Jigs IV

The Making of a Music Barrel Blank

by GARY G. STEVENSON

Photos and illustrations by the author.

INTRODUCTION

As others, I have found mechanical musical instruments that were not working at the time of purchase. Some of these machines have had missing parts I could reproduce but most were complete, only in need of restoration. I have recovered bellows and pneumatics, replaced valves, tubing, repaired pipes or reeds and restored chests and cases to get these instruments playing again. What made each of these past restoration tasks worth doing was that all of these broken instruments had a readily available supply of music strips, rolls or discs to play. It has never been important whether the music supplies were original or reproductions. I have always felt gratified when such instruments were heard again after having been silenced by time or mistreatment.

Barrel-operated instruments have also been found in various states of disrepair, but unlike their roll, strip or disc-playing counterparts, these instruments were not designed and built with a readily interchangeable music supply. In this regard, a barrel-operated instrument is like the cylinder of a music box. The songs which come with it are normally the only songs likely to be heard. But unlike the relatively indestructible brass cylinder of a music box, the wooden cylinder in the barrel-operated instrument is susceptible to the same problems (i.e., cracks, warping, insects and rot) found in wooden items. The one-of-a-kind nature of most barrels has contributed greatly to keeping silent many of these machines with severely damaged barrels.

None of the processes necessary to create the barrel is impossible to duplicate today. However, it is very expensive to pay a craftsman prevailing wages to fabricate a new barrel. The hard part is finding an artisan to properly arrange musical compositions for this new barrel. (Remember, your new barrel would be machine specific.) The final part of this project will be to pin the new barrel (which will be featured in a follow-up article). Keeping all of these steps in mind, it is easy to see why barrel-damaged machines stay unrestored.

A DEPARTURE

In the three previous "Jigs" articles, time was taken in the beginning of the parts fabrication process to set up one or more general purpose stationary tools (table saw, drill press, lathe) to do a specific repetitious job safely and very consistently. In this "Jigs" installment, it is necessary to explore the tasks required to fabricate a new organ barrel blank as well as all required hardware.

NOTE: To use this outlined process it is assumed the instrument being restored has its original barrel, but it is too damaged to be played.

PROJECT HISTORY

Three years ago I found a beautifully inlaid Vaclav Hrubes 28-key barrel organ with 38 pipes and two stops. This organ came with two original seven-tune music barrels. One of the barrels looked as if it had come with the organ when it was sold in the 1880s, the other was dated "February 1, 1904" (***Photo 1***).

I chose to copy the older of the two barrels. The 1880 barrel was slightly warped and had more cracks, which aided in its loss of pins. Though both barrels were basically made the same, I took all measurements from the one I was copying. The 1880 barrel measured 15 9/16" long and had a diameter of 6 15/16". The surface thickness was measured at two locations; it was 5/8" thick at the center flats of the octagonal-shaped end plates and 3/8" thick at the points. None of the pins protruded from the barrel surface more than 1/8" (***Illustration 1***).

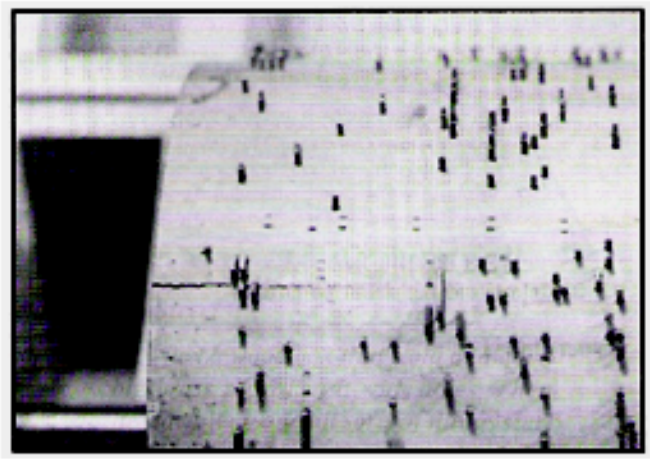

Photo 1. Vaclav Hrubes barrel dated February 1, 1904.

