## Restoration of an Andrew Reuss square piano with 'Grand Viennese' action

#### History:

In 2011 an Andrew Reuss piano came to auction in Chicago from the estate of Professor Werner Bratz, and was purchased by Frank Renfrow who resold it to the author later that year. At the time of the sale, it was only the second confirmed Reuss piano recorded, the other residing at the Smithsonian collection in Washington DC.



Leslie Hindman auction photo, Feb, 2011. Lot 213: \*An American Mahogany Parlor Piano, Andrew Reuss, Width 68 1/2 inches. An American Mahogany Parlor Piano, Andrew Reuss, Walnut Street, Cincinnati, of rectangular form, raised on twin columnar supports joined by a stretcher.



Smithsonian, Reuss – object 315,721 - 56,479.



Object 315,721 - 56479A

Subsequently a third Reuss, built a few years later than these, and with the iron string plate and bracing throughout, has surfaced in response to the on-line Reuss related postings.



The third one features an unusual right hand bentside, which preserves symmetry for the front of the piano, but at the expense of a somewhat massive and compressed look overall.



Joseph Newman, ~1830, built on the same plan as Reuss, in Baltimore.



J. A Knam, Vienna.

A short biography of Andrew Reuss was crafted from available information, and is online at **squarepianotech.com**.

A newspaper sheet pasted to the top of the left pillar support gives enough information to date the paper to late 1834 or early 1835, and we have accepted this date as the likely time of manufacture of this piano. Reuss was active from 1830 until into the 1840s, though his business seemed to diversify and he eventually fell away from building pianos. His work joins the small body of builders mostly located in Baltimore who were building square pianos with the Viennese action from about 1828 until about 1840, and included Joseph Hiskey, Joseph Newman, and George Huppmann. Lovering Ricketts, also active in Baltimore at this time, built along the English tradition. The construction of these pianos precludes being adapted to heavier hammers for the later increasingly heavy stringing for volume that was evolving, so the design was to have a rather short life in America. Andre Stein and J. A. Knam were known to have built pianos along these lines in Vienna contemporary to these.

Along with the Viennese action, many of these pianos also feature 'Janissary' stops, including the bassoon, drum, and bell.

### Assessment:

The piano arrived in a state of low tension, most notes did not play at all or were well away from pitch, many strings broken, and a sense that it had lain undisturbed except for moving for some number of years. An examination showed that the hitch pin block in the far upper right, which provides support for the bass section, had broken loose from the bottom and case walls and had partially torn the birdseye veneer. A few dampers were missing or dislocated, and the upper two hammers were missing from the key levers. In addition to the structural failure at the upper right, both corners of the case showed cracks and dislocations, and the left front cheek had lifted from the bottom boards. Given this serious mechanical failure, tension could not be possible on the instrument as found, and all these points would need to be addressed.





#### Right corner structural failure



Left cheek failure, action removed.

Perhaps 20% of the wire was a later addition, but a significant amount of the stringing was original. All strings, new and old were measured and recorded for diameter and speaking length. The leather for the hammers heads was not in serious condition and would be kept as found. A few of the lead weights in the key levers had swollen and the action was binding as a consequence. The key bed cloth was in good usable condition.

The failure of the wrestplank had put pressure on the soundboard, which is very thin at about 2.5 mm thickness, and the soundboard was cracked in perhaps two dozen places, some worse than others. Very little material had been lost however, and these sort of cracks generally respond well to careful expansion with wetting and gluing, with a thin linen backing for support on the bottom. Wider cracks could be shimmed. The soundboard was in a spruce, the species not identified, but microscopically similar to spruce species in North America.

Overall the finish was in good to very good condition, and possibly largely or wholly original, and no work was anticipated on the finish beyond cleaning and a light microcrystalline wax. Veneer in areas where there had been structural failure was loose and was reattached. Veneer that was once on the curved surfaces in the front had been removed and the areas ebonized, perhaps at an early date. The knobs on the lid may be original, but larger escutcheons were once in place, and the covers on the inside of the fall board are modern.

All cloths but the listing material was preserved to be returned to service. The listing cloth had been attacked by moth larva and was reduced to residual lint and short segments, held in place by oxidation on the wire. It was removed in bits and an example saved back.

The drum for Janissary worked, but not the bell, though it could be heard on bumping the piano up and down, and the bassoon stop had been removed and was missing. The moderator was in place, working, and all moderator tabs in place.

The stand was complete, but the mirror that was once in the pedal box was missing. All pedals and connecting rods accounted for.









