



US005793542A

United States Patent [19]  
Kondo et al.

[11] Patent Number: 5,793,542  
[45] Date of Patent: Aug. 11, 1998

[54] AUTOMOBILE MIRROR ASSEMBLY

0105103 5/1987 Japan ..... 359/868  
1279158 6/1972 United Kingdom ..... 359/868

[76] Inventors: **Hiroshi Kondo**, 29-17, Aza-Hachigaike, Ooasa-Miyoshi, Miyoshi-cho, Nishikamo-gun, Aichi-ken; **Shinji Oota**, 20-16, Hirako 2-chome, Minami-ku, Nagoya-shi, Aichi-ken; **Tomoyasu Yamada**, 69-1, 70-2, Tomioka, Sango-cho, Owariasahi-shi, Aichi-ken; **Harumasa Oota**, 72-1, Yutaka, Ooshima-cho, Toyota-shi, Aichi-ken; **Hiroyoshi Kondo**, 40, Kaminogo, Igaya-cho, Kariya-shi, Aichi-ken, all of Japan

OTHER PUBLICATIONS

David Emil Thomas; "Mirror Images"; Scientific American; Dec. 1980; pp. 206-224.

Primary Examiner—Ricky D. Shafer  
Attorney, Agent, or Firm—Frishauf, Holtz, Goodman, Langer & Chick

ABSTRACT

[57] An automobile mirror assembly improves safety during driving of a car by widening the visual field of the driver with little distortion. The mirror is mounted on a car with a support member and a holding member to be adjustable in its position. A gradually changing mirror section is provided on at least one of an upper, lower and side edges of a main mirror section of the mirror. A surface of a gradually changing mirror section is defined by a plurality of intersections between curved surfaces provided in at least one of a vertical and horizontal directions with hyperbolic curves provided in a direction perpendicular to one of the vertical and horizontal directions. Each respective curved surface passes through circular arcs, the radii of curvatures of the circular area being calculated from Equation 1 indicated below. The radii of curvatures of the circular arcs gradually become smaller in an extending direction. The intersection of the hyperbolic curves and the curved surfaces define the surface of the gradually changing mirror. The Equation 1 is as follows:

[21] Appl. No.: 768,671

[22] Filed: Dec. 18, 1996

Related U.S. Application Data

[63] Continuation of Ser. No. 540,711, Oct. 11, 1995, abandoned.

[30] Foreign Application Priority Data

Oct. 11, 1994 [JP] Japan ..... 6-272812

[51] Int. Cl.<sup>6</sup> ..... G02B 5/10; B60R 1/06

[52] U.S. Cl. .... 359/864; 359/866; 359/868

[58] Field of Search ..... 359/838, 864, 359/866, 868, 872

References Cited

U.S. PATENT DOCUMENTS

1,872,905 8/1932 Darling ..... 359/868  
2,778,273 1/1957 Fellmeth ..... 359/864

(List continued on next page.)

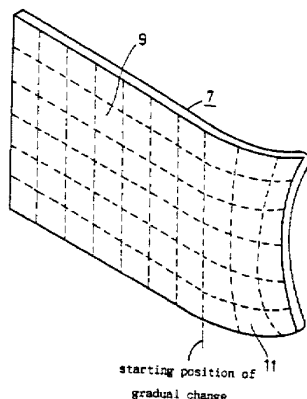
FOREIGN PATENT DOCUMENTS

0210757 2/1987 European Pat. Off. .... 359/864  
2420452 10/1979 France ..... 359/868  
1939756 2/1971 Germany ..... 359/868  
1941895 3/1971 Germany ..... 359/868  
2703206 8/1978 Germany ..... 359/868  
0051635 4/1980 Japan ..... 359/868  
0106403 8/1980 Japan ..... 359/868

$$\Sigma f(xn) = 1 + \frac{1}{\sqrt{1 - \{(K+1) \times c^2 \cdot xn^2\} + \{(A1) \times x1^{-1}\} + \{(A2) \times x2^{-2}\} + \{(A3) \times x3^{-3}\} \dots + \{(An-1) \times xn^{-1} - \{(N-1)\} \times \{(An) \times xn^{-n}\}$$

where: A1, A2, . . . An-1, An are asphericity factors representing asphericity at respective portions in the at least one of the horizontal and the vertical directions, n is any integer, K=0, and C=1/r0, and wherein r0 represents a radius of curvature at a starting position of the gradually changing mirror section.

