(No Model.)

C. G. DAHLGREN & J. H. SVENSSON.

LATHE.

No. 469,813. Patented Mar. 1, 1892.

Fig. 1

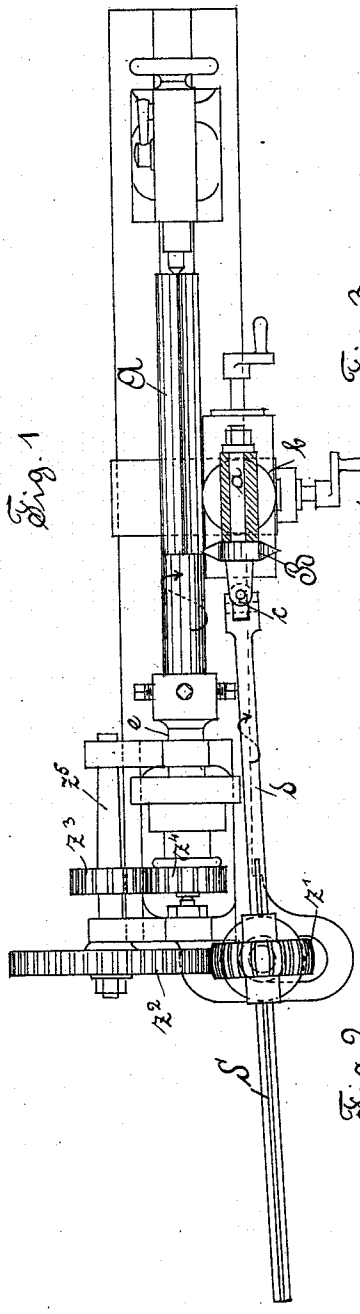


Fig. 3

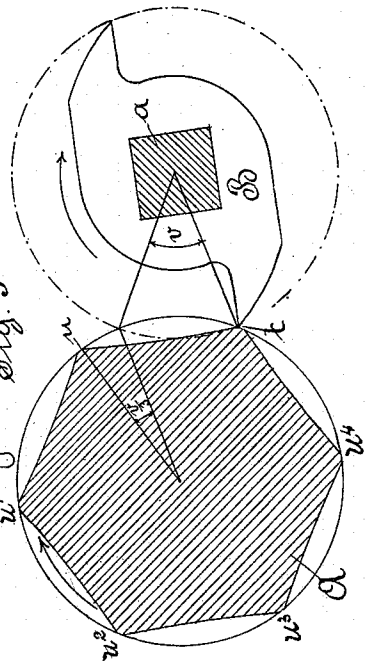
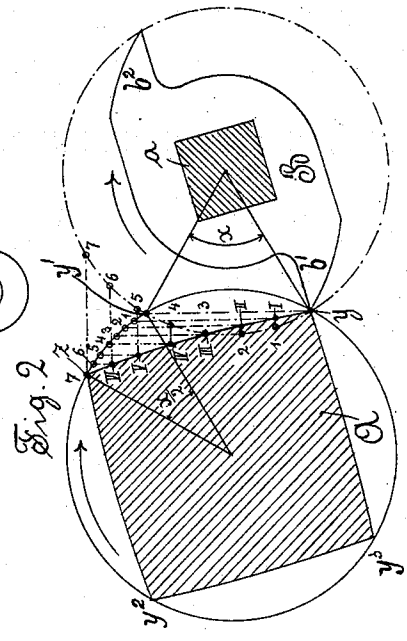


Fig. 2



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CARL GEORG DAHLGREN AND JOHN HUGO SVENSSON, OF GÖTEBORG, SWEDEN.

LATHE.

SPECIFICATION forming part of Letters Patent No. 469,813, dated March 1, 1892.

Application filed January 19, 1891. Serial No. 378,300. (No model.)

To all whom it may concern:

Be it known that we, CARL GEORG DAHLGREN and JOHN HUGO SVENSSON, both subjects of the King of Sweden, residing at Göteborg, in the Kingdom of Sweden, have invented a certain new and useful Improvement in Lathes, of which the following is a specification.

The object of this invention is to enable prismatic or angular sections to be turned in a lathe by means of simple mechanism.

