

APPENDIX 2: AN EFFICIENT METHOD OF CREATING ARCHERY BUTTS

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Last year, after volunteering to be the archery person in my canton, I had an opportunity to talk to the marshal that had been supplying the butts for the local events. As it turned out, he would not be able to continue to do so. He could continue to supply used pallet wrap for stuffing the butts and cardboard for facing them. As a woodworker I could not resist this challenge. I had a fair supply of scrap wood and a 6ft. by 4 ft inch utility trailer to transport the six butts and a bow rack in. What follows is the result of planning to put these assets to best use.

Important Note

Please read the instructions through first and make sure you understand them before you begin to cut wood. Be warned. Because the parts have to be interchangeable, a high degree of accuracy is needed in the construction. A drilling jig is advised.

Materials

Number in brackets is the number of pieces needed.

Six Archery Butts

(1) 4' x 8' x 3/4" sheet of plywood	(9) 8 ft. long two by four
(4) 10 ft. long two by four	(36) 1/4"x 2 1/2" NC. hex head bolts
(12) 1/4"x 1" NC. hex head bolts	(12) 1/4"x 3" NC. hex head bolts
(36) 1/4" NC. tee nuts	(12) 1/4"NC. tapered screw in inserts
(12) 1/4" NC. posi-lock nuts	(12) 1/4" fender washers
(60) 1/4" flat washers	(36) #10 treaded inserts (steel)
(36) #10 x 1 1/2" R.H. brass screws	material to make braces for the stands
(12) #8 x 1" C.S. wood screws	1 box of 1 1/2' galvanized nails
(48) #6 x 3/4" C.S. brass screws	

Drilling jig

(6) bushing inserts	(2 to 6) 1/4" bushings
(2 to 6) 5/16" bushings	

Enough wood to make a 32 1/4 in. square frame at least 1/2" thick with sides at least 2" wide.

Most of the hardware is available at Home Depot. I purchased the drilling jig parts from Lee Valley Tools; other companies may also stock them.

Start by measuring the thickness of your plywood. If it's less than 3/4", then double the difference and add it to the length of part 2. Start cutting up the plywood into twelve part 1's (see fig.3) and twelve part 2's. You can get all the parts out of one sheet by cutting eight part 1's out of one third, four part 1's and four part 2's out of another third, and eight part 2's out of the remaining wood. It's a tight fit, but be careful and you should have no trouble fitting them all in. Drill the holes as marked. Remember, only the tops and side have to be drilled. Now set the plywood parts to one side and get one ten foot length of two by four. These two by fours are to be made into the face frames. Cut off 14 inches from the end of one of them and use this piece to make the parts marked 1A. Hammer the 1/4" Tee nuts into the 5/16" holes in part 1A also into the holes in parts 1. The Tee nut is on the inside of part 1. Nail and glue the parts 1A onto the insides of the sides as shown with the Tee nut on the bottom. You can now glue together the sides and bottoms. I used a biscuit joiner to reinforce the joints but dowels will do nicely. You should bolt the tops on now, as this will aid in assembly and make it possible to stack the parts while the glue dries. Now to work on the face frames. Cut the pieces to match the dimensions shown on the plans. Glue and fasten them together with one #6 x 3/4" counter sunk brass screw in each corner. Check them for square and put them aside to dry. Now to work on the stands. Cut the 8 ft. long 2 x 4 to length and drill as shown on the drawings. A tip- use the straightest wood for the uprights and any twisted wood for the bases. The groove in the base is not fully dimensioned for a reason. If you are using hardwood for the braces, you will need to make the groove 3/8 deep or deeper. If you are using metal, it will probably be around 1/8 inch deep. When assembling the stands. use the 1/4" x 3 1/2 in bolts with a flat washer under the posi-lock nut and a fender washer between the base and the upright.

