

Why Ampico B's May Not Play 'A' Rolls Very Well

By Craig Brougher

A lot of owners and rebuilders are noticing that their Ampico B's are not playing the older rolls very well. There can be a number of reasons for this, but you will discover here that in no way could it have been an oversight by the factory. Let's first consider the many situations that the factory had to deal with when designing a completely new Ampico piano, and then we'll learn why it could never be factory carelessness or oversight.

"The Ampico Reproducing Piano" by Richard J. Howe, pg 110, 111.

B. Peter Brown said you fought with Stoddard a little bit over having the "B" rolls work on the "A" piano and vice versa.

H. Yes. I didn't get anywhere with him. Well, he couldn't get into it because that was policy set up by the president and vice president. But it broke my heart to think that we had to actually make the quality on the new piano rolls less so that they would work on the old one. But we finally doped it out so that we didn't lose too much.

B. But it's noticeable and there are some sections where there is a problem.

H. No, I think we did a pretty good job on that. It looked like a pretty tough problem when it was first patented.

B. Did you yourself have much contact with the actual putting on of the expression marks?

H. No. That was done by Delcamp. Of course Mr. Stoddard also did this work I believe Peter Brown was telling me that Miss Dawson discovered that Mr. Stoddard couldn't hear very well. A lot of that is true you know. His hearing was very bad, but he had good ability as a musician. According to Miss Dawson, he made mistakes, but she blamed it on his ears and not on his judgment. It was his ears that were causing the trouble.

Now what did we just learn?

First of all, Dr. Hickman was not too musically inclined and his opinion was not the criteria by which the musicality of the Ampico would be judged. He admitted it. It was primarily Delcamp's responsibility, for the critical perusal of president Foster, vice president Wade, the board of directors, and any critical musicians they cared to consult with about it. So when we are told that Hickman was not all that musically inclined, Hickman himself would fully agree.

But some of the greatest musicians of the last century were directly represented by Ampico so this was not an issue which dared to be decided by mere conjecture, or personal likes and dislikes anymore. It

was do or die. The company's very existence depended upon this decision as to whether or not the new Ampico could play the company's own rolls perfectly, at LEAST AS WELL as the model A Ampico could play them. *Look at the financial tumble that company would take overnight if their new piano could not play its own standardized model A rolls properly in all respects!* Some customers had large roll collections, by then. It was like the phonograph records of the 50's through 70's. People were intent upon collecting all their favorites.

We really need to just stop and think a minute: The Duo-Art and Welte Licensee were large competitors of the day and would be looking to destroy Ampico's market in reproducing pianos if they could get as much as ONE SINGLE ART CRITIC ANYWHERE to effectually criticize the new Ampico to a degree that others would then take up their negative comments to a new level. Once that started, the destruction would begin. It never did. Nowhere did that ever happen, and the Ampico B walked off with all honors.

J. Milton Delcamp was known worldwide as a musical genius. He was the conductor of a large theatre orchestra at the age of 15, and a brilliant pianist, both classical and popular, but one who had a depth of musical understanding in all fields of music performance, and a particularly fine ear for detail and nuance which defined his value as Ampico's chief musical editor in the roll department, as well as a performer.

By 1926, Delcamp had gotten well through the Ampico library of piano rolls and was in charge of standardizing expression coding so that all the recut rolls of the great artists would follow this pattern from there on out. That's about the same time that Dr. Clarence Hickman was hired to develop the new Ampico, along with Mr. Stoddard, with Delcamp their editor in chief. It would then be Delcamp, who was thoroughly knowledgeable of all facets of roll coding, to code the fine nuances which defines both the model B Ampico and its rolls, and the way in which it played Ampico A rolls, which by that time he knew better than any other living person. No one has ever had to listen that critically!

