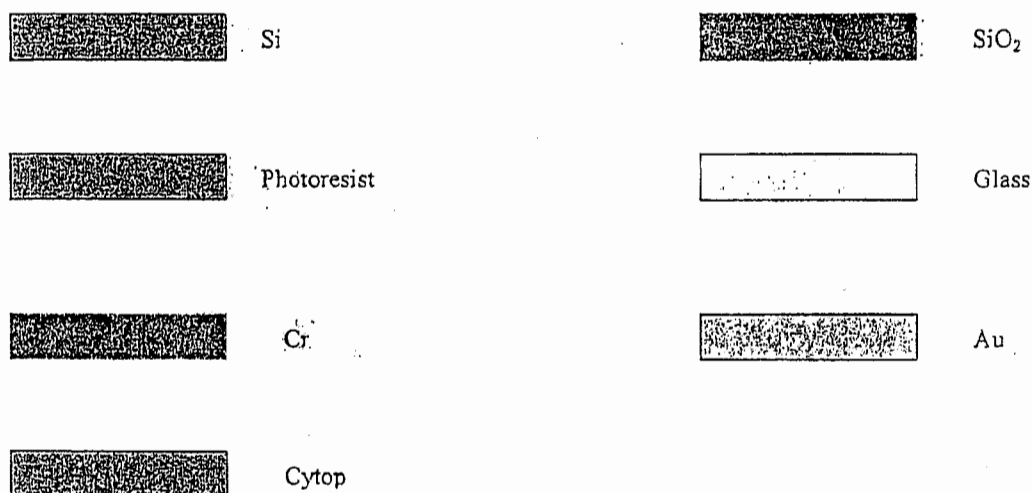
FIG. 4: Snap-shots of the pump while in operation



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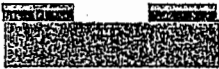
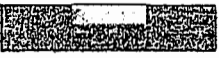
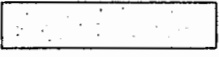
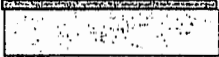
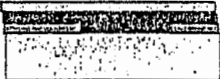
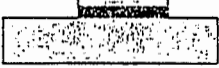
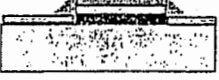
FIG. 5:

Fabrication Process Example



Schematics	Process Description
	1. Piranha cleaning the bared silicon wafer;
	2. Dry oxidation to obtain a layer of SiO ₂ of 1um thick;
	3. Spin coating the photoresist (Shipley SPR220-3.5);
	4. Photolithography to transfer the channel pattern to the photoresist and develop it in the developer; clean with running DI water;

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	5. BHF etching to open window in the SiO ₂ layer;
	6. Photoresist stripping;
	7. Wet etching (KOH, 30%, 60°C) the Si substrate to the depth of 50um;
	8. BHF etching to remove the residual SiO ₂ ; Channel was formed in Si.
	9. Standard cleaning for the glass wafer;
	10. Photoresist spin coating;
	11. Photolithography and develop to transfer the electrode pattern to the photoresist;
	12. Cr and Au deposition;
	13. Lift-off using ultrasonic cleaning; Electrodes were formed on glass.
	14. Spin coat Cytop;

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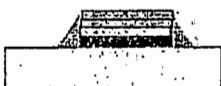
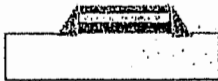
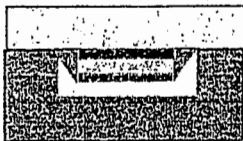
	15. Spin coat photoresist;
	16. Photolithography and develop to transfer the hydrophobic layer pattern to the photoresist;
	17. Remove the residual Cytop by RIE etching;
	18. Photoresist stripping;
	19. Anodic bonding to assembly the glass and Si wafer.

FIG. 6:

