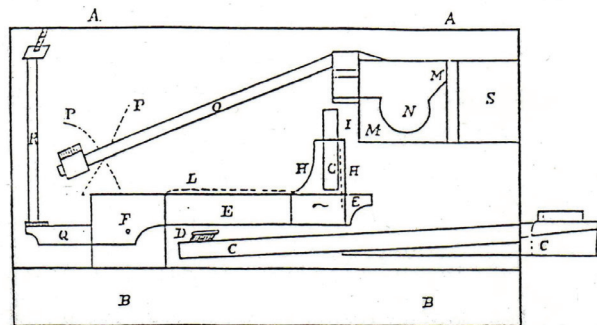


THE PIANOS BY BARTOLOMEO CRISTOFORI UND GOTTFRIED SILBERMANN

Two different worlds of sound produced by the same hammer action

The two most important documents about the invention of the piano by Bartolomeo Cristofori

- | | |
|-------------|--|
| 1700 | Description of an “ <i>Arpicimbalo di Bartolomeo Cristofori , di nuova inventione, che fa il piano e il forte...</i> ”, inventory of the Musical Instrument Collection of Prince Ferdinando de' Medici, State Archive Florence |
| 1711 | Article of Scipione Maffei: “ <i>Nuova Invenzione d'un gravecembalo col piano e forte...</i> ”, <i>Giornale de'letterati d'Italia</i> 5, Venice 1711, pp. 144 - 159 |



ill. 1

Ill. 1 shows the two most important documents about the invention of the piano by Bartolomeo Cristofori. The 1700 document does not mention any technical details about the action or the case construction. Maffei's article describes the escapement action as seen in the drawing, with its intermediate lever, its under damper, the ru-

dimentary check. The point of escapement is in e different position as in the later action.

Both documents are from the early period of Cristofori's life in Florence, no piano survived from this period which is otherwise very well documented. We have bills, three inventories and we have three surviving

instruments (two oval spinets and a harpsichord made in ebony). Cristofori built many more instruments in the period from 1688 when he came to Florence and 1713 when Ferdinando de' Medici his patron died. He also did restorations and was responsible for bringing instruments from one palace to the other.

All three surviving Cristofori pianos are from the 1720ies, when Cristofori probably did not make instruments for the Medici court any more. The curator post of Ferdinando's collection he kept until his death, but probably it was more a bureaucratic position than an active one.

Ill. 2 - 4 show the three surviving Cristofori pianos from 1720, 1722, 1726 and some of their action details. These details show that Cristofori changed details of its action from one to the other. These piano actions are made by a man which even in his sixtieth was still improving his work

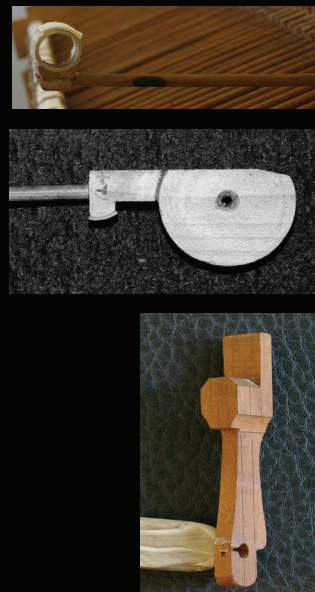
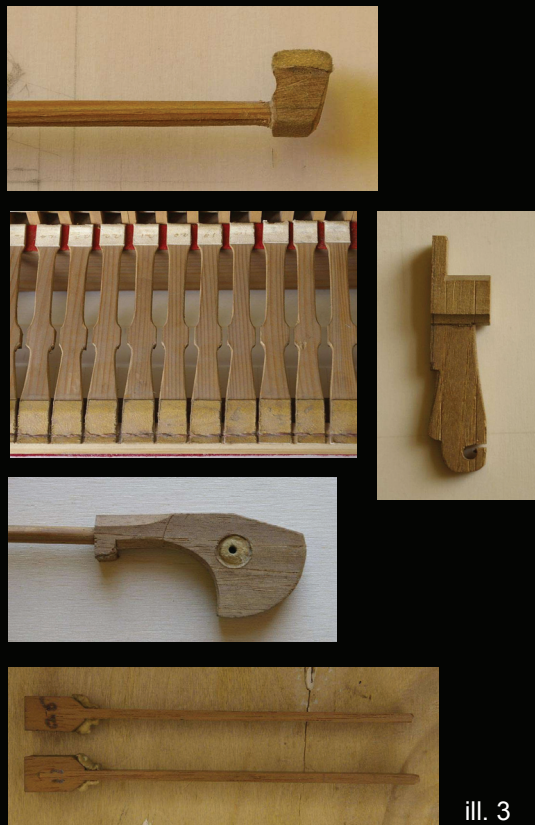
This is a model (ill. 5) of Cristofori's most mature action from 1726, made when he was 71 years old, with thin intermediate leavers, paper rolls, a new damper form and improved escapement jacks.



