



===== **PHASE 5: ATTACHING BRACKETS** =====

Step 1: Make Marking Gauge

Step 2: Mark Bottom Nail Locations and Center Line

Step 3: Prepare Brackets to be Nailed

Step 4: Nail Bottom Nail of Bracket



MAKE MARKING GAUGE

The marking gauge will be used to draw the center line down the post and place a mark where the bottom nail for each bracket is going to be located.

The ideal tool to use as a gauge is a 4 ft. long T-square with black electrical tape used to mark the spot where the bottom nail of each bracket will be driven.

Use the following equation to determine the space between rails (X):

$$X = (H - 5N - B - A) / (N - 1)$$

X = space between the rails

H = Height of the post (54 in. is our recommendation and used in the example below)

N = number of rails (4 in our example below)

B = clearance below the fence (we recommend 10 to 12 inches)

A = distance from top of rail to top of post (1.5 inches if no top bracket is used, .5 inches if special top bracket is being used.)

In our case

$$X = (54 - 5 \times 4 - 10 - 1.5) / (4 - 1) = 22.5 / 3 = 7.5 \text{ inches between rails.}$$

Now it is time to calculate where to place the top edge of the tape on the T-square. The top of the first tape should be 6-7/8 inches (5-7/8 inches if using the special top bracket) down from the right angle of the T-square. The top of each additional piece of tape should be X inches (solved for above) + 5 inches below the top of the last piece of tape.

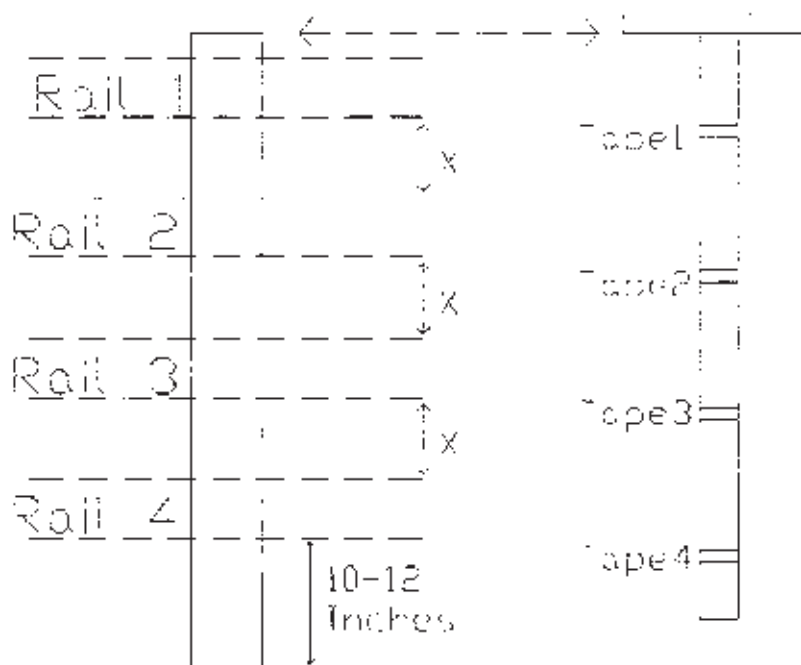
So in our example we would place the tops of the pieces of tape 12.5 (7.5+5) inches below the previous top edge of tape:

Tape 1: 6-7/8 inches below the right angle of the T-square

Tape 2: 6-7/8 + (7.5 + 5) = 19-3/8 inches from the right angle

Tape 3: 19-3/8 + 12.5 = 31-7/8 inches from the right angle

Tape 4: 31-7/8 + 12.5 = 44-3/8 inches from the right angle.





MARK BOTTOM NAIL LOCATIONS AND CENTER LINE

Draw a line down the center of the post with the help of the T-square shown below. Also draw a mark perpendicular to the center line at the top of each piece of tape. This will be the location to hammer in the bottom of each bracket.

Note: Be sure to make the mark at the top of each piece of tape, otherwise the rails will move up and down.



Photo 5-1. A sheetrock square ready to mark posts.



Photo 5-2. Person Marking a Post with a Sheetrock Square.



PREPARE BRACKETS TO BE NAILED

The next step is preparing the brackets to be nailed. This is done simply by putting one nail in each two-piece bracket as shown below. Be sure that the nail is placed in the same hole consistently on the bracket so that all the brackets read the same when placed on the posts.



Photo 5-3. A person preparing the brackets to be nailed.

Installers Tip: This is a great activity to spend time on a rainy day.



ATTACHING BRACKETS TO POSTS



Nail the bottom of the brackets to the marked post using the 3-1/2" Centaur nail, then open brackets as shown.

Important Tip: The top nail of the bracket should not be driven in until the fence has been paid out, tensioned, and deemed to be of acceptable quality.



