

WOOD PEDAL LATHE WITH SPRING POLE – A HISTORICAL LOOK

Grzegorz Wieloch - Rafał Mostowski - Marcin Osada - Jozef Hrić

Abstract

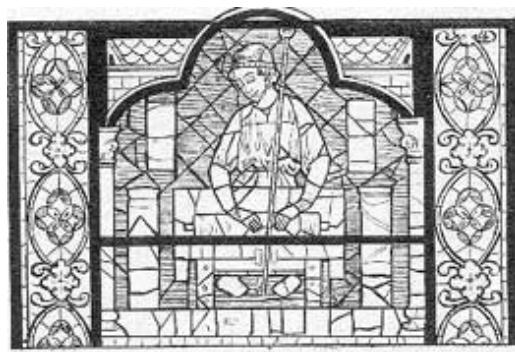
According to historical sources – most often illustrations – wood lathes drive was shown. It was based on strings from ancient times. Drive of machined element was held by foot pressure on lever unwinding one string In the same time the other string winding on which is connected with flat elastic unit/spring-pole/. Winding on and unwinding of strings causes movement of turned unit.

Key words: pedel lathe, spring-pole, power transmission, development of construction, history

INTRODUCTION

Turning from ancient ages is used mainly to receive cylindrical, conical and spherical surfaces.

Traditionally it is generally accepted that the ancient Egyptians introduced about 4000 years B.C. as the first started using lathes /rotation of machined units/. In spite of a valid proof it is considered that Egyptian civilization was so advanced that it was able to develop jelly and drill. With advanced technical knowledge there might be possibility to create lathe. But some historians estimate invention of lathe for around a thousand years B.C. Its development could take place simultaneously in Ceiling of the Room and in Britain /Celts/. In the second century A.C. lathe was known by most European and Middle East nations.



The first known illustration of the pole lathe appeared in a 13th century stained glass window at Chartres given by the turners of the local guild in honour of their patron Saint Julien.

DEVELOPMENT OF FEET DRIVE OF LATHES

In turning a machined unit performs rotary movement when lathe tool is pushed in parallel or perpendicularly to rotary axis. It can also perform both above mentioned movements simultaneously. The nature of work of lathes is rotary movement of a machined units. Human inventiveness has been engaged since ancient times to generate this movement. One of the forms of creating a turning moment / known for several thousands of years which might give inspiration people to adopt it in turning was usage of spindles to wool spinning driven by weights/. Also jolley and its feet drive might give inspiration to the inventors of feet drive of lathes. It is believed that a lathe turning a piece of wood represented only a small modification of a jolley or a drill.

Although we know that a jolley was invented over a thousand years earlier than a lathe, there are strong connections between both crafts which have always had references to the way of supplying drive.

Turned material or formed on a jolley is shaped during turning in one or more points. Using both mechanisms one can change the shape quickly. Both quickness and regularity were the most important advantages which were offered by these two mechanisms.

FEET DRIVE OF LATHES ACCORDING TO HISTORICAL SOURCES

Feet drive of lathe's spindle was constructed using two strings which were wound on a spindle in such a way that when one string was unwinding driving spindle with a turning good, the other one was winding on rotary unit.

In historical literature one can find two kinds of lathe's drive with feet with help of strings:

- Using both feet – when one foot pressing foot lever caused unwinding of string and in the same time the other unclamped pressure on pedal of the other lever and let winding on the string on spindle /Fig.1/. Pressure on the second pedal caused unwinding of earlier wound on string. Alternate pedal was repeated to obtain rotary movement of machined unit. This kind of driving is shown in Chinese literature.
- Using one foot pressing lever /pedal/ and causing unwinding of string earlier wound on spindle. In the same time the other string tensed by resilient pole with changeable cross-section, fixed to ceiling of place (Fig.4) or beam of stand (Fig.3) works as flat spring winding on the other string (Fig.2). The role of spring was performed by branches or whole trees which were nearby. This solution called „Spring-pole Lathes” is dominating in European historical sources from early middle ages.

This kind of driving of turned unit enabled simultaneous manipulation of both hands which was essential for realization of different shapes.



Fig.1. Chinese pedal lathe C.1850.