Escapement pawls from rear

# Approach:

Given the general condition as found, the limited intervention suggested, and the value of having the instrument in playing condition, it was decided to proceed with a restoration. Any serious effort would begin with measuring materials unlikely to be returned to the piano, such as wire and listing cloth, and recording any conditions discovered during disassembly that would need to be corrected as the piano was reassembled. The sound board would need to be removed to access the problems below, and to repair it properly and reattach ribs.

On the Viennese style piano, the soundboard lies across the width of the instrument, and is secured by screws and glue on the left hand side, and a molding strip and glue along the left rear seam, but with a discontinuity near the right rear. The right hand 'S' curve of the soundboard is covered in a screwed- in molding and glued as well, but it is free along the entire front edge, which is removed with the sound board and secured with screws at left and right front. The 'S' curve is covered in parchment/black cloth where visible.

Given this arrangement, wet rags were packed along the glued seams and covered in plastic to reduce evaporation. In 48 hours of occasional tending to keep moisture in place, the board had released to the point where the seams could be heated with heat lamps and the board extracted intact.







On removal, the sound board was evaluated for repair, and it was decided that the bridge and ribs could remain in place in order to effect the corrections. A photo of the soundboard backlit is seen below:



Repairing the soundboard involved identifying which cracks had seen poor repair in the past and removing loose or non functioning shims, and which cracks were superficial and could be re-glued. Splits often respond well to wetting and clamping after gluing together, with a linen backing for support. A high grade artist linen is used for this support, about 0.25 mm thick. Once saturated in glue, the linen strip can add much reinforcement without affecting the sound quality. It is not a good fix where vertical stress will be applied though, and soundboards that have failed due to down bearing might be

reinforced with coniferous strips attached from the back, or the total down bearing force reexamined from an engineering standpoint. The Reuss had failed largely because the structure had failed that it was glued into, and was nominally under acceptable stresses with an intact hitch pin block and case.



The repaired soundboard with moderator stop set in place to show location.

The hitch pin block failed at the joint where additional wood was originally added to complete the block. This gives no real support other than the glue to this area. The introduction of a metal string plate here solved many concerns when introduced a few years after this piano was made. Evaluating the failure, we found the wood to be intact apart from the torn veneer, and the structure simply needing cleaning and gluing back into place. The area was flushed with boiling water to clean it, then warmed thoroughly with heat lamps. Clamping assist blocks of oak were prepared at a thickness to allow them to fit between the hitch pins and glue was injected into the disturbed areas with a large hypodermic syringe and needle, and the assembly clamped up.





Since it failed once, it will fail again, and rather than intrusively replacing out the entire hitchpin block with engineered wood, it was decided to return the current material to service, but to reinforce the block with stainless anchoring screws. These are 4 inches long and 3/16 in diameter, more than sufficient to keep the 2.5 inch thick block held in place. The veneer was cut away in 5/16 plugs with sharpened thin brass tubing such that it could be returned, the hole below drilled for shaft and then narrower for threads, and the screws put in under controlled torque to a point of being set well but not under excessive torque. The veneer was then returned. With the finish restored the cuts disappear.



The Janissary mechanism was nearly complete, including a nicely turned bell, and a drum stick of pine, with a horsehair padded beater covered in suede leather, and resting on a fabric covered, horsehair stuffed pillow glued to the case bottom. The beater is hinged as shown. On depressing the pedal, the beater strikes the sound board giving a loud thump, and as the pedal falls the spring steel arm, with a steel plug strapped to the end of it, strikes the bell and recoils, giving one clear strike.







The sticker for lifting the beater was in place, its top cover worn through, and missing from the side was the arm to lift the spring arm for the bell. This part was easy to make as suggested by witness lines on

the sticker, and functions well once in place. The leather hinge for the wood that holds the spring arm was returned as found to service.





Structurally the case was good inside, and uses a beam down the center and dadoed into a belly rail, all of which is clued to the case bottom boards, to withstand the effects of tension. These joints were checked and glue added where it had given way from twisting.





Left hand side

With the soundboard repaired, the Janissary in working order, and a fine spring day with warm dry weather at hand, the soundboard was returned to the instrument. Given the relatively short glue lengths to cover, and a readymade way to clamp it in from existing designed screws and molding, the soundboard went back in with little or no trouble at all.



