

Historical Guide

(in approximate chronological order)
to (almost) all

Rivett LATHES

manufactured by: **FANEUIL WATCH TOOL CO. (1884 - 1905),**
RIVETT LATHE MANUFACTURING CO. (1905 - 1912),
RIVETT LATHE & GRINDER CORP. (1912 - 1966)

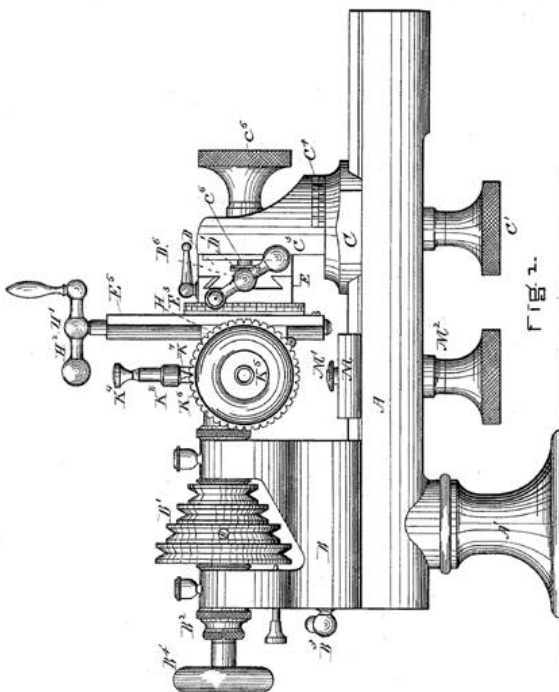
compiled by **Tom Hammond, ©2003**

In 1884, the "Faneuil Watch Tool Co." (hereafter FWTCo) was founded in the Brighton district of (south) Boston by Edward Rivett and C. A. W. Crosby, a jeweler for whom Rivett had worked for the past ten years. The company's first product appears to have been a watchmakers lathe to the design shown in Rivett's patent # 363,000 issued in May, 1887.

(No Model.)

3 Sheets—Sheet 1.

E. RIVETT.
WATCH MAKER'S LATHE.
No. 363,000
Patented May 17, 1887.



WITNESSES.

Frank A. Parker
William Edison

INVENTOR.

Edward Rivett

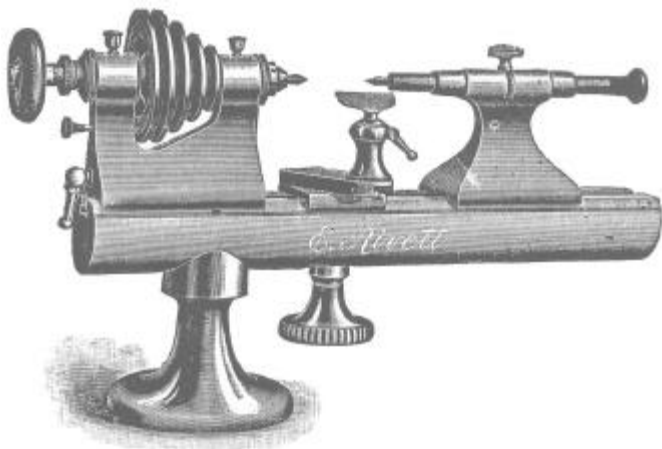
A. PETER, Photographic, Washington, D.C.

Rivett made a number of distinctive choices for the specifications of his watchmakers lathe, and most of these continued through until 1912, when the production of these lathes ended. (There was a brief resurgence of watchmakers lathe manufacturing in the years after World War II, but these machines were to an entirely different design and had nothing in common with the earlier ones.)

Rivett chose a center height of 2 3/16", somewhat larger than the more usual 1 3/4", 50 mm, or 2" center heights of the competition; elected to make the beds of steel rather than cast iron; and designed a unique collet with a shank diameter of 0.300" and sized in a specific-to-Rivett numbering sequence that seems to have been adapted from the Stubbs wire gauge, but with more rational steps between adjacent numbers. He clearly was aiming at the top end of the then-thriving market for American-made watchmakers lathes, and was always content to make and sell a relatively small number of top-quality products rather than seeking a wider market through cost-cutting and more aggressive marketing, a policy not always in harmony with the preferences of his partner.

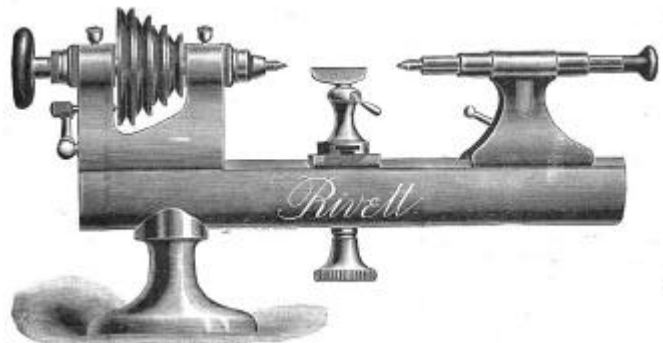
Probably only a small number -- very likely no more than ten -- of the first version of the Rivett watchmakers lathe were produced, and only one surviving example, # 106, has so far turned up and been brought to my attention. There is some evidence that Rivett may have began the serial number sequence for his watchmakers lathes with # 101, and by # 111

the design had been changed by removal of the decorative ornamental rings near the top of the pedestal. This resulted in the first version of the watchmakers lathe to be produced in substantial numbers.

