**SQL Server Management Studio Model**

**(Physical Model)**

**Our tool rental database has entities as follows:**

***Main entities:***

* Customers: Stores information about customers who rent tools, including customer id, first name, last name, birthdate, contact information, address, etc.
* Tools: stores information of all tools including tool id, tool name, rental price per day, dimensions, weight.
* Categories: this entity tracks distinct types of tools, such as power tools, hand tools.
* Rentals: store information of rental orders including rental id, customer id, start date, due date, order date.
* Returns: this entity manages information of returning rented tools, including rental line id, returned date, condition, and penalty fee (if applied).
* Power tools: Stores specific information for power tools such as voltage (volts), power rating (watts), battery type.

***Associate entities:***

* Rental lines: this entity represents individual rented in each rental order, including rental line id, rental id, tool id, tax.
* Tool categories: this entity is to track the type of each tool, including categories and tool id.

**Business rules cover hierarchies, is-a, contains, and related-to relationships:**

* Hierachies: tools can be categorized into distinct types such as power tools and hand tools. Each tool can belong to one or more categories and a category may have one or many tools.
* Is-a Relationships: “Power tools” are the subtype of the “Tools” entity. “Power tools” entity is used to keep track of specific attributes that only apply to “Power tools”, but also inherit information from the “Tools” entity.
* Contains relationship: Rentals include records of the rented tools via rental lines. Each rental line entry only belongs to a specific order and refers to a specific tool (from “Tools” entity).
* Related-to Relationships: Each order may involve multiple tools, and each tool can be rented in many orders. “Customer” is related to Rentals. A customer may place many rental orders, but each order belongs to only one customer. “Returns” is related to “Rental lines” to track the returns of rented tools. Each return is related to only one specific rental line entry so we can ensure each tool (belonging to a specific order) is returned properly.

*Physical model is as follows:*

In our "rental\_lines” table, instead of using composite key of tool\_id and rental\_id as primary key, we use surrogate key of rental\_line\_id , along with foreign keys of rental\_id (referencing to “rentals” table” and tool\_id (referencing to “tools” table) to simplify the primary key in “returns” table since “returns” and “rental\_lines” table has relationship 1:1. This can help to track returns of rented tool items properly.

