Inspiring Greatness

INDEPENDENCE SCHOOL DISTRICT

Engineering

Using an Engineers Notebook

April 20, 2020

Engineering

Lesson: **4/20/2020**

Objective/Learning Target: Students will be able to properly use and engineering notebook

Introduction

Using a Notebook to record ideas, inventions, experimentation records, observations and all work details is a vital part of any laboratory process.

How you keep your Notebook can have a positive impact on the patent outcome of a pending discovery or invention.

This presentation will give you overall recommendations to help you keep more efficient and accurate Notebook entries. Remember, however, that these are simply a suggested set of guidelines. Only your attorney can supply the exact guidelines she would like you to follow to satisfy specific legal requirements. That is why we recommend that you consult your legal counsel.

Simple Rules to Follow

1. Always record entries legibly, neatly and in permanent ink.
2. Immediately enter into your notebook and date all original concepts, data and observations, using separate headings to differentiate each.
3. Record all concepts, results, references and other information in a systematic and orderly manner. (Language, charts and numbering systems should be maintained consistently throughout.)
4. It is acceptable to make your entries brief. Always, however, include enough details for someone else to successfully duplicate the work you have recorded.
5. Label all figures and calculations.
6. Never, under any circumstances, remove pages from your notebook.

Recording Data

Your Notebook is a vital record of your work whether it is for patent purposes, legal records or documenting drug research under FDA guidelines. The Notebook can help you prove:

1. Exact details and dates of conception
2. A chronological record of your work
3. Details and dates of reduction to practice
4. Diligence in reducing your invention to practice
5. Details regarding the structure and operation of your invention
6. Experimentation observations and results
7. Other work details

Formatting

1. Start entries at the top of the first page, and always make successive, dated entries, working your way to the bottom of the last page.
2. After completing a page, sign and date it clearly before continuing to the next page.
3. Never let anyone other than yourself write in your Notebook. (see exceptions below…)
4. Never leave blank spaces, and never erase or remove material you have added. Simply draw lines through any blank spaces at the same time you are making your entries.
5. Do not erase errors. Just draw a single line through any erroneous entry, and then add your initials.
6. You can supplement your entries with supporting material (e.g., test-results, printouts …) but you must permanently affix the material onto a page in its proper chronological location.

Working towards a Patent

A primary purpose of a Notebook is the support of documenting work that may be patentable. Support patent activities, providing clear, concise, chronological entries with specific dates.

To rely on these dates, you must have at least one non-inventor corroborate that the events actually happened and that he or she understood your invention by signing and dating the "Disclosed to and Understood by" signature blocks.

Documentation for a Patent

1. Your Notebook should help you document and prove:

2. Conception Date--The date that you knew your invention would solve the problem.

3. Date of reduction to practice--When you made a working embodiment of your invention.

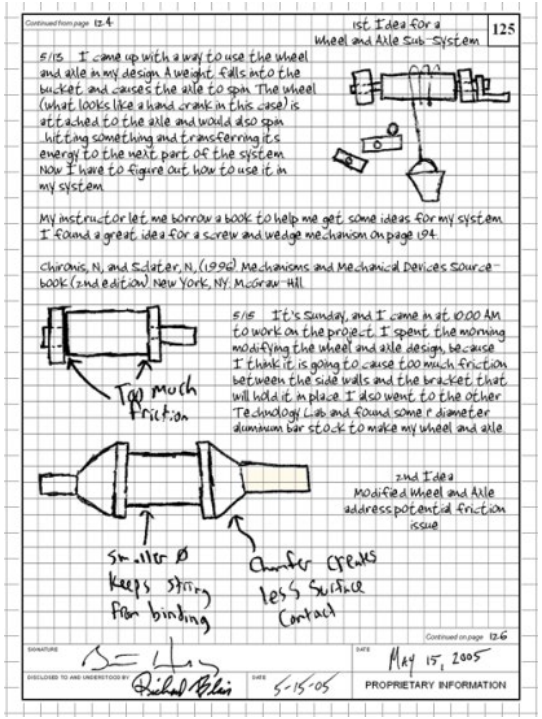
4. Diligence in reducing your invention to practice--Diligence refers to your intent and conscious effort to make a working embodiment. These are dates and facts that show what activities you have conducted to reduce the invention to practice, and when such activities were conducted. Since you may still be diligent despite periods of not working on reducing your invention to practice, always remember to provide reasonable excuses for these periods of inactivity by supplying facts relating to why there was no activity during the period in question. (e.g., unavailability of test conditions or equipment).

Documentation for a Patent

How to make and use your invention--provide documentation details sufficient to teach a colleague how to make and use your invention.

The best mode *of practicing your invention*--document the best way to use your invention.

Documentation Examples



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1st Idea for a Wheel and Axle Sub-System

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5/15 I came up with a way to use the wheel and axle in my design. A weight, falls into the bucket and causes the axle to spin. The wheel (what looks like a hand crank in this case) is attached to the axle and would also spin hitting something and transferring its energy to the next part of the system. Now I have to figure out how to use it in my system.

My instructor let me borrow a book to help me get some ideas for my system. I found a great idea for a screw and wedge mechanism on page 194.