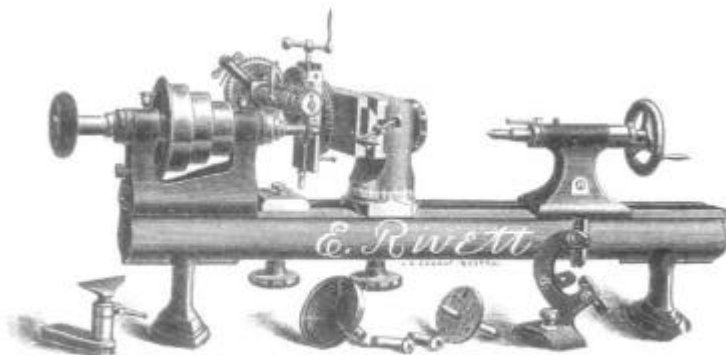


a reduced-specification lathe at \$45, by providing a cast-iron rather than steel bed, leaving off the oil cups from the headstock, and not hardening the tailstock spindle. These were designated "The Crosby Lathe" rather than The Rivett, and they seem not to have sold well. As far as I know, none have survived.

At some point in the early 1890s, Rivett made a small alteration to the tailstock binder, resulting in the lathe design I call Type 1b. These were produced until the late 1890s, with a total production of Type 1 lathes of approximately 1000. Interestingly, Rivett designed a tailstock binder nut within the body of the headstock casting (rather than above it, as in type 1a) similar to the binder nut on a watchmakers staking tool he had patented (# 425,522) in April 1890) and which FWTCO marketed for about ten years before selling that part of the line to the Kendrick and Davis Company of Lebanon, New Hampshire.



Probably shortly after the introduction of their watchmakers lathe line, FWTCO added a small bench lathe to their line which had previously focused exclusively on watchmakers tools. In the earliest FWTCO catalog I have been able to examine (probably from 1888), this is shown as the Rivett Bench Lathe, with text as follows:

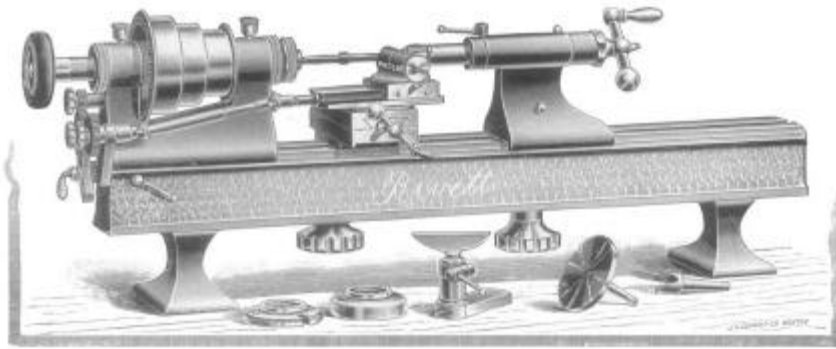


No. 38. — The Rivett Lathe.
For Electricians, Toolmakers, etc.

"Cut No. 38 represents our 32-inch Rivett Bench Lathe. This Lathe is especially adapted for fine tool-makers, electricians, jewelers, model-makers, and all makers of light machinery. The spindles and bushings are made from the very

best tool steel, and are accurately ground by special machinery. It has the patent slide rest and milling attachment, which can easily be converted into a milling machine for cutting wheels and cutters (from three inches down), grooving taps and reamers and making cutters of all angles. The tool-holder on the sliderest is an eccentric, which makes it very easy to set the tool to the center. The quill that goes in sliderest for milling attachment is made to take split chucks same size as the headstock spindle. "Length of bed, 32 inches; swing, 7 inches; between centers, 18 inches; hole through spindle, 19/32 inch; largest hole through spring chuck, 13/32 inch."

This is essentially the round-bed No. 3 of later catalogs, except that the bottoms of the two pedestals are oddly shaped somewhat like double-ended flatirons. The price of the lathe with standard equipment was \$100, and the sliderest sold for \$50 by itself, or \$100 with the milling attachment. The collets would have been the type now designated No. 3OS.

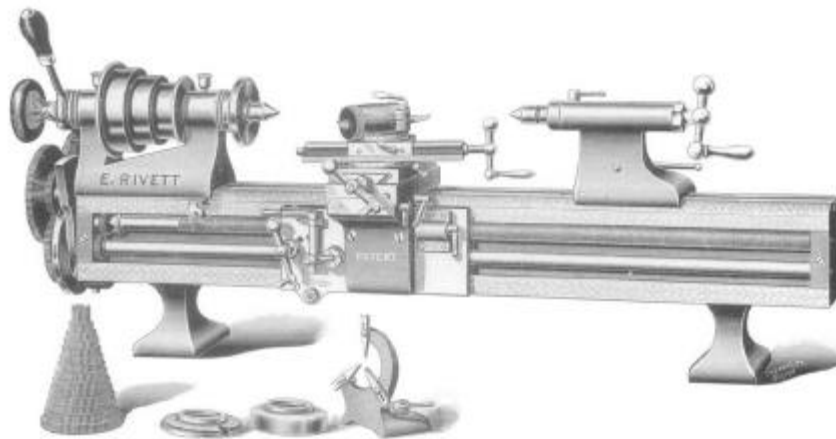


RIVETT No. 4 BENCH LATHE WITH SCREW CUTTING ATTACHMENT FOR SLIDE REST.

In the next few years Rivett began broadening his line of machinery, and probably by the early 1890s (certainly before 1895) had developed a larger bench lathe -- the No. 4. This is a much more substantial tool than its older brother the No. 3, with a comparatively massive bed of rectangular cross-section, with the bed lengthened to 36 inches (18 inches between centers), 8 inch swing, 1/2" collet capacity [the collets were those now designated No. 4OS], and with a 1/2" hole through the

spindle. An interesting comment is made in the FWTCO 1898 catalog (the earliest I have showing the No. 4): "The bed, feet, and all parts of this lathe are milled with forming cutters, scrape finished and polished, leaving no skin of casting to cause unequal strain and false alignment." Again, a full line of attachments including Rivett's patent sliderest and milling attachment were offered. The 1898 price for the No. 4 was \$125, while the sliderest cost an additional \$60 and the milling attachment \$75. The same catalog shows the No. 3 lathe, now with rectangular pedestal bottoms, reduced to \$80.

