(No Model.) 4 Sheets—Sheet 1.

J. PALLESCHITZ.

SPOKE TURNING MACHINE.

No. 553,720. Patented Jan. 28, 1896.

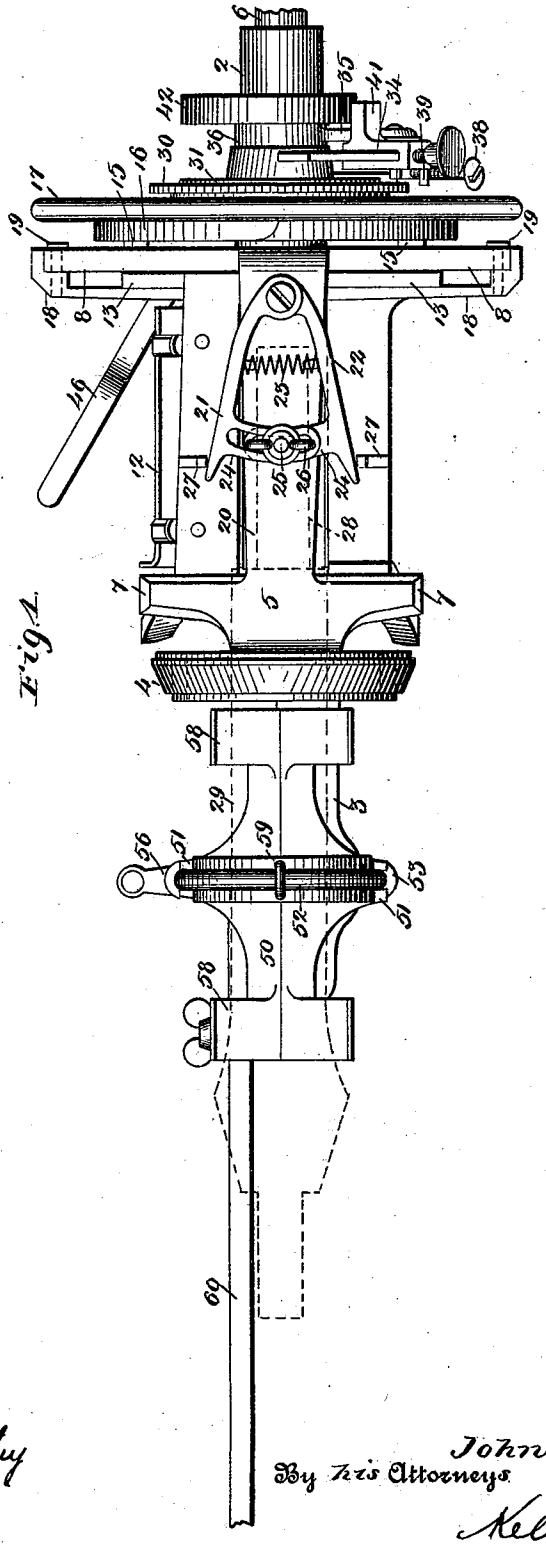

Fig. 1.

