GIFKINS DOVETAIL JIG

Instruction manual
for
dovetail & finger joints

"Limited only by your imagination"

WOODWORKING SAFETY

Woodworking is potentially dangerous, and at all times you should safeguard your health and wellbeing by observing the following:

- Read these instructions fully before using the dovetail jig for the first time.
- When using the Gifkins Dovetail Jig, always check that the clamps are safely above the cutter before turning the router on.
- Operate the jig by pushing it away from you, not pulling it towards you.
- When using the jig, hold on to both ends of the jig with your hands also braced on the table.
- Wear safety glasses whenever using power tools or machinery.
- Provide dust extraction and use dust masks whenever wood dust is present.
- Always use hearing protection when operating power tools and machinery.
- Always follow manufactures recommendations.
- Always work with sharp cutters and blades. Dull blades require greater force, and increase the chance of accident.

When using power tools or machinery, think about what would happen if you slip. If you do something often enough, eventually you will slip! Organise your work practices so that when you slip, you do it safely. Use push blocks so that your fingers are well away from moving parts. This way, it will be the push block that is damaged, and not your fingers.

All wood dusts are dangerous, some more so than others. Always use dust extraction and dust masks.

When using power tools, protection against injury should be of prime concern. It is recommended you always use:

- ♦ EAR MUFFS
- ♦ SAFETY GLASSES
- ♦ DUST MASKS and DUST EXTRACTION
- ♦ ALWAYS UNPLUG TOOLS BEFORE CHANGING CUTTERS or BLADES

The Gifkins Dovetail Jig is covered by the following patents:

US Pat # 5 931 208 Aust Pat # 731 117

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GIFKINS DOVETAIL JIG

Congratulations on choosing the Gifkins Dovetail Jig. It will have you producing beautifully accurate and clean joints with remarkable ease and simplicity in no time at all. You will wonder how you ever coped without it!

The Gifkins Dovetail Jig will cut through dovetail joints and finger joints across a wide range of timber thicknesses and in a wide range of pin sizes and spacings. The joint type, spacing and thickness range is determined by the template profile. Full details of the different profiles are given on page 3 of these instructions. All the profiles are available as template upgrades for those that wish to expand the range of their jig. Each template upgrade includes the template, the cutters and fittings to suit and a pair of backing boards.

The jig is designed for use with a table-mounted router and will work well on any router table with any make or model of router. No special fittings are required for either the table or the router.

The jig uses its own specially designed router bits which are include in our jig packages. Full specifications for the router bits are given on page 3.

Two demonstration DVDs are available as optional extras, one for dovetailing and another for finger joints. The DVDs are a must-have for those wishing to get the most out of their jig. There is now an extract from these DVDs on our website.

Our website includes all the latest information on the jig. Details of any new templates or optional extras will be posted there as they arise. The website also has FREE downloads for the following plans and information:

- Wooden hinge plans
- Drop saw fence and table plans
- Mitred frame clamp plans
- Router table plans
- Newsletters with boxmaking tips and ideas
- Magazine reviews on the jig
- Suppliers of thin timber
- Suppliers of boxmaking hardware

Any additions or amendments to these instructions will be added to the website.

The website also has details on boxmaking plans, boxmaking DVDs, special boxmaking cutters, reducing collets, squares etc. that are available from Gifkins Dovetail.

www.gifkins.com.au

Template specifications

	"H" SERIES		"A" SERIES		"B" SERIES		"F" SERIES	
Joint Type	Through Dovetail						Finger Joint	
Template	H10	H20	A10	A20	B10	B20	F5	F15
Dovetail Cutter	TGHD 12		TGAD 12		TGBD 16 ½			
Straight Cutter	TGHS 12		TGAS 12		TGBS 16 ½		TGF 5	TGF 15
Pin Size	6	6	10	11	17	17	5	15
Pin Spacing	18	26	20.5	28	38	48	10	30
Max Thickness	10	10	13	13	22	22	13	22
Min Thickness *	2	2	5	5	13	13	5	13
Max Width	300	300	310	305	310	310	300	300

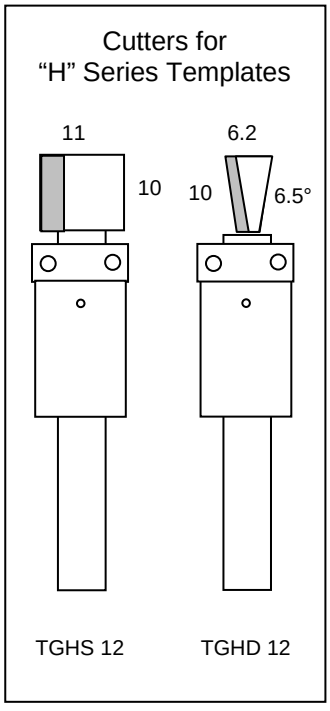
Note: All measurements are in millimetres – pin spacing is centre to centre.
* By changing the procedure slightly, it is possible to go as thin as you like with any template – see advanced techniques

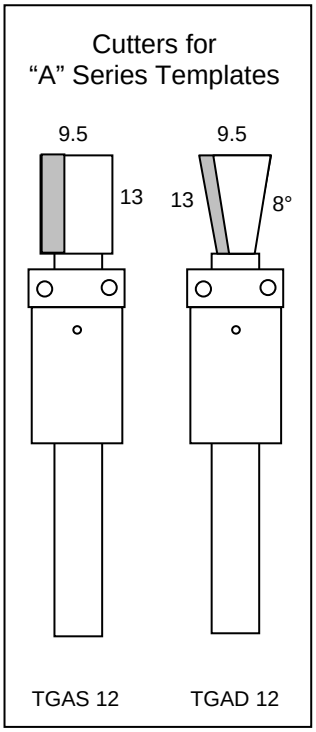
A major consideration when purchasing templates is the thickness of the timber you wish to work with.

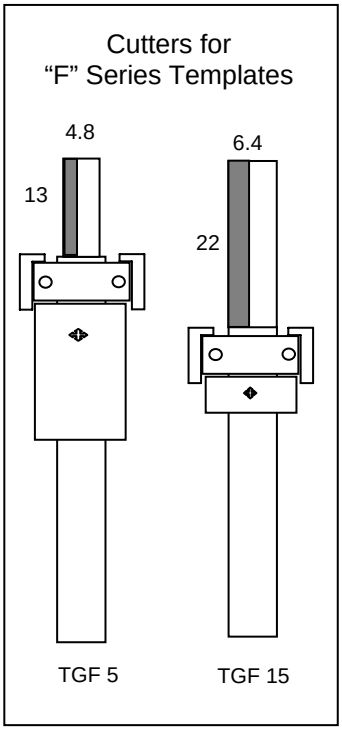
H10 & H20 templates are suitable for any stock up to **10 mm thick** and use ¼" shank cutters
A10, A20 & F5 templates are suitable for stock from **5 mm to 13 mm thick** and use ¼" shank cutters
F15 templates are suitable for stock from **13 mm to 22 mm thick** and use a ¼" shank cutter
B10 & B20 templates are suitable for stock from **13 mm to 22 mm thick** and use ½" shank cutters

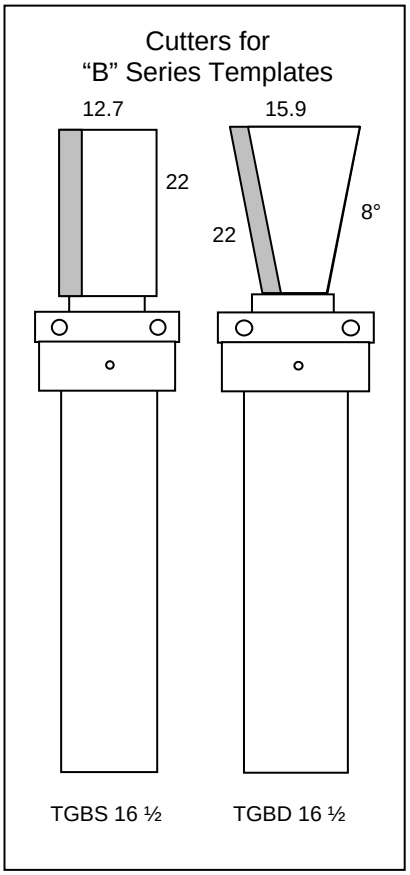
Within each template series there are two template profiles, one with the pins close together and another with the pins wider apart. For example, in the "H" series, the H10 is the close spacing and the H20 is the wide spacing.

Cutter specifications









These drawings show the ACTUAL SIZE of the cutters.

- The "F" series cutters are both solid carbide spiral cutters
- The "H" dovetail cutter is solid carbide
- All the other cutters are carbide tipped
- Before use, please check the grub screw (on the collar below the bearing) is tight, using the Allen key provided

The “H” and “A” straight cutters are very similar, and it is easy to mix them up. Surprisingly, the straight cutter for the “H” templates is larger in diameter than the straight cutter for the “A” templates, even though the A templates are for thicker timber. If the cutters do get mixed up, look at the length of the cutting tips.

“H” cutting tips are 10 mm long
“A” & F5 cutting tips are 13 mm long
“B” & F15 cutting tips are 22 mm long

All these cutters are made specially for Gifkins Dovetail by Carb-I-Tool in Melbourne, and are available from either Gifkins Dovetail or Carb-I-Tool and their agents, or from our agents in the USA and England.
The cutter product codes used above are the same as those used in the Carb-I-Tool catalogue.

Reducing collet

IMPORTANT
When fitting the “A”, “H” or “F” cutters to a ½” router, you must use a reducing collet to take the ¼” shank. The collar on the shank of the cutter must not be inserted directly into the chuck of a ½” router.

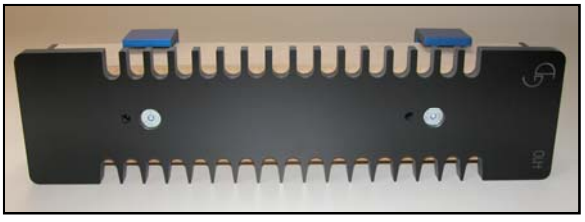
Specially designed reducing collet available from Gifkins Dovetail

Springs on “B” cutters

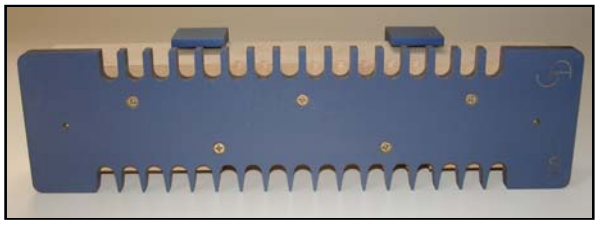
The cutters for the “B” dovetail templates are supplied with springs that fit on the shanks of the cutters, beneath the stop collar. These springs act as an insurance policy against the stop collar coming loose. Without the springs, if the collar did vibrate loose, the first you would know about it is when the router bit cut into the template, destroying the template. With the springs fitted this should not happen. The cutters for the A, H and F5 templates have a long stop collar which sits down against the collet on the router, so springs are not necessary. This long stop collar also acts as a stiffener to reduce vibration and hence give a cleaner and quieter cut.

Template models

There are two different versions of each template, for the New and Old Models of the Gifkins Dovetail Jig. Both templates cut exactly the same joint, only the mounting holes are different.



New Model Template



Old Model Template

1. The Old Model Jig (with timber or high density fibre body) takes a template with five countersunk mounting holes. This template suits all jigs sold before March 2006.
2. The New Model Jig (with aluminium body) takes a template with two countersunk mounting holes. This template suits all jigs sold after 1st March 2006.
3. If ordering a template upgrade, please state which model it is for.

Changing templates

New Model Jig
The template is held in plac***e*** with two countersunk socket head machine screws. To change templates, you need a 5 mm Allen key to undo these screws (this Allen key is provided with the jig). The template is located in position by two socket head grub screws that are factory set (these grub screws take a 4 mm Allen key, to avoid confusion). There should be no need to undo these 4 mm grub screws.

Old Model Jig
The template is held in place with five Phillips Head screws. The template is located in position with two brass pins, which are fixed to the body of the jig.

Template upgrades come with a spare set of MDF backing boards. When you change templates it is best to also change backing boards, as the cutters will cut into these backing boards in different places. When changing backing boards or adjusting the shim, you can either slide both stops to one end of the jig, or remove both stops. If removing the stops, make sure the plastic film goes back in place under the stop when re-assembling. If you want to change the shims without changing the position of the stops, you can remove one end cap from the body of the jig to access the shim.

Clamping

Whilst you can use any clamps to hold the work securely to the jig, some clamps will not reach over the blue sliding stop very well, and others can be awkward to use without three hands! To overcome this, we are now selling Bessey clamps and matching clamp holders as optional extras.

I have found that Bessey's Kliklamp works better than anything else I have tried on the jig. It has an offset head and tail so it can reach over the stop, which makes it ideal as in most situations there is a stop against either side of the work. It is a quick action clamp with a very positive locking action and it can be used one handed. I have designed an inexpensive clamp holder specially for these clamps that fits under the knob on the stop. This locates the clamp in the correct position and also holds it at the correct height, safely above the cutter. These clamp holders are designed to match the Bessey clamps, and would not work with other clamps. For boards wider than about 120 mm it is best to use two clamps, one from each side.

Safety Note: If cutting timber thicker than 19 mm on the Old Model Jig, the clamp holders position the clamps too low, and the cutter may hit the clamp. It is necessary to position the clamps higher in this situation.

