No. 639,294. Patented Dec. 19, 1899.

LA FAYETTE G. ROBINSON.

SPOKE LATHE.

(Application filed Jan. 28, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

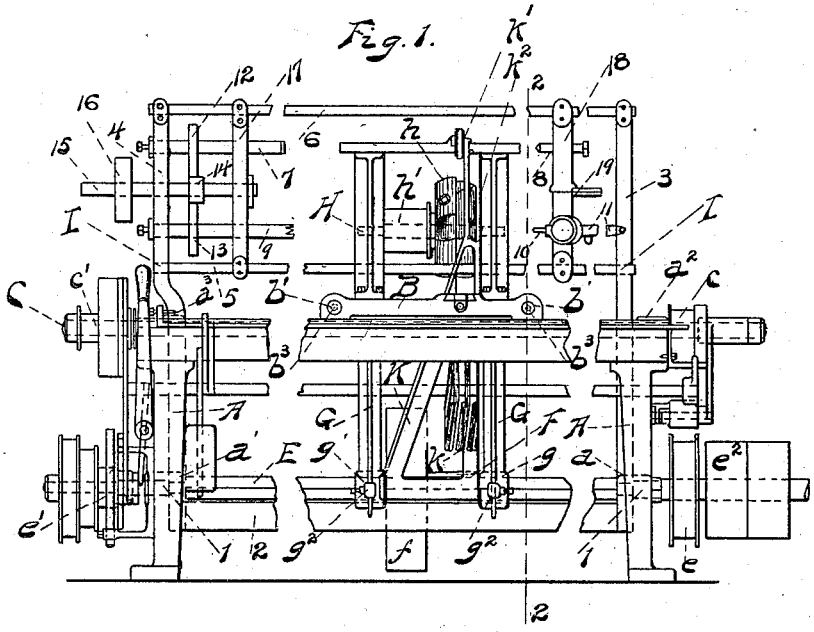


Fig. 5.

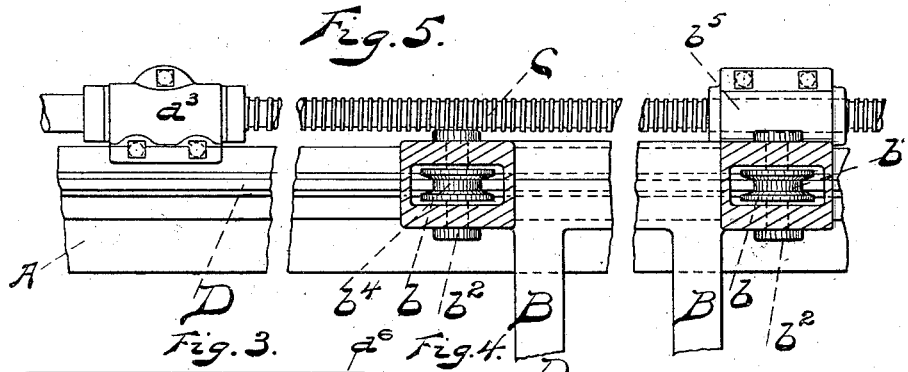


Fig. 3.

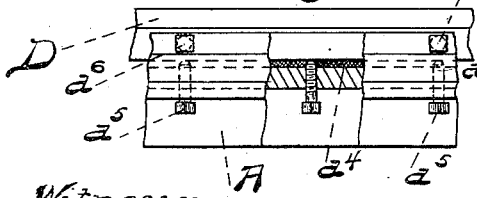
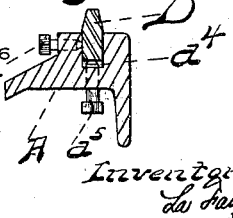


Fig. 4.



