DIY Fence Rollers

for Owners of Escape-Minded Dogs

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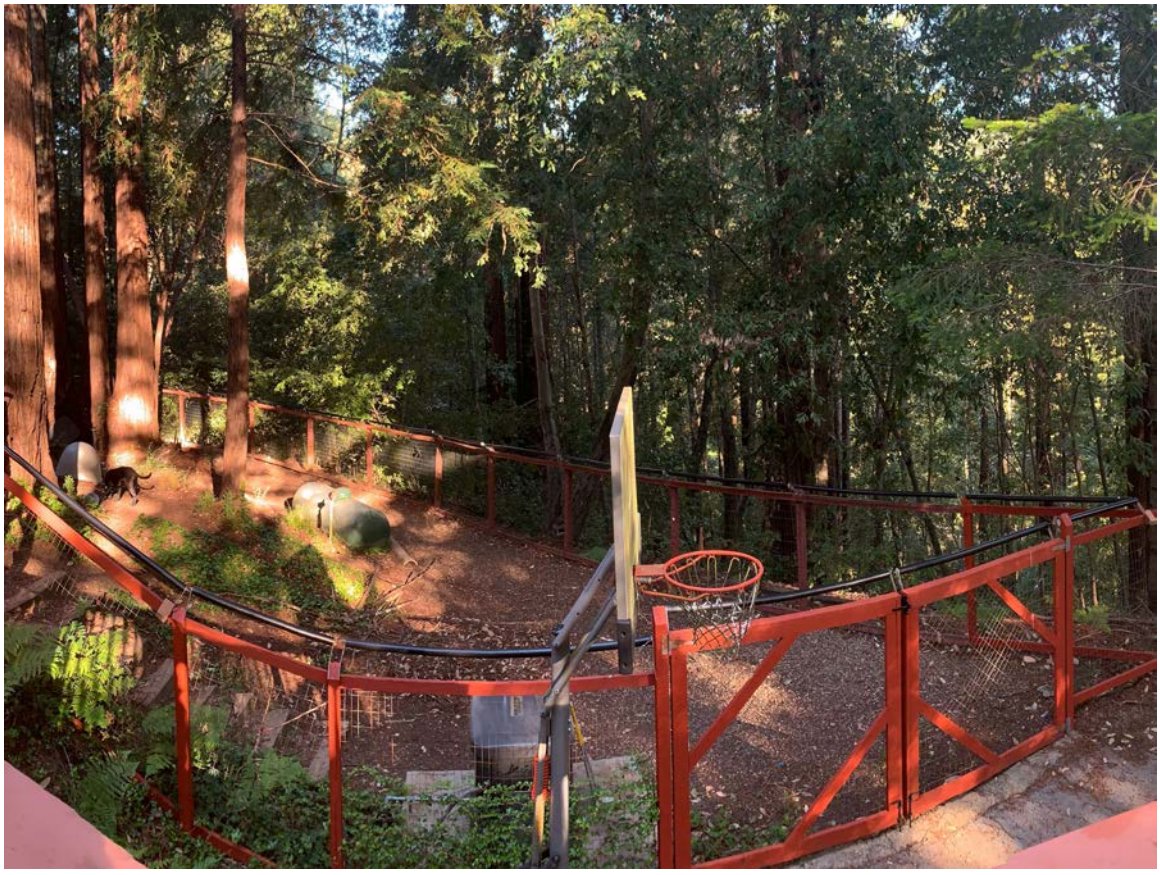
with thanks to Sandy Ettinger



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We were thinking of adopting a 5-year old Siberian Husky, and the foster dad told us our fence (which had adequately kept all our other dogs in) wasn't up to the task.

We came up with this roller design to keep her from climbing the fence. This is similar to the Coyote Roller you might have seen online, but in fairness, we came up with this design before we were aware of them.

Enclosing our 2,000 square foot dog yard cost around $500 in materials plus about 3 weekends to make and install. The Coyote Roller would have cost around $2,500. Roxi is now home with us, safe, and happy in the upgraded yard!