ill.2

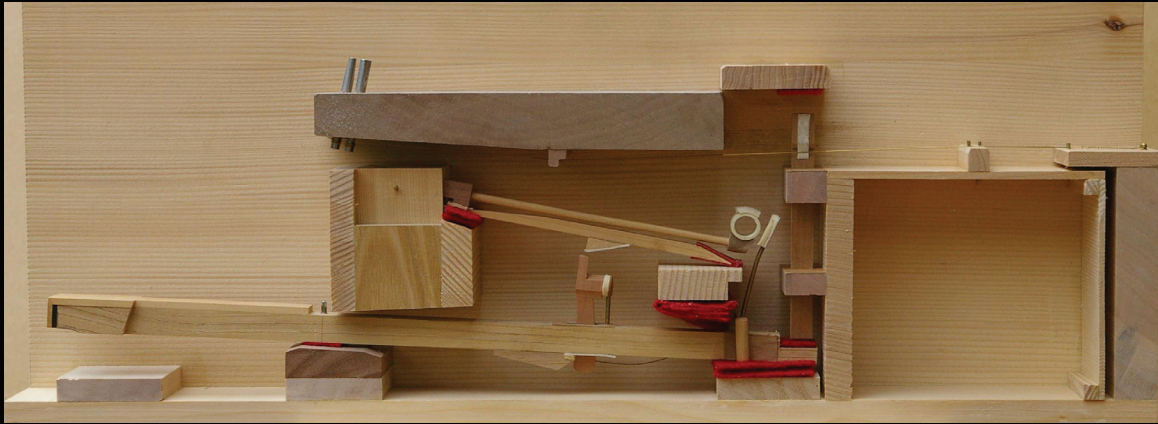


Cristofori piano 1720,
Metropolitan Museum of Art,
New York



ill. 4

Cristofori piano 1726, Grassi-Museum, Leipzig



ill. 5, model of Cristofori's action from 1726

GERMANY

Ill. 6 shows a few important documents about the invention of the piano in Germany.

The first document which in Germany talks about instruments with a hammer action is Christian Gottlob Schröter who in 1721 indicates: " I know more than 20 places where other then normal harpsichords instruments with hammers are build. When the strings are hit from above they are called Pantalons. Instead, when they are stroked from underneath they are called pianoforte. If you asked each of these builders who had actually invented the new instrument, each would say to be the inventor...". In Marpurgs *Kritische Briefe über die Tonkunst* from 1763 a drawing of Schröters own model of a piano action was

published. It was a very simple action without escapement. Because he was an organist and not a builder, probably no instrument with his action has ever been built. So, while the Germans began experimenting with the first hammer actions, in Italy, Bartolomeo Cristofori was looking back to 20 years of experience.

With König's translation of Maffei's article the existence of Cristofori's invention was widely spread under the musically educated German public. But König did not put the date of the original Italian article. Mainly for that reason, in the following centuries there was a big confusion in Germany about who invented the piano.