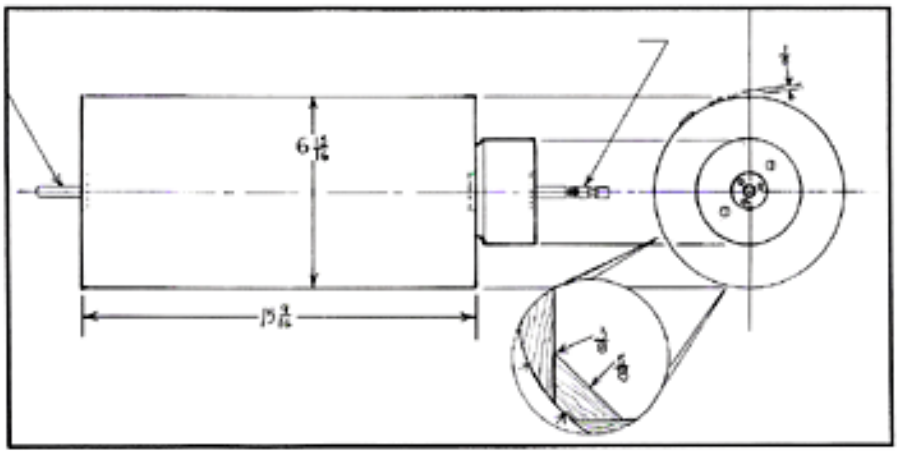

Illustration 1. All of the measurements were taken from the original 1880 barrel.

Wood Stock

Dry, clear, straight-grained poplar was selected to make the 11 wood parts required for assembling the new music barrel. Although poplar was not the wood used to make the original barrel, it was of about the same hardness and grain type as was originally used. Poplar is soft enough to easily accept music pins and firm enough to hold them in after installation. The use of straight-grain lumber lessens the tendency toward warping or twisting.

It is important that dry wood be used to minimize cracking when the barrel was finished. In St. Louis, Missouri, this is wood with a water content of +/-8%. Equally important is the selection of wood with few or no knots. This lessens the odds of one of the music pins being located where it would be difficult or impossible to install.

The selected poplar board was 6" x 96" x 7/8" thick. This was enough stock to make up the two end plates, a center support and the eight sections of pin surface for the reproduction barrel.

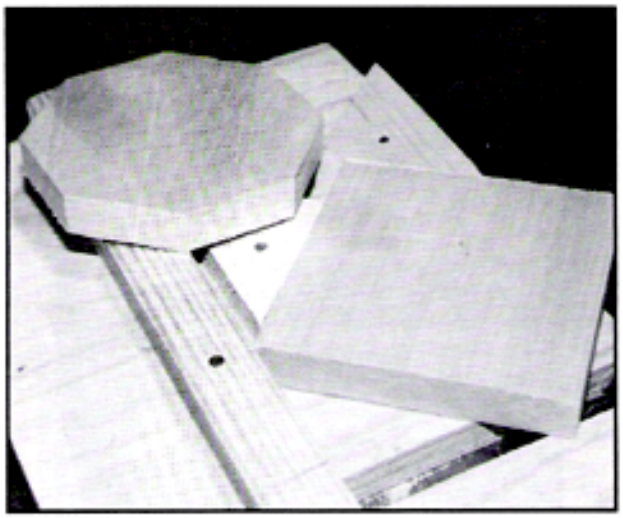

Photo 2. This jig was used to make sure the same amount of corner was removed from all sides.

Hand Tools and Supplies

Since there are no hardware fasteners such as screws or nails used in the barrel, the only hand tool required was a regular screwdriver. Though normally not considered a tool, three large auto radiator hose-type clamps were used as gluing clamps.

NOTE: For this project I used three Ideal brand 5" industrial hose clamps acquired from Granger Industrial Supply Co.