Using two stops

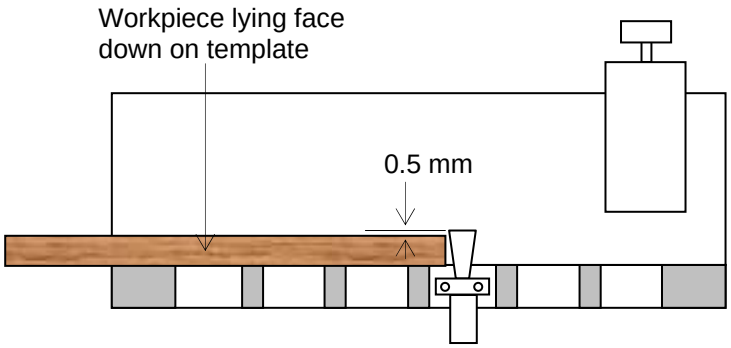
The Old Model Jig came with only one stop. I have recently found that I can get much better edge alignment of the joints by using two stops. By positioning a sliding stop up against each side of the workpiece, the workpiece is very securely located, thereby eliminating most errors with edge alignment. For this reason the jigs are now supplied with two stops as standard. For this idea to work well it is important to prepare all the stock accurately to the same width. This photo shows the clamp holders (available as optional extras) fitted under the knobs on the stops. Note: The demo DVD was recorded on the Old Model Jig with only one stop.

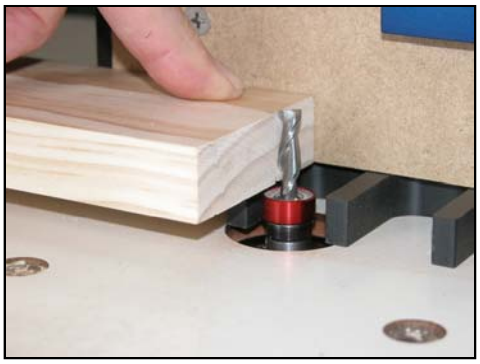
Setting the cutter height

The height setting of the cutters is determined only by the thickness of the stock and has no effect on the fit of the joint. This is true for both dovetail and finger joints. This means that the height of the cutter does not need to be set accurately, although it must be at least as high as the thickness of the timber plus the thickness of the template. I usually set the cutter about 0.5 mm higher than this and clean up the protruding ends after the box is glued up. When changing cutters for dovetail joints you don't need to set the second cutter to exactly the same height as the first cutter.

Important note on cutter height:

With all the joinery on the jig you use the thickness of the timber to set the height of the cutter above the template. However it is important to note that you don't use the piece you are cutting to set this height, but that you use the opposite half of the joint. This becomes very important if you are joining different thickness timbers. With this in mind, you can always clamp the workpiece to the jig first and then use the opposite half of the joint to set the height.



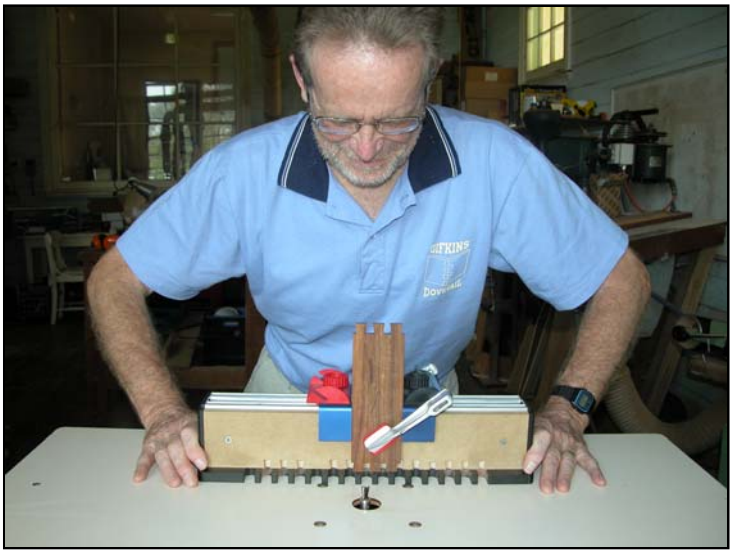


Using the jig

Note: Please read the section on cutting dovetail joints or cutting finger joints before attempting to use the jig for the first time.

The jig is moved by hand onto the cutter, with the jig flat on the table. This gives much greater control than using the router by hand like most other jigs.

To give the cleanest cut, I find it best to rest my hands on the table and to hold the jig at the ends as in the photo. This gives me more control in moving the jig onto the cutter. If you just hold on to the top of the jig, there is a slight tendency for the cutter to grab the work in some situations, which would result in tearout and a poor fitting joint. The recommended method of operation is to push the jig away from you rather than pulling it towards you. This way any dust and shavings are thrown away from the operator.



Jig in use.
Note my hands are braced on the table.

CUTTING DOVETAIL JOINTS

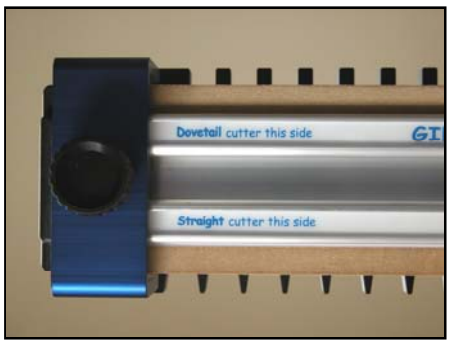
Introduction

There are six different dovetail templates available, to suit different thickness ranges of timber. All the templates cut through dovetails, and they are all interchangeable on the one jig.

The following description applies to any of the dovetail templates. For each different template, it is necessary to go through the trial joint procedure (as detailed below) the first time that template is used. Once adjusted, note the settings for future reference. After this initial setup there is no need for further trial joints with that template.

Each template can be purchased as a complete package (jig, template and cutters), or as a template upgrade (template, backing boards and cutters) if you already have a Gifkins Dovetail Jig.

To cut a through dovetail joint you need to use two different cutters; a dovetail cutter to cut the dovetail slots and a straight cutter to cut the matching pins. The dovetail slots are cut on the side of the jig which has the straight fingers on the template. The pins are cut on the other side, which has tapered fingers on the template. To avoid confusion, the two top edges of the jig are labelled “Dovetail cutter this side” and “Straight cutter this side”.



The recommended method of operation is to push the jig away from you rather than pulling it towards you (see photo on page 6). This way any dust and shavings are thrown away from the operator. To give the most control when operating the jig, I rest my hands on the table whilst holding the jig. This enables you to move the jig very slowly and carefully onto the cutter, and results in a much cleaner joint than you would get by simply hanging on to the top of the jig.

Cutting a trial dovetail joint

For the trial joints, prepare some timber so that all pieces are the same width, and mark an outside face on each piece. Anything longer than about 80 mm will do.

1. With the dovetail cutter in the router, set the height of the cutter to the thickness of the template plus the thickness of the workpiece. It doesn’t hurt if it’s a little higher than this so the joint sits a little proud – see page 6
2. Stand a board on its end above the straight fingers on the template (i.e. the side of the jig labelled “Dovetail cutter this side”) with the outside face mark away from the jig. Position it sideways to get the layout of the joint that you want (note: you will get a good fitting joint in any position).
3. Position a stop against one side of the workpiece and lock it in place by tightening the knob.
4. Position the second stop firmly up against the other side of the workpiece and lock it in place.
5. Clamp the workpiece securely to the jig. Check that the clamps are safely above the cutter before turning the router on. Use two clamps if the workpiece is wider than about 120 mm.
6. Turn the router on and run in and out of each finger, making sure you run in one side and out the other to cut away as much wood as possible. It is worth taking these cuts very slowly to get a clean cut without any tearout. Also, run over each cut a second time to make sure it is cleaned up properly – see page 9 for more detail. The first time the jig is used, the router bit will cut into the MDF backing boards behind the workpiece .
7. To cut the matching half for this joint, change over to the other side of the jig (labelled “Straight cutter this side”) and stand a second board on its end above the tapered fingers. This second board should fit neatly between the two stops. If not, reposition one stop. This will impact on the edge alignment of the joint but not the fit.
8. Fit the straight cutter to the router, and set the cutter height as in step 1 above.
9. Cut this second piece as in step 6 above – see page 9 for more detail. This completes the trial joint.

Initial setup of jig

Follow steps 1 to 9 under "Cutting a trial dovetail joint" above. If the joint you cut is too loose, remove some of the white shims from behind the backing board on the tapered finger side of the jig (the jig is supplied with five shims fitted). If the joint is too tight, add shims to get a looser fit (10 extra shims are provided). Now cut another set of pins (steps 7 to 9). Repeat this process until the required fit is obtained.

NOTES:

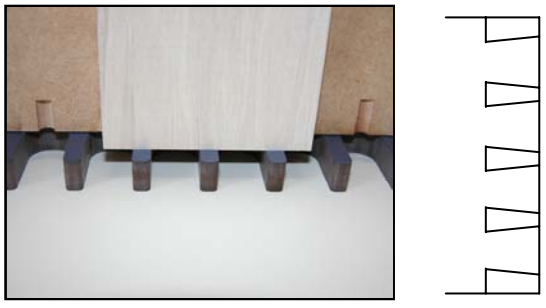
- Each shim is 0.25 mm thick. Adding one shim decreases the width of the pin by only 0.08 mm. This gives very fine adjustment, but it also means that adding or subtracting only one shim makes very little difference.
- You only need to do this adjustment the first time you use any one of the dovetail templates.
- Once adjusted, make a note of how many shims are required for that template, so that when you swap back and forth between templates you don't need to repeat the trial joints.
- If you find you need to add 10 or more shims to get a good fit, then check step 6 above. With the dovetail cutter, you must go in one side and out the other or the joint will be much too tight to fit together.
- You can only adjust the size of the pins. The size of the dovetail slots is fixed.
- Check that the clamps are safely above the cutter before turning the router on.
- Once the shims are set to give a good fit, you should always get the same fit no matter what thickness timber you are working with, even if the two pieces of timbers are different thicknesses.
- The jig is fully adjustable, so when you get your cutters re-sharpened you simply add shims to re-adjust the fit.
- If you have a number of dovetail templates, it is likely that the number of shims to give a good fit will be different for each one.
- The function of the blue sliding stops is to align the edges of the joints flush. Provided both halves of the joint are firmly up against a stop when cut, edge alignment is automatic.
- When positioning for a symmetrical layout, by eye is perfectly adequate. There is no need to measure anything, as the layout does not have any effect on the edge alignment of the joints.
- The jig cuts through dovetails, not half blind dovetails. For drawers, you can create the effect of a half blind joint by adding a false front. This looks best if you use two pieces of stock for the front that are each a bit more than half the thickness of the sides. Cut pins in the first piece, and glue the second piece in place after the drawer is glued up.

Symmetrical layout

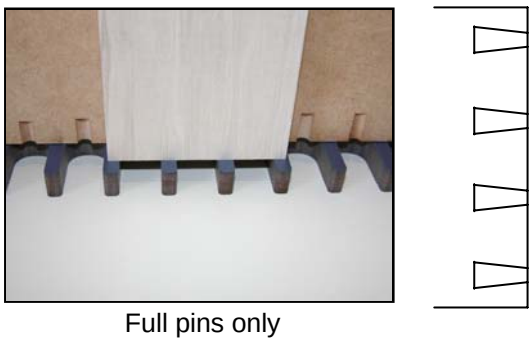
In most situations, the workpiece is positioned to give the joint a symmetrical layout. By choice I usually use the position that gives a half pin top and bottom, as this locks the edges together well. This is also the more traditional layout for dovetail joints. Symmetrical layout works best when the width of the stock is a whole multiple of the pin spacing for that template, or a few millimetres more. Multiples of the pin spacing for the different templates are shown in this table.

H10	H20	A10	A20	B10	B20
18	26	20.5	28	38	48
36	52	41	56	76	96
54	78	61.5	84	114	144
72	104	82	112	152	192
90	130	102.5	140	190	240
etc.					

These widths do not have to be exact. If the joint has a half pin top and bottom, the width can be a bit more than that given above, but not much less or the half pins would be too narrow. If the joint has full pins only, the width can be a bit more or a bit less than that given above. The photos below show the layout for these two options when using the dovetail cutter.

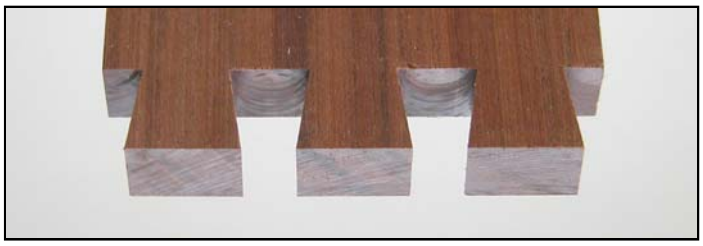


Half pin top and bottom



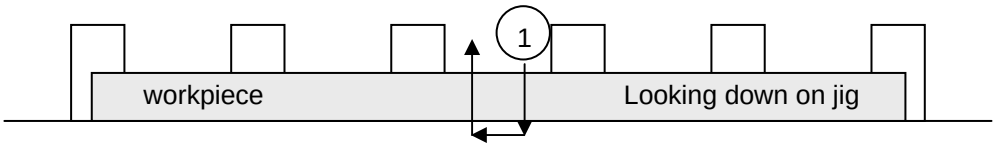
Full pins only

Cutting the dovetails

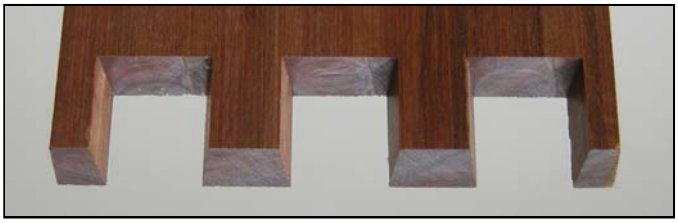


Dovetails are cut on the straight fingers with a dovetail cutter.

For cutting the dovetail slots, plunge slowly through the workpiece with the bearing running on the right hand side of the gap between the straight fingers (cut 1 shown below), using the dovetail cutter. Run across the back of the slot and come out with the bearing now running on the left hand side of the gap. For all cuts, enter and exit the wood as slowly as possible to prevent tearout. As a rough guide, take about five seconds for the cutter to go through the workpiece. It is worth going over each cut a second time to make sure all the waste has been removed. The bearing on the cutter is slightly narrower than the slot between the fingers so it is vital that you run along both sides of each slot.

