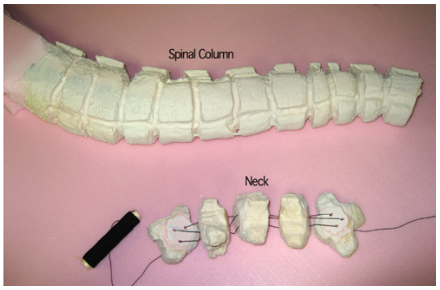
http://www.garageofterror.com/fthome.html

I wanted the fortune teller to be really strange and creepy. This guy was originally going the be a spider-like skeleton with an inhuman skull. Initially, the skull holding the crystal ball was going to his skull and I wanted candy to fall out of his mouth. I soon realized, though, that a human skull was much creepier than the dragon skull. The spines I envisioned as large structures that loomed threateningly over the kids' heads. Alas, it was not to be... but they still turned out great. There are many elements here that can be cannibalized for different projects. The floating head, the creepy insect-like spines, the table, and the crystal ball could all be used as stand-alone props. I'm really upset that I didn't get a good video of him. In the first video I shot, taken during the first group of trick-or-treaters, I forgot to plug in the servo controller so his mouth didn't move. Then, after about 2.5 hours of Halloween, the spine tendons snapped so in my second attempt to video him after Halloween was over, the spines weren't moving. Oh well. Such is life.

In this section, I will talk about the cloak, ribcage and arms. It will all be very short.

For the cloak... well, about 18 years ago I got my mother to sew me a death cloak with an open front (like a kimono) out of some cheap black bed sheets. I highly recommend mothers as a resource. If you can't get yours to sew you a cloak, you can always buy one, but you will have to cut the front open. Also, the hood of my cloak is a large triangle of cloth with one point attached at the back of the neck. This makes an awesome draping hood. If you buy a cloak, cut off the hood and sew on a black triangle (anyone can do that). You will see what I am talking about. While I am talking about the cloak, I loved that thing, used it in some way for the past 18 Halloweens and I HATED cutting holes in it for this guy. I hope it can forgive me.



For the ribcage and spinal column (not neck, that is described in a different section) I followed the tutorial in Vile Things. Theirs is about 10 times better than mine, but mine didn't have to be that good because most of it is covered with the cloak. I used coat hangers to make the armature and coat hanger wire instead of cord to support the spine.

Since my fortune teller is sitting in a chair behind a large enclosed table, I did not need to make any hips or legs. I did need to make arms. A simply bought them from the Anatomical Chart Company. Much simpler than making them from scratch.

Since my fortune teller is a puppet, I had to figure out how to move the arms and hands. I came up with a very simple system. I attached the shoulder to the torso with a wire so that it was relatively mobile then strapped a black stick to the forearm. I ran the stick through a hole in the cloak's sleeve and through the back of the chair. I could give pretty good motion even though the hole in the back of the chair was less than 2" in diameter. "Hey!", you might say. "How could you see what you are doing if you are standing behind a solid wall?" Well, invest a few dollars in a 2-way mirror. I got one custom made for me at a local glass house for about $20. That was a big help.

To make the hands move, I used some very small eye bolts from Home Depot and attached fishing line to the wrist. Using more eyebolts as guides, I ran the fishing line up the forearm and to a loop near the end of the stick. If I stuck my finger through the loop, I could raise and lower the wrist with a tug of my index finger.

If you are thinking ahead here, you are thinking "two arms and a head... you need three hands to operate this guy!" Well, ya. Get a friend to help or just make two of your three items move at a time. I'm not Disney, you know.

