



**Restoration report of 1795 Broadwood square piano #3007  
5 octave compass FF – f3**

*Colm O'Leary 2011*

Following one of my usual internet searches in September 2010 I found this lovely little piano for sale at an antique centre in Hemswell, UK. After several phone calls and some emailed pictures, a deal was done and I arranged for my usual couriers to deliver it to me here in Ireland. A month later it was with me safe and sound and I finally had the opportunity to give my new project a thorough inspection.





The piano itself seemed to be in relatively good condition; however it had parted company with its original stand at some stage in the past. It had been placed sitting on what looked to be a washstand base from the 1840's which, in some respects, mimicked the Regency pianos with their music drawers underneath. A quick inspection of the underside showed that there was a shadow along with two holes for dowel locaters consistent with it having had a trestle stand, rather than the French stand also offered by Broadwood at the time. Given the rarity of old trestle stands without their accompanying pianos it was decided that a new stand would have to be made. The inspection underneath also revealed that the two side plinth pieces had been re-glued rather badly with epoxy and would need to be the first matter addressed. The piano had been re finished quite recently with French polish. An amateurish job, rather badly done, with a resultant plastic orange peel look.

Internally the piano was in excellent unmolested condition. It has its original pine dust cover which extends from side to side and it is in a very good state compared to some I have seen, with no cracks or significant warping. The brass under-dampers were all there but several of them had broken forks and would need repairing or replacement. They were also seized up as is usual with these but luckily, only with a mix of oil and dust rather than corrosion. It appeared that almost all of the strings were present and most of these looked to be original with a few replacements which had been done long ago with lower thickness iron. The strings were quite loose and it was obvious that the instrument had not been tuned in many, many decades. One upside of this was that there was no sign of twisting or warping in the case.





The keyboard was in very good condition with all the ivory present and undamaged although some of the jacked keys in the treble were quite warped. Sadly, the keyslip which goes in front of the key bed was missing but easily replaced.

Again, the name board was in very good condition with a good clear inscription, not rubbed as they usually are and with the only blemish being that someone had “upgraded” the piano by changing the date to 1799. A bit of research on the internet and consultation with David Hackett and the curator of the Broadwood Archives in Surrey resulted in the conclusion that the proper date would have been 1795. This would be re-instated.

The wrest plank and pins were in good condition with no separation from the spine and no loose pins. The pins themselves are all original and un-drilled with their original bronze wash still intact. The hitch rail looked to be in good condition too, with no pins missing, and the original red cloth had not been eaten as we so often find. Even the cloth strip to mute the strings between the bridge and the hitch rail (listing cloth) was original and uneaten.

The soundboard was in a good state with only a tiny separation at the glue joint between the action and the bridge. There was a slight warp to the soundboard between the bridge and the back right corner, and the shape of the diagonal brace underneath could be vaguely discerned. The only downside to this were the abundant dust bunnies which were between the strings and the soundboard. At some stage, quite recently I think someone had sprayed over the inside edges of the case with a thin coat of spray lacquer, probably thinking that they would revive the colour. All they succeeded in doing was gluing 200 years of dust and dirt to the case and soundboard edges.

The action is the usual English single used with brass under dampers and was intact and functioning well though the uppermost hammer had become detached. After carefully cutting a piece of lining paper to the size of the key well, sliding it in underneath the strings and above the dampers, the action was carefully slid out. The keybed screws had been removed previously and would need replacing. An inspection underneath the keys showed that the condition of the original wool cloths was remarkable and that none of them had been munched by the dreaded moth larvae. They were however quite compressed. I now had the chance to examine the hammer heads properly and again, though they had had some use, I deemed them to be quite serviceable with only minimal compression where they had contacted the strings. The uppermost hammer was retrieved and it was decided that this particular one would need recovering. The uppermost five hammers had been covered with a tan leather smooth side out. All the others were covered with the usual cream leather, suede side out.



As mentioned, the brass under-dampers were seized up but an application of baby oil with a dropper soon brought them back into full working condition. More oil was applied to flush out all of the remaining residue and it was easily removed using Q tips.

