



Remove return spring for regulating (its friction adds extra stiffness to keyframe sides) – and sand away its indentations on keyframe.



Feel surface for  
glue drips,  
overspray, or  
debris and  
carefully clear for  
bedding.



Feel also for uneven joints and correct before proceeding.



Check out keybed shape for flatness or lack of flatness side-to-side and front-to-back to know what to expect during bench setup.



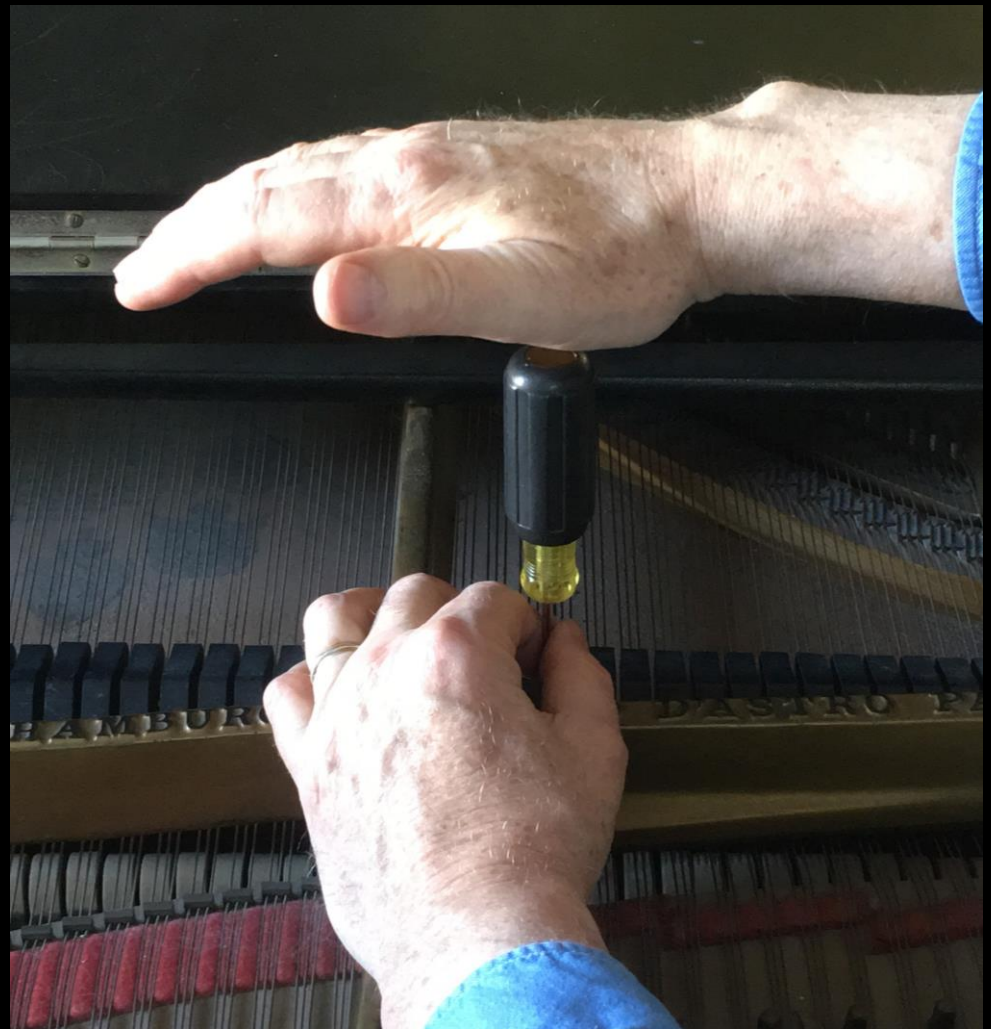
Turn up glidebolts and bed cheek blocks to bring rail to keybed but not over-bear on guide pins – remove factory shims/shim or adjust brass fittings/shim cheek blocks as needed.



Check for hidden glidebolts – don't change those in flexible keyframes unless out of balance as they set correct balancerail elevation.



Check bedding  
with action fully  
assembled – test  
backrail with long  
screwdriver  
through strings on  
rest cloth over  
contact lip.





The lip in this backrail is at the front – testing at the back could produce false tapping.



If backrail needs bedding, remove keys and topstack, sand areas of contact until full contact (or consider balance punching shims under topstack feet to complete fit).



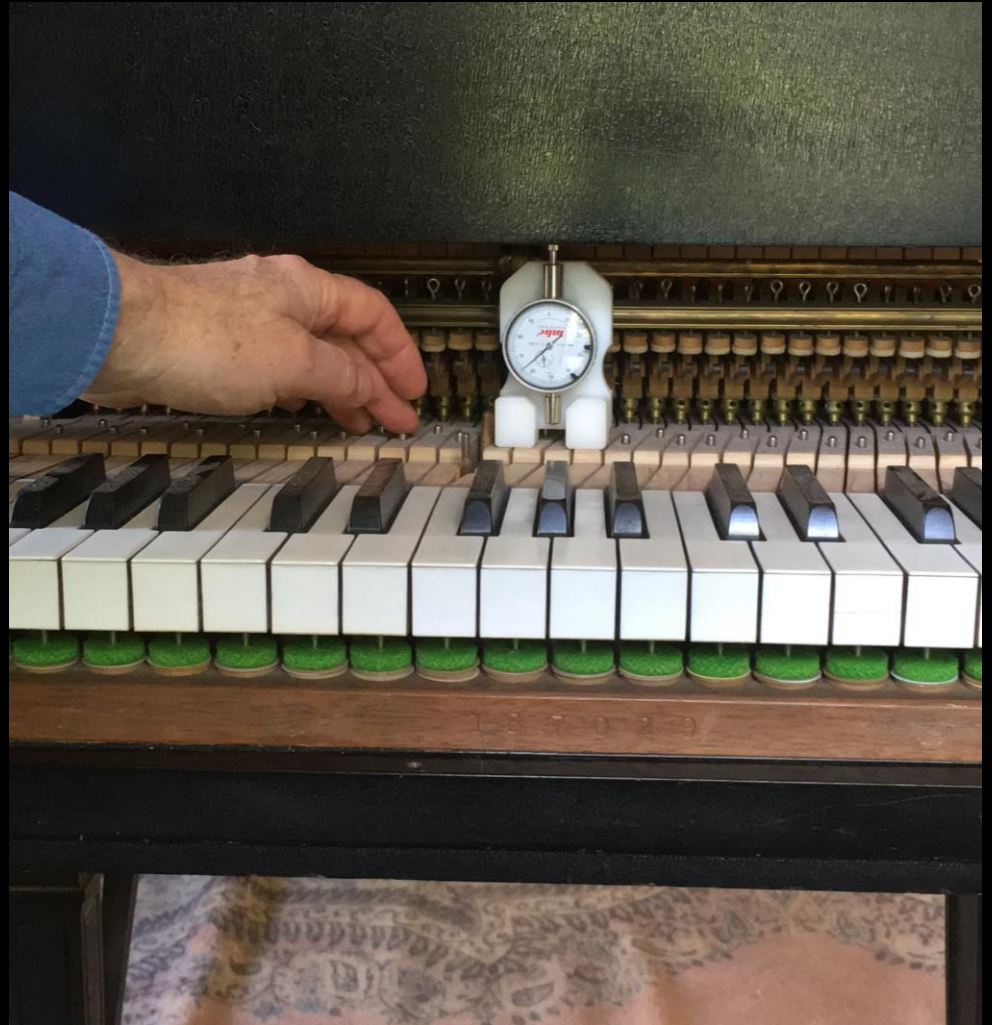
Glue punchings to cleats, clamp with topstack, and validate then trim as needed. Rule: if light touch on cleat completes backrail fit, shim.



