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Harpsichords and Clavichords

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FRETTED

CLAVICHORD

No. 32

OWNER'S MANUAL

FRETTED CLAVICHORD

by Peter Bavington, 2008 (No. 32)

The design of this clavichord is based on an instrument, now in private ownership, made by Johann Jacob Bodechtel in Nuremberg around 1785. One extra note (*BB*) has been added to the compass.

ENVIRONMENTAL CONDITIONS AND GENERAL CARE

This is a robust and stable instrument and, generally speaking, conditions that are comfortable for you will do no harm to the clavichord. However, extreme variations of temperature and humidity will disturb the tuning and may actually cause damage. An excessively dry atmosphere, such as is found in centrally heated rooms without humidification, should be avoided. Do not let the instrument stand for long periods in direct sunlight or in a draught, and keep the lid closed when not in use.

After much use the keys may become dirty. It is best to remove them from the instrument before cleaning (see page 10 below). Rub with a damp cloth to remove dirt, then rub with a dry cloth to polish. The use of detergents is not recommended.

ACCESSORIES

The following items are supplied with the instrument and may be kept in the tool-box:

- Tuning key;
- Cloth strips (see page 5);
- Wooden wedge for inserting cloth strip between strings;
- Felt wedge for minor tuning adjustments;
- Stringing tool (see page 9);
- Miniature wire clippers.

FRETTING

Up to note *d* (a minor seventh below middle C) a separate pair of strings is provided for each note. From note *e^b* upwards the instrument is diatonically fretted. This means that in each octave the following pairs of notes are obtained from a single course:

C and C#; E^b and E[♮]; F and F#; G and G#; B^b and B[♮].

The top four notes do not follow this pattern: *d³* is linked with *e^{b3}* and *e³* is linked with *f³*.

Fretting imposes certain limitations on what it is possible to play. You cannot sound the paired notes simultaneously, so occasionally you may have to omit a note, or curtail it by lifting the finger before it has sounded for its full value. Moreover, when playing the paired notes one after another, you will produce an ugly sound if there is any overlap, especially when descending. Minor-second *appoggiature* in particular may need special care. With practice, though, it is possible to produce a *legato*, and to play rapid ornaments, even when all the notes involved are produced from a single pair of strings. Much of the time you will not be aware of any of these limitations, and in any case they will rarely hinder expressive performance.

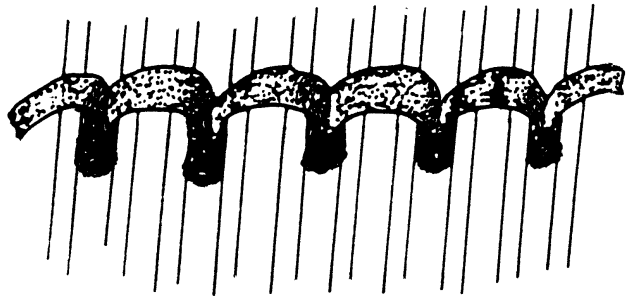
PITCH

The instrument is designed to play at *a¹*=430 Hz).

TUNING

Please always use the tuning key supplied with the instrument. To help you find your place, the tuning pins for all the C's are indicated by a red washer.

A full tuning, including re-setting the temperament, should be required only three or four times a year. I suggest you begin by silencing one of each pair of strings using the strip of red cloth supplied. Starting with the gap immediately in front of the topmost course (notes e^3/f^3), use the wooden wedge to push the cloth strip between the strings, passing over four strings at a time, thus:

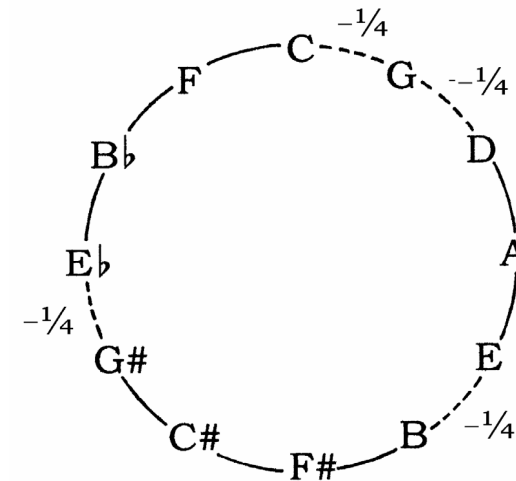


This, in effect, makes the whole instrument single-strung. If the cloth is correctly positioned, only one string of each course will sound (the front and back string alternately). The sounding strings will be controlled by the two outer rows of tuning pins: use these for your tuning. First set the temperament (as described on page 7) then tune the remaining notes upwards and downwards by octaves. Below note *d* (a minor seventh below middle C) you must tune every note but, because of the diatonic fretting, from e^b upwards you need only tune the natural notes: the sharps and flats should then automatically be in tune (though it is wise to check).

