In Search of an Impossible Object

Philipp Schmitt

The New School
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This booklet follows a computer's attempts to generate a drawing of an impossible object using generative artificial neural networks. The system was trained with images of optical illusions and patent illustrations.

Impossible objects are impossible due to the fact they are at odds with the real world. Or so we think. Although an impossible object might defy gravity or concepts of mass, physics also provides ways of reasoning for its plausibility.

A square cannot be round by definition, it seems. But quantum physics tells us that subatomic particles can be in two places at the same time. Researchers have even created a quantum object visible to the naked eye: a tiny piece of metal, less than 0.1mm long, that was vibrating and not vibrating simultaneously.[1] Perhaps, impossible objects become possible as quantum objects?

String theory is another refuge for impossible objects. In our day to day lives we seem to be stuck in the four dimensions we can perceive: x, y, z, and t — width, depth, height, and time. String theorists, however, argue that the world might consist of 10, 11, 26 or more dimensions.[2] In four dimensions, a circle can become a square over time, but it might simultaneously be both in the eleventh dimension. In other words a round square, or any object that seems impossible in four dimensions, could be quite ordinary in an eleven-dimensional world. The challenge then would be to make it visible.

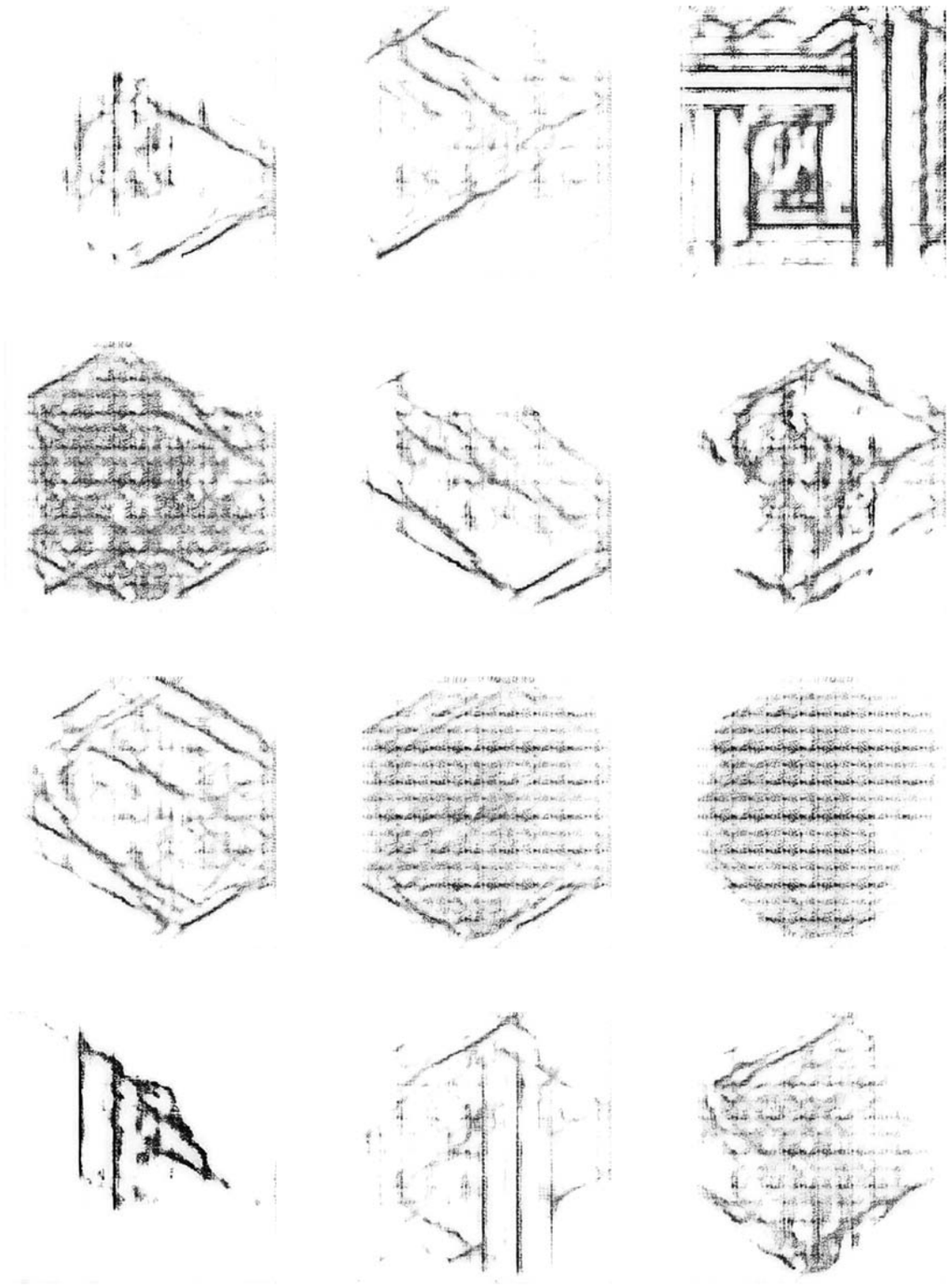
In math, describing an object in more than three dimensions is nothing out of the ordinary and computers excel at it. Artificial neural networks, a technology for machine learning, encode information in a high-dimensional space not bound to the laws of physics but based solely on math. This so-called "latent space" (from the Latin for hidden) is a concealed, mathematically-defined landscape we can create and navigate, but never visualize. For the sake of this exercise, try to imagine a room that extends not in three, but thousands of directions. Here, impossible objects flow into each other in a complex, incomprehensible geometry. Any object is possible — illegibly warped into the vicinity yet ready to be found.

Rendering a picture of latent space requires (computationally) projecting a section of this landscape into the few dimensions we can perceive. This brutal simplification is the closest we can get to seeing an impossible object. As soon as it returns to the four-dimensional world, it has to adhere to its rules, and live up to its standards.

And so it disappears.

[1] O'Connell, Aaron D., et al. "Quantum ground state and single-phonon control of a mechanical resonator." Nature 464.7289 (2010): 697.

[2] Wertheim, Margaret. "How Many Dimen-sions Are There, and What Do They Do to Reality?" Aeon. January 10, 2018. https://aeon.co/essays/how-many-dimensions-are-there-and-what-do-they-do-to-reality.



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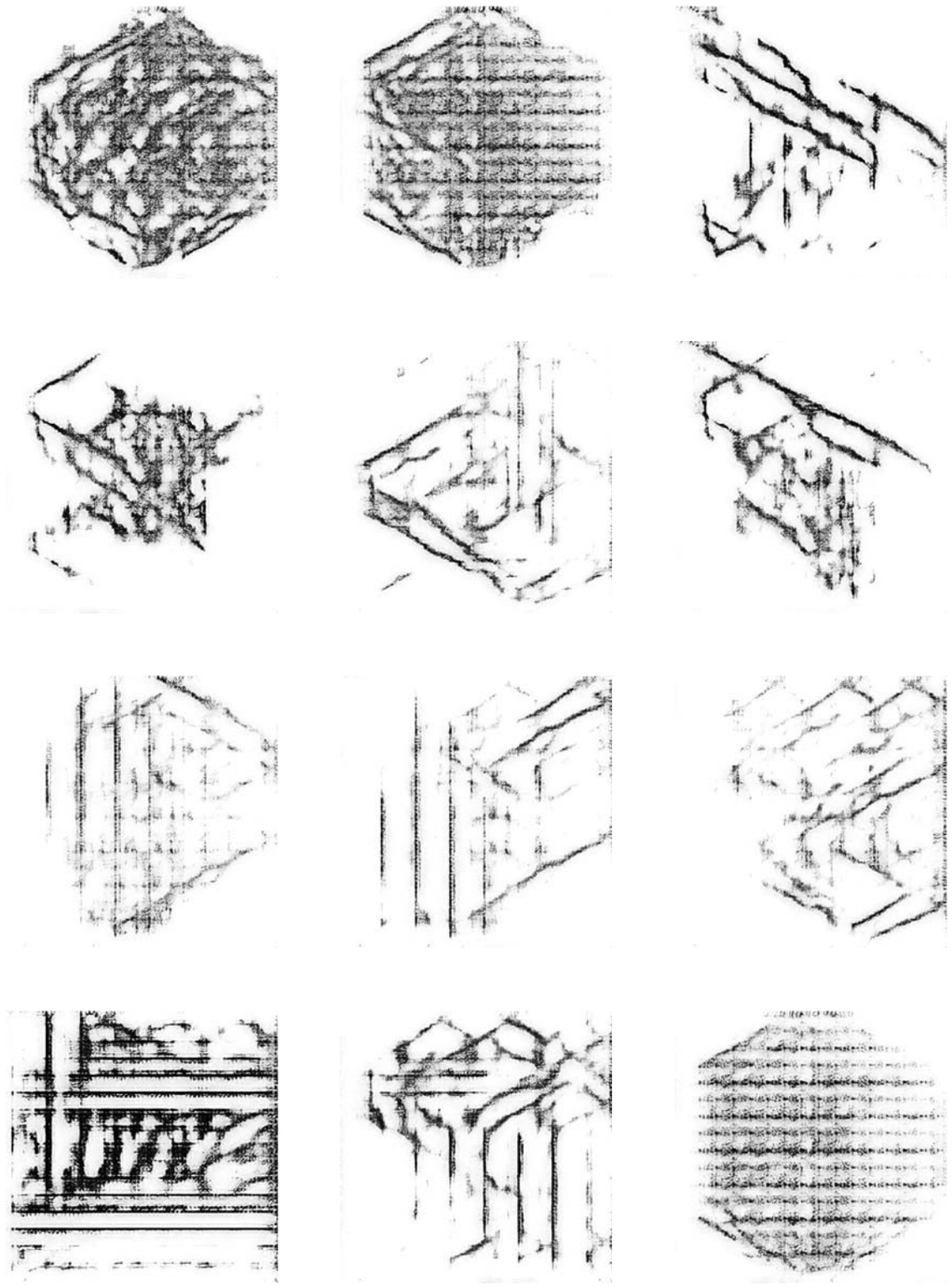

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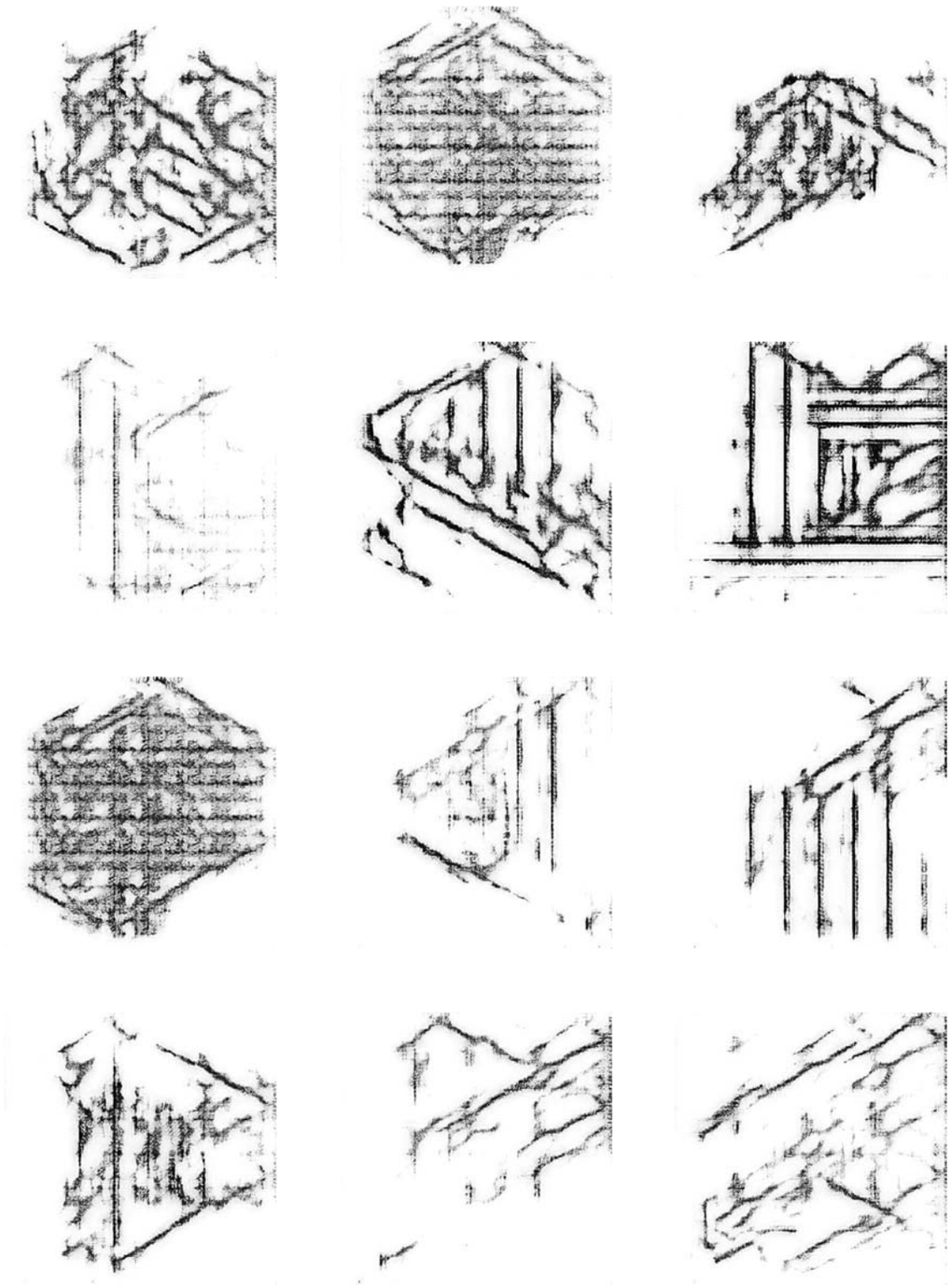

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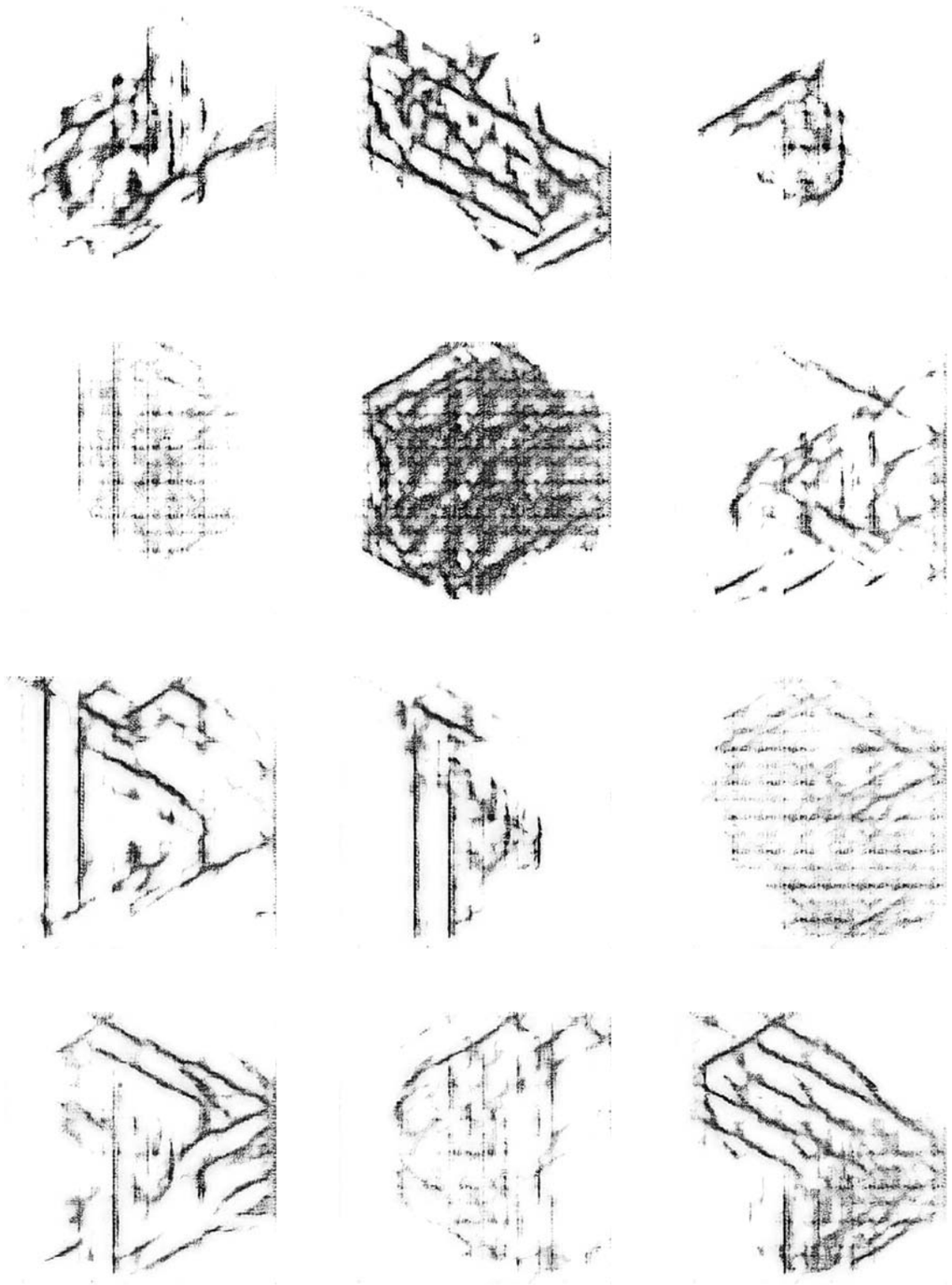

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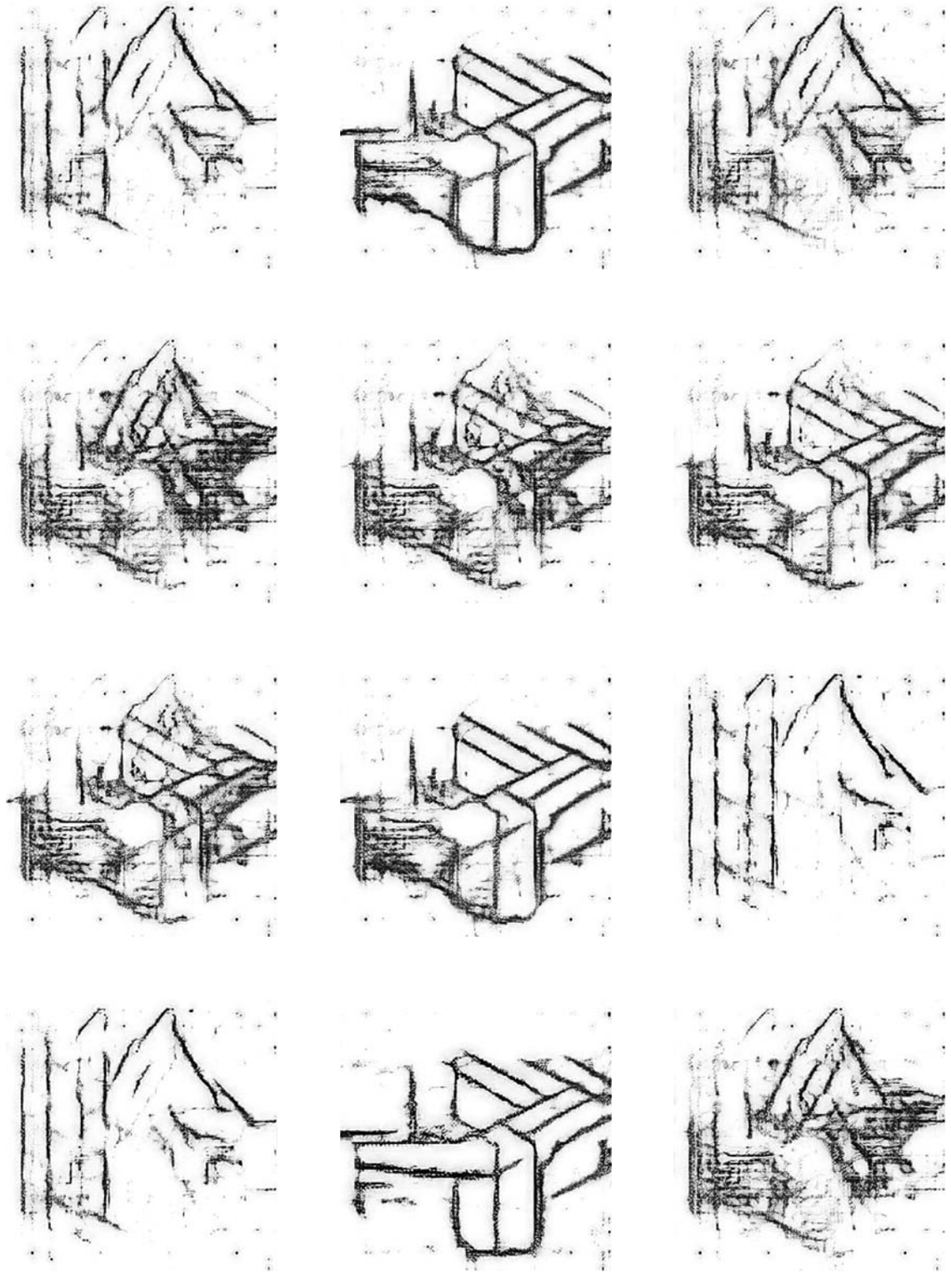

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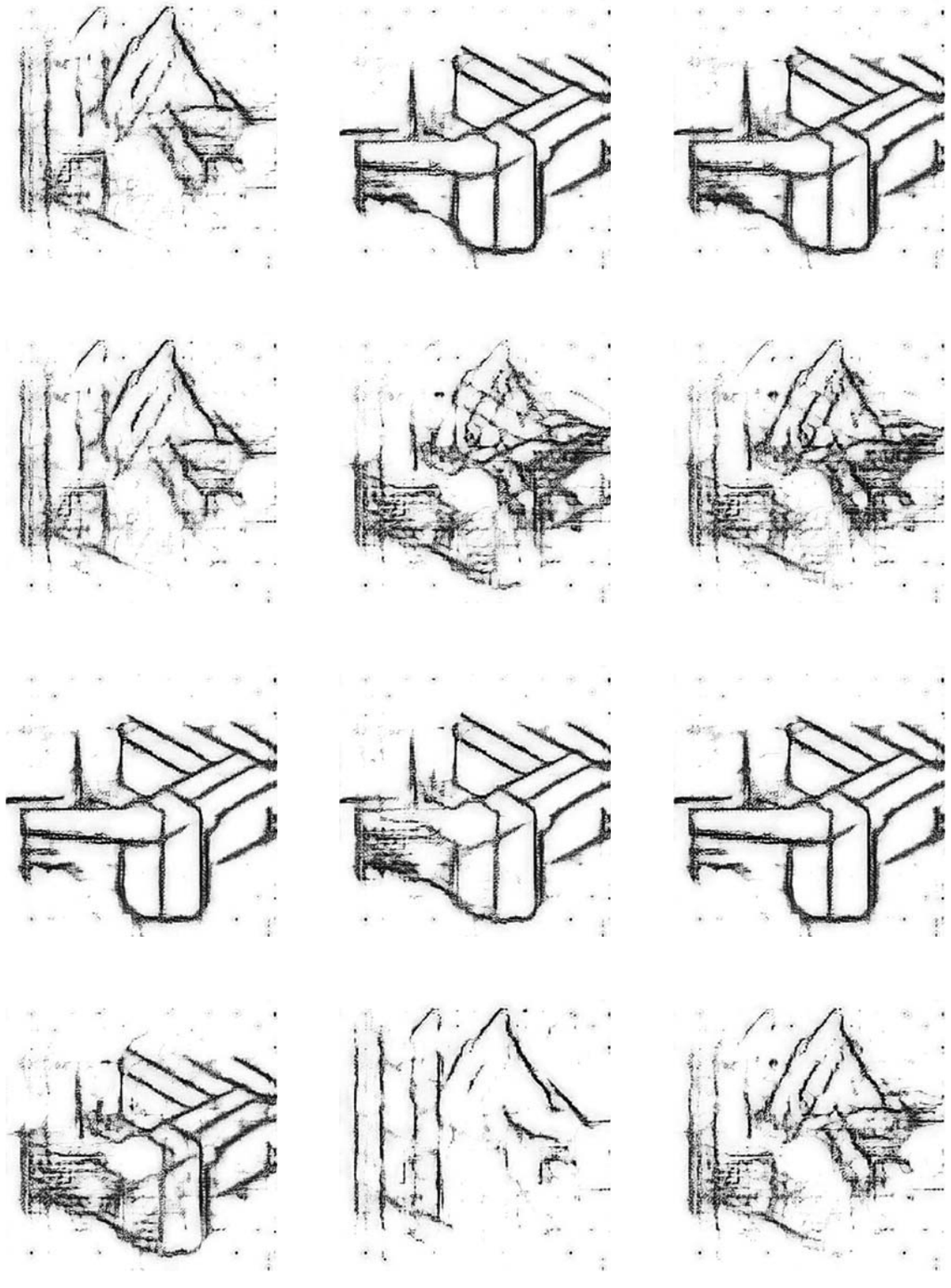

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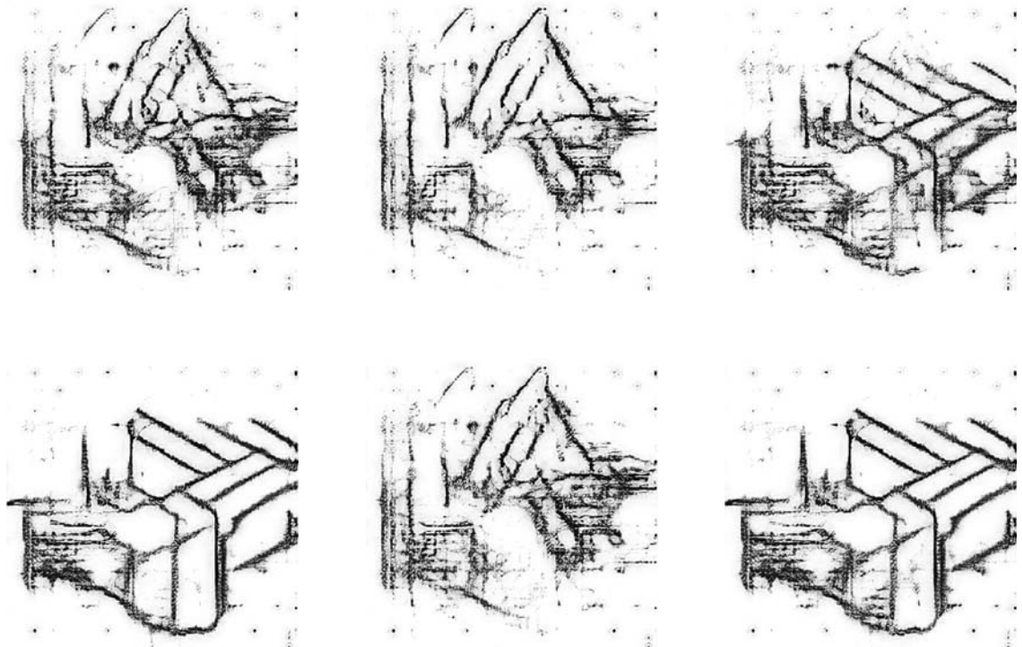

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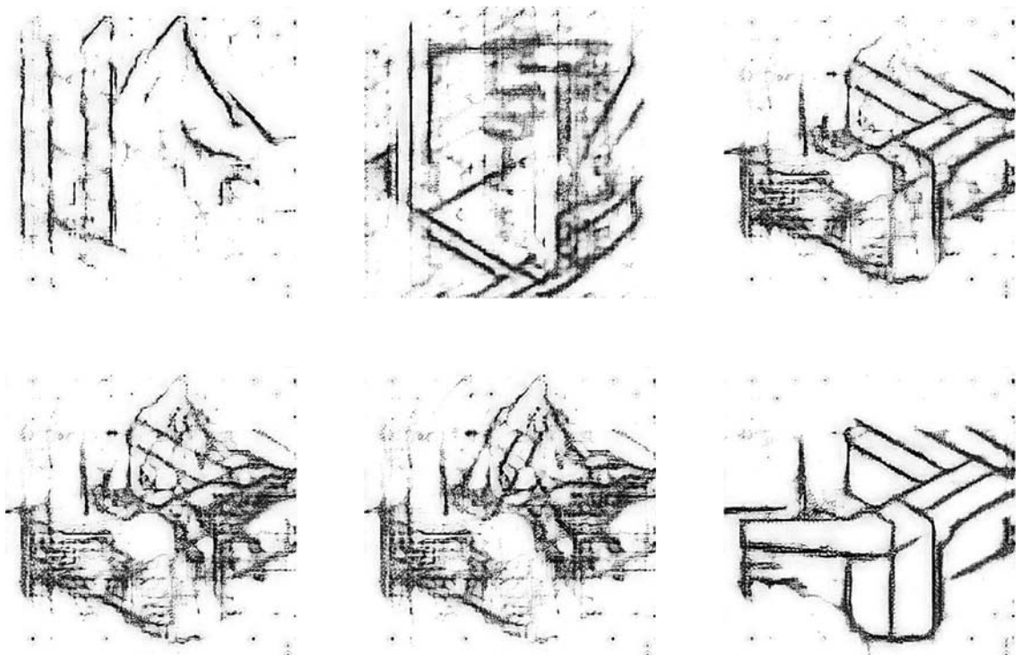

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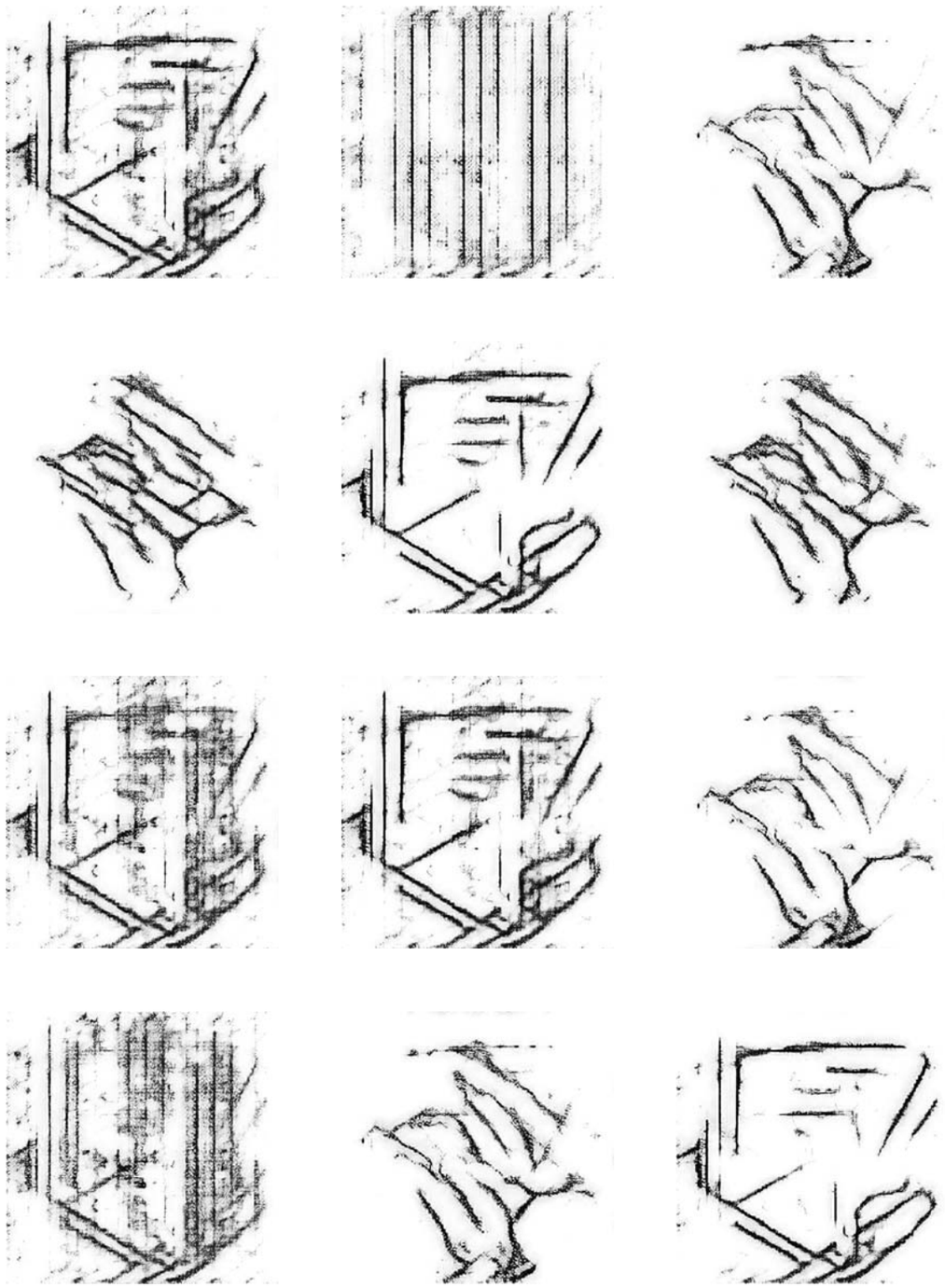

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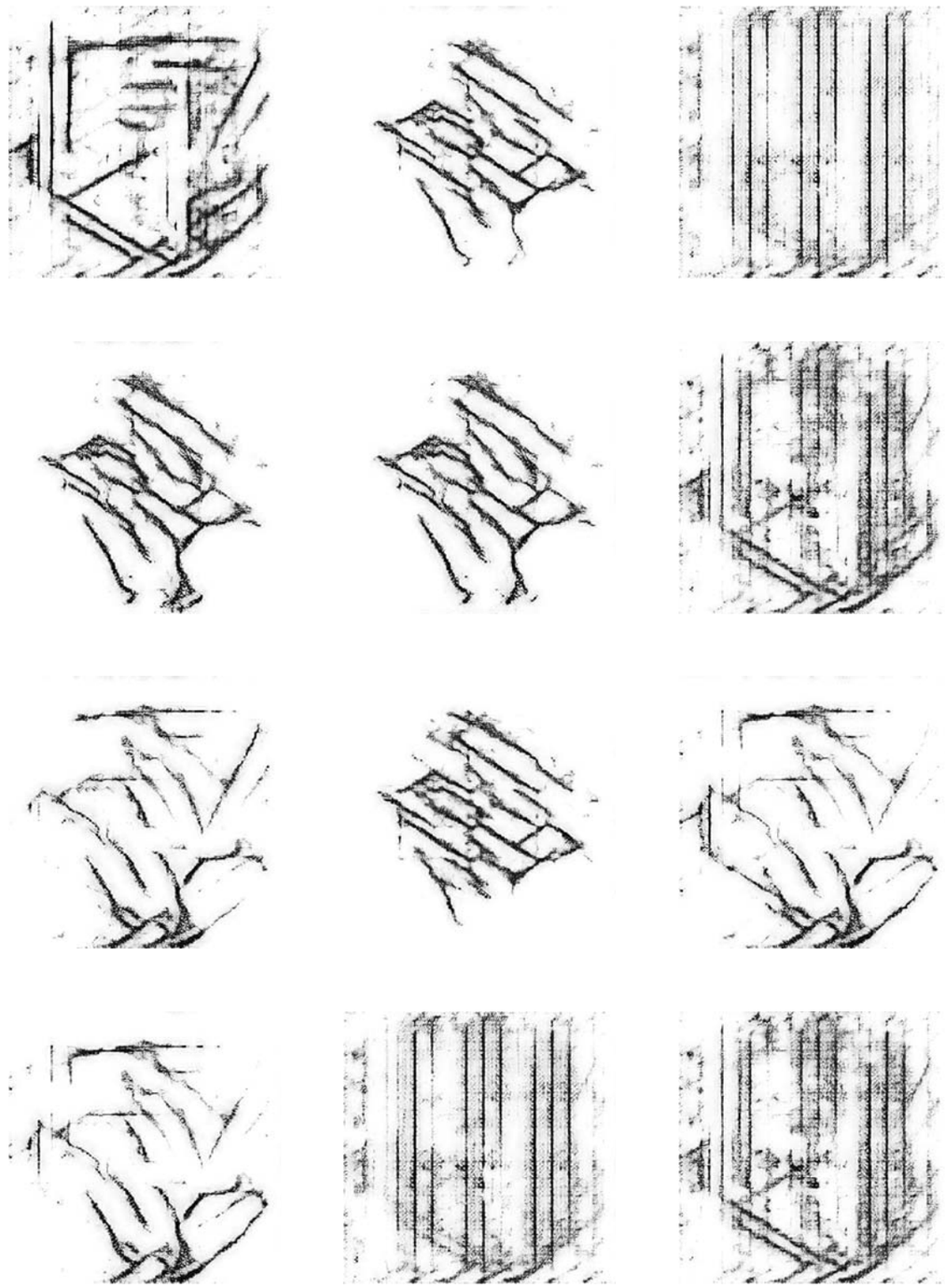

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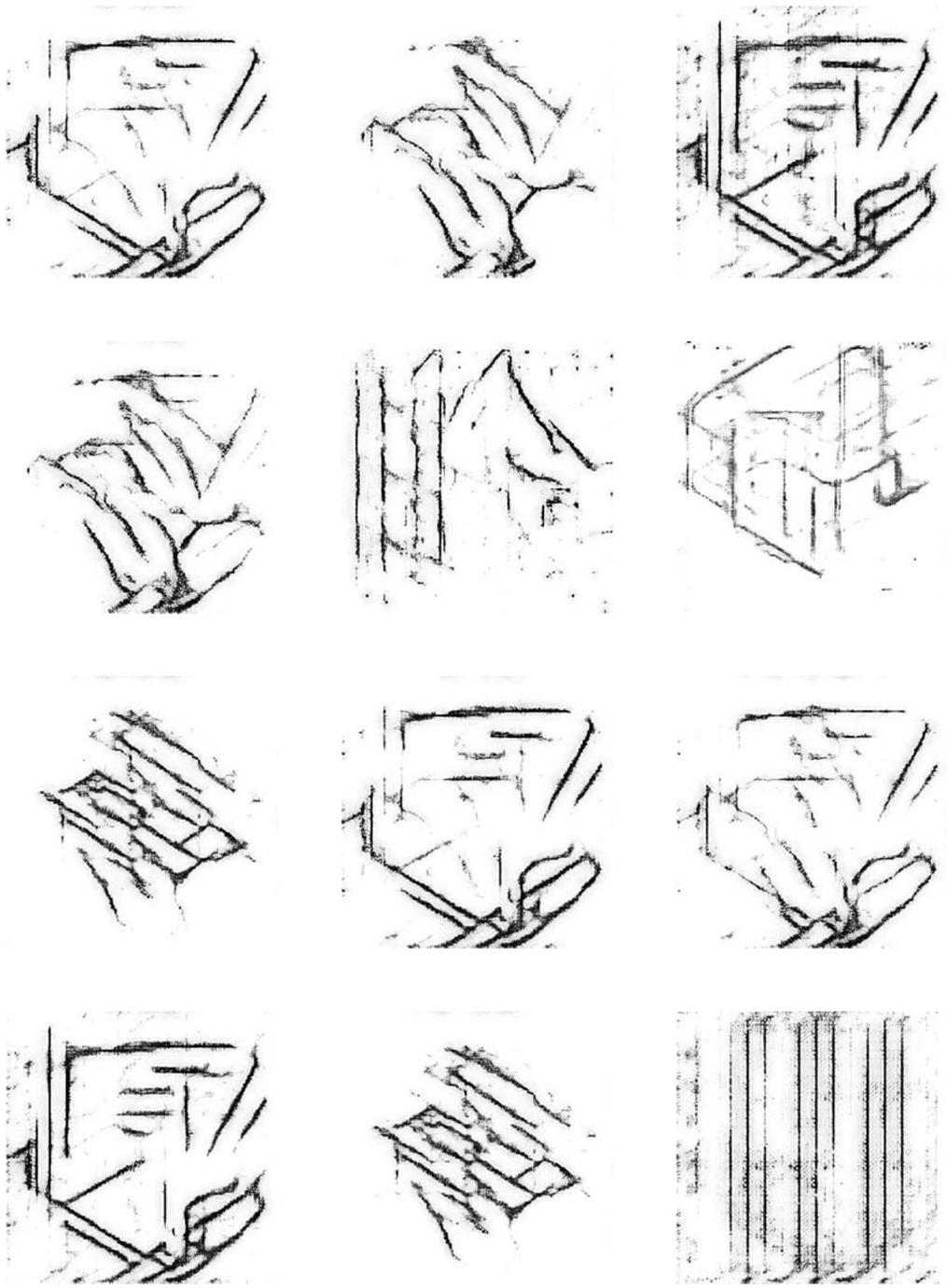

