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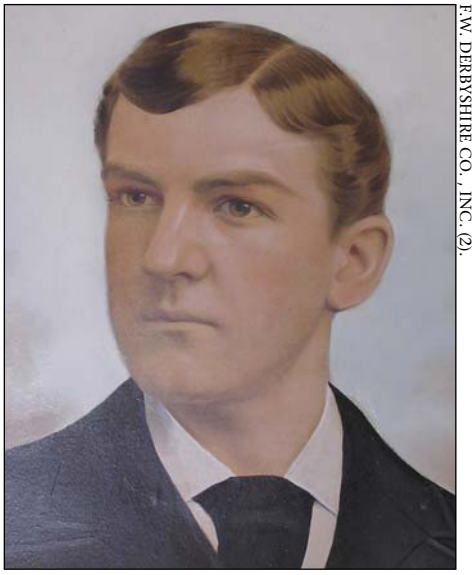
F. W. DERBYSHIRE, INC.

BY ANDREW H. DERVAN, FNAWCC (MI)

Background

By the 1870s the American Watch Co. in Waltham, MA, was firmly established as America's premier watch company, and mechanically talented individuals flocked to Waltham. The company's factory and watch production were growing, and it was developing new machinery and processes for mass-producing pocket watches. Around Waltham a number of watch tool and lathe companies were founded (American Watch Tool Co., Stark Tool Co., Hopkins Watch Tool Co., and Waltham Watch Tool Co.) and over the next 30 years more companies (B. C. Ames, Waltham Machine Works, W. H. Nichols Co., and Wade Tool Co.) were founded. Increasing pocket watch production and sales created a demand for watch tooling for both watch factories and pocket watch repairers. One of the most important products developed by all these companies was the watchmaker's lathe.

This article is a continuation of a series of Bulletin articles by Andrew Dervan on watch tool companies in Waltham, MA. Earlier articles were published in 2009.



F.W. DERBYSHIRE CO., INC. (2).

Figure 1. Young Frederick W. Derbyshire.

Figure 2, below. Frederick Derbyshire in his office, ca. 1917.

Frederick W. Derbyshire (Figure 1) entered the watch tool and lathe business during this growth period. In 1874 he was apprenticed at age 15 to J. E. Whitcomb & Co., a partnership between John E. Whitcomb and Harry N. Fisher, manufacturers of small lathes. In 1876 Ambrose Webster joined them, and the company was renamed American Watch Tool Company. It must have been exciting for young Frederick Derbyshire to work in this vibrant environment, with many talented coworkers and competitors. By 1901 he had risen through the ranks at American Watch Tool Co. to become chief superintendent at age 42.

Company History

In 1911 Frederick left the American Watch Tool Co. and founded F. W. Derbyshire Co. Today, 100 years later, this company is still manufacturing precision machine tools. In 1916 American Watch Tool Co. was acquired by Metz Company, and the next year Metz Company went into voluntary liquidation. In January 1918 the company was auctioned off. Frederick W. Derbyshire bought the former American Watch Tool Co.'s 8-mm and 10-mm watch-lathe drawings, tools, jigs, fixtures, finished lathes, trademarks, trade names (Whitcomb, WW, Webster-Whitcomb, Magnus, and Elect), as well as the necessary patents and copyrights to continue their manufacture.* These were the products that he was completely familiar with. He had designed a number of tools, including his tip-over tool rest, U.S. Patent 936,422 issued October 12,

* Appendix A to this article, listing patents, trademarks, and prints, can be found online at www.nawcc.org→Publications→Watch & Clock Bulletin→W&C Bulletin Addenda.

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1909. He combined the American Watch Tool Company's assets with his experience as a designer and production manager to grow the F. W. Derbyshire Co.