Depending on the material used for the braces, you will have to figure out your own placement for the screw-in insert on the upright. I was lucky enough to find some 1/8 x 1 aluminium that I cut to 11 3/4 inches long. I rounded off the end that was attached to the base and drilled holes 1/2" in from the ends and centred. The hole at the rounded end was drilled 3/16" and countersunk for the #8 x 1" C.S. screw, the other end was drilled 1/4". I just set the upright and base at right angles, swung up the brace until the hole was over the centerline and marked and drilled a 5/16 hole for the 1/4 insert. A 1/4" x 1" bolt with flat washer will hold it in position when the butt is put up.

Now it's time to assemble all the parts of the main body. Pick the four strongest face frames and glue and nail them to the backs of the main bodies using the 1 1/2" nails.

Remember not to glue the frame to the top piece of the body as it's supposed to be removable. Make up the drilling jig. You may if you wish make one out of cardboard or hardboard and just use it for marking the holes. Since I plan to have these butts around for a while I made up a more substantial jig. What I did was make up a frame 32 1/4" square with sides 3" wide out of scrap 1/2" particle board. I then laid out the position of the holes and drilled them with a 5/8 bit. Because pounding in the guide inserts would have made the wood split, I reinforced the holes by nailing and gluing some 1" x 3/4" x 1/2" hardwood beside the holes. These pieces are attached so that the wood extends down 1/4" and will now serve as guides for the face frame. Slip some wood under the jig to protect the hardwood and pound in the guide inserts. The drilling jig is now complete.

Just screw the appropriate guides into the guide inserts and drill your holes. Use the 5/16" guides to drill the holes for the inserts in the main body and the 1/4" guides to drill the face frames.

A word of warning, the inserts love to go in crooked. I used a 1 1/2" long #10 screw with two nuts locked on it as an insertion tool to help to keep the inserts going in straight. The inserts will also split the plywood. Use a clamp to support the plywood while driving in the inserts. Once the inserts are in and the holes are drilled into the face frames, staple sturdy cardboard onto the insides of the face frames and attach the front frames with the #10 brass screws. Now remove the tops of the main body and stuff the butt with whatever you think will stop an arrow. When you go to replace the tops you may find you have to skim a 1/16" off each end in order for them to reinstall more easily. Attach the stands to the body of the butts with 2 1/2" bolts and washer, turn the bases at right angles to the uprights and anchor the braces with the 1" bolts and washers. Set the butts up in a safe area with the replaceable face facing the archers and enjoy.

