How to repair a piano

A simple method to repair, regulate and voice a piano

Juan Olalla

How to repair a piano – ebook

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Introduction

Most people think than repairing a piano is a very difficult task, a job that can only to be carried out by people of the trade. The reality is quite different, as most malfunctions on the piano are easier to mend than they look at first sight. Good observation skills and a good dose of patience backed with some technical knowledge is about all you need to repair the vast majority of faults on a piano.

This book is intended mainly for professional piano tuners and/or advance students with some degree of experience. Some of you might find some excerpts from the book too obvious or even repetitive, my apologies. The reason to explain what it might looks evident to some, is to make the book also accessible to novice students without much experience in piano technology.

The techniques and methods exposed in this book are based on my own experience, and are the product of so many years of work. In addition to the repairing subject “How to repair a piano” covers also so important aspects of the piano as regulation and voicing. The professional technician can compare and contrast his/her methods with those explained in this book, students and amateurs in general will gain a valuable and accessible knowledge.

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Chapter II: The hammers, common malfunctions and the way to repair them

The hammers and its mechanism are possibly the section most frequently area in the piano bound to create problems and malfunctions. This is quite understandable as hammers are the parts with more wear and tear. Just imagine the millions of times that the hammers strike their corresponding strings in the lifespan of a piano.

Hammer extractors. The one at the top is for grands, the one at the bottom is for uprights

Quite often we see hammers so worn out that have lost their felt cover and what strikes the string is the wooden core. Hammers displaced or simply just detached from their handles (shanks).

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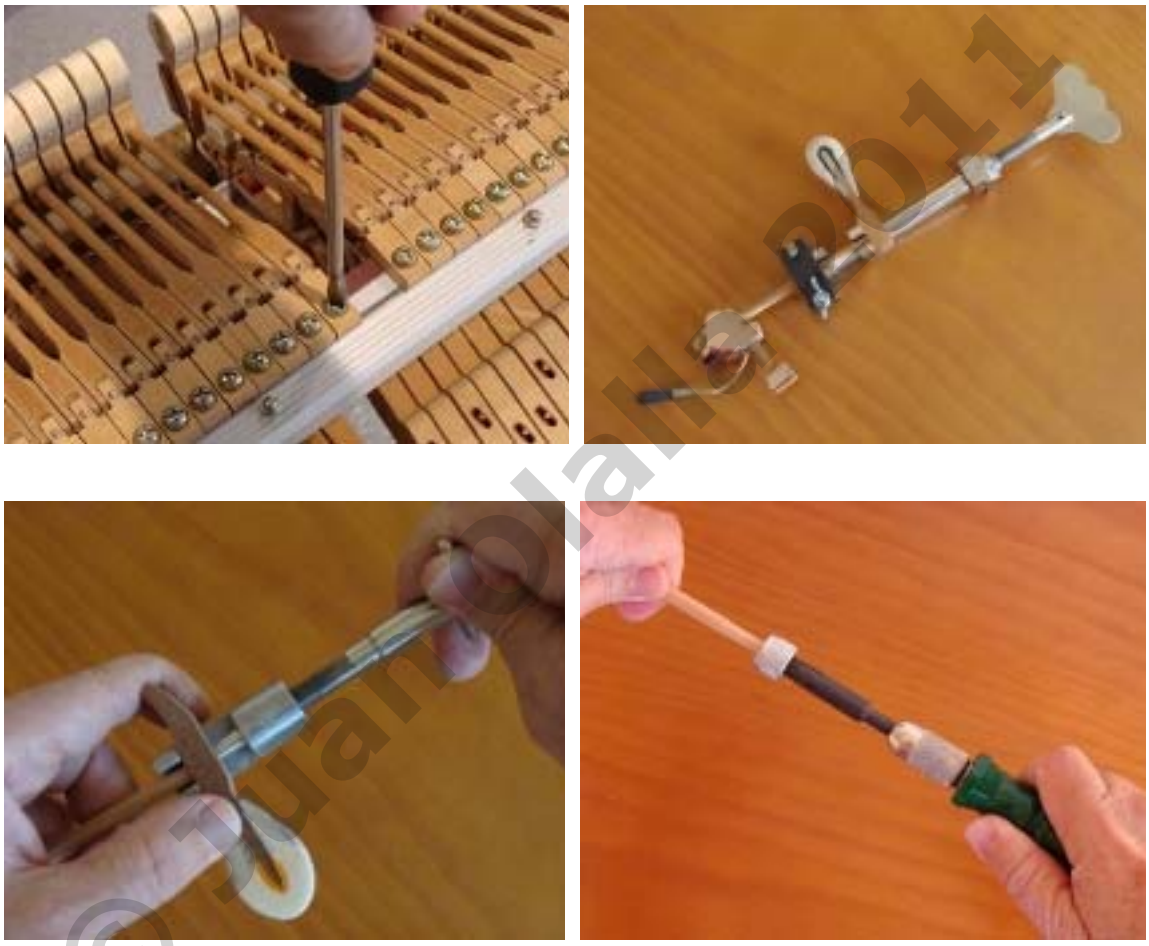
Repairing hammers and shanks

Sometimes hammers come off their shanks and we have to glue them back again in place. In case the hammer is still partly attached to its shank, remove completely the hammer with a hammer extractor (take a look at the picture). Then clean the hole and lightly sand the shank till both hammer and shank are clean and totally free of any old glue.



