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(54) **EXTENDED CONTACT STRIP**
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5,265,324	A	11/1993	Miller et al.
5,399,851	A	3/1995	Strand
5,693,921	A	12/1997	Miller et al.
6,455,793	B1	9/2002	Kasahara et al.
6,593,537	B2	7/2003	Teruyama et al.
6,740,826	B1 *	5/2004	Friedrich et al. 200/61.43
6,898,842	B2	5/2005	Kasahara et al.
7,086,113	B2 *	8/2006	Young 15/104.061
7,094,064	B2	8/2006	Sweetland et al.
7,230,196	B2	6/2007	Toyama
7,373,754	B2	5/2008	Albiero
7,998,611	B2 *	8/2011	Yoshihara et al. 429/148

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See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,732,384	A	5/1973	Fischel
3,855,733	A	12/1974	Miller
4,940,426	A	7/1990	Redmond et al.
5,148,911	A	9/1992	Miller et al.
5,260,530	A	11/1993	Duhon et al.

FOREIGN PATENT DOCUMENTS

EP	0 129 895	A1	1/1985
EP	0 177 267	A2	4/1986

(Continued)

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(57) **ABSTRACT**

The extended contact strip has a first elongate strip having first and second longitudinal edges, an upper and a lower surface, a first electrically conductive strip located on the upper surface of the first elongate strip, a second elongate strip having first and second longitudinal edges, and a flexible resilient portion extending between the first and second edges, the flexible resilient portion having an upper and a lower surface, a second electrically conductive strip located on the lower surface of the second strip, the first and second strips being connectable at their respective first and second edges, and the first and second strips forming an isolating gap such that the first and second electrical conductors lie opposite and spaced apart from each other when the second strip remains un-deformed, such that the first and second electrical conductors can make contact with each other upon deformation of the second strip.

25 Claims, 20 Drawing Sheets

