

Installing WNG Low Friction Front Rail Pins

Tools

Hand tools

- #16 (.177") / 4.5mm jobbers drill bit
- 1/8" (.125") / 3.2mm jobbers drill bit
- Front Rail Pin Insertion tool
- Vice Grips
- Sandpaper block
- Small countersink
- Digital calipers
- Electric drill – 3/8" – 1/2" (10mm to 13mm)
- Hand air nozzle

Specialty tools

- Front Rail Pin Insertion Tool
- Nylon Bushing Insertion Tool
- Front Rail Pin Regulation Tool
- Side cutters
- Upright hammer removal tool

Shop tools

- Drill press
- Keyboard table for drill press
- Air compressor (Desirable but not absolutely necessary)

Parts

- One set of front rail pins (Includes nylon bushings to use as needed).

Supplies

- 120 grit sandpaper
- Buckskin (maybe)
- 1/2" / 12mm hardwood dowel



Figure 1
The tools required

Installation

Select the correct parts for your piano.

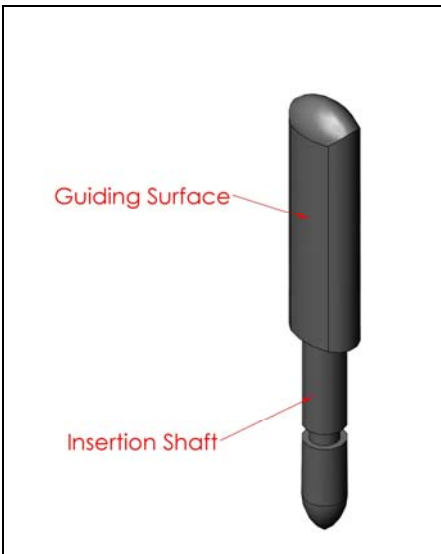


Figure 2
Anatomy of a WNG Front Rail

WNG makes two fundamentally different sizes of front rail pins. The difference has to do with the width of the surface that guides the key in its motion.

The American Standard pins are sized to replace front rail pins in American pianos. The guiding surface is .146" or 3.71mm. There are two lengths of pins, short (37mm) and long (40mm).

The European Standard front rail pins are sized to replace front rail pins on the vast majority of imported pianos, Asian as well as European. The guiding surface is .128" or 3.26mm. There is only one length on these pins (42mm).

Pick the front rail pins that the width of the guiding surface is the closest to the pins in your piano.

Do not worry about the diameter of the insertion shaft of the key pins from your piano. There are too many different diameters in old pianos for us to make parts that fit all. However, as part of the kit, we have provided a solution. All WNG Front Rail Pins have an insertion shaft diameter of 3.25mm (.128"). On American pianos you will need to use the nylon Key Pin Bushing because the hole in the keyframe will be larger than the diameter of the insertion shaft of the WNG Front Rail Pins. We supply these bushings with every set of key pins for your convenience.

