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Lackner et al.

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[54] **SHAPED VOLTAGE PULSE METHOD FOR OPERATING A POLYMER DISPERSED LIQUID CRYSTAL CELL, AND LIGHT VALVE EMPLOYING THE SAME**

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[73] Assignee: **Hughes Aircraft Company**, Los Angeles, Calif.

[21] Appl. No.: **648,479**

[22] Filed: **Jan. 31, 1991**

[51] Int. Cl.⁵ **G02F 1/133; G02F 1/135**

[52] U.S. Cl. **359/51; 359/55; 359/72; 359/84; 340/784**

[58] Field of Search **359/51, 245, 52, 55, 359/72, 84, 85, 99, 102; 340/765, 784, 805; 358/236**

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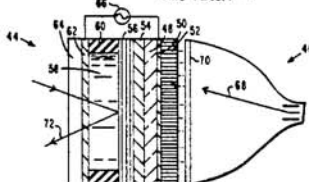
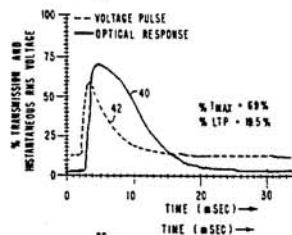
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[57] ABSTRACT

A shaped voltage pulse is applied to a polymer dispersed liquid crystal (PDLC) cell to control its transmission characteristics. The voltage has an initially high level that substantially exceeds the PDLC's threshold voltage. The initial voltage duration is relatively short, and is followed by a gradual reduction of the voltage to a level less than the threshold voltage within a given time frame; the voltage is preferably reduced at a generally exponential rate. Fast response is obtained by setting the initial voltage substantially above the voltage level that corresponds to the desired transmission level in the steady state; the voltage decays from its initial level so that the PDLC transmission actually peaks at the desired range. The shaped waveform forces the PDLC to operate on a hysteresis curve along which the reduction in transmission is delayed as the voltage decays, thereby increasing the cell's optical throughput. The invention is particularly applicable to liquid crystal light valves.

20 Claims, 5 Drawing Sheets



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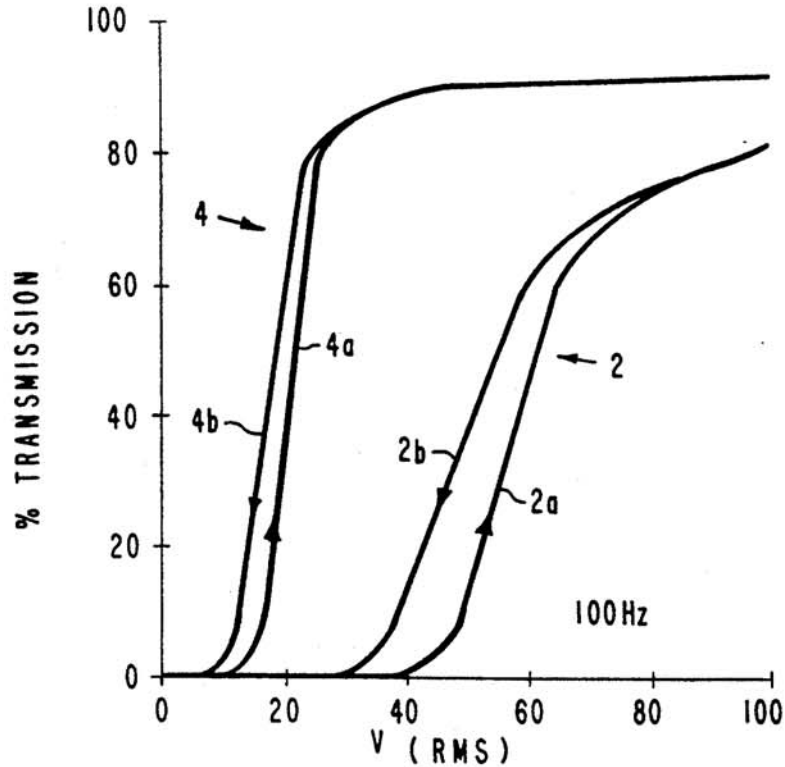


Fig. 1.

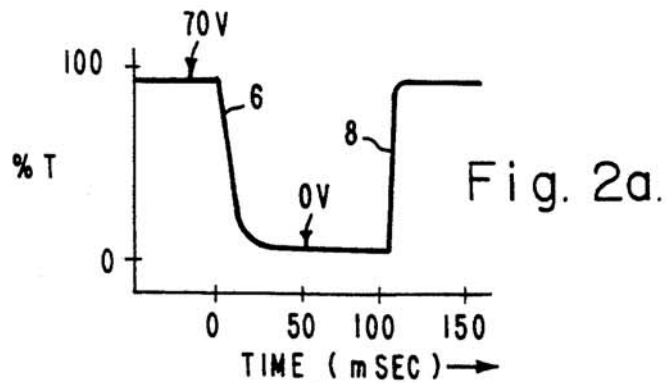


Fig. 2a.

