Differences between Maffei's article on Cristofori's piano in its 1711 and 1719 versions, their subsequent transmission and the implications.

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Abstract:

Although many publications provide a drawing (*disegno*) of Cristofori's piano action and describe it as from the 1711 edition of Maffei's article, most are in fact from altered versions: three altered from the 1711 edition and five from the 1719 edition. The original version has only been re-produced (albeit incompletely) by Rattalino. The 1711 drawing shows an action which is feasible, whereas some versions are functionally impossible. An examination of the text, and of surviving actions, strengthens the argument, already advanced by Och, that Maffei did not write the technical description of the action, but received a report from Cristofori. It is argued here that the other details concerning the nature of the newly-invented *Gravecembalo col piano, e forte* and its use were also provided by Cristofori. Thus, these testify to the maker's intentions, which are significant for us now in understanding the first piano. Maffei's unpublished notes for the article give some insight into Cristofori's early days in Florence, but do not support the interpretation that Cristofori initially declined to work for Prince Ferdinando de' Medici.

Keywords: Cristofori, piano action, Maffei, disegno, Rattalino, Och, *Gravecembalo*, Ferdinando de' Medici.

Scipione Maffei's article on Cristofori's piano published anonymously in 1711 as *Nuova invenzione d'un Gravecembalo col piano, e forte…* was re-published in 1719 in a collection of some of his writings as *Descrizione D'un Gravicembalo Col Piano, E Forte.…*[1]. Both of these editions are relatively well known and extensively cited in the literature. The purpose of this study is to compare the two texts and their accompanying drawings of the piano action in order to investigate whether more details can be gleaned concerning Cristofori's invention. The drawing (*disegno*) requires more attention than the text, but the two themes are inextricably linked.

Until recently, when I had consulted the Maffei drawing I used whichever publication that came to hand. Gradually it occurred to me that details found in one publication, were not present in another, even though both were supposedly of the 1711 drawing.

[1] Scipione Maffei, ' Articolo IX . Nuova invenzione d'un Gravecembalo col piano e forte; aggiunte alcune considerazioni sopra gli strumenti musicali', Giornale De' Letterati d'Italia, vol. v (Gio. Gabbriello Ertz, Venice, 1711), pp. 144-159, and 'Descrizione d'un Gravicembalo col Piano, e Forte', Rime e Prose del Sig. Marchese Scipione Maffei (Sebastiano Coleti, Venice, 1719), pp. 309-316. Ricardo Pergolis kindly provided me with a photocopy of the 1719 publication from a privately-owned edition. Google books has made a copy of the 1719 version available; the drawing (bound between pp. 312-313) is located at: https://books.google.de/books?id=hUkTAAAAQAAJ&hl=de&hl=de&pg=PA312-IA1&img=1&zoom=3&sig=ACfU3U2o4mzTKlAgoXkn7_qgelnDKvC5wA&w=685

On closer study of the two originals (Fig.1 = 1711 and Fig. 7 = 1719), and the various versions published of the drawing, it was found that although several authors have cited the 1711 original (Fig. 1) and reproduced a drawing *described* as such, only Piero Rattalino actually presented a reproduction (Fig. 2) from the *original* 1711 article[2]. Other authors (including myself) have unknowingly reproduced *altered versions* of the originals, either from the 1711 or the 1719 publications[3]. Thus, to my present knowledge there is *no English or German language publication* which has correctly reproduced the original 1711 drawing. Even Rattalino's version (Fig. 2) is not complete, having had the caption and page number removed, i.e. it lacks the following: Tav.I p. 158, an instruction to the printer where to bind the drawing. This implies that most readers have not seen the original 1711 version. Rattalino's version might have been altered since the *proportions* of the "box" around the action are slightly different from the 1711 copy I consulted, although this could perhaps be explained by paper shrinkage[4].

After publication of this article (version 1.1) Baudouin Bokiau drew my attention to his MA thesis which includes the 1711 drawing in its entirety, with some ink marks removed, albeit not at full size. Thus, his thesis probably represents the first publication of the entire 1711 drawing since its printing in Venice[5]. Bokiau also noted that published versions of the drawing differ[6].

My study of the *original* 1711 version reveals details which have not been documented in the literature until now and indicates that at various stages of the subsequent transmission of the description of the invention, some details of the action had not been understood by those producing the drawings. This

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[2] Piero Rattalino, Storia del Pianoforte (Il Saggiatore, Milano 1982, R/Milano 2003), p. 18. There are probably other Italian publications which have reproduced the 1711 drawing, that I presently do not know. The CD booklet of Bartolomeo Cristofori, Sei Sonate di varij Autori, played by Luca Guglielmi (Stradivarius STR 33608) reproduces the Rattalino drawing. The website of Luigi Borgato, http://www.testiweb.com/pianoforte.htm shows the 1711 drawing without the page number in the right hand corner. Judging by the proportions, it is a copy of Rattalino's illustration.

[3] My own misleading contribution appeared in 'Das Hammerklavier von Bartolomeo Cristofori - Das Vorbild für Gottfried Silbermann?' Freiberger Studien zur Orgel 9 (2006), p.56, where I reproduced the sketch published by Stewart Pollens in 'The Pianos of Bartolomeo Cristofori', Journal of the American Musical Instrument Society XX (1984), p. 37. This is described by Pollens as a 'Drawing of the Cristofori piano action of 1711, *after* an illustration in Scipione Maffei, "Nuova invenzione d'un gravecembalo col piano e forte," Giornale de' litterati [sic.] d'Italia 5 (Venice, 1711)'. For some time I had mistakenly assumed that the simplified sketch was *actually* the 1711 version. The drawing was made by Pollens from the 1711 original (private communication), but is not *the* disegno which Maffei reproduced.

[4] When Ratalino's reproduction is brought to a width of 157.5 mm, equivalent to my copy of the 1711 original drawing, then the box is 85.5 mm (at the left, ratio 1:184) to 85 mm high (at the right, ratio 1:1.789). This compares with 89 mm (left or right edge) for my copy of the 1711 drawing (ratio 1:1.73, see the text below). The HathiTrust scan (see note 12 below) would be 87.5 mm, assuming that the base line is 157.5 mm.

[5] Baudouin Bokiau, 'Des manuscrits d'Henri Arnaut de Zwolle aux conceptions de Bartolomeo Cristofori et d'Andreas Stein. Approche historique et technique des méchaniques d'instruments à clavier et à cordes frappées', MA thesis, Université Catholique de Louvain, (2012). The drawing appears on p. 83 and is taken from the HathiTrust scan (see note 12), as was kindly communicated by Baudouin Bokiau (26.11.2015). The baseline is 117mm long when the "actual size" printer command is selected. Bokiau's removal of ink marks is only of significance if one wishes to compare printed versions.

[6] Bokiau, op. cit. p. 89.

may have contributed to a certain difficulty in understanding the function of the action.

Differences in the texts

Both texts were printed in Venice, but the 1719 version was reset in a larger size, occupying only 7 pages of print, instead of the 16 pages of the 1711 original, so it is not a *reprint* from the original type. Thus, it is possible to distinguish readily between the two versions.

The new typesetting led to two minor typographical changes and the change of spelling to Bartolomeo in the 1719 version, compared with Bartolommeo in the first article and the correction of *tastami* to *tastature*. Besides dropping the announcement of a *nuova invenzione* in the title to the 1719 text, Maffei also writes consistently of a Gravicembalo, whereas the earlier version uses the spelling Gravecembalo[7]. Maffei made only one textual addition: in the 7th line of the 1719 text, he added after "e il piano, e 'l forte" the phrase "che corrisponde al chiaro , e scuro della pittura;"[8]. Thus, he appears to have taken enough interest in this publication to add this illustration.

The 1719 text also contains a minor change, where (p. 311, lines 7-8) Maffei writes about the origin of the drawing of the action, which will be discussed later.

Differences between the drawings of 1711 and 1719

The two drawings are apparently of closely similar size, although It has not been possible to inspect the originals and scales were not supplied with the copies I obtained[9]. The "box" size of the 1711 drawing (Fig. 1) is 91 mm (at the highest point in the middle) or 89 mm (at the left or right edge) x 157.5 mm (at the lower edge, ratio 1:1.77), that of the 1719 drawing (Fig. 7) 88 mm x 159.5 mm (ratio 1:1.813) on the copies I have obtained[10]. The 1711 drawing was incorporated as a fold-out sheet, which was not necessarily bound (or glued) at the page indicated on the drawing (p. 158)[11]. At least four digital copies of the 1711 text are currently in the public domain, but the drawings in

[7] As already noted by Pollens, The Early Pianoforte (Cambridge, 1995), p. 56. It was the practice to list corrections in the subsequent volume of the Giornale, but none were given in volume 6 for the article on the Gravecembalo.
[8] "...which corresponds to the light and dark of painting". I have reproduced the text exactly as it appears, including an unnecessary space between *chiaro* and the comma.
[9] I consulted a copy (H.lit.p. 146-5/6) held by the Bayerische Staatsbibliothek, Munich, which I received as a pdf file on 23.03.2010. Current practice is to scan documents so that they will appear at their original size. The printed page at 100% yields the sizes given in the text above.
[10] The 1711 box is 91 mm high at the highest part on my copy, although only 89.5 mm at the right hand side, apparently due lack of flatness of the paper while being scanned. See Fig. 1.
[11] The drawing is located in the HathiTrust scan (see next note) between pages 160 and 161.

two of them were not folded out before scanning and were only partly visible when consulted in 2010. These drawings are now fully visible[12].

It was considered whether the printer of the 1719 version worked from the 1711 publication, or whether he might have had the original sketch at his disposal, from which Maffei had the 1711 version made. The 1719 drawing follows the earlier one so closely in shape and size of parts, despite the slightly larger frame, that it appears a process of tracing was involved from the 1711 publication, albeit with certain errors. These were principally the omission of the hopper stop pad, the hopper axle, and drawing the spring with less clarity, as will be discussed below[13].

In view of the differences, we can exclude the possibility that the 1719 *disegno* was printed from the 1711 plates. I have not investigated what process of reproduction might have been used, but the 1711 and 1719 versions appear equally skillful in technique and use much finer lines than König's 1725 version, which appears as if it might be a woodcut[14].

The subsequent transmission of the 1711 drawing

The first modern author to study Maffei's 1711 article appears to have been Edward Rimbault, who published the original Italian of Maffei's 1711 version together with a drawing (Fig. 4) in 1860, and an English translation[15]. However, the drawing was not reproduced photographically, which would

[12] The HathiTrust digital library makes available a copy held by the University of Michigan. When downloaded on 18.03.2010 the drawing had not been folded out and was not fully visible, as had also happened during the scanning of a copy located through Google books at this date. Another partially visible Google drawing was found by Baudouin Bokiau, which is from a different copy. By December 2011, as Baudouin Bokiau has reported to me, the HathiTrust drawing was fully visible. This resulted from a new digitisation by the University of Michigan of Tomo V. The HathiTrust drawing is located at: http://babel.hathitrust.org/cgi/pt?view=image;size=100;id=mdp.39015064501573;page=root;seq=193;num=160 In fhe meantime a fully-visible version from Google books has also appeared. This is the page URL, without the Google viewer: https://books.google.de/books?id=-tgzAAAAMAAJ&hl=de&hl=de&pg=PA160-IA1&img=1&zoom=3&sig=ACfU3U1nHINfocTL39bsaqx7X4hPURd1Ow&w=685
The size of the HathiTrust drawing depends on the viewing size selected, but when size=100 is selected, the image is 1.2x larger than Fig. 1 given below, which is the closest one can come to the original size. The resolution is rather low, resulting in jagged lines on diagonals. The HathiTrust or Google drawing can be accessed via a right click and the "view image info" menu in a Firefox browser.

[13] See below: Misinterpretations and Corruptions of the 1711 and 1719 versions.

[14] In J. Mattheson, Critica Musica, vol. 2, Hamburg 1725, pp. 335-342: 'Musikalische Merckwuerdigkeiten Des Marchese, Scipio Maffei, Beschreibung eines neuerfundenen Clavi-ceins, auf welchem das piano und forte zu haben, nebst einigen Betrachtungen über die Musikalische Instrumente, Aus dem Welschen ins Teutsche übersetzt von König'. The drawing appears on p. 339.

[15] Edward Rimbault, The Pianoforte, Its Origins, Progress, and Construction, (Robert Cocks, London, 1860, R/Travis & Emery 2009), pp. 95-102. An English translation is printed parallel to the Italian text, which was transcribed with some errors. This has been partially reprinted on at least one occasion (without acknowledgement): see William Leslie Sumner, The Pianoforte, (Macdonald, London 1966), pp. 39-40, which book was kindly supplied by Celia Moules.

presumably have been difficult or costly at this time, and some minor errors were added through the new engraving. Most obvious, but not significant for the sense, is the detachment of the keyhead from the keylever. Rimbault's box enclosing the action is only 45 mm x 79.5 mm in the facsimile edition[16].

In 1874 Leto Puliti re-published the text of the 1711 article but did not include the drawing[17].

There have been some recent works by specialists on the subject. Stewart Pollens published a photographic reproduction of the 1719 drawing[18]. However, this was a simplified tracing, which was *based* on the original 1711 version (Fig. 3), did not include the lettering of the parts, nor were all the details drawn, although it did show the pad at the top of the hopper[19]. Since it was only intended as a *simplified* version of the original it will not be further discussed here.

Konstantin Restle had consulted Rimbault's publication, based on the 1711 text, from which his drawing (Fig. 5) also derives, and had correctly informed his readers of this source[20]. Restle's version appears to be a skillful tracing of Rimbault's version, since there are minor differences which reveal it is not a photographic reproduction and the proportions of the box surrounding the action have been changed[21]. Restle draws the spring correctly, even though this is not in Rimbault's version, but the hopper stop resembles König's version (to be described below).

Michael Cole also drew upon upon Rimbault's version for his publication[22]. Although it would appear to be substantially a photographic reproduction, Cole made a few changes to the drawing (Fig. 6) that was submitted for printing, as noted in the table below, which include noticeable alterations to the lengths of the hopper stalk (I) and spring (L)[23].

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[16] Op. cit. p. 99. It is not known whether the facsimile edition reproduces Rimbault's publication in the original size. It appears that some slight reduction may have taken place since the original was in quarto, i.e. 12" x 9 1/2" and the reproduction is A4, i.e. 11 3/4" x 8 3/8". Otherwise, Rimbault's box around the action maintains the proportions of Maffei's 1711 version.

[17] Leto Puliti, 'Della vita del Ser.^{mo} Ferdinando dei Medici Granprincipe di Toscana e della origine del Fortepiano', Atti del' Accademia del Real Istituto Musicale di Firenze, 1874, pp. 92-216; the Maffei article is pp. 177-183.

[18] Stewart Pollens, the 1719 version appears in The Early Pianoforte, p. 59.

[19] Pollens' sketch version of the 1711 drawing appears in 'The pianos of Bartolomeo Cristofori', Journal of the American Musical Instrument Society XX (1984), p. 37, but not in The Early Pianoforte.

[20] Konstantin Restle, Bartolomeo Cristofori und die Anfänge des Hammerclaviers (Munich, 1991). p. 69, fn. 35.

[21] The sketch has apparently been scanned at a fairly low resolution resulting in a stepped line for the keylever. The proportions of the frame are different with respect to Rimbault's version but actually match Rattalino's.

[22] Private communication, 31.07.2008.

[23] Michael Cole, The Pianoforte In The Classical Era (Oxford, Clarendon Press, 1998), p. 5. Michael Cole (private communication) confirmed that he had made some changes to improve the intelligibility of the drawing.

The subsequent transmission of the 1719 drawing

The earliest line of transmission of the 1719 edition is via the German translation published by Johann König in 1725, which was clearly based on the 1719 *text*. Alfred Hipkins expressed the opinion that Konig translated the 1711 article, which is incorrect[24]. This small detail also has some bearing on the hypotheses concerning the diffusion of Cristofori's invention in Germany[25].

König's drawing (Fig. 8) was probably also based on the 1719 version, since it follows this in several details which are different from the 1711 version[26]. His drawing introduced the first significant error regarding the hopper stop: the top of the hopper stalk was drawn as curving towards the hopper and touching it. König also introduced a horizontal line connecting the top of the fork holding the hopper (H = *ganasce*) and the hammer rack (M), which makes no sense.

In 1868 Oscar Paul re-published König's text and supplied a drawing (Fig. 9), which was a re-drawn version (not photographically reproduced)[27]. As a result it deviated from König's version in some respects. In König, the distinction between the hopper stop (I) and the hopper spring (L) had virtually disappeared, but in Paul's version the two parts are amalgamated into one, which is completely impractical. The damper was reduced to a single vertical line, which makes little sense.