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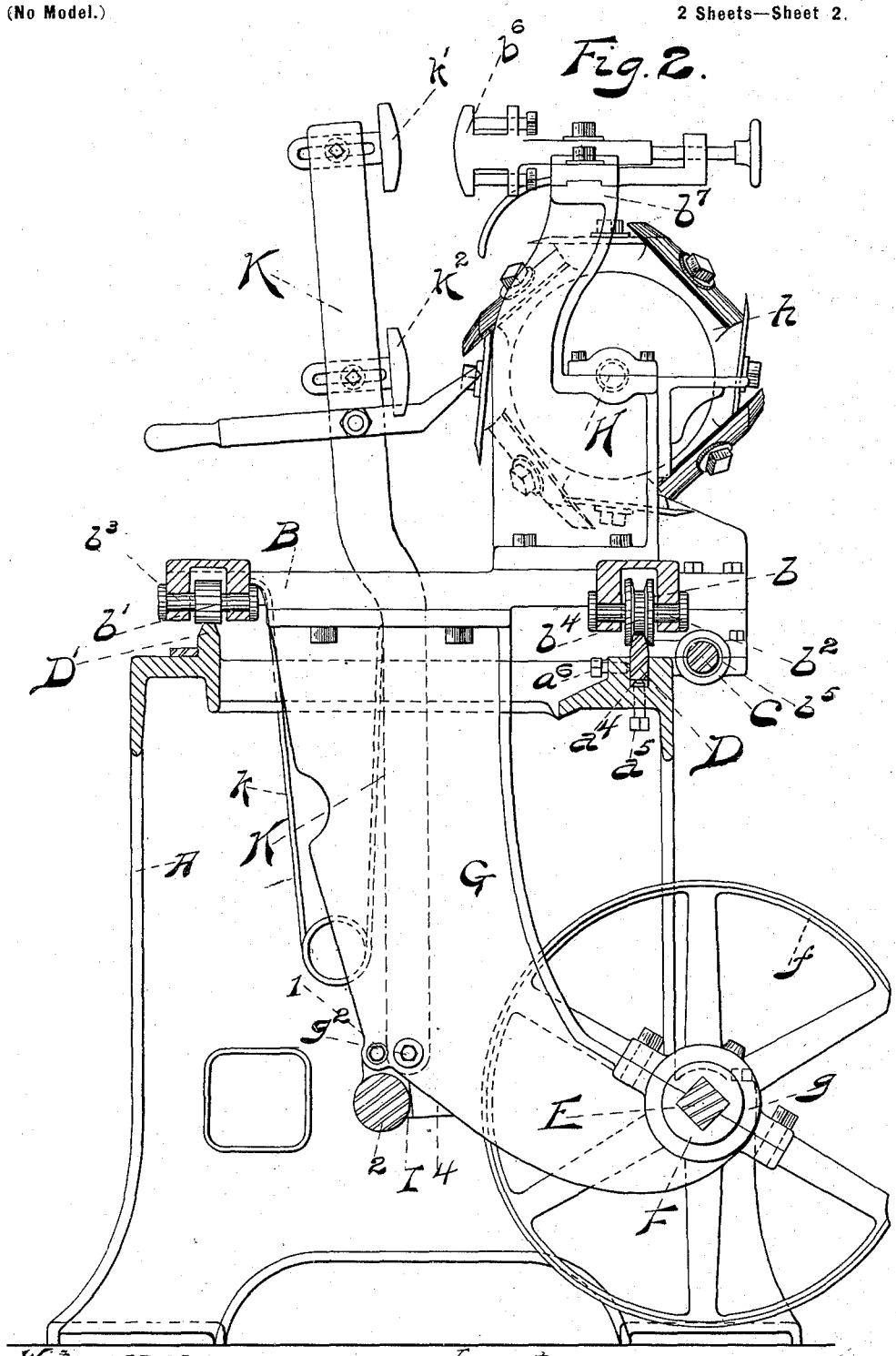
(No Model.) 2 Sheets—Sheet 2.

Fig. 2.



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UNITED STATES PATENT OFFICE.

LA FAYETTE G. ROBINSON, OF CINCINNATI, OHIO, ASSIGNOR TO THE J. A. FAY & EGAN COMPANY, OF SAME PLACE.

SPOKE-LATHE.

SPECIFICATION forming part of Letters Patent No. 639,294, dated December 19, 1899.

Application filed January 23, 1899. Serial No. 703,665. (No model.)

To all whom it may concern:

Be it known that I, LA FAYETTE G. ROBINSON, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented a certain new and useful Improvement in Spoke-Lathes, of which the following is a specification.

My invention relates to that class of spoke-lathes in which the spoke is turned to conform to a predetermined pattern; and it consists in providing a way or rail for the cutter-head frame which is capable of adjustment, refinishing, and replacement, so that it may be continuously maintained in proper correlation with the feed-screw, the vibrating frame which carries the centers supporting the pattern and work to be turned, and the counter-shaft, and, further, in the novel construction, arrangement, and combination of parts hereinafter more fully described and claimed.