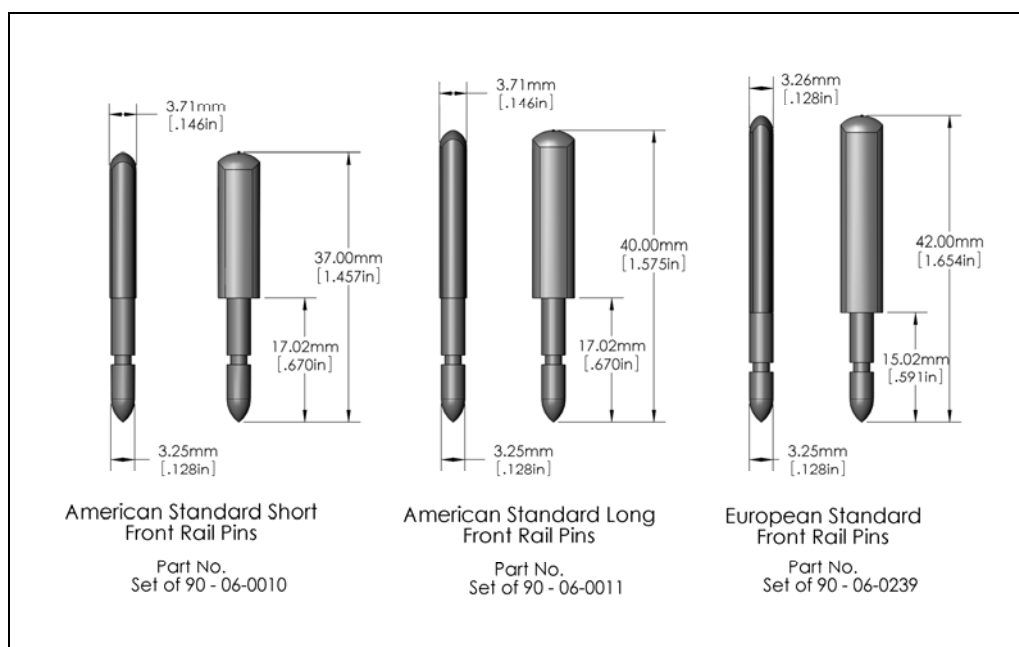


Figure 3
WNG Front Rail Pins

Remove the old front rail pins from the keyframe.

Strip the front rail punching from the keyframe. Most of the time you will want to replace the cloth punching however, if they are nearly new, place the cloth punching in a cup so that you do not lose them while the front rail pins are off the keyboard.

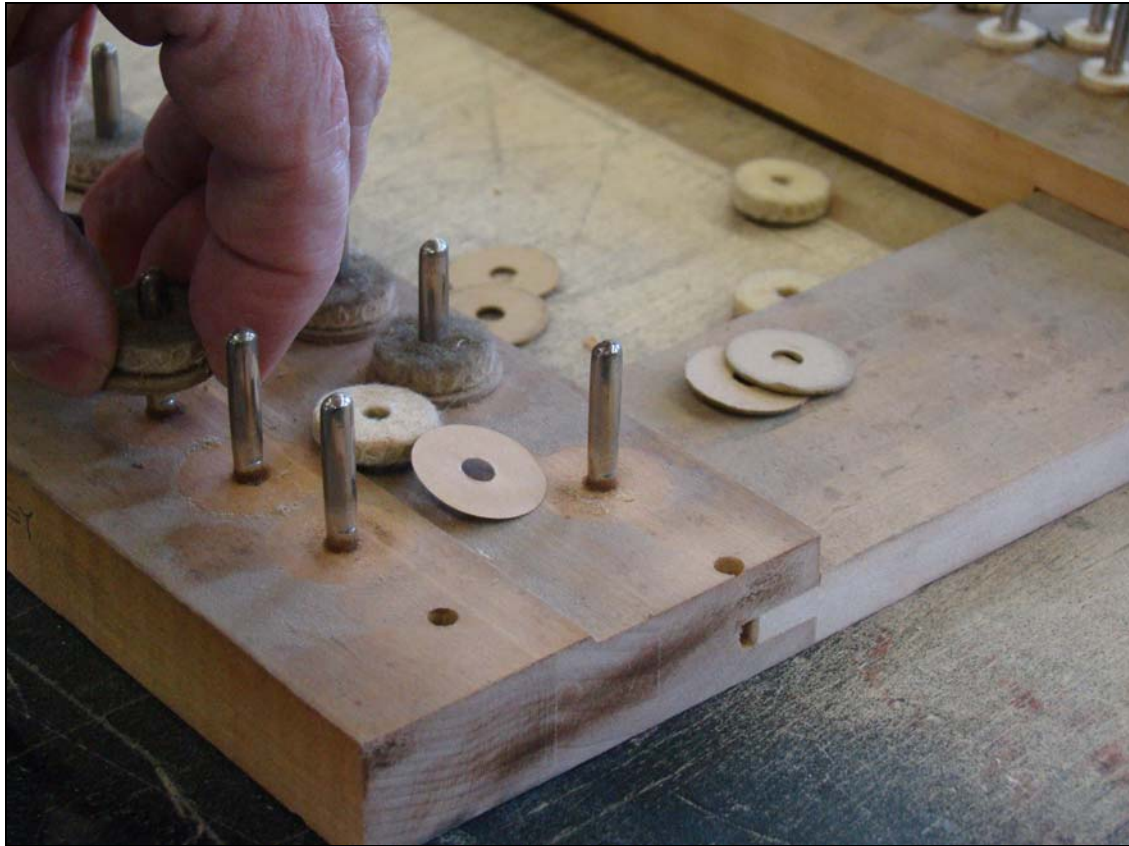


Figure 4
Removing front rail punchings

Remove the old front rail pins from the keyframe. There are three ways to remove front rail pins.

