

# DaveintheGrave's Halloween Props

## Animated Crawling Skeleton



Build a life-size skeleton torso that realistically crawls across the lawn one arm at a time.

### 1. Motor Base and Linkage Assembly

BASE - I used  $\frac{1}{2}$ " thick wood and plywood (6 pieces)

Materials:

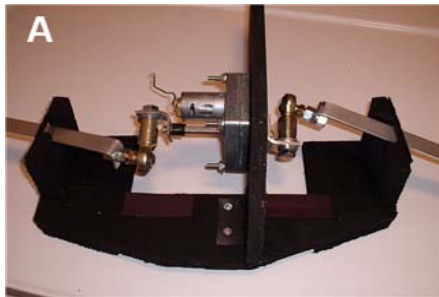
Wood pieces needed :

- (1) 12  $\frac{5}{8}$ " x 3" also known as Piece A
- (2) 6" x 3" also known as Pieces B, C
- (2) 3  $\frac{3}{4}$ " x 3  $\frac{3}{4}$ " also know as Pieces D, E
- (1) 9  $\frac{1}{2}$ " x 4" tall or longer - AKA Piece F

Obtained from  
Omarshauntedtrail.com

## Parts:

- (1) 6 – 18 RPM 12 VDC Gear Motor (Picture B)
- (2) 3/8" x 24 x 1" hex bolts
- (2) Ball joint swivel connectors (Picture C)
- (4) 3/8" x 24 hex nuts
- (1) AC to DC Adaptor (Wall wart)
- (4) 3/8" Lock washers
- 4 ft of 1/8" x 3/4" Flat Aluminum Stock
- (1) 1/2" Fender Washer
- 1 ft of 1/16" x 1" Aluminum Angle stock (L)
- (4) 1/4" Lock washers
- (12) #6 by 3/4" wood screws
- Thin Wire
- Cotter Pin
- (8) #8 by 1" wood screws
- (4) #10 x 32 x 2" Flat Slotted Bolts and Nuts
- Wireless Remote Control Unit



Take A and slide piece B under it and line up flush with the front and left side of A (see picture D). Use # 8 x1" wood screws (2 per side) to secure. Repeat for piece C, except on right side.

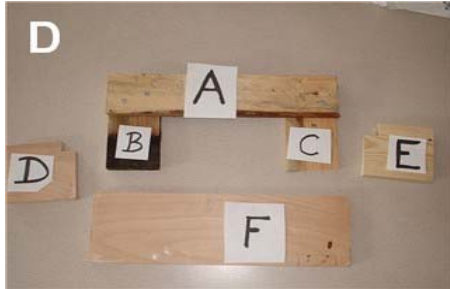


Take piece D and measure 1 1/2" horizontally from REAR of it and mark it and draw a vertical line. Then measure 1 1/2" vertically, mark that point and draw a horizontal line. Where those lines intersect use a 1 1/4" hole saw on drill to make hole. On the front side of D cut out a 3/4" x 3/4" square notch at the bottom (see picture D).



This is where D will overlap A when mounted.. Cut about a 1 1/2" length of the 1" aluminum L – stock. This will be the bracket for attaching D to B (I used #6 x 3/4" wood screws). Drill two 9/64" holes in each side of L – bracket. Center bracket flush with inside bottom of D and screw in place with two # 6 screws. Use a dremel tool with a sanding attachment to round off the edges on the inside (same side as bracket) of the 1 1/4"

hole. This gives the arms more room to rotate properly. (See Picture I)



Repeat step 2 for Piece E. We will do a little more to the D and E pieces after we mount the motor.

Take piece F. Measure over 4 1/8 " horizontal from front of F toward the rear and mark the point and draw a vertical line.



Measure 1 3/4 " from bottom, mark point and draw a horizontal line. Where those lines intersect drill a 7/8" hole using a paddle bit in drill. Cut about a 2" piece of L-stock for a bracket.

