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(54) **PROVIDING COMPOUND IMAGE OF DOPPLER SPECTRUM IMAGES IN ULTRASOUND SYSTEM**

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CPC ***A61B 8/06*** (2013.01); ***A61B 8/488*** (2013.01); ***A61B 8/5253*** (2013.01)

(58) **Field of Classification Search**
CPC A61B 8/06; A61B 8/5253; A61B 8/488
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,398,540 A * 8/1983 Takemura et al. 600/441
2006/0030776 A1* 2/2006 Washburn et al. 600/437
2006/0052704 A1* 3/2006 Baba et al. 600/453
2007/0167790 A1 7/2007 Kim et al.
2009/0149759 A1* 6/2009 Baba A61B 8/06 600/454
2010/0260398 A1* 10/2010 Ma et al. 382/131

FOREIGN PATENT DOCUMENTS

JP 2007160120 A 6/2007
KR 10-0271469 B1 1/2001
KR 10-2006-0115595 A 11/2006
KR 10-0874550 B1 12/2008
KR 10-2010-060852 A 6/2010

OTHER PUBLICATIONS

Stoylen, http://folk.ntnu.no/stoylen/strainrate/Ultrasound, Captured on Sep. 29, 2011, but the webpage was updated on Nov. 2010.*

(Continued)

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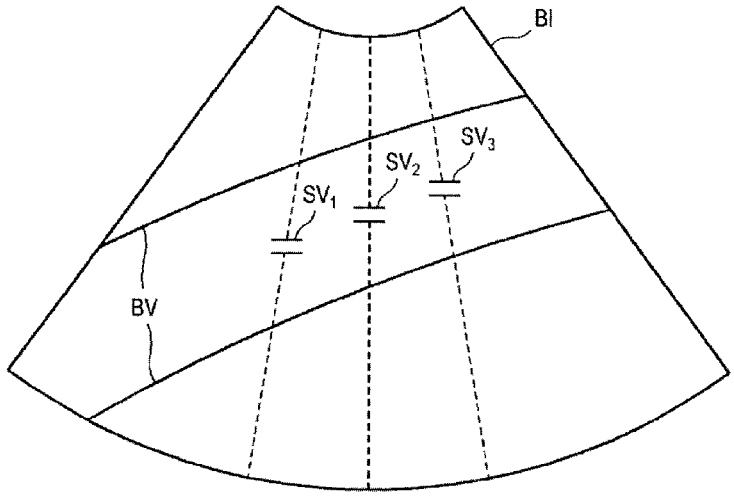
(57) **ABSTRACT**

There are provided embodiments for providing a compound image of Doppler spectrum images corresponding to at least two sample volumes. In one embodiment, by way of non-limiting example, an ultrasound system comprises: a processing unit configured to form at least two Doppler spectrum images corresponding to at least two sample volumes based on ultrasound data corresponding to the at least two sample volume, the processing unit being further configured to perform an image process for forming a compound image upon the at least two Doppler spectrum images to form the compound image.

19 Claims, 14 Drawing Sheets