F. W. Derbyshire Co.'s office and factory were located at 157 High Street in Waltham (see Figure 2), and the company advertised in the 1917 *Waltham-Watertown Business Directory* (Figure 3). In 1960 the company moved to a new larger building at 265 Bear Hill Road in Waltham, and in 1992 the company moved to Shrewsbury, MA. Two interesting F. W. Derbyshire factory photographs from 1917 show workman working on small watchmaker's lathes and much larger lathes, along with various other pieces of equipment (Figures 4 and 5).

Figure 3. F. W. Derbyshire Co. advertisement in 1917 *Waltham-Watertown Business Directory.*

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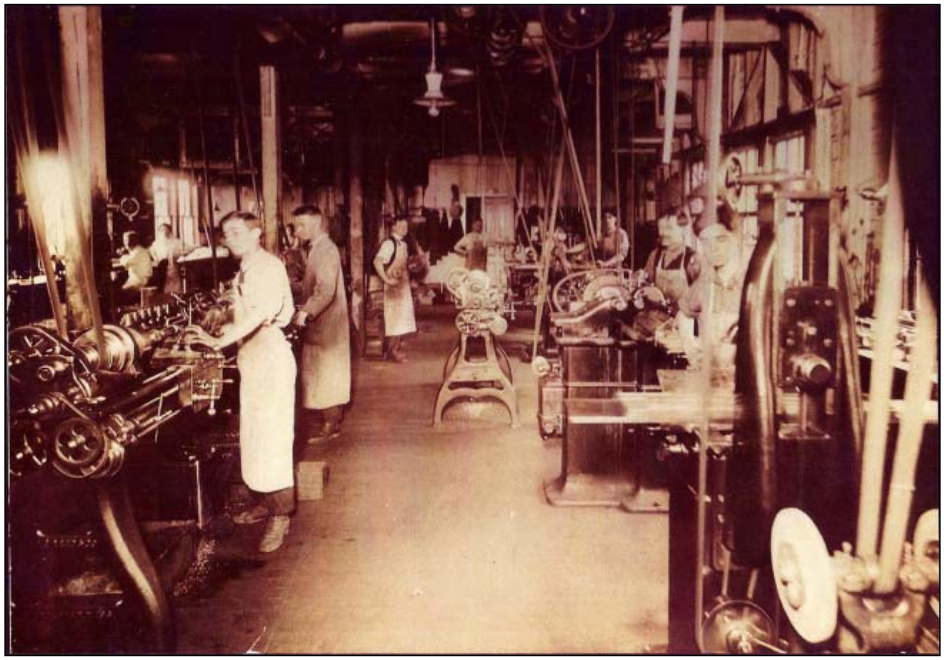
Figures 4 and 5, above and below. Factory photographs from 1917.



Frederick W. Derbyshire remained active in the company until his death on December 30, 1930. His son, Frederick W. Derbyshire Jr., who was born in 1888, was originally a company salesman and became president and general manager in 1931 until his death on April 17, 1948. Unfortunately, Frederick Sr.'s death occurred as the country was entering the Depression; this created a potential devastating family crisis for the business, because Frederick Derbyshire Jr. and his sister Elena had to sell every asset that their father had ever owned to keep the company alive through the Depression. In 1931 the F. W. Derbyshire Co. was incorporated. In 1917 John J. O'Callaghan joined the company and became foreman in 1922 and shop superintendent in 1941; he retired in 1983 with 66 years of service, providing continuity for the company through its many technology changes and evolution. Mary A. Duddy also became forewoman of the Chuck (collet) Department in 1941. The sons and daughter of F. W. Jr., Richard Derbyshire, Robert M. Derbyshire, and Donna D. (Derbyshire) Smith, became involved with the company. Unfortunately, Robert M. Derbyshire was killed in the infamous Coconut Grove fire in 1942. In the early 1950s Richard Derbyshire left the company, purchased the Stark Tool Co., and moved it to Maynard, MA. Unfortunately, that company was unsuccessful and was liquidated by the IRS. Shaw B. Smith, Donna S. Smith's husband, joined the firm in 1948 and later became president. Donna had many roles over many years and became president after her husband retired in 1980. She retired in 1982; their two

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sons, Stuart Smith, who had been active with the company since the mid-1970s, and Douglas S. Smith, who agreed to work for a short time on a few projects in early 1979, took over in active company roles in 1983: Stuart as vice-president and Douglas as president.