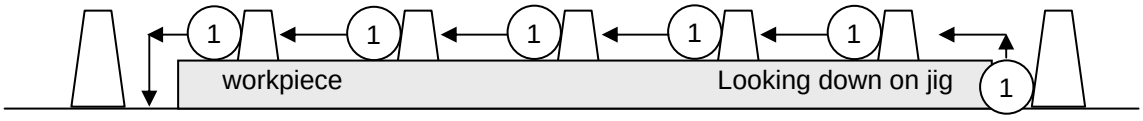


Cutting the pins

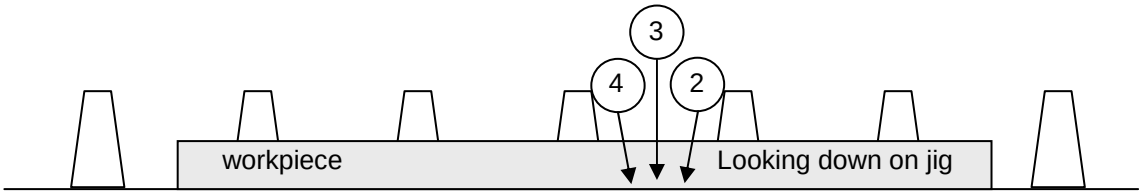


Pins are cut on the tapered fingers with a straight cutter.

To get a clean top to the cut when cutting the pins, start by running the straight cutter across the face of the board from right to left when looking over the top of the jig, only just cutting the surface (cut 1, shown below). This cut should be no more than 2 mm deep:

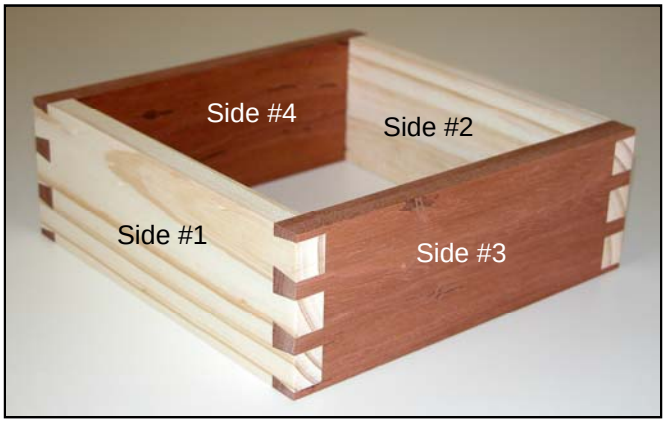


You can now cut the pins. Cut through the right hand side (cut 2, shown below), then come back out and work across to the left hand side (cuts 3 & 4). As with the dovetail slots, it is worth going over cuts 2 and 4 a second time to make sure all the waste has been removed. Note that you are only cutting as you go into the workpiece, not as you come out. This gives the cleanest cut with the least risk of tearout.



Cutting four joints for a box with equal height sides

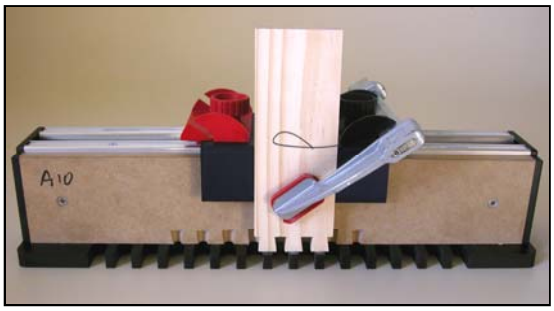
All four pieces of stock are the same width, and the joint is symmetrical across the board.



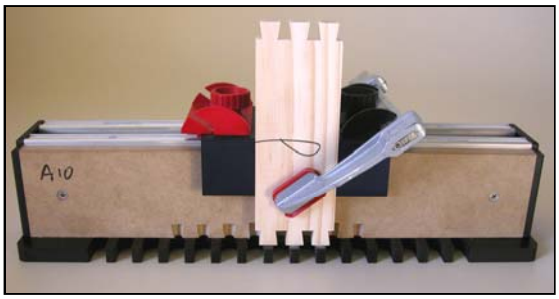
This is the most common situation. Clearly mark the outside face of each piece. All four pieces of stock must be exactly the same width for this method to work well. Once the two stops are set, all the cutting is done with them in this position.

1. Stand side #1 above the straight fingers with the outside face away from the jig and position it to get a symmetrical layout. Position a stop firmly up against each edge of the workpiece and clamp the work in place. With the dovetail cutter in the router, cut dovetail slots in the first end of side #1.
2. Rotate the board end for end (making sure the outside face is still away from the jig) and repeat step 1.
3. Repeat steps 1 and 2 for side #2.
4. To cut the pins, swap over to the other side of the jig, fit side #3 between the two stops and clamp in place. With the straight cutter in the router, cut the first set of pins on this piece.
5. Rotate the board end for end (making sure the outside face is still away from the jig) and repeat step 4.
6. Repeat steps 4 and 5 for side #4.

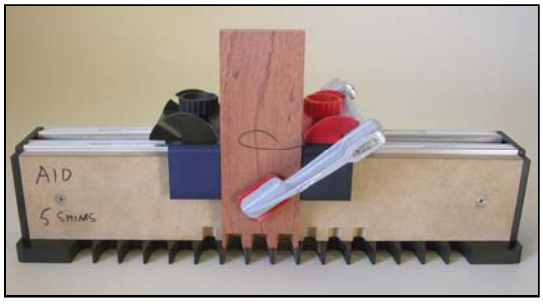
NOTES: When positioning the work to get a symmetrical layout, there is no need to measure anything or to set it accurately. Positioning the work by eye is perfectly adequate. You will get good edge alignment for all the joints in whatever position you set the stops.



Step 1



Step 2

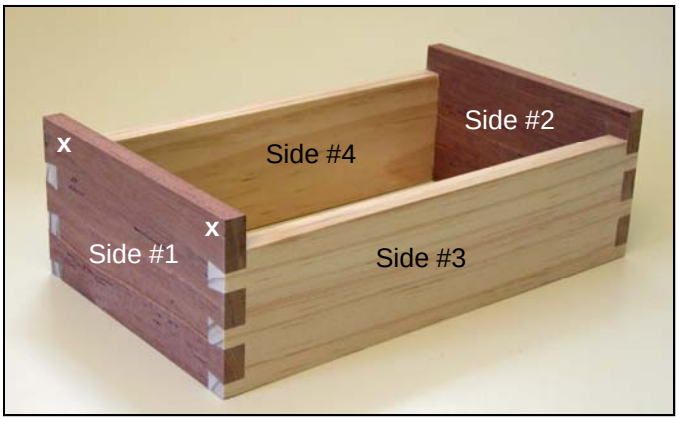


Step 4

Step 5

Cutting four joints for a box with unequal height sides

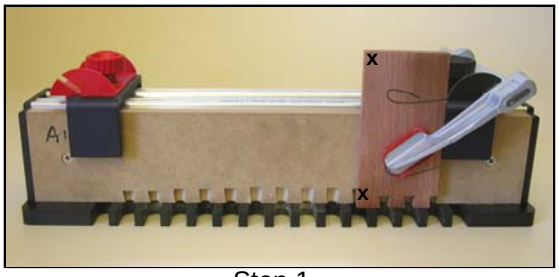
Stock not all the same width,
or joint not symmetrical.



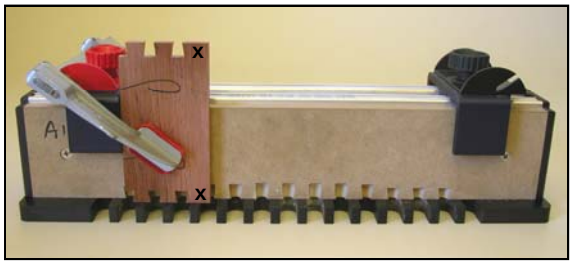
Clearly mark the outside face and the bottom edge of all pieces. Start with a stop roughly positioned towards either end of the jig. For this box we only use a stop against one side of the work piece.

1. Stand side #1 above the straight fingers with the outside face away from the jig and the bottom edge towards the stop. Position it to get the layout you want. Position the stop firmly up against the bottom edge of the workpiece and clamp the work in place. With the dovetail cutter in the router, cut dovetail slots in the first end of side #1. In the situation above, I have marked an **x** in the top corners to remind me not to cut the dovetail slot in this position.
2. Rotate the board end for end, making sure the outside face is still away from the jig, and position it near the other stop. Locate sideways to get the layout you want and then lock the second stop up against the bottom edge. See the notes below for more details on positioning. Cut the dovetail slots in the second end of side #1.
3. Repeat steps 1 and 2 for side #2.
4. To cut the pins, swap over to the other side of the jig without moving the stops. Stand side #3 against a stop so that the outside face is away from the jig and the bottom edge is against a stop. This will only work one way around! With the straight cutter in the router, cut the pins in the first end of side #3.
5. Rotate the board end for end and position it against the other stop, again with the outside face away from the jig and the bottom edge against the stop. Cut the second set of pins in side #3.
6. Repeat steps 4 and 5 for side #4.

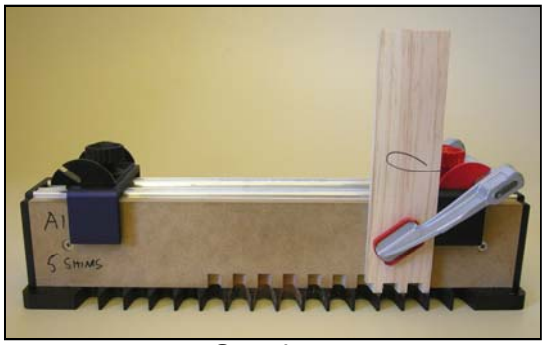
NOTES: In this procedure, the bottom edge of the project is always the edge against the stop. This way all the bottom edges will be flush, no matter where you set the second stop. However, if you wish to set the second stop accurately, use the joint cut in step 1. Turn it inside out and position it by eye over the fingers on the template so the dovetail slots line up with the gaps in the template. Use this position to set the second stop, making sure the stop is against the bottom edge. Note: In the photos below, the wide angle lens makes it look like the timber is not vertical.



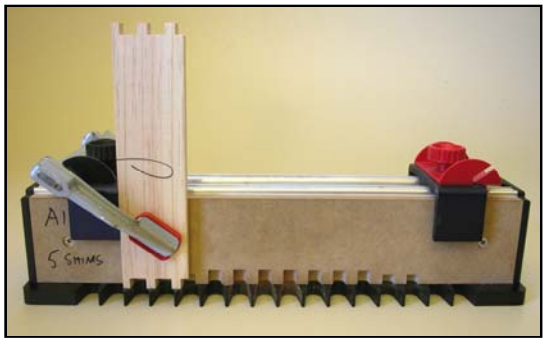
Step 1



Step 2

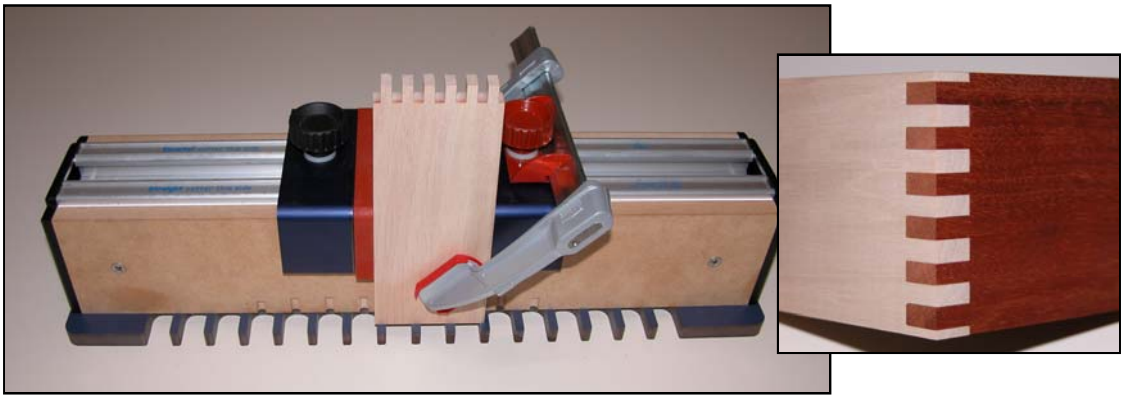


Step 4



Step 5

CUTTING FINGER JOINTS



Introduction

The F5 template is best suited to timber from 5 mm to 13 mm thick, and the F15 from 13 mm up to 22 mm. It is possible to go thinner with either template however the maximum thickness is limited by the length of the cutters.

The fingers on the templates are offset from one side to the other to give edge alignment of the joint. For this to work the two halves of each joint are cut on opposite sides of the jig.

Cutting joints with the F15 template is much the same as with any of the dovetail templates, however with the F5 template, it is not possible to cut all the slots in one go as the ½" bearing on the shank of the cutter is larger than the 5 mm distance between the slots. In this case the timber is moved sideways and the slots are cut in two positions.

The cutters come with a set of five colour coded sleeves (one on the cutter and four in a plastic bag), which allow the fit of the joint to be adjusted. The sleeves, which are fitted to the bearing on the cutter, can be changed to adjust the finger width in increments of 0.1 mm. The shims used to adjust the fit of the joint when using a dovetail template do not influence the fit of the finger joint, so these can be left in place when using the finger joint template.

Timber widths

In these instructions only symmetrical layouts are considered. A symmetrical layout is where the outside fingers of the joint are equal in size. A symmetrical joint can be cut in any width of timber, however if the outside fingers are too narrow there is a danger they will be damaged during assembly. The table below provides a summary of recommendations for various board widths. If a project requires a non-symmetrical layout, any width of timber can be used. Experimentation with the layout may be required to get the desired result.

Widths for the F5 template		
Best	Good	Avoid
23 - 24	20 - 24	25 - 29
33 - 34	30 - 34	35 - 39
43 - 44	40 - 44	45 - 49
53 - 54	50 - 54	55 - 59
etc.		