The Eight-Inch Precision Lathe, the original version of the 608, was essentially a development of the No. 4 lathe into a small and precise but very rigid and capable engine lathe, by taking the rectangular bed of the No. 4 and cutting a dovetail into the front surface, in which a massive saddle slides, driven by separate lead and feed screws. The original version had no backgearing and thus its headstock was very similar to that of the No. 4, except that a spindle gear was added inside the large end of the cone pulley, from which the drive to the lead and feed screws was taken. The tailstock appears identical to that provided for the No. 4 lathe. An article in the



EIGHT-INCH PRECISION LATHE.
Weight, 250 lbs. Price, \$450.00.

March 28, 1896 issue of "Scientific American" magazine shows the lathe in this form, and enumerates the wide range of attachments available for it: detachable slide rest, revolving tailstock (actually a knee for mounting the slide rest upright on the bed for light milling work), traverse miller, slotting attachment, automatic chuck closer, cut-off and forming slide, bed-mounted turret, internal and external grinders, and a traverse grinder. The final paragraph is worth quoting: "Accuracy has been the aim of Mr. Rivett. The lathe is finished in all parts with the most

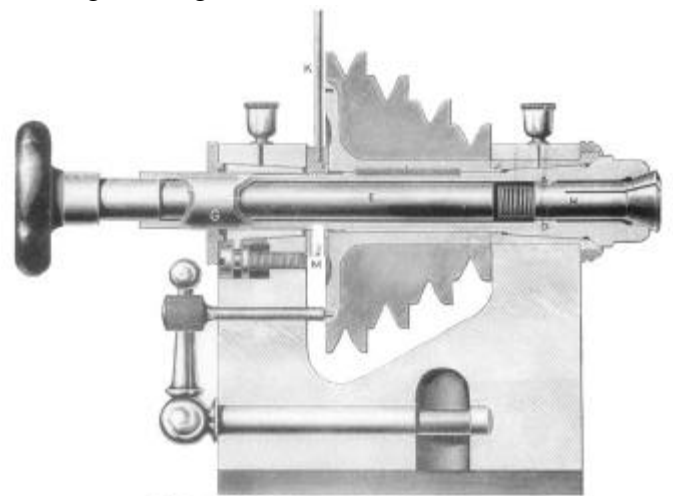
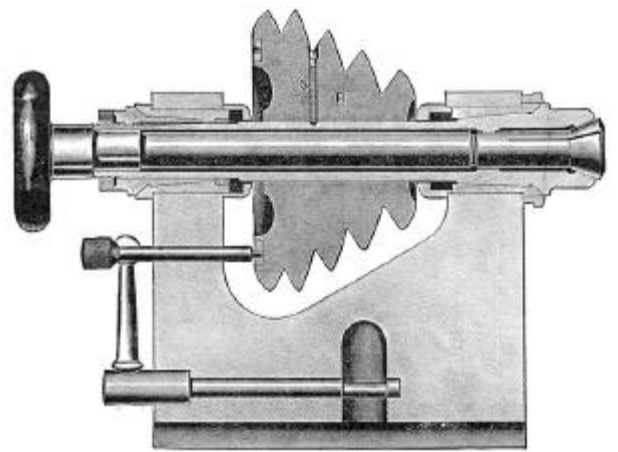
scrupulous care, the work of the scraper and diamond being everywhere shown. The bearings are of hardened steel. All surfaces and fittings are polished and scraped, no paint being used." The Eight-Inch Precision Lathe originally sold for \$500.

In the mid-1890s, at about the time that the Eight Inch Precision Lathe was introduced, Rivett was developing a new arrangement for the bearings of his lathes. Previously he had used the industry-standard double-angle opposed conical bearings originally developed by Charles S. Moseley for the early lathes at the Waltham watch factory. While highly successful in practice, these have the limitation, at least in theory, that there are no independent adjustments for side shake and end shake separately.

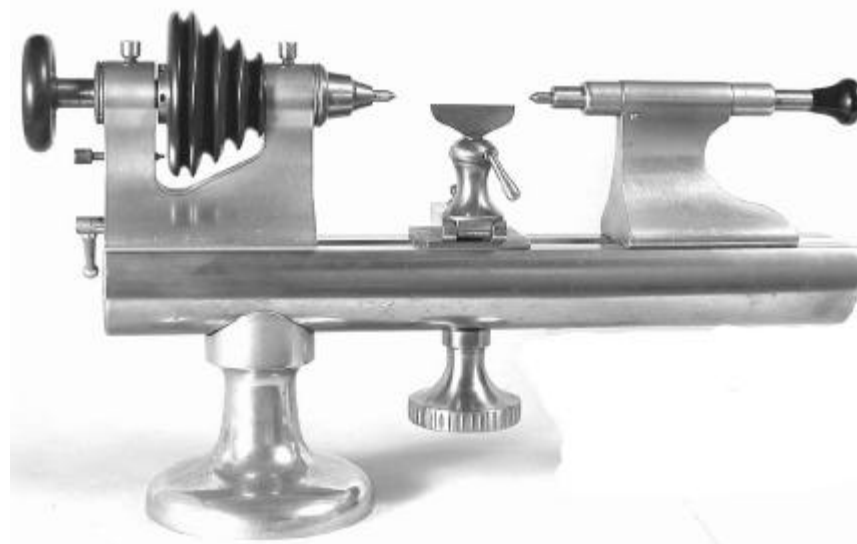
In experimenting with high-speed bearings for his internal and external grinders (he briefly advertised having been able to run the wheel spindles of his grinders at 100,000 RPM, but quickly removed the claim from later catalogs -- presumably the life expectancy of bearings running at such speeds was too short), he changed the form of the rear bearing bushing to one with a parallel inner surface and a single-angle conical outer surface, with a slit so it could be contracted by being drawn into a matching conical female hole in the headstock casting, to control side shake. End shake was controlled by having the pulley make contact with the rear surface of the front bearing housing, under the adjustable control of a ringnut acting on a short thread on the spindle between the pulley and the rear bearing housing.