When you are satisfied with your tuning of the whole instrument in its single-strung state, remove the cloth strip and tune the second string of each note, using this time the inner rows of tuning pins. For touching-up the tuning of individual courses, on occasions when a full tuning is not necessary, you can use the felt wedge supplied.

TEMPERAMENT

The fretting is based on a temperament described by J. P. Bendeler in his *Organopoeia* (c. 1690), usually referred to as 'Bendeler III'. It is a 'circulating' temperament, enabling music in any key to be played. There are eight pure fifths and four fifths narrowed by a quarter of a comma. In the following diagram, pure fifths are indicated by a solid line, tempered fifths by a broken line.



For a practical method of setting this temperament on the instrument, see page 7 opposite.

SETTING THE TEMPERAMENT

The following method may be used to set the temperament by ear:

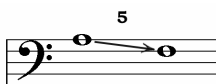
1. Tune note a^1 to the correct pitch (430 Hz), using a tuning fork or other reference, and tune note a one octave below:



2. Tune notes e and d^1 so that the intervals $e-a$ and $a-d^1$ are both pure fourths:



3. Tune f so that the major third $f-a$ is wider than pure and beats about 5 times a second:



4. Tune c^1 a pure fifth above f , and check that the third $a-c\#^1$ beats about 10 times a second.



5. Tune $b\flat$ a pure fourth above f , and check that the fifth $e-b$ is acceptable; it should be narrower than pure.



6. Finally, tune g so that the fourth $g-c^1$ and the fifth $g-d^1$ make acceptable tempered concords, equally far from purity.



All the notes from $e\flat$ to d^1 are now tuned, and the remainder can be tuned by octaves.

REPLACING BROKEN STRINGS

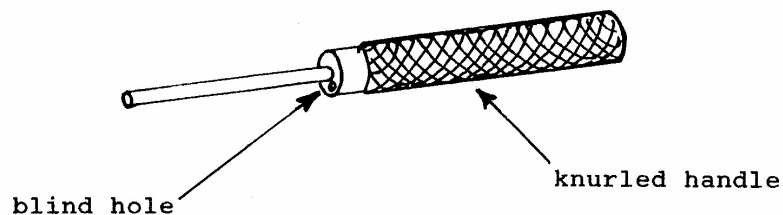
Do not begin by removing the broken string.

First identify the broken string, and check which note it belongs to. Now find the correct replacement string by referring to the list on the back page of this leaflet. If necessary, remove the music shelf to expose the relevant hitch-pin.

Extract the tuning pin from its hole. Take the new string from its packet. Bend about 30 mm (1½ inches) of the plain, untwisted end of the new wire back on itself. Lift the loop of the old, broken string off the hitch-pin, and hook the bent end of the new string through the loop. Now use the old string to pull the new one through the listing cloth. Once the new string is safely through the listing, place the new loop on the hitch-pin and discard the broken string.

The next step is to wind the string on to the tuning pin. I recommend that you use the special tool supplied for this purpose. First, line up the new string so that it passes over the vacant tuning pin hole: you will need about 4 inches (100 mm) of wire beyond the hole (somewhat less for thicker wires), so cut off any excess using the clippers supplied. Put the end of the wire into the blind hole in the handle of the stringing tool, and turn the tool so that it is at right angles to the wire, with the handle in your right hand. Now roll the tool forwards so that the wire forms a tight coil round the narrow part of the tool: continue until you reach the vacant tuning pin hole.

Slip the coil off the tool and cut off the uncoiled end. Now, taking the coil in your left hand and the tuning pin in your right, gently push the coil over the bottom end of the pin whilst revolving it anticlockwise. The coil will grip tightly, but revolving the pin anticlockwise loosens it temporarily just enough for you to be able to slide it up and down the pin. Adjust the coil in this way until it matches the position of the coils on the neighbouring pins. Now push the pin into the hole with the tuning key, and use your fingers to coax the wire into its correct position on the bridge. Check that the hitch-pin end is secure, that the tuning pin is roughly the same height as its neighbours, and that the wire leaves the bridge at roughly the same downward angle as neighbouring strings. It is now safe to tune the new string to pitch.



