A. KLEHE & A. MÜLLER.

LATHE.

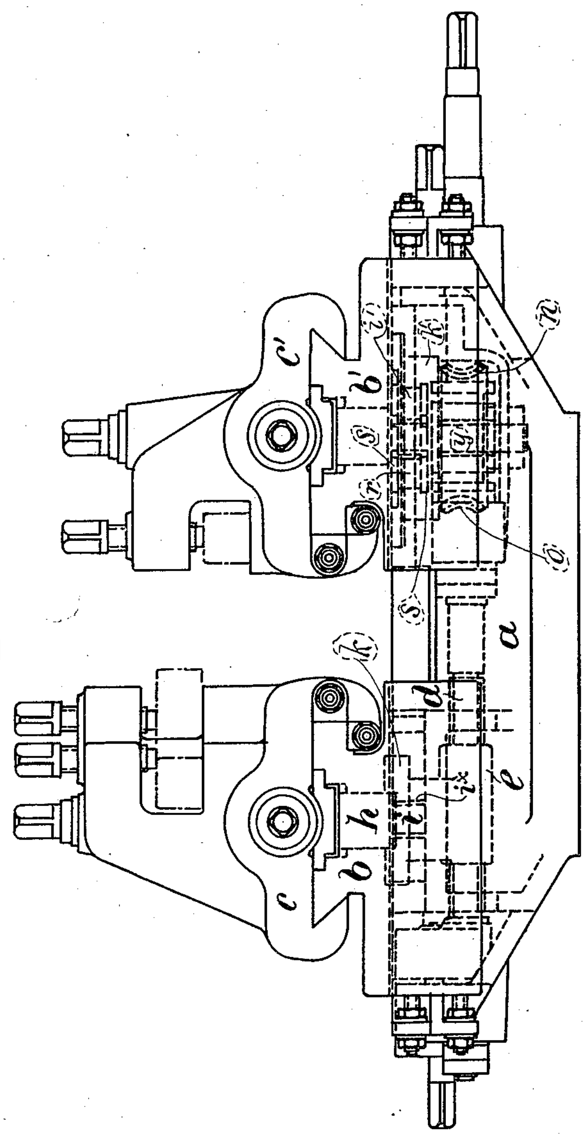
APPLICATION FILED MAY 10, 1911.

1,008,919.

Patented Nov. 14, 1911.

5 SHEETS—SHEET 1.

Fig.1



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5 SHEETS—SHEET 2.

Fig.2

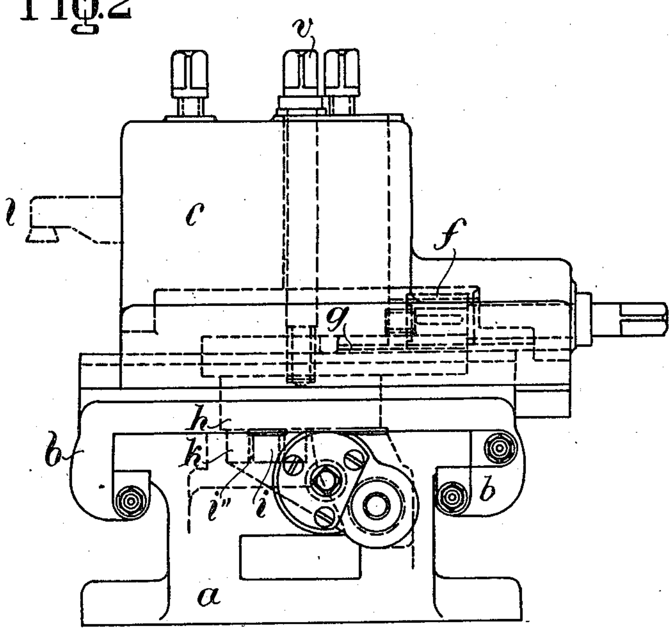
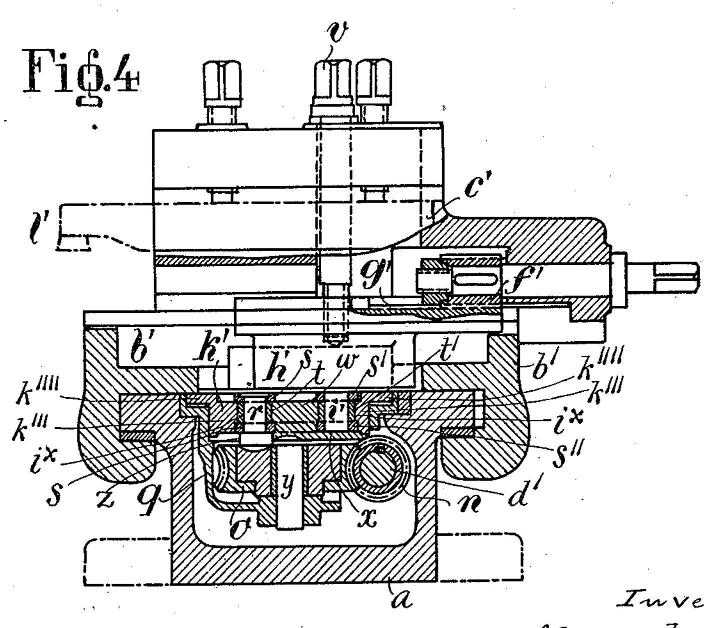