In order to assess the strength of the hitch rail, the action was carefully replaced and the strings brought up slowly and carefully over a few days to A 392. This was about the limit of the existing strings' strength and a few were lost along the way. But, after a couple of tunings at A392 everything held in tune for a couple of weeks indicating that the wrest plank and hitch rail were stable. Sadly, the iron strings were so rusty, and both the iron and over-wound so brittle, that though the tone was pretty, it was a mere shadow of what it would have been. It was reluctantly decided that the strings would have to be replaced. However, this would be one of the last jobs to be done.

The next thing to be done was to tackle the case. The piano was placed on a bench and rotated onto its spine with the lid against the wall for support. The two badly glued side pieces of the plinth were removed with a strong paint scraper of the cheap 99p store variety. These are ideal as they are much thicker than better quality paint scrapers and therefore have more strength when prising and hammering. They also tend to have squared off edges and don't dig into anywhere you don't want them to. (For American readers, the Stanley scrapers at discount hardware stores are similar.) As I mentioned, these pieces had been badly glued with epoxy so it was relatively easy to prise them off. The epoxy was then carefully dissolved and scraped away with cellulose thinners and a sharp blade. Once clean they were ready to be glued back. The bottom planks on the right hand side had also separated slightly from the rest of the case. This was addressed by sliding two narrow cheap paint scrapers into the gap and then wedging them apart with a large screwdriver. This was repeated for the two planks nearest the front edge. Then some hot hide glue was injected into the gap with a reusable veterinary syringe and the joints clamped for several days. After this the plinth pieces were glued back on in the usual way with hide glue and clamped overnight.

After a bit of thought I decided that rather than remove the existing finish and risk removing any remaining patination to the wood, (although precious little did remain) it would be possible to carefully sand the finish back to a level surface as a ground for re polishing it. This French polished finish would then be cut back with 0000 grade steel wool and given several coats of wax along with a patinating wax mix of black shoe polish, homemade beeswax polish and pumice. Ideally, this mix is made using clear wax mixed with ground soot (yes, the stuff from your chimney) which has been ground down in a pestle but due to smokeless fuels and renewable energy this commodity has become thin on the ground. If you are lucky enough to have some, use the light fluffy kind which builds up in the chimney rather than the tarry type. This mix, however you make it, can be applied to scratches to age them or to corners where on an original finish you would expect grease and dirt to build up. I also have to say at this point that the intention in attempting any patinating was to help soften the effect of the extensive renovation which the surface had suffered prior to my buying the instrument. Essentially, to try to take the "made last week" look off of it and make the best of a bad job. My guess is that after chemical stripping it had been sanded to remove the faded surface and every last trace of the grime and wax which builds up with age. Of course, where possible original finishes should be respected and all attempts made to repair a damaged surface rather than the last resort of replacement. But if replacement is the only option then a softly, softly approach with the right methods can minimise the impact on the look of the surface. Sadly, as can be seen below, in this case that ship had well and truly sailed.



Once the case was finished it was time to turn to the stand. A suitable plan drawn by Robert and Andy Durand was kindly supplied by David Hackett along with some close up photographs of original stands, and I set about finding suitable timber. After trawling through my stock of salvaged Cuban mahogany I determined that I didn't have any pieces of a suitable thickness, and considered the possibility of laminating sections, but decided that without a thicknesser at my disposal that it would be impossible to get surfaces flat enough to do the job properly. I then searched to see if I could find a stockist of suitable salvaged timber.

Eventually I did find a timber yard which had a stock of 100 year old Cuban mahogany but the cost would have been many times what I had paid for the piano. However, this company does import plantation grown Cuban mahogany, and although slightly lighter in colour, is the same species and a lot cheaper. When the timber was delivered I found a local sawmill which was able to roughly dimension it into the sizes I needed. I then finished them by hand using a set square and a hand plane.

This, I must admit, was a revelation to me. In my years of restoration of antique furniture I have always used salvaged woods which have been seasoning for at least 100 years and more often than not 200. In comparison this new wood was glorious to use. It had not been dried of its oils by time and was capable of the finest finish. Sliding the plane along it I could get shavings which were almost transparent. A joy!