Broken pins on the nut were repaired, and a few wrest pin holes that were seen to be too loose were shimmed, then the piano reassembled. Items left to address were making one, and a second partial, damper to replace missing ones in the main sequence. The entire piano was originally drilled for dampers throughout, but they are missing in the treble, and it is interesting that the other two Reuss surviving examples have similar missing treble dampers. Perhaps they were designed for but never installed.

The nut was marked in pencil for German gauge diameters, though the marking had been obscured by decades of wear and cleaning. Enough could be made out, coupled with string diameters as-measured, to develop the original scaling.



		The	'As-Found	d' measurements and n	narkings	
Number	Note	Length mm	Gauge	Number	Note	Length Gauge
1	FF	1420	7	41	a1	322
2	FF#	1407	6	42	a#1	304
3	GG	1390		43	b1	287
4	GG#	1376		44	c2	271
5	AA	1360		45	c#2	257
6	AA#	1342	6	46	d2	242
7	BB	1322	6 1/2	47	d#2	228
8	С	1310		48	e2	215
9	C#	1290		49	f2	204
10	D	1272	6 1/2	50	f#2	193
11	D#	1250	5	51	g2	182
12	Е	1230	5 1⁄2	52	g#2	174
			All above	53	a2	165
13	F	1207	5 1/2	54	a#2	159
14	F#	1180	4	55	b2	149
15	G	1152	5 1/2	56	с3	141
16	G#	1125		57	c#3	135
17	А	1098		58	d3	128
18	A#	1065		59	d#3	122
19	BB	1036		60	e3	115
20	С	1001	5 1/2	61	f3	109
21	C#	965	4 o	62	f#3	104
22	d	925		63	g3	96
23	d#	885	4 o	64	g#3	91
24	е	847	4 1/2	65	a3	84
25	f	811		66	a#3	79
26	f#	776		67	b3	74
27	g	740	4 1/2	68	c4	70
28	g#	702	3	69	c#4	65
29	а	664		70	d4	62
30	a#	627		71	d#4	59
31	b	588	3	72	e4	55
32	c1	548	3 1/2	73	f4	53
33	c#1	510				
34	d1	476				
35	d#1	447				
36	e1	424	3 1/2			
37	f1	403	2 o			
38	f#1	380				
39	g1	360				
40	g#1	341				

For the iron strings only, the following final scale was proposed in concert with Stephen Birkett.

	speaking L	found gage	prop gages	prop dia
Г.44	mm	marks	F /0 / 2	mm
F#	1180	4 E 1/2	5/0/2	0.902
G C#	1152	5 1/2		0.902
G#	1125			0.902
A A#	1098			0.902
А# Ц	1000		4/0	0.902
	1030	E 1/2	470	0.639
C C#	1001	5 1/2		0.859
C#	900	4 0		0.859
0 d#	925	4 0		0.859
Q#	885	40	1/0/2	0.859
e	847	4 1/2	4/0/2	0.817
Г <i>Е Д</i>	811			0.817
1#	776	4 1 / 2		0.817
g	740	4 1/2	2 (0	0.817
g#	702	3	3/0	0.778
a - "	004			0.778
a#	627	2		0.778
n 1	588	3	2/0/0	0.778
	548	3 1/2	3/0/2	0.74
C# I	510			0.74
	476			0.74
Q#1	447	0.4.40		0.74
el	424	3 1/2	0.40	0.74
	403	20	2/0	0.704
T# 1	380			0.704
g I	360			0.704
g# I	341			0.704
ai 2 <sup>#1</sup>	322			0.704
d# I	304			0.704
n I - 2	287			0.704
C2	271			0.704
C#2	257		2/0/2	0.704
	242		2/0/2	0.67
0 <i>#</i> ∠	228			0.67
e2	215			0.67
f2	204		1 /0	0.67
T#2	193		170	0.638
y2	182			0.638
g#2	1/4			0.638
a2	165		1/0/0	0.638
a#2	159		170/2	0.607
n2	149			0.607

141		0.607
135		0.607
128		0.607
122		0.607
115		0.607
109		0.607
104	1	0.578
96		0.578
91		0.578
84		0.578
79		0.578
74		0.578
70		0.578
65		0.578
62		0.578
59		0.578
55		0.578
53		0.578
	$     \begin{array}{r}       141 \\       135 \\       128 \\       122 \\       115 \\       109 \\       104 \\       96 \\       91 \\       84 \\       79 \\       74 \\       70 \\       65 \\       62 \\       59 \\       55 \\       53 \\     \end{array} $	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$



While this produces a pronouncedly peaked tension in the tenor, it is representative of this instrument type.

