

# Tips For Joining Frames With Your Underpinner

by Clay Simpson

**P**icture frames have been around for hundreds of years. For most of that time they were joined pretty much the same way—with a hammer and nails. That changed in 1975 when a French man named Antoine Cassese invented the underpinner. His inventions were the v-shaped wedge (or nail) and the equipment to insert them into the corners of frames. They revolutionized the way frames were assembled, and today these v-shaped wedges and other methods of bottom joining are the standard ways to join most frames. You can't throw away the hammer and nails altogether, but these tools *have* gathered a bit of dust in many shops since 1975.

## Why Join By Machine?

There are many advantages to joining from the bottom of the frame as is done with an underpinner. The first is strength. With conventional nails, the wider the moulding, the longer the nails have to be

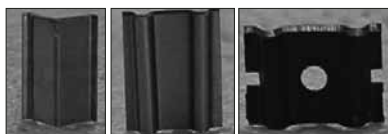


Photo 1: (from l to r) V-shaped wedge and two different types of corrugated nails.



Photo 2: Nails should be inserted in the center two-thirds of the moulding, if the profile shape allows.

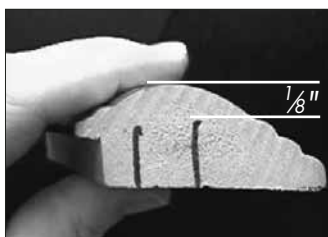


Photo 3: Leave at least an 1/8" clearance from the top of the nail to the face of the moulding.

to join it. Brad nails can only be so long before they become too weak to drive or too fat to be useful. Nobody wants a frame with giant nails in the side! Bottom joiners can insert nails the full width of the frame and can be stacked to join taller mouldings.

The second advantage is aesthetics. There are no nail holes to fill in on the sides of the frames. This has allowed a whole new world of finishes to be used without having to worry about touch-up. More than ever, wide mouldings are chosen for frame designs, and there is a vast number of styles and finishes of all widths. Manufacturers design mouldings with the knowledge that they will most likely be joined from the bottom and must work within the limits of today's equipment.

Another advantage is speed. The equipment on the market today varies in sophistication. It ranges from simple, foot-operated models to computer-controlled

machines that store the information about how to join different mouldings and put the right nail in the right spot every time. (They almost do the whole job for you.)

As useful as underpinners may be, they won't join every moulding of every material and every dimension. For instance, because the frame is joined from the bottom, there are height limitations. Nails can be stacked but usually only two or three high, and in hardwoods maybe not at all. For instance, you'll never join that 3" tall, 1/2" wide, maple moulding on your bottom joiner. Most bottom joiners require a flat-backed moulding, but there are models available that will do "step mouldings."

## Maximize the Join

Quality joining starts with properly cut frames. The best equipment and nails in the world can't make up for bad cuts. Make sure you have good cutting equipment and sharp blades; also keep the moulding from moving during the cutting process. Often the problem is not with the saw but the infeed and measuring tables. Make sure those are inline with the cutting surface. When you have your pieces properly cut to size, you are ready to start the joining process.

### Selecting Nails

Start by selecting the right fastener for the job. This involves the consideration of more than one factor. You have to decide the type of nail and their placement to determine the length to use for the job.

There are different types of

nails available. Some are v-shaped, some u-shaped, and others have a corrugated design (see Photo 1). There are nails designed for softwoods, hardwoods, and even MDF (medium density fiberboard). Some come glued together, others are taped, and some come in car-

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tridges. There are even plastic wedges that are inserted into slots that have been routed out in the back of the moulding. Offerings from manufacturers vary and generally speaking, they all work well.

The most commonly used nail lengths range from 7mm to 15 mm, or 3/8" to 5/8", depending on the measurement system used by the manufacturer. There are of course shorter and longer nails. However, these are the sizes most often utilized.

As mentioned above, most manufacturers offer softwood and hardwood versions of their nails.

