

Quick Release Wheelbarrow Handles For Your Dob

The one thing about building your own scope is that you're never completely satisfied with what you've done. In 2000 Kurt Maurer and I built a 22" truss-tube Dobsonian following the general techniques found in the David Kriege and Richard Berry book, *The Dobsonian Telescope, A Practical Manual for Building Large Aperture Telescopes*. Even though we changed some of their design to suit our needs we did use the book's techniques for attaching wheelbarrow handles (with pneumatic wheels) to the sides of the rocker box to move the scope around. The wheelbarrow handles were attached to the scope with two long eyebolts, which had to be screwed/unscrewed 1 1/2" to attach/remove the handles. The handles enabled me to roll the scope into a trailer or truck bed then roll the scope out to the field. No heavy lifting is required. Once in place the handles were removed for observing. At the end of the observing session, the handles had to be re-attached so the scope could be rolled up ramps into our trailer. Once in the trailer the handles were left on with plenty of room to load our other equipment.

In 2001 Kurt built a 16" scaled down copy of the 22" for my wife Lisa. Once again, wheelbarrow handles were used to move the scope around. However, we encountered a problem when we attempted to load the 16" and the 22" together. Fortunately, the 16" was narrow enough to roll in between the handles of the 22". However, with the handles still attached to the 16", we could not shut the door of the trailer. In order to make both scopes fit, we had to detach the handles on the 16" once the scope was in the trailer. To unload, we had to reattach the handles. While the attaching/detaching of the handles to the scopes is not a major undertaking, it is a chore that I wanted to take as little time as possible. I wanted a quick connect/disconnect system.

After much thought on the matter, I came up with a solution costing under \$10. My idea was to replace the eyebolts with pins which would be permanently attached to the rocker box. These pins would only protrude 1 3/4" from the sides of the rocker box (not out far enough to cause any tripping concerns). The handles would then slip onto the pins and be secured with hitch pins of an appropriate size. Building the prototype, then mass producing seven more pins (for two scopes) took a total of 3 hours, including shopping for the raw materials.

The sides of the rocker boxes on both scopes are 1 1/2" thick. The 3/8" – 16 tpi eyebolts screwed into threaded inserts in the rocker box sides. I wanted my wheelbarrow handle pins to have a thread length of 1 1/2" to match the thickness of the rocker box sides. I wanted the wheelbarrow handles to slip over an unthreaded section of the pin. The width of the wheelbarrow handles was also 1 1/2". My difficulty was finding a 3/8" – 16 tpi bolt with at least 1 1/2" of thread and an unthreaded shank of 1 3/4". The nearest bolt to those requirements was a carriage bolt 8" long. Not including, the head of the



bolt, the unthreaded shank was exactly 1 3/4" long. I would have preferred stainless steel, but had to settle for what I could find.

To fabricate the pins, I had to shorten the threaded portion of the bolt and then remove the head of the bolt. I then had to drill a hole for the hitch pin approximately 1/8" from the end of the unthreaded shank. Fabrication can be done with only a hacksaw, an electric drill, and a file but I used the tools I had available, a Cut-Saw (reciprocating saw), a drill press, a bench mounted combination belt and disk sander and a knee-mill. I also needed an assortment of vises to hold my work piece securely in place during fabrication. This included a home-made bolt block. The bolt block is a 1 3/4" x 1 3/4" block of hardwood with a 3/8" hole bored through the center. The block is then cut in half length wise and centered on the hole. The result is a device which will securely hold the bolt in a vise.



The first task was to shorten the threaded section of the bolt to 1 1/2". I first threaded a couple of nuts onto the bolt past the cut point. If the cut is clean, the

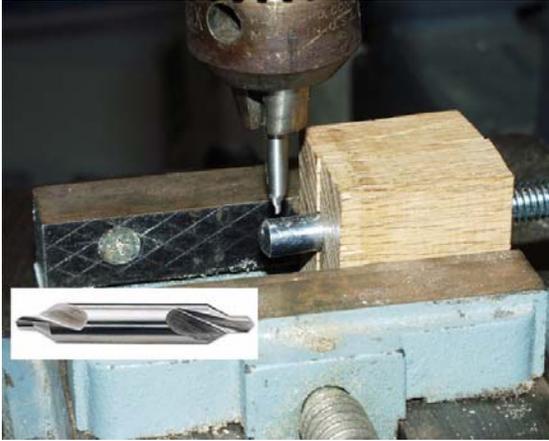
nuts will not be needed. However, if the threads get distorted during the cutting process, just removing the nuts should restore the threads. I used tape to mark where my cut was to be made. I clamped the bolt in a vise using the bolt block and using a cut saw I made my cut. I then dressed the cut using the disk sander placing a shallow bevel on the end. I then unscrewed the nuts which came right off, indicating that no thread damage occurred during the cut.

My next task was to remove the head of the carriage bolt. Recall that I needed 1 3/4" of non-threaded shoulder. The 8" carriage had exactly that amount. I had debated the purchase of 10" carriage bolts which had more than the required amount of non-threaded shoulder. In retrospect I should have purchased the 10" bolt and used the cut saw to make all the cuts. It would have been a lot faster and would have only cost an additional \$.11 per bolt. To remove the head of the carriage bolt and retain all the bolt shoulder, I used a saw on my knee-mill to make the cut. Notice the picture of the bolt in the mill ready to be cut by the saw.

What you can't see is the bolt block and vice securely holding the bolt in place. Once the head of the bolt was removed, I used the disk sander to remove any burrs and then bevel the edge of the bolt. The bevel will make it easier to slip the handles onto the pins.



The last task to fabricating the pins was to drill a 7/64" hole approximately 1/8" from the end of the pin. I used two tools to make this job a snap. The first is a drill press. If you don't have one and your significant other won't let you buy one, then borrow one. Only



as a last resort should you use a hand held drill. The other tool of convenience is called a center drill (about \$1 from Enco or Grizzly mail order tool companies). If you have ever tried drilling a hole with a small bit, especially on a curved surface, you will have noticed that the drill bit tends to wander all around where you want the hole to be drilled. This wandering is due to the very thin nature of the bit which flexes when pressure is applied to get the bit started. A center drill consists of a very short bit on a large shank whose sole purpose is to start a pilot hole without the bit wandering. Once the hole is started, switch to the conventional drill bit to complete the drilling. I used the disk sander to clean up the burrs from the drilling.



To complete the project, I screwed the pins into the threaded inserts in the rocker box then slid on the handles. 7/64" x 1 5/8" hitch pin clips through the holes keep the handles from coming off while moving the scopes. With the new pins, we have virtually eliminated the time it takes to connect and disconnect the handles. Since its so fast and easy we now use a single pair of handles for both scopes.

Supply List (1 telescope):

4 – 3/8" – 16 tpi 8" long carriage bolts (Recommend using 10" carriage bolts)

4 – 7/64" x 1 5/8" hitch pin clips