



US007434973B2

(12) **United States Patent**
Parker et al.

(10) **Patent No.:** **US 7,434,973 B2**
(45) **Date of Patent:** ***Oct. 14, 2008**

(54) **LIGHT EMITTING PANEL ASSEMBLIES**

(75) Inventors: **Jeffery R. Parker**, Strongsville, OH (US); **Gregory A. Coghlan**, Olmsted Falls, OH (US); **Robert M. Ezell**, Copley, OH (US)

(73) Assignee: **Solid State Opto Limited** (VG)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **11/673,302**

(22) Filed: **Feb. 9, 2007**

(65) **Prior Publication Data**

US 2007/0147087 A1 Jun. 28, 2007

Related U.S. Application Data

(60) Continuation of application No. 10/619,815, filed on Jul. 15, 2003, now Pat. No. 7,195,389, which is a continuation of application No. 09/256,275, filed on Feb. 23, 1999, now Pat. No. 6,712,481, which is a continuation-in-part of application No. 08/778,089, filed on Jan. 2, 1997, now Pat. No. 6,079,838, which is a division of application No. 08/495,176, filed on Jun. 27, 1995, now Pat. No. 5,613,751.

(51) **Int. Cl.**
F21V 7/00 (2006.01)

(52) **U.S. Cl.** **362/606**; 362/613; 362/618;
362/619

(58) **Field of Classification Search** 362/800,
362/606-610, 612-613, 617-620, 615, 623-629;
349/65, 63, 62

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,043,947	A	7/1962	Albinger, Jr.
3,070,913	A	1/1963	Miller
3,328,570	A	6/1967	Balchunas
3,543,014	A	11/1970	Bustad
3,571,585	A	3/1971	Schermerhorn
3,752,974	A	8/1973	Baker et al.
3,761,703	A	9/1973	Mund et al.
3,892,959	A	7/1975	Pulles
3,958,113	A	5/1976	Termohlen
4,043,636	A	8/1977	Eberhardt et al.
4,118,111	A	10/1978	Laesser
4,177,501	A	12/1979	Karlin
4,183,628	A	1/1980	Laesser
4,257,084	A	3/1981	Reynolds

(Continued)