Fig.4



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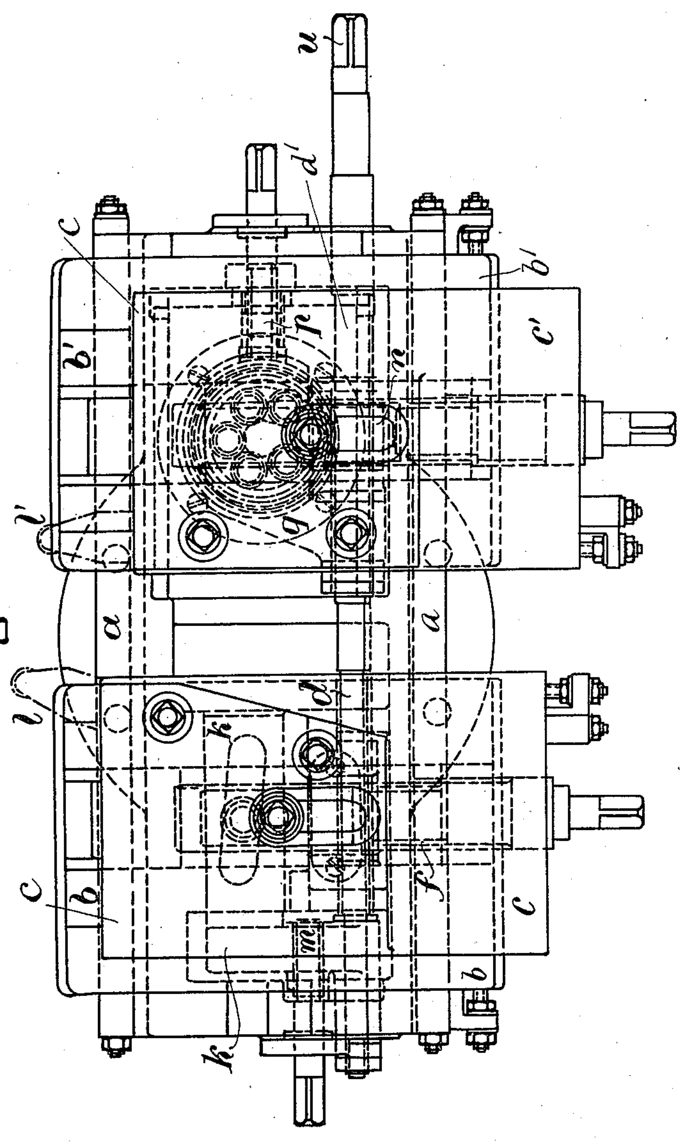
5 SHEETS—SHEET 3.

Fig. 3



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5 SHEETS—SHEET 4.

