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Lynam et al.

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(54) **EXTERIOR MIRROR PLANO-AUXILIARY REFLECTIVE ELEMENT ASSEMBLY**

(75) Inventors: **Niall R. Lynam**, Holland, MI (US);
John O. Lindahl, Fruitport, MI (US);
Hahns Yoachim Fuchs, Holland, MI (US)

(73) Assignee: **Donnelly Corporation**, Holland, MI (US)

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Related U.S. Application Data

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(51) **Int. Cl.**⁷ **G02F 1/15**; G02B 5/08; G02B 5/10; G02B 7/182; B60R 1/06

(52) **U.S. Cl.** **359/265**; 359/267; 359/841; 359/850; 359/864; 359/866; 359/868; 359/872; 359/877; 248/549; 248/900

(58) **Field of Search** 359/841, 850, 359/851, 854, 855, 864, 865, 866, 868, 872, 877, 265, 267; 248/549, 900

(56) **References Cited**

U.S. PATENT DOCUMENTS

| | | | | |
|-------------|---|--------|-------------------|---------|
| 3,338,655 A | * | 8/1967 | Young | |
| 3,375,053 A | | 3/1968 | Ward | 350/293 |
| 3,389,952 A | * | 6/1968 | Tobin, Jr. | |
| 4,268,120 A | | 5/1981 | Jitsumori | 350/302 |
| 4,449,786 A | | 5/1984 | McCord | 350/293 |
| 4,678,294 A | * | 7/1987 | Van Nostrand | |
| 4,917,485 A | * | 4/1990 | Baldwin, Sr. | |
| 5,239,405 A | | 8/1993 | Varaprasad et al. | 359/272 |
| 5,412,512 A | * | 5/1995 | Zebold et al. | |

| | | | | |
|--------------|---|---------|-------------------|---------|
| 5,550,677 A | | 8/1996 | Schofield et al. | 359/604 |
| 5,557,467 A | * | 9/1996 | McColgan et al. | |
| 5,621,577 A | * | 4/1997 | Lang et al. | |
| 5,668,663 A | | 9/1997 | Varaprasad et al. | 359/608 |
| 5,724,187 A | | 3/1998 | Varaprasad et al. | 359/608 |
| 5,751,489 A | | 5/1998 | Caskey et al. | 359/603 |
| 5,784,211 A | * | 7/1998 | Mingledorff | |
| 5,793,542 A | * | 8/1998 | Kondo et al. | |
| 5,805,367 A | * | 9/1998 | Kanazawa | |
| 5,910,854 A | | 6/1999 | Varaprasad et al. | 359/273 |
| 6,116,743 A | * | 9/2000 | Hoek | |
| 6,154,306 A | | 11/2000 | Varaprasad et al. | 359/273 |
| 6,511,192 B1 | * | 1/2003 | Henion et al. | |
| 6,522,451 B1 | * | 2/2003 | Lynam | |

FOREIGN PATENT DOCUMENTS

| | | | | |
|----|------------|-----------|-------|-----------|
| DE | 2409748 | 9/1975 | | B60R/1/02 |
| DE | 3620228 | * 12/1987 | | |
| DE | 4026578 | * 4/1992 | | |
| EP | 0310261 A1 | 9/1988 | | B60R/1/08 |
| EP | 0729864 | * 9/1996 | | |
| EP | 0917987 | * 5/1999 | | |
| FR | 2628042 | 9/1929 | | B60R/1/06 |
| GB | 2092534 | * 8/1982 | | |
| JP | 1186443 | 7/1989 | | B60R/1/06 |

* cited by examiner

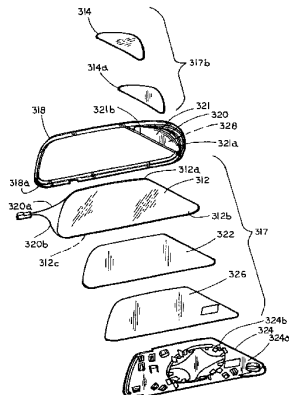
Primary Examiner—Ricky D. Shafer

(74) *Attorney, Agent, or Firm*—Van Dyke, Gardner, Linn & Burkhardt, LLP

(57) **ABSTRACT**

This invention provides a reflective element assembly suitable for use in an exterior sideview mirror assembly mounted to the side body of an automobile. The reflective element assembly includes a first reflective element and a second reflective element. The second reflective element is angled downwardly and forwardly with respect to the first reflective element when the mirror assembly is mounted to a side of an automobile to provide an increased field of view. In one form, both reflective elements are commonly supported on a bezel, which is mounted to the mirror assembly casing. In another form, the reflective elements are separately mounted, with the second reflective element fixedly mounted to the casing and the first reflective element movably supported in the mirror casing, for example, on an actuator.

