

Chapter 6

Bending Rail Installation

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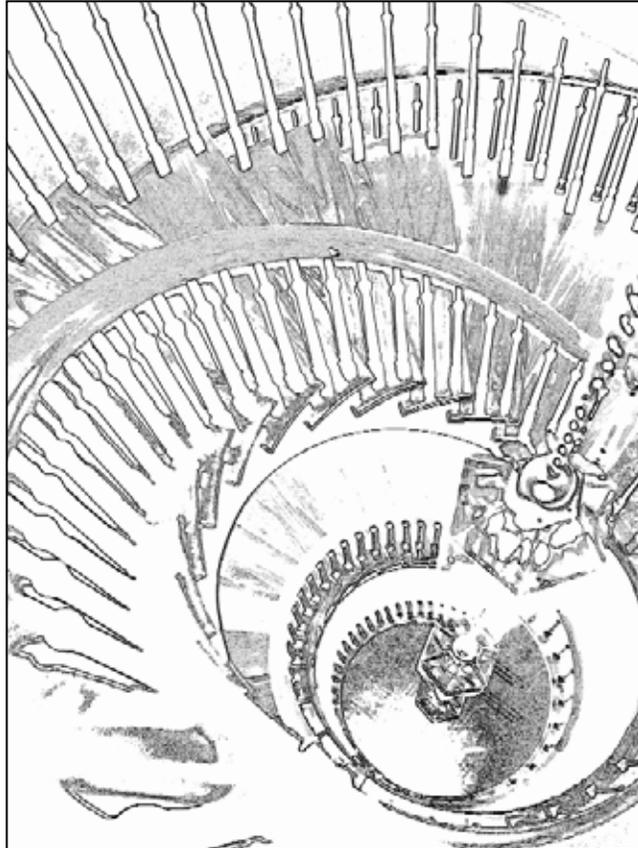
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Bending Rail Installation

Bending or radius handrails are often considered one of the most technically challenging aspects of stair building. In actuality, the methods involved are no more difficult than those used in straight stair installation. With the proper tools and preparation, the job can be handled with minimal difficulty. The most frequent problems occur when materials, (i.e. bending rails & bending molds) are improperly stressed beyond their physical limits.

Note: It is important to note that due to variances in wood grain, it is possible that bending rail may fail if it is bent at a radius tighter than manufacturers recommended usage.

Fitts Industries, Inc. recommends, for successful use of its' bending handrails, that the radius not be tighter than 30-inches.

Bending Brackets

When bending handrail on site, the first step in the process is building a set of brackets. The brackets will act as a form for the rail, and can be made in several ways using a wide variety of materials. You will find our recommendations both cost effective and easy to build. The general design is a basic "L" bracket that is ridged enough to withstand the pressure placed on it by the bending rail. Please note Fig. 6-1 here.