===== **PHASE 6: HANGING THE RAILS** =====

Step 1: Termination with staples

Step 2: Paying out the fence

Step 3a: Installing Barrel Tensioners

Step 4: Nailing the top nail of the brackets

Step 5: Clean-up

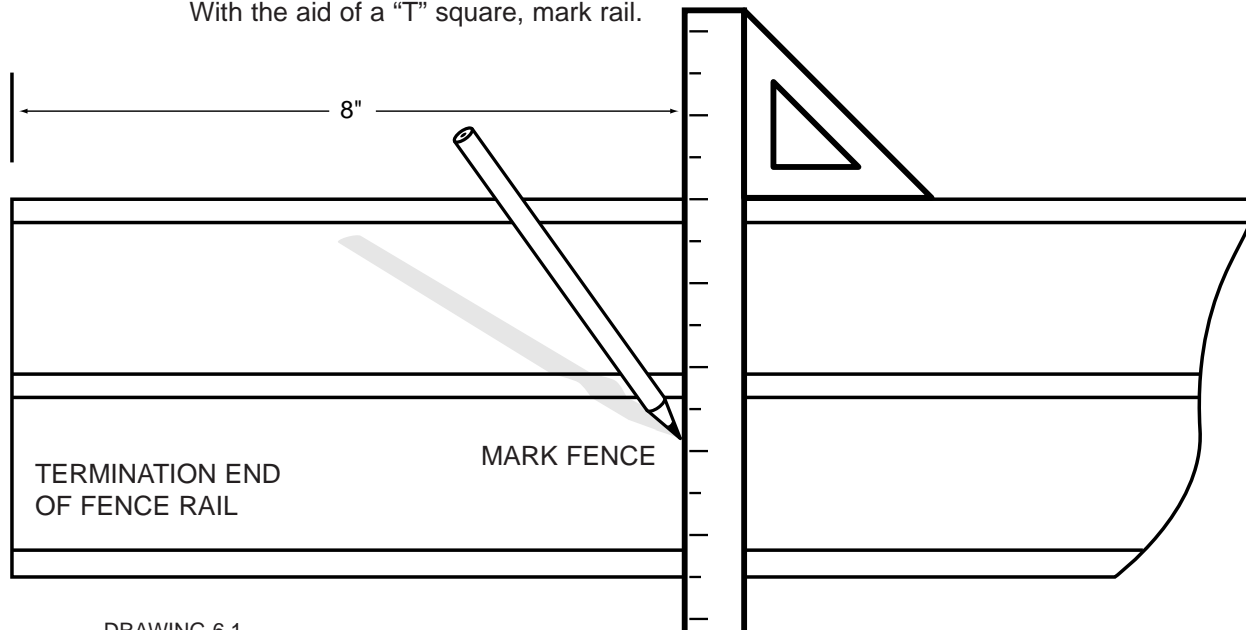
Additional Techniques:

Splicing the Fence



TERMINATION WITH STAPLES

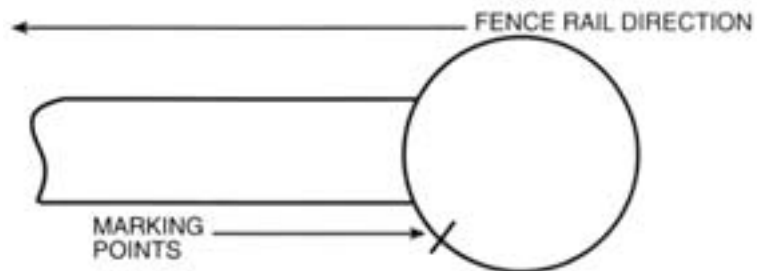
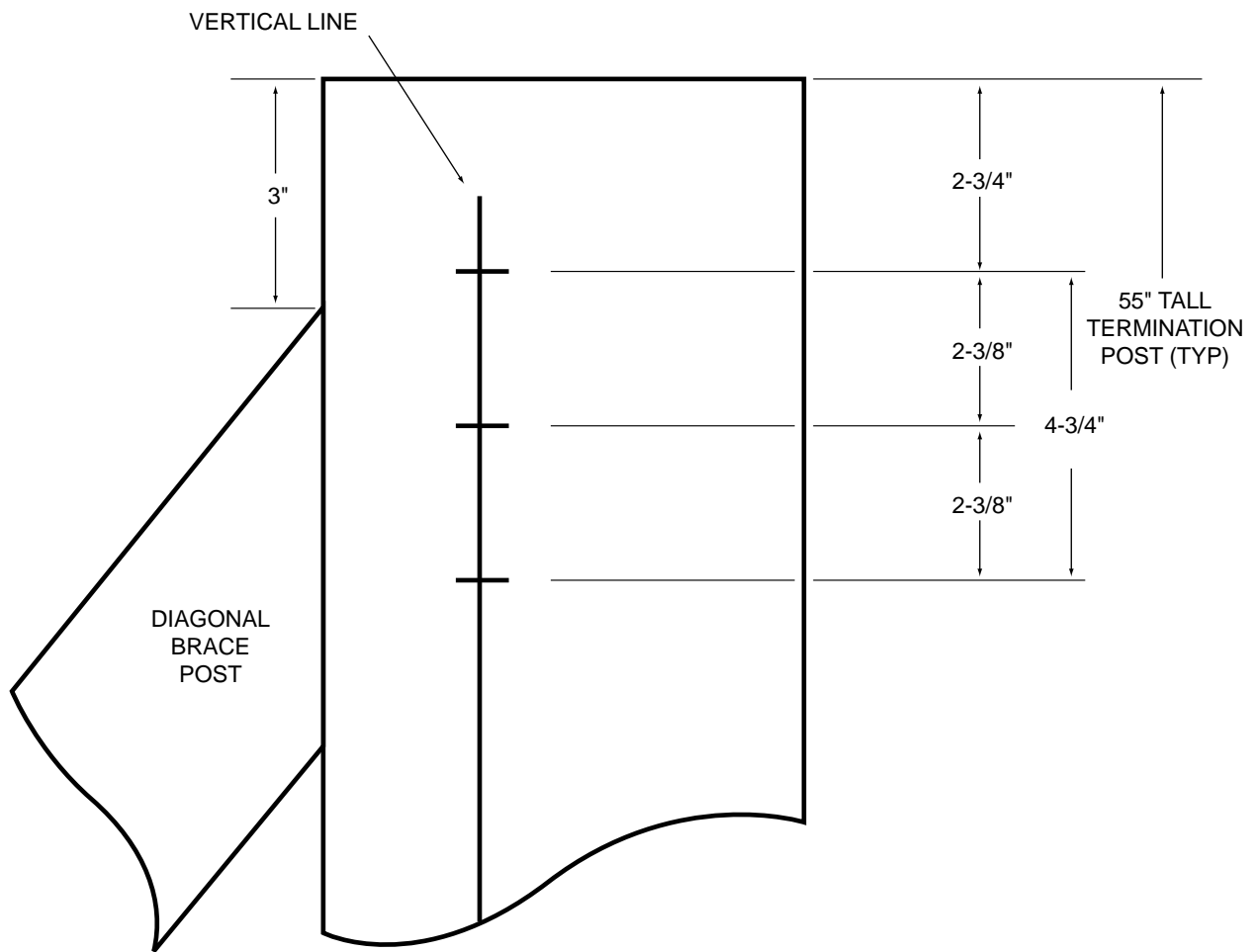
Measure back 8" from end of rail.
With the aid of a "T" square, mark rail.