Company Products

Frederick W. Derbyshire worked on design changes for the small precision lathes that interested him. In 1916 he patented the rack and pinion-operated collet-holding tailstock design (U.S. Patent 1,168,063). Many of these tip-over tool rest rack and pinion tailstock designs are thought to be quite generic today. For a short period of time the company built the very small Derbyshire 1 1/2 lathe, a 28"-long bed lathe, an automatic pinion cutter, and cam automatic lathe. The cam automatic lathe's production continued into the late 1950s.

Frederick Derbyshire Jr. continued the company's product development, introducing a steel bed lathe, the Derbyshire Micro Mill, and a number of other designs, such as the spring-activated collet closer coupled with a mechanical instant spindle stop-start counter shaft, making the Derbyshire lathes more productive.

In 1948 Shaw B. Smith joined and led the company; he directed and designed products to move the company into the high-speed, high-precision arena: introducing the Model A Derbyshire Lathe using ABEC machine tool grade ball bearings from jet engine development.

In 1980 Stuart and Douglas Smith initiated a program to improve the quality and accuracy of all Derbyshire products: using higher spindle speed and greater stiffness that produced higher levels of precision. They developed more cost-effective solution designs and initiated tooling changes. Many product design changes appeared minor but greatly improved product performance. Spindle bores ground with dramatically improved overall tolerances. The Type 460 Derbyshire Speed Lathe and the Derbyshire CNC Lathe were introduced. In addition, casting improvements increased their stability and hardness. The instrument lathe improvements allowed customers to drill on a production basis even from the six station turret holes as small as 0.004" diameter. Today, the company has a large number of special two-spindle units that are used in medical product manufacture. Some of these spindles are used at quite low speeds, and some are cycled 24 hours a day from zero to 9,000 RPM and back to zero in a manner of seconds year after year. Many Magnus collets that were originally built by the American Watch Tool Co. are still used in the production of the latest in high-tech medical products.

Summary of Key Products

Webster-Whitcomb (W/W): A 50-mm (1.968" center-height) lathe with a 50-metric-collet capacity (0.1969"). Developed in 1887, this lathe became the universal standard for watchmaker's lathes throughout the world. The accessories made to fit on the bed of one W/W lathe can normally be used on any other maker's lathes.

Derbyshire Large Lathe: F. W.'s first design marketed under his own name, ca. 1913-1940. It was a watchmaker lathe but with a headstock modified to accept a larger-than-usual 1/4" (80 metric) collet.

Magnus: Introduced by the American Watch Tool Co. in 1909 and produced until the late 1940s. F. W. subsequently developed and named it; it was a larger-capacity, more heavily built lathe that still retained the 50-mm center height of the ordinary lathes but with increased collet capacity to 80 metric (5/16").

Elect: Designed for clock and instrument repair, ca. 1909-late 1940s. It was another larger, more heavily built lathe in the original W/W style but with a 60-mm center height. The collets for this and