After squaring up the pieces and cutting them to the approximate lengths needed, leaving the maximum at each end that I could allow, it was time to cut the moulding. For this I placed the pieces in my folding workbench and used a standard half round router bit of the appropriate size. Luckily I have a stand from a 1770's Longman & Broderip to use as a guide to the construction of the joints. The mortise and tenon joints were cut by hand using a scratch stock, a rechargeable drill, a chisel and a mallet. The mortises were cut first by marking out with the scratch stock; the main body of wood was then removed with a drill bit a couple of mm narrower than the finished width and then finished off by hand with a sharp chisel. The tenons were then cut to match each mortise and finished off by hand with the chisel. One little tip I would pass on is that to get a strong mortis and tenon joint, fit is everything. You don't want it loose if you are using animal glue. The stand should be capable of fitting together firmly and solidly in a dry run without glue. The surfaces which have all the strength in this joint are the two long sides. In order to get a good fit between the pieces the

shoulder (the flat surface on the tennon piece which butts up against the piece with the mortise in it) can be VERY slightly dished from the edges down towards the tennon with a fine chisel. This ensures that when glued and clamped glue will exude slightly from the mortise filling this slight gap and you get a nice looking joint with plenty of strength.

This is also true of the joints for the cross stretchers, which are bolted using bed bolts. These bolts were purchased from a company in the UK called Rutlands Ltd. To do these joints, it is best to glue the two ends together first and then place the frame upside down with the stretchers in place. Place the nut on the bolt about an inch from the end and then sit it on top of the stretcher with the head flush with the end. Mark the position of the nut exactly. The reason for this is that when you cut the mortise for the bolt to sit into, it must be a precise fit. Not too small, or you won't get the nut to go in properly, and not too big or it will fall out easily. You want it to stay in position on its own no matter how many times you put the bolt in or out. Once you have cut the mortise don't be tempted to just push in the nut. You need to drill the hole for the bolt first! Drill the bolt hole using a long auger bit of an appropriate size to intersect with the mortise and continue to drill to the other side so that the rest of the bolt has somewhere to go. Place in your bolt until you can just see the tapered end. Make sure there is enough clearance at the bottom of the mortise below the screw for the nut. Now comes the tricky part. If you have made the mortise correctly you only get ONE go at this so take your time. Place the bolt in the hole so that the end sticks out into the morise. Then place the nut in the hole and hammer in. Once you can feel it hit the bolt stop, withdraw the bolt slightly and hammer down a little bit more until you can feel the hole in the nut with the end of the bolt. It's a bit like keyhole surgery, all done by feel. Once you can feel the hole in the nut, tap it very gently until you can get the bolt to screw in. If it's tight you can tap the nut down very slightly and it should align better. Once you can screw the bolt in stop. Don't be tempted to keep tapping the nut because it's a one way journey. Once it's in you can't get it out again.

Now, no matter how many times the stand is taken apart or put together the nut will always stay in the right place for the bolt.





The next stage was to sand the stand which I did before assembly but once assembled I gave the mouldings a slight sanding where natural wear would occur over time. It was then finished off with 1200 grit garnet paper. The whole thing was given two coats of water based dye made with Van Dyke crystals and left to dry. This was lightly sanded again with special attention paid to where natural wear would occur. I then gave the whole thing a coat of antique pine spirit dye. I find that the Van Dyke crystals make the wood more receptive to spirit dyes. This gave a colour which matched the case rather well and the whole thing was given several coats of French polish to seal it and then several more coats of wax. The antiquing wax was used around the bolts, at the internal joints and in the mouldings. These coats were put on, left to harden and then the excess rubbed off with ordinary wax on a cloth. It takes patience to build up a finish and this can be repeated every few months. Next, the stand was offered up to the piano, still on its spine and aligned with the dust marks on the underneath. Measurements were taken of the dowel holes and corresponding holes drilled in the top of the stand. Two antique dowels were found of the same dimensions and inserted. Then a set of castors were fixed to the bottoms of the legs. These castors, along with a set of three brass lid hooks were purchased from a company in the UK called Optimum Brasses. They are excellent quality. Once the piano was back on its own legs work could begin on the action.