In the same year, Matteson tells us that in 1724 in a journal from Breslau, a description and a drawing of a “Cembal d’amour” invented by Gottfried Silbermann, had been published. He continues saying that

A few important documents about the invention of the piano in Germany

- 1721 "Mehr als zwanzig Städte und Dörfer sind mir bekannt, in welchen ...solche Clavierinstrumente mit Hämmern oder Springern gemacht worden,..."
Schröter 1721/ Marpurg 1764
- 1725 König/ Mattheson, German translation of Maffei's article König/ Mattheson,

Mattheson: „...von dem Florentinischen und dem Freybergischen..." (pianos)
- 1733 „...hat...Herr Silbermann ...vor kurzem wiederum ein neues Instrument erfunden, so er **Piano Fort** nennet," Johann Heinrich Zedler, Grosses vollständiges Universal-Lexicon aller Wissenschaften und Künste
- 1747 8 May famous meeting of J.S. Bach with Fredick the Great, Bach plays the Gottfried Silbermann piano at the *Stadtschloss* in Potsdam
• Berlinische Nachrichten.....No. 56 – 11 Maggio 1747
- 1768 Jacob Adlung/Johann Friedrich Agricola: *Musica Mechanica Organoedi*, Berlin 1768, volume II, retrospective of the development of Silbermann's piano's

ill. 6

someone „...should make a comparison of this instrument with the Florentines (referring to the Florentine pianos) and to the one from Freyberg (referring to the pianos of Gottfried Silbermannn). That means that already in 1725 the two types of pianos, the one by Cristofori and the one by Gottfried Silbermann were known to have existed.

The invention of a *Piano Fort* by Gottfried Silbermann was mentioned shortly in 1733 in the Universal lexicon by Johann Heinrich Zedler which tells us that: "...the famous Silbermann had a short time ago invented another instrument called Piano Fort which he gave to the Elector of Poland, Lithuanian and Saxony and who appreciated the excellent and beautiful sound..." In 1747, the *Berlinische Nachrichten von Staats-und gelehrten Sachsen* describe the famous meeting of J. S. Bach with Fred-

erick the Great which took plays on the 8 May. Bach plays the Gottfried Silbermann piano at the *Stadtschloss* in Potsdam and improvised the Fuge which later was published as the Musical Offering.

In 1768 Jacob Adlung and Johann Friedrich Agricola, in the *Musica Mechanica Organoedi* narrate in a quite detailed retrospective that "...Gottfried Silbermann had made in the beginning two of the new pianos. One of them he showed Johann Sebastian Bach who praised the beautiful sound but he criticised the heavy touch..." Adlung/ Agricola continue saying that Silbermann did not like the criticism but that he after the meeting with Bach worked on his action for many years to improve it. The new version was then approved by the court of Rudolstadt and Prussia and finally also by J. S. Bach.

I think the tale Adlung is telling was prob-

ably spread by Silbermann himself during his lifetime. I think that Gottfried Silbermann experimented with his own hammer action as early as the 1720ies but the piano action that at the end satisfied Bach and Frederick the Great was not his own one but Cristofori's action.

For a long time it has been assumed that Italian musicians of the court of August the Strong had brought a Cristofori piano to Saxony but no document could show this. We know that August the Strong's son Friedrich August was in Florence in 1713 and could have seen the invention by Cristofori. But the prince was only 17 years old, prince Ferdinando de' Medici instead was dieing.

Recently Eva Badura Skoda made up a credible story to which I will add a little point. The story is based on an organ contract, on letters and on an inventory of music and musical instruments of the count Christian Heinrich von Watzdorf who was a secretary at the court of August the Strong.