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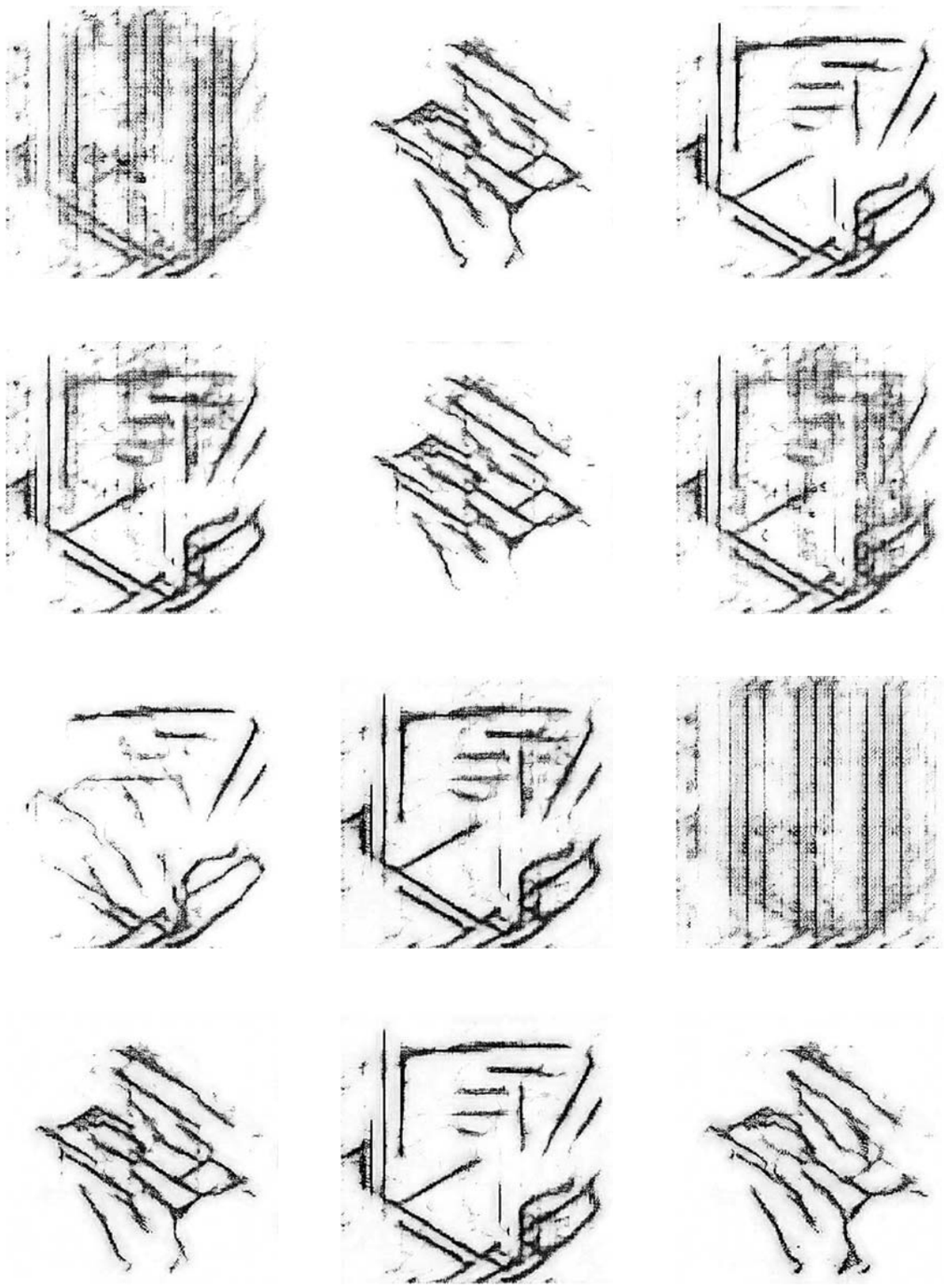

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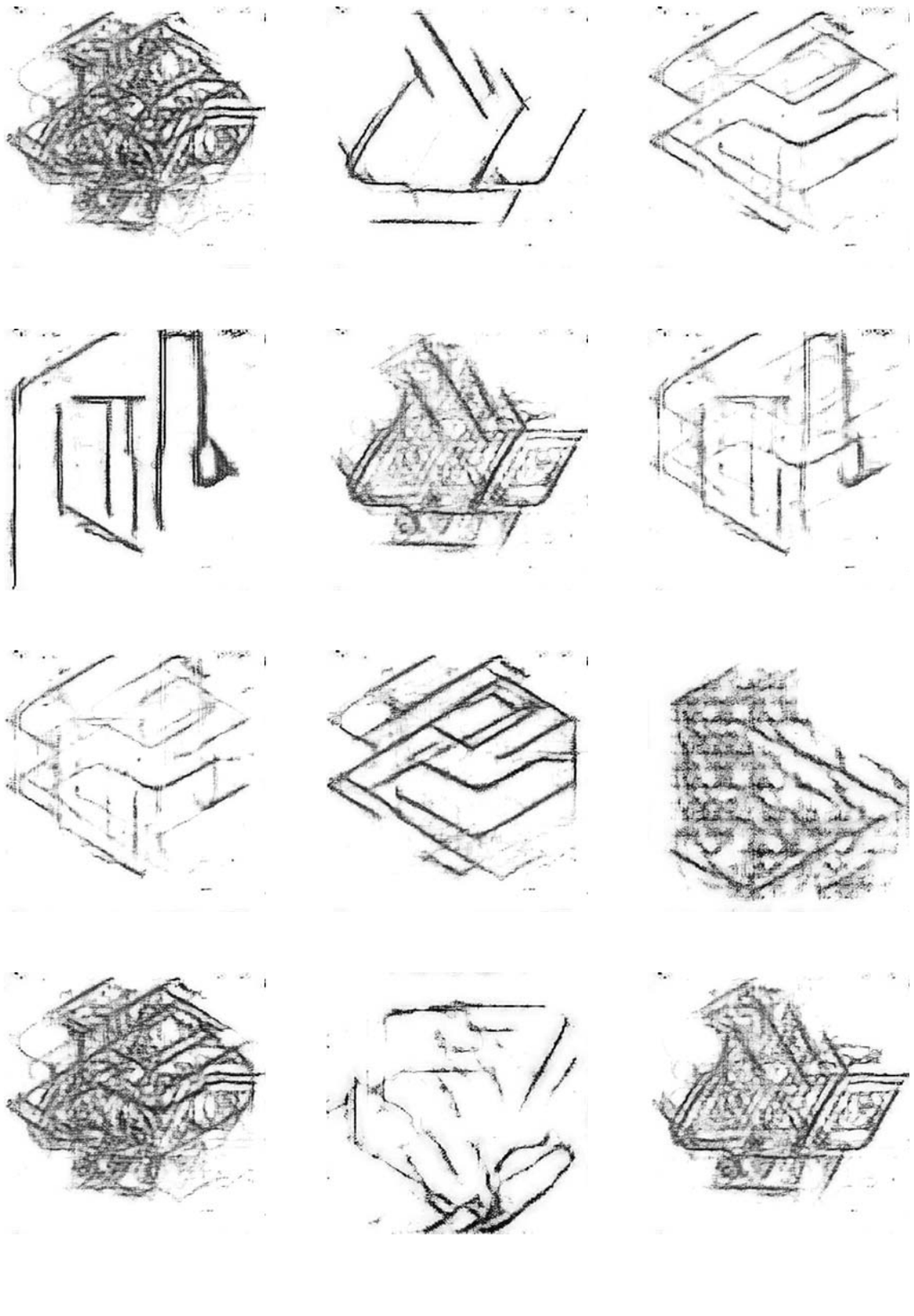

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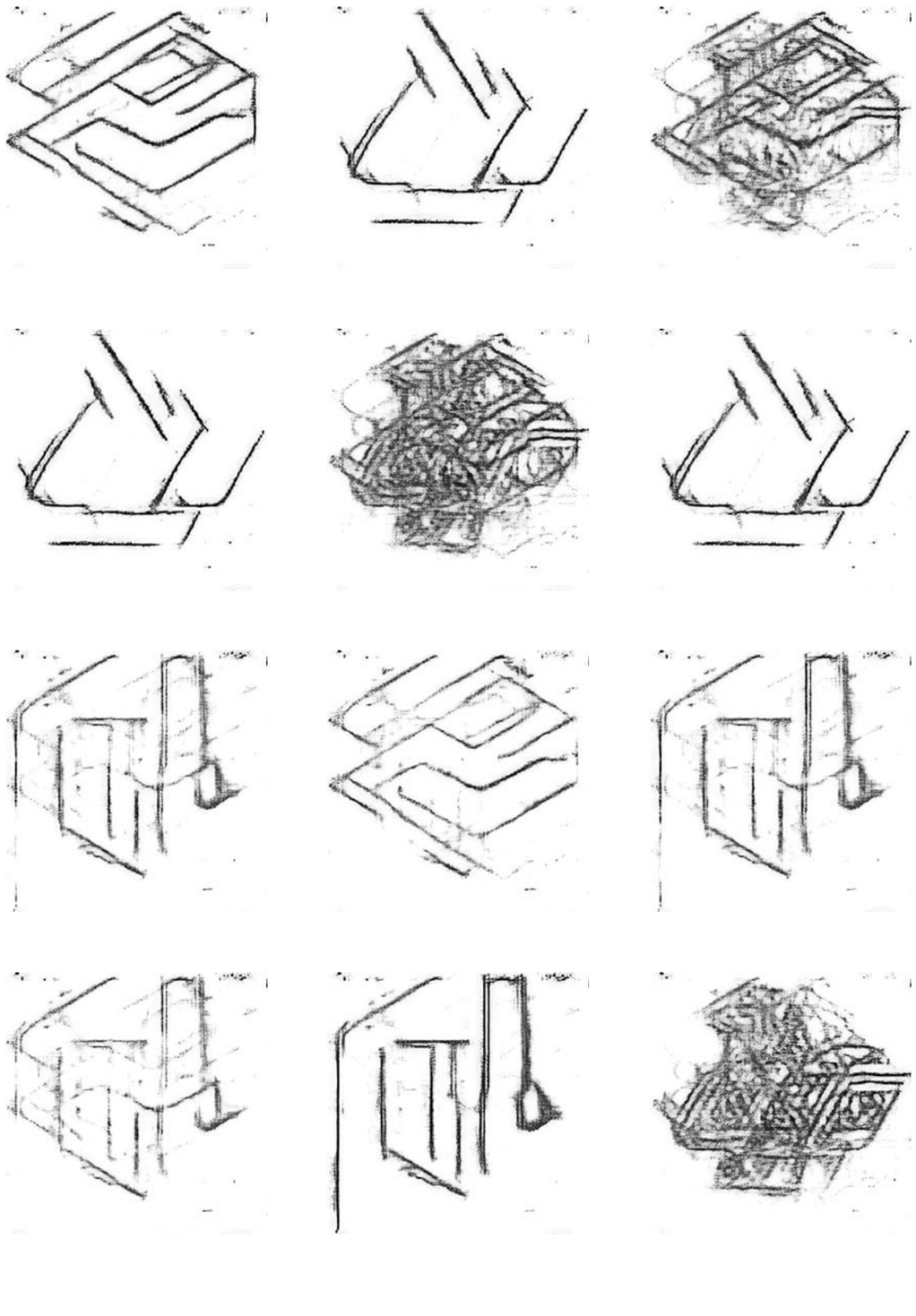

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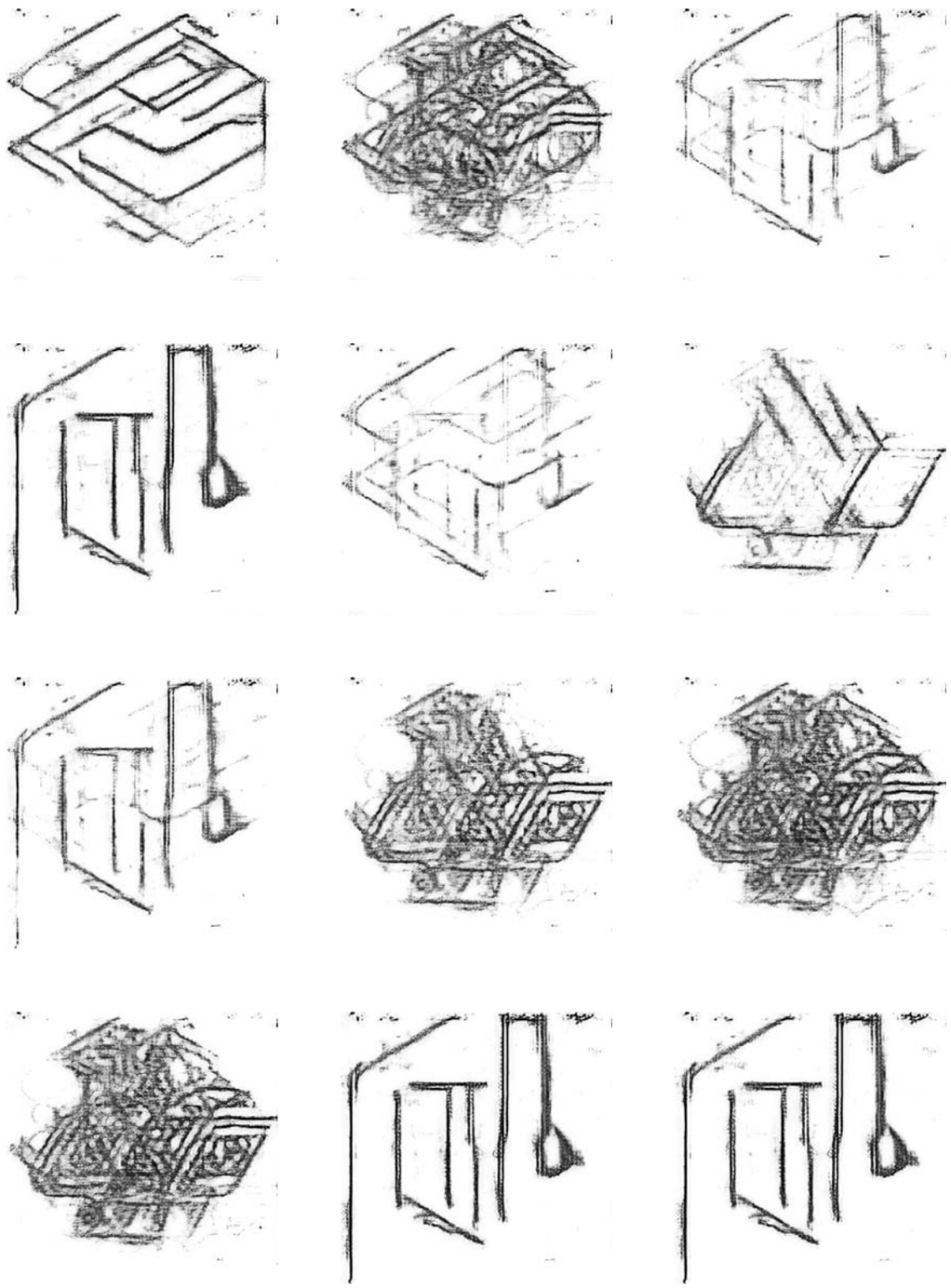

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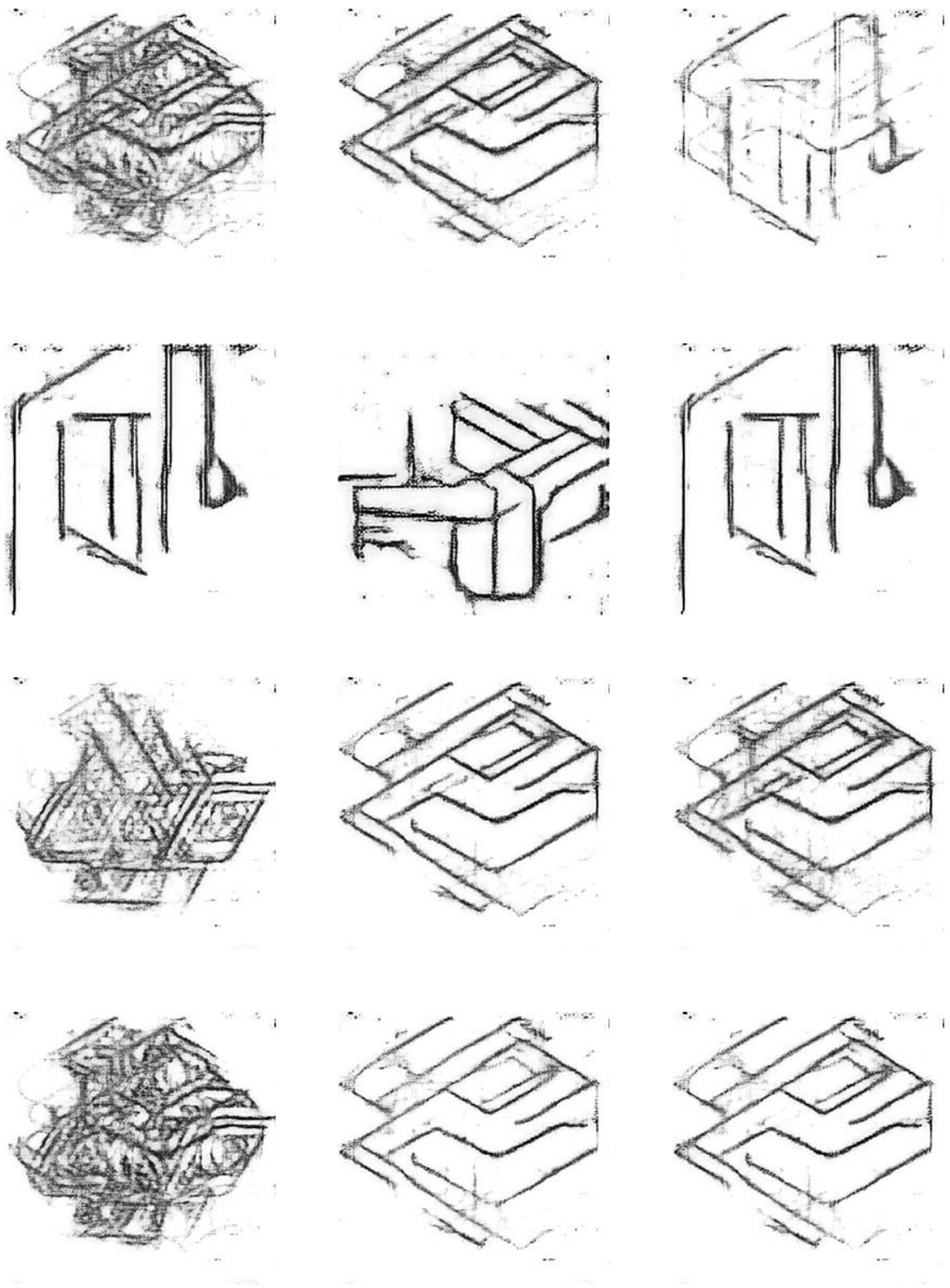

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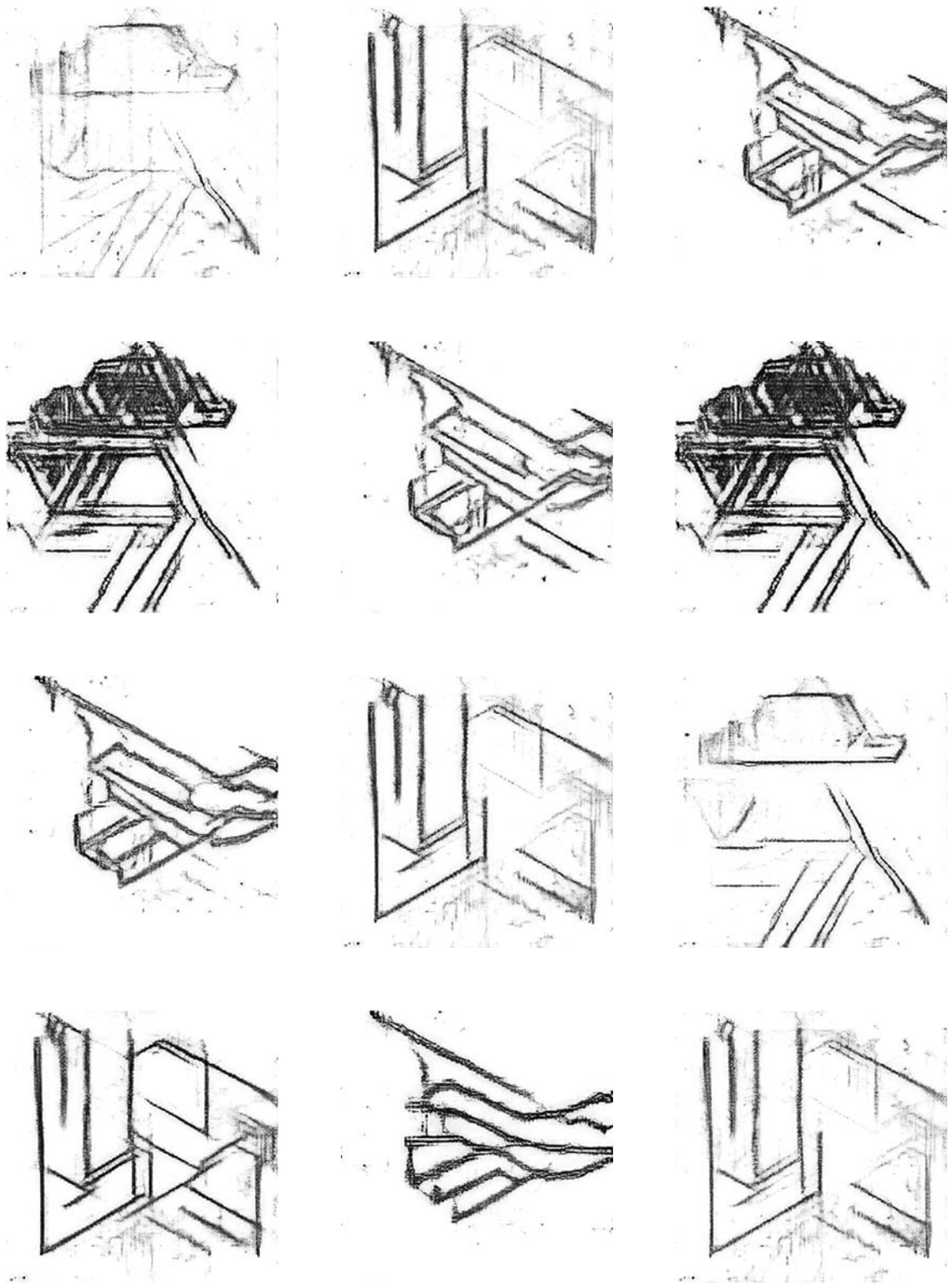

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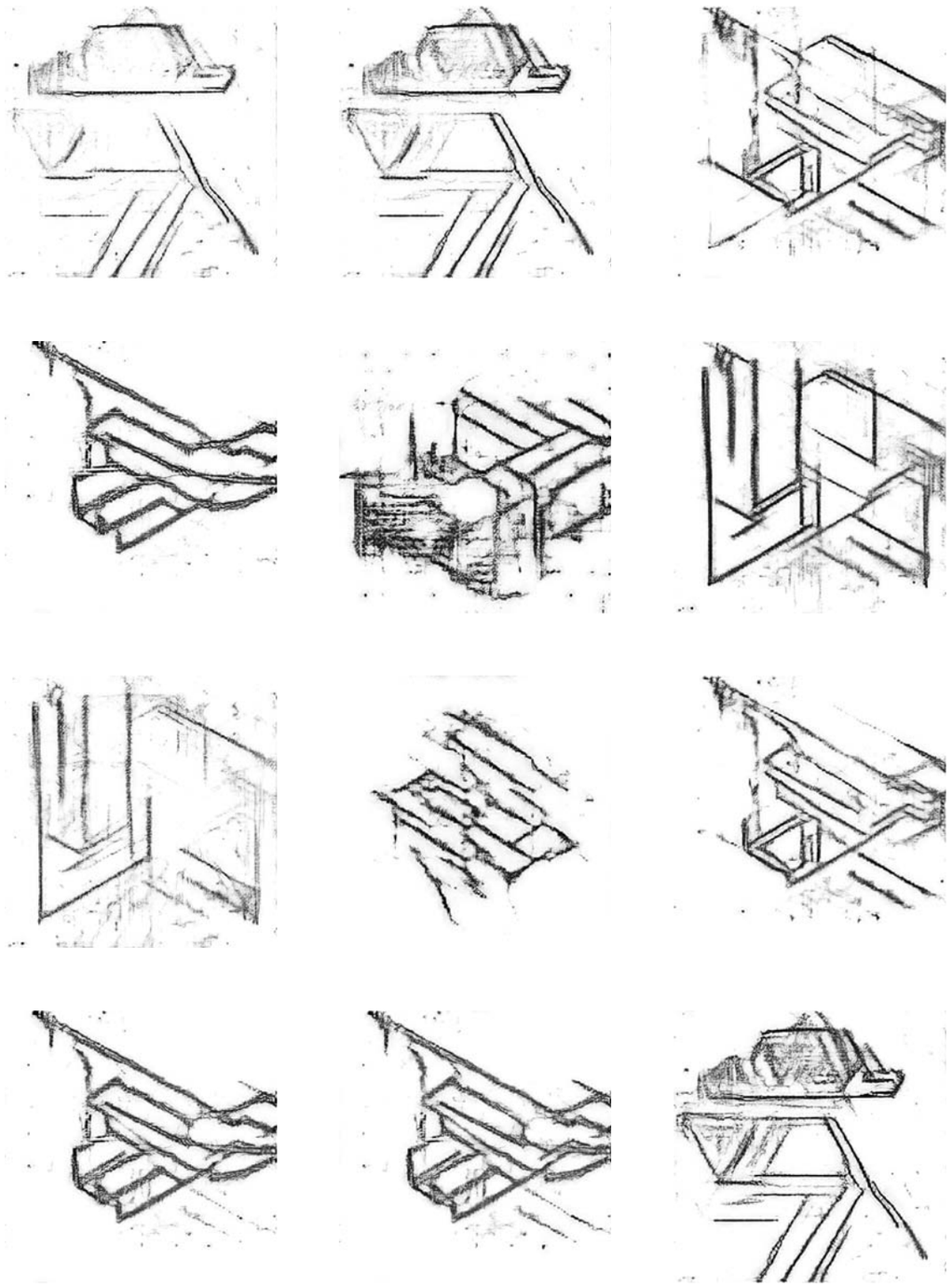

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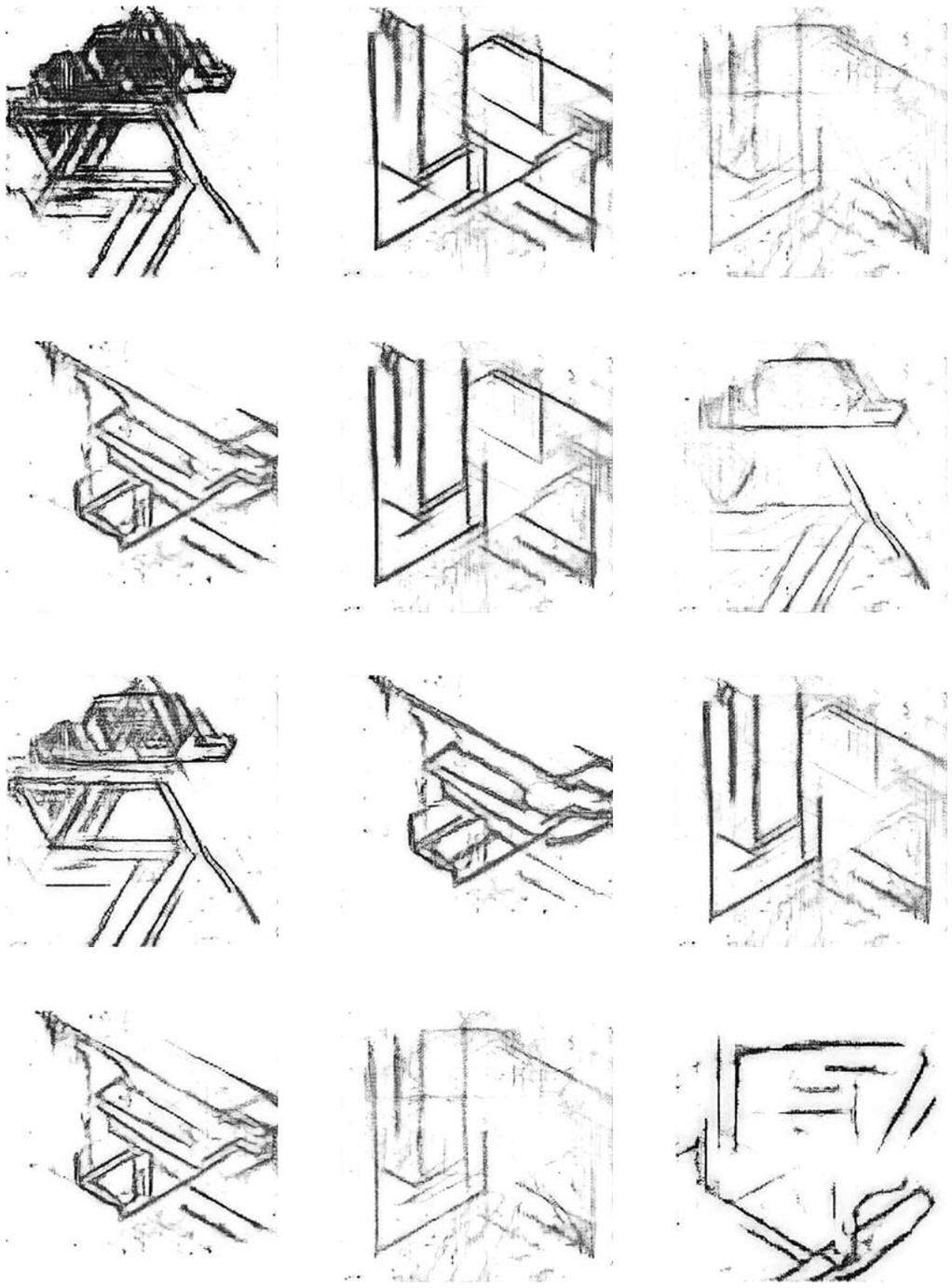

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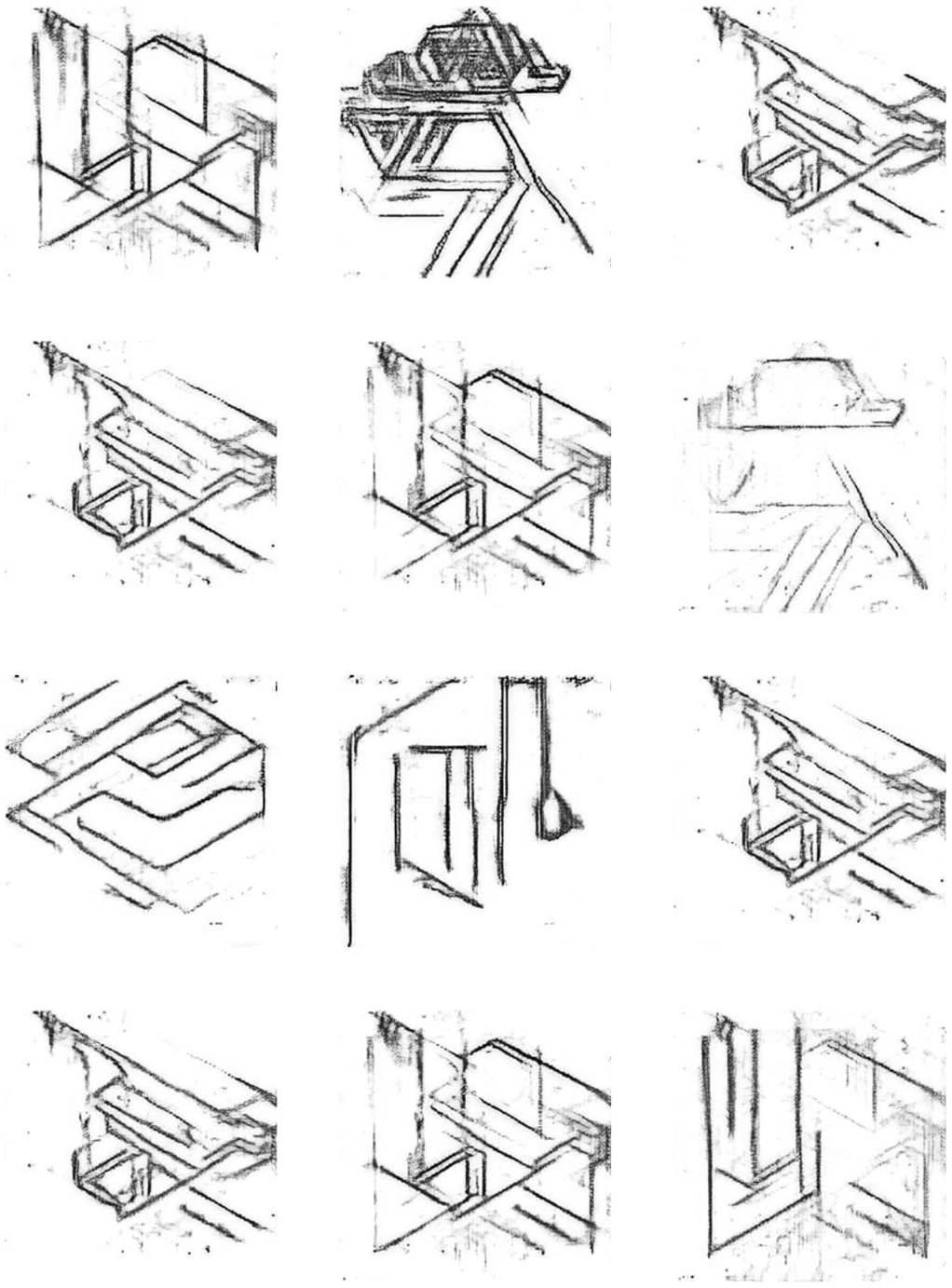

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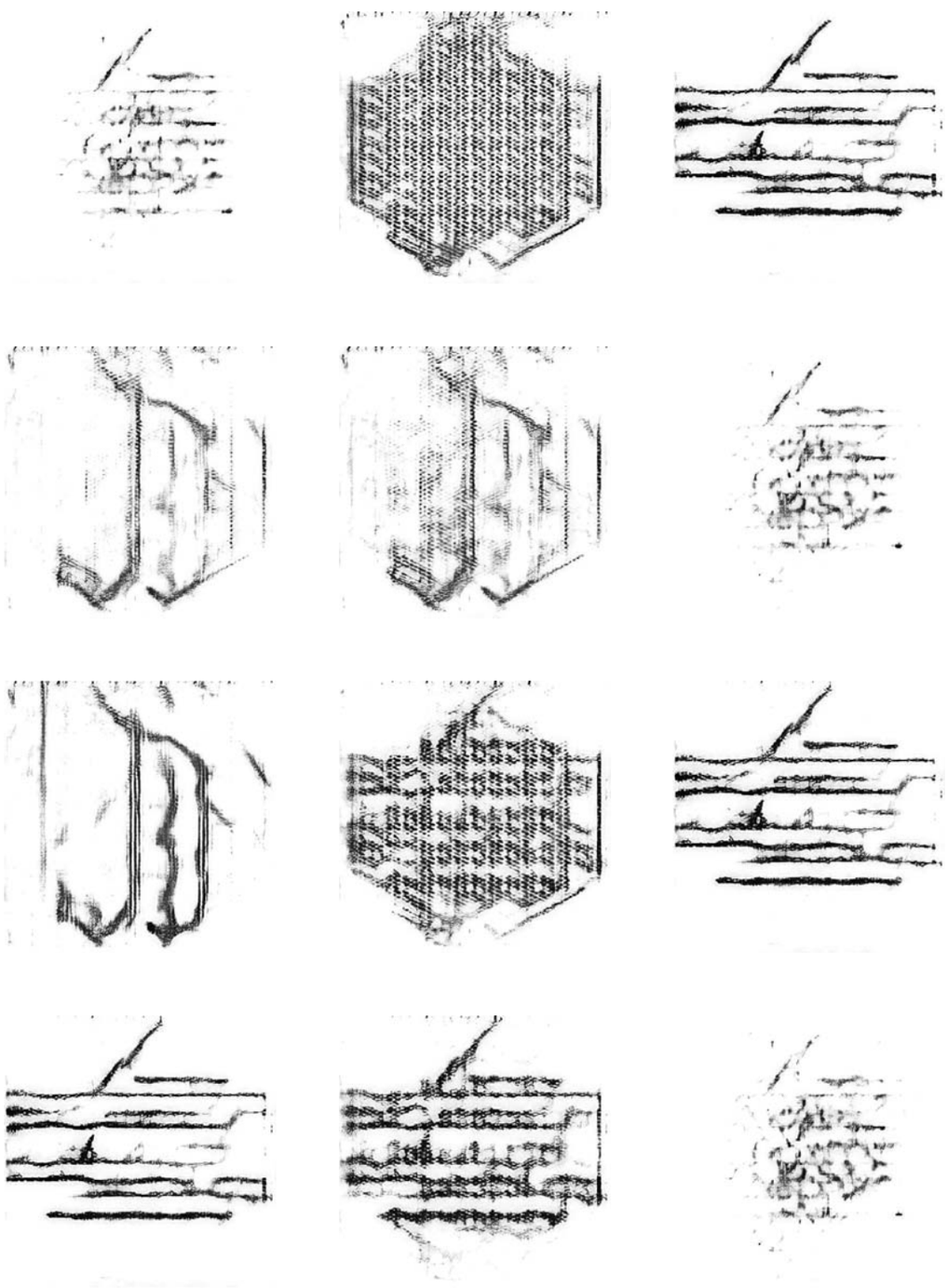

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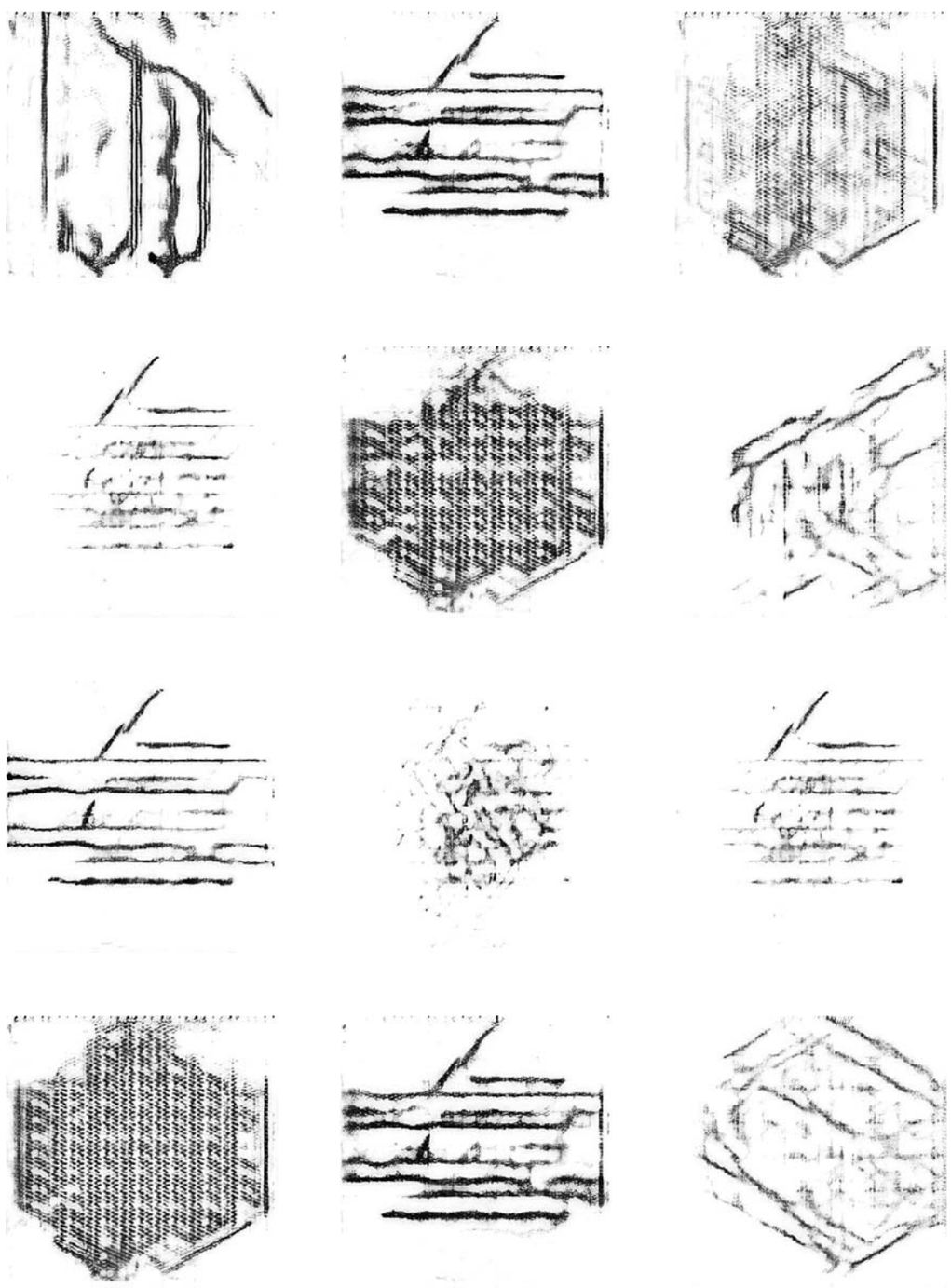