Removing a hammer assembly in a grand piano. Extracting an upright hammer. Extracting a grand hammer and cleaning a shank with a hammer shank reducing tool

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To do this operation in both the upright and grand piano we will have to remove the action and then unscrew the hammer assembly. This will take us just a few minutes. Sometimes the hammer is missing; in that case, inspect thoroughly the insides of the piano.

Procedure to replace a string

When a middle or treble piano wire is broken, in reality are two strings that stops to sound. In the vast majority of modern pianos (Bösendorfer concert grands are an exception) every single piece of middle and treble steel piano wire in reality is used for two strings. The string leaves the tuning pin and stretch through the piano iron plate till it reaches the hitch pin on the other end, then turns back and again extends through the plate till it reaches the tuning pin nearest to the first one.

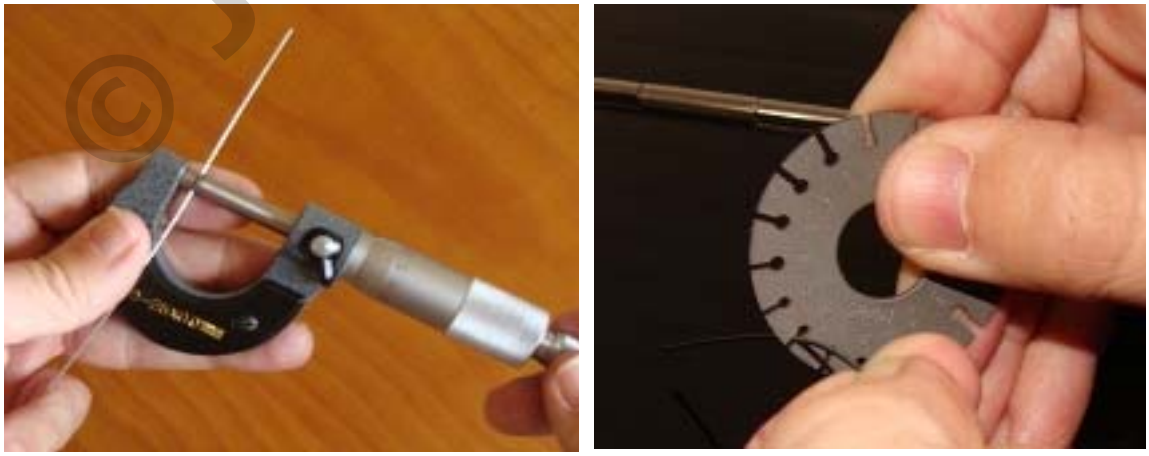
As we said before, replacing a piano string is reasonably easy, as long as you follow the right steps. This is the procedure::

Step one:

Remove the broken string. Better to use a long nose pliers and a thin and long screw driver or similar. As I indicated above, be careful not to scratch the cast iron plate (the nice brass golden color of the plate is only a layer of paint.

Step 2:

Use the micrometer or gauge to measure the diameter of the old wire. Do the measurement at a straight clean point and avoid bend or rusty spots as they will give you an inaccurate reading.



Measuring the diameter of a piano wire using a micrometer or gauge

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Chapter V: The keyboard, the keys

Rating high at the "Piano most common faults exclusive ranking", is the sticking or sluggish key. I think these account for practically half of all the piano malfunctions. This problem is basically due to two reasons. One, to the key itself, e.g. when the key rubs on the key slip or on the key next. Second, to the action, e.g. sluggish flanges.

Key easing pliers for squeezing the wood at each side of the bushing and the bushing itself