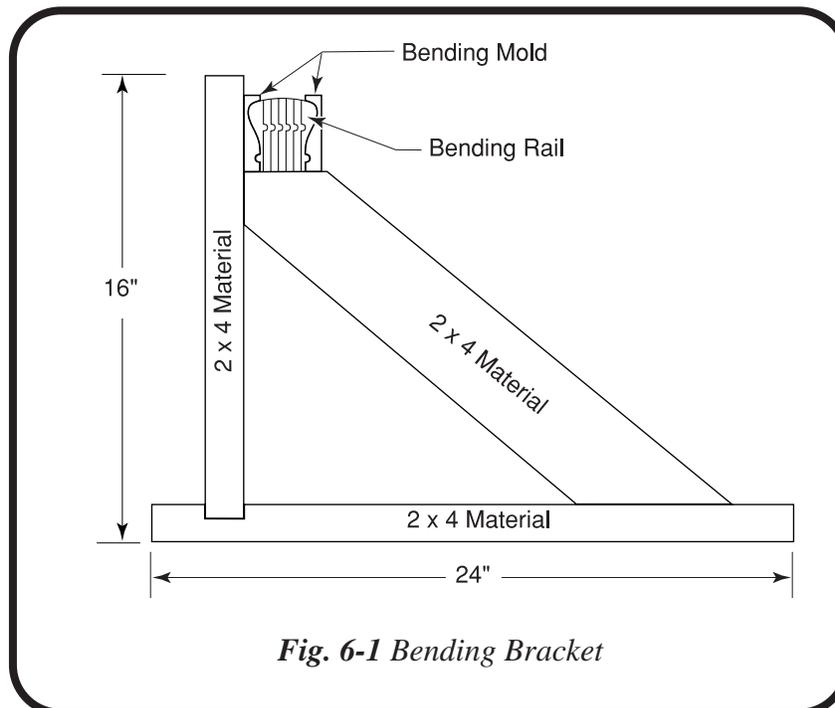


Fig. 6-1 Bending Bracket

This form allows the rail to be suspended above the treads, and will allow for easy inspection of the bottom of the rail during the bending process.

Bending Bracket Attachment and Layout

1. You must first determine the rail centerline. It is best to layout all of the centerlines and newel placements prior to construction. This will verify the proper length and placement of the material.
Note: An important thing to consider is that the bending rail should extend past each end by at least 6-inches.
2. Measure the width of the handrail including the bending mold. Divide this number by 2.
3. Measure over this distance from the rail centerline (Established in Step 1.)
4. Align the bending brackets on the tread so that when the rail is bent, it lies directly over the rail centerline and that the bracket is even with the front of the tread. Please note Fig. 6-2 here.

