

Hand Dovetails

They're really not that hard to do

by Alphonse Mattia

Dovetailing is one of the strongest and most attractive methods of joining the ends of boards together. Traditionally, handcut dovetails consist of a series of alternating pins and tails beginning and ending with a half-pin, with the tails usually about twice as large as the pins.

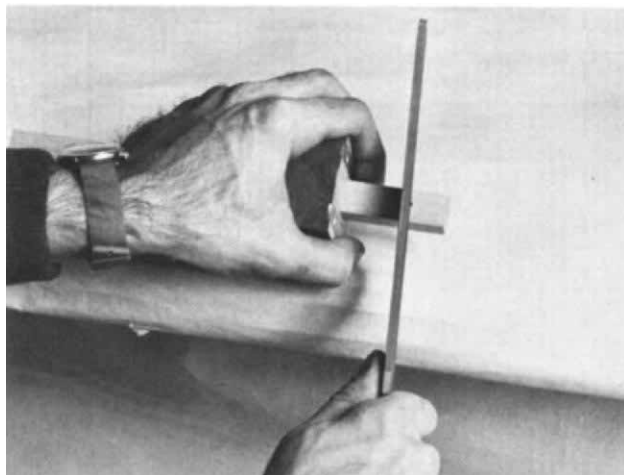
Nowadays, dovetails can be cut much faster by machine, but there are certain disadvantages to doing them this way. The pins and tails are the same size because they are cut together in one step. This makes the joint look very confusing and without character, as it is hard to tell the difference between the pins and tails. Machine dovetails also have a size limitation because there are only two sizes of dovetail router bits generally available. And, when machine cutting half-blind dovetails, there is no guarantee that the series will end with a pin. Taken together, these may not seem like serious points to consider when time is critical, but they do affect the quality of a fine piece of furniture.

With hand-cut dovetails the craftsman has no limitations. He can tailor the shape, size and pattern of his dovetails to suit the piece he is building. There are many types: through, half-blind (only visible from one side), hidden, and mitered dovetails. Simple and compound-angled are also possible.

In this article, I will go through the steps for cutting the through and half-blind dovetails. The most important thing about cutting dovetails is patience. You must be as precise as possible with each step, especially sawing. It takes practice, but in time you will find that they are not at all difficult.

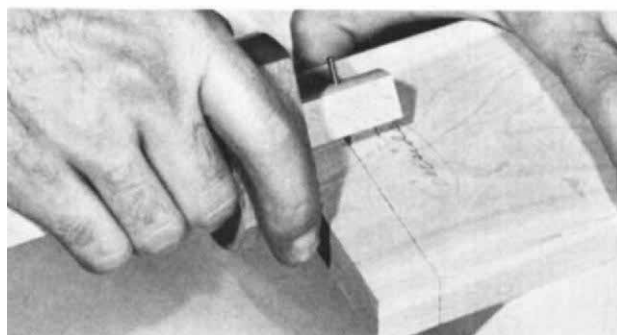
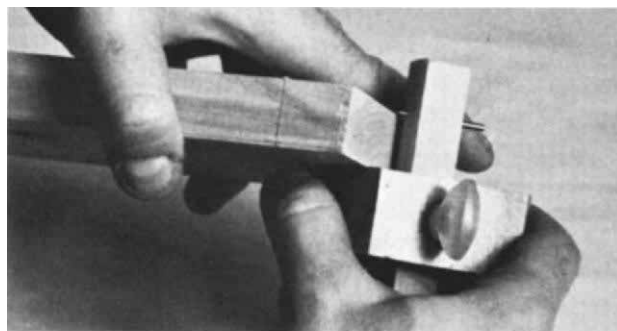
The pieces to be joined should be dressed to the same width and thickness and the ends cut square. The surfaces that will be inside should be sanded and so marked.

It helps if you have a marking gauge. Sharpen it with a file



not quite parallel to the movable block. If angled in the right direction, this slight bevel will tend to draw the gauge tightly against the board being worked. (If the angle is reversed, it will tend to push the gauge away from the board.)

