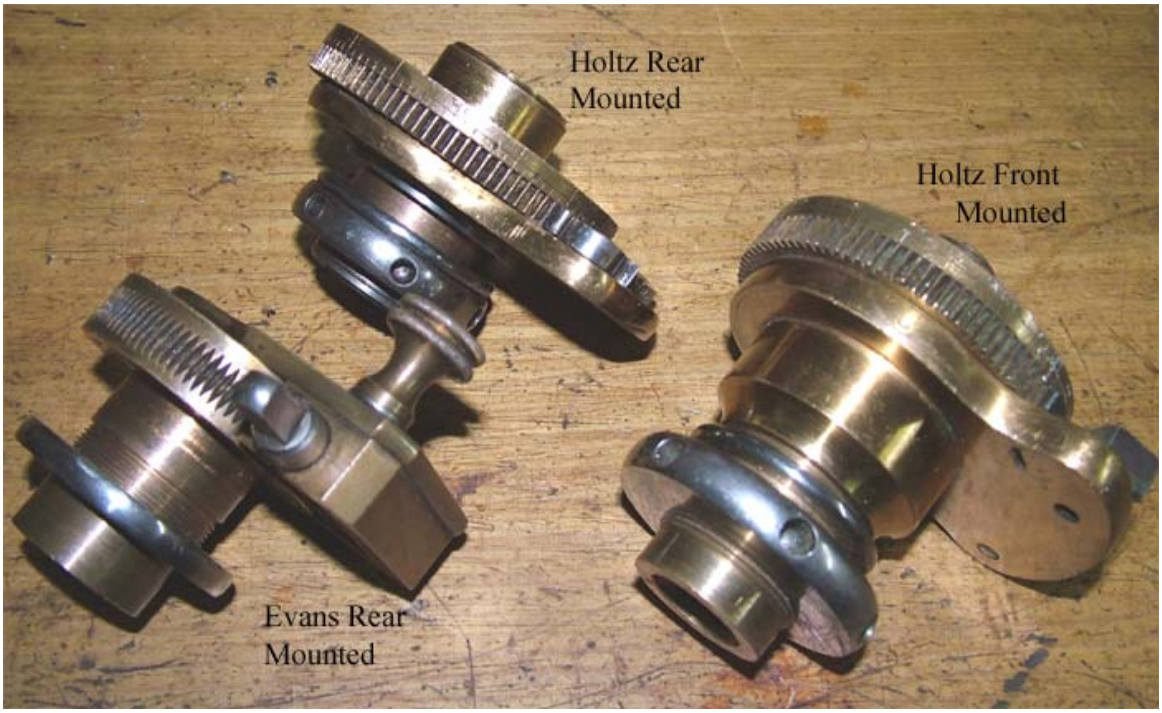
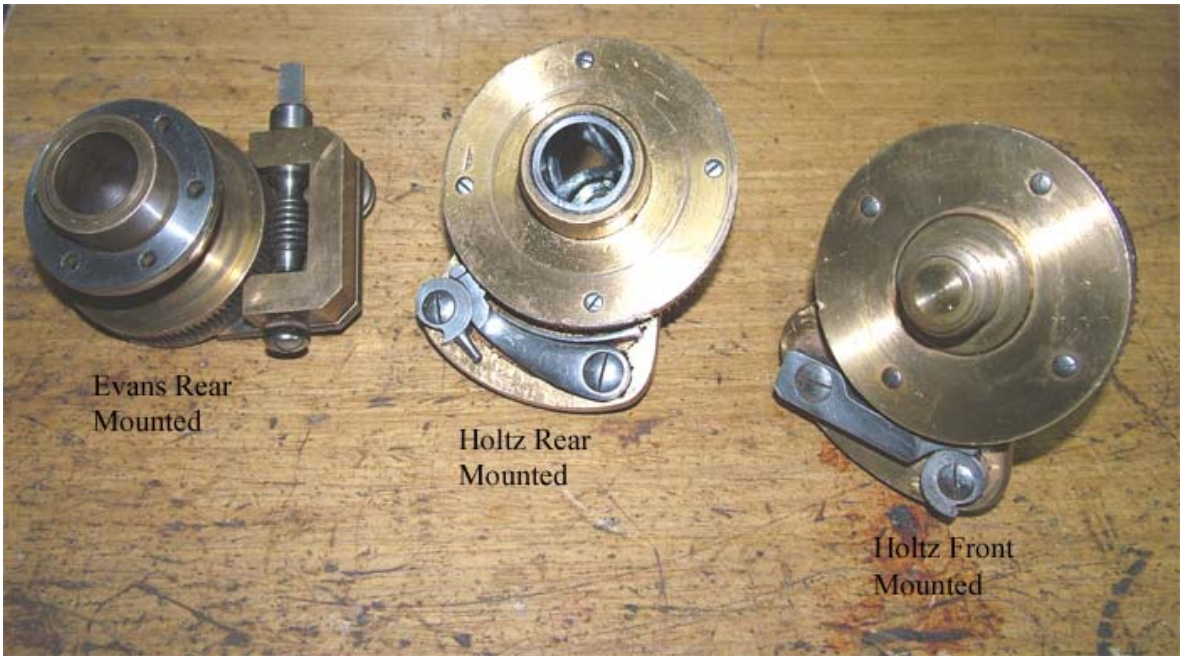
The Spiral Dividing Chuck and how to make it.

