PLAYER PIANOS

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Many Models

In the past there were 55 different player actions that have gone through 3 different generations. In the teens there were over 5000 pianos made, and the players were holding up the market at the time. In the 80-90-year history of the piano there were many players designed, built and used.

Completely Re-Build, Don't Patch

What to look for to determine if the player is worth rebuilding. Does the player cloth feel soft? If it feels like cardboard it is no good. The rubber has rotted; it should be soft and flexible. It is rare to do just one thing and make a difference to the piano. Players cannot just be patched. They need to be completely rebuilt. The rubber does not hold up as long as the felt and the wood do. Lead tubing tends to rot from the inside out. The blisters and warts on the tubing are the oxidation from the inside. Lead tubing should all be removed and treated as if the piano originally had rubber tubing.

It's cheaper time-wise and cost-wise to replace hammer butts than to re-felt them. The same goes for the parts of a player. Baldwin stacks were cheap and light-weight. The Bush & Lane stack was called a tea-kettle stack. This was probably model two of three. The later model was made with pot metal which was very heavy, and none of the parts were interchangeable. Most other pianos have the tubing coming from the bellows to the stack. The Bush & Lane came up and all the way back down again. The elbows were made of cardboard and then sealed with a cloth, so that not only would the tubing break but the elbows would break.

Tuning a Player

To tune a piano, the wind motor is the biggest problem because it is in the way. Most of the time the wind-motors are removable with four screws. Use a screw driver with an extremely long shank for ease of removing the screws. On some stacks, the wind-motor can be disconnected and tipped forward on hinges. If it is necessary to remove the entire player action, to remove a standard upright action stack there were generally four large screws to remove. A few unusual models had two sheet metal screws on each end.

Ask Questions Before Taking on a Player Job

Before tackling a player job, ask the customers some questions before starting. How does the piano work? What do they think it needs? Back in the day, player pianos were meant to be played all night long; they were the entertainment center. The Theme-o-dist shifts back and forth if the theme is in the bass or the treble, and is manually adjustable. Since basic pedaling makes the music sound march-like, a good player can learn to adjust the pedaling force to give expression to the music. The Metrosyle has a lever below the keys that you move back and forth to follow the line on the music paper to vary the tempo slightly for more expression. The pointer on this design tended to get bent and would then lean into the paper and rip it.

How Players Work

The way the player piano works is that it takes potential energy and converts it into kinetic energy. The pedal bellows sucks or pulls in air from the outside. With a normal fireplace bellows, when the bellows is squeezed the flap closes and forces the air out. A piano bellows works in reverse, in a partial vacuum so there is suction applied all the way to the tracker bar. When there is a hole in the paper music roll, the air goes through the tracker bar and through a specific tube that then sucks a valve that plunges the key to play a note.

The back of the whippen in the piano action sticks out farther than that of a normal piano action, and the end of the whippen often has a piece of felt on it. This extended whippen allows for the puppet to push it up. The puppet is a little dowel, like a finger puppet, that pushes the whippen. Some of these puppets have a screw adjustment for achieving the proper height. Each abstract would have a different height for multiple-level stack levers. Almost every player stack is different.

History

There are broadsheets listing all the patents the companies had in different countries. They used this for advertising. Patents, however, meant they were paying someone to use them. So each company would create its own patent. Aeolian became Steinway and other brands.

Tracker Bar Designs

Up until 1908 they were still refining the mechanism. The original piano players played only the middle 45 or 65 notes. When you were finished playing, you would push the mechanism over to the wall (where the fingers would break.) In 1909 the companies colluded and came up with a standard lay-out for tracker bars so the music rolls could be standardized. They learned that the earlier versions had fewer holes per inch and the holes were bigger. With the new smaller holes they learned they needed to be able to adjust the paper alignment. Some people moved the tracker bar instead of the paper, particularly in European pianos, and it often didn't move very fast so the music would wander. The Aeolian side adjusters improved. There were no mechanisms to keep the paper from wandering in 1910. In the early teens manual adjusters were developed. From the late teens on, tracking adjusters were installed on both sides of the paper, and were designed to be automatically triggered with air holes in the paper.

Pouch Bars

The pouch bars are kind of the nerve center for the whole thing. There are three pouch boards. The pneumatics screw to the top of these boards. The pouches, which are now leather instead of rubber cloth, usually need to be replaced. Not only were the pouches glued together, but they were tacked together to hold it while gluing. If you try to chisel these boards apart they will split because the glue joint is stronger than the wood, plus there were hidden nails. Zepher skin was animal intestine that was used for gaskets. The air comes down from the tracker bar. The whole length is under suction; the inside air is slightly less. When air comes into the hole, the pouch pops up from outside air. When the pouch pops up, it pushes up a valve and moves the push rod.

Player Restoration: work hours

At the least plan on 40-60 hours in labor to restore a player. A long time ago it was possible to paint the bellows with a rubberized paint. The bellows also rot from the inside out.

