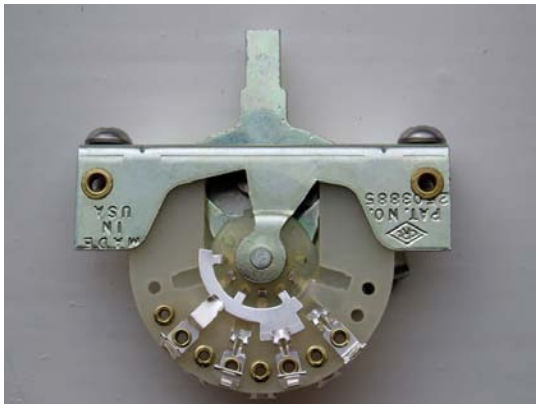
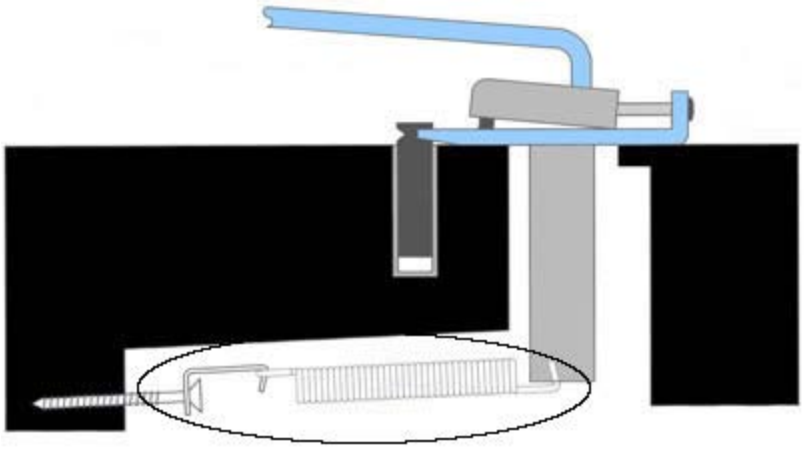
5-way pickup selector switch

For my final project, I will be synthesizing the sound of a 5-way guitar pickup selector switch makes (below) when it is flicked.



The action of rapidly moving the switch introduces some complexity to the system, as the force will travel throughout the wood, also causing the steel springs inside the back cavity of the guitar to vibrate and any un-muted open strings to ring out. Muting the *strings* is independent of the *springs*' noise; it will happen regardless of any palm-muting on the strings.

The player uses the switch to select which pickup, or combination of pickups, to use. The position with the tip facing all the up, pointing towards the player, is the neck pickup only, or position 1. Pushing the switch lightly down one notch is position 2, is selecting both the neck and middle pickups, which are wired together in parallel. The next position 3 is only the middle pickup, followed by position 4 being the middle and bridge pickups, and the last position 5, is just the bridge pickup.



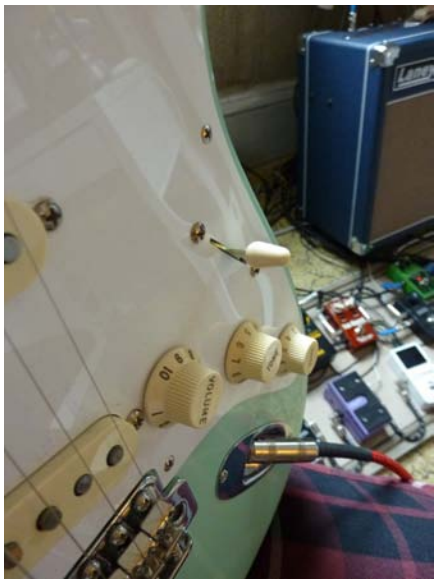
The tremolo springs in the back cavity are under high tension, and connected to the underside of the bridge. They provide counter-tension against the guitar strings so that the tremolo system is able to pivot back and forth.

(Facing player)

1. Neck
2. Neck + Middle
3. Middle
4. Middle + Bridge
5. Bridge

(Facing floor)

This means that the switch will have not 5, but 4 separate clicks for a full cycle.



There is a click every time the switch moves positions and the internals latch it into place. When moving just one position over, the player needs to be careful not to move the switch too far and possibly select the wrong pickup. However if the player wants to quickly switch from the neck to the bridge pickup, all they need to do is flick their wrist indiscriminately, moving the switch from the all the way from top-to-bottom, or vice versa. This will make a loud “flick” noise, which is audible if the amplifier isn’t set too loud.

Video (w/sound) sample: see file P1010258.MOV (2.5 MB)

Requirements:

- Switch sound (physically flipping switch makes a series of clacking noises)
- Body resonance sound (empty electronics cavities resonating)
- Spring sound (high-pitched ringing)

Timeline

FP1:
4/9
Requirement analysis

- The 3 sound components

FP2:
4/11 - 4/16
Research

- How the sound is physically produced

Model making

- Diagram order flow of sound events
- Abstraction

FP3:
4/18 - 4/30
Method selection

- Select method of abstraction

Implementation

FP4:
5/1 - 5/14
Implementation

- Coding in pd

Test

- Realism

21M.380 Music and Technology: Sound Design

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