We notice however that even Nelson Barden, who conducted these wonderfully professional interviews in the Ampico book by Richard J. Howe, also strongly believed that the B pianos did not reproduce the A rolls well, and Barden was a very experienced and knowledgeable fan of reproducing pianos and roll coding at the time. So apparently we have two diametrically opposite points of view. What could possibly have been the reason for this huge disparity? After all, Dr. Hickman just flatly told Barden he was wrong. There were no noticeable differences after the president, the board, and the engineering department collaborated with the roll editors and Delcamp, and "doped it all out."

For every problem, there's a solution, so what was their solution? But then why did there become a disagreement about that 60 years or so later? Did Delcamp lose his hearing in 1928 and nobody wanted to say anything, or did the pianos themselves lose something by 1990? Now some will say their pianos were fully restored and playing perfectly again and only then were they able to notice the problem. Great. So let's keep going and not jump to any conclusions.

The interviews with Hickman and Valerio are what I see as the technical ones, but the Valerio interview is mainly a private discussion referring to several actual rolls Barden and Valerio are looking at and commenting on at the time. The Hickman interview is a “long after the fact” recollection as best he can remember, and then the Hickman diary are mainly just personal notes. So for us there isn’t a lot of direct information regarding the crescendos, so let me fill in what we know for sure.

The Ampico B is not at all a different version of the A. The two machines are different. However, they are designed to read Ampico roll coding the same. Some say the Ampico A has two crescendos and the B has only one. That’s true only physically. However, in practice, the model A also has only one since the roll coding standards were defined that way even before the model B was developed. Charles Stoddard used to characterize it by saying, “*like Siamese twins, the crescendos are joined at the hip. There’s never a time when you would crescendo one end of the piano without the other.*” And the crescendos they used only in conjunction with intensities to graduate the dynamic response between steps. What we call a “crescendo” then is really a misnomer. They were not for crescendoing music, but rather for graduating intensity steps. (See *Valerio Interview, The Ampico Reproducing Piano, pg. 187-188*)

Think of a staircase versus a ramp. But they do something else after the #5 step, too. They raise pump pressure and the intensities raise proportionally through a system called the amplifier. The model A used an amplifier to tighten the spill spring in the pump at the 6th intensity and beyond, which meant the pump pressure would go above the nominal 20” and on up to 35” on the same 3 intensity valves with full crescendo at the Brilliant mode setting.

The model A has a strictly analog crescendo. The slow crescendo takes roughly 9 seconds and the fast crescendo about 2-1/2 seconds. Knowing this and having the basic requirement of playing A rolls to their full capability, the model B slow crescendo is 4.5 seconds and the fast crescendo is about 1-1/2 seconds. The first response then would be how could that possibly be compatible with the model A?

Our problem here then is a total lack of original charts and measurements the company obviously made, but if we jump to conclusions and say it doesn’t compute so therefore the two would not perform equally on Ampico A rolls, *we would clearly be wrong*. We have it on very good authority that B’s reproduced exactly as desired on Ampico A rolls, originally. Since the two mechanisms responded differently to pump pressure timing at the key, it was necessary to change response times to compensate. It’s as simple as that. And since the complaint has never been “too much crescendo too quickly” but just the opposite—too little power when called for sharp accents—then the theoretical crescendo timing between instruments can’t be the problem. Just the opposite happens, supposedly.

The complaint isn’t too much crescendo, but too little power for the A rolls. Some think they have to enhance the crescendo, somehow, not slow it down. So they know about the two available amplifier positions and think, if we could just make the piano assume the position (“first amplifier position,” that is), then we’d have this thing knocked, and we’d still have crescendo to the second amplifier to permit it to crescendo all the way up.

How the Crescendo in the Model B Works

The trigger pneumatic is operated by the amplifier valve. That trigger pneumatic starts out normally closed. That means, the pins that catch the lugs on the crescendo connecting rod are pulled completely out of the way in normal position so the pump crescendo is able to go the full distance in about 1-1/2 seconds for the B rolls on 5T+1T. To do the 1st amplified fixed position, the crescendo starts pulling in and immediately the 0B (amplifier hole) opens the trigger pneumatic on its spring, whose first pin catches the first lug on the connecting rod. The 0B hole is just a momentary bump but the opening pneumatic springs the pin out in the path of the rod lug to catch its first lug. The pneumatic closes again putting a squeezing pressure on the rod slide which catches and holds the lug and clamping it in its "first amplifier position." So that raises all intensities maybe about 10 inches.