Machines and Power Tools

In order to make the parts for my new barrel, I used a few standard power tools: a table saw, drill press, belt sander and metal lathe. The table saw was used to rough cut the board of poplar into the eight barrel face boards and the three octagonal parts that make up the two end caps and center support. A drill press was required to complete the steps for making the 2" diameter recesses that were required to center the axles into the ends of the new barrel. The belt sander was used to speed up the processes of evening surfaces. A metal lathe was used to make the new barrel round so that it would move freely within the organ.

Description of Wood Pieces

The first parts to be made were the three octagonal end caps and center support of the barrel. These parts were made by cutting a strip of wood 8" x 5 ¼" from the 7/8" wood stock. This new board was cut into three blocks 5 ¼" square. A crosscut-type jig was made for the table saw to aid in making the 45° cuts that removed the corners of these 5 ¼" square blocks. This jig was used to insure the amount of corner removed was the same from all sides of each block ***(Photo 2).*** It should be noted that these parts on the original barrel did not have eight equal sides — four of them measure 2 ¼" and four measure 2 1/8" ***(Illustration 2).***

A small pilot hole was drilled into the center of each of these eight-sided plates. I used a # 34 drill bit to do this job. A small headless nail helped to align the stack. Each of the plates was then rotated on this pin to determine the best alignment combination. When this was found, the block was taped together and the open facets were then sanded, then marked for orientation.

Before these three blocks could be assembled into a barrel, two of them had to be drilled for setting the metal axle centers in place later. A 2" Forstner bit was used to drill a 1/32" deep hole into one side of two of these plates ***(Photo 3).***

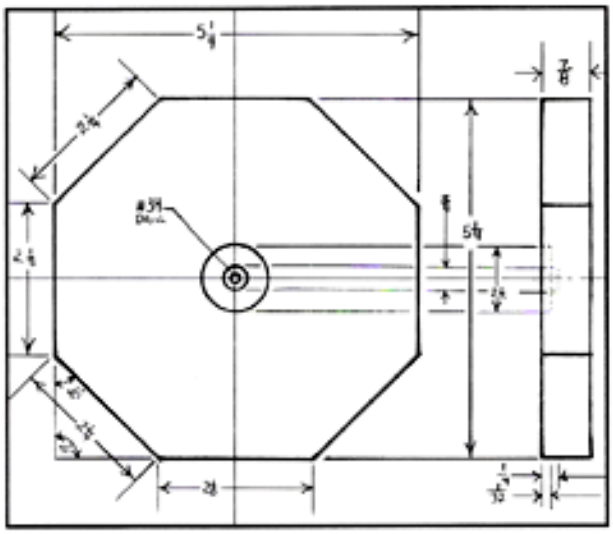

Illustration 2. The three octagonal-shaped end caps and center supports of the barrel (not drawn to scale).

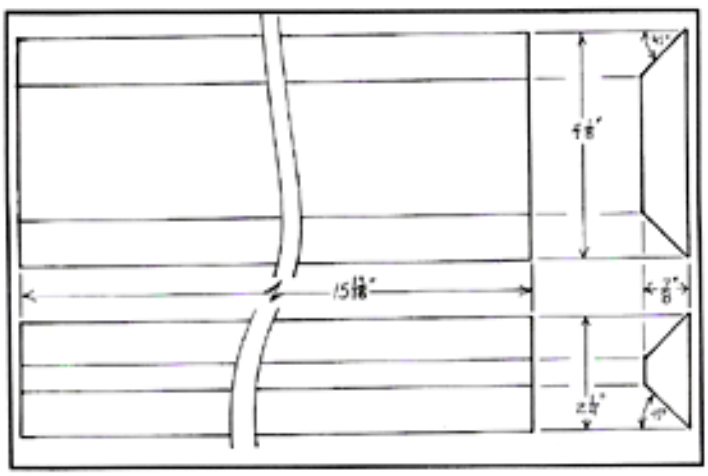

Illustration 3. These are the parts that make up the barrel surface (not drawn to scale).

