TwinDeck 1210 Drawing machine

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Summary

Use laser cut parts, bolts, nuts , washers, electronic components, a small DC motor and patience to construct a machine that draws Guilloche patterns of almost infinite variety.

The motor has variable speed control as well as forward and reverse options. Different combinations of the acrylic gears are used to change the relative speed and direction of two drawing gears. Pantograph arms are employed so the drawing can be made at a distance, and on a medium of your choice. The size and orientation of the drawing can be modified by altering the configuration of the pantograph, and additional complexity is available if the ring gear and planet gears provided are used.

This workshop was devised by Peter Musk for Christmas, 2017.

Rationale

This workshop was devised as a way to explore the 'M' in STEAM. The complexity of the patterns produced are determined mainly by the relative speeds (gear ratios) of the connected drawing wheels, which are a function of the number of teeth on each gear. When the ratios are a simple factor, less complex patterns are produced and as users explore this device this pattern will emerge. Prime numbers of teeth on the gears give the most complex patterns.

The pantograph mechanism also works by the ratio of arm length between fixed points, which determines the degree of magnification.

The mathematical explanation of these patterns has been well resolved (though it is complex), and interested participants can be guided to deeper understanding as required.

Skills Introduced

Materials

A number labeled photo of materials

Part Number	Description	Quantity
1		1
2		1

Tools

Files

Instructions

Rename the steps as you like, use *italics* or **bold** for emphasis

Step Zero:

When you arrive at the workshop - minimum state of readiness for the participants, cover OHS, not essential for all workshops.

Step One:

Step Two:

Step Three:

Step Four:

Development notes

User Guide

The following User Guide hand-out was developed for this workshop explaining the operation and assembly of the device:

Bill of Materials (BOM)

Material	Quantity	Cost	Supplier
Arduino Nano v3	1	$3.40	AliExpress
MAX7219-dot-matrix-module	1	$2.10	AliExpress

Feedback

1. Feedback:

Solution:

2. Feedback:

Solution:

3. Feedback:

Solution:

4. Other observations:

Source Files

This is where you put files for laser cutting etc..