DRAWING 6.1



Remove the polymer and expose 8" of wire as shown in photo.
DO THIS ON ALL RAILS.



DRAWING 6.2

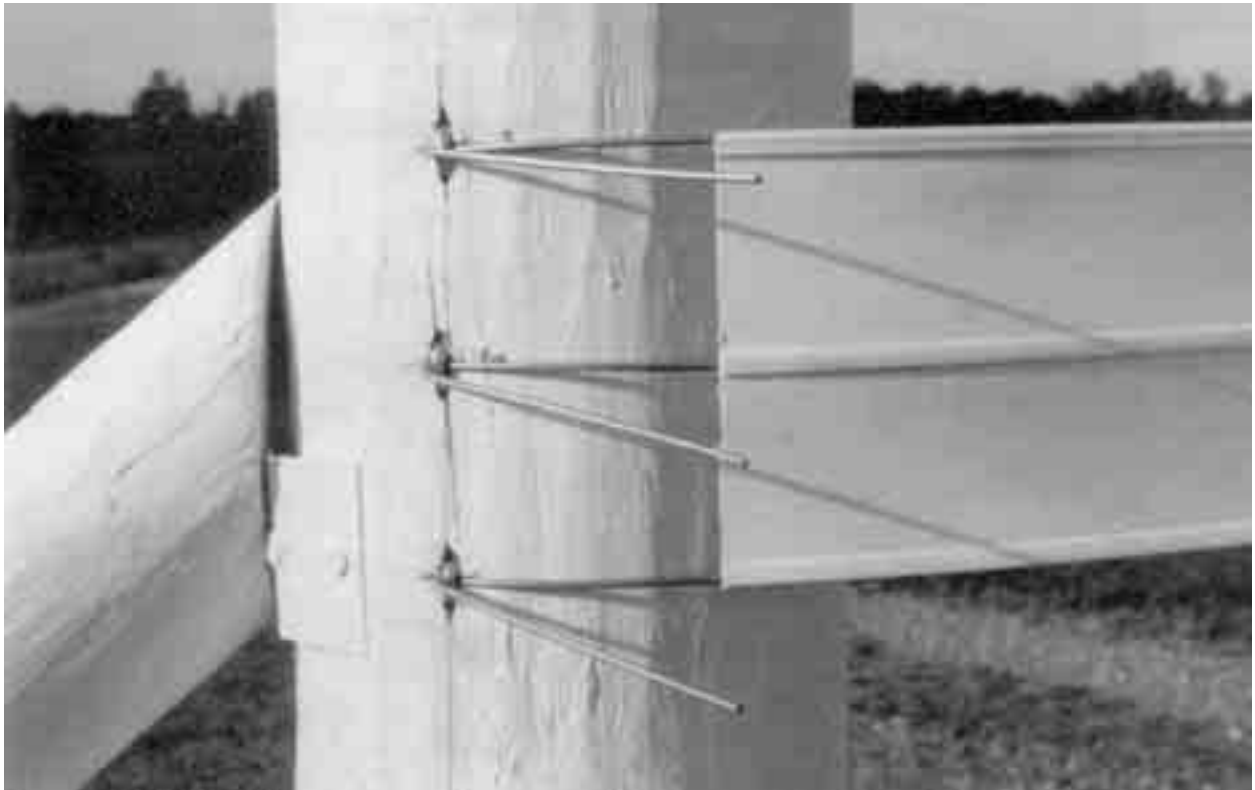
1. Mark post 2-3/4" down from top of the 55" termination post.
2. Draw a vertical line down the length of the post keeping it parallel to the outside of the post.
3. From the initial 2-3/4" mark the vertical line an additional 2-3/8" and 4-3/4" as shown. All additional rails are to be marked to 4-3/4" spacing with the 2-3/8" point between.

Put 1-3/4" staples into post at all marks as shown. Leave staples loose; they will be driven tight later.