Fortune Teller Head and Neck

Strategy: It would be relatively easy just to make a talking skull for my fortune teller. However, I wanted to put a scare at the end of his talk, or he would be nothing more than a creepy fortune teller. So, I thought it would be cool if his head flew forward at the last minute and floated in the air just a few feet from the kids. This meant three things. First, the skull would have to be put at the end of a long black pole and all operating electronics would have to be either in the skull or on the pole. Secondly, the neck vertebra would have to twist and track with the skull without being attached to it. I felt it was important to make the neck move to convince the kids (subconsciously) that the head was actually attached. This would make the surprise bigger. Thirdly, I had to support the hood of the cloak with something so that it would keep its shape when the skull flew out and back.

Making the Skull: I made a foam skull from a mold but I think a Bucky Skull would work here, although it would be heavier. There are better sites for mold making than this one, so rather than go into detail, I will just provide a few links.

Hirst Arts Mold Making

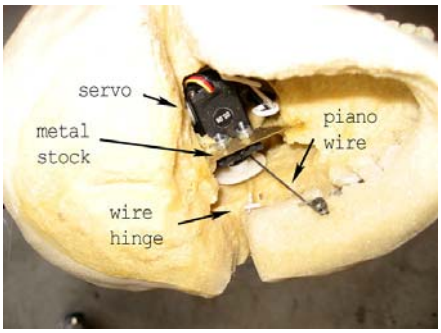
Smooth-on

I used liquid latex over a skull I bought from a Disneyland magic shop about forty years ago. I tried initially to use Great Stuff as my hard shell to keep the latex in place but that did not work very well. So, I remade the latex mold and this time used plaster and cotton gauss for the hard shell but still used Great Stuff to fill in the rest of the box.

Working with two-part polyurethane foam takes practice. The key is in the mixing. I used a bend coat hanger stuck in my power drill and mixed the components in a clear plastic cup. By the way, make very sure you don't have any sharp edges on your mixing blade if you do this. I always tested out the mixer in the cup before I poured anything in it and more than once did the coat hanger rip right through the cup. The key was to bend the coat hanger so that the blade width was about half the width of the bottom of the cup and the end of the wire was protected near the center shaft. Anyway, if you mix too long, you don't get the fine details of the mold. If you mix too little, you get a sticky, toxic skull with large gaping holes in it. So, if it is you first time, buy extra foam.

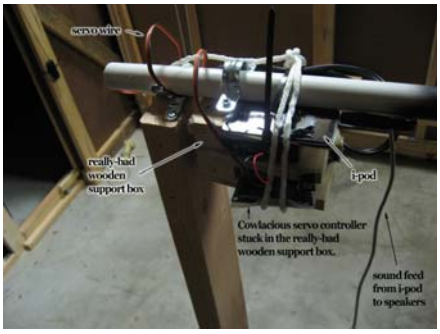
The 6 lbs foam worked for me. I used a Dremel to carve out the nose, jaw and teeth. I carefully carved the jawbone free from the skull and reattached it with wire hinges. I also used a 1" bore to drill a 1" hole in the back of the skull. I made this hole penetrate about three

inches. This is the hole I will use to attach the skull to the black PVC pipe.



I used the "Scary Terry" approach for making the skull talk so I will let him give you the details here. Once I carved the 1" hole in the back of the skull, I used my Dremel to hollow out enough of the interior of the skull cavity to fit the servo motor. I also made sure the 1" bore through the back of the skull went deep enough to meet with this cavity. I mounted the servo onto a thin piece to metal stock I got at the local hobby shop (used for making model planes) and attached (glued) the metal stock to the skull. This did a good job of securing the skull. I then ran the servo wires out through the 1" hole in the back of the skull. I used piano wire to attach the servo motor to the jawbone, similarly to the way "Scary Terry did it."

I spray painted some 1" PVC pipe black and hot-glued it to the skull. The servo connection was only a few inches long and I needed it to run about 6' out the end of the PVC pipe. So, I bought a 6' extension for servos from the same hobby shop I bought the metal stock from. I also cut a hole in the PCV pipe near the base of the skull. This way, I could access the connection of the servo motor to the extension cord. Otherwise, if this connection were to come off, I would have to remove the pipe to reconnect it.