Widths for the F15 template		
Best	Good	Avoid
60 - 74	55 - 74	75 - 84
90 - 104	85 - 104	105 - 114
120 - 134	115 - 134	135 - 144
150 - 164	145 - 164	165 - 174
180 - 194	175 - 194	195 - 204
210 - 224	205 - 224	225 - 234
240 - 254	235 - 254	255 - 264
270 - 284	265 - 284	285 - 294
300 - 314	295 - 314	

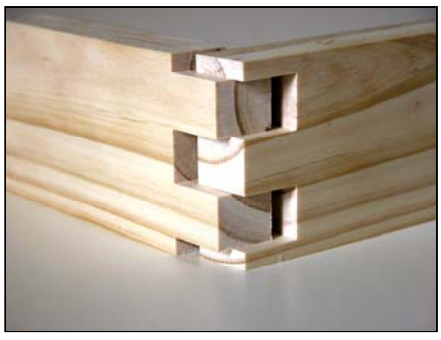
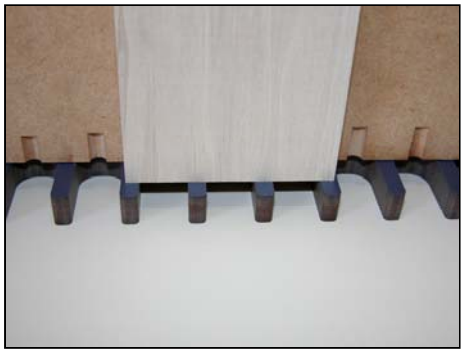


Photo: 55 mm board with 5 mm fingers top and bottom cut on the F15 template

With any width board there will be two positions that give a symmetrical layout and it doesn't matter which one you start with, as they both give exactly the same results. However it is easier to judge a symmetrical layout when the edges of the board sit over the fingers rather than over the gaps.

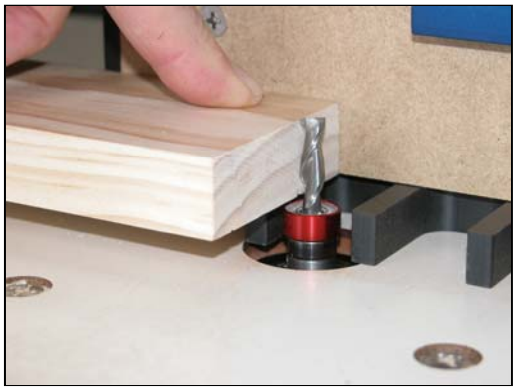


Board symmetrical across four fingers

Same board symmetrical across three fingers

Setting the cutter height

With the cutter in the router, set the height of the cutter to the thickness of the template plus the thickness of the workpiece. It doesn't hurt if it's a little higher than this, so the joint sits a little proud. Once set, keep this height until both halves of your joint are finished.



Cutting a trial F5 joint

Each half of the F5 joint is cut in two positions. The first position cuts every second slot across the board, with a second position required to cut the in-between slots. For the second position a spacer is used to move the workpiece 10 mm sideways. The two position process is repeated for each end of each workpiece. To ensure consistently accurate results, the workpiece and the spacer are held securely between two stops on the jig.

Mark the outside face and the bottom edge of each workpiece to avoid confusion later.

1. Whatever width board you are using, start by positioning it symmetrically across the fingers on the template, with the outside face of the finished joint facing away from the jig. It doesn't matter which side of the jig you start on.
2. Position a stop against one side of the workpiece and lock it in place.
3. Now place the red 10 mm spacer against the other side of the workpiece and position the second stop tight up against this red spacer and lock it in place.
4. Clamp the workpiece securely to the jig, using two clamps if the workpiece is wider than about 120 mm.
5. With the F5 spiral cutter in the router, set the height of the cutter to the thickness of the template plus the thickness of the workpiece.
6. Turn the router on and run in and out of each finger, making sure you run in one side and out the other to cut away as much wood as possible. It is worth taking these cuts very slowly to get a clean cut without any tearout. Run over each cut a second time to make sure it is cleaned up properly.
7. Unclamp and move the red spacer over to the other side of the workpiece. In effect what we are doing here is moving the workpiece accurately 10 mm sideways.
8. As before, run in and out to cut slots midway between the first set of slots you have cut. This half of the joint is now finished.
9. To cut the matching half for this joint, change over to the other side of the jig and repeat the steps above. Cut this second piece in two positions as before by swapping the red spacer from side to side. It doesn't matter which position the red spacer is in to start with. This completes the trial joint.

Cutting a trial F15 joint

Each half of the F15 joint is cut in one position, much like the dovetail joints. Mark the outside face and the bottom edge of each workpiece.

1. With the F15 spiral cutter in the router, set the height of the cutter to the thickness of the template plus the thickness of the workpiece.
2. Position the board symmetrically across the fingers on the template, with the outside face of the finished joint facing away from the jig. It doesn't matter which side of the jig you start on.
3. Position the two stops up against either side of the work piece and lock them in place.
4. Clamp the workpiece securely to the jig using two clamps if the workpiece is wider than about 120 mm.
5. Turn the router on and run in and out of each finger. As the cutter diameter is 6.35 mm, at least three passes are required to remove the 15 mm of material for each slot. To get the cleanest cut, use the following order:
    - Start with a very light cut across the face of the board, from right to left (when looking over the top of the jig), only cutting about 1 mm depth. This gives a very clean top to the cut.
    - Make the second cut by running the bearing of the cutter against the right hand finger of the template (right hand when looking over the top of the jig).
    - Make a third cut removing the center section of the slot.
    - Make the final cut to remove the remaining material on the left.

Second cut

Third cut

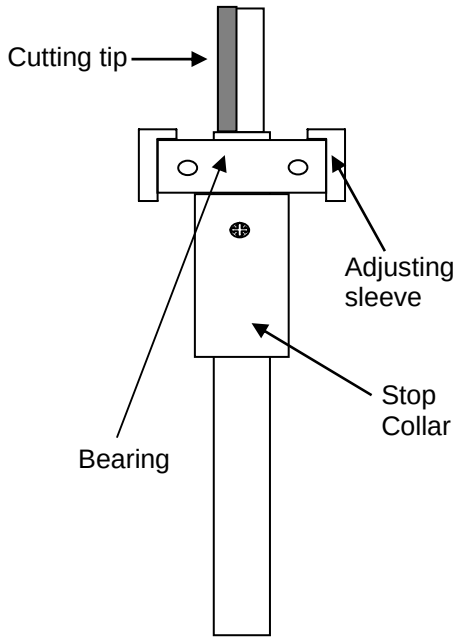
Final cut

6. Repeat these cuts for each finger slot across the board.
7. To cut the matching half for this joint, change over to the other side of the jig and repeat the steps above. This completes the trial joint.

Adjusting the cutter

The first time either template is used it is necessary to cut a trial joint to adjust the fit. Follow the steps under "Cutting a trial joint" above. If the trial joint is too tight, change to a smaller diameter adjusting sleeve. If it is too loose use a larger sleeve. The cutter comes fitted with the middle sized sleeve (red), which should go close to a good fit. The sleeve sizes are:

COLOUR	DIAMETER
Blue	14.60
Green	14.55
Red	14.50
Purple	14.45
Gold	14.40



Changing Sleeves

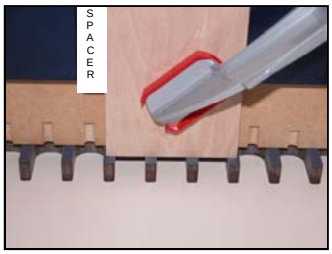
To change sleeves with the cutter in the router, rest both hands on the table and use a finger from both sides to push the sleeve up. Don't just pull the sleeve from above the cutter or you might cut your fingers as they go past the cutter. The sleeves have a very slight lip below the bearing to hold them in place.

Once you have adjusted the cutter to get a good fit, you should get the same fit every time, no matter what thickness timber you are using.

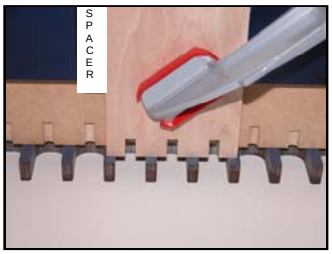
Sequence of cutting four joints with the F5 template

1. Position the timber evenly spaced across the fingers with the outside face away from the jig. Lock a stop against one side. Place the red spacer and then the other stop firmly up against the opposite side and lock the second stop in place.
2. With the height of the cutter set to the thickness of the timber plus the thickness of the template, cut slots between each finger on the template.
3. Move the timber 10 mm sideways by swapping the red spacer from one side to the other.
4. Cut slots between each finger as before.
5. Follow steps 1 to 4 for the other end of this board, and exactly the same procedure for both ends of the opposite side of the box. We now have the first half of each of the four joints finished.
6. For the matching halves of these four joints, we work on the other side of the jig. Note that the timber does not sit symmetrically across the template fingers. It doesn't matter whether the red spacer is on the left hand or right hand side to begin with.
7. Using the same cutter at the same height setting as before, cut slots between each finger on the template.
8. Move the timber 10 mm sideways by swapping the red spacer from one side to the other.
9. Cut slots between each finger as before. This completes the second half of one joint.
10. Follow steps 6 to 9 for the other end of this board, and exactly the same procedure for both ends of the opposite side of the box.

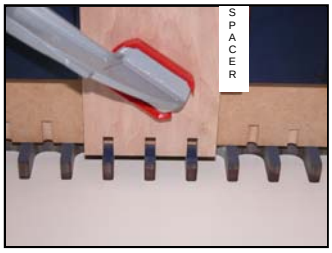
This completes the four joints for the box. Note the 10 mm spacer moves from side to side in the photos below:



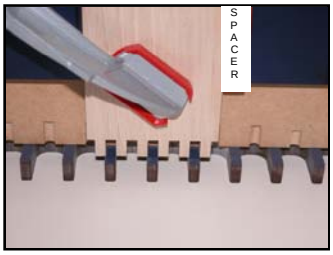
Step 1



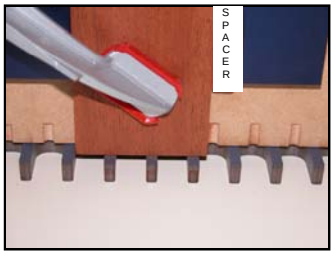
Step 2



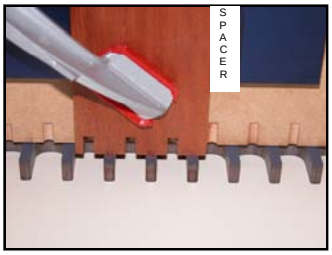
Step 3



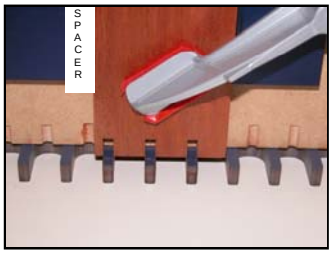
Step 4



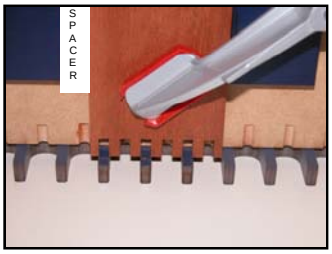
Step 6



Step 7



Step 8



Step 9

Sequence of cutting four joints with the F15 template

1. Position the timber evenly spaced across the fingers with the outside face away from the jig. Lock the two stops firmly up against either edge of the workpiece.
2. With the height of the cutter set to the thickness of the timber plus the thickness of the template, cut slots between each finger on the template.
3. Follow steps 1 and 2 for the other end of this board, and exactly the same procedure for both ends of the opposite side of the box. We now have the first half of each of the four joints finished.
4. The matching halves of these four joints are cut on the other side of the jig. If the timber is well prepared it should not be necessary to move either stop.
5. With the cutter still set to the same height as before, cut slots between each finger on the template. This completes the second half of one joint.
6. Repeat step 5 with the other end of this board, and exactly the same procedure for both ends of the opposite side of the box.

This completes the four finger joints for the box.

Step 2

Step 5

Removing the waste on the F15 template

As noted above, the F15 slots are cut in three passes, and it is easy to miss a bit and leave a thin sliver of wood, especially towards the back of the cut. Before unclamping the work, check that you have cleaned up all the waste in the middle of each slot.

Waste not fully removed in right hand cut

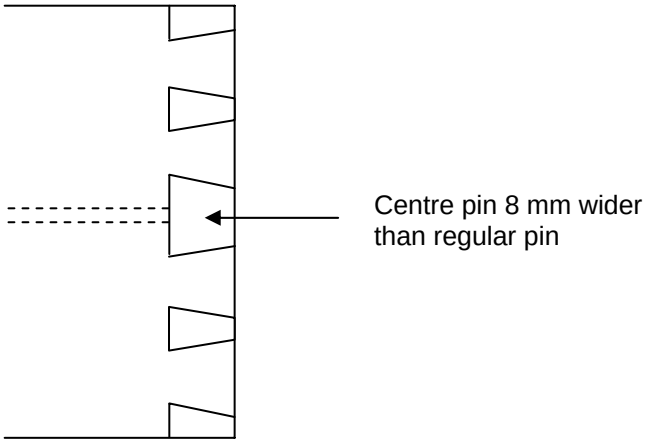
ADVANCED TECHNIQUES

Variable spaced dovetails

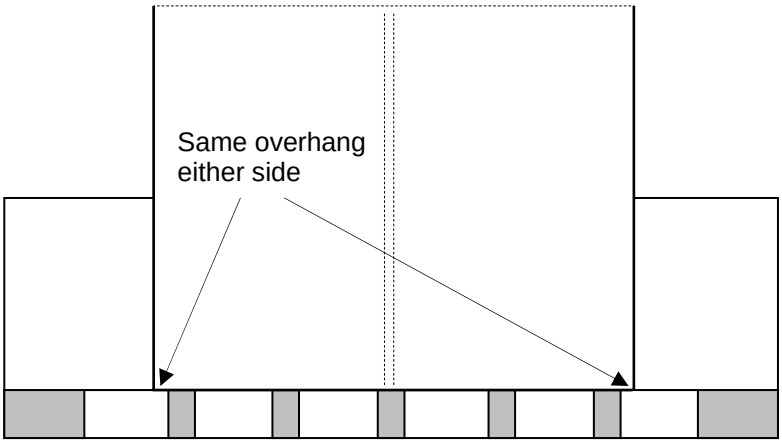
The Variable Space Upgrade (VSU) is a set of eight U-shaped spacers, four green spacers at 2 mm thick and four yellow spacers at 3 mm, available as an optional extra.

