Grand Piano Dampers: An Everyday Guide

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The damper is undoubtedly the unsung hero of the piano action. Through a sophisticated series of levers and springs, the piano can be made to thunder and roar, after which we simply take for granted that these little blocks of soft felt shut it all down. Miraculously, they do, until something goes just a little bit wrong. If they don't go up and come down perfectly straight they don't work. That's when panic can set in.

By understanding how all aspects of this very simply system work, we are able to analyze situations and come up with appropriate solutions. When dampers look rood, they generally are good. First we'll deal with individual lift and then we'll take a look at collective lift.

Remember: "don't just do something: stand there!"

Pianos with an aluminum underlever tray are subject to a particular noise. These can be particularly noisy with an aggressive pedaler. Often the way to fix this rattle is to re-pin the lever flanges. Removing the dampers, fixing the problem and replacing the dampers should take only about 90 minutes to two hours.

There are two types of lift: individual lift and collective lift. Carry spare blank damper wires. The old wire can be punched out and the new wire can be pounded in. If the hole is loose, a little piece of paper in the hole will hold the wire.

Individual lift

There are only three places to make bends in the wire: x, y, z. All three vertical planes should be totally parallel. The only exception is if the underlever is not travelling correctly, in which case the wire might compensate for the lever. Actually the underlever should be removed and travelled. Almost all damper adjustments must be done with the action removed.

- **Z:** The bottom bend **(z**) is to line up with the underlever. There should be no binding; the bottom part of the wire should be vertical and straight up from the underlever. Check the bottom of the wire to make sure there is no kink that might create friction in the set screw hole.
- **Y:** The more travel of the wire, the better. Once the dampers are clear of the strings, are the dampers travelling? The only place that damper travel is attended is at the y bend. Bend the wire away from the direction of travel. Mark one side of the wire bending pliers with tape. You can't un-bend the wire. You can only re-bend it. This bend must be a definite point in the wire, not a general area. Place the peak of the convex side of the plier on the point to bend. Check that y:x is parallel to z:y.
- **X2:** Affects the distance between the guide rail hole and the damper head, and makes the damper block parallel with the wire.

- **X1:** squares the damper head to the string, and enables the damper to be adjusted left or right.

If you see a little motion of the damper head to the left or right when the damper lifts, The damper tool is only for adjusting x1 and x2. When twisting the wire with the tool, counter the pressure on the damper block with your thumb. To move the damper over in order to eliminate the light sideways movement, first remove the mapper and adjust the x1 bend first; then adjust x2 to make the damper parallel with the wire. Use narrow thin needle-nose pliers that have been filed down and that have the teeth ground off; we want smooth pliers so as not to score the damper wires.

Bass dampers will generally bear more on the right string than the left string. Instead of bending all the wires over, actually it is easier and quicker to loosen the damper guide rail screws and to move the entire guide rail over a little bit. Place a level on the bass section and the strings will seem fairly flat.

In the higher treble, the strings seem to have a slight up-hill direction when checked with a level. Therefore the dampers must go more up and back than they do in the bass. Just by lightly tapping the top of the front and the back of the damper, it is easy to feel if the damper is equally seated on the string. There should be an equal feeling of sponginess front to back. The damper must be parallel to the strings and not necessarily 90 degrees to the head.

Collective Lift

All underlever block screws should be loosened, allowing free movement on the wire., If the underlevers have capstans, adjust them so that the underlevers are in a straight line and parallel to the key bed (this is the function of the capstans; they are not meant to fine-tune collective lift). If there are spoons, make sure they are also in a straight line and parallel to the key bed.

Make a pencil line at ½ of hammer blow (usually 23mm from the strike point) on four hammers spaced throughout the action and tighten the corresponding underlever block screws.

Replace the action and slowly raise the pedal prop nut until the tray lifts sample underlevers to where the camper head just starts to move as the pencil line comes to the height of the neighboring hammer. At this point, the sample damper will be well clear of the strings. This is irrelevant; it's the position of the underlever we're concerned with.

1. Remove action and loosen samples
2. Ensure all underlevers are seated comfortably on the tray, and all dampers on strings
3. Tighten all underleverr block screws. Softly at first and the n progressively tighter as you correct for twist and timing
4. Watch the underlevers themselves as well as dampers for uniform lift from section to section. Keep doing the worst ones. There'll always be a worst one.
5. Adjust last bit of twist with pliers (sparingly, very sparingly)

6. Pedal lifts damper at one-third of its travel
7. Lift tray at rest should be about 2mm below underlevers
8. Pedal lift stops as underleves clear depressed black key ends
9. Set up-stop rail for .5 mm clearance on black keys and 1mm on white keys
10. Set sostenuto rail at 45 degrees and approximately 2mm from the center of the tabs at rest, and 90 degrees when depressed.
11. When action shift does not clear the left string, damper return noise will be slightly reduced.