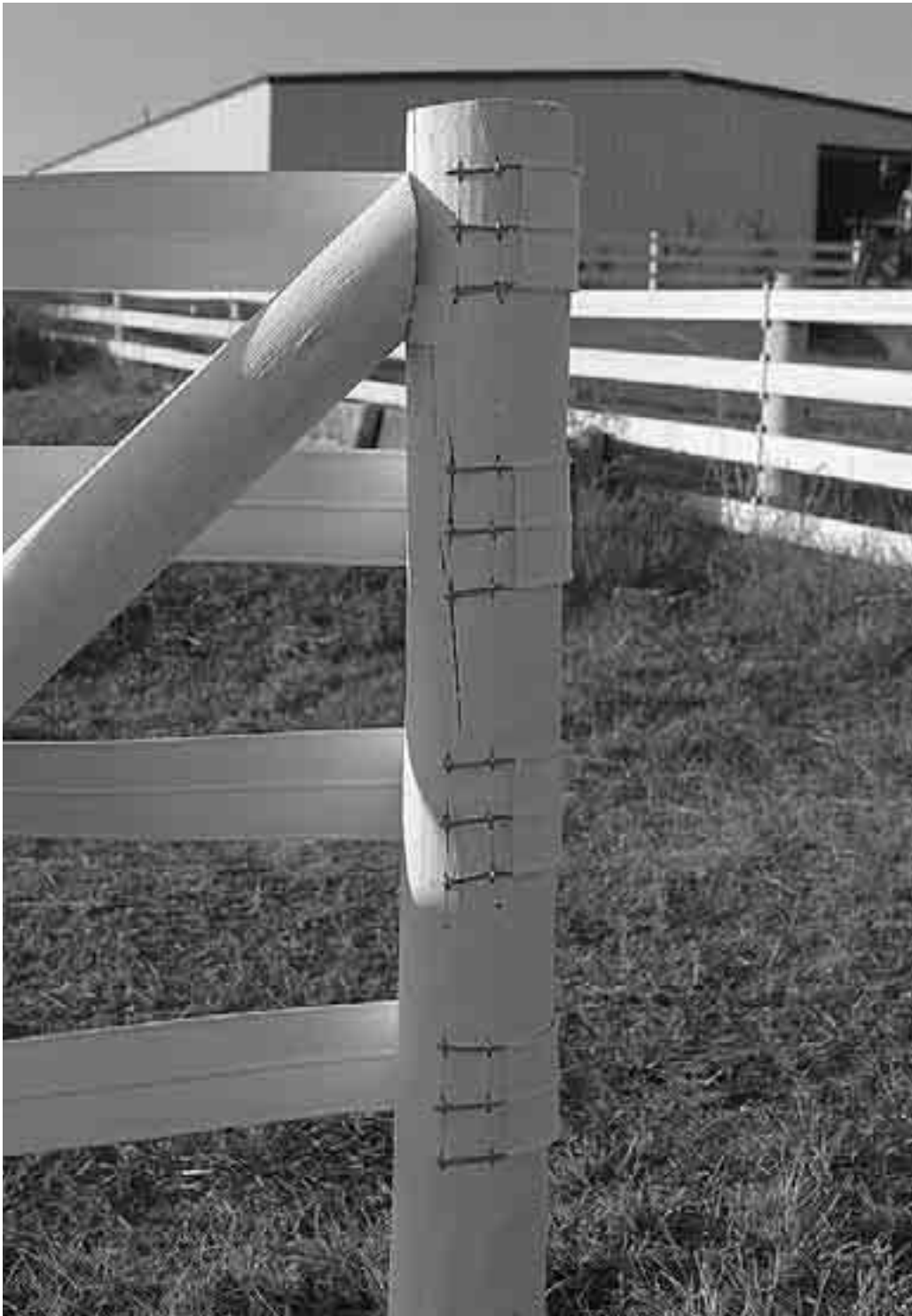
Feed all wires into staples leaving about 3" spacing between polymer and vertical mark. Drive middle staple in tight. Pull slack out of rail. While keeping pressure on rail drive remaining two staples.



Bend wire back on staples as shown.



Place 3 staples over both wires as shown. Do not drive up tight. Cut excess wire off as shown and then drive staples in tight, making sure no sharp ends are exposed. Coat all exposed materials with rust prohibitive paint. Do this on all rails.



This is a completed termination prior to painting.



PAYING OUT THE FENCE

The easiest way to pay out the fence is to place a roll of fence on a spinning jenny on the back end of a pickup truck. This is best done if working in a team of three with one person driving the truck and the other two putting the fence in the brackets. The two walking should simply put the rail in the bracket and move the bracket so that it holds the fence in place.

Important: Be sure to keep the stickers on the packaging as the production date will need to be filled out on the quality questionnaire for the warranty information and sent back in order to receive the warranty.

Note: Start by having one person hold the fence at the starting point (termination or tensioning point) and the other person putting the rail in the first five or so brackets before the person holding the rail can begin helping the other person put the rail in the bracket. This way the rail does not slide along through the brackets.



Photo 6-7. Paying out the rail with a spinning jenny mounted on the back of a 4-Wheeler.

Important Note: If the older tensioners that have boxes are being used, be sure to leave three extra feet of overlap where one roll ends and the next roll begins. This will allow the installer to tie in the tensioner assemblies a little easier. This overlap should occur half way between two posts as the tensioner boxes look best when placed half way between two posts.

Note 2: If the new barrel tensioners are being used make sure that material overlaps by at least 1 foot at a post. The barrel tensioners are mounted right on the post.



BARREL TENSIONER INSTALLATION

The first step is to determine where to drill the pilot holes on the post. To do this have one person pull the top rail straight with the other standing back a few feet telling them to raise or lower the rail similar to running top line.

Next, make a mark at where the top of the rail is. Measure down another 2.5 inches and make another mark. That is where your pilot hole will be. Then use the same gap (12.5 inches in our example) that was used to mark the bracket locations to make the marks for the lower pilot holes.

Now it is time to drill pilot holes. A 3/8 in. drill bit works the best to drill the pilot holes.