In the drawings, Figure 1 is a front elevation of my improved device; Fig. 2, a section on the line 2 2 of Fig. 1, omitting the upper end of the vibrating frame; Fig. 3, a detail showing in front elevation, partly in section, a part of the rail and its support; Fig. 4, a transverse section of same; and Fig. 5 a detail showing in plan view, partly in section, the rear part of the cutter-head carriage in connection with its rail and operating-screw.

A represents the frame or shears of the machine, B the cutter-head carriage, and C the feed-screw for operating the same. The carriage B is provided with rolls $b\,b\,b'\,b'$, mounted upon pins $b^2 b^2 b^3 b^3$. The rolls travel on ways or rails D D′ in the frame of the machine. The rolls $b'\,b'$ may be flat in cross-section at their circumference; but I provide the rolls $b\,b$ with a circumferential groove b^4, preferably of a V shape, taking over and traveling upon the rail D, which is shaped to fit the depression b^4. This construction gives stability to the carriage, causing it to follow its true line of travel and preventing sidewise motion or play.

E is a counter-shaft, square or otherwise suitably shaped to carry with it in its revolutions a sleeve F, which takes over the same and revolves with it, but constructed to slide along its length and follow the travel of the carriage B. The counter-shaft is mounted in bearings $a\,a'$ in the frame of the machine.

The carriage B has a suitable yoke or hangers G depending therefrom, in the lower end of which the sleeve F is mounted in suitable bearings $g\,g'$. When the carriage is moved on its ways, the depending yoke or hangers are carried with it in its movement, thereby causing the sleeve to correspondingly travel on its counter-shaft. A cutter-head spindle H is mounted on the carriage carrying a cutter-head h and pulley h', the pulley being operated from a pulley f, mounted on the sleeve F, all of the parts just mentioned being supported by the carriage and traveling with it. The travel of the carriage is effected by the screw C taking through internally-threaded bearing b^5 for the same on the carriage. The screw C is mounted in bearings $a^2\,a^3$ in the frame of the machine. A pulley c is attached to one end of the screw, receiving motion in one direction from a pulley e on the counter-shaft E. A pulley c' at its other end imparts motion to it in the opposite direction through the medium of a pulley e'.

I is a suitable pattern and work supporting frame, which I shall term a "vibrating" frame. It is hung on fulcrums 1 1 in the frame and consists of the rocker-bar 2, the uprights 3 4, and the braces 5 6. A pattern to determine the shape of the spoke to be turned is placed between the centers 7 and 8. The stock to be operated is placed between the centers 9 and 10. A lever 11 forces the center 10 forward into the stock and holds it in place. Gears 12 and 13 are mounted, respectively, on the centers 7 and 9, a pinion 14 on a shaft 15 serving to rotate the centers 7 and 9 uniformly in the same direction, so that the cutter-head may operate on all parts of the stock, according to pattern. A pulley 16 communicates motion to the shaft 15. Supports 17 and 18 are provided for the centers. The support 18 is adjustable lengthwise of the braces by loosening and fastening the bolts securing it to same. It is preferably also divided at 19, so that the pattern-supporting center 8 may be adjusted with reference to the work-supporting center 10.

K is a pressure-arm supported on pivots g^2 g^2. A spring k, one end of which is secured to the carriage B and the other to the arm K, forces the latter toward the cutter-head. A shoe k' takes against the pattern, which revolves between it and a shoe b^6, adjustably hung on an upright b^7 on the carriage B. After adjustment the shoe b^6 maintains its position with relation to the cutter-head in the travel of the carriage. The pattern revolving and being hung on the vibrating frame and hugging the adjusted shoe b^6 forces the vibrating frame and the stock hung on the same forward and back, the cutter-head cutting the stock to conform to the pattern. A shoe k^2 takes against the stock, supporting it against the thrust of the knives of the cutter-head.

Motion is imparted to the counter-shaft by means of pulley e^2.