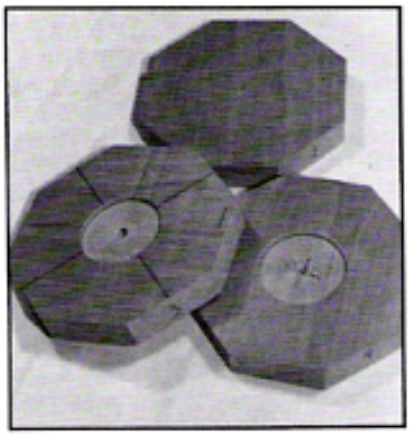

Photo 3. A 2" Forstner bit was used to drill a 1/32" deep hole into one side of two of these plates first for turning centers, later for axle shafts.

NOTE: Because the finished barrel must be turned in the lathe to make the surface round and the sides even, I marked the bottom of these recesses for lathe centers ***(Photo 2)***.

The next parts made were the eight surface boards. These pieces were 15 13/16" long, ¼" longer than was required for the finished barrel. This extra ¼" of wood was added to the length to allow for stock that is removed during the turning process.

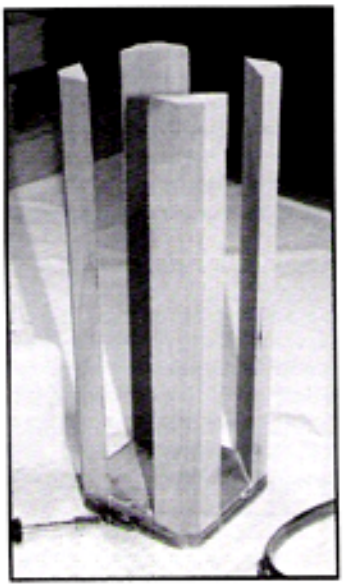

Photo 4. The narrow face boards are glued to an octagonal end piece.

These pieces of wood were ripped along both sides of their length on a 45° angle. Four of them were made 2 ¼" wide. These were the first pieces to be glued in place when the barrel was assembled ***(Illustration 3)***.

The second four boards 4 1/8" wide were used to seal the barrel before it was made perfectly round.

Barrel Assembly

Yellow carpenter's glue was liberally applied to the 2 1/8" facet sides of one of the octagonal pieces. The four 2 ¼" wide face boards were then set in place and one of the large hose clamps was tightened around them. It was important that the face boards and the end boards were square to one another. Once the clamp was tightened, the other end plate was glued, set in place and clamped.

After both ends were assembled, the last octagonal piece was glued as the center brace. Like the two others, it also was held in place by a hose clamp ***(Photo 4)***.

Three hours later, the clamps were removed so this seven-piece assembly could be sanded in preparation for the final gluing process. In order for the completed barrel to be as solid as possible, it must not have any air gaps between any of the wood joints. To accomplish this task, the 2 1/8" wide boards were cut to overlap the facets of the octagonal boards to which they were glued.

Each of the open sides of the barrel assembly were sanded on a belt sander to "homogenize" their surfaces. This process made them ready to accept the four, final surface cap boards. The open surfaces were sanded only enough to even them out. Very little wood was removed from the octagonal-shaped boards.

Photo 5. Glue was liberally applied to the surface and the final pieces then clamped in place.

NOTE: If the gluing surfaces of the cap boards are uneven, they may also need to be sanded. The sanding action on these parts will rough the gluing surfaces, allowing for better glue joints.