With the marking gauge set to the thickness of your boards, scribe a line all the way around the ends of your



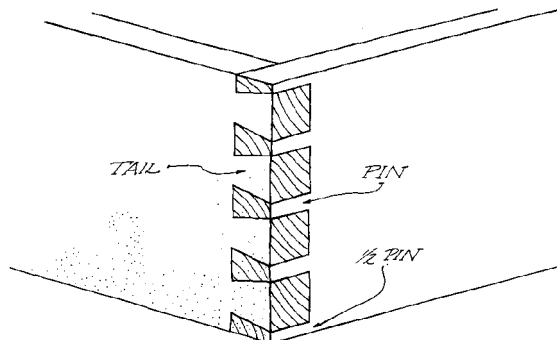
boards (front, back and edges). It helps if you set your marking gauge at a little more than the thickness of the wood (maximum $1/32$). This will cause the pins and tails to extend above the surface of your boards when finished, so that after gluing, a little sanding will give a perfect corner.

(It is possible to join boards of two different thicknesses. If you do, you will have to use two marking gauge settings at this point, one for each thickness of board you are joining.)

Now the pins should be laid out on the end grain of one of the boards to be joined. In making through dovetails, I find it better to start with the pins, because later it will be easier to scribe the tails from the pins. But it is possible to cut the tails first and then the pins. When deciding which piece to lay out the pins on, remember that the dovetailed corner can be pulled apart from one side and not the other because of the wedging effect. For example, on a drawer, the tails would be on the sides and the pins on the front, so you are not depending on glue alone when pulling on the front. A hanging wall

cabinet would have tails cut on the sides and pins on the top and bottom.

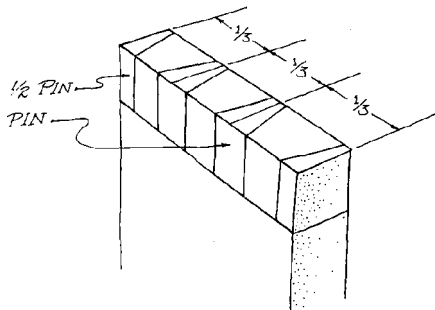
In any event, determine the size of the pins you will use. With handcut dovetails, the pins are usually about half the size of the tails. This ratio is optional, but if the tails are made too large, the strength of the joint is weakened as the holding power of the glue joint is in the long-grain areas between the pins and tails, not in the end-grain areas behind them. The



fewer the tails, the less the glue area. But if the tails are made too small, their strength is considerably reduced because there isn't enough wood across their narrowest point. With pins, however, strength is not significantly affected if they are made smaller (in some antique pieces the pins actually come to a point) because there is always enough cross-sectional area for what they have to do.

The first and last pins are called half-pins because they are angled on only one side, not because they are necessarily half the size of the whole pins. This is important when you are using very narrow pins because if you did make the outside pins half the size of the whole pin there would be danger of chipping or sanding through them. But in any case, begin and end a dovetail series with a half-pin rather than a half-tail, because a tail gets its strength only from being glued to a pin, not to the end grain it butts against.

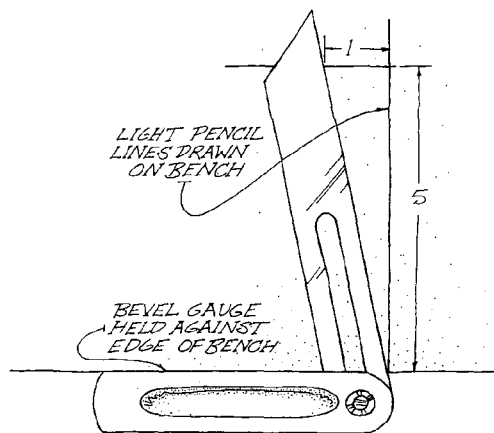
Divide the width of the board that will have the pins into equal divisions, depending on the number of tails you have



room for, e.g. divide in thirds for three tails, fourths for four tails. These division marks are the center points of your pins. If your pins are going to be 1/2-inch in width at their narrowest, measure in 1/4-inch from each end and 1/4-inch on either side of your division marks. This will give you the placement of your pins.