Check frontrail bedding, holding down manually for crowned frontrail. If areas tap back, sand no-tap areas with strips of sandpaper grit side up until none tap.



Use WNG Bedding Tool and bed balancerail without pedals (reset with pedals after bench regulating) – check as you go to not undo previously bedded glidebolts.



Key pre-removal was needed here to access glidebolts, but with no obstructions, bed what you find fully assembled to take advantage of what already works.



Friction affects sampling so, if necessary, take action apart to ease keys, lubricate centers, and space for clearance.



Remove punchings from bedding sample keypins (naturals only, one by each glidebolt) and store on machine screw, hard punchings down.





Choose from two sizes of Keysteps for fit under keys – note underside of Keystep slot has countersink to clear keypin shoulders.



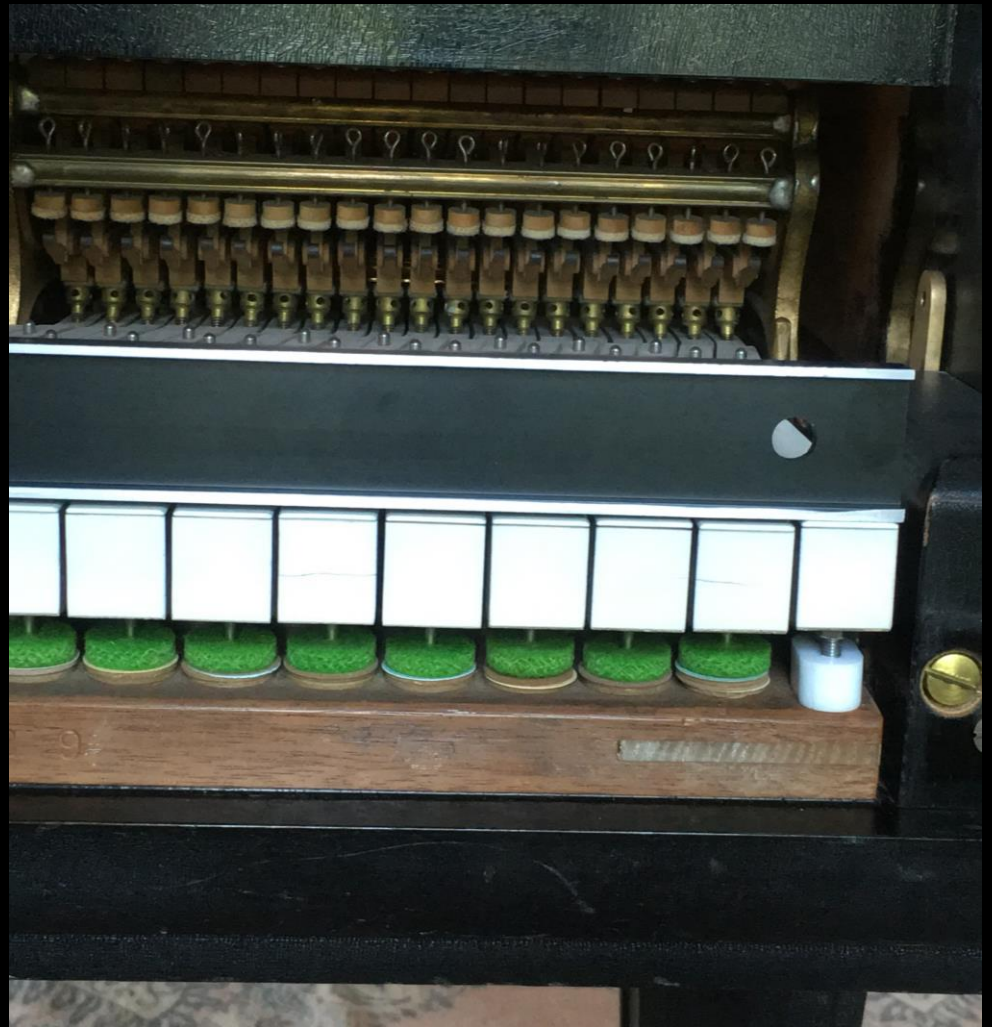
Place Keysteps  
over frontrail pins  
to not fall out in  
transit – center  
and push against  
keypin to position.



Pre-level keys #1  
and #88 (or #85)  
with cut punchings  
– wait for sharps  
until action is set  
up on bench.