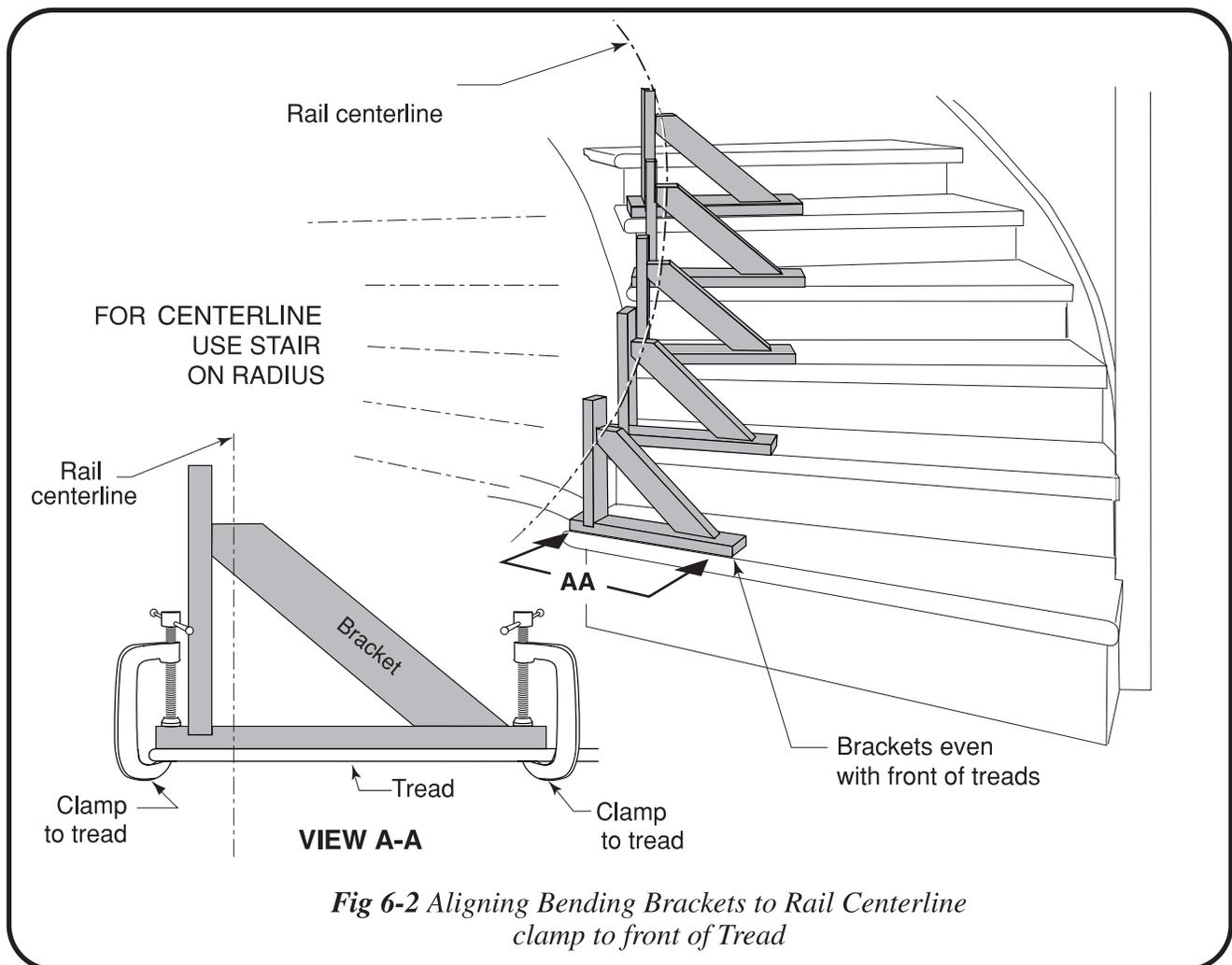


Fig 6-2 Aligning Bending Brackets to Rail Centerline
clamp to front of Tread

5. Clamp the bending brackets to the treads. Cover the treads under the bending rail to catch any excess glue that may drip down. In a Post-to-Post system it may be necessary to place a bending bracket on the floor in front of the stair, as well as at the top level of the stair. This will assure the proper bending of the rail.

Level Balcony Rails

1. Repeat steps 1-3 above.
2. Lay the bending brackets around the balcony on 6-inch centers and positioned so the rail center will be directly over the rail centerline on the balcony.
3. The brackets and the rail should extend about 6-inches on each end.

Gluing the Rail

1. Prior to gluing, dry bend the rail on the stair or balcony to ensure proper length and placement.
2. It is very important to use the proper type of glue when bending a rail. There are many types of glues that will provide the proper strength. It is important that the glue have the proper bonding strength, allowing the user to manipulate and place the rail while it is still wet. Since there will be an excess of residual glue left on the rail after the drying process has occurred, it is important to take into consideration how easy the excess will be to sand and remove.
If this is your first time bending handrail, it is suggested that you use glue with a slower set time. This will allow a longer period to manipulate the rail. When gluing handrail of a lighter variety (in terms of wood species), it is important to consider the color of the glue.
3. Using a glue applicator (such as a small paint roller), apply a thin layer of glue on all surfaces that will be bonded. Please note Fig. 6-3A here.
4. Cover the inside of the bending mold with wax paper, plastic wrap, or baby powder, to minimize the rail sticking to the molding. Please note Fig. 6-3B here.
5. As you glue the laminates, lay the rail into one side of the bending mold. Start with the first outside laminate, placing each layer on top of it. You will finish with the opposite outside ply. Please note Fig. 6-3C here.
6. Lay the other half of the bending mold on the bending rail and place tape around the entire form in three or four places to ensure the rail firmness during the bending process. Please note Fig. 6-3D here. You are now ready to bend the rail.