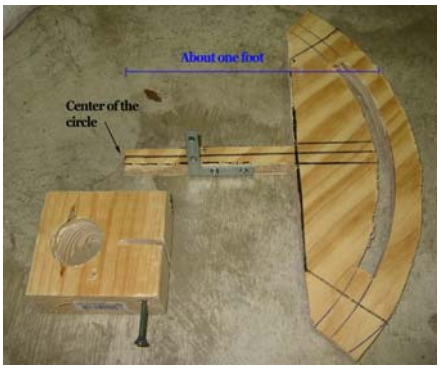


At the other end of the 5' long PVC pipe, I attached a make-shift wooden box to hold the servo controller (I bought it from Cowlacious rather than making it myself. I made sure the box hung down below the pipe when the skull was oriented upright. This way the skull would naturally stand straight up. Also shown in the picture is the wooden support and a metal support bracket to hold the assembly up when I am not moving the head (more on that later).

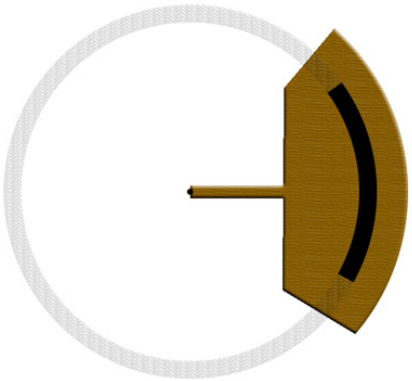
Neck

OK, we have a foam skull at the end of a black PVC pipe with a servo motor controlling the jaw and a servo connection wire running inside the PVC pipe to a severo controller attached to the other end reacting to the sound of an i-pod. Now, let's make a neck. Much easier.

I carved five vertebra out of foam board. I used half-inch foam board so I had to glue two sheets together to get the right thickness. OK, my vertebra isn't nearly as good as Vile Things but al least mine can twist. Along those lines, before I painted anything, I coated the carved pieces of foam with a couple of coats of Minwax polyurethane shellac. This gave the flat foam area a hard, smooth surface that did not catch when the vertebra rubbed against each other. To get the neck to work as a unit, I bought some elastic thread from a fabric store and passed it through the vertebra three times as shown. Now, when everything is tightened up; if you twist the top vertebra, the second twists almost as much, the third a little less and so forth.



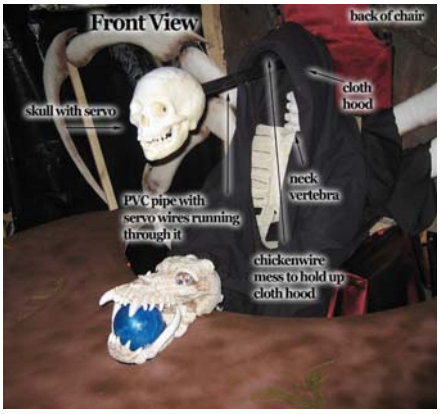
Now, we need the neck to move with the skull motions. To do this, we need to do a little trick. The thing is, the head needs to pivot around the neck, but the actual support for the head will be about one foot behind the neck. To fix this issue, I cut a wedge from some plywood as show below. To make the wedge, I used a compass to draw a circle (really just an arc) that was 12" in radius and 12.5" in radius. I used a jigsaw to cut out the arc then cut the wedge as shown. The center point will attach to the uppermost vertebra of the neck. I also attached an L-brace to the center shaft and made a block with a 1.25" hole bored through it. This piece will support the PVC pipe (described later).