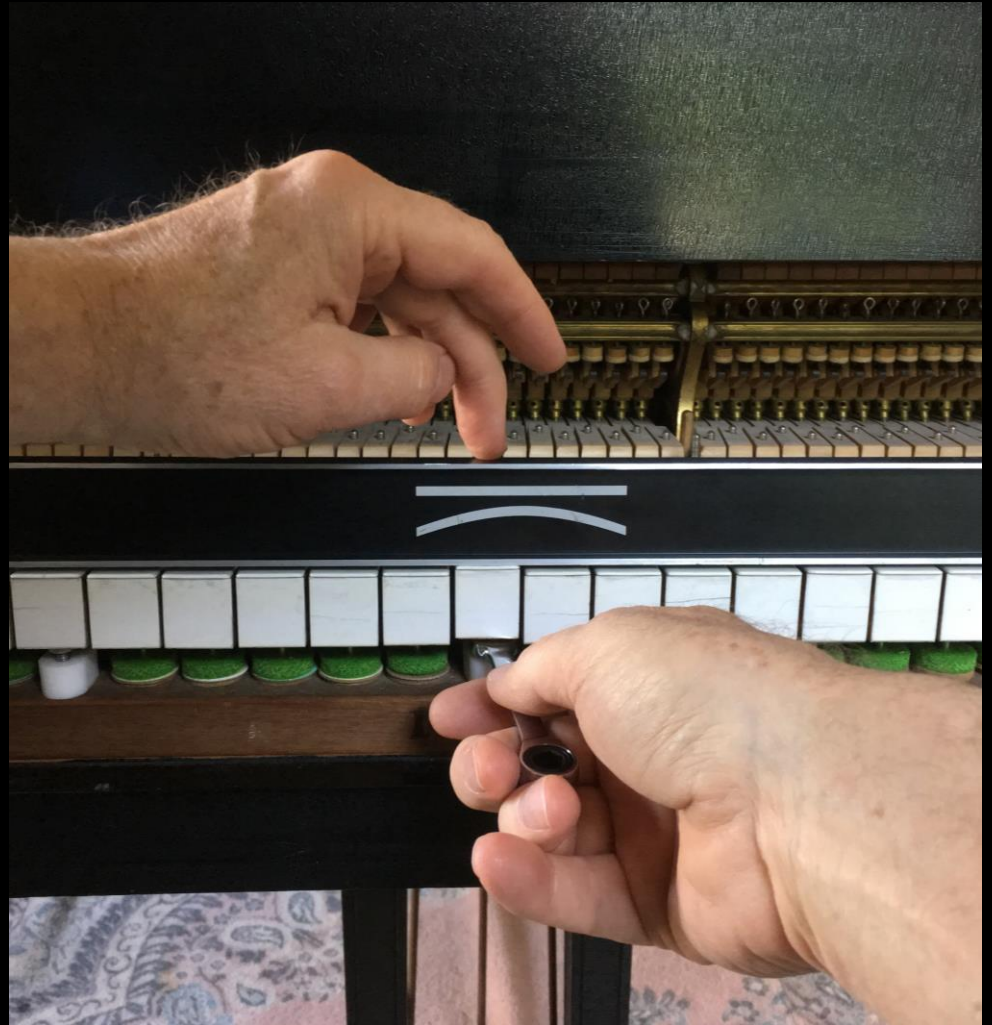
Make sure  
straightedge clears  
all keys. This will  
mean raising level  
of end keys even if  
not leveling (just  
remove punchings  
after setup).



Turn up each Keystep to just touch underside of key using tap/no tap method – these keys now touch all three rails gauging keyframe shape along their lengths.



Lift key #44 with its  
Keystep to just  
contact  
straightedge  
supported by pre-  
leveled end keys –  
this memorizes  
overall shape of  
frontrail.



Straightedge  
should not tap or  
skate at any of the  
three contact  
points – this test is  
sensitive, fast, and  
accurate.



Remove front punchings from strike samples (end-of-section naturals but not bedding samples) to other machine screw as extra aftertouch will be needed.





Move keyframe for strike sampling so hammer wear mark “valleys” are between strings (Regulating Rack templates can only touch “hills”).

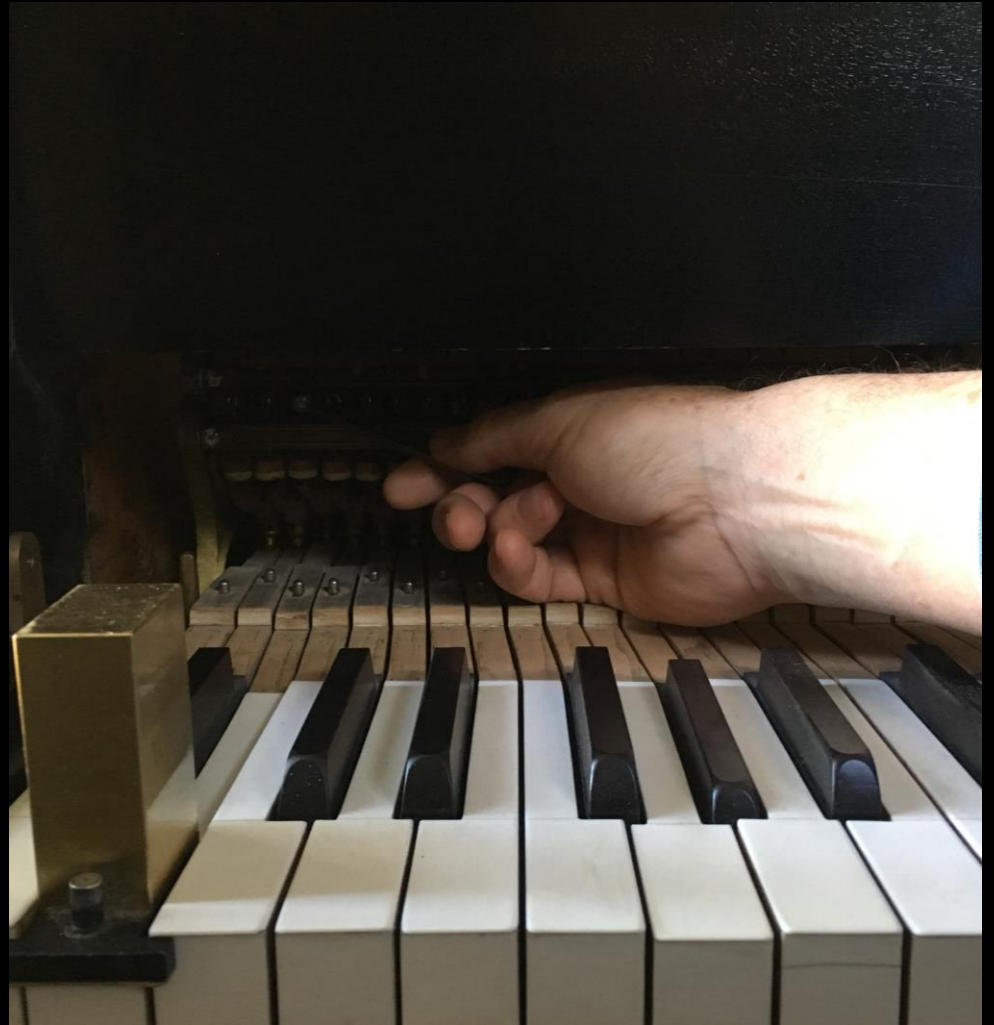


Lightly pre-lift all strings for no red herring samples – underlifted strings (which act as springs affecting tunability and tone) lift easily, stable strings will not move.





Block then “let off”  
each weighted  
strike sample to  
hesitate and drop,  
creating an easy  
symptom to  
reproduce at  
bench setup.



