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(54) **DISPLAY DEVICE**

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(51) **Int. Cl.**

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G02B 1/04	(2006.01)
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G02F 1/29	(2006.01)

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CPC ***G02B 27/2214*** (2013.01); ***G02B 1/041*** (2013.01); ***G02B 27/225*** (2013.01); ***G02B 27/26*** (2013.01); ***G02F 1/13718*** (2013.01); *G02F 1/133526* (2013.01); *G02F 2001/133562* (2013.01); *G02F 2001/294* (2013.01); *G02F 2203/07* (2013.01)

(58) **Field of Classification Search**

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See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

6,678,024	B2	1/2004	Kim
7,760,430	B2	7/2010	Shestak et al.
2007/0195410	A1	8/2007	Yun et al.

FOREIGN PATENT DOCUMENTS

CN	1510492		7/2004
CN	1666142	A	9/2005
CN	1221836	C	10/2005
CN	101025490	A	8/2007
CN	101114055		1/2008
CN	101118316		2/2008
CN	102156565	A	8/2011
JP	2011-164527		8/2011
KR	10-2008-0084527		9/2008
KR	10-2008-0105549		12/2008
KR	10-2009-0065934		6/2009
KR	10-2010-0137725	A	12/2010
TW	201105111	A1	2/2011

OTHER PUBLICATIONS

Giovanni Carbone, et al.: "Uniform Lying Helix Alignment on Periodic Surface Relief Structure Generated via Laser Scanning Lithography", Molecular Crystals and Liquid Crystals, XP055203408, vol. 544, No. 1, Jun. 30, 2011, pp. 37-48.

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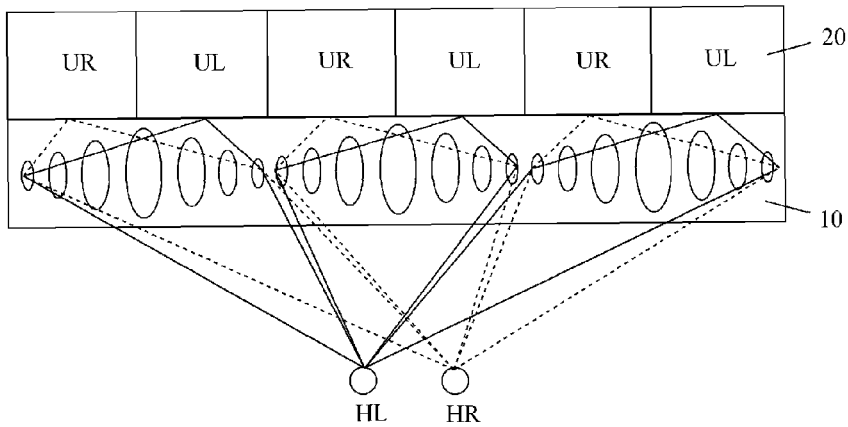
(57) **ABSTRACT**

Provided is a display device. An illustrative display device of the present application may display three-dimensional images or two-dimensional images, which may be enjoyed without glasses.

5 Claims, 4 Drawing Sheets