Drill two 11/64" holes in each side of the bracket. Remove the two screws from the rear of the motor assembly. Be careful – hold motor base tightly or it can come in half and all the little gears will fall out.



I know – it happened to me. Set motor in place on F with short shaft going through the wood (motor tower should be positioned on top, about the 11:00 o'clock position). Center the short shaft in the 7/8 " hole and use some coat hanger wire or small drill bit to mark the 4 motor mount holes.

Use a 13/64 " bit for the 4 holes. Attach L-bracket to F, flush with bottom and centered about 2 inches from the front. Use two #8 screws.



Temporarily screw the motor in place. Use #10 32 x 2" flat slotted bolts and nuts (these bolts match the threads in the motor).

Screw bolts thru wood to motor, then nuts. (See Picture E) Piece F will mounted to A in a position slightly off center. The reason is in order to center the ends of the two motor shafts equally from the arm guides (pieces D and E).



I mounted mine with the wood part of F centered 5 3/4 " from left side of A. Use two #8 screws. Set D in place on B (flush with outside edge) and eyeball thru the large hole at the motor shaft to center the hole in D with the shaft.

Then mark bracket holes in B. Don't screw D to B just yet. Repeat same procedure for right side (E to C). Remove motor from F and replace the two original screws in Base. This a good time to trim the corners off of D and E. (see picture F). And also cut an angle off on the front of piece F (see picture G). Or leave it until later if you think it will be needed to mount the skeleton's head. Also, saw off at an angle both front sides of piece A (See picture G).

This next step might seem unimportant, but it is a very important piece. Needed are two (approx. 3" long, 1 1/2 " wide) thin metal strips (these will go over the holes in C). Use a dremel or drill to make a slot in it (about 1" long) and slightly wider than the 1/8" aluminum stock you are using for the arms. (I find it is easier to drill 4 or 5 small holes in a row and then cut the slot square with a dremel cutting wheel).

Drill a 9/64" hole on each side of the slot in order to mount it (with slot centered in middle of hole) on the outside of D with #6 screws. (See Picture H) Repeat for E. This metal glide gives the arm a pivot point and also keeps the arm from falling forward as it circles around. Without this piece the hand and wrist would never lift off the ground.

Now D and E can be mounted to B and C using the #6 screws in the holes previously marked. Spray paint assembly black. Drill a small hole in flat part of short motor shaft for cotter pin. Re-attach motor to D (using the 10 – 32 x 2" bolts, 1/4 " lock washers and nuts). Attach F to A using two # 8 screws.

## Linkage Assembly

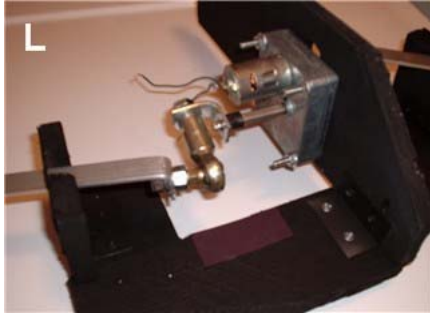


Make small crank for short shaft out of aluminum stock approx 2" long and bend 1" of one end 90 degrees to form an "L" shape. Drill a 3/8 " hole in one end for swivel mounting bolt to go through.

Use dremel cutting tool to cut a rectangular hole needed for crank to fit snugly over 1/2 " shaft. Put crank on shaft and temporarily hold in place with cotter pin.



Make another small crank the same size for long shaft. Bend it the same to an "L" shape. Drill 3/8" hole in one end for swivel mounting bolt. Drill 1/4 "hole near other end of crank for shaft. Before using dremel tool to enlarge hole – hold the crank to the shaft and compare it with the crank on the other side of the motor. You want to position the long shaft crank 180 degrees from the short shaft crank for proper alternating rotation of the arms.



Eyeball the shape of the long shaft and grind out the  $\frac{1}{4}$ " hole in the crank to match, so as to keep it in that 180 degree opposite position when mounted (about  $\frac{1}{4}$ " from end of shaft).