According to this invention both the pieces of wood, metal, marble, stone, or any other material required to be turned, as hereinafter described, and for which the lathe is made of suitable strength, respectively, (these pieces being hereinafter called the "blank,") and also the cutting-tool are rotated simultaneously with different ratios of velocity, according to the shape of section to be given to the piece when turned. By this means sections having regular forms may be turned, said forms having (when the radius of the cutting-tool is equal to the greatest radius of the object turned) a number of angles dependent on the velocities according to the formula $n=c\frac{v'}{v}$, where n equals the number of angles, c the number of blades on the circumference of the cutting-tool, v' the rotary velocity of the tool, and v the rotary velocity of the blank. Thus a cutter having two equidistant blades will, if driven with a velocity double that of the blank, cut out a four-angled figure of section, the faces of which are slightly convex. If driven with a velocity treble that of the blank, it will cut out a hexagonal figure the faces of which will be slightly concave.

In the accompanying drawings, Figure 1 is a plan view of a lathe fitted with the improvements. Fig. 2 is a diagrammatic section showing the turning of a four-angled figure. Fig. 3 is a similar view showing the turning of a hexagonal section.

In the drawings, A is the blank, which is fixed on the live-spindle e in the usual manner. The live-spindle e drives the shaft z^5 by means of toothed wheels z^4 z^3. On the shaft z^5 is the toothed wheel z^2, which gears with the spherical toothed wheel z', through which passes the shaft d, connected to rotate with the wheel z' by means of a long feather d' thereon moving in a keyway in the wheel, so that the shaft d is freely movable in the line of its axis back and forth through said wheel. The shaft d is connected to the shaft a, carrying the cutting-tool B, said shaft a being journaled parallel to the blank in a rest-block with usual adjustments parallel to and perpendicular to the blank. The joint connecting the shafts d and a may be of any known construction of rocking joint, whereby the shaft d may revolve the shaft a at all times, whatever may be the relative angular position of the axes of the shafts during the working of the machine. By replacing the one or other pair of wheels z' z^2 or z^3 z^4 by similar gearing-wheels of different relative sizes the proportion between the velocities of the spindle e and shaft d therefore between the blank and the cutting-tool may be altered at will.

In cutting out a four-angled section the blade of the tool B meets the surface of the blank at the point y and, moving in the direction of the arrow, will have reached the point y', traveling through the angle x, while the blank has moved through the angle $\frac{x}{2}$, being one-half of x, bringing the point z to the position y'. A portion between y and z will therefore be cut away to a maximum depth in the center equivalent to the greatest distance of overlap of the two circles. The arc $y\,z$ should be equivalent to a quarter of the circumference of the blank. Therefore the distance $y\,y'$, through which the circles overlap, subtends an angle of sixty degrees, or two-thirds of a right angle. The velocities being as two to one, the other cutting-blade b^2 of the tool will reach the point y exactly as the point z (where the former cut ended) arrives at said point y. The cut $z\,y^2$ will then be made by the blade b^2. Similarly the cut $y^2\,y^3$ is made by the blade b', and the cut $y^3\,y$ by the blade b^2, thus completing the figure.

The numerals I to VII and 1 to 7 illustrate relative simultaneous positions.

To cut a hexagonal figure, the velocity of

the tool is to that of the blank as three to one. The tool therefore passes through the angle v, while the blank revolves through the angle $\frac{v}{3}$. The arc $t\ u$ will subtend the sum of these angles, and (the figure being six-sided) this sum will therefore be sixty degrees, and the angle v will thus be forty-five degrees. The tool rotates through a distance of half its circumference while the blank moves through a sixth only. Therefore the blade b^2 will meet the point u at the position t and will cut the part $u\ u'$. Similarly the blade b' will cut $u'\ u^2$ and again $u^3\ u^4$, and the blade b^2 will cut $u^2\ u^3$ and $u^4\ t$. Similarly by use of different proportions of velocities and equivalent adjustment of the angle subtending the overlapping part of the two circles other figures may be cut out.

It will be understood that by approaching the tool to the blank so that the angle aforesaid is greater than its true proportion the figure will simply be cut to a smaller scale, while by setting the tool at a greater distance from the blank the part necessary to complete a face of the figure will not be all removed, but a less portion will be removed, the effect being to leave a portion of the original circular circumference between each cut.

We claim as our invention—

In a lathe, the combination of the live-spindle e, adapted to receive and revolve a blank, gears z^4 z^3, shaft z^5, spur-wheel z^2 thereon, spherical wheel z', gearing with said wheel z^2, shaft d, keyed to said wheel z' and movable back and forth therein, universal joint c, and shaft a, with rotary cutting-tool B, said tool having equidistant blades and adjustable rest-block b, carrying said shaft a, the whole substantially as and for the purpose set forth.

In witness whereof we have signed this specification in presence of two witnesses.

CARL GEORG DAHLGREN.
JOHN HUGO SVENSSON.

Witnesses:
CHARLES H. SHEPARD,
HUGO ARWIDSSON.