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Cox

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(54) **IDENTIFYING WORKS, USING A SUB-LINEAR TIME SEARCH, SUCH AS AN APPROXIMATE NEAREST NEIGHBOR SEARCH, FOR INITIATING A WORK-BASED ACTION, SUCH AS AN ACTION ON THE INTERNET**

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This patent is subject to a terminal disclaimer.

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Related U.S. Application Data

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(51) **Int. Cl.**
H04N 7/173 (2011.01)
(52) **U.S. Cl.** **725/110**
(58) **Field of Classification Search** .... None
See application file for complete search history.

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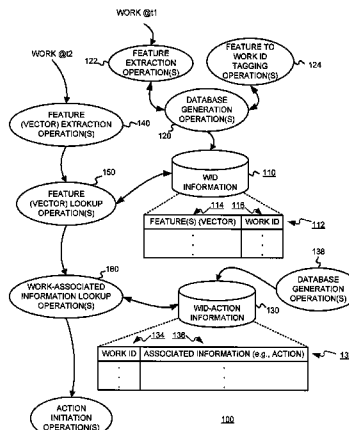(Continued)

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(57) **ABSTRACT**

A media work may be associated with an action by (a) extracting features from the media work, (b) determining an identification of the media work, based on the features extracted, using a sub-linear time search, such as an approximate nearest neighbor search for example, and (c) determining an action based on the identification of the media work determined. The media work may be an audio work. The features extracted from the work may include (A) a frequency decomposition of a signal of the audio work, (B) information samples of the audio work, (C) average intensities of sampled windows of the audio work, and/or (D) information from frequencies of the audio work.

40 Claims, 10 Drawing Sheets

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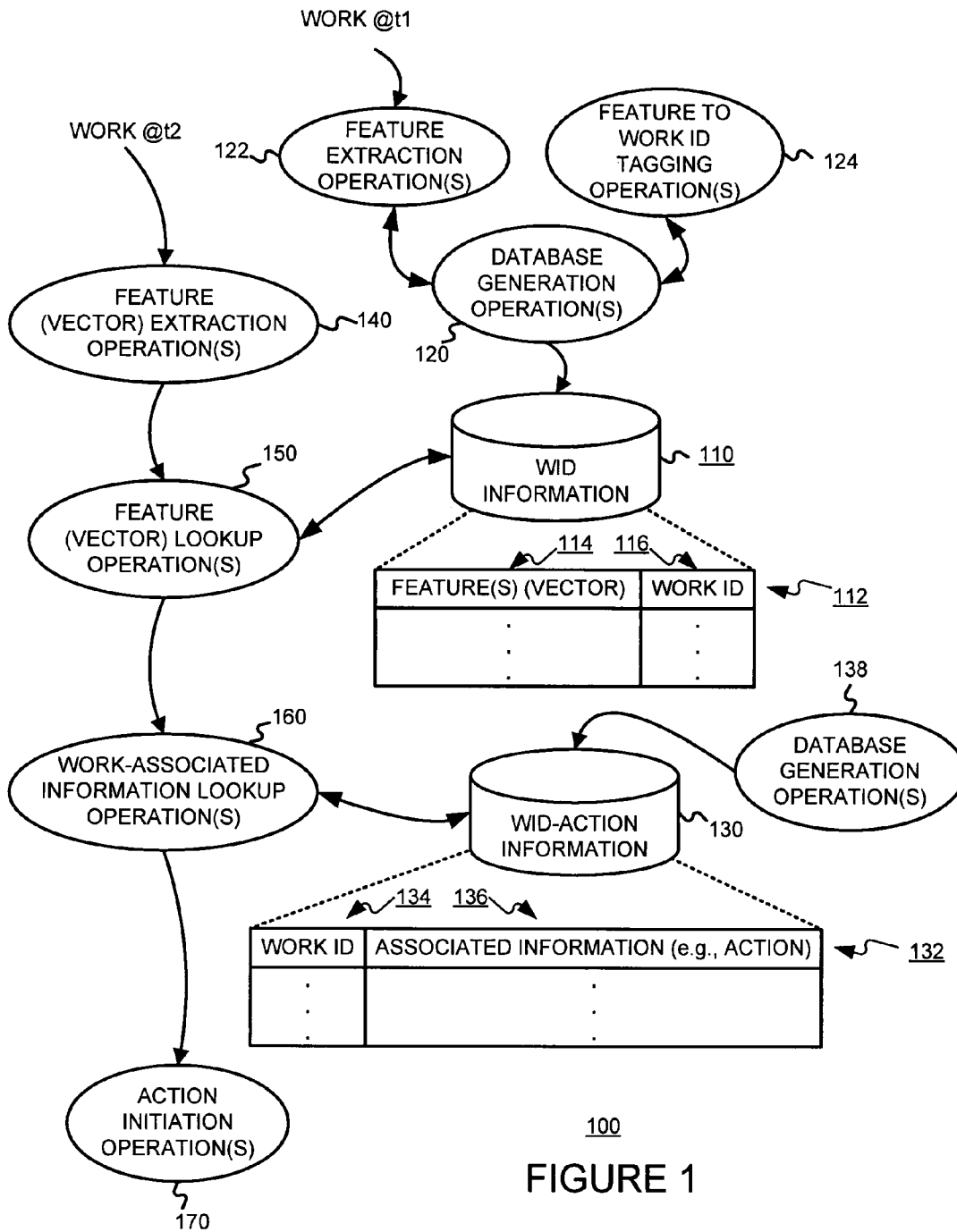
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WORK @t1

WORK @t2

FEATURE EXTRACTION OPERATION(S) — 122

FEATURE TO WORK ID TAGGING OPERATION(S) — 124

FEATURE (VECTOR) EXTRACTION OPERATION(S) — 140

DATABASE GENERATION OPERATION(S) — 120

FEATURE (VECTOR) LOOKUP OPERATION(S) — 150

WID INFORMATION — 110

FEATURE(S) (VECTOR)	WORK ID
.	.
.	.
.	.

114 116 112

138

WORK-ASSOCIATED INFORMATION LOOKUP OPERATION(S) — 160

WID-ACTION INFORMATION — 130

DATABASE GENERATION OPERATION(S)

WORK ID	ASSOCIATED INFORMATION (e.g., ACTION)
.	.
.	.
.	.

134 136 132

ACTION INITIATION OPERATION(S) — 170

100

FIGURE 1

DOCKET ALARM

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