The easiest way is to simply grab the old front rail pin with a pair of vice grips and pull while rotating the pin from side to side. Usually the pin will be easy to remove in this fashion. The jaws of the vice grips will damage the old front rail pins if used in this fashion thus this method assumes you will discard the old front rail pins. It is important that you not elongate the holes during removal.

If you wish to save the old pins (we piano technicians do keep everything don't we) use a piece of buckskin between the pin and the vice grips so that the guiding surface is preserved.

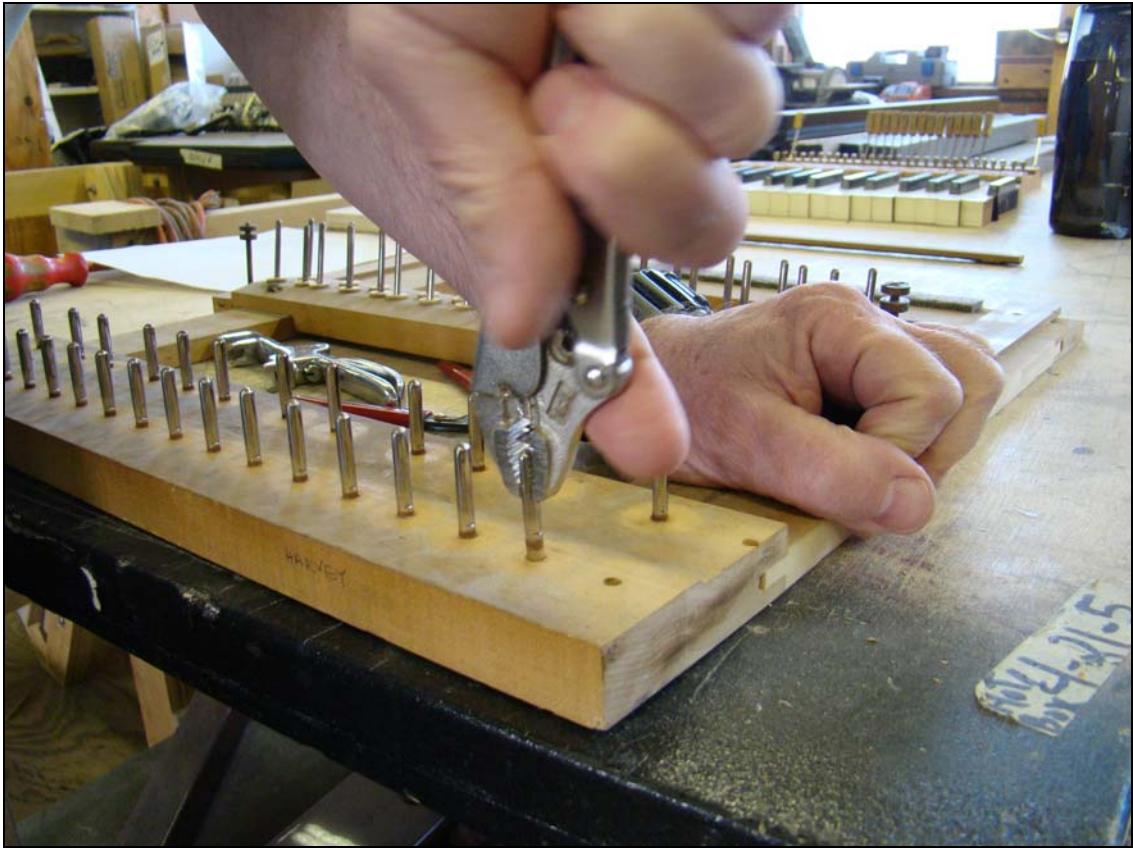


Figure 5
Removing front rail pins with the simple vice grip method

Another method is to use vice grips to provide something to grab the pin while using an upright hammer pulling tool to lift the pin from the front rail. It is likely you will not be able to save the pin using this method.

Last, you can use the upright hammer pulling tool to lift the pin at the front rail while grabbing the pin with a pair of side cutters. Again, the cutters ruin the pin so if you wish to save the pins you should not use this method.



