



US005721646A

United States Patent [19]  
Catlin et al.

[11] Patent Number: 5,721,646  
[45] Date of Patent: Feb. 24, 1998

- [54] EXTERIOR REARVIEW MIRROR FOR VEHICLES
- [75] Inventors: Michael R. Catlin, Holland; Edward A. Gaban, Fennville, both of Mich.
- [73] Assignee: KAM Truck Components, Inc., Holland, Mich.
- [21] Appl. No.: 604,758
- [22] Filed: Feb. 23, 1996
- [51] Int. Cl.<sup>6</sup> ..... G02B 5/08; G02B 7/182; A47G 1/24
- [52] U.S. Cl. .... 359/865; 359/872; 359/877; 248/476
- [58] Field of Search ..... 359/855, 864, 359/865, 871, 872, 877; 248/476, 481
- [56] **References Cited**

U.S. PATENT DOCUMENTS

D. 268,665	4/1983	Sharp	D12/187
D. 283,998	5/1986	Tanaka	D12/187
D. 302,964	8/1989	Fingerte	D12/187
D. 316,841	5/1991	Neff	D12/187
D. 318,837	8/1991	Richardson et al.	D12/187
D. 325,017	3/1992	Richardson et al.	D12/187
3,346,229	10/1967	Carson, Jr.	248/477
3,375,053	3/1968	Ward	350/293
3,408,136	10/1968	Travis	350/293
3,476,464	11/1969	Clark	350/299
3,596,079	7/1971	Clark et al.	240/7.1
3,610,736	10/1971	Bateman	350/289
3,788,734	1/1974	McDuffee, Sr.	350/289
3,830,561	8/1974	La Fave et al.	350/289
4,022,520	5/1977	Scifres	350/304
4,027,953	6/1977	Jacob	350/288
4,094,591	6/1978	Lafont	350/289
4,101,206	7/1978	Oskam et al.	350/289
4,116,538	9/1978	Oskam	350/289
4,190,326	2/1980	Brodbeck	350/289
4,234,246	11/1980	Wunsch et al.	350/289
4,268,120	5/1981	Jitsumori	250/302
4,281,899	8/1981	Oskam	350/289
4,283,117	8/1981	Ellis	350/289
4,295,708	10/1981	Albrecht et al.	250/289

4,372,517 2/1983 Welch et al. .... 248/267  
4,403,829 9/1983 Thujiuchi et al. .... 350/289

(List continued on next page.)

FOREIGN PATENT DOCUMENTS

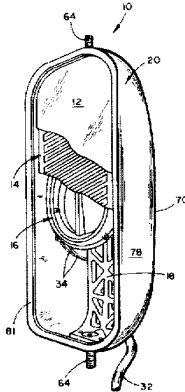
2043982	7/1992	Canada	.
0287181A2	10/1988	European Pat. Off.	.
0310261A1	4/1989	European Pat. Off.	.
0490734A1	6/1992	European Pat. Off.	.
0590510A1	4/1994	European Pat. Off.	.
2628042	9/1989	France	.
2649953	1/1991	France	.
2409748	9/1975	Germany	.
7905320.6	11/1981	Germany	.
1186443	7/1989	Japan	.
WO 95 30495	11/1995	WIPO	.

Primary Examiner—Paul M. Dzierzynski  
Assistant Examiner—Mark A. Robinson  
Attorney, Agent, or Firm—Van Dyke, Gardner, Linn & Burkhart, LLP