Primary Examiner—Sandra O’Shea

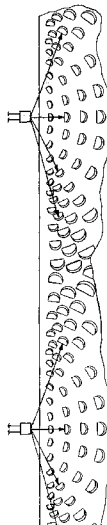
Assistant Examiner—Bao Q Truong

(74) *Attorney, Agent, or Firm*—Renner, Otto, Boisselle & Sklar, LLP

(57) **ABSTRACT**

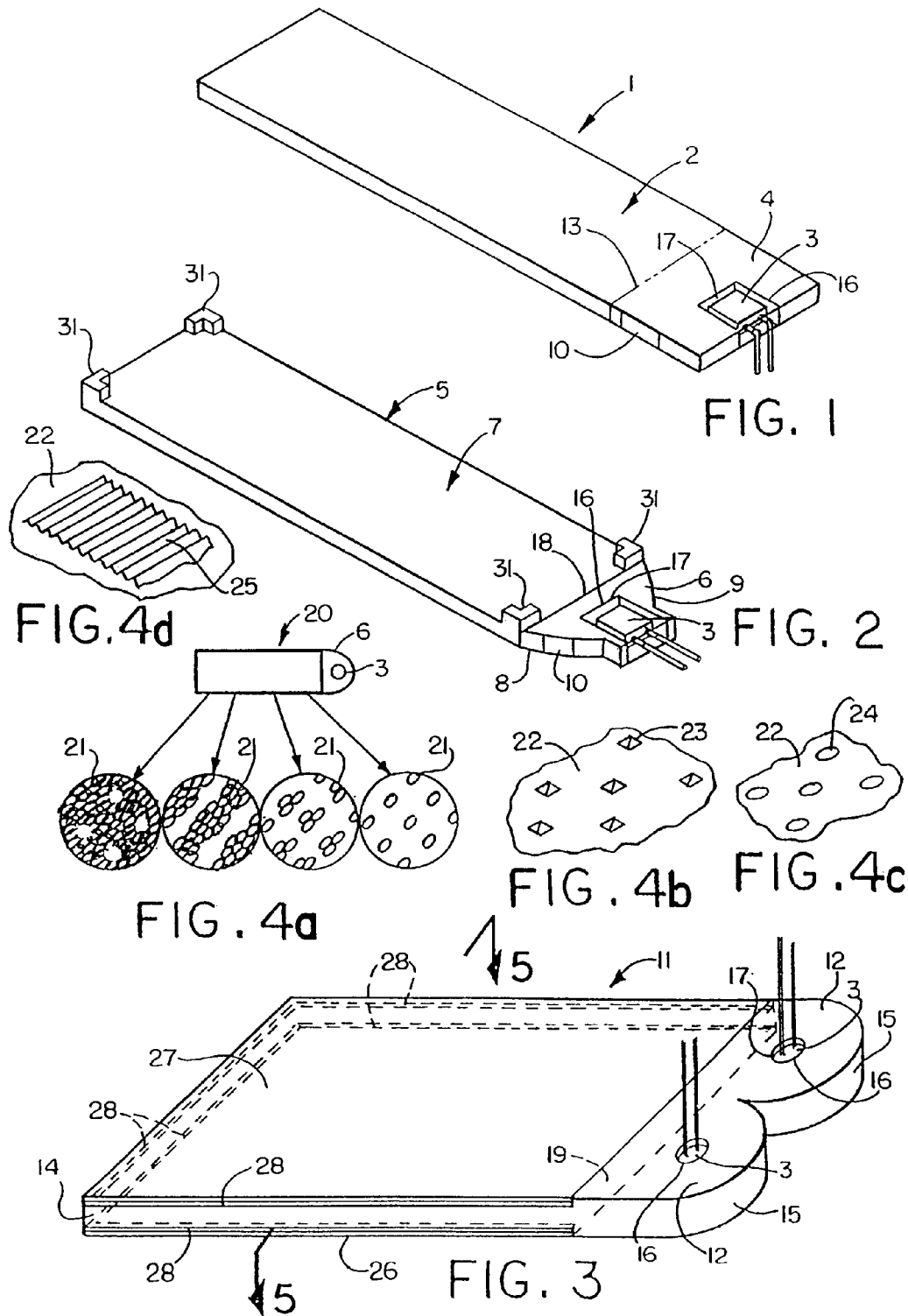
Light emitting panel assemblies include a light emitting panel member having at least one light source optically coupled to a portion of an input edge of the panel member. A plurality of individual light extracting deformities on or in at least one panel surface of the panel member are of well defined shape and have a length and width substantially smaller than the length and width of the panel surface. At least some of the deformities have at least one surface that is angled at different orientations relative to the input edge depending on the location of the deformities on the panel surface to face a portion of the input edge to which a light source is optically coupled.

