

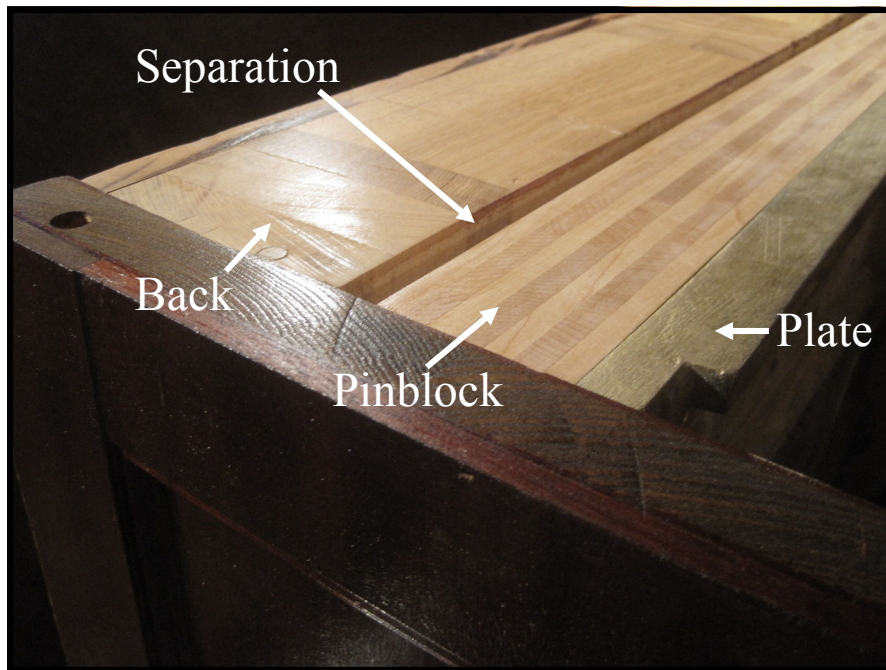
The Owner's Guide to Piano Repair



Focus On: Repairing the Separated Back

Rough Draft Copy

The basic construction of the back the vertical piano by necessity needs to be rock solid in order to hold the 18 or more tons of tension exerted the strings of the piano. The cast iron plate, the pinblock and the back framework of the piano all work together to hold this tension in check and provide a stable foundation for tuning. This solidly built structure can, however, develop problems later in the life of an instrument as essential glue joints weaken with the passage of time. Your piano unfortunately has developed a separation between the pinblock and the back framework which may be detrimental to the welfare of your instrument if left untreated.



Top view of pinblock / back separation.

The following questions have been answered to give you the information you need in order to decide if repairs to the back of your upright piano need immediate attention

What is the cause of this type of structural failure in an vertical piano?

Several factors come into play. For older upright pianos, the back framework and pinblock were traditionally glued together with hot animal hide glue. Although the resulting glue joints were ordinarily very strong, given enough time they can fail. If the all-important glue joint between the back of the pinblock and the framework weakens and allows the enormous tension of the strings to open up even a hairline crack, only the long plate screws remain to hold the plate in place. However, these screws often don't penetrate very far into the back—sometimes less than an inch (see photo, next page). Once these screws pull away, the only thing left holding the structure together is the rigid nature of the cast iron plate itself.

Rough Draft Copy



The photo to the left (taken during the repair of a separated back / pinblock assembly) illustrates the problem. The lag screw shown resting on top of the plate and pinblock wasn't able to hold things together once the glue joint failed. The white line shows where the pinblock ends and the back bracing begins.

Obviously, the screw did not penetrate the back to a degree sufficient to hold the joint together once the glue failed.

What then is the standard operating procedure for such a repair? Is it a straight-forward procedure or are there complications?

There can be factors which make the repair somewhat complicated to perform. The first issue that must oftentimes be dealt with (even before an absolute diagnosis of the extent of the separation may be given) is the fact that on many older upright pianos the upper portion of the back and pinblock is firmly covered—either by the back half of a split lid which may be glued in place, or by a wooden cap underneath the lid which is again firmly glued into place.



With such a covering in place, it is impossible to see the extent of the separation, let alone deal with repairing it. In the case of the maple cap glued in place in the photo to the left, the fissures which had opened up in the cap gave evidence of the separation occurring below it, but until the cap was removed, nothing could be done.

One way or another, a cap or a lid which is glued into place must be first removed before any repair work may be accomplished. Depending on the strength of the glue joint, this may be easy or difficult.

Rough Draft Copy

Ironically, the glue joint holding the lid or the cap in place oftentimes is rock solid (not having been subjected to the constant pull of the strings), and resists being pulled apart. A split lid usually may be pried off without serious damage to the veneer on the top of the lid, but the veneer on the underside of the lid is almost always damaged (see evidence of this in the top photo of page 3).



