



[54] FLAT LIGHT SOURCE USING LIGHT-DIFFUSING SHEET WITH PROJECTIONS THEREON

5,521,725	5/1996	Beeson et al.	362/26
5,521,797	5/1996	Kashima et al.	362/26
5,572,411	11/1996	Watai et al.	362/31
5,598,280	1/1997	Nishio et al.	362/31
5,641,219	6/1997	Mizobe	362/26

[75] Inventors: Michiko Takeuchi; Toshikazu Nishio; Taiji Ishii, all of Tokyo-To, Japan

FOREIGN PATENT DOCUMENTS

[73] Assignee: Dai Nippon Printing Co., Ltd., Japan

55-162201	9/1980	Japan	.
61-55684	3/1986	Japan	.
62-3226	1/1987	Japan	.
1-112202	4/1989	Japan	.
1-245220	9/1989	Japan	.
3-9306	1/1991	Japan	.
4-107201	9/1992	Japan	.
5-196940	8/1993	Japan	.
6-15008	2/1994	Japan	.

[\*] Notice: This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

Primary Examiner—Sandra O’Shea  
Assistant Examiner—Marshall Honeyman  
Attorney, Agent, or Firm—Parkhurst & Wendel LLP

[21] Appl. No.: 08/619,623

[57] ABSTRACT

[22] PCT Filed: Aug. 11, 1995

[86] PCT No.: PCT/JP95/01608

§ 371 Date: May 30, 1996

§ 102(e) Date: May 30, 1996

[87] PCT Pub. No.: WO96/05466

PCT Pub. Date: Feb. 22, 1996

[30] Foreign Application Priority Data

Aug. 12, 1994 [JP] Japan ..... 6-210694

[51] Int. Cl.<sup>6</sup> ..... F21V 7/04

[52] U.S. Cl. .... 362/31; 362/551

[58] Field of Search ..... 362/26, 31, 551

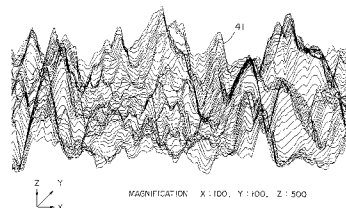
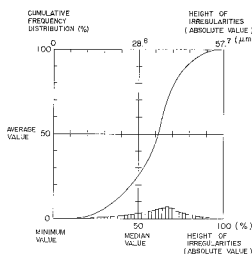
A flat light source used as back-lighting for a liquid crystal display device includes an optically conductive plate (1) having a light reflecting layer (2), and a light source (3). A light-diffusing sheet (8) is provided outside the optically conductive plate (1) opposite to the light reflecting layer (2). A lens sheet (4) is provided outside the light-diffusing sheet (8), with a transmission type of display element (6) provided on the outer side of the lens sheet (4). The light-diffusing sheet (8) is formed of a transparent material free from light-diffusing agent particles and has minute irregularities (41) formed at random on the front surface thereof. The irregularities are of a surface roughness that is at least the wavelength of the light from the light source, but is no more than 100 μm. When the percentage of the cumulative frequency distribution of the heights of the minute irregularities are plotted along the Y-axis and the heights of these minute irregularities are plotted along the X-axis, the cumulative frequency distribution curve has a convex portion oriented towards the lower side of the coordinates and the average value of the heights of the minute irregularities is greater than the median value thereof. Thus, a flat light source is provided which emits highly luminant light uniformly within a predetermined angular range, and which has no local differences in intensity over the surface thereof.

[56] References Cited

U.S. PATENT DOCUMENTS

4,729,067	3/1988	Ohe	362/26
4,729,068	3/1988	Ohe	362/26
4,775,222	10/1988	Ohe	362/26
4,998,804	3/1991	Horiuchi	362/26
5,262,928	11/1993	Kashima et al.	362/26
5,289,351	2/1994	Kashima et al.	362/26
5,408,388	4/1995	Kobayashi et al.	362/26
5,442,523	8/1995	Kashima et al.	362/26
5,467,208	11/1995	Kokawa et al.	362/26
5,467,417	11/1995	Nakamura et al.	362/26

