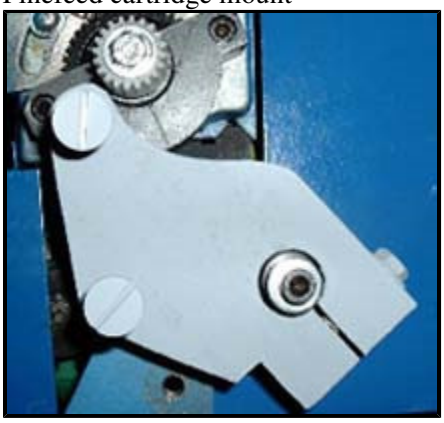
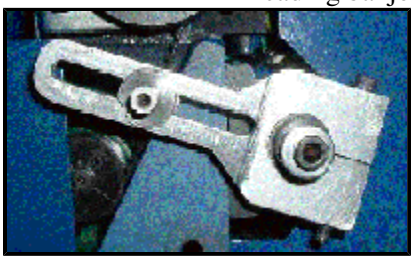
Building a Module for ML Fine Feed and a New Banjo for Threading

Finefeed cartridge mount

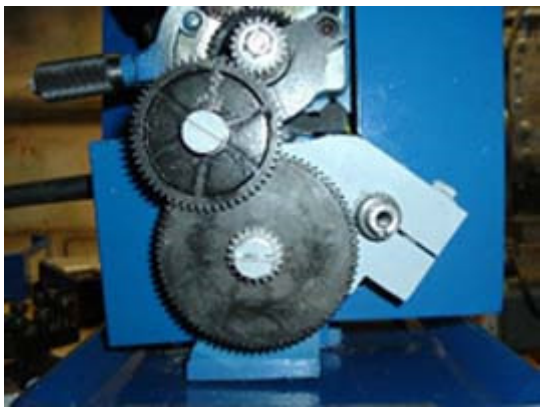


Threading banjo



Probably the most useful feed device would be a variablespeed motor type since the rate can be set as preferred, but it can be complex and is usually in the way. A cartridge type module, dedicated to providing a suitable feed rate for a nice finish, can be easily built. The fine feed module reduces carriage rate by about a factor of 4 from the original minilathe setup. When threading is to be done, the cartridge is removed intact and a simple banjo with change gears already loaded can be installed. Going back to fine feeding again is done in a minute or so by just reinstalling the cartridge. Either choice is simple to install and adjust by an easy clamping on the leadscrew bearing extension.

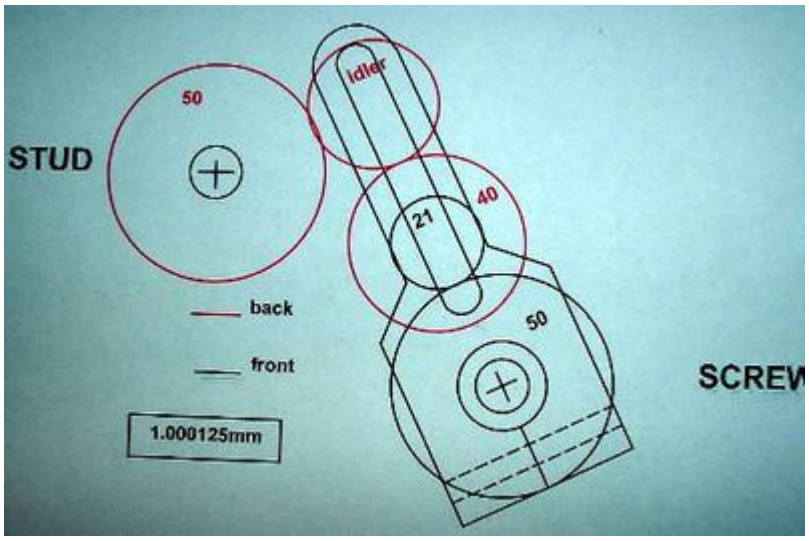
I previously built and used a quickchange gearbox for the ML but unless one is doing a lot of threading of different pitches, the QCGB is a headache as it takes up space and makes the lathe much less portable. It is a nice exercise though if you need something to do.



For threading, the 80 tooth gears and one of the 20 tooth gears which were shipped with the ML are not needed. These will be used in the finefeed cartridge. An additional 20 tooth gear like the others and a special 20 tooth gear will be required as well as a 57 or 60 tooth gear and two new bushings and keys to gang the compound sets. I used the 57 tooth gear from the threading set as I don't envision ever needing it for any threads. I found it easier and cheaper to make the other parts. A minor change to the gear cover (a slot in the back, see below) is required.