All of the keys were removed and dusted, the boxwood fronts cleaned using Q tips and a paste metal polish called Peek. It comes in a tube and, used very sparingly and lightly is excellent for this. Also useful to have to hand is some of that heavy duty kitchen towel. It's lint free and disposable. The Peek polish is also indispensable for cleaning the ivory keys. It removes general dirt, some mild stains and leaves the keys with a lovely clean shine. I've been using it for years on ivory and bakelite and haven't had any adverse effects so far. Once the keys were clean my attention turned to the leather blocks (old man's head) on the brass rod, one for each key, and is the means by which the hammer is struck. Underneath that is a separate block shaped like an outrigger and is the method by which the weighted end of the under damper is lifted. This is adjustable backwards and forwards pivoting on the bras rod and allows for fine adjustment of the damper dip. These appeared to be, again, in excellent general condition with only minimal wear. Some of the heads had been replaced with white leather at some stage but the work was well done and there is no merit in replacing them. One or two which did need replacing were from the upper level which impacts with the underside of the hammer. This was done using vegetable tanned goat skin, smooth side out and trimmed to fit.

With the keys out I could see, as mentioned before, that the cloths were in exceptional condition and it was decided to only remove the balance rail and front rail cloths for thorough cleaning. The rest were brushed with a stiff toothbrush and with a vacuum cleaner head nearby to suck up any dust raised. The removed cloths were gently washed in Woolite and stretched back to the right size and pinned to a Styrofoam board covered in kitchen paper to dry. These then plumped up again and were replaced, ready for another two hundred years service.

In order to replace the detached uppermost hammer the top of the hammer rail had to first be removed. This is screwed on and the screws had rusted slightly. The slots were gently cleaned out using a fine flat headed screwdriver and then a screwdriver of the appropriate size was selected. It is extremely important to use one with a head the right size in order to avoid damaging the slot in the screw. The screwdriver was placed in the slot, firm but not heavy downward pressure maintained at all times and the screw turned slightly clockwise. This screws the screw in tighter and breaks any bond the rust has formed with the wood whilst making the hole ever so slightly bigger. Also, if the head is going to strip you don't want it to strip on the side you need to get it out again. Once the screw tightens you can then gently reverse the process and remove the screw. If the screw proves to be stubborn you can then take an electric soldering iron. Take out the pointed tip, reverse it so that you have a flat end pointing out and use this to heat the screw. Be careful not to heat it too much, you don't want to burn the wood. This expands the metal in the screw making the hole slightly bigger. When the screw cools again it will shrink back and should be straightforward to remove by repeating the above process. Luckily none of that was needed here as they all came out without too



much trouble. Once the cap was off, it was apparent that all the hinges were, like the rest of the action, in very good condition. The hinge end of the missing hammer was placed in hot water until the glue holding the top and bottom pieces dissolved and the old leather could be removed. A new piece of vegetable tanned goat skin of an appropriate thickness was glued in and the hammer glued to the rail. The rail cap was then replaced with the original screws in order.

My attention then turned to the dampers. They were by this time all working well with the only blemish being that some had damaged forks. There were more damaged than initially thought as cloth had been glued onto the remaining sides of the forks. Also, the damper cloths were badly worn and had little or no pile left. It was decided to replace all the cloths. New cloths were cut to size and shape. These are doubled up as far as f# and single thereafter. The cloths were pressed by a steam iron where they were to fit into the forks, thereby minimising the disturbance to the brass required. This generally went well with just two forks succumbing to fracture and one upright failed. As all attempts to find someone to braize new ends onto the original forks which would have been my preferred option failed, new replacements were obtained from David Law, filed to size and fitted. It took a few attempts to get the balance right as they all come as a standard size and width and had a slightly different profile to the original ones on my piano. The original damaged dampers were retained in case it is possible to find someone to repair them at a later date.

The name board was next for my attention. As discussed earlier, the consensus was that piano # 3007 was made in 1795 rather than 1799. The "9" was removed using a Q tip dipped in Liberon finish reviver and then the surface of the name board polished using the same liquid. This is a very fine burnishing cream which used carefully, removes dirt without removing the surface of the finish. An example of an original 1795 Broadwood inscription was found on the internet and the "5" copied with a fine tipped artists felt pen. This was let dry and then sealed to the surface with several coats of what used to be known as Johnsons Klear. It is now branded Pledge Klear, here in Ireland at least. It is a clear liquid that can be applied in very light coats with a piece of kitchen towel. Lightly dab it on a couple of times over the ink which you want to seal in first. Then you can rub it on. It seals the surface and can be polished to a shine and even waxed over.