Duct tape and masking tape is usually stuck onto dirt and will not last long, it will dry up and is not efficient.

Wind-Motors

The wind-motor works on suction and operates kind a like a car motor. The pneumatics are always trying to be collapsed by outside air 14.7 pounds at sea level. That's the pressure for vacuum, and the difference doesn't have to be very much. The chains and gears might be compared to a car transmission. That whole frame is actually called the transmission.

On the newer Aeolians, Stings, and other more modern brands, if the workers spent more than half a day putting the player mechanism into the piano, they lost money. The newer player pianos are cheap, there is glue all over the place, sometimes screws are missing, and other things.

Action Stack Removal

To get the piano action out, first pull the player action forward at least a couple inches, and then wiggle the rest of the part out. Have some band aids handy.

Inventors

Aeolian was in business until the mid-eighties. QRS made 90% of the rolls, but they stopped making them about 5 years ago to get rid of their stock. The newish rolls are re-combinations of old stuff.

Apollo from Melville Clark, who was quite an innovator, had a vertically-mounted record player on the side, and a cone over the tracker bar so you could listen to the record and have your piano playing along with it. When the adjustments were set right and everything was well regulated, you could get quite a range of expression by pedaling easily or hard.

There was no single inventor, and these pianos were forever going through changes. Everyone had their own R&D. The Schultz had a pneumatic instead of a valve that popped up and down. It was made with soft wood, and it worked well when it was working right. This was called the Schults couch pneumatic; it was thin, soft and flexible.

Types of Cloth

There are several kinds of cloth to use for pneumatics. Jeff showed us a nylon cloth. For wind-motors you want it to be thin, flexible, soft, and solid. Leather will bend in all directions, whereas motor cloth is firm. Motor cloth is too stiff for the small pneumatics but is good for the larger bellows. Bellows cloth is 40 thousands, with a sandwich of rubber in the middle. There is even a stiffer cloth at 60/1000 but that is too stiff.

Use hot hide glue for all cloth. Hot hide glue glues hard, is sandable, heat sensitive and water sensitive. Get it above 150 and it will melt off the glue. Water will penetrate the cloth and soften the glue and the cloth can be peeled off; wrap it with a wet wash rag for a while, do something else and come back. Don't ever use a glue gun; the glue will break off within a week. Cold animal hide glue gives a longer work time but is not as strong as hot glue. Uric acid is added to it, which weakens it a bit. With nylon cloth, use PVCE glue. It sets up kind of soft and rubbery and allows two different types of material to be glued together. However, over time it will creep apart, so don't use it on a spring-loaded surface. For spring-loaded surfaces, use hot glue. Yellow wood glue is good for broken wooden parts. Super glue is good for sizing screw holes; put a drop of glue into the screw hole for slightly stripped screws.

Wind-motor/Transmission Chains

The chain that connects the wind motor to the transmission must be on right. There are four ways to put the chain on, but there is only one way to put it on correctly. Put the end of each length on the outside and pointing toward the wind motor. The gear teeth are a little wider on the pianos in the 70's and the ends on the chain tend to be pinched in so they won't sit on the gear as deeply, making it too tight. The chain needs to be floppy; otherwise the wind motor binds. Make it loose enough to be wobbly, but not so loose that it falls off.

Lubricants

- Transmission and metal parts: light oil, like LPS1
- Wind-motor is wood on wood,
    - Don't use any kind of oil. Even plain graphite can attract moisture. We must not let it get gummy.
    - Use:
        - Talcum powder
        - Spray Teflon
        - Teflon powder mixed with naptha
        - Spray graphite and then buff it out

How To Remove the Bellows

At the time these were made, labor was not as expensive as it is today. To remove the bellows there is a wood spring above, and the bottom rests in a slot. Lift up on the spring, lift it out of the slot, make sure the tubing is disconnected, and it will come out. Baldwin bellows were horizontal instead of vertical. They figured it allowed you easier access to the pedals and parts. However, to make it look nice, they put a plate of wood over it to hide everything.

Dimensions

Aeolian also made organs. Aeolian was in the biggest the longest time. Bush & Lane also made organs. When removing screws, rods and parts out, mark the device because you might forget which screw hole they came from. The parts are shoe-horned together, so things will stick if it's not aligned properly. They had to fit things tightly to keep the piano less than 30" to be able to get the piano through the possibility of an only door. On the positive side, this design allows for longer keys, so the doglegs are sufficient and the bushings on the keys won't get as worn. Plus there is a better feel from the front to the back end of the key. Players are better than regular pianos because the key buttons are more centered.

