



Cutting the Balance Rail Punching to Affect Action Ratio

By David Stanwood, RPT
Boston MA Chapter

This article is about a valuable technique for quickly changing action ratio. It is also a tribute to the memory of Bill Garlick.

In 1976 I had an interview with Bill. I was applying to the New England School of Stringed Keyboard Instrument Technology at the North Bennet Street School in Boston's north end.

I remember clearly the first question I asked him: "If a piano doesn't feel good when I play, how can I change it?"

His answer: "That's not easy."

I eventually took this as a challenge, because I ended up devoting my career to the study of touchweight technology. As my tuning teacher and mentor, Bill Garlick was sort of a father figure to me. I always felt a need to prove myself to him, and I finally did so by finding answers to the original question. My discovery of the Equation of Balance opened a whole realm of solutions for making poor-feeling pianos play beautifully and for making fine pianos even finer.

The Equation of Balance gave us the ability to analyze touchweight components and brought attention to the fact that action ratio and hammer weight pairings are critical to the playing quality of pianos. Pianos of a century or more ago generally had lighter hammers and action ratios in the 6.0 – 7.0 range. Later in the 20th century hammer weight levels increased and action ratios generally decreased to the 5.0 – 6.0 range. A heavy dynamic feel is often created when we inadvertently mismatch latter-day production hammer weights with pianos of old that were designed with high action ratios for lighter hammers.

In the 1990s I came up with a quick fix for a heavy action that would not have occurred to me without my prior knowledge and experience of ratio



Photo 1: The glue goes on the backside only.

matching. I had received an action that had been in "wet storage" for several months in a warehouse with water on the floor. The action was sluggish, and after thoroughly drying it out I found that the hammer flange center pinning and key bushings were quite tight. I repinned, eased, lubricated, and regulated the action. I thought it was ready for delivery. I live on an island and I had made a reservation on the ferry to deliver the action. I was getting ready to load it into my car and head to the boat when I played the action on the bench and realized that it was still heavy! I had assumed that the heavy action was only from the high friction. An analysis of a few notes was enough to tell me that the ratio was a mismatch for the hammer weight. We know that necessity (or calm panic) is the mother of invention, and I had an inspiration. I put a line of glue on the bottom of each key just behind the balance rail hole (Photo 1) and carefully brought each key down onto its balance pin without hitting the glue, by sighting the top of the pin through the balance pin mortise. (See Photo 2.) I waited 15 minutes, then pulled each key off. The balance rail cloth punchings were now glued to the bottoms of the keys. With a razor blade I cut off the front part of the punching from the back of the hole forward. (See Photos 3 and 4.) This whole operation took about an hour. When all the keys were back in place, the key



Photo 2: Carefully seat the key without smearing the glue.



Photo 3: Slice the punching.



Photo 4: The half punching remains to the back of the center pin.

level and aftertouch were still good. The action no longer felt dynamically heavy. I made my ferry, delivered the action, and the client was happy. Cutting the punching had shifted the effective bearing point from the center of the balance rail pin to just behind the balance rail pin. Analysis of sample keys showed that the action ratio had dropped by three to four tenths.

Since then, I've used this technique many times and have shared it with many colleagues. It's proven to be a powerful tool and an important addition to our skill set. It's a great money maker, and clients happily pay a premium for having this done to their pianos because it makes such a big change and improvement.

This technique may also be used to make a light action dynamically heavier by cutting off the back side of the punching. It is reversible because the glued punchings can be removed and replaced again with full cloth punchings. Hot hide glue is best for future removal without a trace by soaking the cloth bits off.



Photo 5: Sliced punchings from Piano Forte Supply.

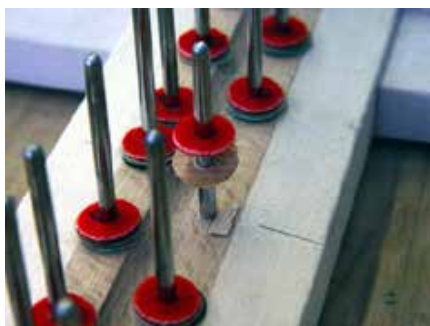


Photo 6: A veneer shim added to the balance rail at the pin.

I described the method to Jurgen Goering of Piano Forte Supply in Canada. He told me that this is similar to an old method that he had become aware of. He supplies a special punching that has the felt cut back but not so much as to eliminate the hole. These may be simply used on the punching stack to provide a slight shift in the bearing point and a small but significant change in the dynamic feel of the action. (See Photo 5.) A more transparent protocol is to glue a veneer shim onto the balance

rail up against the pin (Photo 6). The punching stack is then placed on top of this. Also, cardboard punchings may be cut and glued to the balance rail for varied effects. The method is applied globally but may also be used on individual keys to correct for ratio anomalies, such as compensating for a capstan or balance rail pin that has been installed out of line. (See Photo 7.)



Photo 7: Cardboard punchings glued to the balance rail.

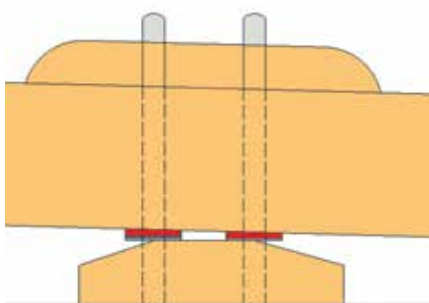


Figure 1: Action rail beveled up to the pins.

There are situations when this method cannot be used. Many balance rails have a front and back beveled edge that is planed all the way up to the center of, or very near to, the balance rail pin. (See Figure 1.) In this case, there is no support under the front side of the natural balance rail punchings or under the back side of the sharp balance rail punchings. Cutting the punchings will change the key level and be ineffectual in changing the ratio. Examine your balance rail carefully and determine whether or no it is a good candidate before proceeding!

The technique will not work on Steinways that have half-round bearings. However, it is possible to replace the half-round with a flat wood, cloth-faced bearing block. The cloth on the front or back side may then be cut off to effect the ratio as needed. (See Photo 8.)

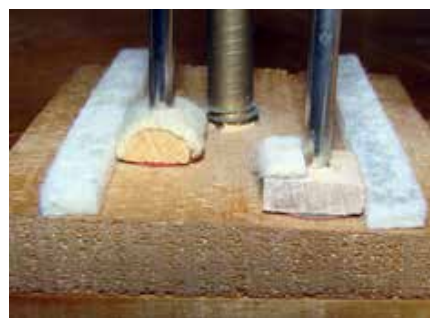


Photo 8: Modified bearings in a Steinway action.

As always, I advise not to use such methods as a "silver bullet." Use the technique responsibly by paying attention basic regulation and voicing first. If the action is still too light or too heavy, then this protocol can be a very potent tool.

I am forever grateful to Bill Garkick for setting me on my professional course. His challenging answer to my first question made all the difference. □



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