Contrary to popular belief, it is possible to cut variable spaced dovetails using a fixed space template. This technique was suggested by David Charlsworth (Devon, England). With this method, you can adjust the template to fit the wood – rather than the other way around! It also produces a joint that looks more like a hand cut dovetail. Consider this situation: we wish to dovetail a box with 90 mm sides and still have a half pin top and bottom, using the A10 template. From the table on page 8 (symmetrical layout) we see that 82 mm works well with this template. If we increase the width of the centre pin by 8 mm, then the 90 mm stock would work well on the A10 template. To do this we use four 2 mm spacers when cutting some of the joint. The spacers could be a few millimetres less than 8 mm, but should not be any more or the half pins would be too narrow. The finished joint would look like this:

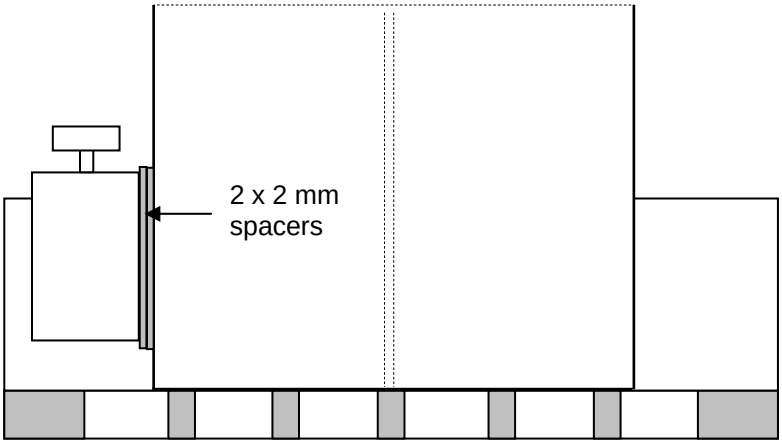
It is very important that you mark lines on the outside face of all four sides to show where you are going to add the extra width.



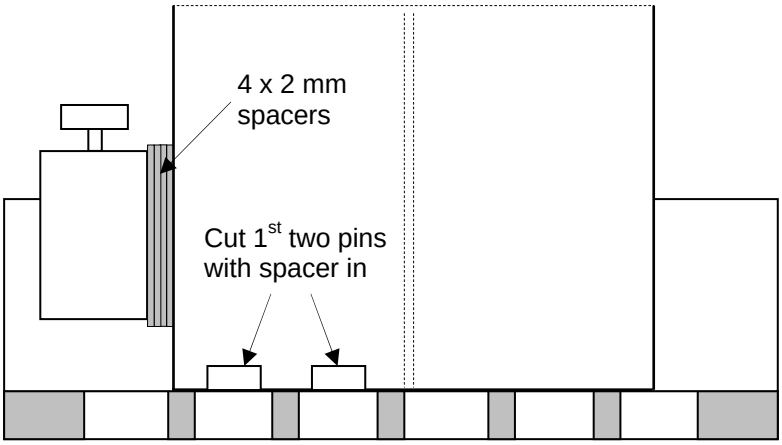
This technique is so useful that I will describe the process in full detail for the situation above (90 mm stock and 8 mm of spacers on the A10 template). The situation I am describing assumes that all four pieces of stock are the same width, so that we can turn the stock end for end without moving the stop. Stand the stock on the jig above the tapered fingers and locate sideways so that the stock is symmetrical across the fingers.



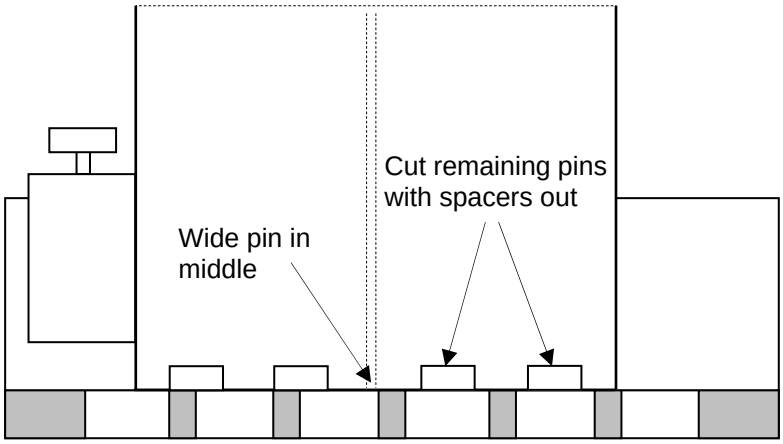
Using spacers of half our chosen thickness (in this case two at 2 mm), place these between the stock and the stop when locking the stop in place. To keep the description simple I will only use one stop, however it is possible to use a stop either side (as with the F5 template)and this may give better alignment of the joint.



The stop is now accurately positioned and should not be moved until all four joints are finished. It is now necessary to move the workpiece sideways and insert four 2 mm spacers between the stop and the workpiece, instead of the two 2 mm spacers. IMPORTANT – move the workpiece, not the stop.
You can now clamp the work in place and cut the first two pins as shown below:

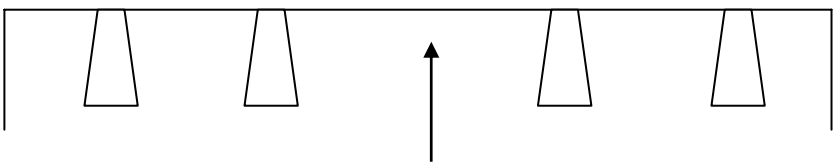


We now remove the spacers before cutting the rest of the pins. This will leave a wide pin in the middle:



We now change cutters and work on the other side of the jig to cut the dovetail slots. Once again, put the four 2 mm spacers in to cut the slots from the stop side to the middle of the board. Remove the spacers to cut the remaining slots. In this case, the centre dovetail slot will be wider to accommodate the wide pin. This means that you have to machine the centre slot twice, once with the spacer in and once with the spacer out. All the boards can now be turned end for end to repeat these cutting operations for the remaining joints, following exactly the same procedure.

In the above example there were five pins, so we could make the centre pin wider and still have a symmetrical joint. If you have an even number of pins, you can make the space between the middle two pins wider to achieve a symmetrical joint:

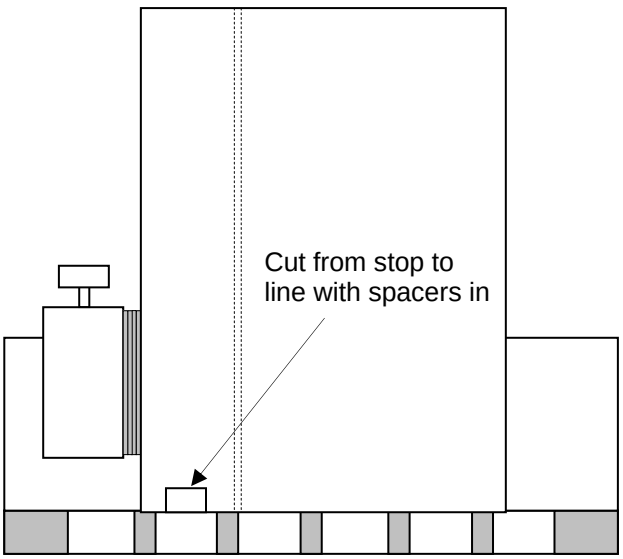


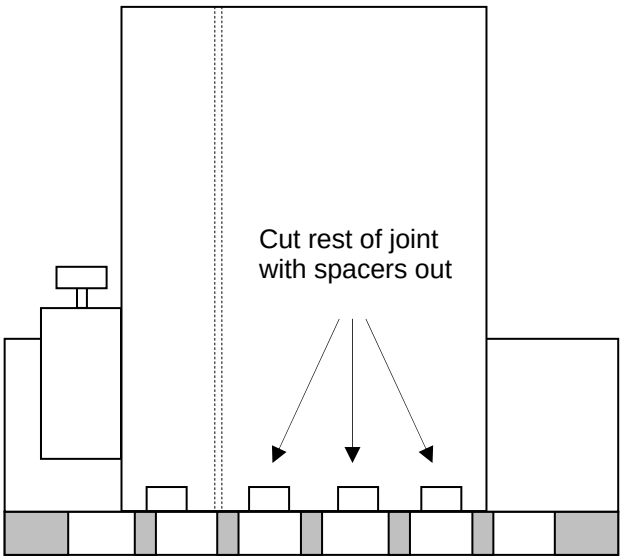
The procedure is the same, although this time we machine all the dovetail slots once and we machine the space between the centre two pins twice. Practise on some offcuts first so you fully understand this technique before starting your project.

Splitting a box to form the lid

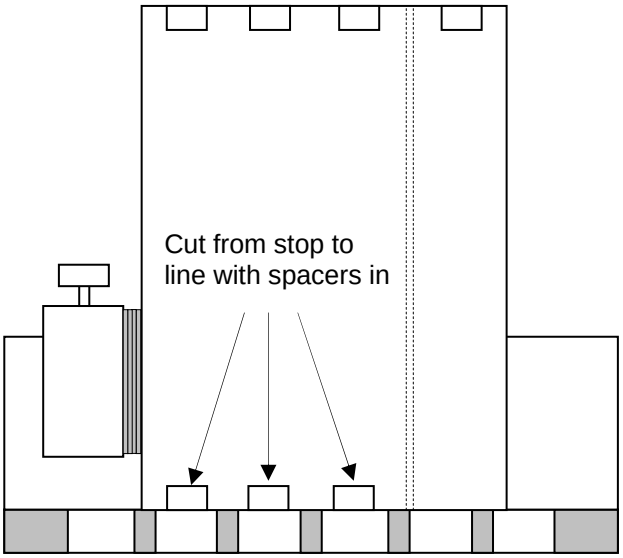
The section above gives details on using the VSU (Variable Space Upgrade) to make a pin wider in the centre of the board. I often use this for decorative effect, and also for use with my wooden hinges where I split the box in half to form the lid. However for most situations where you are cutting the top off the box to form the lid, the cut will not be in the middle, but about one-quarter or one-third of the way down from the top of the box. This situation is slightly different, so I will run through the procedure again:

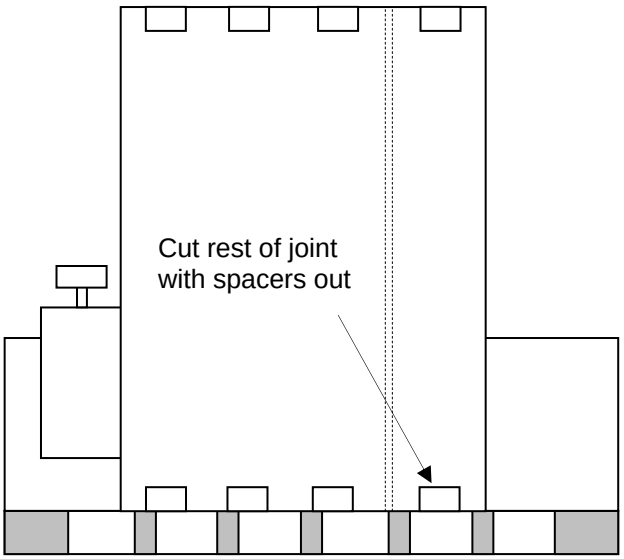
First end of board





Second end of same board





Points to remember:

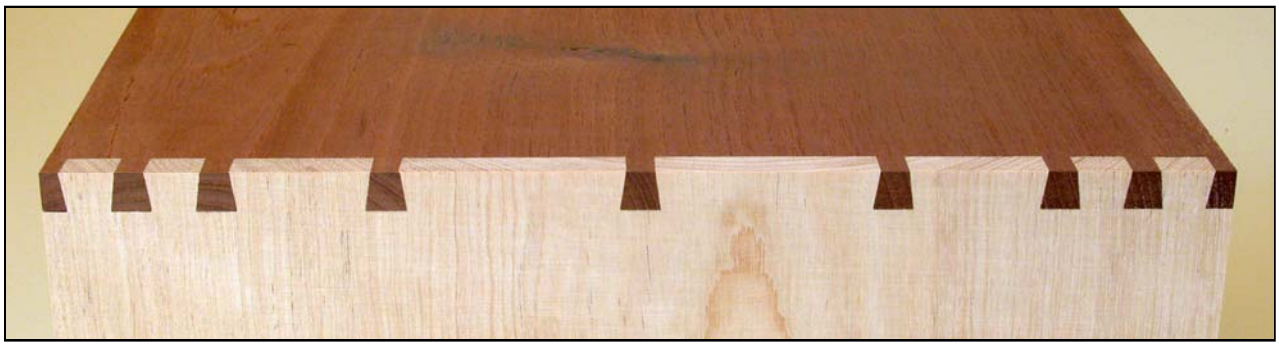
For this to work, you must start by positioning the board symmetrically across the fingers.
As described above, to position the stop you use a spacer only half as thick as your saw kerf (i.e. the thickness of your saw cut). You then use a spacer that is same thickness as your saw kerf for all the dovetailing.

- It is vital that you mark a line on all the boards where you are going to add the extra width to allow for the saw kerf.
- In all situations you cut from the stop to these lines with the spacer in, and you cut the rest of the joint with the spacer out (i.e. from the line to the edge away from the stop).
- If you are making the pin wider (as above), then you cut the dovetail slot where the line is twice, once with the spacer in and once with the spacer out (this is when using the dovetail cutter).
- If you are making the gap between the pins wider, then you cut the gap between the pins twice, once with the spacer in and once with the spacer out (this is when using the straight cutter).
- With all the situations using the VSU, it is possible to avoid small errors creeping in by using the second stop against the other side of the workpiece, as with the F5 finger joint template. If doing this, you would swap the spacers from side to side so the timber is always firmly positioned between the stops.
- There are lots of different situations depending on the size of the project, the template you are using, and how far down you want to cut the lid off, so it is important to practise on offcuts to see how your design will work.

