SCARY TERRY'S

HALLOWEEN PAGES

http://www.scary-terry.com/rockchair/rockchair.htm

Rocking a Chair with a Wiper Motor

This is Gus (some call him "Pops"), and he's our cemetery guard. The problem is, he's not very good. Hundreds of trick-or-treaters get by him each Halloween. He just sits in his chair with his feet propped up on a stump, rocks back and forth and snores all night long. It's like he's dead to the world.

The following is a "how-to" for making a chair rock so you can create your own Gus or whatever you want to call him. It's a fairly simple project and a great introduction to using a wiper motor in your haunt.

To eliminate any confusion, this is not a "rocking chair" but a plain old cheap plastic chair that rocks back and forth. It uses a Saturn wiper motor driven by a 5 volt power supply. Most of the parts can be obtained from your local hardware store/home center. I use a full sized 4th class "Bucky" skeleton which can be obtained from Anatomical Chart Company.

This is a picture of the mechanism we'll be making. It consists of a plastic chair, a "T" shaped piece of wood, a wiper motor and an aluminum bar to connect the motor to the chair. It should cost less than $35 for everything.

Following is a parts list.

- One wiper motor

- One 5 Volt, 2 amp (minimum) power supply (see text for more details)

- One 3 1/2" to 4 1/2" range, hose clamp (for holding motor to mounting board)

- Two each 1 1/2" x 1/4" flat head machine screws, 1/4" tee nuts and 1/4" lock nuts (for attaching the chair to the wood)

- Two each 2" angle brackets, #10 x 1 1/4" flat head screws, #10 nuts and #10 washers (primary motor mount).

- One each 6mm x 10mm screw and 1/4" (or 6mm) lock washer (for attaching motor to bracket).

- Two 2 1/2" wood screws

- One each 3/4" x 1 1/2" x approx. 18" wood, 3/4" x 3" x 19" wood (base of rocking mechanism). Hardwood works best

- One 16" x 3/4" x 1/8" aluminum bar

- One 5/16" x 1 1/2" bolt, two 5/16" nuts and three 5/16" washers (for attaching aluminum bar to motor).

You'll also need a plastic "patio" type chair. For convenience, I used a chair we already had. The modifications to the chair are minimal and it can be used the rest of the year as a regular chair.

Additionally, you'll need hardware and possibly a piece of wood to attach the aluminum bar to your chair. See text for details.

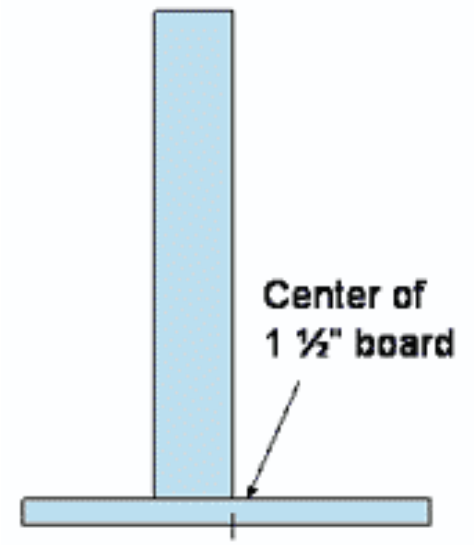
First step is to measure the span of the rear legs of your chair. You'll want to cut the 1 1/2" wide piece of wood just a little longer than this span. In this case, my chair was 16" wide and I cut the wood 16 1/4" long.

You'll also need to drill a 5/16" hole in the end of each rear chair leg. You may need to alter this procedure due to the design of your chair.

Drill a hole in each end of the 1 1/2" wide board to match the holes in the chair legs. This hole needs to be big enough to accommodate the "T" nut, which should be about 5/16" diameter.