54 Claims, 13 Drawing Sheets



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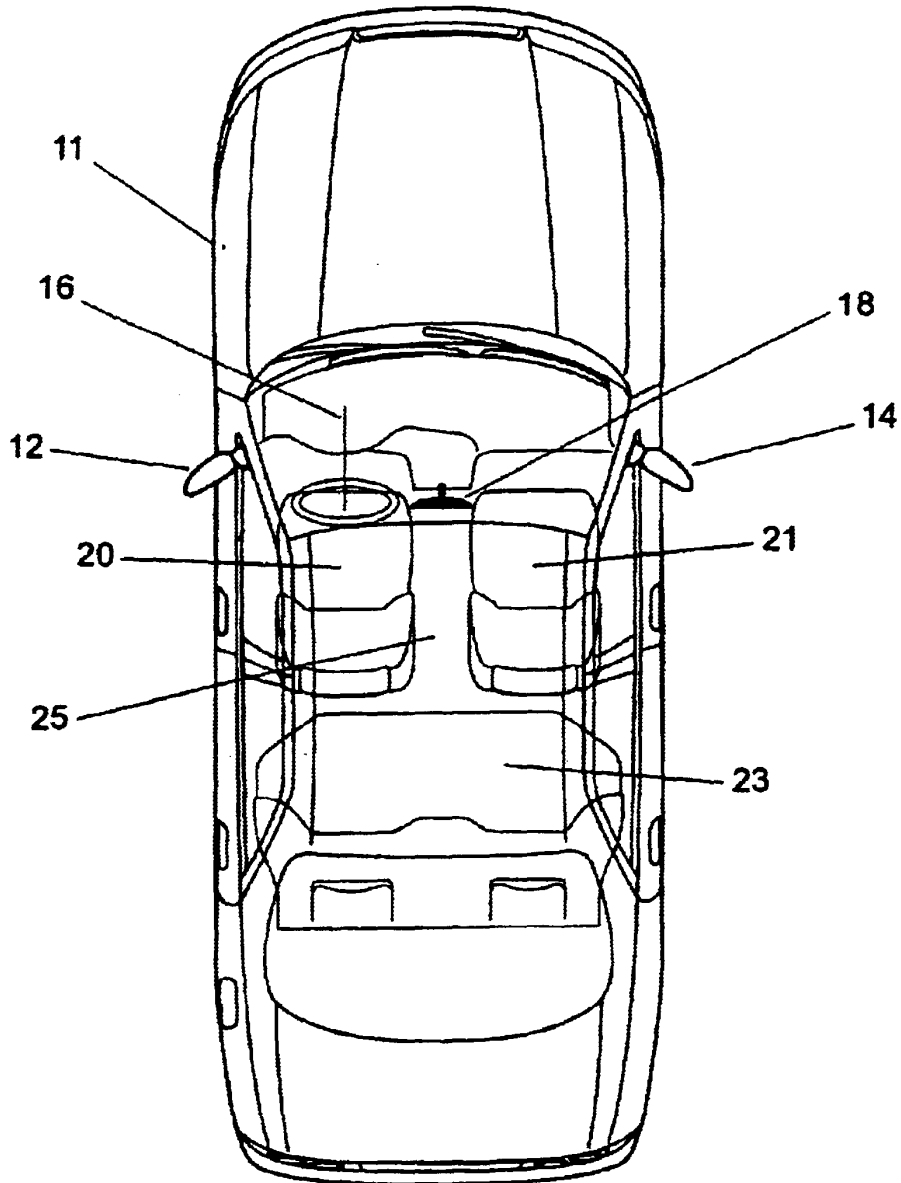