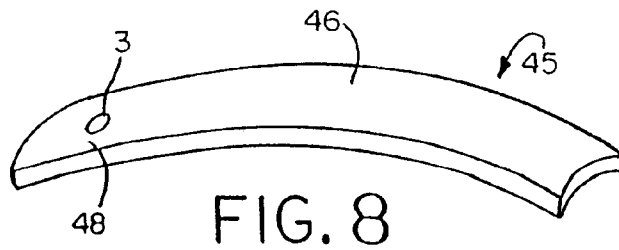
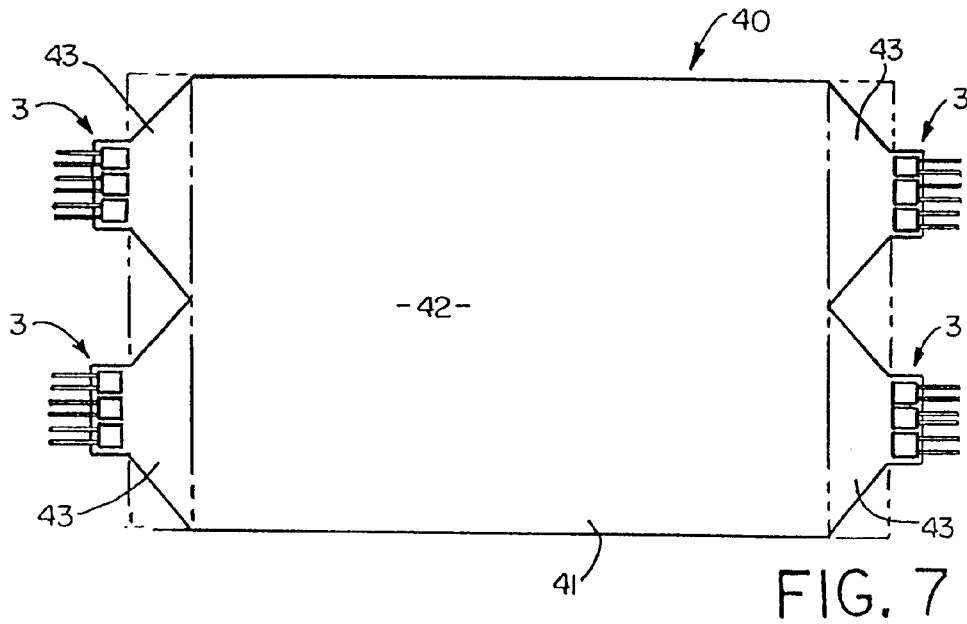
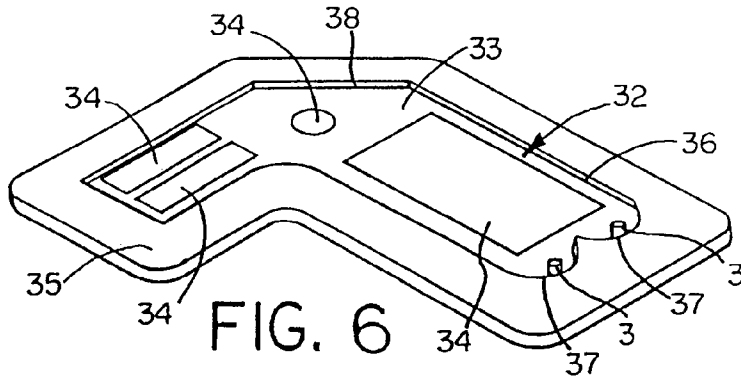
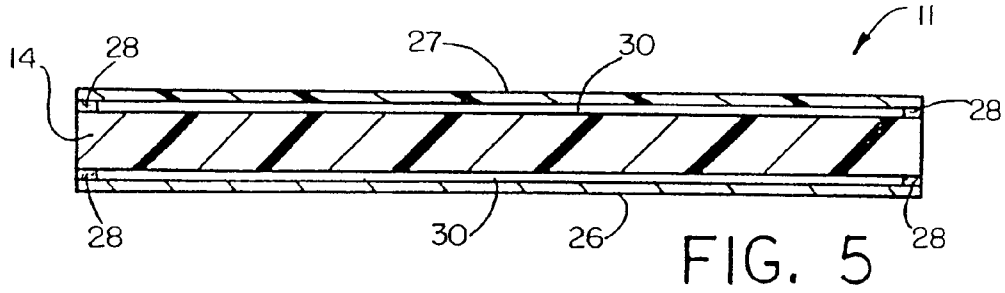
14 Claims, 14 Drawing Sheets