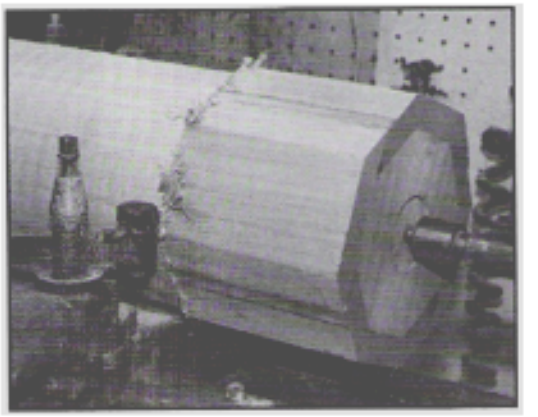

Photo 6. To be made round, the hollow barrel, fully dried, is being rough turned in the lathe.

When all of the openings were even, glue was once more liberally applied on the surfaces, and the final pieces were clamped in place ***(Photo 5)***.

These final gluing steps sealed the barrel "forever." There was no longer a way to get back into the center cavity of the new barrel.

After this hollow, 11-piece assembled barrel fully dried (about 24 hours), it was ready to be turned on the lathe ***(Photo 6)***. The rough ends of the barrel needed to be turned to make them parallel to one another and even to move freely within the organ. This first turning of the barrel blank also began rounding the music pin surface. It was important not to remove too much wood during this first turning. The final turning process was done after the gear and metal axles were installed.

NOTE: If, during this initial turning process, the 2" side holes start to disappear as the surrounding wood is taken off, remove the barrel from the lathe and drill them deeper. These 1/32" deep recesses must be present after the barrel ends have been trued.

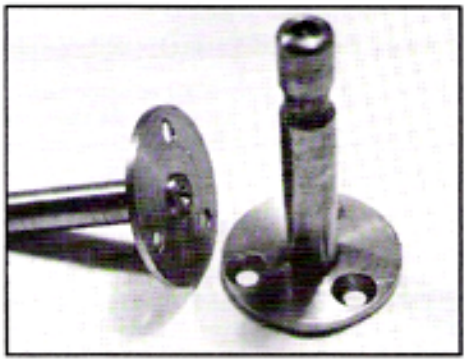

Photo 7. The metal axle shafts and screw plates must fit snugly into the center recess.

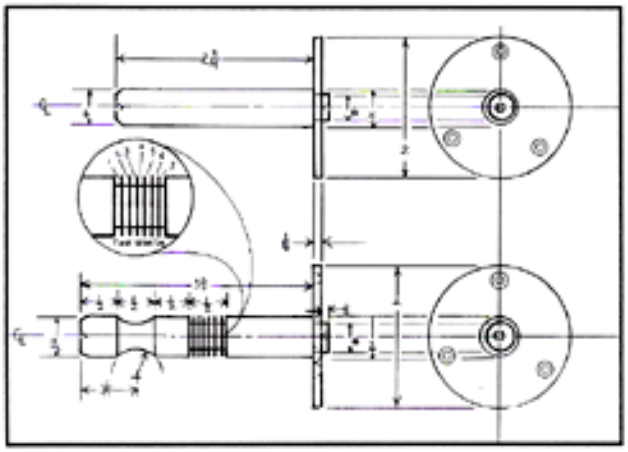

Illustration 4. Drawing of the metal axle shafts on both ends of the barrel.

The Axle Hardware

The final process involved the machining of two new axle shafts which allow the barrel to rotate evenly within the organ (*Illustration 4*). Each of these shafts are made of metal and have a mounting plate on one end. The thinner of the two axles was machined to set snugly into the 2" center recesses of the barrel; the others into the gear blank. Once these shafts were installed, they were tightly secured in place using #12 x 1" screws *(Photo 7)*.

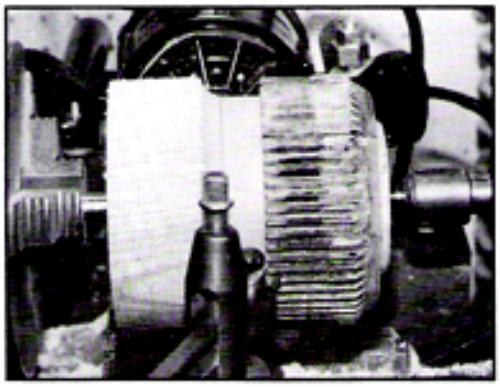

Photo 8. Gear blank, maple adapter ring and original gear were assembled in the lathe during the tooth cutting process.