The next step is to attach the tensioner onto the post using the lag screw. For the two-way barrel tensioner be sure that the curved part is in toward the post as shown in the picture below so that the barrels are in toward the post.

For the end post tensioners do the same thing unless the tensioners are being mounted on a termination that has a horizontal post. If there is a horizontal post, the top tensioner may need to be flipped outward.



Now it is time to mark and cut the rail. If you are using the one-way barrel tensioner, the other end of the rail should already be terminated. If you are using the two-way barrel tensioner, both ends should already be terminated. Make sure that as much of the slack is pulled out of the rail as possible. Then mark and cut along the line as shown below. For the two-way barrel you will be making two cuts. The line to make the cut should be drawn even with the edge of the rotating circle.



Next, slide the rail into the slot of the tensioners as shown below. The edge of the rail should be held even with the slot so that it is not protruding out.



The fence is now ready to be tightened. It is recommended that one person apply tension using two 1/2 inch drivers while the other person prepares to drop the pins into place as shown below.



Continue to apply torque until the rail is satisfactorily tight.

Below is a picture of how the tensioners should look after installation.



===== **NAILING THE TOP NAILS OF THE BRACKETS** =====

After it has been determined that the rail is of acceptable quality, the top nail may be hammered in. It is important that if the rail for whatever reason does not look correct, talk to the owner in addition to letting Centaur know of any problems.

The reason why we ask to wait until now to nail in the top nails is that it is much easier to put up a new roll if the top of the brackets is not nailed in.

Note: Be sure that the bracket is straight up and down, otherwise the rail will not be straight.



CLEAN-UP

It is very important to clean up the fence line after the installation is completely built. There are several objects that will need to be cleaned up. Some of these items are sawed off post tops, strings, stakes, nails, brackets, scrap pieces of fence, and any other trash that does not belong near the fence.

Once these items are picked up, the installation should be complete. Be sure to make the owner aware of the following note, and the job of the installer should be complete.

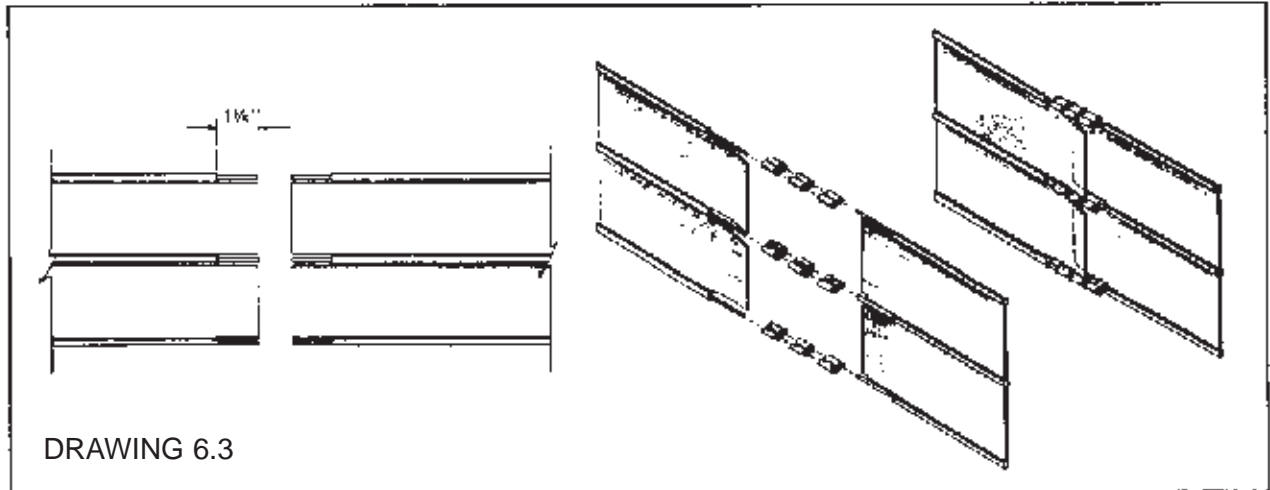


Photo 6-21. All of the debris from the installation needs to be picked up.

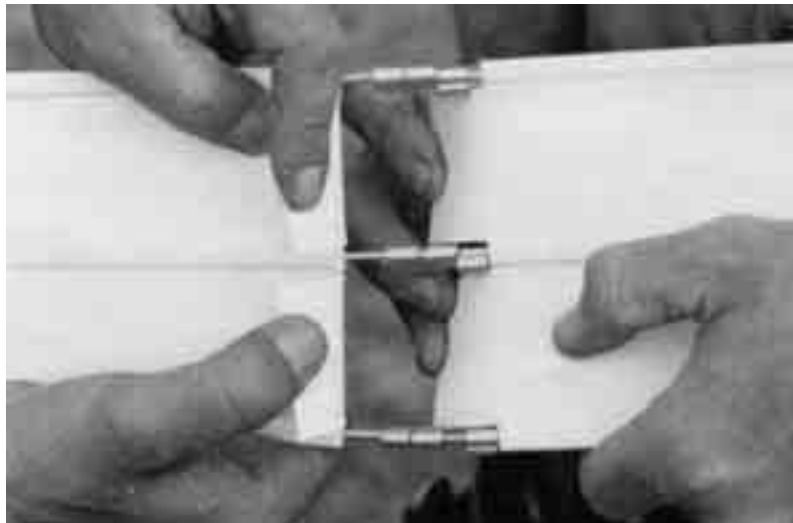
Note: We recommend to retighten the fence one month after the fence has been installed. After this tightening, tighten the rail as necessary which should not be often (every few years) if ever.

