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[54] **INCREASED BRIGHTNESS DRIVE SYSTEM FOR AN ELECTROLUMINESCENT DISPLAY PANEL**

[75] Inventors: **Mohan Lal Kapoor**, Orange; **Dominic Louis Monarchie**, Norwalk; **Thomas John Rebeschi**, North Haven; **Russell Anthony Budzilek**, Bridgeport, all of Conn.

[73] Assignee: **Northrop Grumman Corporation**, Los Angeles, Calif.

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Related U.S. Application Data

[63] Continuation of Ser. No. 367,901, Jan. 3, 1995, abandoned, which is a continuation of Ser. No. 210,118, Mar. 17, 1994, abandoned, which is a continuation of Ser. No. 988,545, Dec. 10, 1992, abandoned.

[51] **Int. Cl.**[6] **G09G 3/30**

[52] **U.S. Cl.** **345/79**; 345/209; 315/169.3

[58] **Field of Search** 345/58, 76, 78, 345/77, 79, 80, 208, 209, 36; 315/169.3; 340/825.81

[56] **References Cited**

U.S. PATENT DOCUMENTS

3,975,661	8/1976	Kanatani et al.	315/169
4,152,626	5/1979	Hatta et al.	340/781
4,479,120	10/1984	Ohba et al.	340/781
4,485,379	11/1984	Kinoshita et al.	340/781
4,488,150	12/1984	Kanatani	345/77
4,691,144	9/1987	King et al.	340/781
4,733,228	3/1988	Flegal	345/76
4,739,320	4/1988	Rolinar et al.	345/78
4,801,920	1/1989	Ohba et al.	340/781
4,866,348	9/1989	Harada et al.	345/79
4,888,523	12/1989	Shoji et al.	345/79
4,893,060	1/1990	Ohba et al.	345/209
4,951,041	8/1990	Inada et al.	345/147
4,975,691	12/1990	Lee	345/209
5,075,596	12/1991	Young et al.	340/781
5,294,919	3/1994	Harju	345/208
5,408,252	4/1995	Oki et al.	345/98
5,550,557	8/1996	Kapoor et al.	345/96

FOREIGN PATENT DOCUMENTS

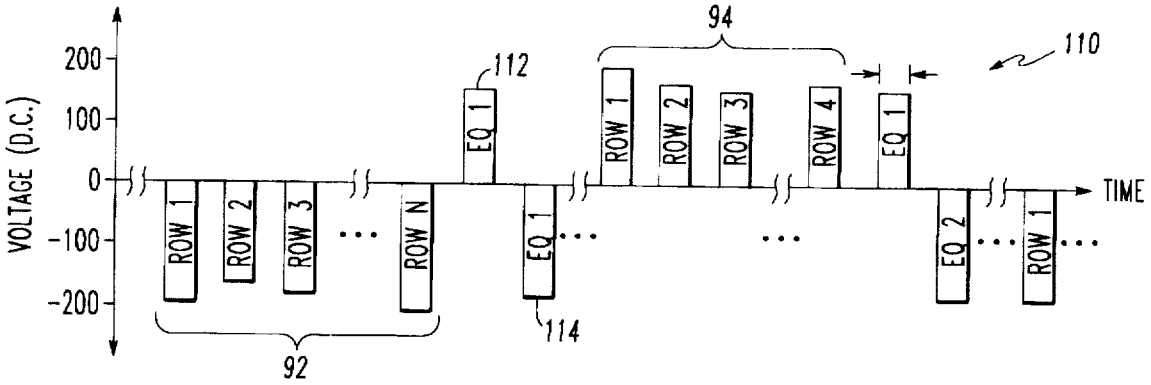
0249954	12/1987	European Pat. Off. .
0295477	12/1988	European Pat. Off. .
0345399	12/1989	European Pat. Off. .
2086634	5/1982	United Kingdom .

OTHER PUBLICATIONS

<<Rata Book 1988–1989>> by Superten Inc. pp. 11–4–11–8.

Primary Examiner—Richard Hjerpe
Assistant Examiner—Lun-Yi Lao
Attorney, Agent, or Firm—Walter G. Sutcliff

[57] **ABSTRACT**

A thin film electroluminescent display panel is driven with either a symmetric or asymmetric drive scheme which includes at least one equalizing voltage pulse per write cycle to remove carriers trapped at the interfaces of dielectric layers and phosphor layer in order to stabilize the charge of each display panel pixel. The present invention reduces the smearing, latent image and pseudo persistence problems caused by carriers being retained and accumulated at the dielectric and phosphor layer interfaces.

5 Claims, 10 Drawing Sheets