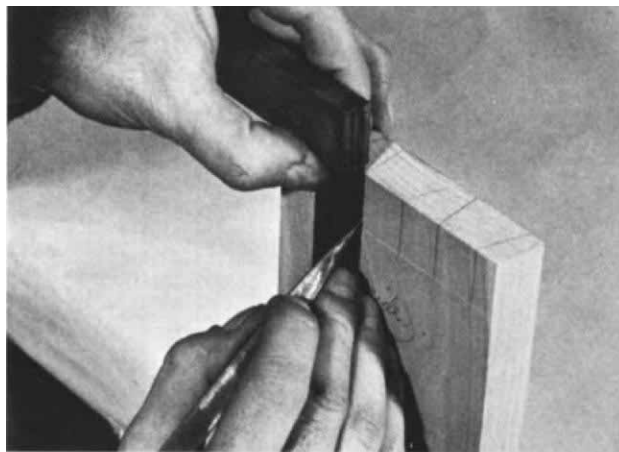
Check your divisions for accuracy. Then with a bevel gauge set to a 1-to-5 ratio, scribe in the lines with a sharp tool such as an awl or a scribe. Don't use a pencil (except for rough layout) because a pencil line is too thick.

The 1-to-5 ratio can be varied, but anything less will cause fragile corners on tails, and anything above 1 to 6 reduces the



strength of the joint because of a flatter wedge.

At this point you should have the pins drawn out on the end grain of your board. The wider end of the pins should be toward the inside surface of the board. With a square you can carry your lines from the edges down to the marking gauge lines on both sides of the board. To avoid confusion, shade in the areas between pins. A common mistake is to saw on the

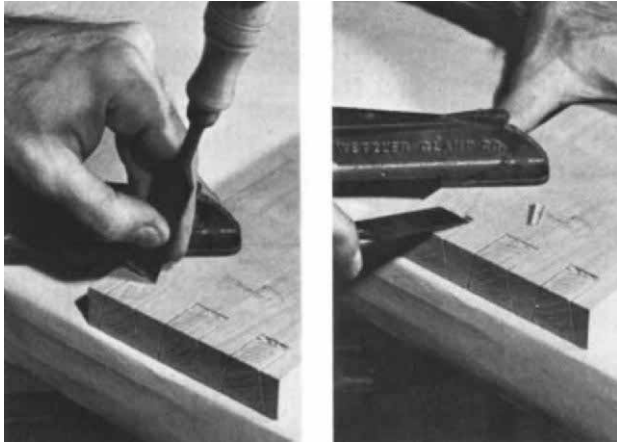


wrong side of the line, or worse yet, to chisel out the wrong areas.

Now, with the piece held securely in a vise, you must make saw cuts down to the marking gauge line. You should use a fine dovetail saw. The thinner the blade, the easier it will be. Remember to split the line on the waste side. You'll find this easier if you imagine the line as having thickness to it, as a pencil line does. It is difficult to saw precisely at first, but you will get better with a little practice.

The piece should now be clamped over a rigid area of the workbench to support it while chiseling. Do not clamp over a vise or allow the piece to extend over the edge of the bench.

Before starting to chisel, it helps to deepen the marking gauge line between the pins with a chisel and then to remove a fine chip out to about 1/8-inch in front of the marking

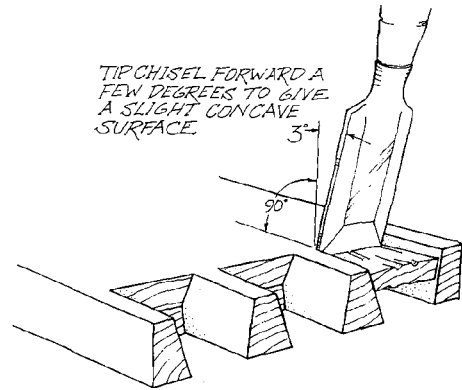


gauge line. This will establish a positive edge to line the chisel against. It will also lessen the chance of the chisel drifting back beyond the marking gauge line during chiseling. Now you are ready to take a heavier cut.