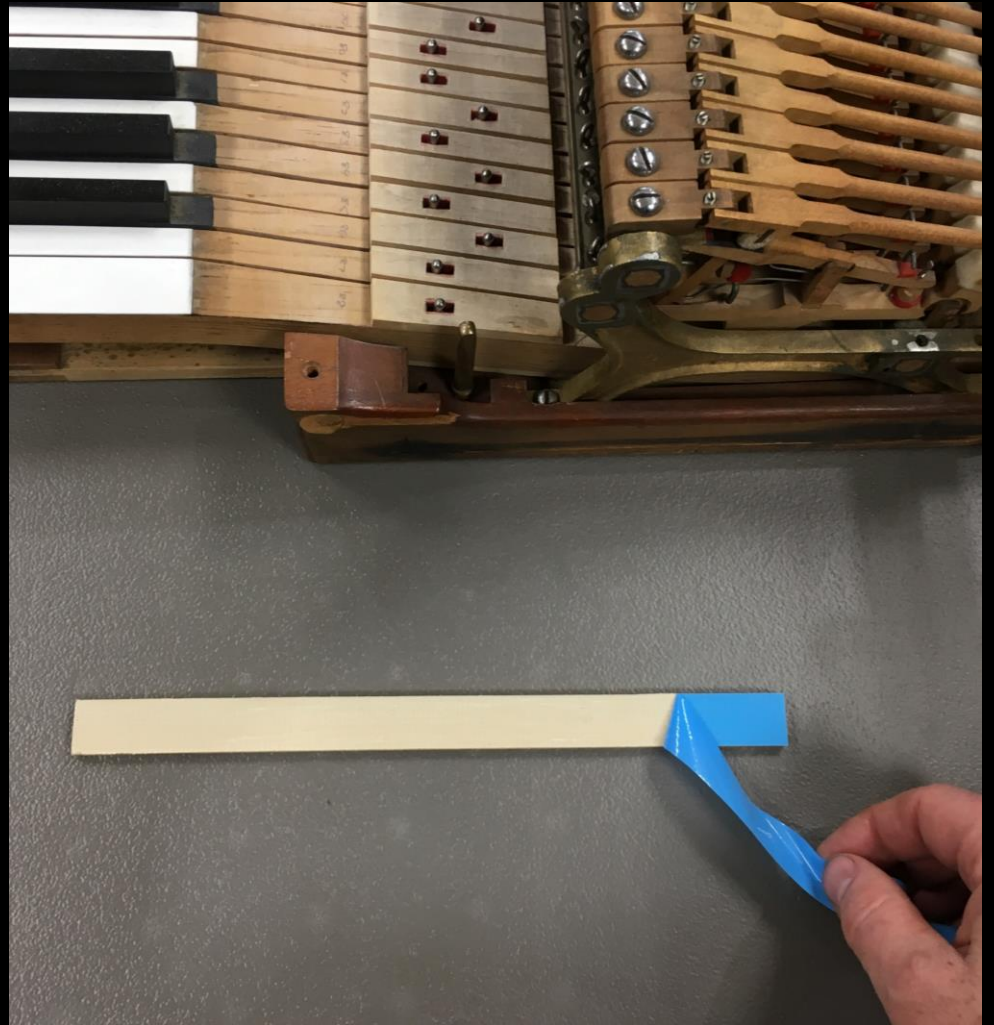
Now, store punchings, remove action, and head for the bench.



New Sampling Kits  
come in covered  
organizing box.



Gather eight suitable pieces of scrap wood or metal and apply double-sided tape to six of them.



Center action on bench and stick two strips in place to hug keyframe – use strips long enough to guide Regulating Rack behind action.





Set legs of  
Regulating Rack so  
they hug keyframe  
positioning strips –  
feet have  
adjustment to  
twist for angled  
strike lines.



Add two strips at back as stops for front-to-back positioning. Now action can be removed and returned to exactly the same place.



Select Regulating Rack templates that extend slightly beyond hammer sections (use two templates butted together for long tenor section).





Set lower stops to touch underside of brackets and upper stops to be blow distance above brackets – the middle white Gauge Key is 1.75" long (others are shorter and longer).



Lightly clamp strips  
(with the least  
pressure that will  
work) to hold  
down frontrail by  
guide pins.



Note, this setup is on a stiff table. A sheet of MDF (supported to be flat) will work well – or any stable bench (at least 60”x 30”).