Figure 6
Removing front rail pins with
vice grips and puller



Figure 7
Removing front rail pins with
side cutter and puller

Determine if you need to use the included nylon Key Pin Bushings.

Why would you need a nylon Key Pin Bushing? Most of the old American style front rail pins were made by forging the guiding shape from a round pin. Usually the pin diameter is larger than the guiding surface. WNG front rail pins are made using a different process. Our pins start as an extrusion and the round shaft is machined from the extrusion. As a practical matter, the diameter of the round insertion shaft is considerably smaller on our pins than is typical of older American pianos. On the other hand, since our pins are made to international standards, if you are replacing the key pins on an imported piano it is possible they will work without the use of the nylon Key Pin Bushing.



Figure 8
New Front Rail Pin with oversize hole

Measure the diameter of the insertion shaft at the bottom of the old front rail pins. Use a pair of digital calipers to measure the bottom of the old pins.

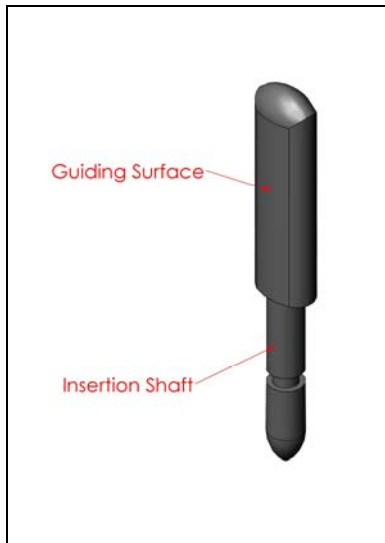


Figure 9
Anatomy of a WNG Front Rail
Pin



Figure 10
Measure insertion shaft

Decide whether to use the nylon Key Pin Bushings. Compare the size of the old pin to the new. If the old pin is larger than 3.25mm you will need to use the nylon Key Pin Bushings. Most likely the old pin will not be significantly smaller than the new key pin however, if it is you might still need to ream out the hole in the front rail so that the new key pin fits the hole properly.

Size front rail key pin holes for the nylon Key Pin Bushings (Required if using bushings).

What do you need to accomplish here? You need to ream out the old key pin hole for a nylon bushing that will hold the new key pin. The hole needs about .005" or .12mm smaller than the bushing for the proper interference fit. Use a .183" or 4.6mm drill bit. The depth drilling needs to be such that the bushing comes out flush with the front rail after installation.

Set up your drill press. Attach a keyframe table to the drill press table. This table will hold the keyframe under the quill of the drill press. The table needs to be slightly over 6' long (72" or 1800mm). This length is required because, while drilling note 1 or note 88, you want the end of the table to be past the balance point of the keyframe. Dropping your keyframe is not considered good form.

You will need to setup the drill bit you intend to use to drill to a depth of 15mm (.59"). You might ask, "Why not set the stops on the drill press?" This would work if the front rail was the same thickness

from one end to the other. Because of keyframe fitting, you cannot count on the front rail to be a consistent thickness.

Use a dowel on the drill bit to control the depth of the hole. Drill a center hole through a piece of dowel using the drill you intend to use on the keyframe. Cut the length of the dowel so that when the dowel is placed onto the drill bit, 15mm or (.59") sticks out from the dowel on the drilling end and 1" protrudes from the other end for the chuck. Place the drill into the chuck and tighten so the jaws of the chuck contact the dowel. This way, the dowel cannot slide up the drill bit when used as a stop. Adjust the height of the table so that drill bit is approximately 1/8" (.125") or 3mm above the high point of the front rail. Slide the keyframe from one end to the other because it is likely that the rail is not the same dimension from one end to the other.



Figure 11
Drill bit with dowel stop



Figure 12
Drill bit with dowel stop in drill press

Drill out the old keyframe holes for the nylon Key Pin Bushings. Position the front rail under the drill bit so that the drill will ream the hole without changing its position or bending the drill bit. Drill the hole until the dowel comes into contact with the keyframe.



Figure 13
Drilling the front rail

Countersink the hole. You need to create a small countersink so that the edge of the bushing encounters an inclined plane to guide it into the hole. The countersink diameter should only be about 1mm (.040) larger than the hole. Place the countersink into a hand held drill. Lightly touch the countersink to the material around the hole to quickly create the countersink.



