

Building the Overarm Blade Guard and Dust Collector

by Gordon J. Sampson

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Introduction

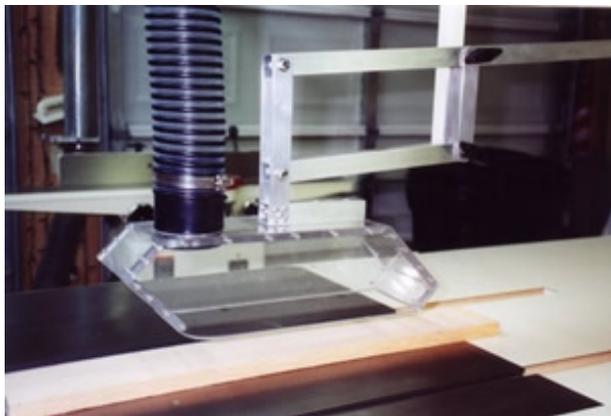
I received a quite a few requests to provide drawings or plans of my overarm blade guard and dust collector. I didn't have any formal drawings when I designed and built the blade guard but Ponders gave me that extra push to get the job done. The drawings were done on PowerPoint. I wanted to make the drawings and procedure easy to follow so even those without CAD or drawing experience could build the blade guard. I accept no responsibility for any injuries or mishaps that occur when using the blade guard from this design. The design is sound. How you plan to use it is up to you.



Blade guard with the structural assembly

Use this design for your own use and pleasure. Copy it, modify it, share it with your woodworking friends. I'm sharing this design because I firmly believe that it provides a safe environment in the shop and will not cost you an arm and a leg to build. Also, Badger Pond has provided me with so much pleasure and knowledge that I wanted to give back something to all my friends here at the Pond.

After two years of not having any blade guard on my Delta Contractors saw, I decided to bite the bullet and build one. I examined the design of 3 or 4 blade guards and none of them had all the features I wanted. I wanted a blade guard that would not only protect my fingers from the spinning blade but would also provide excellent dust collection. I believe I achieved this in my design. The total cost for all parts came in at just under \$100.00. Not bad, huh? Best of all, there is virtually no dust given off when ripping a board or running a panel through the saw and there is very little dust when crosscutting.



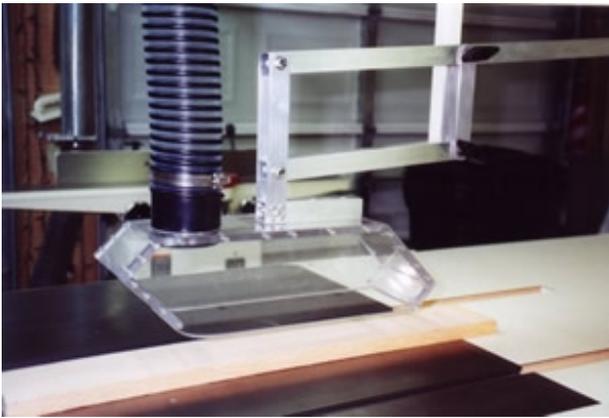
The Lexan blade guard with screw locations

The blade guard is made from 3/8" Lexan. I wanted a clear material that would be almost bullet proof and Lexan met the requirement. I used my table saw to cut the Lexan pieces and the Forrest WWII blade did a great job! I decided to attach all the Lexan pieces together with screws, rather than permanently bond them. This allows me to change out one piece at a time, rather than replace the entire blade guard, if something were to happen. The biggest challenge I faced was drilling the 3" hole in the Lexan top for the 3" plastic splice. If done correctly, the splice will fit into the 3" hole very snugly, requiring no hardware for the connection.

The majority of the structural mechanism that supports the blade guard is aluminum. The telescoping unit is made from 1 1/2", 1 1/4", and 1" steel square tubing. The top of the telescoping unit is bolted to a 2" x 2" x 1/8" piece of angle iron that is bolted to the ceiling. The telescoping unit is also bolted to a garage door support where it will not interfere with the garage door wheel mechanism. If you do not have a place in your shop to bolt the tubing to the ceiling, you may want to design a method to mount it to the shop floor, extension table, or a mobile base.



The entire system, including the steel tubing and dust collection



Aluminum structural mechanism with T knobs

I designed the blade guard so it will not lift up when cutting. The aluminum structural mechanism uses T knobs to tighten the structure and hold the blade guard into place. I prefer to have the bottom of the guard 1/16" to 1/8" above the work piece. This provides additional protection against accidentally running my fingers into the blade. Blade guards that lift up over the work piece do not provide this level of protection. The locking mechanism also allows the blade guard to be held above the table when changing blades and cleaning the table top. The steel tubing that makes up the telescoping unit can also be adjusted to raise the blade higher. The blade guard can also be easily removed from the structural mechanism.

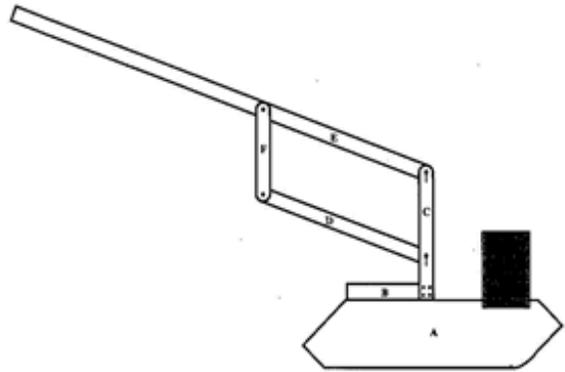
Procedure

The procedure for making the overhead blade guard and dust collector is divided into six parts:

1. Parts List
2. Cutting and drilling the Lexan blade guard
3. Assembling the Lexan blade guard
4. Cutting and drilling the 1" aluminum square tubing
5. Cutting and drilling the 1" x 1/8" aluminum
6. Assembling the Lexan blade guard to the aluminum support mechanism