Hood Support

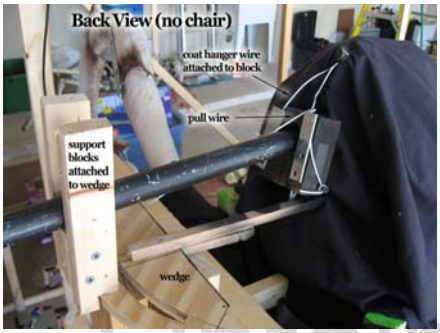
The hood support is just a piece of chicken wire with some paper mache over it. I molded the chicken wire over the skull to get the shape right (I didn't make it form fitting, though. I made it a bit bigger so that the skull can move in and out easily without dragging). Before adding the paper mache, a wove two pieces of clothes-hanger wire through the mesh for support. These wires will hold up the mesh and the cloth hood. I glued the cloth hood to the mesh to keep it from sliding off.

Putting it All Together



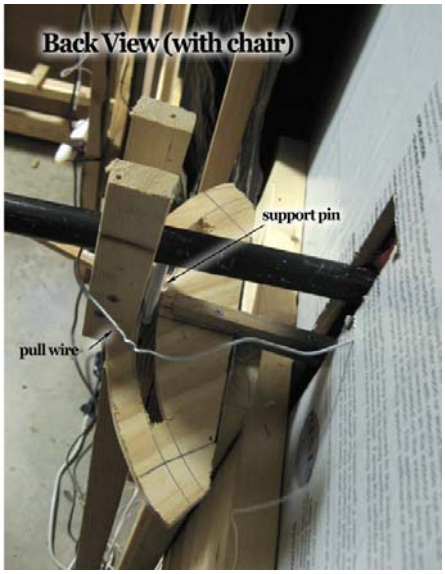
So, from the front view, you can see the free-floating skull, the PVC pipe, the neck vertebra and, if you squint, the black paper mache mesh that is holding up the cloth hood.

The bottom of the neck is glued to the sternum and the top is attached to the center point of the wedge shown earlier. I had to lower the point of attachment slightly with a small block of wood because I was stretching the neck too much. I used a nail and a glue gun to attach the vertebra and made the attachment at the very back so that the wood (now painted black) was not visible from the front.



The fortune teller is sitting in a wooden chair. The chair has a foam-board back (which is removed in this picture) and a 2x4 post that runs behind the back of the chair and stops at head level. You can't see it well in this picture but the wedge is resting on it. In order to support the PVC pipe better, I created a U shape with three blocks of wood and attached it to the wedge. The bottom of the U is even with the hole bored through the front block. I did not close the top of the U and put the front block on a pivot so that I could lift the back of the PVC pipe and make the fortune teller look down into his crystal ball. I attached the two

coat hanger wires from the chicken wire mesh to the back of the block. This way, the mesh moved with the skull. I soon found it was necessary to attach a "pull wire" to the block. I had to pull slightly on this wire just before I made the skull leap forward. Otherwise, the front block would drag on the PVC pipe. Notice that the front block of wood is behind the cloth hood. It is better hidden that way. The PVC pipe slides through a hole in the back of the hood.



This picture shows the PVC pipe, wedge and pull wire running through the back of the chair. As you can see, it all fits through a small slit. This picture also gives a better view of the 2x4 that is supporting the wedge. You can also see the "pin" that is guiding the wedge. This pin is simply a 0.25" in diameter bolt with the head cut off. I drilled a 0.25" hole into the top of the 2x4 and glued the support pin in place. Now, to make the skull look side to side, I could grab the U block (letting the end of the PVC pipe rest on my forearm and elbow) and slide the wedge side-to-side. The support pin helps keep the wedge on track so that it pivots around the center point (now the neck vertebra). Note that the movement of the skull is limited because the wedge itself must stay behind the back of the chair. My fortune teller could look about 20 degrees to the left and right. When at rest, the end of the PVC pipe would rest on the 2x4 support I mentioned much earlier in the tutorial. This support stood about 5' back from the chair.

You know, you thing you are taking good pictures while you are building the thing but they always seem insufficient when you go to write a tutorial. So, sorry if that seemed like a lot without great detail. It really isn't that hard so let me recap.