Figure 14
Countersink the nylon bushing holes

Sand the raised burrs off the front rail. Use a sanding block with 120 grit sandpaper to clean off the top of the front rail so that all burrs raised by the drilling process are removed.

Blow off all drilling and sanding debris before proceeding.



Figure 15
Sand front rail to clean and remove burrs

Press the nylon Key Pin Bushings into the reamed holes (Required if using bushings).

Use the drill press as an arbor press. Your drill press can provide downward pressure without spinning the drill. This is very useful for inserting the nylon bushings and later the front rail pins.

Setup drill press with Nylon Bushing Insertion Tool. Place tool in chuck with the jaws against the lip in the tool. This will keep the tool from sliding up in the chuck while pressing the bushing into the front rail.



Figure 16
Bushing insertion tool

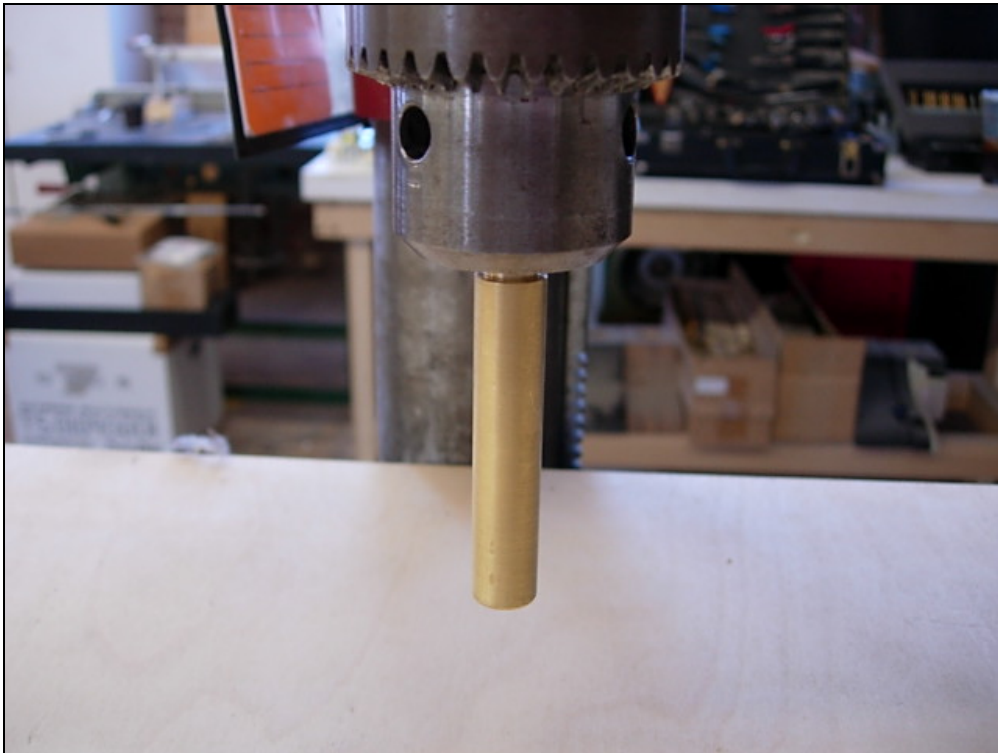


Figure 17
Bushing Insertion Tool in Drill Press

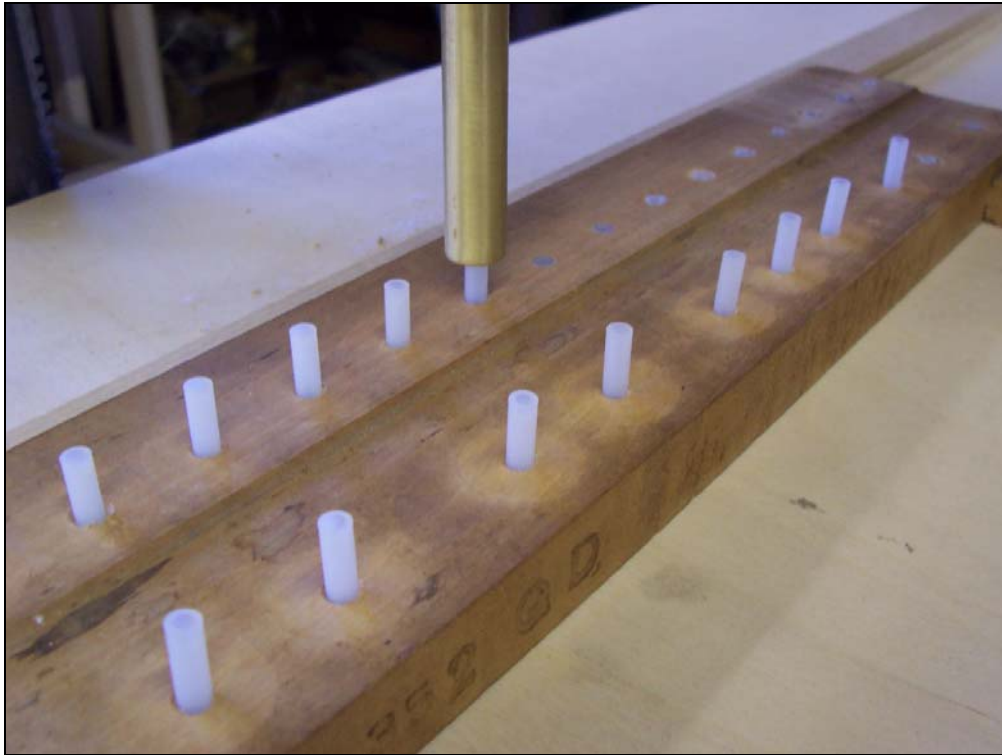


Figure 18
Inserting Nylon Bushings into the front rail

Press bushings into the front rail. Hold the bushing over the hole and use the Bushing Inserter to exert downward pressure on the bushing. Press in until the bushing is flush with the front rail and fully bottomed in the hole. Depth drilling correctly is important.