For the successful and economic operation of the machine it is necessary that the rail D, the screw-shaft C, the counter-shaft E, and the vibrating frame I be kept in proper correlation and alinement with each other. The screw-shaft and the counter-shaft must be relieved of all sidewise strain and binding pressure, so as to leave them perfectly free to perform their respective functions, and the cutter-head must be maintained in the same relation to the pattern and work supporting centers on the vibrating frame. In the practical operation of the machine the greatest strain is borne by the rail D, causing it to wear most quickly and throwing the running-surface of the rail out of proper correlation with the screw, vibrating frame, and counter-shaft. In the constructions heretofore used this rail has been a composite part of the frame, requiring a reconstruction of the screw and counter-shaft fittings upon the rail becoming worn—an expensive operation and one which in a short time destroyed the usefulness of the machine. In my improved machine I provide a novel, economical, and time-saving method of reëstablishing the proper correlation of the parts after the rail has become worn. I therefore provide the rail D, preferably of steel, which takes into a groove a^4 in the frame of the machine. Bolts a^5 a^5 take through the frame and impinge against the bottom of the rail, and by their adjustment the rail is brought to its proper height and alinement. Bolts a^6 a^6 take through the frame preferably at right angles to the bolts a^5 and impinge against the side of the rail, holding it firmly in place after the same has been adjusted. The frame of the machine is cast of the usual grade of iron used for this purpose. The rail heretofore being integral therewith has necessarily been cast of the same material, which is subject to rapid wear. By means of my improved device, however, I am enabled to insert a hardened track or rail of steel or other suitable material and in such way that any wear may be readily and economically taken up as soon as it occurs, the cutter-head kept in proper relative position to the centers on the vibrating frame, and the screw and counter-shaft kept continuously relieved of all side strains or binding pressure. I mount the driving-shaft E, the feed-screw shaft C, and the cutter-head spindle H in substantially a vertical plane in the rear part of the machine. I also place the adjustable rail D in substantially the same vertical plane. The principal weight and working strain of the carriage and the cutter-head and the counter-shaft and screw-shaft connections on the carriage are therefore borne by the rail D, causing it to wear most quickly, as stated, especially as heretofore constructed of the usual cast-iron of which the frame was composed. This quickly brought the bearings of the carriage B for the driving-shaft out of true and proper relation with the bearings for the driving-shaft on the frame, as well as the bearing on the carriage B for the feed-screw shaft out of true and proper relation with the bearings for that shaft on the frame, and the position of the cutter-head on the carriage B out of true and proper relation with the pattern and work supporting agencies on the vibrating frame. I bring all the parts above mentioned into proper correlation and continuously maintain them in that correlation by providing a single part—namely, an adjustable hardened rail D—and by the adjustment of that one part, the adjustable hardened rail D, which I place in substantially a vertical plane with the counter-shaft and feed-screw shaft and their connections with the carriage and frame and the cutter-head spindle and cutter-head between the cutter-head and counter-shaft. The rail D adjusts all the connections on the carriage with relation to the frame—that is, the counter-shaft bearing of the carriage B with relation to the counter-shaft bearings on the frame, the feed-screw-shaft bearing on the carriage B with relation to its bearings on the frame, and the cutter-head on the carriage B with relation to the pattern and work supporting agencies on the vibrating frame—simultaneously, the adjustment of the one part—namely, the track or rail D—raising the counter-shaft bearing and the feed-screw-shaft bearing and the cutter-head on the carriage in a substantially vertical plane and maintaining the plane of travel of the carriage with the parts supported thereby, enabling all the parts to be brought into and continuously maintained in proper correlation by the providing and adjusting of a single part. By means of my improvement I produce a more durable as well as easier-running machine, and capable of a greater output with less power. The rail may at any time be readily removed and replaned or replaced by another without change or adjustment of any other part of the machine.

I claim—

1. In a spoke-lathe, the combination of a main frame, with a cutter-head-carrying car-

riage traveling thereon, hangers depending from the carriage, a sleeve journaled in the hangers, a pulley on the sleeve for driving the cutter-head, a counter-shaft passing through the sleeve for turning the same, bearings on the frame for the counter-shaft, a screw-shaft for reciprocating the carriage on the frame, an internally-threaded bearing on the carriage therefor, bearings on the frame for the screw-shaft, a groove in the frame, and a vertical track in the groove, the counter-shaft with its bearings and the cutter-head located in substantially a vertical plane, with the screw-shaft and the track located between the cutter-head and the counter-shaft, with means for adjusting and alining the track with relation to the frame, constructed and arranged for simultaneously adjusting the counter-shaft bearing, the screw-shaft bearing and the cutter-head on the carriage in substantially a vertical plane, and for readjusting the carriage, its screw-shaft bearing and its hanger connection with the counter-shaft with relation to the frame and the screw-shaft bearings and counter-shaft bearings thereon, and constructed and arranged for permitting the removal of the track from the frame, substantially as and for the purpose specified.