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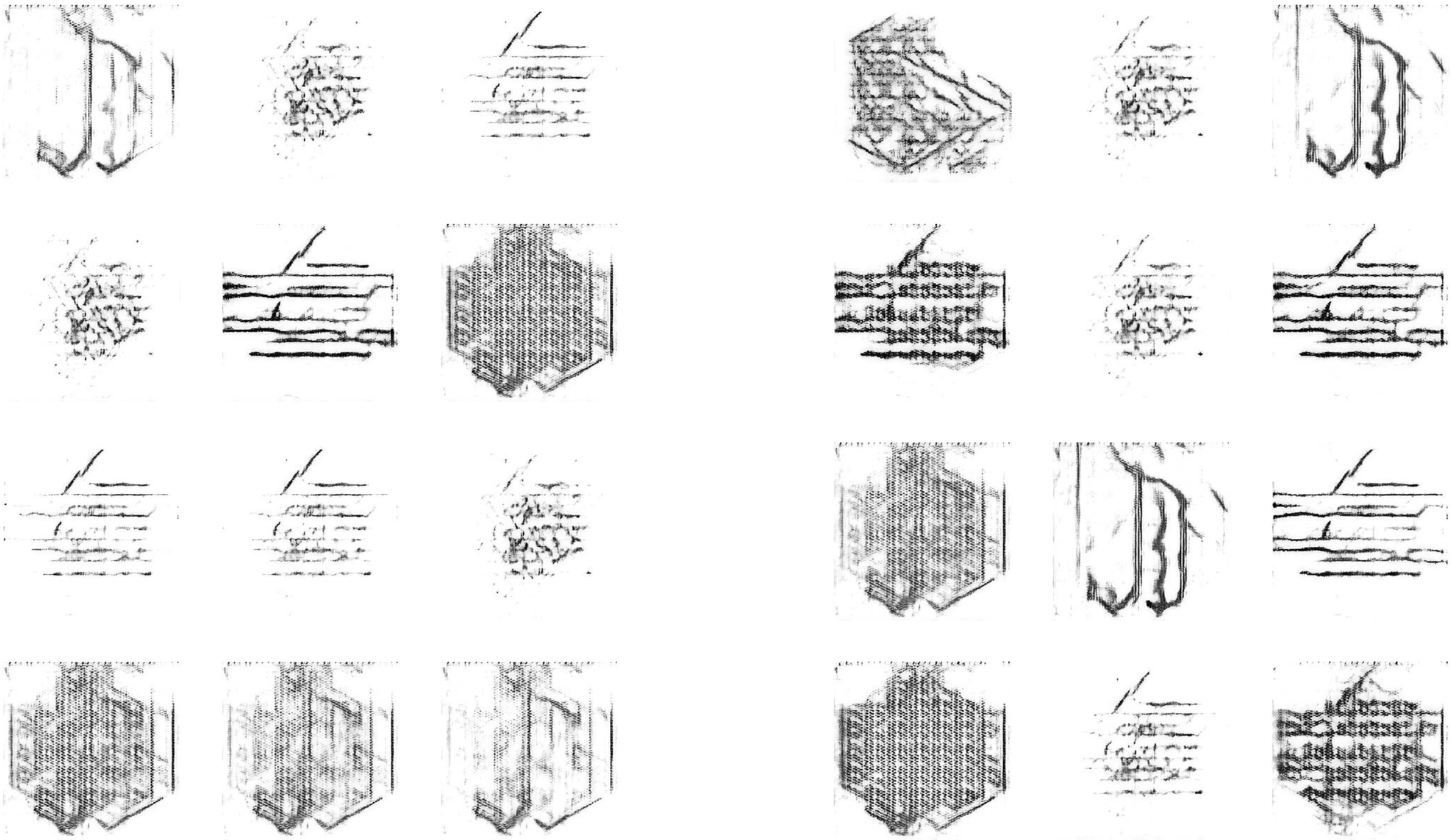

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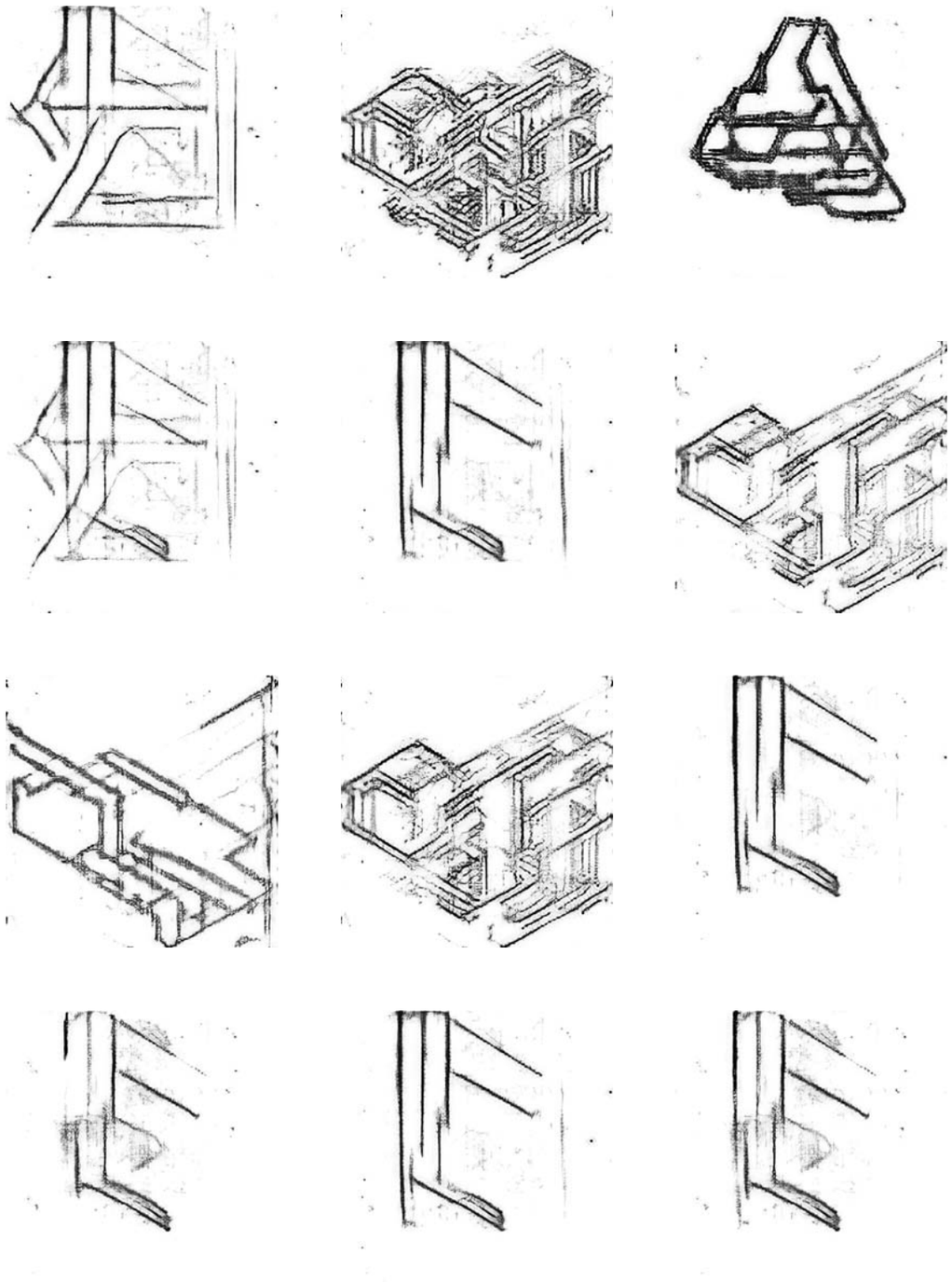

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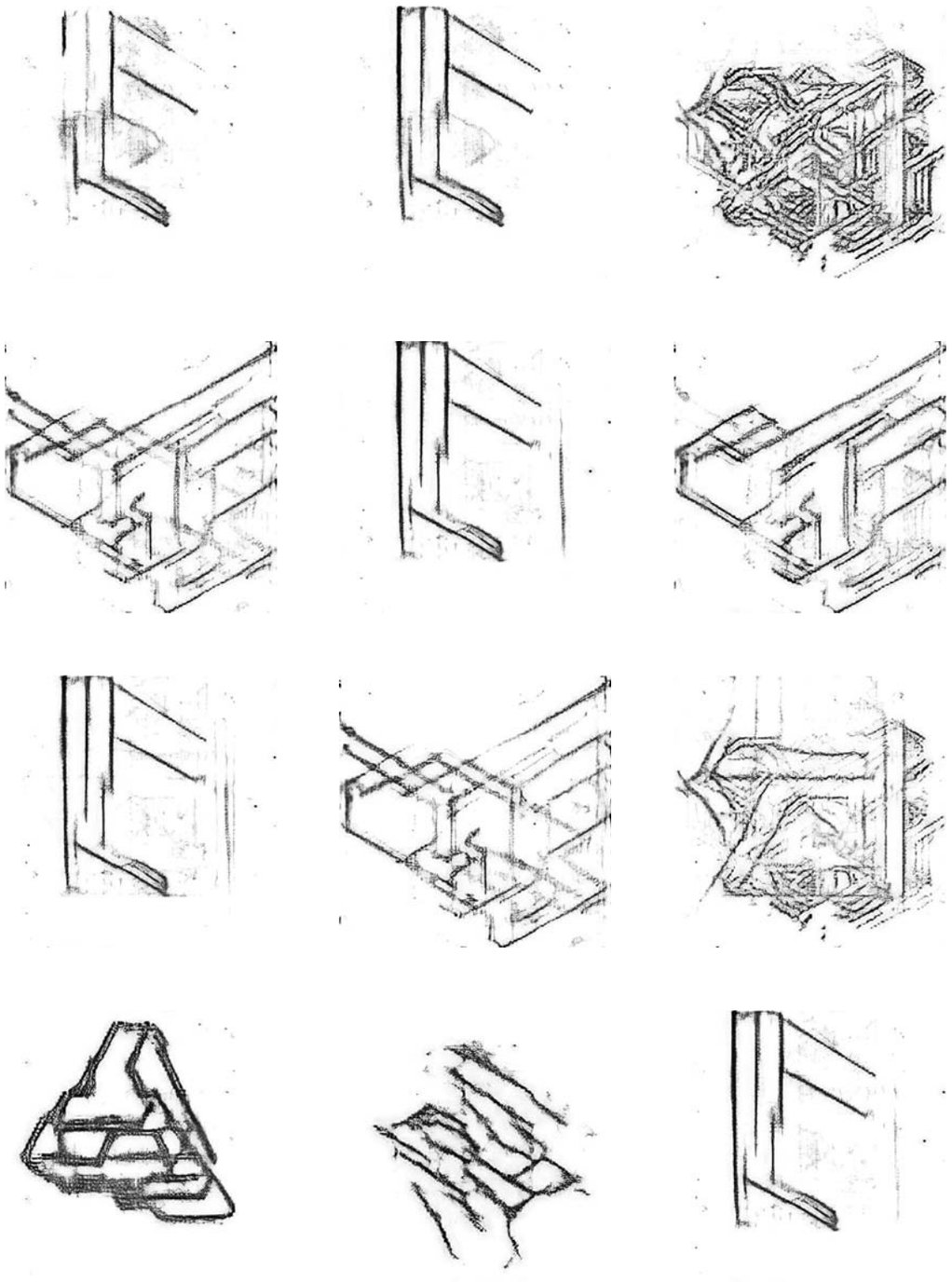

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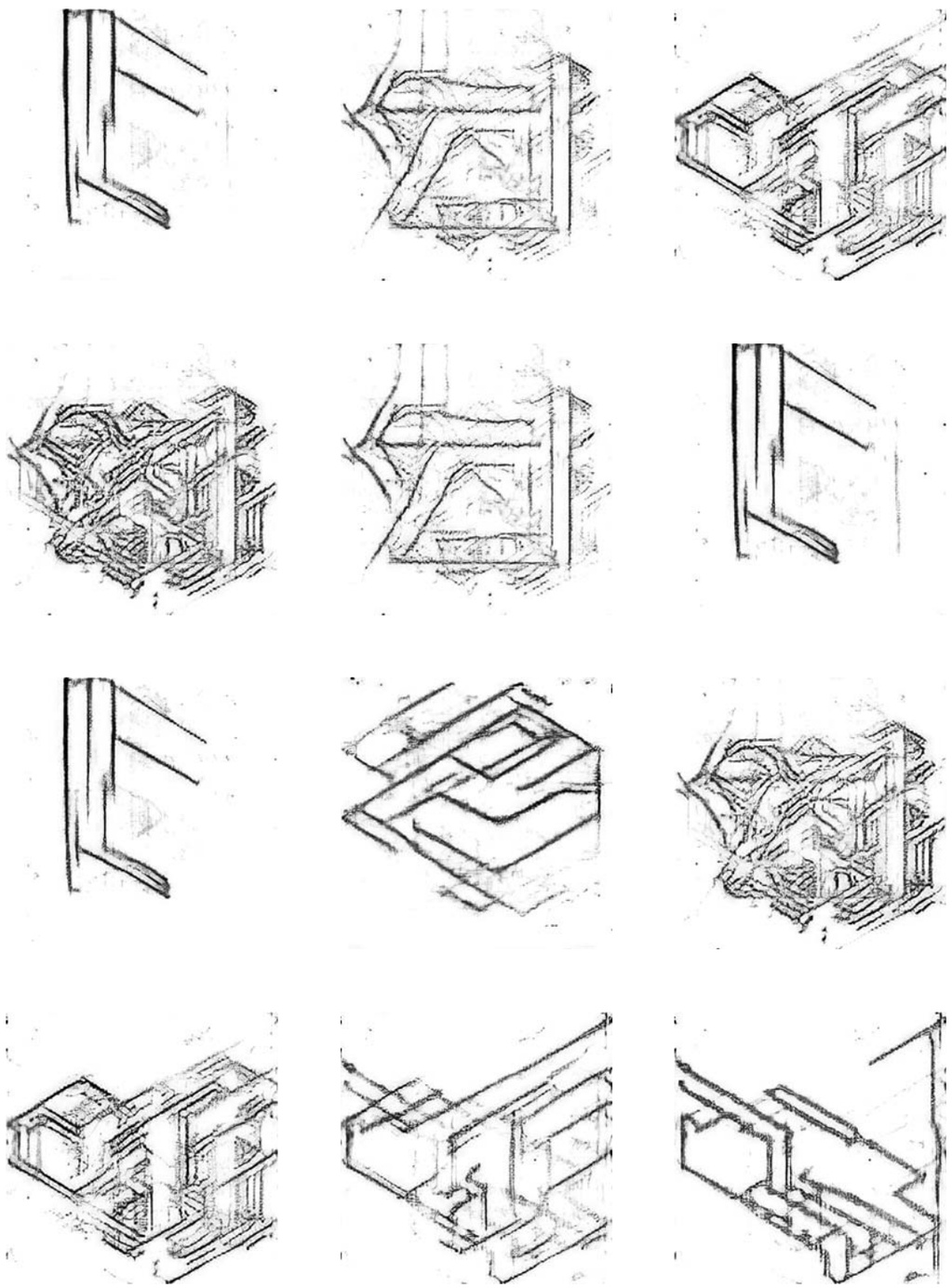

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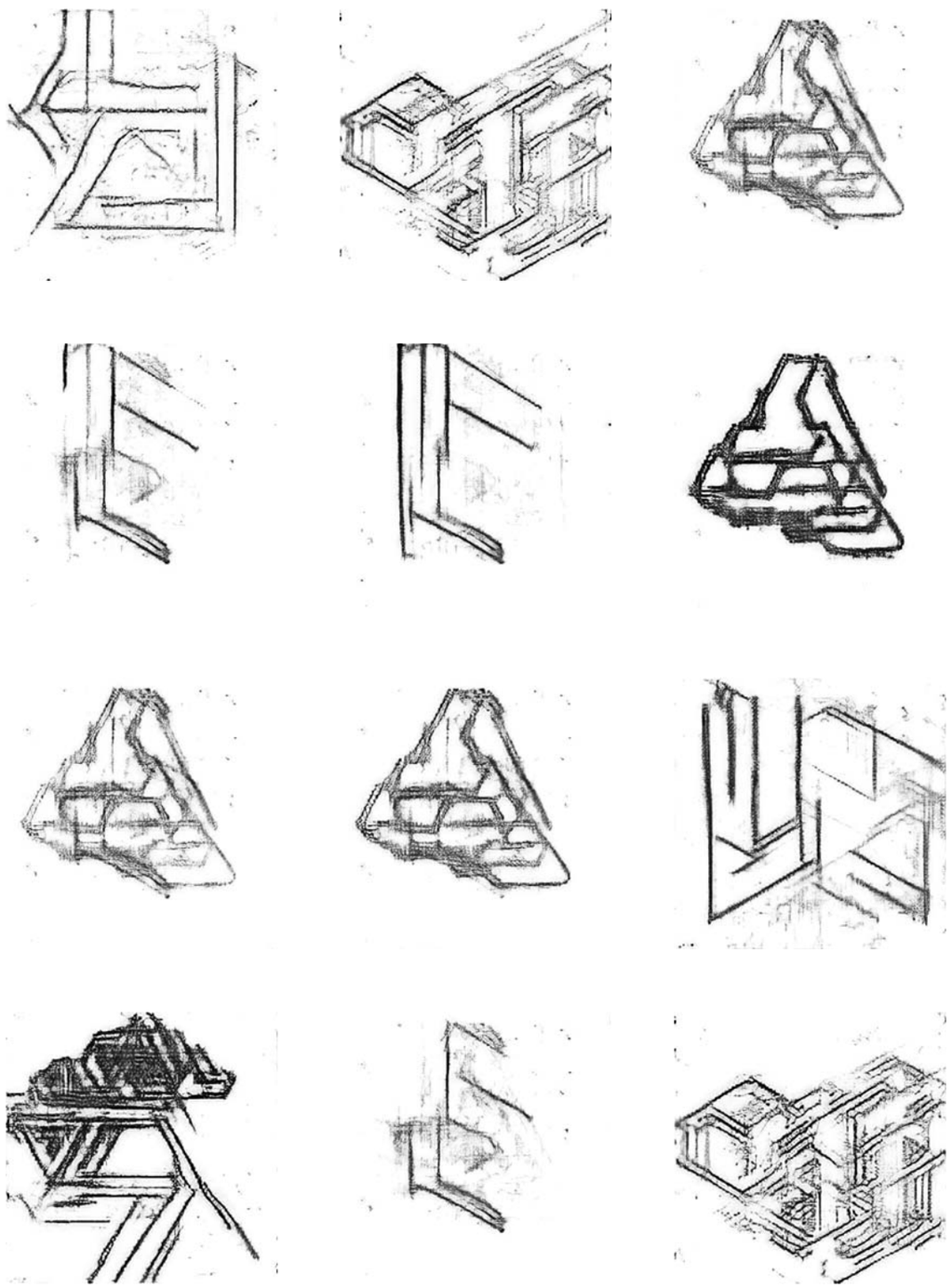

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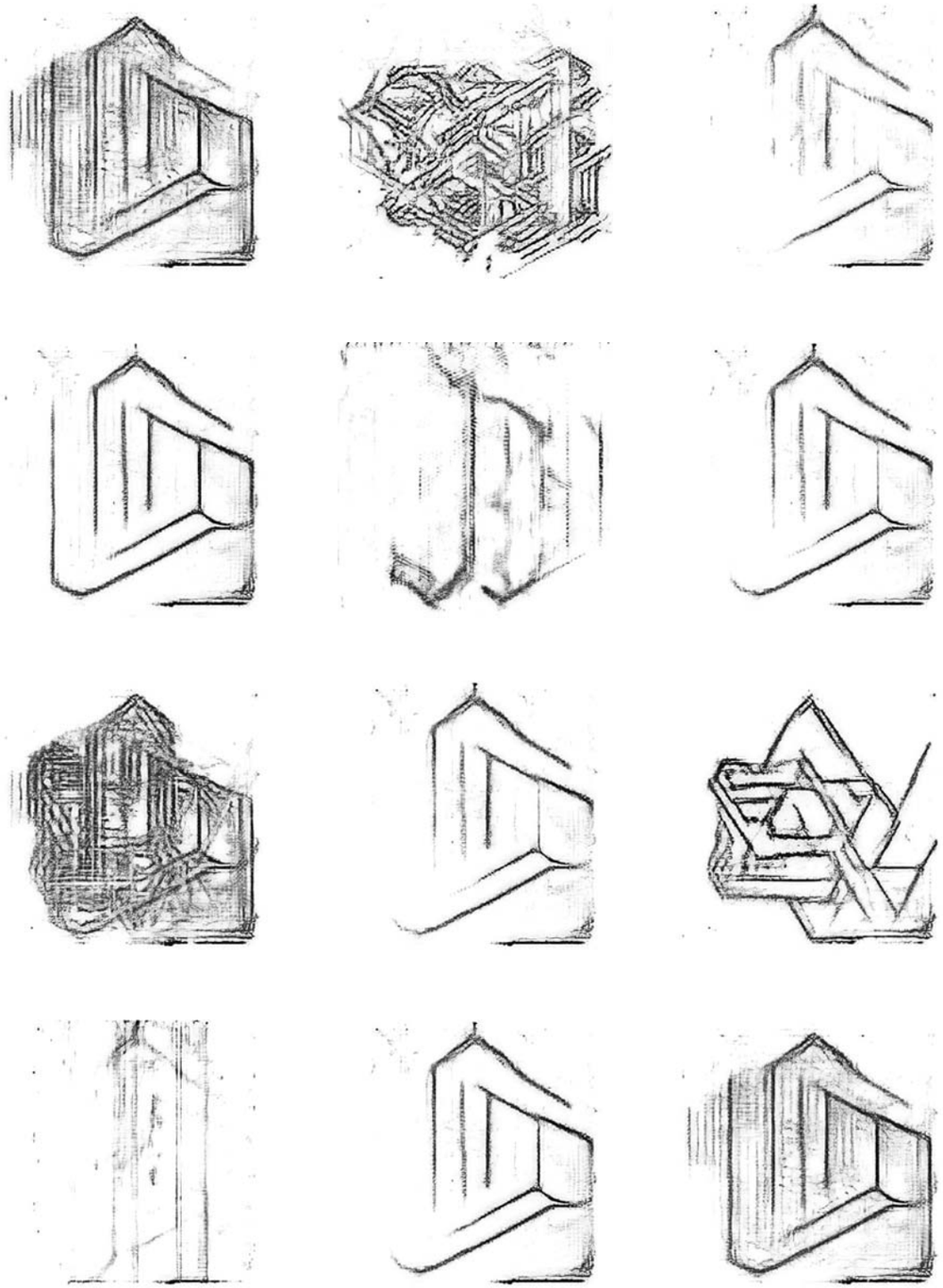

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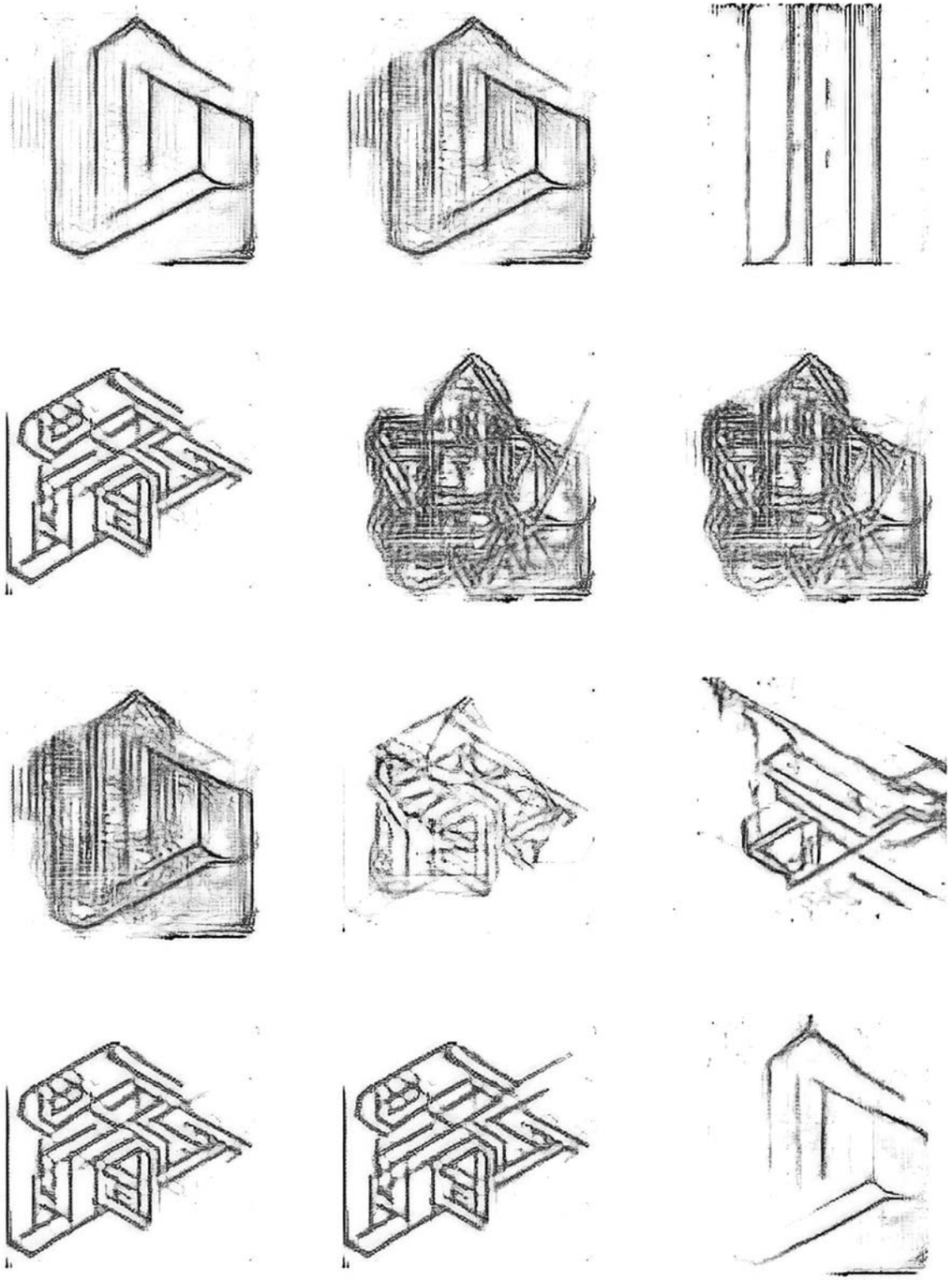

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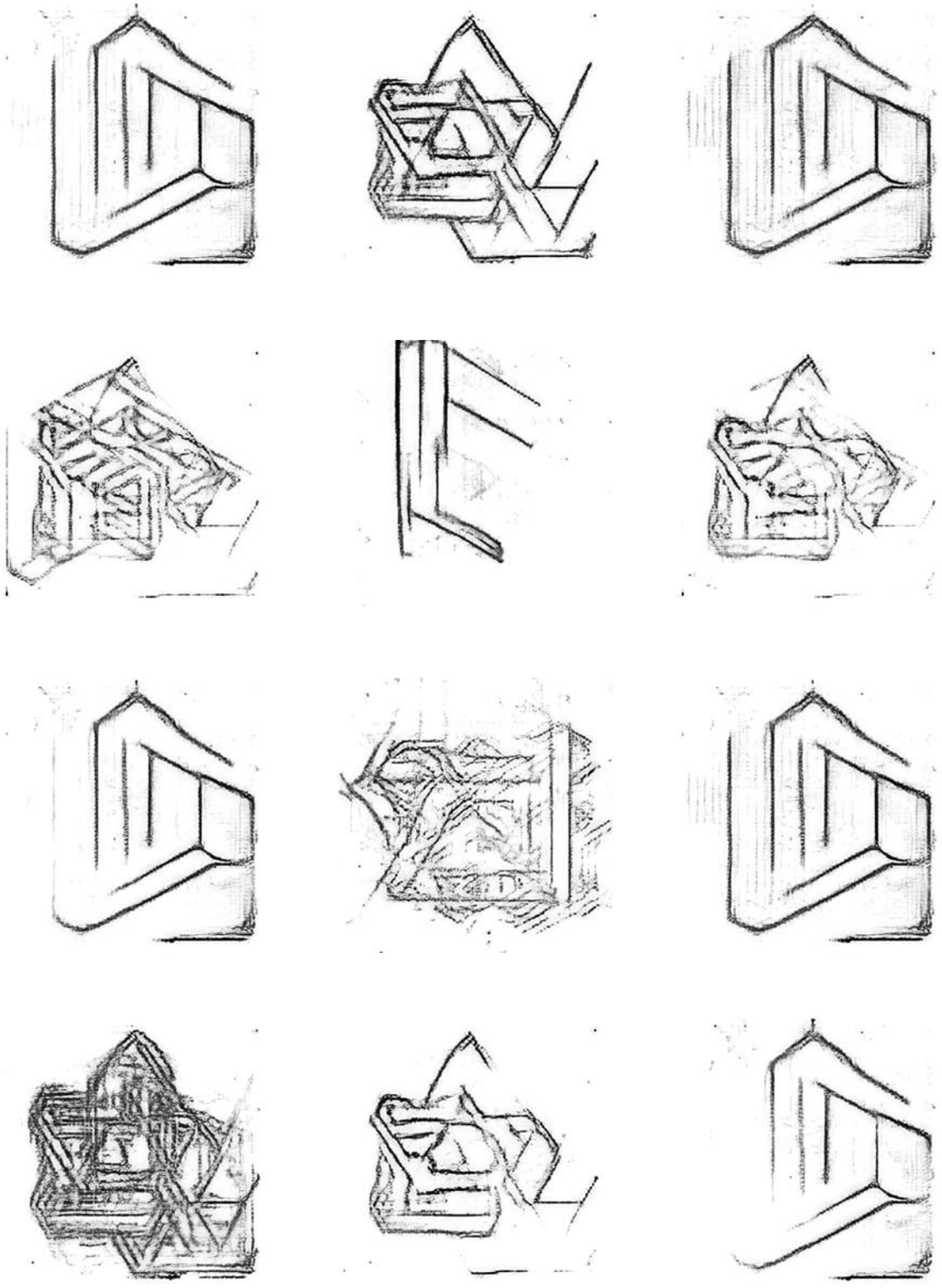

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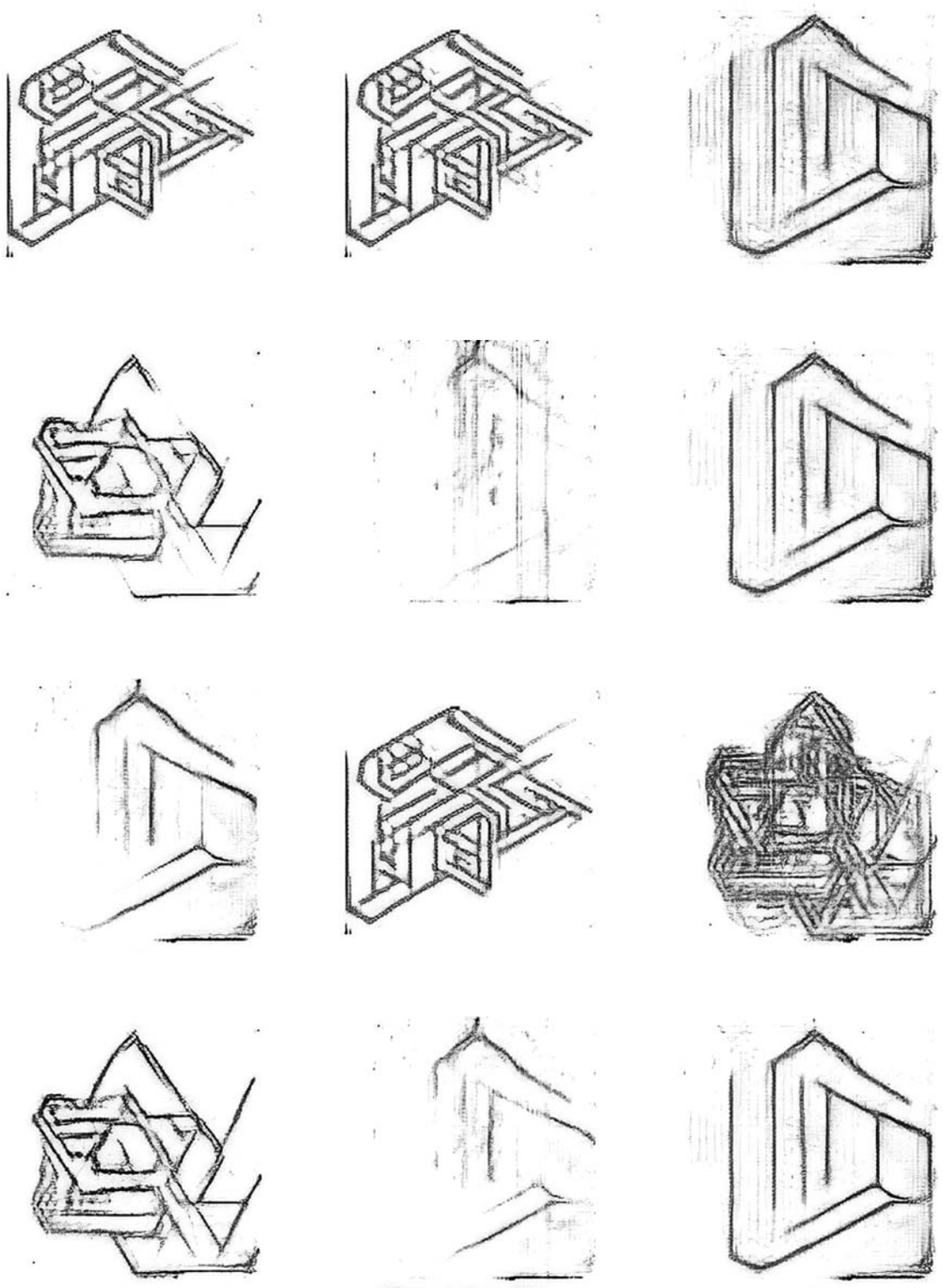

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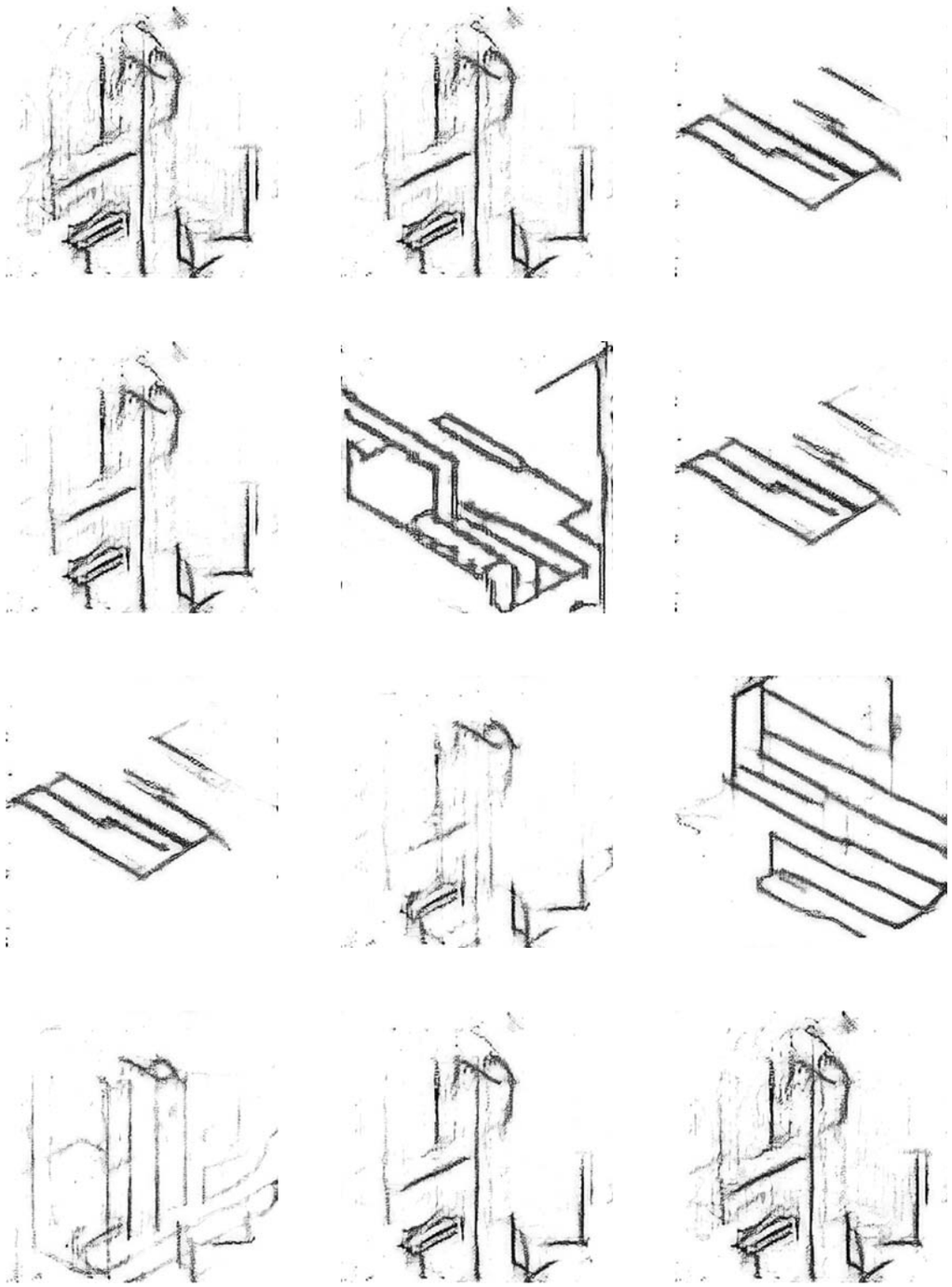

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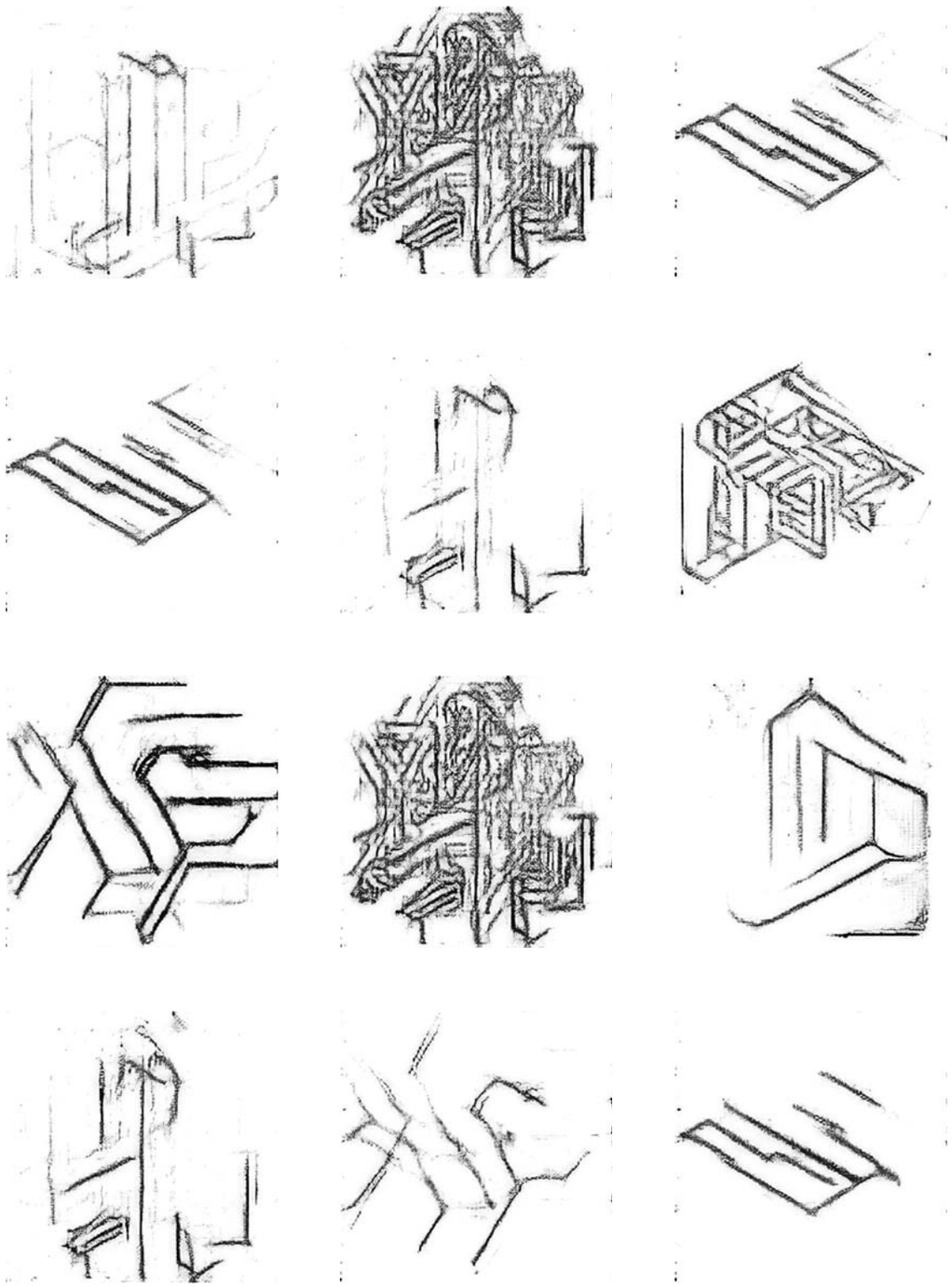