It stays there and the pin blocks the rod lug from returning to normal. But another crescendo can still pull the rod away from that lug and stretch the spill spring tighter. It can still go to a higher position because the pin allows passage where there's no lug to stop it. So if you get another crescendo it increases vacuum further but then it can freely return to 1st amplification again without an 0T trigger.

If, during the second half of the full crescendo, the 0B hole is again activated, the second pin catches the furthest lug on the connecting rod and holds it there with pressure by the trigger pneumatic closing—exactly like the first position. That's the "second amplifier position." To return to normal then, the trigger pneumatic receives another 0B perf, only without crescendo to remove clamping pressure, the connecting arm is released, the 0B perf being timed to clear the slide part of the fiber rod, and pump pressures return to normal. No more amplifier position. *(From this position the trigger pneumatic spring has to be strong enough to release the second lug, by the way. Some lugs are different and release harder than others.)*

So what, you ask? This proves Ampico was "platforming" their intensities, not crescendo-ing, exactly as Valerio said it did. They were thinking in terms of intensities, not crescendos. The slower timing of the model A fast crescendo sufficed roughly as platforming, so it didn't require 2 discrete static amplifier positions. So yes, the crescendo was escalating in the model A while previous intensities were being escalated along with it, and some might even be added during it. Valerio also clarifies this. Slower crescendo speeds were fine in the model A as he says, working as intensity platforming and smooth transitioning because Ampico wasn't relying on their crescendos primarily, but their intensities. And the crescendos were there to make smooth transitions between steps and to raise pump pressures.

Meanwhile, the Ampico B was given a very quick crescendo for extra power on B rolls so how are we going to make that work on model A rolls? In the B roll they just clamped the positions very momentarily to achieve the same platforming. It has very fast crescendo escalation/descalation, so they clamped them momentarily to achieve the same thing—intensity graduation.

So now we come to the question, "why do B pianos no longer play Ampico model A rolls as well as the model A pianos do?" There could be a number of different reasons, of course, but in the half-dozen or so Ampico B's I've received recently to re-build, I've discovered that not one of those pumps had new inside flap valves and seats. They still looked just fine, almost new-like, but then when you remove the

flap seat wire which causes the flap to curl down on its outside edges against the leather flap seat and then pull the leather seats off the wood, you'll leave a lot of rotten leather still sticking to the wooden feeder. It looked great looking down on it from the top, but its glue joint? Take a look. It's long gone.

The Physics of a Flap



In positive displacement pumps when a lot of air is being pumped out at one time, the overall capacity of that pump is barely affected by those half-rotted flap seats because under normal pump pressures, the flaps are curved smoothly and evenly across the seat area and touching mainly on the seat's outside edges, in general. In the model A as the pressures rise under crescendo, the manometer goes from 20" to 30-35" which is roughly 35% change. While that makes a large difference in piano loudness, the Ampico model B under the same conditions changes about 70%! *That's 35% higher yet than the model A.* This means the flap is no longer gently curved across the top of the

leather seat any longer by the flap wire support. It is smacked down hard on its flap support wire and trying to curl around it from the suction, tighter and tighter, and that causes a seal problem.

The flaps in the pump are very soft-hand leather and easily conform to the wire. That causes a very uneven pressure gradient across its width, increasing exponentially in the center and thus decreasing in lbs/sq. inch toward the edges. So if the flap seat is rotting away at its glue joint (*which it certainly is, as you can see from the picture above*) the more pressure the flap exerts on its wire support, the less pressure there is left to exert on the edges of the flap seat where it was designed to seal, commensurately. That means the center of its pressure is concentrated closer to the center of its flap, and since that's the wire itself, its sealing capability of the rotting glue joint decreases rapidly as it's stretched. What you now see in the picture is where Ampico B pumps leak the worst of all because of their soft, conforming flaps and 35% more suction against the inside flap support wires than even the model A experienced.