The new bearing arrangement proved so successful that Rivett used it on almost all of their subsequent plain-bearing lathes, including all 608s up to the very last one produced in the mid-1960s. Hardinge Brothers copied the collapsible bearing arrangement for their "Cataract" range of bench lathes, using it at both ends of the spindle, though with a ball-bearing within the cone pulley to deal with end thrust.

The new bearings were combined with several other changes to the design of the watchmakers lathe, resulting in the No. 2. On this, the guiding surfaces aligning the headstock, tailstock, and shoe (for the tee-



RIVETT LATHE No. 2 FOR WATCHMAKERS.
Sectional cut of Headstock showing new construction.

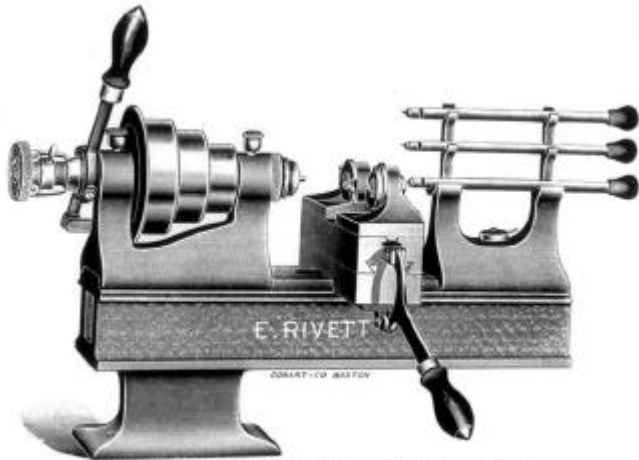
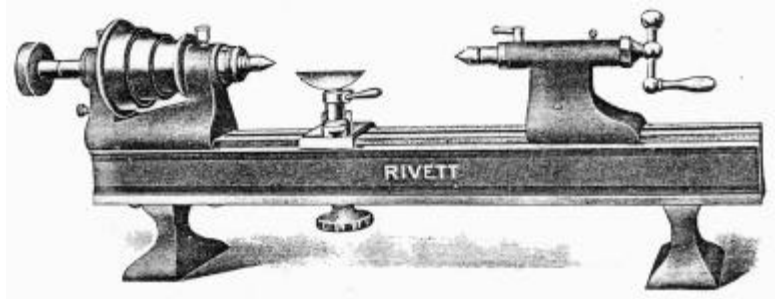


rest and slide-rest) to the bed are moved from the outer edges of the bed ("edge guides") to a vee-groove in the center ("center guide"), and the design of the tailstock is changed to one that is stiffer but perhaps less elegant than that used on the Type 1 lathes, but which provides more metal in the casting.

The new design sold for \$40, but this was still far above the price of the Webster-Whitcomb, which had been reduced to \$27 by 1900!

At about this time, the headstock of the Eight-Inch Precision Lathe was reconfigured with back-gearing and the new bearings and the bed was changed to center guide; it sold for \$450 in 1901. Interestingly, the No. 3 and No. 4 bench lathes received the new bearings but remained edge-guided.

Rivett also added three more sizes to his line of bench lathes: a No. 3 1/2 which was essentially the No. 3 redesigned to resemble the rectangular-bedded No. 4.

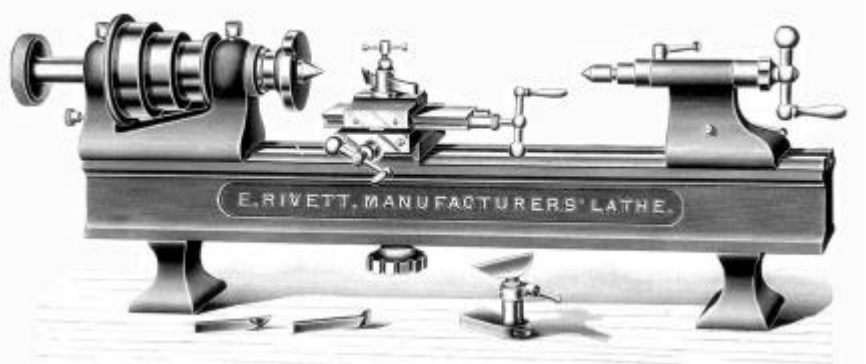


RIVETT MANUFACTURERS' LATHE No. 3.
Weight, 65 lbs.