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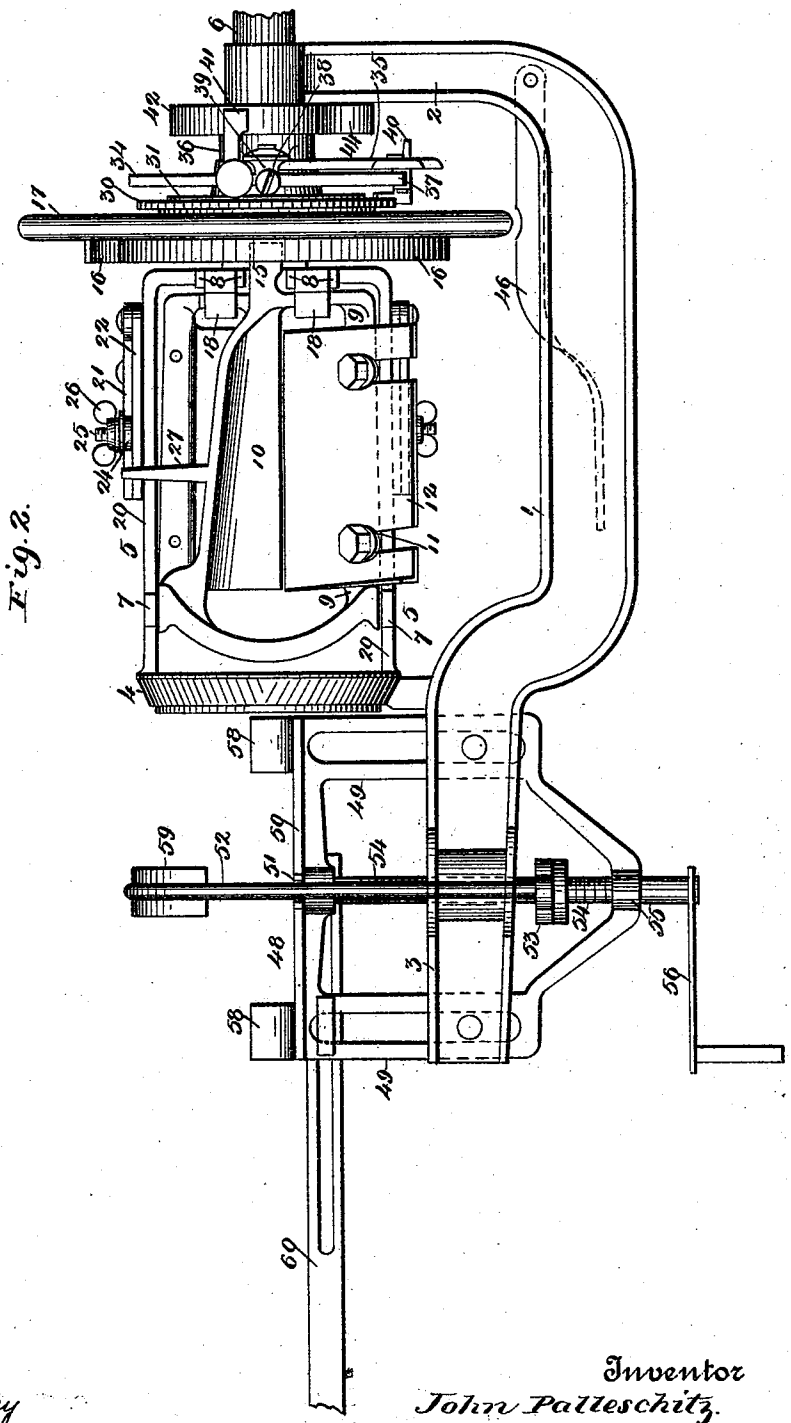

Fig. 2.

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(No Model.) 4 Sheets—Sheet 3.

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SPOKE TURNING MACHINE.

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Fig. 6.

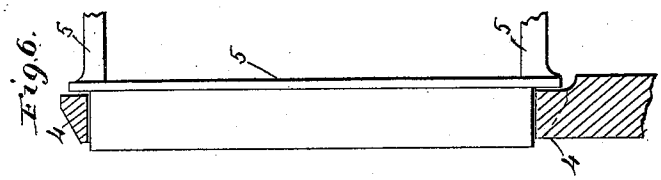


Fig. 4.

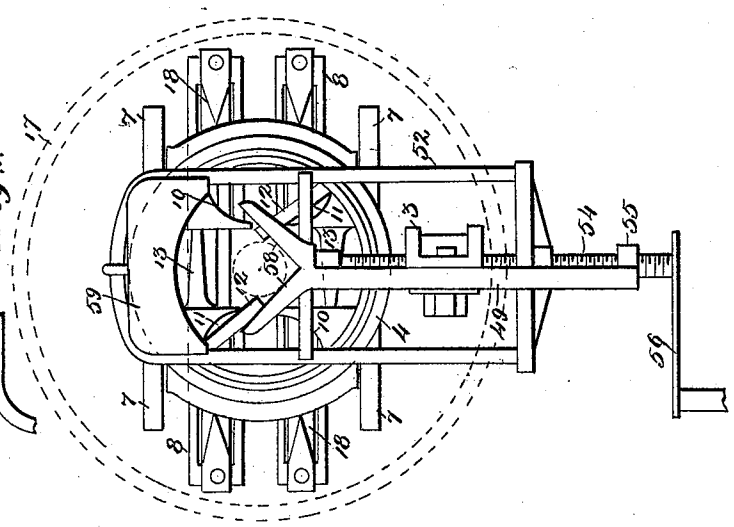


Fig. 5.