With the chisel held vertically at the marking gauge line, a blow with a mallet will cut across the grain. Then a light cut in from the end grain will remove the chip. A few alternating cuts will get you about halfway through. Now turn the board over and repeat the process from the other side until you have chiseled out the material between the pins.

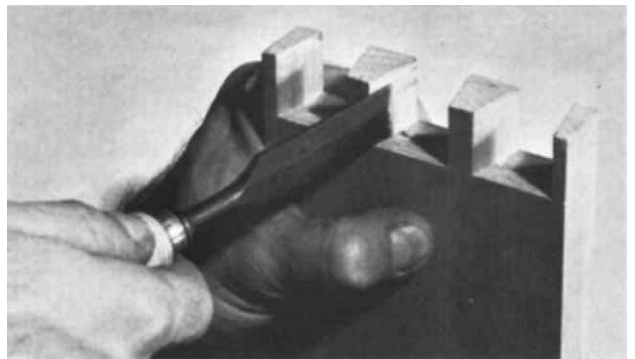


When you are making the vertical cuts across the grain at the marking gauge line, it helps to tip the chisel forward a few degrees. This is called undercutting and if done when chiseling from both sides it will result in a shallow, concave surface in the end grain between the pins. Remember that



this undercut is not visible and does not affect the strength of the joint, but it does result in a tighter looking joint.

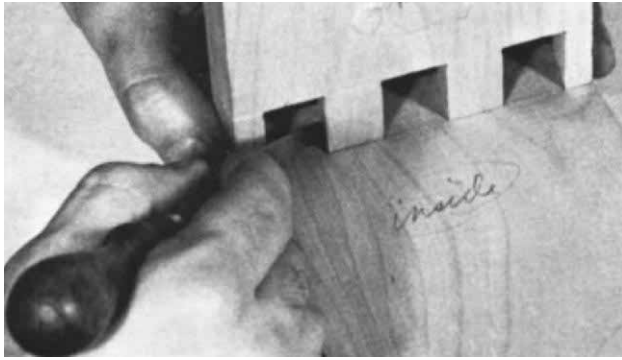
Even with undercutting you will still have a little cleanup to do in the corners between the pins. If any of your saw cuts



are out of square, you can clean them up a little also, but always use a sharp chisel, never sandpaper or a file, when cleaning up the pins.

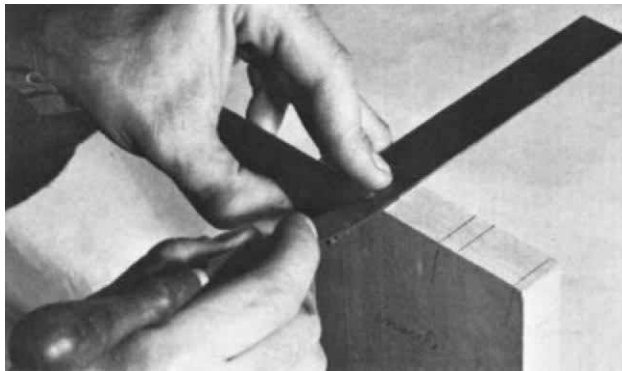
You should now be ready to scribe the tails. Position the pins directly over the side to be joined. Make sure that the ends are flush, that the pins are positioned precisely at the previously drawn marking gauge line, that the inside surfaces are facing in, and that the widest end of the pins is toward the inside of the joint. Now scribe around the pins with a scribe or awl. It is important not to move the piece until all the scribing is completed. Clamp the piece in position if possible.

It is easier to scribe from inside the joint rather than outside. The grain will work to your advantage in keeping the

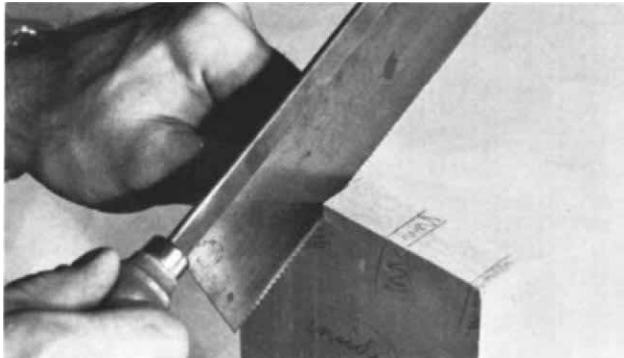


scriber tight against the sides of the pins. From the outside the tool tends to follow the grain away from the side of the pin.