Additional notes & comments:

- Damper timing is adjusted to the entire underlever tray. Start by lowering the underlever tray as low as possible and raise the up-stop rail as high as it will go. If there are capstans and spoons on the underlevers, they are there to make the underlever line perfectly straight. The ends of the keys represent a perfectly flat straight line. The lift on each key should be the same. The place where the key picks up the damper should be about half of the hammer-blow. The inertia of the key and the early lift of the damper makes the
- Too light interferes with the let-off;
- Make sure the underlevers are all nice and straight with the capstans. The capstans should be in an average position – not too high or too low.
- At what point do we set the underlevers? The dampers should lift when the hammer is half way to the string, which is about 23 mm -- half of the 46mm distance of the hammer lift. Raise a sample hammer and make a pencil mark on the side of the hammer at 23mm down from the strike point. This mark can then be seen through the strings when the key is depressed. Now turn the capstan or set shims in the pedal to set the underlever at this point so that all the dampers can be adjusted to the same distance. To get 23mm of key lift to begin lifting the dampers there must be a little tolerance. Raise the tray until the neighboring key reaches the half point and the damper starts to move. There will be some averaging out to do. The tendency is to adjust to a later lift because it is easier to see. We tend to raise the early lifters to match the later ones, which will make the lift a bit higher than it should be. Set four samples and finger-tighten the screws so that they grip.
- To hold the underlever at the right point, either block the underlever tray with a shim or wedge the pedal to hold the damper underlever at the sample height.
- Refine the lift. Catch the early lift by fluttering and squeezing the damper pedal. The early lifters will be seen by fluttering, and the late lifters will be seen by squeezing.
- Put your fingers on the tops of the dampers and you can feel which are early and late.
- Slightly loosen the screws and lift the dampers while pressing lightly on the top of the damper with the fingers to make small adjustments.
- Look at the underlevers. It's easy to get out of whack from the treble to the bass. If there is a tendency for an earlier lift in the treble than the bass, by watching the underlevers this is easier to spot.

- Use a small screw driver to tighten the screws. Pliers do not let you feel the tightness, and can also squeeze the slot thinner. The more you remove yourself from the fell of what you are doing and the harder it will be to be accurate. Carry a couple different sizes of screwdrivers.
- Keep straightening and adjusting while tightening the screws. Because the end of the screw is rough, it will cause the wire to twist. These screws in extreme cases can be removed and the ends can be smoothed out with emery paper.
- To adjust the final twist, place a pier on the top of the underlever and move the wire while the damper is lifted above the strings. Use this technique sparingly because the pliers can bend the wire.

Pedals

- The pedals will lift the underlever 2mm above the dag blocks, which will leave it free. The lever should never rest on the dag blocks. If you put weight on the dampers it will distort the felt on the strings.
- The pedal lifts the dampers at 1/3 of the travel. The end of the pedal dowel is usually a capstan.
- If the pedal lifts the dampers farther, the dampers will bounce. The dampers should clear the keys
- To adjust the up-stop rail to .5-1mm above the underlever.
- The key lifts the damper farther when the pedal is depressed.
- The sostenuto blade should be at 45 degrees when played and 90 degrees at rest.
- The blade should line up with the sostenuto pedal when at rest.

Trichords

- Trichord damper felt sometimes needs to be replaced if it oinks. When the shift pedal is depressed, it can cause this oink as well.
- For whooshing, use hairdresser trimmers to trim the excess felt. You need a license to buy these expensive scissors, but when obtained they are so accurate the fuzz can be trimmed off a peach. They don't distort the felt: they grip the felt and cut it at the same time. Only use these scissors for damper felt. Paper is really hard on scissors.
- Enlarge the slot in a trichord felt with a razor blade. Then massage this slot with a rod, making the slot more bow-legged than vertical. If the aggraffes are not equally spaced, cut towards the wide side and the damper will seat better.
- Pinch the felts together with a plier if they are too wide.
- Leveling the strings is essential.

Tools

- Hairdresser scissors.
- Umbrella stakes can distort the wire, punch out the guide rail felts, and enlarge the hole too much
- A 2mm pice of wire on a handle is ideal for easing guide rail holes. Rough up the wire. With a lighter heat up the wire and use it to ease a sticky guide rail bushing.

- Often the damper lever bushing is the cause of sluggishness in the lift, not the guide rail hole. This center pin must be free-moving like a jack center pin.
- Keep a self-standing cosmetic mirror to help checking for twisting. That way you can see both sides if the damper at the same time. A mirror also helps when adjusting let-off in the treble.
- ProLube in a hypodermic needle can lubricate s single guide rail bushing.
- Snap-off razor blade
- Smooth pliers
- Tiny screwdrivers
- 3mm key-bed block
- Cut a groove at 3mm on a brass wire for a gauge
- Wire-bending pliers

Partial Dampers at the Breaks

- Bend them forward a little since the back has been cut so the front comes down earlier.
- Often the bushing is loose on these.
- The damper can be traveled away from the strut at the x points.
- Some of the block can be trimmed so it doesn't rub.

Underlever leads

Often these lead will come loose and will click.
Lightly tap on the underlevers and you will hear it. Usually it is the front lead that is the worst offender. To fix this, use duck-bill pliers and squeeze on the lead to scrunch the lead. This widens the lead just as they originally did when they stamped them in. This is much quicker than removing and replacing the leads.

Pointers

- Damper lifts at ½ hammer travel and not ½ key dip
- Underlevers and sostenuto tabs should be in a straight line and parallel to the key bed
- Ream and iron tight guide rail bushings with a 2mm reamer (rubber mute handle)
- Use fine hairdresser scissors to trim felt
- Use a thin 6" metal ruler to space block dampers to strings
- Lightly tap front and back of block dampers to determine seating
- Lightly tap damper heads or underlevers to listen for loose leads
- Cut and spread tri-chord felt to help seating. For unevenly spaced agraffes, cut away from the wide side
- Strings may be slightly pinched to help seating
- Keep looking for the worst one
- Check string leveling
- Add a small piece of felt between existing felt to tame leaky dampers in the low bass
- Carry a spare camper wire for confidence