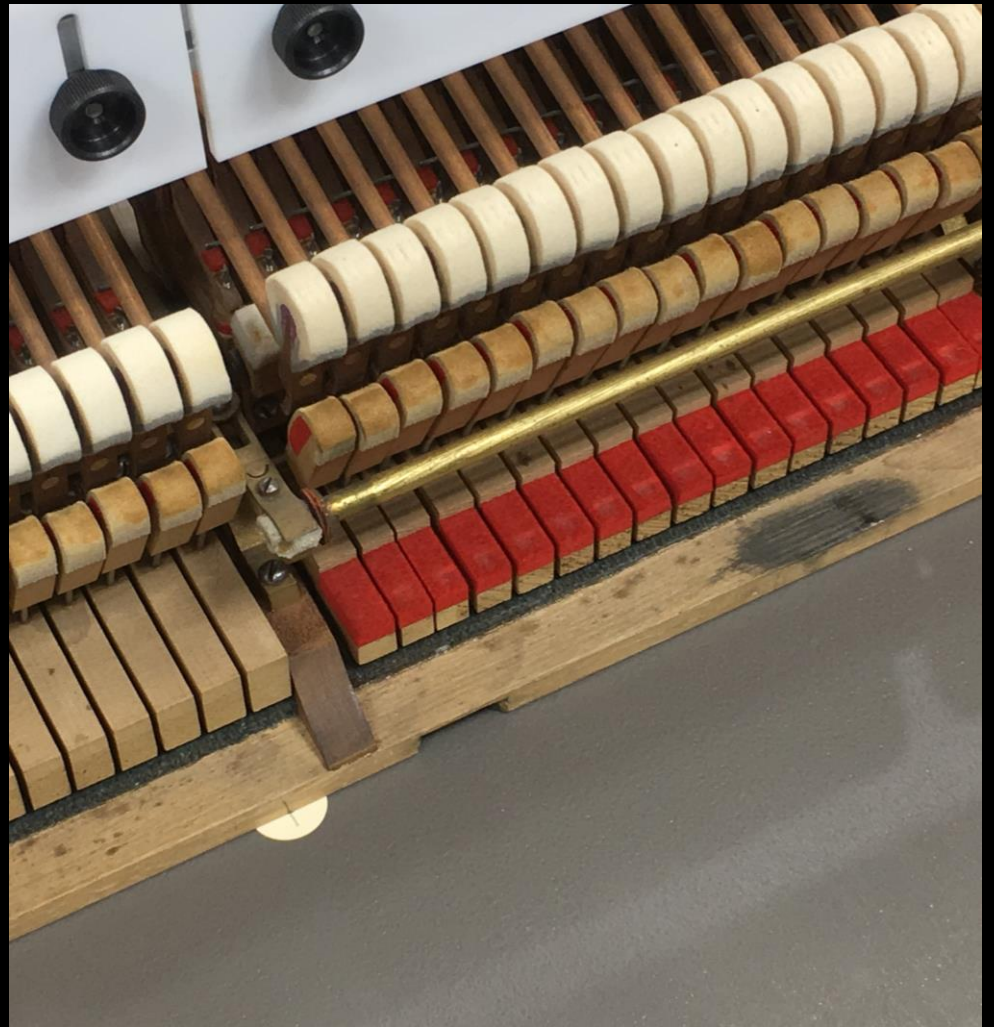


Grandwork Tools now offers a kit to help fix the position of a grand action (its tape has strong adhesion but is easier to remove than most when finished).





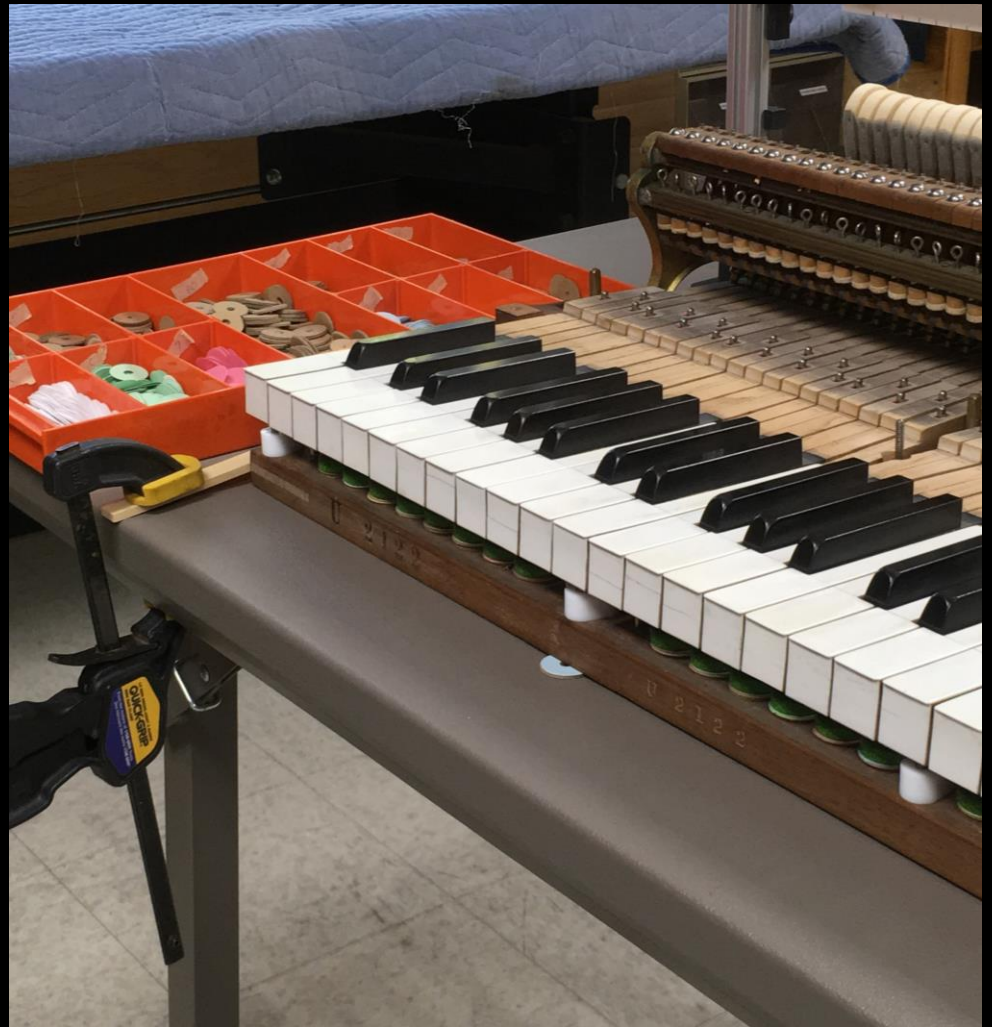
Shim backrail to be stable (and flat if piano's backrail is flat) and mark shim positions for re-inserting if keyframe is moved. Front punchings work well as shims.



Shim frontrail (lift rail for punching insertion with tapered felt knife) so that key #44 just touches straightedge – test three points of contact.



Shim in between ends and middle shim, sharing frontrail-to-benchtap pressure between three shimming locations.



Adjust glidebolts  
so bedding sample  
keys all slightly tap  
on their Keysteps,  
then just eliminate  
tapping from each.



Block weighted samples of strike with templates and fine tune template heights so keys hesitate and drop like they did in the piano.



Add strips to stop  
Regulating Rack  
where crowns of  
hammers touch  
templates at strike  
– all regulating  
happens from  
there back.



From wearmarks,  
mark spacing scale  
on templates at  
strike – wearmarks  
are made at strike  
in the piano!



The scale provides hammers a real place to return to when unspaced during regulation by removal, traveling, or squaring.





Back up Regulating Rack to a reproducible location and record ends-of-section template heights using Underlevel/ String Height Gauge.



With dots in registration holes, the Underlevel/ String Height Gauge records five strike heights per side of plunger – more accurate than numbers.



Remove hammers from topstack and file flared hammers on Filing Jig with firm pressure at tip of molding and slight sideways pressure into drum.



The Filing Jig makes getting consistent size and shape easy – wait to gang-file straight-bored hammers on SFV Block when re-assembled.



Adjust friction in hammer flange centers while hammers are off topstack (and repin repetition levers as needed if whippens are off too).



Apply the same procedure to both sides if tightening (with point of broach pressed into cloth and rotated) to not affect traveling or spacing.



Firmly work parts  
to make stable –  
apply pressure  
with pin against  
part of cloth  
manipulated  
(number of swings  
can be cut in half).