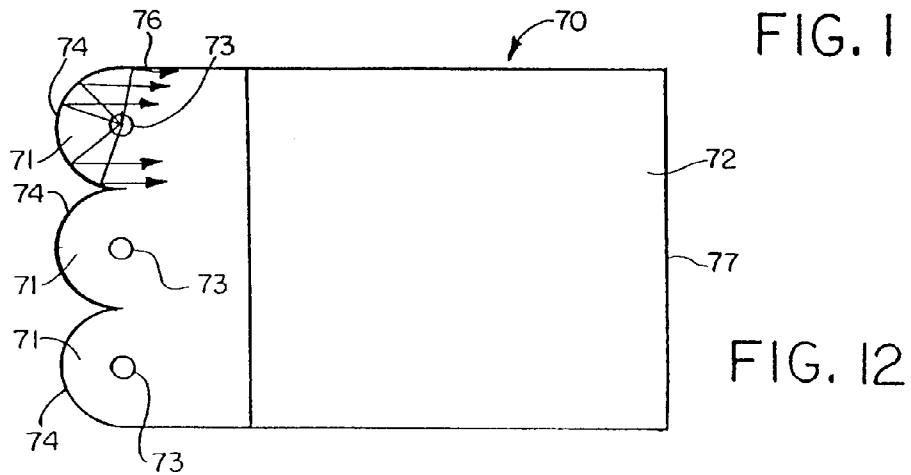
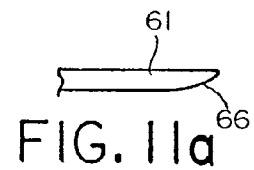
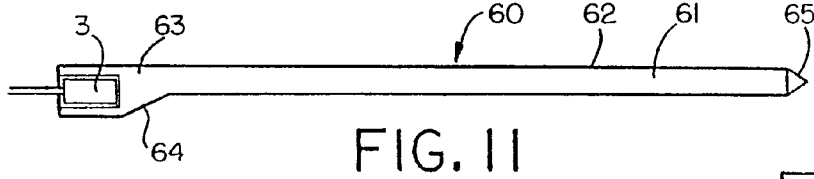
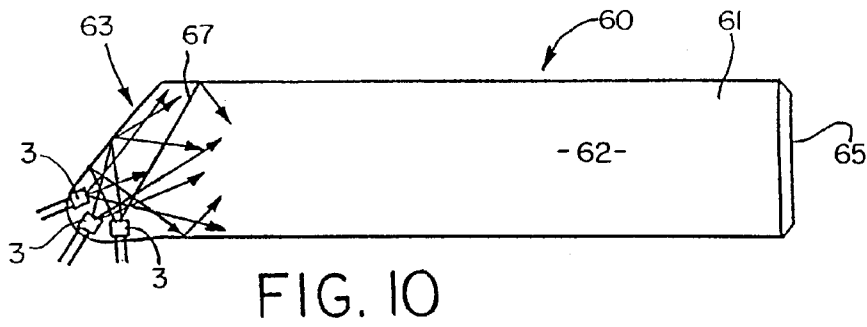
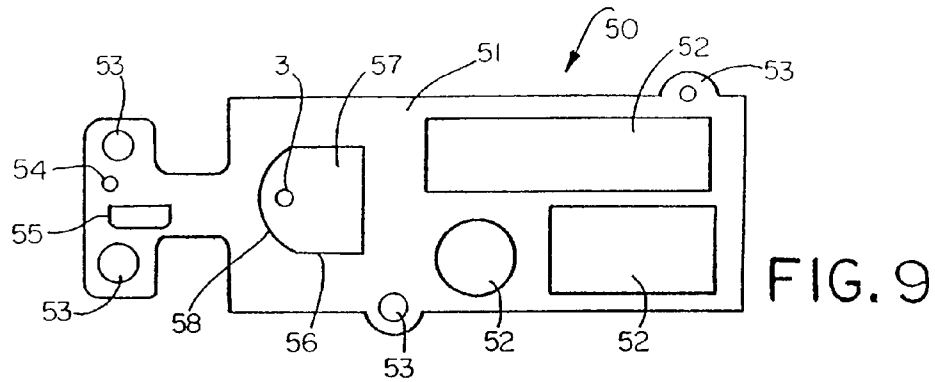