After getting a snug fit, mark the crank's position and use a hacksaw to cut a small groove around the shaft above and below where the crank will sit. Use some small gauge wire or a C-clip below the crank to keep it from sliding down shaft. Leave the groove above the crank open for now.



Use two lengths of flat aluminum stock for the arms. Cut each piece  $17\frac{1}{2}$ " long. Bend approx  $\frac{3}{4}$ " 90 degrees to form an "L" on the end.

Drill a  $\frac{3}{8}$ " hole in small "L" section you just bent over.



Screw one  $\frac{3}{8}$ " nut onto the swivel end of the ball joint to act as a spacer. Slide right swivel ball joint shaft thru the hole and secure it to arm piece with the  $\frac{3}{8}$ " 24 hex nut and lock washer. Use one of the  $\frac{3}{8}$ " x 24 x 1" hex bolts and lock washer through the crank and into the base of the swivel and tighten, making sure swivel ball part is facing away from the motor. See pictures J and K for proper orientation of the crank to the ball joint.



Repeat these steps for attaching LEFT arm into it's crank. From center of motor shafts to end of ball joint should measure about  $1\frac{3}{4}$ " to  $2\frac{1}{4}$ " in length. If more length is needed to increase the rotation arc of the arm, just add a few  $\frac{3}{8}$ " flat washers between base of ball swivel and crank. (See Picture K).



Slide  $\frac{1}{2}$ " fender washer over short motor shaft. Take left arm assembly and slide free end of it through the metal slotted guide in D and slide crank on to short motor shaft. Secure in place with cotter pin.

Slide right arm assembly end through the metal guide in E and slide crank on to long motor shaft (make sure you have installed the two cranks 180 degrees out from each other). See Picture L.



Attach wall wart wires to motor wires. (The wire with the white dotted line on the wall wart is negative). Check rotation by plugging wall wart in to socket briefly, in short bursts. You may find that the aluminum arms will need some trimming where they attach to the ball swivel for proper rotation. If so, remove the arm assembly, trim off excess metal with dremel, then reattach and check rotation again.



Repeat until both arms rotate smoothly.

Secure both cranks on their respective shafts with cotter pin and thin wire on long shaft (in slot previously cut).

Set unit on floor and check for proper crawling operation.



### Ribs, Arms and Skull Assembly

#### MATERIALS NEEDED:

- |  |                          |
|--|--------------------------|
| 3/4" diameter PVC pipe (4 ft.)           | Pool Noodle              |
| 1/2" diameter PVC pipe (3 ft.)           | Elmer's glue.            |
| (2) 45 degree 3/4" PVC connectors.       | Paper Towels.            |
| (2) 1/2 "PVC" T" connectors.             | White latex house paint. |
| 3/4 " diameter wooden dowel rod.         | Masking Tape.            |
| 3/8" diameter clear tubing (25 ft.)      | (2) #8 x 3/4" screws.    |
| (2) Arm bones from a blow-mold skeleton. | (2) #8 Nuts.             |
| Coat Hangers.                            | (2) #8 Flat Washers.     |
| Rigid Wrap plaster cloth product.        | (2) #8 Lock Washers.     |
| (2) 3 inch long #8 screws and nuts.      |                          |
| Small piece of 1/2" flexible tubing.     |                          |

## RIB CAGE

Cut a piece of  $\frac{3}{4}$ " PVC 14" long for a backbone. Drill 9 to 10 small holes thru the side of it at approximately one to one and a half inches apart. Place the PVC section on top of the motor, against the wood (piece F). Mark two spots where holes can be drilled for mounting bolts to go through PVC. Drill the two mounting holes approx.  $\frac{3}{16}$ " diameter all the way thru the PVC. Replace PVC on top of motor and mark the mounting holes on Piece F to drill.

Drill the two holes in Piece F and slide two #8 bolts or screws (about 3" long) through the holes from opposite side of board. I then added  $\frac{1}{2}$ " spacers to the bolts in order to center the backbone. Mount backbone on bolts and secure it temporarily with nuts. Slide lengths of coat hanger wire through small holes and bend each side up and then around and curve under to make each rib (see picture M).