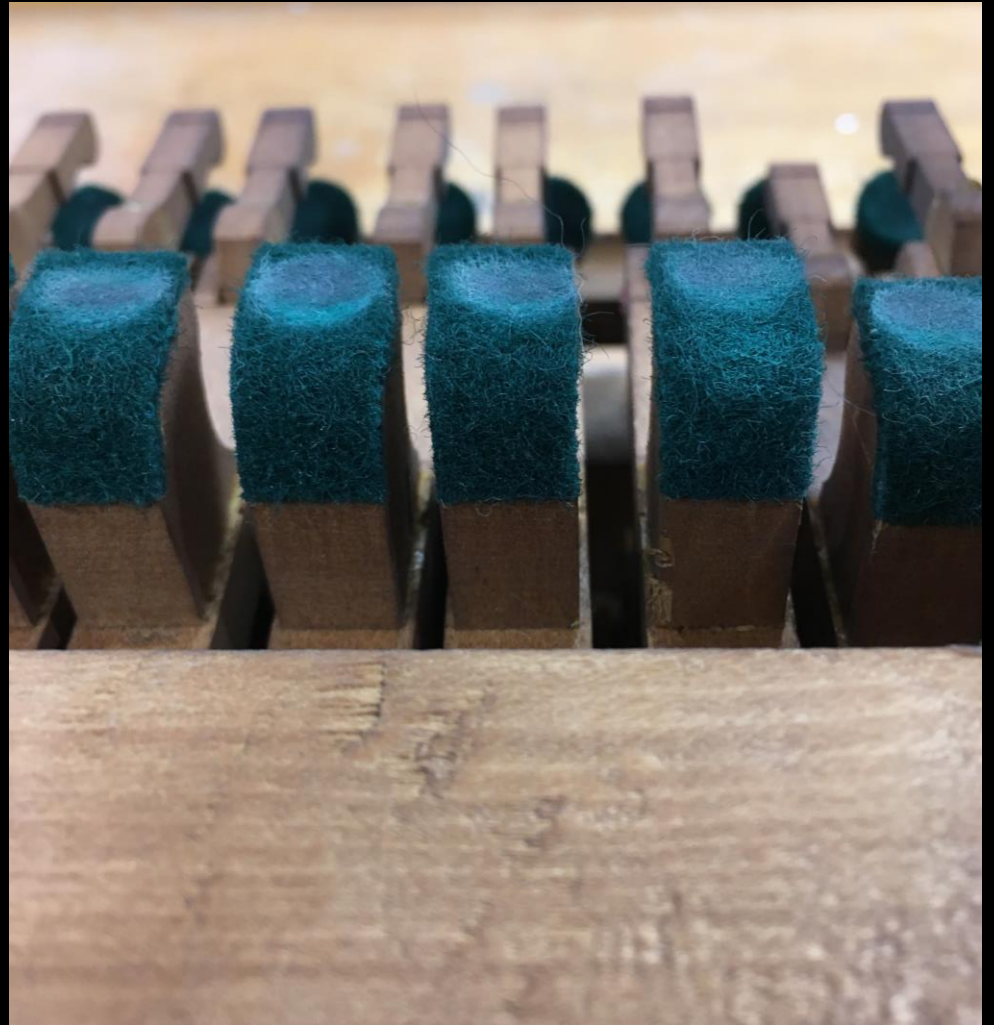


9 half-swings (2.5g at the flange for hard bushings) is ideal – balances needs of stability with needs of repetition.





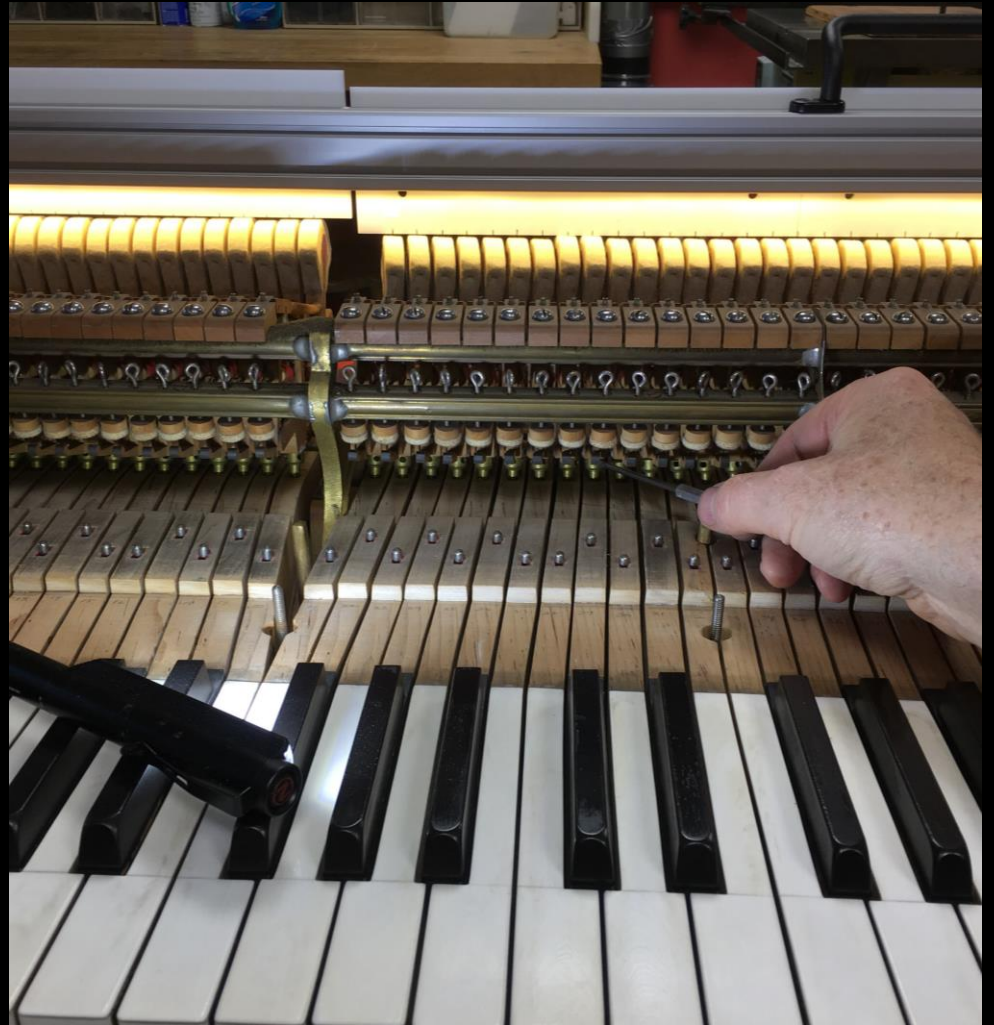
100-year-old whip cushions here are pitted and thinned before treatment with Damp-chaser additive.



After adding pad treatment and smoothing/compressing with flat iron on wool setting, they are like new.