The differences are in the shape of the nail, thickness of material, and geometry of the point. These factors cause the nail to react differently as it enters the wood. Corrugated nails are generally thicker than v-shaped wedges and excel in hardwoods and MDF.

Most nails bend slightly as they enter the wood. This causes tension, draws the corner tight, and holds the frame together. Hardwood nails require more resistance to get them to bend and may leave your softwood frames loose in the corners because they go in straight. Also, using softwood nails on hardwoods may cause the nails to bend too much and they may literally rip themselves apart.

### Nail Placement

Nail placement is another key element in the selection process. As a general rule, you should use the center two-thirds of the moulding for inserting nails (see Photo 2). Getting too close to either the inside or outside edge can cause problems. This is especially important in MDF moulding as the material can push out if you get too close to the edge. Some machines are limited in the number of nailing positions. Others can place nails in as many positions as desired.

It is important to follow the contours of the mouldings. The closer to the top of the moulding you get, the stronger the corner will be. If there are high and low spots you will have to work around the low spots in order to get to the high spots. Unless you want to

change nails for the different positions, or can afford a machine that will change the nails by itself, you'll have to stack nails in the higher spots.

Although there are exceptions, most machines will stack two or three nails effectively.

Oak, ash, and pine mouldings join well but their grain patterns can cause problems, especially when stacking. Ramin, on the other hand, tends to cause fewer problems due to the straight grain.

Maple is the most common wood to cause problems. It can be so hard the wood will crack or the nail will tear itself apart as it is inserted. Stacking in maple is a real challenge! Some exotic hardwoods such as koa may be better left to the trusty drill, hammer, and nails. When in doubt, practice by joining several test pieces as this will save you both time and materials.

If you are going to stack nails, make sure you allow extra room behind the nails as they will tend to bend backwards and can pop out the back of the frame if too close to the edge. Some manufacturers recommend using hardwood nails when you stack, as this will reduce the bending.

You should also make sure you leave at least an 1/8" clearance from the top of the nail to the face of the moulding (see Photo 3). This is because even if it doesn't pop completely through the face, the nail can leave a mark if it comes too close to the surface.

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Taking these factors into account helps you to decide what length nail you should use.

#### *Additional Tips*

Another important technique for bottom joining is to hold the moulding from the top. The trick is to hold it tight enough to drive the nails without damaging the face of the frame. Some creativity with the hold can go along way. Putting a corner of a small moulding face down in the low spot of a larger moulding will create a flat surface for your machine to press against. You may have to pad the face to keep from damaging the finish though. Some vendors sell accessories or inserts designed for this purpose.

It sounds like a lot of work but the results are worth it. Using the right nails in the right places will make a big difference in your corners. Computerized joiners that remember all these factors are gaining in popularity. You make all those decisions once and then recall them at the appropriate time. This can be helpful to production if employee turnover is an issue in your shop.

Keeping your joiner properly maintained will help to ensure years of quality frames. Keeping

the glue out of the machine is one important consideration, since the glue drips down into the opening that the nails come out of.

Follow the manufacturer's instructions for cleaning and maintenance. Some air-driven machines need internal lubrication, other don't. Most have external parts that need cleaning and lubrication. All should have clean work surfaces. Follow the manufacturer's recommendations for air pressure. And while you are doing maintenance, don't forget to drain that compressor. Dirty water in the compressor has caused many joiner failures.

No machine will handle every moulding effectively. There is just too much variety out there. Trade shows are great places to try different models. It can help to bring along cut pieces of your most popular mouldings and use them to make sure the machine you are looking at will join them properly.

Today's equipment is better than ever and still improving. The future holds promise of saws, joiners, and mat cutters all linked to a computer to ensure fewer errors and better, faster results. But even then, I'll hold on to my hammer, nails, and drill because I, for one, like those tall, skinny maple mouldings along with others that keep the "custom" in custom framing. ■