[57] ABSTRACT

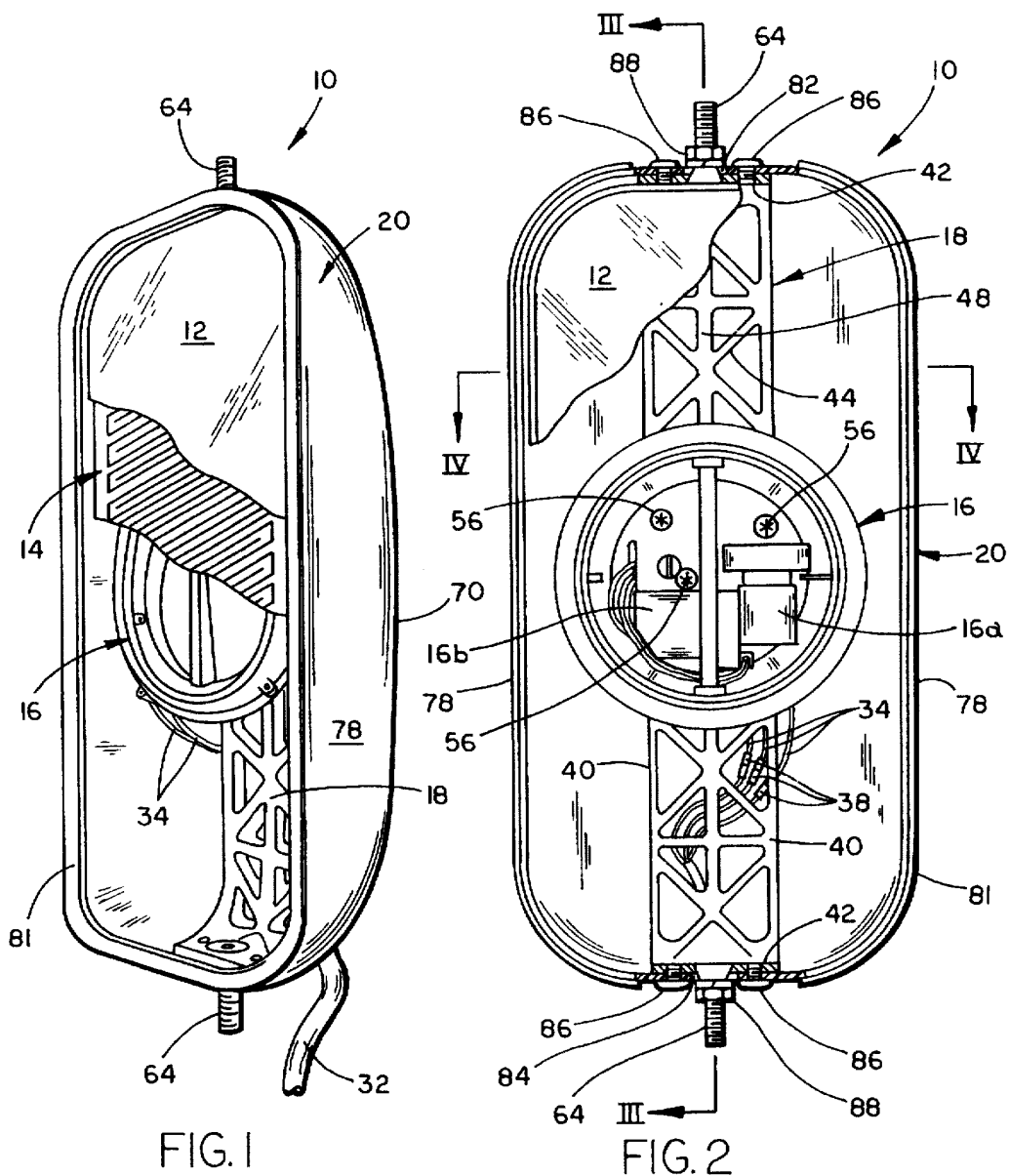
An exterior rearview mirror assembly for vehicles such as trucks, vans and recreation vehicles provides reduced weight and vibration and improved stability. The assembly includes a mirror mount securing a reflective mirror element to an elongated support bracket, and a mirror housing secured to the support bracket and shielding the mirror element, mount and support bracket. The support bracket spans the interior of the housing from adjacent one end of the housing to adjacent the other end, is spaced from the side and rear walls of the housing, and has spaced, elongated support members and at least one brace member extending between the support members. Preferably, the brace members are arranged in an X-pattern along the bracket length, while the mirror mount is an electric actuator providing remote adjustment of the mirror element about multiple axes. In one form, the bracket may include a covering wall over the brace members and support members to increase rigidity and reduce vibration. Also, the bracket may support two spaced actuators for separate, independent adjustment of a planar mirror element and a convex mirror element.