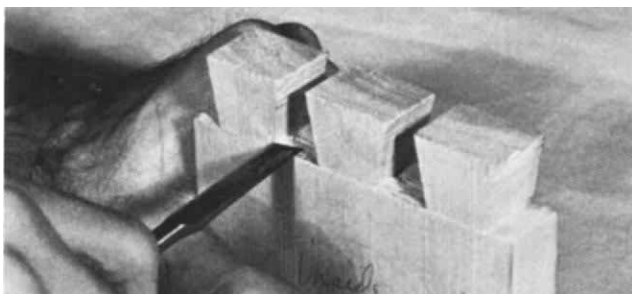
After the pins have been scribed, use a square to scribe the lines across the end grain. Shade in the areas to be removed



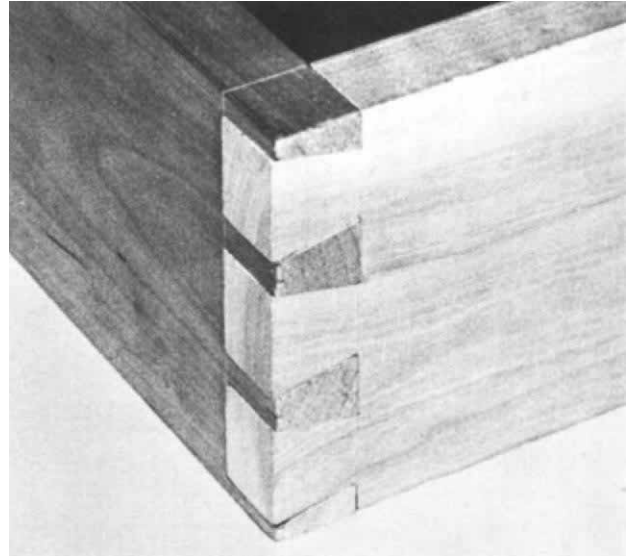
and proceed as you did when cutting out the pins. Be as precise as possible with your saw cuts, remembering to split the line on the waste side. Deepen the marking gauge line with a chisel and remove a 1/8-inch chip. Undercut when chiseling.



It is probably neater and easier to saw rather than to chisel the ends out. Clean up the corners between tails with a chisel before trying the joint.



Do not force the joint together. If it is your first set, you will probably have more cleaning up to do. With practice you should be able to tap the two pieces together without any cleanup or splits or gaps.



The dovetails should be tight enough to require some tapping when putting them together; however, be careful of splitting. If your dovetails are very tight and require a lot of effort to drive them together, they are probably too tight and may split when the glue is applied (glue swells the joint slightly). Always dry clamp before gluing and use glue blocks—small pieces of a softer wood that are notched so they direct the clamp pressure over the tails. A little sanding to bring the ends down flush with the sides and your through dovetails are complete.

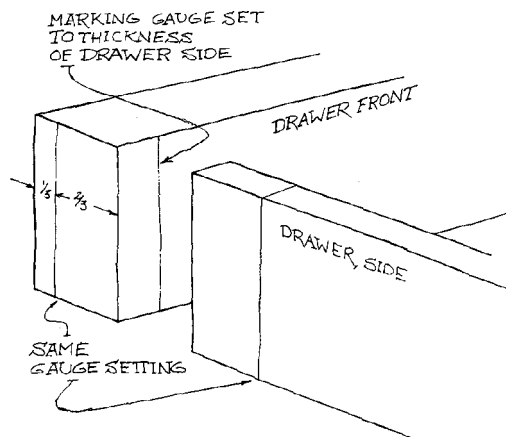
Half-blind Dovetails

Half-blind dovetails are those that show from only one side. They are most commonly used for drawer fronts but they can be used elsewhere quite effectively. The procedure for making them is basically the same as for through dovetails. I will list only the steps that differ.