An end view and front view show the finefeed mod in use. Use the lathe this way except when thread cutting is wanted remove the FF mod and install the banjo with the appropriate gears mounted.

The fine feed module inserts an extra gear into the train so operation of the Fwd/Idle/Rev lever is reversed, i.e. when the pin is in the FWD detent the carriage will move to the right.

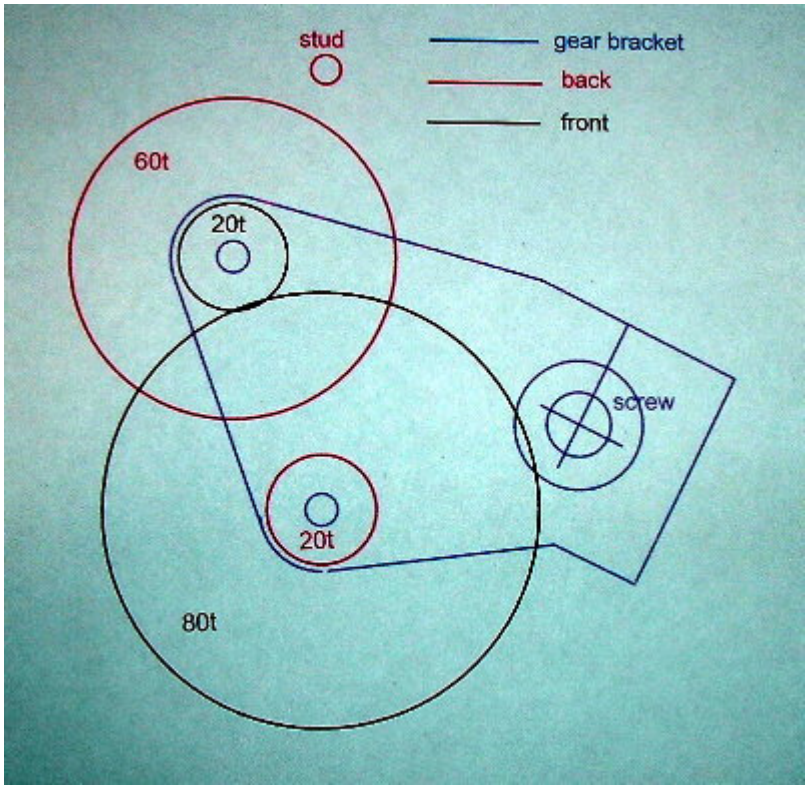


The drawing shows how the gears are arranged on the banjo while the picture shows it in place, ready to operate.

The idler gear is needed with a few threads, most don't need it so you could make one gear shaft to start and make the second when the need arises.

Richard 2004

Fine Feed Construction Info



The fine feed module can be made of 3/8 aluminum or from thicker plastic as in the pictures above.

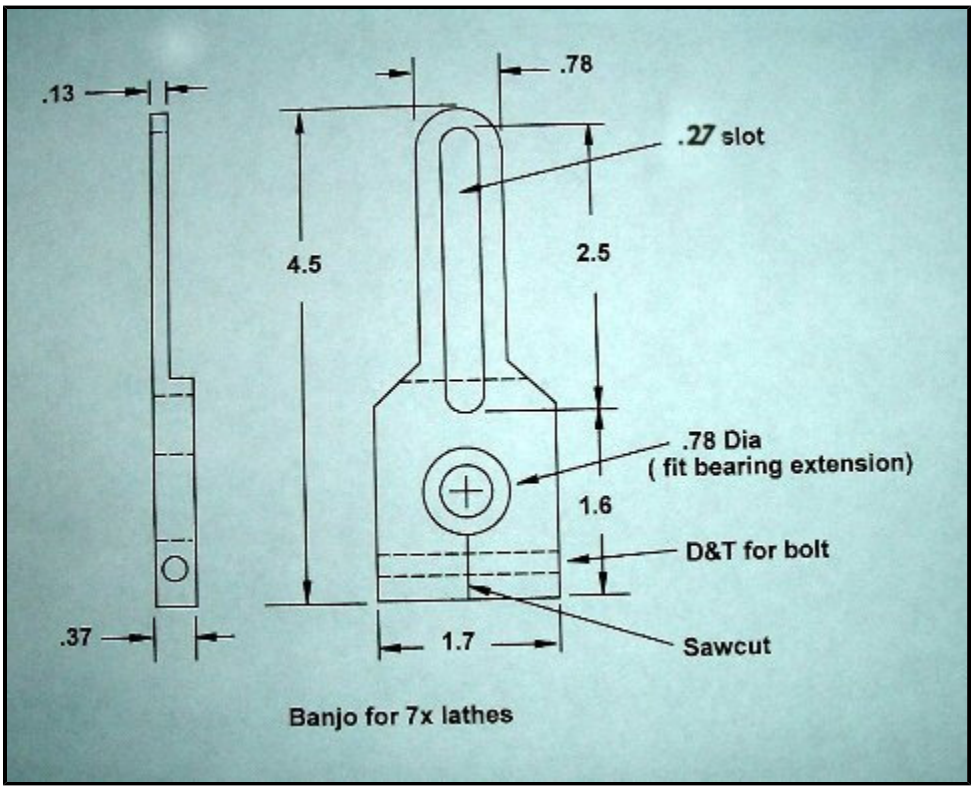
This drawing shows the general layout. Dimensions are not given because it is possible to use different gear sets; e.g. units with 57 or 60 teeth at the first gear are reasonable. The obtuse angle in the triangle formed by the gear shafts is 108 degrees.

