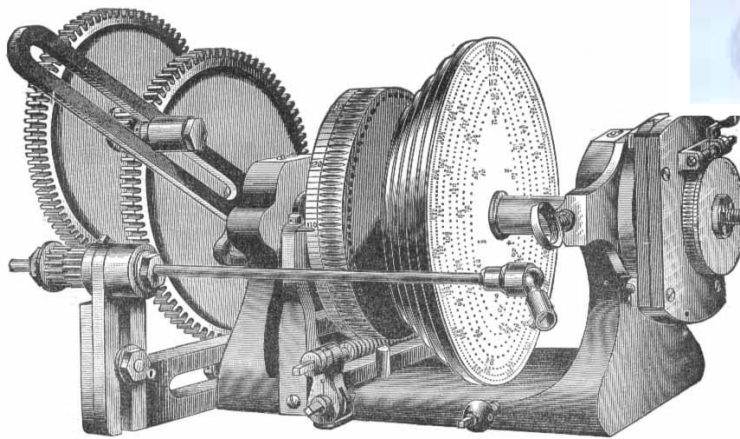


THE SPIRAL APPARATUS, THE RECIPROCATOR AND THE GEOMETRIC CHUCK.

Spiral Apparatus: comprises a Dividing Chuck (on the lathe spindle) and a train of gears connected to the leadscrew of the main slide of the ornamental slide-rest; such that, when the leadscrew is rotated and the slide-rest carriage moves along the lathe bed, the lathe spindle will rotate according to the ratio of the gear train and the cutter will cut a spiral (or a screw-thread) on cylindrical work.



Spiral apparatus



Two items made with the assistance of the Spiral apparatus: a pepper mill and salt cellar in African Blackwood and an oval casket in boxwood with a cameo on the lid.



The Reciprocator is used for making zigzag cuts. It comprises a rocking arm and an eccentric arm; the rocking arm is fixed to the Dividing Chuck on the tail of the lathe spindle, in place of the main spiral gear; the eccentric arm is joined to the rocking arm by a bolt screwed into one of the holes (the hole furthest from the spindle gives the least amount of rock); the next abor of the gear train is passed through the

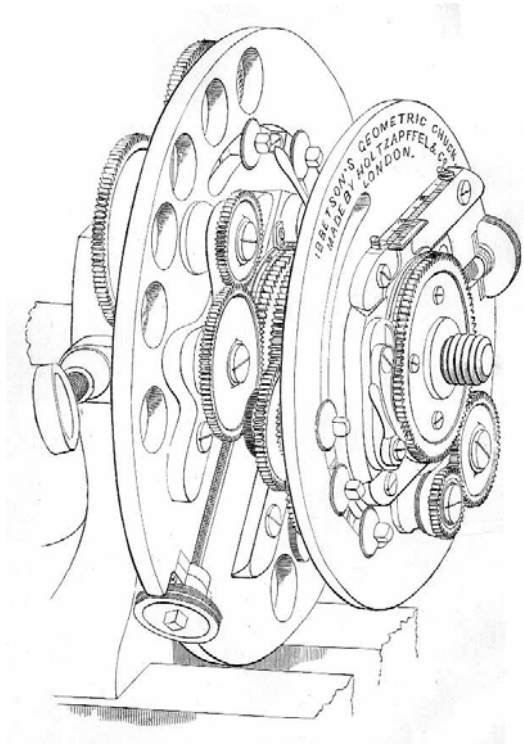
eccentric hole (or one of them if there are 2 or more) so that as the arbor rotates the eccentric, rotating within the steel ring at the end of the arm, causes the arm to push and pull on the rocking arm. This action causes the lathe spindle to rock back and forth instead of rotating as the gear train is rotated through its connection with the leadscrew of the slide-rest. Meanwhile the carriage of the slide-rest moves along the main slide so that the cutter follows a zigzag path along the work.