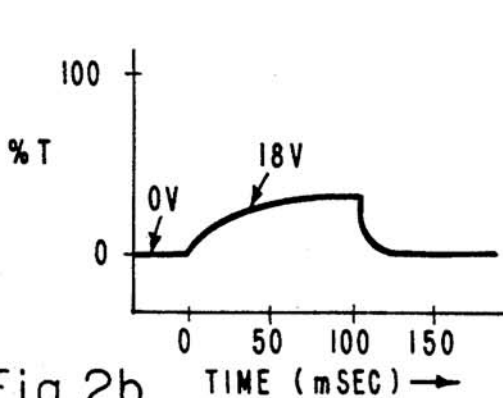


Fig. 2b.

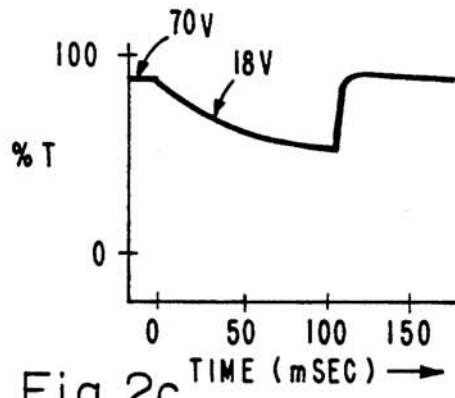


Fig. 2c.

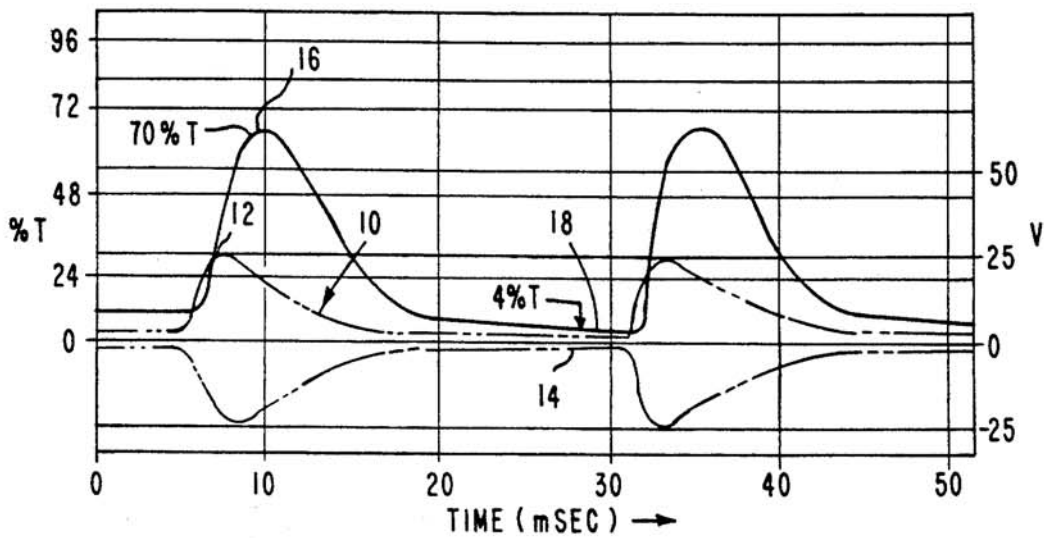


Fig. 3.

