Progress Report 3

Tissue Sample Preparation Device for Biochemical Analysis

Team Members:
Sara Alford (Team Leader)
Christine Koranda (Communications Rep.)
Carla Maas (BWIG)
Ryan Roth (BSAC)

Client:
Jeff Ross and Charles Tessier
University of Wisconsin - Medical School
Department of Oncology

Advisor: Paul Thompson

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Problem Statement: To design a device that completes the preparation process done manually to prep a tissue sample for biochemical analysis. The device should freeze the tissue (with liquid nitrogen), and grind it to a powder. Sample should be easily collected.

Restatement of Team and Individual Goals:

Team:
1) Complete Invention Disclosure Report and submit to WARF soon (Christine is leading this)
2) Fill out EXPO display paperwork

Christine:
1) Meet with Sara to design chamber specifications and determine ways to solidly attach the chamber to the rest of the prototype.
2) Determine feasible attachment of grinding head to replace the temporary attachment
3) Visit machine shop for options to build attachment of grinding head
4) Begin engineering drawings of the design

Carla:
1) Find a switch that could be controlled by the simple timing circuit. This switch will control the AC power to the solenoid valve.
2) Pick up a 555 timer from either Radio Shack or the EE Parts Shop if BME design lab does not have any
3) Start building the timer circuit
4) Find a few library books for advice outside of the design lab
5) Get up new website as soon as I hear from BWIG

Ryan:
1) To delve more deeply into the world of timer circuits, help Carla as needed
2) Get cylinder operational and a working connection to the compressed air

Sara:
1) Determine flow of heat for the dry ice bath to the chamber with liquid nitrogen.
2) Meet with Christine to design chamber specifications and determine ways to solidly attach the chamber to the rest of the prototype.
3) Begin engineering drawings of the design.

Summary of Accomplishments:
1. EXPO entry and funding request entered, we actually heard back and received funding for our EXPO exhibit.
2. Patent sections completed, patent was submitted.
3. Prototype working - Christmas lights helped dissipate current so that the flasher functioned and operated the solenoid.
4. Purchased fittings and clamps to ensure the safety of our device during operation. (The hose shot off of the compressed air port like a bullet. It could have taken out someone’s eye).
5. Researched 555 timer design with possible circuit diagrams, purchased a 555 timer.
6. Began looking for appropriate timer circuit components (including relay).
7. Determined grinding head attachment to cylinder after visit to ME Shop
8. Brainstormed ways to attach grinding chamber to cooling chamber
9. Determined machining plan for the grinding head after securing funding
10. Started working on heat flow diagrams and calculations.

**Team and Individual Goals for Next Week:**

**Team:**
1. EXPO planning and expectations for display
2. Long term goal planning

**Christine:**
1. Complete AutoCAD drawing of the grinding head and have ME shop begin machining
2. Further brainstorm grinding chamber attachments

**Carla:**
1. Purchase 555 timer, potentiometers. Find/claim breadboard in design lab.
2. Meet Wednesday with Ryan to build circuit with 555 timer
3. Find relay to switch the AC signal to the solenoid (recommended by Paul)

**Ryan:**
1. Successfully complete timer circuit component acquisition and construct circuit from such components.
2. Examine the cycling period of the pneumatic cylinder and adjust as needed.

**Sara:**
2. Further design drawings for the sample chamber and attachment mechanisms.

**Project Schedule:**
Week 1: Group chose same project, client was contacted.
Week 2: Divided tasks, patent proposal, prototype work
Week 3: Patent, EXPO proposal, prototype working, chamber design

**Difficulties:**
*EXPO, patent, and testing the prototype monopolized our time last week.

**Weekly Hours:**
Group: 1
Christine: 3.5 hours
Carla: 1.5 hours
Ryan: 3 hours
Sara: 2 hours

**Total Hours:**
Christine: 10 hours
Carla: 8 hours
Ryan: 8 hours
Sara: 8 hours