The next stage was to take a rubbing of the hitch, bridge and nut pins and send it to Lucy Coad so that a complete new set of strings could be made and I set about removing the old ones, carefully labelling them in pairs, to be sent to Malcolm Rose for measuring. Original strings provide valuable information and even if they are being replaced should be measured and retained with the instrument as a future reference.

Once the strings and pins were removed from the piano the wrest plank could be gently cleaned of all its dust and dirt. It was then sealed with several coats of Klear. This is an excellent product for sealing wood without it looking like it has been sealed. Again apply with kitchen towel. It seals out the dirt and as it's not sticky or waxy, will not attract dust.

With the strings removed it was now possible to clean and examine the soundboard properly. The dust was vacuumed away and light coats of cellulose thinners applied to the inside edges of the case to remove the laquer mentioned previously which had sealed in the dust and dirt. Once this was removed the soundboard was cleaned by rubbing with 0000 grade steel wool dipped in Libron finish reviver. The cleaned sides were cleaned with 0000 grade steel wool dipped in wax and then polished.

The now cleaned soundboard was examined and deemed to be in excellent condition apart from a small joint separation about 6 inches long between the bridge and the action. There were no apparent loose ribs and the bridge was well attached. The warp mentioned earlier could be seen better now and was only very slight. The soundboard, now cleaned was given several coats of clear wax and buffed. The dampening strip which was removed with the strings was washed in Woolite, pinned to a piece of Styrofoam and left to dry. The next task was to try to clean the scarlet cloth on the hitch rail. This had to be done without removing it and was accomplished by using a stiff toothbrush and a very powerful vacuum cleaner. I was quite surprise how much of the dirt just brushed out. This was the extent of cleaning needed to return it to a usable state.

By now the new strings had arrived from Lucy Coad and I preceded to re string the piano. They had been packaged them in such a way that they were numbered from the top note to the bottom so it was simply a task of starting at the top of the package and working my way down keeping an eye on

the reference scale she had emailed me. She also very patiently explained to me how to wind these strings onto an undrilled pin.

As per these instructions, the first thing I did was make some little shims. I used some light coloured hard wood veneer cut into 4-5 mm strips and so that they stick about 10 mm out of the pin hole. These are not glued in but merely placed against the back edge of each hole one at a time as I went along. Using this method, the pins are held tightly but never seem to be too tight. As far as I can see, gluing in shims is not necessary and it also means that if, at some future date, you need to replace a string, you can just take out the old shim and replace it with a new one.

I hitched the string onto the appropriate hitch pin and measured to the hole my pin was going to go into. I measured about 6 to 8 inches beyond that hole and that was my starting point for the wind. I cut the excess wire off a further three inches or so beyond that. I took the tuning pin in my left hand with the bottom of the pin pointing to my right. I then took the wire with my right hand and laying it over the top of the pin at the point where I wanted to begin winding, both on the string and on the pin. I wound the end of the string diagonally around and towards the bottom of the pin and cut off the excess string about an inch after that.

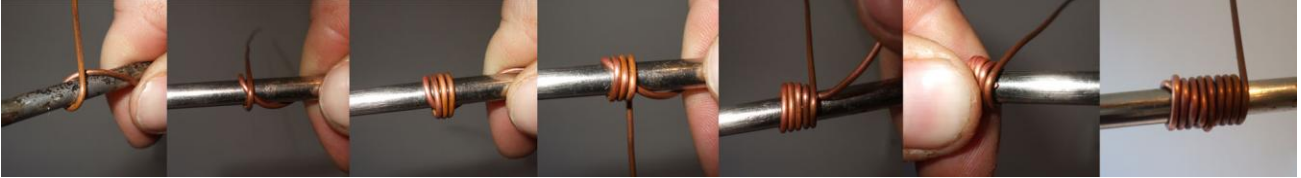
Now here you are meant to wind the string by hand, holding it tight. What I have found makes it a little easier is to initially use a brad awl to make one loop in the string first, just bringing the string around not quite all the way closed. Then taking a nail in between the size of the brad awl and the tuning pin, widen this loop and then screw on the tuning pin, down to the appropriate level that I wished to wind from. What this does is give the string a little better grip on the pin at that crucial first turning.

