Chapter 3

Building the Brass Frame Reel

"Believe you can and you're halfway there."

Theodore Roosevelt, 26th President of the United States, 1858-1919

The brass frame reel (**Figure 3-1**) with friction drag is a great first reel to build. Being 3" in diameter, it is a light reel (3 to 4 weight fly line) suitable for trout and panfish fishing. The reel holds a conventional 90' 4wt fly line with about 25 yards of backing, more than enough for small and medium stream fishing. It can be built using simple hand tools and an electric drill. Once you've completed building it, you will have learned basic reelsmithing skills and will be ready to modify its design or experiment with your own designs.

Figure 3-1 – The Brass Frame Reel with Friction Drag

Getting Started

"The Reelsmith's Primer" takes a task-oriented approach to constructing the brass frame reel. This approach breaks down the process of building a fly fishing reel into a set of less complex and easily completed tasks. These tasks are organized into five chapters. In each of the first four chapters, you will complete an entire sub-assembly of the reel. In the fifth chapter, you will perform the finishing touches and assemble the reel. Upon completing each chapter, you will feel a sense of accomplishment from having made significant progress.

The brass frame reel consists of five sub-assemblies:

1) A frame that forms the basic skeleton of the reel.
2) A spool that holds the fly line.
3) A friction drag system that prevents over-run while stripping out line.
4) A handle attached to the spool for the angler to grip and reel in the line.
5) A reel foot and bracket mounted to the frame to attach the reel to the rod.

The frame is constructed in *Chapter 7 – Constructing the Frame*. The spool and friction drag assemblies are combined in *Chapter 8 – Constructing the Spool and Assembling the Drag*. The handle is constructed in *Chapter 9 – Making the Handle and Knob* and the reel foot and bracket are built in *Chapter 10 – Constructing the Reel Foot and Bracket*. When you have completed these sub-assemblies, you will perform the final fitting, tuning, polishing, and assembly in *Chapter 11 – Completing the Reel*. **Figure 3-2** shows all of the fabricated parts ready to assemble.