Type 1. Front Mounting: This was the earlier design used mainly for lathes without traversing mandrels. Disadvantage: when they are mounted on the front you can't also mount the Ellipse Chuck because there is nowhere to fix the cam-ring.
Type 2. Rear Mounting: Later development; mounted on the tail of the mandrel after removal of the sleeve that prevents to mandrel from traversing. The **Holtz design** has a cam-lock and a click-wheel adjustment which is inferior because the cam can shake loose with vibration and the handle can get snapped off (as has happened with the two

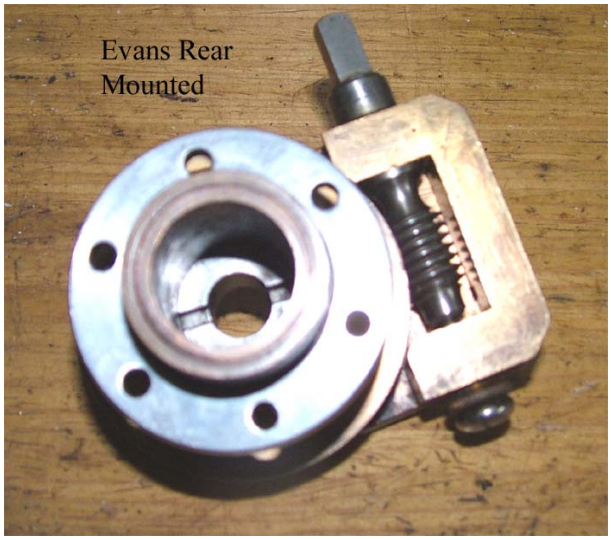




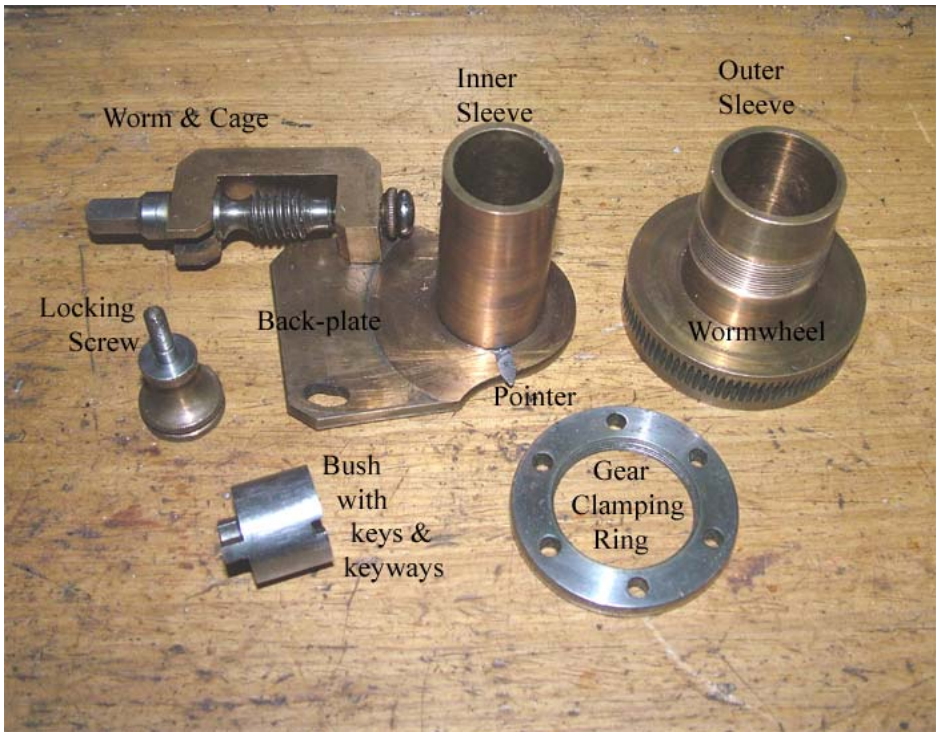
Holtz examples shown). Also the click-wheel cannot be adjusted between divisions as the worm-wheel can. The **Evans design** is superior in that it has a locking screw and a worm & wheel adjustment; this can be adjusted to any position, it can't come loose and the locking screw can't easily be broken off.


Evans Rear Mounted

Construction: Make a sleeve in bronze which is about ¾" longer than the steel one on the tail of the mandrel but with the outer surface very slightly tapered. Make a bronze back-plate and cut into it a recess and silver-solder the thickest end of the sleeve into it; and mill a small channel to take a steel index point which should also be silver-soldered in and filed level with the surface of the back-plate. Mount the sleeve in the lathe and bore through the back-plate a hole sufficient for the end bolt of the mandrel to pass through. Cut two keyways in the back-plate at 180°, then make a steel bush the same diameter as the mandrel tail; cut a key-way across one end to fit exactly over the two keys on the tail of the mandrel and cut a pair of keys into the other end of the bush so they locate precisely in the two key-ways you have cut in the back-plate. Fit this assembly over the tail of the mandrel and shorten either the sleeve or the bush until the combination, when bolted to the mandrel tail, allows the