Paul's drawing was further re-drawn for Blüthner and Gretschel (1909) with some omissions (Fig. 10): the damper cloth, the arcade, and the hatched lines on the pad of the intermediate lever, under the damper[28]. I have not yet come across further transmissions of this version, although there are probably several German works which have reproduced it.

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[24] Alfred J. Hipkins, A description and History of the Pianoforte and of the older keyboard instruments (London, 1896, 3/1929, R/1975), p. 102, records that König made a translation of Maffei's article in the Giornale, i.e. the 1711 version, which is incorrect. Restle, op. cit. p. 86, apparently assumes that König worked from the 1711 version since he writes of a delay of more than 10 years before the article became known at the Dresden court. König translates the phrase about light and dark in painting (noted in my text above), which is only to be found in the 1719 version. However, König's title "…Beschreibung eines neuerfundenen [newly invented] Clavi-ceins, auf welchem das piano und forte zu haben,..." suggests that he was acquainted with the title of Maffei's 1711 version in which the "new invention" is mentioned.

[25] See Restle's discussion of Schröter, Lotti, and Silbermann, pp. 116-119, p. 133, pp. 259-262 respectively. Restle suggests, p. 259, that Lotti brought news of the Cristofori piano to Dresden in 1717, where Johann König lived, possibly even an actual instrument. If this was so, then one wonders why König's translation was based on the text which appeared in 1719 and not on the 1711 version which had already been published. Lotti returned to Venice in 1719.

[26] König, op. cit., p. 339.

[27] Oscar Paul, Geschichte des Klaviers, Leipzig, 1868, pp. 105-113; the drawing is on p. 110. I consulted the Bärenreiter reprint, produced in Leipzig 1986.

[28] Julius Blüthner and H. Gretschel, Der Pianofortebau. Theorie und Praxis des Baues der Flügel und Pianinos nebst einer Einführung in die Geschichte des Pianofortes und einem kurzen Abriss der musikalischen Akustik, Dritte Vollständig Neubearbeitete Ausgabe, Herausgegeben von Rob. Hannemann, Leipzig (Verlag Voigt) 1909, pp. 15-16. I am obliged to Volkmar Krafft for a copy of this source, from which I discovered it.

It appears that Hipkins used the Paul version as the basis of his drawing (Fig. 11) since he refers to the publication in his article on the Pianoforte for Grove's Dictionary and his drawing (not a photographic reproduction) closely resembles Paul's[29]. There are also some deviations introduced, which are recorded in the table below. There are few publications which reproduce Hipkins' version, so it has little significance for the history of this subject matter.

Rosamund Harding's version of the drawing (Fig. 12), although described as *Maffei's* (edition not specified), is a photographic reproduction of Paul's version[30]. Paul's work is cited in her publication, but not in connection with the drawing. In fact Harding gives passages of Maffei's 1711 text in English translation from Rimbault's edition, but the drawing has clearly come from the German source. Edwin Good's essay includes a drawing (Fig. 13) which is cited as from Maffei's 1711 publication, but in fact is a photoreproduction of the Paul-Harding version[31].
Thus, the versions of the drawings and their transmission are as follows:

1711 Maffei > Rimbault (re-drawn) > Restle (tracing)
> Cole (photorepro. + changes)
> Pollens (simplified drawing)

1719 Maffei
> König (re-drawn)
> Paul (re-drawn) > Blüthner & Gretschel (re-drawn)
> Hipkins (re-drawn)
> Harding (photorepro.) > Good (photorepro.)

Thus, there are, excluding Pollens' simplified drawing, at least eight different versions of the disegno in print, three of them being versions of the 1711 drawing and five being modifications of the 1719 drawing.

It is not necessary to comment here on all the differences of the versions, since they are listed in tabular form below.

[29] Alfred J. Hipkins, 'Pianoforte', Grove's Dictionary of Music and Musicians, 3rd ed. (London, 1934, R/1952), p.151.
[30] Rosamund Harding, The Piano-Forte, 2nd ed. 1978 (Gresham Books, Old Woking). The drawing appears on p. 8.
[31] Edwin Good, 'Reflections on a Year With Cristofori', *Piano Technicians Journal*, xlv/12 (2002), p. 22-30, xlvi/1 (2003), pp.26-30, and xlvi/2 (2003), pp.18-22. I am obliged to Edwin Good for a copy of this article. Part 1 was accessible at http://www.ptg.org/userfiles/file/2002-12.pdf

The content of the text

Maffei's article can be seen as consisting of four sections. It will be useful for the discussion below to list in detail the content of the second and fourth sections.

1. An introductory passage describing Cristofori as in the employment of the Prince of Tuscany and stating that three instruments had been built (p. 144 – p.145, line 15; total 36 lines in the 1711 version).

2. A description of the tonal character of the instrument and its musical use (p.145, line 15 – p. 147, line 28; total 72 lines).

2a. Producing loud or soft sound in the new invention depends on the playing force.

2b. *Professori* have not given the instrument the praise it merits; they have not understood the ingenuity and careful work required[32].

2c. The sound of the instrument has been considered too soft and dull compared to the normal harpsichord.

2d. Opposition has been raised that the instrument is not as loud as ordinary harpsichords. It has more power than credited, when one knows how to produce it, by playing the keys with force. One should accept things for what they are.

2e. This is a chamber instrument, not for church music or large orchestras. It is intended to be heard alone (like the lute, harp or viol and other " sweet and gentle " [*soave*] instruments), although it can accompany a singer or another instrument, and succeeds in a moderate-sized concerto[33].

2f. The main opposition from which the instrument has suffered results from people not knowing at the outset how to play it. It requires a person to study its strengths, know how to vary the force of playing, choose suitable music, and allow the voices to be heard.

3. A description of the action, including the description of the parts labelled on the drawing (p. 148, line 15 - p. 153, line 28; total 173 lines).

4. Miscellaneous remarks, mostly on harpsichord making (p. 153, line 28 – p. 159, end of article; total 160 lines).

4a. The necessity for soundholes in a harpsichord.

4b. The effect of moving the soundpost in bowed instruments.

4c. Cristofori claims he can make new instruments sound as well as old ones by removing the "elasticity" of the bentside and bridge, which would otherwise affect the soundboard.

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[32] Riccardo Pergolis suggests besides "professors", or "authoritative musicians" as a suitable translation, that "professori" is intended to convey a slight tone of mockery, while still retaining the required etiquette, (personal communication 17.04.2015), Of course, a musician who did not understand the difference between a g sharp and a flat would have had much understanding of his craft. (see 4f)

[33] David Sutherland has observed (private communication) that the text refers to a moderate-sized group (however many instruments that may imply) and not a "smallish ensemble", as translated by Pollens, The Early Pianoforte, p. 58, which appears to be a little smaller. The Rimbault and König translations are in accord with Sutherland's observation.

4d. The quality of the wood also plays a role in the tone of the instrument.

4e. A perfect harpsichord in Florence with 5 keyboards has every note divided into 5 parts so that dissonances can be avoided.

4f. Ordinary harpsichords are imperfect because they do not enable perfect fifths. Some instruments e.g. by Undeus, were made with split sharps to provide a g# and a flat, something which many *Professori* do not understand.

4g. Harpsichords and violins cannot play in tune together because of the imperfect tuning of the keyboard instrument. Multi-keyed instruments provide perfect intonation and are not more difficult to tune because one always tunes perfect intervals, not the lowered fifths and raised fourths and thirds of temperaments.

The origin of the text

The 1711 article was printed without any reference to Maffei as the author. In the table of contents we find Cristofori's name listed in front of the article "CRISTOFARI [sic.] (Bartolomméo)". In 1719, when Maffei's *Rime e Prose* was published in Venice, it became clear who compiled the 1711 article and since then Maffei's name has always been linked with the description.

Maffei's presence in Florence in October 1709, as Puliti has informed us, is documented by Apostolo Zeno's letter to Prince Ferdinando concerning the "Giornale Letterario" (founded by Zeno in 1710) and introducing Maffei[34]. The Prince's reply of the 2nd of November indicates that the publication was to receive the support Zeno had sought and that Maffei had been assured of this. Apparently his mission was diplomatic, in the service of the publication; on the title page of the 1711 edition we read.: *Sotto la Protezione del Serenissimo Principe di Toscana*. Such endorsements were considered important for the financial success of a publication. The Giornale appeared in four volumes each year; volume 5 alone had 416 pages, the next volume 538 pages, indicating the scale of editorial work required.

Of course, Maffei probably met Cristofori in the autumn of 1709, but it would be incorrect to suppose that the whole purpose of his visit to Florence was to interview Cristofori[35]. Laura Och mentions later correspondance with Buonarroti indicating their frequent contacts on antiquities, which presumably started in Florence, and were one of Maffei's main interests. Another anonymous publication in the Giornale de' Letterati, preceding that on the

[34] See Puliti, op. cit. pp. 150-152, which gives the letters in full. Laura Och, 'Bartolomeo Cristofori, Scipione Maffei e la prima descrizione del "gravicembalo col piano e forte"', Il Flauto Dolce 14-15 (Apr/Oct 1986), pp. 16-23, cites Maffei's collected letters as a source for the same information, see fn. 35.

[35] Whether a second meeting between Cristofori and Maffei took place, as Mannucci reports, does not affect the issues involved. It is not intended to discuss Mannucci's supposed report which is in M. Fabbri, 'Nuova luce sull'attività fiorentina di Giacomo Antonio Perti, Bartolomeo Cristofori, e Giorgio F. Haendel', Chigiana 21 (1964), pp, 143-190, but which may be a fake. Restle op. cit. presents the relevent material, pp. 73-75, as does O'Brien, who questions the authenticity of the report, pp. 115-130, including both the original texts and English translations.

piano, is attributed by Och to Maffei, indicating the range of his work and contacts in Florence[36].

Regarding the origin of the text describing the action (section 3), Maffei has the following to say:

“But turning now to the particular structure of this instrument, if the craftsman who invented it had been able to describe it as he had been able to build it with such perfection, it would not be difficult to explain the artifice to the reader. However, since he has not only failed in that, but has deemed it impossible to represent it so as to enable one to construe an idea of it, somebody else must needs perform the task, although with the instrument no longer close at hand and with no aid but a few notes taken when the instrument was examined, and a rough drawing sketched by the maker himself.”[37]

From this statement we are led to infer that Cristofori either provided an explanation of the action which Maffei considered insufficient, or that he failed, or even declined, to produce such a description. There is even the grotesque implication that Maffei divined the correct function of the action whereas Cristofori was unable to explain it to him.

In any event Maffei lays a clear claim to be the author of the 600-word passage immediately following this, which describes the action, from p. 148 (line 15, 1711 edition) starting at "Diremo adunque primieramente…" [I will therefore say first of all...] to "…e il perno passa per esso." [...and the pin passes through it.] on p. 153, line 28.

It is strange that Maffei should turn on Cristofori somewhat testily, as he does here, for not being able (or willing) to describe the action, considering his praise and evident admiration for the inventor in several other sections.

If Maffei's claim were true then it invites the speculation that Cristofori might have been unwilling to part with so much practical detail about the workings of the instrument and that he initially attempted to discourage Maffei's enquiries with the explanation that it would not be possible to describe the action. Given the general secrecy of craftsmen of this period in guarding their production processes, in order to maintain their place in the market and thereby assure their livelihood, it would not be surprising if Cristofori had been reluctant to part with so much information.

It is the generally-accepted interpretation in commentaries that Maffei was the author of the text. Och had found it unlikely, that Maffei would have mastered the technical detail in a single visit and have recalled it from memory, even

[36] See Och, 'Bartolomeo...' fn. 38 on the *tromba acustica*, which appears in the same volume, immediately preceeding the article on the pianoforte.
[37] Maffei's text is on p. 148 in the 1711 edition and p. 310 in the 1719 version. Riccardo Pergolis kindly provided this translation for my article 'Recent approaches in understanding Cristofori's fortepiano', Early Music, 34, no. 4 (2006), pp. 635-644; the translation is on p. 636. This translation makes clear who produced the drawing, a matter discussed further below.

with the assistance of Cristofori's rough drawing, to which he refers[38]. Pollens also almost registered disbelief about Maffei's purported authorship of the description, which he found "surprisingly lucid"[39]. Having reproduced a Cristofori action I saw the questions it raised among my contemporaries. Then, after examining the amount of technical detail Maffei was supposed to have assimilated during his visit, I reached the conclusion that it was extremely unlikely the text would have been his own work.

More compelling though as evidence is that Och was able to find Maffei's notes, evidently those referred to by the author himself, since they contain material printed in the article. However, they also show that the published 600-word passage explaining the action could not be constructed from the mere 44 words in the notes which mention it, since the detail is insufficient, which became Och's main argument in her later article[40]. The reader can find these notes in the original Italian in Och and together with an English translation provided by Pollens[41].

We should not neglect to consider the possibility that a substantial part of Maffei's notes has gone missing, from which he could have constructed the description of the instrument. Indeed, there is the comment in the article, but not in the notes, about Undeus having made spinets with split sharps. Nevertheless, that could have been general knowledge for someone from the Veneto such as Maffei. Similarly there is the record of Casini and the rare harpsichord in Florence with five keyboards, a detail which Maffei probably only learned of in Florence, but which is not in the notes. Thus, some details of the article are not documented in the notes.

However, there is a memorandum in Maffei's hand, which speaks against the idea of lost notes: "To have the instrument maker write a report noting the substance of the invention, wherein lies its strength and wherein its greatest difficulties"[42]. This was crossed out in ink, as Och reports (although still legible), from which Och inferred an intention on Maffei's part to hide

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[38] Och, ; 'Bartolomeo...', p. 19. In this article she emphasised that Maffei was not an expert and could not have mastered the technical detail. In her later publication 'Interessi e conoscenze musicali di Scipione Maffei' in Scipione Maffei nell'Europea del Settecento, Proceedings of the conference, Verona, 23-25 September 1996, ed. Gian Paolo Romagnani (Consorzio Editori Veneti, 1998), pp. 551-577, although Och dealt with the subject only briefly, she referred to the lack of technical information in Maffei's notes as the main reason why his article must have been taken from Cristofori's report.

[39] Pollens, The Early Pianoforte, p. 62.

[40] Denzil Wraight, 'Recent approaches in understanding Cristofori's fortepiano', Early Music, 34, no. 4 (2006), pp. 635-644; see pp. 636-637. My article laid the emphasis on the lack of technical detail in Maffei's notes as the reason why Maffei could not have written the description of the piano mechanism. I only became aware of Och's 1996 article, in which she described a simlar analysis (see note 38 above), after this present study was completed.

[41] Och, 'Bartolomeo...' p. 22, provided a partial facsimile of the handwritten notes, which probably comprised two pages. Och's single sheet is a collage of the first column of the first page and a few lines near the end. The entire first page is reproduced in facsimile on p. 384 in Giuliana Montanari, 'Bartolomeo Cristofori: a list and historical survey of his instruments', Early Music 19 (Aug 1991), pp. 383-396. Pollens, The Early Pianoforte, pp. 232-237. Baudouin Bokiau reproduces the remaining pages in an article 'Les Premiers *Pianoforte* de Bartolomeo Cristofori' (in press).

[42] The translation is given by Pollens, The Early Pianoforte, p. 235.

Cristofori's contribution[43]. However, we might find a less sinister interpretation in the possibility that Cristofori complied with the request and that it was crossed out by Maffei as accomplished. There are other (vertical) cancellation lines in the manuscript which correspond to text that appears in the article and can be seen as confirming the idea that he was crossing them out as already transferred[44]. As was explained above, Maffei was involved in the publication of the new Giornale, which required a considerable editorial effort to produce the required text.

Another note (above the previous one) tells us "When I return I will have Cav[alier] Albisi, relative of Buonarroti, describe the cembalo and note all the terminology"[45]. This "Albisi" can probably be identified with a member of the noble Florentine family, possibly Luca degli Albizzi, with whom Cristofori would undoubtedly have had contact since he was a significant organiser in Ferdinando's household[46]. Altermatively it might have been Cosimo degli Albizzi who was named as an executor in Cristofori's first will of 2th January 1728[47]. It is interesting to see that Cristofori had sufficient standing to be able to call on a Florentine nobleman to act as executor. Thus, it is possible that Albisi might have supplied the description of the action himself, if we can believe that someone outside the inventor's workshop was capable of this highly technical task. However, assuming that he was ever asked, it seems more likely that he interceded so that Cristofori provided the report[48].

These two memoranda are the penultimate entries in the manuscript so they confirm that the notes were the entire state of Maffei's knowledge, at least at that time. If that is so then the final entry (which will now be described) must be seen as being Maffei's *recollection* of part of the conversation, and not notes made during the visit.