Barrel Gear

Making a new barrel cog was covered in "Jigs III" (see References). An adaptation of that process was explored for this project. The biggest difference between this application and the original process was that no mandrel was made. The axle shafts were made first; the round gear blank was then drilled with a 2" bit in its center to accept the axle; the axle was screwed to the blank; and then this assembly was turned in the lathe as a unit. The barrel mating surface at the tail-stock side of the blank was formed to fit into a 3/8" deep x 2" diameter hole which was later drilled into the barrel blank. This gear had to mate exactly with the new barrel when finished *(Photo 8)*.

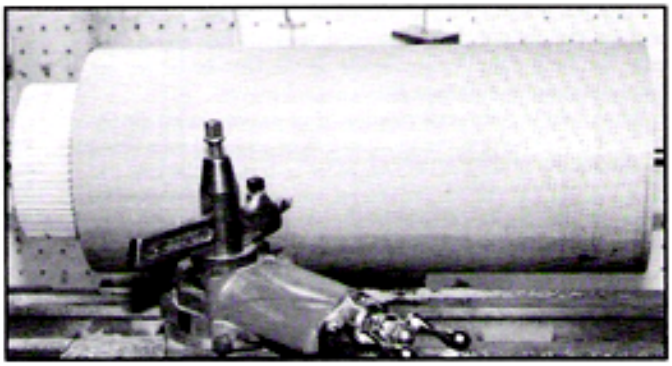

Photo 9. The fully assembled barrel with axles and gear must be turned in the lathe together to make sure they are true to one another.

To determine the locations of the teeth on the new gear blank, I connected it to the original wooden cog. To accomplish this, a ¾" thick wooden maple adapter ring had to be made. A 3" square scrap piece of hard maple was drilled at its center with a 2" diameter x 3/8" deep hole. The 2" diameter end of the gear blank was inserted into this hole and two #14 x 3 ¾" wood screws were put through the gear blank to tighten it to the ring. This assembly was trimmed in the lathe to make it round; then the tail-stock side of this adapter ring was turned to fit into the axle side of the original gear. The final step was to attach the original gear to the ring. This was done with #14 x 3 ¾" wood screws. The assembly was placed in the lathe, and teeth were machined into the new blank as explained in "Jigs III."

Final Turning

The first turning was done when the fully assembled barrel blank had dried and the clamps were removed. This final turning made all the parts (rough-turned barrel, gear blank and both axles) of the new barrel work together *(Photo 9)*.

Conclusion

Although I used this process to make a new barrel for the Vaclav Hrubes, I believe it can be adapted to make working barrels for a variety of instruments.

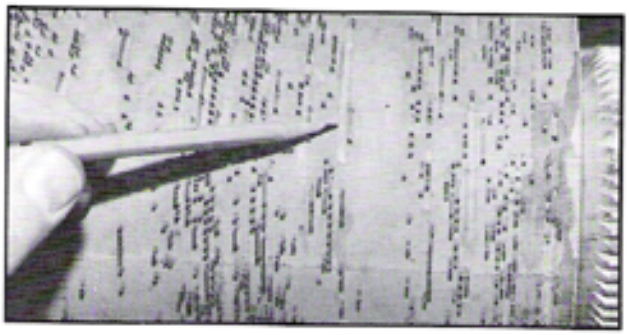

Photo 10. Strips of paper indicate an older tune change on the 1880 barrel of the Vaclav Hrubes organ.

Historic Note

Even though compositions found intact on barrels today were made when skilled labor and artistic reimbursement were very inexpensive, it was still cheaper to replace one or two songs on an existing barrel than it was to make a new barrel and have a full core installed on it. As with other organ barrels which I have seen, there had been a tune change made on the 1880 barrel for my Vaclav Hrubes organ ***(Photo 10)***.