To make matters even worse, over the years the flaps of the model B conform to that shape and are no longer curved on top. Only the cloth cover looks curved but the leather looks different. It's reformed because of the much higher pressures developed by the crescendo bellows in the pump. So the smaller leakages due to the same principle on the model A pump will be greatly exaggerated in the B pump! At the high pressures then, the B pump will leak enormously out of proportion compared to the model A.

In most playing, they both sound fine. But whenever the pump is not exhausting a lot of air and you anticipate a sharp accent for a chord or a few notes, you won't hear that distinctive accent at the high pressures as powerfully because it's being leaked away by the half-rotten glue joint, relieved now by a flap's changed pressure variants. As explained, the flap loses its curve against the seat edges and flattens against its own support wire, relieving itself off the seat edges during hard pumping and low

cu. ft of air/minute, and the percentage of the flap leak increases exponentially, splaying out on the edges. (Regarding accents by the way—they are *relative* to the softer playing which they accent. The ear is not a decibel meter and it's the degree rather than the actual velocity of the hammer. $P = v^2$. A little p makes a large change, exponentially, by comparison. So comparing the B to the A only subjectively is reasonable, anyway.)

Flap crawl can be observed by connecting the output of a fully restored B pump (which apparently are rather rare these days) to a shop built manifold screwed down to an uncovered feeder under test and watching its inside flaps without the cloth. The leather flaps change as the spill pressure changes. Measure the change, versus new flap seats and flaps on the test feeder. Once seen and measured, it's hard to argue with. The best flaps to use today will be much stiffer leather than the original. Soft flap leather tanned for clothing should not be used in a pump with wire flap supports anyway. That was a little detail that I feel the factory missed, but only as a matter of perfecting the system for 2 generations.



Now of course, if you decide to replace the seats, you also have to replace the inside flaps too. And now we find out at least one reason why 60 years seems to make a difference in the way Ampico B's play Ampico A rolls, today. I've heard this universal complaint for years now, but I had never experienced it in my own instruments. I've also had many musicians and art critics listen closely to these pianos including my own Ampico B, and they didn't notice anything that resembled a lack of power for accented notes in any of them. **But in every case, when this is done and the pump is totally restored and tested, the accent problem will at least diminish noticeably and you know you're on the right track.**

I would also not be surprised if, even though this *was* done, other things, creating the same overall effect, had not been done. For example, Ampico valve restoration requires new pouches because the old ones were "rubberized," as Dr. Hickman called it, meaning they were coated with Carter's rubber cement. In 30 years or less they'd all become stiff and simply lack the suppleness of new pouch leather, not to mention the durability. The worst thing you can do then is to recoat them, unless of course, you like them to be especially stiff. Also modern rubber cement won't last half as long as the original stuff did.

All Ampico model B valves and expression valves which hang under the stack used a black bakelite valve seat. Half of them will fall right out with just a little push, today. And long before they could do that even, the shellac used to seal them had long since cracked and loosened because shellac is brittle just like bakelite is, while wood expands and contracts. Even if the seats won't fall out at all, they cannot be relied on for air tightness anymore and a sealer like PVC-E glue or Phenoseal should be used to seal them up. Those are flexible and will last practically forever. Most importantly, they're airtight.

The spring-loaded pouches in the expression regulator must be replaced, but seldom are in general, likewise the sleeve pneumatics and absolutely the expression curtains. It all must be replaced and by far the best material for expression curtains is the poly-coated nylon cloth, today. But even when these are done, I've noticed they are seldom done right. In every case I have redone, they lack enough travel and easy flexibility to gently cover the grid holes without having to stretch to do it. When they are not checked for that with a piece of marked-off Plexiglas and a tube attached for test suction, you haven't learned yet if it's going to work or not, right? Do it right. If the curtain is even a little too tight the piano will never play to the very soft intensities you hoped for.