These last remarks are highly compressed. They refer to the large difference in movement of a hammer head which is possible if the hammer butt is set in motion near the axle rather than further away from it. Although these details are to be found in the published article, there is a further insight into the origin of Cristofori's invention which is omitted in the publication. The notes contain the following: "*Sta nell'aver osservato la differenza del moto...*" [In having observed the difference in movement...] and give us Cristofori's narrative of the process of invention. The essential difference between the clavichord and

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[43] Och, 'Bartolomeo...' p. 20. She also cites other evidence of Maffei's plagiarism in note 34.
[44] These are visible in Montanari's publication, but appear to have been removed by a change of contrast in Och's 1986 publication.
[45] Pollens, The Early Pianoforte, p. 235.
[46] On Luca see: O'Brien, p. 68. The clue has already been given as how to identify the person since he was the nephew of Buonarroti. Och, 'Bartolomeo...' fn 55, has identified this Buonarroti as Filippo Buonarroti (b. 18 Nov. 1661).
[47] O'Brien, Appendix VIII, Cristofori's Wills. The will is transcribed and an English translation of the relevent section is at p. 195.
[48] Bokiau op. cit. p. 88 suggests that since the drawing was not to scale and is not to be found in Maffei's notes, the description was provided by Albisi The lack of the original drawing should not surprise us when we consider that it must have been sent to the engraver, who probably did not return it.

Cristofori's piano action is that the hammer is accelerated towards the string with more force than the unaided finger can cause the tangent to be moved.

In any event the intended request for a report reinforces Och's and my interpretation that Maffei was not able to supply the description himself, and thus does not support his claim to be the author of the text in question.

That Maffei should brazenly claim to be the author presents a puzzle, which perhaps Och has explained with her observation that Maffei's self-promotion is a visible characteristic in his other writings, and therefore not just in the article on the newly invented *piano e forte*.

Maffei's contribution to the article

Although Pollens suggests that Maffei's notes were made *during* the interview with Cristofori, a memorandum to ask Cristofori why "a good player [of the harpsichord] does not play well for dancing" shows that at least this remark was written later, as were therefore the two following memoranda regarding the report Cristofori should provide and Albisi's intended role in collecting information[49]. These memoranda, and the lack of questions directed towards the piano, suggest that Maffei may not even have formed the intention of writing a description of the new invention until *after* his visit to Cristofori, at which time it was plain that he had insufficient information for the task and needed to obtain it from Cristofori as a written report. This would explain the discrepancy in content between the notes and the article, although it cannot account for Maffei's claim to have written the text largely from memory.

In an earlier section I analysed the article as consisting of four parts. The size of each part is as follows:

1. Introduction	36 lines	8.2 %
2. Tonal character and use of the instrument	72 lines	16.3
3. Description of the action	173 lines	39.2%
4. Miscellaneous remarks on instruments	160 lines	36.3%

Parts 2 and 3 contain that which is of interest concerning Cristofori's invention, comprising some 55% of the article.

If we examine Maffei's notes closely we see that these provide the content for parts 1 and 4, but nothing for part 2, and virtually nothing (only 44 words) for part 3.

This explains his memoranda to have the instrument maker supply an account of the strengths and weaknesses of the new instrument (= part 2) and for Albisi to describe the instrument and note all the terminology (= part 3).

[49] Pollens, The Early Pianoforte, pp. 232-234. Pollens now prefers the expression “notes made in connection with the interview” (private communication 28.11.2015).

Although Maffei intended to request a report not simply on the strengths of the instrument, but also its *weaknesses*, part 2 contains a defence of the *supposed* weaknesses. The author is at least a strong proponent of the new invention and it is not far fetched to detect Cristofori's hand in rejecting the criticisms of the instrument.

The contrast between sections 3 and 4 is considerable. Section 3 is a lucid and well-ordered description of the action and all the parts, whereas section 4 is a miscellany of observations without any guiding order, just as we find in Maffei's notes.

Maffei's notes provide mostly general information about instrument making and tuning, with Cristofori discussing the tonal effect of the movement of the soundpost in a violin, or the use of soundholes in the case rather than in the soundboard of a harpsichord. Maffei's curiosity led him to have Cristofori explain the cause of some buzzing sounds in his (Maffei's) harpsichord, which lends a particularly authentic touch to the account. It also reveals Maffei's lack of expert knowledge of the behaviour of a keyboard instrument. However, the notes do not convey the impression that Maffei went into an interview primed with questions about the newly-invented piano. A discussion of the piano is patently absent, perhaps (as I have suggested above) because he had not formed the idea of writing an article specifically on Cristofori's invention at this stage.

Although I have argued that Maffei had only a limited role in describing the instrument and the action, we can also glean insights as to how Maffei worked with his scant material. From the remarks found in Maffei's notes, which Cristofori evidently made about the necessity for an opening in the case of a harpsichord (or piano), a broader view is offered in the article itself: Maffei places these practical details within the contemporary investigations of Natural Philosophy, which yield the secrets of Nature. This is appropriate to a man of letters and for the journal which sought to record developments in the arts and society.

We have a clear contrast in style and content with parts 1 and 2 of the article corresponding to Maffei's notes, but parts 2 and 3 being largely undocumented. There are therefore three main issues to be considered:
1. Maffei's claim to have written the description of the instrument.
2. The inherent implausibility, as Och and I see it, that an outsider could have compiled the technical description of the action.
3. Maffei's notes, adduced by Och, which correspond largely to parts 1 and 4, i.e. omitting any technical description of the action, or its reception and use.

In the light of the information revealed by Och's research, Maffei's claim to have written the description of the action from memory is not plausible, nor is it likely in my view that he provided the assessment of the piano's character and intended use[50]. In this respect my analysis goes beyond Och's since she saw Maffei as being the author of part 2.

[50] Och, 'Interessi...' pp. 556-557 sees these descriptions as Maffei's own writing.

Thus, I infer that Cristofori supplied the report Maffei requested and was the source of most of the text, even if the prose was perhaps altered by Maffei. Part 2 is one of the most significant sections of the article since it gives us a contemporary view of the instrument, and as I argue, probably from Cristofori himself.

We therefore learn from it how Cristofori saw the function and use of the instrument, one of the most significant details being that his new invention should be understood as a "soave" (sweet and gentle) instrument. Although one cannot translate the Italian "soave" fully with a single English word, a sound agreeable to the senses, without harshness or excessive force, is to be understood[51]. The sound was clearly so distinct from the harpsichord, that critics found it "*troppo molle, e ottusa*" (too soft, and dull)[52]. Thus, it is hardly possible to consider that Cristofori intended the instrument to have the bright sound of the harpsichord, but with the addition of dynamics. There would have been no point in making a combined harpsichord and pianoforte, as did Ferrini in 1746, if there were no contrast of tone colour. This distinction needs to be made since some writings suggest there was little difference between the sound of the harpsichord and the early piano.

It follows from this re-assessment of the origins of the content in the article that Maffei can not be so clearly seen as "promoting" Cristofori's invention, as has been seen until now, since the assessment of the instrument probably comes from the maker himself. However, Och attests that Maffei's interest in matters of music was neither superficial nor occasional, as can be seen in his other writings[53]. Thus it would be a distortion to imply that Maffei had little interest in the invention merely because he had incorporated Cristofori's text without citation. Indeed, the fact that Maffei had the description printed in his collected works of 1719 speaks for his continued interest.

Finally there remains the issue why Maffei should have claimed to have written an article (albeit published anonymously), substantial parts of which were probably provided by Cristofori. Och is in no doubt in calling this plagiarism, but she makes the interesting observation that it was most unusual at this time for the work of a craftsman to be the subject of an article in a journal of letters[54]. The benefit of assessing the authorship is that we understand better the quality of the source of the information

[51] Riccardo Pergolis has consulted a number of Italian sources and older dictionaries to enable this appreciation. "Suave" (in English) acquired an additional, less positive sense in the 20th century which makes it no longer the single, best translation. Pergolis selected the aria from Handel's "Serse" to illustrate this highly agreeable sense: "Ombra mai fu, di vegetabile cara ed amabilie soave più", (private communication 19.04.2015)
[52] Maffei, 1711, p. 146; Maffei 1719, p. 310.
[53] Och, 'Interessi...' p. 569.
[54] Och, 'Interessi...' pp. 556.

The origin of the *disegno*

I have argued elsewhere that the *disegno* published by Maffei in 1711 was based on a drawing made by Cristofori, not by Maffei[55]. It would not be surprising if English language readers were of the opinion that Maffei had produced the drawing. The first English translation by Rimbault introduced an error with Maffei having a “model” in front of him, not a drawing[56].

The critical phrase occurs in lines 14-15 on p. 148 of the 1711 version; *"...e sopra un disegno rozzamente da prima disteso."* In Pollens' translation this is rendered as " a rough design done from scratch" without mention of who made the drawing[57]. Cole saw Maffei as providing a diagram "admittedly drawn some time afterwards, when he did not have the instrument to hand"[58].

However, this matter is not merely a problem of translation because the 1711 version is potentially ambiguous since *"da prima disteso"* (the aforementioned) could refer to Cristofori or Maffei. In fact Och assumed in her 1986 article that Maffei was intended as the author, and Rattalino before her had also made this assumption[59]. This is literally correct when we scan back through the text and see who was previously mentioned.

One of the few passages in the 1719 text which was changed concerns this matter, and Och drew attention to it in her later article. Maffei wrote in the 1711 version of "un disegno rozzamente da primo disteso" [a rough drawing made by the aforementioned], but, as if to clarify the issue for us, in the 1719 version it is "un disegno rozzamente da lui disteso", [a rough drawing made by him]. In this way Maffei avoids any possible confusion that "the aforementioned" could be thought to refer to him (Maffei). There should be no doubt: Maffei did not claim to have been the source of the drawing of the action in the 1719 version. König translated the Italian correctly into German from the 1719 article, so the problem does not occur in his text.

What the motivation for this change may have been is more difficult to assess. I supposed that Maffei wished to avoid taking any responsibility for possible inaccuracies in the drawing, or perhaps for something which he did not understand. Och thought of two other explanations: That Maffei wished to convey more credibilty to his writing, or, that 8 years after the first article there might have been some legitimate protest by Cristofori about Maffei's plagiarism[60].

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[55] Wraight, op. cit.
[56] Rimbault, p. 97: “...I have no longer the instrument before my eyes, but only some memoranda made while examining it, and a rough model laid before me". Restle op. cit. pp. 86-90 discusses other translation errors made by Rimbault.
[57] Pollens, The Early Pianoforte, p.58. In the text on p. 62 he parallels Rimbault's version by referring to " a rough model or diagram".
[58] Cole p. 5.
[59] Rattalino's assumption is implied by his statement (op. cit, p. 17) that the drawing was perhaps made by Cristofori.
[60] Och, "Interessi..." p. 555.

Cristofori's "rough drawing" could have been the *only* source at the disposal of the printer, but Maffei might have further improved the copy himself, as Cole has suggested, in order to make the *disegno* more intelligible[61].

Given the doubt we can entertain about the veracity of Maffei's claim to have described the action, we must also question whether Cristofori's drawing was as rough as Maffei suggests.

Whether Maffei was capable of the task of improving the sketch is difficult to determine, but when we consider the various faults in the drawing, which are listed below, to which new errors were added in the 1719 edition, then it is clear that, at the very least, Maffei did not devote much effort to the 1719 drawing. If he had completely *understood* the function of the instrument, then he could have corrected the 1711 drawing's deficiencies in the 1719 edition.

We do not have to believe that Maffei produced the description of the instrument in order to consider his possible role in preparing and improving the drawing for the printer, but I think it unlikely that Maffei could have shown more command of the subject in the drawing than he did in the description. As the 1719 version shows, he clearly distanced himself from being considered the draughtsman, perhaps because he did not wish to be held accountable for the possible errors.

In conclusion, it seems to me unlikely that the drawing was substantially improved by Maffei and that it therefore mostly represents Cristofori's work, albeit with errors, the source of which we cannot trace.

Cristofori's arrival In Florence and the invention

An interesting detail concerning Cristofori's working conditions in Florence emerges in Maffei's notes, but was not printed in the article. It has no bearing on the matters discussed above, but illustrates again the value of examining the original sources. This detail has been used by Montanari to argue that Cristofori initially declined an invitation to go to Florence in the Prince's employment.

"Cristofori's appointment to the Medici family is thought to have come about as a result of meeting Prince Ferdinando in March or April 1688, when the latter was returning from a visit to Venice for the Carnival. It appears that although Cristofori was not immediately enthusiastic, 'che fu detto al Principe, che non volevo, rispos'egli il farò volere io' (the prince was told I did not wish to go, he replied that he would make me want to), he was in fact established in Florence by May of that year."[62]

[61] Personal communication (18.04.2011).

[62] Giuliana Montanari, op. cit., p. 384. March or April 1688 is the date estimated by O'Brien (p. 70) from expense records when Cristofori mostly likely arrived in Florence. 1687 is the date given by Puliti for Ferdinando's trip to Venice. As Riccardo Pergolis has informed me (personal communication 5.3.2015) the discrepancy in the dates may have to do with the fact that the Venetian year changed on 1st March.

Although Pollens' English translation, published after Montanari's article, provided a different interpretation (the correct one in my view), the matter was not taken up directly. O'Brien repeated Montanari's interpretation, which has been seen as adding credance to it[63].

Riccardo Pergolis has provided a translation of the passage which corrects some points of case and tense[64]. Square brackets indicate where an expansion of Maffei's brief notes is required to convey the full sense.

Accord to Bortolo the invention of the pianoforte. That he learnt much from the others after coming here. That at the beginning it was a strain on him to go into the large room with all that noise. That the Prince was told he did not want [...], he [the Prince] replied: "I will make him want to [...]" He gives him ten scudi per month[65].

Exactly what Cristofori did not want (che non voleva), is not mentioned in the brevity of Maffei's notes. How one extends the sense of the missing meaning in the [...] brackets is the crucial point, but the underlining in Maffei's hand suggests that Cristofori felt strongly about it. In any event it is clear that the Prince required his acquiesence.

As Pergolis has further explained, Maffei's notes indicate that Cristofori did not have an interview with the Prince, but, as we might well expect in view of the difference of standing, had to convey his wish through an intermediary[66]. The nature of the reply suggests that it was not seemly for Cristofori to express wishes conflicting with the desires of a Prince. Not surprisingly, Maffei diplomatically avoided any mention of this matter in his article since the Giornale de' Letterati was under the protection of the Prince.

The events which are described in this passage relate to Cristofori's presence in Florence from the beginning (1688) to the time of the interview with Maffei (probably 1709). The unclear section is contained within these temporal markers. Thus, in the sequence of the narrative, the natural conclusion is that it was the working conditions which were uncongenial, as Pollens' translation indicates.

O'Brien challenges the view given by Montanari that Cristofori was employed in the *Galleria dei Lavori*. Invoices O'Brien cites reveal that by August 1690 Cristofori had established his workshop on the other side of the Arno from the

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[63] Michael O'Brien, Bartolomeo Cristofori at court in late Medici Florence, diss. The Catholic University of America, Washington, D.C., 1994, (UMI order number 9424289), p. 69.
[64] Riccardo Pergolis, personal communication (19.01.2015).
[65] "Accordar a Bortolo l'invenzione del piano, e forte.
Che molto ha imparato qua dopo venuto da gli altri.
Che da principio durava fatica ad andare nello stanzone in questo strepito.
Che fu detto al Principe, che non voleva [underlined in MS]. rispos'egli il farò volere io. Gli dà dieci scudi al mese." Laura Och has kindly confirmed (personal communication 02.02.2015), since her text differs from Pollens', that " piano, e forte" (not "piano, è forte") is the correct version in the original document. Her transcription had been altered by the editor, who changed some punctuation.
[66] Riccardo Pergolis, personal communication 19.01.2015.

Pitti palace[67]. O'Brien has documented that Cristofori was attached to Ferdinando's household, which was only one among the Medici in Florence. Thus, there was not a single "court" with Cristofori "the" court instrument maker, as some writings tend to suggest. Cristofori had a higher standing in Florence through being an employee of Ferdinando, but he did not work exclusively for the Prince. He earned in total more than his instrument-making colleagues in Florence and had his rent paid, so we should not suppose that this passage indicates some sort of especially hard treatment, even if the working conditions were perhaps initially not to Cristofori's liking[68].

Montanari's argument appears at first perfectly plausible, until one understands that it was the *speculation* of Puliti, not a fact, that the Prince, on his way back from the carnival in Venice, might have met Cristofori in 1687 [sic.] to gain his services[69]. This hypothesis was apparently motivated by Puliti's failing to find any record in the 20,000 letters (which he claims to have examined) that could explain Cristofori's appointment in Florence. The idea that an invitation had been issued to go to Florence (which Cristofori supposedly did not want to accept) is not mentioned by Maffei and is thus not supported by the notes[70]. Montanari's translation of "*che non voleva*" (that he did not want...) as "I did not wish to go" is a distortion of the meaning and purely speculative addition.

