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United States Patent [19]

Savant

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ABSTRACT

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A surface light shaping diffuser (LSD) is formed from a monolithic glass material by recording light shaping structures on a surface of the material during its formation. A surface LSD is produced by embossing or molding light shaping structures onto a high quality optical glass or by embossing light shaping structures on a glass film layer coated onto a substrate. A rubber submaster carrying the light shaping structures is used as the master in such diffusers control the angular spread of transmitted light while homogenizing otherwise spatially noisy light sources such as LCDs and filamented light sources and while maintaining damage thresholds consistent with any glass optical element. The surface LSD has a transmission effi-

through the physical spectrum and into the near-infrared. 23 Claims, 8 Drawing Sheets

ciency of over 90% from the Ultraviolet wavelengths

[54] HIGH EFFICIENCY MONOLITHIC GLASS LIGHT SHAPING DIFFUSER AND METHOD **OF MAKING** [75] Inventor: Gajendra D. Savant, Torrance, Calif. Assignee: Physical Optics Corporation, Torrance, Calif. Appl. No.: 09/139,379 [22] Filed: Aug. 25, 1998 Related U.S. Application Data Continuation-in-part of application No. 08/902,415, Jul. 29, [51] [52] [56] References Cited

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PROCESS FOR CASTING PHOTOSENSITIVE GLASS LSDs

30 SI(OEt)4+ EIOH + H₂O + HCI + PHOTOSENSITIZER Sol-Gel Solution

32 MIXING AT ROOM TEMPERATURE

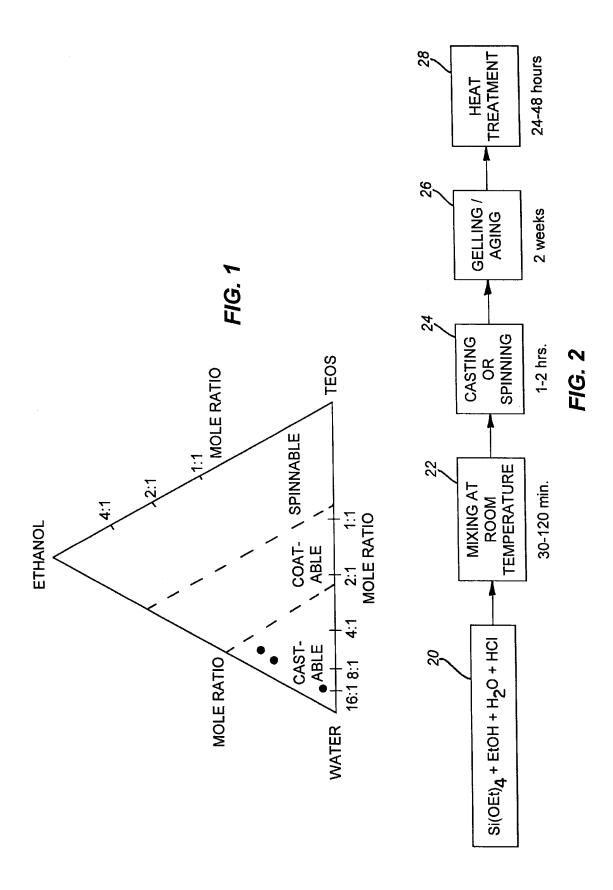
34 CASTING WITH 1-2 hrs.

40 FIXING LSD PATTERN HEAT TREATMENT

42 CONSOLIDATE LSD GLASS

24-48 hrs.





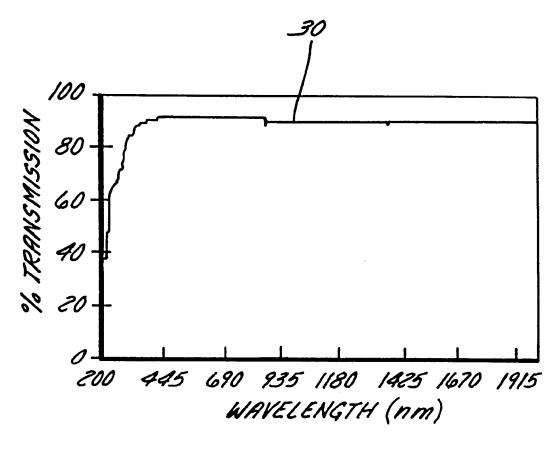


FIG. 3

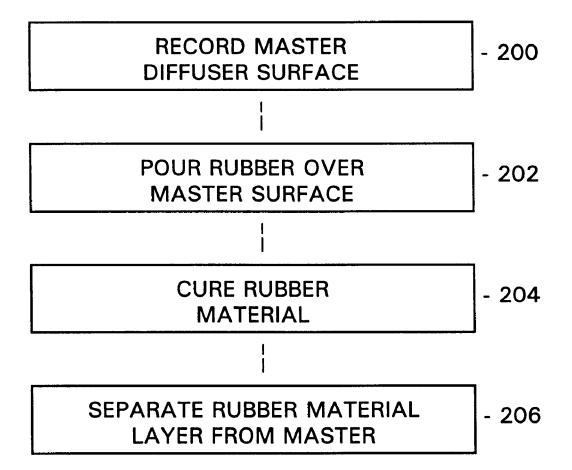


FIG. 4

COATING PROCESS FOR GLASS LSDs

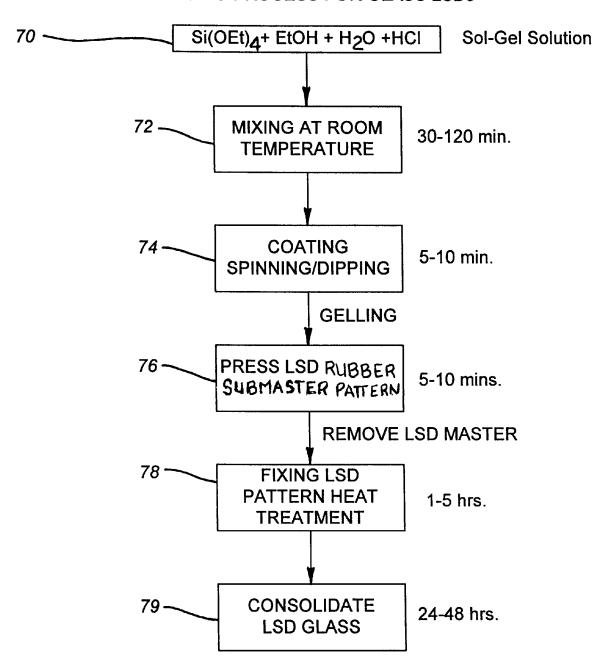


FIG. 5

DOCKET

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