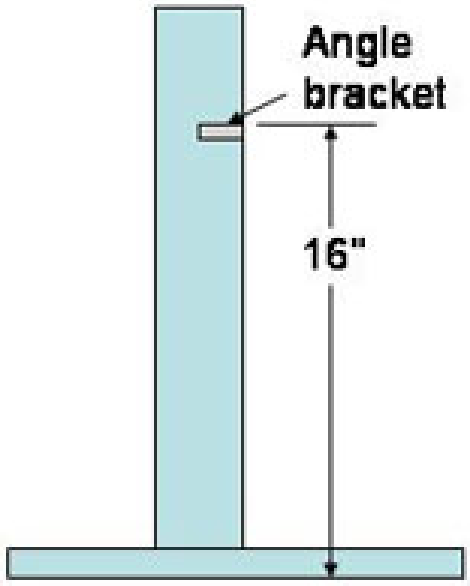
Countersink the hole so the 1/4" screw will fit flush with the bottom of the wood. Insert the "T" nut into the top side of the wood and then screw in the screw.

The picture at above shows the bottom side of wood with the screw inserted, the picture at the left is the top.



Next, we'll join the two boards together. Line them up as shown at left, with right side of the 3" board aligned with the center line of the 1 1/2" board (this will place the drive side of the motor below the center of the chair).

Pre-drill and countersink for the 2 1/2" wood screws, then using those screws, join the two boards together.



In this step, we'll install the angle bracket that will be used to mount the motor. Mark a line on the 3" wide board about 16" from the back edge of the 1 1/2" board (this distance may vary depending on the chair).

Hold the angle bracket on this line, mark the two holes and drill them out for the #10 screws. Counter sink the holes on the bottom side of the board, insert the screws, and mount the angle bracket with the #10 washers and nuts as shown in the photograph

To mount the motor, you'll need to enlarge the top hole in the angle bracket to accommodate the 6mm screw for mounting the motor. Use a 1/4" drill bit (or 6mm) to drill out this hole.

Next, place the hose clamp over the angle bracket as shown left.

Using the 6mm screw and 1/4" lock washer, mount the motor, as shown right, with the gearbox forward and the motor housing to the rear.

This step is optional, but if you're going to use the chair on a hard surface, I'd recommend it.

Temporarily slide the hose clamp over the motor and mark the underside of the board along the path of the clamp. Slide the hose clamp out of the way and notch out the board as shown left. I just used a back saw and chisel to make the notch. There are many other ways to do it (i.e. dado blade, router, etc.).

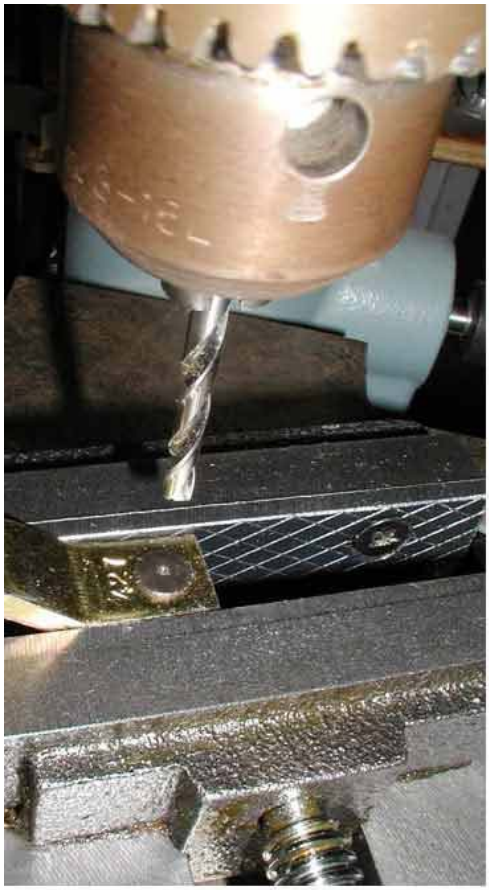
Now slide the hose clamp over the motor and tighten securely, but not too tight or you'll dent the motor casing.