Parts List:

- 1 3/8" x 12" x 24" Lexan
- 1 1" x 48" Aluminum Square Tubing
- 1 1/8" x 1" x 18" Flat Aluminum
- 1 1 1/2" x 36" Steel Square Tubing
- 1 1 1/4" x 36" Steel Square Tubing
- 1 1" x 36" Steel Square Tubing
- 1 1/8" x 2" x 2" x 24" Angle Iron
- 38 6-32 x 3/4" SS Flathead Screws
- 3 6-32 x 1/2" SS Machine Screws
- 3 6-32 SS washers and lock washers
- 8 4-40 x 1/2" SS Screws
- 8 4-40 SS washers, lock washers, and nuts
- 2 1/4-20 x 2 3/4" SS Bolts
- 2 1/4" dia. x 1 1/2" SS Pins
- 12 1/4" SS Washers
- 2 1/4" SS Lock Washers
- 2 1/4-20 T knobs
- 2 SS Cotter Pins
- Misc. hardware for mounting and connecting telescoping tubing and angle iron.



Overarm Blade Guard, overall view
(Larger Image at end of Article)

Cutting and Drilling the Lexan Blade Guard (Part A)

NOTE: Lexan is sold with a protective wrapping. Leave the wrapping on to protect the Lexan against scratches when cutting. I removed the wrapping on one side of Part A (both side pieces) to mark and drill the Lexan. I was concerned that the wrapping might introduce some error.

1. Cut the sides to the dimensions shown in Figure 2. I used double-sided tape to connect the two sides when I made the cuts. This ensured both sides would be the same dimensions.
2. Cut out the front and rear pieces to the dimensions shown in Figure 4.
3. Cut out the top of the blade guard to the dimensions shown in Figure 5. Cut the 45° angles in each end of the top at this time.
4. Drill holes in the two sides to accept 6-32 stainless steel flathead screws. The hole pattern is shown in Figure 3. Do not counter sink the holes at this time. You may want to use these holes as a reference when laying out the holes for the front, rear, and top pieces.

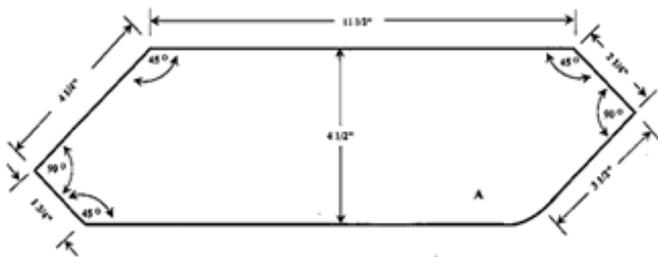


Figure2 - Lexan Sides
(Larger Image at end of Article)

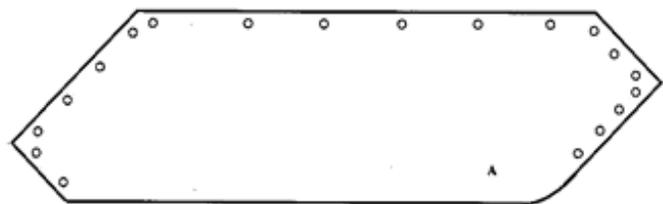


Figure 3 Hole Patterns
(Larger Image at end of Article)

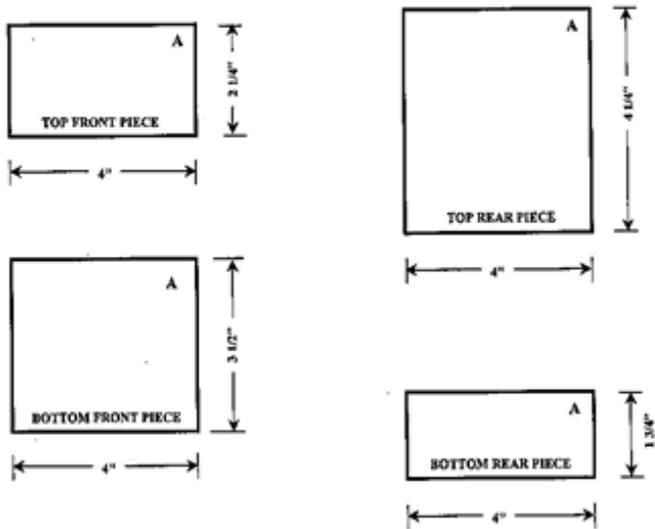


Figure 4 Front & Rear Pieces
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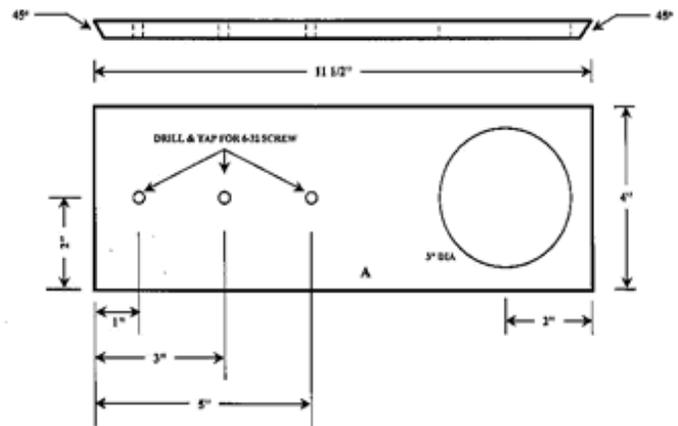


Figure 5 Top Piece
(Larger Image at end of Article)

Note: Use a #36 drill bit (decimal equivalent is 7/64") to drill all holes that will be tapped. I used 6-32 x 3/4" stainless steel flathead screws to connect the Lexan pieces together. Drill the holes in the front, rear, and top a little deeper than required (1/2" deep). This will give you a 1/8" clearance beyond the end of the screws.