Fig.2. Women using Parisian manuscript dating from the mid-13th century Singer p.645 fig 586

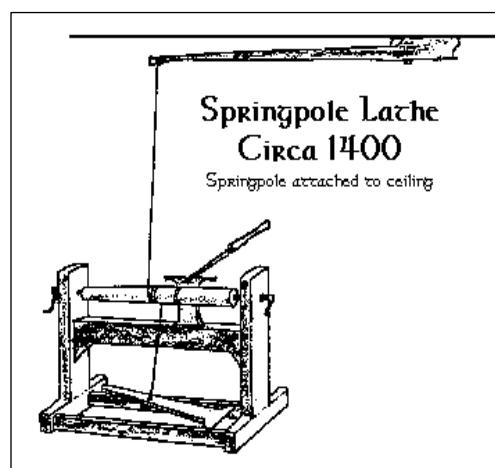
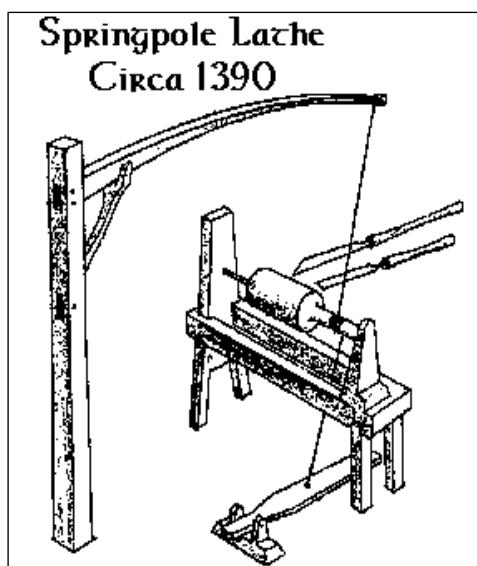


Fig.3 and 4 Two early examples of spring pole lathe

Spring pole was usually made from wood. Its dimensions and cross-section were chosen according to turner's weight. It was designed from different kinds of hard wood – less or more elastic. If the spring was too strong then it was lengthened as well as length of lever which was pedaled by a turner. Spring pole was situated in the same line as pedaled lever. Sometimes spring pole was weakened by knife cuts. The thicker end of spring pole was either fixed to a grider or to a ceiling in the workshops with a single nail or a bolt in such a way that its position could be changed for optimal one.

On the thinner end of spring pole is fixed string. Its length must enable wind around turned unit. During turning of soft wood units the unit was wound twice and

During turning of hard wood units the unit was wound three times to avoid lost motion between string and wood. String was produced from sheep intestine choosing its thickness in depending on anticipated cutting resistance.

according to: Joseph Moxon.



Fig.5. Spring-pole lathe according to: Mendelsches Bruderbuch 1395



Fig.6. Button Maker using a spring pole lathe for buffing, or polishing buttons molded of resin.

Source: Diderot's "Encyclopedia of Trades and Industry."



Fig.7. Above is an illustration of a Dutch wood-turner dated 1650. I would have no difficulty using his lathe, nor he mine.

''Woodturning with the pole-lathe'' by Brian G. Howarth.

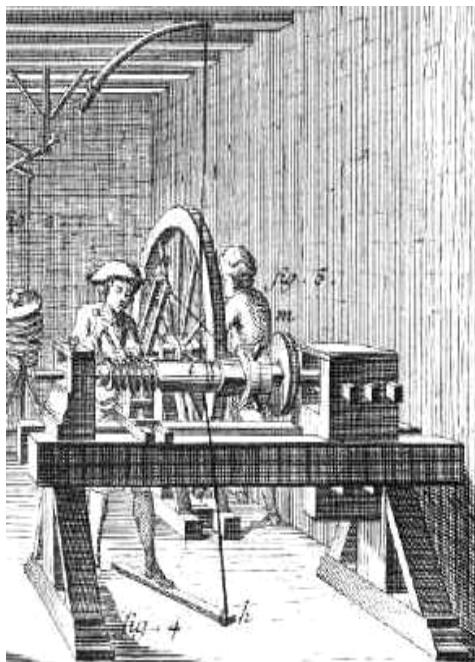


Fig. 8. A Toolmakers lathe for cutting large screws.

Source: Diderot's "Encyclopédie of Trades and Industry." See the Screw-cutting lathes on this page [Specialty Lathes](#) for a better idea of how this worked.

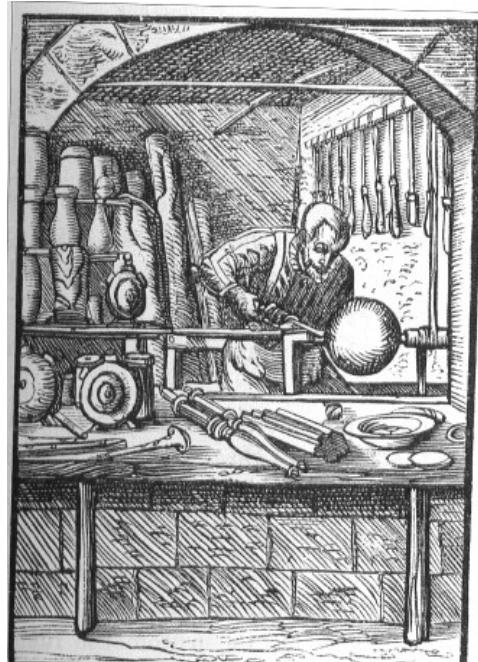


Fig. 9. 16th Century Turning Shop
A turner working a making a sphere using a spring-pole lathe in a woodcut from *Panoplia Omnia* (1568), by Hartman Shopp. Scanned from M. Darlow's [Woodturning Techniques](#)