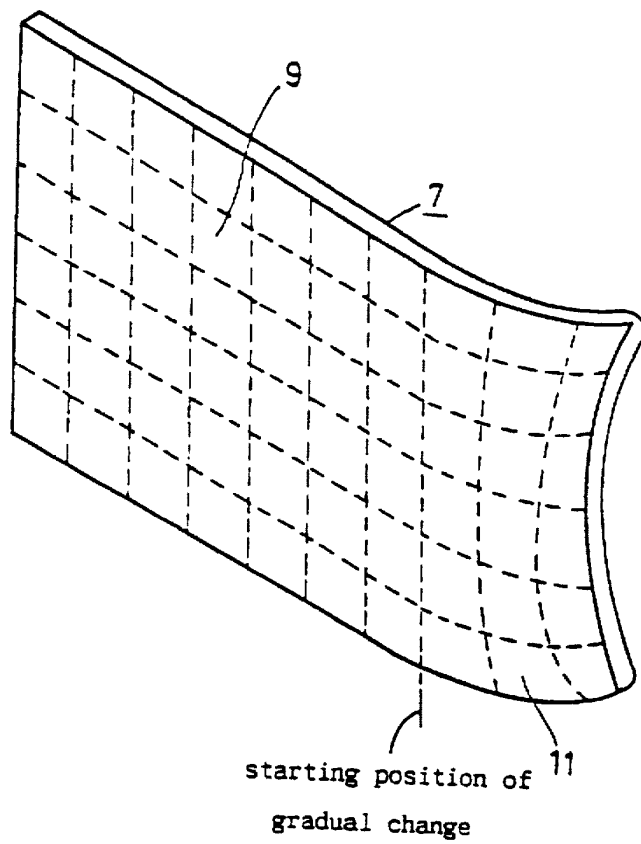
3 Claims, 8 Drawing Sheets



---

U.S. PATENT DOCUMENTS						
			4,258,979	3/1981	Mahin .....	359/868
			4,264,144	4/1981	McCord .....	359/868
2,857,810	10/1958	Troendle .....	4,331,382	5/1982	Graff .....	359/868
3,389,952	6/1968	Tobin, Jr. ....	4,449,786	5/1984	McCord .....	359/868
3,764,201	10/1973	Haile .....	5,005,962	4/1991	Edelman .....	359/866
4,035,064	7/1977	Cowman, Jr. et al. ....	5,096,281	3/1992	Windebank et al. ....	359/868

Fig. 1



F i g. 2

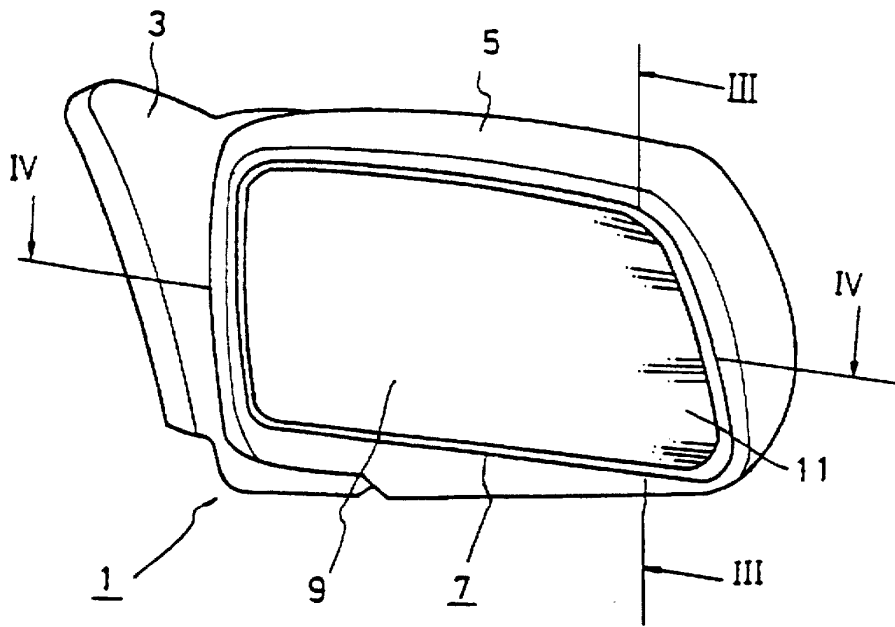


Fig. 3

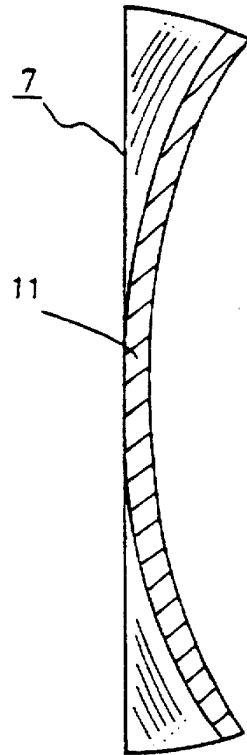
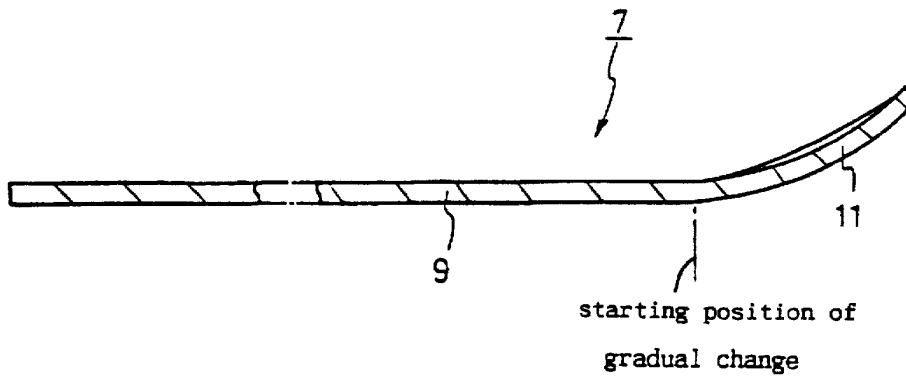


Fig. 4



# 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.