5. Drill holes in the two front and two rear Lexan pieces to match the holes in the sides.
6. Drill holes in the top Lexan piece to match the holes in the sides.
7. Counter sink the holes in the two sides so the flathead screws are flush with the Lexan when seated.
8. Tap the 38 holes in the front, rear, and top pieces with a 6-32 tap. Be sure to back the tap out after every few turns to clear the threads.
9. Drill and tap the three holes in the top, as shown in Figure 5.
10. Cut the 3" hole into the top, as shown in Figure 5. I used a hole cutter for this task. I practiced on a scrap piece of Lexan and did a fit check with the plastic splice to ensure the hole diameter was sized correctly. Worked for me!

Assembling the Lexan Blade Guard (Part A)

Note: Use Figure 1 and pictures from my post as references when assembling the blade guard.

1. Attach the front and rear pieces to the sides with 6-32 x 3/4" stainless steel flathead screws.
2. Do a fit check with the top piece and all corresponding pieces. Make sure the top fits without any gap or overlay. Once you're satisfied you have a good fit, attach the top to the sides with 6-32 x 3/4" stainless steel flathead screws.

The blade guard is now assembled and ready to be attached to the aluminum structural mechanism.

Cutting and Drilling the 1" Aluminum Square Tubing (Parts B, D, and E)

1. Cut the 1" aluminum tubing for Parts B, D, and E to the dimensions shown in Figure 6. The length of Part E is shown as 28". This length can be modified to meet your specifications.
2. Mark and center punch the locations for holes to be drilled in Parts B, D, and E. Hole locations are shown in Figure 6.
3. Round over the sides of each end of Part D, as shown in Figure 6. I chose to use a file to round over the ends because it allowed me to take my time to get a nice, round edge. A square will ensure that both ends are rounded over evenly.
4. Round over the sides of one end of Part E, as shown in Figure 6.
5. Drill three holes for the 6-32 x 1/2" screws in the bottom of Part B, as shown in Figure 6. Deburr the three holes.
6. Drill three 5/16" holes (big enough for a screwdriver shaft) in the top of Part B, as shown in Figure 6. Deburr the three holes.
7. Drill four holes for the 4-40 x 1/2" screws in both sides of Part B, as shown in Figure 6. Deburr the eight holes.
8. Drill two 1/4" holes through both ends (both sides) of Part D, as shown in Figure 6. Deburr the four holes.
9. Drill one 1/4" hole through one end (both sides) of Part E, as shown in Figure 6. Deburr the two holes.
10. Drill two 1/4" holes through both sides of Part E, 11 1/2" from the rounded end, as shown in Figure 6. Deburr the two holes.

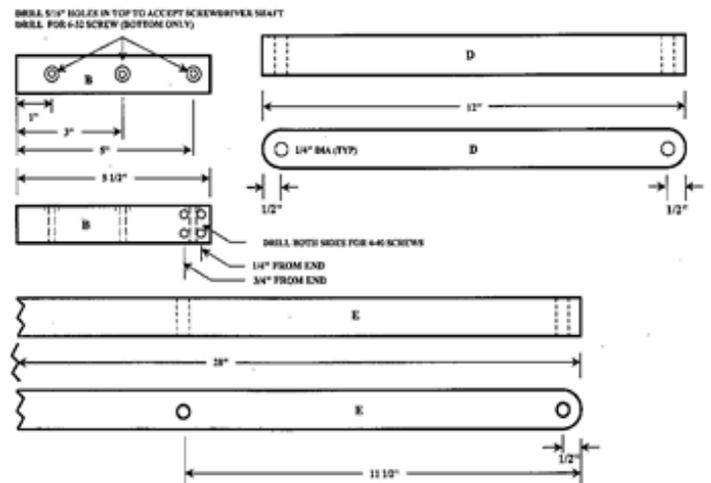


Figure 6 - 1" Aluminum Tubing
(Larger Image at end of Article)

Cutting and Drilling the 1" x 1/8" Aluminum (Parts C and F)

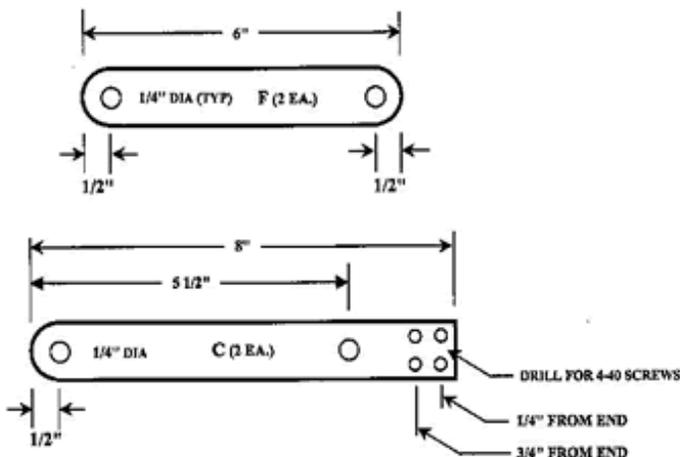


Figure 7 - 1" x 1/8" Aluminum
(Larger Image at end of Article)

1. Cut the 1" flat aluminum for Parts C and F to the dimensions shown in Figure 7.
2. Mark and center punch the locations for holes to be drilled in Parts C and F. Hole locations are shown in Figure 7.
3. Round over one end of Part C (both pieces), as shown in Figure 7. Again, I used a file to round over the ends of all pieces.
4. Round over both ends of Part F (both pieces), as shown in Figure 7.
5. Drill four holes for the 4-40 x 1/2" screws in the squared end of Part C (both pieces), as shown in Figure 7. Deburr the eight holes.
6. Drill one 1/4" hole in the rounded end of Part C (both pieces), as shown in Figure 7. Deburr the two holes.
7. Drill one 1/4" hole in Part C (both pieces) 5 1/2" from the rounded end, as shown in Figure 7. Deburr the two holes.
8. Drill two 1/4" holes in both ends of Part F (both pieces), as shown in Figure 7. Deburr the four holes.