Stringing tool

SUPPORTING YOUR MUSIC

Music can be rested against the lid and supported by the music shelf. However, this is not suitable for heavy music books.

TO REMOVE AND REPLACE THE MUSIC SHELF

The shelf is held in place by a single metal prong underneath, which goes into a hole in the hitch-pin rail. To remove the shelf, grasp it firmly at either end and lift directly upwards. If necessary, rock slightly from side to side as you lift, to free the prong. To replace the shelf, push the prong down into its hole.

TO REMOVE THE FRONT BOARD

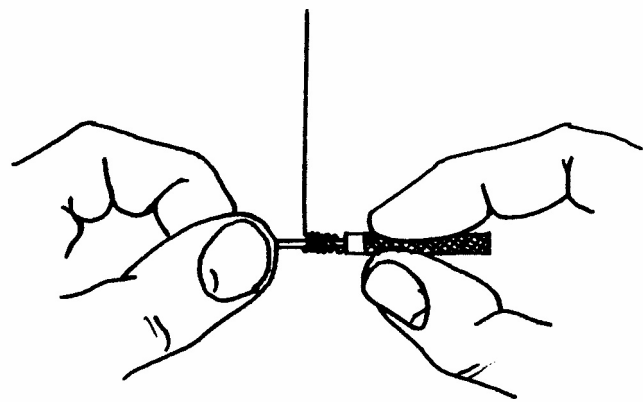
Hold the board near each end and lift directly upwards. Take care not to jam the board by lifting one end above the other.

TO REMOVE INDIVIDUAL KEYS

Keys may have to be removed for cleaning, to deal with problems arising with the tangents or guide pins, or to retrieve objects accidentally lodged inside the instrument.

First remove the front board (see above). A key which is straight (or nearly straight) can then usually be removed by lifting it off its pivot-pin and simply drawing it forward, keeping the tangent end as low as possible so as not to foul the strings. To remove cranked keys, it is usually best to start by removing the nearest straight key, and then adjacent keys until you reach the one you want. It may help to turn a key on to its side when removing it.

The lowest 18 keys (notes *BB* to *eb*) are heavily cranked, and keys in the middle of this section cannot be removed individually – or at any rate not without difficulty. It is best to start by removing either key *BB* or key *eb*, and then work inwards.



Stringing tool in use

STRING LIST

In the string list opposite:

'85/15' means 85/15 red brass wire manufactured by Little Falls Alloys Inc.;

'MR Brass' means 'English' brass wire manufactured by Malcolm Rose; and

'IWS Brass' means harpsichord brass wire supplied by Instrument Workshop, USA.

Spare strings of various gauges are supplied with the instrument. Further replacement strings can be ordered from me, including the specially-made over-wound strings which are fitted for note A and below: see <http://www.peter-bavington.co.uk> for current prices.

String list

Clavichord No. 32

note	material	gauge	note	material	gauge
<i>BB</i>	Covered		<i>a</i>	brass	0.38
<i>C</i>	strings		<i>bb/b</i>	"	0.36
<i>C#</i>	"		<i>c¹/c#¹</i>	"	"
<i>D</i>	"		<i>d¹</i>	"	"
<i>E_b</i>	"		<i>eb¹/e¹</i>	"	0.33
<i>E</i>	"		<i>f¹/f#¹</i>	"	"
<i>F</i>	"		<i>g¹/g#¹</i>	"	"
<i>F#</i>	"		<i>a¹</i>	"	"
<i>G</i>	"		<i>bb¹/b¹</i>	IWS brass	0.305
<i>G#</i>	"		<i>c²/c#²</i>	"	"
<i>A</i>	"		<i>d²</i>	"	"
<i>B_b</i>	85/15	0.45	<i>eb²/e²</i>	"	"
<i>B</i>	"	"	<i>f²/f#²</i>	"	0.279
<i>c</i>	"	"	<i>g/g#²</i>	"	"
<i>c#</i>	MR brass	0.44	<i>a²</i>	"	"
<i>d</i>	"	0.42	<i>bb²/b²</i>	"	"
<i>eb/e</i>	"	"	<i>c³/c#³</i>	"	"
<i>f/f#</i>	"	0.4	<i>d³/eb³</i>	"	"
<i>g/g#</i>	"	"	<i>e³/f³</i>	"	"