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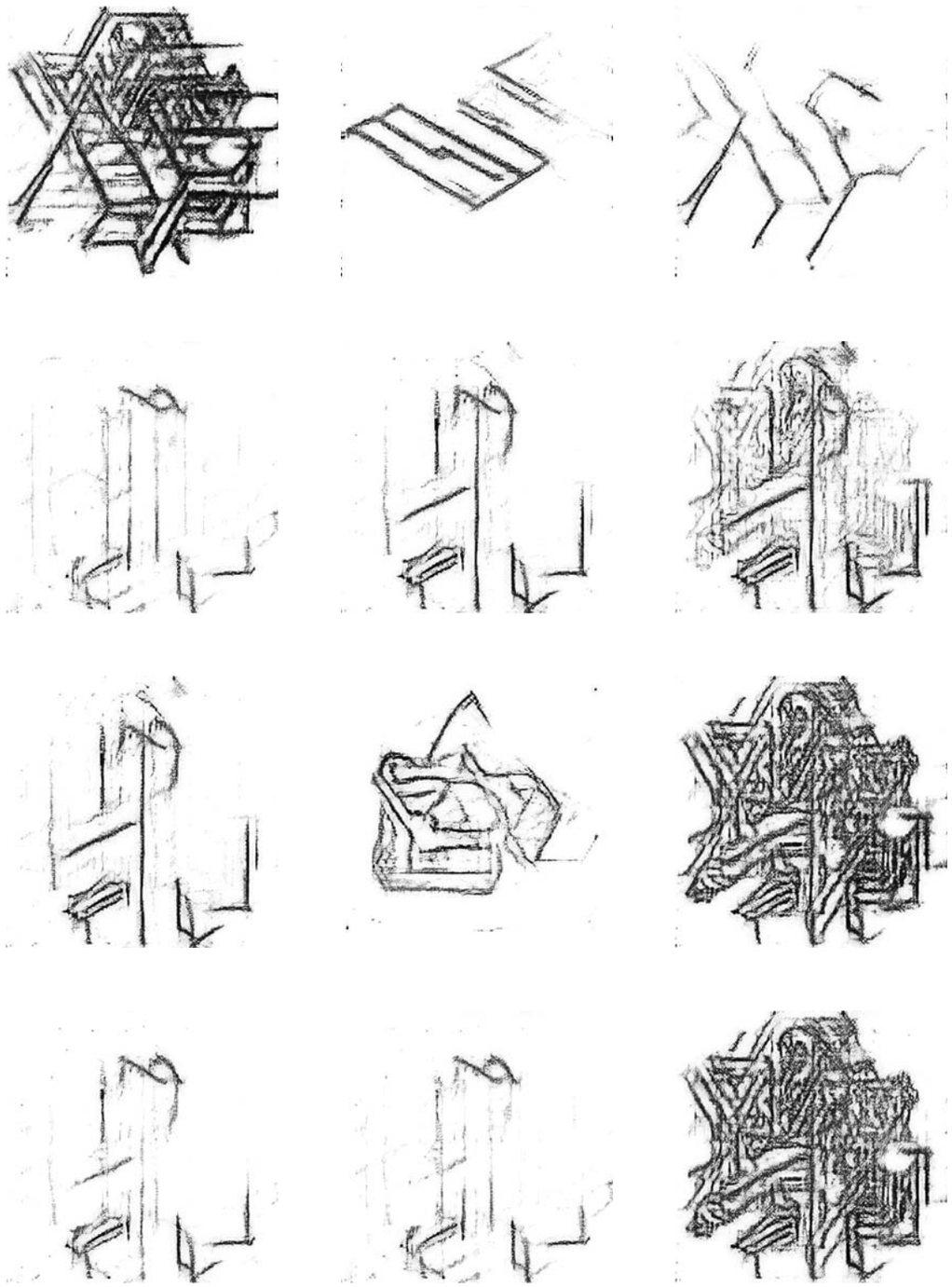

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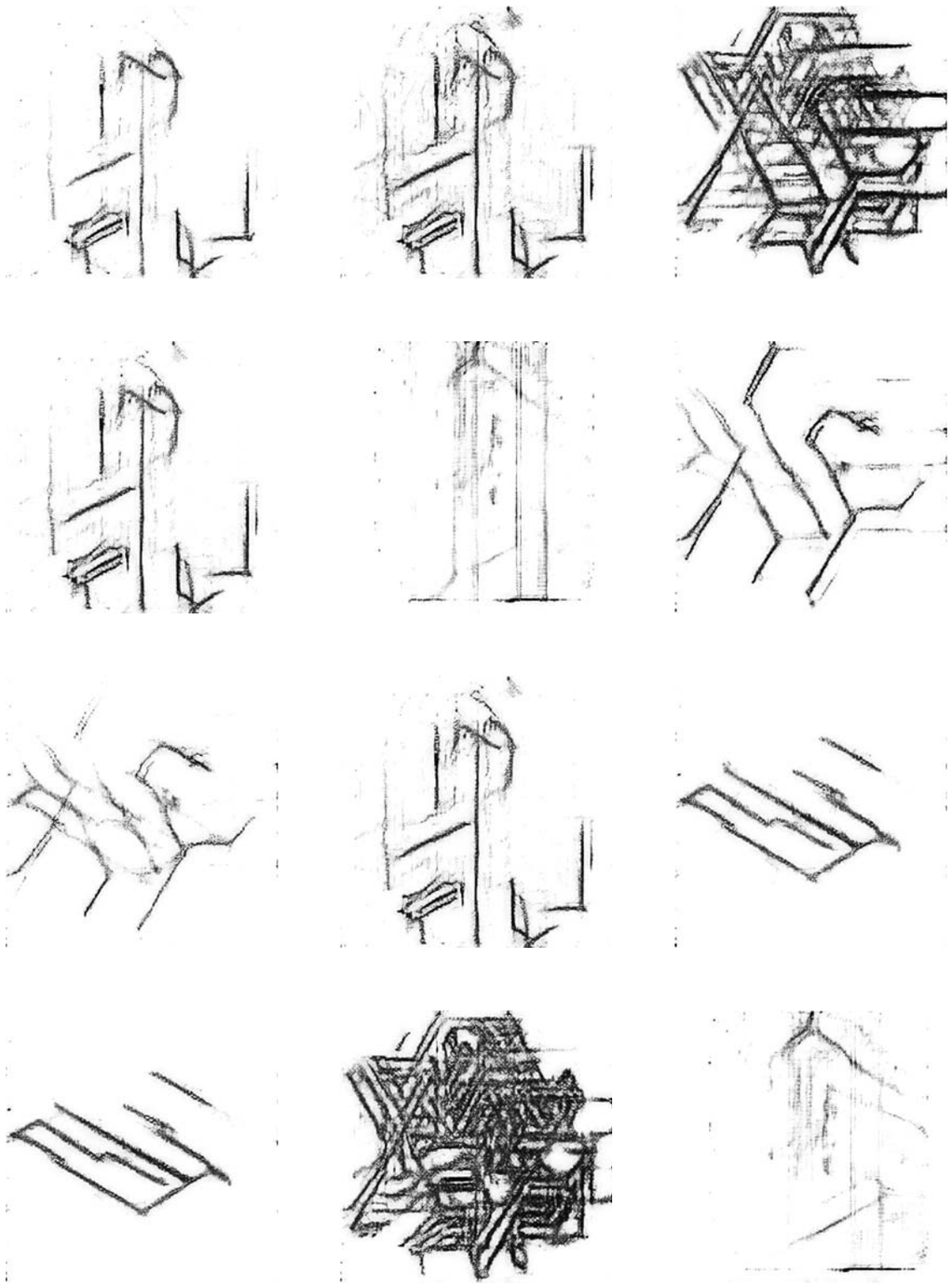

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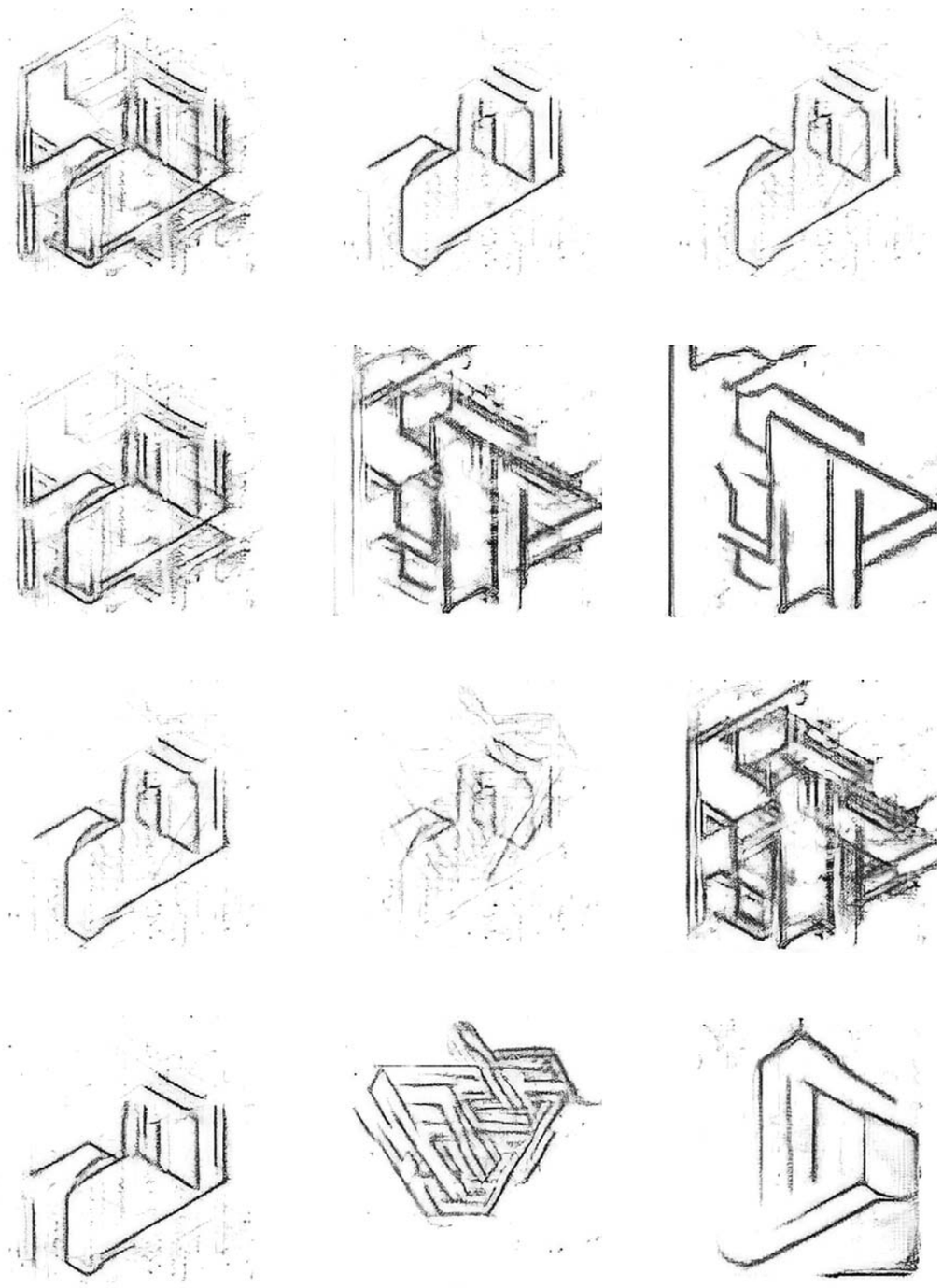

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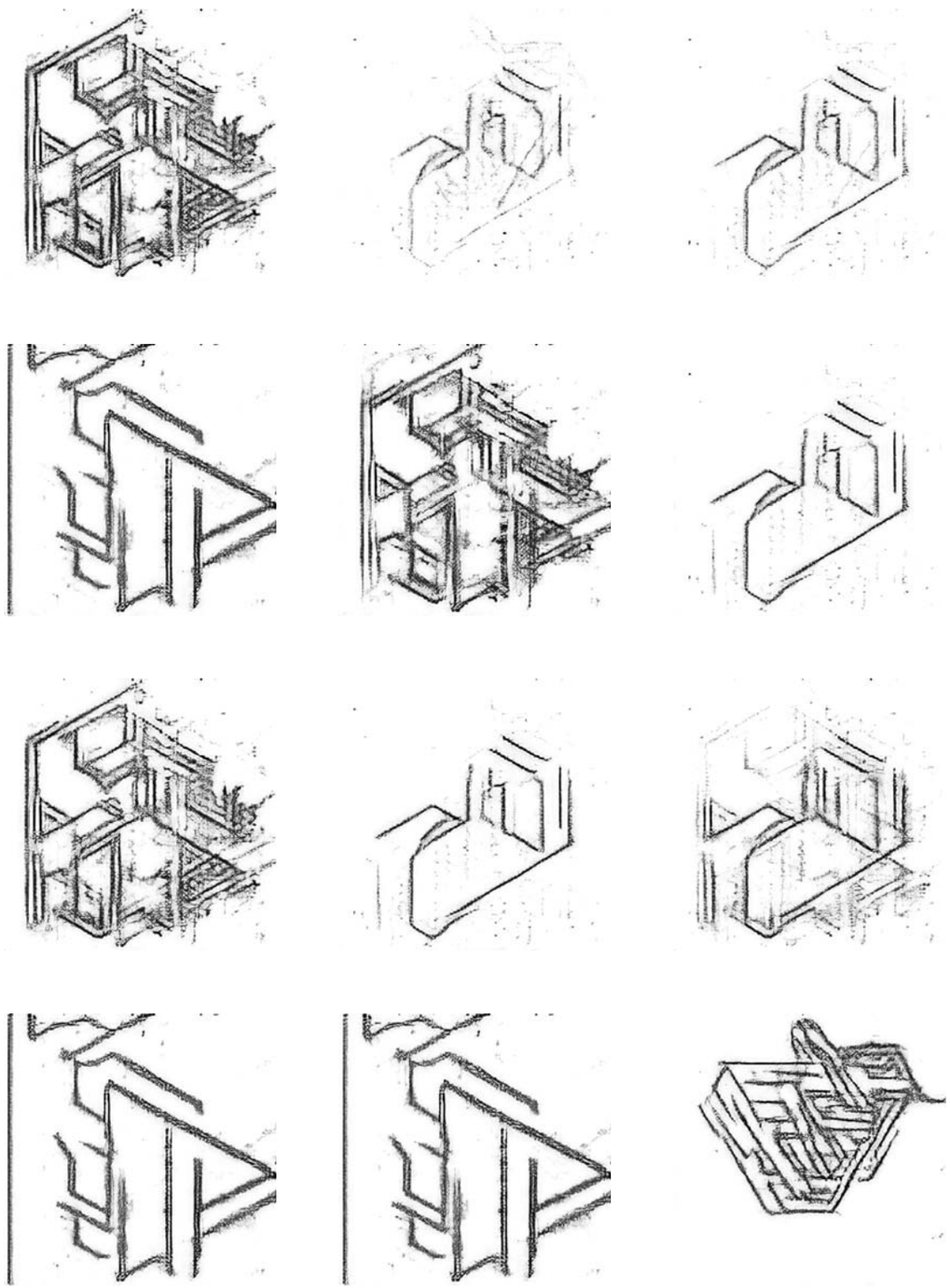

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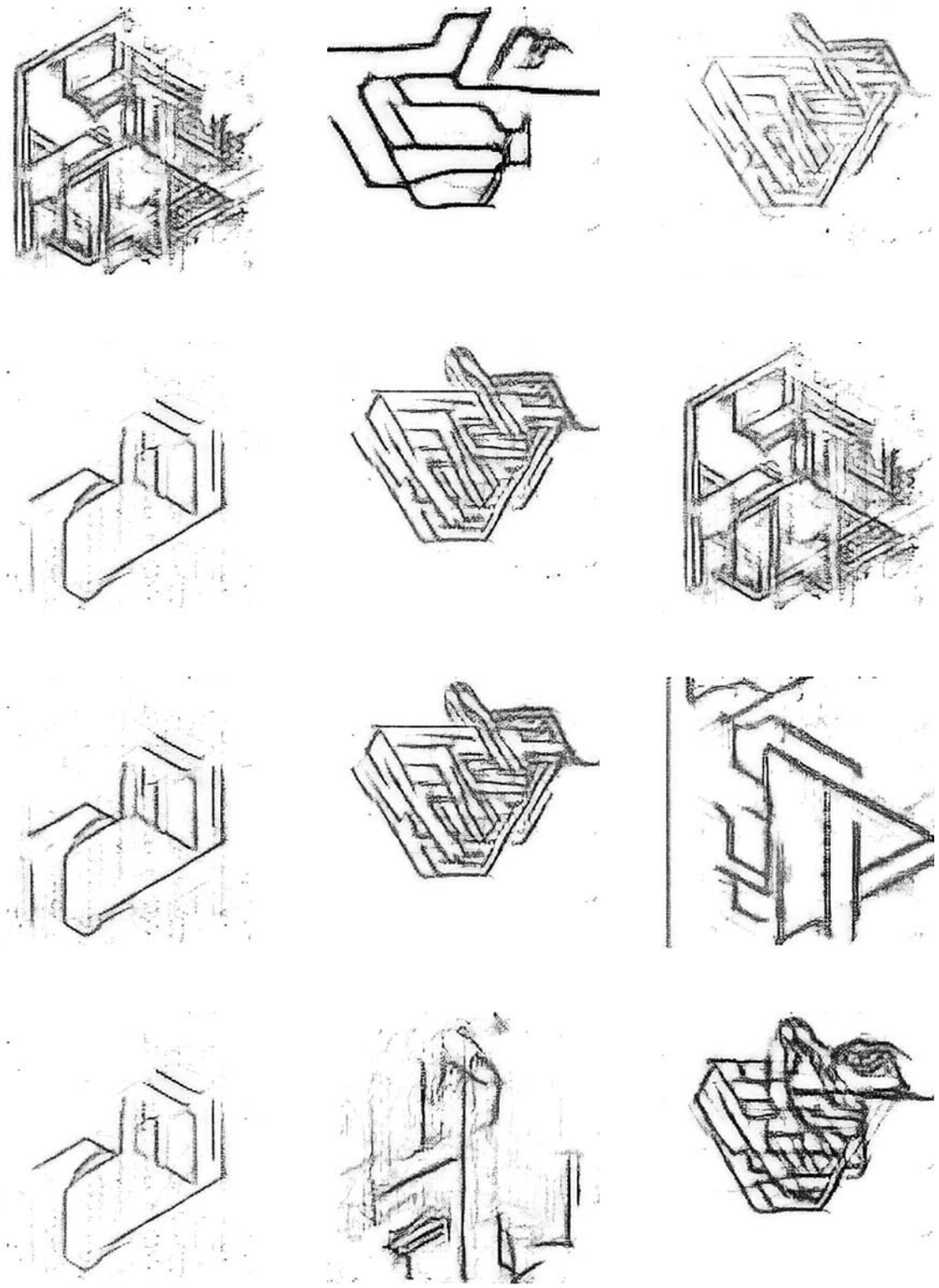

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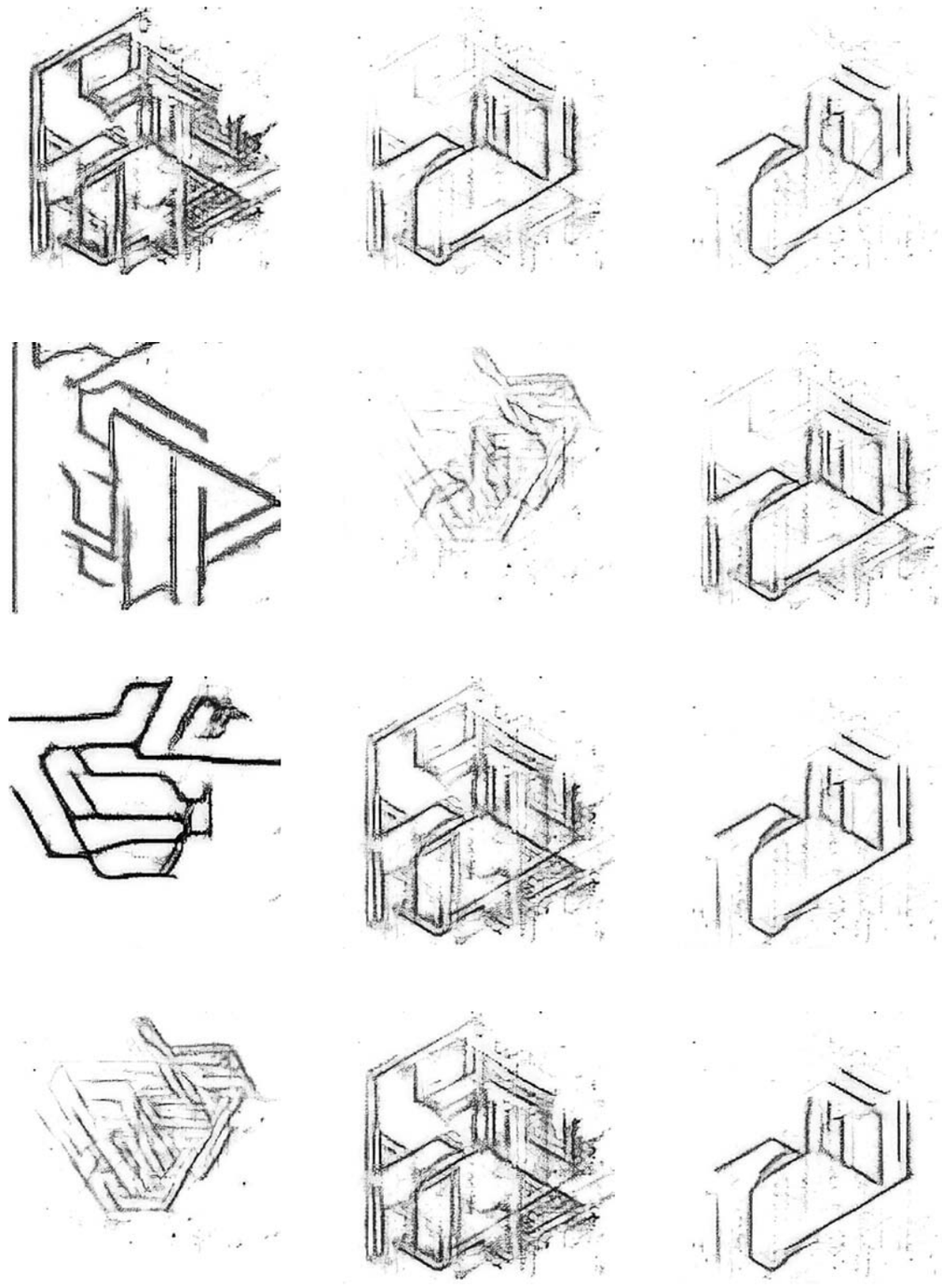

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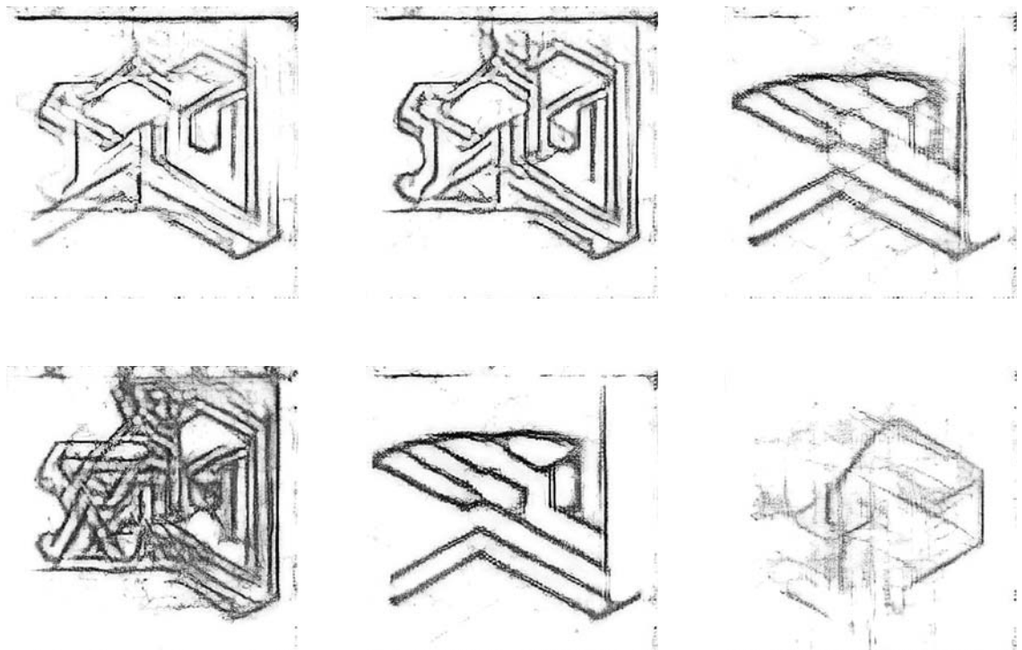

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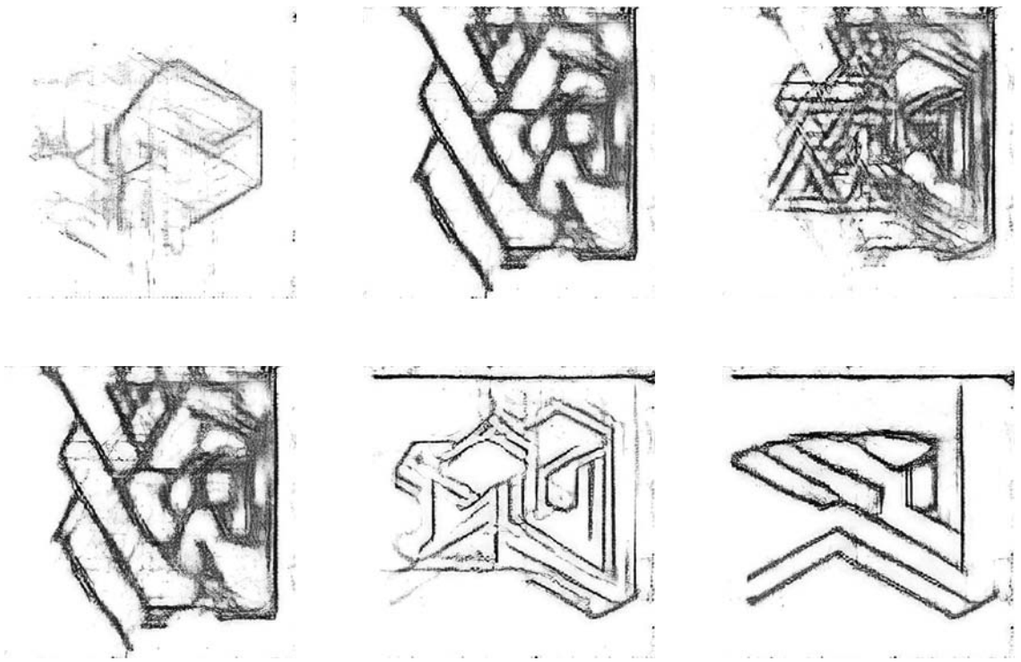

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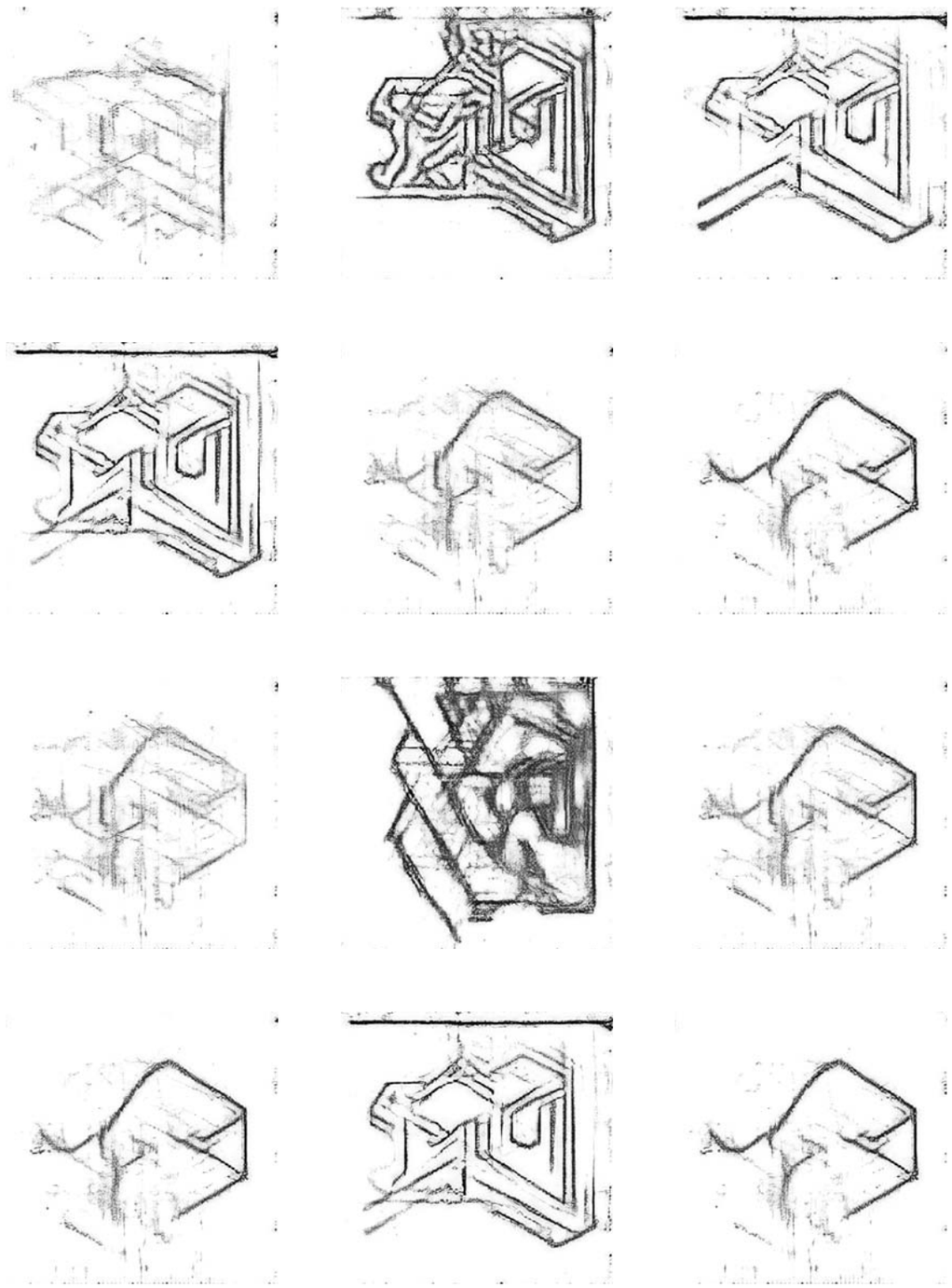

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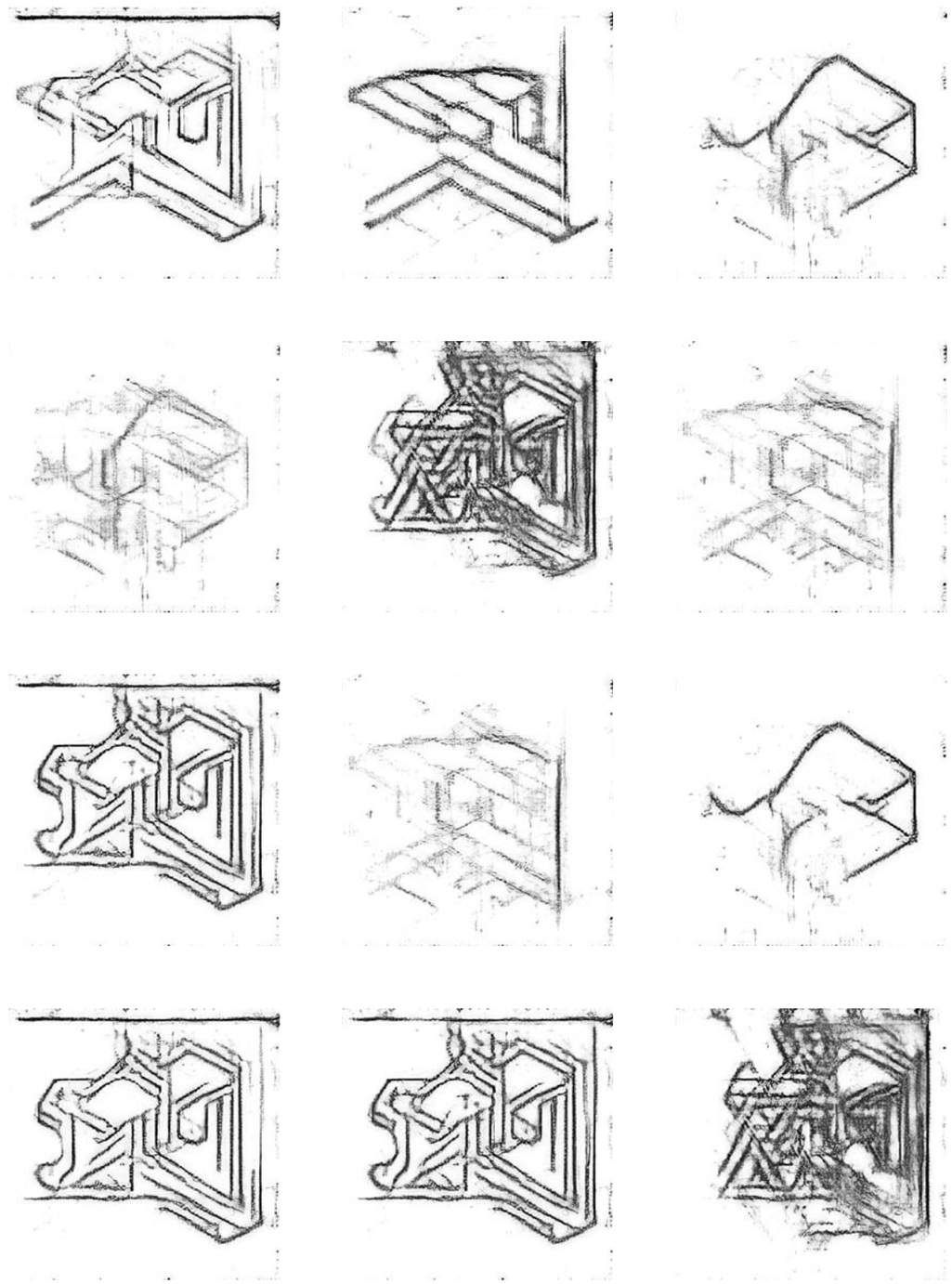

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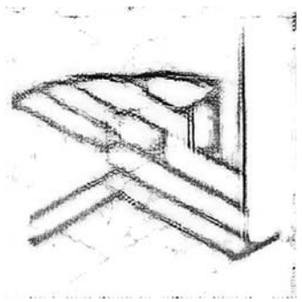
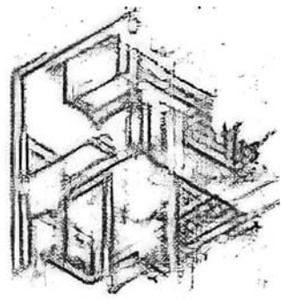
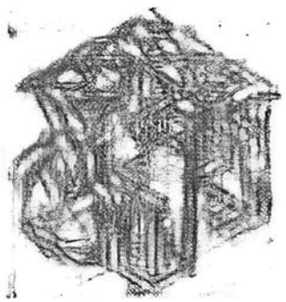
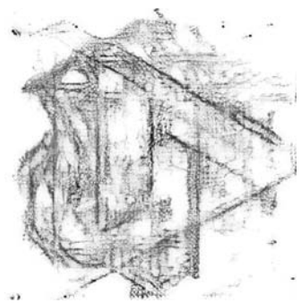
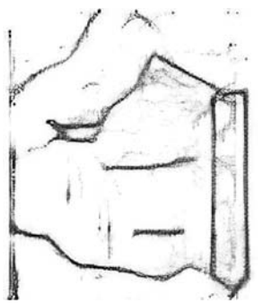
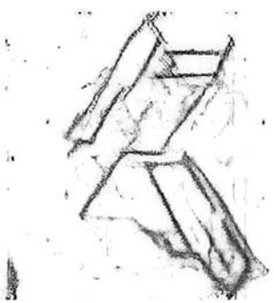
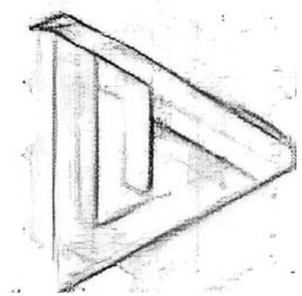
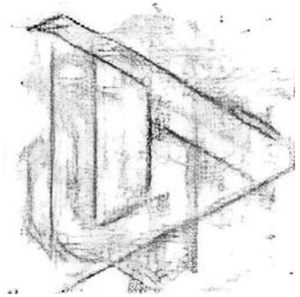
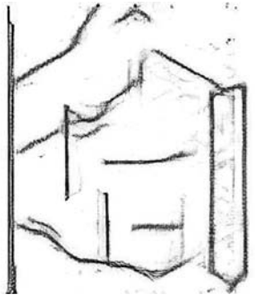
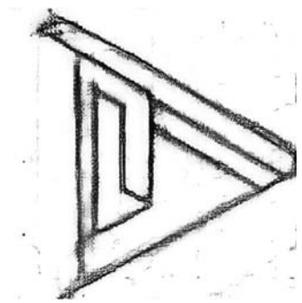
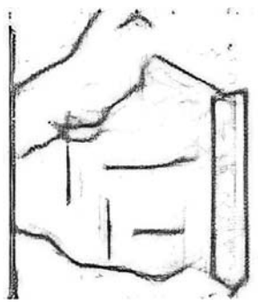
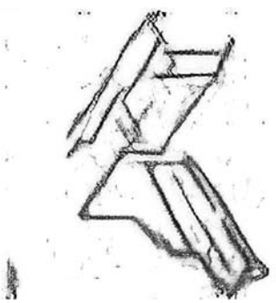

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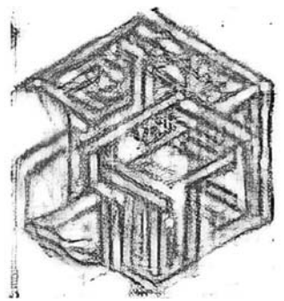
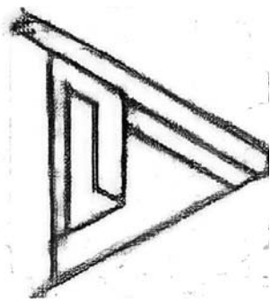
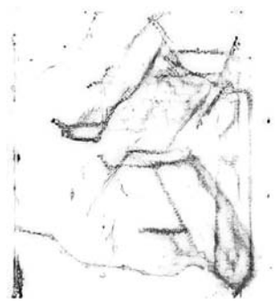
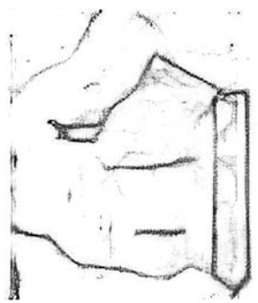
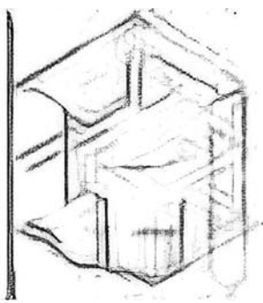
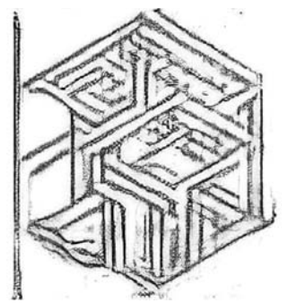
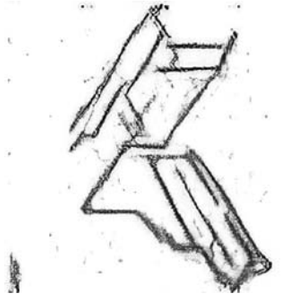
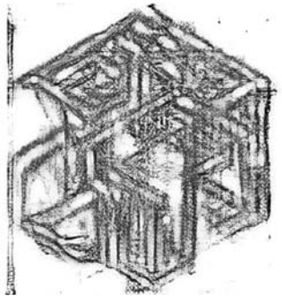
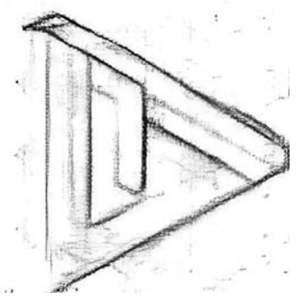
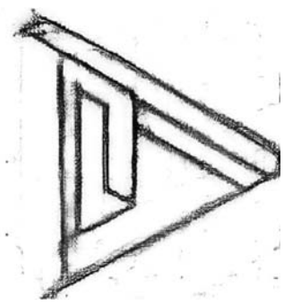
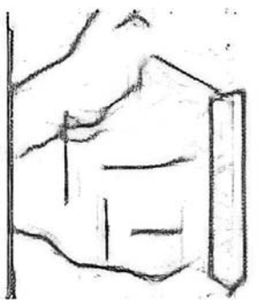
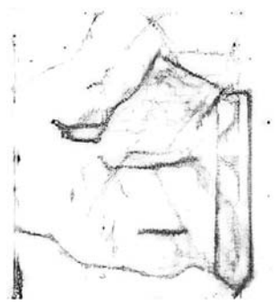