Leaving pins out

It is also possible to vary the layout of dovetail joints by leaving one or more pins out. This is a simpler procedure than using the VSU. Let's consider a joint with every second pin left out to give a wider spacing. With the dovetail cutter, simply cut every second dovetail slot rather than cutting them all. When we swap sides of the jig to cut the pins, you need to cut all the pins in the normal manner and then remove the pins you don't want. This can be done quite accurately on the jig. With all the pins cut, move the timber sideways on the jig by about half a pin width, so the timber is still standing above the tapered fingers. With the same cutter setting as used to cut the pins, machine away one side of the pins you don't want. You then move the timber back the other way, so that the remainder of the extra pins are no longer standing above a finger on the template and machine away the rest of the pin. Note: If you move the timber sideways by more than a pin width, you lose the height registration of the workpiece and the work will fall down between the fingers on the template. This is why machining the pins away is done in two steps.

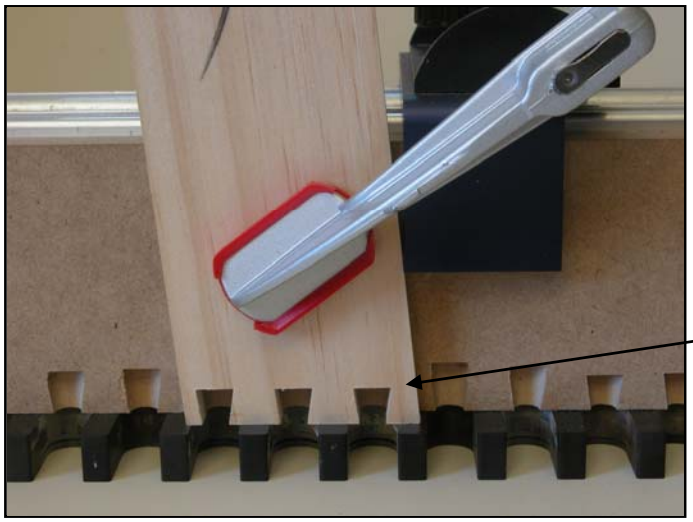
With this method you can play with the layout to create the effect of hand cut dovetails, by having pins close together on the outside of the joint and spaced more widely towards the middle:



Angled dovetails

It is possible to cut angled joints so that all the sides of the box slope in or out by up to about 15°. To do this, prepare the stock with the ends cut at the appropriate angle. For this procedure you would only use a stop against one side of the workpiece. Start with a stop positioned towards each end of the jig.

The procedure is much the same as that given in “Cutting four sides for a box with unequal height sides” on page 11. To cut the first set of dovetails, stand the workpiece on the jig with its end flush against the template (this means the workpiece will be sloping rather than standing vertically). Locate sideways to get the required layout of the joint and lock a stop up against the edge as shown. In this situation it is only the bottom corner of the stop that will touch the work, but this still gives good edge alignment of the joint. Remember that the cuts are at an angle to the long edges of the board and so it will need to be positioned carefully. If you position the board symmetrically, the right hand dovetail slot in the photo below would go very close to the edge of the board.



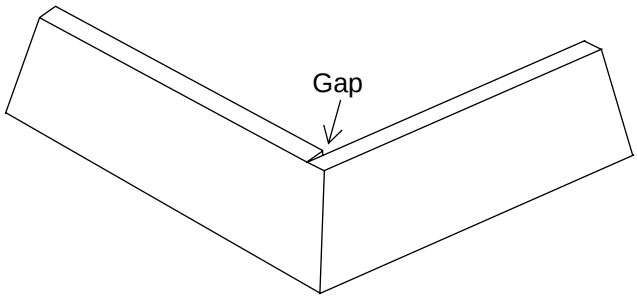
As we are only using one stop, you need to take extra care that the timber is firmly up against the stop. Cut the dovetail slots in one end only of this board. Now turn the board end for end, keeping the outside face away from the jig, and position it near the other stop. Locate sideways to again get the layout you want, and then lock the second stop up against the edge. See note 2 below for more details on positioning.

Cut the dovetail slots in the second end of this piece, and repeat exactly the same procedures for the opposite side of the box.

It is now necessary to change over to the straight cutter to cut the matching pins. With the sliding stops still locked in the same positions as before, come around to the other side of the jig. Position a board for the pins up against a stop, again with the bottom corner of the stop touching the workpiece and clamp it in place. Cut the first set of pins. Now turn the board end for end and clamp it against the other stop to cut the second set of pins. Repeat exactly the same procedure for the fourth side of the box.

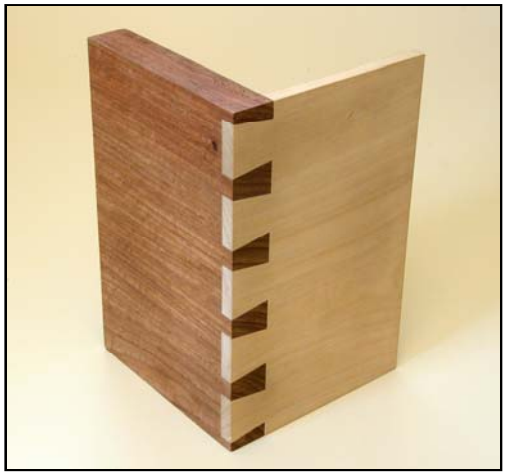
Notes:

1. If the sides slope more than about 15°, the inside of the joint will not pull up tight when you assemble the box. With 15° or less, this error is minor, but as the angle increases the inside gap will get wider:- see drawing below.
2. Repositioning the stop for the second end of each board can be done by eye as the position doesn’t impact on the edge alignment of the joints. However if you do wish to position it accurately, use the board you have already cut and turn its outside face towards the jig. Locate the cuts evenly over the fingers on the template and use this position to set the second stop.
3. If only two sides of the box are sloping and the other two are upright, the dovetail slots must be cut in the upright sides (which have sloping ends), and the pins are cut in the sloping sides (which have square ends).



Joining different thickness timbers

With dovetail and finger joints, you can join any thickness to any other thickness, provided both pieces of stock are less than the maximum thickness for your chosen template. All that is required is to re-set the height of the cutter when changing over from one side of the jig to the other. Set the cutter height with the thin piece of timber when cutting the thick piece, and set it with the thick piece when cutting the thin piece. To state this another way, you don't set the height using the piece you are about to cut, you use the piece it will join on to. If this is not obvious, look at a finished joint to see what is going on. Setting the cutter heights this way will not change the fit of the joint. All the joinery must be done on the one template, so it is not possible to join a thick piece cut on a "B" template, to a thin piece cut on an "A" template. For example, if you wish to join 20 mm timber to 8 mm timber, it must all be done on a "B" or F15 template, using the "Working with thin timber" procedure below when cutting the 8 mm stock.



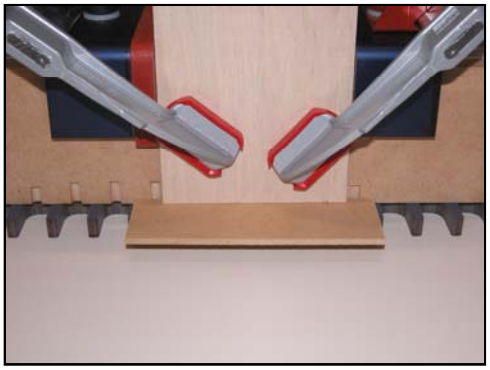
Dovetail joint in 22 mm and 8 mm timber, cut on the B10 template

Working with thin timber

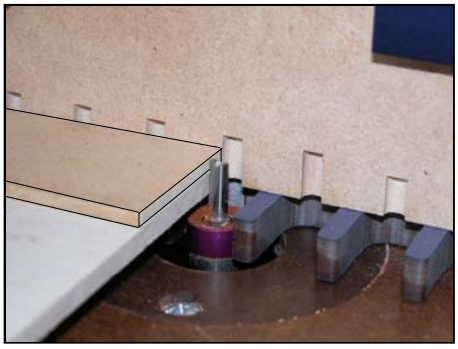
The table on page 3 gives the minimum thickness for each template. This minimum thickness is to ensure that the bearing on the shank of the cutter is safely above the table. You can go thinner with any template by following one of the following procedures.

The easiest way is to insert a spacer under the workpiece before clamping the workpiece in place. Set the height of the cutter to the thickness of the template plus the thickness of the stock plus the thickness of the spacer (or just a bit more). The aim is to make sure we have at least 2 mm of bearing above the table for the template to run against.

For example with 3 mm stock on an F5 template, you could use a 3 mm spacer and set the cutter height to about 6 mm above the template. When using this method it is necessary to use two clamps to hold the workpiece. The spacer is removed before you start the cutting.



3 mm workpiece with 3 mm spacer under workpiece on the F5 template



Set height of cutter to thickness of workpiece plus spacer plus template

An alternative method is to set the cutter height to the minimum given in the table, no matter how thin the workpiece. If you wanted to dovetail 10 mm timber on a "B" template, you would set the cutter heights to 13 mm. This produces a joint with 3 mm overhang on both sides, which is cut or sanded off after the joint is glued up. Don't forget to allow for this extra length when cutting your stock to size.

MAINTAINANCE

Sharpening cutters

It is possible to sharpen all the cutters for the dovetail templates and to re-adjust the shims to allow for the slight reduction in diameter. It doesn't matter if you only sharpen one of the cutters rather than the pair, it is still possible to get a good fit. After sharpening you may need to add shims. With the dovetail cutters it is important to maintain the correct angle when sharpening. With the finger joint cutters, it is extremely difficult to re-sharpen the solid carbide spiral cutters successfully and it is recommended that the spiral cutters be replaced when blunt rather than sharpened.

Caring for cutters, collets and bearings

If the cutters are blunt, not only will the quality of the cut be poor, but there is also a risk that excess chatter will cause the cutters to slowly vibrate out of the router. This will destroy the joint being cut and may lead to cutter breakage.

Figures from Carb-I-Tool suggest that 80% of all cutter breakage is directly related to worn router collets or worn reducing collets. If the shank of the cutter shows wear marks just below the top of the collet, then the collet needs replacing. This is much cheaper than replacing the cutters. If the router is in good condition there should be no wear marks on the shank of the router bit. Reducing collets are made from mild steel and they do wear out.

The bearings on the cutters should be oiled regularly so that they always turn freely. If they seize they will damage the template. Every time you fit a cutter to the router, get in the habit of spinning the bearing to make sure it runs free and oil them often. I use light household oil and apply a single drop after every half a dozen joints or so. After oiling, run the router for a few seconds to throw off any excess oil.

Solid carbide cutters are fragile, so care should be taken. Don't rush the cut, and avoid any sudden shocks to the cutter. In some situations there is a slight tendency for the cutter to run with the cut, so a firm grip on the jig is important with hands braced on the table.

Template care

It is important to keep the template free from any build-up of shavings or dust as this would make the joint too tight. Clean all the fingers on the template regularly with a cloth or a nylon brush (an old tooth brush works well). This is more of a problem with timbers high in resin, like pine.

Backing boards

The MDF backing boards support the back of the cut to prevent tearout as the cutter exits the work. The first time the jig is used you cut into these backing boards, however they still support the cut with subsequent use. If using different thickness timbers, they eventually get messy. You can turn them over to work on a clean edge but eventually they may need replacing. You can purchase new backing boards from Gifkins Dovetail or make them up yourself from 12 mm MDF. When replacing the backing boards it is necessary to re-adjust the shims for dovetail joints if the new boards are not exactly the same thickness as the old ones.

When changing templates it is also best to change backing boards, as the cutters will cut into these boards in different places. Keep a set of backing boards for each of your templates. Once the jig has been adjusted to give the fit you want, write on the backing board which template they belong to and how many shims are needed to give a good fit. This eliminates the need for trial joints further down the track.

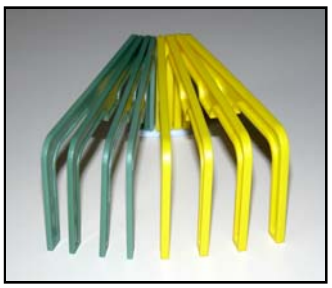
OPTIONAL EXTRAS

All these optional extras are available from Gifkins Dovetail.

Template upgrades

All the different template profiles are available as template upgrades for those that wish to expand the range of their jig. Each template upgrade includes the template with the cutters and fittings to suit plus a pair of backing boards. In schools and busy workshops it is better to buy a complete new jig rather than an upgrade, as this way each template is always set up and ready to use.

Variable space upgrade (VSU)



This tool allows for small variations in the layout of the joint, as described in the Advanced Techniques above. It is very handy if you are splitting the top off a box to form the lid as you can allow for the saw kerf and still end up with a uniform joint.

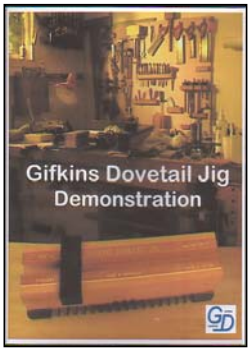
Clamps

I have found that Bessey's Kliklamp works better than anything else I have tried on the jig. It has an offset head and tail so it can reach over the stop which makes it ideal, as in most situations there is a stop against either side of the work. It is a quick action clamp with a very positive locking action and it can be used one-handed.

Clamp holders

I have designed a clamp holder that fits under the knob on the jig's stop, for use with Bessey's Kliklamps. These holders locate the clamps in the correct position and also hold them at the correct height, safely above the cutter. They make clamping the work to the jig a very quick and simple one-handed operation.

DVDs



I have recently recorded a new 75 minute Dovetailing Demonstration DVD on the Gifkins Dovetail Jig. This DVD goes through all aspects of setting up and using the jig for dovetailing. The 15 chapters cover setting up and adjusting the jig, cutting four joints for a box, different design situations, using the Variable Space Upgrade, changing and adjusting templates, large work, and more.