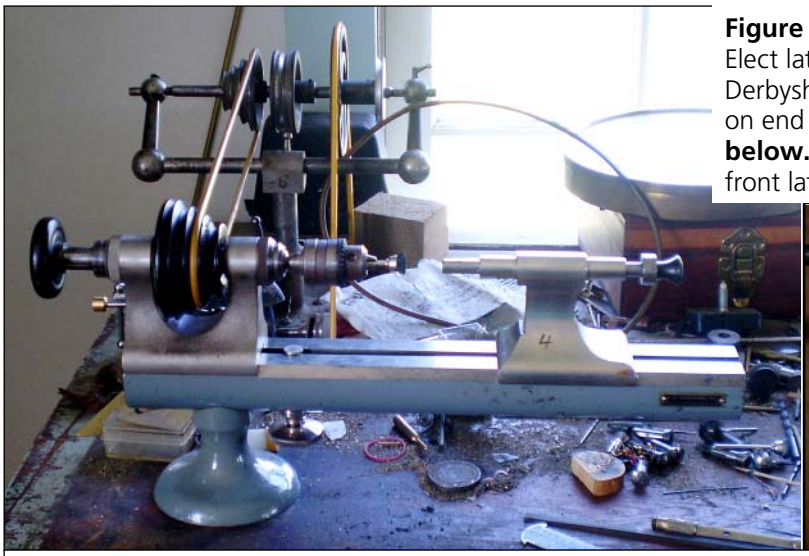

Figure 6A, left. 10-mm Derbyshire Elect lathe. **Figure 6B, right.** "F.W. Derbyshire Waltham MASS" stamped on end of the lathe bed. **Figure 6C, below.** Company nameplate affixed to front lathe bed.

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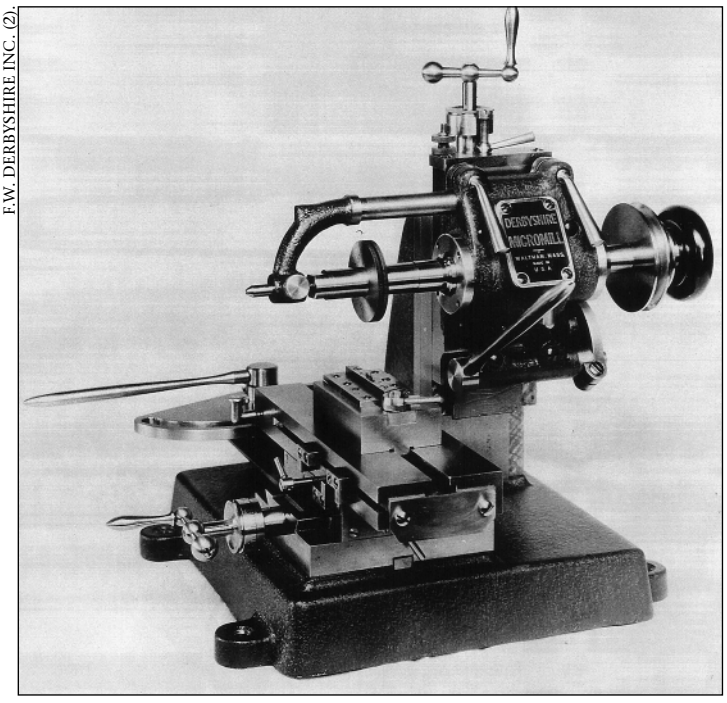

Figure 7. Derbyshire Micro Mill.

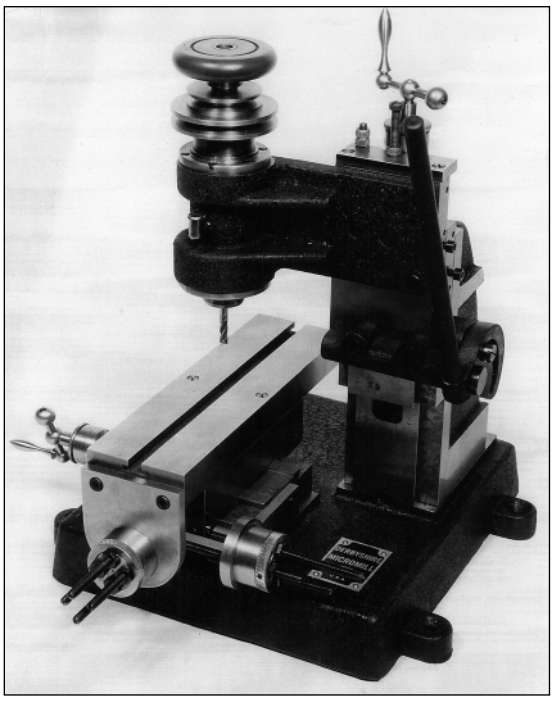

Figure 8. Micro Drill Press.

the Magnus are identical (Magnus-Elect collets).