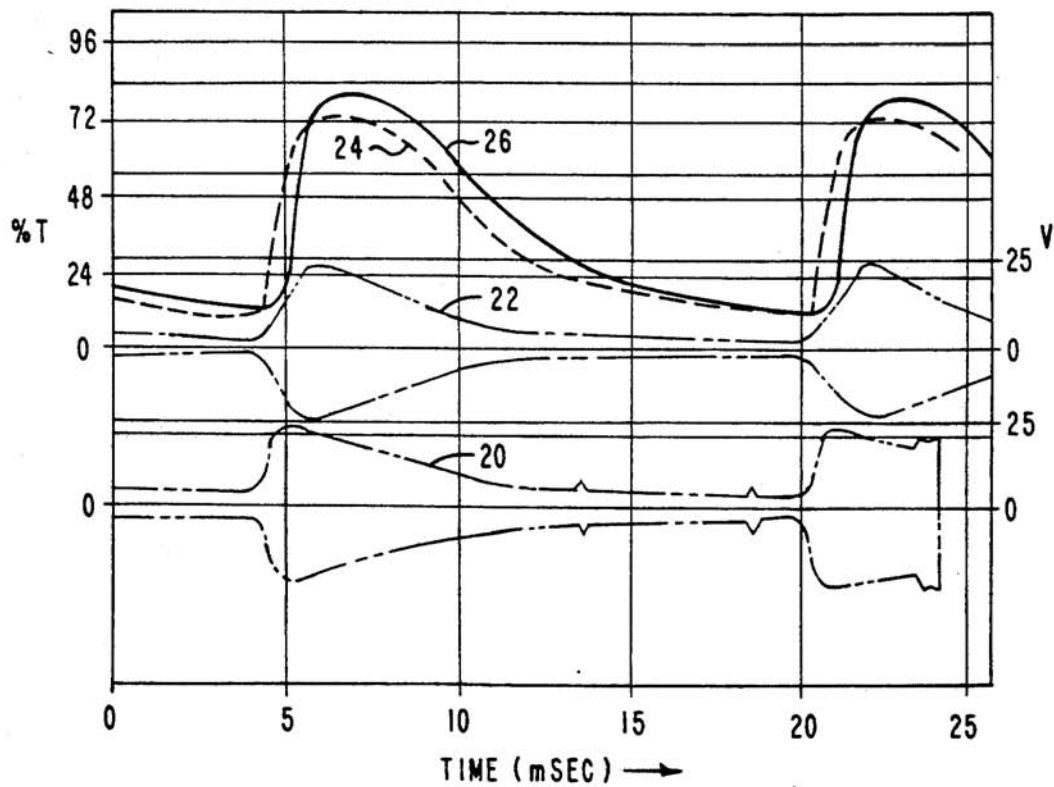


Fig. 4.

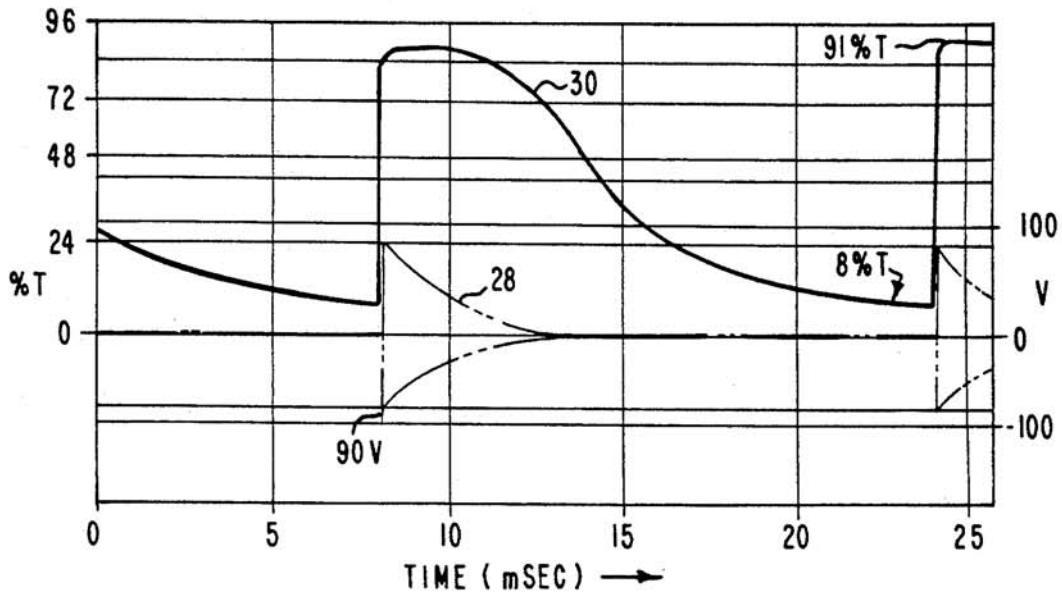


Fig. 5.

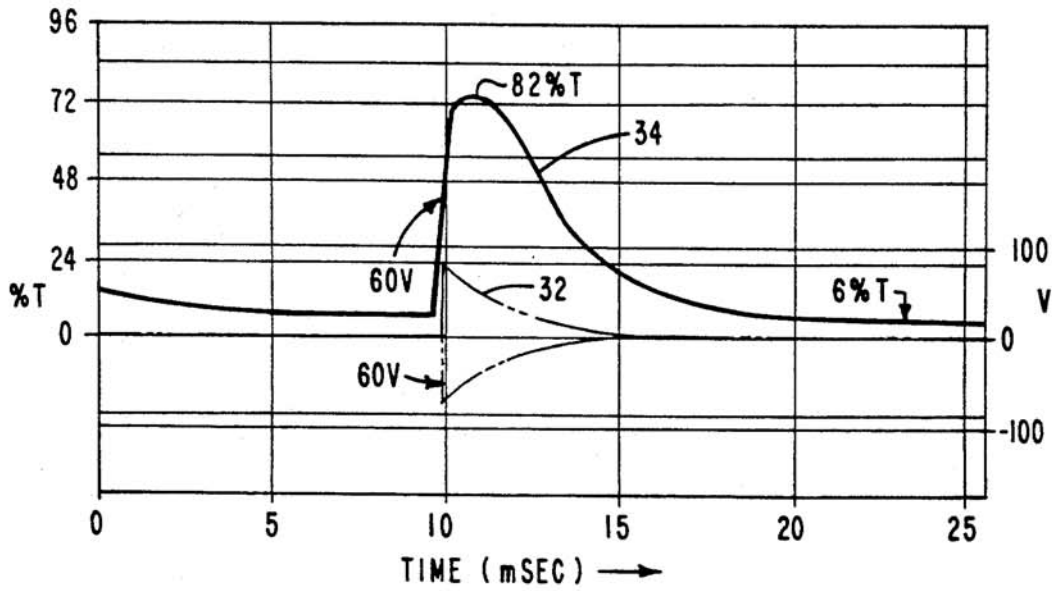


Fig. 6.

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