mandrel to rotate freely but with no end float. Make another sleeve in bronze (or steel) large enough to fit over the first sleeve; the inside bore must be slightly too small to fit at this stage. Make a worm and wheel of 96 divisions; a worm of 8 t.p.i. will fit on a wormwheel of around 2.24" outer diameter. Cut the wormwheel blank slightly oversize then cut into it a recess and silver-solder the end of the outer sleeve into it. Turn the outside of the outer sleeve to 2" diameter to fit the standard Holtz (or Evans) gears and cut a screw-thread (about 26 t.p.i) onto which a steel washer and a steel clamping ring may be screwed. The clamping ring should be made with 6 holes and a spanner made to tighten the ring against washer and the gear. Bore out the centre of this combination slightly taper to match that of the taper on the inner sleeve and a little oversize so that they may be lapped together. Lap them together until the wormwheel fits snugly against the backplate and the sleeves may just move freely.


Evans Rear Mounted

When the lapping compound is washed out and the two sleeves oiled, they should turn easily but with absolutely no shake. Mount the assembly on the lathe and cut 96 slash-cuts with a Universal Cutting Frame set to the helix angle of the worm; then hob these cuts with a tapping spindle. Make a cage for the worm of the thickness needed for the worm to mesh precisely with the wormwheel when the cage is screwed to the back-plate. Fix one side with a temporary screw which can be fully tightened, then drill and tap for the locking screw. Then elongate the hole through which the locking screw passes so that the worm may be lifted off the wormwheel or engaged with it.



Replace the temporary screw with another having a small shoulder so that, when it is fully tightened, the cage can swing freely when the locking screw is loosened. Scribe division lines around the edge of the wormwheel, engrave numerals for every 12th division, long lines for every 6th and dots for every 4th.