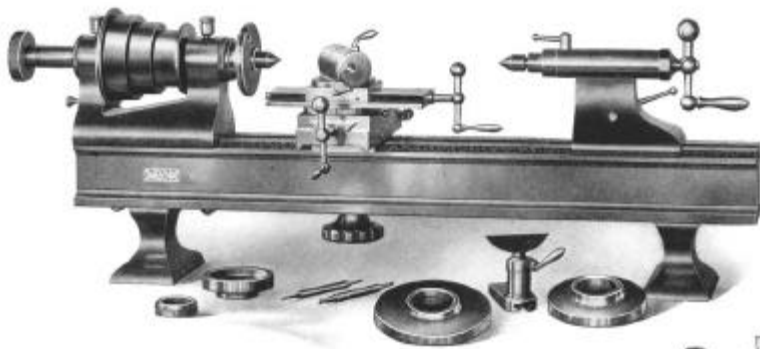
A No. 3 Manufacturer's Lathe which was a short-bed, single-pedestal version of the No. 3 1/2 with a lever collet-closer, double-tool forming slide, and a half-open tailstock with readily-interchangeable quills (\$175).

A No. 5 Manufacturers Lathe which is a No. 4 with a larger-spindled headstock accepting larger collets with a 3/4" through-capacity (\$165 with slide-rest).

In 1905 Edward Rivett bought the remaining part of the business from C. A. W. Crosby's heirs, and Faneuil Watch Tool Co. became Rivett Lathe Mfg. Co. Other than the change of name on the machine nameplates, the line continued much as before, except that a set of larger collets was introduced at about this time, with the "OS" (old style) collets replaced by "NS" (new style) with larger bodies and capacities. Thus the No. 3 lathes now take 1/2" rod, the No. 4 3/4", and the No. 5 1". In the case of the watchmakers lathes, the new collet was called the Ideal (though Hardinge Bros. still lists it as the #2NS), and while it has a larger shank diameter (.325" vs. .300"), the capacity was not changed, and both versions of the collets had the same maximum .227" capacity. The Ideal collet had enough metal that it surely could have been made in a 1/4" size, and this may have been available as a special order. The very similar Hardinge 1C collet (.335" shank diameter) has a 1/4" maximum capacity.

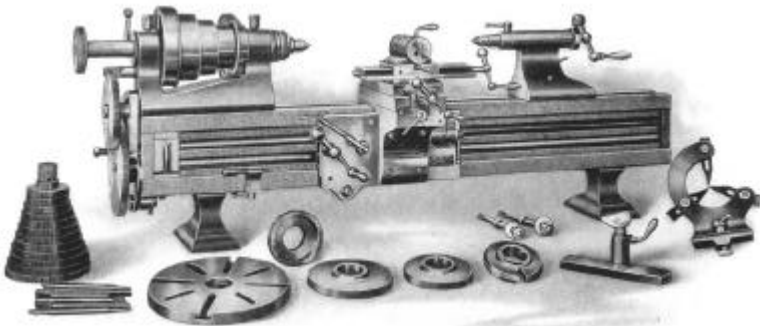
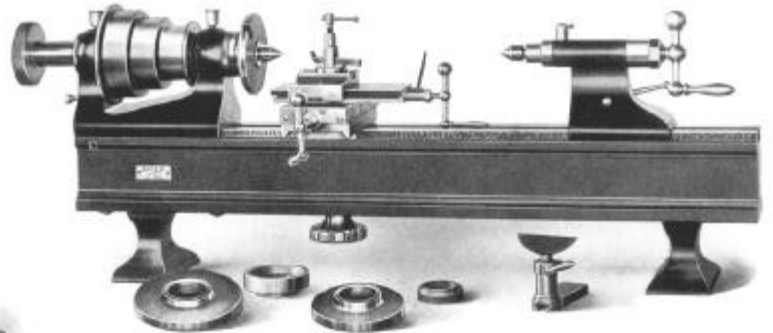


In 1912 Edward Rivett, supposedly concerned about his health, decided to retire and sold the business to a group of investors. He had no further involvement with the company (now known as Rivett Lathe & Grinder Co.), though he lived for twenty-five more years. Soon after the change in ownership, the line of products was simplified and renamed: the watchmakers and No. 3 and 3 1/2 lathes were discontinued, the No. 4 lathe was renamed the 504, the No. 5 lathe became the 505, and the Eight-Inch Precision Lathe was now designated the 608.



504 Lathe

505 Lathe



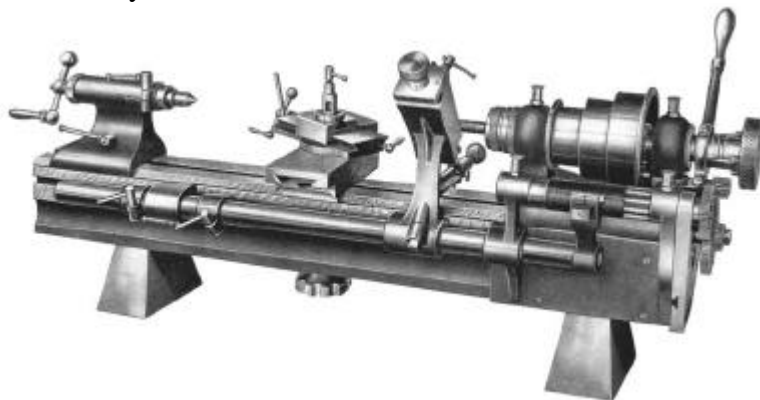
608 Lathe

507 "Junior"