=====**SPLICING TECHNIQUES WITH CRIMP FITTINGS**===== 

If a splice is required, follow Drawing 6.3 and accompanying photos.



After polymer on beads has been removed, insert three crimp fittings on each wire.



Insert wire from other rail into crimp fittings.

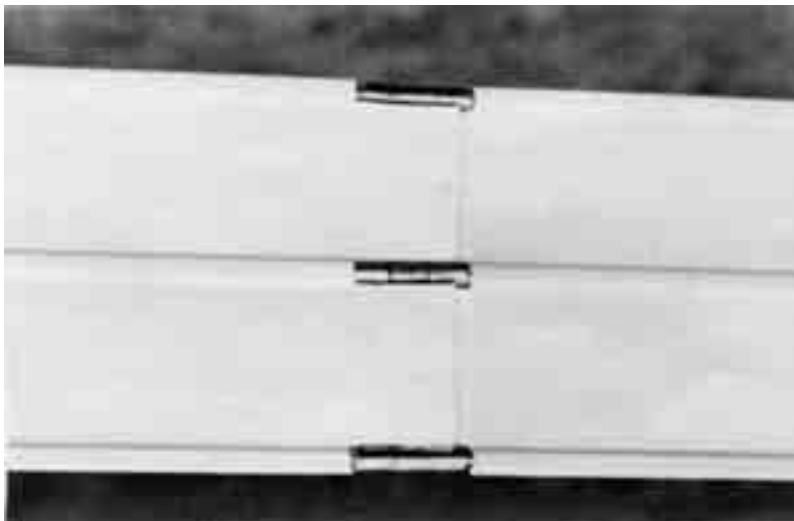


Keeping rails as parallel as possible, crimp crimp fittings using crimper tool as shown in photos.

NOTE: Rails must be kept parallel during crimping operation or the rail will be wavy.



Flip each web inside out as shown in photo.



This is a complete splice. After completion of splice, paint all exposed steel and maintain as required to prohibit rust.



SPLICING TECHNIQUES WITH WIRE VICE LINKS



Measure back 2-1/4" and put a mark on the polymer. See photo to the left.

Using a T-square for assistance, draw a line down the rail. See photo to the right.



The beads are to be removed from this line.

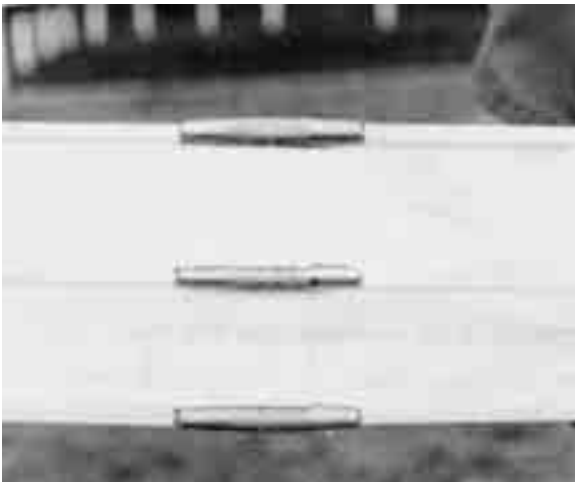
Therefore, cut around beads and down next to beads, and with a twisting action pull beads off wire as shown in photo below.





Measure back 1-1/4" from bead and cut off 1" of wire at this mark. Do this on all three wires. See photo on left.

Insert wire vice link on wire in all three locations. Repeat the same operation for the mating rail. See photo on right.



Inserting wire into other end of wire vice link, mate two rails together as shown in Photo on left.

As always, spray a rust preventive paint on exposed wire vice links as shown in Photo on right.

NOTE: If web is contacting wire vice link to the point of making it distorted, trim as required.



APPENDIX A HOT RAIL™ INSTALLATION



- A-1 Hot Rail™ Circuits
- A-2 Charger (Energizer) Selection
- A-3 Hot Rail™ Barrel Tensioner Installation

Important Note #1:

Please read the Hot Rail™ Installation instructions carefully before installing the fence.

Important Note #2:

All posts, bracing, and brackets must be installed according to the Centaur Installation Manual. However, be sure to pay close attention to the special Hot Rail™ Tensioning method mentioned in the following pages.

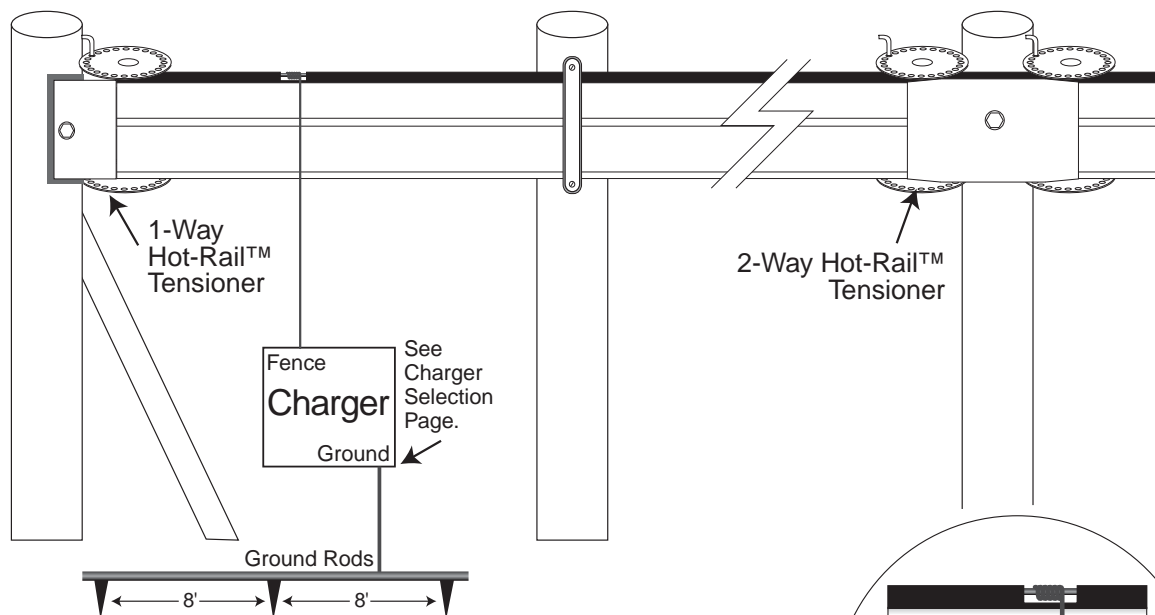
Important Note #3:

Centaur brackets act as insulators for the Hot Rail™ product. If for any reason the bracket does not isolate the rail from the post, some insulating material may need to be placed between the post and the rail. Also, on square corners the brackets may want to be stacked two high with the rail going through the outer most bracket.



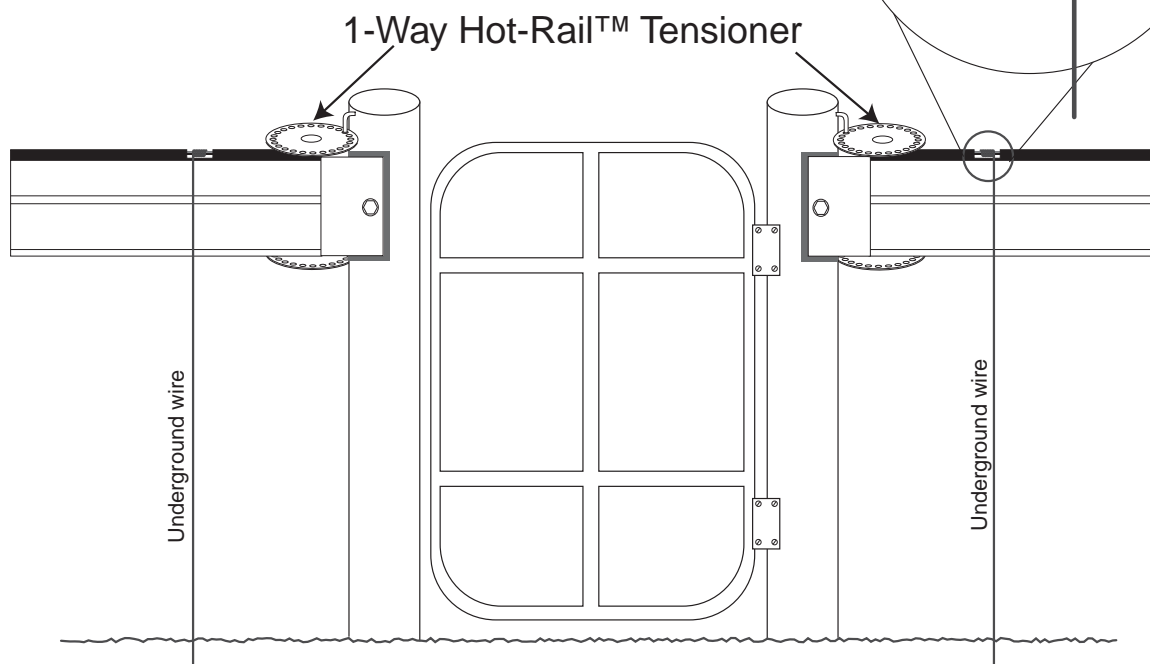
HOT RAIL™ CIRCUIT

Typical Hot-Rail™ Circuit



Gates

Remove 1" of the bead and wrap the connecting wire around the wire.



Note: Tensioners must be used everywhere that rail terminates. See Hot-Rail tensioner installation instructions



CHARGER (ENERGIZER) SELECTION

Tips for selecting charger for use with Hot Rail

1. Buy a low impedance intermittent charger. Impedance can be looked at as a leak. The lower the impedance, the better your electric fence will perform.
2. Select a charger with adequate capacity. Look at the chart at the bottom of the page to choose the appropriate charger. Buy a charger with the appropriate number of Joules given below for the length of fence needed.
3. If more electric fence might be added soon, buy a charger with more Joules than is currently necessary.
4. Check the guarantee on the charger. Some cover lightning damage.
5. Do not forget the ground system. No matter what charger is selected, if the ground system is not properly installed the fence will not function properly.
6. **Never put more than 1 charger on the same circuit.** The fence circuit must be split if 2 or more chargers are being used. A ground system must be installed on each circuit if this is done.

Hot Rail Energizer Data

Joules	Miles
0.17	0.5
0.34	1
0.68	2
1	3
1.36	4
3.4	10
5.1	15
6.8	20
8.5	25

TABLE A.1 Fence Charger Recommendations

This chart shows that Centaur testing has found that 1 Joule will adequately charge 3 miles of Hot Rail.

Example 1:

If the length of fence to be charged is 10 miles, from the chart it can be read that a charger with a rating of at least **3.4 Joules** be used.

Example 2:

If the length of fence to be charged is 7 miles, then $.34 \times 7 = 2.38$ **Joules** or more are needed from the charger.

Important Note:

If the fence consists of 2 or more rails of Hot Rail, each rail counts toward the length of the fence. So if there are 3 rails of Hot Rail and the fence is 1 mile long. That counts as 3 miles of fence.