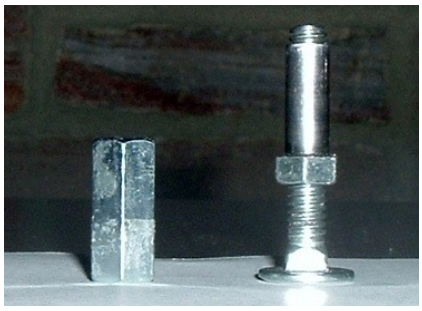
The gears are metric module 1 so it is straightforward to calculate the distance between shafts: sum the tooth counts for the two gears, divide by two, convert to inches if desired by dividing by 25.4. For example, (80+20)/2= 50 = 1.968 inches. Add 3-5 thou for a little play in the gears. The mounting studs are threaded on the end to mount in the ff module with a shoulder to butt against the plate; file flats on the shoulder to fit a wrench for tightening. The outer end of the shafts can be d/t or the shaft can be made longer and threaded for a nut.

Should the gears mesh too tightly in the completed unit you can recover by drilling the mounting hole much larger and adding a bushing plus a set screw to retain this bushing; d/t the hole in the bushing for the gear shaft slightly off center so rotating the bush provides an eccentric adjustment for shaft spacing. There is room behind the ff module for a small shoulder on the bushing. Generally, the plastic gears are very accurately made but occasionally one is slightly eccentric and this bushing trick will fix the problem.

To set the mesh of the 57/60 with the minilathe gears, insert a scrap of newspaper between the gears, mesh them tightly, and lock the module in place with the screw. Spin the gears by hand to remove the paper.

Banjo Construction Info





Dimensions for the banjo are shown in the drawing at left.

The gear shaft which is positioned in the banjo slot is made from a standard 1/4-20 coupling nut for threaded stock, and a 1 1/2 x 1/4 cap screw, as shown in the photo. The coupling nut was modified by turning a section to fit the bore of the lathe's B/C gear mounting bushing (there are two bore sizes, the Tiawan one is 7mm the Chinese one is 8 mm)! Most use the 8mm unit. The head of the cap screw may be faced as needed to thin it down. This is the simplest method of mounting the gears onto the slotted banjo; the square section of the bolt fits the slot in the banjo so only one wrench is needed to move the gear shaft.

The gears slip onto the bushings as before and should allow a turning fit. A regular nut and washer are used to retain the gears on the bushing.

A setup aid can be turned to simplify adjustment: simply a round section sized to fit the bottom (0.78) hole of the banjo with a smaller section to accept the gear. Insert this in the banjo, put the final gear on it, adjust the next gear by positioning the shaft in the slot. Remove the setup aid and mount the banjo, no bending and fumbling in the dark while adjusting the gear in the slot!

This is the slot in the cover required to accommodate the fine feed module. The edge of my slot is 1 inch from the open side but yours may differ so Dremel it as needed, trying for fit frequently. A small cover could be added over the exposed gear per the example next to the gear cover.

On the right is the banjo compared to the part it replaces. Seems like it would be easier to provide a banjo rather than the original part although perhaps it would take some machining rather than a punched out part. The banjo is easier to use except that sometimes an idler gear is needed, causing the fwd/rev lever to work backwards -- the directions for use might be harder to write but the actual operation is obvious.