(No Model.)

G. A. BRODIN.

LATHE.

No. 442,662. Patented Dec. 16, 1890.

Fig. 4.

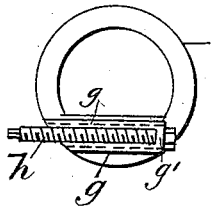


Fig. 5.

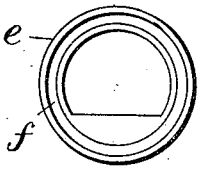


Fig. 6.

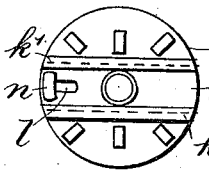


Fig. 7.

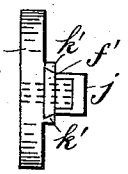


Fig. 2.

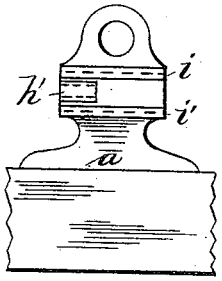


Fig. 8.

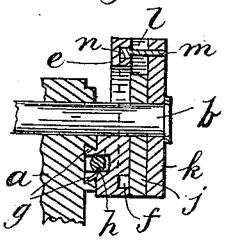


Fig. 3.

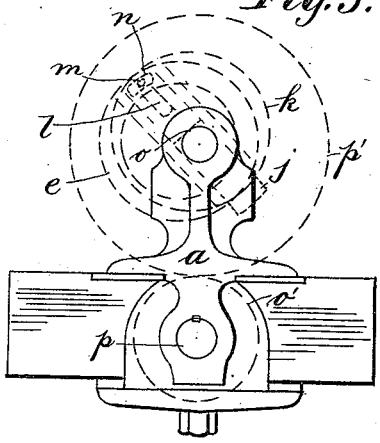
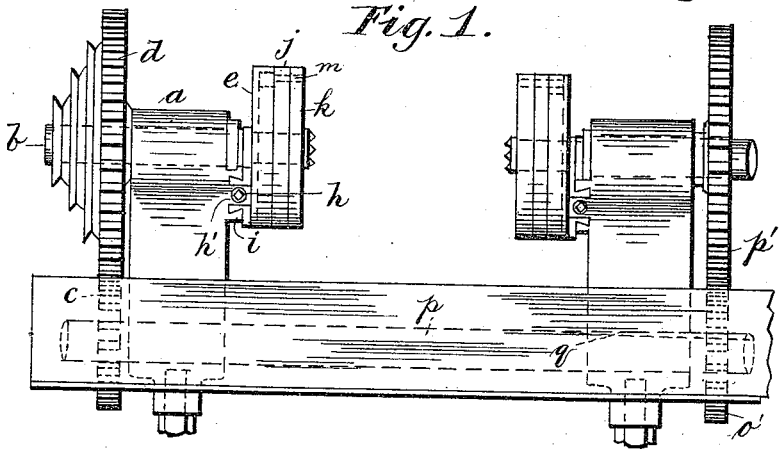


Fig. 1.



Witnesses:
H. B. Kingsbery
H. E. Decker

Inventor:
Gustaf A. Brodin,
by William E. Soulter
atty.

UNITED STATES PATENT OFFICE.

GUSTAF ADOLF BRODIN, OF STOCKHOLM, SWEDEN.

LATHE.

SPECIFICATION forming part of Letters Patent No. 442,662, dated December 16, 1890.

Application filed June 16, 1890. Serial No. 355,696. (No model.) Patented in Sweden November 16, 1889, No. 2,312.

To all whom it may concern:

Be it known that I, GUSTAF ADOLF BRODIN, a subject of the King of Sweden, and residing at Stockholm, in Sweden, have invented certain new and useful Improvements in Lathes, (for which I have obtained Letters Patent in Sweden, No. 2,312, dated November 16, 1889,) of which the following is a full, clear, and exact description.

My invention has relation to lathes for turning regular forms, and it relates more particularly to that class thereof known as "oval lathes;" and among the objects of my invention are, first, to provide a lathe which is adapted equally well for turning either round, oval, or elliptical bodies; secondly, to provide a lathe which is readily adapted to produce bodies having varying shapes throughout their lengths, and, finally, to provide a lathe which is of extremely simple construction, and which can be readily manipulated to vary the character of the work produced thereby.

With the above objects in view my invention consists in the construction, arrangement, and combinations of parts, all as hereinafter fully described, illustrated in the accompanying drawings, and pointed out in the claim.

In said drawings, Figure 1 is a side elevation of a lathe constructed in accordance with my invention; Fig. 2, an elevation of one of the head-stocks; Fig. 3, a like view of one of the head-stocks and chucks shown in Fig. 1, and looking in the direction of the arrow in said figure. Figs. 4 and 5 are elevations of the slotted ring viewed from opposite sides; Fig. 6, a face view of one of the chucks and its support; Fig. 7, an edge view thereof. Fig. 8 is an axial section through the ring, support, chuck, and connecting-pin.

In the drawings I have shown a lathe employing two head-stocks, each of which is provided with my improvements, hereinafter described, and in such case I impart a positive rotation to the spindles of each head-stock from a common driving-shaft through the medium of gear-wheels. It will be understood, however, that I may dispense with one of said head-stocks and the transmitting-gearing therefor and employ in lieu thereof an ordinary tail-stock. I prefer, however, to employ two head-stocks, as shown, as by such arrangement I am enabled to shape bodies much more speedily, and at the same time by properly manipulating the devices carried by said head-stocks I can impart varying shapes to each of the bodies turned, all as will more plainly appear hereinafter.