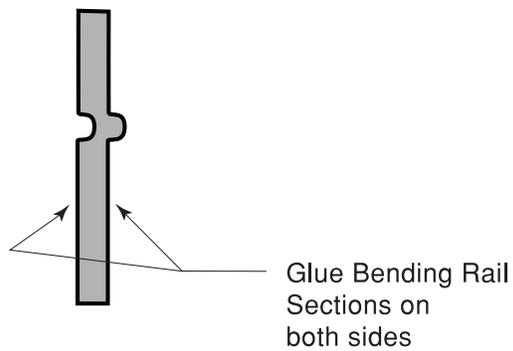


Fig. 6-3A

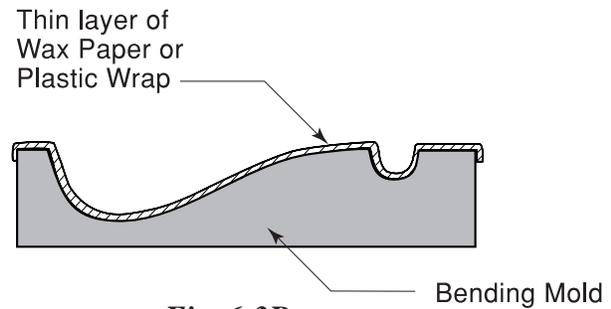


Fig. 6-3B

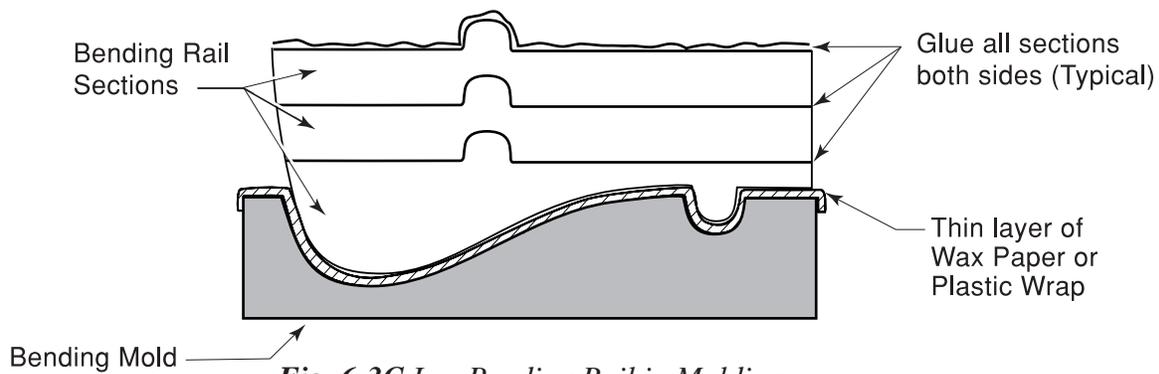


Fig. 6-3C Lay Bending Rail in Molding

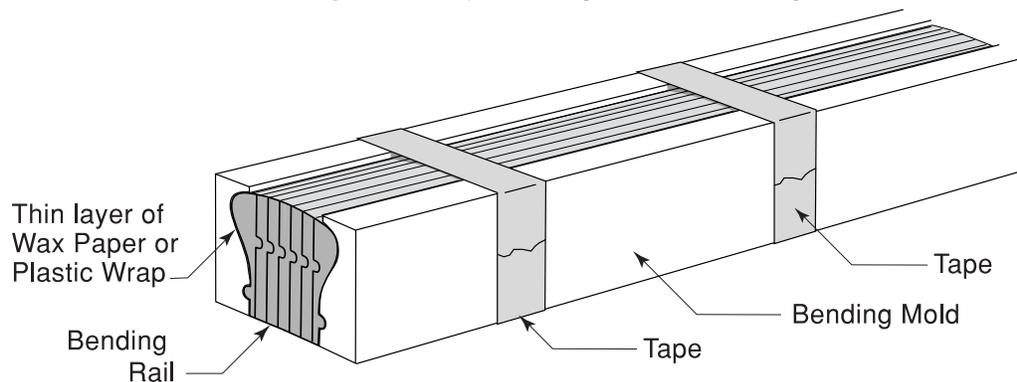


Fig. 6-3D

Note: When a required rail measures more than 16 feet, you may need to “lace” or “splice” two shorter sections of rail together. Please note Fig. 6-4. The splice is made by making a “butt-joint” between each laminate. A filament tape or a joint strap may be used to hold the joint together during bending. To make the best joint, it is suggested that you stagger the bending rail sections by two feet, so that the joint is “flatter” and stronger.