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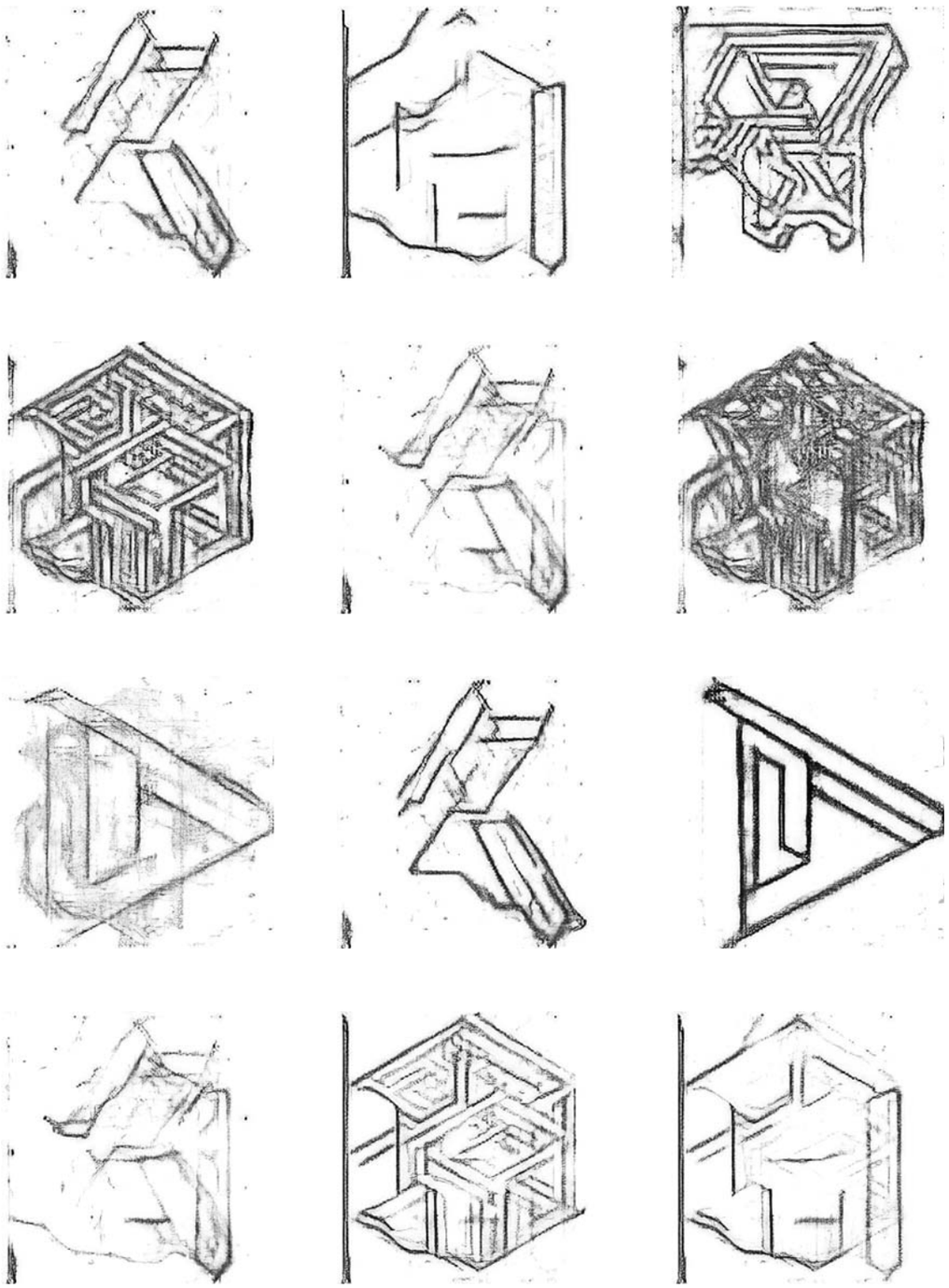

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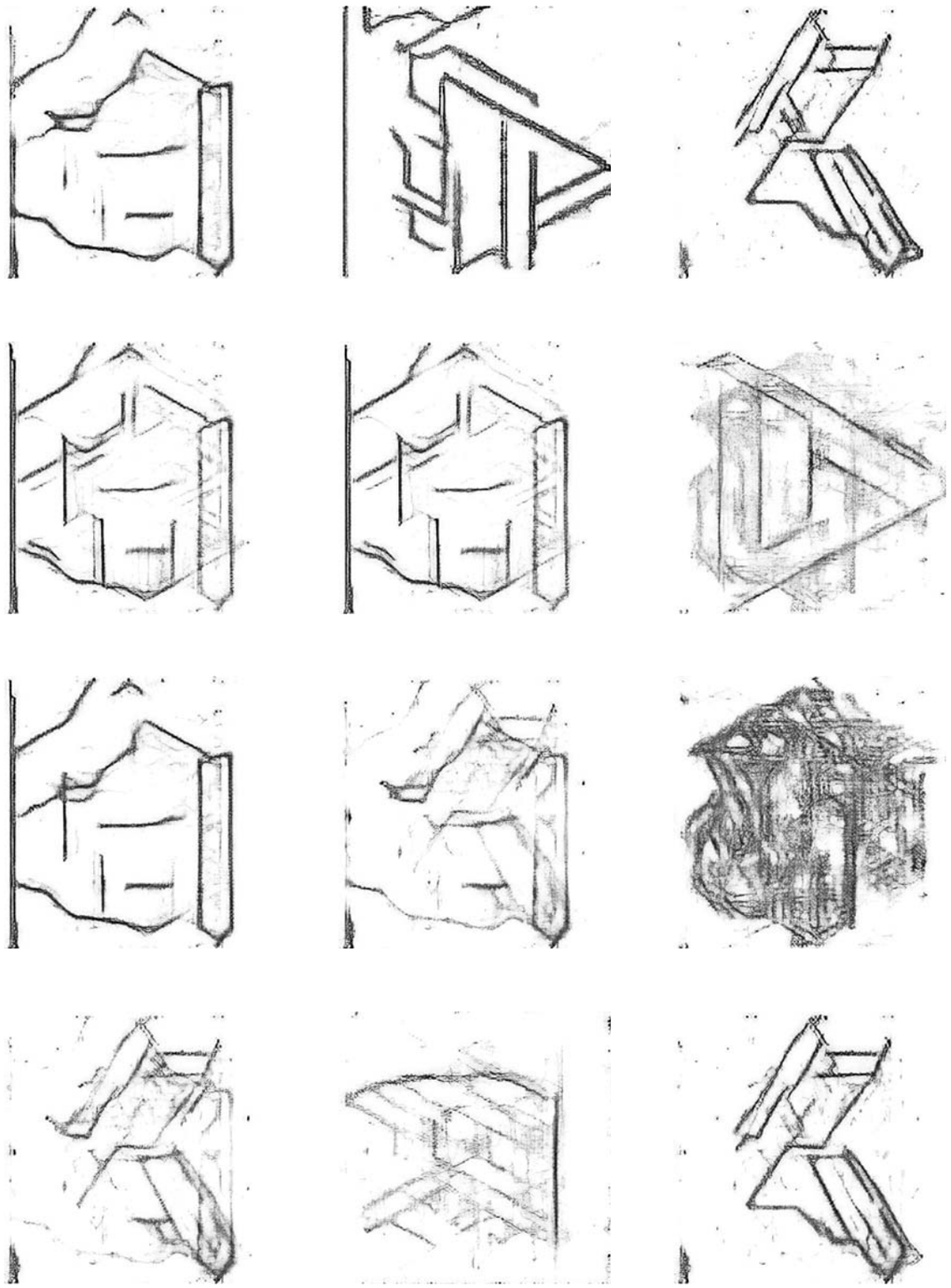

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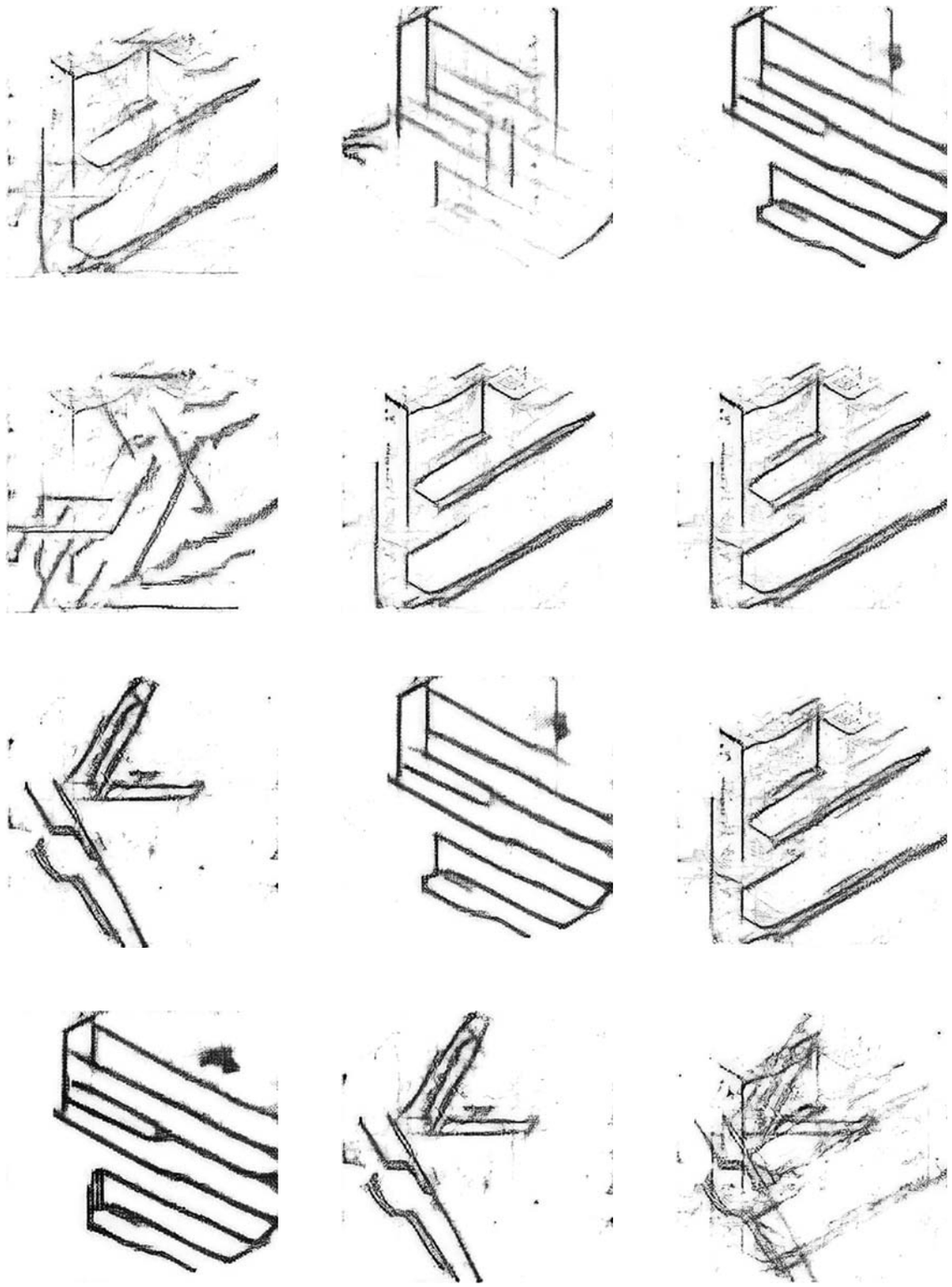

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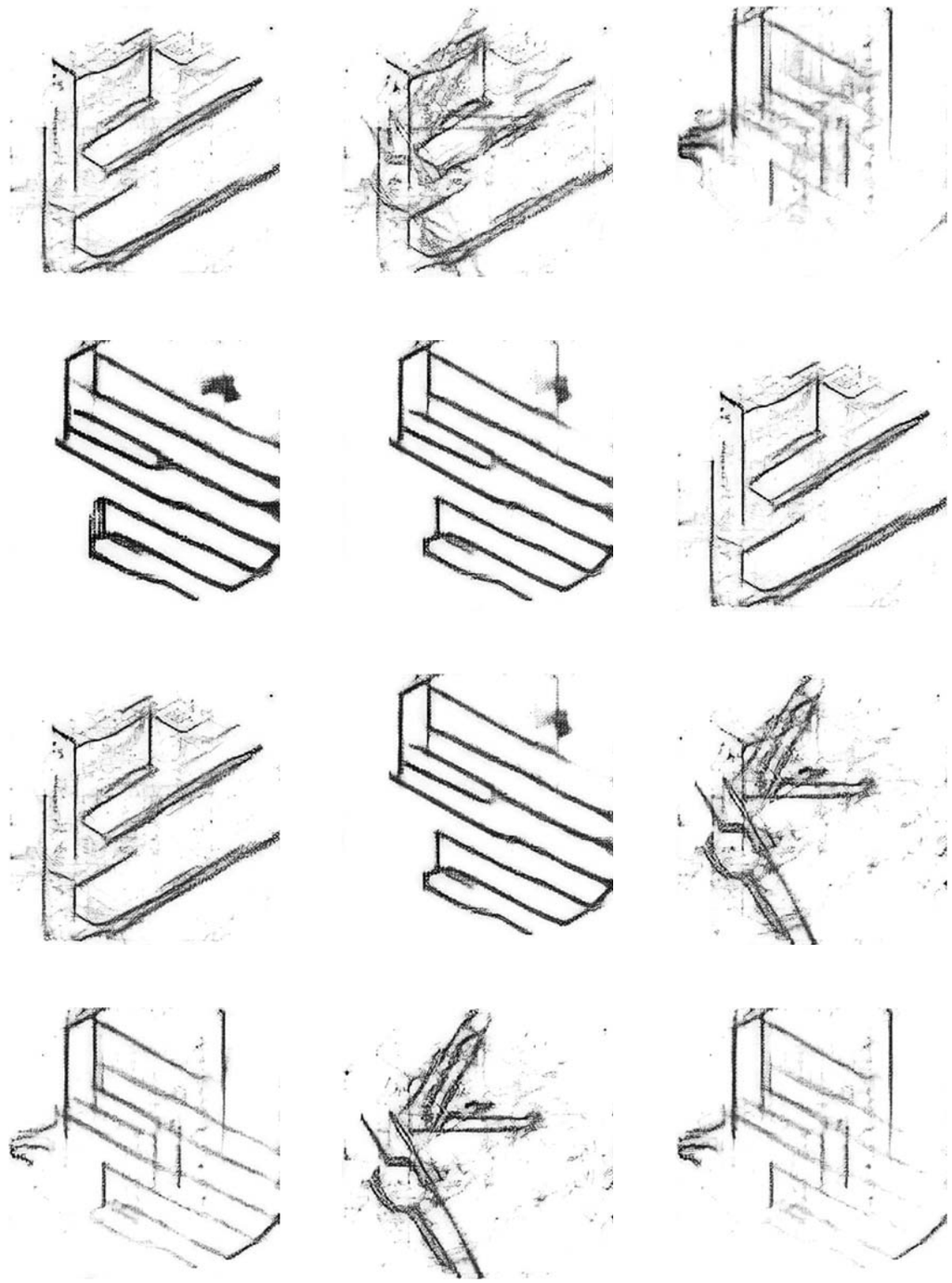

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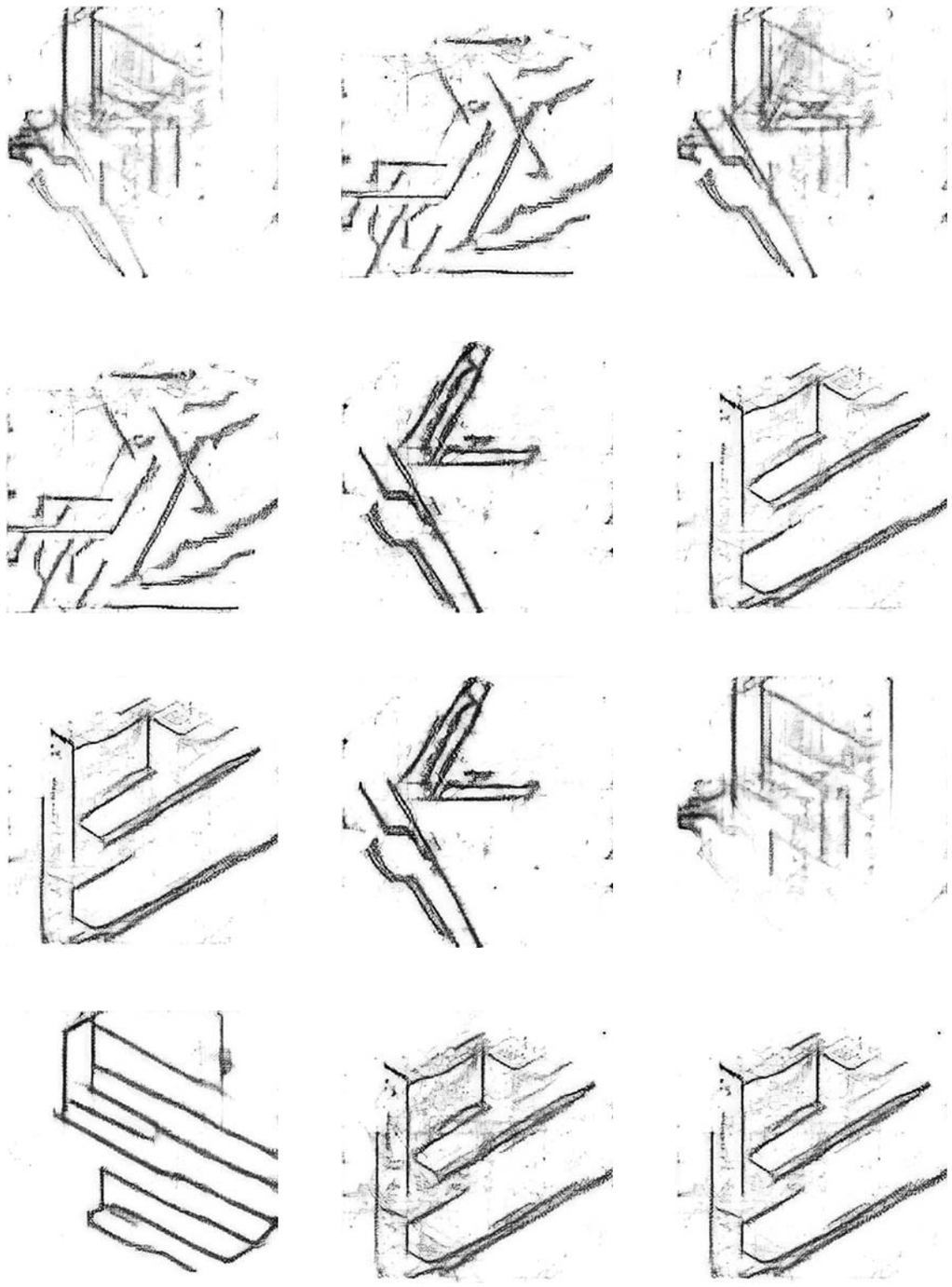

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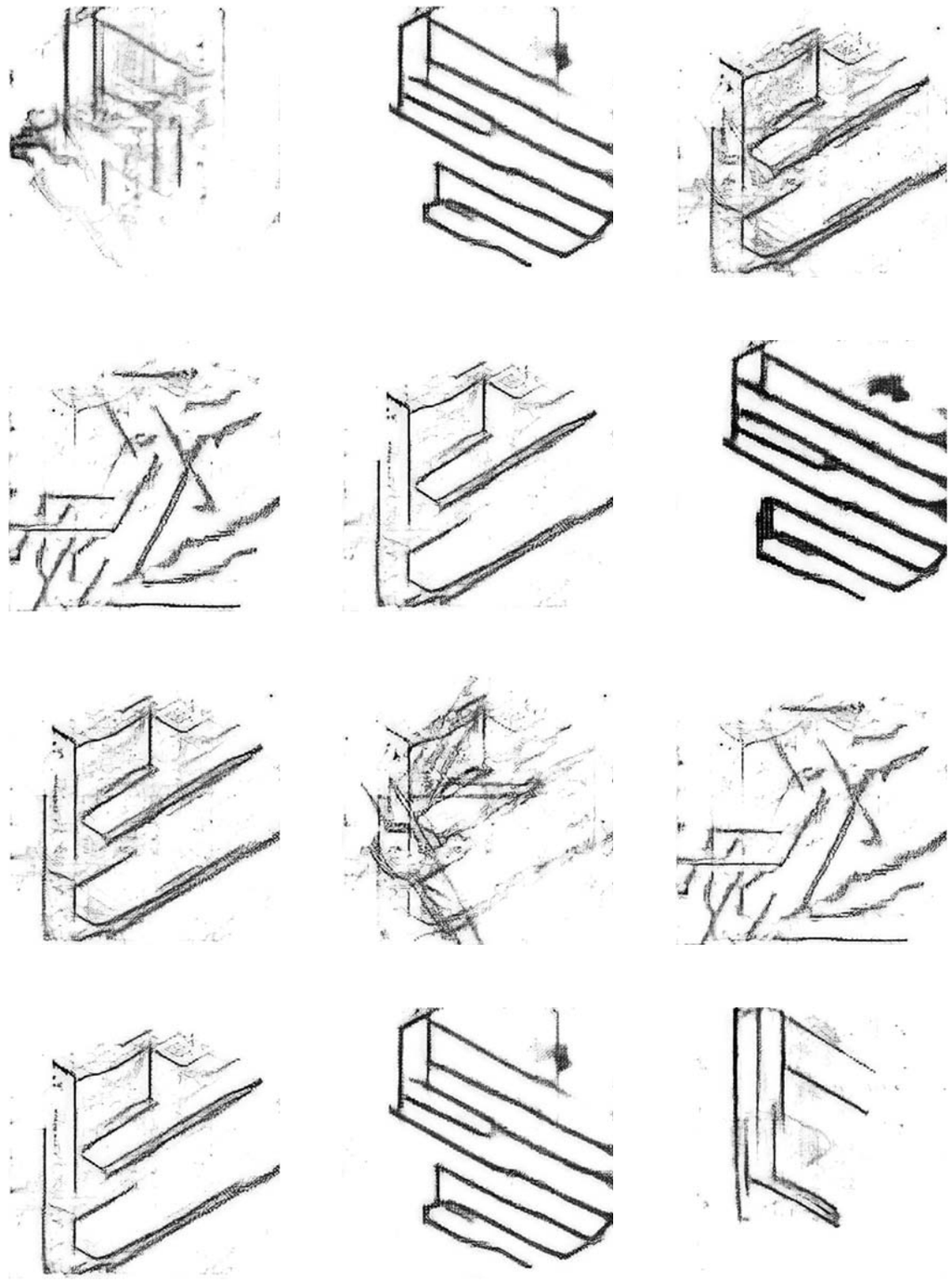

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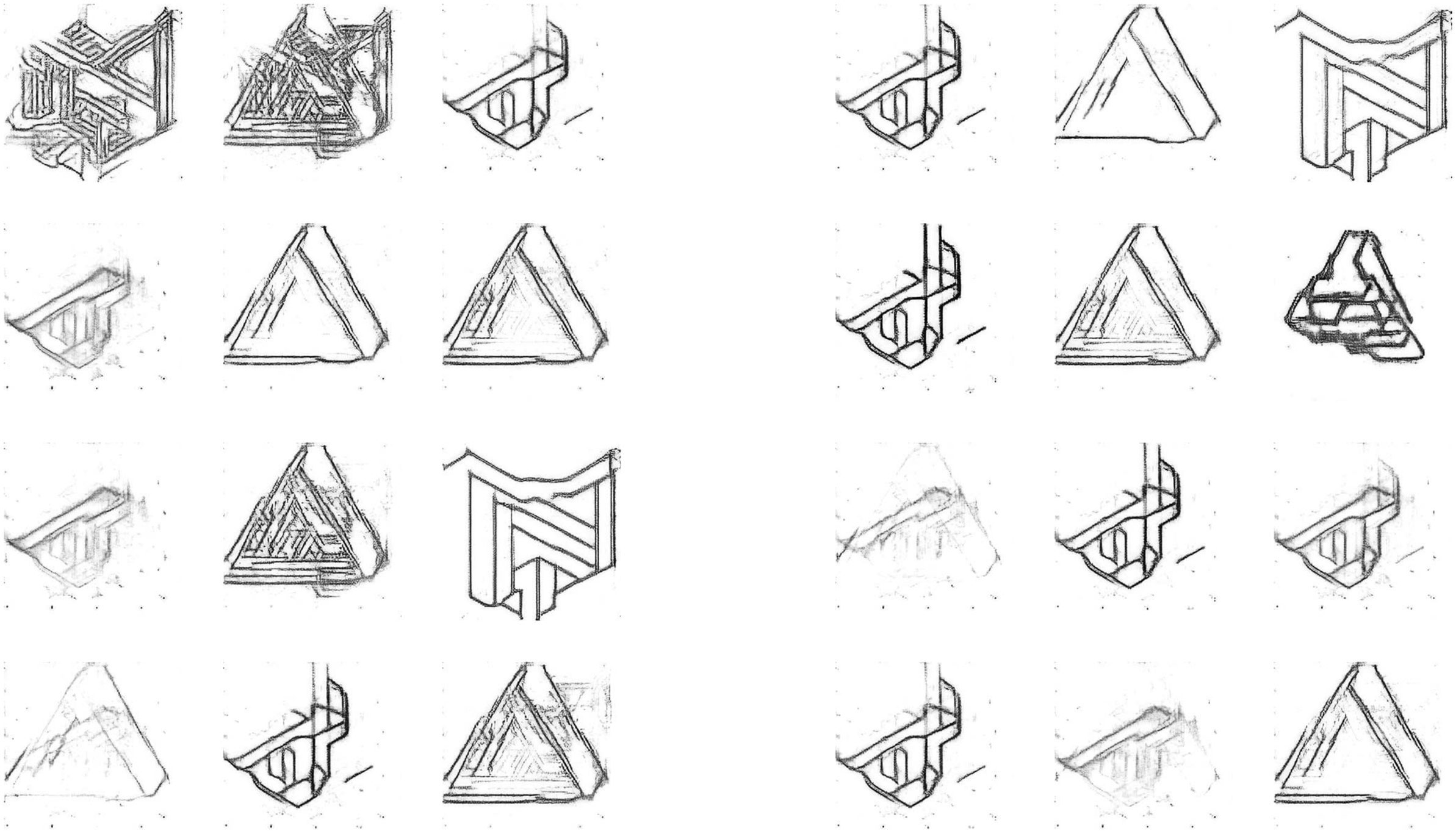

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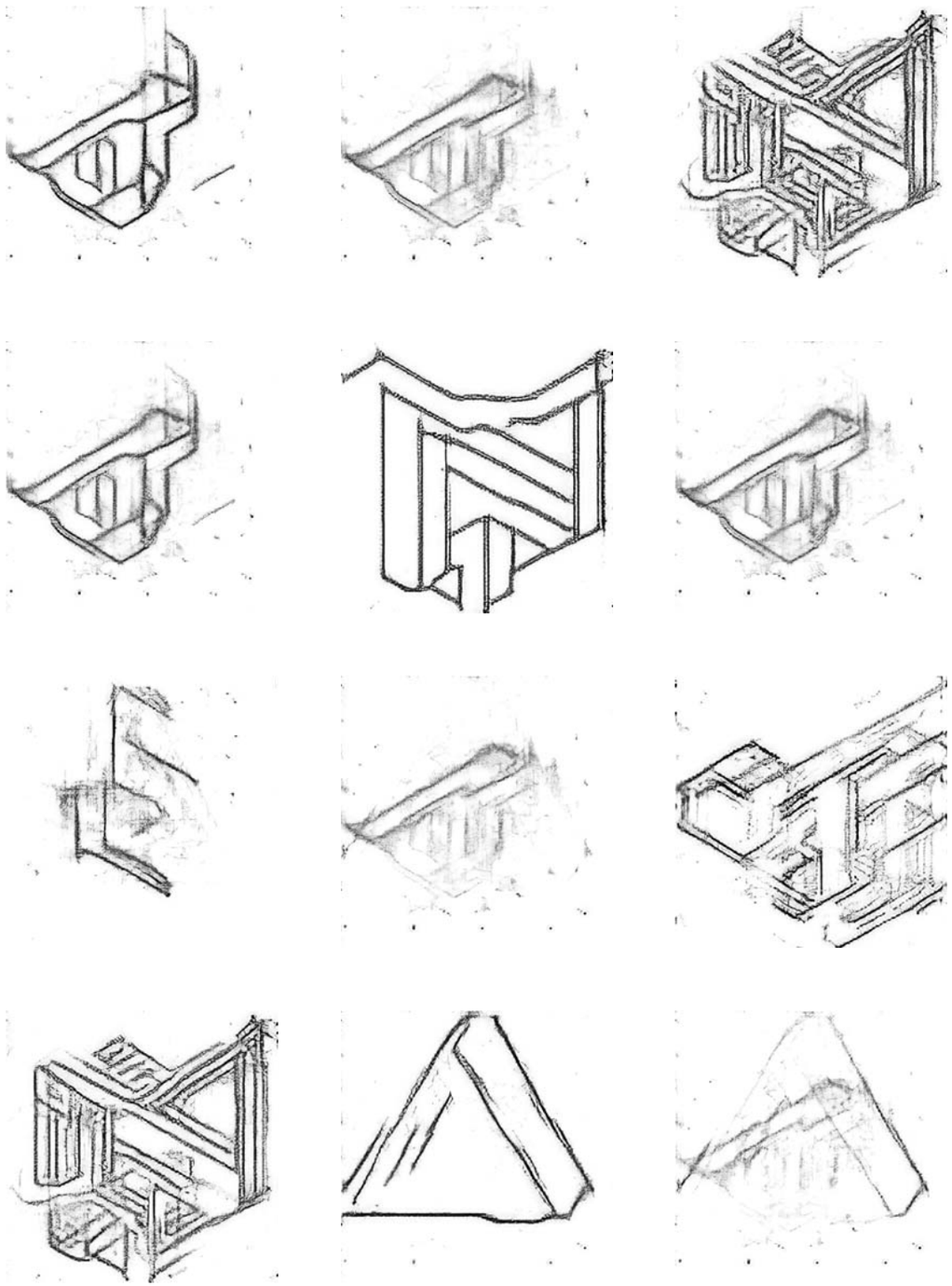

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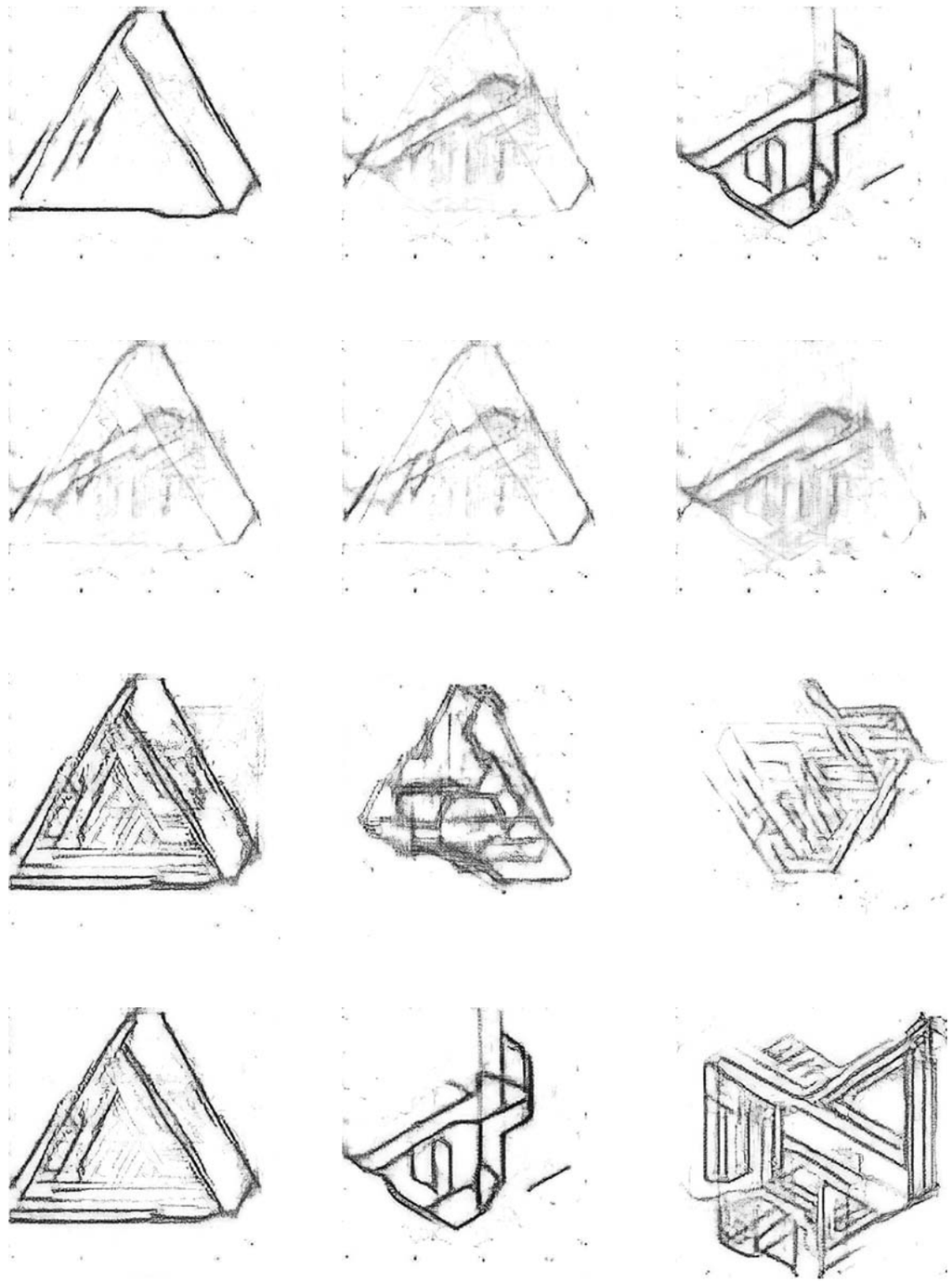

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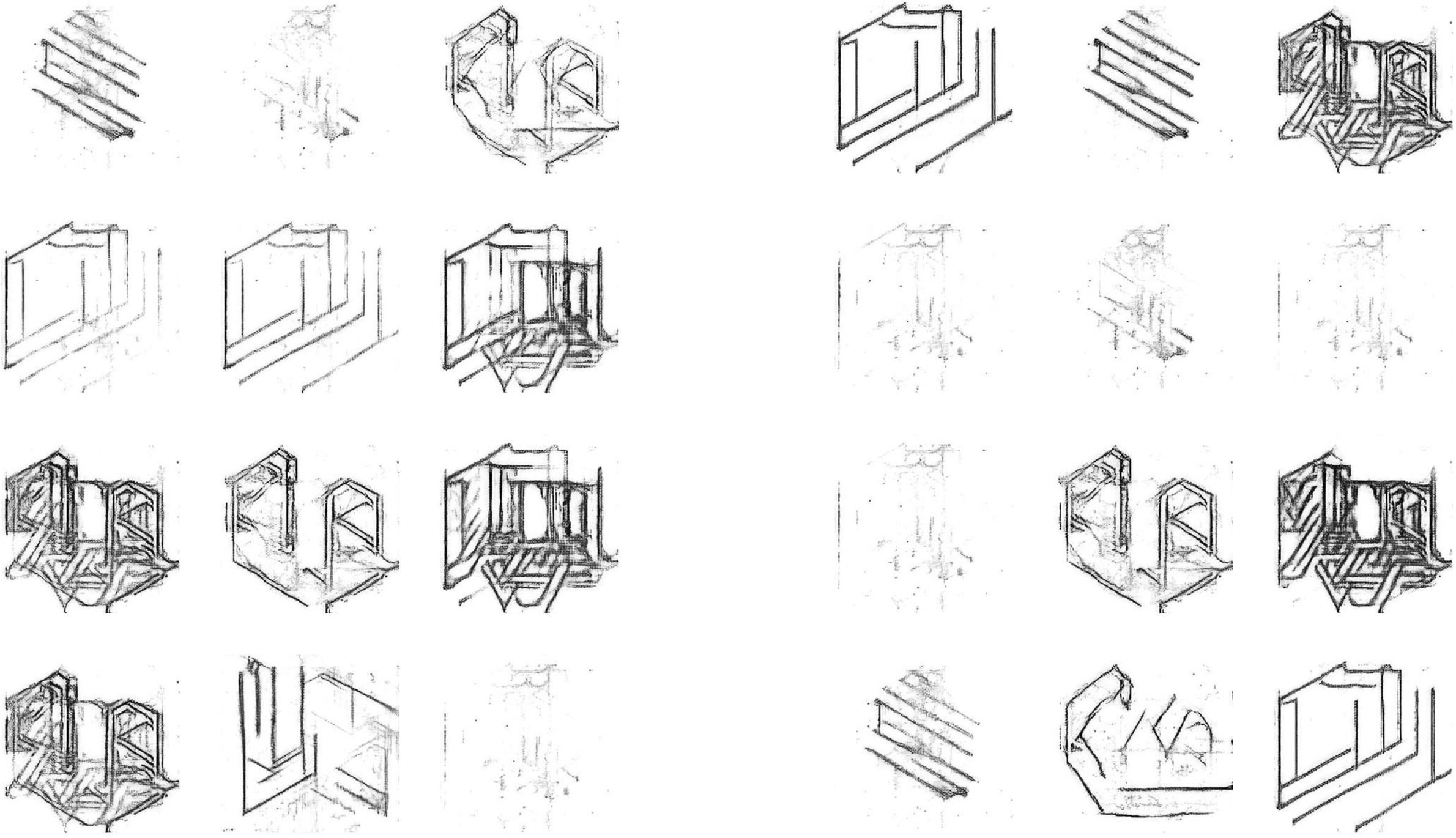

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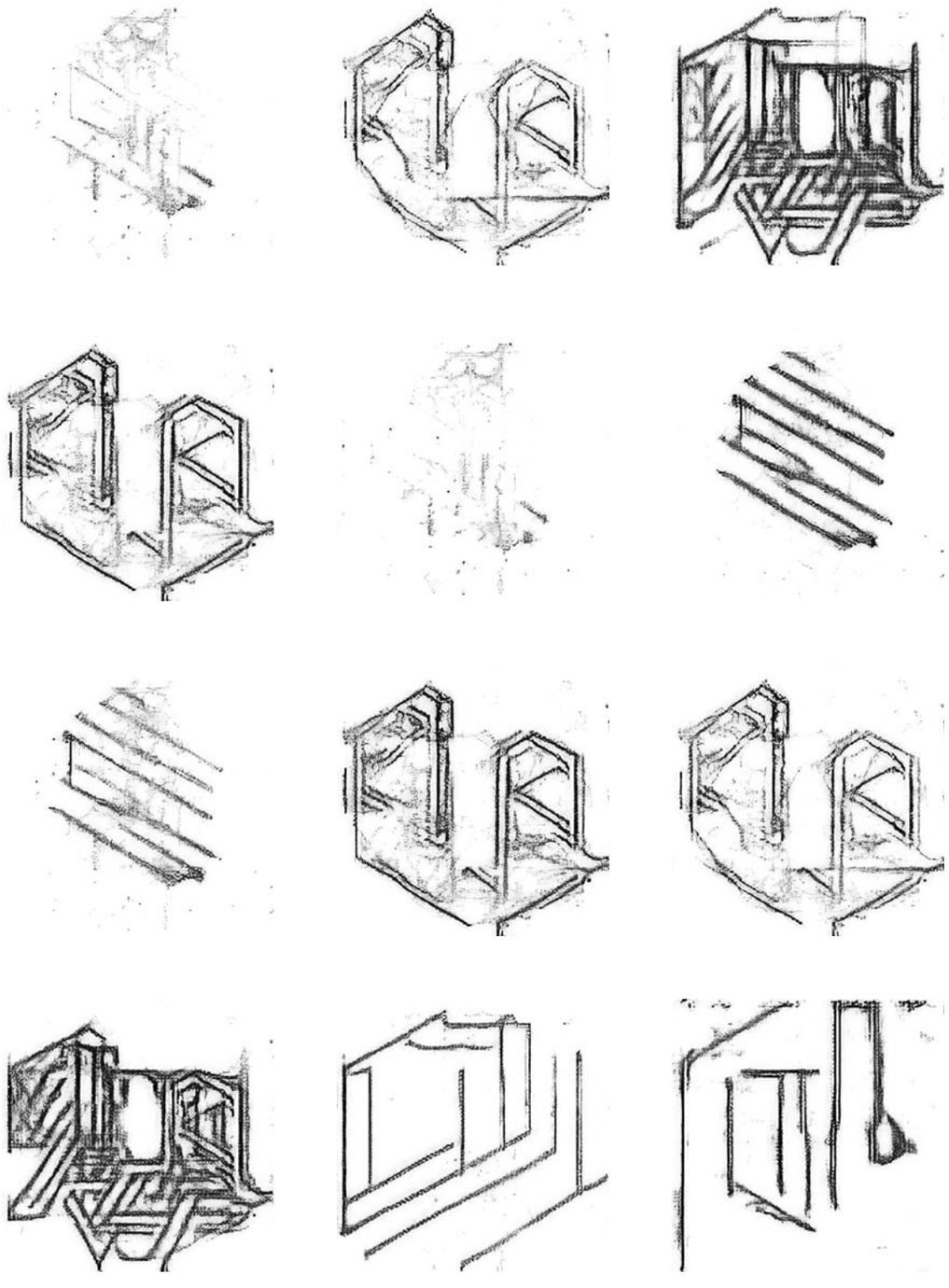