Inasmuch as my improvements are applied to each of the head-stocks, it will be sufficient to describe said improvements in so far as they relate to only one of said head-stocks.

a indicates one of the head-stocks; *b*, its spindle; *p*, the driving-shaft, and *c d* the gear-wheels for imparting rotation to said spindle from said shaft, all being arranged with relation to and supported upon the bed of the lathe in the usual manner.

e represents what I denominate a "guide ring or disk" having a large central opening and disposed over the spindle adjacent to the head-stock. Said guide-ring has in its outer face near its edge a circumferential slot or recess *f* and upon its inner face ribs or lugs *g*. Said ribs fit and are adapted to slide between guide-ribs *i* on the head-stock. A screw *h* at one end screws within the threaded lug *g'* on ring *e* in the rib *g*, and has a bearing at the other end in a lug *h'* on the head-stock. The said end of the screw is squared to adapt it to be readily turned. By turning the screw in one or the other direction the guide-ring *e* is caused to be moved laterally with relation to the head-stock, and thus cause its center to move to one side or the other of the center of the spindle and at varying distances therefrom.

j indicates a support, which is shown as a narrow plate, which is mounted centrally upon the spindle *b* and adjacent to the ring *e*.

k indicates one of the chucks, which is provided upon its inner face with ribs *k'*, which form between them a dovetailed recess, within which is loosely fitted the enlarged dovetailed portion *j'* of the support *j*. The chuck is thus supported in position by the said plate and adapted to slide thereon. Passing through the chuck *k* and near the outer edge thereof and through a radial slot *l* in the support *j* is a pin *m*, carrying upon its inner end a head *n*, which is adapted to fit and slide within the

slot or recess in the ring *e* during the rotation of the chuck. The function of the slot *l* in support *j* is to permit the pin *m* to ride within the same when the chuck assumes various positions by sliding upon the support, and thus allow a free sliding movement to said chuck.

Supposing the guide-ring *e* to be so adjusted laterally as to bring its center to one side of the center of the spindle, it will be seen that when the spindle and chuck are rotated the latter, as well as the body chucked thereto, will be caused to describe an elliptical or oval figure by reason of the pin *m* and head *n*, which latter slides within the recess in the guide-ring.

The shape of the ellipse or oval described by the chuck and body to be turned—that is to say, the relative lengths of the axes of the figure—will be varied according as the center of the ring *e* is moved closer to or farther from the center of the spindle *b*, since, as before stated, the head *n* of pin *m*, by lying within the recess *f* of said ring, will cause the chuck to partake of a motion which will cause it to describe a figure around the center of the spindle corresponding with that described by the recess around said center.

Fig. 3 shows the support at an angle of about forty-five degrees, the center of the chuck being at the point *o*.

When a second head-stock is employed, as in Fig. 1, provided with devices similar to those above described, I impart a positive rotation to the second spindle, and this I accomplish by means of the gear-wheel *o'*, mounted on the driving-shaft, which gear-wheel gears with the gear-wheel *p'* on the second spindle. By this means both spindles are driven positively and at a like speed. The second head-stock is made adjustable longitudinally of the lathe-bed in any suitable manner, and the driving-shaft is provided with a long seat *q* for the key of the gear-wheel *o'* to enable the latter to be adjusted along the shaft whenever the head-stock is adjusted, and thus preserve the mesh of the gear-wheels.

It will be seen that if both the slotted rings are adjusted equally far from the center of their respective spindles upon the same side thereof, the ellipses described by the chucks and the body at both ends will be the same, and therefore said body will be turned an elliptical shape along its entire length; but if one of the rings is adjusted so that its center will be nearer to the center of its spindle than the center of the other ring is to the center of the other spindle, then the shape of the body will vary at its ends, one end being more of an ellipse than the other.

Should the center of both rings be on a line with the center of the spindles then the body will be turned round its entire length, and should one of the rings be adjusted so that its center will be diametrically opposite the center of the other ring—that is to say, upon the opposite side of the center of the spindle, then the body will be elliptical or oval at its ends and round in the center.

By means of my improved devices I am thus enabled to produce bodies having a great variety of shapes, and I attain this result in a very simple and expeditious manner.

The cutting-tool and slide-rest, which I have deemed unnecessary to show, may be of any approved construction and arranged in any well-known manner.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

In a lathe of the class described, the combination, with a head-stock and its spindle, said head-stock being provided with guide-ribs, as described, of the guide ring or disk *e*, disposed over the spindle and having ribs fitting and adapted to slide between the guide-ribs on the head-stock, a screw adapted to operate upon the ring or disk, whereby the latter may be adjusted laterally, a circumferential slot or recess in the ring *e* near its outer edge, the supporting-plate *j*, mounted upon the lathe-spindle adjacent to the ring *e* and having a radial slot near its outer edge and a diametrical dovetailed guide-rib, a chuck disposed over the spindle adjacent to the plate *j*, ribs carried by said chuck, forming between them a dovetailed recess, as described, and within which recess fits the dovetailed rib on plate *j*, and a pin passing through the chuck and the radial slot in said plate *j*, and having a head lying within the circumferential recess in ring *e*, all said parts being arranged and adapted for co-operation substantially as described.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

GUSTAF ADOLF BRODIN.

Witnesses:
NERE A. ELFWING,
ERNST SVANQVIST.