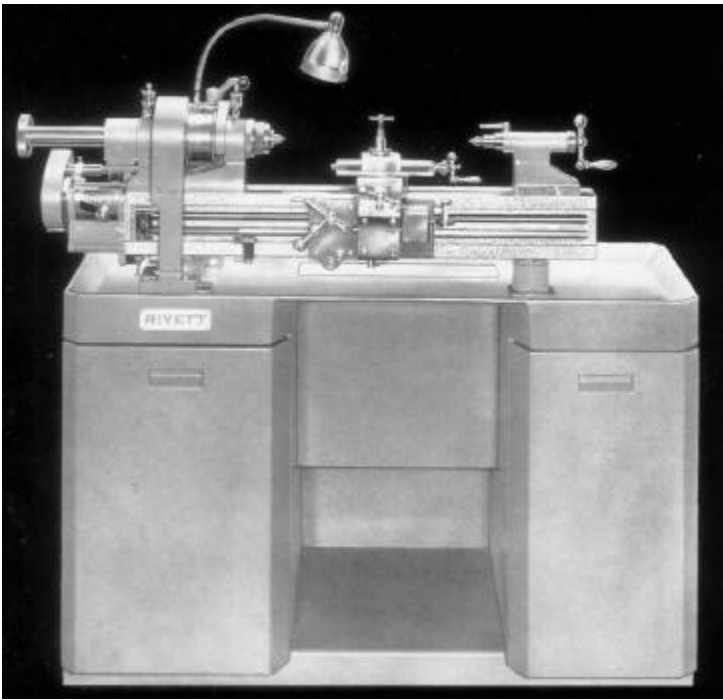


Changes to the products were relatively infrequent during the ensuing decades. The major change during the 1920s was the introduction of a new line of less-expensive bench lathes, the 507 or "Junior". These somewhat resemble the 504 lathes, but had several changes which allowed them to be manufactured and sold at a lower price. The headstock bearing arrangement was essentially two "collapsible" parallel-inner-surface cast-iron bushes (which, in steel, were used as the rear bearing only in other Rivett lathes), with end shake controlled by a threaded insert into the rear of the pulley cone, with fiber washers preventing metal-to-metal contact. The spindle took Rivett No. 7 collets (3/4" maximum capacity), and had a 5-degree included angle taper nose. Relatively small numbers were produced, totaling fewer than 300 by 1940, when it was discontinued.

Another brief introduction was a chasing lathe designated the 606, which only appeared in one catalog. It resembled a 505, but with gearing from the rear of the spindle to a leadscrew on the back of the bed.



The 504 lathe apparently sold poorly, with most buyers preferring the larger capacity of the 505, and it was discontinued in 1928.

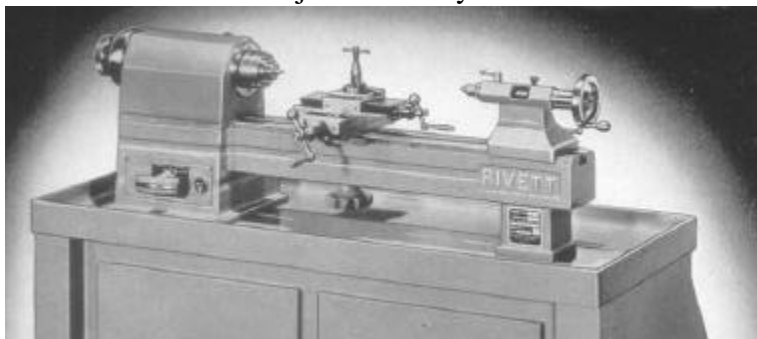


At some point during the 1920s, two changes were made to the 608: it acquired a quick-change gearbox for threading and power feed, and a version was produced with a larger spindle taking 5C collets, with a maximum capacity of 1 1/16", versus the 3/4" of the 4NS version. Both of these features were initially optional, but eventually (by the late 1940s?) the 608 was only produced with both included as standard. Later a vee-belt drive supplemented the traditional flat-belt version, and it too became standard eventually.

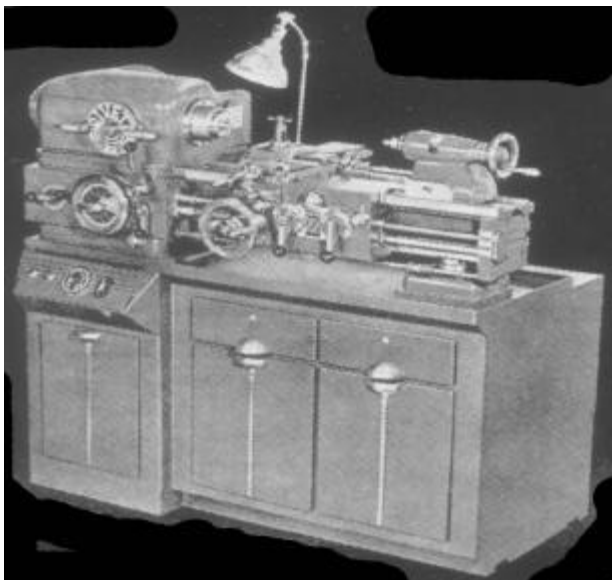
During the depression years in the 1930s, Rivett suffered along with most other tool makers from greatly reduced orders, but as war loomed in the late 1930s, business began to improve. Several hundred 608s were sent to England on "lend-lease", and many hundreds of others were ordered for the US Military. Perhaps buoyed by soaring sales of their existing

models, Rivett management began planning for a line of new models.

The first of these to appear was the 918, which began production in 1938. This was a thoroughly modern plain bench lathe, 9" swing by 18" between centers; it was also available as a hand screw machine or turret lathe. More massively constructed than any previous Rivett lathe, it had a box headstock with the drive pulley on the rear of a spindle mounted in precision ball bearings, so belts could be changed without interfering with the spindle bearing preload adjustments. Rivett had offered versions of the 505 with ball (and roller) bearings, but the 918 was the first Rivett product designed specifically to take advantage of them. 918s were available with spindles taking either 5C (1 1/16" capacity) or 6R (1 1/8" capacity) draw-in collets. The lathe was generally supplied on a cabinet containing either a motor-jackshaft drive providing eight spindle speeds between 150 and 3750 RPM or a variable speed drive providing any speed between 100 to 2500 RPM; the lathe with cabinet and drive weighed about 850 lbs. This became by far the most popular Rivett lathe, with over 2000 sold in just over 20 years.