Fig. 5

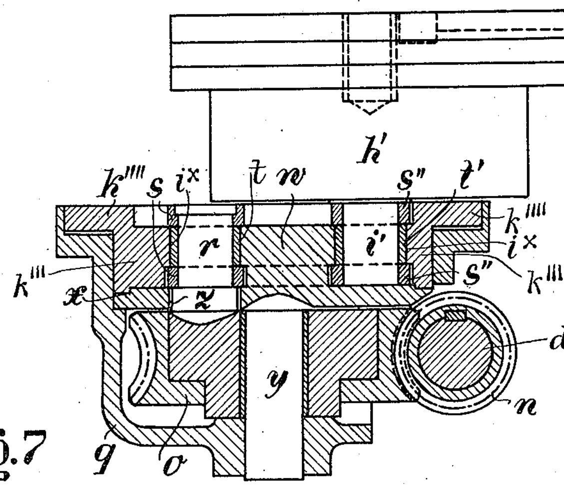


Fig. 7

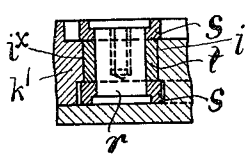
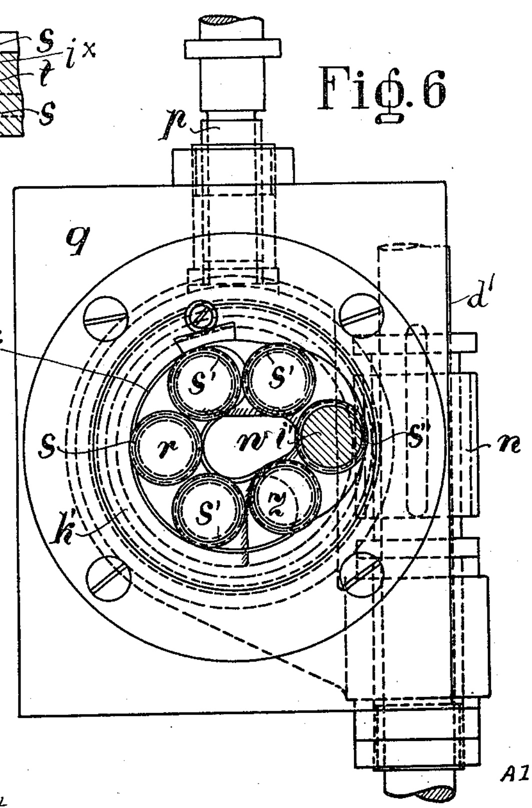


Fig. 6



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5 SHEETS—SHEET 5.

Fig.8

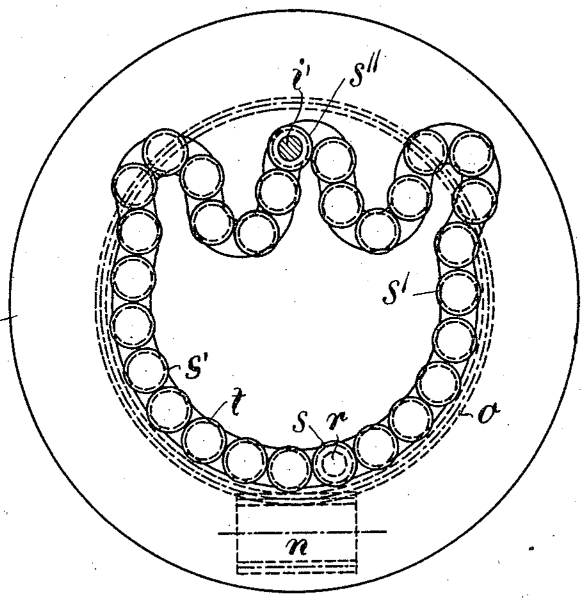
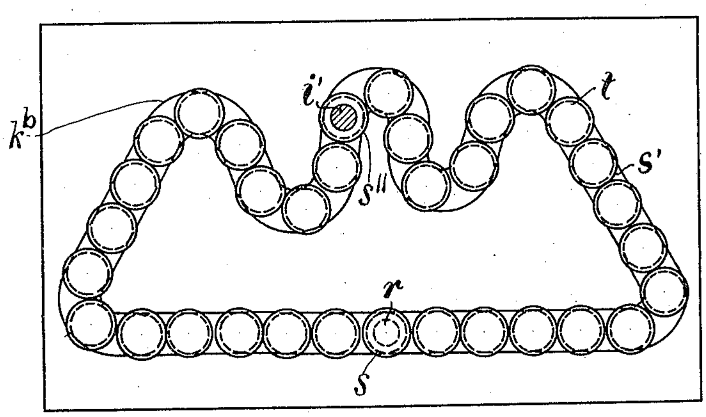


Fig.9



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UNITED STATES PATENT OFFICE.

ALEXANDER KLEHE, OF RATIBOR, AND AUGUST MÜLLER, OF DORTMUND, GERMANY.

LATHE.

1,008,919. Specification of Letters Patent. **Patented Nov. 14, 1911.**

Application filed May 10, 1911. Serial No. 626,382.

To all whom it may concern:

Be it known that we, ALEXANDER KLEHE, a subject of the Emperor of Germany, residing at 23 Weisenstrasse, Ratibor, in the Empire of Germany, and AUGUST MÜLLER, a subject of the Emperor of Germany, residing at 20 Bochumerstrasse, Dortmund, in the Empire of Germany, have invented certain new and useful Improvements in Lathes, of which the following is a specification.

