Electromagnetic Drill Press Vise

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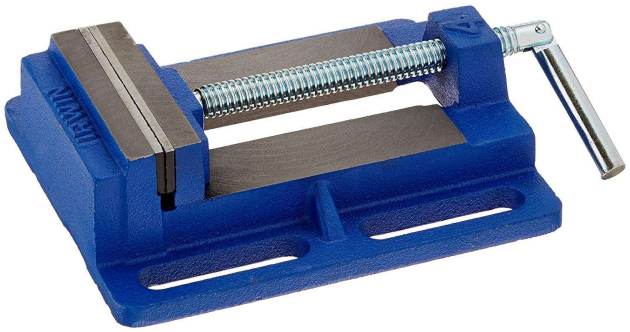
What does the product need to do?

- A drill press vise needs to be able to hold a variety of materials securely to the drill press table, so that holes can be safely and accurately drilled
- The vise must be easy and safe to use and maintain, for both amateur and professional users

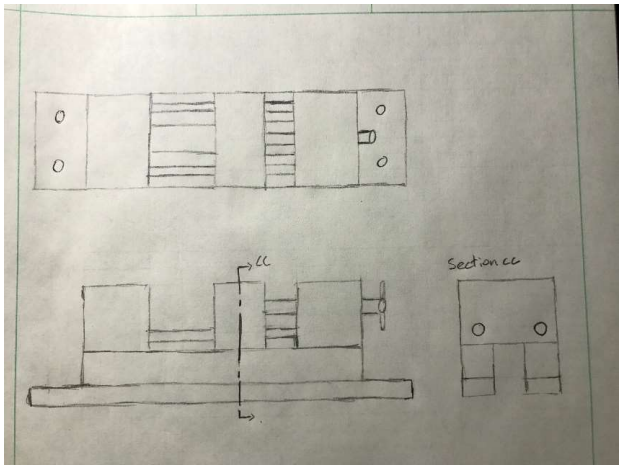
There are many drill press vises already on the market

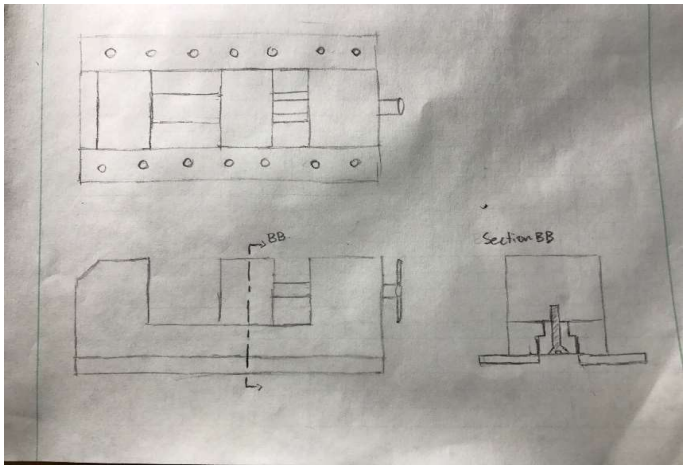
- Most mid to low price range models have a similar design, being held to the drill press table with either clamps or bolts.
- The moving jaw typically slides either in a slot in the vise base, or on cylindrical rails.



Design Alternatives

- 3 designs were initially generated, which were then refined into a single design
- The main design choices involved choosing between the slot vs rod design, choosing between a single-piece vs multi-piece vise base, and determining the optimal method to secure the vise to the drill press table





Analysis

- The design that was determined to fit the requirements best was the multi-part vise base, with the slot method for the sliding jaw.
- All designs had relatively similar levels of safety, which was deemed the most important design parameter to meet
- This design was chosen mainly due to the ease of machining and ease of maintenance of the design

Vise hold down method analysis

- Several options were generated for the method of securing the vise to the drill press table
- The two traditional methods are bolts or clamps
- Another option is to use magnets, either electromagnets and a power source or a permanent magnet and a mechanism to engage it
- Ultimately, electromagnets were chosen, as they are less mechanically complex, and therefore cheaper, less likely to fail, and easier to perform maintenance on

Final Design

- The final design incorporates all the design choices made throughout the design process
- Electromagnets are attached on all four corners of the vise, using removable side pieces