



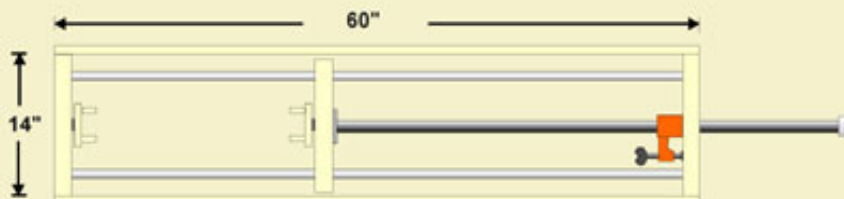
Tool Tip...

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Multi-Break Shell Press

by Kyle Kepley



Introduction:

The press described in this article is designed to facilitate the assembly and spiking of large multi-break shells. The shell construction technique requires that each break be completed and spiked individually in order to be used with this press. It is ideally suited for the construction of Maltese shells, which use this modular construction method.

This press must be used in conjunction with the [Maltese shell roller](#) described in the June edition. While the shell roller is a tool commonly used in Malta, this particular press is my own design. I do believe some Maltese builders use some kind of press to assemble their breaks, but I don't know the details of their designs. This one is very simple and works well as an accessory to the shell rolling tool.

The purpose of this device is to compress all the breaks together while still allowing them to be rotated. The amount of compression force generated is much greater than can be achieved by attaching one break at a time using spiking twine.

The fact that the shells can still be rotated while under compression makes the task of filling in between the breaks with newspaper much easier, since there is no spiking twine to get in the way. After the gaps have been rammed with pasted newspaper and compressed as far as possible, they will expand very little after the vice is removed. This allows the vertical twine that secures the breaks to be applied around all the breaks as they rest on the roller. The entire shell is assembled and spiked together without ever having to lift it off the rollers!

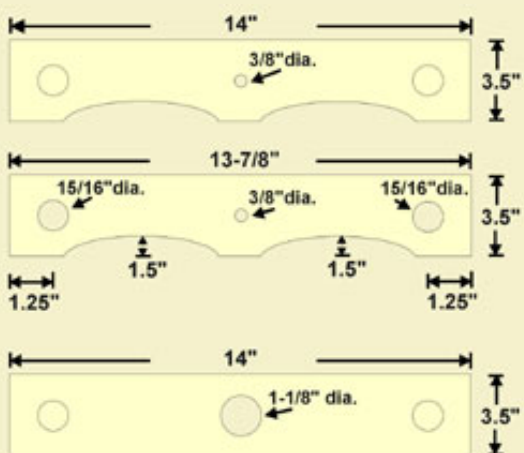


Figure 1: Dimensions of 2x4 frame pieces.

Materials:

- ▶ (2) 60" long 1x4s
- ▶ (2) 14" long 2x4s
- ▶ (1) 13-1/8" long 2x4
- ▶ (2) 58-1/2" long 1" conduit
- ▶ (1) 48" long 3/4" black plumbing pipe
- ▶ (1) 3/4" pipe flange
- ▶ (1) 3/4" pipe clamp w/screw on sliding jaw
- ▶ (1) 3/4" pipe end cap
- ▶ (8) 2" long 1/4" lag screws
- ▶ (8) 1/4" washers
- ▶ (2) 2-1/2" long 3/8" bolts
- ▶ (2) 3/8" ball bearings
- ▶ (2) 3/8" washers
- ▶ (2) 3/8" lock nuts
- ▶ (8) 2" long 3/4" dowel rod

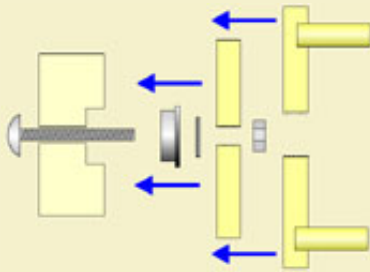


Figure 2: Assembling the rotary heads.

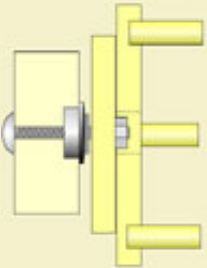


Figure 3: Rotary unit mounted on stationary vice jaw.

