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

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(45) **Date of Patent:** ***Oct. 14, 2008**

- (54) **LIGHT EMITTING PANEL ASSEMBLIES**
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- (*) 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.

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F21V 7/00 (2006.01)
- (52) **U.S. Cl.** **362/606**; 362/613; 362/618; 362/619
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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

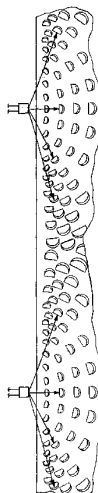
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(57) **ABSTRACT**

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.

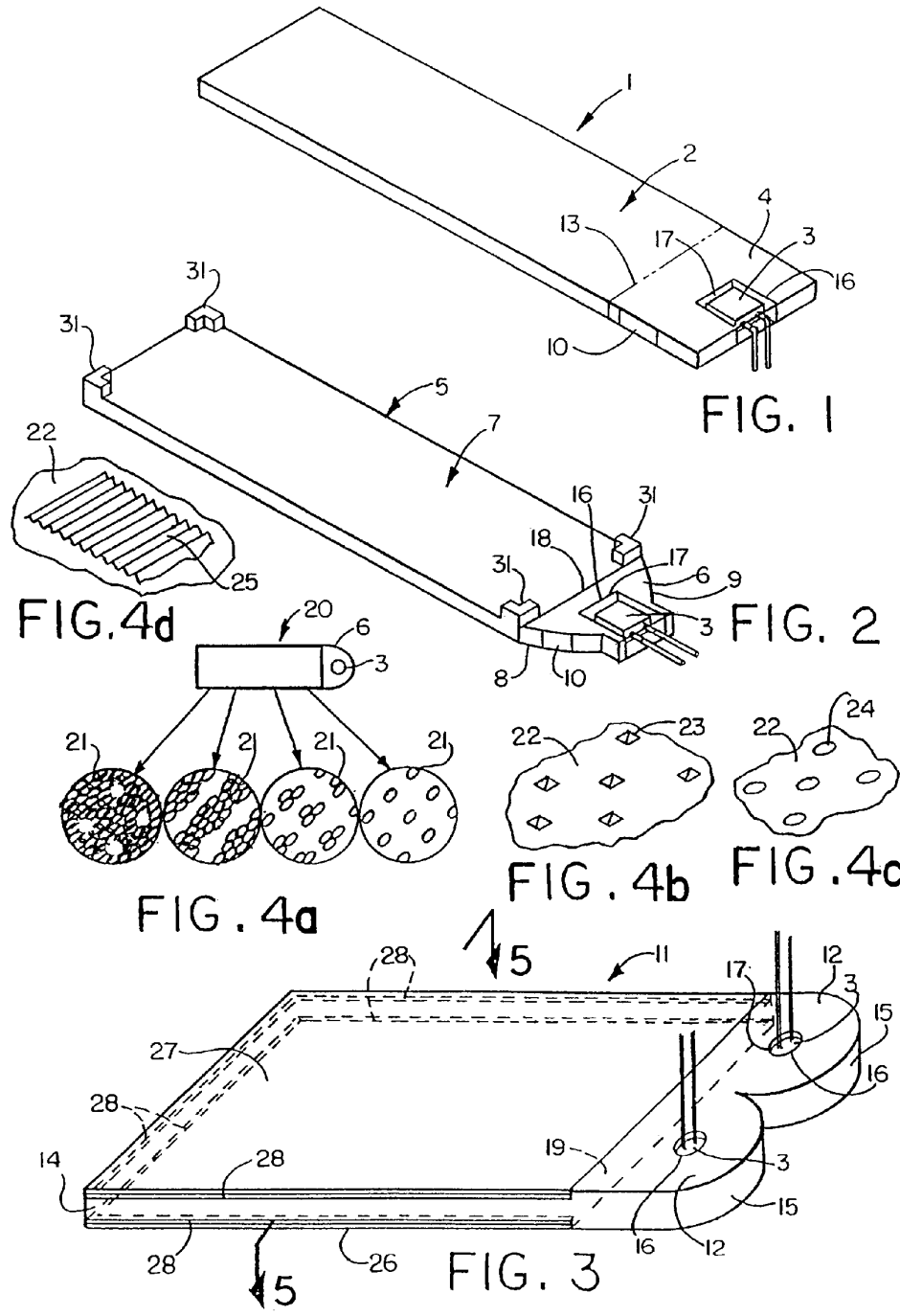
14 Claims, 14 Drawing Sheets

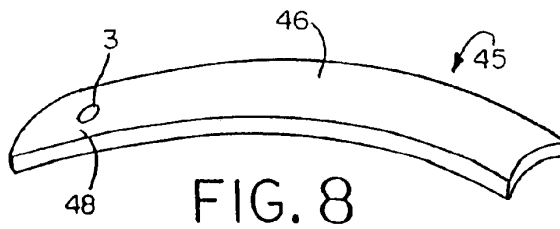
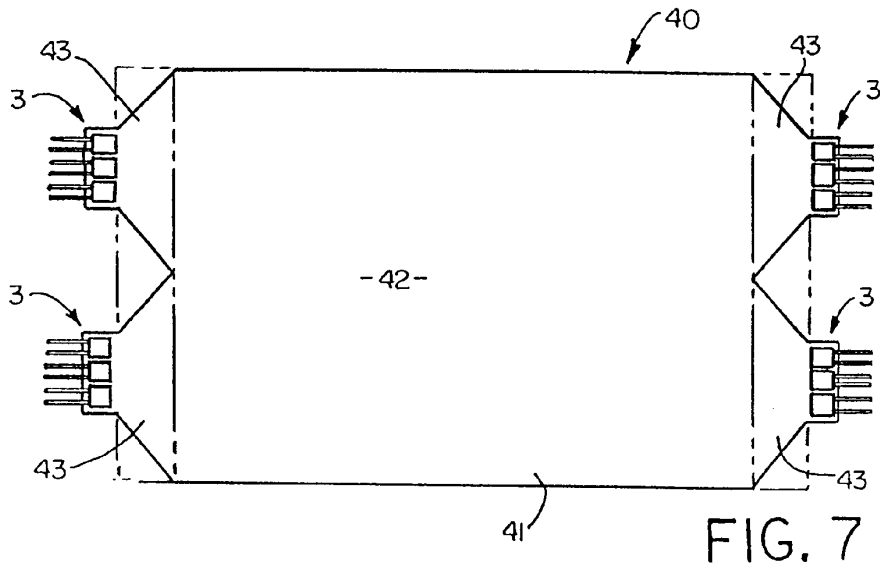
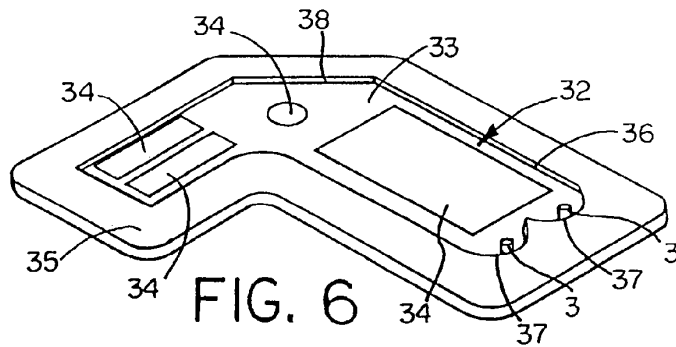
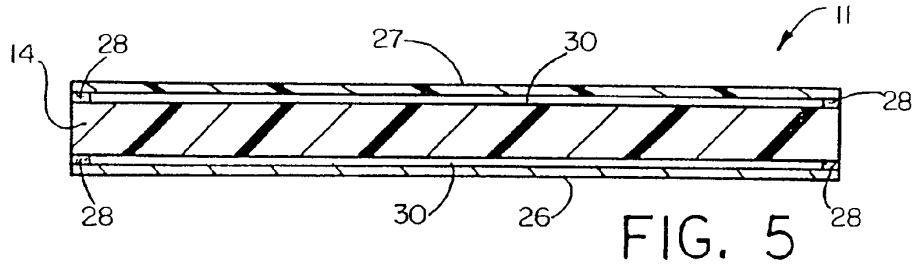


U.S. PATENT DOCUMENTS

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

* cited by examiner





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