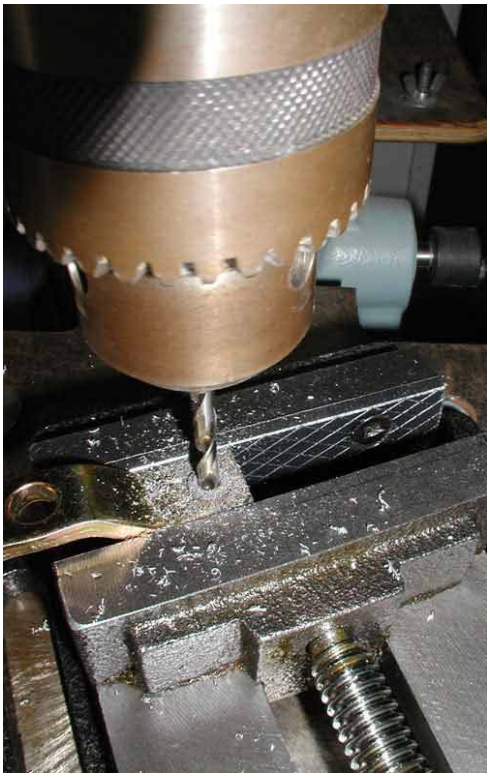
these!!).

We need to remove the ball from the arm that's attached to the motor

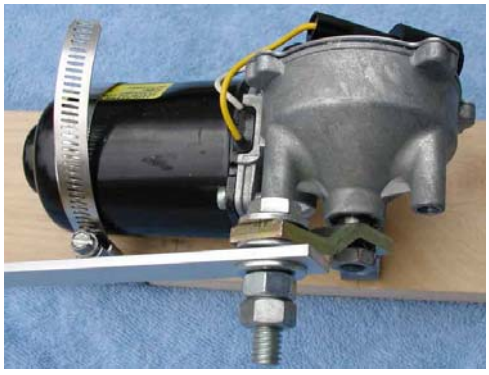
- Start by removing the nut and washer from the motor shaft (don't loose Gently tap the arm with a hammer and it should come off easily.
- Clamp the arm in a vise and center punch the backside of the ball as shown below left.
- To drill out the ball, I find it easier to start with a small drill bit (1/8") (below, second from left) and finish with a 5/16". This should remove the ball and give a nice clean hole in the arm as shown below right.

Reattach the arm and tighten securely.

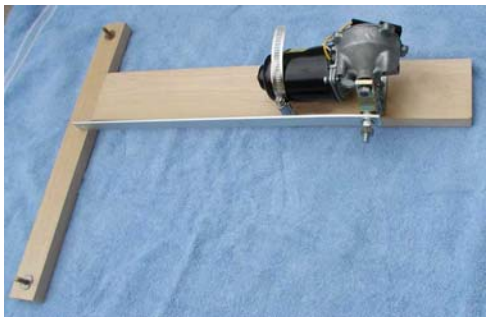




Next, drill a hole in each end of the 16" long aluminum bar. One hole should be 5/16" diameter, the other should be the appropriate size to accommodate the hardware you'll be using to attach it to the chair (see below).



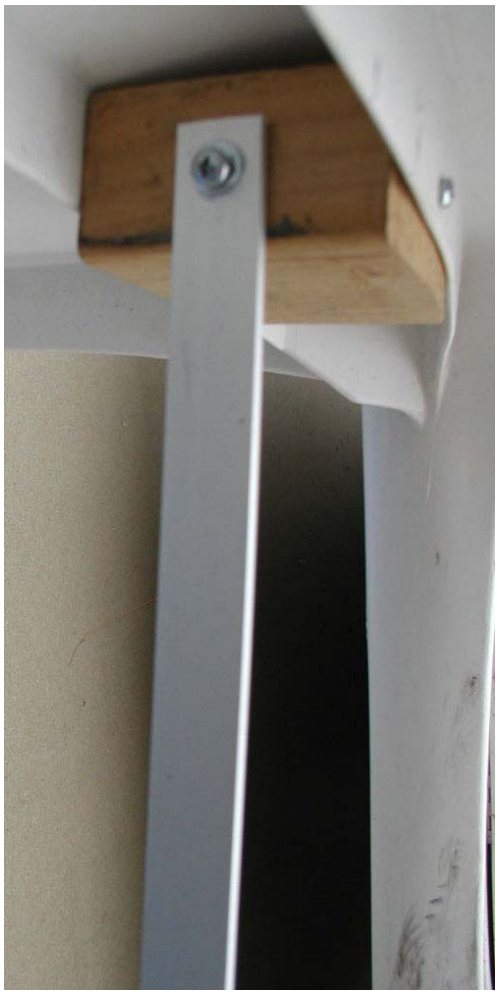
You need to attach the aluminum bar to the motor. Using the 5/16" bolt, three washers and two nuts, assemble as shown left, through the 5/16" hole in the bar.