The idea which was nourished by this speculation, or was the reason for it, is that Ferdinando was supposedly determined to obtain Cristofori's services as an instrument maker. Related to this is a small detail in Maffei's notes which O'Brien drew upon. He interpreted this information to indicate that Cristofori was not commissioned by the Prince to work on the invention of the piano, which would be an interesting new detail, if it were a correct reading of Maffei's comment[71]. However, the pertinent remark referred to in Maffei's notes indicates that Cristofori claimed that he had not received "influence from any other thing", expressed somewhat literally[72]. In other words, he had not based his piano action on any existing instrument. Thus, I do not think that we can infer as much as O'Brien suggests and we must therefore admit that

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[67] O'Brien p.72 and fn 18. In Cristofori's first will his address is given as "Canto agl'Alberti", which is at the junction of the Via dei Neri and Via dei Benci. In Cristofori's second will his address is given as the parish of San Remigio. The Piazza San Remigio is some 150m distant from the first address.

[68] O'Brien, p. 49 and ch. IV, esp. pp.75-76. The reader is referred to O'Brien's study for a details of Cristofori's income, position in Florence, and the other Medici households.

[69] Puliti, p.130. This reference is given by Pollens, "The Early Piano...", p. 47, who makes clear that there is no evidence of a meeting. O'Brien pp. 67-68 discusses the possible contacts between the Prince and Cristofori in more detail.

[70] O'Brien ibid. incorrectly translated Maffei's notes as Cristofori "did not wish to go". As we have seen, they are not this specific..

[71] O'Brien, p. 12.

[72] "...Cristofali...ha inventato senza motivo avuto da altra cosa il cembalo col piano e forte...". See Och, 'Bartolomeo...', p. 21. Pollens' translation, The Early Piano p. 232, suggests that Cristofori "has invented without any outside help the cembalo with the piano and forte", and in similar vein Montanari writes that "has invented a harpsichord with piano and forte by himself", neither of which are quite the same as the translation I have given. Riccardo Pergolis kindly assisted in this assessment of the text.

Maffei's notes shed no further light on why Cristofori became a *stipendiato* of Ferdinando.

The arguments concerning this reach beyond the scope of this article, but it would be useful in closing this discussion to mention some views that have been expressed. O'Brien's argued that Cristofori was employed to replace Bolcioni as a tuner and maintainer of instruments[73]. While it may be true that Cristofori was the successor to Bolcioni, David Sutherland has taken the wider view that Cristofori became a *stipendiato* in oder to supply instruments to the court and saw in this appointment Ferdinando's recognition of Cristofori's pre-eminent position as an instrument maker and the Prince's expectation of great works[74]. When we consider that Cristofori increased Ferdinando's keyboard instrument collection by seven instruments in the 12 years between 1688 and 1700, then Sutherland's view encompasses the available evidence. Whether Ferdinando's expectation in 1688 included the Gravecembalo col piano, e forte is not yet proven, but it is certainly possible.

Further evidence for Cristofori as a source of the description of the action

The 1711 *disegno* and the accompanying description of the action also provide details which lend additional credance for Cristofori as the author of the printed information, as will now be explained.

The hopper stop is drawn in the 1711 version with the suggestion of a pad at the top. Of course, this action part requires padding at this point in order to prevent the hopper creating undue noise when it returns quickly to its position of rest. In the description it is written "I: Filo fermo d'ottone schiacciato in cima, che tien ferma la linguetta". Rimbault's translation is: "The strong brass wire pressed together at the top, which keeps the hopper in its place"[75]. König's translation is nearer the mark when he refers to the stop as "…an der Spitze breit geschlagen" [hammered wide/flat at the top][76]. When one *knows* how Cristofori executed this detail in the 1726 action, one understands that the correct English translation would be "forged". However, even this word does not reveal exactly how the (1726) hopper stop was formed. The photo below makes the matter clear since on one of the stops, the rear, covering disc of leather has been lost.

[73] O'Brien, p. 75. His name is spelled as Bolgioni in some documents.
[74] David Sutherland, 'Bartolomeo Cristofori's Paired Cembalos of 1726', Journal of the American Musical Instrument Society XXVI (2000), pp. 5-56, see p. 29.
[75] Rimbault, p.99.
[76] König, p. 339.

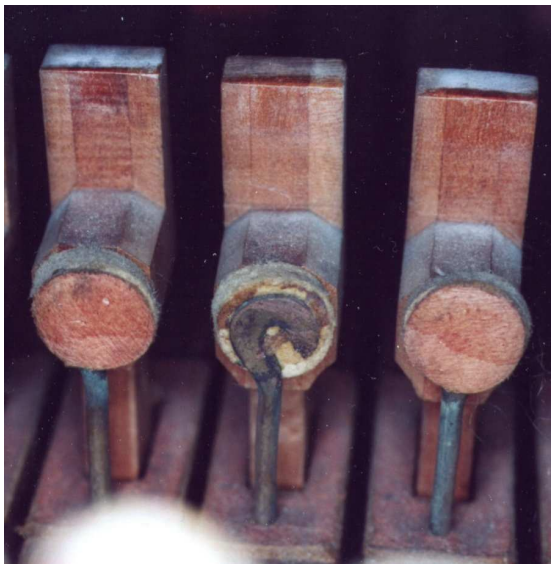

Photo: Denzil Wraight

The brass rod has been forged to a hook, which has then been flattened and is slightly smaller than the leather pad. In this way leather is glued to leather with the hopper stop rod enclosed in the middle, a strategy which ensures a good adhesion of the leather pad to the brass rod. Of course, with such a style of construction, no one but the maker would *know* that the rod had been forged and could supply such a description. Even if the details of manufacture used in 1726 had not have been developed in 1711, the simple fact that the author speaks of something which is not visible, suggests that he knew how it was made.

Other details concern parts of the action which are described, but not drawn, or at least not made clear. For example, although the hammer butts are described as being *infilati* (on a wire [axle]), the axle is not drawn in the 1711 (or 1719) edition, although it would have been a detail as obvious as the axle (F) for the intermediate lever. The hopper is described as being pivoted [*impernata*], but the pivot or axle is only marked with a dot, which is not as clear as the pivot [*perno*], i.e. axle, F for the intermediate lever. In the 1719 version the hopper axle is missing. Given the fact that Cristofori later developed a hopper without an axle, this detail is of significance in the development of his invention.

Another detail of interest is the remark that rattles and noise in the action, are prevented by the use of leather or cloth[77]. Although the intelligent observer might discover this for himself, the use of leather at the axle hole in the rotelle is virtually invisible in the 1726 piano action since the leather is hidden behind small wooden discs glued in the hammer butts (*rotelle*) and can only be felt with an appropriate tool. I detect Cristofori's pride of achievement behind the emphasis "especially at the axles", not the observation of a visitor to the

[77] 1711 edition, p. 153, the passage: "In tutti i contatti...con singolar maestria del dante."

workshop[78]. It was one of Cristofori's strokes of practical genius to have found the amazingly effective "low-tech" solution to the noise which is made in the action by plain wooden axle holes in the *rotelle*. No matter how close the tolerance be, the slack which is necessary for the *rotelle* to rotate freely also causes a clacking noise in the wood of the *rotella*. Leather washers inside the *rotelle* prevent or damp out this noise, yet allow the *rotelle* enough freedom of movement. I was only able to appreciate this subtle advantage as a result of having *constructed* a Cristofori action. The likelihood that an uninformed visitor to the workshop could perceive and appreciate this feature is slim.

In the light of this modern experience in reproducing a Cristofori action one can understand the phrase "con singolar maestria del dante" [with singular mastery of {of the use of} buckskin[79]], the description of the leather bushing of the axle, and also the piqued claim in part 2 that the *professori* had not appreciated how much ingenuity was required in the invention and what skillful execution was needed for the successful operation of the instrument. Even the apparently simple hook shape of the hopper stop, which is hidden between two discs of leather, is not easy to produce with such a tight bending of the wire. Only a carefully-refined technique of annealing, bending and hammering produces the shape Cristofori used, revealing the skills that were developed for the production of the piano.

Thus, the description of the action appears to be not only correct, but extremely well informed as regards manufacturing detail, presumably because it was Cristofori's own report.

Errors in the 1711 *disegno*

The first stage of error arose when the printer worked from Cristofori's sketch, which, on Maffei's testimony, was the at least the basis of the *disegno* in the 1711 article.

It is evident to anyone familiar with keyboard instruments that an arcade was never placed on the keyfront as in the 1711 drawing, so that the finger could touch its top edge: of course, the arcade is always *under* the keycover. Such an elementary error should warn us not to accept every detail as literally correct, even in the 1711 version. Presumably the engraver made a small slip, possibly without realising the significance of his error.

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[78] We find a documented example of Cristofori's pride in his achievement and self-reliance in his first will of 24th Jan. 1728, where he claims never having been in debt to any person: "...the said testator being and having been very prudent by not having contracted a debt of any kind to any person of this world... See O'Brien's translation, p. 205. In this respect he goes beyond the precautionary denial that anyone could have a claim on his estate.

[79] Pollens translation "with singular skill" is almost too modest, The Early Pianoforte, p. 60. "Maestria" suggests both prowess and bravura and the author does not err on the side of modesty. Rimbault, p. 100, incorrectly transcribes "maestria" as "maestri", then fails to be able to translate it.

A curious detail is the hammershank-hammer butt assembly. The hammer shank has been drawn in its position of rest, the hammer butt as if the hammer shank were near the top of its travel.

One conclusion we may draw is that Cristofori probably never saw a proof of the *disegno* which went to press, or if he did (and made corrections), these (or at least some of them) were not implemented. It is equally evident that Cristofori was probably not consulted in 1719 when Maffei's article was re-printed, otherwise Cristofori could have made corrections at that stage.

Misinterpretations and corruptions of the 1711 and 1719 versions

There are four essential features in the 1711 drawing, as has emerged from this study, which were omitted, corrupted, or changed in the later versions. Even the 1719 version contains what one could call interpretive errors. Thus, it is useful to distinguish between the changes introduced in the 1719 version, and those introduced by later interpretations, even though some of these occurred as early as 1725 with König's German version.

The main features are:

1. the damper (R)
2. the hopper (G = *linguetta mobile*)
3. the hopper spring (L)
4. the hopper stop (I)

In addition, there are four minor details:

5. the slope of the keyframe
6. the silk thread check
7. the pad on the underside of the hammer
8. the apparent connection of the second lever (E) to the hammer rack

Misinterpretations and corruptions, 1. The damper.

The damper assembly raises doubts about what the engraver understood from the sketch with which he was provided. The later versions even obscure one small detail. In the 1711 version (fig. 1) there is a small piece of, presumably leather, depicted with hatched lines, which emerges at the top of the damper at a slight angle from the vertical. Hatched lines were the convention used for the pads on the hammer head and the end of the intermediate lever where the damper rests. I suggest that Cristofori's intention in his drawing was to indicate a wedge damper which would enter between the bichord pair from below, rather than a pad which contacted the string pair and remained below the strings. His damper in the surviving, later actions was a wedge which entered between the strings from *above*, thus it may supply the missing information. The square "platform", on which the wedge is

mounted, might be an interpretive error, but it could also be an actual platform on which a small wedge of leather was glued.

The following photo shows a realisation of this wedge damper, with the damper (left) cut from a piece of thick leather. The damper at the right is an inverted version of the damper in the 1726 action, using a strip of thin leather.

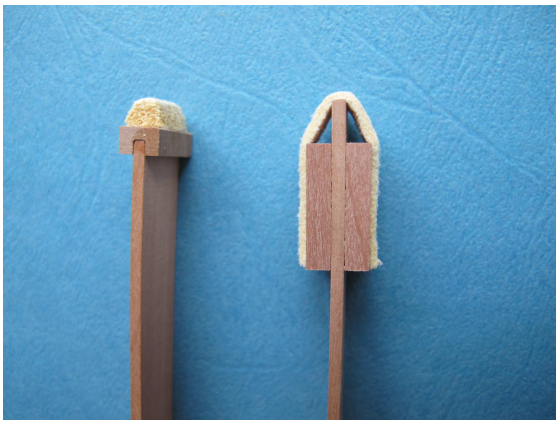

Photo: Denzil Wraight

The following photo shows the wedge damper in operation. It has been dimensioned so that it is possible to spread the strings slightly and pull it up through the strings for removal.

Photo: Denzil Wraight

The later, inverted 1726 style of damper also achieves a self-centring function.

Photo: Denzil Wraight

Following Cole we could infer that there might have been some means (such as a special tool) of separating the dampers from the intermediate levers on which they normally rest, otherwise one might not be able to insert the

keyboard without removing all the dampers by pulling them through the strings[80].

One clear advantage of the wedge damper *between* the string pair, in contrast to a pad damper touching the strings from below, is that the resting point of the intermediate lever is not defined by a damper bouncing on the string pair, but can be more clearly set with a closer tolerance by the second lever (E) resting on the block (D).

Misinterpretations and corruptions, 2. The hopper.

Only in the 1711 version is there an indication in the *disegno* that the hopper was mounted on an axle in the fork [*ganasce*]. It is merely a dot in the 1711 drawing I have reproduced (Fig. 1), which could be interpreted as an adventitious ink mark from the printing process were it not for the fact that this also appears in Rattalino's reproduction (Fig. 2), and also in the HathiTrust scan. This implies that it is an original feature of the drawing, even if it is not labelled with a letter. It is described sufficiently clearly in the text, albeit under *H.* Ganasche sottile, nelle quali e impernata la linguetta [thin jaws in which is pivoted the little tongue]. Since the axle (F) for the intermediate lever (E) is described as a *perno*, we may reasonably infer that the hopper was able to rotate on an axle, and was not axle-less, as was the later version we find in the extant Cristofori pianos. In this respect, the hopper of the first action shares a family resemblance with the tongue of a 16th-century harpsichord jack.

The fact that Cristofori's later action used no axle for the hopper demonstrates that an axle is not strictly necessary for correct operation. The 1711 version invites us to consider why Cristofori might have omitted the axle from his later version.

It seems probable that he wished at least to avoid the work and complication involved in padding the axle bearing against noise. Since the axle of the hammer rack *certainly* makes a clicking noise (without the leather which Cristofori placed here), the hopper would presumably also make a similar clicking noise. Furthermore, and possibly more significantly, looseness or wear in the axle bushing would create change in the adjustment of the *let off*, i.e. the point at which escapement occurs. I have found that in practice even humidity changes affect the dimensions of the hopper stop leather, thereby causing a 3mm difference in the height of the let off in an action based on the 1726 model. This indicates the sensitivity of the adjustment!

However, the *later* version hopper requires that the spring perform two *separate* functions: that of holding the hopper in its seating *and* biasing the

[80] Cole p. 9 infers there might have been a tool which contacted the chamfered front of all the intermediate levers and lifted them, thereby freeing the rear end of the levers from the dampers.

hopper against its stop. If it fails in *either* regard the repetition may be unreliable[81].

Based on my experience of the Cristofori action, I would infer that Cristofori in eliminating the hopper axle sought a simpler construction, possibly quieter, with more accuracy and duration of the let off adjustment.

Misinterpretations and corruptions, 3. The hopper spring.

As drawn in the 1711 version (Fig. 1), the spring is at the bottom of the hopper and bears on the *middle* of this piece. In order for it to bias the hopper against its stop (I) it would need to penetrate *into* the hopper for effective operation. There is a slight upward curve drawn on the hopper end of the spring which suggests that it enters the hopper. The length of the spring, its stiffness, and the angle of the wire entering the hopper then become the controlling factors. Alternatively, for correct operation, the spring could just press against the underside of the hopper on the *soundboard* side, but this is not what is drawn.

The far end of the spring marked L, i.e. near the axle F, is bent through 90° and apparently enters the intermediate lever, in order to provide a firm point of purchase so that the spring can bias the hopper.

The drawing is not consistent in showing hidden parts: the anchoring of the far end of the spring (L) in the intermediate lever is not shown, yet the bottom of the hopper stop stalk (discussed in the next section) is shown entering the lever.

In the 1719 version (fig. 7), and later drawings based on this by König (Fig. 8) and Hipkins (Fig. 11), the spring simply bears on the bottom of the hopper, which is a different principle of operation. Furthermore, Hipkin's version shows the damper end of the spring without any point of anchoring, which is literally impossible. Bokiau notes the differences in the representation of the spring[82].

Misinterpretations and corruptions, 4. The hopper stop.

In the 1711 version (Fig. 1) the top of the hopper stop is clearly shown as having a small pad to arrest the hopper, which is obviously necessary to avoid noise. The hopper stalk (1.65 mm diameter brass rod in the 1726 action) is drawn as entering the intermediate lever, which it clearly must.