Assembling the Lexan Blade Guard (Part A) to the Aluminum Structural Mechanism (Parts B, C, D, E, and F)

Note: Use Figure 1 and the pictures above and previous pages as references when assembling the blade guard to the aluminum structural mechanism.

1. Connect the assembled Lexan blade guard to Part B using three 6-32 x 1/2" screws, washers, and lock washers. Do Not over tighten the screws.
2. Connect Part B to Part C using eight 4-40 x 1/2" screws, washers, lock washers, and nuts (four in each side). Long nose pliers really help in inserting the washers, lock washers, and nuts onto the 4-40 screws inside the tubing of Part B.
3. Connect Part C (both pieces) to Part D using a 1/4" diameter pin and two washers. I made my own 1 1/2" pins by cutting 1/4-20 x 3" bolts (not fully threaded) to the required length and drilling a small hole through one end of the now threadless bolt. Insert a cotter pin through the hole in the pin.
4. Connect Part C (both pieces) to Part E using the same procedure as in Step 3.
5. Connect Part D to Part F using a 1/4-20 bolt, washers, lock washer, and T knob (use a T knob in replace of a nut). The length of the bolt will be determined by the method you chose to support the blade guard. I supported my system from the ceiling and used a 2 3/4" bolt.
6. Connect Part E to Part F using the same procedure as in Step 5.

The blade guard is now assembled to the aluminum structural mechanism. It's now up to you to determine how to support the blade guard and dust collector system. Once you have the unit supported and ready for use, attach a 3" plastic splice to a 3" plastic hose and insert the splice into the 3" hole in the top of the Lexan blade guard.

You're now ready for a safe, dust free (well, almost dust free) trial run on your table saw. If you have any questions, please feel free to e-mail me and I'll do my best to answer your questions. Other pictures of the blade guard can be found in the [Badger Pond](#) archives. Have fun, be safe, and cut lots of wood.