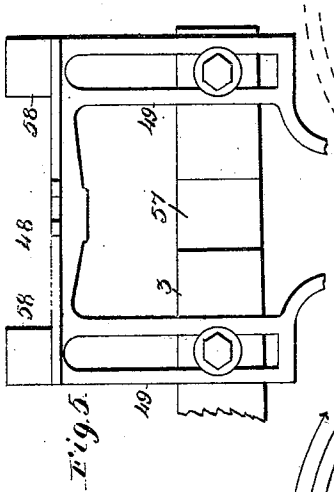
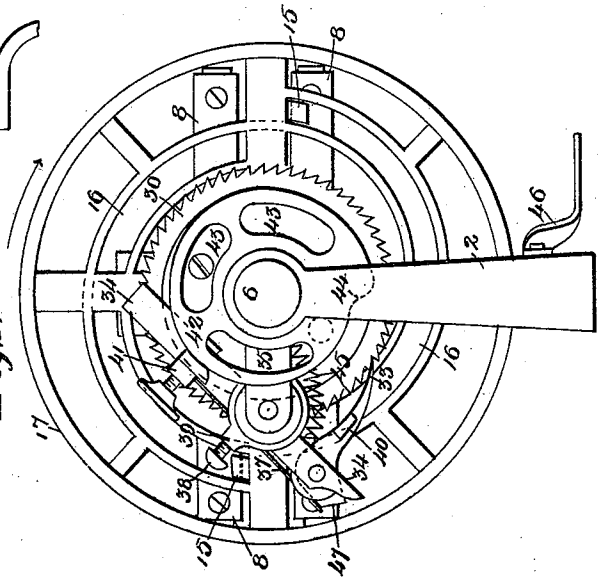


Fig. 3.



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(No Model.) 4 Sheets—Sheet 4.

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SPOKE TURNING MACHINE.

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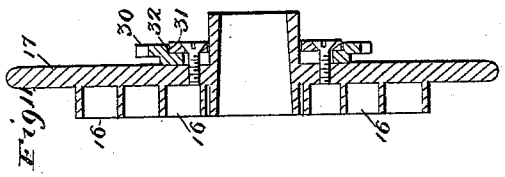