Drill out the bushings for the key pins (Required if using bushings).

Why are we doing this? After the nylon bushing is pressed into the front rail the fit to the key pin is much too tight. If you try to press the pin into the bushing at this point you will break the key pin. We need to drill out the bushing so there is a reasonable press fit. In addition, we need to deepen the hole so the shaft of the front rail pin does not hit the bottom before the top seats on the front rail.

Setup drill press. Place a 1/8" (.125") or 3.2mm drill bit into the chuck in the drill press. Set the height of the table so that the drill bit is above the highest place on the front rail by 1/8" (3mm). Set the stops so that you drill at least down from the top of the rail at least .6875" / 17.5mm. Since the pin itself will stop when the top part comes into contact with the rail a precise depth drilling is not necessary. It is required, however, that the hole be deep enough so that the pin will not bottom.

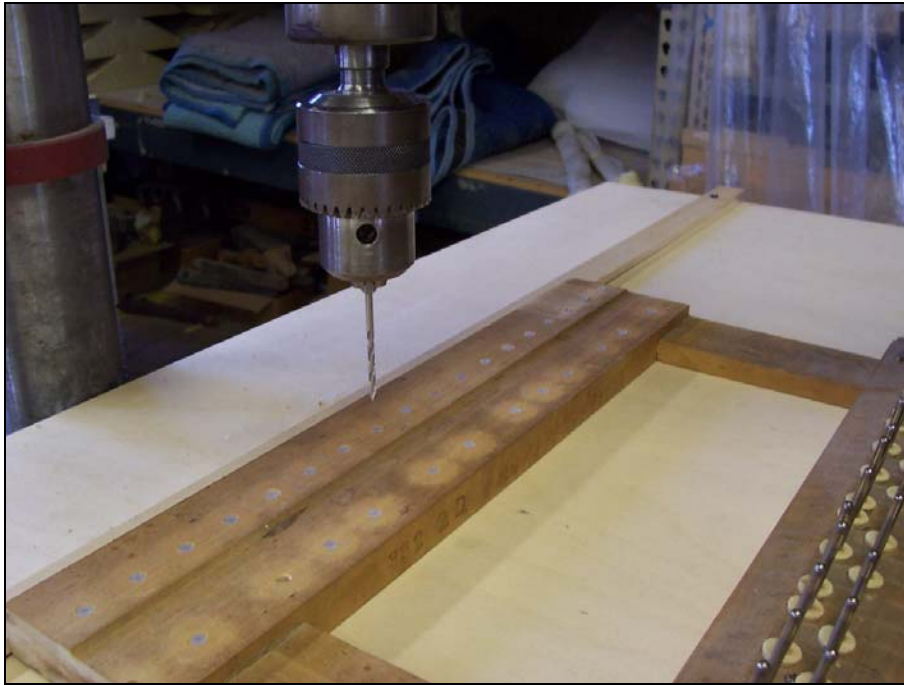


Figure 19
Setup drill press to drill out Nylon Bushings

Drill the holes. Position the front rail under the drill bit so that the drill will reach the hole without changing its position or bending the drill bit. Drill the hole to the stops.