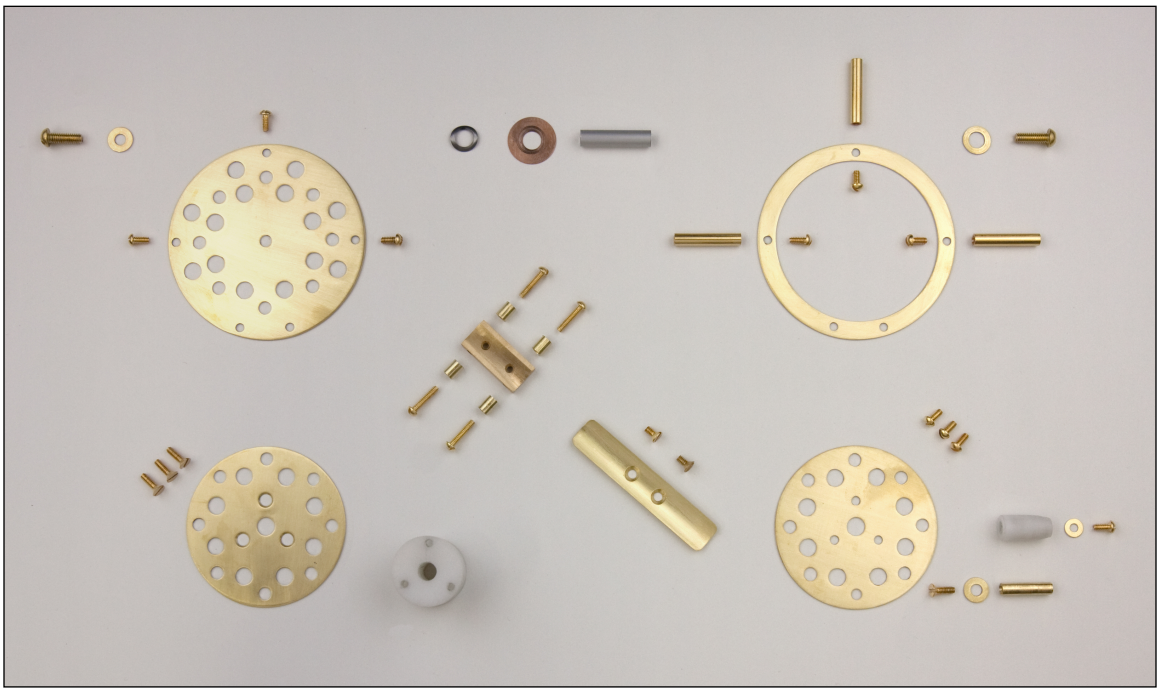

Figure 3-2 – Reel Exploded View

As I developed my reels and taught others how to build their own, I discovered that the key to success is simplicity. Once I created a functional and attractive reel design, I spent a lot of time experimenting with tools, materials, and techniques to make it easier to build. For example, my first reels used 1/4" or 3/16" diameter brass rod for the frame pillars (see **Figure I-2**). This rod needed to be center drilled before it could be tapped. Center drilling small diameter rods like these is best performed on a metal lathe. While browsing material supplier catalogs and Web sites I discovered the thick walled 3/16" tubing that I now use. This tubing can be tapped with a 4-40 tap without the need to center drill. Similarly, each material on the material list was optimized to ease construction while also keeping the overall materials costs down.

I also explored using hand tools and manual processes for operations that I performed on my metal lathe and drill press. The more I learned, the more determined I became to build a reel "by hand". Amazingly, I discovered that many hand operations are actually faster to perform and more efficient than setting up a machine tool to do a similar job.

Making the frame front ring turned out to be my greatest challenge. I struggled for months exploring ways to cut the ring using the drill lathe (you will learn about that in the next chapter) and homemade parting tools. I was able to develop a working process but I was concerned that it was not safe and it certainly made a lot of high-pitched squealing noises. I turned to watchmakers and jewelers for ideas. For centuries, these craftsmen have used jeweler's saws with very fine blades to cut intricate designs in thin sheets of metal. I purchased a jeweler's saw and some blades and tried it myself. Within 5 minutes, I was able to cut the front ring, a process that took 15 minutes or longer on the drill lathe. As an added benefit, the kerf created by the fine jeweler's saw blade is so narrow that it allowed me to reuse the disk that was cut out as one of the spool plates.

One of the unique features of my process is the use of full-sized layout and template drawings (see *Appendix G – Layout and Template Drawings*). The templates are designed to be cut out and glued to the materials. This significantly simplifies making the parts since all of the complex measuring and layout is already done for you. Each of the template drawings has a corresponding layout drawing that shows the detailed dimensions, positions, and hole sizes for your reference. I don't recall when I developed this technique but it significantly simplifies building reels.

How To Use this Book

The next three chapters, *Chapters 4* through *6*, cover tools, materials, and techniques in detail. Even if you are an experienced machinist or handy with tools, take the time to read these chapters. I highly recommend building your first reel "by the book". You will learn a lot as you go and my process has been tested by many other reelsmiths. I know from personal experience that if a project stalls for even the slightest reason, that short delay turns into a week, then a month, and before you know it, a year later you still have an unfinished project on your workbench. I really want you to complete your first reel!

Following the overview on tools, materials, and techniques, you will learn to build the reel in *Chapters 7* through *11*. These chapters follow the same pattern to help you

organize your materials, prepare your tools, and perform the build steps. Each chapter begins with a short overview of the sub-assembly you will construct along with a list of the layout and template drawings you will use. A photograph of the materials used and the completed sub-assembly follows the overview. The materials shown in the photograph are numbered and referenced in the *Materials* table that follows the photograph. Finally, the *Tools and Supplies* table lists the tools and supplies needed to complete the sub-assembly. The construction process will go more smoothly if you use these tables to organize your materials and tools before beginning work.

Within each chapter, the construction process is organized as a set of numbered tasks. Each task begins with a short description followed by a sequence of numbered steps. Tasks are natural starting and stopping points in the event you can't complete an entire chapter at once. This numbering scheme makes it easier to follow along and helps you refer to a specific step by using its chapter number, task number, and step number. For instance, step ***8-2-3*** refers to *Chapter 8*, ***Task 2***, *Step 3*.

A checklist of all of the construction tasks, presented by chapter, is provided in *Appendix E*. Each task is listed with its task number, a description, and its page number. Make a photocopy of this list or download and print a copy of it[7]. Then, to help you stay organized, simply check off each task as you complete it. The checklist also provides spaces to write down key measurements you will make in a few tasks.

Next Steps

Like most new learning experiences, take your time and do the best you can on each task. Don't worry if you make a few mistakes. Most of these will not affect the overall appearance or performance of your reel. The materials required to build the reel are relatively inexpensive. If you do need to remake a component, your cost will be low and your learning experience high! Once you've completed your first reel you may very well find yourself addicted to reelsmithing. For now though, read *Chapters 4* through *6* and then get started building your reel in *Chapter 7*.

[7] see *Appendix F* for details