The basic idea is that if your dog can scale your fence, once they put a paw on the roller, the roller . . . well . . . rolls and the paw slips off. As an added measure, we mounted the rollers at an angle to over-hang the inside of the yard, but the rollers can be mounted above the top of the fence as well.

This design assumes a fence with spaced vertical wooden posts that you can drive wood screws into. Some alternate mounting hardware would be needed for metal, like in a cyclone fence

A lot of the design choices for the roller assemblies were based on doing this at low cost and having the system work well enough to prevent most escape attempts. If you think that there are ways to improve the design, go right ahead!

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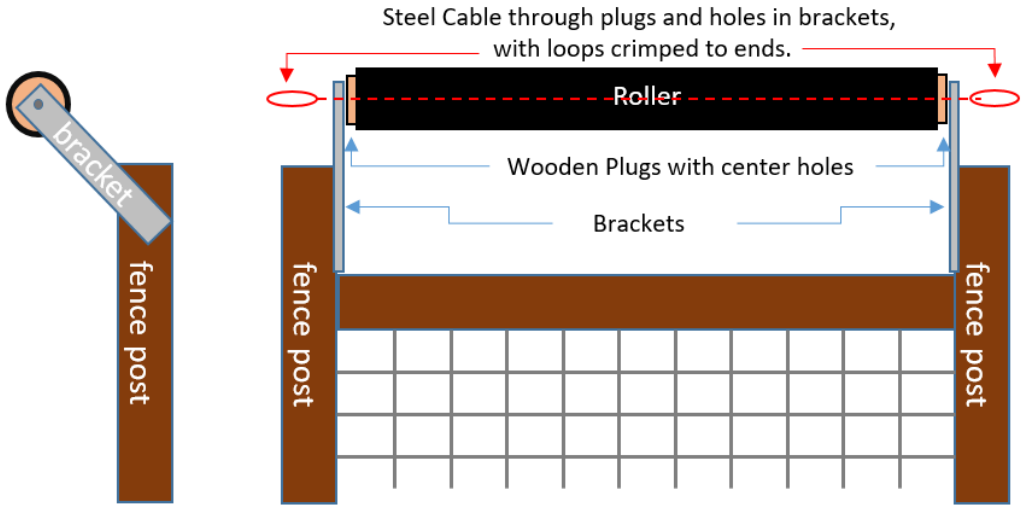
Overview:

Each section of fence will end up with a roller that is mounted to a bracket at each end.



Materials and Tools List

The following is a list of the materials we used. Materials can be substituted to meet your needs.

- Cable sheers.
- Counter-sink drill bit:

- Counter punch tool for setting drill holes starts:

- Crimp lugs for the cable to make loops:

- Electric drill, preferably cordless.
- Galvanized brackets with predrilled holes -- two brackets for each section of plastic tubing. We used construction straps:

- Galvanized wood screws for mounting the brackets. You'll need 3-4 screws per bracket. We used Spax screws with Torx drive heads.
- Cable, stranded $^{1}/_{16}$", preferably stainless steel. Don't use plastic-coated cable -- you'll have to strip the coating off later.

- Liquid Nails glue or similar adhesive and a caulk gun for application. One tube got us through making about 35 rollers.
- Plastic pipe. We used 2"diameter x 10' long ABS from Home Depot.
- Fender Washers – Outer diameter of at least an inch, but smaller than the dowel diameter. The inner diameter should be a quarter inch or larger. We used 1-1/4 x ¼ washers.
- Saw for cutting tubing and dowel. A radial arm saw is highly recommended for ease of making multiple square cuts to tubing and dowels.
- **Safety glasses when using all power tools.**
- Medium grit sandpaper and a sanding block for de-burring edges of cut dowels and pipe.
- Metal file for de-burring any sharp edges on brackets.
- Tape measure.
- Wooden dowel with an outer diameter closely matching the inner diameter of the plastic pipe – it should slide in snugly.