11 Claims, 20 Drawing Sheets



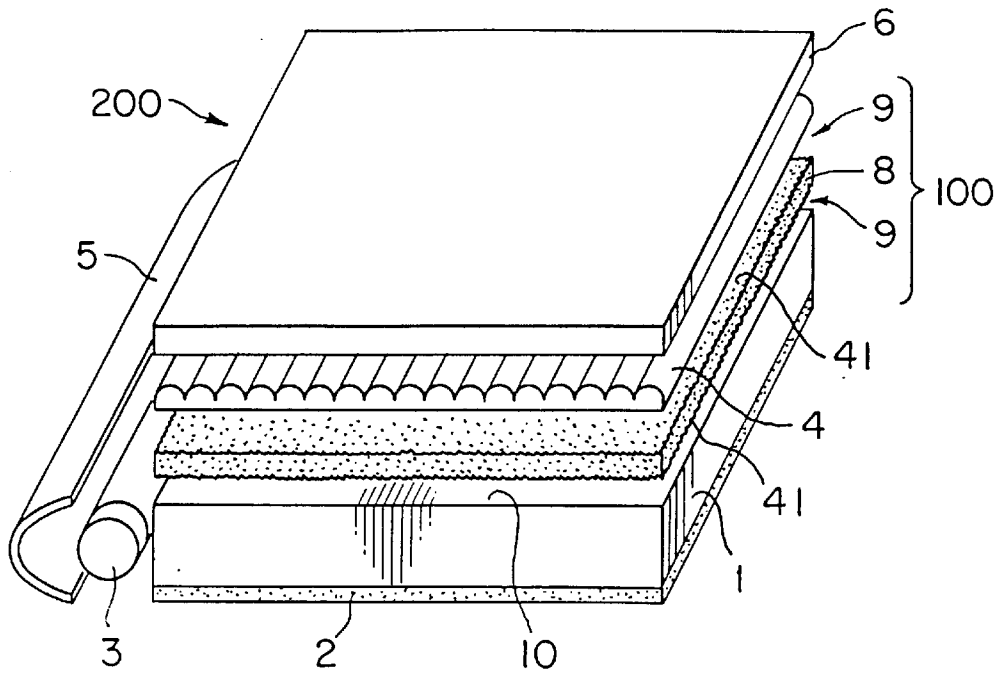


FIG. 1

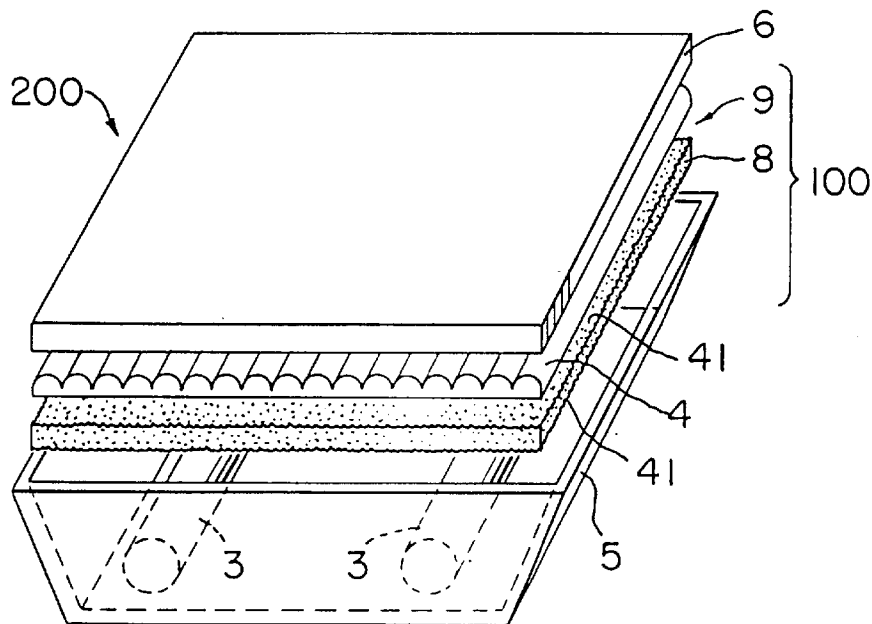


FIG. 2

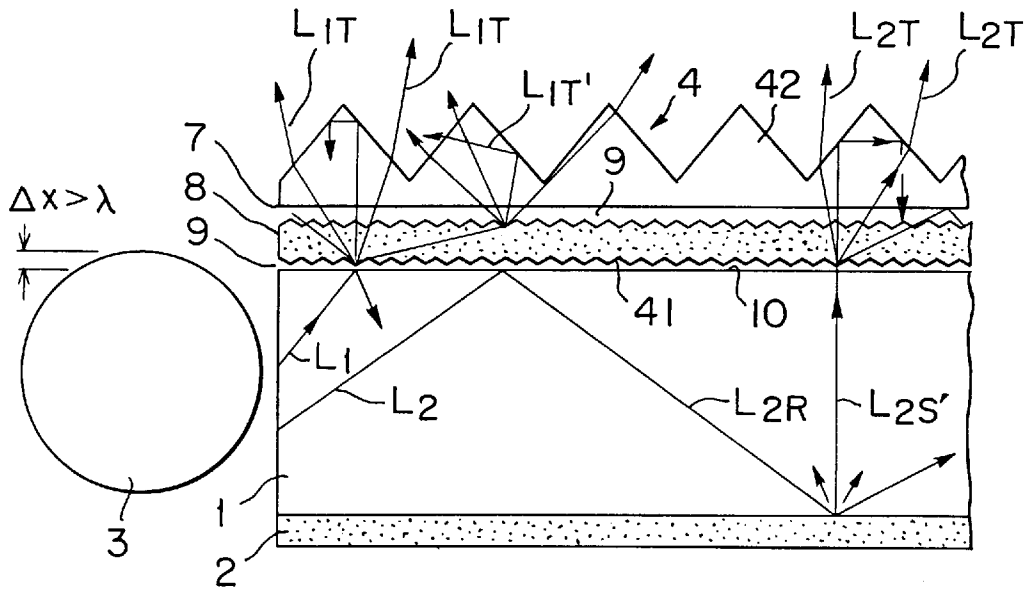


FIG. 3

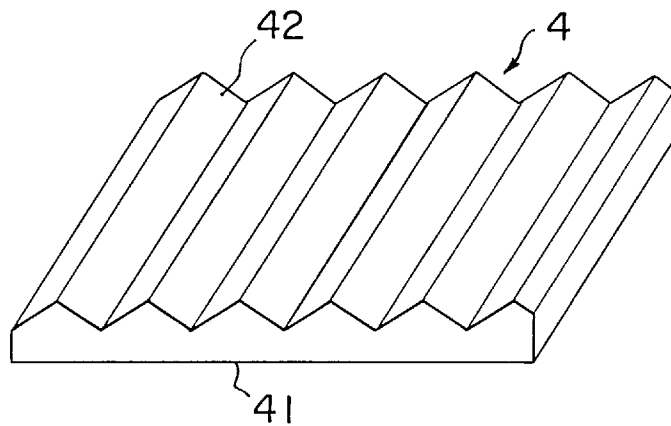


FIG. 4

FIG. 5

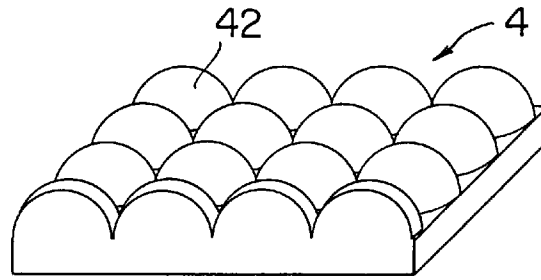


FIG. 6

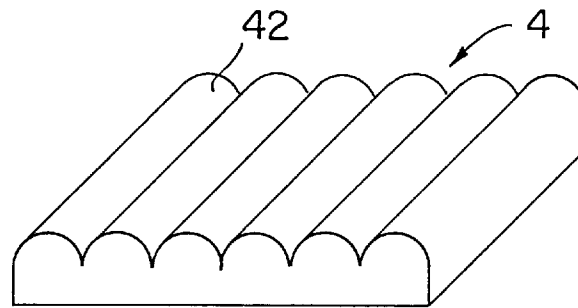


FIG. 7