This pad is missing in the 1719 version (Fig. 7) and the stalk does not enter the intermediate lever. In König's version (Fig. 8), based on the 1719 drawing, a misinterpretation has arisen as if the hopper stalk were curved towards the

[81] In addition, a spring which is either too weak or too strong does not perform correctly. The style of spring bias used by Cristofori and Ferrini suggests that they may not have realised what difficulties can manifest themselves in this part of the action.
[82] Bokiau, op. cit. p. 91.

hopper. Thus, it appears as if the wire were fixed in the *top* of the hopper, which is either impractical if it has no pad, or nonsense if fixed.

Paul's (and later Harding's) drawing (Fig. 9) combined the spring (L) and the hopper stop (I) as if they were one item. This came about in a number of stages. Firstly, the stalk of the hopper stop in the 1719 version (Fig. 7) does not enter the intermediate lever, which it does in the 1711 version (Fig. 1). The end of the spring in the 1719 version does not enter the bottom of the hopper, as it apparently does in the 1711 version, although this is a small detail. In König's version (Fig. 8) the end of the spring (at the hopper) and beginning of the hopper stalk were drawn so close to each other that they almost appeared as one item. In Paul's version (Fig. 9) we see that the two parts are definitely shown as one. He appears to have understood the spring as bending at 90° around the player's side of the hopper and then entering the top of the hopper. Lacking a positive stop, the hopper would have no clearly defined point of rest and would not provide the necessary function. Since Harding's book, and reproductions from it, are relatively well known, this version (Fig. 9) has probably contributed to a certain lack of understanding regarding Cristofori's action.

Misinterpretations and corruptions, 5. The slope of the keyframe.

The 1711 drawing (Fig. 1) shows a keyframe which is parallel to the drawing's frame and a keylever at a slightly sloping angle to the keyframe. This is in fact what one finds in most Italian harpsichords. The keylever, rather curiously, consists of three lines, but it suggests that the original drawing Cristofori supplied may have indicated slightly different lines of slope for the natural and sharp levers, which is exactly what one finds in instruments, although the effect is so small that it could have been neglected in this drawing. This shows us something about the draughtsman's attention to detail.

The 1719 drawing (Fig. 7) shows the keyframe at a sloping angle to the drawing's frame, with the keylever parallel to the keyframe. This is an obvious feature which readily distinguishes the 1719 from the 1711 version, although it is without any great significance for understanding the action. Curiously, König's version (Fig. 8) corrects this slope, making the keyframe parallel to the drawing's frame.

Misinterpretations and corruptions, 6. The silk thread check.

It is interesting to see that not every source illustrated the function of the silk threads as clearly as in the realistic, 1711 original (Fig. 1). In this we see that one thread is drawn in front of the hammer shank, and one behind it, clearly indicating a crossed, "X" arrangement and not a "V"-shaped loop. The 1719 version (Fig. 7) is literally impossible as drawn, since one of the threads would have prevented the ascent of the hammer shank!

A possible realisation is correctly illustrated in Gai albeit with the theads mounted between vertical rods on a separate rail[83]. Langer's arrangement, according to my recollection, extended the supports for the pivot at F vertically upwards, and attached the silk threads to these[84]. This is the most economical arrangement, but one can imagine that Cristofori's drawing might have omitted these details in order not to crowd the representation with too much detail.

Although the threads are only a minor detail, they provide the clearest, simple indication of the original 1711 drawing when comparing versions.

Misinterpretations and corruptions, 7. The pad on the underside of the hammer butt.

In the 1711 drawing (Fig. 1) there is a line drawn *under* the hammer butt, which probably indicates the leather pad that would be necessary where the hopper makes contact with it. However, this inferred pad is not hatched, as was the convention with other pads in the drawing. In the 1719 drawing (Fig. 7) this line has been drawn *above* the underside of the hammer butt, which makes its function less clear.

Misinterpretations and corruptions, 8. The connection of the intermediate lever to the hammer rack.

In König's drawing (Fig. 8), the top of the *ganasce* (the fork holding the hopper) on the intermediate lever has been continued, in error, to connect with the underside of the hammer rack, which makes no sense. This error was perpetuated in all the sources based on König, from Paul through to Good (Figs. 9-13).

Further observations

Neither of the drawings in Maffei's articles shows any means of guiding the keylevers, nor the balance pins and balance rail. The use of guide pegs *between* the keyends in the second action (as in the extant 1720, 1722, and 1726 instruments), some 28 mm from the ends of the levers, may be a relict

[83] Vinicio Gai, Gli strumenti musicali della corte medicea e il museo del conservatorio 'Luigi Cherubini' di Firenze (Florence, 1969), p. 171. It appears from the text which discusses Ponsicchi's work as if the drawing Gai reproduces derives from Cesare Ponsicchi, Il pianoforte sua origine e sviluppo (con tavole) e rassegna dell'esposizione storica fatta nello stabilimento musicale Brizzi e Niccolai nell'occasione delle onoranze a Bartolommeo Cristofori, (Guidi, Firenze, 1876). However, Ponsicchi's drawing of the first action is much simpler and does not show how the silk threads would be fixed. Gai's drawing appears to be of a model which Ponsicchi made. I am obliged to Prof. Dr. Eszter Fontana, and Christine Korff of the Universitätsbibliothek Leipzig, for a copy of Ponsicchi's work.

[84] This was exhibited at the Symposium 'Bartolomeo Cristofori und Giovanni Platti. Das frühe Fortepiano und seine Musik in der Toscana und Franken', Musikwissenschaftliches Institut der Bayerischen Julius-Maximilian-Universität, Würzburg, 28-31 October 2004.

from the first action, since it would have been possible to use a standard Italian rack in the later instruments. In the first action there is little space for a key-guiding rack since the second lever (E) would come too close to the rack (below it). Only if the block (D) were about 10mm high would it be possible to incorporate a rack underneath the intermediate lever.

Conclusions

The 1711 version of Maffei's article is well known by reference, but its accompanying drawing has hardly been shown to the modern reader. Rattalino's Italian-language publication of 1982 shows the original drawing, albeit with the page number missing. Bokiau's 2012 MA thesis includes a full drawing, at reduced scale, being the first complete publication.

This publication shows the 1711 drawing in its entirety and at full size, comparing it with all other drawings at the same scale.

The misinterpretations and corruptions of the original 1711 drawing started with Maffei's second publication of 1719, which introduced errors, such as the missing hopper stop pad, hopper axle, and incorrectly drawn silk-thread "check". However, it was mainly the reduced clarity of the hopper stop function and the spring which led to a chain of further errors initiated by the 1725 König translation. Further publications drew on König, but were *described* as Maffei's 1711 version.

König's translation and drawing published in 1725 was based on the 1719 version, thus, Maffei's article may not have been known in Germany before 1719.

A second line of transmission came through Rimbault's 1860 publication with its re-drawn version of the 1711 drawing, which incorporated fewer errors than the 1719 version, but did not display the hopper stop pad correctly. This in turn led to two slightly different versions in recent times, again described as the 1711 drawing.

Maffei lays a clear claim to have been the author of the description of the instrument's action (analysed here as Part 3), but it is probable, given the paucity of Maffei's notes (discovered and published by Och) and the lucid, technical description, that Cristofori supplied a written report.

The combined technical detail of the text and drawing of 1711, together with the hidden manufacturing detail of the hopper stop, which is correctly described, strengthen the claim that Cristofori was the sole informed source of the technical description of the action in Maffei's article.

It is possible that Maffei only conceived the idea of writing an article after he had met Cristofori, by which time it was plain he had insufficient information. We learn from Maffei's notes he intended to request a report from the maker describing the strengths and weaknesses of the invention. Thus, it is claimed

here that 55% of the article was supplied by Cristofori, not only describing the action, but also the use and the reception of the instrument (described as Part 2 above). In Och's analysis only Part 3 was due to Cristofori.

The instrument was seen by Cristofori as one of the "*soave*" (sweet and gentle) type, which is significant for understanding the intended timbre of the new invention as distinct from the harpsichord.

Cristofori made a drawing of the action, on which the published *disegno* was based, as was clearly acknowledged by Maffei, through a correction in the 1719 text. It seems unlikely that Maffei improved drawing this for publication.

The original 1711 drawing clarifies the function of the spring, hopper axle, and hopper stop. These features were either unclear or functionally impossible in some drawings, depending on the version consulted.

It is now clearer that the hopper of the first action used an axle, but the surviving actions (1720-1726) incorporated modifications to avoid its use, which can be seen as an improvement.

The only drawing to show the silk-thread "check" correctly is the original 1711 drawing: one thread is in front of the shank, one behind it. Thus, this feature serves as a quick test of the original drawing when comparing versions.

It is probable that even the 1711 drawing fell short of conveying what Cristofori had sketched, especially regarding the damper; our understanding of the function remains speculative: it may have been a wedge damper entering the string pair from below.

An unsubstantiated speculation by Puliti that Ferdinando might have visited Cristofori in Padua is sometimes offered as a fact. Maffei's notes contain details which have been incorrectly interpreted to suggest that Cristofori initially declined to accept Prince Ferdinando's request to work for him in Florence. However, they fail to shed light on this aspect or whether Cristofori received a specific instruction to develop his piano action. Sutherland's view that Ferdinando obtained Cristofori's services with the expectation of the manufacture fine musical instruments, possibly including the invention of the piano, remains the fullest interpretation of the available evidence.

Acknowledgements

Riccardo Pergolis kindly provided a complete copy of the 1719 article and translated sections of Maffei's text. In addition he has provided advice on the translation of a number of other points, which has made a significant contribution to a better understanding of some matters. David Sutherland has not only reviewed several versions of this manuscript but has generously engaged in many discussions which bear on matters concerning Cristofori's work forming the background of this study. Laura Och kindly provided clarification on Maffei's notes. I am grateful to Prof. Dr. Christian Ahrens, and

Michael Cole for their comments on versions of the manuscript. Prof. Dr. Eszter Fontana, Edwin Good, Christine Korff, Volkmar Krafft, Celia Moules, and Laura Och kindly assisted with copies of sources.

Version 1.2. Comments on the text by Stewart Pollens are gratefully acknowledged, which led to some changes. Thanks also go to Baudouin Bokiau who kindly supplied a textual correction, information on the digital copies of the 1711 drawing, and a copy of his MA thesis. This contribution, examined in 2012, has been taken account of in the main text, conclusions, and various footnotes.

Version 1.3
Baudouin Bokiau kindly supplied a copy of his forthcoming article 'Les Premiers *Pianoforte* de Bartolomeo Cristofori'.

Version history

A manuscript was circulated in April 2011 to some readers mentioned in the acknowledgements.

Publications, at my website with the URL: www.denzilwraight.com/Maffei.pdf

Version 1.1, dated 10.11.2015
Version 1.2, dated 06.12.2015 (Bokiau's contributions added)
Version 1.3, dated 19.12.2015 (minor changes in the text, changes to notes 1 and 12 with new URLs, and additions in notes 5 and 41)
Version 1.4, dated 20.12.2015 (an addition to note 48 with Bokiau's contribution and the accompanying text)
Version 1.41, dated 07.01.2017 (version number corrected on first page, spelling correction in footnote 69)

A summary of the details of the *disegno* in the 1711 and later versions

* indicates a feature which readily distinguishes Rimbault's version from the 1711 drawing

Details of the action	**1711**	**1719**	**König based on 1719**	**Paul based on König >> Harding > Good**	**Hipkins based on Paul**	**Rimbault based on 1711 >> Restle Cole**
Drawing page reference	TAV.I. p.158 at the outside of the drawing, top right side of drawing	pag: 312 at the outside of drawing, top left side of the drawing	re-engraved no page number	re-drawn, no page number	re-drawn, no page number	re-drawn, no page number
Labels	upper case letters	upper case letters	upper case letters	upper case letters	lower case letters throughout	upper case letters
A, string	letters A drawn on the string line	as 1711		letters A slightly above the string		letters A slightly above the string *
B, keyboard frame	drawn parallel to the bottom line	drawn sloping with reference to the bottom line	as in 1711, although taken from 1719 version	as 1711	as in König	as 1711
C, keylever "first lever"	the arcade was drawn as reaching to the top surface of the keycover, an elementary error by someone not familiar with instruments	as 1711, but arcade is nearer a wedge shape than of constant thickness, another error from lack of familiarity with instruments	more exaggerated version of 1711	even more wedge shaped than 1719. Arcade missing in Blüthner & Gretschel	more exaggerated version of König	as 1711
C, keylever	the natural cover is correctly drawn as higher than the keylever	not so realistic as 1711	keycover level with keylever	keycover drawn as below the level of the keylever	as in König	keycover level with keylever, keyhead detached from lever*. Cole has attached the keyhead with additional lines

Details of the action	1711	1719	König based on 1719	Paul based on König >> Harding > Good	Hipkins based on Paul	Rimbault based on 1711 >> Restle Cole
C, keylever	three lines for the keylever, presumably intending to show the slightly different height of the sharp and natural levers	only two lines for the keylever	only two lines for keylever, lower level of keyhead shown as continuing into the line BB	follows König	follows König	similar to 1711
C, keylever	keylever drawn as sloping down slightly towards the line BB, i.e. reflects the normal practice that the back end of the keylever is lower than the front	keylever drawn parallel to the line BB, which itself slopes with respect to the base line	keylever parallel with the line BB	keylever parallel with the line BB	keylever parallel with the line BB	as in 1711
D, block	drawn with vertical sloping lines and an apparent cover (probably leather)	similar to 1711, but vertical lines with less angle	vertical lines have more slope than Maffei's versions	follows König	vertical lines almost 90°	similar to 1711 but not as wide
E, second lever	drawn with an incurved end	as 1711 for shape and size	as 1719	repeats the rounded corner on the underside	as Konig but a rounded corner on the underside near the letter F	as 1711 for shape and size
F, second lever axle	shown as a clear ring	a ring, but marginally displaced from centre, at 45° upwards, to the right	as 1719	as 1711	as König	as 1711

Details of the action	**1711**	**1719**	**König based on 1719**	**Paul based on König >> Harding > Good**	**Hipkins based on Paul**	**Rimbault based on 1711 >> Restle Cole**
G, hopper, *linguetta mobile*	labelled G twice, at top and bottom	as 1711	as 1719	as 1711	bottom of G has been labelled h	G only at bottom *
G, hopper, *linguetta mobile*	axle point shown	no axle point	no axle point	no axle point	no axle point	no axle point
H, fork	labelled H either side of the fork	identical to 1711	same as Maffei versions	correctly labelled, as in either Maffei version, or König	the fork is not labelled twice, on either side, but misleadingly on the lower end of the hopper	same as 1711
H, fork	drawn as separate from the hammer rack M	follows 1711 closely	similar to 1719 but top of fork has been continued horizontally connecting it to M, which makes no sense	Repeats König's error	top of fork repates König's error	drawn correctly as in Maffei versions. Restle omits the "squiggle" found on Rimbault's version
I, hopper stop	shows the pad at the top which would be necessary to stop the hopper	pad missing	pad missing; the top of the hopper stalk is curved towards the hopper	pad missing; instead the stalk is drawn with a curve going into the hopper (not understood)	curved towards the hopper at the top	pad missing, Restle has the end of the hopper stop curved towards the hopper, similar to Harding
I, hopper stop stalk	penetrates into the intermediate lever near E	hopper stalk does not penetrate into the lever.	same as 1719	hopper stalk is drawn as a continuation of the spring L (not understood)	same as 1719	as 1711

Details of the action	**1711**	**1719**	**König based on 1719**	**Paul based on König >> Harding > Good**	**Hipkins based on Paul**	**Rimbault based on 1711 >> Restle Cole**
I, hopper stop stalk	stalk distinct from the edge of *ganasce* H	stalk is drawn very close to the edge of the *ganasce* H	as in 1719	follows König	drawn nearer fork than hopper, but distinct	stalk drawn closer to tongue G than to *ganasce* H. In Cole, the stalk does not reach above the *ganasce*
L, spring	has a curved end, entering into the bottom of the hopper G	spring ends under the hopper, without entering it	same as 1719	spring and hopper stalk appear as one item	hatched lines for spring continue almost as far as the hopper stalk so that there is virtually no difference between the two parts	similar to 1719. Restle shows the end of the spring entering the bottom of the hopper, as in 1711. Cole shows it stopping at the *ganasce* and not reaching the hopper
L, spring	has a curved end entering into the lever E	curved end is a little flatter	curved end yet flatter and not entering into the lever E. the end is near the vertical line of the fork which contains the lever E	shows curved end enetering lever E, similar to 1719	spring stops in the sir without entering the lever E	fairly flat end touching the lever E at the vertical line of the fork which contains the lever *
M, hammer rack	somewhat misleadingly the *rotella* is also labelled in the top right hand corner with an M	as 1711	as 1719	as 1711 and 1719	only one M which is placed above the hammer rack, above the two parallel lines	as 1711 and 1719