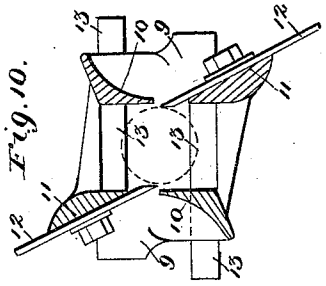

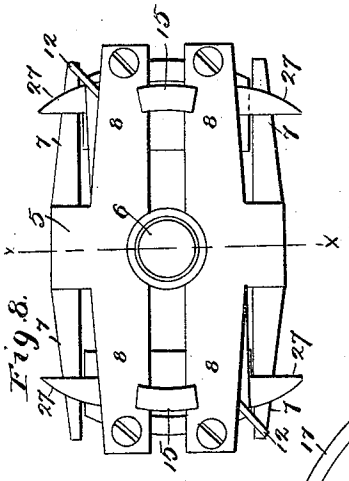

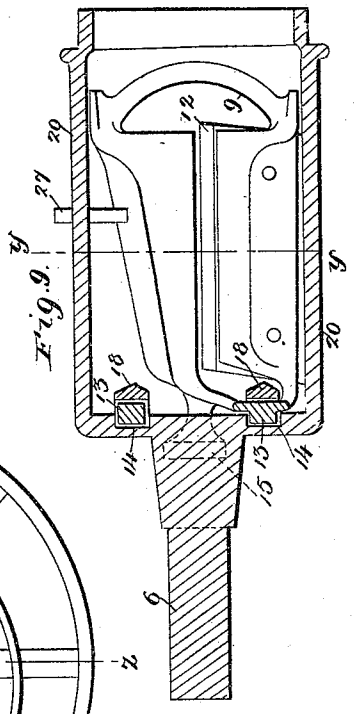

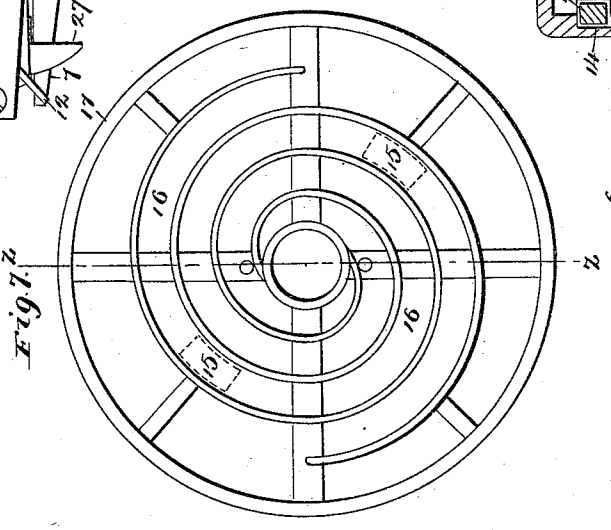

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UNITED STATES PATENT OFFICE.

JOHN PALLESCHITZ, OF ST. LOUIS, MISSOURI, ASSIGNOR OF ONE-HALF TO JACOB GELDBACH, OF SAME PLACE.

SPOKE-TURNING MACHINE.

SPECIFICATION forming part of Letters Patent No. 553,720, dated January 28, 1896.

Application filed June 5, 1895. Serial No. 551,749. (No model.)

To all whom it may concern:

Be it known that I, JOHN PALLESCHITZ, a subject of the Emperor of Austria-Hungary, residing at St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Spoke-Turning Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention has relation to improvements in machines for turning the ends of spokes; and it consists in the novel arrangement and combination of parts more fully set forth in the specification and pointed out in the claims.

In the drawings, Figure 1 is a top plan view of my complete invention. Fig. 2 is a side elevation thereof. Fig. 3 is an end view looking from the side which carries the feed mechanism. Fig. 4 is an end view from the opposite side or that carrying the clamp for the spoke. Fig. 5 is a detail in side elevation of the clamp with the binding-yoke removed therefrom. Fig. 6 is a sectional detail showing the supporting-ring for one end of the rotating frame which carries the cutting-knives. Fig. 7 is a plan view of the feed-disk. Fig. 8 is a bottom plan view of the detached revolving frame, or that side of the said frame against which the feed-disk is placed. Fig. 9 is a section on *x x* of Fig. 8. Fig. 10 is a section on *y y* of Fig. 9, and Fig. 11 is a section on *z z* of Fig. 7.

The object of my invention is to construct a spoke-turning machine—that is, one designed to turn down to proper diameter the outer ends of spokes over which the felly is passed. The present device is so constructed to cut the end of the spoke thus reduced or turned to make any desirable angle with the general axis of the spoke. It consists, among other details, of a series of revolving cutters or knives which are automatically fed toward the spoke during their rotation about the same; of a device for limiting the feed of the cutters; of suitable means for controlling the rapidity of the feed mechanism; of a suitable clamp whereby the spoke can be inserted into the machine at variable angles with reference to the axis of rotation of the cutter-knives; of a suitable gage to enable the operator to cut the spokes uniformly, and of further and other details to be hereinafter more fully set forth.

Referring to the drawings, 1 represents a general supporting-bar having an arm 2 projecting at an angle at one end thereof, and 3 is an extension at the opposite end thereof. At the base of the extension 3 is secured a ring or band 4 whose inner surface forms a bearing for the circular end of the rotating cutter-carrying frame 5, the opposite end of said frame being secured to or formed integral with the main operating-shaft 6, which has its bearing in the end of the arm 2, it being understood that the axes of rotation of the shaft 6 and the circular end of the frame are concentric—that is to say, they lie in the same straight line. Any rotation therefore imparted to the shaft 6 imparts rotation to the frame 5.