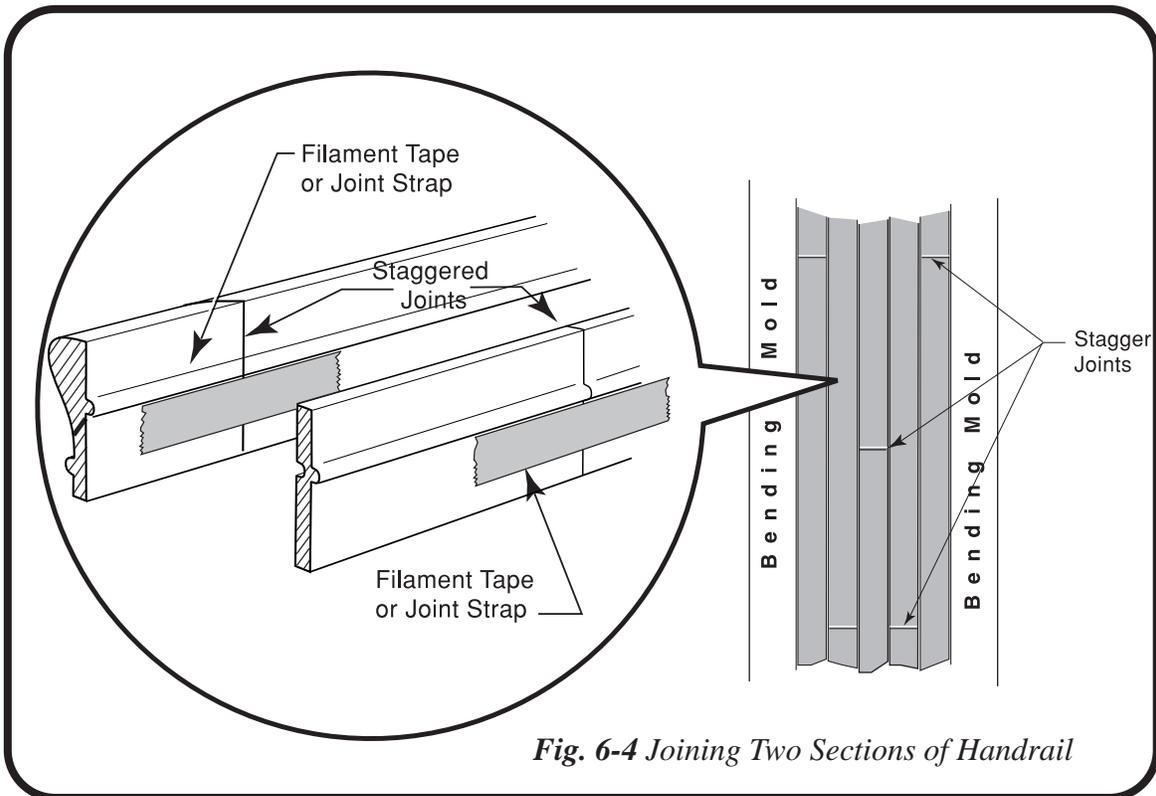


Fig. 6-4 Joining Two Sections of Handrail

Bending the Rail

1. Lay the rail on the bending brackets and loosely clamp into place.
2. Starting with the middle, pull the rail tightly to the brackets with a clamp.
3. Make sure that the bending mold is pushed down tightly against the rail, and that the rail is “square” inside the molding. This will ensure the proper twist on the rail. Please note Fig. 6-5 here.