It takes some patience to get the overall shape of a rib cage. Take your time.

To give each rib some thickness I slid sections of  $\frac{3}{8}$ " clear tubing over each rib.

Paper mache the whole rib cage. I used cheapo paper towels and a mixture of one part Elmer's glue to two parts water for mache mixture. Paint it with two coats of white latex house paint.

## Arms/Hands

The easiest way to make the arms is to use the upper and lower arm pieces of a cheap blow-mold skeleton. For my version I used a blow-mold for the upper arm only. Cut a slot in each end of the bone and slide it on to the left metal stock arm. (After coating it with paper mache and latex paint.) Leave about two inches of metal at the "elbow" for space to attach the lower arm. I use a short length of  $\frac{1}{2}$ " diameter PVC and a T-connector for the lower arm (see picture N). I used various sized wads of masking tape to make the

T-connector more rounded on the edges. Leave the rear hole in the T-connector open in order to put on the nut to hold the lower arm in place. I also added the extra bone beside the main PVC bone to make it more realistic (used the white cardboard tube from a coat hanger for extra bone).

For the hands I used coat hanger wire to shape the fingers and added wads of masking tape for knuckles. Then covered the fingers in more tape (see picture O). Once that is done either tape the hand to the PVC section or cut a slot in the end of the PVC "wrist" and slide the hand section in place. Again, paper mache the lower arm and cover with two coats of white latex paint.

Drill an  $\frac{11}{64}$ " hole in the center of the bottom of the T-connector. Drill a matching hole in the elbow area of the upper arm metal stock piece. Use a #8 x  $\frac{3}{4}$ " screw to attach the

lower arm to the upper arm. Insert screw from the bottom, into the T-connector, then use pliers to add a flat washer, lock washer and nut. Tighten it all down.

Repeat procedure for right arm.

### Spine Extension

I used a short length of ½" flexible tubing and some pool noodle sections to make a spine extension for the lower end of the rib cage. Slide the pool noodle sections on to the tubing and use an exacto blade to shape each vertebrae piece (see picture P). Paper mache the spine and paint with the same white latex paint. Slide one end of the spine into the lower end of the rib cage PVC, drill a small hole and secure it in place with a screw.

### Skull



I used a full size plastic skull and covered it with plaster/cloth material called "rigid wrap" to make a copy of it (see picture Q). After it dried, use an exacto to slice over the top of the skull (from ear to ear) in order to easily remove the skull copy from the plastic one. After removing the two halves use some more strips of rigid wrap to fuse them back together into a complete skull. Later, paint the whole thing with

white latex paint and after it dries use various colors of acrylic paint to color the eye sockets, nose, teeth and any other highlights you desire. If you want the skeleton's mouth to be open – slice off the lower jaw (between upper and lower teeth) replace it in open position on the upper skull part and use thin wire to secure it on each side. Then add more rigid wrap at each joint (see picture R).

### Neck



Cut a section of ¾ " PVC about 8" in length for a neck. Use a 45 degree angle PVC connector on the top end of the rib cage PVC pipe to connect the neck piece. Make two or three neck vertebrae out of pool noodle material just like the spine vertebrae, but smaller. Slide these on the neck. Paper mache and paint the neck assembly. Test fit skull onto neck to see if neck piece needs to be shortened.



## Final Assembly

Mount rib cage on Piece F using the previously installed 3" bolts. Secure tightly in place with nuts. Attach neck to top end of rib cage. Cut a 5 inch piece of  $\frac{3}{4}$ " wooden dowel rod and mount it inside the skull, using a wood screw on the outside of the skull to secure it. Attach skull to neck by sliding the dowel rod into the  $\frac{3}{4}$ " PVC neck. Use a wireless remote control to power the skeleton or just use an extension cord with a light switch installed in the middle of it.

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