Details of the action	**1711**	**1719**	**König based on 1719**	**Paul based on König >> Harding > Good**	**Hipkins based on Paul**	**Rimbault based on 1711 >> Restle Cole**
N, hammer butt, *rotella*	there is no axle depicted for the *rotella*	the N is slightly lower than in 1711	similar to 1719	similar to 1719, König	similar to König	similar to 1711
N, hammer butt, *rotella*	the horizontal line projecting from the hammer butt towards the hammer shank has a line drawn parallel and *under* it. This was probably intended to represent a leather pad, although it has no hatched lines like the other pads	the parallel line is drawn *above* the line projecting from the hammer butt, which yields no sense if the 1711 version shows a pad	same as 1719	same as 1719	same as 1719	same as 1711
O, hammer head	both the hammer head and hammer shank are labelled O	as in 1711	as in 1719, but a diagonal line has been added to the letter O, giving the appearance of a screw	as in König	as in König (=1719), but with O outside hammer head as in Blüthner & Gretschel	only the hammer shank is labelled O*
O, hammer head	there is a flat pad drawn on the hammer head	as 1711	as 1711	as 1711, but pad hatched with diagonal lines	as 1711	as 1711
P, silk check	one thread in front of hammer shank, the second thread behind it, indicating the “X” to catch the shank *	both threads in front of hammer shank *	as 1719	both threads in front of hammer shank	both threads in front of hammer shank	both threads *behind* the hammer shank *

Details of the action	**1711**	**1719**	**König based on 1719**	**Paul based on König >> Harding > Good**	**Hipkins based on Paul**	**Rimbault based on 1711 >> Restle Cole**
Q, end of second lever	pad under the damper	pad is thinner	pad is a continuous platform on this piece, but the area under the damper has vertical, hatched lines;	as in König	as in König, but without vertical hatched lines for the pad	nearer 1719
Q, end of second lever	incurved end	incurve is almost straight	incurved end is drawn straight	incurved end is drawn straight	incurved end is drawn straight	drawn with incurved end as 1711
R, damper	there is a square platform on the top of the damper "jack" on which the damper is mounted. The vertical damper (with hatched lines) is inclined at an angle of about 5° to the right	damper is exactly vertical	damper is exactly vertical, but thinner than the 1719 version	damper is reduced to a vertical line at the back left corner of the square platform and is thus implausible	the square platform is not centred on the damper flag. The damper is vertical but on the far edge of the square platform at the end of the damper "jack", which gives no clear idea of the function. Both the square platform and damper "jack" are labelled r	as 1711. Restle labels this H instead of R
S, stiffening rail for the hammer rack	is the same in all versions					

The *disegno*

Maffei's 1711 and 1719 drawings and the various versions referred to are reproduced below. The 1711 version is taken from a pdf file which I obtained and is reproduced at 100% of the original size. The 1719 drawing was scanned from a photocopy at the original size of the photocopy.

All other drawings were brought to *approximately* the same size as their 1711 or 1719 origin (i.e. 157.5 or 159.5 mm respectively) by photocopying and then scanning at 300dpi.

There may be some signs of diagonal lines appearing to have "steps" on a computer display due to the settings of the resolution, but all drawings will print as normal lines with the exception of Restle's drawing (Fig. 5) which was printed with such stepped lines.

Figures for Maffei's drawing

Figure 1: Maffei, 1711, **original**: Scipione Maffei, 'Nuova invenzione d'un Gravecembalo col piano e forte...', Giornale de' Letterati d'Italia vol. v (Gio. Gabbriello Ertz, Venice, 1711), pp. 144-159. Source: Bayerische Staatsbibliothek Munich, H.lit.p. 146-5/6. Reproduced with permission.

Figure 2: Maffei, 1711, version: Reproduced in Rattalino. Source: Piero Rattalino, Storia del Pianoforte (Il Saggiatore, Milano 1982, R/Milano 2003), p. 18.

Figure 3: Pollens' version (drawing after Maffei 1711, Fig. 1). Source: Stewart Pollens, 'The Pianos of Bartolomeo Cristofori', Journal of the American Musical Instrument Society XX (1984), p. 37.

Figure 4: Rimbault's version (after Maffei 1711, Fig. 1). Source: Edward Rimbault, The Pianoforte, Its Origins, Progress, and Construction, (Robert Cocks, London, 1860, R/Travis & Emery 2009), p. 99.

Figure 5: Restle's version (after Rimbault, Fig. 4). Source: Konstantin Restle, Bartolomeo Cristofori und die Anfänge des Hammerclaviers (Munich, 1991). p. 80.

Figure 6: Cole's version (after Rimbault, Fig. 4). Source: Michael Cole, The Pianoforte In The Classical Era (Oxford, Clarendon Press, 1998), p. 5.

Figure 7: Maffei 1719 **original**: 'Descrizione d'un Gravicembalo col Piano, e Forte', Rime e Prose del Sig. Marchese Scipione Maffei (Sebastiano Coleti, Venice, 1719), pp. 309-316. Source: (from an original in private ownership, Italy).

Figure 8: König's version (after 1719 Maffei, Fig. 7). Source: J. Mattheson, 'Musikalische Merckwuerdigkeiten Des Marchese, Scipio Maffei, Beschreibung eines neuerfundenen Clavi-ceins, auf welchem das piano und forte zu haben, nebst einigen Betrachtungen über die Musikalische Instrumente, Aus dem Welschen ins Teutsche übersetzt von König', Critica Musica, vol. 2, (Hamburg, 1725), p. 339.

Figure 9: Paul's version (after König, Fig. 8). Source: Oscar Paul, Geschichte des Klaviers, Leipzig, 1868 (R/1986, Bärenreiter, Kassel), p. 110.

Figure 10: Blüthner & Gretschel's version (after Paul, Fig. 9). Source: Julius Blüthner and H. Gretschel, Der Pianofortebau. Theorie und Praxis des Baues der Flügel und Pianinos nebst einer Einführung in die Geschichte des Pianofortes und einem kurzen Abriss der musikalischen Akustik, Dritte Vollständig Neubearbeitete Ausgabe, Herausgegeben von Rob. Hannemann, Leipzig (Verlag Voigt) 1909, p. 16.

Figure 11: Hipkin's version (after Paul, Fig. 9). Source: Alfred J. Hipkins, 'Pianoforte', Grove's Dictionary of Music and Musicians, 3rd ed. (London, 1934, R/1952), p. 151.

Figure 12: Harding's version (photoreproduction of Paul, Fig. 9). Source: Rosamund Harding, The Piano-Forte, 2nd ed. 1978 (Gresham Books, Old Woking), p. 8.

Figure 13. Good's version (photoreproduction of Harding, Fig. 12). Source: Edwin Good, 'Reflections on a Year With Cristofori', *Piano Technicians Journal*, xlv/12 (2002), p. 25.

Figure 1: Maffei, 1711, **original**: Scipione Maffei, 'Nuova invenzione d'un Gravecembalo col piano e forte', Giornale de' Letterati d'Italia vol. v (Gio. Gabbriello Ertz, Venice, 1711), pp. 144-159
Source: Bayerische Staatsbibliothek Munich, H.lit.p. 146-5/6. Reproduced with permission.
The lack of straightness of the lines of the outer box is due to the drawing not having been folded flat before scanning. The lower edge of the box should print to 157.5 mm x 89 mm (left or right edge, 91mm in the middle). (Hint: select "Actual Size" in the Size Options of your printer)

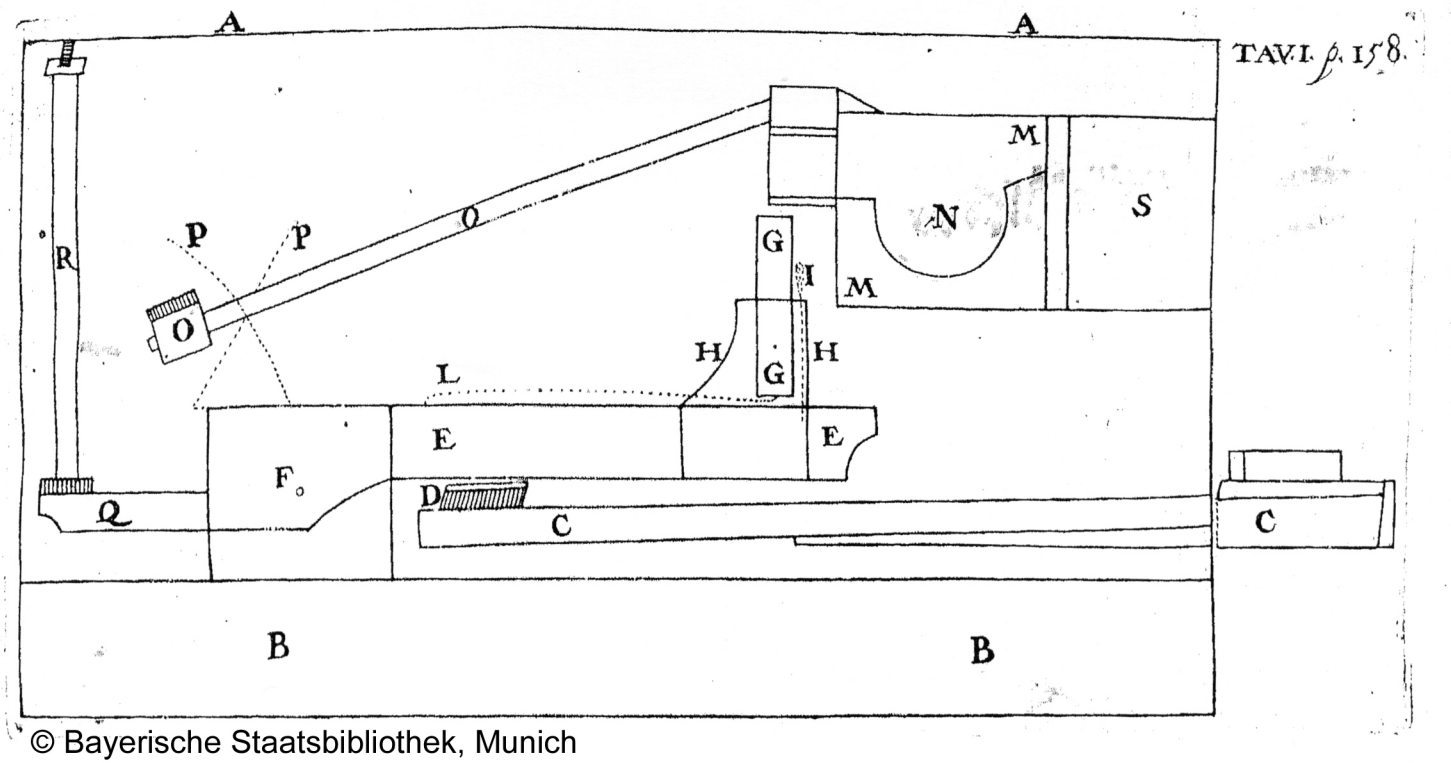

Figure 2: Maffei, 1711, version: Reproduced in Rattalino 94 mm x 51 mm („box“ proportions changed to: 157 mm x 86 mm compared with Figure 1 157.5 mm x 89 mm).
Source: Piero Rattalino, Storia del Pianoforte (Il Saggiatore, Milano 1982, R/Milano 2003), p. 18.

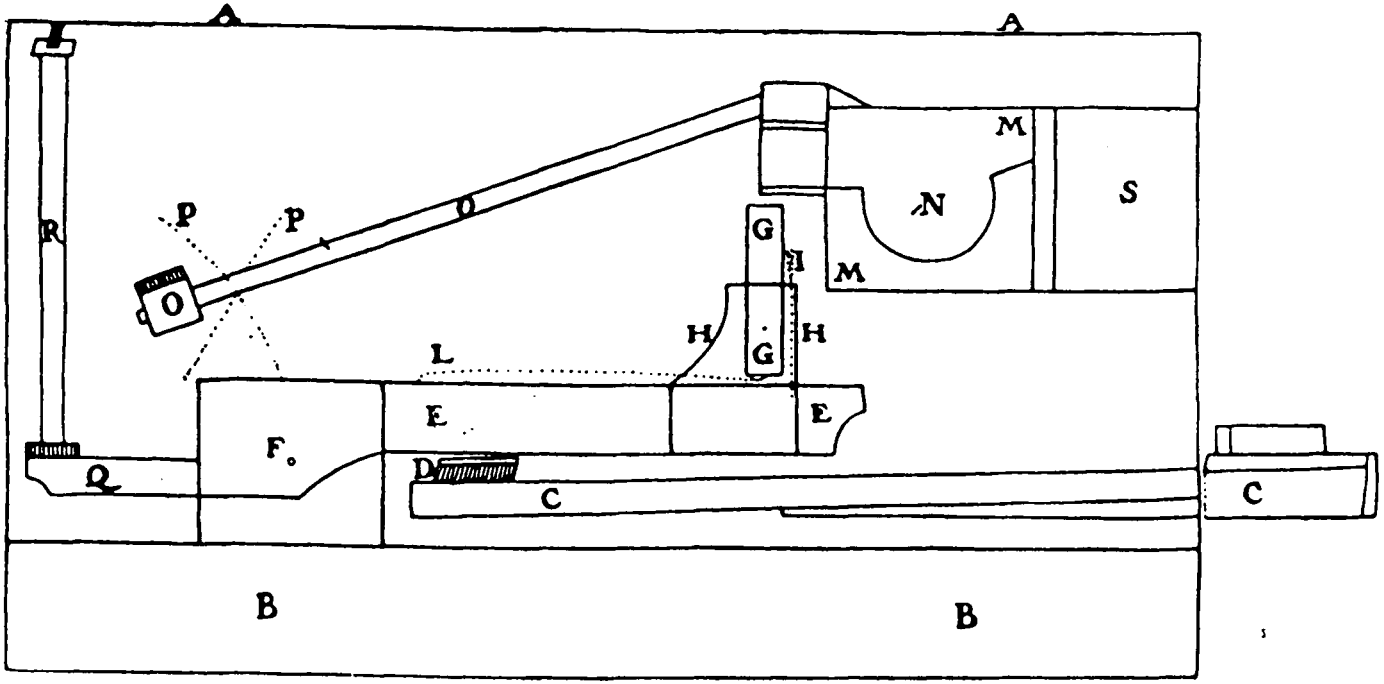

Figure 3: Pollens' simplified version (drawing after Maffei 1711, Fig. 1)
Source: Stewart Pollens, 'The Pianos of Bartolomeo Cristofori', Journal of the American Musical Instrument Society XX (1984), p. 37.

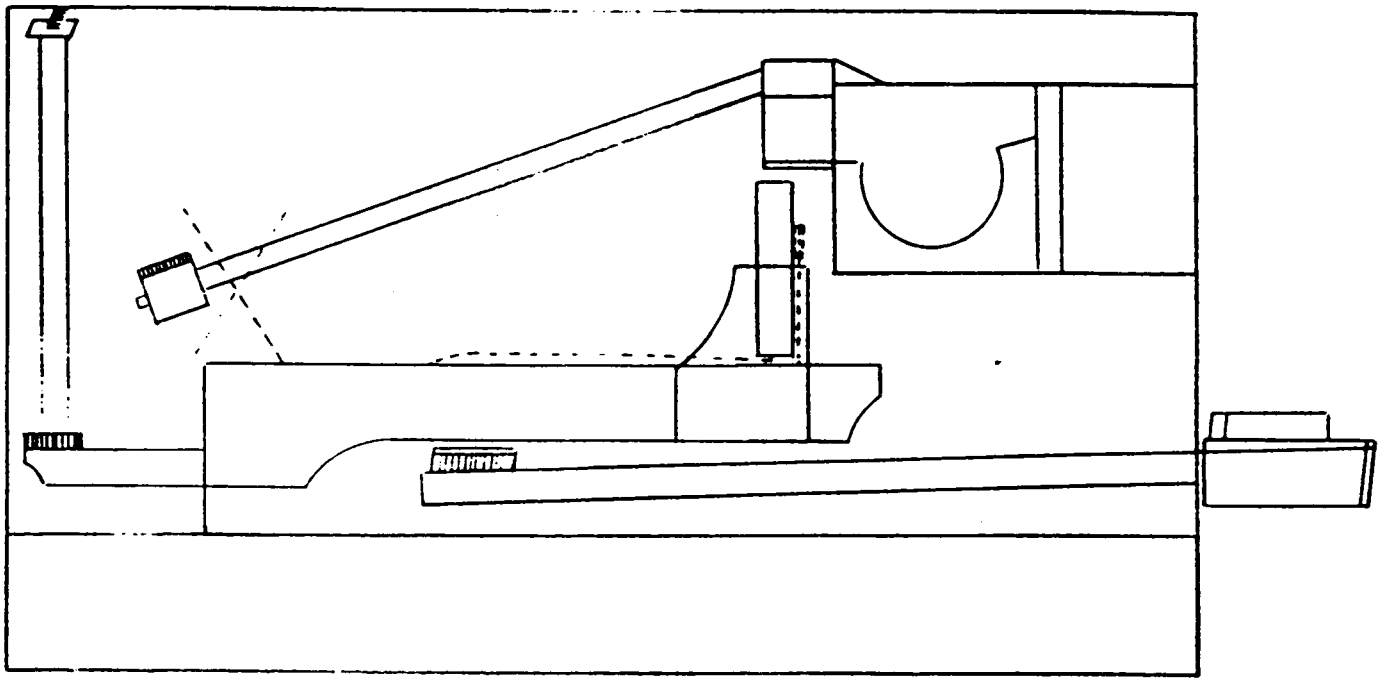

Figure 4: Rimbault's version 80 mm x 45 mm (after Maffei 1711, Fig. 1)
Source: Edward Rimbault, The Pianoforte, Its Origins, Progress, and Construction, (Robert Cocks, London, 1860, R/Travis & Emery 2009), pp. 99.