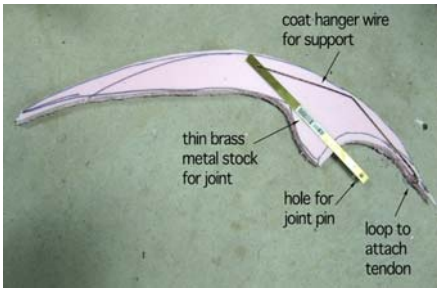
- Make or buy a skull with a moveable jaw.
- Make or buy a servo controller that reacts to sound.
- Install a servo into your skull so that it can move the jaw.
- Attach the skull to one end of a PVC pipe and the servo controller to the other end.
- Make a wedge from some plywood. Cut an arc out that has a center focus around the end of the stick you will attach to your neck vertebra. The purpose of the wedge is to act as a guide so that you can make the skull pivot around a neck it is not attached to. It will also hold the skull in place when you are not around. Put a U shaped block a the back of the wedge and a block (that can pivot) with a big hole in it near the front.
- Make five vertebra from foam board. String them together with elastic.

- Attach the bottom vertebra to the sternum. Attach the top vertebra to the wedge.
- Fold some chicken wire around your skull. Run some coat hanger wire through it for extra support and let those wires run out the back. Encase the chicken wire in a coat of paper mache and paint flat black.
- Attach the ends of those coat hanger wires to the front block of the wedge so that the hood will move with the skull.
- Attach a wire to the top of the front block so that you can pull the block back a little when you want to slide the PVC pipe through it.
- Attach i-pod to speakers. Fin.

Fortune Teller Moving Spines

As I mentioned elsewhere, my original idea with the spines would be these long, lanky bones that would loom high over the kids' heads. I figured I could operate them like a marionette puppet from above. I had success with this approach with my candy-dispensing spider. The issue was that my garage ceiling was only 10 feet high and it would take only one tall kid to jump up and grab a spine to destroy the whole thing. Then, I found some discarded Teflon tubing at work about the same time I was wondering if I could ever hope to make a halfway-descent bone with foam board and my newly acquired Dremel. Then it came to me. Do the exo-skeleton thing. Use internal tendons to make the bones move. This project did take some time and planning, but primarily because I had to make FOUR of these things and I was a newbie when it can to using a Dremel.

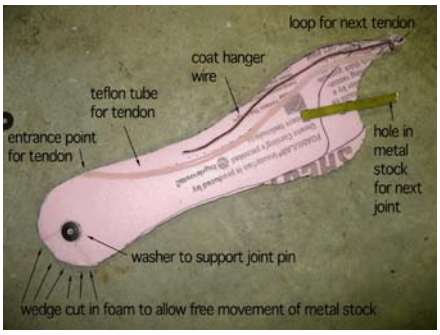
Each spine had three sections. I will show each separately. All three were made from 4 layer sandwiches of half-inch foam board, with some internal structure. So, when you see a shape below cut in foam board, you really need to cut four of those shapes to glue together. Since there are four spines, you actually need to cut 16 of them.



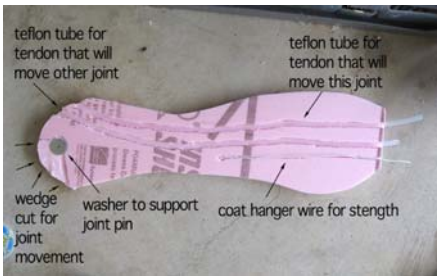
It is important to make these in order so that everything matches up. Start with the claw and work your way back. I wanted a curved claw like that of a crab leg (yes, my fortune teller got the nickname of "Darth Lobster"). I could have added serrations here if I wanted but I decided against those. Anyway, you can see a coat hander wire with a loop running most of the length of the claw and terminating at the tip of the spine with a loop.