A cap, however, is not veneered as are the case parts, and thus is not so easy to pry loose. Many times, a solid wooden cap (usually made of maple) must be routed off (top photo) in order to give access to the back framework and pinblock. Once repairs have been accomplished, a new cap may be produced and installed—preferably with countersunk screws to allow access in the future!



Once the actual separation has been exposed (photo left) repairing the problem may begin. For anything greater than a simple hairline crack, the first step is to clean any debris out of the crack, block it open, then take the stress off the assembly by letting the tension on the strings down considerably. With the tension released, glue (usually epoxy or carpenter's glue such as Titebond) is worked down into the crack. Then the gap is closed by using clamps to squeeze the assembly together.

The type of and number of clamps used depends on the amount of separation which has occurred. For a very small crack, several large C-clamps may be sufficient to draw the back and the pinblock together. For a wide crack, however, larger clamps in greater number are preferable. A number of bar clamps or pipe clamps spaced evenly from one side of the piano to the other is the ideal arrangement. With this set-up, the clamps may be turned down a little at a time from one side to the other without placing too much stress on any individual spot along the plate at one time. Compare this to the method for correctly tightening the lug nuts on the wheel of a car. Instead of turning one nut down completely, a pattern is used where each nut is turned down a little at a time to tighten the wheel in place evenly (see photo next page).

Rough Draft Copy



With this set-up, the plate may be eased back into position as gently as possible. The crank on each clamp is turned a quarter turn at a time to apply pressure evenly from side to side. Once the gap has been closed to the point where beads of glue have been squeezed out, the clamps should be left in place at least 24 hours in order for the glue to cure before proceeding.

Important note: Even using extreme caution in applying pressure to the plate to tighten up the gap, it is possible that the plate can crack, especially if the separation is severe or longstanding. If the plate were to crack, that is a very serious issue that may well result in the piano being unplayable. This is a very rare occurrence, but it needs to be understood that it can happen.

Once the clamps are removed (and before tension is returned to the strings) the original bolts may be returned (after plugging and retapping the holes). The advantage to this method is a simple cosmetic one —the appearance of the piano will be unaltered. For a more reliable repair, however, the bolt holes may be drilled all the way through the back of the piano so that threaded rods with nuts and washers on either end might be inserted. This does make the repair more obvious, especially from the back of the piano, but it insures that the problem will never crop up again!.

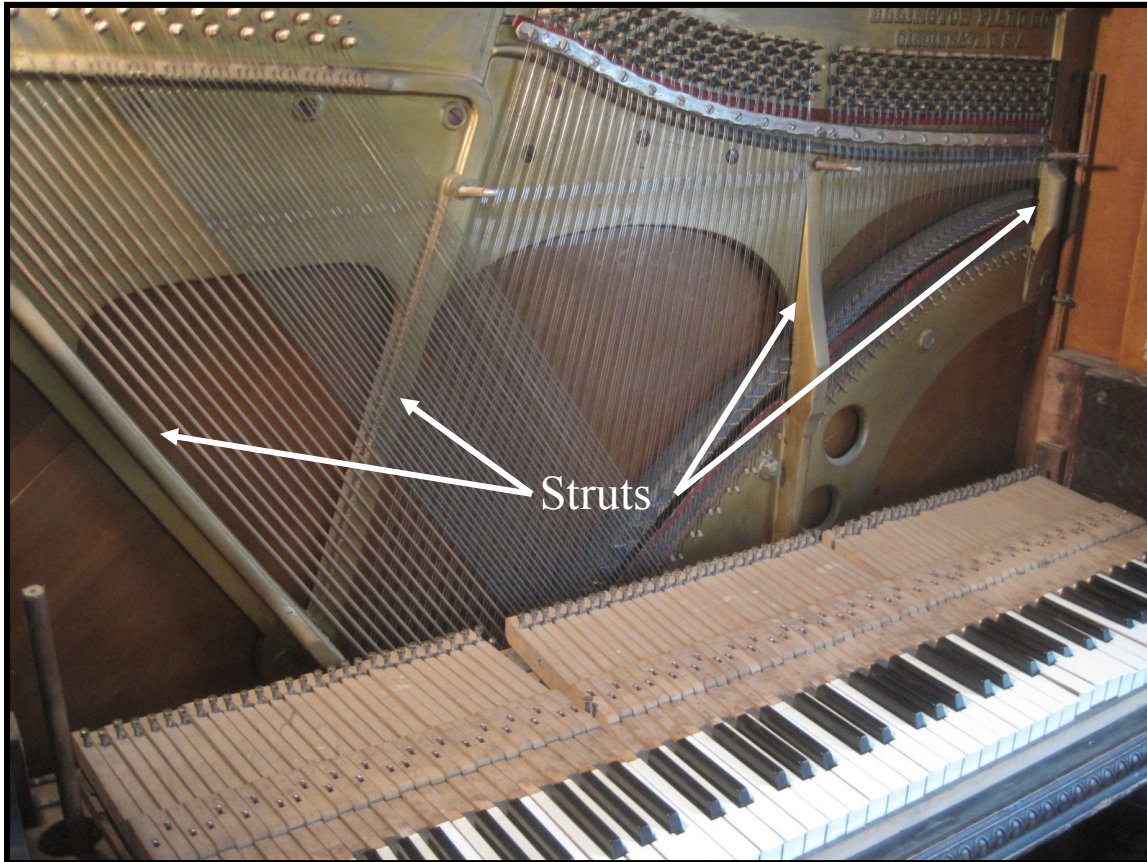
The standard procedure for this repair is to drill 1/2" holes through the plate where the original bolts were placed, then on through the pinblock and the back frame of the piano. Precut threaded rods are inserted and the nuts are snugged down from both front and back (inset).



