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Benchtop Mounting System

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Benchtop Mounting System

Problem Statement

Bench space was at a premium in many hobbyists and business owner's shops. A method to quickly and easily mount vises, grinders, and other tools to the surface of the table would be extremely valuable in these instances. There was no universal quick attach system we have found that can be used to attach multiple different tools to a work surface. By filling this niche Fleenor Manufacturing is able to cater to the group of hobbyists that can benefit from freeing up valuable bench space. Fleenor Manufacturing also gains an add on that could be marketed with current bench systems that they offer. There are quick attach systems available for some devices, but they are limited to specific items. This application can be used in virtually any industry that multiple things may need to be attached to the same bench, either simultaneously or separately. This could include small scale manufacturing, hobbyists, and laboratories.

Disciplines

Bioresource and Agricultural Engineering | Industrial Technology

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TSM 416 Technology Capstone Project

Benchtop Mounting System

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1 PROBLEM STATEMENT

Problem Statement

- Bench space was at a premium in many hobbyists and business owner's shops. A method to quickly and easily mount vises, grinders, and other tools to the surface of the table would be extremely valuable in these instances.
 - There was no universal quick attach system we have found that can be used to attach multiple different tools to a work surface.
 - By filling this niche Fleenor Manufacturing is able to cater to the group of hobbyists that can benefit from freeing up valuable bench space. Fleenor Manufacturing also gains an add on that could be marketed with current bench systems that they offer.
 - There are quick attach systems available for some devices, but they are limited to specific items. This application can be used in virtually any industry that multiple things may need to be attached to the same bench, either simultaneously or separately. This could include small scale manufacturing, hobbyists, and laboratories.

Business Case Statement

- A. Before most hobbyists run into a shortage of bench space. Items such as reloading presses, bench vises, and grinders quickly fill up space. We looked at a method to eliminate much of this crowding, and allow the bench to have only what is necessary at the current time, while the rest of the items can be stored out of the way.
- B. This is a fairly niche market, made up of hobbyists and small scale manufacturing or laboratory facilities. This caters to the smaller operation, who cannot afford or justify large expansions including large amounts of bench space.
- C. These issues occur often when attempting to perform a task on a bench that is filled with other tools. A common example may be someone who reloads ammunition as a hobby, and uses the same space that they also use for woodworking. While reloading valuable bench space may be taken up by woodworking tools that are not being used at the time.
- D. This problem is something that can free up space on a workbench for a moderate cost. This can also be added to existing bench options that Fleenor Manufacturing offers, giving another opportunity for sales. This product is easily scalable, and can be introduced to as many different markets as Fleenor Manufacturing wants to pursue.
- E. Anyone who may have limited space could benefit from this product. In addition to inconvenience, safety issues can arise from an over cluttered bench, and by eliminating that clutter safety and productivity can both be increased.

2 GOAL STATEMENT

- A. Found a way to optimize available bench space for the average consumer with an existing work surface.
- B. Improvements can be measured by the space normally occupied by items by the space gained. The real measurement of success will be creating a marketable product.
- C. Parameters must be met within both three dimensional modeling and within the finished product.
 - a. Our goal was to produce this using effective lean manufacturing techniques, in order to reduce material used and time spent.
 - b. This product is used to help draw more customers to Fleenor Manufacturing, in order to sell other products that are currently, or may eventually be produced.
 - c. This product was implemented during the spring of 2017, and is ready for market in the summer of 2017.
- **Main Objective(s) and Specific Objectives**
 - The main objective was to design a modular system for mounting tools to a bench top.
 - This was specifically designed with gunsmith's and outdoor hobbyists in mind.
 - Alternatively, usable in manufacturing and laboratory settings

- Reasonably priced (less than 150 dollars)
 - Ability to be efficiently manufactured
 - Utilize lean techniques in selection of material and manufacturing
 - Aesthetically pleasing design
 - Ability to be mounted permanently to any bench top
- **Rationale**
- Bench top tools will be able to easily be mounted and removed from work surfaces.
 - Reduces worker fatigue by placing tools at the optimum location, rather than simply where there is room
 - Increases safety by allowing the worker to move tools around so they are not reaching over tools such as grinders.

3 PROJECT PLAN/OUTLINE

A. Methods/Approach

- **Data collection:**
 - Most of the information used to create this project was gathered using advice and tips from local gunsmiths and machinists. Supplementary information such as manufacturing techniques were gathered from our mentors, Mr. Fleenor, and Mr. Vanstrom.
- **Skills:**
 - The first thing we needed to learn is what may need to be mounted to this.
 - Vises
 - Grinders
 - etc.
 - To complete this project, as a team, we needed team members to be able to design a three dimensional drawing within solidworks. From the three dimensional drawing we needed to be able to apply lean manufacturing techniques to be able to mass produce this item. Finally, we need to be able to market this product in an effective manner to promote sales.
 - Useful classes for this project will be TSM-216 which will help us with our three dimensional drawing. TSM-240 practices will be used in to order to physically make the part.
- **Solutions:**
 - To analyze the market visited local gunsmiths, to see what they look for in a table top mounted device
 - We determined the value of our design based on ease of use, cost, and how easily it is implemented into existing bench spaces.
 - The proposed solutions were evaluated based on cost to manufacture, and ease of use.