Gordon J. Sampson
2-22-01

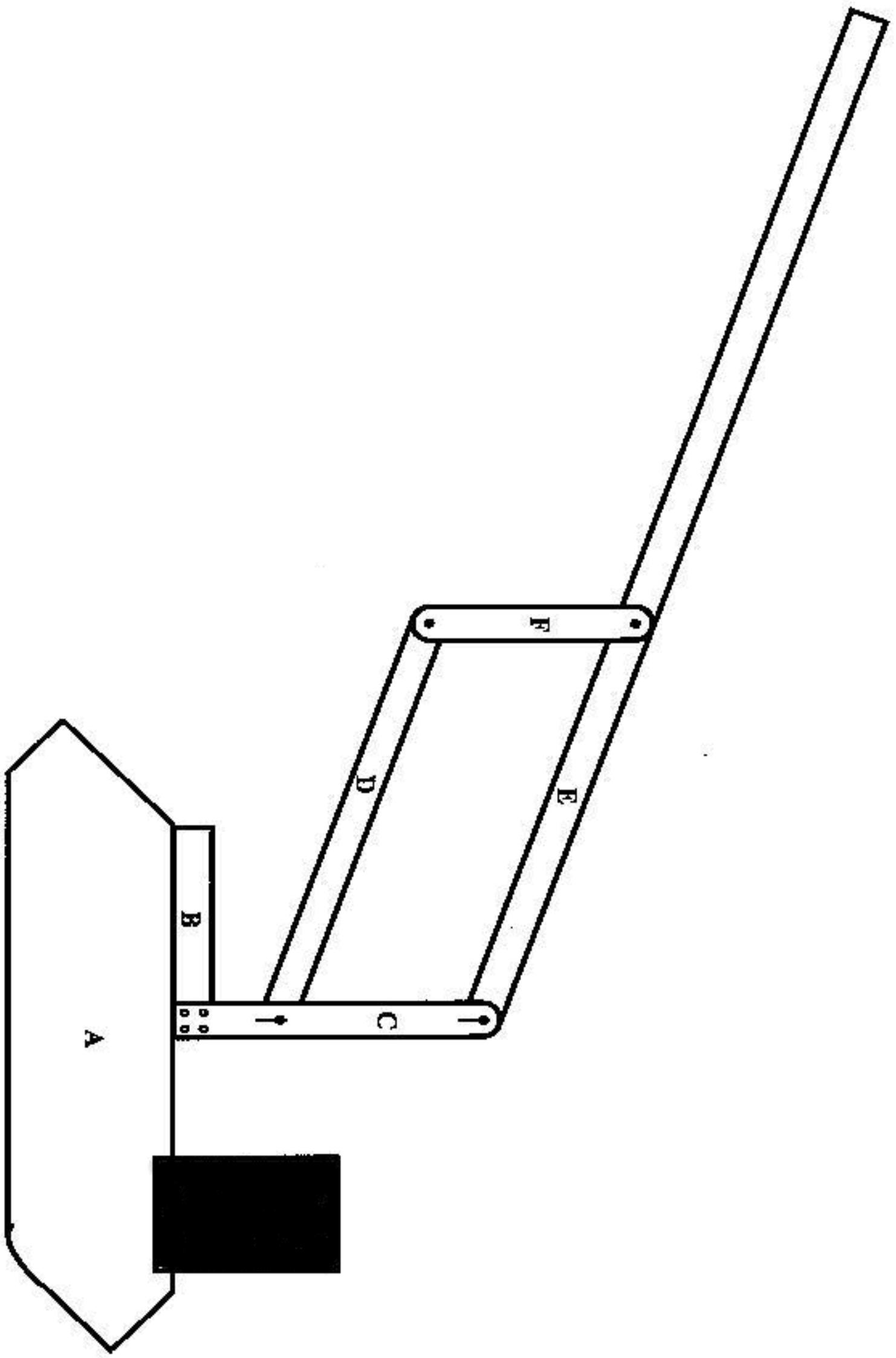


Figure 1. Overarm Blade Guard - Overall View

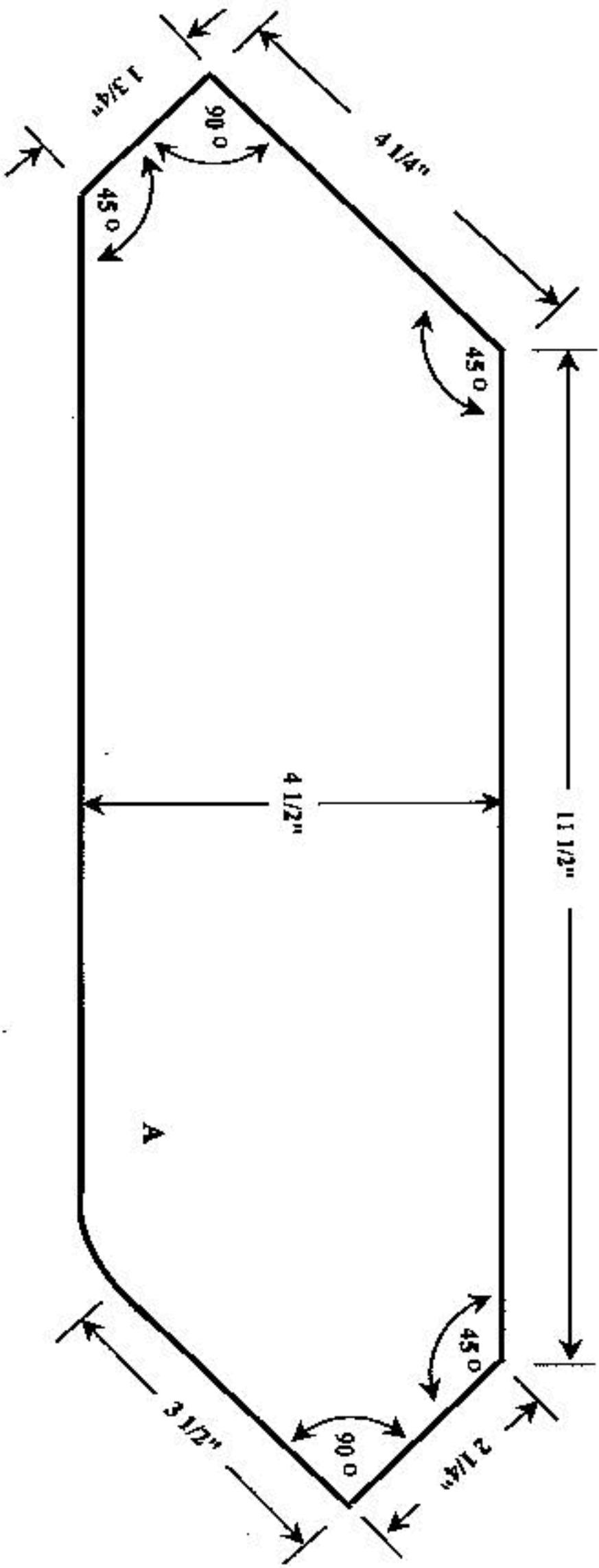


Figure 2. Overarm Blade Guard - Lexas Sides

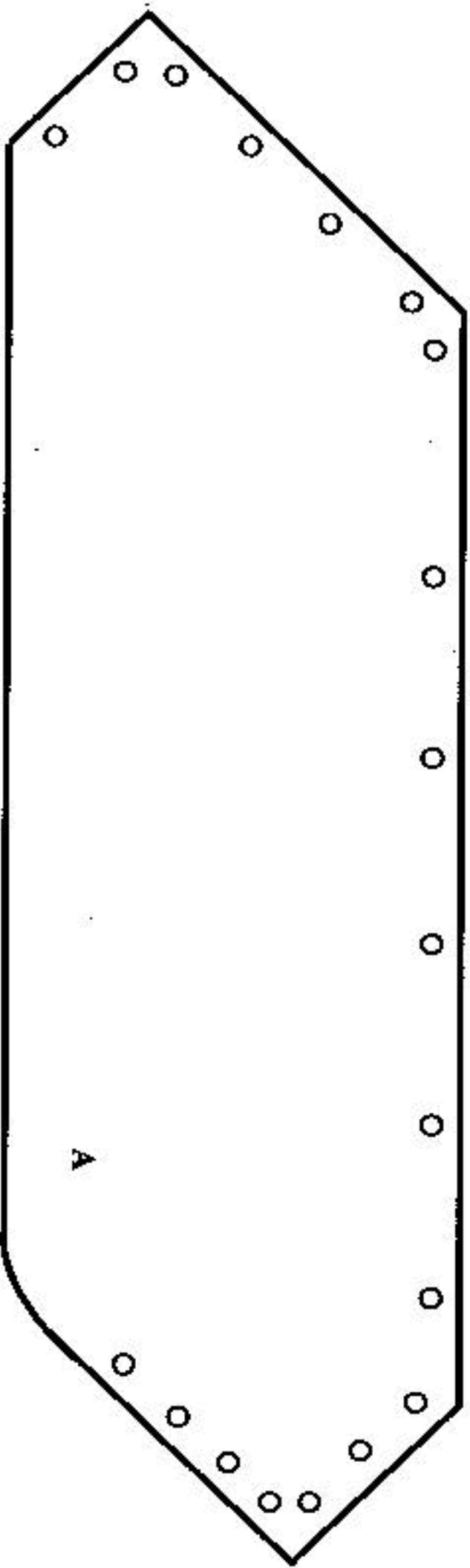


