

**Q: Do you know anything about a Carving Machine called the Dentifactor? It is a machine describes in Holtzapffel Volume 2, page 955, Appendix L.**

**A: The principle is that of a medallion copying machine but the method is different.**

Jordan's patent Carving Machine and Tomes's Dentifactor were both invented in 1845 to carve copies of three-dimensional objects. These machines are based on what we nowadays call a co-ordinate table, with two horizontally opposed slides to allow a stylus and a drilling spindle, fixed to a horizontal table on the top slide, to follow the contours of a model fixed directly opposite on a vertical slide. The vertical slide takes the place of a lathe headstock and the co-ordinate table takes the place of the slide-rest. The model and the workpiece are mounted on the vertical slide, four inches apart, and the stylus and the cutting drill are mounted on the horizontal table directly opposite, so the operator can clearly see the surfaces of both the model and the workpiece.

The operator holds the horizontal table with both hands, pushing the stylus gently towards the profile of the model, working from side to side. Tomes's machine had a ratchet mechanism to control the height of the vertical slide, so the profile was followed and cut in horizontal lines; but Jordan's design allowed the operator to use a foot pedal to raise and lower it (it had no lead-screw, just a counterbalance weight like a straight line engine). Each cut should be started at a high spot and progress downhill into a depression, rather like using the curvilinear apparatus on the ornamental turning lathe, cutting progressively deeper until the stylus reaches the lowest part of the profile. By this means the stylus can be made to traverse in any direction across the entire face of the model while simultaneously the drill removes all surplus material from the workpiece.

Tomes's machine was used for making dentures from ivory, so to make them look more real, he needed to be able to copy the undercut parts of the model. His solution for this problem was to mount both model and workpiece on rotatable discs, connected by a tangent screw, so that they may rotate simultaneously. At the same time the vertical slide was made to rotate as much as 20 degrees in the horizontal plane so that any undercut parts of the model could be reached by the stylus and copied on the workpiece.

For this wonderful invention Mr Tomes received the Gold Isis Medal of the Society of Arts in 1845. His brilliant machine was constructed for him by Holtzapffel & Co., and it is so amazing that I am surprised they did not adapt the system to make a Carving & Rose Engine Lathe Extraordinaire!

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