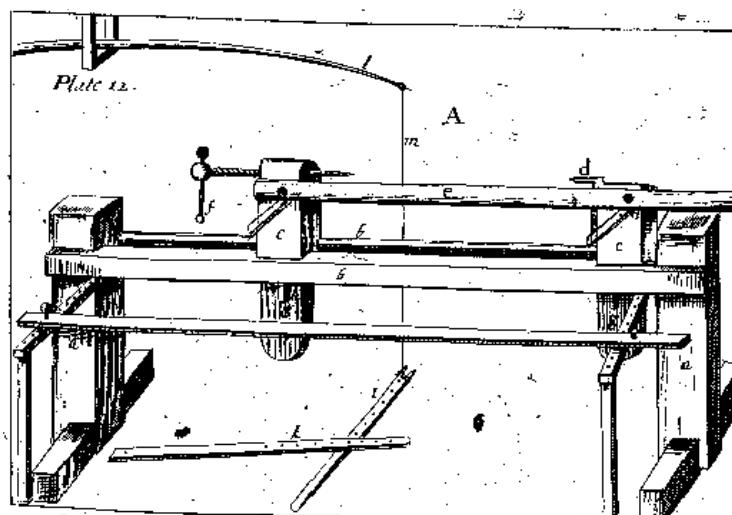


Fig. 10. Wood lathe with support for the tool

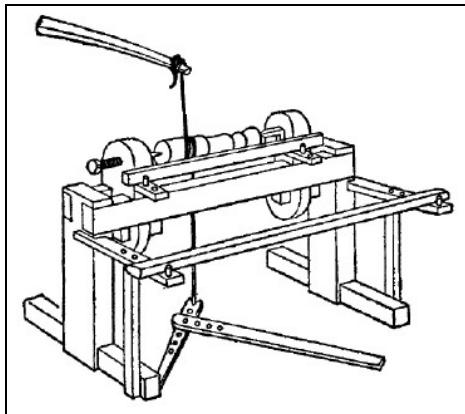


Fig.11. Wood lathe with support for the tool

Another scene of a lathe on which one can see better the machine and with turner's seat which is adapted to change position as well as the lever has possibility of length change. The seat /bench/ is adopted to withstand rather than seat on it. One can also see support with possibility to change position to rotation axis of turned unit. Dumas in his „History, Technology & Invention” suggests that tool rest doesn't appear on turners up till the end of the 15th century or even till the middle of the 16th century.

The pole lathe depicted has a heavy wooden timber frame and the drawing shows the pole which was fixed at one end in the wall and connected at the other to a cord.

The cord was wound on around the workpiece and connected at its other end to the treadle. In use, the turner pumped the treadle with one leg while balancing on the other and could lean against the cross-bar in the foreground which served as a back-rest to steady and support his body. The posture necessitated by this lathe was fatiguing and not very secure. (*From Holtzapffel, vol. IV*)

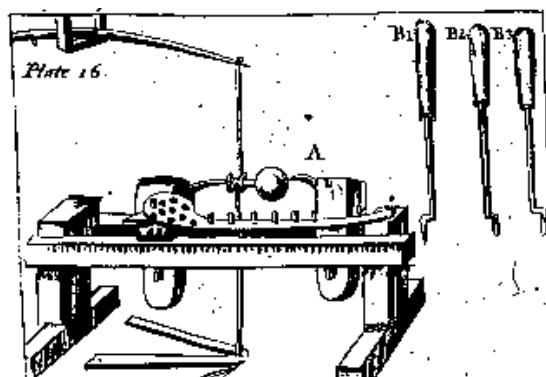


Fig.12. Spring pole lathe with support tool
From Holtzapffel, vol. IV

Fig. 12 shows that the tools have twisted shapes to enable their easier manipulation during turning and that metal bolts in the support board give additional racking for tools used by a turner.

PRESENT MODELS OF LATHES CONSTRUCTED ACCORDING TO FARMER EXAMPLES

At present together with discovering and fascination of old technical solutions many lathes are constructed based on shown above way of drive (strings and levers driven by foot together with spring pole. This type of primitive machine tools are presented while working on different kinds of historic and folklore festivals. Most such constructors live in Great Britain and the USA, where primitive lathes are reconstructed according to old pictures. They are shown on photographs bellow - Fig.13 to Fig.16.



Fig.13-15. The spring pole lathe turners



Fig.16. Association of Pole lathe Turners turning at Wendover Woods
Friday, April 28, 2006, 09:03 AM

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