The story is this: Gottfried Silbermann installed in 1732 an organ built by him in the church of Krostau, a little village in the south east of Saxony at the border to Poland. The organ was paid by count Christian Heinrich von Watzdorf, who was the main property owner in the region. Gottfried Silbermann and count Christian Heinrich von Watzdorf met personally at least ones, in 1730. Christian Heinrich von Watzdorf was himself a keyboard player. As a secretary of the court of August the Strong he was send with diplomatic missions various times to Italy. From summer 1725 to summer 1726 he spend one year in Florence and here he must have played a Cristofori piano and took it back to Saxony or commissioned someone to send it to Saxony. It seems everywhere he went he created scandals, so much, that when after August the Strong's death in 1733 Friedrich August II came on power in Dresden he was arrested and put in prison up to

the end of his life in 1747. All his property was seized and when count Watzdorf died it became property of the Saxon State. Gottfried Silbermann, by the end of the 1730ies or beginning of the 1740ies must have managed to buy the Cristofori piano of count Watzdorf.

Later on when I will do a comparison of the detail's of Cristofori's and Silbermann's action it becomes clearer that a short visit to count Watzdorf's villa would not have been enough to copy so closely Cristofori's action as he did. He must have had the possibility to dismantle the action completely and must have had enough time to measure and draw all details carefully, something that would have taken a few days, since they did not have electronic and photo devices.

Ill. 7 – 9 show the three surviving Silbermann pianos

Johann Nikolaus Forkel says in his biography of Johann Sebastian Bach, published in 1802 in Leipzig, that " ... the king of Prussia liked the pianos by Silbermann from Freyberg so much that he bought all, around fifteen. Now one can find them in various corners of the royal palace, all out of use..." If we look at the document we see that this is exaggerated. Bills exist only for two pianos, for the one from 1746 (for 420 Thaler a "Piano e Forte" from Silbermann) and for another one from 1747 ("Piano e Forte" for 373 Thaler.).

The other documents are short descriptions in inventories of the three palaces (Stadtschloss, Sanssouci and Neues Palais) for the years 1780 al 1825. They talk about one piano in each palace and also the photos that exist from before the war show three pianos. Interesting are the short messages about repair work on the Silbermann pianos for the years 1749 and 1754, 1767, 1769 and 1771, which indicate





ill. 9
Gottfried
Silbermann
Piano 1749,
Germanisches
Nationalmuseum
Nürnberg

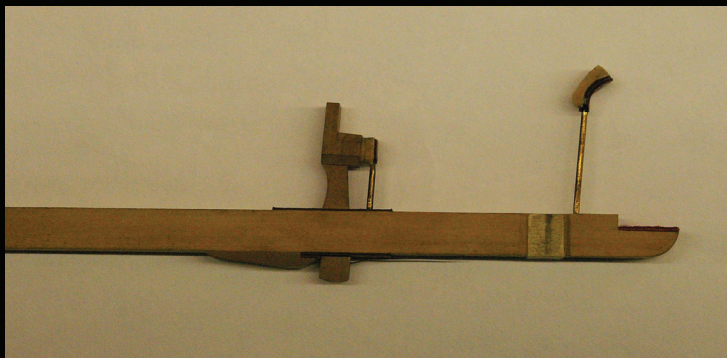
that they were in use at least for the period CPE Bach played for Frederick the Great and probably up to the 1780ies as long as the king was alive. Of the three Silbermann pianos owned by Frederick the Great, the two in *Sanccouci* and in the *Neues Palais* survived, the one in the *Stadtschloss* burned down together with the castle in World War II.

Ill. 10 – 13 show details of the actions of the Cristofori and the Silbermann pianos

Silbermann copied exactly Cristofori's action by using different kinds of wood for the various parts. Concerning the actions, G. Silbermann's work could be described as standardized. All three actions of the surviving G. Silbermann pianos are identical – a part from the different keyboard range – and everything is made with extremely high precision.

Ill. 14 model comparison Cristofori/ Silbermann

The choice of pear wood for the hammer shanks and the intermediate levers make the Silbermann action feel more heavy but the far biggest difference makes the distance the hammer has to travel to the strings. In a Cristofori piano the distance between the hammer head and the strings are only 2 cm, in the Silbermann pianos the same distance is 4 cm, Silbermann's hammers have to travel twice the distance as do the hammers in a Cristofori piano. Cristofori's action, even if all parts are copied exactly, inside the case of the Silbermann piano become much slower, the repetition works less good, the touch is much heavier. The point is, that the moment of escapement is prolonged, the moment the escapement jack and the little triangle are in contact is much longer.