When barrel organs were plentiful, if an owner wanted the latest tune for a given instrument, it had to be arranged on a barrel for that organ. Most of the time an older or less popular tune had to be stripped from the original barrel before a new tune could be installed. When the pins for the old tunes were removed from the barrel, the holes they occupied were filled and each area was covered with a strip of paper. This paper strip gave an arranger a clean surface to mark pin locations for the new song. Following these arrangement marks, a craftsman installed the pins, and the new tune was ready to be played.

Today, most collectors would not even consider stripping a barrel to replace any of its music. I believe that all of the surviving arrangements currently found on music barrels have their own merit. Whether or not we like the tunes, they are important examples of work from past artisans, and we have an obligation to preserve them for the future.

Author's Notes

In this article I explored one way of solving a task relating to the restoration of a barrel organ. Further information on different types of these instruments, as well as information on pinning a barrel, may be found in *The Barrel Organ* by Ord-Hume and *The Treasury of Mechanical Music* by Bowers and Reblitz.

References

Ord-Hume, Arthur W.J.G., *The Barrel Organ*, A. W. S. Barnes & Co., 1978.

Bowers, Q. David and Reblitz, Arthur, *The Treasury of Mechanical Music*, Vestal Press, 1970.

Ord-Hume, Arthur W.J.G., *Player Pianos*, A.W. S. Barnes & Co., 1970.

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Gary G. Stevenson is a collector and restorer of mechanical musical instruments and a member of the MBSI Publications Committee.

GIL'S FURNITURE BOUGHT & SOLD

From *The House on Mango Street*

Sandra Cisneros in *The House on Mango Street* tells the story of Esperanza Cordero, a young girl growing up in the Hispanic quarter of Chicago. This excerpt is from a chapter that describes Esperanza and her friend's first encounter with a disc-playing musical box. Ms. Cisneros has so eloquently captured the joy and perhaps disappointment that many of us have experienced from our first encounter with musical boxes. The fact that this piece of literature is frequently read by students who may never see or hear such a musical box should make us aware of our need to educate the young about these wonderful machines.

There is a junk store. An old man owns it. We bought a used refrigerator from him once, and Carlos sold a box of magazines for a dollar. The store is small with just a dirty window for light. He doesn't turn the lights on unless you got money to buy things with, so in the dark we look and see all kinds of things, me and Nenny. Tables with their feet upside-down and rows and rows of refrigerators with round corners and couches that spin dust in the air when you punch them and a hundred T.V.'s that don't work probably. Everything is on top of everything so the whole store has skinny aisles to walk through. You can get lost easy.

The owner, he is a black man who doesn't talk much and sometimes if you didn't know better you could be in there a long time before your eyes notice a pair of gold glasses floating in the dark. Nenny, who thinks she is smart and talks to any old man, asks lots of questions. Me, I never said nothing to him except once when I bought the Statue of Liberty for a dime.

... just a wood box that's old and got a big brass record in it with holes. Then he starts it up and all sorts of things start happening.

But Nenny, I hear her asking one time how's this here and the man says, This, this is a music box, and I turn around quick thinking he means a pretty box with flowers painted on it, with a ballerina inside. Only there's nothing like that where this old man is pointing, just a wood box that's old and got a big brass record in it with holes. Then he starts it up and all sorts of things start happening. It's like all of a sudden he let go a million moths all over the dusty furniture and swan-neck shadows and in our bones. It's like drops of water. Or like marimbas only with a funny little plucked sound to it like if you were running your fingers across the teeth of a metal comb.

And then I don't know why, but I have to turn around and pretend I don't care about the box so Nenny won't see how stupid I am. But Nenny, who is stupider, already is asking how much and I can see her fingers going for the quarters in her pants pocket.

This, the old man says shutting the lid, this ain't for sale.

The House on Mango Street,
Random House, New York, 1991.
Submitted by Cynthia Craig
St. Louis, MO.