In practice any suitable means may be used for imparting motion to the shaft 6. Within the frame 5 and guided by the inner surfaces of the transverse arms 7 thereof and guided at the opposite end within suitable grooves or guides of the extended arms 8 are mounted a pair of reciprocating knife-carrying jaws 9, each jaw being formed of a concave wall 10 for directing the shavings cut from the spoke, and a second inclined wall 11 to which the cutter or knife 12 is secured, on the principle of an ordinary plane.

To properly guide the cutters in their guideways in the arms 8, each cutter-jaw is provided with a toe or lateral extension 13 tending in opposite directions, (as the two jaws face each other,) which is confined within the groove 14 of such arm 8. Each jaw, too, is provided with a heel 15 projecting from the space between the arms 8, which is adapted to operate each in a spiral guideway 16 of a feed-disk 17 loosely mounted on the shaft 6 adjacent to one end or the base of the frame 5. Each spiral 16 has a point of beginning at the center of its disk, the said points being one hundred and eighty degrees apart, and then gradually unwind or develop, and each ends at a point one hundred and eighty degrees apart from each other. The disk 17 being loose on the shaft 6 it is obvious that if the same be turned thereon in one direction

or the other the heels 15 will traverse their respective spiral guides and the knife-jaws of which each heel forms a part will be reciprocated to or from one another, being guided in their reciprocation within the frame 5. The feed-disk therefore will cause the jaws carrying the cutters to approach each other or recede from one another according to the direction of rotation imparted to said disk on the shaft 6.

To properly confine the toes 13 within their guides or grooves 14 I provide a retaining-strip 18, which passes over the outer surface of each toe and at its opposite ends embraces or closes the open end of the groove, being secured to the arm 8 at each end by bolts 19. The outer overlapping end of the retaining-strip 18 of course limits the outward expansion of the knife-carrying jaws. Their inward movement is limited of course by the termination of the respective spirals 16; but should it be desirable to limit their inward feed at any intermediate point, this point varying of course with the diameter to be given to the reduced end of the spoke, I provide the following mechanism to intercept the said jaws: Pivoted to a common bolt on the outer surface of the bar or member 20 connecting the arms 7 and 8 are arms 21 22, normally held open by an expanding-spring 23 held between them near their medial portions, each arm having inward-slotted extensions 24 passing adjacently over a bolt 25 and bearing against the surface of the bar 20. A thumb-nut 26 screwed at the outer end of the bolt can be made to firmly secure the arms in any position intermediate between their extreme open position and their closed position. The cutter-jaws during the operation of the machine will feed inwardly until their outwardly-extending wings or fingers 27 will simultaneously strike the arms 21 22 whatever may be the position to which said arms have been set. In this manner the jaws will feed as far as the arms 21 22 will permit them, and each spoke will be turned to the same degree, thus insuring a constant diameter for the reduced end 28 of the spoke 29 inserted into the machine.

The manner of operating the feed-disk during the revolution of the cutters, which are set in motion by the rotation of the shaft 6, is as follows: It was stated that the feed-disk is loosely mounted on the shaft 6, although it must be borne in mind that the friction between these parts is sufficient to cause the disk to rotate with the shaft upon the operation of the latter. When the spoke is first inserted into the rotating frame 5 and between the knife-carrying jaws thereof, the latter are first expanded by holding the shaft 6 and frame 5 carried thereby stationary and operating the feed-disk independently so as to cause the jaws to diverge. When the spoke is once inserted, as subsequently to be explained, the frame 5 is rotated in one direction about the spoke (held stationary by a suitable clamp, as subsequently to be explained,) and at regular intervals the loosely-mounted feed-disk, which is carried by the shaft 6 and rotated in the same direction, (see arrow in Fig. 3,) is given a periodic turn about said shaft in the opposite direction, thus gradually bringing the cutter-jaws toward the spoke inserted into the frame and turning the inner end of said spoke up to the point where the wings or fingers 27 strike the outer surfaces of the arms 21 22, previously set to determine the diameter of the reduced portion of the spoke.