==== HOT RAIL™ BARREL TENSIONER INSTALLATION ====

At any point in which the rail ends, 1-way tensioners must be used to terminate the fence. If the stretch of fence is longer than 660 ft. and two rolls of Hot Rail™ need to be connected, a 2-way tensioner must be used to connect the two rolls.

Important Tip:

Due to the fact that the rail is electrified, the tensioners must be isolated from the post using the IsoPad (black square of rubber).

The first step is to determine where to drill the pilot holes on the post. To do this have one person pull the top rail straight with the other standing back a few feet telling them to raise or lower the rail similar to running top line.

Next, make a mark where the top of the rail is. Measure down another 2.5 inches and make another mark. That is where the pilot hole will be. Then use the same gap (12.5 inches in our example) that was used to mark the bracket locations to make the marks for the lower pilot holes.

Now it is time to drill pilot holes. A 3/8 in. drill bit works best to drill the pilot holes. Drill each 3/8 in. hole where the mark is located as shown below. The pilot hole should be drilled two to three inches deep.



Photo A.1. Drilling a pilot hole using a 3/8" bit.

Now you are ready to drill a 3/8 in. hole in the IsoPad. This hole will allow the screw to pass through the rubber. The rubber is cut so that it is in 6 inch by 6 inch squares. The hole should be drilled so that its center is 3 inches below the top edge and 1.5 inches away from the side edge as shown in the photo below for a 1-way tensioner. For a 2-way tensioner, the hole should be drilled in the center of the IsoPad.

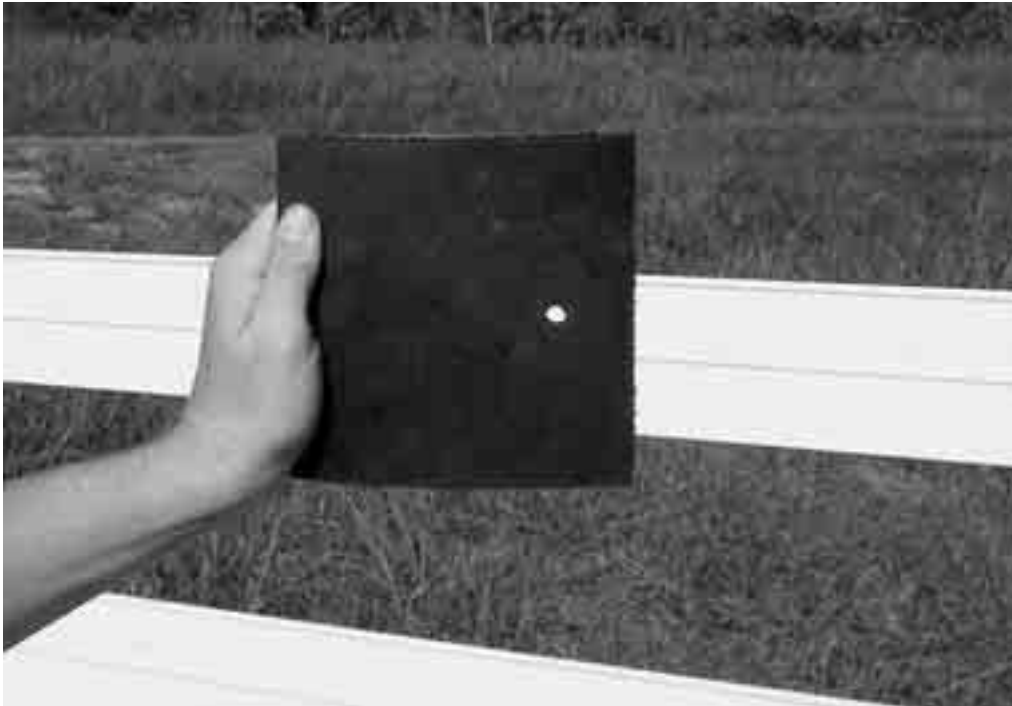


Photo A.2 A hole drilled in the Iso Pad.

The next step is to attach the tensioner onto the post using the lag screw with the IsoPad isolating the tensioner from the post as shown below.



Photo A.3 A tensioner mounted on the post.

Now it is time to mark and cut the rail. If you are using a 1-way tensioner, the other end of the rail should already be terminated. If you are using the 2-way tensioner, both ends should already be terminated. Make sure that as much of the slack is pulled out of the rail as possible. Then mark and cut along the line as shown below. For the 2-way you will be making two cuts. The line to make the cut should be drawn even with the edge of the rotating circle. Make sure the cut is perpendicular to the bead (edge of rail).



Photo A.4 Cutting the Rail to length.

Next, slide the rail into the slot of the tensioner as shown below. The edge of the rail should be held even with the slot so that it is not protruding out.



Photo A.5 Rail slid into slot of tensioner.

The fence is now ready to be tightened. It is recommended that one person apply tension using two 1/2 inch drivers while the other person prepares to drop the pins into place as shown below.



Photo A.6 Tightening the rail.

Continue to apply torque until the rail is satisfactorily tight.

Below is a picture of how the Hot Rail™ 1-way tensioners should look after installation.



Photo A.7 The finished result.

Important Tip:

In the event that not enough current is being transferred from rail to rail using the 2-way tensioner, you may choose to use underground wire or insultube to connect the 2 hot beads as shown in the photo below.



Photo A.8 A 2-way tensioner with connecting wire.

A 1 inch section of the hot bead is removed on each side of the tensioner. The connecting wire is then wrapped around the bare wire. The connecting wire can be run between the tensioner and the post. The connecting wire is then connected to the other section of bare wire.