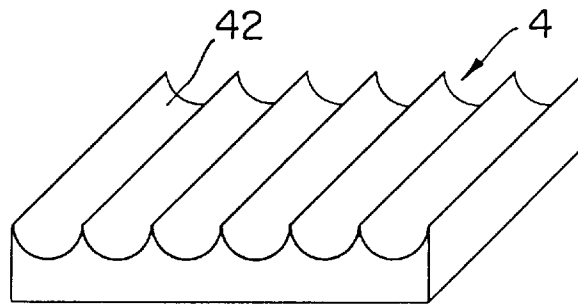
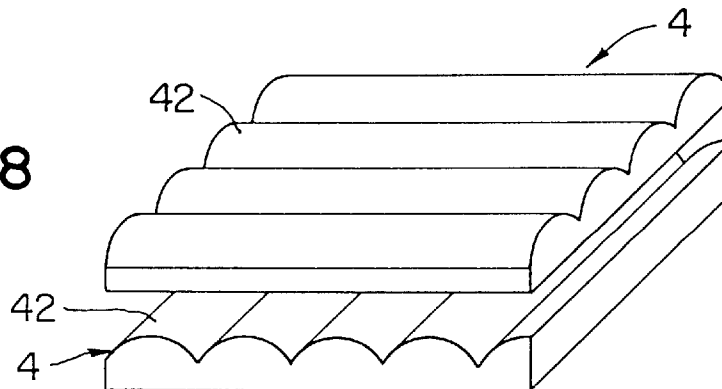


FIG. 8



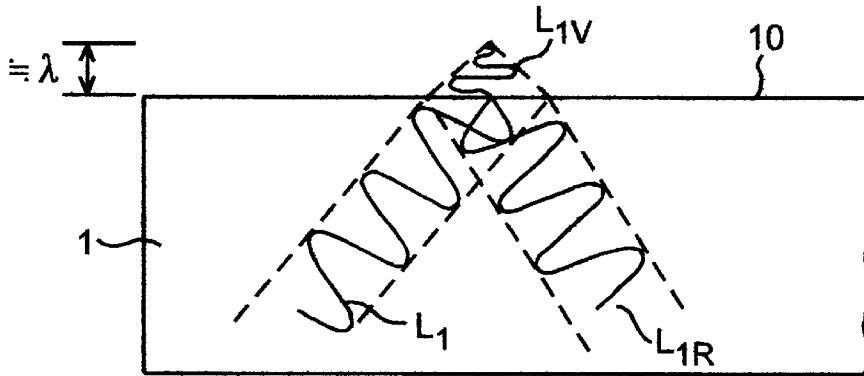


FIG. 9

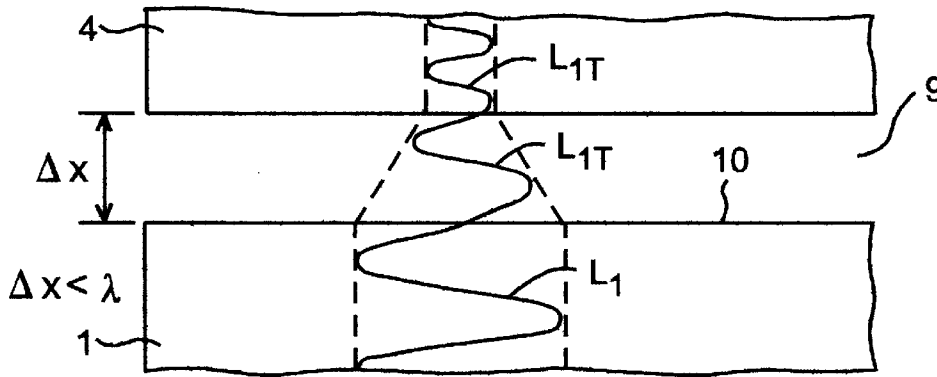


FIG. 10

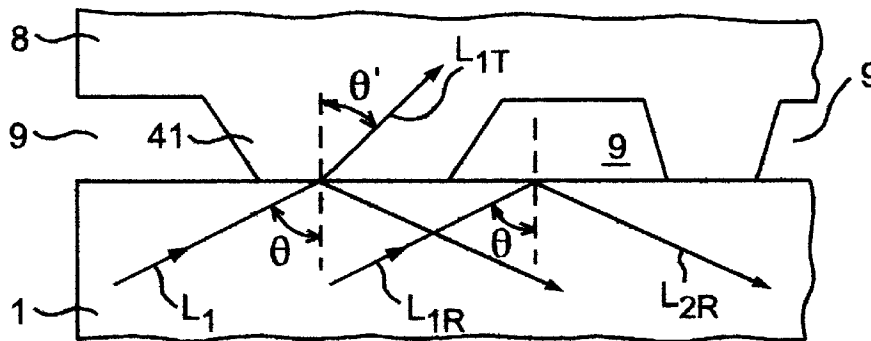


FIG. 11

# Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

## Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

## Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

## Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

## API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

## LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

## FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

## E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.