The Finger Joint Demonstration DVD cuts a trial joint on the F5 template, adjusts the cutter to get a perfect fit, and then cuts all four joints for a simple box. This DVD uses the Bessey clamps and clamp holders and shows how quick and easy they are to use. While the F15 template is not used on this demo, the setup and adjustment are the same as for the F5, with the cutting technique being quicker and easier. As a result, this DVD would also be useful for the F15 finger joint template.

These DVDs are a must for those that want to get the most from their jig!

TROUBLESHOOTING

With all the cutters there is a chance of the grub screw (on the collar below the bearing) coming loose, especially if there is any vibration or run-out in the router. Check the grub screws before using the cutters for the first time, and occasionally during use.

Joints too tight or too loose

There are many possibilities:

1. The shims for dovetailing or the sleeves for finger joints may need adjusting. The shims for adjusting the fit of dovetail joints are located behind the backing board on the side of the jig that has tapered fingers on the template. A new jig is fitted with five shims, which should go close to giving a good fitting joint if using a new pair of cutters. See instructions for “Cutting a trial dovetail joint” for details on adjusting the shim. See “Adjusting the cutter” for details on adjusting the finger joint sleeves.
2. If changing from a very hard wood to a very soft wood or vice versa, it is worth cutting another trial joint to check the shim or sleeve adjustment. If they need adjusting, make a note of the shims or sleeves required for that timber species. This avoids the need for trial joints the next time.
3. The wrong cutters: It is possible to mix the cutters up and use the wrong cutters, especially with the “A” and “H” dovetail templates or the F5 and F15 finger joint templates. See details on page 3 for cutter specifications for the different templates.
4. The wrong cutting technique: The bearing on the dovetail cutter (or the sleeve on the “F” cutter) is narrower than the gaps between the fingers on the template, so it is vital that you run the bearing along both sides of these gaps. If you run in one side and back out the same side, the joint will be much too tight.
5. It is important to run over each cut two or three times to make sure it is cleaned up properly. With the first cut, when cutting lots of timber away, shavings can get between the bearing and the cutter, giving a tight joint.
6. Shavings built up on the template or bearing: Any shavings stuck to the template or the bearing will make the joint too tight. This is more of a problem with timbers that have a high resin content like pine. Use an old tooth brush to keep the template clean.
7. For dovetailing only: The shims must be on the side of the jig that has tapered fingers on the template.
8. For dovetailing only: The thickness of the backing boards affects the fit of the joint in the same way as adjusting the shim. If replacing the backing boards you do need to cut a trial joint to check the fit.

If the joint is too tight, the first thing to do is to look at the sides of each cut. All the cut surfaces should be perfectly flat. If not, then check points 4, 5 and 6 above.

Edge misalignment

There are a number of factors that impact on the edge alignment of the joints, and it can be quite difficult to determine which one is causing problems. It is more than likely that errors are a combination of the points below, with small errors adding together to create the problem.

1. Timber not cut square. The more accurately you prepare your stock, the better the results will be.
2. Not clamping the wood vertically on the jig.
3. Turning the wood inside out to cut the second end. The outside of the finished box must always face away from the jig. It is vital to keep this in mind when turning the board end for end.
4. Not clamping the wood firmly up against the stop.

Most errors can be overcome by using two stops, with one firmly against each side of the workpiece. This locates the timber more securely, and it also ensures the timber is standing vertically. When you turn the work end for end it will fit back between the stops with no chance of error, likewise when you change from one side of the jig to the other. As long as you cut your stock accurately to width, with all four sides the same, then the edge alignment should be perfect.

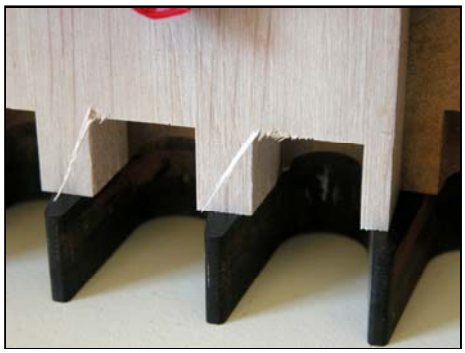
For customers with the Old Model Jig (with only one stop), the purchase of a second stop is highly recommended.

Tearout

The order of cutting is important to get the cleanest cut with the least chance of tearout. See the details on cutting order on page 9 for dovetailing and on page 14 for finger joints. Tearout in different positions is covered in the following points:

1. On the right hand side of each cut (when looking over the top of the jig): This is the most common problem and it has two possible causes. As the cutter is rotating anti-clockwise, the cutting tips are pushing out of the workpiece as the cutter enters the right hand side of the cut. Take the cut very slowly as the cutter first enters the work. Once the cutter is into the work by half its diameter, this is no longer a problem. Blunt cutters will cause the same problem.
2. On the top of the cut, when cutting the dovetail pins or the F15 fingers: A light cut across the face of the board should eliminate any tearout, again entering the work slowly. See instructions for cutting the pins on page 9.
3. Back of the cut: One function of the backing boards is to prevent tearout as the cutter exits through the back of the work. To get a super clean finish on the inside of the joint, work on a new section of the backing boards or replace them with a new pair.
4. On the right hand edge of the board (when looking over the top of the jig): As in point 1 above, the leading edge of the cutter is pushing out of the work with this cut. Take the cut down this edge much slower than all the other cuts. In really soft timbers, running sticky tape around the edge of the board before cutting can help.
5. Not clamped securely: The more securely the work is held to the jig, the cleaner the cut will be, and also the quieter the cut will be. Use a clamp from each side if the work is wider than about 120 mm. If the workpiece is bowed, work with the concave surface away from the jig and use two clamps, so that the clamps pull the work flat against the jig.

Point 1

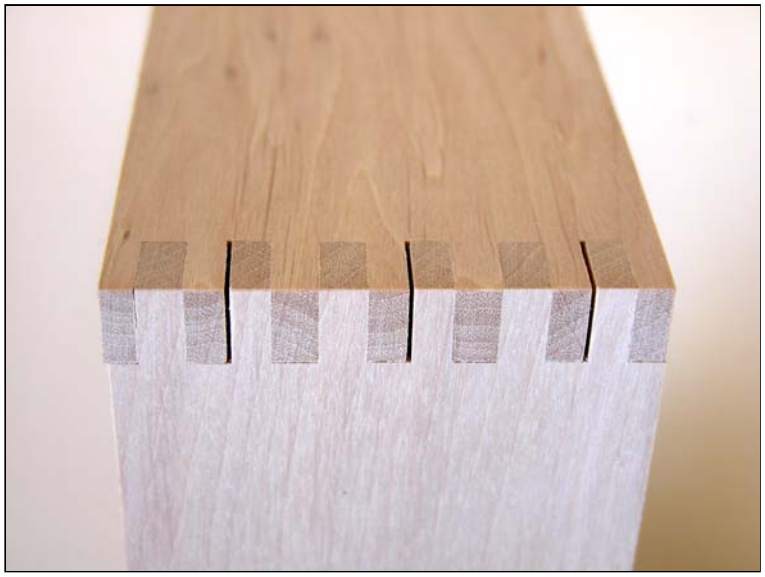


Point 2

Point 4

Gaps on some F5 fingers

For the F5 joint to work, the sideways movement needs to be exactly 10.0 mm. If it is more or less than this the joint will be tight on every second pin, with a gap showing on the in-between pins. By using a second stop and clamping it hard up against the workpiece and the red spacer, this error should be avoided.



GIFKINS ROUTER TABLE

These plans are a refinement on my earlier router table plans, and are specially designed to keep the construction as simple as possible. The table is suitable for any router that uses three or four screws to hold its plastic base in place. The finished table has a 34 mm central hole which is ideal for all boxmaking work.

By choice, I now use Triton routers in all my tables as you can change cutters from above the table using a single spanner, and they have a quick height adjustment as well as a fine height adjustment. These two features make them quicker and easier to use than any other router I have tried.

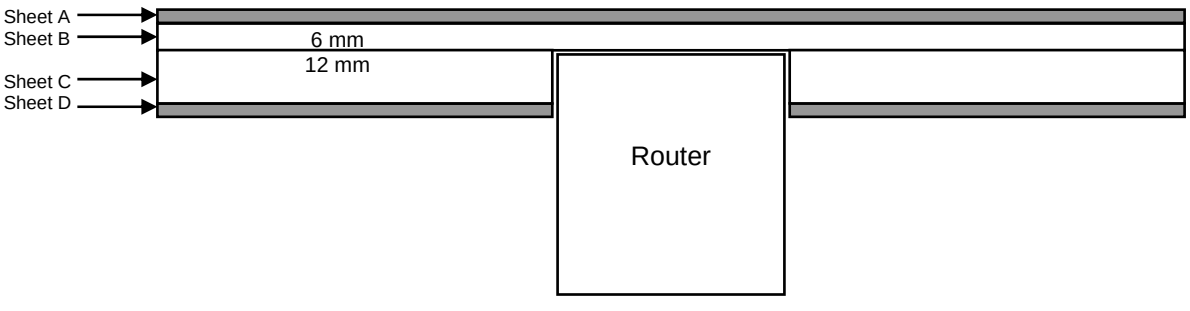
Materials List

This table can be built to any size, but Laminex panelling is available in 900 x 450 or 900 x 600 so these are good sizes.

Table Top:		Laminex wet area panelling	2 pieces 900 x 450 or 600
		6 mm ply or MDF	1 piece 900 x 450 or 600
		12 mm ply or MDF	1 piece 900 x 450 or 600
Stand:		12 mm or 18 mm MDF	2 pieces 900 x 450
			1 piece 600 x 450
Hardware:	Stand	8 cross dowels M6 x 10 mm diameter	
		4 flat head bolts M6 x 60	
		4 countersunk bolts M6 x 60	
	Fence	2 Tee nuts M8	
		1 knob with M8 x 40 threaded insert	
		1 knob with M8 x 25 threaded insert	
	Router	3 or 4 screws 16 mm long to hold router into table	
		(the thread depends on the make of router, Triton Routers use ¼" Witworth)	
Glue		Contact cement or AV 515 from Laminex Industries	

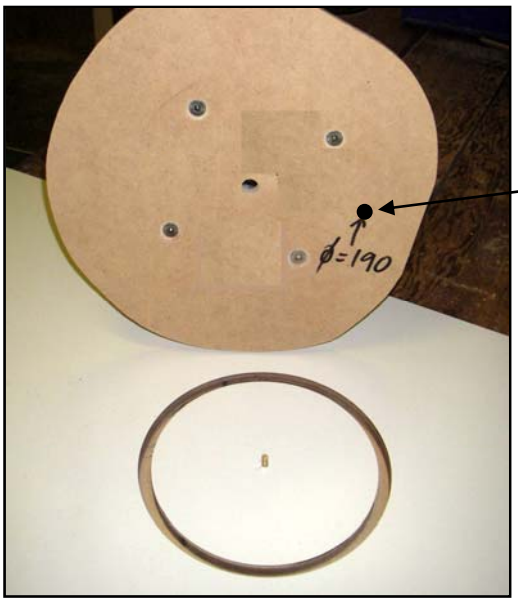
Making the table top

The table top is laminated out of four sheets of material (see drawing below). It uses 3 mm Laminex wet area panelling top and bottom, with two layers of ply or MDF in-between. If you used a single sheet of material in-between, you would need to recess the router into this sheet, which is difficult to do. With this setup, we can cut a hole right through the 12 mm layer (slightly larger than the router), so that the router bolts directly to the top 6 mm sheet plus the Laminex. The top sheet of Laminex gives a hard, smooth, long lasting surface to the table. The bottom sheet of Laminex makes the table much more rigid, and less likely to sag over time. It also prevents uneven absorption of moisture which would cause the table to warp. For a long lasting table, it is vital that you use this second sheet of Laminex on the bottom.



Section through table

Start by cutting a hole through the middle of sheets C & D that is slightly bigger than the base of your router. For the Triton router with a 180 mm base, make this hole 190 mm in diameter.



To cut these holes we will spin the router around a pin through the middle of our table material (see photos above) For this we will need a dowel or pin about 30 mm long (I used 5 mm brass), a drill bit the same diameter as the pin, and a piece of MDF or ply about 100 mm bigger than your router's base, to use as a false base for the router (I used 12 mm MDF).

Remove the black plastic base from your router and use this to mark out the mounting holes on the false base. Fit a small straight plunge bit to the router (I used a 10 mm bit), screw the MDF base on, and plunge a hole through the middle of the base. We can now measure out from the middle of this hole to position the pin hole to swing the router around.

Measure out a distance D, where:

D = ½ x (Diameter of the hole we want to cut – Diameter of the cutter we are using)

For 190 mm holes in sheets C & D (for the Triton Router), using a 10 mm cutter this is

D = ½ x (190 – 10) = 90 mm

Drill a hole in the false base (the same size as the pin) a distance of 90 mm from the middle of the plunge hole. This hole can be any direction out from the centre.

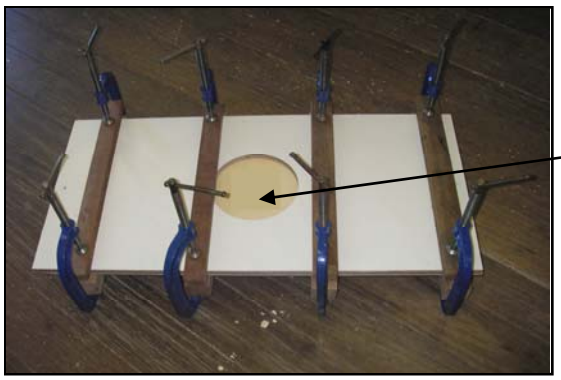
To use this hole jig, start by placing sheets C & D on a waste piece of MDF and clamp all three pieces down to your workbench. Drill a hole (the same size as the pin) through the middle of sheets C & D (i.e. middle in the length and middle in the width) and into the waste sheet by about 10 mm. Insert the pin into this hole and then locate the false base onto this pin. We can now plunge the router into the sheets and swing it around the pin in a full circle to cut a 190 mm hole in the sheets. It is a good idea to do this in two or three passes so we are not cutting too much away with each pass.

