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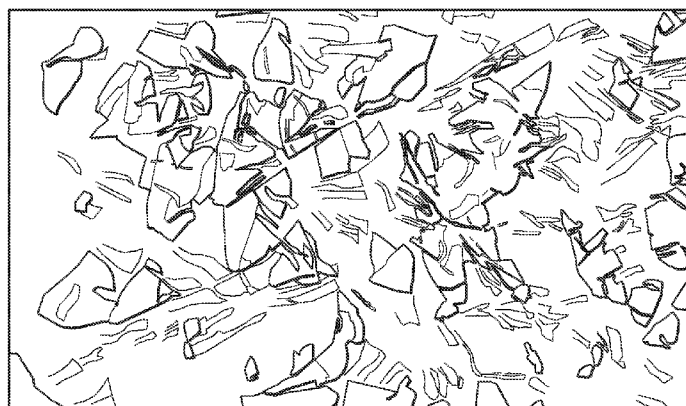


FIG. 1

(57) Abstract: The disclosed embodiments include a method, apparatus, and computer program product for generating hybrid computational meshes around complex and discrete fractures for the purpose of reservoir simulation. For example, one disclosed embodiment is a computer-implemented method for modeling three-dimensional (3D) geological fractures. The method includes receiving a set of 3D fracture surfaces with geometry that has been discretized in a two-dimensional (2D) manifold by a collection of polygons. The method defines a family of non-intersecting 2D slicing surfaces for slicing the set of 3D fracture surfaces. The method then uses the intersection of the 2D slicing surface with the 2D manifolds defining the fracture surfaces to create a set of 2D fractures on each slicing surface. Following a series of steps, the method logically connects 2D fracture cells corresponding to each fracture from each slicing surface to its above/below neighbors to simulate three-dimensional geology using two-dimensional elements.