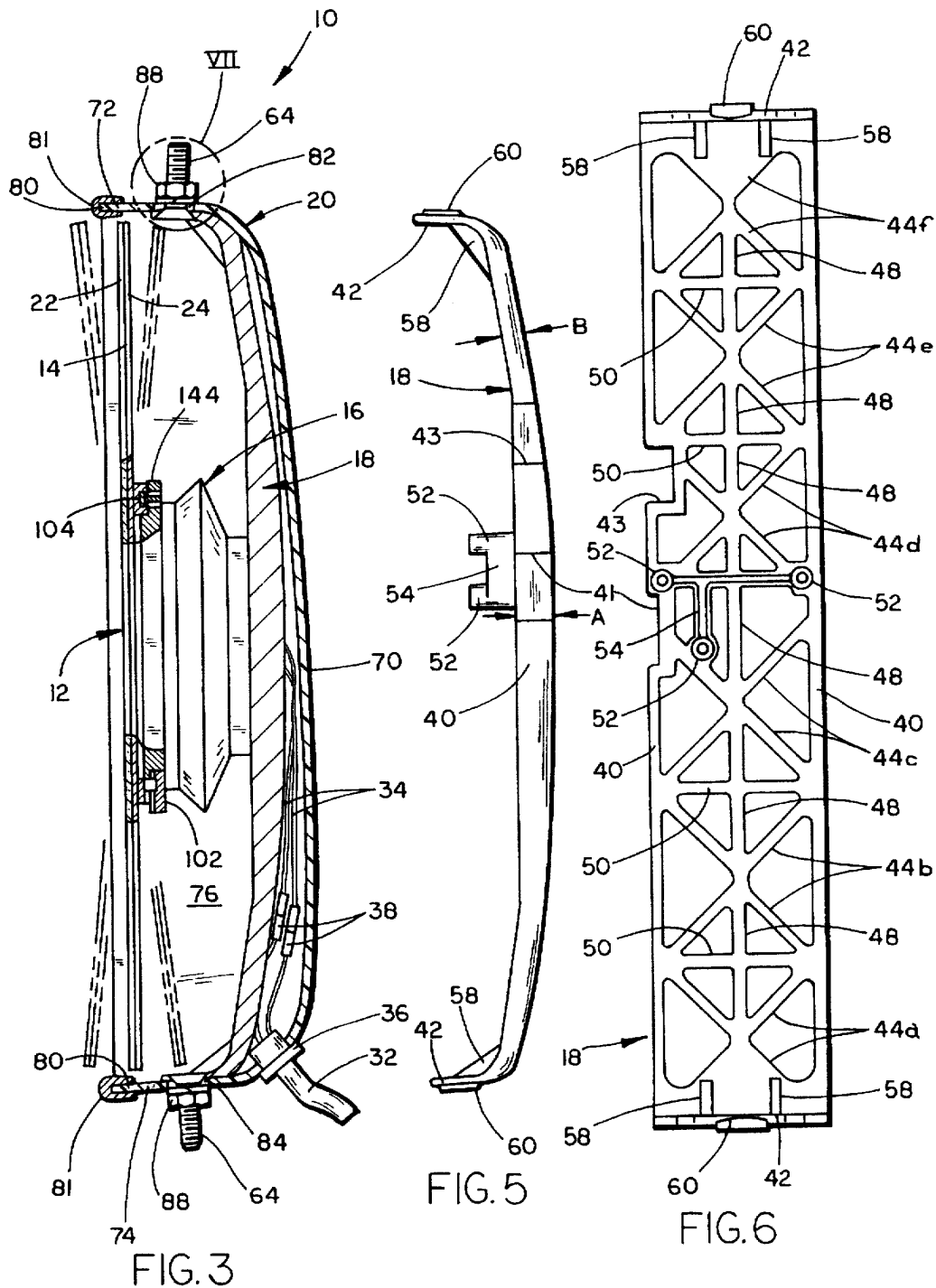
62 Claims, 8 Drawing Sheets

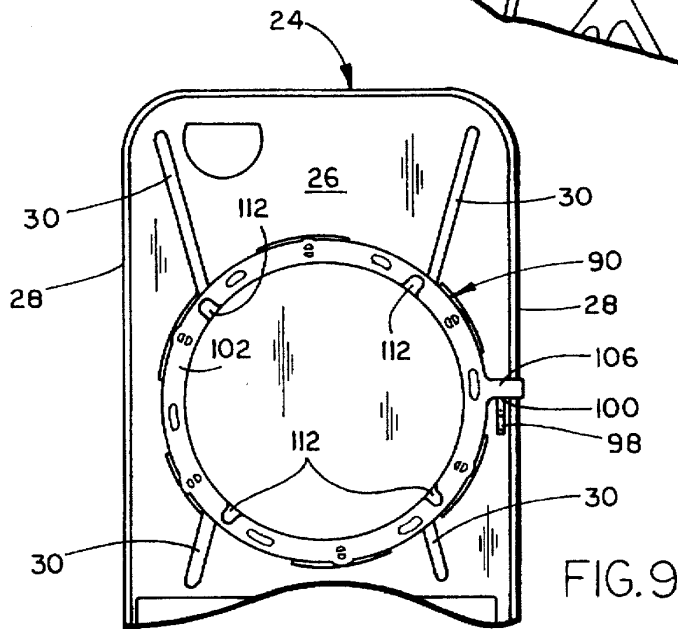
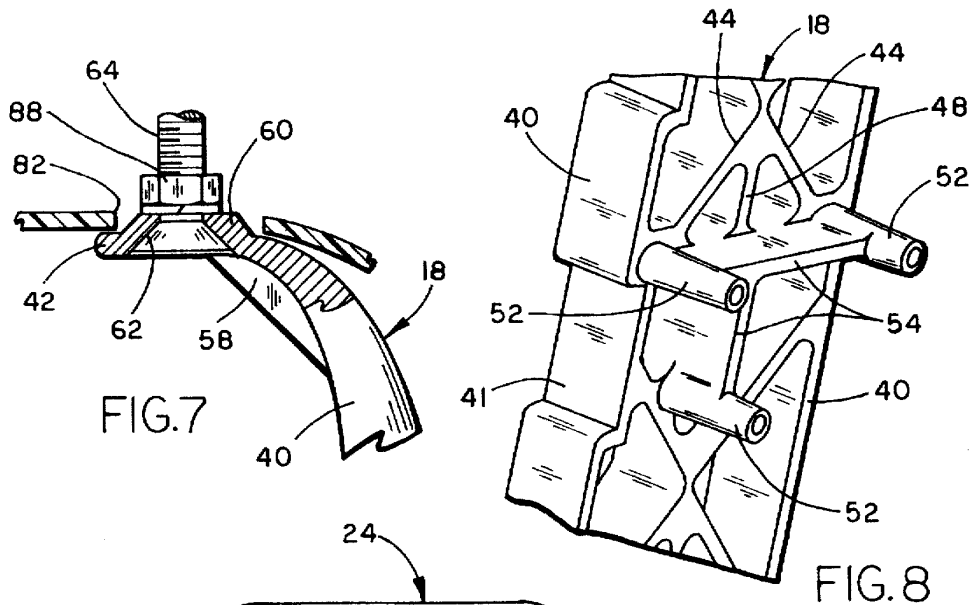
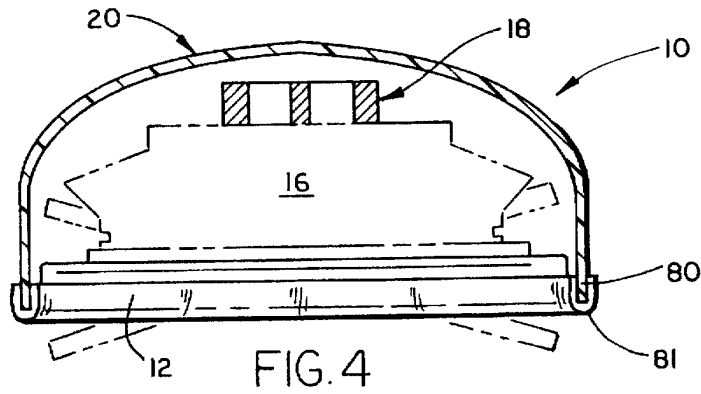


## U.S. PATENT DOCUMENTS

4,464,016	8/1984	Weber et al.	350/289	4,778,265	10/1988	Fingerle et al.	350/604
4,488,778	12/1984	Polzer et al.	350/631	4,787,726	11/1988	Hendricks	350/637
4,498,738	2/1985	Kumai	350/637	4,804,257	2/1989	Schmidt et al.	350/626
4,502,759	3/1985	Herzog et al.	350/636	4,818,090	4/1989	Righi	350/634
4,504,116	3/1985	Sharp	350/637	4,877,214	10/1989	Toshiaki et al.	348/483
4,504,117	3/1985	Mittelhauser	350/636	4,929,074	5/1990	Urban	350/625
4,540,252	9/1985	Hayashi et al.	350/634	4,973,147	11/1990	Fujita et al.	350/637
4,555,166	11/1985	Enomoto	350/634	4,973,820	11/1990	Mittelhauser	219/219
4,572,626	2/1986	Suzuki	350/634	4,988,178	1/1991	Eifert	350/631
4,623,115	11/1986	Brester	248/479	5,015,824	5/1991	Monter et al.	219/219
4,632,594	12/1986	Del Tufo et al.	403/322	5,042,932	8/1991	Pent	359/874
4,648,693	3/1987	Losch	350/636	5,044,739	9/1991	do Espirito Santo	359/864
4,648,737	3/1987	Lake, Jr. et al.	403/322	5,073,019	12/1991	Ferreira do Espirito Santo	359/872
4,670,679	6/1987	Koot et al.	310/99	5,082,361	1/1992	McKee	359/876
4,693,571	9/1987	Kimura et al.	350/634	5,110,019	5/1992	Lang et al.	359/874
4,701,037	10/1987	Bramer	350/634	5,111,125	5/1992	Barrs	318/603
4,730,913	3/1988	Boothe	350/604	5,115,352	5/1992	do Espirito Santo	359/855
4,740,068	4/1988	Fisher	350/634	5,238,214	8/1993	Syamoto et al.	248/544
4,757,786	7/1988	Ellegard	123/2	5,294,084	3/1994	Syamoto et al.	248/544
4,763,381	8/1988	Williams	15/250.01	5,615,054	3/1997	Lang et al.	359/844







# 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.