Figure 20
Drilling Nylon Bushings in the front rail

Install the front rail pins

Use the drill press as an arbor press. Your drill press can provide downward pressure without spinning the drill. This is very useful for inserting the front rail pins.



Figure 21
Front Rail Pin Insertion Tool



Figure 22
Drill press set up with Front Rail Pin Insertion Tool

Setup drill press with Front Rail Pin Insertion Tool. Place tool in chuck with the jaws against the lip in the tool. This keeps the tool from sliding up in the chuck while pressing the bushing into the front rail.

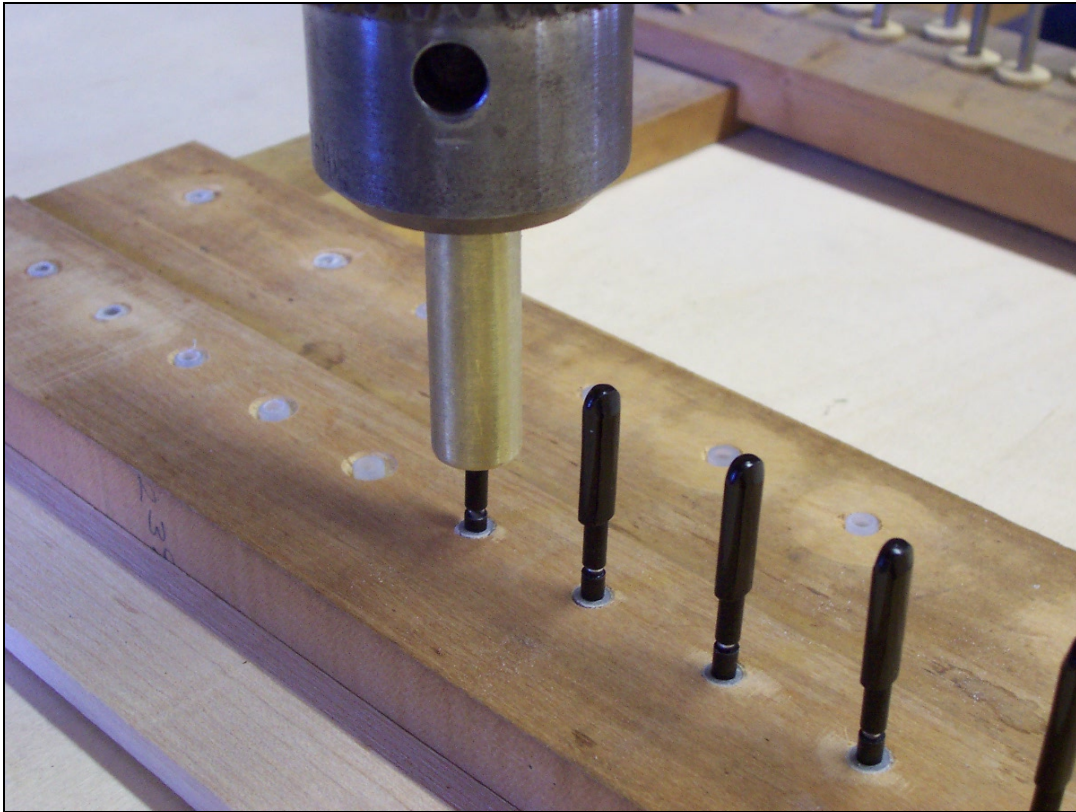


Figure 23
Inserting Front Rail Pins into Nylon Bushings

Press Front Rail Pins into the front rail (bushing or not). Hold the front rail pin over the hole and use the Insertion Tool to exert downward pressure on the front rail pin. Press in until the front rail pin is fully bottomed in the rail.

