

# Regulating and Voicing of Clavichords

September 04, 2022

Paul Y. Irvin

This presentation will not discuss inspecting or judging a clavichord for possible purchase, but will describe my understanding of historical approaches which can be used to improve sound and playability of historically-based clavichord designs.

## Interactions:

**But first**, some discussion about the many interactions among features in historical clavichords:

Changing **leverage** from bass to treble. (acceleration, string support, back weight)

Changing **cranking** of keys bass to treble. (bridge design, string impact positions)

Changing **keydip** from bass to treble.

Changing of **pre-** and **post-lengths** as sounding lengths change bass to treble.

**String sizes** in a well-balanced design were carefully chosen to maximize the musical qualities resulting from interactions with these other elements, as well as the player's fingers. Any changes to string sizes will alter the intended speech, timbre, sustain, and playing qualities.

Use of **lead weights** in keys is very unusual historically, except for one major builder. Key return appears primarily to have been achieved by key lever design, especially the area behind the tangent.

**Tangents** were historically made of thin metal (0.4 to 1.3mm / .016" to .051", treble to bass, design dependent). Even when their tops needed to be wider so as not to get stuck in between windings of open-wound bass strings the rest of the tangent remained thin which gave several advantages over using thick tangents. This historical metal was soft enough to be folded over or squished wider by hammering, demonstrating that it was softer than the metal usually used on modern instruments which fractures under these treatments. This thinness and softness also meant that the tangent could not be bent over too much for tuning purposes or it quickly loses efficiency in transferring force to the string, and bending it would increase the distance of its top to its string compared to the distance of its more vertical standing neighbors. NB: This softer metal (in tangents and bridge pins) bearing against softer strings also results in different sound than when using modern harder materials.

(Bending thicker tangents of modern stiffer materials often creates a looser fit in its hole in the keylever, especially if it is in a soft wood, so care must be taken or more work is created.)

## Now, application:

Because many factors interact with each other it is sometimes/usually necessary to go around a few times to finally get an instrument fully sorted out. The following sequence is my typical approach.

### **Key Fronts:**

How **level** and **even** are the key fronts, naturals and accidentals? Important for consistent touch. Can usually be adjusted at balance pin. (Soft cloth washers not recommended.) Gently slide a finger sideways over the keys to see if any are sluggish or hesitant about returning. Keys should move quickly up and down, but not jump on their balance pin when playing.

### **Tangent path:**

How far can the tangent lift the string for loud playing or *bebung* without the tangent scraping against the neighbor string in front or behind? The tangent should be installed somewhat leaning forward so that the arcing key path will align the tangent cleanly between its neighbors. Most tangents are narrower at the bottom which makes it easier to bend them there front or back to achieve this alignment. Serious misalignment may necessitate moving the tangent to a new position.

### **Tangent lift distances:**

Now, from the front with the nameboard removed, look under the strings and above the keys at how evenly the tangents are spaced from their strings above. The more consistent these striking distances, the more consistent will be the sound qualities and the easier it will be to play with predictability and confidence. The greater the strike distance the easier it is to play loud, **but** this can often result in a thumping beginning to the sound and reduced sustain, as well as making it more difficult to control quieter dynamics and tonal color. **And** clavichords are mainly about dynamic range and nuance.

Distance from natural key to top of sharp reveals the maximum tangent lift possible using *bebung*. Listening will determine the most musically rewarding lift spacing for a particular instrument with a given playing style.

**Before adjusting** this lift distance, first check whether the average key lies horizontal to the string band when its tangent just touches its strings (if not, altering the rear key level and/or at the balance rail can correct this relationship for the whole keyboard).

When the action geometry is correctly established for the intended lift distance then the heights of the individual tangents can be regulated for consistency. If the tangents are snugly fit into firm-enough wood then the heights of tangent tops can usually be adjusted by pulling up with, or hammering down with, the tangent held in a ViceGrips.

### **Tangent top voicing:**

**Stagger:** When the tangent top rises slowly to its string pair and contacts them both at the same time the result is usually a sound that is rather dull and short lived. Better that its top slopes slightly so that the back string is contacted slightly before the front string. This produces more life and sustain from the string pair. If there is too much difference in the timing of the two contacts then speech will become less clear and there will be buzzing problems with slow releases. Light filing can achieve the desired angle, with some final fine emory cloth polishing.

**Width** of tangent top contact surface:

narrow - provides better contact for impact and support with string. (More pressure for same finger force, like high-heels) = cleaner speech and longer sustain

wide - less secure contact with string (pressure is reduced by increased area of contact),

Must be exactly parallel to the string or one or the other edge may initially contact with the other edge contacting as the string lifts further. (Wider tops are needed for open-wound strings, but good pressure is maintained since only the thin windings contact the wide top.)

**Shape** of top width - listen to choose your preferred shape

pointed ridge - minimum contact, but can create noise if small dents appear on ridge

beveled - two sharp ridges

rounded - as with bridge pins, minimum contact from any angle

Shape with a fine file and smooth with fine emory cloth.

**Cleaning tangent tops.** With time the once shiny tangent top appears duller as oxides build up. This soft layer can begin to choke the speech and shorten the sustain. Rub the tangent top on some hard paper.

**Listing cloth** - Too much listing and/or too tight of a weave often results in duller tone and shorter sustain, as well as creating a thumping sound as each key strikes due to all the strings being too connected with each other. It is usually to best to use a soft, supple cloth and experiment to find how much is needed in each area as you weave to just dampen those strings' tones when those keys are released and not induce a drumming sound.

### **Recommended reading:**

Clavichord International - twice yearly journal, editor Gregory Crowell, published by Het Nederlands Clavichord Genootschap.

Clavichord Tuning and Maintenance by Peter Bavington, Keyword Press.

PYI 09-04-22

[pyirvin@comcast.net](mailto:pyirvin@comcast.net)

[pyirvin.com](http://pyirvin.com)