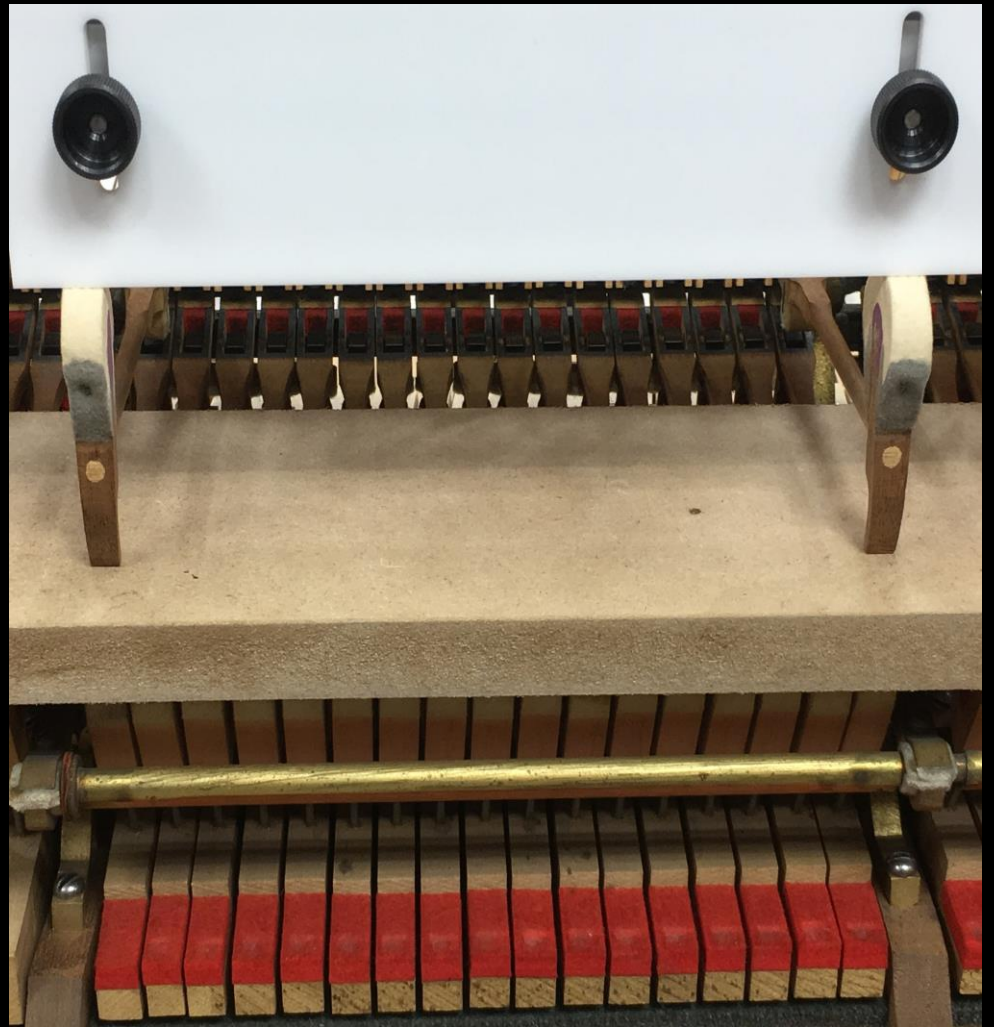
Fully regulate at least one sharp and one natural to try out specs, parts, and materials – and to anticipate needs of weighoff.



Gang-lift shanks to travel vertically, indexing to samples that match scale at both strike and hammerline.



Set up hammers to be at strike for squaring to vertical with Hammer Square on SFV (squaring/filing/voicing) Block.



Use Articulated Hammer Square with legs turned in for better referencing of vertical – heat shanks and twist to correct.



For hammers that require tilting for clearance, add a stilt. Avoid this if possible, however, for better tone, power, repetition, and stability.



And use the SFV  
Block for gang-  
filing straight-  
bored hammers.





Sand overall shape with wide paddle and finish with strips of different grits, being particularly careful of crowns at ends of sections.



The SFV Block can also offer a solid surface to support hammers for voicing, and it is wide enough to span most sections.



Squaring, spacing, and leveling keys are easier on the bench (use topstack not weights for the fastest route to best key leveling).



Glue-reinforce topstack screw holes on first removal as preventative care – stripped screw repairs cost time, energy, and momentum.



Watery hot hide glue sizes balance holes that backchuck and tightens more with multiple applications.



Use Gauge Keys  
(thinnest white for  
treble, thickest  
white for bass) to  
position Template  
Rail for letoff.









Lower rail to stops  
and regulate  
hammerline – sight  
with Regulating  
Rack just slightly  
back to reveal  
hammers that  
overshoot.



And let Regulating  
Rack LEDs, Lil Larry,  
and a headlamp  
light the way...



Regulate natural backchecks as high as possible (no tail scraping when hammer is played against a resistance).





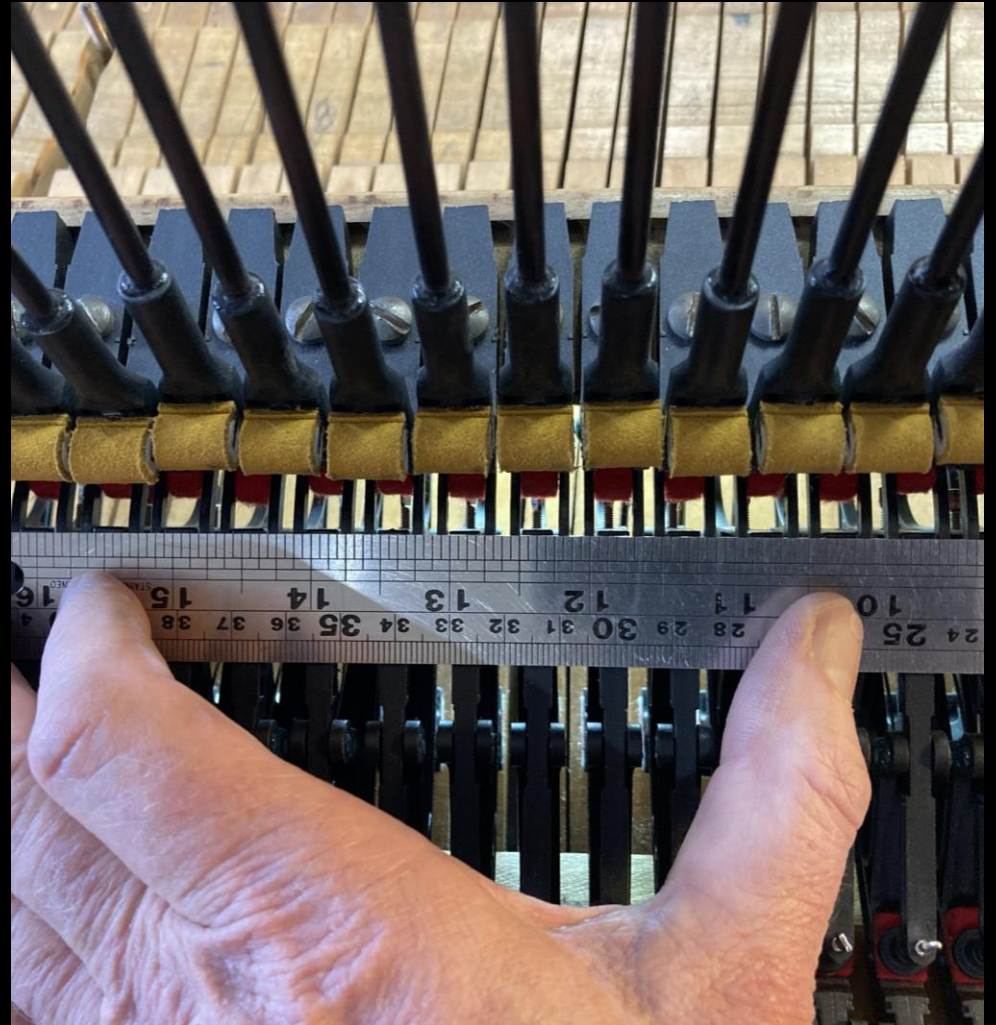
Check  
backchecking  
accuracy every so  
often with Gauge  
Key (narrow widths  
offer incremental  
backchecking  
distances) and  
touch up as  
needed.