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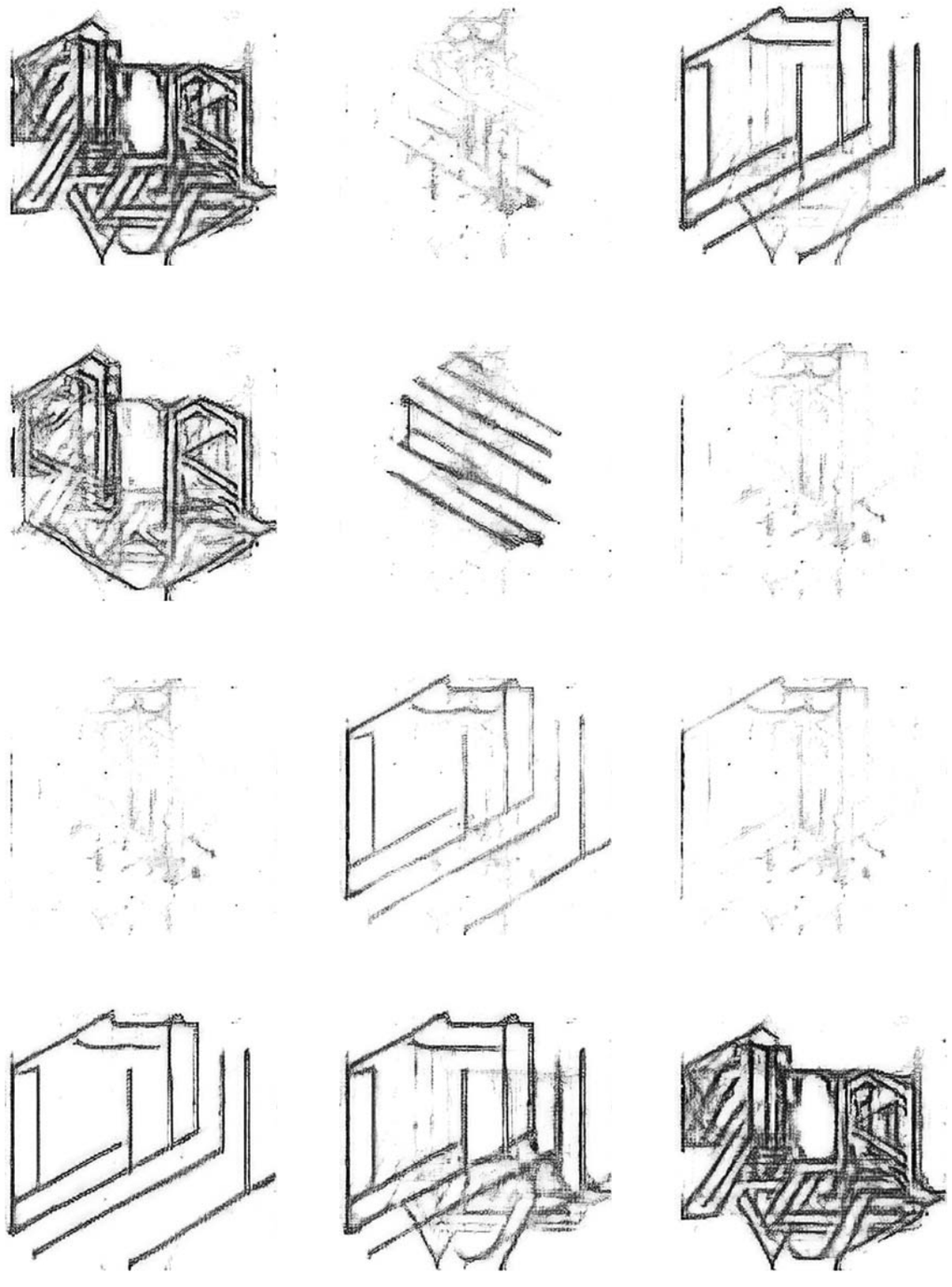

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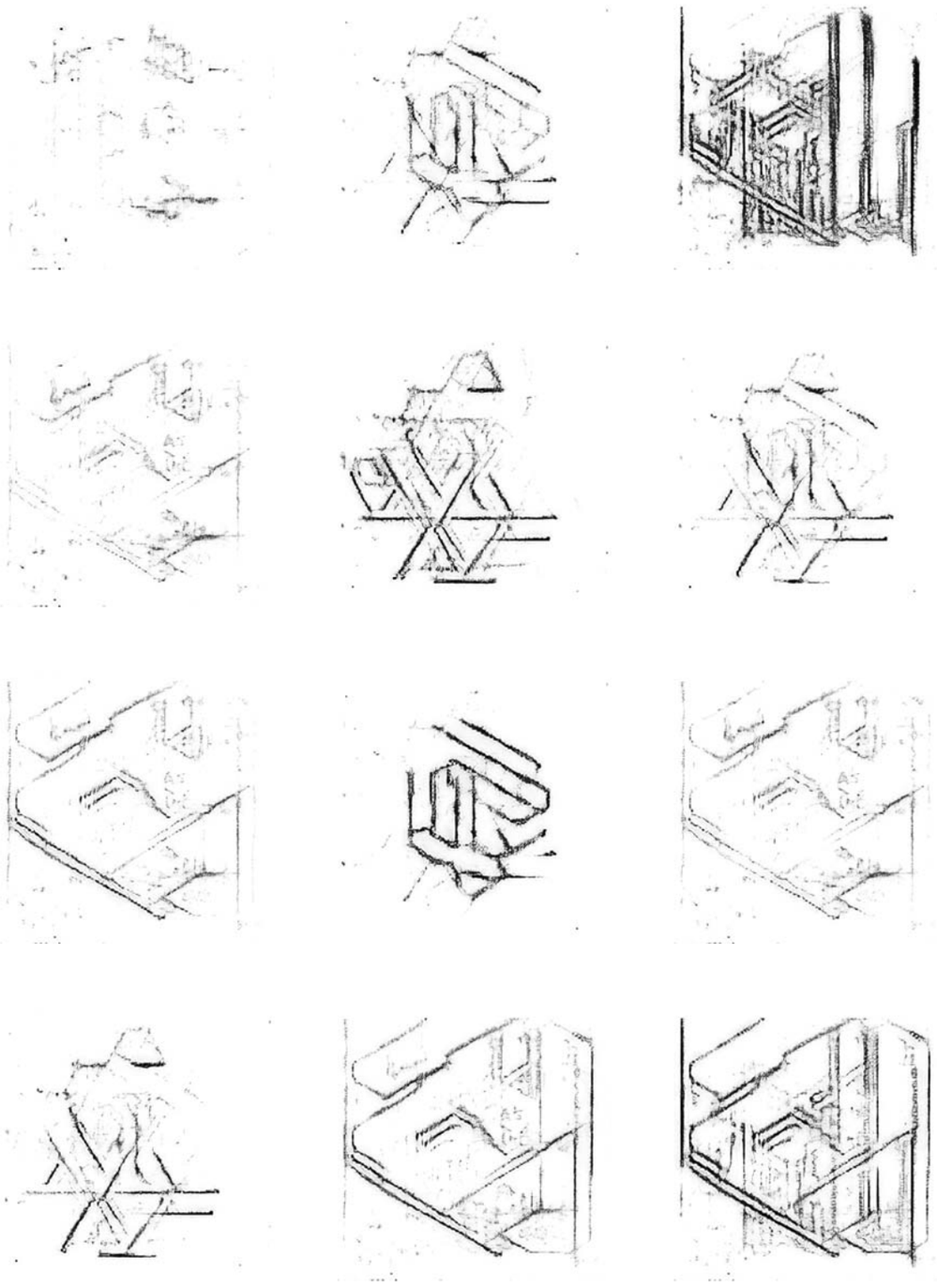

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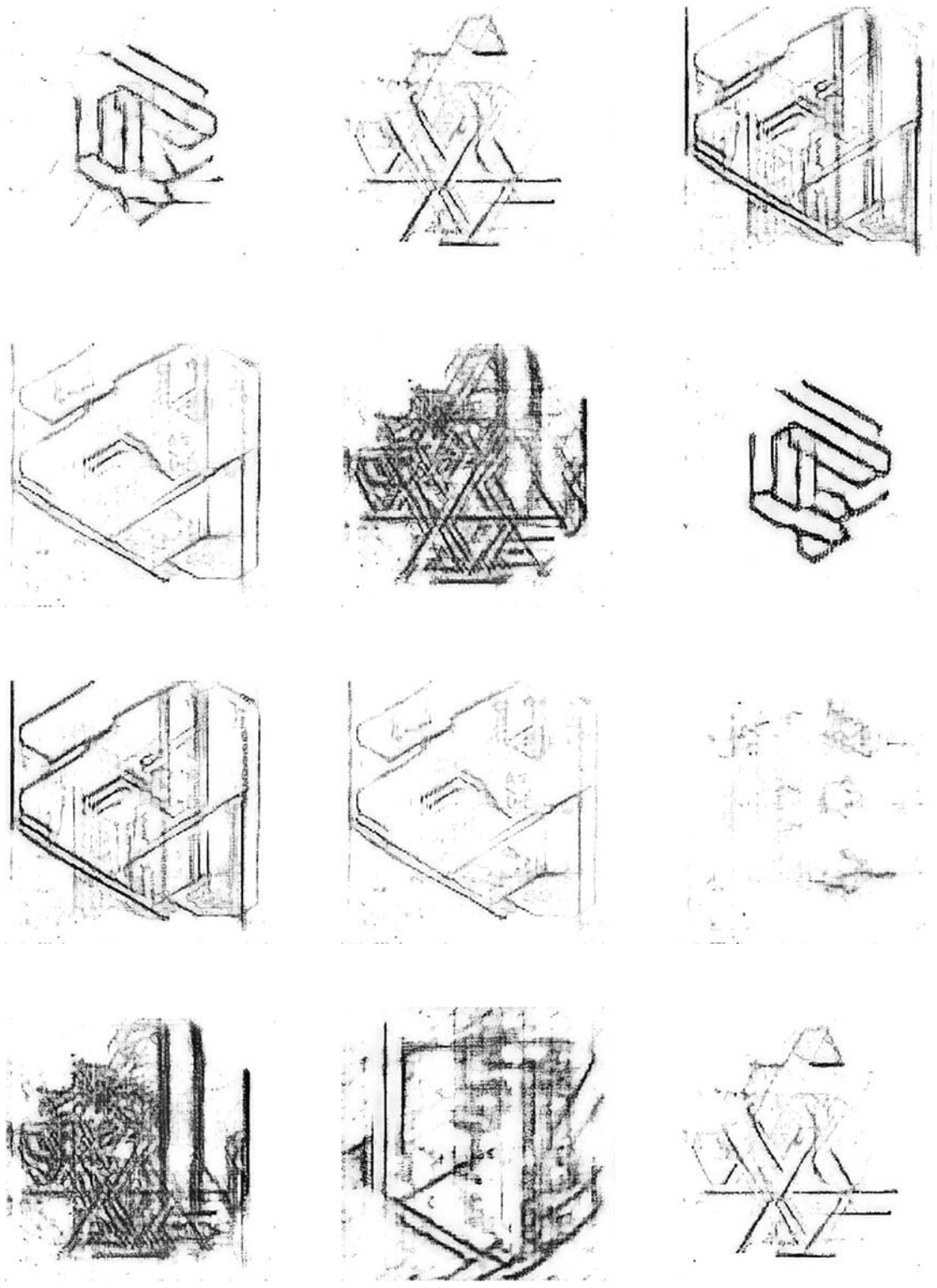

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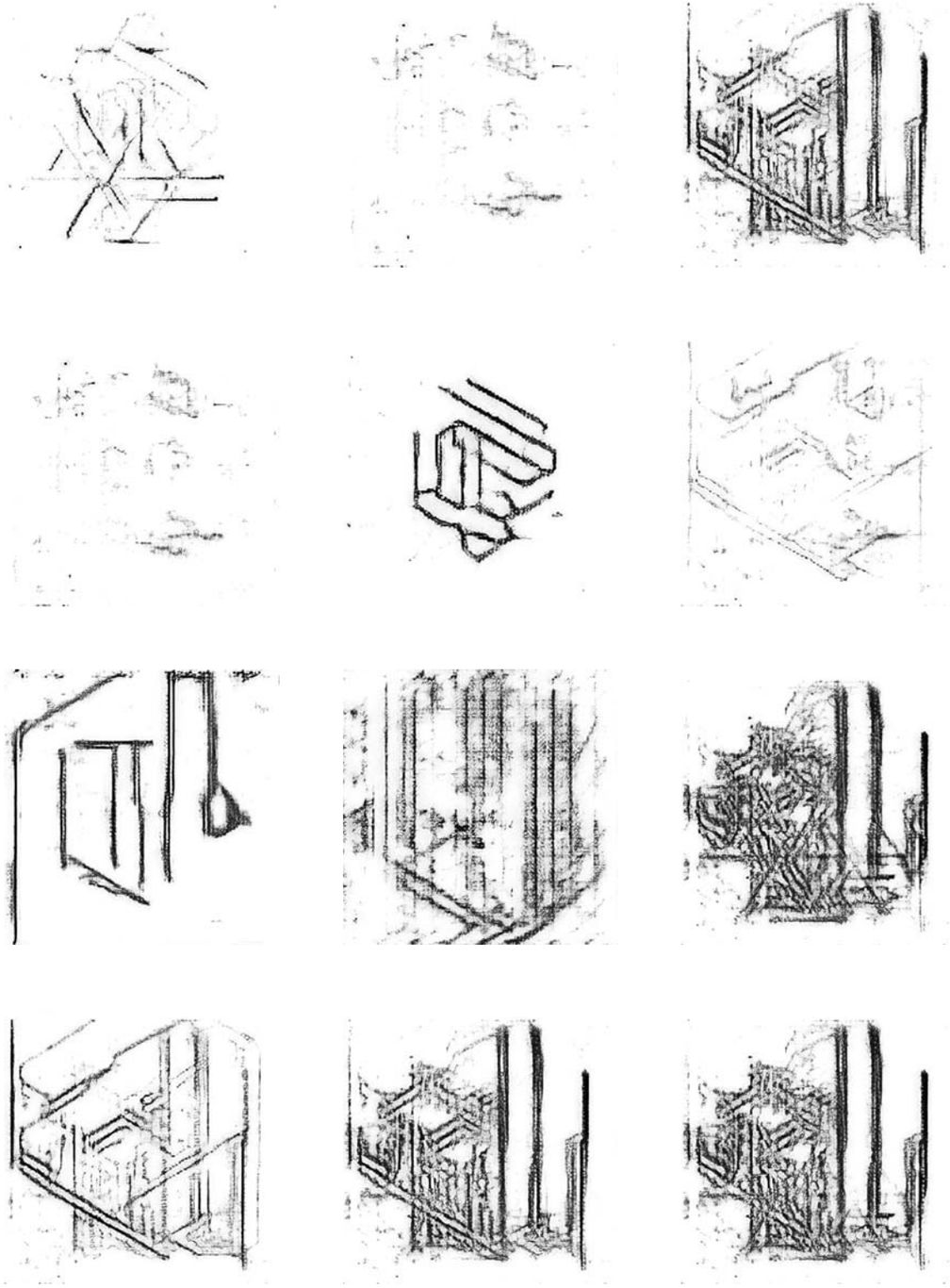

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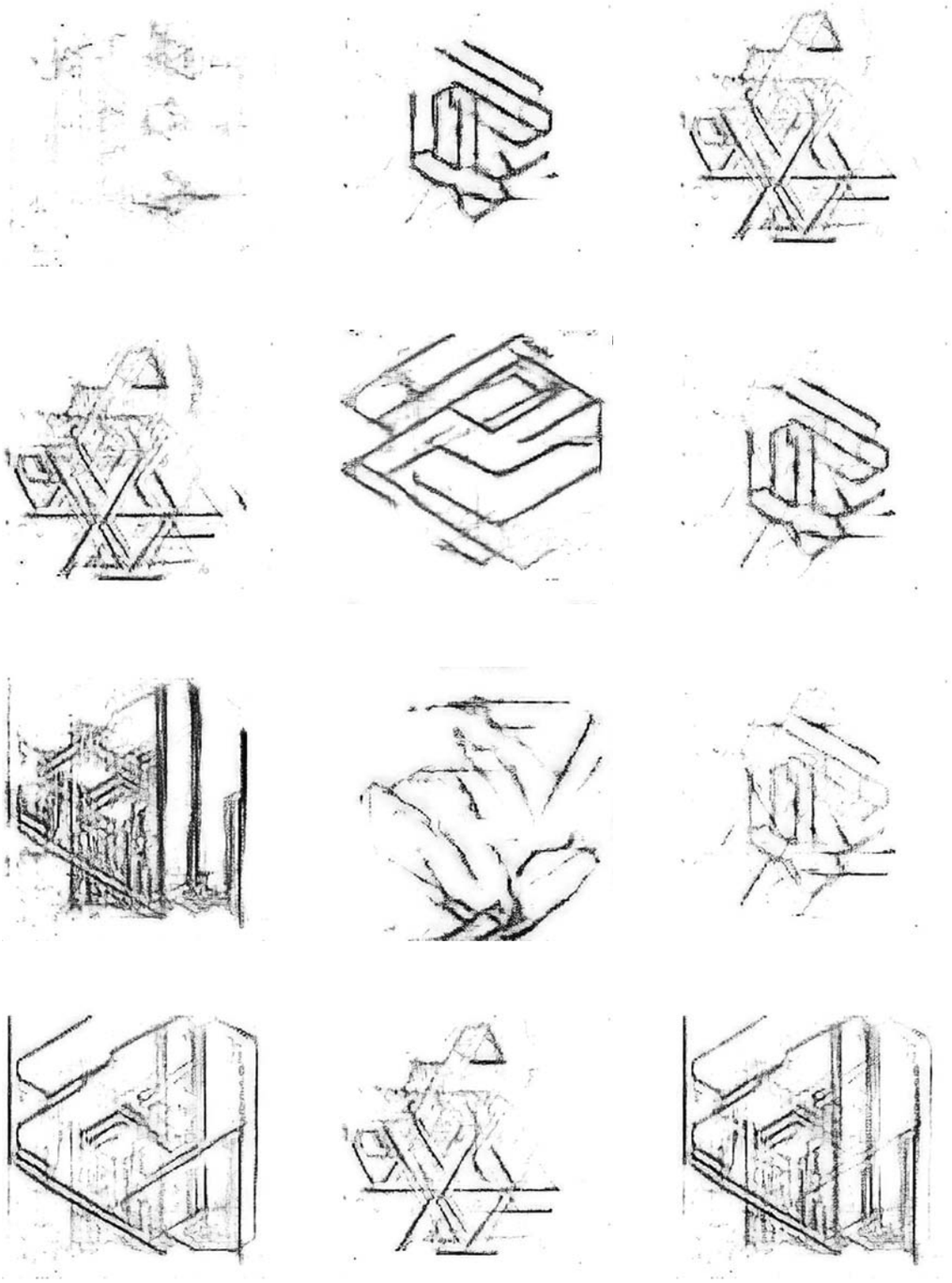

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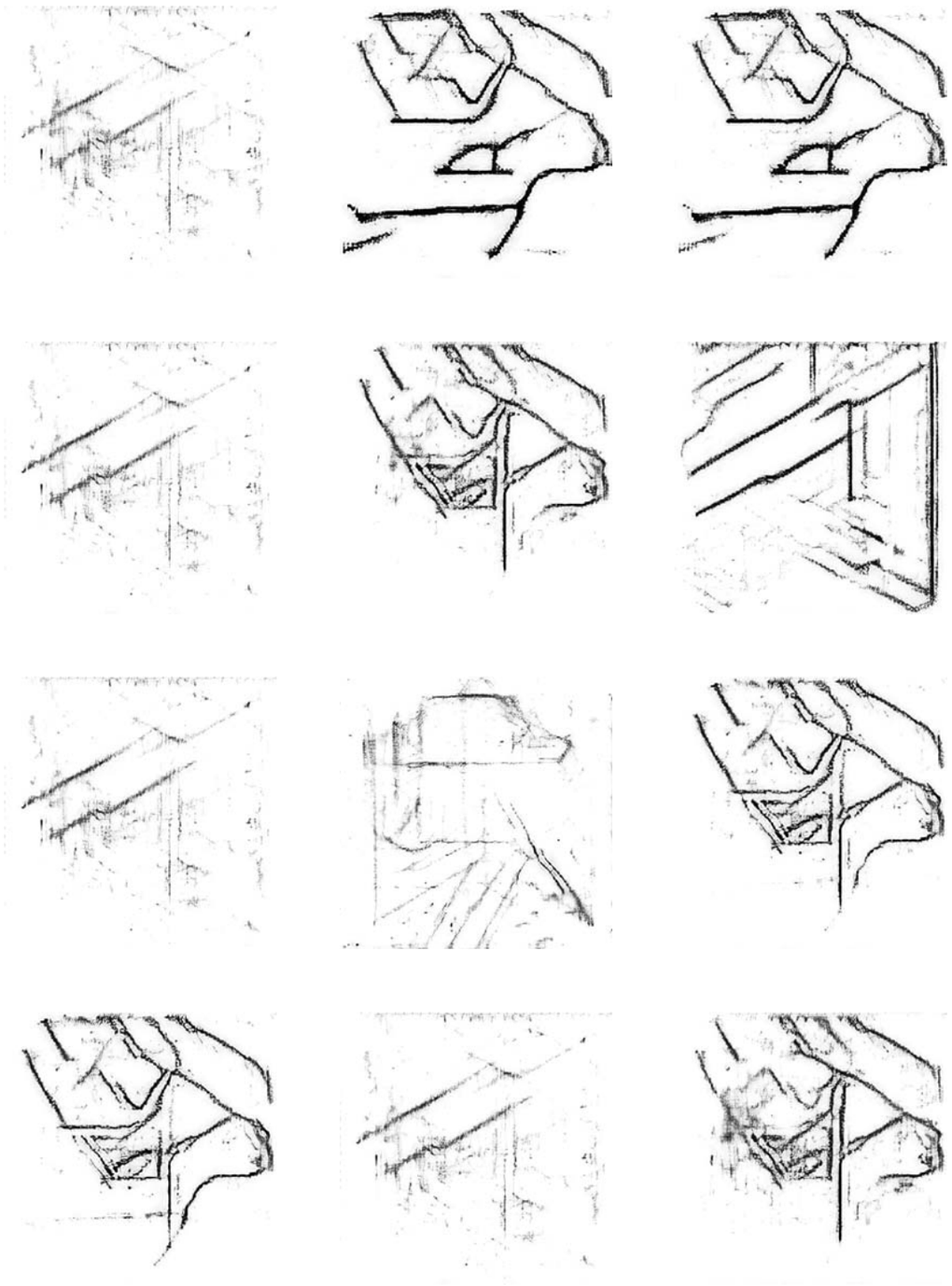

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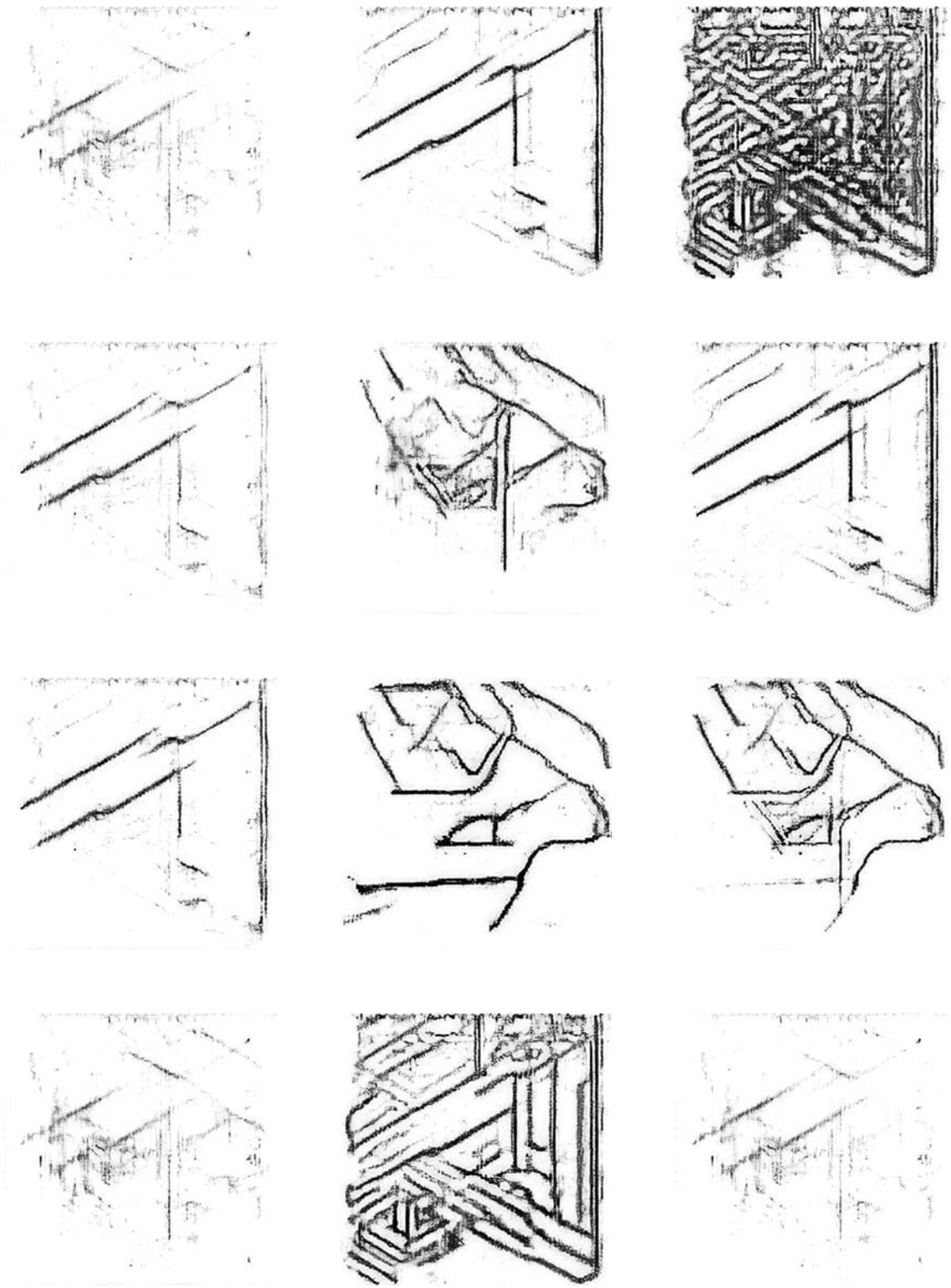

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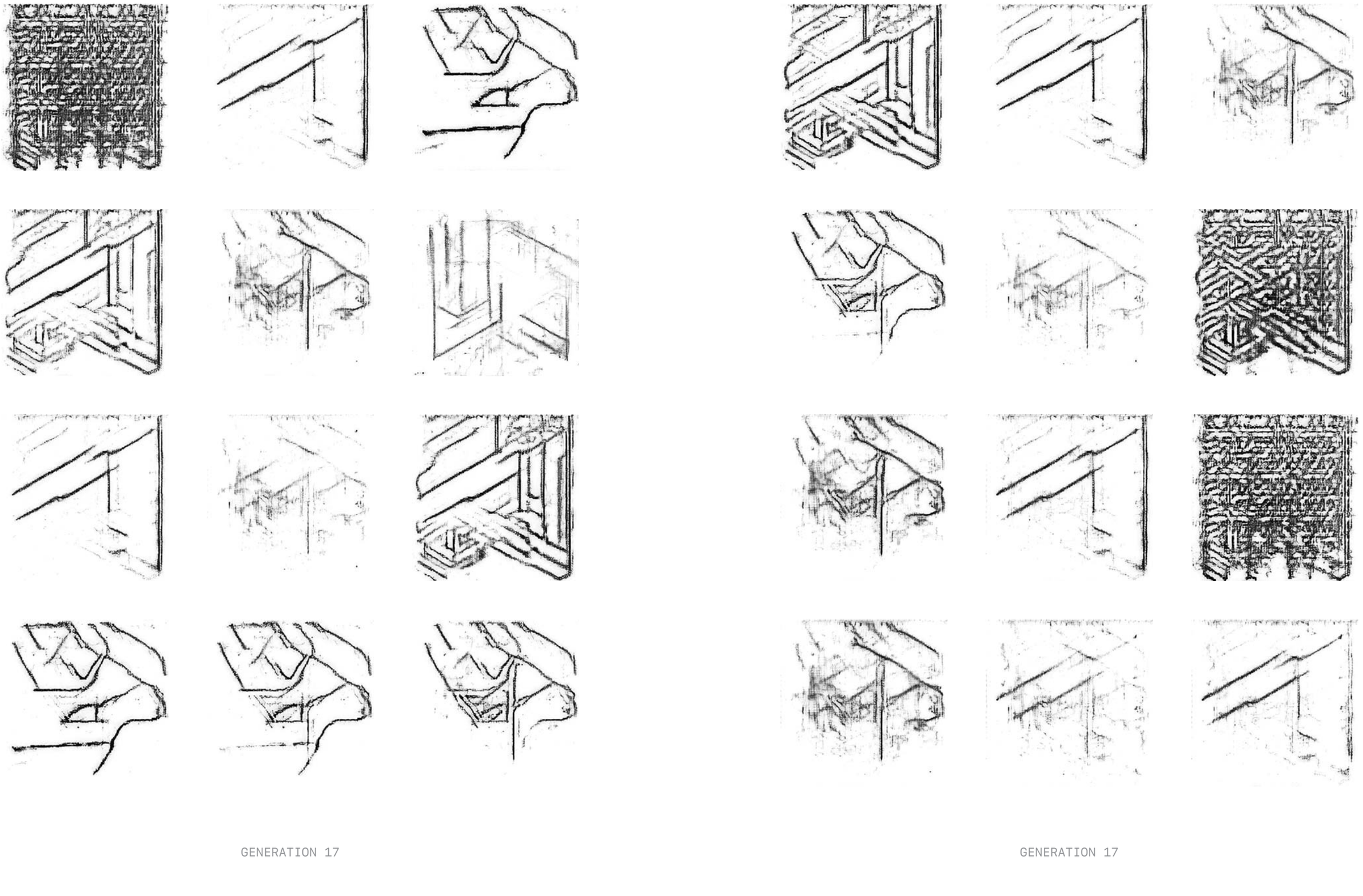

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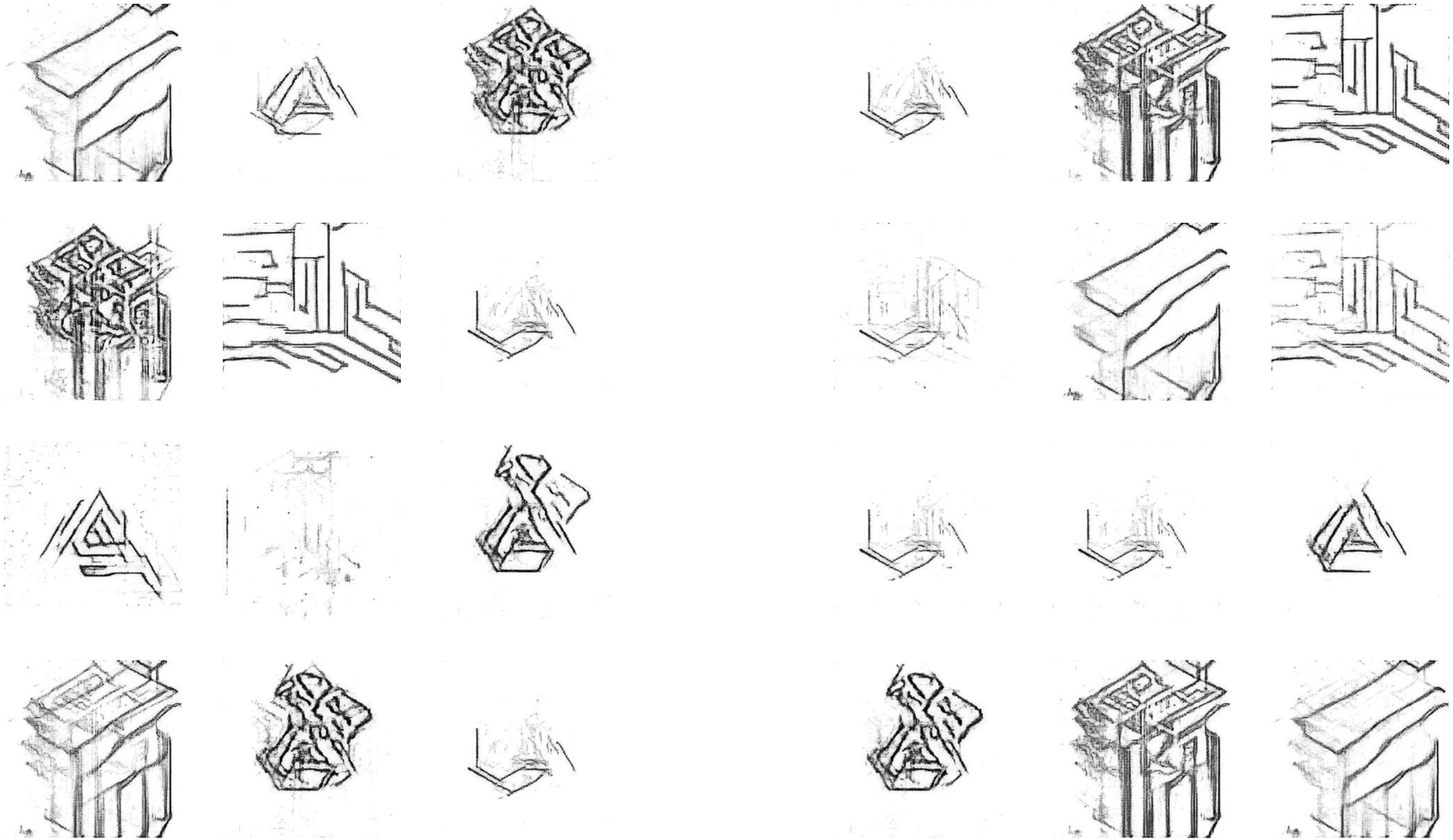

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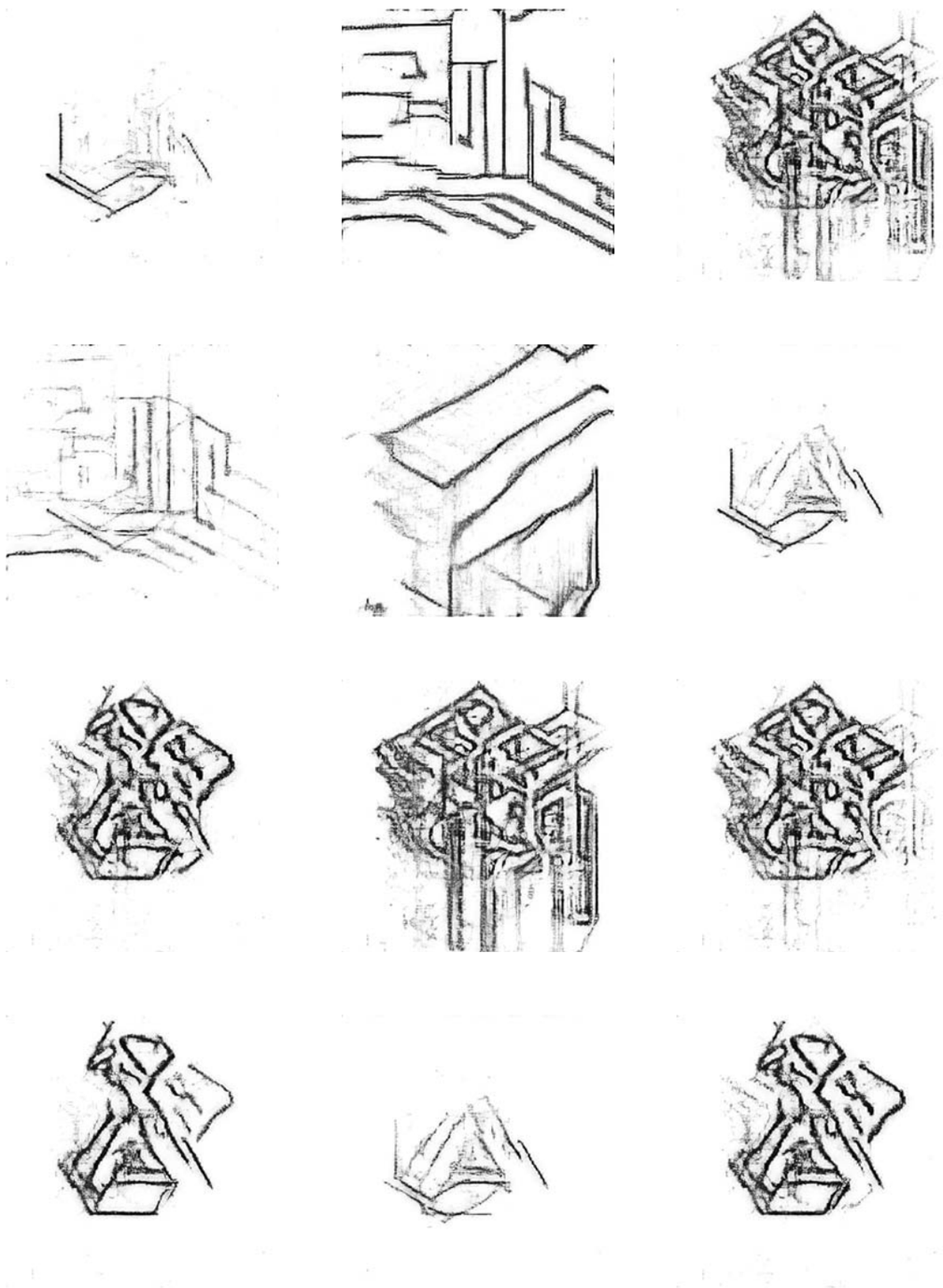

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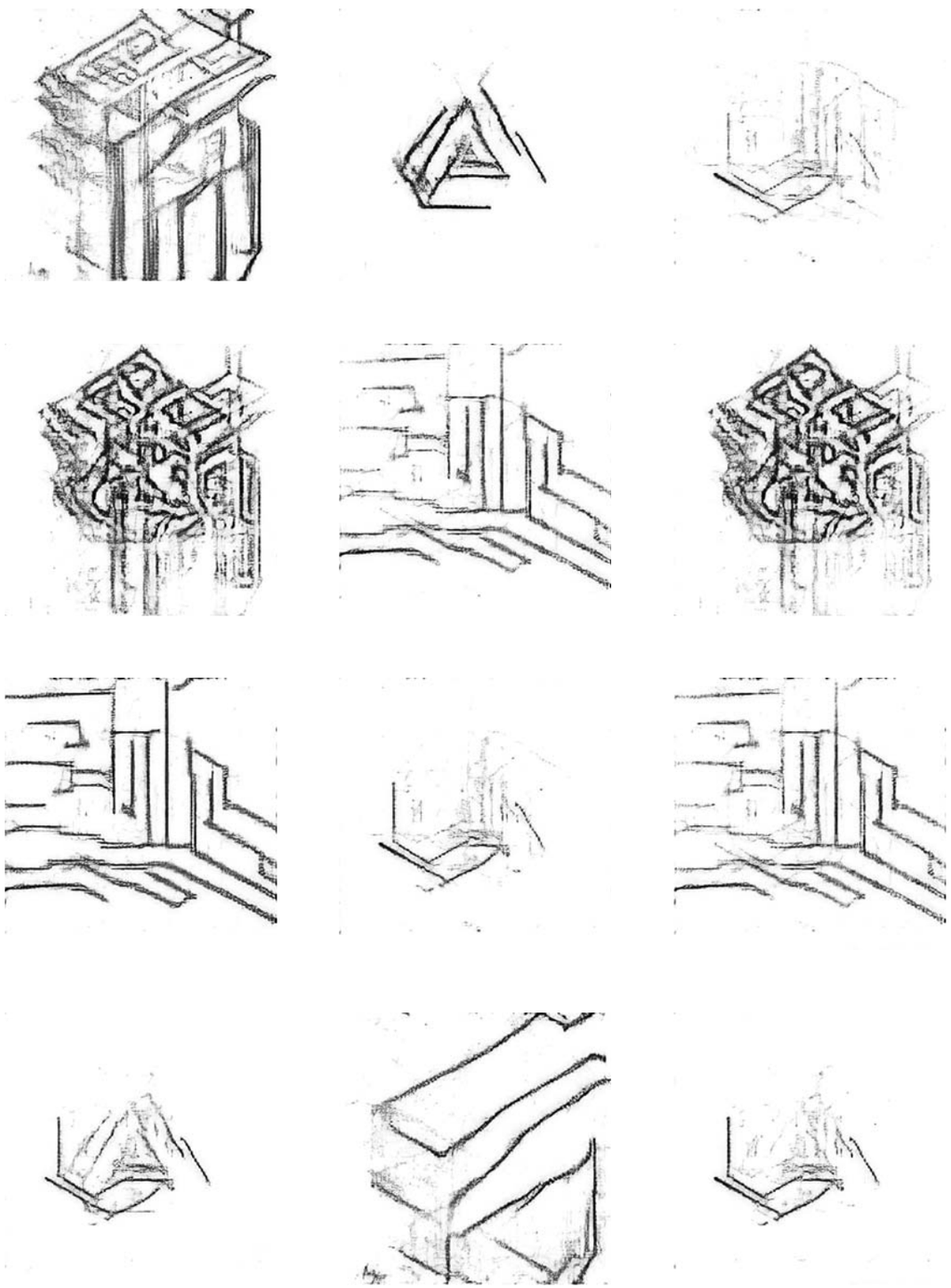

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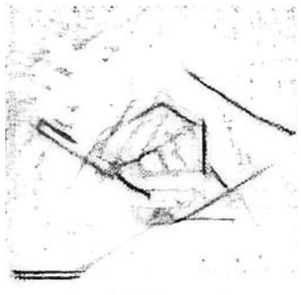
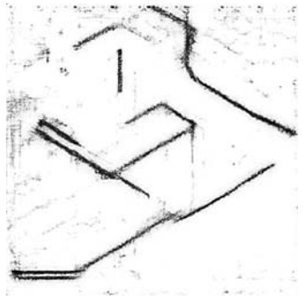
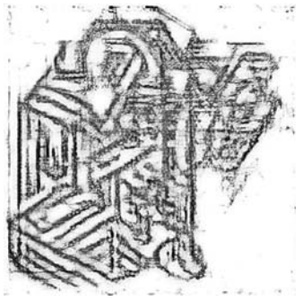
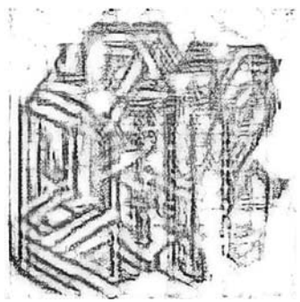
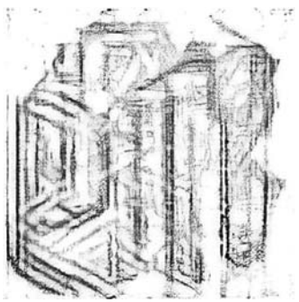