Leave a little play in the mechanism so the motor is free to rotate, then tighten the nuts against each other. You could also use a lock nut in this case, but I've had one gradually tighten before and seize up the mechanism, so I prefer the "jam nut" technique.

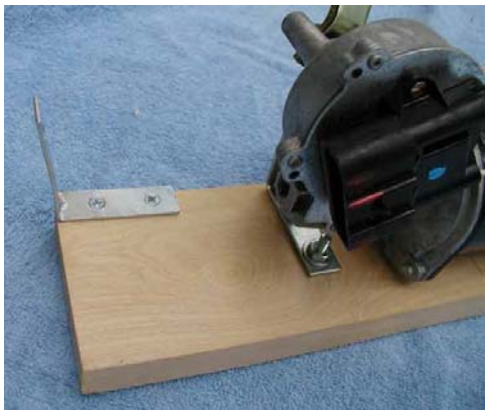
Your mechanism should now look like the one pictured here

Some chairs have ribs that run from front to back which make for an easy installation of the aluminum bar.

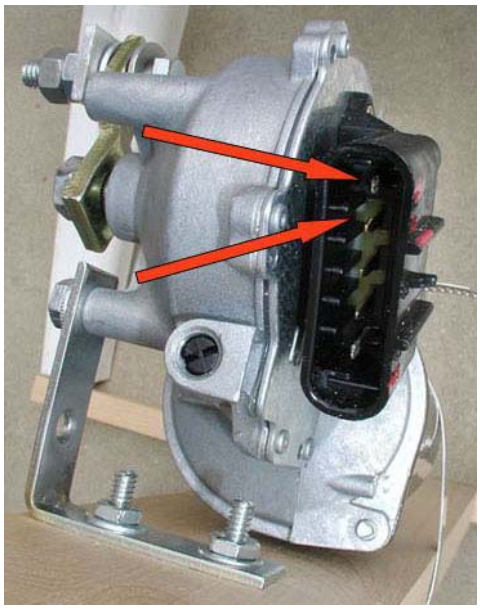


My chair did not have these ribs so I had to add a 2x4 block of wood as shown left for the mount. You'll have to adapt your chair as necessary. I used a 1" #8 wood screw and washer to mount the bar to the block of wood .

To complete the project, place the chair legs over the screws on the rear board and then install the 1/4" lock nuts. Tighten the lock nut just enough to engage the locking material but be sure to leave a gap as shown right to allow the chair to rock freely. The nut is just to make sure the chair does not come off the screws.



One more addition I make is to add an angle bracket to the front of the main board. This allows us to attach the rocking mechanism to the stump or box that the Bucky can prop his feet on and helps to keep everything together. You don't need to prop up the feet, but I think it creates a better effect with the knees bending rather than the legs just dangling there. It also hides the motor.



The final step is to wire the power supply to the motor. You want to connect to the top two terminals of the motor as shown right. I find it easiest to cut away some of the connector housing so I can solder wires to the motor terminals. You could also use some push-on crimp type connectors. Polarity is not critical as a polarity reversal just changes motor rotation direction. The second terminal is attached to the motor housing, so it's probably best to connect this pin to the negative side of the supply.

Even though this is a 12 volt motor, I've found that it runs just fine on 5 volts and gives the "rocking" effect at just the right pace.

On my rocking chair, I've added a microswitch that is activated each time the motor arm turns. The microswitch in turns triggers a ChipCorder that plays a snoring sound over a speaker mounted in the Bucky's head. Here's a page that shows the microswitch mount. I've also attached an audio/servo driver and servo that makes the jaw on the Bucky move in sync with the sound.