Optional, But Makes Work Go Faster

- Crimping tool for the crimp lugs. You can use a heavy pair of pliers or Vice Grips, but a crimping tool won't let the lug slip while you compress it.
- Roller stand to support long tubing while cutting with saw.
- Scrap lumber to make small templates.
- Wood clamp.

Make a Shopping List

1. Take accurate measurements of the distances between your posts – from the inside face of one post to the inside face of the next post. Keep track of which measurement goes with which section of posts. Our posts were generally about 8' apart, with the exception of areas that turned corners or had gates.

   Number the fence sections with Sharpie as you go around the yard so you'll know which pipe section goes to it.

2. The pipe stock is generally sold in 10-foot lengths. If you have multiple fence segments that are well under 10 feet, you might be able to get multiple sections from one pipe. It's a good idea to buy a couple of extra lengths to cover mistakes in measurements or cuts. If your fence sections are longer than 10 feet, you'll have to create mid-fence brackets and make more rollers.

   You should now have a count for how many sections of pipe you need.

3. Each roller unit has:

- One pipe
- One length of cable
- Two, 1" wide dowel plugs
- Two brackets
- Two washers
- Two cable crimps

4. Start with the number of rollers and double that number. That's how many dowel plugs, washers, and cable lugs you'll need.
5. For the cable, start with the length of each roller and add 16 to 20" for each. Add all of the lengths together and this will tell you how much cable you'll need. We'd recommend adding another 10 to 20 feet to cover mistakes.

   Do not cut lengths ahead of time.

6. Purchase your materials and any tools you'll need. Save the receipts. If you have to wait for shipping, tell your dog stories about the exciting new yard that's coming.

Making the Plugs:

Only apply one washer to each plug. The washers allow the roller to spin with smooth metal against smooth metal, instead of having wood or plastic pipe rubbing against the edges of the metal bracket.

1. Cut your dowel into 1" long lengths. **It's important that the cuts be square to the axis of the dowel.** If they're not square, the roller will have a lop-sided rub against the mounting bracket when it spins.
2. Use a centering tool or a home-made jig to mark the center on the flat face of each plug.
3. Make a starting dent with the indent tool to guide drilling.
4. Drill a $^{3}/_{16}$" hole through the plug, keeping the hole as square to the face of the plug as possible. Repeat for each plug.
5. Apply a dab of adhesive to lightly cover one face of a washer and apply it to one face of a dowel plug. Keep the washer centered. Don't let glue get into the

drilled hole. If available, use a wood clamp for a few minutes to press the washer firmly against the plug.

6. Repeat for all plugs. If some glue ran into the hole, let it dry, then run the drill bit through to clear the glue.

   Let the glue dry thoroughly before working with the plugs again. For Liquid Nails, this will take a couple of hours.

Installing the Brackets

For good rolling, it is important that the brackets be parallel (square) to each other and to the roller that will hang between them. If you have a yard and fence that isn't just 90-degree angles, the segments of fence in between the posts might not be square, and the brackets might not be parallel. In this case, see the **Appendix** *"Non Parallel Post"* for ideas on correcting the problem.

1. Decide how you will install the brackets – angled or straight up. The final project will look nicer if you are consistent in the height and angle of the brackets.

   We made a small template to guide bracket placement with a 45 degree cut to set the bracket angle. We cut the length of the template so we could set it against the top of the fence rail and when the bracket was placed against it, it was at the correct distance.

2. After the bracket is placed properly, trace the holes with a pen.
7. Hold the bracket against the post and drill screws through the bracket holes and into the wood. Repeat for the other side of the fence segment.
8. Repeat the bracket installation process for each fence segment.

Cutting the Pipes into Segments

Before you start cutting, re-measure each fence segment, specifically measuring the distance between the inside faces of the tips of the brackets. Make a list for each segment that you numbered, writing down the measurement for each. You'll

probably find that the measurements are a bit different than what you got for the distance between the posts.