The tendon will be tied to this loop. For the joint, I used a thin, brass metal stock that I got at a hobby shop. This metal is used to make model airplanes. I chose it because it was cheap and I thought it would be easy to drill through (I am not experienced in metal work). Choosing this material was a mistake. It was too flimsy to support the entire assembly and I later had to add additional supports. Go with something stiffer even though it will be harder to drill your hole. I let the metal stock extend about three inches from the edge of the foam board. When you cut your shape, remember that you will be carving this down so make it bigger than you need. I cut a shallow wedge in the foam board to recess the

coat hanger wire and glued two layers together with polyurethane glue. Once the two layers dried, I glued the other two layers to make the thing four layers thick (the metal stock stuck out at the center of the stack). Sorry I seem to have forgotten to take pictures of the intermediate stack. Anyway, once everything was dry, I carved away with my new Dremel (I was covered in little flecks of pink foam. You should have seen my wife's face) and sanded the claw smooth with fine sand paper.



You must make two measurements before you can make this second piece. You need to align the washer to the hole in the metal stock sticking out of the claw you just made. Once you have done that, you need to match up the entrance point of the tendon with the wire loop on the claw's spine (see the picture below). The rest you can improvise. Using the cutting guide that came with my Dremel, I carved a shallow wedge in an arc shape at the washer so that the metal stock wouldn't rub as the joint flexed. I also added a second washer to the layer opposite of this one. That way, the metal stock would be sandwiched between two metal washers. The metal washers are important because the joint pin would just cut through the foam without their support. Since the urethane glue expands before it dries, use it sparingly around the washers. When I was ready to glue the two pieces together, I inserted the joint pin (without gluing it) to make sure the holes of the two washers lined up. The joint pin, by the way, is simply a short, straight piece of coat hanger wire.

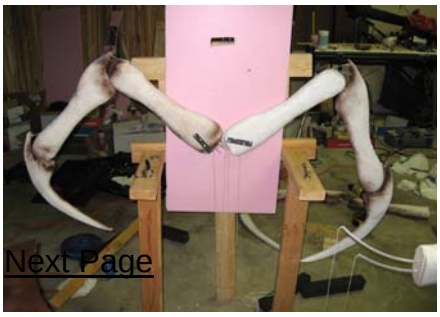


You must make three measurements before you can make the last piece. You need to align the washer to the middle joint just like you did with the claw. But now, you have two tendons to align. The inner tube will hold the tendon that runs all the way to the claw. The other tube will hold the tendon that will move the center bone. The rest is just a duplicate of what you just did.

Next Page

Fortune Teller Spines, continued...

Once you have carved and sanded your pieces, give them a couple of coats of liquid latex and paint. It is amazing how good an untalented guy can make these look with just two different colors of spray paint. Do a couple of coats of flat white, then spay a mist of dirty brown at the joints. Do all this before you glue the joint pins in place. I used masonry line (Home Depot) for the tendons (another mistake. They gave out after about 2.5 hours of use. Use a stronger string). Tie one tendon to the loop at the claw and run it through the entrance hole of the middle bone. If you use a relatively stiff string, it will be easy to feed the string through the bone. Then feed the tendon through the inner-most tube of the final bone. Let plenty of extra string dangle. Tie a shorter piece of string to the loop at the middle bone and feed it through the outer-most tube of the last bone. The final product should look like this.

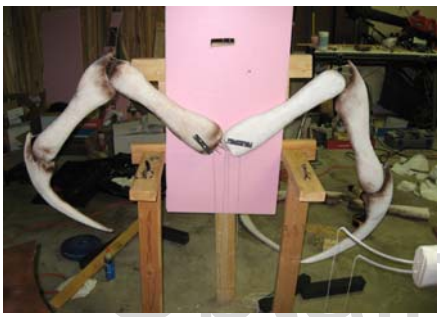


Attach the four spines to the back of the chair with 6" lag screws and some brackets. Be careful not to tighten too much or you will crush the spine.

