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Maltese Shell Roller

Introduction:
Large multi-break shells frequently weigh over 30 lbs, and some large shells can weigh as much as 100 lbs. Such heavy shells can become quite difficult to work with during construction, especially during the spiking and assembly stages. When working with smaller shells, applying the horizontal spiking by holding the shell and rotating it is a manageable task, but this method is often unworkable with larger shells.

Maltese shell builders frequently use a roller device similar to the one pictured above in order to support the shell while allowing it to be spun around it's vertical axis. The roller bars also help to keep multi-break shells in alignment during the spiking process. The roller described here is rugged enough to handle shells weighing over 100 lbs, with an adjustable roller to allow a wide range of shell sizes to fit the roller.

Materials:

- (1) 1x4 ft laminated shelving board
- (2) 3 ft long 2" dia. galvanized conduit
- (4) 10" long 1x2s
- (4) 4" long 2x4s
- (1) 10" long 2.25" dia wood round stock
- (2) 1" long 3/8" dowel rod
- (4) 3/8" ball bearings
- (4) 3-1/2" long 3/8" bolts
- (8) 3/8" lock nuts
- (2) 2" long 1/4" lag screws
- (2) 1/4" washers
- (8) 1-1/4" long #8 wood screws

Tools:

- Drill press
- Wood lathe
- Portable drill
- Hacksaw or horizontal bandsaw
- Vertical bandsaw or jigsaw
- Hack saw
- Wood Saw (hand or power)
- 1-1/8" spade bit
- 3/4" spade bit

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Figure 1: Details of the roller plug assembly.

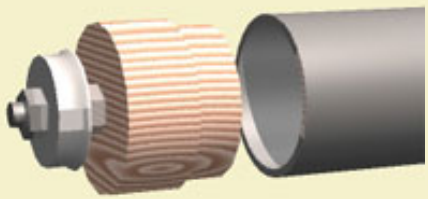

Figure 2: Inserting an assembled plug into the conduit.

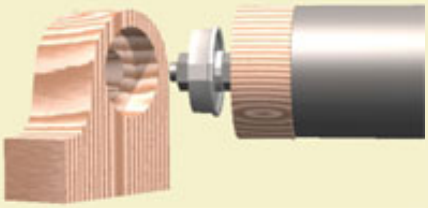

Figure 3: Pillow block with countersunk hole to accept bearings.

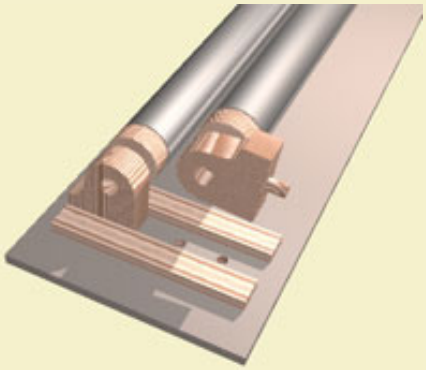

Figure 4: One fixed roller and one adjustable roller held into position with pegs.

Construction:

The basic concept of this tool is such that each builder is likely to construct his own version depending on what tools and materials are available. While PVC conduit may be used for the roller bars, this will limit the amount of weight the roller can handle before the rollers bend to the point of creating a problem. Two inch steal conduit available in most home improvement stores makes an excellent roller. Fence pipe may also be used.

Once your roller bar material is selected, you must plug both ends with a wooden end plug that contains a centered hole. The O.D. of this plug must be flush with the roller bars, otherwise the shell will not be supported evenly on the rollers. The pivot hole must be exactly centered in the plug or the bars will wobble while spinning. With heavier shells, this off centered rotation can make rolling quite difficult.

The plugs illustrated in Figure 1 were cut from spruce using a wood lathe. All four plugs were cut from a 10" long piece of round stock turned down to the O. D. of the conduit. Two inch wide bands were then shaved down to the I.D. of the conduit, with a 1/2" spacing between each band. These were then cut apart by resting a notched hand saw on the tool rest and bringing it down onto the plug sections while the lathe was running. Separating the plugs in this way results in accurately faced off ends, which is important to obtain a straight center hole when drilling them on the drill press.

Since many readers probably do not have a wood lathe, an alternate method is to use a 2" hole saw to cut the plugs. This method has the advantage of leaving a centered hole in the plug. The plugs will then have to be glued or held inside the pipe using screws or pins drilled in through the conduit wall.

Once the plugs are cut, a 3/8" hole is drilled down the center of each one. A 3-1/2" long 3/8" bolt is then fed into the plug, with a lock nut tightened down from the other side to secure the bolt. A 3/8" ball bearing is then fixed to each bolt using another lock nut to hold it in place, as seen in Figure 1.

Figure 2 shows a plug assembly being inserted into the end of the conduit. The notched plug as made using the lathe method only needs to be a slip-fit, while plugs without the outer lip will need to be fastened to the conduit.

Figure 3 shows the wooden pillow block that the bearings slip into. For the bearings used here, a 1-1/8" hole was drilled half way through the block, then a 3/4" hole drilled the reset of the way. This gives a countersunk seat to hold the bearing.

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Figure 5: Using a roller to spike between the breaks of a large shell.

Figure 6: Using a roller to apply horizontal spiking on a bottom shot.

Figure 7: Roller adjusted to narrow spacing to handle a long multi-break 4" shell.

The pillow blocks are cut from 2x4 segments 4 inches long, with the grain running in the long direction (vertically). The radius of the top of the block must be less than the radius of the conduit, since some very long shells may overhang the ends of the roller. The block centers should be at least 2-3/4" above the bottom.

The two rollers with both block assemblies attached are now centered on top of the laminated shelving board, as shown in Figure 4. One roller is fixed in place using a lag screw driven in from the bottom up into the pillow blocks at both ends. The hole for the lag screw should be countersunk so that the board may rest flat on a table without hitting the screw heads.

Next the 1x2 wood strips are screwed down on both sides of the pillow blocks at each end, forming a slot for the other block to slide in, as seen in Figure 4.

The sliding roller bar will be the adjustable side, allowing different sized shells to fit between the rollers. Two or three 3/8" holes are drilled in the center of the track at both ends, making sure each hole is spaced the same distance from the edge of the fixed pillow block. A 1" long peg is now set into the bottom of the detachable pillow blocks such that 1/2" of the pin protrudes. Both ends of the adjustable roller should easily drop into the alignment holes and hold the roller in position during use.

Applications:

The primary use for this shell rolling tool is to aid in the application of spiking twine. It may be used when horizontally spiking single breaks, as seen in Figure 6, or more commonly when spiking between breaks as shown in Figure 5. In both these scenarios, the spiking twine his held firmly in one hand while the shell is rotated on the rollers with the other hand.

My own method for spiking with a roller involves using one foot to hold the twine down on the floor while both hands spin the shell and guide the string into place. The twine passes between the folds of a sheet of newspaper, which is held to the floor by standing on it with one foot. The amount of body weight shifted to the foot holding the twine down will control the tension in the string as the shell is rolled.

This roller may also be used in conjunction with a special press when assembling the breaks of a Maltese style shell. Instructions for building the press and how to use it with this roller will appear in a future article.