The present invention relates to lathes and more particularly to that class of lathes employed for turning the rims or tires of wheels for locomotives or like rolling stock wherein accuracy of profile is very essential. In lathes of this kind it is a well known practice to employ supports in which the tool is guided by a reproducing or copying roller moved along a guide groove or guide curve corresponding to the profile to be produced. Where the curvature of the guide groove only slightly deviated from the direction of movement of the support, that is to say, is provided only with shallow curves and gradual deviations, it is easy to guide the copying roller in the guide groove without any material expenditure of energy. Where, however, the guide groove is complex or provided with steep curvatures abruptly alternating with shallow portions, the force and the speed employed are split up into such unequal components that the friction can hardly be overcome with advantage. It is therefore necessary to guide the reproducing roller connected with the tool along such complex gage plates by a special driving arrangement effecting a uniform movement of the guide pin and consequently also of the tool upon the work and at the same time uniformly distributing the operative forces and reducing the friction as much, as possible. In order to attain this object according to the present invention the guide pin is caused to travel in the guide groove without any play but is moved positively and in a uniform manner by means of a set of pressure and guide rollers closely following or bearing on the guide groove. One form of such an arrangement may be that in which a guide pin traveling or rotating in the guide groove in the desired direction and at an appropriate speed is connected with the set of rollers above mentioned.

In the accompanying drawings: Figure 1 is an elevation of our improved lathe having a double gage support for turning the profile or tread portion of a locomotive or like wheel tire. Fig. 2 is an elevation of the left hand end of the lathe. Fig. 3 is a plan view of the lathe. Fig. 4 is a vertical transverse section of the lathe taken through the right hand gage support. Fig. 5 is a detail vertical transverse section of the right hand gage support. Fig. 6 is a detail horizontal section of the same. Fig. 7 is an axial section of the guide-pin and its adjacent parts. Fig. 8 is a plan view of a modified form of guide groove plate. Fig. 9 is another modified form of guide groove plate.

The support shown is constructed as a double gage support. In the drawing the left hand support serves for turning the conoidal tread portion and the right hand one for the turning of the flange. Both supports are mounted on a common carrier *a*. The left hand support consists in a known manner of a lower slide *b* guided on the carrier *a* parallel with the longitudinal direction of the lathe. Guided on the lower slide *b* in an angular or transverse direction is an upper slide *c* carrying the chuck for the tool *l*. The lower slide *b* is moved by the screw spindle *d* which is movably journaled in the carrier *a* and rotatable in the gage plate *k*, its nut *e* being arranged on the lower slide *b*. During the longitudinal movement of the lower slide *b* on the carrier *a*, a pin *i* is guided in the stationary gage plate *k* so as to effect the transverse movement of the slide *c* whereby an appropriate displacement is imparted to the turning tool. As the guide curve i^* in the gage plate *k* only slightly deviates from the longitudinal direction in which the lower slide is moved on the carrier *a*, the known and hitherto usual mode of guiding the pin *i* which carries a roller i'' (Fig. 2) may be resorted to without difficulty, and for this reason the simple longitudinal movement of the lower slide *b* by means of the screw spindle *d* and nut *e* suffices to guide the turning tool along the desired curve. In the case however of the profile curve of the flange the circumstances are radically different, since the position of the two lateral tangents on the curve is almost at right angles to the longitudinal direction and the pin on the member or slide block guiding the upper slide is therefore no longer capable of overcoming the friction occurring in the guide curve during the longitudinal displacement of the lower slide. In order to obviate this difficulty it has been proposed to aid the guide pin in overcoming the steep curvatures in the guide curve and to reduce the friction by the provision of a toothed rack with pinion arranged parallel with the curve or by a rotating pin and slot guide affording sufficient play for the pin, without however enabling the required precision of the profile to be attained in an entirely satisfactory manner. A device for efficiently removing these difficulties is embodied in the right hand support. This support has substantially the same construction as the left hand support. Arranged on the common carrier *a* is a lower slide *b′* carrying an upper slide *c′* mounted on which is the chuck for the tool *l′*. Journaled in the upper slide is a worm *f′* engaging with a rack *g′* of a slide block *h′* supported within and guided in the lower slide *b′*, as can be seen from the sectional view shown in Fig. 4 and having a depending guide pin *i′*. The guide pin *i′* on the slide block *h′* projects into a stationary gage plate *k′* which in Figs. 5 and 6 is shown on a larger scale. The lower slide *b′* is in this case driven, not as heretofore directly, but by means of a worm gear *n o* arranged on the smooth right hand end *d′* of the spindle *d*. The worm gear *n o* is located in a housing *q* movable within the carrier *a* by means of a screw *p* (Fig. 3). The worm wheel *o* carries eccentrically on its upper face a vertical crank pin *r* engaging with gage plate *k′* which is located above the worm gear *n o*. This crank pin *r* carries lower and upper pressure rollers *s* and is connected by sets of lower and upper pressure rollers *s′* and their intermediate guide rollers *t* with the lower and upper pressure rollers *s″* and intermediate guide roller *t′* on the depending guide pin *i′* of the slide block *h′*. Now when the worm *n* is rotated by the rotation of the square head *u* (Fig. 3) the guide pin *i′*, together with its guide roller *t′*, and the intermediate guide rollers *t* are caused to travel along the guide groove *i** by the crank pin *r* of the worm wheel *o* by means of the pressure rollers *s s′ s″*. In this arrangement it is characteristic that the guide rollers *t t′* are located within the guide groove between the pressure rollers *s′* and *s″*, which have a larger diameter, while the pressure rollers *s s′ s″* are arranged above and below the guide groove the guide rollers *t t′* rotating about the pins *r r′* and *i′* respectively and traveling in the guide groove without mutual contact, whereas the pressure rollers *s s′ s″* are rigidly connected to their pins *r r′* and *i′* and being in close contact with each other mutually roll upon one another during their movement.