Rough Draft Copy

If the problem is ignored, what are the risks?

First of all, any tuning done on a piano with a pinblock which has come loose from the back is going to be unstable to a greater or lesser degree. If the crack has widened to the point where the bolts have let go, the piano will most likely go flat very quickly if tuned.



The cast iron plate revealed.

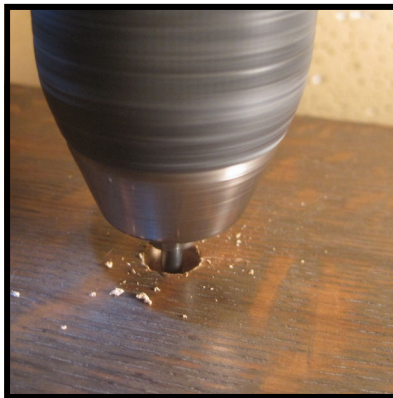
Much more serious, however, is the fact that with the top of the plate only attached to the pinblock, the tension of the strings will pull the plate further and further from the back. Although the cast iron plate looks as if its a solid expanse of metal when view from the top, it's actually not. In between the top and the bottom of the piano are struts which must resist the downward pull of the strings.

The problem here is that when the top of the cast iron plate is being pulled forward and away from the back of the framework, the middle section and the bottom of the plate are still firmly held in check.. If enough deflection of the top of the plate occurs, the plate can break, usually at one or more of the struts. (Ask anyone who has broken up an old cast iron bathtub. Cast iron is very strong, but given enough force it will break.)

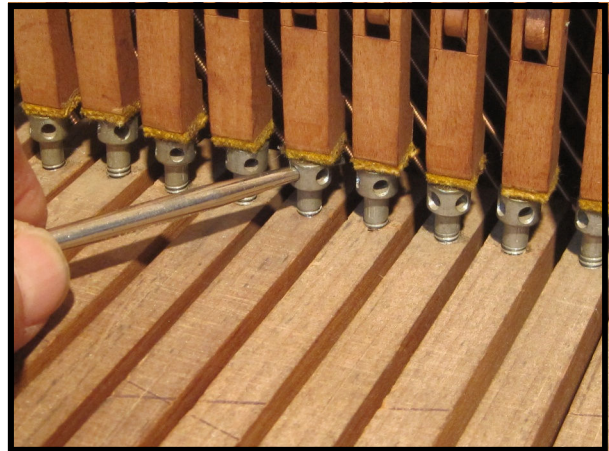
Rough Draft Copy

If the repair is done on my piano, will there be other issues that need to be dealt with?

If the piano has a split lid which needed to be pried off, it will need to be secured—preferably with screws instead of glue. The most common procedure is to drill 2 holes on either side of the lid part way through (left photo), position the lid on the piano and drill a smaller pilot hole through the rest of the lid and into the the back framework of the piano (center photo), insert round head screws and cover with rubber bumpers (right photo)



Very possibly (especially if the separation between the back framework and the pinblock was an issue for a period of time and adjustments were made to compensate for any change in the geometry of the strings / action), the touch of the piano will be unsatisfactory once the repair has been made. If that is the case, the piano will need to be regulated to put all the important adjustments to the action back to their proper specifications. Also, with most of the tension removed then put back on the piano, the tuning will need to be gone over several times before it settles down and is stable.



On the positive side of the issue, with the basic structure of the instrument on a solid footing once again, the piano may be safely tuned up to pitch. Once the piano has been regulated and any other issues have been cleared up, it should be playing up to its potential once again.

Rough Draft Copy



Repaired back allows tuning at A-440 for the first time in decades!

"In business to bring your piano to its full potential."