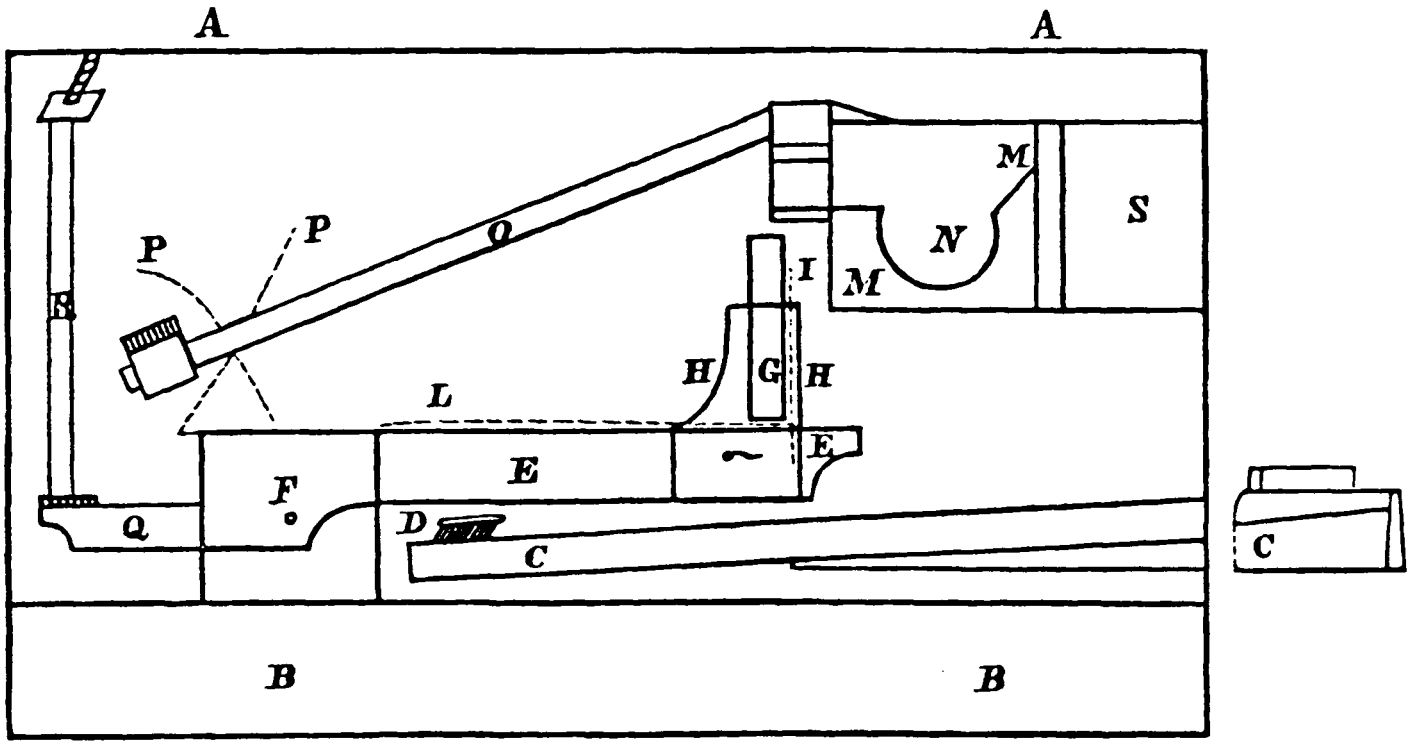

Figure 5: Restle's version 81 mm x 44 mm (after Rimbault, Fig. 4)
Source: Konstantin Restle, Bartolomeo Cristofori und die Anfänge des Hammerclaviers (Munich, 1991). p. 80.

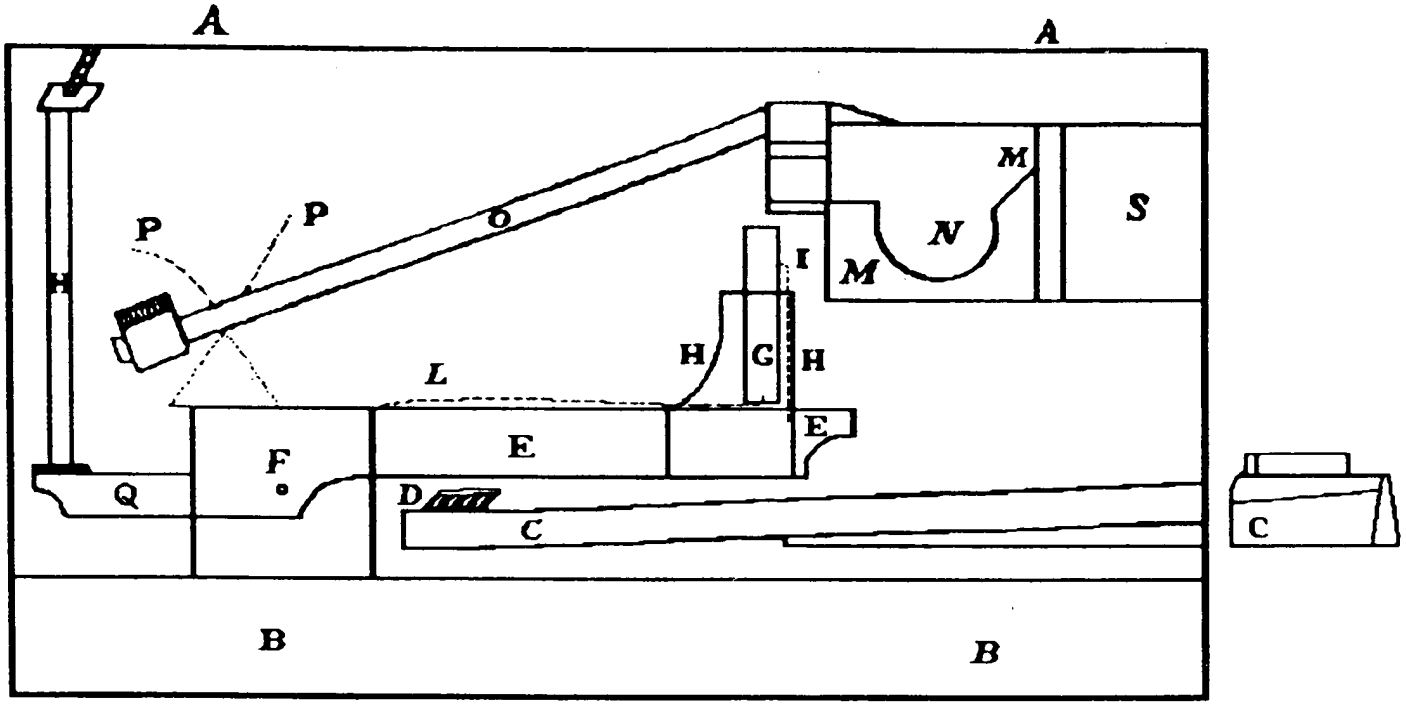

Figure 6: Cole's version 74 mm x 42 mm (after Rimbault, Fig. 4)
Source: Michael Cole, The Pianoforte In The Classical Era (Oxford, Clarendon Press, 1998), p. 5.

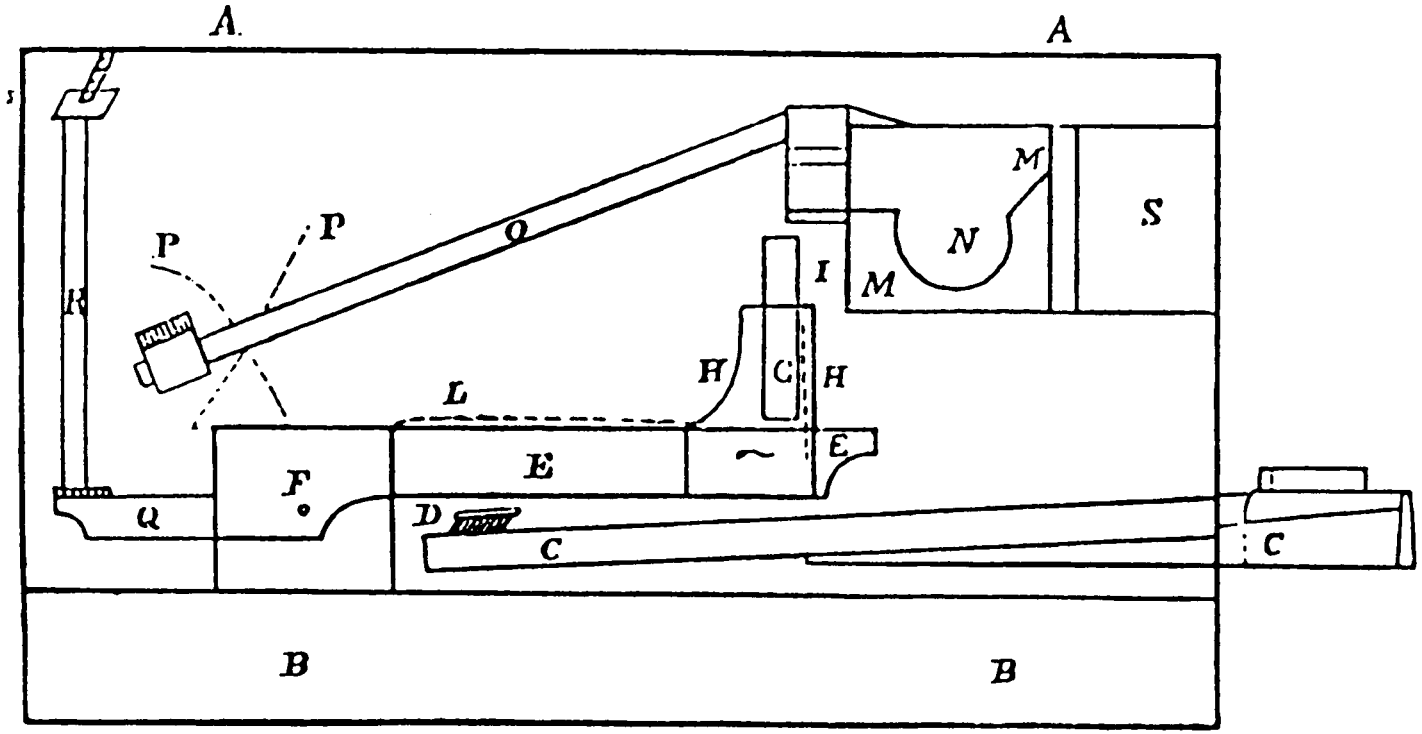

Figure 7: Maffei 1719 **original** 159.5 mm x 88 mm: 'Descrizione d'un Gravicembalo col Piano, e Forte', Rime e Prose del Sig. Marchese Scipione Maffei (Sebastiano Coleti, Venice, 1719), pp. 309-316.
Source: (from an original in private ownership, Italy).

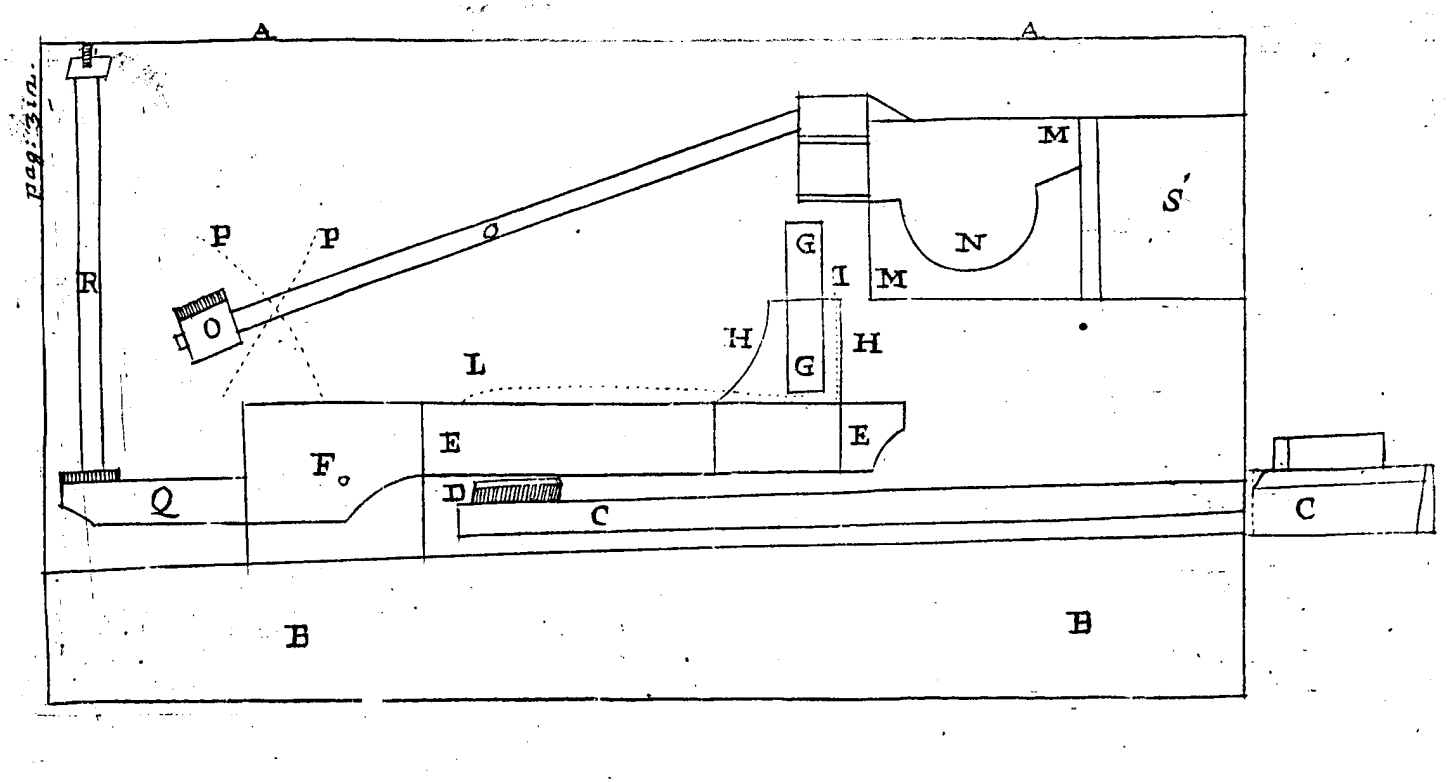

Figure 8: König's version (after 1719 Maffei, Fig. 7)
Source: J. Mattheson, 'Musikalische Merckwuerdigkeiten Des Marchese, Scipio Maffei, Beschreibung eines neuerfundenen Claviceins, auf welchem das piano und forte zu haben, nebst einigen Betrachtungen über die Musikalische Instrumente, Aus dem Welschen ins Teutsche übersetzt von König', Critica Musica, vol. 2, (Hamburg, 1725), p. 339.