Figure 3. Overarm Bladeguard - Høfe Pattern

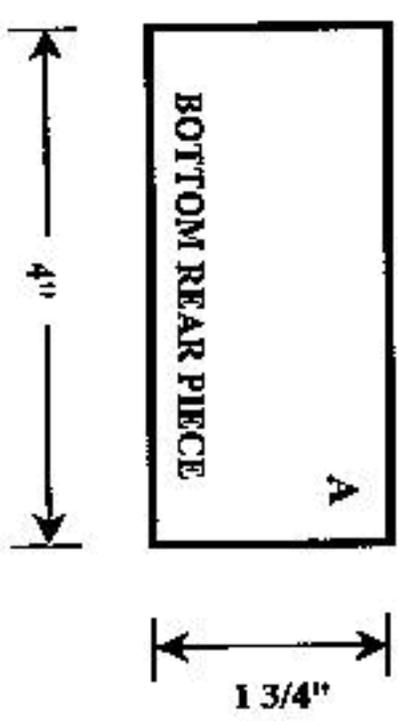
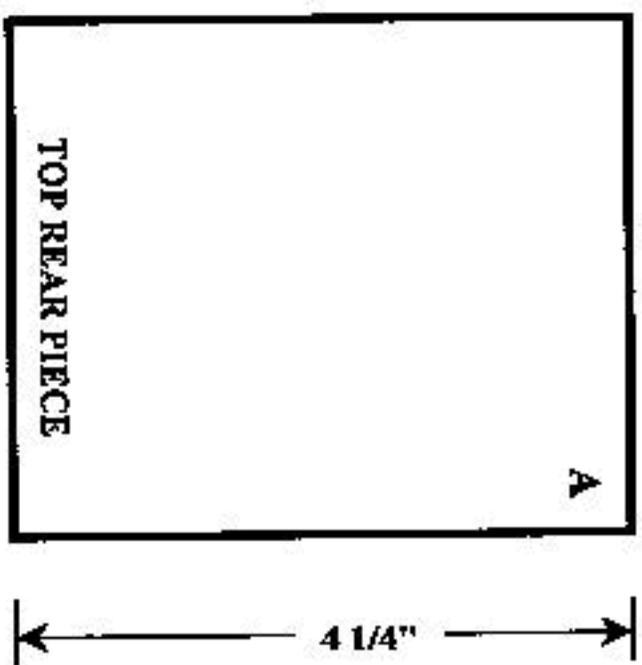
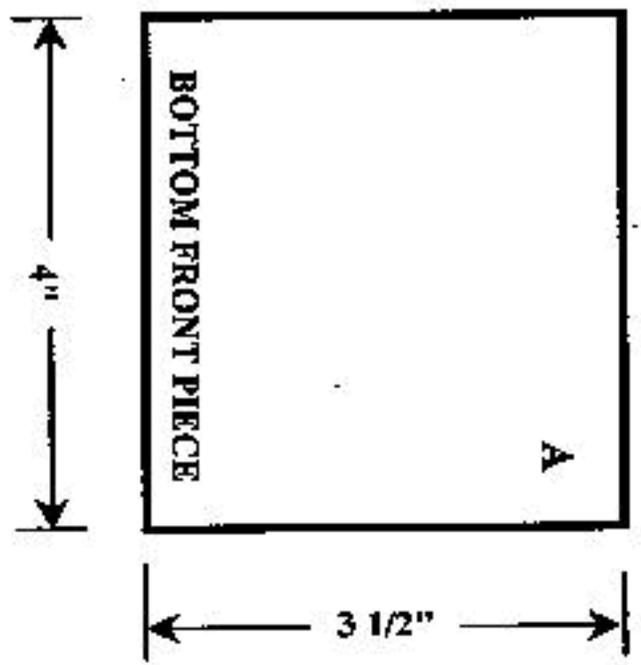
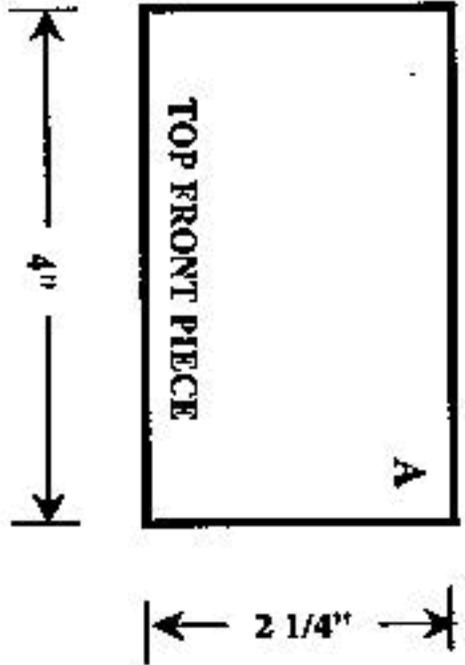