Key with escapement and check, G. Silbermann piano from 1749



Key with escapement and check, Cristofori piano from 1726

ill. 10



Hammer shanks and intermediate lever G. Silbermann piano



Hammer shanks and intermediate lever Cristofori piano

ill.11



Hammer heads, left: Cristofori, right: Gottfried Silbermann

ill.12

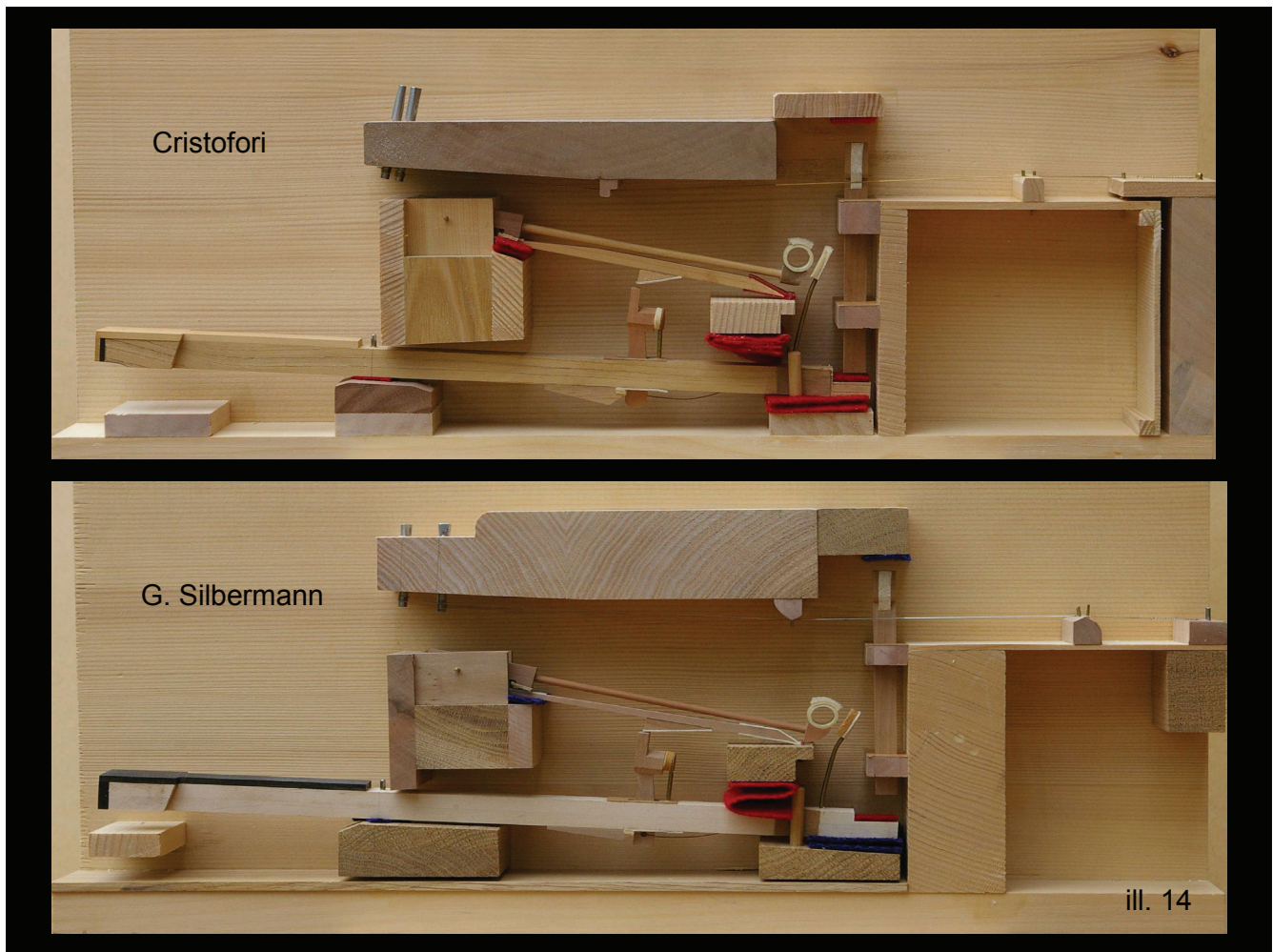


ill.13



Dampers
Above: Cristofori
Underneath: Gottfried Silbermann





SOUND

The sound is very much influenced by the way the case and the soundboard is made. Silbermann copied the inverted wrest-planck (ill. 15), but the general concept of his construction is completely different. Cristofori uses for his pianos a very light and extremely flexible case (double bent-side!) identical to the one he used for his harpsichords. Silbermann chose a very heavy case construction, probably especially reinforced. Signed harpsichords by Gottfried Silbermann did not survive but in confront to other German harpsichords of the same period, this is a very heavy construction (ill. 16).

The soundboard construction is very different as well. Cristofori's soundboards are quite thick (3 - 4mm), Silbermann's soundboards are very thin (2 - 3mm) (ill.17). Cristofori's pianos have brass scaling, Silbermann's pianos have iron scaling. The strings in the Silbermann piano are much thicker, the overall tension is three times bigger than in a Cristofori piano.

Two of the surviving Silbermann piano's, the one in Nürnberg and the one in the Neues Palais have a half tone transposition. I think most modern copies work with the pitch 440 Hz in the upper position and 415 Hz in the lower position. I am convinced that the normal upper position was at around 410/415Hz and the transpo-

sition down at around 390 Hz. The transposition was needed to accompany Frederick the Great with his Quantz flutes. Frederick the Great not only was a professional flute player but he was also actively involved in the construction of his flutes. He was finding the best wood for Quantz and he was very critical and did not except every flute made for him. Thanks to Tom Lerch's research we know that the pitch of the surviving Quantz flutes go from around 390 Hz - 408 Hz.