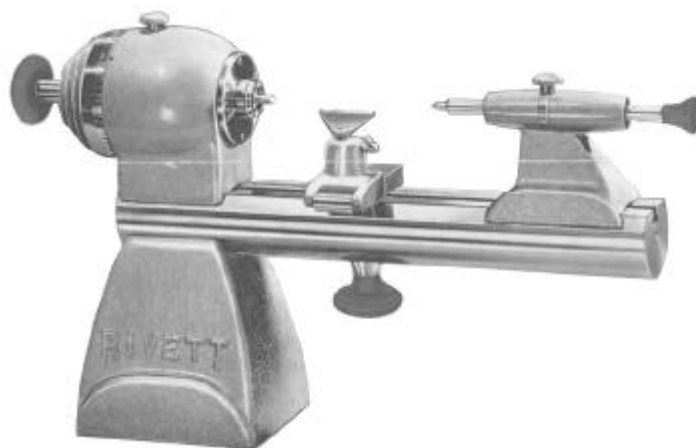
Rivett simultaneously developed and began production of the 715 lathe, the 918's little brother. Built to essentially the same design, it used 4C collets (3/4" maximum capacity), with everything reduced more or less in proportion. It never sold in similar quantities to the 918, with production terminating in 1953 at serial number 598.



Rivett also introduced, in 1941, an entirely new toolroom lathe, the 1020. The pre-war version was a much smaller machine than the post-war version, but was still a massive step up from the 608: 10" swing and 20" between centers in a floor-model lathe with integrated base and drive, weighing 1475 lbs in a 26" by 53" footprint. A 1 HP DC variable-speed motor provided spindle speeds of 100 to 2300 RPM in open belt drive and 20 to 460 RPM in back gear. A quick-change gearbox allowed 51 thread pitches between 7 and 156 tpi, and feeds between .001" and .028" per revolution.

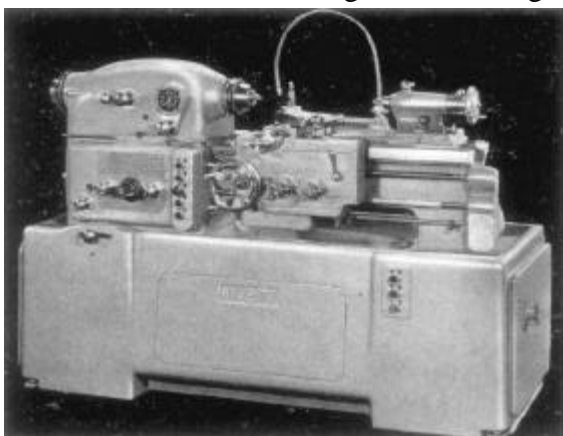
Only a couple of dozen of these were produced in 1941 and 1942, before production was halted to concentrate on large-volume wartime orders for the other lathes, and as far as I know none have survived.

At the end of the war in 1945, Rivett began planning to reenter the market for watchmakers lathes, after an absence of more than 30 years. I have been told that management thought they would find a market among the returning servicemen retraining to become watchmakers and instrument repairmen.



In 1948 the 1R or BALL BEARING lathe was introduced, representing a totally new design with both styling and mechanical features derived from the 918/715 line. The headstock casting had an unmistakable bulbous shape, with large covers for the (comparatively) massive bearings, and the pulley was overhung at the far left of the headstock. Compared to all earlier Rivett watchmakers lathes, the center height was reduced from 2 3/16" to 50 mm, matching the Derbyshire "WW" standard. The bed, made from stainless steel, had outside guides which matched also "WW" dimensions. The knobs for the drawtube, tailstock spindle, and tee-rest retaining bolt, were made from a bright red translucent plastic which turned out to be very brittle, and many surviving lathes no longer have their original knobs. The spindle takes Rivett 1R collets which are very similar to Derbyshire "WW", though with a slightly smaller thread. Oddly, at a time when most other manufacturers were offering collet-holding tailstocks, the new Rivetts had plain, small-spindle tailstocks. The

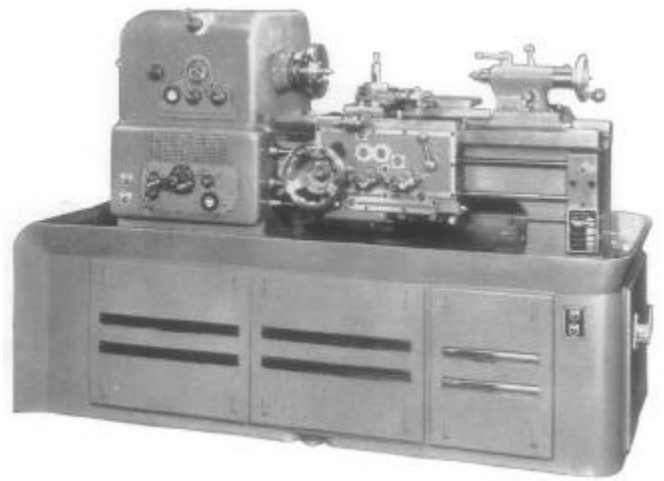
serial numbers, stamped on the bearing cover facing the headstock, form a new series: those known to have survived have numbers from 21 to 503. There were two versions, identical except for the base, which was usually a box casting, but some were sold with a pedestal. Production seems to have ended sometime in the early 1950s.