Figure A2.1 Finished assembly

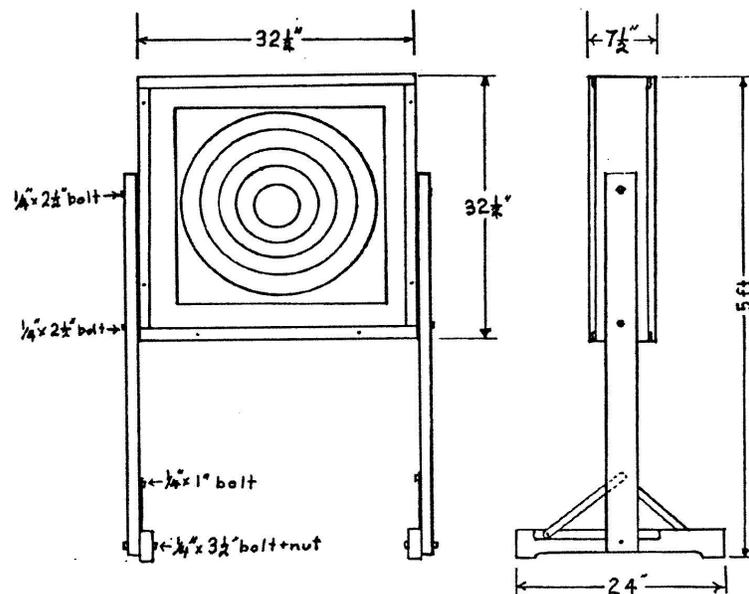


Figure A2.2 Main body

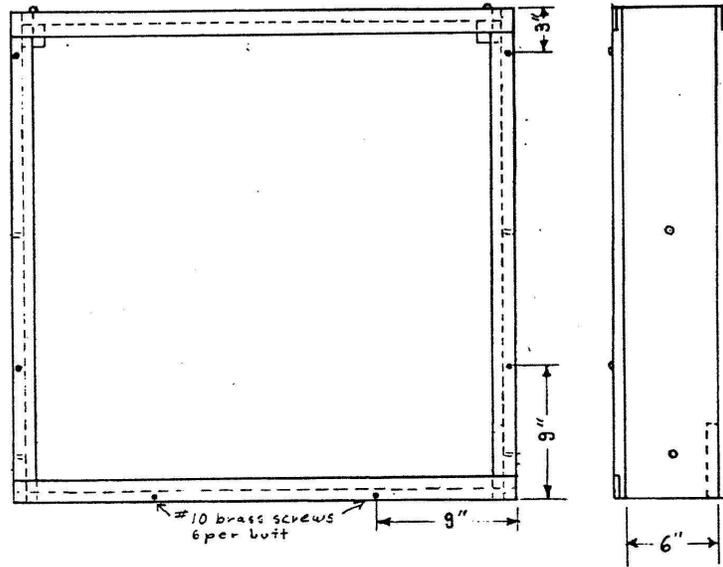


Figure A2.3 Main body parts

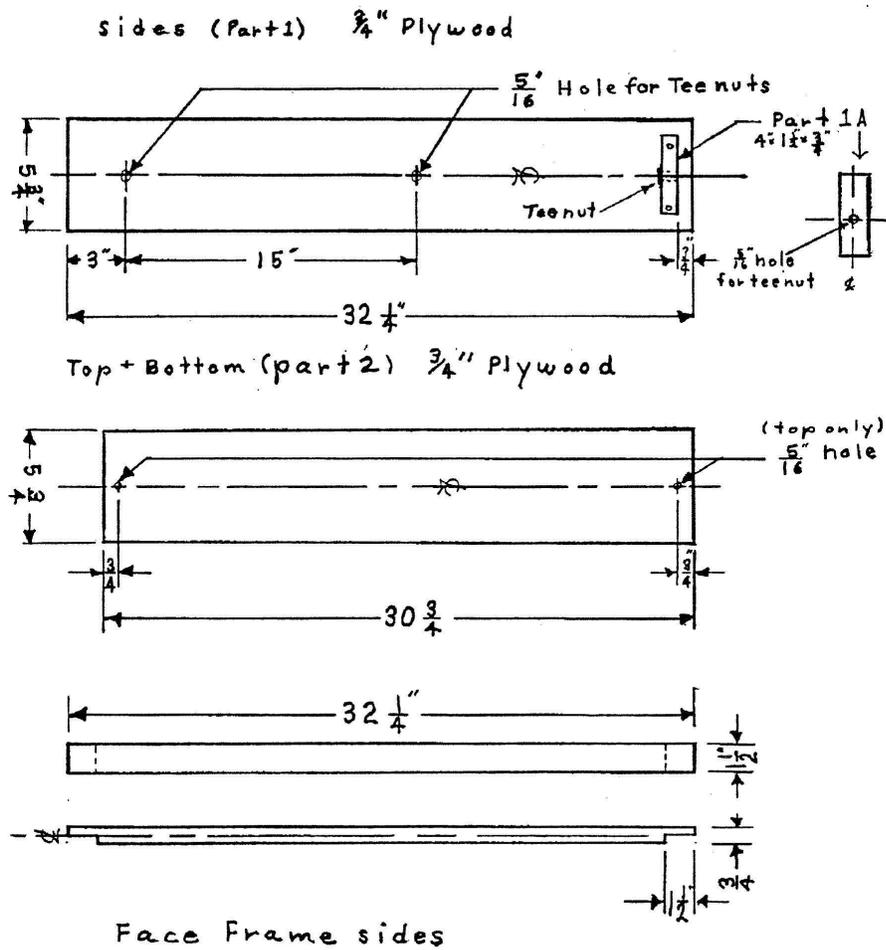
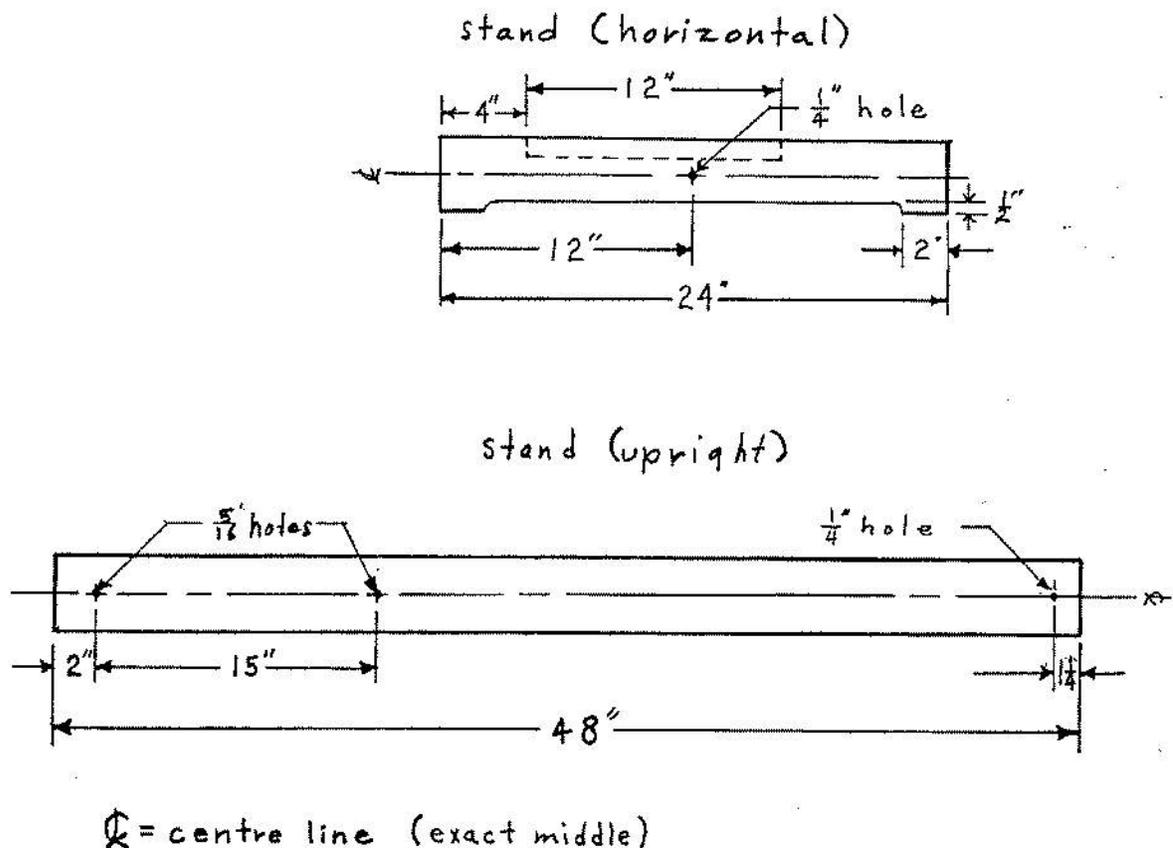


Figure A2.4 Stand Construction



Postscript:

The butts have gone through a season's use now and I can reflect on the successes and shortcomings. They've held up very well, even the splits in the face frames on the archers' side have been glued back together several times and with new cardboard made it to the end of the season. They tip over in high winds. I've added a eye screw to the top of the bottom back edge and anchor them down with a rope and peg whenever I put them up. I've found that really wet corrugated cardboard turns to mush. At the first event it **POURED!** After the rain stopped the first arrow that hit the twenty yard target went through in a cloud of wet plastic and wood pulp. I now carry 42 x 48 inch garbage bags to put over the butts. I've also found that heavy bows, 50 pounds and over will hit the stuffing hard enough to crack the back cardboard. I'm replacing the back cardboard with some old carpeting. Other than those small problems, they've been great, and have made me rather popular in local archery circles.