U.S. PATENT DOCUMENTS					
			5,467,208	A	11/1995 Kokawa et al.
4,282,560	A	8/1981 Kringel et al.	5,467,417	A	11/1995 Nakamura et al.
4,290,093	A	9/1981 Thompson et al.	5,485,291	A	1/1996 Qiao et al.
4,446,508	A	5/1984 Kinzie	5,506,929	A	4/1996 Tai et al.
4,460,940	A *	7/1984 Mori 362/558	5,521,342	A	5/1996 Barley et al.
4,542,449	A	9/1985 Whitehead	5,576,078	A	11/1996 Schatz
4,573,766	A	3/1986 Bournay, Jr. et al.	5,579,134	A	11/1996 Lengyel
4,630,895	A	12/1986 Abdala, Jr. et al.	5,590,945	A	1/1997 Simms
4,714,983	A	12/1987 Lang	5,598,281	A	1/1997 Zimmerman et al.
4,729,185	A	3/1988 Baba	5,600,462	A	2/1997 Suzuki et al.
4,751,615	A	6/1988 Abrams	5,618,095	A	4/1997 Kashima et al.
4,763,984	A	8/1988 Awai et al.	5,649,754	A	7/1997 Matsumoto
4,765,701	A	8/1988 Cheslak	5,664,862	A	9/1997 Redmond et al.
4,906,070	A	3/1990 Cobb, Jr.	5,671,994	A	9/1997 Tai et al.
4,974,122	A	11/1990 Shaw	5,711,592	A	1/1998 Hotta
4,975,808	A	12/1990 Bond et al.	5,719,649	A *	2/1998 Shono et al. 349/65
4,978,952	A	12/1990 Irwin	5,771,328	A	6/1998 Wortman et al.
5,005,108	A	4/1991 Pristash et al.	5,775,791	A	7/1998 Yoshikawa et al.
5,027,258	A	6/1991 Schoniger et al.	5,779,337	A	7/1998 Saito et al.
5,056,892	A	10/1991 Cobb, Jr.	5,779,338	A	7/1998 Ishikawa et al.
5,070,431	A	12/1991 Kitazawa et al.	5,808,784	A	9/1998 Ando et al.
5,093,765	A	3/1992 Kashima et al.	5,844,720	A	12/1998 Ohara et al.
5,134,549	A	7/1992 Yokoyama	5,890,791	A	4/1999 Saito
5,136,483	A	8/1992 Schoniger et al.	5,917,664	A	6/1999 O'Neill et al.
5,178,447	A	1/1993 Murase et al.	5,919,551	A	7/1999 Cobb, Jr. et al.
5,207,493	A	5/1993 Murase et al.	5,931,555	A	8/1999 Akahane et al.
5,262,928	A	11/1993 Kashima et al.	5,961,198	A	10/1999 Hira et al.
5,283,673	A	2/1994 Murase et al.	5,971,559	A	10/1999 Ishikawa et al.
5,303,322	A	4/1994 Winston et al.	6,011,602	A	1/2000 Miyashita et al.
5,307,244	A	4/1994 Gaudette	6,036,329	A	3/2000 Iimura
5,339,179	A	8/1994 Rudisill et al.	6,091,547	A	7/2000 Gardiner et al.
5,349,503	A	9/1994 Blonder et al.	6,120,280	A	9/2000 Mimura et al.
5,375,043	A *	12/1994 Tokunaga 362/601	6,130,730	A	10/2000 Jansson et al.
5,377,084	A	12/1994 Kojima et al.	6,151,169	A	11/2000 Kim
5,390,085	A	2/1995 Mari-Roca et al.	6,172,809	B1	1/2001 Koike et al.
5,394,308	A	2/1995 Watanabe et al.	7,195,389	B2 *	3/2007 Parker et al. 362/606
5,396,350	A *	3/1995 Beeson et al. 349/62			
5,442,523	A	8/1995 Kashima et al.			

* cited by examiner







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.