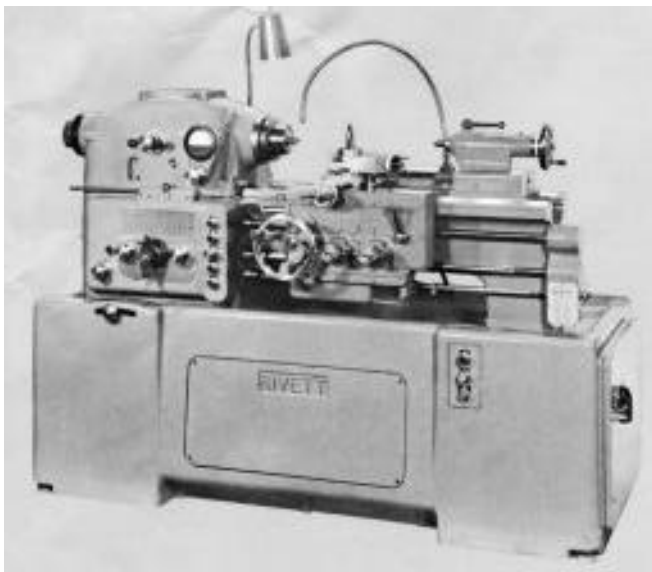
1020S/1030S

At about the same time as 1R watchmakers lathe went on the market, Rivett introduced its ultimate new model, the 1020S/1030S toolroom lathes. These were truly massive machines, weighing 3900 lbs, and providing 12 1/2" swing (despite the "10" in the model designation) and either 20" or 30" between centers, in a 29" x 73" footprint.

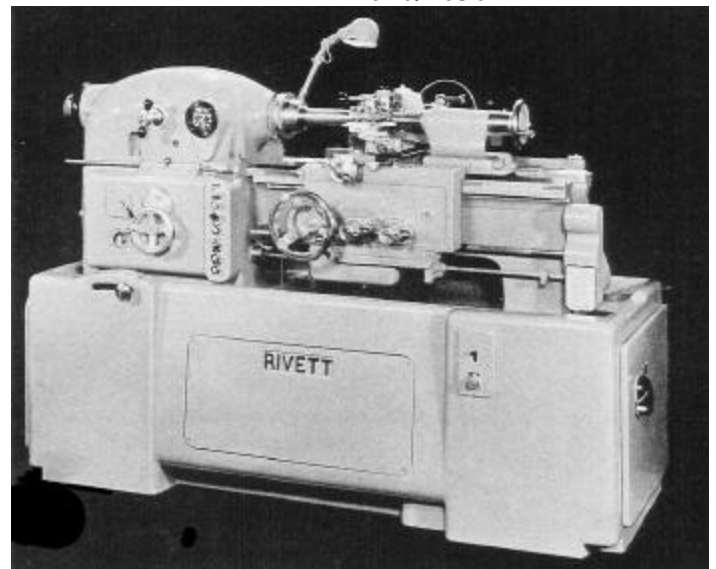
They were aimed at approximately the same market niche as the Monarch 10EE or the Hardinge HLV, but were more massive and powerful than either, with a 5 HP drive providing speeds of 280 to 2500 RPM or 400 to 3600 RPM in open drive, and 22 to 200 RPM and 44 to 400 RPM through two sets of back gearing. The spindle was offered in either L0 taper or 4" D-1 cam-lock mount, and 6R collets (1 1/8" capacity) fit directly into the spindle without an adapter. A quick-change gearbox provided thread pitches "including every world standard from 2 to 240 per inch". About 400 were made, with production continuing until the end of the company in 1966. Variations on the 1020/1030 theme were offered as 1020/1030F, 1020/1030M, and 1020/1030R, but I have very little information on them.



1020/1030R

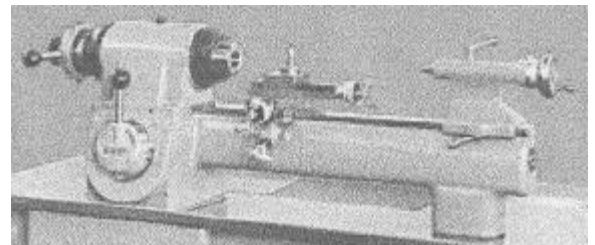


1020/1030F



1020/1030M

The final lathe produced by Rivett, beginning in the 1960s, was a redesign of the 918 which was designated the Sixty Series. I have never encountered one of these machines, nor have I seen any detailed literature on them, so I can only state what was shown in Rivett ads in "Machinery" in 1960: they were available either as a plain bench lathe or as a turret lathe taking 5C or 6R draw-in collets (1 1/16" or 1 1/8" capacity) or 7R stationary collets (15/16" capacity), with air-powered or lever-operated collet opener/closers. The styling of the bed and headstock castings was more rounded and "modern" than those of the 918, and the drive featured a "single lever [which] starts lathe spindle and selects any speed within the range up to 4800 r. p. m. Same lever will change speed during operation, instantly stop or reverse spindle, and control air operated collet closer. No waiting during speed selection or speed change."



The mid 1960s found Rivett's lathe sales at an unprofitable level, only eleven 1020F lathes remained to be built from an order of 50, and future orders were bleak. At the same time Rivett had established a profitable line of Hydraulic Valves, based on an earlier Rivett patent. The Hydraulic Valve business was sold to Applied Power. Their existing hydraulic division was Dynex, which eventually became Dynex/Rivett.

The Rivett Machine Tool manufacturing business was acquired by, and became a division of the Leland-Gifford Company, Worcester MA, (makers primarily of multi-spindle drill presses) in 1966. Leland-Gifford was acquired the next year by White Consolidated (trucks, appliances, etc.), who apparently was not interested in being in the precision machine tool business, and shut down the Rivett Machine Tool operations. Rumors say that the entire stock of records, drawings, patterns, castings, spares, etc. were disposed of in a Dexter, Maine landfill in the 1970s. A sad end to a company almost 90 years old.