The feed mechanism for the feed-disk comprises a feed ratchet-disk 30 secured or clamped by suitable screws to the outer face of the disk by an annular band 31 fitting into a recess 32 formed in the ratchet. (See Fig. 11.) With the ratchet 30 there co-operates a spring-actuated pawl 33 pivoted to one end of a tripping or tilting lever 34, which in turn is pivoted near its medial portion to the end of an arm 35 formed integral with and projecting outwardly from a ring 36, passed over and firmly secured to the shaft 6 adjacent to the ratchet-disk. The engaging end of the pawl is kept in contact with the teeth of the ratchet by the free end of a spring-plate 37 bearing against the flat surface of the short arm of the pawl, the teeth of the ratchet inclining to cause the pawl engaging therewith to feed the same in proper direction. The opposite end of the spring-plate 37 is secured to the lever 34 by a binding-screw 38 carried by a small projecting arm 39 formed with the lever. The pawl is provided with an arm 40 by which it can be seized and operated. The long arm of the tripping-lever 34 carries a rider 41 which can be moved along said arm and clamped thereto in any adjusted position. In proximity to these parts just described and carried by the end of the arm 2, which forms a bearing for the shaft 6, and passed firmly around said bearing is a cam-ring 42, having suitable openings 43 for the passage of a screw driver in case the operator desires to drive home the bolts securing the ratchet-disk 30 to the feed-disk. In the path of the outer periphery of the cam-surface is a depression 44.

It is to be observed that the tripping-lever and pawl as a unit are kept in engagement with the teeth of the ratchet 30 by the combined action of the spring-plate 37 and a coiled spring 45, having one end secured to the tripping-lever adjacent to the pivotal point of the pawl, and the other end secured to the base of the projecting arm 35. Now, assuming that the knife-jaws have been spread apart to accommodate a spoke to be cut, (by holding the frame 5 stationary and turning the feed-disk in the direction indicated by arrow in Fig. 3, so as to properly separate said jaws,) then, if we turn the frame 5 within its bearings by operating the shaft 6 in the direction indicated by the arrow in Fig. 3, the feed-disk and ratchet will turn in the same direction, (owing to frictional contact between these

parts,) the tripping-lever and pawl 33 will likewise be carried in the same direction, since these parts are carried by the arm 35 directly keyed to the shaft 6, and in their rotation of course the rider 41 will traverse the outer surface of the stationary cam 42. The moment, however, the rider passes over the depression 44, the effect is to bring the rider nearer the axis of rotation of the shaft 6—that is to say, to tilt the end of the lever carrying the pawl away from the said axis, and cause the engaging end of the pawl to slip along two or three teeth on the feed-ratchet—but as the rotation of the parts continues and the rider passes over the most eccentric portion of the cam, or that portion farthest removed from the depression 44, the tilting of the lever carrying the rider will be in a reverse direction, and the consequence is that instead of the engaging end of the pawl slipping along the teeth of the ratchet, it will feed it momentarily in a direction reverse to the general direction of rotation of the parts, the distance thus fed depending on the number of teeth the pawl slipped over or seized during the first part of its operation. Thus by degrees the jaws co-operating with the spiral guideways of the feed-disk are fed toward each other and the cutters or knives carried by them gradually shave the end of the spoke to the desired diameter.

Should the shaft 6 be rotated after the spoke has been turned to its proper limit, (a limit determined by the arms 21 22,) the feed-ratchet 30 will slip around its securing-band 31, the said ratchet being only clamped sufficiently tight to the feed-disk 17 to feed the latter under circumstances of ordinary resistance—that is, the resistance encountered by the knives in cutting the spoke.

Should it be desired to stop the feed-disk during the operation of the machine, I provide a brake-lever 46 pivoted to the bar 1 and adapted to be grasped by the operator and pressed against the disk 17. The disk thus held against rotation will resist the feeding action of the spring-actuated pawl carried by the tilting lever. It may be stated in passing that when it is desired to turn the feed-disk in a direction to expand the knife-carrying jaws the pawl 33 is tilted back out of engagement with the ratchet, in which position it is temporarily held by the free end of the spring-plate bearing against the flat terminal edge 47 of the short arm of the pawl; and it may be further stated in passing that it is the expanding-spring 45 which controls the tilting lever so as to keep the rider 41 carried by it in constant engagement with the outer surface of the cam over which it rides.