1. One pipe at a time, measure out your cuts and mark it on the pipe. Measure 1/8" shorter than the measurement distance between the straps to leave space for the washers.
2. Number the pipe segments as you go to match the fence section where it will be installed.
3. Make your cuts. Use a roller stand or a helper to keep the pipe square on the saw or workspace; this also keeps the pipe from springing up when the cut finishes.
4. Check the fit of the cut pipe against the brackets. Hold it between the bracket tips; it should fit in the gap with a small amount of clearance. If it won't fit, trim the end to fit properly.
5. Repeat the pipe-cut and fit-check process for each segment of fence.

Installing Half of the Plugs

Note: Install only one plug in each pipe. The second plug will be installed later.

1. Apply enough adhesive to lightly coat the outer edge of a plug.
2. Slide the plug into one end of a pipe with the washer facing outward.

   Rotate the plug while slowly inserting it to help spread the adhesive.
3. Insert the plug until the wood is flush with the end of the pipe. The face of the washer should stick out beyond the end of the pipe.
4. Lay the pipe horizontally so that the plug will not slide and let the adhesive dry.
5. Repeat for the rest of the pipes. **Let the glue dry before proceeding.**

Installing the Wire & Second Plug

1. After the adhesive has set on the plugs, cut a length of cable that is 16-20" longer than the pipe you're working with.
2. Feed one end of the cable segment through the hole in the plug, pushing cable through until it emerges from the other end of the pipe. You should have 8 to 10" sticking out of the plug.
6. Tie the end into a loose knot to make sure the cable won't pull through the plug. (The photo below doesn't have the washer, but yours should.)
7. Lay the pipe on the ground or work surface and get a plug for the open end.
8. Thread the cable through the new plug **through the face that does not have a washer.**
3. Apply enough adhesive to lightly coat the outer edge of the plug.
9. Slide the plug into the pipe with the washer facing outward.

4. Tie a loose loop into the second end of the cable like the other side, and verify the cable is still sticking out both ends.
10. Leave the pipe horizontal until the glue dries.

Note: If you inadvertently pulled the cable through so it's not sticking out one end, pull out the plug you just glued in before the glue dries. Rethread the cable and place the plug back in.

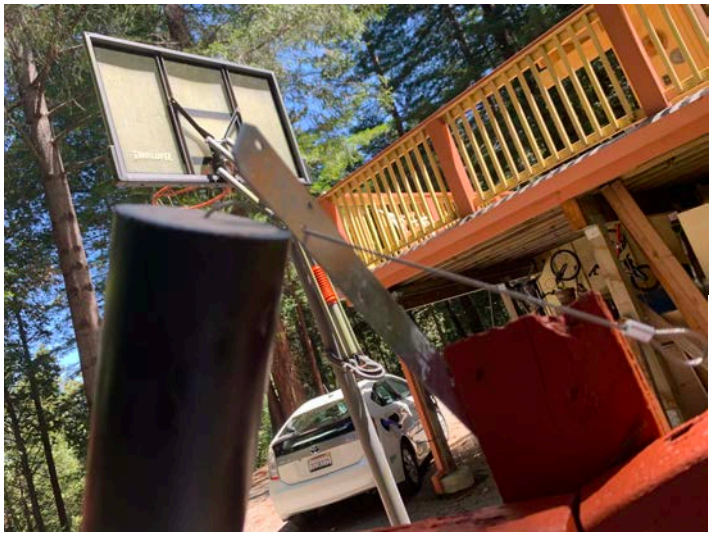
11. Repeat the thread-cable-and-glue process for the second plug on all remaining pipes.
    Only proceed after the glue has dried.

Installing the Rollers

To install the rollers, you'll need cable lugs, the crimping tool, and cable sheers. If you're installing the rollers by yourself, see the Appendix *"Installing Rollers By Yourself"* for helpful suggestions.