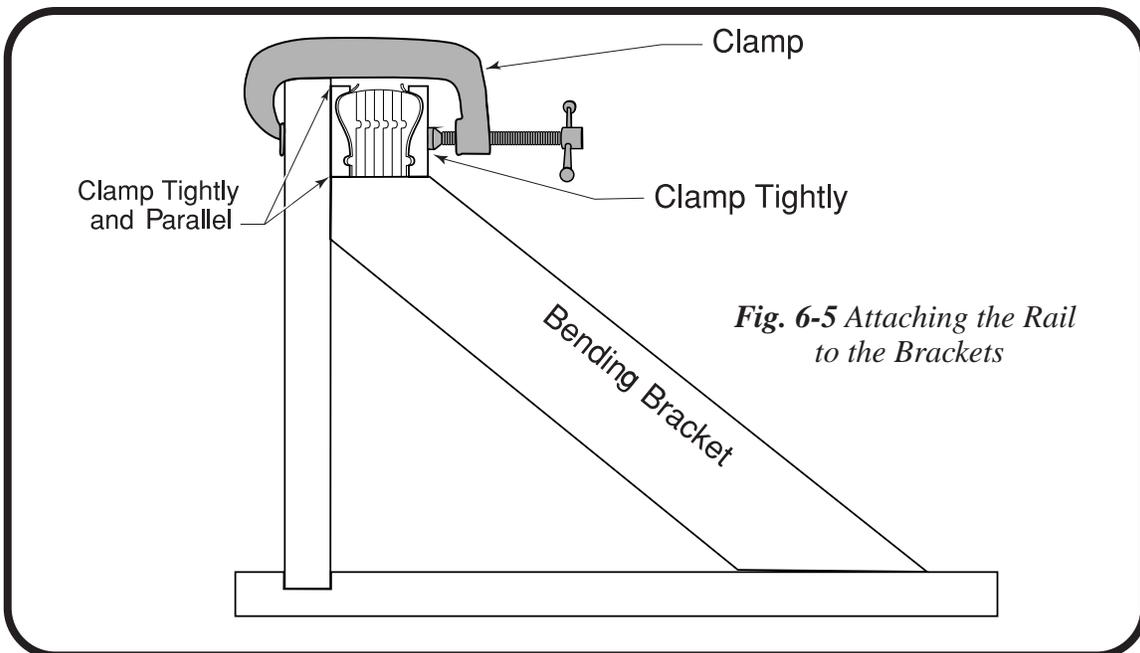


Fig. 6-5 Attaching the Rail to the Brackets

4. Place a clamp on each bracket, and one between each bracket. It is important to place the clamps close together so that the rail will achieve a good bond.
5. Since the outside laminates of most bending rail are thicker at the top than they are on the bottom, it is very important to check the bottom of the rail for gaps in the laminates. It may be necessary to add clamps to the bottom of the rail to close the gaps.
6. In most cases the rail can be removed within 24-48 hours. The temperature of the room, the humidity, and the tightness of the bend will affect the drying time. For the best results, plan to leave the rail in the mold for the full 48 hour time period.
7. Mark the rail with reference points so that you will be able to return the rail to the treads exactly where it was taken off.
8. Unclamp the dry rail and remove it from the stair.
9. Carefully remove the bending mold and any excess glue left on the rail with a sander or scraper.
10. Attach fittings, newels, and balusters using standard installation procedures.

Note: When possible, leave the bending rail attached to the stair while working on other areas of the stair system.

Chapter 6: Things to Remember

1. Always consult your local building codes before building a stair.
2. Make sure to construct brackets that will withstand the pressure needed to bend handrail.
3. Make sure to clamp brackets to the tread so that the handrail sits directly on the rail centerline.
4. Bending rail should extend 6-inches past the beginning and ending of the stair. (This will ensure that the proper length material is used.)
5. Pay special attention to the bonding time and color of the glue.
6. It is important to check the bottom of the rail during the bending process to ensure that there are no gaps in the plies.
7. Make sure to apply wax paper or powder to the inside of the bending mold⁷ so that you do not glue the bending rail to the bending mold.
8. Make sure that the rail is clamped tightly and “squarely” to the bracket. This will ensure the proper “twist” to the rail.
9. For best results, let the glue set for 48 hours.
10. If at all possible, leave rail attached to the stair while working on other areas of the stair system.