By the system of pressure and guide rollers above described it is possible to guide the pin *i′* over the steep and acutely curved portions of the guide groove in a positive manner without any difficulty and at the same time to reduce the friction to the smallest possible minimum.

It is clear that the longitudinal displacement of the lower slide *b′* as well as the transverse movement of the upper slide *c′* are both effected by the movement of the pin *i′*. As the worm *n* is arranged on the screw spindle *d* both supports are operated simultaneously during the rotation of the screw spindle *d*.

In order to enable the gage plate *k′* to be readily inserted in the housing *q* and secured and adjusted therein, it is externally of cylindrical shape and provided with a flange *k′′′′* as clearly shown in Fig. 5. In order moreover to enable the guide groove to be more easily produced the body of the gage plate is made in two sections. It comprises an outer ring *k‴* having inwardly an egg-shaped curve for producing the profile of the tire flange, and a likewise egg-shaped center piece or core *w* which is screwed to the outer ring by means of a flange *x*. On the underside of the flange *x* is a journal pin *y* about which the worm wheel *o* rotates. The crank pin *r* projects through a concentrical slot *z* in the flange *x* into the body of the worm wheel.

By making the gage plate in two sections it is possible to produce the guide groove or guide curve in a very simple, cheap and precise manner as the concentrical portions can be produced in any lathe and the tangents may readily be worked out by hand.

While the invention specified in the foregoing description more particularly refers to the turning of the wheel rims or tires it may of course be used for the reproduction of other profiles k^a k^b, as clearly shown for instance in Figs. 8 and 9 respectively with the aid of constructional modifications of the mechanism above explained, without departing from the spirit of the present invention.

What we claim and desire to secure by Letters Patent is:—

1. A lathe comprising a carrier, a gage plate having a groove and mounted in the carrier, a rotating member mounted in the carrier beneath the gage plate and having a crank-pin which works in the groove, a lower slide mounted on the carrier, an upper slide mounted on the lower slide, a slide block carried by the upper slide and having a guide-pin which travels in the groove, pressure and guide rollers in the groove between the crank and guide pins, and means for driving the rotating member.

2. A lathe comprising a carrier, a gage plate having a groove and mounted in the

carrier, a worm wheel mounted in the carrier beneath the gage plate and having a crank-pin which works in the groove, a lower slide mounted on the carrier, an upper slide mounted on the lower slide, a slide block carried by the upper slide and having a guide pin which travels in the groove, pressure and guide rollers in the groove between the crank and guide pins, and a worm shaft for driving the worm wheel.

3. A lathe comprising a carrier, a gage plate having a groove of oval shape and mounted in the carrier, a rotating member mounted in the carrier beneath the gage plate and having a crank pin which works in the groove, a lower slide mounted on the carrier, an upper slide mounted on the lower slide, a slide block carried by the upper slide and having a guide pin which travels in the groove, pressure and guide rollers in the groove between the crank and guide pins, and means for driving the rotating member.

4. A lathe comprising a carrier, a housing mounted in the carrier, a gage plate consisting of an outer ring having a flange by which it is supported in the housing and a core having a flange secured to the ring and a groove formed by the ring and core, a journal pin mounted in the housing, a worm wheel mounted on the journal pin beneath the gage plate, and having a crank pin which works in the groove, a lower slide mounted on the carrier, an upper slide mounted on the lower slide, a slide block carried by the upper slide and having a guide pin which travels in the groove, pressure and guide rollers in the groove between the crank and guide pins and a worm shaft for driving the worm wheel.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

ALEXANDER KLEHE.
AUGUST MÜLLER.

Witnesses:
U. L. Lämer,
E. Steunaller.