Half-blind dovetails can be used for joining pieces of the same thickness, but because they are most commonly used for drawers, I will describe cutting them with pieces of different thicknesses—a thicker piece for the drawer front, a thinner piece for the side.

Dress the pieces to be joined to the desired thicknesses and sand and mark the inside surfaces. You will need two marking-gauge settings for half-blind dovetails. First the marking gauge is set to the thickness of the drawer side. With this setting scribe a line along the end of the drawer front on the inside surface only. Now reset the marking gauge to about 2/3 the thickness of the drawer front and scribe a line into the endgrain of the drawer front. The scribed line should be in 1/3 of the way from the outside (or 2/3 from the inside) surface of the drawer front. At this same setting scribe a line around both sides and edges of the drawer side.

The 2/3 proportion can be varied. It determines how long the tails will be. They can be longer, providing they don't interfere with any shaping or face carving on the drawer front. But as tails are shortened, the strength of the joint is reduced.



When cutting half-blind dovetails I find it easier to cut the tails first because it is difficult to scribe inside the pins. But others say the pins should be cut first.

On the drawer side lay out the tails. This is done in the



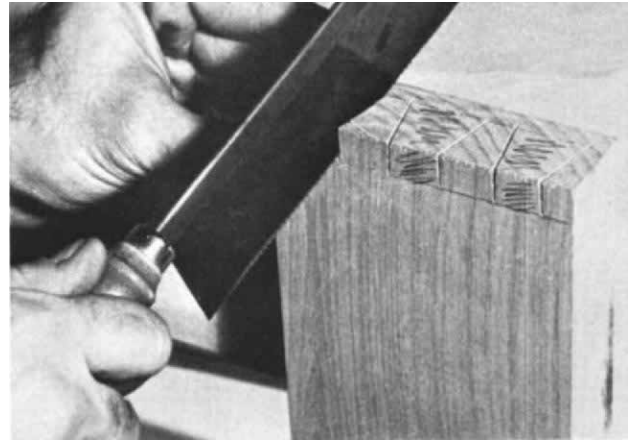
same way as when laying out pins for through dovetails except you will be working on the outside of the drawer side rather than on the end grain of the drawer front.

Saw and chisel out the areas between the tails you have just laid out using the same techniques as in through dovetails. Once the tails are cut out and cleaned up, you must scribe the pins onto the end grain of the drawer front. Clamp the drawer front in a vise flush to the workbench top and lay the



side over it. Be sure inside surfaces are towards the inside of the corner. Line the edges of the boards up, and position the ends of the tails exactly at the marking gauge line. This positioning is critical. If it is not done accurately, it will result in gaps. Clamp or hold the piece securely and scribe the pins from the sides of the tails. The lines should then be extended

with a square down the inside of the drawer front to the other marking gauge line. Novices usually expect the sawing and chiseling out of the pins to be difficult, but you will find that it is not much different than with through dovetails. Start sawing at the inside edge of the drawer front. Remember to split the line on the waste side, but do not saw past either of the two marking gauge lines.



The chiseling is done with the same alternating cuts as for through dovetails. Remember to undercut slightly. The only difference here is that the inside corners will splinter as each chip is removed because the saw cuts do not extend back all the way. It helps to clean out these splintered internal corners after removing each chip. When you reach the marking gauge line do whatever cleanup is necessary and try the joint.



For purposes of clarity I have described procedures for cutting each of the types of dovetails on two pieces of wood. This is the best way to practice these joints. However, when actually making a box or a drawer, it is much more efficient and easier to be accurate if you work on all four corners at once. In other words, lay out and saw the pins on both ends of the front and back at once. Scribe the tails on both ends of the sides at the same time. Make all the saw cuts in one operation and then chisel out all the tails at once. But remember to letter each corner so you know which set of tails was scribed from which set of pins.

There are nearly as many methods for cutting dovetails as there are craftsmen. The methods I have described work best for me, and I hope with a little practice they will produce satisfactory results for the reader.