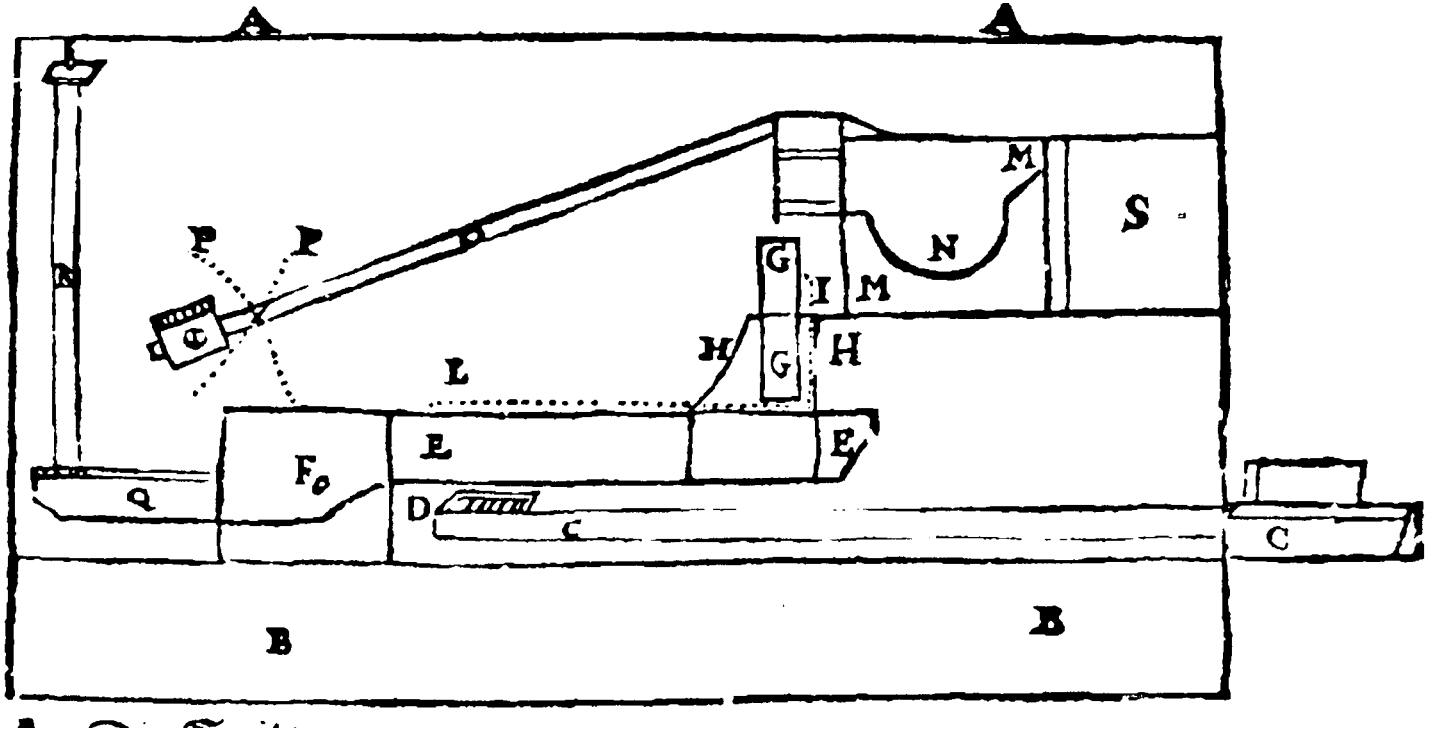

Figure 9: Paul's version 101.5 mm x 57 mm (after König, Fig. 8)
Source: Oscar Paul, Geschichte des Klaviers, Leipzig, 1868 (R/1986, Bärenreiter, Kassel), p. 110.

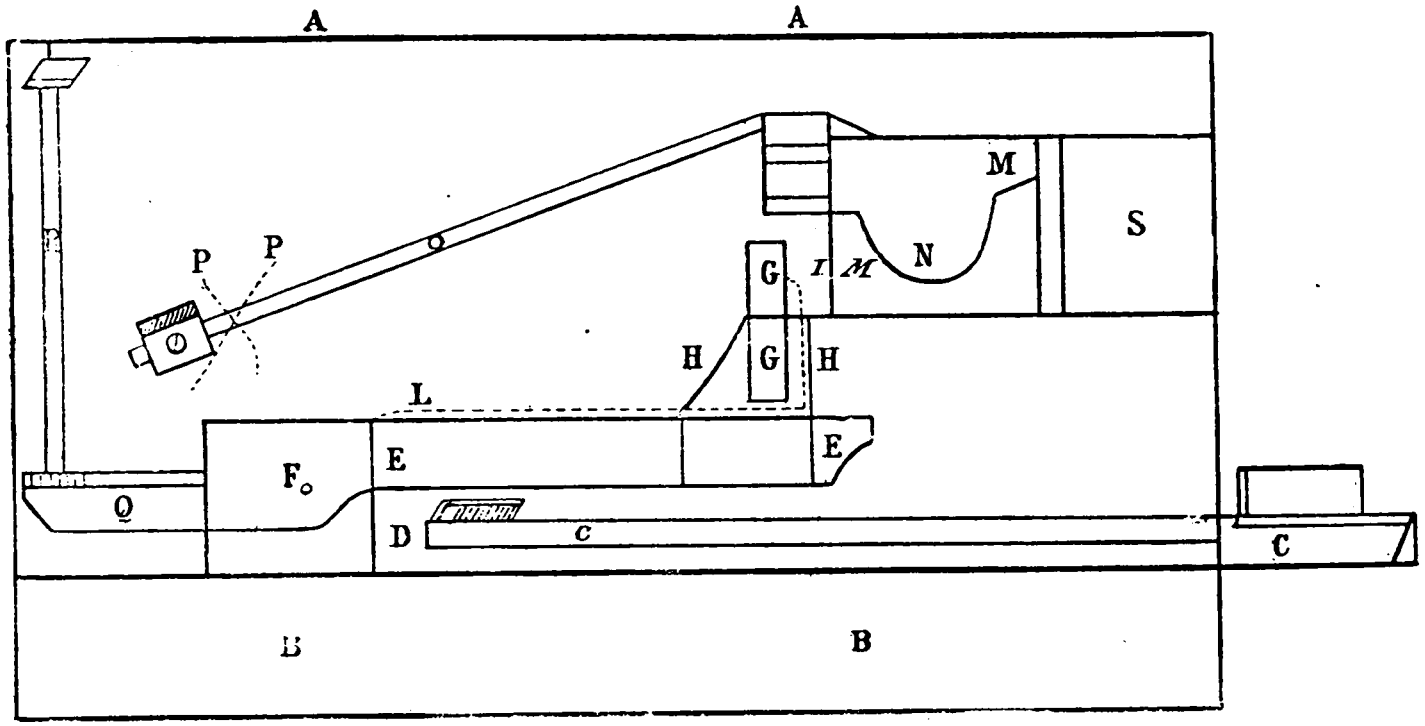

Figure 10: Blüthner & Gretschel's version 100 mm x 56 mm (after Paul, Fig. 9)
Source: Julius Blüthner and H. Gretschel, Der Pianofortebau. Theorie und Praxis des Baues der Flügel und Pianinos nebst einer Einführung in die Geschichte des Pianofortes und einem kurzen Abriss der musikalischen Akustik, Dritte Vollständig Neubearbeitete Ausgabe, Herausgegeben von Rob. Hannemann, Leipzig (Verlag Voigt) 1909, p. 16.

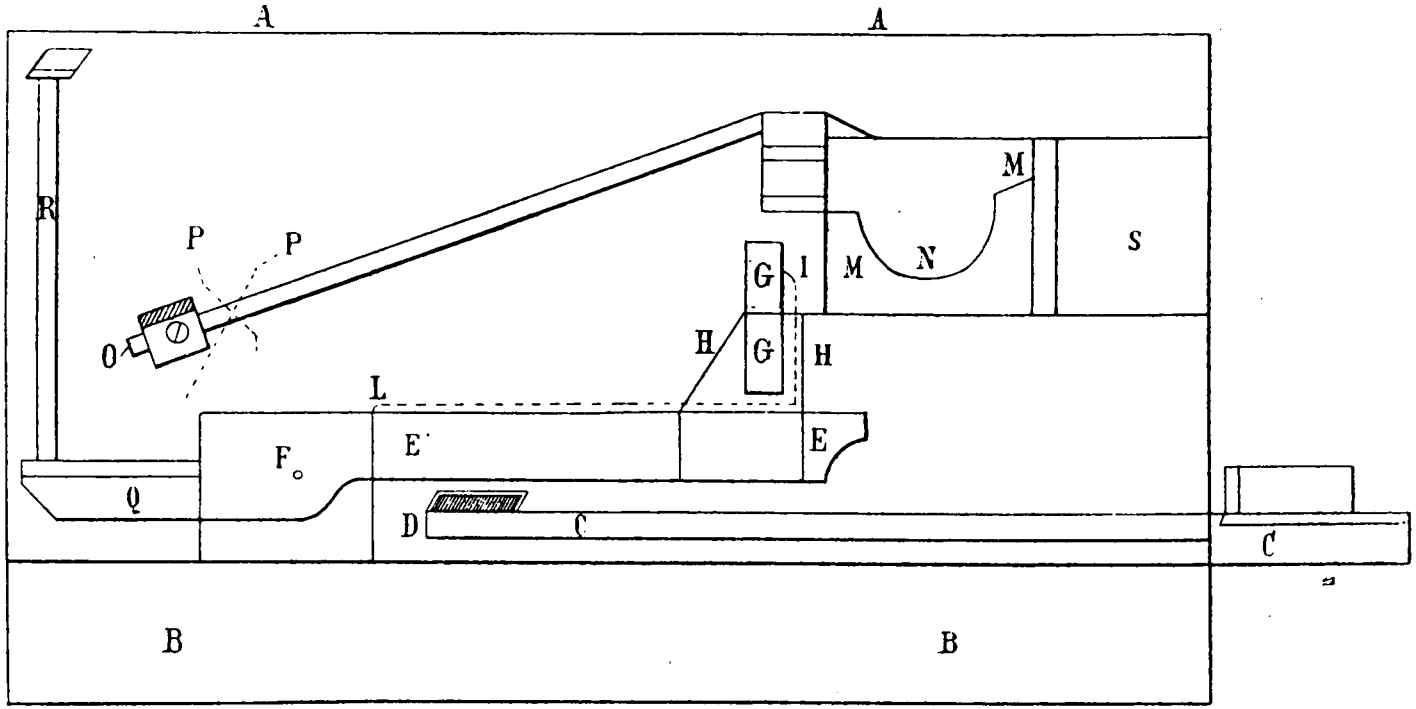

Figure 11: Hipkin's version 49.5 mm x 28 mm (after Paul, Fig. 9)
Source: Alfred J. Hipkins, 'Pianoforte', Grove's Dictionary of Music and Musicians, 3rd ed. (London, 1934, R/1952), p. 151.

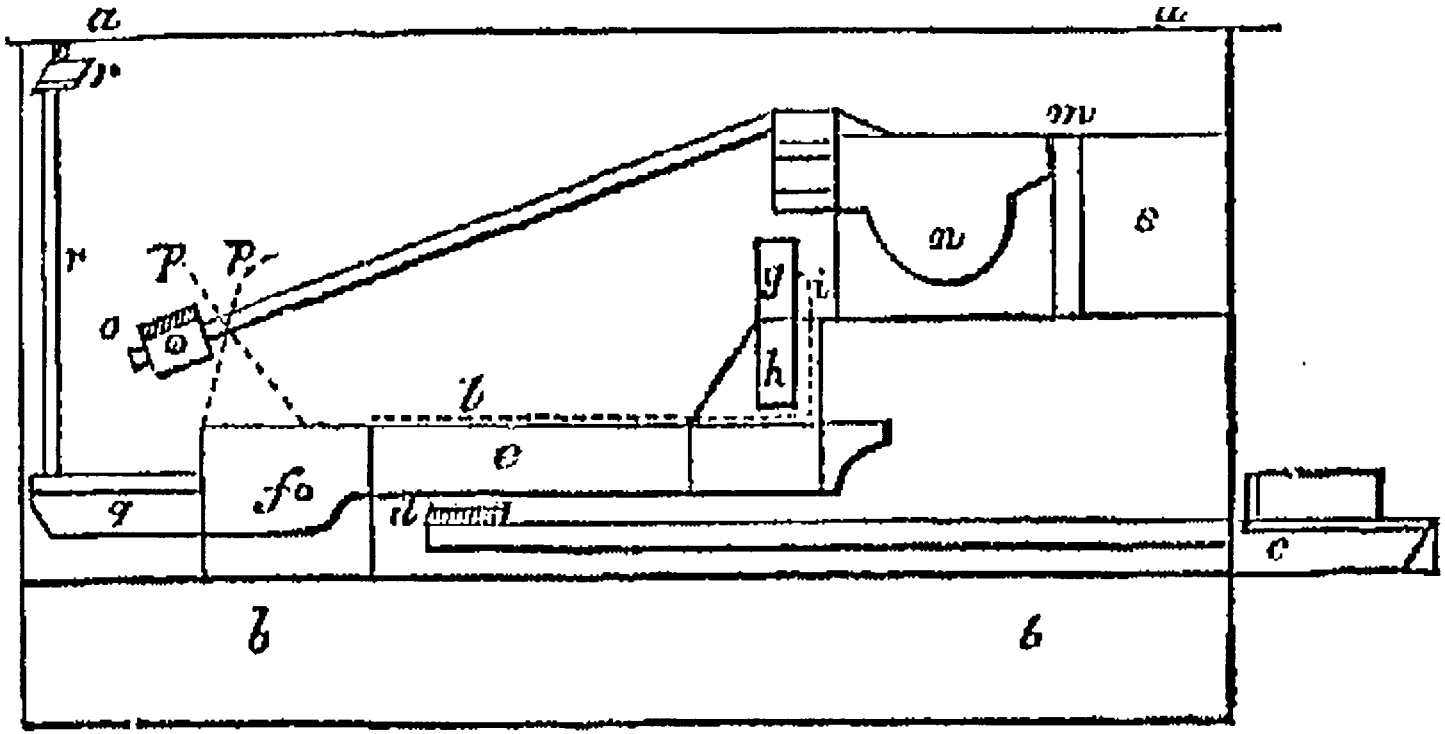

Figure 12: Harding's version 71 mm x 39 mm (photoreproduction of Paul, Fig.9)
Source: Rosamund Harding, The Piano-Forte, 2nd ed. 1978 (Gresham Books, Old Woking), p. 8.

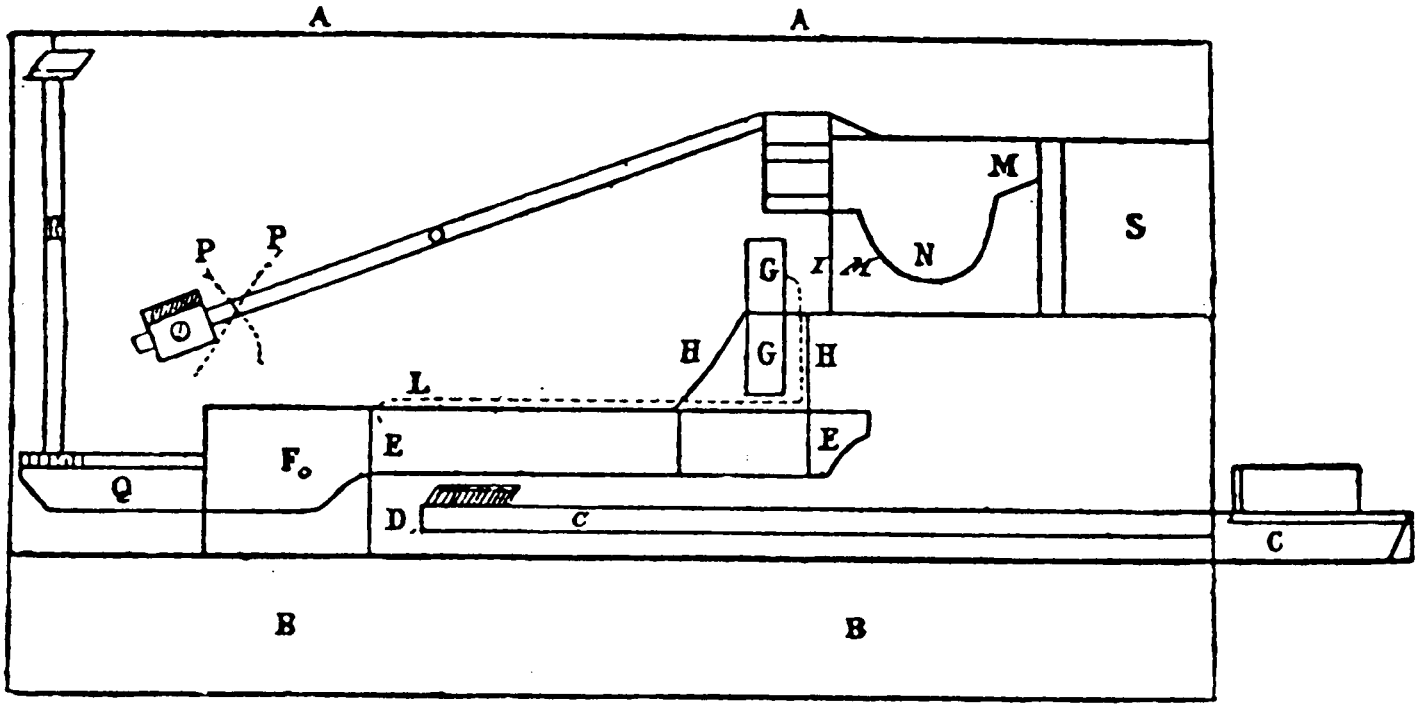

Figure 13. Good's version 161 mm x 90 mm (photoreproduction of Harding, Fig. 12)
Source: Edwin Good, 'Reflections on a Year With Cristofori', *Piano Technicians Journal*, xlv/12 (2002), p. 25.