Reciprocator

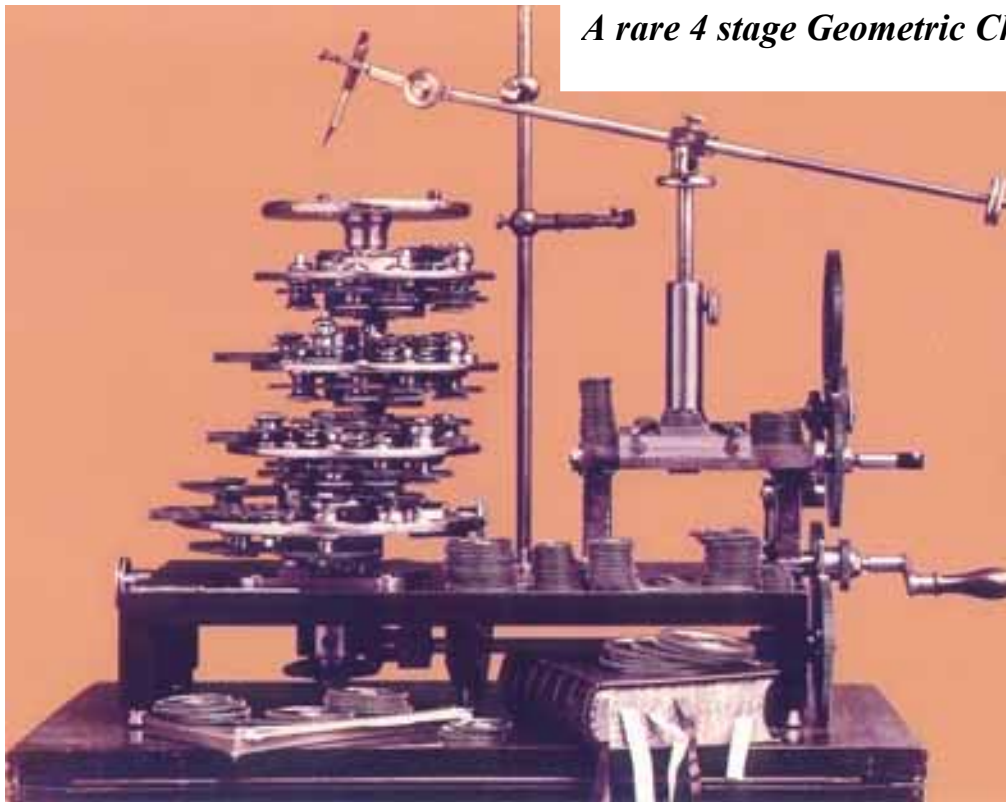
A Reciprocator pattern cut in polyester resin with the Universal Cutting Frame at around 30° from horizontal; giving a 'flaming zigzag' effect.





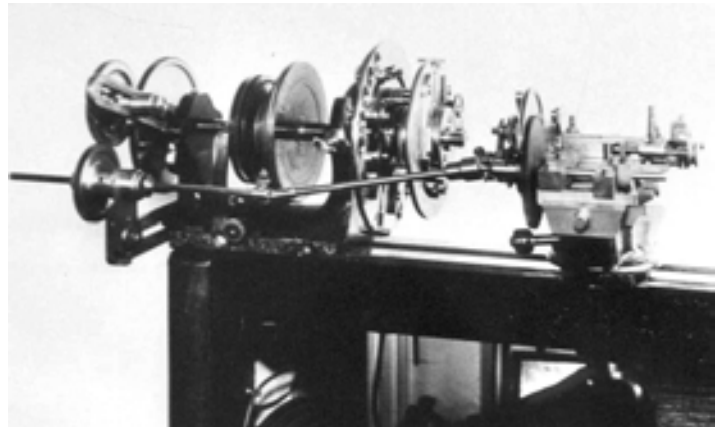
The Geometric Chuck is for cutting patterns made up of rolling circles. It has a fixed gear attached to the face of the headstock casting and a foundation plate that screws onto the lathe spindle nose. As the spindle rotates the fixed gear transmits movement through a gear train passing through the foundation plate and to a fixed gear on the bottom of the foundation plate of a second stage. The second stage will move slower than the first according to the value of change-wheels in the gear train. Each stage has an eccentric slide across its centre so that the axis of rotation of its nosewheel can be set eccentric to the nosewheel of the previous stage (or the nose of the lathe spindle). Thus, each stage has the rolling circle motion similar to that of the Epicycloidal Cutting Frame, but in

this case, one rolling circle is superimposed upon another. Some Geometric Chucks have been constructed with as many as six stages and the patterns produced on them can be quite fantastic.



A rare 4 stage Geometric Chuck

The overhang of a chuck of many stages could cause strain on the apparatus if mounted horizontally so these are usually mounted vertically and used for pen drawing or light engraving. One way of alleviating the problem of overhang is to mount a two-stage chuck on the lathe spindle and connect it through the Spiral apparatus to an Epicycloidal Cutting Frame in the Slide-rest.



This gives almost the same range of movement as a three-stage chuck but with only the same overhang as a two-stager.



Here are some patterns cut on the Geometric Chuck by Norman Tweddle, past President of the Society of Ornamental Turners. These pieces are in the Society's collection of ornamentally turned objects.