Now, holding the pin in my left hand and keeping as much tension on the string at all times as I could I wound the excess wire to the right diagonally down the pin as mentioned before and cut off the excess about an inch or so from the end. Any more and you risk impaling your hand on the string and it will just get in the way. Next comes the tricky bit.

Keeping the tension on the string with my left hand and keeping the string which is already wound in position with my right, I slowly and carefully turned the tuning pin towards me and wound the wire on to the pin. The point at which the string your winding on crosses over the string which is already on the pin is the trickiest and is where you must keep the gap small for a neat winding. I find keeping the string at about 80 degrees to the left hand side of the pin helps with this. I rotated the pin alternate between the right and left hand keeping one thumb and forefinger against the already wound string at all times. Once I got about halfway along the winding with the pin in my left hand and with the string having just passed over the diagonal wire which was wound down the pin, I took the excess of that wire and giving it a few twists, snapped it off. I then continued winding as normal until I lined up with the appropriate hole in the wrest plank. Then taking the pin in my left hand, and (this is the tricky point) keeping the tension on the wire, place the tip of the pin in the hole and with a hammer in my right hand knocked it into the hole. Now I aligned the string with the bridge and nut pins and tightened it slightly with the tuning hammer. The final task is using a flat head screwdriver placed between the pin and the excess veneer. I pressed down and snapped off the unwanted portion of shim flush with the top of the wrest plank. This gives a winding exactly like the original ones used.

As I don't have more than two hands I've illustrated the steps of winding the wire using two different size screwdrivers to represent the brad awl and the tuning pin and used copper wire as a substitute for the string. Hopefully it will be enough to get the principle of the winding across.





I repeated this over the course of a couple of days for all the other strings and re using the by now clean and dry original muting strip. I then retired for a few days to nurse my sore fingers! Lesson learned?.... Listen to what you are told by people who know better and do this over a week or so.

The piano was tuned up to equal temperament at A415 over three daily tunings and then left for a week to stabilise. After a week the tuning was tested and it had slipped fairly evenly between about 5 to 10 cents. It was then tuned again and left for a month and then following the suggestion of a friend it was tuned to Young. This has improved the tone a lot and it has now stabilised and the tone improves by the week.

After re stringing, the action was replaced in the case and I turned my attention to the warped keys. These were mainly the jacked keys in the treble, which seems to be quite a problem with Broadwoods of this period. The solution was to take a small hand steamer of the type sold for kitchen and bathroom cleaning at most hardware stores and two short but full size quick release clamps of the type with metal bars and nylon bodies with rubber pads. Finding where the warp is in any key is the hardest part but if you look along the key it's usually possible to see where the twisting starts. I then took the clamps and placed one at each side of this twist at 90 degrees to each other and using the steamer, thoroughly steamed the area with the twist. Now I took the bars of the clamps, one in each hand and gently but firmly twisted the warp out. You have to turn the key slightly beyond where you want to end up as it will warp back slightly as it cools and dries. Some of the keys took only one treatment but most took two or three before I got the twists out.

These were then left to dry in situ on their pins for several days. Then as the keys were quite loose and rattled they were shimmed by taking a blade and inserting it into each side of the hole for the balance pin and shims of veneer pushed in and sliced flat. This did take some time to get right so that everything ran smoothly without sticking or rattling. Next the keys were all levelled using paper punchings. One thing to note about these pianos is that the key fronts do not run parallel with the key frame but slope down ever so slightly towards the treble. I assume that this is something to do with the increasing weight of the hammers as you go further down the scale needing more dynamic movement from the key.

One of the final tasks was to make a new key slip to cover the front of the key frame. This was made using a piece of lovely salvaged Cuban mahogany with a lovely patinated surface and sliced to 3 mm thick on my band saw. This was then polished, waxed and sprung into position.

The final task was to tackle the old lock. It was carefully taken off and opened up in order to clean out two hundred plus years of dust bunnies, grease it and re-cut a lovely Georgian key to fit.



None of this could have been done without David Hackett, Andy & Robert Durand and Lucy Coad to whom I owe a huge debt of gratitude and who were always there with answers to questions, no matter how silly, advice and general encouragement.