Next Page

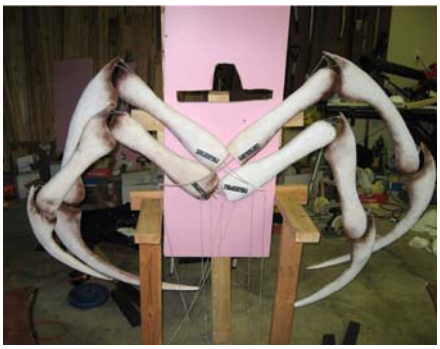
Fortune Teller Spines, continued...

Once you have carved and sanded your pieces, give them a couple of coats of liquid latex and paint. It is amazing how good an untalented guy can make these look with just two different colors of spray paint. Do a couple of coats of flat white, then spay a mist of dirty brown at the joints. Do all this before you glue the joint pins in place. I used masonry line (Home Depot) for the tendons (another mistake. They gave out after about 2.5 hours of use. Use a stronger string). Tie one tendon to the loop at the claw and run it through the entrance hole of the middle bone. If you use a relatively stiff string, it will be easy to feed the string through the bone. Then feed the tendon through the inner-most tube of the final bone. Let plenty of extra string dangle. Tie a shorter piece of string to the loop at the middle bone and feed it through the outer-most tube of the last bone. The final product should look like this.



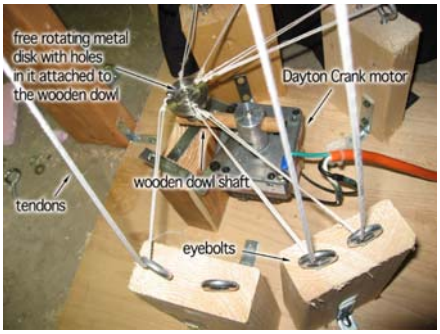
Attach the four spines to the back of the chair with 6" lag screws and some brackets. Be careful not to tighten too much or you will crush the spine.

Making the Spines Move

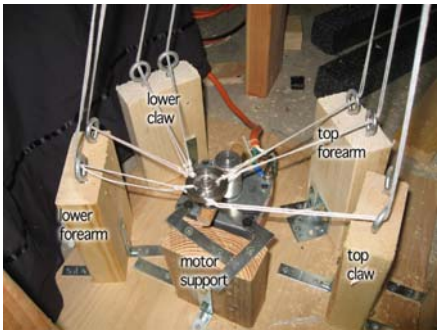


OK, here are all four spines on the chair. This is a good picture because it shows the chair itself (which is just some 2x4s with a foam board back and no seat), you can see the 2x4 and support pin through the hole in the foam board that will support the plywood wedge described in the "making the head and neck" section. You can also see that, rather than making all four spines identical, I made the top two larger and longer than the bottom two Just a note: I ended up cutting off the back of this chair because the hole you are looking at was unnecessarily big. It ended up being just a slit.

So, there are 16 strings hanging down. What do we do with them? We are going to Flying Crank Ghost them!



The Flying Crank Ghost (FCG) mechanism is very versatile. I use it in a different manner for the crystal ball. It is simply a slowly rotating shaft that pulls your strings in a way that makes your prop look alive.



There are lots of tutorials on the Flying Crank Ghost so I am not going to go into that much detail in the mechanism itself. Here are the basics. I have a Dayton Crank motor that rotates at 6 rpm. You do need a motor with some reasonable torque o make this work. I attached a 4" wooden dowel as the shaft. I surrounded the motor with four block of wood and put 2 eyebolts in the top of each. The tendons ran through these eyebolts and to the free-rotating metal disk attached to the dowel.

This is not the only way to set it up but flexing the "forearm" does pull on the claw tendon so it is better tighten the forearm first then pull on the claw. My setup has the left and right sides moving in unison. The motor is running clockwise.