The piano would be strung up in the new P-Wire, or Berlin Wire, as developed by Professor Birkett at Waterloo University in Canada. This wire is an exceptionally close match to the metallurgy of early 19<sup>th</sup> C wire from Germany, and incurs only one stretch during tensioning, after which it remains quite stable. It is a higher tension strength wire than Rose D, and has perhaps a somewhat greater resistance to corrosion. The material starts life as rod stock about 2 meters long and perhaps a centimeter in diameter, and is essentially hand drawn at low speed through the die progression, a labor intensive task.

P-wire is only available in limited quantities still. Dr. Birkett is works to commercialize the process however, and hopefully real quantities will become available in the coming years. The price point should be equivalent to Rose and others now available. The plain (not overspun) brass bass octave was replaced in Rose yellow brass.

The bassoon stop was missing from the piano and was reconstructed based on an example still present in the Joseph Newman piano at Colonial Williamsburg. This is a sawn and tapering curved bar, attaching to the back of the wrest plank by a pivot screw, with the other end tilted up by a sticker rod activated by the pedal. The total travel of the bassoon stop is about 1 cm. The paper loop is formed of a stiff stock (in this case we formed it of a heavy marbled paper) and the height adjusted along the length of the bar such that as the bar is raised the paper meets the strings at about the same point down the length.



CWF Newman example below:



The Reuss bassoon stop bar installed.





Bassoon pivot point.

This stop can be removed with a little difficulty once installed, but is designed to remain in place of course. The paper tends to degenerate with time if left acidic, and once this happens, this stop becomes useless.

The base of the piano, as discussed in the short biography, contained clues as to the manufacture date. A single layer of newspaper was glued to the top of one pillar, and it contains coverage of issues that date the piano to late 1834 or early 1835.

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und manner Millin acindi o by the country and b were under their for to ----- in source of the te ciationes the bird by place Tim thun & the last desperato effort affendy alman in the state. I -in plant propabate in some saint great maximal anot only most of those may Republican is m when it avoid the remained to here the and I runy fust, course o be to the supplie of the con well to say wolding While we think of it, hour eur, we the guld com; a true up orever of county helividue tho minuous IPlac to the matter .-the pay of the Astosiaistanboy, during Laur i, on actorial of inter, charged Mr. Webster whith out day month dept thint ugoig will him. on the foor of Cougan, conditing the destruction should sicep. Those ings the Congress only provide for the vich, nich lesingel ip no sleep .-the rich will take more of the poor." New, the base ind obout We are libeller who made this adout allow farms in whe filled at the line he made it; and so we indirer, did al - avolued ousility of the atfive e pensioned presses

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se, thur he. Webster.

All this refers to an accusation of Webster, trying to cast doubt on his devotion to the common man, and is a perfect story for us, as it was large enough to have been documented (Webster makes a written denial on Aug. 5 1834) but small enough to only have meaning in a topical use, meaning that the storm over the issue blew over quickly and was replaced by others.

The pedestal consists of two massive pillars attached by long central iron bolts about 5/8" diameter, and a stretcher to which the pedal box attaches. The pedal box bears a close resemblance to a memorial market that Reuss erected to his parents and sister and dated 1836 (see biography).











As reconstructed with mirror replaced in middle.



Regulation of the action was limited to rebuilding the heads on the highest two treble hammers, and aligning the heads to the strings. While alignment is reasonably straightforward, the need to remove the sled, then the action, and repeat the process to reinstall, makes this a cumbersome exercise. Adding to this difficulty, the dampers drop down on removal of the action and their sticker wires interfere with removal and replacement, such that they must all be slid out first before the action can be addressed. While not so troublesome as removing the dampers from a captive damper Clementi or Dettmer, this is still an engineering difficulty.

With the hammers in good alignment and freely actuating, and two hinges for the pawl escapement replaced, the piano was strung in P-Wire and tuned. The forward wrestplank without any support is an engineering problem as well. It tends to bow under tension ever so slightly in the middle, such that the tenor and low treble fall rapidly as neighboring strings are brought up. The consequence is that tuning is an involved chase towards an ever tightening goal. This must have been the case from the beginning, so that these pianos by design are hard to tune from and un-tensioned point. Once at tune though, stability was fairly good. It is clear that to minimize the time a tuner would need to spend, the piano should be tuned often once at tension. It may be that tuning stability played a role in the fairly short adoption period that these pianos enjoyed.







Tom Strange Dec 18, 2012