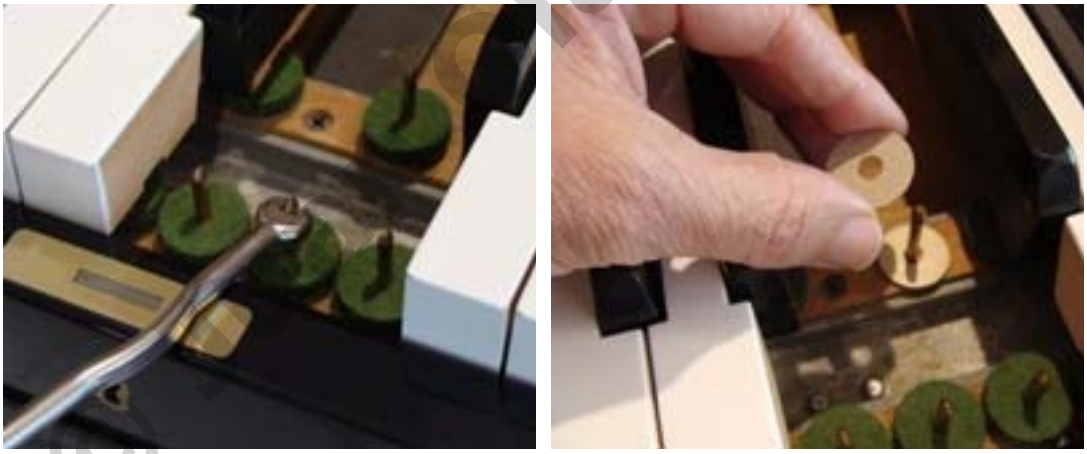
Determine where is the problem

First thing is to find which of these two reasons is the one that creates the problem. Hold the key with one hand, with the other raise the wippen and let it fall. If the wippen drops normally to its rest position, then the problem is not in the wippen, is on the key. If

Regulating the let-off

Regulate the key dip

The Standard white and black key dip for most pianos is 10 mm. The key dip is the distance the key moves down until it stops on the front rail punching. The way to regulate both, white and black key dip is by adding or subtracting paper washers (punchings) under the felt washers at the front rail oval pins. See right picture below.



Left: Adjusting a bent oval front rail pin. Right: Adding paper washers to correct the key dip of a black key.

To regulate the white key dip you can use a simple but practical little tool call “key dip block”. Place the key block on top of the key as shown in the picture, the adjacent key should be flush with it. Also you can use a “sharp key labelling tool” calibrated to 10 mm. in the

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Chapter VI: Regulating

Regulation is probably the most neglected aspect of the care and maintenance of a piano. How many times a customer will call you to come and regulate his/her piano? Frankly, very few. This is due basically to lack of understanding and awareness on the part of the piano owner. Is a fact that regular adjustment of the action among other parts, is essential for the performance, maintenance and life span of a piano.

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Basic regulating tools. Up to down: Upright let-off regulator. Grand let-off regulator (narrow). Capstan regulator. Bent key spacer. Flange screw driver regulator. Kit tool handle.

Many of the malfunctions on a piano are due simply to poor or lack of regulation, an yet most of these faults are easily fix if we know how to do the right adjustment. Also, lack of regulation is responsible for an irregular wear of the action parts, which in turn, could become a serious problem after some time.

Check your regulation by looking at the repetition lever in straight line from the side, while pushing gently the repetition lever with one finger. Take a look at the picture below, where we have drawn a line to make it clearer

The white line shows the exact position of the jack with respect to the Roller.

Every time you play the key loudly, If the jack is too far forward at resting position, it will slide under the roller too soon, so the hammer will lose power, and the note will sound weak. If however, the jack is too far back under its roller, it will cause too much friction every time the jacks trips out under the roller.

Tip:

When you encounter a piano with low dynamic response (weak sound) one of the first things you must check and provably also to adjust is the position of the jacks with respect to the hammer rollers.

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In most cases, you will voice to get a more smooth and mellow sound, (voicing for “soft”) but also, sometimes you will be ask to regulate the tone as to brighten up certain notes, (voicing for “strong”) specially at the high treble.

Voicing tools

Although there are specific tools called “needle holders” with three or four needles that you can buy at any piano parts and tools merchants, (see picture below) you can also use an ordinary needle attached to something to hold it firmly in place. Personally I prefer this way, as I reckon it gives you a finer touch. A thin needle for shallow puncturing in order to smooth the sound, and a thicker one for the opposite effect.

Swivel needle holder tool with four needles for voicing the hammers

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The voicing technique

The voicing technique is fairly simple, providing that you grasp a few basic concepts that will be explained below. Before proceeding with voicing, a minimum previous preparation is needed. Follow these steps.

Action problems, summary for quick reference

This final section of the book is a check-list for quick reference of the most usual problems that can be found in a piano, their symptoms and the way to mend them. Some of these faults are purely mechanical and required repairing, others are due to improper adjustment and required a correct regulation. This quick reference is valid for grand pianos as well as uprights.

Note is too weak

- Let off is incorrectly adjusted too far away from the strings. In grands, the jack resting position isn't far enough under the roller.
- Hammer butt spring is broken or the flanges are far too tight making the hammer sluggish and unable to reset properly to its rest position.
- Hammer shank is broken but still in place. Hammer can also be loose and needs gluing again.
- Repetition lever spring don't have sufficient strength to allow the jack to reset.

Note doesn't sound at all (dead key)

- Key bushing maybe too tight or key rubbing on neighbouring key due to key warped.
- Key is simply broken
- Some kind of strange object has fall underneath the key or inside the action, blocking normal movement.
- Jack spring is broken or has slipped out of place
- Bushings at the jack flanges are far too tight, avoiding the jack from resetting.

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