Figure 1

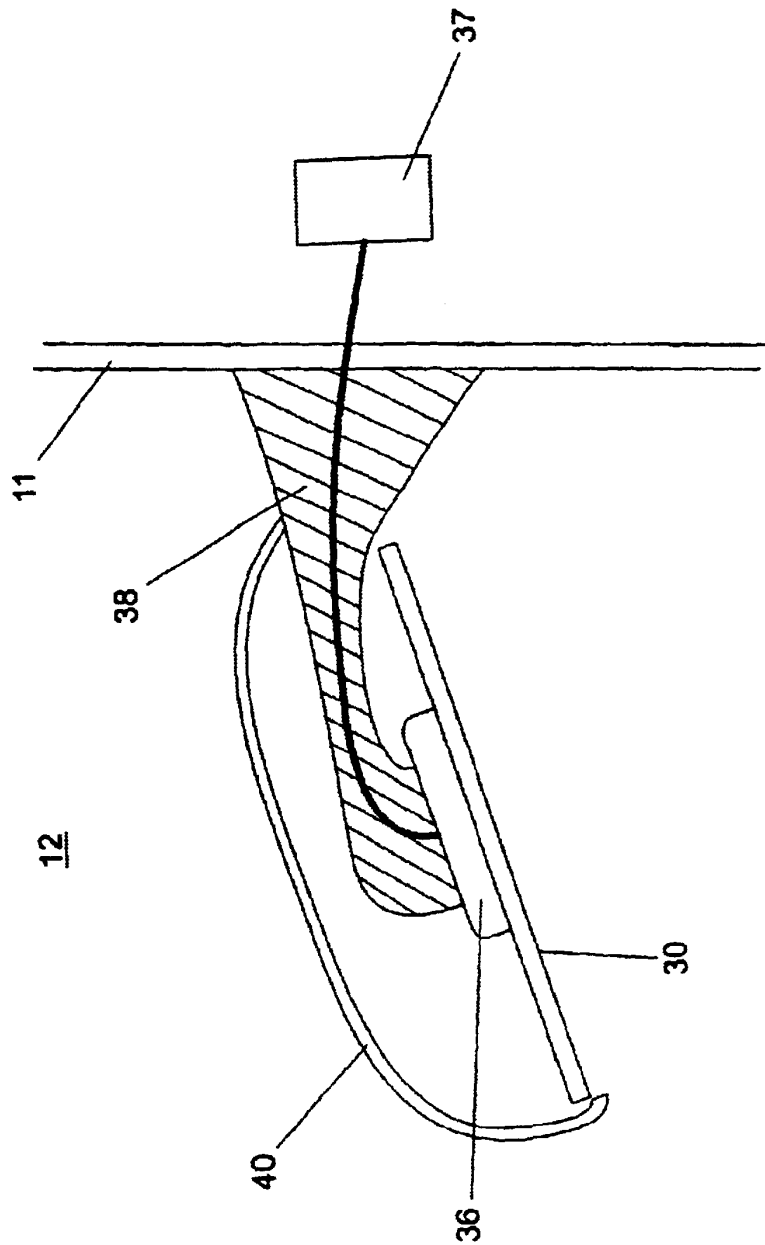


Figure 2

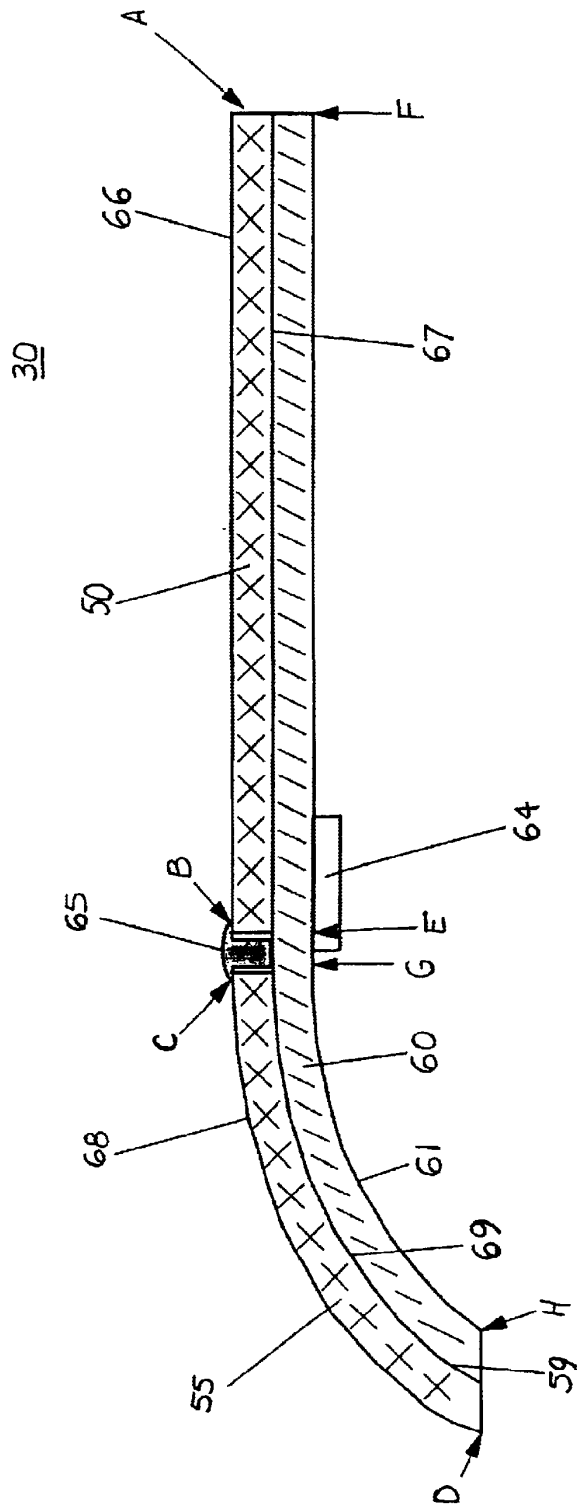