2. In a spoke-lathe, the combination of a main frame, with a cutter-head-carrying carriage traveling thereon, hangers depending from the carriage, a sleeve journaled in the hangers, a pulley on the sleeve for driving the cutter-head, a counter-shaft passing through the sleeve for turning the same, bearings on the frame for the counter-shaft, a screw-shaft for reciprocating the carriage on the frame, an internally-threaded bearing on the carriage therefor, bearings on the frame for the screw-shaft, a cutter-head rotatably mounted on the carriage, a vibrating frame mounted in the main frame and arranged for guiding the stock in front of the cutter-head, a vertical groove in the frame, a vertical track in the groove, the counter-shaft with its bearings and the cutter-head located in substantially a vertical plane, with the screw-shaft and the track located between the cutter-head and the counter-shaft, with the bolts a^5 for giving the rail a vertical adjustment, constructed and arranged for simultaneously adjusting the counter-shaft bearing, the screw-shaft bearing and the cutter-head on the carriage in substantially a vertical plane, and for readjusting the carriage, its screw-shaft bearing and its hanger connection with the counter-shaft with relation to the frame and the screw-shaft bearings and the counter-shaft bearings thereon, and of the cutter-head on the carriage with relation to the stock-supporting agencies on the vibrating frame, and the set-bolts a^6 for securing the track in its adjusted position, constructed and arranged substantially as and for the purpose specified.

3. In a spoke-lathe, the combination of a main frame, with a cutter-head-carrying carriage traveling thereon, hangers depending from the carriage, a sleeve journaled in the hangers, a pulley on the sleeve for driving the cutter-head, a counter-shaft passing through the sleeve for turning the same, bearings on the frame therefor, a screw-shaft for reciprocating the carriage on the frame, an internally-threaded bearing on the carriage therefor, bearings on the frame for the screw-shaft, a cutter-head rotatably mounted on the carriage, a vibrating frame rocking in the main frame and having work-supporting agencies to bring the stock to proper relation with the cutter-head, a vertical groove a^4 in the frame, a vertical track D in the groove, the counter-shaft with its bearings and the cutter-head located in substantially a vertical plane, with the screw-shaft and the track located between the cutter-head and the counter-shaft, V-shaped bearings on the upper edge of the track, rolls b, b, on the bottom of the carriage provided with correspondingly V-shaped grooves b^4 and traveling on the track and arranged for preventing sidewise motion between the track and carriage, bolts a^5 taking through the frame under the track, constructed and arranged for simultaneously adjusting the counter-shaft bearing, the screw-shaft bearing and the cutter-head on the carriage in substantially a vertical plane, and for adjusting the track vertically and readjusting the carriage, its screw-shaft bearing and its hanger connection with the counter-shaft with relation to the frame and the screw-shaft bearings and counter-shaft bearings thereon, and of the cutter-head on the carriage with relation to the stock-supporting agencies on the vibrating frame, and set-bolts a^6 for securing the track in its adjusted position, constructed and arranged, substantially as and for the purpose specified.

4. In a spoke-lathe, the combination of a frame, a carriage traveling thereon, a spindle and cutter-head on the carriage, hangers depending therefrom, a sleeve in the hangers, a counter-shaft passing through the sleeve for turning the same, and bearings on the frame for the counter-shaft, a pulley on the sleeve, a pulley on the cutter-head spindle, with the cutter-head spindle and the cutter-head and the sleeve on the carriage and the counter-shaft and counter-shaft bearings on the frame located in substantially a vertical plane, with a vertically-adjustable track for the carriage, located on the frame between the cutter-head spindle with its cutter-head and the sleeve with the counter-shaft and its bearings, constructed and arranged for adjusting the cutter-head spindle and cutter-head and the sleeve on the carriage simultaneously in substantially a vertical plane, substantially as described.

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Witnesses:
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