Model 750: Designed in the 1950s for use in instrument and electronic factories and repair shops—and for light, precision manufacturing. This lathe remained in production during the early years of the twenty-first century. The center height is 75 mm and the collet capacity is 80 metric (5/16").

Model A: In production since the late 1950s, this is a variation of the 750 with a 0.5" collet capacity. Many accessories are interchangeable with the 750.

Micromill: Produced, ca. 1930s-1950s, to handle work connected with the timing fuses of large shells, this miniature precision milling machine has always excited the imagination of machine tool enthusiasts. About the size of a portable typewriter, it has been used for other jobs because it allows milling and grinding to very close limits (Figure 7).

Micro Drill Press: Drilling microscopic holes is a much more difficult task than turning small parts. The Micro Drill Press was designed to hold the drill in an ultraprecise collet and so give the job the best chance of starting straight and remaining true (Figure 8), ca. 1930s-1950s.

460: Type 460 was introduced in 1985 and designated a Magnus instrument lathe (Figure 9).

800, 900, 1000 Series CNC lathes: 800 and 900 series CNC lathes were introduced in 1987; Model 800 used a Magnus collet, Model 900 used a 3-C collet, and the 1987 Model 1000 uses a 5-C collet. These were the first lathes to use an interchangeable dovetail clamp-down top tool plate to remove and replace tooling setups for different jobs. See Figure 10 for Model 900 CNC lathe.

Derbyshire Collets

The Webster/Whitcomb Collet was originally designed by the American Watch Tool Company and copied by the Germans and Swiss. However, because the collet was then still patent protected, the first Swiss (and probably German) versions used altered thread pitches. When Levin began making lathes in the 1940s, they also produced a deviant type.

The standard body size of a W/W collet is 8 mm and the nominal thread diameter is 7 mm. What is usually referred to as a 10-mm Derbyshire collet is actually a 10-mm body-diameter Magnus collet, also called (since the Levin copies first appeared) the "D" or "Derbyshire" collet. The Derbyshire Elect Lathe also accepts the same collet.

The other collet that causes confusion is the Derbyshire "Large"; these have an 8-mm body and an 8-mm diameter thread, allowing a 1/4" through-collet capacity. Although the "Large" will fit a standard Webster/Whitcomb lathe, it requires the draw-in spindle to be changed. Now discontinued by F. W. Derbyshire as a regular stock item, the company can still supply "Large" collets on a special-order basis.

Conclusions

F. W. Derbyshire was founded by Frederick W. Derbyshire in 1911. He gained extensive experience developing and refining lathes working for the American Watch Tool Co. He carried on the American Watch Tool Co. traditional lathe lines and made product refinement and larger-capacity lathes; his son Frederick Jr. developed a Micromill and Micro Drill Press. The F. W. Derbyshire Co.

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has continued developing new generations of precision mills, lathes, and CNC machines. The company is located in Shrewsbury, MA, and celebrates its 100th anniversary in 2011.

Technical and Business Acknowledgments

F. W. Derbyshire, Inc., and Tony Griffiths website, lathes.co.uk, provided the technical information on F. W. Derbyshire Co. and its products. *The Waltham News-Tribune* May 21, 1986, article, page 8, provided details on the company's history at the time of its 65th anniversary.

Acknowledgments

I give a special acknowledgment to my wife Linda for her support and patience with this project. This article could not have been completed without assistance from many people and institutions who provided research information: Tony Griffiths, Douglas Smith, Leslie Nesky, Mahlon Shetler, and *The Waltham News-Tribune*.

About the Author

Andrew Dervan joined the NAWCC in 1997 and found clock collecting fascinating. He has found researching the histories of various makers and companies as challenging and exciting as collecting. His principal collecting interest is weight-driven clocks from late nineteenth and early twentieth centuries. He supports his clock addiction by working as a chemist for DuPont Performance Coatings.