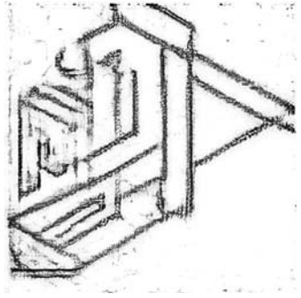
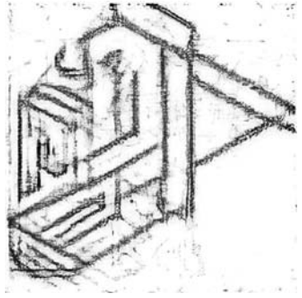

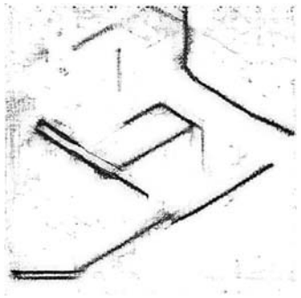
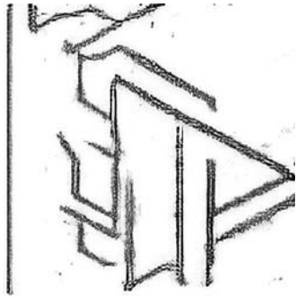
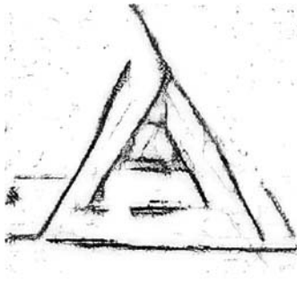

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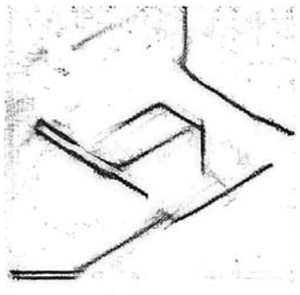
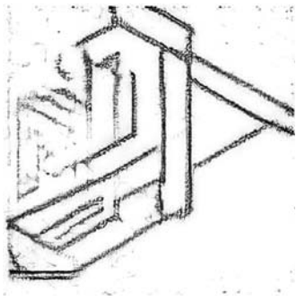
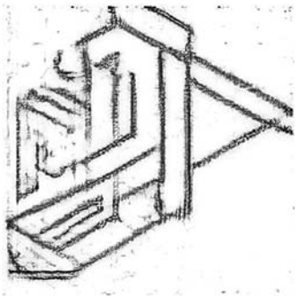
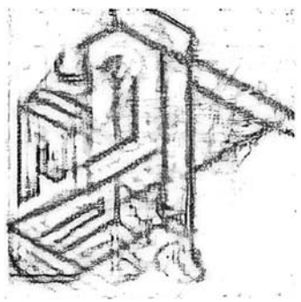

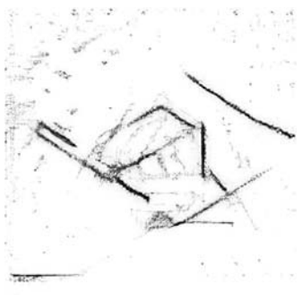
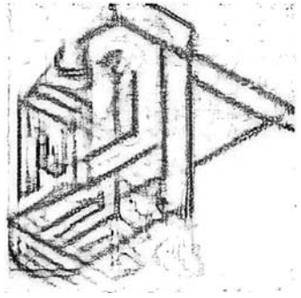

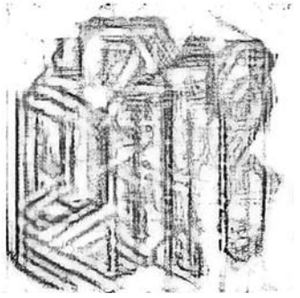
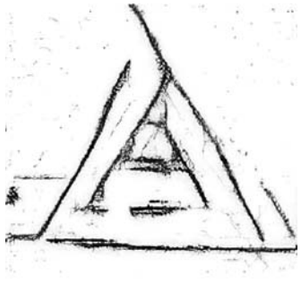
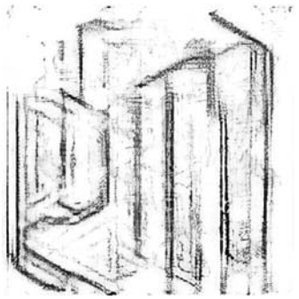
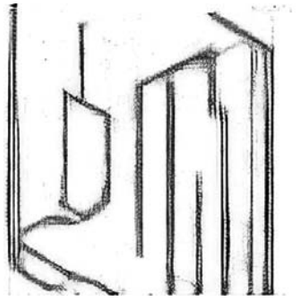

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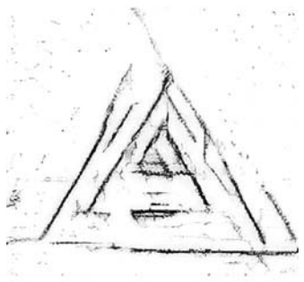
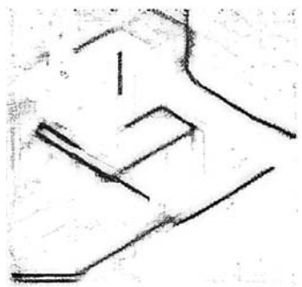
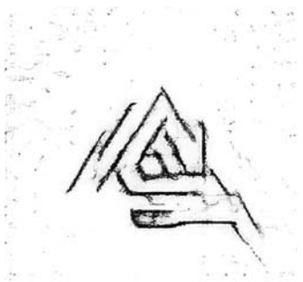
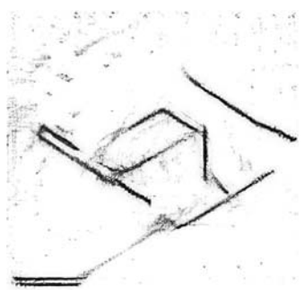
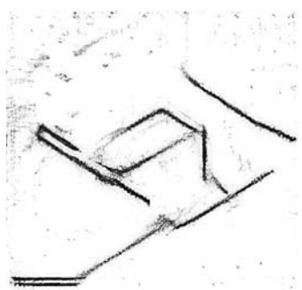
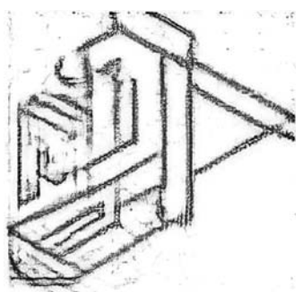
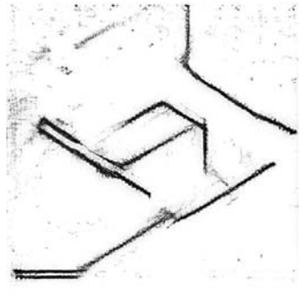
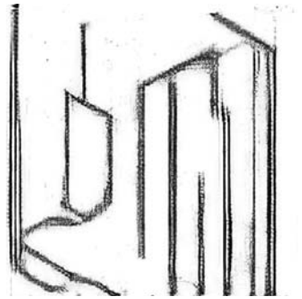
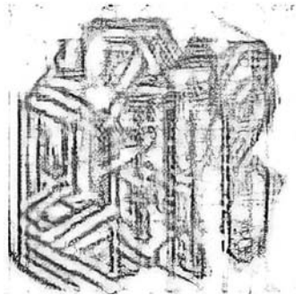
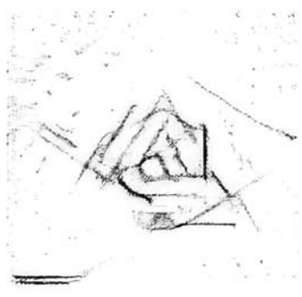
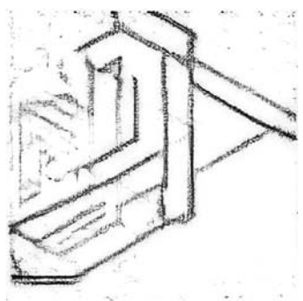
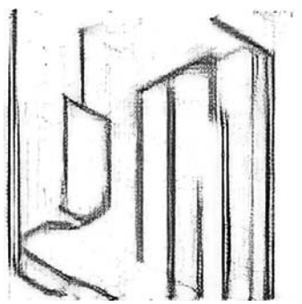

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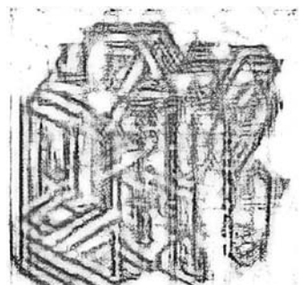
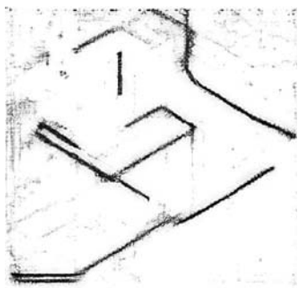
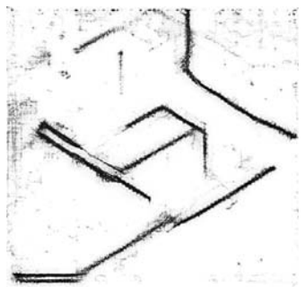
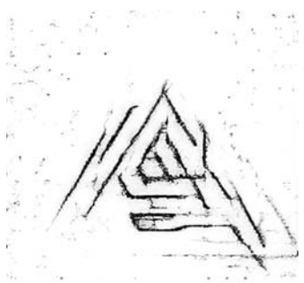
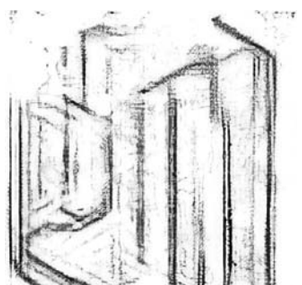
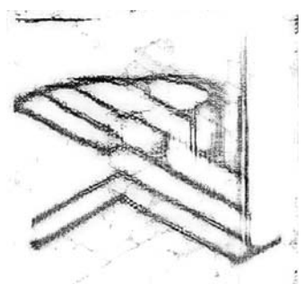
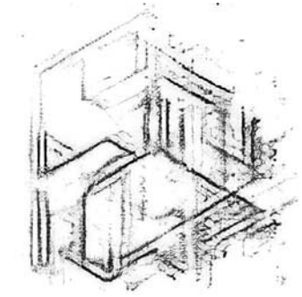
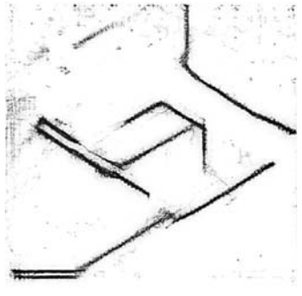
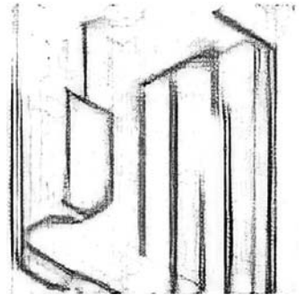
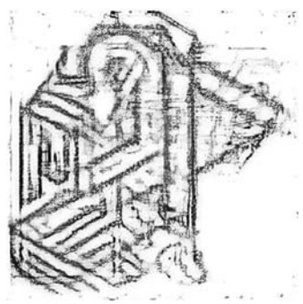
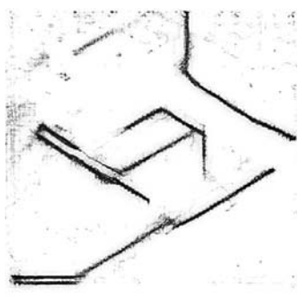
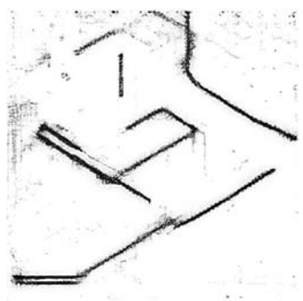

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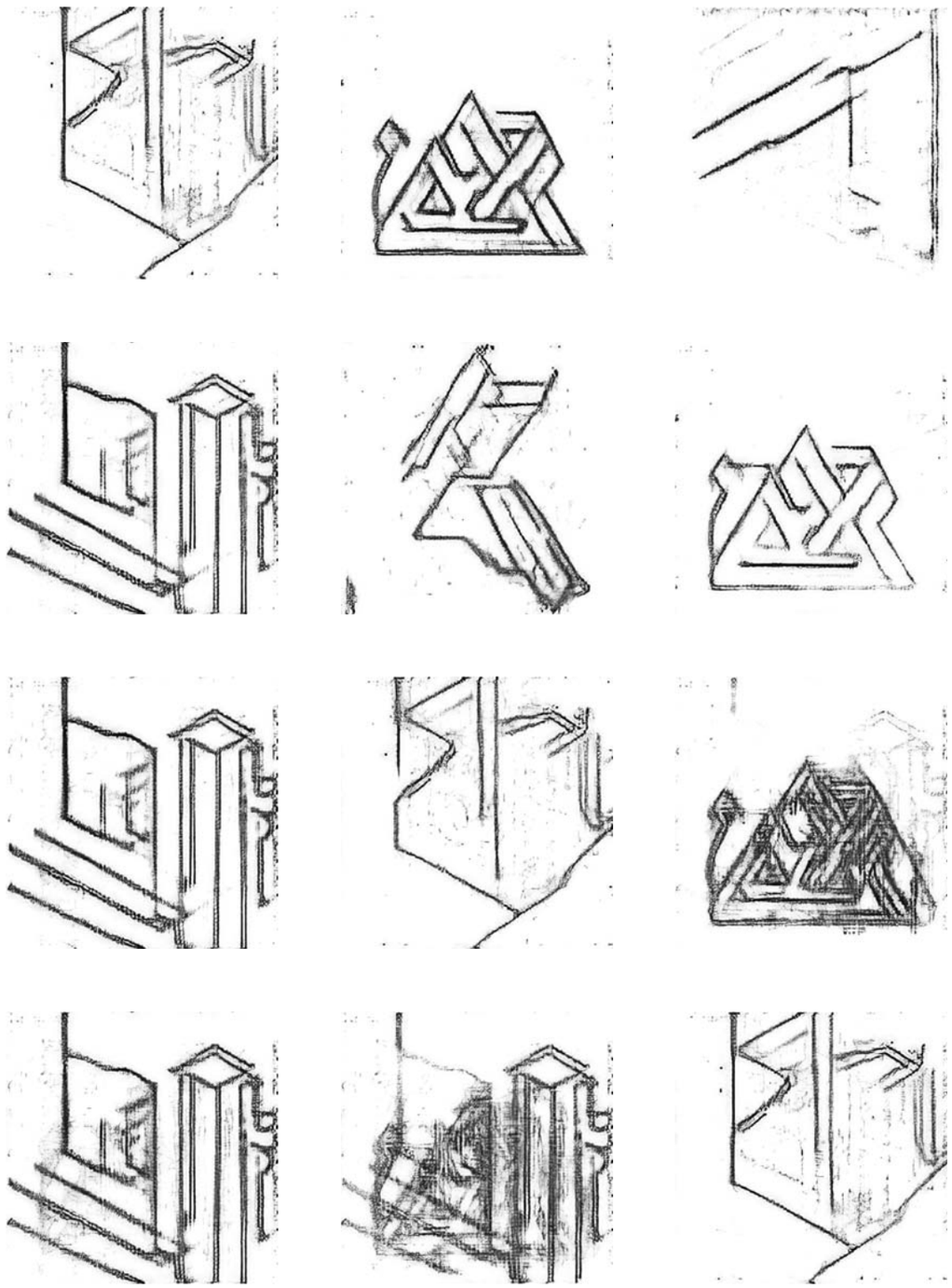

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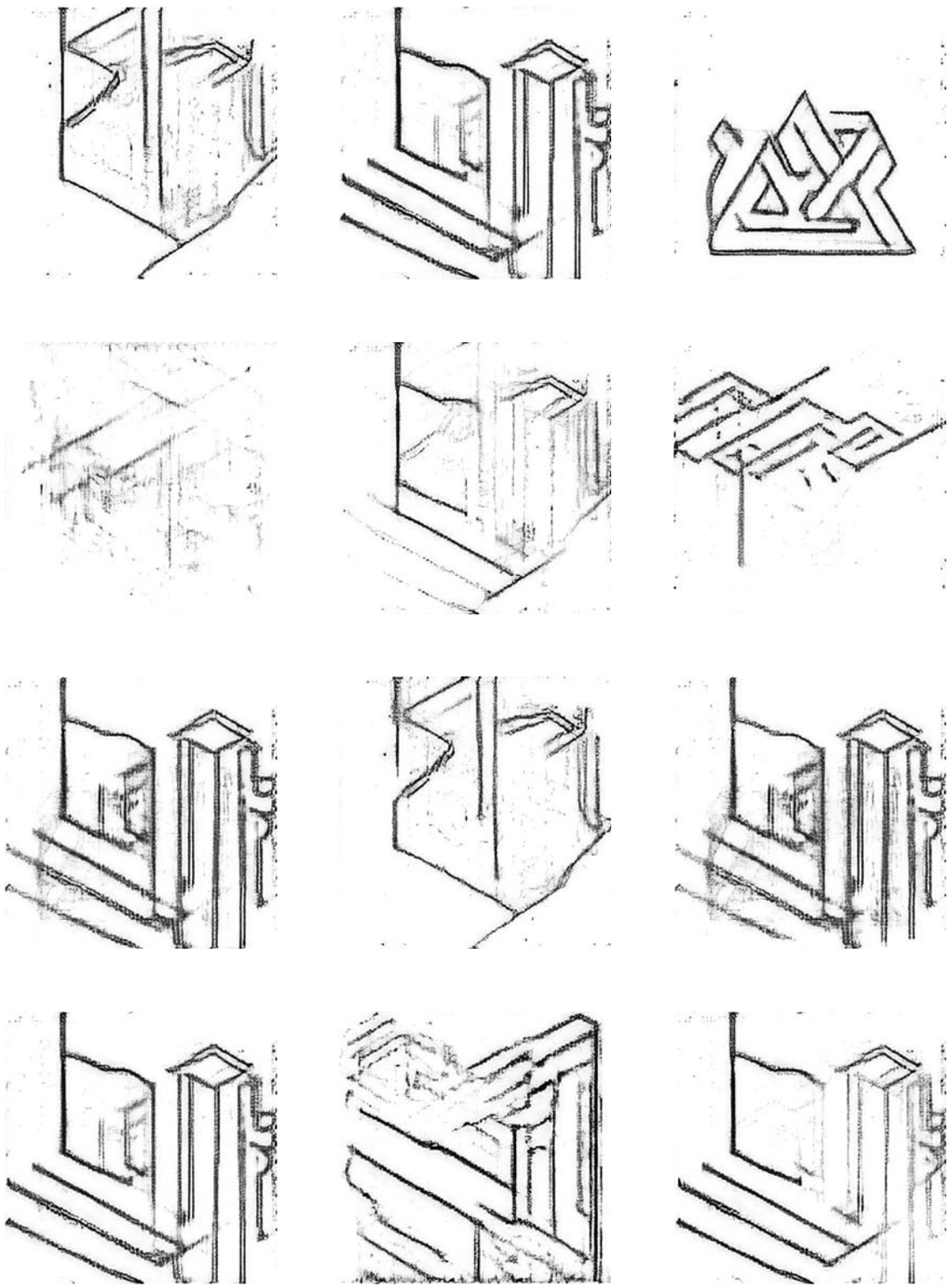

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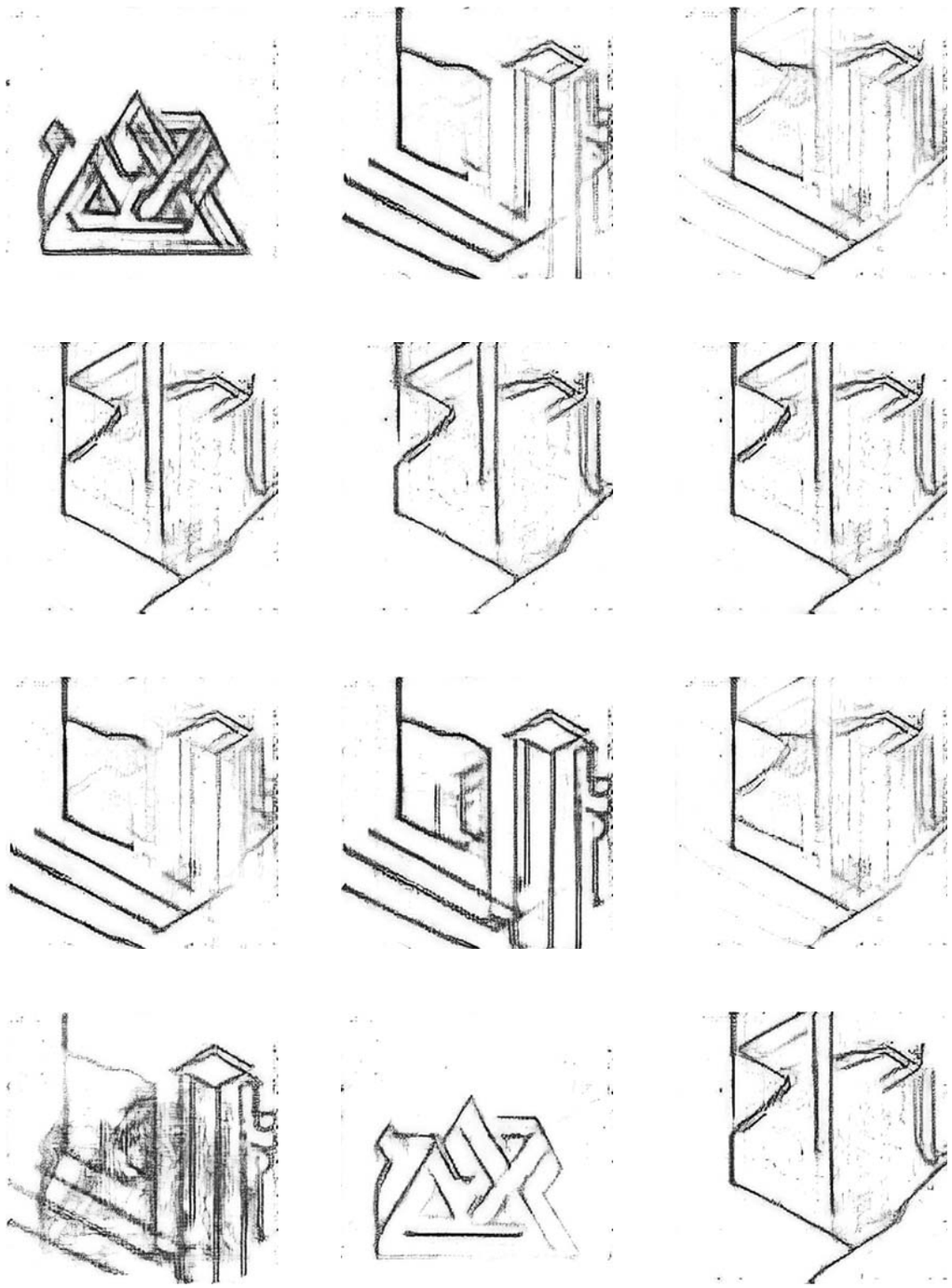

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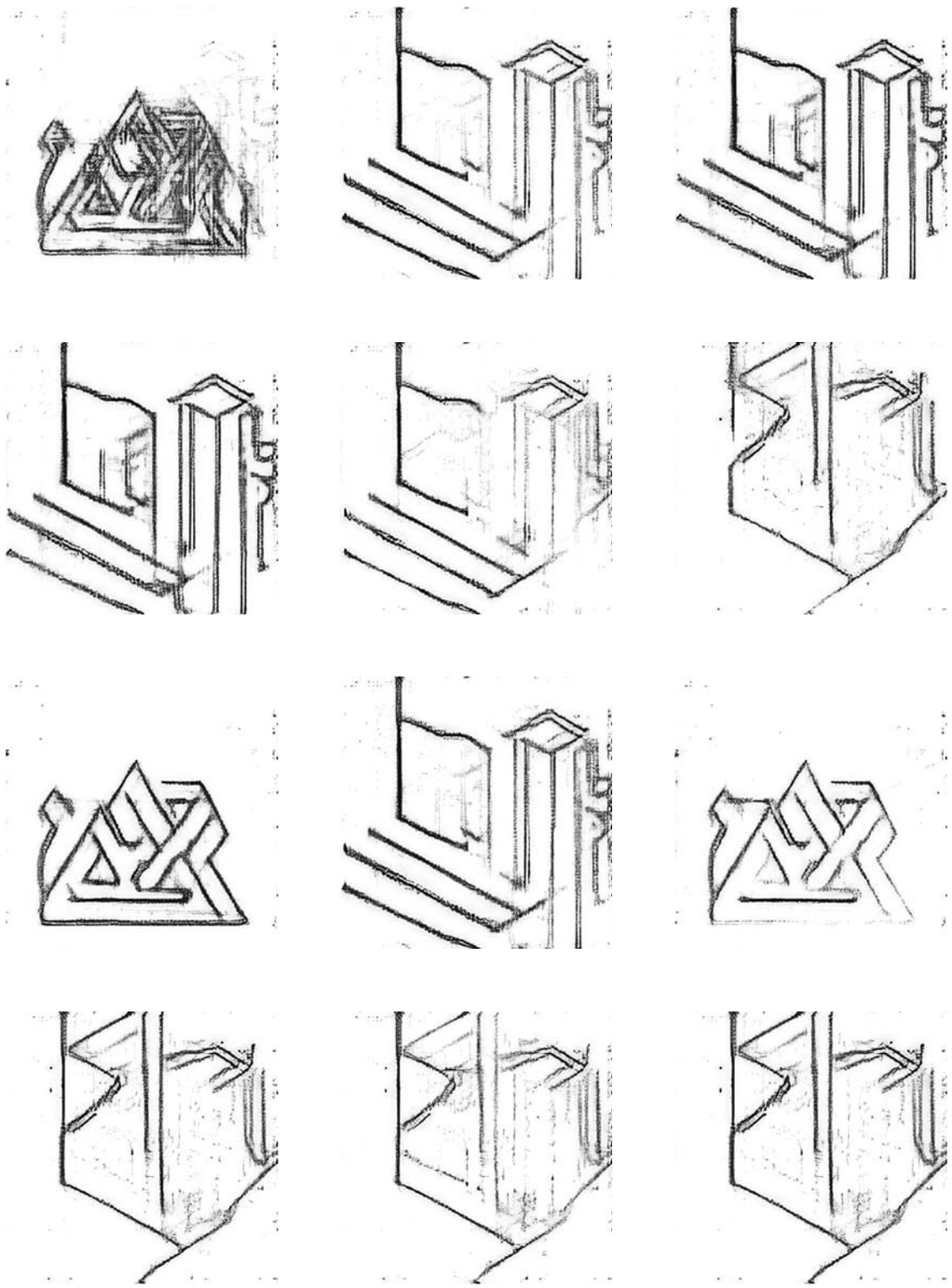

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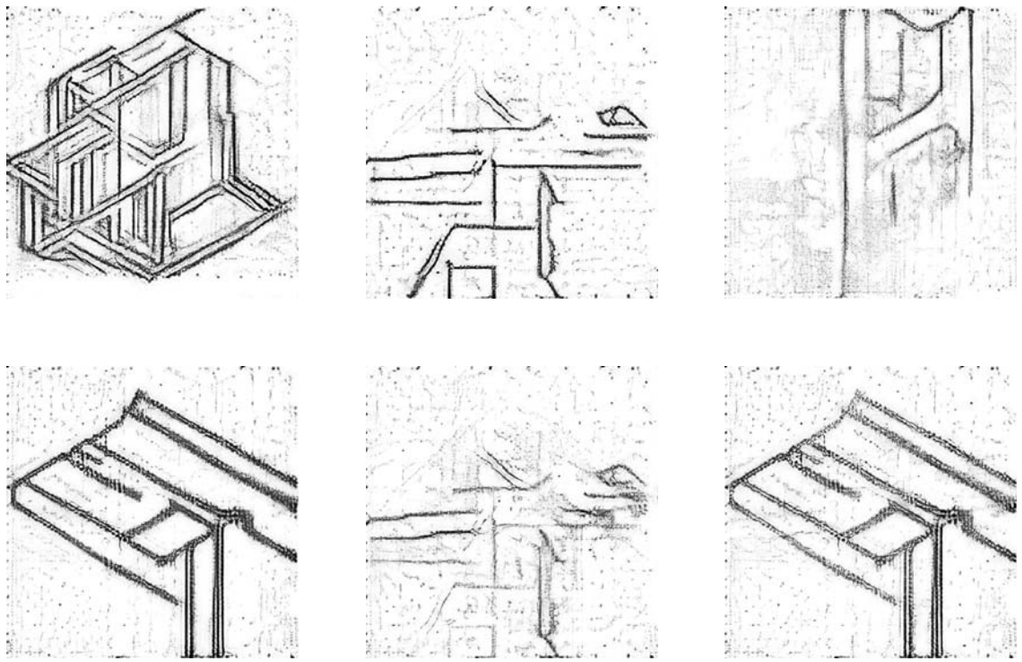

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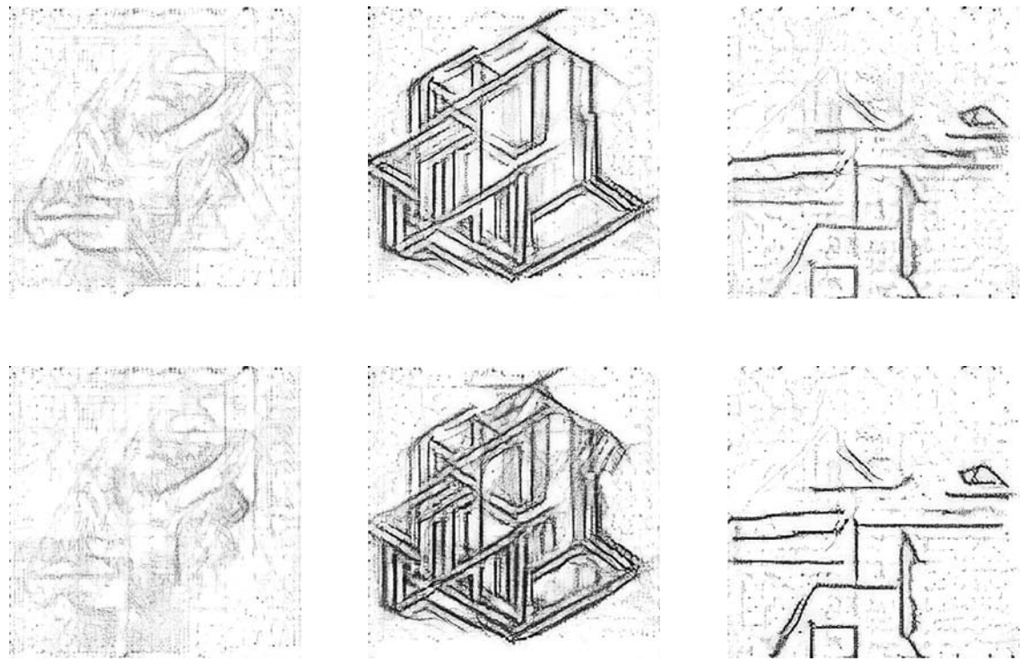

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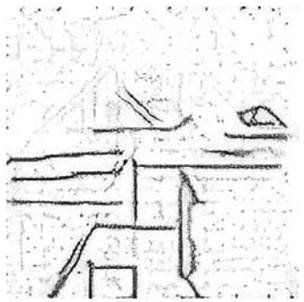
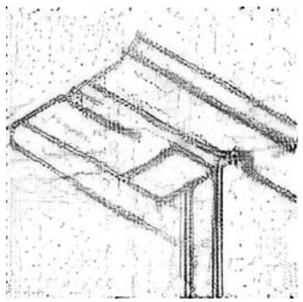
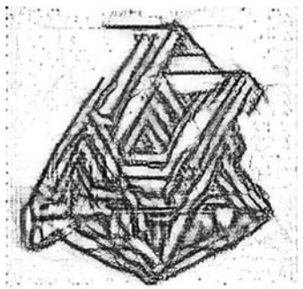
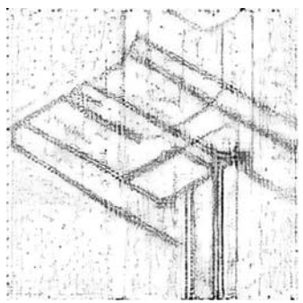
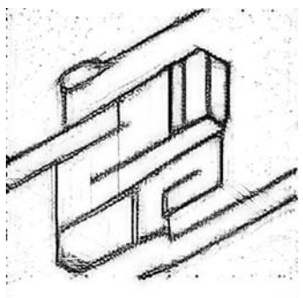
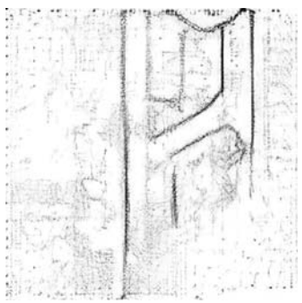
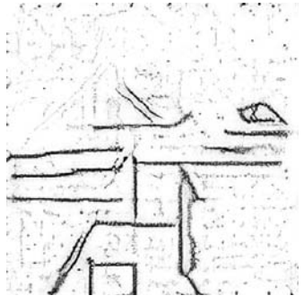
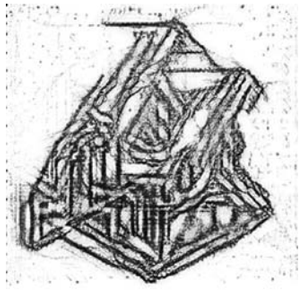
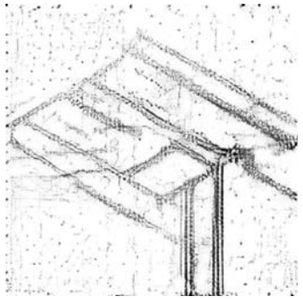
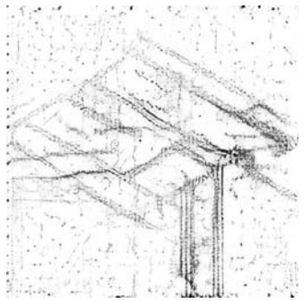
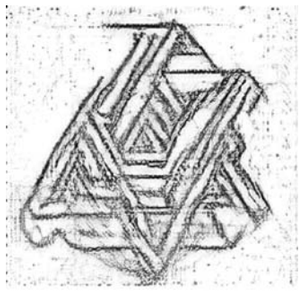
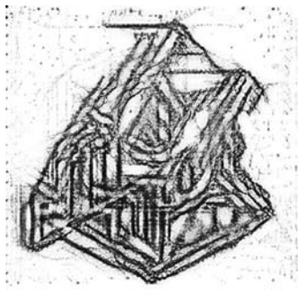

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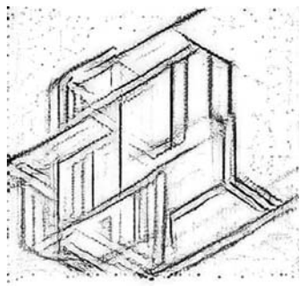
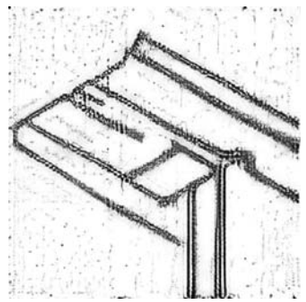
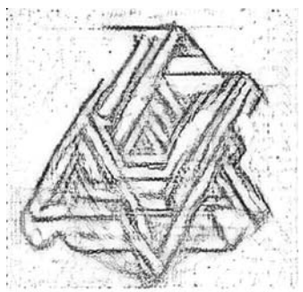
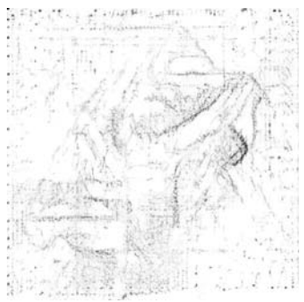
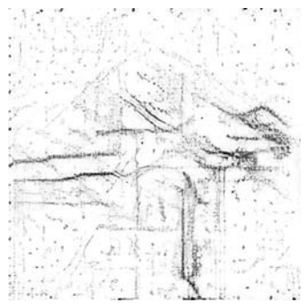
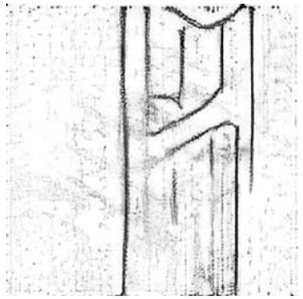
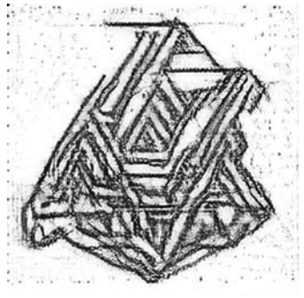
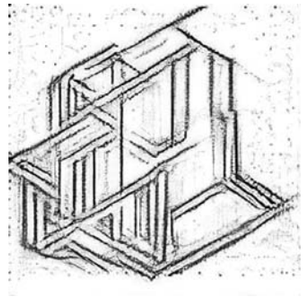
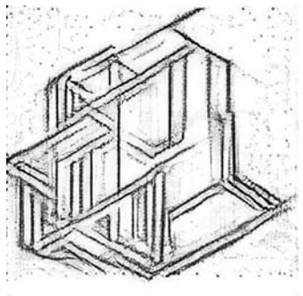
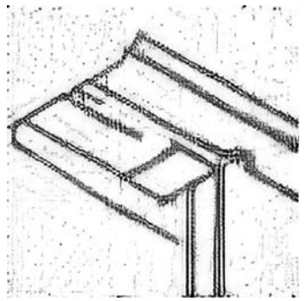
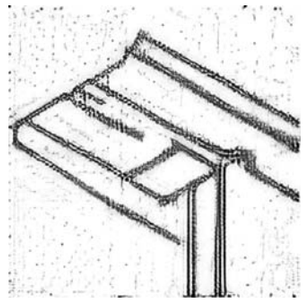

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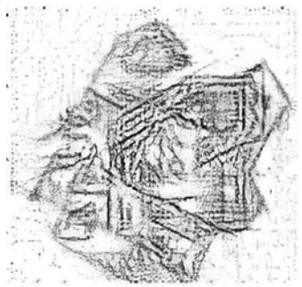
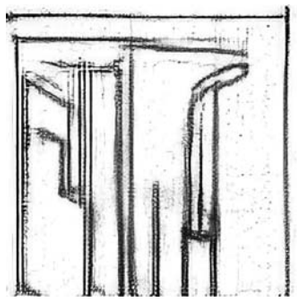
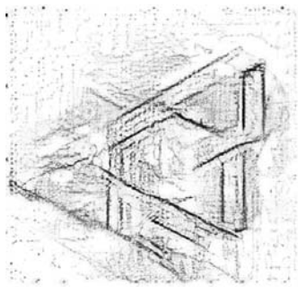
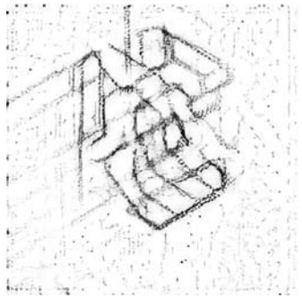
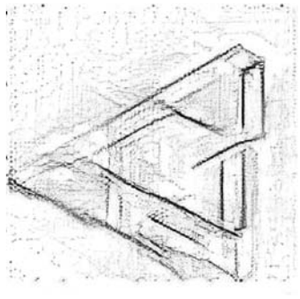
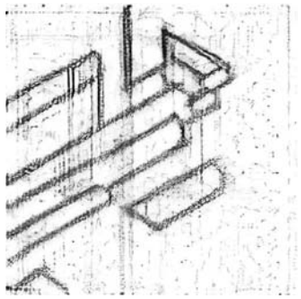

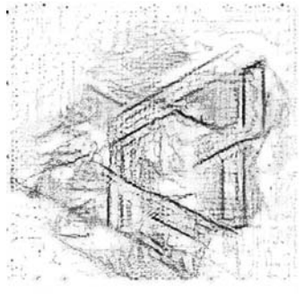
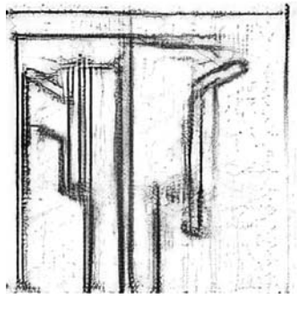
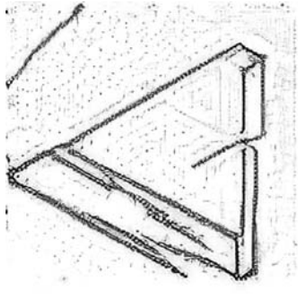