Chironis, N. and Sclater, N. (1996) Mechanisms and Mechanical Devices Source-book (2nd edition) New York, NY: McGraw-Hill

Too much friction

5/15 It's Sunday, and I came in at 10:00 AM to work on the project. I spent the morning modifying the wheel and axle design, because I think it is going to cause too much friction between the side walls and the bracket that will hold it in place. I also went to the other Technology Lab and found some 1" diameter aluminum bar stock to make my wheel and axle.

2nd Idea
Modified Wheel and Axle address potential friction issue

Smaller Ø keeps string from binding

Chamfer creates less surface contact

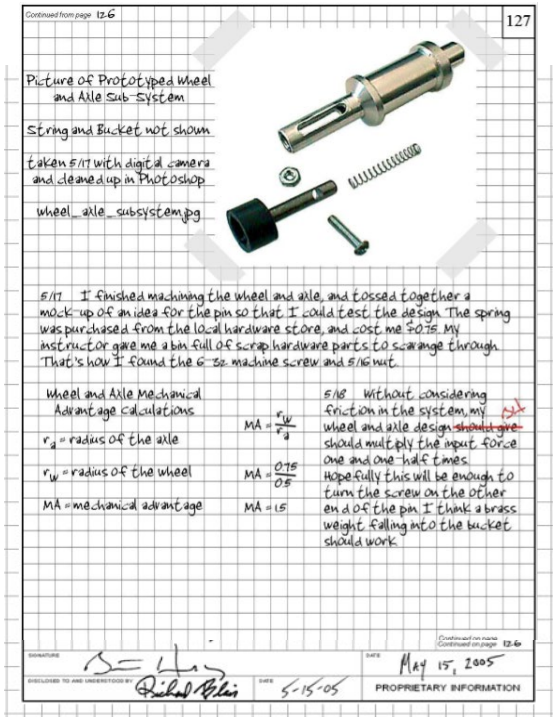
Continued on page 12-6

SIGNATURE

DISCLOSED TO AND UNDERSTOOD BY Richard Klein DATE 5-15-05

DATE May 15, 2005

PROPRIETARY INFORMATION



Continued from page 12-6

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Picture of Prototyped Wheel and Axle Sub-System

String and Bucket not shown

taken 5/17 with digital camera and cleaned up in Photoshop

wheel_axle_subsystem.jpg

5/17 I finished machining the wheel and axle, and tossed together a mock-up of an idea for the pin so that I could test the design. The spring was purchased from the local hardware store, and cost me $0.75. My instructor gave me a bin full of scrap hardware parts to scavenge through. That's how I found the 6-32 machine screw and 5/16 nut.

Wheel and Axle Mechanical Advantage Calculations

$MA = \frac{r_w}{r_a}$

r_a = radius of the axle

$MA = \frac{0.75}{0.5}$

r_w = radius of the wheel

$MA = 1.5$

MA = mechanical advantage

5/18 Without considering friction in the system, my wheel and axle design ~~should give~~ should multiply the input force one and one-half times. Hopefully this will be enough to turn the screw on the other end of the pin. I think a brass weight falling into the bucket should work.

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SIGNATURE

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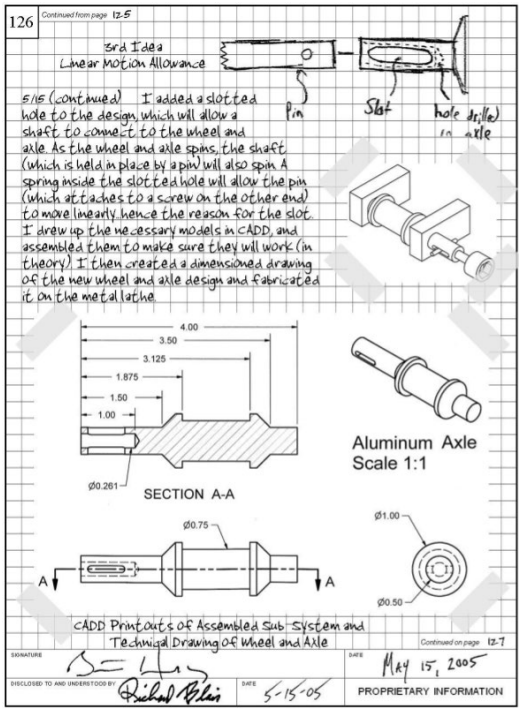

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3rd Idea
Linear Motion Allowance

Pin

Slot

hole dr. 1/16 in axle

5/15 (continued) I added a slotted hole to the design, which will allow a shaft to connect to the wheel and axle. As the wheel and axle spins, the shaft (which is held in place by a pin) will also spin. A spring inside the slotted hole will allow the pin (which attaches to a screw on the other end) to move linearly, hence the reason for the slot. I drew up the necessary models in CADD, and assembled them to make sure they will work (in theory). I then created a dimensioned drawing of the new wheel and axle design and fabricated it on the metal lathe.

4.00
3.50
3.125
1.875
1.50
1.00

Ø0.261

SECTION A-A

Aluminum Axle
Scale 1:1

Ø0.75

A A

Ø1.00

Ø0.50

CADD Printouts of Assembled Sub-System and Technical Drawing of Wheel and Axle

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PROPRIETARY INFORMATION

Helpful Links

Etude Engineering Notebook Guide

Bizfluent Article on the Purpose of Engineers Notebook