It will be understood that the spokes are first secured to a suitable hub and then the supporting-bar 1 is clamped to the spoke in the following manner: A clamp 48 is adjustably secured to the extension 3 of the bar by suitable bolts screwed into said extension and passed through the slotted arms 49 of the said clamp. The front transverse bar 50 of the clamp has lateral terminally-grooved arms 51, over the grooves of which pass the arms of a U-shaped yoke 52, the ends of said yoke-arms being connected by a cross-bar 53, through which passes a screw-threaded stem 54, whose inner smooth end has a bearing in the transverse bar 50 and whose outer end passes through a bearing 55 of the clamp and is provided also with an operating-handle 56. Since the opposite bearings of the stem 54 and the center line of the extension 3 are in the same straight line, the said extension is provided with a suitable depression 57 to allow said stem to freely pass between the two bearings.

It is obvious that upon turning the stem 54 in one direction or the other the yoke 52 will be brought to variable distances from the transverse bar 54. The bar 54 is provided at either end with forks 58 and the medial portion of the yoke is provided with a block 59. When the spoke is inserted between the block 59 and the forks 58, as indicated in Fig. 1, and the yoke is brought firmly against the said spoke by operating the stem 54 in proper direction, the spoke will be firmly held between said parts. Should the operator desire to tilt the spoke more or less with reference to the general axis of the rotating cutter-frame he has simply to slightly vary the position of the clamp 48 along the extension 3, to which it is secured or may be secured at any angle by reason of the slots of its arms 49 and the securing-bolts passing through said slots. By giving the clamp a slight inclination to the general axis of rotation of the cutting-knives, it is obvious that the end of the spoke thus reduced under these circumstances will be slightly inclined to the general axis of the spoke, a practice almost universal in the turning of spokes and commonly known as "dishing." Where a series of spokes is to be cut or turned, to insure that the entire series of spokes is cut uniformly as to length I provide a slotted rule or gage-arm 60, which can be adjustably clamped by a binding-screw passed through one of the slots of the arm 49, as seen in Fig. 2. When the length of one spoke of the series is once determined and the machine is first clamped to the first spoke of said series, the rule 60 is shifted or adjusted until the free end thereof comes in contact with the hub carrying the spokes. When one spoke is turned the device is unclamped by operating the binding-yoke to release the machine from said spoke, and is then secured in like manner to the next succeeding spoke, the end of the rule 60 being brought in contact with the hub to insure a uniform length for the second spoke, and so on until the entire series have been turned.

It will be understood from the foregoing that each spoke actually supports the machine during the turning operation. Of course the machine may be otherwise supported and the successive spokes inserted one by one into the frame thereof, when the cutting-knives

can be rotated about the spoke and the turning of the same proceed. In Fig. 1 I have shown in dotted lines a spoke that has been turned.

As the action of the knives and the manner of feeding the same has been fully set forth, a description of the operation of the machine need not be repeated.

Of course, before the insertion of a new spoke the pawl 33 is disengaged from its ratchet, the feed-disk is turned to sufficiently expand the knife-carrying jaws to embrace the end of the spoke, the pawl is then re-engaged with its ratchet, the shaft 6 and its frame 5 are rotated, when the gradual feeding of the knives takes place, as already described, and the operation of turning proceeds. To vary the feed, the rider 41 is shifted along the tilting lever. The nearer it is placed to the pivotal point of said lever the longer will be its contact with the cam 42 and the greater will be the tilt of the lever as its rider passes over the depression 44 and the greater will be the number of teeth passed over and seized by the pawl. The farther the rider is shifted from the pivotal point of the tilting lever the less will be the degree of tilt given the lever as the rider passes over the depression 44 and the fewer number of teeth will be seized and fed forward, thus making the extent of the feed-disk more limited.

When the machine is supported otherwise than by being clamped to the spoke it is obvious that the latter can be readily withdrawn from the machine for inspection at any portion of the operation.

As seen from the drawings, the arms 8, having the grooves 14, are shown parallel—that is, their grooves lie in the same plane. Under this construction the reduced portion of the spoke cut by the knives will make a right angle to the shoulder at the base of said reduced portion; but when it is desirable that this angle shall deviate from a right angle, and at the same time that the shoulder be dished out somewhat, the arms 8 are constructed so as to slightly deviate from their parallel relation. In other words, they may be constructed to make a slight angle with one another, but in planes parallel to the axis of rotation and to each other.