Figure 4. Overarm Bladeguard - Front & Rear Pieces

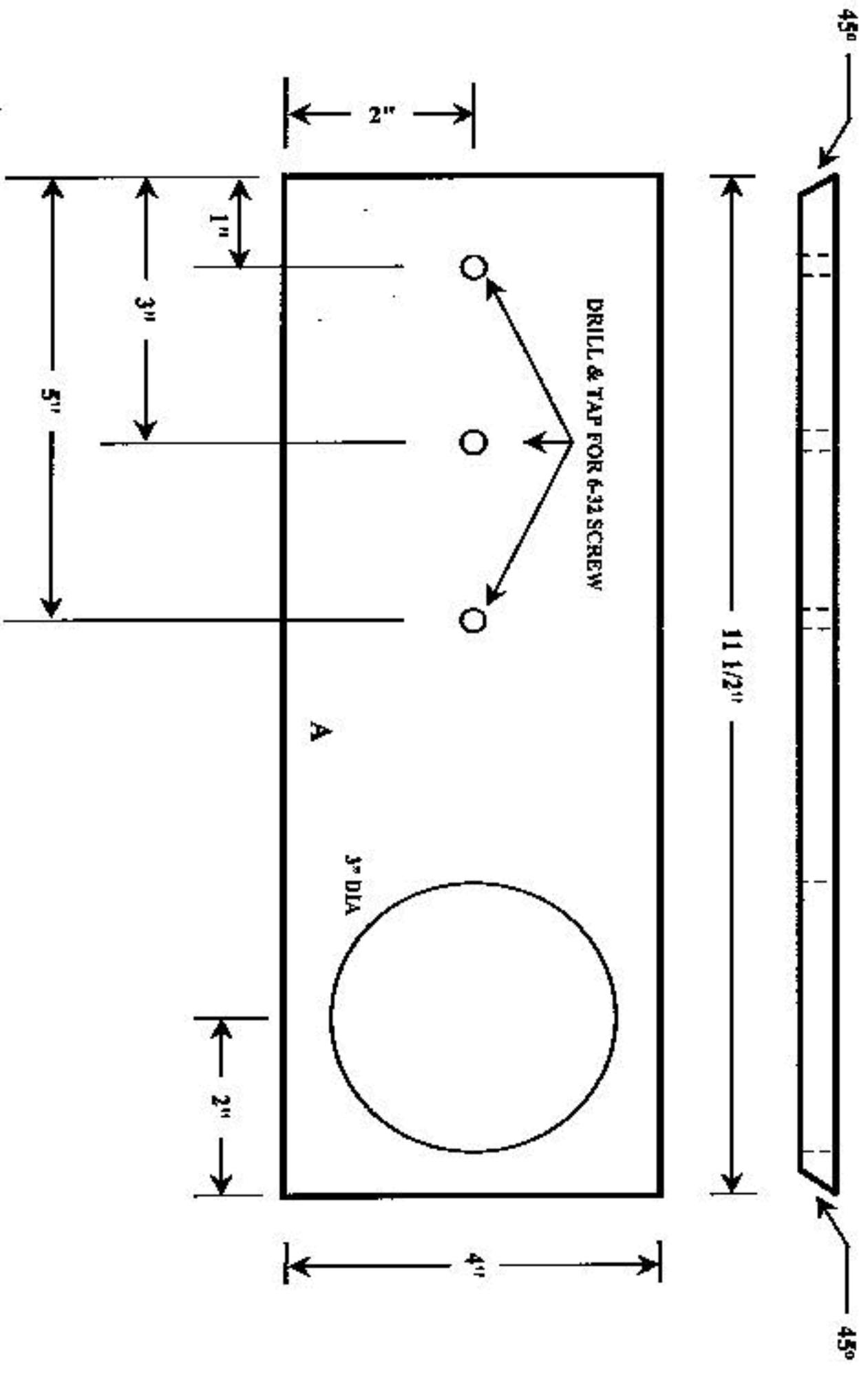


Figure 5. Overarm Bladeguard - Top Piece

DRILL 5/16" HOLES IN TOP TO ACCEPT SCREWDRIIVER SHAFT
 DRILL FOR 6-32 SCREW (BOTTOM ONLY)