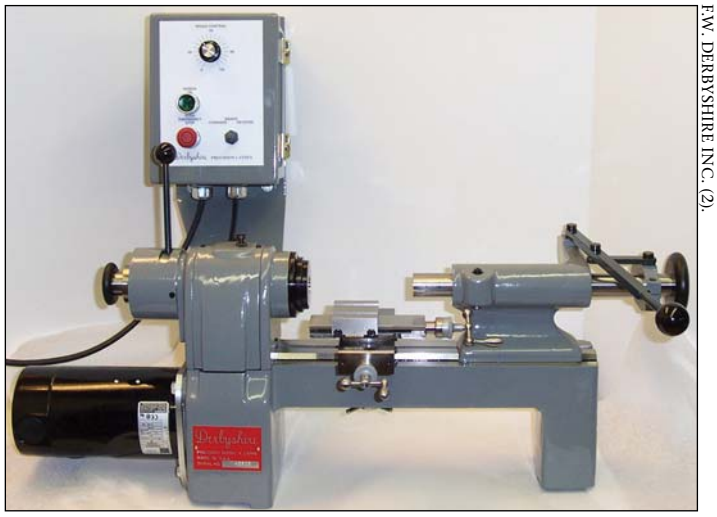

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Figure 9. Type 460 lathe: Magnus LB (Long Bed).

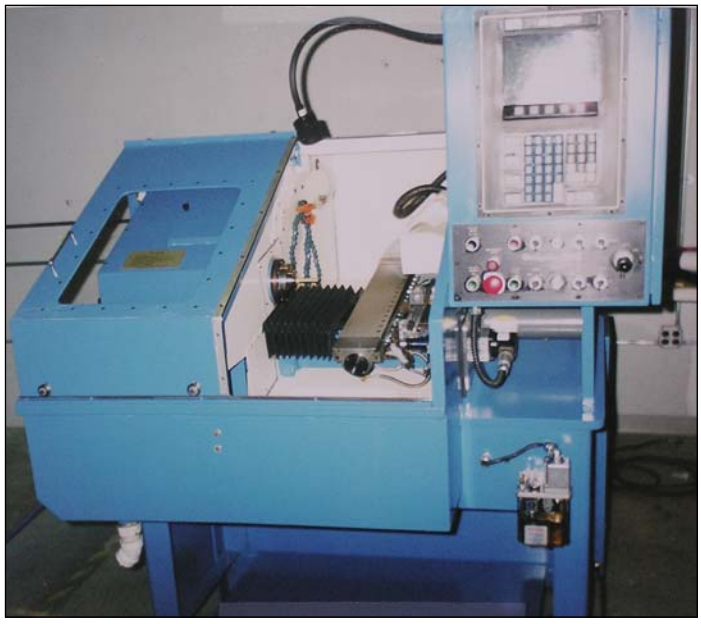

Figure 10. Model 900 CNC lathe.

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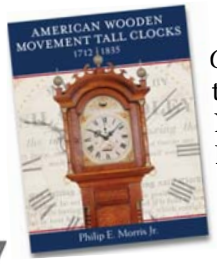

Copies of *American Wooden Movement Tall Clocks 1712-1835* will be awarded as prizes at the Symposium. This new book is by Philip Morris Jr., the Symposium James Arthur Lecture speaker.

Philip Morris is widely recognized as an authority on wooden tall clocks. *American Wooden Movement Tall Clocks: 1712-1835* is an essential reference book for collectors, dealers, and students of early American clocks, furniture, antiques, or decorative arts. Lavishly illustrated and meticulously researched, this volume is the most comprehensive, accurate, and up-to-date compilation of early eighteenth- and nineteenth-century wooden clockmakers and their clocks. New information obtained from the study of hundreds of wooden clocks, account books, diaries, genealogical records, family histories, town histories, probate records, and period newspapers is included.

Symposium information begins on page 376.

Symposium information continues on page 420.