- o Our proposed solution met the objectives. These may still be somewhat flexible depending on what we find when meeting with people who may purchase this device.
 - o The proposed solution met client expectations, due to ease of production, cost of production, and the flexibility that the design allows the end user.
 - o
 - o **Organization:** As a team met on Mondays from 2 to 4, the client was welcome to attend at his convenience unless we specifically ask our client for work time during our meeting period.
 - o Each week at our Monday meeting, we assigned certain tasks to each team member to efficiently improve on our project.
 - o A major milestone for our project was having a prototype for the client to see.
 - o We were willing to meet at additional times other than our planned meetings to fix/get around any set backs we may face.
- B. Results/Deliverables**
- o Our deliverables include a finished product, with the requirements on how to manufacture this item as well as how to market it.

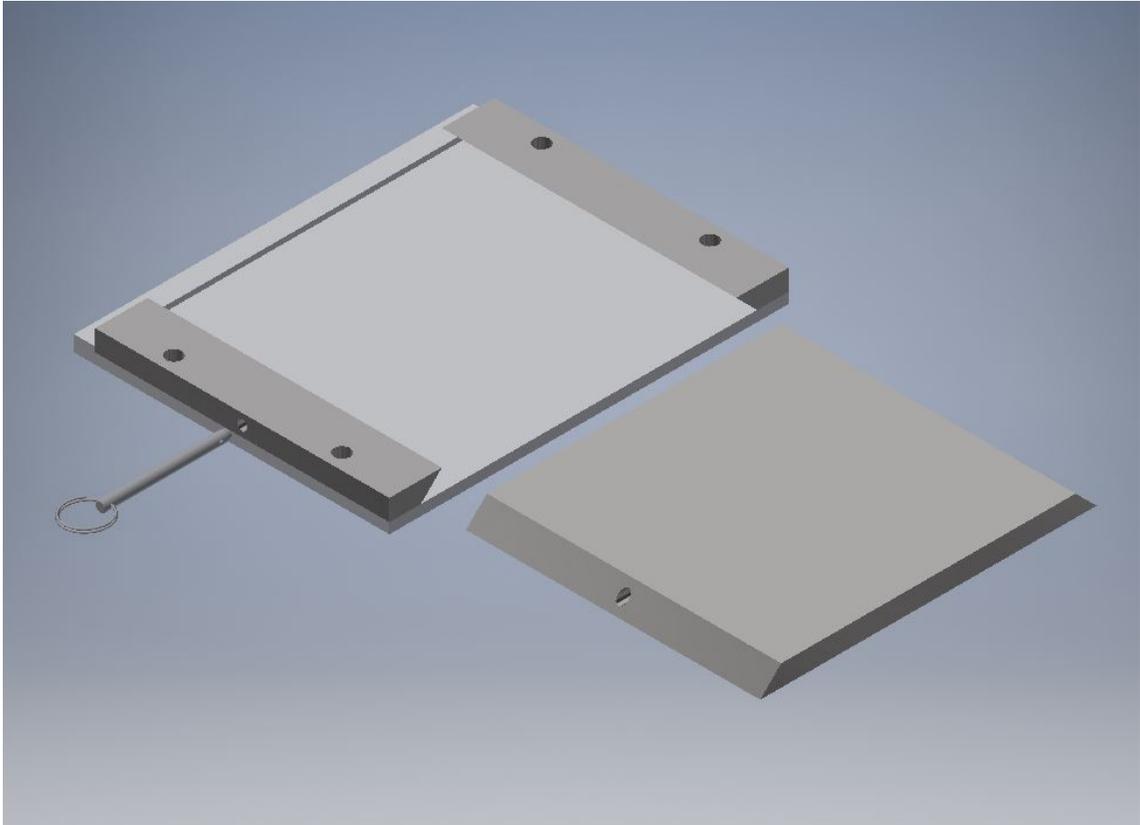
4 BROADER OPPORTUNITY STATEMENT

- A. Our project was designed and marketed for the average person. Any person with access to an existing bench or table top can utilize our system.
- B. Our product will improve the average person's work bench. This improves productivity by allowing for a work surface to more flexible to current needs. It will also allow for increased ergonomics by placing any tool necessary at the optimum location for use. We also intend this product to improve the safety of existing workplace items; such as vises and grinders, by making a secure and safe work platform. This item can also decrease the amount of reaching that is required, potentially improving safety.
- C. Any person who owns or works around a work bench. Our product benefits anyone with a workbench, but business owners or manufacturers with multiple workbenches will be most beneficial as multiple tools will not be needed for each bench. (Example: vises and grinders can be used and safely attached to each bench) This may also be used in a laboratory setting in which multiple devices may need to be mounted to the same bench.
- D. This application could be used in any small scale manufacturing, any hobby using a workbench, laboratory settings, and any other setting in which a bench with mounted tools is used.
- E. Some companies do offer devices that can be used mount and dismount their specific product to a bench. These products are only usable with the specific brand, and as such have very little flexibility. No universal alternative has been found in our research.
- F. This product should remain viable for a long period of time. It is an expandable solution, so as companies or hobbyists begin to invest in the system, they can constantly expand and evolve as their company evolves. People will always be looking for ways to improve efficiency and safety, and our product is a relatively low cost way to do that.

5 PROJECT SCOPE

- A. This product was designed to take up limited space. It is low profile, with very little footprint outside of the working surface. It is also easy to work with. This product was designed with economics in mind in order to keep the price as low as possible.
- B. The product will be produced by Fleenor manufacturing and outside contractors.

6 GRAPHICAL ABSTRACT



7 APPENDIXES