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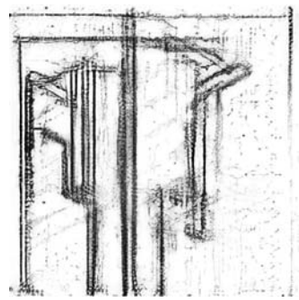
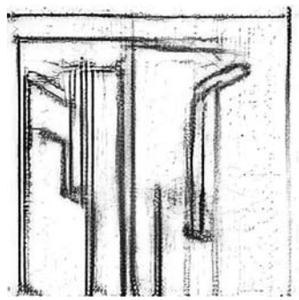
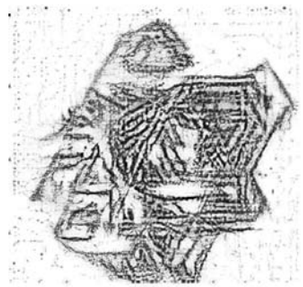
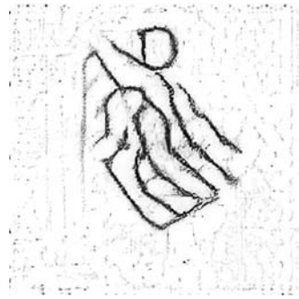
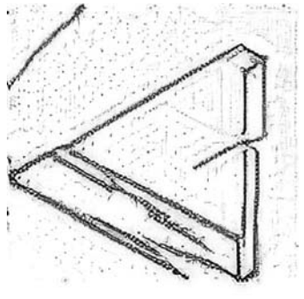
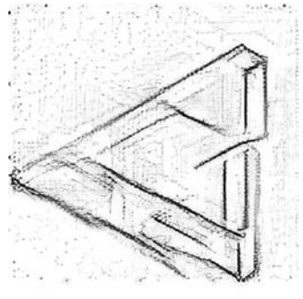

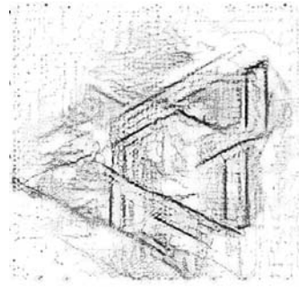

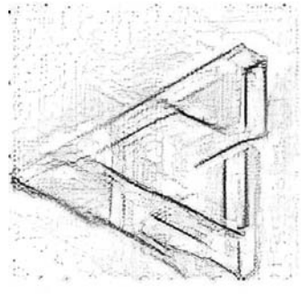

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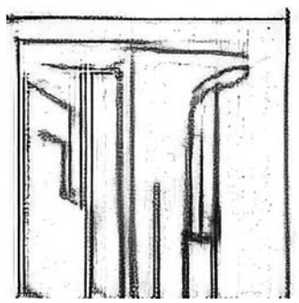
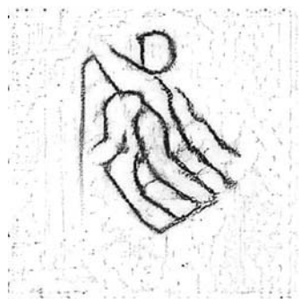
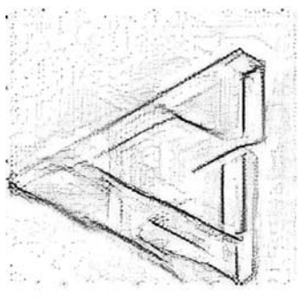
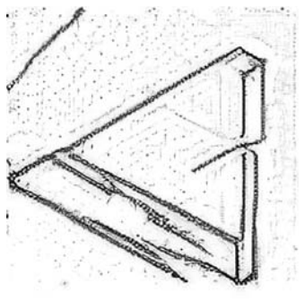
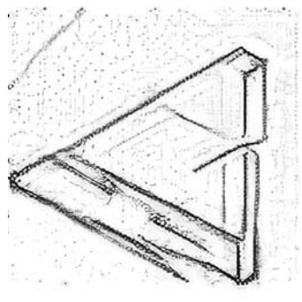
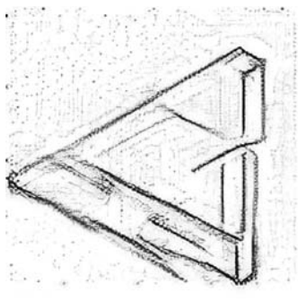
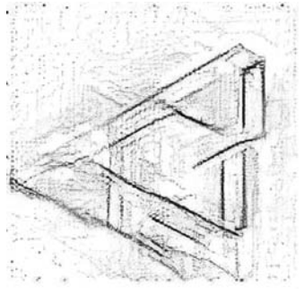
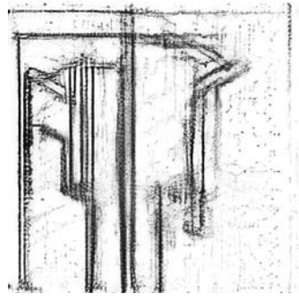
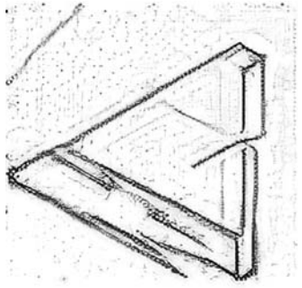
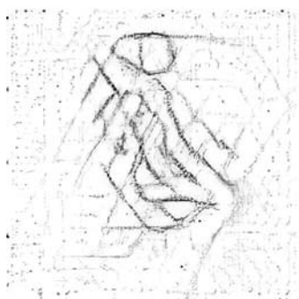
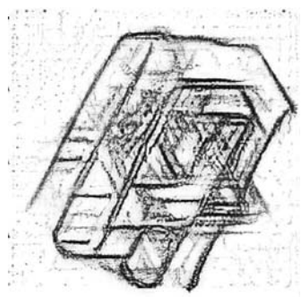
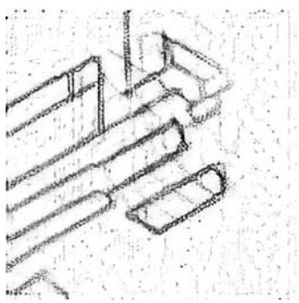

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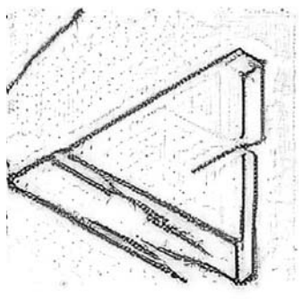
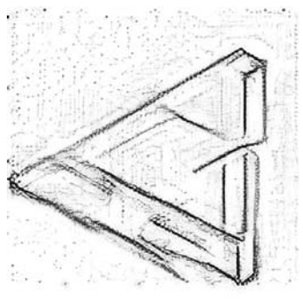
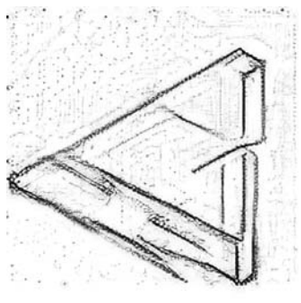
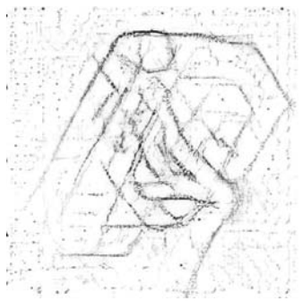
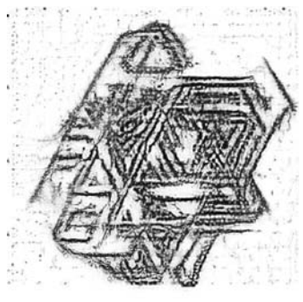
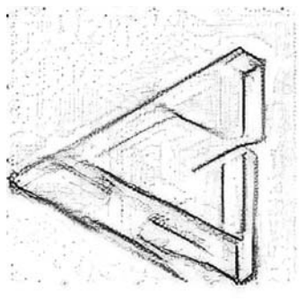
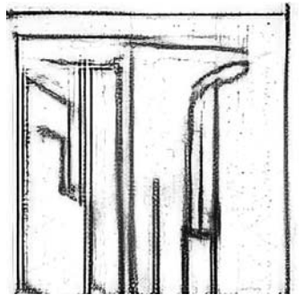
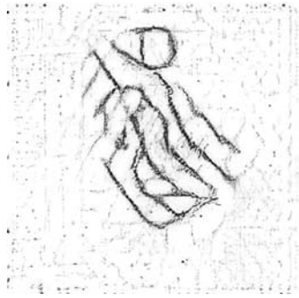
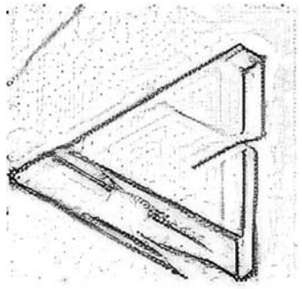

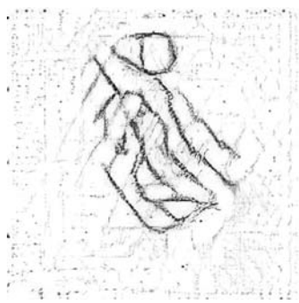

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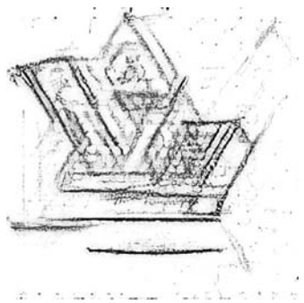
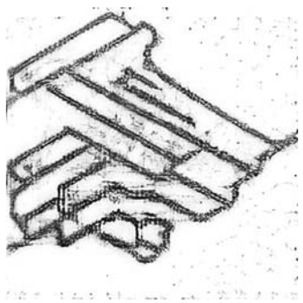
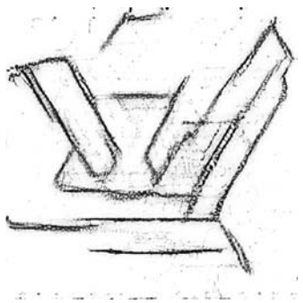
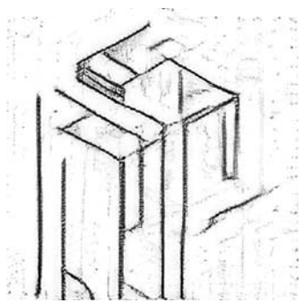
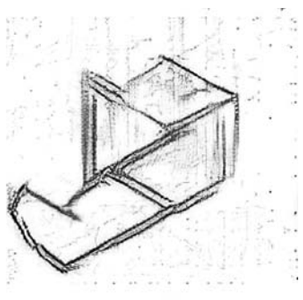
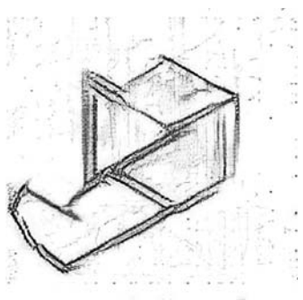
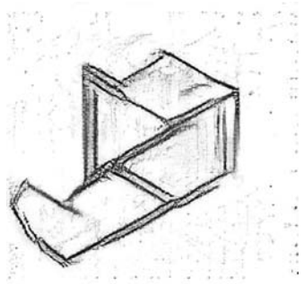
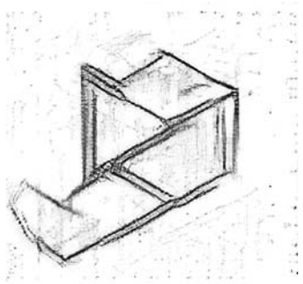
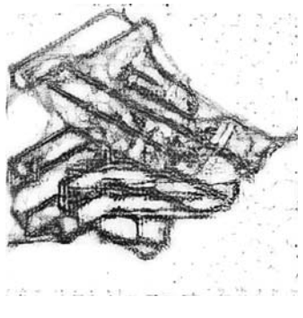
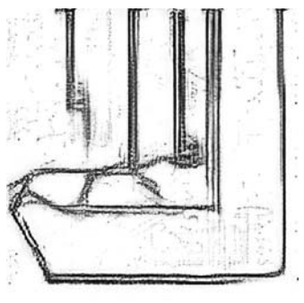
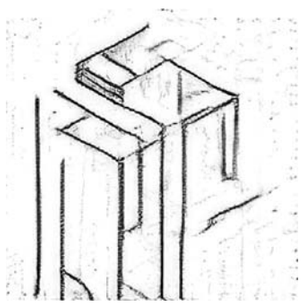
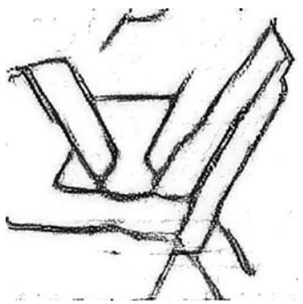

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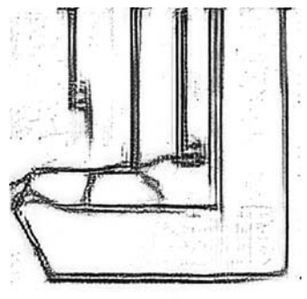
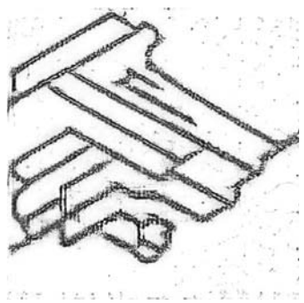
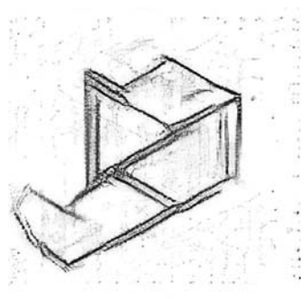
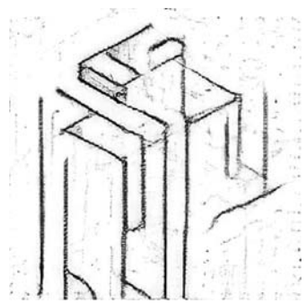
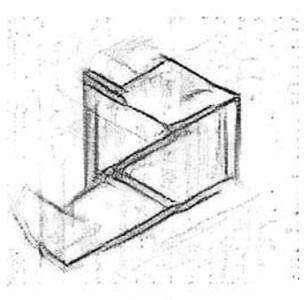
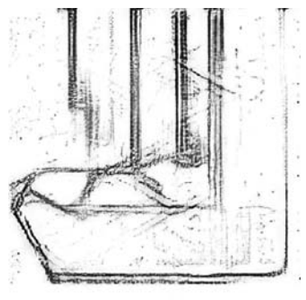
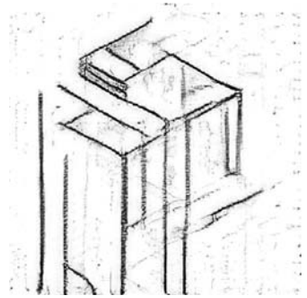
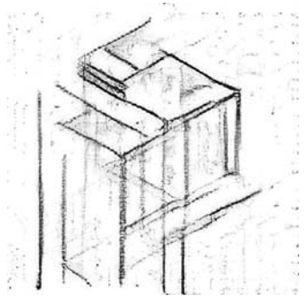
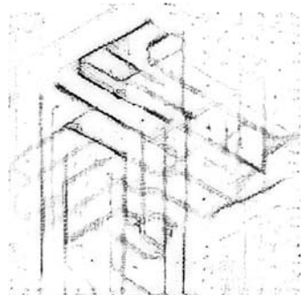
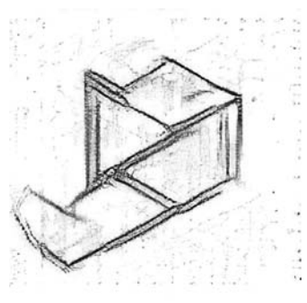
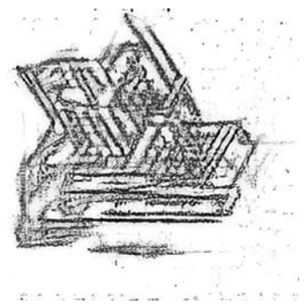
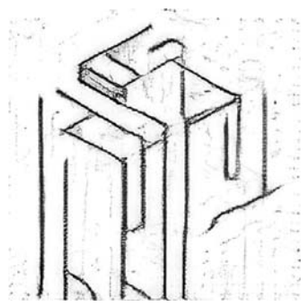

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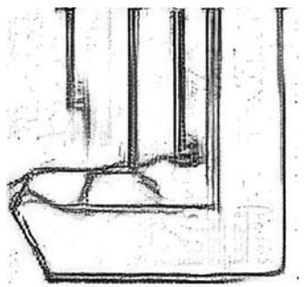
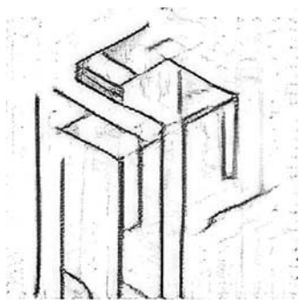
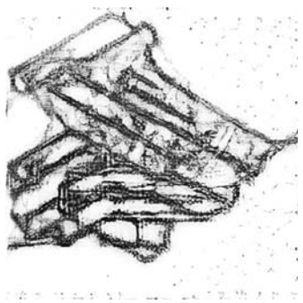
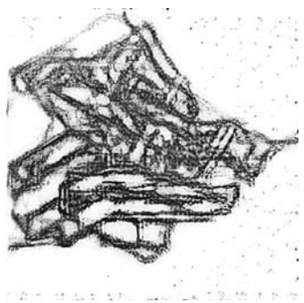
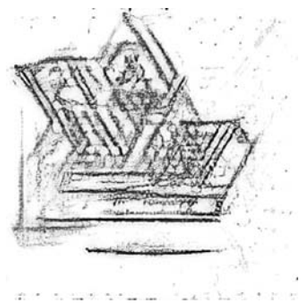
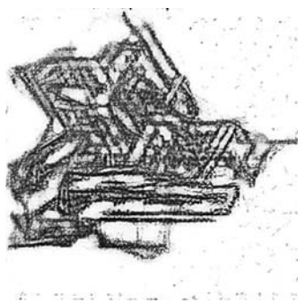
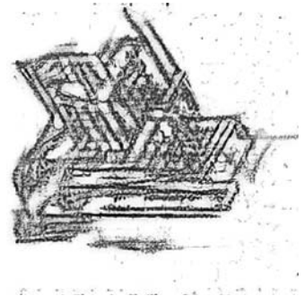
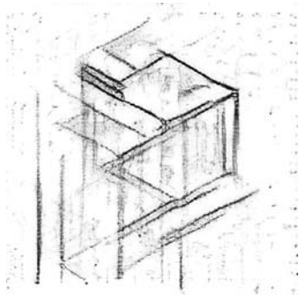
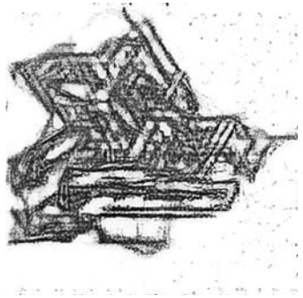
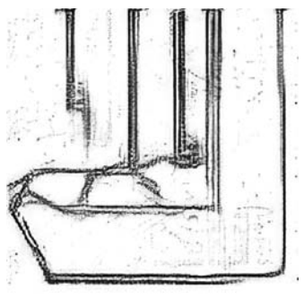
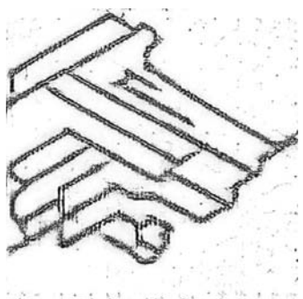
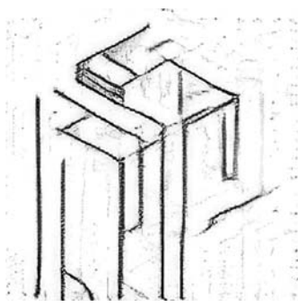

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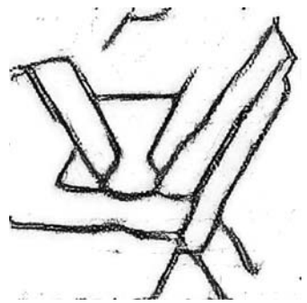
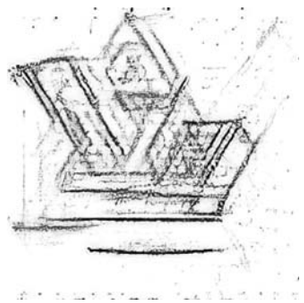
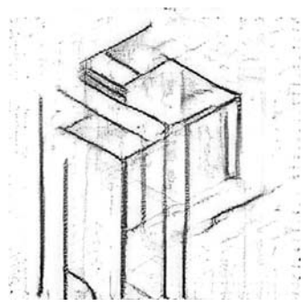
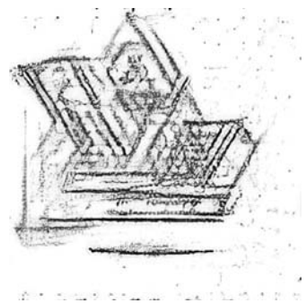
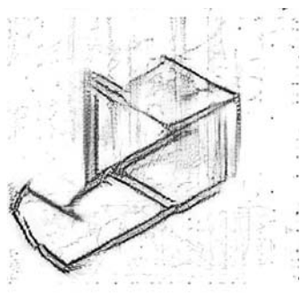
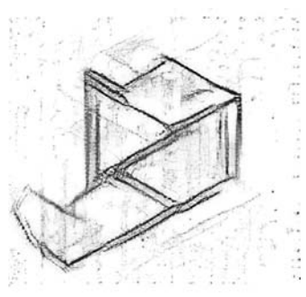
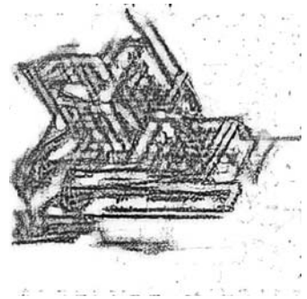
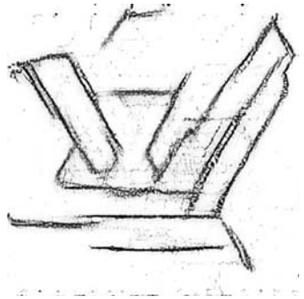
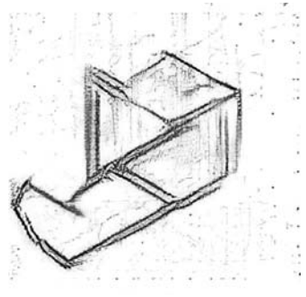
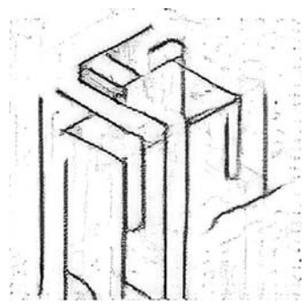
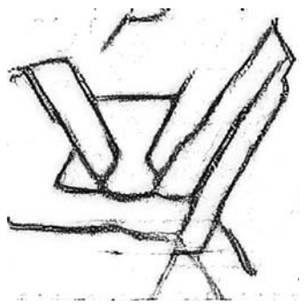
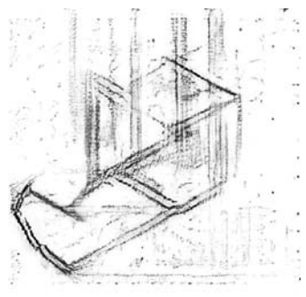

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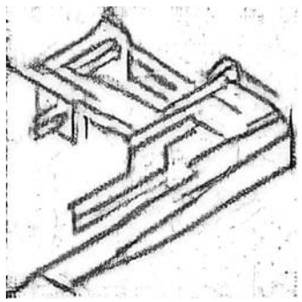
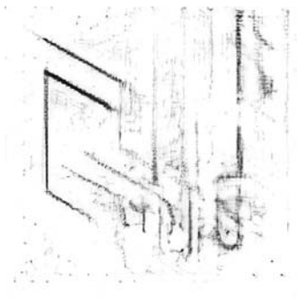
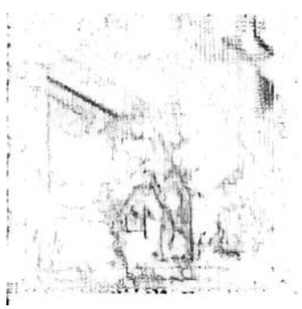
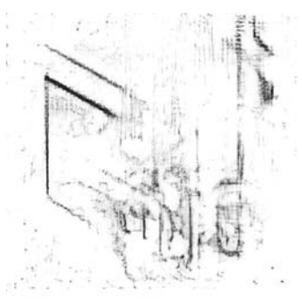
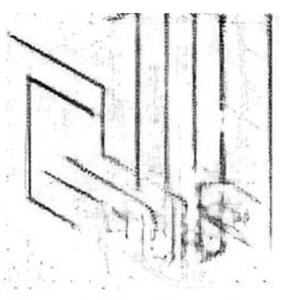
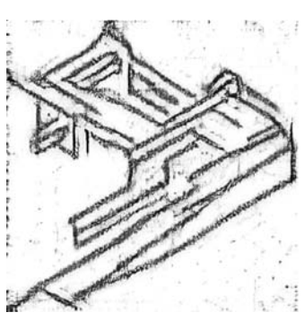
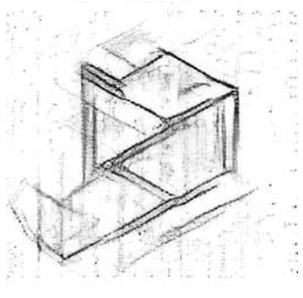
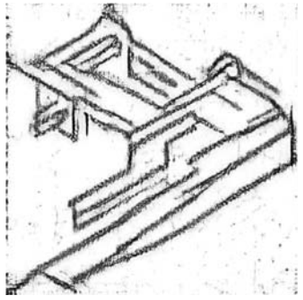
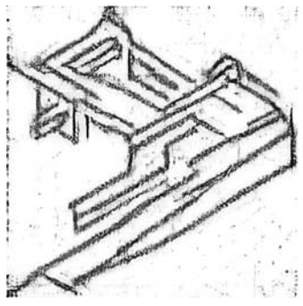
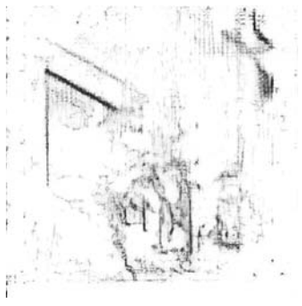
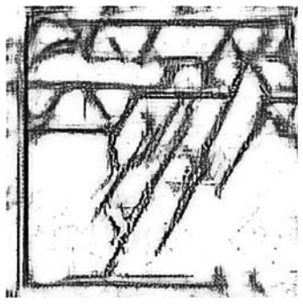

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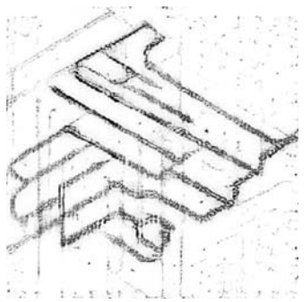
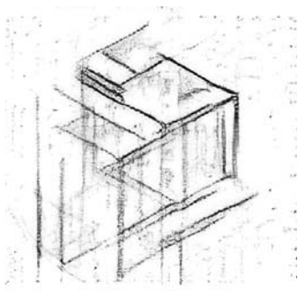
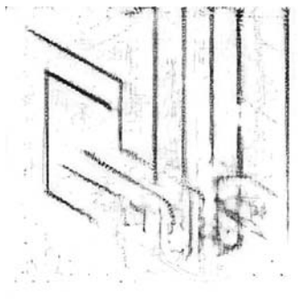

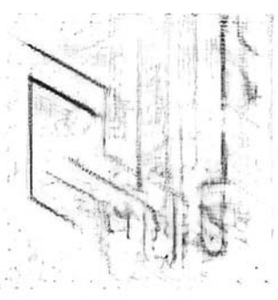

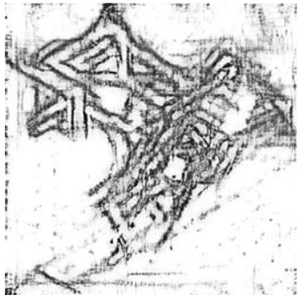

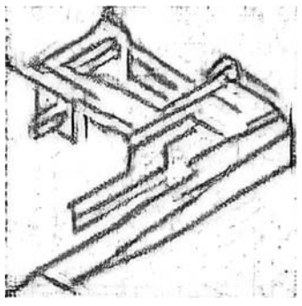
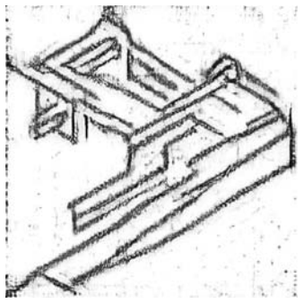

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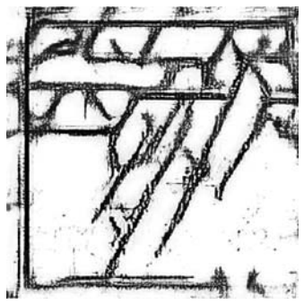

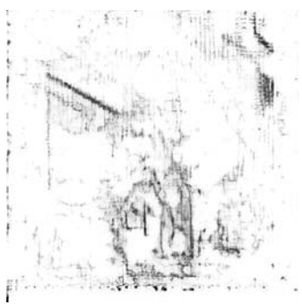
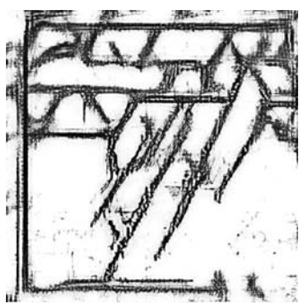
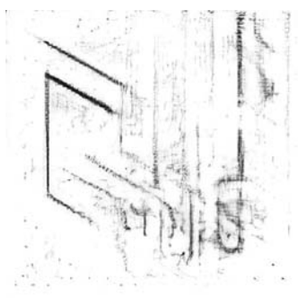
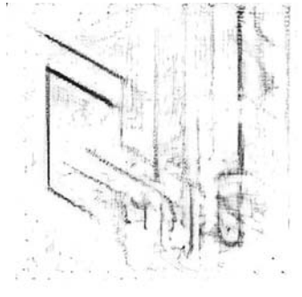
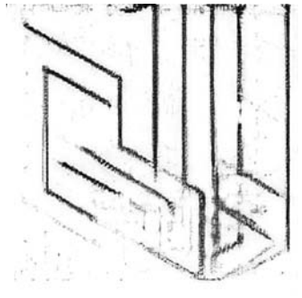
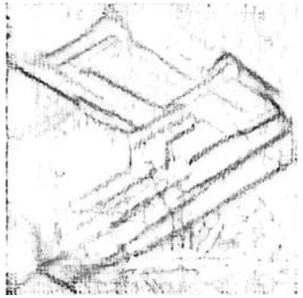
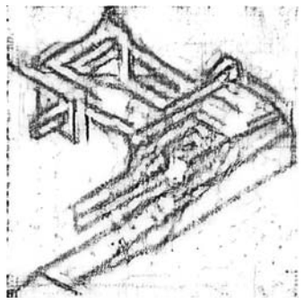
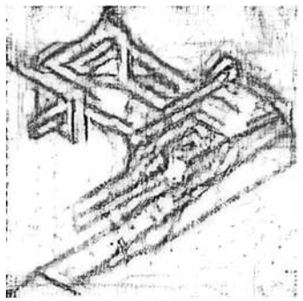
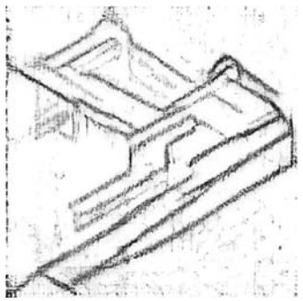

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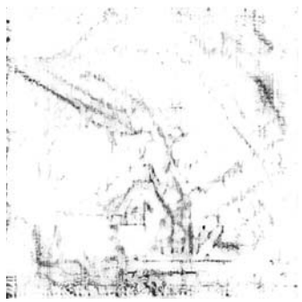
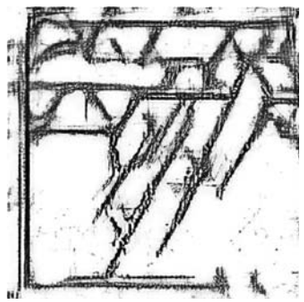
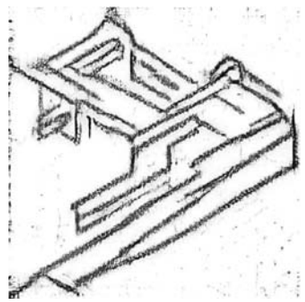

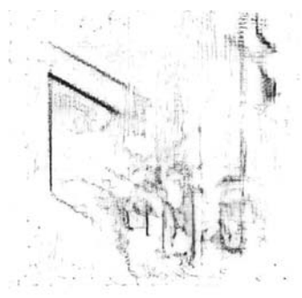
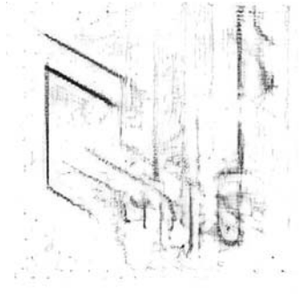
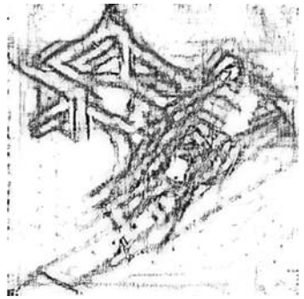
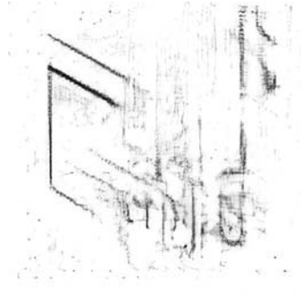
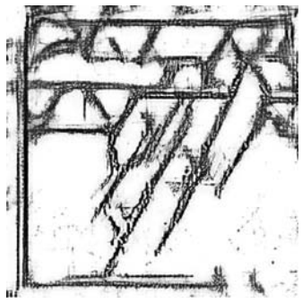
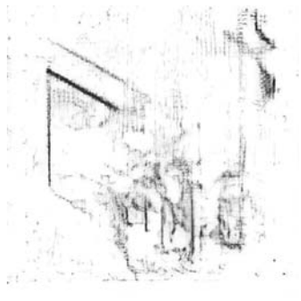
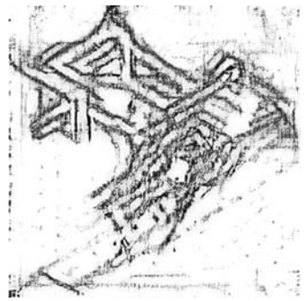

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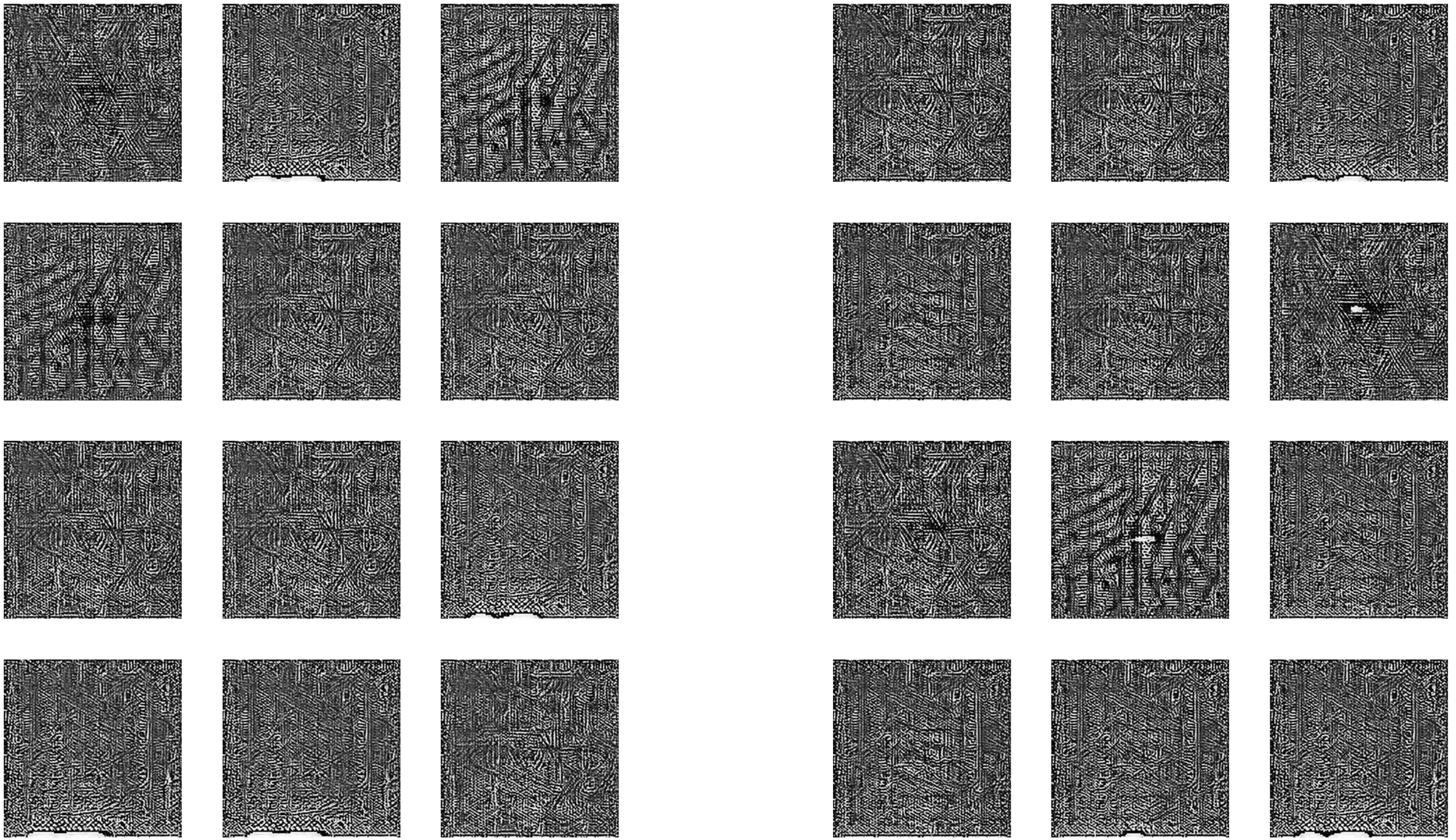

GENERATION 25

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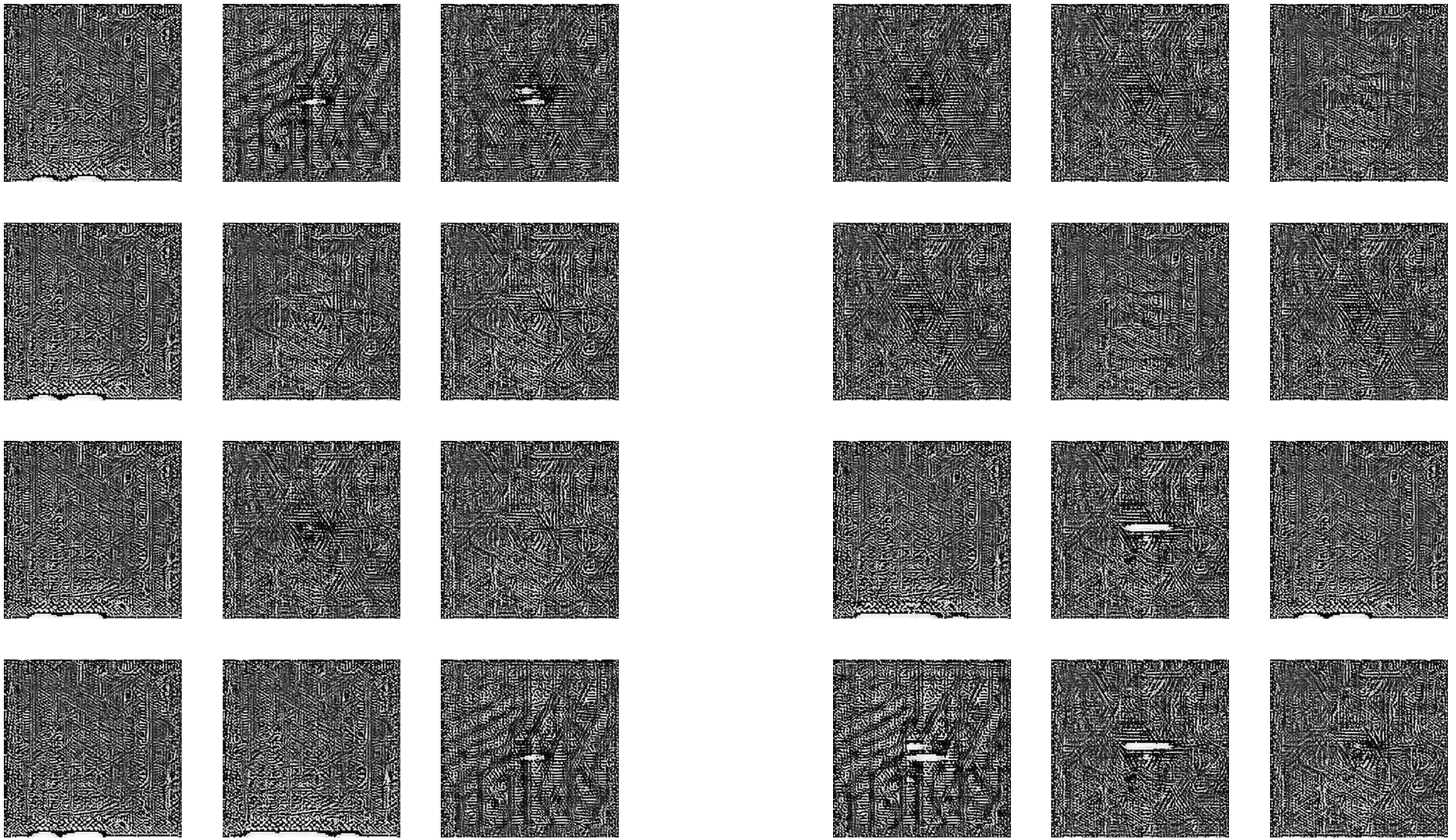

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