Regulate the Front Rail Pins



Figure 24
Align Front Rail Pins

Align the pins to guide the keys. Use a Front Rail Pin Regulation Tool to turn the pins parallel to the direction of the keys.

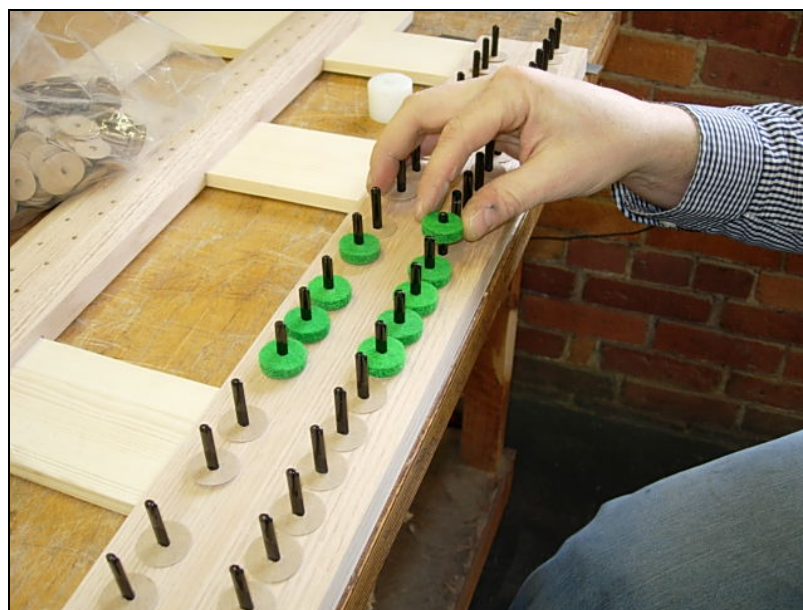


Figure 25
Felt Keyframe

Felt the Front Rail. Place cloth front rail punching on the front rail pins.



Figure 25
Felt Keyframe

Check key easing between the bushings and the front rail pins. Make sure that you have turned the key pins to their smallest profile first. You should expect that the possibility exists that the keys will need to be eased or even re-bushed at this point. The clearance between the new pins and the key bushings is very important to the playability of the piano.



Figure 26
Level Keys

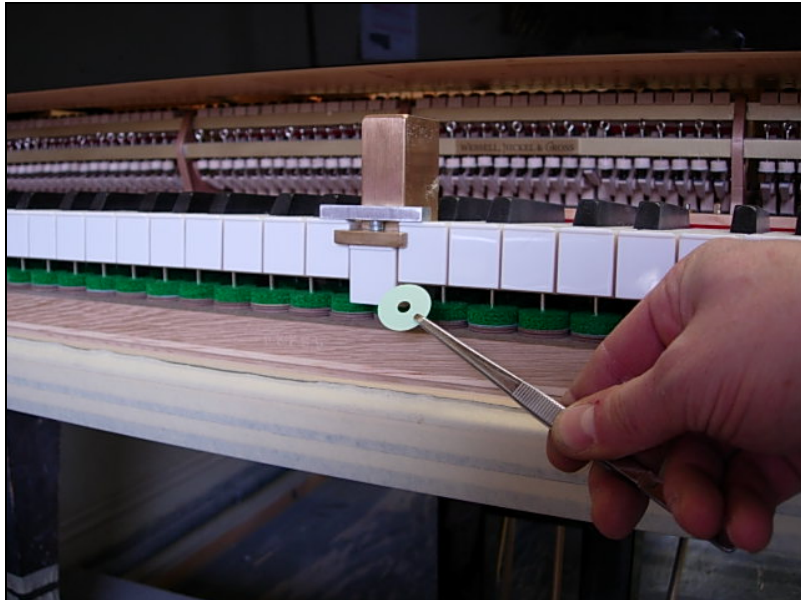


Figure 27
Set Key Dip

Go over level and dip. The keys need to be leveled and dipped so the action works properly. Also, it is not possible to accurately space the keys until you are sure that the key level is done well.



Figure 28
Space Keys

Space the keys. You will probably have more to do when you space the keys than you typically encounter during most of your jobs. Typically this work was done first during the fabrication of the

keyboard and later during installation of the action into the piano. Technicians, in the field, rarely see a raw keyboard.

You space a key by bending the front rail pin side to side so the gaps between the keys are equalized.