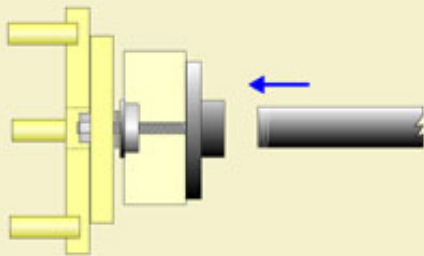


Figure 4: Threading the 3/4" black plumbing pipe into the flange mounted on the movable vice jaw.



Figure 5: The reversible pipe clamp provides the force.

- ▶ (2) 4" dia disks of 5/8" plywood
- ▶ (2) 5-1/2" dia disks of 5/8" plywood

Assembly:

Start by preparing the pieces shown in Figure 1. The 15/16" diameter holes go all the way through the center piece, but are countersunk 3/4" deep in the two end pieces, which is where the 1" conduit will fit into. The round cutout area on the bottom of the first two pieces, which are the vice jaws, do not have to be any specific shape as long as they are 1-1/5" deep and have enough curve so that they do not hit the roller bars that the vice will sit on. The center hole on the first two pieces, which is 3/8" diameter, will also need a countersink large enough to seat the bearing shown in Figure 2. This hole will vary depending on the size of your bearings, but it should be drilled first before making the 3/8" hole.

Next you should attach the bearing assembly to the two jaws, as seen in Figure 2. Hammer the bolt through the back side hard enough so that it will not rotate when you tighten the lock nut on the other side of the 4" wooden disk. The second disk shown in Figure 2, with the 3/4" dowel rod fingers glued into it, is not part of the assembly. It is an interchangeable piece that just fits tightly over the lock nut. This piece will need to match the diameter of the shell you will be clamping, such as 5-1/2" for a six, 7-1/2" for an eight etc.

The inner sliding jaw, which is the second piece from the top in Figure 1, needs to have a 3/4" flange mount for the pipe clamp bar to screw into. This is screwed onto the back of the jaw after the rotary assembly has been attached, as seen in Figure 4.

Now you are ready to assemble all the pieces, using the two five foot long 1x4s to make the sides. Each side piece is screwed onto the ends of the 2x4s using the 2" lag screws with washers under them. Do both sides of one end, then insert the two pieces of conduit, slide the movable jaw over them, then attach the remaining side of the frame.

The type of pipe clamp required for this project is the reversible kind where the screw mechanism is located on the sliding piece rather than fixed to the end of the pipe. Both kinds are sold in kits that don't include the bar, so be sure to get the right kind. Figure 5 shows how the clamp piece is positioned at the back of the press when applying pressure to a shell.

The four foot piece of 3/4" pipe should easily fit through the hole in the back, through the clamping mechanism shown in Figure 5, and screw into the flange mount on the movable vice jaw.

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Figure 6: Four 6" shells being compressed together.



Figure 7: Fingers are long enough to allow room for spolette.



Figure 8: End view of press frame sitting over the roller.

Application:

When using this press, you will first need to insert the correct set of finger jaws onto each end. These are simply disks that match the shell diameter and have four equally spaced dowel rods glued into holes along the periphery. Figure 7 shows a close-up of a jaw, note how the fingers are long enough to make room for the spolette.

The rotary disks actually ride on the shell rolling bars that are part of a separate jig. It will be necessary to adjust the feet at the back end of the press frame so that the heavy bar clamp does not cause it to tilt when no shell is present.

The individual beaks are first stacked upside down, then placed onto the rollers. The adjustable jaw is brought up against the bottom of the shell, and the screw on the clamp mechanism is screwed all the way out to allow for maximum travel. The clamp ratchet is then slid all the way against the wood. Now you simply turn the clamp screw and press the shells together. Figure 8 shows an end view of the press in action.

Since the shell can still freely rotate even when under pressure, it is very easy to ram the pasted newspaper between the breaks to fill the remaining gaps. Full length strips of crumpled paper are fed into the gap and rammed with a thin stick while the shell is rolled, as seen in figure 9. While this step is traditionally done after the shells have been strung together, using this method avoids the hassles of trying to work the paper in between the many strands of twine that get in the way.

It is actually possible to string the shell while it is still between the clamp jaws, which is done by winding the string onto a shuttle and passing it between the fingers at each end of the shell. However, since the shell will not uncompress any noticeable amount when the clamp is removed, it is much easier to remove the press and apply the vertical spiking without any obstructions.

The shell rolling jig and this press combine to make the final assembly of large multi-break shells one of the easiest parts of the overall process! 🔥



Figure 9: Paper wadding is rammed in with ease.