Backlight, sight  
(by depressing  
immediate  
neighbor), and align  
sample jacks, back  
of jack to back of  
knuckle core.



Then complete jack positioning with straightedge held sample-to-sample, sighting fronts of jack tips.



Back away  
Regulating Rack  
again to both light  
and reference  
“winking” (rep  
lever height)  
adjustment.







Choose consistent  
downweight or  
consistent  
balanceweight to  
weigh off with the  
Grandwork  
Weighoff Kit.



Note outliers here (probably from varying friction in a downweight-only weighoff). Chalk zeros mark keys that are correct without adjustment).



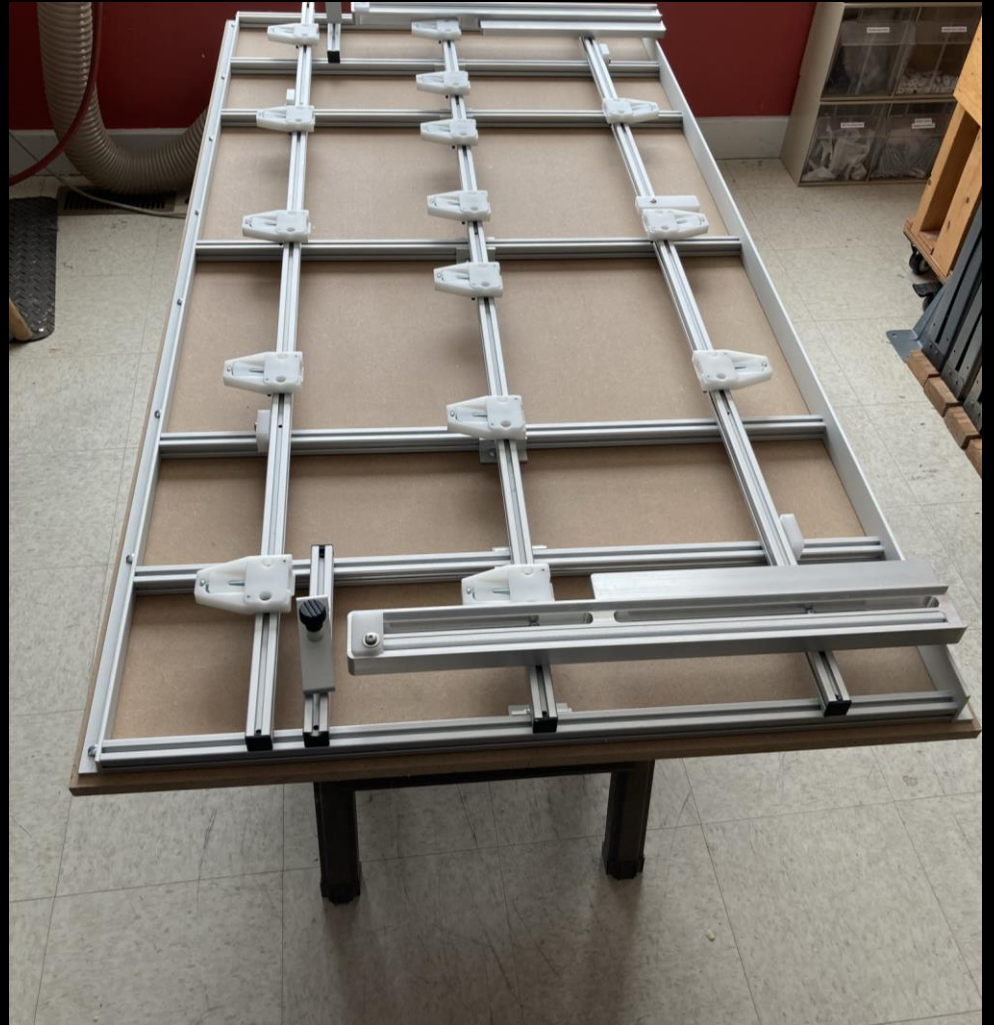
Returning action to piano, touch up balancerail bedding with pedals, re-install return spring, and square spring as needed.



Fit strings to hammers with stringing hook (string leveling and mating in one step). Then regulate dampers and pedals, tune, and voice.



The Regulation Station Deluxe includes a Custom Keybed shipped on a sheet of MDF. Its Bedding Platforms fine tune rail heights with the turn of a screw.



The RS Deluxe also features the Squaring Platform (adjustable in height, width, and depth), shown here with Shank Traveler.



The Shank Traveler provides reference edges for traveling shanks to vertical (touch shank to a reference edge to add tactile and aural referencing to the visual).





The Hammer Square on a Squaring Platform squares hammers to vertical at strike more easily and accurately than on a SFV Block.



The Regulation Station Full Monte comes with its own panels, Tool Trays, Electric Base, and Lighting Rail.



The Full Monte also includes Action Tray, Work Tray, and Hammer Hanging Jig (which works from the Squaring Platform).



# Key Steps for Grand Regulating

RS Starter and the Grandwork System

By Chris Brown RPT

<https://grandwork.tools/>

Check out the [Chris Brown RPT Channel on YouTube](#)

**GRANDWORK™**

Tools and training