Having described my invention, what I claim is—

1. In a spoke-turning machine, a suitable rotating frame, reciprocating knives carried by said frame, guides for said knives, a shaft forming a part of the frame, a feed-disk loosely mounted on the said shaft, but normally adapted to turn with the frame during the rotation of the latter, guideways formed in the feed-disk adapted to co-operate with the knives and feed the same toward the spoke during the rotation of the frame, means for periodically turning the feed-disk in the opposite direction to that of the rotating frame and thus feed the knives to the spoke carried by the frame, and a clamp for holding the spoke within the frame and against rotation during the operation of the machine, substantially as set forth.

2. In a spoke-turning machine, a suitable rotating frame, a bar having suitable bearings for the support of said frame, a series of reciprocating knife-carrying jaws guided within the frame, a shaft forming a part of the rotating frame, a feed-disk loosely mounted on the shaft, and adapted to rotate with the frame during the rotation of the latter, a series of spiral guideways formed in the feed-disk, suitable projecting heels formed with the knife-carrying jaws operating within the spiral guideways of the feed-disk, a suitable clamp for the spoke, and means for periodically turning the feed-disk in a direction reverse to the general direction of rotation of the frame and thus feeding the knives to the spoke inserted in the frame, substantially as set forth.

3. In a spoke-turning machine, a suitable rotating frame, reciprocating knife-carrying jaws guided within said frame, a feed-disk normally rotating with the frame and adapted to operate the jaws in a direction either to or from each other, means for periodically turning the feed-disk in a direction opposite to that of its normal rotation with the frame, and a suitable device carried by the frame for limiting the inward movement of the jaws, substantially as set forth.

4. In a spoke-turning machine, a suitable rotating frame, guide-arms formed at either end of the same, the arms at one end having suitable guide-grooves, reciprocating knife-jaws guided by said arms and the grooves of the same, a lateral extension or toe formed in each jaw and operating within the grooves, a heel projecting from each toe through the space formed between the said grooved arms, a feed-disk having spiral guideways adapted to co-operate with the said heels, spring-controlled arms pivoted to the frame, slotted extensions for said arms, a binding-screw for said extensions whereby the said arms may be adjusted to any predetermined open position, wings carried by the knife-jaws adapted to come in contact with the spring-controlled arms and thus limit the inward feed of the knife-jaws, and a suitable clamp for holding the spoke against rotation within the frame carrying the knife-jaws, substantially as set forth.

5. In a spoke-turning machine, a suitable rotating frame, a shaft for the same, a feed-disk loosely mounted on said shaft, reciprocating knife-jaws carried by the frame, said feed-disk being adapted to rotate with the frame during the rotation of the latter, and means for periodically turning the feed-disk in the opposite direction and thus gradually feed the knife-jaws to the spoke carried by the frame, substantially as set forth.

6. In a spoke-turning machine, a suitable shaft, a feed-disk loosely mounted thereon, a feed-ratchet secured to the disk, a spring-

controlled tilting lever carried by the shaft, a spring-controlled feed-pawl pivoted at one end of the lever and adapted to co-operate with the feed-ratchet, a movable rider carried by one of the arms of the tilting lever, a cam fixed to the stationary part of the machine over the periphery of which the rider is adapted to travel, a depression in the path of the periphery of the cam over which the rider passes and tilts the end of the lever carrying the pawl to cause the latter to slip a definite number of teeth in advance of the ratchet, whereby the lever is tilted by degrees in the reverse direction during the passage of the rider over the enlarged portion of the cam and the feed-disk is thus turned in a direction opposite to that of the general rotation of the shaft carrying the same, substantially as set forth.

7. In a spoke-turning machine, a rotating frame, a suitable feed-disk normally rotating with the same, jaws controlled by said disk, means for periodically turning the feed-disk in the opposite direction to that of its normal rotation, an annular feed-ratchet carried by the disk, an annular groove or depression in said ratchet, and a band inserted in said groove and secured to the feed-disk whereby the ratchet may be allowed to slip in case increased resistance is offered to the rotation of the feed-disk, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN PALLESCHITZ.

Witnesses:
ALFRED A. MATHEY,
E. STAREK.