Figure 3

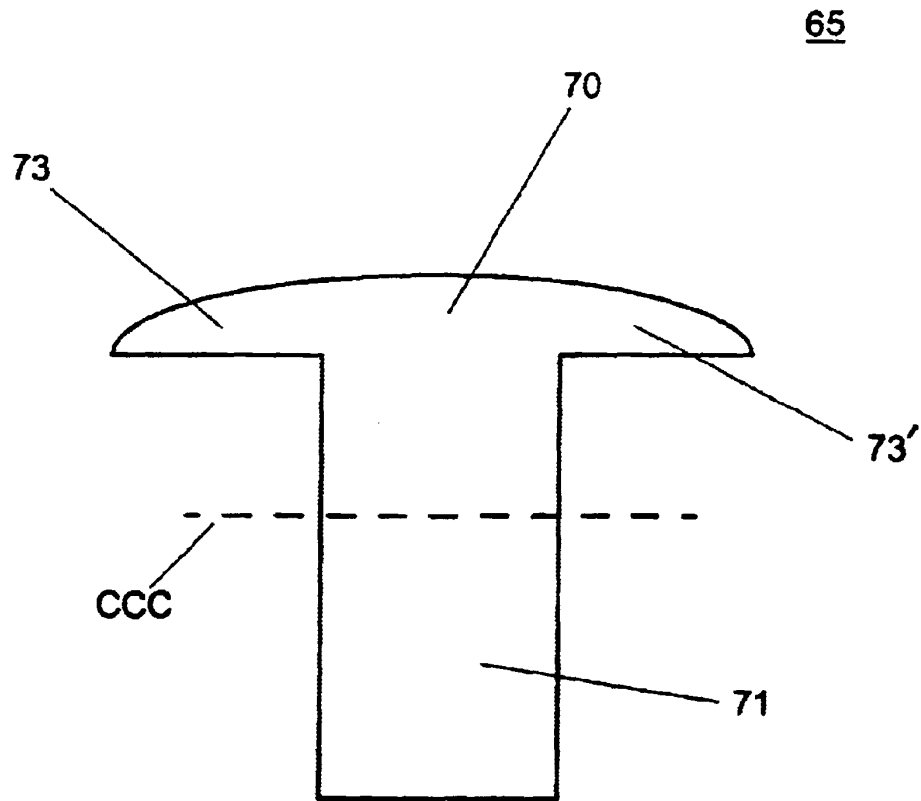


Figure 4

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