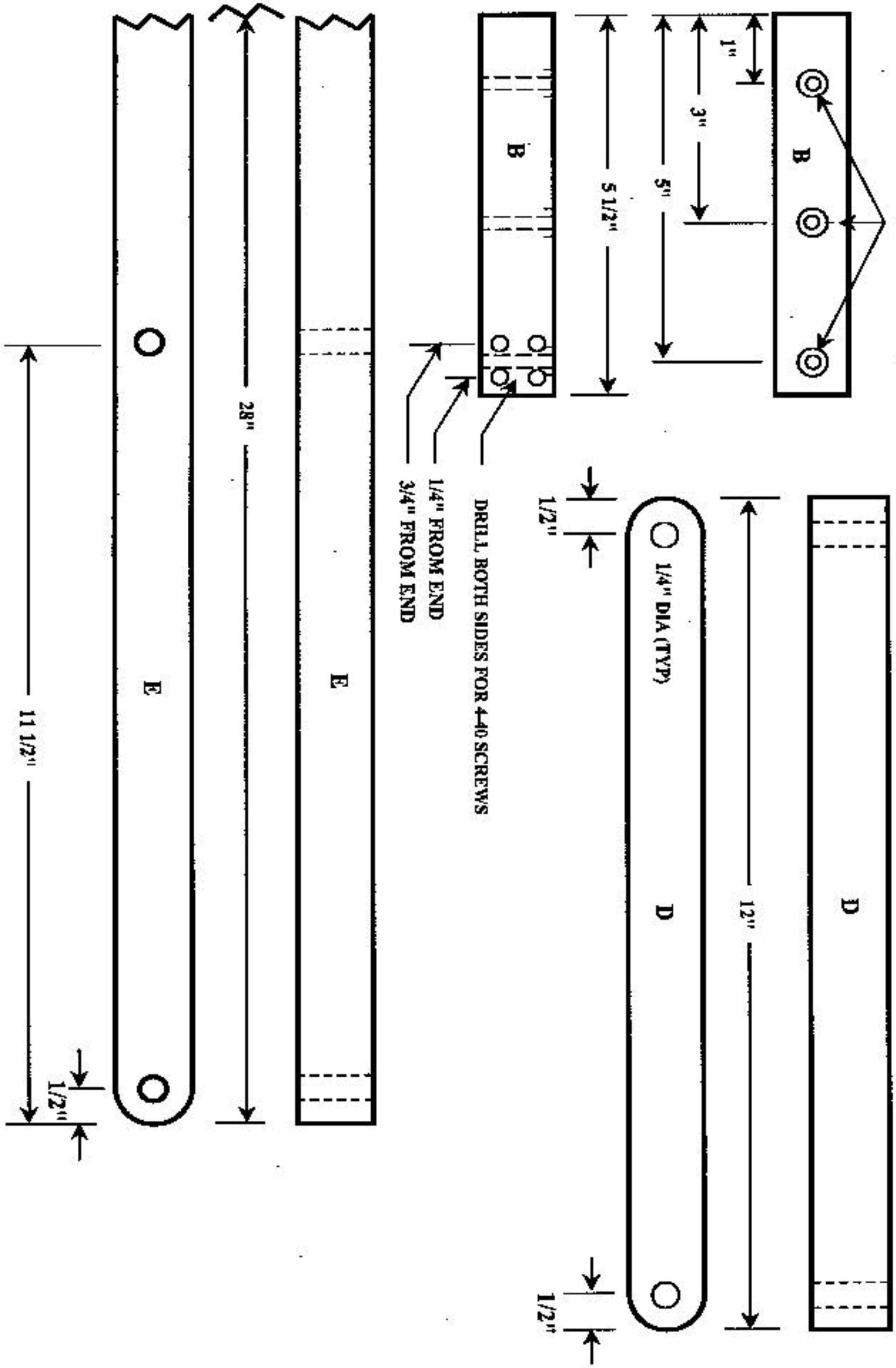


Figure 6. Overarm Bladeguard - 1" Aluminum Tubing

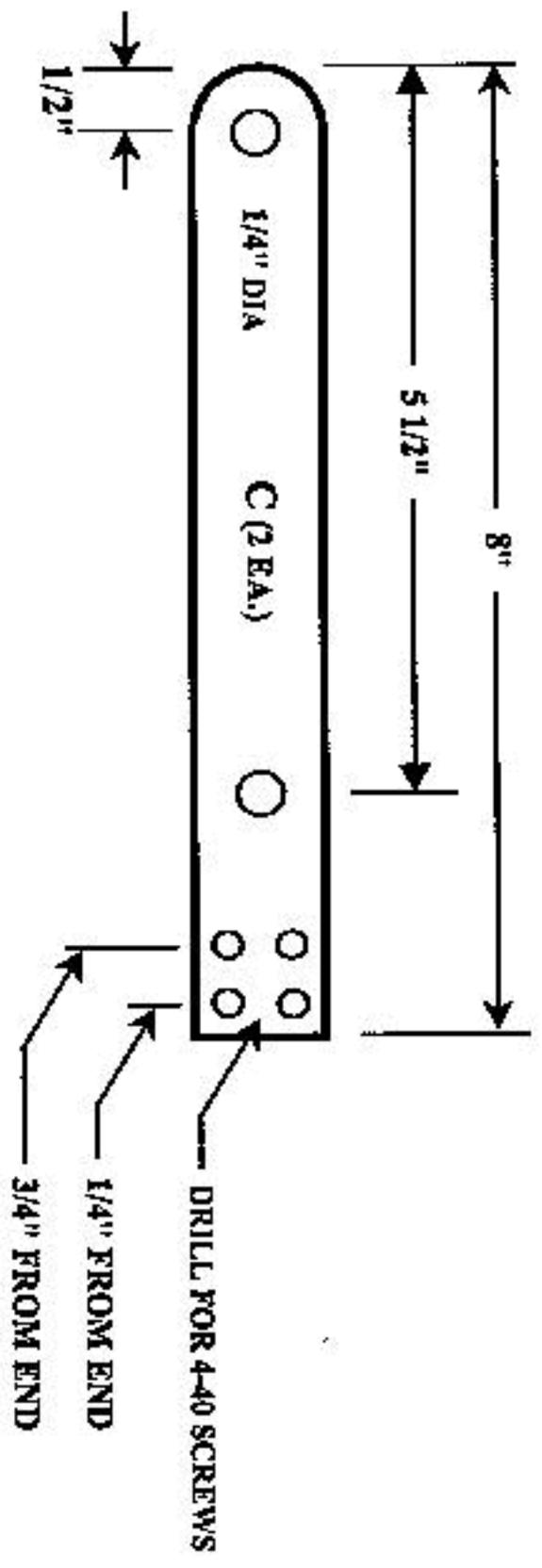
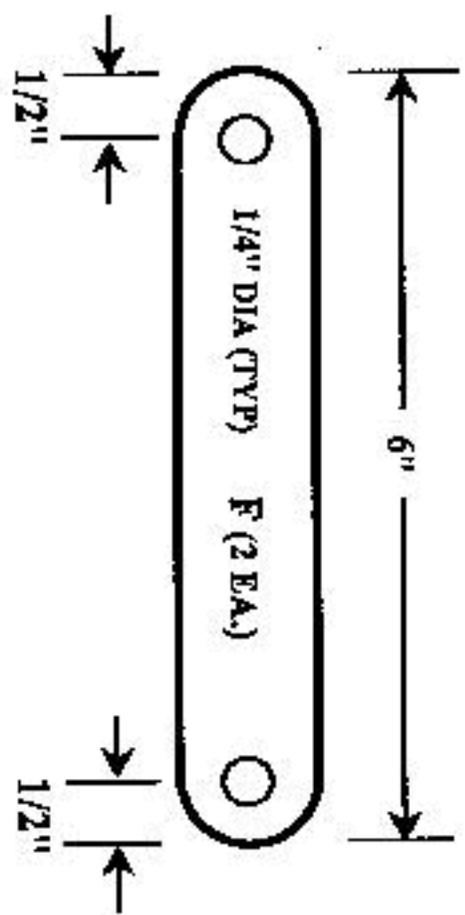


Figure 7. Overarm Blade Guard - 1" x 1/8" Aluminum