1. Move a roller section to the fence section with the same number.
2. Use a helper or other means to keep the roller level. Move one end of the roller next to the inside face of a bracket. Make a final check that the roller fits without interference.
3. Untie the loose knot on one end of the cable and feed the end through the hole at the tip of the bracket, from the inside face to the outside.
4. Feed the cable tip through one lobe of a crimp lug. Pull several inches through the lug. Circle the cable back and insert the tip back into the lug until the tip is flush with the end. You should have a loop of cable sticking out the outside face of the bracket.

5. Gently push the lug toward the loop, pulling cable out of the loop to make the loop smaller. You should be able to make the loop less than an inch long without pulling too hard.
6. After the loop is reduced, use the crimping tool to crimp the lug onto the cable.



7. Keeping the roller supported, push the just-crimped lug against the bracket, and feed the leftover cable back into the roller. Place the roller against the

bracket. At the other end, pull any slack cable through the roller and out the other end.

8. Repeat the process of feeding the cable through the second bracket and forming a loop. Use the cable shears to cut off excess cable.
9. Pull as much slack as possible out of the cable, and push the lug as close as possible to the outside of the bracket. The cable should be as taught as possible.
10. Crimp the lug.

Congratulations, you have a roller installed!

11. Repeat the process for every section of the fence.

During all that work, you might have dropped screws, drill bits, and so on. Check your perimeter for dropped stuff that could puncture paws or snouts. If the saw and the drill are missing, check the doghouse.

12. Open a refreshing beverage of your choice and take a load off!

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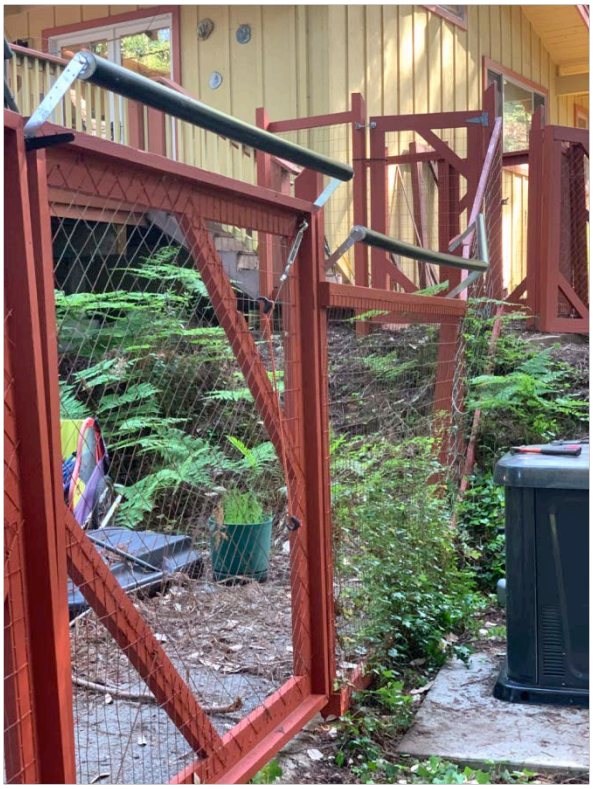
We hope you and your dogs (ok, well maybe just you) enjoy your new, escape-resistant fence!



Appendix

Non Parallel Posts

If you have a fence that isn't just 90-degree angles, you might have sections that bend around curves. In this case, the segments of fence between the posts might not be square to the sides of the posts, and the brackets might not end up parallel. In this case, you have a couple of options:

- After the bracket is installed, use a heavy pair of pliers to bend the bracket into square with the fence segment between the posts. Or . . .
- If you have access to a compound saw, cut a wedge of wood to place between the fence post and the bracket that will bring the bracket into square with the fence segment. If you do this, you will probably need longer screws to attach the bracket and the wedge to the fence post.

Installing Rollers By Yourself

For sections where you're working by yourself, we made some basic braces out of scrap lumber. The braces sit on the fence top and support one end of the roller while you work on the other end.