The arrangement of the tuning pins tells us that the main position was the one above and the transposition was down and not up (ill. 18).

With the pitch at 415Hz, the strings in the Silbermann piano remain with their tension much more under breaking point than it is the case in a Cristofori piano. Silbermann in this respect already anticipates the piano development of the years to come.

Because Silbermann was influenced by the sound of the Pantalon he invented the damper rising mechanism and the Pantalon register to imitate the Pantalon.

There is another important detail for the sound: Silbermann changed the arrangement of the strings, pairwise in the Cristofori, equally spaced in the Silbermann.

(ill.19) If the hammer has to travel twice the distance there is much more hammer movement sidewise, so probably *una corda* did not work so well and Silbermann had to widen the distance of the two strings which make the pair. The result is that the strings touch the hammer head much more on the side, which is very tricky for getting a nice sound! The action has to be done extremely accurate, otherwise the tone produced is not very nice.

SUMMERY

Gottfried Silbermann, after trying to invent himself a piano action decided in the 1730ies or early 1740ies to secretly copy Cristofori's action while maintaining – with success - his reputation as being the inventor of the piano in Germany.

Gottfried Silbermann copied closely Cristofori's action but he did not improve it, something which has often been published in recent years by various scholars. Cristofori's action works on it's limit in the Silbermann piano case but it produces a very different and much stronger sound, a sound which I would describe as the introduction of the "piano sound".



The inverted wrestplank,
above: Cristofori piano 1726
underneath: G. Silbermann
piano 1749



ill. 15



ill. 16, Inner construction, left Cristofori, right G. Silbermann



Ill. 17, Soundboard ribbing, left: Cristofori, right: G. Silbermann



ill. 18, Arrangement of the tuning pins in the two G. Silbermann pianos with transposition



Equal spacing of strings in the pianos by Gottfried Silbermann



ill. 19, String spacing in pairs in Cristofori's pianos