Variations on Models

There are also spinet players. The Wurlitzer is totally electric. Kimball is all foot-pedal. To tune a Kimball, the ends of the screws need to be undone with a 3/8" nut driver or possibly a screwdriver, and the whole tray must be lifted up and set on top of the tuning pins because they didn't put in long enough tubing. Most of the players made in the past forty years are not very good because the labor and the cost of materials is not what it was in the old days. The new pianos are made quickly. In the old days they would hire a crew to put together a large order of pianos for a particular company. But the crews would be different each time, and therefore each batch would have a different issue.

If you're bored working on a normal upright with standard parts, players have such a variety of designs that they are always interesting. Universal was a player piano out of LA in the 70's and 80's were a Kohler and Campbell piano that were very simple in design. They had a simple electric motor that could not be fixed; it had to be replaced. The player action was mounted under the keys and pushed up on the bottom of the keys. They had to cut a slot in the back of the key bed for this, which would weaken the key bed. Sometimes people would add angle iron to the back of the key bed to strengthen it.

Wear

Lead tubing tends to rot. Internal valves should be floppy, but they build up verdigris, a copper compound, which makes it stiff. If each valve leaks just a little bit, these leaks can add up to enough that the piano won't play. When replacing flanges, it is quicker and easier to replace Billings flanges with standard wood flanges because it is quicker and easier to adjust them. It is worth cutting a new slot to accommodate standard flanges.

Carl Nancarrow wrote music for player pianos so there could be lots of notes (more than ten) playing at the same time. He literally made his own rolls. Nancarrow composed strange elaborate music. Bar pianos would get totally worn out in the middle sections because they were played non-stop from morning to night. However, pianos that were hardly ever played might have sat so still that they would be moth-eaten. It is often hard to anticipate a certain issue until you actually get into the piano.

Pedaling Technique

The Bush and Lane Sicilian was a good model. It was made of pot metal. The Otto Higgle player was a very well designed piano. The way to get expression is how you pedal. Otto had it so if you pedaled softly you would also move the hammers closer to the strings. When you pedaled harder, the rod would pull the hammer rail farther back.

Gulbransen

The Reproducers, the Duo-Art and the Ampico were very popular. Before WWI was Welty. Anything German was drawn out of the country during the war. Gulbransen went through 3 generations. On the plate on the inside it will say Gulbransen Dickinson (bad kind). Between 1920 and 1925 the whole thing was glued together. For this brand you would ship the whole piano back to Chicago and they would ship you out a new piano. They would throw the old parts into the furnace to heat the factory. The good parts were all made out of maple and everything was glued together. In order to dismantle these pianos, you can saw them apart, you can freeze them and break the brittle glue apart, or you can leave them out in the weather so the moisture ruins the glue. The early Gulbransen had 4 screws. Later each pneumatic had a gasket and the part was screwed on. One way to tell is to look at the slot in front of the piano. If there are only four screws it was glued together. If there are thirty screws, it was not glued.

Up-Stop Rail

The up-stop rail will prevent you from proper regulation. Remove this rail before regulating; remember to replace the rail when you are done. This rail will be either on the player action or the piano action. It is there to act as the dip. Err on the more dip side than less dip. Make sure the jack definitely escapes; this is probably the most important adjustment. The hammer should check a little higher. If you put new hammer butts on, even if you don't see it

when you are working on it the jack will catch on the track often enough that the customer will notice. Don't give the owners the choice of new or old butts. Replace all new hammers and butts. Tokiwa makes good parts. Wally Brooks makes good hammers.

Older Pianos

Jeff learned the tuning business from his father-in-law about forty years ago. If made in 1920 it's ok, if before 1940, hang up. Nowadays the time has changed but the rule is still good. The older pianos are going to be a lot of work. If your mate is a little frustrated, don't take on a player rebuild. Roger started in 64, Jeff started in 72. Everyone tuned orally. A strobe was looked down on. Right now Jeff's smart phone is dead. Machines can fail. We still need to know how to tune aurally. Standard, Aeolian, Baldwin, Simplex are what Jeff now works on mostly.

Pumping Pedals

When you electrify a standard because the pedals are getting hard to pump, the pump is usually put in a box. Sometimes there is no room, so the reservoir must be removed, which removes some of the expression. But most people who use these usually turn the pianos on and walk away.

Test: play with one foot. If this works it will be really easy with both feet. Jeff sets up the bellows and the stack on the bench so it works when he pedals. In this way he can see everything and work on everything on the spot. When he returns the player mechanism he wants it to work. It is not fun to go all the way to the home, install everything and then discover that something is not right so it all needs to be taken back to the shop.

Listening for Leaks

To listen for leaks there are two ways. One is an auto mechanic's stethoscope. Rip off the diaphragm and use the open tube. These stethoscopes cost about $20. Get one that is easy to remove the diaphragm. Move it around and you can hear the leaks. Another way is to hold a stick of burning incense around the questionable areas and watch which way the smoke goes. This is a good visible test. If you don't find the leak right away, it provides a chance to meditate on it.

Tools

- Screwdrivers: really long shank
- Electric screwdriver
- Belt sander