Gluing up

Before gluing, it is a good idea to align the four sheets together (as they will be assembled) and to drill a 1/8" hole through all four sheets at each end. We can then use a short length of brass rod (or a nail) to align the sheets when gluing. These pins should be about 1 mm less that the total thickness of the table top, and there is no need to remove them after gluing. Without these locating pins, the sheets tend to slip sideways when you apply pressure with clamps. While the sheets are dry assembled and located in position, mark the position of the cut out circle onto the 6 mm ply, as we don't want any glue here when we come to glue up (see photo below). To save panic when gluing, it is a good idea to mark all the sheets so you know which way up they go!

This is all you need to do before gluing up the top. We will cut the central hole in sheets A & B later.

If using AV 515 from Laminex Industries, apply glue to one side only of each sheet, then assemble and clamp. If using contact cement, apply to both sides and follow the directions on the container. Use clamping blocks of flat, straight timber (e.g. 50 mm x 50 mm) top and bottom (see photo). The flatter the table is held whilst gluing, the better it will be.



Don't apply glue here on the bottom side of sheet B

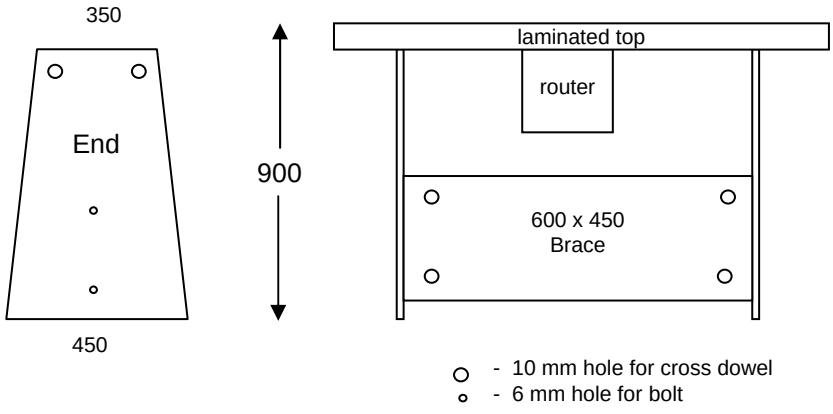
A waste sheet of MDF either side of the table top would help spread clamping pressure when gluing up.

Mounting holes for router

Once glued up, use the black plastic base plate from the router to accurately lay out the mounting holes in sheets A & B. With the top upside down, centre the base plate within the hole you have cut in sheets C & D, and carefully mark the position of the screw holes. Remember to position these holes so that the router's position in the table will make it easy to change bits and reach the height adjustment. On some routers, the holes are not symmetrically positioned, so the router will only attach to the table in one way. Drill the mounting holes through from the underside and then countersink them from above, being careful not to countersink too deeply. We need to retain as much of the Laminex as possible below the screw head to give the top some strength. These mounting holes need to be as accurately positioned as possible. To mount the router in the table once the stand is finished, remove the base plate and use some 16 mm countersunk screws to secure the router to the table.

Stand

The stand can be built out of ply or MDF using knock-down fittings. 12 mm material is okay but 16 mm or 18 mm material makes the table much more rigid. It is important that the top of the stand is narrower that the table top, so you can clamp a fence to the top in any position, without the stand fouling the clamps. I build my tables around 900 mm high, but this can be changed to a height you feel comfortable with. Keep in mind that the higher the table, the less sturdy it will be.



Stand showing position of holes for knock-down fittings

Using knock-down fittings for the stand makes a very neat table, but it would be simpler to use cleats of timber screwed to the frame to lock everything together.

If using knock-down fittings with 60 mm bolts, the cross dowel should be 35 mm in from the edge. I use 60 mm countersunk bolts to hold the top to the stand and 60 mm flat head bolts to hold the stand together. Marking out for these holes needs to be accurate so that everything lines up. You need to drill holes (about 7 mm diameter) into the edges of the sheets to line up with the 10 mm cross dowel holes.

Do not enclose the router under the table as the router will overheat without a free flow of air. A switched power board mounted on the side of the stand makes controlling the router much easier than reaching underneath to the switch on the router.

Central hole in top

Once the stand and top are complete, we plunge a series of cutters through the top to produce the central hole.

Fit a ½" straight, plunge cut bit to the router before fitting the router to the table. Bolt the router securely to the table. Then with the router spinning raise the cutter up through the table top. You will then need to fit a larger cutter (e.g. the Gifkins tenon bit or panel raising bit) and repeat this process, to increase the hole to about 32 mm or 34 mm. If you have a range of cutters with plunge ability, work your way up to 34 mm so you are not removing too much with each cut.

FENCES FOR THE ROUTER TABLE

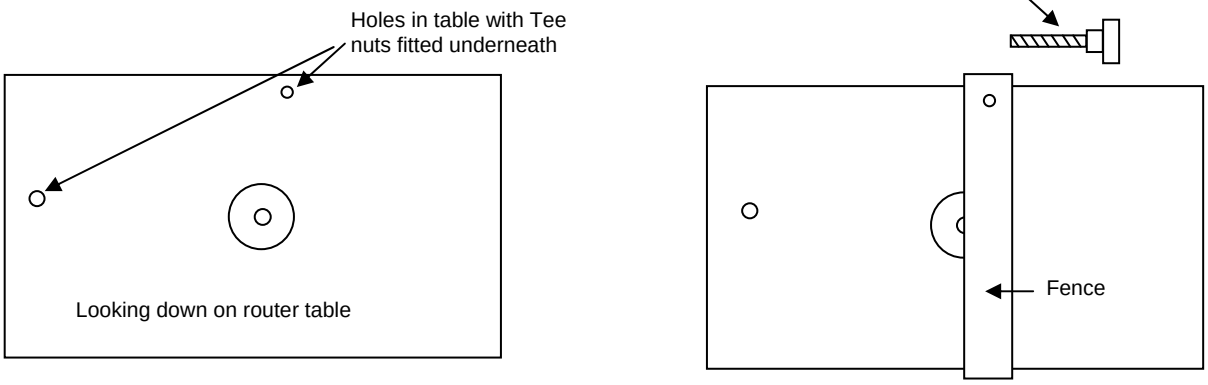
Over the years I have made all sorts of fences for the router table, some with dust extraction built in, and these ideas have slowly evolved to give some very simple and effective fences. I will describe two of them here in detail. It is possible to apply these ideas to all sorts of other situations. The idea is that I make a new fence for each cutter I want to use so that the fence matches the cutter exactly. This way the fence gives maximum support to the workpiece as it goes past the cutter. With boxmaking we are often handling small workpieces and it is vital that there is no possibility of the workpiece catching on a gap in the fence as it goes past the cutter. If we make the fence to suit the cutter then any gaps can be kept to an absolute minimum. For this idea to work the fence must screw down to a threaded hole in the table top, so it always goes back on the table in exactly the same position.

The best fence material is old recycled hardwood which is dry and stable, although pine is okay. Ideally we want a material that will remain flat and straight and will not wear, so the fences can be used time and again. These fences are ideally suited to router tables built along the lines of the Gifkins Table above.

Making the fences

To attach the fences to the table top you need a knob or two with threaded inserts and Tee nuts to suit. The details given below are for M8 threaded knobs and M8 Tee nuts.

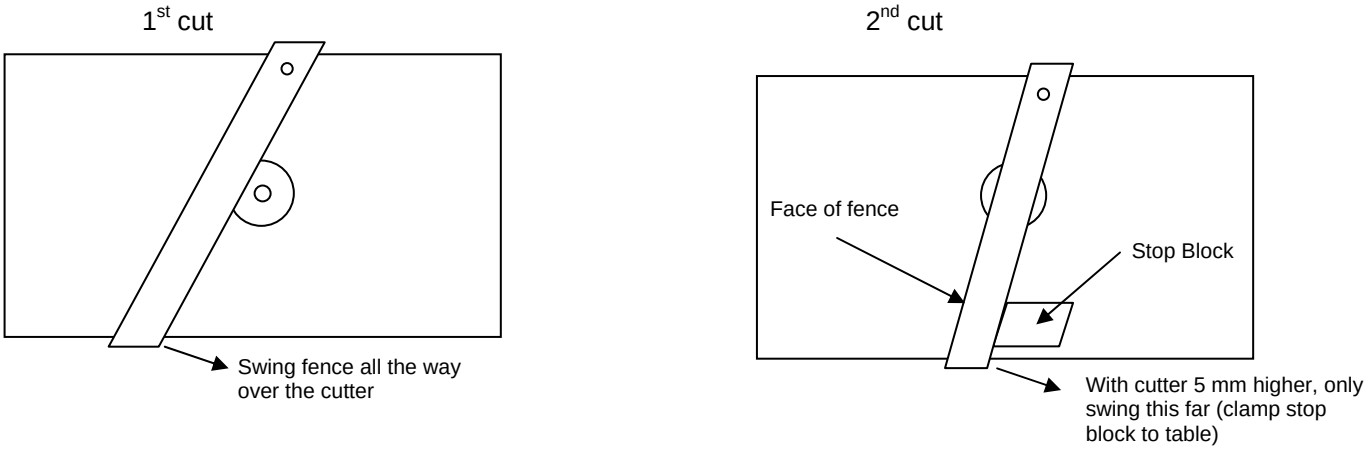
Start by drilling two 10 mm holes in the table top as shown on the next page, and fit captured Tee nuts on the underside of the table. To do this you need to use a forstner bit to drill a large hole through the Laminex on the underside, as the Tee nut needs a soft material to sink its teeth into. One hole is for short fences across the table and the other is for longer fences running the length of the table. These threaded holes are important as it means we can pivot the fence around these points, and it also means that the fence will always go back on the table in exactly the same position. I then drill an 8.5 mm hole in the fence and use a knob with threaded insert to hold the fence down to the table at one end. Don't make the hole in the fence too big as we don't want any free play.



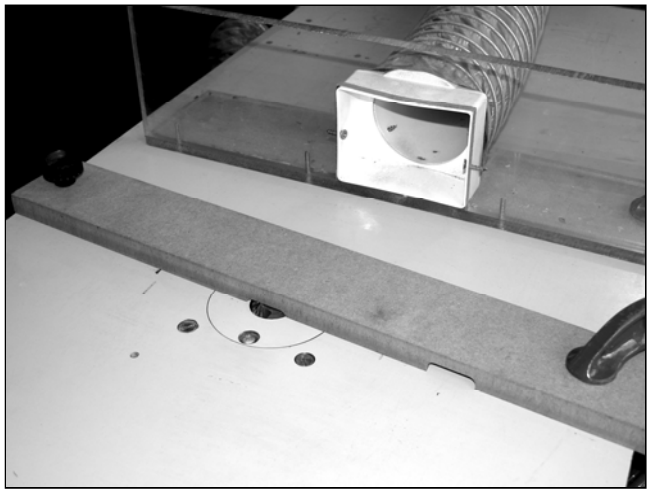
The beauty of this set up is that we can fit a cutter to the router and then machine a rebate through the fence by swinging the fence over the cutter.

Fence for panel raising cutter or tenon cutter

Fit the panel raising cutter to the router and set the cutter about 1 mm higher than you need for your current project. Turn the router on and swing the fence over the cutter to produce a dish shaped rebate right across the underside of the fence. Now raise the cutter about 5 mm and again swing the fence over the cutter, but this time not going all the way across. Clamp a stop block to the table so it stops 5 mm or 10 mm short of the face of the fence.



This way, there will be a deeper rebate on the back of the fence to aid dust extraction. In use, the fence is held with the knob at one end and a clamp at the other, and a dust extraction hood can be placed on the table behind the fence. The cutter should throw the dust well clear of the fence, so the hood can sit back from the fence.



Fence for slot cutter

This is an improvement on the fence described in my earlier “Boxmaking Plans - introduction to small joinery”.

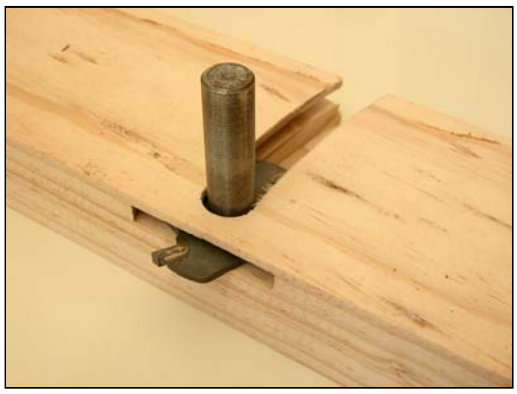
Start with a straight cutter in the router that is a bit larger in diameter than the ½” shank on the slot cutter (I used 14 mm). Use this to cut a slot in the fence, but not right through. This slot should stop 5 mm short of the face. It is best to do this in a few passes, only cutting away about 5 mm height of material each time. Clamp a stop block to the table so that each pass stops at the same place. This slot should be high enough to allow room for the set screw and washer which are above the blade of the slot cutter.

Now fit the slot cutter to the router and set the height 1 mm higher than you want for your project. With the router running, swing the fence over the cutter as far as it will go. The stopped slot from the previous cut won’t allow the slot cutter to come right through the fence. Swing back off the cutter and re-set the cutter height to 1 mm lower than your project. Once again, swing the fence over the cutter as far as it will go. This will allow room for a bit of height adjustment when working on your project.

The idea of this fence is that the work is fully supported both above and below the cutter, as well as right up to the cutting tips before and behind the cutter. You would need to make a new fence along these lines if using timber that is a very different thickness to your current project.

50 mm x 3.2 mm Slot cutter

Fence for slot cutter.
Photo shows fence upside down, with face away from camera.



Slot cutter located loosely into fence.
Photo shows fence upside down, with face towards camera.

Tee nut inserted into underside of table, along with the range of hardware used.